



BURBO BANK EXTENSION OFFSHORE WIND FARM
ENVIRONMENTAL IMPACT ASSESSMENT
SCOPING REPORT

July 2010

DONG
energy

Burbo Bank Extension offshore wind farm

Environmental Impact Assessment Scoping Report

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Glossary of Abbreviations

Acronyms and Terms

AA – Appropriate Assessment

AIS – Automatic Identification System

DCO – Development Consent Order

EIA – Environmental Impact Assessment

ES – Environmental Statement

IPC – Infrastructure Planning Commission

NPS – National Policy Statement

NSIP – Nationally Significant Infrastructure Project

SAC – Special Areas of Conservation; pSAC – possible SAC

SPA – Special Protection Area; pSPA – potential SPA

SoCC – Statement of Community Consultation

TCE – The Crown Estate

VMS – Vessel Monitoring System

Units

GW – gigawatt (power)

kV – kilovolt (electrical potential)

kW – kilowatt (power)

m/s – metres per second (wind speed)

MW – megawatt (power)

N, S, E, W – North, South, East, West (cardinal points)

nm – nautical mile (distance; 1 nm = 1.852 km)

Q1 (Quarter 1) – January, February, and March

Q2 (Quarter 2) – April, May, and June

Q3 (Quarter 3) – July, August, and September

Q4 (Quarter 4) – October, November, December

Summary

DONG Energy is proposing to develop an extension to the existing and operational Burbo Bank offshore wind farm in Liverpool Bay, located 7 to 8.5 km off the North Wirral and Sefton coasts.

DONG Energy specialises in developing projects for the generation of electricity from renewable sources like offshore wind farms, and intends to submit an application for a Development Consent Order (DCO) to the Infrastructure Planning Commission (IPC) to develop an extension to the operational Burbo Bank offshore wind farm, which is to be known as **Burbo Bank Extension offshore wind farm**. The DCO will also contain proposals for associated development, such as onshore underground cables and an onshore substation, away from the offshore wind farm site which is deemed necessary for the construction and operation of the project.

The DCO application will comprise full details of the development proposals and will be accompanied by an Environmental Statement (ES) (conforming to the *Infrastructure Planning (Environmental Impact Assessment) Regulations 2009*) and other documents, including a statement on pre-application consultation.

This Scoping Report sets out the proposed content, methodologies and key issues to be included in the Environmental Impact Assessment (EIA) and the resulting ES to be submitted with the DCO application. The purpose of this document is to support a request for a scoping opinion for an EIA from the IPC. It is also intended that this report builds upon consultation carried out to date and supports ongoing consultation with statutory and non-statutory consultees and stakeholders on the scope of the EIA required for the Burbo Bank Extension offshore wind farm.

The Scoping Report is structured in sections relating to principal topic areas, providing an overview of the project, the developer, and the assessment and consents process by way of an introduction section (Chapter 1), a description of the project (Chapter 2), the scoping of environmental offshore and onshore impacts with summary tables of potential impacts (Chapter 3), and finally an overview of the consultation process and the probable dates of the various steps leading to the grant of the DCO and subsequent construction and operation (Chapter 4).

Within Chapter 3 (Scoping of Environmental Impacts), specific topics are arranged within categories of physical, biological, human offshore environments and onshore environments. Each of these subsections presents a description of baseline conditions from field and survey work followed by an assessment of potential impacts and the studies and surveys proposed to address these within the EIA.

1. Introduction

1.1 The Burbo Bank Extension Offshore Wind Farm Development

1.1.1 The Developer

DONG Energy is one of the leading energy groups in Northern Europe. The company is headquartered in Denmark and the business is based on procuring, producing, distributing and trading in energy and related products in Northern Europe. The company employs approximately 6,000 employees across Northern Europe and the United Kingdom

DONG Energy is a world leader in the construction and operation of offshore wind farms. It has pioneered the offshore wind farm industry through involvement in more than 50% of the current operating offshore wind farms worldwide. In September 2009 the company inaugurated *Horns Rev 2*, the largest operating offshore wind farm in the world to date with a capacity of 209 MW, which is located off the western Danish coast in the North Sea.

DONG Energy is involved in a number of Round 1 and Round 2 offshore wind projects (see Chart 1 on the next page) in the United Kingdom, among which the operational Barrow and Burbo Bank offshore wind farms (90 MW each) and the recently opened Gunfleet Sands (172 MW) - which helped, along with Robin Rigg, the UK to pass the 1 GW (1,000 MW) of total installed wind farm operational capacity.

Also in the pipeline are the Walney project (367.2 MW, under construction) and the London Array (630 MW for phase 1, under construction) as well other projects under development such as West of Duddon Sands (500 MW). The Westernmost Rough (245 MW) and Wigtown Bay projects (in Scotland, 280 MW) are also being progressed by DONG Energy as development opportunities.

1.1.2 The Existing Offshore Wind Farm

The existing Burbo Bank offshore wind farm (or 'the Operational Wind Farm') is located in Liverpool Bay off the North Wirral (7.5 km) and Sefton (6.5 km) coasts with a total installed capacity of 90 MW. It features 25 x 3.6 MW wind turbines over an area (leased from The Crown Estate) of 10 km² and has been operational since October 2007. It is fully owned and operated by DONG Energy Burbo (UK) Ltd.

1.1.3 The Extension Offshore Wind Farm Development

The proposed Burbo Bank Extension offshore wind farm development (or 'the Project') consists of an area of 40 km² and an estimated capacity of 169 to 234 MW, and is located adjacent to the west of the Operational Wind Farm. The Project was awarded an agreement for lease by The Crown Estate in April 2010. The Project will be comprised of the wind turbines, foundations, inter-array cables and the transmission assets, i.e. an offshore substation, the export cable(s) and an onshore substation. Given the Offshore Transmission Operator (OFTO) regime currently under consultation, the offshore transmission assets will probably be owned and operated by an appointed independent OFTO, which is also likely to build these assets.

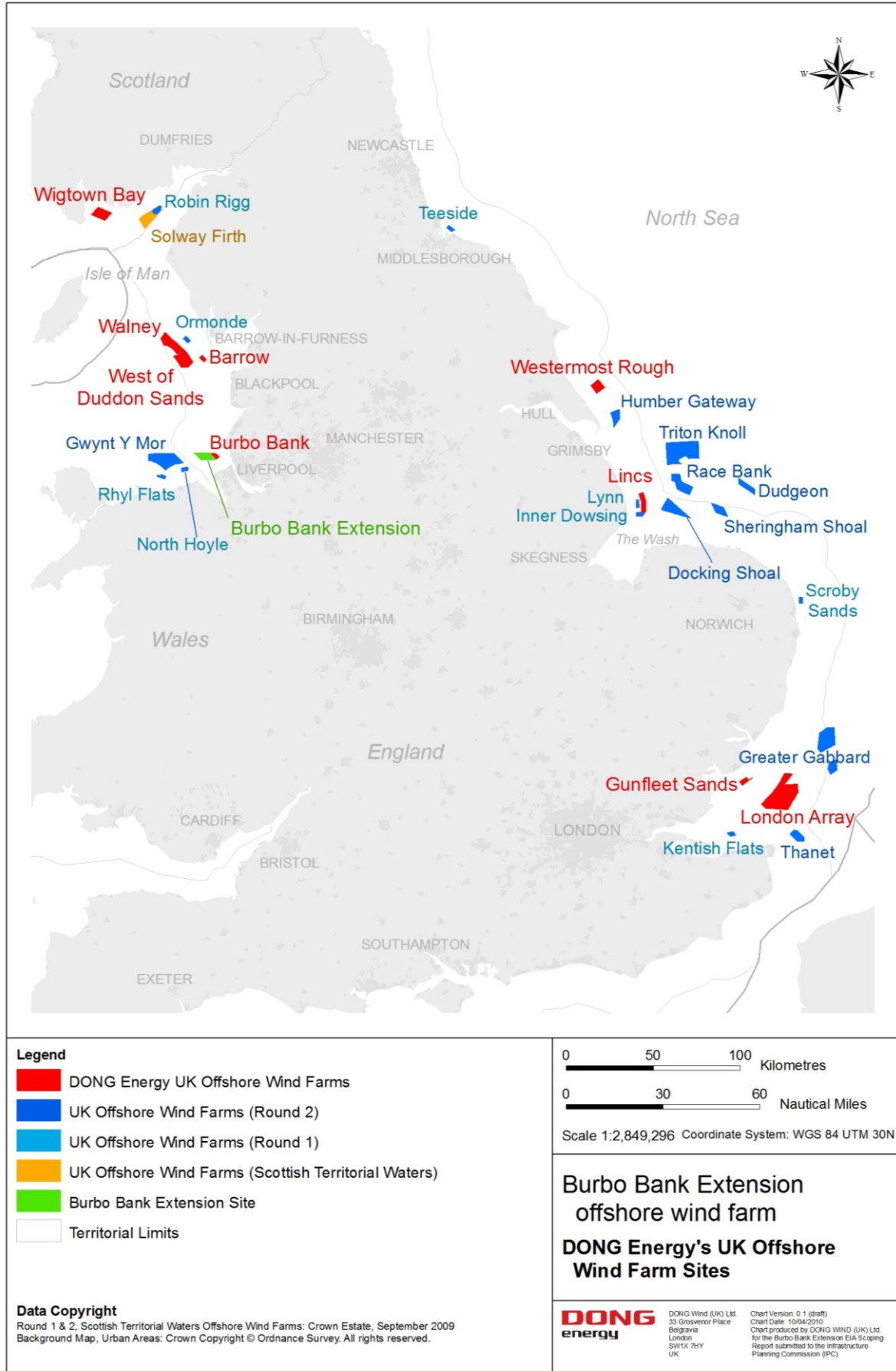


Chart 1: Location of DONG Energy's offshore wind farm projects in the UK territorial waters

1.2 The Scoping Report

1.2.1 Objectives

The role of this *Environmental Impact Assessment Scoping Report* (hereinafter called 'the Scoping Report') is to identify the main aspects of the offshore and onshore human, biological and physical environment likely to be significantly affected by the construction and operation of the proposed Burbo Bank Extension offshore wind farm project, and to assist with agreeing the extent of relevant environmental studies to be undertaken as part of an environmental impact assessment (EIA) for the competent authorities and statutory consultees to then consider.

This Scoping Report has been prepared in support of a request for a *Scoping Opinion* from the Infrastructure Planning Commission (IPC). It describes the work (i.e. surveys and studies) already completed in relation to the Operational Wind Farm and the Project site, the work which is underway and that which remains to be carried out.

In short, this Scoping Report has the following objectives:

- To provide a brief description of the Project;
- To identify key environmental constraints and sensitivities in and around the Project site;
- To identify the likely key impacts, both positive and negative, as a result of the Project development and to briefly identify any possible mitigation and enhancement opportunities;
- To identify gaps in the information and data collected through surveys and studies, and propose any requirements for further surveys and studies;
- To briefly outline the strategic background to the Project including proposed and existing legislation and planning guidance and the required consents;
- To briefly describe the way forward for further stages of the EIA, the consultation process, and the project development up to its construction and operation.

The IPC, having received the Scoping Report, will consult with the relevant competent authorities and key statutory consultees to seek their comments on the scope of the proposed studies.

In addition to the bodies that IPC will formally consult, DONG Energy will circulate the Scoping Report more widely to other consultees (stakeholders) and welcomes comments from them on potential impacts as well as the proposals for studies and surveys described in the document.

DONG Energy is strongly committed to considering all suitable mitigations for potentially adverse impacts that may arise from the development of the Project. It is intended that such mitigations will be discussed in detail with the relevant consultees during the consultation process following the publication of this Scoping Report.

1.2.2 Activities and Data

This Scoping Report has been informed by the following range of activities carried out from around mid 2002 to mid 2010:

- Data collection, subsequent assessment and modelling for both the Operational Wind Farm and the Project site (from June to December 2009);
- Work undertaken to date on the Operational Wind Farm, including surveys and studies carried out before, during and after construction (from 2002 to 2007 – see Tables 2, 12, 16, and 20 in Chapter 3 for a full list);
- Discussions and meetings with key stakeholders likely to be affected by the development of the Project (during October and November 2009 – see Section 4.3.1 for more details);
- Discussions with the development consultants who worked on the development of the Operational Wind Farm, meetings with DONG Energy construction colleagues in Denmark who built the Operational Wind Farm and operation and maintenance staff at the Burbo Bank site office in Liverpool (from June to November 2009);
- Information contained in the Burbo Bank offshore wind farm Environmental Statement published in September 2002 (SeaScape Energy, 2002);
- DONG Energy's experience from developing, constructing and operating other offshore wind farms in Denmark and the United Kingdom.

This report also includes a proposed table of contents for the Environmental Statement for the Project (see Appendix A), which it is intended will be published in late 2012.

1.3 Policy Background

1.3.1 The UK Energy Policy and the Role of the Renewable Sources of Energy

UK energy requirements have traditionally been met by fossil fuels and nuclear energy. Increasing concern over the environmental impacts of burning fossil fuels, together with the decline in available domestic fossil fuel resources, has led the UK government to seek to diversify the energy resource base and reduce greenhouse gas emissions by setting ambitious targets.

In 2006, the Stern Review (Stern, 2006) concluded that there was overwhelming evidence for climate change with significant global risks demanding urgent global response. The *Meeting the Energy Challenge* white paper published by the former BERR (now Department for Energy and Climate Change – DECC) in 2007 described two long-term challenges for the UK:

- Tackling climate change by reducing carbon dioxide emissions both within the UK and abroad;
- Ensuring secure, clean and affordable energy.

As a contribution to the European Union commitment to the United Nation Framework Convention on Climate Change (UNFCCC), agreed in Kyoto in 1997, the UK Government is committed to cutting the emission of greenhouse gases to 12.5% from 1990 levels by 2008-2012, implying an 8% reduction in greenhouses gases in that timeframe.

At a European Union (EU) level the Renewables Directive (Directive 2009/28/EC) requires that by 2020 some 20% of the EU's energy consumption must come from renewable sources (this necessitates an even higher percentage of electricity consumption from renewable sources because of the inflexible nature of powering transport).

Additional commitments were transposed into UK law by the Climate Change Act 2008, which places a duty on the Secretary of State to ensure that the net UK carbon account for the year 2050 is 80% lower than the 1990 baseline. As part of this process the *UK Renewable Energy Strategy* published by The Secretary of State for Energy and Climate Change in 2009 set the UK's commitment to source 15% of its energy from renewable sources by 2020.

In addition to accelerating the uptake of renewable energy and decarbonising energy production in the UK to enable the UK to meet renewable energy and climate change targets these policies also seek to ensure secure and safe energy supplies and promote economic growth in a low carbon economy.

Scenarios published in the 2009 Renewable Energy Strategy predict that more than 30% of UK electricity will, in the future, be generated from renewables (up from about 5.5% today). Most of this will be generated from wind farms (onshore and offshore) but biomass, hydro, wave and tidal will all play a significant role too.

1.3.2 Round 1 and 2 of Offshore Wind Farm Development

The Crown Estate's awarding of sites for Round 1 offshore wind farm projects in 2001 marked the emergence of the offshore wind industry in the UK. Round 1 acted as a demonstration round under which a limited area of seabed, covering a maximum of 10 km², was awarded for the development of projects with a capacity of up to 90 MW.

In 2002, the DTI's consultation paper *Future Offshore* set out the Government's policy direction and commitment to develop offshore wind farms in Round 2 projects.

In 2003 a total of 15 Round 2 projects, totally 7.2 GW, were awarded Agreements for Lease by the Crown Estate, (The Crown Estate, 2010).

Forecasting undertaken by the BWEA in *UK Offshore Wind: Staying on Track* (2009), identifies the installation programme for UK offshore wind including the Round 2 projects, and predicts that installation targets for 2015 will reach 5.5 GW of total capacity.

In October 2008 proposals for offshore wind farm developments in Scottish Territorial Waters were submitted and exclusive development rights were awarded to ten companies and consortia to provide a potential installed capacity of over 6 GW of offshore wind energy in Scottish Waters.

In January 2010 successful bidders for each of the nine Round 3 offshore zones within UK waters were announced with successful bidders developing an ambitious 32.2 GW by 2020.



Figure 1: Wind turbines at the operational Burbo Bank offshore wind farm

1.3.3 The Extensions to Round 1 and 2 Offshore Wind Farms

At the end of July 2009 the Crown Estate (TCE) issued an Invitation to Tender (ITT) for a leasing round for the extension of existing Round 1 and Round 2 site areas. This offer was open to Round 1 and 2 projects which were either consented or had submitted consents for determination.

The aim of offering these areas was to take advantage of the possible accelerated delivery of extensions, in order that construction could be underway before development commenced on Round 3 offshore wind farm projects in order to deliver increased renewable energy capacity. The emphasis of this offer was on the timely delivery of additional offshore wind capacity following UK Government consent. Applications were required to demonstrate that the extensions could be delivered to acceptable timescales.

A number of criteria were used to define acceptable extension areas; these included:

- The proposed extension must share a substantial part of one or more boundaries with the original existing site;
- No maximum size of extension was set, however the scale of the extension should be appropriate for the scale of the original site;
- The extension proposal should demonstrate synergies with the original site, e.g. of construction, operation, improvement of economics and/or grid connectivity;
- No extension would be permitted to encroach within a radius less than 5 km of any nearby Round 1 or 2 sites, except with the express agreement of the tenant of the existing nearby site;

- The proposed extension must not adversely affect delivery or operation of the original site or any neighbouring site;

DONG Energy submitted an expression of interest on September 9th 2009 and subsequently made a full application for the extension to the Operational Wind Farm to TCE on December 18th 2009.

In April 2010 DONG Energy was awarded the extension by The Crown Estate.

1.4 Planning Consents and Environmental Impact Assessment

This section summarises the new set of planning consents that will be required, under the *Planning Act 2008* and the new IPC regime, in order to develop Project for the offshore wind farm works and the onshore cable route and substation works, as well as describing the UK and EU legal requirements for Environmental Impact Assessment (EIA).

1.4.1 The Planning Act 2008

The *Planning Act 2008* sets out the consenting system for major infrastructure projects including those in the energy sector. Part 2 of the Act specifies the provisions in relation to National Policy Statements (NPS), which set the framework for decisions by the IPC. The draft NPS also identifies relevant environmental considerations. Seven draft NPSs have been published to date, including an Overarching Energy NPS (EN-1), the draft Renewables NPS (EN-3), and the draft Electricity Networks NPS (EN-5). These were subject to consultation until February 2010.

Significant changes have been made to the planning system under the Planning Act 2008 and the Burbo Bank Extension offshore wind farm project will fall under the auspices of the new regime which came into force on March 1st 2010.

Under this legislation the development of an offshore wind farm capable of generating in excess of 100 MW will be classified as a Nationally Significant Infrastructure Project (NSIP) and will require a Development Consent Order (DCO) from a new independent body called the Infrastructure Planning Commission (IPC).

1.4.2 The Development Consent Order (DCO)

The *Development Consent Order (DCO)* will replace a number of consents normally required for an offshore wind farm development. The DCO will provide for the project in its entirety, i.e. both the offshore and the onshore aspects, with onshore electrical grid connection works comprising 'associated development' under the new regime. A formal Environmental Impact Assessment (EIA) will be required as part of the application for a DCO and an Environmental Statement (ES), the report documenting the EIA process, will be prepared in accordance with the *Infrastructure Planning (Environmental Impact Assessment) Regulations (2009)*, which came into force in October 2009.

For the purposes of this Scoping Report, 'onshore' refers to the land from mean high water mark to the connection with the National Grid transmission system; 'offshore' refers to the area seaward of the mean high water mark. As identified above, the landfall works, onshore cabling and substation extension would be classed as associated development forming part of an application for a DCO to the IPC under Section 37 of the Planning Act 2008.

The new DCO procedure dispenses with the need for separate planning permission and consents under Section 36 or 37 of the Electricity Act 1989 (Section 32), the Town and Country Planning Act, the Food and Environment Protection Act (FEPA) and the Coast Protection Act (CPA), licences for the latter two legislative instruments having recently been consolidated by a *Marine Licence* under the Marine and Coastal Access Act 2009. Any need for an EIA under the Marine Licence would be provided for through that undertaken for the DCO application.

In addition to the principal licences, any minor consents and licences will be identified during the project development stage and consultations with statutory bodies.

1.4.3 Consultation Process

Under Part 5 of the Planning Act 2008 there are statutory requirements for promoters of a DCO application to engage in pre-application consultation with local communities, local authorities and those who would be directly affected by the proposals.

The *Infrastructure Planning (Applications and Procedure) Regulations 2009* prescribe various matters in connection with making an application for development consent, including publicising a proposed application and consulting with local and statutory stakeholders.

Before an application for a DCO is submitted to the IPC, extensive consultation with key stakeholders (local authorities and statutory bodies) and the local community and interest groups is required. This formal consultation is undertaken during the preparation of the ES, before the DCO application is made.

Relevant local authorities with coastal and landward jurisdictions within which the potential development footprint falls will also be approached, in order to ensure local consultation at both authority and community level.

Prior to any application to the IPC, the *Infrastructure Planning (Applications and Procedure) Regulations 2009* will require a programme of community consultation to be agreed with the relevant Local Authorities. In this case, land affected by the offshore wind farm and the onshore works come under the local authority jurisdiction of Wirral Metropolitan Borough Council for the landfall at Mockbeggar Wharf, for the onshore substation and all cable routes towards the Birkenhead 275 kV onshore substation. There might be additional Local Authorities to be consulted in case the alternative option to Deeside 400 kV substation is chosen by National Grid (see Section 3.5 for further details).

In brief, the Planning Act 2008 requires promoters to:

- Consult with the relevant Local Authority(ies) on what should be in the promoter's Statement of Community Consultation (SoCC), which will describe how the promoter proposes to consult the local community about the proposals;
- Have regard to the Local Authority's response to that consultation in preparing the SoCC;
- Publish the SoCC in a locally circulating newspaper, as required by secondary legislation, and carry out consultation in accordance with the SoCC. This Scoping Report may help inform that consultation exercise;



Figure 2: Summary of the key steps from the Scoping Report and consultation process up to the application for a DCO and related legislative requirements

- Consult a range of statutory consultees as identified by IPC. Again, the Scoping Report may help inform that consultation exercise;
- Set a deadline of at least 28 days by which responses to consultation must be received;
- Notify the IPC of the proposed application;
- Publicise the proposed application in accordance with regulations in secondary legislation;
- Have regard to relevant responses to publicity and consultation;
- Prepare a Consultation Report and submit it to the IPC with the DCO Application.

The above process is summarised in Figure 2 on the previous page.

1.4.4 Environmental Impact Assessment (EIA)

The *EC Directive 85/337/EEC* - as amended by Directive 97/11/EC (known as the "EIA Directive") - requires an EIA to be completed in support of an application for development consent for certain types of projects.

Offshore wind farms are listed in Annex II of the Directive, as "installations for the harnessing of wind power for energy production (wind farms)", and these provisions have been transposed into UK legislation.

In the UK the Directive is applied to wind farm projects (and associated onshore infrastructure through *the Infrastructure Planning (Environmental Impact Assessment) Regulations (2009)*). These Regulations set out the statutory process and minimum requirements for the provision of adequate environmental information to enable EIA. The EIA activities, surveys and studies will be reported in the Environmental Statement (ES).

This EIA process will include consideration of the requirements of the EU Habitats and Birds Directives as implemented by the *Conservation (Natural Habitats &c) Regulations 1994 (as amended)*. The consideration will include an assessment of Cumulative and In-Combination Impacts¹ and provide sufficient information to inform an Appropriate Assessment (if any is required by the IPC acting as the Competent Authority under the *Conservation (Natural Habitats & C) (Amendment)(No. 2) Regulations 2009*).

The relationship between the onshore and offshore aspects of the EIA and with other documents that are submitted with the application for a DCO will be explained within the Environmental Statement. This will include details of the consultations that have been undertaken in the preparation of the applications, which will be provided as a separate report in conformity with the new process.

1.4.4.1 Approach to the EIA

The development of offshore wind farms is complex, and much of the final design of both the turbine array (layout, foundation type, and interarray cabling and turbine model) and the associated infrastructure (export cable route, installation methodology, and onshore cable route and substation

¹ See Section 3.6 for more details on the appropriate assessment and the cumulative and in-combination Impacts.

design/location) is refined throughout the development process. This flexibility is necessitated by factors including site specificities in seabed type, meteorological conditions and environmental sensitivities as well as technological improvement and economic considerations, the understanding and definition of which develops as more information is gathered during feasibility work and site surveys.

In order to accommodate such dynamic design considerations, it has become relatively routine practice to employ a 'Rochdale envelope'² approach within an EIA, to ensure that the final scheme is accommodated within the impact assessments reported in the ES which will support the DCO application, and therefore the associated consent.

The EIA for the Project will therefore be conducted on the maximum potential adverse impacts which could realistically accrue from the wind farm development; any impacts arising from the final scheme design (during construction, operation or decommissioning) will therefore be within the predicted 'envelope' of impacts identified within the ES such that no impacts of higher significance will occur.

Where such design or methodology options remain at the time of application, these will be clearly identified in the ES together with the reasons for such required flexibility and draft DCO clauses provided to address such outstanding issues to the satisfaction of the IPC and key stakeholders.

1.4.4.2 Best Practice

DONG Energy has applied best practice in respect of consultation and environmental assessment of its previous developments. The EIA process for this project will adhere to best practice as appropriate to the Project. Of specific relevance to this project under the current regime, BERR has published the *Guidance on the Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations 2000, Urn 01/789*, September 2000.

In addition to the above, the Department for Communities and Local Government has consulted on proposed amendments to *Circular 02/99* and on new EIA guidance. This has been considered where relevant.

Further guidance may be forthcoming on the *Infrastructure Planning (Environmental Impact Assessment) Regulations (2009)*. Draft guidance has also been provided on pre-application procedures under the Planning Act 2008, some of which is relevant to EIA. These, together with the relevant aspects of previous best-practice guidance will be taken into account during the Project EIA.

Additionally the survey methods adopted for the Project will build upon various best practice guidelines available to the industry and detailed discussions with the statutory agencies, for example DEFRA and CEFAS Guidance, CAA Guidelines and JNCC guidance.

1.4.5 Conditions in the Existing Burbo Bank Offshore Wind Farm

The existing Burbo Bank offshore wind farm has been awarded a number of consents (or licenses) required by the following statutes:

² Case law (i.e. *R.V. Rochdale MBC Ex Part C Tew* 1999 – "the Rochdale case") set a precedent that "indicative" sketches and layouts, etc, cannot provide a sufficient basis for the determination of applications for outline planning permission for EIA development. In respect of DCO consent, the final scheme constructed must have been covered by the scope of the EIA.

- Electricity Act (EA) 1989, Section 36;
- Food and Environment Protection Act (FEPA) 1985, Section 5;
- Coast Protection Act (CPA) 1949, Section 34;
- Town and Country Planning Act (TCPA).

The EA Section 36 consent was awarded in July 2003. The main issues during the post-EIA consultation process were found to be the potential impact of the wind farm on wildlife, its visual impact, and disturbance of contaminated sediments as a result of the construction or operation of the wind farm. This consent does not include conditions specifically related to the above concerns (these are contained in the FEPA licence), although it outlines requirements for the size and positions of the structures and conditions related to acceptable noise levels during construction of the wind farm.

The FEPA licence (no. 31864, awarded 5th September 2003) includes conditions related to environmental monitoring to be undertaken during the pre-construction, construction and post-construction. An environmental monitoring programme has been completed and has not shown any unforeseen impacts as a result of the construction or operation of the existing wind farm.

The TCPA planning permission was granted in February 2003 and includes conditions related to a landscape scheme, onshore substation design and ecological conditions along the onshore export cable route.

2. Project Description

2.1 Objectives of the Development

The principal objective of the Burbo Bank Extension offshore wind farm project is the generation of energy from a renewable source, i.e. wind, in line with the UK Government's targets described in Section 1.3.

2.2 Site Layout

The Burbo Bank Extension offshore wind farm (or 'the Project') is an extension to the existing and operational Burbo Bank offshore wind farm. The Project site is located W of the Operational Wind Farm in Liverpool Bay, around 7 km N of the North Wirral coast near the village of Meols, 8.5 km from Crosby beach, and 12.2 km from the Point of Ayr on the Welsh coast. The total area occupied by the Project site is approximately 40 km², which is four times the area of the Operational Wind Farm site (10 km²) leased from The Crown Estate. The Project and the Operational Wind Farm site areas and turbine layouts (indicative for the Project) are shown on Chart 2. Table 25 in Appendix C provides the co-ordinates of the nodes of the Project site boundary.

The main components of the Project are likely to include:

- Wind turbines;
- Foundations;
- Offshore inter-array and export cables;
- Offshore substation;
- Onshore export cable;
- Onshore substation.

These elements are described in the next sections.

2.3 Foundations for Wind Turbines

The Project area has good ground (seabed) conditions with water depths ranging between 6 and 13 m and acceptable wave and tidal conditions. These conditions are ideal for using steel monopile foundations, although depending on the size of the turbines other foundation types (e.g. a suction bucket concept or jacket designs) might be considered.

2.4 Wind Turbines

The Operational Wind Farm consists of 25 turbines with a total capacity of 90 MW. The turbine model is the Siemens SWT-3.6-107 (each turbine has a 3.6 MW installed capacity) with an 88.3 m hub height. The turbines are installed on monopile foundations. The preliminary design basis for the Project is expected to consider a range of turbines from 3 MW to 7.5 MW capacities. The base case scenario will deploy the Siemens SWT-3.6-120 with 90 m hub height.

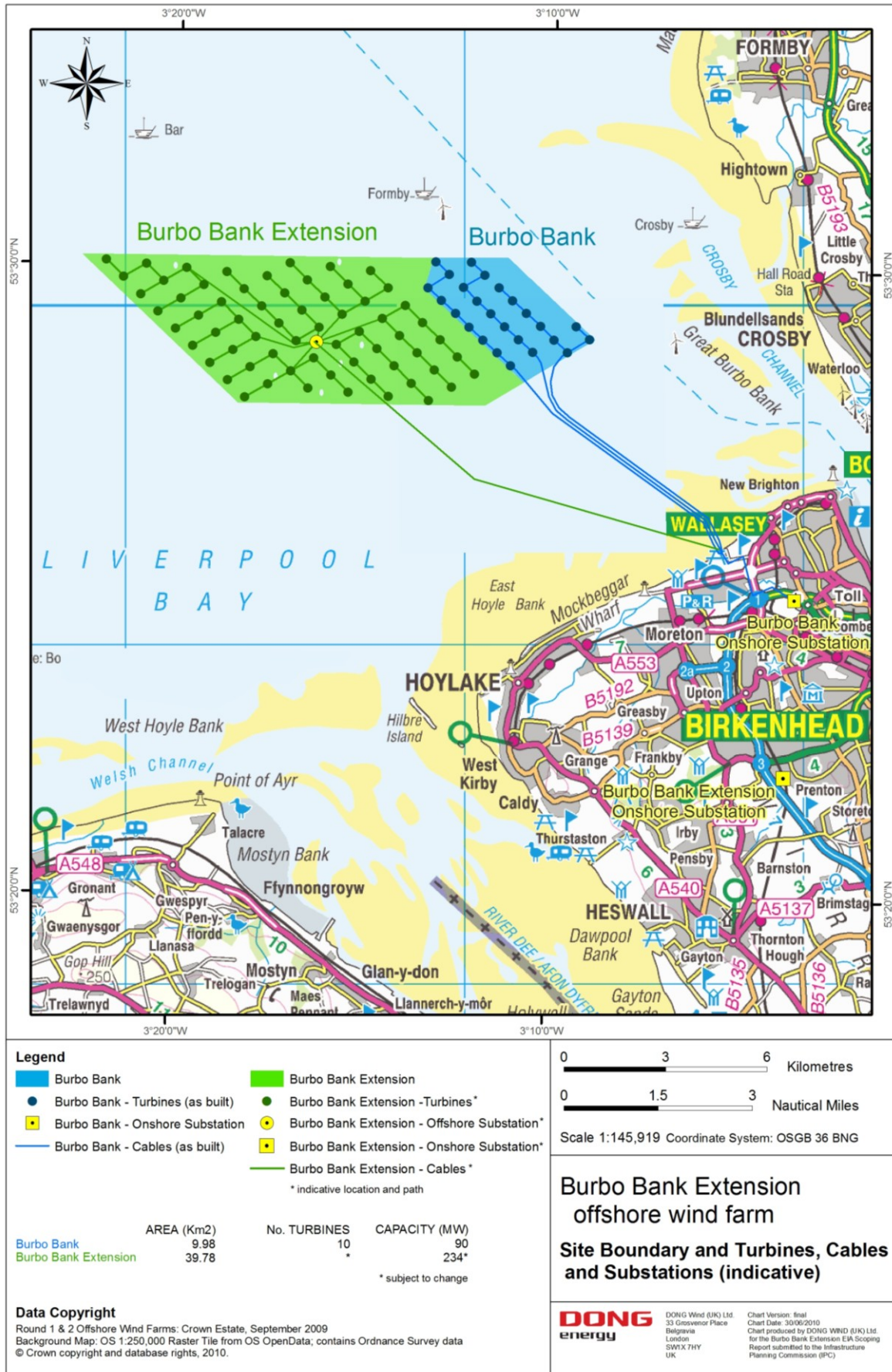


Chart 2: Location of Burbo Bank and Burbo Bank Extension offshore wind farms

The expected upper limit for turbine rated capacity is 7.5 MW. The resulting expected range of the Project's capacity is from 169 MW to 234 MW approximately. The turbine positioning within the Project area is likely to provide for an increased spacing than that at the Operational Wind Farm (755 x 570 m), primarily because of the potentially larger turbine rating.

The wind turbine layout within the Project site will be designed and constructed to satisfy the safety requirements of the Maritime and Coastguard Agency (MCA) as well as the marking, lighting and fog-horn specifications of the Civil Aviation Authority (CAA) and the Trinity House Lighthouse Service (THLS). Trinity House recommendations will be followed as described in '*Renewable Energy Installation Farms and Fields – Provision and Maintenance of Local Aids to Navigation by Trinity House*' and '*IALA Recommendation O-117 on the Marking of Offshore Windfarms, Edition 2*' December 2004. CAA recommendations on '*Lighting of Wind Turbine Generators in United Kingdom Territorial Waters*' September 2004 will also be followed.

All the wind turbines would be marked with clearly visible unique identification characters, which will be visible from all sides of the wind turbine generators and comply with requirements in Maritime and Coastguard Agency *Marine Guidance Notice MGN 371 (M+F)*, i.e. that they should be visible from at least 150 m from the structure and be permanently lit by downlights to minimise light pollution. The colour scheme of the turbine tower, nacelle and blades is likely to be light grey RAL 7035 white RAL 9010 or equivalent.

2.5 Offshore Substation

While the existing wind farm has no offshore substation, one will be constructed for the Project. The substation will be located within the Project area and its final location will be determined following an optimisation study of the inter-array cable layout. An indicative location is shown on Chart 2.

Medium voltage inter-array cables will be collected at the substation and the voltage stepped up to high voltage by two transformers before transmission to shore. The substation's potential voltage will be between 132 kV and 275 kV, depending on the final installed capacity. The substation will be marked similarly to the turbines in terms of navigation and aviation lighting.

2.6 Inter-array and Export Cables

The turbines will be connected to the step-up transformers located in the offshore substation via a network of inter-array cables most likely with a voltage of 33 kV. The total length of this network will depend on the chosen wind turbine capacity and the findings of an inter-array cable optimisation study, based on minimisation of costs and transmission losses. It is common practice to use sea-armoured 3-core copper XLPE cables for this installation. See Chart 2 for an indicative layout.

A minimum of one cable running to the shore is expected to be used to connect the offshore substation to the onshore substation with a voltage between 132 and 275 kV. The offshore section of the export cable is likely to be a 3-core submarine cable up to the shore (approximately 7 to 10 km) and its onshore parts to be three single-core cable from the landfall to the onshore substation (approximately 8 to 10 km, depending on the chosen onshore route). The length of the export cable is, however, dependant on National Grid, in terms of the connection that it will offer for the Project to connect to the grid.

2.7 Onshore Substation

The onshore substation is expected to be located near the National Grid Birkenhead 275 kV substation, SW of the village of Prenton, in the Metropolitan Borough of Wirral. An alternative option might be near the National Grid Deeside 400 kV substation near the Deeside Power Station NW of the town of Connah's Quay/Cei Connah in Flintshire (Wales). A grid connection application was recently submitted to National Grid considering an onshore entry point at the onshore substation. National Grid will then offer a grid connection for the Project, considering the most optimal onshore location. For more details see Section 3.5.

2.8 Anemometry Mast

It is not expected that an anemometry (“met”) mast will be deployed in the development of the Project. Wind measurements will be available from the Operational Wind Farm, derived from previously collected Supervisory Control and Data Acquisition (SCADA) data.

2.9 Navigation Radar Mast

A navigation radar mast, to help regulate the shipping traffic across the Queens Channel to and from the Port of Liverpool, is expected to be placed on the northernmost operating wind turbine of the Operational Wind Farm in fulfilment of a consent condition for it.

Technical details of the final solution are currently being discussed between Peel Ports Ltd. (operator of the Port of Liverpool) and DONG Energy.



Figure 3: Wind turbines at the operational Burbo Bank offshore wind farm

3. Scoping of Environmental Impacts

3.1 Introduction

This chapter of the Scoping Report discusses the following topics:

- An overview of the *existing offshore and onshore physical, biological and human environment conditions* that exist in and around the Burbo Bank Extension offshore wind farm site (the 'Project');
- An overview of the *potential impacts* on both these environments that may arise should the Project be developed. A ranking of the significance of these impacts is shown in Table 1 below;
- A summary of *surveys and studies completed* to date (mainly in relation to the operational Burbo Bank offshore wind farm), along with recommendations for *proposed surveys and studies* and a brief description on the *assessment methodology*.

Much of the information presented within this section is based upon:

- Data collected as part of the Environmental Impact Assessment (EIA) surveys and studies undertaken for the Operational Wind Farm in 2002 by SeaScape Energy Ltd, the previous developer;
- Data collected during the pre-construction, construction and post-construction surveys (geotechnical site investigations and the environmental monitoring programme) from 2004 to 2007 for the Operational Wind Farm;
- Additional data collection and desktop studies performed during the site selection process (August to October 2009) for the Project.

Some of the EIA and pre-construction surveys already undertaken in relation to the Operational Wind Farm and part of the data from these surveys will be directly applicable to the Project site due to its proximity.

Significance of the Impact	Description
Major Impact	Impacts of sufficient importance to call for serious consideration of change to the project.
Moderate Impact	Impacts of sufficient importance to call for consideration of mitigating measures.
Minor Impact	Impacts which are unlikely to be sufficiently important to call for mitigating measures.
Negligible / No Impact	Impacts that are assessed to be of such low significance that they are not considered relevant for the decision-making process.

Table 1: Ranking of the significance of potential impacts on the offshore and onshore environments

3.2 The Offshore Physical Environment

3.2.1 Overview of the Proposed Site

The proposed Project site is located W of the Operational Wind Farm in Liverpool Bay, approximately 7 km N of Hoylake and Meols, Wirral, 8.5 km from Crosby beach and 12.2 km from the Point of Ayr, Wales. It is bordered by the Queens Channel navigation channel into the Port of Liverpool to the NE.

Further W of Operational Wind Farm (10 km) the Gwynt Y Môr offshore wind farm site is located and SW is the North Hoyle offshore wind farm site. The Dee estuary, dividing England and Wales, is located 7 km S of the Project site, which is entirely within English waters.

3.2.2 Physical Conditions

3.2.2.1 Bathymetry

The water depth range of the Project site (6 to 13 m) is greater than that for the Operational Wind Farm site, which ranges from 0.5 to 7.8 m. Generally, greater water depths are experienced in the western area of the Project site.

3.2.2.2 Geology

The profile of the local seabed shelves around the Project site and is comprised of sandy deposits. Samples that were taken around the Operational Wind Farm area showed a high sand content (95% on average) and fall within 4 types of classification.

Sediment types within Liverpool Bay are predominately sands with variable gravel content and low mud content. A sandbank at Little Burbo is comprised of medium to coarse sand abundant with shell material. In an E to W trending band, approximately 1 km across the N and S of the sandbank, a 1 m thick layer of 'fluidised' and loose sand occurs due to higher silt content.

Coarser sediments dominate in the less developed southern section and very low reflectivity sediments showing a prominent seabed lineation are visible, providing evidence for the cross-bedded and planar-bedded sands below the surface layer across the survey area.

3.2.2.3 Coastal Morphology

The present day coastal configuration is shaped by sub-aerial deposition caused by the post-glacial retreat that occurred over the last 10,000 years (Pleistocene and Holocene). Over time, coastal recession is likely to occur along the exposed coast with the predicted progressive rise in sea level and a lack of supply of sediment to the littoral zone.

The cable route is planned to be directionally drilled under the existing sea defences at Mockbeggar Wharf, near the village of Leasowe, Wirral. The Wirral coastline includes several coastal defence structures to arrest long-shore drift and trap beach sediments. Unlike the Sefton coast, the Wirral coast is not protected by a well-developed dune system.

3.2.2.4 Seabed Morphology

Interpretation of seabed features over the Operational Wind Farm site (and partly the Project site) has been carried out primarily by using data from side-scan sonar and echo-sounder, together with occasional grab sampling, and correlated with BGS charts for the area and magnetometer data. The

local seabed shelves around the Project site in the N (Little Burbo), E (Great Burbo) and S (Newcome Knoll), with deeper water to the W (Liverpool Bay).

A key feature around the site includes the dredged navigation channel (Queens Channel) into Mersey Docks. This navigation channel is enclosed by sections of training banks where large sand bodies have accumulated against it. Water depths are relatively shallow throughout the site, varying between 6 to 13m (chart datum), but do not dry. Shallowest depths are in the NE corner, where the site runs up to Little Burbo and deepest areas are located along the SW boundary.

3.2.3 Meteorology

3.2.3.1 Wind

The wind regime at the Operational Wind Farm site has been estimated based on met mast measurements at the now withdrawn Shell Flats offshore wind farm site (off the Blackpool coast), with adjustments based on long-term reference data near the Operational Wind Farm site. Based on the existing studies, the wind predominantly comes from W–SW, with an average wind speed of 9.2 m/s. This is likely to be higher in the Project area where coastal impacts become less significant.

3.2.3.2 Wave

The local wave regime has been shown to respond to wind forcing along local fetches and variations due to tidal impacts. As the offshore waves approach Liverpool Bay the shallow water modifies the waves. These modifications are depth-related and the waves modulate accordingly with tidal levels. Low water events especially restrict large wave moving across the development site and onwards to the coastlines.

3.2.3.3 Tide

The tidal range in Liverpool Bay normally achieves its peak (10.9 m), on average, twice a year at the vernal and autumnal equinoxes. The average of spring tides provides a range of 8.7 m and the average of neap tides a range of 4.5 m. Therefore, for all conditions the tidal range achieves the condition of a “macro” tide, i.e. >4 m. Tidal flows across Liverpool Bay move across the shallow bathymetry and interact with the various banks and channels. Velocity profile varies markedly in direction and magnitude.

3.2.3.4 Current

In addition to the tidally driven currents, the flow regime is also influenced by density driven current arising from the mixing process between the sea, by wind stress, storm surges and by waves. Despite the relatively low magnitude of density driven currents, they are persistent and make a significant contribution to residual flows. However, the wind-driven currents predominate over density-driven currents at wind speeds of 5-10 m/s, while above 10-20 m/s density driven currents become insignificant.

3.2.3.5 Other Meteorological Aspects

Other meteorological characteristics which can influence wind farm operation include wind shear, ambient turbulence and atmospheric stability. Through the operation of the Burbo Bank offshore wind farm, detrimental impacts on turbine structures are not expected for the Project.

3.2.4 Water Quality

The whole region of Liverpool Bay has been contaminated historically with mercury from the chloralkali industry. There are known issues with lead, cadmium and arsenic, elements of high environmental concern.

Copper, zinc, chromium and nickel are dispersed from industrial areas but are normally considered to be of lower concern. From previous studies the sediments in the area of Burbo Bank are heterogeneous and are unlikely to contain any persistent contaminants to pose a risk of adverse impact if dispersed.

3.2.5 Offshore Physical Environment – Potential Environmental Impacts

Table 2 below summarises the key potential environmental impacts that may arise, during the construction, operation and decommissioning phase, upon the physical environment as a result of the Project development.

Offshore Physical Environment – Potential Environmental Impacts from Burbo Bank Extension offshore wind farm			
<i>Construction / Decommissioning</i>	<i>Significance of Impact</i>	<i>Operation</i>	<i>Significance of Impact</i>
Impacts upon water quality: - Increased suspended sediment concentrations from trenching and piling works.	Minor impact.	Impacts upon the seabed: - Scour impacts around base of turbines; - Scour impacts in vicinity of cables.	Minor impact.
		Impacts upon coastal processes: - Changes in near-field and far-field wave and tidal regime leading to changes in sediment transport processes.	

Table 2: Potential impacts upon the offshore physical environment from the proposed Burbo Bank Extension offshore wind farm project

3.2.6 Offshore Physical Environment – Surveys and Studies Undertaken to Date and Proposed Surveys

Table 3 below lists all physical surveys and studies that have been undertaken to date as part of the development of the Operational Wind Farm.

Discussions will be held with key stakeholders, including DECC, DEFRA, CEFAS, Natural England and JNCC, to determine the ongoing validity of surveys already carried out and whether or not they could be used for the Project.

A provisional assessment of whether these existing datasets will be valid is provided in the Table 3 below.

Offshore Physical Environment – Surveys and Studies for Burbo Bank offshore wind farm					
Survey / Study	Date	Undertaken by	Description	Relevance	
				Exist.	Exten.
Preliminary Coastal Process investigation	2001	ABP Research & Consultancy Ltd.	Considered the necessary data requirements to support more detailed studies.	✓	✓*
Coastal Process study	2002	ABP Marine Environmental Research Ltd.	Assessment of the magnitude and significance of changes caused by the offshore development on the hydrodynamic regime.	✓	✓*
Oceanographic survey: Tides, Currents & Waves	2002	Titan Environmental Surveys Ltd.	Collection of wave height, current, turbidity and tidal data from two sites over a period of 6 months at the development site.	✓	✓*
Geophysical survey	2002	Titan Environmental Surveys Ltd.	A geophysical survey undertaken at the site and cable route of the development to determine bathymetric and sea-bed features of the area	✓	✓*
Sediment sampling and analysis	2002	CMACS	83 sediment samples were collected across the development site and cable route followed by their analysis.	✓	✓*
Geotechnical site investigation (existing site and offshore export cable route)	2004-2005	Seacore Ltd.	Cone Penetration Tests (CPTs), sample boreholes, and vibrocores (see main text for further details).	✓	X
Geotechnical site investigation (met mast)	2002	Seacore Ltd.		✓	X

* Note: Although the surveys were taken in 2002-2005, they mostly covered an area wider than the Burbo Bank and Burbo Bank Extension sites. Data collected, while still relevant for the Project site, will be updated through a new set of proposed surveys (see Table 4 below).

Table 3: Summary of offshore physical environment surveys and studies undertaken to date in relation to the existing Burbo Bank offshore wind farm

Two separate investigations have been carried out on coastal processes in 2001 and 2002. An initial investigation outlined the necessary data requirements followed by the completion of a comprehensive coastal process investigation to form part of the EIA for the Operational Wind Farm. The overall aim of the coastal process study was to address the relevant issues raised by the environmental scoping study (Casella, 2001) and to determine the impact the scheme may have had on the environment.

The main objective was to assess the magnitude and significance of changes caused by the offshore development to the hydrodynamic and sediment regime as well as site specific issues raised from initial consultations.

Two surveys were also conducted by Titan Environmental Surveys Ltd. in 2002. Firstly an Oceanographic survey investigating wave, current, turbidity and tidal data at the Operational Wind Farm site. Two devices (Valeport 730D) were deployed at the site and strategically located to allow for a clear understanding of the hydrodynamic regime.

Secondly, a geophysical survey was carried out. The geophysical survey was undertaken to enhance the description of coastal geology in the local area allowing for an improved understanding of the bathymetry and sea bed features of the Operational Wind Farm site and cable route.

Sediment sampling and analysis was conducted by the Centre for Marine and Coastal Studies (CMACS). In total 83 sediment samples were collected across the Operational Wind Farm site, cable route and adjacent area. All samples were analysed in a number of ways including physical analysis (particle size analysis), chemical analysis (total organic carbon and total nitrogen content) and lastly benthic analysis.

A geotechnical site investigation was completed by Seacore Ltd. across Operational Wind Farm site from December 2004 to February 2005 and along the offshore cable route in March 2005. The investigation at the wind farm site comprised 22 cone penetration tests (CPTs), 8 seismic CPTs, and 8 sample boreholes.

The cable route investigation included 6 shallow CPTs and 10 vibrocores. Furthermore, Seacore Ltd. completed a geotechnical investigation for the meteorological met mast south of the Operational Wind Farm site in June 2002, including 1 borehole and 1 CPT.

In terms of further surveys and/or studies that may be required to supplement the work done in the past for the Operational Wind Farm site, Table 4 shows the proposed surveys and/or studies that are required as part of the Burbo Bank Extension project.

Offshore Physical Environment – Proposed Surveys and Studies for Burbo Bank Extension offshore wind farm	
<i>Proposed Survey / Study</i>	<i>Description and Assessment Methodology</i>
Geology desk study	<p>Study to provide all necessary information about major soil units, in and around the Project site, in order to optimise the subsequent surveys.</p> <p>The British Geological Survey data on sea bed features, sand waves, geology, bed forms will be interpreted to understand how they were formed, if they are likely to remain in the present position in the future, and if changes in the Project site and surrounding environment are likely to cause changes within the structure and position of banks and channels.</p>
Geophysical survey	<p>The survey consists of 100% coverage of side scan sonar (500 kHz) and multi beam. Furthermore a magnetometer will be deployed. The survey would cover both the Project site and the offshore export cable route And the line spacing will be designed to ensure full coverage of the study area.</p> <p>The survey will inform sea bed bathymetry, seabed features and obstructions, debris and potential archaeological features.</p> <p>The geophysical survey will inform the coastal process study (see below).</p> <p>An assessment of the survey data and modelling techniques will provide information on the geophysical nature of Project area and the offshore export cable route. See the main text preceding this Table for more details.</p>
Coastal Process study	<p>Study to provide an assessment of the magnitude and significance of changes caused by the Project site development on the hydrodynamic and sediment transport regime. See the main text preceding this Table for more details.</p>
Oceanographic and Meteorological (MetOcean) study	<p>Assessment of the ocean environment characteristics such as water salinity, temperature, turbidity as well as current profiles, tide and wave height data in and around the proposed offshore extension.</p> <p>The assessment will include the establishment of baseline scenarios and the definition of other worst/realistic case scenarios by using a number of models (e.g. wave model) and data previously collected (see Table 3) to determine any changes to such characteristics of the ocean environment.</p>
Geotechnical survey	<p>Cone penetration tests (CPT) at each proposed wind turbine position within the Project site and sampling boreholes at selected positions.</p> <p>Shallow CPTs and vibrocores will be carried out along the cable route as well.</p> <p>The survey will, however, be carried out only if the Development Consent Order (DCO) is awarded.</p>

Table 4: Proposed offshore physical environment surveys and studies in relation to the Burbo Bank Extension offshore wind farm project

3.3 The Offshore Biological Environment

The following sections describe the existing offshore biological conditions in and around the Operational Wind Farm site and the proposed Burbo Bank Extension project site, including benthos, fish and shellfish, birds, and marine mammals as well as an overview of the currently designated nature conservation areas.

Also, a review of potential impacts will be provided along with a summary of surveys/studies undertaken previously for the operational offshore wind farm site and any surveys/studies that may be required for the development of the Project.

3.3.1 Benthic Ecology

Several benthic pre- and post-construction surveys have been undertaken on the Operational Wind Farm site and adjacent areas. However, only one sampling station is located within the proposed Project site. The area is classified as "sublittoral sandbank less than 20m", consisting predominantly of sandy sediments and associated fauna. As such, the benthic ecology found within the proposed extension is expected to be largely similar to that of the existing site. This is confirmed through sourcing information from the Mapping European Seabed Habitats (MESH) database, although it should be noted that MESH partly relies upon modelled data.

Two main sandy biotopes are identified:

- IGX.FabMag (*Fabulina fibula* and *Magelona mirabilis* with venerid bivalves in infralittoral compacted sand);
- IGS.NcirBat (*Nephtys cirrowsa* and *Bathyporeia spp* in infralittoral sand).

The biotopes support polychaete worms and bivalve populations which are important prey species for flatfish and for diving ducks such as common scoter. A less common biotope is identified as CMSABRNucCor (*Abra alba*, *Nucula nitida* and *Corbula gibba* in circa-littoral muddy sand or slightly mixed sediments).

Typically, sandy sediments support largely infaunal communities and only a few epifaunal species. Dominant species in these communities are known to have short life spans and they exhibit high natural variability and good recoverability. This is common of benthic communities in relatively mobile conditions, which are well adapted to high energy conditions and tolerate changes in sediment disturbance and movement.

The benthic ecology within the Project site is not considered to be of high sensitivity. Significant impacts beyond the direct habitat loss due to the installation of pile and scour protection are unlikely and as such impacts are likely to be localised and small-scale in nature. However, indirect impacts of seabed changes may affect the conservation management objectives for the Liverpool Bay SPA and this will be assessed in details during the EIA.

The baseline benthos survey will follow the general Round 2 approach and standard EIA assessment methodologies. This approach is general for Round 2 developments and is adopted as the potential significance of impact is expected to be minor.

3.3.2 Intertidal Habitats

Bassindale (1938) carried out surveys of the Mersey Estuary with several sample locations along the Wallasey foreshore. Within the North Bank area and shore the area was described as "...sparsely inhabited sand". Along the lower shore he noted a number of *Echinocardium cordatum* and *Lanice conchilega* although these were found to be more abundant to the west. The bivalve *Callista chione* was also found to be present, in some places alone, on the lower sand banks. Other species that has been recorded on the sand banks are: the bivalves *Macoma Sp*, *Mactra corallina*, *spisula solida* and the polychaete *Owenia sp*. *Corophium* were also noted in muddy areas towards East Hoyle Bank, although communities generally became less rich but more densely inhabited on this direction.

Bamber (1988) and Darwood & Coster Smith (1991) investigated the sandy intertidal zone on the northern tip of the Wirral peninsula. Above the mid tide level on the open shore, the infauna was found to be dominated by the polychaete *Scolecopsis squamata*, the amphipod *Bathyporeia* and the isopod *Eurydice pulchra*. Below the mid tide level, the shore was dominated by the polychaetes *Spio martinensis*, *Magelona mirabilis*, *Nephtys cirrosa*, *Lanice conchilega* and *Arenicola Marina*.

The Eastern Irish Sea/Liverpool Bay coastline is characterised by a number of major estuaries and the main within Liverpool Bay is; Dee, Mersey and Ribble Estuaries. The Dee, Mersey and Ribble Estuary comprise most of intertidal habitat (mudflat and sand flats exposed at low water) and almost all the saltmarsh within Liverpool Bay.

A habitat mapping of the intertidal habitats was undertaken at the Wallasey foreshore as a part of the environmental impact assessment for the Operational Wind Farm to identify the distribution of biotope communities along the proposed cable route. In general the shore is dominated by fine, well-sorted sands extending around 2 km from the upper shore to low water. Some zonation is present too, even though the communities are patchy as a result of channels cutting into the sandbank creating raised well drained areas. The identified biotopes were typical of sandy shores along this section of coast. Species and communities were found to be similar to previous surveys. Of the nine biotopes recorded, all except three were classified as very common or common.

Offshore Biological Environment – Intertidal Habitats			
<i>Short Code</i>	<i>Long Code</i>	<i>Description</i>	<i>Frequency of occurring in Britain</i>
1	LR	Bare rock.	N7A
2u	SLR.F.Fspi	<i>Fucus Spiralis</i> on moderately exposed to very sheltered mideulittoral rock.	Very common
4h	MLR.Eph:EntPor	<i>Porphyra purpurea</i> or <i>Enteromorpha</i> spp. on sand-scoured mid or lower eulittoral rock.	Scarce
5e	ELR.MB.Bpat.Sem	<i>Semibalanus balanoides</i> on exposed or moderately exposed, or vertical sheltered, eulittoral rock.	Very common
5g	ELR.MB.MytB	<i>Mytilus edulis</i> and <i>fucus vesiculosus</i> on moderately exposed mid eulittoral rock.	Common
13b	LGS.S.Bar.Snd	Barren coarse sand shores.	Common
13c	LGS.S.Lan	Dense <i>Lanice conchilega</i> in tide-swept lower shore sand.	Uncommon
13d	LGS.S.AEur	Burrowing amphipods and <i>Eurydice pulchra</i> in well drained clean shores.	Common
13g	LGS.S.AP.P	Burrowing imphipods and polychaetes (often <i>Arenicola marina</i>) in clean sand shores.	Common

Source: Seascope Energy (September 2002) *Burbo Bank Offshore Wind Farm, Environmental Statement*.

Table 5: Intertidal habitats found around the operational Burbo Bank offshore wind farm area

3.3.3 Fish and Shellfish

Liverpool Bay supports a number of ecologically and commercially important fish and shellfish species, as well as providing suitable conditions for estuarine and migratory species. Furthermore, the shallow inshore waters of Liverpool Bay are important nursery grounds for a number of species.

Previous desk studies as well as the Burbo Bank Environmental Statement (2002) have outlined that several shellfish species including cockles, mussels, lobsters, crabs and whelks are present in the area, with brown shrimp (*Crangon crangon*) being the most abundant shellfish species in the study area. These findings are also confirmed by field surveys. Analysis of commercial fishing activities in the proposed extension appears to show levels to be relatively low (see further in Section 3.4.2).

Previous studies have indicated that the area tends to be dominated by demersal fish such as flatfish species, whiting (*Merlangius merlangus*) and cod (*Gadus morhua*). Fish surveys have indicated that the most common species in the area is dab (*Limanda limanda*), plaice (*Pleuronectes platessa*), flounder (*Platichthys flesus*) and Dover sole (*Solea solea*). Pelagic fish, on the other hand, tend to be underestimated in beam trawl surveys. However, previous surveys do show that the lesser sandeel and the smooth sandeel are present in small numbers at a few trawl transects. Thornback Ray (*Raja clavata*) has also been identified in relatively high numbers in previous surveys in the area.

Migratory species that are likely to be present in the area are the Atlantic Salmon (*Salmo salar*), the Sea Trout (*Salmo trutta trutta*) and the European eel (*Anguilla anguilla*). The River Dee is also designated as a Special Area of Conservation (SAC) for Atlantic Salmon. In general the site is considered to be of low sensitivity in terms of other fish and shellfish of conservation importance.

3.3.4 Ornithology

3.3.4.1 Existing Data and Surveys

The Operational Wind Farm Environmental Statement (Seascope Energy, 2002) presented data on birds obtained from the following marine surveys:

- Boat-based surveys;
- Aerial surveys (undertaken in February, March, December 2001, January, February, March and April 2002 as well as during 2004-2005 and 2005-2006;

Boat-based bird surveys have been undertaken before, during and after the construction of the Operational Wind Farm.

The survey area (transects) partly covers the Project site (around half of it) as shown in Chart 3. Additionally, the Project site is entirely located within the BERR aerial survey sector NW6, where aerial surveys of water birds were undertaken in 2004-2005 and 2005-2006³.

3.3.4.2 Species

The key issue regarding ornithology is the potential impacts upon Red-throated Diver (*Gavia stellata*) and Common Scoter (*Melanitta nigra*) populations, for which the Liverpool Bay potential Special Protection Area (pSPA) has been proposed and is being progressed by DEFRA (advised by Natural England) as a current SPA⁴.

³ See BERR (2007). *Aerial Surveys of Waterbirds in Strategic Wind Farm Areas: 2005/06 Final Report*. Available at the URL: <http://www.berr.gov.uk/files/file42555.pdf>

⁴ More information available on the Natural England website at the URL: http://www.naturalengland.org.uk/Images/LivBay-brief_tcm6-15208.pdf

Both species are typically associated with sandbank environments, which support preferred prey items. Common Scoters are benthic feeders and are, therefore, potentially vulnerable to any changes to, and/or loss of, benthic habitat. Red-throated Diver feed on small fish such as sprat and sandeel which rely on sandbank habitats as nursery, spawning or shelter areas and may be indirectly affected by changes to sandbanks.

Red-throated Diver were mainly observed in coastal waters, concentrated mostly in the eastern and southern parts of the aerial survey area along the northern Welsh and Merseyside coasts, at relative densities of 0.001 to 5 individuals per 2 km². In proximity to the Project site, the two areas of peak activity (up to relative density of 5 per 2 km²) are noted. One is located on the southern boundary of the Project site where sightings were largely recorded around the East Hoyle Spit and bank.

The second area is N of the Queens Channel and Taylors Bank. The presence of red-throated divers on the southern boundary of the Project will require additional investigation, particularly as the hotspot area falls within the 2 to 4 km buffer area of potential disturbance suggested by previous studies at other offshore wind farms.

The same surveys observed large numbers of Common Scoter across the survey area. A number of hotspots were also apparent along the coast. Aggregations were largest N of the Queens Channel near Taylors Bank, N of the proposed extension with relative densities of 50 to 100 individuals per 2 km². Common scoters were frequently sighted just S and SW of the Project site but at lower relative densities of 0.001 to 25 per 2 km². Other hotspots at some distance from the Project site were in and around the Shell Flats & Lune Deep pSPA (N of the Project site), Colwyn Bay and Rhyl Flats (SW of the Project site).

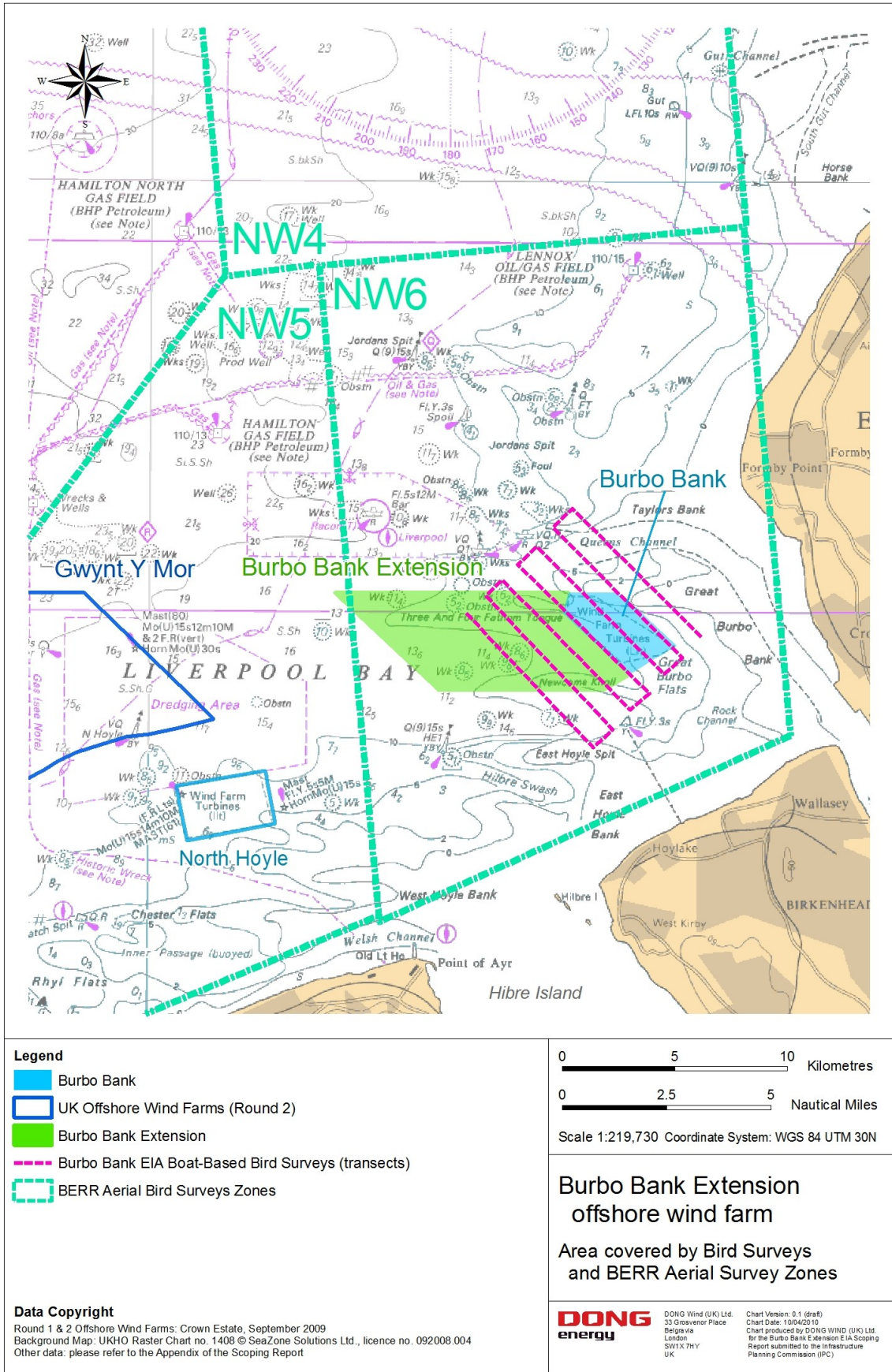


Chart 3: Areas covered by boat-based bird surveys undertaken for the Burbo Bank EIA and the zones of aerial surveys conducted by BERR

The data presented in pre-construction, construction and post-construction reports show that general numbers of birds using the Operational Wind Farm survey area is low, indicating that the Operational Wind Farm site is of lower value than other areas of Liverpool Bay. It is thought that this may be because of the presence of the busy Queens Channel shipping lane directly to the E of the Project site, which may already create significant levels of disturbance and lower bird activity at the Operational Wind Farm site.

Little change in bird activity was observed during and after the construction of the Operational Wind Farm site, which suggests that impacts on bird numbers and activity levels were minimal (albeit from an already low level). However, it should be noted that this observation is based on the 1st year only of the post-construction monitoring survey.

Analysis of pre-construction, during-construction and post-construction survey work shows higher usage and a general preference for the study reference site, SW of the Operational Wind Farm site. This reference site covers a small part of the Project site and is adjacent to it.

According to post-construction survey data, the highest count for Red-throated Diver in the study reference area was nine during in April 2007. Birds were mainly observed on the water or being flushed by vessel. Flight heights were low (<5 m).

Common Scoter individuals were also observed to utilise the study reference area in preference to the Operational Wind Farm site itself with none observed within the wind farm itself. The birds observed were in small groups (up to 9) and always in flight. Common scoters usually aggregate when feeding into large groups. This behaviour indicates that birds were possibly “commuting” through the reference area and, hence, it may not be a key feeding area.

It can be concluded that usage of the Project site by Red-throated Divers and Common Scoter is higher than at the Operational Wind Farm site. However, in relation to the rest of the wider area the usage is lower.

Aerial bird surveys also recorded high numbers of terns from the Dee Estuary SPA in and near the Project site. Relative densities of 2 to 6 birds per 2 km² were observed. This is the highest density of terns in the region and is likely to require assessment as terns are generally regarded as species, which are vulnerable to collision risk. Other noteworthy species to consider are those listed in the Natura 2000 Site⁵.

The following three tables give an overview of:

- Complete list of species identified within the existing Burbo Bank offshore wind farm area and buffer zone (Table 6);
- Observed species qualifying or assemblage of an SPA or a pSPA (Table 7);
- Species not associated with SPAs (Table 8).

⁵ Natura 2000 is an ecological network composed of sites designated under the EU Birds Directive by means of Special Protection Areas (SPAs) and the Habitats Directive by means of Sites of Community Importance (SCIs) and Special Areas of Conservation (SACs).

Table 6: Summary of bird species identified within the existing Burbo Bank offshore wind farm area

Note: This table is a complete list of species present within the existing Burbo Bank wind farm area and buffer zone based on results of pre-construction, construction and post construction surveys^{2,3,4} from 2005 -2008. Where a species was observed in low numbers (i.e. less than 5 individuals reported in each phase), these are listed for completeness, but vulnerability and cumulative impacts (table 5) are not assessed.

Bird Species known to Frequent Area of Development	Vulnerability to Wind Farm Development? (high, medium, low, unknown)⁵				Overall Risk⁷	Feature of SPA with potential for interaction with Site? (if Yes, see Table 7)	Use of Site	Potential for Cumulative Impact? (if Yes, see Table 8)	Information Sources¹
	<i>Displacement</i>	<i>Collision</i>	<i>Barrier Effect</i>	<i>Indirect Effects on Prey Species</i>					
Red Throated Diver ⁸	High	Low	Medium	Medium	High	Yes	Passage/ Foraging	Yes	2,3,4,5,6 usually observed in flight
Auk sp (based on common and black guillemot – predominant species)	Medium	Low	Medium	Medium	Medium	Yes	Combination	Yes	2,3,4,5,6
Common Scoter ⁸	Medium	Low	Medium	Medium	Medium	Yes	Passage/ Foraging	Yes	2,3,4,5,6 usually observed in flight not foraging
Little Gull	Low	Low	Low	Low	? – unspecified by RSPB	No	Passage	No	2,3,4,5,6
Cormorant ⁸	Low	Medium	Medium	Medium	Medium	Yes	Foraging/ Breeding	Yes	2,3,4,5,6 usually observed foraging/ roosting at wind farm
Common Tern ⁸	Low	Medium	Low	Medium	Medium	Yes	Foraging/ Breeding	Yes	2,3,5
Knot	Unknown	Unknown	Unknown	Unknown	Unknown	Yes	Combination	Unknown	2 (5,6 – wader sp)
Sandwich Tern	Low	Medium	Low	Medium	Medium	Yes	Foraging/ Breeding	Yes	2,5
Kittiwake	Medium	Low	Low	Low	Low	No	Combination	No	3,4,5,6
Manx Shearwater	Low	Low	Unknown	Medium	High	Yes	Passage	No	3,4,5 Although overall risk is high (as defined by RSPB, low numbers of Manx shearwater were observed at

									the site, 7 in total, 6 during the construction phase
Gannet	Low	Medium	Low	Low	High	No		No	^{3,4,5,6} Although overall risk is high, relatively low numbers of Gannet were observed at the site, a total of 14 over all surveys
Dunlin	Unknown	Unknown	Unknown	Unknown	Unknown	Yes		No	⁴
Red Necked Phalaropes	See note above	See note above	See note above	See note above	See note above	No		No	² Observed in low numbers
Great Northern Diver	See note above	See note above	See note above	See note above	See note above	No		No	^{3,4,5,6} Observed in low numbers
Mediterranean Gull	See note above	See note above	See note above	See note above	See note above	No		No	^{3,4} Observed in low numbers
Great crested Grebe	See note above	See note above	See note above	See note above	See note above	No		No	^{3,4} Observed in low numbers ^(5,6 – grebe sp)
Oystercatcher	See note above	See note above	See note above	See note above	See note above	Yes		No	^{4,5,6} Observed in low numbers
Turnstone	See note above	See note above	See note above	See note above	See note above	Yes		No	⁴ Observed in low numbers. ^(5,6 – wader sp)
Curlew	See note above	See note above	See note above	See note above	See note above	Yes		No	³ Observed in low numbers. ^(5,6 – wader sp)
Grey Phalarope	See note above	See note above	See note above	See note above	See note above	No		No	^{3,4} Observed in low numbers

¹ Information source column to include details of evidence base for information set out in previous column including vulnerability, SPA designation, cumulative impact etc. Sources may include Seabirds at Sea database, SEA data, preliminary surveys commissioned by developer, NBN gateway among others etc.

² CMACS Ltd (2006) *Burbo Offshore Wind Farm. Year 1 Pre-construction Environmental Monitoring Report*. Report ref: J3034. v1.1. Report compiled by CMACS Ltd.

³ SeaScape Energy (2008) *Burbo Offshore Wind Farm. Ornithological Survey – Construction Period*.

⁴ SeaScape Energy (2008) *Burbo Offshore Wind Farm. Year 1 Post-construction ornithology report*. Report prepared by CMACS Ltd and Avian Ecology on behalf of SeaScape Energy.

⁵ DTI (2006) *Aerial Surveys of Waterbirds in Strategic Wind Farm Areas 2004/5* Final Report .

⁶ DTI (2006) *Aerial Surveys of Waterbirds in Strategic Wind Farm Areas 2005/6*, Final Report.

⁷ Overall risk is taken from Langston (2010) *Offshore wind farms and birds: Round 3 zones, extensions to Round 1 and 2 sites & Scottish Territorial waters*. RSPB research report no.39.

⁸ These are the species that were identified during ornithology surveys for the existing Burbo Bank offshore wind farm as Target Species.

Table 7: Summary of potential affected sites – Special Protection Area (SPA)

Note: all species recorded at the Burbo Bank offshore wind farm site (during period 2005-2008) have been included where they are a qualifying or assemblage feature of an SPA or pSPA (including those recorded at low numbers).

Species¹	Site Name(s)	Site Number(s)	Minimum Distance from Burbo Bank Site	Qualifying Feature?²	Population of SPA³ and Status (current, at designation or from SPA review)	Sensitivity⁴	Additional Notes⁵
Red Throated Diver (Annex 1 species)	Liverpool Bay pSPA	UK9020294	Burbo Bank lies within pSPA	Yes	922 individuals	High	
Common Scoter	Liverpool Bay pSPA	UK9020294	Burbo Bank lies within pSPA	Yes	54,675 individuals	Medium	Most Common Scoter aggregations occur along the north Welsh Coast, west of Burbo and the waters around Shell Flats to the north of Burbo Bank
	The Ribble and Alt Estuaries SPA	UK9005103	6 km	Assemblage Feature	N/A		
Common Tern (Annex 1 species)	The Dee Estuary SPA	UK9010141	Both are 6 km distant	Yes	277 pairs	Medium	Breeding. Mean foraging range is 8.5km ⁶ , so may interact. Have been observed foraging in area ⁷
	The Ribble and Alt Estuaries SPA	UK9005103			182 pairs		
Cormorant	Ynys Seiol SPA	UK9020285	43 km	Yes	776 pairs	Medium	During breeding season.
	The Ribble and Alt Estuaries SPA	UK9005103	6 km	Assemblage Feature	N/A		
	The Dee Estuary SPA	UK901014	6 km	Assemblage Feature	N/A		
Sandwich Tern (Annex 1 species)	The Dee Estuary SPA	UK9010141	6 km	Yes	818 individuals	Medium	On Passage. Mean foraging range is 14.7km ⁶ , so may interact with Dee population directly with some connectivity issues to SPAs further north
	Morecambe Bay SPA	UK9005081	42 km	Yes	290 pairs		
	Duddon Estuary SPA	UK9005031	50 km	Yes	210 pairs		
Oystercatcher	Lavan Sands/ Traeth Lafan SPA	UK9013031	44 km	Yes	4,932 individuals	N/A. Low numbers observed at site	Over wintering. In poor weather birds from Dee estuary SPA seek refuge here.

	The Ribble and Alt Estuaries SPA	UK9005103	6 km	Yes	16,159 individuals	N/A. Low numbers observed at site	Overwintering.
	The Dee Estuary SPA	UK9010141	6 km	Yes	28,434 individuals	N/A. Low numbers observed at site	Overwintering.
	Mersey Narrows and North Wirral Foreshore SPA	UK902028	7 km	Assemblage Feature	N/A	N/A. Low numbers observed at site	Wetland of international importance.
	Duddon Estuary SPA	UK9005031	50 km	Assemblage Feature	N/A	N/A. Low numbers observed at site	Wetland of international importance
Knot	The Ribble and Alt Estuaries SPA	UK9005103	6 km	Yes	57,865 individuals	N/A. Low numbers observed at site	Over wintering
	The Dee Estuary SPA	UK9010141	6 km	Yes	21,553 individuals	N/A. Low numbers observed at site	Over wintering
	Mersey Narrows and North Wirral Foreshore SPA	UK9020287	7 km	Assemblage Feature	N/A	N/A. Low numbers observed at site	Wetland of international importance
	Duddon Estuary SPA	UK9005031	50 km	Yes	4,495 individuals	N/A. Low numbers observed at site	Over wintering
Dunlin	The Ribble and Alt Estuaries SPA	UK9005103	6 km	Assemblage Feature	N/A	N/A. Low numbers observed at site	Wetland of international importance;
	The Dee Estuary SPA	UK9010141	6 km	Yes	22,479 individuals	N/A. Low numbers observed at site	Over winter.
	Mersey Narrows and North Wirral Foreshore SPA	UK9020287	7 km	Assemblage Feature	N/A	N/A. Low numbers observed at site	Wetland of international importance;.
	Mersey Estuary SPA	UK9005131	16 km	Yes	44,300 individuals	N/A. Low numbers observed at site	Over wintering;

	Duddon Estuary SPA	UK9005031	50 km	Assemblage Feature	N/A	N/A. Low numbers observed at site	Wetland of international importance
Auk (based on Guillemot)	Ailsa Craig SPA	UK 9003091	> 200km	Assemblage Feature	N/A	Medium	Seabird assemblage of international importance. Maximum foraging range is 123km ⁷ and so outside range
	Skokholm and Skomer SPA	UK9014051	> 200km	Assemblage Feature	N/A		
Curlew	The Ribble and Alt Estuaries SPA	UK9005103	6 km	Assemblage Feature	N/A	N/A. Low numbers observed at site	Wetland of international importance
	The Dee Estuary SPA	UK9010141	6 km	Yes	4,028 individuals	N/A. Low numbers observed at site	Over wintering
	Mersey Estuary SPA	UK9005131	16 km	Assemblage Feature	N/A	N/A. Low numbers observed at site	Wetland of international importance
	Duddon Estuary SPA	UK9005031	50 km	Assemblage Feature	N/A	N/A. Low numbers observed at site	
Manx Shearwater	Glannau Aberdaron and Ynys Enlli SPA	UK9013121	Approx 120 km	Yes	6,930 pairs	High	Migratory. Mean foraging range is 171km ⁶ and so may be within range

¹ From Table 6 above.

² Some species fall within definition of aggregations rather than being listed by species.

³ From SPA data form unless more recent data available.

⁴ From 3rd column of Table 6.

⁵ Please note here, if relevant, any relationship between the sites – e.g. shared population, key ecological linkage etc – or other relevant information.

⁶ Langston (2010) *Offshore wind farms and birds: Round 3 zones, extensions to Round 1 and 2 sites & Scottish Territorial waters*. RSPB research report no.39

⁷ CMACS Ltd (2006) *Burbo Offshore Wind Farm. Year 1 Pre-construction Environmental Monitoring Report*. Report ref: J3034. v1.1.1, Report Compiled by CMACS Ltd.

Table 8: Summary of species not associated with Special Protection Areas (SPAs)

Note: those species that were observed at low numbers (Table 7) have been excluded from this assessment. There are no SSSIs, other than those which form component parts of SPAs already mentioned, designated for the species listed below.

Species¹	Use of Area²	Distance from Site	Relevant Population³	Is Species Part of Another Designated Feature? (SSSI, Ramsar etc) If so state which.	Potential for SPA Designation?	Sensitivity⁴	Additional Notes
Auk sp	Present through year ⁵	Within existing wind farm site and reference area	Regional population (Liverpool Bay) will be assessed	No	Yes	Medium	
Little Gull	Passage ⁵	Within existing wind farm site and reference area	Regional population (Liverpool Bay) will be assessed	No	No	?	
Kittiwake	Passage ⁵	Within existing wind farm site and reference area	Regional population (Liverpool Bay) will be assessed	No	No	Low	
Gannet		Within existing wind farm site and reference area	Regional population (Liverpool Bay) will be assessed	No	No	High but observed in low numbers	
Great northern Diver		Within existing wind farm site and reference area	Regional population (Liverpool Bay) will be assessed	No	No	High but observed in low numbers	

¹ From Table 6 above.

² E.g. passage bird/migrant passing through area, over-wintering aggregation etc.

³ For purposes of environmental impact assessment – provide further details if necessary to justify selection of this quantum, minimum and maximum size should be stated.

⁴ Taken from Langston (2010) *Offshore wind farms and birds: Round 3 zones, extensions to Round 1 and 2 sites & Scottish Territorial waters*. RSPB research report no.39

⁵ Taken from SeaScape Energy (2008) *Burbo Offshore Wind Farm. Ornithological Survey – Construction Period*.

3.3.4.3 Proposed Approach to Survey Methodology

Because of the high level of biological data currently available for the Project site, and the documented low importance of the site to birds, DONG Energy is proposing that the Environmental Impact Assessment (EIA) and Appropriate Assessment (AA) requirements can be suitably informed by obtaining data from a single year of ornithology surveys to supplement and verify existing information. The rationale for this proposal is outlined below.

Historically the statutory nature conservation agencies have requested the provision of two year's worth of data to inform environmental impact assessment of the potential ornithological impact of proposed offshore wind farm development. DONG Energy are committed to delivering a robust EIA process but believe that, in this instance, the requirement for two years of assessment is excessive for the following reasons:

1. Low importance of area to birds

The area is known to be of low importance for birds. This is supported by the two years of DTI aerial survey data which generally show low levels of activity, primarily due to presence of shipping lanes and the low abundance benthic environment. As confirmed in the Burbo environmental statement and as verified by the FEPA monitoring studies (which have been approved by DEFRA and the statutory consultees) the risks to birds from wind farm development in this area are low. It is accepted that species of high conservation importance including Common Scoter and Red Throated Diver are found in the area but the aerial surveys locate them away from the proposed development site.

2. Low levels of environmental change

The marine environment in the area is stable. The FEPA monitoring has shown only small changes to benthos in the reference area over the monitoring period and bathymetry surveys (which will be repeated as part of the extension EIA surveys) indicate that the sandbank is a stable structure with only insignificant changes in form and function over the study period, despite the large flows of sediment in the area.

3. Quantity of existing data

The extension site and surrounding area is extremely well surveyed. In addition to boat based surveys undertaken to support the original EIA and the FEPA monitoring requirements (which cover part of the proposed development site), the area has been comprehensively covered by aerial survey from 2001 onwards (Webb et al 2006). A recent RSPB report (unpublished report, September 2008, by DECC, JNCC, WTT) concludes that the area is one of the most extensively aerially surveyed areas around the UK coastline. This is also shown in Figure 4.

4. Quality of existing data

It should be noted that, in itself, the age of data is not a concern unless significant environmental changes have occurred or there is good evidence that other factors are affecting the distribution and/or abundance of birds in the area.

While all populations, of course, fluctuate the provision of five years winter data should provide a sufficiently robust baseline for any reasonable EIA requirement; particularly as, as highlighted above, the area is of relatively low importance for seabirds and there is no evidence of significant change to the benthic environment.

5. Regulatory consideration of positive environmental benefits

As stated above DONG Energy is committed to a high level of environmental performance and, as one of the largest operators in the wind industry, has pioneered many of the techniques currently used in EIA of offshore wind projects. In the case of the Burbo Bank extension we believe that there is good sound scientific evidence that ornithological information only needs verifying or refreshing and there is no scientific need for a second year of new survey data.

It is important that all industries operating in the marine sector are regulated appropriately to ensure that environmental damage does not occur. However it is also important that regulation is proportionate to the risks involved and the environmental benefits which offshore wind can deliver are also considered; particular in respect of mitigating potential climate change impacts on nature conservation interests. It is particularly noteworthy that marine aggregate and oil and gas activities are not subject to the same level of bird survey requirements despite potential impacts being far greater, the former from wide scale habitat modification and the latter from flaring, disturbance and the risk of potential pollution.

In this case DONG Energy believes that the two year requirement is disproportionate and not based on a sound evidence base, even when taking into account the precautionary principle.

DONG Energy proposes that single year of aerial or boat based survey takes place to inform the Burbo Bank extension EIA. This survey data would be used to verify and supplement the already high level of ornithological and environmental information available in respect of the site. The surveys would be carried out to established standards.

In the event of significant variation in bird numbers from the historical average DONG Energy would seek to discuss the relevance of those changes with relevant consultees including the RSPB and Natural England. However the potential for such change is, in itself, not a justification for requiring two years of data.

3.3.4.4 Scoping of Cumulative Impacts on Bird Population according to COWRIE Guidance

This section provides an overview of the potential cumulative impacts on bird populations divided into species and SPA/pSPA (Table 9) as well as an overview of the projects and activities to be included in the cumulative impact assessment (Table 10).

Morecambe Bay SPA which is designated for Sandwich Tern is included in this assessment. Morecambe Bay SPA is just over 40km from the Project and the Operational Wind Farm site, however, there is likely to be some passage of Sandwich Terns, and therefore connectivity, between the Morecombe Bay and the Dee Estuary SPAs. Hence there is the potential for wind farms to the north of Liverpool Bay to interact with species designated at the Morecombe Bay SPA and therefore also the Dee Estuary SPA. Ynys Seiriol SPA designated Cormorant has been included for similar reasons. There may be some connectivity along the North Welsh coast between Ynys Seiriol SPA and the The Ribble and Alt Estuaries SPA and The Dee Estuary SPA where cormorants are an assemblage feature.

Table 10 below provides a summary of potential cumulative impacts from all offshore wind farm projects in the area. Where possible, the Environmental Statements of the projects have been

consulted to confirm species presence. In the case of the proposed Walney Extension offshore wind farm project development, species presence is assumed to be the same as the existing Walney site.

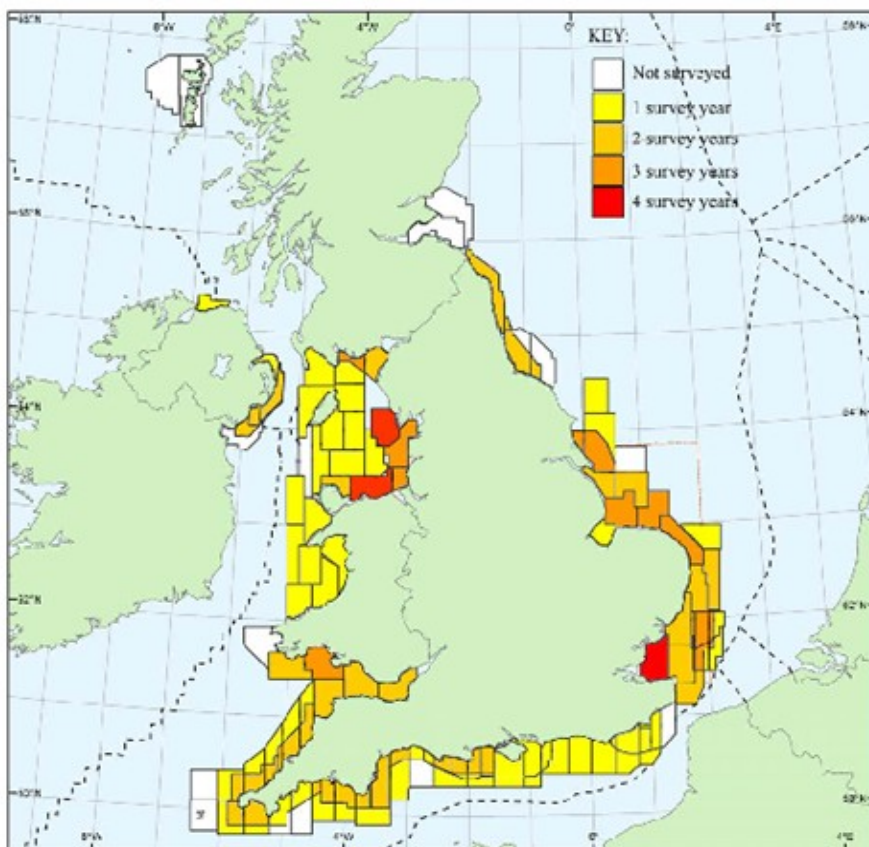


Figure 4: Winter survey coverage of UK waters by aerial surveys (unpublished information, Sept 2008)

(Compiled from DECC, JNCC, WTT; image courtesy of WTT)

Table 9: Summary of potential cumulative impacts of offshore wind farm projects on a species by species basis

Note: This table is intended to summarise sensitive receptors (identified in Table 4) on a species by species basis (rather than according to project). The wind farms included within this table will be those whose effects are not yet be visible in the baseline i.e. those in planning, consented, or under construction. The box is marked 'Y' if the species is present as sensitive receptor. Species sensitive at more than one site are then easily identified as being potentially cumulatively impacted.

Sensitive Receptors identified on Table 10 (next page)	Sensitive Receptors Identified on Table 10 (next page) in Respect of Other Offshore Wind Farms in Planning or Construction?								
	<i>Burbo Bank</i>	<i>Gwynt-Y-Môr¹</i>	<i>North Hoyle²</i>	<i>Rhyl Flats³</i>	<i>Walney⁴</i>	<i>Barrow⁵</i>	<i>West of Duddon Sands⁶</i>	<i>Ormonde⁷</i>	<i>Walney Extension</i>
Red Throated Diver	Y	Y	Y	Y	Y	N	N	N	N
Common Scoter	Y	Y	Y	Y	Y	Y	N	N	N
Common Tern	Y	Y	Y	Y	N	N	N	N	N
Sandwich Tern	Y	Y	Y	Y	Y	Y	Y	Y	Y
Cormorant	Y	Y	Y	Y	N	N	N	N	N

¹ Gwynt-y-Môr Environmental Statement, Gwynt-y-Môr Offshore Wind farm Ltd., 2005; ² North Hoyle Environmental Statement, NWP Offshore wind Ltd., 2002; ³ Rhyl Flats Environmental Statement, Celtic Offshore Wind Ltd., 2002; ⁴ Walney Environmental Statement, DONG Energy, 2006; ⁵ Barrow Offshore Wind Farm post construction monitoring report, Barrow Offshore Wind Farm Ltd., 2009; ⁶ West of Duddon Sands Environmental Statement, Morecombe Wind Ltd., 2006; ⁷ Ormonde Project Environmental Statement, Morecombe Wind Ltd., 2005.

Table 10: Projects and activities to be considered as part of a cumulative ornithological impact assessment

Project / Activity	Cumulative Factor in Respect of? (Y / N)				For Which Species?	Potential Cumulative / In-Combination Impact on SPA? If So, Identify Site
	<i>Displacement</i>	<i>Collision</i>	<i>Barrier Effect</i>	<i>Indirect Impact (e.g. prey species)</i>		
Wind Farms						
Burbo Bank	Y	Y	N	Y	Red Throated Diver, Common Scoter, Common Tern, Sandwich Tern, Cormorant, Auk	Liverpool Bay Pspa; The Ribble and Alt Estuaries SPA; The Dee Estuary SPA; Ynys Seiol SPA
Gwynt-Y-Môr	Y	Y	N	Y	Red Throated Diver, Common Scoter, Common Tern, Sandwich Tern, Cormorant, Auk	Liverpool Bay pSPA; The Ribble and Alt Estuaries SPA; The Dee Estuary SPA; Ynys Seiol SPA
Rhyl Flats	Y	Y	N	Y	Red Throated Diver, Common Scoter, Common Tern, Sandwich Tern, Cormorant, Auk	Liverpool Bay pSPA; The Ribble and Alt Estuaries SPA; The Dee Estuary SPA; Ynys Seiol SPA
North Hoyle	Y	Y	N	Y	Red Throated Diver, Common Scoter, Common Tern, Sandwich Tern, Cormorant, Auk	Liverpool Bay pSPA; The Ribble and Alt Estuaries SPA; The Dee Estuary SPA; Ynys Seiol SPA
Walney	N	Y	N	Y	Sandwich Tern	Morecambe Bay SPA
West of Duddon Sands	N	Y	N	Y	Sandwich Tern	Morecambe Bay SPA
Barrow	N	Y	N	Y	Sandwich Tern	Morecambe Bay SPA
Ormonde	N	Y	N	Y	Sandwich Tern	Morecambe Bay SPA
Walney Extension	N	Y	N	Y	Sandwich Tern	Morecambe Bay SPA
Round 3 Zone 9	Y	Y	Y	N	Cormorant, Sandwich Tern, Common Tern, Auks	The Dee Estuary SPA; Morecambe Bay SPA; Duddon Estuary SPA; The Ribble and Alt Estuaries SPA
Oil and Gas Activities						
Hamilton Gas Platform	N	N	N	N	N/A	N/A
Aggregate Dredging Projects						
Dredging site no. 392 operated by TMD	Y	N	N	Y	Red Throated Diver, Common Scoter	Liverpool Bay pSPA
Dredging site no. 393 operated by NSB	Y	N	N	Y	Red Throated Diver, Common Scoter	Liverpool Bay pSPA

3.3.5 Marine Mammals

Harbour Porpoises and seals were observed during regional surveys undertaken by DTI and BERR⁶. Harbour Porpoise (*Phocoena phocoena*) individuals were seen to occur regularly along the north Welsh coast and in the E of Liverpool Bay in vicinity of the Operational Wind Farm site and the Project site.

No marine mammal monitoring was required during construction at Burbo Bank in 2006. Since Burbo Bank was consented, legislative amendments have been made which have significant implications for marine mammals.

Grey seals (*Phoca vitulina*) are present in the area and are noted Grade D⁷ features at a number of coastal Natura 2000 sites such as the Dee Estuary SAC, the Morecambe Bay SAC and in the Menai Strait and Conway Bay/Y Fenai a Bae Conwy SAC, which are 6 km, 42 km and 31 km respectively E of the Project site.

Grey seals are known to travel widely during foraging trips and are likely to be present in the area, which is supported by the pre-construction, construction and post-construction ornithology surveys which recorded seals (common grey seal) within both the Operational Wind Farm and the Project sites.

Common seals, on the other hand, are not frequently seen in the area. The nearest Natura 2000 sites with common seals as a feature are the Murlough SAC and Strangford Lough SAC located in Ireland.

Therefore, although the area around the Operational Wind Farm and Project sites does not support high levels of marine mammal activity, it has the potential to be a preferred location for Harbour Porpoise in the context of the wider Liverpool Bay area.

3.3.6 Nature Conservation Areas

The following sub-sections provide a summary of the designated nature conservation interests in and around the Project site. Reference is made to existing designated sites as well as species and habitat that may represent potential features of nature conservation interests. Chart 12 in Appendix C provides an overview of the location of the sites.

3.3.6.1 Designated and Proposed Nature Conservation Sites

A number of relevant designated and proposed nature conservation areas are located around the Project site, including:

- The Liverpool Bay potential Special Protection Area (Liverpool Bay pSPA), for the presence of Red-Throated diver and Common Scoter populations;
- The Dee Estuary SPA, for the presence of Common Tern, Little Tern, Sandwich Tern, as well as internationally important wetland bird assemblages;
- The Dee Estuary Special Area of Conservation (SAC) for the presence of Atlantic Salmon;

⁶ During the aerial and boat-based bird surveys mentioned in Section 3.3.3.

⁷ Grade D means 'present but not a qualifying feature for which conservation objectives are set'.

- The Ribble and Alt Estuaries SPA, for the presence of Common Tern, Bewick's Swan, Whooper Swan, and Pink-footed Geese;
- The Mersey Estuary SPA, for the presence of several waterfowl species;
- The Mersey Narrows and North Wirral Foreshore pSPA, for the presence of several waterfowl species;

Further away from the proposed offshore development Project site, other nature conservation areas of interest are located:

- The Morecambe Bay SPA (47 km NE of the Project site), for the presence of Little Tern, Sandwich Tern, Pink-footed Geese, and internationally important seabird populations;
- The Lavan Sands/Traeth Lafan SPA (45 km WSW of the Project site), for the presence of Oystercatchers;
- The Puffin Island/Ynys Seiriol SPA in Conwy Bay (43 km WSW of the Project site) in Conwy Bay, for the presence of Cormorants;
- The Martin Mere SPA (26 km NE of the site), for the presence of Bewick's Swan, Whooper Swan, Pink-footed Geese, and internationally important wetland bird populations.

The most important of these designated and proposed nature conservation sites is the Liverpool Bay pSPA, which covers a large area of coastal waters including Liverpool Bay and Irish Sea waters to the north and south-west. It has been proposed because of the wintering populations of Red-throated Diver and Common Scoter that the area has been found to support.

The Liverpool Bay pSPA has been proposed since the Operational Wind Farm was consented and will therefore present a new risk not previously addressed in the original Burbo Bank EIA process. As an SPA, its qualifying features (Red-throated Diver and Common Scoter) have defined conservation management objectives designed to maintain populations in a favourable condition.

3.3.6.2 Features of Potential Nature Conservation Interest

In addition to the nature conservation areas mentioned, it is important that any marine development also fully considers the scope for the scheme to cause adverse impacts upon species and/or habitats that could potentially be designated in the future. This is particularly relevant to habitats and species listed in Annexes 1 and 2 of the EU Habitats Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora.

Natural England and the Joint Nature Conservation Committee (JNCC) have just completed a public consultation of marine SACs and SPAs in the UK territorial waters. Although the Burbo Bank is classified as "sublittoral sandbank less than 20m", it is not considered as a potential nature conservation area, also because the Shell Flat & Lune Deep pSPA (44 km N of the Project site, off the Blackpool coast) is expected to be designated by Natural England for the presence of sandbanks and reefs.

3.3.6.3 UK Biodiversity Action Plan (BAP)

The United Kingdom is a signatory to the 1992 Convention of Biological Diversity, an international legally binding treaty which was signed at the 1992 Earth Summit in Rio de Janeiro and provides a

legal framework for biodiversity conservation. From the initial strategy publication, 391 Species Action Plans (SAPs) and 45 Habitat Action Plans (HAPs) were published for the UK most threatened (i.e. "priority") species and habitats.

These plans describe the status of each habitat and species and outline the threats they face, set targets and objectives for their management, and propose actions necessary to achieve recovery.



Figure 5: The Burbo Bank offshore wind farm as seen from the coast near Leasowe Bay, Wirral

In addition, there are approximately 150 Local Biodiversity Action Plans (LBAPs), normally at county level. These plans usually include actions to address the needs of the UK priority habitats and species in the local area, together with a range of other plans for habitats and species that are of local importance or interest.

Certain marine habitats and species may exist in and around the Burbo Bank Extension site. It is therefore important that the Burbo Bank Extension Environmental Statement fully assesses the existence of and potential impacts upon any such habitats and/or species in this area.

Habitats and species that may occur around the Project site currently include the following:

- Sublittoral sands and gravels;
- Intertidal mudflats and muddy gravels;
- *Sabellaria spinulosa* (in its reef-building form);
- Certain marine fish species (part of the Grouped Plan for Commercial Marine Fish).

3.3.7 Offshore Biological Environment – Potential Environmental Impacts

The Burbo Bank Extension offshore wind farm project has the potential to produce a range of impacts upon the biological environment, which are summarised in Table 11 below.

Offshore Biological Environment – Potential Environmental Impacts from Burbo Bank Extension offshore wind farm				
<i>Parameter</i>	<i>Construction / Decommissioning</i>	<i>Significance of impact</i>	<i>Operation</i>	<i>Significance of impact</i>
Benthic Ecology	<ul style="list-style-type: none"> - Temporary increases in suspended sediment concentrations from trenching; - Temporary increases in sediment deposition from plumes; - Release of contaminants bound in sediments; - Potential release of pollutants from construction plan. 	Minor impact.	<ul style="list-style-type: none"> - Loss of sea bed habitat through presence of turbines and foundations; - Scour around foundations leading to change in sea bed habitat; - Change in sediment transport leading to localised changes in habitats; - Colonisation of turbines leading to increased biodiversity; - Introduction of scour protection leading to localised change in seabed habitats. 	Minor impact.
Fish and Shellfish	<ul style="list-style-type: none"> - Impact on seabed spawning habitat as a result of changes in sediment transport; - Behavioural impacts from construction noise (e.g. piling); - Sediment plumes creating temporary disruption to migratory pathways; - Construction noise (e.g. piling) creating temporary disruption to migratory pathways (salmon). 	Minor impact.	<ul style="list-style-type: none"> - Loss of spawning/nursery habitat through presence of turbines and foundations 	Negligible impact to beneficial.
			<ul style="list-style-type: none"> - Increased habitat complexity due to presence of turbines - Scour protection act as artificial reef increase amount of fish; 	
			<ul style="list-style-type: none"> - Behavioural impacts of electromagnetic field emission. 	Minor impact.
Ornithology	<ul style="list-style-type: none"> - Disturbance impacts from construction noise and visual intrusion; - Disturbance impacts from construction noise and visual intrusion (intertidal and terrestrial). 	Please see details in Section 3.3.4.3.	<ul style="list-style-type: none"> - Wind farm act as barrier for migrating and foraging birds; - Risk for collision with turbines; - Loss of habitat due to turbines and scour protection; - Disturbance impacts due to navigation and aviation lighting; - Avoidance of area due to presence of turbines; - Change in prey 	Please see details in Section 3.3.4.3.

Offshore Biological Environment – Potential Environmental Impacts from Burbo Bank Extension offshore wind farm				
<i>Parameter</i>	<i>Construction / Decommissioning</i>	<i>Significance of impact</i>	<i>Operation</i>	<i>Significance of impact</i>
			species due to change in seabed habitat.	
Marine Mammals	Behavioural impacts from construction noise (e.g. piling).	Minor and temporary impact.	Behavioural impacts from low frequency operational noise and vibration.	Negligible to no impact.

Table 11: Potential impacts upon the offshore biological environment from the proposed Burbo Bank Extension offshore wind farm project

3.3.8 Offshore Biological Environment – Surveys and Studies Undertaken to Date and Proposed Surveys

As part for the EIA as well as the pre-construction and post-construction processes for the Operational Wind Farm, several surveys and studies were undertaken relating to the offshore biological environment.

Table 12 below provides a full list of these, together with an assessment of whether the data collected during the surveys and studies will be valid for the Project site as well.

Offshore Biological Environment – Surveys and Studies for Burbo Bank offshore wind farm					
<i>Survey / Study</i>	<i>Date</i>	<i>Undertaken by</i>	<i>Description</i>	<i>Relevance</i>	
				<i>Exist.</i>	<i>Exten.</i>
Marine Ecology studies and surveys	Aug 2002	CMACS Ltd.	EIA report including studies on benthic communities, intertidal ecology, fish & shell fish and marine mammals.	✓	✗
Ornithological studies and surveys	Sept 2002	Casella Stanger	EIA including aerial and boat-based bird survey data, analyses and reporting on species, abundance and distribution.	✓	✗
	Sept 2005 - May 2006	Hyder Consultants Ltd.	<i>Pre-construction survey</i> Boat-based bird surveys in transects. Analyses of species, abundance and distribution.	✓	✓*
	Sept 2006 - March 2007		<i>Construction survey</i> Boat-based bird surveys in transects in and outside the wind farm site. Analyses of species, abundance and distribution.	✓	✓*
	Aug 2007- July 2008		<i>Post-construction survey</i> Boat-based bird surveys in transects in and outside the wind farm footprint. Analyses of species, abundance and distribution.	✓	✓*
Seabed Contaminants surveys	Oct 2005	CMACS Ltd.	<i>Pre-construction survey</i> Analyses of sediment samples for contaminants.	✓	✓*
Benthos surveys	Sept 2005	CMACS Ltd.	<i>Pre-construction survey</i>	✓	✓*

Offshore Biological Environment – Surveys and Studies for Burbo Bank offshore wind farm					
Survey / Study	Date	Undertaken by	Description	Relevance	
				Exist.	Exten.
			Grab samples at approx. 20 locations, analyses for sediment particle sizes and macrofauna inside the wind farm and reference stations. One sampling station in the Burbo Bank Extension site.		
	Sept 2006		<i>Construction survey</i> Grab samples at approx. 20 locations; analyses for sediment particle sizes and macrofauna. Inside the wind farm and reference stations. One sampling station in proposed extension.	✓	✓*
	Sept 2007		<i>Post-construction survey</i> Grab samples at approx. 20 locations, analyses for sediment particle sizes and macrofauna. Inside the wind farm and reference stations. One sampling station in the Burbo Bank Extension.	✓	✓*
	September/ October 2009		<i>Post-construction survey</i> Grab samples at app 20 locations, analyses for sediment particle sizes and macrofauna. Inside the wind farm and reference stations. One sampling station in Burbo Bank Extension site.	✓	✓*
Intertidal invertebrates surveys	Aug 2006	CMACS Ltd.	<i>Pre-construction survey</i> Shallow sediment cores at 27 locations along export cables and photos of the tidal flats. Sediment cores analysed for macrofauna and particle sizes.	✓	✗
Marine Fish surveys	Sept 2005	CMACS Ltd.	<i>Pre-construction survey</i> Using a 2m beam trawl in 12 transects in and outside the existing wind farm. One transect in Burbo Bank Extension site.	✓	✓*
	May 2006		<i>Pre-construction survey</i> Using a 4m beam trawl. Survey in 12 transects in and outside the existing wind farm. One transect in proposed extension.	✓	✓*
	Autumn 2006		<i>Construction survey</i> Using a 2m beam trawl. Survey in 12 transects in and outside the existing wind farm. One transect in Burbo Bank Extension site.	✓	✓*
	May 2007		<i>Construction survey</i> Using a 4m beam trawl. Survey in 12 transects in and outside the existing wind farm. One transect in Burbo Bank Extension site.	✓	✓*

Offshore Biological Environment – Surveys and Studies for Burbo Bank offshore wind farm					
Survey / Study	Date	Undertaken by	Description	Relevance	
				Exist.	Exten.
	Autumn 2007		<i>Post-construction survey</i> Using a 2m beam trawl. Survey in 12 transects in and outside the existing wind farm. One transect Burbo Bank Extension site.	✓	✓*
	May 2008		<i>Post-construction survey</i> Using a 4m beam trawl. Survey in 12 transects in and outside the existing wind farm. One transect in Burbo Bank Extension site.	✓	✓*
	Autumn 2009		<i>Post-construction survey</i> Using a 2m beam trawl. Survey in 12 transects in and outside the existing wind farm. One transect in Burbo Bank Extension site.	✓	✓*
	May 2010		<i>Post-construction survey</i> Using a 4m beam trawl. Survey in 12 transects in and outside the existing wind farm. One transect in Burbo Bank Extension site.	✓	✓*
Intertidal ecology	Aug 2006	CMACS Ltd.	Pre construction intertidal ecological survey.	✓	X
Intertidal ecology	July 2006		Pre-construction Intertidal Photographic Cable Route Survey.	✓	X
Intertidal ecology	Aug 2007		Post-construction intertidal biotope survey.	✓	X
Sediment contaminant survey	April 2008	CMACS Ltd.	During construction suspended sediment monitoring.	✓	X

* Note: although the surveys were taken from 2002 until recently, they mostly covered an area wider than the Burbo Bank and Burbo Bank Extension sites. Data collected, while still relevant for the Project site, will be updated through a new set of proposed surveys (see Table 13 and Table 14).

Table 12: Summary of offshore biological environment surveys and studies undertaken to date in relation to the existing Burbo Bank offshore wind farm

In terms of further surveys and/or studies that may be required to supplement the work done in the past for the Operational Wind Farm site, it is proposed that the following surveys and/or studies are required as part of the Project development.

The Tables below describe the proposed surveys for the offshore biological environment with a separate table on the proposed ornithological surveys techniques, frequency, and assessment methodology (based on the species present).

Offshore Biological Environment – Proposed Surveys and Studies (excluding ornithological ones) for Burbo Bank Extension offshore wind farm	
<i>Proposed Survey / Study</i>	<i>Description and Assessment methodology</i>
Benthos and sediment survey	<p>The survey will consist of grab samples from an appropriate amount of sample locations in the project area, along the proposed cable route and at agreed reference sample stations. All samples will be analysed for macrofauna and sediment characteristic according to the current guidelines.</p> <p>If any potential protected habitats are identified on basis of the geophysical survey and the grab sampling these will be further investigated with a drop down camera survey.</p> <p>Scope of Work for benthic surveys will be agreed with the relevant statutory consultees prior to commencement of survey.</p> <p>The assessment and presentation of survey data will follow the general Round 2 approach and standard EIA assessment methodologies.</p> <p>The reporting will include: overview of species, sedimentological analyses, biotope classification, and various multivariate statistical analyses. The survey data will be used to confirm the predicted impacts outlined in Table 11.</p>
Intertidal Ecology survey	<p>It is proposed to undertake a survey of the intertidal zone to determine the sea bed habitats and species in the proposed cable corridor.</p> <p>The survey will be undertaken either as a land based survey or included on benthos and sediment survey as described above.</p>
Marine Fish and Shell fish survey	<p>Baseline fishery surveys will consist of a Spring and an Autumn survey. It is proposed to undertake a scientific (2 m wide) beam trawl survey in autumn to provide information on epibenthic invertebrate communities and smaller demersal fish. A 4 m wide trawl using commercial fishing gear will be undertaken in spring to survey larger benthic fish species and to provide information on elasmobranchs.</p> <p>The Scope of Work for the surveys will be agreed with CEFAS prior to commencement of surveys and will follow best practice.</p> <p>It is furthermore proposed to undertake a desk study of the Dee Estuary Atlantic Salmon to get a better understanding of the migration pattern.</p>
Marine Mammal survey	<p>No specific field surveys are proposed. The presence of marine mammals will be recorded during the ornithological surveys (see Table 14).</p> <p>Furthermore it is proposed to supply this with a desk based study to identify the dominant species in the area.</p>

Table 13: Proposed offshore biological (excluding ornithological) environment surveys and studies in relation to the Burbo Bank Extension offshore wind farm project

The following Table 14 details the proposed ornithological surveys and analysis methodologies (based on the species present) for the Project site.

Table 14: Proposed offshore ornithological surveys and studies in relation to the Burbo Bank Extension offshore wind farm project

Offshore Biological Environment – Proposed Ornithological Surveys and Studies for Burbo Bank Extension offshore wind farm								
<i>Bird Species</i>	<i>Survey or Analysis Technique²</i>	<i>Frequency and Duration of Surveys</i>	<i>Proposed Review Dates/ Milestones³</i>	<i>Summary of Assessment Methodology</i>				<i>Validation/ Discussion with Regulator and/or Statutory Advisor Required?</i>
				<i>Displacement</i>	<i>Collision</i>	<i>Barrier Effect</i>	<i>Indirect Effect (e.g. prey species)</i>	
Red Throated Diver	Aerial or boat based	Once a month for 12 months	Monthly field reports. Annual reporting	Surveys in buffer zone	Flight height observation	Simple model involving flight lines / densities recorded during boat survey	Benthic studies (outside of bird survey)	Yes
Auk sp (based on common and black guillemot – predominant species)	Aerial or boat based	Once a month for 12 months	Monthly field reports. Annual reporting	Surveys in buffer zone	Flight height observation	Simple model involving flight lines / densities recorded during boat survey	Benthic studies (outside of bird survey)	No
Common Scoter	Aerial or boat based	Once a month for 12 months	Monthly field reports. Annual reporting	Surveys in buffer zone	Flight height observation	Simple model involving flight lines / densities recorded during boat survey	Benthic studies (outside of bird survey)	Yes
Little Gull	Aerial or boat based	Once a month for 12 months	Monthly field reports. Annual reporting	Surveys in buffer zone	Flight height observation	Simple model involving flight lines / densities recorded during boat survey	Benthic studies (outside of bird survey)	No
Cormorant	Aerial or boat based	Once a month for 12 months	Monthly field reports. Annual reporting	Surveys in buffer zone	Flight height observation	Simple model involving flight lines / densities recorded during boat survey	Benthic studies (outside of bird survey)	Yes
Common Tern	Aerial or boat based	Once a month for 12 months	Monthly field reports. Annual reporting	Surveys in buffer zone	Flight height observation	Simple model involving flight lines / densities recorded during boat survey	Benthic studies (outside of bird survey)	Yes

Offshore Biological Environment – Proposed Ornithological Surveys and Studies for Burbo Bank Extension offshore wind farm								
<i>Bird Species</i>	<i>Survey or Analysis Technique²</i>	<i>Frequency and Duration of Surveys</i>	<i>Proposed Review Dates/ Milestones³</i>	<i>Summary of Assessment Methodology</i>				<i>Validation/ Discussion with Regulator and/or Statutory Advisor Required?</i>
				<i>Displacement</i>	<i>Collision</i>	<i>Barrier Effect</i>	<i>Indirect Effect (e.g. prey species)</i>	
Knot	Aerial or boat based	Once a month for 12 months	Monthly field reports. Annual reporting	Surveys in buffer zone	Flight height observation	Simple model involving flight lines / densities recorded during boat survey	Benthic studies (outside of bird survey)	No
Sandwich Tern	Aerial or boat based	Once a month for 12 months	Monthly field reports. Annual reporting	Surveys in buffer zone	Flight height observation	Simple model involving flight lines / densities recorded during boat survey	Benthic studies (outside of bird survey)	Yes
Kittiwake	Aerial or boat based	Once a month for 12 months	Monthly field reports. Annual reporting	Surveys in buffer zone	Flight height observation	Simple model involving flight lines / densities recorded during boat survey	Benthic studies (outside of bird survey)	No
Manx shearwater	Aerial or boat based	Once a month for 12 months	Monthly field reports. Annual reporting	Surveys in buffer zone	Flight height observation	Simple model involving flight lines / densities recorded during boat survey	Benthic studies (outside of bird survey)	No

Note: this table is intended to record details of the survey and analysis techniques intended to be used to address EIA and CIA issues.

¹ As identified in Table 6

² Example: boat based survey, aerial with observer, aerial with high definition camera, radar, thermal imaging, shore based observation, tagging

³ Example: monthly

3.4 The Offshore Human Environment

The following section provides a brief overview of the existing offshore human environment in and around the Project site. It also includes a review of potential impacts on various offshore human activities, e.g. aggregate dredging, commercial fisheries, shipping, etc. and a summary of survey/studies undertaken previously as part of the Operational Wind Farm and survey/studies that may be required for the development of the Project.

3.4.1 Shipping and Navigation

The northern section of the Project site is close to three shipping lanes used by passenger and cargo vessels to and from the port of Liverpool across the Queens Channel. According to the AIS data collected for 28 days in August 2009 (see Table 16), the average total number of vessels per day using these lanes is around 50, with cargo vessels making up a quarter (28%) of the total traffic followed by tankers (19%), tugs (16%), and passenger ferries (15%) to Dublin, Belfast and Douglas (operated by Norfolkline, P&O, and the Steam Packet Company). The shipping lane closer to the site is used by an average of approximately 13 cargo and passenger vessels per day, which use the eastbound lane of the Liverpool Bay Traffic Separation Scheme (TSS). The average draught of vessels which passed around the Project site during the survey period was 4.5 m, while the average length of vessel recorded was 92 m.

The proposed Project site boundary has been designed by applying a separation buffer from the shipping lanes of at least 0.6 nautical miles, in order to avoid major disruption to the shipping traffic, as shown in Chart 9. Usually, a 0.5 nautical mile (926 metres) separation buffer is suggested by the Maritime and Coastguard Agency (MCA)'s *Wind Farm Shipping Route Template*, and is the minimum distance to which the risk posed by offshore wind farm to vessels is classified as 'high but tolerable'⁸.

Also, to minimise the impact on recreational, dredging and cargo vessels operations, the NW section crossed by aggregate dredging vessels (see Section 3.4.6) and anchoring ships as well as the southern section crossed by recreational vessels (see Section 3.4.10) were partly excluded from the proposed Project site.

Chart 8 in Appendix C provides an overview of the shipping traffic type around the Project site. Chart 9 shows the shipping 90% lanes (i.e. the main shipping lanes identified from the AIS tracks by extracting each lane and analysing their lateral distribution to define the 90% traffic boundary).

3.4.2 Commercial Fisheries

The Project is sited falls within an area where, according to VMS satellite data, there have been only very low levels of activity by UK fishing vessels with a length over 15 metres (>15m), usually being beam trawlers.

In comparison to other areas of the Irish Sea, fishing activity in the area is low and, as a consequence of national regulations and local by-laws, is confined to the smaller class of inshore vessels (<15 m),

⁸ *Offshore Renewable Energy Installations (OREIs) - Guidance on UK Navigational Practice, Safety and Emergency Response Issues*. Available at the URL: <http://www.mcga.gov.uk/c4mca/mgn371.pdf>

which appear to be potting and gill-netting vessels; therefore minor impacts are predicted as these low level activities may be able to continue within the Project site.

3.4.3 Oil & Gas Exploration and Production

The NW corner of the Project site overlaps briefly (3 km²) with a 6 nautical mile safety buffer applied to the Hamilton gas platform owned by BHP Billiton Ltd. This safety buffer was previously relaxed for the Gwynt Y Môr offshore wind farm, and it is expected that it will also be relaxed for the Project.

The Project site is outside any oil and gas current licence areas and the 26th Licensing Round block (on offer by DECC since January 2010). Chart 10 in Appendix C provides an overview of the activities in the area.

3.4.4 Pipelines

Although the NW part of Liverpool Bay features several gas fields (e.g. Hamilton, Douglas) some of them close to the Project site, no oil and gas pipelines run through or close to the Project site. The closest gas pipeline is the PL1302 to Point of Ayr gas terminal in Wales at 13 km SW of the Project site. No impacts are therefore predicted. See Chart 10 for more details.

3.4.5 Telecommunication Cables, Microwave Links and Radio and Television Masts

No cables are found within or close to the Project site, the closest ones being in Morecambe Bay 40 km N of the Project site. Crosby Coastguard Station and the Port of Liverpool Operation use radio links (as documented in the Burbo Bank Environmental Statement), which were not affected by that project. No civilian radio communications and TV broadcaster masts are found close to the Project site, the closest ones being located in Point of Ayr in Wales, 13 km to the SW.

3.4.6 Aggregate Dredging

The Project site is 8 km E from the two overlapping active dredging areas no. 392 operated by TMD (Tarmac Ltd.) and no. 393 operated by NSB. These two areas are within a wider licensed area that borders with Gwynt Y Môr offshore wind farm.

Some dredging vessels routes, as recorded by the AIS survey in August 2009, pass close and through the NW section of the Project site from/to the port of Liverpool to reach the dredging areas, and therefore there might be moderate impacts in terms of increased steaming to avoid the site and subsequent extra fuel costs. See Chart 10 for more details.

3.4.7 Civil Aviation Authority regulated Airports and National Air Traffic Service Radars

The closest major civilian commercial airport to the Project site is Liverpool John Lennon Airport (26 km SE). Warton Airport used by BAE Systems and Airbus and the civilian commercial Blackpool Airport are located respectively 34 and 32 km NE of the site.

The whole southern part of the Liverpool Bay area is within an area of potential high interference for wind turbines with the National Air Traffic Service (NATS) radar system. The closest NATS radar facility is in St Anne's Lytham Moss, Blackpool, 34 km NE of the site.

CAA has already confirmed there are no safeguarding issues relating to the Project site. Chart 11 in Appendix C provides an overview of the aviation and defence activities in the area.

3.4.8 Ministry of Defence Surveillance Radars, Practice and Exercise Areas, and Low-Flying Military Zones

The closest MoD-operated Air Surveillance and Control System (ASACS) Radar is located in Wales at the Royal Air Force (RAF) Valley base in Ty Croes at more than 75 km WSW of the Project site.

No Danger Practice and Exercise Areas (DPEXAs) are found within the southern part of Liverpool Bay. These are usually considered as 'no-go areas' for offshore wind farm development. On the other hand, the Altcar Rifle Range (PEXA X5306, not classified as 'Danger Area') is located 10 km E of the site on Formby beach. The Project site is also 25 km SW of the Blackpool military air traffic zone. See Chart 11 for more details.

The site is also outside of any low, medium or high priority low-flying military zones, as classified by the MoD⁹, where concerns might be raised.

Previously the MoD had no objection to the Operational Wind Farm, which had no predicted impacts on aviation, surface or subsurface military operations in Liverpool Bay. No impacts from the development of the Project are therefore predicted.

3.4.9 Tourism

The Project site is adjacent to the coastal areas of northern Flintshire County (Wales) and the Wirral and Sefton counties (England). The closest point (7 km) to the Project site is on the Wirral coast at the village of Meols, near Hoylake, a seaside town featuring golf courses (including The Royal Liverpool Golf Club), a promenade, surfing facilities and listed buildings. To the NE of it, the coast in Wallasey features Leasowe Bay with two golf courses and a promenade up to New Brighton at the other end of the Wirral Peninsula.

On the other side on the Sefton coast, Crosby beach features the man-sized bronze sculptures *Another Place* by Antony Gormley. Further N, the sand dunes of Formby Point are located. On the Welsh coast, the seaside town of Prestatyn features beaches and a golf course.

3.4.10 Recreational Sailing, Cruising, Angling, and other Sport Activities

There are eight cruising routes passing through the proposed Project site, of which 5 are defined by the Royal Yachting Association (RYA) as medium-use and 3 are light-use cruising routes. Several of these routes are using the Rock Channel (S of the Project site), which gives small recreational craft access to the River Mersey from Liverpool Bay.

Sailing and racing activities take place in the area, and some of the cruising routes of medium intensity border the Project site in the southern section. Sailing clubs are found in Hoylake, Wallasey, Prestatyn (Wales) and Crosby. As the previous EIA identified, the coast at West Kirby (south of Hoylake) is popular with windsurfing activities, and jet-skiing is practised at New Brighton.

⁹ See the chart showing the classification at the Renewable Energy STATisticS (RESTATS) database at the URL: http://www.restats.org.uk/aviation/Safe-Guarding_Maps/Low_Flying_and_Radar/LowFlyingZones.pdf

While permanent safety zones may be imposed around turbine structures during operation these will not in themselves restrict the safe passage of recreational traffic through the wind farm footprint. It is, however, acknowledged that some recreational sailors may prefer to avoid the Project area following construction.

3.4.11 Archaeology & Cultural Heritage

The archaeological study undertaken by the Liverpool Museum Field Archaeology Unit (2002) for the Operational Wind Farm's EIA showed that there may be several shipwrecks in the Burbo Bank sandbank area, as recorded by different surveys, although many do not have exact charted locations.

According to the United Kingdom Hydrographic Office (UKHO) Admiralty Chart no. 1826, six charted wrecks are found within the Project site. No protected or designated wreck (as classified by English Heritage) or war grave sites are found within the Project site. Any further wrecks or anomalies within the Project site and export cable route will be identified during the geophysical survey (see Table 4).

3.4.12 Waste Disposal

No dumping grounds are found within or around the Project site. The closest ones (spoil ground IS150 and the sewage sludge dump site IS070) are found >15 km NW of the Project site close to the Hamilton and Douglas gas fields. Two smaller possibly disused grounds are found 6 to 8 km N of the Project site. No impacts are therefore predicted.

3.4.13 Unexploded Ordnance (UXO)

No known unexploded ordnance or munitions sites are found within both the Operational Wind Farm or Project sites, nor were any found by the previous EIA surveys. Proposed geophysical surveys for the Project site (see Table 4) will identify any further unexploded ordnance sites.

3.4.14 Landscape and Seascape

The Project site falls within the 'Great Orme to Mersey' National Seascape Unit as well as within the 'North Wirral' Regional Seascape Unit.

The visual impact for the Operational Wind Farm was assessed in the EIA carried out in 2002, and it was concluded that visual impacts would be highest from those viewpoints closest to the existing development where the sensitivity of receptor is high, where the viewpoint is within 10 km, and where a significant change to the baseline condition is expected.

Highest impacts were therefore expected at Formby Point (10.5 km NE of the Project site), while moderate to high impacts were predicted for Hibre Island (in the Dee Estuary, 9 km SW of the Project site) and Crosby Marina (9 km NE) and moderate impacts for the North Wirral coastal path up to Leasowe Bay (S of the Project site).

The Project site's EIA will likewise assess the potential significance of the additional turbines associated with the proposed Project as well as taking into account the landscape and visual impact assessment already performed.

3.4.15 Noise and Vibrations

The EIA for the Operational Wind Farm modelled turbines noise levels at selected sensitive locations and concluded that operational noise at those locations would range between 10 to 20 dB at wind speeds of 8 m/s, while background noise would be >30 dB. Therefore it is predicted that turbine noise will be inaudible from the Project even with wind blowing onshore.

3.4.16 Offshore Human Environment – Potential Environmental Impacts

The proposed Project, if not appropriately mitigated, has the potential to give rise to a range of impacts upon the human environment. These are summarised in Table 15 below.

Offshore Human Environment – Potential Environmental Impacts from Burbo Bank Extension offshore wind farm		
<i>Parameter</i>	<i>Construction / Decommissioning</i>	<i>Operation</i>
	<i>Significance of Impact</i>	
Landscape and Seascape	Temporary impact of construction plant on site during construction and decommissioning phase.	Visual impact of the turbines and offshore substation upon seascape and landscape and visual impact of lighting during hours of darkness.
	Minor impact.	Minor to moderate impact.
Commercial Fisheries	<ul style="list-style-type: none"> - Reduced access to existing fishing grounds; - Potential increased navigation risk for commercial fishing vessels due to passage of construction traffic 	<ul style="list-style-type: none"> - Loss of part of existing fishing grounds; - Displacement impacts for certain gear types.
	Minor to moderate impact.	Minor impact.
Shipping and Navigation	Potential increased navigation risk for commercial vessels due to passage of construction traffic. An exclusion area of around 500 m will likely be applied around the site.	Site is located at least 0.6 nm from main navigation channels and anchoring area, so minor impacts on journey time are predicted. Appropriate navigation safety measures will be adopted.
	Moderate impact.	Moderate impact.
Archaeology & Cultural Heritage	<ul style="list-style-type: none"> - Direct damage to wreck structures and contents; - Disturbance to relationships between structures, artefacts and their surroundings; - Destabilisation prompting renewed corrosion, and decay; - Erosion leading to damage, disturbance and instability in the medium to long term. 	Change in sediment transport (and scour) leading to exposure of previously buried features.
	Minor impact.	Minor impact.
Tourism	Potential visual intrusion for tourists and residents onshore.	
	Minor to moderate impact.	
Noise	Noise emissions from construction process (in particular piling).	No impacts predicted.

Offshore Human Environment – Potential Environmental Impacts from Burbo Bank Extension offshore wind farm		
<i>Parameter</i>	<i>Construction / Decommissioning</i>	<i>Operation</i>
	<i>Significance of Impact</i>	
	Minor to moderate impact.	
Recreational Activities	Temporary displacement of recreational vessels crossing the SW part of the site.	Minor impacts on recreational vessels avoiding the site for perceived safety reasons.
	Minor to moderate impact.	Minor impact.
Oil and Gas Exploration	No impacts predicted.	Minor impacts predicted for helicopter, safety cases which will need amendment to incorporate mitigation measures to allow for relaxation of gas platforms buffer relaxation (according to CAA safety standards).
Aggregate Dredging	Increase in construction traffic may affect existing dredger movements (e.g. re-routing) with extra fuel usage	Increased distance to reach the dredging areas and consequent increased fuel usage by the dredgers due to the extra steaming to avoid the extension site.
	Moderate impact.	Moderate impact.
Cables and Pipelines	No impacts predicted.	No impacts predicted.
Waste Disposal	No impacts predicted.	No impacts predicted.
Military Radars, PEXAs, Low-Flying Areas	No impacts predicted.	No impacts predicted.
CAA Airports	No impacts predicted.	No impacts predicted.
NATS Radars	No impacts predicted.	Possible minor to moderate impacts to primary radar operation, although effective mitigation measures can be implemented.
Unexploded Ordnance	No impacts predicted – however, pre-construction geophysical surveys will provide evidence of any munitions within the Project site.	No impacts predicted.

Table 15: Potential impacts upon the offshore human environment from the proposed Burbo Bank Extension offshore wind farm project

3.4.17 Offshore Human Environment – Surveys and Studies Undertaken to Date and Proposed Surveys

As part of the EIA process for the Operational Wind Farm, numerous studies were undertaken relating to the human environment, and they are summarised in the Table 16 below, together with an assessment of whether the data will be valid for the Project site as well.

Some of the surveys (such as the shipping and navigation) and studies (such as the one on the commercial fisheries) carried out for the site selection of the proposed Project are listed in Table 16.

Offshore Human Environment – Surveys and Studies for Burbo Bank offshore wind farm and Burbo Bank Extension offshore wind farm					
Survey / Study	Date	Undertaken by	Description	Relevance	
				Exist.	Exten.
Shipping and Navigation study and survey	August 2002	Anatec Ltd., Portia Management Services	Assessment of navigational impact and associated risk of the existing offshore wind farm based on data and modelling, along with a supporting study provided by the former Mersey Docks and Harbour Company, now Peel Ports Ltd.	✓	✓*
Shipping and Navigation study and survey	August, October 2009	Anatec Ltd.	Review of potential navigational impacts associated with the proposed extension through AIS data collection and analysis.	✓	✓*
Other Offshore Human Activities study			Review of other offshore activities (oil and gas, dredging, recreational, cables, other offshore wind farms) in the area.	✓	✓
Commercial Fisheries study	April 2002	Poseidon Aquatic Resource Assessment Ltd.	Review of the commercial fisheries baseline in the area, impact analysis and proposal of mitigation measures.	✓	✓*
Commercial Fisheries study	October 2009	Brown & May Marine Ltd.	Review of the commercial fisheries baseline in the area, primarily base on VMS satellite tracking and landing values.	✓	✓
Archaeology & Cultural Heritage study	August 2002	Liverpool Museum Field Archaeology Unit	Archaeological assessment of the offshore and foreshore areas around the existing site as well as the onshore area around the cable route.	✓	✓*
Landscape and Seascape visual impact assessment study	July 2002	Casella Stanger	Assessment of existing landscape and seascape, appraisal of predicted (and cumulative) visual impacts from the existing offshore wind farm, and proposal of mitigation measures. Photomontages from 16 viewpoints included.	✓	X**

* Note: Although some of the surveys were taken in 2002, they mostly covered an area wider than the Burbo Bank and Burbo Bank Extension sites. Data collected, while still relevant for the Project site, will be updated through a new set of proposed surveys (see Table 17 below).

** Note: The Landscape and Seascape visual impact assessment was conducted for the 25 turbines of the Operational Wind Farm site only. Therefore, a new similar assessment will have to be undertaken for the additional turbines of the Project site.

Table 16: Summary of offshore human environment surveys and studies undertaken to date in relation to the existing Burbo Bank offshore wind farm and those undertaken so far in relation to the Burbo Bank Extension offshore wind farm project

In terms of further surveys and/or studies that may be required to supplement the work done in the past for the Operational Wind Farm, it is proposed that the surveys and/or studies listed in Table 17 below are required as part of the Project site development.

Offshore Human Environment – Proposed Surveys and Studies for Burbo Bank Extension offshore wind farm	
<i>Proposed Survey / Study or Activity</i>	<i>Description and Assessment Methodology</i>
Marine Archaeological study and survey	<ul style="list-style-type: none"> - Review and update of the report from 2002 and review of geophysical data with respect to marine archaeology; - Survey as part of the proposed Geophysical Survey (see Table 4).
Landscape and Visual Impact Assessment	<p>To investigate the potential impact of the Project's extra turbines in addition to those already operating on the landscape and seascape of the coastal areas around both the Operational Wind Farm and Project sites.</p> <p>The assessment methodology will follow best practice as set out in visual impact assessment guidance documents, including <i>Guidance on the Assessment of Impact of Offshore Wind Farms: Seascape and Visual Impact Report</i> by DTI (2005) and other that may be recommended.</p>
Commercial Fisheries consultation and study	<p>Starting from the review done in 2002 and 2009 (see Table 16) of commercial fisheries around the Operational Wind Farm site, the following activities will be carried out:</p> <ul style="list-style-type: none"> - Set up engagement plans with local fishing industry; - Provide information on the Project site development; - If relevant, define disturbance payments/compensation.
Navigation & Shipping traffic & safety survey and study	<p>The navigation and shipping survey work to be undertaken as part of the EIA would include:</p> <ul style="list-style-type: none"> - Site specific assessment of the existing traffic in accordance with the guidelines published by the MCA (<i>Marine Guidance Note - Proposed UK Offshore Renewable Energy Installations (OREI) - Guidance on Navigational Safety Issues / MGN371(M)</i>); - Statistical assessment of the probability of collision; - Assessment of future traffic changes; - Full navigational risk assessment (according to MGN371(M)); - Assessment of the potential of the proposed site to interfere with communications, marine radar and positioning systems; - Assessment of potential in-combination impacts; - Engagement with Peel Ports Ltd. (operator of the Port of Liverpool), the Harbour Master, the shipping community and the other ports in the Liverpool Bay area within a Navigational Working Group.
Unexploded Ordnance (UXO) survey	To be carried out as part of the Geophysical survey (see Table 4)
Military and Aviation radar and traffic study	<p>To assess the extent of visibility of the turbines to any military or civil aviation radars (e.g. the Controlled Airspace - CAS, Lower Airspace Radar Services - LARS, Primary Service Radar - PSR, Secondary Service Radar - SSR, and NATS En Route) and any adverse impacts on military air and helicopter traffic around the Project area. Potential operational and technical mitigations will be explored.</p>
Socio-economic & Tourism study	<p>The study will determine the socio-economic background of the region around the Project site and the onshore cable route and substation, and assess any negative and positive impacts on the local economies, tourism and social fabrics.</p> <p>Socio-economic studies previously carried out will be used as a reference for the assessment.</p>

Table 17: Proposed offshore human environment surveys and studies in relation to the Burbo Bank Extension offshore wind farm project

3.5 The Onshore Environment

The following section describes the existing onshore physical, biological, and human environments around the Burbo Bank Extension offshore wind farm's indicative export cable(s) landing on the North Wirral coast in Wallasey, the indicative onshore cable route, and the most likely onshore substation connecting to the National Grid's transmission grid at the Birkenhead 275 kV substation. A possible alternative connection at the National Grid Deeside 400 kV substation is also briefly described.

DONG Energy has recently submitted a Grid Connection Application to National Grid and the location of the connection to the National Grid transmission grid is expected to be known in September 2010.

3.5.1 Preliminary Considerations

Due to the current Offshore Transmission Operator (OFTO) regime, it is up to National Grid to propose the most optimal grid entry point at the onshore transmission network and provide a preliminary solution for the offshore transmission asset, which, following a competitive bidding process, will then be designed and built by the appointed OFTO. It is therefore difficult at this stage to provide full information on landfall and onshore cable route.

After a preliminary assessment meeting with National Grid in late 2009, the Birkenhead 275 kV substation seems the most likely choice for connecting the Project. If this substation is chosen, the export cable(s) may have the landfall close to the landfall for the existing Burbo Bank cables, i.e. behind the sea wall on the Wirral coast at Mockbeggar Wharf in Leasowe.

The indicative onshore cable route may then initially run for 9 km approximately buried underneath the ground along the existing Burbo Bank cable route as far as the Junction 1 of the A5139/M53 with the A554 (near the B&Q Trading Estate NW of Bidston railway station) and then divide from it to run along the M53 and the railway line as far as the Birkenhead substation (located SW of the village of Prenton), in order to minimise any potential environmental impact. A more detailed study will be made once the onshore grid entry point is proposed by National Grid and the subsequent selection of the landfall and onshore cable route is more certain.

Chart 4 shows the indicative cable landing, onshore cable route and the location of the onshore substation for the Project at the National Grid Birkenhead 275 kV substation. The following sections describe the physical, biological, and human onshore environments around the likely onshore cable route and substation.

New infrastructure i.e. an extension to the National Grid Birkenhead 275 kV substation, might need to be built in order to connect the offshore wind farm to the onshore transmission grid and will likely be located close to it. An indicative location is shown on Chart 6.

Once the onshore grid entry point is known, i.e. after National Grid will issue the grid connection offer, more detailed studies will be performed to determine the most suitable location for the new infrastructure.

3.5.2 Physical & Chemical Environments

3.5.2.1 Geology & Geomorphology

The proposed onshore cable route might follow the existing cable route initially through sand dunes at Mockbeggar Wharf and buried underneath the car park tarmac. Subsequently it will run buried beneath a flat, green field terrain.

3.5.2.2 Hydrology

The area around the proposed indicative cable route and corridor does not feature any rivers, streams or lakes. A few ponds are located along it (see further in Section 3.5.3.3) and there is a stream or ditch course between the M53 and the Bidston Rail station that the route will cross.

3.5.3 Biological Environment

3.5.3.1 Nature Conservation Areas

The existing cable landfall is located on the border of the North Wirral Foreshore SSSI and the Dee Estuary SAC. The indicative cable route and corridor does not fall within or close to any conservation areas. SW and NE of the Junction 1 with the M53 there is the Bidston Moss Local Nature Reserve, where some ponds are found.

3.5.3.2 Vegetation

The existing cable landfall and route pass through an area of sand dunes for around 400 m, with low sandy hummocks and local foreshore species and plants. Along the proposed indicative cable route corridor several green fields featuring bushes and low trees vegetation are located, as well as a floodplain grazing marsh W of the cable corridor and the M53 at the junction with the A553.

3.5.3.3 Ditches, Drains, Ponds

Along the proposed indicative cable route corridor there are some ponds within the Bidston Moss Local Nature Reserve located SW of the Junction 1 of the M53 with A554 and 200 m N of Bidston Rail station. A ditch course is located nearby with another small pond N of Fender Lane on the A553.

3.5.3.4 Fauna, including Amphibians, Reptiles, Birds and Mammals

An ecological walk and survey over the cable route and corridor and around the substation location to inform the Project EIA will reveal if any protected or sensitive species are located close to either of them. If so, and there is significant risk of disturbance to protected species such as badgers, otters or great crested newt, relevant licences will be applied for and appropriate mitigation measures will be put in place.

The ponds mentioned in 3.5.3.3 have not been searched for great crested newt populations, which are designated under the Wildlife and Countryside Act 1981 and the Habitats Regulations. Appropriate surveys will be required as a part of the EIA if there is the risk of the ponds or newt populations being affected by development and relevant mitigation measures will be applied if necessary. As outlined in 3.5.3.2 low trees are present along the cable route. These trees will be surveyed to ensure that they are not inhabited by bats.

It has not been identified whether there is any presence of sensitive species in the vegetated areas mentioned above; however, an ecological survey will be carried out to verify this. Table 18 below summarises the impacts predicted on the onshore biological environment mentioned above.

<i>Onshore Biological Environment – Potential Environmental Impacts from Burbo Bank Extension offshore wind farm</i>				
<i>Parameter</i>	<i>Construction / Decommissioning</i>	<i>Significance of impact</i>	<i>Operation</i>	<i>Significance of impact</i>
Vegetation	- Temporary loss of habitat due to trenching; - Fragmentation of habitats due to trenching.	Minor impact	No impacts predicted.	No impact
Statutory and non-statutory nature conservation areas	Temporary loss of habitats due to trenching.	Minor impact	No impacts predicted.	No impact
Ditches, drains and ponds	- Temporary loss of habitats due to trenching; - Damage to and siltation of ditches and drains due to trenching.	Minor impact	No impacts predicted.	No impact
Badgers	Temporary disturbance of habitat due to trenching.	Minor impact	No impacts predicted.	No impact
Bats	- Temporary loss of habitat due to removal of trees; - Loss of possible roosts.	Minor impact	No impacts predicted.	No impact
Otters	Temporary loss of ditch habitat during trenching.	Minor impact	No impacts predicted.	No impact
Water voles	Temporary loss of ditch habitat during trenching.	Minor impact	No impacts predicted.	No impact
Brown Hare	Temporary loss of habitat due to trenching.	Minor impact	No impacts predicted.	No impact
Reptiles	Temporary loss of habitat due to trenching.	Minor impact	No impacts predicted.	No impact
Great Crested Newts	Temporary loss of habitat due to trenching.	Minor impact	No impacts predicted.	No impact
Birds	Temporary loss of habitat, including nesting habitat due to removal of vegetation along the cable route.	Minor impact	No impacts predicted.	No impact

Table 18: Potential impacts upon the onshore biological environment from the proposed Burbo Bank Extension offshore wind farm project

3.5.4 Human Environment

3.5.4.1 Road and Rail Traffic

The existing cable route begins at the car park on Mockbeggar Wharf and then runs south and west along a single track tarmac road (called Green Lane) as far as the junction with A554 and then south as far as the A554's Junction 1 with the M53 at the Mid Wirral Motorway.

Subsequently, the new proposed indicative cable route may run S, alongside the eastern part of the M53, crossing the Wirral railway line (to West Kirby) west of Bidston rail station, and then S again sandwiched between the M53 and the Wirral railway line (to Chester) as far as the junction of the M53

with the A552 close to the North Cheshire Trading Estate, where it will turn E to connect to the Birkenhead 275 kV substation SW of the village of Prenton.

3.5.4.2 Tourism & Recreational Activities

The Wirral coast at Mockbeggar Wharf in Leasowe features the Wallasey Golf Course (E of it) and the Leasowe Golf Course (SW of it). Along the proposed indicative route, E of the village of Leasowe, another golf club is located i.e. the Bidston Golf Course. Alongside the cable corridor there are a couple of non-manicured race tracks, sport and playing fields, and green meadows.

South of the indicative onshore substation at Birkenhead 275 kV substation there is a rugby playing field (500 m) and the Prenton Golf Club (700 m).



Chart 4: The Burbo Bank Extension indicative onshore cable landing, cable route and onshore substation at the National Grid Birkenhead 275 kV substation

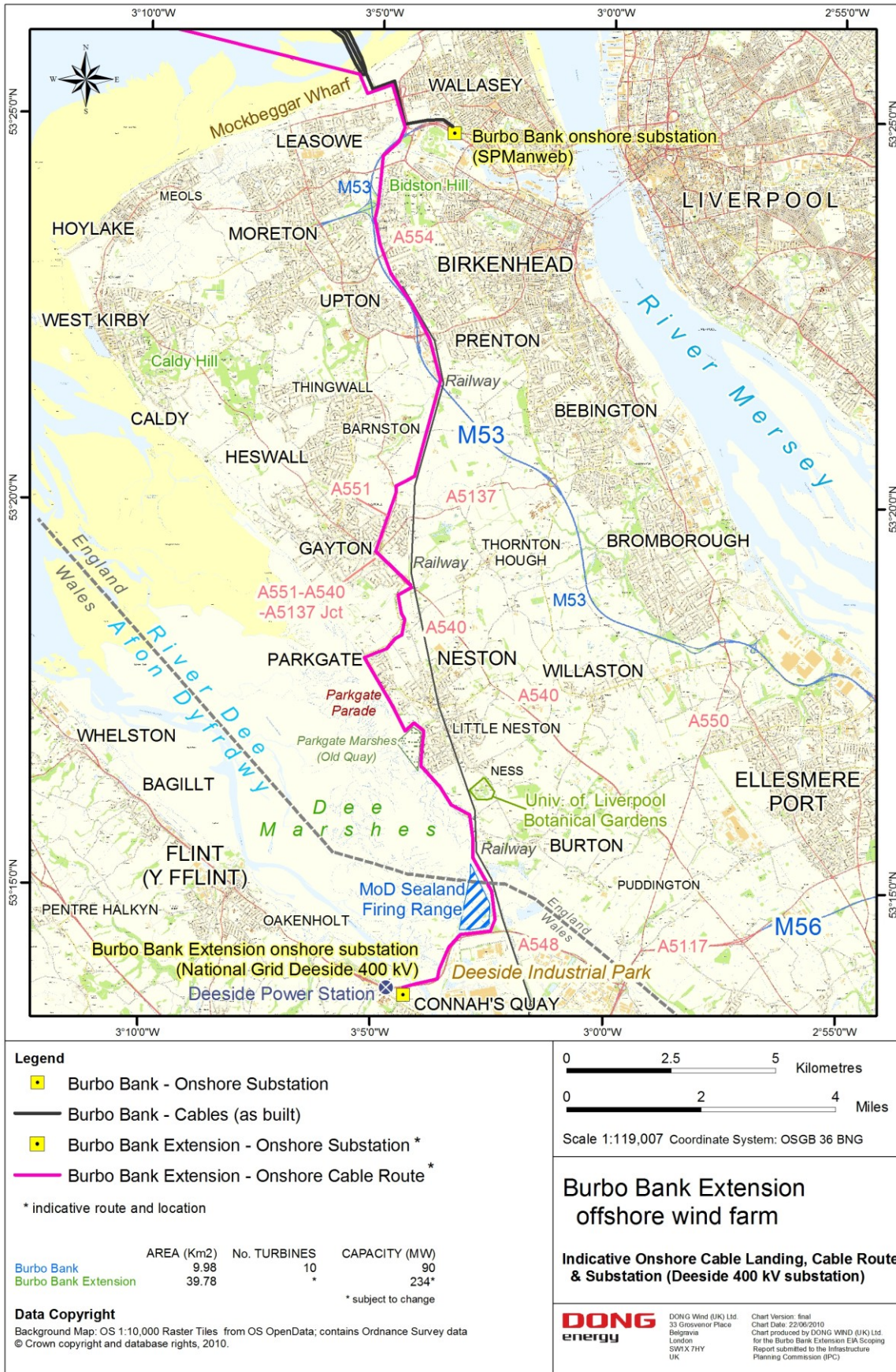


Chart 5: The Burbo Bank Extension indicative onshore cable landing, cable route and onshore substation at the National Grid Deeside 400 kV substation

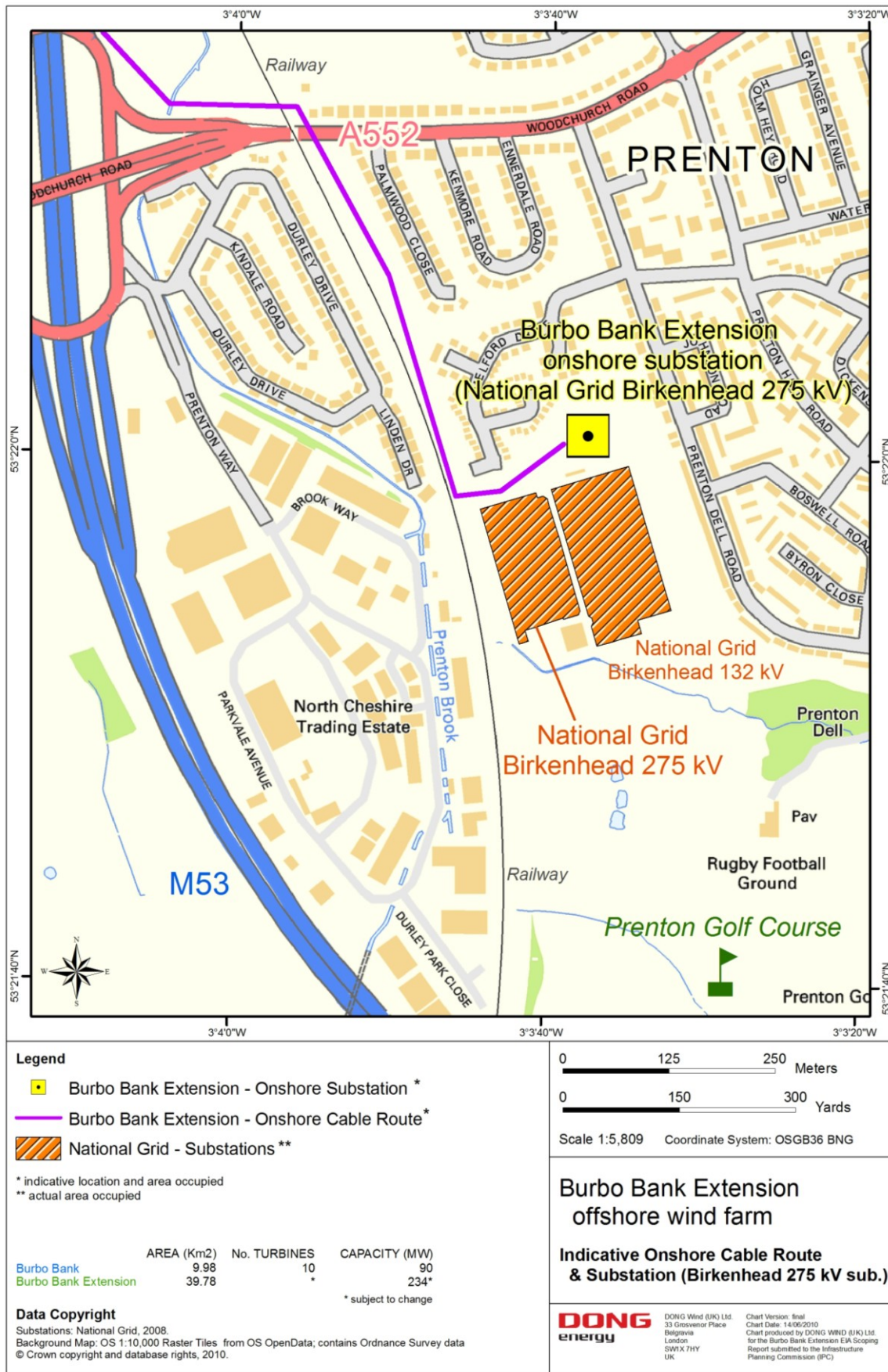


Chart 6: Indicative location of the Burbo Bank Extension onshore substation at the National Grid Birkenhead 275 kV substation

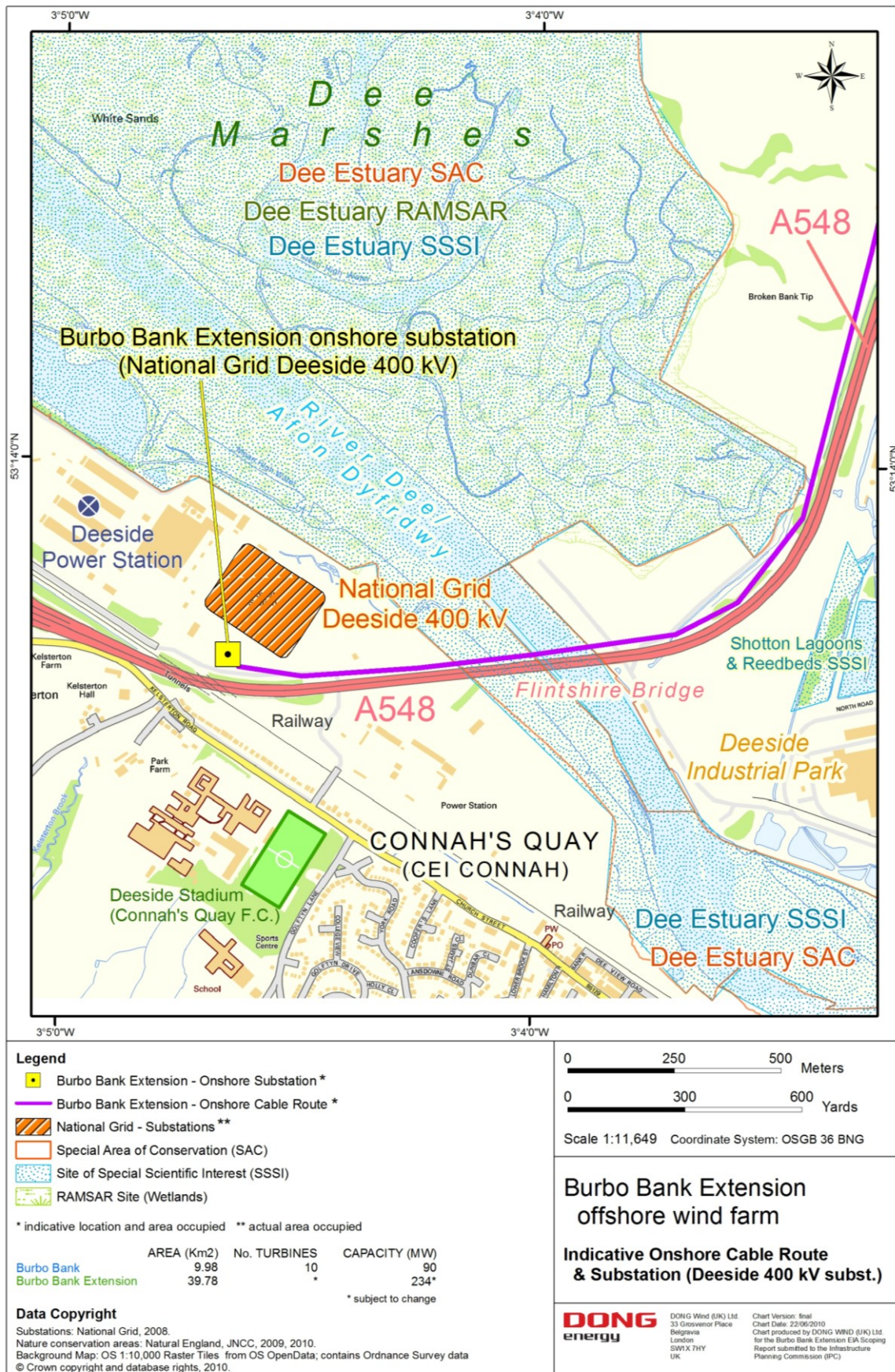


Chart 7: Indicative location of the Burbo Bank Extension onshore substation at the National Grid Deeside 400 kV substation

3.5.4.3 Archaeology & Cultural Heritage

No scheduled monuments, listed buildings, parks and gardens or any other archaeological remains are located within or close to the cable route and corridor. The nearest site (around 1 km E) is Bidston Hill (50 m height on the sea level), featuring a listed lighthouse, windmill, observatory, ancient rock carvings and other monuments.

The archaeological study undertaken by the Liverpool Museum Field Archaeology Unit (2002) for the Burbo Bank EIA (see Table 20) highlighted that 19th and 20th century construction may have destroyed any archaeological deposits along the existing cable route but that Bidston Moss (500 m E of the indicative cable route) was an attractive area for settlements in the Prehistoric period.

3.5.4.4 Land Use & Agriculture

The land along the cable route is characterised by predominantly built-up areas (residential areas and trading estates) as well as main roads (A and B roads, motorways) and two railways. Some sections along the M53–Wirral Railway corridor feature green fields with bushes and low trees vegetation. An allotment area of around 2 km² is located near Green Lane, S of the existing route. Around the substation there are green fields and a residential area (part of the village of Prenton).

3.5.4.5 Landscape

The onshore cable landing and route and the onshore substation are not sited within, or close to, any areas specially protected by designation due to their specific international, national or local landscape importance. The landscape around the cable corridor is defined as 'Merseyside conurbation' and 'Wirral' by Natural England¹⁰, with flat plains except for Bidston Hill located 800 m E of the cable corridor. The highest elevation point along the cable route is 24 m (close to the Birkenhead substation), as recorded on Google Earth™ software¹¹.

3.5.4.6 Noise Climate & Air Quality

Sensitive receptors within 100 m of the proposed indicative cable route and substation site comprise a number of private dwellings E of the A554 in Wallasey, and all along the M53 and the railway (in the villages of Bidston, Upton, and Prenton) as well as commercial buildings (the B&Q retail park at Junction no. 9 and the North Chester Trading Estate located E of the Birkenhead substation) and a school in Leasowe (W of the cable route).

Also, a residential area in the village of Prenton, immediately N and E of Birkenhead 275 kV substation, is to be considered as a noise receptor.

3.5.4.7 Local Economy

Construction works for the onshore cable route and substation, as well as the offshore wind farm itself, are expected to bring positive impacts on the local economy by using local labour force. See Table 19 for further details on the impacts.

¹⁰ As per the *National Character Areas (England)* GIS data as described at the URL: <http://www.magic.gov.uk/datadoc/-metadata.asp?dataset=10&x=16&y=9>.

¹¹ Version 3.5.1.

3.5.5 Alternative Connection

Another possible alternative connection for the Project might be located at the National Grid Deeside 400 Kv substation, situated near the River Dee Bridge and the Deeside Power Station, N of the town of Connah's Quay/Cei Connah in Flintshire (Wales). An indicative cable route for this alternative connection is shown in Chart 5.

This indicative cable route length may be of around 25-30 km and will indicatively follow the same route as the Birkenhead option and then run S along the railway line, crossing the M53, as far as the village of Barnston, where it will turn SW to run along a minor road through the village of Gayton up to the junction of A551 and A540 with A5137.

From there it will indicatively run SE along minor roads and then turn SW following the B5135 road across green fields as far as the village of Parkgate, where it will run along the coastline and the Parkgate Parade facing the Dee Estuary and marshes, avoiding the Parkgate Marshes (Old Quay) and then S on the coastline W of the villages of Neston and Little Neston and then running ½ km W of the University of Liverpool Botanical Gardens, and then always along the coastline as far as the MoD Sealand Military Firing Range, where it will turn SSE to follow the railway as far as the Deeside Industrial Park, where it will run W along the A548 crossing the Flintshire Bridge on the River Dee to reach the Deeside 400 kV substation next to the Deeside Power Station. By crossing the River Dee, the indicative route may have to go through the nature conservation areas of the Dee Estuary SAC, SSI, and Ramsar site.

This indicative onshore cable route would run across the territories of three local councils, namely the Metropolitan Borough of Wirral, Cheshire West and Chester, and Flintshire County (in Wales).

DONG Energy has been made aware that National Grid may seek consent for a similar cable route for its Western HVDC link from Hunterston in Scotland to National Grid Deeside 400 kV substation. DONG Energy intends to further discuss this subject with National Grid further in the coming months.

3.5.6 Onshore Environment – Potential Environmental Impacts

The following table summarises the potential impacts that the onshore cable route and substation during their construction, operation and decommissioning, may have on the onshore environment.

<i>Onshore Environment – Potential Environmental Impacts from Burbo Bank Extension offshore wind farm</i>		
<i>Parameter</i>	<i>Construction / Decommissioning</i>	<i>Operation</i>
Socio-Economics	<ul style="list-style-type: none"> - Potential direct beneficial impact via employment of local workers during construction of wind farm; - Potential indirect beneficial impact via employment in suppliers and other sub-contractors further down the supply chain that will be initiated by the Project; - Potential induced impacts i.e. second tier employment, supported by spending of wages in the local economy. 	Potential direct beneficial impact via employment of local workers during operation of wind farm.
Noise	Noise emissions from onshore cable and substation construction process.	Noise emissions from the substation once operational.

Onshore Environment – Potential Environmental Impacts from Burbo Bank Extension offshore wind farm		
<i>Parameter</i>	<i>Construction / Decommissioning</i>	<i>Operation</i>
Tourism and Recreation	Potential visual intrusion for tourists and residents onshore.	Visual impact (onshore substation and onshore junction chamber at the cable landing).
Nature Conservation, Fauna, and Vegetation	Potential impact on protected species, habitats and vegetation as a result of construction noise/activities and vegetation clearance. See also Table 18.	No impacts predicted.
Road and Rail Traffic	Potential minor disruption to road and rail traffic where the cable route crosses road and rail tracks, due to brief closures to allow works in safe conditions for the road and rail users.	No impacts predicted.
Archaeology & Cultural Heritage	- No impacts predicted on cultural heritage sites; - Potential removal of some archaeological remains found during excavation for cable burial.	No impacts predicted.

Table 19: Potential impacts upon the onshore environment from the proposed Burbo Bank Extension offshore wind farm project

3.5.7 Onshore Environment – Surveys and Studies Undertaken to Date and Proposed Surveys

As part for the EIA process for the Operational Wind Farm, studies were undertaken relating to the onshore environment, and they are summarised in the table below, together with an assessment of whether the data will be valid for the Burbo Bank Extension project site as well.

Onshore Environment – Surveys and Studies Undertaken for Burbo Bank offshore wind farm					
<i>Survey / Study</i>	<i>Date</i>	<i>Undertaken by</i>	<i>Description</i>	<i>Relevance</i>	
				<i>Exist.</i>	<i>Exten.</i>
Archaeology & Cultural Heritage (onshore) study	August 2002	Liverpool Museum Field Archaeology Unit	Archaeological assessment of the onshore area around the cable route and substation.	✓	✓*
Landscape and Visual (onshore) assessment	July 2002	Casella Stanger	Baseline assessment of the landscape character of the onshore installation and assessment of the potential impacts and consideration of mitigation measures (ref. Chapter 5 of the EIA survey).	✓	✗

* Note: Although the surveys were taken in 2002, they mostly covered an area wider than the Burbo Bank and Burbo Bank Extension sites. Data collected, while still relevant for the Burbo Bank Extension, will be updated through a new set of proposed surveys (see Table 21 below).

Table 20: Summary of onshore environment surveys and studies undertaken to date in relation to the existing Burbo Bank offshore wind farm

In terms of further surveys and/or studies that may be required to supplement the work done in the past for the Operational Wind Farm site, it is proposed that the following surveys and/or studies are

required as part of either options (Birkenhead 275 kV or Deeside 400 kV) of the onshore cable route and onshore substation of the Project.

Onshore Environment – Proposed Surveys and Studies for Burbo Bank Extension offshore wind farm	
<i>Proposed Survey / Study</i>	<i>Description and Assessment Methodology</i>
Archaeology and Cultural Heritage study	To extend the assessment done in 2002 for the remaining section of the onshore cable route (from Junction 1 to the potential Birkenhead substation and possibly for the Deeside substation) and the new onshore substation at either Birkenhead or Deeside. Assessment will include a description of the likely effects on the onshore archaeological and cultural heritage and the landscape, by taking into account relevant best practice guidance.
Landscape and Visual impact assessment study	
Noise Impact study	To assess the noise emissions during the construction of substation and cable burial works as well the substation's operation. Assessment will take into account relevant best practice guidance for environmental noise (e.g. BS 4142:1997 - <i>Method for rating industrial noise affecting mixed residential and industrial areas</i>). A different methodology might be discussed with environmental health officer(s).
Ground Investigation, Soils, and Contaminated Land survey	To provide an assessment of the geotechnical engineering properties of the ground and the extent of any agriculture, land use and soil contamination on the area around the onshore cable route and the onshore substation. Assessment will include the description of any likely effects that the Project might have on agriculture and land use, and relevant best practice guidance will be taken into account (e.g. DEFRA's <i>Code for the Sustainable Use of Soils on Construction Sites</i>).
Ecological & Nature Conservation and Ornithology surveys	Walkover surveys to record the ecology along the cable route and around the substation in order to identify if they are inhabited by protected species such as bats, newts, badgers, hare, birds etc and if there is any nature reserve or area of natural interest. Assessment will include a description of effects on nature conservation areas, habitats, species, etc. Best practice guidance on both survey and assessment (e.g. the <i>Guidelines for Ecological Impact Assessment in the United Kingdom</i> by IEEM (2006)) will be followed.
Road and Rail Transport and Traffic study	To provide an assessment of the likely impacts on the road and rail traffic during the construction phase due to movement and burial of cables, construction. The work will include desk study and site visits and a subsequent description of the impacts on traffic and transport.
Hydrogeology and Water Quality survey	The surveys and study will investigate the likely significant impacts of the onshore elements of the Project on hydrology and flood risk, ground conditions, and potential risk of contaminated water run-off and effects on water quality.
Flood Risk and Coastal Defence study	The assessment method will include the description of the impacts, a Flood Risk Assessment for the onshore substation, and a mitigation strategy and compensation measures if required.
Socio-Economics and Tourism study	To be included in the Socio-Economics & Tourism study for the offshore human environment (see Table 17).

Table 21: Proposed onshore environment surveys and studies in relation to the Burbo Bank Extension offshore wind farm project

3.6 Cumulative and In-Combination Impacts and Appropriate Assessment

The EIA and Habitats Directives require cumulative and in-combination impacts to be considered as part of the EIA and Appropriate Assessment processes. Here, *cumulative* refers to all other wind farm projects while *in-combination* refers to other marine projects or licensed activities, for example, marine aggregate extraction. Projects considered in the assessment will include existing projects as well as those currently in the planning system which could interact with the Project either spatially or temporally.

In summary, the following activities and projects will need to be considered in relation to the cumulative and in-combination impact assessment offshore:

- The North Hoyle, Rhyl Flats and Gwynt Y Môr existing offshore wind farm sites W of the Project site;
- The marine aggregate extraction activities W of the Project site;
- The oil and gas extraction activities NW of the Project site;
- Commercial fisheries activities in the area around the Project site.



Figure 6: Maintenance vessel at the existing Burbo Bank offshore wind farm

The EIA process will also identify cumulative and in-combination impacts within the onshore development areas, including other onshore developments which may affect receptors in the vicinity of the cable route or at any substation location. These may include aspects such as ecology and nature conservation, historic environment, landscape and visual character.

However, the actual topic areas where detailed consideration will be required will depend much on the final grid connection route and any associated development, such as the new onshore substation. Relevant local authorities will be consulted on other development types that might have an effect in combination with the onshore grid connection project.

In terms of further surveys and/or studies, it is proposed that the following are required in order to provide a thorough cumulative and in-combination impact assessment.

Cumulative Impacts – Proposed Surveys and Studies for Burbo Bank Extension offshore wind farm	
<i>Proposed Survey / Study</i>	<i>Description</i>
Cumulative Landscape and Visual impact assessment	To assess the cumulative visual impact of the existing offshore wind farms in the Liverpool Bay and the Project site (to be part of the general Landscape and Visual Assessment study described in Table 17).
Cumulative Navigation and Shipping traffic survey, risk assessment, probability of collision, and modelling of traffic changes.	To assess the cumulative impacts on navigation traffic and safety (to be part of the general Navigation and Shipping traffic study described in Table 17).
Cumulative Impacts on the Coastal Process study	To assess the cumulative impacts on coastal processes of the existing offshore wind farms in the Liverpool Bay and the Project site (to be part of the Coastal Process study described in Table 4).
Cumulative Impacts on ornithology	To assess the potential cumulative impacts on bird populations of the existing wind farms in the Liverpool Bay and the Project site (to be part of the ornithological study described in Table 14).
In-Combination Impacts study	To assess the in-combination impacts arising from the extension site with other marine projects and licensed activities.

Table 22: Proposed cumulative impact assessment studies in relation to the Burbo Bank Extension offshore wind farm development

Regarding the *Appropriate Assessment*, when a project, alone or in combination with other plans or projects, is considered to have a likely significant effect on a European site (i.e. on internationally important habitats and/or species), and is not directly associated with the management of the site for nature conservation, the developer is required to provide the competent authority with information to undertake a test of likely significance.

This process may subsequently involve the completion of an Appropriate Assessment by the competent authority under the *Conservation (Natural Habitats & Co.) Regulations 1994 (as amended)*. The determination on both matters, i.e. the formal assessment of whether a likely significant effect will occur and the AA, should this be required, is undertaken during the examination process. For the purposes of a NSIP (see Section 1.4.1) such as the Project the competent authority will be the Infrastructure Planning Commission (IPC).

For offshore wind farms, an Appropriate Assessment may be required for the following types of potential likely significant impacts:

- Impacts of construction noise on marine mammals should they be linked to an identified SAC;

- Impacts of export cable installation on sub-tidal and inter-tidal habitats (including benthic biotypes and saltmarsh habitats);
- Impacts of disturbance arising from wind farm construction and export cable installation on bird species; and
- Impacts of Operational Wind Farms on bird species, including collision risk of migratory and breeding birds, potential displacement and/or barrier impacts;
- Cumulative impacts on bird species. This item was extensively discussed in Section 3.3.4.4.

As noted above, the Habitats Regulations require that the likely impacts of a project on European sites are considered both alone and in-combination with other plans or projects. As such, the cumulative and in-combination assessment forms a component of the assessment work for the cumulative and in-combination studies.

4. Way Forward

4.1 Overview

As outlined above DONG Energy is seeking to develop an extension to the existing Burbo Bank offshore wind farm. The proposed development will add turbines to the existing 25 already operational within an area of 40 km², for an indicative total installed capacity ranging from 169 to 234 MW.

The present Scoping Report was prepared in support of a request for a Scoping Opinion from the Infrastructure Planning Commission (IPC) under the Regulation no. 8 of the 2009 Statutory Instrument no. 2263 (*The Infrastructure Planning Environmental Impact Assessment Regulations 2009*).

The next sections will briefly describe the steps following the submission of the Scoping Report to the IPC and the receipt of the Scoping Opinion, starting with the consultation process, the preparation of the Environmental Statement and its submission in support of the application for consents for the development of the Project, the surveys and works leading to the construction, and finally the operation of the wind farm scheduled for the end of 2015.

Figure 6 in the next page illustrates the process and its abovementioned key stages with indicative dates of completion.

4.2 The Scoping Process

4.2.1 Scoping Report Consultations for the Scoping Opinion

As part of the formal scoping process, the IPC will consult a number of statutory consultees to obtain their comments, within twenty-eight (28) days from its submission of the content of the Scoping Report.

These opinions will be attached, along with the IPC opinion, to the *Scoping Opinion* document, which will be released by the IPC within forty-two (42) days after the submission of the Scoping Report. Subsequently, both the Scoping Report and the Scoping Opinion documents will be made public on the IPC website¹². It is expected that the Scoping Opinion document will be received by DONG Energy around August 2010.

Besides the statutory bodies, DONG Energy would be interested in the views of other consultees and organisations on the proposed offshore wind farm development.

4.2.1.1 Statutory Consultees

The IPC will identify and formally consult with a number of statutory bodies as per the 2009 Statutory Instrument no. 2264 – *The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 – Schedule 1*, in order to obtain their Scoping Opinion on the Project.

¹² At the *Projects* section, whose URL is http://infrastructure.independent.gov.uk/?page_id=202

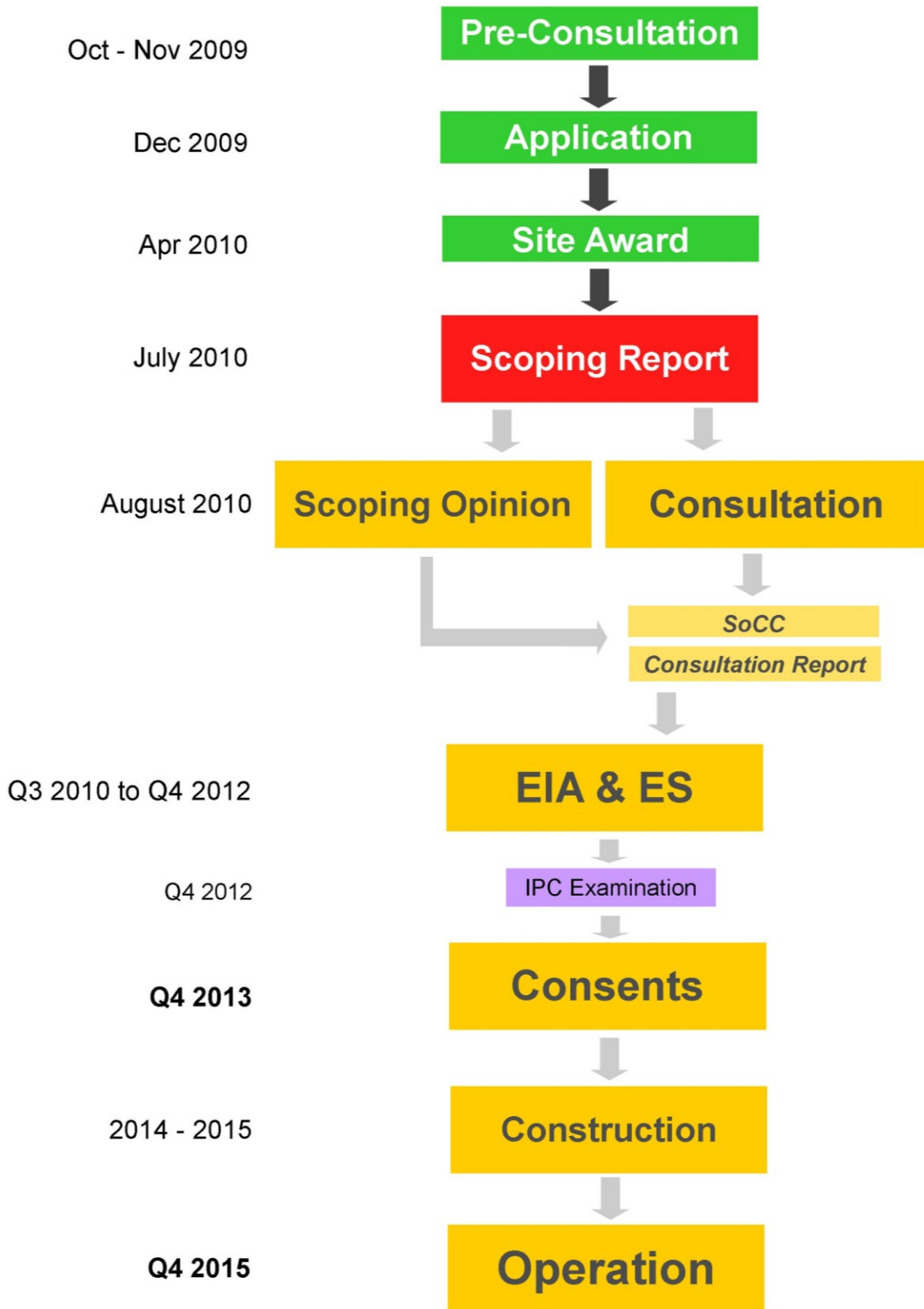


Figure 7: Timeline of the key stages and indicative dates in the Burbo Bank Extension offshore wind farm development

4.2.1.2 Other Consultees

During the early and formal consultation stages (see Figure 2) various stakeholders will be consulted by DONG Energy, as shown in Table 23. The list is not an exhaustive list of all the stakeholders to be consulted in respect of the Project and it will be very likely to be augmented with potential new stakeholders during the consultation process prior to submission of the consent application. These stakeholders may also be consulted by the IPC.

Organisation	Contact Person
<i>National Government Departments and Local Government Councils</i>	
Environment Agency	Ms Beverley Lambert
Wirral Metropolitan Borough Council	Mr John Entwistle
Sefton Metropolitan Borough Council	Mr Andy Wallis
Flintshire County Council	<i>To be identified</i>
Liverpool City Council	<i>To be identified</i>
Cheshire West and Chester Council	<i>To be identified</i>
Other neighbouring councils to be defined	<i>To be identified</i>
<i>Human Environment</i>	
Chamber of Shipping	Captain Saurabh Sachdeva
Maritime and Coastguard Agency	Captain Paul Townsend
Peel Ports Ltd. (Port of Liverpool)	Mr Gary Hodgson)
Port of Liverpool	Captain Stephen Gallimore
Port of Mostyn	<i>To be identified</i>
Ministry of Defence (MoD), Defence Estates	Mr Richard Masey
Civil Aviation Authority (CAA)	Mr Mark Smailes
Liverpool John Lennon Airport	Mr Andrew Hepworth
Airbus Ltd.	Mrs Catalina Peters
National Air Traffic Services (NATS)	<i>To be identified</i>
Office of Communications (Ofcom)	<i>To be identified</i>
Fishermen Associations in the area	<i>To be identified</i>
Royal Yachting Association (RYA)	Mr Ted Osborn
Cruising Association (CA)	Mr Chris Edwards
Royal National Lifeboat Institution (RNLI)	Ms Sarah Halls
BHP Billiton Petroleum Ltd.	Andy Edgar
United Marine Dredging Ltd. (Tarmac Ltd.)	Mr Andrew Bellamy
English Heritage	Mr Chris Pater
National Trust	<i>To be identified</i>
Sport England (English Sport Council)	<i>To be identified</i>
Gwynt Y Môr, North Hoyle, and Rhyl Flats offshore wind farms	Mr Jamie May
<i>Natural Environment</i>	
Natural England	Ms Victoria Copley
Countryside Council for Wales	Mr John Briggs
North Wales Coastal Forum	Mr John Nicholson
Countryside Agency (England)	Ms Diane Bethell
Royal Society for the Preservation of Birds	Mr Toby Gethin
Centre for Environment, Fisheries and Aquaculture Science (CEFAS)	Mr Adrian Judd
Mersey Conservancy	Mr Martin Bailey

Table 23: Indicative list of Other Consultees for the Burbo Bank Extension offshore wind farm project

4.3 Consultation

4.3.1 Pre-Consultation

Prior to the submission of the application for the Project to The Crown Estate in December 2009, DONG Energy consulted with a number of stakeholders during the months of October and November 2009.

The consultees were briefed on the potential plans for the proposed extension and their opinions on the likely impacts of the extension development on their own activities or interests were collected. In many cases the design of the Project has been amended to reflect these comments. These comments and changes are recorded in Table 24.

4.3.2 Formal Consultation

Once the Scoping Opinion has been received, formal consultation process (as specified in the Planning Act 2008, S42) with stakeholders such as local authorities, statutory and non-statutory consultees (as specified in Section 4.2) and landowners is likely to start in September 2010. The consultation period is likely to last until the consent application is submitted. This consultation process will include high-level consultations with key stakeholders throughout the period and other activities involving the general public such as exhibitions, publication of brochures, leaflets and other events.

As previously mentioned in Section 1.4.3, during this process, DONG Energy will publish the *Statement of Community Consultation (SoCC)* (as per the Planning Act 2008, Section 47) which will specify whether the Project will require an Environmental Impact Assessment and how the preliminary environmental information is to be consulted upon.

The SoCC is expected to be published in the area comprising the Metropolitan Boroughs of Wirral, Sefton, the Flintshire County Council and the City of Liverpool Council. Other councils will be likely added by following IPC guidance and compliance with Council Statements of Community Involvement (SCIs)¹³.

At the same time, all responses (within 28 days) to the SoCC and to the formal consultation process will be collected in the *Consultation Report* (as per the Planning Act 2008, S48) to be published along with the *Environmental Statement* (see section 4.4) in October 2012.

4.4 Environmental Impact Assessment and Environmental Statement

Parallel to the Formal Consultation process, the Environmental Impact Assessment survey tender process is expected to start in July 2010 to end in October 2010, when the proposed offshore and onshore survey work programme (see the relevant tables in Chapter 3) can be carried out along with the relevant desk studies to last for around one year until around late 2011.

¹³ The IPC website notes that "[...] Section 47 of the Planning Act 2008 requires the promoter to consult only the local authority for the area where the land the subject of a possible scheme is situated before preparing an SoCC. There is no legal requirement to consult neighbouring authorities about the SoCC". See the URL: http://infrastructure.independent.gov.uk/?page_id=47 .

4.5 Application for Consents

Once the survey works and studies are completed, the compilation of the *Environmental Statement (ES)* will take place for around one year. It is expected that the ES will be submitted to the IPC in late 2012 in support of a Development Consent Order (DCO) and possibly other consents (see Section 1.4.2). The application for the DCO will include draft clauses for inclusion in the final order.

It is expected that the IPC will start the examination of the submitted application around late 2012 for around 10 months until Q4 2013, when the determination of the Project application will take place with the grant or refusal of the DCO.

4.6 Construction

The offshore construction activities on the Project site are likely to last for just over two years, expected to commence 2014 until the end of 2015. In parallel, the onshore construction activities are expected to take place for around one year starting in late 2013 and ending in late 2014.

It is expected that foundations will be constructed from mid 2014 to mid 2015, while inter-array cables will be laid down from Q4 2014 to mid 2015 and subsequently export cable(s) from Q2 to Q3 2015. Wind turbines will be eventually installed from Q2 to Q4 2015.

4.7 Operation

The Project is finally expected to start exporting energy to the transmission grid in Q3 2015 with the final commissioning at full capacity in Q4 of the same year.

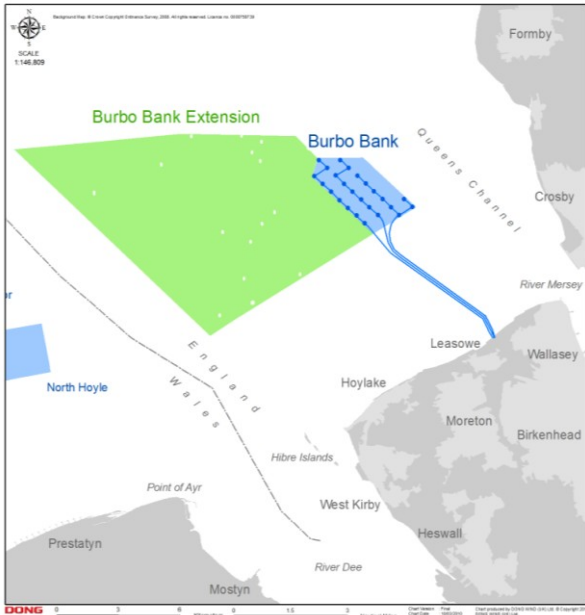
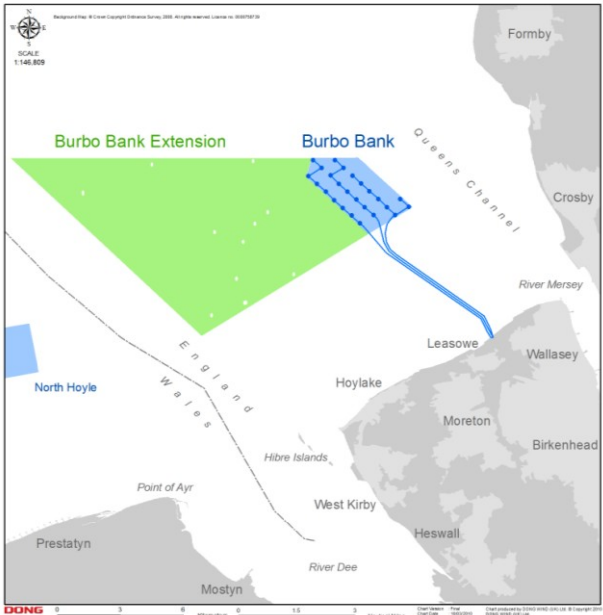
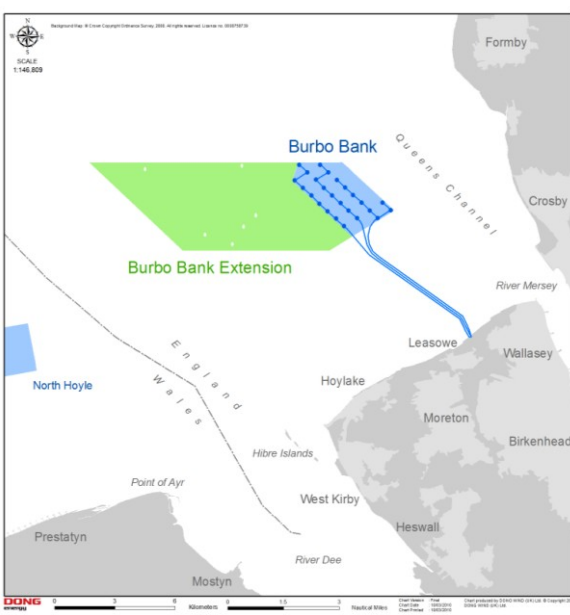
<p>Initial Design (October 2009)</p>	<p>Design submitted to the Crown Estate following Pre-Consultation activities (December 2009)</p>	<p>Final Design awarded by The Crown Estate (April 2010)</p>
		
<p>Site Area: around 90 km²</p>	<p>Site Area: around 80 km²</p>	<p>Site Area: around 40 km²</p>
	<p>Changes in the Design:</p> <ul style="list-style-type: none"> - Northern boundary amended by keeping a separation of at least 0.6 nm from the shipping lanes from/to the Port of Liverpool across the Queens Channel. 	<p>Changes in the Design:</p> <ul style="list-style-type: none"> - Southern boundary amended by keeping a bigger distance from the Welsh and Wirral coasts and avoiding recreational cruising areas in the south; also avoiding the largest concentration of Red-Throated Divers in the southern part near the Dee Estuary. - Western boundary amended to reduce impact on anchoring vessels and dredging routes in that area.

Table 24: Changes in the design of the Burbo Bank Extension reflecting comments received from stakeholders

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Appendix A – Draft Outline for the Burbo Bank Extension Environmental Statement

The following is the proposed high-level structure (subject to modifications) of the Environmental Statement (ES) to be prepared for the Project in support to the application for consents to the IPC.

It is proposed to adopt a three volume format for the ES, comprising of the following volumes:

- **Volume 1: Non-technical Summary;**
- **Volume 2: Environmental Statement Main Text** and;
- **Volume 3: Environmental Statement Figures.**

The ES Main Text (Volume 2) will comprise of a series of introductory chapters and EIA chapters, the preliminary format for which is presented below:

1 Summary

2 Introduction

- 2.1 The Applicant
- 2.2 Project Justification
- 2.3 Legislative context and regulatory requirements (including IPC requirements)
- 2.4 Environmental Impact Assessment Process
- 2.5 Assessment Methodology

3 The Proposed Offshore Wind Farm

- 3.1 Site Layout
- 3.2 Foundations
- 3.3 Turbines
- 3.4 Offshore electrical elements
- 3.5 Onshore electrical elements
- 3.6 Construction
- 3.7 Operation and Maintenance
- 3.8 Decommissioning

4 Offshore Physical & Chemical Environment

- 4.1 Wind Resource
- 4.2 Geology

4.3 Bathymetry and seabed features

4.4 MetOcean

4.5 Morphology

4.6 Sediment Chemistry

4.7 Contamination

4.8 Noise

4.9 Electromagnetic Fields

5 Offshore Biological Environment

5.1 Designated Areas including Natura 2000 issues

5.2 Bottom Fauna

5.3 Fish and shellfish

5.4 Birds

5.5 Marine Mammals

6 Offshore Human Environment

6.1 Navigation

6.2 Commercial Fishery

6.3 Cultural Heritage Offshore

6.4 Seascape and Visual Resource

6.5 Military and Aviation

6.6 Telecommunication

7 Onshore Physical and Chemical Environment

7.1 Geology and Geomorphology

7.2 Hydrology

7.3 Impact during construction

7.4 Impact during operation

7.5 Impact during decommissioning

7.6 Cumulative Impact

7.7 Mitigation

7.8 Residual Impact

8 Onshore Biological Environment

8.1 Baseline

- 8.2 Impact during construction
- 8.3 Impact during operation
- 8.4 Impact during decommissioning
- 8.5 Cumulative assessment
- 8.6 Mitigation
- 8.7 Residual impacts

9 Onshore Human Environment

- 9.1 Traffic
- 9.2 Occupation incl. tourism
- 9.3 Cultural Heritage
- 9.4 Landscape
- 9.5 Land use and agriculture
- 9.6 Emission and noise

10 Cumulative Impacts

- 10.1 Cumulative impact on offshore environment
- 10.2 Cumulative impact on onshore environment
- 10.3 Cumulative Impact – Summary

11 QHSE Management

- 11.1 QHSE Management System

12 Risks

13 Summary of mitigation measures

Appendices

- 1 References**
- 2 List of abbreviations**
- 3 List of stakeholders consulted**
- 4 Large Format Figures**
- 5 List of Annexes**

Appendix B – List of studies undertaken for the Burbo Bank offshore wind farm development

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Appendix C – Site Co-ordinates and Charts

This section includes the co-ordinates of the Burbo Bank Extension offshore wind farm site boundary and a series of charts showing the main offshore human and biological constraints found in and around the Project site.

The co-ordinates of the Burbo Bank Extension offshore wind farm site boundary (as awarded by The Crown Estate) are provided below. They are given as degrees, decimal minutes and projected in WGS 84, UTM Zone 30N.

Node	Latitude	Longitude
1	53.50236645	-3.376545957
2	53.50283717	-3.219970902
3	53.49471074	-3.223962594
4	53.47023143	-3.179016632
5	53.4638772	-3.196291069
6	53.46361972	-3.305976647

Table 25: Co-ordinates of the Burbo Bank Extension offshore wind farm site boundary

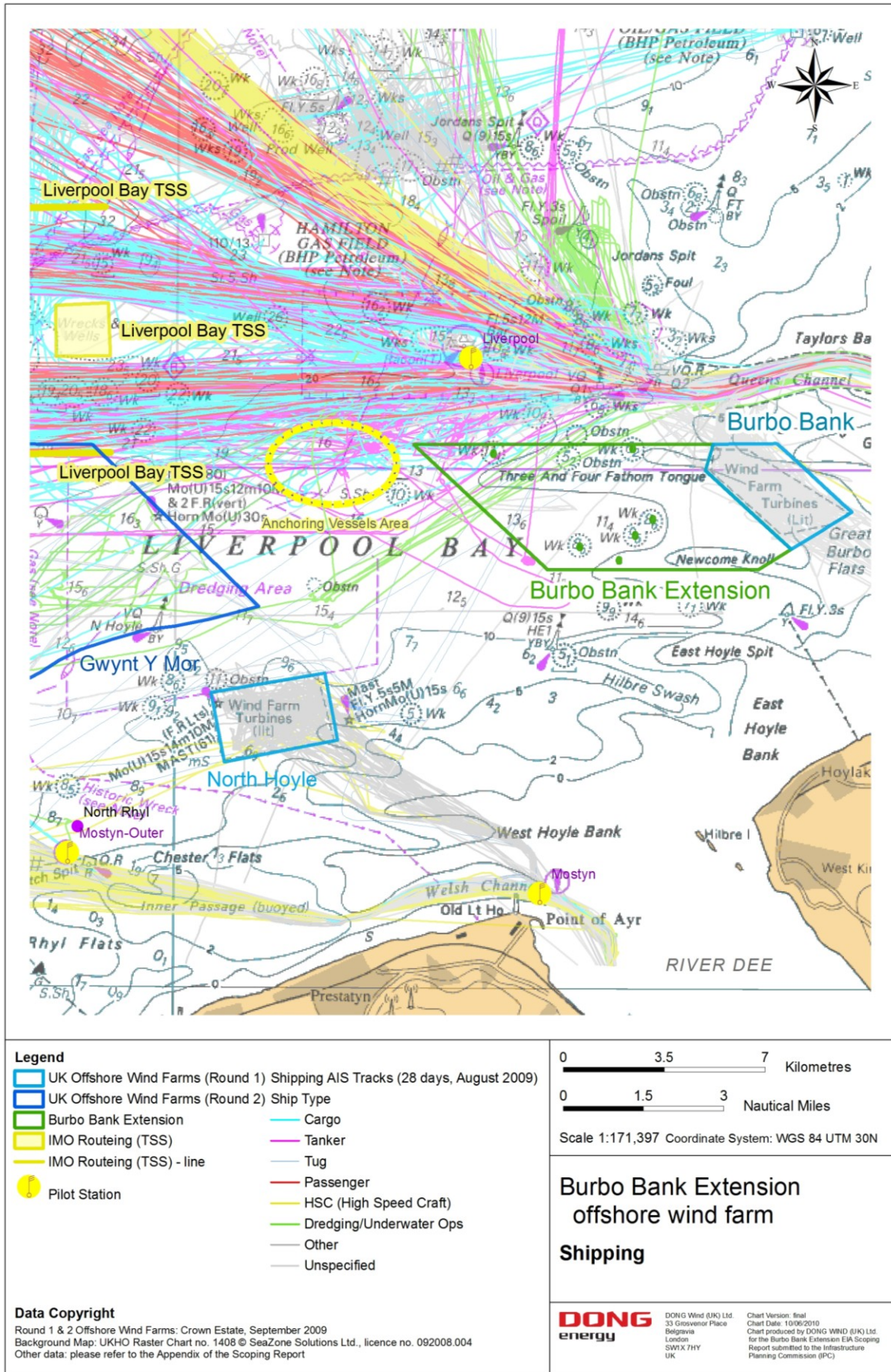


Chart 8: AIS shipping tracks recorded in August 2009 around the Burbo Bank Extension offshore wind farm site

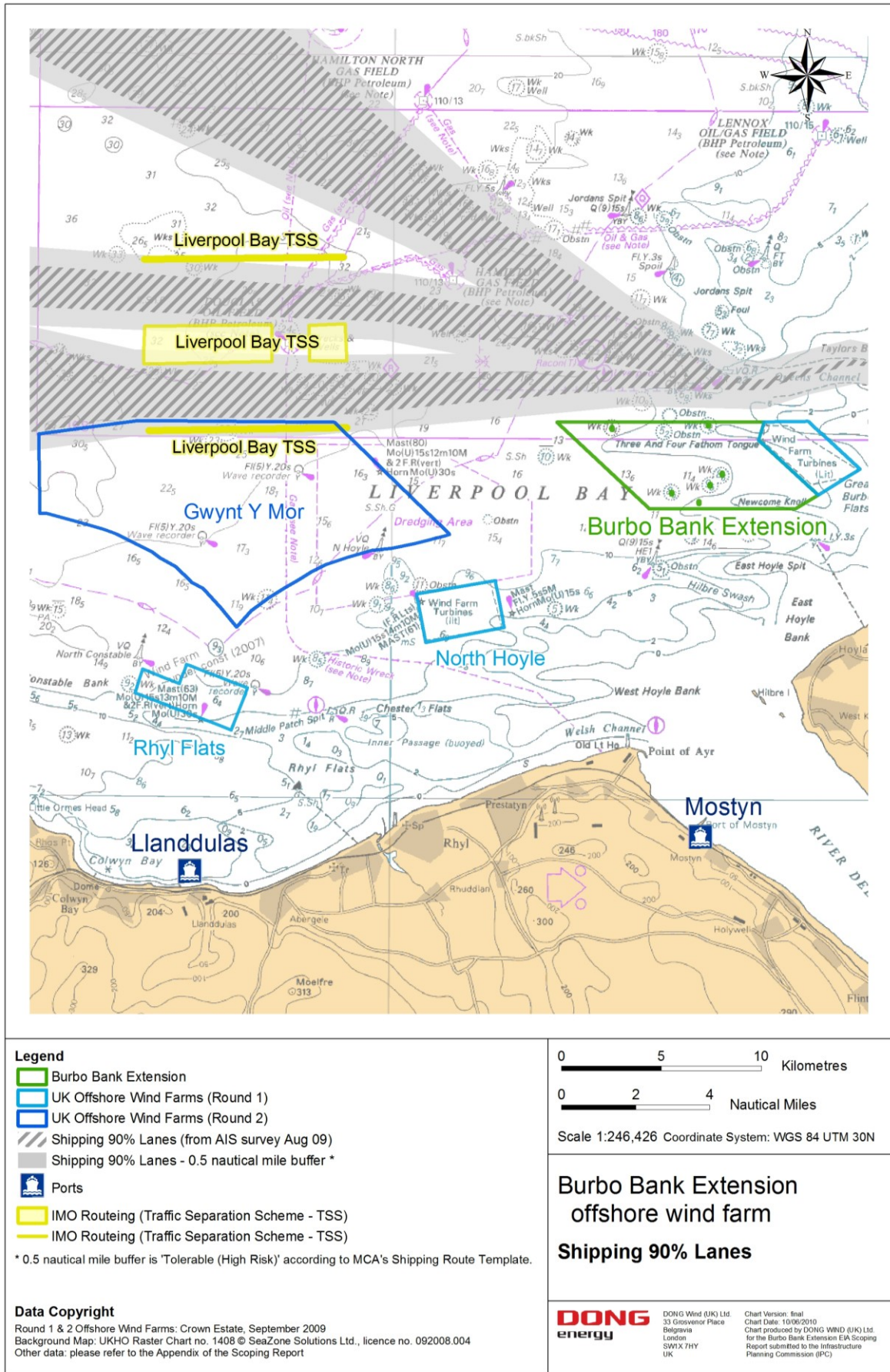


Chart 9: Shipping 90% lanes around the Burbo Bank Extension offshore wind farm site

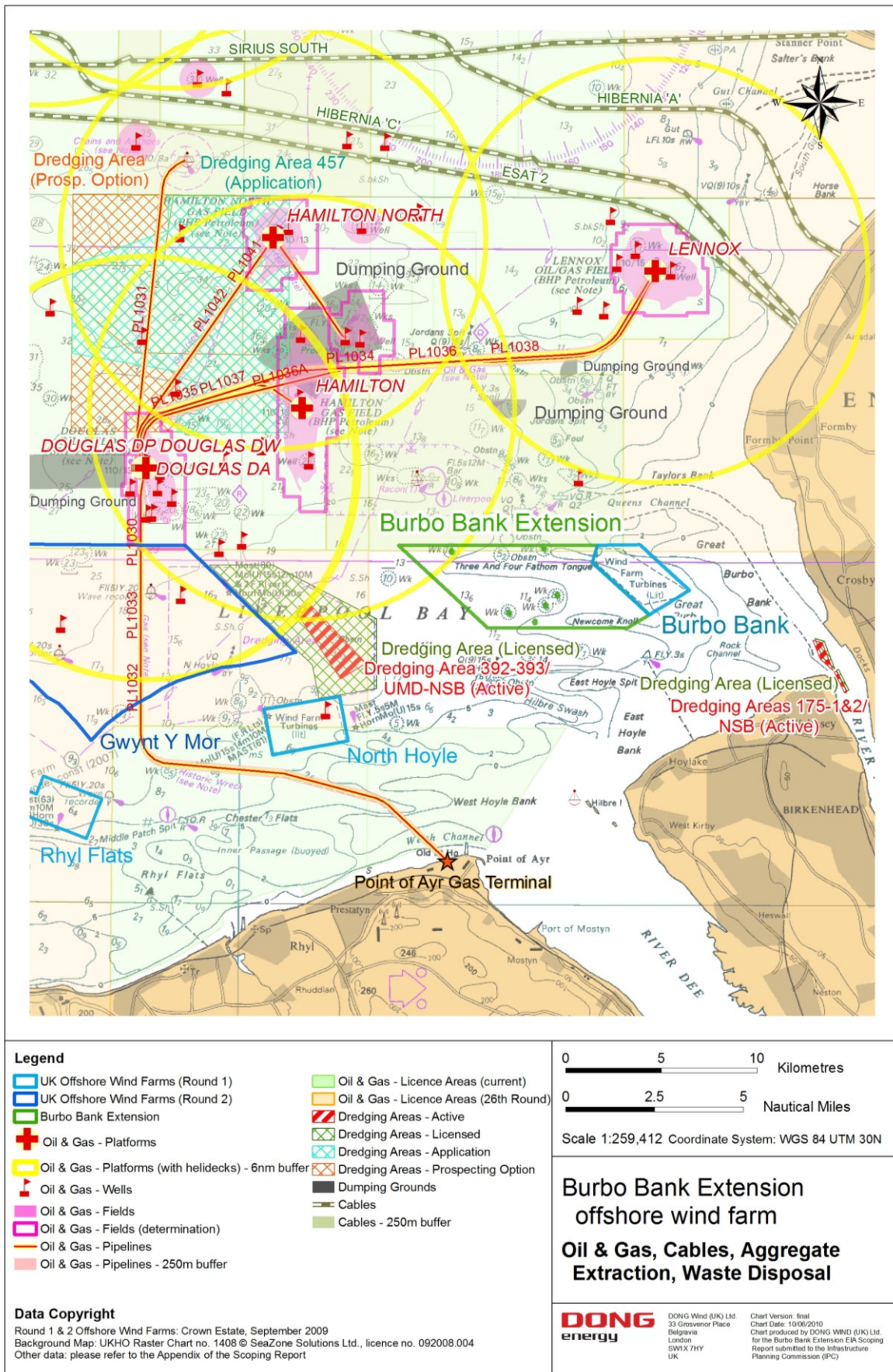
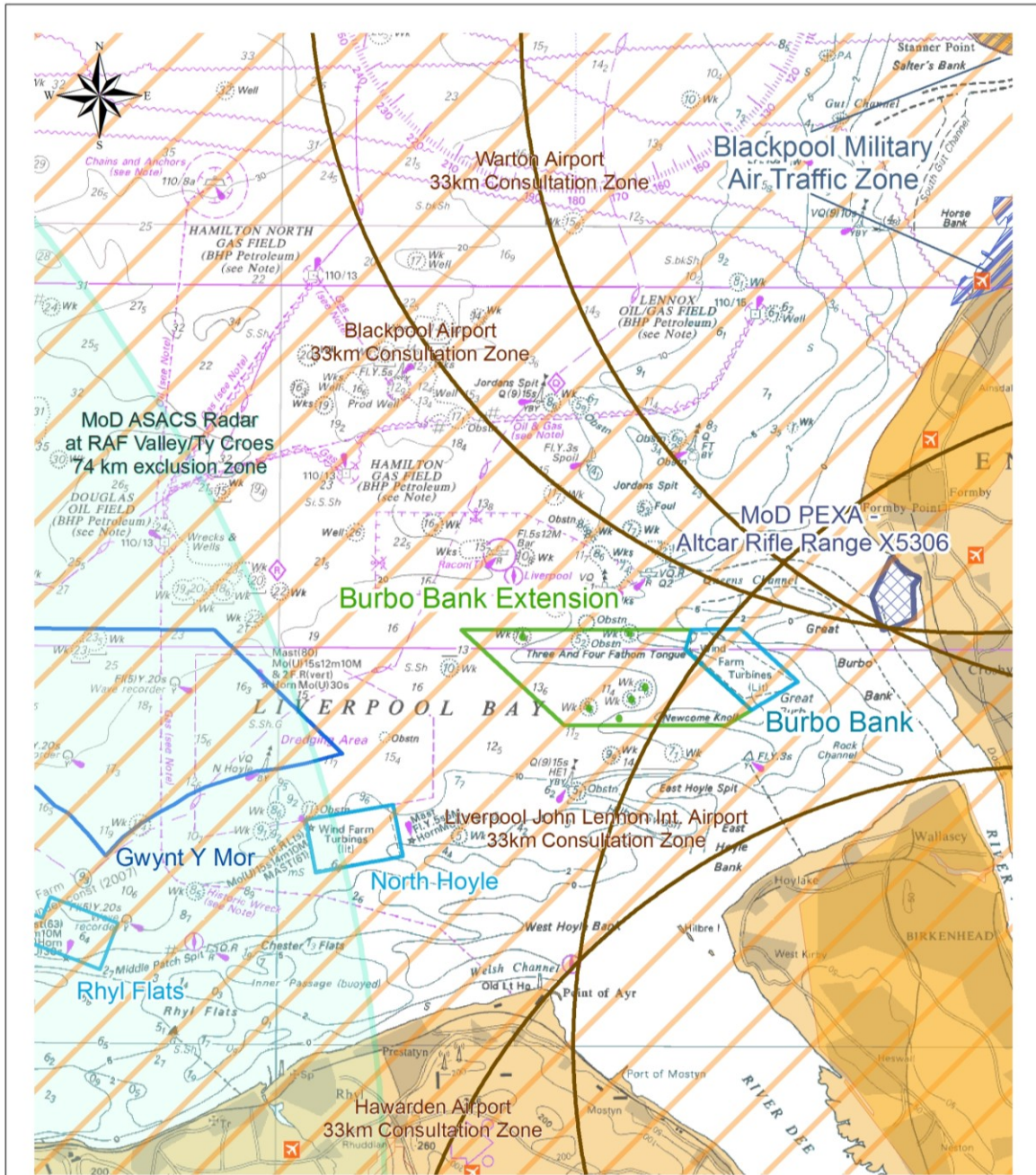


Chart 10: Oil and gas aggregate dredging, and waste disposal activities around the Burbo Bank Extension offshore wind farm site



<p>Legend</p> <ul style="list-style-type: none"> UK Offshore Wind Farms (Round 1) UK Offshore Wind Farms (Round 2) Burbo Bank Extension CAA Airports Other Airports/Aerodromes CAA Airport Consultation Zones CAA Air Traffic Zones Interference with NATS Operations Likelihood to interfere (140m blade tip height) High Medium MoD RAF UK ASACS Radars - Buffer 74km MoD PEXA - Other Areas MoD Military Air Traffic Zones 		<p>0 5 10 Kilometres</p> <p>0 2.5 5 Nautical Miles</p> <p>Scale 1:259,412 Coordinate System: WGS 84 UTM 30N</p>
<p>Data Copyright</p> <p>Round 1 & 2 Offshore Wind Farms: Crown Estate, September 2009 Background Map: UKHO Raster Chart no. 1408 © SeaZone Solutions Ltd., licence no. 092008.004 Other data: please refer to the Appendix of the Scoping Report</p>		<p>Burbo Bank Extension offshore wind farm Military & Aviation</p> <p>DONG energy</p> <p><small>DONG Wind (UK) Ltd. 33 Grosvenor Place Belgrave London SW1X 7HY UK</small></p> <p><small>Chart Version final Chart Date: 1/06/2010 Chart produced by DONG WIND (UK) Ltd. for the Burbo Bank Extension EIA Scoping Report submitted to the Infrastructure Planning Commission (IPC)</small></p>

Chart 11: Military and aviation activities around the Burbo Bank Extension offshore wind farm site

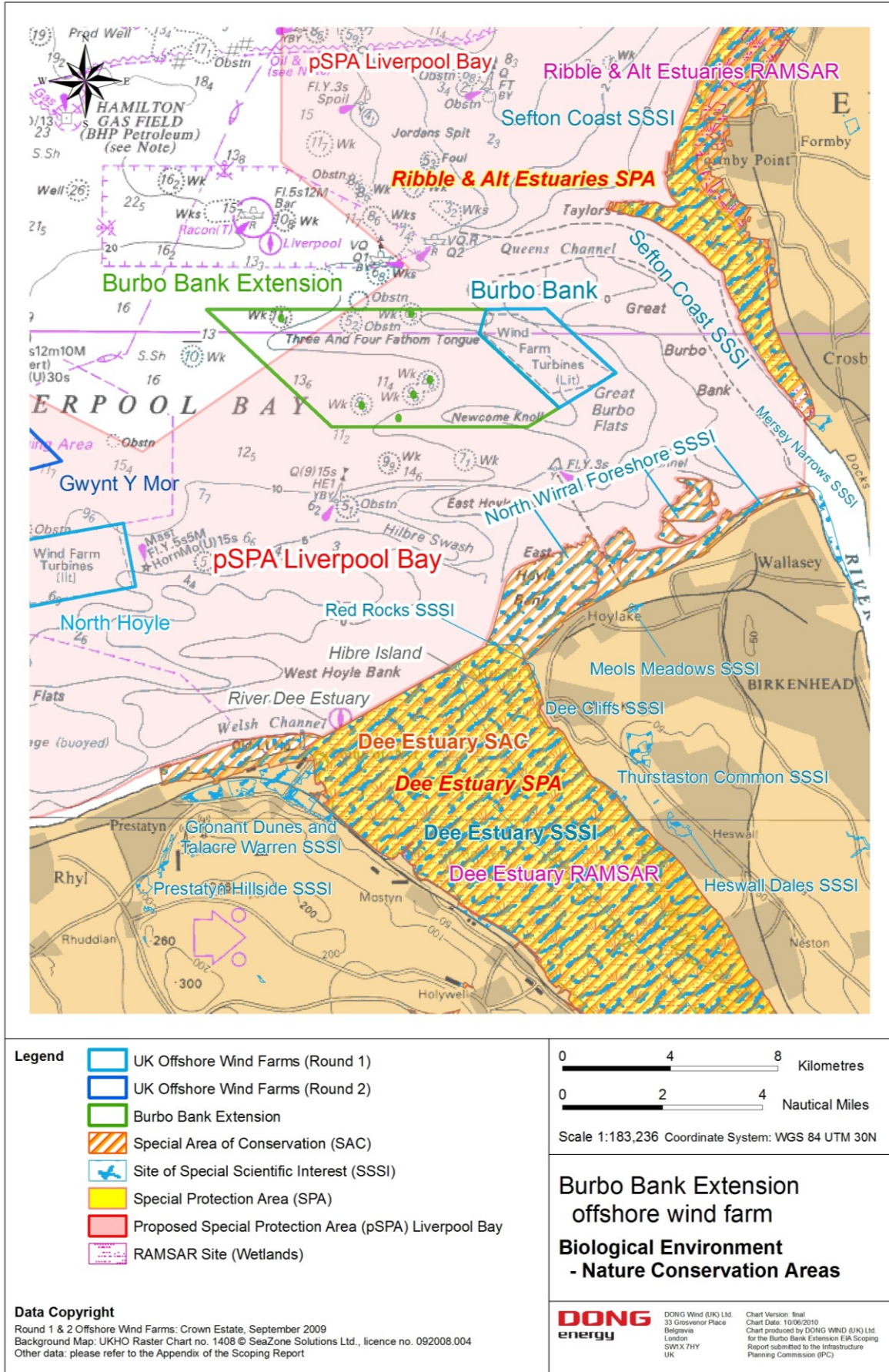


Chart 12: Nature conservation areas around the Burbo Bank Extension offshore wind farm site

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- Nature conservation areas: Natural England, Joint Nature Conservation Committee, 2008, 2009, 2010.
- Shipping tracks: AIS data collected for 28 days over August 2009 by Anatec Ltd.
- Oil and gas fields, platforms, pipelines, licence blocks: UKDEAL, 2009, 2010.
- Telecommunication cables: Anatec Ltd., 2009 from Kingfisher charts.
- Marine aggregate dredging areas: Anatec Ltd., 2009 from The Crown Estate charts.
- Dumping grounds: Anatec Ltd., 2009.
- CAA airports and consultations zones: RESTATS database (AEA-DECC), 2008.
- NATS interference zones: BWEA/NATS En Route Plc, 2008.
- MoD UK ASACS radars and 74 km exclusion zones: taken from taken from DTI, BWEA, MoD, NATS (2002) *Wind Energy and Aviation Interests - Interim Guidelines*, page 37. Positions checked on GoogleEarth™.
- MoD PEXA: taken from UKHO chart no. 1826 © SeaZone Solutions, 2008, 2009. Licence no. 092008.004 © Crown Copyright. All rights reserved.
- Transmission grid and substations: National Grid, 2008.

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