

## **River Fealge (Clonakilty) Drainage Scheme**

### **Environmental Impact Statement Vol. 3 - Appendices**

**Final Report**

**December 2014**





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## Revision History

Revision Ref / Date Issued	Amendments	Issued to
v1.0 / December 2014		Patrick McAlinney (OPW)

## Contract

This report describes work commissioned by Liam Basquille, on behalf of the Office of Public Works, by a letter dated 27th February 2014. The Office of Public Works representative for the contract was Patrick McAlinney. Tom Sampson, Laura Thomas, Matthew Hemsworth, David Mould, Keiran Sheehan, Seb Bentley, Nicholas Allin, Alex Craven and Declan Egan of JBA Consulting, Teresa Bolger of Rubicon Heritage, Craig Bullock of Optimise Consulting and Howard Williams of INIS Environmental carried out this work.

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## Purpose

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## **Appendix 4A - SWFRB CFRAM Study Clonakilty PID Report**







# SWRBD CFRAM Study

Clonakility PID Report

November 2012  
Office of Public Works





# SWRBD CFRAM Study

Clonakilty PID Report

November 2012

Office of Public Works

Jonathan Swift Street  
Trim  
Co. Meath



# Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	November 2012	A. Lambe	B O'Connor	F. McGivern	Initial Issue

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# 1. Introduction

This Report details the Public Information Day held in Clonakilty on 16<sup>th</sup> October 2012.

Following the flood events that occurred in Clonakilty in the summer of 2012, it was decided to prioritise the work of the study in the town. Originally it was scheduled that the public consultation on the preferred flood risk management option for Clonakilty would take place in June 2014. The programme for Clonakilty has been accelerated so that this consultation will now take place in the first half of 2013, over a year earlier than originally planned. This PID was held at the commencement of the project to gather information about public perception of flood risk and experience of flooding and views on potential solutions.

The program for the Public Information Day included:

- A presentation to the Elected Representatives, Cork County Council and Clonakilty Town Council.
- A meeting with Clonakilty Chamber of Commerce and Progress Group Members.
- A public information session.

Questionnaire forms were available at the Public Information Day in order to collate the opinions and information available from the public and other parties on the issue of Flood Risk in Clonakilty. The Questionnaire forms could be completed and returned on the day or by 2<sup>nd</sup> November 2012 by post or directly to Cork County Council. A summary of the public submissions is contained in Section 2.0 and Appendix D of this report.

A Detailed submission was also received from the Clonakilty Chamber of Commerce. Refer to Section 3.0 of this report outlining the detailed submission which is included in Appendix E of this report.

## 2.1 Introduction

The public submissions are listed in table 2.1, with name of person (where supplied) and the type of property the submission related to.

[illegible]

Name	Type of property
	Residential
	Residential
	Residential
	Residential/Retail
	Retail
	Residential
	Residential
	Residential
	Residential
	Residential; Retail; Hotel
	Residential
	Residential/Hotel/Off-Licence/Shop/Beer Garden
	Open Space
	Residential
	Residential
	Retail
	Residential
	Residential
	Residential/Workshop
	Residential
	Residential
	Residential
	Residential/Retail
	Retail (Dental Surgery)
	Office/Open Space
	Public House
	Residential
	Residential
	Public House
	Residential
	Retail
	Residential
	Retail
	Restaurant
	Restaurant
	Retail
	Other
	Retail
	Office/Workshop
	Residential
	Retail
	Residential
	Retail

Name	Type of property
	Retail
	Retail
	Other
	Residential/Office
	Residential
	Residential
	Residential
	Residential
	Residential
	Residential
	Residential

## 2.2 Summary of Submissions

### 2.2.1 History of Flooding in Clonakilty

The dates of individual flood events in Clonakilty detailed in the submitted questionnaires from the public are set out below, including the number of individual reports relating to that flood event.

5 flood events during 2012 were reported in the public submissions received, these included:

- 10<sup>th</sup> October 2012
  - 10 submissions were received
- September 2012
  - 1 submissions was received
- 28<sup>th</sup> August 2012
  - 13 submissions were received
- 28<sup>th</sup> July 2012
  - 1 submission received
- 27<sup>th</sup> to 29<sup>th</sup> June 2012
  - 53 submissions were received

1 flood event during 2010 was reported in the public submissions received.

3 flood events during 2009 were reported in the public submissions received, these included:

- 30<sup>th</sup> September 2009
  - 1 submission
- 19<sup>th</sup> November 2009
  - 2 submissions
- 31<sup>st</sup> December 2009
  - 2 submissions
- 2009 (no date provided)
  - 3 submissions

2 flood events during 2008 were reported in the public submissions received, these included:

- November 2008

- 2008 (no date provided)

1 flood event during 2006 was reported in the public submissions received.

1 flood event during 2004 was reported in the public submissions received.

1 flood event during 16<sup>th</sup> to 18<sup>th</sup> December 1996 was reported in the public submissions received.

Historic flooding was reported during 1960's, with reports of flooding during 1961 and 1963.

Other submissions detailed the frequency of flooding as follows:

- 4 times between 1962-2012
- 20 times in 40 years
- On average every 9 years
- Tidally flooded every 20 years
- 4 times between 1962 - 2012

### 2.2.2 Flood Depths in Clonakilty

Maximum flood depths reported in Clonakilty ranged from 0.021 to 1.5 m. Information was not provided which could link the maximum depth of flooding to a particular flood event.

### 2.2.3 Source of Flooding in Clonakilty

The source of flooding was attributed to drains (4 submissions), river/stream (18 submissions), sea (1 submission) and surface water (8 submissions), however the majority of the submissions reported multiple sources as the source of flooding in Clonakilty.

### 2.2.4 Ranking of Measures

The questionnaire included a section on the ranking of measures (from 1 to 7) with 1 assigned to the most effective/preferred measure and 7 assigned to the least effective/preferred option. This section of the questionnaire was not completed in all the returned questionnaires. Therefore in order to assess the overall ranking of the measures, a count of 1, 2, and 3 rankings (i.e. the most preferred measures) was assessed. This is set out in Table 2.2 below.

Table 2.2: Summary of Measures with Rankings (1 to 3)

Measures	Number of 1s assigned	Number of 2s assigned	Number of 3s assigned
No Work	3	0	0
Flood warning	17	4	6
Walls / Embankments	15	14	16
Dredging	16	12	9

Measures	Number of 1s assigned	Number of 2s assigned	Number of 3s assigned
Widening	12	17	11
Barrage	16	6	8
Relocation	0	0	2

Based on the rankings assigned in the questionnaires received, the Flood Warning, Dredging and Barrage measures received the most first ranks (1) , however when including the number of 2<sup>nd</sup> and 3<sup>rd</sup> ranks assigned the Walls/Embankment Measure appears to be preferred measure by the majority of the public, with River Widening Measures also highly ranked.

## 3. Detailed Submissions

### 3.1 Introduction

A detailed submission was submitted by the Clonakilty Chamber of Commerce, it is included in Appendix E of this report.

This detailed submission identified the problems associated with flooding in the affected areas of Clonakilty Town, providing possible solutions to flood risk in these areas.

A further detailed submission was received from [REDACTED] . This is also included in Appendix E.

# Appendices

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# Appendix A. Public Information Day Poster



# ***SOUTH WESTERN CFRAM STUDY***

## **SOUTH WESTERN CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT STUDY**

### **INTRODUCTION**

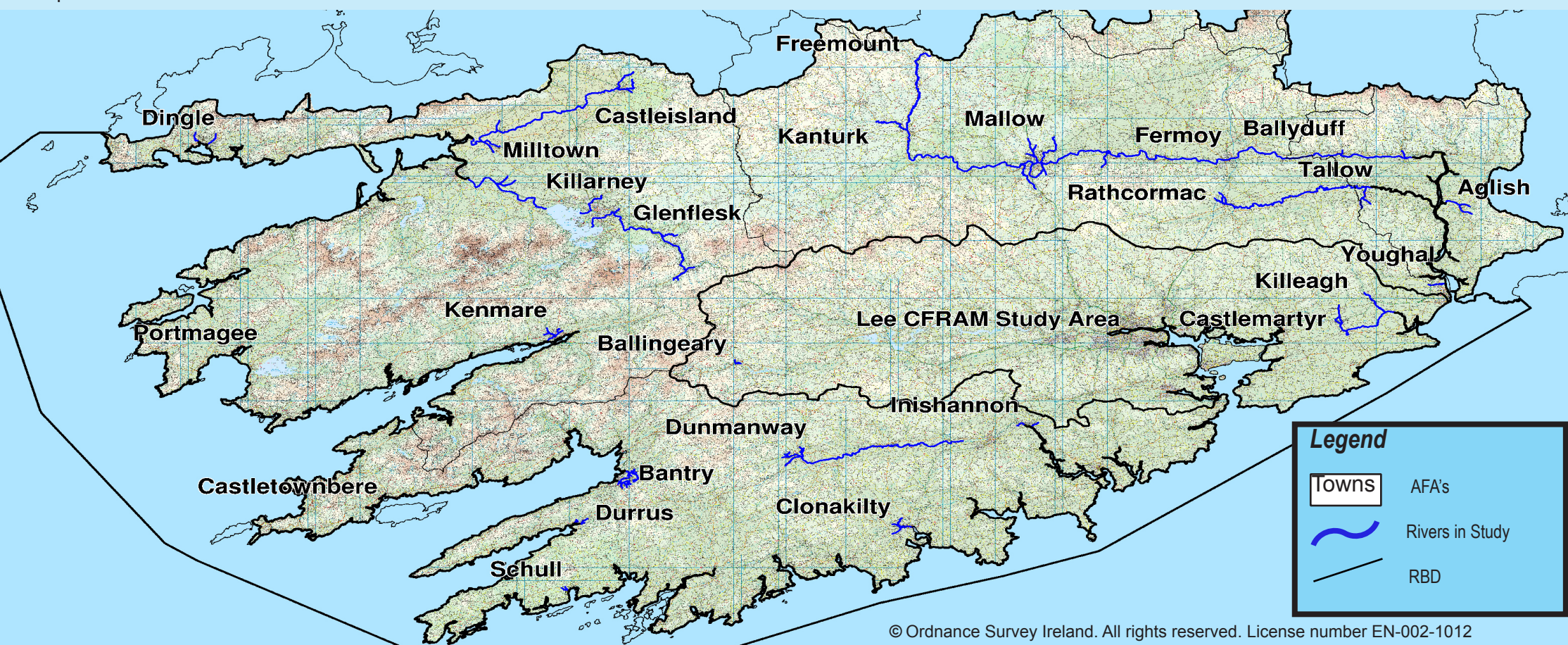
In November 2011 the **Office of Public Works** (OPW) appointed Mott MacDonald Ireland to carry out the **South Western River Basin District Catchment Flood Risk Assessment and Management** (CFRAM) Study. The South Western CFRAM Study is part of the National CFRAM Programme that is being carried out by the Office Of Public Works. The CFRAM Programme is central to the Irish Government's medium to long-term strategy for the reduction and management of flood risk in Ireland. The South Western **River Basin District** (RBD) stretches from Dingle to Dungarvan and includes parts of Counties Cork, Kerry, Limerick, Tipperary and Waterford. The objective of the study is to produce detailed Flood Risk Mapping for all areas at significant risk in the District and to prepare Flood Risk Management Plans to identify and manage the risks of flooding on a catchment wide scale. The CFRAM Programme will help the Irish Government to fulfil its duties under the EU Floods Directive and will inform Irish Planners as to the level of flood risk present in our towns and cities.

### **FLOOD RISK REVIEW**

The OPW's nationwide Preliminary Flood Risk Assessment (PFRA) identified 67 towns and villages in the RBD where the potential for flood risk was high. In December 2011 and January 2012, these areas were visited by engineers engaged in the study. Through a process of review and interviews with local residents and other stakeholders the study team identified that 26 of the 67 locations were at significant risk from flooding and should be investigated in detail. These locations are known as Areas for Further Assessment (AFAs) and are shown in the map below.



### **AFA's and watercourses covered by the study**



### **HAVE YOUR SAY**

Visit our website to subscribe to our newsletter and to find out details of upcoming consultation events throughout the District.

Follow us on Twitter to keep up to date with the latest events in the CFRAM Study;

[www.twitter.com/SW\\_CFRAM\\_Study](https://www.twitter.com/SW_CFRAM_Study) 

### **CONTACT US**

Email: [SWCFRAM@mottmac.com](mailto:SWCFRAM@mottmac.com)

[www.southwestcframstudy.ie](http://www.southwestcframstudy.ie)



# Appendix B. Public Information Day Information Leaflet



### **Your opportunity to take part.**

The OPW wishes to consider all of the opinions and information available on the issue of Flood Risk in Clonakilty. The way that this information is gathered is through a questionnaire.

Questionnaire forms will be available at the Public Information Day and can be completed and returned on the day or at a later date.

Completed forms can be handed in at Clonakilty Town Hall prior to the 2<sup>nd</sup> of November. Alternatively completed questionnaires can be posted to the Address below before 2<sup>nd</sup> November..



# Clonakilty Flood Risk Management Public Information Day



### **Contact us.**

The South Western CFRAM Communications Co-Ordinator can be contacted at all times by post or email. Your queries and comments are most welcomed.

By Post  
Mr. Fintan McGivern  
South Western CFRAM Communications Coordinator  
Mott MacDonald Ireland Ltd.  
5 East Gate Avenue, Little Island, Co. Cork

By e-mail;  
SWCFRAM@mottmac.com

Visit our website; <http://www.southwestcframstudy.ie>

Follow the study on twitter; [www.twitter.com/SW\\_CFRAM\\_Study](http://www.twitter.com/SW_CFRAM_Study)



October 16<sup>th</sup> 2012





## Introduction.

The Office of Public Works (OPW) have appointed Mott MacDonald to carry out the South Western River Basin District Catchment Flood Risk Assessment and Management (CFRAM) Study. The South Western CFRAM Study is part of the National CFRAM Programme that was rolled out by the Office Of Public Works between January 2011 and March 2012. The CFRAM Programme is central to the Government's medium to long-term strategy for the mitigation and management of flood risk in Ireland. The South Western River Basin District (RBD) stretches from Dingle to Dungarvan and includes parts of Counties Cork, Kerry, Limerick, Tipperary and Waterford. The aim of this study is to identify areas at significant risk of flooding and to propose measures that will manage the flood risk in those areas. This study will use the most up to date flood modelling tools to determine the extent and depth of flooding that can be expected during extreme flood events in areas at significant risk. Clonakilty has been identified as one of the areas that are at significant risk from flooding. Clonakilty has been given top priority in the South Western CFRAM Study area in order to identify the preferred flood risk management option for the town as soon as possible. This is the first public consultation to be held in the South Western CFRAM Study. The purpose of this public consultation event is to gather information on flooding in Clonakilty and to advise the public on the work and programme of the South Western CFRAM study in Clonakilty.



River Survey

## Work carried out to date.

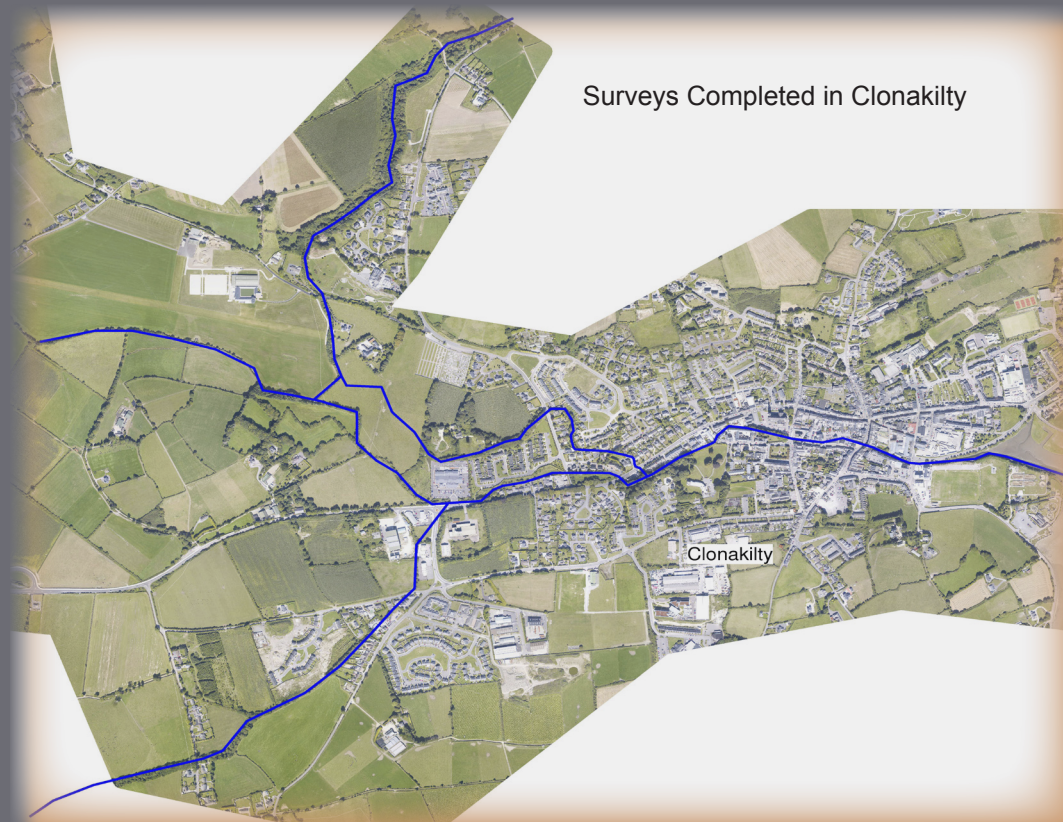
The initial stage of the CFRAM study involves gathering a large amount of data. Since November 2011, the Office of Public Works, Cork County Council and Mott MacDonald have been gathering the data and procuring the surveys necessary to define the extent of flood risk in the South Western River Basin District. The data collected includes meteorological data, hydrometric data, social datasets, land use data, habitat data, flood studies and records of past flood events.

In order to get the most accurate results possible from the flood modelling tools, it was necessary to gather large volumes of topographical data. This data covers the flood plains, the river channels and the structures that are found on the rivers. Flood plain data was captured early in 2012 by aerial surveying techniques. The river channel and structure data was captured by more traditional surveying techniques. This survey was completed week ending 28th of September.

The hydrology of the catchment in Clonakilty has been already assessed to a preliminary degree in order to split it into sub catchments and decide upon the best way to derive design flows for use in the hydraulic models.

## Prioritisation of Clonakilty.

Following the flood events that occurred in Clonakilty in the summer of 2012, it was decided to prioritise the work of the study in the town. Originally it was scheduled that the public consultation on the preferred flood risk management option for Clonakilty would take place in June 2014. The programme for Clonakilty has been accelerated so that this consultation will now take place in the first half of 2013, over a year earlier than originally planned.



## What happens next?

All of the feedback received at the Public Information Day will be considered by the OPW and will help in the development of the preferred flood risk management option for Clonakilty. Subject to the identification of a cost beneficial and publicly accepted scheme, Ministerial consent will be sought to proceed with a public exhibition of the scheme.

Following the anticipated successful exhibition, which will be carried out in accordance with the Arterial Drainage Acts, detailed design of the scheme works will proceed. Contract documents will be prepared and subject to confirmation by the Minister for Expenditure and Reform construction will commence.

## Flood Risk Management Methods.

For every area at risk from flooding there are a range of methods that are initially considered to determine if they can be of benefit in the area in question. These are listed below. The study team will review each method and will determine the method or combination of methods which would provide the optimum solution for Clonakilty.

## Potential Flood Alleviation Measures

### Structural Measures

- Storage
- Flow Diversion
- Increase Conveyance
- Construct Flood Defences
- Rehabilitate, improve existing defences
- Relocation of Properties

Non Structural Measures (e.g. flood warning system)

# Appendix C. Public Information Day Presentation



# South Western CFRAM Study



Elected Members  
Briefing

Clonakilty Public  
Information Day  
16 October 2012





- Roles and Responsibilities

- OPW

- Competent Authority  
CFRAM Funding and Management  
Reporting, Coordination and Consultation
    - (key contacts: Peter Lowe, Conor Galvin, Cian Ó Dónaill, Ezra MacManamon, Peter Duffy)

- Public Bodies (infrastructural Sources of Risk)

Includes the Local Authorities; Cork County Council

- (key contacts: Noel O’Keeffe, Joan Dineen, Charles Brannigan)

- Consultants- Mott MacDonald Ireland

(key Contacts Fintan McGivern, Richard Gamble, Barry O’Connor)

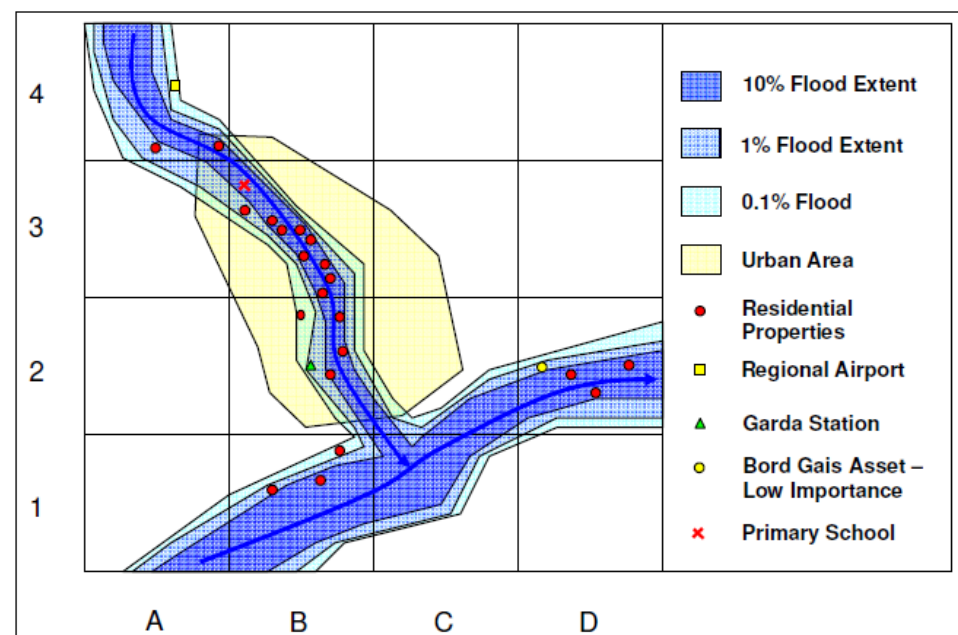




- River basin Districts
  - South Western
  - South Eastern
  - Eastern
  - Neagh Bann
  - North Eastern
  - North Western
  - Western
  - Shannon



# Preliminary Flood Risk Assessment



Vulnerability Class	Vulnerability Class Factor	Probability of Flood Event (Annual Exceedance Probability)		
		10% - High	1% - Medium	0.1% - Low
Critical Vulnerability	2500	25000	2500	250
Extreme Vulnerability	250	2500	250	25
High Vulnerability	25	250	25	2.5
Moderate Vulnerability	2.5	25	2.5	0.25
Low Vulnerability	1	10	1	0.1



- The CFRAM Study
  - Data Collection
  - Flood Risk Review
  - Hydrology
  - Surveys
  - Hydraulic Modelling
  - Flood Risk Assessment
  - Flood Risk Management
  - Environmental Assessment
  - Consultation and Engagement
  - Flood Risk Management Plans (FRMP)





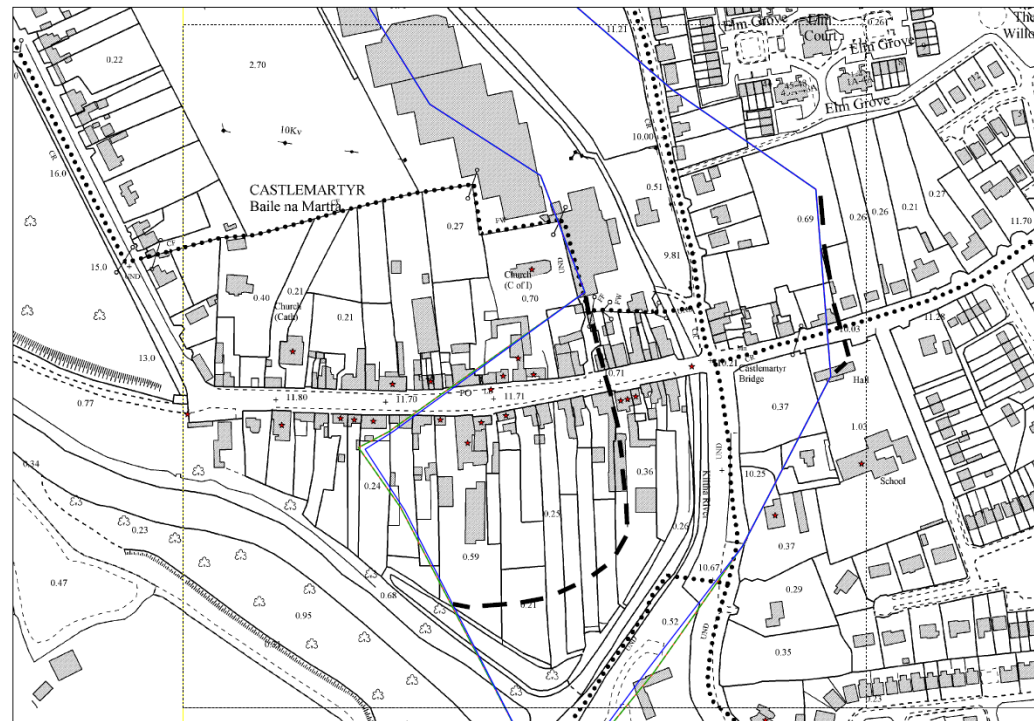
- **Data Collection**

- Flood Relief/Risk Management Measures
- Historical Flood Data
- Baseline Mapping
- Hydrometric Data
- Meteorological Data
- Land Use Data
- Planning & Development Information
- Environmental Data
- Soil & Geological Data
- Defence & Coastal Protection Asset Data



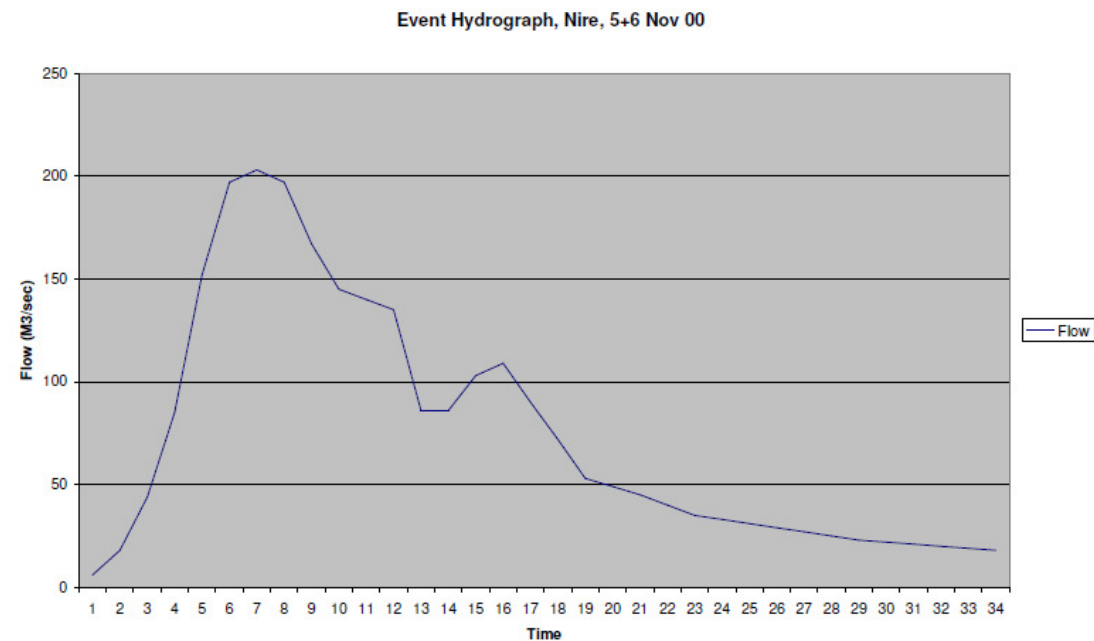
- Flood Risk Review

- PFRA
- Flood Outlines
- Receptors
- Validation



## • Hydrology

- Historical events
- Catchment boundaries
- Analysis of rainfall data
- Hydrometric data review
- Gauging station rating review
- Estimation of design flood parameters
- Joint probability analysis
- Sensitivity analysis
- Future changes





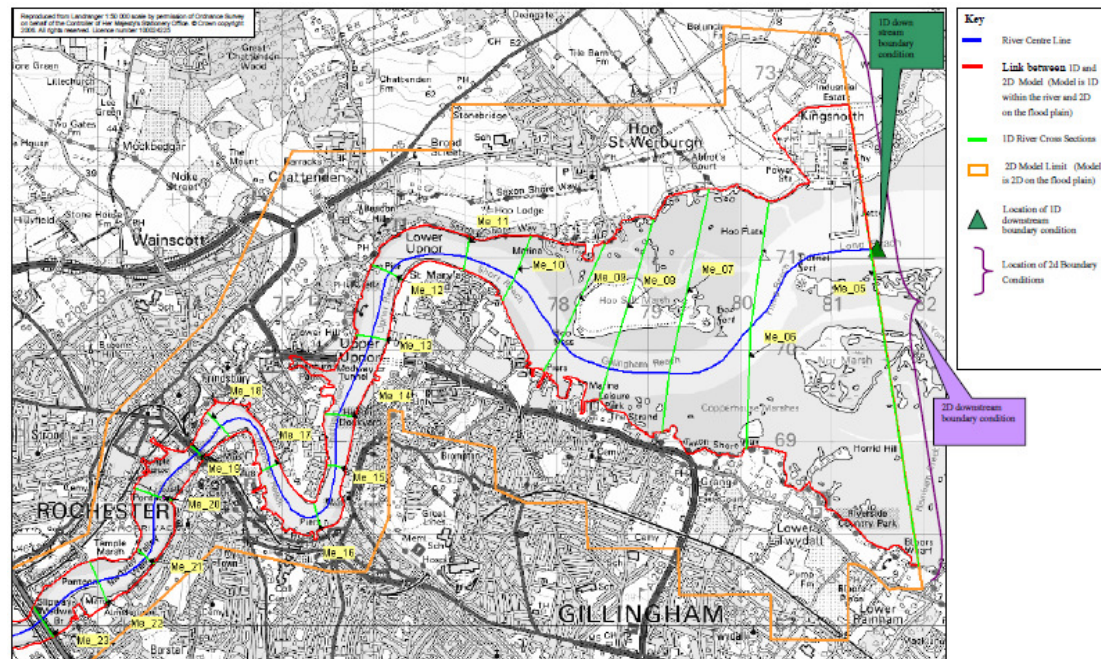


- Surveys

- River sections, structures, defences
- Floodplain surveys
- Defence Asset Condition Surveys
- Property Surveys

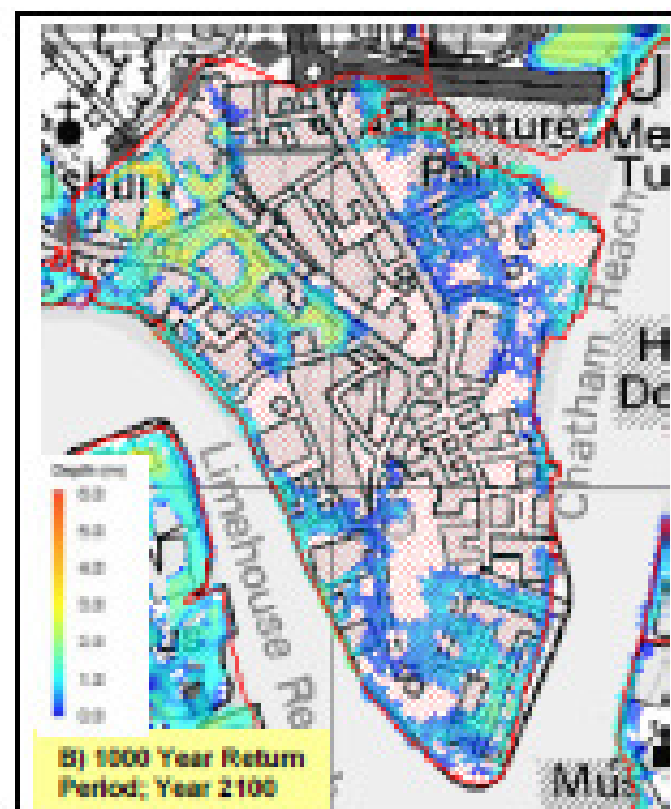
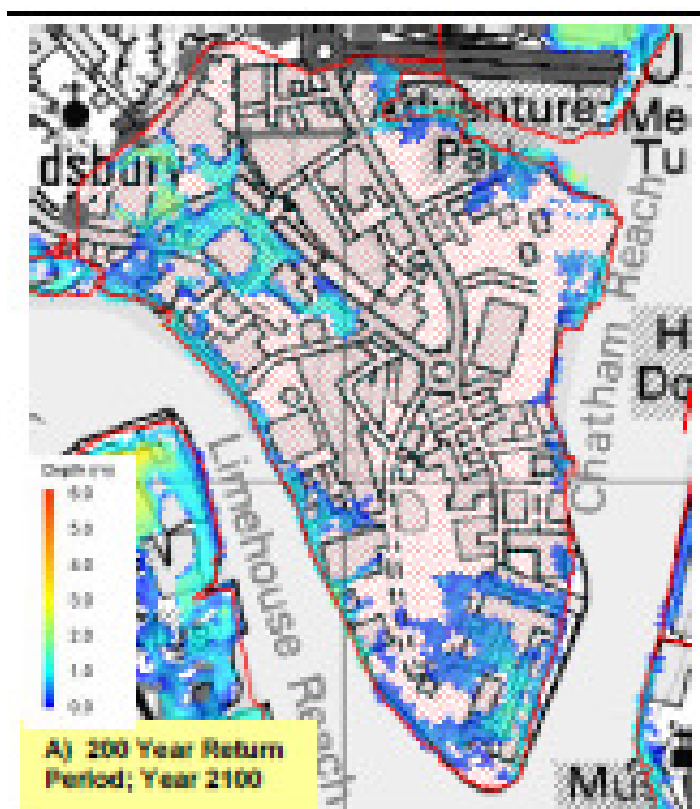


- Hydraulic Modelling
  - Model conceptualisation
  - Model construction
  - Calibration & validation
  - Coastal flood modelling
  - Mapping





- Flood Risk Assessment





- Flood Risk management







- Environmental Assessment

- Strategic Environmental assessment
- Appropriate Assessment





- Consultation and Engagement

- Public Information Days
- Newsletters
- Project Website
- Workshops and presentations
- Responses to queries from the public







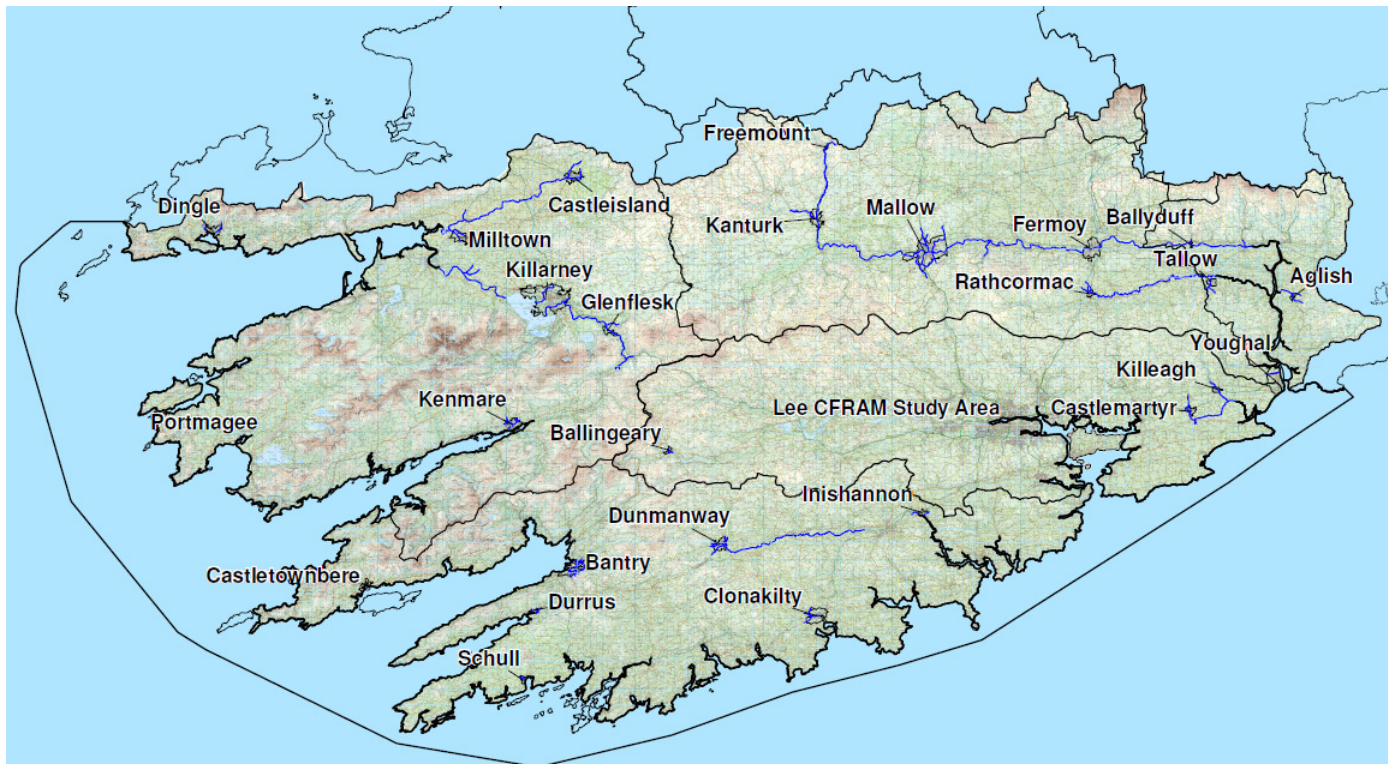
# Flood Risk Management Plans

- Collate all relevant data from the study
- Sets out
  - Flood Risk Management Objectives
  - Flood Risk Management Options
  - Prioritised programme of works

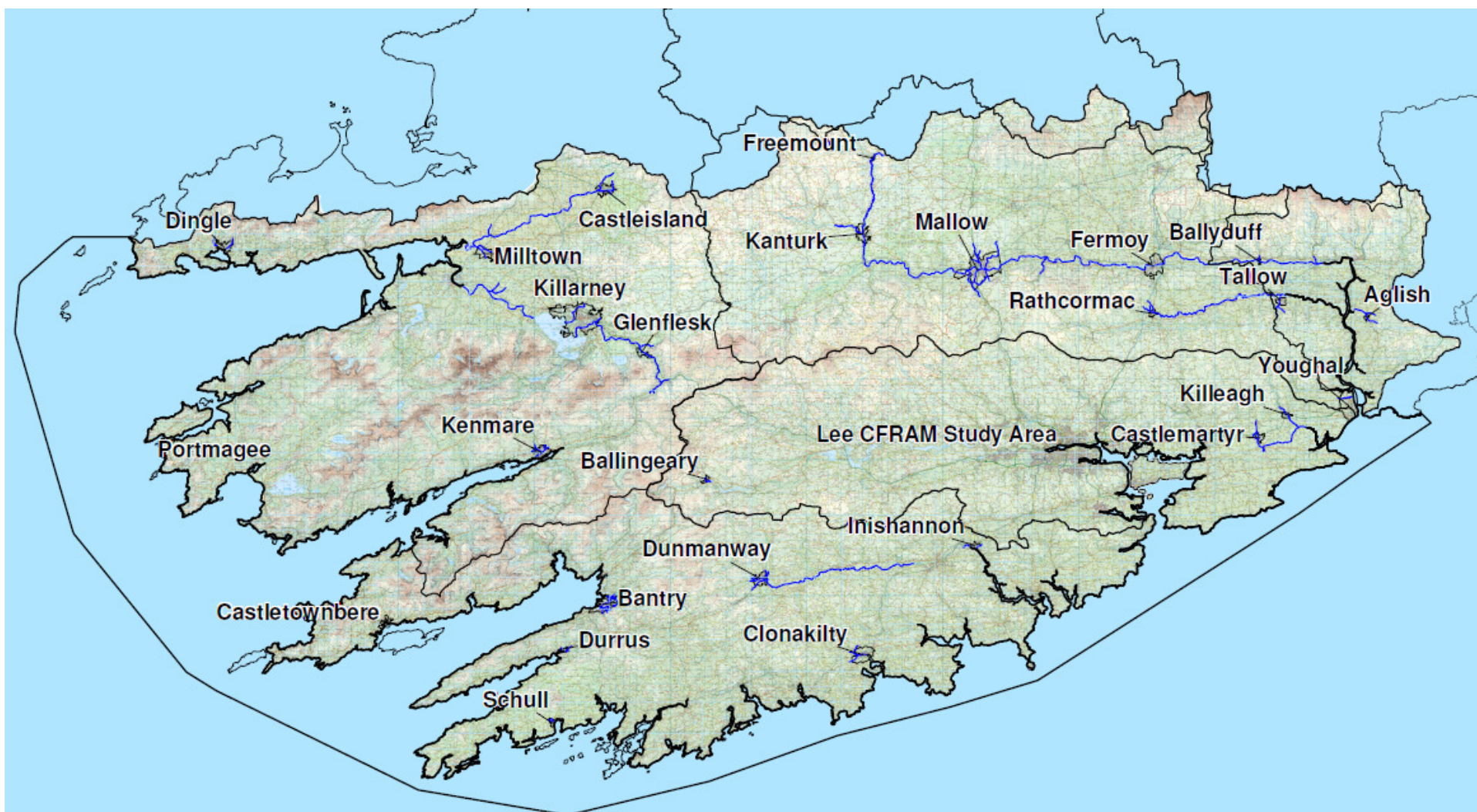


- Programme
  - Preliminary Flood Risk Assessment December 2011
  - Flood Maps by December 2013
  - Flood Risk Management Plans December 2015

# The Catchment











- Work Done to date
  - Preliminary Flood Risk Assessment
  - Data Collection
  - Flood Risk Review
  - Preliminary Hydrological Assessment
  - Flood Plain Surveys
  - River channel and structure surveys

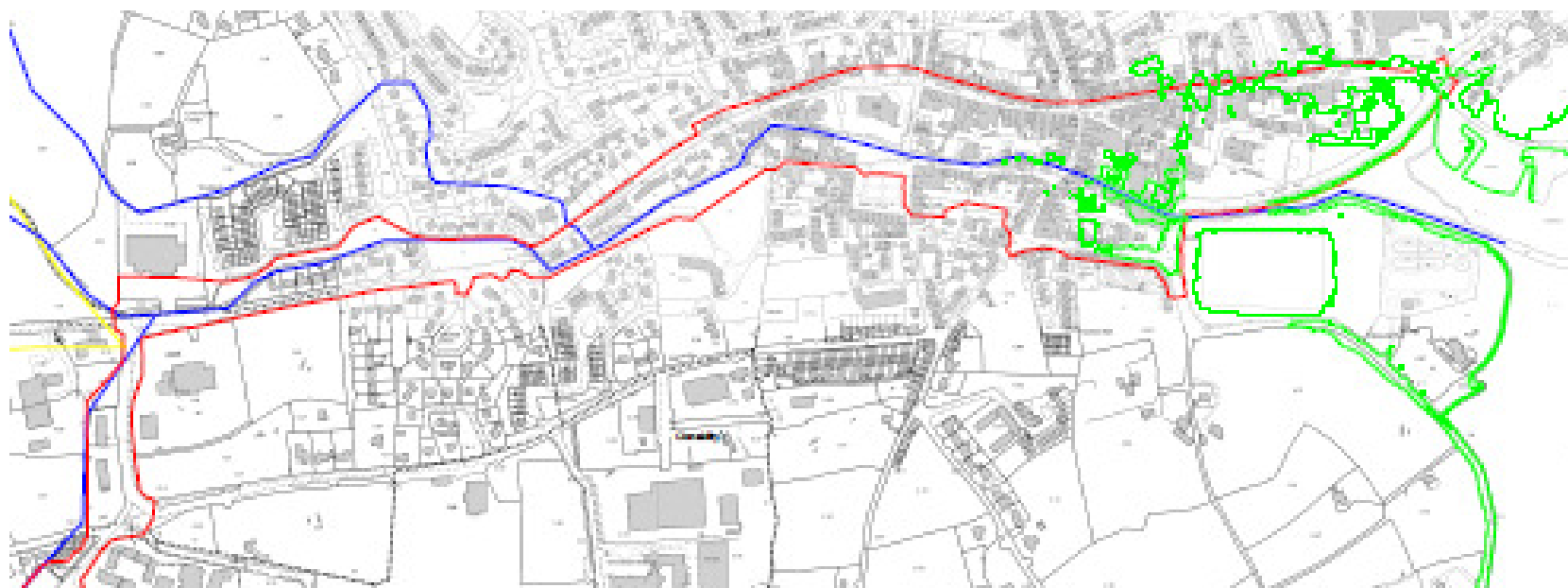


# Clonakilty

- Historical flooding in 1961, 1962, 1981, 1986, 1989, 1995, 2009, 2012(x3)
- Flash flooding features in many reports
- Tidal Flooding also an issue



- June 28 2012





- **Flood Risk Management options**

- Non Structural Measures
  - Flood Warning System
  - Individual property protection
  - Land Use Management
- Structural Measures
  - Flood storage
  - River walls
  - Flow diversion
  - Channel Works
  - Rehabilitate existing walls / defences





- Issues to be considered
  - Capacity of existing bridges
  - Surface water drainage
  - Tidal flooding





- Accelerated Clonakilty Programme
  - Surveys complete September 2012
  - Modelling complete January 2013
  - Preliminary options report March 2013 (One year earlier than scheduled)

# Appendix D. Summary of Submissions

UOM	Record Nr	Date	General Area	AFA	History of flooding				Type of property	Maximum depth of flooding	Source of flooding	Photographs	Measures in place								How can flooding be resolved	
					Most recent	Previous	Previous	Previous		Metres		yes / no		No Work	Flood warning	Walls / Embankments	Dredging	Widening	Barrage	Relocation		
20	200001	16/10/2012																				
20	200002	16/10/2012		Clonakilty	28/06/2012	31/12/2009	19/11/2009		Retail	0.9	Directly from river/stream; from drains; overground flow (surface water)	Yes	Yes	7	1	1		1			Improve drainage; Stop building on flood plains; Create ways of letting river water, surface water etc. to get to marsh/flood plain; Put in place a flood warning system.	
20	200003	16/10/2012		Clonakilty					Restaurant	0.9	From drains											
20	200004	16/10/2012		Clonakilty	28/06/2012				Residential	1.2	Directly from river/stream	Yes	Yes								Volume of water falling and lack of flood plain has contributed to flooding, not river or tide alone. Emergency communication vital for flood warning. Various methods of communication, e.g. radio.	
20	200005	16/10/2012		Clonakilty	1963				Residential/Retail	1	Directly from river/stream; from drains; overground flow (surface water)	Yes	Yes								Drain Connolly Street. Pipe water under arch at bottom of Connolly Street and drain water into bay below Spar bridge. Build barrage at a mains point	
20	200006	16/10/2012		Clonakilty	10/10/2012	28/08/2012	29/06/2012		Residential/Retail	0.6	From drains	Yes	Yes								Early flood warning system; Walls/Embankments; River Dredging; Compound River Channel (river widening); Tidal Barrage	
20	200007	16/10/2012		Clonakilty	28/06/2012	Tidally flooded every 20 years			Retail	0.8	Directly from river/stream; from drains	Yes	Yes		2		1		3		Walls stopping water getting into river!	
20	200008	16/10/2012		Clonakilty	28/06/2012				Residential	0.5	Directly from river/stream	No	Yes			2	1		3		Dredging river - Council should be more careful in future planning decisions; take serious notice of box 10 or 11 on planning forms (has this property flooded?). walls and embankments, though need to be careful to maintain existing standard of good curtain walls in town.	
20	200009	16/10/2012		Clonakilty	28/06/2012	30/09/2009			Office	1.2	Directly from river/stream; from drains	Yes	Yes	7	1	5	2	3	4	6		
20	200010	16/10/2012		Clonakilty	28/06/2012	1960's			Retail	0.15	Directly from river/stream	Yes	Yes		1	2			3		More efficient drainage, enhanced pipework	
20	200011	16/10/2012		Clonakilty	28/06/2012	Aug-12	Oct-12	At least 4 times in last 20 years	Residential	1.2	Directly from river/stream; from drains; overground flow (surface water); rain	Yes	No								"Please do something quickly before someone dies"	
20	200012	16/10/2012		Clonakilty	28/06/2012				Residential	0.6	Directly from river/stream; from drains; overground flow (surface water)				4	3	2	1			Centre of road too high - the rainwater should be taken by the drainage system - for ordinary rainfall and something to be done to stop the river flowing down Western Road at a height of 2.5 - 3 ft.	
20	200013	16/10/2012		Clonakilty	Sep-12	28/06/2012	Regularly each year		Retail	0.7	Directly from river/stream; from drains; overground flow (surface water)	Yes	Yes			1	2	3			The surface and roads are higher than ground floor level of houses. This is causing a lot of the problems. Also, surface water running down the hills, which the drainage system can't cope with is a problem. The other problem is overflow from the river - need for deepening and raising walls.	
20	200014	16/10/2012		Clonakilty					Residential	0.7		Yes	No								Early flood warning system; Walls/Embankments; River Dredging; Tidal Barrage	
20	200015	16/10/2012		Clonakilty	2009				Residential/Guesthouse	0.2	Directly from river/stream; overground flow (surface water)	Yes	Yes								"No Idea"	
20	200016	16/10/2012		Clonakilty	28/08/2012	28/06/2012 (x 2)			Residential	0.3	Directly from river/stream; from drains; overground flow (surface water)	Yes		7	3	1	5	2	4	6	By not building on flood plains. By having something that will take the water away before it reaches the town.	
20	200017	16/10/2012		Clonakilty	28/06/2012	2006	16-18 Dec. 1996		Residential/Retail	0.7	Directly from river/stream; from the sea; from drains	No				2			1		Tidal barrage is major. Cleaning gullies	
20	200018	16/10/2012		Clonakilty	28/06/2012				Residential	0.7	Directly from river/stream	No	Yes		2	4	1	3			1) Reconstructing the river walls. 2) flood plains	
20	200019	16/10/2012		Clonakilty	28/06/2012				Retail	0.6	Directly from river/stream	Yes	No		3	2	1	4			As this has never happened in this premises in over one hundred years, I think it's safe to say that planning is at fault.	
20	200020	16/10/2012		Clonakilty	28/06/2012				Residential	0.6	Direct from river/stream	Yes	Yes		1	3	2	4			Though planning, which has been a huge cause in the recent flooding.	
20	200021	16/10/2012		Clonakilty	10/10/2012	28/08/2012	26/06/2012		Residential	0.1	From drains; Overground flow (surface water)	No	Yes		1	2	3	4	5	6	Get the unfinished developments in Old Chapel Lane finished and drained properly so water is not running out on the road. Improve drains and water flow further up the hill and have these drains cleared on a regular basis. Check in Sea Breeze Heights if drains are big enough. 50% of floodwaters end up at Mick Finn's Pub and 50% down in Sea Breeze Heights or on to Tawnies Crescent.	
20	200022	16/10/2012		Clonakilty	28/06/2012	N/A	N/A	N/A	Residential	0.25	Overground flow (surface water)	Yes	Yes	7	5	3	4	2	1	6	It would help if the rivers were kept free of rubbish, branches of trees, etc. Anything!!	
20	200023	16/10/2012		Clonakilty	28/06/2012	About 20 times in 40 years (from river, not tide)			Residential	1.5	Directly from river/stream	Yes	Yes									
20	200024	16/10/2012		Clonakilty	28/06/2012				Residential	0.3	Directly from river/stream	No	Yes								Some method of getting floodwater into the bay as on the night of 28th June the bay was completely empty.	
20	200025	16/10/2012		Clonakilty	28/06/2012	N/A			Residential	0.9	Directly from river/stream; from drains	Yes	Yes									
20	200026	16/10/2012		Clonakilty	28/06/2012	N/A			Residential	1.2	Directly from river/stream; down through road	Yes	Yes									
20	200027	16/10/2012		Clonakilty	28/06/2012				Residential	0.4	Directly from river/stream; down street	No	Yes						1			
20	200028	16/10/2012		Clonakilty	28/06/2012	Any time there's flooding on the street			Residential	0.05	Directly from river/stream; down street	No	Yes									
20	200029	16/10/2012		Clonakilty					Residential	A raised floor has offered protection against flooding	From the sea - always a worry	No	Yes		5	4	3	2	1		It's always a huge worry every time south-east gales are forecast to coincide with high tides. A barrage would offer protection and act as a wonderful amenity for Clonakilty Bay for leisure pursuits in water sports and a looped walk for local enthusiasts and enhancement for tourists.	
20	200030	16/10/2012		Clonakilty	28/06/2012				Residential	0.4	From drains; Overground flow (surface water)	Yes	Yes		6	1	3	2	5	4	7	Flooding at the western side of Clonakilty was due to bad planning practices of building on river flood plains. As the western side of the town was not threatened by flooding before 2009, it is hard to see how things can be reversed. Firstly, surface water from Lady's Cross area needs to be redirected away from roundabout at Maxol Station, as does the water from the housing estate above West Cork Carpets whose water comes into same spot, contrary to planning, given that all water be redirected to White's Mans, Granagoleen. Yearly cleaning of river widening at Bridge; sorting water problems at Dunnes Stores.
20	200031	16/10/2012		Clonakilty	28/06/2012	Dec. 2009	2004	Several times between 1962 - 2012	Residential/Retail	0.9	From the sea; from drains; overground flow (surface water)	Yes	No			5	2	4	3	1	6	Tidal Barrage/River Dredging. Better planning process for extensive development; making provisions for drainage etc.; non-return valves; larger drainage pipes, gullies, etc.



UOM	Record Nr	Date	General Area	AFA	History of flooding				Type of property	Maximum depth of flooding	Source of flooding	Photographs	Measures in place								How can flooding be resolved
					Most recent	Previous	Previous	Previous		Metres		yes / no		No Work	Flood warning	Walls / Embankments	Dredging	Widening	Barrage	Relocation	
20	200032	16/10/2012		Clonakilty	2009				Retail	0.6 (Connolly Street) & 0.1 at Ross Street	Directly from river/stream; overground flow (surface water)	Yes	Yes	7	5	3	2	1	4	6	1) Use large underground pipe from Dunnes Stores via the by-pass and into the bay. Pipe large enough to drive a small car through. 2) Also, a pipe on Connolly Street going through the archway taking water back into the river. This to be done straight away.
20	200033	16/10/2012		Clonakilty	28/08/2012	28/06/2012			Residential		Directly from river/stream	Yes	Yes		3	5	1	2	4		Flooding is not coming from sea but it contributes to the level of water in the river across the road from our house. We have had no major problems with flooding in the past 19 years that we have lived here. I believe that the problem that needs to be addressed in our area is with the river itself as even when Clonakilty has non-serious flooding before, we never had a problem with flooding in our area before.
20	200034	16/10/2012		Clonakilty	28/08/2012				Residential	0.6	Direct from river; from the sea; from drains; overground flow (surface water)	No									It is impossible for any one person to prevent this problem as the drains are blocked. The river needs to be dredged as it cannot now take the water.
20	200035	16/10/2012		Clonakilty	28/08/2012				Residential	0.4	Directly from river/stream; from the sea; from drains; overground flow (surface water)	No	Yes		5	4	1	2	3	6	River dredging; river widening; tidal barrage. Bridge at Spar cannot take the water. It should be dredged immediately. Bridge at Church also inadequate.
20	200036	16/10/2012		Clonakilty	28/06/2012				Residential	0.075	Directly from river/stream; from the sea; from drains; overground flow (surface water)	No	Yes	1	1	1	1	1	1	7	
20	200037	16/10/2012		Clonakilty	10/10/2012	28/08/2012	28/06/2012		Residential; Retail; Hotel	0.1; 0.15; and 0.1 respectively	Directly from river/stream; from the sea; from drains; overground flow (surface water)	Yes	Yes		5	2	3	4	1		By proper drainage. Flood barrier from sea; by slowing the flow of water into the town.
20	200038	16/10/2012		Clonakilty	28/06/2012				Residential	0.6	From drains	Yes	Yes		4	1	2	3	5		
20	200039	16/10/2012		Clonakilty	28/06/2012				Residential/Hotel/Off-Licence/Shop/Beer Garden	0.3	Overground flow (surface water) - Main Street	Yes	Yes		4	3	1	2			Tom Keating (087-2586652), who owns "Craanmore" property below Fernhill is a retired Water Engineer. His property has been used as a flood plain previously. He said he has a suggestion to make to avert future flooding. Perhaps he could be contacted at the mobile number above. Worth a phone call! He said the problem can be solved for €100,000.
20	200040	16/10/2012		Clonakilty	28/06/2012				Open Space		Directly from river/stream	No		1		1	2		3		Flood walls; tidal barrage.
20	200041	16/10/2012		Clonakilty	28/06/2012				Residential	0.6	Directly from river/stream	No	Yes			1					
20	200042	16/10/2012		Clonakilty	28/06/2012				Residential	0.075	From drains	No	No					1			In my case, a non-return valve would have stopped the inflow.
20	200043	16/10/2012		Clonakilty	28/06/2012				Retail	0.1		Yes	Yes		1	2	4		3		
20	200044	16/10/2012		Clonakilty																	Divert stream at Springmount/Ballyvolane; Tidal Barrage; Increase size of pipes Gerald Hair's.
20	200045	16/10/2012		Clonakilty	10/10/2012 (Wolfe Tone Street)	Flooding on average once every 9 years. Sea initially. Rainwater and river recently			Residential	0.15 - 0.025	Directly from river/stream; from the sea; from drains	No	Yes								Elevate flooding immediately at end of Wolfe Tone Street and Casement Street
20	200046	16/10/2012		Clonakilty	10/10/2012				Residential			Yes	Yes		2	3	4	5	1		
20	200047	16/10/2012		Clonakilty	28/08/2012	28/06/2012	At least 4 times since 1961		Residential/Workshop	0.9m in 1961	Directly from river/stream; from the sea	Yes	Yes			2	3	1	4		River Flooding: Widen river and bigger bridges, straighten and smoothen walls and holding tanks. Tidal Flooding: Tidal barrage with flood gate.
20	200048	16/10/2012		Clonakilty	10/10/2012				Residential	1	Directly from river/stream; from the sea; from drains; overground flow (surface water)	Yes	Yes	7	5	4	3	2	1	6	By numbers 1 - 5 of Q12
20	200049	16/10/2012		Clonakilty	10/10/2012				Residential	1	Directly from river/stream; from the sea; from drains; overground flow (surface water)	Yes	Yes	7	5	4	3	2	1	6	By numbers 1 - 5 of Q12
20	200050	16/10/2012		Clonakilty	10/10/2012				Residential	1	Directly from river/stream; from the sea; from drains; overground flow (surface water)	Yes		7	5	4	3	2	1	6	By numbers 1 - 5 of Q12
20	200051	16/10/2012		Clonakilty	28/06/2012	N/A			Residential/Retail	0.4	Directly from river/stream	No	No		1	2					
20	200052	16/10/2012		Clonakilty	28/06/2012				Retail (Dental Surgery)	0.3	Directly from river/stream; from drains	Yes	Yes	7	5	2	1	3	4	6	Dredging; better drains; better planning for future housing; flood relief drains in front of Waterfront Complex - it's stopping water draining to sea! - who allowed planning here?
20	200053	16/10/2012		Clonakilty	28/06/2012				Office/Open Space	0.9	Directly from river/stream; overground flow (surface water)	Yes	No	7	5	4	3	2	1	6	Attenuation ponds for the river. Eco-friendly Tidal Barrage. Improve drainage system to alleviate the water from flash flooding. Objection to anyone building on flood plain around Clonakilty.
20	200054	16/10/2012		Clonakilty	10/10/2012	28/08/2012	28/06/2012		Public House	0.1	Directly from river/stream; from drains; overground flow (surface water)	Yes	Yes	6	5	4	2	1	3	7	Firstly, find exact cause. Drains are a major issue. Don't seem to be able to handle any kind of water flow. To look at where flood source is and tackle it properly. Business to be contacted directly by OPW/Mott MacDonald with updates.
20	200055	16/10/2012		Clonakilty	28/06/2012	Oct-10	2008		Residential	0.15	Directly from river/stream; from the sea; from drains; overground flow (surface water)	Yes	Yes	1	2	3					Get the basics right first. Early flood warning systems that work, i.e., road closures. Better storm drain works that will allow water into the bay. On 28/06/2012, the tide was out at Haste's Corner - water couldn't get into the bay.
20	200056	16/10/2012		Clonakilty	28/08/2012	28/06/2012			Residential	28/08 (0.025m) 28/06 (0.6m)	Directly from river/stream; from drains; overground flow (surface water)	Yes	Yes	7	1	1	1	4	1	7	Proper drainage system to alleviate flash flooding. Tidal barrage and attenuation ponds for the river. We have been flooded 3 times since 28 June 2012. We need some works carried out immediately and we also need to know what funding there is for the main works next June.
20	200057	16/10/2012		Clonakilty	28/06/2012				Public House	1.2	Directly from river/stream	Yes	Yes	7	4	1	3	2	5	6	
20	200058	16/10/2012		Clonakilty					Residential	0.6	Directly from river/stream	No									
20	200059	16/10/2012		Clonakilty	28/06/2012				Retail	0.2	Directly from river/stream	No (on YouTube)	Yes	7	4	1	2	3	5	6	
20	200060	16/10/2012		Clonakilty	28/06/2012				Residential	0.35	Directly from river	Yes	Yes								
20	200061	16/10/2012		Clonakilty					Retail	0.6	Directly from river/stream	Yes	Yes	7	3	2	4	5	1	6	Basins
20	200262	16/10/2012		Clonakilty	28/06/2012				Restaurant	0.6	Overground flow (surface water)	Yes	Yes		1	3	4	5	2		Equipment to pump the water back out for the time being; Sort out drainage; Non-returnable valves.
20	200063	16/10/2012		Clonakilty	28/07/2012	28/06/2012			Restaurant	0.9	Directly from river/stream; from drains	Yes	Yes		1	3	4		2		Equipment to pump the water back out for the time being; Sort out drainage; Non-returnable valves.
20	200064	16/10/2012		Clonakilty	27/06/2012				Retail	0.3	Directly from river/stream	Yes	Yes								Stop building on the flood plain; keep drains clean at all times; resolve the problem asap.
20	200065	16/10/2012		Clonakilty	28/06/2012	Nov-09			Other	0.06	Directly from river/stream; overground flow (surface water)	No	No		4	1		3	2		Improved flood defences on river; tidal barrage; improved surface water drainage system
20	200066	16/10/2012		Clonakilty	28/06/2012				Retail	0.5	Directly from river/stream; from drains; overground flow (surface water)	Yes		7	1	2	4	3	5	6	Early flood warnings is important.

UOM	Record Nr	Date	General Area	AFA	History of flooding				Type of property	Maximum depth of flooding	Source of flooding	Photographs	Measures in place								How can flooding be resolved			
					Most recent	Previous		Previous		Metres		yes / no		No Work	Flood warning	Walls / Embankments	Dredging	Widening	Barrage	Relocation				
20	200067	16/10/2012		Clonakilty	28/06/2012	29/06/2012			Office/Workshop	0.3	Overground flow (surface water)	Yes	Yes	6	5	3	1	2	4	7	Basically, the OPW have to replace the flood plains and areas which traditionally have taken the flood waters, but have been granted planning permission for development during the boom. In addition to this, the river has to be dredged and widened and some flood basic development and made available further upstream. Also, some form of tidal barrage for high tides and the Council must maintain and keep clear all the excess water in the Town and create a proper dredged channel into the bay!!			
20	200068	16/10/2012		Clonakilty	28/06/2012				Residential	0.15	Overground flow (surface water)	Yes	Yes	7	4	1	5	2	6	3	Reassure the inhabitants that when developments are approved that inter-departmental works ensure environmental impact studies are conducted. Insist that developers are forced to put proper infrastructure in place prior to commencing projects. Reconsider the knocking of ditches; free up flood plains; address the insufficient bridges in the locality.			
20	200069	16/10/2012		Clonakilty	28/06/2012				Retail	0.6	Directly from river/stream; from drains; overground flow (surface water)	No	Yes	7	5	3	4	1	2	6	Stop building on flood plains; attenuation ponds to prevent river flooding; tidal barrage; improve drainage system.			
20	200070	16/10/2012		Clonakilty	28/06/2012				Residential	0.5	Overground flow (surface water)	No	No		1						Ongoing preventative maintenance on streams and rivers; holding tanks and pump stations on low-lying areas; tidal barrage for tidal surges; survey of existing drainage systems; calculation of surface water surges off industrial estates, housing estates and car parks.			
20	200071	16/10/2012		Clonakilty	28/06/2012				Retail	0.15	Directly from river/stream	No	Yes			1	2	3	4		Divert river into large open flat field, holding there and allow to soak away; build a tidal barrage to prevent tidal flooding because if river and tidal flooding coincide, Clonakilty will be under 10 ft. of water.			
20	200072	16/10/2012		Clonakilty	28/08/2012	28/06/2012			Retail	0.9	Overground flow (surface water)	Yes	Yes					3	4		1) Extra Drains; 2) Storage. You have a 2-year plan which seems to make sense, but what do we do in the meantime. There has to be immediate works so we can survive this 2-year period.			
20	200073	16/10/2012		Clonakilty	27/06/2012				Retail	0.2	Overground flow (surface water)	No		7	3	1	1	2	1	7				
20	200074	16/10/2012		Clonakilty	28 & 29/06/2012	2009			Other		Directly from river/stream; overground flow (surface water)	Yes	No	6	4	3	1	2	5	7	Dredge the river starting at the bottom and work back to Dunnes Stores. Restore flood plain in old GAA grounds or nearby. Revoke any planning permissions that have been granted on known flood plains.			
20	200075	16/10/2012		Clonakilty	28/06/2012				Residential/Office	0.6	Directly from river/stream; overground flow (surface water)	No	Yes		4	3	2	1	5		In my 63 years, all previous flooding came from tides/bay. On 28/06/12, the flood waters came from the eastern end of town, i.e., river. This is totally due to the buildings no flood plains over the past 15 years in particular. In remember as a youth, various fields flooded every winter, i.e., flood plains. There has been building development onall of these flood plains so it is obvious that this was the cause of the flooding on 28th June. <u>Water will flow</u> . If there was a combination of the events of 28/06/12 with the high tides now in October, it would be disastrous for the town. If the works had been undertaken that Cork Co. Council collected charges from developers fro to pay proper drains etc. there would have been a lot less floodign on 28/6/12. Kindly establish the amount of money collected from developers for relief of flood wters over the past 20 years and not spent in Clonakilty. I would like a reply to that question.			
	200076	16/10/2012		Clonakilty	28/06/2012				Residential	0.7	Directly from river/stream; from drains; overground flow (surface water)	No	Yes		1		4	2	3		Hold back flood waters in lands west of town and then release slowly. This could be done by agreement with landowners. They could be compensated following flooding. Proper ongoing maintenance locally and tidal barrage.			
20	200077	16/10/2012		Clonakilty	28/06/2012	Nov-08			Residential	0.021	Directly from river/stream; overground flow (surface water)	Yes	Yes		1	1	1	1	1		If the drains cannot hold all the rainwater/ roadwater then the river(s) will have to be diverted before it reaches town. An early warning system is important. It is vital to have helpers in hand to deal with issues as they arise during a flood warning. We do not have enough sandbags for example and on the night of 16th October last, I was only given 6, so a more responsive service depending on needs.			
20	200078	16/10/2012		Clonakilty	28/06/2012				Residential	0.275	Directly from river/stream	Yes	No		3	3	4	1	2		The Waterfront building is a big problem, insufficient drainage is an issue here and should be looked into			
20	200079	16/10/2012		Clonakilty	28/06/2012				Residential	0.275	Directly from river/stream	Yes	yes	7	5	4	6	1	2	6	Provide more capacity for surface water			
20	200080	16/10/2012		Clonakilty	11/10/142	28/08/2012	28/06/2012	10/10/2012	Residential	0.15	Directly from river/stream; from drains, overground flow (surface water)		Yes		4	3	1	2	5					
20	200081	16/10/2012		Clonakilty																				
20	200082	16/10/2012		Clonakilty		28/08/2012	28/06/2012	10/10/2012	Residential	0.35	Directly from river/stream; from drains, overground flow (surface water)		Yes	7	1	2	6	4	5	3				

# Appendix E. Detailed Submissions

**Presentation**  
**from**  
**The Flood Committee of the Clonakilty**  
**Chamber of Commerce**  
**to the**  
**Office of Public Works**  
**with regard to**  
**Flooding Problems in Clonakilty,**  
**West Cork**

**16<sup>th</sup> October 2012**

## PROBLEMS IN CLONAKILTY SOUTH

### S1. LADY'S CROSS, DUNNES STORES, THE MILES

**Problem:** Meeting of streams and water from developments resulting in water flowing into town. There is inadequate drainage and diversion of surface water away from town.;

**Solution:** Divert part of River Feale to run to marsh at Cloheen Strand / Whites Marsh ( which is already OPW property)

### S2. MEETING OF PARK ROAD/YOUGHALS/LAMB STREET/ JIM HURLEY TERRACE

**Problem:** Surface water from Cloheen East flowing onto bypass through Lamb Street onto Connolly Street, Rossa Street and Casement Street which results in the flooding of Connolly Street, Casement Street and Clark Street

**Solution:** A. Run a storm drain from underneath Clonakilty Lodge through agricultural land to meet the bay at the sewerage plant

B. Run a pipe from Cloheen East to Whites marsh

### S3. KENT STREET, ROSSA STREET, CONNOLLY STREET

**Problem:** Low lying streets without adequate drainage. Suffers flooding from hotspot 2 and from the river bursting its banks on Kent Street

**Solution:**

A. An **emergency** storm drain needs to be laid going through in Hartes Courtyard and then left into river. Estimated distance of pipe is 40 meters.



- B. The **emergency** reconstruction of the wall in Kent Street is necessary
- C. Rebuilding of the temporary wall in the car park that collapsed in the flood of June 28<sup>th</sup> to be considered.
- D. All damaged bridges and drains to be accessed, enlarged and repaired as necessary

#### S4. WATERFRONT, EUROSPAR

**Problem:** Build up of water flowing from Cloheen and adjacent streets. Inadequate drainage. There is also a danger here from tidal flooding.

**Solution:**

- A. Another emergency storm drain needs to be laid to take water to bay side of Clark Street Bridge.
- B. Construction of a tidal barrage

#### S5. RICHY'S, ONEILL SPORTS – JUNCTION OF ASH STREET, WOLFE TONE STREET AND CLARK STREET

**Problem:** Water from community college, Ash Street, and James P O'Regan road floods this area which is also susceptible to tidal flooding and has inadequate drains

**Solution:** Storm drain with pipe running adjacent to An Sugan and entering the bay on the bypass road and fitted with a non return valve.

## S6. TOBAIRIN ROAD

**Problem:** Major surface water flowing down Old Timoleague Road/  
Tobairin Road flooding Fax Bridge area

**Solution:** New storm drain with pipe through agricultural land through  
to the bay; this solution can also be linked into a drain on Convent Road

## S7. CLONAKILTY BAY

**Problem:** The culmination of heavy rain, south east winds and high tides  
has historically caused Clonakilty to flood.

**Solution:** The erection of a flood barrage at Gilman's Point (the  
narrowest part of the bay). Planning permission was sought and granted for  
this project but it did not go ahead.

# PROBLEMS IN CLONAKILTY NORTH

## N1. GAA PITCH

**Problem:** Flood plains have been built on and excess water is going into  
river Feale which is bursting its banks at Dunnes Stores and from there  
flowing via Western Road and flooding the town centre.

**Solution:**

A. Allowing flood plains and farmland adjacent to the river to  
flood and arranging compensation for farmers. Creating holding ponds  
adjacent to Dunnes Stores.

B. Divert the river to Whites Marsh

## N2. TAWNIES LOWER

**Problem:** Excess surface water flowing down hill from developments is culminating in flooding at the oil depot area on Western Road.

**Solution:** Build a storm drain at the junction of graveyard car park to holding ponds via river.

## N3. TAWNIES LOWER, BARRACK HILL, OLD CHAPEL LANE, MCCURTAIN HILL



**Problem:** Water from higher ground flowing down McCurtain Hill, Old Chapel Lane and Patrick's Street Hill onto Main Street ( Pearse Street)


**Solution:** Storm drain at the top of Patrick's Street Hill going across Old Chapel Lane meeting drain on McCurtain Hill going to Community College at the back of Strand Road and entering the bay at Faxbridge. This would alleviate flooding on the Pearse Street /Strand Road area.


**The flood committee of the Clonakilty Chamber of Commerce would like to take this opportunity to invite the representatives of the Office of Public Works to visit the sites included in this presentation.**



INDEX

-  North of River
-  South of River

 Proposed Large Storm Drainage Pipework

 Natural Flood areas + Holding Pond Locations





# CLONAKILTY FLOOD RELIEF SCHEME

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## PROBLEM DESCRIPTION.

- THE 28<sup>TH</sup> OF JUNE 2012 CLONAKILTY WAS HIT OVERNIGHT BY A CLOUDBURST WHICH PRODUCED BETWEEN 50 MM AND 75 MM IN A VERY SHORT PERIOD FROM 23.00 H TIL 03.00 H.
- 100% SATURATION OF THE SOIL IN THE AREA ~~WAS~~ MEANT THAT WATER COULD ONLY FLOW OVER SURFACE IN DIRECTION OF THE FEALGE RIVER.
- AT DUNNES STORES ON THE WESTERN SIDE OF THE BRIDGE, WATER LEVELS INCREASED VERY QUICKLY UNTIL THE MOMENT THAT THE BRIDGE COULD NOT TAKE ANY MORE WATER. A BACKLOG OF WATER WAS BUILDING UP AND REACHED WALL LEVEL ALONG THE MAXOL PETROL STATION
- A WEAK SPOT IN THE WALL COLLAPSED AND THIS INTRODUCED A NEW FLOW PATH OF THE RIVER THROUGH WESTERN ROAD, PEARSE STREET, STRAN ROAD INTO THE BAY.
- FOR A COUPLE OF HOURS IT WAS A VERY DANGEROUS SITUATION AND LUCKILY IT WAS THE MIDDLE OF THE NIGHT AND NOT MANY PEOPLE AROUND. THE SPEED OF THE WAS ENORMOUS AND COULD HAVE CAUSED HUMAN CASUALTIES
- AT 5.00 A.M. THE WATER IN THE MAIN TRANSPORT ROUTE THROUGH TOWN STOPPED TO FLOW AND THE WATER SLOWLY RECEDED
- THE TOTAL DURATION OF THIS OCCASION WAS ONLY SIX HOURS



## PROBLEM AREAS

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- \* THE WATER CARRYING CAPACITY UNDER THE NEW DUNNES STORES BRIDGE IS INSUFFICIENT
- \* DISAPPEARANCE OF FLOODPLAINS OF THE PAST, SUCH AS: OLD GAA PITCH, WOODLANDS, ESTATE (AT THE BACK OF SHELL DEPOT) AND AREAS FURTHER UPSTREAM E.G. THE KILGARTIE STUD FARM AREA
- \* INCREASE OF BUILT UP AREA AS PART OF THE TOWN OVER THE LAST 40 YEARS
- \* THE QUALITY OF WALLS ON THE BANKS OF THE FEAGE RIVER IN THE TOWN AREA HAS DETERIORATED OVER THE YEARS
- \* THE DRAINAGE SYSTEMS OF THE BUILDINGS IN THE CENTRAL OLDER PART OF CLOVAHILTY HAS DETERIORATED
- \* OPENINGS UNDER BRIDGES ARE NOT CLEANED AND CLEARED REGULARLY AND UPSTREAM MAINTENANCE OF THE BANKS OF THE FEAGE HAS BEEN SPORADIC

## STRATEGY FOR FLOOD RELIEF SCHEME.

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THE PROBLEMS THAT CLONAKILTY FACES ARE TWO-FOLD.

1. INSUFFICIENT WATER-CONVEYING CAPACITY IN PERIODS OF HIGH SOIL WATER SATURATION COMBINED WITH HIGH AMOUNTS OF RAINFALL OVER A SHORT TIME
2. INTERIOR WATER RETENTION, NOW PRACTICALLY SOLELY DEPENDENT ON THE TIDAL SITUATION AT THE PEAK SUPPLY OF THE RIVER FEAGLE

### MEASURES TO BE TAKEN.

SUB 1. THE WATER CONVEYING CAPACITY IN THE TOWN CAN BE IMPROVED BY MEANS OF A CONCRETE PIPE LINE THAT FOLLOWS THE ROUTE OF THE CLONAKILTY BYPASS FROM DUNNES STORES ROUNDABOUT TO ABOUT 100 METERS BEYOND BUS-STOP NEAR HARTE'S SUPERMARKET  
TOTAL LENGTH : 2000 METERS. DIAMETER 1.6 METER. WITH A STARTING SPEED AT DUNNES STORES OF 5 METERS PER SECOND THIS PIPE LINE WILL HAVE A CAPACITY OF  $10 \text{ M}^3$  PER SECOND