

# MONA OFFSHORE WIND PROJECT

## HRA Stage 2 Information to Support an Appropriate Assessment

### Part Three: Special Protection Areas and Ramsar sites Assessments

#### Annex E1.3.2: Assessment of proposed Ramsar Sites within the Isle of Man

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Image of an offshore wind farm

MONA OFFSHORE WIND PROJECT

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## Contents

<b>1</b>	<b>ASSESSMENT OF PROPOSED RAMSAR SITES WITHIN THE ISLE OF MAN</b>	<b>7</b>
1.1	Summary	7
1.2	Introduction	7
1.3	Summary of the pRamsar sites within Isle of Man	9
1.3.2	Central Valley Curragh pRamsar site	9
1.3.3	Dalby Peatlands pRamsar site	10
1.3.4	Gob ny Rona, Maughold Head & Port Cornaa pRamsar site	10
1.3.5	Southern Coasts & Calf of Man pRamsar site	11
1.3.6	The Ayres pRamsar site	13
1.4	HRA Stage 1 - Screening	14
1.4.1	Potential connectivity	14
1.4.2	Assessment of LSE	18
1.5	HRA Stage 2 – Appropriate Assessment	30
1.5.1	Gob ny Rona, Maughold Head & Port Cornaa	30
1.5.2	Southern Coasts & Calf of Man	36
1.5.3	The Ayres	41
1.5.4	In-combination assessments for offshore ornithology	45
1.6	Population Viability Analysis	60
1.6.2	Black-legged kittiwake	60
1.6.3	Common guillemot	64
1.6.4	Great black-backed gull	66
1.7	Conclusions	67
1.8	References	69

## Tables

Table 1-1:	Information on the Central Valley Curragh pRamsar site	10
Table 1-2:	Information on the Dalby Peatlands pRamsar site	10
Table 1-3:	Information on the Gob ny Rona, Maughold Head & Port Cornaa pRamsar site	10
Table 1-4:	Information on the Southern Coasts & Calf of Man pRamsar site	12
Table 1-5:	Information on The Ayres pRamsar site	13
Table 1-6:	Initial screening of pRamsar sites for offshore ornithology based on foraging range connectivity	15
Table 1-7:	Initial screening of pRamsar sites for marine habitats	16
Table 1-8:	Initial screening of pRamsar sites for fish and shellfish species	17
Table 1-9:	Initial screening of pRamsar sites for marine mammal species	18
Table 1-10:	Impacts apportioned to the pRamsar sites	19
Table 1-11:	Assessment of LSE for pRamsar sites for fish and shellfish species	22
Table 1-12:	Initial screening of pRamsar sites for marine mammal species	28
Table 1-13:	Integrity test: Step 1 for the Gob ny Rona, Maughold Head & Port Cornaa pRamsar site from the Mona Offshore Wind Project acting alone	31
Table 1-14:	Information to inform an appropriate assessment for the fish features of the Gob ny Rona, Maughold Head & Port Cornaa pRamsar site from the Mona Offshore Wind Project alone	32
Table 1-15:	Information to inform an appropriate assessment for the marine mammal feature of the Gob ny Rona, Maughold Head & Port Cornaa pRamsar site from the Mona Offshore Wind Project alone	33
Table 1-16:	Information to inform an appropriate assessment for the fish features of the Gob ny Rona, Maughold Head & Port Cornaa pRamsar site from the Mona Offshore Wind Project in-combination with other plans and projects	34
Table 1-17:	Information to inform an appropriate assessment for the marine mammal feature of the Gob ny Rona, Maughold Head & Port Cornaa pRamsar site from the Mona Offshore Wind Project in-combination with other plans and projects	35
Table 1-18:	Integrity test: Step 1 for the Southern Coasts & Calf of Man pRamsar site from the Mona Offshore Wind Project acting alone	37

## MONA OFFSHORE WIND PROJECT

Table 1-19: Information to inform an appropriate assessment for the fish features of the Southern Coasts & Calf of Man pRamsar site from the Mona Offshore Wind Project alone .....	38
Table 1-20: Information to inform an appropriate assessment for the marine mammal feature of the Southern Coasts & Calf of Man pRamsar site from the Mona Offshore Wind Project acting alone .....	39
Table 1-21: Information to inform an appropriate assessment for the fish features of the Southern Coasts & Calf of Man pRamsar site from the Mona Offshore Wind Project acting in-combination with other plans and projects.....	40
Table 1-22: Information to inform an appropriate assessment for the marine mammal feature of the Southern Coasts & Calf of Man pRamsar site from the Mona Offshore Wind Project acting in-combination with other plans and projects .....	41
Table 1-23: Information to inform an appropriate assessment for the fish features of The Ayres pRamsar site from the Mona Offshore Wind Project acting alone.....	42
Table 1-24: Information to inform an appropriate assessment for the fish features of The Ayres pRamsar site from the Mona Offshore Wind Project in-combination with other plans and projects .....	43
Table 1-25: In-combination assessment for black-legged kittiwake from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site – when considering 50% displacement and 1% mortality.....	46
Table 1-26: Displacement matrix for in-combination assessment of black-legged kittiwake from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site .....	47
Table 1-27: Matrix (including collisions impacts – 0.84 birds) for in-combination assessment of black-legged kittiwake from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site .....	48
Table 1-28: In-combination assessment for black-legged kittiwake from Southern Coasts & Calf of Man pRamsar site – when considering 50% displacement and 1% mortality.....	49
Table 1-29: Displacement matrix for in-combination assessment of black-legged kittiwake from Southern Coasts & Calf of Man pRamsar site .....	50
Table 1-30: Matrix (including collisions impacts – 6.65 birds) for in-combination assessment of black-legged kittiwake from Southern Coasts & Calf of Man pRamsar site .....	51
Table 1-31: In-combination assessment for black-legged kittiwake from the Gob ny Rona, Maughold Head & Port Cornaa pRamsar site – when considering collisions only. ....	52
Table 1-32: In-combination assessment for black-legged kittiwake from the Southern Coasts & Calf of Man pRamsar site – when considering collisions only. ....	53
Table 1-33: In-combination assessment for common guillemot from the Gob ny Rona, Maughold Head & Port Cornaa pRamsar site.....	55
Table 1-34: Displacement matrix for in-combination assessment of common guillemot from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site .....	56
Table 1-35: Displacement matrix for in-combination assessment of common guillemot from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site .....	56
Table 1-36: In-combination assessment for common guillemot from the Southern Coasts & Calf of Man pRamsar site.....	57
Table 1-37: Displacement matrix for in-combination assessment of common guillemot from Southern Coasts & Calf of Man pRamsar site .....	58
Table 1-38: Displacement matrix for in-combination assessment of common guillemot from Southern Coasts & Calf of Man pRamsar site .....	58
Table 1-39: In-combination assessment for great black-backed gull from the Southern Coasts & Calf of Man pRamsar site.....	59
Table 1-40: Summary of colony sites where apportioned in-combination impacts result in an increase in baseline mortality of >1%. ....	60
Table 1-41: Summary of the annual in-combination impacts used in the PVA for black-legged kittiwake from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site.....	61
Table 1-42: PVA outputs for black-legged kittiwake from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site.....	61
Table 1-43: Summary of the annual in-combination impacts used in the PVA for black-legged kittiwake from Southern Coasts & Calf of Man pRamsar site.....	62
Table 1-44: PVA outputs for black-legged kittiwake from Southern Coasts & Calf of Man pRamsar site.....	63
Table 1-45: Summary of the annual in-combination impacts used in the PVA for common guillemot from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site.....	64

## MONA OFFSHORE WIND PROJECT

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Table 1-46: PVA outputs for common guillemot from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site. ....	64
Table 1-47: Summary of the annual in-combination impacts used in the PVA for common guillemot from Southern Coasts & Calf of Man pRamsar site.....	65
Table 1-48: PVA outputs for common guillemot from Southern Coasts & Calf of Man site. ....	65
Table 1-49: Summary of the annual in-combination impacts used in the PVA for great black-backed gull from Southern Coasts & Calf of Man pRamsar site.....	66
Table 1-50: PVA outputs for great black-backed gull from Southern Coasts & Calf of Man pRamsar site....	67

## MONA OFFSHORE WIND PROJECT

### Glossary

Term	Meaning
Applicant	Mona Offshore Wind Limited.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Project (NSIP).
Mona Offshore Wind Project	The Mona Offshore Wind Project is comprised of both the generation assets, offshore and onshore transmission assets, and associated activities.
The Planning Inspectorate	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects.

### Acronyms

Acronym	Description
AEol	Adverse Effect on Integrity
ASSI	Areas of Special Scientific Interest
BDMPS	Biologically Defined Minimum Population Scales
CGR	Counterfactual of Growth Rate
CPS	Counterfactual of Population Size
DAFF	Department of Agriculture Fisheries and Forestry
EIA	Environmental Impact Assessment
EMF	Electromagnetic Field
ExA	Examining Authority
HRA	Habitats Regulations Assessment
IoM	Isle of Man
ISAA	Information to Support an Appropriate Assessment
JNCC	Joint Nature Conservation Committee
LSE	Likely Significant Effect
MNRs	Marine Nature Reserves
NRW	Natural Resources Wales
PVA	Population Viability Analysis
SAC	Special Area of Conservation
SMP	Seabird Monitoring Programme
SNCB	Statutory Nature Conservation Body
SPAs	Special Protection Areas
UK	United Kingdom
UKOTCF	UK Overseas Territories Conservation Forum
UK	United Kingdom
UXO	Unexploded ordnance

## MONA OFFSHORE WIND PROJECT

Acronym	Description
Zol	Zone of Influence

## Units

Unit	Description
%	Percentage
km <sup>2</sup>	Square kilometres
km	Kilometres
m	Metres



# 1 ASSESSMENT OF PROPOSED RAMSAR SITES WITHIN THE ISLE OF MAN

## 1.1 Summary

- 1.1.1.1 This assessment of the proposed Ramsar (pRamsar) sites on the Isle of Man has been submitted to allow the Secretary of State to complete an appropriate assessment on these sites if it is determined one is required. The Isle of Man Government did not raise any concerns with respect to the five pRamsar sites during pre-application consultation or in its Relevant Representation with respect to the consideration of these sites in the Habitats Regulations Assessment (HRA) Stage 1 Screening Report (Document Reference E1.4 F03). However, the Applicant acknowledges that the Overarching National Policy Statement for Energy (NPS EN-1) (Department for Energy Security & Net Zero, 2023) requires pRamsar sites to be included within the HRA (see paragraph 5.4.5). It is unclear whether this applies to pRamsar sites outwith the UK National Site Network. Therefore, to ensure completeness, information to support appropriate assessment of these five pRamsar sites has been provided in this Annex should it be required.
- 1.1.1.2 The Applicant has given due consideration to the potential for impacts to features of the Isle of Man Marine Nature Reserves (MNRs), as identified as priorities by the Isle of Man Government, in the Environmental Impact Assessment (EIA).
- 1.1.1.3 Based on the evidence presented in Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02) and HRA Stage 2 Information to Support an Appropriate Assessment (ISAA), Part Two: SACs Assessments (Document Reference E1.2 F02), it was concluded that for all features of all sites taken forward for full assessment, no adverse effect on integrity (AEol) is predicted as a result of the Mona Offshore Wind Project alone or in-combination with other plans and projects.
- 1.1.1.4 The assessment of offshore ornithological features concluded no AEol from the Mona Offshore Wind Project alone in-combination with other plans and projects for all three pRamsar sites screened in for appropriate assessment (Gob ny Rona, Maughold Head and Port Cornaa, Southern Coasts & Calf of Man and The Ayres pRamsar sites).

## 1.2 Introduction

- 1.2.1.1 During the Mona Offshore Wind Project examination, the Examining Authority's (ExA) first written questions, the ExA requested confirmation of consideration to the potential effects on the following proposed Ramsar (pRamsar) sites on the Isle of Man:
- Central Valley Curragh pRamsar site
  - Dalby Peatlands pRamsar site
  - Gob ny Rona, Maughold Head and Port Cornaa pRamsar site
  - Southern Coasts and Calf of Man pRamsar site
  - The Eyres pRamsar site
- 1.2.1.2 The Applicant responded to the question and confirmed that the Applicant used the maps data provided on the official Isle of Man Government website (<https://www.gov.im/maps/>) to identify the Isle of Man designated sites. With regards to the five pRamsar sites listed by the ExA on the Isle of Man, the Applicant notes that these sites are not included in the maps data provided on the official Isle of Man Government website (<https://www.gov.im/maps/>). The only reference that the



## MONA OFFSHORE WIND PROJECT

Applicant is aware of relating to these sites is in the United Kingdom (UK) Overseas Territories Conservation Forum (UKOTCF) (2005a) review of existing and pRamsar sites in UK Overseas Territories and Crown Dependencies and associated Annex 2 of draft Ramsar Information Sheets (UKOTCF, 2005b). At no point during pre-application consultation, or in its Relevant Representation, did the Isle of Man Government raise the five pRamsar sites to the Applicant, nor request consideration of these in the HRA Stage 1 Screening Report (Document Reference E1.4 F03). Therefore, the Applicant focussed on the Isle of Man MNRs in the EIA as advised by the Isle of Man Government.

- 1.2.1.3 The Applicant notes that the Isle of Man MNRs, which were designated in 2018 (under the Wildlife Act, 1990), provide coverage of most of the coastline of the Isle of Man, including the areas proposed to be covered by the Gob ny Rona, Maughold Head and Port Cornaa pRamsar site, the Southern Coasts and Calf of Man pRamsar site and The Ayres pRamsar site. The Applicant also notes that the proposed features of these pRamsar sites are now designated under the Isle of Man MNRs. The Applicant has given due consideration to the potential for impacts to features of the Isle of Man MNRs, as identified as priorities by the Isle of Man Government, in the EIA.
- 1.2.1.4 The Applicant acknowledges, however, that the Overarching National Policy Statement for Energy (NPS EN-1) (Department for Energy Security & Net Zero, 2023) requires pRamsar sites to be included within the HRA (see paragraph 5.4.5). However, it is unclear whether this applies to pRamsar sites outwith the UK National Site Network. Therefore, to ensure completeness, information to support an appropriate assessment of the five Isle of Man pRamsar sites has been provided in this note.
- 1.2.1.5 The Information Sheets for the pRamsar sites considered within this document come from the UK Overseas Territories Conservation Forum 2005 report 'Review of existing and potential Ramsar sites in (UKOTCF, 2005a) (hereafter referred to as the Site Information Sheet), which the Applicant believes are the most recent versions of the Information Sheets. The Applicant contacted the IoM Government to confirm there is no further or more recent information. The IoM Government responded on 11 December 2024, providing a link to maps showing the pRamsar boundaries. These maps are presented in Appendix B: and used in the assessment to aid the exercise of defining species populations which may occur within the boundary of the sites.
- 1.2.1.6 One of the sites within the 2005 review, The Ballaugh Curragh Ramsar site, was fully designated in September 2006. The Applicant can confirm that the Ballaugh Curragh Ramsar site was considered in the pre-screening of sites but was screened out from further consideration at this initial pre-screening stage on the basis that there is no potential for an impact on any of the features of the Ramsar site (i.e., peatlands, corncrake *Crex crex*, the asilid fly *Epitriptus cowini* and hen harrier *Circus cyaneus*). Screening for onshore ornithological features is presented within section 1.3.8 of the HRA Stage 1 Screening Report (Document Reference E1.4 F03). Therefore, the Ballaugh Curragh Ramsar site is not considered further within this Annex. However, the other sites are still at a 'proposed' stage, with no official confirmation from the Isle of Man Government regarding their status.
- 1.2.1.7 Within the review (UKOTCF, 2005a), it's stated that:

*The term 'proposed' when used in this report means proposed by this Review (or an earlier proposal confirmed by this Review). Whilst in most cases individuals or organisations in the territories concerned have been consulted on the list of proposed sites, it does not mean that these sites have been formally proposed to Government for designation. Thus whilst many of these sites have the potential to be proposed by the relevant authorities, 'proposed' is taken to*

## MONA OFFSHORE WIND PROJECT

mean ‘potential sites that have been identified as meriting Ramsar designation by the Review of Existing and potential Ramsar sites in the UK Overseas Territories and Crown Dependencies’.

- 1.2.1.8 It is for this reason that the Applicant believes the Isle of Man has focused on designating protected sites under their own legislation (e.g. MNRs and/or Areas of Special Scientific Interest (ASSIs)).
- 1.2.1.9 The Applicant has reviewed the 2022 update to the ‘Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance of the Convention on Wetlands (Ramsar, Iran, 1971)’<sup>1</sup>. Within paragraph 185 of the 2022 update, a definition of ‘waterbirds’ is provided for which Ramsar sites can be designated under Criterion 4. Seabirds and cliff nesting gulls are not covered by these regulations. The criteria within the Isle of Man to designate the ASSI (Department of Agriculture Fisheries and Forestry (DAFF), 2008) covers the protection of seabird and cliff-nesting birds. Hence, the Applicant suggests that the Isle of Man designate these areas as ASSIs (and/or MNRs) and not Ramsar sites.
- 1.2.1.10 In addition, the Applicant wishes to highlight that some of the bird species mentioned on the pRamsar sites Information Sheets do not surpass any threshold required for designation (e.g. ‘of international importance’) and therefore would not be named specifically under any of the Ramsar criteria applicable to birds (criteria 2, 3, 4, 5 and 6) – see details in section 1.3 below.

## 1.3 Summary of the pRamsar sites within Isle of Man

- 1.3.1.1 The Applicant has undertaken a review of the Information Sheets within UKOTCF (2005a) and the Isle of Man’s online ‘Island Environment’ map (Isle of Man Government, 2024) to determine the pRamsar sites extent and latest information. Where the ‘Island Environment’ map showed the proposed spatial extent of the pRamsar sites, these are presented in Appendix B:.
- 1.3.1.2 As part of the Volume 2, Chapter 2: Benthic subtidal and intertidal ecology (Document Reference F2.2 F02), Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02), Volume 2, Chapter 4: Marine mammals (Document Reference F2.4 F02) and Volume 2, Chapter 5: Offshore Ornithology (Document Reference F2.5 F04), the Applicant has reviewed the sensitivity of the species that are mentioned on the Information Sheets of these pRamsar sites. This information is cross referenced in this Annex rather than repeated.

### 1.3.2 Central Valley Curragh pRamsar site

- 1.3.2.1 Information relevant to this assessment presented within the Site Information Sheet on the Central Valley Curragh pRamsar site is provided in Table 1-1 and a map showing the location of the site is provided in Appendix B: . However, this site is wholly terrestrial and is ‘lowland flat river valley curraghs (carrs)’, which is ‘retaining characteristic nature as one of the best remaining examples of a river-valley curragh’. No migratory species nor marine habitats are present, and therefore, there is no potential connectivity between the Mona Offshore Wind Project and the Central Valley Curragh pRamsar site.

<sup>1</sup> Accessible from: [https://rsis.ramsar.org/RISapp/StatDoc/strategic\\_framework\\_en.pdf](https://rsis.ramsar.org/RISapp/StatDoc/strategic_framework_en.pdf)

## MONA OFFSHORE WIND PROJECT

**Table 1-1: Information on the Central Valley Curragh pRamsar site.**

Information	Description from Information Sheet
Location	Central valley from near Peel to near Douglas
Criterion 1	Particularly good surviving example of shrub-dominated riverside curraghs (carrs).
Other designated sites with presumed overlap	None
Estimated distance to the Mona Offshore Wind Project	Approximately 50 km - no potential for connectivity.

### 1.3.3 Dalby Peatlands pRamsar site

- 1.3.3.1 Information relevant to this assessment presented within the Information Sheet on the Dalby Peatlands pRamsar site is provided in Table 1-2 and a map showing the location of the site is provided in Appendix B:. However, this site is wholly terrestrial and is 'lowland flat river valley curraghs (carrs)...retaining characteristic nature as one of the best remaining examples of a river-valley curragh'. No migratory species nor marine habitats are present, and therefore, there is no potential connectivity between the Mona Offshore Wind Project and the Dalby Peatlands pRamsar site. The Information Sheet for the Dalby Peatlands pRamsar sites mentioned hen harrier *Circus cyaneus*, as a 'noteworthy fauna' however bird species was not presented as a criterion for proposed designation and therefore hen harrier are not considered further.

**Table 1-2: Information on the Dalby Peatlands pRamsar site**

Information	Description from Information Sheet
Location	7 km south of Peel
Criterion 1	Dalby Peatland is a representative of a wet heath and bog habitat in a near-natural condition
Criterion 2	Both heathland and bog are limited in their European distribution and known to be subject to a range of threats.
Other designated sites with presumed overlap	'Dalby Mountain' Manx Wildlife Trust site. Adjacent to Glen Rushen ASSI
Estimated distance to the Mona Offshore Wind Project	Approximately 54 km - no potential for connectivity.

### 1.3.4 Gob ny Rona, Maughold Head & Port Cornaa pRamsar site

- 1.3.4.1 Information relevant to this assessment presented within the Information Sheet on the Gob ny Rona, Maughold Head & Port Cornaa pRamsar site is provided in Table 1-3 and a map showing the location of the site is provided in Appendix B:.

**Table 1-3: Information on the Gob ny Rona, Maughold Head & Port Cornaa pRamsar site**

Information	Description from Information Sheet
Location	Coast southward from Ramsey
Criterion 1	Rocky marine shore ecosystem including cliffs, maerl, kelp and knotted wrack beds and priority seagrass beds

## MONA OFFSHORE WIND PROJECT

Information	Description from Information Sheet
Criterion 2	Supports vulnerable, endangered, or critically endangered species or threatened ecological communities
Criterion 4	The cliffs and coastal waters support important breeding populations of seabirds and grey seals
Criterion 8	The Sulby River is considered important as a salmon and sea trout river
Offshore ornithological species mentioned within the Information Sheet – not ‘official features’ as they do not fall into a specific criteria for designation. Mentioned under Criterion 4 (see paragraph 1.2.1.9, which states these species are not covered by the Ramsar Convention)	Atlantic puffin <i>Fratercula arctica</i> Black guillemot <i>Cepphus grylle</i> Black-legged kittiwake <i>Rissa tridactyla</i> Common guillemot <i>Uria aalge</i> Cormorant <i>Phalacrocorax carbo</i> Great black-backed gull <i>Larus marinus</i> Herring gull <i>Larus argentatus</i> Lesser black-backed gull <i>Larus fuscus</i> Northern fulmar <i>Fulmarus glacialis</i> Razorbill <i>Alca torda</i> Shag <i>Gulosus aristotelis</i>
Marine habitats mentioned within the Information Sheet – not ‘official features’ as they do not fall into a specific criteria for designation. Mentioned under Criterion 1 and 2	Rocky marine shore ecosystem including cliffs, maerl, kelp and knotted wrack beds and seagrass beds Horse mussel beds Saltmarsh
Fish/shellfish species mentioned within the Information Sheet – not ‘official features’ as they do not fall into a specific criteria for designation. Mentioned under Criterion 8	Salmon <i>Salmo salar</i> Sea trout <i>Salmo trutta</i>
Marine mammal species mentioned within the Information Sheet – not ‘official features’ as they do not fall into a specific criteria for designation. Mentioned under Criterion 1 and 4	Grey seal <i>Halichoerus grypus</i>
Other designated sites with presumed overlap	Ramsey Bay MNR Maughold Cliffs & Brooghs ASSI
Estimated distance to the Mona Offshore Wind Project	Approximately 58 km (to Ramsay Bay MNR)

1.3.4.2 As there are offshore ornithological, marine habitats and non-ornithological marine species listed within the Information Sheet for this site, an impact-receptor pathway exists, and so this site is considered within this document, see section 1.4.

### 1.3.5 Southern Coasts & Calf of Man pRamsar site

1.3.5.1 Information relevant to this assessment presented within the Information Sheet on the Southern Coasts & Calf of Man pRamsar site is provided in Table 1-4 and a map showing the location of the site is provided in Appendix B:.

## MONA OFFSHORE WIND PROJECT

**Table 1-4: Information on the Southern Coasts & Calf of Man pRamsar site.**

Information	Description from Information Sheet
Location	The coast from Peel southward, including the Calf of Man and Chicken Rock, and eastward along the southern coast to Santon Burn mouth, including the Langness peninsula. The site passes (and excludes the small towns of Port Erin, Port St Mary and Castletown.
Criterion 1	Important complex of coastal and marine habitats, including: marine, subtidal beds of priority ecosystem seagrass as well as kelp and knotted wrack, maerl, rocky shores, cliffs, sea caves and coastal heath.
Criterion 3	The heath on Langness is the only site in the British Isles site for the grasshopper <i>Stenobothrus stigmaticus</i> . Langness is the main site in the Isle of Man for waterbirds.
Criterion 4	The cliffs and coastal waters support important breeding populations of seabirds. The Calf of Man is an important breeding colony for grey seals. Wart Bank, to the south east of the Calf of Man is a shallow submerged sandbank which is recognized as an important fish and bird feeding ground.
Criterion 7	The southern coasts of the Isle of Man are important summer feeding grounds for basking shark <i>Cetorhinus maximus</i> .
Criterion 8	Port Erin Bay is an important plaice <i>Pleuronectes platessa</i> nursery ground.
Offshore ornithology species mentioned within the Information Sheet– not ‘official features’ as they do not fall into a specific criteria for designation. Mentioned under Criterion 4 (see paragraph 1.2.1.9, which states these species are not covered by the Ramsar Convention)	Atlantic puffin Black guillemot Black-legged kittiwake Common guillemot Great black-backed gull Herring gull Lesser black-backed gull Manx shearwater <i>Puffinus puffinus</i> Northern fulmar Razorbill Shag
Marine habitats mentioned within the Information Sheet – not ‘official features’ as do not fall into a specific criteria for designation. Mentioned under Criterion 1	Seagrass beds Kelp and knotted wrack Maerl Rocky shores Cliffs Sea caves Coastal heath Sandbank

## MONA OFFSHORE WIND PROJECT

Information	Description from Information Sheet
Fish/shellfish species mentioned within the Information Sheet – not ‘official features’ as do not fall into a specific criteria for designation. Mentioned under Criterion 4 and 7	Basking shark Plaice (nursery ground) Cray fish <i>Palinurus elephas</i>
Marine mammal species mentioned within the Information Sheet – not ‘official features’ as do not fall into a specific criteria for designation. Mentioned under Criterion 4	Grey seal
Other designated sites with presumed overlap	Baie ny Carrickey MNR Calf and Wart Bank MNR Dalby Coast ASSI Glen Maye ASSI Langess MNR Langness, Sandwick and Derbyhaven ASSI Niarbyl Bay MNR Port Erin Bay MNR Port St Mary Ledges & Kallow Point ASSI Poyll Vaaish Coast ASSI
Estimated distance to the Mona Offshore Wind Project	Approximately 48km (to Langess MNR)

1.3.5.2 As there are offshore ornithological, marine habitats and non-ornithological marine species listed within the Information Sheet for this site, an impact-receptor pathway exists, and so this site is considered within this document, see section 1.4.

### 1.3.6 The Ayres pRamsar site

1.3.6.1 Information relevant to this assessment presented within the Information Sheet on The Ayres pRamsar site is provided in Table 1-5 and a map showing the location of the site is provided in Appendix B:.

**Table 1-5: Information on The Ayres pRamsar site.**

Information	Description from Information Sheet
Location	Northernmost tip of Isle of Man, 9 km north of Ramsey
Criterion 1	The Ayres is a diverse representative of shingle, vegetated shingle, dune and cobble coastal ecosystems which includes lichen heath on sand/shingle and combination of related habitats.
Criterion 2	Supports the endangered moth <i>Pyrausta sanguinalis</i> on thyme (Parsons 1993), and vulnerable fly <i>Bombylius minor</i> on the heath.  Maerl beds and horse mussel beds Rare invertebrates
Criterion 3	Important marine habitats – maerl and horse mussel beds offshore. Edible mussel <i>Mytilus edulis</i> bed mixed with kelp.
Criterion 4	Important feeding area for seabirds.
Criterion 7	Important marine habitats – maerl, horse mussels offshore, and unusual dense edible mussel bed mixed with kelp of conservation interest.



## MONA OFFSHORE WIND PROJECT

Information	Description from Information Sheet
Criterion 8	Maerl is now recognised as important habitat for fish and shellfish settlement and nursery area, so the extensive maerl beds to the east of the Point of Ayre are likely to be of importance to local populations of fish and shellfish.
Offshore ornithological species considered – not ‘official features’ as do not fall into a specific criteria for designation. Mentioned under Criterion 4.	Arctic tern <i>Sterna paradisaea</i> Black-headed gull <i>Chroicocephalus ridibundus</i> Common gull <i>Larus canus</i> Common tern <i>Sterna hirundo</i> Great black-backed gull Herring gull Lesser black-backed gull Little tern <i>Sternula albifrons</i> Northern gannet <i>Morus bassanus</i> <u>Wintering divers</u>
Marine habitats mentioned within the Information Sheet – not ‘official features’ as do not fall into a specific criteria for designation. Mentioned under Criterion 1, 2, 3 and 4	Shingle, vegetated shingle, dune and cobble coastal ecosystems <i>Mytilus edulis</i> beds (mixed with kelp) Maerl beds Horse mussel beds
Fish/shellfish species mentioned within the Information Sheet – not ‘official features’ as do not fall into a specific criteria for designation. Mentioned under Criterion 8	Herring <i>Clupea harengus</i> Salmon Sea trout
Other designated sites with presumed overlap	West Coast MNR Central Ayres ASSI The Ayres NNR
Estimated distance to the Mona Offshore Wind Project	Approximately 62 km (to West Coast MNR)

1.3.6.2 As there are offshore ornithological, marine habitats and non-ornithological marine species listed within the Information Sheet for this site, an impact-receptor pathway exists, and so this site is considered within this document, see section 1.4.

## 1.4 HRA Stage 1 - Screening

### 1.4.1 Potential connectivity

#### Offshore ornithology

1.4.1.1 As set out in section 1.3.7 of the HRA Stage 1 Screening Report (Document Reference E1.4 F03, the initial screening stage for designated sites is to determine connectivity between the designated site and the Mona Offshore Wind Project. The connectivity between each pRamsar site and the Mona Offshore Wind Project is defined by the foraging range of the species in question (as per the list of species mentioned within the Information Sheets are shown in Table 1-3, Table 1-4 and Table 1-5). Foraging ranges are taken from Woodward *et al.* (2019).

1.4.1.2 Species which have no connectivity to the Mona Offshore Wind Project are not considered further within this assessment. These species are marked with grey text within Table 1-6.

## MONA OFFSHORE WIND PROJECT

**Table 1-6: Initial screening of pRamsar sites for offshore ornithology based on foraging range connectivity**

pRamsar site	Distance to the Mona Offshore Wind Project (km)	Species mentioned within the Information Sheets	Species foraging range (km) (mean maximum $\pm$ one SD)	Connectivity between site and the Mona Offshore Wind Project
Gob ny Rona, Maughold Head & Port Cornaa	~58km	Atlantic puffin	265.4	Yes
		Black guillemot	9.1	No
		Black-legged kittiwake	300.6	Yes
		Common guillemot	95.2	Yes
		Cormorant	33.9	No
		Great black-backed gull	73 (maximum)	Yes
		Herring gull	85.6	Yes
		Lesser black-backed gull	236	Yes
		Northern fulmar	1,200	Yes
		Razorbill	122.2	Yes
		Shag	23.7	No
Southern Coasts & Calf of Man	~48km	Atlantic puffin	265.4	Yes
		Black guillemot	9.1	No
		Black-legged kittiwake	300.6	Yes
		Common guillemot	95.2	Yes
		Great black-backed gull	73 (maximum)	Yes
		Herring gull	85.6	Yes
		Lesser black-backed gull	236	Yes
		Manx shearwater	2,366	Yes
		Northern fulmar	1,200	Yes
		Razorbill	122.2	Yes
		Shag	23.7	No
The Ayres	~62km	Arctic tern	40.5	No
		Black-headed gull	18.5 (maximum)	No
		Common gull	50 (maximum)	No
		Common tern	26.9	No
		Herring gull	85.6	Yes
		Great black-backed gull	73 (maximum)	Yes
		Lesser black-backed gull	236	Yes

## MONA OFFSHORE WIND PROJECT

pRamsar site	Distance to the Mona Offshore Wind Project (km)	Species mentioned within the Information Sheets	Species foraging range (km) (mean maximum $\pm$ one SD)	Connectivity been site and the Mona Offshore Wind Project
		Little tern	5 (maximum)	No
		Northern gannet	512	Yes
		'Wintering divers'	N/A	No – wintering divers are spatially restricted and do not travel ~60km. There is also no specific species mentioned.

### Marine habitats

- 1.4.1.3 As set out in section 1.3.2 of the HRA Stage 1 Screening Report (Document Reference E1.4 F03), the initial stage of screening of European sites designated for marine habitats is to determine the potential for connectivity with the Mona Offshore Wind Project. The potential for connectivity is determined by the presence/absence of a physical overlap between the pRamsar and the Mona Offshore Wind Project, or the zone of influence (Zol) defined for the Mona Offshore Wind Project and determined by the outputs of physical processes modelling (i.e. 12 km).
- 1.4.1.4 The outputs of the initial screening are summarised in Table 1-7 which demonstrates that all of the pRamsars are located beyond the 12 km Zol. There is therefore no potential for connectivity with any of the pRamsars with marine habitats as features and so marine habitats are screened out of further consideration within this document.

**Table 1-7: Initial screening of pRamsar sites for marine habitats**

pRamsar site	Distance to the Mona Offshore Wind Project (km)	Marine habitats mentioned within the Information Sheets	Connectivity been site and the Mona Offshore Wind Project
Gob ny Rona, Maughold Head & Port Cornaa	~58km	Rocky marine shore ecosystem including cliffs, maerl, kelp and knotted wrack beds and seagrass beds	No, this site and all associated habitat features are located beyond the 12 km Zol so are screened out for further consideration for all impact pathways.
		Horse mussel beds	
		Saltmarsh	
Southern Coasts & Calf of Man	~48km	Seagrass	No, this site and all associated habitat features are located beyond the 12 km Zol so are screened out for further consideration for all impact pathways.
		Kelp and knotted wrack	
		Mearl	
		Rocky shores	
		Cliffs	
		Sea caves	
		Coastal heath	
		Sandbank	

## MONA OFFSHORE WIND PROJECT

pRamsar site	Distance to the Mona Offshore Wind Project (km)	Marine habitats mentioned within the Information Sheets	Connectivity been site and the Mona Offshore Wind Project
The Ayres	~62km	Shingle, vegetated shingle, dune and cobble coastal ecosystem	No, this site and all associated habitat features are located beyond the 12 km ZOI so are screened out for further consideration for all impact pathways.
		<i>Mytilus edulis</i> beds (mixed with kelp)	
		Maerl bed	
		Horse mussel bed	

### Fish and shellfish

1.4.1.5 As set out in section 1.3.3 of the HRA Stage 1 Screening Report (Document Reference E1.4 F03), the initial stage of screening of European sites designated for fish species is to determine the potential for connectivity with the Mona Offshore Wind Project. The potential for connectivity is determined by the presence/absence of a physical overlap between the pRamsar and the Mona Offshore Wind Project or the zone of influence (100 km) defined to capture migratory fish species which may be affected by indirect impacts such as underwater sound and increased suspended sediment concentrations (SSCs).

1.4.1.6 The outputs of the initial screening are summarised in Table 1-8 which demonstrates that there is potential for connectivity between the Mona Offshore Wind Project and the three pRamsars with fish and shellfish species as features. Fish and shellfish are therefore screened in for further consideration in this document.

**Table 1-8: Initial screening of pRamsar sites for fish and shellfish species**

pRamsar site	Distance to the Mona Offshore Wind Project (km)	Species mentioned within the Information Sheets	Connectivity been site and the Mona Offshore Wind Project
Gob ny Rona, Maughold Head & Port Cornaa	~58km	Salmon	Yes
		Trout	
Southern Coasts & Calf of Man	~48km	Basking shark	Yes
		Plaice	
		Cray fish <i>Palinurus elephas</i>	
The Ayres	~62km	Herring	Yes
		Salmon	
		Sea trout	

### Marine mammals

1.4.1.7 As set out in section 1.3.3 of the HRA Stage 1 Screening Report (Document Reference E1.4 F03), the initial stage of screening of European sites designated for marine mammal species is to determine the potential for connectivity with the Mona Offshore Wind Project. The potential for connectivity is determined by the presence/absence of a physical overlap between the pRamsar and the Mona Offshore Wind Project or an

## MONA OFFSHORE WIND PROJECT

overlap between the Mona Offshore Wind Project and Inter-agency Marine Mammal Working Group management units (MU) for marine mammals.

- 1.4.1.8 The outputs of the initial screening are summarised in Table 1-9 which demonstrates that there is potential for connectivity between the Mona Offshore Wind Project and two pRamsars with marine mammal species as features (i.e. Gob ny Rona, Maughold Head & Port Cornaa pRamsar and Southern Coasts & Calf of Man pRamsar). Marine mammals are therefore screened in for further consideration in this document.

**Table 1-9: Initial screening of pRamsar sites for marine mammal species**

pRamsar site	Distance to the Mona Offshore Wind Project (km)	Species mentioned within the Information Sheets	Connectivity been site and the Mona Offshore Wind Project
Gob ny Rona, Maughold Head & Port Cornaa	~58km	Grey seal	Yes
Southern Coasts & Calf of Man	~48km	Grey seal	Yes
The Ayres	~62km	None	N/A (as there are no marine mammal features mentioned for this site)

### 1.4.2 Assessment of LSE

#### Offshore ornithology

- 1.4.2.1 The next step within the HRA Stage 1 Screening Report (Document Reference E1.4 F03) was to look at the potential impact on these sites and species to determine if an LSE could be excluded. As set out in paragraph 1.4.6.30 of the HRA Stage 1 Screening Report (Document Reference E1.4 F03) following the apportioning of birds to specific sites, if the predicted mortality is more than 0.0 birds (i.e. an annual figure of 0.2 mortalities would not be rounded down to 0, but 0.04 annual mortalities would be) then that pRamsar has been screened in for further assessment (section 1.5). Any apportioning impact less than 0.0 annual mortalities has not been screened in, on the basis that the magnitude of the impact is too low for there to be any risk of LSE either alone or in-combination.
- 1.4.2.2 Within section 1.4.6 (assessment of LSE for offshore ornithological features) of the HRA Stage 1 Screening Report (Document Reference E1.4 F03), six impact pathways were considered. Only two pathways can occur over a spatial scale by which Isle of Man pRamsar sites could be impacted. These are 'Disturbance and displacement from airborne sound and presence of vessels and infrastructure' and 'collision risk'. Therefore, the Applicant has focussed on these two impact pathways (collisions and displacement) which can occur over a large distance due to the connectivity with breeding and/or migratory seabirds.
- 1.4.2.3 Within Volume 6, Annex 5.5: Offshore Ornithology Apportioning Technical Report (Document Reference F6.5.5 F03), the MNR, which overlaps the pRamsar sites, were included within the apportioning calculations. As part of this apportioning exercise, the Applicant amalgamated colony counts from the Seabird Monitoring Programme (SMP) which fell within a specific boundary of a designated site. Volume 6, Annex 5.5: Offshore Ornithology Apportioning Technical Report (Document Reference F6.5.5 F03) provided a predicted proportion of how many of a certain species may originate

## MONA OFFSHORE WIND PROJECT

from a single colony. In hypothetical terms, if 1000 birds were recorded during a site-specific survey, all 1000 birds would not originate from the same colony; they would originate from multiple colonies. The apportioning method allows an estimation of the proportion of the 1000 birds from each colony, which accounts for the colony size and distance between the colonies, as well as a number of other parameters. Apportioning uses the latest population estimates (which the pRamsar sites do not have), and therefore, the Applicant has presumed that the apportioning values for the MNRs which overlap the pRamsar sites are representative of the pRamsar site population currently. Therefore, the apportioning value for the MNR which overlaps the pRamsar site being assessed has been used within the assessment of impact within this document.

1.4.2.4 There is no Isle of Man guidance on displacement and mortality rates or species-group or species-specific avoidance rates, therefore for this screening exercise, the Applicant has presented the species-group avoidance rate and the single point estimate for displacement impact in line with the Applicant's Approach from Stage 2 Information to Support an Appropriate Assessment Part Three: Special Protection Areas and Ramsar sites Assessments (Document Reference E1.3 F03). The Applicant has also provided matrix tables showing predicted impacts based on 1-100% displacement and mortality rates to allow any interested party to identify the predicted impact for their preferred rates.

**Table 1-10: Impacts apportioned to the pRamsar sites.**

pRamsar site	Species mentioned within the Information Sheets	Apportioning value (site used within Volume 6, Annex 5.5: Offshore Ornithology Apportioning Technical Report (REP2-022))	Breeding season predicted impact (non-breeding screened out)	Taken through to HRA Stage 2 (>0.0 birds impacted)
Gob ny Rona, Maughold Head & Port Cornaa	Atlantic puffin	No record of breeding since 1999.	N/A	No, LSE can be ruled out.
	Black-legged kittiwake	0.5% (Ramsey Bay MNR)	0.1 – collisions only 0.1 – displacement and collisions	Yes, a LSE cannot be ruled out and therefore this site and species are taken through to HRA Stage 2 (section 1.5).
	Common guillemot	0.6% (Ramsey Bay MNR)	0.1	Yes, a LSE cannot be ruled out and therefore this site and species are taken through to HRA Stage 2 (section 1.5).
	Great black-backed gull	0.8% (Ramsey Bay MNR)	0.0	No, LSE can be ruled out.
	Herring gull	0.8% (Ramsey Bay MNR)	0.0	No, LSE can be ruled out.
	Lesser black-backed gull	<0.1%. Not included in apportioning report.	0.0	No, LSE can be ruled out.
	Northern fulmar	Not included in apportioning report. Annual impact was two birds un-apportioned.	N/A	No, LSE can be ruled out.



## MONA OFFSHORE WIND PROJECT

pRamsar site	Species mentioned within the Information Sheets	Apportioning value (site used within Volume 6, Annex 5.5: Offshore Ornithology Apportioning Technical Report (REP2-022))	Breeding season predicted impact (non-breeding screened out)	Taken through to HRA Stage 2 (>0.0 birds impacted)
	Razorbill	0.5% (Ramsey Bay MNR)	0.0	No, LSE can be ruled out.
Southern Coasts & Calf of Man	Atlantic puffin	No record of breeding since 1999.	N/A	No, LSE can be ruled out.
	Black-legged kittiwake	4.3% (Calf and Wart Bank MNR and Baie ny Carrickey MNR)	0.6 – collisions only 0.8 – displacement and collisions	Yes, a LSE cannot be ruled out and therefore this site and species are taken through to HRA Stage 2 (section 1.5).
	Common guillemot	5.7% (Calf and Wart Bank MNR and Baie ny Carrickey MNR)	1.0	Yes, a LSE cannot be ruled out and therefore this site and species are taken through to HRA Stage 2 (section 1.5).
	Great black-backed gull	6.1% (Calf and Wart Bank MNR, Baie ny Carrickey MNR, Port Erin Bay MNR, Niarbyl Bay MNR and Langness MNR)	0.1	Yes, a LSE cannot be ruled out and therefore this site and species are taken through to HRA Stage 2 (section 1.5).
	Herring gull	2.9% (Calf and Wart Bank MNR, Baie ny Carrickey MNR and Port Erin Bay MNR)	0.0	No, LSE can be ruled out.
	Lesser black-backed gull	0.2% (Calf and Wart Bank MNR)	0.0	No, LSE can be ruled out.
	Manx shearwater	1.1% (Calf and Wart Bank MNR)	0.1	Yes, a LSE cannot be ruled out and therefore this site and species are taken through to HRA Stage 2 (section 1.5).
	Northern fulmar	Not included in apportioning report. Annual impact was two birds un-apportioned.	N/A	No, LSE can be ruled out.
	Razorbill	6.5% (Calf and Wart Bank MNR, Baie ny Carrickey MNR, Port Erin Bay MNR, Niarbyl Bay MNR and Langness MNR)	0.0	No, LSE can be ruled out.
The Ayres	Herring gull	1.4% (West Coast MNR)	0.0	No, LSE can be ruled out.

## MONA OFFSHORE WIND PROJECT

pRamsar site	Species mentioned within the Information Sheets	Apportioning value (site used within Volume 6, Annex 5.5: Offshore Ornithology Apportioning Technical Report (REP2-022))	Breeding season predicted impact (non-breeding screened out)	Taken through to HRA Stage 2 (>0.0 birds impacted)
	Great black-backed gull	1.8% (West Coast MNR)	0.0	No, LSE can be ruled out.
	Lesser black-backed gull	<0.1%. Not included in apportioning report.	0.0	No, LSE can be ruled out.
	Northern gannet	The Information Sheets states northern gannet forage offshore. They are therefore from other sites not The Ayres pRamsar site. The HRA Stage 1 Screening Report (REP2-012) identifies which designated sites with gannet are features are included in the assessment and therefore the species is fully assessed already.		No, LSE can be ruled out.

1.4.2.5 As neither herring gull, great black-backed gull, lesser black-backed gull or northern gannet is predicted to be impacted by more than 0.0 birds, the Ayres pRamsar site is no longer considered within this document for offshore ornithology as there is no potential for an LSE to occur.

### Fish and shellfish

1.4.2.6 As noted in paragraph 1.4.2.1, the next step within the HRA Stage 1 Screening Report (Document Reference E1.4 F03) was to examine the potential impact of the Mona Offshore Wind Project on the pRamsars and fish/shellfish species to determine if an LSE can be excluded.

1.4.2.7 Table 1-11 provides the results of the screening of impact pathways which have the potential to result in an LSE on the pRamsar sites with fish and shellfish features (identified in section 1.3).

1.4.2.8 Table 1-11 concludes that LSE cannot be ruled out for the 'underwater sound impacting fish and shellfish receptors' impact pathway and the 'electromagnetic field (EMF) from subsea electrical cabling' impact pathway only.

## MONA OFFSHORE WIND PROJECT

**Table 1-11: Assessment of LSE for pRamsar sites for fish and shellfish species**

pRamsar site	Distance to the Mona Offshore Wind Project (km)	Species mentioned within the Information Sheets	Impact pathways	Taken through to HRA Stage 2	Justification
Gob ny Rona, Maughold Head & Port Cornaa	~58km	All fish features	Temporary habitat loss/disturbance Increases in SSC and sediment deposition Long-term habitat loss Introduction of artificial structures and colonisation Disturbance/remobilisation of sediment bound contaminants Accidental pollution	No	Impact pathways screened out based on the justifications provided for diadromous fish in section 1.4.4 of the HRA Stage 1 Screening Report (REP2-012).
		Salmon	Underwater sound impacting fish and shellfish receptors	Yes	As outlined in paragraphs 1.4.4.16 and 1.4.4.32 of the HRA Stage 1 Screening Report (Document Reference E1.4 F03), there is potential for migratory species such as salmon to be present within, or transiting through, the Mona Array Area and potential zone of impact from underwater sound. There is therefore the potential for LSE during the construction and decommissioning phases.
			EMF from subsea electrical cabling	Yes	As outlined in paragraph 1.4.4.27 of the HRA Stage 1 Screening Report (Document Reference E1.4 F03), EMF emitted from subsea electrical cabling has the potential to interfere with the navigation of migratory fish, such as salmon, that may be present within or transiting through the Mona Array Area. There is, therefore, the potential for LSE during the operation and maintenance phase.
		Trout	Underwater sound impacting fish and shellfish receptors	Yes	As outlined in section 3.9.3 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02), there is potential for trout to be present within, or transiting through, the Mona Array Area and potential zone of impact from underwater sound. There is, therefore, the potential for LSE during the construction and decommissioning phases.

## MONA OFFSHORE WIND PROJECT

pRamsar site	Distance to the Mona Offshore Wind Project (km)	Species mentioned within the Information Sheets	Impact pathways	Taken through to HRA Stage 2	Justification
			EMF from subsea electrical cabling	Yes	As outlined in section 3.9.6 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02), EMF emitted from subsea electrical cabling has the potential to interfere with the navigation of migratory fish, such as trout, that may be present within or transiting through the Mona Array Area. There is, therefore, the potential for LSE during the operation and maintenance phase.
Southern Coasts & Calf of Man	~48km	All fish and shellfish features	Temporary habitat loss/disturbance Increases in SSC and sediment deposition Long-term habitat loss Introduction of artificial structures and colonisation Disturbance/remobilisation of sediment bound contaminants Accidental pollution	No	Impact pathways screened out based on the justifications provided for diadromous fish in section 1.4.4 of the HRA Stage 1 Screening Report (Document Reference E1.4 F03).
			Injury due to increased risk of collision with vessels	No	For the reasons outlined in paragraphs 1.4.5.32 to 1.4.5.37 of the HRA Stage 1 Screening Report (Document Reference E1.4 F03), the risk of collision events for basking shark is low and this impact pathway is screened out.
			Underwater sound impacting fish and shellfish receptors	Yes	As outlined in section 3.9.3 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02), there is potential for basking shark to be present within, or transiting through, the Mona Array Area and potential zone of impact from underwater sound. There is, therefore, the potential for LSE during the construction and decommissioning phases.
			EMF from subsea electrical cabling	Yes	As outlined in section 3.9.6 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02), EMF emitted from subsea electrical cabling has the potential to interfere with the navigation of migratory fish, such as basking shark, that may be present within or transiting through the Mona Array Area. There is, therefore, the potential for LSE during the operation and maintenance phase.

## MONA OFFSHORE WIND PROJECT

pRamsar site	Distance to the Mona Offshore Wind Project (km)	Species mentioned within the Information Sheets	Impact pathways	Taken through to HRA Stage 2	Justification
		Plaice	Underwater sound impacting fish and shellfish receptors	Yes	As outlined in section 3.9.3 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02), there is the potential for plaice to be present within the Mona Array Area and potential zone of impact from underwater sound. There is therefore the potential for LSE during the construction and decommissioning phases.
			EMF from subsea electrical cabling	Yes	As outlined in section 3.9.6 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02), there is potential for plaice to be present within the Mona Array Area. There is, therefore, the potential for LSE during the operation and maintenance phase.
		Cray fish	Underwater sound impacting fish and shellfish receptors	No	Cray fish show high site fidelity (Gibson-Hall <i>et al.</i> , 2020) and so features of this pRamsar are unlikely to be present within the Mona Array Area and potential zone of impact from underwater sound. This impact pathway is screened out.
			EMF from subsea electrical cabling	No	Cray fish show high site fidelity (Gibson-Hall <i>et al.</i> , 2020) and so features of this pRamsar are unlikely to be present within the Mona Array Area. This impact pathway is screened out.
The Ayres	~62km	All fish features	Temporary habitat loss/disturbance Increases in SSC and sediment deposition Long-term habitat loss Introduction of artificial structures and colonisation Disturbance/remobilisation of sediment bound contaminants Accidental pollution	No	Impact pathways screened out based on the justifications provided for diadromous fish in section 1.4.4 of the HRA Stage 1 Screening Report (Document Reference E1.4 F03).

## MONA OFFSHORE WIND PROJECT

pRamsar site	Distance to the Mona Offshore Wind Project (km)	Species mentioned within the Information Sheets	Impact pathways	Taken through to HRA Stage 2	Justification
		Herring	Underwater sound impacting fish and shellfish receptors	Yes	As outlined in section 3.9.3 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02), there is potential for herring to be present within or transiting through the Mona Array Area and potential zone of impact from underwater sound. There is, therefore, the potential for LSE during the construction and decommissioning phases.
			EMF from subsea electrical cabling	No	As a pelagic species, herring generally swim well above the seafloor and can be expected to rarely be exposed to the EMF at the lowest levels from AC undersea power cables buried in the seafloor. This impact pathway is screened out.
		Salmon	Underwater sound impacting fish and shellfish receptors	Yes	As outlined in paragraphs 1.4.4.16 and 1.4.4.32 of HRA Stage 1 Screening Report (Document Reference E1.4 F03), there is potential for migratory species such as salmon to be present within, or transiting through, the Mona Array Area and potential zone of impact from underwater sound. There is, therefore, the potential for LSE during the construction and decommissioning phases.
			EMF from subsea electrical cabling	Yes	As outlined in paragraph 1.4.4.27 of the HRA Stage 1 Screening Report (Document Reference E1.4 F03), EMF emitted from subsea electrical cabling has the potential to interfere with the navigation of migratory fish, such as salmon, that may be present within or transiting through the Mona Array Area. There is, therefore, the potential for LSE during the operation and maintenance phase.
		Trout	Underwater sound impacting fish and shellfish receptors	Yes	As outlined in section 3.9.3 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02), there is potential for trout to be present within, or transiting through, the Mona Array Area and potential zone of impact from underwater sound. There is, therefore, the potential for LSE during the construction and decommissioning phases.



## MONA OFFSHORE WIND PROJECT

pRamsar site	Distance to the Mona Offshore Wind Project (km)	Species mentioned within the Information Sheets	Impact pathways	Taken through to HRA Stage 2	Justification
			EMF from subsea electrical cabling	Yes	As outlined in section 3.9.6 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02), EMF emitted from subsea electrical cabling has the potential to interfere with the navigation of migratory fish, such as trout, that may be present within or transiting through the Mona Array Area. There is, therefore, the potential for LSE during the operation and maintenance phase.

### **Marine mammals**

- 1.4.2.9 As noted in paragraph 1.4.2.1, the next step within the HRA Stage 1 Screening (Document Reference E1.4 F03) was to examine the potential impact on these sites and species to determine if an LSE could be excluded.
- 1.4.2.10 Table 1-12 provides the result of the screening of impact pathways, which have the potential to result in an LSE on the pRamsar sites with marine mammal features (identified in section 1.3).
- 1.4.2.11 Table 1-12 concludes that LSE cannot be ruled out for the following four impact pathways: 'underwater sound from piling', 'underwater sound from clearance of unexploded ordnance (UXO)<sup>2</sup>', 'underwater sound during site investigation surveys' and 'underwater sound due to vessel use and other activities'.

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<sup>2</sup> In response to concerns raised by the statutory nature conservation bodies (SNCBs) during examination, the Applicant has committed to the use of low order UXO clearance only through the DCO. High order UXO clearance will not be authorised under the DCO or the NRW Marine Licence (ML). This is reflected in the updated drafting of the deemed marine licence in Schedule 14, Condition 21 in the draft DCO (REP5-006), and for clarity, the Marine Licence Principles Document (REP5-022) has been updated to remove high order UXO clearance from the NRW marine licence application. Low order clearance only will be authorised and this commitment has been included in reference numbers 33 and 111 of the Mitigation and Monitoring Schedule (J10 F07).

## MONA OFFSHORE WIND PROJECT

**Table 1-12: Initial screening of pRamsar sites for marine mammal species**

pRamsar site	Distance to the Mona Offshore Wind Project (km)	Species mentioned within the Information Sheets	Impact pathways	Taken through to HRA Stage 2	Justification
Gob ny Rona, Maughold Head & Port Cornaa	~58km	Grey seal	Accidental pollution EMF Underwater sound from wind turbine operation Change in water clarity Changes in prey availability Vessel collision risk	No	For the reasons outlined in section 1.4.5 of the HRA Stage 1 Screening (Document Reference E1.4 F03), these impact pathways are screened out of further consideration.
			Underwater sound from piling	Yes	As outlined in paragraphs 1.4.5.4 to 1.4.5.15 of the HRA Stage 1 Screening Report (Document Reference E1.4 F03), there is potential for grey seal to be present within, or transiting through, the Mona Array Area and potential zone of impact from underwater sound. There is, therefore, the potential for LSE during the construction phase.
			Underwater sound from clearance of UXO <sup>2</sup>	Yes	
			Underwater sound during site investigation surveys	Yes	
			Underwater sound due to vessel use and other activities	Yes	As outlined in paragraphs 1.4.5.16 to 1.4.5.18 and paragraph 1.4.5.31 of the HRA Stage 1 Screening Report (Document Reference E1.4 F03), there is potential for grey seal to be present within, or transiting through, the Mona Array Area and potential zone of impact from underwater sound from vessels. There is, therefore, the potential for LSE across all phases of the Mona Offshore Wind Farm.
Southern Coasts & Calf of Man	~48km	Grey seal	Accidental pollution; EMF Underwater sound from wind turbine operation Change in water clarity Changes in prey availability Vessel collision risk	No	For the reasons outlined in section 1.4.5 of the HRA Stage 1 Screening (Document Reference E1.4 F03), these impact pathways are screened out of further consideration.

## MONA OFFSHORE WIND PROJECT

pRamsar site	Distance to the Mona Offshore Wind Project (km)	Species mentioned within the Information Sheets	Impact pathways	Taken through to HRA Stage 2	Justification
			Underwater sound from piling	Yes	As outlined in paragraphs 1.4.5.4 to 1.4.5.15 of the HRA Stage 1 Screening Report (Document Reference E1.4 F03), there is potential for grey seal to be present within, or transiting through, the Mona Array Area and potential zone of impact from underwater sound. There is, therefore, the potential for LSE during the construction phase.
			Underwater sound from clearance of UXO <sup>2</sup>	Yes	
			Underwater sound during site investigation surveys	Yes	
			Underwater sound due to vessel use and other activities	Yes	As outlined in paragraphs 1.4.5.16 to 1.4.5.18 and paragraph 1.4.5.31 of the HRA Stage 1 Screening Report (Document Reference E1.4 F03), there is potential for grey seal to be present within, or transiting through, the Mona Array Area and potential zone of impact from underwater sound from vessels. There is, therefore, the potential for LSE across all phases of the Mona Offshore Wind Farm.

## 1.5 HRA Stage 2 – Appropriate Assessment

### 1.5.1 Gob ny Rona, Maughold Head & Port Cornaa

#### Mona Offshore Wind Project alone assessment

##### **Offshore ornithology**

- 1.5.1.1 The integrity test: Step 1 for the Gob ny Rona, Maughold Head & Port Cornaa pRamsar site is presented in Table 1-13 for the Mona Offshore Wind Project alone. Where a predicted impact increases the baseline mortality by <1%, a conclusion of no adverse effect can be predicted due to the impact being of a scale which is within the natural fluctuations of a population.
- 1.5.1.2 Where the impact is >0.05% increase in baseline mortality from the Mona Offshore Wind Project alone, an in-combination assessment has been presented in section 1.5.4.
- 1.5.1.3 The Applicant has used the colony counts available from the SMP, which is available online (SMP, 2024). The baseline mortality rates are taken from Horswill and Robinson (2015).

## MONA OFFSHORE WIND PROJECT

**Table 1-13: Integrity test: Step 1 for the Gob ny Rona, Maughold Head & Port Cornaa pRamsar site from the Mona Offshore Wind Project acting alone.**

Species included on the Information Sheet	Predicted mortalities (adult birds)	Latest bird population and baseline mortality	% increase in baseline mortality	Conclusion
Black-legged kittiwake	0.1 – collisions only (99.28% avoidance rate)	156 individuals 23 baseline mortality	0.34%	No risk of an adverse effect on integrity (AEoI) of the Gob ny Rona, Maughold Head & Port Cornaa pRamsar site from the Mona Offshore Wind Project alone when considering collisions as the impact is <1% increase in baseline mortality. Due to the increase in baseline mortality being >0.05%, an in-combination assessment has been undertaken (section 1.5.4).
	0.1 – displacement and collisions		0.42%	No risk of an AEoI of the Gob ny Rona, Maughold Head & Port Cornaa pRamsar site from the Mona Offshore Wind Project alone when considering the a rate of displacement (50%) and mortality (1%) plus collisions as the impact is <1% increase in baseline mortality. Due to the increase in baseline mortality being >0.05%, an in-combination assessment has been undertaken (section 1.5.4).
Common guillemot	0.1 - displacement only	631 individuals 38 baseline mortality	0.31%	No risk of an AEoI of the Gob ny Rona, Maughold Head & Port Cornaa pRamsar site from the Mona Offshore Wind Project alone when considering the a rate of displacement (50%) and mortality (1%) as the impact is <1% increase in baseline mortality. Due to the increase in baseline mortality being >0.05%, an in-combination assessment has been undertaken (section 1.5.4).



## MONA OFFSHORE WIND PROJECT

### Fish

- 1.5.1.4 Section 1.4 identified the potential for LSEs on the salmon and trout features of the Gob ny Rona, Maughold Head & Port Cornaa pRamsar as a result of underwater sound and EMFs from subsea cabling.
- 1.5.1.5 This section presents the Stage 2 appropriate assessment for the fish features of this site. Table 1-14 highlights the relevant evidence from the EIA and HRA which has been used to inform an appropriate assessment for the pRamsar site.

**Table 1-14: Information to inform an appropriate assessment for the fish features of the Gob ny Rona, Maughold Head & Port Cornaa pRamsar site from the Mona Offshore Wind Project alone**

Species included on the Information Sheet	Conclusion
Salmon	<p><u>Underwater sound impacting fish and shellfish receptors:</u> the HRA Stage 2 Information to Support an Appropriate Assessment (ISAA), Part Two: SACs Assessments (Document Reference E1.2 F02) concluded that for European sites with salmon as a feature there was no risk of an AEol (AEol) as a result of underwater sound impacting salmon (see section 1.6.3, paragraph 1.6.3.2 to 1.6.3.80).</p> <p><u>EMF from subsea electrical cabling:</u> the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02) also concluded that for European sites with salmon as a feature, there was no risk of an AEol as a result of EMF from subsea electrical cabling (see section 1.6.3, paragraph 1.6.3.81 to 1.6.3.133).</p> <p><b>Conclusion:</b> Based on the evidence presented in the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02), it is concluded that there is no AEol of Gob ny Rona, Maughold Head &amp; Port Cornaa pRamsar site as a result of the Mona Offshore Wind Project alone.</p>
Trout	<p><u>Underwater sound impacting fish and shellfish receptors:</u> no significant effects were identified in section 3.9.3 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference E1.2 F02) in relation to underwater sound impacting fish. On the basis of the evidence presented therein, it is concluded that there will be no AEol of the pRamsar as a result of underwater sound impacting trout.</p> <p><u>EMF from subsea electrical cabling:</u> no significant effects were identified in section 3.9.6 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference E1.2 F02) in relation to EMF from subsea electrical cables. On the basis of the evidence presented therein, it is concluded that there will be no AEol of the pRamsar as a result of EMF impacting trout.</p> <p><b>Conclusion:</b> Based on the evidence presented in Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference E1.2 F02), with no significant effects being identified for either of the impact pathways screened in (section 1.4), it is concluded that there is no AEol of Gob ny Rona, Maughold Head &amp; Port Cornaa pRamsar site as a result of the Mona Offshore Wind Project alone.</p>

### Marine mammals

- 1.5.1.6 Th Section 1.4 identified the potential for LSEs on the grey seal feature of the Gob ny Rona, Maughold Head & Port Cornaa pRamsar as a result of underwater sound.
- 1.5.1.7 This section presents the Stage 2 assessments for the grey seal feature of this site. Table 1-15 highlights the relevant evidence from the EIA and HRA which has been used to inform an appropriate assessment for the pRamsar site.

## MONA OFFSHORE WIND PROJECT

**Table 1-15: Information to inform an appropriate assessment for the marine mammal feature of the Gob ny Rona, Maughold Head & Port Cornaa pRamsar site from the Mona Offshore Wind Project alone**

Species included on the Information Sheet	Conclusion
Grey seal	<p><u>Underwater sound:</u> the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02) concluded that for European sites with grey seal as a feature, there was no risk of an AEol AEol(see section 1.7.3) as a result of the following impacts:</p> <ul style="list-style-type: none"> <li>• Injury and disturbance from underwater sound generated during piling (paragraphs 1.7.3.2 to 1.7.3.111 of the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02));</li> <li>• Injury and disturbance from underwater sound generation from UXO detonation<sup>2</sup> (paragraphs 1.7.3.112 to 1.7.3.183 of the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02)) and noting that impacts will be reduced from that presented in the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02)) as high order UXO clearance has been removed;</li> <li>• Injury and disturbance from underwater sound from pre-construction site investigation surveys (paragraphs 1.7.3.204 to 1.7.3.266 of the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02)); and</li> <li>• Injury and disturbance to marine mammals from elevated underwater sound due to vessel use and other (non-piling) activities (paragraphs 1.7.3.291 to 1.7.3.369 and paragraphs 1.7.3.394 to 1.7.3.443 of the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02)).</li> </ul> <p><b>Conclusion:</b> Based on the evidence presented in the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02), it is concluded that there is no AEol of the Gob ny Rona, Maughold Head &amp; Port Cornaa pRamsar site as a result of the Mona Offshore Wind Project alone.</p>

### In-combination assessment

#### Offshore ornithology

1.5.1.8 Please see section 1.5.4 below.

#### Fish

1.5.1.9 Where the potential for LSE has been concluded for the Mona Offshore Wind Project alone, the potential for LSE has also been concluded in-combination. For effects discounted for LSE alone, there is either no pathway to effect, or the Mona Offshore Wind Project would result in only negligible or inconsequential effects that would not contribute (even collectively) materially to in-combination effects and therefore, no additional in-combination effects are identified (see Table 1-14).

1.5.1.10 The other developments (projects/plans) that could result in in-combination effects associated with the Mona Offshore Wind Project on fish features of the Gob ny Rona, Maughold Head & Port Cornaa pRamsar site have been summarised in Table 1.58 and shown in Figure 1.13 in the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02).

1.5.1.11 Table 1-16 highlights the relevant evidence as presented in the EIA and HRA which has been used to inform an appropriate assessment for the pRamsar site for Mona Offshore Wind Project in-combination with other plans/projects.

**Table 1-16: Information to inform an appropriate assessment for the fish features of the Gob ny Rona, Maughold Head & Port Cornaa pRamsar site from the Mona Offshore Wind Project in-combination with other plans and projects**

Species included on the Information Sheet	Conclusion
Salmon	<p><u>Underwater sound impacting fish and shellfish receptors:</u> the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02 ) concluded that for European sites with salmon as a feature, there was no risk of an AEol as a result of underwater sound effects on fish associated with the Mona Offshore Wind Project in-combination with other plans and projects (see section 1.6.4, paragraph 1.6.4.5 to 1.6.4.42).</p> <p><u>EMF from subsea electrical cabling:</u> the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02) also concluded that for European sites with salmon as a feature, there was no AEol as a result of EMF from subsea electrical cabling in-combination with other plans and projects (see section 1.6.4, paragraph 1.6.4.43 to 1.6.4.81).</p> <p><b>Conclusion:</b> Based on the evidence presented in the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02), it is concluded that there is no AEol the Gob ny Rona, Maughold Head &amp; Port Cornaa pRamsar site as a result of the Mona Offshore Wind Project in-combination with other plans and projects.</p>
Trout	<p><u>Underwater sound impacting fish and shellfish receptors:</u> no significant effects were identified in section 3.11.3 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference E1.2 F02) in relation to cumulative underwater sound impacting on fish and shellfish receptors. On the basis of the evidence presented therein, it is concluded that there will be no AEol of the pRamsar as a result of in-combination underwater sound impacting trout.</p> <p><u>EMF from subsea electrical cabling:</u> no significant effects were identified in section 3.11.6 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference E1.2 F02) in relation to cumulative EMF effects from subsea electrical cabling. On the basis of the evidence presented therein, it is concluded that there will be no AEol of the pRamsar as a result of in-combination EMF impacting trout.</p> <p><b>Conclusion:</b> Based on the evidence presented in Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference E1.2 F02), with no significant effects being identified for either of the impact pathways screened in (section 1.4), it is concluded that there is no AEol of the Gob ny Rona, Maughold Head &amp; Port Cornaa pRamsar site as a result of the Mona Offshore Wind Project acting in-combination with other plans and projects.</p>

## Marine mammals

- 1.5.1.12 Where the potential for LSE has been concluded alone, the potential for LSE has also been concluded in-combination. For effects discounted for LSE alone, there is either no pathway to effect or the Mona Offshore Wind Project would result in only negligible or inconsequential effects that would not contribute (even collectively) materially to in-combination effects and therefore, no additional in-combination effects are identified (see Table 1-14).
- 1.5.1.13 The other developments (projects and plans) that could result in in-combination effects associated with the Mona Offshore Wind Project on marine mammal features of the Gob ny Rona, Maughold Head & Port Cornaa pRamsar site have been summarised in Table 1.154 and are shown in Figure 1.21 in the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02).

## MONA OFFSHORE WIND PROJECT

- 1.5.1.14 Table 1-17 highlights the relevant evidence as presented in the EIA and HRA which has been used to inform an appropriate assessment for the pRamsar site for Mona Offshore Wind Project in-combination with other plans and projects.

**Table 1-17: Information to inform an appropriate assessment for the marine mammal feature of the Gob ny Rona, Maughold Head & Port Cornaa pRamsar site from the Mona Offshore Wind Project in-combination with other plans and projects**

Species included on the Information Sheet	Conclusion
Grey seal	<p><u>Underwater sound:</u> the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02) concluded that for sites with grey seal as a feature, there was no AEol as a result of the Mona Offshore Wind Project acting in-combination with other plans and projects (see section 1.7.4), for the following in-combination impact pathways:</p> <ul style="list-style-type: none"> <li>• Injury and disturbance from underwater sound generated during piling (paragraphs 1.7.4.5 to 1.7.4.91 of the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02));</li> <li>• Injury and disturbance from underwater sound generation from UXO detonation<sup>2</sup> (paragraph 1.7.4.112 to 1.7.3.179 of the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02)) and noting that impacts will be reduced from that presented in the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02)) as high order UXO clearance has been removed;</li> <li>• Injury and disturbance from underwater sound from pre-construction site investigation surveys (paragraph 1.7.4.200 to 1.7.4.246 of the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02)); and</li> <li>• Injury and disturbance to marine mammals from elevated underwater sound due to vessel use and other (non-piling) activities (paragraph 1.7.4.271 to 1.7.4.327 of the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02)).</li> </ul> <p><b><u>Conclusion:</u></b> Based on the evidence presented in the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02) it is concluded that there is no AEol of the Gob ny Rona, Maughold Head &amp; Port Cornaa pRamsar site as a result of the Mona Offshore Wind Project acting alone-combination with other plans and projects</p>

## 1.5.2 Southern Coasts & Calf of Man

### Mona Offshore Wind Project alone assessment

#### Offshore Ornithology

- 1.5.2.1 The integrity test: Step 1 for the Southern Coasts & Calf of Man pRamsar site is presented in Table 1-18 for the Mona Offshore Wind Project alone. When a predicted impact increases the baseline mortality by <1%, a conclusion of no adverse effect can be predicted due to the impact being of a scale which is within the natural fluctuations of a population.
- 1.5.2.2 Where the impact is >0.05% increase in baseline mortality from the Mona Offshore Wind Project alone, an in-combination assessment has been presented in section 1.5.4.
- 1.5.2.3 The Applicant has used the colony counts available from the SMP, which is available online (SMP, 2024). The baseline mortality rates are taken from Horswill and Robinson (2015).

## MONA OFFSHORE WIND PROJECT

**Table 1-18: Integrity test: Step 1 for the Southern Coasts & Calf of Man pRamsar site from the Mona Offshore Wind Project acting alone.**

Species included on the Information Sheet	Predicted mortalities (adult birds)	Latest population and baseline mortality	% increase in baseline mortality	Conclusion
Black-legged kittiwake	0.6 – collisions only (99.28% avoidance rate)	1,214 individuals 165 baseline mortality	0.36%	No risk of an AEol of the Southern Coasts & Calf of Man pRamsar site from the Mona Offshore Wind Project alone from collisions as the impact is <1% increase in baseline mortality. Due to the increase in baseline mortality being >0.05%, an in-combination assessment has been undertaken (section 1.5.4).
	0.8 – displacement and collisions (99.28% avoidance rate)		0.45%	No risk of an AEol of the Southern Coasts & Calf of Man pRamsar site from the Mona Offshore Wind Project alone when considering displacement (50%) and mortality (1%) plus collisions as the impact is <1% increase in baseline mortality. Due to the increase in baseline mortality being >0.05%, an in-combination assessment has been undertaken (section 1.5.4).
Common guillemot	1.1 – displacement only	6,362 individuals 388 baseline mortality	0.29%	No risk of an AEol of the Southern Coasts & Calf of Man pRamsar site from the Mona Offshore Wind Project alone when considering displacement (50%) and mortality (1%) as the impact is <1% increase in baseline mortality. Due to the increase in baseline mortality being >0.05%, an in-combination assessment has been undertaken (section 1.5.4).
Great black-backed gull	0.1 – collisions only (99.39% avoidance rate)	114 individuals 8 baseline mortality	1.07%	Potential for AEol of the Southern Coasts & Calf of Man pRamsar site from the Mona Offshore Wind Project alone when considering the species-group avoidance rate for collision impacts. Due to the increase in baseline mortality being >0.05%, an in-combination assessment has been undertaken (section 1.5.4).
	0.0 – collisions only (99.91% avoidance rate)		0.16%	No risk of an AEol of the Southern Coasts & Calf of Man pRamsar site from the Mona Offshore Wind Project alone as the impact is <1% increase in baseline mortality Due to the increase in baseline mortality being >0.05%, an in-combination assessment has been undertaken (section 1.5.4).
Manx shearwater	0.1- collisions and displacement	1,100 individuals 143 baseline mortality	<0.05%	No risk of an AEol of the Southern Coasts & Calf of Man pRamsar site from the Mona Offshore Wind Project alone and in-combination and as the increase in baseline mortality is <0.05%, an in-combination assessment is not required and a conclusion of no AEol can be concluded.



## MONA OFFSHORE WIND PROJECT

### Fish

- 1.5.2.4 Section 1.4 identified the potential for LSEs on the basking shark and plaice features of the Southern Coasts & Calf of Man pRamsar as a result of underwater sound and EMFs from subsea cabling.
- 1.5.2.5 This section presents the Stage 2 appropriate assessment for the fish features of this site. Table 1-19 highlights the relevant evidence from the EIA which has been used to inform an appropriate assessment for the pRamsar site.

**Table 1-19: Information to inform an appropriate assessment for the fish features of the Southern Coasts & Calf of Man pRamsar site from the Mona Offshore Wind Project alone**

Species included on the Information Sheet	Conclusion
Basking shark	<p><u>Underwater sound impacting fish and shellfish receptors:</u> no significant effects were identified in section 3.9.3 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02) in relation to underwater sound impacting basking shark. On the basis of the evidence presented therein, it is concluded that there will be no AEol of the pRamsar as a result of underwater sound impacting basking shark.</p> <p><u>EMF from subsea electrical cabling:</u> no significant effects were identified in section 3.9.6 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02) in relation to EMF from subsea electrical cables. On the basis of the evidence presented therein, it is concluded that there will be no AEol of the pRamsar as a result of EMF impacting basking shark.</p> <p><b>Conclusion:</b> Based on the evidence presented in Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02), with no significant effects being identified for either of the impact pathways screened in (section 1.4), it is concluded that there is no AEol of the Southern Coasts &amp; Calf of Man pRamsar site as a result of the Mona Offshore Wind Project alone.</p>
Plaice	<p><u>Underwater sound impacting fish and shellfish receptors:</u> no significant effects were identified in section 3.9.3 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02) in relation to underwater sound impacting plaice. On the basis of the evidence presented therein, it is concluded that there will be no AEol of the pRamsar as a result of underwater sound impacting plaice.</p> <p><u>EMF from subsea electrical cabling:</u> no significant effects were identified in section 3.9.6 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02) in relation to EMF from subsea electrical cables. On the basis of the evidence presented therein, it is concluded that there will be no AEol of the pRamsar as a result of EMF impacting plaice.</p> <p><b>Conclusion:</b> Based on the evidence presented in Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02), with no significant effects being identified for either of the impact pathways screened in (section 1.4), it is concluded that there is no AEol of the Southern Coasts &amp; Calf of Man pRamsar site as a result of the Mona Offshore Wind Project alone.</p>

### Marine mammals

- 1.5.2.6 Section 1.4 identified the potential for LSEs on the grey seal feature of the Southern Coasts & Calf of Man pRamsar as a result of underwater sound.
- 1.5.2.7 This section presents the Stage 2 appropriate assessment for the grey seal feature of this site. Table 1-20 highlights the relevant evidence from the EIA and HRA which has been used to inform an appropriate assessment for the pRamsar site.



## MONA OFFSHORE WIND PROJECT

**Table 1-20: Information to inform an appropriate assessment for the marine mammal feature of the Southern Coasts & Calf of Man pRamsar site from the Mona Offshore Wind Project acting alone**

Species included on the Information Sheet	Conclusion
Grey seal	<p><b>Underwater sound:</b> the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02) concluded that for European sites with grey seal as a feature, there was no risk of an AEol (see section 1.7.3) as a result of the following impacts:</p> <ul style="list-style-type: none"> <li>• Injury and disturbance from underwater sound generated during piling (paragraphs 1.7.3.2 to 1.7.3.111 of the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02));</li> <li>• Injury and disturbance from underwater sound generation from UXO detonation<sup>2</sup> (paragraphs 1.7.3.112 to 1.7.3.183 of the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02)) and noting that impacts will be reduced from that presented in the HRA Stage 2 ISAA, Part Two: SACs Assessments (APP-032)) as high order UXO clearance has been removed;</li> <li>• Injury and disturbance from underwater sound from pre-construction site investigation surveys (paragraphs 1.7.3.204 to 1.7.3.266 of the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02)); and</li> <li>• Injury and disturbance to marine mammals from elevated underwater sound due to vessel use and other (non-piling) activities (paragraphs 1.7.3.291 to 1.7.3.369 and paragraphs 1.7.3.394 to 1.7.3.443 of the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02)).</li> </ul> <p><b>Conclusion:</b> Based on the evidence presented in the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02) it is concluded that there is no AEol of the Southern Coasts &amp; Calf of Man pRamsar site as a result of the Mona Offshore Wind Project alone.</p>

### In-combination assessment

#### Offshore ornithology

1.5.2.8 Please see section 1.5.4 below.

#### Fish

1.5.2.9 Where the potential for LSE has been concluded alone, the potential for LSE has also been concluded in-combination. For effects discounted for LSE alone, there is either no pathway to effect, or the Mona Offshore Wind Project would result in only negligible or inconsequential effects that would not contribute (even collectively) materially to in-combination effects and therefore, no additional in-combination effects are identified (see Table 1-19).

1.5.2.10 The other developments (projects/plans) that could result in in-combination effects associated with the Mona Offshore Wind Project on the fish features of the Southern Coasts & Calf of Man pRamsar site have been summarised in Table 1.58 and shown in Figure 1.13 in the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02).

1.5.2.11 Table 1-21 highlights the relevant evidence as presented in the EIA which has been used to inform an appropriate assessment for the pRamsar site for Mona Offshore Wind Project in-combination with other plans and projects.

## MONA OFFSHORE WIND PROJECT

**Table 1-21: Information to inform an appropriate assessment for the fish features of the Southern Coasts & Calf of Man pRamsar site from the Mona Offshore Wind Project acting in-combination with other plans and projects**

Species included on the Information Sheet	Conclusion
Basking shark	<p><u>Underwater sound impacting fish and shellfish receptors:</u> no significant effects were identified in section 3.11.3 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02) in relation to cumulative underwater sound impacting on fish and shellfish receptors. On the basis of the evidence presented therein, it is concluded that there will be no AEol of the pRamsar as a result of in-combination underwater sound impacting basking shark.</p> <p><u>EMF from subsea electrical cabling:</u> no significant effects were identified in section 3.11.6 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02) in relation to cumulative EMF effects from subsea electrical cabling. On the basis of the evidence presented therein, it is concluded that there will be no AEol of the pRamsar as a result of in-combination EMF impacting basking shark.</p> <p><b>Conclusion:</b> Based on the evidence presented in Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02), with no significant effects being identified for either of the impact pathways screened in (section 1.4), it is concluded that there is no AEol of the Southern Coasts &amp; Calf of Man pRamsar site as a result of the Mona Offshore Wind Project in-combination with other plans and projects.</p>
Plaice	<p><u>Underwater sound impacting fish and shellfish receptors:</u> no significant effects were identified in section 3.11.3 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02) in relation to cumulative underwater sound impacting on fish and shellfish receptors. On the basis of the evidence presented therein, it is concluded that there will be no AEol of the pRamsar as a result of in-combination underwater sound impacting plaice.</p> <p><u>EMF from subsea electrical cabling:</u> no significant effects were identified in section 3.11.6 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02) in relation to cumulative EMF effects from subsea electrical cabling. On the basis of the evidence presented therein, it is concluded that there will be no AEol of the pRamsar as a result of in-combination EMF impacting plaice.</p> <p><b>Conclusion:</b> Based on the evidence presented in Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02), with no significant effects being identified for either of the impact pathways screened in (section 1.4), it is concluded that there is no AEol of the Southern Coasts &amp; Calf of Man pRamsar site as a result of the Mona Offshore Wind Project in-combination with other plans and projects.</p>

### Marine mammals

- 1.5.2.12 Where the potential for LSE has been concluded alone, the potential for LSE has also been concluded in-combination. For effects discounted for LSE alone, there is either no pathway to effect or the Mona Offshore Wind Project would result in only negligible or inconsequential effects that would not contribute (even collectively) materially to in-combination effects and therefore, no additional in-combination effects are identified (see Table 1-19).
- 1.5.2.13 The other developments (projects and plans) that could result in in-combination effects associated with the Mona Offshore Wind Project on the marine mammal feature of the Southern Coasts & Calf of Man pRamsar site have been summarised in Table 1.154

## MONA OFFSHORE WIND PROJECT

and are shown in Figure 1.21 in the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02).

- 1.5.2.14 Table 1-22 highlights the relevant evidence as presented in the HRA which has been used to inform an appropriate assessment for the pRamsar site for Mona Offshore Wind Project in-combination with other plans and projects.

**Table 1-22: Information to inform an appropriate assessment for the marine mammal feature of the Southern Coasts & Calf of Man pRamsar site from the Mona Offshore Wind Project acting in-combination with other plans and projects**

Species included on the Information Sheet	Conclusion
Grey seal	<p><u>Underwater sound:</u> the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02) concluded that for sites with grey seal as a feature, there was no AEol as a result of the Mona Offshore Wind Project in-combination with other plans and projects (see section 1.7.4), for the following in-combination impact pathways:</p> <ul style="list-style-type: none"> <li>• Injury and disturbance from underwater sound generated during piling (paragraphs 1.7.4.5 to 1.7.4.91 of the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02));</li> <li>• Injury and disturbance from underwater sound generation from UXO detonation<sup>2</sup> (paragraph 1.7.4.112 to 1.7.3.179 of the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02)) and noting that impacts will be reduced from that presented in the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02)) as high order UXO clearance has been removed;</li> <li>• Injury and disturbance from underwater sound from pre-construction site investigation surveys (paragraph 1.7.4.200 to 1.7.4.246 of the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02)); and</li> <li>• Injury and disturbance to marine mammals from elevated underwater sound due to vessel use and other (non-piling) activities (paragraph 1.7.4.271 to 1.7.4.327 of the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02)).</li> </ul> <p><u>Conclusion:</u> Based on the evidence presented in the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02), it is concluded that there is no AEol of the Southern Coasts &amp; Calf of Man pRamsar site as a result of the Mona Offshore Wind Project in-combination with other plans and projects</p>

### 1.5.3 The Ayres

#### Mona Offshore Wind Project alone assessment

##### Fish

- 1.5.3.1 Section 1.4 identified the potential for LSEs on the herring, salmon and trout features of The Ayres pRamsar site as a result of underwater sound and EMFs from subsea cabling.
- 1.5.3.2 This section presents the Stage 2 appropriate assessments for the fish features of this site. Table 1-23 highlights the relevant evidence from the EIA and HRA which has been used to inform an appropriate assessment for the pRamsar site.

## MONA OFFSHORE WIND PROJECT

**Table 1-23: Information to inform an appropriate assessment for the fish features of The Ayres pRamsar site from the Mona Offshore Wind Project acting alone**

Species included on the Information Sheet	Conclusion
Herring	<p><u>Underwater sound impacting fish and shellfish receptors:</u> no significant effects were identified in section 3.9.3 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02) in relation to underwater sound impacting fish. On the basis of the evidence presented therein, it is concluded that there will be no AEol of the pRamsar as a result of underwater sound impacting herring.</p> <p><u>EMF from subsea electrical cabling:</u> no significant effects were identified in section 3.9.6 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02) in relation to EMF from subsea electrical cables. On the basis of the evidence presented therein, it is concluded that there will be no AEol of the pRamsar as a result of EMF impacting herring.</p> <p><b>Conclusion:</b> Based on the evidence presented in the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02) it is concluded that there is no AEol of The Ayres pRamsar site as a result of the Mona Offshore Wind Project alone.</p>
Salmon	<p><u>Underwater sound impacting fish and shellfish receptors:</u> the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02) concluded that for European sites with salmon as a feature there was no risk of an AEol as a result of underwater sound impacting salmon (see section 1.6.3, paragraph 1.6.3.2 to 1.6.3.80).</p> <p><u>EMF from subsea electrical cabling:</u> the HRA Stage 2 Information to Support an Appropriate Assessment also concluded that for European sites with salmon as a feature there was no risk of an AEol as a result of EMF from subsea electrical cabling (see section 1.6.3, paragraph 1.6.3.81 to 1.6.3.133).</p> <p><b>Conclusion:</b> Based on the evidence presented in the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02), it is concluded that there is no AEol of The Ayres pRamsar site as a result of the Mona Offshore Wind Project alone.</p>
Trout	<p><u>Underwater sound impacting fish and shellfish receptors:</u> no significant effects were identified in section 3.9.3 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02) in relation to underwater sound impacting fish. On the basis of the evidence presented therein, it is concluded that there will be no AEol of the pRamsar as a result of underwater sound impacting trout.</p> <p><u>EMF from subsea electrical cabling:</u> no significant effects were identified in section 3.9.6 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02) in relation to EMF from subsea electrical cables. On the basis of the evidence presented therein, it is concluded that there will be no AEol of the pRamsar as a result of EMF impacting trout.</p> <p><b>Conclusion:</b> Based on the evidence presented in Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02), with no significant effects being identified for either of the impact pathways screened in (section 1.4), it is concluded that there is no AEol of The Ayres pRamsar site as a result of the Mona Offshore Wind Project alone.</p>

### In-combination assessment

#### **Fish**

- 1.5.3.3 Where the potential for LSE has been concluded alone, the potential for LSE has also been concluded in-combination. For effects discounted for LSE alone, there is either no pathway to effect, or the Mona Offshore Wind Project would result in only negligible or inconsequential effects that would not contribute (even collectively) materially to in-

## MONA OFFSHORE WIND PROJECT

combination effects and therefore, no additional in-combination effects are identified (see Table 1-23).

- 1.5.3.4 The other developments (projects/plans) that could result in in-combination effects associated with the Mona Offshore Wind Project on fish features of The Ayres pRamsar site have been summarised in Table 1.58 and shown in Figure 1.13 in the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02).
- 1.5.3.5 Table 1-24 highlights the relevant evidence as presented in the EIA and HRA which has been used to inform an appropriate assessment for the pRamsar site for Mona Offshore Wind Project in-combination with other plans and projects.

**Table 1-24: Information to inform an appropriate assessment for the fish features of The Ayres pRamsar site from the Mona Offshore Wind Project in-combination with other plans and projects**

Species included on the Information Sheet	Conclusion
Herring	<p><u>Underwater sound impacting fish and shellfish receptors:</u> no significant effects were identified in section 3.11.3 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02) in relation to cumulative underwater sound impacting on fish and shellfish receptors. On the basis of the evidence presented therein, it is concluded that there will be no AEol of the pRamsar as a result of in-combination underwater sound impacting herring.</p> <p><u>EMF from subsea electrical cabling:</u> no significant effects were identified in section 3.11.6 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02) in relation to cumulative EMF effects from subsea electrical cabling. On the basis of the evidence presented therein, it is concluded that there will be no AEol of the pRamsar as a result of in-combination EMF impacting herring.</p> <p><b>Conclusion:</b> Based on the evidence presented in Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02), with no significant effects being identified for either of the impact pathways screened in (section 1.4), it is concluded that there is no AEol of The Ayres pRamsar site as a result of the Mona Offshore Wind Project in-combination with other plans and projects.</p>
Salmon	<p><u>Underwater sound impacting fish and shellfish receptors:</u> the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02) concluded that for European sites with salmon as a feature, there was no risk of an AEol as a result of underwater sound effects on fish associated with the Mona Offshore Wind Project acting in-combination with other plans and projects (see section 1.6.4, paragraph 1.6.4.5 to 1.6.4.42).</p> <p><u>EMF from subsea electrical cabling:</u> the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02) also concluded that for European sites with salmon as a feature there was no AEol as a result of EMF from subsea electrical cabling in-combination with other plans and projects (see section 1.6.4, paragraph 1.6.4.43 to 1.6.4.81).</p> <p><b>Conclusion:</b> Based on the evidence presented in the HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference E1.2 F02) it is concluded that there is no AEol of The Ayres pRamsar site as a result of the Mona Offshore Wind Project in-combination with other plans and projects.</p>

## MONA OFFSHORE WIND PROJECT

Species included on the Information Sheet	Conclusion
Trout	<p><u>Underwater sound impacting fish and shellfish receptors:</u> no significant effects were identified in section 3.11.3 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02) in relation to cumulative underwater sound impacting on fish and shellfish receptors. On the basis of the evidence presented therein, it is concluded that there will be no AEol of the pRamsar as a result of in-combination underwater sound impacting trout.</p> <p><u>EMF from subsea electrical cabling:</u> no significant effects were identified in section 3.11.6 of Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02) in relation to cumulative EMF effects from subsea electrical cabling. On the basis of the evidence presented therein, it is concluded that there will be no AEol of the pRamsar as a result of in-combination EMF impacting trout.</p> <p><b>Conclusion:</b> Based on the evidence presented in Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02), with no significant effects being identified for either of the impact pathways screened in (section 1.4), it is concluded that there is no AEol of The Ayres pRamsar site as a result of the Mona Offshore Wind Project in-combination with other plans and projects.</p>

## **1.5.4 In-combination assessments for offshore ornithology**

1.5.4.1 The following species and pRamsar sites require an in-combination assessment due to the impact from the Mona Offshore Wind Project predicted to increase the baseline mortality by >0.05%:

- Black-legged kittiwake annually from:
  - Gob ny Rona, Maughold Head & Port Cornaa pRamsar site
  - Southern Coasts & Calf of Man pRamsar site
- Common guillemot annually from:
  - Gob ny Rona, Maughold Head & Port Cornaa pRamsar site
  - Southern Coasts & Calf of Man pRamsar site
- Great black-backed gull annually from:
  - Southern Coasts & Calf of Man pRamsar site



## Black-legged kittiwake – displacement and collisions combined

### Gob ny Rona, Maughold Head & Port Cornaa pRamsar site

1.5.4.2 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline black-legged kittiwake mortality from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site, an in-combination assessment is presented within Table 1-25 (50% displacement and 1% mortality). A displacement matrix is presented within Table 1-26 and Table 1-27 so that any interested party can calculate the impact and increase in baseline mortality, respectively, using the preferred displacement and mortality rates.

**Table 1-25: In-combination assessment for black-legged kittiwake from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site – when considering 50% displacement and 1% mortality.**

a – During the non-breeding season the age-class proportions are derived from the adult/immature proportion from the Appendix tables of Furness (2015). For black-legged kittiwake, the proportions are 100% of birds are adults in the breeding period (where no site specific data exists – see point d for projects whereby site-specific age-class was reported), 54.33% of birds are adults in the pre-breeding period and 54.74% of birds are adults in the post-breeding season.

b – the apportioning value during the breeding season was taken from project specific documentation

c – the apportioning value during the breeding season has used that of Mona Offshore Wind Project, specifically 0.005.

d – the site-specific age-class proportion for Mona Offshore Wind Project is 95.36% of birds are adults during the breeding season; for Morgan Offshore Wind Project Generation Assets is 58.94% of birds are adults during the breeding season; for Erebus Floating Wind Demo is 100% of birds are adults during the breeding season; for Llŷr Offshore Wind Project is 77.39% of birds are adults during the breeding season.

Project	Un-apportioned abundances (adult birds) <sup>a</sup>			Un-apportioned collision impacts (adult birds) <sup>a</sup>			Apportioning values			Apportioned displacement impact values (50% displacement and 1% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact			
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Annual
Awel y Môr Offshore Wind Farm	162	87	45	8.14	11.66	4.41	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.06	0.00	0.07
Burbo Bank Extension Offshore Wind Farm	27	707	25	0.00	23.04	0.00	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.02	0.00	0.00	0.12	0.00	0.00	0.13	0.00	0.13
Erebus Floating Wind Demo	1	2,022	278	6.66	0.5	13.11	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
TwinHub (Wave Hub Floating Wind Farm)	30	4	103	0.00	9.72	0.00	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.05	0.00	0.05
Llŷr Offshore Wind Project	112	68	1,064	1.4	0.85	11.28	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
Mona Offshore Wind Project	312	692	307	4.65	14.80	4.47	0.0004	0.0050 <sup>b</sup>	0.0003	0.00	0.02	0.00	0.00	0.07	0.00	0.00	0.09	0.00	0.10
Morecambe Offshore Windfarm Generation Assets	41	1,729	940	0.34	16.32	4.65	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.04	0.00	0.00	0.08	0.00	0.00	0.12	0.00	0.12
Morgan Offshore Wind Project Generation Assets	430	298	630	7.39	4.77	10.07	0.0004	0.0240 <sup>b</sup>	0.0003	0.00	0.05	0.00	0.00	0.16	0.00	0.00	0.21	0.00	0.22
Ormonde Wind Farm	12	60	11	0.00	3.27	0.00	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.02	0.00	0.02
Rampion Offshore Wind Farm	451	1,059	122	22.22	70.56	8.43	0.0004	No connectivity	0.0003	0.00	-	0.00	0.01	-	0.00	0.01	-	0.00	0.01
Rampion 2 Offshore Wind Farm	155	5	53	9.04	1	5.32	0.0004	No connectivity	0.0003	0.00	-	0.00	0.00	-	0.00	0.00	-	0.00	0.00
Walney (3 and 4) Extension Offshore Wind Farm	797	319	610	8.08	18.79	45.96	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.01	0.00	0.00	0.09	0.01	0.00	0.10	0.01	0.11

MONA OFFSHORE WIND PROJECT

Project	Un-apportioned abundances (adult birds) <sup>a</sup>			Un-apportioned collision impacts (adult birds) <sup>a</sup>			Apportioning values			Apportioned displacement impact values (50% displacement and 1% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact			
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Annual
West of Orkney Windfarm	661	690	437	11.17	17.06	8.75	0.0004	No connectivity	0.0003	0.00	-	0.00	0.00	-	0.00	0.00	-	0.00	0.01
White Cross Offshore Windfarm	379	44	94	4.93	3.7	0.98	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.02	0.00	0.02
Gap-filled projects																			
Barrow Offshore Wind Farm	12	20	11	0.34	1.19	0.44	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.01
Burbo Bank	12	14	11	0.29	0.84	0.45	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gwynt y Môr Offshore Wind Farm	39	51	36	0.45	1.45	0.71	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.01
North Hoyle Wind Farm	11	17	10	0.42	1.47	0.54	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.01
Robin Rigg	16	21	15	0.39	1.33	0.68	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.01
Rhyl Flats Offshore Wind Farm	12	16	11	0.40	1.34	0.63	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.01
Walney 1 - abundances are 1+2 combined	51	63	47	0.62	1.81	0.99	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.01
Walney 2	Included above			0.30	3.26	0.45	0.0004	0.0050 <sup>c</sup>	0.0003	Included above			0.00	0.02	0.00	0.00	0.03	0.00	0.03
West of Duddon Sands Offshore Wind Farm	37	454	34	1.41	3.99	2.28	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.01	0.00	0.00	0.02	0.00	0.00	0.03	0.00	0.03
Total predicted impact (adult birds)										0.01	0.16	0.01	0.04	0.76	0.04	0.05	0.92	0.05	1.01
Increase in baseline mortality (%) (baseline mortality of 23 birds)										0.04%	0.69%	0.03%	0.16%	3.29%	0.17%	0.20%	3.98%	0.20%	4.40%

1.5.4.3 As the predicted impact on black-legged kittiwake from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site is >1% increase in baseline mortality, the impact is further investigated by a PVA (see section 1.6) to determine whether AEoI can be ruled out beyond reasonable scientific doubt. Within Table 1-26 and Table 1-27 the blue squares indicate the displacement and mortality range that has been requested by the JNCC. The yellow square is the Applicant’s identified displacement and mortality scenario as presented within Table 1-25.

Table 1-26: Displacement matrix for in-combination assessment of black-legged kittiwake from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site

Annual impact (mortalities)		Mortality rate (%)								
		1%	3%	5%	10%	20%	30%	50%	75%	100%
Displacement (%)	1%	0	0	0	0	0	0	0	0	0
	5%	0	0	0	0	0	1	1	1	2
	10%	0	0	0	0	1	1	2	3	4
	20%	0	0	0	1	1	2	4	5	7
	30%	0	0	1	1	2	3	5	8	11
	40%	0	0	1	1	3	4	7	11	14
	50%	0	1	1	2	4	5	9	13	18
	60%	0	1	1	2	4	6	11	16	21
	70%	0	1	1	2	5	7	12	19	25

MONA OFFSHORE WIND PROJECT

Annual impact (mortalities)		Mortality rate (%)								
		1%	3%	5%	10%	20%	30%	50%	75%	100%
	80%	0	1	1	3	6	8	14	21	28
	90%	0	1	2	3	6	10	16	24	32
	100%	0	1	2	4	7	11	18	26	35

Table 1-27: Matrix (including collisions impacts – 0.84 birds) for in-combination assessment of black-legged kittiwake from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site

Annual impact (increase in baseline mortality)		Mortality rate (%)								
		1%	3%	5%	10%	20%	30%	50%	75%	100%
Displacement (%)	1%	3.64%	3.67%	3.70%	3.78%	3.93%	4.09%	4.40%	4.78%	5.16%
	5%	3.70%	3.86%	4.01%	4.40%	5.16%	5.93%	7.46%	9.38%	11.30%
	10%	3.78%	4.09%	4.40%	5.16%	6.70%	8.23%	11.30%	15.13%	18.97%
	20%	3.93%	4.55%	5.16%	6.70%	9.76%	12.83%	18.97%	26.64%	34.31%
	30%	4.09%	5.01%	5.93%	8.23%	12.83%	17.43%	26.64%	38.14%	49.65%
	40%	4.24%	5.47%	6.70%	9.76%	15.90%	22.04%	34.31%	49.65%	64.99%
	50%	4.40%	5.93%	7.46%	11.30%	18.97%	26.64%	41.98%	61.15%	80.33%
	60%	4.55%	6.39%	8.23%	12.83%	22.04%	31.24%	49.65%	72.66%	95.67%
	70%	4.70%	6.85%	9.00%	14.37%	25.10%	35.84%	57.32%	84.16%	111.01%
	80%	4.86%	7.31%	9.76%	15.90%	28.17%	40.44%	64.99%	95.67%	126.35%
	90%	5.01%	7.77%	10.53%	17.43%	31.24%	45.05%	72.66%	107.17%	141.69%
	100%	5.16%	8.23%	11.30%	18.97%	34.31%	49.65%	80.33%	118.68%	157.03%

# MONA OFFSHORE WIND PROJECT

## Southern Coasts & Calf of Man pRamsar site

As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline black-legged kittiwake from Southern Coasts & Calf of Man pRamsar site, an in-combination assessment is presented within Table 1-28 (50% displacement and 1% mortality). A displacement matrix is presented within Table 1-29 and Table 1-30 so that any interested party can calculate the impact and increase in baseline mortality, respectively, using the preferred displacement and mortality rates.

**Table 1-28: In-combination assessment for black-legged kittiwake from Southern Coasts & Calf of Man pRamsar site – when considering 50% displacement and 1% mortality.**

a – During the non-breeding season the age-class proportions are derived from the adult/immature proportion from the Appendix tables of Furness (2015). For black-legged kittiwake, the proportions are 100% of birds are adults in the breeding period (where no site specific data exists – see point d for projects whereby site-specific age-class was reported), 54.33% of birds are adults in the pre-breeding period and 54.74% of birds are adults in the post-breeding season.

b – the apportioning value during the breeding season was taken from project specific documentation

c – the apportioning value during the breeding season has used that of Mona Offshore Wind Project, specifically 0.043.

d – the site-specific age-class proportion for Mona Offshore Wind Project is 95.36% of birds are adults during the breeding season; for Morgan Offshore Wind Project Generation Assets is 58.94% of birds are adults during the breeding season; for Erebus Floating Wind Demo is 100% of birds are adults during the breeding season; for Llyr Offshore Wind Project is 77.39% of birds are adults during the breeding season.

Project	Un-apportioned abundances (adult birds) <sup>a</sup>			Un-apportioned collision impacts (adult birds) <sup>a</sup>			Apportioning values			Apportioned displacement impact values (50% displacement and 1% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact			
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Annual
Awel y Môr Offshore Wind Farm	162	87	45	8.14	11.66	4.41	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.02	0.00	0.03	0.50	0.01	0.03	0.52	0.01	0.56
Burbo Bank Extension Offshore Wind Farm	27	707	25	0.00	23.04	0.00	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.15	0.00	0.00	0.99	0.00	0.00	1.14	0.00	1.14
Erebus Floating Wind Demo	1	2,022	278	6.66	0.5	13.11	0.0030	0.0430 <sup>c</sup>	0.0023	0.02	0.00	0.00	0.02	0.02	0.03	0.04	0.02	0.03	0.09
TwinHub (Wave Hub Floating Wind Farm)	30	4	103	0.00	9.72	0.00	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.00	0.00	0.00	0.42	0.00	0.00	0.42	0.00	0.42
Llyr Offshore Wind Project	112	68	1,064	1.4	0.85	11.28	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.01	0.01	0.00	0.04	0.03	0.01	0.05	0.04	0.09
Mona Offshore Wind Project	312	692	307	4.65	14.80	4.47	0.0030	0.0430 <sup>b</sup>	0.0023	0.00	0.15	0.00	0.01	0.64	0.01	0.02	0.79	0.01	0.82
Morecambe Offshore Windfarm Generation Assets	41	1,729	940	0.34	16.32	4.65	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.36	0.01	0.00	0.68	0.01	0.00	1.04	0.02	1.06
Morgan Offshore Wind Project Generation Assets	430	298	630	7.39	4.77	10.07	0.0030	0.1450 <sup>b</sup>	0.0023	0.01	0.31	0.01	0.02	0.99	0.02	0.03	1.30	0.03	1.35
Ormonde Wind Farm	12	60	11	0.00	3.27	0.00	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.01	0.00	0.00	0.14	0.00	0.00	0.15	0.00	0.15
Rampion Offshore Wind Farm	451	1,059	122	22.22	70.56	8.43	0.0030	No connectivity	0.0023	0.01	-	0.00	0.07	-	0.02	0.08	-	0.02	0.10
Rampion 2 Offshore Wind Farm	155	5	53	9.04	1	5.32	0.0030	No connectivity	0.0023	0.00	-	0.00	0.03	-	0.01	0.03	-	0.01	0.04
Walney (3 and 4) Extension Offshore Wind Farm	797	319	610	8.08	18.79	45.96	0.0030	0.0430 <sup>c</sup>	0.0023	0.01	0.07	0.01	0.02	0.81	0.11	0.04	0.88	0.11	1.03
West of Orkney Windfarm	661	690	437	11.17	17.06	8.75	0.0030	No connectivity	0.0023	0.01	-	0.00	0.03	-	0.02	0.04	-	0.03	0.07

MONA OFFSHORE WIND PROJECT

Project	Un-apportioned abundances (adult birds) <sup>a</sup>			Un-apportioned collision impacts (adult birds) <sup>a</sup>			Apportioning values			Apportioned displacement impact values (50% displacement and 1% mortality)			Apportioned collision values (species-group avoidance rate 99.28)			Combined impact			
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Annual
White Cross Offshore Windfarm	379	44	94	4.93	3.7	0.98	0.0030	0.0430 <sup>c</sup>	0.0023	0.01	0.01	0.00	0.02	0.16	0.00	0.02	0.17	0.00	0.19
Gap-filled projects																			
Barrow	12	20	11	0.34	1.19	0.44	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.06	0.00	0.06
Burbo Bank	12	14	11	0.29	0.84	0.45	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.04	0.00	0.04
Gwynt y Môr Offshore Wind Farm	39	51	36	0.45	1.45	0.71	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.01	0.00	0.00	0.06	0.00	0.00	0.07	0.00	0.08
North Hoyle	11	17	10	0.42	1.47	0.54	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.07	0.00	0.07
Robin Rigg	16	21	15	0.39	1.33	0.68	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.06	0.00	0.06
Rhyl Flats Offshore Wind Farm	12	16	11	0.40	1.34	0.63	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.06	0.00	0.06
Walney 1 - abundances are 1+2 combined	51	63	47	0.62	1.81	0.99	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.01	0.00	0.00	0.08	0.00	0.00	0.09	0.00	0.10
Walney 2	Included above			0.30	3.26	0.45	0.0030	0.0430 <sup>c</sup>	0.0023	Included above			0.00	0.14	0.00	0.00	0.14	0.00	0.14
West of Duddon Sands Offshore Wind Farm	37	454	34	1.41	3.99	2.28	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.10	0.00	0.00	0.17	0.00	0.00	0.27	0.01	0.28
Total predicted impact (adult birds)										0.07	1.23	0.06	0.27	6.09	0.29	0.34	7.33	0.34	8.02
Increase in baseline mortality (%) (baseline mortality of 165 birds)										0.04%	0.75%	0.03%	0.16%	3.69%	0.18%	0.21%	4.44%	0.21%	4.86%

- 1.5.4.4
As the predicted impact on black-legged kittiwake from Southern Coasts & Calf of Man pRamsar site is >1% increase in baseline mortality the impact is further investigated by a PVA (see section 1.6) to determine whether AEoI can be ruled out beyond reasonable scientific doubt.
- 1.5.4.5
Within Table 1-29 and Table 1-30, the blue squares indicate the displacement and mortality range that has been requested by the JNCC. The yellow square is the Applicant’s identified displacement and mortality scenario as presented within Table 1-28.

Table 1-29: Displacement matrix for in-combination assessment of black-legged kittiwake from Southern Coasts & Calf of Man pRamsar site

Annual impact (mortalities)		Mortality rate (%)								
		1%	3%	5%	10%	20%	30%	50%	75%	100%
Displacement (%)	1%	0	0	0	0	1	1	1	2	3
	5%	0	0	1	1	3	4	7	10	14
	10%	0	1	1	3	5	8	14	20	27
	20%	1	2	3	5	11	16	27	41	55
	30%	1	2	4	8	16	25	41	61	82
	40%	1	3	5	11	22	33	55	82	109
	50%	1	4	7	14	27	41	68	102	136
	60%	2	5	8	16	33	49	82	123	164
	70%	2	6	10	19	38	57	95	143	191
	80%	2	7	11	22	44	65	109	164	218

MONA OFFSHORE WIND PROJECT

Annual impact (mortalities)		Mortality rate (%)								
		1%	3%	5%	10%	20%	30%	50%	75%	100%
	90%	2	7	12	25	49	74	123	184	245
	100%	3	8	14	27	55	82	136	204	273

Table 1-30: Matrix (including collisions impacts – 6.65 birds) for in-combination assessment of black-legged kittiwake from Southern Coasts & Calf of Man pRamsar site

Annual impact (increase in baseline mortality)		Mortality rate (%)								
		1%	3%	5%	10%	20%	30%	50%	75%	100%
Displacement (%)	1%	4.05%	4.08%	4.12%	4.20%	4.36%	4.53%	4.86%	5.27%	5.68%
	5%	4.12%	4.28%	4.45%	4.86%	5.68%	6.51%	8.16%	10.23%	12.29%
	10%	4.20%	4.53%	4.86%	5.68%	7.34%	8.99%	12.29%	16.42%	20.55%
	20%	4.36%	5.02%	5.68%	7.34%	10.64%	13.94%	20.55%	28.81%	37.07%
	30%	4.53%	5.52%	6.51%	8.99%	13.94%	18.90%	28.81%	41.20%	53.59%
	40%	4.69%	6.02%	7.34%	10.64%	17.25%	23.86%	37.07%	53.59%	70.11%
	50%	4.86%	6.51%	8.16%	12.29%	20.55%	28.81%	45.33%	65.98%	86.63%
	60%	5.02%	7.01%	8.99%	13.94%	23.86%	33.77%	53.59%	78.37%	103.15%
	70%	5.19%	7.50%	9.81%	15.60%	27.16%	38.72%	61.85%	90.76%	119.67%
	80%	5.35%	8.00%	10.64%	17.25%	30.46%	43.68%	70.11%	103.15%	136.19%
	90%	5.52%	8.49%	11.47%	18.90%	33.77%	48.64%	78.37%	115.54%	152.71%
	100%	5.68%	8.99%	12.29%	20.55%	37.07%	53.59%	86.63%	127.93%	169.23%



Black-legged kittiwake – collisions only

Gob ny Rona, Maughold Head & Port Cornaa pRamsar site

1.5.4.6 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline black-legged kittiwake from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site, an in-combination assessment is presented within Table 1-31 (collisions only).

Table 1-31: In-combination assessment for black-legged kittiwake from the Gob ny Rona, Maughold Head & Port Cornaa pRamsar site – when considering collisions only.

a – During the non-breeding season the age-class proportions are derived from the adult/immature proportion from the Appendix tables of Furness (2015). For black-legged kittiwake, the proportions are 100% of birds are adults in the breeding period (where no site specific data exists – see points d for projects whereby site-specific age-class was reported), 54.33% of birds are adults in the pre-breeding period and 54.74% of birds are adults in the post-breeding season.

b – the apportioning value during the breeding season was taken from project specific documentation

c – the apportioning value during the breeding season has used that of Mona Offshore Wind Project, specifically 0.005.

d – the site-specific age-class proportion for Mona Offshore Wind Project is 95.36% of birds are adults during the breeding season; for Morgan Offshore Wind Project Generation Assets is 58.94% of birds are adults during the breeding season; for Erebus Floating Wind Demo is 100% of birds are adults during the breeding season; for Llyr Offshore Wind Project is 77.39% of birds are adults during the breeding season.

Project	Un-apportioned collision impacts (adult birds) a			Apportioning values			Apportioned collision values (species-group avoidance rate 99.28)			
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Annual
Awel y Môr Offshore Wind Farm	8.14	11.66	4.41	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.06	0.00	0.06
Burbo Bank Extension Offshore Wind Farm	0.00	23.04	0.00	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.12	0.00	0.12
Erebus Floating Wind Demo	6.66	0.5	13.11	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.00	0.00	0.01
TwinHub (Wave Hub Floating Wind Farm)	0.00	9.72	0.00	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.05	0.00	0.05
Llyr Offshore Wind Project	1.4	0.85	11.28	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.00	0.00	0.01
Mona Offshore Wind Project	4.65	14.80	4.47	0.0004	0.0050 <sup>b</sup>	0.0003	0.00	0.07	0.00	0.08
Morecambe Offshore Windfarm Generation Assets	0.34	16.32	4.65	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.08	0.00	0.08
Morgan Offshore Wind Project Generation Assets	7.39	4.77	10.07	0.0004	0.0240 <sup>c</sup>	0.0003	0.00	0.16	0.00	0.17
Ormonde Wind Farm	0.00	3.27	0.00	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.02	0.00	0.02
Rampion Offshore Wind Farm	22.22	70.56	8.43	0.0004	No connectivity	0.0003	0.01	-	0.00	0.01
Rampion 2 Offshore Wind Farm	9.04	1	5.32	0.0004	No connectivity	0.0003	0.00	-	0.00	0.01
Walney (3 and 4) Extension Offshore Wind Farm	8.08	18.79	45.96	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.09	0.01	0.11
West of Orkney Windfarm	11.17	17.06	8.75	0.0004	No connectivity	0.0003	0.00	-	0.00	0.01
White Cross Offshore Windfarm	4.93	3.7	0.98	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.02	0.00	0.02
Gap-filled projects										
Barrow	0.34	1.19	0.44	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.01	0.00	0.01
Burbo Bank	0.29	0.84	0.45	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.00	0.00	0.00
Gwynt y Môr Offshore Wind Farm	0.45	1.45	0.71	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.01	0.00	0.01
North Hoyle	0.42	1.47	0.54	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.01	0.00	0.01
Robin Rigg	0.39	1.33	0.68	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.01	0.00	0.01
Rhyl Flats Offshore Wind Farm	0.40	1.34	0.63	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.01	0.00	0.01
Walney 1 - abundances are 1+2 combined	0.62	1.81	0.99	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.01	0.00	0.01



## MONA OFFSHORE WIND PROJECT

Project	Un-apportioned collision impacts (adult birds) <sup>a</sup>			Apportioning values			Apportioned collision values (species-group avoidance rate 99.28)			
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Annual
Walney 2	0.30	3.26	0.45	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.02	0.00	0.02
West of Duddon Sands Offshore Wind Farm	1.41	3.99	2.28	0.0004	0.0050 <sup>c</sup>	0.0003	0.00	0.02	0.00	0.02
<b>Total predicted impact (adult birds)</b>							<b>0.04</b>	<b>0.76</b>	<b>0.04</b>	<b>0.83</b>
<b>Increase in baseline mortality (%) (baseline mortality of 23 birds)</b>							<b>0.16%</b>	<b>3.29%</b>	<b>0.17%</b>	<b>3.63%</b>

1.5.4.7 As the predicted impact on black-legged kittiwake from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site is >1% increase in baseline mortality the impact is further investigated by a PVA (see section 1.6) to determine whether AEol can be ruled out beyond reasonable scientific doubt.

### Southern Coasts & Calf of Man pRamsar site

1.5.4.8 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline black-legged kittiwake from Southern Coasts & Calf of Man pRamsar site, an in-combination assessment is presented within Table 1-32 (collisions only).

**Table 1-32: In-combination assessment for black-legged kittiwake from the Southern Coasts & Calf of Man pRamsar site – when considering collisions only.**

a – During the non-breeding season the age-class proportions are derived from the adult/immature proportion from the Appendix tables of (Furness, 2015). For black-legged kittiwake, the proportions are 100% of birds are adults in the breeding period (where no site specific data exists – see points d for projects whereby site-specific age-class was reported), 54.33% of birds are adults in the pre-breeding period and 54.74% of birds are adults in the post-breeding season.

b – the apportioning value during the breeding season was taken from project specific documentation

c – the apportioning value during the breeding season has used that of Mona Offshore Wind Project, specifically 0.043.

d – the site-specific age-class proportion for Mona Offshore Wind Project is 95.36% of birds are adults during the breeding season; for Morgan Offshore Wind Project Generation Assets is 58.94% of birds are adults during the breeding season; for Erebus Floating Wind Demo is 100% of birds are adults during the breeding season; for Llyr Offshore Wind Project is 77.39% of birds are adults during the breeding season.

Project	Un-apportioned collision impacts (adult birds) <sup>a</sup>			Apportioning values			Apportioned collision values (species-group avoidance rate 99.28)			
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Annual
Awel y Môr Offshore Wind Farm	8.14	11.66	4.41	0.0030	0.0430 <sup>c</sup>	0.0023	0.03	0.50	0.01	0.54
Burbo Bank Extension Offshore Wind Farm	0.00	23.04	0.00	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.99	0.00	0.99
Erebus Floating Wind Demo	6.66	0.5	13.11	0.0030	0.0430 <sup>c</sup>	0.0023	0.02	0.02	0.03	0.07
TwinHub (Wave Hub Floating Wind Farm)	0.00	9.72	0.00	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.42	0.00	0.42
Llyr Offshore Wind Project	1.4	0.85	11.28	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.04	0.03	0.07
Mona Offshore Wind Project	4.65	14.80	4.47	0.0030	0.0430 <sup>b</sup>	0.0023	0.01	0.64	0.01	0.66
Morecambe Offshore Windfarm Generation Assets	0.34	16.32	4.65	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.68	0.01	0.69
Morgan Offshore Wind Project Generation Assets	7.39	4.77	10.07	0.0030	0.1450 <sup>c</sup>	0.0023	0.02	0.99	0.02	1.03
Ormonde Wind Farm	0.00	3.27	0.00	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.14	0.00	0.14
Rampion Offshore Wind Farm	22.22	70.56	8.43	0.0030	No connectivity	0.0023	0.07	-	0.02	0.09
Rampion 2 Offshore Wind Farm	9.04	1	5.32	0.0030	No connectivity	0.0023	0.03	-	0.01	0.04
Walney (3 and 4) Extension Offshore Wind Farm	8.08	18.79	45.96	0.0030	0.0430 <sup>c</sup>	0.0023	0.02	0.81	0.11	0.94

**MONA OFFSHORE WIND PROJECT**

Project	Un-apportioned collision impacts (adult birds) <sup>a</sup>			Apportioning values			Apportioned collision values (species-group avoidance rate 99.28)			
	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Pre-breeding	Breeding	Post-breeding	Annual
West of Orkney Windfarm	11.17	17.06	8.75	0.0030	No connectivity	0.0023	0.03	-	0.02	0.05
White Cross Offshore Windfarm	4.93	3.7	0.98	0.0030	0.0430 <sup>c</sup>	0.0023	0.02	0.16	0.00	0.18
<b>Gap-filled projects</b>										
Barrow	0.34	1.19	0.44	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.05	0.00	0.05
Burbo Bank	0.29	0.84	0.45	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.04	0.00	0.04
Gwynt y Môr Offshore Wind Farm	0.45	1.45	0.71	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.06	0.00	0.07
North Hoyle	0.42	1.47	0.54	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.06	0.00	0.07
Robin Rigg	0.39	1.33	0.68	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.06	0.00	0.06
Rhyl Flats Offshore Wind Farm	0.40	1.34	0.63	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.06	0.00	0.06
Walney 1 - abundances are 1+2 combined	0.62	1.81	0.99	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.08	0.00	0.08
Walney 2	0.30	3.26	0.45	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.14	0.00	0.14
West of Duddon Sands Offshore Wind Farm	1.41	3.99	2.28	0.0030	0.0430 <sup>c</sup>	0.0023	0.00	0.17	0.01	0.18
<b>Total predicted impact (adult birds)</b>							<b>0.27</b>	<b>6.09</b>	<b>0.29</b>	<b>6.65</b>
<b>Increase in baseline mortality (%) (baseline mortality of 165 birds)</b>							<b>0.16%</b>	<b>3.69%</b>	<b>0.18%</b>	<b>4.03%</b>

1.5.4.9 As the predicted impact on black-legged kittiwake from Southern Coasts & Calf of Man pRamsar site is >1% increase in baseline mortality the impact is further investigated by a PVA (see section 1.6) to determine whether AEol can be ruled out beyond reasonable scientific doubt.

Common guillemot

Gob ny Rona, Maughold Head & Port Cornaa pRamsar site

1.5.4.10 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline common guillemot from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site, an in-combination assessment is presented within Table 1-33 (50% displacement and 1% mortality). A displacement matrix is presented within Table 1-34 and Table 1-35 so that any interested party can calculate the impact and increase in baseline mortality, respectively, using the preferred displacement and mortality rates.

Table 1-33: In-combination assessment for common guillemot from the Gob ny Rona, Maughold Head & Port Cornaa pRamsar site.

a – During the non-breeding season the age-class proportions are derived from the adult/immature proportion from the Appendix tables of Furness (2015). For common guillemot, the proportions are 100% of birds are adults in the breeding period, 57.6% of birds are adults in the non-breeding period.

b – the apportioning value during the breeding season was taken from project specific documentation

c – the apportioning value during the breeding season has used that of Mona Offshore Wind Project, specifically 0.006.

Project	Un-apportioned abundances (adult birds) <sup>a</sup>		Apportioning values		Apportioned displacement impact values (50% displacement and 1% mortality)		
	Breeding	Non-breeding	Breeding	Non-breeding	Breeding	Non-breeding	Annual
Awel y Môr Offshore Wind Farm	1,569	2,919	0.006 <sup>c</sup>	0.001	0.05	0.01	0.06
Burbo Bank Extension Offshore Wind Farm	1,000	1,561	0.006 <sup>c</sup>	0.001	0.03	0.00	0.03
Erebus Floating Wind Demo	7,001	28,338	No connectivity	0.001	-	0.08	0.08
Llŷr Offshore Wind Project	2,026	13,009	No connectivity	0.001	-	0.04	0.04
Mona Offshore Wind Project	4,220	3,756	0.006 <sup>b</sup>	0.001	0.13	0.01	0.14
Morecambe Offshore Windfarm Generation Assets	6,374	8,315	0.006 <sup>c</sup>	0.001	0.19	0.02	0.21
Morgan Offshore Wind Project Generation Assets	4,010	3,824	0.019 <sup>b</sup>	0.001	0.38	0.01	0.13
TwinHub (Wave Hub Floating Wind Farm)	39	217	No connectivity	0.001	-	0.00	0.00
Walney (3 and 4) Extension Offshore Wind Farm	4,169	1,927	0.006 <sup>c</sup>	0.001	0.13	0.01	0.13
West of Orkney Windfarm	4,861	4,275	No connectivity	0.001	-	0.01	0.01
White Cross Offshore Windfarm	3,304	1,059	No connectivity	0.001	-	0.00	0.00
<b>Gap-filled projects</b>							
Barrow	43	36	0.006 <sup>c</sup>	0.001	0.00	0.00	0.00
Burbo Bank	41	58	0.006 <sup>c</sup>	0.001	0.00	0.00	0.00
Gwynt Y Môr	149	205	0.006 <sup>c</sup>	0.001	0.00	0.00	0.01
North Hoyle	45	36	0.006 <sup>c</sup>	0.001	0.00	0.00	0.00
Ormonde Wind Farm	912	39	0.006 <sup>c</sup>	0.001	0.03	0.00	0.03
Robin Rigg	138	88	0.006 <sup>c</sup>	0.001	0.00	0.00	0.00
Rhyl Flats Offshore Wind Farm	49	68	0.006 <sup>c</sup>	0.001	0.00	0.00	0.00
Walney 1 & 2	161	227	0.006 <sup>c</sup>	0.001	0.00	0.00	0.01
West of Duddon Sands Offshore Wind Farm	1,321	166	0.006 <sup>c</sup>	0.001	0.04	0.00	0.04
<b>Total predicted impact (adult birds)</b>					<b>0.99</b>	<b>0.19</b>	<b>1.18</b>
<b>Increase in baseline mortality (%) (baseline mortality of 38 birds)</b>					<b>2.60%</b>	<b>0.51%</b>	<b>3.11%</b>

1.5.4.11 As the predicted impact on common guillemot from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site is >1% increase in baseline mortality the impact is further investigated by a PVA (see section 1.6) to determine whether AEol can be ruled out beyond reasonable scientific doubt.

1.5.4.12 Within Table 1-34 and Table 1-35, the blue squares indicate the displacement and mortality rate that has been requested by the JNCC and NRW (A). The yellow square is the Applicant’s identified displacement and mortality scenario as presented within Table 1-33.

Table 1-34: Displacement matrix for in-combination assessment of common guillemot from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site

Annual impact (mortalities)		Mortality rate (%)												
		1%	2%	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Displacement (%)	1%	0	0	0	0	0	1	1	1	1	2	2	2	2
	5%	0	0	1	1	2	4	5	6	7	8	9	11	12
	10%	0	0	1	2	5	7	9	12	14	17	19	21	24
	20%	0	1	2	5	9	14	19	24	28	33	38	43	47
	30%	1	1	4	7	14	21	28	35	43	50	57	64	71
	40%	1	2	5	9	19	28	38	47	57	66	76	85	94
	50%	1	2	6	12	24	35	47	59	71	83	94	106	118
	60%	1	3	7	14	28	43	57	71	85	99	113	128	142
	70%	2	3	8	17	33	50	66	83	99	116	132	149	165
	80%	2	4	9	19	38	57	76	94	113	132	151	170	189
	90%	2	4	11	21	43	64	85	106	128	149	170	191	213
	100%	2	5	12	24	47	71	94	118	142	165	189	213	236

Table 1-35: Displacement matrix for in-combination assessment of common guillemot from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site

Annual impact (increase in baseline mortality)		Mortality rate (%)												
		1%	2%	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Displacement (%)	1%	0.06%	0.12%	0.31%	0.62%	1.24%	1.86%	2.49%	3.11%	3.73%	4.35%	4.97%	5.59%	6.22%
	5%	0.31%	0.62%	1.55%	3.11%	6.22%	9.32%	12.43%	15.54%	18.65%	21.76%	24.86%	27.97%	31.08%
	10%	0.62%	1.24%	3.11%	6.22%	12.43%	18.65%	24.86%	31.08%	37.30%	43.51%	49.73%	55.94%	62.16%
	20%	1.24%	2.49%	6.22%	12.43%	24.86%	37.30%	49.73%	62.16%	74.59%	87.02%	99.46%	111.89%	124.32%
	30%	1.86%	3.73%	9.32%	18.65%	37.30%	55.94%	74.59%	93.24%	111.89%	130.53%	149.18%	167.83%	186.48%
	40%	2.49%	4.97%	12.43%	24.86%	49.73%	74.59%	99.46%	124.32%	149.18%	174.05%	198.91%	223.77%	248.64%
	50%	3.11%	6.22%	15.54%	31.08%	62.16%	93.24%	124.32%	155.40%	186.48%	217.56%	248.64%	279.72%	310.80%
	60%	3.73%	7.46%	18.65%	37.30%	74.59%	111.89%	149.18%	186.48%	223.77%	261.07%	298.37%	335.66%	372.96%
	70%	4.35%	8.70%	21.76%	43.51%	87.02%	130.53%	174.05%	217.56%	261.07%	304.58%	348.09%	391.60%	435.12%
	80%	4.97%	9.95%	24.86%	49.73%	99.46%	149.18%	198.91%	248.64%	298.37%	348.09%	397.82%	447.55%	497.28%
	90%	5.59%	11.19%	27.97%	55.94%	111.89%	167.83%	223.77%	279.72%	335.66%	391.60%	447.55%	503.49%	559.43%
	100%	6.22%	12.43%	31.08%	62.16%	124.32%	186.48%	248.64%	310.80%	372.96%	435.12%	497.28%	559.43%	621.59%

Southern Coasts & Calf of Man pRamsar site

1.5.4.13 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline common guillemot from Southern Coasts & Calf of Man pRamsar site, an in-combination assessment is presented within Table 1-36 (50% displacement and 1% mortality). A displacement matrix is presented within Table 1-37 and Table 1-38 so that any interested party can calculate the impact and increase in baseline mortality, respectively, using the preferred displacement and mortality rates.

Table 1-36: In-combination assessment for common guillemot from the Southern Coasts & Calf of Man pRamsar site.

a – During the non-breeding season the age-class proportions are derived from the adult/immature proportion from the Appendix tables of (Furness, 2015). For common guillemot, the proportions are 100% of birds are adults in the breeding period, 57.60% of birds are adults in the non-breeding period.  
b – the apportioning value during the breeding season was taken from project specific documentation  
c – the apportioning value during the breeding season has used that of Mona Offshore Wind Project, specifically 0.057.

Project	Un-apportioned abundances (adult birds) <sup>a</sup>		Apportioning values		Apportioned displacement impact values (50% displacement and 1% mortality)		
	Breeding	Non-breeding	Breeding	Non-breeding	Breeding	Non-breeding	Annual
Awel y Môr Offshore Wind Farm	1,569	2,919	0.057 <sup>c</sup>	0.008	0.45	0.07	0.52
Burbo Bank Extension Offshore Wind Farm	1,000	1,561	0.057 <sup>c</sup>	0.008	0.29	0.04	0.32
Erebus Floating Wind Demo	7,001	28,338	No connectivity	0.008	-	0.68	0.68
Llyr Offshore Wind Project	2,026	13,009	No connectivity	0.008	-	0.31	0.31
Mona Offshore Wind Project	4,220	3,756	0.057 <sup>b</sup>	0.008	1.20	0.09	1.29
Morecambe Offshore Windfarm Generation Assets	6,374	8,315	0.057 <sup>c</sup>	0.008	1.82	0.20	2.02
Morgan Offshore Wind Project Generation Assets	4,010	3,824	0.116 <sup>b</sup>	0.008	2.33	0.09	2.42
TwinHub (Wave Hub Floating Wind Farm)	39	217	No connectivity	0.008	-	0.01	0.01
Walney (3 and 4) Extension Offshore Wind Farm	4,169	1,927	0.057 <sup>c</sup>	0.008	1.19	0.05	1.23
West of Orkney Windfarm	4,861	4,275	No connectivity	0.008	-	0.10	0.10
White Cross Offshore Windfarm	3,304	1,059	No connectivity	0.008	-	0.03	0.03
<b>Gap-filled projects</b>							
Barrow	43	36	0.057 <sup>c</sup>	0.008	0.01	0.00	0.01
Burbo Bank	41	58	0.057 <sup>c</sup>	0.008	0.01	0.00	0.01
Gwynt Y Môr	149	205	0.057 <sup>c</sup>	0.008	0.04	0.00	0.05
North Hoyle	45	36	0.057 <sup>c</sup>	0.008	0.01	0.00	0.01
Ormonde Wind Farm	912	39	0.057 <sup>c</sup>	0.008	0.26	0.00	0.26
Robin Rigg	138	88	0.057 <sup>c</sup>	0.008	0.04	0.00	0.04
Rhyl Flats Offshore Wind Farm	49	68	0.057 <sup>c</sup>	0.008	0.01	0.00	0.02
Walney 1 & 2	161	227	0.057 <sup>c</sup>	0.008	0.05	0.01	0.05
West of Duddon Sands Offshore Wind Farm	1,321	166	0.057 <sup>c</sup>	0.008	0.38	0.00	0.38
<b>Total predicted impact (adult birds)</b>					<b>8.08</b>	<b>1.68</b>	<b>9.76</b>
<b>Increase in baseline mortality (%) (baseline mortality of 334 birds)</b>					<b>2.42%</b>	<b>0.50%</b>	<b>2.92%</b>

- 1.5.4.14 As the predicted impact on common guillemot from Southern Coasts & Calf of Man pRamsar site is >1% increase in baseline mortality, the impact is further investigated by a PVA (see section 1.6) to determine whether AEol can be ruled out beyond reasonable scientific doubt.
- 1.5.4.15 Within Table 1-37 and Table 1-38, the blue squares indicate the displacement and mortality rate that has been requested by the JNCC and NRW (A). The yellow square is the Applicant’s preferred displacement and mortality scenario as presented within Table 1-36.

**Table 1-37: Displacement matrix for in-combination assessment of common guillemot from Southern Coasts & Calf of Man pRamsar site**

Annual impact (mortalities)		Mortality rate (%)												
		1%	2%	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Displacement (%)	1%	0	0	1	2	4	6	8	10	12	14	16	18	20
	5%	1	2	5	10	20	29	39	49	59	68	78	88	98
	10%	2	4	10	20	39	59	78	98	117	137	156	176	195
	20%	4	8	20	39	78	117	156	195	234	273	312	352	391
	30%	6	12	29	59	117	176	234	293	352	410	469	527	586
	40%	8	16	39	78	156	234	312	391	469	547	625	703	781
	50%	10	20	49	98	195	293	391	488	586	684	781	879	976
	60%	12	23	59	117	234	352	469	586	703	820	937	1,055	1,172
	70%	14	27	68	137	273	410	547	684	820	957	1,094	1,230	1,367
	80%	16	31	78	156	312	469	625	781	937	1,094	1,250	1,406	1,562
	90%	18	35	88	176	352	527	703	879	1,055	1,230	1,406	1,582	1,758
	100%	20	39	98	195	391	586	781	976	1,172	1,367	1,562	1,758	1,953

**Table 1-38: Displacement matrix for in-combination assessment of common guillemot from Southern Coasts & Calf of Man pRamsar site**

Annual impact (increase in baseline mortality)		Mortality rate (%)												
		1%	2%	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Displacement (%)	1%	0.06%	0.12%	0.29%	0.58%	1.17%	1.75%	2.34%	2.92%	3.51%	4.09%	4.68%	5.26%	5.85%
	5%	0.29%	0.58%	1.46%	2.92%	5.85%	8.77%	11.69%	14.62%	17.54%	20.47%	23.39%	26.31%	29.24%
	10%	0.58%	1.17%	2.92%	5.85%	11.69%	17.54%	23.39%	29.24%	35.08%	40.93%	46.78%	52.62%	58.47%
	20%	1.17%	2.34%	5.85%	11.69%	23.39%	35.08%	46.78%	58.47%	70.17%	81.86%	93.55%	105.25%	116.94%
	30%	1.75%	3.51%	8.77%	17.54%	35.08%	52.62%	70.17%	87.71%	105.25%	122.79%	140.33%	157.87%	175.41%
	40%	2.34%	4.68%	11.69%	23.39%	46.78%	70.17%	93.55%	116.94%	140.33%	163.72%	187.11%	210.50%	233.89%
	50%	2.92%	5.85%	14.62%	29.24%	58.47%	87.71%	116.94%	146.18%	175.41%	204.65%	233.89%	263.12%	292.36%
	60%	3.51%	7.02%	17.54%	35.08%	70.17%	105.25%	140.33%	175.41%	210.50%	245.58%	280.66%	315.75%	350.83%
	70%	4.09%	8.19%	20.47%	40.93%	81.86%	122.79%	163.72%	204.65%	245.58%	286.51%	327.44%	368.37%	409.30%
	80%	4.68%	9.36%	23.39%	46.78%	93.55%	140.33%	187.11%	233.89%	280.66%	327.44%	374.22%	420.99%	467.77%
	90%	5.26%	10.52%	26.31%	52.62%	105.25%	157.87%	210.50%	263.12%	315.75%	368.37%	420.99%	473.62%	526.24%
	100%	5.85%	11.69%	29.24%	58.47%	116.94%	175.41%	233.89%	292.36%	350.83%	409.30%	467.77%	526.24%	584.71%



## Great black-backed gull

1.5.4.16 As the impact from the Mona Offshore Wind Project alone was predicted to result in a >0.05% increase in baseline great black-backed gull mortality from the Southern Coasts & Calf of Man pRamsar site, an in-combination assessment is presented within Table 1-39.

**Table 1-39: In-combination assessment for great black-backed gull from the Southern Coasts & Calf of Man pRamsar site.**

a – During the non-breeding season the age-class proportions are derived from the adult/immature proportion from the Appendix tables of Furness (2015). For great black-backed gull, the proportions are 100% of birds are adults in the breeding period (where no site specific data exists – see points d for projects whereby site-specific age-class was reported), 31.9% of birds are adults in the non-breeding period.

b – Ormonde Wind Farm presented an annual impact only (2.36 when considering 95% avoidance). For precaution and as no monthly breakdown of abundance/density was available 100% of the impact is considered as part of the non-breeding season when there is connectivity to the Southern Coasts & Calf of Man pRamsar site.

c - the site-specific age-class proportion for Mona Offshore Wind Project is 83.3% of birds are adults during the breeding season and for Morgan Offshore Wind Project Generation Assets is 87.5% of birds are adults during the breeding season.

d – the apportioning value during the breeding season was taken from project specific documentation

e – the apportioning value during the breeding season has used that of Mona Offshore Wind Project, specifically 0.061.

Project	Un-apportioned collision impacts (adult birds) <sup>a</sup>		Apportioning values		Apportioned collision (species-group avoidance rate 0.9939)		
	Non-breeding season	Breeding season	Non-breeding season	Breeding season	Non-breeding season	Breeding season	Annual
Awel y Môr Offshore Wind Farm	0.20	5.30	0.017	No connectivity	0.00	-	0.00
Erebus Floating Wind Demo	0.26	0.00	0.017	No connectivity	0.00	-	0.00
Mona Offshore Wind Project	1.01	1.39	0.017	0.061 <sup>d</sup>	0.02	0.08	0.10
Morecambe Offshore Windfarm Generation Assets	0.14	0.53	0.017	0.061 <sup>e</sup>	0.00	0.03	0.03
Morgan Offshore Wind Project Generation Assets	0.23	1.84	0.017	0.250 <sup>d</sup>	0.00	0.46	0.46
Ormonde Wind Farm	0.09 <sup>b</sup>	0.00	0.017	No connectivity	0.00	-	0.00
Rampion Offshore Wind Farm	4.34	6.25	0.017	No connectivity	0.08	-	0.08
Rampion 2 (Rampion Extension) Offshore Wind Farm	10.62	4.76	0.017	No connectivity	0.19	-	0.19
TwinHub (Wave Hub Floating Wind Farm)	2.93	6.56	0.017	No connectivity	0.05	-	0.05
Walney (3 and 4) Extension Offshore Wind Farm	6.48	5.89	0.017	0.061 <sup>e</sup>	0.11	0.36	0.47
White Cross Offshore Windfarm	0.00	0.93	0.017	No connectivity	0.00	-	0.00
<b>Gap-filled projects</b>							
Barrow	0.45	0.78	0.017	No connectivity	0.01	-	0.01
Burbo Bank	0.32	1.31	0.017	No connectivity	0.01	-	0.01
Burbo Bank Extension	0.88	3.94	0.017	No connectivity	0.02	-	0.02
Gwynt y Môr Offshore Wind Farm	1.45	5.74	0.017	No connectivity	0.03	-	0.03
North Hoyle	0.23	0.94	0.017	No connectivity	0.00	-	0.00
Rhyl Flats Offshore Wind Farm	0.38	0.70	0.017	No connectivity	0.01	-	0.01
Robin Rigg	0.83	1.55	0.017	No connectivity	0.01	-	0.01
Walney 1	0.65	2.20	0.017	0.061 <sup>e</sup>	0.01	0.13	0.15
Walney 2	0.78	1.73	0.017	0.061 <sup>e</sup>	0.01	0.11	0.12
West of Duddon Sands Offshore Wind Farm	1.01	5.16	0.017	0.061 <sup>e</sup>	0.02	0.31	0.33
<b>Total predicted impact (adult birds)</b>					<b>0.58</b>	<b>1.49</b>	<b>2.07</b>
<b>Increase in baseline mortality (%) (baseline mortality of 7 birds)</b>					<b>8.27%</b>	<b>21.29%</b>	<b>29.55%</b>

1.5.4.17 As the predicted impact on great black-backed gull from Southern Coasts & Calf of Man pRamsar site is >1% increase in baseline mortality, the impact is further investigated by a PVA (see section 1.6) to determine whether AEoI can be ruled out beyond reasonable scientific doubt.



## 1.6 Population Viability Analysis

- 1.6.1.1 Table 1-40 provides a summary of those sites and species where the increase in baseline mortality from in-combination impacts was found to exceed 1%.
- 1.6.1.2 A PVA has been undertaken for each pRamsar site and species that exceeds a >1% increase in baseline mortality. All PVAs were run density independently, and therefore the counterfactual of growth rate (CGR) is a more useful metric than counterfactual of population size (CPS).

**Table 1-40: Summary of colony sites where apportioned in-combination impacts result in an increase in baseline mortality of >1%.**

Species	Impact	Site	Adult bird mortalities	Increase in baseline mortality(worst-case)
Common guillemot	Displacement	Gob ny Rona, Maughold Head & Port Cornaa	1.18	3.11%
		Southern Coasts & Calf of Man	9.76	2.92%
Black-legged kittiwake	Displacement and collisions	Gob ny Rona, Maughold Head & Port Cornaa	1.01	4.40%
		Southern Coasts & Calf of Man	8.02	4.86%
Black-legged kittiwake	Collisions	Gob ny Rona, Maughold Head & Port Cornaa	0.83	3.63%
		Southern Coasts & Calf of Man	6.65	4.03%
Great black-backed gull	Collisions	Southern Coasts & Calf of Man	2.07	29.55%

- 1.6.1.3 The Applicant has provided PVAs for a range of different scenarios as advised by the SNCBs.

### 1.6.2 Black-legged kittiwake

#### Gob ny Rona, Maughold Head & Port Cornaa

- 1.6.2.1 Four scenarios were modelled within the PVA for black-legged kittiwake from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site. One scenario consisted of collision impacts only in line with NRW (A) advice, one scenario consisted of collision impacts plus 50% displacement and 1% mortality in line with the Applicant's approach within the ISAA, one scenario consisted of collision impacts plus displacement at 70% displacement and 10% mortality in line with the upper estimate of JNCC advice, and one scenario consisted of collision impacts plus displacement at 30% displacement and 3% mortality, in line with the upper estimate of NatureScot guidance (NatureScot, 2023). All PVAs were run considering that 100% of birds would be adults in the absence of site specific data.
- 1.6.2.2 The input parameters of the PVA are summarised within Table 1-41 and presented in full within section A.1.1.

## MONA OFFSHORE WIND PROJECT

**Table 1-41: Summary of the annual in-combination impacts used in the PVA for black-legged kittiwake from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site.**

Scenario	Predicted adult mortalities	Increase in baseline mortality (%)	Decrease in survival rate
A: Collisions only	0.83	3.63%	0.005349168
B: 50% displacement and 1% mortality plus predicted collisions	1.01	4.40%	0.006479999
C: 30% displacement and 3% mortality plus predicted collisions	1.15	5.01%	0.007384663
D: 70% displacement and 10% mortality plus predicted collisions	3.30	14.37%	0.02118079

1.6.2.3 For three scenarios (A, B and C), the predicted impact would result in the median growth rate being marginally <1 after 35 years of operation and therefore indicating that the population is predicted to decrease in size under these modelled parameters (Table 1-42). The CGR, however, indicates these three impact scenarios are near to the baseline or the non-impacted predicted growth rate, therefore the difference between the baseline and the impacted scenario is small (0.6 to 0.9% smaller).

1.6.2.4 When considering the upper limit of the JNCC advice (scenario D), the population is predicted to decrease due to the annual impact. However, the Applicant does not consider that the empirical evidence to date supports this highly conservative scenario for black-legged kittiwakes. Therefore, whilst the Applicant has provided this information in accordance with the JNCC's advice, it does not consider this a realistic potential impact that would occur under any situation.

**Table 1-42: PVA outputs for black-legged kittiwake from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site.**

Year	Impact scenario	Median adult population size	Population change (%) since 2017	Median growth rate	2.5 percentile of growth rate	97.5 percentile of growth rate	Median CPS	Median CGR
2030	Baseline	161	1.15%	1.012	0.796	1.182	-	-
2030	Impact (Scenario A)	160	0.60%	1.006	0.789	1.175	1.005	0.993
2030	Impact (Scenario B)	160	0.50%	1.005	0.794	1.171	1.002	0.993
2030	Impact (Scenario C)	159	0.00%	1.000	0.785	1.175	1.001	0.992
2030	Impact (Scenario D)	157	-1.31%	0.987	0.767	1.158	0.985	0.975
2065	Baseline	173	8.74%	1.002	0.978	1.024	-	-
2065	Impact (Scenario A)	138	-13.83%	0.996	0.971	1.017	0.831	0.994
2065	Impact (Scenario B)	131	-17.73%	0.995	0.970	1.016	0.790	0.992

## MONA OFFSHORE WIND PROJECT

Year	Impact scenario	Median adult population size	Population change (%) since 2017	Median growth rate	2.5 percentile of growth rate	97.5 percentile of growth rate	Median CPS	Median CGR
2065	Impact (Scenario C)	126	-20.85%	0.994	0.968	1.015	0.761	0.991
2065	Impact (Scenario D)	69	-57.14	0.977	0.950	0.999	0.415	0.975

- 1.6.2.5 The results of the PVA undertaken for black-legged kittiwake from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site indicate a stable or marginally declining population size with and without the predicted impacts. There is a large variation around the median growth rate, which indicates both increasing and decreasing populations under all scenarios and the baseline.
- 1.6.2.6 There are no conservation objective for Ramsar sites, nor pRamsar sites and therefore there is no official objective to compare against. Considering the population continues to exist and would be marginally different in growth rates of <1% it can be concluded that there is no AEoI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects.

### Southern Coasts & Calf of Man

- 1.6.2.7 Four scenarios were modelled within the PVA for black-legged kittiwake from Southern Coasts & Calf of Man pRamsar site. One scenario consisted of collision impacts only in line with NRW (A) advice, one scenario consisted of collision impacts plus 50% displacement and 1% mortality in line with the Applicant's approach within the ISAA, one scenario consisted of collision impacts plus displacement at 70% displacement and 10% mortality in line with the upper estimate of JNCC advice, and one scenario consisted of collision impacts plus displacement at 30% displacement and 3% mortality, in line with the upper estimate of NatureScot guidance (NatureScot, 2023). All PVAs were run considering that 100% of birds would be adults in the absence of site specific data.
- 1.6.2.8 The input parameters of the PVA are summarised within Table 1-43 and presented in full within section A.1.2.

**Table 1-43: Summary of the annual in-combination impacts used in the PVA for black-legged kittiwake from Southern Coasts & Calf of Man pRamsar site.**

Scenario	Predicted adult mortalities	Increase in baseline mortality (%)	Decrease in survival rate
A: Collisions only	6.65	4.03%	0.005481432
B: 50% displacement and 1% mortality plus predicted collisions	8.02	4.86%	0.006604072
C: 30% displacement and 3% mortality plus predicted collisions	9.11	5.52%	0.007502184

## MONA OFFSHORE WIND PROJECT

Scenario	Predicted adult mortalities	Increase in baseline mortality (%)	Decrease in survival rate
D: 70% displacement and 10% mortality plus predicted collisions	25.73	15.60%	0.021198389

1.6.2.9 For three scenarios (A, B and C), the predicted impact would result in the median growth rate being marginally <1 after 35 years of operation and therefore indicating that the population is predicted to decrease in size under these modelled parameters (Table 1-44). The CGR, however, indicates these three impact scenarios are near to the baseline or the non-impacted predicted growth rate, therefore the difference between the baseline and the impacted scenario is small (0.6 to 0.9% smaller).

1.6.2.10 When considering the upper limit of the JNCC advice, the population is predicted to decrease due to the annual impact. However, the Applicant does not consider that the empirical evidence to date supports this highly conservative scenario for black-legged kittiwakes. Therefore, whilst the Applicant has provided this information in accordance with the JNCC's advice, it does not consider this a realistic potential impact that would occur under any situation.

**Table 1-44: PVA outputs for black-legged kittiwake from Southern Coasts & Calf of Man pRamsar site**

Year	Impact scenario	Median adult population size	Population change (%) since 2017	Median growth rate	2.5 percentile of growth rate	97.5 percentile of growth rate	Median CPS	Median CGR
2030	Baseline	1,254	1.28%	1.013	0.812	1.161	-	-
2030	Impact (Scenario A)	1,248	0.51%	1.005	0.804	1.156	0.993	0.994
2030	Impact (Scenario B)	1,248	0.35%	1.003	0.801	1.158	0.993	0.992
2030	Impact (Scenario C)	1,240	0.37%	1.004	0.802	1.154	0.989	0.991
2030	Impact (Scenario D)	1,225	-1.41%	0.986	0.788	1.137	0.974	0.976
2065	Baseline	1,377	10.68%	1.003	0.981	1.022	-	-
2065	Impact (Scenario A)	1,098	-12.38%	0.996	0.975	1.016	0.791	0.994
2065	Impact (Scenario B)	1,042	-16.76%	0.995	0.973	1.015	0.754	0.992
2065	Impact (Scenario C)	1,001	-19.68%	0.994	0.972	1.014	0.725	0.991
2065	Impact (Scenario D)	550	-55.80%	0.978	0.956	0.997	0.400	0.975

1.6.2.11 The results of the PVA undertaken for black-legged kittiwake from Southern Coasts & Calf of Man pRamsar site indicate a stable or marginally declining population size with and without the predicted impacts. There is a large variation around the median growth

## MONA OFFSHORE WIND PROJECT

rate, which indicates both increasing and decreasing populations under all scenarios and the baseline.

- 1.6.2.12 There are no conservation objectives for Ramsar sites, nor pRamsar sites, and therefore, there is no official objective to compare against. Considering the population continues to exist and would be marginally different in growth rates of <1%, it can be concluded that there is no AEoI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects.

### 1.6.3 Common guillemot

#### Gob ny Rona, Maughold Head & Port Cornaa

- 1.6.3.1 Three scenarios were modelled within the PVA for common guillemot from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site: one considering the worst-case scenario of 70% displacement and 10% mortality, one considering an alternative approach considering 70% displacement and 2% mortality and one using the Applicant's approach considering 50% displacement and 1% mortality.
- 1.6.3.2 The input parameters of the PVA are summarised within Table 1-45 and presented in full within section A.1.3.

**Table 1-45: Summary of the annual in-combination impacts used in the PVA for common guillemot from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site.**

Scenario	Predicted adult mortalities	Increase in baseline mortality (%)	Decrease in survival rate
A: 50% displacement and 1% mortality	1.18	3.11%	0.001871677
B: 70% displacement and 2% mortality	3.31	8.70%	0.002246012
C: 70% displacement and 10% mortality	16.53	43.51%	0.002620348

- 1.6.3.3 For all scenarios, the predicted impact would result in the median growth rate (and 95% confidence intervals) continuing to be >1 and therefore indicating that the population is predicted to increase in size under these modelled parameters after 35 years (Table 1-46). The CGR also indicates the impact scenarios are close to the baseline (0.2 to 0.3% difference).

**Table 1-46: PVA outputs for common guillemot from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site.**

Year	Impact scenario	Median adult population size	Population change (%) since 2017	Median growth rate	2.5 percentile of growth rate	97.5 percentile of growth rate	Median CPS	Median CGR
2030	Baseline	874	2.68%	1.027	0.949	1.100	-	-
2030	Scenario A	870	2.50%	1.025	0.949	1.098	0.997	0.998
2030	Scenario B	870	2.38%	1.024	0.947	1.098	0.996	0.997
2030	Scenario C	869	2.35%	1.024	0.949	1.098	0.996	0.997
2065	Baseline	2,130	151.18%	1.026	1.017	1.035	-	-

## MONA OFFSHORE WIND PROJECT

Year	Impact scenario	Median adult population size	Population change (%) since 2017	Median growth rate	2.5 percentile of growth rate	97.5 percentile of growth rate	Median CPS	Median CGR
2065	Scenario A	1,982	133.29%	1.024	1.014	1.033	0.929	0.998
2065	Scenario B	1,947	129.38%	1.023	1.014	1.032	0.912	0.998
2065	Scenario C	1,911	125.56%	1.023	1.014	1.032	0.898	0.997

1.6.3.4 As the results of the three PVAs undertaken for common guillemot from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site indicate an increasing population size with and without the predicted impacts, it can be concluded that there is no AEoI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in-combination with other plans and projects.

1.6.3.5 There are no conservation objective for Ramsar sites, nor pRamsar sites and therefore there is no official objective to compare against.

### Southern Coasts & Calf of Man

1.6.3.6 Three scenarios were modelled within the PVA for common guillemot from Southern Coasts & Calf of Man pRamsar site: one considering the worst-case scenario of 70% displacement and 10% mortality, one considering an alternative approach considering 70% displacement and 2% mortality and one using the Applicant's approach considering 50% displacement and 1% mortality.

1.6.3.7 The input parameters of the PVA are summarised within Table 1-47 and presented in full within section A.1.4.

**Table 1-47: Summary of the annual in-combination impacts used in the PVA for common guillemot from Southern Coasts & Calf of Man pRamsar site.**

Scenario	Predicted adult mortalities	Increase in baseline mortality (%)	Decrease in survival rate
A: 50% displacement and 1% mortality	9.76	2.92%	0.001841824
B: 70% displacement and 2% mortality	27.34	8.19%	0.002148795
C: 70% displacement and 10% mortality	136.71	40.93%	0.002455766

1.6.3.8 For all scenarios, the predicted impact would result in the median growth rate (and 95% confidence intervals) continuing to be >1 and therefore indicating that the population is predicted to increase in size under these modelled parameters after 35 years (Table 1-48). The CGR also indicates the impact scenarios are close to the baseline (0.2 to 0.3% difference).

**Table 1-48: PVA outputs for common guillemot from Southern Coasts & Calf of Man site.**

Year	Impact scenario	Median adult population size	Population change (%) since 2017	Median growth rate	2.5 percentile of growth rate	97.5 percentile of growth rate	Median CPS	Median CGR
2030	Baseline	8,798	2.71%	1.027	0.953	1.098	-	-



## MONA OFFSHORE WIND PROJECT

Year	Impact scenario	Median adult population size	Population change (%) since 2017	Median growth rate	2.5 percentile of growth rate	97.5 percentile of growth rate	Median CPS	Median CGR
2030	Scenario A	8,789	2.48%	1.025	0.953	1.095	0.998	0.998
2030	Scenario B	8,772	2.47%	1.025	0.951	1.095	0.998	0.998
2030	Scenario C	8,779	2.42%	1.024	0.950	1.095	0.997	0.997
2065	Baseline	21,553	151.75%	1.026	1.017	1.035	-	-
2065	Scenario A	19,992	133.40%	1.024	1.015	1.033	0.929	0.998
2065	Scenario B	19,728	130.82%	1.024	1.014	1.032	0.918	0.998
2065	Scenario C	19,548	127.81%	1.023	1.014	1.032	0.906	0.997

1.6.3.9 As the results of the three PVAs undertaken for common guillemot from Southern Coasts & Calf of Man pRamsar site indicate an increasing population size with and without the predicted impacts, it can be concluded that there is no AEoI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in combination with other plans and projects.

1.6.3.10 There are no conservation objective for Ramsar sites, nor pRamsar sites and therefore there is no official objective to compare against.

### 1.6.4 Great black-backed gull

#### Southern Coasts & Calf of Man

1.6.4.1 Two scenarios were modelled within the PVA for great black-backed gull from Southern Coasts & Calf of Man pRamsar site, one considering the species-group avoidance rate of 99.39% and one considering the species-group avoidance rate of 99.91%.

1.6.4.2 The input parameters of the PVA are summarised within Table 1-49 and presented in full within section A.1.5.

**Table 1-49: Summary of the annual in-combination impacts used in the PVA for great black-backed gull from Southern Coasts & Calf of Man pRamsar site.**

Scenario	Predicted adult mortalities	Increase in baseline mortality (%)	Decrease in survival rate
A: 99.91% avoidance rate	0.31	4.41%	0.002677223
B: 99.39% avoidance rate	2.07	29.55%	0.018145626

1.6.4.3 The PVA resulted in a predicted impact, which indicates that the median growth rate (and 95% confidence intervals) continues to be >1 and, therefore indicate that the population is predicted to increase in size under these modelled parameters (Table 1-50). The CGR also indicates the impact scenario is close to the baseline or the non-impacted predicted growth rate.



## MONA OFFSHORE WIND PROJECT

**Table 1-50: PVA outputs for great black-backed gull from Southern Coasts & Calf of Man pRamsar site.**

Year	Impact scenario	Median adult population size	Population change (%) since 2017	Median growth rate	2.5 percentile of growth rate	97.5 percentile of growth rate	Median CPS	Median CGR
2030	Baseline	506	12.58%	1.126	1.050	1.214	-	-
2030	Scenario A	506	12.34%	1.123	1.047	1.210	0.998	0.998
2030	Scenario B	497	10.43%	1.104	1.026	1.192	0.984	0.981
2065	Baseline	32,577	7,154.36%	1.126	1.119	1.134	-	-
2065	Scenario A	29,368	6,431.06%	1.123	1.116	1.130	0.900	0.997
2065	Scenario B	15,856	3,423.99%	1.104	1.097	1.111	0.486	0.980

1.6.4.4 As the results of the two PVAs undertaken for great black-backed gull from Southern Coasts & Calf of Man pRamsar site indicate an increasing population size with and without the predicted impacts, it can be concluded that there is no AEoI, beyond reasonable scientific doubt, when considering the Mona Offshore Wind Project in combination with other plans and projects.

1.6.4.5 There are no conservation objective for Ramsar sites, nor pRamsar sites and therefore there is no official objective to compare against.

## 1.7 Conclusions

1.7.1.1 As outlined in paragraph 1.2.1.4, the information presented in this Annex has been provided to support an appropriate assessment should one be required to be undertaken by the Competent Authority for the five pRamsar sites on the Isle of Man. The Applicant notes that this information has not been requested pre-application or post-application by any stakeholder or Interested Party in the Mona Offshore Wind Project examination.

1.7.1.2 The assessment of the Isle of Man pRamsar sites considered the potential for LSE on marine habitats, fish/shellfish, marine mammal and offshore ornithological features of these sites.

1.7.1.3 The HRA Stage 1 screening (see section 1.4) concluded that no sites with habitat features were required to be taken forward for further assessment as all habitat features are located beyond the 12 km Zol of the Mona Offshore Wind Project. The potential for LSE was identified for three pRamsar sites with fish, marine mammal and offshore ornithological features (Gob ny Rona, Maughold Head & Port Cornaa pRamsar, Southern Coasts & Calf of Man pRamsar and The Ayres pRamsar) which were taken forward to appropriate assessment in section 1.5.

1.7.1.4 Based on the evidence presented in Volume 2, Chapter 3: Fish and shellfish ecology (Document Reference F2.3 F02) and HRA Stage 2 ISAA, Part Two: SACs Assessments (Document Reference: E1.2 F02), it was concluded that for all features of all sites taken forward for full assessment, no AEoI is predicted as a result of the Mona Offshore Wind Project alone or in-combination with other plans and projects.

1.7.1.5 The assessment of offshore ornithological features concluded no AEoI from the Mona Offshore Wind Project for all three pRamsar sites screened in for appropriate

## MONA OFFSHORE WIND PROJECT

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assessment. In-combination assessments (section 1.5.4) were required for all bar (Manx shearwater from Southern Coasts & Calf of Man pRamsar site). The in-combination assessments predicted an increase in baseline mortality of >1% and therefore PVAs were undertaken to investigate the population impact. Following the PVAs, a conclusion of no AEol was reached for each pRamsar site from the Mona Offshore Wind Project alone in-combination with other plans and projects.

## 1.8 References

DAFF, 2008. Guidelines for the selection of biological Areas of Special Scientific Interest (ASSIs) on the Isle of Man, Volume 1 and 2.

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PVA modelling sheets seabird populations in SPAs. Available at: <https://www.nature.scot/doc/interim-guidance-apportioning-impacts-marine-renewable-developments-breeding-seabird-populations>

## Appendix A: PVA modelling parameters

### A.1.1 PVA input parameters for black-legged kittiwake from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site

#### A.1.1.1 Set up

The log file was created on: 2024-12-13 14:54:25 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

##	Package	Version
## popbio	"popbio"	"2.4.4"
## shiny	"shiny"	"1.1.0"
## shinyjs	"shinyjs"	"1.0"
## shinydashboard	"shinydashboard"	"0.7.1"
## shinyWidgets	"shinyWidgets"	"0.4.5"
## DT	"DT"	"0.5"
## plotly	"plotly"	"4.8.0"
## rmarkdown	"rmarkdown"	"1.10"
## dplyr	"dplyr"	"0.7.6"
## tidyr	"tidyr"	"0.8.1"

#### A.1.1.2 Basic information

This run had reference name "pRamsar\_KI\_Gob ny".

PVA model run type: simplescenarios.

Model to use for environmental stochasticity: betagamma.

Model for density dependence: nodd.

Include demographic stochasticity in model?: Yes.

Number of simulations: 5000.

Random seed: 15.

Years for burn-in: 5.

Case study selected: None.

#### A.1.1.3 Baseline demographic rates

Species chosen to set initial values: Black-legged kittiwake.

Region type to use for breeding success data: Global.

Available colony-specific survival rate: National. Sector to use within breeding success region: Global.

Age at first breeding: 4.

Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.

Number of subpopulations: 1.

Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults

## MONA OFFSHORE WIND PROJECT

Are baseline demographic rates specified separately for immatures?: Yes.

### A.1.1.4 Population 1

Initial population values: Initial population 156 in 2017

Productivity rate per pair: mean: 0.619 , sd: 0.121

Adult survival rate: mean: 0.854 , sd: 0.077

Immatures survival rates:

Age class 0 to 1 - mean: 0.79 , sd: 0.001 , DD: NA

Age class 1 to 2 - mean: 0.854 , sd: 0.077, DD: NA

Age class 2 to 3 - mean: 0.854 , sd: 0.077, DD: NA

Age class 3 to 4 - mean: 0.854 , sd: 0.077, DD: NA

### A.1.1.1 Impacts

Number of impact scenarios: 4.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

### A.1.1.2 Impact on Demographic Rates

Scenario A - Name: Collisions only

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.005349168, se: NA

Scenario B - Name: 50% displacement, 1% mortality plus collisions

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.006479999, se: NA

Scenario C - Name: 30% displacement, 3% mortality plus collisions

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.007384663, se: NA

Scenario D - Name: 70% displacement, 10% mortality plus collisions

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.021180790, se: NA

## MONA OFFSHORE WIND PROJECT

### A.1.1.3 Output:

First year to include in outputs: 2030

Final year to include in outputs: 2065

How should outputs be produced, in terms of ages?: breeding.adults

Target population size to use in calculating impact metrics: NA

Quasi-extinction threshold to use in calculating impact metrics: NA

### A.1.2 PVA input parameters for black-legged kittiwake from Southern Coasts & Calf of Man pRamsar site

#### A.1.2.1 Set up

The log file was created on: 2024-12-13 14:54:25 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

##	Package	Version
## popbio	"popbio"	"2.4.4"
## shiny	"shiny"	"1.1.0"
## shinyjs	"shinyjs"	"1.0"
## shinydashboard	"shinydashboard"	"0.7.1"
## shinyWidgets	"shinyWidgets"	"0.4.5"
## DT	"DT"	"0.5"
## plotly	"plotly"	"4.8.0"
## rmarkdown	"rmarkdown"	"1.10"
## dplyr	"dplyr"	"0.7.6"
## tidyr	"tidyr"	"0.8.1"

#### A.1.2.2 Basic information

This run had reference name "pRamsar\_KI\_Southern".

PVA model run type: simplescenarios.

Model to use for environmental stochasticity: betagamma.

Model for density dependence: nodd.

Include demographic stochasticity in model?: Yes.

Number of simulations: 5000.

Random seed: 15.

Years for burn-in: 5.

Case study selected: None.

#### A.1.2.3 Baseline demographic rates

Species chosen to set initial values: Black-legged kittiwake.

Region type to use for breeding success data: Global.

Available colony-specific survival rate: National. Sector to use within breeding success region: Global.

Age at first breeding: 4.

## MONA OFFSHORE WIND PROJECT

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Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.

Number of subpopulations: 1.

Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults

Are baseline demographic rates specified separately for immatures?: Yes.

### A.1.2.4 Population 1

Initial population values: Initial population 1,214 in 2017

Productivity rate per pair: mean: 0.619 , sd: 0.121

Adult survival rate: mean: 0.854 , sd: 0.077

Immatures survival rates:

Age class 0 to 1 - mean: 0.79 , sd: 0.001 , DD: NA

Age class 1 to 2 - mean: 0.854 , sd: 0.077, DD: NA

Age class 2 to 3 - mean: 0.854 , sd: 0.077, DD: NA

Age class 3 to 4 - mean: 0.854 , sd: 0.077, DD: NA

### A.1.1.4 Impacts

Number of impact scenarios: 4.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

### A.1.1.5 Impact on Demographic Rates

Scenario A - Name: Collisions only

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.005481432, se: NA

Scenario B - Name: 50% displacement, 1% mortality plus collisions

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.006604072, se: NA

Scenario C - Name: 30% displacement, 3% mortality plus collisions

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.007502184, se: NA



## MONA OFFSHORE WIND PROJECT

Scenario D - Name: 70% displacement, 10% mortality plus collisions

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.021198389, se: NA

### A.1.1.6 Output:

First year to include in outputs: 2030

Final year to include in outputs: 2065

How should outputs be produced, in terms of ages?: breeding.adults

Target population size to use in calculating impact metrics: NA

Quasi-extinction threshold to use in calculating impact metrics: NA

### A.1.3 PVA input parameters for common guillemot from Gob ny Rona, Maughold Head & Port Cornaa pRamsar site

#### A.1.3.1 Set up

The log file was created on: 2024-11-28 14:54:25 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

##	Package	Version
## popbio	"popbio"	"2.4.4"
## shiny	"shiny"	"1.1.0"
## shinyjs	"shinyjs"	"1.0"
## shinydashboard	"shinydashboard"	"0.7.1"
## shinyWidgets	"shinyWidgets"	"0.4.5"
## DT	"DT"	"0.5"
## plotly	"plotly"	"4.8.0"
## rmarkdown	"rmarkdown"	"1.10"
## dplyr	"dplyr"	"0.7.6"
## tidyr	"tidyr"	"0.8.1"

#### A.1.3.2 Basic information

This run had reference name "Guillemot\_Cumulative\_Rerun".

PVA model run type: simplescenarios.

Model to use for environmental stochasticity: betagamma.

Model for density dependence: nodd.

Include demographic stochasticity in model?: Yes.

Number of simulations: 5000.

Random seed: 15.

Years for burn-in: 5.

Case study selected: None.

#### A.1.3.3 Baseline demographic rates

Species chosen to set initial values: Common guillemot.

## MONA OFFSHORE WIND PROJECT

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Region type to use for breeding success data: Global.

Available colony-specific survival rate: National. Sector to use within breeding success region: Global.

Age at first breeding: 6.

Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.

Number of subpopulations: 1.

Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults

Are baseline demographic rates specified separately for immatures?: Yes.

### A.1.3.4 Population 1

Initial population values: Initial population 631 in 2017

Productivity rate per pair: mean: 0.583, sd: 0.075

Adult survival rate: mean: 0.94 , sd: 0.025

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 0.152 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 0.077, DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 0.098, DD: NA

Age class 3 to 4 - mean: 0.938 , sd: 0.107, DD: NA

Age class 4 to 5 - mean: 0.94 , sd: 0.025 , DD: NA

Age class 5 to 6 - mean: 0.94 , sd: 0.025 , DD: NA

### A.1.3.5 Impacts

Number of impact scenarios: 3.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

### A.1.3.6 Impact on Demographic Rates

Scenario A - Name: 50% displacement, 1% mortality

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.001871677, se: NA

Scenario B - Name: 70% displacement, 2% mortality

## MONA OFFSHORE WIND PROJECT

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.002246012, se: NA

Scenario C - Name: 70% displacement, 10% mortality

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.002620348, se: NA

### A.1.3.7 Output:

First year to include in outputs: 2030

Final year to include in outputs: 2065

How should outputs be produced, in terms of ages?: breeding.adults

Target population size to use in calculating impact metrics: NA

Quasi-extinction threshold to use in calculating impact metrics: NA

## A.1.4 PVA input parameters for common guillemot from Southern Coasts & Calf of Man pRamsar sites

### A.1.4.1 Set up

The log file was created on: 2024-11-28 14:54:25 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

##	Package	Version
## popbio	"popbio"	"2.4.4"
## shiny	"shiny"	"1.1.0"
## shinyjs	"shinyjs"	"1.0"
## shinydashboard	"shinydashboard"	"0.7.1"
## shinyWidgets	"shinyWidgets"	"0.4.5"
## DT	"DT"	"0.5"
## plotly	"plotly"	"4.8.0"
## rmarkdown	"rmarkdown"	"1.10"
## dplyr	"dplyr"	"0.7.6"
## tidyr	"tidyr"	"0.8.1"

### A.1.4.2 Basic information

This run had reference name "pRamsar\_GU\_Southern".

PVA model run type: simplescenarios.

Model to use for environmental stochasticity: betagamma.

Model for density dependence: nodd.

Include demographic stochasticity in model?: Yes.

Number of simulations: 5000.

Random seed: 15.

Years for burn-in: 5.

## MONA OFFSHORE WIND PROJECT

---

Case study selected: None.

### A.1.4.3 Baseline demographic rates

Species chosen to set initial values: Common guillemot.

Region type to use for breeding success data: Global.

Available colony-specific survival rate: National. Sector to use within breeding success region: Global.

Age at first breeding: 6.

Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.

Number of subpopulations: 1.

Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults

Are baseline demographic rates specified separately for immatures?: Yes.

### A.1.4.4 Population 1

Initial population values: Initial population 6,362 in 2017

Productivity rate per pair: mean: 0.583, sd: 0.075

Adult survival rate: mean: 0.94 , sd: 0.025

Immatures survival rates:

Age class 0 to 1 - mean: 0.56 , sd: 0.152 , DD: NA

Age class 1 to 2 - mean: 0.792 , sd: 0.077, DD: NA

Age class 2 to 3 - mean: 0.917 , sd: 0.098, DD: NA

Age class 3 to 4 - mean: 0.938 , sd: 0.107, DD: NA

Age class 4 to 5 - mean: 0.94 , sd: 0.025 , DD: NA

Age class 5 to 6 - mean: 0.94 , sd: 0.025 , DD: NA

### A.1.4.5 Impacts

Number of impact scenarios: 3.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

### A.1.4.6 Impact on Demographic Rates

Scenario A - Name: 50% displacement, 1% mortality

All subpopulations

## MONA OFFSHORE WIND PROJECT

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.001841824, se: NA

Scenario B - Name: 70% displacement, 2% mortality

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.002148795, se: NA

Scenario C - Name: 70% displacement, 10% mortality

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.002455766, se: NA

### A.1.4.7 Output:

First year to include in outputs: 2030

Final year to include in outputs: 2065

How should outputs be produced, in terms of ages?: breeding.adults

Target population size to use in calculating impact metrics: NA

Quasi-extinction threshold to use in calculating impact metrics: NA

## A.1.5 PVA input parameters for great black-backed gull from Southern Coasts & Calf of Man pRamsar site

### A.1.5.1 Set up

The log file was created on: 2024-12-14 14:54:25 using Tool version 2, with R version 3.5.1, PVA package version: 4.18 (with UI version 1.7)

##	Package	Version
## popbio	"popbio"	"2.4.4"
## shiny	"shiny"	"1.1.0"
## shinyjs	"shinyjs"	"1.0"
## shinydashboard	"shinydashboard"	"0.7.1"
## shinyWidgets	"shinyWidgets"	"0.4.5"
## DT	"DT"	"0.5"
## plotly	"plotly"	"4.8.0"
## rmarkdown	"rmarkdown"	"1.10"
## dplyr	"dplyr"	"0.7.6"
## tidyr	"tidyr"	"0.8.1"

### A.1.5.2 Basic information

This run had reference name "pRamsar\_GBBG\_Southern".

PVA model run type: simplescenarios.

Model to use for environmental stochasticity: betagamma.

Model for density dependence: nodd.

## MONA OFFSHORE WIND PROJECT

---

Include demographic stochasticity in model?: Yes.

Number of simulations: 5000.

Random seed: 15.

Years for burn-in: 5.

Case study selected: None.

### A.1.5.3 Baseline demographic rates

Species chosen to set initial values: Great black-backed gull.

Region type to use for breeding success data: Global.

Available colony-specific survival rate: National. Sector to use within breeding success region: Global.

Age at first breeding: 5.

Is there an upper constraint on productivity in the model?: Yes, constrained to 1 per pair.

Number of subpopulations: 1.

Are demographic rates applied separately to each subpopulation?: No.

Units for initial population size: breeding.adults

Are baseline demographic rates specified separately for immatures?: Yes.

### A.1.5.4 Population 1

Initial population values: Initial population 114 in 2017

Productivity rate per pair: mean: 1.061 , sd: 0.132

Adult survival rate: mean: 0.93 , sd: 0.001

Immatures survival rates:

Age class 0 to 1 - mean: 0.798 , sd: 0.092 , DD: NA

Age class 1 to 2 - mean: 0.93 , sd: 0.001, DD: NA

Age class 2 to 3 - mean: 0.93 , sd: 0.001, DD: NA

Age class 3 to 4 - mean: 0.93 , sd: 0.001, DD: NA

Age class 4 to 5 - mean: 0.93 , sd: 0.001, DD: NA

### A.1.1.7 Impacts

Number of impact scenarios: 2.

Are impacts applied separately to each subpopulation?: No

Are impacts of scenarios specified separately for immatures?: No

Are standard errors of impacts available?: No

Should random seeds be matched for impact scenarios?: No

Are impacts specified as a relative value or absolute harvest?: relative

Years in which impacts are assumed to begin and end: 2030 to 2065

### A.1.1.8 Impact on Demographic Rates

## MONA OFFSHORE WIND PROJECT

---

Scenario A - Name: 99.39 Avoidance Rate

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.018145626, se: NA

Scenario B - Name: 99.91 Avoidance Rate

All subpopulations

Impact on productivity rate mean: 0 , se: NA

Impact on adult survival rate mean: 0.002677223, se: NA

### **A.1.1.9      Output:**

First year to include in outputs: 2030

Final year to include in outputs: 2065

How should outputs be produced, in terms of ages?: breeding.adults

Target population size to use in calculating impact metrics: NA

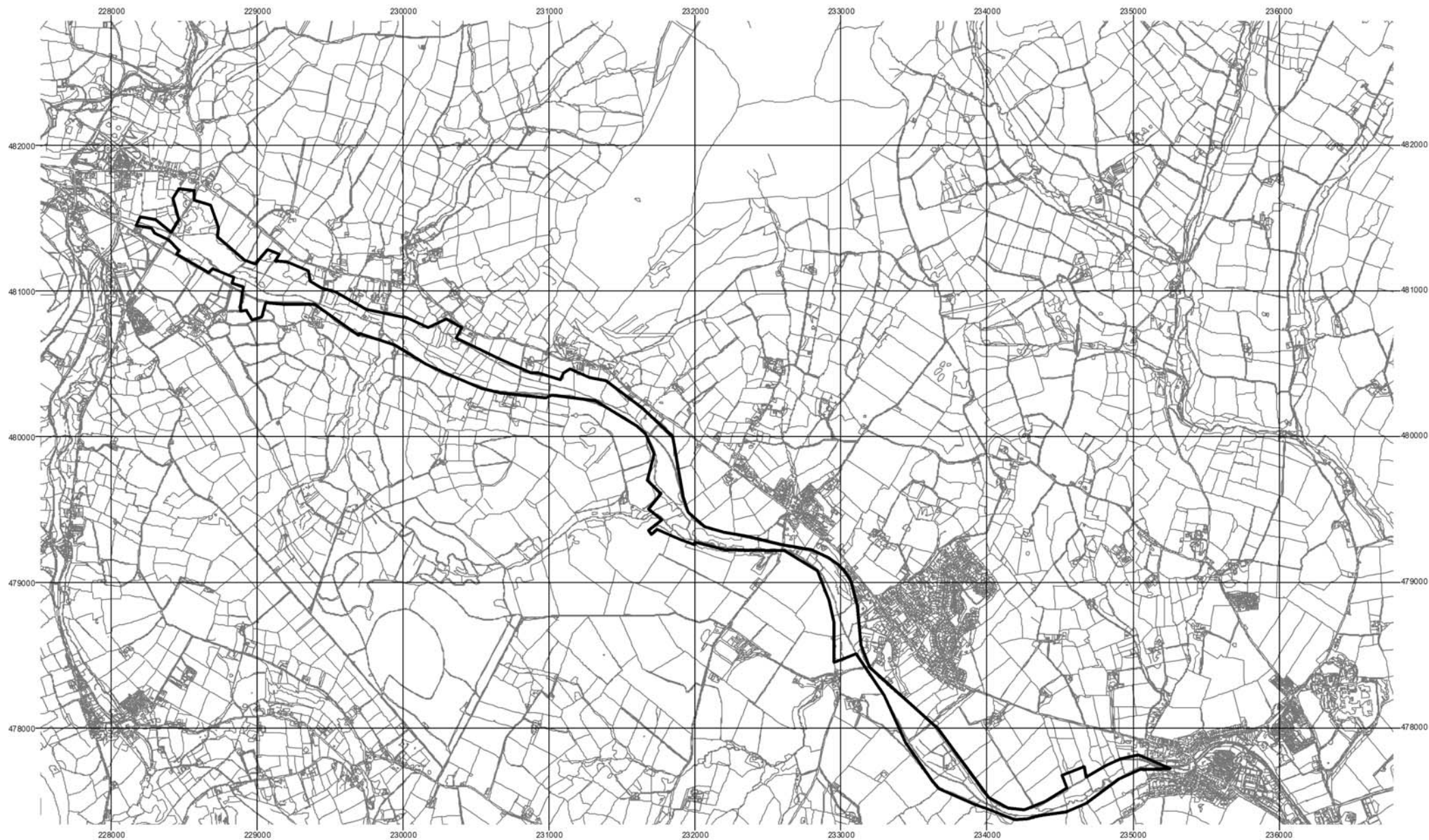
Quasi-extinction threshold to use in calculating impact metrics: NA




## Appendix B: pRamsar site maps from Annex 4 of UKOTCF (2005a)

# UK21004 Central Valley Curragh, Isle of Man

Isle of Man, Central Valley proposed Ramsar site



 Proposed Ramsar Site boundary

0 0.5 1 1.5 Kilometers





# UK21006 Dalby Peatlands, Isle of Man

878

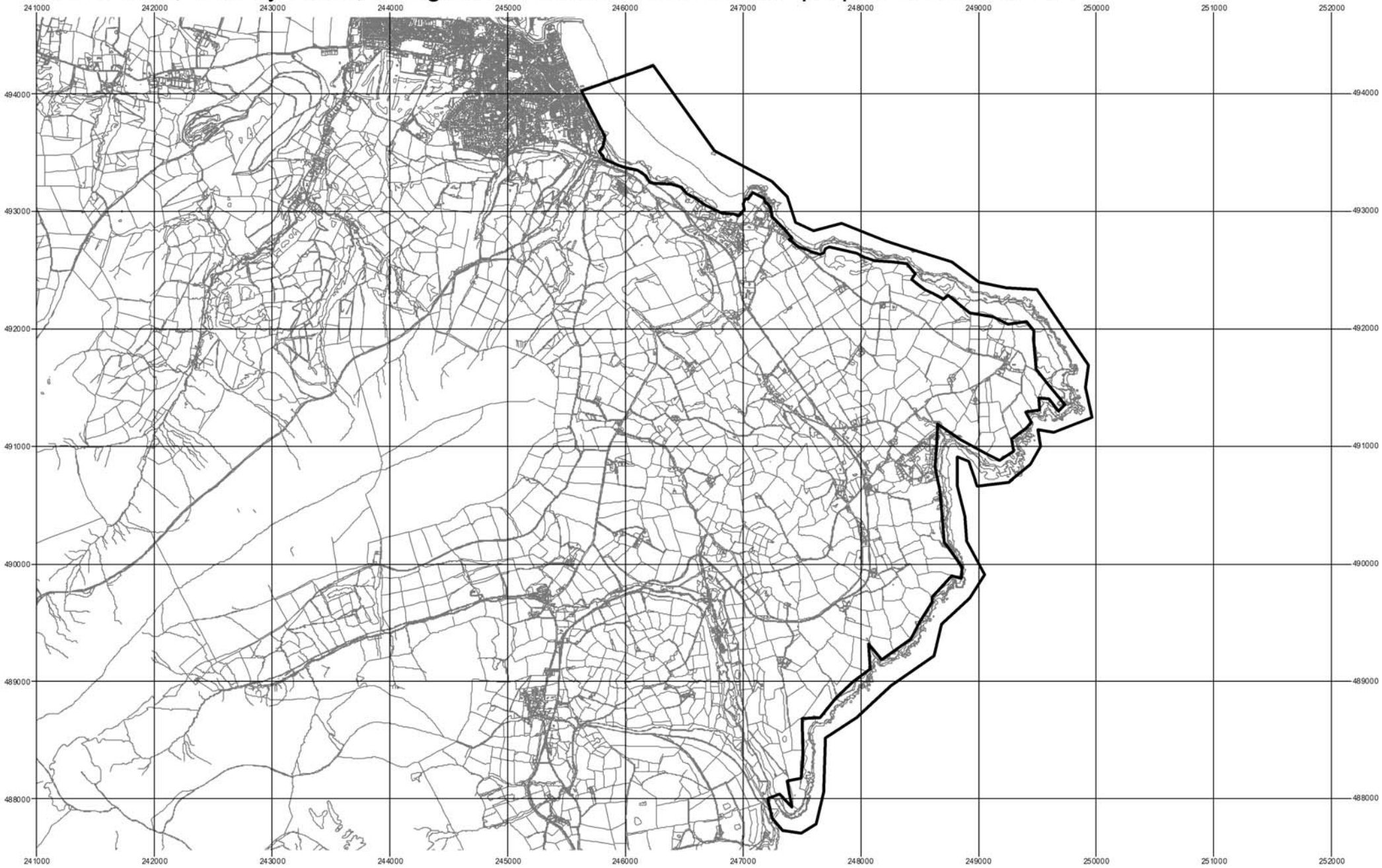


Isle of Man, Dalby Peatland proposed Ramsar site

□ Proposed Ramsar Site boundary



0 0.5 1 1.5 Kilometers



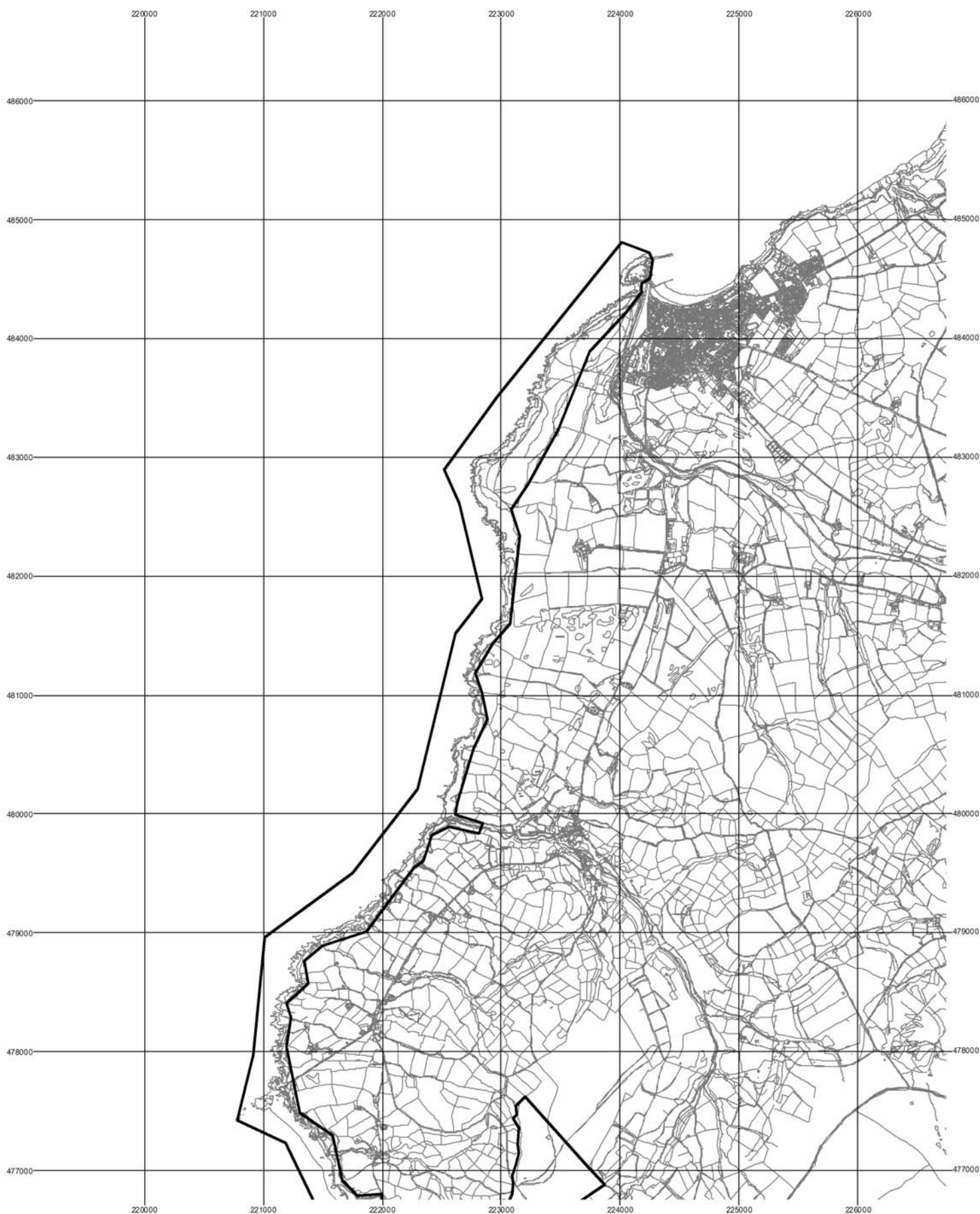
Proposed Ramsar Site boundary





# Isle of Man UK21003 Southern Coasts & Calf of Man (NW part) 872

## West Coast Cliffs (north) proposed Ramsar site



 Proposed Ramsar Site boundary

0 0.5 1 1.5 Kilometers





# Isle of Man UK21003 Southern Coasts & Calf of Man (W part)

## West Coast Cliffs (south) proposed Ramsar site

873



 Proposed Ramsar Site boundary

0 0.5 1 1.5 Kilometers




# UK21003 Southern Coasts & Calf of Man (SW part), Isle of Man

Isle of Man, Calf and Meayll Peninsular proposed Ramsar site

874



 Proposed Ramsar Site boundary

0 0.5 1 1.5 Kilometers





# UK21003 Southern Coasts & Calf of Man (S part) Isle of Man, Scarlett and Langness pRamsar site

