

From: Dominika Phillips [mailto:DOMPH@orsted.co.uk]
Sent: 08 February 2019 21:06
To: KJ Johansson; Kay Sully; Hornsea Project Three
Cc: Andrew Guyton; Stuart Livesey
Subject: Hornsea Project Three (UK) Ltd response to Deadline 6 (Part1)

Dear Kay, K-J

We are pleased to enclose Ørsted Hornsea Project Three (UK) Ltd (“the Applicant”) response to Deadline 6, Friday 8th Feb 2019. These documents have been prepared by the Applicant and have been produced in response to the Examining Authority’s (ExA) letter of 9 October 2018 (“the Rule 8 letter”).

These documents are being issued over a series of emails, each email containing a pdf file or files. The **last** email to be issued by the Applicant will contain a supporting file tracking sheet – to help the ExA ensure that it has received each email transmission.

Please acknowledge safe receipt of these documents.

If we can be of any assistance in that regard, please do not hesitate to contact myself or Andrew Guyton.

Best regards,
Dr Dominika Chalder PIEMA
Environment and Consent Manager



Environmental Management UK| Wind Power
5 Howick Place | London | SW1P 1WG



Please consider the environment before printing this e-mail

This communication contains information which is confidential and is for the exclusive use of the addressee(s).

If you are not a named addressee, please inform the sender immediately and also delete the communication from your system.

Orsted Power (UK) Limited is registered in England
Registered number: 04984787
Registered Address: 5 Howick Place, London, SW1P 1WG
The Company is a wholly owned subsidiary of Orsted A/S (a company registered in Denmark)
More information on the business of the Orsted group can be found at www.orsted.com
Disclaimer version 1.1

This email has been scanned by the Symantec Email Security.cloud service.
For more information please visit <http://www.symanteccloud.com>

Hornsea Project Three
Offshore Wind Farm



Hornsea Project Three Offshore Wind Farm

Appendix 1 to Deadline 6 submission - Clarification Note on
Onshore Cable Corridor Widths (HVAC and HVDC)

Date: 08th February 2019

Document Control			
Document Properties			
Organisation	Ørsted Hornsea Project Three		
Author	Orsted		
Checked by	Orsted		
Approved by	Andrew Guyton		
Title	Appendix 1 to Deadline 6 submission - Clarification Note on Onshore Cable Corridor Widths (HVAC and HVDC)		
PINS Document Number	n/a		
Version History			
Date	Version	Status	Description / Changes
08/02/2019	A	Final	Submitted at Deadline 6 (08/02/2019)

Ørsted

5 Howick Place,

London, SW1P 1WG

© Orsted Power (UK) Ltd, 2019. All rights reserved

Front cover picture: Kite surfer near a UK offshore wind farm © Ørsted Hornsea Project Three (UK) Ltd., 2019.

Table of Contents

1. Introduction	3
2. Typical Onshore Cable Corridor widths	3
3. Width of the Onshore Cable Corridor at the Norfolk Vanguard crossing	5
Annex 1 – Figure of Illustrative HVDC Cable Construction Corridor (minimum typical).....	6

List of Tables

Table 1.1: Minimum land take requirements for construction	4
--	---

1. Introduction

- 1.1 This note has been prepared by the Applicant to provide clarification on matters raised at Issue Specific Hearing 7: Compulsory Acquisition on 31 January 2019 relating to specific parameters of the onshore cable corridor. These comprise:
- Width of the onshore cable corridor for a single or phased delivery using one transmission technology i.e. using either HVAC (for all phases), or HVDC (for all phases);
 - Width of the onshore cable corridor for a phased delivery where two different transmission technologies are proposed e.g. HVAC in the first phase, followed by an HVDC in the second phase; and
 - Width of the onshore cable corridor at the Norfolk Vanguard crossing location and any implications of transmission technology (HVAC or HVDC) and crossing methodology (open cut or HDD).
- 1.2 Additional information relating to the inclusion of both HVAC and HVDC transmission technologies applied for within the DCO is provided in Appendix 22 submitted at Deadline 1 REP1-164, Transmission System (HVAC/HVDC) Briefing Note.

2. Typical Onshore Cable Corridor widths

- 2.1 Table 1.1 sets out the minimum typical onshore cable corridor widths to deliver the maximum parameters of the scheme for HVAC and HVDC transmission technology.
- 2.2 As compulsory acquisition powers will only be exercised over the minimum area required to deliver the scheme, Table 1.1 confirms that a typical minimum corridor width for HVAC transmission system is 80m and for HVDC transmission is 60m.
- 2.3 In Table 7 of the Transmission System HVAC/HVDC briefing note [REP1-164], a width of 68m was included for HVDC transmission. As set out in the response to Further Written Question Q2.1.5 [REP4-012], the Applicant's preferred corridor width includes an additional 8m meters in order to facilitate a fully phased build out. However, the Applicant can confirm that the typical minimum width required is 60m.

Table 2.1: Minimum land take requirements for construction

Parameter	Width	Commentary	Documented
Typical <u>minimum</u> land take required to deliver the maximum design parameter HVAC transmission (across single or two phases)	80m	An 80m temporary corridor provides an efficient and safe working width whilst seeking to minimise land take. Where existing constraints require, this working width can be reduced. However, it would not be possible to use a reduced working width for the entire corridor as this would result in reduced cable installation efficiency, increased complexity for field drainage and added management requirements for soil separation and management. In some locations a wider corridor is required due to environmental or engineering constraints.	APP-012, 2.4.1 Works Plan (Onshore).
Typical <u>minimum</u> land take required to deliver the maximum design parameter for HVDC transmission (across single or two phases)	60m	A 60m temporary corridor, provides an efficient and safe working width whilst seeking to minimise land take. Where existing constraints require, this working width can be reduced. However, it would not be possible to use a reduced working width for the entire corridor as this would result in reduced cable installation efficiency, increased complexity for field drainage and added management requirements for soil separation and management. In some locations a wider corridor is required due to environmental or engineering constraints.	(See Annex 1)

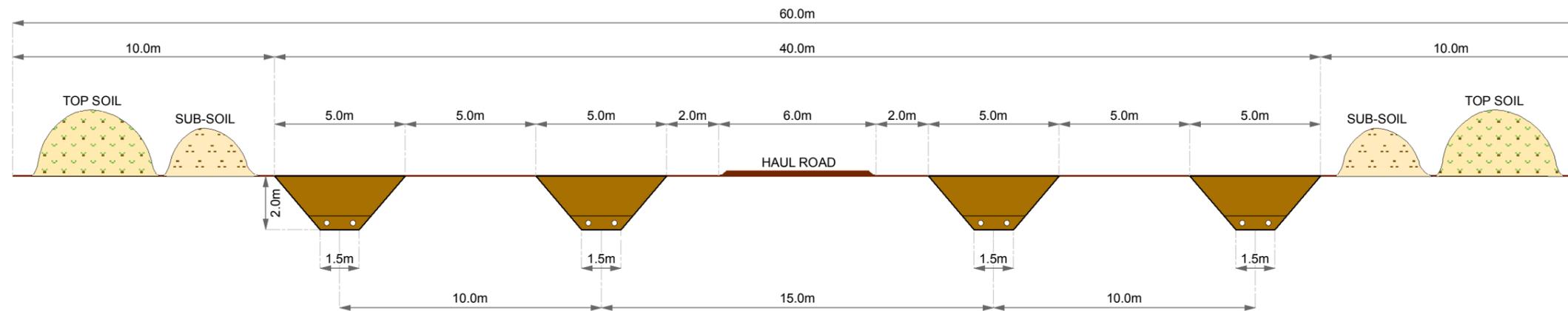
2.4 Where a mix of transmission technologies are deployed under a two-phase scenario, the Applicant cannot define a minimum cable corridor width for each phase. This width is highly dependent on the capacity of each phase, approach to cable selection size of the conductor and range of voltage, all of which are matters for detailed design post consent. As set out in Appendix A of the Outline Code of Construction Practice (submitted for Deadline 6), the Applicant will notify landowners of the extent of land take prior to construction.

3. Width of the Onshore Cable Corridor at the Norfolk Vanguard crossing

- 3.1 At the point of crossing between Hornsea Three and Norfolk Vanguard / Boreas projects, Hornsea Three requires the ability to HDD or open cut at this location, as one project (Hornsea Three or Norfolk Vanguard / Norfolk Boreas) will need to install by way of open cut and the other by way of HDD.
- 3.2 The Applicant requires additional space within which to install the cables due to consideration and management of electrical interaction of the cables for each project, cable separation and thermal interactions, and a potential need for increased working areas in the event that both projects are being built concurrently. Furthermore, the additional land take is required to enable the implementation of any localised temporary Public Right of Way alignment.
- 3.3 The selection of transmission technology by either project does not necessarily lead to a requirement for one project to be installed by way of open cut or HDD as both transmission technologies can be installed by way of HDD or open cut trench, although wider factors may influence how a project is installed – for example project phasing.

Annex 1 – Figure of Illustrative HVDC Cable Construction Corridor (minimum typical)

Hornsea Three
 Cable Route Export Circuits
 HVDC Cable Construction Corridor



NOT TO SCALE

REV	REMARK	DATE
00	Initial Issue	08/02/2019
---	---	---
---	---	---

Hornsea Three
 Cable Route Export Circuits
 HVDC Cable Construction Corridor (minimum)

Doc no: HOW030322
 Created by: XAMIJ
 Checked by: GAPAR
 Approved by: ANGUY



Illustrative layout