From:	Francesca De Vita
To:	Leigh, Gareth (Energy Development & Resilience); Thompson, Alexander (Energy Development & Resilience)
Cc:	Karma Leyland; Simon Fox
Subject:	Hornsea Project Three - EN10080 [DLGL-20-6585]
Date:	10 September 2020 15:27:05
Attachments:	image002.png image004.png HOW03_COM_Kellas Midstream Response_04 Sep 20 SK+CH.pdf DONGPerenco_AgreementinPrinciple_20072017_Signed_All (00203239_A) (1).pdf HOW03_Kellas Response Rev02.pdf

Dear Gareth

I attach the following in response to the letter from Kellas Midstream dated 6th April 2020:

1. Joint response on behalf of Orsted Hornsea Project Three and Kellas North Sea 2 Limited;
2. Agreement in Principle dated 20th July 2017; and
3. Hornsea Three Response to Representation.

I would be grateful if you could acknowledge receipt and confirm that the Secretary of State requires no further comments from the Applicant.

Best regards
Francesca

Best regards,
Francesca De Vita
Lead Legal Counsel
Legal Offshore CE & UK
Group Support

Learn more at orsted.co.uk

5 Howick Place, Westminster
SW1P 1WG London
United Kingdom
[redacted]

fradv@orsted.co.uk
orsted.co.uk

FAO: Gareth Leigh
Department for Business, Energy & Industrial Strategy
1 Victoria Street
London
SW1H 0ET

Hornsea Project Three

4 September 2020

Your ref. EN010080
Our ref. Kella's Response

Dear Mr. Leigh,

Thank you for your letter dated 13 July 2020. We note the content of the letter dated 6 April 2020 from Kellas North Sea 2 Limited (Kellas) in respect of the Esmond Transmission System.

We attach a joint statement dated 20 July 2017 from the Applicant (then DONG Energy) and Perenco UK Limited referring to the Esmond to Bacton gas pipeline. This is part of the Esmond Transmission System. It is now operated by Kellas as a wholly owned subsidiary of Kellas Midstream Limited who own 65% of the Esmond Transmission System. Perenco UK Limited continue to operate the pipeline in partnership with Kellas.

We also attach the Applicant's 'Response to Representation from Kellas Midstream August 2020 Rev. 2', dated 24/8/2020, confirming the Applicant's commitments in respect of the Hornsea Project Three and the Esmond Transmission System.

In line with the attached joint statement and Response, the Applicant and Kellas commit to ongoing co-operation and can confirm that the matters raised in the letter dated 6 April have been addressed.

We would be grateful for confirmation from the Secretary of State that no further comments are required from the Applicant in relation to this matter.

Yours sincerely

Signed: [redacted]

Date: 07-Sep-20

Craig Harwood
Project Development Manager
Orsted Hornsea Project Three

Signed: [redacted]

Date: 04-Sep-20

Stefan Kent
Asset Support Manager
Kellas North Sea 2 Limited

Hornsea 3
Offshore Wind Farm

DONG energy

DONG Energy Wind Power UK
5 Howick Place
London
SW1P 1WG

www.dongenergy.com
Company no. 31 84 92 92

Laurent Combe
General Manager
Perenco UK Limited
3 Central Avenue
St Andrews Business Park
Norwich NR7 0HR

20/07/2017

olpal@dongenergy.co.uk
Tel +44 2078115456

Dear Laurent,

Hornsea Project Three

DONG Energy Hornsea Project Three (UK) Ltd ("DONG Energy") is proposing to develop an offshore wind farm ("Hornsea Project Three") in the North Sea approximately 120km off the North Norfolk Coast. Perenco UK Limited is the operator of the following gas and chemical pipelines located in the North Sea:

- Bacton to Lancelot gas pipeline
- Bacton to Lancelot chemical pipeline
- Esmond to Bacton gas pipeline

Both parties agree that if the Hornsea Project Three is approved as proposed they will:

1. cooperate in order to develop appropriate offshore crossing and/or proximity agreements. It is agreed that these agreements will be finalised (subject to the approval of Perenco) once all relevant technical and commercial information is available;

2. that on-going dialogue is maintained to ensure future cooperation is maximised;

3. that this letter will be placed on public record as part of the examination of Hornsea Project Three to clearly demonstrate the proposed co-operation between the parties.

Registered office:
Kraftværksvej 53
7000 Fredericia, Denmark

Hornsea 3
Offshore Wind Farm

DONG energy

Perenco confirms that, subject to Perenco and DONG Energy finalising and signing fully termed crossing and/or proximity agreements prior to construction, it consents in principle to the development of Hornsea Project Three and will not object to the future development of Hornsea Project Three.

Please confirm your agreement to the above by countersigning and returning the attached copy of this letter.

Yours sincerely,

The Hornsea Project Three Offshore Wind Farm Project

Signed: [redacted] [redacted]

Date: 22/08/2017

Stuart Livesey

Project Development Manager – DONG Energy Hornsea Project Three

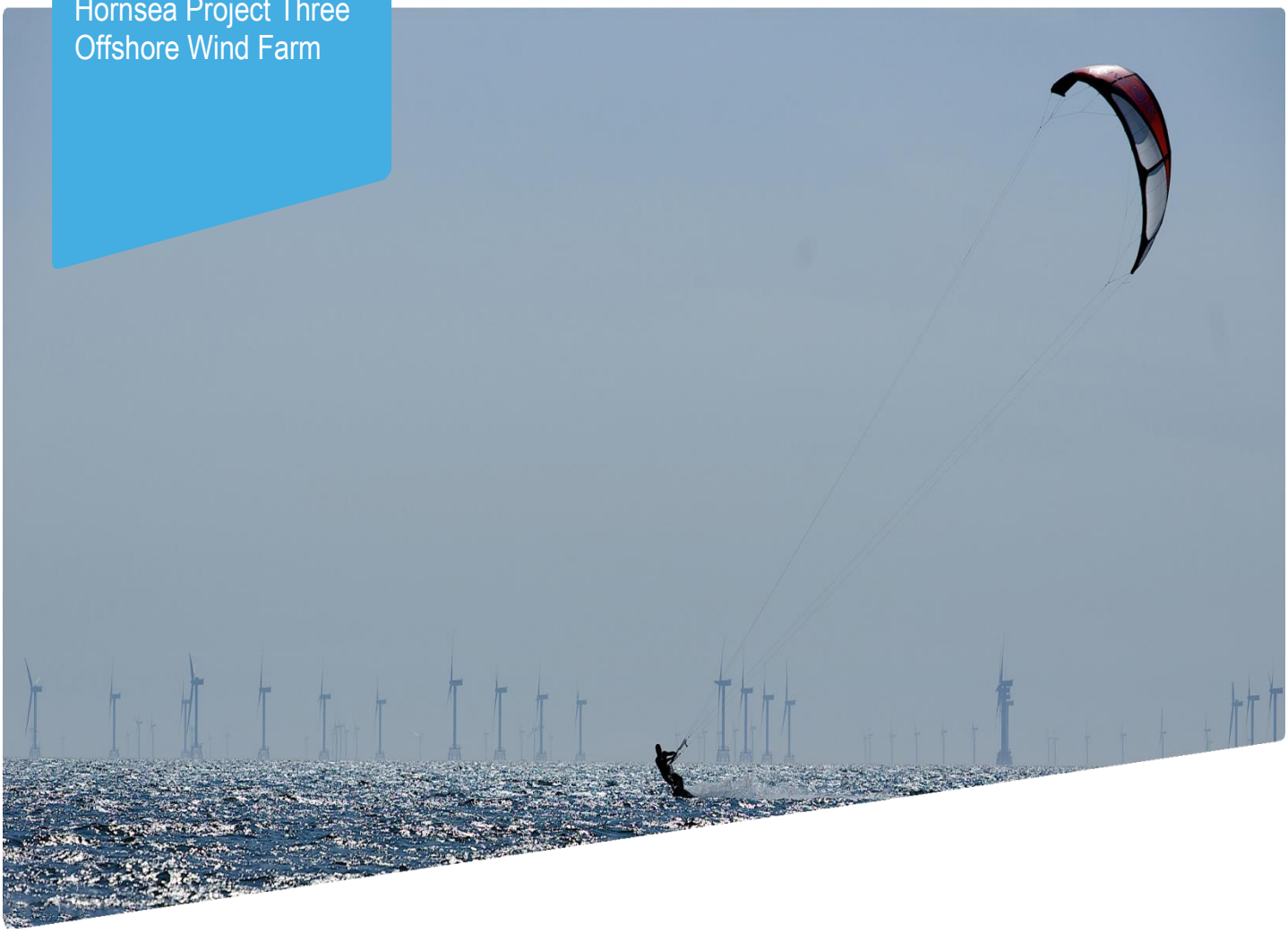
(on behalf of DONG Energy Hornsea Project Three (UK) Ltd.)

Date: 27/07/17

Laurent Combe

General Manager – Perenco UK Limited

Hornsea Project Three
Offshore Wind Farm



Hornsea Project Three

Offshore Wind Farm

Hornsea Three Response to Representation from Kellas Midstream

Date: August 2020

Hornsea 3
Offshore Wind Farm

Ørsted

Hornsea Three Response to Representation from Kellas Midstream

Document Control			
Document Properties			
Organisation	Ørsted Hornsea Project Three		
Author	RPS		
Checked by	Laurence Cross		
Approved by	Karma Leyland		
Title	Response to Representation from Kellas Midstream		
Version History			
Date	Version	Status	Description / Changes
10/08/2020	Rev00	Draft	RPS Internal Draft
18/08/2020	Rev01	Draft	Draft for Ørsted review
24/08/2020	Rev02	Final	Final following review

Ørsted

5 Howick Place,

London, SW1P 1WG

Front cover picture: Kite surfer near a UK offshore wind farm © Orsted Hornsea Project Three (UK) Ltd., 2018.

Table of Contents

1. Background and Scope 1
2. Cable/Pipeline Crossing Protection 1
3. Cable Laying Activities, Including Sandwave Clearance 2
4. Construction or Presence of the HVAC Booster Substation 4
5. Summary 5
6. References 8

List of Figures

Figure 1: Hornsea Three offshore cable corridor and HVAC booster substation search area relative to the ETS pipeline (including crossing). 6
Figure 2: Sediment transport pathways across the Hornsea Three marine processes study area. 7

1. Background and Scope

1.1 This technical note provides a response to a representation made by Kellas Midstream on the Hornsea Three Development Consent Order (DCO) application on 6 April 2020 (received by PINS on 8 July 2020). The purpose of this technical note is to provide reassurance to Kellas Midstream that construction, operation and maintenance and decommissioning of Hornsea Three infrastructure within the offshore cable corridor will not represent a risk to the integrity of the existing Esmond to Bacton Pipeline (Esmond Transmission System; ETS).

1.2 Specifically, Kellas Midstream highlighted, in their representation, concerns about potential exposure of the existing pipeline. Kellas Midstream noted that span remediation works were recently undertaken on three sections of the pipeline between KP164-KP167 (located over 3 km from the Hornsea Three offshore cable corridor/HVAC booster substation search area; see Figure 1). Kellas Midstream requested that The Applicant demonstrate that the following activities do not represent a risk of exposure (e.g. accelerated spanning) to the ETS due to:

- Cable/pipeline crossing protection;
- Cable laying activities, including sandwave clearance; and
- Construction or presence of the HVAC booster substation).

1.3 This note draws on information presented within the Hornsea Three Environmental Statement, specifically the following documents:

- Hornsea Project Three Offshore Wind Farm Environmental Statement: Volume 2, Chapter 1 – Marine Processes (APP-061)[1];
- Hornsea Project Three Offshore Wind Farm Environmental Statement: Volume 5, Annex 1.1 – Marine Processes Technical Annex (APP-101)[2];
- Hornsea Project Three Offshore Wind Farm Appendix 11 to Deadline 1 Submission – Sandwave Clearance Clarification Note (REP1-183)[3];

2. Cable/Pipeline Crossing Protection

2.1 Scour protection is a mature engineering concept and by design will prevent primary scour and minimise secondary scour. The risk of substantial scour occurring when scour protection is installed is very low.

2.2 In addition to having scour protection installed, the point of crossing has been carefully considered. The crossing has been intentionally selected between KP158 and KP159 of the ETS pipeline (see Figure 1) as this section lays within a trough between two large sandwaves.

[1] https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010080/EN010080-000531-HOW03_6.2.1_Volume%202%20-%20Ch%201%20-%20Marine%20Processes.pdf
[2] https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010080/EN010080-000571-HOW03_6.5.1.1_Volume%205%20-%201.1%20-%20Marine%20Processes%20Technical%20Report.pdf
[3] https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010080/EN010080-001133-DI_HOW03_Appendix%2011.pdf

2.3 The location in the trough will minimise the natural seabed changes in the crossing area, limiting risk of exposure of the assets caused by migrating bedforms. Furthermore, troughs typically have lower current speeds, due to their greater depth, and are places where sediment is known to deposit slowly over time. By having the crossing located in a trough this provides greater confidence that scour is even less likely to occur.

2.4 The Applicant will ensure that the cable protection at the crossing will be adequately designed to fully protect both the export cable and the ETS pipeline beneath. A thin separation layer of either circular rock pad or concrete mattress will provide separation between the two assets. A single layer low relief rock berm designed to local hydrodynamic conditions will be installed to cover the Hornsea Three export cable and the separation layer. The low relief rock berm and the crossing location in the trough between two sandwaves both works to minimise local scour around the assets, as they will minimise the obstruction height.

3. Cable Laying Activities, Including Sandwave Clearance

3.1 Understanding of the marine processes baseline conditions for the Hornsea Three project area has been developed through consideration of both existing publicly available datasets and reports, as well as from the project-specific survey data (the full baseline characterisation is presented in Volume 5, Annex 1.1 – Marine Processes Technical Annex (APP-101). The adequacy of these surveys for informing the marine processes baseline was agreed with regulators and stakeholders at the Hornsea Three Marine Processes, Benthic Ecology and Fish and Shellfish Ecology Expert Working Group (EWG) meetings (6 June 2016, 12 July 2016, 17 November 2016, 1 February 2017, 11 April 2017, 4 December 2017 and 23 February 2018). These datasets are presented in greater detail in APP-061.

3.2 The baseline characterisation describes the natural variability in the marine processes, both in terms of seasonal temporal change as well as medium/longer term change anticipated to occur over the lifetime of the project, in the absence of the proposed infrastructure. The baseline characterisation provides the reference condition against which to compare the impacts associated with Hornsea Three, enabling and providing the basis to inform the assessment of the significance of any consequential changes to the baseline.

Currents

3.3 A detailed regional-scale overview of the spatial variation in tidal current speed and direction for the Hornsea Three project area is provided in Emu (2011).

3.4 Tidal streams along the Hornsea Three offshore cable corridor are broadly aligned to the coast and therefore in an approximate northwest to southeast orientation, becoming more east-west aligned at the nearshore area.

Waves

3.5 A series of wave roses from locations within the Hornsea Three array area as well as along the offshore cable corridor based on 36 year hindcast wave records were presented in Figure 1.6 in APP-061 from the ABPmer SEASTATES wave hindcast database (ABPmer, 2013). Collectively, they illustrate spatial variation in wave conditions across this region.

3.6 In the deeper offshore areas of the Hornsea Three offshore cable corridor, waves propagate without major modification with waves regularly coming from the south-southeast, through all of the eastern sectors to the north-northwest.

Seabed sediments

3.7 The Hornsea Three offshore cable corridor stratigraphy can be broadly divided into (i) seabed sediments; (ii) Quaternary units; and (iii) solid geology (bedrock). Maps showing the distribution and thickness of these various units are provided in Figure 1.11 of APP-061 and Figure 4.2 of APP-101.

3.8 The seabed along the Hornsea Three offshore cable corridor predominantly comprises coarse grained sand and gravel sediments (Bibby HydroMap, 2016). The relative proportion of sands and gravels varies along the Hornsea Three offshore cable corridor, with more sandy sediments associated with the flanks and crests of sandbanks and more gravelly sediments encountered in the sandwave troughs and elsewhere.

Sediment transport

3.9 Existing regional-scale mapping suggests that at the offshore terminus of the Hornsea Three offshore cable corridor, bedload sediment transport is broadly to the northwest and towards the south/southeast within inshore/nearshore areas. The two regions of sediment transport are separated by a bedload parting zone which runs in an approximately shore parallel direction, at a distance of approximately 15 km from the coast (Figure 2**Error! Reference source not found.**). These regional scale patterns are broadly consistent with the directions of sediment transport interpreted from bed forms mapped as part of the Hornsea Three offshore cable corridor geophysical survey.

3.10 In general terms, sediment mobility is expected to increase with greater proximity to the coast as a result of the increase in tidal current speed. In all areas, medium sized sand is expected to be mobilised to some degree by the action of tidal currents alone, whilst in the area of higher current speeds encountered off the northeast Norfolk coast, gravel sized material is also expected to be mobile. The influence of wave induced orbital currents on sediment mobility will vary spatially in response to both water depth as well as the height, period and direction of prevailing waves. However, within nearshore areas (as well as over the crest of shallow sandbanks) wave driven transport becomes increasingly important and in these shallow areas, both sand and gravel sized material is expected to be mobile.

3.11 Sandbanks belonging to the North Norfolk Sandbanks, which are located closer inshore and are known to be active under present day hydrodynamic conditions (Kenyon and Cooper, 2005) include: Swarte Bank; Well Bank; Ower Bank; Inner Bank; and Leman Bank (located immediately to the northeast of the proposed crossing of the Hornsea Three offshore cable corridor and the ETS).

3.12 The Hornsea Three offshore cable corridor geophysical survey identified that much of the route is characterised by the presence of megaripple bedforms and sandwaves. These bedforms develop where peak spring tidal currents are moderately strong with crests orientated transverse to the main axis of flow.

3.13 The most extensive sandwave fields are located inshore from Ower Bank although all of the North Norfolk Sandbanks are typically associated with sandwave fields, superimposed with megaripples. No direct measurements of bedform migration rates are presently available for these features within the Hornsea Three offshore cable corridor; however, observational evidence from analogous settings elsewhere in the southern North Sea suggests rates of migration may be in the order of several metres per year in the vicinity of sandbank systems (Knaapen et al, 2005). This is likely to be in a northwest direction, based on observations described above.

3.14 An assessment of potential changes associated with the sandwave clearance was undertaken along the Hornsea Three offshore cable corridor (Section 1.11.5 of APP-061), with further evidence and assessment presented in REP1-183. Key findings are summarised below:

- Bed levelling is not considered likely to disrupt the form and function of the sandbank system as these are governed by processes that occur at a much larger scale than the proposed works;
- Bedform recovery will likely occur in relation to the migration and sediment transport processes across the system. Recovery rates for sandwaves are likely in the order of up to several years, depending on the location and degree of sandwave clearance operations undertaken; and
- The proposed bed levelling is not likely to pose any barrier to ongoing sediment transport within or to locations beyond the sandbank system.

3.15 There is a high degree of confidence the cable installation, including sandwave clearance, will not affect the ETS pipeline due to the distances between the cable corridor and the ETS pipeline and the limited nature and scale of effects. The works will not affect the regional sediment transport processes or sandwave formation/migration patterns and will therefore not increase the risk of exposure of the ETS pipeline. Further, the direction of sediment transport (i.e. to the northwest) means that the ETS pipeline is effectively “upstream” of the cable corridor.

4. Construction or Presence of the HVAC Booster Substation

4.1 Up to four HVAC booster substations may be constructed within the HVAC booster substation search area shown in Figure 1 (the eastern and southern corners of which are approximately 2 km and 4 km from the ETS, respectively). The installation of the HVAC booster substation’s foundations will have short term localised effects to the sediment budget, as drill arisings will deposit in the near-field, i.e. 10s to 100s of meters from the installation site. At a distance of 2 km to 4 km, any sediments or drill arisings deposited on the seabed will be imperceptible against the background sediment transport regime.

4.2 The long-term influences of the HVAC booster substation foundations on regional sediment transport processes will be negligible. Local formation changes, either through deposition or scouring would likely occur in the immediate vicinity of the foundations, but any measurable effect of this would not reach beyond 10s or 100s of meters.

4.3 As outlined above, the ETS gas pipeline is positioned at least 2km from the HVAC booster substation search area, with the KP164 to KP167 sections over 3 km from this. Due to the distance between the ETS pipeline and the HVAC Booster Substation and the limited distance at which changes to physical processes (e.g. scour or changes to sediment transport) are predicted to occur, there is a high degree of confidence that there would be no impact from the Hornsea Three infrastructure on the ETS pipeline.

5. Summary

5.1 The evidence presented here and in the supporting documentation submitted as part of the DCO Application and Examination Phase demonstrate that the construction or operation and maintenance of Hornsea Three infrastructure will not represent a risk to the ETS pipeline, including potential for exposure of the pipeline at cable crossing, and would not alter the natural variability of the sandwaves in the vicinity of KP164 to KP167.

5.2 Modelling of the effects of sandwave clearance is not considered to be appropriate due to the distance between the cable corridor and the pipeline and the limited scale of effects and therefore the very low risk of impacts to the ETS pipeline.

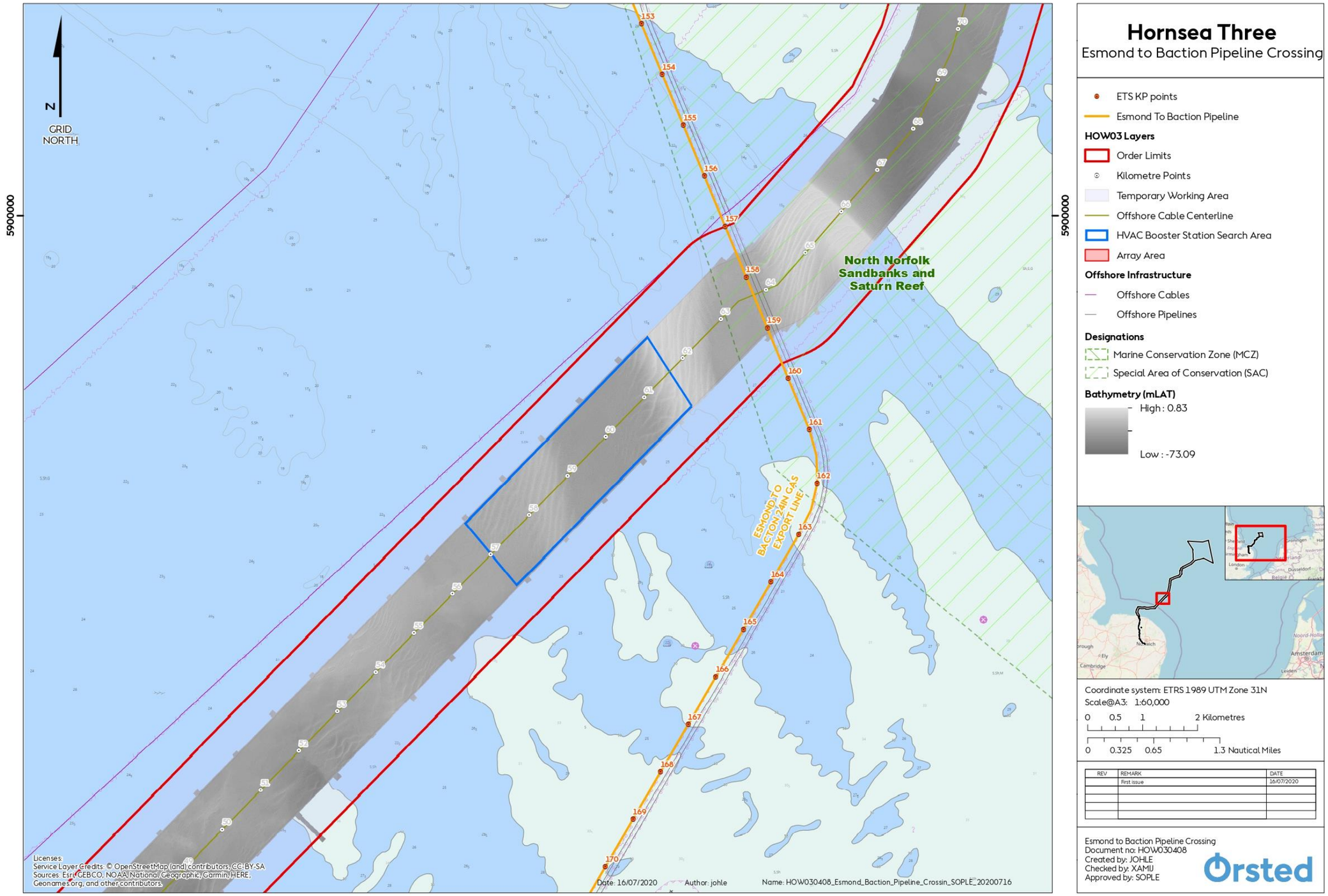


Figure 1: **Hornsea Three offshore cable corridor and HVAC booster substation search area relative to the ETS pipeline (including crossing).**

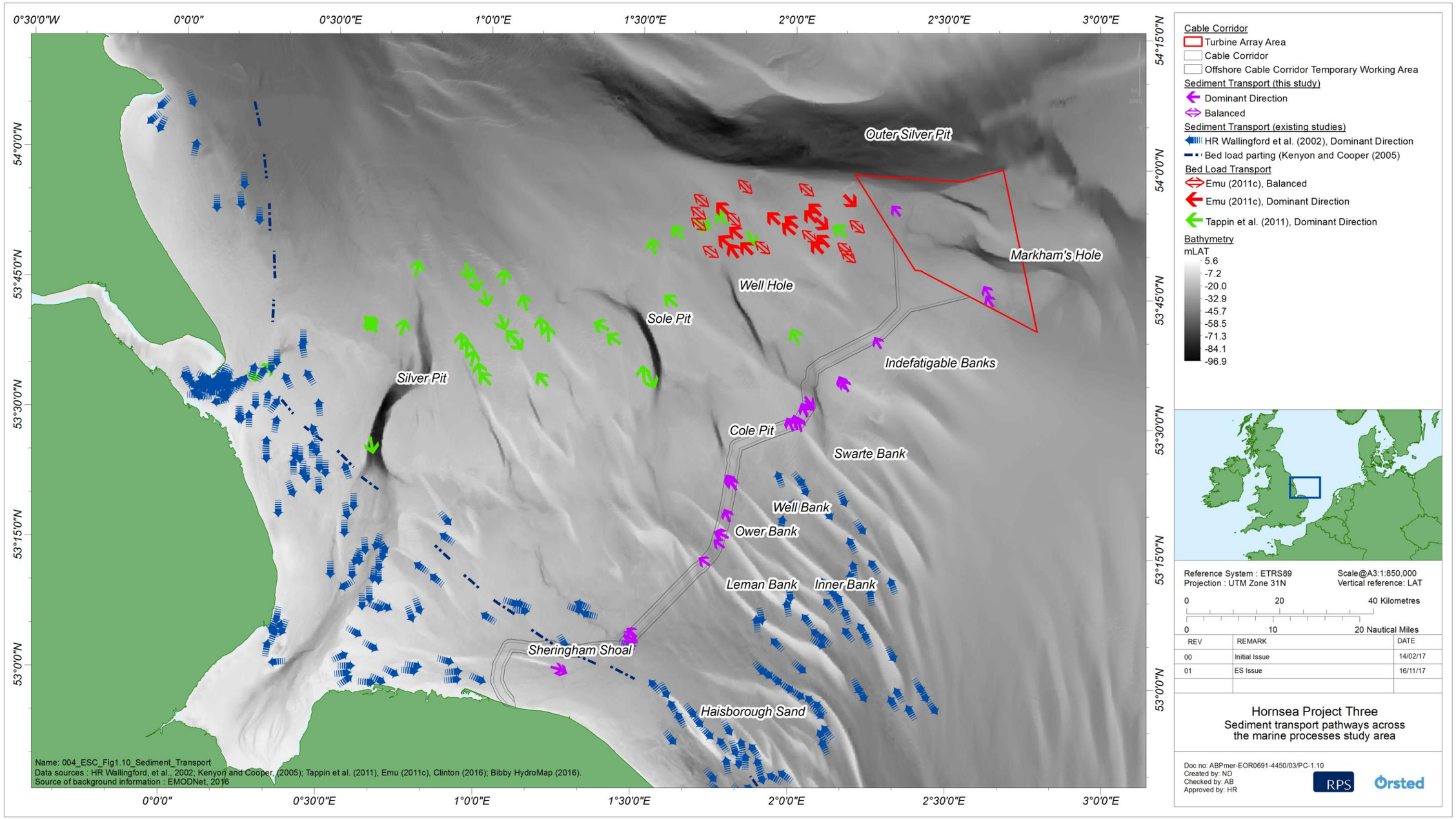


Figure 2: Sediment transport pathways across the Hornsea Three marine processes study area.

6. References

ABPmer (2013). SEASTATES Wave Hindcast Model: Calibration and Validation Report. ABP Marine Environmental Research Ltd, Report No. R.2145. August 2013.

Bibby HydroMap (2016). Hornsea Zone Geophysical Survey Lot 6. Volume 3 – Results Report. Bibby HydroMap Project No. 2016-032.

Emu (2011). Subzone Assessment (Phase 1 and 2): Final Technical Report – MetOcean: Data Collection Campaign June 2010 – September 2011. Emu Reference 11/J/1/01/1563/1264.

Kenyon NH. and Cooper WS. (2005). Sandbanks, sand transport and offshore wind farms. DTI SEA 6 Technical Report.

Knaapen, M.A.F. Van Berge Henegouw, C.N. and Hu, Y.Y. (2005) Quantifying bedform migration using multi-beam sonar. Geo-Marine Letters, 25 (5): 306 – 314.