FEM-FRAMS

Fingal East Meath Flood Risk Assessment and Management Study

Appropriate Assessment
Stage 2: Statement for Appropriate Assessment

October 2011

comhairle chontae na mí
meath county council

OPW
The Office of Public Works
Oifig na nOibreacha Poiblí

Comhairle Contae Fhine Gall
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Acknowledgements

In 2008, Fingal County Council (FCC), Meath County Council (MCC) and the Office of Public Works (OPW) commenced work on a Flood Risk Assessment and Management Study (FRAM Study) for the Fingal and East Meath area, as a means of addressing existing flood risk in the study area and the potential for significant increases in this risk in the future.

The Fingal East Meath Flood Risk Assessment Management Study (FEM FRAMS) was one of four pilot CFRAM studies for the new Flood Risk Assessment and Management Programme. The CFRAM studies are the core of the delivery of the new Flood Policy adopted by the Irish Government in 2004, shifting the emphasis in addressing flood risk towards a catchment-based, pro-active approach for identifying and managing existing, and potential future, flood risk'.

The principal output from FEM FRAMS is a Flood Risk Management Plan (FRMP). This has been prepared by Halcrow Barry in consultation with Fingal County Council, Meath County Council and the OPW.

An in-house Project Management Team consisting of representatives from the OPW, FCC and MCC managed the work of the Consultant on the Study. A Project Steering Group, which included representatives from the OPW, FCC, MCC, the Environmental Protection Agency, the Department of Agriculture, Fisheries and Food (DAFF, which, later on, became part of the OPW) was responsible for overseeing and directing the study, and reviewing key outputs and deliverables.

The project team would like to acknowledge and thank the data suppliers who have contributed to the project. These are listed below:

- Department of Agriculture Fisheries and Food (DAFF)
- Department of the Environment Heritage and Local Government (DEHLG)
- DigiTech 3D
- Dublin Airport Authority (DAA)
- Dublin City Council (DCC)
- Inland Fisheries Ireland (IFI)
- Environmental Protection Agency (EPA)
- Fingal County Council (FCC)
- Forestry Services
- Geological Survey of Ireland
- Health Service Executive (HSE)
- Marcon Computation International Ltd
- Meath County Council (MCC)
- Met Eireann

- National Parks and Wildlife Services (NPWS)
- National University of Ireland, Galway
- National University of Ireland, Maynooth
- Office of Public Works (OPW)
- Teagasc
- University College Dublin (UCD)

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1. Introduction

1.1. Introduction

Halcrow Barry has been commissioned by Fingal County Council (FCC), Meath County Council (MCC) and The Office of Public Works (OPW) to prepare a Flood Risk Management Plan (FRMP) for the Fingal and East Meath (FEM) Study Area. Situated in the study area are several *Natura 2000* or European Sites designated under the EU Birds Directive[1] and Habitats Directive[2]. These are: Boyne Coast and Estuary candidate Special Area of Conservation (cSAC), Boyne Estuary Special Protection Area (SPA), River Nanny Estuary and Shore SPA, Skerries Islands SPA, Rogerstown Estuary cSAC and SPA, Broadmeadow Estuary/Swords SPA, Malahide Estuary cSAC, Baldoyle Bay cSAC and SPA and Ireland's Eye cSAC and SPA.

Under Article 6(3) of the EU Habitats Directive, an "appropriate assessment" (AA) is required where any plan or project, either alone or 'in combination' with other plans or projects, could have an adverse effect on the integrity of a European Site. This requirement is implemented in Ireland through Regulation 15 of the European Union (Natural Habitats) Regulations, SI 94/1997, as amended; and Circular Letter SEA 1/08 & NPWS 1/08[3]. Guidance in undertaking an appropriate assessment in Ireland is provided by the Department of Environment, Heritage and Local Government (DEHLG) (DEHLG, 2009)[4]. In addition, Draft European Communities (Birds and Natural Habitats) Regulations 2010 have been prepared to consolidate and update existing regulations, and were subject to public consultation in August 2010, but they have not yet entered into force.

The Screening for Appropriate Assessment stage (Stage 1) has concluded that the proposed draft Fingal East Meath FRMP has the potential to have significant effects, either alone or in-combination, on seven of the European Sites considered, and, therefore, that an appropriate assessment (AA) is required. The screening assessment was submitted to the Development Applications Unit of the DEHLG, in April 2011, which agreed with the conclusion that the FRMP should be subjected to a Stage 2 Appropriate Assessment (see Appendix A). Consequently this Statement for AA has been prepared in accordance with the DEHLG (2009) guidance, to "*examine the direct and indirect impacts that the plan . . . might have on its own or in combination with other plans or projects, on one or more Natura 2000 sites in view of the sites' conservation objectives*"[5].

[1] Council Directive 79/409/EEC on the conservation of wild birds (the 'Birds Directive'). This has now been replaced by Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (codified version)
[2] Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora (the 'Habitats Directive')
[3] Department of Environment, Heritage and Local Government Circular Letter SEA 1/08 & NPWS 1/08. Appropriate Assessment of Land Use Plans. 15 February, 2008
[4] DEHLG (2009) *Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities.* Department of Environment, Heritage and Local Government, Dublin.
[5] DEHLG (2009) *Op.cit.*, p23

1.2. Habitats Directive requirements

Article 6(3) of the EU Habitats Directive requires that:

Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.

Consequently, Circular Letter SEA 1/08 & NPWS 1/08 requires that, in Ireland:

Any draft land use plan (development plans, local area plans, regional planning guidelines, schemes for strategic development zones) or amendment/variation to it proposed under the Planning and Development Act 2000 (as amended) must be screened for any potential impact on areas designated as [European] Sites.

This screening should be based on any ecological information available to the authority and an adequate description of the plan and its likely environmental impacts. This should take into account any policies that will set the terms for future development. The results of the screening should be recorded and made available to the public.

This requirement is codified in Regulation 56(1) of the Draft European Communities (Birds and Natural Habitats) Regulations 2010 so that: *A public authority shall conduct a Screening for Appropriate Assessment of a plan or project before deciding to undertake, or give consent, permission or other authorisation for that plan or project to ascertain whether that plan or project . . . is likely to have a significant effect on a European Site, either individually or in combination with other plans or projects*; and

Therefore, it must first be established, through an initial screening assessment, whether: (1) the proposed Plan is directly connected with or necessary for the management of a European Site for nature conservation; and (2) it is likely to have a significant adverse effect on a European Site, either individually or in combination with other Plans or projects.

Following screening, Circular Letters SEA 1/08 & NPWS 1/08 require that *in any case where . . . it is found that the draft plan or amendment may have an impact on the conservation objectives of a [European Site] or that such an impact cannot be ruled out, adopting a precautionary approach, an appropriate assessment of the plan must be carried out. An appropriate assessment means an assessment, based on best scientific knowledge, by a person with ecological expertise, of the potential impacts of the plan on the conservation objectives of any [European] Site (including [European] Sites not situated in the area encompassed by the draft plan or scheme) and the development, where necessary, of mitigation or avoidance measures to preclude negative effects*.

In compliance with Article 6(3) of the EU Habitats Directive, this appropriate assessment must then determine whether or not the plan will adversely affect the integrity[6] of the European site.

Regulation 56(1) of the Draft European Communities (Birds and Natural Habitats) Regulations 2010 states that: *A public authority should conduct an Appropriate Assessment of the implications for a European Site of a plan or project in view of the site's conservation objectives before deciding to undertake, or give any consent, permission or other authorisation*; and that *Subject to the provisions of Regulation 57, a public authority may agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European Site, which is the case where no reasonable scientific doubt remains as to the absence of such effects*.

Should the appropriate assessment identify that there is a perceived risk that a proposed Plan would have an adverse effect on the integrity of a European Site, Circular Letter SEA 1/08 & NPWS 1/08 requires that further conditions must be satisfied before a Plan can be finalised. Alternative solutions must be examined, including the option of not adopting the plan, or part of it. If there are no alternative solutions or mitigation measures that can avoid the adverse effects, approval of the plan can only be granted if it is accepted that there are there are imperative reasons of over-riding public interest (IROPI). In this case, compensatory measures must be taken to ensure that the overall coherence of the *Natura 2000* network is protected.

1.3. Approach to and scope of this assessment

Following the identification of the need for an assessment of the proposed draft FEM FRMP under the requirements of the regulations and guidance described above, it was established that the assessment would be undertaken in two phases – an initial Screening for Appropriate Assessment phase (Stage 1) and, if required, a subsequent, more detailed, appropriate assessment phase (Stage 2).

This report is the Stage 2: Statement for Appropriate Assessment prepared as part of the appropriate assessment phase, and is based on an examination of European Site Synopses and Standard Data Forms (obtained through consultation with the National Parks and Wildlife Service (NPWS) in October 2010), as well as readily accessible internet resources concerning the nature and wildlife value of the sites. The report will determine whether the proposed draft FEM FRMP is likely to have an adverse effect on integrity of the seven European Sites, for which the screening assessment identified potential significant effects, in view of their conservation objectives.

[6] The integrity of a site is the coherence of its ecological structure and function, across its whole area, which enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified.

2. The Flood Risk Management Plan

2.1. Introduction

The OPW is currently undertaking a national programme of catchment-based Flood Risk Assessment and Management Studies (FRAMS) within Ireland. The need for this is driven by the 2004 report by the Flood Policy Review Group which highlighted the need to pro-actively and sustainably manage flood risk; and the requirements of the EU Floods Directive. As part of this programme, and to address flood risk issues in the Fingal and East Meath areas, FCC, along with project partners MCC and the OPW, have commissioned the Fingal East Meath Flood Risk Assessment and Management Study or FEM FRAMS for short.

The main output from this study is a suite of flood hazard and risk maps and a Flood Risk Management Plan (FRMP), which identifies a long-term programme of prioritised studies, actions and works to manage the flood risk in the Fingal East Meath study area (Figure 2-1). The plan also makes recommendations in relation to appropriate development planning.

Figure 2-1: Extent of the study area

The Fingal East Meath study area covers approximately 772km^2 and comprises a group of 23 rivers and streams, three estuaries and the Fingal and Meath coastline. The study area is highly susceptible to extreme flood events, despite having low annual rainfall and small

catchment areas, and there are records of at least 141 historic flood events since the 1940s. It is generally affected by four types of flooding, resulting from:

- Intense rainfall events, as in August 2008;
- Exceptionally high tide levels, as in February 2002;
- A combination of intense rainfall and high tides, as in 2004; and
- Lack of drainage capacity in urban areas.

In order to address this flood risk, the FEM FRAMS sets out to achieve the following objectives:

- Identify and map the existing and potential future flood hazard and risk areas;
- Build the strategic information base necessary for making informed decisions in relation to managing flood risk and provide appropriate data to inform future spatial planning and development;
- Identify viable structural and non-structural measures and options for managing flood risks for localised high-risk areas and within the study area as a whole;
- Integrate a Strategic Environmental Assessment (SEA) and Habitats Directive Appropriate Assessment into the FRMP development process so that environmental issues can be fully integrated into the plan; and
- Prepare a Flood Risk Management Plan (FRMP) for the study area, with associated environmental assessment reports.

2.2. The Draft FRMP

The FEM FRMP is intended to be a non-technical document, which summarises what has been done to date on the study and sets out a prioritised list of studies, actions and works (structural and non-structural), including indicative costs and benefits, to manage the flood risk in the study area in the long-term.

The draft FEM FRMP will be issued for consultation and made available on the project website www.fingaleastmeathframs.ie and in hard copy format at various Council offices in the study area. Following a review of the comments received, the draft FEM FRMP will be amended, finalised and published, together with an SEA Post Adoption Statement. The FEM FRMP will then be reviewed on a six-yearly cycle as required by the EU Floods Directive.

2.3. Proposed FRMP actions and works

In order to develop the flood risk management strategy which forms the basis of the FEM FRMP, the study area was divided into a number of assessment units, which are defined at four spatial scales:

(i) **Study area:** in this case the Fingal East Meath study area;

(ii) **Analysis unit (AU) scale:** these are individual or combined catchments (e.g. Nanny and Delvin) or areas of tidal influence (e.g. Coastal). For fluvial AUs that

have a tidal influence at their downstream end, there is overlap between this area of tidal influence and the Coastal AU;

(iii) **Areas of Potential Significant Risk (APSR):** for the option development process these are existing urban areas with high degrees of flood risk and hence economic damage;

(iv) **Individual risk receptor (IRR):** an individual asset of particular economic, environmental or social value that has been identified as being prone to flooding and hence represents a significant risk in its own right, such as transport and utilities infrastructure, which may require specific consideration during the development of the flood risk management options.

Following a flood risk assessment of the entire study area, the AUs and APSRs considered during the detailed option assessment process are shown on Figure 2-2.

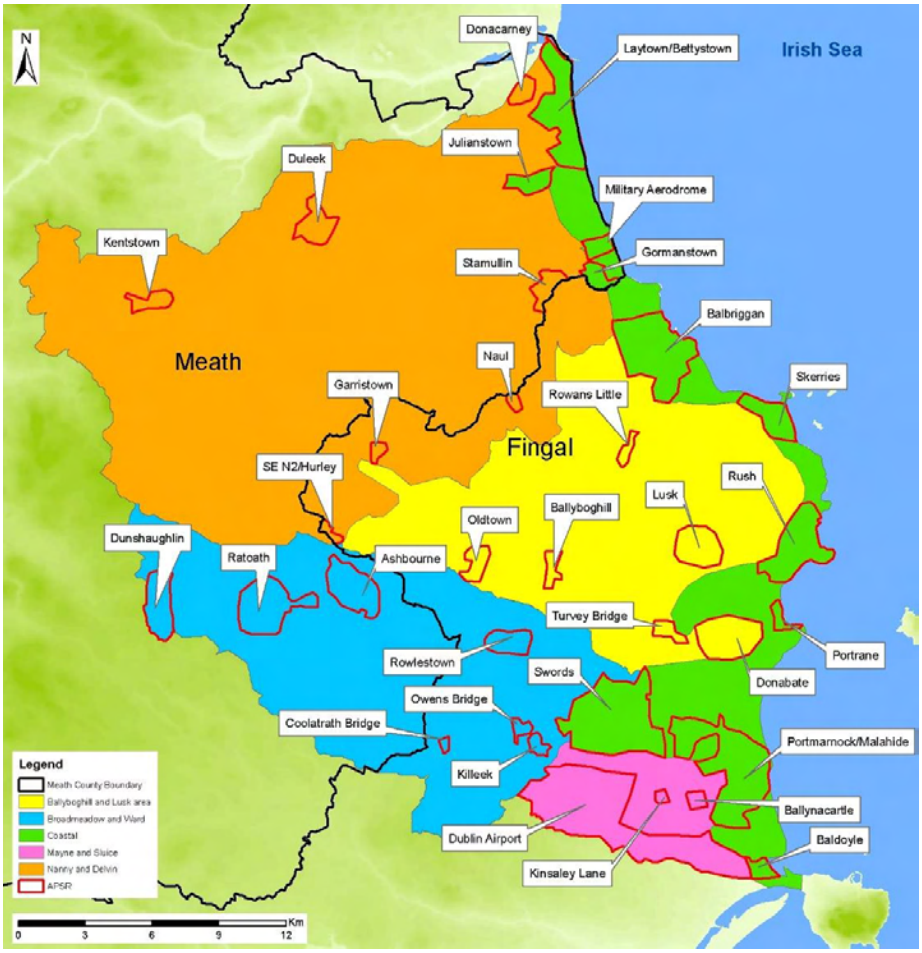

Figure 2-2: The study area and the assessed AUs and APSRs.

Following a comprehensive multi-criteria option assessment process[7], preferred flood risk management options have been recommended in the FRMP for the study area as a whole and several AUs and APSRs. These are summarised in Table 2-1 and are the subject of this Habitats Directive assessment.

An indicative implementation programme is set out in the FRMP, with suggested timescales linked loosely to EU Directive cycles:

- First phase - High priority: Plan implementation to 2015;
- Second phase – Medium priority: 2016 to 2021; and
- Third phase – Low priority: 2022 onwards.

Table 2-1: Preferred options identified for the study area, AUs and APSRs

Spatial scale	Preferred Options
Study area	
Study area	Development (Meath) and enhancement (Fingal) of a **proactive maintenance regime** targeting potential culvert blockage locations
	Targeted public **awareness and education** campaign and **individual property flood proofing (IPFP)**
Analysis Unit (AU)	
Nanny & Delvin (N&D)	Develop a fluvial **Flood Forecasting and Warning System (FFWS)** for the **Nanny River**
Broadmeadow & Ward (B&W)	Develop a fluvial **FFWS** for the **Broadmeadow River**
Mayne & Sluice (M&S)	Develop a fluvial **FFWS** for the **Mayne River**
Coastal (C)	Develop a combined fluvial and tidal **FFWS**
Area of Potential Significant Risk (APSR)	
Duleek area (N&D AU)	**Raising existing defence** embankment to a higher standard of protection (to protect up to 0.1% AEP) (included in the FRMP as a medium to low priority element[8])
Ratoath area (B&W AU)	**Improving channel conveyance** by replacing a bridge on the Broadmeadow River at the R125 Ratoath road, and replacing a culvert along a tributary of the Broadmeadow River with a larger capacity culvert
Rowlestown East area (B&W AU)	**Construction of flood defence embankments** along left bank of Broadmeadow River tributaries upstream of R125
St.Margaret's, Dublin Airport, Belcamp & Balgriffin areas	**Balgriffin: Improving channel conveyance** by removing old bridge structure combined with construction of flood defence embankments and walls upstream of R123 and along left bank of Mayne River

[7] Based on the following high-level criteria: applicability; technical feasibility; economic feasibility; social acceptability; and environmental acceptability

[8] It will not be implemented during this cycle of the FEM FRMP but will be reviewed under the next cycle commencing in 2016.

Spatial scale	Preferred Options
(M&S AU)	
Portmarnock & Malahide areas (C AU)	**Portmarnock: Rehabilitating and raising** existing coastal defences at **Strand Road** (including rehabilitation of flapped outfall) and construction of flood defence **embankment**
	Malahide town centre: Construction of demountable flood defences at underpass, along with flood walls/demountable walls and localised raising of existing defences to the north-east of Malahide, to protect at risk properties in Malahide town centre
Laytown, Bettystown & Coastal area (C AU)	Construction of flood defence **embankments** to protect properties at risk along the coast and from the **Nanny River**
Swords area (C AU)	Improve channel conveyance by **widening and deepening** of the Gaybrook Stream to reduce fluvial flood risk to properties at **Aspen near Kinsaley**
Rush area (C AU)	Improve conveyance by constructing secondary **culvert** along **Channel Road** to protect properties at risk from fluvial flooding along the West Rush stream
Skerries area (C AU)	Improve channel conveyance by **replacing culverts** under roads and railway with larger capacity culverts, and **widening** channel through park to reduce fluvial flood risk to properties at **Miller Lane and Sherlock Park**

Based on the results of the flood risk assessment, a list of Individual Risk Receptors (IRRs) at risk in the study area was prepared (Table 2-2). IRRs are essential infrastructure assets, sites with the potential to cause significant environmental pollution if flooded and important cultural heritage sites identified as being at significant risk of flooding from either the 1% AEP fluvial event or the 0.5% AEP tidal event. The list mainly includes utility assets, with one National Primary roadway at risk. All of the IRRs are at risk from either the 1% AEP fluvial event or 0.5% AEP tidal event with the exception of the wastewater treatment works at Owens Bridge which is only at risk for the 0.1% AEP event.

Table 2-2 Preferred options for IRRs

Risk receptor	Location	Likely FRM option
Utility asset at Stamullin	Stamullin area APSR	Construction of localised flood defence embankments or IPFP
WWTW at Ballyboghil	Ballyboghil area APSR	Construction of localised flood defence embankments
M1 at Staffordstown	Ballyboghil & Lusk AU	Construction of localised flood defence embankments
Wastewater pumping station in Ashbourne	Ashbourne area APSR	Construction of localised flood defence embankments
WWTWs at Toberburr	Owens Bridge area APSR	Construction of localised flood defence embankments
N32 at Clonshaugh	St Margaret's, Dublin Airport, Belcamp & Balgriffin areas APSR	Construction of localised flood defence embankments
WWTWs at Julianstown	Julianstown area APSR	Construction of localised flood defence embankments

3. Implications for the Conservation Objectives of the European Sites

3.1. Introduction

The screening assessment considered the 14 European Sites in the Fingal East Meath study area and immediately adjacent to it, and these are listed below and shown on Figure 3-1:

- Boyne Coast and Estuary candidate Special Area of Conservation (cSAC);
- Boyne Estuary Special Protection Area (SPA);
- River Nanny Estuary and Shore SPA;
- Skerries Islands SPA;
- Rogerstown Estuary cSAC;
- Rogerstown Estuary SPA;
- Broadmeadow Estuary/Swords SPA;
- Malahide Estuary cSAC;
- Baldoyle Bay cSAC;
- Baldoyle Bay SPA;
- Ireland's Eye cSAC;
- Ireland's Eye SPA;
- Howth Head cSAC; and
- Howth Head Coast SPA.

These were chosen on the basis that the most likely effects of a catchment FRMP would be within and downstream of the catchments involved, rather than adjacent catchments not connected hydrologically or ecologically. A number of other European Sites can be found within 15km of the Fingal East Meath study area boundary (as defined in Figure 2-1), and these are listed in Table 3-1. However, this assessment does not consider these European Sites further, as they are not within or downstream of the river catchments, or within or contiguous to the coastal cells of Fingal and East Meath, and would, therefore, not be affected by the FRMP. It is considered that there are very unlikely to be hydrological or ecological pathways that could result in the preferred flood risk management options for the Fingal East Meath study area having a significant effect on any of these sites.

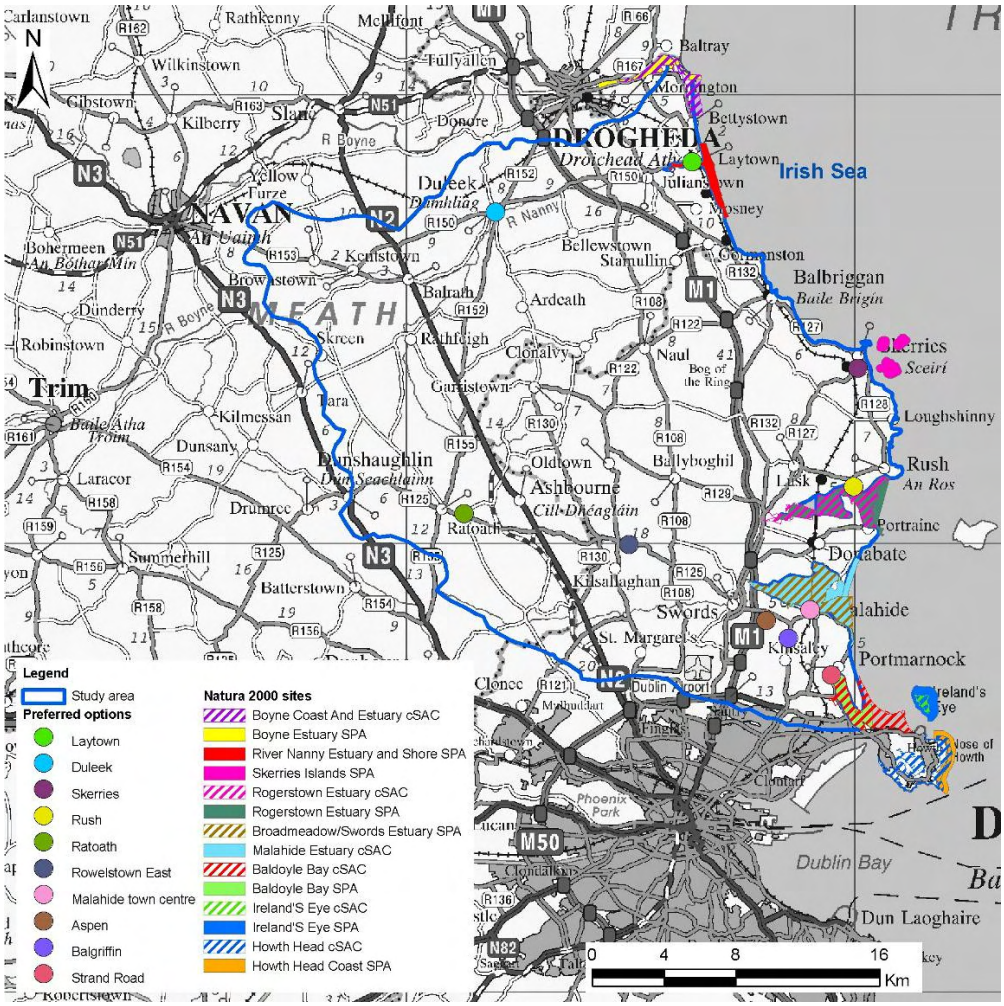

Figure 3-1 Natura 2000 or European Sites within the study area (Source: NPWS)

Table 3-1: Other European Sites within 15km of the study area boundary.

European Site	Summary Description	Comments
Clogher Head cSAC	Rocky coastal promontory designated for its dry heath and vegetated sea cliffs.	Located 6.7km north of the northern boundary of the study area. No potential or pathway for direct or indirect effects.
River Boyne and River Blackwater cSAC	The freshwater element of the Rivers Boyne and Blackwater and their tributaries. Designated for alkaline fen and alluvial woodlands, and populations of otter, salmon and river lamprey.	Within 2km of the study area boundary at closest point but, being a different catchment, there is no hydrological or hydro-ecological connection. No potential or pathways for direct or indirect effect.
Rockabill SPA	Small rocky islands with important seabird colonies, c.7km north-east of Skerries.	In the Irish Sea, c6km north-east of The Skerries Islands SPA. No potential or pathways for direct or indirect effect.

European Site	Summary Description	Comments
Lambay Island cSAC	Rocky island with good examples of vegetated sea cliffs and a colony of grey seals. 4km off the mouth of the Broadmeadow/ Swords/ Malahide estuary.	Located 3.7km offshore from the mouth of the Broadmeadow/ Malahide estuary. No potential or pathway for direct or indirect effect.
Lambay Island SPA	As above. Designated for its important seabird colonies,	As above.
North Dublin Bay cSAC	Excellent example of a coastal site with good examples of ten Annex I coastal habitats.	Located only 0.4km due south of study area, across the isthmus of Howth Head, but c.4km south of nearest option location and c.14km via the sea round Howth Head. No potential or pathway for direct or indirect effect.
North Bull Island SPA	Inner part of North Dublin Bay, of international importance for waterfowl.	Located only 0.4km due south of study area, across the isthmus of Howth Head, but c.4km south of nearest option location and c.12.5km via the sea round Howth Head. No potential or pathway for direct or indirect effect.
South Dublin Bay/ Tolka Estuary SPA	Intertidal sand and mudflats at mouth of the Liffey and Tolka Rivers, designated for important waterfowl populations.	Located over 5km south of the study area and over 14km round Howth Head. No potential or pathway for direct or indirect effect.
South Dublin Bay cSAC	Fine example of a coastal system with intertidal sand and mudflats, south of the River Liffey.	Located over 6km south of the study area and over 15km round Howth Head. No potential or pathway for direct or indirect effect.
Dalkey Islands SPA	Rocky island with important populations of roseate tern, common tern and arctic tern.	Over 13km due south of the study area boundary across the whole of Dublin Bay. No potential or pathway for direct or indirect effect.

As stated in Section 1.1, the Screening for Appropriate Assessment stage (Stage 1) concluded that the proposed draft Fingal East Meath FRMP has the potential to have significant effects, either alone or in-combination, on seven of the 14 European Sites:

- Boyne Estuary SPA;
- River Nanny Estuary and Shore SPA;
- Rogerstown Estuary SPA;
- Rogerstown Estuary cSAC;
- Broadmeadow/Swords Estuary SPA;
- Baldoyle Bay cSAC; and
- Baldoyle Bay SPA.

Table 3-2 is a copy of Table 4-2 of the Stage 1 screening assessment, and Table 3-3 is based on and summarises Table 4-1 of the screening assessment. They highlight the European Sites and interest features which are potentially sensitive and exposed to impacts arising from the implementation of the proposed Fingal East Meath FRMP.

The red shading in Table 3-2 indicates that the assessment has highlighted that a significant effect is likely, orange shading indicates that a significant effect is uncertain, and green shading indicates that the assessment has concluded no potential for a significant effect. The blank squares in Table 3.2 indicate that no link between the APSR and European Site was identified. None of the preferred options at the study area and AU scale was identified as having potential for a significant effect.

Table 3-2: Summary of screening assessment of the potential effects of the proposed FEM FRMP on European Sites in the study area

	Duleek APSR	Ratoath APSR	Rowlestown East APSR	St.Margaret's, Dublin Airport, Belcamp & Balgriffin APSR	Portmarnock & Malahide APSR	Laytown, Bettystown & Coastal APSR	Swords APSR	Rush APSR	Skerries APSR
Boyne Coast and Estuary cSAC						No effect			
Boyne Estuary SPA						Effect uncertain			
River Nanny Estuary and Shore SPA	No effect					Likely effect			
Skerries Islands SPA									No effect
Rogerstown Estuary cSAC								Effect uncertain	
Rogerstown Estuary SPA								Effect uncertain	
Broadmeadow Estuary/Swords SPA		No effect	No effect		Effect uncertain		No effect		
Malahide Estuary cSAC		No effect	No effect		No effect		No effect		
Baldoyle Bay cSAC				Effect uncertain	Effect uncertain				
Baldoyle Bay SPA				Effect uncertain	Effect uncertain				
Ireland's Eye cSAC					No effect		No effect		
Ireland's Eye SPA					No effect		No effect		
Howth Head cSAC and					No effect		No effect		
Howth Head Coast SPA					No effect		No effect		

Table 3-3: European Sites and features potentially sensitive and exposed to risks arising from the proposed FEM FRMP.

Features potentially affected	Risks to site
Boyne Estuary SPA	
• Birds listed in Annex 1 of Council Directive 79/409/EEC • Other regularly occurring migratory birds	*Laytown, Bettystown & Coastal area APSR* Potential impact on bird populations shared with the River Nanny Estuary and Shore SPA as a result of permanent loss of, and temporary damage to, intertidal habitats on the River Nanny Estuary, and potential for disturbance to birds during construction works. Potential long term habitat loss resulting from coastal squeeze.
River Nanny Estuary and Shore SPA	
• Birds listed in Annex 1 of Council Directive 79/409/EEC • Other regularly occurring migratory birds	*Laytown, Bettystown & Coastal area APSR* Permanent loss of, and temporary damage to, intertidal habitats of the SPA, and potential for disturbance to birds during construction works. Potential long term habitat loss resulting from coastal squeeze.
Rogerstown Estuary SPA	
• Birds listed in Annex 1 of Council Directive 79/409/EEC • Other regularly occurring migratory birds	*Rush APSR* Potential disturbance to bird populations of the SPA and damage to intertidal habitat during construction. Potential changes to the pattern of freshwater input into the estuary, affecting habitats and food supplies.
Rogerstown Estuary cSAC	
• Dune grassland • Shifting dunes with marram • Estuaries • Intertidal mudflats and sandflats • Pioneer saltmarshes • Atlantic salt meadows (or saltmarshes) • Mediterranean salt meadows (or saltmarshes) • Cord-grass swards (or saltmarshes)	*Rush APSR* Potential for changes to the frequency and duration of freshwater input into the estuary, which may affect intertidal cSAC habitats. Potential damage to cSAC habitats in the locality of the works during construction.
Broadmeadow Estuary/Swords SPA	
• Birds listed in Annex 1 of Council Directive 79/409/EEC • Other regularly occurring migratory birds	*Portmarnock and Malahide areas APSR: Malahide town centre* Potential disturbance to SPA bird species during the construction period. Potential long term intertidal habitat loss as a result of coastal squeeze.
Baldoyle Bay cSAC	

Features potentially affected	Risks to site
• Intertidal mudflats and sandflats • Pioneer saltmarshes • Atlantic saltmeadows (or saltmarshes) • Mediterranean salt meadows (or saltmarshes) • Cord grass swards (or saltmarshes)	*Portmarnock and Malahide areas APSR: Portmarnock* Potential permanent loss of, and temporary damage to, cSAC habitats beneath the footprint of the works. Potential long term habitat loss as a result of coastal squeeze. Potential changes to the frequency and duration of freshwater input into the estuary, which may affect intertidal cSAC habitats. *St. Margaret's, Dublin Airport, Belcamp & Balgriffin areas APSR* Potential changes to the frequency and duration of freshwater input into the estuary, which may affect intertidal cSAC habitats.
Baldoyle Bay SPA	
• Birds listed in Annex 1 of Council Directive 79/409/EEC • Other regularly occurring migratory birds	*Portmarnock and Malahide areas APSR Portmarnock* Potential loss of or damage to intertidal habitat beneath the footprint of the works, and temporary disturbance to birds of the SPA during construction. Potential long term habitat loss as a result of coastal squeeze. Potential for changes to the pattern of freshwater input into the estuary, affecting the birds' habitats and food supplies. *St. Margaret's, Dublin Airport, Belcamp & Balgriffin areas APSR* Potential changes to the pattern of freshwater input into the estuary, affecting habitats and food supplies.

The detailed appropriate assessment that follows in Sections 3.2-3.6 analyses the potential risks to each of these European Sites, and the implications for their conservation objectives, to determine whether the FRMP will adversely affect its integrity. [Note that, although the sites have generally been listed in this document in approximate geographical order, from north to south, the assessment begins with the River Nanny Estuary and Shore SPA as the potential risks to the Boyne Estuary SPA relate to proposed works on the River Nanny Estuary.] The appropriate assessment also identifies specific avoidance or mitigation measures to ensure that the plan has no adverse effect on the integrity of the European Sites. Finally, a summary and conclusion of the assessment are provided in Section 3.9.

This assessment at the Plan level does not remove the need for an Appropriate Assessment at the project level, regardless of whether or not the project is consistent with the FRMP. As a result of uncertainties concerning the potential impacts of the preferred FRMP options on the European Sites, detail emerging at the scheme or project design stage may identify additional impacts which have not been assessed here. Consequently, any scheme or project arising

out of the plan will be assessed to ensure any adverse effects on the integrity of European Sites are avoided.

3.2. River Nanny Estuary and Shore SPA

3.2.1. Introduction

The River Nanny Estuary and Shore SPA covers 216ha, incorporating the entire 2km length of the River Nanny Estuary, and approximately 3km of shoreline to the north and south of the estuary mouth. The estuary is narrow and sheltered, and its principal habitats are mudflats, saltmarshes and, along the edges, freshwater marsh/wet grassland. The open sea shore, which extends approximately 500m to the low tide mark, comprises beach and intertidal sand flats and is backed in places by low clay cliffs. The site is nationally important for waterbirds, supporting five species in nationally important numbers, as well as smaller populations of several other species.

3.2.2. Potential risk to site resulting from the FRMP

As a result of construction of the preferred option for Laytown, Bettystown & Coastal area APSR, there is potential for permanent loss of estuarine habitat beneath the footprint of the walls, and, depending on the timing of the construction works, the potential for disturbance to birds which are designated interest features of the SPA. In the long term, this option, combined with sea level rise, could result in further coastal squeeze and loss of bird habitat.

3.2.3. Interest features potentially exposed to risk

Full details of the interest features for which the site is identified, as listed in the *Natura 2000* Standard Data Form, are provided in Table 3-4.

Table 3-4: River Nanny and Shore SPA interest features[9]

River Nanny and Shore SPA interest features
Birds listed on Annex 1 of Council Directive 79/409/EEC
Pluvialis squatarola Golden plover (wintering) *Limosa lapponica* Bar-tailed godwit (wintering)
Regularly occurring migratory birds not listed on Annex 1 of Council Directive 79/409/EEC
Phalacrocorax carbo Cormorant (wintering) *Branta bernicla* Brent goose (wintering) *Anas platyrhynchos* Mallard (wintering) *Haematopus ostralegus* Oystercatcher (wintering) *Charadrius hiaticula* Ringed plover (wintering) *Pluvialis squatarola* Grey plover (wintering) *Vanellus vanellus* Lapwing (wintering) *Calidris canutus* Knot (wintering)

[9] As listed in the Natura 2000 Standard Data Form provided by NPWS.

River Nanny and Shore SPA interest features
Calidris alba Sanderling (wintering) *Calidris alpina* Dunlin (wintering) *Numenius arquata* Curlew (wintering) *Tringa totanus* Redshank (wintering) *Arenaria interpres* Turnstone (wintering) *Larus ridibundus* Black-headed gull (wintering) *Larus canus* Common or mew gull (wintering) *Larus argentatus* Herring gull (wintering)

However, a revised list of "Special Conservation Interests" for the SPA has been proposed by NPWS[10] as follows:

- The site is selected for: Ringed plover, Knot and Sanderling; and
- Additional Special Conservation Interests: Oystercatcher, Golden plover, Herring gull, Wetland and Waterbirds.

This revised list indicates the relative priorities assigned to the significant species occurring on the site, and facilitates the setting of conservation objectives. The inclusion of the category "Wetland and Waterbirds" reflects the requirements of the Birds Directive, Article 4(2), for Member States to pay particular attention to the protection of wetlands and all regularly occurring migratory species.

3.2.4. Ecological value of potentially affected features

The River Nanny Estuary and Shore is a nationally important waterbird site, ranked 36th in the list of 276 wetlands in the Republic of Ireland on the basis of its mean total waterbird count for the period 2002-2007[11]. During that period it supported a mean total of 6,696 birds, including nationally important numbers[12] of five species: Common scoter, Oystercatcher, Ringed plover, Knot and Sanderling. However, this list differs slightly from that published in the SPA Site Synopsis and the Natura 2000 Standard Data Form, which is based on average peaks for the 5-year period 1995/6-1999/2000 (given in parentheses): Golden plover (1759), Oystercatcher (1014), Ringed plover (185), Knot (1140) and Sanderling (240)[13]. Knot and

[10] NPWS, *pers.comm.* (October 2010).
[11] Boland, H., Crowe, O. & Walsh, A. (2008) Irish Wetland Bird Survey: Results of waterbird monitoring in Ireland in 2006/07. *Irish Birds 8*: 341-350.
http://www.birdwatchireland.ie/LinkClick.aspx?fileticket=lblqbv468Ac=&tabid=281
[12] This is based on the concept of the "1% rule", an arbitrary threshold that was developed under the Ramsar Convention, so that a wetland is considered important in a national (e.g. Great Britain or all-Ireland) context if it regularly holds 1% or more of one waterbird species, sub-species or population (in Great Britain or the island of Ireland respectively), and of international importance if it regularly supports the same proportion of the relevant international population. Normally this is measured by calculating the five-year peak mean for each species and expressing this as a percentage of the national/international population estimates.
[13] Figures are average peaks for the 5-year period 1995/6-1999/2000 taken from the site synopsis.

Sanderling numbers are particularly important as they represent 4% of the all-Ireland totals for both species, and these species are two of the three for which the site is selected.

The site synopsis and Natura 2000 Standard Data Form state that the SPA is most important as a roost area, but that the intertidal flats also provide feeding habitat. In addition it is stated that many of the birds also utilise the intertidal areas and beaches further to the north and south, as well as fields. As the estuary itself is very small and narrow, and the intertidal mudflats within it are quite restricted, this suggests that the main feeding areas are probably the intertidal sandflats on the open coast, whilst the beaches, and the saltmarshes and fringing wet grassland of the estuary itself, provide high tide roosting areas.

3.2.5. Conservation objectives

The draft main conservation objective[14] for River Nanny and Shore SPA is based on the proposed list of Special Conservation Interests, and is:

- To maintain the special conservation interests for this SPA at favourable conservation status[15]: Oystercatcher, Golden plover, Ringed plover, Knot, Sanderling, Herring gull, Wetland and Waterbirds.

3.2.6. Condition of site and management

According to the Natura 2000 Data Form (2004), the main threat to wintering bird populations is increased disturbance from walkers, dogs and other beach users.

3.2.7. Potential impact of scheme alone

The application of the preferred option for Laytown, Bettystown & Coastal area APSR would involve the construction of a total of 0.45km of permanent flood defence embankments and walls on the left bank of the River Nanny along the R150 southwest of Laytown (Figure 3-2). This would comprise 211m of flood defence walls, constructed 150m upstream of the railway bridge, and 239m of flood embankments built immediately downstream of the bridge. The downstream length would be set back from the channel but the upstream section would be constructed to the river bed level because of limited space. Hydraulic modelling indicates that there would be no impact on water levels, but there is potential impact on an existing overland flow route (eastwards along the R150 which continues under the railway bridge and into Laytown), although there are no areas of significant natural floodplain storage affected by this option.

[14] Supplied by NPWS, October 2010.
[15] The favourable conservation status of a species is achieved when: population data on the species concerned indicate that it is maintaining itself; the natural range of the species is neither being reduced or likely to be reduced for the foreseeable future; and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

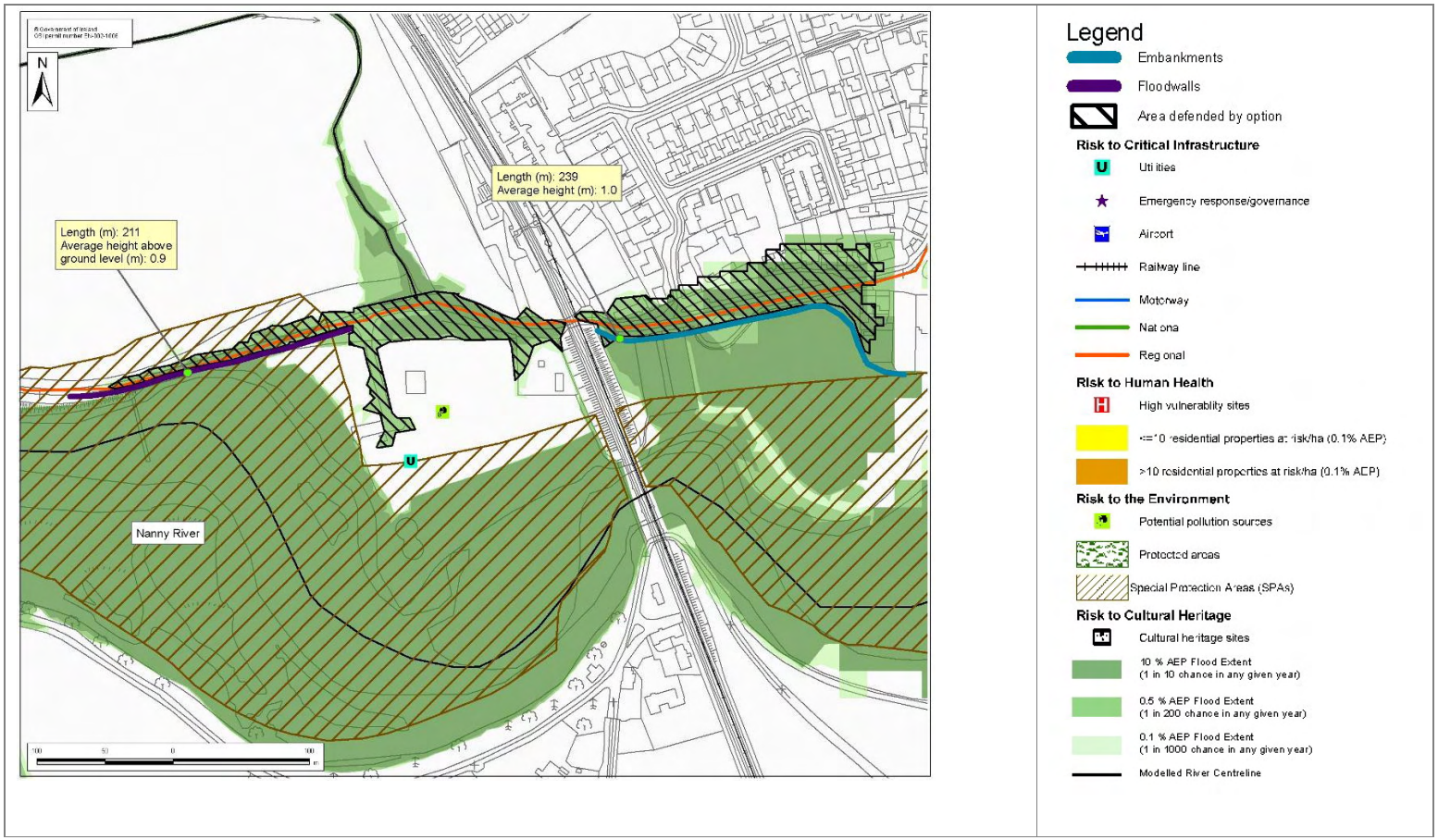

Figure 3-2: Location of preferred option for the Laytown, Bettystown & Coastal area APSR in relation to the River Nanny Estuary and Shore SPA.

The new downstream embankments would be situated within 50m of the SPA boundary, but set back at least 75m from the shore, along a busy residential road (Strand Road) and landward of a children's playground. However, the new upstream walls would be nearly 50m inside the SPA boundary and, in places, within the estuarine channel itself. As such, there will be temporary damage to and permanent loss of estuarine habitat beneath the footprint of the walls. In the long term, this option, as a "hold the line" option in terms of coastal management, could contribute to further coastal squeeze and a loss of intertidal habitat resulting from accelerated sea level rise In addition, depending on the timing of the construction works, there is the potential for disturbance to birds which are designated interest features of the SPA.

The estuary and its intertidal zones are very narrow, and constrained to landward by the current defences and roads, and, therefore, are unlikely to be used by large numbers of foraging birds. However, the upstream walls would be built along the broadest part of the inner estuary, which includes the largest mudflat and is, therefore, likely to be the most important part of the inner estuary for birds. During the construction of these walls, there is likely to be some disturbances to the intertidal habitat along the alignment of the defence as a result of excavation for foundations, temporary works, etc. Nevertheless, given the presence of the Strand Road and the R150 running close to the estuary shore, and the activity and noise levels associated with the road, it is likely that the narrow strip of mudflat adjacent to the road, which would be lost under the footprint of the new upstream walls, is little used by foraging birds.

There is, however, potential for temporary disturbance to foraging and roosting bird populations, as a result of noise and activity associated with the works. In addition to the intertidal mudflat which is used by foraging birds, the saltmarshes on the opposite side of the narrow channel from the proposed upstream walls are likely to be important high tide roost sites. Again, given the presence of the Strand Road and the R150 running close to the estuary shore, and the current activity and noise levels associated with the road, the response of birds to additional activity may be limited. A study by IECS (2007) on the Humber estuary concluded that birds become habituated to regular construction noise below 70dB. Consequently, it is not clear that the noise and activity levels associated with the proposed downstream works would represent a significant increase in relation to the present conditions, although the activity associated with the upstream works are likely to have a greater effect. It is very likely that birds will be displaced from the immediate vicinity of the upstream construction site as a result of personnel and plant, but the effects on more distant birds are more difficult to assess. However, the birds may become habituated to the new activity within a number of days thus reducing the magnitude of the effect. Potential disturbance to the SPA bird populations would be reduced to a minimum by undertaking the works, as far as possible, between April and August to avoid the main migration and wintering period, and by using good practice construction methods to reduce noise levels.

It is concluded that, provided these measures are implemented, the application of the preferred option for the Laytown, Bettystown & Coastal area APSR will not impact on a significant proportion of the estuary's bird populations and, therefore, will not adversely affect the integrity of the River Nanny Estuary and Shore SPA and its Special Conservation Interests.

3.2.8. Potential impact of scheme in-combination

A number of other plans and strategies were examined that could potentially affect the European Site in-combination with the FEM FRMP, including Meath Development Plan 2007-

2013 and East Meath Local Area Plan 2005. No significant adverse 'in combination' effects were identified at the strategic level, although there is potential for such impacts at a local level depending on the timing of actions resulting from the FRMP and other plans. Objective LAY6 of the East Meath Local Area Plan 2005 provides for an Eco-residential Park on lands to the west of Laytown and bordering part of the north bank of the River Nanny Estuary, and this may lead to an increase in disturbance levels on a temporary (construction) or permanent basis. However, any in-combination effect would depend on the timing of works resulting from both plans, and it may only be possible to assess the potential for such effects during project-specific appropriate assessment.

3.2.9. Measures to avoid adverse effects

The works should be undertaken, as far as possible, between April and August to avoid the main migration and wintering period, and good construction practices should be implemented to reduce noise levels.

The potential for setting back the road and the flood defences from the estuary, or for intertidal habitat creation, should be investigated in order to mitigate for loss through coastal squeeze or to replace lost habitat.

A review of the plan mentioned in Section 3.2.8 (the East Meath Local Area Plan 2005) should be undertaken at the project stage as part of the project level appropriate assessment, in order to determine whether any in-combination effects are likely and whether further measures are required to avoid adverse effects.

3.3. Boyne Estuary SPA

3.3.1. Introduction

The Boyne Estuary SPA is smaller than the Boyne Coast and Estuary SAC, covering an area of 407.7ha and only a small proportion of the site lies within the study area. The designated site covers most of the estuary of the River Boyne and comprises intertidal sand and mudflats, saltmarshes and eel grass (*Zostera*) beds, but not the open coast section of the cSAC. The Boyne Estuary is the second most important site for wintering and migratory birds along the Louth-Meath coastline, with nationally important wintering populations of up to ten waterfowl species, and smaller populations of several other species.

3.3.2. Potential risk to site resulting from the FRMP

Laytown, Bettystown & Coastal area APSR

It is suggested by the River Nanny Estuary and Shore SPA site synopsis that there may be some interchange of bird populations between the Nanny Estuary and Shore and the Boyne Estuary. The potential for permanent loss of estuarine habitat on the River Nanny Estuary beneath the footprint of the walls, and, depending on the timing of the construction works, the potential for disturbance to birds could affect species that are also designated interest features of the Boyne Estuary SPA. In the long term, this option, combined with sea level rise, could result in further coastal squeeze and loss of bird habitat.

3.3.3. Interest features potentially exposed to risk

Full details of the interest features for which the site is identified, as listed in the *Natura 2000* Standard Data Form, are provided in Table 3-5.

Table 3-5: Boyne Estuary SPA interest features

Boyne Estuary SPA interest features
Birds listed on Annex 1 of Council Directive 79/409/EEC
Pluvialis squatarola Golden plover (wintering) *Limosa lapponica* Bar-tailed godwit (wintering) *Sterna albifrons* Little tern (breeding)
Regularly occurring migratory birds not listed on Annex 1 of Council Directive 79/409/EEC
Branta bernicla Brent goose (wintering) *Tadorna tadorna* Shelduck (breeding & wintering) *Anas penelope* Wigeon (wintering) *Anas crecca* Teal (wintering) *Anas platyrhyncos* Mallard (wintering) *Mergus serrator* Red-breasted merganser (wintering) *Phalacrocorax carbo* Cormorant (wintering) *Haematopus ostralegus* Oystercatcher (breeding & wintering) *Charadrius hiaticula* Ringed plover (breeding & wintering) *Pluvialis squatarola* Grey plover (wintering) *Vanellus vanellus* Lapwing (wintering) *Calidris canutus* Knot (wintering) *Calidris alba* Sanderling (wintering) *Calidris alpina* Dunlin (wintering) *Limosa limosa* Black-tailed godwit (wintering) *Numenius arquata* Curlew (wintering) *Tringa totanus* Redshank (breeding & wintering) *Tringa nebularia* Greenshank (wintering) *Arenaria interpres* Turnstone (wintering) *Larus ridibundus* Black-headed gull (wintering) *Larus canus* Common gull (wintering)

However, a revised list of “Special Conservation Interests” for the SPA has been proposed by NPWS (see section 3.2.3), as follows:

- The site is selected for: Golden plover, Black-tailed godwit and Turnstone.
- Additional Special Conservation Interests: Shelduck, Oystercatcher, Grey plover, Lapwing, Sanderling, Redshank, Little tern, Wetland and Waterbirds

There was a breeding colony of little terns *Sterna albifrons* on the site until 1996, and recent conservation efforts have been successful in re-establishing the colony on the beach and sand dunes at Baltray, just outside the SPA boundary.

3.3.4. Ecological value of potentially affected features

The Boyne Estuary is a nationally important waterbird site, ranked 25th in the list of 276 wetlands in the Republic of Ireland on the basis of its mean total waterbird count for the period 2002-2007[16]. During that period it supported a mean total of 11,006 birds, including nationally important numbers[17] of five species: Golden plover, Grey plover, Knot, Sanderling and Black-tailed godwit. However, this list differs from that published in the SPA Site Synopsis and the Natura 2000 Standard Data Form, which is based on average peaks for the 5-year period 1995/6-1999/2000 (given in parentheses): Shelduck (218), Oystercatcher (1,099), Golden plover (6,070), Grey plover (98), Lapwing (4,657), Knot (1,771), Sanderling (69), Black-tailed godwit (471), Redshank (583) and Turnstone (175)[18]. Golden plover and Knot numbers are particularly important as they represent 4% and 7% of their respective all-Ireland totals.

The site synopsis and Natura 2000 Standard Data Form state that the SPA provides both feeding and roosting areas for the birds. There may be some interchange between the bird populations of the Boyne Estuary SPA and the River Nanny Estuary and Shore SPA as their boundaries are only 3.52km apart at their nearest point and the River Nanny Estuary and Shore site synopsis refers to birds using intertidal areas and beaches to the north and south.

3.3.5. Conservation objectives

The draft main conservation objective[19] for Boyne Estuary SPA is based on the proposed list of Special Conservation Interests, and is:

- To maintain the special conservation interests for this SPA at favourable conservation status: Golden plover, Knot, Black-tailed godwit, Turnstone, Shelduck, Oystercatcher, Grey plover, Lapwing, Sanderling, Redshank, Little tern, Wetland and Waterbirds.

3.3.6. Condition of site and management

The main threats to the wintering bird populations and their habitats are infilling of intertidal habitats for land claim, sewage pollution and port expansion[20].

[16] Boland,*et al.* (2008) *Op.cit.*
[17] This is based on the concept of the "1% rule", an arbitrary threshold that was developed under the Ramsar Convention, so that a wetland is considered important in a national (eg. Great Britain or all-Ireland) context if it regularly holds 1% or more of one waterbird species, sub-species or population (in Great Britain or the island of Ireland respectively), and of international importance if it regularly supports the same proportion of the relevant international population. Normally this is measured by calculating the five-year peak mean for each species and expressing this as a percentage of the national/international population estimates.
[18] Figures are average peaks for the 5-year period 1995/6-1999/2000 taken from the site synopsis.
[19] Supplied by NPWS, October 2010.
[20] Natura 2000 Data Form.

3.3.7. Potential impact of scheme alone

Laytown, Bettystown & Coastal area APSR

The application of the preferred option for Laytown, Bettystown & Coastal area APSR would involve the construction of 0.45km of permanent flood defence embankments and walls within the Nanny River estuary, 4km south of the Boyne Estuary SPA (see Section 3.2.7 for full details). As a result of the possible interchange of bird populations between the Nanny Estuary and Shore and the Boyne Estuary, as suggested by the River Nanny Estuary and Shore SPA site synopsis (see Section 3.3.4), there is potential for the proposed works in the Nanny Estuary to affect birds associated with the Boyne estuary. However, given that the boundaries of the two SPAs are closest on the open sea shore it is likely that any interchange of bird populations occurs along the beaches in this area. It is unlikely, that birds from the Boyne estuary would occur regularly within the inner Nanny estuary, particularly in significant numbers.

Consequently, it is concluded that the application of the preferred option for Laytown, Bettystown & Coastal area APSR will not adversely affect the integrity of the Boyne Estuary SPA and its Special Conservation Interests, particularly if the proposed measures are implemented as outlined in Sections 3.2.7, 3.2.9 and 3.3.9.

3.3.8. Potential impact of scheme in-combination

As it is unlikely that birds from the Boyne estuary would occur regularly within the inner Nanny estuary, particularly in significant numbers, no significant adverse 'in combination' effects were identified.

3.3.9. Measures to avoid adverse effects

Adverse effects on the Boyne Estuary SPA and its bird populations are unlikely to result from the option for the Laytown, Bettystown & Coastal area APSR. However, any risk would be further reduced by the works being undertaken between April and August to avoid the main migration and wintering period, and good construction practices should be implemented to reduce noise levels.

A review of other plans and strategies that could potentially affect the European Site in-combination with the FEM FRMP, including Meath Development Plan 2007-2013 and East Meath Local Area Plan 2005, should be undertaken at the project stage as part of the project level appropriate assessment, in order to confirm whether any in-combination effects are likely and whether further measures are required to avoid adverse effects.

3.4. Rogerstown Estuary SPA

3.4.1. Introduction

Rogerstown Estuary SPA covers 586.5ha and is a relatively small, narrow estuary separated from the sea by a sand and shingle bar. The estuary receives freshwater input from two main rivers (Ballyboghill and Balleally) as well as several small streams, and has a wide salinity range. It contains good examples of estuarine habitat types including sand dunes, saltmarshes, and intertidal mud and sandflats and is a significant site for waterfowl. The population of Brent geese is internationally important, and there are nationally important

populations of a further 16-17 waterfowl species, including Oystercatcher, Golden plover, Lapwing, Knot and Dunlin, and smaller populations of several other species.

3.4.2. Potential risk to site resulting from the FRMP

Rush APSR

As a result of the construction of the preferred option for Rush APSR, there is a potential for temporary changes to the pattern of freshwater input into the estuary, which may affect the habitats and food supplies of the SPA bird populations. There is also potential, during the construction period, for disturbance to the bird populations that are designated features of the SPA. There is also potential for an in-combination effect with increased development in the catchment of the Rush (Brook) Stream.

3.4.3. Interest features potentially exposed to risk

Full details of the interest features for which the site is identified, as listed in the *Natura 2000* Standard Data Form, are provided in Table 3-6.

Table 3-6: Rogerstown Estuary SPA interest features

Rogerstown Estuary SPA interest features
Birds listed on Annex 1 of Council Directive 79/409/EEC
Pluvialis squatarola Golden plover (wintering) *Philomachus pugnax* Ruff (staging)
Regularly occurring migratory birds not listed on Annex 1 of Council Directive 79/409/EEC
Phalacrocorax carbo Cormorant (wintering) *Anser anser* Greylag goose (wintering) *Branta bernicla* Brent goose (wintering) *Tadorna tadorna* Shelduck (breeding & wintering) *Anas penelope* Wigeon (wintering) *Anas crecca* Teal (wintering) *Anas platyrhyncos* Mallard (wintering) *Anas clypeata* Shoveler (breeding and wintering) *Mergus serrator* Red-breasted merganser (wintering) *Haematopus ostralegus* Oystercatcher (wintering) *Charadrius hiaticula* Ringed plover (breeding & wintering) *Pluvialis squatarola* Grey plover (wintering) *Vanellus vanellus* Lapwing (wintering) *Calidris canutus* Knot (wintering) *Calidris alba* Sanderling (wintering) *Calidris alpina* Dunlin (wintering) *Calidris ferruginea* Curlew sandpiper (staging) *Gallinago gallinago* Snipe (wintering) *Calidris minuta* Little stint (staging) *Limosa limosa* Black-tailed godwit (wintering) *Numenius arquata* Curlew (wintering) *Tringa totanus* Redshank (breeding & wintering) *Tringa nebularia* Greenshank (wintering) *Tringa ochropus* Green sandpiper (staging) *Arenaria interpres* Turnstone (wintering)

However, a revised list of "Special Conservation Interests" for the SPA has been proposed by NPWS (see section 3.2.3) as follows:

- The site is selected for: Light-bellied brent goose, Shelduck, Oystercatcher, Ringed plover and Knot.
- Additional Special Conservation Interests: Greylag goose, Shoveler, Grey plover, Dunlin, Black-tailed godwit, Redshank, and Wetland and Waterbirds.

3.4.4. Ecological value of potentially affected features

The Rogerstown Estuary is an internationally important waterbird site, ranked 11th in the list of 276 wetlands in the Republic of Ireland on the basis of its mean total waterbird count for the period 2002-2007[21]. During that period it supported a mean total of 22,375 birds, including internationally important numbers[22] of Light-bellied brent goose and Black tailed godwit, as well as nationally important numbers of seventeen other species: Greylag goose, Shelduck, Wigeon, Teal, Shoveler, Oystercatcher, Ringed plover, Golden plover, Grey plover, Lapwing, Knot, Sanderling, Dunlin, Curlew, Greenshank, Redshank and Turnstone. However, this list differs slightly from those published in the SPA Site Synopsis and the Natura 2000 Standard Data Form, which are based on data from previous periods and list totals of seventeen and sixteen species respectively. The *Natura 2000* Standard Data Form highlights the international importance of the Light-bellied brent goose population which represents 5.9% of the all-Ireland total, as well as nationally important populations of Knot (8.6%), Shelduck (5.3%) and Golden plover (4.5%).

3.4.5. Conservation objectives

The draft main conservation objective for Rogerstown Estuary SPA is:

- To maintain the special conservation interests for this SPA at favourable conservation status: Light-bellied brent goose, Shelduck, Oystercatcher, Ringed plover, Knot, Greylag goose, Shoveler, Grey plover, Dunlin, Black-tailed godwit, Redshank, Wetland and Waterbirds.

3.4.6. Condition of site and management

The main threats to the wintering bird populations and their habitats are pollution from a landfill site, sewage pollution and agricultural run-off[23]. Illegal shooting causes disturbance to wintering waterfowl.

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[21] Boland, et.al.. (2008) *Op.cit.*
[22] This is based on the concept of the "1% rule", an arbitrary threshold that was developed under the Ramsar Convention, so that a wetland is considered important in a national (e.g. Great Britain or all-Ireland) context if it regularly holds 1% or more of one waterbird species, sub-species or population (in Great Britain or the island of Ireland respectively), and of international importance if it regularly supports the same proportion of the relevant international population. Normally this is measured by calculating the five-year peak mean for each species and expressing this as a percentage of the national/international population estimates.
[23] Natura 2000 Data Form.

3.4.7. Potential impact of scheme alone

Rush APSR

The preferred option for Rush APSR shown on Figure 3.3 would involve constructing a secondary culvert alongside the existing culvert on the downstream end of the Rush West Stream. Modelling results indicate that a new circular culvert with a diameter of 0.5m when combined with the capacity of the existing structure would be sufficient to reduce fluvial flood risk in Rush. The combined culverts would convey a flow of 1.2m^3/s, which equates to the 1% AEP flow without surcharging. The results of the modelling indicate that this option modifies existing overland flood flow paths which are the result of capacity problems at the entrance to the existing culvert and lead to the flooding of properties in Rush. The option prevents these overland flow paths through increasing the capacity of the culvert. There are no areas of significant natural floodplain storage affected by this option.

Consequently, freshwater that previously left the channel upstream of the existing culvert, during a 1% AEP flood event, will remain in-channel and thus enter the estuary directly, resulting in a temporary change to the pattern of freshwater input into the estuary. However the volume discharged will increase (approximately double the existing peak discharge) and will be discharged over a shorter time period during a flood event. This increase in volume may lead to some scouring so it should be recommended that scour protection is included at the outlet of this structure.

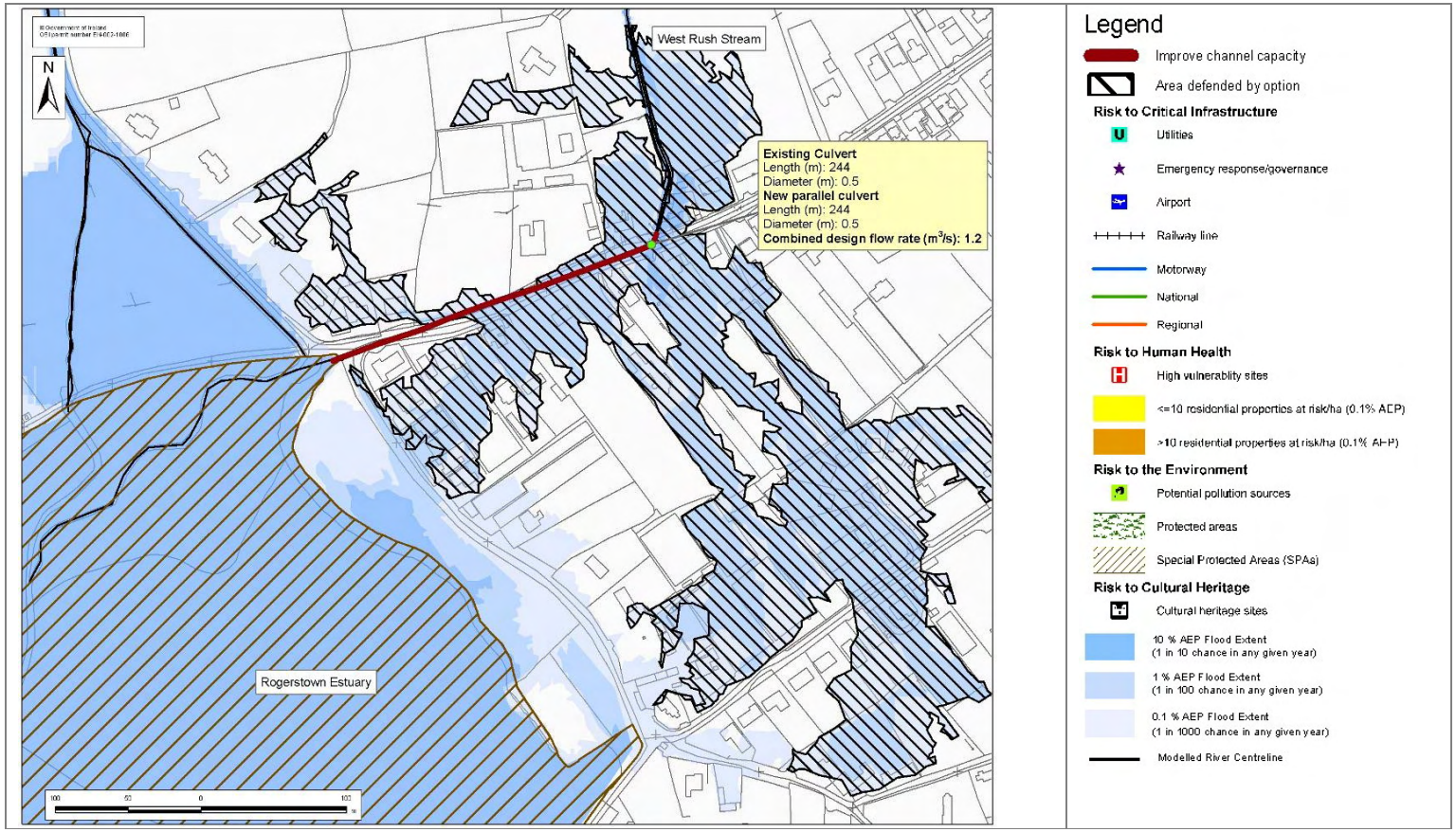

Figure 3-3: Location of Preferred Option for Rush APSR in relation to Rogerstown Estuary SPA.

The normal physical and biological functioning of estuaries depends in part on the pattern of freshwater inflow which influences salinity gradients, turbidity and organic matter inputs. Changes could, therefore, affect the intertidal habitats and food supplies of the SPA bird populations in the Rogerstown estuary. However, the predicted changes are for an extreme event and, during such an event, the proposed new culvert will only channel flow which is normally out of bank. Consequently, there should be no change for in-bank events and, therefore, no change in the regular pattern of freshwater inflow beyond the limits of natural variation. In addition, the input of the West Rush Stream into the estuary is extremely small, and the stream forms only a very narrow meandering tributary channel of only 1-3m wide across the fronting mudflat.

There is potential for temporary disturbance to foraging bird populations on the fronting mudflat, as a result of noise and activity associated with the works at the downstream end of the new culvert. Nevertheless, given the enclosed nature of works site bounded on the north side by Channel Road and on the south by an area of amenity grassland fronting South Shore Road, it is unlikely that the immediate vicinity of the proposed works is used by more than a few foraging waterbirds. In addition, as a result of existing local traffic and activity along Channel Road and South Shore Road running close to the estuary shore, the response of birds to additional activity may be limited. A study by IECS (2007) on the Humber estuary concluded that birds become habituated to regular construction noise below 70dB. It is very likely that birds will be displaced from the immediate vicinity of the construction site as a result of personnel and plant, but the effects on more distant birds are more difficult to assess. However, the birds may become habituated to the new activity within a number of days thus reducing the magnitude of the effect. Potential disturbance to the SPA bird populations would be reduced to a minimum by the mitigation measures of undertaking the works, as far as possible, between April and August to avoid the main migration and wintering period.

Consequently, it is concluded that, provided that these measures are implemented, the application of the preferred option for Rush APSR will not impact a significant proportion of the estuary's bird populations and, therefore, will not adversely affect the integrity of the Rogerstown Estuary SPA and its Special Conservation Interests.

3.4.8. Potential impact of scheme in-combination

A number of other plans and strategies were examined that could potentially affect the European Site in-combination with the FEM FRMP, including Fingal Development Plan 2011-2017 and local area development plans. No significant adverse 'in combination' effects were identified at the strategic level. However, there is potential for such impacts resulting from Zoning Objectives "RU" Rural and "RA" Residential Area in the Fingal Development Plan 2011-2017, and their implementation through the Rush Kenure and Rush (Skerries Road) Local Area Plans, if these lead to additional changes to the flow characteristics of Rush West Stream. However, given the small size and capacity of the stream, it is unlikely that in-combination effects would significantly change the regular pattern of freshwater input into the estuary beyond the limits of natural variation. Nevertheless, this would be assessed at the project stage as part of the project-level Appropriate Assessment.

3.4.9. Measures to avoid adverse effects

Scour protection should be installed at the downstream end of the culvert to prevent scour of the intertidal habitats.

The works should be undertaken, as far as possible, between April and August to avoid the main migration and wintering periods for the birds that are the Special Conservation Interests of the SPA.

A review of the Fingal Development Plan 2011-2017, Rush Kenure Local Area Plan and the Rush (Skerries Road) Local Area Plan should be undertaken at the project stage as part of the project level appropriate assessment, in order to determine whether any in-combination effects are likely and whether further measures are required to avoid adverse effects.

3.5. Rogerstown Estuary cSAC

3.5.1. Introduction

Rogerstown Estuary cSAC covers the same area as the SPA (586.5ha) and is a relatively small, narrow estuary separated from the sea by a sand and shingle bar. The estuary receives freshwater input from two main rivers (Ballyboghill and Balleally) as well as several small streams, and has a wide salinity range. It contains good examples of estuarine habitat types including sand dunes, saltmarshes, and intertidal mud and sandflats.

3.5.2. Potential risk to site resulting from the FRMP

Rush APSR

As a result of the construction of the preferred option for Rush APSR, there is a potential for temporary changes to the pattern of freshwater input into the estuary, which may affect the intertidal cSAC habitats of the Rogerstown estuary. There is also a risk that construction of the culvert could have an effect on cSAC habitats in the locality of the works. There is also potential for an in-combination effect with increased development in the catchment of the Rush West Stream.

3.5.3. Interest features potentially exposed to risk

Full details of the interest features for which the site is identified, as listed in the *Natura 2000* Standard Data Form, are provided in Table 3-7.

Table 3-7: Rogerstown Estuary cSAC interest features.

Rogerstown Estuary cSAC interest features.	
Habitat types listed in Annex I of Council Directive 92/43/EEC (* = priority habitat)	**Common Name**
2130 Fixed coastal dunes with herbaceous vegetation (grey dunes) (Category C: significant representativity)	Dune grassland
2120 Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) (Category C: significant representativity)	Shifting dunes with marram
1130 Estuaries (Category B: good representativity)	Estuaries
1140 Mudflats and sandflats not covered by sea water at low tide (Category B: good representativity)	Intertidal mudflats and sandflats
1310 *Salicorna* and other annuals colonizing mud and sand (Category B: good representativity)	Pioneer saltmarshes
1330 Atlantic salt meadows (*Glauco-Puccinelliatelia maritimae*) (Category B: good representativity)	Atlantic salt meadows (or saltmarshes)

Rogerstown Estuary cSAC interest features.	
Habitat types listed in Annex I of Council Directive 92/43/EEC (* = priority habitat)	**Common Name**
1410 Mediterranean salt meadows (*Juncetalia maritimi*) (Category B: good representativity)	Mediterranean salt meadows (or saltmarshes)
1320 *Spartina* swards (*Spartinion maritimae*) (Category D: non-significant presence)	Cord-grass swards (or saltmarshes)

3.5.4. Ecological value of potentially affected features

The intertidal habitats of the estuary are variable in quality owing to pollution from a number of sources. The fringing saltmarshes of the estuary are of moderate importance and quality, and the sand dunes are limited in their distribution and quality. The estuary experiences wide variations in salinity range from near full sea water to near full freshwater.[24]

A large area of the mudflats fronting South Shore Road, in the vicinity of the proposed works, is thinly vegetated with plants indicative of lower saltmarsh, i.e. stands of glasswort *Salicornia* spp. and cord grass *Spartina* spp[25].

3.5.5. Conservation objectives

The draft conservation objectives for the Rogerstown Estuary cSAC are:

- To maintain the Annex I habitats for which the cSAC has been selected, at favourable conservation status: Estuaries; Mudflats and sandflats not covered by sea water at low tide; *Salicorna* and other annuals colonizing mud and sand; Atlantic salt meadows (*Glauco-Puccinelliatelia maritimae*); Mediterranean salt meadows (*Juncetalia maritimi*); Shifting shifting dunes along the shoreline with *Ammophila arenaria* (white dunes); Fixed coastal dunes with herbaceous vegetation (grey dunes);
- To maintain the extent, species richness and biodiversity of the entire site; and
- To establish effective liaison and co-operation with landowners, legal users and relevant authorities.

3.5.6. Condition of site and management

The main threats to the ecology of the site and the quality of the intertidal habitats are pollution from a landfill site, sewage pollution and agricultural run-off[26]. "The dunes are considered to be in a highly vulnerable state owing to a combination of natural (erosion) and anthropogenic factors." On the northern side of the estuary, in the Rogerstown area, nutrient-

[24] Natura 2000 standard data form.
[25] Doogue, D., Tiernan, D. & Visser, H. (2004) *Ecological Study of the Coastal Habitats in County Fingal, Phase I& II: Habitats & Flora*. Fingal County Council. Pp 13-14, 41.
http://www.fingalbiodiversity.ie/resources/fingal_coast/2004%20Floral%20Habitats.pdf
[26] Natura 2000 Data Form.

rich groundwater seeps over the shore, and one of the streams entering the estuary at the end of Spout Road (Bride's Stream) is heavily polluted[27].

3.5.7. Potential impact of scheme alone

Rush APSR

The preferred option for Rush APSR shown on Figure 3.4 would involve constructing a secondary culvert along side the existing culvert on the downstream end of the Rush West Stream, and full details are given in Section 3.4.7.

The normal physical and biological functioning of estuaries depends in part on the pattern of freshwater inflow which influences salinity gradients, turbidity and organic matter inputs. Changes could, therefore, affect the intertidal habitats that are designated features of Rogerstown Estuary cSAC. However, the predicted changes are for an extreme event, and are unlikely to alter the regular pattern of freshwater inflow beyond the limits of natural variation. In addition, the input of the West Rush Stream into the estuary is extremely small, and the stream forms only a very narrow meandering tributary channel of only 1-3m wide across the fronting mudflat.

However the volume discharged will increase (approximately double the existing peak discharge) and will be discharged over a shorter time period during a flood event. This increase in volume may lead to some scouring so it should be recommended that scour protection is included at the outlet of this structure.

Consequently, it is concluded that provided the above mitigation measures are implemented, the application of the preferred option for Rush APSR will not adversely affect the conservation status of the Special Conservation Interests, and the species richness of the site, and will not therefore, adversely affect the integrity of the Rogerstown Estuary cSAC.

3.5.8. Potential impact of scheme in-combination

A number of other plans and strategies were examined that could potentially affect the European Sites in-combination with the FEM FRMP, including Fingal Development Plan 2011-2017 and Local area development plans. No significant adverse 'in combination' effects were identified at the strategic level. However, there is potential for such impacts resulting from Zoning Objectives "RU" Rural and "RA" Residential Area in the Fingal Development Plan 2011-2017, and subsequent implementation through the Rush Kenure and Rush (Skerries Road) Local Area Plans if these lead to additional changes to the flow characteristics of Rush (Brook) Stream. However, given the small size and capacity of the stream, it is unlikely that in-combination effects would significantly change the regular pattern of freshwater input into the estuary beyond the limits of natural variation. Nevertheless, this would be assessed at the project stage as part of the project level appropriate assessment.

[27] Doogue *et al.* (2004) *Op.cit.*, p41.

3.5.9. Measures to avoid adverse effects

Scour protection should be installed at the downstream end of the culvert to prevent erosion of the intertidal habitats.

A review of the Fingal Development Plan 2011-2017, Rush Kenure Local Area Plan and the Rush (Skerries Road) Local Area Plan should be undertaken at the project stage as part of the project level appropriate assessment, in order to determine whether any in-combination effects are likely and whether further measures are required to avoid adverse effects.

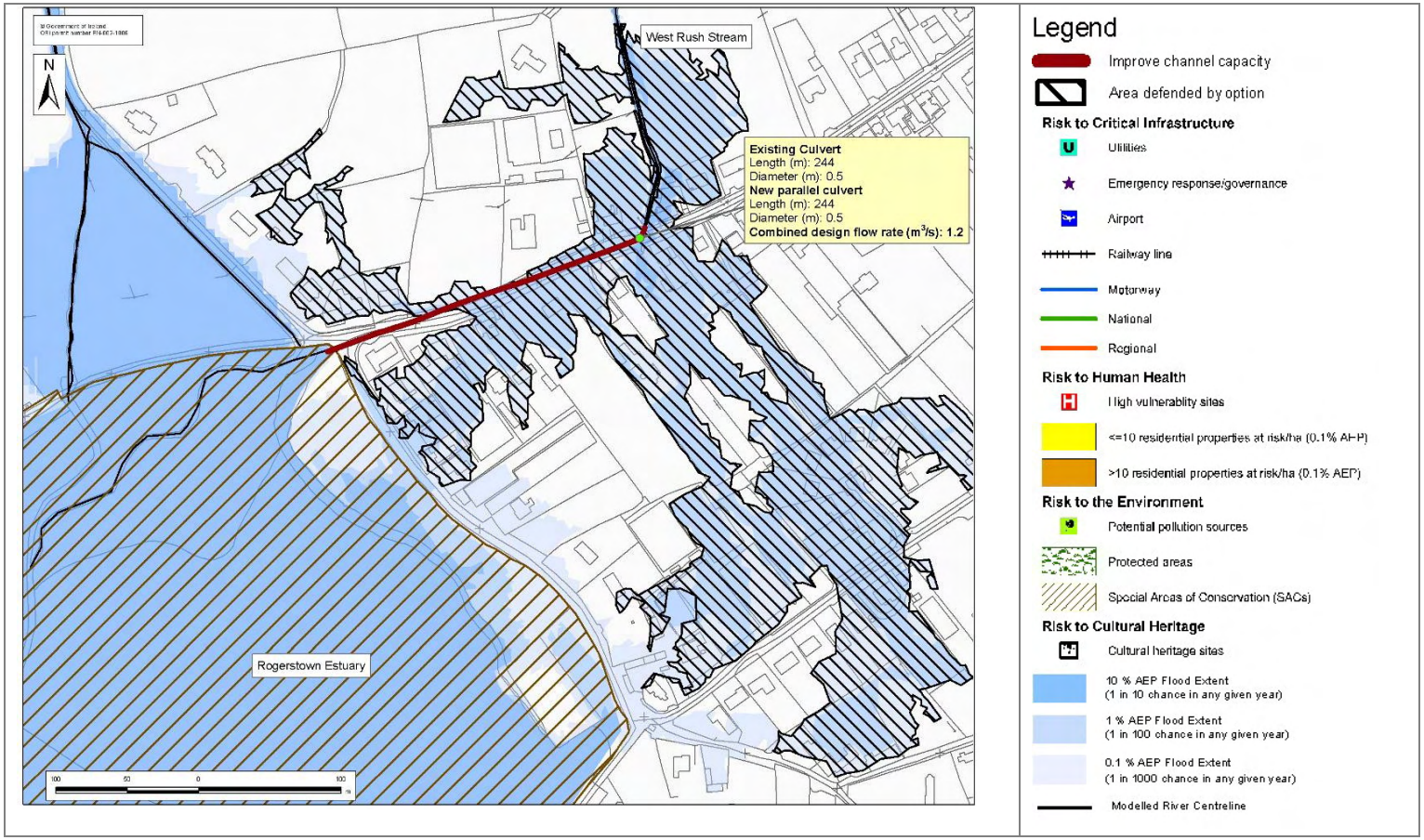

Figure 3-4: Location of Preferred Option for Rush APSR in relation to Rogerstown Estuary cSAC.

3.6. Broadmeadow Estuary/Swords SPA

3.6.1. Introduction

Broadmeadow Estuary/Swords SPA covers an area of 764ha and is a very good example of an estuarine system, comprising a range of intertidal mudflats and saltmarshes, as well as large beds of eel grass. The estuary is divided into two by a railway viaduct and is substantially separated from the sea by a large sand spit known as "The Island". The inner estuary is lagoonal in character and tidal exchange is limited, only the extreme inner part draining at low water. The outer part of the estuary empties almost completely at low water, exposing extensive intertidal flats, and there is a large bed of eelgrass in the northern section.

The Broadmeadow Estuary is an internationally important wetland[28], supporting up to three waterbird species in internationally important numbers[29], and a further 12 species in nationally important numbers (see section 3.6.4 for further details).

3.6.2. Potential risk to site resulting from FRMP

During construction of the preferred option for Malahide town centre within the Portmarnock and Malahide areas APSR, there is potential for disturbance to SPA bird species. In the long term, this option, combined with sea level rise, could contribute to coastal squeeze and a loss of intertidal habitat.

3.6.3. Interest features potentially exposed to risk

Full details of the interest features for which the site is identified, as listed in the Natura 2000 Standard Data Form, are provided in Table 3-8.

Table 3-8: Broadmeadow/Swords SPA interest features

Broadmeadow/Swords SPA interest features
Birds listed on Annex 1 of Council Directive 79/409/EEC
Pluvialis squatarola Golden plover (wintering) *Philomachus pugnax* Ruff (staging) *Limosa lapponica* Bar-tailed godwit (wintering)
Regularly occurring migratory birds not listed on Annex 1 of Council Directive 79/409/EEC
Cygnus olor Mute swan (wintering) *Branta bernicla hrota* Light-bellied brent goose (wintering) *Tadorna tadorna* Shelduck (breeding & wintering) *Anas acuta* Pintail (wintering) *Aythya ferina* Pochard (wintering) *Bucephala clangula* Goldeneye (wintering) *Mergus mergus* Red-breasted merganser (wintering)

[28] Boland et al. (2008) *Op.cit.*
[29] Representing 1% or more of the relevant international population (see section 3.2.4).

Broadmeadow/Swords SPA interest features
Podiceps cristatus Great crested grebe (wintering)
Ardea cinerea Grey heron (breeding and wintering)
Haematopus ostralegus Oystercatcher (wintering)
Charadrius hiaticula Ringed plover (breeding & wintering)
Pluvialis squatarola Grey plover (wintering)
Vanellus vanellus Lapwing (breeding & wintering)
Calidris canutus Knot (wintering)
Calidris alpina Dunlin (wintering)
Calidris minuta Little stint (staging)
Limosa limosa Black-tailed godwit (breeding potential & wintering)
Numenius arquata Curlew (breeding & wintering)
Tringa erythropus Spotted redshank (staging)
Tringa totanus Redshank (breeding & wintering)
Tringa nebularia Greenshank (wintering)
Tringa ochropus Green sandpiper (staging)
Arenaria interpres Turnstone (wintering)

However, a revised list of Special Conservation Interests for the SPA have been proposed by NPWS (see section 3.2.3) as follows:

- The site is selected for: Light-bellied brent goose, Goldeneye, Black-tailed godwit.
- Additional Special Conservation Interests: Great crested grebe, Shelduck, Pintail, Red-breasted merganser, Oystercatcher, Golden plover, Grey plover, Knot, Dunlin, Bar-tailed godwit, Redshank, Wetland and Waterbirds.

3.6.4. Ecological value of potentially affected features

The Broadmeadow Estuary is an internationally important waterbird site, ranked 17th in the list of 276 wetlands in the Republic of Ireland on the basis of its mean total waterbird count for the period 2002-2007[30]. During that period it supported a mean total of 14,042 waterbirds, three of which were present in internationally important numbers: Great-crested grebe, Light-bellied brent goose and Turnstone. However, this differs slightly from the list featured in the Broadmeadow Estuary SPA Site Synopsis and Natura 2000 Data Form, which lists internationally important populations of Light-bellied brent geese (956) and nationally important populations[31] of a further 12 waterfowl species including Red-breasted merganser (105), Oystercatcher (1493), Golden plover (1843), Greenshank (38), Shelduck (439), Pintail (58), Goldeneye (215), Grey plover (201), Knot (915), Dunlin (1594), Redshank (581) and Bar-tailed godwit (156). The Light-bellied brent goose population represents 4.8% of the all-Ireland total, the knot population 3.7%, Shelduck 3%, Pintail 2.9%, Red-breasted merganser 2.8% and Golden plover 2.7%. The lagoonal nature of the inner estuary increases the diversity of the waterfowl community by providing good conditions for diving ducks, and it is one of the few sites in eastern Ireland where substantial numbers of Goldeneye can be found. It also supports a regular flock of non-breeding Mute swans (Plate 3-1).

[30] Boland *et al.*. (2008) *Op.cit.*
[31] Based on average peaks for the 5-year period 1995/6-1999/2000 (given in parethenses),.

Plate 3-1: Mute swans on the Broadmeadow Estuary, January 2009

The small area at the western end of the estuary, from Seatown to Prospect Point is by far the most important part of the inner estuary in terms of numbers and diversity of foraging waterbirds[32]. This is the result of the diverse nature of the habitats in this area, including saltmarsh, creeks and channels, shallow water with small tidal influence and exposed mud-flats. The rest of the inner estuary is permanently submerged in deep water, has narrow stony shores, and is very disturbed by human recreational activities. Foraging birds in the outer estuary are fairly evenly distributed across the intertidal sand and mudflats at low water.

Saltmarshes provide important high tide roost sites, and the primary roosting areas are at the western end of the inner estuary, at the southern end of "The Island", and on a small peninsula, isolated by the railway, in the northern part of the outer estuary[33]. There is also a secondary roost near the dinghy clubs at Cave's Marsh, on the southern side of the estuary, and this is particularly used by Light-bellied brent geese,. Most of the rest of the southern shore is increasingly disturbed[34].

Some birds that feed in the outer estuary (especially Light-bellied brent geese, Redshank and Dunlin) fly up the estuary to roost in small area west of Prospect Point[35]. In recent winters, Light-bellied brent geese have also used agricultural fields adjacent to estuary, for feeding and roosting, as well as short grass playing fields and parks on the south side of the estuary.

[32] Merne, O.J. (2008) *Broadmeadow River Estuary (Swords/Malahide), Co.Dublin: Waterbirds in July and August 2008*. http://www.fingalbiodiversity.ie/resources/fingal_coast/2008%20Summer%20Waterbirds.pdf
[33] Visser, H., Coveney, J., Kelly, D., McManus, F., Pierce, S. & Dillon, D. (2004) *Ecological Study of the Coastal Habitats in County Fingal, Phase II – Birds.* Fingal County Council.. p 17
http://www.fingalbiodiversity.ie/resources/fingal_coast/2004%20Bird%20Habitats.pdf
[34] *Ibid.* p13
[35] Merne (2008) *Op.cit.*

3.6.5. Conservation objectives

The draft main conservation objective[36] for Broadmeadow Estuary/Swords SPA, based on the proposed list of Special Conservation Interests, is:

- To maintain the special conservation interests for this SPA at favourable conservation status: Light-Bellied brent goose, Goldeneye, Pintail, Red-breasted merganser, Great-crested grebe, Shelduck, Oystercatcher, Golden plover, Grey plover, Ringed plover, Knot, Dunlin. Black-tailed godwit, Bar-tailed godwit, Redshank, Wetland and Waterbirds.

3.6.6. Condition of site and management

The main problems and threats to the SPA and its birds are from recreational activities (especially water sports), water pollution and infilling. The inner estuary is heavily used for water sports, which causes disturbance to birds, and part of the outer estuary was taken for a new marina in the 1990s[37].

The enclosed nature of the inner estuary also makes it particularly vulnerable to pollution, which enters from Broadmeadow River and from sewage plants at Swords and Malahide.

3.6.7. Potential impact of scheme alone

Portmarnock and Malahide areas APSR: Malahide town centre

The application of the preferred option for Malahide town centre in the Portmarnock and Malahide areas APSR shown on Figure 3.5 would involve the construction of flood walls and the improvement of existing defences at The Green, on the north-east side of Malahide, and the construction of a demountable flood defence across the railway underpass on Bissets Strand, to the north-west of the town centre, in order to prevent the propagation of flood waters along the coast road eastwards into the town.

The proposed new defences, and those to be improved, are located along the boundary of Broadmeadow estuary SPA on the north-east side of the town and, therefore, there is the potential for disturbance to SPA bird species during the construction period.

The estuarine habitat present at the location of the preferred option comprises a small area of mudflat (c.0.35ha) confined between the current defences on the western side, a marina on the north side and a jetty on the south side. There is also a small concrete slipway that is used for the launching of small boats into this enclosed area at high tide. The mudflat between the jetty and the marina is unlikely to be used by large numbers of foraging birds, and those that are present are likely to be habituated to current levels of noise and human activity. Consequently, their response to additional activity may be limited. However, to the east of the jetty the mudflat continues unbroken to the mouth of the estuary and this is likely to accommodate greater numbers of foraging birds.

[36] Supplied by NPWS, October 2010.
[37] Information in the Natura 2000 Data Form.

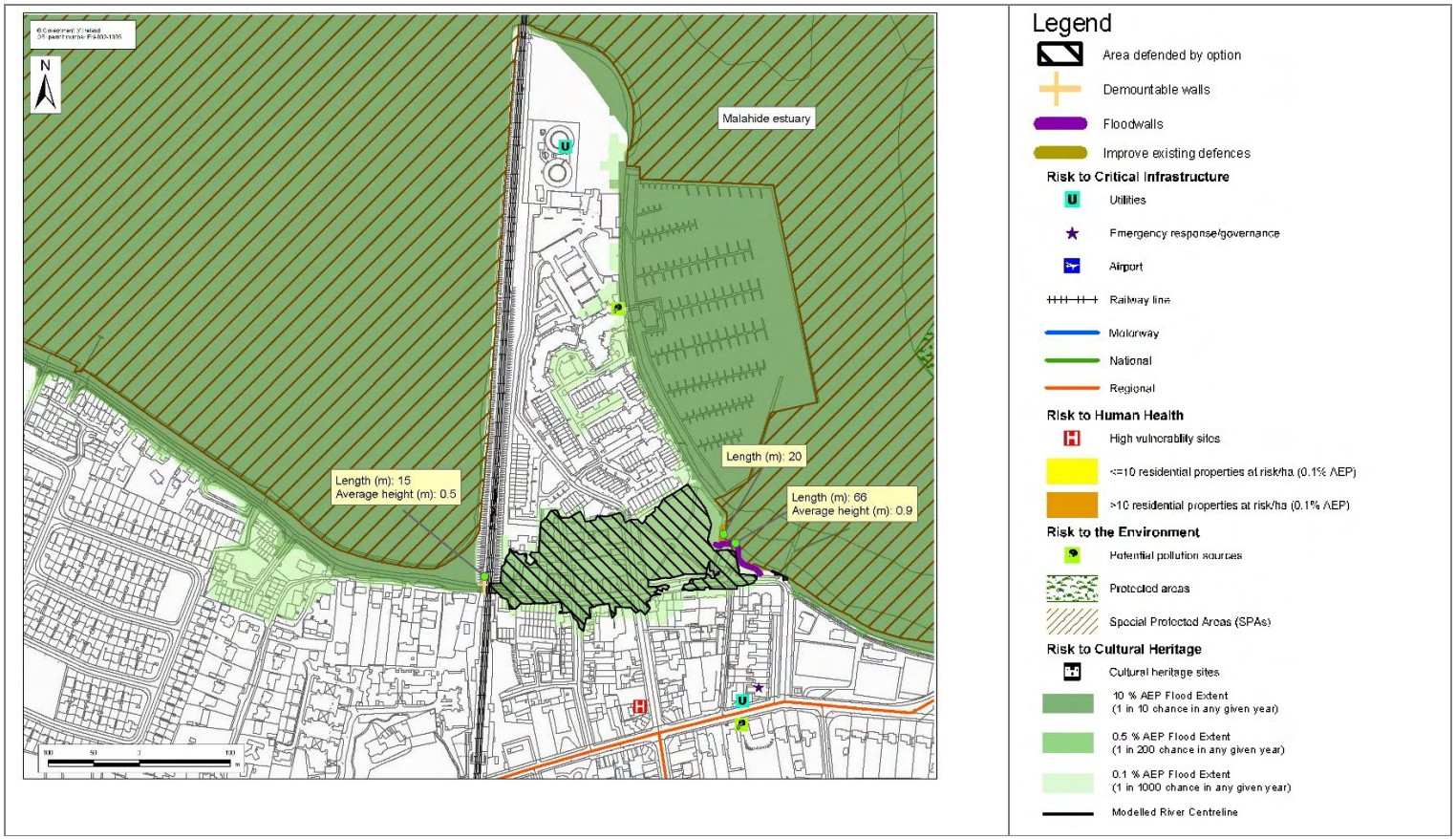

Figure 3-5: Location of the preferred option for Portmarnock and Malahide areas APSR: Malahide town centre, in relation to Broadmeadow Estuary/ Swords SPA.

A study by IECS (2007) on the Humber estuary concluded that birds become habituated to regular construction noise below 70dB. It is, therefore, not clear that the proposed construction activities will represent a significant increase in noise and activity levels in relation to the present conditions. It is very likely that birds will be displaced from the immediate vicinity of the active construction sites as a result of personnel and plant, but the effects on more distant birds are more difficult to assess. However, the birds may become habituated to the new activity within a number of days thus reducing the magnitude of the effect.

In the long term, this option, as a "hold the line" option in terms of coastal management, could contribute to coastal squeeze and a loss of intertidal habitat resulting from accelerated sea level rise. Nevertheless, considering the small area of intertidal habitat concerned, which covers approximately 0.05% of the total area of the SPA, and the small number of birds that are likely to be affected temporarily by the proposed works or, in the long term by coastal squeeze, it is considered that this option would not impact a significant proportion of the estuary's bird populations. Consequently, it is concluded that the application of the preferred option for Portmarnock and Malahide areas APSR: Malahide Town Centre would not adversely affect the integrity of the Broadmeadow Estuary/Swords SPA and its Special Conservation Interests.

3.6.8. Potential impact of scheme in-combination

A number of other plans and strategies were examined that could potentially affect the European Sites in-combination with the FEM FRMP, including Fingal Development Plan 2011-2017 and Local area development plans. No significant adverse 'in combination' effects were identified at the strategic level, although there is potential for such impacts at a local level depending on the implementation of any relevant actions resulting from other plans. In the Fingal Development Plan 2011-2017, there is a mix of Zoning Objectives "RS" Residential, "TC" Town and District Centre and "OS" Open Space in the area of the proposed option and eastwards along the estuary. This may increase the likelihood of coastal squeeze along this stretch of the estuary shore, although there is some potential opportunity for realignment. However, it is concluded that any in-combination effects on the bird populations that are designated features of the Broadmeadow Estuary/Swords SPA, as a result of coastal squeeze of their intertidal habitats, are not likely to be significant but would be assessed at the project stage as part of the project level appropriate assessment.

3.6.9. Measures to avoid adverse effects

To further reduce any impact on bird populations, the works should be undertaken, as far as possible, between April and August to avoid the main migration and wintering period, and good practice construction methods should be used to reduce noise levels and visual disturbance.

A review of the Fingal Development Plan 2011-2017 and Local area development plans should be undertaken at the project stage as part of the project level appropriate assessment, in order to determine whether any in-combination effects are likely and whether further measures are required to avoid adverse effects.

3.7. Baldoyle Bay cSAC

3.7.1. Introduction

Baldoyle Bay cSAC covers an area of 538.9ha and comprises a tidal estuary bay, formed by a sand spit that substantially separates and shelters it from the Irish Sea, as well as extensive intertidal flats beyond the shelter of the sand spit. The bay contains large areas of intertidal sands, grading to mud in the sheltered areas, and there are extensive cord grass swards, smaller areas of other saltmarsh types, and some beds of eel grass. Most of the dunes on the spit are now used as a golf course.

Baldoyle Bay receives freshwater input from the Sluice River, which enters at Portmarnock Bridge at the head of the estuary, and the Mayne River which enters approximately 1km downstream. The lower tidal section of the Mayne River and its adjoining brackish marshes are included in the cSAC. Both rivers drain an agricultural and suburban catchment.

3.7.2. Potential risk to site resulting from FRMP

As a result of construction of the preferred option for Portmarnock and Malahide areas APSR: Portmarnock, there is potential for loss of cSAC habitats beneath the increased footprint should it encroach into the designated site. In the long term, this option, combined with sea level rise, could result in coastal squeeze and a loss of intertidal cSAC habitats.

In addition, the construction of the preferred options for the Portmarnock and Malahide areas APSR: Portmarnock, and the St. Margaret's, Dublin Airport, Belcamp & Balgriffin areas APSR, could lead to a change in the pattern of freshwater flow into the estuary.

3.7.3. Interest features potentially exposed to risk

Full details of the interest features for which the site is identified, as listed in the *Natura 2000* Standard Data Form, are provided in Table 3-9.

Table 3-9: Baldoyle Bay cSAC interest features

Baldoyle Bay cSAC interest features	
Habitat types listed in Annex I of Council Directive 92/43/EEC (* = priority habitat)	**Common name**
1140 Mudflats and sandflats not covered by sea water at low tide (Category B: good representativity)	Intertidal mudflats and sandflats
1310 *Salicorna* and other annuals colonizing mud and sand (Category C: significant representativity)	Pioneer saltmarshes
1330 Atlantic salt meadows (*Glauco-Puccinelliatelia maritimae*) (Category B: good representativity)	Atlantic salt meadows (or saltmarshes)
1410 Mediterranean salt meadows (*Juncetalia maritimi*) (Category B: good representativity)	Mediterranean salt meadows (or saltmarshes)
1320 *Spartina* swards (*Spartinion maritimae*) (Category D: non-significant presence)	Cord-grass swards (or saltmarshes)

3.7.4. Ecological value of potentially affected features

The main areas of saltmarsh on the estuary are those at Portmarnock, at the head of the estuary, and at the tip of Portmarnock Point, but there are also narrow strips of saltmarsh along other parts of estuary. The saltmarsh at Portmarnock is clearly divided into upper

saltmarsh, dominated by sea club rush *Juncus maritimus*, and a lower zone containing beds of sea purslane *Atriplex portulaoides* and parsley water dropwort *Oenanthe lachenalii*, the latter being indicative of percolating freshwater input[38]. There are also stands of common reed *Phragmites australis* near the Coast Road.

A habitat map, produced as a result of a survey undertaken in 2007-2008[39], shows that the saltmarsh habitats immediately adjacent to the proposed works comprise a cord-grass (*Spartina)* sward, east of the Sluice River channel, and mainly unspecified habitat west of the channel, although Atlantic salt meadow reaches the wall at two narrow points (approximately 15m or less in width).

The peninsula of Portmarnock Point was once covered in extensive sand dunes, but these have largely been replaced by two golf courses.

3.7.5. Conservation objectives

The draft conservation objectives for the Baldoyle Bay cSAC are:

- To maintain the Annex I habitats for which the cSAC has been selected, at favourable conservation status: Mudflats and sandflats not covered by sea water at low tide; *Salicorna* and other annuals colonizing mud and sand; Atlantic salt meadows (*Glauco-Puccinelliatelia maritimae*); Mediterranean salt meadows (*Juncetalia maritimi*);
- To maintain the extent, species richness and biodiversity of the entire site; and
- To establish effective liaison and co-operation with landowners, legal users and relevant authorities.

3.7.6. Condition of site and management

A large proportion (36%) of the site is protected as a Nature Reserve and is not, therefore, significantly threatened.

Pollution of the estuary occurs from a number of sources, especially sewage from rivers and sewage works. There are also some problems caused by bait digging, and spread of cord-grass *Spartina* may be an issue for some intertidal habitats.

In the past, developments have been proposed for the area near the Mayne River, which is outside the nature reserve, and this area is still considered under threat.

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[38] Doogue *et al.* (2004), *Op.cit.* p51.

[39] McCorry, M. & Ryle, T. (2009) *Saltmarsh Monitoring Project 2007-2008, Volume 2, Final Report.* A Report for Research Branch, National Parks and Wildlife Service. Environment, Heritage and Local Government, Dublin. http://www.npws.ie/publications/archive/McCorry_&_Ryle_2009_Saltmarsh_survey_V2-20.pdf (Accessed 07/09/2011)

3.7.7. Potential impact of scheme alone

Portmarnock and Malahide areas APSR: Portmarnock

The application of the preferred option for the Portmarnock and Malahide areas APSR shown in Figure 3.6 would involve strengthening and raising 0.5km of existing walls which run alongside the R106 at Strand Road. It also involves replacing the flapped gates on the Sluice River at Portmarnock Bridge, to prevent the propagation of high tides upstream of this bridge, and the construction of 120m of flood embankments on the left bank of the Sluice River upstream of Portmarnock Bridge.

Hydraulic modelling indicates that there is no impact on water levels upstream or downstream of Strand Road. The construction of the flood embankment along the left bank of the Sluice River prevents an existing overland flow path (westwards through Hazel Grove and across the R106), but this would not be considered a principal overland flow route, and there are no areas of significant natural floodplain storage affected by this option.

These works would take place on the boundary of Baldoyle Bay cSAC, but the raised wall would be constructed on the line of the existing wall and would not encroach on the cSAC saltmarsh habitat. However, there is potential for temporary damage to saltmarsh during construction, affecting approximately 1,500m^2 or 0.16ha of saltmarsh comprising a 5m strip along a 300m length of wall. Nevertheless, considering that there are 37.73ha of saltmarsh in Baldoyle Bay[40], the potentially affected area constitutes only 0.4% of the whole. In addition, only a very small proportion of the potentially affected area of saltmarsh comprises an Annex 1 habitat (Atlantic salt meadow) subject to the specific conservation objectives for the site. However, measures would be put in place to minimise the temporary damage caused to the saltmarsh, to avoid the Atlantic salt meadow, and to facilitate the saltmarsh recovery after completion of the works. Consequently, it is concluded that, although this option would potentially have some temporary adverse impact on saltmarsh in the Baldoyle Bay cSAC, the extent, species richness and biodiversity of the entire site would be maintained, and would not be adversely affected in the long term.

The construction of the fluvial flood defence embankment will result, during a 0.5% AEP flood event, in freshwater that previously flooded the area upstream of Portmarnock Bridge entering the estuary directly, thus resulting in a temporary change to the pattern of freshwater input into the estuary. However, estuarine organisms have wide salinity tolerances and exist in a naturally variable environment. Consequently, they are only affected by changes in freshwater input that are beyond their normal range of variability for a prolonged period of time. As the predicted change to river flow would only occur in an extreme and temporary event, at the rate of 1 in 200 years, it is considered that there will be no effect on the regular pattern of freshwater inflow beyond levels of natural variability.

Consequently, it is concluded that the application of the preferred option for Portmarnock and Malahide areas APSR would not adversely affect the integrity of the Baldoyle Bay cSAC, as it

[40] Calculated on the basis of figures given in the Natura 2000 Standard Data Form for Baldoyle Bay SAC.

will not change the ecological structure and function of the site as a whole, nor the habitats for which it was classified.

St. Margaret's, Dublin Airport, Belcamp & Balgriffin areas APSR

The application of the preferred option for St. Margaret's, Dublin Airport, Belcamp & Balgriffin areas APSR shown in Figure 3-7 would involve the construction of a flood defence embankment north of the R123 on the Mayne River tributary, the construction of embankments and walls along the left bank of the Mayne River and tributary at Balgriffin, and the removal of an unused bridge structure north of the R123.

Modelling results indicate that this option will have some localised impact on water levels upstream and downstream of the proposed location. Upstream, water levels would be lowered by an average of 0.12m along a 120m stretch of the channel, and downstream they would be raised by an average of 0.16m along 430m of river channel. The results of the modelling also indicate that existing overland flood flow paths are modified with this option, but there are no areas of significant natural floodplain storage affected, although some reduction in floodplain storage does occur.

The implementation of the proposed option for the APSR has the potential for a localised effect on Baldoyle Bay cSAC, approximately 1.5km downstream, as a result of a potential change in the pattern of freshwater flow into the estuary. Increased water flow through the channel and the introduction of new flood embankments and a floodwall is likely to change the pattern of flow downstream of the APSR during a 1% AEP flood event, and possibly during a 10% AEP flood event. However, any effects are expected to be localised and it is concluded that the preferred option for St. Margaret's, Dublin Airport, Belcamp & Balgriffin areas APSR is unlikely to have an adverse effect on the integrity of Baldoyle Bay cSAC.

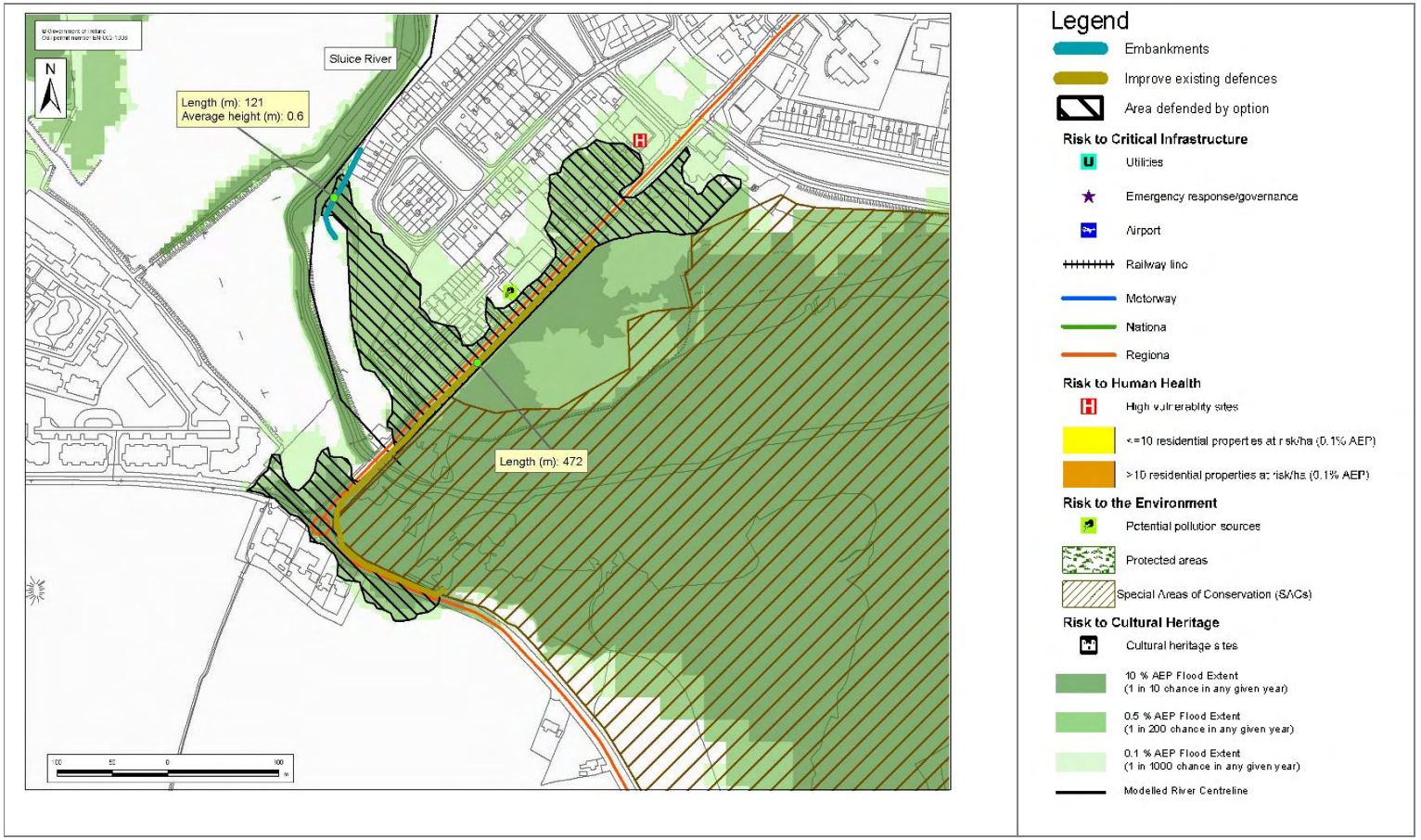

Figure 3-6: Location of the preferred option for Portmarnock and Malahide areas APSR: Portmarnock, in relation to Baldoyle Bay cSAC.

3.7.8. Potential impact of scheme in-combination

A number of other plans and strategies were examined that could potentially affect the European Sites in-combination with the FEM FRMP, including Fingal Development Plan 2011-2017 and Local area development plans. No significant adverse 'in combination' effects were identified at the strategic level, although there is potential for such impacts at a local level depending on the implementation of any relevant actions resulting from Zoning Objective "RA" Residential Area in the Fingal Development Plan 2011-2017, and the Portmarnock Local Area Plan 2006. However, this potential for an in-combination effect would need to be assessed at the project stage as part of the project level appropriate assessment

3.7.9. Measures to avoid adverse effects

In order to avoid adverse effects on the saltmarsh interest features of the cSAC, measures would be taken during the detailed design and construction phases of the scheme to ensure that the works on the new flood embankment at Portmarnock are undertaken from the road or from a temporary removable track or working platform laid along the saltmarsh. Particular emphasis would be placed on minimising any effect on the small areas of Atlantic salt meadow which may be present in the working area, and the specifications of the material to be used in raising the wall will be screened to ensure no adverse chemical effects on the saltmarsh or other wildlife present in the cSAC.

A review of the Fingal Development Plan 2011-2017 and Local area development plans should be undertaken at the project stage as part of the project level appropriate assessment, in order to determine whether any in-combination effects are likely and whether further measures are required to avoid adverse effects.

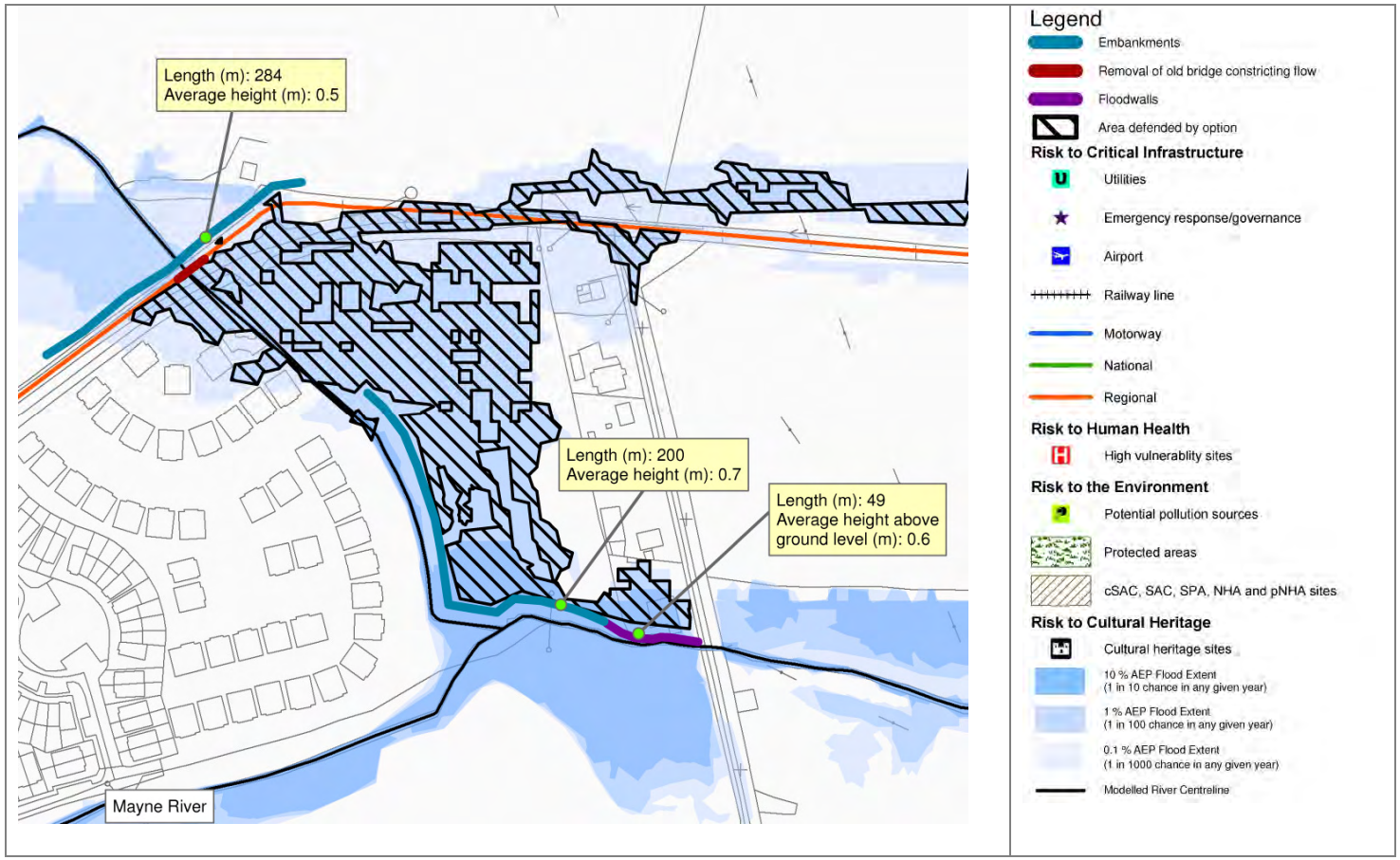

Figure 3-7: Location of the preferred option for St. Margaret's, Dublin Airport, Belcamp & Balgriffin areas APSR.

3.8. Baldoyle Bay SPA

3.8.1. Introduction

Baldoyle Bay SPA covers an area 262.77ha comprising a tidal estuary bay formed by a sand spit that substantially separates it from the Irish Sea. It is smaller than the cSAC as it does not include the intertidal flats on the open coast beyond the shelter of the sand spit. The bay contains large areas of intertidal sands, grading to mud in the sheltered areas, and there are extensive cord grass swards, smaller areas of other saltmarsh types, and some beds of eel grass. The bay supports internationally important wintering populations of Light-bellied brent geese, and nationally important populations of a further seven waterfowl species: Great crested grebe, Shelduck, Pintail, Ringed plover, Golden plover, Grey plover and Bar-tailed godwit. There are also smaller populations of several other species.

3.8.2. Potential risk to site resulting from FRMP

As a result of construction of the preferred option for Portmarnock and Malahide areas APSR: Portmarnock, there is potential for temporary disturbance (e.g. noise, line of sight etc) to birds of the SPA during the construction period. There is also potential for loss of habitats should the raised embankment encroach into the designated site. In the long term, this option, combined with sea level rise, could result in coastal squeeze and a loss of intertidal bird habitats.

In addition, there is potential for the preferred options for Portmarnock and Malahide areas APSR: Portmarnock and St. Margaret's, Dublin Airport, Belcamp & Balgriffin areas APSR to result in changes to the pattern of freshwater flow into the estuary. There is the potential for this change in freshwater input during flood events to affect the birds which are a designated feature of the SPA, through changes to their habitats.

3.8.3. Interest features potentially exposed to risk

Full details of the interest features for which the site is identified, as listed in the Natura 2000 Standard Data Form, are provided in Table 3-10.

Table 3-10: Baldoyle Bay SPA interest features

Baldoyle Bay SPA interest features
Birds listed on Annex 1 of Council Directive 79/409/EEC
Pluvialis squatarola Golden plover (wintering) *Limosa lapponica* Bar-tailed godwit (wintering)
Regularly occurring migratory birds not listed on Annex 1 of Council Directive 79/409/EEC
Branta bernicla hrota Pale-bellied Brent goose (wintering) *Tadorna tadorna* Shelduck (breeding & wintering) *Anas crecca* Teal (wintering) *Anas platyrhyncos* Mallard (breeding and wintering) *Anas acuta* Pintail (wintering) *Mergus serrator* Red-breasted merganser (wintering) *Podiceps cristatus* Great crested grebe (wintering) *Haematopus ostralegus* Oystercatcher (wintering) *Charadrius hiaticula* Ringed plover (breeding & wintering)

Baldoyle Bay SPA interest features
Pluvialis squatarola Grey plover (wintering) *Vanellus vanellus* Lapwing (wintering) *Calidris canutus* Knot (wintering) *Calidris alpina* Dunlin (wintering) *Caldris alba* Sanderling (wintering) *Limosa limosa* Black-tailed godwit (wintering) *Numenius arquata* Curlew (wintering) *Tringa totanus* Redshank (wintering) *Tringa nebularia* Greenshank (wintering) *Arenaria interpres* Turnstone (wintering)

However, a revised list of Special Conservation Interests for the SPA have been proposed by NPWS (see section 3.2.3) as follows:

- The site is selected for:
    - Light-bellied brent goose;
    - Ringed plover; and
    - Bar-tailed godwit.
- Additional Special Conservation Interests:
    - Shelduck;
    - Golden plover;
    - Grey plover; and
    - Wetland and Waterbirds.

3.8.4. Ecology on site of potentially affected features

Baldoyle Bay is an internationally important waterbird site, ranked 42nd in the list of 276 wetlands in the Republic of Ireland in terms of its mean total waterbird count for the period 2002-2007[41]. Although it supports a mean total of only 5,284 waterbirds, Light-bellied brent goose is present in internationally important numbers (726)[42], and a further five species are present in nationally important numbers. The most recently available data[43] list the nationally important populations as Shelduck, Pintail, Grey plover Black-tailed godwit and Bar-tailed godwit. However, this list differs slightly from that published in the SPA Site Synopsis and the Natura 2000 Standard Data Form (based on average peaks for the 5-year period 1995/6-

[41] Boland et al. (2008) *Op.cit.*
[42] Numbers from 1995/6-1999/2000
[43] Boland et al. (2008) *Op.cit.*

1999/2000):[44]: Great crested grebe (42), Shelduck (147), Pintail (22), Ringed plover (221), Golden plover (1810), Grey plover (200) and Bar-tailed godwit (353).

Portmarnock Point is the main roosting area, although some of it is outside the SPA, and birds also use the saltmarshes which fringe other parts of the estuary. It is also used as a late summer roost of up to 150 Arctic and Common terns and 15-20 Roseate terns[45].

Fields on the western side of the head of the estuary used to be important for up to 200 feeding Light-bellied brent geese and, occasionally, 1,500 roosting Golden plover, but the fields are are gradually being lost to development[46]. However, a large area of amenity grassland in Seagrange Park, Baldoyle, regularly supports internationally important numbers of Light-bellied brent geese and, in wet weather, internationally important numbers of Black-tailed godwits[47].

3.8.5. Conservation objectives

The draft main conservation objective for Baldoyle Bay SPA, based on the proposed list of Special Conservation Interests, is:

- To maintain the special conservation interests for this SPA at favourable conservation status: Light-bellied brent goose, Ringed plover, Bar-tailed godwit, Shelduck, Golden plover, Grey plover, Wetland and Waterbirds.

3.8.6. Condition of site and management

According to the Natura 2000 Standard Data Form, the present condition and vulnerability of the site is as follows:

- A significant part of the site is protected as a Nature Reserve;
- Pollution occurs from a number of sources, especially sewage;
- There are some problem caused by bait digging;
- The spread of cord-grass *Spartina* may be an issue for other intertidal habitats; and
- Disturbance from walkers and dogs is a problem.

In addition, as mentioned above, fields on the western side of the head of the estuary, which were important for Light-bellied brent geese and Golden plover, are now gradually being lost to development.

[44] Figures are average peaks for the 5-year period 1995/6-1999/2000 taken from the site synopsis.
[45] Visser et al. (2004) *Op.cit.* p13
[46] *Ibid.*, p13
[47] *Ibid.*.

3.8.7. Potential impact of scheme alone

Portmarnock and Malahide areas APSR: Portmarnock

The application of the preferred option for Portmarnock and Malahide areas APSR: Portmarnock, shown on Figure 3.8, would involve strengthening and raising 0.5km of existing walls which run alongside the R106 at Strand Road, to provide sufficient flood defence function up to the 0.5% AEP tidal event. It also involves replacing the flapped gates on the Sluice River at Portmarnock Bridge, to prevent the propagation of high tides upstream of this bridge, and the construction of 120m of flood embankments on the left bank of the Sluice River upstream of Portmarnock Bridge to provide protection up to the 1% AEP fluvial event and 0.5% AEP tidal event. Full details are given in Section 3.7.7.

These works would take place on the boundary of Baldoyle Bay estuary and SPA. Works to raise the wall are likely to cause temporary disturbance (e.g. noise, line of sight etc) to birds of the SPA during the construction period, although the degree of disturbance will depend on the timing and methodology of the construction works. Although the raised wall would be constructed on the line of the existing wall, and would not result in a loss of habitat by encroaching into the designated site, there is potential for damage to the saltmarsh during construction, affecting approximately 1500m^2 or 0.16ha of saltmarsh, comprising an approximately 5m strip along a 300m length of wall. In the long term, this option, combined with sea level rise, could result in coastal squeeze and a loss of intertidal bird habitats.

However, given the presence of the R106 Strand Road and Coast Road running close to the estuary shore, and the activity and noise levels associated with the road, it is likely that the narrow strip of saltmarsh and estuarine channel adjacent to the road, which would be lost under the footprint of the new upstream walls, is little used by foraging or roosting birds (see Section 3.8.4). Nevertheless, potential disturbance to the SPA bird populations would be reduced to a minimum by undertaking the works, as far as possible, between April and August to avoid the main migration and wintering period, and by using good construction practices to reduce noise levels.

In addition, the construction of the fluvial flood defence embankment will result, during a 0.5% AEP flood event, in freshwater that previously flooded the area upstream of Portmarnock Bridge entering the estuary directly, thus resulting in a temporary change to the pattern of freshwater input into the estuary. However, estuarine organisms have wide salinity tolerances and exist in a naturally variable environment. Consequently, they are only affected by changes in freshwater input that are beyond their normal range of variability for a prolonged period of time. As the predicted change to river flow would only occur in an extreme and temporary event, at the rate of 1 in 200 years, it is considered that it would have no effect on the regular pattern of freshwater inflow beyond levels of natural variability, and would be unlikely to damage the habitat and food supplies of the SPA bird populations.

It is, therefore, concluded that the application of the preferred option for Portmarnock and Malahide areas APSR will not impact a significant proportion of the estuary's bird populations and, therefore, will not adversely affect the integrity of the Baldoyle Bay SPA and its Special Conservation Interests.

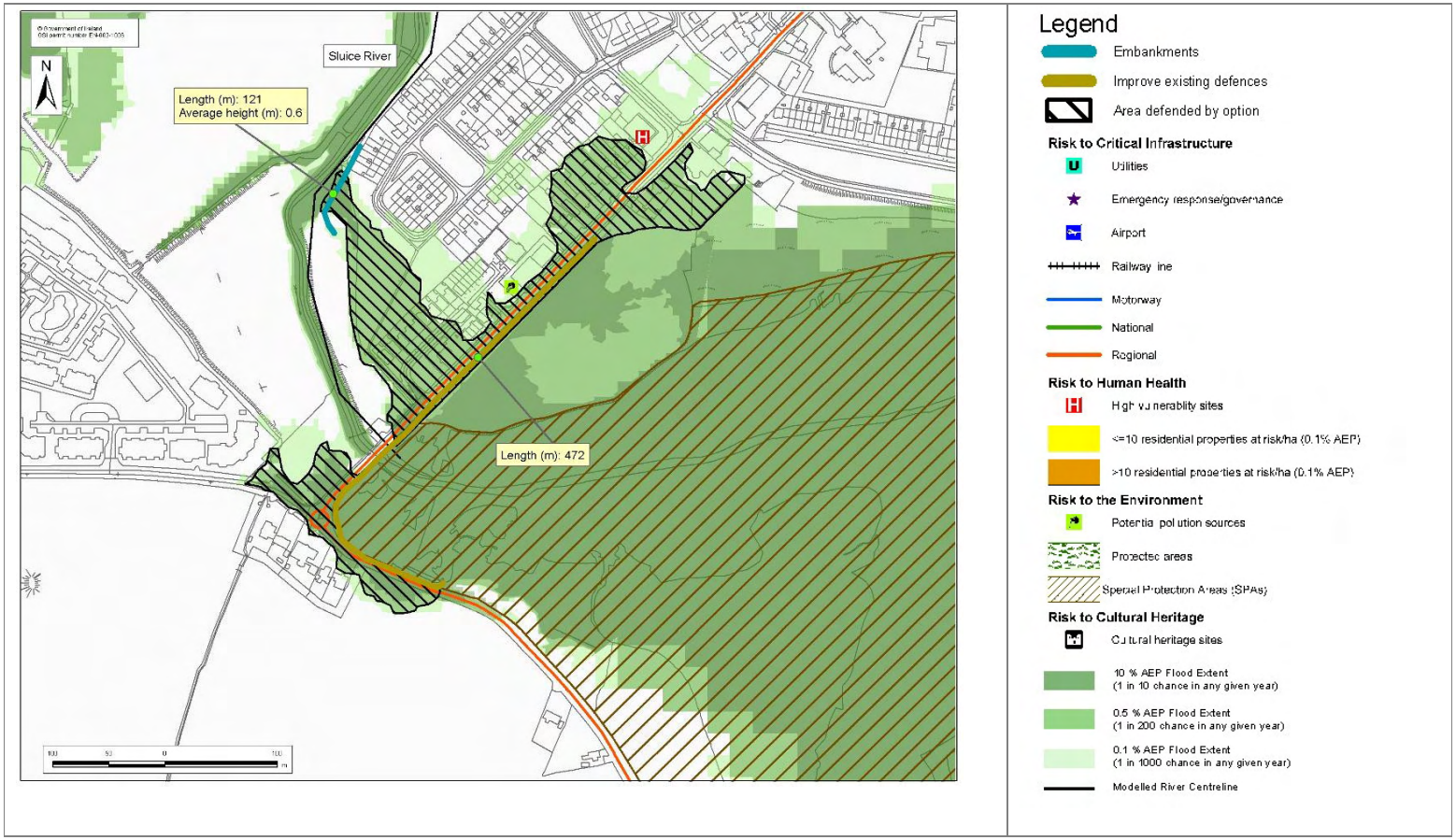

Figure 3-8: Location of the preferred option for Portmarnock and Malahide areas APSR: Portmarnock, in relation to Baldoyle Bay SPA.

St. Margaret's, Dublin Airport, Belcamp & Balgriffin areas APSR

Details of the preferred option are described in Section 3.7.7. The implementation of the proposed option for this APSR has the potential for a localised effect on Baldoyle Bay SPA as a result of a potential change in the pattern of freshwater flow into the estuary. Increased water flow through the channel and the introduction of new flood embankments and a floodwall is likely to change the pattern of flow downstream of the APSR during a 1% AEP flood event (1 in 100 chance in any given year), and possibly during a 10% AEP flood event (1 in 10 chance). However, any effects are expected to be localised and it is concluded that the preferred option for St. Margaret's, Dublin Airport, Belcamp & Balgriffin areas APSR is unlikely to have an adverse effect on the integrity of the Baldoyle Bay SPA and its Special Conservation Interests.

3.8.8. Potential impact of scheme in-combination

A number of other plans and strategies were examined that could potentially affect the European Sites in-combination with the FEM FRMP, including Fingal Development Plan 2011-2017, the Portmarnock Local Area Plan 2006 and Draft Portmarnock Urban Centre Strategy 2009.

Portmarnock and Malahide areas APSR:

No significant adverse 'in combination' effects were identified at the strategic level, although there is potential for such impacts at a local level depending on the implementation of any relevant actions resulting from Zoning Objective "RA" Residential Area in the Fingal Development Plan 2011-2017. The Portmarnock Local Area Plan 2006 has identified an area adjoining the west bank of Baldoyle Bay close to the location of the proposed works, as a Village Expansion Zone. This could lead to increased disturbance, during construction, of the birds that are designated features of the Baldoyle Bay SPA, and increase the potential for coastal squeeze on their habitats. This would, therefore, be assessed at the project stage as part of the project level Appropriate Assessment

St. Margaret's, Dublin Airport, Belcamp & Balgriffin areas APSR

No significant adverse 'in combination' effects were identified at the strategic level, although there is potential for such impacts at a local level depending on the implementation of any relevant actions resulting from Zoning Objective "RA" Residential Area for Balgriffin in the Fingal Development Plan 2011-2017. This would, therefore, be assessed at the project stage as part of the project level Appropriate Assessment

3.8.9. Measures to avoid adverse effects

To further reduce any impact on bird populations, the works should be undertaken, as far as possible, between April and August to avoid the main migration and wintering period, and any piling work should be undertaken using a non-percussive piling technique to reduce noise levels.

The potential for intertidal habitat creation in the estuary should be investigated in order to replace any habitat that may be lost through coastal squeeze. In addition, the specifications of the material to be used in raising the wall will be screened to ensure no adverse chemical effects on the benthic invertebrates and other fauna and flora of the estuary which comprise the food resources of the SPA bird populations.

A review of the Fingal Development Plan 2011-2017 and Local area development plans should be undertaken at the project stage as part of the project level Appropriate Assessment, in order to determine whether any in-combination effects are likely and whether further measures are required to avoid adverse effects.

3.9. Potential in-combination effect between SPAs

The potential exists for an in-combination effect on birds as a result of multiple and simultaneous disturbances at all the construction project locations and SPAs. However, each construction project is small in scale relative to the size of the SPA on which it is located, and only one such project is envisaged for each site. In addition, it is proposed that construction works should be undertaken outside the main migration and wintering period to avoid the disturbance of large numbers of birds. Consequently, it is expected that any birds disturbed by the works are likely to be in small numbers and be displaced within the SPA rather than between SPAs, so that any such in-combination effect is unlikely.

3.10. Summary and Conclusions

Following the Screening for Appropriate Assessment stage (stage 1), this Statement for Appropriate Assessment has been prepared considering the likely effects of the implementation of the preferred options for the APSRs identified in the draft Fingal East Meath FRMP, alone and in-combination, on the integrity of seven European Sites: Boyne Estuary SPA, River Nanny Estuary and Shore SPA, Rogerstown Estuary SPA and cSAC, Broadmeadow/Swords Estuary SPA, Baldoyle Bay cSAC and SPA. None of the preferred options for the Study Area and Assessment Units were identified as having potential for a significant effect.

It is concluded that the preferred options for the APSRs are not likely to adversely affect the integrity of any site provided the following mitigation measures are applied:

- **River Nanny Estuary and Shore SPA** and **Boyne Estuary SPA** - the timing of the proposed works on the River Nanny Estuary to take place between April and August to avoid the main bird migration and wintering period; the reduction of noise by using appropriate construction methods; and the setting back of the flood defences and road, or the creation of new intertidal habitat to mitigate for habitat likely to be lost through coastal squeeze.
- **Rogerstown Estuary SPA and cSAC** - the timing of the proposed works to take place between April and August to avoid the main bird migration and wintering period, and measures to minimise construction noise; scour protection to be installed at the outlet of the culvert.
- **Broadmeadow/Swords Estuary SPA** - the timing of the proposed works to take place between April and August to avoid the main bird migration and wintering period, and measures to minimise construction noise.
- **Baldoyle Bay cSAC and SPA** - minimising the footprint of the proposed works at the detailed design and construction phases of the scheme, to avoid or minimise effects on the intertidal zone of the estuary; the timing of the proposed works; the reduction of noise by using, appropriate construction methods; minimising the use of construction materials that may have a contaminant effect on the estuary; and

the creation of new intertidal habitat to replace any habitat that may be lost through coastal squeeze.

However, site specific assessments should be undertaken at the project stage to confirm that the Plan will have no adverse effect on the integrity of the European Sites and that mitigation measures are appropriate.

Individual schemes or projects will be designed to incorporate standard and specific mitigation measures, and the construction phase will follow good site practices, with the aim of ensuring that there are no adverse effects on the integrity of the European Sites, following discussions with NPWS. These measures will be described in the individual scheme or project appropriate assessments.

Glossary of terms

Alluvial Found on or in deposits of sand, silt, clay, gravel, or other matter deposited by flowing water, as in a riverbed or floodplain.

Analysis Unit These cover large spatial scale and are large sub-catchments or areas of tidal influence.

AEP (Annual exceedence probability) Historically, the likelihood of a flood event was described in terms of its return period. For example, a 1 in 100 year event could be expected to be equalled or exceeded on average once every 100 years. However, there is a tendency for this definition to be misunderstood. There is an expectation that if such an event occurs, it will not be repeated for another 100 years. However, this is not the case; to try to avoid the misunderstanding, flood events are expressed in terms of the chance of them occurring in any year. This can be stated in two ways, namely a percentage or a probability. Taking the above example, we would say that this event has a one per cent, or 1 in 100, chance of being equalled or exceeded in any year.

Areas of Potential Significant Risk (APSR) are existing urban areas with high degrees of flood risk and hence economic damage.

Assessment Unit Define the spatial scale at which flood risk management options are assessed. Assessment Units are defined on four spatial scales ranging in size from largest to smallest as follows: catchment scale, Analysis Unit (AU) scale, Areas of Potential Significant Risk (APSR) and Individual Risk Receptors (IRR).

Biodiversity Biological diversity, the number and abundance of species present.

Birds Directive European Community Directive 79/409/EEC on the conservation of wild birds. The Directive is implemented in Ireland through The Wildlife Act 1976, as amended. It establishes a comprehensive system for the protection of all wild birds.

Catchment A surface water catchment is the total area of land that drains into a watercourse.

Catchment Flood Risk Management Plan (CFRMP) is a large-scale strategic planning framework for the integrated management of flood risks to people and the developed and natural environment in a sustainable manner.

Coastal squeeze The term 'coastal squeeze' is applied to the situation where the extent of coastal habitats is diminishing as it is 'squeezed' between fixed landward boundaries (artificial or otherwise) and the rising sea level.

Conservation objectives These are goals or broad targets describing the desired state of a habitat, species population or conservation site.

Estuary A semi-enclosed coastal body of water with one or more rivers or streams flowing into it, and with an open connection to the sea.

Estuarine Formed in, found in or pertaining to estuaries.

EU Directive Legislation issued by the European Union that is binding on Member States in terms of the result to be achieved, but leaves choice as to methods.

Favourable conservation status The status of natural habitats and species whose natural range, areas covered and populations are stable or increasing, and are likely to continue as such for the foreseeable future.

Flood Defence A structure (or system of structures) for the alleviation of flooding from rivers or the sea.

Flood event An occurrence of flooding.

Flood Risk The level of flood risk is the product of the frequency or likelihood of flood events and their consequences (such as loss, damage, harm, distress and disruption).

Flood Risk Management The activity of understanding the probability and consequences of flooding, and seeking to modify these factors to reduce flood risk to people, property and the environment. This should take account of other water level management and environmental requirements, and opportunities and constraints. It is not just the application of physical flood defence measures.

Flood Risk Management Measure Structural and non-structural interventions that modify flooding and flood risk either through changing the frequency of flooding, or by changing the extent and consequences of flooding, or by reducing the vulnerability of those exposed to flood risks.

Flood Risk Management Option Can be either a single flood risk management measure in isolation or a combination of more than one measure to manage flood risk.

Flood Warning To alert people of the danger to life and property within a community.

Floodplain Any area of land over which water flows or is stored during a flood event or would flow but for the presence of flood defences.

Fluvial Pertaining to a watercourse (river, stream or lake).

Geomorphology The science concerned with understanding the form of the Earth's land surface and the processes by which it is shaped, both at the present day as well as in the past.

Groundwater Water occurring below ground in natural formations (typically rocks, gravels and sands). The subsurface water in the zone of saturation, including water below the water table and water occupying cavities, pores and openings in underlying soils and rocks.

Habitat The place where an organism or species normally lives and is characterised by its physical characteristics and/or dominant type of vegetation.

Habitats Directive European Community Directive (92/43/EEC) on the Conservation of Natural Habitats and of Wild Flora and Fauna. Known as the 'Habitats Directive', and is implemented in Ireland through Regulation 15 of the European Union (Natural Habitats) Regulations, SI 94/1997, as amended, and Circular letters SEA 1/08 and NPWS 1/08 . It establishes a system to protect certain fauna, flora and habitats deemed to be of European conservation importance.

In-combination This refers to the assessment of the effects of more than one scheme acting together.

Individual Risk Receptors Essential infrastructure assets such as a motorway or potentially significant environmentally polluting sites.

Intertidal This refers to habitats that exist between high tide and low tide levels.

Land Management Various activities relating to the practice of agriculture, forestry, etc.

Land Use Various designations of activities, developments, cropping types, etc, for which land is used.

Local Authority Development Plans Development plans are the blueprint for the planning and development of within a local authority area. Each plan sets out the overall planning policies of the local authority, and consists of a written statement and a series of maps.

Natura 2000 European network of protected sites which represent areas of the highest value for natural habitats and species of plants and animals which are rare, endangered or vulnerable in the European Community. The *Natura 2000* network will include two types of area. Areas may be designated as Special Areas of Conservation (SAC) where they support rare, endangered or vulnerable natural habitats and species of plants or animals (other than birds). Where areas support significant numbers of wild birds and their habitats, they may become Special Protection Areas (SPA). SACs are designated under the Habitats Directive and SPAs are classified under the Birds Directive. Some very important areas may become both SAC and SPA.

Ramsar site Wetland site of international importance designated under the Ramsar Convention on Wetlands of International Importance 1971, primarily because of its importance for waterfowl.

Special Area for Conservation (SAC), Candidate Special Area for Conservation (cSAC) SACs are internationally important sites, protected for their habitats and non-bird species. They are designated, as required, under the EC Habitats Directive. A cSAC is a candidate site, but is afforded the same status as if it were confirmed.

Special Protection Area (SPA) SPAs are sites of international importance for breeding, feeding and roosting habitat for bird species. They are designated, as required, under the EC Birds Directive.

Species richness A measure of the number of species in a particular area.

Strategic Environmental Assessment (SEA) Assessment under EU Directive 2001/41/EC. SEA is a multi-staged process, designed to enable the integration of environmental considerations at key stages of the plan development process and maximise the potential for environmental impacts to be minimised.

Surface Water Water in rivers, estuaries, ponds and lakes.

The Office of Public Works (OPW) The lead agency with responsibility for flood risk management in Ireland.

Tidal Related to the sea and its tide.

Waders Also known as shorebirds. Birds that feed in intertidal habitats, especially mud and sand flats, and shallow freshwater habitats. Typical species are curlew, oystercatcher and redshank.

Waterfowl Ducks, geese, waders and other water birds such as moorhens, coots, grebes and herons.

Wetland Wetlands are areas of marsh, fen, peatland or water, with water that is fresh, brackish or salt, including shallow areas of sea.

Wildfowl Ducks, geese and waders.

Appendix A. Letter from DEHLG in response to Screening Assessment (Stage 1)

6th May 2011

Anne Marie Conibear,
Project Manager,
Tramway House
32 Dartry Road
Dublin 6

Your Ref: Y8122/2.3/258 AMC
Our Ref: G2010/633
Re: Fingal – East Meath FRAMS: Appropriate Assessment

A Chara,

I refer to the Appropriate Assessment (AA) for the Fingal – East Meath Flood Risk Assessment and Management Study (FEM-FRAMS) as forwarded to this office on the 8th April 2011. Please find attached nature conservation observations on the Appropriate Assessment and the draft Plan.

This office agrees with the conclusion of the AA screening that the Plan should be subjected to a stage 2 AA. It is recommended that the Local Authorities are consulted about future and current projects that should be considered for cumulative impacts.

Regarding the draft Plan we note that on page two it is stated that the outputs from the study shall be in compliance with the EU Floods Directive and Water Framework Directive. It is recommended that the Habitats Directive is also included.

We also note a couple of probable errors. Regarding the list of abbreviations in the draft Plan the abbreviation FFWS has been omitted. Regarding the list of estuaries on pages xii and 10 the Nanny Estuary has been omitted.

Please forward a copy of the stage 2 AA and SEA when completed

Kindly forward any further information received, or in the event of a decision being made a copy of same should be forwarded to the following address as soon as it issues:

The Manager,
Development Applications Unit,
Department of Tourism, Culture and Sport,
Newtown Road,
Wexford

Alternatively, documentation associated with the above can be referred electronically to the DAU at the following address:

manager.dau@environ.ie

In addition, please acknowledge receipt of these observations by return.

Is mise le meas,

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