

South Western CFRAM Study

SEA Environmental Report - Non Technical
Summary UoM 19

July 2017

Office of Public Works

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1 Introduction

1.1 Introduction

This Non-Technical Summary (NTS) summarises the Strategic Environmental Assessment (SEA) Environmental Report for the Flood Risk Management Plan (FRMP) for Unit of Management (UoM) 19. The Plan has been prepared on behalf of the Office of Public Works (OPW) and their partners and sets out a programme of prioritised studies, actions and works (including both structural and non-structural measures) to manage predicted flood risk in catchments within UoM 19 in the short to long-term.

The purpose of the Environmental Report is to identify, evaluate and describe the likely significant effects on the environment of implementing the Flood Risk Management Plan (FRMP) for UoM 19. Once the environmental effects have been identified, then mitigation measures are developed in tandem with an effective monitoring programme to ensure that the potential environmental impacts are minimised.

As the FRMP has the potential to impact upon European sites there is a requirement under the EU Habitats Directive to carry out an Appropriate Assessment (AA) within UoM19. These sites are areas designated for the protection and conservation of habitats, flora and fauna, called Special Areas of Conservation and Special Protection Areas.

1.2 Flood Risk Management Plan for Unit of Management (UoM) 19

For the purpose of delivering on the components of the National Flood Policy and on the requirements of the European Union Floods Directive, the OPW, in conjunction with local authorities and stakeholders, is conducting several Catchment Flood Risk Assessment and Management (CFRAM) Studies. *These studies are the core activity from which medium to long-term strategies for the reduction and management of flood risk in Ireland will be achieved.*

The overarching objectives of the CFRAM Studies are to:

- i Identify and map the existing and potential future flood hazard within the study area;
- i Assess and map the existing and potential future flood risk within the study area;
- i Identify viable structural and non-structural options and measures for the effective and sustainable management of flood risk within the study area;
- i Prepare Flood Risk Management Plans (FRMPs) setting out recommendations to manage the existing flood risk and also the potential future flood risk which may increase due to climate change, development, and other pressures that may arise in the future. FRMPs will set out policies, strategies, measures and actions that should be pursued by the relevant bodies (including the OPW, Local Authorities and other Stakeholders), to achieve the most cost-effective and sustainable management of existing and potential future flood risk within the study area, taking account of environmental plans, objectives and legislative requirements and other statutory plans and requirements¹.

¹ The Floods Directive requires that Flood Risk Management Plans should take into account the particular characteristics of the areas they cover and provide for tailored solutions according to the needs and priorities of those areas, whilst promoting the achievement of environmental objectives laid down in Community legislation.

The OPW has commissioned a CFRAM study for each of Ireland's seven River Basin Districts (RBDs)².

Unit of Management 19 is located within the **South Western River Basin District (SWRBD)** which covers an area of approximately 11,160 km². The study area of the SWRBD includes most of county Cork, large parts of counties Kerry and Waterford along with small parts of the counties of Tipperary and Limerick. The study area contains over 1,800 km of coastline along the Atlantic Ocean and the Celtic Sea. (Refer to Figure 1.1)

In total, six Local Authorities administer the regions within the SWRBD: Cork County Council, Cork City Council, Kerry County Council, Waterford City and County Council, Tipperary County Council and Limerick City and County Council. Much of the SWRBD is rural and the predominant land usage is agriculture.

Figure 1.1: South Western River Basin District (SWRBD)



² River Basin Districts (RBDs) are the main units for the management of river basins and have been delineated by Member States under Article 3 of the Water Framework Directive (2000/60/EC). RBDs are areas of land and sea, made up of one or more neighbouring river basins together with their associated groundwaters and coastal waters.

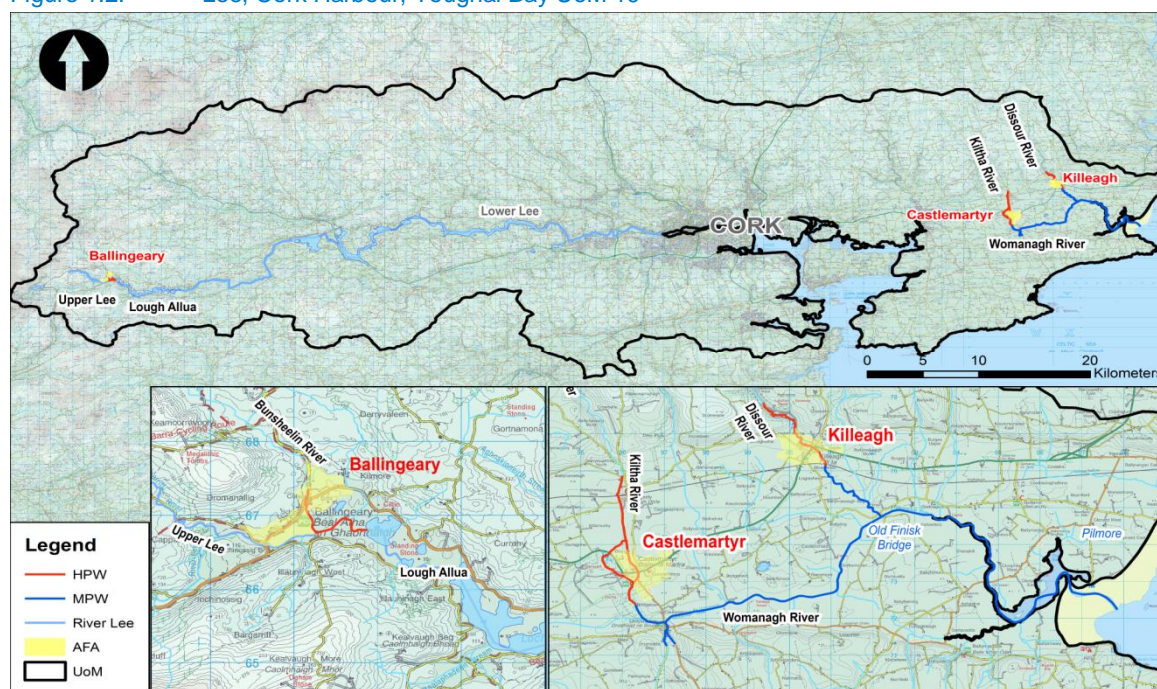
The **Lee, Cork Harbour and Youghal Bay UoM** covers an area of approximately 2,145km². The entire area of UoM 19 is within County Cork. The main rivers within UoM 19 are the Lee, Owenboy and Womanagh (Refer to Figure 1.2).

Four Areas for Further Assessment (AFAs) have been identified within UoM 19 (Refer to Table). Associated with the AFA's is over 29km of high and medium priority watercourses.

Table 1.2: AFAs within Unit of Management 19

UoM	Name	Unique ID	Fluvial	Coastal	County	Easting	Northing
19	Killeagh	190274	Yes	No	Cork	200750	75750
19	Castlemartyr	190277	Yes	No	Cork	196250	73250
19	Ballingeary	195499	Yes	No	Cork	115090	67135
19	Inchigeelagh	N/A	Yes	No	Cork	122589	66287

Figure 1.2: Lee, Cork Harbour, Youghal Bay UoM 19



The OPW have undertaken a separate Catchment Flood Risk Assessment and Management (CFRAM) Study within UoM 19 for the Lee Catchment. However, the towns of Ballingeary and Inchigeelagh in the upper reach of the Lee, which have been identified as Areas of Further Assessment (AFAs) were not included in the Lee CFRAM. This study includes the Womanagh and its tributaries the Kilthorpe and the Dissour which are outside of the Lee Catchment and the watercourses in Ballingeary

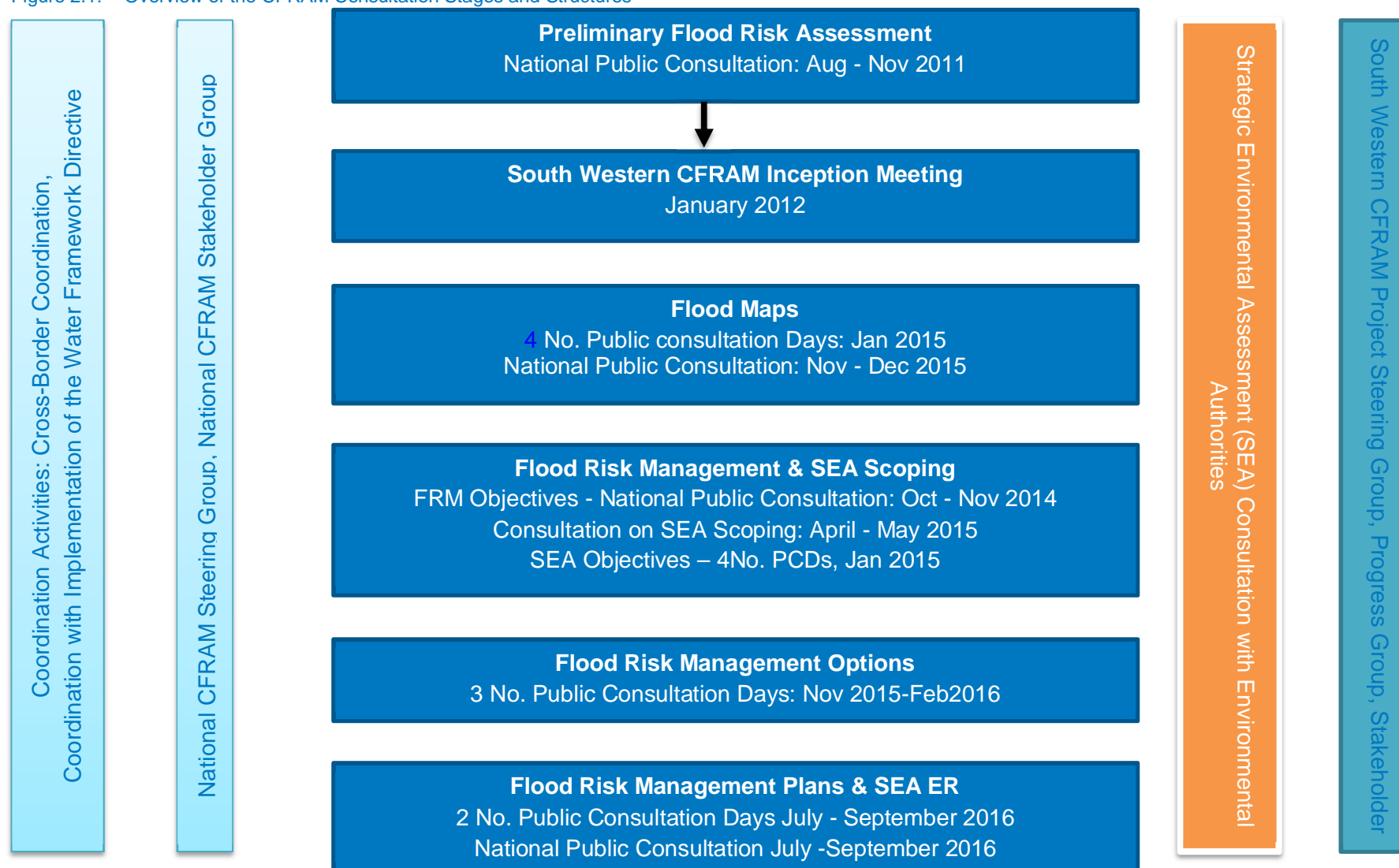
2 Stakeholder and Public Consultation

The SEA Directive (2001/42/EC) requires that consultation is carried out with Environmental Authorities and with members of the public at various stages in the SEA process. The intention of this consultation process is to enhance transparency in the decision-making process, to ensure that the relevant authorities and the public are informed and are provided with an early opportunity to express their opinion, and to ensure that the information used in the assessment is comprehensive and reliable. Early consultation and the open delivery of information on the assessment will avoid unnecessary delays in the decision-making process at later stages which may arise due to public opposition.

Article 5(4) of the SEA Directive requires that Environmental Authorities (designated by each Member State) be consulted when deciding on the scope and level of detail of the information which must be included in the Environmental Report i.e. consultation is statutorily required at this Scoping Stage of the SEA process.

Consultation is undertaken throughout the development of the CFRAM plan and Figure 2.1 gives an overview of the main consultation undertaken during the project development.

Figure 2.1: Overview of the CFRAM Consultation Stages and Structures



3 Key Environmental Issues in UoM 19

UoM 19 is an area of significant ecological, cultural, social and landscape value. The key environmental issues identified for UoM are as follows:

- i Population and Human Health: The towns of Killeagh and Castlemartyr (AFAs in UoM 19) are situated on the primary route between Cork City and Waterford City (both of which are identified as gateways in the National Spatial Strategy). Cork and Waterford city will experience further development and expansion in the future. It is likely that their associated regions will also experience overall population growth and it logical that those towns located on commuting routes to the cities will experience greater population increase than more remote locations. Areas with increasing development pressures and populations may be prone to increased risk arising from flooding.
- i Geology, Soils and Land Use: Flood management options under consideration in the Flood Risk Management Plans include non-structural options such as planning control and land use management. Publication of the plans may result in the zoning of lands for particular land use practices for the purpose of preventing or protecting against flooding. This may entail the re-zoning of lands currently zoned for alternative purposes
- i Archaeology and Cultural Heritage: Many RMP (Record of Monuments and Places) sites are associated with watercourses and may potentially be impacted by the implementation of flood risk management measures. There is one protected bridge structure located on watercourses in each of the AFAs of Castlemartyr and Balingeary which may currently act as hydraulic restrictions. Flood risk management measures may include the destruction of these structures. There is one protected water mill in the AFA of Killeagh. Other features, including churches, religious buildings and houses, are located in close proximity to watercourses and, as such, may constrain the application of certain flood risk management measures at these locations. The Underwater Archaeology Unit (UAU) of the National Monuments Service maintains an inventory of shipwrecks recorded in Irish waters. One shipwreck has been recorded at Roche's Point, Cork. Tidal flood risk management measures may potentially impact upon maritime archaeology.
- i Water Resources: Consideration must be given to how the implementation of flood protection measures could influence the achievement of the objectives of the Water Framework Directive. Flood protection measures can have direct and indirect impacts on a watercourse. Status classification for the purpose of the Water Framework Directive is based on a combination of biological, morphological and chemical assessment of a watercourse. Any activity that affects any of these elements has the potential to jeopardise the achievement of Water Framework Directive objectives. Conversely, flood protection measures can assist in achieving the objectives of the WFD by preventing flooding of point source pressures, which if flooded could result in the deterioration of water quality. Development of flood risk management measures in areas of extreme and high groundwater vulnerability and in ground water protection areas has the potential to result in contamination of groundwater resources. Geotechnical engineering of a site can mitigate against potential groundwater pollution. The possibility of employing mitigation rather than circumventing an area can be investigated before a decision is taken to progress flood protection measures.
- i Air and Climate: The Flood Risk Management Plans consider changes in climate change (on the basis of a 100-year time horizon) and make allowance for predicted impacts. The implementation of flood risk management measures has the potential to result in a phenomenon known as coastal squeeze i.e. the loss of coastal habitats in front of coastal flood protection measures. In an unrestricted scenario, coastal habitat will naturally move landward as sea level rises with climate change. Where coastal defences are constructed these can impede the landward movement of habitat ultimately resulting in a reduction in habitat extent as it is squeezed between the increasing tide and the coastal defence.

- i Biodiversity, Flora and Fauna: Many ecological features of significance within UoM 19 are aquatic habitats and species and, by the nature of the environment they live in, are relatively tolerant to flood events. Certain habitats have a dependence on flooding e.g. alluvial woodlands, a priority habitat protected under the Habitats Directive, which occurs in areas that are subject to periodic flooding within UoM 19. Flood risk management measures will alter flood regime and can cause a reduction in habitat quality and extent. The requirement for ecological protection can limit potential options for flood risk management. Freshwater pearl mussel is particularly sensitive to deterioration in water quality, nutrient enrichment and siltation, all of which may potentially occur due to the implementation of flood risk management measures. In addition, flood risk management measures can act as barriers to fish migration. The life cycle of freshwater pearl mussel is dependent on the presence of migratory fish. Implementation of flood risk management measures can also contribute towards the spread of invasive/non-native species if not properly managed.
- i Tourism and Recreation: Many of the tourist attractions of the Lee / Cork Harbour River Basin are centred on the Lee Valley. Flood risk management options can intrude upon scenic landscapes and can result in amenity walks having to be diverted thereby reducing the quality of the tourist attractions. Conversely flood risk management options can be used as an opportunity to enhance tourist attractions e.g. through the use of glass flood walls thereby increasing views of our rivers and coastal areas. Public consultation has identified historic flooding and subsequent damage to Carrignacurra footbridge in Inchigeelagh which provided public access to O'Leary Castle along a 2-mile circular walk which was part of the Beara Cork Cycle Route and Greenway Project.
- i Fisheries, Aquaculture and Angling: Flood risk management measures should give consideration to the protection and enhancement of fishery habitat and should have regard to any fishery management programmes. Also, fish migration needs to be considered in the identification of flood risk management options. Consideration should be given to the enhancement and preservation of commercial and tourism fishery facilities.
- i Landscape and Visual Amenity: Many amenity walks, scenic routes and views are along river valleys or coastal areas i.e. at locations where flood risk management measures may be implemented. Flood protection measures can intrude upon views and prospects. The application of flood risk management measures in landscape conservation areas may be constrained for the purposes of the preservation of the landscape. Flooding can be a formative feature of a landscape's character. Flood risk management options need to be sympathetic towards landscape character and opportunities to enhance landscape character should be explored.
- i Infrastructure and Material Assets: Future development can alter land drainage run-off characteristics and can result in related changes in river hydrology and therefore flooding.

4 Strategic Environmental Objectives

SEA analysis was undertaken to assess alternatives and preferred plan measures utilising the SEA Objectives, sub objectives and the associated indicators and targets. The analysis was undertaken as part of a Multi-criteria Analysis (MCA) which included environmental, social, technical and financial objectives for the projects. The analysis was undertaken in line with the National CFRAM Programme Guidance Note No. 28.

A key element of the SEA process is the development of the of SEA Objectives, Sub-Objectives, indicators and targets. These form the basis on which the environmental impact of the proposed plan measures can be assessed. The SEA Objectives are developed based on an understanding of the receiving environment in terms of spatial scale, sensitivity and existing problems. They are intended to be used as a yardstick to measure the potential for the plan measures to impact the receiving environment positively or negatively. It is important that the Strategic environmental objectives are developed to allow for the identification of opportunities as well as problems arising from the plan measures.

These objectives, sub-objectives and indicators will also perform a role in monitoring of the effectiveness of the flood risk management measures as part of a monitoring programme to inform future reviews and revisions to the Flood Risk Management Plans. These objectives, sub-objectives and indicators utilised for the purposes of this strategic environmental assessment are outlined in Table 4.1

Table 4.1: SEA Objectives, Sub-Objectives Indicators, and Targets

Objective	Sub-Objective	Indicator	Basic Requirement	Aspirational Target
Minimise risk to human health and life	Minimise risk to human health and life of residents	Annual Average number of residential properties at risk from flooding	Number of residential properties at risk from flooding does not increase	Reduce the number of residential properties at risk from flooding to 0
	Minimise risk to high vulnerability properties	Number of high vulnerability properties at risk from flooding	Do not increase number of high vulnerability properties at risk from flooding	Reduce the number of high vulnerability properties at risk from flooding to 0
Minimise risk to community	Minimise risk to social infrastructure and amenity	Number of social infrastructure receptors at risk from flooding	Do not increase number of social infrastructure receptors at risk from flooding	Reduce the number of social infrastructure receptors at risk from flooding to 0
	Minimise risk to local employment	Number of enterprises at risk from flooding	Do not increase number of enterprises at risk from flooding	Reduce the number of enterprises at risk from flooding to 0
Support the objectives of the WFD	Provide no impediment to the achievement of water body objectives and, if possible, contribute to the achievement of water body objectives.	Ecological status of water bodies	Provide no constraint to the achievement of water body objectives	Contribute to the achievement of water body objectives
Support the objectives of the Habitats and Birds Directives	Avoid detrimental effects to, and where possible enhance, Natura 2000 network, protected species and their key habitats, recognising relevant landscape features and stepping stones.	Area of site at risk from flooding and qualitative Assessment of impact of option on habitat	No deterioration in the conservation status of designated sites as a result of flood risk management measures	Improvement in the conservation status of designated sites as a result of flood risk management measures
Avoid damage to, and where possible enhance, the flora and fauna of the catchment	Avoid damage to and where possible enhance the flora and fauna of the catchment	Avoid damage to and where possible enhance, legally protected sites / habitats and other sites / habitats of national regional and local nature conservation importance	No deterioration on condition of existing sites due to implementation of option	Creation of new or improved condition of existing sites due to implementation of option
Protect, and where possible enhance, fisheries resource within the catchment	Maintain existing, and where possible create new, fisheries habitat including the maintenance or improvement of	Area of suitable habitat supporting fish. Number of upstream barriers	No loss of integrity of fisheries habitat. Maintenance of upstream accessibility	No loss of fishery habitat. Improvement of habitat quality / quantity. Enhanced upstream accessibility

Objective	Sub-Objective	Indicator	Basic Requirement	Aspirational Target
	conditions that allow upstream migration for fish species.			
Protect, and where possible enhance, landscape character and visual amenity within the river corridor	Protect, and where possible enhance, visual amenity, landscape protection zones and views into / from designated scenic areas within the river corridor.	Changes to reported conservation status of designated sites relating to flood risk management Extent of affected Natura 2000 site, NHA/pNHA or other affected National or International designations (e.g. Nature reserves and Ramsar sites), i.e. Area of re	1. No significant impact on landscape designation (protected site, scenic route/amenity, natural landscape form) within zone of visibility of measures 2. No significant change in the quality of existing landscape characteristics of the receiving environment	1. No change to the existing landscape form. 2. Enhancement of existing landscape or landscape feature
Avoid damage to or loss of features, institutions and collections of cultural heritage importance and their setting	Avoid damage to or loss of features, institutions and collections of architectural value and their setting and improve their protection from extreme floods.	a) The number of architectural features, institutions and collections subject to flooding. b) The impact of flood risk management measures on architectural features, institutions and collections.	a) No increase in risk to architectural features, institutions and collections at risk from flooding. b) No detrimental impacts from flood risk management measures on architectural features, institutions and collections.	a) Complete removal of all relevant architectural features, institutions and collections from the risk of harm by extreme floods. b) Enhanced protection and value of architectural features, institutions and collections importance arising from the implementation of the selected measures.
	Avoid damage to or loss of features, institutions and collections of archaeological value and their setting and improve their protection from extreme floods where this is beneficial.	a) The number of archaeological features, institutions and collections subject to flooding. b) The impact of flood risk management measures on archaeological features, institutions and collections.	a) No increase in risk to archaeological features, institutions and collections at risk from flooding. b) No detrimental impacts from flood risk management measures on archaeological features, institutions and collections.	a) Complete removal of all relevant archaeological features, institutions and collections from the risk of harm by extreme floods. b) Enhanced protection and value of archaeological features, institutions and collections importance arising from the implementation of the selected measures.

5 Assessment of Alternatives

The development of the FRMP for UoM 19 included the analysis of a range of flood risk management options within the Unit of Management. These flood risk options included both structural and non-structural measures. It should be noted that non-structural flood management measures will be implemented to some degree in all UoMs and so the alternatives assessment is relevant to structural measures only. The potential structural options provide realistic alternatives to the preferred options recommended at an AFA scale (Refer to Table 5.1 for the structural measures assessed as alternatives. Each of these alternatives was assessed by way of a multi-criteria analysis to identify the preferred flood risk management option. The outcomes of the alternatives assessment are presented below in Table 5.2.

Table 5.1: Structural Measures

Measure	Description
Flood Storage	Measures could include provision of flood storage/retardation system
Flow Diversion	This could include full diversion of provision of a by-pass channel/flood relief channel
Increased Conveyance	Measures could include in-channel works, floodplain earthworks, removal of constraints/constrictions or channel floodplain clearance.
Flood Defences	Flood defences can include such measures as walls, embankments or demountable defences
Improve Existing Defences	Existing defences could be repaired or gaps infilled.
Relocation of Properties	Existing properties could be relocated outside areas of flood risk
Localised Protection Works	This could involve such actions as minor raising of existing flood defences.

Table 5.2: AFAs within Unit of Management 19

UoM	Name	County	Viable structural options	Preferred Option	Note
19	Killeagh	Cork	No	None	None of the structural options are technically feasible.
19	Castlemartyr	Cork	Yes	Option 1 – Flood Defences & Flow Diversion	
19	Ballingeary	Cork	Yes	Option 1 Flood Defences	
19	Inchigeelagh	Cork	Yes	Option 1 Flood Defences	In this case Option 1 Flood Defences was the only viable structural measure

6 Assessment of South West FRMP for UoM 19

This section identifies the likely significant effects on the receiving environment resulting from the implementation of the individual options from the proposed FRMP both alone and in combination with other relevant plans and strategies. The assessment considers the potential impacts of implementing the following options:

1. *Non-Structural Measures*: General Flood Prevention and Flood Preparedness Measures; and
2. *Structural measures*: Preferred location-specific options for the management of flooding in AFAs.

The preferred flood risk management options/measures for UoM have been determined based on range of assessments, with the strategic environmental assessment fully integrated into the decision-making process:

- | The MCA Benefit - Cost Ratio;
- | The economic viability (the BCR);
- | The outcomes of the Strategic Environmental Assessments;
- | The adaptability to possible future changes, such as the potential impacts of climate change;
- | Professional experience and judgement of the OPW, local authorities and Mott MacDonald Ireland;
- | Public and stakeholder input and opinion.

Non-Structural Measures

There are a number of prevention and preparedness measures related to flood risk management which form part of wider Government policy. These measures will be applied across the whole UoM, including all AFAs and are:

- | **Planning Control** based on the *Guidelines on the Planning System and Flood Risk Management* (DEHLG, 2009);
- | Management of runoff water from developments utilising **Sustainable Urban Drainage Systems (SUDS)**.
- | Providing **Flood Forecasting and Warning** of impending flood events.
- | Increased **Public Awareness** measures to increase the public's recognition of the potential of the risk of flooding and the potential consequences thereof. Knowing in advance means that actions can be taken in a timely manner.
- | **Land Use Management** measures include strategies to control overland flow, such as improving agricultural and forestry practices in key catchment areas. Local natural flood management measures such as the creation of wetlands or forestry to retain overland flow could also be adopted.

The non-structural measures described in this section are complimentary to structural measures and should be implemented as national policy to the SSAs where appropriate. These measures have been assessed with regard to the SEA Strategic Environmental Objectives and this assessment has identified that these measures will in general have a neutral to positive effect if implemented

Structural Measures

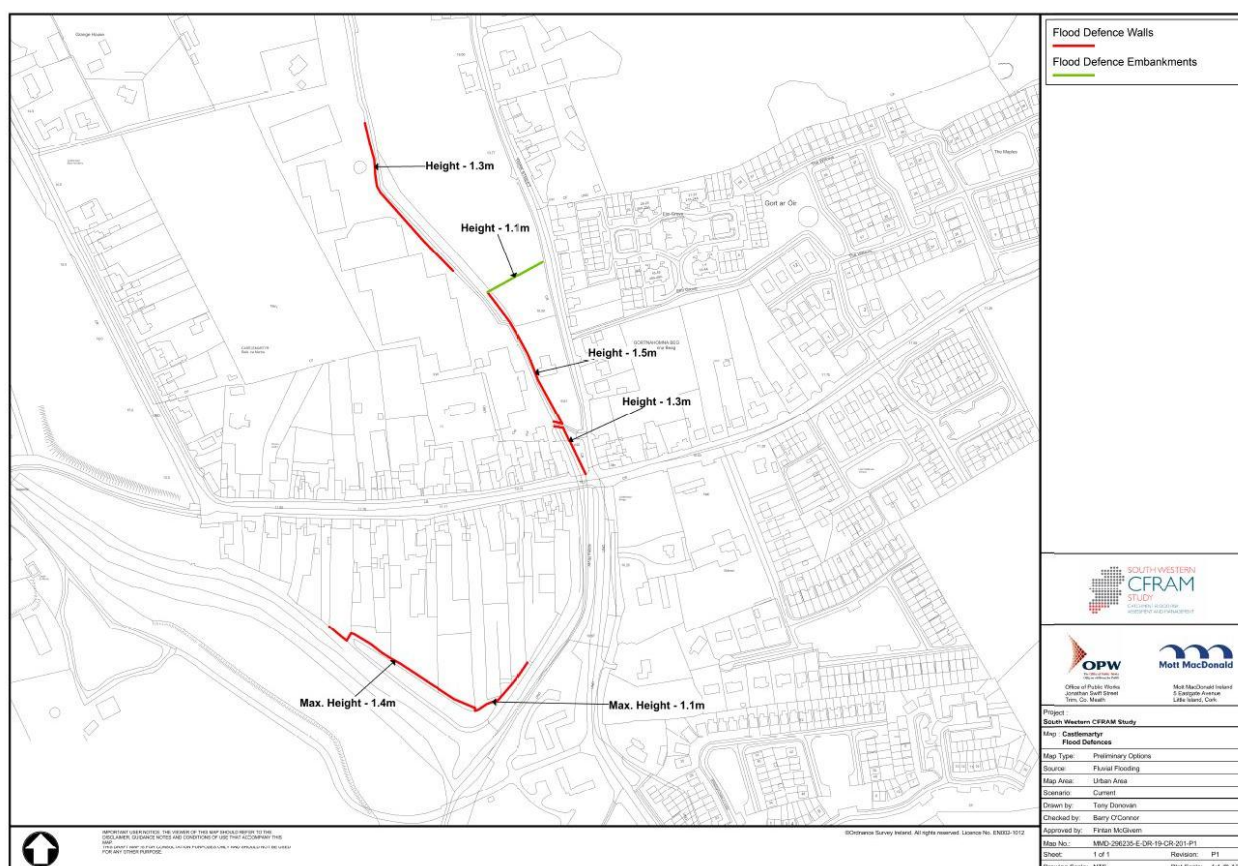
For each AFA, a number of structural measures have been assessed. The proposed structural measures are described below:

- i Castlemartyr AFA: The preferred flood risk management option as identified in the MCA is Flood Defences and Flow Diversion. This option includes diverting excess flows (in excess of 7m³/sec) from the Kiltha River around the town through an existing bypass channel which is currently disused (Killamucky Stream). A new flow diversion structure is required to reconnect to the flow diversion channel. Flood walls will also be constructed within the town north of the confluence of the Killamucky stream and the River Kiltha ranging in height from 1.1m to 1.4m.
- i Ballingeary AFA: The preferred flood risk management option as identified in the MCA is Fluvial Flood Defences which would comprise of walls and embankments.
- i Inchigeelagh AFA: The preferred flood risk management option as identified in the MCA is Fluvial Flood Defences which would comprise of flood walls and embankments.

The proposed measures at an AFA scale have been assessed for the three AFAs in UoM 19 as shown on Table 6.1, 6.2, 6.3 below.

Table 6.1: Castlemartyr AFA - Outcomes of SEA Appraisal

UoM	Lee, Cork Harbour and Youghal Bay
Area / Location	Castlemartyr
Option	Option 1 – Flood Defences
Code	IE-19-IE-AFA-190277-CR01-M33
Description	Diversion of excess flows around the town and the construction of flood walls ranging in height from 1.1m to 1.5m within the town



Strategic Environmental Assessments

Key Conclusions:

- The construction of this option could result in temporary negative impacts on the water body status without appropriate mitigation.
- This option will impose a permanent barrier to the transit of mammals along the river corridor.

Adaptability to Potential Future Changes

Option is not adaptable to climate change

Public Consultation Outcomes

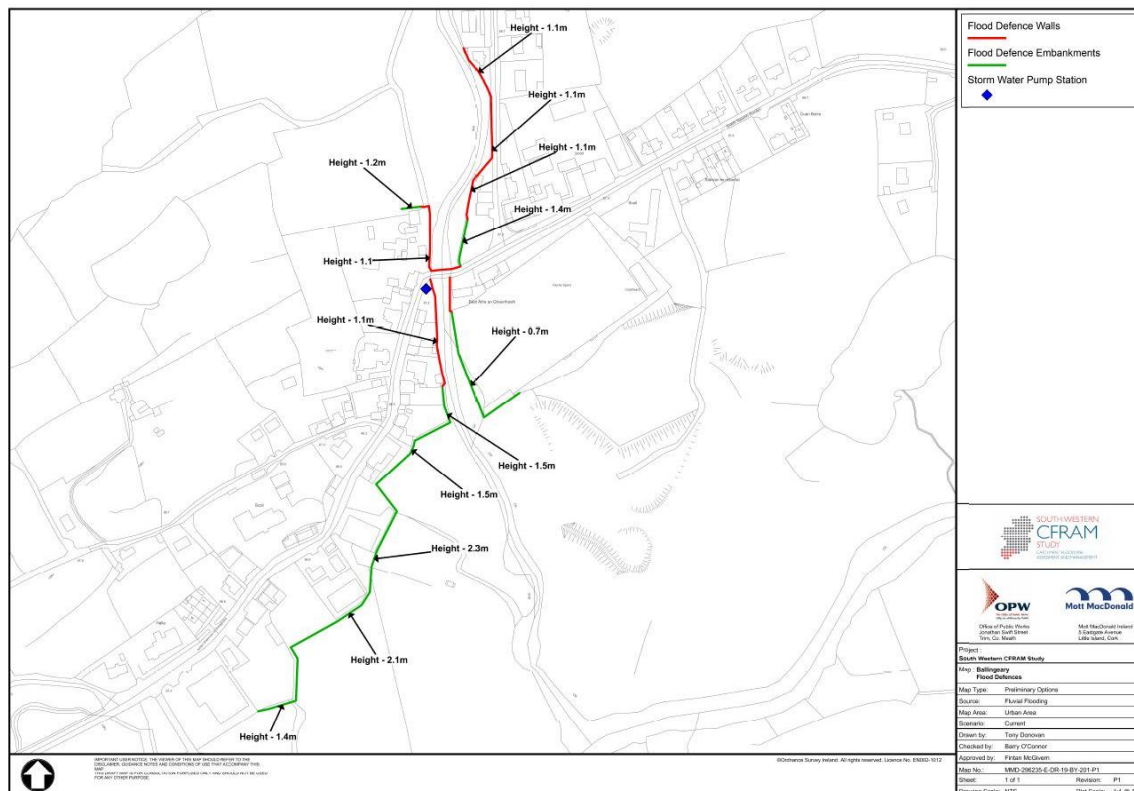
This option was preferred option of people who gave feedback at the public consultation.

Other Issues / Conclusions

The MCA has identified Option 1 – Flood Defences as the preferred Flood Risk Management Option.

Table 6.2: Ballingeary AFA - Outcomes of SEA Appraisal

UoM	Lee, Cork Harbour and Youghal Bay
Area / Location	Ballingeary
Option	Option 1 – Fluvial Flood Defences
Code	IE-19-IE-AFA-195499-BY01-M61
Description	Fluvial flood defences comprising of walls and embankments.



Strategic Environmental Assessments

Key Conclusions:

- The construction of this option could result in temporary negative impacts on the water body status without appropriate mitigation.
- The prevention of flooding will reduce the level of pollutants in the river Lee.

Adaptability to Potential Future Changes

Option is adaptable to climate change

Public Consultation Outcomes

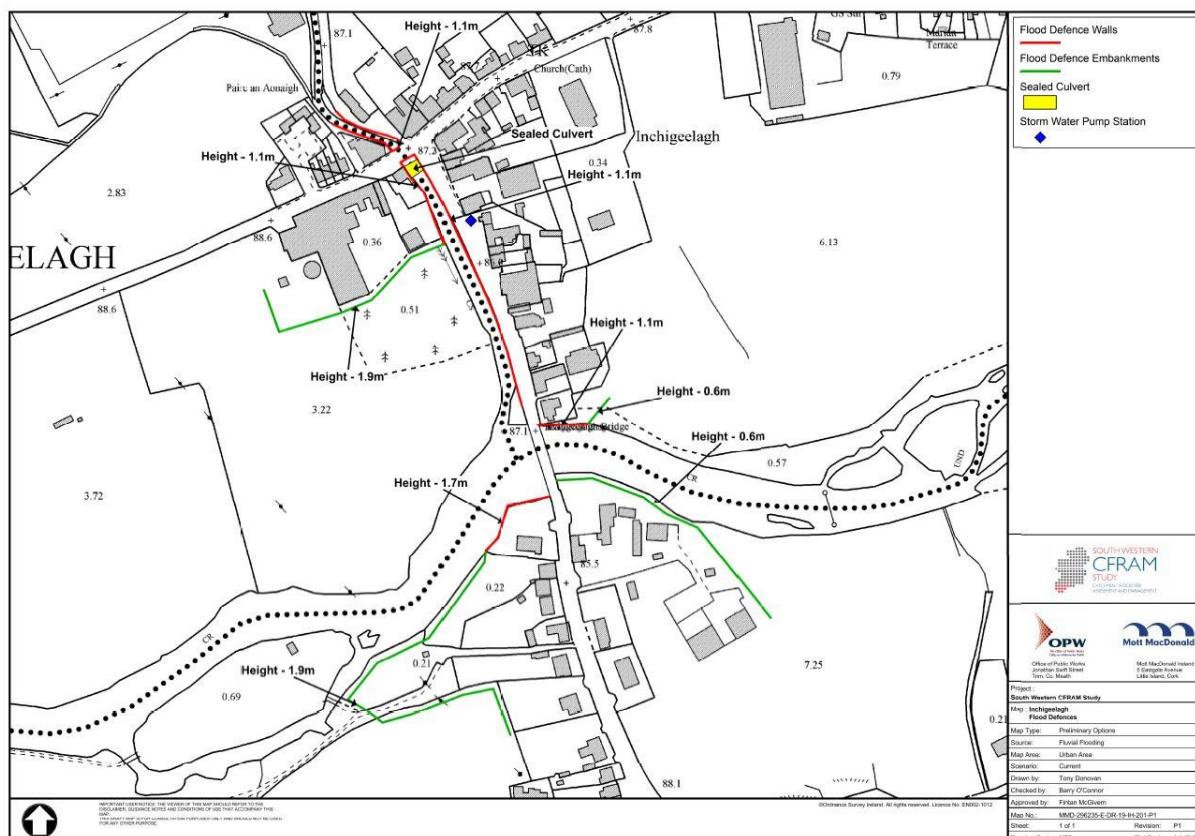
The feedback received at the Public Consultation Day indicated that this was the preferred option.

Other Issues / Conclusions

The MCA has identified Option 1 – Fluvial Flood Defences as the preferred Flood Risk Management Option.

Table 6.3: Inchigeelagh AFA - Outcomes of SEA Appraisal

UoM	Lee, Cork Harbour and Youghal Bay
Area / Location	Inchigeelagh
Option	Option 1 – Flood Defences
Code	IE-19-IE-AFA-190268-IH01-M33
Description	Fluvial flood defences comprising of flood walls and embankments



7 Mitigation and Monitoring

The preferred structural flood risk management options could give rise to some environmental impacts, both positive and negative of short term and long-term duration. For each of the proposed measures that have a potential negative impact mitigation measures have been developed to minimise the potential negative impacts arising from the options to be adopted.

The SEA assessment identified that the non-structural measures proposed for UoM 19 have either positive or neutral impacts and as a result do not require the implementation of mitigation measures. Furthermore, Habitats Directive Assessment was undertaken for UoM 19, potential for significant effects on the Natura 2000 sites (i.e. cSACs and SPAs) were assessed. Having regard to the findings of the AA Screening, that potential to have significant effects, either alone or in combination, the ecological integrity of the Natura 2000 sites was not reasonably foreseeable.

The principal mitigation recommendation is that potential impacts should be considered further during the next stage of option development, when detailed design of the preferred structural option progresses. This will allow the proposed option to be optimised through detailed design to limit the potential negative impacts on the receiving environment and based on the findings of project level environmental assessment, mitigation measures should be put in place. Environmental studies based on the detailed design and construction methodology will be undertaken as appropriate.

8 Conclusions

This SEA Environmental Report demonstrates how the strategic environmental assessment process was fully integrated into the development of the FRMP for UoM 19.

The preferred flood risk management options, both structural and non-structural measures at UoM scale and at the AFA scale were assessed to determine the potential impacts on the receiving environment.

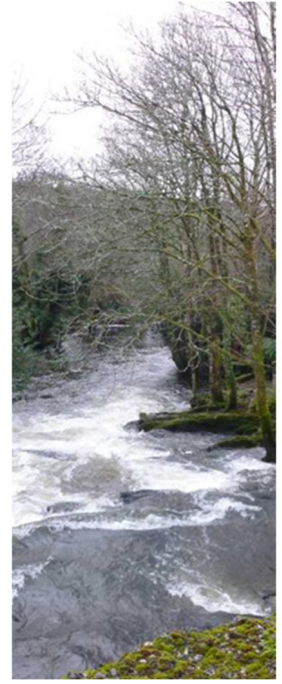
The integration of the SEA within the development of the FRMP has ensured that:

- Key environmental issues, constraints and opportunities within the vicinity of the proposed flood management options were considered;
- Environmentally unacceptable flood risk management measures did not progress to be a preferred option;
- The development of flood risk management options to avoid potential environmental impacts where possible;

Structural measures were specified for three AFAs:

- Castlemartyr: Flood Defences and Flow Diversion;
- Ballingeary: Fluvial Flood Defences;
- Inchigeelagh: Fluvial Flood Defences.

A suite of mitigation measures and proposed monitoring were developed for each of the proposed FRMP structural measures to ensure that the potential to impact on the receiving environment are minimised. However potential impacts should be considered further during the next stage of option development, when detailed design of the preferred structural option progresses.



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C	31/07/2017	NR	RH	BOC	Update following Consultation
D	05/10/2017	NR	RH	BOC	Update to Include a glossary

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Abbreviations

AA	Appropriate Assessment
ACA	Architectural Conservation Area
AFA	Area for Further Assessment
CAFE	Clean Air for Europe [Directive]
CBA	Cost Benefit Analysis
CDP	County Development Plan
CFRAM	Catchment Flood Risk Assessment and Management
CJEU	Court of Justice of the European Union
DAFM	Department of Agriculture, Food and the Marine
DAHG	Department of Arts, Heritage and the Gaeltacht
DAHRRGA	Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs
DCCAE	Department of Communications, Climate Action and Environment
DCENR	Department of Communications, Energy and Natural Resources
DD	Drainage District
DECLG	Department of Environment, Community and Local Government
DEHLG	Department of Environment, Heritage and Local Government
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
FPM	Freshwater Pearl Mussel
FRA	Flood Risk Assessment
FRM	Flood Risk Management
FRMP	Flood Risk Management Plan

GIS	Geographical Information Systems
GSI	Geological Survey Ireland
HA	Hydrometric Area
HPW	High Priority Watercourse
IFI	Inland Fisheries Ireland
IPP	Individual Property Protection
LAP	Local Area Plan
MCA	Multi-Criteria Analysis
MPW	Medium Priority Watercourse
NHA	Natural Heritage Area
NIS	Natura Impact Statement
NIHA	National Inventory of Architectural Heritage
NPWS	National Parks and Wildlife Service
OD	Ordnance Datum
OPW	Office of Public Works
OSi	Ordnance Survey Ireland
PFRA	Preliminary Flood Risk Assessment
RBD	River Basin District
RBMP	River Basin Management Plan
RMP	Record of Monuments and Places
RPS	Record of Protected Structures
SAC	Special Area of Conservation

SEA	Strategic Environmental Assessment
SI	Statutory Instrument
SOP	Standard Operating Procedure
SPA	Special Protection Area
SWRBD	South Western River Basin District
UoM	Unit of Management
WFD	Water Framework Directive
WHO	World Health Organisation

Glossary

Annual Exceedance Probability (AEP)	The probability, typically expressed as a percentage, of a flood event of a given magnitude being equalled or exceeded in any given year. For example, a 1% AEP flood event has a 1%, or 1 in a 100, chance of occurring or being exceeded in any given year
Appropriate Assessment	An assessment of the effects of a plan or project on the Natura 2000 network
Area for Further Assessment Or AFA	Areas where, based on the Preliminary Flood Risk Assessment, the risks associated with flooding are considered to be potentially significant. For these areas further, more detailed assessment is required to determine the degree of flood risk, and develop measures to manage and reduce the flood risk. The AFAs are the focus of the CFRAM Studies.
Arterial Drainage Scheme	Works undertaken under the Arterial Drainage Act (1945) to improve the drainage of land. Such works were undertaken, and are maintained on an ongoing basis, by the OPW.
Benefiting Lands	Lands benefiting from an Arterial Drainage Scheme.
Baseline	A description of the present and future state of an area, in the absence of any development, taking into account changes resulting from natural events and from other human activities
Catchment	The area of land draining to a particular point on a river or drainage system, such as an Area for Further Assessment (AFA) or the outfall of a river to the sea.
Catchment Flood Risk Assessment and Management Study Or CFRAM Study	A study to assess and map the flood hazard and risk, both existing and potential future, from fluvial and coastal waters, and to define objectives for the management of the identified risks and prepare a Plan setting out a prioritised set of measures aimed at meeting the defined objectives.
Flood	The temporary covering by water of land that is not normally covered by water.
Floods' Directive	The EU 'Floods' Directive [2007/60/EC] is the Directive that came into force in November 2007 requiring Member States to undertake

	a PFRA to identify Areas for Further Assessment (AFAs), and then to prepare flood maps and Plans for these areas
Flood Extent	The extent of land that has been, or might be, flooded. Flood extent is often represented on a flood map
Flood Hazard Map	A map indicating areas of land that may be prone to flooding, referred to as a flood extent map, or a map indicating the depth, velocity or other aspect of flooding or flood waters for a given flood event. Flood hazard maps are typically prepared for either a past event or for (a) potential future flood event(s) of a given probability
Flood Risk Map	A map showing the potential risks associated with flooding. These maps may indicate a particular aspect of risk, taking into account the probability of flooding (e.g., annual average economic damages), but can also show the various receptors that could be affected by floods of different probabilities
Floodplain	The area of land adjacent to a river or coastal reach that is prone to periodic flooding from that river or the sea
Indicator	A measure of variables over time, often used to measure achievement of objectives
Mitigation Measures	Refers to measures to avoid, reduce or offset significant adverse effects
Natura 2000 Network	The assemblage of sites which are identified as Special Areas of Conservation (SAC) under the Habitats Directive or identified as Special Protection Areas (SPAs) under the Birds Directive, or a site of Community Importance (SCI)
Natura Impact Statement	The statement prepared during Appropriate Assessment as required under the Habitats Directive which presents information on the assessment and the process of collating data on a project/plan and its potential significant impacts on Natura 2000 network sites
Objective	A statement of what is intended, specifying the desired direction of change in trends
Preliminary Flood Risk Assessment (PFRA)	An initial, high-level screening of flood risk at the national level to determine where the risks associated with flooding are potentially significant, to identify the AFAs. The PFRA is the first step required under the EU 'Floods' Directive

Public Consultation Day (PCD)	A public and stakeholder consultation and engagement event advertised in advance, where the project team displayed and presented material (e.g., flood maps, flood risk management options) at a venue within a community, with staff available to explain and discuss the material, and where members of the community and other interested parties could provide local information and put forward their views
Riparian	River bank. Often used to describe the area on or near a river bank that supports certain vegetation suited to that environment (riparian zone)
Risk	The combination of the probability of flooding, and the consequence of a flood
River Basin	An area of land (catchment) draining to a particular estuary or reach of coastline
Scoping	The process of deciding the scope and level of detail of an SEA, including the sustainability effects and options which needs to be considering, the assessment methods to be used, and the structure and contents of the Environmental Report
Sedimentation	the accumulation of particles (of soils, sand, clay, peat, etc) in the river channel
SEA	Strategic environmental assessment, is a formal, systematic evaluation of the likely significant effects of implementing a plan or programme before a decision is made to adopt it. It ensures that these effects are appropriately addressed at the earliest appropriate stage of decision making in tandem with economic and social considerations
Significant Risk	Flood risk that is of particular concern nationally. The PFRA Main Report (see www.cfram.ie) sets out how significant risk is determined for the PFRA, and hence how Areas for Further Assessment have been identified
Surface Water	Water on the surface of the land. Often used to refer to ponding of rainfall unable to drain away or infiltrate into the soil
Tidal	Related to the tides of the sea / oceans, often used in the context of tidal flooding, i.e., flooding caused from high sea or estuarine levels
Topography	The shape of the land, e.g., where land rises or is flat

Transitional Water	The estuarine or inter tidal reach of a river, where the water is influenced by both freshwater river flow and saltwater from the sea
Unit of management (UoM)	A hydrological division of land defined for the purposes of the Floods Directive. One Plan will be prepared for each Unit of Management, which is referred to within the Plan as a River Basin
Vulnerability	The potential degree of damage to a receptor (see above), and the degree of consequences that would arise from such damage
Waterbody	A term used in the Water Framework Directive (see below) to describe discrete section of rivers, lakes, estuaries, the sea, groundwater and other bodies of water
Water Framework Directive	Directive 2000/60//EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for community action in the field of water policy
Zone of Influence	The area over which a plan can impact on the environment

1 Introduction

1.1 Introduction

This document consists of the Strategic Environmental Assessment (SEA) Environmental Report for the Flood Risk Management Plan (FRMP) covering the Unit of Management (UoM) 19 in the South Western River Basin District.

The purpose of this Environmental Report is to identify, evaluate and describe the likely significant effects on the environment of implementing the Flood Risk Management Plan (FRMP) for UoM 19. Once the environmental effects have been identified, then mitigation measures are developed in tandem with an effective monitoring programme to ensure that the potential environmental impacts are minimised.

SEA is required under the EU Council Directive 2001/42/EC on the *Assessment of the Effects of Certain Plans and Programmes on the Environment*), more commonly known as the “SEA Directive” which has been transposed into Irish law by the following regulations:

- i European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations, 2004 (S.I. 435 of 2004); and
- i Planning and Development (Strategic Environmental Assessment) Regulations, 2004 (S.I. 436 of 2004).

These regulations were replaced in 2011 by the European Communities (Environmental Assessment of Certain Plans and Programmes) (Amendment) Regulations, 2011 (S.I. No. 200 of 2011) and the Planning and Development (Strategic Environmental Assessment) (Amendment) Regulations 2011 (S.I. No. 201 of 2011).

1.2 Background – Flood Risk Assessment and Management in Ireland

In 2004, the Irish Government adopted a new National Flood Policy for Ireland which shifted the emphasis in addressing flood risk away from arterial drainage and targeted towards the protection of agriculture and cities /towns liable to serious flooding and towards a waterbody catchment-based flood risk assessment (a similar catchment-based management approach to that already being implemented under the Water Framework Directive 2000/60/EC).

In 2007, the Floods Directive [2007/60/EC] was published which requires the establishment of a framework of measures to reduce the risks of flood damage. The Floods Directive was transposed into Irish law by the European Communities (Assessment and Management of Flood Risks) Regulations, 2010 (S.I. No. 122 of 2010). The Regulations identify the Office of Public Works (OPW) as the lead agency in implementing flood management policy in Ireland.

1.3 Catchment Flood Risk Assessment and Management (CFRAM) Studies

For the purpose of delivering on the components of the National Flood Policy and on the requirements of the European Union Floods Directive, the OPW, in conjunction with local authorities and stakeholders, is conducting a number of Catchment Flood Risk Assessment and Management (CFRAM) Studies. These

studies are the core activity from which medium to long-term strategies for the reduction and management of flood risk in Ireland will be achieved.

The overarching objectives of the CFRAM Studies are to:

- i Identify and map the existing and potential future flood hazard within the study area;
- i Assess and map the existing and potential future flood risk within the study area;
- i Identify viable structural and non-structural options and measures for the effective and sustainable management of flood risk within the study area;
- i Prepare Flood Risk Management Plans (FRMPs) setting out recommendations to manage the existing flood risk and also the potential future flood risk which may increase due to climate change, development, and other pressures that may arise in the future. FRMPs will set out policies, strategies, measures and actions that should be pursued by the relevant bodies (including the OPW, Local Authorities and other Stakeholders), to achieve the most cost-effective and sustainable management of existing and potential future flood risk within the study area, taking account of environmental plans, objectives and legislative requirements and other statutory plans and requirements¹.

The programme for the delivery of flood risk management in Ireland comprises of the following phases:

- i Preliminary Flood Risk Assessment, which was completed in 2011, identified areas of existing or foreseeable future potentially significant flood risk (referred to as 'Areas for Further Assessment'/AFAs);
- i CFRAM Studies, which were completed during the period 2011 to 2017;
- i Flood Risk Management Plans were produced, at Unit of Management scale, for each CFRAM study in 2017;
- i The Flood Risk Management Plans will be implemented from 2017 onwards and will be reviewed on a rolling six-yearly cycle.

It should be noted that the detailed designs for flood risk management measures will not be developed as part of the Flood Risk Management Plans / CFRAM Studies but rather measures will be progressed on a project by project basis, outside of the scope of the CFRAM studies.

This report is a Strategic Environmental Assessment Environmental Report and pertains to the Lee, Cork Harbour and Youghal Bay River Basin Unit of Management (UoM 19) in the South Western River Basin District.

1.4 Overview of the South Western River Basin District

The South Western River Basin District (SWRBD) covers an area of approximately 11,160 km². The study area of the SWRBD includes most of county Cork, large parts of counties Kerry and Waterford along with

¹ The Floods Directive requires that Flood Risk Management Plans should take into account the particular characteristics of the areas they cover and provide for tailored solutions according to the needs and priorities of those areas, whilst promoting the achievement of environmental objectives laid down in Community legislation.

small parts of the counties of Tipperary and Limerick. The study area contains over 1,800 km of coastline along the Atlantic Ocean and the Celtic Sea. (Refer to Figure 1.1)

In total, six Local Authorities administer the regions within the SWRBD: Cork County Council, Cork City Council, Kerry County Council, Waterford City and County Council, Tipperary County Council and Limerick City & County Council. Much of the SWRBD is rural and the predominant land usage is agriculture.

Figure 1.1: South Western River Basin District (SWRBD)



1.5 Overview of the Lee, Cork Harbour and Youghal Bay Unit of Management (UoM 19)

The Lee, Cork Harbour and Youghal Bay River Basin UoM covers an area of approximately 2,145km². The entire area of UoM 19 is within County Cork. The main rivers within UoM 19 are the Lee, Owenboy and Womagh (Refer to Figure 1.2).

The OPW have undertaken a separate Catchment Flood Risk Assessment and Management (CFRAM) Study within UoM 19 for the Lee Catchment. However, the towns of Ballingeary and Inchigeelagh in the upper reach of the Lee, which have been identified as AFAs were not included in the Lee CFRAM. This study includes the Womagh and its tributaries the Kiltha and the Dissour which are outside of the Lee Catchment and the watercourses in Ballingeary

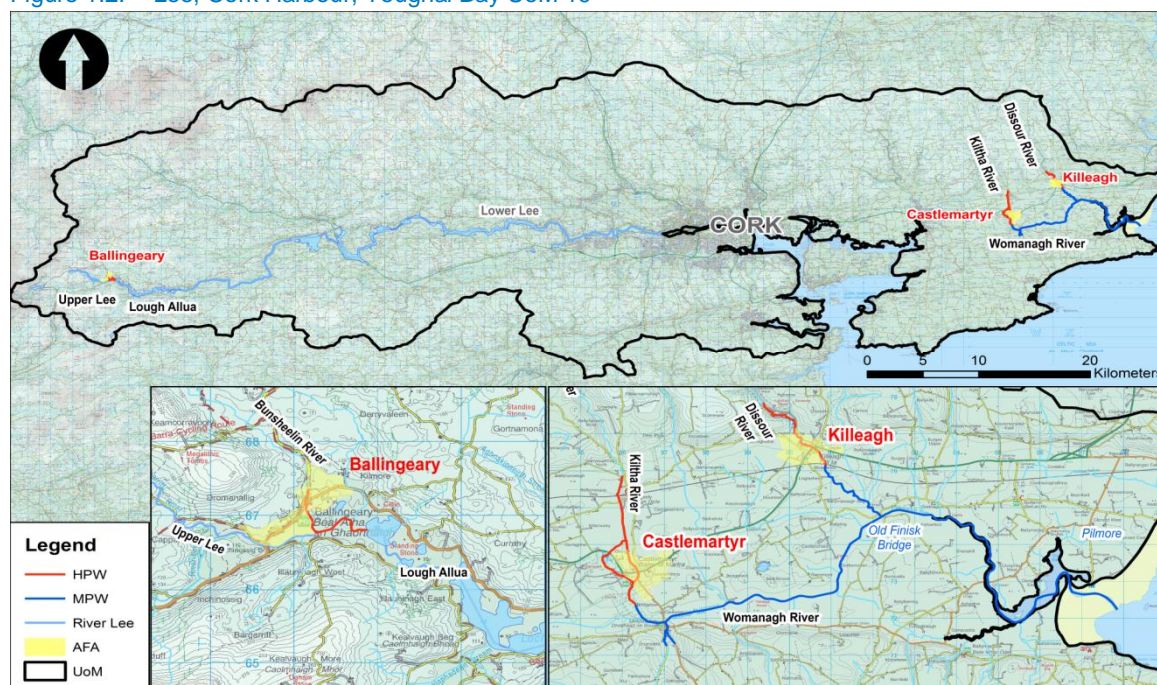
As part of this study, there are four Areas for Further Assessment (AFAs) that have been identified within UoM 19 (Refer to Table 1.1). The Lee CFRAM study included a further twelve AFAs. Associated with the AFA's in this study are over 29km of high and medium priority watercourses².

Killeagh AFA was ruled out of the optioneering process as it was determined that the risk of flooding is low. Therefore, for the purpose of this SEA Environmental Report, the following three AFA's were only considered, Castlemartyr, Ballingeary, and Inchigeelagh.

Table 1.1: AFAs within Unit of Management 19

UoM	Name	Unique ID	Fluvial	Coastal	County	Easting	Northing	Viable structural options
19	Killeagh	190274	Yes	No	Cork	200750	75750	No
19	Castlemartyr	190277	Yes	No	Cork	196250	73250	Yes
19	Ballingeary	195499	Yes	No	Cork	115090	67135	Yes
19	Inchigeelagh	N/A	Yes	No	Cork	122589	66287	Yes

Figure 1.2: Lee, Cork Harbour, Youghal Bay UoM 19



² High priority watercourses are any modelled watercourse within an AFA. Medium priority watercourses are all other modelled watercourses

1.6 Purpose and Structure of this Report

The CFRAM studies and Flood Risk Management Plans will be informed by a Strategic Environmental Assessment completed in accordance with the requirements of the SEA Directive (2001/42/EC), as transposed into Irish law through S.I. No. 435 and 436 of 2004 and S.I. No. 200 and 201 of 2011.

This is the SEA Environmental Report for UoM 19 of the South Western River Basin District CFRAM study. This report forms part of the overall SEA process.

The purpose of this report is to:

- a) Outline the key environmental characteristics of the Unit of Management and to present an understanding of how flood risk management measures may influence these environmental characteristics;
- b) Present the Strategic Environmental Objectives;
- c) Presentation of an assessment of alternatives and outline the preferred flood risk management options;
- d) Presentation of an assessment of the preferred flood risk management options and define potential for an environmental effect
- e) Define appropriate mitigation proposals and realistic monitoring programmes;

1.7 Report Structure

Section 1 Introduction: provides a broad background to the South Western CFRAM project in the context of National Flood Policy and legislation. This section also specifies the legislative requirement for Strategic Environmental Assessment (SEA) and outlines the purpose of this document – the Environmental Report.

Section 2 Flood Risk Management in UoM 19 provides details on the historical occurrence of flooding in the Lee, Cork Harbour and Youghal Bay Unit of Management and gives an overview of the Flood Risk Management Plan.

Section 3 Approach to Strategic Environmental Assessment: gives an overview of the SEA process and the relationship between SEA AA and the CFRAM project.

Section 4 Stakeholder and Public Consultation provides a programme of all the key stakeholder and public consultation events undertaken for the purposes of the Strategic Environmental Assessment of the CFRAM project in the South Western River Basin Districts.

Section 5 Relationship with Other Plans presents a review of the potential for interactions between the CFRAMS plan for the South Western RBD and other relevant plans.

Section 6 Key Characteristics of UoM 19 provides a summary description of the receiving environment within the Unit of Management and also includes potential interrelationships / interactions between the various environmental topics.

Section 7 Strategic Environmental objectives: presents the SEA objectives, indicators and associated targets to be used in the SEA assessment, as developed in the SEA Scoping process.

Section 8 Assessment of Alternatives: outlines the results and outcomes of the assessment of alternatives undertaken during the SEA process as part of the development of the CFRAM plan for the South Western RBD.

Section 9 Assessment of South Western CFRAM Plan to UoM 19 presents details of the SEA assessment of the CFRAMS plan for the South Western RBD utilising the Strategic Environmental Objectives developed for the project.

Section 10 Mitigation and Monitoring presents the proposed SEA mitigation measures and monitoring programme.

Section 11: Conclusions and Recommendations: Conclusions of the draft Strategic Environmental Assessment.

2 Flood Risk Management in UoM 19

2.1 Historic Flooding in UoM 19

Historic flood events for the catchments in UoM 19 were identified from the floods database (www.floods.ie), previous reports, and drawing on local accounts of the relevant Local Authority personnel as part of the flood risk review site inspections. There were limited details available for historic flood events, as detailed records of impacts for events more than 20 years ago are scarce. Refer to Table 2.2 for details of the key flooding events that have occurred within the UoM 19.

2.2 Preliminary Flood Risk Assessment

The Preliminary Flood Risk Assessment (PFRA) was a national screening exercise, based on available and readily-derivable information, to identify areas where there may be a significant risk associated with flooding. The PFRA for Ireland was finalised in December 2011.

The outcomes of the PFRA in combination with public consultation outcomes and the Flood Risk Reviews were used to designate the Areas of Further Assessment (AFAs). The AFAs are areas which have been identified as having significant risks associated with flooding and are the subject of further detailed assessment during the CFRAM process. Table 2.1 identifies the AFAs that are within the area covered by this FRMP, which are also shown in Figure 2.1.

Table 2.1: List of AFAs within the Lee, Cork Harbour and Youghal Bay UoM

UoM	Name	Unique ID	Fluvial	Coastal	County	Easting	Northing
South Western CFRAM Study							
19	Ballingeary	195499	Yes	No	Cork	115090	67135
19	Castlemartyr	190277	Yes	No	Cork	196250	73250
19	Killeagh	190274	Yes	No	Cork	200750	75750
19	Inchigeelagh	190268	Yes	No	Cork	122589	66287
Lee CFRAM Study							
19	Ballymakeery / Ballyvourney	190292	Yes	No	Cork	120250	77000
19	Blarney / Tower	190280	Yes	No	Cork	158250	73750
19	Carrigaline	190289	No	Yes	Cork	173000	62500
19	Cobh	192407	No	Yes	Cork	179420	66626
19	Cork City	190286	Yes	Yes	Cork	167750	71250
19	Crookstown	192414	Yes	No	Cork	142597	66085
19	Douglas	190291	Yes	Yes	Cork	170750	69500
19	Glanmire	190290	Yes	Yes	Cork	172500	73750
19	Little Island	190284	No	Yes	Cork	175250	72500
19	Macroom	190270	Yes	No	Cork	132250	73750
19	Middleton / Ballinacurra	190279	Yes	No	Cork	188250	73000

UoM	Name	Unique ID	Fluvial	Coastal	County	Easting	Northing
19	Passage West	190283	No	Yes	Cork	177000	68750
19	Togher	190288	Yes	No	Cork	166500	69000
19	Whitegate	190282	No	Yes	Cork	184000	63500

Table 2.2: Key Historical Flood Events

Date	Flooding Mechanisms	Areas Affected	AFA Properties Flooded	Reported Duration of Flooding (Hours)
06/08/1986	River flooding along the Lee, Sullane and Laney	Ballymakerry; Macroom; Cork City; Ballincollig	None within in AFAs	24 hours
04/02/2004	Fluvial flooding due to overtopping on the Bunsheelin River as it meets the River Lee, exacerbated by high Lough levels	Ballingeary: R584, Casadh Na Spride Park, An Grianán	At least 1 residential property	~ 20 hours
27/10/2004			At least 1 residential property	~ 20 hours
07/01/2005			8 residential properties flooded	~ 20 hours
19/11/2009	Fluvial flooding due to overtopping on the Bunsheelin River as it meets the River Lee, exacerbated by high Lough levels Fluvial flooding due to overtopping on the River Kiltia	Ballingeary: Ardán Seamus O'Shea Castlemartyr: Mogeely Road Killeagh: Main Street Wider Lee Catchment	19 residential, 6 commercial and 1 school 3 residential and roads Roads only	Estimated to be over 20 hours (58 hour storm) Estimated to be less than 12 hours Estimated to be less than 12 hours
15/01/2011	Flash flooding along Bunsheelin River exacerbated by raised Lough levels from preceding events.	Ballingeary:	1 residential 2 commercial	18 hours
02/11/2011	Flooding due to raised Lough levels from preceding events.	Ballingeary:	Fields flooded and local road nearly flooded	18 Hours

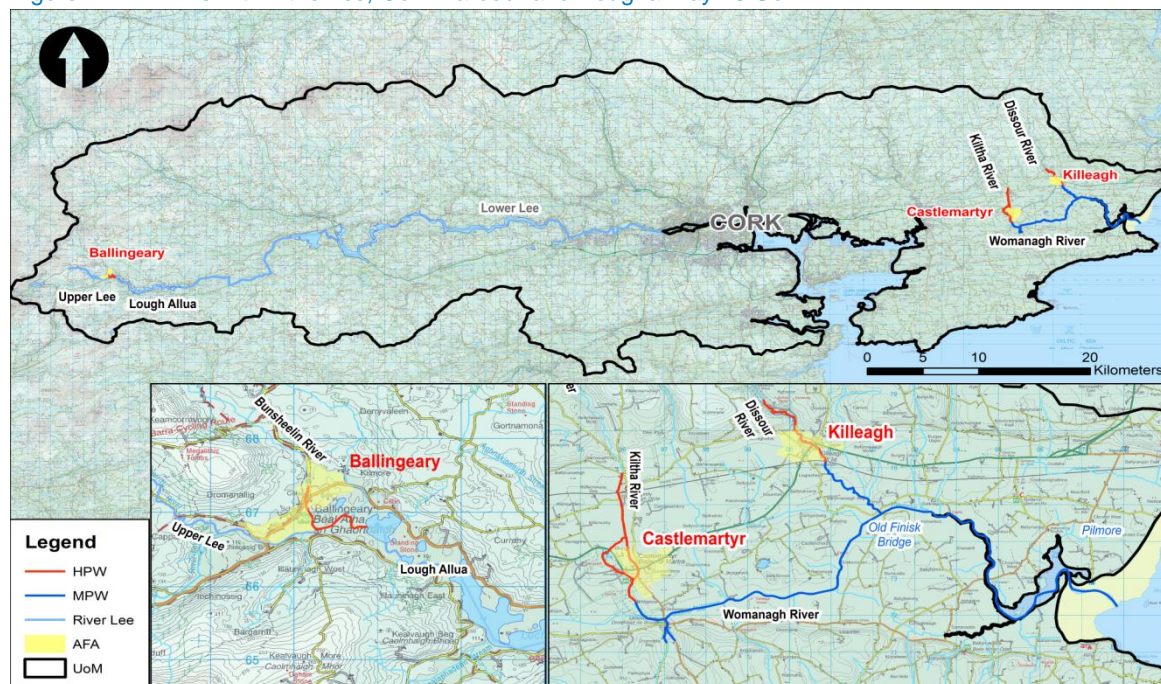
2.3 Catchment Flood Risk Assessment and Management (CFRAM) Study

A Flood Risk Management Plan (FRMP) has been prepared for this UoM as part of an overall development CFRAM programme for the South Western RBD.

The CFRAM programme has been developed to set out a sustainable long-term strategy to manage existing identified flood risk and potential for future increasing flood risks due to the effects of climate change. The objectives of the CFRAM Programme are to:

- i Identify and map the existing and potential future flood hazard and flood risk;
- i Identify viable structural and non-structural options and measures for the effective and sustainable management of flood risk in the Areas for Further Assessment (AFAs);
- i Prepare a set of FRMPs, and associated Strategic Environmental and Habitats Directive (Appropriate) Assessments, that sets out the policies, strategies, measures and actions that should be pursued by the relevant bodies, including the OPW, Local Authorities and other Stakeholders, to achieve the most cost-effective and sustainable management of existing and potential future flood risk, taking account of environmental plans, objectives and legislative requirements and other statutory plans and requirements.

Figure 2.1: AFAs within the Lee, Cork Harbour and Youghal Bay 19 UoM



2.4 Development of the FRMP

The development of the FRMP has comprised a number of steps as part of a well-defined and transparent process aimed at identifying appropriate flood management solutions. The Strategic Environmental Assessment has been fully integrated into the FRMP development strategy.

2.4.1 Data collection and collation

The CFRAM Programme involves the collection of a wide range of information on past floods, the environment, flood defence assets, ground levels, hydrometric data, details on hydrogeomorphological processes, land use, and details of watercourses and the coastline to provide a thorough understanding of the flood risk, both in the cities, towns and villages and along the rivers that connect them.

2.4.2 Flood Risk Modelling

A review and analysis of historical flood events, hydrometric data and hydrogeomorphological processes has highlighted flooding issues to urban areas and nationally important infrastructure from the River Womanagh, Upper Lee, Bunsheelin River and a number of smaller tributaries. The Flood Studies Update methodologies have been used to determine the current design peak flows for eight specified flood probabilities. Rainfall-runoff modelling has been used to derive the critical hydrograph at Ballingeary that results in flooding to the town. The FSU UPO-ERR Gamma curve has been applied to derive the characteristic flood hydrographs across the Womanagh catchments. Corresponding coastal conditions have been developed for the design fluvial events. Calibration events were identified in Castlemartyr, Killeagh, and Ballingeary where there was sufficient historical flood data.

Potential future catchment changes relevant to the Upper Lee and Womanagh catchment have been assessed including changes in urban development, land use and hydrology related to global climate change. Two future scenarios have been developed from this analysis, a Mid-Range Future Scenario and High End Future Scenario, which have been used to develop potential future flows and extreme sea levels.

The resultant design flood hydrographs and coastal conditions were used as input to the hydraulic models used to map flood hazard and to develop flood risk management options.

Four hydraulic models have been developed for UoM19. The hydraulic assessment and flood mapping for the remainder of UoM19 has been completed as part of the Lee Pilot CFRAM Study in 2013.

The river channels have been modelled using 1D ISIS software to calculate flows and head loss at hydraulic structures. The 2D TUFLOW software has been used to simulate the multi-directional flows across the urban floodplains of Castlemartyr and Killeagh. The 1D and 2D components of the models are hydrodynamically linked such that water can flow between the river and floodplain during the event to simulate the observed flood mechanisms. A 1D approach has been taken in Ballingeary and Inchigeelagh because the floodplain flow was deemed to be parallel to and fully connected with the channel flow.

The Ballingeary, Inchigeelagh and Castlemartyr were calibrated to the flood events of 19th November 2009 at Ballingeary, Inchigeelagh and Castlemartyr AFAs. The Killeagh and Womanagh models were not calibrated due to a lack of flood report, extents, levels and gauge information. However, sensitivity tests were undertaken on flow, downstream level and Manning's 'n' for all models.

The calibrated and tested models were then run for eight flood probabilities under the current design scenario, eight flood probabilities under the mid-range future scenario, and three flood probabilities under the high end future scenario from both fluvial and coastal sources. Each scenario considers the joint probability between fluvial sources of both the main river and tributaries in Ballingeary, Inchigeelagh, and Womanagh; and between fluvial and coastal sources on the Womanagh. Joint probability between different fluvial sources was not considered for Castlemartyr and Killeagh because there are no tributaries within the Areas for Further Assessment. The flood extent, flood zone, flood depth, flood velocity and flood hazard have all been mapped for the specified scenarios.

The outputs of the modelling results and flood maps will be used as inputs to the flood risk review. The knowledge of the flood mechanisms, critical structures and impact of flooding established in this report will support the development of sustainable and appropriate flood risk management options in the flood risk areas.

2.4.3 Flood Risk Analysis and Mapping

The potential adverse consequences (risk) associated with flooding to the following four risk receptor groups were assessed and mapped for each AFA:

- i Society;
- i The Environment;
- i Cultural Heritage; and
- i The Economy.

In addition, specific flood risk maps were prepared to assess the following:

- i Number of Inhabitants: maps which present the indicative number of inhabitants at risk of flooding within each AEP event;
- i Types of Economic Activity: maps which present the types of property use and type of economic activity at risk of flooding within each AEP event;
- i Specific Risk Density: maps which present the annual average damage.

2.4.4 Flood Risk Management Objectives

A set of flood risk management objectives were developed and applied through the Pilot CFRAM Studies, with stakeholder consultation to ensure the objectives set were appropriate. In commencing the National CFRAM Programme, the objectives used in the Pilot Studies were reviewed and refined. The OPW considered it appropriate to publicly consult on the proposed objectives, and launched a public consultation in October 2014. 71 submissions were received which informed amendments then made to define the final

Objectives. The final set of objectives were approved by the Minister for Public Expenditure and Reform in March 2015.

These Flood Risk Management Objectives set out what the goals that the FRMP is aiming to achieve. They have a key role in the preparation of the FRMP, as the proposed plan measures are appraised against these objectives to determine how well each option contributes towards meeting the defined goals.

The Objectives are aimed at considering potential benefits and impacts across a broad range of sectors including human health, the environment, cultural heritage and economic activity.

The environmental objectives included in the overall flood risk management objectives are the SEA Objectives developed at the scoping stage of the process. This means that the strategic environmental assessment is integrated into the overall appraisal process used to identify the preferred flood risk management measures.

2.4.5 Multi-Criteria Assessment (MCA)

A Multi-Criteria Assessment (MCA) is used as part of the process for assessing potential options for reducing or managing flood risk in each AFA.

The MCA makes use of 'Global Weightings' to rank the general importance, or level of 'societal value', for each of the Objectives (Refer to Table 2.3). 'Local Weightings' are also used to reflect the relevance of each objective in each individual UoM, Sub-Catchment or AFA.

Given the key role the Objectives and their Global Weightings have in selecting preferred measures for managing flood risk, the OPW considered it appropriate to consult on the Global Weightings that would be assigned to each objective, and commissioned an independent poll of over 1000 members of the public on the Global Weightings through a structured questionnaire. The results of this poll were analysed by UCD. The final Global Weightings adopted for each Objectives were then set, and are set out in the Plan.

2.4.6 Generation of Flood Mitigation Measures

There are a wide range of different approaches or methods that can be taken to reduce or manage flood risk. These can range from non-structural methods, that do not involve any physical works to prevent flooding but rather actions typically aimed at reducing the impacts of flooding, to structural works that reduce flood flows or levels in the area at risk or protect the area against flooding. The range of methods for managing flood risk that are considered include those outlined below.

- i **Flood prevention measures** are aimed at avoiding or eliminating a flood risk. This can be done by not creating new assets that could be vulnerable to flood damage in areas prone to flooding, or removing such assets that already exist. Flood prevention is hence generally focussed on sustainable planning and / or the re-location of existing assets, such as properties or infrastructure. This includes ensuring the area planning is undertaken having regard to the requirements of the *Guidelines on the Planning System and Flood Risk Management*;

- | **Flood protection measures** are aimed at reducing the likelihood and/or the severity of flood events. These measures, typically requiring physical works, can reduce risk in a range of ways, such as by reducing or diverting the peak flood flows, reducing flood levels or holding back flood waters. Such measures include the development of flood defence structures, increasing channel conveyance, flow diversions and the development of flood water storage;
- | **Flood Preparedness** includes measures that reduce the consequence of flooding in terms of minimising the impact of flooding events on people, property and other assets. Such measures include Flood forecasting and warning, emergency response planning, promotion of individual and community resilience and flood related data collection.

For each UoM and AFA options for managing and reducing the flood risk as identified have been investigated to determine the most effective and appropriate options considering technical, financial, environmental and social constraints. Draft Flood Risk Management Plans were developed and were issued for public and stakeholder consultation as part of the Strategic Environmental Assessment (SEA) process.

Following the public and stakeholder consultation on the Draft FRMPs, where necessary the Plans were reviewed and amended appropriately before the Plans are submitted for comment, amendment or approval by the Minister.

It should be noted that the potential measures set out in the FRMPs that have been developed through the CFRAM Programme are to an outline design, and are generally, for structural schemes, not at this point ready for construction. Further detailed design will be required for many measures before implementation along with project-level environmental appraisal and planning permission or confirmation, where relevant.

Table 2.3: Flood Risk Management Objectives for the National CFRAM Programme

Criteria	Objective		Sub-Objective
1 Technical	a	Ensure flood risk management options are operationally robust	i) Ensure flood risk management options are operationally robust
	b	Minimise health and safety risks associated with the construction, operation and maintenance of flood risk management options	l) Minimise health and safety risks associated with the construction, operation and maintenance of flood risk management options
	c	Ensure flood risk management options are adaptable to future flood risk, and the potential impacts of climate change	i) Ensure flood risk management options are adaptable to future flood risk, and the potential impacts of climate change
2 Economic	a	Minimise economic risk	i) Minimise economic risk
	d	Minimise risk to transport infrastructure	i) Minimise risk to transport infrastructure
	c	Minimise risk to utility infrastructure	i) Minimise risk to utility infrastructure
	d	Minimise risk to agriculture	i) Minimise risk to agriculture
3 Social	a	Minimise risk to human health and life	i) Minimise risk to human health and life of residents
			ii) Minimise risk to high vulnerability properties
	b	Minimise risk to community	i) Minimise risk to social infrastructure and amenity
			ii) Minimise risk to local employment
4 Environmental	a	Support the objectives of the WFD	i) Provide no impediment to the achievement of water body objectives and, if possible, contribute to the achievement of water body objectives.
	B	Support the objectives of the Habitats Directive	i) Avoid detrimental effects to, and where possible enhance, Natura 2000 network, protected species and their key habitats, recognising relevant landscape features and stepping stones.
	c	Avoid damage to, and where possible enhance, the flora and fauna of the catchment	i) Avoid damage to or loss of, and where possible enhance, nature conservation sites and protected species or other know species of conservation concern.
	d	Protect, and where possible enhance, fisheries resource within the catchment	i) Maintain existing, and where possible create new, fisheries habitat including the maintenance or improvement of conditions that allow upstream migration for fish species.
	e	Protect, and where possible enhance, landscape character and visual amenity within the river corridor	i) Protect, and where possible enhance, visual amenity, landscape protection zones and views into / from designated scenic areas within the river corridor.

Criteria	Objective	Sub-Objective
f	Avoid damage to or loss of features, institutions and collections of cultural heritage importance and their setting	i) Avoid damage to or loss of features, institutions and collections of architectural value and their setting.
		ii) Avoid damage to or loss of features, institutions and collections of archaeological value and their setting.

3 Approach to Strategic Environmental Assessment

3.1 What is Strategic Environmental Assessment (SEA)?

Strategic Environmental Assessment (SEA) is a formal, systematic evaluation of the likely significant environmental effects of implementing a plan or programme, prior to a decision being made to adopt a plan or programme.

SEA in Ireland is based on *Directive 2001/42/EC (Assessment of the Effects of Certain Plans and Programmes on the Environment)*, more commonly known as the “SEA Directive”. The Directive has been transposed into Irish law by the *European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations, 2004 (S.I. 435 of 2004)* and the *Planning and Development (Strategic Environmental Assessment) Regulations, 2004 (S.I. 436 of 2004)* as amended by the *European Communities (Environmental Assessment of Certain Plans and Programmes) (Amendment) Regulations, 2011 (S.I. No. 200 of 2011)* and the *Planning and Development (Strategic Environmental Assessment) (Amendment) Regulations 2011 (S.I. No. 201 of 2011)*.).

The main objective of the SEA Directive is to:

“provide for a high level of protection for the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development.”

3.2 SEA Guidance

The SEA for the South Western CFRAM Study is in accordance with national best practise guidance as follows:

- | Environmental Protection Agency. *SEA Scoping Guidance Document*. March 2015;
- | Environmental Protection Agency, *GISEA Manual* 2015;
- | Environmental Protection Agency. *Integrating Climate Change into Strategic Environmental Assessment in Ireland - A Guidance Note*. 2015;
- | Environmental Protection Agency. *Developing and Assessing Alternatives in Strategic Environmental Assessment*. 2015;
- | Environmental Protection Agency. *Strive Report No. 106. Integrated Biodiversity Impact Assessment – Streamlining AA, SEA and EIA Processes: Practitioner’s Manual*. 2013;
- | Environmental Protection Agency. *SEA Pack*. Updated 18th April 2013;
- | Environmental Protection Agency & West Regional Authority. *SEA Resource Manual for Local and Regional Planning Authorities - Integration of SEA Legislation and Procedures for Land use Plans*. July 2013;
- | Environmental Protection Agency. *Review of Effectiveness of SEA in Ireland*, 2012;
- | Department of the Environment, Heritage and Local Government. *Implementation of SEA Directive (2001/42/EC): Assessment of the Effects of Certain Plans and Programmes on the Environment. Guidelines for Regional Authorities and Planning Authorities*. November 2004;
- | Environmental Protection Agency. *Development of Strategic Environmental Assessment (SEA) Methodologies for Plans and Programmes in Ireland. Synthesis Report*, 2003.

3.3 Strategic Environmental Assessment –Process Overview

3.3.1 Overview

The SEA process involves six key stages as follows:

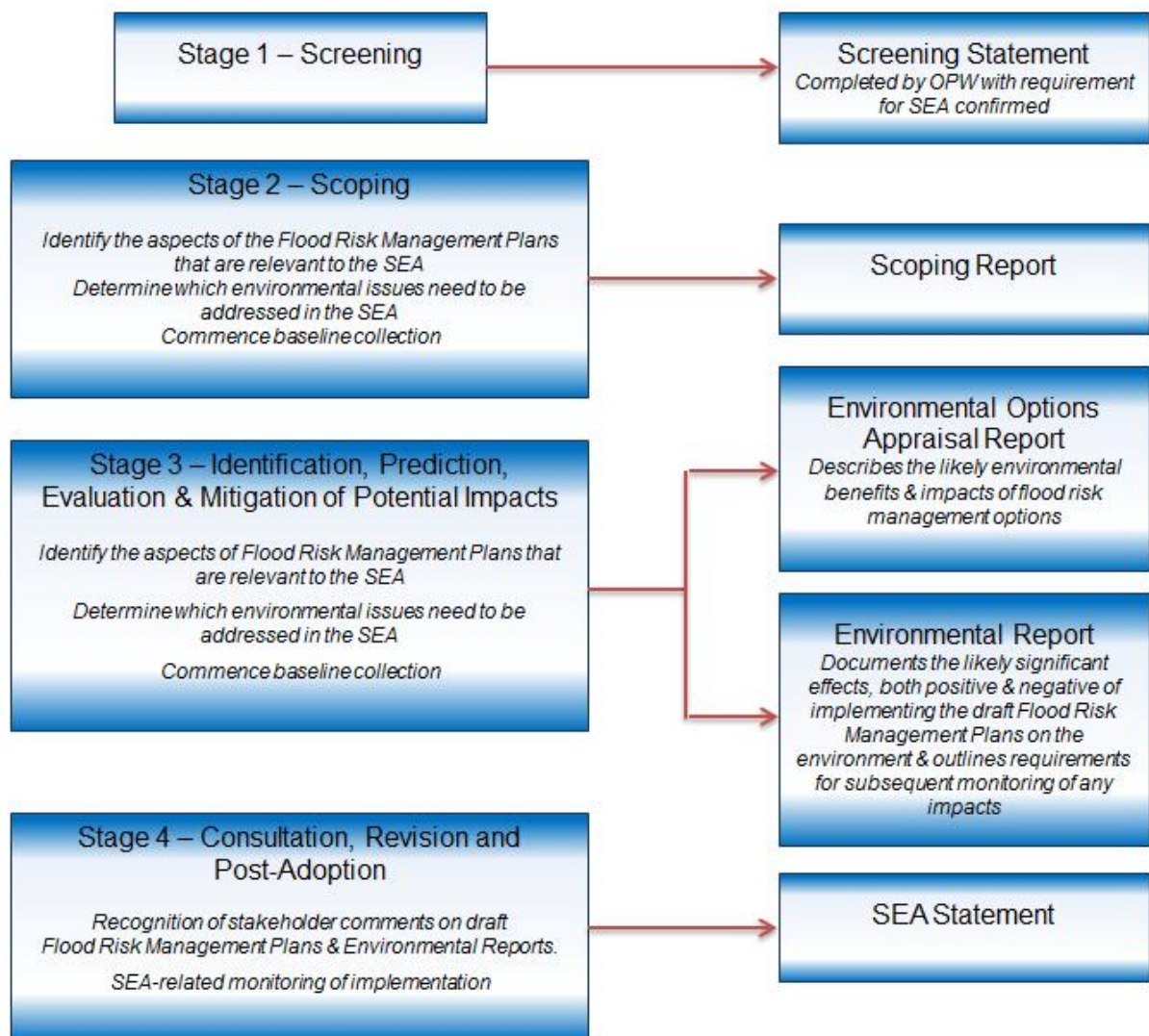
- i **Screening** – The process to identify the requirement for Strategic Environmental Assessment based on the criteria in Schedule 1 of the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (S.I. No. 435 of 2004), as amended by the European Communities (Environmental Assessment of Certain Plans and Programmes) (Amendment) Regulations, 2011 (S.I. 200 of 2011) [SEA regulations];
- i **Scoping** – Scoping determines the range of environmental issues which are to be addressed in the Strategic Environmental Assessment. The scoping process has due regard to the requirements of Schedule 2/2b of the SEA regulations. The scoping process is of high importance as it sets out a framework for the assessment of environmental effects resulting from a plan or programme and the generation of alternatives to ensure minimal environmental impact. Consultation is a key element of the scoping process in which relevant designated environmental authorities provide input into the scoping exercise to define the relevant environmental issues to be addressed during the SEA process. A draft SEA Scoping Report was issued for consultation in November 2013. The final SEA Scoping Report was amended to take account of the inputs received during the consultation process and was issued in April 2015.
- i **Environmental Assessment and Environmental Report** – This is a key document in the SEA process as it outlines the likely significant effects on the environment arising from the implementation of the Flood Risk Management Plan and recommends mitigation to address any significant adverse effects identified. The determination of the likely significant effects on the environment is based on a qualitative assessment under a series of Environmental Objectives. These Environmental Objectives are based on Environmental headings in Annex 2(f) of the *European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations, 2004 (S.I. 435 of 2004)*. The Environmental Report also documents the SEA process and how it was conducted with particular emphasis on stakeholder and public involvement. The Final version of the Environmental Assessment and Environmental Report Stage is the output of this stage;
- i **Consultation on the Draft Flood Risk Management Plan (FRMP) and SEA Environmental Report** – Consultation was conducted with the relevant environmental authorities and the public. Both groups were invited to make submissions in relation to the Draft Plan and Draft Environmental Report. Submissions made during the consultation process were considered and the Environmental Report was amended as required to reflect the outcomes of the consultation period;
- i **SEA Statement** – From a legal and process perspective the production of the SEA Statement is the most important phase in the process. The function of the SEA Statement is to identify how the SEA process has influenced the plan and how responses from consultees were taken into account. Another requirement of the SEA Statement is the inclusion of reasons for choosing the plan as adopted in light of the other reasonable alternatives considered;
- i **Monitoring** - Monitoring requirements refer to the need to monitor the significant effects on the environment as a result of the implementation of the Flood Risk Management Plans. Monitoring begins with the adoption of the plan and continues for the duration of the plan.

The observations and views submitted as part of the consultation on the Draft FRMP were reviewed and assessed and where required the FRMP was amended. The FRMP will then be submitted for comment, amendment or approval by the Minister.

On finalisation of the FRMP, measures involving physical works (e.g., flood protection schemes) will be further developed at a local project level before submission for planning approval as required. At the project stage, local information that cannot be captured at the FRMP stage of the project such as ground investigation results and project-level environmental assessments, may give rise to some amendment of the proposed measures to ensure that it is fully adapted, developed and appropriate within the local context.

In this context, it is stressed that the SEA undertaken in relation to the FRMP are plan-level assessments. The FRMP will inform the progression of the preferred measures, and these measures will progress at a project level and will be subject to for the required consenting and planning. The approval of the Final FRMP does not confer approval or permission for the installation or construction of any physical works.

Figure 3.1: Stages of SEA



3.3.2 SEA Screening

The OPW conducted a screening assessment for the CFRAM studies in September 2011. In the Strategic Environmental Assessment Screening Report it was proposed that an SEA should be undertaken as a matter of good practice for all CFRAM Studies to ensure that environmental effects and potential benefits are fully integrated into the decision-making process on appropriate flood risk management measures and strategies that will form the core of the FRMPs.

This position was further validated by way of a two-stage screening process where the context of the FRMPs have been assessed against the screening check and the environmental significance criteria as set out in Schedule 1 of the *Planning and Development (Strategic Environmental Assessment) Regulations 2004*. (S.I. No. 435 of 2004). This assessment identified the requirement for SEA based on the following criteria:

- i The outcome of the screening assessment having full regard to Schedule 1 of the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 as amended indicates that SEA is required;
- i The FRMPs will be carried out for areas typically greater than 1000 km² and collectively they will cover the entire landmass of the Republic of Ireland. The outcomes of the FRMPs therefore have the potential to have a significant effect on the Environment. Carrying out SEAs will allow for the early consideration of environmental issues and the incorporation of these issues into the formulation of the recommendations for flood risk management within the FRMPs;
- i The FRMPs will form a framework for future projects and allocation of resources concerning reduction of flooding risk;
- i The FRMPs will influence spatial plans at both regional and local level;
- i The FRMPs are likely to require an assessment under Article 6 of the EU Habitats Directive.

The screening assessment also concluded that Appropriate Assessment under the Habitats Directive (92/43/EEC) is likely to be necessary for the CFRAM studies. Further information on Appropriate Assessment is provided in Section 3.4.

3.3.3 SEA Scoping

The SEA Scoping report for the South Western River Basin district was prepared and presents the following details:

- i The key environmental characteristics of each Unit of Management in the South Western River Basin District and an understanding of how flood risk management measures may influence these environmental characteristics;
- i The approach, scope, and level of detail to be included in the Environmental Report to be produced as part of the SEA process, established through consultation with statutory and non-statutory consultees;
- i The SEA Objectives that will be utilised in the appraisal of the Flood Risk Management Plans.

A set of proposed SEA objectives were compiled for each of the key environmental issues as relevant to the Flood Risk Management Plans. The SEA objectives were developed provide an index against which the environmental effects of the Flood Risk Management Plans could be assessed. The proposed SEA objectives identified in this Scoping Report are outlined in Table 3.1.

Table 3.1: SEA Objectives

CRITERIA	OBJECTIVE	SUB-OBJECTIVE
Social	a Minimise risk to human health and life	i) Minimise risk to human health and life of residents
		ii) Minimise risk to high vulnerability properties
	b Minimise risk to community	i) Minimise risk to social infrastructure and amenity

CRITERIA	OBJECTIVE	SUB-OBJECTIVE
Environmental		ii) Minimise risk to local employment
	a Support the objectives of the WFD	i) Provide no impediment to the achievement of water body objectives and, if possible, contribute to the achievement of water body objectives.
	b Support the objectives of the Habitats Directive	i) Avoid detrimental effects to, and where possible enhance, Natura 2000 network, protected species and their key habitats, recognising relevant landscape features and stepping stones.
	c Avoid damage to, and where possible enhance, the flora and fauna of the catchment	i) Avoid damage to or loss of, and where possible enhance, nature conservation sites and protected species or other know species of conservation concern.
	d Protect, and where possible enhance, fisheries resource within the catchment	i) Maintain existing, and where possible create new, fisheries habitat including the maintenance or improvement of conditions that allow upstream migration for fish species.
	e Protect, and where possible enhance, landscape character and visual amenity within the river corridor	i) Protect, and where possible enhance, visual amenity, landscape protection zones and views into / from designated scenic areas within the river corridor
	f Avoid damage to or loss of features, institutions and collections of cultural heritage importance and their setting	i) Avoid damage to or loss of features, institutions and collections of architectural value and their setting. ii) Avoid damage to or loss of features, institutions and collections of archaeological value and their setting

The finalised Strategic Environmental Assessment Scoping Report has been informed by a series of public and stakeholder consultation events which were as follows:

i Public Consultation

- A series of public consultation days (PCDs) were held within each Area for Further Assessment (AFA) within the SWRBD between October 2014 and February 2015. The intention of the public consultation was to inform the public of progress and provide them with an opportunity to comment on the CFRAM Study, Flood Risk Management Maps and associated Strategic Environmental Assessment Scoping.
- The SW CFRAM study has also used other media for the purpose of public consultation including a dedicated project website, newsletters and SEA specific leaflets, and presentations.

j Stakeholder Consultation

- Presentation to South Western Regional Authority on 27th March 2012;
- Presentations to Kerry and Cork County Council's Development Committees on 15th April 2013;
- Presentation to the National Parks and Wildlife Services (NPWS) on proposed flood risk management options for Clonakilty on 29th May 2013;
- Elected Members Briefing on the Clonakilty Public Information Day held on 16th July 2013.
- A stakeholder workshop was held on 02nd December 2013 pertaining to Strategic Environmental Assessment (SEA) Scoping and Flood Risk Management Objectives. Stakeholder input from the workshop was incorporated into a draft SEA scoping report which was then formally issued to the Environmental Authorities on 7th November 2014 for comment.

- Consultation responses were received from the following Environmental Authorities: Environmental Protection Agency Development Applications Unit of the Department of Arts, Heritage and Gaeltacht Affairs. Inland Fisheries Ireland and the Geological Survey of Ireland also submitted formal responses following the stakeholder workshop.

Further Development of the SEA Objectives: The framework of environmental objectives, sub objectives and targets identified at the scoping stage were modified following consultation and finalised to account for feedback received during the consultation. These were then included within the full suite of flood risk management objectives, which are defined under technical, economic, social and environmental categories, and formed part of the overall option assessment process. Global weightings and local weightings were developed for each objective as described in Section 2.4.5 of this document.

3.3.4 Environmental Assessment & Environmental Report

This stage of the SEA process requires the assessment and evaluation of the FRMP measures to identify the potential significant effects of the flood risk management options on the receiving environment and to identify the preferred options and appropriate mitigation and monitoring required to offset potential impacts. This assessment has been done as part of an overall Multiple Criteria Analysis as detailed in Section 2.4.5 where the SEA Objectives are utilised to assess the measures proposed in the FRMP for the UoM 19. The principle steps in the assessment process are as follows:

Flood Management Option Development and Assessment: The SEA process has been fully integrated into the overall appraisal process for the identification of flood risk management options. Based on a detailed understanding of the flood risk identified for each Area of Further Assessment (AFA) a number of different flood alleviation risk management options were developed as described in Section 2.4.6. Each of these options was then assessed based on a multi-criteria option assessment (MCA) process (as outlined in Section 2.4.5). The MCA used a suite of project objectives, which include the SEA objectives to rate each of the proposed plan options. This assessment was then used to identify the preferred flood risk management options. In order to facilitate a more accurate assessment a semi-quantitative approach was adopted whereby each plan option was assessed against the SEA objectives and sub-objectives having regard to the indicators, basic requirements and aspirational targets (Refer to Table 3.3):

- i Indicator: The indicators are parameters, measurable and numeric where possible by which the success of an option in meeting a particular objective is gauged;
- i Basic Requirements: A basic requirement is set for each objective as a measure to gauge whether the proposed option meets a minimum standard with regard to each objective. The Basic requirement is a measure below which the proposed objective would have a negative effect.
- i Aspirational Targets: This is a target set for each objective and defines the perfect outcome with regard to the potential impact of the objective.

Each option was scored against the objectives and sub-objectives based on the scoring matrix outlined in Table 3.2. Once a score was defined for each objective then a global weighting was applied which defined the perceived importance of the objective in question. Furthermore, local conditions were also considered for each AFA whereby a local weighting was applied based on an understanding of the local conditions relevant to objective in question.

Table 3.2: MCA Scoring

Score	Description of the Scoring
5	An option that meets the aspirational target should be given a score of 5.
1 to 4	An option that performs somewhere between the basic requirement and the aspirational target should be given a score between 1 and 4.
0	An option that meets the basic requirement only should be given a score of 0.
-1 to -5	An option that performs worse than the basic requirement i.e. creates a dis-benefit or does not perform to an acceptable standard should be given a negative score down to -5.
-999	There are exceptions to the negative scoring where the performance or impact of the option becomes unacceptable and the option should be rejected on the basis of its performance on the given option alone.

Following the identification of preferred flood risk management options from the MCA process, the next stage of the study comprises the development of an overall flood risk management strategy which would comprise a combination of Flood prevention measures, flood protection measures and flood preparedness.

Table 3.3: MCA Analysis Indicators, Basic Requirements & Aspirational Targets

Criteria	Objective	Sub-Objective	Indicator	Basic Requirement	Aspirational Target
Social	Minimise risk to human health and life	Minimise risk to human health and life of residents	Annual Average number of residential properties at risk from flooding	Number of residential properties at risk from flooding does not increase	Reduce the number of residential properties at risk from flooding to 0
		Minimise risk to high vulnerability properties	Number of high vulnerability properties at risk from flooding	Do not increase number of high vulnerability properties at risk from flooding	Reduce the number of high vulnerability properties at risk from flooding to 0
	Minimise risk to community	Minimise risk to social infrastructure and amenity	Number of social infrastructure receptors at risk from flooding	Do not increase number of social infrastructure receptors at risk from flooding	Reduce the number of social infrastructure receptors at risk from flooding to 0
		Minimise risk to local employment	Number of enterprises at risk from flooding	Do not increase number of enterprises at risk from flooding	Reduce the number of enterprises at risk from flooding to 0
Environmental	Support the objectives of the WFD	Provide no impediment to the achievement of water body objectives and, if possible, contribute to the achievement of water body objectives.	Ecological status of water bodies	Provide no constraint to the achievement of water body objectives	Contribute to the achievement of water body objectives
	Support the objectives of the Habitats and Birds Directives	Avoid detrimental effects to, and where possible enhance, Natura 2000 network, protected species and their key habitats, recognising relevant landscape features and stepping stones.	Area of site at risk from flooding and qualitative Assessment of impact of option on habitat	No deterioration in the conservation status of designated sites as a result of flood risk management measures	Improvement in the conservation status of designated sites as a result of flood risk management measures
	Avoid damage to, and where possible enhance, the flora and fauna of the catchment	Avoid damage to and where possible enhance the flora and fauna of the catchment	Avoid damage to and where possible enhance, legally protected sites / habitats and other sites / habitats of national regional and local nature conservation importance	No deterioration on condition of existing sites due to implementation of option	Creation of new or improved condition of existing sites due to implementation of option
	Protect, and where possible enhance, fisheries resource within the catchment	Maintain existing, and where possible create new, fisheries habitat including the maintenance or improvement of conditions that allow upstream migration for fish species.	Area of suitable habitat supporting fish. Number of upstream barriers	No loss of integrity of fisheries habitat. Maintenance of upstream accessibility	No loss of fishery habitat. Improvement of habitat quality / quantity. Enhanced upstream accessibility
	Protect, and where possible enhance,	Protect, and where possible enhance, visual amenity,	Changes to reported conservation status of	1. No significant impact on landscape designation	1. No change to the existing landscape form. 2.

Criteria	Objective	Sub-Objective	Indicator	Basic Requirement	Aspirational Target
	landscape character and visual amenity within the river corridor	landscape protection zones and views into / from designated scenic areas within the river corridor.	designated sites relating to flood risk management Extent of affected Natura 2000 site, NHA/pNHA or other affected National or International designations (e.g. Nature reserves and Ramsar sites), i.e. Area of re	(protected site, scenic route/amenity, natural landscape form) within zone of visibility of measures 2. No significant change in the quality of existing landscape characteristics of the receiving environment	Enhancement of existing landscape or landscape feature
	Avoid damage to or loss of features, institutions and collections of cultural heritage importance and their setting	Avoid damage to or loss of features, institutions and collections of architectural value and their setting and improve their protection from extreme floods.	a) The number of architectural features, institutions and collections subject to flooding. b) The impact of flood risk management measures on architectural features, institutions and collections.	a) No increase in risk to architectural features, institutions and collections at risk from flooding. b) No detrimental impacts from flood risk management measures on architectural features, institutions and collections.	a) Complete removal of all relevant architectural features, institutions and collections from the risk of harm by extreme floods. b) Enhanced protection and value of architectural features, institutions and collections importance arising from the implementation of the selected measures.
		Avoid damage to or loss of features, institutions and collections of archaeological value and their setting and improve their protection from extreme floods where this is beneficial.	a) The number of archaeological features, institutions and collections subject to flooding. b) The impact of flood risk management measures on archaeological features, institutions and collections.	a) No increase in risk to archaeological features, institutions and collections at risk from flooding. b) No detrimental impacts from flood risk management measures on archaeological features, institutions and collections.	a) Complete removal of all relevant archaeological features, institutions and collections from the risk of harm by extreme floods. b) Enhanced protection and value of archaeological features, institutions and collections importance arising from the implementation of the selected measures.

3.3.5 Compliance with the Requirements of the SEA Directive

Table 3.4 below outlines how and where the Environmental Report complies with the requirements of the SEA Directive.

Table 3.4: Requirement of SEA Directive and Relevant Section in Environmental Report

Requirement of SEA Directive (Article 5 (1) Annex I)	Relevant Section in the Environmental Report
An outline of the contents and main objectives of the plan or programme, or modification to a plan or programme, and relationship with other relevant plans or programmes	Chapter 1 and Chapter 5
The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan	Chapter 6
The environmental characteristics of areas likely to be significantly affected	Chapter 6
Any existing environmental problems which are relevant to the plan, including in particular those relating to any areas of particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC	Chapter 6 and Chapter 9
The environmental protection objectives, established at international, community or member state level, which are relevant to the plan and the way those objectives and any environmental considerations have been taken into account during its preparation	Chapter 7 and Chapter 9.
The likely significant effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factor, material assets, cultural heritage including architectural and archaeological heritage, landscape and interrelationship between the above factors.	Chapter 8
The measures envisaged to prevent, reduce, and as fully as possible offset any significant adverse effects on the environment of implementing the plan	Chapter 9
An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties encountered in compiling the required information	Chapter 9
A description of the measures envisaged concerning monitoring in accordance with Article 10	Chapter 10 and SEA Statement
A non-technical summary of the information provided under the above headings.	Non-Technical Summary

3.3.6 SEA Statement

An SEA Statement has been produced to clearly specify how environmental considerations, through the Strategic Environmental Assessment have influenced the development of the FRMP.

3.3.7 Monitoring

Monitoring requirements refer to the need to monitor the significant effects on the environment as a result of the implementation of the Flood Risk Management Plans. Monitoring begins with the adoption of the plan and continues for the duration of the Plan.

3.4 Appropriate Assessment

Flood Risk Management Plans will be subject to Appropriate Assessment in accordance with the requirements of Articles 6(3) and 6(4) of Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive). The purpose of Appropriate Assessment is to inform the Competent Authority of whether a plan will have adverse impacts on the conservation objectives of Natura 2000 sites (designated Special Areas of Conservation and Special Protection Areas) within the zone of influence.

Appropriate Assessment of the SWRBD CFRAM study has been conducted in accordance with all relevant guidance and legislation including:

- i European Communities (Birds and Natural Habitats) Regulations 2011;
- i NPWS (2012) Marine Natura Impact Statements in Irish Special Areas of Conservation, A working Document;
- i DEHLG (2009) Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities (as revised in 11 February 2010 to replace "Statement for Appropriate Assessment" with "Natura Impact Statement" or NIS);
- i EC (2000) Managing Natura 2000 Sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC;
- i EC (2001) Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC;
- i EC (2007) Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC: Clarification of the concepts of alternative solutions and imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the Commission.

3.5 Inter-Relationship between AA and SEA

Directive 2001/42/EC (Strategic Environmental Assessment Directive) requires that Strategic Environmental Assessment (SEA) must be carried out during the preparation stage of a Plan i.e. before the adoption of the Plan. When an Appropriate Assessment is being carried out for a plan it must be published concurrently/jointly with the SEA (as two separate reports). The outcomes and recommendations of each stage in the Appropriate Assessment process inform the Strategic Environmental Assessment and vice

versa. It is important that the assessments be carried out in parallel in order that any environmental issues raised in each assessment can be considered as part of the other. Similarly, any mitigation or alternatives proposed must be addressed in both assessments.

Appropriate Assessment is specifically intended to determine the likely significant effects on European sites in view of their conservation objectives, and to ensure that no plan or project that would have adverse effects on the integrity of a European site is approved or adopted (unless in exceptional circumstances where the requirements of Article 6(4) of the Habitats Directive can be met). Appropriate assessment does not deal with all significant ecological issues of relevance to SEA, nor does it address all legal requirements in relation to the conservation and protection of ecological sites, habitats and species.

While the Appropriate Assessment is integrated with the various stages of the SEA and the data contained in the Natura Impact Statement (i.e. the Appropriate Assessment report) is fed into the SEA Environmental Report a stand-alone Natura Impact Statement is required to be produced.

The DEHLG Guidance (2009), 'Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities' requires that the findings and recommendations of the Appropriate Assessment inform the policies and strategies of the Plan. Information contained in the Natura Impact Statement that will feed in the SEA and ultimately into the South Western Flood Risk Management Plans (FRMP) includes the following;

- i The areas likely to be significantly affected by the plan;
- i Any existing environmental characteristics which are relevant to the plan including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC;
- i The environmental protection objectives and qualifying interests (established at international, Community or Member State level) which are relevant to the areas of the environment likely to be effected by the plan;
- i The likely significant effects on the Natura 2000 site, such as impacts on biodiversity, fauna, flora, soil, water, etc.
- i The measures envisaged to mitigate against any significant adverse effects on the designated sites of implementing the plan; and
- i Alternatives to the proposals in the plan and their potential effectiveness in maintaining the conservation value of the site.

3.6 FRMP and Consenting Process

Detailed designs for flood risk management options will not be developed as part of the Flood Risk Management Plans (FRMP) / CFRAM Studies but rather measures will be progressed on a scheme by scheme basis, outside of the scope of the CFRAM studies.

In accordance with Section 20 of the European Communities (Assessment and Management of Flood Risks) Regulations, 2010 (S.I. No. 122 of 2010), once the Flood Risk Management Plans (subsequent to a process of consultation) have been approved by the Minister of Finance they will be issued to the Local Authorities for adoption (through a reserved function process). Section 25 of the Regulations permits the

Office of Public Works to prepare a flood risk management scheme for the execution of such options provided for under the Flood Risk Management Plan or where the OPW considers them expedient.

There are three primary legislative pathways to securing consent for flood risk schemes:

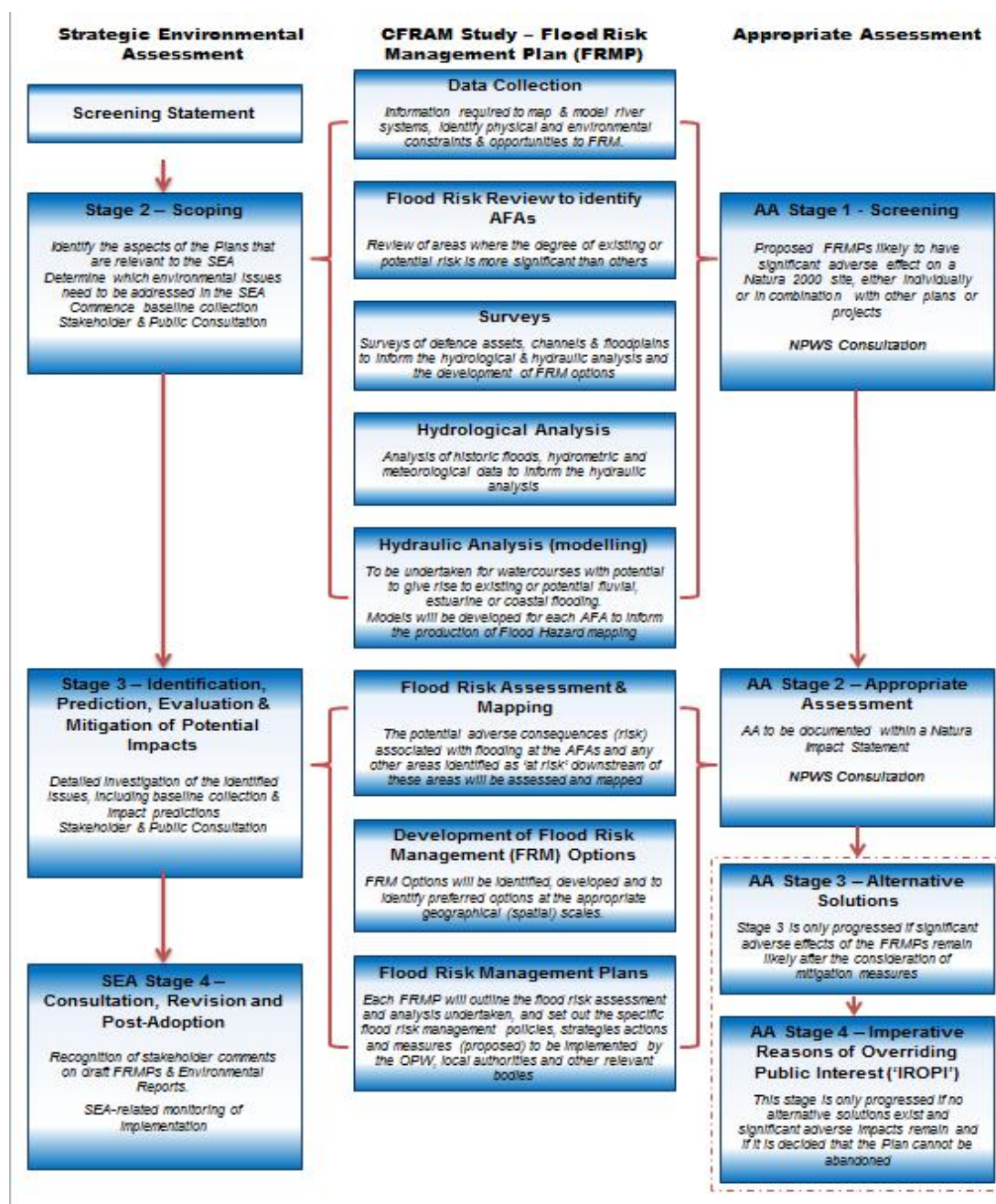
1. Approval of the scheme as 'strategic infrastructure' under the Planning and Development (Strategic Infrastructure) Act 2006 by An Bord Pleanála;
2. Approval of the scheme under Part 8 of the Planning and Development Regulations, 2001 as amended; and
3. Approval of the scheme by the Minister for Finance under the European Communities (Assessment and Management of Flood Risks) Regulations, 2010).

Every flood risk management scheme which involves the execution of works of a class specified in Article 24 of the European Communities (Planning and Development) Regulations, 2001 as amended is required to include an Environmental Impact Assessment when submitting an application for approval to a Planning Authority. Attention is also drawn to requirements of the European Union (Environmental Impact Assessment) (Flood Risk) Regulations, 2012.

Any flood risk management scheme that is to progress through the planning process with potential to impact on a Natura 2000 site will be subject to Appropriate Assessment set out by the European Communities (Birds and Natural Habitats) Regulations 2011.

Schemes which would be likely (either individually or in combination with other plans or projects) to give rise to significant adverse impacts on the integrity of any Natura 2000 site will not be permitted on the basis of the Flood Risk Management Plan unless imperative reasons of overriding public interest (IROPI) can be established and there are no feasible alternative solutions.

Figure 3.2: Inter-relationship Between AA, SEA, and FRMP



3.7 Difficulties and Data Gaps

This SEA has been undertaken using best available data and best practice methodologies available at the time of the assessment. The environmental baseline datasets established to allow for the SEA analysis are dated from the time of initial assessment in 2013.

The following difficulties and data gaps were encountered during the SEA process:

- i Relevant environmental datasets are held by a variety of bodies and this requires data to be sourced from a range of sources for the purposes of the SEA.
- i The long timeline for the development of the Flood Risk Management Plans, means that additional data and analysis were required to ensure that the data used, the processes followed and particularly the policy and legislative requirements cited are still relevant.

4 Stakeholder and Public Consultation

4.1 Introduction

The SEA Directive (2001/42/EC) requires that consultation is carried out with Environmental Authorities and with members of the public at various stages in the SEA process. The intention of this consultation process is to enhance transparency in the decision-making process, to ensure that the relevant authorities and the public are informed and are provided with an early opportunity to express their opinion, and to ensure that the information used in the assessment is comprehensive and reliable. Early consultation and the open delivery of information on the assessment will avoid unnecessary delays in the decision-making process at later stages which may arise due to public opposition.

Consultation is undertaken throughout the development of the CFRAM plan and Figure 4.1 gives an overview of the main consultation undertaken during the project.

4.2 The CFRAM Steering and Progress Group

4.2.1 The National CFRAM Steering Group

The National CFRAM Steering Group was established in 2009, and was established to provide for the engagement of key Government Departments and other state stakeholders in the process of the implementation of the 'Floods' Directive, including the National CFRAM Programme.

4.2.2 The South Western CFRAM Project Steering Group

A Project Steering Group was established for the South Western CFRAM Project that includes the Lee, Cork Harbour & Youghal Bay River Basin UoM, in 2012. This Group, which includes senior representatives of the members, provides for the input of the members to guide the CFRAM Programme and acts as a forum for communication between the CFRAM Programme and senior management of key stakeholders. The Project Steering Group typically meets twice a year.

4.2.3 The South Western CFRAM Project Progress Group

A Project Progress Group was established for the South Western CFRAM Project in 2012. This group is a working group that supports the Project Steering Group and meets approximately every six weeks. The Group was established to ensure regular communication between key stakeholders and the CFRAM Project and to support the successful implementation of the Project. The organizational membership of this Group is the same as for the South Western CFRAM Project Steering Group.

4.3 Stakeholder Consultation Groups

Stakeholder Groups were formed at national and regional level to permit non-governmental stakeholder groups to participate in the 'Floods' Directive and CFRAM processes and these are detailed below.

4.3.1 National Stakeholder Group

The National CFRAM Stakeholder Group was established in 2014, and was established to provide for the engagement of key national non-governmental stakeholder organisations in the process of the implementation of the National CFRAM Programme.

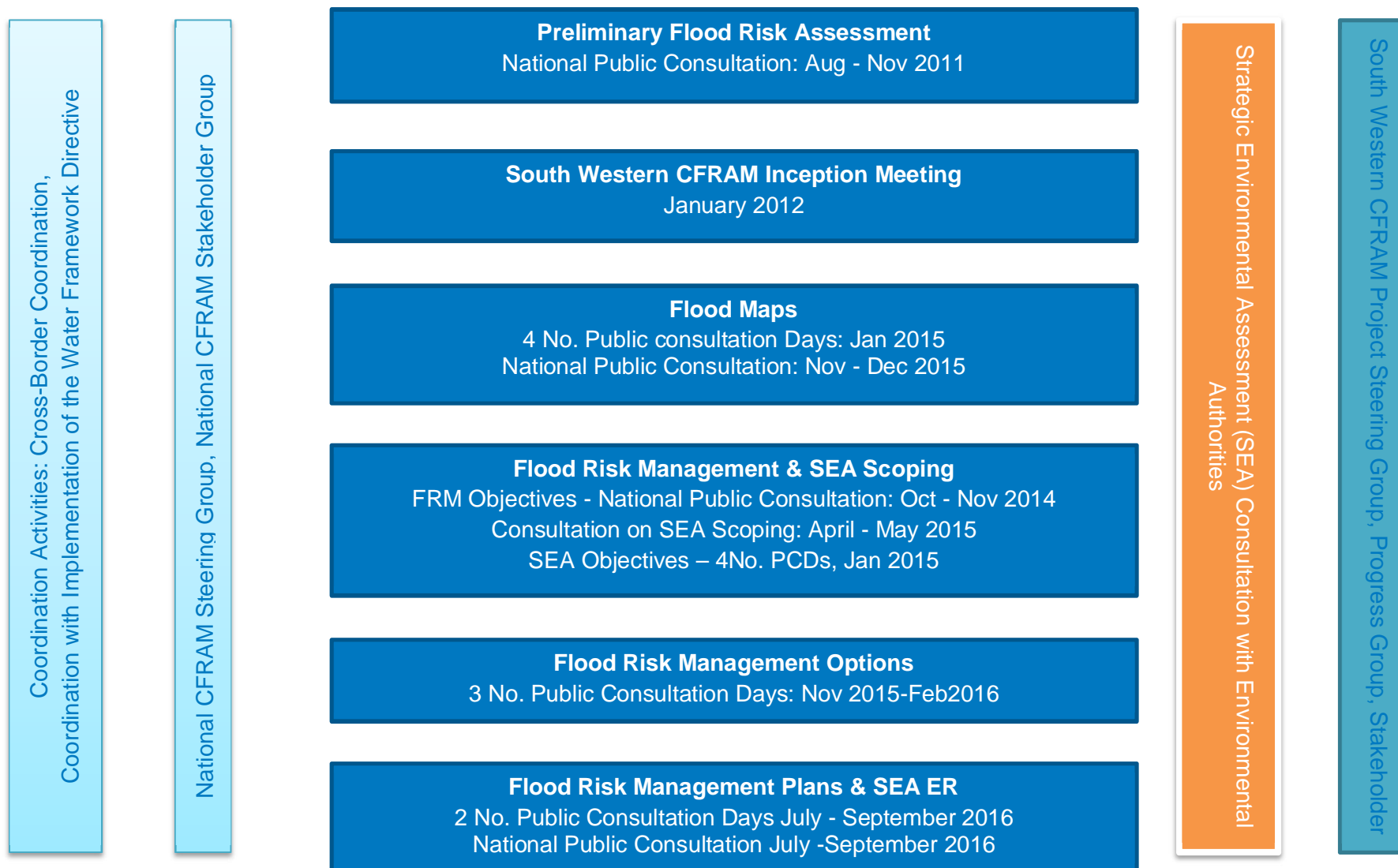
4.3.2 Regional Stakeholder Group

The South Western CFRAM Stakeholder Group was established in 2012, and has met on 3 occasions up to the date of publication of this Draft FRMP. It was established to provide for the engagement of local non-governmental stakeholder organisations at key stages in the process of the implementation of the South Western CFRAM Project.

4.4 Public Consultation and Engagement

In addition to the structured engagement with relevant stakeholders through the Steering and Stakeholder Groups, the public have also been given the opportunity and encouraged to engage with the implementation of the CFRAM process. These engagement and consultation steps are set out in Figure 4.1 below, and are further described below.

Figure 4.1: Overview of the CFRAM Consultation Stages and Structures



4.4.1 Consultation on Flood Maps

The initial preparation of the flood maps involved extensive consultation with the South Western CFRAM Progress Group and planners within the various relevant local authorities. This led to the development of draft flood maps that were then consulted upon with the public through local Public Consultation Days and a national consultation.

The OPW decided at the beginning of the National CFRAM Programme that effective consultation and public engagement would require local engagement at a community level, and hence determined that Public Consultation Days (PCDs) would be held in each AFA (where possible and appropriate) to engage with the communities at various stages of the projects, including during the production of the flood maps.

The PCDs were advertised locally in advance, and were held at a local venue in the community during the afternoon and early evening. OPW, Local Authority and Mott MacDonald Ireland staff were present to explain the maps that were displayed around the venue and answer any questions on the maps and the CFRAM process. The PCDs in the Lee, Cork Harbour and Youghal Bay River Basin UoM were held for consultation on the flood maps at the venues listed in Table 4.1.

Table 4.1: Public Consultation Days at the Flood Mapping Stage

AFA	Date	Venue	No. Attendees
Ballingeary	27/01/2015	Ballingeary GAA Club	25
Inchigeelagh	27/01/2015	Iveleary GAA Club	23
Castlemartyr	23/01/2015	St Joseph's national School	6
Kayleigh	23/01/2015	Killeagh Community Hall	18

While the number of attendees at the PCDs were variable, overall the PCDs were very useful in informing and validating the flood maps. The PCDs were also useful as a means to raise awareness of flooding and flood risk in the community, and to begin the discussion on potential measures to manage or reduce the risk. Key environmental considerations raised through stakeholder consultation process pertain to the following:

- i The identification of additional sources of environmental receptor data e.g. the EPA SEA WebGIS, EPA bathing water mapping, GSI mapping data;
- i The identification of newly available data e.g. aggregate potential mapping, aquifer storage / recharge data;
- i The requirement of the SEA objectives to include the protection of geological heritage, all protected habitats and species (not just Natura 2000 sites);
- i The requirement to consider the interactions between the Flood Risk Management Plan and previously unidentified Plans including those currently in draft format;
- i Comments on Appropriate Assessment screening.

4.4.2 National Flood Map Consultation

While not a requirement of the 'Floods' Directive, the Government considered it appropriate to stipulate in SI No. 122 of 2010 (that transposed the Directive into Irish law) that a national consultation exercise should be undertaken³. The consultation on the flood for all areas was launched in November 2015, in line with SI Nos. 122 of 2010 and 495 of 2015.

4.4.3 Consultation for SEA Scoping on the Flood Risk Management Objectives

During the scoping phase of the SEA, a number of consultation exercises were undertaken to inform the decision-making process during the Scoping phase and these are as follows:

- i The OPW considered it appropriate to publicly consult on the proposed flood risk management objectives. As a result, a public consultation was launched in October 2014 and 71 submissions were received during this consultation which were subsequently considered and amendments made to the Objectives where appropriate.
- j Furthermore, in order to provide a robust scoping of the SWRBD CFRAM Study, baseline information on each of the environmental headings set out in Annex 2(f) of the *European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations, 2004* was gathered for each Unit of Management. This information was also subject to consultation with the project stakeholders and the public. Following this consultation, a final set of project objectives including SEA objectives were adopted in March 2015.

A Multi-Criteria Assessment (MCA) is used as part of the process for assessing potential options for reducing or managing flood risk in each AFA as described in section 2.4.5. The MCA makes use of weightings to rank the importance of the Objectives. The OPW considered it appropriate to consult on the weightings that would be assigned to each Objective, and commissioned an independent poll of over 1000 members of the public on the weightings through a structured questionnaire. The results of this poll were analysed by UCD, and the weightings for each of the Objectives then set.

4.4.4 Consultation on Flood Management Options

Based on the flood hazard and risk identified in the flood maps, options for reducing or managing flood risk in each AFA were developed and assessed. PCDs, similar to those held for the consultation on the flood maps were held during the development and assessment of options. These events were intended to allow for full engagement with the affected communities. Each event allowed the local community to set out the local issues of importance, the flood risk measures that they considered would be most suitable and comment on which identified options might be effective and appropriate, or otherwise. The PCDs in the UoM 19 were held during the option development stage at the venues listed below in Table 4.2.

³ Sections 12, 13 and 14, SI No. 122 of 2010

Table 4.2: Public Consultation Days at the Options Development Stage

AFA	Date	Venue	No. Attendees
Ballingeary	17/02/2016	Ballingeary GAA Club	31
Inchigeelagh	18/02/2016	Iveleary GAA Club	21
Castlemartyr	26/11/2015	St Joseph's national School	4

4.4.5 Consultation on Draft SEA ER and the FRMP

The report SEA Environmental Report for the Draft FRMP for the Lee, Cork Harbour and Youghal Bay Unit of Management (UoM) was subject to public consultation and from relevant councils during the July 2016 to September 2016. Presentations were also made to Local Authorities during the Public Consultation period. A series of PCDs, similar to those held for the consultation on the flood risk management options were held to engage locally and directly with the community and provide people with opportunity to discuss and fully understand the Draft FRMPs. The outcomes of this consultation were reported and reflected in the Final FRMPs and observations and recommendations received from the SEA statutory consultees have been taken into account in this Final Environmental Report.

4.5 Environmental Authorities and Non-Statutory Consultees

The Environmental Authorities in Ireland established under the Planning and Development (Strategic Environmental Assessment) (Amendment) Regulations 2011 which are required to be consulted on the SEA are set out hereunder. It was considered best practice to also include a number of non-statutory consultees as primary and secondary stakeholders.

Environmental Authorities	
Environmental Protection Agency	Geological Survey Ireland
Department of Communications, Energy and Natural Resources	Health Services Executive (HSE)
Department of the Environment, Community and Local Government	Iarnród Eireann
Department of Agriculture, Food and the Marine	Industrial Development Agency
Department of Arts, Heritage and Gaeltacht Affairs	Industrial Heritage Association of Ireland
	Inland Fisheries Ireland
	Inland Waterways Association of Ireland
	Institute of Professional Auctioneers and Valuers (IPAV)
Primary Stakeholders	Insurance Ireland
Office of Public Works	Irish Academy of Engineering
County Councils / County Development Boards	Irish Angling Development Alliance
South West Regional Authority	Irish Business and Employers Confederation (IBEC)
	Irish Concrete Federation
Secondary Stakeholders	Irish Co-Operative Organisation Society
An Bord Pleanála	Irish Countrywomen's Association
An Taisce	Irish Creamery Milk Suppliers Association (ICMSA)
Association of Consulting Engineers of Ireland (ACEI)	Irish Farmers Association (IFA)
Association of County and City Councils	

Association of Municipal Authorities of Ireland	Irish Federation of Pike Angling Clubs
Badgerwatch	Irish Federation of Sea Anglers
Bat Conservation Ireland	Irish Marine Federation / Irish Boat Rental Association
BirdWatch Ireland	Irish National Committee of Blue Shield
Bord Geis Networks	Irish National Flood Forum
Bord na Mona	Irish Natural Forestry Foundation
Bus Eireann	Irish Peatland Conservation Council
Canoeing Ireland	Irish Planning Institute (IPI)
Chambers Ireland	Irish Red Cross
Citizens Information Board	Irish Small and Medium Enterprises Association (ISME)
CIWEM Ireland	Irish Water
Coarse Angling Federation of Ireland	Irish Water and Fish Preservation Society
Coastal and Marine Resources Centre	Irish Wildlife Trust
Coastwatch Ireland	IRLOGI
Coillte	Landscape Alliance Ireland
Construction Industry Federation (CIF)	Local and Regional Planners
Council of Cultural Institutes	Macra na Feirme
Department of Health and Children	Marine Institute
Department of Transport, Tourism, and Sport	Marine Institute
Eircom	Met Eireann
EirGrid	Mills and Millers of Ireland
Electricity Supply Board (ESB)	National Anglers Representative Association
Engineers Ireland	National Monuments Service
ESB Fisheries Conservation	National Parks and Wildlife Service
Fáilte Ireland	National Roads Authority
Friends of the Irish Environment	National Transport Authority
Native Woodland Trust	St. Vincent de Paul
Recreational Angling Ireland	Sustainable Energy Authority of Ireland
Retail Grocery Dairy & Allied Trades Association - RGDATA	Sustainable Water Network (SWAN)
River Basin District Authorities and Competent Authorities for Water Framework Directive	Teagasc
Rowing Ireland	The Heritage Council
Society of Chartered Surveyors of Ireland (SCSI)	Tree Council of Ireland
	Trout Anglers Federation of Ireland
	Voice of Irish Concern for the Environment (Voice)

4.6 Coordination with Water Framework Directive (WFD)

The Water Framework Directive (WFD) requires all EU member states to protect and improve water quality in all waterbodies. While the 'Floods' Directive guides the assessment of flood risk and the development of flood risk management., Both Directives are concerned with water and river basin management, and hence coordination is required between the two processes to achieve integrated river basin management, achieve joint benefits, and address conflicts.

There has been, and will continue to be, coordination with the authorities responsible for the implementation of the WFD through a range of mechanisms, including bi-lateral meetings and cross-representation on various management groups. These groups include the following:

- i The Water Policy Advisory Committee (WPAC), the
- i The National Implementation Group (NIG);
- i The Catchment Management Network;
- i Local Authorities Water and Communities Office (LAWCO) and
- i The Floods Directive: Steering and Progress Groups.

5 Relationship with Other Plans, Policies, and Programmes

5.1 Introduction

In addition to gathering data on the existing environmental baseline of the South Western RBD, a key part of the SEA process is to determine the plan and policy context in which the South Western Flood Risk Management Plans will be implemented. The South Western Flood Risk Management Plans will influence, and will in turn be influenced by, a number of external statutory and non-statutory plans, strategies and policies and programmes. The interaction of the environmental policies and objectives within these documents, with the proposals of the Flood Risk Management Plans, must therefore be considered. It is necessary to consider these interactions at all levels of the plan and policy-making hierarchy, i.e. at National, Regional and Local.

This chapter provides an overview of the plans, policies and programmes at National, Regional and Local level which will influence, and in turn be influenced by, the South Western Flood Risk Management Plans.

5.2 Plan and Policy Context

Table 5.1 summarises the legislation, and plans, policies and programmes of relevance to the South Western RBD which have been reviewed as part of this study.

The FRMPs will present an opportunity to inform future proposals for development. It is also recognised that recommended actions from this study will need to take account of appropriate development controls as set out at national, regional and local levels.

Other, principally non-statutory, sectoral plans are also relevant to this assessment. These include various economic development, and environmental protection plans. Where relevant to flood risk management, specific policies and recommendations arising from these plans have been considered here.

Table 5.1: Legislation, Plans, Policies and Programmes with Potential to Interact with SW CFRMP

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
International and National Legislation		
Floods Directive (2007/60/EC)	This directive sets out a template for the assessment and management of flood risk. The aim of this Directive is to reduce the adverse consequences of flooding on human health, the environment, cultural heritage and economic activity	The development of the flood risk management plans are a core objective of the Floods Directive
Water Framework Directive (2000/60/EC)	This Directive aims to improve the water status of all waterbodies. It requires governments to take a holistic approach to the management of waterbodies. WFD implementation in Ireland is	The Flood Risk Management Plan /SEA should, ideally help to improve the water status of waterbodies and should not in any way impact on the capacity of a waterbody to achieve "good water status".

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
	currently in its 2 nd cycle from 2016 -2021.	
EU Habitats Directive (92/43/EC)	The Habitats Directive protects valuable natural habitats and the species supported by those habitats. Together with the Birds Directive, it underpins a European network of protected areas known as Natura 2000 sites: Special Protection Areas (SPAs, are classified under the Birds Directive)	The Flood Risk Management Plan/SEA objectives aim to prevent loss or damage to Natura 2000 sites). The Flood Risk Management Plans will also be subject to a separate AA in accordance with Article 6 (3) of the Habitat Directive.
EU Birds Directive (2009/147/EC)	Protects all wild birds, their nests, eggs and habitats within the European Community. It gives EU member states the power and responsibility to classify Special Protection Areas (SPAs) to protect birds which are rare or vulnerable in Europe, as well as all migratory birds which are regular visitors	The Flood Risk Management Plan/SEA objectives aim to prevent loss or damage to Natura 2000 sites). The Flood Risk Management Plans will also be subject to a separate AA in accordance with Article 6 (3) of the Habitat Directive
EU SEA Directive (2001/42/EC)	The Directive provide for a high level of protection of the environment by integrating environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development.	The FRMP is subject to a Strategic Environmental Assessment (SEA). The FRMP has been developed in parallel with the SEA process.
EIA Directive (2014/52/EC)	The Directive requires an Environmental Impact Assessment of the potential environmental effects of projects of a type and scale that are likely to have significant effects on the environment	Where a project under the FRMP options requires an Environmental Impact Assessment (EIA) under the provisions of the EIA Directive, this will be carried out.
Bathing Water Directive 2006 (2006/7/EC)	The Directive aims to protect the public and the environment from faecal pollution at designated bathing waters. Achieves this by setting out the requirement to monitoring and assess bathing waters and by making information on bathing water available to the public..	The Flood Risk Management Plans /SEA objectives should consider the contribution that measures could make towards the attainment of bathing water quality standards.

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
Shellfish Waters Directive (2006/113/EC)	shellfish life and growth. The Directive aims to protect or improve shellfish waters in order to support physical, chemical and microbiological requirements that designated shellfish waters must comply with.	The Flood Risk Management Plans /SEA objectives should consider the contribution that measures could make towards the attainment of shellfish designated standards within shellfish designated waters.
Drinking Water Directive (80/778/EEC) as amended by Directive (98/83/EC)	The Directive objective is to protect human health from adverse effects of any contamination of water intended for human consumption.	The Flood Risk Management Plans /SEA objectives should consider the contribution that measures could make towards the attainment of drinking water quality standards
Urban Wastewater Treatment Directive (91/271/EEC), as amended by Directive (98/15/EEC)	The Directive aims to protect the receiving environment from the adverse effects of urban wastewater discharges. It sets standards to be met in the collection and treatment of wastewater as well as the monitoring requirements for wastewater discharges from urban areas.	The Flood Risk Management Plans /SEA objectives should consider the contribution that measures could make towards the attainment of waste water quality standards
European Landscape Convention (2000)	The Convention's purpose is to promote landscape protection, management and planning of European landscapes and to organise European co-operation on landscape issues. The treaty is concerned with protection, management and enhancement of European landscape. It is extremely wide in scope: the Convention applies to the Parties' entire territory and covers natural, rural, urban and rural-urban transitional areas, also including land, inland water and marine areas. The Convention covers every-day or degraded landscapes as well as those that can be considered outstanding i.e. recognition of the importance of all landscape.	The flood risk management options will be required to be ensure compliance with the objectives and actions of the National landscape Strategy 2014-2024.
Arterial Drainage Act, 1945, and Arterial Drainage (Amendment) Act, 1995	Acts empowering the Office of Public Works to implement Arterial Drainage Schemes (1945) and	Flood risk management options will need to be developed at project scale to ensure that the functioning of the

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
	Flood Relief Schemes (1995), which must then be maintained	arterial drainage and flood relief schemes are not impacted and that Arterial Drainage maintenance is not impacted.
Coast Protection Act, 1963	Act to provide for the making and execution of coast protection schemes and to provide maintenance for these schemes	Flood risk management options will need to be developed at project scale to ensure that the functioning of the arterial drainage and flood relief schemes are not impacted and that Arterial Drainage maintenance is not impacted
Local Government (Works) Act, 1949	Enables local authorities to execute works affording relief or protection from flooding	This act gives Local Authorities powers to implement schemes to alleviate perceived flood risk. The FRAMP identifies areas where flood risk exists and management measures are required. Measures implemented under both schemes will need to be consistent while ensuring the receiving environment is protected.
European Communities (Assessment and Management of Flood Risks Regulations 2010 and 2015	Transposing Instruments for the EU 'Floods' Directive European Communities (Assessment and Management of Flood Risks) Regulations 2010 & 2015	The flood risk management options will facilitate the core objective set out within the Regulations
Climate Action and Low Carbon Development Act, 2015	Provides for the making of a National Adaptation Framework to specify the national strategy for the application of adaptation measures in different sectors and by local authorities to reduce the vulnerability of the State to the negative effects of climate change, including potential increases in flood risk	The implementation of the Act and similar global scale climate change mitigation programs will be required to ensure that in the future, there is not an increased flood risk resulting from climate change.
European Communities (Water Policy) Regulations, 2003 as amended	Transposing Instruments for the EU Water Framework Directive: European Communities (Water Policy) Regulations, 2003 & 2014	The flood risk management options will facilitate the core objective set out within the Regulations
European Communities (Environmental Liability) Regulations 2008	Transposing Instruments for the Environmental Liability Directive on environmental liability with regard to the prevention and remedying of environmental damage. The purpose of these Regulations is to establish a framework of environmental liability based on the 'polluter-pays' principle, to prevent and remedy environmental damage	The provision of flood risk management options will be required to ensure that there is no environmental damage resulting, having particular regard to receiving waterbodies and Natura 2000 sites.

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
European Communities (Birds and Natural Habitats) Regulations 2011	Transposing Instruments for the EU Birds and Habitats Directives	The Flood Risk Management Plan/SEA objectives aim to prevent loss or damage to Natura 2000 sites). The Flood Risk Management Plans will also be subject to a separate AA in accordance with Article 6 (3) of the Habitat Directive
European Communities Environmental Objectives (Groundwater) Regulations 2010	The Groundwater Regulations establish environmental objectives to be achieved in groundwater bodies and include groundwater quality standards and threshold values for the classification of groundwater and the protection of groundwater against pollution and deterioration in groundwater quality	The Flood Risk Management Plans /SEA objectives should consider the contribution that measures could make towards the attainment of water quality standards
European Communities (Environmental Impact Assessment) (Agriculture) Regulations 2011	The Regulations apply to rural restructuring of land holdings, use of uncultivated land for intensive agriculture and land drainage works on lands for agriculture.	The Flood Risk Management plan objectives should include measures to consider agricultural land use management changes through the development of Land Use and Natural Flood Risk Management
European Communities Environmental Objectives (Surface Water) Regulations 2009	The Surface Waters Regulations institute a wide-ranging set of environmental standards for Irish surface waters	The Flood Risk Management Plans /SEA objectives should consider the contribution that measures could make towards the attainment of water quality standards
European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009	The Regulations aims to support the achievement of favourable conservation status for freshwater pearl mussels. These set environmental quality objectives for the habitats of the FRPM populations named in the First Schedule to these Regulations that are within the boundaries of a site notified in a candidate list of European sites, or designated as a Special Area of Conservation, under the European Communities (Natural Habitats) Regulations, 1997. These regulations require the production of sub-basin management plans with programme of measures to achieve these objectives.	There are a number of FRPM waters within the CFRAM SW RBD which have associated management plans. These designations were taken into account during development of FRMP having regard to the SEA objectives
Framework and Principles for the Protection of Archaeological Heritage (1999)	The document describes the administrative framework for the protection of the archaeological heritage by the Department of	The Flood Risk Management Plans /SEA objectives should consider the contribution that measures could make towards the protection and

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
	Arts, Heritage, Gaeltacht and the Islands and draws attention to relevant international conventions which provide a basis for policy development. The document sets out principles for the protection of the archaeological heritage	preservation of sites of cultural and archaeological significance
The National Monuments Acts (1930 to 2004)	Acts makes provision for the protection and preservation of national monuments and for the preservation of archaeological objects.	The Flood Risk Management Plans /SEA objectives should consider the contribution that measures could make towards the protection and preservation of sites of cultural and archaeological significance
The Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999	Acts provide for the establishment of a national inventory of architectural heritage and for related matters and to provide for the obligations of sanitary authorities in respect of registered historic monuments	The Flood Risk Management Plans /SEA objectives should consider the contribution that measures could make towards the protection and preservation of sites of architectural significance
Wildlife Acts 1976- 2010	Acts to provide for the protection of wildlife (both flora and fauna) and the control of activities, which may impact adversely on the conservation of wildlife	The Flood Risk Management Plans aim to prevent loss or damage to flora and fauna The FRMP/SEA objectives should have regard to the protection of species as per the Act
Flora Protection Order 2015	Order to protect listed flora and their habitats from alteration, damage or interference in anyway. This protection applies wherever the plants are found and is not confined to sites designated for nature conservation.	The Flood Risk Management Plans aim to prevent loss or damage to flora. The FRMP/SEA objectives should have regard to the protection of species as per the Wildlife Act and the Flora Protection Order
National Policies /Plans/Programmes		
National Development Plan (NDP) 2007 – 2013	The NDP identifies a number of areas for improvement including physical and social infrastructure, attraction of inward investment, social inclusion, balanced regional development environmental protection and sustainable development. infrastructure investments are identified, including flood relief measures. A public awareness campaign linked to the issue of flooding was undertaken during the period of the Plan.	The FRMP options will allow for the protection of assets and land use currently at risk from flooding. This supports the overall development strategies set out in the National Development Plan.
Ireland 2040 – Our Plan	A replacement plan is currently being developed to replace the National Spatial Strategy (NSS).	The development of projects arising from the FRMP will be required to have

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
	This plan will function as a high level framework for the spatial development until 2040.	regard to the national policies that will arise from Ireland 2040.
National Spatial Strategy (NSS) 2002 – 2020 (Issue Paper on National Planning Framework in preparation)	A 20-year national planning framework for Ireland that aims to achieve a better spatial balance of social, economic and physical development across Ireland, supported by more effective and integrated planning	The FRMP options will allow for the protection of assets and land use currently at risk from flooding. This supports the overall development strategies set out in the National Spatial Strategy.
National Heritage Plan (2002)	The main objective of this plan is to protect Ireland's heritage and it sets out archaeological policies and principles that should be applied by all bodies when undertaking a development. Each county is obliged to produce their own county heritage plan Relevant plans in the SWRBD include those for Counties Cork, Kerry, Waterford and Limerick.	The SEA contains objectives to ensure the protection of archaeological heritage
National Parks and Wildlife Conservation Plans for SACs and SPAs	The NPWS produces a conservation plan for each SAC, SPA and NHA. Each plan lists the wildlife resources of the area, the current human uses, any conflicts between the two, and strategies for retaining the conservation value.	These plans will be consulted/referenced during the preparation of Baseline environment considerations for each FRMP option development with regard to the SEA objectives
Climate Change Sectoral Adaptation Plan for Flood Risk Management, 2015	Sets out the policy on climate change adaptation of the OPW, the lead agency for flood risk management in Ireland, based on a current understanding of the potential consequences of climate change for flooding and flood risk in Ireland, and the adaptation actions to be implemented by the OPW and other responsible Departments and agencies in the flood risk management sector.	The flood risk management options will facilitate the core objective set out within the Adaptation Plan.
National Mitigation Plan	The National Mitigation Plan is being developed under the Climate Action and Low Carbon Development Act 2015. The Plan outlines first steps in enabling a government wide transition to a low carbon, climate-resilient and environmentally sustainable economy by 2050	The CFRAM FRAMP will support national mitigation actions to adapt to the impacts of Climate Change.
Rural Development Programme 2014-2020	The Rural Development Programme (RDP) has been	The RDP recognises that the OPW has been appointed as the lead agency to

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
	developed under the requirements of CAP and includes a series of agri-environment and climate measures. The RDP is structured around three core axes which have the aim of: 1. Improving the competitiveness of agriculture; 2. Improving the environment; and 3. Improving the quality of life in rural areas	implement flooding policy in Ireland and that they are developing CRFAMs likely to involve both structural and non-structural measures such as storage and better flood forecasting and warning, but will also include structural works, particularly where flooding is already a problem. The RDP will monitor any developments and where necessary reflected these in the RDP measures.
The Planning System & Flood Risk Management Guidelines for Planning Authorities (2009)	Guidelines published under Section 28 of the Planning and Development Acts that provide a transparent and robust framework for the consideration of flood risk in planning and development management	The development of FRMP options will support the sustainable development of areas previously at flood risk by allowing for development to progress in the absence of flood risk where management strategies have been successful.
National Landscape Strategy for Ireland 2015-2025	This draft National Landscape Strategy is the means by which the State, working in co-operation with public authorities, stakeholders, communities and individuals, will provide a framework for the protection of the many cultural, social, economic and environmental values embedded in the landscape	The development of FRMP options should support the protection of landscape objectives set out in the strategy having regard to the SEA objectives
Regional/Local		
South West Regional Planning Guidelines for the West Region 2010 – 2022	Planning strategies at the regional level to provide the link between the national and local planning frameworks, which work within the overall approach taken in the NSS, while providing more detail and establishing a development and spatial framework that can be used to strengthen local authority development plans and other planning strategies at county, city and local level	Objectives and actions identified within the Regional Planning Guidelines were used to inform the development of FRMP options having regard to the SEA objectives.
South Western River Basin Management Plan 2009-2015 (and subsequent revisions)	Plans (RBMPs) prepared under the Water Framework Directive (2000/60/EC) that summarise the waterbodies that may not meet the environmental objectives of the WFD and identify which pressures are contributing to the environmental objectives not being achieved. The plans describe the	The River Basin Management Plans set specific objectives for each water body and provide a Programme of Measures to be implemented in order to achieve the objectives. These measures are an important consideration for implementation of the FRMP options.

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
	classification results and identified measures that can be introduced in order to safeguard waters and meet the environmental objectives of the WFD. New RBMPs are to be adopted by the end of 2017	
Second Cycle of River Basin Management Plans: 2015 - 2021	River Basin Management Planning takes an integrated approach to the protection, improvement and sustainable management of the water environment. Under the second cycle of WFD there is just a single river basin district covering Ireland.	
County Development Plans	The development plan sets the agenda for the development of the local authority's area over its six year lifespan. Development, whether it be residential, industrial, commercial or amenity, must generally take place in accordance with the policies and objectives of the development plan. The plan is therefore a blueprint for the economic and social development of the county for which it has been made.	The development of FRMP options should support the Land Use and development objectives and policies set out in the County Development Plans.
Local Area Plans	Local Area Plans provide more detailed planning policies at a local level for either urban areas or wider urban and rural areas where significant development and change is anticipated	The development of FRMP options should support the Land Use and development objectives and policies set out in the Local Area Plans having regard to the SEA objectives
County Heritage Plans	Identifies objectives and actions for the protection of the cultural heritage and archaeology resources at county level	The development of FRMP options should support protection of cultural heritage objectives and policies set out in the Plan having regard to the SEA objectives
Local Economic and Community Plans 2016 - 2021, when published	The plans set out the objectives and actions which will guide the economic and community development of local areas over the 2016 - 2021 period	The development of FRMP options should support economic and community objectives set out in the Plan having regard to the SEA objectives
Local Authority Strategic Plans (e.g. Cork Area Strategic Plan, Marine Leisure Infrastructure Strategy)	These plans provide strategic core goals to provide a framework setting out strategic spatial and development goals to facilitate sustainable development through the implementation of social,	The development of FRMP options should support the Land Use and development objectives and policies set out in the Plan having regard to the SEA objectives

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
	cultural and economic, environmental policies and programmes. while taking into account existing planning commitments and short term market trends	
County Landscape Character Strategy	County level Landscape Strategy aims to provide an explanation landscape at a county level by way of describing what the landscape actually entails, while highlighting how areas within the county have their own distinctiveness and character	The development of FRMP options should support the landscape objectives set out in the strategy having regard to the SEA objectives
Shellfish Water Pollution Reduction Programmes	The pollution reduction programme for shellfish waters in accordance with the standards and objectives established by the Quality of shellfish Waters regulations for designated shellfish growing waters.	There are a number of shellfish water within the CFRAM SW RBD which have associated pollution protection programmes. These designations were taken into account during the baseline considerations appraisal.
Draft Freshwater Pearl Mussel sub basin Management Plans	These plans aim to address catchment wide issues that re contributing to the decline in FWPM and to develop a strategy for implementing measures that will bring the catchment and population back to favourable conditions.	There are a number of FRPW waters occur within the CFRAM SW RBD which have associated management plans. These designations were taken into account during development of FRMP options as having regard to the SEA objectives

5.2.1 Relationship of CFRAMs and other Plans and Programmes

The following section explores the relationship of the international and national levels plans, programmes deemed to be most pertinent to the South Western RBD CFRAMS. As noted above, there are a number of plans and programmes which would be expected to influence or be influenced by the FRMPs, for the purpose of this SEA environmental report key relationships are discussed under each of the key environmental topics below;

5.2.1.1 Population and Human Health

The National Development Plan (NDP) is an overarching development plan setting out strategic proposals at a national scale. The National Spatial Strategy and the Regional Guidelines are the two documents which underpin the spatial development in the UoM at a national and regional level. These identifies a number of areas for improvement including physical and social infrastructure, attraction of inward investment, social inclusion, balanced regional development, environmental protection and sustainable development. The NSS identifies the Cork and Waterford as Gateways, the largest urban and economic

centre in the South West Region and towns of Mallow and Killarney are identified as hubs. The key challenge is to increase its rate of development and population growth in a sustainable manner. Flooding can cause risk to life, injury, illness and stress, and impacts may be greater for more socially vulnerable groups. Actions to manage flood risk can have wider positive and adverse impacts on people and human health. National and Local Planning Policies strive to reduce the exposure of people to flooding through policies and advice regarding new developments in flood risk areas and provide an enhance quality of life for the population. The FRMP is supported by land use strategies set out at National and Local scale as it ties in with the long-term objectives set out in the National Development Plan (NDP) and the National Spatial Strategy (NSS). The NSS will be replaced by the National Planning Framework (NPF), which is currently under development by the Department of Housing, Planning, Community and Local Government. This framework will have a co-ordinated focus on economic development and investment, inter alia, housing, health and education infrastructure over a period up to 2040. The FRMP will contribute to delivery of sustainable planning by reducing overall flood risk within the UoM and reducing risk to life and impacts on human health. The FRMP and SEA objectives have been developed to minimise risk of flooding to human health and community life.

5.2.1.2 Geology, Soils and Land Use

Soils and geology provide a range of benefits, which include supporting a diverse agri-food sector, filtering impurities from water and their role and function in land use drainage and flood management practices. Pressures on soils include those from climate change, flooding risk, and land use and land management change (including compaction and soil sealing). Flooding can impact on soils through deposition of sediments and pollutants. Land use objectives and policies identified within the relevant spatial planning policy documents were used to inform the development of appropriate and sustainable flood risk management measures. Guidelines on the Planning System and Flood Risk Management, 2009 provides a transparent and robust framework for the consideration of flood risk in planning and development management. The FRMP should also assist in the realisation of sustainable land use planning by providing protection to the amenity of new and existing development.

5.2.1.3 Architecture, Archaeology and Cultural Heritage

The European Convention on the Protection of the Archaeological Heritage ratified by Ireland in 1997, requires that appropriate consideration be given to archaeological issues at all stages of the planning and development process. This FRMP and the development of the SEA have had due consideration to the protection of the historic environment. Specific objectives have been included within the SEA to ensure that the protection of cultural heritage is considered within the development of the FRMP and during the SEA process.

5.2.1.4 Water Resources

The Water Frame Directive (WFD) establishes the legal framework for the protection, monitoring reporting and management of water resources across Europe. Under the Directive the management of water quality is carried out on an integrated approach and requires the preparation of River Basin Management Plans (RBMPs). The South West River Basin District Management Plan sets out a series of objectives and measures for the river, lake, estuarine, coastal and groundwater bodies of the South Western RBD.. The draft River Basin Management Plan for Ireland 2018-2021 is currently subject to public consultation. The

FRMP flood risk measures have been developed to achieve the objectives and measures proposed within the FRMP while ensuring compliance with the SEA objectives including the objective to support the achievement of the Water Framework Directive objectives.

5.2.1.5 Air and Climate

Air Quality regulations in Ireland derive from EU Directive 2008/50/EC, which has been transferred into Irish law through the Air Quality Standards Regulations, 2011 (S.I. No 180 of 2011), and the EU National Emissions Ceiling (NEC) Directive 2001/81/EC (EC, 2001a). In addition to the aforementioned regulations, Ireland is a member of the Convention on Long Range Transboundary Air Pollution through which the Gothenburg Protocol sets out targets for the control of ammonia emissions. Implementation of the Gothenburg Protocol is achieved through limits set out in the National Emissions Ceilings Directive. A number of atmospheric pollutants are measured by the EPA in order to monitor compliance with European ambient air quality directives (e.g. EC, 2008). As noted the drivers for air quality are largely EU driven, however in 2015 the DECLG (now DCCAE) announced the intention to publish Ireland's first National Clean Air Strategy in 2017. This Strategy will provide a policy framework by which Ireland can develop the necessary policies and measures to comply with new and emerging EU legislation, as well helping to tackle climate change. The FRMP options have been developed to take climate change projections into account when assessing flood risk, setting objectives and selecting measures that be adaptable in future to the effects of a changing climate and contribute to climate change mitigation.

5.2.1.6 Biodiversity, Flora and Fauna

At the top of the European protection hierarchy is the Habitats Directive (92/43/EC) and the Birds Directive (2009/147/EC) which have been transposed into Irish law principally through the European Communities (Birds and Natural Habitats) Regulations 2011. These regulations consolidates the European Communities (Natural Habitats) Regulations 1997 to 2005 and the European Communities (Birds and Natural Habitats)(Control of Recreational Activities) Regulations 2010, as well as addressing transposition deficiencies in the original implementing legislation. Also relevant to the FRMPs and this SEA is the EU Biodiversity Strategy to 2020 which aims to prevent and eliminate the causes of biodiversity loss and maintain and enhance current levels of biodiversity. At a national level, protection and conservation continues with the National Biodiversity Plan and the National Parks and Wildlife Conservation Plans for SACs and SPAs. The FRMP and SEA objectives have been developed to ensure that the planned flood risk measures result in compliance with all existing EU and national objectives, policies and legislation which also seek to protect the natural environment. The FRMP looks for opportunities to conserve, and where possible restore, biodiversity. Article 6 of the Habitats Directive requires that any plan or project, which includes the CFRAMS FRMPs, be screened for AA to determine if it, alone or in combination with other plans and projects, is likely to have a significant effect on a European Site. This screening has been undertaken in parallel to development of the FRMPs SEA. The outcomes and recommendations of each stage in the Appropriate Assessment process inform the Strategic Environmental Assessment and vice versa.

5.2.1.7 Fisheries, Aquaculture and Angling

The EU Common Fisheries Policy (CFP) guides the development and management of Fisheries and aquaculture in the European Union. The policy aims to ensure the sustainable and economic viability of the industry. This is achieved through a number of different measures including the usage of fishing quotas to restrict the quantity of fish caught. The Sea Fisheries Policy & Management Division of the Department of Agriculture Food and the Marine is responsible for the management of the seafood sector and the implementation of the Common Fisheries Policy. The Aquaculture and Foreshore Management Division of the Department is also responsible for the licencing of aquaculture under the Fisheries (Amendment) Act 1997. The CFP requires a multi-annual strategic plan to be prepared for aquaculture based on the Strategies Guidelines for the Sustainable Development of EU Aquaculture. The National Strategic Plan for Sustainable Aquaculture Development specifies a number of guiding principles to achieve the sustainable development of the industry including the implementation of “responsible Planning”, the implementation of Ecosystem Protection, using science based approach to decision making and ensuring compliance with the relevant European and National Legislation such as the SEA and EIA legislation. The FRMP’s have had due regard to protecting fishery assets, by virtue of the fact that the proposed measures have been developed to ensure that the receiving environment is not significantly impacted by the proposed measures. Mitigation measures during the construction phase of structural measures will be required to minimise the potential for pollution.

5.2.1.8 Tourism and Recreation

People, Place and Policy -Growing Tourism to 2025 outlines current Government policy with regard to tourism in Ireland. The policy document sets goals for significant tourism growth up to 2025 and identifies the quality of the environment as a significant attraction to overseas tourists coming to Ireland. Furthermore the policy document highlights the requirement for the development of public infrastructure and private construction to be carried out with as much sympathy as possible for the natural and historical landscape. The document outlines policies to ensure that the natural and built environment are protected to ensure a viable tourism product. The FRMP’s have had due regard to protecting landscapes and elements of cultural heritage when devising flood management measures. The SEA has assessed the potential of proposed measures to impact on both of these elements and this assessment has informed the development of the FRMP.

5.2.1.9 Landscape and Visual Amenities

The European Landscape Convention is a Council of Europe initiative that highlights the importance of all landscapes and encourages more attention to their care and planning. Public authorities are encouraged to adopt policies and measures at local and regional level for protecting landscapes. Sensitive areas of landscape are identified at Local Authority level through County Development Plans and local Area Plans. The FRMP’s have had due regard to protecting landscapes and have regard to the potential impacts of national and local landscape and visual amenity designations. Landscape policies related to key areas of recognised values, for example, designated areas, scenic routes, and national parks designations including their sensitivity and importance/value were considered in the development of appropriate flood

risk management measures. The development of FRMP options reduce the risk of flooding to the benefiting lands, thereby protecting the Landscape and visual resources within these lands.

5.2.1.10 Infrastructure and Material Assets

Flood measures such as flood defences are a material asset. The FRMP options entail the flood defences to ensure effective management of flood risk into the future. This management of flood risk provides protection for other material assets, such as water services, road and rail infrastructure from flooding. Sector Programmes of wastewater treatment plants and networks, water supply infrastructure, transport infrastructure and energy supply etc. are required to be implemented in several areas in order to accommodate recent and future population growth and to facilitate the climate adaptation strategies. The development of FRMP options reduce the risk of flooding to the benefiting lands, thereby protecting the material assets and strategic infrastructure resources within the UoM.

6 Key Environmental Issues in UoM 19

6.1 Introduction

Ireland's natural environment, although under increasing pressure, generally remains of good quality and represents one of the country's most essential national assets. In the document entitled Ireland's Environment 2016 – An Assessment, the EPA outlines the four priority challenges for the environment, which, if addressed successfully should benefit the present and future quality of Ireland's environment. These are as follows;

- i Valuing and Protecting our Natural Environment;
- i Building a Resource-Efficient, Low Carbon Economy;
- i Implementing Environmental Legislation; and
- i Putting the Environment at the Centre of Our Decision Making.

These challenges are summarised below with reference to how the FRMP is framed relative to these challenges.

Challenge	FRMP is framed relative to these challenges
Valuing and Protecting our Natural Environment	Although the focus of the Plan relates to flood risk management measures the potential changes in current land use practices (e.g. population, health, land use adaptation and resiliencies.) and the development of the associated infrastructure (e.g. energy and climate change and transport) have the potential to impact on the natural environment. In this regard, the FRMP and AFA mitigation measures have been developed to ensure that the planned flood risk measures are carried out in compliance with all existing EU and national objectives, policies and legislation which also seek to protect the natural environment (such as biodiversity, protected habitats/species, landscapes water resources and etc)
Building a Resource-Efficient, Low Carbon Economy	The FRMP objectives set out goals that plan is aiming to achieve. They have a key role in the preparation of the Plan, and the identification of appropriate measures, as the options that are available to manage flood risk within an AFA are appraised against these objectives to determine how well the option contributes towards meeting the defined goals. The objectives are aimed at considering the benefits and impacts across a broad range of sectors to achieve the most cost effective, and sustainable management of existing and potential future flood risk
Implementing Environmental Legislation	The FRMP is undergoing both SEA and AA in line with the EU and national legislation. The approval adoption of the Plan does not confer approval or permission for the installation or construction of any project. projects arising from the FRMP will require further environmental assessment (SEA, EIA, AA). Where development is below the thresholds of this legislation and regulation, this Environmental Report will make recommendations to protect the environment. This SEA has regard to inter-related EU legislation such as the Water Framework Directive, Habitats Directive.
Putting the Environment at the Centre of Our Decision Making	As noted above, the FRMP is undergoing both SEA and AA in line with existing EU and national legislation. This is ensuring that the environmental consequences of any measures undertaken as a result of the plan are taken into account as part of the plan's development. Both processes are helping to shape the evolution of the FRMP and the associated AFA Flood risk measures

The existing and potential future environmental characteristics of Unit of Management 19 are described in this section and the key social and environmental issues that may be affected by flooding and flood risk management are identified.

In the identification of key social and environmental issues in UoM 19 regard was had to the issued identified in the Lee Catchment Flood Risk Assessment and Management Study which includes:

- | The need to protect the conservation status of the Natura 2000 sites such as the Gearagh and areas of Cork Harbour;
- | The Need to maintain natural channel form to support the good fishery value of the rivers in the Lee catchment which are all capable of supporting salmon, brown trout and sea trout;
- | The need to protect areas of landscape and visual importance within the catchment and also tourist attractions such as Cork Harbour, the Lee Valley, and amenity woodlands;
- | The need to protect important commercial ports, national roads, and electricity generation facilities within the catchment;

Environmental characteristics of UoM 19 are presented under the following topics:

- | Population and Human Health;
- | Geology, Soils and Land Use;
- | Architecture, Archaeology and Cultural Heritage;
- | Water Resources;
- | Air and Climate;
- | Biodiversity, Flora and Fauna;
- | Tourism and Recreation;
- | Fisheries, Aquaculture and Angling;
- | Landscape and Visual Amenity;
- | Material Assets

6.2 Population and Human Health

6.2.1 Population

The results for the 2016 Census (available through www.cso.ie) recorded a national population of 4,761,865 on census night). Comparison against the 2011 census figures indicates 3.8% increase in the national population over the 5-year period. This national upward trend is reflected in the South West region (Counties Cork, Kerry, Limerick, Tipperary and Waterford) population figures (Table 6.1).

Table 6.1: Population of CFRAMs Southwest Counties 2011 and 2016

County	Persons 2016	%age difference between 2011-2016
Cork County	417,211	4.4
Kerry	147,707	1.5
Limerick City and County	194,899	1.6
Waterford City and County	116,176	2.1
Tipperary	159,553	0.5

Source: Central Statistics Office

Centres of population are recognised as vulnerable receptors to flooding and often host services and facilities that, if flooded, will impact a broader catchment of people than that directly impacted by the flood event itself. The upward trend in population figures in the South West counties has the potential to result in an increase in the number of receptors vulnerable to flooding (where these population increases are focused around areas prone to flooding).

The CSO Small Area Population Statistics (SAPS) (2011 most recent SAPA data) demonstrates that the upward trend in population growth has continued from the 2006 census for areas within the AFAs. Census data between 2006 and 2011 is presented in Table 6.2.

Table 6.2: CSO Population of Towns 2006 and CSO 2011 SAPS Data

AFA	Persons 2006	SAPS 2011 Data
Killeagh	521	721
Castlemartyr	978	1,277
Ballingeary	No Data Available	238

Source: Central Statistics Office – 2011 Census data and <http://census.cso.ie/sapmap/>

Ballingeary is noted as a Gaeltacht area within this UoM 19.

6.2.2 Human Health

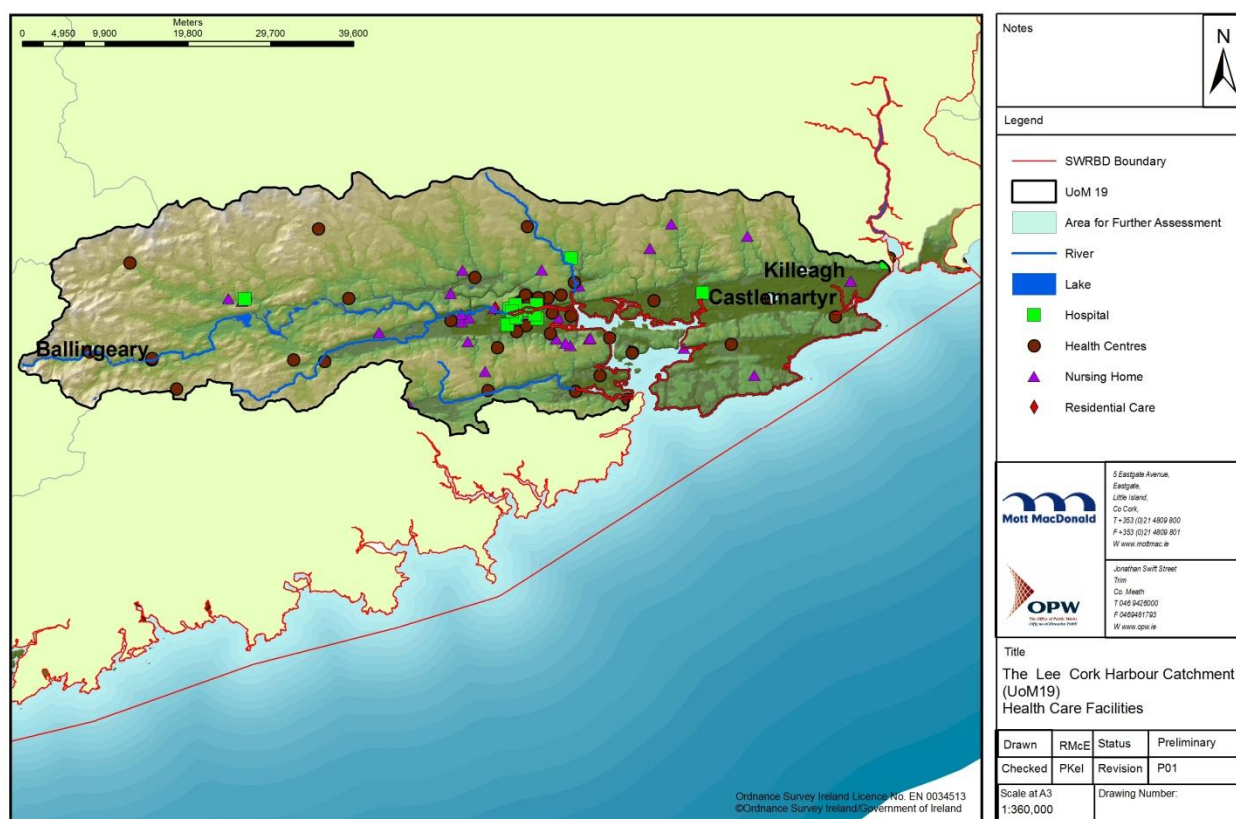
Flooding can have significant temporary impacts on some of the more vulnerable members of society including the sick and the elderly. The provision of clean portable water can be affected when WWTPs are flooded and the blockage of transport links can make it difficult for the old and infirm to access required medical assistance.

Additional impacts can be realised when a health care facility is flooded including placing the safety of already vulnerable people at risk by having to move them from a facility and imposing pressures on other health care facilities which have to accommodate additional patients.

Health care service providers in Unit of Management 19 include hospitals, health care centres, and residential care for the elderly. Hospitals in UoM 19 include regional hospitals which service all of the South West e.g. Cork University Hospital and Cork University Maternity Hospital. Flooding of access routes to these hospitals can have significant impacts in terms of numbers of people affected.

Many of the larger health care service providers in Unit of Management 19 are contained within the River Lee Catchment and as such, potential implications of flood risk management on these receptors are considered under the Lee CFRAM Study.

Figure 6.1: Health Care Facilities, UoM 19



6.2.3 Future Trends in Population and Human Health

6.2.3.1 Population

The general population trend in the South Western River Basin District is one of steady growth. The Central Statistics Office (CSO) regional population projections (which include traditional migration assumptions) provide projected population figures for the South West and the South East regions to the year 2031 which reflect the observed trend (refer to Table 6.3).

The CSO reported in the publication entitled Population and Labour Force Projections 2016-2046, that the total population in Ireland is expected increase to 5.3 million by 2026. The CSO predicts the average annual population growth rate between 2016-2046 (taking account of fertility and migration) to be between 0.4 and 1%, compared to the 0.7% growth rate recorded during the 2011-2016 census periods.

Table 6.3: Projected Population of Regional Areas

Region	CSO Projected 2031 Figure
South East	550,000
South West	733,000

The National Development Plan (NDP) sets out physical and spatial planning policy such that the population projections in the NSS are supported by adequate facilities and infrastructure. Although the period of the NDP has now expired it remains a pertinent guidance document until such time that a replacement plan or strategy is published. The National Spatial Strategy (NSS) and the NDP are implemented at a regional level through Regional Planning Guidelines which are subsequently adopted through county and local planning strategies. In 2015, the South West and South East Regional Authorities (now restructured as the Southern Regional Assembly), published their RPGs for the period 2011-2022.

A number of public investment programmes have been launched under the National Spatial Strategy are focused towards the development of key gateway (urban centres) and hub (towns linking urban centres to rural areas) areas. Public investment programmes include the following:

- i Infrastructure and Capital Investment 2012-2016: The Plan sets tranche of investment over the period 2012-2016, the capital investment is designed to facilitate economic growth and build social infrastructure in the state. Environmental Infrastructure is identified as a key investment requirement for Ireland and to this end the OPW has been allocated €500 million allocation to assist the flood relief programme.
- i Smarter travel-A new transport Policy for Ireland 2009-2020 is designed to guide the development of sustainable transport in Ireland thereby reducing health and environmental impacts of current transport systems and improve quality of life.
- i Water Services Investment –Irish Water was established in March 2013 under the Water Services Act 2013 and is Ireland's new national water services provider. Irish Water has taken over the responsibilities relating to the provision of water and wastewater infrastructure from Local Authorities on a phased basis since January 2014.;
- i Communications and Broadband Programme – promoting the rollout of broadband across the country, focusing on achieving connectivity in rural areas; and
- i Realising Our Rural Potential – Action Plan for Rural Development (2017)–This is a plan to promote the sustainable growth of the agriculture and forestry sectors and unlock the potential of rural Ireland through a framework of supports at national and local level.

On-going investment at regional and local level in order to support Ireland's National Spatial Strategy may result in the re-zoning of lands within this Unit of Management, particularly in areas identified as gateways and hubs. Regional Planning Guidelines for the South-West and South-East regions predict an increase in housing demand with the main areas of housing development located in gateway areas and hub towns. The CSO census data highlights the continual housing shortage in Ireland, the data notes households in Ireland have increased by 3%, whilst the overall population increased by 3.7%. To this end, the Government have set out an Action Plan Rebuilding Ireland – Action Plan for Housing and Homelessness. The Plan proposes a number of measures on the land management side. The Spatial Planning as outlined

in Local Authority Development Plans and Local Area Plans are a particularly important mechanism for land management in Ireland. The Government estimate that on average extra 25,000 homes are required to be provided every year in the period to 2021.

6.2.3.2 Human Health

In November 2012, the Department of Health published *Future Health: A Strategic Framework for Reform of the Health Service 2012-2015*. This document sets out proposed government health care reform for Ireland. Key areas addressed include:

- i **Service Reform** – movement away from the treatment of people through hospital care towards a greater utilisation of community care for people at the lowest level of complexity such that care is close to home and provided in a timely manner;
- i **Structural Reform** - through the provision of a new management structure in the HSE and the establishment of hospital groups on an administrative boundary basis. There will also be emphasis on the alignment of local level service providers.

The reform of the health care service in Ireland will result in a shift towards home care and community level care which may result in changes on the ground to health care services in the future.

In line with legislative requirements the National Service Plan (NSP) 2016 sets out the type and volume of health and personal social services which will be provided by HSE notes that the total funding available to the HSE for existing services in 2016 is €12,890m which represents an increase in the region of €100m (0.8%) on the projected expenditure for 2015.

6.2.4 Population and Human Health – Key Issues Relating to Flood Risk Management

The towns of Killeagh and Castlemartyr (AFAs in UoM 19) are situated on the primary route between Cork City and Waterford City (both of which are identified as gateways in the NSS). Cork and Waterford city will experience further development and expansion in the future. It is likely that their associated regions will also experience overall population growth and it is logical that those towns located on commuting routes to the cities will experience greater population increase than more remote locations.

The prevalence of local health care facilities is likely to increase through the implementation of the Department's health service reform programme. The development of existing facilities (in terms of services offered and facility capacity) could potentially result in an increase in the number of people at risk from flooding whereby these facilities are located in flood risk areas.

6.3 Geology, Soils and Land Use

6.3.1 Topography

The River Womanagh catchment ranges from less than 1mODM near Gortnagark Castle up to 238mODM in the upper reaches of the Kiltha and Dissour River. The areas of highest relief are associated with the more resistant underlying geology to the north and south of the Womanagh Valley. The low-lying tidal floodplain downstream of Finisk is typically 600m wide constrained by the resistant geology either side. The floodplain narrows to 350m at Crompaun Bridge as the valley side spurs limit the volume available on the floodplain. Downstream, the floodplain widens as the Gortavadden Channel joins from the west and Ballymadog Channel from the north. There is a low pass at Ballykinealy which may be vulnerable to extreme storm surges with predicted climatic change.

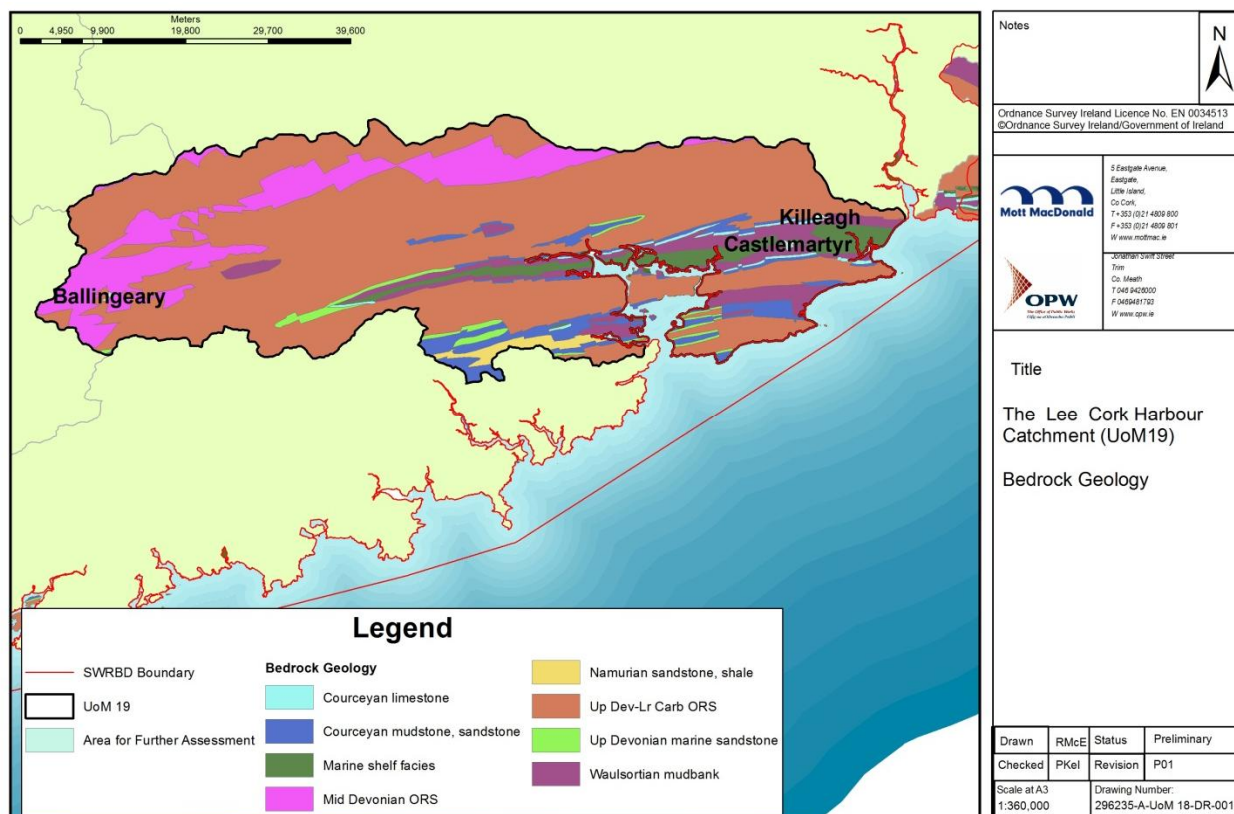
The relief in Ballingeary is much higher. The Bunsheelin catchment ranges from 85mODM at Lough Allua to over 530mODM in its headwaters. The upper reaches are steep (1 in 35) and the valley is constrained by the relatively mountainous topography. The steep-sided valley results in a fast-responding catchment leaving some properties at the bottom of these slopes vulnerable to surface water run-off as well as flash flooding from the river. The floodplain widens to 400m as the Bunsheelin flattens out to join the Upper Lee and Lough Allua. The flatter topography and presence of Lough Allua downstream can prolong flooding in the lower reaches depending on the Lough level prior to the event.

6.3.2 Geology and Soils

6.3.2.1 Bedrock Geology

The Lee catchment is predominantly underlain by Old Devonian Sandstones which are relatively impermeable and create steep relief in the mountainous areas around Ballingeary. This leads to flashy response to rainfall in the upper catchments of Bunsheelin and the Upper Lee. The Womanagh valley and lower reaches of its tributaries are underlain by permeable Dinatian Limestone forming part of a regionally important aquifer. The high permeability of underlying soils in this area may reduce flows when the ground is unsaturated. However, flooding could be exacerbated when the underlying aquifer is saturated prior to a flood event. There are a number of limestone and sand and gravel quarries operating in UoM 19.

Figure 6.2: Bedrock Geology in UoM 19



Source: Bedrock geology provided by the Geological Survey of Ireland

6.3.2.2 Geological Heritage

The Geological Survey of Ireland (GSI) and the National Parks and Wildlife Service (NPWS) operate the Irish Geological Heritage Programme (IGH) in Ireland since 1998. The IGH programme aims to identify and document the wealth of geological heritage in Ireland with the ultimate goal of protecting and conserving Ireland's geological heritage. IGH sites identified to date under the Programme in UoM 19 are presented in Figure 6.3.

Legend

- SWRBD Boundary
- UoM 19
- Area for Further Assessment
- River
- Lake
- Geological Heritage Site

Scale

0 4,950 9,900 Meters 19,800 29,700 39,800

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Geological Heritage Sites

Drawn	RMcE	Status	Preliminary
Checked	PKel	Revision	P01

Scale at A3: 1:360,000

Drawing Number: 296235-A-UoM 18-DR-001

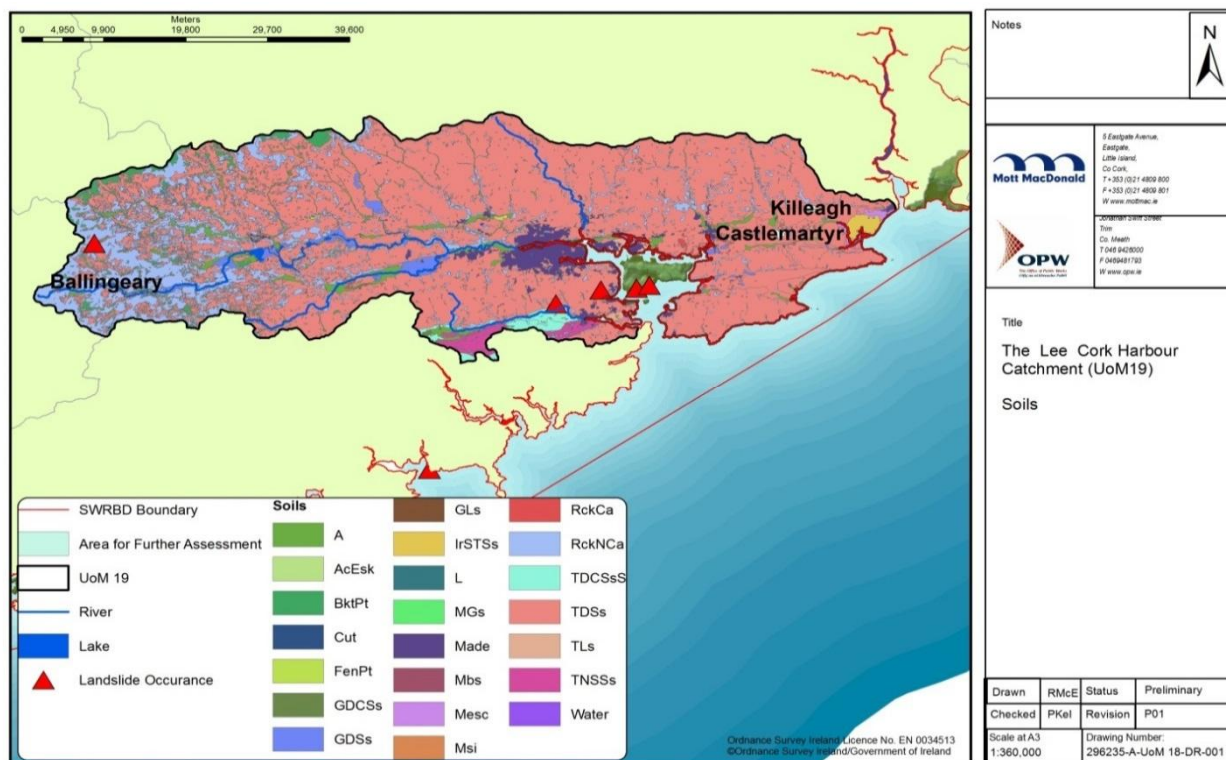
6.3.2.3 Soils

Table 6.4: Records of landslides in UoM 19

Location and year	County	Mechanism	Land Cover
Fuhiry1997	Cork	Unknown	Peat
-	Cork	-	Earth
-	Cork	-	Earth

63 296235/IWE/CCW/ES003/D

Figure 6.4: Soils of UoM 19



Source: Soil mapping – free download from <http://gis.epa.ie/>

6.3.3 Land Use

The Bunsheelin and wider Lee catchment is predominately rural in its upper reaches with land assigned to peat bog, pastoral practices or forestry. The forest tends to be coniferous but this makes up less than 6% of the area around Ballingeary. The lack of dense vegetation across the majority of the catchment tends to exacerbate runoff over the steep sided slopes, creating a flashy response to rainfall downstream.

The Womanagh catchment is dominated by pastoral farming, although the lower reaches of the Kiltla River are heavily wooded accounting for 15% of land cover in this catchment. The urban areas of Castlemartyr and Killeagh have a combined population of less than 2000 and account for less than 1% of land cover.

Since 1995, the Forest Service of Ireland has produced spatial datasets detailing the extent of the forest estate in Ireland. There are four distinct ownership categories in the national forest inventory dataset (FIPS): (1) Private Non-Grant Aided which includes forest areas planted prior to 1980, (2) Private Grant Aided which are forest areas which were in receipt of grant aid, (3) Premiums which includes forestry

under the Teagasc grant scheme, (4) Public which is forest owned by Coillte and the National Parks and Wildlife Service.

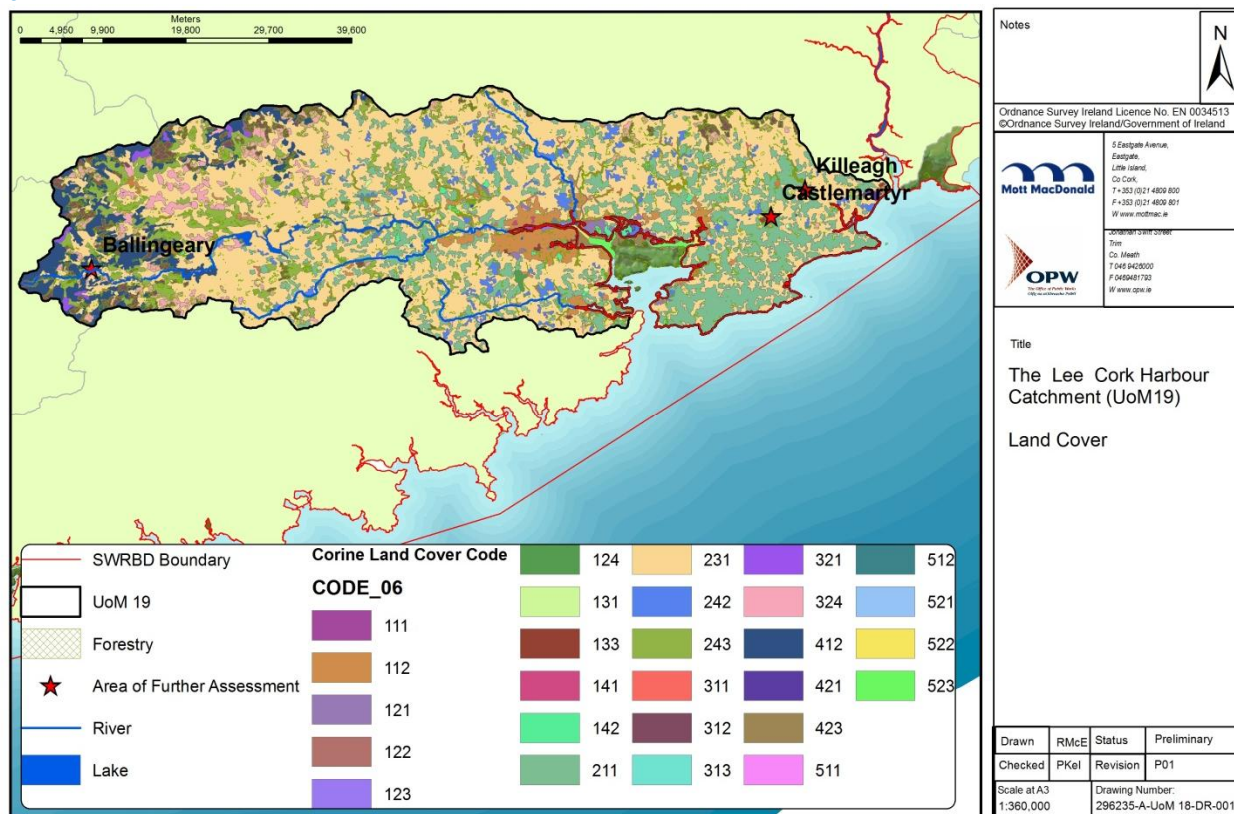
Ireland has one of the lowest forest landcover rates in the EU. Forests provide many environmental related functions, including carbon sequestration, and storage and support of biodiversity in addition to their commercial value. Irelands National Forestry Programme 2014-2020 has identified four key needs for the national forestry sector. These include:

1. Permanently increasing Ireland's forest cover;
2. Increasing and sustaining forest based biomass production to meet the EU Energy targets;
3. Supporting forest holders in actively managing their plantations;
4. Optimising the environmental and social benefits of new and existing forests.

According to the National Forestry Policy Review (2014) annual afforestation has decreased over the past 3 years (2012-2015). The Policy Review sets out annual afforestation targets up to 2046

Two dams in the Upper Lee Catchment, at Carrigadrohid and Inniscarra, manage the flow of water from the Upper Lee catchment to the lower Lee Catchment. The dams play an important role in the management of flood risk in the Lee Valley through the provision of storage and controlled discharge of flood waters.

Figure 6.5: Land Cover within UoM 19



Source: Corine – free download from <http://gis.epa.ie>.

Forestry – Forestry07 mapping data sourced from the Department of Agriculture, Food and the Marine.

Table 6.5: Corine Codes Relevant to UoM 19

Corine Code	Description
111	Continuous urban fabric
112	Discontinuous urban fabric
121	Industrial and commercial units
122	Road and rail network
123	Sea ports
124	Airports
131	Mineral extraction sites
133	Construction sites
141	Green urban areas
142	Sport and leisure facilities
211	Non-irrigated arable land

Corine Code	Description
231	Pastures
242	Complex cultivation patterns
243	Land principally occupied by agriculture with significant areas of natural vegetation
311	Broad-leaved forests
312	Coniferous forests
313	Mixed forests
321	Natural grassland
324	Transitional woodland scrub
412	Peat bogs
421	Salt marshes
423	Intertidal flats
511	Stream courses
512	Water bodies
521	Coastal lagoons
522	Estuaries
523	Sea and ocean

6.3.4 Future Trends in Land Use

6.3.4.1 Agriculture

Flooding can impact on soils through deposition of sediments and pollutants. Flooding may exacerbate erosion leading to loss of fertile topsoil from fields, which can damage a range of soil functions. Flooding can impact on agriculture by damaging livestock and crops, and affecting soil quality. Land cover in UoM 19 is dominated by agricultural pastureland. While it is unlikely that the general pattern of land use within the UoM will be substantially changed in the future, the reform of the EU Common Agricultural Policy (CAP) in June 2013 has the potential to result in changes in farm practices.

CAPs main objective is ensuring a decent standard of living for farmers whilst securing the provision of a stable and safe food supply at affordable prices. The CAP has been reformed such that approximately 30% of payments to farmers will be linked to the farmers' compliance with sustainable agricultural practices (such as crop diversification, the maintenance of permanent grassland or the preservation of ecological areas on farms).

EU Milk quotas were abolished in 2015 which will allow many dairy farmers scope to increase milk production. The abolition of the milk quotas has resulted in changes in land use practice and increases in stocking densities.

Agriculture in Ireland is a resource-rich and primarily grass-based industry with 81%³ (3.8 million ha) dedicated to pasture, hay and silage. According to the 2015/2016 data published by the Department Agriculture, beef and dairy production constitute almost 68.0% of total agricultural output. The planned intensification under Food Harvest 2020 and Food Wise 2025 will increase the numbers in the national herds and if the planned intensification is not carried out in sustainable manner will place increase pressures on the land and flood risk management.

The EU Soil Thematic Strategy [COM(2006)231] sets out four pillars for the protection of soil in the EU:

- i awareness raising initiatives;
- i research projects, particularly in the areas of landslides, soil sealing, soil functions and their link to biodiversity, the soil carbon and nitrogen cycles (with a focus on peatland restoration), soil fertility, and nutrients recycling in agriculture;
- i soil monitoring for food security and safety, diffuse contamination, and climate change adaptation;
- i integration of soil protection in different policies and legislation.

The strategy identifies agriculture as being one of the more detrimental activities to the protection of soil integrity. The Seventh Environment Action Program states that degradation of soil is a serious problem, both for member states and globally. It is proposed that by 2020 all land in the EU should be managed sustainably and soils afforded protection, with remediation of contaminated sites also laid out as a priority. Inappropriate or intensive land-use practices can result in erosion, modification of channel geomorphology, or discharge of receiving sediments. Management of land-use practices directly impacts the soils. Pressures on soils include climate change, and land use and land management change (including compaction and soil sealing).

Within Ireland, a Nitrates Action Programme has been prepared in accordance with Article 5 of the Nitrates Directive and is to be applied to the State as a whole. The Waste Management (Use of Sewage Sludge in Agriculture) Amendment Regulations 2001, requires that where sludge is reused in agriculture, Local Authorities ensure that the testing and management of the sludge, is compliant with the requirements of the Regulations, and in particular that a nutrient management plan is used.

6.3.4.2 Energy

European Union policy to tackle climate change sets ambitious targets for the generation of energy from renewable sources. Ireland has outlined a renewable energy strategy⁴ to support the European objectives which sets a target of 40% from renewable resources by 2020. This will be met by 40% from renewable electricity, 12% from renewable heat, and 10% from renewable transport. The European Union (EU) has recently adopted a target for the year 2030 of at least 27% renewable energy. This target is binding at EU level. In Ireland, by 2013, 7.8% of gross final energy use came from renewable sources with renewable electricity accounting for 20.9% of all electricity generated⁵. It is anticipated that there will be significant investment in the development of renewable energy infrastructure in Ireland in the medium to long term.

⁴ Strategy for Renewable Energy: 2012 – 2020 (Department of Communications, Energy and Natural Resources, May 2012)

⁵ SEAI Energy in Ireland Key Statistics 2015

6.3.5 Geology, Soils and Land Use Key Issues Relating to Flood Risk Management

Flood management options under consideration in the Flood Risk Management Plans include non-structural options such as planning control and land use management. Publication of the plans may result in the zoning of lands for particular land use practices for the purpose of preventing or protecting against flooding. This may entail the re-zoning of lands currently zoned for alternative purposes. In the absence of FRMP options being implemented, the risk of flooding to the benefiting lands would increase significantly. The flooding of agricultural land could result in damage to the valuable soil resource within the relevant lands, with knock-on effects including loss of production and the associated financial losses and costs. The environmental effects of flooding to soil also include soil erosion, bank erosion and land sliding.

6.4 Architecture, Archaeology and Cultural Heritage

The South Western River Basin District hosts a variety of archaeological and architectural features which are afforded varying levels of protection under national legislation. Such features include:

- i Records of Monuments and Places (RMP) – the National Monuments Service (www.archaeology.ie) holds responsibility for maintaining this inventory of sites of archaeological significance which pre-date the eighteenth Century (including records of those which historically have been destroyed). These sites are established under the National Monuments Acts 1930 to 2004;
- i National Inventory of Architectural Heritage (NIAH) – is a record of sites of architectural heritage importance in Ireland dating from the start of the eighteenth century up to the present day which are established under the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999. The National Inventory of Architectural Heritage also maintains an inventory of historic gardens and demesnes;
- i Records of Protected Structures – The Planning and Development Act 2000 requires Local Authorities to compile a “Record of Protected Structures” as part of the County Development Plan. These are structures, or part thereof, which are considered to be of architectural value. Many of these structures also appear on the NIAH list;
- i Architectural Conservation Areas – In accordance with article 81 of the Planning and Development Act 2000, Local Authority County Development Plans are to identify Architectural Conservation Areas and are to include an objective in the Plan to preserve the character of such areas;
- i Preservation Order sites - available from the Department of Arts, Heritage and the Gaeltacht, are sites protected under the National Monuments Act 1930-2004.

Flooding has the potential to cause physical damage to archaeological and architectural features. The implementation of flood risk management measures can include intentional destruction of features of architectural heritage e.g. destruction of a listed bridge for the purpose of improving the capacity of a waterbody.

The locations of archaeological and architectural features within UoM 19 are presented in Figure 6.6. Many of these features, particularly listings on the NIAH due to the urban nature of the Lee Catchment, are

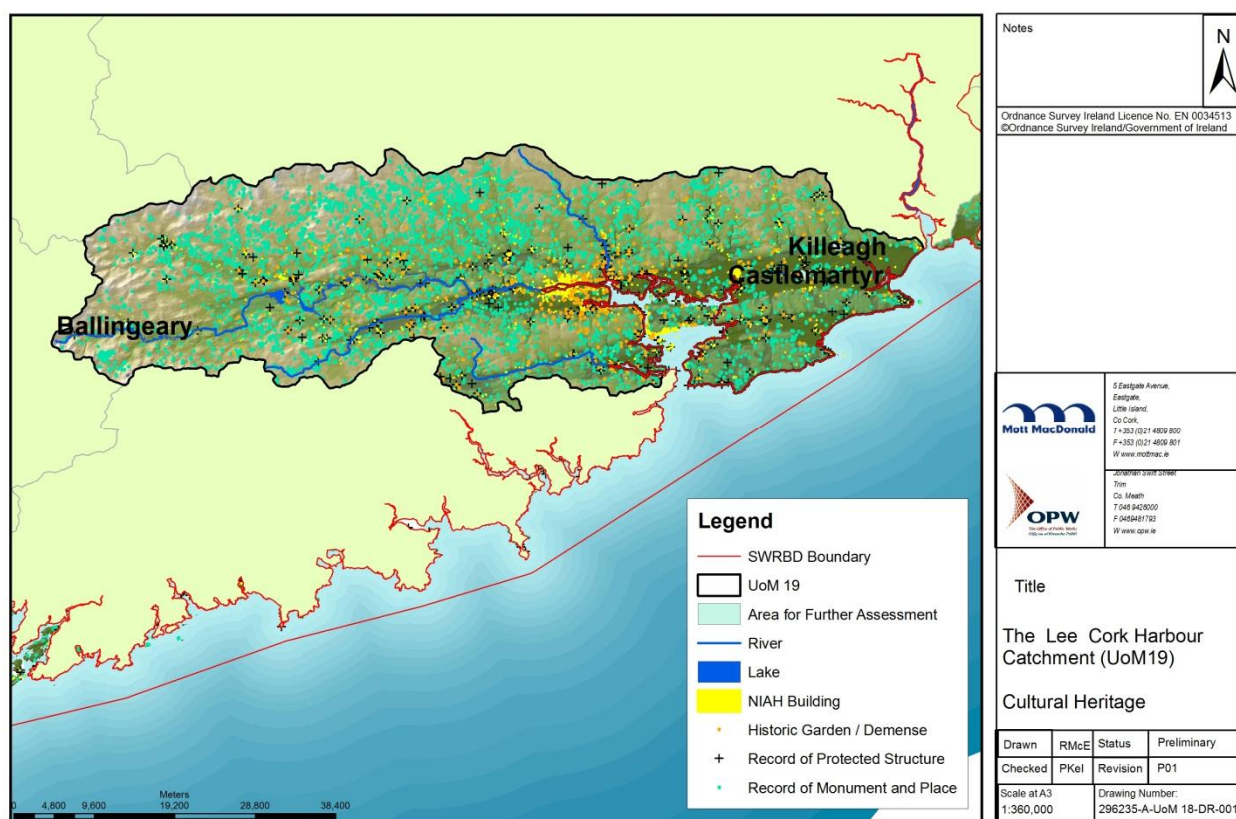
contained within the River Lee Catchment and as such, potential implications of flood risk management on these receptors are considered under the Lee CFRAM Study.

There are approximately 5,160 Records of Monuments and Places (RMP) within UoM 19, approximately 15 of which are located within AFAs. RMP classifications include:

- | Burial grounds;
- | Bridge (including railway bridge);
- | Buildings;
- | Cairn;
- | Castle;
- | Church;
- | Historic Town;
- | Landscape feature;
- | Earthwork and enclosure;
- | Fish pond;
- | Fulacht Fia;
- | Kiln;
- | Leper Hospital;
- | Ogham Stone / Standing Stone;
- | Ringfort;
- | Water Mill.

There are approximately 3,900 listings on the NIAH within this Unit of Management, approximately 45 of which are located within the AFAs in UoM 19. There are approximately 425 historic gardens and demesnes in UoM 19; none of which are located in the AFAs of UoM 19. There are approximately 308 protected structures in UoM 19, approximately 6 of which are located in AFAs. There are no designated UNESCO World Heritage Sites or sites listed on the Tentative List located in this Unit of Management. A relatively low percentage of the archaeological and architectural sites in UoM 19 are located within the AFAs.

Figure 6.6: Archaeological and Architectural Features of UoM 19



6.4.1 Future Trends in Architecture, Archaeology and Cultural Heritage

Archaeological heritage of the SWRBD also includes unrecorded archaeological features. Future flood risk management projects which may arise as a result of the FRMPs will need to consider potential impacts on unknown archaeological features which may be present. In the absence of FRMP options being implemented, the risk of flooding to the benefiting lands would increase significantly. The risk of flood damage to features of architectural or archaeological heritage located within these lands would therefore also increase.

6.4.2 Architecture, Archaeology and Cultural Heritage - Key Issues in UoM 19

Many RMP sites are associated with watercourses and may potentially be impacted by the implementation of flood risk management measures. There is one protected bridge structure located on watercourses in each of the AFAs of Castlemartyr and Ballingeary which may currently act as hydraulic restrictions. Flood

risk management measures may include the destruction of these structures. There is one protected water mills in the AFA of Killeagh. Other features, including churches, religious buildings and houses, are located in close proximity to watercourses and as such may constrain the application of certain flood risk management measures at these locations.

The Underwater Archaeology Unit (UAU) of the National Monuments Service maintains an inventory of shipwrecks recorded in Irish waters. One shipwreck has been recorded at Roche's Point, Cork. Tidal flood risk management measures may potentially impact upon maritime archaeology.

6.5 Water Resources

Water resources include surface water (rivers, streams, lakes), groundwater (aquifers and public water sources) transitional waters (estuaries) and coastal waters. The water resources in the SWRBD are managed on a catchment basis in accordance with the South Western River Basin Management Plan 2009-2015, developed under the Water Framework Directive (2000/60/EC). The primary objectives of the Water Framework Directive are to prevent any deterioration in the existing status of waters, to aim to improve the quality of waters which are less than 'good status', to ensure the maintenance of the quality of waters which are currently of 'high status', and to achieve the standards as set out in National and European legislation for areas designated for protection such as drinking waters, bathing waters etc. The South Western River Basin Management Plan sets out specific measures to be implemented on a waterbody catchment basis such that the objectives of the Water Framework Directive are met.

Flood risk management measures interact directly with water resources and must be designed effectively such that processes influencing existing waterbody status are not negatively impacted so as to cause deterioration in waterbody status.

The main channel of the River Lee is designated moderate status or less under the WFD (refer to Figure 6.7). Waterbodies to the west of UoM 19 are generally of better quality than those to the east, this is principally related to land use (lands to the west are dominated by rural lands with peaty land cover and associated lower intensity agricultural practices whereas lands to the east include a greater number of urban areas with associated land use pressures).

Activities in the River Lee catchment which are known to be attributing to the poor water quality include onsite waste water treatment systems (OSWTS) such as septic tanks, landfills and licensed waste facilities, waste water treatment plants, combined sewer overflows (CSOs), agriculture (particularly landspreading and slurry pits), licensed discharges (IPPC and Local Authority) (Refer to Figure 6.8).

There are eight landfills and 12 licensed waste transfer / recovery facilities within UoM 19. Data on the location of known contaminated sites is held by Local Authorities and will be considered during the future stages of this SEA.

There are 42 IPPC/IED facilities (mainly concentrated towards Cork City, and therefore considered under the Lee CFRAM study), approximately 30 licensed discharges to waters, 45 waste water treatment plants,

and eight water treatment plants in UoM 19. The CSOs are principally confined to Cork City. Public consultation has indicated that the waste water treatment plant in Castlemartyr is subjected to flooding.

A number of Seveso sites, identified in accordance with the Control of Major Accident Hazards Involving Dangerous Substances Regulations (the 'COMAH Regulations' or 'Seveso Regulations') which give effect to European Directive 96/82/EC, are located within and in close proximity to Cork City however there are no sites within the AFAs of UoM 19.

Figure 6.7: Surface Waterbody Status in UoM 19

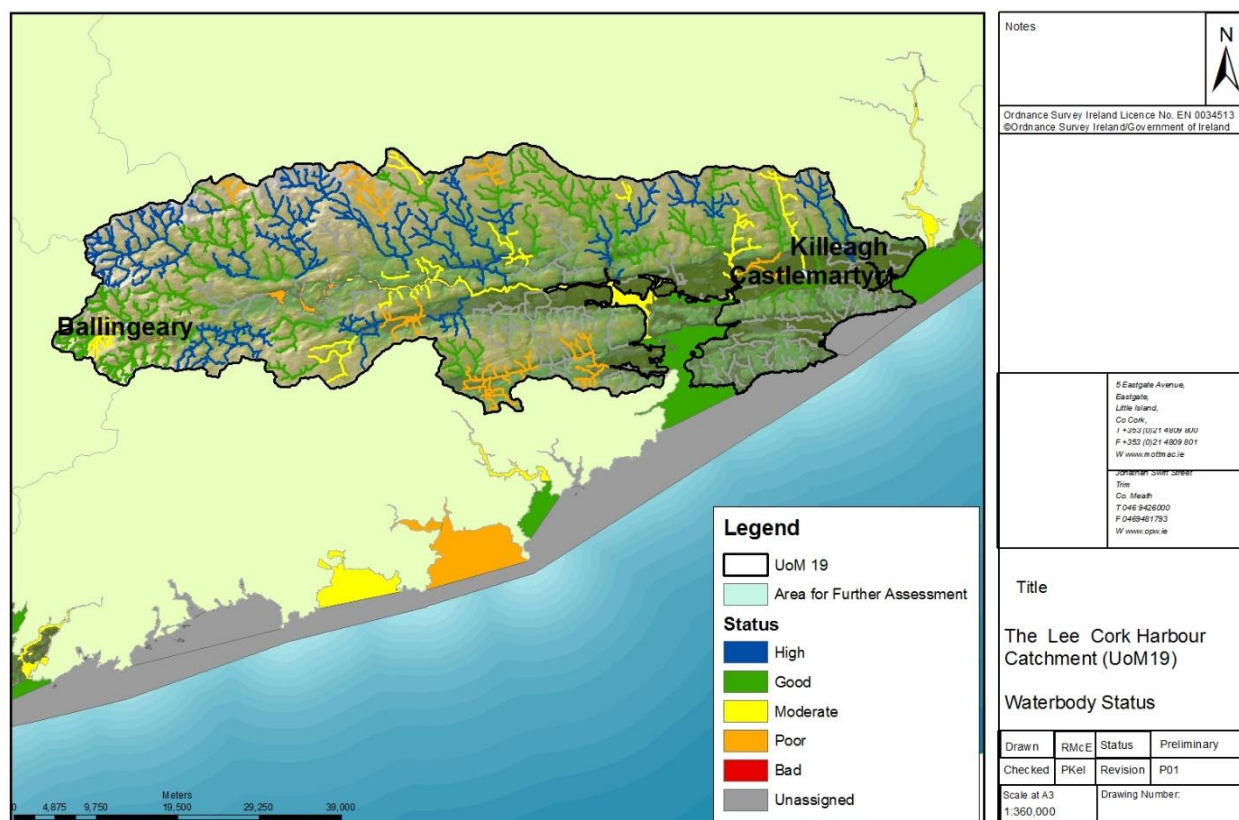
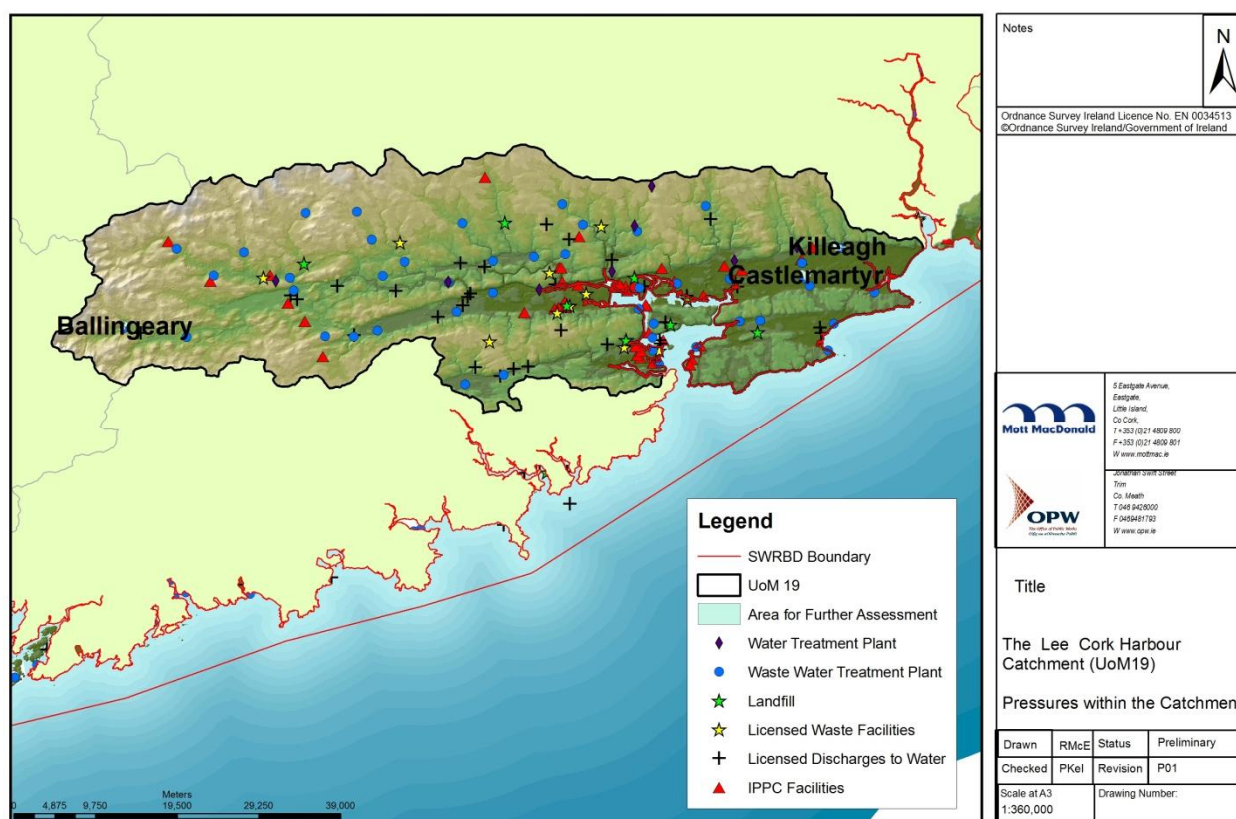


Figure 6.8: Point Pressures in UoM 19



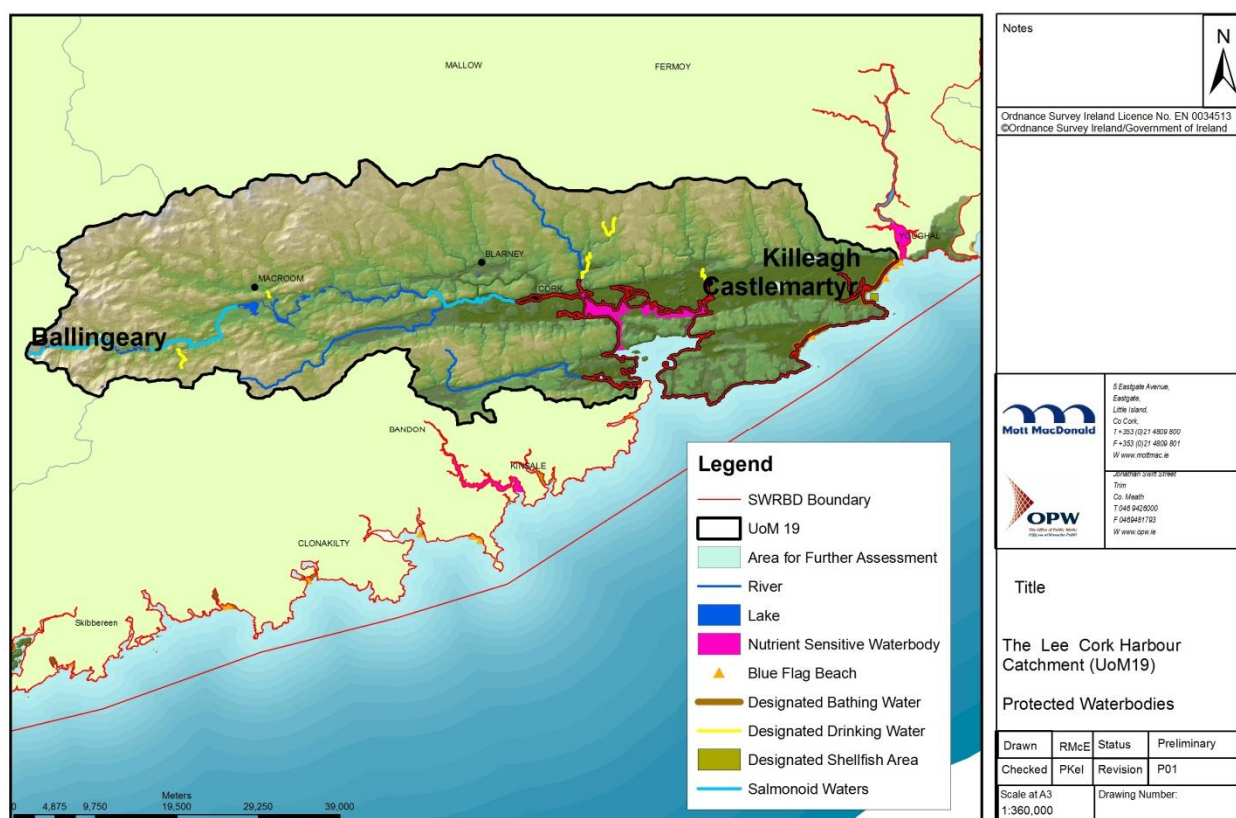
The groundwater in UoM 19 is assigned good status. There are 17 groundwater source protection areas located within UoM 19, of which only one (Dower in Castlemartyr) is within the boundary of an AFA. Aquifer vulnerability in this UoM includes areas of extreme and high vulnerability. Implementation of flood risk management measures could potentially result in contamination of groundwaters in such vulnerable areas.

A number of water resources in UoM 19 have been designated for special protection (refer to Figure 6.9). These include:

- i Nutrient sensitive waters - identified under Urban Waste Water Treatment Regulations, 2001 (as amended), which requires additional treatment of effluent discharges from municipal waste water treatment plants to such waters;
- i Designated shellfish areas - areas designated in accordance with the Shellfish Waters Directive (2006/113/EC) which requires that Member States protect or improve the aquatic habitat of shellfish (bivalve and gastropod molluscs) in order to support shellfish life and growth. Standards and objectives

- for these waters are established under the European Communities (Quality of Shellfish Waters) Regulations 2006 (SI No 268 of 2006) as amended;
- i Designated Bathing Waters – identified under the Bathing Water Quality Regulations, 2008 (as amended). Local authorities are responsible for bathing water quality in their functional areas;
- i The Blue Flag Scheme is administered in Ireland by An Taisce. It is a voluntary, non-statutory scheme. To gain a Blue Flag, the bathing areas must also comply with certain quality and amenity criteria;
- i Waters used for the abstraction of drinking water – designated under the European Communities (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regulations, 1989;

Figure 6.9: Protected Waterbodies



6.5.1 Future Trends in Water Resources

Ireland is obliged, in accordance with the requirements of the Water Framework Directive to implement measures for the achievement of good status by 2027 (where technically feasible). The implementation of measures under the South Western River Basin District Management Plan 2009-2015 (which includes the

enforcement of National and European legislation for the protection of our waters) brought about improvement in both compliance levels and the impact of urban waste water on water quality. During this period there was progress made with the licensing of urban waste water discharges and associated investment in urban waste water treatment and the implementation of the Nitrates Action Programme (Good Agricultural Practice Regulations). The 2nd cycle River Basin Management Plan is currently in draft and in consultation, and this plan will cover the period 2018-2021 and aims to build on the progress made during the first cycle and also learn from those aspects which did not progress as well as expected. Lessons learnt during the 1st cycle of the Plan, include that multiple RBD is not effective and a national single river Basin Structure is proposed as part of the 2nd cycle of the Plan.

6.5.2 Water Resources - Key Issues in UoM 19

Consideration must be given to how the implementation of flood protection measures could influence the achievement of the objectives of the Water Framework Directive. Flood protection measures can have direct and indirect impacts on a watercourse. Status classification for the purpose of the Water Framework Directive is based on a combination of biological, morphological and chemical assessment of a watercourse. Any activity that affects any of these elements has the potential to jeopardise the achievement of Water Framework Directive objectives. Conversely, flood protection measures can assist in achieving the objectives of the WFD by preventing flooding of point source pressures, which if flooded could result in the deterioration of water quality.

Any proposed future development must be designed and implemented such that it will not result in deterioration in existing waterbody status and will not impede the achievement of the good status by the required timescale. In the absence of FRMP options, the risk of flooding to the benefiting lands would increase significantly. The flooding of water supply infrastructure will result in loss of water supply over large areas, which can magnify the impact of flooding well beyond the immediate community. Flooding can also pose a significant pollution risk to water quality with consequent negative impacts on human health, habitats and flora and fauna.

Development of flood risk management measures in areas of extreme and high groundwater vulnerability and in ground water protection areas has the potential to result in contamination of groundwater resources. Geotechnical engineering of a site can mitigate against potential groundwater pollution. The possibility of employing mitigation rather than circumventing an area can be investigated before a decision is taken to progress flood protection measures.

6.6 Air and Climate

The Air Quality Standards Regulations 2011 (S.I. No. 180/2011) make provisions for the implementation of Directive 2008/50/EC on ambient air quality and cleaner air for Europe. The EPA is the competent authority in Ireland for the implementation of the regulations. The EPA has established zones throughout Ireland for the purpose of air quality assessment and air quality management. The EPA carried out air quality monitoring at 31 monitoring stations around the country in 2015. Four of these are in the SWRBD;

Valentia, Cork City Centre, Glashaboy, and Heatherton Park. The EPA's Air quality report (2015) shows air quality in Ireland to be generally good and compares favourably with other EU member states. However, when we compare our air quality levels to those recommended by the World Health Organisation, the situation is less positive and Ireland face challenges in reducing levels of particulate matter (both PM10 and PM2.5) and ozone to below those recommended by the WHO Air Quality Guidelines.

The Flood Risk Management Plans will not influence air quality; however implementation of flood risk management measures has some potential to impact on air quality during the construction phase (albeit impacts are likely to be localised minor due to exhaust emissions from construction vehicles and dust dispersion). Any flood risk management projects arising from the Flood Risk Management Plans will be subjected to the proper planning controls, including environmental assessment as necessary.

6.6.1 Future Trends in Air and Climate

In the long-term air quality is expected to improve as Ireland move closer towards meeting our obligations under the International and national policies and under the Kyoto and Paris Agreements for the reduction in greenhouse gas emissions.

Climate change is predicted to change existing hydrological conditions in the future. The predicted impacts of climate change are likely to include:

- i Increase in rainfall;
- i Increase in river flow;
- i Sea level rise (including land movement);
- i Increase in urbanisation (due to populations displacement); and
- i De-forestation.

6.6.2 Air and Climate - Key Issues in UoM 19

The Flood Risk Management Plans consider changes in climate change (on the basis of a 100 year time horizon) and make allowance for predicted impacts.

6.7 Biodiversity, Flora and Fauna

The South Western River Basin District contains a variety of habitats and species of conservation concern which are protected under various European and national legislation. Areas in the SWRBD which have been designated for the protection of habitats and species include the following:

- i Special Areas of Conservation (SACs) - designated in accordance with the Habitats Directive (92/43/EEC) for the conservation of certain habitats and species;
- i Special Protection Areas (SPAs) - designated under the EU Birds Directive (79/409/EEC) for the protection of birds of conservation concern;

- | Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs) - designated under the Wildlife Act as they are considered important habitats which support animals or vegetation of importance;
- | Ramsar Sites - designated under the Convention on Wetlands of International Importance for the protection of wetland areas (which are important feeding habitats for birds);
- | Wildfowl Sanctuaries - areas established under the Wildlife Act, 1976 and excluded from the 'Open Season Order' in which shooting of game birds is permitted;
- | National Parks – established under the International Union for the Conservation of Nature, are areas identified as not materially altered by human exploitation and occupation and where steps have been taken to prevent exploitation or occupation in respect of ecological, geomorphological or aesthetic features;
- | Nature Reserves - identified as being important habitats to support wildlife and are protected under Ministerial Order;
- | Biosphere Reserves – are sites recognized under UNESCO's Man and the Biosphere (MAB) Programme to promote sustainable development;
- | OSPAR – sites identified under the OSPAR Convention to protect marine environment of the North East Atlantic. Ireland established a number of its SACs as OSPAR MPAs for marine habitats.

Any proposed development within an SAC or SPA must be subjected to Appropriate Assessment to determine whether a plan or project can be implemented without causing damage to the designated area. It is of note that under the Appropriate Assessment process in accordance with the Habitats Directive⁶, where it can be proven that development within a Natura 2000 Site (SAC or SPA) will not have a significant adverse impact on the integrity of the site, such a development may be permitted.

Also present in the SWRBD are Margaritifera sensitive areas. These are waterbody catchments known to support Freshwater Pearl Mussel (*Margaritifera margaritifera*) which are designated under the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 (S.I. No 296 of 2009) and which are sensitive to changes in nutrient or sediment loading and to changes in flow dynamics.

Special Areas of Conservation which are fully or partially contained in UoM 19 are presented in Table 6.6. There are no OSPAR marine protected areas in UoM 19.

Special Protection Areas, designated under the EU Birds Directive (79/409/EEC) for the protection of birds of conservation concern, which are fully or partially contained in UoM 19 are presented in Table 6.7.

There are a number of RAMSAR sites in UoM 19 namely Ballycotton Bay (which includes mobile shingle beach, marsh and reed dominated wetlands and supports wetland waterbirds and migrant birds. This site is also designated as a wildfowl refuge), Ballymacoda Bay (which includes intertidal sandflat/mudflat estuary, saltmarsh and beach and supports good numbers of wetland birds), Cork Harbour (which supports

⁶ Council Directive 92/43/EEC

internationally important numbers of wetland birds), and The Gearagh (which is also designated a nature reserve and includes alluvial forest and streams. The site hosts a nationally important wintering flock of *Cygnus cygnus*). Wildfowl sanctuaries in UoM 19 include The Lough, the Lough Aderry, and the Lee Reservoir and Farran Wood. There are two Nature Reserves within UoM 19, the Gearagh and Capel Island.

Table 6.6: Special Areas of Conservation in UoM 19

Site Name	Site Code	Qualifying Interests
Ballymacoda (Clonpriest and Pillmore) SAC	000077	This site comprises the estuary of the Womanagh River. Intertidal flats are well represented, with a good diversity of macro-invertebrate species and range of intertidal biotopes. Atlantic salt meadows are particularly well developed and currently extending in parts of site. Salicornia and other annuals of intertidal sand and mud flats also occur. The site is very important for wintering waterfowl.
Great Island Channel SAC	001058	This site comprises the north-eastern part of Cork Harbour. It includes all of the Great Island Channel, the intertidal areas between Fota Island and Little Island, and also the estuary of the Dungourney and Owennacurra Rivers as far as Midleton. The site is of ecological importance for its examples of intertidal mud and sand flats and Atlantic salt meadows of the estuarine type.
Mullaghanish Bog SAC	001890	A small area of intact mountain blanket bog on the summit of Mullaghanish.
St. Gobnet's Wood SAC	000106	A relatively large complex of oakwood developed on brown earth, brown podzolic & gleyed soils, situated on rocky slopes on either side of the River Sullane. Although partially degraded through the presence of exotic trees and an area of dense <i>Rhododendron ponticum</i> and <i>Prunus laurocerasus</i> , this wood is of value as a good example of old oak woodland.
The Gearagh SAC	000108	Site comprises a 7km section of the River Lee and includes the confluence with the River Toon. The Gearagh represents the only extensive alluvial forest Ireland or Britain

Table 6.7: Special Protection Areas in UoM 19

Site Name	Site Code	Qualifying Interests
Mullaghanish to Musheramore Mountains SPA	004162	The site consists of a variety of upland habitats, though approximately one-third is afforested. Almost one-third of the site is unplanted blanket bog and heath, with both wet and dry heaths present. The remainder of the site is largely rough grassland that is used for hill farming. This SPA is a stronghold for Hen Harriers. The early stage of new and second rotation conifer plantation are the most frequently used nesting sites, though some pairs may still nest in tall heather of unplanted bogs and heath. This site also supports a breeding population of Merlin. The main threat to the long-term survival of Hen Harriers within this site is further afforestation which would reduce the amount of foraging habitat, with a possible reduction in breeding density and possible productivity (as foraging areas become further fragmented).
Ballycotton Bay SPA	004022	Situated on the south coast, Ballycotton Bay is an east-facing coastal complex, which stretches northwards from Ballycotton towards Garryvoe, a distance of c. 3 kilometres. The site is characterised by two sheltered inlets which receive the flows of several small rivers. The site supports an excellent diversity of wintering waterfowl species, and has nationally important populations of nine species: <i>Anas crecca</i> , <i>Charadrius hiaticula</i> , <i>Pluvialis apricaria</i> , <i>Pluvialis squatarola</i> , <i>Vanellus vanellus</i> , <i>Limosa limosa</i> , <i>Limosa lapponica</i> , <i>Numenius arquata</i> and <i>Arenaria interpres</i> . Ballycotton Bay is also important for wintering gulls, especially <i>Larus fuscus</i> in

Site Name	Site Code	Qualifying Interests
		autumn and early-winter. <i>Larus fuscus</i> and <i>Larus canus</i> occur in numbers of national importance. Passage waders, such as <i>Philomachus pugnax</i> and <i>Calidris minuta</i> , are regular, especially in autumn. The site provides both feeding and roosting areas for the waterfowl species. <i>Acrocephalus scirpaceus</i> breeds at the site, which is near the western edge of the range of the species in Ireland. Wintering bird populations are well monitored. The Red Data Book plant <i>Crambe maritima</i> occurs. Past drainage and land-claim have damaged this wetland site and is a continued threat. Increasing visitor pressure may cause disturbance to the birds. Part of site is a Wildfowl Sanctuary.
Ballymacoda Bay SPA	004023	The site comprises of the estuary of the Womanagh River. Ballymacoda Bay is the second most important site for wintering waterfowl on the south coast after Cork Harbour. The site has internationally important numbers of <i>Limosa limosa</i> and <i>Larus fuscus</i> , and is the most important site in the country for <i>Larus fuscus</i> during autumn. Nationally important numbers of a further 16 species are found in the site. Of particular note is that it holds 9.6% of the national total for <i>Pluvialis apricaria</i> , 9.2% of the total for <i>Pluvialis squatarola</i> , 4.3% for <i>Limosa lapponica</i> and 3.2% for <i>Calidris alpina</i> . Ballymacoda Bay is a regular site for passage waders such as <i>Philomachus pugnax</i> , <i>Calidris ferruginea</i> and <i>Numenius phaeopus</i> . It is also an important site for wintering gulls, especially <i>Larus canus</i> . The site provides both feeding and roosting areas for the waterfowl species and habitat quality for most of the estuarine habitats is very good.
Cork Harbour SPA	004030	Cork Harbour is a large, sheltered bay system, with several river estuaries - principally those of the Rivers Lee, Douglas, Owenboy and Owenacurra. The site comprises the main intertidal areas of Cork Harbour, including all of the North Channel, the Douglas Estuary, inner Lough Mahon, Monkstown Creek, Lough Beg, the Owenboy Estuary, Whitegate Bay and the Rostellan inlet. Cork Harbour is an internationally important wetland site, regularly supporting in excess of 20,000 wintering waterfowl, for which it is amongst the top five sites in the country. A further 15 species have populations of national importance, with particularly notable numbers of <i>Tadorna tadorna</i> (9.6% of national total), <i>Anas clypeata</i> (4.5% of total), <i>Anas acuta</i> (4.2% of total) and <i>Phalacrocorax carbo</i> (4.1% of total) occurring. It has regionally important populations of <i>Pluvialis apricaria</i> and <i>Limosa lapponica</i> .
The Gearagh SPA	004109	This site, located c. 2 km south-west of Macroom, comprises a stretch of the River Lee that was dammed in the 1950s as part of a hydroelectric scheme. The site supports important populations of wintering waterfowl, including swans, dabbling duck, diving duck and some waders. Six of the species have populations of national importance: <i>Cygnus olor</i> , <i>Anas penelope</i> , <i>Anas crecca</i> , <i>Anas clypeata</i> , <i>Fulica atra</i> and <i>Pluvialis apricaria</i> . The site is a Nature Reserve, Ramsar site.

Scale: 0 4,950 9,900 19,800 29,700 39,600 Meters

Legend:

- SWRBD Boundary
- UoM 19
- Area for Further Assessment
- River
- Lake
- Nature Reserve
- Wildfowl Sanctuary
- Ramsar Site
- National Parks
- Special Protection Area
- Special Area of Conservation

Map Labels: Ballingeary, Killeagh Castle/martyr

Notes:

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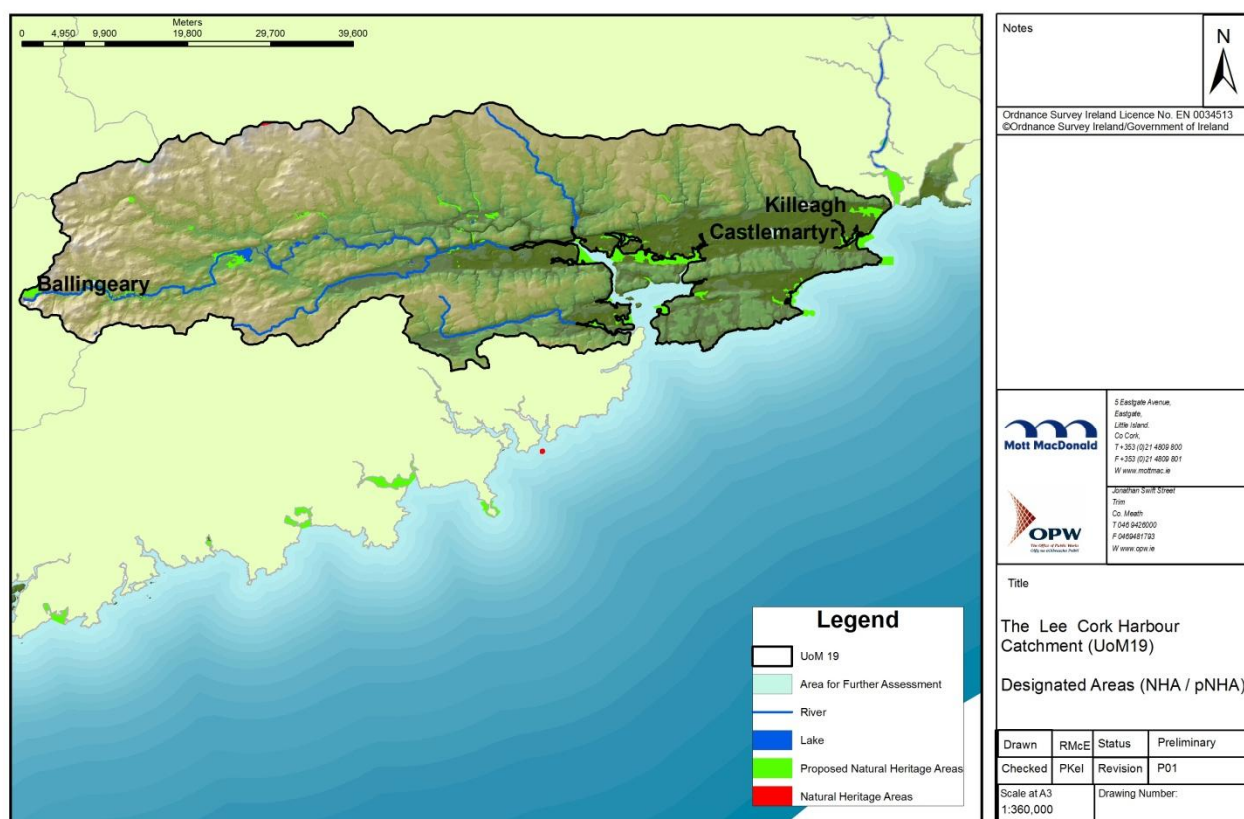
The Lee Cork Harbour
Catchment (UoM19)

Designated Areas (SAC / SPA)

Drawn	RMCE	Status	Preliminary
Checked	PKel	Revision	P01
Scale at A3 1:360,000		Drawing Number:	

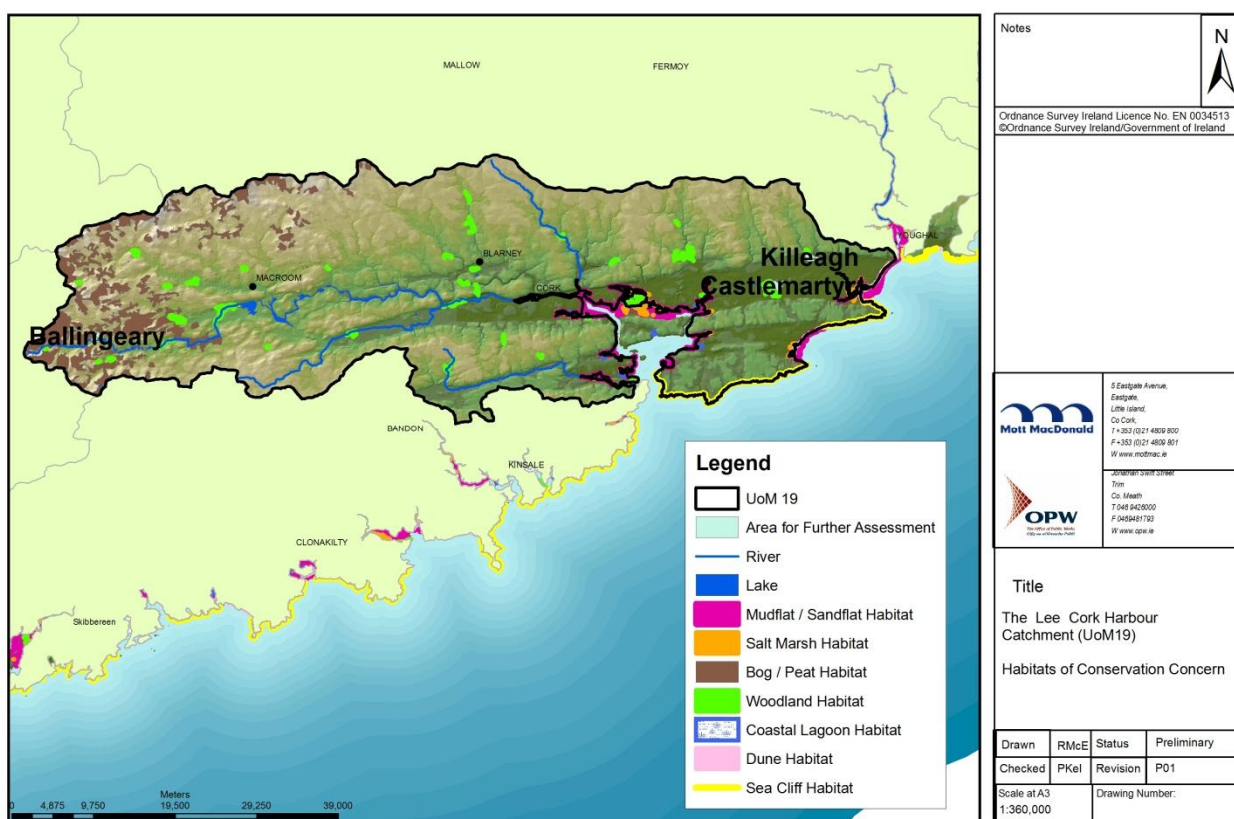
81

Figure 6.11: Natural Heritage Areas and proposed Natural Heritage Areas in UoM 19



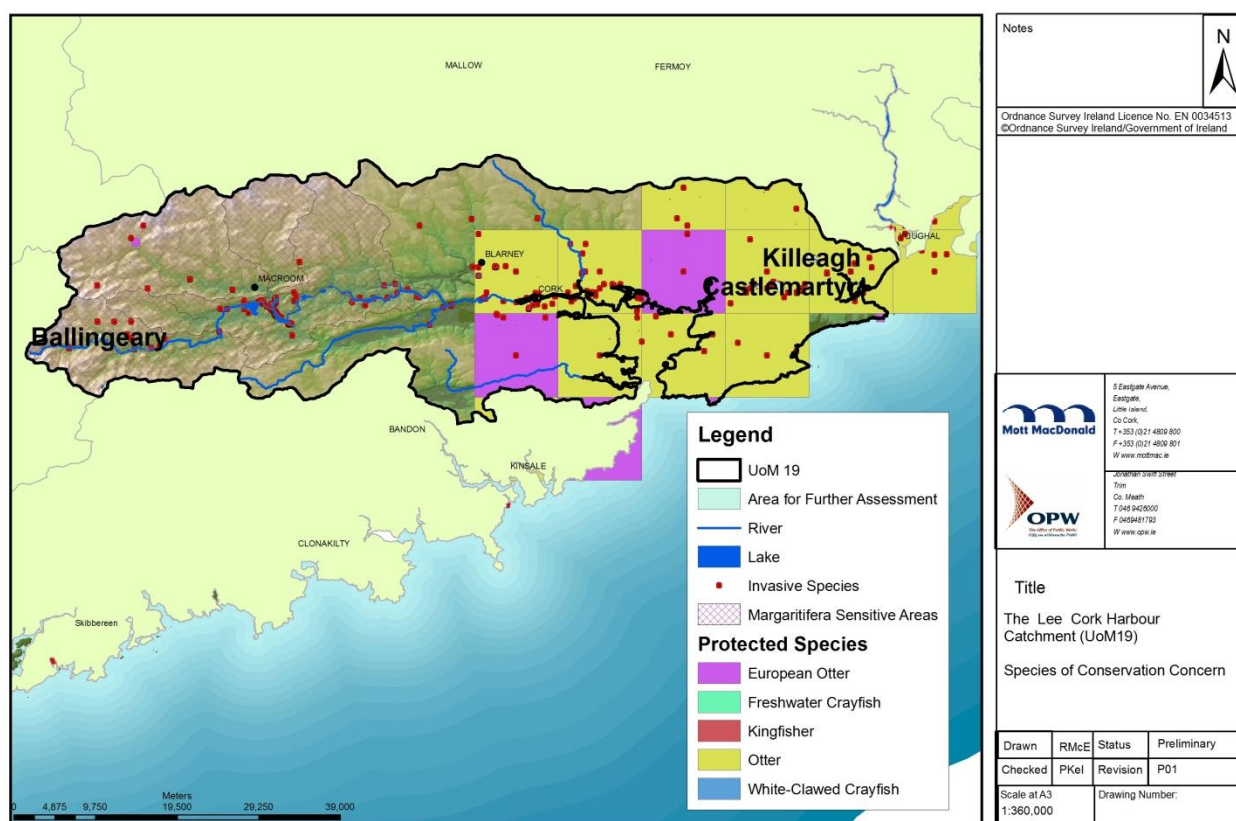
Other ecological features of significance within UoM 19 include broadleaf, mixed and coniferous woodlands, semi natural grasslands, moors and heaths, peat bogs, salt marshes, sea cliffs, and estuaries. Many of these habitats are Annex I habitats and already contained within the boundary of designated SACs. (refer to Figure 6.12).

Figure 6.12: Habitats of Conservation Concern



The UoM also hosts a number of protected species, many of which are aquatic species. Specific impacts to habitats and species of conservation importance will be addressed at options selection stage. Aquatic species of importance which occur in UoM 19 are shown in Figure 6.13. Records of invasive species in UoM 19 are also shown in Figure 6.13, many of which are aquatic and include Canadian pondweed, Giant hogweed, dace, Japanese knotweed, and Waterfern.

Figure 6.13: Species of Conservation Concern and Invasive Species



Source: WWW.NPWS.ie

6.7.1 Future Trends in Biodiversity, Flora and Fauna

Changes in farm payments under the Common Agricultural Policy will result in a shift towards more environmentally friendly and sustainable land use practices. This, coupled with the implementation of management plans for the protection of the environment (such as the South Western River Basin Management Plan, NPWS Conservation Management Plans, local authority Biodiversity Action Plans etc.), is likely to result in an overall enhancement in biodiversity. The EIA Directive 2014, introduces the inclusion of proposed flood risk management schemes in the EIA screening process, the Directive also introduces

the need to address, where relevant biodiversity and use of natural resources during construction and operation.

The European Commission published Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment in 2013. Future application of this guidance will improve assessment of impact of a project on biodiversity and ultimately will lead to the protection of biodiversity through appropriate planning and design.

6.7.2 Biodiversity, Flora and Fauna - Key Issues in UoM 19

Many ecological features of significance within UoM 19 are aquatic habitats and species and, by the nature of the environment they live in, are relatively tolerant to flood events. Flood events can also often benefit an ecosystem e.g. through the movement, sorting and deposition of riverine bed material which can create suitable habitat for aquatic species, or through the release of nutrients from sediments due to resuspension during flooding. Certain habitats have a dependence on flooding e.g. alluvial woodlands, a priority habitat protected under the Habitats Directive, which occurs in areas that are subject to periodic flooding within UoM 19. Flood risk management measures will alter flood regime and can cause a reduction in habitat quality and extent.

The requirement for ecological protection can limit potential options for flood risk management.

Freshwater Pearl Mussel is particularly sensitive to deterioration in water quality, nutrient enrichment and siltation, all of which may potentially occur due to the implementation of flood risk management measures. In addition, flood risk management measures can act as barriers to fish migration. The life cycle of freshwater pearl mussel is dependent on the presence of migratory fish.

In the absence of appropriate mitigation, implementation of flood risk management measures can also contribute towards the spread of invasive / non-native species if not properly managed.

6.8 Tourism and Recreation

People Place & Policy- Growing Tourism to 2025 identifies the Government position to grow tourism to up to 10 million overseas tourists by 2025. Tourism agencies in Ireland (Tourism Ireland and Fáilte Ireland) have developed a range of plans and policies to deliver on the objectives of the Tourism Development Programme including the development of the Wild Atlantic Way. The Wild Atlantic Way starts in Derry and extends down the west coast and along the south west coast as far as Kinsale in County Cork.

Investment is also evident at a local level through the development of greenways (amenity walks and cycle routes) by Local Authorities.

The Lee, Cork Harbour & Youghal Bay River Basin offers a range of tourism and recreation opportunities and hosts a range of natural coastal and inland landscapes which has associated with it a number of tourist attractions including:

- | The Wild Atlantic Way runs along the Atlantic coast passing through the towns of Schull, Skibbereen and Clonakilty;
- | Amenity walks. Including a number of Slí na Sláinte walks such as those in Little island and Fota Wildlife Park and also more extensive walking routes including the Lee Valley / Gearagh walking route near Macroom. There are also a number of Greenway projects under consideration within the area, such as Midleton-Youghal Greenway project.
- | Cycling Routes. These are often coupled with walking routes and include the Macroom / Gougane Barra cycle.
- | Golf. There are a number of golf courses within UoM 19 including Cork Golf Club and Fota Island Golf Club.

The rivers and lakes in the Lee are also important tourist attractions and attract hundreds of tourists annually. A number of boating tour operators also operate within the Lee Valley, including Cork Harbour Cruises, and the Lee Valley Boat Centre.

6.8.1 Future Trends in Tourism and Recreation

Ireland's Tourism Development Programme, established under the National Development Plan 2007-2013, aims to promote and grow tourism in Ireland, particularly in rural areas. The continued investment in the tourism sector is a priority in the Medium-Term Exchequer. Tourism agencies in Ireland (Tourism Ireland and Fáilte Ireland) have developed a range of plans and policies to deliver on the objectives of the Tourism Development Programme including 'The Wild Atlantic Way initiative.

Investment is also evident at a local level through the development of greenways (amenity walks and cycle routes) by Local Authorities.

6.8.2 Tourism and Recreation - Key Issues in UoM 19

Many of the tourist attractions of the Lee, Cork Harbour & Youghal Bay River Basin are centred on the Lee Valley. Flood risk management options can intrude upon scenic landscapes and can result in amenity walks having to be diverted thereby reducing the quality of the tourist attractions. Conversely flood risk management options can be used as an opportunity to enhance tourist attractions e.g. through the use of glass flood walls thereby increasing views of our rivers and coastal areas.

Public consultation has identified historic flooding and subsequent damage to Carrignacurra footbridge in Inchigeelagh which provided public access to O'Leary Castle along a 2-mile circular walk which was part of the Beara Cork Cycle Route and Greenway Project.

6.9 Fisheries, Aquaculture and Angling

The responsibility of monitoring fish for the purpose of assigning waterbody status in accordance with the Water Framework Directive has been assigned to Inland Fisheries Ireland. Monitoring for the South Western River Basin District showed good abundance and distribution of indicator species including brown trout and salmon (in freshwater), and European eel, Pollock, and Sea bass (in transitional waters).

Reports produced by Inland Fishery Ireland on fish stock sampling conducted for the WFD waterbody status classification show that waterbodies in UoM 19 support fish species indicative of good and moderate environmental quality.

The Lee is recognised as an important river to support brown trout and salmon species.

There are a number of areas designated in accordance with the Shellfish Waters Directive (2006/113/EC) in UoM 19, namely Rostellan South and North, Great Island North Channel, and Oysterhaven.

The IFI is tasked with monitoring and reporting, on a 6-year cycle, on the status of the fish species listed in Annex II of the EU Habitats Directive (River, brook and sea lamprey, Twaite and Killarney shad, Pollan and Atlantic salmon). The latest IFI report on monitoring under the Habitats Directive ⁷ was produced in 2015. The Lee catchment was surveyed for juvenile lamprey in 2011 and a high proportion of suitable sites were identified relative to the number of sites surveyed. Brook/River lamprey juveniles were recorded.

There are several aquaculture sites administered through the Aquaculture and Foreshore Management Division of the Department of Agriculture, Food and the Marine within / in close proximity to UoM 19. Three are coastally located and are concentrated around Cork Harbour (all shellfish licences). Four are located inland and are finfish licences and include a salmon licence at Carrigdrohid and rainbow trout at lough Allua.

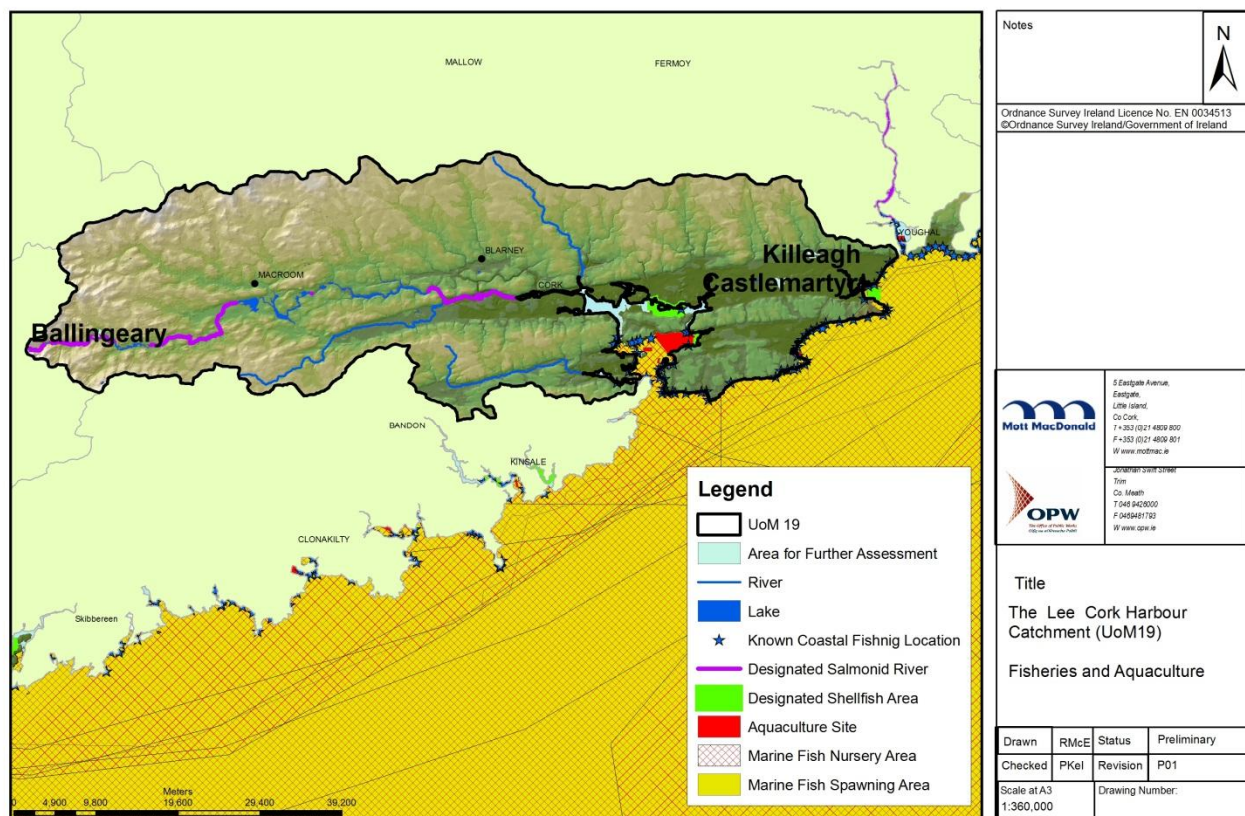
The coastal habitat in proximity to UoM 19 hosts significant nursery and spawning habitat for a number of marine fish species including cod, herring, mackerel and whiting. Much of Cork Harbour is used as a land-based vantage point for marine fishing for the above species.

IFI has developed a series of angling guides for Ireland which include on-shore angling vantage points in the Lee, Cork Harbour & Youghal Bay River Basin.

Flood risk management will need to consider the impact upon fish habitat, migratory routes and aquaculture in close proximity to watercourses.

⁷ Inland Fisheries Ireland (2011) National Programme: Habitats Directive and Red Data Book Fish Species Executive Report

Figure 6.14: Fisheries and Aquaculture in UoM 19



6.9.1 Future Trends in Fisheries, Aquaculture and Angling

Monitoring operations conducted by Inland Fisheries Ireland will generate data which will allow the targeted implementation of measures for the better management of fish stocks.

There are on-going programmes for the protection and management of fisheries (for example the eel management programme and the Salmon Conservation Limit (CL) Attainment Project) which will continue to operate and to contribute towards the enhancement of fisheries in Ireland.

6.9.2 Fisheries, Aquaculture and Angling - Key Issues in UoM 19

Flood risk management measures should give consideration to the protection and enhancement of fishery habitat and should have regard to any fishery management programmes. Fish migration also needs to be considered in the identification of flood risk management options.

Consideration should be given to the enhancement and preservation of commercial and tourism fishery facilities. Implementation of flood risk management measures can contribute towards the spread of invasive species if not properly managed. Giant Hogweed has been recorded in the Lee catchment near Macroom.

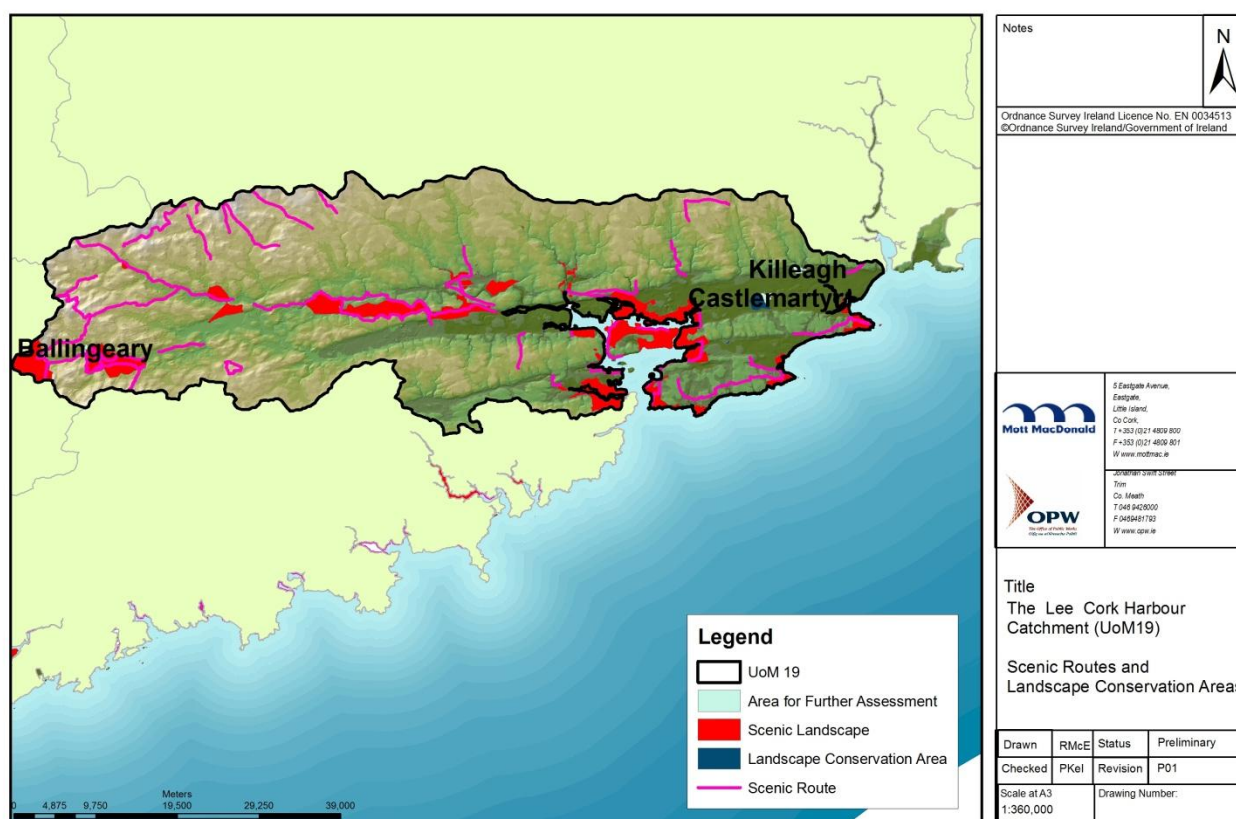
6.10 Landscape and Visual Amenity

There is no national database of landscape areas in Ireland. Sensitive areas of landscape are identified at Local Authority level through City / County Development Plans. Landscape Character Assessments are produced by Local Authorities as part of their development plans which identify areas of high, moderate and low sensitivity within the county. Local Authority approach to identifying sensitive landscape areas is based on Department of the Environment guidance on landscape and landscape assessment. The determination of landscape sensitivity takes the initial approach of identifying landscape character (based on landform / landcover and visual distinctiveness e.g. river valleys and water corridors, upland areas etc.). Following this landscape value is assigned (historical, cultural, religious, ecological), and finally landscape sensitivity is determined (a measure of the ability of the landscape to accommodate change without suffering unacceptable effects to its character and values).

The Planning and Development Act, 2000 requires that planning authorities shall set out in their County Development Plans objectives for the preservation of the character of the landscape including the preservation of views and prospects and the amenities of places and features of natural beauty or interest within their functional area. Many of the scenic routes and views in UoM 19 are along national, regional and local roads while others are along river valleys or coastal areas. Scenic landscapes have been identified in Cork County Council's County Development Plan and include the river landscapes of the Lee Valley, the Gearagh, and Cork Harbour.

Article 204 of the Planning and Development Act, 2000 prescribed that a planning authority may designate an area or place as a landscape conservation area for the purposes of the preservation of the landscape. Development in such areas may be subject to conditions for the protection of the landscape. There are 9 landscape conservation areas in UoM 19 including Killeagh and Castlemartyr, both of which are AFAs in UoM 19. Other landscape conservation areas include locations in proximity to Cork Harbour such as Monkstown and Cloyne.

Figure 6.15: Scenic Routes and Landscape Conservation Areas in UoM 19



6.10.1 Future Trends in Landscape and Visual Amenity

The existing landscape is not expected to change significantly in the immediate future, however if population targets under the National Spatial Strategy are reached, urban expansion is likely to place localised pressure on the landscape. County Development Plans identify objectives and strategies for landscape protection which aim to restrict away from areas of significant beauty or interest.

In 2010, the Heritage Council published 'Proposals for Ireland's Landscapes 2010' to promote the implementation of the European Landscape Convention (2000) which came into force in Ireland on 1 March 2004. Following this, in September 2011, the Department of Arts, Heritage and the Gaeltacht published a consultation paper on 'A National Landscape Strategy for Ireland' which aims towards the management of Ireland's landscape through improved land-use planning assisted by greater definition of baseline landscape character. Local Authorities have produced (or are in the process of producing), as part of their County Development Plans, Landscape Character Assessment (LCA) reports which identify the

types of landscapes within their functional area and their sensitivity to change. Land-use planning is likely to provide greater protection of landscape character going forward as they will be based on the more robust baseline assessment of landscape through the LCAs.

6.10.2 Landscape and Visual Amenity - Key Issues in UoM 19

Many amenity walks, scenic routes and views are along river valleys or coastal areas i.e. at locations where flood risk management measures may be implemented. Flood protection measures can intrude upon views and prospects.

The application of flood risk management measures in landscape conservation areas may be constrained for the purposes of the preservation of the landscape.

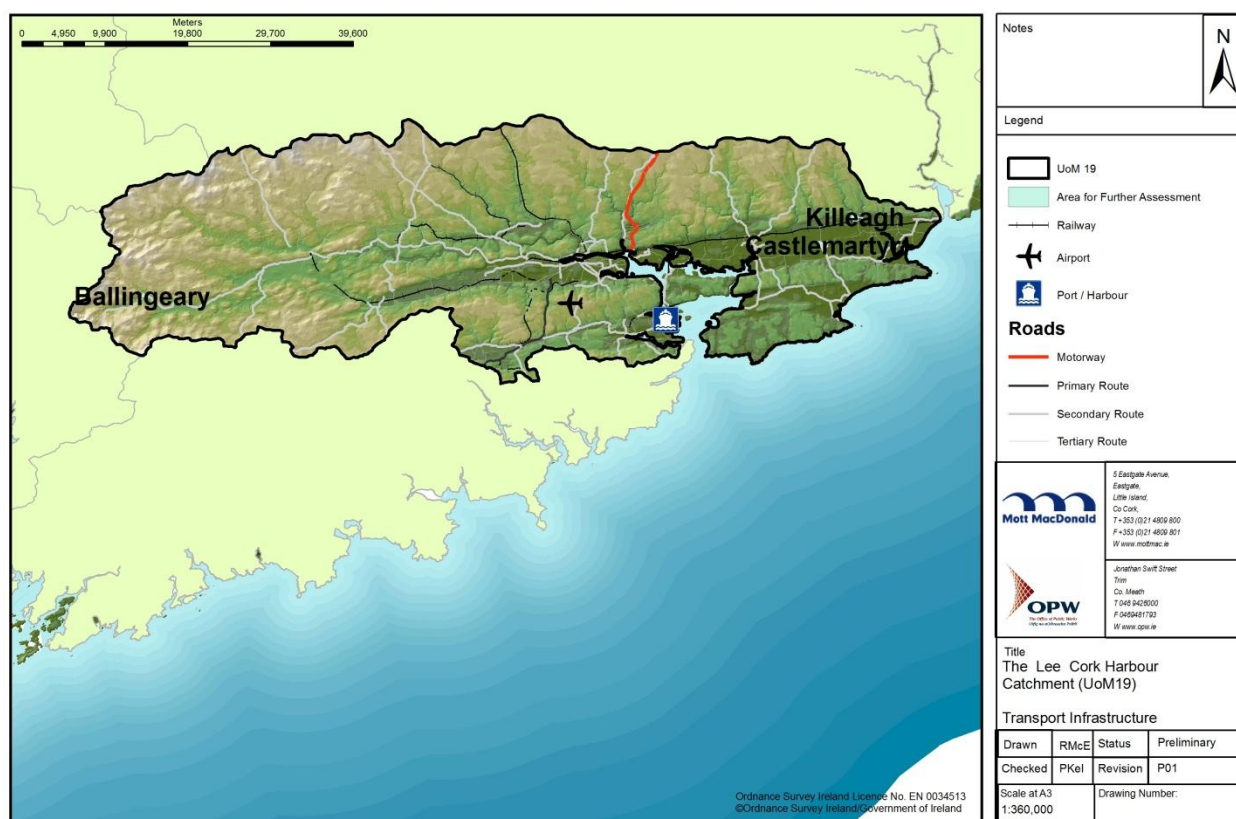
Flooding can be a formative feature of a landscape's character. Flood risk management options need to be sympathetic towards landscape character and opportunities to enhance landscape character should be explored.

6.11 Infrastructure and Material Assets

The UoM 19 is relatively well serviced by transport infrastructure. The major road infrastructure in the area comprises the M8 Cork to Dublin motorway, the N71 (Bandon Road) National Primary Route, and the N25 (Cork to Waterford) National Primary Route. The Cork to Macroom and the Cork to Midleton railway lines transect this Unit of Management. Much of the road and rail infrastructure is located close to and along river networks in UoM 19 and are susceptible to flooding. Cork Airport is located close to Cork City Centre. Cork Harbour is located on the estuary to the River Lee.

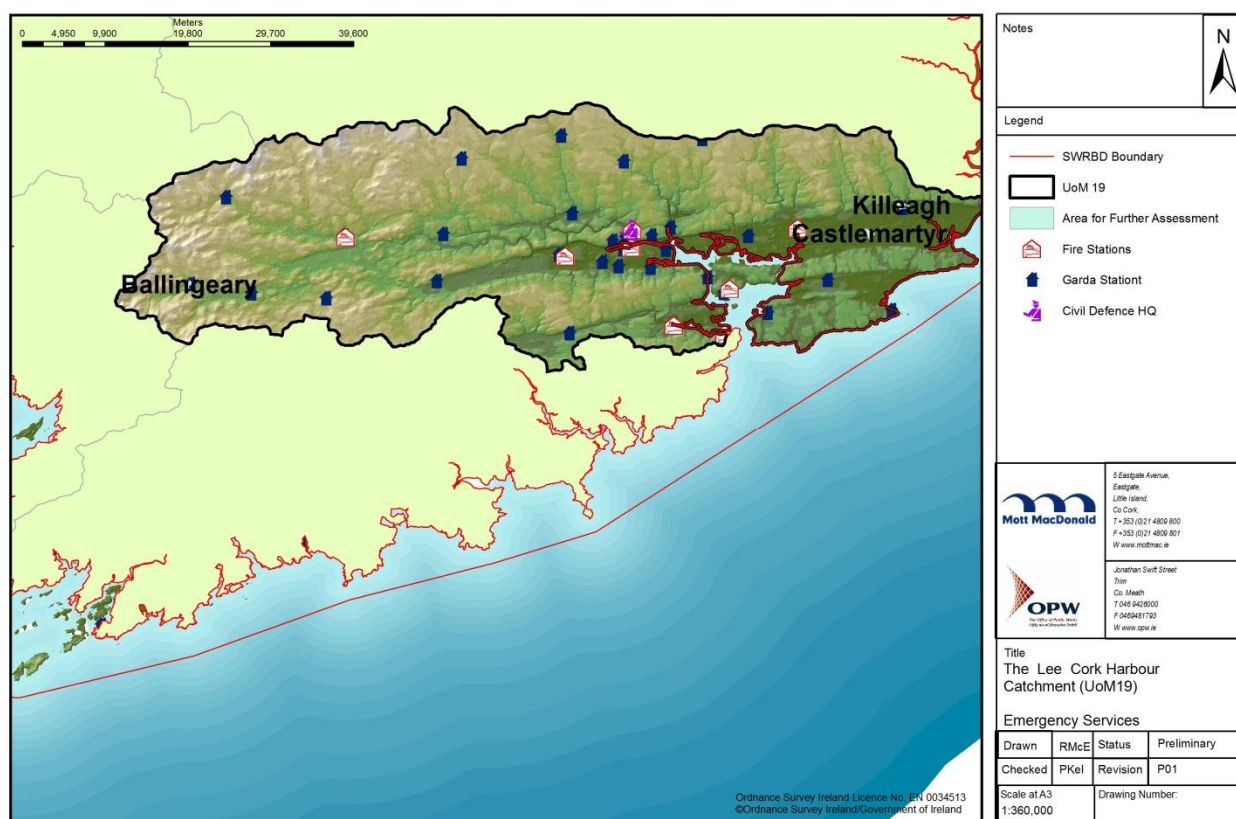
Flooding of the transport infrastructure has the potential to cause disruption to movements of residents and commuters which could have a short-term impact on the local economy.

Figure 6.16: Key Transport Infrastructure in UoM 19



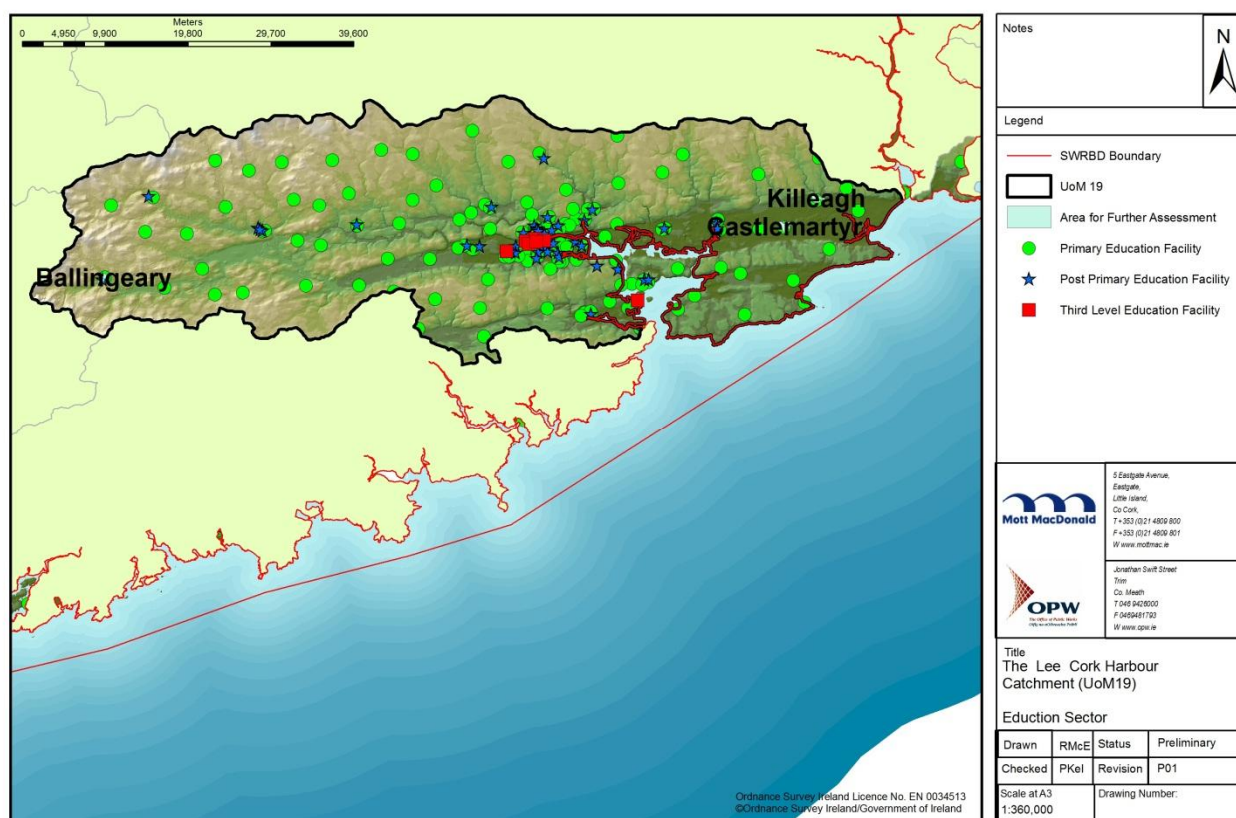
Fire stations and Garda stations within the UoM are shown below. There is also one Civil Defence headquarters located in Ballyvolane, Cork, this is within the Lee CFRAM study boundary. The efficient delivery of emergency services is dependent on clear access to those requiring the service. Flooding of the road network can impede delivery of these services.

Figure 6.17: Emergency Services in UoM 19



Education facilities within the region are dominated by primary schools, with approximately 150 are present in UoM 19. Secondary facilities are far less abundant, approximately 50 post-primary facilities. There are 5 third level education facilities in the unit of management, University College Cork and Cork Institute of Technology being the largest of the facilities, all of which are contained within the boundary of the Lee CFRAM Study.

Figure 6.18: Education Facilities in UoM 19



There are a number of wind farms currently operational within Unit of Management 19, each serviced by electricity transmission infrastructure including transmission lines and substations. Flooding can cause damage to such infrastructure

6.11.1 Future Trends in Infrastructure and Material Assets

Population figures for Ireland are trending upwards and our National Spatial Strategy has set a 2022 target for the South West of 795,000. It will be necessary to invest in infrastructure in order to support this

population growth. There is likely to be continued investment in renewable energy in Ireland in order to meet climate change targets.

6.11.2 Infrastructure and Material Assets - Key Issues in UoM 19

Future development can alter land drainage run-off characteristics and can result in related changes in river hydrology and therefore flooding. Flooding can cause significant damage to properties and property content, utilities, transport, and community infrastructure. In rural areas, the disruption can be particularly severe where alternative infrastructure may be rare or absent. Measures set out in the development of the FRMP to manage flood risk can produce positive impacts for material assets, through protecting existing assets and lessening the resource use that would otherwise be needed to repair and replace these assets if they were damaged by flooding.

6.12 Interrelationships

This section has presented details of environmental features separately in terms of each environmental topic. However, it is also important to recognise that there are a number of inter-relationships between topics, which means that, for example, changes to one environmental feature has direct or indirect effects on other features. In carrying out the assessment these important direct and indirect relationships have been taken into account fully to ensure a robust and complete assessment. Figure below highlights the key interrelationships identified in this SEA. The potential interrelationships have been considered in the assessment of the FRMP options for each AFA.

Figure 6.19 Interrelationship between topics

Environmental Topic	Population and Human Health	Geology, Soils and land-use	Architecture, Archaeology and Cultural Heritage	Water Resources	Air and Climate	Biodiversity, Flora and Fauna	Tourism and Recreation	Fisheries, Aquaculture and Angling	Landscape and Visual	Infrastructure and Material Assets
Population and Human Health		√	x	√	√	√	√	v	√	√
Geology, Soils and land-use	√		√	√	√	√	√	√	√	√
Architecture, Archaeology and Cultural Heritage	x	√		√	x	√	√	√	√	√
Water Resources	√	√	√		√	√	√	√	√	√
Air and Climate	√	√	x	√		√	√	√	√	x
Biodiversity, Flora and Fauna	√	√	√	√	√		√	√	√	√
Tourism and Recreation	√	√	√	√	√	√		√	√	√
Fisheries, Aquaculture and Angling	√	√	√	√	√	√	√		x	√
Landscape and Visual	√	√	√	√	√	√	√	x		√
Infrastructure and Material Assets	√	√	x	√	x	√	√	√	√	

7 Strategic Environmental Objectives

7.1 Introduction

A key element of the scoping process is the development of a set of SEA Objectives, Sub-Objectives, indicators and targets. These form the basis on which the environmental impact of the proposed plan measures can be assessed. The SEA Objectives are developed based on an understanding of the receiving environment in terms of spatial scale, sensitivity and existing problems. They are intended to be used as a yardstick to measure the potential for the plan measures to impact the receiving environment positively or negatively. It is important that the Strategic environmental objectives are developed to allow for the identification of opportunities as well as problems arising from the plan measures.

These objectives, sub-objectives and indicators will also perform a role in monitoring of the effectiveness of the flood risk management measures as part of a monitoring programme to inform future reviews and revisions to the Flood Risk Management Plans.

7.2 Development of SEA Objectives, Sub-Objectives and Indicators

An initial revision of the SEA objectives was developed during the scoping process, based on an understanding of the environmental issues, constraints and opportunities within the study area.

The SEA objectives were divided into more specific sub-objectives to allow for a more refined analysis of potential impacts on the receiving environment. For each objectives and sub-objectives, indicators and targets (Basic requirements and Aspirational targets) were developed allowing for better quantification of the potential impacts arising from the plan measures.

Two levels of targets have been developed each objective and sub-objective:

- i Basic Requirement: The first target sets the minimum requirement that needs to be met for an option to be acceptable; or at least, could be acceptable through the implementation of appropriate mitigation strategies to offset any potential adverse effects;
- i Aspirational Target: The second, more demanding and environmentally beneficial, aspirational target does not need to be met for the acceptance of options; although options meeting these higher targets will achieve a higher score and are likely to be favoured.

7.3 SEA Objectives, Sub-Objectives Indicators and Targets

SEA objectives, sub-objectives, indicators and targets have been developed for each of the social and environmental criteria during the scoping phase of the project and are listed in Table 7.1. It should be noted that the strategic environmental objectives were integrated into a multi-criteria analysis (MCA) of the flood risk management options in order to identify the preferred and most appropriate options.

Table 7.1: SEA Objectives, Sub-Objectives Indicators and Targets

Objective	Sub-Objective	Indicator	Basic Requirement	Aspirational Target
Minimise risk to human health and life	Minimise risk to human health and life of residents	Annual Average number of residential properties at risk from flooding	Number of residential properties at risk from flooding does not increase	Reduce the number of residential properties at risk from flooding to 0
	Minimise risk to high vulnerability properties	Number of high vulnerability properties at risk from flooding	Do not increase number of high vulnerability properties at risk from flooding	Reduce the number of high vulnerability properties at risk from flooding to 0
Minimise risk to community	Minimise risk to social infrastructure and amenity	Number of social infrastructure receptors at risk from flooding	Do not increase number of social infrastructure receptors at risk from flooding	Reduce the number of social infrastructure receptors at risk from flooding to 0
	Minimise risk to local employment	Number of enterprises at risk from flooding	Do not increase number of enterprises at risk from flooding	Reduce the number of enterprises at risk from flooding to 0
Support the objectives of the WFD	Provide no impediment to the achievement of water body objectives and, if possible, contribute to the achievement of water body objectives.	Ecological status of water bodies	Provide no constraint to the achievement of water body objectives	Contribute to the achievement of water body objectives
Support the objectives of the Habitats and Birds Directives	Avoid detrimental effects to, and where possible enhance, Natura 2000 network, protected species and their key habitats, recognising relevant landscape features and stepping stones.	Area of site at risk from flooding and qualitative Assessment of impact of option on habitat	No deterioration in the conservation status of designated sites as a result of flood risk management measures	Improvement in the conservation status of designated sites as a result of flood risk management measures
Avoid damage to, and where possible enhance, the flora and fauna of the catchment	Avoid damage to and where possible enhance the flora and fauna of the catchment	Avoid damage to and where possible enhance, legally protected sites / habitats and other sites / habitats of national regional and local nature conservation importance	No deterioration on condition of existing sites due to implementation of option	Creation of new or improved condition of existing sites due to implementation of option
Protect, and where possible enhance, fisheries resource within the catchment	Maintain existing, and where possible create new, fisheries habitat including the maintenance or improvement of	Area of suitable habitat supporting fish. Number of upstream barriers	No loss of integrity of fisheries habitat. Maintenance of upstream accessibility	No loss of fishery habitat. Improvement of habitat quality / quantity. Enhanced upstream accessibility

Objective	Sub-Objective	Indicator	Basic Requirement	Aspirational Target
	conditions that allow upstream migration for fish species.			
Protect, and where possible enhance, landscape character and visual amenity within the river corridor	Protect, and where possible enhance, visual amenity, landscape protection zones and views into / from designated scenic areas within the river corridor.	Changes to reported conservation status of designated sites relating to flood risk management Extent of affected Natura 2000 site, NHA/pNHA or other affected National or International designations (e.g. Nature reserves and Ramsar sites), i.e. Area of re	1. No significant impact on landscape designation (protected site, scenic route/amenity, natural landscape form) within zone of visibility of measures 2. No significant change in the quality of existing landscape characteristics of the receiving environment	1. No change to the existing landscape form. 2. Enhancement of existing landscape or landscape feature
Avoid damage to or loss of features, institutions and collections of cultural heritage importance and their setting	Avoid damage to or loss of features, institutions and collections of architectural value and their setting and improve their protection from extreme floods.	a) The number of architectural features, institutions and collections subject to flooding. b) The impact of flood risk management measures on architectural features, institutions and collections.	a) No increase in risk to architectural features, institutions and collections at risk from flooding. b) No detrimental impacts from flood risk management measures on architectural features, institutions and collections.	a) Complete removal of all relevant architectural features, institutions and collections from the risk of harm by extreme floods. b) Enhanced protection and value of architectural features, institutions and collections importance arising from the implementation of the selected measures.
	Avoid damage to or loss of features, institutions and collections of archaeological value and their setting and improve their protection from extreme floods where this is beneficial.	a) The number of archaeological features, institutions and collections subject to flooding. b) The impact of flood risk management measures on archaeological features, institutions and collections.	a) No increase in risk to archaeological features, institutions and collections at risk from flooding. b) No detrimental impacts from flood risk management measures on archaeological features, institutions and collections.	a) Complete removal of all relevant archaeological features, institutions and collections from the risk of harm by extreme floods. b) Enhanced protection and value of archaeological features, institutions and collections importance arising from the implementation of the selected measures.

7.4 Analysis utilising the Strategic Environmental Objectives

SEA analysis was undertaken to assess alternatives and preferred plan measures utilising the SEA Objectives, sub objectives and the associated indicators and targets. The analysis was undertaken as part of a Multi-criteria analysis (MCA) which included environmental, social, technical and financial objectives for the projects. The analysis was undertaken in line with the National CFRAM Programme Guidance Note No. 28.

8 Assessment of Alternatives

8.1 Introduction

The development of the draft FRMP for UoM 19 included the analysis of a range of flood risk management options within the Unit of Management. These potential options provide realistic alternatives to the preferred options recommended at an AFA scale. Each of these alternatives was assessed by way of a multi-criteria analysis to identify the preferred flood risk management option. A summary of the assessed options for each AFA are presented in this chapter. All the details of the assessment of alternatives has been presented in the SEA Options Appraisal Report for UoM 19.

The Office of Public Works has published a Guidance Note under the National CFRAM Programme called *Option Appraisal and Multi-Criteria Analysis Framework (Revision C, April 2015)*. Appendix B to this guidance note includes a detailed description of each of the environmental objectives and the methodology for the environmental evaluation of the flood risk management options.

8.2 Flood Risk Management Measures

Flood risk measures proposed for UoM 19 include non-structural measures and structural measures at an AFA scale. It should be noted that non-structural flood management measures will be implemented to some degree in all AFAs and so the alternatives assessment is relevant to structural measures only.

Structural measures for flood risk management can include one or a combination of some of the following;

Table 8.1: Structural Measures

Measure	Description
Flood Storage	Measures could include provision of flood storage/retardation system
Flow Diversion	This could include full diversion of provision of a by-pass channel/flood relief channel
Increased Conveyance	Measures could include in-channel works, floodplain earthworks, removal of constraints/constrictions or channel floodplain clearance.
Flood Defences	Flood defences can include such measures as walls, embankments or demountable defences
Improve Existing Defences	Existing defences could be repaired or gaps infilled.
Relocation of Properties	Existing properties could be relocated outside areas of flood risk
Localised Protection Works	This could involve such actions as minor raising of existing flood defences.

8.3 Castlemartyr

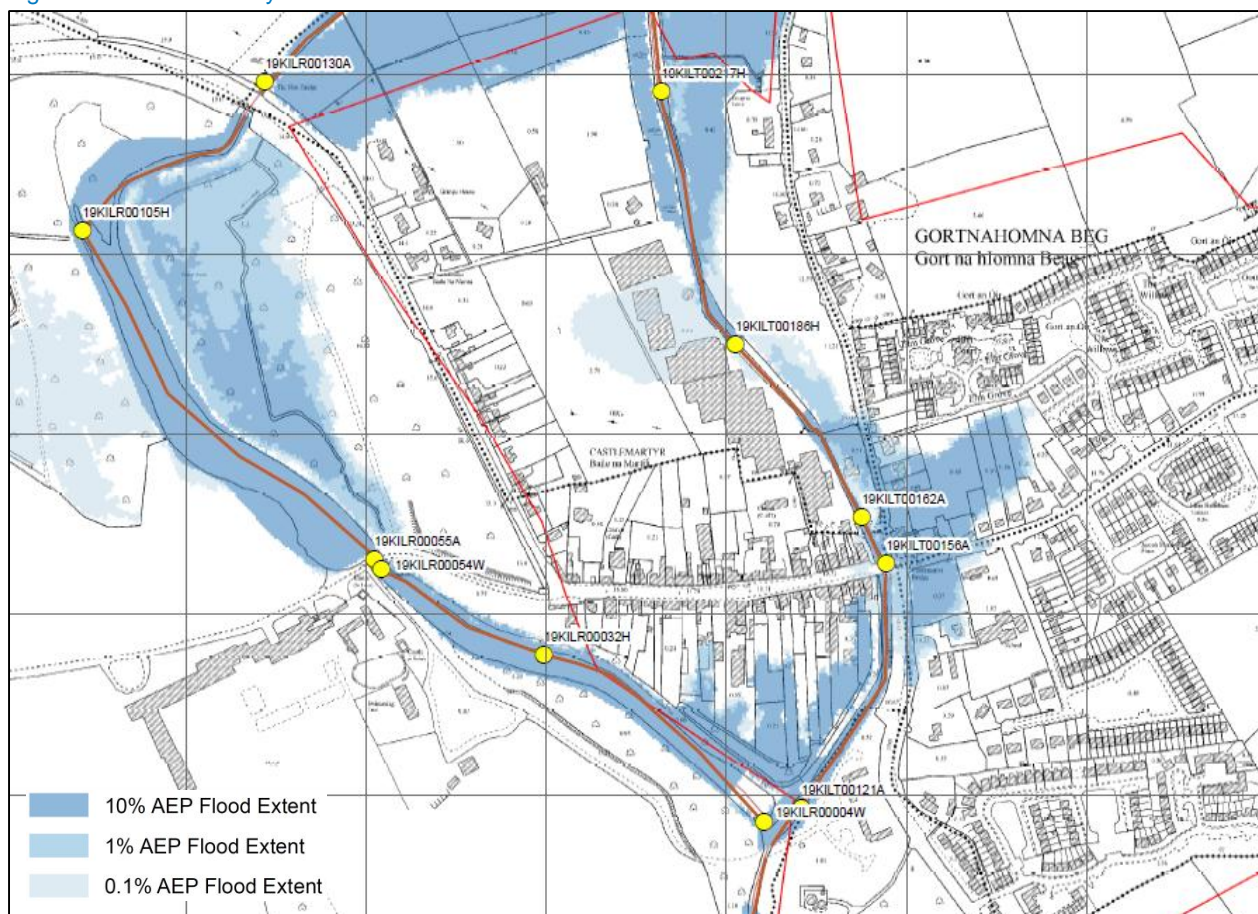
Castlemartyr is located on the confluence of the Kiltha River and Womanagh River in County Cork. The AFA and the existing fluvial flood risk are shown in Figure 8.1.

8.3.1 Viable Flood Risk Management Options

A number of viable structural flood risk mitigation options were identified and modelled to determine their effectiveness and impact and these are:

- i **Option 1 - Flood Defences/Localised Protection Works** - This option includes the construction of flood walls and embankments ranging in height from 1.1m to 1.5m within the town. The proposed flood defences fully achieve the required standard of protection for the 1% AEP fluvial event.
- i **Option 2 - Flood Defences and Flow Diversion** – This option includes diverting excess flows (in excess of $7\text{m}^3/\text{sec}$) from the Kiltha River around the town through an existing bypass channel which is currently disused (Killamucky Stream). A new flow diversion structure is required to reconnect to the flow diversion channel. Flood walls will also be constructed within the town north of the confluence of the Killamucky stream and the River Kiltha ranging in height from 1.1m to 1.4m. The proposed flood defences fully achieve the required standard of protection for the 1% AEP fluvial event.

Figure 8.1: Castlemartyr Current Scenario Fluvial Flood Extents



8.3.2 Key Environmental Sensitivities

The key environmental sensitivities of the Castlemartyr AFA are summarised below:

- i The Womanagh River stretches from its source at Carrigour to its tidal outfall at Pilmore.
- i The Kiltha River flows from Springfields/Mogeely southwards through Castlemartyr to join the Womanagh near Ladysbridge. Within Castlemartyr, a spring at Little Island diverts water from the Kiltha via the Castle, through the lake to re-join downstream of the town.
- i The River Womanagh is classified as having a moderate to good water status under the Water Framework Directive (WFD) and is a considered sensitive body. Kiltha is unclassified under the WFD.
- i The rivers discharge into Youghal Bay a shellfish sensitive area designated under the European Communities (Quality of Shellfish Waters) Regulations 2006 as amended.
- i The Castlemartyr AFA boundary does not overlap with any Natura 2000 site boundary. The Ballymacoda Bay Special Area of Protection (SPA) and Ballymacoda (Clonpriest and Pillmore) Special Area of Conservation (SAC) are located approximately 10km east of Castlemartyr. The Kiltha River (which flows through Castlemartyr) is hydrologically connected to Ballymacoda Bay via the Womanagh River.
- i There are no significant polluting sources within the 1% Annual Exceedance Probability⁴ (AEP) flood extent.
- i Womanagh River is not known as a river for high salmon/lamprey potential. There may be local fishing amenity value along the river.
- i The village and surrounding area has a wealth of natural and built heritage. According to the Cork County Development Plan (2014), there are five buildings or other structures located within the village, which are entered in the Record of Protected Structures. These includes St. Anne's Church of Ireland and Castlemartyr Castle, which, along with its grounds and part of the village main street, are included as part of an Architectural Conservation Area. According to the Plan there is an objective to protect and enhance the special character of the area. These sites are not within the 1% AEP at risk from fluvial flooding.
- i According to the Cork Development Plan (2014), Castlemartyr is located within an area characterised as "Broad Fertile Lowland Valley" landscape character type. This landscape character type is classified as having local value and medium sensitivity in its ability to accommodate change without adverse impact on its character and value. There are no scenic routes within the town.
- i Receptors at risk from the 1% AEP flood extent within the AFA include:
 - 13 No. Residential properties
 - 9 No. Non-Residential properties
 - 1 No. Society Amenity Site
 - 3 No. Roads at risk
- i There are no high vulnerability properties at risk from fluvial flooding within the AFA. There are no recorded or protected archaeological monuments or sites at risk 1% AEP within the AFA.

8.3.3 Environmental Assessment

The potential impacts arising for each of the proposed measures has been assessed in Table 8.2 below provides a summary of the potential impacts arising from the proposed options as determined through the

SEA assessment. In addition, Table 8.2 also highlights the requirement for mitigation measures for each option under each social and environmental objective. Table 8.2 should be read in conjunction with the SEA scoring matrix.

Table 8.2: Castlemartyr Options Scoring Matrix – Social and Environmental Objectives

SEA Objectives	Do nothing		Option 1		Option 2	
Social Objectives	Impact	Mitigation required	Impact	Mitigation required	Impact	Mitigation required
Human Health and life of residents	O	N	√√√	N	√√√	N
High vulnerability properties	O	N	O	N	O	N
Social infrastructure and amenity	O	N	√√	N	√√	N
Risk to local employment	O	N	√√√	N	√√√	N
Environmental Objectives						
WFD Directive	O	N	X	Y	X	Y
Birds and Habitats Directive	O	N	O	N	O	N
Flora and Fauna	O	N	X	Y	X X	Y
Fisheries	O	N	X X	Y	x	Y
Landscape	O	N	X	Y	xx	Y
Architectural Heritage	X X	Y	√√	N	√	Y
Archaeological Heritage	O	N	√√	N	√	N

SEA Scoring Matrix

Score	Key	Description
+5	√√√	Achieving aspirational target
+4	√√	
+3	√√	Partly achieving aspirational target
+2	√	Exceeding minimum target
+1	√	
0	O	Meeting minimum target
-1	X	Just failing minimum target
-2	X	
-3	X X	Partly failing minimum target
-4	X X	
-5	XX X	Fully failing minimum target
-999.99	XX X	Unacceptable negative impact where feasible alternative exists

There are no significant polluting sources within the 1% Annual Exceedance Probability (AEP) flood extent within the Castlemartyr AFA. The construction stage of all measures could result in temporary negative impacts on the water body status, resulting from sedimentation, accidental pollution or loss of habitat in the absence of appropriate mitigation. However, *Option 2*, will require instream works during the construction of the control structure in addition to the temporary impacts caused by disturbance to river bed and banks.

This option will also result in permanent loss of river bed and bank within the footprint of the control structure. It is also considered that the diversion structure will not significantly alter the attainment of good water status in the long term.

Having regard to the requirements of the Habitats and Birds Directive, the AFA does not occur within any Natura 2000 site. There is no requirement for land take within a Natura 2000 site for the construction of the proposed measures. Potential removal of riparian habitat to accommodate the options will not impact the qualifying features of the SAC or SPA.

The Kiltha River is hydrologically connected to Ballymacoda Bay via the Womanagh River. Sediment release / accidental pollution of the Kiltha River could potentially enter the bay. The release of sediment into the bay is extremely unlikely to impact the qualifying features of the SAC. These habitats are habitually inundated with sediment during tidal exchanges and are adapted to such conditions. Pollutants e.g. concrete / oil leaks will be diluted by flows in the Kiltha River, the Womanagh River and also by estuarine water in the bay. It is highly unlikely that pollutants would reach the bay at such concentrations what would cause habitat damage.

All of the proposed options have the potential to cause disturbance to species of conservation importance, such as otters, and bats, through general impacts associated with construction stage project. Such impacts include noise generated by the works and the use of artificial lighting in the darker evenings or in winter months in order to facilitate the construction works.

Option 1 includes the construction of extensive length of flood walls in the town, short term negative impacts are likely during the construction including the possible removal of riparian habitat and riverside screen planting in order to facilitate the construction of the measures. Option 2 measures include a flow diversion for the Kiltha River. A new flow diversion structure will be required and the bypass channel will need to be cleared of debris / vegetation before coming on line. The proposed measure may result in the scouring in the Kiltha River at the bypass channel outlet and potential damage to habitat during the construction.

The protection of lamprey and salmon are not qualifying features within the Ballymacoda Bay SAC. Womanagh is not known as a river for high salmon/lamprey habitat potential. There may however be local fishing amenity value along the river. The flow diversion structure within Option 2, will result in a permanent loss of fisheries habitat within the footprint of the structure.

The existing Kiltha River runs through Pigeon Wood. Pigeon Wood a long -established woodland, is located immediately west of Castlemartyr AFA. This woodland comprises a mix of conifer plantation, broadleaf and mixed woodland. There are also areas which have been recently clear-felled. This is not Annex I habitat, it is outside the boundary of Natura 2000 sites and is not a qualifying feature. There is potential for destruction of woodland habitat to facilitate the access of machinery during the construction of the diversion structure.

In terms of the social objectives do something is always preferable, Options 1 and 2 achieve aspirational targets set out to minimise flood risk to residential properties and risk to the community within the AFA.

Each of the options considered above score the same having regard to the protection the measures provide to human health and life of residents and protection provided to local employment within the AFA.

According to the Cork County Development Plan (2014), parts of the Castlemartyr main street are included within an Architectural Conservation Area (ACA), where it is an objective to protect and enhance the special character of the area. There are no protected buildings or recorded monuments and sites at risk within the 1% AEP extent within the AFA. All of the 'do something' options will however provide the same protection for the town however there is no discernible difference between options in the context of potential impacts on the architectural setting and landscape value of the AFA. Option 1 includes the construction of flood walls within the town north of the confluence of the Killamucky Stream and the Kiltha River ranging in height from 1.1m to 1.4m. There are a number of existing walls already within the town and the construction of the new defence walls are unlikely be notably different subject to a consistent visual appearance being integrated into the design process.

8.3.4 Preferred Flood Risk Management Option

On the basis of the evaluation summarised above, and having regard to the public consultation, it is proposed that Option 2 has been determined to be the preferred option. Mitigation actions are recommended for the identified negative effects. The key recommendation is that these negative impacts should be considered during the next stage of option development, when the alignment of the proposed defences and details of the option would be optimised through detailed design in order to limit impacts on the river channel and banks of the river.

8.4 Ballingeary

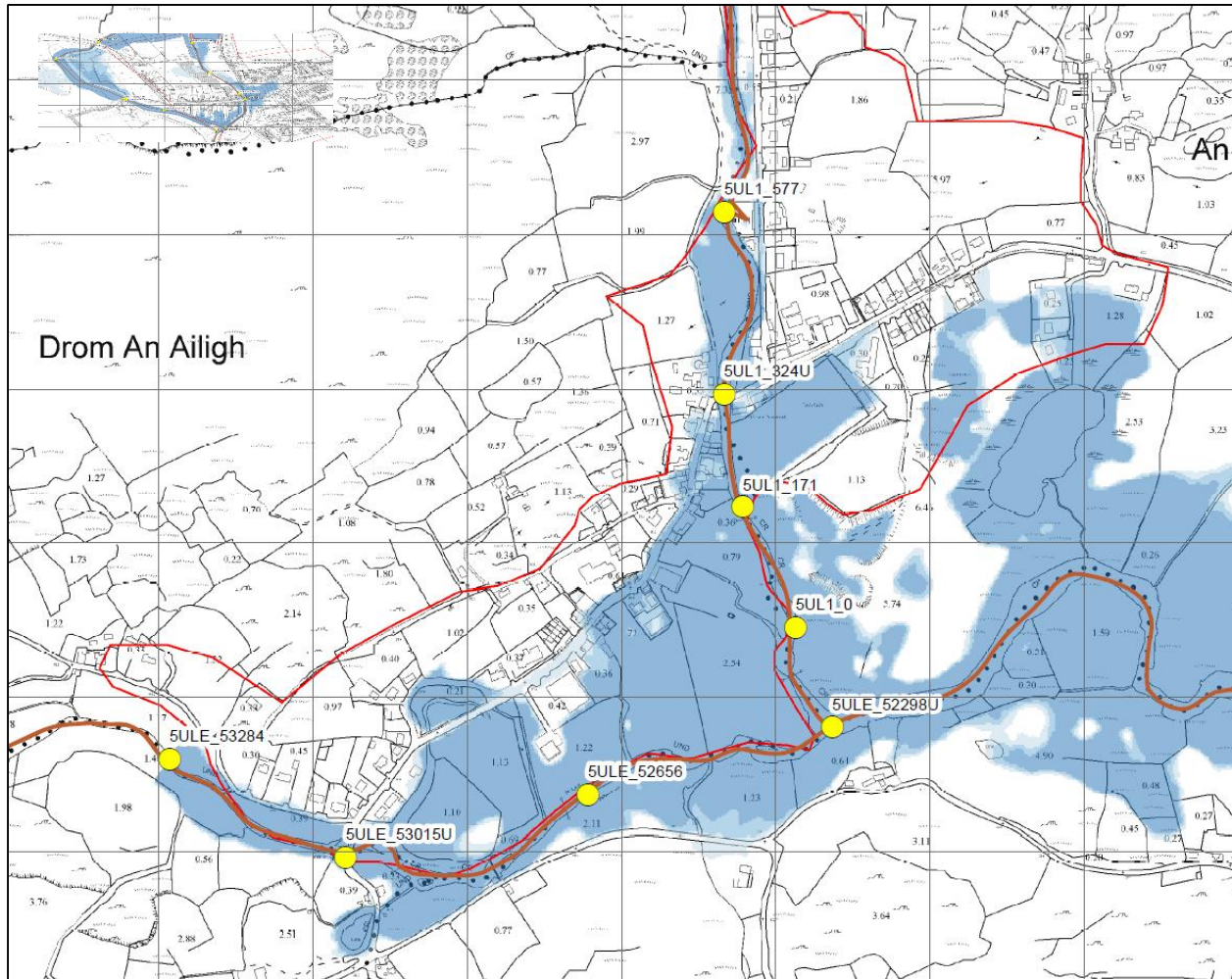
Ballingeary is located along the upper reach of the River Lee in County Cork. Ballingeary is at risk of fluvial flooding. The AFA and the existing fluvial flood risk are shown in Figure 8.2.

8.4.1 Viable Flood Risk Management Options

A number of viable flood risk mitigation options were identified and modelled to determine their effectiveness and impact and these are:

- i **Option 1 - Flood Defences** - This option includes the construction of flood walls and embankments ranging in height from 0.7m to 1.5m within the town. The proposed flood defences fully achieve the required standard of protection for the 1% AEP fluvial event.
- i **Option 2 – Storage** - This option includes the construction of two flood storage areas on the River Lee and its tributary the Bunsheelin of 450,700m² and 257,500m² respectively. This work will involve stream realignment, construction of embankments to contain flood waters and installation of a sluice gate to control flow from the storage.

Figure 8.2: Ballingearry – Current Scenario Fluvial Flood Extents



8.4.2 Key Environmental Sensitivities

The key environmental sensitivities of the Ballingearry AFA are summarised below:

- | The Bunsheelin Stream and River Lee flows through Ballingearry. These watercourses are assigned good status under the WFD.
- | The River Lee is considered a sensitive waterbody. Spawning grounds for salmonid are likely upstream along the River Lee. There is local fishing amenity value along the River Lee.
- | There is one significant polluting source at risk from flooding in the 1% AEP.
- | The AFA boundary does not overlap with any Natura 2000 site boundary. The Gearagh SPA and The Gearagh SAC are located approximately 15km southeast of Ballingearry. The sites are hydrological connected via the River Lee.

- i According to the Cork County Development Plan (2014), the village occurs in a landscape character zone "Ridged and Peaked upland". The landscape value is considered to be high value and has a sensitivity of local importance.
- i According to the Cork County Development (2014), the approach roads into the town are protected scenic routes.
- i Receptors at risk from the 1% AEP flood extent within the AFA include:
 - 21 No. Residential properties
 - 25 No. Non-Residential properties
 - 2 No. Society Amenity Site
 - 3 No. Roads at risk
 - 1 No. High Vulnerability Properties
- i There are no NIAH monuments at risk within the 1% AEP extent. The bridges within the town are RMP and these occur within the 1% AEP flood extent.

8.4.3 Environmental Assessment

The potential impacts arising for each of the proposed measures has been assessed in and Table 8.3 below provides a summary of the potential impacts arising from the proposed options as determined through the SEA assessment. In addition, Table 8.3 also highlights the requirement for mitigation measures for each option under each social and environmental objective. Table 8.3 should be read in conjunction with the SEA scoring matrix below.

Table 8.3: Ballingeary Options Scoring Matrix- Social and Environmental Objectives

SEA Objectives	Do nothing		Option 1		Option 2	
Social Objectives	Impact	Mitigation required	Impact	Mitigation required	Impact	Mitigation required
Human Health and life of residents	O	N	√√√	Y	√√√	Y
High vulnerability properties	O	N	O	N	O	N
Social infrastructure and amenity	O	N	O	N	O	N
Risk to local employment	O	N	√√	Y	√√	Y
Environmental Objectives						
WFD Directive	X	Y	√	Y	X	Y
Birds and Habitats Directive	O	N	O	N	O	N
Flora and Fauna	O	N	X	Y	X X	Y
Fisheries	X	Y	X	Y	X	Y
Landscape	O	N	O	N	X	Y
Architectural Heritage	O	N	O	N	O	N
Archaeological Heritage	O	N	O	N	√	Y

SEA Scoring Matrix

Score	Key	Description
+5	vvv	Achieving aspirational target
+4	vv	
+3	vv	Partly achieving aspirational target
+2	v	Exceeding minimum target
+1	v	
0	o	Meeting minimum target
-1	x	Just failing minimum target
-2	x	
-3	xx	Partly failing minimum target
-4	xx	
-5	xxx	Fully failing minimum target
-999.99	xxx	Unacceptable negative impact where feasible alternative exists

Having regard to the requirements of the Habitats and Birds Directive, the AFA does not occur within any Natura 2000 site. There is no requirement for land take within a Natura 2000 site for the construction of the proposed measures. Potential removal of riparian habitat to accommodate the options will not impact the qualifying features of the SAC or SPA.

The Bunsheelin Stream, a tributary of the River Lee, flows through Ballingeary is hydrologically connected downstream to the Gearagh SAC. The release of sediment into the river is extremely unlikely to impact the qualifying features of the SAC. Pollutants e.g. concrete / oil leaks will be diluted by flows in the River Lee and its tributary. It is highly unlikely that pollutants would reach the Gearagh at such concentrations that would cause habitat damage. Therefore, there are no preferences between the options having regard to potential impacts associated with the Birds and Habitats Directive objective.

Permanent fragmentation of linear riparian features resulting from the construction of very large embankments (e.g. 7m embankment in River Lee) which may deter commuting protected species from using an area. The construction of Option 2 will require significant instream works including the excavation of the river bed and bank material, a section of the river bed will be replaced by a concrete channel and walls such that the control structure can be anchored to the concrete. This will result in the loss of river bed and river bank within the footprint of the control structure.

The River Lee is assigned a good status under the WFD. The River Lee and its tributary are sensitive water bodies. There is one significant polluting source at risk from flooding in the 1% AEP. All of the options provide flood protection measures which assist in achieving the objectives of the WFD by prevent flooding. Spawning grounds for salmonid are likely upstream along the River Lee. Impacts on salmonid from sedimentation associated with instream works and construction of the embankments required for Option 2 are likely to be significant prior to mitigation. Having regard to the requirements of the WFD, Option 2 is the least preferred option.

Option 2 includes for the construction of a storage area, the proposed measures include the construction of 7m embankment, given the local topography this measure is likely to be visible from the scenic roads and will result in a permanent change in the landscape prior mitigation.

Option 1 includes the construction of flood walls within the town ranging in height from 0.7m to 1.5m. There are a number of existing walls already within the town and the construction of the new defence walls are unlikely be notably different subject to a consistent visual appearance being integrated into the design process.

In comparison to the Do-nothing scenario, in terms of the social objectives do something is always preferable. Each of the do something options considered above score the same in regard to the protection the measures provided to human health and life of residents and protection provided to local community within the AFA.

8.4.4 Preferred Flood Risk Management Option

On the basis of the evaluation summarised above, Option 1 (Flood Defences) has been determined to be the preferred option. Mitigation actions are recommended for the identified negative effects. The key recommendation is that these negative impacts should be considered during the next stage of option development, when the alignment of the proposed defences and details of the option would be optimised through detailed design in order to limit impacts on the river channel and banks of the river.

8.5 Inchigeelagh

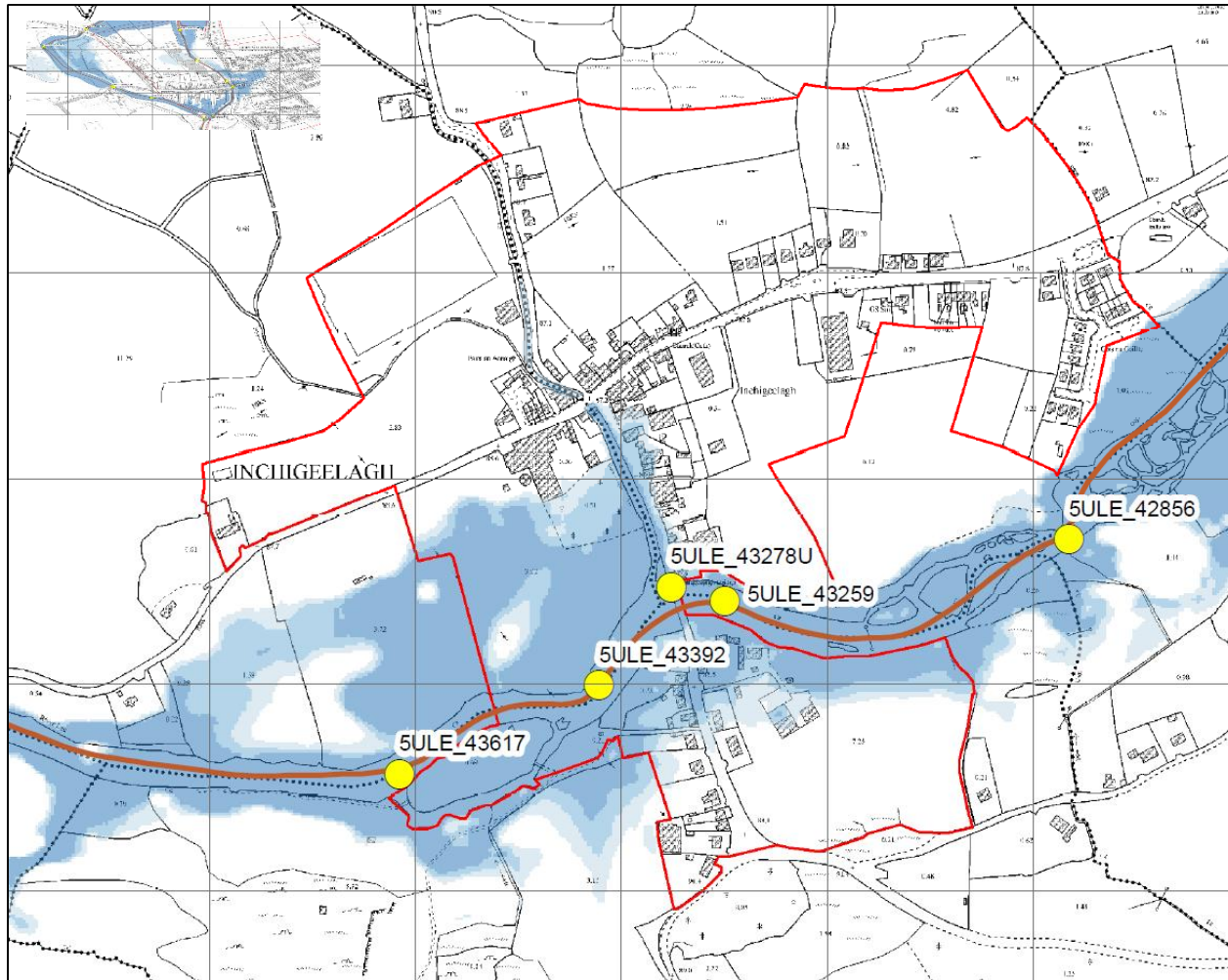
Inchigeelagh is located along the River Lee in County Cork, approximately 8km downstream of Ballingeary. Inchigeelagh is at risk of fluvial flooding. The AFA and the existing fluvial flood risk are shown in Figure 8.3.

8.5.1 Viable Flood Risk Management Options

One viable flood risk mitigation option was identified and modelled to determine its effectiveness and impact and this is:

- i **Option 1 - Flood Defences** - This option includes the construction of flood walls and embankments ranging in height from 0.6m to 1.9m within the village. This option also includes the sealing of an existing culvert within the village. The proposed flood defences fully achieve the required standard of protection for the 1% AEP fluvial event.

Figure 8.3: Inchigeelagh – Current Scenario Fluvial Flood Extents



8.5.2 Key Environmental Sensitivities

The key environmental sensitivities of the Inchigeelagh AFA are summarised below:

- | The River Lee flows through Inchigeelagh AFA. This watercourse is assigned good status under the WFD.
- | The River Lee is considered a sensitive waterbody. Spawning grounds for salmonid are likely upstream along the River Lee. River Lee is noted for its importance of fishery amenity value.
- | There is one significant polluting source at risk from flooding in the 1% AEP.
- | The Inchigeelagh AFA boundary does not overlap with any Natura 2000 site boundary. The Gearagh SPA and Gearagh SAC are located approximately 7km east of the village.

- According to the Cork County Development Plan (2014), the village occurs in a landscape character zone assigned as "Ridged and Peaked upland". The landscape value is considered to be high value and sensitivity of local importance.
- According to the Cork County Development Plan (2014), there are scenic routes on the approach road from Ballingeary.
- Receptors at risk from the 1% AEP flood extent within the AFA include:
 - 14 No. Residential properties
 - 14 No. Non-Residential properties
 - 1 No. Society Amenity Site
 - 2 No. Roads at risk
- There are no high vulnerability properties at risk from fluvial flooding within the AFA.
- There are no NIAH monuments at risk within the 1% AEP extent. There is one RMP within the 1% AEP extent.

8.5.3 Environmental Assessment

The potential impacts arising for each of the proposed measures has been assessed in and Table 8.4 below provides a summary of the potential impacts arising from the proposed options as determined through the SEA assessment. In addition, Table 8.4 also highlights the requirement for mitigation measures for each option under each social and environmental objective. Table 8.4 should be read in conjunction with the SEA scoring matrix below.

Table 8.4: Inchigeelagh Options Scoring Matrix –Social and Environmental Objectives

SEA Objectives	Do nothing		Option 1	
Social Objective	Impact	Mitigation	Impact	Mitigation
Human Health and life of residents	0	N	√√√	Y
High vulnerability properties	0	N	0	N
Social infrastructure and amenity	0	N	0	N
Risk to local employment	0	N	√√√	Y
Environmental Objectives				
WFD Directive	O	Y	√	Y
Birds and Habitats Directive	O	N	O	N
Flora and Fauna	X	Y	X	Y
Fisheries	O	Y	X	Y
Landscape	O	N	X	Y
Architectural Heritage	O	Y	O	Y
Archaeological Heritage	X	Y	O	Y

SEA Scoring Matrix

Score	Key	Description
+5	vvv	Achieving aspirational target
+4	vv	
+3	vv	Partly achieving aspirational target
+2	v	Exceeding minimum target
+1	v	
0	0	Meeting minimum target
-1	x	Just failing minimum target
-2	x	
-3	xx	Partly failing minimum target
-4	xx	
-5	xxx	Fully failing minimum target
-999.99	xxx	Unacceptable negative impact where feasible alternative exists

The 'do-something option', Option 1, can assist in contributing to maintaining the objectives of the Water Framework Directive by preventing flooding of the significant polluting source within the 1% AEP extent.

In the context of the Birds and Habitat Directive objective, it should be noted that there are no Natura 2000 sites within the AFA. The proposed works will have the potential to cause disturbance to species of conservation importance such as otters through operation of construction machinery and personnel, noise generated by the works and possibly artificial lighting that may be used in the darker winter months.

The River Lee is recognised as an important river for supporting salmon species and it is recognised as having high fishery value. The proposed works will not directly impact on the River Lee, however the works may require excavation of the bank of river during the construction stage. This would result in short term damage to habitat and emissions of sediment to the waterbody and downstream on the River Lee without appropriate mitigation measures being implemented. There is a potential need for access restrictions to the local fishery for during the construction stage.

The proposed measures within Option 1 will change the views across the river from the bridge, however the wall and embankments relatively low lying. The construction of the low lying walls along the river are unlikely to adversely impact on the views along the road. There is potential to include landscape planting as part of the design of the embankments. The proposed measures will likely change the existing landscape form in the short term during construction.

The construction of the low lying walls has potential impacts on the setting of the Church/Parish Hall (CO081-014001) within the AFA, however there are currently low lying stone wall parallel to the local road, the proposed measures will result in a height increase of approximately 0.5m and the measures will provide protection to this monument.

In comparison to the Do-nothing scenario, in terms of the social objectives do something is always preferable, the viable option, Option 1, exceeds the minimum targets set out to minimise flood risk to residential properties and risk to the community within the AFA.

8.5.4 Preferred Flood Risk Management Option

On the basis of the evaluation summarised above, Option 1, on the Brewery River in combination with localised flood defences on the River Lee is considered to be the preferred option. Mitigation actions are recommended for the identified negative effects. The key recommendation is that these negative impacts should be considered during the next stage of option development, when the alignment of the proposed defences and details of the option would be optimised through detailed design in order to limit impacts on the river channel and banks, particularly on water quality status of the river and setting of the protected monuments within the town.

9 Assessment of South Western FRMP for UoM19

9.1 Introduction

This chapter identifies the likely significant effects on the receiving environment resulting from the implementation of the individual options from the proposed FRMP both alone and in combination with other relevant plans and strategies. The assessment considers the potential impacts of implementing the following options:

- | *Unit of Management Measures:* General Flood Prevention and Flood Preparedness Measures; and
- | *AFA measures:* Preferred location-specific options for the management of flooding in AFAs.

9.2 Proposed Flood Risk Management Plans

The preferred flood risk management options/measures for UoM have been determined based on range of assessments, with the strategic environmental assessment fully integrated into the decision-making process:

- | The MCA Benefit - Cost Ratio;
- | The economic viability (the BCR);
- | The outcomes of the Strategic Environmental Assessments;
- | The adaptability to possible future changes, such as the potential impacts of climate change;
- | Professional experience and judgement of the OPW, local authorities and Mott MacDonald Ireland;
- | Public and stakeholder input and opinion.

9.3 Unit of Management Measures

There are a number of prevention and preparedness measures related to flood risk management which form part of wider Government policy. These measures are set out below and will be applied across the whole UoM, including all AFAs.

Non-structural measures such as Land Use Management, Natural Flood Management, Green Infrastructure etc. are terms used to cover a suite of measures that are intended to reduce flood risk by working with natural systems and, where possible, provide environmental benefits. While in small catchments they can effectively manage flood risk to a certain degree in their own right, in larger catchments they can work in a complimentary way with other measures to achieve flood risk management targets.

Due to the time required to initiate, establish and prove the flood risk management targets of such measures, they are not deemed viable to mitigate the current flood risk and any potential reductions in flood risk should not be considered when developing other options based on structural measures.

Where there is existing flood risk, the implementation of non-structural measures such as Planning Control, SUDS etc. at any spatial scale of assessment will not mitigate flood risk, unless those measures are retrospectively applied. As this is unrealistic and not economically viable, such non-structural measures can only be applied to new development to maintain the status quo of the current flood risk scenario or mitigate future flood risk. The application of non-structural measures such as individual property resilience,

public awareness and flood forecasting, to redevelopment or new development may reduce potential damage costs.

The non-structural measures described in this section are complimentary to structural measures and should be implemented as national policy to the SSAs where appropriate. However, at this stage they should not be considered in the development of options based on structural measures.

9.3.1 Planning Control

In November 2009, the Guidelines on the Planning System and Flood Risk Management, jointly developed by DECLG and the OPW, were published under Section 28 of the Planning Acts. These Guidelines provide a systematic and transparent framework for the consideration of flood risk in the planning and development management processes, whereby:

- i A sequential approach should be adopted to planning and development based on avoidance, reduction and mitigation of flood risk.
- i A flood risk assessment should be undertaken that should inform the process of decision-making within the planning and development management processes at an early stage.
- i Development should be avoided in floodplains unless there are demonstrable, wider sustainability and proper planning objectives that justify appropriate development and where the flood risk to such development can be reduced and managed to an acceptable level without increasing flood risk elsewhere (as set out through the Justification test).
- i The proper application of the Guidelines by the planning authorities is essential to avoid inappropriate development in flood prone areas, and hence avoid unnecessary increases in flood risk into the future. The flood mapping provided as part of the FRMP will facilitate the application of the Guidelines.
- i In flood-prone areas where development can be justified (i.e., re-development, infill development or new development that has passed the Justification Test), the planning authorities can manage the risk by setting suitable objectives or conditions, such as minimum floor levels or flood resistant or resilient building methods.

9.3.2 Sustainable Urban Drainage Systems (SUDS)

Sustainable Urban Drainage (SUDS) involves the management of surface water run-off from developments in a manner which attempts to replicate the natural behaviour within catchments and watercourses, which is typically achieved through attenuation.

Within existing urban or developed areas there is typically little space available for the attenuation of storm water flows to a degree which would mitigate or reduce current flood risk. Therefore, it is not considered practical to implement SUDS for the mitigation of current risk at any SSA. However, within all SSAs every new developments (and where possible redevelopment), should apply the principles of SUDS.

9.3.3 Flood Forecasting and Warning

Flood forecasting is a means of providing advanced warning of an impending flood event. A reliable advance warning system allows protective measures to be put in place and protective actions to be carried out in advance of a flood event. These actions and measures can reduce the damage caused in a flood event.

Flood forecasting is not a possible FRM measure at all SSAs. This is because the time between transmitting a flood forecast in which the authorities have reasonable confidence and the arrival of flood waters may not be long enough for people to take effective action to reduce flood damage. The minimum time to take effective action is deemed to be 6 hours.

9.3.4 Public Awareness

Many of the measures to mitigate and manage flood risk and the potential consequences for flooding will involve the public at large. It is therefore important that the public is made aware of where to find information, what the information means and what actions the public and business owners can take to reduce the damage that would occur to their properties, possessions and interests in the event of a flood.

Public awareness measures will engender the public's recognition of the potential of the risk of flooding and the potential consequences thereof. Knowing in advance means that actions can be taken in a timely manner.

Measures to increase and promote public awareness include:

- i Identifying the areas prone to flooding
- i Information on measures to be implemented to reduce and / or manage the risk of flooding
- i Measures in place to provide advance warning of flooding
- i Establishment of methods to interface with the public and in particular the owners of vulnerable properties, i.e. workshops and meetings, Facebook, Twitter, text messaging, newsprint, websites, etc.

Flood risk maps and flood hazard maps have been produced for the UoM 19 AFAs. The dissemination of this information to the public will increase awareness.

9.3.5 Land Use Management

Land Use Management can be utilised as a non-structural measure to prevent or reduce the impact of flooding on properties, roads and other critical infrastructure. Land Use Management includes strategies to control overland flow, such as improving agricultural and forestry practices in key catchment areas. Local natural flood management measures such as the creation of wetlands or forestry to retain overland flow could also be adopted.

9.4 Area of Further Assessment (AFA)

For each AFA a number of options have been assessed, some of which are described as *non-structural measures* and some of which are *structural measures*.

9.5 Non-structural measures

Non-structural measures proposed for UoM 19 at the AFA scale are identical to those to be implemented at the UoM scale. Please refer to Section 9.3 above for further details.

9.6 Structural Measures

9.6.1 Castlemartyr AFA

The preferred flood risk management option as identified in the MCA is Flood Defences and Flow Diversion. This option includes diverting excess flows (in excess of 7m³/sec) from the Kiltha River around the town through an existing bypass channel which is currently disused (Killamucky Stream). A new flow diversion structure is required to reconnect to the flow diversion channel. Flood walls will also be constructed within the town north of the confluence of the Killamucky stream and the River Kiltha ranging in height from 1.1m to 1.4m.

9.6.2 Ballingeary AFA

The preferred flood risk management option as identified in the MCA is Fluvial Flood Defences which would comprise of walls and embankments.

9.6.3 Inchigeelagh AFA

The preferred flood risk management option as identified in the MCA is Fluvial Flood Defences which would comprise of flood walls and embankments

9.7 Assessment of Options

This assessment utilises the results of the detailed MCA process used to select the preferred flood risk management options which included the use of the 11 SEA objectives presented in Chapter 7. The methodologies used for this SEA assessment and evaluation process are described in Section 3.3.4 and Chapter 7. The assessment of options is presented below at two different scales:

- i Unit of Management (UoM) General Options; The general UoM options are assessed considering the UoM as one area; and
- i Area of Further Assessment (AFA) Options: The proposed AFA options are assessed for each AFA separately.

9.7.1 Unit of Management (UoM) General Options

The unit of Management (UoM) General Options are assessed considering the UoM as one area and the outputs of this assessment are presented below in Table 9.3. The general measures at UoM scale are non-structural measures with a focus on:

- i Improving the planning process to ensure that unsuitable development does not occur in flood risk areas;
- i Increasing awareness of flood risk and promoting the implementation of flood defence or flood risk reduction measures at individual properties; and
- i Improving future flood predications.

The proposed UoM scale measures are assessed having regard to the SEA Scoring Matrix outlined in Table 9.1.

Table 9.1: SEA Scoring Matrix

Score	Key	Description
+5	vvv	Achieving aspirational target
+4	vv	
+3	v	Partly achieving aspirational target
+2	v	Exceeding minimum target
+1	v	
0	o	Meeting minimum target
-1	x	Just failing minimum target
-2	x	
-3	xx	Partly failing minimum target
-4	xx	
-5	xxx	Fully failing minimum target
-999.99	xxx	Unacceptable negative impact where feasible alternative exists

The key outcomes of the assessment are as follows:

- i The UoM scale measures have a neutral or positive effect on the SEA Objectives overall;
- i The proposed measures have potential to have a positive impact in terms of SEA objectives that relate to the social and health SEA Objectives, as the implementation of the measures will result in reduced flooding of property. Reduced flooding will result in benefits in terms of protection of health, social infrastructure and amenity and enterprise;
- i The proposed measures have potential to have a positive impact in terms of SEA objectives that relate to the Archaeological and Architectural SEA Objectives, as the implementation of the measures will result in reduced flooding of buildings and urban areas where these features are located;
- i The proposed measures are non-intrusive in general and so do not have potential to impact on the SEA objectives that relate to water quality and ecological conservation. The exception to this is the implementation of the *Guidelines on the Planning System and Flood Risk Management* as these guidelines outline additional requirements to ensure the protection of Water Framework Directive (WFD) status and Natura 2000 sites as required in the planning process.

Table 9.2: SEA Assessment of Proposed UoM Scale Flood Risk Management Options.

Criteria	Objective	Sub-Objective	Planning Control				
				Land Use Management	SUDS	Public Awareness	Flood Forecasting
Social	Minimise risk to human health and life	Minimise risk to human health and life of residents	This measure will ensure that best practice planning will be implemented, thereby reducing the construction of inappropriate developments in flood risk areas. This will reduce the potential for flooding and resultant health impacts that result from contaminated flood water, flooded households and other buildings.	This measure will ensure that effective land use management will be implemented, thereby reducing the construction of inappropriate developments in flood risk areas. This will reduce the potential for flooding and resultant health impacts that result from contaminated flood water, flooded households and other buildings.	The implementation of SUDS as part of new developments will ensure that the new properties will be better protected from flooding, thereby reducing the negative health effects impacted by flooding.	The raising of awareness with regard to the requirement to implement flood management measures by each property owner will ensure that the number of properties effected by flooding will be reduced, thereby reducing the negative health effects impacted by flooding.	The improvement of flood predication will result in a reduction in the impacts of flood events in the long term with resultant benefits on health.
		Minimise risk to high vulnerability properties	This measure will ensure that best practice planning will be implemented, thereby reducing the construction of inappropriate developments in flood risk areas. This will reduce the potential for flooding on vulnerable properties	This measure will ensure that effective land use management will be implemented, thereby reducing the construction of inappropriate developments in flood risk areas. This will reduce the potential for flooding on vulnerable properties	The implementation of SUDS as part of new developments will ensure that the new properties will be better protected from flooding, thereby reducing the potential for flooding on vulnerable properties.	The raising of awareness with regard to the requirement to implement flood management measures by each property owner will ensure that the number of vulnerable properties affected by flooding will be reduced.	The improvement of flood predication will result in a reduction in the impacts of flood events on vulnerable properties in the long term.
	Minimise risk to community	Minimise risk to social infrastructure and amenity	This measure will ensure that best practice planning will be implemented, thereby reducing the construction of inappropriate developments in flood risk areas. This will reduce the potential for flooding on social infrastructure and amenity	This measure will ensure effective land use management will be implemented, thereby reducing the construction of inappropriate developments in flood risk areas. This will reduce the potential for flooding on social infrastructure and amenity	The implementation of SUDS as part of new developments will ensure that the new properties will be better protected from flooding, thereby is reducing the potential for flooding on social infrastructure and amenity.	The raising of awareness with regard to the requirement to implement flood management measures by each property owner will ensure a reduction in impacts on social infrastructure and amenity.	The improvement of flood predication will result in a reduction in the impacts of flood events on social infrastructure in the long term.
		Minimise risk to local employment	This measure will ensure that best practice planning will be implemented, thereby reducing the construction of inappropriate developments in flood risk areas. This will reduce the potential for impacts on enterprises from flooding	This measure will ensure effective land use management will be implemented, thereby reducing the construction of inappropriate developments in flood risk areas. This will reduce the potential for impacts on enterprises from flooding	The implementation of SUDS as part of new developments will ensure that the new properties will be better protected from flooding, thereby is reducing the potential for flooding on enterprises.	The raising of awareness with regard to the requirement to implement flood management measures by each property owner will ensure a reduction in impacts on enterprises.	The improvement of flood predication will result in a reduction in the impacts of flood events in the long term.
Environmental	Support the objectives of the WFD	Provide no impediment to the achievement of water body objectives and, if possible, contribute to the achievement of water body objectives.	This measure will reduce the occurrence of developments within flood risk areas in proximity to rivers and streams. This will result in a reduction in future anthropogenic pressures on rivers and streams, allowing waterbodies to achieve required water status objectives.	This measure will reduce the occurrence of developments within flood risk areas in proximity to rivers and streams. This will result in a reduction in future anthropogenic pressures on rivers and streams, allowing waterbodies to achieve required water status objectives.	This measure will not have a significant effect on the achievement of good water status as required under the water framework directive.	This measure will not have a significant effect on the achievement of good water status as required under the water framework directive.	This measure will not have a significant effect on the achievement of good water status as required under the water framework directive.
	Support the objectives of the Habitats and Birds Directives	Avoid detrimental effects to, and where possible enhance, Natura 2000 network, protected species and their key habitats, recognising relevant landscape features and stepping stones.	The guidelines specify the requirement for a full assessment of sensitive habitats under the EU Habitats Directive as part of an evaluation of developments. This will ensure the protection of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.
	Avoid damage to, and where possible enhance, the flora and fauna of the catchment	Avoid damage to and where possible enhance the flora and fauna of the catchment	This measure will reduce the occurrence of developments within flood risk areas in proximity to rivers and streams. This will result in a reduction in future anthropogenic pressures habitats in the vicinity of streams, allowing for the conservation of relevant habitats.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.

Criteria	Objective	Sub-Objective	Planning Control				
				Land Use Management	SUDS	Public Awareness	Flood Forecasting
	Protect, and where possible enhance, fisheries resource within the catchment	Maintain existing, and where possible create new, fisheries habitat including the maintenance or improvement of conditions that allow upstream migration for fish species.	This measure will reduce the occurrence of developments within flood risk areas in proximity to rivers and streams. This will result in a reduction in future anthropogenic pressures on rivers and streams, allowing fisheries habitats to be conserved.	This measure will reduce the occurrence of developments within flood risk areas in proximity to rivers and streams. This will result in a reduction in future anthropogenic pressures on rivers and streams, allowing fisheries habitats to be conserved.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.
	Protect, and where possible enhance, landscape character and visual amenity within the river corridor	Protect, and where possible enhance, visual amenity, landscape protection zones and views into / from designated scenic areas within the river corridor.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.	This measure will not have a significant effect on the conservation status of Natura 2000 sites.
	Avoid damage to or loss of features, institutions and collections of cultural heritage importance and their setting	Avoid damage to or loss of features, institutions and collections of architectural value and their setting and improve their protection from extreme floods.	This measure will ensure that best practice planning will be implemented, thereby reducing the construction of inappropriate developments in flood risk areas. This will reduce the potential for impacts on architectural features from flooding	This measure will ensure that best practice planning will be implemented, thereby reducing the construction of inappropriate developments in flood risk areas. This will reduce the potential for impacts on architectural features from flooding	This measure will not have a significant effect on the conservation status of architectural features.	The raising of awareness with regard to the requirement to implement flood management measures by each property owner will ensure a reduction in impacts on architectural features.	The improvement of flood predication will result in a reduction in the impacts of flood events in the long term.
		Avoid damage to or loss of features, institutions and collections of archaeological value and their setting and improve their protection from extreme floods where this is beneficial.	This measure will ensure that best practice planning will be implemented, thereby reducing the construction of inappropriate developments in flood risk areas. This will reduce the potential for impacts on archaeological features from flooding	This measure will ensure that best practice planning will be implemented, thereby reducing the construction of inappropriate developments in flood risk areas. This will reduce the potential for impacts on archaeological features from flooding	This measure will not have a significant effect on the conservation status of archaeological features.	This measure will not have a significant effect on the conservation status of archaeological features.	The improvement of flood predication will result in a reduction in the impacts of flood events in the long term.

9.8 Assessment of Area of Further Assessment Options

9.8.1 Non-structural measures

The proposed non-structural measures that are viable for UoM 19 are as follows:

- | Planning Control;
- | SUDS;
- | Public Awareness;
- | Land Use Management.

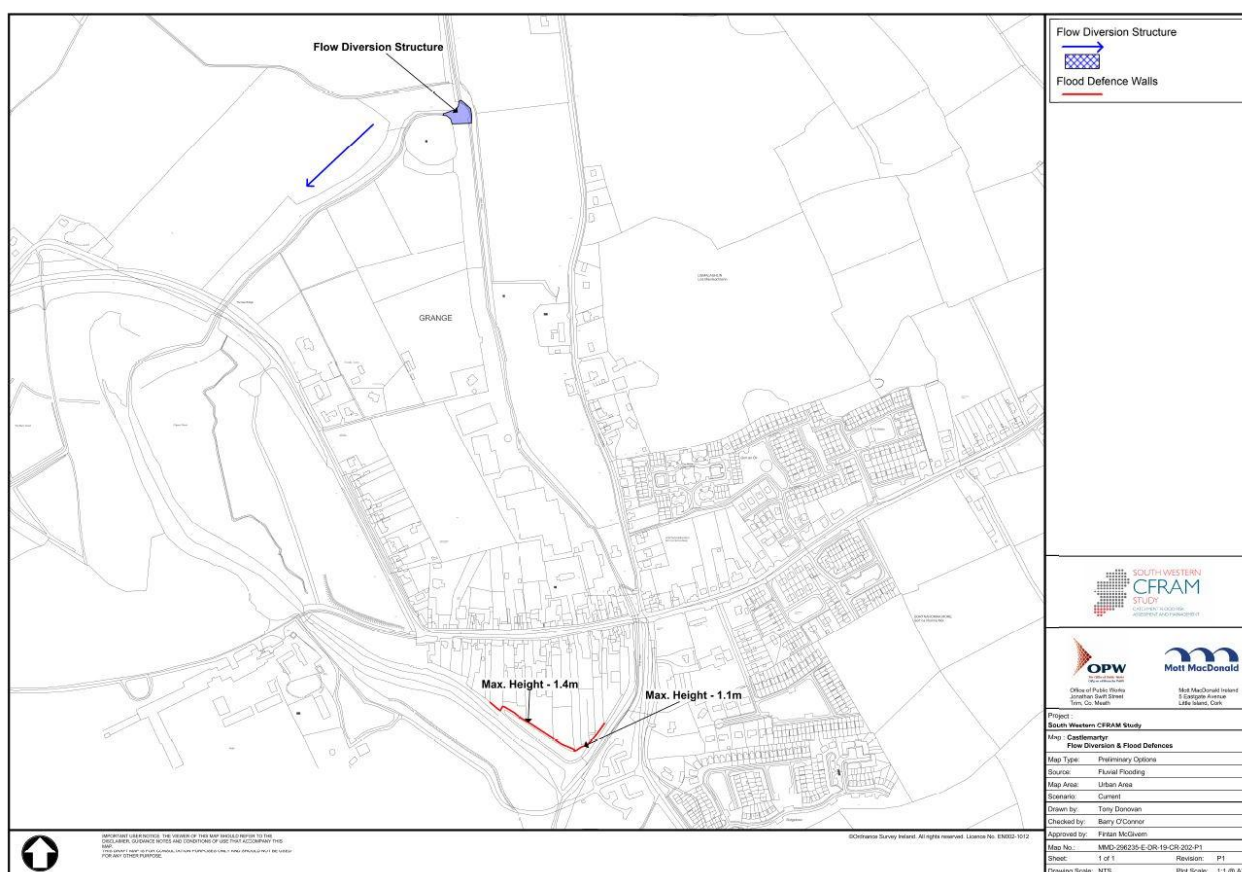
As the non-structural measures at the AFA scale are identical to the proposed non-structural measures at the UoM scale, the assessment of these options is presented in Table 9.3.

9.8.2 Structural Measures

The proposed measures at an AFA scale have been assessed for the three AFAs in UoM 19 in the tables below.

Table 9.3: Castlemartyr AFA - Outcomes of SEA Appraisal

UoM	Lee, Cork Harbour and Youghal Bay
Area / Location	Castlemartyr
Option	Option 1 – Flood Defences and flow Diversion
Code	IE-19-IE-AFA-190277-CR01-M33
Description	Diversion of excess flows around the town and the construction of flood walls ranging in height from 1.1m to 1.5m within the town



MCA Appraisal Outcomes		
Objective	Score	Comment
1.a.i	4.77	Calculated as per Guidance Note 28
1.a.ii	0	Calculated as per Guidance Note 28
1.b.i	3.75	Calculated as per Guidance Note 28
1.b.ii	4.67	Calculated as per Guidance Note 28
3.a	-2	The River Womanagh and Kiltia are classified as having a moderate to good water status under the WFD. The waterbodies are considered to be sensitive bodies. The rivers discharge into Youghal Bay a shellfish sensitive area. Ballymacoda Bay is a SAC. There are no significant polluting sources at risk from flooding. (-2) There are short term negative impacts associated with the construction
3.b	0	The Castlemartyr AFA boundary does not overlap with any Natura 2000 site boundary. The Ballymacoda Bay SPA and Ballymacoda (Clonpriest and Pillmore) SAC are located approximately 10km east of Castlemartyr. There will be no requirement for land take within a Natura 2000 site for the construction of flood protection works. Therefore there is no potential for direct damage to Annex I habitat. Potential removal of riparian habitat to accommodate the works will not impact the qualifying features of the SAC or SPA. The Kiltia River (which flows through Castlemartyr) is hydrologically connected to Ballymacoda Bay via the Womanagh River. Sediment release / accidental pollution of the Kiltia River could potentially enter the Bay. The release of sediment into the bay is extremely unlikely to impact the qualifying features of the SAC. These habitats are habitually inundated with sediment during tidal exchanges and are adapted to such conditions. Pollutants e.g. concrete / oil leaks will be diluted by flows in the Kiltia River, the Womanagh River and also by estuarine water in the bay. It is highly unlikely that pollutants would reach the Bay at such concentrations what would cause habitat damage.
3.c	-1	Potential removal of riparian habitat to accommodate the works will impact on the local flora and fauna of the catchment (-1).
3.d	-3	The Ballymacoda Bay SAC is not designated for lamprey / salmon. Castlemartyr Woamangh is not known as a river for high salmon/lamprey potential. There may be local fishing value along the river. (-1). The measures will result in an increased risk of flooding downstream of Castlemartyr and potential limiting access to fishing activity in the area during flooding. (-1) The construction of the measures on the river may require excavation of the bank of stream and diversion of the river during the construction stage this would result in significant short term emissions of sediment to the waterbody and downstream without treatment. The flood defence structure will result in a permanent loss of fisheries habitat. (-3) The diversion of the flow during high flow constitutes an intermittent negative impact to the hydrological regime of the river.
3.e	-1	Castlemartyr is designated within the Development plan as a Broad Fertile lowland valley. This landscape character type is of local value and medium sensitivity and value. There are no scenic routes within the town. Existing vegetation will be removed to facilitate the construction of the structure. there are wide expansive views from the road. There will be short term impacts during construction and where is opportunity to design natural riparian around the structure.
3.f.i	3	Castlemartyr is classified in the Cork Development Plan as an area of architectural importance. There are a number of sites/features listed on the record of structures and NIAH within the town and potentially affected with a high to moderate vulnerability. However, these sites are not within 1%AEP risk. The proposed measures will however provide protection to the ACA.
3.f.ii	3	The proposed measures will have no impact on the risk of flooding on archaeological heritage.

Strategic Environmental Assessments

Key Conclusions:

- The construction of this option could result in temporary negative impacts on the water body status without appropriate mitigation.
- This option will impose a permanent barrier to the transit of mammals along the river corridor.

Adaptability to Potential Future Changes

Option is not adaptable to climate change – Score 0

Public Consultation Outcomes

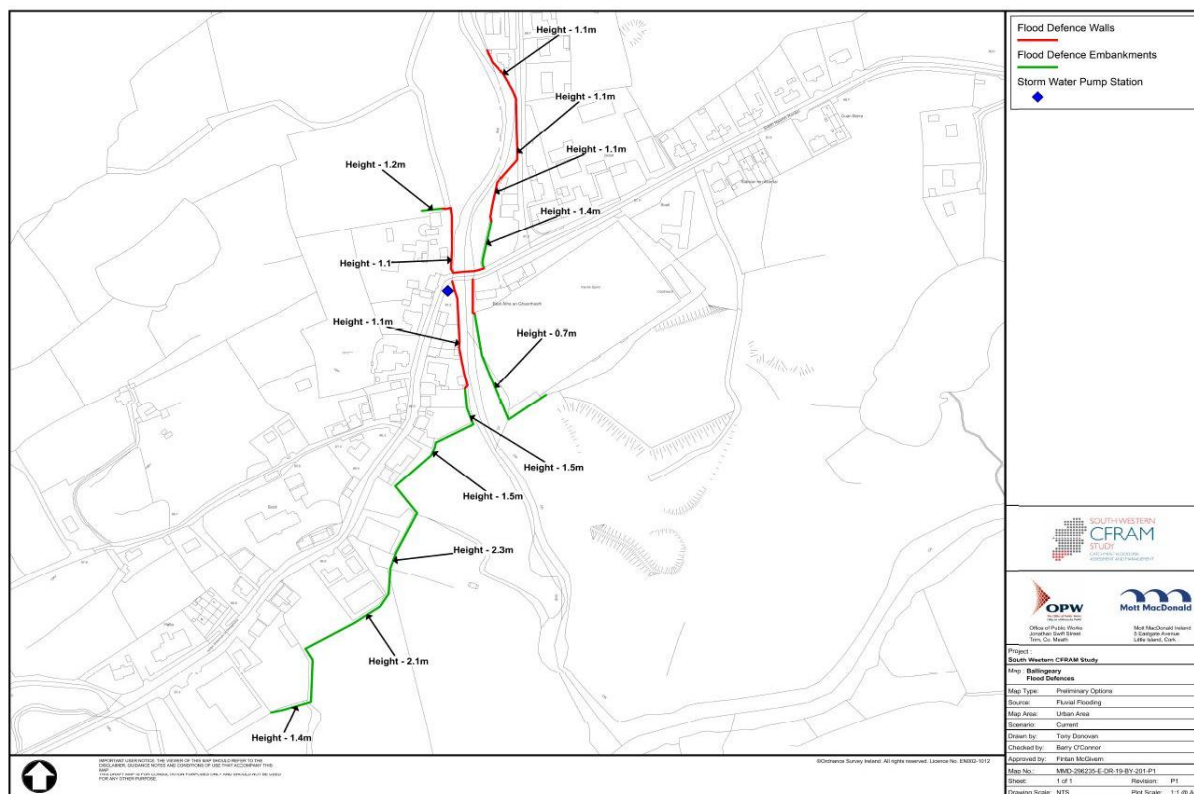
This option was preferred option of people who gave feedback at the public consultation.

Other Issues / Conclusions

The MCA has identified Option 2 – Flood Defences and flow diversion as the preferred Flood Risk Management Option.

Table 9.4: Ballingeary AFA - Outcomes of SEA Appraisal

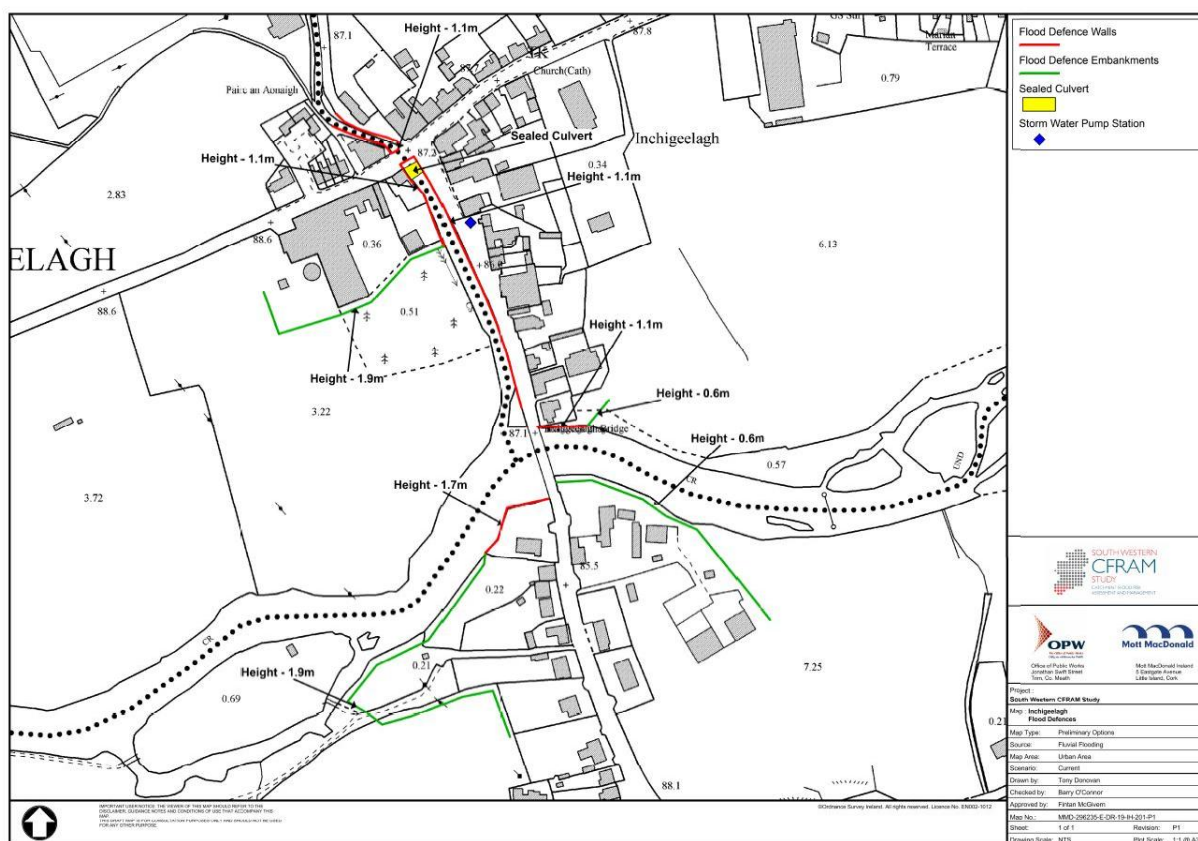
UoM	Lee, Cork Harbour and Youghal Bay
Area / Location	Ballingeary
Option	Option 1 – Fluvial Flood Defences
Code	IE-19-IE-AFA-195499-BY01-M33
Description	Fluvial flood defences comprising of walls and embankments.



MCA Appraisal Outcomes		
Objective	Score	Comment
1.a.i	4.77	Calculated as per Guidance Note 28
1.a.ii	0	Calculated as per Guidance Note 28
1.b.i	0	Calculated as per Guidance Note 28
1.b.ii	4.33	Calculated as per Guidance Note 28
3.a	2	The Bunsheelin stream and River Lee flows through Ballingearry These are classified as good status under the WFD. The River Lee is considered sensitive (-2). Spawning grounds for salmonid are likely upstream along the River Lee. There is one significant polluting source at risk from flooding in the 1% AEP. There is potential for short term impacts on sensitive waterbodies (-2) There is potential for long term retainment of good water status due to the implementation of the flood measures (+4).
3.b	0	AFA do not occur within the boundary of any Natura 2000 sites. The Gearagh SPA and SAC are located approximately 15km east of Ballingearry. The sites are hydrological connected via the River Lee. The proposed measures will not have significant effects on the conservation objectives of the designated sites.
3.c	-2	Otters have not been recorded within 10km of the village. It is extremely unlikely that Otter use the habitat in proximity to the village (0). The River Lee is a salmonid river. Construction of flood walls and embankments can cause temporary release of sediment and pollutants to the watercourse which can negatively impact fishery habitat (-1) The proposed measures will result in temporary short negative impacts resulting from construction phase i.e. noise and disturbance on wintering birds. (-2)
3.d	-1	There is potential for a short term negative impact during the construction flood walls and embankments. This would result in emissions of sediment to the waterbody downstream. (-1).
3.e	0	The proposed measures will have no impact on the landscape value or sensitivity
3.f.i	0	There are no RPS at risk from flooding.
3.f.ii	0	There are a number of protected bridges RMP's at risk from flooding. The proposed measures include the construction of walls along the banks of the river potential directly impacting on the setting of the bridge (-2). The wall height range from 0.7-1.1m and are in keeping with the existing built environment and provide protection from flooding (+2)
Strategic Environmental Assessments		
Key Conclusions: <ul style="list-style-type: none"> The construction of this option could result in temporary negative impacts on the water body status without appropriate mitigation. The prevention of flooding will reduce the level of pollutants in the River Lee. 		
Adaptability to Potential Future Changes		
Option is adaptable to climate change – Score 4		
Public Consultation Outcomes		
The feedback received at the Public Consultation Day indicated that this was the preferred option.		
Other Issues / Conclusions		
The MCA has identified Option 1 – Fluvial Flood Defences as the preferred Flood Risk Management Option.		

Table 9.5: Inchigeelagh AFA - Outcomes of SEA Appraisal

UoM	Lee, Cork Harbour and Youghal Bay
Area / Location	Inchigeelagh
Option	Option 1 – Flood Defences
Code	IE-19-IE-AFA-190268-IH01-M33
Description	Fluvial flood defences comprising of flood walls and embankments



MCA Appraisal Outcomes		
Objective	Score	Comment
1.a.i	4.83	Calculated as per Guidance Note 28
1.a.ii	0	Calculated as per Guidance Note 28
1.b.i	0	Calculated as per Guidance Note 28
1.b.ii	4.59	Calculated as per Guidance Note 28
3.a	2	The River Lee is considered a sensitive waterbody spawning grounds for salmonid are likely upstream along the River Lee. There is one significant polluting source at risk from flooding in the 1% AEP. Spawning grounds for salmonid are likely upstream along the River Lee. There is one significant polluting source at risk from flooding in the 1% AEP. There is potential for short term impacts on sensitive waterbodies (-2) There is potential for long term retainment of good water status due to the implementation of the flood measures (+4).
3.b	0	The Inchigeelagh AFA boundary does not overlap with any Natura 2000 site boundary. The Gearagh SPA and SAC are located approximately 7km east of the village. There will be no requirement for land take within a Natura 2000 site for the construction of flood protection works. Therefore there is no potential for direct damage to Annex I habitat
3.c	-1	There are no current records for Otter within 10km of the village. It is extremely unlikely that Otter use the habitat for foraging as they would have to pass through the village in order to commute upstream. The urban setting is a likely deterrent to the species. There is temporary short term disruption (noise and physical presence) on local fauna. The proposed measures will be along the existing river bank and will require vegetation clearance
3.d	-1	There is potential for a short term negative impact during the construction flood walls and embankments. This would result in emissions of sediment to the waterbody downstream. (-1). Short term impacts during construction prior to mitigation
3.e	-1	The proposed measures will change the views across the river from the bridge however the wall and embankments relatively low lying.
3.f.i	0	There are a number of NIAH within the town. However these are not at risk from flooding and are not impacted by flood measures.
3.f.ii	0	There proposed measures will have potential impacts on the setting of the RMP's (-2). However the measures will provide protection to these monuments. (+2)
Strategic Environmental Assessments		
Key Conclusions:		
<ul style="list-style-type: none"> The construction of this option could result in temporary negative impacts on the water body status without appropriate mitigation. This option will prevent pollution of the Lee from pollution sources at risk of flooding. 		
Adaptability to Potential Future Changes		
Option is adaptable to climate change – Score 4.		
Public Consultation Outcomes		
The feedback provided at the Public Consultation Day was in support of Option 1 – Fluvial Flood Defences.		
Other Issues / Conclusions		
The MCA has identified Option 1 – Flood Defences as the preferred Flood Risk Management Option.		

9.9 Cumulative/In Combination Effects

In combination effects are considered to assess if there is potential for significant in combination effects between (a) different plan options and (b) between the FRMP and other plans and strategies.

9.9.1 Between individual flood management options

As identified in Tables 9.4 to 9.6, for each of the AFAs it is predicted that there will be no additional negative in-combination effects between all related components of the FRMP taking into account the potential impacts with regard to the SEA objectives.

If all the proposed flood risk management options identified in the draft FRMP were implemented in parallel, the in-combination effects of the proposed options would be no worse than the predicted negative effects when assessed individually.

This is because the proposed options are either geographically distinct from each other and there is limited potential for interactions; or the nature of the proposed options are such that any impacts would be neutral or mutually beneficial.

9.9.2 With other relevant plans and strategies

As identified in Tables 9.2 to 9.5, there is potential for interactions between the FRMP components and the external plans and strategies identified in Chapter 5; giving rise to the potential for resulting in-combination effects.

Table 9.6 provides details of any interactions and linkages between these plans, which could give rise to in-combination effects, for those AFAs where the proposed options contained in the FRMP have been identified as likely to result in positive or negative effects. These include the following:

- i **Strategic, County and Local development plans:** Table 9.6 provides details of any interactions and linkages between these plans and the FRMP for UoM 19, which could give rise to in-combination effects,
- i **SWRBD River Basin Management Plan and Draft 2nd cycle River Basin Management Plan:** Consideration of the requirements of this plan have been fully integrated with the development of the FRMP and the SEA process through the inclusion of a SEA objective requiring the “support of the objectives of the Water Framework Directive (WFD)
- i **Sectoral Plans:** Consideration of the requirements of these plans has been made through the development of the SEA objectives relating to flora and fauna/biodiversity, pollution risk, cultural heritage, landscape, fisheries, human health, infrastructure, rural land use and community facilities
- i **Arterial Drainage Maintenance Plan List of Activities 2016-2021:** Whilst there is no statutory requirement under the Arterial Drainage Acts, 1945 as amended, for the production of a plan or programme for Arterial Drainage Maintenance scheme. The draft list of Activities has adopted a timescale 2016-2021 to facilitate the coordination with the RBMP and CFRAMs. All maintenance operations are carried out in accordance with the OPWs Environmental Management Protocols and

Standard Operating Procedures (SOPs) and Environmental River Enhancement Programme (EREP). A national framework has been set up where Arterial Drainage Maintenance activities undergo an Appropriate Assessment for a 5-year period. Consideration of these programmes has been made through the development of the SEA Objective relating to WFD, Flora and Fauna/Biodiversity.

A review of the potential effects of the proposed flood risk management options for the Lee CFRMP in combination with these plans has identified no additional or more significant negative effects, beyond those identified in the table below. However, opportunities for mutual benefits e.g. the construction of structures that could provide both transport and flood risk management functions have been identified (see Table 9-6).

Table 9.6: Potential Cumulative and In-Combination Effects with Other Plans and Strategies

AFA	Flood Risk Management Option	Potential Cumulative and In-Combination Effects with other Plans and Strategies
Non-structural options	Planning Control Sustainable Urban Drainage Systems Flood Forecasting & Warning Public awareness Land Use Management	<p>A review of all relevant plans and strategies were reviewed in regard to the proposed flood risk management options. No significant negative in combination effects were identified.</p> <p>The flood risk management plan is supported and planned for at a national, regional and local level.</p>
Castlemartyr AFA	Structural Options – Flood Defence and flow diversion	<p>No significant negative in combination effects were identified.</p> <p>The flood risk management plan is supported and planned for at a national, regional and local level. Opportunities for mutual benefit include for example; The flood mapping provided as part of the FRMP will facilitate the application of Objective WS 6.1 set out within the Cork County Development Plan 2014-2020 and local objectives set out in the Skibbereen Electoral Area Local Area Plan 2015.</p> <p>The options will have considerations of the mitigation measures and monitoring programme set out in the OPW and Environmental Management Protocols and SOPs</p> <p>The flood risk management options provide protection against flooding would help achieve the core objective of achieving water body objectives set out within. No significant negative In combination effects were identified in regard to the South Western River Basin Management Plan once required mitigation measures are implemented. The options will have considerations of the mitigation measures and monitoring programme set out in the OPW and Environmental Management Protocols and SOPs.</p> <p>Each individual project will be subject to a separate appropriate assessment process as set out in Article 6(3) of the Habitats Directive to ensure there are no significant effects to the Natura 2000 site in the context of the sites conservation objectives.</p> <p>The flood risk management options would be designed appropriate to minimise potential visual effects on quality of existing landscape characteristics and polices set out within the Cork County Landscape Strategy.</p> <p>Each individual project will be subject to designed to minimise negative impacts on the designed appropriate to minimise potential adverse effects on the setting</p>

AFA	Flood Risk Management Option	Potential Cumulative and In-Combination Effects with other Plans and Strategies
		<p>and character of the cultural archaeological and architectural heritage value within the Castlemartyr Architectural Conservation Area. According to the Plan there is an objective to protect and enhance the special character of the area</p>
<p>Ballingeary AFA</p>	<p>Preferred Structural Option-Flood Defences</p>	<p>A review of all relevant plans and strategies were reviewed in regard to the proposed flood risk management options. No significant negative in combination effects were identified.</p> <p>The flood risk management plan is supported and planned for at a national, regional and local level. Opportunities. Neutral impacts or opportunities for mutual benefit include for example; The flood mapping provided as part of the FRMP will facilitate the application of Objective WS 6.1 set out within the Cork County Development Plan 2014-2020 and local objectives set out in the Macroom Electoral Area Local Area Plan.</p> <p>The flood risk management options will facilitate the core objective set out within the South Western River Basin Management Plan, allowing waterbodies to achieve required water status objectives once the required mitigation measures are implemented The options will have considerations of the mitigation measures and monitoring programme set out in the OPW and Environmental Management Protocols and SOPs.</p> <p>Each individual project will be subject to a separate appropriate assessment process as set out in Article 6(3) of the Habitats Directive to ensure there are no significant effects to the Natura 2000 site in the context of the sites conservation objectives.</p> <p>The flood risk management options would be designed appropriately to minimise potential visual effects on quality of existing landscape characteristics and policies set out within the Cork County Development Plan.</p> <p>Each individual project will be subject to designed to minimise negative impacts on the designed appropriate to minimise potential adverse effects on the setting and character of the cultural archaeological and architectural heritage value within the AFA.</p>

AFA	Flood Risk Management Option	Potential Cumulative and In-Combination Effects with other Plans and Strategies
Inchigeelagh AFA	Preferred Structural option- Flood Defence	<p>A review of all relevant plans and strategies were reviewed in regard to the proposed flood risk management options. No significant negative In-combination effects were identified.</p> <p>The flood risk management plan is supported and planned for at a national, regional and local level. Opportunities for mutual benefit include for example; The flood mapping provided as part of the FRMP will facilitate the application of Objective WS 6.1 set out within the Cork County Development Plan 2014-2020 and local objectives set out in the Macroom Electoral Area Local Area Plan.</p> <p>The flood risk management options provide protection against flooding would help achieve the core objective of achieving water body objectives set out within the South Western River Basin Management Plan once appropriate mitigation is implemented The options will have considerations of the mitigation measures and monitoring programme set out in the OPW and Environmental Management Protocols and SOPs.</p> <p>Each individual project will be subject to a separate appropriate assessment process as set out in Article 6(3) of the Habitats Directive to ensure there are no significant effects to the Natura 2000 site in the context of the sites conservation objectives.</p> <p>The flood risk management options would be designed appropriately to minimise potential visual effects on quality of existing landscape characteristics and policies set out within the Cork County Development Plan.</p> <p>Each individual project will be subject to designed to minimise negative impacts on the designed appropriate to minimise potential adverse effects on the setting and character of the cultural archaeological and architectural heritage value within the AFA</p>

10 Mitigation and Monitoring

10.1 Introduction

The FRMP makes recommendations for flood risk management options which are appropriate for flood risk management for each AFA. The Strategic Environmental Assessment and Appropriate Assessment has as part of the plan development identified the preferred flood risk management options for each of the AFAs in UoM 19. The proposed structural measures were developed through the multi-criteria analysis (MCA) of a number of alternative options for each AFA. The approval of the options does not confer approval or permission for the installation or construction of any flood management option. Flood risk management schemes must be subjected to 'project level' assessment under the relevant legislation for consenting appropriate to that project.

Section 25 of the European Communities (Assessment and Management of Flood Risks) Regulations, 2010 permits the OPW to prepare a flood risk management scheme for the execution of flood management options provided for under the FRMP, the legislative pathways for securing consent for a project is outlined in Section 3.6. Depending on this, the following as a minimum will be required:

- i Environmental Impact Assessment (EIA) Screening; and
- i Appropriate Assessment (AA) Screening.

Subject to the above screenings the following further assessments may be required.

The SEA assessment identified that the non-structural measures proposed for UoM 19 have either positive or neutral impacts and as a result do not require the implementation of mitigation measures. Furthermore, Habitats Directive Assessment was undertaken for UoM 19, potential for significant effects on the Natura 2000 sites (i.e. cSACs and SPAs) were assessed. Having regard to the findings of the AA Screening, that potential to have significant effects, either alone or in combination, on the ecological integrity of the Natura 2000 sites were not reasonable foreseeable as a result of the implementation of flood risk management measures in UoM 19.

10.1.1 General Mitigation Pre-construction/Detail Design

The preferred structural flood risk management options could give rise to some environmental impacts, both positive and negative of short term and long term duration. For each of the proposed measures that have a potential negative impact mitigation measures have been formulated to minimise the potential negative impacts arising from the options to be adopted. Furthermore Section 25 of the Regulations permits the OPW to carry out such hydrometric, engineering, environmental, topographical, valuation and other surveys as deemed necessary to prepare a flood scheme.

Measures to reduce/eliminate any likely impacts of a flood risk management scheme on environmental, social and cultural receptors must adopt the mitigation hierarchy;

1. Avoidance- avoid creating impacts from the outset design optimisation by careful spatial or temporal placement of infrastructure or disturbance;

2. Minimisation – measures taken to reduce the duration, intensity and/or extent of impacts that cannot be completely avoided;
3. Rehabilitation/restoration- measures taken to improve degraded or removed ecosystems following exposure to impacts;
4. Compensation; measures taken to compensate for any residual, adverse impacts.

The principal mitigation recommendation is that potential impacts should be considered further during the next stage of option development, when detailed design of the preferred structural option progresses. This will allow the proposed option to be optimised through detailed design in order to limit the potential negative impacts on the receiving environment and based on the findings of project level environmental assessment, mitigation measures should be put in place. Environmental studies based on the detailed design and construction methodology will be undertaken as appropriate. These studies include but are not limited to:

- i Engineering structure surveys;
- i Topographical surveys;
- i Ground investigations;
- i Habitat & species surveys⁸;
- i Ornithological surveys;
- i Bat surveys;
- i Fish surveys;
- i Water quality surveys;
- i WFD hydro-morphological assessments;
- i Archaeological surveys;
- i Landscape and visual assessments;
- i Land valuation surveys; and
- i Other surveys as deemed necessary to prepare a project

Where it is not feasible to avoid impacts on protected wild birds / animals or protected flora/habitats (through for example alternative flood protection measures, design and construction methods), it will be necessary to attain a derogation from the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs (issued through NPWS). In accordance with Circular letter NPWS 2/07, any application for a derogation must be submitted prior to seeking planning permission or approval for a scheme.

⁸ In the context of ecological mitigation, the habitat and species surveys are conducted as required to assess the various aspects for the project, such as ecological surveys for:

- protected or notable habitats and species, including Annex 1 habitats, Annex II and Annex IV species,
- species protected under the Wildlife Acts,
- species protected under the Flora Protection Order,
- the resting and breeding places of relevant species and,

invasive species, both plant and animal

If potential impacts on archaeological heritage (Record of Monument and Places, RMP) cannot be avoided, written notice must be issued to the Minister 2 months in advance of commencing the work. Any instruction or information request issued by the Minister in response must be adhered to.

If in the course of the implementation of a scheme it is proposed to alter in any way a structure listed on the Local Authority's Record of Protected Structures (RPS), a declaration must be sought from the Local Authority under Section 57 of the Planning and Development Act 2000 which will set out whether planning permission is required or not for the proposed works.

It is an offence under Regulation 49 of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended), to plant, disperse, allow or cause to disperse, spread or otherwise cause to grow any plant specified in the Third Schedule of the Regulations (invasive plant species). Similarly, it is an offence to release or allow / cause to disperse any animal in the Third Schedule of the Regulations. Where invasive species are determined to be present within the zone of influence of a scheme, an Invasive Species Management Plan must be produced in advance of the works. Note recommendations on the use of pesticides for the control of invasive species can only be done by a Pesticide Advisor registered with the Department of Agriculture, Food and the Marine (DAFM). Therefore, the Invasive Species Management Plan must be prepared by suitably qualified person(s) (note also that the use of pesticides can only be carried out by a registered 'Pesticide user' with DAFM).

10.1.2 General Mitigation Construction Stage

Mitigation measures should also refer to a monitoring regime that will be carried out over the following 6 yearly cycle. Review of national available data (i.e. catchments.ie) and associated report published as and when they become available will inform the 6 -yearly review of the CFRAM Studies. The information should be also in line with the 6-yearly cycle review for the WFD.

The opportunity for environmental enhancement should be assessed and implemented as appropriate at design stage and should include both aquatic and terrestrial enhancements as appropriate. Environmentally sensitive design should be adopted e.g. use of channel deflectors.

The feasibility /appropriateness of applying green engineering instead of hard flood protection measures should be assessed and implemented as appropriate at design stage.

An appropriate assessment shall be conducted at project stage, which will consider the specific design details and construction methods that will be set out for each option at project level.

The OPW will ensure that a Construction Environmental Management Plan (CEMP) is produced for every scheme which is to be progressed under Section 25 of the European Communities (Assessment and Management of Flood Risks) Regulations, 2010. The CEMP will incorporate all environmental commitments, mitigation measures, environmental requirements and the like, relevant to the construction of the works, as detailed;

- i In law;
- i The flood Risk Management Plan (FRMP) and SEA and AA;

- | Any scheme related Environmental Impact statements, Appropriate Assessments, Conditions of Approval,
- | Recommendations set out by statutory authorities, IFI, NPWS, and EPA;
- | Recommendations of surveys conducted under Section 25 of the Flood Risk Regulations;
- | The OPW Arterial Drainage Maintenance Environmental Management Protocols & Standard Operating procedures.

Best Practice construction mitigation shall include, but not be limited to, the following best practice guidance:

- | Construction Industry Research and Information Association (CIRIA) 'Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors' (CIRIA, 2001);
- | CIRIA C648: Control of water pollution from linear construction projects: Technical guidance (Murnane et al. 2006);
- | CIRIA C649 Control of Water Pollution from Linear Construction Projects: Site Guide (Murnane et al. 2006);
- | Inland Fisheries Board Guidance Document (formerly developed by Eastern Fisheries Board) "Requirements for the protection of fisheries habitat during Construction and development works at river Sites";
- | UK Environment Agency: Pollution Prevention Guidelines; and
- | BS 5228: Part 1 and the European Communities (Noise Emission by Equipment for Use Outdoors) Regulations, 2001

The CEMP should be site-specific. Work should only commence once the CEMP (and detailed method statements as appropriate) has been approved by IFI and NPWS as relevant.

An Environmental clerk of works should be engaged for each scheme.

It is of noted that Regulation 38 of the European Communities (Assessment and Management of Flood Risks) Regulations, 2010 state that "it shall not be obligatory on the Commissioners, when constructing flood risk management works pursuant to a flood risk management scheme, to comply with the Fisheries Acts, 1842 to 2016.

The proposed mitigation measures having regard to the SEA objectives have been formulated for each AFA below in Table 10.1 for Castlemartyr, Table 10.2 for Ballingeary and Table 10.3 for Inchigeelagh. The list provided is not exhaustive and a complete list of project level specific mitigation measures will be considered further during the next stage of option development.

10.2 Proposed Mitigation & Monitoring of the Plan

In addition to the general mitigation measures noted above, a mitigation and monitoring programme has been formulated for the each AFA within the FRMP based on the SEA objectives sub objectives and the associated indicators. The monitoring programme is required for the following reasons:

- | To monitor the predicted significant negative effects of the FRMP; and to
- | Monitor the baseline environmental conditions for all SEA objectives.

The monitoring programme will also help to identify any unforeseen negative effects of the Plan and ensure that action can be taken to mitigate them.

This monitoring will be carried out at various stages of scheme implementation e.g. before, during and after scheme development, such that the success of measures to protect or enhance environmental, social and cultural receptors can be assessed.

As part of the monitoring programme, relevant and appropriate thresholds will be agreed in consultation with the competent authorities to determine when remedial action is required for the particular aspect of the environment being monitored. Existing environmental monitoring is currently undertaken throughout Ireland by the OPW and other organisations like the EPA, IFI, and NPWS, for a number of environmental elements in accordance with environmental legislation, these sources will be used as baseline data or reference.

The proposed mitigation & monitoring programme is specified below in Table 10.1 for Castlemartyr, Table 10.2 for Ballingearry and Table 10.3 for Inchigeelagh.

Table 10.1: Castlemartyr Mitigation & Monitoring

Environmental Topic	Objective	Sub-Objective	Indicator	Mitigation	Proposed Monitoring
Population and Human Health	Minimise risk to human health and life	Minimise risk to human health and life of residents	Annual Average number of residential properties at risk from flooding	Specific Mitigation is not required.	Review of national available population data when it becomes available Review of location and details of services data during detail design Consultation with competent authorities prior to works should enable all impacts are kept to minimum over a short timescale.
		Minimise risk to high vulnerability properties	Number of high vulnerability properties at risk from flooding		
	Minimise risk to community	Minimise risk to social infrastructure and amenity	Number of social infrastructure receptors at risk from flooding	Specific Mitigation is not required	
		Minimise risk to local employment	Number of enterprises at risk from flooding		
Water Resources	Support the objectives of the WFD	Provide no impediment to the achievement of water body objectives and, if possible, contribute to the achievement of water body objectives.	Ecological status of water bodies	Pre-construction baseline studies, including aquatic surveys, terrestrial and ornithological surveys, hydrogeomorphological assessments, consultation with statutory authorities, Development and adherence of measures set out CEMP, including as specified in accompanying Erosion and Sediment Control Plan, Invasive Species Management Plan, waste management Plan and preparation of emergency response plans and Good Site Management practises and post construction monitoring Environmental clerk of works should be engaged for each scheme	Review of national available data and associated reports published as and when they become available including EPA monitoring programme for WFD compliance Conservation Status Assessment Reports (CSARs), Backing Documents and Maps prepared in accordance with Article 17 of the Habitats Directive
Ecology	Support the objectives of the Habitats and Birds Directives	Avoid detrimental effects to, and where possible enhance, Natura 2000 network, protected species and their key habitats, recognising relevant landscape features and stepping stones.	Area of site at risk from flooding and qualitative Assessment of impact of option on habitat	No Natura 2000 sites however, project level AA should be undertaken	Review of national available data and associated reports published as and when they become available Conservation Status Assessment Reports (CSARs), Backing Documents and Maps prepared in accordance with Article 17 of the Habitats Directive Monitoring of Receiving Waters during Construction and post construction
	Avoid damage to, and where possible enhance, the flora and fauna of the catchment	Avoid damage to and where possible enhance the flora and fauna of the catchment	Avoid damage to and where possible enhance, legally protected sites / habitats and other sites / habitats of national regional and local nature conservation importance	Baseline ecological surveys including terrestrial, otter and aquatic surveys Consultation with statutory authorities, CEMP and post construction monitoring Environmental clerk of works should be engaged for each scheme. Should important species or habitats be found during baseline and pre-construction surveys the sequential approach of avoid, reduce or mitigate should be adopted. Any derogation licences applied for where necessary. Adhere to OPW EMP and SOP. Minimise the use of noisy equipment during the construction works Pre-construction surveys for invasive species along the zone of works where necessary should be carried out. There are a list of 9 species prioritised through Regulation (No. 1143/2014).	Review of national available data and associated reports published as and when they become available including EPA monitoring programme and NPWS/Biodiversity datasets Review of available published environmental and ecological surveys for other scheme with hydrological linkage to the proposed works area
	Protect, and where possible enhance, fisheries resource within the catchment	Maintain existing, and where possible create new, fisheries habitat including the maintenance or	Area of suitable habitat supporting fish. Number of upstream barriers	Design optimisation to avoid loss of riparian habitat minimise working footprint of works area Consultation with IFI and angling groups	Review of national available data and associated reports published as and when they become available

Environmental Topic	Objective	Sub-Objective	Indicator	Mitigation	Proposed Monitoring
		improvement of conditions that allow upstream migration for fish species.		Good planning and timing of works to minimise footprint impacts. Where applicable prior to vegetation clearance an	
Landscape and Visual	Protect, and where possible enhance, landscape character and visual amenity within the river corridor	Protect, and where possible enhance, visual amenity, landscape protection zones and views into / from designated scenic areas within the river corridor.	Changes to reported conservation status of designated sites relating to flood risk management Extent of affected Natura 2000 site, NHA/pNHA or other affected National or International designations (e.g. Nature reserves and Ramsar sites), i.e. Area of re	Landscape and visual assessment to be undertaken. Impacts are kept to a minimum through sensitive design and planning of the scheme i.e. screening of works area and adoption of Construction Best Practice The appearance of floodwalls should be designed appropriately to minimise visual impacts, particularly on areas of sensitive landscape value and high visual amenity such as the Scenic Route along which the floodwall extends	Review of County Development Plan landscape designations and landscape character areas in the detail design stage
Archaeology and Architectural and Cultural Heritage	Avoid damage to or loss of features, institutions and collections of cultural heritage importance and their setting	Avoid damage to or loss of features, institutions and collections of architectural value and their setting and improve their protection from extreme floods.	a) The number of architectural features, institutions and collections subject to flooding. b) The impact of flood risk management measures on architectural features, institutions and collections.	Confirm to the requirements of the National Monuments Acts 1930 as amended. Archaeological and architectural assessment to be undertaken. Impacts are kept to a minimum through sensitive design and planning of the scheme. Construction supervision by qualified project archaeological will minimise any impacts or the possibility of destruction of undiscovered heritage features and Any licences applied for where necessary	Review of County Development Plan designations, review of national datasets when they become available and landscape character areas in the detail design stage
		Avoid damage to or loss of features, institutions and collections of archaeological value and their setting and improve their protection from extreme floods where this is beneficial.	a) The number of archaeological features, institutions and collections subject to flooding. b) The impact of flood risk management measures on archaeological features, institutions and collections.	Specific Mitigation is not required	

Table 10.2: Ballingeary Mitigation & Monitoring

Environmental Topic	Objective	Sub-Objective	Indicator	Mitigation	Proposed Monitoring
Population and Human Health	Minimise risk to human health and life	Minimise risk to human health and life of residents	Annual Average number of residential properties at risk from flooding	Specific Mitigation is not required.	Review of national available population data when it becomes available Review of location and details of services data during detail design Consultation with competent authorities prior to works should enable all impacts are kept to minimum over a short timescale. During Construction
		Minimise risk to high vulnerability properties	Number of high vulnerability properties at risk from flooding		
	Minimise risk to community	Minimise risk to social infrastructure and amenity	Number of social infrastructure receptors at risk from flooding	Specific Mitigation is not required	
		Minimise risk to local employment	Number of enterprises at risk from flooding		

Environmental Topic	Objective	Sub-Objective	Indicator	Mitigation	Proposed Monitoring
Water Resources	Support the objectives of the WFD	Provide no impediment to the achievement of water body objectives and, if possible, contribute to the achievement of water body objectives.	Ecological status of water bodies	<p>Pre-construction baseline studies, including aquatic surveys, terrestrial and ornithological surveys, hydrogeomorphological audit assessments, consultation with statutory authorities,</p> <p>Development and adherence of measures set out CEMP, including as specified in accompanying Erosion and Sediment Control Plan; Invasive Species Management Plan, waste management Plan and preparation of emergency response plans and Good Site Management practises and post construction monitoring</p> <p>Environmental clerk of works should be engaged for each scheme</p>	<p>Review of national available data and associated reports published as and when they become available including EPA monitoring programme for WFD compliance</p> <p>Conservation Status Assessment Reports (CSARs), Backing Documents and Maps prepared in accordance with Article 17 of the Habitats Directive</p>
Ecology	Support the objectives of the Habitats and Birds Directives	Avoid detrimental effects to, and where possible enhance, Natura 2000 network, protected species and their key habitats, recognising relevant landscape features and stepping stones.	Area of site at risk from flooding and qualitative Assessment of impact of option on habitat	<p>No Natura 2000 sites however, project level AA should be undertaken</p>	<p>Review of national available data and associated reports published as and when they become available including EPA monitoring</p> <p>Conservation Status Assessment Reports (CSARs), Backing Documents and Maps prepared in accordance with Article 17 of the Habitats Directive</p>
	Avoid damage to, and where possible enhance, the flora and fauna of the catchment	Avoid damage to and where possible enhance the flora and fauna of the catchment	Avoid damage to and where possible enhance, legally protected sites / habitats and other sites / habitats of national regional and local nature conservation importance	<p>Baseline ecological surveys including terrestrial, otter and aquatic surveys</p> <p>Consultation with statutory authorities, CEMP and post construction monitoring</p> <p>Environmental clerk of works should be engaged for each scheme. Should important species or habitats be found during baseline and pre-construction surveys the sequential approach of avoid, reduce or mitigate should be adopted.</p> <p>Any derogation licences applied for where necessary. Adhere to OPW EMP and SOP.</p> <p>Minimise the use of noisy equipment during the construction works</p> <p>Pre-construction surveys for invasive species along the zone of works where necessary should be carried out. There are a list of 9 species prioritised through Regulation (No. 1143/2014</p>	<p>Review of national available data and associated reports published as and when they become available including EPA monitoring programme and NPWS datasets</p> <p>Review of available published environmental and ecological surveys for other scheme with hydrological linkage to the proposed works area</p> <p>Monitoring of Receiving Waters during Construction and post construction</p>
	Protect, and where possible enhance, fisheries resource within the catchment	Maintain existing, and where possible create new, fisheries habitat including the maintenance or improvement of conditions that allow upstream migration for fish species.	Area of suitable habitat supporting fish. Number of upstream barriers	<p>Design optimisation to avoid loss of riparian habitat minimise working footprint of works area</p> <p>Consultation with IFI and angling groups</p> <p>Good planning and timing of works to minimise footprint impacts. Where applicable prior to vegetation clearance an</p>	<p>Review of national available data and associated reports published as and when they become available</p>
Landscape and Visual	Protect, and where possible enhance, landscape character and visual amenity within the river corridor	Protect, and where possible enhance, visual amenity, landscape protection zones and views into / from designated scenic areas within the river corridor.	<p>Changes to reported conservation status of designated sites relating to flood risk management</p> <p>Extent of affected Natura 2000 site, NHA/pNHA or other affected National or International</p>	<p>Landscape and visual assessment to be undertaken. Impacts are kept to a minimum through sensitive design and planning of the scheme i.e. screening of works area and adoption of Construction Best Practice</p> <p>The appearance of floodwalls should be designed appropriately to minimise visual impacts, particularly on areas of sensitive landscape value and high visual amenity such as the Scenic Route along which the floodwall extends</p>	<p>Review of County Development Plan landscape designations and landscape character areas in the detail design stage</p>

Environmental Topic	Objective	Sub-Objective	Indicator	Mitigation	Proposed Monitoring
Archaeology and Architectural and Cultural Heritage	Avoid damage to or loss of features, institutions and collections of cultural heritage importance and their setting	Avoid damage to or loss of features, institutions and collections of architectural value and their setting and improve their protection from extreme floods.	designations (e.g. Nature reserves and Ramsar sites), i.e. Area of re a) The number of architectural features, institutions and collections subject to flooding. b) The impact of flood risk management measures on architectural features, institutions and collections.	Confirm to the requirements of the National Monuments Acts 1930 as amended. Archaeological and architectural assessment to be undertaken. Impacts are kept to a minimum through sensitive design and planning of the scheme. Construction supervision by qualified project archaeological will minimise any impacts or the possibility of destruction of undiscovered heritage features and Any licences applied for where necessary	Review of County Development Plan designations, review of national datasets when they become available and landscape character areas in the detail design stage
		Avoid damage to or loss of features, institutions and collections of archaeological value and their setting and improve their protection from extreme floods where this is beneficial.	a) The number of archaeological features, institutions and collections subject to flooding. b) The impact of flood risk management measures on archaeological features, institutions and collections.	Specific Mitigation is not required	

Table 10.3: Inchigeelagh Mitigation & Monitoring

Environmental Topic	Objective	Sub-Objective	Indicator	Mitigation	Proposed Monitoring
Population and Human Health	Minimise risk to human health and life	Minimise risk to human health and life of residents	Annual Average number of residential properties at risk from flooding	Specific Mitigation is not required.	Review of national available population data when it becomes available Review of location and details of services data during detail design Consultation with competent authorities prior to works should enable all impacts are kept to minimum over a short timescale. During Construction
		Minimise risk to high vulnerability properties	Number of high vulnerability properties at risk from flooding		
	Minimise risk to community	Minimise risk to social infrastructure and amenity	Number of social infrastructure receptors at risk from flooding	Specific Mitigation is not required	
		Minimise risk to local employment	Number of enterprises at risk from flooding		
Water Resources	Support the objectives of the WFD	Provide no impediment to the achievement of water body objectives and, if possible, contribute to the achievement of water body objectives.	Ecological status of water bodies	Pre-construction baseline studies, including aquatic surveys, terrestrial and ornithological surveys, hydrogeomorphological audit assessments, consultation with statutory authorities, Development and adherence of measures set out CEMP, including as specified in accompanying Erosion and Sediment Control Plan; Invasive Species Management Plan, waste management Plan and preparation of emergency response plans and Good Site Management practises and post construction monitoring Environmental clerk of works should be engaged for each scheme	Review of national available data and associated reports published as and when they become available including EPA monitoring programme for WFD compliance Conservation Status Assessment Reports (CSARs), Backing Documents and Maps prepared in accordance with Article 17 of the Habitats Directive

Environmental Topic	Objective	Sub-Objective	Indicator	Mitigation	Proposed Monitoring
Ecology	Support the objectives of the Habitats and Birds Directives	Avoid detrimental effects to, and where possible enhance, Natura 2000 network, protected species and their key habitats, recognising relevant landscape features and stepping stones.	Area of site at risk from flooding and qualitative Assessment of impact of option on habitat	No Natura 2000 sites however, project level AA should be undertaken	Review of national available data and associated reports published as and when they become available including EPA monitoring Conservation Status Assessment Reports (CSARs), Backing Documents and Maps prepared in accordance with Article 17 of the Habitats Directive
	Avoid damage to, and where possible enhance, the flora and fauna of the catchment	Avoid damage to and where possible enhance the flora and fauna of the catchment	Avoid damage to and where possible enhance, legally protected sites / habitats and other sites / habitats of national regional and local nature conservation importance	Baseline ecological surveys including terrestrial, otter and aquatic surveys Consultation with statutory authorities, CEMP and post construction monitoring Environmental clerk of works should be engaged for each scheme. Should important species or habitats be found during baseline and pre-construction surveys the sequential approach of avoid, reduce or mitigate should be adopted. Any derogation licences applied for where necessary. Adhere to OPW EMP and SOP. Minimise the use of noisy equipment during the construction works Pre-construction surveys for invasive species along the zone of works where necessary should be carried out. There are a list of 9 species prioritised through Regulation (No. 1143/2014	Review of national available data and associated reports published as and when they become available including EPA monitoring programme and NPWS datasets Review of available published environmental and ecological surveys for other scheme with hydrological linkage to the proposed works area Monitoring of Receiving Waters during Construction and post construction
	Protect, and where possible enhance, fisheries resource within the catchment	Maintain existing, and where possible create new, fisheries habitat including the maintenance or improvement of conditions that allow upstream migration for fish species.	Area of suitable habitat supporting fish. Number of upstream barriers	Design optimisation to avoid loss of riparian habitat minimise working footprint of works area Consultation with IFI and angling groups Good planning and timing of works to minimise footprint impacts. Where applicable prior to vegetation clearance an	Review of national available data and associated reports published as and when they become available
Landscape and Visual	Protect, and where possible enhance, landscape character and visual amenity within the river corridor	Protect, and where possible enhance, visual amenity, landscape protection zones and views into / from designated scenic areas within the river corridor.	Changes to reported conservation status of designated sites relating to flood risk management Extent of affected Natura 2000 site, NHA/pNHA or other affected National or International designations (e.g. Nature reserves and Ramsar sites), i.e. Area of re	Landscape and visual assessment to be undertaken. Impacts are kept to a minimum through sensitive design and planning of the scheme i.e. screening of works area and adoption of Construction Best Practice The appearance of floodwalls should be designed appropriately to minimise visual impacts, particularly on areas of sensitive landscape value and high visual amenity such as the Scenic Route along which the floodwall extends	Review of County Development Plan landscape designations and landscape character areas in the detail design stage
Archaeology and Architectural and Cultural Heritage	Avoid damage to or loss of features, institutions and collections of cultural heritage importance and their setting	Avoid damage to or loss of features, institutions and collections of architectural value and their setting and improve their protection from extreme floods.	a) The number of architectural features, institutions and collections subject to flooding. b) The impact of flood risk management measures on architectural features, institutions and collections.	Confirm to the requirements of the National Monuments Acts 1930 as amended. Archaeological and architectural assessment to be undertaken. Impacts are kept to a minimum through sensitive design and planning of the scheme. Construction supervision by qualified project archaeological will minimise any impacts or the possibility of destruction of undiscovered heritage features and Any licences applied for where necessary	Review of County Development Plan designations, review of national datasets when they become available and landscape character areas in the detail design stage

Environmental Topic	Objective	Sub-Objective	Indicator	Mitigation	Proposed Monitoring
		Avoid damage to or loss of features, institutions and collections of archaeological value and their setting and improve their protection from extreme floods where this is beneficial.	a) The number of archaeological features, institutions and collections subject to flooding. b) The impact of flood risk management measures on archaeological features, institutions and collections.	Specific Mitigation is not required	

11 Conclusions

11.1 Overview

This SEA Environmental Report demonstrates how the strategic environmental assessment process was fully integrated into the development of the FRMP for UoM 19.

The preferred flood risk management options, both structural and non-structural measures at UoM scale and at the AFA scale were assessed to determine the potential impacts on the receiving environment.

The detailed multi-criteria assessment (MCA) focussed on undertaking a detailed assessment of the structural measures as detailed in Chapter 7 and Chapter 9. As part of this assessment alternative structural measures were assessed for each AFA in Chapter 7.

Furthermore, non-structural measures were assessed by way of a comparative analysis with the SEA objectives in Chapter 9.

The integration of the SEA within the development of the FRMP has ensured that:

- i Key environmental issues, constraints and opportunities within the vicinity of the proposed flood management options were considered;
- i Environmentally unacceptable flood risk management measures did not progress to be a preferred option;
- i The development of flood risk management options to avoid potential environmental impacts where possible;

Structural measures were specified for three AFAs:

- i Castlemartyr: Flood Defences and Flow Diversion;
- i Ballingeary: Fluvial Flood Defences;
- i Inchigeelagh: Fluvial Flood Defences.

A suite of mitigation measures and proposed monitoring were developed for each of the proposed FRMP structural measures to ensure that the potential to impact on the receiving environment (as identified by the SEA objectives) are minimised, as detailed in Chapter 10.

12 References

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