



Department
of Energy &
Climate Change

**RECORD OF THE HABITATS REGULATIONS ASSESSMENT UNDERTAKEN
UNDER REGULATION 61 OF THE CONSERVATION OF HABITATS AND
SPECIES REGULATIONS 2010 (AS AMENDED) FOR AN APPLICATION UNDER
THE PLANNING ACT 2008 (AS AMENDED)**

Project Title: Walney Extension Offshore Wind Farm

Date: 5th November 2014

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Introduction

Background

- 1.1 This is a record of the Habitats Regulation Assessment (HRA) that the Secretary of State (SoS) for Energy and Climate Change has undertaken under the Conservation of Habitats and Species Regulations 2010 (as amended) (the Habitats Regulations) and the Offshore Marine Conservation (Natural Habitats & c.) Regulations 2007 (as amended) (the Offshore Habitats Regulations) in respect of the Development Consent Order (DCO) and Deemed Marine Licence (DML) for the proposed Walney Extension Offshore Wind Farm and its associated infrastructure (the Project). For the purposes of these Regulations the SoS is the competent authority.
- 1.2 DONG Energy Walney Extension (UK) Ltd (hereafter the Applicant) has applied to the SoS for a Development Consent Order (DCO) under Section 37 of the Planning Act 2008 (as amended) for the construction and operation of a 750MW offshore wind farm, and its associated offshore and onshore infrastructure. The wind turbine array is 149km², only 23km² is within UK territorial waters (within 12 nautical miles of the coast) and the whole project is within the UK renewable energy zone. The Project proposed comprises the construction and operation of up to 207 wind turbine generators and a network of subsea inter-array cables, together with associated development offshore (three substation platforms and connection works of up to five export cable systems) and onshore (onshore export cable systems; an electrical substation compound; access roads and works areas), referred to as the 'Project'. The Project application is described in more detail in Section 0.
- 1.3 In England and Wales, offshore energy generating stations greater than 100 MW constitute nationally significant infrastructure projects (NSIPs) and applications for consent are subject to the requirements of the Planning Act 2008 (as amended). This Project constitutes an NSIP as it has a generation capacity of 750 MW.
- 1.4 The Project was accepted by the Planning Inspectorate (PINS) on 19th July 2013 and a three-member Panel of Inspectors (the Panel) was appointed as the Examining Authority (ExA) for the application. The examination of the Project application began on 12th November 2013 and completed on 12th May 2014. The Panel submitted its report of the examination, including its recommendation (the Panel's Report), to the SoS on 7th August 2014.
- 1.5 The SoS conclusions on habitats and wild birds issues contained in this HRA report have been informed by the ExA's Report, and further information and analysis, including a Report on the Implications for European Sites (RIES) and written responses to it.

Habitats Regulation Assessment (HRA)

- 1.6 Council Directive 92/43/EC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive) and Council Directive 2009/147/EC on the conservation of wild birds (the Birds Directive) aims to ensure the long-term survival of certain species and habitats by protecting them from adverse effects of plans and projects.
- 1.7 The Habitats Directive provides for the designation of sites for the protection of habitats and species of European importance. These sites are called Special Areas of Conservation (SACs). The Birds Directive provides for the classification of sites for the protection of rare and vulnerable birds and for regularly occurring migratory species. These sites are called Special Protection Areas (SPAs). SACs and SPAs are collectively termed European sites and form part of a network of protected sites across Europe. This network is called Natura 2000.
- 1.8 The Convention on Wetlands of International Importance 1972 (the Ramsar Convention) provides for the listing of wetlands of international importance. These sites are called Ramsar sites. UK Government policy is to afford Ramsar sites in the United Kingdom the same protection as European sites.
- 1.9 In the UK, the Habitats Regulations transpose the Habitats and Birds Directives into national law as far as the 12 nm limit of territorial waters. Beyond territorial waters, the Offshore Habitats Regulations serves the same function for the UK's offshore marine area. The Project straddles the 12 nm limit and so both sets of Regulations apply.
- 1.10 Regulation 61 of the Habitats Regulations provides that:
“.....before deciding to give consent, permission or other authorisation for, a plan or project which is likely to have a significant effect on a European site (either alone or in combination) and which is not directly connected with or necessary to the management of the site, the competent authority must make an appropriate assessment of the implications for the site in view of the site's conservation objectives.”
- 1.11 Regulation 25 of the Offshore Habitats Regulations contains similar provisions:
“.....before deciding to give consent, permission or other authorisation for, a plan or project which is to be carried out on any part of the waters or on or in any part of the seabed or subsoil comprising an offshore marine area or on or in relation to an offshore marine installation and which is likely to have a significant effect on a European marine site (either alone or in combination) and which is not directly connected with or necessary to the management of the site, the competent authority must make an appropriate assessment of the implications for the site in view of the site's conservation objectives.”
- 1.12 This Project is not directly connected with, or necessary to, the management of a European site or a European marine site. The Habitats Regulations require that, where the project is likely to have a significant effect (LSE) on any such site, an appropriate assessment (AA) is carried out to determine whether or not the project will adversely affect the integrity of the site in view of its

Conservation Objectives. In this document, the assessments as to whether there are LSEs, and, where required, the AAs, are collectively referred to as the HRA.

1.13 The HRA takes account of mitigation measures which are secured by requirements and conditions within both the DCO and DML.

1.14 This report should be read in conjunction with the following documents that provide extensive background information:

- The Planning Act 2008 (as amended) Walney Extension Offshore Wind Farm Examining Authority's Report of Findings and Conclusions and Recommendations to the SoS for Energy and Climate Change. 7 August 2014.
- Report on the Implications for European Sites Proposed Walney Extension Offshore Wind Farm. An examining authority report prepared with the support of the environmental services team, 14th April 2014. – termed "the RIES"
- Environmental Statement (the ES), June 2013.
- Applicant's report to inform Habitats Regulations Assessment, June 2013.
- Development Consent Order as made by the SoS dated 6th November 2014 (DCO).
- Relevant Representations Natural England and JNCC. 20th September 2013.
- Applicant's Clarification Note - Export cable installation and maintenance within Morecambe Bay SAC and SPA. 27th November 2013.
- Written Representations of Natural England. 16th December 2013.
- Response to First Questions Natural England. 16th December 2013 (Doc Ref: D1-037).
- Applicant's Clarification Note: Collision risk modelling Options and Potential Collision Height – updated. 31st January 2014.
- Applicant's Clarification note on HDD impact on Morecambe Bay SAC and Belted Beauty moth (*Lycia zonaria*). February 2014.
- Applicant's clarification note: Herring gull feature of Morecambe Bay SPA collision risk apportioning. February 2014.
- Applicant's clarification note: lesser black-backed gull in-combination collision risk assessment and SPA apportioning, March 2014.
- Applicant's clarification note - screening for SPA breeding birds outside of the breeding season. March 2014.
- Natural England's written summary from the Issue Specific Hearings held on 27-28th March 2014.
- Natural England comments on the draft DCO and Report on the Implications for European Sites 20th April 2014.

1.15 The key information in these documents and written representations is summarised and referenced in this report.

The RIES and Statutory Consultation

- 1.16 Under the Habitats Regulations the competent authority must, for the purposes of an AA, consult the appropriate nature conservation body and have regard to any representation made by that body within such reasonable time as the authority specify.
- 1.17 Natural England (NE) is the Statutory Nature Conservation Body (SNCB) for England and for English waters within the 12 nm limit. During the course of the examination, new arrangements came into force where NE took over sole responsibility for providing advice for offshore renewable projects up to 200 nm. Natural Resources Wales (NRW) is the Statutory Nature Conservation Body for Welsh waters and the Department of the Environment Northern Ireland (DOENI), has responsibility for European sites within Northern Irish waters.
- 1.18 The ExA, with support from the Planning Inspectorate (PINS), prepared a Report on the implications for European Sites (RIES), based on working matrices prepared by the Applicant. The RIES documented the information received during the examination and presented the ExA's understanding of the main facts regarding the HRA to be carried out by the SoS.
- 1.19 The RIES was published on PINS planning portal website and circulated to interested parties on 14th April 2014 for a period of 21 days for the purposes of statutory consultation. The RIES, and the written responses to it, have been taken into account in this assessment. There were responses to the RIES consultation from the Applicant and NE.
- 1.20 The SoS is content to accept the ExA's recommendation that the RIES, and written responses to it, represents an adequate body of information to enable the SoS to fulfil his duties in respect to European sites and species.

Development Description

Development Components

- 2.1 The offshore array is proposed to cover approximately 149 km², with a maximum installed capacity of 750 MW and up to 207 wind turbines. The offshore components of the Project include:
- Up to 207 wind turbines generators;
 - Turbine monopile foundations (no diameter greater than 9 metres) ;
 - Offshore inter-array cables between the turbines and the substations;
 - Up to three offshore substation;
 - Onshore export cables(s); and
 - Onshore substation.
- 2.2 Full details of the infrastructure to be used in the Development are detailed in Schedule 1, part 1 of the DCO.

Rochdale Envelope

- 2.3 In this Project the Applicant has adopted a 'Rochdale Envelope' approach within their Environmental Statement (ES). The Rochdale Envelope is a term used in planning to reflect that often a developer will not know all of the details associated with the proposal at the time of application. The Rochdale Envelope allows the Applicant to set out the broad range of options under consideration and then carry out an ES based on the worst case scenario (maximum adverse scenario) for each of those options. These options are used within the ES to assess the significance of the Project's environmental effects. This allows the Applicant to apply for a DCO that allows some flexibility in the final design of the Project whilst providing certainty that no greater environmental effects than those described in the ES can occur, providing the final project design lies within the options assessed.
- 2.4 In this case, the precise siting of turbines within the application boundary as well as the foundation type, turbine model, substations and export/ inter-array cable route systems and landfall will be determined post-consent, once detailed geotechnical seabed investigations, foundation and engineering design, economic assessments and the selection and appointment of equipment and contractors have taken place (ES chapter 4). The Applicant therefore seeks to retain flexibility in the final project design and the DCO has been framed to allow for multiple design options in accordance with the Rochdale Envelope concept. The ES sets out these multiple options for a number of project components including indicative specifications e.g. maximum number of turbines is 207; rotor diameter between 120m and 200m; blade to tip height 142m to 222m.
- 2.5 The ES is therefore based on the assessment of a maximum adverse scenario (the realistic worst case) in environmental terms. The Project is however, bound by the DCO application

boundary, which sets out areas within which the infrastructure can be located, together with various technical restrictions.

Development stages

Construction

- 2.6 The precise construction programme and sequence of works was not known by the Applicant during the examination. Chapter 4 of the Applicant's ES outlines an indicative programme. This has a 5 year construction programme starting in 2015 and ending by 2020. The offshore construction programme will have a duration of up to 4.5 years and commence in spring 2016. They will schedule works all year round, but with the majority of works performed in spring and summer when the environmental conditions are more benign. Certain works have seasonal restriction outlined within the Project's DCO. The onshore construction programme is scheduled from 2015 until the end of 2016, with most works being carried out throughout the year from Monday to Saturday.

Operation and Maintenance

- 2.7 The overall strategy for offshore operation and maintenance has not been finalised for the Project. This will be finalised once the onshore base location is chosen and more detail on the technical specifications for the wind farm has been decided. There will be consideration of parameters such as onshore facilities, parking facilities, harbour facilities, service vessels, staff and traffic. The design envelope is set out by the Applicant within the ES chapter 4.

Decommissioning

- 2.8 Project decommissioning is regulated under the Energy Act 2004. Broadly speaking, the SoS shall require a person who is responsible for an offshore renewable energy installation to prepare a costed decommissioning programme and ensure that it is carried out. The SoS can approve, modify or reject a decommissioning programme at any point. It is not possible at this stage to predict with any certainty what the European and Ramsar site context of the Project will be in the future as sites may increase or decrease in importance over that time. Decommissioning activities will need to comply with all relevant UK legislation at the time. Separate authorisations will also be required as part of decommissioning, after the preparation of an ES and HRA by the authorising body (including appropriate consultation with the relevant statutory nature conservation bodies).
- 2.9 However, if the environmental baseline were to be similar to the current situation, then the impacts of decommissioning of the Project could be expected to be similar to the anticipated impacts of construction, without the impacts of piling. There is no reason to suppose that the impacts of decommissioning will cause an adverse effect on site integrity and on this basis, the SoS considers that it is reasonable not to include a detailed discussion on decommissioning impacts in this report. He is satisfied that decommissioning effects will be addressed fully by the

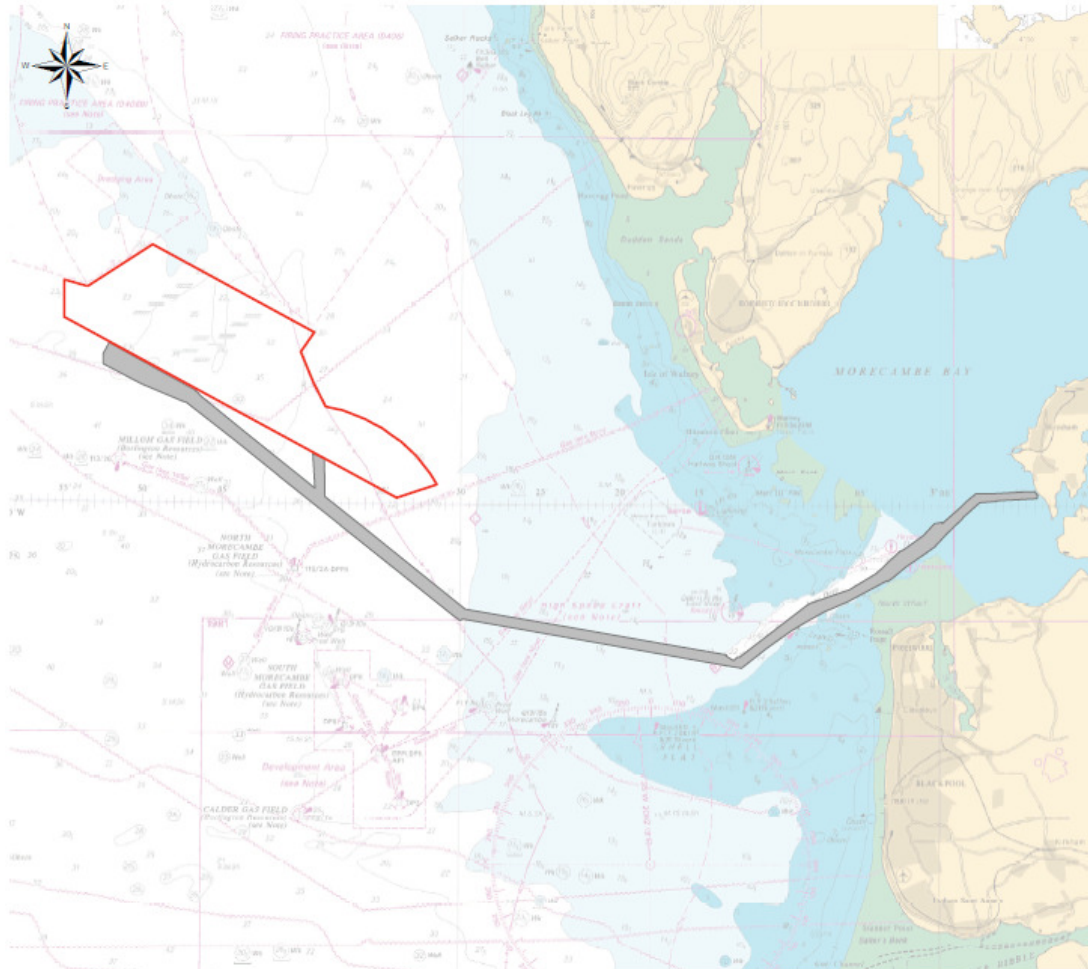
relevant authorities, prior to decommissioning and in light of more detailed information on decommissioning processes and environmental conditions at that time.

Development location and designated sites

Location

3.0 The Project is an extension to the existing Walney I and Walney II offshore wind farms. The offshore elements of the Project are located NW of the existing wind farm in the Irish Sea, approximately 19km west-southwest of Walney Island in Cumbria, 26 km southwest of the Millom coast in Cumbria, 35 km northwest of the Fleetwood and Blackpool coast, and 31 km southeast from the Isle of Man. A map of the array and offshore export cable is given at *Figure 1*.

Figure 1 Map of Offshore wind farm site and cable corridor (from the Applicant's ES)



European and International Sites

- 3.1 In its screening matrices, the RIES considered 67 European sites. There is significant overlap between SPA and Ramsar designations, so for the purposes of this assessment; the Ramsar designations are considered in parallel with the SPA designation as all relevant species are covered by both designations.
- 3.2 The study area for the Project was assessed by the Applicant as either the works area, buffer area and a wider area to reflect the spatial scope of potential effects on European site features i.e.
- annex I habitat – works area plus buffer zone
 - fish – eastern Irish sea
 - marine mammals – Irish sea zone
 - passage and over-wintering birds – works area plus 4km buffer zone
 - breeding seabird colonies – the zone of influence for seabirds during the breeding season is defined by the mean maximum foraging range from the colony (using values from Thaxter et al. 2012).
- 3.3 Natural England provided comments on the RIES and did not disagree with this approach. NRW and the Northern Irish Environment Agency provided comments during the examination however they did not provide comments on the REIS.

Likely Significant Effects Test

- 4.1 Under Regulation 61 of the Habitats Regulations, the SoS must consider whether a development will have a likely significant effect (LSE) on a European site, either alone or in combination with other plans or projects. A LSE is, in this context, any effect that may be reasonably predicted as a consequence of a plan or project that may affect the conservation objectives of the features for which the site was designated, but excluding trivial or inconsequential effects. An AA is required if a plan or project is likely to have a significant effect on a European site, either alone or in combination with other plans or projects.
- 4.2 The purpose of this test is to identify LSEs on European sites that may result from the Project and to record the SoS's conclusions on the need for an AA and his reasons for screening activities, sites or plans and projects for further consideration in the AA. For those features where a LSE is identified, these must be subject to an AA. This review of potential implications can be described as a 'two-tier process' with the LSE test as the first tier and the review of effects on integrity (AA) as the second tier.
- 4.3 This section addresses this first tier of the HRA, for which the SoS has considered the potential impacts of the Project both alone and in combination with other plans and projects on each of the interest features of the European sites identified in the RIES (and listed in paragraph 5.63) to determine whether or not there will be an LSE.

Likely Significant Effects

- 4.4 The RIES sets out the potential impacts of each stage of the Project and describes if these could impact on a European site's features. The RIES also describes potential impacts from this project on the European sites identified within the Applicant's HRA. For birds this included impacts such as disturbance/ displacement from vessel movement and pile driving impacting on prey species during construction of the project. During operation of the wind turbines there could also be displacement of birds from the wind farm site, direct collision with the turbines and a potential for the wind farm to cause a barrier to the movement of migrating birds.
- 4.5 The Secretary of State considers that LSEs could not be ruled out for breeding Lesser Black-Backed Gull, Herring Gull, Manx Shearwater and intertidal mudflats and sandflats as a result of the Project alone. These are features of five European sites and an additional two sites may be affected when the Project is considered in combination with other plans and projects.
- 4.6 These sites and features are shown in *Table 1* and have been taken forward to the AA in section 5 below.

Table 1 Sites where an LSE could not be ruled out.

Site	Feature	Effect	Project Alone	Project In combination
Bowland Fells SPA	lesser black-backed gull (breeding)	Turbine Collision	Y	Y
Aberdaron Coast and Bardsey Island SPA	Manx shearwater (breeding)	Displacement during construction and operations	Y	Y
Copeland Islands SPA	Manx shearwater (breeding)	Displacement during construction and operations	Y	Y
Morecambe Bay SPA/Ramsar	lesser black-backed gull (breeding) & Herring gull (breeding)	Turbine Collision	Y	Y
Morecambe Bay SAC	Intertidal mudflats and sandflats not covered by seawater at low tide	Cable installation / rock armour	Y	Y
Ribble and Alt Estuaries SPA/Ramsar	Lesser black-backed gull (breeding)	Collision	Y	Y
Skokholm and Skomer SPA	Manx shearwater (breeding)	Displacement during construction and operation	Y	Y

4.7 During the examination, LSEs were ruled out for pink-footed goose and the whooper swan features of the Martin Mere, Morecambe Bay and Ribble and Alt Estuaries SPAs. NE's ornithologist considered that that potential collision impacts for both species would be "immeasurable against the level of background mortality allowing for measurement error and variability." (Dr Alex Banks, submission to PINS 4 March 2014). In reaching this conclusion, NE accepted that a 99% avoidance rate for swans and geese uses the best available evidence.

4.8 LSEs were also ruled out for the saltmarsh feature of Morecambe Bay SAC due to Horizontal Directional Drilling (HDD) for the installation of the export cabling and this is documented in NE's comments on the HDD feasibility review (update to Statement of Common Ground, 25 March 2014). NE consider that the risk of breakout of drilling mud is highly to extremely unlikely. If it were to occur, the worst case impacted area would be an estimated 0.033% of the total SAC saltmarsh feature area – a very small amount.

4.9 LSEs for red throated diver and common scoter features of Liverpool Bay SPA were ruled out due to the displacement and disturbance effects of cable laying. This was on the basis of the very low number of birds recorded on the cable route; the fact that the cable installation operation will result in only temporary disturbance; and slow moving boat traffic .

4.10 LSEs for the overwintering bird features of Morecambe Bay SPA/ Ramsar were ruled out due to a restriction in the timing of construction to avoid disturbance and displacement effects. The DCO for the Project within the deemed marine licence (8) requires that the construction period in the inter-tidal area must fall outside October to March, and no working two hours either side

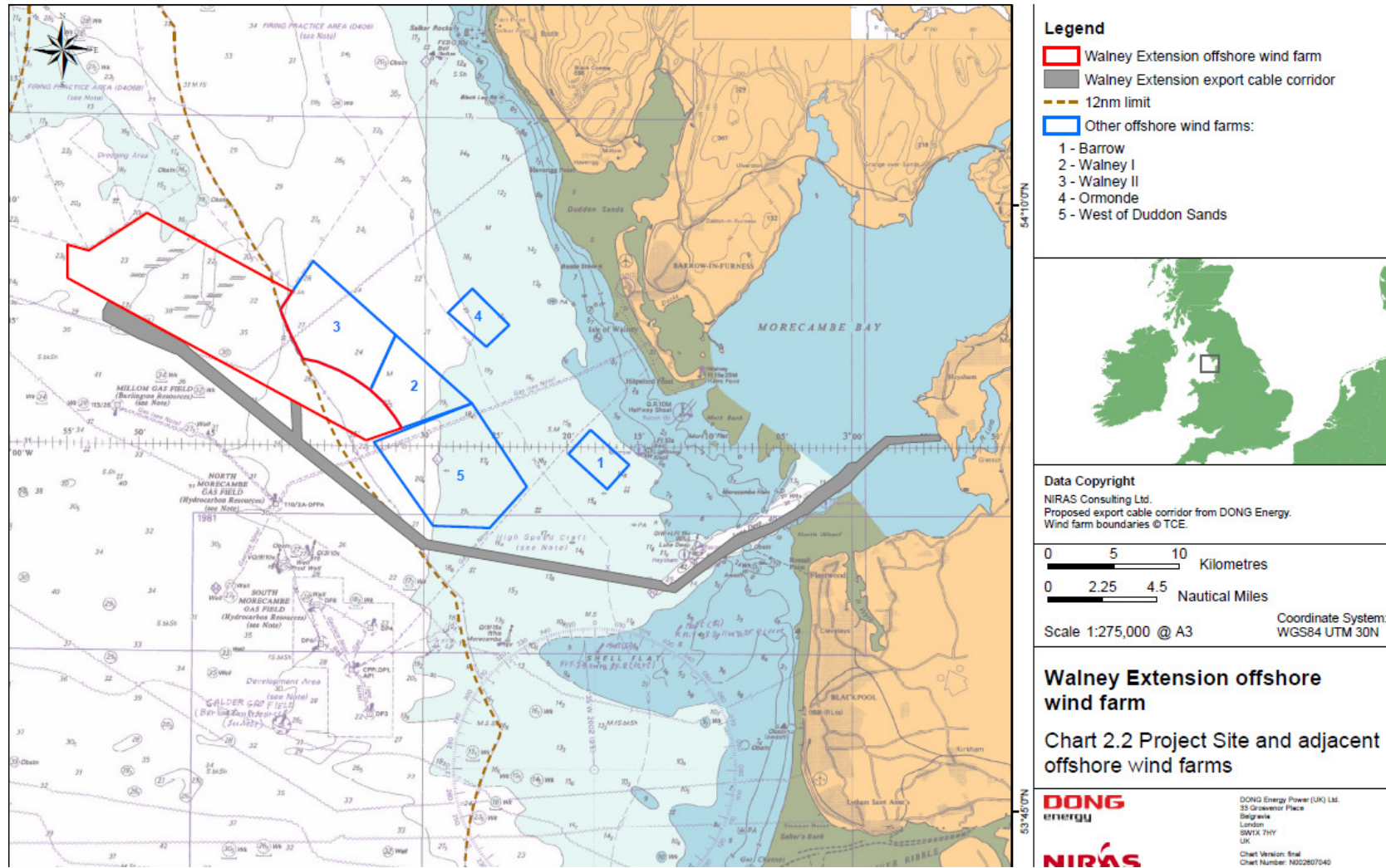
of high tide from the 01st -14th April. The Applicant provided a clarification note for SPA/Ramsar birds outside the breeding season assessing the impact from the Project and found that there is no potential for LSE across the full annual cycle as a result of displacement or collision effects on those SPAs for which the Project site is within the bird's foraging range

In combination effects

- 4.11 Under the Habitats Regulations, the SoS is obliged to consider whether other plans or projects in combination with the Project might affect European sites. In this case there are a number of other plans and projects which could potentially affect some of the same European sites as the Project. These are listed in the RIES with adjacent sites are shown in *Figure 2*¹.
- 4.12 The potential for LSEs in combination with other plans and projects could not be ruled out for features at 7 sites (see *Table 1*) in England, Wales and Northern Ireland. LSEs on all the other qualifying features at the other sites were excluded with the agreement of all parties.

¹ Since the examination Centrica have announced that it will not proceed with its Celtic Array Zone (Rhiannon). Burbo Bank Extension has also been consented by the SoS.

Figure 2 Project site and adjacent offshore wind farms from the Applicant's shadow HRA



Conclusions on Likely Significant Effects

- 4.13 The SoS considers that sufficient information has been provided to inform a robust assessment in line with his duties under the Habitats Regulations. His conclusions that an appropriate assessment is required for the features and sites set out in *Table 1* are in accordance with the views of Natural England as statutory nature conservation advisors, set out in the Statement of Common Ground between the Applicant and NE and are supported by the RIES.
- 4.14 He notes, however, the ExA's view that "... In light of the above conclusions on the absence of LSE that the SoS, as competent authority, does not need to carry out [an] appropriate assessment." (5.74 Panel's Report). The SoS considers, however, that there are potential pathways for impacts on European sites that are not trivial and has therefore undertaken an AA as required under the Habitats Regulations.

Appropriate Assessment

Test for Adverse Effect on Site Integrity

- 5.1 The requirement to undertake an AA is triggered when a competent authority, in this case the SoS, determines that a plan or project is likely to have a significant effect on a European site either alone or in combination with other plans or projects. Guidance issued by the European Commission states that the purpose of an AA is to determine whether adverse effects on the integrity of the site can be ruled out as a result of the plan or project, either alone or in combination with other plans and projects, in view of the site's conservation objectives (European Commission, 2000).
- 5.2 The purpose of this AA is to determine whether or not adverse effects on the integrity of those sites and features during the LSE test can be ruled out as a result of the Project alone or in combination with other plans and projects in view of the site's conservation objectives and using the best scientific evidence available.
- 5.3 There is significant overlap between SPA and Ramsar designations so for the purposes of this assessment, consideration of the Ramsar designations will be done in parallel with the SPA designations.
- 5.4 If the competent authority cannot ascertain the absence of an adverse effect on site integrity within reasonable scientific doubt, then under the Habitats Regulations, alternative solutions should be sought. In the absence of an acceptable alternative, the project can proceed only if there are imperative reasons of overriding public interest (IROPI) and suitable compensation measures identified. Considerations of IROPI and compensation are beyond the scope of an AA.

Conservation Objectives

- 5.5 Guidance from the European Commission indicates that disturbance to a species or deterioration of a European site must be considered in relation to the integrity of that site and its conservation objectives (European Commission, 2000). Section 4.6.3 of that guidance defines site integrity as:

"...the coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and/or populations of species for which the site is or will be classified."

- 5.6 Conservation objectives outline the desired state for a European site, in terms of the interest features for which it has been designated. If these interest features are being managed in a way which maintains their nature conservation value, they are assessed as being in a 'favourable condition'. An adverse effect on integrity is likely to be one which prevents the site from making the same contribution to favourable conservation status for the relevant feature as it did at the time of its designation (English Nature, 1997).

- 5.7 There are no set thresholds at which impacts on site integrity are considered to be adverse. This is a matter for interpretation on a site-by-site basis, depending on the designated feature and nature, scale and significance of the impact.
- 5.8 Conservation objectives have been used by the SoS to consider whether the Project has the potential for having an adverse effect on a sites' integrity, either alone or in combination.
- 5.9 The potential for the Project to have an adverse effect is considered for each site in turn.

Bowland Fells SPA

- 5.10 The Bowland Fells are an extensive upland area in Lancashire; its major habitats are heather-dominated moorland and blanket mire. These habitats help to support important populations of upland breeding birds, especially breeding merlin (*Falco columbarius*) and hen harrier (*Circus cyaneus*). The site covers approximately 16,000 ha and is approximately 55 km from the Project. The Conservation Objectives for the site are shown in *Table 2*.
- 5.11 The SPA Review in 2001 recommended the addition of breeding lesser black-backed gulls (*Larus fuscus*) to the citation, as such they have been considered within this AA. The Bowland Fells SPA citation lists the breeding population of lesser black-backed gulls as being 13,900 pairs representing up to 11.2% of the breeding Western Europe/ Mediterranean/ Western Africa population. There has been a steep decline in lesser black-backed gull populations the past 12 years².

Table 2 The Conservation Objectives for the Bowland Fells SPA.

Conservation Objectives	<p>Avoid the deterioration of the habitats of the qualifying features, and the significant disturbance of the qualifying features, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving the aims of the Birds Directive.</p> <p>Subject to natural change, to maintain or restore:</p> <ul style="list-style-type: none"> • The extent and distribution of the habitats of the qualifying features; • The structure and function of the habitats of the qualifying features; • The supporting processes on which the habitats of the qualifying features rely; • The populations of the qualifying features; • The distribution of the qualifying features within the site. <p>Qualifying Features:</p> <ul style="list-style-type: none"> • Hen harrier (Breeding); <i>Circus cyaneus</i> • Merlin (Breeding); <i>Falco columbarius</i> <p>Additional Qualifying Features Identified by the 2001 UK SPA Review:</p> <ul style="list-style-type: none"> • Lesser black-backed gull (Breeding); <i>Larus fuscus</i>
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- 5.12 The RIES indicated that there was potential for a LSE on this site because of the potential for an increase in collision risk impacting on lesser black-backed gulls feature as a result of the Project alone and in combination with other plans and projects.

² JNCC seabird monitoring programme data & JNCC Seabird Population Trends and Causes of Change: 1986-2013 Report

Estimating and understanding the effects of increased collision risk

- 5.13 There are two parts to estimating collision mortality. The first is to understand the number of birds passing through the swept area of the turbines within the wind farm. This is determined by calculating the number of birds which are likely to be passing through the wind farm and then factoring in the heights above sea level at which various species fly at to determine the numbers of birds at collision risk height. This calculation is done using a mathematical model, the Band model being the most commonly used. There are several different versions of the Band model which use bird flight height in different ways to produce different estimates of collision risk. Band models 1 and 2 (known as the basic Band model) assume that all individuals of a species of bird fly at the same height. For Band model 1, that height is determined by aerial or *in situ* boat surveys. For Band model 2, that height is based on published literature from Cook *et al* (2012). Band model 3 (known as the extended Band model) uses detailed flight height data (from Cook *et al*, 2012) to calculate the proportional risk to a bird according to its location within the swept rotor space. The rationale being that if a bird is closer to the nacelle (houses all of the generating components) then it is at greater risk of collision than if at the edge of the blade.
- 5.14 The second step to estimating collision mortality is to define the percentage of birds that are likely to make a behavioural response to the presence of a wind farm (or to an individual turbine) so as to avoid flying on a path that puts them at risk of collision with the rotating turbine blades. This is known as the avoidance rate (AR). The choice of AR has a significant influence on the number of predicted collisions. The overall AR will be the result of a combination of factors including macro-avoidance (of the whole wind farm, by diverting over or around it) and micro-avoidance (ability to avoid collision with a turbine blade once within a wind farm). In practice, the actual AR for any given location will also be affected by site-specific and temporal variations, including the layout of turbines, weather and visibility, whether the birds are foraging or migrating and also whether they are part of a large flock.
- 5.15 Whilst collision AR can be generic, where essentially the same rate of turbine blade avoidance is assumed for a wide range of bird species, irrespective of any behavioural assumptions or empirical observations, it can also be tailored to a species or a group of species on the basis of qualitative assessments (taking known behaviours including manoeuvrability into account) and empirical data (such as surveys of actual bird behaviours for example blade avoidance, or mortality impacts evidenced by recovered dead bird counts). Species-specific AR have been developed by Scottish Natural Heritage to take into account factors such as the behaviour patterns, reactions, size and agility of different bird species (Scottish Natural Heritage, 2010).
- 5.16 Once the number of birds expected to collide with the wind turbines have been calculated, the next step is to determine what impact that will have on the species population on a recurring annual basis. There are several methods of doing this, and the Applicant's shadow HRA has used Potential Biological Removal (PBR) analysis to calculate this. The Applicant's approach was agreed with NE (Natural England's Written Summary of hearings 3 April 2014) and follows a similar approach to the analysis done for Burbo Bank Extension Wind Farm. The analysis

undertaken for the Burbo Bank Extension project³ considers the same set of in combination projects as this Project and also considers the same set of lesser black-backed gull SPA colonies.

5.17 PBR analysis quantifies the potential level of additional mortality which could occur on an annual basis without resulting in a long term population decline. One of the key parts of the PBR calculation is determining what the recovery factor (f factor) for a species is. This value (ranging between 0.1 and 1.0) is intended to compensate for the inherent uncertainties present when making estimates about impacts upon a population. A recovery factor of 0.1 is often used for endangered species/populations where the risks of getting a prediction wrong will have serious consequences for that species/population. Natural England's written representation of the 16th December 2013 advice is that $f = 0.3$ is the maximum that should be used for a European protected site. They also advise that more conservative values might be appropriate at Bowland Fells SPA and Morecambe Bay SPA where there have been large-scale population declines.

Lesser black-backed gulls – alone

5.18 The Applicant submitted a clarification note to assess lesser black-backed gull in combination collision risk assessment and SPA apportioning. This report suggests that annually two collisions can be apportioned to this SPA from the Project alone. This is from the 24 predicted breeding season bird collisions at the Project site. This report uses 2012 band model option 2 and a 98% avoidance rate. This approach was agreed by NE (written representation 16th December 2013). Options 1 and 2 are recommended by NE as these have been mathematically tested to their acceptance. The Applicant has also looked at option 3, however, JNCC and NE did not advise its use because of reservations regarding some of the underpinning assumptions.

5.19 NE in their written representation (16th December 2013) acknowledge that the predicted 24 collisions are unlikely to have an adverse effect on any of the Bowland Fells SPA, Morecambe Bay SPA and Ribble and Alt Estuaries SPA.

5.20 The Applicant used PBR analysis, within their shadow HRA and clarification note, to estimate the number of birds which could be sustainably removed from the population every year without causing a long term decrease in numbers. NE's written representation advises a recovery factor of between 0.1 and 0.3 for this SPA. The PBR analysis showed that between 202 to 67 birds could be removed from the population on an annual basis without affecting the population in the long term. The predicted number of birds that could be sustainably removed from the population are shown below, correlated with different recovery factors.

- A recovery factor of 0.3 = 202;
- A recovery factor of 0.2 = 134.7;
- A recovery factor of 0.1 = 67.4

³ DONG Energy – Appendix 9 – lesser black-backed gull collision risk modelling: An update to the in-combination assessment submitted for the deadline of 5th February 2014.

- 5.21 The results of the CRM and the PBR analysis demonstrate that the Project alone will not have an adverse effect upon this European site. The SoS is of the view that the additional lesser black-backed gull mortality levels as a result of the Project will not prevent the site from achieving favourable conservation status in line with the site's published conservation objectives. This is because the estimated annual mortality (of around 2 birds) is much lower than the population could withstand without experiencing a long term population decline (67 birds using the most conservative figures).
- 5.22 NE confirmed that they could conclude no adverse effects on integrity of the SPA beyond reasonable scientific doubt (Written Summary of hearings 3 April 2014, NE and the Applicant's statement of common ground). **The SoS is therefore satisfied that the Project (when considered alone) will not have an adverse effect upon the integrity of the Bowland Fells SPA as a result of the increased collision risk to lesser black-backed gulls.**

Lesser black-backed gulls in combination

- 5.23 An LSE on the lesser black backed gull feature of Bowland Fells SPA could not be ruled out when collisions as a result of the project were considered in combination with nine other consented offshore wind farm projects. These projects are listed in Table 3.
- 5.24 The Applicant's clarification note found that 24 collisions per breeding season on lesser black-backed gulls from the Bowland Fells SPA from the Project and wind farms within tiers 1-4. This includes all wind farms that are operational, built, under construction, are consented or consent is being examined. They undertook an assessment using a number of stages. Stage F is where the Applicant adjusts historic collision risk model (CRM) estimates to take account of changes in colony size from the baseline surveys to the current estimates. Stage G includes a correction level from the CRM estimates to account for the non-breeding birds within the population. A 15% correction level and methodology was agreed with NE during the 3rd issue specific hearing on the 27-28th March 2014.
- 5.25 Burbo bank extension received consent on the 26th September 2014 which was subsequent to the end of examination of this Project. As this is now consented it means that this project would now fall within tier 1-3 projects. The SoS has considered therefore considered this project as a tier 1-3 rather than tier 4 project as it was during examination.

Table 3 Estimated lesser black-backed gull breeding period collisions (CRM Option 2) at analysis Stage F and Stage G for Morecambe Bay (MB), Ribble & Alt Estuaries (R&A) and Bowland Fells (BF) SPAs adapted from the Applicant's clarification note.

S t a g e	Analysis description	SPA	Projects considered in combination										
			Tiers 1 - 3										
			Walney Extension	Walney I & II	West of Duddon Sands	Ormonde	Gwynt y Môr	Burbo Bank	Rhyl Flats	North Hoyle	Barrow	Burbo Bank Extension	Total
F	CRM tracking breeding population	BF	2	2	2	1	1	0	0	0	1	18	27
		R&A	Considered not applicable by Natural England										
		MB	17	23	26	17	2 (3)	0	0	0	15	31	131
G	Correction for immature birds	BF	2	2	2	1	1	0	0	0	1	15	24
		R&A	1	2	2	1	3 (4)	2	0	0	1	37	49
		MB	14	20	22	14	2 (3)	0	0	0	13	26	111

5.26 The Applicant has estimated an annual mortality up to 24 breeding lesser black-backed gulls as a result of the Project in combination with consented plans/ projects (i.e. Walney 1 & 2, West of Duddon Sands, Ormonde, Gwynt y Môr, Burbo Bank, Rhyl Flats, North Hoyle, Barrow and Burbo Bank Extension). The SoS is of the view that the additional lesser black-backed gull mortality levels as a result of the Project in combination with other wind farms will not prevent the European site from achieving favourable conservation status in line with the site's published conservation objectives. This is because the estimated annual mortality (of up to 24 birds) is much lower than the population could withstand without experiencing a long-term population decline (67 birds to 202 birds depending on the recovery factor used).

5.27 Natural England's oral statement on the 3rd April 2014 indicated that NE was satisfied that an adverse effect upon the integrity of the Bowland Fells SPA site could be excluded: *'We can therefore conclude no AEOSI [Adverse effect on site integrity] on the SPAs (for lesser black-backed Gull) beyond reasonable scientific doubt and have agreed this with the Applicant in our Statement of Common Ground'*.

5.28 The SoS is satisfied that an adverse effect upon the integrity of the Bowland Fells SPA can be excluded based on the cumulative lesser black-backed gulls predicted mortalities as a result of collision with the Project in combination with other plans and projects. The PBR analysis demonstrates that the impact will not affect the species at a population level.

Ribble and Alt Estuaries SPA and Ramsar site

5.29 The Ribble and Alt Estuaries SPA/Ramsar site lies approximately 45 km from the Project. The site consists of 2 estuaries which form part of a chain of western SPAs which fringe the Irish Sea. The site consists of extensive sand- and mud-flats and large areas of saltmarsh. These habitats in turn support a large number of species of birds. The site covers 12,361 ha and the conservation objectives are shown in *Table 4*.

Table 4 The Conservation Objectives for the Ribble and Alt Estuaries SPA.

Conservation Objectives	<p>Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;</p> <ul style="list-style-type: none"> • The extent and distribution of the habitats of the qualifying features. • The structure and function of the habitats of the qualifying features • The supporting processes on which the habitats of the qualifying features rely. • The population of each of the qualifying features, and, • The distribution of the qualifying features within the site. <p>Qualifying Features:</p> <ul style="list-style-type: none"> • Bewick’s swan (Non-breeding); <i>Cygnus columbianus bewickii</i> • whooper swan (Non-breeding); <i>Cygnus cygnus</i> • pink-footed goose (Non-breeding); <i>Anser brachyrhynchus</i> • common shelduck (Non-breeding); <i>Tadorna tadorna</i> • Eurasian wigeon (Non-breeding); <i>Anas penelope</i> • Eurasian teal (Non-breeding); <i>Anas crecca</i> • northern pintail (Non-breeding); <i>Anas acuta</i> • Eurasian oystercatcher (Non-breeding); <i>Haematopus ostralegus</i> • ringed plover (Non-breeding); <i>Charadrius hiaticula</i> • European golden plover (Non-breeding); <i>Pluvialis apricaria</i> • grey plover (Non-breeding); <i>Pluvialis squatarola</i> • red knot (Non-breeding); <i>Calidris canutus</i> • sanderling (Non-breeding); <i>Calidris alba</i> • dunlin (Non-breeding); <i>Calidris alpina alpina</i> • ruff (Breeding); <i>Philomachus pugnax</i> • black-tailed godwit (Non-breeding); <i>Limosa limosa islandica</i> • bar-tailed godwit (Non-breeding); <i>Limosa lapponica</i> • common redshank (Non-breeding); <i>Tringa totanus</i> • lesser black-backed gull (Breeding); <i>Larus fuscus</i> • common tern (Breeding); <i>Sterna hirundo</i> • waterbird assemblage • seabird assemblage
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5.30 The RIES recorded an LSE (alone and in combination) for breeding lesser black-backed gull because of increased collision risk.

Lesser black-backed gulls – project alone

- 5.31 The Applicant undertook CRM and PBR analysis to determine the effects of the Project upon the Ribble and Alt Estuaries SPA/Ramsar site. This was done alongside the assessment for Bowland Fells SPA and Morecombe Bay SPA. Please see 5.13 to 5.17 for the detailed assessment.
- 5.32 Following further discussion with NE during the Examination, the Applicant submitted additional information within their clarification note. This follows a similar methodology to Burbo Bank extension assessment agreed with NE.
- 5.33 The updated CRM analysis predicted an annual mortality of 1 breeding lesser black-backed gull from this site (Band model option 2, 98 % AR). The PBR analysis indicated that the Ribble and Alt Estuaries SPA/Ramsar site could support the loss of up to between 50 to 152 breeding lesser black backed gull per year without suffering a detrimental population effect in the long term ($f = 0.1 - 0.3$). Within NE's expert report on ornithology from the 16th December 2013, a recovery factor of 0.3 is suggested for this site. The predicted number of birds that could be sustainably removed from the population are shown below, correlated with different recovery factors.
- A recovery factor of 0.3 = 152.1;
 - A recovery factor of 0.2 = 101.4;
 - A recovery factor of 0.1 = 50.7.
- 5.34 Based on these updated CRM figures, NE was satisfied that the Project (alone) will not have an adverse effect on the site (Written Summary of hearings 3 April 2014, NE and the Applicant's statement of common ground).
- 5.35 The SoS is of the view that the additional lesser black-backed gull mortality as a result of the Project will not prevent the site from achieving favourable conservation status in line with the site's published conservation objectives. This is because the predicted annual number of breeding lesser black-backed gull mortalities (1) as a result of the Project is much lower than the population could withstand without experiencing a long term population decline (50 birds at the most conservative of estimate and 152 at the suggested estimate).
- 5.36 **The SoS, noting the predicted CRM results and the PBR analysis, and the agreement between NE and the Applicant, concludes that the Project will not have an adverse effect upon the integrity of the Ribble and Alt Estuaries SPA and Ramsar site.**

Lesser black-backed gulls – in combination

- 5.37 The RIES considered the number of collisions apportioned to this Project impacting on birds from this SPA in combination with nine other consented offshore wind farm projects and concluded that an LSE on the lesser black-backed gull feature of this site could not be ruled out.

- 5.38 The Applicant's clarification note estimates up to 49 fatal collisions per breeding season on lesser black-backed gulls from the Bowland Fells SPA, from the Project and wind farms within tiers 1-4. The Applicant includes consented plans/projects, Walney 1 & 2, West of Duddon Sands, Ormonde, Gwynt y Môr, Burbo Bank, Rhyl Flats, North Hoyle, Barrow and the Burbo Bank Extension (recently consented) in the in combination assessment. As Burbo Bank Extension has recently been consented this is now considered a tier 3 project.
- 5.39 The PBR analysis by the Applicant finds this to be a sustainable loss to the population. The PBR estimates that up to a collision mortality of 50 birds at the most conservative estimate and 152 at the suggested estimate is sustainable to the population. The SoS is therefore of the view that the potential additional lesser black-backed gull mortality as a result of the Project will not prevent the site from achieving favourable conservation status in line with the site's published conservation objectives. In its oral statement of the 3rd April, NE indicated that it was satisfied that an adverse effect upon the integrity of the Ribble and Alt Estuaries site could be excluded: *'We can therefore conclude no AEOSI [Adverse effect on site integrity] on the SPAs (for lesser black-backed Gull) beyond reasonable scientific doubt and have agreed this with the Applicant in our Statement of Common Ground'.*
- 5.40 **The SoS is satisfied that an adverse effect upon the integrity of the Ribble and Alt Estuaries SPA can be excluded based on the cumulative lesser black-backed gulls mortalities as a result of collision with the Project in combination with other plans and projects. The PBR analysis demonstrates that the impact will not affect the species at a population level.**

Morecambe Bay SPA and Ramsar site

- 5.41 The Morecambe Bay SPA and Ramsar site lies approximately 20 km from the Project. The site is one of the largest estuarine systems in the UK and is fed by 5 main river channels. The large intertidal areas support abundant invertebrates which in turn provide food for a number of waders and waterfowl. Qualifying features include lesser black-backed gull and this is the only SPA where herring gulls qualify as a breeding feature within the foraging range of the Project. The conservation objectives for the site are shown in Table 5.

Table 5 The Conservation Objectives for the Morecambe Bay SPA.

Conservation Objectives	<p>Avoid the deterioration of the habitats of the qualifying features, and the significant disturbance of the qualifying features, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving the aims of the Birds Directive.</p> <p>Subject to natural change, to maintain or restore:</p> <ul style="list-style-type: none"> • The extent and distribution of the habitats of the qualifying features; • The structure and function of the habitats of the qualifying features; • The supporting processes on which the habitats of the qualifying features rely; • The populations of the qualifying features; • The distribution of the qualifying features within the site.
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	<p>Qualifying Features:</p> <ul style="list-style-type: none"> • pink-footed goose (Non-breeding); <i>Anser brachyrhynchus</i> • common shelduck (Non-breeding); <i>Tadorna tadorna</i> • northern pintail (Non-breeding); <i>Anas acuta</i> • common eider (Breeding); <i>Somateria mollissima</i> • Eurasian oystercatcher (Non-breeding); <i>Haematopus ostralegus</i> • ringed plover (Non-breeding); <i>Charadrius hiaticula</i> • European golden plover (Non-breeding); <i>Pluvialis apricaria</i> • grey plover (Non-breeding); <i>Pluvialis squatarola</i> • red knot (Non-breeding); <i>Calidris canutus</i> • dunlin (Non-breeding); <i>Calidris alpina alpina</i> • bar-tailed godwit (Non-breeding); <i>Limosa lapponica</i> • Eurasian curlew (Non-breeding); <i>Numenius arquata</i> • common redshank (Non-breeding); <i>Tringa totanus</i> • ruddy turnstone (Non-breeding); <i>Arenaria interpres</i> • lesser black-backed gull (Breeding); <i>Larus fuscus</i> • herring gull (Breeding); <i>Larus argentatus</i> • sandwich tern (Breeding); <i>Sterna sandvicensis</i> • common tern (Breeding); <i>Sterna hirundo</i> • little tern (Breeding); <i>Sterna albifrons</i> • waterbird assemblage <p>Additional Qualifying Features Identified by the 2001 UK SPA Review:</p> <ul style="list-style-type: none"> • sanderling (Non-breeding); <i>Calidris alba</i> • seabird assemblage
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5.42 A LSE was identified for this site because of the potential for the Project (alone, and in combination) to affect breeding populations of lesser black backed gull (*Larus fuscus*) and herring gulls (*Larus argentatus*) through a potential increase in turbine collision risk mortality.

Lesser black-backed gulls – project alone

5.43 Following a request from NE and alongside the lesser black backed gull from the Bowland Fells SPA and Ribble and Alt estuaries SPA, the Applicant undertook CRM and PBR analysis to determine annual lesser black backed gull mortality levels and predict long term population impacts. Please see 5.13 to 5.17 for the detailed assessment. This follows a similar methodology to Burbo Bank extension assessment agreed with NE.

5.44 The updated CRM analysis predicted an annual mortality of 17 breeding lesser black backed gull from this site (Band model option 2, 98 % AR). The PBR analysis indicated that the Morecambe Bay SPA/Ramsar site could support the loss of up to between 100 to 300 breeding lesser black backed gull per year without suffering a detrimental population effect in the long term ($f = 0.1 - 0.3$). Within NE's expert report on ornithology a recover factor of between 0.1 and 0.3 is suggested for this site. The predicted number of birds that could be sustainably removed from the population are shown below, correlated with different recovery factors.

- A recovery factor of 0.3 = 300.7;
- A recovery factor of 0.2 = 200.5;
- A recovery factor of 0.1 = 100.2.

- 5.45 Based on these updated CRM figures, NE was satisfied that the Project (alone) will not have an adverse effect on the site (Written Summary of hearings 3 April 2014, NE and the Applicant's statement of common ground).
- 5.46 The SoS is of the view that the potential additional lesser black-backed gull mortality as a result of the Project will not prevent the site from achieving favourable conservation status in line with the site's published conservation objectives. This is because the predicted annual number of breeding lesser black-backed gull mortalities (17) as a result of the Project is much lower than the population could withstand without experiencing a long term population decline (100 birds at the most conservative of estimate).
- 5.47 **The SoS, noting the predicted CRM results and the PBR analysis, and the agreement between NE and the Applicant, concludes that the Project alone will not have an adverse effect upon the integrity of the Morecambe Bay SPA and Ramsar site.**

Lesser black-backed gulls – in combination

- 5.48 The ExA and RIES found collisions apportioned to this Project impacting on birds from this SPA in combination with nine other consented offshore wind farm projects and concluded that there was a potential impact on the lesser black-backed gull feature of this European site.
- 5.49 The Applicant's clarification note estimates up to 111 fatal collisions per breeding season on lesser black-backed gulls from the Morecambe Bay SPA, from the Project and wind farms within tiers 1-4. The Applicant includes consented plans/projects Walney 1 & 2, West of Duddon Sands, Ormonde, Gwynt y Môr, Burbo Bank, Rhyl Flats, North Hoyle and Barrow and Burbo Bank Extension (recently consented) in the in combination assessment.
- 5.50 The PBR analysis by the Applicant finds this to be a sustainable loss to the population. The PBR estimates that up to a collision mortality of 100 birds at the most conservative of estimate and 300 at a recovery factor of 0.3. NE did not confirm which recovery factor was appropriate but the estimated mortality is 11 birds using the most conservative value recovery factor. NE agreed that the estimated collision mortality was sustainable. The SoS is therefore satisfied that the Project will not prevent Morecambe Bay SPA and Ramsar site from achieving favourable conservation status in line with the site's published conservation objectives. NE's oral statement on the 3rd April 2014 indicated that they are satisfied that an adverse effect upon the integrity of the Morecambe Bay SPA and Ramsar site could be excluded: *'We can therefore conclude no AEOSI [Adverse effect on site integrity] on the SPAs (for lesser black-backed gull) beyond reasonable scientific doubt and have agreed this with the Applicant in our Statement of Common Ground'.*

Herring gulls – project alone and in combination

- 5.51 NE raised the risk of Morecambe Bay's herring gulls suffering collision impact at the Project within their relevant representation. The potential impacts upon herring gulls from the

Morecambe Bay SPA/Ramsar site are similar to those for lesser black-backed gulls and as such the Applicant addressed them in a similar manner.

- 5.52 Collision risk modelling and PBR analysis was undertaken to determine annual herring gull mortality as a result of the Project alone and in combination to determine whether that could lead to a detrimental effect upon the population in the long term. There was discussion of the appropriate methodology during the examination and, following advice from NE (NE written representation 16th December 2013), the Applicant re-assessed their collision impacts and provided a clarification note.
- 5.53 The Applicant identified four other offshore wind farms within 61 km, the maximum foraging range of the herring gull colony. These additional sites are Barrow, Ormonde, Walney 1 & 11 and West of Duddon sands.
- 5.54 The Applicant modelled an in combination impact of 36 herring gulls collisions at the Project site during the breeding season. The CRM results indicate an annual mortality of 17 breeding herring gulls (Band model option 2, 98% avoidance rates) from the Morecambe Bay SPA. NE agreed $f= 0.1$ to 0.3 as a safe maximum for the European site and agreed with the Applicant over their methodology (NE written representation 16th December 2013). The predicted number of birds that could be sustainably removed from the population are shown below, correlated with different recovery factors:
- A recovery factor of $0.3 = 90$;
 - A recovery factor of $0.2 = 60$;
 - A recovery factor of $0.1 = 30$.
- 5.55 The Applicant did not find enough data to inform a quantitative in combination assessment of all the wind farms within the foraging range of the European site. Instead they looked at studies of post construction monitoring data which strongly indicated that any use of this data to populate modelling will not provide significant levels of collision. NE agreed with the Applicant that the low densities of herring gulls found at the wind farm sites will not translate into CRM figures of concern.
- 5.56 Natural England subsequently agreed (supplementary expert report 4th March 2014) with the Applicant's conclusions that the Project will not have an adverse effect upon the herring gull population of the Morecambe Bay SPA/Ramsar site.
- 5.57 The SoS is of the view that the additional herring gull mortality as a result of the Project (36 mortalities per year) will not prevent the site from achieving favourable conservation status in line with the site's published conservation objectives. This is because the potential number of herring gulls mortally colliding with the Project on an annual basis is lower than that the population could withstand without experiencing a long term population decline.
- 5.58 **The SoS is satisfied that an adverse effect upon the integrity of the Morecambe Bay SPA can be excluded based on the cumulative lesser black-backed gulls and herring gulls**

mortalities as a result of collision with the Project alone and in combination with other plans and projects. The PBR analysis demonstrates that the impact will not affect the species at a population level.

Aberdaron Coast and Bardsey Island SPA, Copeland Islands SPA and Skokholm and Skomer SPA

5.59 **Aberdaron Coast and Bardsey Island SPA**⁴ in north-west Wales consists of areas of coastal land on the western tip of the Llŷn Peninsula and Bardsey Island. It is 147km from the Project site. NRW consulted on changes to this SPA earlier this year, including extending the boundary to the adjacent sea area. The site's features include rocky cliffs topped with heather. Along the coastline are small pastures divided by 'cloddiau', the earthbank field boundaries characteristic of the area. The site supports a population of chough birds throughout the year, both breeding and wintering, which depend on the low-intensity pastoral management of this mix of habitats. Choughs have not been recorded by the Applicant at the Project site and are essentially sedentary in the UK (Cramp and Perrins, 1994⁵) The wintering flocks are important for the survival of the species on the site. Bardsey Island hosts a large breeding colony of Manx shearwaters (*Puffinus puffinus*) which forage widely across the ocean but 'raft' on adjacent areas of the sea, resting and preening before returning to their burrows on the island at nightfall.

Table 6 The Conservation Objectives for the Aberdaron Coast and Bardsey Island SPA.

Conservation Objectives	<p>The conservation objectives for breeding Manx shearwater are to maintain the population in favourable conservation status, where all of the following conditions are satisfied:</p> <ul style="list-style-type: none"> • Breeding population of Manx shearwater (confined to Bardsey) is stable or increasing (lower limit 10,000 pairs); • Reproductive rates remain stable (lowest tolerable limit of >0.5 fledged chicks per pair for 3 consecutive years); • Deaths from the lighthouse attractions, fencing and other infrastructure are minimal (upper limit of 35 fatalities per year); • No ground predators are introduced; • Nesting birds are not disturbed by restoration works on boundary walls or recreational activities; and • All factors affecting the achievement of these conditions are under control.
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⁴ <http://www.ccg.gov.uk/landscape-wildlife/protecting-our-landscape/special-sites-project/glannau-aberaron-spa.aspx>

⁵ Cramp S, Perrins CM (1994) Handbook of the birds of Europe, the Middle East and North Africa, Vol VI. The birds of the Western Palearctic. Oxford: Oxford University Press.

5.60 **Copeland Islands SPA**⁶ is located off the north-east coast of County Down, Northern Ireland and covers an area of 201.52 ha. It is 120km from the Project site. The SPA comprises three islands (Big Copeland, Light House Island and Mew Island) together with a number of associated islets. The principal interests and features of the SPA are the breeding colonies of Manx shearwater and Arctic tern (*Sterna paradisaea*). The site includes rocky shores together with small areas of sand/mud and cobble/boulder beaches. Terrestrially, the site is composed of saltmarsh, freshwater marsh, maritime grassland and a limited extent of inland cliff and semi-improved agricultural grassland. The site is designated for supporting nationally important numbers of Arctic tern (566 pairs representing 22.6% of the Irish population) and for supporting internationally important numbers of Manx shearwater (4800 pairs representing 1.7% of the world population). The islands also support a number of non-qualifying species including a nationally important breeding and wintering population of Eider duck (200 individuals representing 10% of the Irish population), a nationally important population of common gull (250 pairs representing 7% of the Irish population) and Northern Ireland's first breeding pair of Mediterranean gull. Notable breeding populations of wader species also occur on Big Copeland. The conservation objective is to 'To maintain each feature in favourable condition'. The Component objectives for breeding Manx shearwater and breeding Arctic tern include no significant decrease in population against national trends, caused by on-site factors and Fledging success.

Table 7 The Conservation Objectives for Copeland Islands SPA.

Conservation Objectives	<p>The conservation objective is to 'To maintain each feature in favourable condition'.</p> <ul style="list-style-type: none"> The Component objectives for breeding Manx shearwater and breeding Arctic tern include no significant decrease in population against national trends, caused by on-site factors and Fledging success.
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5.61 **Skokholm and Skomer SPA**⁷ the site is formed of two islands which are designated for a number of breeding seabird colonies, in particular Manx shearwater, puffin, storm petrel and lesser black-backed gull, as well as for breeding chough and short-eared owl. It is 287km from the Project site. NRW consulted on changes to this SPA earlier this year, including extending the boundary to the adjacent sea area. The islands lie off the extreme south-west tip of Pembrokeshire in south-west Wales. They are bounded by high cliffs. Especially notable is the high proportion (over half; 150,968 pairs) of the world population of Manx shearwater that nest here. The nesting seabirds using the site feed outside the SPA in surrounding marine areas, as well as more distantly.

⁶ http://www.doeni.gov.uk/niea/protected_areas_home/spec_protect/copeland_islands_spa.htm

⁷ <http://www.ccg.gov.uk/landscape-wildlife/protecting-our-landscape/special-sites-project/skokholm-and-skomer-spa.aspx>

Table 8 The Conservation Objectives for Skokholm and Skomer SPA.

Conservation Objectives	<p>The conservation objectives for breeding Manx shearwater are to maintain the population in favourable conservation status, where all of the following conditions are satisfied:</p> <ul style="list-style-type: none">• During the breeding season the population of Manx shearwater will be at least 150,000 pairs within the SPA;• Breeding success will be at least 0.5 chicks per egg laid; and• The factors affecting the feature (Disturbance, predators, soil erosion, bracken distribution, food availability and oil spills) are under control
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Manx shearwater

5.62 There was a LSE on Manx shearwater (*Puffinus puffinus*) which is one of the features of Aberdaron Coast and Bardsey Island SPA, Copeland Islands SPA and Skokholm and Skomer SPA. The Applicant undertook an analysis of collision and displacement risk to this bird from the Project. NE and JNCC raised concerns regarding the Applicant's assessment of collision risk to birds and in particular with regard to proportioning of birds to group level rather than species level. The Applicant's clarification note from January 2014 addressed this concern and provides further analysis of collision and displacement risk to Manx shearwater collision. The RIES states that this risk was assessed as negligible (less than 0.07 birds per annum) due to the flight height of this species. Displacement risk was assessed using, separately, abundance values from aerial data at the Project site and boat-based survey data taken between March and November 2012 at the project site. Manx shearwater were found at the Project site by the Applicant in their boat based surveys. Aerial surveys also showed that they were present in high numbers during May and September, with lower numbers in the middle of summer during the breeding season.

5.63 The RIES found displacement values apportioned to the three SPAs (Aberdaron Coast and Bardsey Island SPA, Copeland Islands SPA, and Skokholm and Skomer SPA) for which the Project is in the 330km mean maximum foraging range for Manx shearwater (the Applicant used values from Thaxter *et al.*(2012)⁸. Skokholm and Skomer SPA is 287km away from the project site, so it is located at the extreme end of the mean maximum foraging range for Manx shearwater. The other sites are 120km and 147km from the project site. At the assumed 30% displacement level and 10% mortality rate, less than 1% of the Aberdaron Coast and Bardsey Island SPA, Copeland Islands SPA, and Skokholm and Skomer SPA populations are affected regardless of whether boat or aerial survey abundance data are used. The Applicant used a

⁸ Thaxter, C., Lascelles, B., Sugar.K., Cook, A.S.C.P., Roos, S., Bolton, M., Langston, R.H.W, and Burton, N.H.K. 2012. Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas. *Biological Conservation*. Doi:10.1016/j.biocon.2011.12.009.

30% displacement based on the work by Furness and Wade (2012)⁹ showing the bird's lack of sensitivity to disturbance and also the monitoring results from Walney 1 and 11.

5.64 The Applicant's shadow HRA did not identify an adverse effect from displacement. The note that this bird is considered to be a highly mobile forager with a high degree of habitat flexibility. They have an extensive foraging range and excursions from these colonies cover a wide extent within the Irish Sea. The low numbers of the bird within the Project site during the breeding period suggests that the Project site does not provide key foraging opportunities during this time. Monitoring work during Walney 1 and 11 also did not find any significant changes on the response of Manx shearwater during the construction period.

5.65 The Applicant's shadow HRA looked at displacement risk and found that a 30% mortality would be needed before the Project started to affect 1% of the population:

- Aberdaron Coast and Bardsey Island SPA (147km from the Project site) a 30% displacement level with a 60% mortality would be needed to affect 1% of the population (considered a significant level).
- Copeland Islands SPA (120km from the Project site) a 30% displacement level with a 30% mortality would be needed to affect 1% of the population (considered a significant level).
- Skokholm and Skomer SPA (287km from the Project site) a 100% displacement level and 100% mortality would not affect 1% of the population (considered a significant level)

5.66 The Applicant's clarification note from January 2014 found with band model option 1 and a avoidance rate of 98% analysis predicted an annual mortality of 9 birds and 6 birds within the breeding season.

Table 9 Collision risk estimates for Manx shearwater at Walney Extension from the Applicant's clarification note dated 31st January 2014.

Avoidance rate (%)	Band (2012) CRM Option					
	All year (collisions/annum)			Breeding (May-Aug)		
	1 (Site-specific)	2	3	1 (Site-specific)	2	3
No avoidance	473	0	0	310	0	0
95	24	0	0	15	0	0
98	9	0	0	6	0	0
99	5	0	0	3	0	0
99.5	2	0	0	2	0	0

5.67 Displacement analysis was also undertaken for the Project by the Applicant in combination with the Burbo Bank Extension project. The predicted combined displacement values were similarly below a 1% threshold for these three SPAs. The Applicant concludes no adverse effect on this feature of the Aberdaron Coast and Bardsey Island SPA, Copeland Islands SPA, and Skokholm and Skomer SPA. Natural Resources Wales (NRW) email of the 14th March 2014 confirmed that

⁹ Furness, R.W. and Wade, H. (2012). Vulnerability of Scottish seabirds to offshore wind turbines. Report to Marine Scotland.

they are content that no more assessment for the Project is needed regarding any of the proposed changes to the three SPAs.

- 5.68 No concerns were raised by the statutory nature conservation bodies on this assessment during examination. **The SoS is satisfied that the Project alone or in combination with the Burbo Bank Extension project will not have an adverse effect upon the integrity of Aberdaron Coast and Bardsey Island SPA, Copeland Islands SPA, and Skokholm and Skomer SPA as a result of the increased displacement and collision risk to Manx shearwater as the flight height of the birds means that collision risk is negligible and displacement levels are less than 1%.**

Morecambe Bay SAC

- 5.69 LSEs could not be ruled out for the intertidal salt and mudflat feature of this site as the habitat is crossed by the export power cables. Installation of the cables through trenching could impact on intertidal invertebrates. If there were to be an adverse impact, this could have knock on effects for the birds of Morecambe Bay SPA through loss of prey species. This assessment looks jointly at the potential impacts on Morecambe Bay SAC and SPA. The cables will be protected by techniques such as rock armouring (see *Figure 3*). This and the maintenance of the cables could impact on salt and mudflat habitats. All these impacts were assessed by the Applicant within their ES and further clarified within their Clarification note on HDD impact on Morecambe Bay SAC and belted beauty moth (*Lycia zonaria*).
- 5.70 NE in their written representation (December 2013) acknowledge that the potential impact area is very small relative to the size of the SAC. NE research has also found that these habitat's characteristic species are resilient to change, which happens naturally due to shifting sediments. The habitat that the cable is crossing is also formed by habitats with a low sensitivity and can recover more rapidly than those formed in more sheltered areas. The programme for installation means that the whole area will not be impacted at the same time. The installations methods will cause invertebrate mortality but not completely remove them. For the reasons listed below, the Secretary of State agrees with the statutory nature conservation body and considers that there would not be adverse effects on the integrity of the Morecambe Bay SAC (and SPA):
- The area of impact is small relative to the SAC (Middleton Sands and the wider SPA);
 - The physical habitat will recover;
 - There will be no loss of habitat, allowing invertebrate infauna to recolonize and recover.
- 5.71 This is in line with NE's advice as set out in written representation from the 16th December 2013. However due to the uncertainties, in the recovery time of the intertidal invertebrates, mitigation to protect the SAC was suggested by NE and has also been included in the DCO and DML. These requirements/ conditions ensure the operation of the trenching will be mechanically

Habitats Regulations Assessment Conclusions

6.0 The SoS has carefully considered all of the information presented before and during the Examination, including the ES, the Applicant's shadow HRA & clarification notes, representations made by Interested Parties, and the ExA's report itself. He considers that the Project has the potential to have an LSE on seven European sites when considered alone and an additional two sites may be affected when the Project is considered in combination with other plans and projects. This is as set out in *Table 1* and comprises sites in England, Wales and Northern Ireland. The sites are:

- Bowland Fells SPA
- Ribble and Alt Estuaries SPA / Ramsar
- Morecambe Bay SPA / Ramsar
- Morecambe Bay SAC
- Aberdaron Coast and Bardsey Island SPA (in combination only)
- Copeland Islands SPA (in combination only).
- Skokholm and Skomer Special Protection Area

6.1 The Secretary of State is confident that, with the mitigation measures in the DCO, there will be no adverse effect on the integrity on any of these sites.

6.2 Mitigation for the Project will be secured and delivered through the following DCO requirements within Schedule 1 Part 3:

- Requirement 14 Offshore Decommissioning;
- Requirement 16 Detailed design approval onshore;
- Requirement 27 Code of Construction Practice;
- Requirement 28 Construction and environmental management plan;
- Requirement 34 Control of noise during construction;
- Requirement 30 European protected species;
- Requirement 40 Onshore decommissioning.

Two Deemed Marine Licence Conditions:

SCHEDULE 9 PART 2

- Condition 11 Pre-construction plans and documentation;
- Condition 12 Preconstruction surveying and monitoring;
- Condition 13 Construction monitoring;
- Condition 14 Post construction monitoring;
- Condition 15 Offshore Decommissioning;

SCHEDULE 10 PART 2

- Condition 8 Restrictions on works in the Inter-tidal Area;
- Condition 10 Pre-construction plans and documentation;
- Condition 11 Pre-construction surveying and monitoring;
- Condition 12 Construction monitoring;
- Condition 13 Post construction monitoring;
- Condition 14 Offshore Decommissioning.

6.3 The SoS has undertaken an appropriate assessment in respect of those European sites' Conservation Objectives to determine whether the project, either alone or in combination with other plans and projects, will result in an adverse effect upon the sites' integrity.

6.4 **The SoS has determined that the Walney Extension Offshore Wind Farm will not have an adverse effect upon the sites' integrity either alone or in combination with other plans or projects. He has undertaken a robust assessment using all of the information available to him, not least the views of the various Interested Parties.**

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