

South Western CFRAM Study

SEA Environmental Report - Non Technical
Summary UoM 22

July 2017

Office of Public Works

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Trim, Co. Meath

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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) 22. 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 22 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 22. 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.

The Environmental Report also specifically identifies the impacts of the Plan on sites of international and national nature conservation importance within UoM 22. A “Habitats Directive Assessment” (HDA) was undertaken in tandem with the SEA process and the outcomes of this assessment are included in the overall SEA appraisal presented in this Environmental Report

1.2 Flood Risk Management Plan for Unit of Management (UoM) 22

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.

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 22 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.

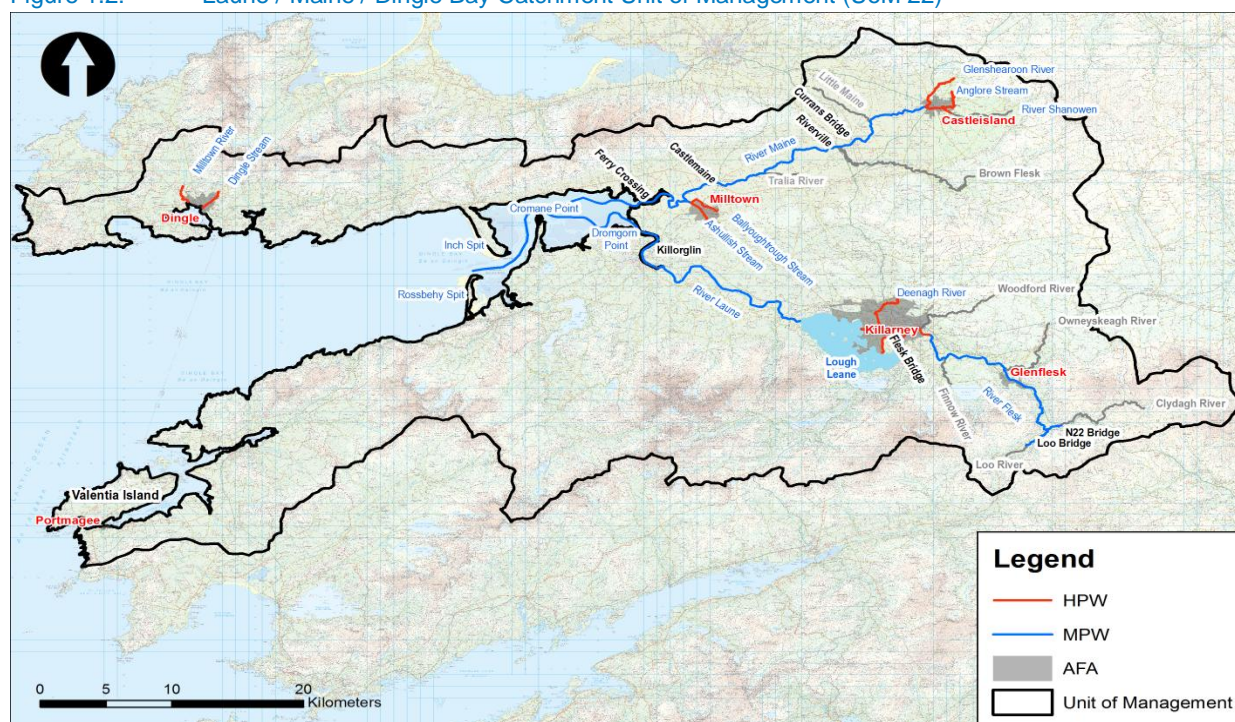
The Laune / Maine / Dingle Bay Catchment UoM covers an area of approximately 2,031km². The large majority of the area is in County Kerry with parts in County Cork. The main rivers within UoM 22 are the Maine, the Flesk and the Laune. UoM 22 also has a number of large lakes including Lough Leane and Muckcross Lake (Refer to Figure 1.2).

Six Areas for Further Assessment (AFAs) have been identified within UoM 22 (Refer to Table 1.2). Associated with the AFA's is over 134km of high and medium priority watercourses.

Table 1.2: AFAs within Unit of Management 22

UoM	Name	Unique ID	Fluvial	Coastal	County	Easting	Northing
22	Castleisland	220323	Yes	No	Kerry	97750	110000
22	Dingle	220327	Yes	Yes	Kerry	44500	101000
22	Glenflesk	225502	Yes	No	Kerry	106621	85316
22	Killarney	220337	Yes	No	Kerry	97000	90500
22	Milltown	220339	Yes	No	Kerry	82500	101000
22	Portmagee	220340	No	Yes	Kerry	36500	73000

Figure 1.2: Laune / Maine / Dingle Bay Catchment Unit of Management (UoM 22)



The AFA Portmagee was ruled out of the optioneering process in the Flood Risk Management Plan, therefore for the purpose of this SEA Environmental Report, the viable structural options for Castleisland, Dingle, Glenflesk, Killarney and Milltown AFA's are considered.

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 22

UoM 22 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 town of Killarney, identified as a hub in the National Spatial Strategy (NSS), is located in UoM 22 and development in the town may influence population trends in nearby hinterlands such as Glenflesk and Castleisland. The population of Killarney has increased steadily since 2002. Population and development growth in Killarney and Castleisland could potentially increase the number of people and properties at risk from flooding. At present, land use policies for each AFA are set out in their respective Local Area Plans, however the intension is that local planning policy for these settlements will be contained within the new Municipal District Plans which are currently in consultation.

The Killarney Town Development Plan 2009 – 2015 has identified that there is currently sufficient land zoned for residential development to accommodate future population growth of the town. Some of these areas of land are in proximity to the River Flesk. A policy of the Killarney Town Development Plan is to ensure that flood risk is assessed as part of any planning application within identified flood zone areas and that sustainable drainage techniques are employed as part of any development in such areas.

The prevalence of local health care facilities is likely to increase through the implementation of the Department's health service reform programme. A number of health service and community facilities in Castleisland are located in flood risk areas. 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. The Castleisland Local Area Plan recognises the need for flood risk assessment in the future development in proximity to the Maine River

- 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 Architecture, Archaeology and Cultural Heritage: Many RMP sites are associated with watercourses and may potentially be impacted by the implementation of flood risk management measures. The bridge structure in Killarney is protected and may be impacted by flood risk management measures which may include structural alteration or destruction of the structure. There is a protected water mill in Killarney. Other features, including churches, religious buildings and country 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. There is one shipwreck record at Valencia Bay in 1988. 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 22 are aquatic habitats and species and, by the nature of the environment they live in, are relatively tolerant to flood events. In fact, flood events can 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 re-suspension 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 22. Flood risk management measures will alter flood regime and can cause a reduction in habitat quality and extent. 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 Catchment are centred on the coast or around the lakes of Killarney and are reliant on the portrayal of pristine environment. 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.
- 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. Implementation of flood risk management measures can contribute towards the spread of invasive species if not properly managed.
- i Landscape and Visual Amenity: Many amenity walks, scenic routes and views are along river valleys, the lakes of Killarney, 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 22 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 22

UoM	Name	County	Viable structural options	Preferred Option	Note
22	Killarney	Kerry	Yes	Option 1 Flood Defences / Localised Protection Works	In this case Option 1 Flood Defences was the only viable structural measure
22	Dingle	Kerry	Yes	Option 1 – Storage & Flood Defences	
22	Castleisland	Kerry	Yes	Option 3 – Flow Diversion and Western Flood Defences	
22	Glenflesk	Kerry	Yes	Option 1 Flood Defences	Option not economically viable
22	Milltown	Kerry	Yes	Option 1 & others	Options not economically viable

6 Assessment of South West FRMP for UoM 22

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

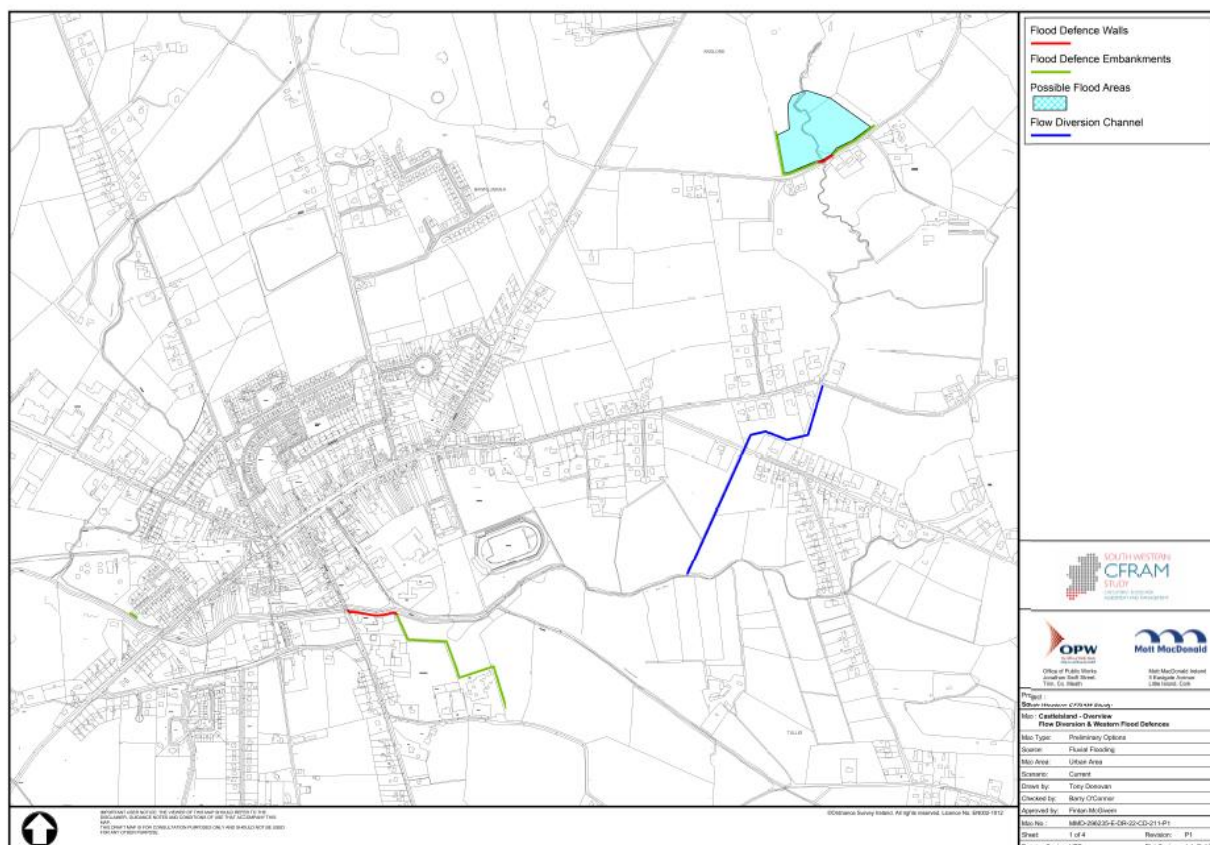
For each AFA, a number of structural measures have been assessed. The proposed structural measures are described below:

- i Killarney AFA: The preferred flood risk management option as identified in the MCA is Flood Defences which would include localised fluvial defence works within the town includes walls and embankments ranging in height form 1m to 2m.
- i Dingle AFA: The preferred flood risk management option as identified in the MCA is Storage & Flood Defences. This will include for the provision of a storage area on the Dingle Stream upstream of the town and tidal flood defences comprising of sea walls and embankments
- i Castleisland AFA: The preferred flood risk management option for Castleisland as identified in the MCA is Flow Diversion and Western Defences
- i Glenflesk AFA: The preferred option as identified in the MCA is Flood Defences. However, the preferred option is not economically viable. A range of non-structural measures were considered and put on display at the PCD. The feedback provided indicated that the public's preference is for a combination of Emergency Response Procedures and Land Use Management.
- i Milltown AFA: The preferred option as identified in the MCA is Flood Defences. However, the preferred option is not economically viable. A range of non-structural measures were considered and put on display at the PCD. The feedback provided indicated that the public's preference is for a combination of Emergency Response Procedures and Land Use Management.

The proposed measures at an AFA scale have been assessed for the three AFAs in UoM 22 as shown on Table 6.1, 6.2 and 6.3 below.

Table 6.1: Castleisland AFA - Outcomes of SEA Appraisal

UoM	Laune / Maine / Dingle Bay
Area / Location	Castleisland
Option	Option 3 – Flow Diversion and Western Flood Defences
Code	IE-22-IE-AFA-220323-CD01-M33
Description	Flow diversion of the Anglore river around properties at risk and the construction of defences to protect other vulnerable properties.



Strategic Environmental Assessments

Key Conclusions:

- The Maine is a salmonid river
- Otter could be impacted upon by the works
- The flow diversion could release sediment into the Maine during construction.

Adaptability to Potential Future Changes

Option is adaptable to climate change

Public Consultation Outcomes

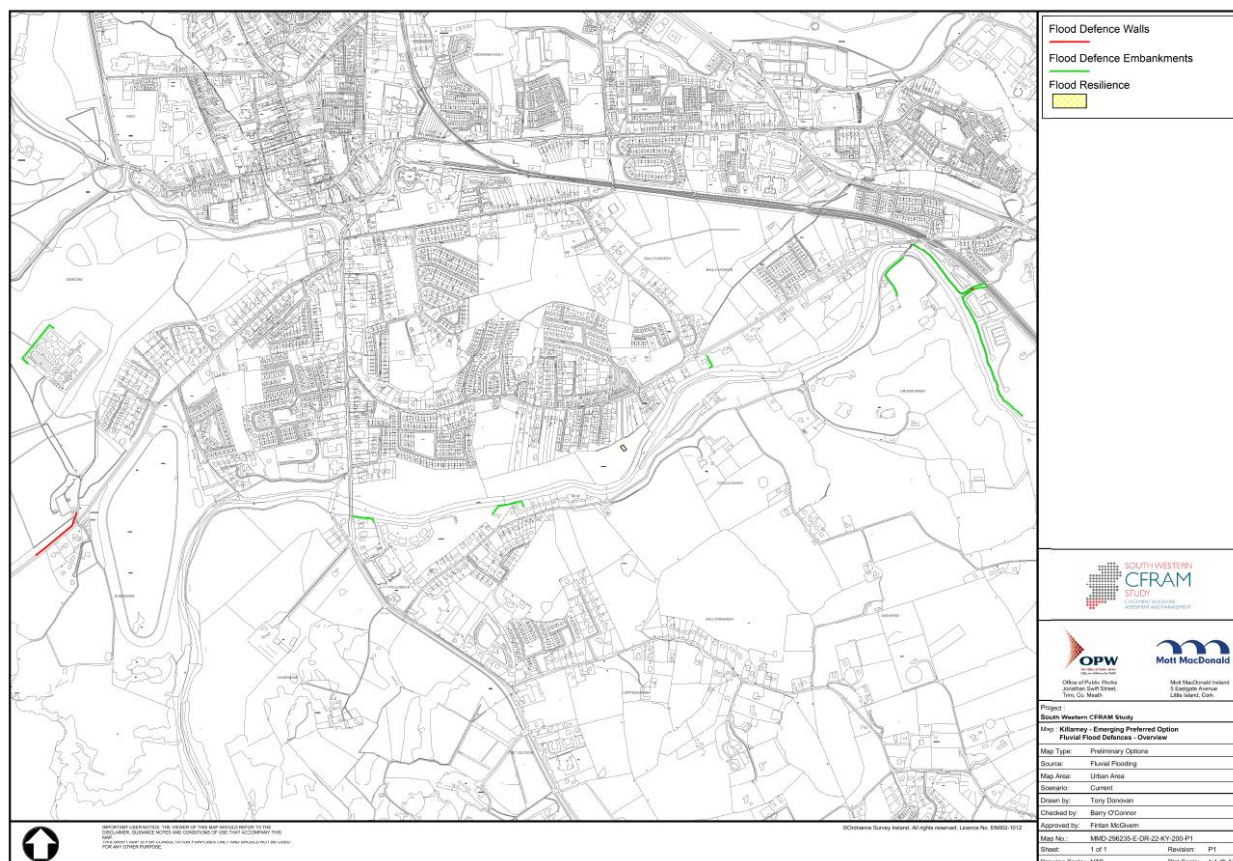
The feedback received at the Public Consultation Day was in support of Option 1 – Flood Defences

Other Issues / Conclusions

The MCA has identified Option 3 – Flow Diversion and Western Defences Flood Defences as the preferred Flood Risk Management Option.

Table 6.2: Killarney AFA - Outcomes of SEA Appraisal

UoM	Laune / Maine / Dingle Bay
Area / Location	Killarney
Option	Option 1 – Flood Defences
Code	IE-22-IE-AFA-220337-KY01-M33
Description	Localised fluvial defence works within the town includes walls and embankments ranging in height form 1m to 2m



Strategic Environmental Assessments

Key Conclusions:

- Potential for an impact during the construction phase on Freshwater Pearl Mussel;
- Potential for impact during the construction phase on otters, bats and other protected species;
- Potential for disturbance of invasive species in the area
- Potential for an impact on important landscape and visual amenity;

Adaptability to Potential Future Changes

Option is adaptable to climate change

Public Consultation Outcomes

The feedback received at the Public Consultation was in support of Option 1 – Flood Defences

Other Issues / Conclusions

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

Table 6.3: Dingle AFA - Outcomes of SEA Appraisal

UoM	Laune / Maine / Dingle Bay
Area / Location	Dingle
Option	Option 1 – Storage and Flood Defences
Code	IE-22-IE-AFA-220327-DE01-M33
Description	The provision of a storage area on the Dingle Stream upstream of the town and tidal flood defences comprising of sea walls and embankments

Storage
Storage Embankment
Area
Flood Defence Walls
Flood Defence Embankment
Pump Station

South Western CFRAM Study
Office of Public Works
Galway, Dublin, Cork, Limerick, Wick, Wexford, Kerry, Clare, Donegal, Mayo, Sligo, Fermanagh, Londonderry, Northern Ireland

OPW
Office of Public Works
Galway, Dublin, Cork, Limerick, Wick, Wexford, Kerry, Clare, Donegal, Mayo, Sligo, Fermanagh, Londonderry, Northern Ireland

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Project: South Western CFRAM Study
Map: Dingle
Storage and Flood Defences - Overview
Map Type: Preliminary Options
Source: Flood & Tidal Flooding
Map Area: Urban Area
Scenario: Current
Drawn by: Barry O'Connor
Checked by: Barry O'Connor
Approved by: Peter McGovern
Map No: MWD-2015-01-04-22-06-2015-P1
Sheet: 1 of 4
Revision: IP1
Drawing Scale: NTS
Plot Scale: 1:1 @ A3

Strategic Environmental Assessments

Key Conclusions:

- Proposed measures could result in the spread of invasive species if appropriate management not implemented;
- Flood defence walls have potential to impact scenic routes;
- The flood management measures will reduce the risk of flooding in the ACA.

Adaptability to Potential Future Changes

Option is adaptable to climate change

Public Consultation Outcomes

This option was the preferred option indicated by the public at the public consultation day.

Other Issues / Conclusions

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

In combination effects have also been fully 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.

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 22 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 22, potential for significant effects on the Natura 2000 sites (i.e. cSACs and SPAs) were identified. A Natura Impact Statement (NIS) was prepared for the Plan for UoM 22 and the proposed mitigation measures and conclusions of this assessment have been incorporated into the SEA mitigation measures.

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 22.

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:

- 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 Killarney: Flood Defences;
- i Castleisland- Flow Diversion and Western Defences
- i Dingle: Storage & 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.



South Western RBD CFRAM Study

SEA Environmental Report UoM 22

Oct 2017

Office of Public Works

South Western RBD CFRAM Study

SEA Environmental Report UoM 22

Oct 2017

Office of Public Works

Trim, Co. Meath

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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) 22 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 22. 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);
- 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 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 a 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 Laune-Maine-Dingle Bay River Basin Unit of Management (UoM 22) 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 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)

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.

In total, six Local Authorities administer the regions within the SWRBD and these are 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 Laune / Maine / Dingle Bay River Basin Unit of Management (UoM 22)

The Laune / Maine / Dingle Bay River Basin UoM 22 covers an area of approximately 2,031km². Most of the UoM is in County Kerry with parts in County Cork. The main rivers within UoM 22 are the Maine, the Flesk and the Laune. UoM 22 also has a number of large lakes including Lough Leane and Muckross Lake (Refer to Figure 1.2).

Six Areas for Further Assessment (AFAs) have been identified within UoM 22 (Refer to Table 1.1). Associated with the AFA's is over 134km of high and medium priority watercourses².

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

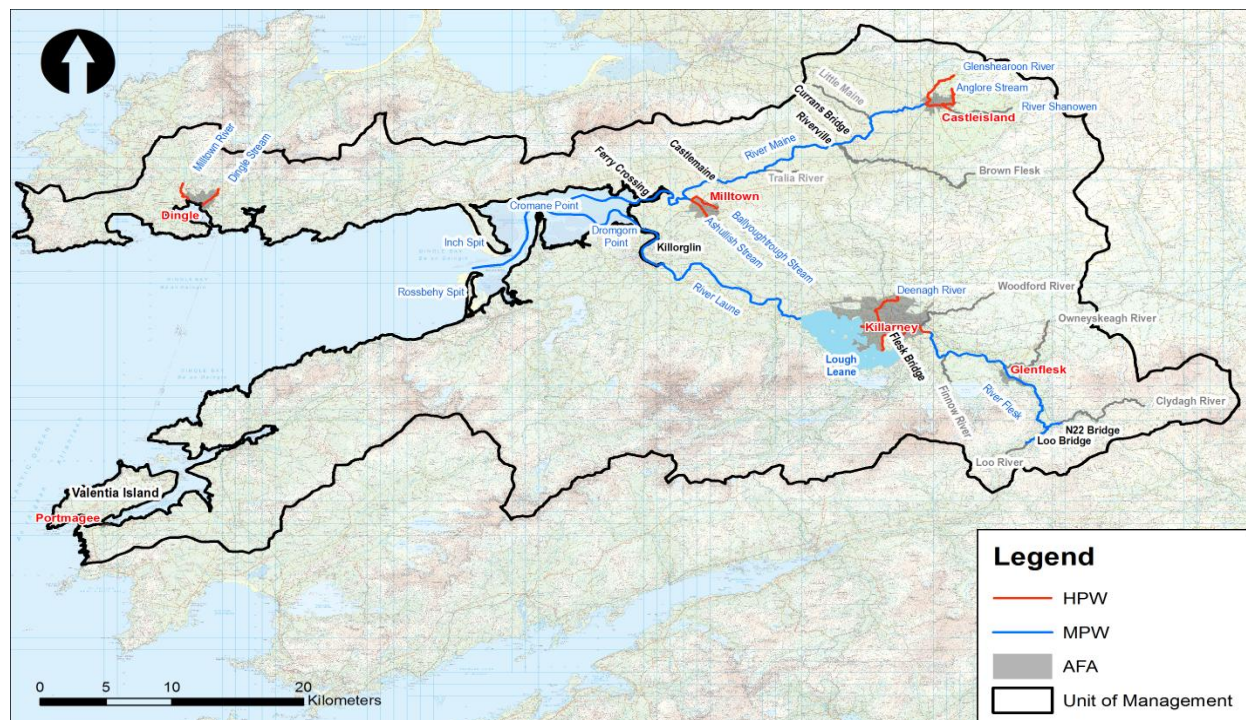
Table 1.1: AFAs within Unit of Management 22

UoM	Name	Unique ID	Fluvial	Coastal	County	Easting	Northing	Viable Structural Options
22	Castleisland	220323	Yes	No	Kerry	97750	110000	Yes
22	Dingle	220327	Yes	Yes	Kerry	44500	101000	Yes
22	Glenflesk	225502	Yes	No	Kerry	106621	85316	Yes
22	Killarney	220337	Yes	No	Kerry	97000	90500	Yes
22	Milltown	220339	Yes	No	Kerry	82500	101000	Yes
22	Portmagee	220340	No	Yes	Kerry	36500	73000	No

The AFA Portmagee was ruled out of the optioneering process in the Flood Risk Management Plan as the level of risk was deemed to be low and therefore for the purpose of this SEA Environmental Report, the viable structural options for the following AFA's are considered;

Castleisland, Dingle, Glenflesk, Killarney and Milltown

Figure 1.2: Laune / Maine / Dingle River Basin Unit of Management (UoM 22)



1.6 Sub-Catchments & Coastlines

The Laune / Maine / Dingle Bay UoM can be split into the following sub-catchments covering the AFAs;

1.6.1 Castleisland Sub-Catchment

The Study considers 32km of the River Maine from Castleisland to its tidal outfall into Castlemaine Harbour. The River Shanowen rises near Mount Eagle and flows westwards towards Castleisland where it joins with the Anglore Stream to form the River Maine at Castleisland. The River Maine then continues to flow westwards joining with the Glanshearoon Stream at the downstream of Castleisland and the Little Maine River at Springmount before flowing south-westwards to Currans Bridge.

Downstream of Currans Bridge, the River Maine becomes increasingly embanked above the surrounding floodplain. The major tributary of the Brown Flesk joins the River Maine near the N22 crossing at Riverville gauge. Downstream of the Tralia River, the River Maine becomes increasingly tidally-influenced and is tidally-dominated downstream of Castlemaine. The River Maine continues to meander across the tidal floodplain where it is joined by a number of embanked tributaries notably Ashullish Stream from Milltown. The River Maine outfalls into the Castlemaine natural harbour at the ferry crossing, before flowing out into Dingle Bay.

1.6.2 Milltown Sub-Catchment

Ashullish Stream is a steep watercourse before flowing north-westwards through the centre of Milltown, under the N70 to outfall into the River Maine. The main tributary Sruhaun Ballyoughtragh Stream (henceforth referred to as Ballyoughtrough) flows in a north-westerly direction to Chapel Bridge, flowing past the GAA grounds and alongside Old Station Road before turning west into embanked sections to join Ashullish Stream.

1.6.3 Dingle Sub-Catchment

There are two watercourses within the Dingle AFA; Dingle Stream and Milltown River. Dingle Stream flows in a south-westerly direction into central Dingle along Spa Road, under Bridge Street and along the Mall to outfall at the eastern end of the marina. Milltown River flows southwards to Ballinabooly where the Ballyeabought River joins from the east. Milltown River then becomes increasingly tidally influenced as it continues southwards where a minor tributary joins and then outfalls into Dingle Harbour at Milltown Bridge.

1.6.4 The Flesk / Laune Sub-Catchment (Glenflesk / Killarney)

The Study also considers 73km of river in the River Laune catchment from the N22 Bridge to the tidal outfall downstream of Killorglin. The River Clydagh rises near Mullaghanish and flows over steep ground to join with the Loo River downstream of Loo Bridge to form the River Flesk. The River Flesk flows in a north-westerly direction across shallow gradients to Glenflesk and joins with the Owenyskeagh River 2km downstream of the town. Downstream of Flesk Bridge, the River Flesk has a steeper gradient until it reaches Mill Road Bridge and flows west along the southern edge of Killarney before out-falling into Lough Leane. The River Deenagh flows along the North of Killarney before turning southwards along Port Road, and then westwards through the Killarney National Park to the outfall into Lough Leane. A number of other

rivers flow into Lough Leane including Owenreagh River and Muckcross Lake outfall. These inflows combine with River Flesk and Deenagh to form the River Laune at the outfall. The River Laune then flows in a north-westerly direction to Killorglin where it outfalls into Castlemaine Harbour at Dromgorn Point.

1.6.5 Coastal Features

The River Maine and River Laune both outfall into the naturally formed Castlemaine Harbour. Castlemaine Harbour is a complex estuary that extends west from the Maine and Laune into Dingle Bay.

1.7 Purpose and Structure of this Report

The FRMPs 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 the UoM 22 of the South Western River Basin District FRMP 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;

1.8 Report Structure

Section 1 Introduction: provides a broad background to the South Western FRMP 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 22: provides details on the historical occurrence of flooding in the Laune / Maine / Dingle Bay River Basin 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 FRMP.

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 FRMP project in the South Western River Basin Districts.

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

Section 6 Key Characteristics of UoM 22: 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 FRMP plan for the South Western RBD.

Section 9 Assessment of South Western FRAMP for UoM 22: 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 Strategic Environmental Assessment.

2 Flood Risk Management in UoM 22

2.1 Historic Flooding in UoM 22

There have been a number of significant recorded fluvial and tidal flooding events within UoM 22 between the years 1980 and 2012 which have resulted in damage to property and loss of earnings. Historic flood events for the catchments in UoM 22 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 22.

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 Laune / Maine / Dingle Bay River Basin UoM

ID No.	COUNTY	NAME
220323	Kerry	Castleisland
220327	Kerry	Dingle
225502	Kerry	Glenflesk
220337	Kerry	Killarney
220339	Kerry	Milltown
220340	Kerry	Portmagee

Table 2.2: Key Historical Flood Events UoM 22

Date	Flooding Mechanisms	Areas Affected	Properties Flooded	Reported Peak Level (mODM)	Reported Duration of Flooding (hrs)
02/11/1980	Fluvial / pluvial flooding due to intense, heavy rainfall causing the River Flesk to overtop.	Glenflesk / River Flesk	23 houses 3009 acres of land	27.2 at Flesk Bridge Up to 1.2m at properties	36 hours
06/08/1986	Fluvial / pluvial flooding due to intense, heavy rainfall causing the River Flesk to overtop.	Killarney / River Flesk	Number not reported	26.99 at Flesk Bridge Gauge	Not Recorded
01/01/1988	Tidal surge – high tides and rain causing surcharging of sewers.	Dingle Bridge Street, Hudson's Bridge,	Number not reported	Not Recorded	Not Recorded
17/02/1997	Fluvial / pluvial flooding due to heavy rainfall over a sustained period prior to flood. Overtopping of the River Flesk and River Laune.	Killarney / River Flesk River Laune	Number not reported	26.25 at Flesk Bridge Gauge & 21.73 at Laune Bridge Gauge	Estimated to be up ~24 hours
01/02/2002	Fluvial flooding on the River Maine.	Castlemaine / River Maine Annagh Tributary of River Maine	Number not reported	26.56 at Castlemaine Gauge	Estimated to be up ~24 hours
04/01/2008	Fluvial flooding from undersized culverts and bridge.	Milltown / Ashullish-Ballyoutragh Old Station Road, N71 Bridge	Seven properties	Not recorded	Estimated to be up ~24 hours
04/10/2008	Fluvial flooding from intense rainfall, causing the Glanshearoon to overtop and flow into a nearby swallow hole, causing water to rise into the Anglore Stream.	Castleisland / River Maine- Glanshearoon Cordal Road	Several properties and one commercial property	24.03 at Castleisland Not Recorded	Estimated to be short duration
19/11/2009	Fluvial / pluvial flooding due to heavy rainfall over a sustained period prior to flood. Lack of maintenance of the River Flesk.	Killarney / River Flesk	Number not reported	27.07 at Flesk Bridge Gauge	Not Recorded
15/01/2011	Fluvial flooding due to rising level of Lough Leane.	Killarney / River Flesk N71 National Secondary Road	Number not reported. N71 road impassable for 300m	26.73 at Flesk Bridge Gauge	Estimated to be up to 48 hours

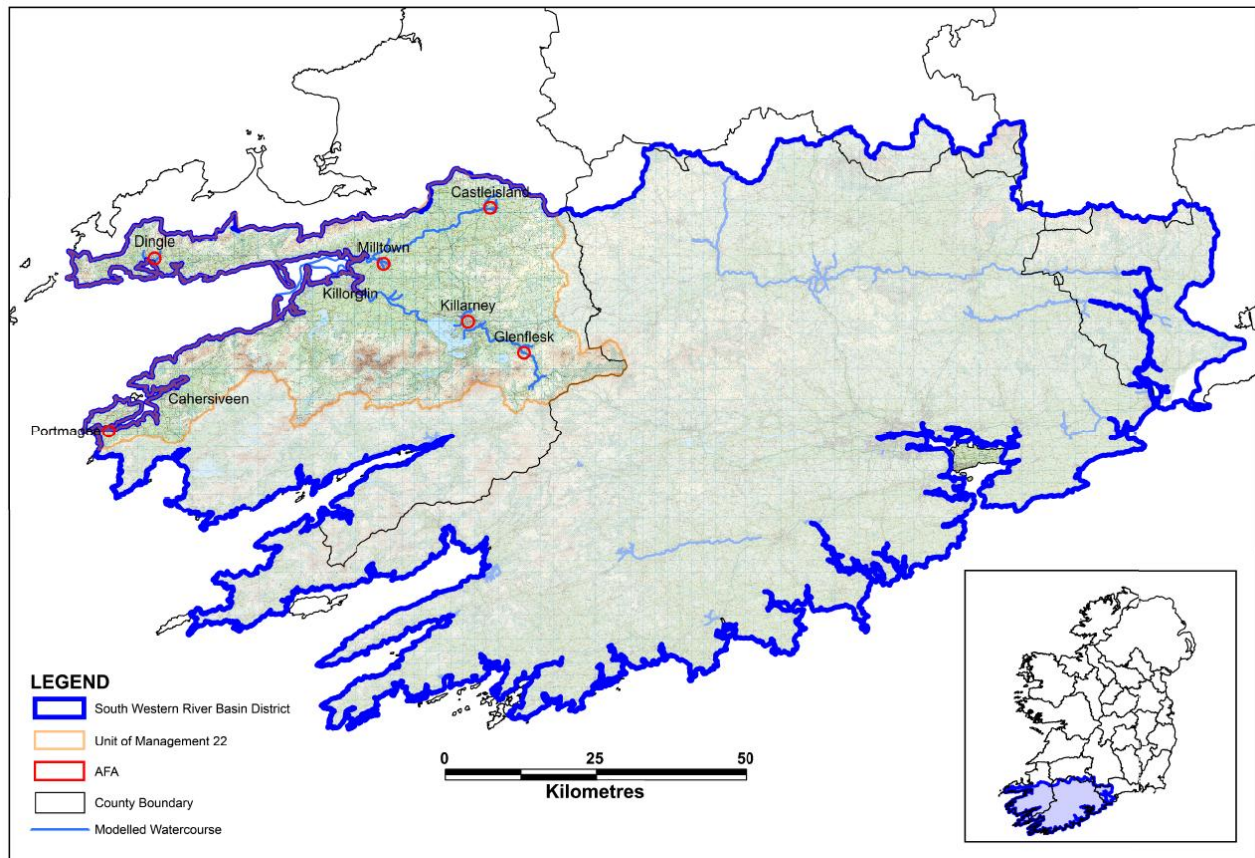
2.3 Catchment Flood Risk Assessment and Management (CFRAM) Study

A Flood Risk Management Plan (FRMP) has been prepared for UoM 22 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 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 Laune / Maine / Dingle Bay River Basin 22 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 Flesk, Lough Leane, River Maine and a number of smaller tributaries. The Flood Studies Update (FSU) methodologies have been used to determine the existing design peak flows, lough levels and characteristic flood hydrographs for eight specified flood probabilities across the sub-catchments. Corresponding coastal conditions have been developed for those areas at coastal flood risk. A number of calibration events were identified in the Laune and Maine catchments where there was sufficient historical flood data.

Potential future catchment changes relevant to the Laune, Maine and Dingle catchments 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 into the hydraulic models. The knowledge of the hydrological processes and the historical flooding issues in the Laune, Maine and Dingle catchments established supported the development of sustainable and appropriate flood risk management options in those areas at greatest flood risk.

A total of eight hydraulic models have been developed for the six Areas for Further Assessment (AFAs) and Medium Priority Watercourse downstream (MPW) to assess fluvial and coastal flood risk for various flood probabilities.

The majority of models used a 1D/2D ISIS/TUFLOW hydrodynamically linked approach such that water can flow between the river and floodplain during the event to simulate the observed flood mechanisms within AFAs. 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 complex urban floodplains. However, Portmagee was developed with a 2D TUFLOW only approach to assess coastal flood risk as it was not deemed to be at risk from fluvial flooding.

The Castleisland and Killarney models were calibrated to flood events of 4th October 2008, 2nd November 1980 and 19th November 2009 where sufficient data enabled full calibration of the hydraulic parameters. The Maine model was also calibrated for high flow in-bank events on the 4th October 2008 and 12th January 2010 events. The Milltown, Glenflesk and Dingle models were validated against reports of recurring flooding to ensure representation for historic flooding. Sensitivity tests were undertaken on flow, downstream level and Manning's 'n' for all models. An additional sensitivity test was undertaken on the culvert coefficient at Milltown following comments from the local area engineers.

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. The flood extent, flood zone, flood depth, flood velocity and flood hazard have all been mapped for the specified scenarios.

The findings from the modelling results and flood maps were used as inputs to the flood risk review. The knowledge of the flood mechanisms, critical structures and impact of flooding established supported 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;
- 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 included in **Error!**

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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 that planning is undertaken having regard to the requirements of the *Guidelines on the Planning System and Flood Risk Management*.
- i **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.
- i **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 flood risk have been investigated to determine the most effective and appropriate Draft FRMP's 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	i) 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*. 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)*.

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 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.

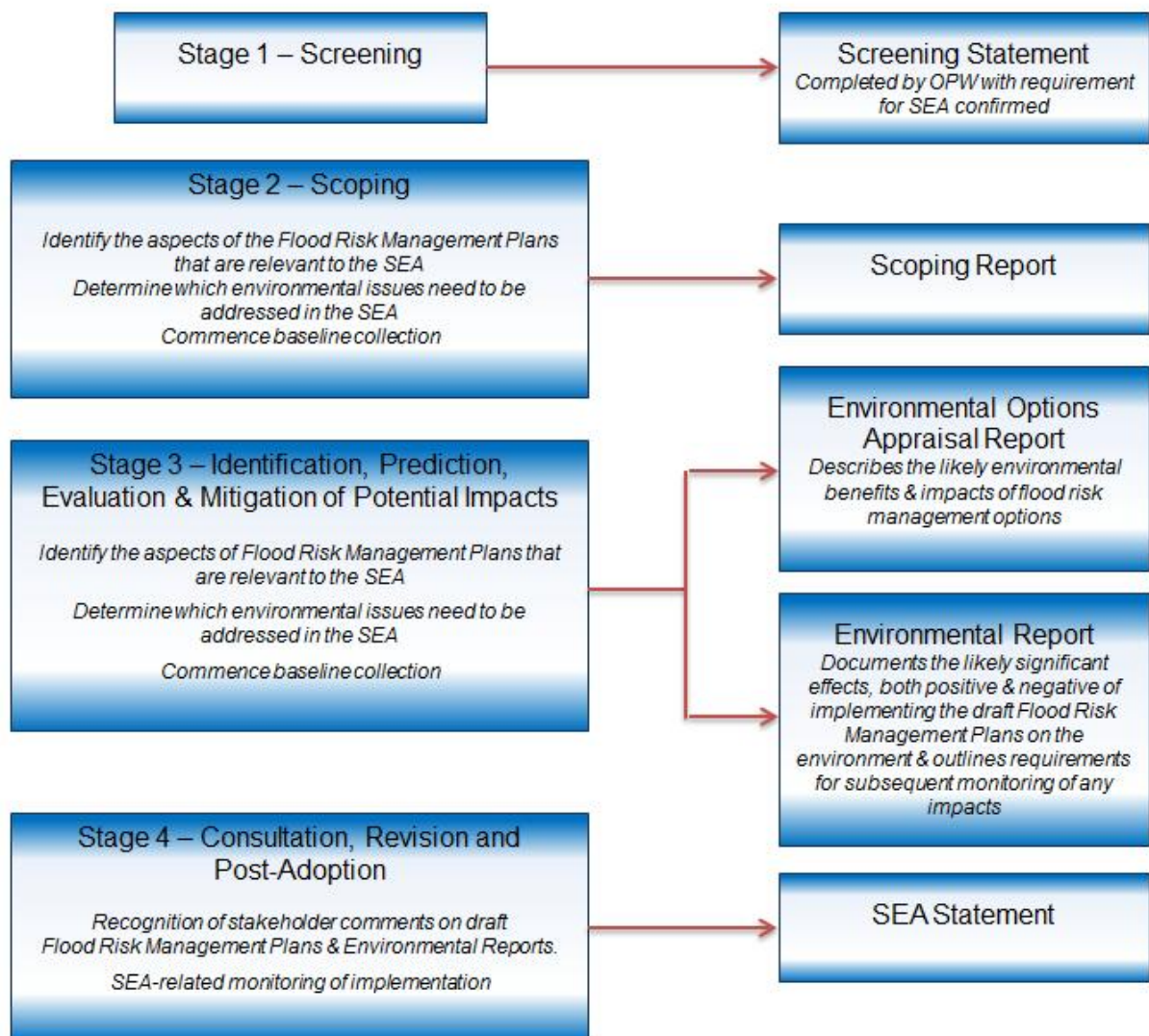
- i **Monitoring** - Monitoring requirements refer to the need to monitor the significant effects on the environment as a result of the implementation of the Flood Risk Management Plans. Monitoring begins with the adoption of the plan and continues for the duration of the plan.

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 finalisations 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 this 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 and AA 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 project-level assessments and these will need to be undertaken as appropriate under the relevant legislation for consenting to that project for any physical works that may progress in the future. 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	a Support the objectives of the WFD	ii) Minimise risk to local employment
		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.

i 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 2nd 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 22. The principle steps in the assessment process are as follows:

Flood Risk 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 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, landscape character	Protect, and where possible enhance, visual amenity, landscape protection zones and	Changes to reported conservation status of designated sites relating to flood	1. No significant impact on landscape designation (protected site, scenic	1. No change to the existing landscape form. 2.

Criteria	Objective	Sub-Objective	Indicator	Basic Requirement	Aspirational Target
	and visual amenity within the river corridor	views into / from designated scenic areas within the river corridor.	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	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 Environmental 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 will be produced to clearly specify how environmental considerations, through the Strategic Environmental Assessment has 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 RBD 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 CFRAMs 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:

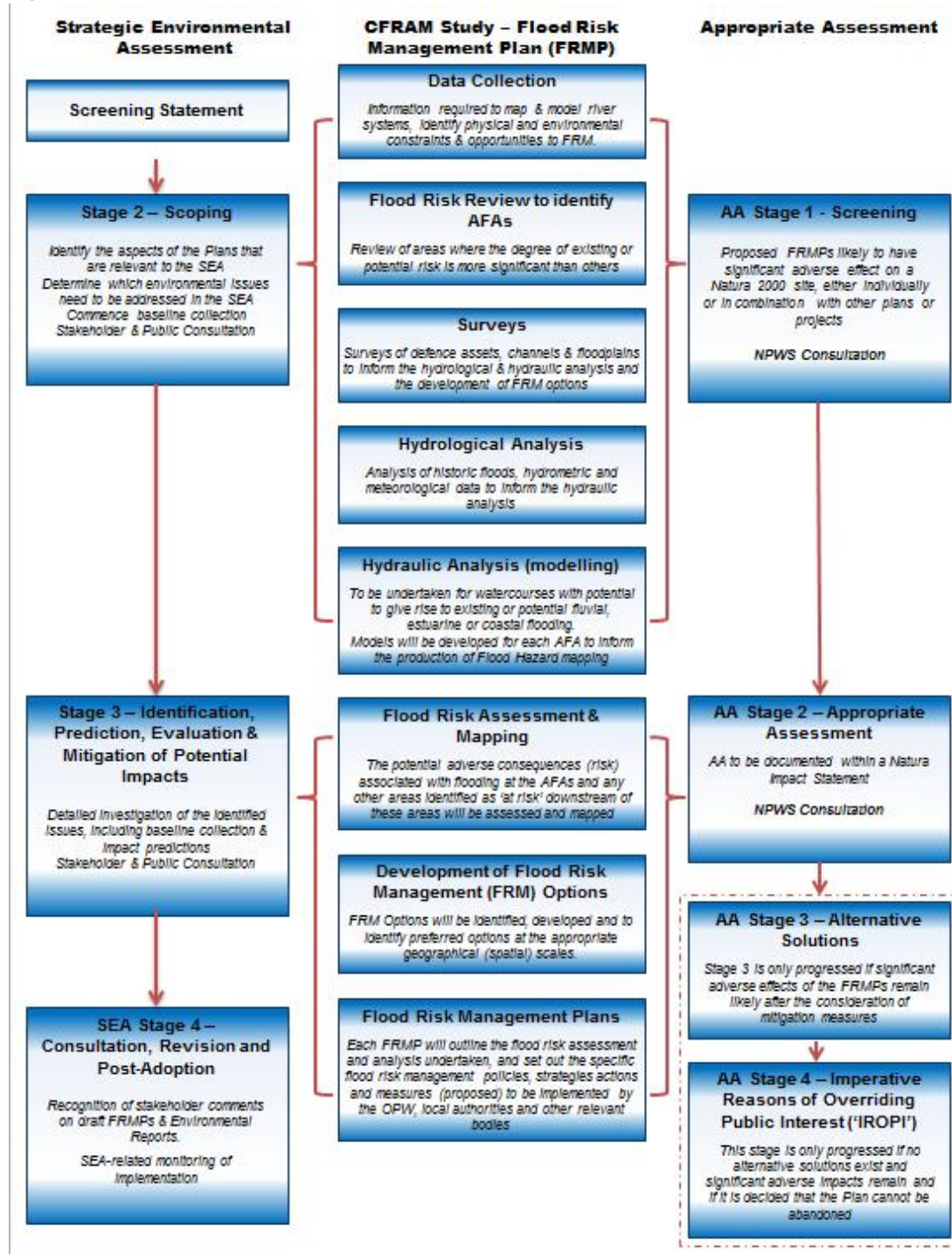
1. Approval of the scheme as 'strategic infrastructure' under the Planning and Development (Strategic Infrastructure) Act 2006 by An Bord Pleanála;
2. Approval of the scheme under Part 8 of the Planning and Development Regulations, 2001 as amended; and
3. Approval of the scheme by the Minister for Finance 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 (Environmental Impact Assessment) Regulations, 1989 as amended is required to include an Environmental Impact Assessment. 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 Natura 2000 sites 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 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; and
- i The long timelines 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.

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 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 Laune / Maine / Dingle 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.

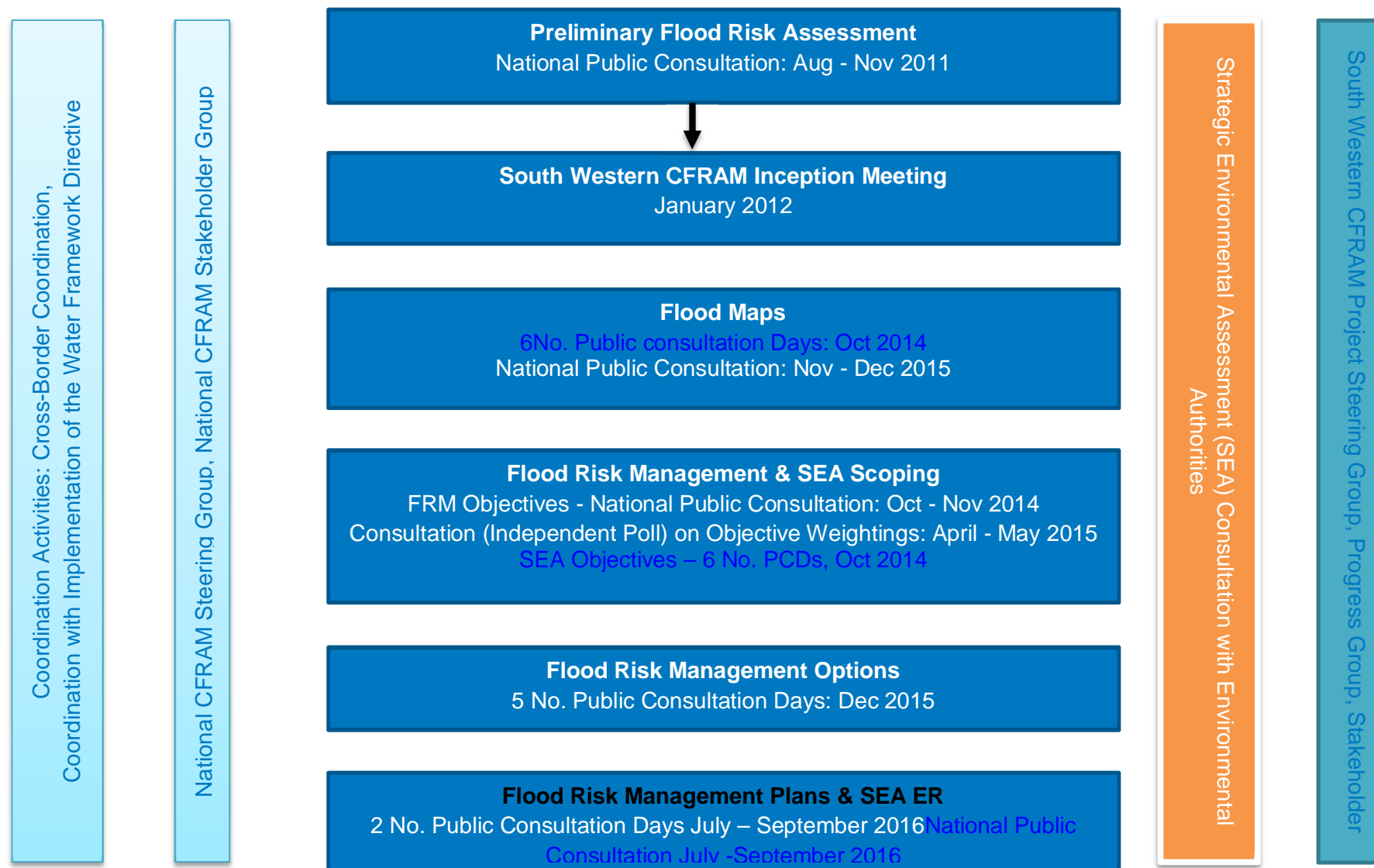
4.3.2 Regional Stakeholder Group

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, 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 Laune / Maine / Dingle 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
Castleisland	29/10/2014	KCC Area Office, Castleisland	14
Dingle	06/11/2014	Dingle Library	14
Glenflesk	21/10/2014	Glenflesk GAA Club	36
Killarney	23/10/2014	KCC Area Office, Killarney	11
Milltown	16/10/2014	Milltown Community Centre	16
Portmagee	30/10/2014	Portmagee Community Centre	7

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 for consideration (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 undertaken. 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. 71 submissions were received during this consultation which were subsequently considered and amendments made to the Objectives where appropriate.
- i 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
- i 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 Laune / Maine / Dingle Bay River Basin UoM were held during the option development stage at the venues listed below in Table 4.2.

Table 4.2: Public Consultation Days at the Options Development Stage

AFA	Date	Venue	No. Attendees
Castleisland	09/12/2015	KCC Area Office, Castleisland	22
Dingle	09/12/2015	Dingle Library	12
Glenflesk	08/12/2015	Glenflesk GAA Club	32
Killarney	08/12/2015	Avenue Hotel, Killarney	20
Milltown	10/12/2015	Milltown Community Centre	12

4.4.5 Consultation on Draft SEA ER and the FRMP

The SEA Environmental Report for the Draft FRMP for the Laune / Maine / Dingle Bay River basin 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 Councils during the Public Consultation period, in parallel and complimentary to the formal public consultation process, a series of PCDs, similar to those held for the consultation on the 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 comments 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
Department of Communications, Energy and Natural Resources
Department of the Environment, Community and Local Government
Department of Agriculture, Food and the Marine
Department of Arts, Heritage and Gaeltacht Affairs

Geological Survey Ireland
Health Services Executive (HSE)
Iarnród Éireann
Industrial Development Agency
Industrial Heritage Association of Ireland
Inland Fisheries Ireland
Inland Waterways Association of Ireland
Institute of Professional Auctioneers and Valuers (IPAV)
Insurance Ireland
Irish Academy of Engineering
Irish Angling Development Alliance
Irish Business and Employers Confederation (IBEC)
Irish Concrete Federation
Irish Co-Operative Organisation Society
Irish Countrywomen's Association
Irish Creamery Milk Suppliers Association (ICMSA)

Primary Stakeholders

Office of Public Works
County Councils / County Development Boards
South West Regional Authority

Secondary Stakeholders

An Bord Pleanála
An Taisce
Association of Consulting Engineers of Ireland (ACEI)

Association of County and City Councils	Irish Farmers Association (IFA)
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 Gáis 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 the Implementation of the Water Framework Directive

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:

- | The Water Policy Advisory Committee (WPAC), the
- | The National Implementation Group (NIG);
- | The Catchment Management Network;
- | Local Authorities Water and Communities Office (LAWCO) and
- | 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 other plans, policies and programmes of relevance to the South Western CFRAM Study 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 level.

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 CFRAMS in terms of the SEA

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.
Shellfish Waters Directive (2006/113/EC)	Shellfish life and growth. The Directive sets Directive aims to	The Flood Risk Management Plans /SEA objectives should consider the

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
	protect or improve shellfish waters in order to support physical, chemical and microbiological requirements that designated shellfish waters must comply with.	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 Relief Schemes (1995), which must then be maintained	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.
Coast Protection Act, 1963	Act to provide for the making and execution of coast protection	Flood risk management options will need to be developed at project scale to ensure that the functioning of the arterial drainage and flood relief

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
	schemes and to provide maintenance for these schemes	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 a 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.
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 (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

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
		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 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 favorable 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 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.	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 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.

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
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). This plan will function as a high level framework for the spatial development until 2040.	The development of projects arising from the FRMP will be required to have 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	The SEA contains objectives to ensure the protection of archaeological heritage.

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
	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.	
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 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.	The RDP recognises that the OPW has been appointed as the lead agency to 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	The development of FRMP options will support the sustainable development of areas previously at flood risk by allowing for

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
	for the consideration of flood risk in planning and development management.	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 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.	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.
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,	The development of FRMP options should support the Land Use and development objectives and policies

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
	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.	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, cultural and economic, environmental policies and programmes, while taking into account existing planning commitments and short term market trends.	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.
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	There are a number of shellfish water within the CFRAM SW RBD which have associated pollution protection programmes. These designations were

Legislation/Plan/Policies/Programme	Description	Potential relevance with SW CFRAMP in terms of the SEA
	regulations for designated shellfish growing waters.	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 identify 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 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 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 Framework 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 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 Amenity

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 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 Characteristics of UoM 22

6.1 Environmental Characteristics

6.1.1 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 measure 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 the 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 UoM 22 are described in this section and the key social and environmental issues that may be affected by flooding and flood risk management are identified.

Environmental characteristics are presented under the following topics:

- i Population and Human Health;

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

6.2 Population and Human Health

6.2.1 Population

The preliminary 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 a 3.8% increase in the national population over the 5 year period. This national trend is reflected in the CFRAM South West (Counties Cork, Kerry, Limerick, Tipperary and Waterford) population figures (Table 6.1). The CSO Small Area Population Statistics (SAPS) (2011 most recent SAP data) demonstrates that the upward trend in population growth has generally continued from the 2006 census for the areas within the AFAs. Census data between 2006 and 2016 is presented in Table 6.1 and Table 6.2.

Table 6.1: Population of CFRAMS South West (Counties Cork, Kerry, Limerick Tipperary and Waterford) from 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 2016

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).

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

AFA	Persons 2006	SAPS 2011 Data
Castleisland	2,300	2,153
Dingle	No data	1,965

AFA	Persons 2006	SAPS 2011 Data
Glenflesk	No data	No data
Killarney	13,497	14,219
Milltown	415	838
Portmagee	No data	No data

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

The Corca Dhuibhne Gaeltacht is located on the western end of the Dingle peninsula.

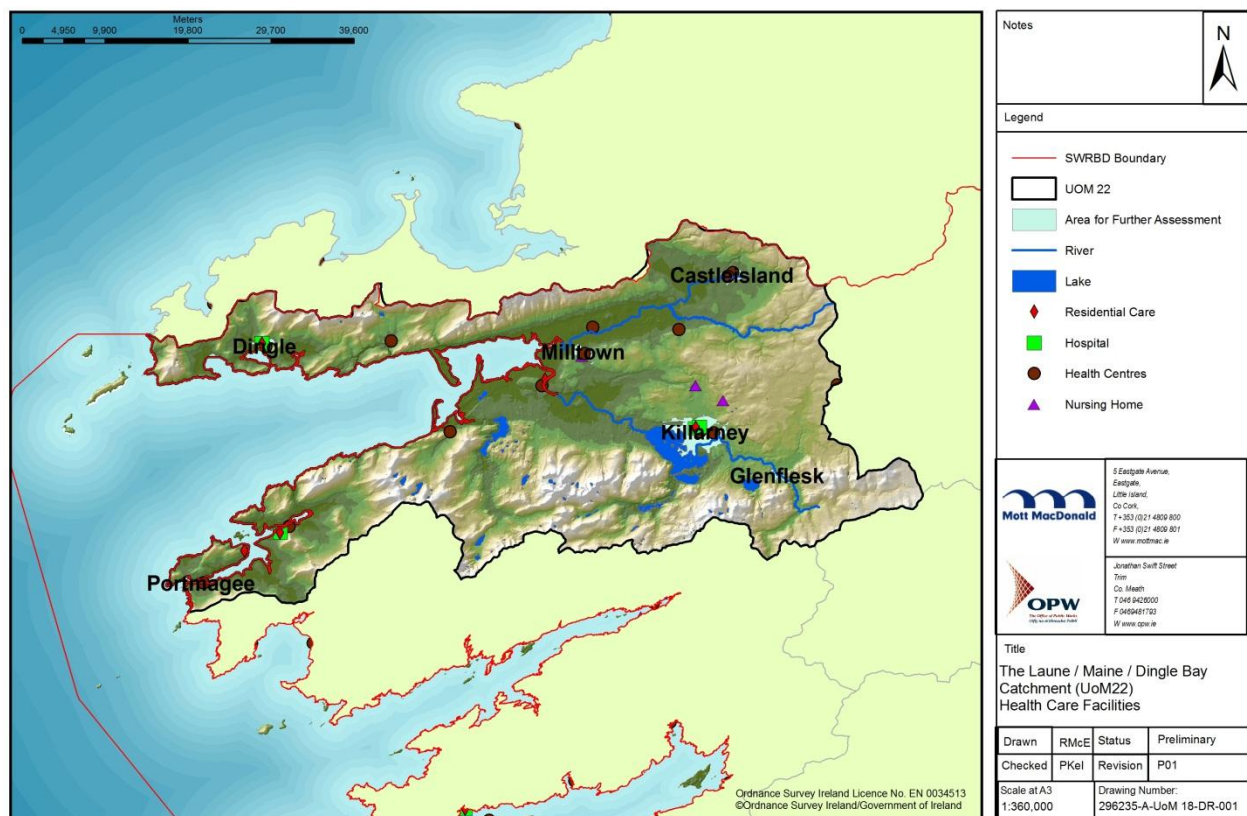
6.2.2 Human Health

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 potable 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 UoM 22 include hospitals, health care centres, and nursing homes. The majority of Health care services are centred around Killarney. There are no residential care facilities for the elderly in UoM 22. Hospitals in the UoM are community hospitals, as opposed to regional hospitals and therefore tend to provide a lesser range of services than the larger regional facilities.

Figure 6.1: Health Care Facilities, UoM 22



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 assumptions³) 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.

³ The 1996 pattern of inter-regional flows is applied in 2016 and kept constant thereafter, with the difference between the 2006 and 1996 patterns apportioned over the years between 2006 and 2016.

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) which 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 not 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.

Within the South West Region, Cork City is identified as a gateway and the towns of Mallow and Killarney are identified as hubs. In the South East Region, Waterford City is identified as a Gateway and Dungarvan is identified as a hub.

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. Spatial planning as outlined the Local Authority Development Plans and Local Area Plans are an important mechanism for land management in Ireland. The Government estimate that on average of 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 town of Killarney, identified as a hub in the NSS, is located in UoM 22 and development in the town may influence population trends in nearby hinterlands such as Glenflesk and Castleisland. The population of Killarney has increased steadily since 2002. Population and development growth in Killarney and Castleisland could potentially increase the number of people and properties at risk from flooding. At present land-use policies for each AFA are set out in their respective Local Area Plans, however the intension is that local planning policy for these settlements will be contained within the new Municipal District Plans which are currently in consultation.

The Killarney Town Development Plan 2009 – 2015 has identified that there is currently sufficient land zoned for residential development to accommodate future population growth of the town. Some of these areas of land are in proximity to the River Flesk. A policy of the Killarney Town Development Plan is to ensure that flood risk is assessed as part of any planning application within identified flood zone areas and that sustainable drainage techniques are employed as part of any development in such areas.

The prevalence of local health care facilities is likely to increase through the implementation of the Department's health service reform programme. A number of health service and community facilities in Castleisland are located in flood risk areas. 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. The Castleisland Local Area Plan recognises the need for flood risk assessment in the future development in proximity to the Maine River.

6.3 Geology, Soils and Land Use

6.3.1 Topography

The River Maine catchment is relatively low lying with elevations ranging from <1mODM at the outfall to over 400mODM in the headwaters of the River Shanowen upstream of Castleisland. The River Maine has a typical gradient of approximately 1 in 770 until Currans Bridge and Riverville. The major tributaries of the Little Maine River and Brown Flesk River have similar gradients and meander planforms.

The River Maine then flattens out into the embanked reaches downstream where Castlemaine and a number of smaller settlements lie below the flood embankments. Therefore, these populations are vulnerable to prolonged river and coastal flooding if water overtops the embankments as the flood waters become trapped on the floodplain. The surrounding hills including the Dingle catchment and the tributaries of the lower Maine are typically very steep as the rivers flow through the steep valley sides of the Dingle Peninsula Mountains. However, the gradient flattens out significantly as these tributaries meet the sea or enter the Maine floodplain.

The River Laune catchment and tributaries' elevations range from sea level at Killorglin to over 1000m at Carrauntoohill, the highest peak in Ireland. However, the upper Flesk is relatively flat until Glenflesk (1 in 3600) before the gradient increases towards Killarney and Lough Leane. Lough Leane itself is surrounded by mountainous terrain which reaches over 1000mODM.

Lough Leane outfalls into the River Laune which has a relatively constant 1 in 100 gradient to its outfall into Castlemaine Harbour downstream of Killorglin. The Laune valley is relatively narrow and surrounded by steep mountainous terrain to the North and South.

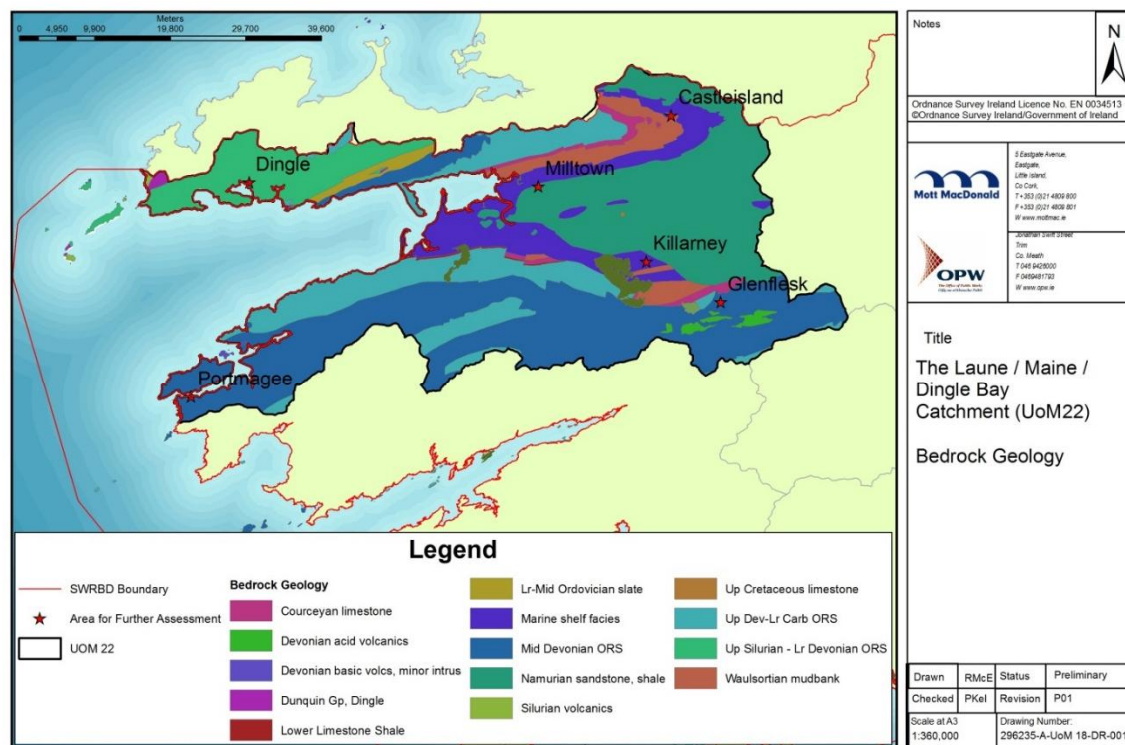
6.3.2 Geology and Soils

6.3.2.1 Bedrock Geology

The River Maine is dominated by underlying nationally important karst features in the upper catchment which can increase infiltration and therefore reduce peak flow when the ground is not saturated. However, the karst geology can also amplify flooding when the karst is saturated from preceding rainfall by providing subterranean flow routes and or groundwater flooding in addition to the river flooding.

The River Flesk is underlain by Devonian Old Red Sandstones until Glenflesk which forms the relatively flat valley floodplain surrounded by basalt which forms the steep valley sides. Downstream of Glenflesk, the underlying geology changes to karstified Dinantian limestones with the joining of the Owenskeagh River which increases the river gradient and narrows the valley. The land immediately next to Lough Leane is formed of fluvial and lacustrine deposits from the Lough and tributaries. The outfalls of Lough Leane and the River Laune floodplain are underlain by Dinantian limestone but surrounded by Dinantian shales, sandstones and limestones forming the steeper valley sides.

Figure 6.2: Bedrock Geology in UoM 22

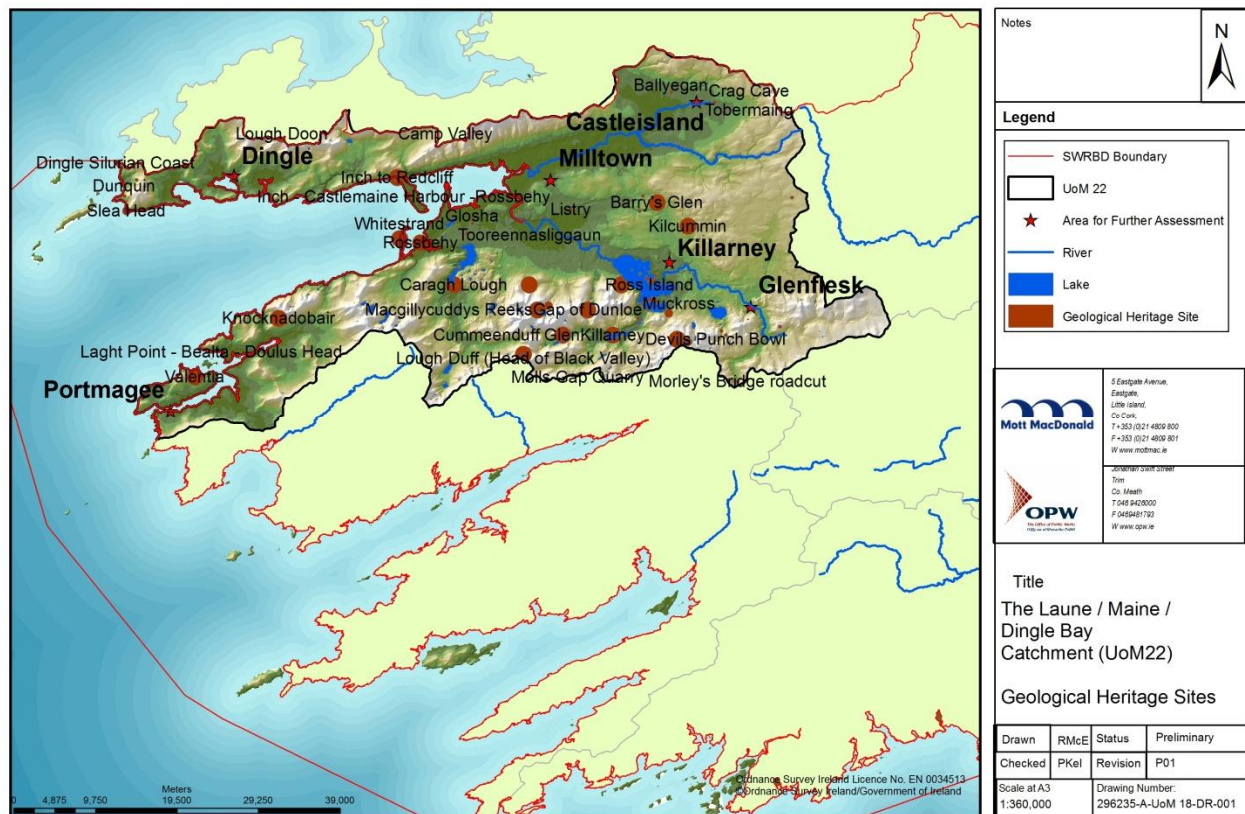


Source: Bedrock geology provided by the Geological Survey of Ireland

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 22 are presented in Figure 6.3.

Figure 6.3: Irish Geological Heritage (IGH) Sites in UoM 22



Source: Geological heritage site information provided by the Geological Survey of Ireland

6.3.2.3 Soils

Soils in UoM 22 are dominated by Non-calcareous bedrock (RckNCa) and Blanket peat (BktPt) to the south and by Namurian Shale and sandstone till (TNSSs) to the north (refer to Figure 6.4).

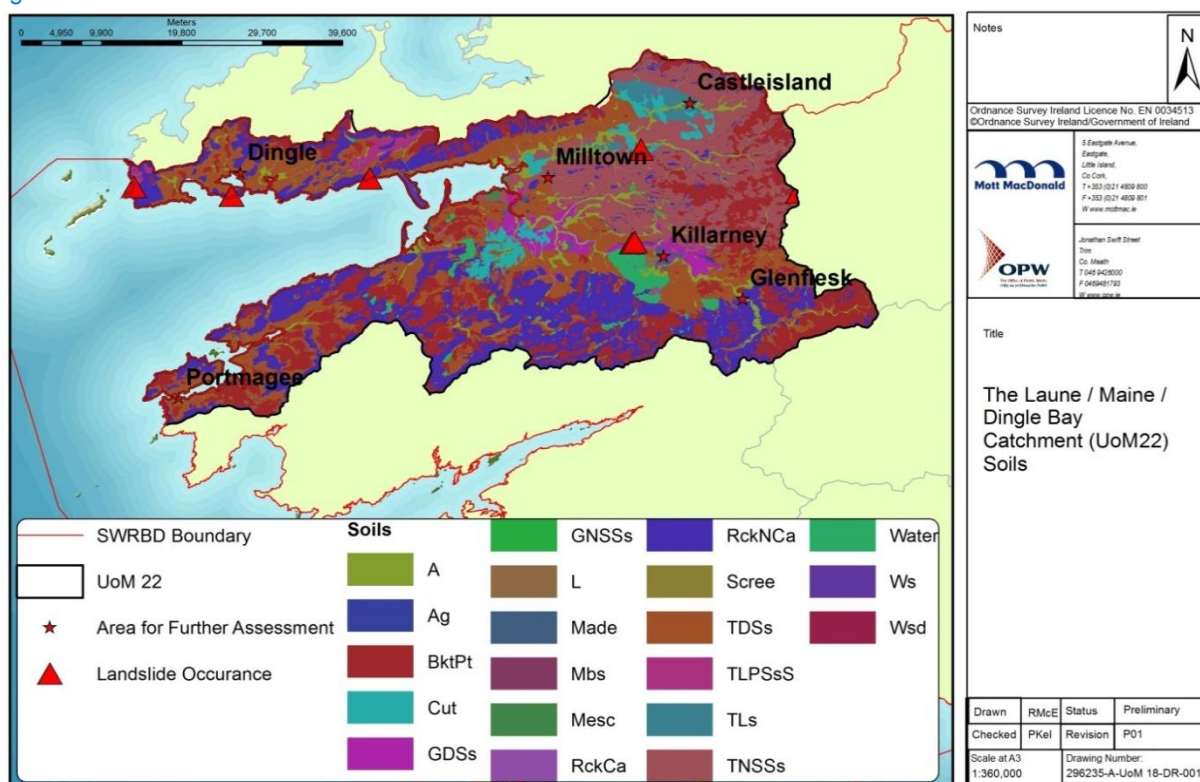
The Geological Survey of Ireland maintains an inventory of landslides in Ireland. Work in this area is on-going since 2008. The GSI has records of three landslide occurrences in UoM 22 (refer to Table 6.4). Many landslide occurrences in UoM 22 were located coastally.

Table 6.4: Records of landslides in UoM 22

Location and year	County	Mechanism	Land Cover
DunChaoín 2007	Kerry	Fall	Earth Cliff
Ballymacdoyle Hill	Kerry	Unknown	Cliff
Brackloon	Kerry	Unknown	Earth
Lackabane 2002	Kerry	Translational Slide	Earth Hill
Tralee 1997	Kerry	-	
Lackabane 1999	Kerry	Rotational Slide	Earth Hill

Source: Geological Survey of Ireland

Figure 6.4: Soils of UoM 22



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

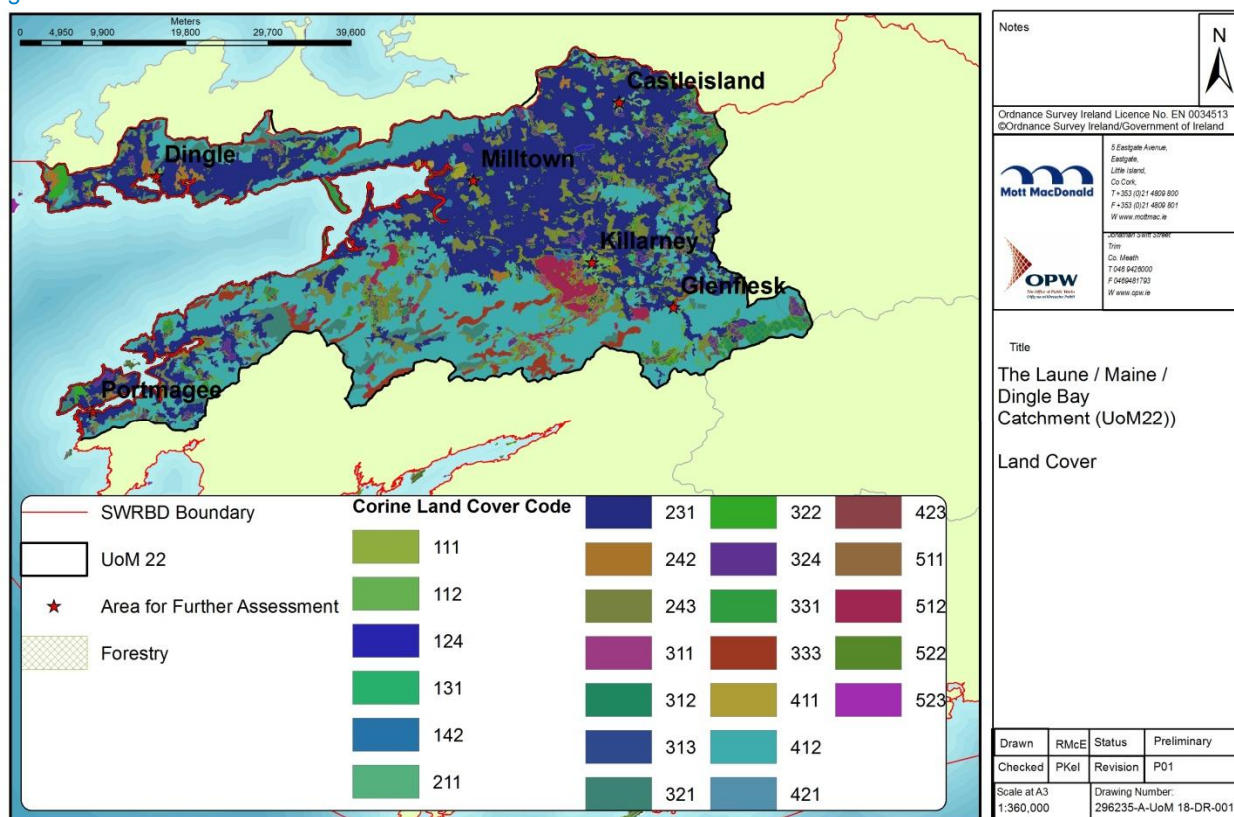
6.3.3 Land Use

Land use comprises pastoral and agriculture, with pastoral focussed on the steep relief along the valley sides. Farmland along the lower Maine is heavily drained in these flat low lying areas to maintain agricultural production.

There are areas of coniferous plantation around Milltown and along the lower Maine in the flat floodplain. There are also a number of Natura 2000 designated bog lands along the lower Maine particularly Inchinveema bog by the Brown Flesk confluence which naturally attenuate and store flood flows.

The major urban areas are located at Killarney, Killorglin, and Dingle. The remaining smaller settlements tend to be located at the edge of the floodplains or along the coast, away from the main rivers considered in this study.

Figure 6.5: Land Cover within UoM 22



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 22

Corine Code	Description
111	Continuous urban fabric
112	Discontinuous urban fabric
124	Airports
131	Mineral extraction sites
142	Sport and leisure facilities
211	Non-irrigated arable land
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
322	Moors and heathlands
324	Transitional woodland scrub
331	Beaches, dunes, sand
411	Inland marshes
412	Peat bogs
421	Salt marshes
423	Intertidal flats
511	Stream courses
512	Water bodies
522	Estuaries
523	Sea and ocean

6.3.4 Future Trends in Land Use

6.3.4.1 Agriculture

Land cover in UoM 22 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 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).

Milk quotas were abolished in 2015 which allowed 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.

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 short to medium term. To date wind farms have been developed in UoM 22, Killorglin being one example.

6.3.5 Geology, Soils, Land Use and Energy 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.

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

⁵ SEAI Energy in Ireland Key Statistics 2014

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 World Heritage Sites – the Department of Arts, Heritage and the Gaeltacht are responsible for the nomination of World Heritage Sites (sites of outstanding heritage value) in Ireland such that they are protected under the World Heritage Convention;
- 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 22 are presented in Figure 6.6.

There are approximately 6,260 Records of Monuments and Places (RMP) within UoM 22, approximately 195 of which are located within the AFAs of UoM 22. RMP classifications include:

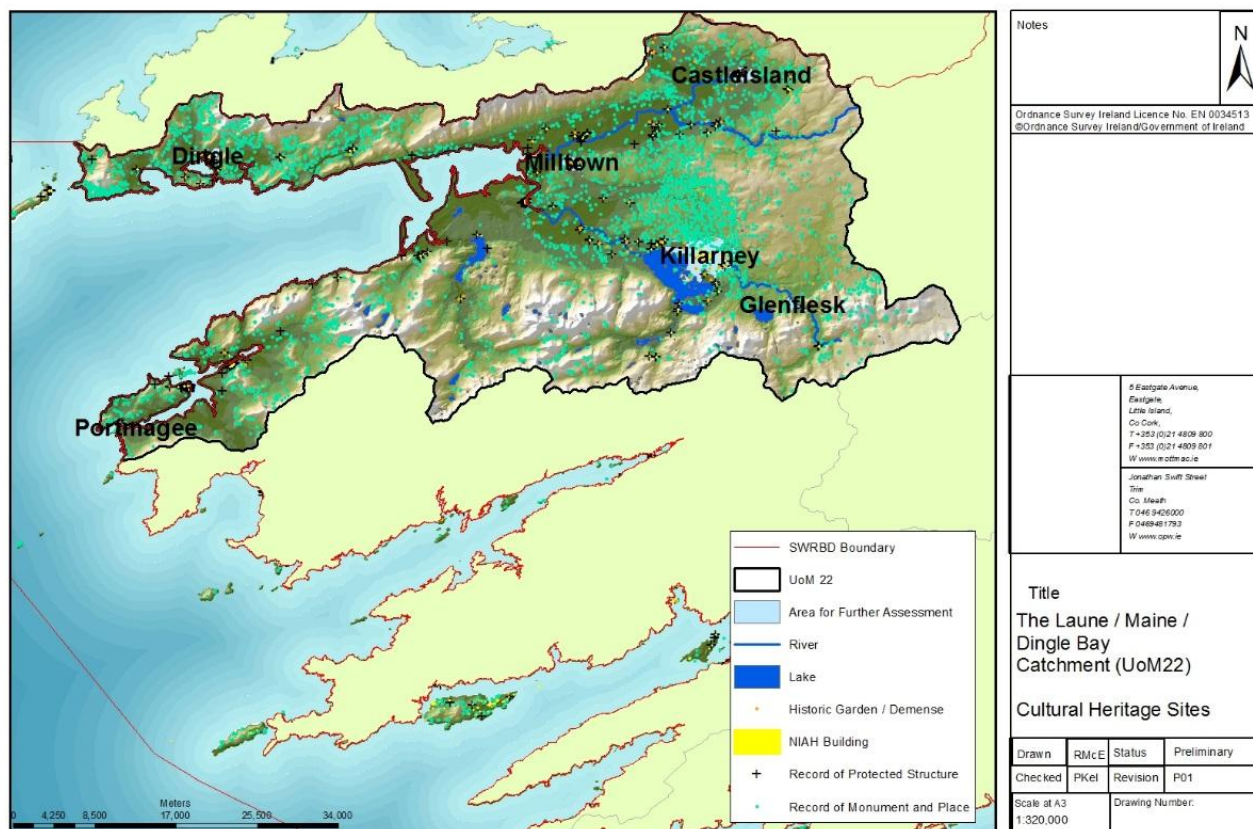
- i Burial grounds;
- i Bridge (including railway bridge);
- i Buildings;
- i Cairn;
- i Canal;
- i Castle;
- i Church;
- i Historic Town;
- i Landscape feature;

- | Earthwork and enclosure;
- | Fluacht Fia;
- | Kiln;
- | Ogham Stone / Standing Stone;
- | Ringfort;
- | Water Mill.

There are approximately 293 listings on the NIAH within this Unit of Management, approximately 143 of which are located within the AFAs in UoM 22. There are over 60 historic gardens and demesnes in UoM 22; 15 of which are located in AFAs. There are approximately 323 protected structures in UoM 22, 89 of which are located in the AFAs in UoM 22.

Kerry Biosphere Reserve previously known as Killarney Biosphere Reserve is designated as a Biosphere Reserve by UNESCO.

Figure 6.6: Archaeological and Architectural Features of UoM 22



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.

6.4.2 Architecture, Archaeology and Cultural Heritage - Key Issues in UoM 22

Many RMP sites are associated with watercourses and may potentially be impacted by the implementation of flood risk management measures. The bridge structure in Killarney is protected and may be impacted by flood risk management measures which may include structural alteration or destruction of the structure. There is a protected water mill in Killarney. Other features, including churches, religious buildings and country 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. There is one shipwreck record at Valencia Bay in 1988. Tidal flood risk management measures may potentially impact upon maritime archaeology.

6.5 Water Resources

Water resources include surface water (rivers, streams and 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 Laune and the Maine River catchments are generally classified as having good/high status under the Water Framework Directive (refer to Figure 6.7).

Activities in UoM 22 which are known to be adversely impacting on 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 land spreading and slurry pits), licensed discharges (IPPC and Local Authority) (Refer to Figure 6.8).

There is one landfill and five licensed waste transfer / recovery facilities within UoM 22.

There are a number of IPPC/IED facilities, there are over 20 licensed discharges to waters, 17 waste water treatment plants, and 5 water treatment plants in UoM 22. The CSOs are principally confined to populated areas and are located in the AFAs of Killarney, Castleisland and Milltown.

There are no 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 in UoM 22.

Figure 6.7: Surface Waterbody Status in UoM 22

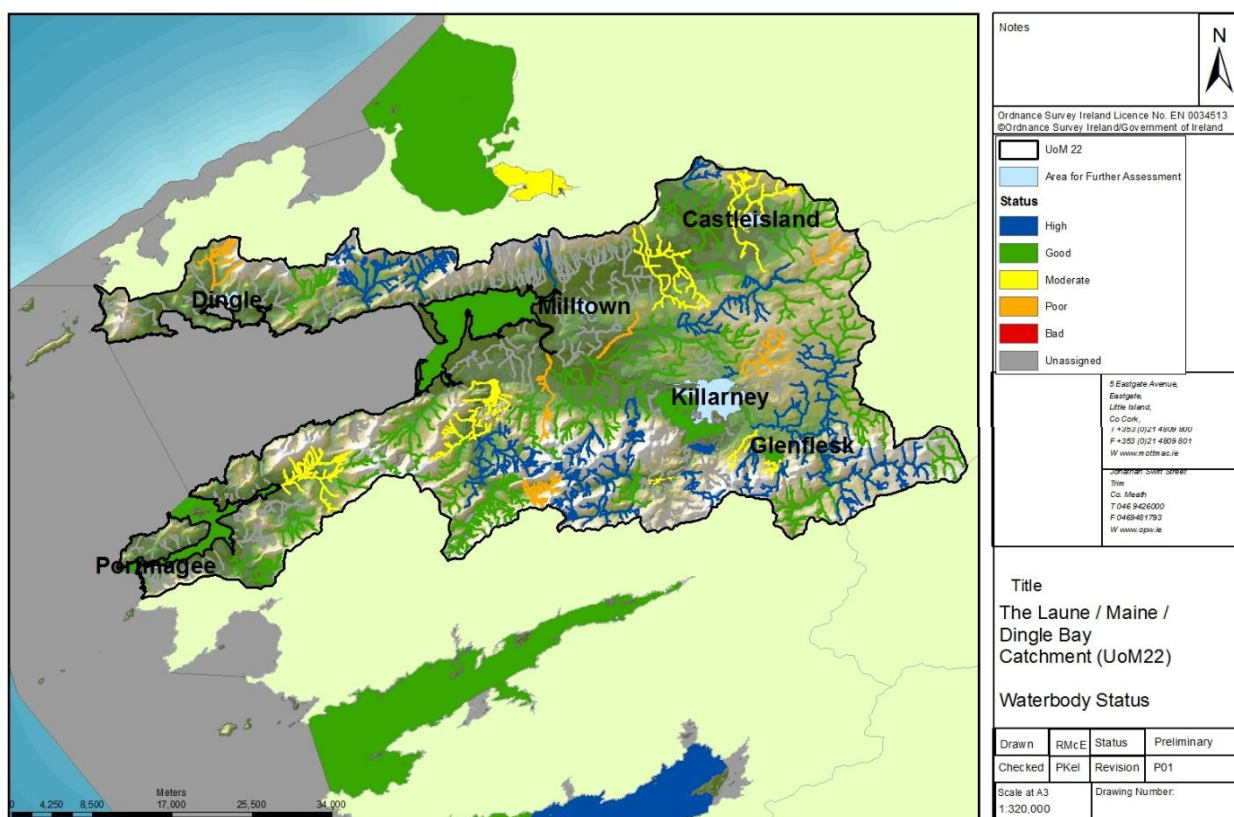
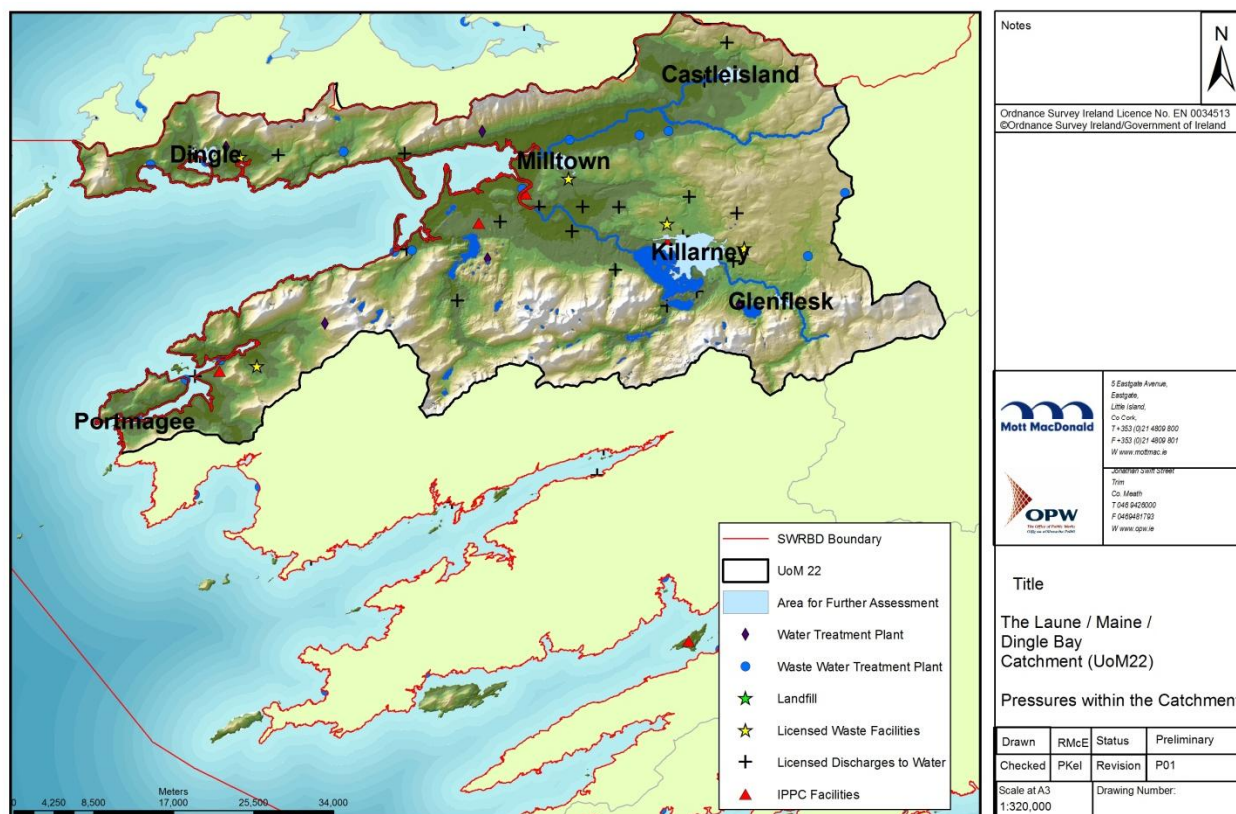


Figure 6.8: Point Pressures in UoM 22



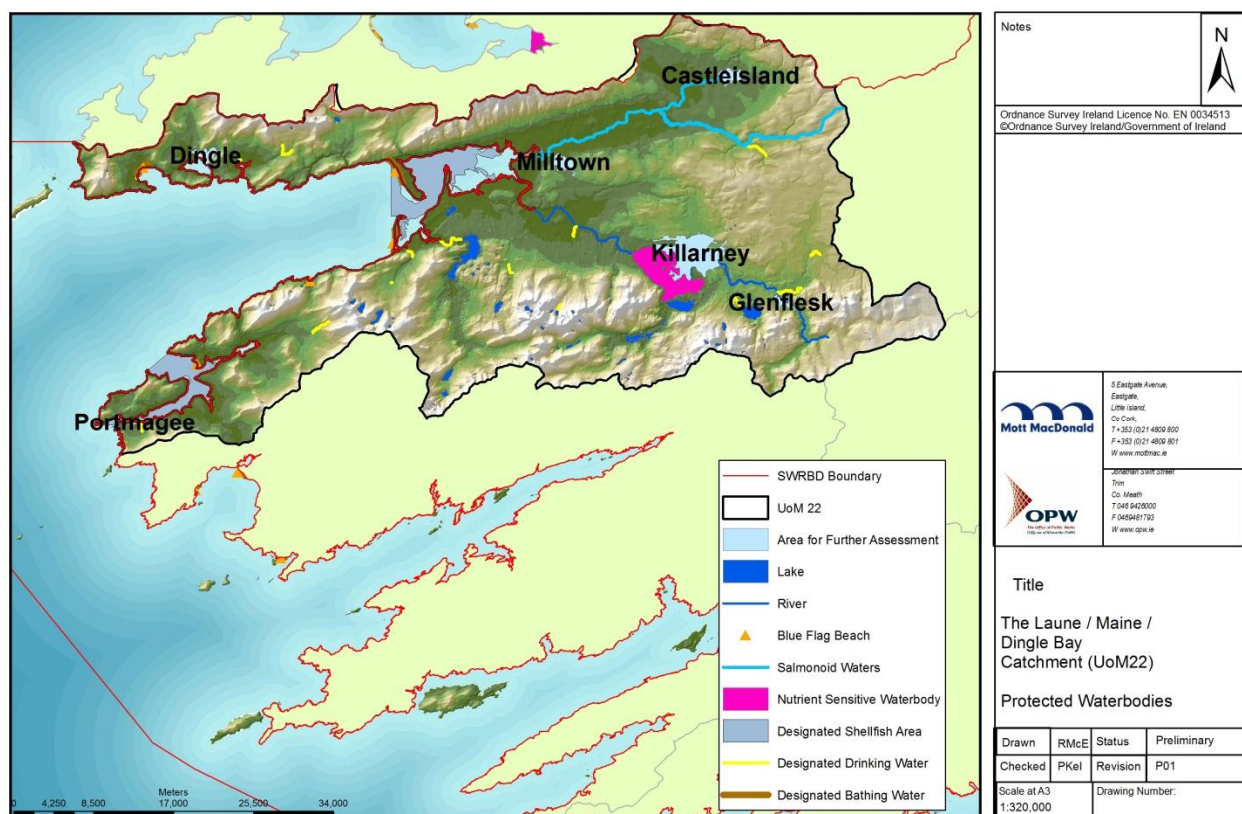
The majority of groundwater in UoM 22 is classified as good status with the exception of the Laune / Muckcross groundwater bodies. There are no groundwater source protection areas located within UoM 22. Aquifer vulnerability in this UoM includes areas of extreme and high vulnerability. Implementation of flood risk management measures could potentially result in contamination of groundwaters in such vulnerable areas.

A number of water resources in UoM 22 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;

- | 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;
- | 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;
- | 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;
- | Designated Salmonid Waters – under the European Communities (Quality of Salmonid Waters) Regulations, 1988. The objective of this designation is to maintain water quality for salmon and trout freshwater species.

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 2015 (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 and saw 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 River Basin Management Plan is currently in draft and in consultation, the 2nd cycle of the Plan 2018-2021 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. Any proposed future development must be designed and implemented such that it will not result in a deterioration in existing waterbody status and will not impede the achievement of the good status by the required timescale.

6.5.2 Water Resources - Key Issues in UoM 22

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.

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^[1] 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.

^[1] Air Quality in Ireland 2015

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. Adaptation to climate change is recognised as an important response to climate change. Adaptation to reduce vulnerability to the adverse impacts of climate change have been considered with the development of the FRMP.

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 density;
- 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 22

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;
- i 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.
- i 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 22 is presented in Table 6.7 The waters in proximity to the Blasket Islands (off the Dingle peninsula) were designated an OSPAR marine protected area in 2009.

Killarney National Park is designated a UNESCO Biosphere Reserve. The site comprises mountains and woodlands surrounding Lough Leane Lake and adjacent smaller lakes, moorlands, parks and gardens. Three main woodland types occur: woods of sessile oak (*Quercus petraea*) with holly (*Ilex aquifolium*) in the understorey on sandstone; yew (*Taxus baccata*) wood growing on almost bare limestone; and carr forest dominated by *Alnus glutinosa* in places along the north-east shore of Lough Leane and in other poorly-drained areas.

There are four Nature Reserves within UoM 22: Derrycunihy Wood, Eirk Bog, Lough Nambrackdarrig, Lough Yganavan, and Sheheree Bog.

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 22 is presented in Table 6.7.

⁶ Council Directive 92/43/EEC

Castlemaine Harbour is identified as a RAMSAR site. The estuarine habitat the head of Dingle Bay protected under the RAMSAR convention includes mudflats, sandbanks, saltmarshes and dunes. The mudflats support one of the four largest 'Zostera' beds in Ireland. The mudflats provide food for various species of wintering waterbirds, including internationally important numbers of the goose (*Branta bernicla* hrota). There are four wildfowl sanctuaries within UoM 22, namely Coon (at Ventry), Rossbehy, Doolough/Tullaha, and Derrycunihy & Gallavally.

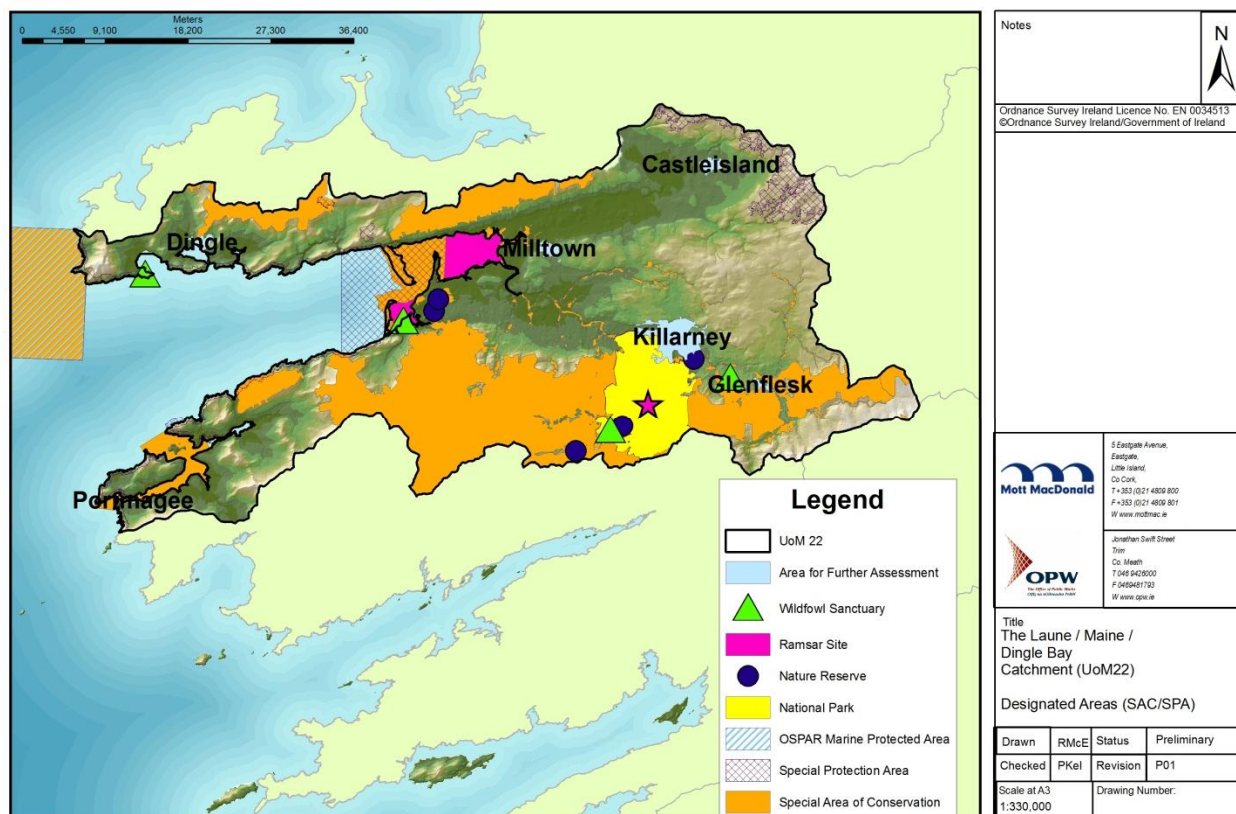
Table 6.7: Special Areas of Conservation in UoM 22

Site Name	Site Code	Qualifying Interests
Blasket Islands SAC	002172	Situated at the end of the Dingle peninsula, the site includes good examples of exposed infralittoral and circalittoral reef communities. The rare red alga, <i>Schizymenia dubyi</i> , occurs in the infralittoral zone, and notable sponge, nudibranch, anthozoan and hydroid species also occur in the area. Sea caves occur on several of the islands. Vegetated sea cliffs are very well represented on most of the islands. The islands are important for breeding birds, in particular for <i>Halichoerus grypus</i> , <i>Hydrobates pelagicus</i> and <i>Puffinus puffinus</i> . <i>Phocoena phocoena</i> (harbour porpoise) also occur here.
Castlemaine Harbour SAC	000343	This is a large coastal site occupying the innermost part of Dingle Bay in Co. Kerry and is of major ecological importance for its diversity and range of coastal habitats and species including dunes and saltmarsh.
Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC	000365	This site is of great ecological importance. It includes the most extensive oakwoods in the country, with some of the best bryophyte communities in Europe
Lough Yganavan and Lough Nambrackdarrig SAC	000370	This site includes two annexed habitats: residual inland fixed dune system and a shallow oligotrophic lake system.
Mount Brandon SAC	000375	This site is of high ecological importance for the alpine and arctic-alpine heath and cliff communities it supports. The site also supports a population of <i>Margaritifera margaritifera</i> . Two Annex I Bird Directive species, <i>Falco peregrinus</i> and <i>Pyrhocorax pyrrhocorax</i> , breed within the site.
Mullaghanish Bog SAC	001890	This site comprises a small area of intact mountain blanket bog on the summit of Mullaghanish
Old Domestic Building, Curraglass Wood SAC	002041	This site consists of a small two-roomed stone dwelling situated in Rossacrae Wood, North of Kilgarven, Co. Kerry. This site is used by >100 Lesser Horseshoe Bats (<i>Rhinolophus hipposideros</i>)
Sheheree (Ardagh) Bog SAC	000382	This raised bog site contains areas of active raised bog, degraded raised bog, carr woodland and marsh/rich-fen vegetation. It is the only remaining raised bog site with an intact surrounding lagg system in the country
Slieve Mish Mountains SAC	002185	The site contains a number of habitats which are listed in the EU Habitats Directive including wet heath, oligotrophic lakes and blanket bog. The site contains an important population of the Annex II fern, <i>Trichomanes speciosum</i> .
Valencia Harbour/Portmagee Channel SAC	002262	The site contains important and good quality examples of large shallow inlets and bays, intertidal sand and mud flats, and reefs, and has several species of high conservation importance that do not occur in the rest of the country. Two scarce nudibranch species, scarce and vulnerable sea pens and an echinoderm of conservation importance occur.

Table 6.8: Special Protection Areas in UoM 22

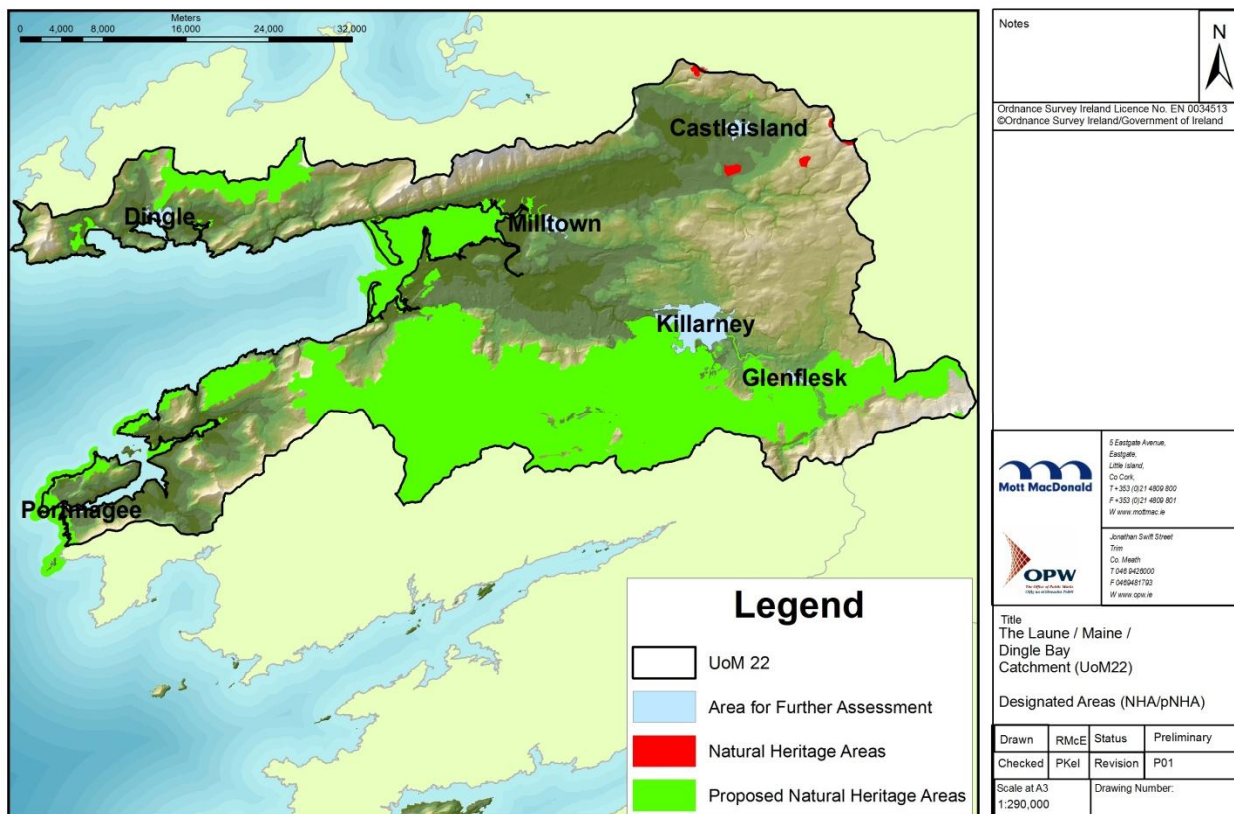
Site Name	Site Code	Qualifying Interests
Castlemaine Harbour SPA	004029	This is a large coastal site occupying the innermost part of Dingle Bay and is one of the most important sites for wintering waterfowl in the south-west. It supports nationally important populations of at least a further seven species: <i>Gavia stellata</i> , <i>Anas acuta</i> , <i>Anas penelope</i> , <i>Charadrius hiaticula</i> , <i>Calidris alba</i> , <i>Limosa lapponica</i> and <i>Tringa nebularia</i> .
Dingle Peninsula SPA	004153	The Dingle Peninsula SPA is a large site situated on the west coast of Co. Kerry. The site supports <i>Pyrrhocorax pyrrhocorax</i> . The sea cliffs also support nationally important populations of breeding <i>Falco peregrinus</i> and <i>Fulmarus glacialis</i> .
Eirk Bog SPA	004108	Eirk Bog is located within the Owenreagh River valley, approximately 1 km north of Moll's Gap. The bog has been used as a feeding site by the flock of wintering <i>Anser albifrons flavirostris</i> centred in the Killarney Valley.
Iveragh Peninsula SPA	004154	This site supports a nationally important population of breeding Chough, a Red Data Book species that is listed on Annex I of the E.U. Birds Directive. The site also supports a Peregrine population. The site also holds nationally important populations of Guillemot (2,860 pairs in 1999-2000), Fulmar (766 pairs in 1999-2000), Kittiwake (1,150 pairs in 2000), Great Black-backed Gull (63 pairs in 1999-2000) and Black Guillemot (118 individuals in 1999), as well as smaller populations of other breeding seabirds: Razorbill (90 pairs in 1999-2000), Herring Gull (30 pairs in 1999-2000), Cormorant (33 pairs in 1999-2000) and Shag (11 pairs in 1999-2000).
Killarney National Park SPA	004038	The site is of importance as it supports a good diversity of upland and woodland birds, as well as wintering waterfowl. It is a traditional site for a population of <i>Anser albifrons flavirostris</i> . Upland species which breed within the site include <i>Falco peregrinus</i> , <i>Falco columbarius</i> , <i>Lagopus lagopus</i> and <i>Turdus torquatus</i> - the latter two species are Red-listed in Ireland.
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA	004161	Supports c. 21% of the all-Ireland population of <i>Circus cyaneus</i> , which is the largest concentration in the country for the species.

Figure 6.10: Special Areas of Conservation and Special Protection Areas in UoM 22



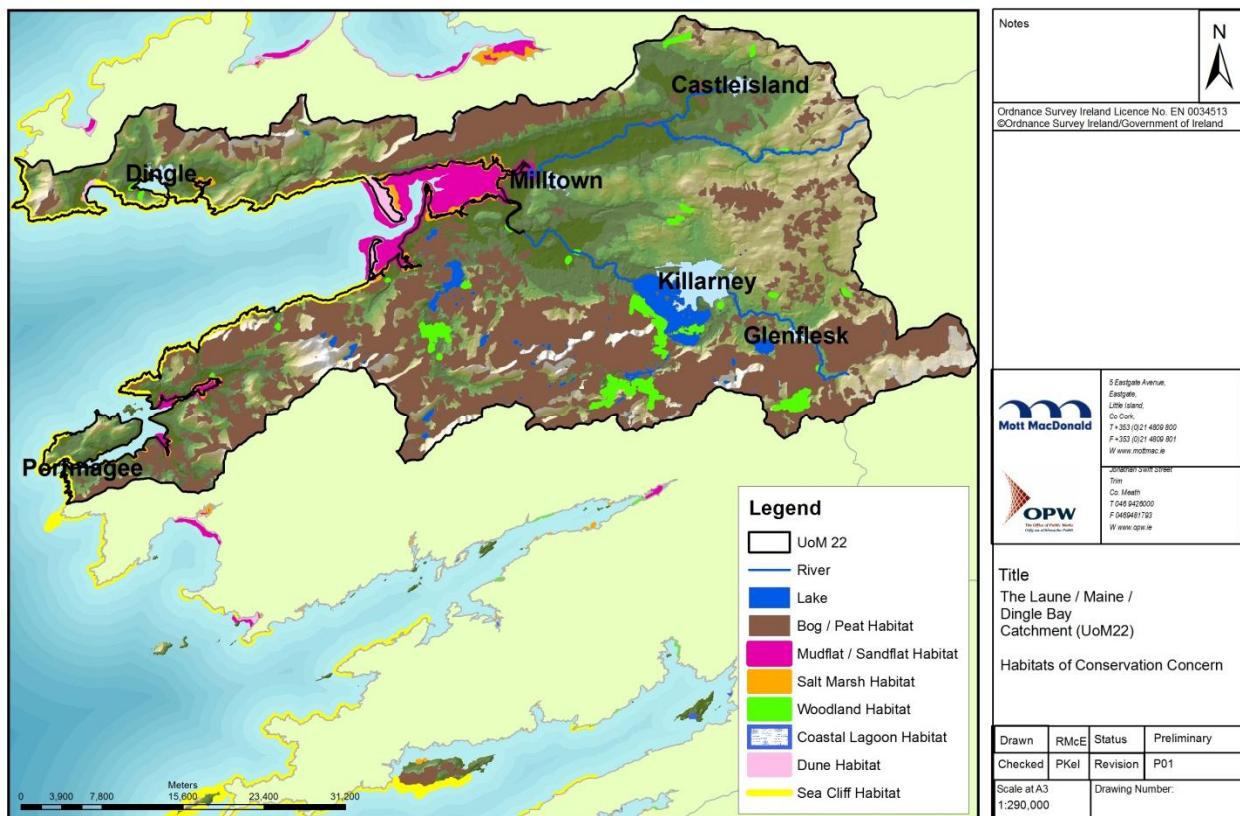
There are three Natural Heritage Areas (NHAs) and 18 proposed Natural Heritage Areas (pNHAs) within the study area which have been designated under the Wildlife Act. These areas are designated as they are considered important habitats which support animals or vegetation of importance. NHAs which have been designated in Ireland are mainly raised or blanket bog habitat. pNHAs are proposed for a variety of habitats in Ireland ranging in size and function, however each is proposed for the protection of plants or animals of importance (refer to Figure 6.11).

Figure 6.11: Natural Heritage Areas and proposed Natural Heritage Areas in UoM 22



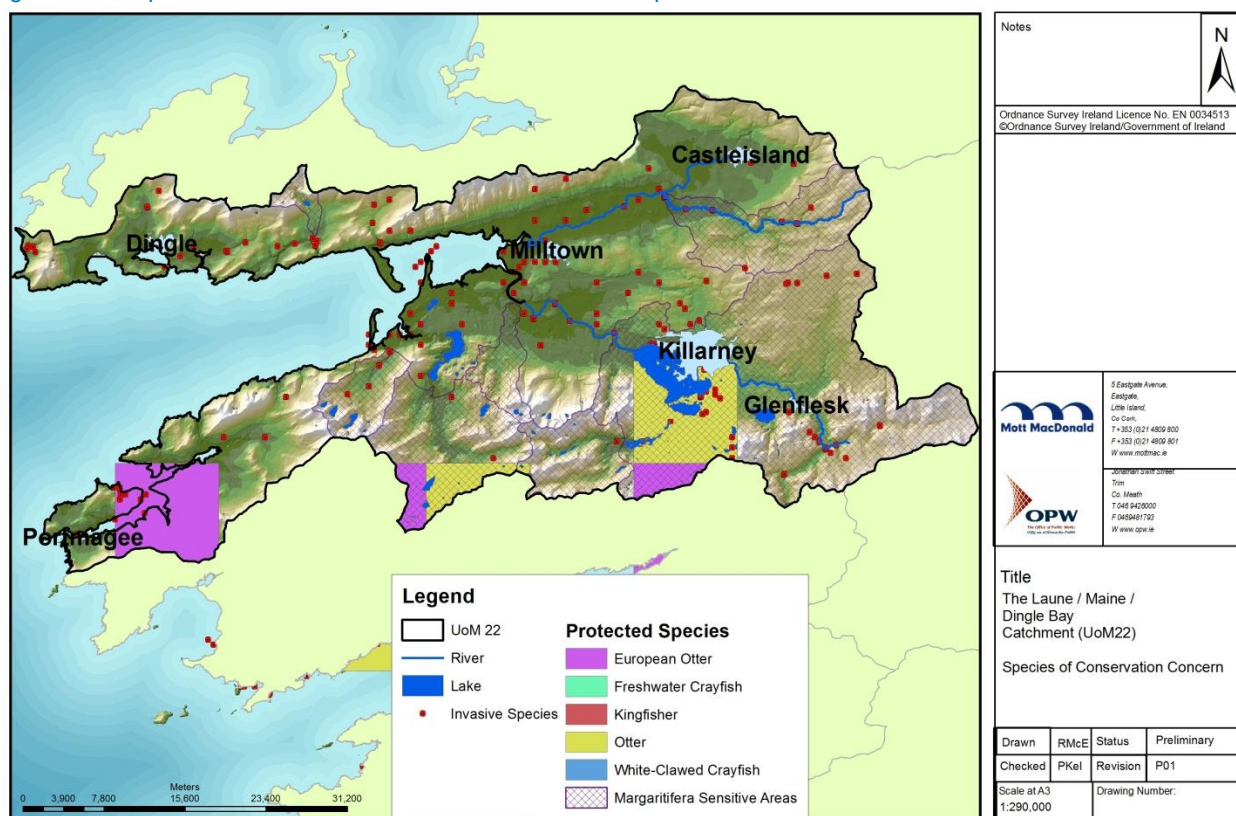
Other ecological features of significance within UoM 22 include broadleaf, mixed and coniferous woodlands, moors and heaths, peat bogs, salt marshes, sea cliffs, mudflats / sandflats, and estuaries. Many of these habitats are Annex I habitats and are already contained within the boundary of designated SACs (refer to Figure 6.12).

Figure 6.12: Habitats of Conservation Concern



The UoM 22 also hosts a number of protected species, many of which are aquatic species. Of particular note are the extensive areas of freshwater pearl mussel sensitive areas within the UoM. Specific impacts to habitats and species of conservation importance were addressed at options selection stage. Aquatic species of importance which occur in UoM 22 are shown in Figure 6.13. Records of invasive species in UoM 22 are also shown in Figure 6.13, many of which are aquatic and include Canadian Pondweed, Chilean Iris, Common Cord Grass, Fringed Waterlily, Perch, Roach, 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 22

Many ecological features of significance within UoM 22 are aquatic habitats and species and, by the nature of the environment they live in, are relatively tolerant to flood events. In fact flood events can 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 re-suspension 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 22. 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.

6.8 Tourism and Recreation

UoM 22 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:

- i The Wild Atlantic Way;
- i Amenity walks and trails. Including a number of Slí na Sláinte walks such as that in Dingle and also more extensive walking routes such as The Kerry Way, which is the longest of Ireland's Waymarked Trails. It is a 214km circular route that circumnavigates the Iveragh peninsula, starting and finishing in Killarney. There are also numerous walks within Killarney National Park and along the coast. In addition the Kerry Geopark promotes numerous geological heritage trails (geo trails) and geological features of tourist / recreation interest;
- i Cycling Routes. These are often coupled with walking routes and include the Mangerton Mountain Looped Walk which ascends 800m around the tourist areas of Torc Waterfall in Killarney, and the Rossbeigh Looped Walk 10km over and around Rossbeigh Hill in Glenbeigh;

- | Golf. There are a number of golf courses within UoM 22 including the Killorglin golf club;
- | Equestrian centres. These are particularly concentrated in the Killarney area and in the more popular coastal tourist location such as Dingle and Glenbeigh.

The Killarney National Park is a significant tourist attraction in the area, with Muckross Lake and Lough Leane attracting angling and boating tourists alike. Boats depart from Portmagee to the Skelligs and to whale watching excursions which are also run from Dingle. The coastal areas also host a number of water sports clubs. Angling is also dominant in the area with Lough Leane holds spring salmon and grilse which can be fished from January until September.

Blue Flag beaches are also an attraction of the area, including Kells, Whitestrand and Ventry.

6.8.1 Future Trends in 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 successful development of the "The Wild Atlantic Way".

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 22

Many of the tourist attractions are centred on the coast or around the lakes of Killarney and are reliant on the portrayal of pristine environment. 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.

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 22 generally support fish species indicative of good environmental quality.

The River Maine and the Laune catchment are recognised as important rivers to support brown trout and salmon species. The river Maine is designated as Salmonid under the European Communities (Quality of

Salmonid Waters) Regulations, 1988. In 2015 2,076 salmon were caught on the River Laune. This represents 27% of the commercial catch⁷.

There are a number of large areas designated in accordance with the Shellfish Waters Directive (2006/113/EC) in UoM 22 including Valentia Harbour and Cromane.

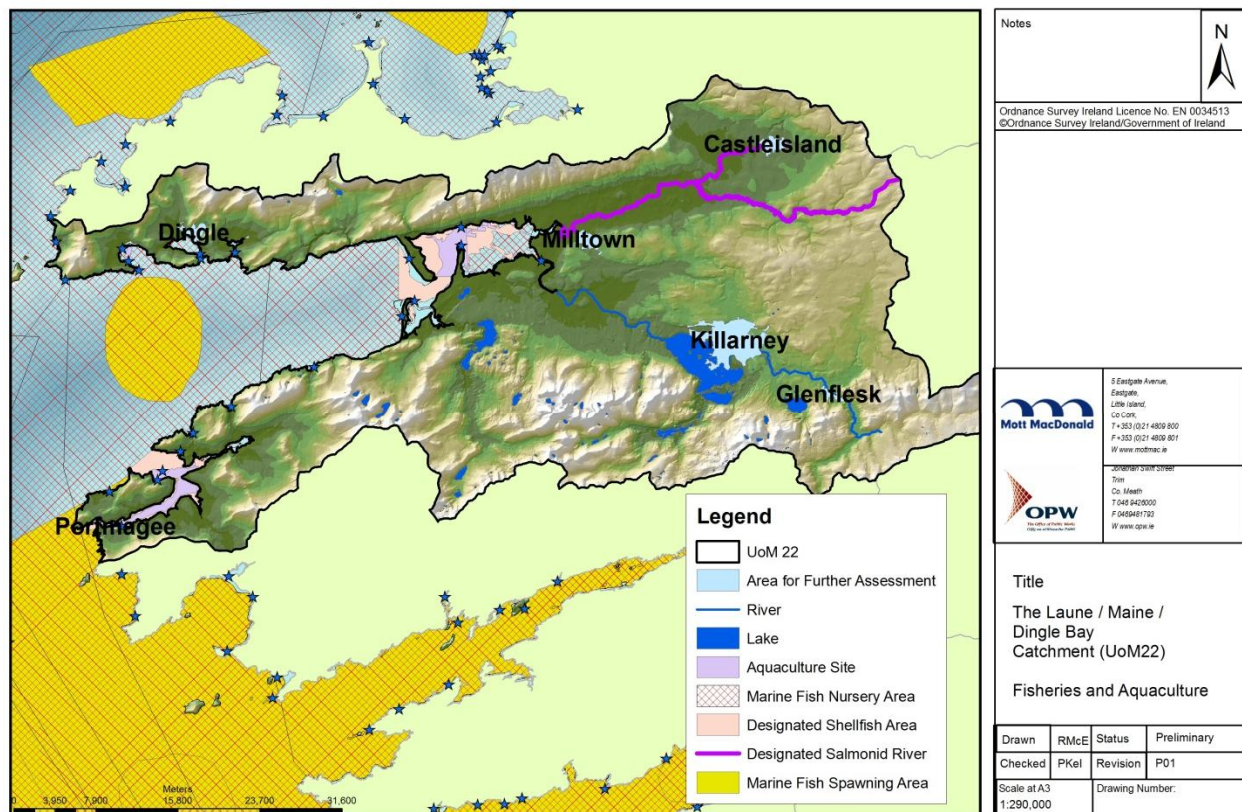
There are approximately 45 aquaculture licences administered through the Aquaculture and Foreshore Management Division of the Department of Agriculture, Food and the Marine within / in close proximity to UoM 22. All, with the exception of one land-based finfish farm at Dingle, are shellfish licences. The high number of licences administered for the areas is reflective of the generally good quality waters in the area.

The coastal habitat in proximity to UoM 22 hosts significant nursery and spawning habitat for a number of marine fish species including cod, herring, mackerel, monk fish and whiting. Much of Dingle Peninsula is used as a land-based vantage point for marine fishing for the above species.

Flood risk management will need to consider the impact upon fish habitat and migratory routes.

⁷ 2015 Annual Report for Inland Fisheries Ireland (IFI)

Figure 6.14: Fisheries and Aquaculture in UoM 22



6.9.1 Future Trends in Fisheries, Aquaculture and Angling

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

There are existing 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 contribute towards the enhancement of fisheries in Ireland.

Environmental Rivers Enhancement Programmes (EREP) are funded through OPW and co-ordinated by IFI. These programmes include river bank protection, fish passage improvements, spawning enhancement, in-stream structures, fencing and riparian zone improvement. An example of this is the Maine River underwent capital enhancement works under the 2008-2010 programme. These works involved the construction of alternating deflectors within the river, coupled with pool and gravel habitat and stabilisation of eroding banks in several locations. These measures will enhance the environment in support of fisheries. Similar measures may be undertaken in the future in other watercourses within this UoM.

6.9.2 Fisheries, Aquaculture and Angling - Key Issues in UoM 22

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.

Implementation of flood risk management measures can contribute towards the spread of invasive species if not properly managed.

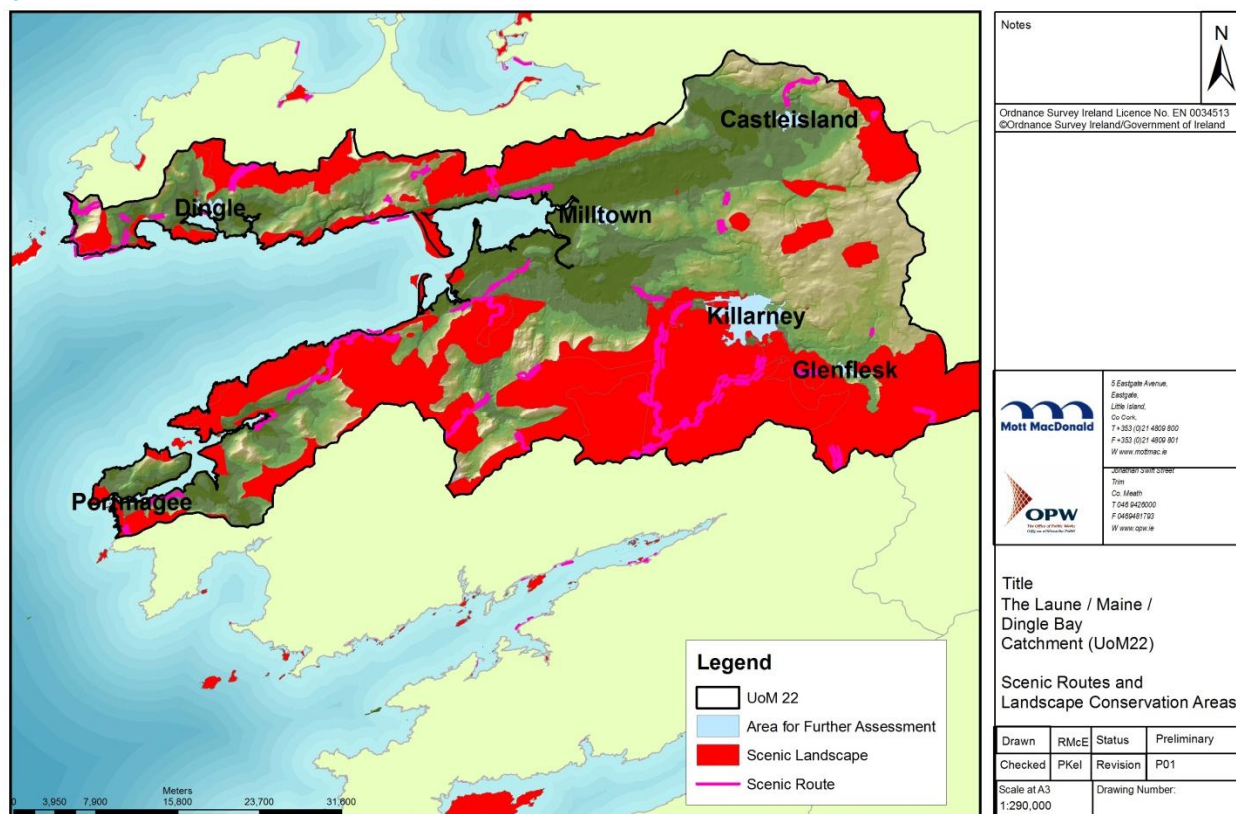
6.10 Landscape and Visual Amenity

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 22 are along national, regional and local roads while others are along river valleys or coastal areas.

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. Much of the landscape surrounding the Lakes of Killarney and along the coast in UoM 22 are identified as scenic landscapes and include scenic routes.

Figure 6.15: Scenic Routes and Landscape Conservation Areas in UoM 22



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. In response 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 22

Many amenity walks, scenic routes and views are along river valleys, the Lakes of Killarney, 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.

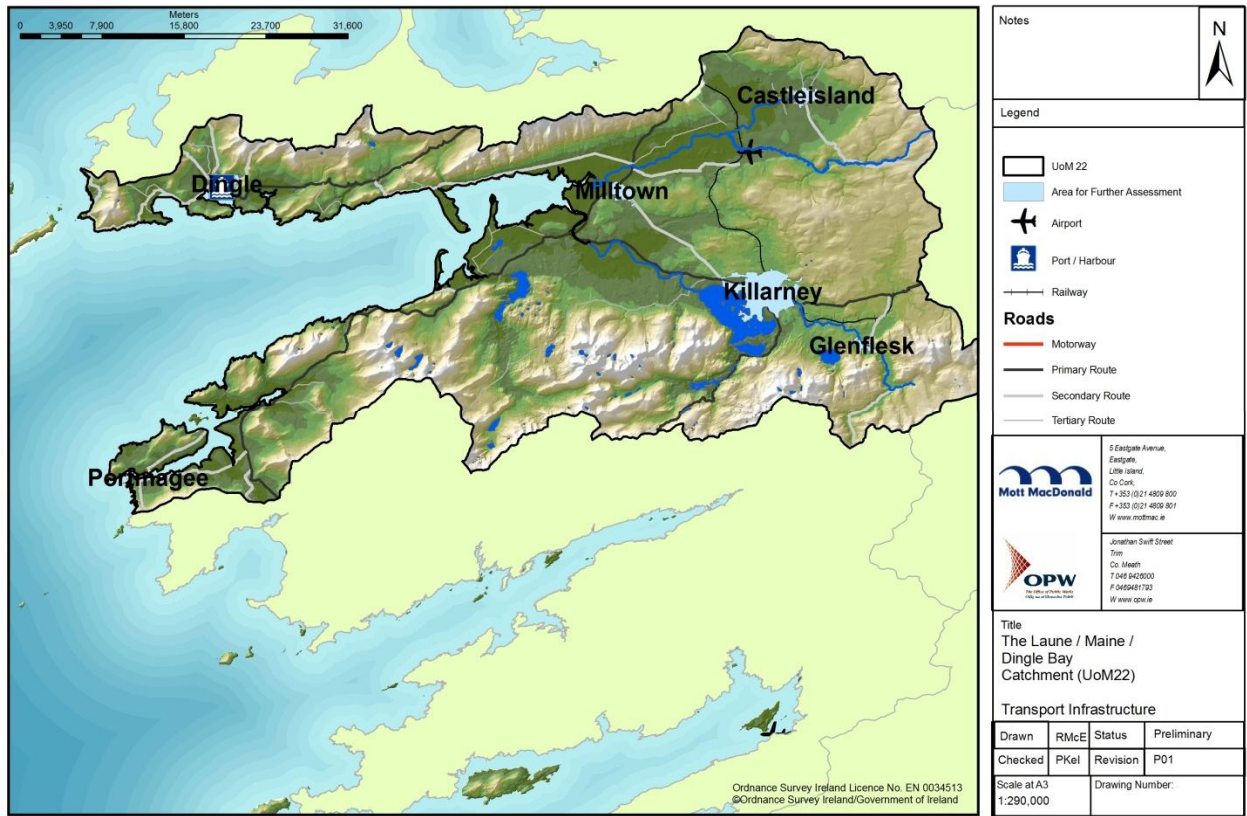
Flooding can be a formative feature of a landscape's character. Flood risk management options need to be sympathetic towards landscape character and opportunities to enhance landscape character should be explored.

6.11 Infrastructure and Material Assets

UoM 22 is relatively sparsely serviced by transport infrastructure. The major road infrastructure in the area comprises the N71 Cork to Killarney, the N71 ring of Kerry, and the N86 Tralee to Dingle National Secondary Routes. The Killarney to Tralee railway line transects this Unit of Management. Much of the road and rail infrastructure is located close to and along river networks in UoM 22 and are susceptible to flooding.

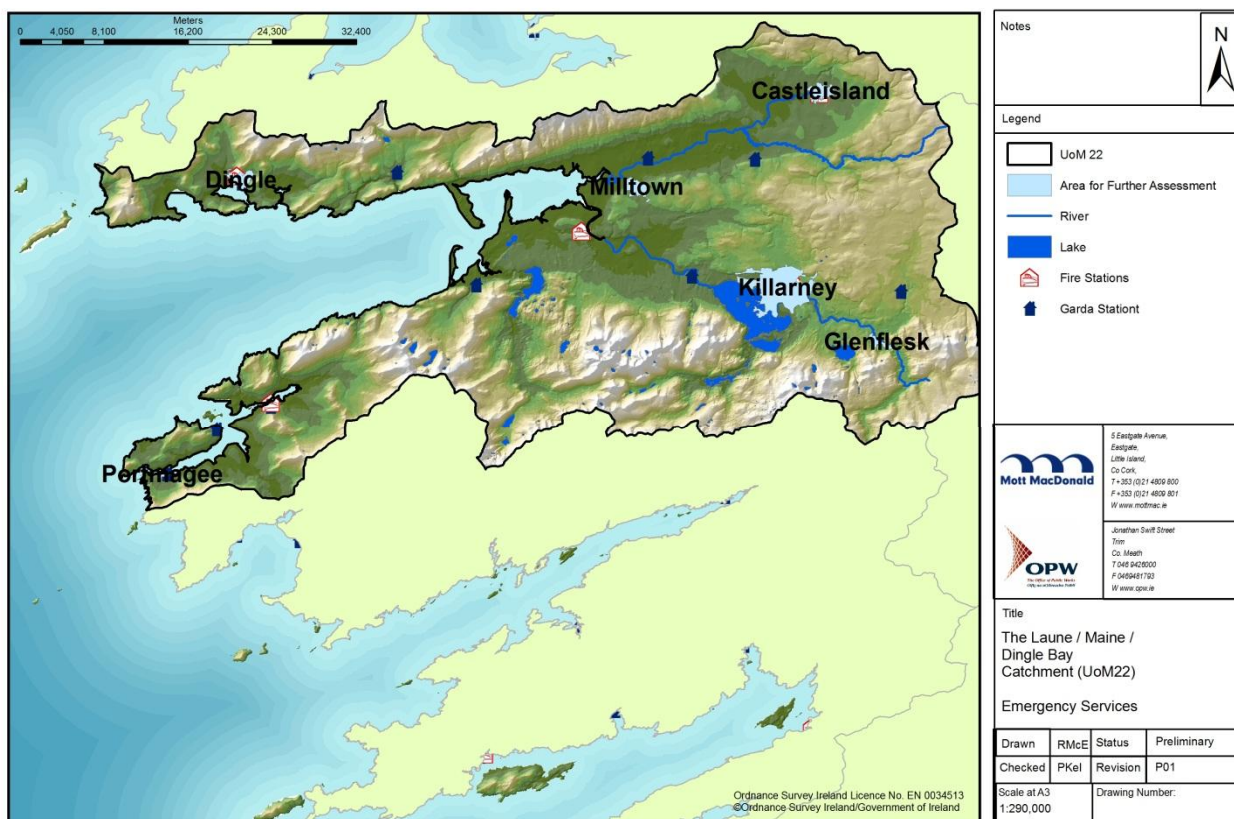
Kerry Airport, located at Farranfore is located within the fluvial floodplain of the Brown Flesk River. Flooding of the transport infrastructure has the potential to cause disruption to movements of residents and commuters which could have a short-term impact on the local economy.

Figure 6.16: Key Transport infrastructure in UoM 22



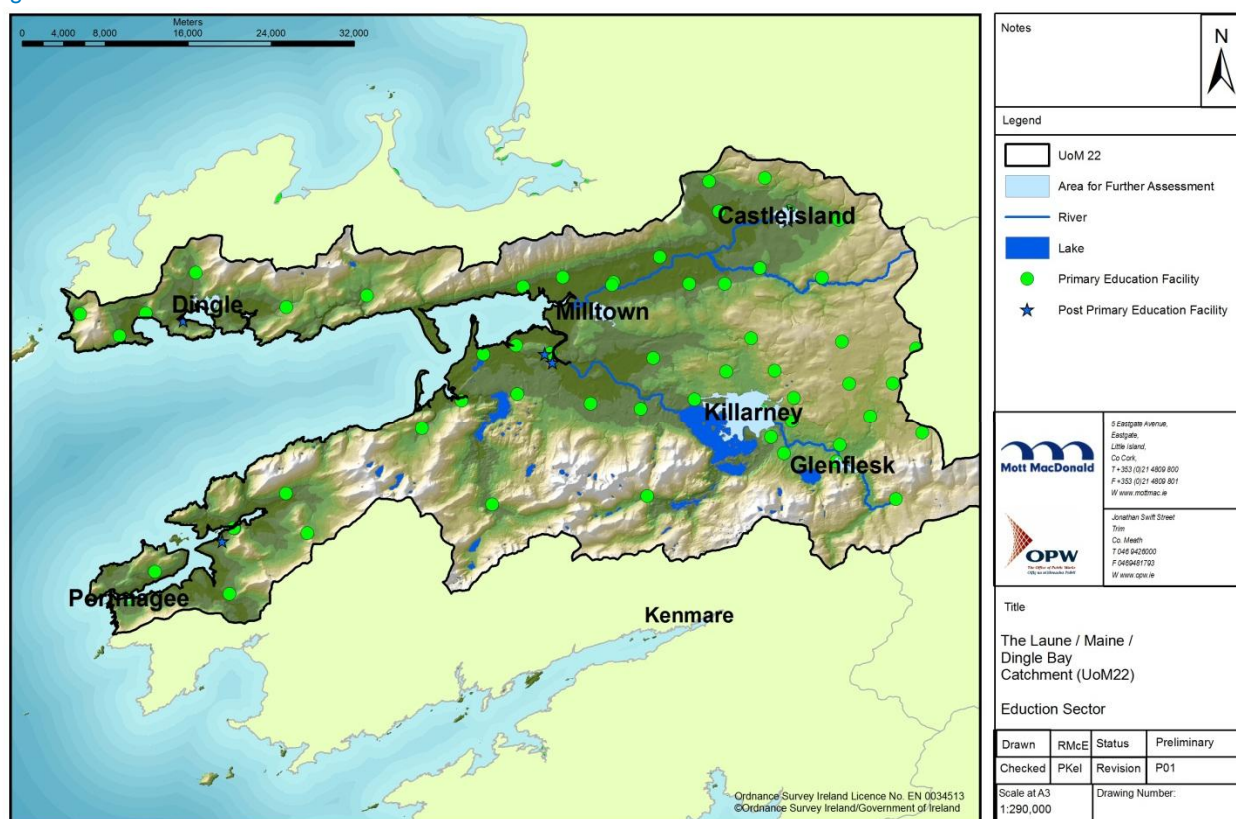
There are approximately 5 Fire Stations and a number of Garda Stations in this UoM. The efficient delivery of emergency services is dependent on clear access to those requiring the service. Flooding of the road network can impede delivery of these services.

Figure 6.17: Emergency Services in UoM 22



Education facilities within the region are dominated by primary schools, with approximately 65 present in UoM 22. Secondary facilities are far less abundant, in range of almost 12 post-primary facilities. There are no third level facilities in the UoM however the Institute of Technology in Tralee does operate a number of courses from a Regional Learning Centre in Killarney.

Figure 6.18: Education Facilities in UoM 22



There are number of wind farms currently operational within UoM 22, 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 22

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 taken into account 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	√	√	√	√		√	√	√	√	√
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 an index 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 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 FRMP for UoM 22 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 were 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 22.

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 22 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.

8.2.1 Structural Measures

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 Killarney

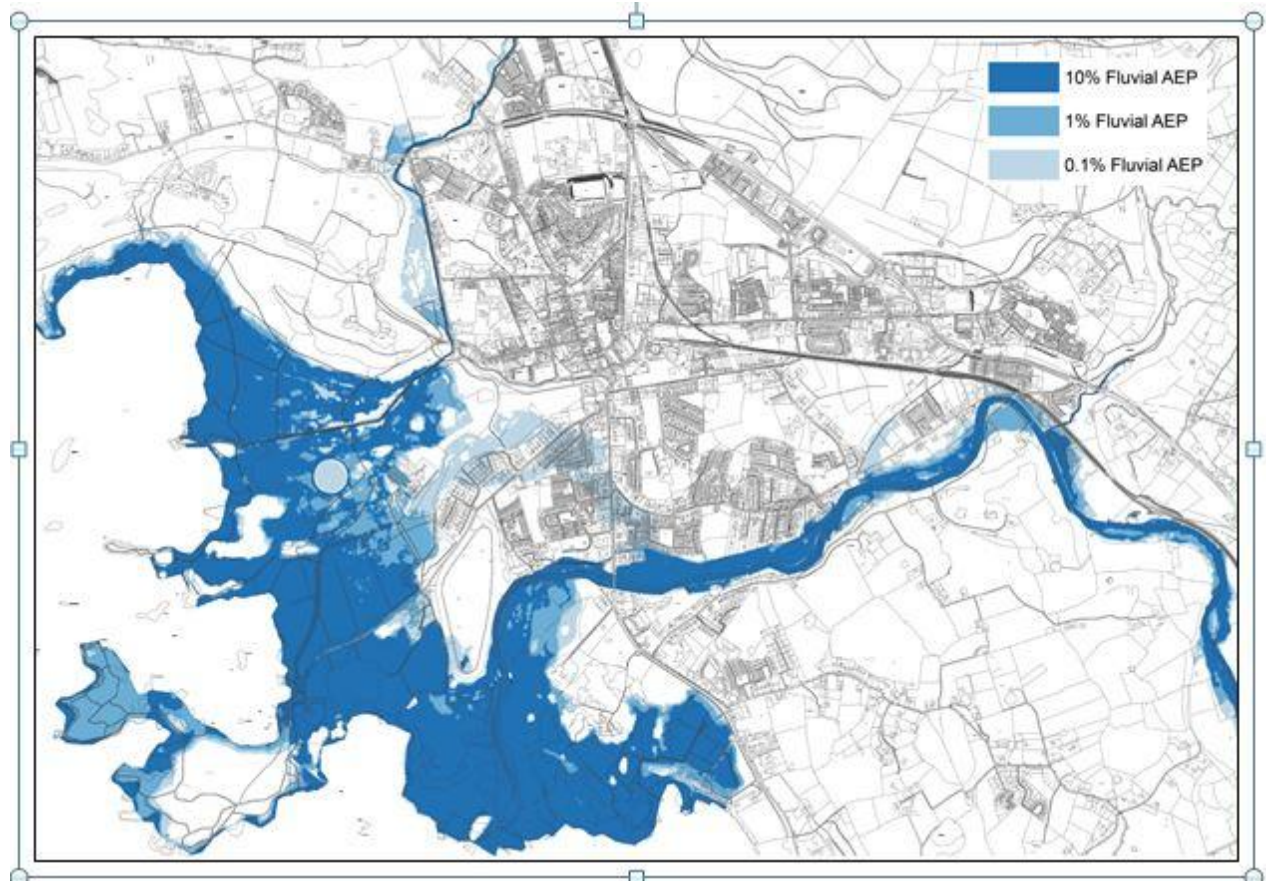
Killarney in County Kerry is located along the River Flesk and immediately upstream of Lough Leane. There are a number of other smaller rivers and tributaries which flow through Killarney into Lough Leane. Killarney is at risk of fluvial flooding. The AFA and the existing fluvial flood risk are highlighted in Figure 8.1.

8.3.1 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 Defence /Localised Protection Works** - this option includes localised fluvial defence works within the town includes walls and embankments ranging in height form 1m to 2m. The proposed option fully achieves the required standard of protection for the 1% AEP fluvial event.

Figure 8.1: Killarney Current Scenario Fluvial Flood Extents



8.3.2 Key Environmental Sensitivities

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

- i Killarney is at risk of fluvial flooding.
- i Killarney is located along River Flesk. The river is classified as having good water status under the Water Framework Directive (WFD). Lough Leane is also classified as having good water status under the WFD.

- i There is one significant polluting source (Waste Water Treatment Plant) within the 0.1% AEP fluvial flood extent.
- i The Flesk flows into Lough Leane which is part of the Killarney National Park Special Area of Conservation SAC and Special Protection Areas. The River Flesk is also part of the SAC. There are a number of species of conservation importance within the AFA, these include otters, badgers, and lamprey and salmon.
- i There are a number of confirmed roosts for this species within a 6km radius of Killarney (NPWS Data).
- i River Flesk is considered a Margaritifera sensitive area (Freshwater Pearl Mussel).
- i Receptors at risk from fluvial flooding 1% AEP within the AFA:
 - 10 No. Residential properties
 - 4 No. Non-Residential properties
 - 1 No. Society Amenity Sites
 - 1 No. NIAH sites
 - 5 No, RMPs sites
 - 2 No. Roads.

8.3.3 Environmental Assessment

The potential impacts arising for each of the proposed measures has been assessed in and 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: Killarney Options Scoring Matrix – Social and Environmental Objectives

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

SEA Scoring Matrix

Score	Key	Description
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+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 WFD objective, the construction of the do something Option 1 will result in temporary negative impacts on the water body status in the absence of appropriate mitigation. The Waste Water Treatment Plant (WwTP) is considered a significant polluting source in the AFA and Option 1 can contribute in achieving the objectives of the WFD by preventing recurring flooding to this significant polluting source.

Impacts on the conservation interests of the Killarney National Park SPA are extremely unlikely given that the flood walls and embankments would be constructed within the urban setting of the town which is sub-optimal habitat for Merlin and Greenland White-fronted Goose and works are proposed for outside of the SPA boundary.

Impacts on the qualifying features of the SPA from the proposed construction of flood walls and embankment on the River Flesk are unlikely due to absence of connectivity between the flood protection works and the supporting habitat of the qualifying species.

The embankments proposed along the River Flesk are within riparian habitat. Removal of bankside vegetation and the construction of earth mounds bank-side have an associated risk of elevated levels of sediment runoff to the watercourse. Sediment runoff has potential to cause impacts on Freshwater Pearl Mussel (FPM) which is particularly sensitive to elevations in siltation levels. The Freshwater Pearl Mussel Regulations (2009) require that there are no artificially elevated levels of siltation in pearl mussel habitat. The infilling of stable cobbles / gravels with sediment prevents oxygen movement into interstitial spaces and can lead to the death of juvenile mussels. Also adult mussels can suffer death due to a defensive response to water turbidity and pollution (they clam up and therefore cannot take up oxygen from the water). In the absence of appropriate mitigation, there is a significant possibility that FPM would be directly impacted by elevated levels of sediment runoff to the watercourse from the construction of the proposed flood risk management options.

Similarly Atlantic Salmon and Lamprey may be impacted by sedimentation, although it should be noted that these species are less sensitive to sedimentation than the FPM. Otter occur around the Lakes of Killarney. There are no current records for Otter on the River Flesk within Killarney Town. The urban setting is a likely deterrent to the species. The removal of riparian habitat to accommodate embankment

construction on the River Flesk is unlikely to result in damage to Otter habitat. Lesser Horseshoe Bat roosts occur within 1km of the proposed works. Lesser Horseshoe Bats normally forage in woodlands / scrub within 2.5km of their roosts (Schofield, 2008). It is highly unlikely that bat commuting or foraging would be affected by the implementation of defences within Killarney Town given the location of these measures within an urban setting (Lesser Horseshoe Bats are highly unlikely to be foraging within this environment as they will avoid brightly lit areas).

According to the Killarney Local Area Plan, Killarney is characterised as being particularly valuable in terms of architecture and archaeological heritage. The town has a number of NIAHs throughout the town, however only one site is at risk within the 1% AEP fluvial extent. The provision of a flood wall along the river will provide protection to a number of RMPs against flooding. Generally, Option 1 performs well in terms of its protection to the AFA and exceeds the minimum targets to provide protection to the town, however there is potential for permanent long term negative impacts arising from their setting within the visual envelope of the town resulting from the measures.

8.3.4 Preferred Flood Risk Management Option

On the basis of the evaluation summarised above, Option 1 is considered 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. Mitigation will include measures to limit impacts on the river channel and banks, particularly on water quality status of the river within the SAC and protection of the Freshwater Pearl Mussels and landscape and architectural setting of the AFA.

8.4 Dingle

Dingle is located on the coast with the Milltown River to the west and the Dingle Stream to the East of the town. Dingle is at risk of both fluvial and tidal flooding. The AFA and the existing fluvial flood risk are highlighted in Figure 8.2 and Figure 8.3.

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 & Storage** – This option considers a combination of online storage on the Dingle Stream and flood defence walls in proximity to the harbour ranging in height 1.1 to 1.8m and wall on the Milltown River Estuary ranging in height 2.7m to 2.9m. The proposed storage area is storage area is approximately 23,100m². This work will involve stream realignment, construction of embankments to contain floodwaters and installation of a sluice gate to control flow from the storage area. The proposed option fully achieves the required standard of protection for the 0.5% AEP tidal event and 1% AEP fluvial event.

Option 2 - Flow Diversion (Fluvial) & Flood Defences (Fluvial & Tidal) - This option aims to mitigate the fluvial flood risk by diverting the upstream flow from the Dingle Stream away from the town discharging to the sea through a new outfall. The proposed culvert size of 2.4m x 2.1m and length of 2000m is required. This measure is was identified used in combination with localised defence works along the quays ranging in height from 1.1m to 1.8m and defences 2.7 m to 2.9m on the Milltown River estuary. The proposed option fully achieves the required standard of protection for the 0.5% AEP tidal event and 1% AEP fluvial event.

Option 3 - Flood Defence (Fluvial and Tidal) - This option considers the management of flood risk through the construction of flood defences and localised protection works, ranging in height from 1.0m to 5.8m and defences 2.7 m to 2.9m on the Milltown River estuary. These defences include walls and embankments. The proposed option fully achieves the required standard of protection for the 0.5% AEP tidal event and 1% AEP fluvial event.

Figure 8.2: Dingle Current Scenario Fluvial Flood Extents

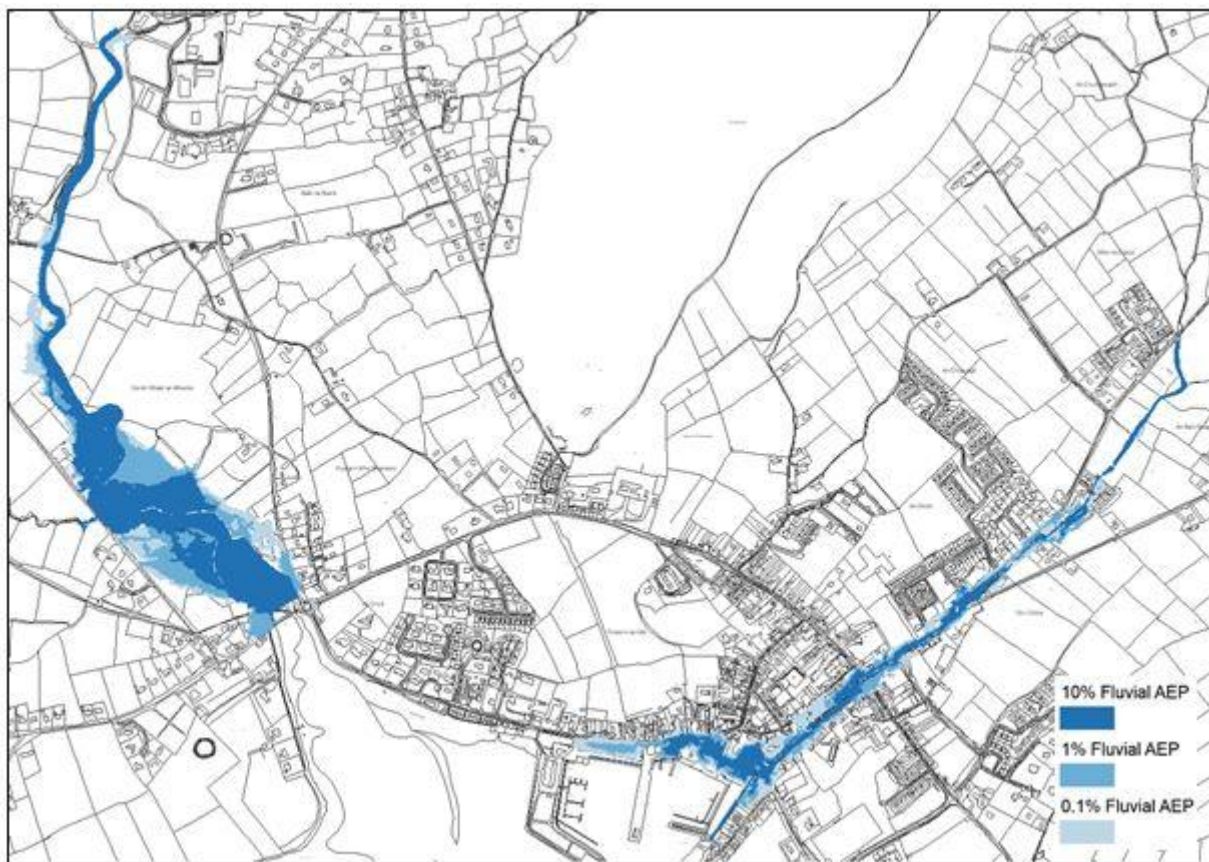


Figure 8.3: Dingle Current Scenario Tidal Flood Extents



8.4.2 Key Environmental Sensitivities

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

- | Dingle is at risk of both fluvial and tidal flooding.
- | There are two watercourses within the Dingle AFA; Dingle Stream and Milltown River. Dingle flows in a south-westerly direction into central Dingle along Spa Road, under Bridge Street and along the Mall to outfall at the eastern end of the marina. Milltown River flows southwards to Ballinabooly where the Ballyeabought River joins from the east. Milltown River then becomes increasingly tidally influenced as it continues southwards where a minor tributary joins under the R559 and then outfalls into Dingle Harbour at Milltown Bridge.
- | There are no significant polluting sources within the 1% AEP fluvial and 0.5% AEP tidal extents.
- | The Milltown River for much of its length has a poor water body status under the Water Framework Directive, and has no assigned status for the last 1.5km before it terminates in Dingle Harbour. Dingle stream has no assigned WFD river water body status.

- It is noted that there are no Natura 2000 sites within the AFA. Mount Brandon Special Area of Conservation SAC (000375) is located immediately north of Dingle AFA. The Dingle Peninsula Special Protection Area (SPA) is approximately 2.5km south of Dingle AFA.
- According to the Kerry County Development Plan, part of the town has been designated as an Architectural Conservation Area (ACA).
- Receptors at risk 1% AEP fluvial flooding extent within the AFA:
 - 35 No. Residential Properties;
 - 54 No. Non Residential Properties
 - 3 No. Social Amenity Site
 - 3 No. NIAH
 - 1 No. RMP
 - 9 No. Roads at risk

Receptors at risk 0.5% AEP tidal flooding extent;

- 12 No. Residential Properties;
- 1 No. Architectural site
- 30 No. Roads at risk

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.

Table 8.3: Dingle Options Scoring Matrix – Social and Environmental Objectives

SEA Objectives	Do nothing		Option 1		Option 2		Option 3	
	Impact	Mitigation required	Impact	Mitigation required	Impact	Mitigation required	Impact	Mitigation required
Human Health and life of residents	O	N	O	N	O	N	O	N
High vulnerability properties	O	N	O	N	O	N	O	N
Social infrastructure and amenity	O	N	O	N	O	N	O	N
Risk to local employment	O	N	O	N	O	N	O	N
Environmental Objectives								
WFD Directive	O	N	X	Y	X	Y	X	Y
Birds and Habitats Directive	O	N	O	N	O	N	O	N
Flora and Fauna	O	N	XX	Y	XX	Y	XX	Y
Fisheries	XX	Y	XX	Y	XXX	Y	XX	Y
Landscape	X	Y	XX	Y	XXX	Y	XX	Y
Architectural Heritage	X	Y	v	N	v	N	v	N

SEA Objectives	Do nothing	Option 1	Option 2	Option 3
Archaeological Heritage	X	Y	N	N

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	XX X	Fully failing minimum target
-999.99	XX X	Unacceptable negative impact where feasible alternative exists

All options generally performed the same when assessed against the WFD objective. The construction of all options will result in temporary negative impacts on the water body status in the absence of appropriate mitigation. There are no significant polluting sources at risk of flooding within 1% AEP fluvial flood extent and 0.5% AEP tidal flood extent.

It is noted that there are no Natura 2000 sites within the AFA. The Dingle Peninsula SPA is approximately 2.5km south of Dingle AFA. Potential disturbance to conservation interests of the SPA during the construction stage is extremely unlikely given distance from SPA.

Option 2 Flow diversion, requires the construction of approximately 2km of culvert through agricultural lands and it is considered that there is limited potential for impact on species of conservation importance such as bats, otters and badgers. Option 3 Flood Defence works, requires the construction of extensive lengths of permanent walls ranging in height from 1.0m to 5.8m. Otters have been recorded at the proposed location of the embankment and flood wall on the Milltown River. This option has the potential to cause considerable disturbance to otter foraging. It is noted that invasive species such as Japanese Knotweed and Giant Rhubarb occur along the bank of the Milltown stream. For each of the options 2 and 3, there is potential that works may spread these species. Detailed invasive species management is required to manage the control and spreading of the species during the construction stage. Given the highly engineered and channelised nature of Dingle Stream and Milltown stream there is very limited potential for the juvenile fish habitat.

According to the Kerry County Development Plan (2015) Dingle town is not located in an area designated as primary or secondary special amenity. The N86 and R560 approach roads entering Dingle are identified as having significant views and prospects. Construction of significant area of storage within sight of scenic viewpoints would cause short term impacts on visual amenity. Option 1, Storage area requires the

construction of flood defence walls and embankments max height of 5m at the storage area and approx. 2.9m high along the Milltown stream in proximity to scenic routes and views. The construction of this option is likely to cause a permanent change to the landscape character of the AFA and result in long term impact. Currently, walls within the town range around 1m in height, the construction of these proposed defence walls will be a discernible change in the town and will cause significant permanent visual intrusion on the views along Spa road. All of the options include measures for the protection of tidal flooding along the harbour and estuary, these include the construction of approximately 1-2m high defence walls along the eastern extent of the harbour and 2.7-2.9m barriers along the estuary respectively. These are expected to impede views from dwellings currently overlooking the harbour and estuary and these permanent structures will change the view and prospect and character in the area.

According to the Kerry County Development Plan, Dingle is designated as an Architectural Conservation Zone. There are number of site of architectural significance at risk within the AFA. Each of the options will provide protection to these sites. Therefore no preference between options is considered to existing in the context of the architectural objective.

There is no preference in terms of the social objectives, each of the do something options ensures the risk to flooding on human health and risk to community is minimised.

8.4.4 Preferred Flood Risk Management Option

On the basis of the evaluation summarised above, Option 1 Storage & 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 proposed defences are being developed.

8.5 Castleisland

Castleisland is located along the River Maine in County Kerry. Castleisland is at risk of fluvial flooding from the River Maine and its tributaries, the Shanowen, the Anglore and the Glenshearoon. The AFA and the existing flood risk are highlighted in Figure 8.4.

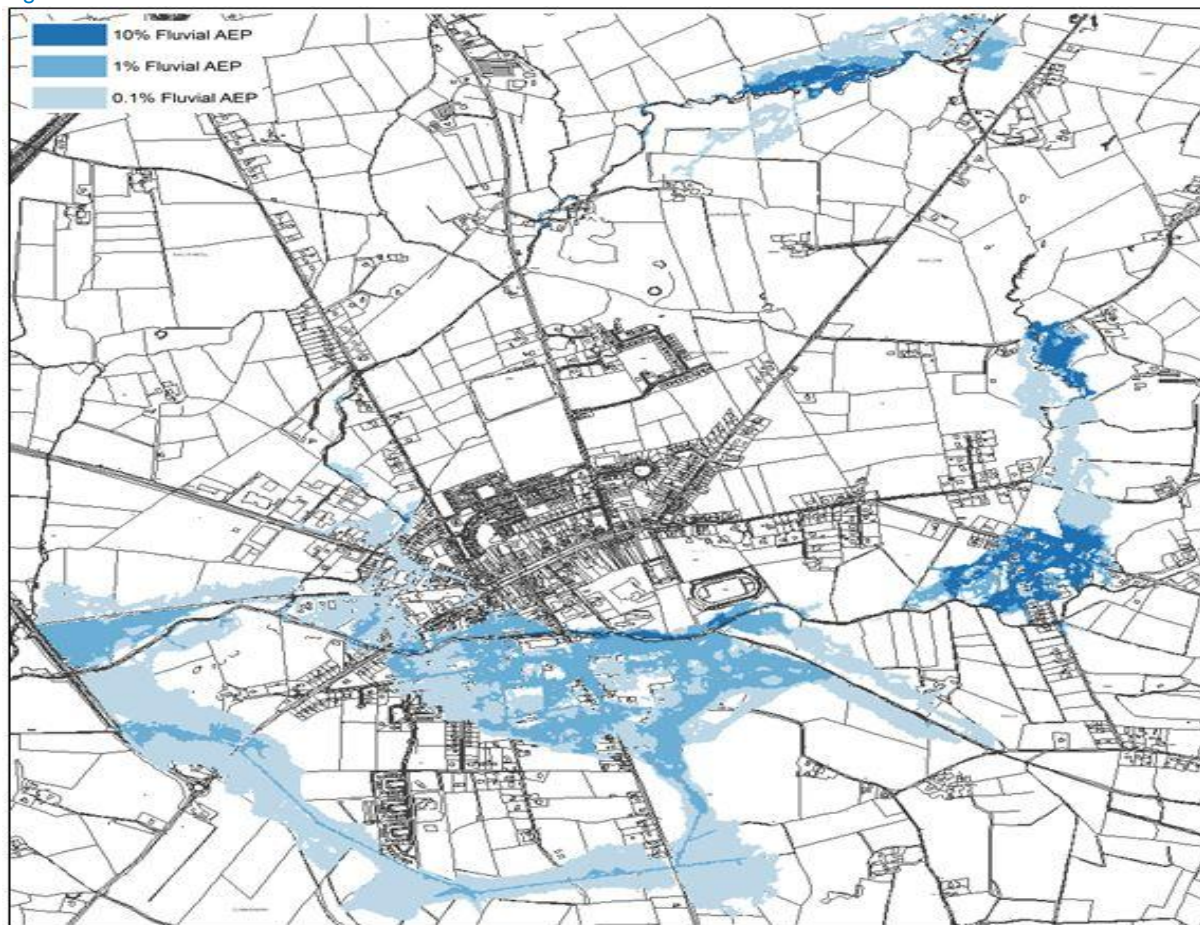
8.5.1 Viable Flood Risk Management Options

Two viable flood risk mitigation options were identified and modelled to determine its effectiveness and impact and these are;

- i **Option 1 - Flood Defences Works** - This option aims to mitigate the fluvial flood risk through the construction of flood defences and localised protection works in Anglore Upper, Anglore Lower and within the town centre. The proposed option fully achieves the required standard of protection for the 1% AEP fluvial event.
- i **Option 2 – Flood Defences & Flow Diversion** – Fluvial flood defences comprising of walls and embankments and the construction of an open channel to divert the Anglore around Tullig.

Option 3- Flow Diversion & Western Flood Defences – This option aims to mitigate the fluvial flood risk in Tullig through the construction of a flow diversion channel. This option also includes for the construction of flood defences within town centre.

Figure 8.4: Castleisland Current Scenario Fluvial Flood Extents



8.5.2 Key Environmental Sensitivities

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

- | Castleisland is at risk of fluvial flooding.
- | River Main is classified as having a moderate/ good status under the Water Framework Directive (WFD). River Shanowen is assigned good water status under the WFD.
- | There are no significant point sources at risk within the 1% AEP fluvial extent. Castleisland WWTP is located on the west side of the town but it is not identified within the 1% AEP extent.
- | The Castleisland AFA boundary does not overlap with any Natura 2000 site boundary. There are no habitats of conservation importance noted within the AFA.

- i According to the Kerry County Development Plan (2015), there are no landscape or amenity designations within the town. The River Maine Riverwalk is a walk that goes from the park at An Ríocht at the east of the town to the treatment works at the west of the town.
- j Receptors at risk 1% AEP fluvial flooding extent within the AFA:
 - 76 No. Residential Properties;
 - 26 No. Non Residential Properties
 - 1 No. Social Amenity Site
 - 7 No. Roads at risk
- i There are no high vulnerability properties at risk from fluvial flooding within the AFA. There are no NIAH / RMPs at risk from fluvial flooding within the AFA.

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.

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

SEA Objectives	Do nothing		Option 1		Option 2		Option 3	
Social Objectives	Impact	Mitigation required	Impact	Mitigation required	Impact	Mitigation required	Impact	Mitigation required
Human Health and life of residents	O	N	√√	N	√√	N	√√	N
High vulnerability properties	O	N	0	N	0	N	0	N
Social infrastructure and amenity	O	N	√√	N	√√	N	√√	N
Risk to local employment	O	N	√√	N	√√	N	√√	N
Environmental Objectives								
WFD Directive	O	N	X	Y	X	Y	X	Y
Birds and Habitats Directive	O	N	O	Y	O	Y		Y
Flora and Fauna	O	N	X X	Y	X X	Y	X X	Y
Fisheries	O	N	X	Y	X X	Y	X X	Y
Landscape	O	N	X	Y	X	Y	X	Y
Architectural Heritage	O	Y	O	Y	O	Y	O	Y
Archaeological Heritage	O	Y	O	Y	O	Y	O	Y

SEA Scoring Matrix

Score	Key	Description
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+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

The construction of measures for both options will result in temporary negative impacts on the water body status in the absence of appropriate mitigation. The Maine River is likely to have potential as juvenile habitats for fish species. The construction stage of the 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. Option 2 has the potential for more instream works and so will result in a greater negative impact.

There are no significant polluting sources at risk of flooding within 1% AEP fluvial flood extent.

With reference to the Birds and Habitats Directive, the Castleisland AFA does not overlap with any Natura 2000 site boundary. The Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161) is approximately 5km north of Castleisland. This is designated for Hen Harrier (*Circus cyaneus*). There is no potential for impact on this qualifying feature given the absence of suitable Hen Harrier nesting (conifer forestry) and foraging (bog and heath) habitat within the environs of Castleisland.

It is noted that invasive species such as Japanese Knotweed and Giant Rhubarb occur along the bank of the river. There is potential that works may spread these species for both Option 1 and Option 2. Detailed invasive species management is required to manage the control and spreading of the species during the construction stage.

The proposed measures include the construction of a permanent wall along the River Maine Walkway. This will restrict access in short term and permanently change the landscape setting of the walkway.

Both Options ensures the risk to flooding on human health and risk to community is minimised.

8.5.4 Preferred Flood Risk Management Option

On the basis of the overall evaluation with regard to the environmental factors as summarised above, Option 1 has been determined to be the preferred option in environmental terms. However this option is

not economically viable. Option 3 however is economically viable and is considered to be the preferred option considering all of the assessment criteria.

8.6 Glenflesk

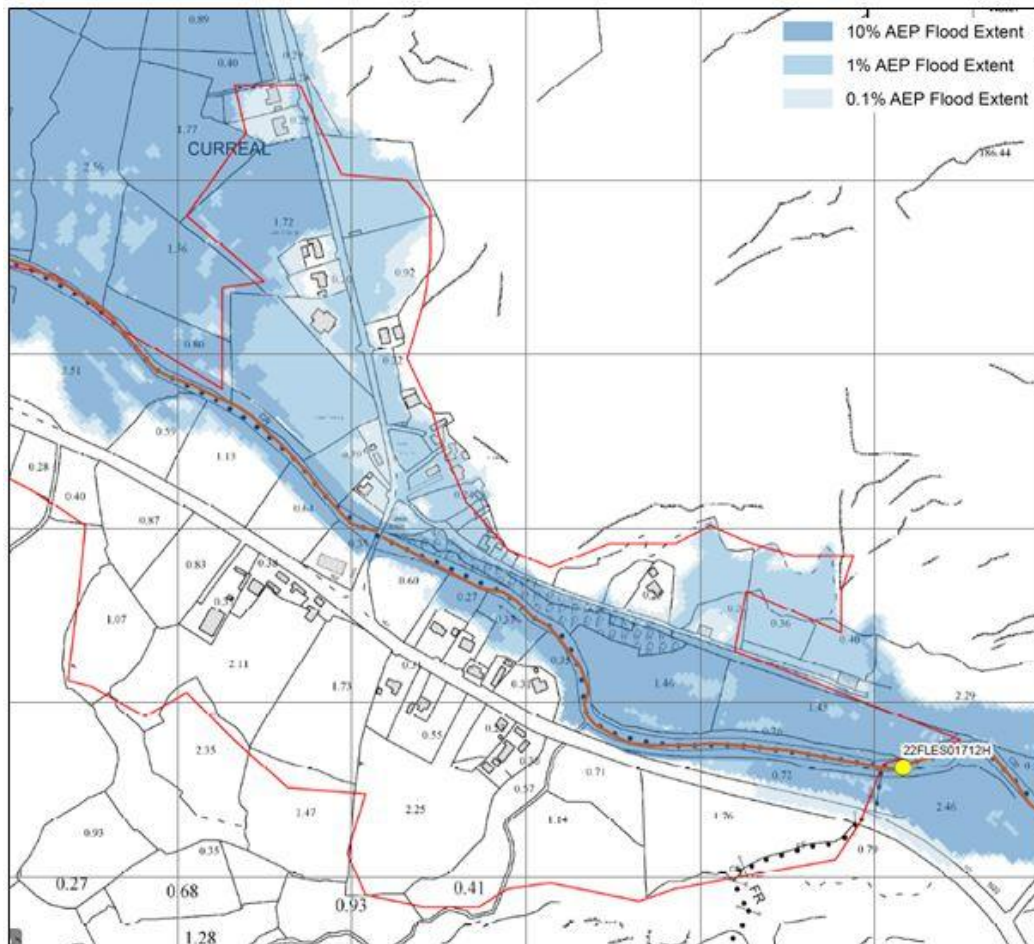
Glenflesk is located along the River Flesk in County Kerry and is at risk of fluvial flooding. The AFA and the existing fluvial flood risk are highlighted in Figure 8.5.

8.6.1 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 aims to mitigate the fluvial flood risk through the construction of flood defences and localised protection works such as road raising.

Figure 8.5: Glenflesk Current Scenario Fluvial Flood Extents



8.6.2 Key Environmental Sensitivities

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

- i Glenflesk is at risk of fluvial flooding.
- i The River Flesk is part of the Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC.
- i The River Flesk is considered a *Margaritifera* sensitive area (Freshwater Pearl Mussels). Freshwater Pearl Mussels (FPM) are identified as an Annex II species under the Habitats Directive. Similarly, lamprey, and Atlantic salmon habitat occur.
- i There are no significant polluting sources within the 1% AEP Fluvial flooding extent.
- i Receptors at risk from fluvial flooding 1% AEP within the AFA:
 - 7 No. Residential properties
 - 119 No. Non-Residential properties
 - 1 No. Society Amenity Sites

8.6.3 Environmental Assessment

The potential impacts arising for each of the proposed measures has been assessed in and Table 8.5 below provides a summary of the potential impacts arising from the proposed options as determined through the SEA assessment. In addition Table 8.5 also highlights the requirement for mitigation measures for each option under each social and environmental objective. Table 8.5 should be read in conjunction with the SEA scoring matrix.

Table 8.5: Glenflesk Options Scoring Matrix – Social and Environmental Objectives

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

SEA Scoring Matrix

Score	Key	Description
+5	√√√	Achieving aspirational target
+4	√√	

+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

The River Flesk is part of the Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC. The proposed works occur within or adjacent to the SAC Boundary. The do something Option 1 along the Flesk River are likely to require the removal of bankside vegetation and the construction of earth mounds bank-side has an associated risk of elevated sediment runoff to the watercourse in the absence of appropriate mitigation.

Killarney AFA is within the Laune Freshwater Pearl Mussel catchment. The Laune Catchment was identified by the NPWS as a catchment with extant populations i.e. populations that were not considered of sufficient quality to warrant designation under the Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. Therefore, detailed restoration objectives, targets, plans or measures are unlikely to be developed for the catchment.

There are no instream works proposed as part of the flood risk management option for Killarney. However, the flood defence measures proposed along the Flesk River are within riparian habitat. There is potential for in-stream works in the Flesk River to cause direct damage to suitable lamprey and Atlantic Salmon spawning habitat / juvenile habitat. Additionally, the construction of flood protection measures is likely to result in sediment run-off into the watercourse which will degrade fishery habitat and water quality. Watercourses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation may be represented in the River Flesk also sediment may be released to the River Flesk during the construction works. Sediment deposition on vegetation can impact photosynthesis and can smother vegetation.

There are a number of species of conservation importance within the AFA, these include otters, badgers, and bats. Option 1 has the potential to cause disturbance to species of conservation concern through operation of construction plant and personnel and noise generated by the works and possibly artificial lighting that may be used in the darker evenings.

The proposed embankments are low in nature with a maximum height of 1.5m. As a result it is considered unlikely that these will have a significant impact on the landscape character of the area, other than short term temporary impacts during the construction phase.

8.6.4 Preferred Flood Risk Management Option

On the basis of the evaluation summarised above, Option 1 has been determined to be the preferred option. In comparison to the Do-nothing scenario, Option 1 provides protection to residential and non-residential properties at risk from fluvial flooding within the 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 within the AFA. The appearance of floodwalls would be designed appropriate to minimise potential visual effects within the AFA. The preferred option is economically viable. A range of non-structural measures were considered and put on display at the PCD. The feedback provided indicated that the public's preference is for a combination of Emergency Response Procedures and Land Use Management.

8.7 Milltown

8.7.1 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 Defence** -This option considers the mitigation of flood risk through the construction of flood defences and localised protection works. These defences include walls and embankments.
- i **Option 2 – Flow Diversion / Flood Defences** -This option aims to mitigate the flood risk by diverting the flow from the Ashullish Stream to the Rathpogue west Stream in combination with the construction of flood defences.

Figure 8.6: Milltown Current Scenario Fluvial Flood Extents (upstream)

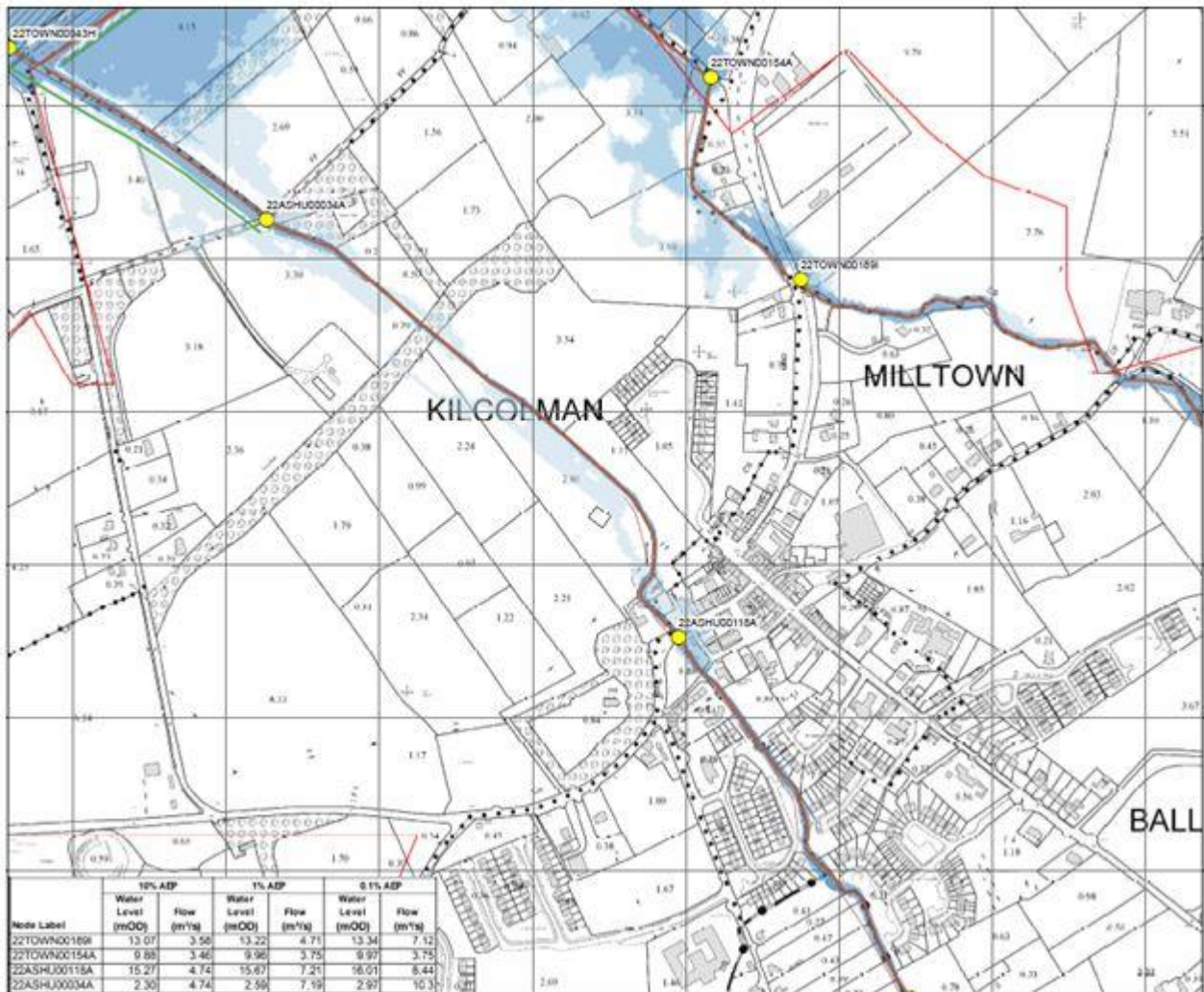
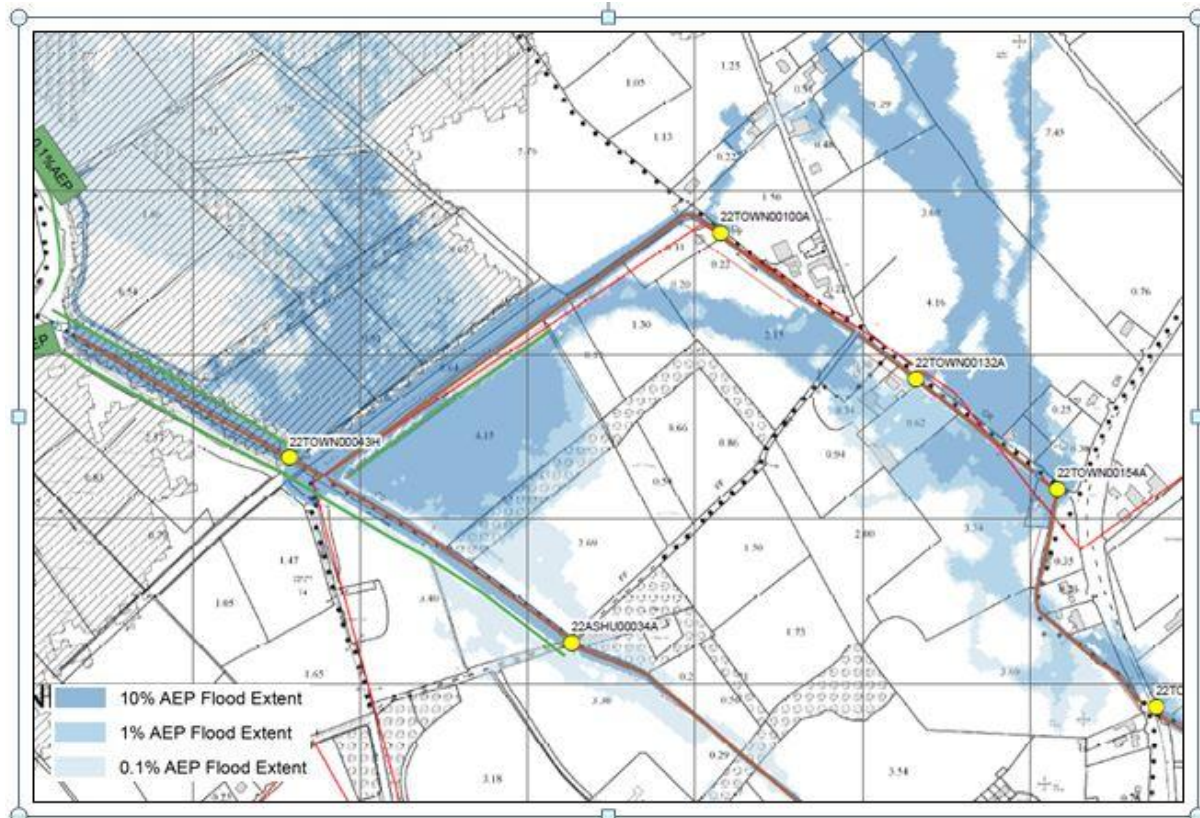


Figure 8.7: Milltown Current Scenario Fluvial Flood Extents (downstream)



8.7.2 Key Environmental Sensitivities

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

- i Milltown is at risk of fluvial flooding
- i Milltown is located along a number of tributaries of the River Maine. The river is not assigned under the Water Framework Directive. However Castlemaine Harbour which is located c. 1km downstream is a transitional waterbody classified as being of good water status.
- i There are no significant polluting sources (Waste Water Treatment Plant) within the 0.1% AEP fluvial flood extent.
- i The River Maine flows into Castlemaine Harbour which is a designated Special Area of Conservation (SAC) and a Special Protection Areas (SPA). The River Flesk is also part of the SAC. There are a number of species of conservation importance within the AFA, these include otters, badgers, and lamprey and salmon.
- i The Southern Slieve Mish Mountains and Milltown Pastures Landscape Character area is classified as being of high value.
- i Receptors at risk from fluvial flooding 1% AEP within the AFA:
 - 6 No. Residential properties

- 3 No. Roads.

8.7.3 Environmental Assessment

The potential impacts arising for each of the proposed measures has been assessed in and Table 8.6 below provides a summary of the potential impacts arising from the proposed options as determined through the SEA assessment. In addition Table 8.6 also highlights the requirement for mitigation measures for each option under each social and environmental objective. Table 8.6 should be read in conjunction with the SEA scoring matrix.

Table 8.6: Milltown 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	O	N	O	N
High vulnerability properties	0	N	0	N	0	N
Social infrastructure and amenity	0	N	0	N	0	N
Risk to local employment	0	N	0	N	0	N
Environmental Objectives						
WFD Directive	0	N	X	Y	X	Y
Birds and Habitats Directive	0	N	0	Y	X	Y
Flora and Fauna	0	N	X	Y	XX	Y
Fisheries	0	N	X	Y	X	Y
Landscape	0	N	0	N	X	Y
Architectural Heritage	0	N	0	N	0	N
Archaeological Heritage	0	N	0	N	0	N

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

Overall it is considered that potential environmental impacts arising from the flood protection options proposed for Milltown are limited.

Having regard to the WFD objective, the construction of the do something Option 1 and Option 2 will result in temporary negative impacts on the water body status in the absence of appropriate mitigation.

Potential impacts on the conservation interests of the Castlemaine Harbour SPA and Castlemaine SAC are extremely unlikely given that the proposed flood walls and embankments are limited in extent and the potential for significant sediment loss during construction is limited. Having consideration of the fact that the Natura 2000 sites are at closest 1km downstream it is unlikely that the proposed works will have any impact on the Natura 2000 sites.

It is considered that the Option 2 flow diversion has a greater potential to release sediment and other contaminants during construction. As a result this option has a greater potential to impact on the water status of the receiving waterbody with a slightly greater potential to impact on the downstream Natura 2000 sites.

According to the County Development Plan (2015), the relevant Landscape Character Area (LCA) is designated as being of high value. However it is considered that the proposed flood defence measures are unlikely to have a significant effect on the landscape character area.

There is no potential for any of the proposed options to impact (positively or negatively) on elements of archaeological or architectural value.

8.7.4 Preferred Flood Risk Management Option

On the basis of the evaluation summarised above, Option 1 is considered 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 flood defences and details of the option are optimised through detailed design in order to limit impacts on the river channel and banks, particularly on water quality status of the river.

The preferred option is not economically viable. A range of non-structural measures were considered and put on display at the PCD. The feedback provided indicated that the public's preference is for a combination of Emergency Response Procedures and Land Use Management.

9 Assessment of South Western FRMP for UoM22

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 22 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 development (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 22 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 22 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 Killarney AFA

The preferred flood risk management option as identified in the MCA is Flood Defences which would include localised fluvial defence works within the town includes walls and embankments ranging in height from 1m to 2m.

9.6.2 Dingle AFA

The preferred flood risk management option as identified in the MCA is Storage & Flood Defences. This will include for the provision of a storage area on the Dingle Stream upstream of the town and tidal flood defences comprising of sea walls and embankments.

9.6.3 Castleisland AFA

The preferred flood risk management option for Castleisland as identified in the MCA is Flow Diversion and Western Defences.

9.6.4 Glenflesk AFA

The preferred option as identified in the MCA is Flood Defences. However, the preferred option is not economically viable. A range of non-structural measures were considered and put on display at the PCD. The feedback provided indicated that the public's preference is for a combination of Emergency Response Procedures and Land Use Management.

9.6.5 Milltown AFA

The preferred option as identified in the MCA is Flood Defences. However, the preferred option is not economically viable. A range of non-structural measures were considered and put on display at the PCD. The feedback provided indicated that the public's preference is for a combination of Emergency Response Procedures and Land Use Management. Potentially viable flood relief works have been investigated for

Milltown. The assessment of these works are detailed in the Preliminary Options Report. None of the methods were found to be economically viable. This is because the flood risk in the Milltown AFA is relatively low. There are only 6 no. residential properties and 9 no non-residential properties at risk in Milltown from the 1% AEP event. The assessment found that the cost of protecting those properties was over four times the value of the potential flood damage to those same properties.

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 9.2. 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	√√√	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	

-4	X X	Partly failing minimum target
-5	XX X	Fully failing minimum target
-999.99	XX X	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 22 are as follows:

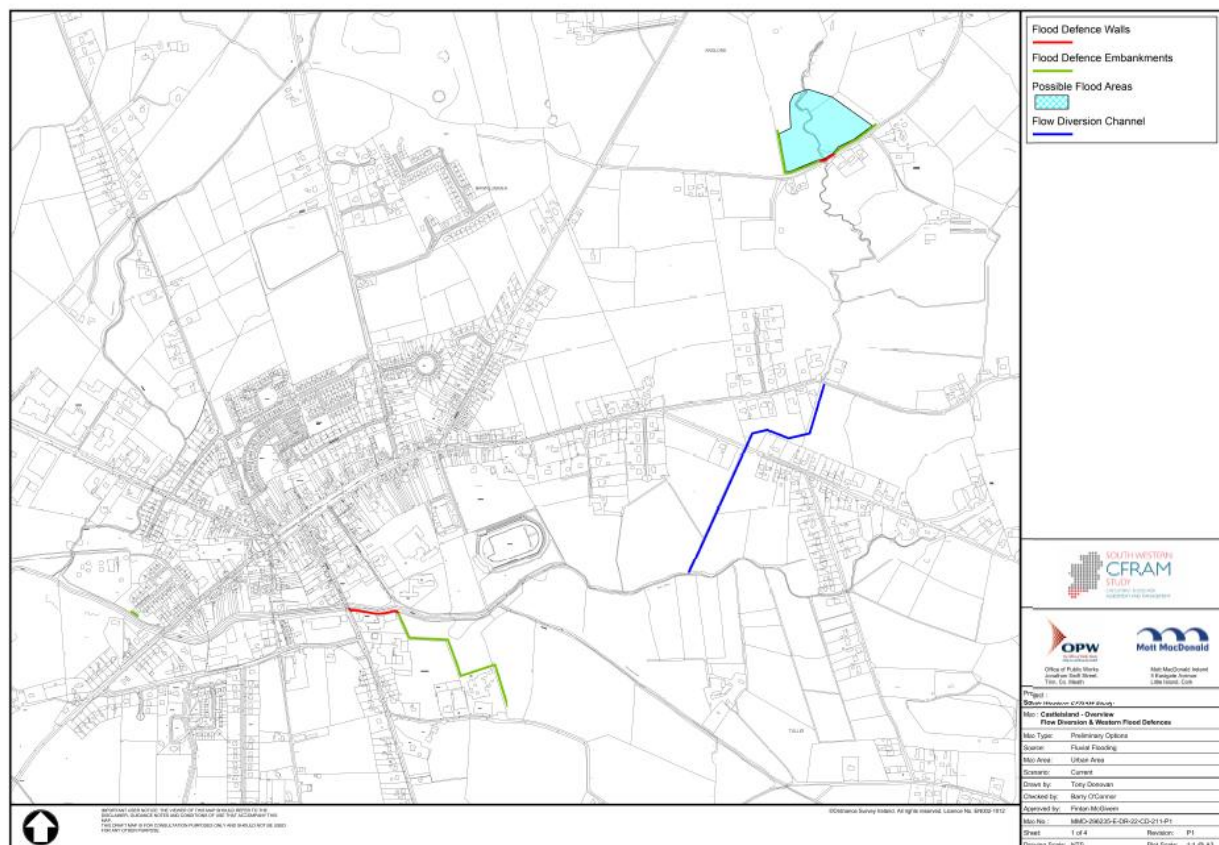
- | Planning Control ;
- | SUDS;
- | Public Awareness;
- | Land Use Management.

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 9.2.

9.8.2 Structural Measures

The proposed measures at an AFA scale have been assessed for each of the AFAs in UoM 22.

UoM	Laune / Maine / Dingle Bay
Area / Location	Castleisland
Option	Option 3 – Flow Diversion and Western Flood Defences
Code	IE-22-IE-AFA-220323-CD01-M33
Description	Flow diversion of the Anglore river around properties at risk and the construction of defences to protect other vulnerable properties.

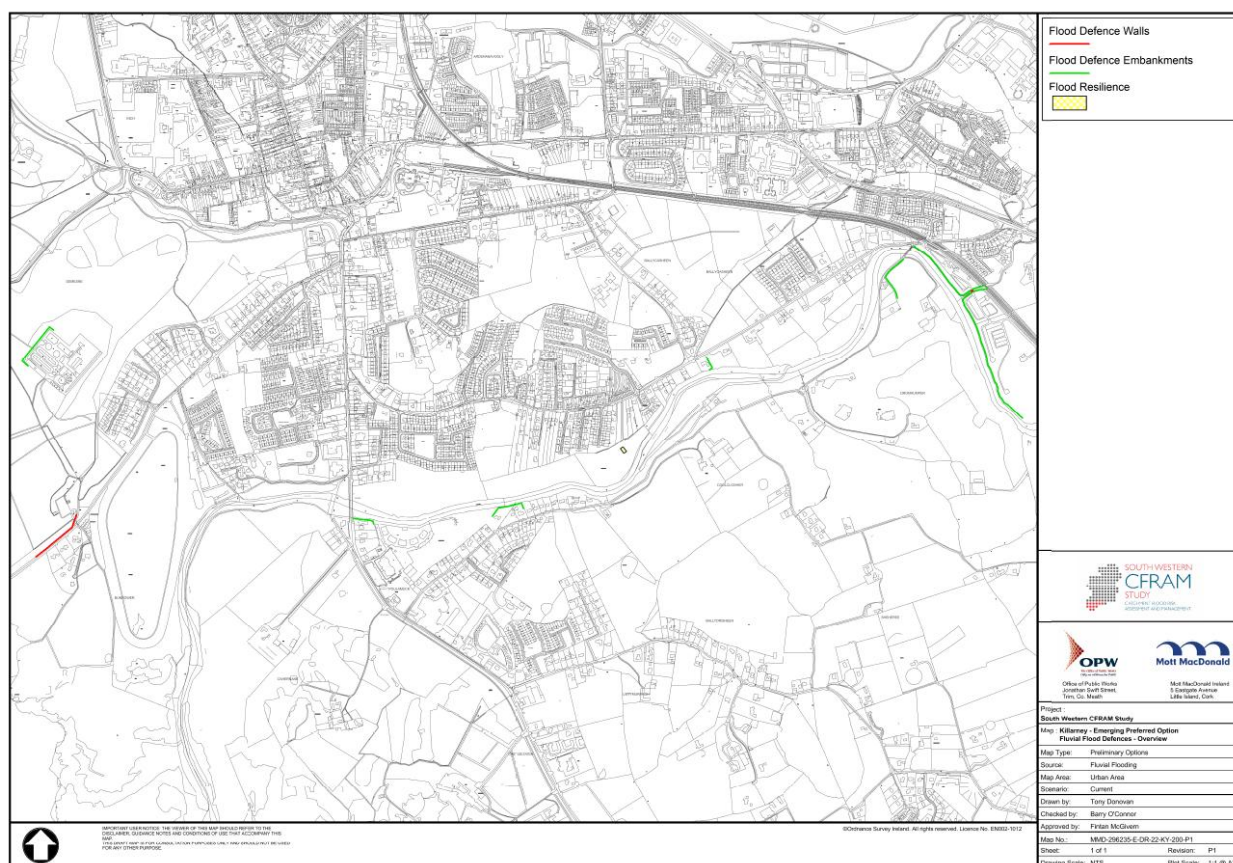


MCA Appraisal Outcomes		
Objective	Score	Comment
1.a.i	1.83	Calculated as per Guidance Note 28
1.a.ii	0	Calculated as per Guidance Note 28
1.b.i	2.88	Calculated as per Guidance Note 28
1.b.ii	3.96	Calculated as per Guidance Note 28
3.a	-2	The River Maine is salmonid and considered sensitive, it has a moderate to good WFD status. During the construction phase there is potential for short term impacts on sensitive waterbodies (-2).
3.b	0	The proposed works will have no impact on Natura 2000 sites as there are no designations in the area.
3.c	-3	Construction of the measures can result in temporary release of sediment and pollutants to the watercourse. The Maine is salmonid. The proposed works require instream works. Sedimentation during spawning season could have detrimental effects on salmonid populations (-2) Otter has been recorded on the Maine in Castleisland. There is potential for temporary disturbance during construction including the removal of considerable hedgerows and treeline to facilitate the construction of earthen berms (-1). the proposed measures include for the construction of flow diversion channel at Tobermaing. there is potential localised loss or disturbance to flora/fauna however this is limited by the already modified nature of the ditch (-1). Works will involve re-engineering of the existing ditch including the installation of a culvert across the road. It is noted that invasive species such as Japanese Knotweed and Giant Rhubarb occur along the bank of the river. There is potential that works may spread these species in this option. Detailed invasive species management is required to manage the control and spreading of the species during the construction stage (-3)
3.d	-4	The River Maine is salmonid. The proposed measures include the construction of walls within the town at the western extent of the town, this will restrict fishing access to the river in the town to a lesser extent than option 2. The construction of embankments and walls and drainage channel will require excavation of the bank of stream during the construction stage this would result in short term emissions of sediment to the waterbody and downstream without treatment (-2). The proposed measures include the re-engineering of an existing drainage ditch in Tobinmaing, these instream works have potential to emission of significant sedimentation downstream without treatment (-4). The potential fisheries habitat value is not known however the Maine is assigned good/moderate water body status under the WFD.
3.e	-1	The proposed measures also include the construction of a permanent wall along the short extent River Maine Walkway. There is currently a wall along this section of the walkway. This will restrict access in short term (-1) however it is unlikely to differ from the existing setting of the walkway at this location (0) Once constructed the drainage channel is unlikely to be a discernible different in the landscape.
3.f.i	0	There are a small number of NIAH within the town including a school and church on church street these are not at risk from flooding.

3.f.ii	0	There are a small number of RMP within the town including the castle however these are not at risk from flooding
Strategic Environmental Assessments		
Key Conclusions:		
<ul style="list-style-type: none"> · The River Maine is a salmonid river · Otter could be impacted upon by the works · The flow diversion could release sediment into the Maine during construction. 		
Adaptability to Potential Future Changes		
Option is adaptable to climate change – Score 2.25		
Public Consultation Outcomes		
The feedback received at the Public Consultation Day was in support of Option 1 – Flood Defences		
Other Issues / Conclusions		
The MCA has identified Option 3 – Flow Diversion and Western Defences Flood Defences as the preferred Flood Risk Management Option.		

Table 9.4: Killarney AFA – Outcomes of SEA Appraisal

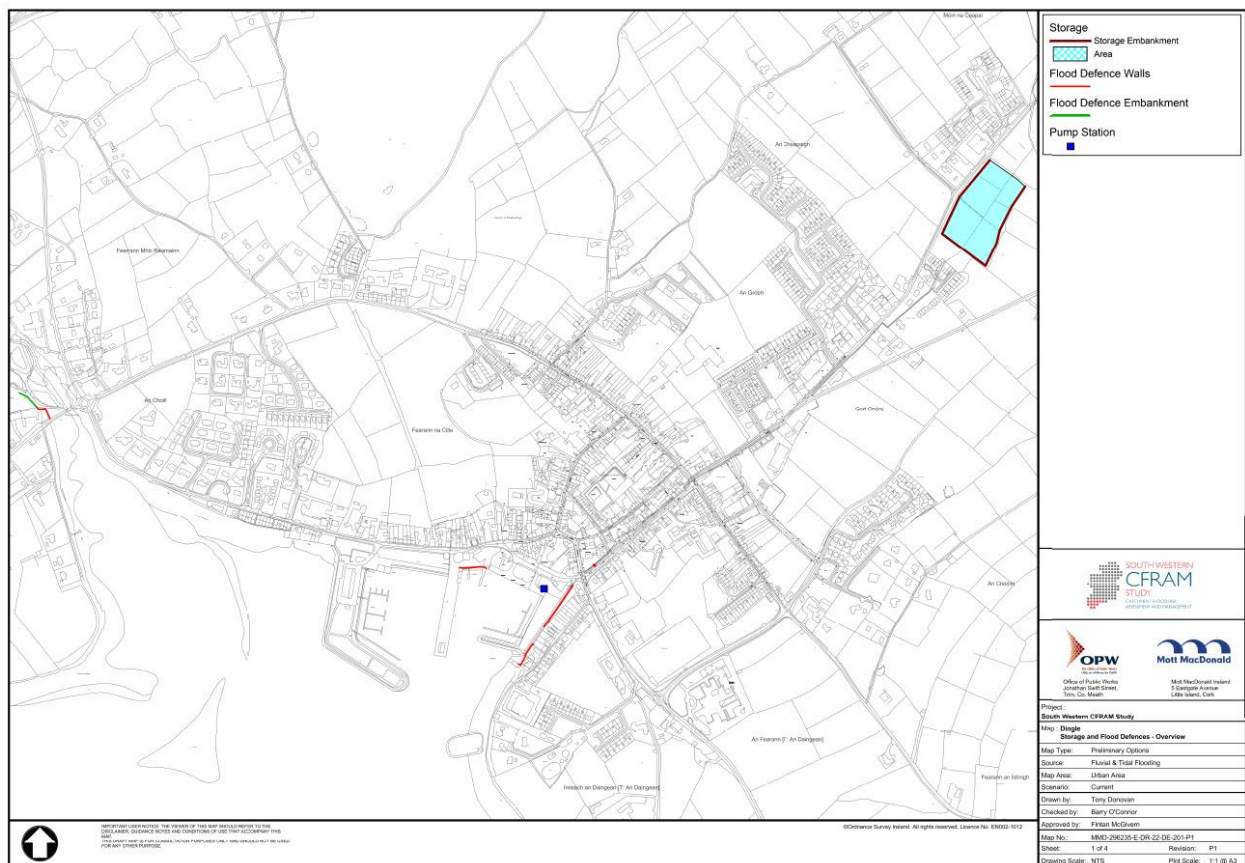
UoM	Laune / Maine / Dingle Bay
Area / Location	Killarney
Option	Option 1 – Flood Defences
Code	IE-22-IE-AFA-220337-KY01-M33
Description	Localised fluvial defence works within the town includes walls and embankments ranging in height form 1m to 2m



MCA Appraisal Outcomes		
Objective	Score	Comment
1.a.i	0.95	Calculated as per Guidance Note 28
1.a.ii	0	Calculated as per Guidance Note 28
1.b.i	4.75	Calculated as per Guidance Note 28
1.b.ii	4.64	Calculated as per Guidance Note 28
3.a	2	Killarney is located along Flesk River. The river is assigned Good water status under the WFD. Parts of the town including the WwTP is at risk from fluvial flooding. It is considered that the provision of an embankment surrounding (in part) the WwTP will mitigate flooding at the WwTP and the impacts on the water quality in Ross Bay of Lough Leane (3). However during the construction of embankments there is potential for short term impacts on the water status of the local waterbodies due to the generation of sediment (-1)
3.b	-5	River Flesk has pearl mussel populations in close proximity to proposed embankment locations. Very high risk of sediment runoff into the watercourse with significant implications for conservation objectives (-5).
3.c	-3	High potential for localised disturbance to species - otter, Lesser Horse shoe bats and for deterioration in local habitat (high potential for translocation of Japanese Knotweed which is common throughout the area locally).
3.d	0	The reduction in flood related impacts on water quality resulting from storm water overflows at the WwTP, will ensure that fishery habitats in Lough Leane are improved. (1). However there is potential for a short term negative impact arising from the release of sediments to the Folly Stream, Lough Leane and to the River Flesk during the construction phase (-1).
3.e	-4	The area is considered to be "very scenic" and of extreme importance for tourism and of national or county importance. In order to place adequate flood defences along the River Flesk there will be a requirement to remove significant stands of mature trees along the river, at the Ross Road and at the WwTP. This will have a long term negative impact on the landscape amenity of the area. (-4)
3.f.i	2	There are 3 NIAHs that currently located within the 1% AED flood zone. A number of these will be protected from further flooding (3). However a flood defence wall in proximity to Reen cottage may have a negative setting impact, primarily due to the requirement to move existing vegetation to accommodate the wall. (-1). However, this can be mitigated.
3.f.ii	3	There are 4 RMPs that currently located within the 1% AED flood zone. These are at risk of damage during flood events. Risk of damage will be reduced.
Strategic Environmental Assessments		
Key Conclusions: <ul style="list-style-type: none"> · Potential for an impact during the construction phase on Freshwater Pearl Mussel; · Potential for impact during the construction phase on otters, bats and other protected species; · Potential for disturbance of invasive species in the area · Potential for an impact on important landscape and visual amenity; 		
Adaptability to Potential Future Changes		
Option is adaptable to climate change – Score 1.5		
Public Consultation Outcomes		
The feedback received at the Public Consultation Day was in support of Option 1 – Flood Defences		
Other Issues / Conclusions		
The MCA has identified Option 1 – Flood Defences as the preferred Flood Risk Management Option.		

Table 9.5: Dingle AFA – Outcomes of SEA Appraisal

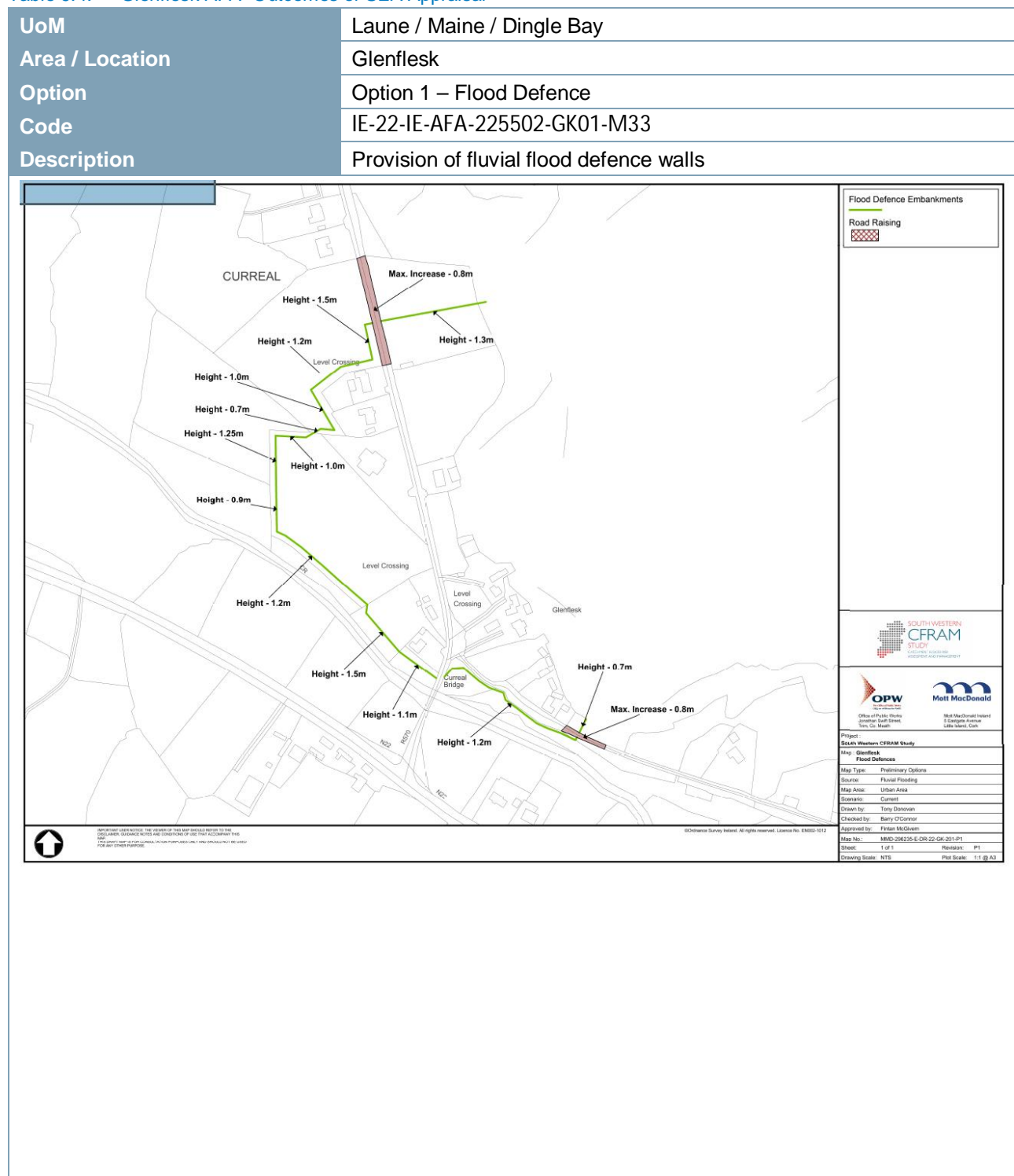
UoM	Laune / Maine / Dingle Bay
Area / Location	Dingle
Option	Option 1 – Storage and Flood Defences
Code	IE-22-IE-AFA-220327-DE01-M33
Description	The provision of a storage area on the Dingle Stream upstream of the town and tidal flood defences comprising of sea walls and embankments.



MCA Appraisal Outcomes		
Objective	Score	Comment
1.a.i	4.55	Calculated as per Guidance Note 28
1.a.ii	3.75	Calculated as per Guidance Note 28
1.b.i	0	Calculated as per Guidance Note 28
1.b.ii	0	Calculated as per Guidance Note 28
3.a	-1	The Milltown River rises north of Dingle (town) and flows south to discharge into Dingle harbour on the west side of the town. The Dingle Stream rises north of the town and enters from the north east, before following Spa Road to terminate in Dingle Harbour. The WFD river water body status for the Milltown River is poor for most of its length, and has no assigned status for the last 1.5km before it terminates in Dingle Harbour. Dingle stream has no assigned WFD river water body status. These rivers are not considered to be sensitive waterbodies. the measures include a combination of storage and flood defences within the town. There are no significant polluting sources within the 1% AEP. (-1) Short Term Construction phase impacts of flood defence walls and embankments.
3.b	0	Mount Brandon SAC is primarily designated for habitats and flora. FPM are a qualifying feature but are within the Owenmore River. There will be no work within the SAC and there is no hydrological connection between to the Owenmore River therefore no potential for impact on FPM (0). The SPA is ~2km south of the AFA. Noise impacts are unlikely (0)
3.c	-3	Flood walls on the Dingle Stream will be along existing walls and as such there is limited potential for impact. The stream heavily channelised and culverted within the town and has low fishery value (0). Japanese knotweed and Giant rhubarb occur along the bank of the stream immediately north of the roundabout on the N86 and at the proposed locations for flood walls. These invasive species will need to be removed to accommodate the works. It is highly probable that Japanese knotweed in particular could be spread downstream. A weighting of (-4) is applied to highlight the greater environmental risk associated with this proposed option. Otter has been recorded at the location of the embankment and flood wall propose on the Milltown River. There is potential for localised disturbance to feeding (-3)
3.d	-4	Both the Milltown River and the Dingle Stream cross the Mount Brandon SAC. This area is not designated for fishery habitat, the stream is heavy channelized. (-1) Construction of the storage tank and flood defence walls would require excavation of the bank of stream and diversion of the Dingle Stream during the construction stage. This would result in short term emissions of sediment to the waterbody and downstream without treatment. (-5) The storage area would result in a permanent construction of large embankments and likely result in the permanent loss of fisheries habitat
3.e	-4	Dingle town is not located in an area designated as primary or secondary special amenity in the Kerry county development plan. The N86 and R560 roads entering Dingle are identified as having significant views and prospects. (-2) Construction of significant area of storage within sight of scenic viewpoints would cause short term impacts on visual amenity. (-4) Flood defence walls and embankments max height of 5m at the storage area and approx. 2.9m high along the Milltown stream in proximity to scenic routes and views will cause a permanent/long term impact. the existing landscape features include approximately 1m height stone walls parallel to the road the measures will be discernible from the existing landscape and will cause a significant permanent long term visual intrusion on the views along spa road. The proposed measures also includes for the construction of approx. 2m high defence wall along the eastern extent of the harbour this will impede views from the dwellings currently overlooking the harbour and 2.9m embankments within the estuary. (-5) These measures will have significant impacts on the visual amenity of the harbour and estuary. This measure has considerable less wall structures within the town plus (1)

3.f.i	2	Parts of the town have been designated an Architectural Conservation Area (ACA). There are a number of NIAH designated sites designated. (2) The proposed measures will reduce the risk of flooding downstream on the dingle stream on designated features along the meal and the tracks within the town. The proposed storage area is located upstream and will not impact on the setting of these features
3.f.ii	1	There are a number of RMP sites within the town boundary. The proposed measures will reduce the risk of fluvial flooding on one RMP
Strategic Environmental Assessments		
Key Conclusions: <ul style="list-style-type: none"> Proposed measures could result in the spread of invasive species if appropriate management not implemented; Flood defence walls have potential to impact scenic routes; The flood management measures will reduce the risk of flooding in the ACA. 		
Adaptability to Potential Future Changes		
Option is adaptable to climate change – Score 1.5		
Public Consultation Outcomes		
This option was the preferred option indicated by the public at the public consultation day.		
Other Issues / Conclusions		
The MCA has identified Option 1 – Storage & Flood Defences as the preferred Flood Risk Management Option.		

Table 9.4: Glenflesk AFA- Outcomes of SEA Appraisal



MCA Appraisal Outcomes		
Objective	Score	Comment
1.a.i	4.55	Calculated as per Guidance Note 28
1.a.ii	0	Calculated as per Guidance Note 28
1.b.i		Calculated as per Guidance Note 28
1.b.ii		Calculated as per Guidance Note 28
3.a	-2	There are no significant pollutant sources at risk from flooding. The River flesk is considered a sensitive water body. (-2) Short term construction impacts
3.b	-5	The Flesk River is part of the Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC. Rive Flesk has pearl mussel populations in close proximity to proposed embankment locations. Very high risk of sediment runoff into the watercourse with significant implications for conservation objectives (-5). However appropriate mitigation can be utilised to minimise the release of sediment to the stream.
3.c	-3	High potential for bats (particularly Daubenton's bat) at the Curreal Bridge. Otter are also likely in the area - potential for disturbance during the construction phase is likely (-3).
3.d	-2	(-2) construction impacts associated with the works and temporary restrict access to the river are likely to occur in the construction however these can be mitigated against through proper construction site management.
3.e	-1	The proposed embankments are low in nature with a maximum height of 1.5m. As a result it is considered unlikely that these will have a significant impact on the landscape character of the area, other than short term temporary impacts during the construction phase No likely impacts. Temporary short term impacts on a local level prior to mitigation
3.f.i	0	The church is not at risk from flooding and the proposed measures are unlikely to affect the setting of the structure
3.f.ii	0	There are no designated sites at risk from flooding
Strategic Environmental Assessments		
Key Conclusions: <ul style="list-style-type: none"> The Flesk River is part of the Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC. The proposed works occur within or adjacent to the SAC Boundary. This options requires the removal of bankside vegetation and the construction of earth mounds bank-side and has an associated risk of elevated sediment runoff to the watercourse in the absence of appropriate mitigation. There are a number of species of conservation importance within the AFA, these include otters, badgers, bats. Option 1 has the potential to cause disturbance to species of conservation concern through operation of construction plant and personnel and noise generated by the works and possibly artificial lighting that may be used in the darker evenings. The construction of the embankments are unlikely to have a significant impact on the landscape character of the area. The appearance of floodwalls would be designed appropriate to minimise potential visual effects within the AFA. This option will have a neutral impact on archaeological, cultural and architectural heritage of the AFA 		
Adaptability to Potential Future Changes		
Option is adaptable to climate change – Score 1.5		
Public Consultation Outcomes		
A range of non-structural measures were considered and put on display at the PCD. The feedback provided indicated that the public's preference is for a combination of Emergency Response Procedures and Land Use Management.		
Other Issues / Conclusions		

The preferred option as identified in the MCA is Flood Defences. However, the preferred option is not economically viable. A range of non-structural measures were considered and put on display at the PCD. The feedback provided indicated that the public's preference is for a combination of Emergency Response Procedures and Land Use Management

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 9.3 to 9.5, 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 9.3 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 22, 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.

Arterial Drainage Maintenance Plan List of Activities 2016-2021: Whilst there are 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).

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

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	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. The flood risk management plan is supported and planned for at a national, regional and local level.
Killarney AFA	Preferred Structural Option-Flood Defences	No significant negative in combination effects were identified. Opportunities for mutual benefit include for example; The flood mapping provided as part of the FRMP will facilitate the application of flood risk management policies and Objective NE79 set out within the Kerry County Development Plan 2015-2021 and local objectives set out in the Tralee/Killarney Functional Area Local Area Plan 2013-2019. 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 as long as the specified measures to mitigate impacts 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. 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. The flood risk management options would be designed appropriate to minimise potential visual effects on quality of existing landscape characteristics and policies set out within the Kerry County Development Plan. Killarney is characterised as being particularly valuable in terms of architecture and archaeological heritage and 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 town
Dingle AFA	Preferred Structural Option-Flood Defences/Storage	No significant negative in combination effects were identified. Opportunities for mutual benefit include for example; The flood mapping provided as part of the FRMP will facilitate the application of flood risk management policies and Objective NE79 set out within the Kerry County Development Plan 2015-2021 and local objectives set out in the Dingle Functional Area Local Area Plan 2012-2018.

Flood Risk Management Option	Potential Cumulative and In-Combination Effects with other Plans and Strategies
	<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 as long as the specified measures to mitigate impacts 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 policies set out within the Kerry County Development Plan.</p> <p>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 town</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 22. 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:

- Environmental Impact Assessment (EIA) Screening; and
- 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 22 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 22, whereby potentially significant effects on the *Natura 2000* sites (i.e. cSACs and SPAs) were identified. A Natura Impact Statement (NIS) was prepared for the Plan for UoM 22 and the proposed mitigation measures and conclusions of this assessment have been incorporated into the SEA mitigation measures.

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.

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.

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

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

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 options 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;
- i Any scheme related Environmental Impact statements, Appropriate Assessments, Conditions of Approval,
- i Recommendations set out by statutory authorities, IFI, NPWS, and EPA;
- i 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 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 Killarney, Table 10.2 for Dingle and Table 10.3 for Castleisland. 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 and 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 Killarney, Table 10.2 for Castleisland and Table 10.3 for Dingle. 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.

Table 10.1: Killarney 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
		Minimise risk to high vulnerability properties	Number of high vulnerability properties at risk from flooding		Review of location and details of services data during detail design
	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.	Consultation with competent authorities prior to works should enable all impacts are kept to minimum over a short timescale
		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	<p>Pre construction baseline studies, including aquatic surveys, terrestrial 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</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> <p>Monitoring of Receiving Waters during Construction</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>Killarney National Park, Macgillycuddy Reeks and Caragh River SAC is significant ecological importance. Potential for significant effects on the QI of the SAC. There are no instream works with implementation of appropriate project level mitigation it is not predicted however Project level screening AA should be undertaken</p>	<p>Review of national available data and associated reports published as and when they become available</p> <p>Conservation Status Assessment Reports (CSARs), Backing Documents and Maps prepared in accordance with Article 17 of the Habitats Directive</p> <p>Monitoring of Receiving Waters during Construction and post</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, bird, 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>
	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.</p>	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.	<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 designations (e.g. Nature reserves and Ramsar sites), i.e. Area of re</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>Consultation with local residents potentially impacted by the measure</p>	Review of County Development Plan landscape designations and landscape character areas in the detail design stage

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.	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.	There are number of RMPs that currently located within the 1% AED flood zone. These are at risk of damage during flood events. Confirm to the requirements of the Local Government (planning and Development) Act 2000 as amended	

Table 10.2: Castleisland 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
		Minimise risk to high vulnerability properties	Number of high vulnerability properties at risk from flooding		Review of location and details of services data during detail design
	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.	Consultation with competent authorities prior to works should enable all impacts are kept to minimum over a short timescale
		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, hydro-geomorphological assessments. Should important species or habitats be found during baseline and pre construction surveys the sequential approach of avoid, reduce or mitigate should be adopted 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 Ecological/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 Monitoring of Receiving Waters during Construction
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	AFA does not occur within Natura 2000 site. Project level screening 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
	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, bird, 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

Environmental Topic	Objective	Sub-Objective	Indicator	Mitigation	Proposed Monitoring
	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.	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	The proposed options includes construction of a wall along the River Maine walkway. 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 Consultation with local residents potentially impacted by the measure	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. 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 architectural features, institutions and collections subject to flooding. b) The impact of flood risk management measures on architectural features, institutions and collections. 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.	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 There are no RMPs located within the 1% AED flood zone. Confirm to the requirements of the Local Government (planning and Development) Act 2000 as amended	Review of County Development Plan designations, review of national datasets when they become available and landscape character areas in the detail design stage

Table 10.3 Dingle 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
		Minimise risk to high vulnerability properties	Number of high vulnerability properties at risk from flooding		Review of location and details of services data during detail design
	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. Consultation with competent authorities prior to works should enable all impacts are kept to minimum over a short timescale
		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 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 Monitoring of Receiving Waters during Construction
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	There will be no work within the SAC and there is no hydrological connection between to the Owenmore River. There are no instream works with implementation of appropriate project level mitigation it is not predicted however Project level screening 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

Environmental Topic	Objective	Sub-Objective	Indicator	Mitigation	Proposed Monitoring
					Monitoring of Receiving Waters during Construction and post
	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, bird, 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
	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.	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 Consultation with local residents potentially impacted by the measure	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. 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 architectural features, institutions and collections subject to flooding. b) The impact of flood risk management measures on architectural features, institutions and collections. 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.	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 Confirm to the requirements of the Local Government (planning and Development) Act 2000 as amended	Review of County Development Plan designations, review of national datasets when they become available and landscape character areas in the detail design stage

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 22.

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 Killarney: Flood Defences;
- i Castleisland - Flow Diversion and Western Defences
- i Dingle: Storage & 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.

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