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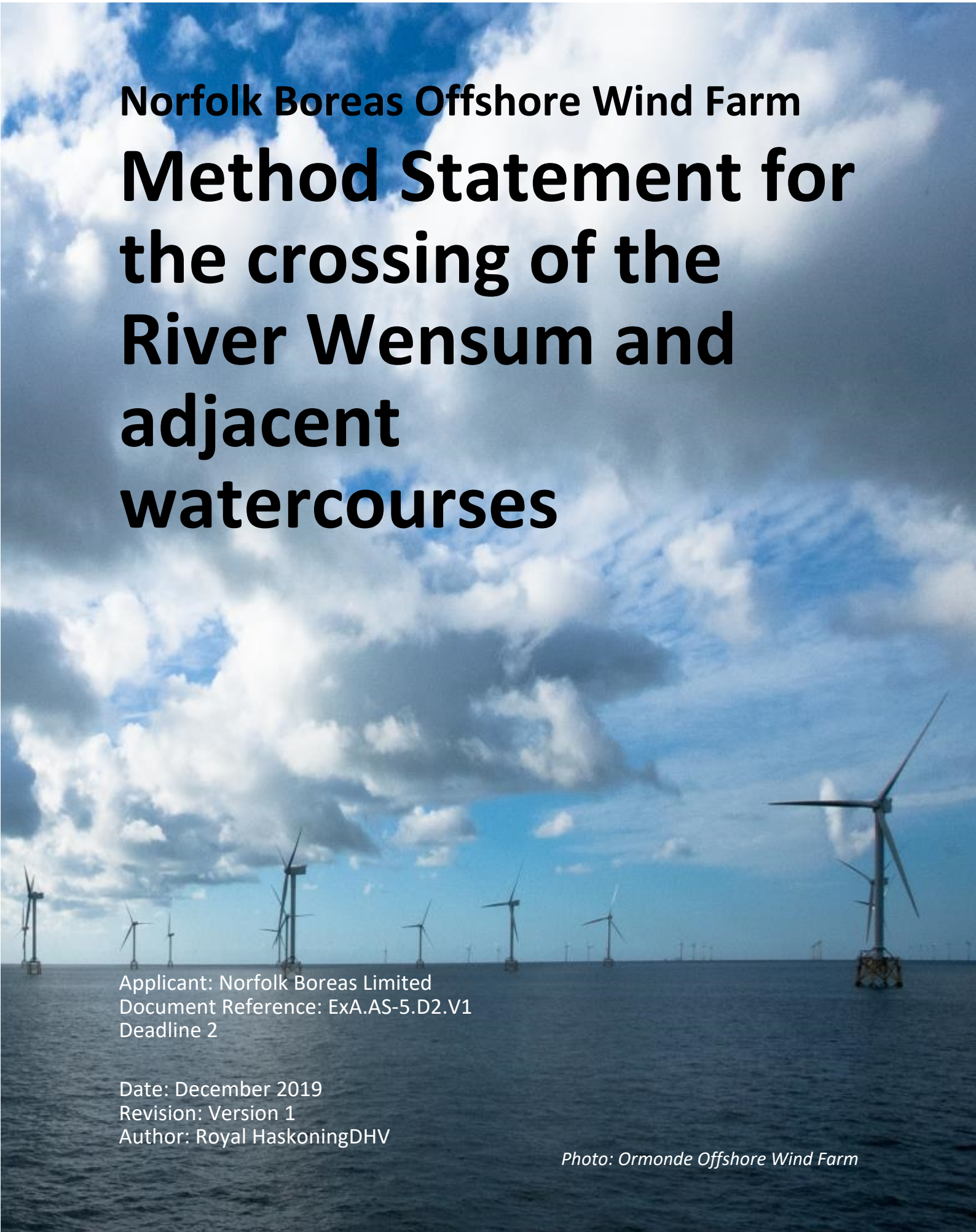

Norfolk Boreas Offshore Wind Farm

Method Statement for the crossing of the River Wensum and adjacent watercourses

Applicant: Norfolk Boreas Limited
Document Reference: ExA.AS-5.D2.V1
Deadline 2

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Revision: Version 1
Author: Royal HaskoningDHV

Photo: Ormonde Offshore Wind Farm

Date	Issue No.	Remarks / Reason for Issue	Author	Checked	Approved
06/12/19	01D	First draft for Deadline 2	AH/CD	VR/JL	JL

Table of Contents

Glossary of Terminology

Ducts	A duct is a length of underground piping, which is used to house electrical and communications cables.
Onshore cable route	The up to 35m working width within a 45m wide corridor which will contain the buried export cables as well as the temporary running track, topsoil storage and excavated material during construction.
Onshore project area	The area of the onshore infrastructure (landfall, onshore cable route, accesses, trenchless crossing zones and mobilisation areas; onshore project substation and extension to the Necton National Grid substation and overhead line modifications).
Running track	The track along the onshore cable route which the construction traffic would use to access work sites.
Trenchless crossing compound	Pairs of compounds at each trenchless crossing zone to allow boring to take place from either side of the crossing.
Trenchless crossing zone	Areas within the onshore cable route which will house trenchless crossing entry and exit points.

1 Introduction

1. Following Issue Specific Hearing 2 on Environmental Matters and Habitat Regulations Assessment held on Thursday 14th November, an action was identified by the Examining Authority for the Applicant to produce a Method Statement for the crossing of the River Wensum and adjacent watercourses. Clarification on this action point was also provided in the Examining Authority's First Written Questions Q12.0.2.

2. This document has been produced in response to these requests and provides an explanation of the cable crossing of the River Wensum and the adjacent watercourses. The crossing of the River Wensum to install ducts is only required under Scenario 2, under Scenario 1 the ducts would have already been installed by Norfolk Vanguard.

2 River Wensum Crossing Methodology

2.1.1 River Wensum Crossings

3. A schedule of the watercourse crossings is provided in Environment Statement (ES) Appendix 20.4 (APP-589), this provides details of the crossing techniques for the duct installation that are proposed for each watercourse crossing along the onshore cable route and the locations of the crossings are identified in Figure 20.1.4 of ES Appendix 20.1 (APP-586). Table 2.1 presents an extract from the watercourse crossing schedule to identify watercourse crossings for the River Wensum and the adjacent watercourses. These crossing locations are shown on Figure 1 and Figure 2.

Table 2.1 River Wensum and adjacent watercourse crossings

ID	Crossing Method	Watercourse Type
86(8)(3)	Trenchless	IDB Drain
86(8)(7)	**Trenchless**	**Main River – River Wensum**
86(7)(3)	Trenchless	IDB Drain
87(7)(5)	Trenchless	IDB Drain
88(4)(1)	Trenchless	Ordinary watercourse

2.1.2 Trenchless Crossing Method

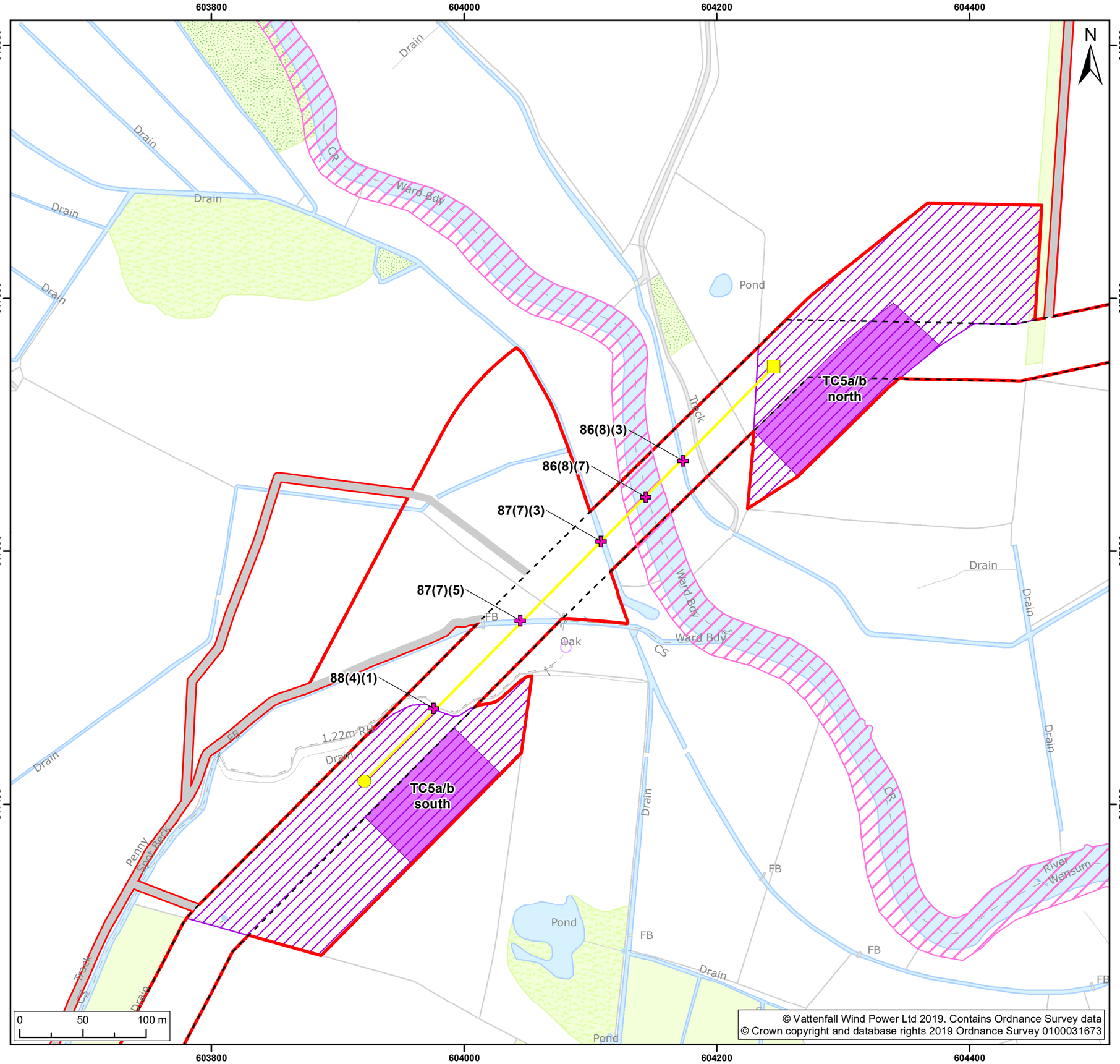
4. The Applicant has committed to installing ducts underneath the River Wensum using a trenchless method, as secured in Requirement 16 of the dDCO. The Applicant also proposes to install ducts underneath the four adjacent watercourses in the vicinity of the River Wensum main channel (identified in Table 2.1).

5. Three trenchless crossing zones have been included in the Application to accommodate up to three trenchless crossing compounds. This facilitates the trenchless duct installation at the River Wensum as there are two drill profiles under consideration. The locations of the trenchless crossing zones are secured by

document 2.4 Work Plans (Sheet 29) (REP1-006). For clarity, the trenchless crossing zone is an area within which the trenchless crossing compounds can be sited, the maximum footprints of the trenchless crossing compounds as secured in the updated dDCO Requirement 16 (15) submitted at Deadline 1 (REP1-008); 7.5000m^2 at each drill entry site and 5,000m^2 at each drill exit site. Flexibility in the location of the trenchless crossing compound within the trenchless crossing zone is required until detailed design of the crossing is completed. The detailed design will include consideration of the final cables to be installed, as this will inform the final drill alignment, size, method and location of entry and exit sites. All duct installation will be conducted within the onshore cable route, with adjacent trenchless compound areas being included to provide storage for materials, welfare facilities and other functions as described in Section 5.7.2.4.3 of ES Chapter 5 Project Description (APP-218).

6. As indicated, there are two potential trenchless crossing installation profiles under consideration, these are illustrated in Figure 1 and Figure 2. The first profile under consideration, illustrated on Figure 1, is a single trenchless crossing profile from a location adjacent to the indicative crossing compounds of TC5a/b to the north of the River Wensum. Under this crossing profile, TC5a would not be required. This crossing profile would only be achievable where cable lengths of over 500m can be delivered due to the length of the crossing.

7. Access to the south would be via the running track within the onshore cable route or AC130 (as identified on sheet 29 document 2.5 Access to Works Plan, APP-011 and Table 3.2 of Outline Traffic Management Plan, REP1-022). Access to the north would be via the running track within the onshore cable route or AC126 (as identified on sheet 29 document 2.5 Access to Works Plan, APP-011 and Table 3.2 of Outline Traffic Management Plan, REP1-022).



Legend:

- Norfolk Boreas Order Limits

Norfolk Boreas Onshore Project Infrastructure Scenario 2

- Onshore cable route
- Construction access
- Trenchless crossing zone (e.g. HDD)
- Indicative trenchless crossing compound
- Profile 1 indicative entry point
- Profile 1 indicative exit point
- Profile 1 indicative drill line

Water crossing location[1]

- Under scenario 2

Environmental Designations[2]

- River Wensum Special Area of Conservation (SAC) / Site of Special Scientific Interest (SSSI)

[1] GHD, 2018 and ES Appendix 20.4 Watercourse Crossing Schedule (APP-589)
[2] Natural England, 2019.

Project:	Report:
Norfolk Boreas	Method Statement for crossing River Wensum and adjacent watercourses

Title: River Wensum Trenchless Crossing Profile 1

Figure: 1 | Drawing No: PB5640-008-007-010

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	28/11/2019	GC	CD	A3	1:3,000

Co-ordinate system: British National Grid **EPSG:** 27700

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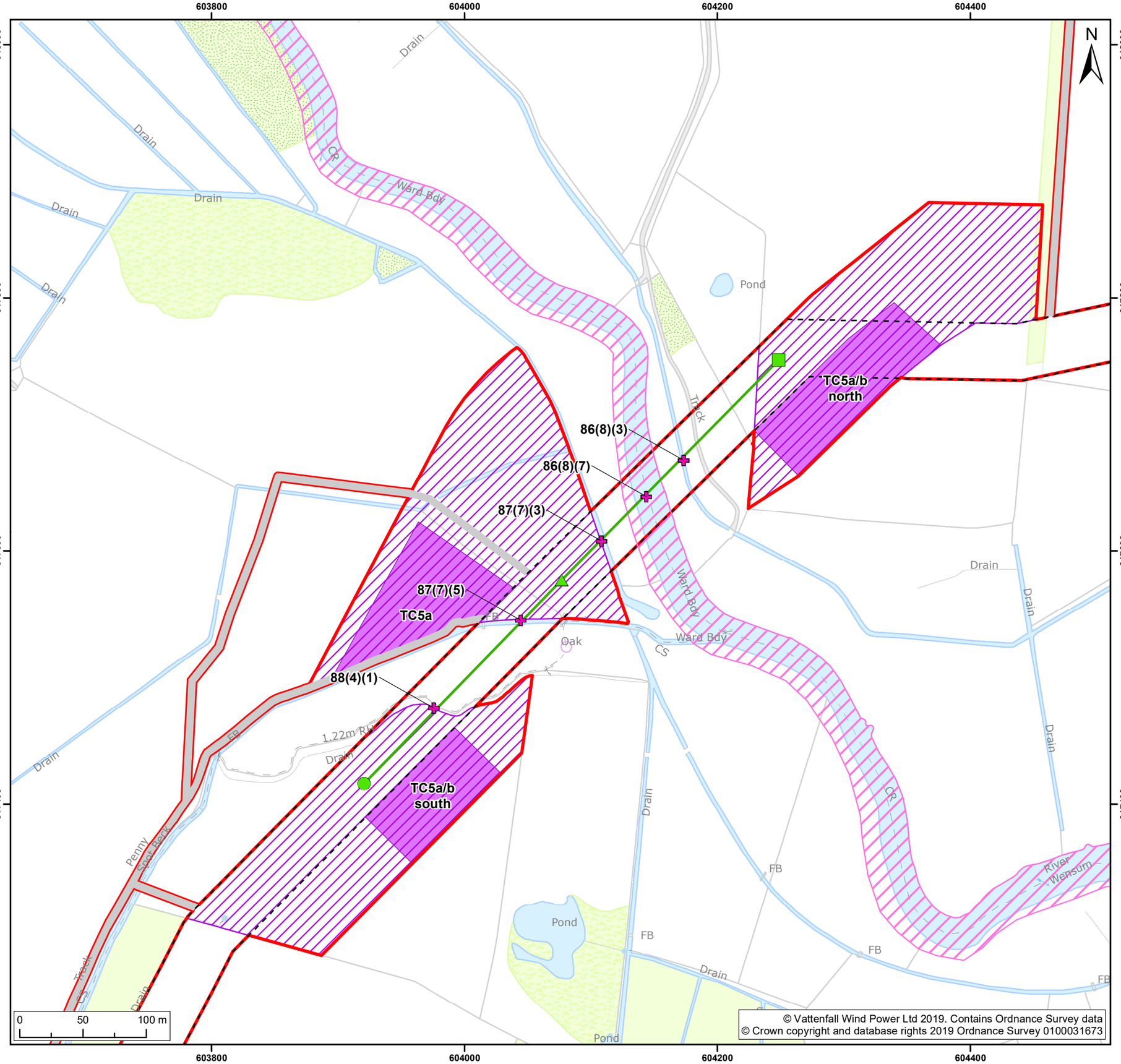
8. The second profile under consideration, illustrated on Figure 2, is a two stage trenchless crossing profile from TC5a/b, via TC5a to TC5a/b. This profile has been included due to the potential size of electrical cable which may be required at the trenchless crossing, due to deeper installation in this location than in trenched locations, and therefore potential limitations on the length of cable which can be delivered on a cable drum which may be 500m or less. In this profile, two separate trenchless crossings will be made to allow for two separate cable installations and a future cable joint in the onshore cable route adjacent to TC5a if required. Access to the TC5a/b compounds would be as per the above profile with access to TC5a being from AC130 (as identified on sheet 29 document 2.5 Access to Works Plan, APP-011). AC130 and TC5a interact with the River Wensum Long Distance Trail (shown on sheet 29 of document 2.6 Temporary stopping up of public rights of way plan), therefore if these are utilised a temporary closure of the trail between points 29a to 29b may be required during the trenchless crossing works.

9. Access point AC128 is an operational access and therefore will not be used during construction so therefore will not be used for the trenchless crossing.

10. The final trenchless crossing profile will be determined post consent following detailed design of the trenchless crossing and selection of the final cable size for deeper (trenchless) installation and associated transport capacity.

11. Further information on the trenchless crossing technique proposed at the River Wensum is provided in Clarification Note on Trenchless Crossing and Potential Effects of Breakout on the River Wensum submitted at Deadline 1 (REP1-039).



Legend:

- Norfolk Boreas Order Limits

Norfolk Boreas Onshore Project Infrastructure Scenario 2

- Onshore cable route
- Construction access
- Trenchless crossing zone (e.g. HDD)
- Indicative trenchless crossing compound
- Profile 2 indicative entry point
- Profile 2 exit and entry point
- Profile 2 indicative exit point
- Profile 2 indicative drill line

Water crossing location[1]

- Under scenario 2

Environmental Designations[2]

- River Wensum Special Area of Conservation (SAC) / Site of Special Scientific Interest (SSSI)

[1] GHD, 2018 and ES Appendix 20.4 Watercourse Crossing Schedule (APP-589)
[2] Natural England, 2019.

Project:	Report:
Norfolk Boreas	Method Statement for crossing River Wensum and adjacent watercourses

Title: River Wensum Trenchless Crossing Profile 2

Figure: 2 | Drawing No: PB5640-008-007-011

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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3 Summary

12. The Applicant is committed to using a trenchless crossing of the River Wensum and adjacent watercourses. Two drill profiles are under consideration at this location and the final drill profile utilised will be dictated by detailed design of the onshore cable and trenchless crossing. To facilitate these alternate profiles, three trenchless crossing zones are identified within the Application at this location, as detailed in Section 2.1.2 and illustrated on Figure 1 and Figure 2. However, under both profiles the River Wensum main channel, adjacent watercourses will all be crossed using a trenchless method.

13. Access to the trenchless crossing zone to the north will be via AC126 or via the running track. Access to the trenchless crossing zones to the south will be via AC130 or via the running track. AC130 and TC5a interact with the River Wensum Long Distance Trail, therefore if these are utilised the trail may be subject to a temporary closure during the trenchless crossing works.