Diamond Transmission Partners RB Ltd Decommissioning Programme

Document History

Issue	Date	Summary of Changes / Reasons	Author(s)	Approved By (Inc. Job Title)
1	24/02/20	Draft v5 updated to Issue 1 following BEIS approval of the Decommissioning Plan dated 07 May 2019.	T Gwatinyanya/ J Matthews	G Thornton

TABLE OF CONTENTS

Contents

1 Introduction

This document presents the proposed OFTO decommissioning programme for the Diamond Transmission Partners RB Limited ("**DTPRB**") assets and is based upon the decommissioning plan[1] proposed by Race Bank Wind Farm Limited ("**RBWFL**"). The decommissioning programme proposed by DTPRB is informed and supported by the Environmental Statement (Centrica, 2009) and Supplementary Environmental Report (Haskoning, 2012).

The project is a 580MW wind farm developed by DONG Energy RB (UK) Limited.

The Race Bank project has been awarded a number of primary consents necessary for its construction and operation. Those consents with provisions relating to decommissioning of the offshore wind farm are shown in Table 1.1.

Table 1.1: Race Bank Consents

Regulation	Legislative Context	Achieved Consents	Authority
Secretary of State for the Department for Business, Energy and Industrial Strategy ("**BEIS**") / Planning Inspectorate ("**PINS**")	Section 36 consent 12.04.09.04/76C (as varied 25/03/2015)	Permission to operate onshore and offshore generating stations with a generating capacity above 50MW	Secretary of State for BEIS/ PINS
Marine Management Organisation	Marine and Coastal Access Act 2009: Part 4 – Marine Licensing	Marine licence awarded 6 July 2012 (L/2012/00217), and subsequently split for OFTO purposes which resulted in two separate licences: Transmission assets Marine Licence (L/2017/00248/2) awarded on 11th August 2017; and Generator Assets Marine Licence (L/2012/00217/18) awarded on 6th July 2012 (construction only). Race Bank Wind Farm Limited is currently applying for the Race Bank Transmission Assets operational and Maintenance activities for	Marine Management Organisation

[1] 2.7.3.1 Race Bank Decommissioning Plan – Version D, Doc. no. 2394965, November 2016

		OFTO assets marine licence.	

In accordance with Section 105(02) of the Energy Act 2004, RBWL was required to prepare a draft decommissioning programme for the Race Bank Offshore Wind Farm and to submit the document to DECC (now Department for Business & Industrial Strategy ("**BEIS**")) for approval prior to the construction of the wind farm.

The draft decommissioning programme outlines the methods for decommissioning, and is consistent with the relevant requirements outlined in BEIS's guidance note on decommissioning of offshore renewable energy installations.

RBWFL's decommissioning plan has been submitted to BEIS and approved by BEIS on 17 January 2017. RBWFL in their financial security document state that the OFTO assets will be decommissioned by the appointed OFTO. This will remove any obligations they have under the licence and pass this on to the OFTO.

If possible the generator assets will be decommissioned at the same time as the DTPRB assets after the expected operational life time of 25 years. At the end of its lifetime, the transmission assets will be decommissioned in order to restore the site as far back to its original conditions as possible.

The programme will be continuously reviewed and revised throughout the life of the project. These reviews will take into account any changes in legislation, circumstances, technological advancements and regulatory requirements.

DTPRB will adopt the principles of the BEIS programme process stages and will follow the process as set out below.

Stage 1: DTPRB discusses draft decommissioning programme with BEIS (including proposed financial security measures), developer and other consultation parties including any additional EIA activities;

Stage 2: DTPRB formal submission of the decommissioning programme and approval under the Energy Act;

Stage 3: Reviews and modifications of decommissioning programme (and any financial security);

Stage 4: Responsible person ensures decommissioning is carried out in accordance with the programme; and

Stage 5: Responsible person adopts decommissioning monitoring, maintenance and management as specified in the programme.

2 Executive Summary

RBWFL obtained consents and licences necessary for the construction of the wind farm in 2012. The operational lifetime is approximately 25 years. At the end of this time the objective will be to decommission the asset in accordance with the provisions set out in the various licences obtained.

In accordance with section 105(2) of the Energy Act 2004, RBWFL submitted its decommissioning plan for the Race Bank project to BEIS (formerly DECC). RBWFL decommissioning programme was approved by BEIS on 17 January 2017.

The proposed decommissioning measures set out in this decommissioning plan aim to adhere to the existing UK and international legislation and guidance notes. In addition, decommissioning industry best practice will be applied, taking into account the legislation applying at the time of decommissioning of the DTPRB assets. DTPRB will pay full regard to the "waste hierarchy", which suggests that

reuse should be considered first, followed by recycling, incineration with energy recovery and, lastly, disposal.

It is difficult to determine the decommissioning schedule, as unforeseen issues can arise during the installation and operation of the assets, which ultimately could affect the decommissioning. At the time of writing, no offshore wind farms (including offshore transmission assets) worldwide have been decommissioned[2], so direct experience of the potential challenges are limited. Once other projects start to be decommissioned, it will provide valuable insight into the timing, costs and operational challenges to be faced.

The proposed decommissioning measures for the offshore components of the DTPRB assets can be summarised as:

- complete removal of the offshore substation;
- offshore substation foundations cut off below seabed and removed; and
- offshore export and interlink cables cut, weighted down and left in situ; and
- sections of the export and interlink cables which are not buried and will not remain buried post decommissioning will be cut and lifted off the sea-bed for recycling.

In accordance with the Polluter Pays Principle, DTPRB in conjunction with RBWFL proposes to clear the seabed in accordance with the provisions made in this decommissioning plan and in the Marine and Coastal Access Act 2009 (Marine Licence), and to collect and provide evidence to reflect this.

DTPRB in conjunction with RBWFL is committed to restoring the site and cable corridors to the condition it was in prior to construction, as far as it is reasonably practicable. The key restoration work will relate to ensuring that all cut foundations are made safe and adequately covered, and ensuring that cable ends is adequately buried.

DTPRB in conjunction with RBWFL proposes that, following decommissioning, a full geophysical survey (swath, side scan sonar and magnetometer) is carried out. The survey will be commissioned by DTPRB and carried out by an independent survey contractor and all results issued to BEIS and DTPRB in parallel for review and comment. It is proposed to undertake magnetometer and geophysical surveys at the completion of decommissioning, and subsequently, primarily due to the Port Authorities Cable Zone Agreement, we will undertake geophysical surveys periodically until such time that we expect the surveys from the 20 year operational and post operational period to provide sufficient evidence to the Port Authorities that further geophysical surveys will not be required. The area covered by the magnetometer and geophysical surveys will be determined prior to decommissioning, but we are aware of oil and gas installation guidance which specifies a 500 metres radius around any installation.

A cost estimate for the programme has been derived, based on the equipment, personnel requirements and the duration of works. Financial security provisions have been carefully considered to ensure that this liability will be met.

In advance of decommissioning, the EIA will be reviewed to assess the potential impacts that may arise and to identify any additional impacts that were not covered in the initial EIA process and subsequent reviews.

[2] Danish windfarm Vindeby (1.8km from shore 4.95MW) decommissioned in 2017. Swedish windfarm Yttre Stengrund (2km from shore, 10MW) decommissioned in 2016. Both projects are small scale and do not include transmission assets. Though they provide valuable insights, these can't be used to benchmark for large offshore transmission systems.

Once the assets are nearing the end of their agreed operational life, DTPRB will initiate a final review of this document and the proposed programme of works. Once this review is complete, a "Decommissioning Programme of Works" will be developed, in conjunction with the wind farm owner, and the schedule of works will be determined in agreement with the statutory authorities.

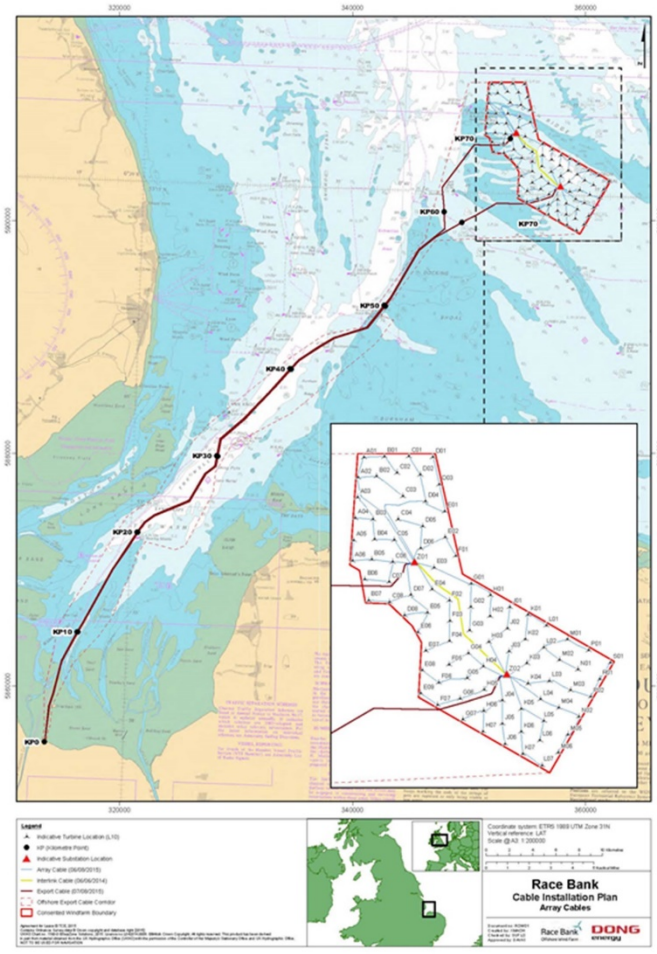
3 Background Information

This section describes the project and gives a brief overview of the biological, physical and human environment in the area.

3.1 Location

The project is located approximately 27km off Blakeney Point on the North Norfolk coast in the Greater Wash. In total, the offshore site occupies and area of 65km^2. The location is shown in Figure 3.1.

Figure 3.1: Race Bank Offshore Wind Farm



3.2 Design and Background

Race Bank Wind Farm has an installed capacity of 580MW fed from 91 turbines rated at 6.4MW each. Power generated by the turbines is transmitted through a network of inter array cables.

The array cables transmit power to two offshore substations.

The two substations have an interlink cable connecting them with an approximate length of 6.4km.

Using a combination of subsea and land cable with an approximate length of 83km (71km offshore and 12km onshore), power is transmitted to an onshore substation at Walpole called Walpole Substation for connection onto the National Grid, see Figure 3.1.

DTPRB will operate and maintain the Offshore Transmission Assets associated with the Race Bank Wind Farm.

3.3 As Built Information

The Construction Design and Management ("**CDM**") Regulations 2015 apply and will require accurate as-built data as amended during the lifetime of the project to be used as a basis for the decommissioning methodologies. The Developer is responsible at the time of purchase for providing the purchaser with this information. DTPRB will expect that such information is supplied and will include as a minimum:

i. as-built position for all structures;
ii. details of the construction of all structures; and
iii. position depths of burial and other forms of cable protection for all subsea cables (both export cables and inter-array cables).

If at any time during the lifetime of the project the as-built details change, for example, after a repair to a subsea cable, amended details will be prepared for the on-going live status of as-built data.

3.4 Site Characteristics

The site characteristics are described by a comprehensive data set and information collated for the Environmental Statement (Centrica, 2009) and Supplementary Environmental Report (Centrica, 2012).

3.4.1 Physical Characteristics: Geology, Bathymetry and Seabed Features.

A brief summary of the key physical characteristics for the offshore locations of the RBOWF site is provided below. Further information about the sub-topics is available in the Environmental Statement (Centrica, 2009) and Supplementary Environmental Report (Centrica, 2012).

Holocene marine sediments consisting of slightly gravelly sand up to 7.5m thick, overlie glacially deposited Boulders Bank Formation sediments (approximately 5m deep) which in turn overlie Cretaceous chalk bedrock are locate within the Race Bank array.

The western section of the proposed wind farm site is situated on Race Bank itself a marked sandbank feature. The north of the proposed site lies on North Ridge which extends into Dudgeon Shoal to the east, also pronounced sandbank features. However, the central to eastern section of the site is in deeper water, to the south and east of the sandbanks. Consequently, the depth varies between less than 6m on the top of North Ridge and between North Ridge and Race Bank lies a flatter, featureless area with depths ranging from 11m Chart Datum ("**CD**") in the north-west to 23m CD.

The export cable corridor passes west of the Docking Shoal project and then through The Wash. The Wash morphology is an undulating seabed with shifting sandbanks. Many of these sandbanks are exposed at all states of the tide. The seabed is mainly gravel or sand sediments. The route crosses an intertidal zone of muddy sediments near shore in the form of mudflats and salt marshes.

The cable corridor extends from the saltmarshes to the east of the River Nene, northwards through the Wash, and to the west of the proposed Docking Shoal

Offshore Wind Farm Site and joining the main Race Bank site in the southwest corner. The corridor also has a much greater range of depths, from 0m near shore to 55m near the mouth of the Wash. The deepest part of the corridor is in a linear trench approximately 5km long and 1km wide named the Well to the north and extending southwards into Lynn Deeps. Although the maximum depth is 55m, most of this trench is 45m to 50m below CD and throughout the rest of the corridor; the deepest parts are 30m. There is little variation in sediment size throughout the Wash cable route corridor; although a slight increase in proportion of fines occurs towards the Inner Wash, where the seabed is more uniform. However patches of gravel, with irregular bed forms can be found in the shallower water.

The bathymetry surveys identified 7 distinctive areas as identified below:

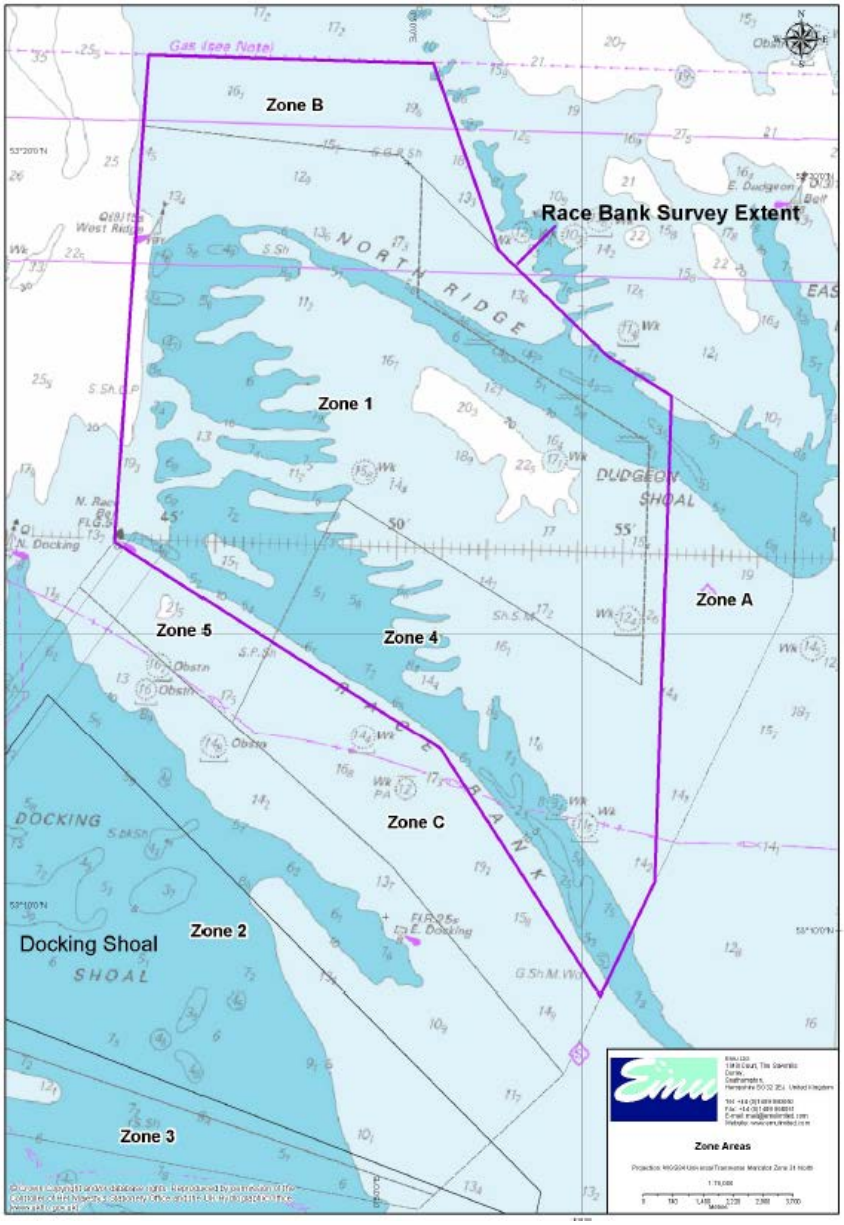
- Zone 1: The prograding northern edge of North Ridge which is migrating in a northerly direction;
- Zone 2a: West Ridge features, which comprise of small sand waves with varying orientations and migration directions;
- Zone 2b: The main body of the Race Bank features, which is made up of northerly migrating large sand waves;
- Zone 3a: The relatively flat and featureless area situated between Race Bank and North Ridge;
- Zone 3b: Southern margin of North Ridge – Dudgeon Shoal. Characterised by the presence of low amplitude (<0.5 m) mega ripple bed forms;
- Zone 4: The western part of North Ridge. This area comprises northerly migrating large sand waves and north-westerly migrating smaller sand waves; and
- Zone 5: Flat featureless seabed further north of North Ridge, no bed forms are present, but the area is in the pathway of the migrating North Ridge.

The first Bathymetric survey was carried out on the area encompassing the wind farm and substation (Figure 3.4.1a). The depths within the Race Bank survey area range between 4m below CD and over 28m below CD. The area is dominated by the sand banks that make up Race Bank in the south and west.

North Ridge is in the north and Dudgeon Shoal in the northeast where the shallowest parts of the area that was measured. The Race Bank feature runs from SE to NW along the southern boundary of Zones 1 and 4, and then continues north towards the West Ridge light buoy. To the west of this ridge lay the deepest depths in the area at around 28m. The peak of the bank goes east along North Ridge where it divides into 2 ridges approximately 200m apart and shallows to a minimum of 8m depth. Further east the ridges broaden into Dudgeon Shoal where they become shallower, reaching 6m below CD at the north eastern edge of Zone 4. Two flat areas were identified from the data interpretation. One is located between the south edge of Race Bank and North Ridge east of zone 1, with depths that range from 11m to 24m below CD. The second area lies to the north beyond North Ridge and into Zone B where depths range between 13m and 18m below CD with a slight slope to the northeast. Sand waves predominate on the banks with dimensions of 2.5-8.0km in length and 3-4m in height. Mega ripples are also frequently seen.

Several targets were identified from close inspection of the side can sonar records and 13 of those were found to be possible wrecks with lengths from 6m to 50m and heights of between 1m and 3m.

Figure 3.4.1a Race Bank Survey area



The second bathymetric survey area was that of the cable route. The surveyed area is located within the estuary/banks of the Wash, and, therefore, the general depth profile tends to shallow towards the southwest corner. Depths show a large range from 0m CD down to 55m below CD. The shallowest areas are those in the extreme south, on top of the Long Sand in the west and over the Burnham Flats in the north where depths are close to, or even above 0m. The deepest depths occur within The Well and Lynn Deep in the central east area. These features form a deep trench approximately 5km by 1km where the average depth is 45m – 50m. One very steep north-south feature occurs on the edge of the Burnham Flats in the north where depths fall from 0m to 8m producing a maximum 1 in 4 slope.

Three distinct areas of sand waves and mega ripples are clearly observed from the bathymetry in the north (Outer Wash) region, one area just to the north of The Well and two areas in the north east. The heights of these features range from 1.8m to 4m and wavelengths from 90m to 200m. Orientation of the crests is generally east-west. The rest of the area is fairly flat and uniform with depths ranging between 0m and 30m. Nine distinct seabed types have been identified

throughout the survey of the Race Bank, Docking Shoal and Greater Wash. Only five of those are represented in the Greater Wash and these consist of various combinations of silt, sand and gravel. Overall there is little variation in sediment size throughout the Wash, with the only differences being the small changes in ratio of the three constituents; sand, gravel, silt; and the common occurrence of shells. Boundaries related to sediment size and composition, are not well-defined as they change gradually. The AGDS data showed essentially 3 seabed types, fine sand, coarse sand, and mixed sediments which corresponded with the side scan data.

The side scan sonar data and interpretation confirm the findings of the bathymetry (above) with respect to the areas of sand waves and mega ripples. In total 97 anomalies were measured. Six targets were identified as possible wrecks with heights between 1m and 2m and lengths that range from 10m to 35m. These wrecks were crosschecked with other datasets (magnetometer and admiralty charts) and they correlate well. Other targets include chains, large boulders as well as other unidentified natural or artificial disturbances.

Along the cable route the geological interest was confined to the superficial sediments only, a series of Holocene deposits which overlie Cretaceous Chalk and Pleistocene 'tills' in this area. The thickness of this horizon has a range of 0m to 28m. Large parts of the middle and upper portions of the survey area show the sediments thickness to be 6m – 8m but these decreases to 2m – 4m in the north east towards Docking Shoal. In a number of isolated areas, the thickness rises to well over 10m, peaking at 28m in the extreme south east. No areas showing substrate outcrops have been found in the Greater Wash.

3.4.2 Met Ocean and Coastal Processes

Seabed levels within the Project site vary from between -11 metres (m) to -22m relative to Lowest Astronomical Tide (LAT). The tidal currents at the Project site are predominantly north-westerly and south-easterly and the site is mainly exposed to waves from the north (DONG Energy, 2015b).

The array site and export cable route through The Wash are both located within a macro-tidal environment, with spring neap tidal ranges upwards of 6m (ABPmer, 2016). Within the array site and along the majority of the export cable route, flood tidal currents are to the southeast and ebb currents are to the northwest. Data from the Renewables Atlas (ABPmer, 2008) has shown that in the northern part of the array site mean spring peak current speeds are around 1.1 m/s and mean neap peak current speeds are around 0.58 m/s. To the south of the array site in the vicinity of Race Bank, mean neap and mean spring peak current speeds are slightly lower (around 0.90 and 0.49 m/s, respectively). These flow speeds broadly correspond with the peak spring conditions that were modelled for the site in the ES (Centrica, 2009). The ES also indicates the presence of a net tidal residual current orientated to the north and northwest in relation to the ebb tidal flow across this part of the Southern North Sea, indicating ebb dominance across the Study Area (Centrica, 2009.

In the offshore area of the export cable route the tidal regime between the array site and the outer Wash is similar to the array site. At the onshore end of the export cable route the bathymetry and geomorphology of The Wash controls the direction and magnitude of tidal currents. Tidal currents along the route, within The Wash, are also asymmetric in nature, with the flood tide being stronger than the ebb, especially in the main channels. The flood dominance along this section of the route results in a flood residual and a net landward flux of fine and coarse sediment into The Wash (ABPmer, 2008a; 2008b). Along the export cable corridor in proximity to the Lynn Channel, which acts as a sediment sink, peak flood currents of 0.6 and 1.2 m/s occur on the spring neap tides respectively, with peak ebb currents of 0.5 and 1 m/s.

3.4.3 **Biological Environment:** Sub tidal and Intertidal Benthic Ecology

Designated Areas

The Race Bank Offshore Wind Farm array site lies within the Inner Dowsing, Race Bank and North Ridge Site of Community Importance (IDRBNR SCI).

The site is located relatively close to a number of important sites designated for nature conservation including Ramsar sites, Special Areas of Conservation (SACs), Special Protected Areas (SPAs), National Nature Reserves (NNR), Sites of Special Scientific Interest (SSSIs) and local nature reserves. Sites with international designations are:

- The Wash Ramsar Site;
- Gibraltar Point Ramsar Site;
- North Norfolk Coast Ramsar Site;
- The Wash and North Norfolk Coast SAC;
- The North Norfolk Coast SAC;
- Saltfleetby - Theddlethorpe Dunes and Gibraltar Point SAC;
- The North Norfolk Coast SPA;
- Inner Dowsing Race Bank North Ridge Site of Community Importance;
- Greater Wash SPA;
- The Wash SPA; and
- Gibraltar Point SPA.

In addition to these, there are also eight NNRs and eight SSSIs and a number of reserves owned and/or managed by Lincolnshire Wildlife Trust, Norfolk Wildlife Trust and the Royal Society for the Protection of Birds (RSPB), and EIFCA bylaw areas.

The Project export cable corridor traverses The Wash Ramsar site, The Wash and North Norfolk Coast SAC, The Wash SPA, The Wash NNR and The Wash SSSI.

Benthic Fauna

The offshore array and export cable corridor are located off the north Norfolk coast in shallow waters with a strong tidal influence and highly mobile substrata. The region is characterised by sub tidal sandbanks and is influenced by The Wash. Sediments in this region typically comprise extensive shallow mobile sands interspersed with coarse or mixed sediments in deeper areas. A range of sediments are found in the vicinity of the offshore array; from fine sands through to coarse mixed sediments within which quantities of mud, sand, gravel, pebble and cobble vary greatly (Centrica 2009).

Strong currents, wave action, storm events and anthropogenic influences shape the benthic communities in these often turbid waters. Most communities identified were those associated with mobile sands and coarser gravelly sands.

Such habitats are naturally relatively impoverished indicating quite mobile sediments, and generally characterised by polychaetes such as Nephtys cirrosa or spionids and amphipod crustaceans such as Urothoe spp. and Bathyporeia spp.

Surveys conducted in support of the ES (Centrica 2009) showed that some areas comprised more stable medium to coarse or slightly gravelly sand. In these areas robust bivalves such as Moerella sp. and Goodallia triangularis were present, whilst in others the sand mason Lanice conchilega characterised the community. Other species found included smaller polychaetes such as Nephtys cirrosa,

Travisia forbesii, Ophelia borealis and occasionally interstitial polychaetes such as Hesionura elongata or Microphthalmus similis.

More mobile coarse sands and gravelly sands were relatively impoverished and supported species such as Glycera oxycephala, Gastrosaccus spinifer or Caulleriella zetlandica. Taxa found in and around the offshore array and the export cable corridor are typical of the southern North Sea and include polychaetes, decapods, amphipods, crustacean and echinoderms (Centrica 2009).

It should be noted that coarse, mobile and mixed sediments are both the result of a higher energy hydrodynamic regime, in comparison to finer, stable sediments, and also are able to recover more easily from both natural and anthropogenic changes. Similarly, the fauna of these areas is well- adapted to adjust to sediment changes (Gray and Elliott 2008).

The Information for Race Bank Offshore Wind Farm Shadow Appropriate Assessment provides a more detailed description of the sub tidal sandbanks within the IDRBNR SCI (Centrica 2011). Broad scale benthic habitat maps show that a number of biotopes are found in the region including the Sabellaria spinulosa biotope and variants of the Abra biotope, among others, characterised by polychaetes and amphipods (Foster-Smith and Sotheran 1999).

Benthic surveys indicate that although Sabellaria spinulosa occurs throughout the region, its distribution is patchy and generally comprises of low lying encrustations (Centrica 2009, Section 6.1). The key areas of Sabellaria spinulosa reef are found to the south-west of the wind farm site. This was confirmed by further video surveys conducted in 2015 as a part of the preconstruction Annex I reef habitat assessment (DONG Energy 2015a).

Fish and Shellfish Ecology

The baseline data for fish and shellfish including those of commercial and conservation importance is detailed in the ES (Centrica 2009, Section 6.1). Species found are characteristic of the southern North Sea such as haddock (Melanogrammus aeglefinus), whiting (Merlangius merlangus), cod (Gadus morhua), plaice (Pleuronectes platessa), herring (Clupea harengus) and Dover sole (Solea solea) (Jones et al. 2004).

The Greater Wash is also known for its shellfish notably edible crab (Cancer pagurus), lobster (Homarus gammarus) and whelk (Buccinum undatum), as well as supporting a brown (Crangon crangon) and pink (Pandalus montagui) shrimp fishery (Centrica 2009).

The ES (Centrica 2009) identified that seabed habitats within the Project area are used as spawning, nursery and feeding grounds for commercial and non-commercial fish species.

Historically herring spawning also takes place in the vicinity of the wind farm site. In particular the northern part of the site is recognised as a historic herring spawning ground. There is however very little information available that indicates that the spawning grounds are currently still being used (Centrica 2009). There is however a piling restriction in place from 01 October – 15 November in the northern part of the wind farm site.

Considering that the part of the herring spawning area that overlaps with the wind farm site is very small, the area in which it is located is already a highly dynamic environment and that the activities set out in this document fall within the bounds of what has already been assessed, significant adverse impacts on the herring spawning ground are not anticipated and are therefore not considered further in this document.

The export cables pass through The Wash where intertidal and sub tidal areas are characterised by relatively extensive inshore populations of commercial shellfish species including: mussel (Mytilus edulis); cockle (Cerastoderma edule); and razor clam (Ensis directus). In The Wash cockle beds generally form on muddy sand in the middle to lower intertidal and occasionally sub tidal zones. Pre-construction monitoring of cockle bed extent was undertaken in 2016. The export cable route was selected so that it passes through the outer edge of the commercial cockle bed in The Wash where cockle density is lowest, with the cockle beds being concentrated in the area between KP2.0 and KP4.0 i.e. outside the area considered in this assessment. The 2016 monitoring showed that there was a high variation in cockle density across the sampled sites. In the export cable route cockle density averaged at 33/0.1m^2 (DONG Energy, 2016).

3.4.4 Marine Mammals

A number of marine mammal species are known to readily use the area around the wind farm array and export cable route. Pinnipeds including harbour seal (*Phoca vitulina*) and grey seal (*Halichoerus grypus*) are common in The Wash and surrounding area and were reported in the ES from characterisation survey work undertaken to inform the assessment (Centrica, 2009). Harbour seal are a feature of The Wash and North Norfolk Coast SAC. There are up to 50 recorded haul out sites in The Wash which are regularly used by harbour seals during the breeding season (June and July) and annual moult (August) (SCOS, 2016). The breeding season is when seals are most sensitive to disturbance as ongoing disturbance can lead to separation of pups from their mothers which can affect their survival (Thompson, 2008).

Harbour porpoise (*Phocoena phocoena*) is the most commonly recorded cetacean species within the area and occurs regularly across the year within the North Sea and was the only cetacean species recorded during the characterisation surveys (Centrica, 2009). Other species of cetacean have been infrequently recorded in the area including; fin whale, minke whale, beaked whale, sperm whale and dolphin species. These records have been taken from a combination of at sea sightings and strandings data reported within the Race Bank ES (Centrica, 2009). Aerial surveys for birds and marine megafauna were undertaken across the Project site and 10km buffer between November 2016 and April 2017. These surveys recorded sightings of harbour porpoise, harbour seal and grey seal (DONG Energy, 2017).

For seals, the main haul out locations are Donna Nook (haul out for grey and common seals and breeding area for grey seals), Blakeney Point (haul out for common seal), Gibraltar Point and the Wash (haul out for common seal) (Centrica 2009). These sites are located at distances of 42 km west-north-west, 27 km south and 35 km west-south-west of the wind farm site respectively.

3.4.5 Offshore Ornithology (Birds)

Characterisation surveys identified the array area and site buffer as being used by 35 species of bird, a mix of wildfowl, wader and seabird species. True seabird species were found to be dominant in the proposed array area, the most abundant species included; guillemot, sandwich tern, little gull, kittiwake, fulmar, gannet and razorbill which exceeded 250 recorded individuals (Centrica, 2009). Sensitivity assessment work undertaken as part of the ornithology chapter of the ES identified nine bird species as being sensitive receptors to construction and operational impacts. These species are: Sandwich tern, little gull, common tern, fulmar, razorbill, guillemot, gannet, lesser black-backed gull and kittiwake (Centrica, 2009). Further aerial surveys were undertaken across the Project site and a 10km buffer between November 2016 and April 2017. These surveys showed a similar pattern of results with true seabird species being most abundant in the array area (DONG Energy, 2017).

3.4.6 Nature Conservation

The Greater Wash and surrounding area is known to be important for both breeding and overwintering shore and seabirds and large areas of the coast are designated as SSSI, SPA and Ramsar sites. The export cable route for the Race Bank OWF passes through The Wash SPA and Ramsar site. This site supports the following species during the wintering period: avocet, bar-tailed godwit, black-tailed godwit, curlew, dark-bellied brent goose, dunlin, golden plover, grey plover, knot, oystercatcher, pinkfooted goose, pintail, redshank, shelduck, turnstone, whooper swan. The site is also important for the large aggregations of waders and waterfowl supported during the wintering period. During the breeding season the site supports: common tern, little tern and marsh harrier (Natural England, 2014).

Natural England and the JNCC are currently consulting on the proposal to create a new SPA in the Greater Wash (the Greater Wash pSPA). The Race Bank offshore wind farm sits partially within the boundary of the pSPA, however and the offshore export cables pass through the proposed site. This site is being put forward to protect overwintering internationally important assemblages of wildfowl, red throated diver, common scoter and little gull. The site will also include foraging grounds for breeding sandwich tern and common tern (Natural England & JNCC, 2016). The Departmental Brief for the proposed site includes data on the foraging ranges of the two tern species from key breeding colonies at Scott Head and Blakeley Point. The export cable route for the Race Bank offshore wind farm lies primarily outside of these known foraging areas (Natural England & JNCC, 2016).

3.4.7 Offshore Human Environment

Shipping and Navigation

The Race Bank array area is located within an area of low density vessel traffic, located away from the main shipping lanes of the southern North Sea (Centrica, 2009)(Figure 3.4.7). Within the ES, four main shipping routes for commercial vessel traffic were identified in proximity of the wind farm site, all of these shipping lanes passed at a safe distance from the array area. Recreational and fishing vessel use of the area was similarly found to be very low in these characterisation studies. Fishing activity primarily occurred further inshore of the Race Bank array area or in other areas within the Greater Wash (Centrica, 2009).

For the export cable route, the maritime traffic survey undertaken in 2006 showed that on average six vessels per day transited the deep water channel to or from ports in The Wash. The volume of traffic varied depending on whether there was a spring or neap tidal cycle with an increase in vessel movements during the spring cycle with arrivals and departures occurring 1.5 to 2 hours either side of high water (Centrica, 2009). At the time of writing the ES the Harbour Masters of The Wash Ports expressed a preference for export cable installation work to take place during the neap tidal cycle. Vessel traffic levels are thought to have remained relatively stable in the Greater Wash area since the survey work undertaken for the Race Bank ES. During operation there will be slightly higher numbers of vessels using routes transiting to and from the array area.

The shipping and navigation study within the ES was based on a combination of a shipping movement database, site specific radar and Automatic Identification System (AIS), and consultation.

There are two main shipping routes near Race Bank which had 19 - 20 vessels each day (Centrica 2009). One is to the north, leading from the Humber and passing between Triton Knoll and Race Bank, and one is to the south, passing along the Race Bank channel. A few tracks were also observed to the west of

Race Bank, but this is not a recognised navigation route. The Project site was deemed to be a sufficient distance from each of these to avoid significant effects on ships' radar.

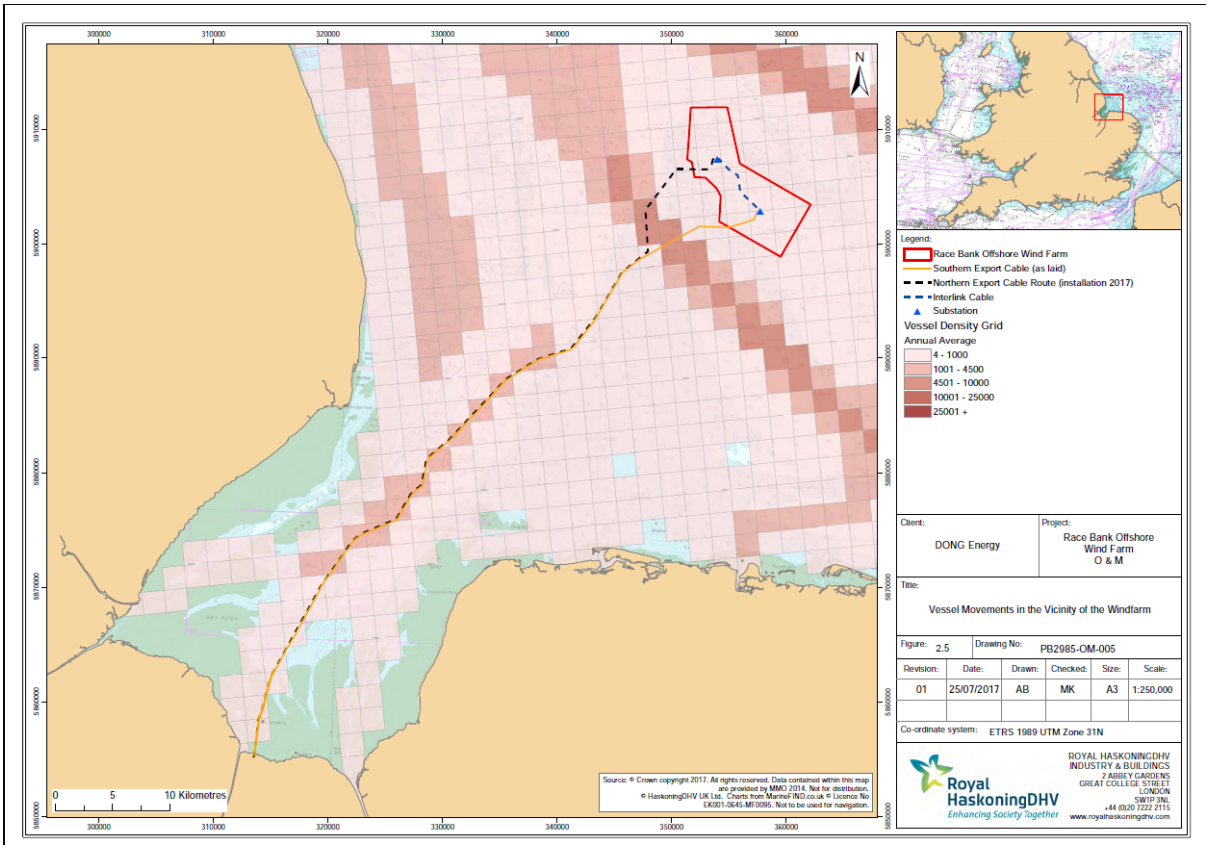
A navigational risk assessment was undertaken and no risks were found to be unacceptable.

In November 2015, Anatec reviewed AIS only data from two separate 14 day periods from 15 – 29 January 2015 (winter) and 04 – 17 August 2015 (summer). The most frequently recorded vessel types within 5nm of the Project site boundary throughout all surveys were cargo vessels, tankers and passenger vessels. The relative proportion of each of these vessel types was 72.3%, 13.3% and 9.0% respectively.

An average of 40 unique vessels per day was recorded throughout the 2015 winter survey period. An average of 36 unique vessels per day was recorded throughout the summer survey period, comparable to the NRA survey data. The busiest day throughout the 2015 survey data was the 17th January 2015, when a total of 49 unique vessels was recorded (Anatec 2015).

Overall Anatec 2015 concludes that the volume of vessel traffic recorded within 5nm of the Project site boundary has not altered significantly between survey periods (2003-2015).

Figure 3.4.7: Ship Tracks Relative to Race Bank Site



Commercial Fisheries

Fishing activity in the Project site consists of a limited number of local potters and minimal levels of long-lining in the general area. A small area of lesser brown shrimp fishing ground is also located within the proposed cable corridor. The route of the export cable dissects a natural cockle bed in The Wash which is open for fishing for a limited period each year.

Marine Archaeology and Cultural Heritage

The archaeology of the Project site and export cable route includes both wrecks and buried landscapes. Both desk study and analysis of geophysical data have been used to identify potential areas of archaeological importance and a number of sites within the wind farm array site and its export cable route have been recommended for exclusion zones during construction so that vessels and equipment avoid areas of potential archaeological interest.

On the basis of the archaeological and geophysical assessments conducted to date, a total of 50 wrecks and geophysical anomalies are considered to be of sufficient interest to be subject to Archaeological Exclusion Zones (AEZs). Eleven AEZs are proposed for the array site, and 47 AEZs for the export cable route corridor.

Existing Infrastructure

Along the export cable route, there is existing infrastructure that will need to be taken into account during decommissioning. These are as follows:

- Onshore Cable Crossing and Proximity: Lincs Offshore Windfarm export cable (TC Lincs OFTO Limited); and
- Offshore Cable Proximity: Lincs Offshore Windfarm export cable (TC Lincs OFTO Limited).

The nearest pipeline to Project site is the southernmost gas pipeline which leads into Theddlethorpe Gas Terminal on the Lincolnshire coast. This is 2.3km to the north of the Project site, and is operated by ConocoPhillips.

There is a further gas pipeline to the east of the development which leads into the Bacton Interconnector Terminal on the north Norfolk coast. This is 35km to the east-south-east of the proposed wind farm site.

4 Decommissioning Techniques

As part of the windfarm construction the OFTO assets are also constructed in a way that it is possible to decommission them at the end of its operational life (approximately 25 years[3]), in order to fulfil regulatory requirements at construction consenting stage.

The following decommissioning measures are based on today's known techniques and have been proposed with regard to:

- The Best Practicable Environmental Option (BPEO);
- OSPAR guidance documents on offshore wind farms;

[3] Note Ofgem OFTO regime requires OFTOs to be prepared to decommission the transmission asset after 20 years.

- IMO 'Guidelines and Standards for the Removal of Offshore Installations and Structures on the Continental Shelf and in the Exclusive Economic Zone';
- Government guidance notes for decommissioning offshore oil and gas installations in compliance with OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic Decision 98/3;
- UNCLOS and OSPAR obligations;
- Safety of surface and subsurface navigation;
- Other users of the sea, and
- Health and safety considerations.

Components left in situ following decommissioning will be aligned with standards set out by the IMO that specify that, an installation or structure need not be entirely removed if:

- it would not involve extreme cost;
- it is not technically feasible (however, the design and construction should be such that entire removal would be feasible);
- it would involve an unacceptable risk to personnel; and
- it would involve an unacceptable risk to the environment.

In addition, DTPRB will also apply the following principles:

Table 4.1: Guiding Principles

Guiding Principles	Comments
Minimise environmental impact	In considering decommissioning measures, the Best Practicable Environmental Option ("**BPEO**") will be chosen in order to minimise impact on the environment at an acceptable cost.
Safety at all times for all	The highest levels of health and safety will be followed throughout the project lifecycle. Safe practices will be followed in implementing decommissioning solutions.
Maximise reuse of materials	DTPRB will aim to maximise the reuse of waste material from the decommissioning phase and will pay full regard to the 'waste hierarchy', see Table 4.2.
Consideration of the rights and needs of legitimate users of the sea	The rights and needs of other users are respected by DTPRB. Decommissioning activities will seek to minimise the impact on stakeholders and emphasis will be placed on clear and open communication.
Follow Polluter Pays Principle	DTPRB decommissioning and waste management provisions acknowledge our responsibility to incur the costs associated with our impact on the environment.

5 Description of Items to be Decommissioned

The items covered in this section for decommissioning by DTPRB are:

- Two Offshore Platform Substations ("**OSP**") (including jacket and ALL components on the platform);

- Two Offshore export cables; and
- Interlink cables.

Scour Protection and Rock Berms

It is understood that scour protection is identified installed on the northern OSPs foundations. Leaving scour protection on the seabed is associated with certain positive effects (leaving the exposed rock habitat and benthic community that will have likely colonised it in place, and avoiding the increased vessel disturbance/damage and sediment effects associated with removing the material). However, leaving scour protection in place is also associated with certain adverse effects (the enduring loss of the original biotopes and potential scouring of surrounding natural seabed sediments). On balance, avoiding impacts arising from removal and the positive impacts of colonisation outweigh the negligible to minor adverse impacts of continued seabed loss and potential scour. A similar rationale applies in relation to cable and pipeline crossings where the exposed cable was covered by rock armour, and also where removal is undesirable owing to the risk of damaging the other cable or pipeline.

5.1 Offshore Substation

The project has an installed capacity of 580MW. The offshore element of the project consists of two 33/220kV OSPs. The purpose of the OSPs is to transform the voltages of the electricity generated by the turbines from 33kV up to 220kV for transmission of generated power to the onshore transmission grid system.

The offshore substations each consist of one jacket foundation with two driven piles in each corner with the addition of a mud mat (Z01 substation) and one driven pile in each corner with the addition of a mudmat (Z02 substation) on which a topside rests.

The dimensions of the Race Bank OSPs are as follows:

- topside weight: approximately 2700 tonnes;
- foundation and support structure weight (excl. piles):
  - Substation Z01- 1600 tonnes; and
  - Substation Z02- 1200 tonnes.
- area of topside: 38.25m by 23.9m

Located on the platform is:

- two main transformers including coolers;
- reactor;
- 12 x medium voltage ("**MV**") switchgears;
- three 220kV Gas Insulated Switchgear ("**GIS**");
- two auxiliary transformers and two earthing resistors;
- control and communication room ("**SCADA**");
- diesel power room;
- LV & utility room;
- public room Accommodation (emergency)Laydown areas;
- cable deck; and
- crane 3.5 tonnes.

Figure 5.1: Race Bank Topside

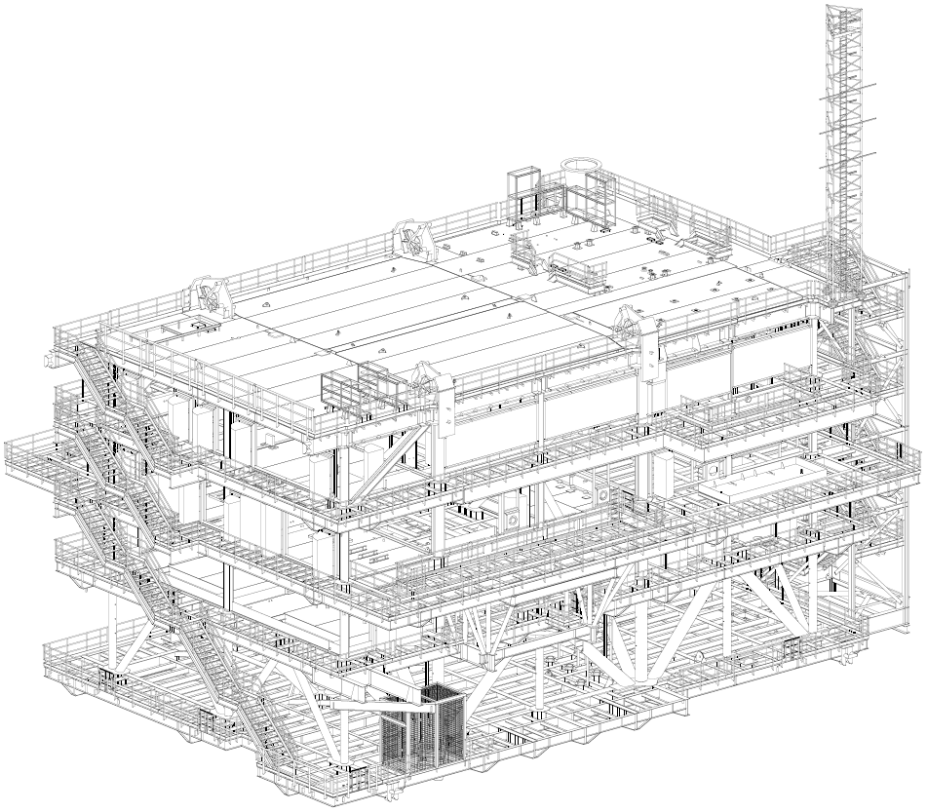
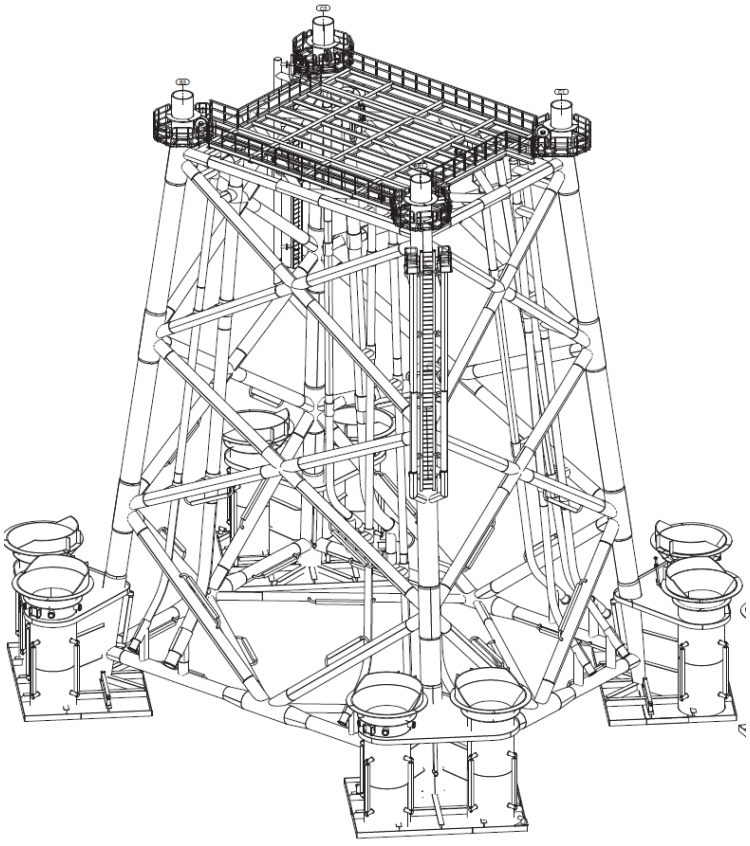


Figure 5.2: Race Bank Jacket and Foundation



5.2 Offshore Export Cable

The total length of the each offshore export cable is 71km from the OSP to landfall and a 6.3km long interlink cable between the two OSPs. The subsea cable is required to connect the wind farm to the onshore electricity transmission system. As part of their design the cable will also have an internal fibre optic for data transfer and control purposes.

The subsea export cable is buried to a nominal depth of 0.6m to 3.00m.

Removing the cables from the seabed is expected to have a far greater negative environmental impact than leaving them in the seabed as referred to in Section 4. In order to minimise any such negative impacts as far as possible, the array and export cable ends will be cut off prior to foundation removal and the remaining lengths buried, and thus allowed to stay in situ.

The proposal to leave the buried parts of the cables in situ is in line with the decommissioning principles and current industry standards. Whilst it is considered that cables that have remained buried for the life of the wind farm prior to decommissioning will be at low risk of subsequent exposure, contingency plans will be put in place to ensure that appropriate actions are carried out in the event that any cables do become exposed.

The cables are designed for a long service life in marine conditions and will degrade very slowly with no material impact on the surrounding environment. Since any exposed sections of cable will be removed during decommissioning, as will any sections which are deemed likely to become exposed, the cable sections left in situ are considered to be stable and unlikely to become exposed or subject to movement. This will be verified by post-decommissioning surveys and seabed mobility prognosis for the 50 year period beyond decommissioning.

Any changes in the available approaches to decommissioning, the appropriate set of principles, or knowledge concerning the application of these principles will be applied when the decommissioning programme is updated. Such an update will be undertaken in the event of a major change in input data and, in any event, in line with the required permitting processes.

6 Description of Proposed Decommissioning Measures

This section gives an overview of legislation and guidance relevant to decommissioning activities and further outlines in more detail how decommissioning of individual parts of the development will be carried out i.e. the OSPs and the export cables.

At the time of writing this document, the decommissioning phase is not expected to commence before a timeframe of at least 20-25 years. Therefore, it is not possible to describe the precise technology and methods of decommissioning works. These will develop over the operational lifetime of the wind farm, and should therefore be reviewed and a detailed decommissioning works schedule finalised before the decommissioning phase starts. DTPRB will also review the plan upon request by BEIS.

However as mentioned in Section 4, certain principles are projected to be followed:

- health and safety considerations;
- Best Practicable Environmental Option ("**BPEO**");
- safety of surface and subsurface navigation; and
- other uses of the sea.

6.1 Adherence to relevant legislation and guidance

The decommissioning measures are based on known techniques of today and have been proposed taking into consideration the following key UK and international legislation and guidance notes:

- Decommissioning of Offshore Renewable Energy Installations under the Energy Act 2004: Guidance notes for Industry, DECC, January 2011;
- Guidelines and Standards for the Removal of Offshore Installations and Structures on the Continental Shelf and in the Exclusive Economic Zone, International Maritime Organisation (IMO), 19th October 1989;
- Guidance Notes for Industry: Decommissioning of Offshore Installations and Pipelines under the Petroleum Act 1998, DECC;
- OSPAR guidance documents on offshore wind farms;
- Guidelines for Environmental Risk Assessment and Management, Defra, September 2002; and
- United Nations Convention on the Law of the Sea (UNCLOS), 1982.

Other relevant legislation includes:

- Hazardous Waste Regulations 2005;
- Marine and Coastal Access Act 2009;
- The Water Resources Act 1991;
- The Conservation of Habitats and Species Regulations 2010;
- The disposal or recovery of waste on land, principally under Part II of the Environmental Protection Act 1990, other legislation relating to the carriage and transfer of waste and, where appropriate, the Hazardous Waste Regulations 2005; and relevant health and safety legislation;
- London Convention 1972 and the 1996 Protocol, relating to the prevention of marine pollution by dumping of wastes;
- Construction (Design and Management) Regulations (CDM) 2015; and
- Appropriate H&S Regulations.

6.2 Phasing and Co-ordination of Decommissioning

The phasing and detailed programme for decommissioning will be defined and submitted to BEIS in advance of decommissioning.

6.3 Plan of Works and Integration

A detailed final decommissioning plan will be prepared two years ahead of the proposed decommissioning date and will incorporate the results of a detailed recent EIA, thus allowing sufficient time to implement any measures arising into the final decommissioning plan. The process supporting the EIA will include pre-decommissioning surveys. The plan of work will include detailed method statement together with project specific hazard and risk assessments. DTPRB will also liaise with other developers in the East region to ensure potential synergies for decommissioning facilities are investigated.

6.4 Decommissioning of Offshore Substation

It is planned that the structure for the offshore substation will be removed in its entirety including the foundations. There however are some structures that may be left under the seabed i.e. cables and foundation bottom pieces whereby removal may result in greater impact on the environment than leaving them in place.

The items to be decommissioned are:

- all of the topside equipment and transformers;

  (As the transformers and reactor are oil filled they and the various other components including generators and fuel storage, will be transported to an onshore facility for dismantling with constituent parts processed for reuse, recycling and disposal. This will be performed in conjunction with the generator)

- the topside's support structure;
- the jacket structure, including all appurtenances such as J-Tubes and boat access system;
- the piles will be cut at such a depth below the surface of the seabed that the remaining parts do not pose a danger for shipping or fishing vessels, even if sediment should become relocated. Following the cutting operation the foundations and the jacket structure may be removed as a single structure after the removal of the topside; and
- the interlink cable and turbine interconnecting cables adjacent to the substructure will be cut at a point below the surface of the seabed to allow the cable to remain buried (cut sections will be removed with minimal disruption to the seabed).

It is expected that the offshore substations will be decommissioned in two main stages, comprising the complete removal firstly of the topside, followed by removal also of the jacket foundation.

Prior to removal of the topside, a number of preparatory activities will be conducted including:

- de-energise and isolate required electrical control and power cables from National Grid and SCADA system;
- it is proposed that the oil filled transformers and reactor are braced for sea transportation, transformer oil levels can be reduced in components like the conservator tank and cooler fins to deal with a liquid load;
- dismantle terminations for export and array cables; removal of all cables back to cable deck, or seabed;
- removal of all unsecured loose items from the topside;
- containment and/or removal of potentially hazardous/polluting fluids, a special agreement will be made with the Gas Insulated Switchgear ("**GIS**") supplier to ensure the safe removal of the SF_6 Gas; and
- cutting welded stab-in connections between topside and foundation.

A Heavy Lift Barge Vessel ("**HLV**") will be used to dismantle the topside and transport the structure ashore for further dismantling.

The process of decommissioning of the OSP is likely to involve the following second stage sequence:

- a HLV lifts the topside module onto an adjacent barge;
- topside is transported back to port where the topside is transferred to the quayside;
- topside will be processed for recycling and or disposal as appropriate; and
- jacket piles will be cut off at a target of 1m – 2m below seabed, the method used could be either water cutting or remote thermal cutting.

Complete removal of the pile below the seabed is considered neither practical nor environmentally desirable. The appropriate depth for removal would depend upon the sea-bed conditions and site characteristics at the time of decommissioning. This is in line with the IMO standards as complete removal of the foundations would involve an unacceptable risk to the marine environment and is likely to involve extreme cost. If an obstruction exists above the sea bed or an obstruction appears following decommissioning which is attributable to the wind farm, this obstruction will be marked by the owner so as not to present a hazard to other sea users. The marking will remain in place until such time as the obstruction is removed or is no longer considered to be a hazard to other sea users. The monitoring of this obstruction will be built into the decommissioning monitoring and maintenance programme.

The general target for cutting of the jacket piles will be one metre below the seabed, though this is likely to be varied due to individual localised factors such as ground condition etc. at each site. When assessing the possibility of cutting below the seabed, it is important to consider the need to overcome frictional forces acting on the pile. Considerable excavation will have to take place, approximately two meters diameter for every meter in depth below the seabed.

Once cut the jacket will then be lifted onto a barge and transported back to port for recycling or sold off as scrap metal.

Items contained within the topside will be processed for recycling accordingly or disposed as appropriate.

All hazardous waste will be handled accordingly and disposed of in accordance with its classification.

6.5 Decommissioning of Export Cables and interlink cable

A decision whether or not to remove the cables will be taken closer to the end of the project's lifetime and will be subject to consultation as part of an application for consent to cover decommissioning activities. If cables are left in-situ, the ends will be weighted down and buried at the current depth to ensure that no navigational risk arises in the sense that fishing gear or anchor would interface with the as left cables. Also, only export cables and interlink cables which are buried to a depth considered to be safe will be left in situ. Exposed cables will be removed or buried to a secure depth.

Where a cable is removed on request, the sequence for removal is anticipated to be:

- Identify the location of the export cables that need to be removed;
- Seabed material may need to be removed to locate the cable, likely to be carried out using a water jetting tool similar to that used during cable installation e.g. mass flow excavator. Buried cables will be located using a grapnel to lift them from the seabed. Alternatively, or in addition, it may be necessary to use an Remote operated Vehicle ("**ROV**") to cut and/or attach a lifting attachment to the cable so that it can be recovered to the vessel;
- The recovery vessel will either 'peel out' the cable as it moves backwards along the cable route whilst picking it up on the winch or cable engines, or, if the seabed is very stiff/hard it may first under-run the cable with a suspended sheave block to lift the cable from the seabed. The use of a suspended sheave block could be carried out before by a separate vessel such as a tug prior to the recovery vessel 'peeling out' the cable;

- The recovery vessel will either spool the recovered cable into a carousel or chop it into lengths as it is brought on-board before transport to shore; and
- Parts will be processed for reuse, recycle or disposal.

6.6 Summary of Proposed Decommissioning Measures

A summary of the proposed decommissioning measures for the offshore components of the DTPRB are outlined in Table 6.1 and 6.2.

Table 6.1: Summary of Proposed Decommissioning Measures for DTPRB

Component		Proposed decommissioning measures
Offshore substation	Topside	Complete removal
	Jacket	Cut off (target 1-2 m) below seabed level and removed
Offshore export cable		Cut off at the base of the platform, the remaining cable will be weighted down and left in situ.
Offshore interlink cable		Cut off at the base of the platform, the remaining cable will be weighted down and left in situ.

Table 6.2: Decommissioning Plan Technical and Environmental Summary

Activity	Description	Approach
Dis-connection	Transmission assets disconnected from NGET and wind turbine generators, isolated and earthed.	Undertaken in accordance with the safety rules in place at the time.
Topside structure housing the offshore substation ("OSP")	Houses transmission assets including oil-filled transformers, reactor, gas-insulated switchgear, diesel generators and termination of the OFTO export cables and wind farm array cables. Total lift weight of each substation topside is approximately 2,700 tonnes.	Oil filled transformers and reactor is braced for sea transportation, transformer oil levels reduced in the conservator tank and cooler fins to deal with a liquid load. Cables will be removed or cut at the hang-off. Any loose items will be removed. The topside is then cut from the jacket and removed in one piece. Parts will be processed for reuse, recycling and disposal.
OSP platform structures and piles	Jacket structure and supporting foundations and piles.	Critical joints and members of the structure will be inspected. Foundations will be inspected using ROV.

Activity	Description	Approach
		Jacket piles will be cut off at a target of 1-2 metre below seabed. Following the cutting operation the foundations and the jacket structure will be removed as a single structure after the removal of the topside.
Inter array cables	Inter array cables are owned by Orsted and connect the wind turbine generators to equipment on the OSP.	In conjunction with the Developer inter array cables will be cut or dismantled at the hang-off to enable removal of the platform.
Offshore export cables	OSP is connected to land by a 71 km subsea export cable buried to a target depth of between 0.6 to 7.5 metres. The subsea export cable consists of two XLPE insulated; three core 950mm^2 (1600mm^2 at landfall) aluminium conductor cables.	As per the current industry standard to minimise environmental disturbance to the seabed, only offshore cables that are exposed at the time of decommissioning will be removed. Cable requiring removal will be cut as close to the platform foundation, or sea bed, as is possible, with the ends weighted down and buried to a secure depth below seabed level. Recovered cable will be stripped and recycled. Contingency plans will be put in place to ensure appropriate actions are in place if the cables become exposed post decommissioning.
Offshore interlink cable	OSPs are connected to each other by a 6.4 km subsea interlink cable buried to a target depth of 1 metre. The interlink cable consists of one XLPE insulated; three core 950 mm^2 aluminium conductor cable.	As per the current industry standard to minimise environmental disturbance to the seabed, only offshore cables that are exposed at the time of decommissioning will be removed. Cable requiring removal will be cut as close to the platform foundation, or sea bed, as is possible, with the ends weighted down and buried to a secure depth below seabed level. Recovered cable will be stripped and recycled. Contingency plans will be put in place to ensure

Activity	Description	Approach
		appropriate actions are in place if the cables become exposed post decommissioning.
Onshore cables	The onshore cables run for approximately 12 km from the transition joint bay, via ducts through local land, under roads and via further joint bays to the onshore substation located at Walpole. The onshore cable consists of three 1400 mm^2 aluminium conductors; single core XLPE insulated cables.	Onshore cables will where reasonably practicable be drawn and recovered where in ducts. The cable ducts will be sealed and manholes and draw pits back filled, ground will be reinstated to an acceptable appearance.
Onshore substation	The onshore substation is on freehold land.	Components varying technical life expectancies (usually >=40 years). Decommissioning will be reviewed with Ofgem and NGET in the light of any existing or proposed use of the substation. If decommissioning is required, transformers, switchgear and reactors will be removed and sold / recycled where appropriate. Following removal of equipment and any above ground structures, all pavements, slabs and piles will be demolished to 1 metre below ground level and the area refinished to its original condition.

6.7 Proposed Waste Management Solutions

DTPRB is committed to maximising the reuse of waste materials and pays full regard to the 'waste hierarchy' which suggest that reuse should be considered first, followed by recycling, incineration with energy recovery and lastly, disposal. In any event waste management will be carried out in accordance with all relevant legislation and it would be intended that any disposal takes place on land.

A waste management plan will be drawn up prior to the commencement of decommissioning to ensure that adequate time remains for the proper provisions to be made.

At the time of decommissioning, where assets have remaining technical asset life and a second hand market exists DTPRB will look to sell assets. If this is not possible then DTPRB will recycle or disposal.

An overview of expected types of wastes and their expected re-use, recycling or disposal is given in Table 6.3. In any event, waste management will be carried out in accordance with all relevant legislation at the time of decommissioning and it is intended that any disposal will take place on land.

Table 6.3: Re-use, Recycle and Disposal Options

Asset	Waste Type	Re-Use	Recycle	Disposal
Jacket and foundations from OSPs	Steel from topside and Foundations		X	
Main power transformers	Steel, iron laminate, copper, transformer oil	X	X	
Gas insulated switchgear	Copper, electronics	X	X	
OSP power cables	Copper		X	
Diesel generators	Steel, copper, electronics	X	X	
Reactors	Steel, iron laminate, copper, reactor oil	X	X	
Auxiliary transformers	Steel, iron laminate, copper, transformer oil	X	X	
SCADA, protection panels	Steel, electronics		X	
Neutral earthing resistor	Steel, copper	X	X	
LV switchboard	Steel, electronics	X	X	
Subsea cables	Aluminium, steel		X	
Onshore cables	Aluminium, steel		X	
Other	Non-recyclable materials and fluids			X

6.8 Details of any item left in-situ offshore following decommissioning

As described in the previous sections, it is proposed to leave a major section of offshore cables, interlink cables and the embedded piles of the OSPs in the seabed. The basis of this decision is that the items in question meet at least one of the four situations in which (based on the IMO standards) non-removal or partial removal may be considered.

The four situations are where:

1. the installation or structure will serve a new use, whether for renewable energy generation or for another purpose, such as enhancement of a living resource (provided it would not be detrimental to other aims, such as conservation);
2. entire removal would involve an unacceptable risk to personnel;
3. entire removal would involve an unacceptable risk to the marine environment; and
4. entire removal would involve extreme costs.

The primary reason for leaving cables buried and embedded piles in the seabed is:

1. Decommissioning of the buried cables and embedded piles may require the involvement of divers in significant and dangerous operations e.g. in preparation work for cable/embedded pile removal, installation/recovery/snagging works of any under runners used during the cable removal etc.;
2. The complete recovery of all of the buried cable and pile structures would entail a major excavation of the seabed that would be hugely damaging to the environment in the area. An updated EIA will be produced at the decommissioning programme year 18 review to confirm this assumption based on the environmental conditions at the time; and
3. Cost to remove the full export cable is estimated to increase the current decommissioning forecast costs by between 110% and 150%. The cost of decommissioning cable that is adequately buried, more than doubles the forecast cost of decommissioning the offshore transmission assets, and as such will not present value for money for the UK consumer who would pay these costs through the offshore transmission tender revenue stream.

DTPRB will enter into discussions with BEIS and TCE regarding long term monitoring and residual liability of any infrastructure left in situ.

The methodology to determine the export cable seabed mobility and minimum depth of lowering of the cable, to ensure the cable is adequately protected is detailed in document '2925735 ROW01 – Export and Interlink Cables – Minimum depth of lowering dated 05 October 2017'. Table 4 within the aforementioned document was updated following the 2018 bathymetric survey and is detailed in document 'ROW01 Final As-Built Dataset dated 30 July 2018'.

In summary the Reference Seabed Level ("**RSBL**") is calculated for the lowest expected elevation of the seabed level over the lifetime of the project (2016-2046).

Based on the updated depths of lowering, the total length of cable which has not been buried deeper than the RSBL is (see document '190122 As-Installed Depths and RSBL') is:

- Circuit 1 – 2,052m
- Circuit 2 – 2,278m

This represents approximately 3% of the total installed route length of approximately 146km. The remaining cable, which has been buried deeper than the RSBL is forecast to remain buried for the lifetime of the assets and is therefore considered stable, however this will be monitored throughout the lifetime of the assets. At the time of decommissioning any cable that has remained adequately buried for a period in excess of 20 years will be expected to remain buried for the foreseeable future and will be evidenced by a final RSBL assessment prior to decommissioning.

Where the RSBL has not been achieved, some further remedial works are planned by RBWFL between 2019 and 2022. This is expected to consist of the installation of rock berms and applies to a total of 1,677m (1,092m of Circuit 1 and 585m of Circuit 2) of the sections identified as being buried shallower than the RSBL. If and when this work is completed the Decommissioning Programme will be updated to take account of the decommissioning liabilities regarding any rock berm installation.

6.9 Currently excluding any future work, the sections where the cable has not been installed deeper than the RSBL, will be reviewed by DTPRB (as part of the overall cable monitoring) at each update of the Decommissioning Programme. If exposures occur during the life of the project and are not forecast to be naturally reburied by bedform movement, then DTPRB will undertake remedial burial works. This additional lowering may result in an overall depth of lowering which ensures long-term stability of the cable and no future exposures. Conservatively, DTPRB has assumed that the sections of cable where the RSBL has not been achieved, minus the cable protection work planned by RBWFL, will require removal during decommissioning in line with Table 6.2.**Lighting and marking**

During the decommissioning of the Race Bank Offshore Wind Farm, appropriate aviation and nautical marking and illumination will be applied.

In accordance with the Race Bank consent under Section 36 of the Electricity Act 1989, DTPRB is committed to exhibiting the appropriate marks and lights during the decommissioning of the project.

In relation to aviation safety, the shape, colour and character of the lighting will be compliant with the Air Navigation Order 2005, or as otherwise directed by the Civil Aviation Authority or the relevant legislation at the time.

In relation to navigational safety, lights and marks will be agreed with Trinity House, in consultation with the Maritime and Coastguard Agency prior to decommissioning to specify any obstruction marking that may be required during the removal operations. In the event that any obstruction is left on site, which may be considered to present a hazard to navigation, the necessary and specified marking will be provided.

7 Environmental Impact Assessment

An EIA was completed by DONG Energy RB (UK) Ltd. for Race Bank wind farm in 2009, Table 7.1 summarizes the impacts from the decommissioning phase.

Table 7.1: Summary of Decommissioning Impact Assessment

Topic	Impact Description	Decommissioning Impact
Met Ocean	Short term impacts on current and wave patterns from decommissioning vessels.	Negligible
Morphology and coastal processes	During decommissioning, sediment would be disturbed. Most of the suspended sediment would be sand, which would be rapidly re-deposited on the seabed and would not cause a significant increase to the background sediment concentrations. There would be a small fraction of gravel in the sediment but this would not be mobilised. Any chalk bedrock that would be disturbed is expected to be minor in	Negligible

Topic	Impact Description	Decommissioning Impact
	comparison to background levels, so the overall effects would be insignificant.	
Bottom fauna	The EIA identifies a number of potential impacts of minor significance on benthic (and epibenthic) communities during construction of the wind farm. These include disturbance to benthic communities and small increases in sediment suspension and deposition within the wind farm site and export cable route. Minor to moderate impacts associated with construction of the wind farm are predicted on noise-sensitive species (e.g. herring), with impacts ranging from physiological to behavioural (avoidance) effects. Effects from decommissioning are expected to be similar to those from construction.	Minor to moderate.
Fish and Shellfish	The EIA identifies minor impacts on fish and shellfish communities for the potential impacts of habitat loss and temporary increases in suspended sediment levels and sediment deposition across the wind farm site and cable route. Minor to moderate impacts associated with construction of the wind farm are predicted on noise sensitive species (e.g. herring), with impacts ranging from physiological to behavioural (avoidance) effects. Effects from decommissioning are expected to be similar to those from construction.	Minor to moderate
Birds	The EIA identifies the potential impacts on birds as disturbance and displacement effects caused by the proposed wind farm and associated vessel traffic, indirect impacts on prey, particularly due to piling noise during construction and collision risk with the wind turbines. A range of ornithological impacts, many of which were minor or negligible and therefore not significant were predicted. Where moderate impacts were predicted they were assessed as tolerable and therefore not significant in all but one case. This was the indirect effect of piling noise on the prey species of Sandwich terns where the lack of knowledge about the specific effects of piling noise and knowledge gained from	Minor to moderate

Topic	Impact Description	Decommissioning Impact
	the construction of other projects has been inconclusive.	
Marine mammals	The most common marine mammals in and around the site and cable route are the common seal, grey seal and harbour porpoise. The EIA highlighted that physiological impacts associated with underwater noise generated by pile driving are potentially significant within 80m to 130m of the piling operation. However, with appropriate mitigation, residual impacts can be minimised to acceptable levels. Only one of the impacts considered was assessed as being of moderate significance. This is the potential for the displacement of marine mammals over large areas during piling. Modelling estimates displacement of up to 12km for harbour porpoise and 11.5km for seals in deep water, and displacement of between 7.5km and 8km in shallower waters to the west of Race Bank due to noise attenuation. The proposed Race Bank site has not been found to be used for breeding and it is considered that marine mammals can move into other suitable habitats in the Greater Wash and southern North Sea during piling activities. Assuming a rapid return to the area following cessation, as has been the case for other developments, impacts have been classed as minor to moderate. Effects from decommissioning are expected to be similar to or less than those from construction.	Minor to moderate
Shipping and navigation	The EIA finds that the Project will have no significant effect on ship routeing and radar. A Navigation Risk Assessment ("**NRA**") was undertaken as part of the EIA, which found that no hazards were identified as being unacceptable. The increase in risk associated with the wind farm to shipping activities was considered low compared to background levels. Further hazard assessments are recommended when the details of construction activities are known to ensure the risks associated with increased shipping traffic in the wind farm area remain low.	Minor

Topic	Impact Description	Decommissioning Impact
Commercial fishery	In order to comply with statutory safety policies, temporary safety zones will be required during decommissioning, the extent of which would be dependent upon the final decommissioning strategy adopted, and would be designed to ensure the safety of all vessels including those not directly associated with the development work. In view of the numbers of vessels that might be affected, the relatively short periods of any such displacement, and the scope for relocating to adjacent areas without risks of conflicting with other vessels, the expected residual loss of area impact is expected to be localised, of minor significance and confined to a small number of vessels. Provided all vessels comply with safety zones and standard safety policy, impacts on safety should be negligible. Interference with fishing vessels by construction vessels would be minimised by decommissioning vessels using existing shipping lanes and prescribed transit corridors. On-going liaison would also keep fishermen informed of proposed works.	Minor to negligible
Cultural heritage	To avoid any effect on potentially sensitive locations, 11 exclusion zones (during construction) have been recommended within the site and 47 within the cable corridor. Accordingly, there will be no effects. A Written Scheme of Investigation ("**WSI**") has been developed prior to construction which details procedures for contractors to follow during construction, operation and decommissioning if anything significant is found on site.	Negligible
Contamination	Given the sediment type at the wind farm site (medium- coarse sands and gravel or mixed cobble/pebble shell and gravel with relatively low silt content) and the absence of likely sources of contaminants within the wind farm site, the EIA anticipates that CEFAS action levels would not be exceeded anywhere in the proposed site. Along the cable route, levels of polycyclic aromatic hydrocarbon ("**PAH**") exceeded the CEFAS Action Levels at one site at	Negligible

Topic	Impact Description	Decommissioning Impact
	the southern end of the proposed cable corridor, close to the River Nene.	
Airborne noise	The EIA finds that the wind farm, considered either on its own or in combination with any other offshore wind farm consented or in planning, should not cause any loss of amenity onshore and therefore the impact is predicted to be not significant.	Negligible
Underwater noise	Refer to 'Marine mammals' above.	Minor to moderate
Seascape and visual	The EIA identifies that the effects arising from the proposed development would be reversible and, after decommissioning, would leave no net residual effect upon either the seascape resource or the visual environment.	Negligible

Consistent with the commitment to undertake reviews of the decommissioning provisions contained within this document, DTPRB will review and update the existing EIA throughout the lifetime of the project. A final review will be undertaken towards the end of the operation period when final details of the decommissioning measures are known in order to address the impacts at the time. At this point a decision will be made as to whether a more detailed assessment is required. Key criteria that will inform the decision will include:

- An updated review, identification and assessment of potential impacts on both the physical, biological and human environment. Planned surveys in and around the transmission assets which could inform this process could include:
  - geophysical surveys (side scan sonar ("**SSS**") and Multi-beam Echo Sounder ("**MBES**");
  - geotechnical surveys;
  - benthic grab/camera surveys;
  - ornithological surveys; and
  - marine mammal monitoring.
- An updated review, identification and assessment of activities of other legitimate users of the sea with the potential to be affected by decommissioning. This is because the nature and/or intensity of human activities taking place on/around the transmission assets, such as navigation in and out of the The Wash, could have changed over the lifetime of the project.
- An updated review, identification and assessment of the potential impacts of decommissioning on the local community, e.g. potential socio-economic impacts.
- An updated review, identification and assessment of potential impacts on historic environment interests, in particular marine archaeological features.

If upon these additional reviews it is concluded that gaps exist in any of the topics above, a specific EIA covering the decommissioning process will be prepared in consultation with the relevant authorities. The EIA will list measures to avoid or otherwise reduce or remedy adverse impacts where possible.

8 Consultation with Key Stakeholders and General Public

DTPRB regards open and effective communication and consultation as an essential element of owning and operating the asset. Carrying on with the good work and relationships established by RBWFL during the development and construction phase, we will ensure that this is applied during the operational life of the asset through to decommissioning.

DTPRB proposes to seek the advice and opinions on the draft decommissioning plan form a range of stakeholders including but not limited to:

- BEIS;
- Historic England;
- Environment Agency;
- Marine Management Organisation;
- Centre for Environment, Fisheries and Aquaculture Science;
- Maritime and Coastguard Agency;
- Natural England;
- Eastern Inshore Fisheries and Conservation Authority;
- Port of Boston;
- King's Lynn Conservancy Board;
- Nene Ports Authority;
- National Federation of Fishermen's Organisations;
- British Marine Aggregate Producers Association;
- Trinity House Lighthouse Service;
- Royal Yachting Association; and
- Chamber of Shipping.

DTPRB will apply for a separate decommissioning marine licence from the MMO at the time of decommissioning.

In accordance with the relevant clauses under Section 36 of the Electricity Act 1989 and relevant conditions of the Marine Licence, DTPRB will issue timely and efficient Notice to Mariners and other navigational warnings of the position and nature of the decommissioning activities that will be taking place. Efforts will be made to ensure that this information reaches mariners of the shipping and fishing industry as well as recreational mariners. The UK Hydrographic Office will be notified as appropriate on the progress and completion of works.

9 Costs and Financial Security

Cost and financial security information is confidential and therefore not included in Decommissioning Programme. Cost and financial security information is provided separately to BEIS.

10 Proposed Decommissioning Schedule

It is proposed that decommissioning commences between year 20-25, coinciding with the end of life of the asset based on its design life and the mid-life of The Crown Estate lease.

As no offshore windfarm has been decommissioned to date worldwide, it is difficult to anticipate the operational challenges, costs and precise timings of works. Once other farms start to be decommissioned, it will provide valuable information to DTPRB on timings, costs and operational challenges to be faced. Currently we anticipate Race Bank offshore wind farm will be decommissioned between 2039 and 2043, and will take 24 months to complete.

In line with project management guidelines and DTPRB experience, we acknowledge that the most important step in the decommissioning process is advanced planning and having an option of decommissioning methods. Applying the principles mentioned in earlier parts of this document, DTPRB will carry out regular reviews throughout the project lifecycle.

DTPRB intends to undertake internal reviews of the Decommissioning Programme throughout the life of the project with an internal review of the Decommissioning Programme before the commencement of the formal review in year 9 to ensure the decommissioning programme and financial security estimates are up to date. Formal review exercises will be undertaken with BEIS at the following times:

- 9 years following commencement of OFTO transmission licence;
- 15 years following commencement of transmission licence; and
- 18 years following commencement of the transmission licence.

During the formal reviews DTPRB will undertake a review of any items proposed to be left in-situ following decommissioning.

In addition a formal review will be undertaken following any major work or when a material change has occurred with the relevant authorities notified. It is noted that RBWFL propose to undertake further work in 2019-2022 which may involve the installation of rock berms at several locations. If this work is completed the Decommissioning Programme will be updated to reflect the installation and decommissioning requirements of any rock berms installed. The updated decommissioning programme will be issued to the BEIS decommissioning team.

The final review will provide an opportunity to scrutinise the detail of the decommissioning provisions in consultation with BEIS and key stakeholders (including the MMO), ensuring the impacts of the decommissioning works have been adequately assessed and the schedule of works and the costs associated are fully understood and agreed. This final review will include the latest bathymetric survey data to confirm the cable burial depths against the RSBL to demonstrate that any cable intended to be left in-situ is adequately buried. At this stage consideration will also be given as to whether a revised EIA and Appropriate Assessment are deemed necessary.

11 Project Management and Verification

The final Decommissioning Plan will provide information on how DTPRB will manage the implementation of the decommissioning works and also provide assurance to the BEIS concerning progress and compliance. The final review of this document and the proposed schedule of decommissioning works will be undertaken towards the end of the operational lifetime (depending on repowering taking place or not). This review will produce a Decommissioning Plan of Works, including current knowledge of decommissioning methods, measures and timing. The Decommissioning Plan will be made available to the public for comment.

The project management of the decommissioning works will be undertaken with the right level of rigor expected of such a project. DTPRB envisages a single main contractor for the decommissioning work and will also appoint an experienced and highly qualified project management team to ensure the decommissioning work proceeds on schedule and in accordance with the requirements of the Decommissioning Programme.

A Decommissioning Report will be issued for the approval from the appropriate regulatory authorities after the decommissioning phase is finished, in compliance with the BEIS Guidance, summarising how the Programme has been carried out.

As a minimum, this report will include:

- confirmation that the approved decommissioning programme has been adhered to during the decommissioning works; otherwise, an explanation of any major variances from the programme; this includes information of actual costs of the works and an explanation of any major variances from the forecast costs;
- information on the outcome of the decommissioning phase, including sea bed clearance;
- confirmation that relevant authorities have been notified, in case any elements of the development remain protruding from the seabed, of existence of such remains; and
- information of any appropriate aids to navigation have been installed, where required, to overcome risks posed by such remains.

Upon completion, not more than four months after the decommissioning works, the report will be provided to BEIS.

12 Sea-bed Clearance

In accordance with the Polluter Pays Principle ("**PPP**"), DTPRB proposes to clear the seabed in accordance with the provisions made in this decommissioning programme and to collect and provide evidence of this.

Following the completion of decommissioning works, surveys will be carried out to show that the site has been cleared. These surveys will enable identification and subsequent recovery of any debris located on the sea-bed which may have arisen from activities related to the project and which may pose a risk to navigation, other users of the sea or the marine environment. It is currently intended that side scan sonar will be used to identify debris, with an ROV deployed to investigate and recover any potential identified.

The area to be covered will be determined prior to decommissioning but DTPRB is aware of the guidance for oil and gas installations which specifies a 500m radius around any installation.

References will be made to 'Archaeological No Build Areas' in order that these are not inadvertently cleared in the process of removing any debris. Analysis of the survey data will also ensure that items for removal and disposal relate only to the project. The appropriate competent authority will be approached regarding the identification of other anomalies that may be of archaeological interest.

It is important that this process of collecting and presenting evidence that the site is cleared is independent. DTPRB proposes that an independent survey company will be commissioned by DTPRB to complete the surveys and that they report in parallel to both DTPRB and BEIS for review and comment.

13 Restoration of the Site

Following the successful completion of the decommissioning works, the DTPRB site will be restored, as far as reasonably practicable, to the condition it was in pre-construction. This will apply to the area of the platform installation and the export cable corridor.

The key restoration works will include the following:

- securing and adequately covering all cut foundations; and
- ensuring that cable ends are adequately buried.

Active restoration relying on intervention with equipment is not proposed as it is considered that such works present unnecessary and unacceptable risk to personnel. For the export and interlink cables, it should be noted that the currently envisaged option is to leave the cable buried in the seabed. Allowing the seabed to 'self-settle' is considered sufficient and in proportion to the limited environmental impact of the proposed decommissioning. Should post decommissioning surveys indicate that previously buried cables have become exposed such that they pose a navigational risk, the exposed parts of the cable would be cut away and removed from the seabed.

14 Post-decommissioning Monitoring, Maintenance and Management of the Site

DTPRB proposes to use an independent contractor to carry out surveys post decommissioning. The scope will include identification and mitigation of any unexpected risks to navigation and other users of the sea caused by materials left on the seabed.

DTPRB propose to undertake magnetometer and geophysical surveys at the completion of decommissioning, and subsequently, primarily due to the Port Authorities Cable Zone Agreement, we will undertake geophysical surveys periodically until such time that we expect the surveys from the 20 year operational and post operational period to provide sufficient evidence to the Port Authorities that further geophysical surveys will not be required. The area covered by the magnetometer and geophysical surveys will be determined prior to decommissioning, but we are aware of oil and gas installation guidance which specifies a 500 metres radius around any installation.

Should these surveys identify any residual elements from the project protruding above the sea bed, DTPRB will ensure that notification is given to the UK Hydrographic Office so that suitable notation of a potential anchoring hazard can be marked on relevant charts and mariners informed accordingly. Appropriate measures will then be taken to remove or re-bury in order to avoid posing a risk to mariners potentially using the area. The removal or reburial technique and machinery will be decided depending on the type, size and location of the elements, but will more likely mirror that used for the initial decommissioning works.

15 Supporting Studies

Any supporting studies or investigations which are undertaken in support of future decommissioning plans will be included as annexes to the Decommissioning Plan.

The following documents inform and support the decommissioning provisions contained in this document:

- Race Bank Offshore Wind Farm Decommissioning Plan;
- Decommissioning of offshore renewable installations under the Energy Act 2004: Guidance notes for the industry, DECC, January 2011(revised);

- Marine and Coastal Access Act 2009;
- Marine Licence (Ref: L/2012/00217 as amended);
- Section 36 Licence (granted 6 July 2012, amended 25 March 2015);
- Race Bank Offshore Wind Farm Environmental Statement (Centrica 2009);
- Information for Race Bank Offshore Wind Farm Shadow Appropriate Assessment (ABPmer, August 2011);
- Race Bank Offshore Wind Farm Appropriate Assessment (DECC, 2011, December 2011, updated June 2012); and
- Supplementary Environmental Report (application to amend intertidal consents) (Centrica, December 2012).

APPENDIX 1 – SUMMARY OF CONSULTATION AND RESPONSES

Organisation	Date of Response	Summary of Issues Raised	Action Taken / Response
The Crown Estate ("**TCE**")	19/10/18	1. TCE`s general presumption is that the whole of all disused infrastructure associated with offshore wind farm installations should be removed, including foundations and cables in accordance the UK's general international obligations under UNCLOS and OSPAR. TCE notes that the programme proposes to cut the substation foundations below sea level. TCE understands the reasons why less than full removal of equipment may be appropriate, however these have not necessarily been qualified in DTP`s decommissioning programme, and it reserves its position until the final decommissioning programme is produced whether complete foundation removal will be appropriate based on the latest technological advances in decommissioning, environmental circumstances and other relevant parameters. 2. The seabed Bathymetry and features which include sand waves and megaripple bed forms means that there may be mobility and exposure of items in the future. Better understanding of the potential for mobility is required to determine the burial depth which ensures the asset will not become exposed in the future. The TCE therefore considers that any reference to "cutting 1-2 m below seabed level" should be changed "to be cut at such a depth below the surface of the seabed that the remaining parts do not pose a danger for shipping or fishing	1. It is noted and understood that TCE will reserve its position until the final decommissioning plan is produced on whether complete removal of the foundations and cables would be appropriate based on: survey data over the life of the project; latest technological advances in decommissioning; environmental circumstances; and other relevant parameters. 2. Section 6.4 has been modified accordingly. 3. Complete removal was considered as per standards set out by the IMO. Page 20 and 21 of the 'Decommissioning of offshore renewable energy installations under the Energy Act 2004 Guidance Document January 2011' states the conditions with which an exemption may be granted i.e. cables left in situ. The Decommissioning Programme is based on our considering that; (1) the cost to remove the entire cable based on the current engineering knowledge and costs will be extreme; and (2) it will pose unacceptable risk to the marine environment. The base assumption should be what is planned to undertake in 20 years based on current knowledge and technology. The Decommissioning Programme states that the removal of the offshore cables from the seabed will pose a significant environmental impact risk given the cables are buried 1m to 2m below the seabed. A seabed mobility study

Organisation	Date of Response	Summary of Issues Raised	Action Taken / Response
		vessels, even if sediment should become relocated". 3. TCE notes that the decommissioning programme proposes that cables and scour protections should be left in situ, with exposed cable ends buried to a suitable depth. TCE agrees that the crossing of existing pipelines and cables may justify leaving parts of the cables and or scour protections in situ. However, the reasons for doing so have not been quantified sufficiently to warrant a blanket "leave in situ" assumption. TCE notes that the DECC (BEIS) guidelines specify that "it would not be acceptable for a decommissioning programme to propose leaving an installation in place on the grounds that it, may in the future provide new surface for colonisation and the formation of an artificial reef". Additionally, the EIA states that the impact of cable decommissioning on the environment ranges from "insignificant" to "minor". TCE would therefore expect the programme to include complete removal of cables and scour protections. Any decision for retention must be made closer to the time based on the EIA and other circumstances. 4. TCE notes that aside from any consideration of pile cut depths and removal of cables in regard to the potential for long term emergence of buried infrastructure, The Crown Estate will want to ensure that any future commercial value of the seabed is not impaired. Specifically, (in accordance with the marine mineral	has been undertaken that defines the cable burial Reference Seabed Level ("**RSBL**") across a 30-year period to ensure cables do not become exposed. We expect future surveys to support this assessment and confirm that cables that have remained buried and stable over a 20 year period will not pose a future risk. A review of this proposal will be undertaken prior to decommissioning and if new evidence comes to light then this will be assessed and taken into account in formulating an updated plan for the decommissioning of the export cable. Please note there are no offshore crossing of existing pipelines and cables at Race Bank. 4. Please refer to response to items 2 and 3. Any infrastructure being left on the seabed will be at a depth that should not impact any future exploitation of the seabed. Surveys will be undertaken pre and post decommissioning to ensure that any assumptions made in this plan are still valid and mitigation measures undertaken if required. It should be noted to remove piles at greater depths will result in the excavation hole increasing for every metre in depth below the seabed. 5. The post decommissioning surveys will be shared with TCE.

Organisation	Date of Response	Summary of Issues Raised	Action Taken / Response
		safeguarding policies in the East Inshore/Offshore Marine Plans, particularly policy AGG30), identification of, and safeguarding of, any future exploitation of surficial aggregate extraction that overlaps with any proposed residual infrastructure in the decommissioning plan will require complete removal of any cables and removal of piles down to a level (with an appropriate safety margin) that would not interfere with subsequent activity on the site. 5. TCE advises that they would require post decommissioning surveys be shared with them. 6. TCE advises that should the decision be taken to approve with less than the complete removal of equipment they would wish to be provided with suitable arrangement for residual risk they may inherent as stipulated in BEIS Decommissioning guidelines.	6. Noted.
Business, Energy & Industrial Strategy ("**BEIS**")	19/10/18	1. We note that the programme proposes that cables and scour protections should be left in situ, with exposed cable ends buried to a suitable depth. The programme states that the removal of the offshore cables from the seabed will pose a significant environmental impact risk. It should be noted that as per our guidance notes for industry, it is expected that all installations and structures will be fully removed at the end of their operational life to minimise residual liability. Foundations, cables and scour protection may be considered as	1. Noted, also refer to our response to TCE items 1 to 3. 2. The statement is not a reference to a monitoring period of 50 years post decommissioning. It states a review of the subsea survey history from operation and the post decommissioning surveys and provides a 'prognosis' of the seabed mobility within the area for a 50 year period which will be used to support any assumptions made within the decommissioning programme.

Organisation	Date of Response	Summary of Issues Raised	Action Taken / Response
		exceptions if there is evidence to demonstrate that leaving in situ would be in line with IMO standards. Exceptions will be considered on a case by case basis prior to decommissioning, taking on board environmental conditions, the balance of risk, cost and technological capabilities at that time. In all cases, evidence should be presented in Decommissioning Programmes to allow an evaluation of realistic decommissioning options, including full removal. We would advise that supporting evidence should be supplied in subsequent drafts of the programme to justify the leaving in situ of cables and scour protections before a decision is taken to allow infrastructure to remain in situ. 2. We note that the DTP commits to monitoring for a 50-year period however due to DTPRBL status as a SPV and therefore will not exist after the asset has been removed. Advises that the DTP must include statement making parent company jointly liable or the period of post decommissioning monitoring. 3. We note the infrequency of review dates in the period leading up to decommissioning with last review period at Y15 and would advise that dates closer to the date of actual decommissioning should be included.	3. Noted and updated in Section 10.
Marine Management	19/10/18	1. The MMO notes that the Marine License for the Race Bank offshore wind farm transmission assets (L/2017/00248) includes condition 5.2.58	1. Noted and updated in Section 10. 2. Noted and a reference included in Section 8.

Organisation	Date of Response	Summary of Issues Raised	Action Taken / Response
Organisation ("**MMO**")		which requires a decommissioning plan to be submitted to the MMO for approval at least three months prior to the planned commencement of the decommissioning of the works. 2. The MMO considers the decommissioning programme a high-level document to address a notice given to DONG Energy (RB) UK Ltd under s.105 of the Energy Act 2004 that requires a decommissioning programme to be prepared and approved before construction of the wind farm. The OFTO has submitted the decommissioning programme in anticipation of taking on the transmission assets. Marine Licence L/2012/00248 does not consent for the decommissioning of the wind farm transmission assets and a marine licence will need to be applied for nearer the time of decommissioning. 3. The MMO notes the intention to leave in situ scour protection at the offshore substation and rock protection in relation to cable and pipeline crossings where exposed cable was covered by rock armour. The MMO advises that the assumption should be that scour and cable protection would be removed at the decommissioning stage. Any request to leave the elements of construction in situ will require written approval of the MMO. The MMO would expect further discussions at the time of decommissioning on the removal of scour protection above the seabed. 4. The MMO notes that the decommissioning of the wind farm is not expected until the end of the	3. Noted and refer to our response to TCE items 1 to 3. 4. Noted. 5. The Decommissioning Plan will be reviewed and a final updated plan will be shared with all relevant stakeholders prior to the commencement of the decommissioning works, specific reference has been made to the MMO in Section 10. 6. Noted and updated in Section 1. 7. Noted and updated in Section 3.2. 8. Noted and updated in Section 3.4.3.

Organisation	Date of Response	Summary of Issues Raised	Action Taken / Response
		expected lifetime of the wind farm (at least 25 years), the MMO does not expect a detailed description of the methods or technology of the decommissioning works at this time. 5. The MMO advises that a more detailed final decommissioning report must be submitted to the licensing authority at least 3 months prior to the commencement of the decommissioning phase for approval in consultation with Natural England and Cefas in accordance with marine licence condition 5.2.58. 6. The MMO advises that the decommissioning programme includes reference to the original OWF marine licence awarded 6 July 2012 (L/2012/00217). This licence was subsequently split for OFTO purposes which resulted in two separate licences; one for transmission assets and one for generation assets. 7. The MMO advises that the report requires updating in respect of completion of construction for example, section 3.2, Design and background. The MMO believes that with the exception of cable remedial burial works, for which there is a separate marine licence currently submitted to the MMO, construction work has already been completed. 8. The MMO advises the report requires updating in respect of designated areas, i.e. Inner Dowsing Race Bank North Ridge Site of Community Importance (SCI) is now designated as a Special Area of Conservation (SAC) as is the Greater	

Organisation	Date of Response	Summary of Issues Raised	Action Taken / Response
		Wash Special Protection Area (SPA). Therefore, all designated areas should be reviewed and updated where relevant.	
BEIS	14/12/18	1. We would also advise that a commitment to review the decision to leave infrastructure in situ is included within the decommissioning programme. 2. Notes that DTPRBL will not be monitoring for a period of 50 years but would advise that the programme should be clear on whom the independent contractor will report to and where liability shall lie after decommissioning of the site. 3. Notes the inclusion of a formal review date 18 years following commencement but would advise a further review date between years 1 and 9 be included within the programme. 4. It is noted that "complete removal was considered as per standards set out by the IMO and Page 20 and 21 of our 'Decommissioning of offshore renewable energy installations under the Energy Act 2004 Guidance Document January 2011' states the conditions with which an exemption may be granted i.e. cables left in situ. The Decommissioning Programme is based on our considering that; (1) the cost to remove the entire cable based on the current engineering knowledge and costs will be extreme; and (2) it will pose unacceptable risk to the marine environment".	1. Section 10 has been updated to include the following statement "This final review will include the latest bathymetric survey data to confirm the cable burial depths against the RSBL to demonstrate that any cable intended to be left in-situ is adequately buried". 2. Sections 2 and 10 have been amended to clarify that the survey will be commissioned by DTPRB and carried out by an independent survey contractor and all results issued to BEIS and DTPRB in parallel for review and comment. In line with our response to BEIS question 2 dated 19 October 2018 in this table. As part of the final review of the decommissioning plan there will be a 50 year (historic and forward looking) assessment of seabed mobility which will determine the final decommissioning plan agreed between BEIS and DTPRB. Once DTPRB has delivered the agreed decommissioning plan, to the acceptance of BEIS, DTPRB's liabilities will have been discharged. 3. Section 10 contains 3 formal reviews at years 9, 15 and 18. We consider it is economic post the construction review to hold the first formal review of the decommissioning plan twelve months prior to the first year of reserving for

Organisation	Date of Response	Summary of Issues Raised	Action Taken / Response
		We would advise that such considerations must be evidenced before BEIS Decommissioning team will consider allowing any infrastructure to be left in situ. Therefore, we would ask that before a decision is taken to allow cables to be left in situ, contrary to our default position, evidence should be provided highlighting the extreme cost of removing the entire cable based on current engineering knowledge, and the proposed risk to the marine environment. I would also advise that the seabed mobility study could aid in our decision to either allow cables to be left in situ or acquire full removal, therefore I would ask that this study be made available to BEIS decommissioning team. It should be noted that the decision to allow infrastructure to remain in situ is to be taken on a case by case basis and should be based upon site specific justification and evidence. We would also advise that a commitment to review the decision to leave infrastructure in situ is included within the decommissioning programme.	the financial security. A further review of the financial security requirements will be undertaken mid-way through the reserving period and finally at year 18 prior to the commencement of decommissioning after year 20. We have also added the following statement in Section 10 "In addition a formal review will be undertaken following any major work". 4. Sections 6.8 and 10 have been updated in line with comments.
BEIS	12/02/19	1. BEIS would advise the addition of a clear commitment to review the decision to potentially leave infrastructure in situ is included within the decommissioning programme. 2. DTPRBL is encouraged to work with stakeholders 3. BEIS notes the reference to updating the decommissioning programme and would advise DTPRBL to communicate when remedial works	1. The following text has been added to Section 10 'During the formal reviews DTPRB will undertake a review of any items proposed to be left in-situ following decommissioning.' 2. Section 8 details our stakeholder management.

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		are to take place and update and send the decommissioning programme to BEIS decommissioning team. 4. BEIS would advise that if exposure occurs during the life of the Project BEIS Decommissioning team should be notified as soon as possible by DTPRBL with the decommissioning programme updated to reflect any changes. 5. BEIS would advise that if the decision is taken to allow infrastructure to remain in situ either before the start of the financial security accrual in Y10 or closer to the time of decommissioning, DTPRBL may be required to enter into discussions regarding long term monitoring and residual liability of infrastructure in situ with BEIS and TCE. The decommissioning programme should be updated to reflect these potential requirements and obligations. 6. BEIS notes formal review dates at years 9, 15 and 18 BEIS would advise that DTPRBL conduct an internal review of the decommissioning programme before the commencement of the formal review in year 9 to ensure the decommissioning programme and financial security estimates are up to date. 7. BEIS notes that proposed works are potentially to take place in 2019/2022 BEIS would advise DTPRBL that if the decision is taken to carry out said works DTPRBL should communicate this decision to BEIS at the earliest opportunity and	3. Section 10 has the following added 'The updated decommissioning programme will be issued to the BEIS decommissioning team'. 4. The following sentence has been modified in Section 10 to 'In addition a formal review will be undertaken following any major work or when a material change has occurred with the relevant authorities notified'. 5. 'DTPRB will enter into discussions with BEIS and TCE regarding long term monitoring and residual liability of any infrastructure left in situ.' has been added to Section 6.8. 6. Section 10 has been amended as follows: 'DTPRB intends to undertake internal reviews of the Decommissioning Programme throughout the life of the project with an internal review of the Decommissioning Programme before the commencement of the formal review in year 9 to ensure the decommissioning programme and financial security estimates are up to date'. 7. Section 10 has been amended as follows: 'In addition a formal review will be undertaken following any major work or when a material change has occurred with the relevant authorities notified. It is noted that RBWFL propose to undertake further work between 2019 and 2022 which may involve the installation of rock berms at several locations. If this work is completed the Decommissioning Programme will be updated to reflect the installation and decommissioning requirements

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		update the decommissioning programme accordingly.	of any rock berms installed. The updated decommissioning programme will be issued to the BEIS decommissioning team'.