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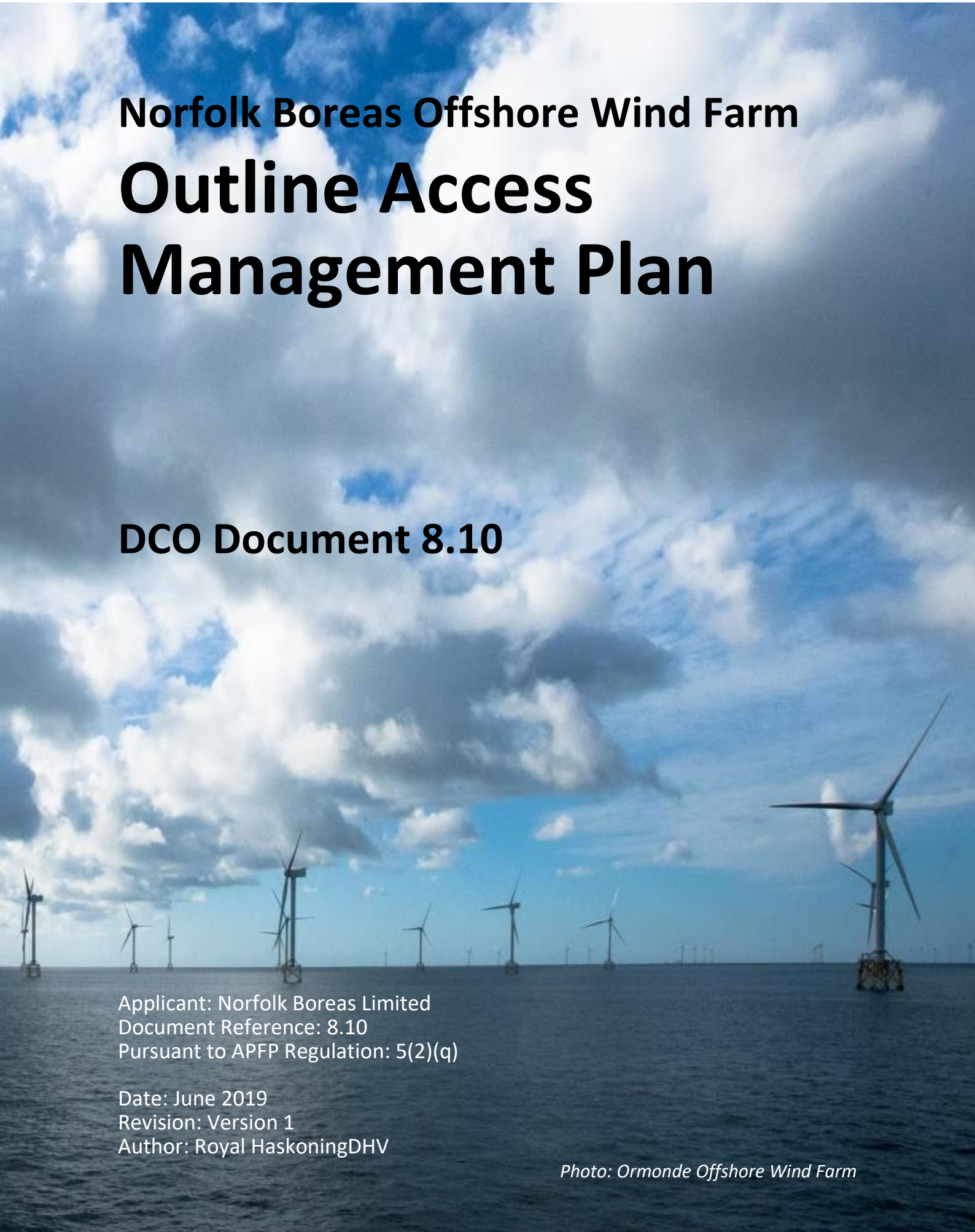

Norfolk Boreas Offshore Wind Farm

Outline Access Management Plan

DCO Document 8.10

Applicant: Norfolk Boreas Limited
Document Reference: 8.10
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Glossary of Acronyms

AC	Access
AMP	Access Management Plan
DCO	Development Consent Order
DMRB	Design Manual for Roads and Bridges
EIA	Environmental Impact Assessment
ES	Environmental Statement
HDD	Horizontal Directional Drilling
HE	Highways England
HGV	Heavy Goods Vehicle
HVDC	High Voltage Direct Current
MA	Mobilisation Area
OAMP	Outline Access Management Plan
OTMP	Outline Traffic Management Plan
OTP	Outline Travel Plan
TC	Trenchless Crossing

Glossary of Terminology

Control Point	A location that provides the checks and controls for the movement of HGVs and employees.
Delivery	A delivery is the process of transporting goods from a source location to a predefined destination. A delivery will generate two vehicle movements (an arrival and departure)
Jointing pit	Underground structures constructed at regular intervals along the onshore cable route to join sections of cable and facilitate installation of the cables into the buried ducts
Landfall	Where the offshore cables come ashore at Happisburgh South
Landfall zone	Area within which the landfall would be located
Mobilisation area	Areas approx. 100 x 100m used as access points to the running track for duct installation. Required to store equipment and provide welfare facilities. Located adjacent to the onshore cable route, accessible from local highways network suitable for the delivery of heavy and oversized materials and equipment.
National Grid overhead line modifications	The works to be undertaken to complete the necessary modification to the existing 400kV overhead lines.
National Grid substation extension	The permanent footprint of the National Grid substation extension.
Necton National Grid substation	The grid connection location for Norfolk Boreas and Norfolk Vanguard
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 cables	The cables which take power and communications from landfall to the onshore project substation
Onshore infrastructure	The combined name for all onshore infrastructure associated with the project from landfall to grid connection.
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).
Onshore project substation	A compound containing electrical equipment to enable connection to the National Grid. The substation will convert the exported power from HVDC to HVAC, to 400kV (grid voltage). This also contains equipment to help maintain stable grid voltage.
Running track	The track along the onshore cable route which the construction traffic would use to access work areas.
The Applicant	Norfolk Boreas Limited
The project	Norfolk Boreas Wind Farm including the onshore and offshore infrastructure.
Trenchless crossing zone	Areas within the onshore cable route which will house trenchless crossing entry and exit points.
Vehicle movement	A single trip (i.e. either an arrival to, or departure from site) for the transfer of employees or goods.
Vehicle (HGV, Traffic) flow	Total vehicle movements on a road (highway link).

1 INTRODUCTION

1.1 Background

1. This document forms part of the Development Consent Order (DCO) application for the onshore project area for the Norfolk Boreas Offshore Wind Farm (hereafter 'the project').

2. A traffic and transport impact assessment has been undertaken for the project and is detailed in Chapter 24 Traffic and Transport of the Environmental Statement (ES) (document reference 6.1.24).

3. In respect of traffic and transport, the certified plans referred to in the DCO are outlined below:

   - Outline Traffic Management Plan (OTMP) (document reference 8.8): the OTMP sets out the standards and procedures for managing the impact of Heavy Goods Vehicles (HGV) traffic during the onshore construction period, including localised road improvements necessary to facilitate the safe use of the existing road network;

   - Outline Travel Plan (OTP) (document reference 8.9): the OTP sets out how onshore construction employee traffic would be managed and controlled; and

   - Outline Access Management Plan (OAMP) (document reference 8.10): the OAMP sets out detail on the location, frontage, general layout, visibility and embedded mitigation measures for access for the onshore project substation, landfall and points of access to the onshore cable route. It presents the requirements and standards that will be incorporated into the final access design.

4. Final plans which accord with these outline documents must be submitted to and approved by the relevant local planning authority (in consultation with Norfolk County Council (NCC) and Highways England (HE)) prior to commencement of any relevant works, as per Requirement 21 of the draft DCO.

5. This OAMP is complimented by the OTMP which details additional measures to facilitate vehicles (particularly HGVs) to safely access the main distributor highway network via the identified access tracks and minor routes during the onshore construction period.

6. Following appointment of a contractor, the respective plan measures (OAMP, OTMP and OTP) would be validated and optimised in consultation with NCC and HE.

1.2 Development Scenarios

7. Vattenfall Wind Power Limited (VWPL), the parent company of Norfolk Boreas Limited, is also developing Norfolk Vanguard, a 'sister project' to Norfolk Boreas. The Norfolk Vanguard project is approximately one year ahead of Norfolk Boreas in its development programme having submitted its DCO application in June 2018. In order to minimise impacts associated with onshore construction works for the two projects, Norfolk Vanguard are seeking consent to undertake the duct installation and some enabling works for both projects at the same time. This is the preferred option and considered to be the most likely however, Norfolk Boreas needs to consider the possibility that Norfolk Vanguard may not proceed to construction.

8. Therefore, it is necessary for this OAMP to consider the following two alternative scenarios:

- **Scenario 1** – Norfolk Vanguard proceeds to construction and installs ducts and other shared enabling works for Norfolk Boreas.
- **Scenario 2** – Norfolk Vanguard does not proceed to construction and Norfolk Boreas proceeds alone. Norfolk Boreas undertakes all works required as an independent project.

1.3 OAMP Approach to Development Scenarios

9. This OAMP is an outline strategy and takes account of both potential development scenarios for the project as discussed in section 1.2.

10. The final OAMP would be drafted post-consent based on the adopted scenario which would be taken forward to construction.

1.4 Purpose of the OAMP

11. The purpose of the OAMP is to set out details on the location, general layout, visibility and embedded mitigation measures for access for the onshore project substation, and points of access to the onshore cable route.

12. The OAMP presents the requirements and standards that will be incorporated into the final Access Management Plan (AMP) pursuant to the discharge of Requirement 21 of the DCO.

13. Norfolk Boreas Limited would define performance standards to be observed as part of the Contractor's obligations to comply with and observe the Requirements 21 and 22 of the DCO.

14. Norfolk Boreas Limited will work with the relevant Local Authorities to ensure that the provisions set out in the OAMP are adhered to.

1.5 Consultation

15. Norfolk Boreas Limited has undertaken pre-application consultation on the project in accordance with the requirements of the Planning Act 2008.

16. To date, consultation regarding traffic and transport has been conducted through a Scoping Report (Royal HaskoningDHV, May 2017), a Traffic and Transport Method Statement (Royal HaskoningDHV, 2018, unpublished) and the Expert Topic Group Meeting held in May 2018. Consultation has also been undertaken through the publishing of the Preliminary Environmental Information Report (Norfolk Boreas Limited, 2018) and subsequent public Drop In Events in November 2018.

17. A programme of consultation was undertaken by Norfolk Vanguard, as Norfolk Boreas is co-located with Norfolk Vanguard, this consultation is relevant to both projects and has been used to inform this document.

18. Further details of consultation undertaken to date is outlined within Chapter 24 Traffic and Transport of the Environmental Statement (ES) (document reference 6.1.24).

1.6 Project Description

19. A comprehensive project description of the onshore project area is contained within Chapter 5 Project Description of the ES (document reference 6.1.5), this includes a detailed comparison of the scenarios provided in Appendix 5.1 (document reference 6.3.5.1).

20. The onshore cable route is approximately 60km in length and travels west from the landfall at Happisburgh South towards the northern edge of North Walsham before bearing southwest to the onshore project substation near Necton as shown in Figure 1.

21. The project could be constructed in either two phases or one continuous phase for the cable pulling. For the purposes of the Environmental Impact Assessment (EIA), a two phase approach was assessed as the worst case for both scenarios.

1.6.1 Scenario 1

22. Under Scenario 1, Norfolk Vanguard proceeds to construction and would have completed the following activities to benefit Norfolk Boreas:

- Installation of ducts to house Norfolk Boreas cables along the entirety of the onshore cable route from the landfall zone to the onshore project substation;
- A47 junction works for both projects and installation of a shared access road up to the Norfolk Vanguard substation; and

- Overhead line modifications at the Necton National Grid substation, which will accommodate both projects.

23. Under Scenario 1 the following onshore elements of the project will be constructed by Norfolk Boreas:

- Installation of ducts and cables at the landfall;
- Cable pulling through pre-installed ducts, including reinstallation of up to approximately 12km of temporary running track;
- Construction of onshore project substation, including extension of the access road from the A47 (installed by Norfolk Vanguard);
- Extension of the Necton National Grid Substation in an easterly direction, with a footprint of approximately 135m by 150m; and
- Landscape mitigation planting.

24. There are two discreet stages in the Scenario 1 construction, namely;

- Stage 1: Landfall and onshore project substation primary works (including National Grid substation extension); and
- Stage 2: Two phase cable pulling, jointing and commissioning

25. Table 1.1 details an indicative construction programme for Scenario 1.

Table 1.1 Indicative project construction programme under Scenario 1

Activity	Year					
	2022	2023	2024	2025	2026	2027
Landfall						
Duct Installation Option A[1]						
Duct Installation Option B[1]						
Cable pulling, jointing and commission						
Phase 1[2]						
Phase 2[2]						
Onshore Cable Route						
Cable pulling, jointing and commission						
Phase 1[2]						
Phase 2[2]						
Onshore Project Substation						
Preconstruction works						
Primary works						
Electrical plant installation and commission						
Phase 1[2]						

Activity	Year					
	2022	2023	2024	2025	2026	2027
Phase 2[2]						

[1]Two potential options for landfall duct installation: Option A install ducts prior to cable pulling; and Option B install ducts at the same time as Norfolk Vanguard.
[2]In the two phase option, cables are installed in two consecutive years to facilitate the commissioning of the offshore wind farm.

1.6.1.1 Scenario 1 - Stage 1: Landfall and onshore project substation primary works

26. The onshore project substation would be accessed via a permanent access which would have been constructed for the Norfolk Vanguard project and construction activities would be served by a Mobilisation Area (MA). The construction of the National Grid substation extension would be served by the existing 'Dudgeon' access (with geometry upgrades undertaken by Norfolk Vanguard) and would be served by a MA.

27. The landfall would be accessed via a preconstructed Norfolk Vanguard access which would either be kept in situ for the Norfolk Boreas works or be required to be reinstalled (if the land has been reinstated by Norfolk Vanguard).

1.6.1.2 Scenario 1 - Stage 2: Cable pulling, jointing and commission

28. Cables would be pulled through the pre-installed ducts (installed by Norfolk Vanguard) in a two phase approach. This approach would allow the main civil works to be completed in advance by Norfolk Vanguard, preventing the requirement to reopen the land on a wholesale basis.

29. The cables would be pulled through the pre-installed ducts at jointing pit locations located along the onshore cable route. The jointing pits and associated accesses would be constructed to facilitate the cable pulling activities.

30. Access to the onshore cable route would be directly from the highway network (at running track crossing locations) or existing local access routes where possible. In some locations, isolated sections of the running track would be left in place from the Norfolk Vanguard duct installation works or be reinstalled (if reinstated by Norfolk Vanguard) to allow access to more remote joint locations. It is estimated that a running track would be required for up to 20% of the total onshore cable route length for the cable pulling works.

31. A review of over 200 access tracks, public highway roads and running track crossing points has been undertaken taking into account potential jointing pit locations. This has narrowed down the potential access points to the 75 locations as presented in this plan (refer to Table 3.1).

32. Figure 2 details the key components of the Scenario 1 onshore infrastructure.

1.6.2 Scenario 2

33. Under Scenario 2, the onshore elements of the project will be constructed by Norfolk Boreas:

- Installation of ducts and cable at the landfall;
- Duct installation via open trenching and trenchless crossings, including installation of 60km of temporary running track;
- Installation of mobilisation areas and trenchless crossing compounds;
- Cable pulling through pre-installed ducts, including retaining or reinstalling up to approximately 12km of temporary running track;
- Construction of onshore project substation, including installation of new permanent access road from A47 and associated junction improvement works;
- Extension of the Necton National Grid Substation in a westerly direction, with a footprint of approximately 200m by 150m;
- Modifications to the existing National Grid overhead lines; and
- Landscape mitigation planting.

34. The onshore cable route would require trenches (within which ducts would be installed to house the cable circuits), a running track to deliver equipment to the installation site from mobilisation areas and separate storage areas for topsoil and subsoil.

35. The main installation method would be through the use of open cut trenching. Ducts would be installed within the trenches and the soil backfilled. Cables would then be pulled though the pre-laid ducts at a later stage in the programme.

36. There are three discrete stages in Scenario 2 construction, namely:

- Stage 1: Pre-construction works e.g. pre-construction surveys;
- Stage 2: Duct installation works, landfall and onshore project substation primary works (including National Grid substation extension); and
- Stage 3: Cable pulling, jointing and commission.

37. Table 1.2 details an indicative construction programme for Scenario 2.

Table 1.2 Indicative project construction programme under Scenario 2

Activity	Year					
	2021	2022	2023	2024	2025	2026
Landfall						
Duct Installation						
Cable Pulling, Jointing and Commission						
Phase 1[1]						

Activity	Year					
	2021	2022	2023	2024	2025	2026
Phase 2[1]						
Onshore cable route						
Pre-construction works						
Duct installation works						
Cable pulling, jointing and commission						
Phase 1[1]						
Phase 2[1]						
Onshore project substation						
Pre-construction works						
Primary works						
Electrical plant installation and commission						
Phase 1[1]						
Phase 2[1]						

[1]In the two phase option, cables are installed in two consecutive years to facilitate the commissioning of the offshore wind turbine planting.

1.6.2.1 Scenario 2 - Stage 1: Pre-construction works

38. The pre-construction stage represents a number of activities with limited traffic demand (e.g. pre-construction surveys). Access to the onshore project area would be via existing tracks; however, some new accesses may be constructed during this phase to facilitate construction at Stage 2.

1.6.2.2 Scenario 2 - Stage 2: Duct installation works and onshore project substation primary works

39. The access strategy for Scenario 2 Stage 2 has been developed to accommodate the following requirements:

- Access to mobilisation areas;
- Crossing of the highway by the project 'running track'; and
- Access to trenchless crossing locations.

40. The onshore duct installation and onshore project substation primary works are serviced by 14 mobilisation areas. The main function of the mobilisation areas is to provide a control point for HGVs delivering to the onshore cable route, as well as providing welfare facilities, parking for staff and storage areas for materials, plant and equipment.

41. The mobilisation areas are located in close proximity to A roads and B roads to concentrate traffic demand away from minor routes. They are located away from settlements to minimise disruption to local communities.

42. The onshore cable route has been separated into 20 cable route sections, which would be accessed from the mobilisation areas via a running track. The running track would provide safe access for construction vehicles along the onshore cable route, from mobilisation areas to duct installation sites and would serve to significantly reduce the number of trips on the local highway network.

43. The running track would be up to 6m wide and may ultimately extend the majority length of the onshore cable route, crossing the public highway in a number of locations.

44. There are a number of physical features which cannot be disturbed by trenching methods or the running track; examples of this include rivers and railway lines. To install the onshore cable route across such features, a trenchless crossing technique[1] would be employed.

45. Each trenchless crossing location would require access to the entry and exit points of the crossing. Access would be via the running track in the majority of cases, however some locations may be totally 'land locked' and therefore require direct access either via a private track from the public highway (referred to as a 'side access') or via a road crossing access direct into the cable route.

46. Figure 3 details the key components of the stage 2 construction phase.

1.6.2.3 Scenario 2 - Stage 3: Cable pulling, jointing and commissionrequi

47. Details of Scenario 2 Stage 3: cable pulling, jointing and commission follows the assumptions set out within paragraphs 28 to 32 of Scenario 1 Stage 2.

48. Cable pulling would not require the trenches to be re-opened. The cables would be pulled through the pre-installed ducts installed during the duct installation works at jointing pit locations located along the onshore cable route. The jointing pits and associated accesses would be constructed during the cable pull phase which would facilitate the cable pulling activities.

49. This would be achieved through access to the onshore cable route directly from the highway network (at running track crossing locations) or existing local access routes where possible. In some locations, isolated sections of the running track would be left in place from the duct installation works or be reinstalled to allow access to

[1] Trenchless crossing techniques include Horizontal Directional Drilling/Auger Bore/Micro Tunnel

more remote joint locations. It is estimated that a running track would be required for up to 20% of the total onshore cable route length for the cable pulling works.

50. The development of the access strategy for this stage has been informed by a reduced demand for materials and employees (relative to stage 2) leading to a substantial reduction in forecast traffic demand.

51. A review of over 200 access tracks, public highway roads and running track crossing points (from the previous construction stage) has been undertaken taking into account potential joint pit locations. This has narrowed down the potential access points to the 75 locations as presented in this plan (refer to Table 3.1).

1.7 Embedded Mitigation

52. Norfolk Boreas Limited has committed to a number of techniques and engineering designs/modifications as part of the project, during the pre-application phase, in order to avoid a number of impacts or reduce impacts as far as possible. Embedding mitigation into the project design is a type of primary mitigation and is an inherent aspect of the EIA process.

53. Full details of the embedded mitigation can be found within Chapter 5 Project description of the ES.

54. The following Table 1.3 outlines the key embedded mitigation measures relevant for this assessment. Where embedded mitigation measures have been developed into the design of the project with specific regard to the traffic forecasts contained in this OAMP these are described in Table 1.4.

Table 1.3 Embedded mitigation

Parameter	Mitigation measures embedded into the project design	Notes
Project Wide		
Commitment to HVDC technology	Commitment to HVDC technology minimises environmental impacts through the following design considerations; • HVDC requires fewer cables than the HVAC solution. During the duct installation phase in Scenario 2 this reduces the cable route working width to 35m from the previously identified worst case of 50m. As a result, the overall footprint of the onshore cable route required for the duct installation phase is reduced from approx. 300ha to 210ha; • The width of permanent cable easement is also reduced from 25m to 13m; • Removes the requirement for a cable relay station; • Reduces the maximum duration of the cable pulling phase from three years down to two years; • Reduces the total number of jointing bays for Norfolk Boreas from 450 to 150; and Reduces the number of drills needed at trenchless crossings	Norfolk Boreas Limited has reviewed consultation received and in light of the feedback, has made a number of decisions in relation to the project design. One of these decisions is to deploy HVDC technology as the export system.

Parameter	Mitigation measures embedded into the project design	Notes
	(including landfall).	
Site Selection	The project has undergone an extensive site selection process which has involved incorporating environmental considerations in collaboration with the engineering design requirements. Considerations include (but are not limited to) adhering to the Horlock Rules for the onshore project substation and National Grid infrastructure, a preference for the shortest route length (where practical) and developing construction methodologies to minimise potential impacts. Key design principles from the outset were followed (wherever practical) and further refined during the EIA process, including; • Avoiding proximity to residential dwellings; • Avoiding proximity to historic buildings; • Avoiding designated sites; • Minimising impacts to local residents in relation to access to services and road usage, including footpath closures; • Utilising open agricultural land, therefore reducing road carriageway works; • Minimising requirement for complex crossing arrangements, e.g. road, river and rail crossings; • Avoiding areas of important habitat, trees, ponds and agricultural ditches; • Installing cables in flat terrain maintaining a straight route where possible for ease of pulling cables through ducts; • Avoiding other services (e.g. gas pipelines) but aiming to cross at close to right angles where crossings are required; • Minimising the number of hedgerow crossings, utilising existing gaps in field boundaries; • Avoiding rendering parcels of agricultural land inaccessible; and Utilising and upgrading existing accesses where possible to avoid impacting undisturbed ground.	Constraints mapping and sensitive site selection to avoid a number of impacts, or to reduce impacts as far as possible, is a type of primary mitigation and is an inherent aspect of the EIA process. Norfolk Boreas Limited has reviewed consultation received to inform the site selection process (including local communities, landowners and regulators) and in response to feedback, has made a number of decisions in relation to the siting of project infrastructure. The site selection process is set out in Chapter 4 Site Selection and Assessment of Alternatives.
Long Horizontal Directional Drilling (HDD) at landfall	Use of long HDD at landfall to avoid restrictions or closures to Happisburgh beach and retain open access to the beach during construction. Norfolk Boreas Limited have also agreed to not use the beach car park at Happisburgh South.	Norfolk Boreas Limited has reviewed consultation received and in response to feedback, has made a number of decisions in relation to the project design. One of those decisions is to use long HDD at landfall.
Scenario 1		
Strategic approach to delivering Norfolk Vanguard and	Subject to both Norfolk Vanguard and Norfolk Boreas receiving development consent and progressing to construction, onshore ducts will be installed for both projects at the same time, as part of the Norfolk Vanguard construction works. This would allow the main civil works for the cable route to be completed in one construction period and in advance of cable delivery, preventing the requirement to reopen the land in order to minimise	The strategic approach to delivering Norfolk Vanguard and Norfolk Boreas has been a consideration from the outset of the project.

Parameter	Mitigation measures embedded into the project design	Notes
Norfolk Boreas	disruption. Onshore cables would then be pulled through the pre-installed ducts in a phased approach at later stages. In accordance with the Horlock Rules, the co-location of Norfolk Vanguard and Norfolk Boreas onshore project substations will keep these developments contained within a localised area and, in so doing, will contain the extent of potential impacts.	
Scenario 2		
Duct Installation	Under Scenario 2 the onshore cable duct installation strategy is proposed to be conducted in a sectionalised approach in order to minimise impacts. Construction teams would work on a short length (approximately 150m section) and once the cable ducts have been installed, the section would be back filled and the top soil replaced before moving onto the next section. This would minimise the amount of land being worked on at any one time and would also minimise disruption.	This has been a very early project commitment. Chapter 5 Project Description provides a detailed description of the process.
Trenchless Crossings	Under Scenario 2 a commitment to trenchless crossing techniques to minimise impacts to the following specific features; • Wendling Carr County Wildlife Site; • Little Wood County Wildlife Site; • Land South of Dillington Carr County Wildlife Site; • Kerdiston proposed County Wildlife Site; • Marriott's Way County Wildlife Site / Public Right of Way (PRoW); • Paston Way and Knapton Cutting County Wildlife Site; • Norfolk Coast Path; • Witton Hall Plantation along Old Hall Road; • King's Beck; • River Wensum; • River Bure; • Wendling Beck; • Wendling Carr; • North Walsham and Dilham Canal; • Network Rail line at North Walsham that runs from Norwich to Cromer; • Mid-Norfolk Railway line at Dereham that runs from Wymondham to North Elmham; and Trunk/Principal Roads including A47, A140, A149, A1067..	A commitment to a number of trenchless crossings at certain sensitive locations was identified at the outset of the Project., Norfolk Boreas Limited has committed to additional trenchless crossings as a direct response to stakeholder requests.

Table 1.4 Embedded mitigation for traffic and transport

Parameter	Mitigation measures embedded into the project design	Applicable to Scenario 1	Applicable to Scenario 2	Notes
Mobilisation Areas	Mobilisation areas located close to main A-roads and B-roads where possible, minimising impacts upon local communities and utilising the most suitable roads.	N/A	✓	Details contained within in the OTMP (document reference 8.8)

Parameter	Mitigation measures embedded into the project design	Applicable to Scenario 1	Applicable to Scenario 2	Notes
	Mobilisation areas located away from population centres where practical to reduce impact on local communities and population centres.			
Duct Installation	Suitable access points and identification of optimum routes for construction traffic to use. This minimises impacts on sensitive receptors.	N/A	✓	Details contained within in the OTMP (document reference 8.8)
Cable Pulling and Jointing Stage access	Suitable side accesses and road crossing locations reviewed from initial schedule of 200+ access points to 76 realistic potential access points to minimise local route impacts.	✓	✓	Details contained within the OTMP (document reference 8.8)
HGV Vehicle Movement	Construction of an (up to) 6m wide running track. This would reduce the number of access points required and HGV movements on the local road network.	✓ (12km)	✓ (60km)	Details contained within the OTMP (document reference 8.8)
	Consolidating HGVs at mobilisation areas to reduce vehicle movements along more sensitive local routes.	✓ (Ma1b only)	✓	
	Carefully selected delivery routes acknowledging the sensitive receptors within the study area Management measures to control timing deliveries.	✓	✓	
Employee Vehicle Movement	Consolidating onshore cable route section construction employee movements at mobilisation areas. Onward travel along the running track to place of work reducing vehicle movements along local routes.	✓ (Ma1b only)	✓	Details contained within the OTP (document reference 8.9)

2 ACCESS STRATEGY

2.1 Access Strategy Summary

55. Table 2.1 details all accesses (AC) required for Scenario 1 and Scenario 2. Locations for ACs are detailed graphically in the Access to Works Plan (document reference 2.5), submitted as part of the DCO application.

56. The project components to be accessed are detailed as follows: MA (mobilisation area), TC (trenchless crossing location), cable section, landfall and onshore project substation.

Table 2.1 Access location and function

Access ID	Highway Link	Potential Access Route	Scenario 1		Scenario 2	
			Stage 1	Stage 2	Stage 2	Stage 3
AC3	Whimpwell Street	B1159, Vicarage Road, The Common, Coronation Road, Whimpwell Street	Landfall	Cable Section 16	Landfall	Cable Section 16
AC5	Grub Street	B1159, N Walsham Road, Grub Street	Not required	Cable Section 16	Crossing only	Cable Section 16
AC10	Walcott Green	B1159, N Walsham Road, Walcott Green	Not required	Cable Section 16	Crossing only	Cable Section 16
AC12	North Walsham Road	B1159, North Walsham Road	Not required	Cable Section 16	Not required	Cable Section 16
AC13	North Walsham Road	B1159, North Walsham Road	Not required	Cable Section 15 & 16	MA11 (Cable section 17 & 18)	Cable Section 15 & 16
AC16	North Walsham Road	B1159, Happisburgh Road, N Walsham Road	Not required	Cable Section 15	Crossing only	Cable Section 15
AC18	Hole House Road	B1159, Happisburgh Road, N Walsham Road, Hole House Road	Not required	Cable Section 15	Crossing only	Cable Section 15
AC20	Edingthorpe	B1159, N Walsham Road, Bacton Road, Edingthorpe	Not required	Cable Section 15	Not required	Cable Section 15
AC21	Bacton Road	B1159, Happisburgh Road, N Walsham Road, Bacton Road	Not required	Cable Section 15	Crossing only	Cable Section 15
AC22	Edingthorpe Road	B1159, Happisburgh Road, N Walsham Road, Bacton Road, Edingthorpe Road	Not required	Cable Section 15	Crossing only	Cable Section 15

Access ID	Highway Link	Potential Access Route	Scenario 1		Scenario 2	
			Stage 1	Stage 2	Stage 2	Stage 3
AC24	Edingthorpe	B1159, Bloodslat Lane, N Walsham Road, Plantation Road	Not required	Cable Section 14	TC16(e)	Cable Section 14
AC25	Plantation Road	B1159, Bloodslat Lane, N Walsham Road, Plantation Road	Not required	Cable Section 14	MA10a Cable Section 17a TC16(w).	Cable Section 14
AC28	North Walsham Road	B1159, Bloodslat Lane, N Walsham Road	Not required	Cable Section 14	Crossing only	Cable Section 14
AC32	Paston Road	B1159, Bloodslat Lane, N Walsham Road, Paston Road	Not required	Cable Section 14	Crossing only	Cable Section 14
AC34	Hall Lane	B1145, Bacton Road, Hall Lane	Not required	Cable Section 14	TC15(e)	Cable Section 14
AC35	Hall Lane	B1159, Bloodslat Lane, N Walsham Road, Hall Lane	Not required	Cable Section 14	TC15(e)	Cable Section 14
AC37	Little London Road	B1145, Little London Road	Not required	Cable Section 14	TC14(e), TC15(w)	Cable Section 14
AC38	B1145	B1145	Not required	Cable Section 14	MA10 (Cable Section 15 & 16a) TC13(e)	Cable Section 14
AC47	A149	A149	Not required	Cable Section 13	MA9 (Cable section 14) TC12(e)(w), TC13(w)	Cable Section 13

Access ID	Highway Link	Potential Access Route	Scenario 1		Scenario 2	
			Stage 1	Stage 2	Stage 2	Stage 3
AC49	Felmingham Road	B1145, Felmingham Road	Not required	Cable Section 13	Crossing only	Cable Section 13
AC50	Felmingham Road	B1145, Felmingham Road	Not required	Cable Section 13	Not required	Cable Section 13
AC51	Brick Kiln Lane	B1145, Felmingham Road, Brick Kiln Lane	Not required	Cable Section 13	Not required	Cable Section 13
AC55	Suffield Road	B1145, Suffield Road	Not required	Cable Section 12	TC11(e)	Cable Section 12
AC57	Church Road, into farm access	A140, High Noon Road, Church Road	Not required	Cable Section 12	TC11(w)	Cable Section 12
AC58	Church Road	A140, High Noon Road, Church Road	Not required	Cable Section 12	Crossing only	Cable Section 12
AC62	Banningham Road	A140, Banningham Road	Not required	Cable Section 11	Crossing only	Cable Section 11
AC66	A140	A140	Not required	Cable Section 11	MA8 (Cable section 13) TC10(w)(e), TC9(w)	Cable Section 11
AC75	Un-named Road	B1149, B1354 (Brickling Road), Un-named Road	Not required	Cable Section 11	TC9(w)	Cable Section 11
AC77	Blickling Road	B1149, B1354 (Brickling Road)	Not required	Cable Section 10 & 11	Crossing only	Cable Section 10 & 11
AC78	Blickling Road	B1149, B1354 (Blickling Road)	Not required	Cable Section 10	Not required	Cable Section 10

Access ID	Highway Link	Potential Access Route	Scenario 1		Scenario 2	
			Stage 1	Stage 2	Stage 2	Stage 3
AC84	Heydon Road	B1149, The Street, Heydon Road	Not required	Cable Section 10	MA7 (Cable section 11 & 12)	Cable Section 10
AC85	Heydon Road	B1149, The Street, Heydon Road	Not required	Cable Section 10	Not required	Cable Section 10
AC88	The Street	B1149, The Street	Not required	Cable Section 9	Not required	Cable Section 9
AC89	B1149	B1149	Not required	Cable Section 9	Crossing only	Cable Section 9
AC91	Southgate (Road to Southgate from B1149)	B1149, Southgate	Not required	Cable Section 9	Not required	Cable Section 9
AC92	Southgate (Road to Southgate from B1149)	B1149, Southgate	Not required	Cable Section 9	Crossing only	Cable Section 9
AC96	Heydon Road	B1149, B1145, Heydon Road	Not required	Cable Section 9	Crossing only	Cable Section 9
AC101	B1145 (Cawston)	B1149, B1145	Not required	Cable Section 8	MA6 (Cable section 9 & 10)	Cable Section 8
AC103	B1145 (Cawston)	B1149, B1145	Not required	Cable Section 8	TC8(e)	Cable Section 8
AC104	B1145 (Reepham)	B1145	Not required	Cable Section 8	Cable section 9a TC7(e), TC8(w)	Cable Section 8

Access ID	Highway Link	Potential Access Route	Scenario 1		Scenario 2	
			Stage 1	Stage 2	Stage 2	Stage 3
AC106	Wood Dalling Road	B1145, Wood Dalling Road	Not required	Cable Section 8	Crossing only	Cable Section 8
AC107	Worlds End Lane	B1149, B1145, Wood Dalling Road, Worlds End Lane	Not required	Cable Section 8	Not required	Cable Section 8
AC109	B1145 (Bawdeswell)	A1067	Not required	Cable Section 7	Cable section 8a TC7(w)	Cable Section 7
AC110	B1145 (Bawdeswell)	A1067	Not required	Cable Section 7	Cable section 8a TC6(n)	Cable Section 7
AC111	B1145 (Bawdeswell)	A1067	Not required	Cable Section 7	TC6(s)	Cable Section 7
AC120	Private Access Track (Adjacent to Well Lane)	A1067, B1145, Private Access Track (Adjacent to Well Lane)	Not required	Cable Section 6	MA 5b (Cable section 8)	Cable Section 6
AC121	Lime Kiln Road	A1067, Lime Kiln Road	Not required	Cable Section 6	MA 5a (Cable section 7)	Cable Section 6
AC125	Mill Street	A1067, Elsing Lane, Mill Street	Not required	Cable Section 5	Crossing only	Cable Section 5
AC126	Unnamed Road to Bylaugh Hall	A1067, Elsing Lane, Unnamed Road to Bylaugh Hall	Not required	Cable Section 5	Cable section 16a TC5(e)	Cable Section 5
AC127	Elsing Road	A1067, B1147, Elsing Road	Not required	Cable Section 5	Not required	Cable Section 5

Access ID	Highway Link	Potential Access Route	Scenario 1		Scenario 2	
			Stage 1	Stage 2	Stage 2	Stage 3
AC130	Elsing Road	A1067, B1147, Elsing Road	Not required	Cable Section 5	TC5(w)	Cable Section 5
AC131	Elsing Road, Private Access Track	A1067, B1147, Elsing Road, Private Access Track	Not required	Cable Section 5	Not required	Cable Section 5
SA134	Mowles Road, Farm Access Track	A47, B1147 (Norwich Road), Mowles Road, Farm Access Track	Not required	Cable Section 4	Not required	Cable Section 4
AC135	Norwich Road	A47, B1147 (Norwich Road), Mowles Road, Norwich Road	Not required	Cable Section 4	Crossing only	Cable Section 4
AC136	Luddenham Road	A47, B1147 (Norwich Road), Mowles Road, Luddenham Road	Not required	Cable Section 4	MA4 (Cable section 5 & 6)	Cable Section 4
AC137	Swanton Road	A47, B1147 (Norwich Road), Mowles Road, Luddenham Road, Swanton Road	Not required	Cable Section 4	Crossing only	Cable Section 4
AC141	Hoe Road South	A47, B1147 (Norwich Road), Mowles Road, Luddenham Road, Swanton Road, Hoe Road South	Not required	Cable Section 4	Not required	Cable Section 4
AC142	Hoe Road South	A47, B1147 (Norwich Road), Mowles Road, Luddenham Road, Swanton Road, Hoe Road South	Not required	Cable Section 4	Not required	Cable Section 4
AC143	Hoe Road South	A47, B1147 (Norwich Road), Mowles Road, Luddenham Road, Swanton Road, Hoe Road South	Not required	Cable Section 4	TC4(w)(e)	Cable Section 4

Access ID	Highway Link	Potential Access Route	Scenario 1		Scenario 2	
			Stage 1	Stage 2	Stage 2	Stage 3
AC144	Back Lane	A1067, B1145, B1110	Not required	Cable Section 4	Crossing only	Cable Section 4
AC146	B1146 (Holt Road)	A1067, B1145, B1110	Not required	Cable Section 3	MA4 (Cable section 3 & 4)	Cable Section 3
AC147	B1146 (Holt Road)	A1067, B1145, B1110	Not required	Cable Section 3	Not required	Cable Section 3
AC150	Mill Lane	A1067, B1146, Gressenhall Road to Dillington	Not required	Cable Section 3	TC3b(e)	Cable Section 3
AC151	Church Lane	A1067, B1146, Gressenhall Road to Dillington, Church Lane	Not required	Cable Section 3	TC3b(w)	Cable Section 3
AC152	Church Lane	B1146, Rushmeadow Rd, Longham Rd	Not required	Cable Section 3	TC3a(w)	Cable Section 3
AC159	Unnamed Road	A47, Unnamed Road	Not required	Cable Section 2	MA2 (Cable Section 2 TC1(n), TC2(n)(s)	Cable Section 2
AC160	Dale Road	A47, Dale Road	Not required	Cable Section 2	Not required	Cable Section 2
AC162	Dereham Road	A47, Greenbanks Road, Dereham Road	Not required	Cable Section 2	MA 1b (Cable section 1) TC1(s)	Cable Section 2
AC163	Dale Road	A47, Greenbanks Road, Dereham Road, Dale Road	Not required	Cable Section 2	Crossing only	Cable Section 2

Access ID	Highway Link	Potential Access Route	Scenario 1		Scenario 2	
			Stage 1	Stage 2	Stage 2	Stage 3
AC164	Dereham Road	A47, Greenbanks Road	Not required	Cable Section 2	Crossing only	Cable Section 2
AC165	Bradenham Lane	A47, Bradenham Lane	Not required	Cable Section 2	Not required	Cable Section 2
AC166	Bradenham Lane	A47, Bradenham Lane	Not required	Cable Section 1	Not required	Cable Section 1
AC178	A47	A47	National Grid Substation Extension	Not required	National Grid Substation Extension	Not required
AC179	A47	A47	Not required	Not required	National Grid Overhead Line Modifications	Not required
AC180	A47	A47	Onshore Substation	Not required	Onshore Substation	Not required

3 ACCESS DESIGN

3.1 General Approach

57. The OAMP presents access design principles and concepts to be developed by the appointed contractor.

58. The recommendations contained within this document will be subject to detailed engineering and assessment of traffic management requirements in consultation with the relevant authorities (NCC and HE).

59. This process will ultimately determine the design requirement at each of the project access points referred to in Table 2.1, including visibility requirements, adoption of any temporary speed reductions or other traffic management measures and any agreed departures from DMRB standards.

60. In addition to the powers set out in the draft DCO, relevant powers under the Highways Act (1980), the Road Traffic Regulation Act (1984) and the New Roads and Street Works Act (1991) may also be relied upon to implement the access strategy (e.g. to implement temporary speed limits).

61. The relevant drainage authorities would be consulted when determining appropriate access treatment to cross a watercourse.

62. Apart from the onshore project substation, all other project access points are temporary and following completion of construction would be reinstated to their former state unless otherwise agreed with the relevant local authority.

63. The design process will be supported by a Stage 1 Road Safety Audit[2] of each location.

3.2 Design Considerations

64. Access to the onshore cable route has been developed assuming the use of a suitably sized HGV (a 20t payload tipper and a low loader). The design of the accesses will provide suitable radii/ overrun areas for these vehicle types.

65. To minimise overrun areas on minor roads, it is assumed the HGVs entering the side access will be able to use the entire width of the side access carriageway to manoeuvre (rather than adhere to lane discipline).

66. With the exception of a small number of locations, the majority of the local highway network operates a 60mph speed limit. Most of the roads are rural, single

[2] Stage 1 Assessment undertaken at completion of preliminary design.

carriageway or tracks with no footways or street lighting present; many with established hedgerows or trees forming the highway boundary.

67. The Design Manual for Roads and Bridges (DMRB) is adopted as the most appropriate design standard for major roads (A and B roads) and for visibility splays for all roads.

68. Minor road access design has been developed by means of 'first principles' i.e. using vehicle simulation tools to size the side access.

69. The guiding principle in developing the access designs is to minimise the impact on the surrounding environment. Recognising the temporary nature of the majority of the accesses, opportunities will be sought to 'step below' design standards to minimise impact whist maintaining safety.

70. If a requisite visibility splay cannot be achieved without substantial hedgerow removal, in the first instance the designer will seek to introduce speed limits/traffic management to reduce the distance required.

3.3 Access Designs

3.3.1 Access Design Concepts

71. Four access design concepts have been developed for the project through the ETG consultation process as shown in Appendix 1:

- Type A access: a fully standard compliant (DMRB) major/ minor road junction (as shown in RHDHV drawing PB5640-DR-H1-D-0100). Intended for use on A and major B roads. For this type of access, the requirement for a major road right turn lane would be determined in accordance with validated turning traffic demand;
- Type B and C access: a reduced footprint access suitable for small B roads, minor and unclassified roads (as shown in RHDHV drawing PB5640-DR-H1-D-0101); and
- Type D access: a running track crossing point. This type of access could be adapted for limited construction traffic demand by adding radii to provide access where required to create a suitable access type A, B or C (as shown in RHDHV drawing PB5640-DR-H1-D-102).

72. Traffic control for each access type will be determined according to background traffic flow and visibility and would range from a simple priority junction to traffic signal control. For roads with high traffic flows a 'staggered' arrangement would be considered, incorporating type A access.

73. In all cases advance hazard warning signs will be provided in accordance with the Traffic Signs Manual, Chapter 8, Traffic Safety Measures and Signs for Road Works and Temporary Solutions, Parts 1 and 2, commonly referred to as Chapter 8. This signage will encourage drivers to slow in the knowledge that there is a hazard ahead such as the potential for turning vehicles.

74. The required public highway crossings and side accesses have been reviewed to determine appropriate access type and the requirement for traffic management to secure a suitable visibility splay. The results are set out in Table 3.1.

Table 3.1 Access review

Access ID	Scenario 1 – Stage 1 Scenario 2 – Stage 2 Access Type Required	Main Duct Installation / Primary Works Stage Peak HGVs Movements (Daily)		Scenario 1 – Stage 2 Scenario 2 – Stage 3 Access Type Required	Cable Pulling Stage Peak HGVs Movements (Daily)		Existing speed limit (mph)	Visibility compliance* for existing design speed (Y/N)	Temp speed reduction required (Y/N)
		Scenario 1 – Stage 1	Scenario 2 - Stage 2		Scenario 1 – Stage 2	Scenario 2 - Stage 3			
AC3	D/B or C	34	30	B or C	31	31	30	Y	N
AC5	D	-	-	B or C	31	31	60	N	Y
AC10	D	-	-	B or C	31	31	60	N	Y
AC12	-	-	-	B or C	31	31	60	N	Y
AC13	B or C	-	80	B or C	33	33	60	N	Y
AC16	D	-	-	B or C	33	33	30	Y	N
AC18	D	-	-	B or C	33	33	60	N	Y
AC20	-	-	-	B or C	33	33	60	N	Y (East only)
AC21	D	-	-	B or C	33	33	60	Y	Y
AC22	D	-	-	B or C	33	33	60	N	Y

Access ID	Scenario 1 – Stage 1 Scenario 2 – Stage 2 Access Type Required	Main Duct Installation / Primary Works Stage Peak HGVs Movements (Daily)		Scenario 1 – Stage 2 Scenario 2 – Stage 3 Access Type Required	Cable Pulling Stage Peak HGVs Movements (Daily)		Existing speed limit (mph)	Visibility compliance* for existing design speed (Y/N)	Temp speed reduction required (Y/N)
		Scenario 1 – Stage 1	Scenario 2 - Stage 2		Scenario 1 – Stage 2	Scenario 2 - Stage 3			
AC24	B or C	-	72	B or C	33	33	60	N	Y
AC25	B or C	-	72	B or C	30	30	60	N	Y
AC28	D	-	-	B or C	30	30	60	N	Y
AC32	D	-	-	B or C	30	30	60	N	Y
AC34	B or C	-	72	B or C	30	30	60	N	Y
AC35	D/B or C	-	72	B or C	30	30	60	N	Y
AC37	B or C	-	48	B or C	30	30	60	N	Y
AC38	A	-	152	B or C	30	30	30	Y	N
AC47	A	-	112	B or C	37	37	60	Y	N
AC49	D	-	-	B or C	37	37	60	N	Y
AC50	-	-	-	B or C	37	37	60	Y	N

Access ID	Scenario 1 – Stage 1 Scenario 2 – Stage 2 Access Type Required	Main Duct Installation / Primary Works Stage Peak HGVs Movements (Daily)		Scenario 1 – Stage 2 Scenario 2 – Stage 3 Access Type Required	Cable Pulling Stage Peak HGVs Movements (Daily)		Existing speed limit (mph)	Visibility compliance* for existing design speed (Y/N)	Temp speed reduction required (Y/N)
		Scenario 1 – Stage 1	Scenario 2 - Stage 2		Scenario 1 – Stage 2	Scenario 2 - Stage 3			
AC51	-	-	-	B or C	37	37	60	Y	N
AC55	D/B or C	-	72	B or C	31	31	60	N	Y
AC57	B or C	-	72	B or C	31	31	60	N	Y
AC58	D	-	-	B or C	31	31	60	N	Y
AC62	D	-	-	B or C	34	34	60	N	Y
AC66	A	-	136	B or C	34	34	60	Y	N
AC75	B or C	-	72	B or C	34	34	60	Y	N
AC77	D	-	-	B or C	37	37	60	N	Y
AC78	-	-	-	B or C	37	37	60	N	Y
AC84	D/B or C	-	80	B or C	37	37	60	N	Y
AC85	-	-	-	B or C	35	35	60	Y	N

Access ID	Scenario 1 – Stage 1 Scenario 2 – Stage 2 Access Type Required	Main Duct Installation / Primary Works Stage Peak HGVs Movements (Daily)		Scenario 1 – Stage 2 Scenario 2 – Stage 3 Access Type Required	Cable Pulling Stage Peak HGVs Movements (Daily)		Existing speed limit (mph)	Visibility compliance* for existing design speed (Y/N)	Temp speed reduction required (Y/N)
		Scenario 1 – Stage 1	Scenario 2 - Stage 2		Scenario 1 – Stage 2	Scenario 2 - Stage 3			
AC88	-	-	-	B or C	35	35	60	Y	N
AC89	-	-	-	-	-	-	-	n/a	n/a
AC91	-	-	-	B or C	29	29	60	N	Y
AC92	D	-	-	B or C	29	29	60	N	Y
AC96	D	-	-	B or C	29	29	60	N	N
AC101	D/A	-	80	A	32	32	60	Y	N
AC103	A	-	72	A	32	32	60	N	Y
AC104	D/A	-	112	A	32	32	60	N	Y
AC106	D	-	-	B or C	32	32	60	N	Y
AC107	-	-	-	B or C	32	32	60 N/ 30 S	N (North only)	Y (North only)
AC109	B or C	-	72	B or C	40	40	60	N	Y

Access ID	Scenario 1 – Stage 1 Scenario 2 – Stage 2 Access Type Required	Main Duct Installation / Primary Works Stage Peak HGVs Movements (Daily)		Scenario 1 – Stage 2 Scenario 2 – Stage 3 Access Type Required	Cable Pulling Stage Peak HGVs Movements (Daily)		Existing speed limit (mph)	Visibility compliance* for existing design speed (Y/N)	Temp speed reduction required (Y/N)
		Scenario 1 – Stage 1	Scenario 2 - Stage 2		Scenario 1 – Stage 2	Scenario 2 - Stage 3			
AC110	B or C	-	72	B or C	40	40	60	N	Y
AC111	B or C	-	72	B or C	40	40	60	N	Y
AC120	A	-	40	A	34	34	60	Y	N
AC121	B or C	-	40	B or C	34	34	60	N	Y
AC125	D	-	-	B or C	30	30	60	N	Y
AC126	B or C	-	72	B or C	30	30	60	N	Y
AC127	D/B or C	-	-	B or C	30	30	60	N	Y
AC130	B or C	-	72	B or C	30	30	60	Y	N
AC131	-	-	-	B or C	30	30	60	N	Y
AC134	-	-	-	B or C	29	29	60	N	Y
AC135	D	-	-	B or C	29	29	60	N	Y

Access ID	Scenario 1 – Stage 1 Scenario 2 – Stage 2 Access Type Required	Main Duct Installation / Primary Works Stage Peak HGVs Movements (Daily)		Scenario 1 – Stage 2 Scenario 2 – Stage 3 Access Type Required	Cable Pulling Stage Peak HGVs Movements (Daily)		Existing speed limit (mph)	Visibility compliance* for existing design speed (Y/N)	Temp speed reduction required (Y/N)
		Scenario 1 – Stage 1	Scenario 2 - Stage 2		Scenario 1 – Stage 2	Scenario 2 - Stage 3			
AC136	D/A	-	80	B or C	29	29	60	N	Y
AC137	D	-	-	B or C	29	29	30 N/ 60 S	Y (North)/ N (South)	Y (South only)
AC141	-	-	-	B or C	29	29	60	N	Y
AC142	-	-	-	B or C	29	29	60	N	Y
AC143	B or C	-	96	B or C	29	29	60	N	Y
AC144	D	-	-	B or C	29	29	60	Y	N
AC146	D/A	-	80	B or C	34	34	60	N	Y
AC147	-	-	-	B or C	34	34	60	N (South only)	Y (South only)
AC150	B or C	-	72	B or C	34	34	60	N	Y
AC151	B or C	-	72	B or C	34	34	60	N	Y
AC152	D/B or C	-	72	B or C	34	34	60	N	Y

Access ID	Scenario 1 – Stage 1 Scenario 2 – Stage 2 Access Type Required	Main Duct Installation / Primary Works Stage Peak HGVs Movements (Daily)		Scenario 1 – Stage 2 Scenario 2 – Stage 3 Access Type Required	Cable Pulling Stage Peak HGVs Movements (Daily)		Existing speed limit (mph)	Visibility compliance* for existing design speed (Y/N)	Temp speed reduction required (Y/N)
		Scenario 1 – Stage 1	Scenario 2 - Stage 2		Scenario 1 – Stage 2	Scenario 2 - Stage 3			
AC159	Temporary (refer to section 3.3.2.1) (TP-PB5640-DR010)	-	136	Temporary (refer to section 3.3.2.1) (TP-PB5640-DR010)	34	34	60	N	Y
AC160	-	-	-	-	-	-	60	N	Y
AC162	A	-	112	A	34	34	60	Y	N
AC163	D	-	-	B or C	34	34	60	N	Y
AC164	D	-	-	B or C	34	34	60	N	Y
AC165	-	-	-	B or C	34	34	60	N	Y
AC166	-	-	-	B or C	34	34	60	N	Y
AC178	Permanent (refer to section 3.3.2.2) (TP-PB5640-DR001)	34	68	-	-	-	60	Y	N
AC179	Temporary (refer to section 3.3.2.3)	-	20	Temporary (refer to section 3.3.2.3)	-	-	60	N	Y

Access ID	Scenario 1 – Stage 1 Scenario 2 – Stage 2 Access Type Required	Main Duct Installation / Primary Works Stage Peak HGVs Movements (Daily)		Scenario 1 – Stage 2 Scenario 2 – Stage 3 Access Type Required	Cable Pulling Stage Peak HGVs Movements (Daily)		Existing speed limit (mph)	Visibility compliance* for existing design speed (Y/N)	Temp speed reduction required (Y/N)
		Scenario 1 – Stage 1	Scenario 2 - Stage 2		Scenario 1 – Stage 2	Scenario 2 - Stage 3			
	(TP-PB4476-DR003)			(TP-PB5640-DR003)					
AC180	Permanent (refer to section 3.3.2.4) (TP-PB5640-DR002)	46	134	Permanent (refer to section 3.3.2.4) (TP-PB5640-DR002)	34	34	60	Y	N
*	DMRB visibility compliance in accordance to the DMRB TD 42/95 Volume 6 Section 2 Part 6 – Table 7/1								

75. Finalised drawings, showing full details of access improvements and hierarchical strategies allowing safe access/egress from the highway onto the onshore cable route would be agreed as part of the development of the AMP (once a contractor has been appointed), and in consultation with NCC and HE.

3.3.2 Strategic Road Network (A47) Access Designs

76. The project access from the A47 requires specific design considerations as the locations will be subject to high traffic demand during the construction phase of the project. The substation sites treatment will be permanent to serve the operational phase of the project.

77. In consultation with HE, a number of specific A47 outline access designs have been developed including AC159, AC178, AC179 and AC180, a description of each access and respective design requirement follows:

78. The outline access designs for all A47 accesses can be found in Appendix 2 and corresponding swept path analysis is provided in Appendix 3.

3.3.2.1 AC159 – MA2-East and TC1 (north) and TC2

79. Access to the infrastructure sites north west of Scarning would require the following infrastructure improvements to enable the use of AC159:

- Removal of 60m of existing vegetation (trees and hedgerow) to allow for realignment and widening of Bushy Common Road to cater for a minimum 7.3m approach width allowing passing of two HGVs;
- Existing vegetation cutback/lowering to provide 215m visibility splays in both directions along the A47 in compliance with a 100A (60mph) design speed.
- Upgrade of the existing A47 / Bushey Common Road bellmouth to a DMRB compliant rural simple priority junction incorporating a minimum 15m corner radii and 1:8 tapers over 30m distance; and
- Construction of a new bellmouth (AC159) west off Bushy Common Road with a minimum 15m corner radii and 1:10 tapers over 25m distance for the entry into minor access allowing passing of two HGVs. Vegetation clearance in compliance with a 20mph Manual for Streets visibility splay of 22m.

3.3.2.2 AC178 – National Grid Substation Extension

80. Access to the National Grid Substation Extension would require the following infrastructure improvements to enable the use of AC159:

- Removal of the existing grasscrete;
- Existing vegetation cutback/lowering to provide 215m visibility splays in both directions along the A47 in compliance with a 100A (60mph) design speed;

- Realignment and widening of existing access approach to cater for a 7.3m approach width, allowing passing of two HGVs; and
- Upgrade of the existing bellmouth to a DMRB compliant rural simple priority junction incorporating a minimum 15m corner radii and 1:10 tapers over 25m distance.

3.3.2.3 AC179 – National Grid Overhead Line Modifications Works.

81. Access to the field north of the A47 to complete the overhead Line Modification (OHLM) works would require the following infrastructure improvements to enable the use of AC179:

- Existing vegetation cutback/lowering to provide 90m visibility splays in both directions along the A47 in compliance with a 60B (30mph) design speed;
- Realignment and widening of existing access approach to cater for a 7.3m approach width, allowing passing of two HGVs;
- Upgrade of the existing bellmouth to a DMRB compliant rural simple priority junction incorporating a minimum 15m corner radii and 1:8 tapers over 30m distance; and
- Temporary 30mph speed limit to be introduced when AC179 is operational.

3.3.2.4 Access AC180 (onshore project substation, MA1a-West and MA1a-East)

82. Access to the onshore substation south off the A47 will require the following infrastructure requirements to enable the use of AC180.

- Construction of new access to a DMRB compliant right turn ghost island priority junction (all movements permitted) incorporating a minimum 15m corner radii and 1:6 tapers over 30m distance;
- Existing vegetation cutback/lowering to provide 215m visibility splays in both directions along the A47 in compliance with a 100A (60mph) design speed.
- Access approach width of 8.4m to allow passing of two HGVs and to cater for Abnormal Indivisible Load deliveries; and
- HGV turning area to be provided within the site allowing HGVS to enter and exit the A47 in a forward gear.

83. Alternative access arrangements are to be explored with the landowner, whereby a single point of access may be provided at access B for construction and farm traffic. Details will be finalised during detailed design stage and a commitment will be included within the Final AMP.

3.3.2.5 General Provisions

84. All temporary infrastructure requirements for accesses of the A47 (AC159, AC178, AC179 and AC180) would be contained within the highway boundaries or the DCO limits. Any hedgerow or tree removal would be subject to the ecological mitigation

measures set out in the Outline Landscape and Ecological Management Strategy (OLEMS) (document reference 8.7).

85. Accesses AC159, AC178 and AC179 are to adopt a 'no right turn' traffic management plan, details of diversion routes and enforcement measures are provided in the OTMP (document reference 8.8).

86. Accesses AC159, AC178, AC179 and AC180 have all been 'agreed in principle' with Highways England subject to:

- Visibility splays being cleared of foliage;
- Visibility being proven in the vertical plane;
- The implementation of the traffic management measures proposed; and
- The carrying out of Stage 1 and 2 Road Safety Audits.

4 REFERENCES

Design Manual for Roads and Bridges, Vol 6, Section 2, Part 6, TD 42/95 'Geometric Design of Major/Minor Priority Junctions'.
Design Manual for Roads and Bridges, Vol 5, Section 2, Part 2, HD 19/15 'Road Safety Audit'.
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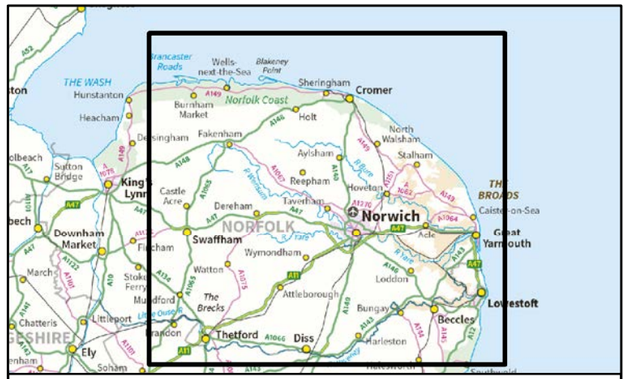
Traffic Signs Manual, Chapter 8, 'Traffic safety measures and Signs for Road Works and Temporary solutions, Parts 1 and 2'

5 FIGURES

580000 600000 620000 640000

340000 320000 300000 280000

N



Legend:

Norfolk Boreas onshore red line boundary

Project:	Report:
Norfolk Boreas	Outline Access Management Plan

Title:

Onshore project study area

Figure: 1	Drawing No: PB5640-007-011-001				
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: British National Grid **EPSG:** 27700

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0 5 10 km

590000 600000 610000 620000 630000 640000

340000 330000 320000 310000 300000

N

Map 1
Map 2
Map 3
Map 4
Map 5
Map 6
Map 7
Map 8
Map 9

Landfall

Kings Lynn 25km

Kings Lynn 30km

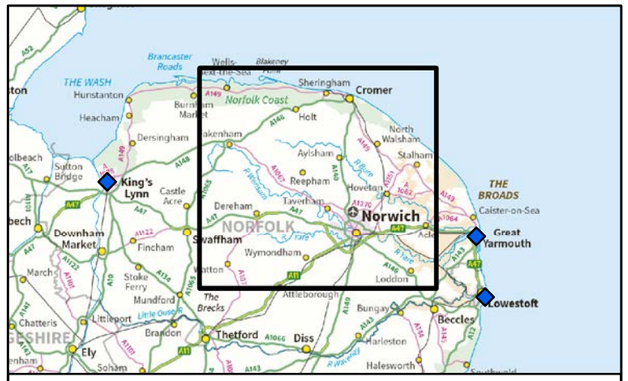
Substation Sites

Great Yarmouth 18km

Great Yarmouth 13km

Lowestoft 24km

0 5 10 km



Legend:

- Norfolk Boreas onshore red line boundary
- Location of cable route sections - see figure 2a
- Port location[1]

NOTE: Distances to towns measured from edge of map.
[1] DECC, 2012.

Project:	Report:
Norfolk Boreas	Outline Access Management Plan

Title: Onshore Project Infrastructure Sites Scenario 1

Figure: 2 | Drawing No: PB5640-007-009-002

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: British National Grid **EPSG:** 27700

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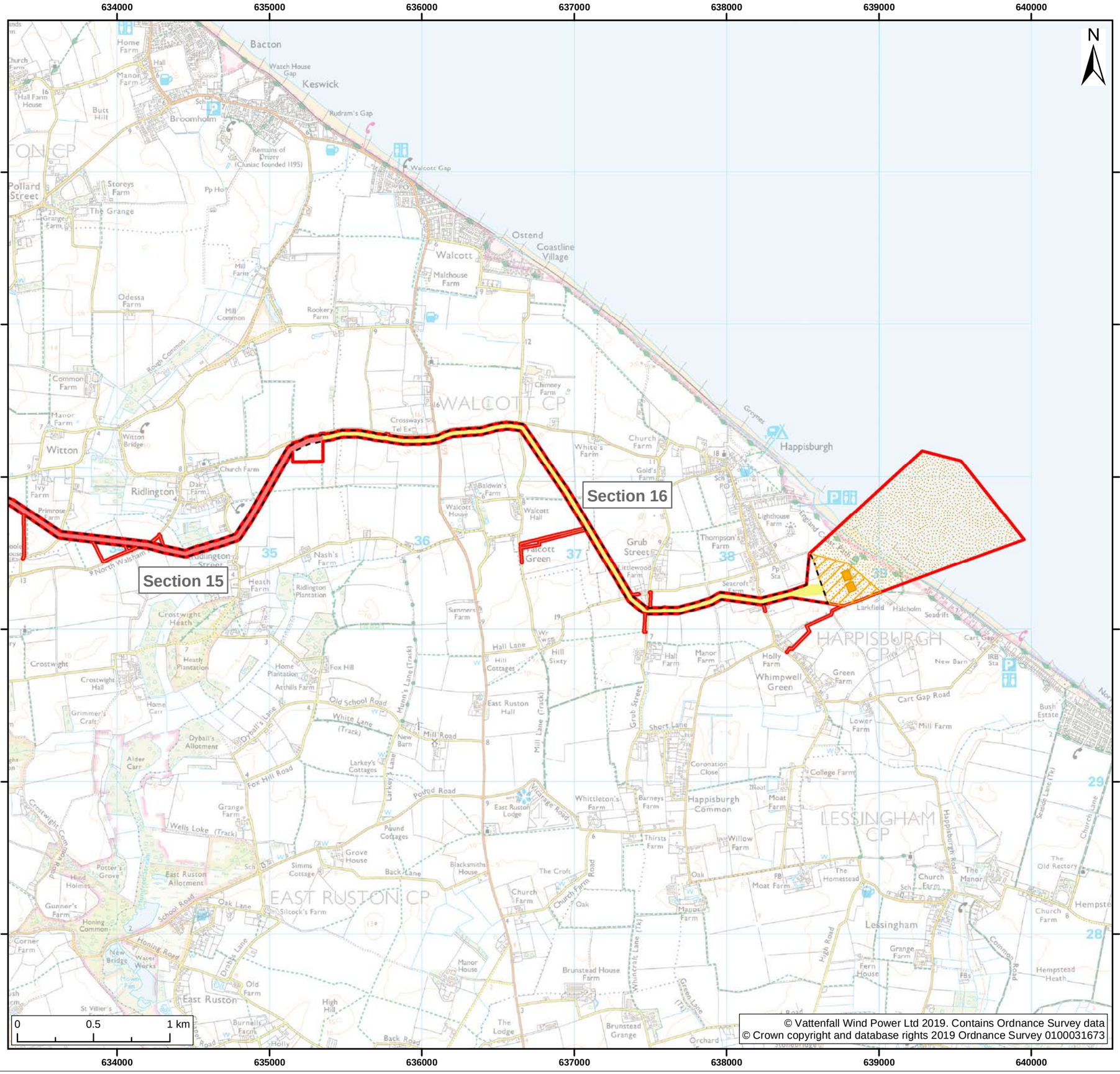

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 1)

- Landfall zone
- Landfall compound zone
- Indicative landfall compound
- Onshore cable route
- Construction access
- Operational access

Cable Route Sections

- Section 15
- Section 16

Project: Norfolk Boreas	Report: Outline Access Management Plan

Title: Onshore Project Infrastructure Sites Scenario 1 (1:25,000) (Map 1 of 9)

Figure: 2a | Drawing No: PB5640-007-009-002a

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: British National Grid **EPSG:** 27700

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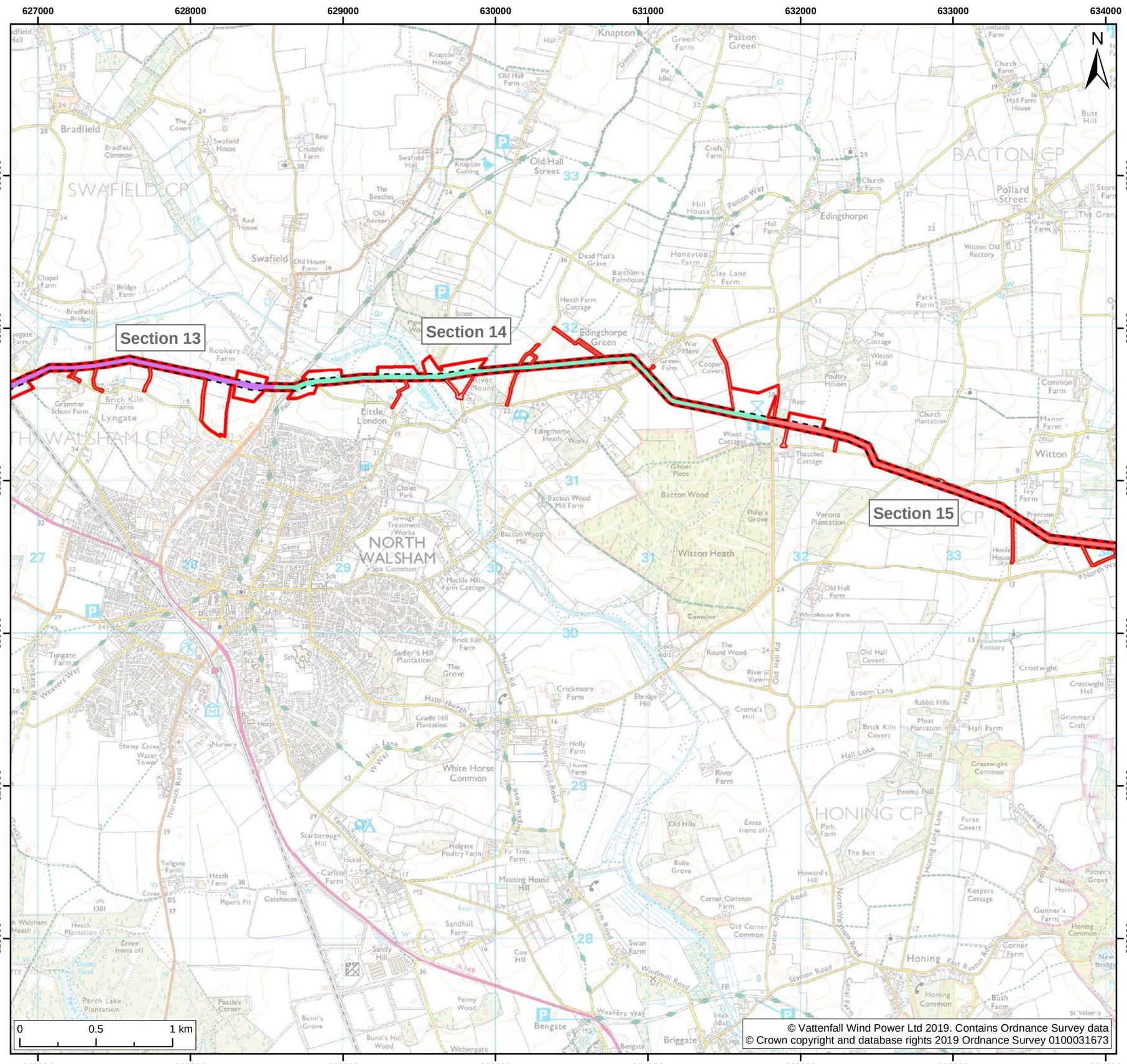

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 1)

- Onshore cable route
- Construction access
- Operational access

Cable Route Sections

- Section 13
- Section 14
- Section 15

Project: Norfolk Boreas	Report: Outline Access Management Plan

Title: Onshore Project Infrastructure Sites Scenario 1 (1:25,000) (Map 2 of 9)

Figure: 2a | Drawing No: PB5640-007-009-002a

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: British National Grid **EPSG:** 27700

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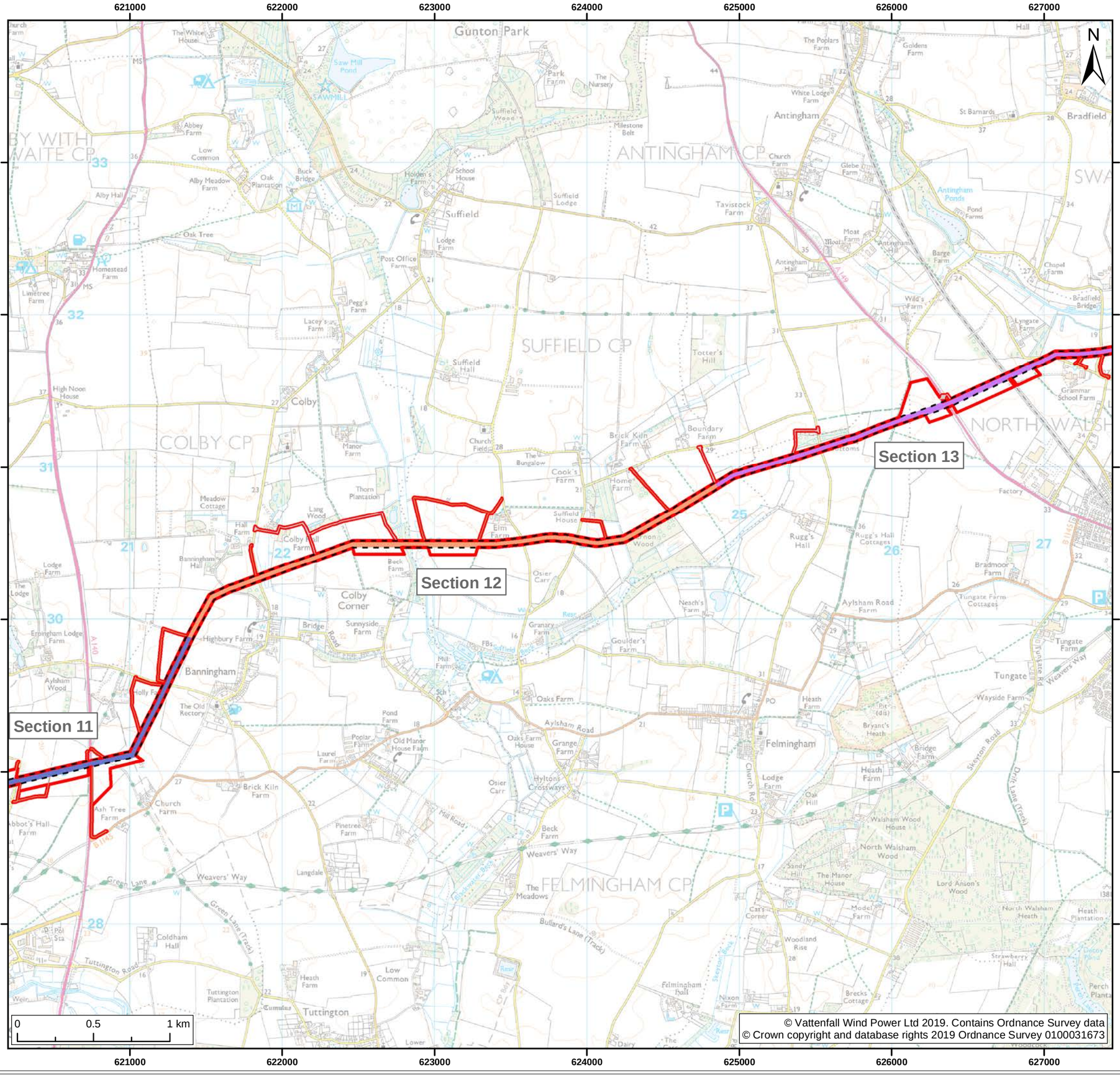

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 1)

- Onshore cable route
- Construction access
- Operational access

Cable Route Sections

- Section 11
- Section 12
- Section 13

Project: Norfolk Boreas	Report: Outline Access Management Plan

Title: Onshore Project Infrastructure Sites Scenario 1 (1:25,000) (Map 3 of 9)

Figure: 2a | Drawing No: PB5640-007-009-002a

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: British National Grid **EPSG:** 27700

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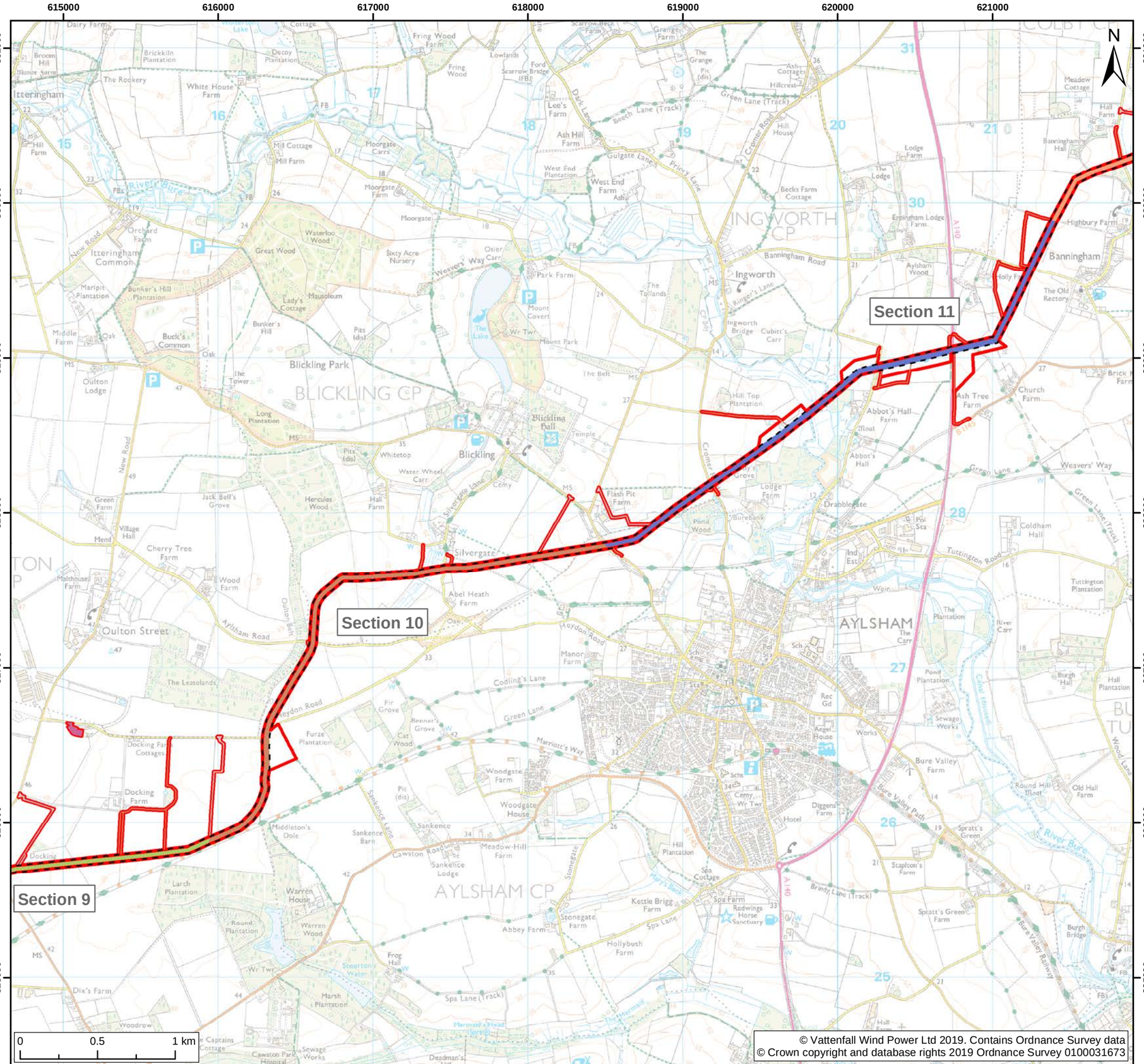

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 1)

- Onshore cable route
- Cable logistics area
- Construction access
- Operational access

Cable Route Sections

- Section 9
- Section 10
- Section 11
- Section 12

Project:	Report:
Norfolk Boreas	Outline Access Management Plan

Title: Onshore Project Infrastructure Sites Scenario 1 (1:25,000) (Map 4 of 9)

Figure: 2a | Drawing No: PB5640-007-009-002a

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: British National Grid **EPSG:** 27700

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609000 610000 611000 612000 613000 614000 615000

327000 326000 325000 324000 323000 322000

Section 9

Section 8

Section 7

N

0 0.5 1 km

Legend:

Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 1)

- Onshore cable route
- Cable logistics area
- Construction access
- Operational access

Cable Route Sections

- Section 7
- Section 8
- Section 9

Project: Norfolk Boreas	Report: Outline Access Management Plan

Title: Onshore Project Infrastructure Sites Scenario 1 (1:25,000) (Map 5 of 9)

Figure: 2a | Drawing No: PB5640-007-009-002a

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: British National Grid **EPSG:** 27700

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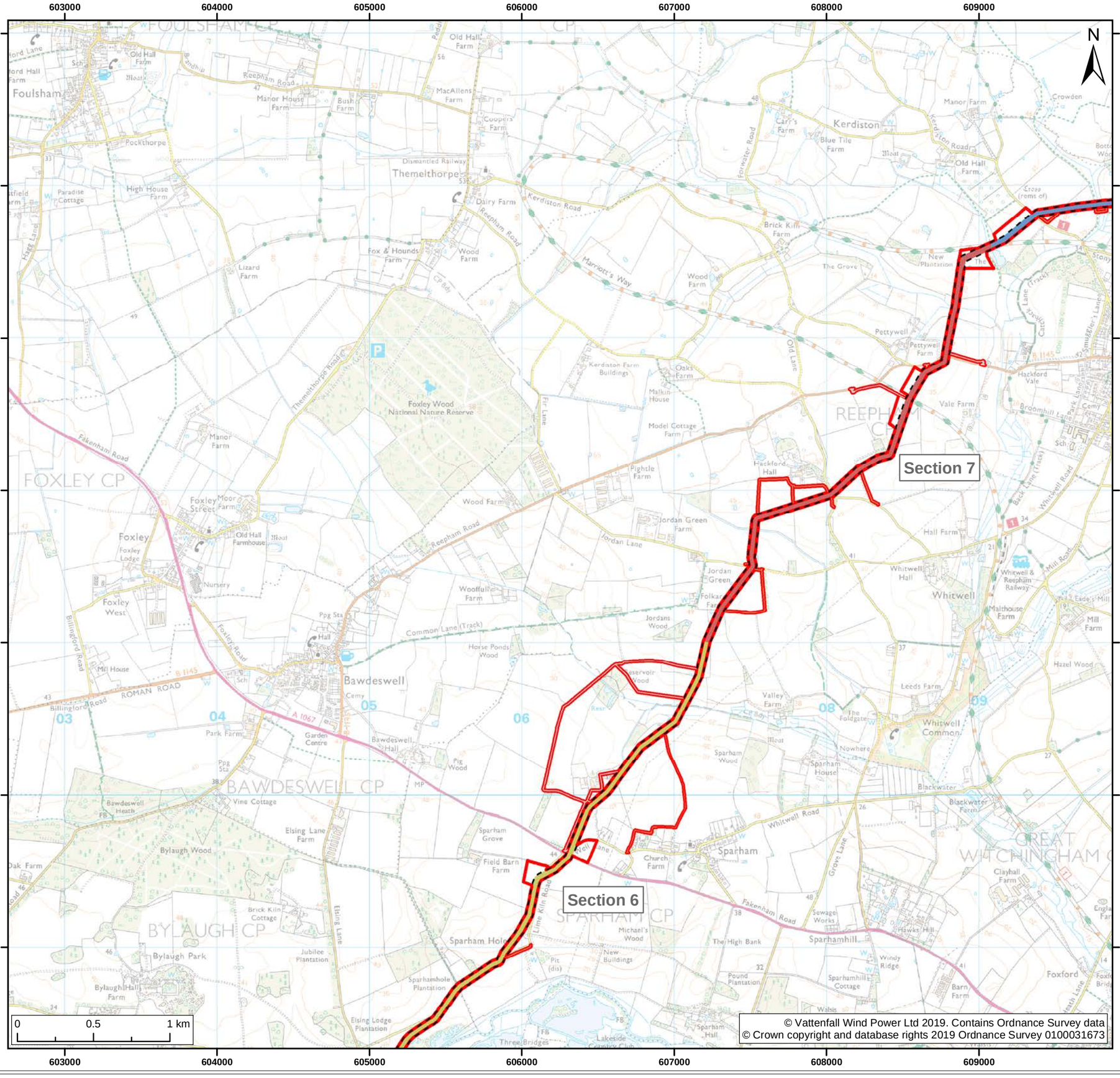

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 1)

- Onshore cable route
- Construction access
- Operational access

Cable Route Sections

- Section 6
- Section 7
- Section 8

Project:	Report:
Norfolk Boreas	Outline Access Management Plan

Title: Onshore Project Infrastructure Sites Scenario 1 (1:25,000) (Map 6 of 9)

Figure: 2a | Drawing No: PB5640-007-009-002a

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: British National Grid **EPSG:** 27700

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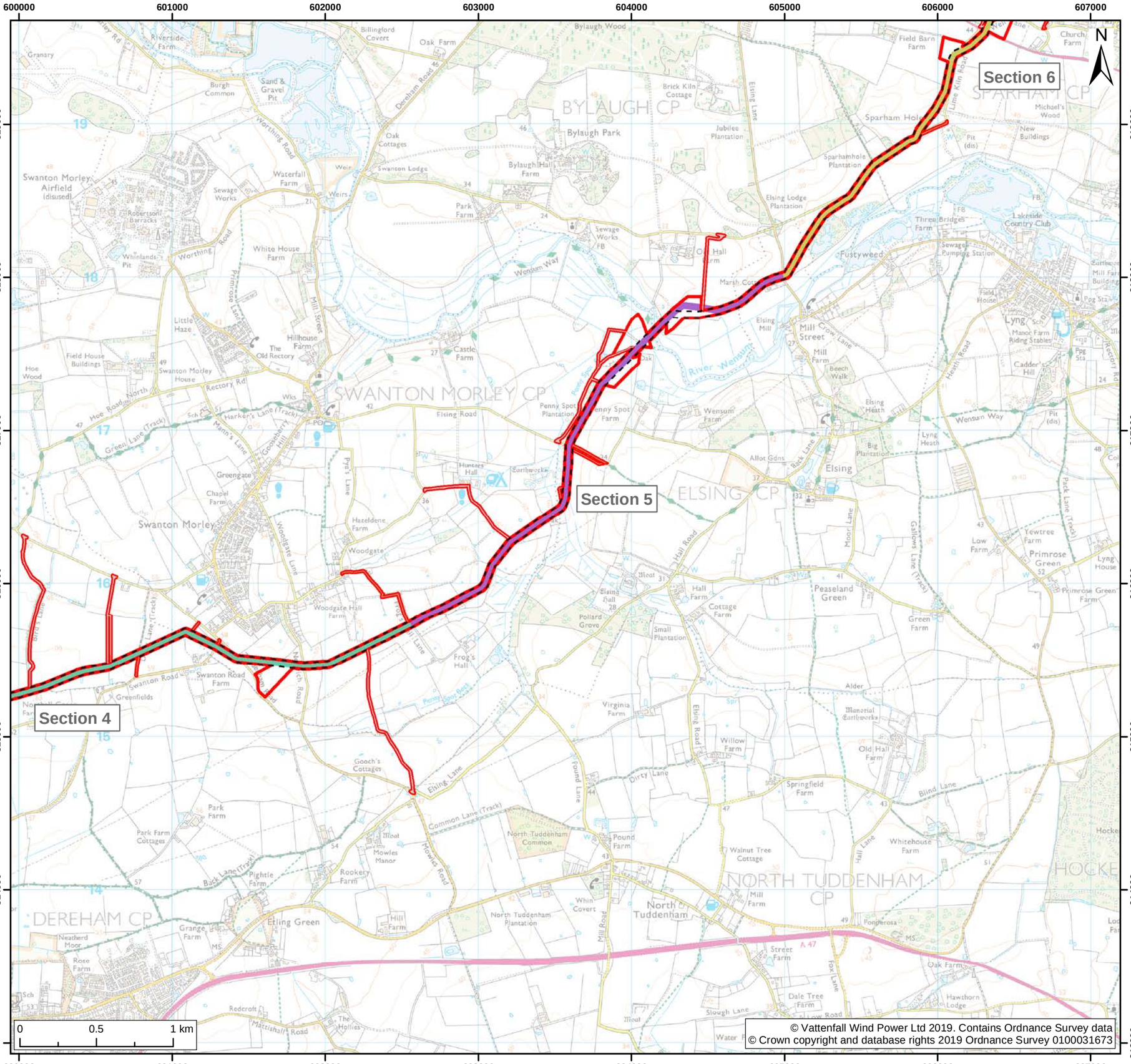

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 1)

- Onshore cable route
- Construction access
- Operational access

Cable Route Sections

- Section 4
- Section 5
- Section 6

Project: Norfolk Boreas	Report: Outline Access Management Plan

Title: Onshore Project Infrastructure Sites Scenario 1 (1:25,000) (Map 7 of 9)

Figure: 2a | Drawing No: PB5640-007-009-002a

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: British National Grid **EPSG:** 27700

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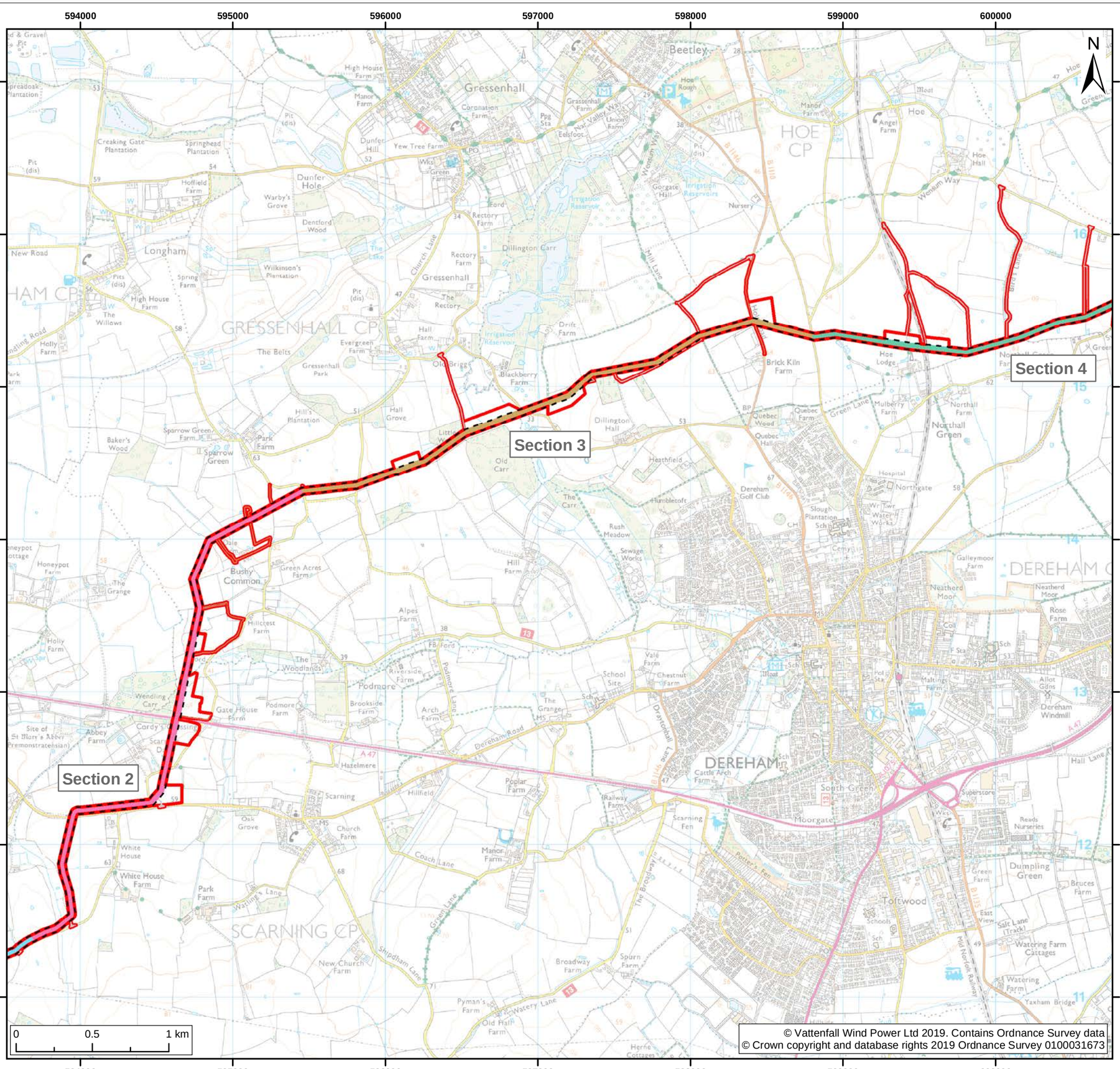

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 1)

- Onshore cable route
- Construction access
- Operational access

Cable Route Sections

- Section 1
- Section 2
- Section 3
- Section 4

Project: Norfolk Boreas	Report: Outline Access Management Plan

Title: Onshore Project Infrastructure Sites Scenario 1 (1:25,000) (Map 8 of 9)

Figure: 2a | Drawing No: PB5640-007-009-002a

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	03/05/2019	JT	CD	A3	1:25,000

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

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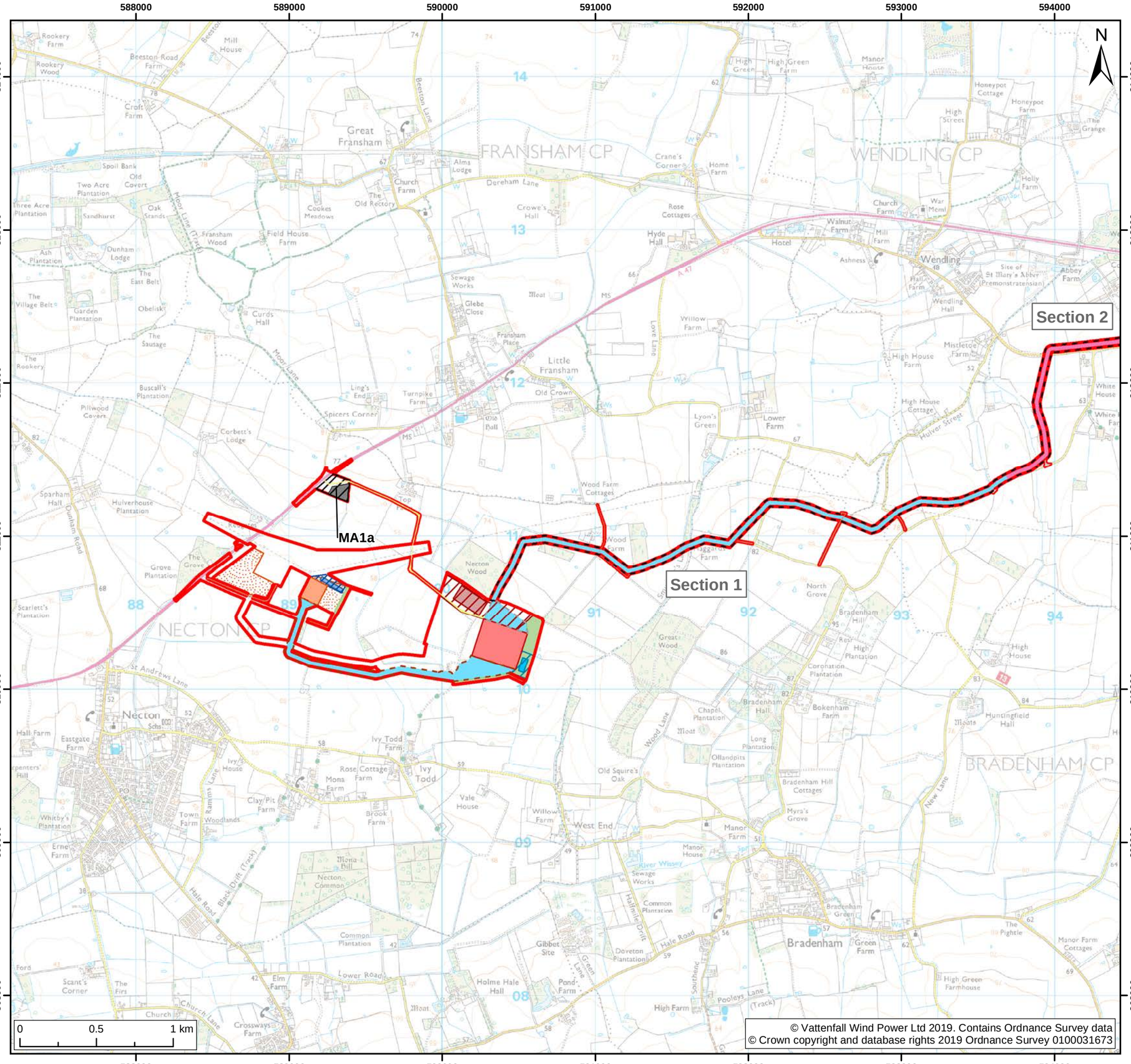

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 1)

- Onshore cable route
- Cable route entry to substation
- Onshore 400kV cable route
- Mobilisation zone
- Indicative mobilisation area compound
- Construction access
- Operational access
- Permanent access
- Onshore project substation
- Onshore project substation temporary construction compound zone
- Indicative onshore project substation temporary construction compound
- Attenuation pond zone
- Indicative attenuation pond
- Indicative mitigation planting
- National Grid substation extension
- National Grid temporary works
- National Grid attenuation pond location search area
- Indicative National Grid attenuation pond

Cable Route Sections

- Section 1
- Section 2

Project:	Report:
Norfolk Boreas	Outline Access Management Plan

Title: Onshore Project Infrastructure Sites Scenario 1 (1:25,000) (Map 9 of 9)

Figure: 2a | Drawing No: PB5640-007-009-002a

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: British National Grid **EPSG:** 27700

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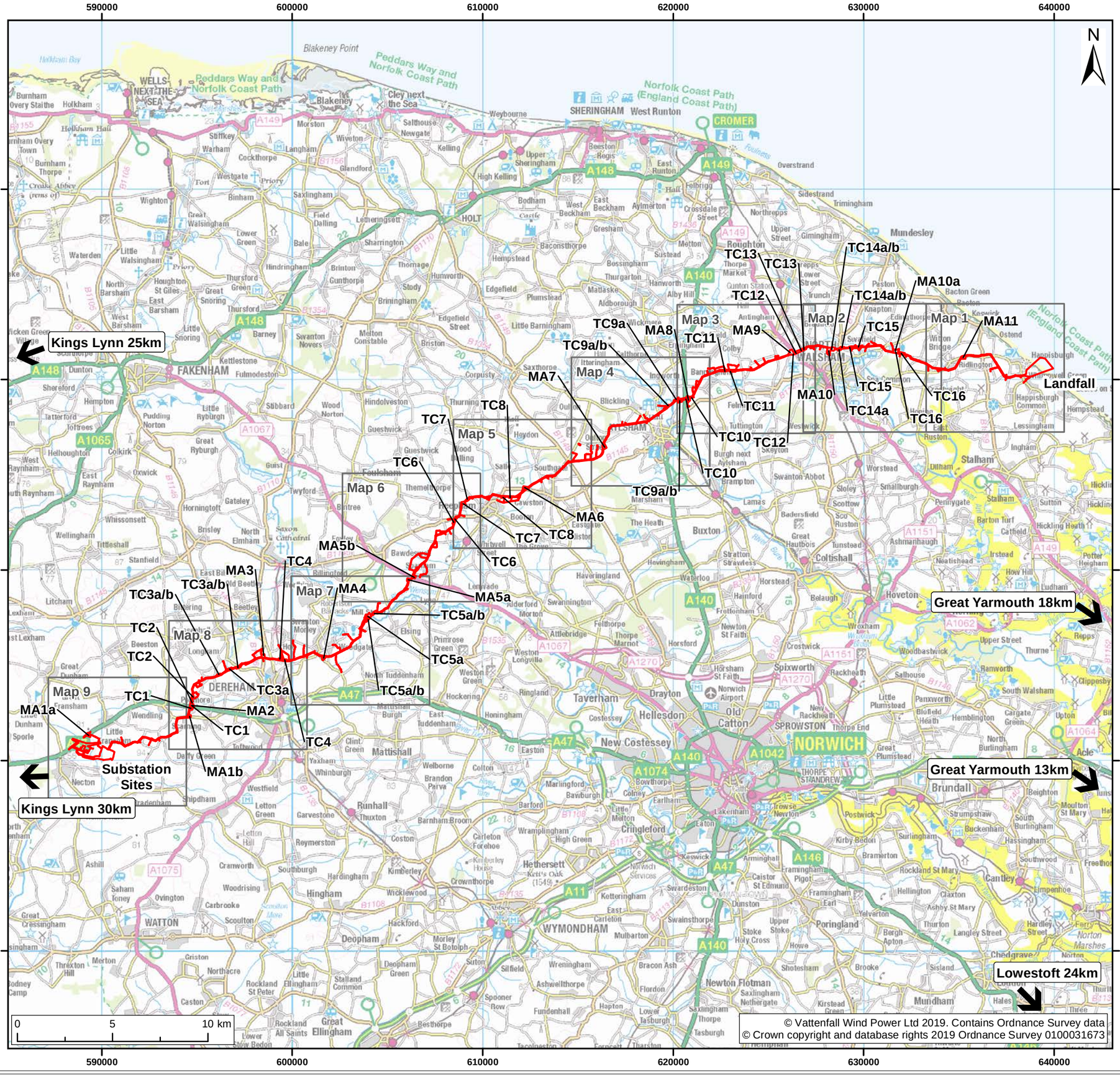

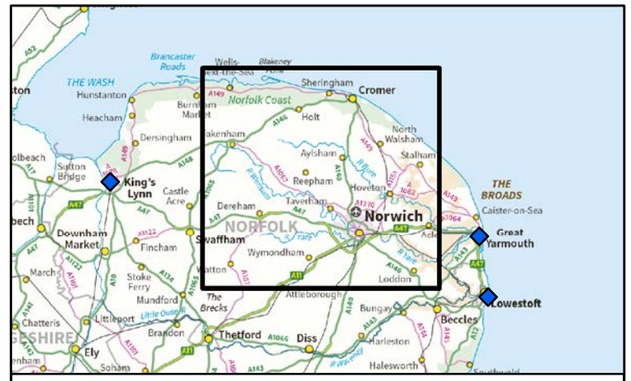

Legend:

- Norfolk Boreas onshore red line boundary
- Location of cable route sections - see figure 3a
- Port location[1]

NOTE: Distances to towns measured from edge of map.
MA = Mobilisation Area; TC = Trenchless Crossing
[1] DECC, 2012.

Project:	Report:
Norfolk Boreas	Outline Access Management Plan

Title:

Onshore Project Infrastructure Sites Scenario 2

Figure:	Drawing No:
3	PB5640-007-009-003

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	03/05/2019	JT	CD	A3	1:200,000

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

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634000 635000 636000 637000 638000 639000 640000

333000 332000 331000 330000 329000 328000

N

Section 18: MA11-E

Section 17: MA11-W

MA11

0 0.5 1 km

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Landfall zone
- Landfall compound zone
- Indicative landfall compound
- Onshore cable route
- Mobilisation zone
- Indicative mobilisation area compound
- Construction access
- Operational access

Cable Route Sections

- Section 17: MA11-W
- Section 18: MA11-E

Project:	Report:
Norfolk Boreas	Outline Access Management Plan

Title: Onshore Project Infrastructure Sites Scenario 2 (1:25,000) (Map 1 of 9)

Figure: 3a | Drawing No: PB5640-007-009-003a

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	03/05/2019	JT	CD	A3	1:25,000

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

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627000 628000 629000 630000 631000 632000 633000 634000

333000 332000 331000 330000 329000 328000

N

Section 15: MA10-W

Section 16a: MA10-E

Section 17a: MA10a-W

Section 17: MA11-W

TC13

MA10

TC14a/b

TC14a

TC15

TC14a/b

TC15

MA10a

TC16

TC16

0 0.5 1 km

Legend:

Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Onshore cable route
- Trenchless crossing zone (e.g. HDD)
- Indicative trenchless crossing compound
- Mobilisation zone
- Indicative mobilisation area compound
- Construction access
- Operational access

Cable Route Sections

- Section 15: MA10-W
- Section 16a: MA10-E
- Section 17: MA11-W
- Section 17a: MA10a-W

Project:	Report:
Norfolk Boreas	Outline Access Management Plan

Title: Onshore Project Infrastructure Sites Scenario 2 (1:25,000) (Map 2 of 9)

Figure: 3a | Drawing No: PB5640-007-009-003a

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: British National Grid **EPSG:** 27700

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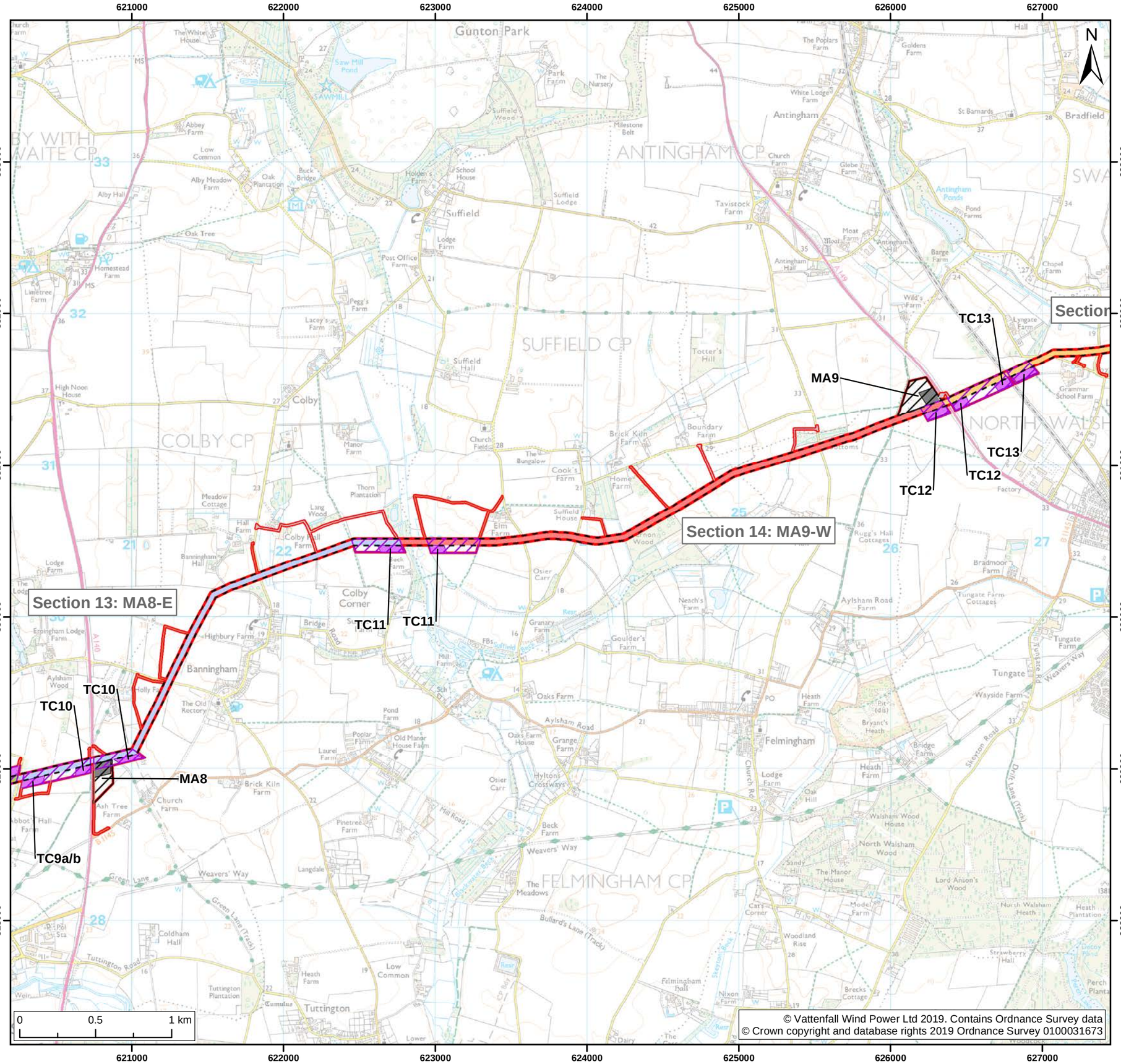

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Onshore cable route
- Trenchless crossing zone (e.g. HDD)
- Indicative trenchless crossing compound
- Mobilisation zone
- Indicative mobilisation area compound
- Construction access
- Operational access

Cable Route Sections

- Section 12: MA7-E
- Section 13: MA8-E
- Section 14: MA9-W
- Section 15: MA10-W

Project: Norfolk Boreas	Report: Outline Access Management Plan

Title: Onshore Project Infrastructure Sites Scenario 2 (1:25,000) (Map 3 of 9)

Figure: 3a | Drawing No: PB5640-007-009-003a

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	03/05/2019	JT	CD	A3	1:25,000

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

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615000 616000 617000 618000 619000 620000 621000

331000 330000 329000 328000 327000 326000 325000

N

Section 13: MA8-E

Section 12: MA7-E

Section 11: MA7-W

TC9a

TC10

TC9a/b

MA8

TC10

TC9a/b

MA7

0 0.5 1 km

Legend:

Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Onshore cable route
- Trenchless crossing zone (e.g. HDD)
- Indicative trenchless crossing compound
- Mobilisation zone
- Indicative mobilisation area compound
- Cable logistics area
- Construction access
- Operational access

Cable Route Sections

- Section 11: MA7-W
- Section 12: MA7-E
- Section 13: MA8-E

Project:	Report:
Norfolk Boreas	Outline Access Management Plan

Title: Onshore Project Infrastructure Sites Scenario 2 (1:25,000) (Map 4 of 9)

Figure: 3a | Drawing No: PB5640-007-009-003a

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	03/05/2019	JT	CD	A3	1:25,000

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

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609000 610000 611000 612000 613000 614000 615000

327000 326000 325000 324000 323000 322000

N

Section 11: MA7-W

Section 10: MA6-E

MA6

Section 9: MA6-W

Section 9a: MA6-W

TC7

TC7

TC8

TC8

Section 8a: MA5b-E

TC6

TC6

0 0.5 1 km

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Onshore cable route
- Trenchless crossing zone (e.g. HDD)
- Indicative trenchless crossing compound
- Mobilisation zone
- Indicative mobilisation area compound
- Cable logistics area
- Construction access
- Operational access

Cable Route Sections

- Section 8: MA5b-E
- Section 8a: MA5b-E
- Section 9: MA6-W
- Section 9a: MA6-W
- Section 10: MA6-E
- Section 11: MA7-W

Project:	Report:
Norfolk Boreas	Outline Access Management Plan

Title: Onshore Project Infrastructure Sites Scenario 2 (1:25,000) (Map 5 of 9)

Figure: 3a | Drawing No: PB5640-007-009-003a

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: British National Grid **EPSG:** 27700

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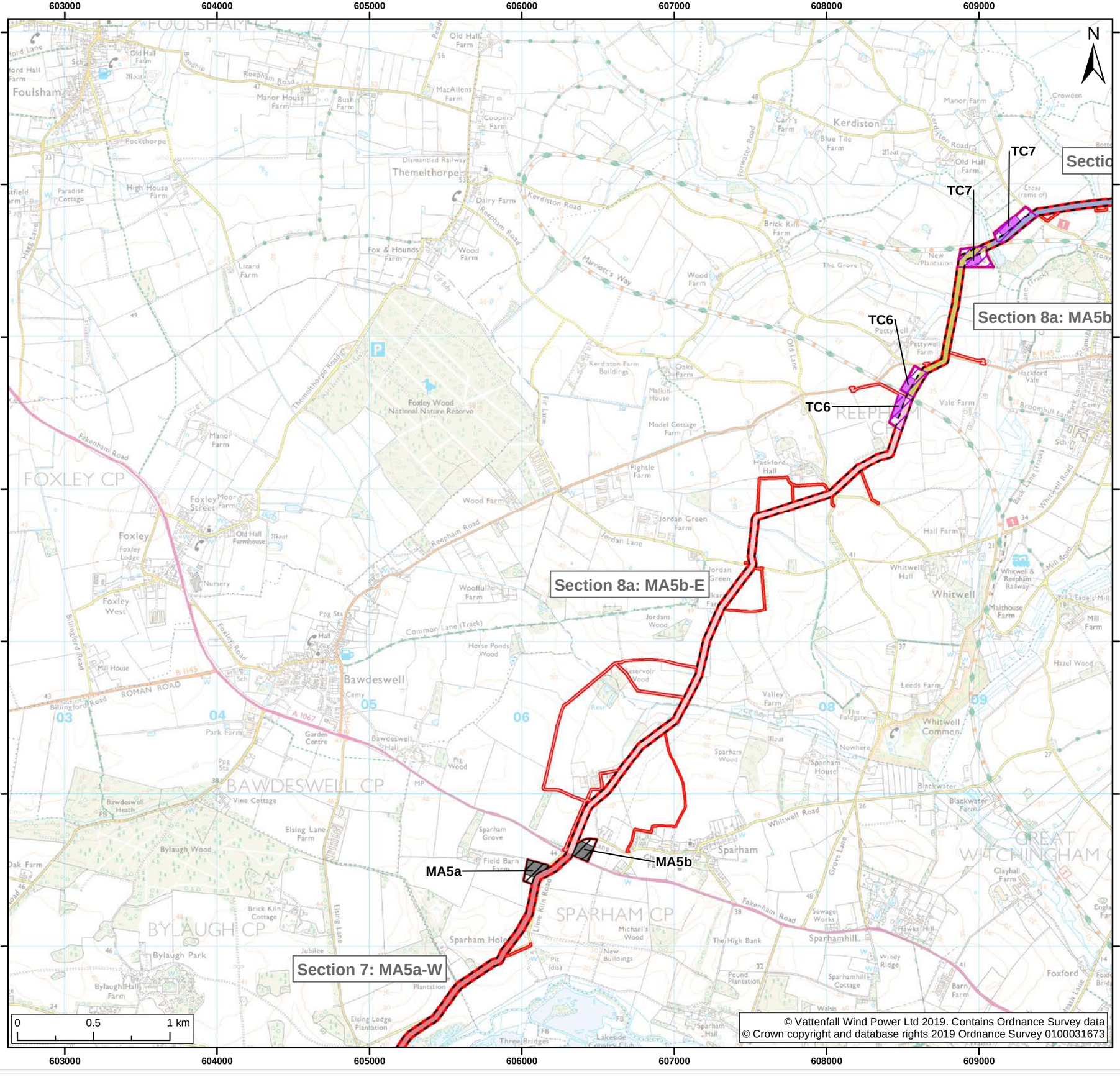

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Onshore cable route
- Trenchless crossing zone (e.g. HDD)
- Indicative trenchless crossing compound
- Mobilisation zone
- Indicative mobilisation area compound
- Construction access
- Operational access

Cable Route Sections

- Section 7: MA5a-W
- Section 8: MA5b-E
- Section 8a: MA5b-E
- Section 9a: MA6-W

Project: Norfolk Boreas	Report: Outline Access Management Plan

Title: Onshore Project Infrastructure Sites Scenario 2 (1:25,000) (Map 6 of 9)

Figure: 3a | Drawing No: PB5640-007-009-003a

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: British National Grid **EPSG:** 27700

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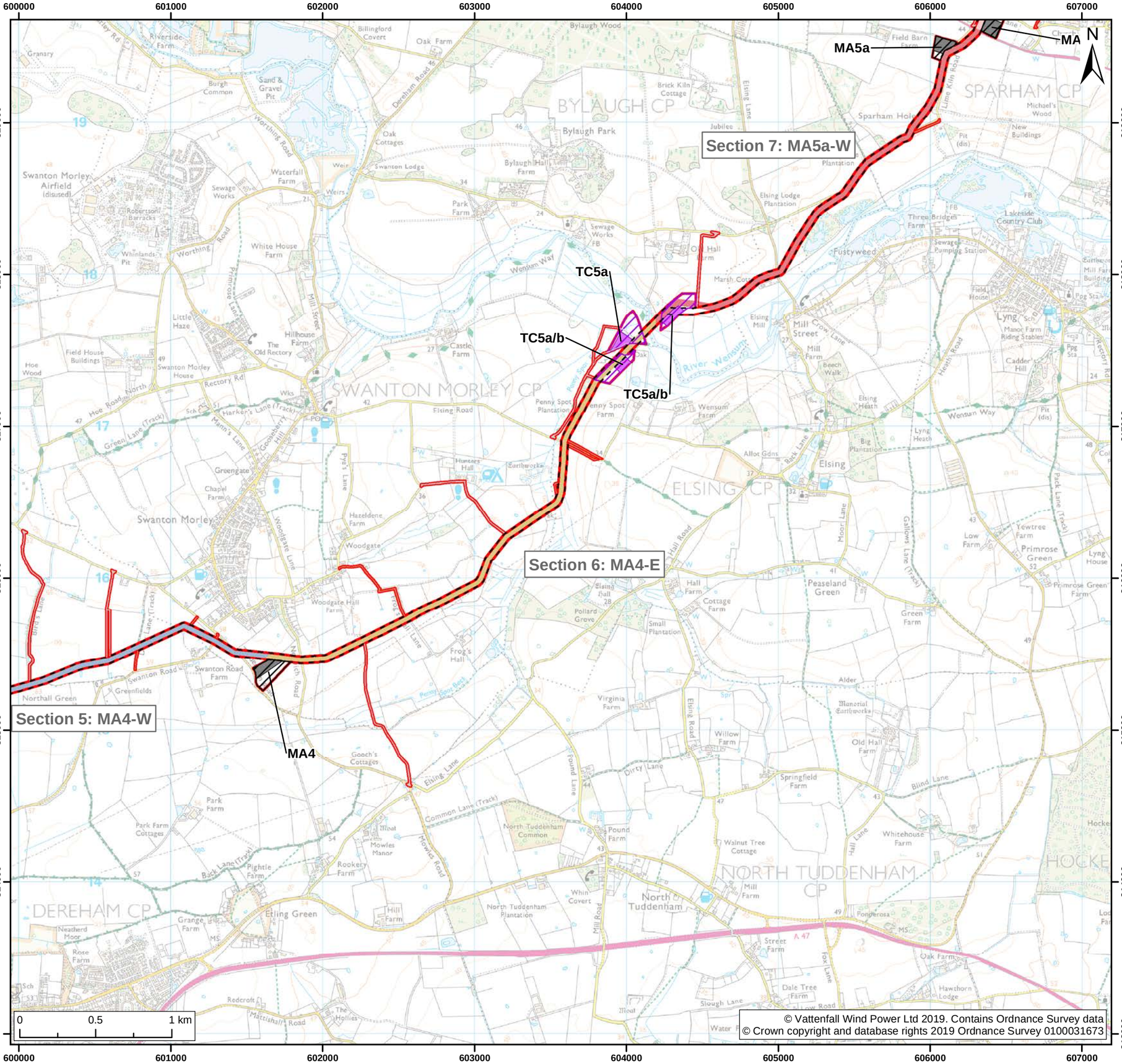

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Onshore cable route
- Trenchless crossing zone (e.g. HDD)
- Indicative trenchless crossing compound
- Mobilisation zone
- Indicative mobilisation area compound
- Construction access
- Operational access

Cable Route Sections

- Section 5: MA4-W
- Section 6: MA4-E
- Section 7: MA5a-W
- Section 8: MA5b-E

Project: Norfolk Boreas	Report: Outline Access Management Plan

Title: Onshore Project Infrastructure Sites Scenario 2 (1:25,000) (Map 7 of 9)

Figure: 3a | Drawing No: PB5640-007-009-003a

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	03/05/2019	JT	CD	A3	1:25,000

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

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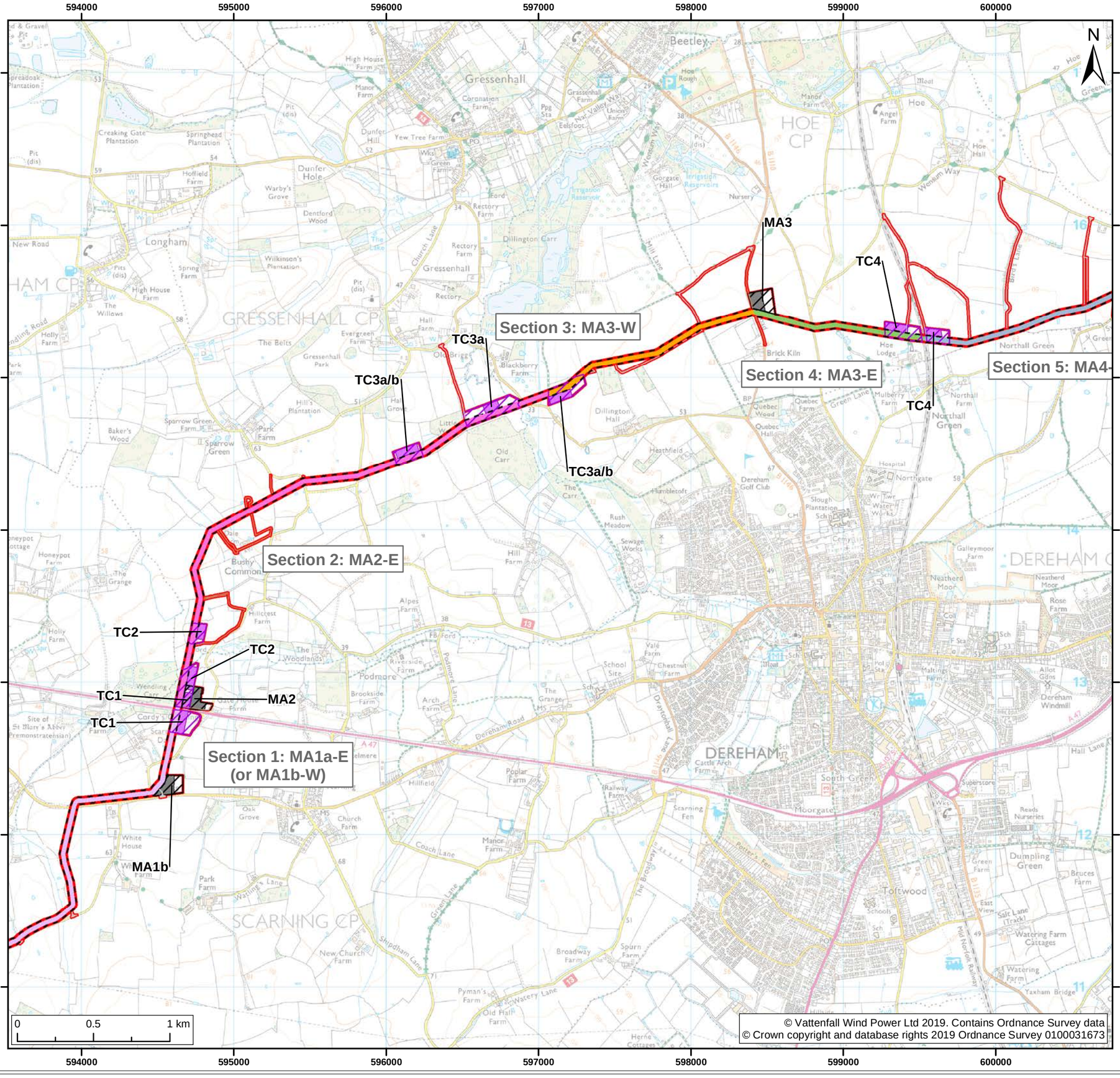

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Onshore cable route
- Trenchless crossing zone (e.g. HDD)
- Indicative trenchless crossing compound
- Mobilisation zone
- Indicative mobilisation area compound
- Construction access
- Operational access

Cable Route Sections

- Section 1: MA1a-E (or MA1b-W)
- Section 2: MA2-E
- Section 3: MA3-W
- Section 4: MA3-E
- Section 5: MA4-W

Project: Norfolk Boreas	Report: Outline Access Management Plan

Title: Onshore Project Infrastructure Sites Scenario 2 (1:25,000) (Map 8 of 9)

Figure: 3a | Drawing No: PB5640-007-009-003a

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: British National Grid **EPSG:** 27700

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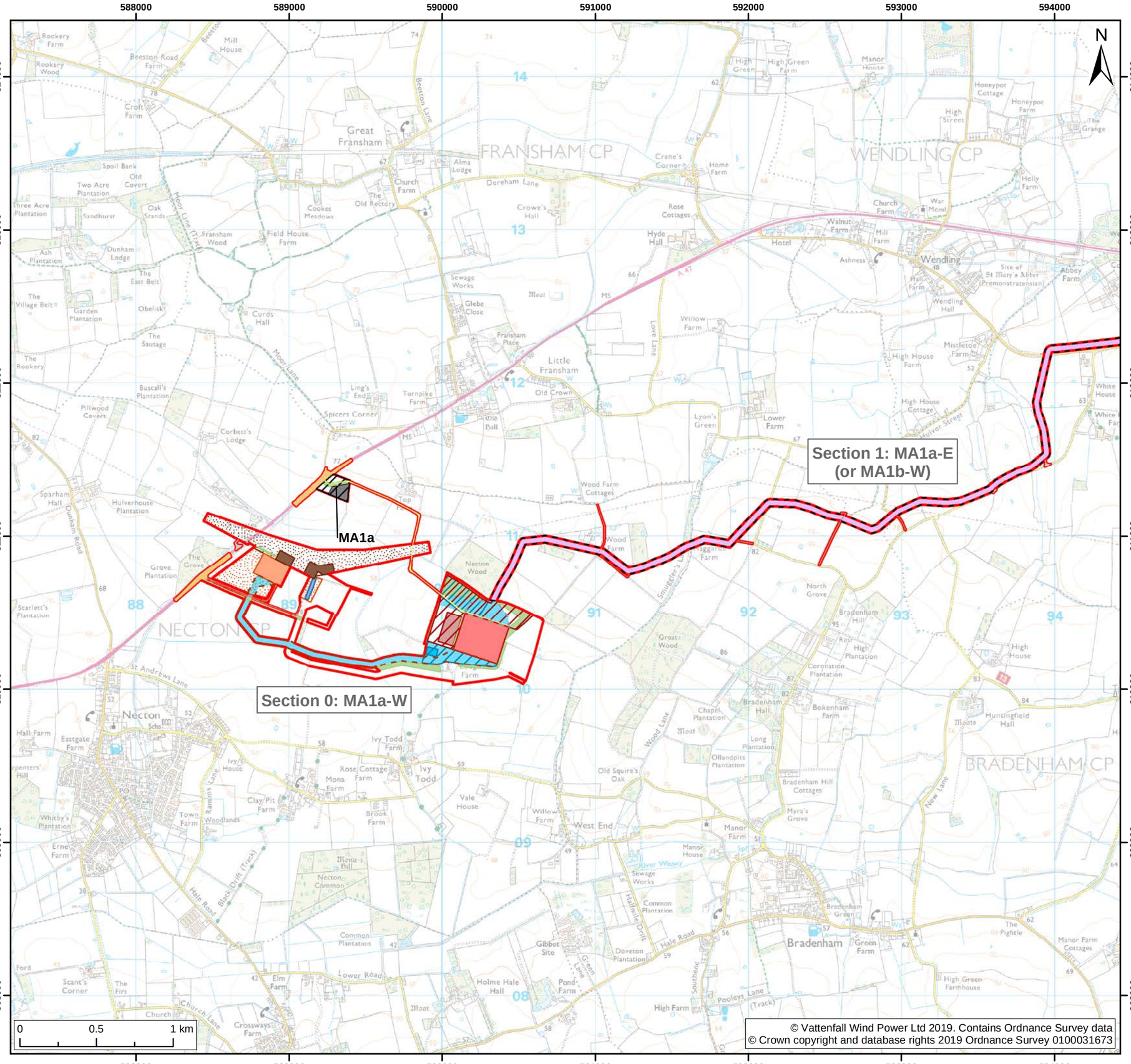

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Onshore cable route
- Cable route entry to substation
- Onshore 400kV cable route
- Mobilisation zone
- Indicative mobilisation area compound
- Highways temporary works area
- Construction access
- Operational access
- Permanent access
- Onshore project substation
- Onshore project substation temporary construction compound zone
- Indicative onshore project substation temporary construction compound
- Attenuation pond zone
- Indicative attenuation pond
- Indicative mitigation planting
- National Grid substation extension
- National Grid new / replacement OHL tower
- National Grid temporary works
- Overhead line temporary works
- National Grid attenuation pond

Cable Route Sections

- Section 0: MA1a-W
- Section 1: MA1a-E (or MA1b-W)

Project:	Report:
Norfolk Boreas	Outline Access Management Plan

Title: Onshore Project Infrastructure Sites Scenario 2 (1:25,000) (Map 9 of 9)

Figure: 3a | Drawing No: PB5640-007-009-003a

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	03/05/2019	JT	CD	A3	1:25,000

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

VATTENFALL

Royal HaskoningDHV
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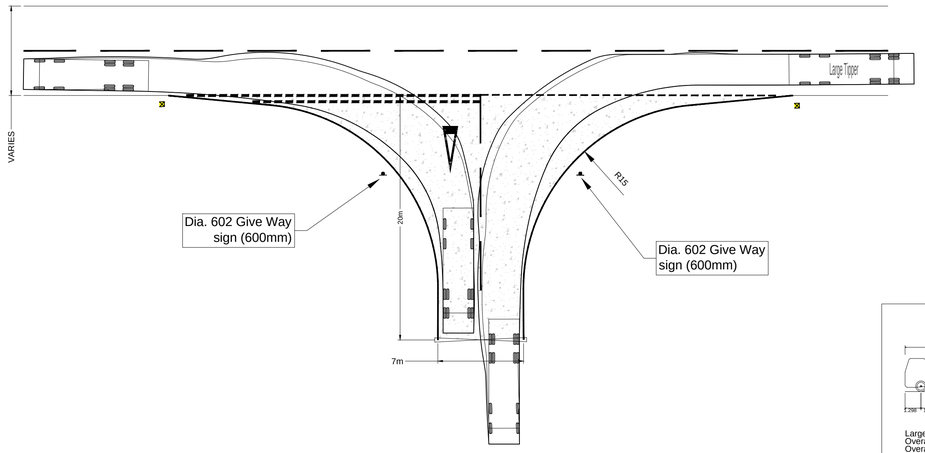
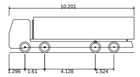
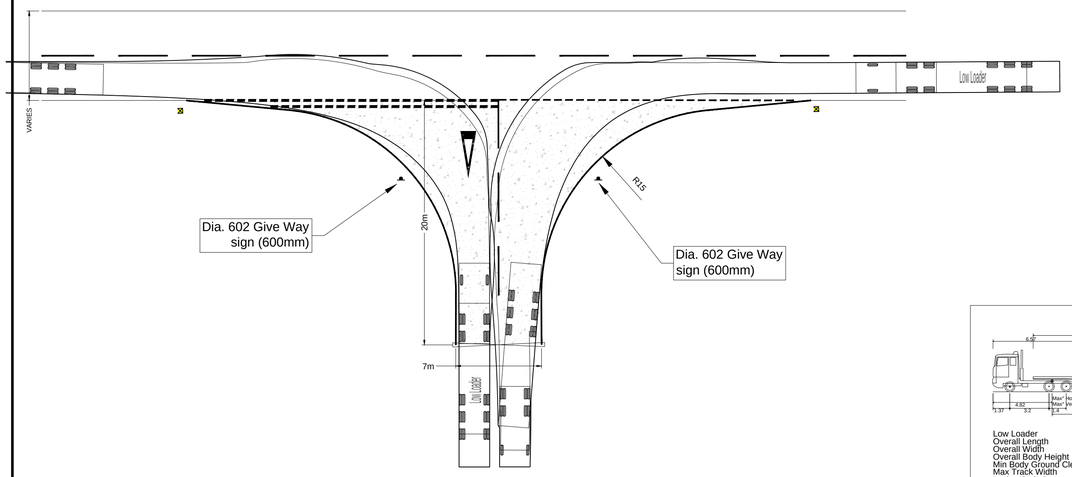
6 APPENDIX 1 ACCESS DESIGN CONCEPTS

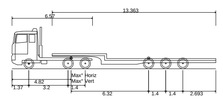
DRAWING No.
PB4476-DR-H1-D-0100





Large Tipper	
Overall Length	10.201m
Overall Width	2.500m
Overall Body Height	2.893m
Min Body Ground Clearance	0.343m
Max Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	11.550m





Low Loader	
Overall Length	16.633m
Overall Width	2.500m
Overall Body Height	3.396m
Min Body Ground Clearance	0.320m
Max Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	6.790m

NOTES

1. Do not scale from this drawing, all dimensions are in metres unless noted otherwise.
2. Exact junction types to be determined from relevant section of Design Manual for Roads & Bridges (TD 42/95).

KEY

- EXISTING METALED ROAD BOUNDARY
- PROPOSED ACCESS BOUNDARY/ROAD MARKINGS
- PROPOSED GATE
- PROPOSED PLASTIC DEMARCATION BOLLARD
- PROPOSED POST MOUNTED TRAFFIC SIGN
- PROPOSED ACCESS CONSTRUCTION

DRAFT - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	BY	CHK	APP

REVISIONS

CLIENT

VATTENFALL

PROJECT

NORFOLK BOREAS
OFFSHORE WIND FARM

TITLE

TYPE A ACCESS

DMRB A/B ROAD JUNCTION
20t TIPPER & LARGE LOW LOADER

Rightwell House, Bretton
Peterborough, Cambridgeshire, PE3 8DW
Tel +44(0)1733 334455
Email info@rhdhv.com
www.royalhaskoningDHV.com

Royal HaskoningDHV
Enhancing Society Together

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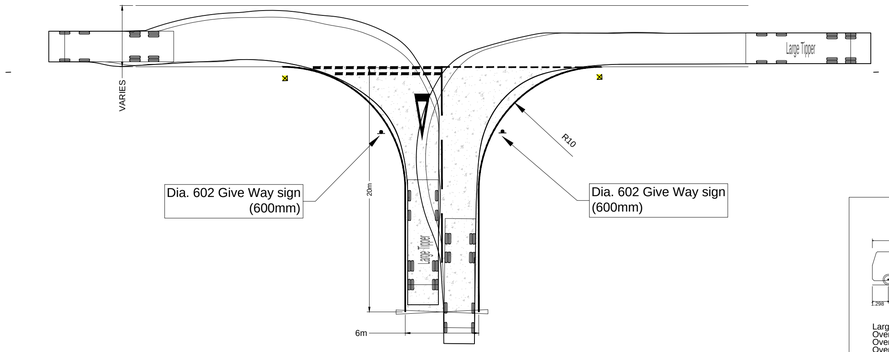
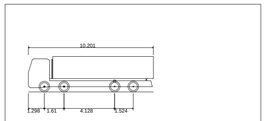
BKB	RNE	ADR

DATE	SCALE AT A1	CLIENTS REF.
APR 2018	1:250	

DRAWING No.	REVISION
PB5640-DR-H1-D-0100	-
CLIENT DWG No.	

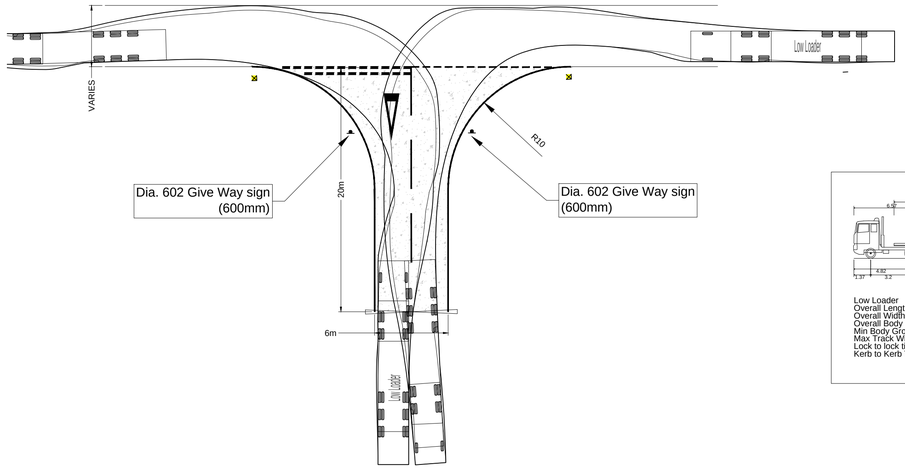
DRAWING No.
PB4476-DR-H1-D-0101

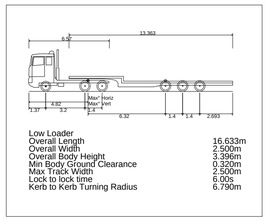




Large Tipper	
Overall Length	10.201m
Overall Width	2.500m
Overall Body Height	2.893m
Min Body Ground Clearance	0.343m
Max Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	11.550m

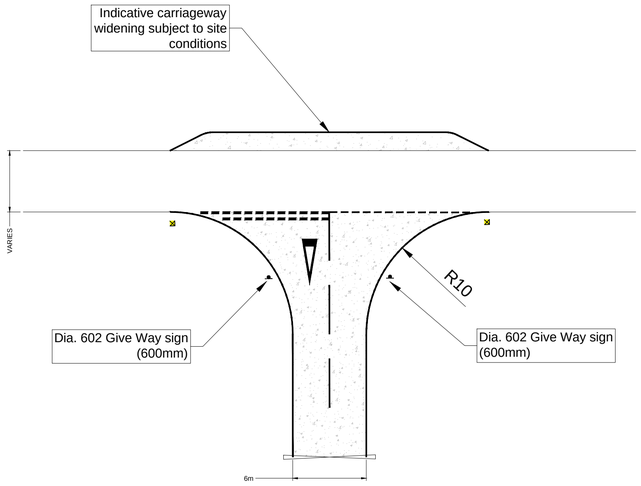
TYPE B ACCESS - RIGID VEHICLE
SWEPT PATH ANALYSIS





Low Loader	
Overall Length	16.633m
Overall Width	2.500m
Overall Body Height	3.396m
Min Body Ground Clearance	0.320m
Max Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	6.790m

TYPE B ACCESS - LOW LOADER
SWEPT PATH ANALYSIS



TYPE C ACCESS WITH OPPOSITE
VERGE WIDENING

REPRODUCED FROM ORDNANCE SURVEY MAPS WITH PERMISSION FROM THE CONTROLLER OF HM STATIONERY OFFICE. CROWN COPYRIGHT RESERVED. LICENCE No. 100023422 2007.

NOTES

1. Do not scale from this drawing, all dimensions are in metres unless noted otherwise.
2. Final design subject to micro-siting and a review of vehicle requirements.
3. Exact junction types to be determined from relevant section of Design Manual for Roads & Bridges (TD 42/95).

KEY

- EXISTING METALED ROAD BOUNDARY
- PROPOSED ACCESS BOUNDARY/ROAD MARKINGS
- PROPOSED GATE
- PROPOSED PLASTIC DEMARCATION BOLLARD
- PROPOSED POST MOUNTED TRAFFIC SIGN
- PROPOSED ACCESS CONSTRUCTION

DRAFT - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	BY	CHK	APP

REVISIONS

CLIENT

VATTENFALL

PROJECT

NORFOLK BOREAS
OFFSHORE WIND FARM

TITLE

TYPE B & C ACCESS

REDUCED JUNCTION WITH 20t TIPPER & LARGE LOW LOADER

Rightwell House, Bretton
Peterborough, Cambridgeshire, PE3 8DW
Tel +44(0)1733 334455
Email info@rhdhv.com
www.royalhaskoningDHV.com

Royal HaskoningDHV
Enhancing Society Together

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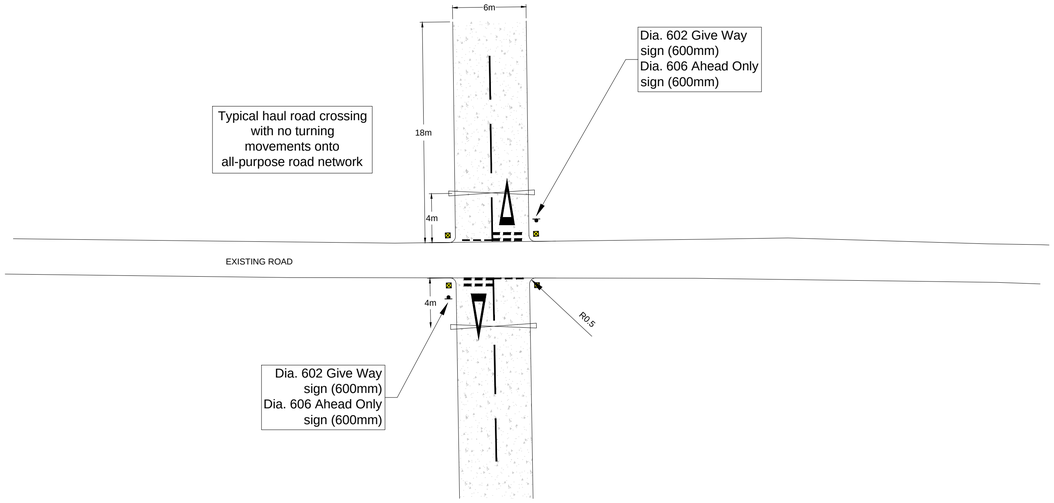
BKB	RNE	ADR

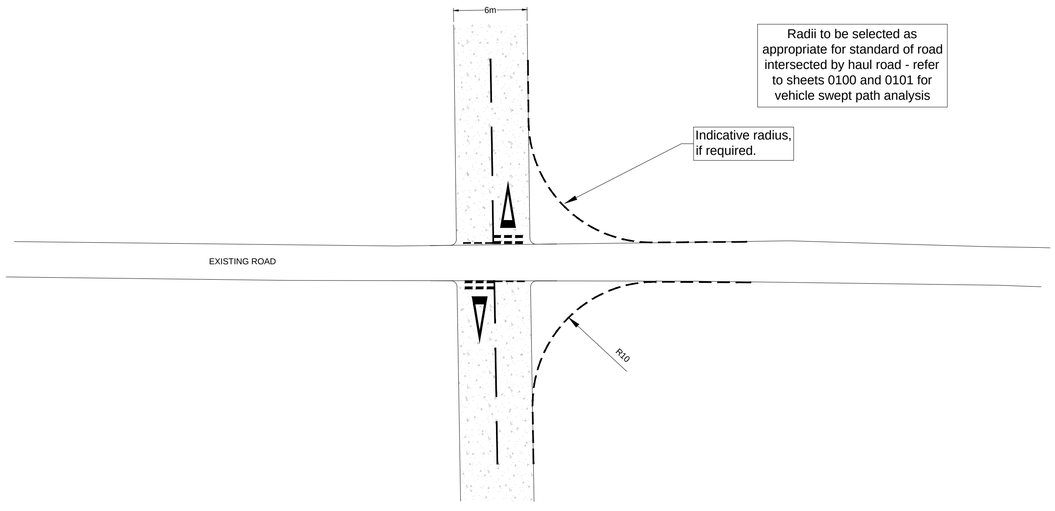
DATE	SCALE AT A1	CLIENTS REF.
APR 2018	1:250	

DRAWING No.	REVISION
PB5640-DR-H1-D-0101	-
CLIENT DWG No.	

DRAWING No.
PB4476-DR-H1-D-0102



TYPICAL HAUL ROAD CROSSING WITH NO TURNING MOVEMENTS ONTO ALL-PURPOSE ROAD NETWORK



TYPICAL HAUL ROAD CROSSING WITH TURNING MOVEMENTS ONTO ALL-PURPOSE ROAD NETWORK

NOTES

1. Do not scale from this drawing, all dimensions are in metres unless noted otherwise.
2. Exact junction types to be determined from relevant section of Design Manual for Roads & Bridges (TD 42/95).

KEY

- EXISTING METALED ROAD BOUNDARY
- PROPOSED ACCESS BOUNDARY/ROAD MARKINGS
- PROPOSED GATE
- PROPOSED PLASTIC DEMARCATION BOLLARD
- PROPOSED POST MOUNTED TRAFFIC SIGN
- PROPOSED ACCESS CONSTRUCTION

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REV	DATE	DESCRIPTION	BY	CHK	APP

REVISIONS

CLIENT

VATTENFALL

PROJECT

NORFOLK BOREAS OFFSHORE WIND FARM

TITLE

TYPE D ACCESS

TYPICAL ROAD CROSSINGS

Rightwell House, Bretton
Peterborough, Cambridgeshire, PE3 8DW
Tel +44(0)1733 334455
Email info@rhdhv.com
www.royalhaskoningDHV.com

Royal HaskoningDHV
Enhancing Society Together

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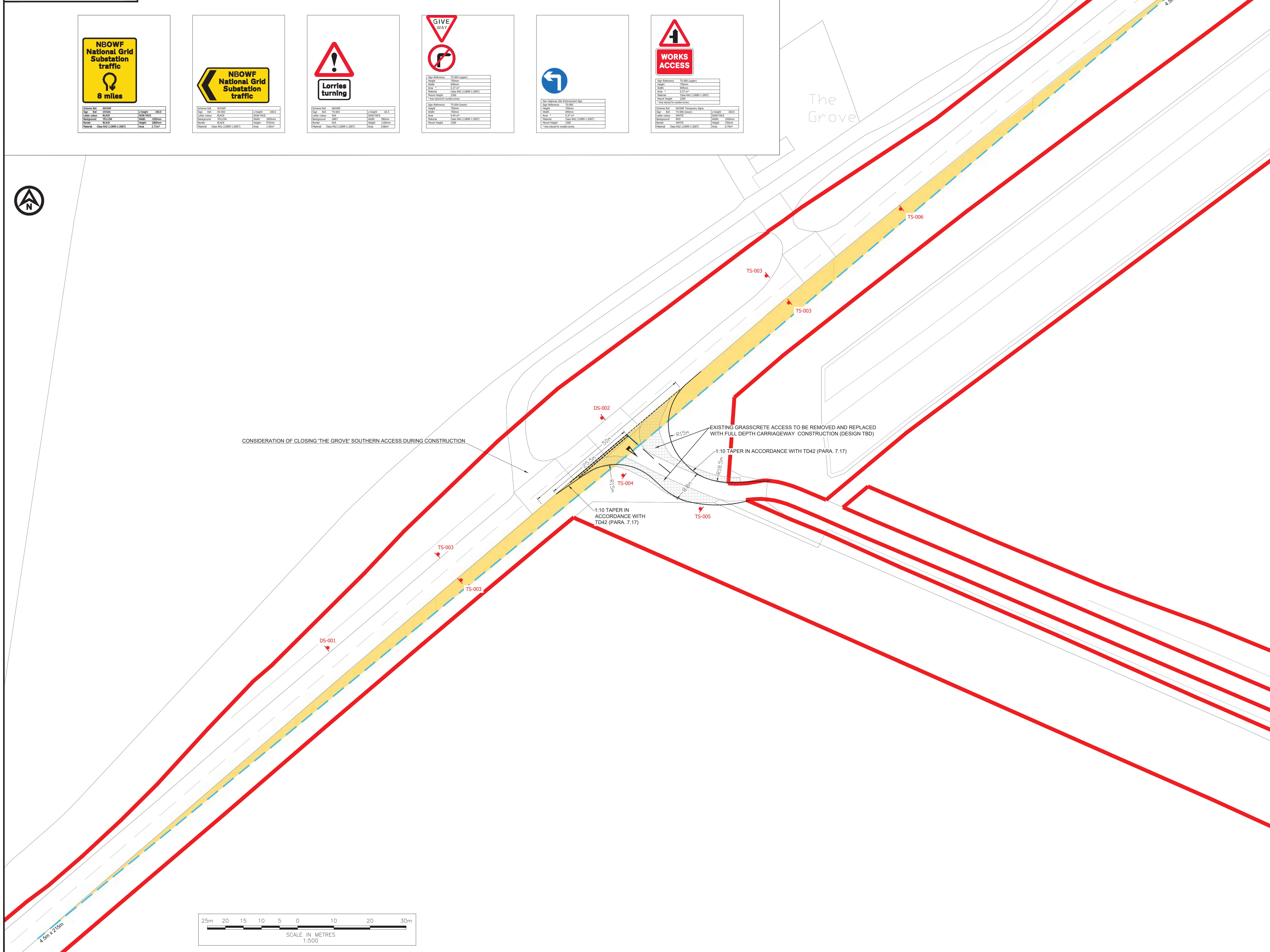
APR 2018	1:250	

DRAWING No. PB5640-DR-H1-D-0102 REVISION -

CLIENT DWG No.

7 APPENDIX 2 A47 OUTLINE ACCESS GENERAL ARRANGEMENTS

DRAWING No. TP-PB5640-DR001



NOTES

1. Do not scale from this drawing. all dimensions are in metres unless noted otherwise.
2. This drawing has been based upon Ordnance Survey Maps and Royal HaskoningDHV can not guarantee the accuracy of data.

Visibility

5. Stopping Sight Distance (SSD) for design speed of the road.
6. X-distance - the set back from the nearest edge of the carriageway from which the access will be taken
7. Y-distance - the SSD measured along the nearest edge of the carriageway to its intersection with the centreline of the access.
8. All vegetation to be cleared/trimmed within identified visibility envelope.

Road Signs

9. All temporary traffic signs to be mounted on suitable A-Frames weighted down with sandbags as per supplier recommendations.
10. All temporary traffic signs to be set out in accordance with the requirements of Traffic Signs Manual Chapter 8, the Traffic Signs Regulations and General Directions 2016 and TD42 during the detailed design stage.
11. Setting out of signs to be undertaken only by approved traffic management operatives.

KEY

- ORDER LIMITS
- EXISTING METALED ROAD BOUNDARY
- VISIBILITY SPLAY
- APPROXIMATE SIGN LOCATION
- LAND REQUIRED TO BE CLEAR TO ACHIEVE VISIBILITY
- EXISTING GRASSCRETE

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REV	DATE	DESCRIPTION	BY	CHK	APP
F1.0		FIRST ISSUE			

REVISIONS

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PROJECT

NORFOLK BOREAS OFFSHORE WIND FARM

TITLE

A47 NATIONAL GRID SUBSTATION ACCESS AC178 CONCEPT DRAWING (LEFT TURN IN / LEFT TURN OUT)

Rightwell House, Bretton
Peterborough, Cambridgeshire, PE3 8DW
Tel +44(0)1733 334455
Email info@rhdhv.com
www.royalhaskoningDHV.com

Royal HaskoningDHV
Enhancing Society Together

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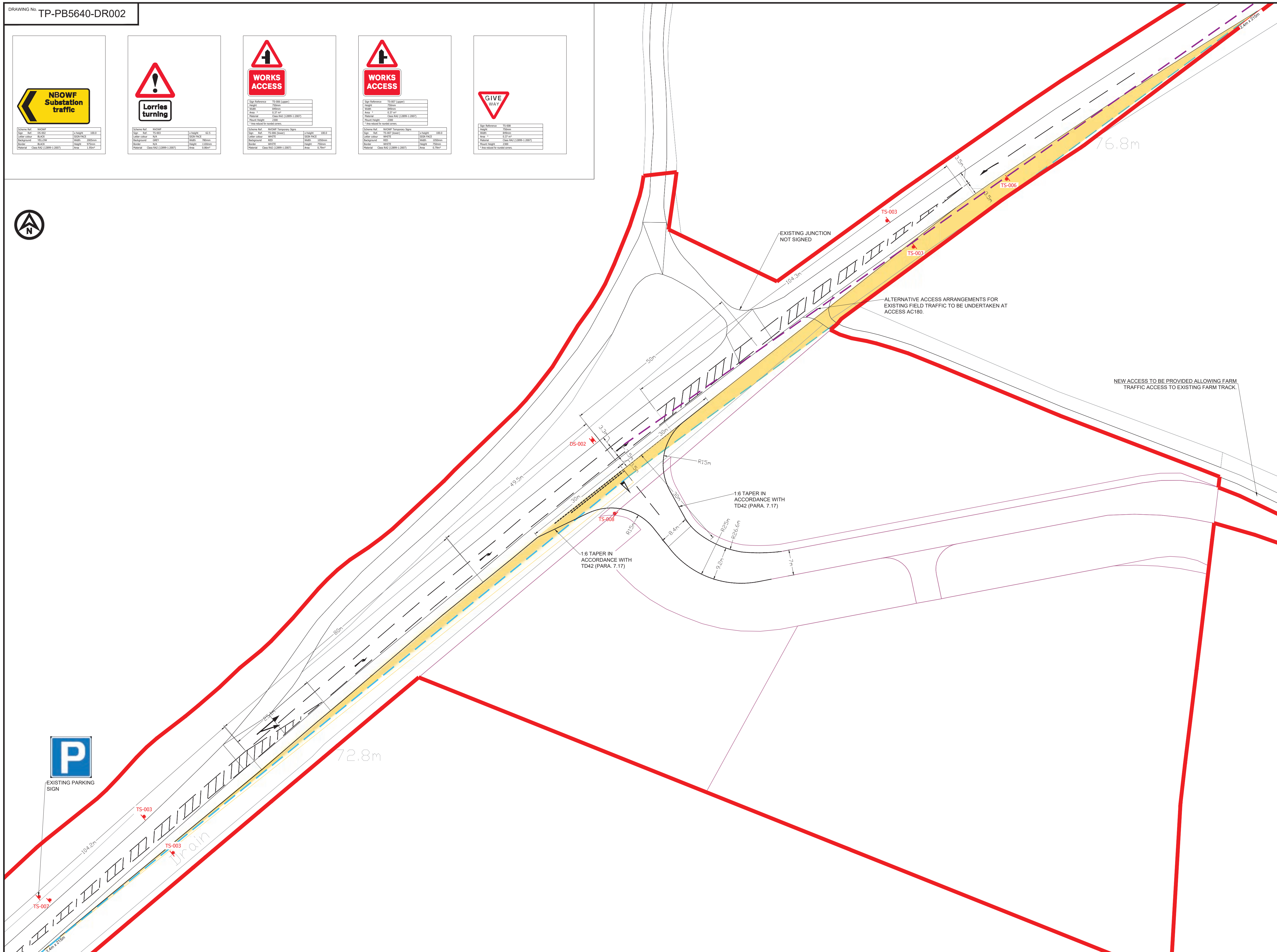
DRAWING No. TP-PB5640-DR001 | REVISION F1.0

CLIENT DWG No.

A47 - NATIONAL GRID SUBSTATION ACCESS AC178

SCALE - 1:500

DRAWING No. TP-PB5640-DR002



A47 - SUBSTATION ACCESS AC180

SCALE - 1:500

25m 20 15 10 5 0 10 20 30m

SCALE IN METRES 1:500

NOTES

1. Do not scale from this drawing. all dimensions are in metres unless noted otherwise.
2. This drawing has been based upon Ordnance Survey Maps and Royal Haskoning can not guarentee the accuracy of data.

Visibility

5. Stopping Sight Distance (SSD) for design speed of the road.
6. X-distance - the set back from the nearest edge of the carriageway from which the access will be taken
7. Y-distance - the SSD measured along the nearest edge of the carriageway to its intersection with the centreline of the access.
8. All vegetation to be cleared/trimmed within identified visibility envelope.

Road Signs

9. All permanent traffic signs to be set out in accordance with the requirements of Traffic Signs Manual Chapter 1-7, The Traffic Signs Regulations and General Directions 2016 and DMRB TD42 during the detailed design stage.
10. Setting out of signs to be undertaken only by approved traffic management operatives.

KEY

- ORDER LIMITS
- EXISTING METALLED ROAD BOUNDARY
- PROPOSED ACCESS BOUNDARY/ROAD MARKINGS
- VISIBILITY SPLAY
- FORWARD VISIBILITY SPLAY FOR RIGHT TURNING VEHICLES
- PROPOSED GATE
- APPROXIMATE SIGN LOCATION
- LAND REQUIRED FOR VISIBILITY SPLAYS

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REV	DATE	DESCRIPTION	BY	CHK	APP
F1.0		FIRST ISSUE			

REVISIONS

CLIENT

VATTENFALL

PROJECT

NORFOLK BOREAS OFFSHORE WIND FARM

TITLE

A47 NORFOLK BOREAS ONSHORE PROJECT SUBSTATION ACCESS AC180 CONCEPT

Royal HaskoningDHV
Enhancing Society Together
Rightwell House, Bretton
Peterborough, Cambridgeshire, PE3 8DW
Tel +44(0)1733 334455
Email info@rhdhv.com
www.royalhaskoningDHV.com

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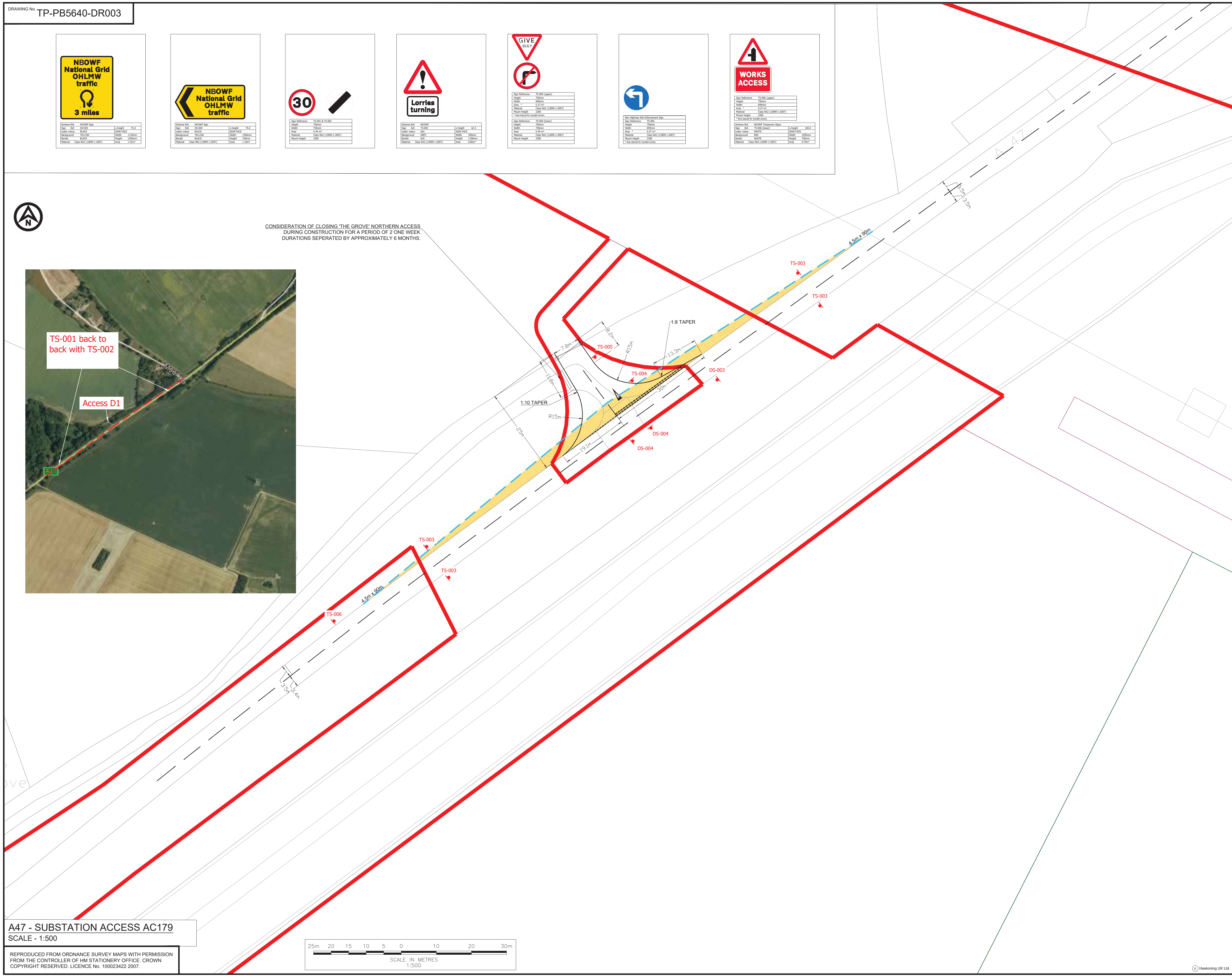
CLIENT DWG No.

DRAWING No. TP-PB5640-DR003



A47 - SUBSTATION ACCESS AC179
SCALE - 1:500

NOTES

1. Do not scale from this drawing. all dimensions are in metres unless noted otherwise.
2. This drawing has been based upon Ordnance Survey Maps and Royal Haskoning can not guarantee the accuracy of data.

Visibility

5. Stopping Sight Distance (SSD) for design speed of the road.
6. X-distance - the set back from the nearest edge of the carriageway from which the access will be taken
7. Y-Distance - the SSD measured along the nearest edge of the carriageway to its intersection with the centreline of the access.
8. All vegetation to be cleared/trimmed within identified visibility envelope.

Road Signs

7. All temporary traffic signs to be mounted on suitable A-Frames weighted down with sandbags as per supplier recommendations.
8. All temporary traffic signs to be set out in accordance with the requirements of Traffic Signs Manual Chapter 8, Traffic Signs Regulationa and General Direction and DMRB TD42.
9. Setting out of signs to be undertaken only by approved traffic management operatives.

Enforcement Measures

10. enforcement measures to be determined with NCC in partnership with other organisations such as the Police and Fire and Rescue.

KEY

- ORDER LIMITS
- EXISTING METALLED ROAD BOUNDARY
- PROPOSED ACCESS BOUNDARY/ROAD MARKINGS
- VISIBILITY SPLAY
- PROPOSED GATE
- APPROXIMATE SIGN LOCATION
- LAND REQUIRED TO BE CLEAR TO ACHIEVE VISIBILITY

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REV	DATE	DESCRIPTION	BY	CHK	APP
F1.0		FIRST ISSUE			

REVISIONS

CLIENT

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PROJECT

NORFOLK BOREAS OFFSHORE WIND FARM

TITLE

A47 NATIONAL GRID OHLMW

ACCESS AC179 CONCEPT (TEMPORARY)

Royal HaskoningDHV
Enhancing Society Together
Rightwell House, Bretton
Peterborough, Cambridgeshire, PE3 8DW
Tel +44(0)1733 334455
Email info@rhdhv.com
www.royalhaskoningDHV.com

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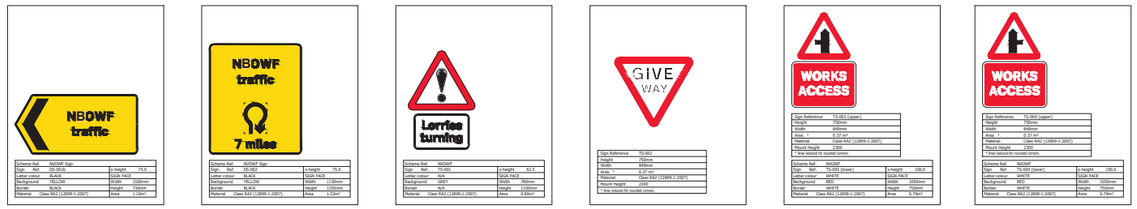
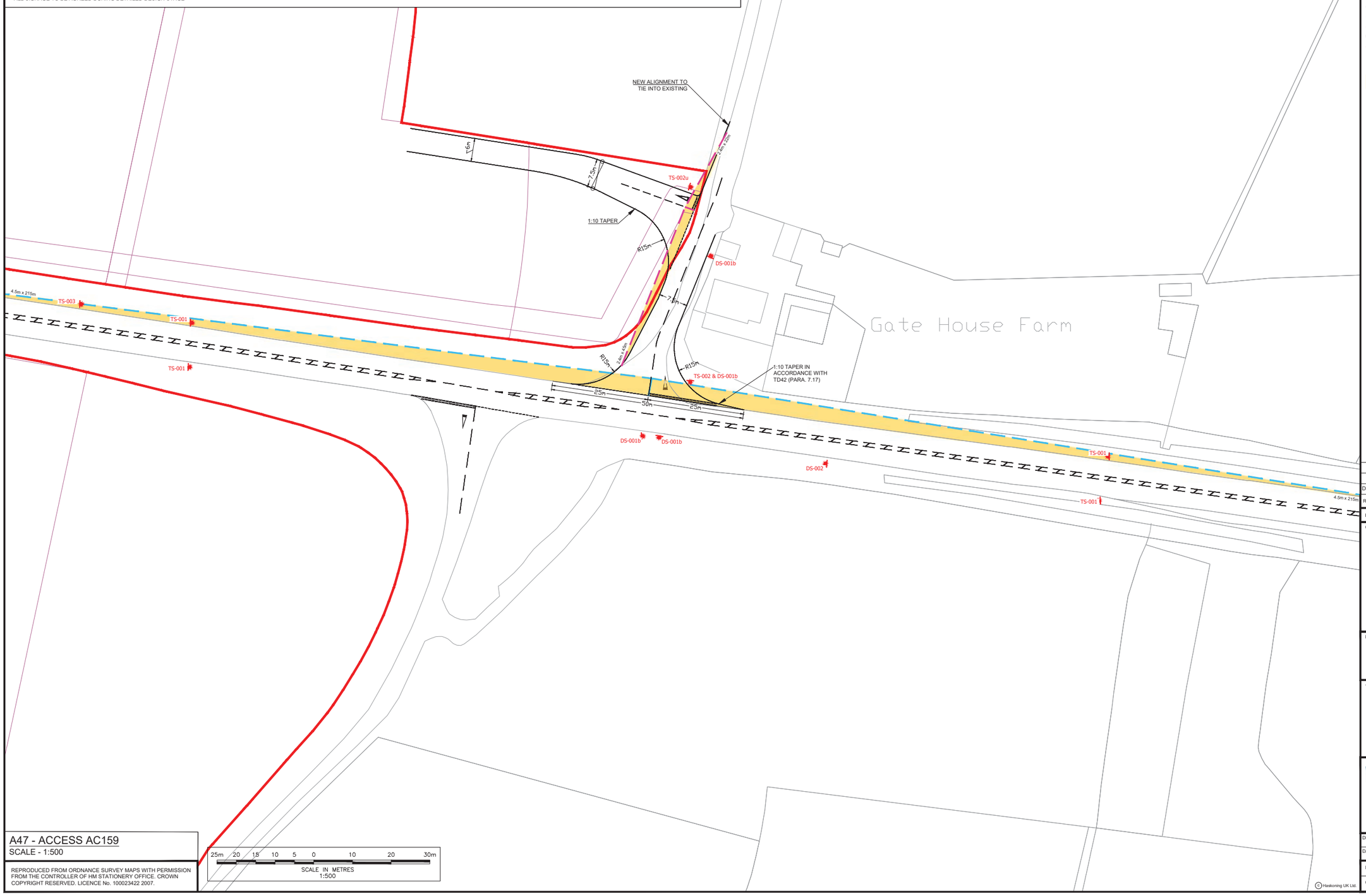
DRAWING No. TP-PB5640-DR003
CLIENT DWG No.
REVISION F1.0

DRAWING No. TP-PB5640-DR010



ALL SIGNAGE TO BE AGREED DURING DETAILED DESIGN STAGE



A47 - ACCESS AC159
SCALE - 1:500

25m 20 15 10 5 0 10 20 30m
SCALE IN METRES
1:500

NOTES

1. Do not scale from this drawing. all dimensions are in metres unless noted otherwise.
2. This drawing has been based upon Ordnance Survey Maps and Royal Haskoning can not guarentee the accuracy of data.

Visibility

5. Stopping Sight Distance (SSD) for design speed of the road.
6. X-distance - the set back from the nearest edge of the carriageway from which the access will be taken
7. Y-distance - the SSD measured along the nearest edge of the carriageway to its intersection with the centreline of the access.
8. All vegetation to be cleared/trimmed within identified visibility envelope.

Road Signs

9. All permanent traffic signs to be set out in accordance with the requirements of Traffic Signs Manual Chapter 1-7 and Traffic Signs Regulations General Direction 2016 and DMRB TD/42 during the detailed design stage.
10. Setting out of signs to be undertaken only by approved traffic management operatives.

KEY

- ORDER LIMITS
- EXISTING METALLED ROAD BOUNDARY
- PROPOSED ACCESS BOUNDARY/ROAD MARKINGS
- VISIBILITY SPLAY (DMRB) applicable to 60mph design speed
- VISIBILITY SPLAY (MfS) applicable to 20mph design speed
- PROPOSED GATE
- APPROXIMATE SIGN LOCATION
- LAND REQUIRED FOR VISIBILITY SPLAYS

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REV	DATE	DESCRIPTION	BY	CHK	APP
D.01		FIRST ISSUE			

REVISIONS

CLIENT

VATTENFALL

PROJECT

NORFOLK BOREAS
OFFSHORE WIND FARM

TITLE

ACCESS AC159
CONCEPT DESIGN
MA2-E, TC#1 (N) AND TC#2 (N & S)

Rightwell House, Bretton
Peterborough, Cambridgeshire, PE3 8DW
Tel +44(0)1733 334455
Email info@rhdhv.com
www.royalhaskoningDHV.com

Royal HaskoningDHV
Enhancing Society Together

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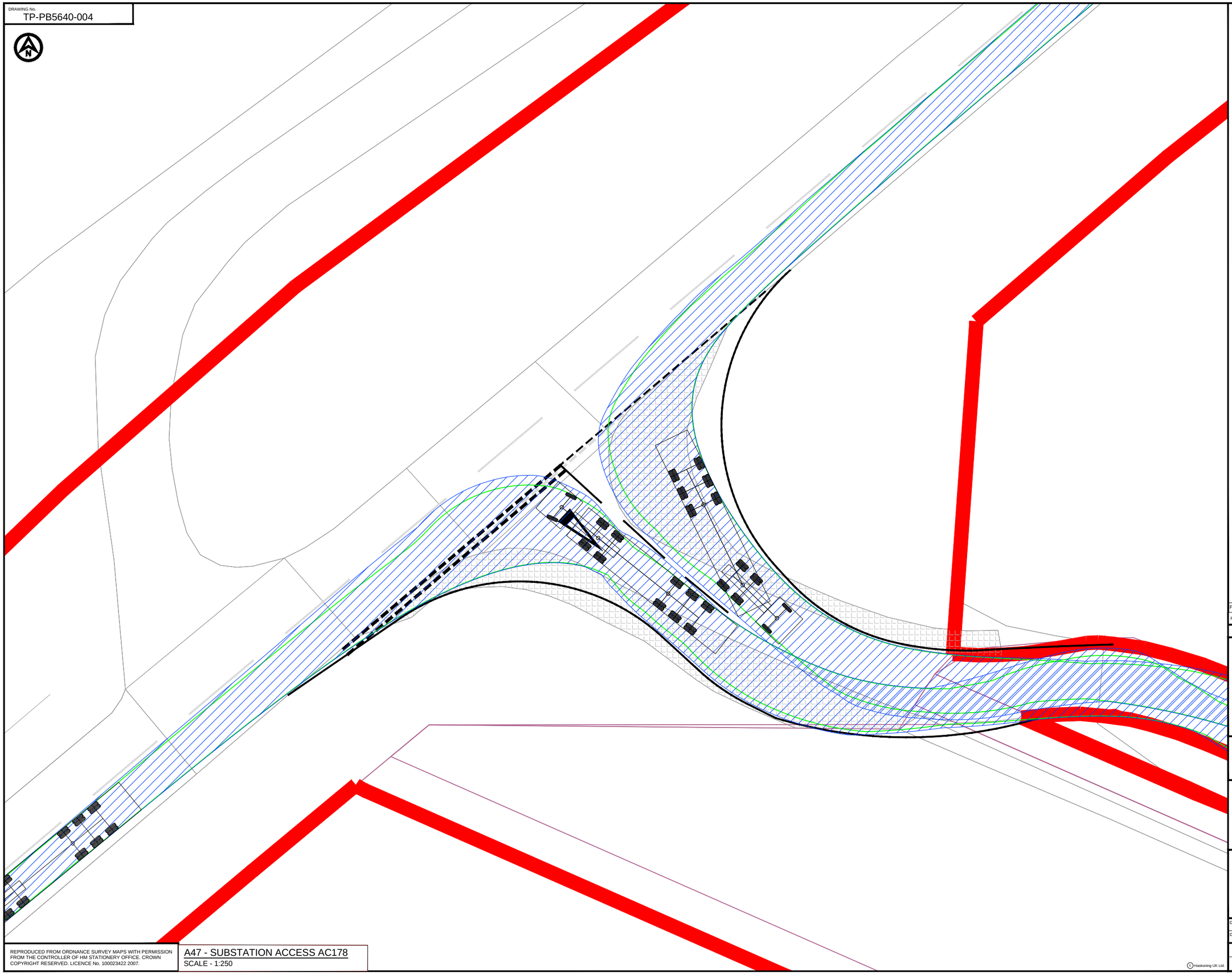
DATE	SCALE AT A1	CLIENTS REF.
11.05.19	1:500 uno	

DRAWING No.	REVISION
TP-PB5640-DR010	F1.0

CLIENT DWG No.

8 APPENDIX 3 A47 SWEPT PATH ANALYSIS DRAWING

DRAWING No.
TP-PB5640-004



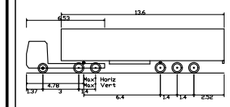
NOTES

1. Do not scale from this drawing, all dimensions are in metres unless noted otherwise.
2. This drawing has been based upon Ordnance Survey Maps and Royal Haskoning can not guarentee the accuracy of data.

KEY

ORDER LIMITS

VEHICLE TRACKING



Max Legal Length (UK) Articulated Vehicle (16.5m)

Overall Length	16.500m
Overall Width	2.550m
Overall Body Height	3.681m
Min Body Ground Clearance	0.411m
Max Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	6.530m

VEHICLE BODY SWEPT PATH (FORWARD GEAR)

VEHICLE CHASIS SWEPT PATH

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REV	DATE	DESCRIPTION	BY	CHK	APP
F1.0		FIRST ISSUE			

REVISIONS

CLIENT

VATTENFALL

PROJECT
NORFOLK BOREAS OFFSHORE WIND FARM

TITLE
A47 NATIONAL GRID SUBSTATION ACCESS AC178
ARTICULATED VEHICLE SWEPT PATH ANALYSIS
(LEFT TURN IN / LEFT TURN OUT)

Rightwell House, Bretton
Peterborough, Cambridgeshire, PE3 8DW
Tel +44(0)1733 334455
Email info@rhdhv.com
www.royalhaskoningDHV.com

Royal HaskoningDHV
Enhancing Society Together

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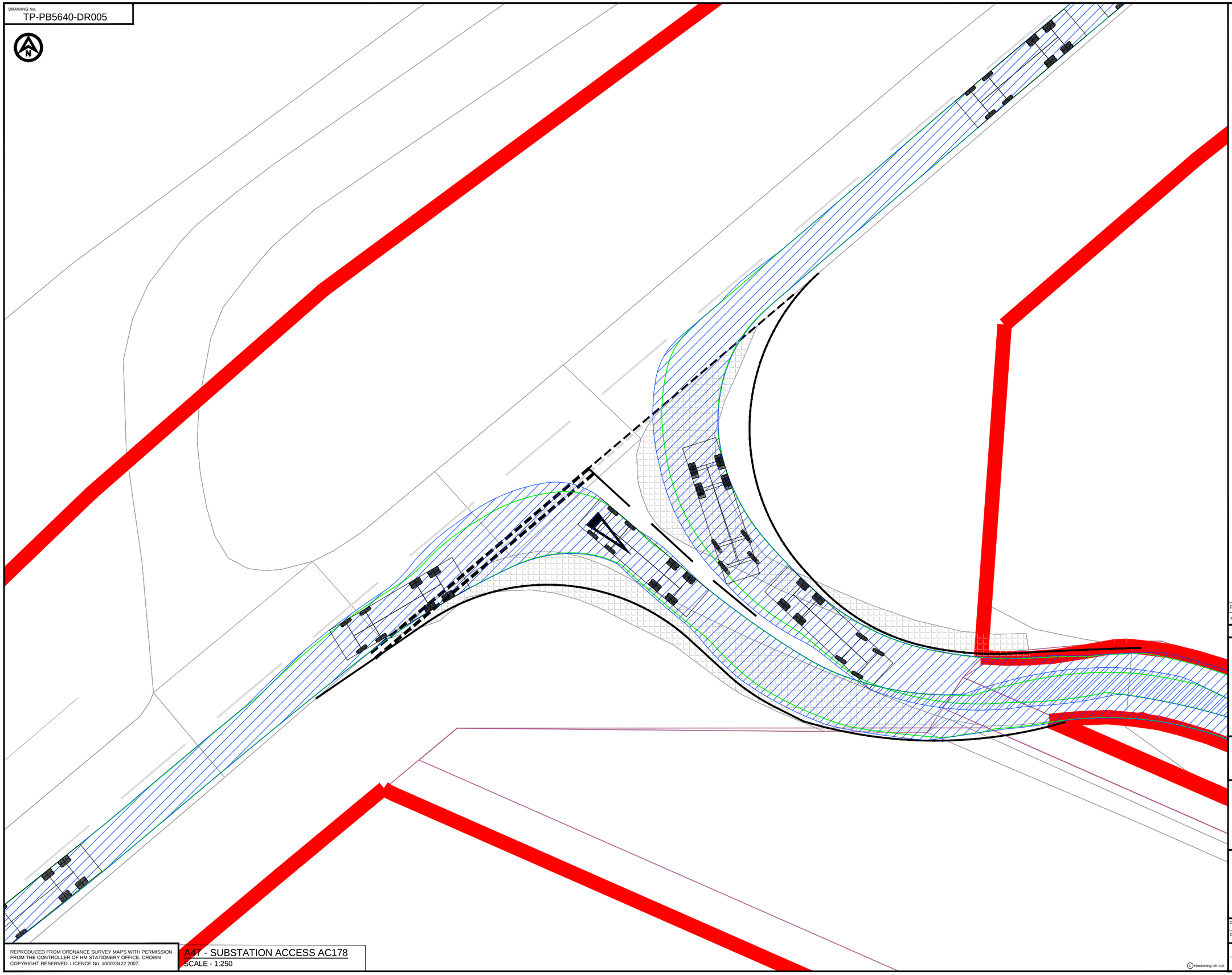
DRAWING No.	REVISION
TP-PB5640-004	F1.0

CLIENT DWG No.

A47 - SUBSTATION ACCESS AC178
SCALE - 1:250

DRAWING No.
TP-PB5640-DR005

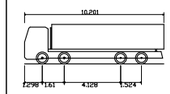


NOTES
1. Do not scale from this drawing, all dimensions are in metres unless noted otherwise.
2. This drawing has been based upon Ordnance Survey Maps and Royal Haskoning can not guarentee the accuracy of data.

KEY

ORDER LIMITS

VEHICLE TRACKING



Large Tipper	
Overall Length	10.201m
Overall Width	2.495m
Overall Body Height	3.890m
Min Body Ground Clearance	0.341m
Track Width	2.471m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	11.550m

VEHICLE BODY SWEPT PATH (FORWARD GEAR)

VEHICLE CHASIS SWEPT PATH

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REV	DATE	DESCRIPTION	BY	CHK	APP
F1.0		FIRST ISSUE			

REVISIONS

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VATTENFALL

PROJECT
NORFOLK BOREAS OFFSHORE WIND FARM

TITLE
A47 NATIONAL GRID SUBSTATION ACCESS AC178
LARGE TIPPER
SWEPT PATH ANALYSIS
(LEFT TURN IN / LEFT TURN OUT)

Rightwell House, Bretton
Peterborough, Cambridgeshire, PE3 8DW
Tel +44(0)1733 334455
Email info@rhdhv.com
www.royalhaskoningDHV.com

Royal HaskoningDHV
Enhancing Society Together

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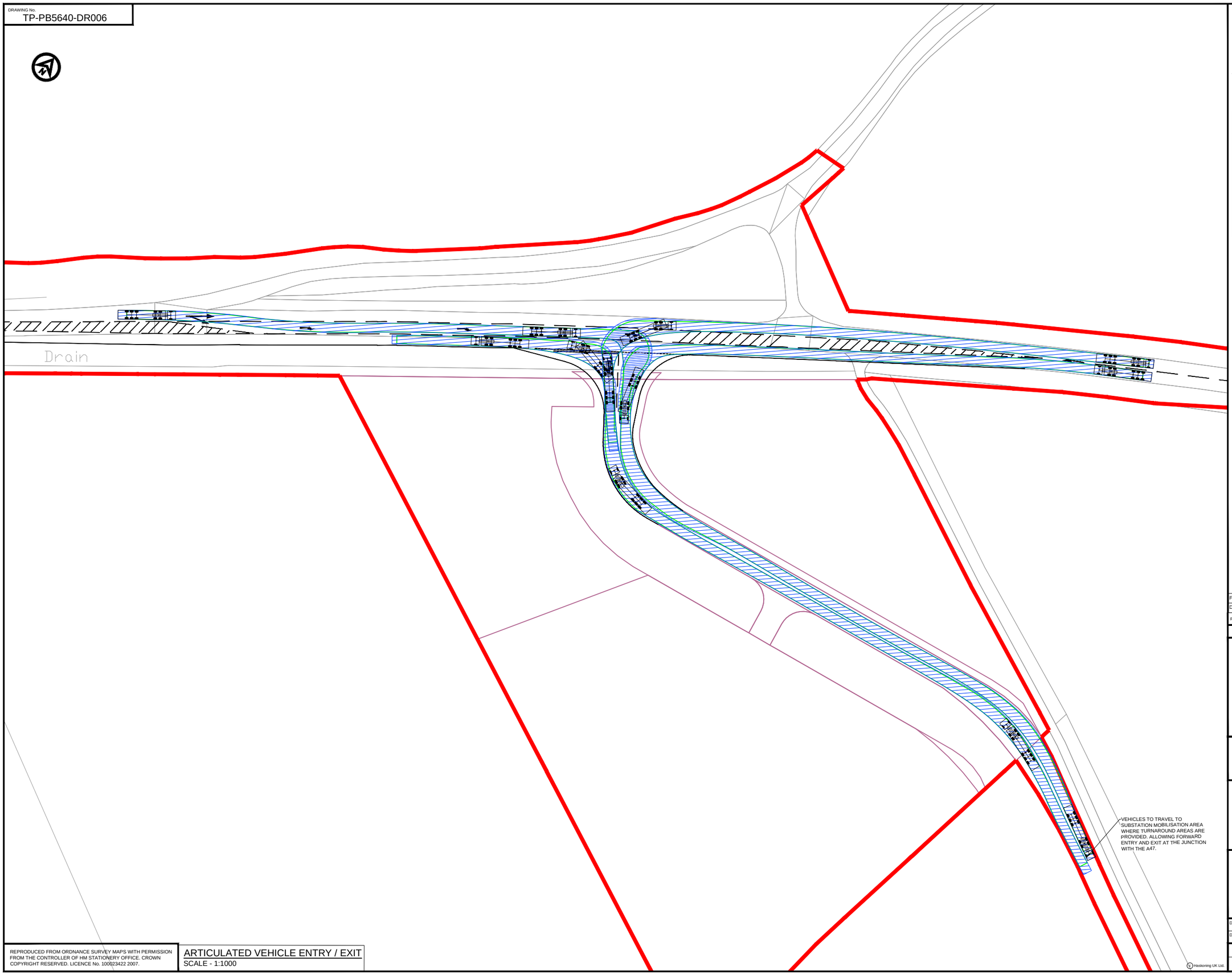
DRAWING No.	REVISION
TP-PB5640-DR005	F1.0
CLIENT DWG No.	

A47 - SUBSTATION ACCESS AC178
SCALE - 1:250

DRAWING No.
TP-PB5640-DR006



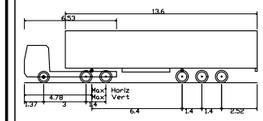
NOTES

1. Do not scale from this drawing, all dimensions are in metres unless noted otherwise.
2. This drawing has been based upon Ordnance Survey Maps and Royal Haskoning can not guarentee the accuracy of data.

KEY

ORDER LIMITS

VEHICLE TRACKING



Max Legal Length (UK) Articulated Vehicle (1	
Overall Length	16.500m
Overall Width	2.550m
Overall Body Height	3.681m
Min Body Ground Clearance	0.411m
Max Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	6.530m

VEHICLE BODY SWEPT PATH (FORWARD GEAR)

VEHICLE CHASIS SWEPT PATH

DRAFT - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	BY	CHK	APP
P1.0	JI	Updated in accordance with HE comments	JI	RNE	ADR
D.01		FIRST ISSUE			

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VATTENFALL

PROJECT

NORFOLK BOREAS OFFSHORE WIND FARM

TITLE

A47 SUBSTATION

ACCESS AC180 CONCEPT ARTICULATED VEHICLE SPA

Rightwell House, Bretton
Peterborough, Cambridgeshire, PE3 8DW
Tel +44(0)1733 334455
Email info@rhdhv.com
www.royalhaskoningDHV.com

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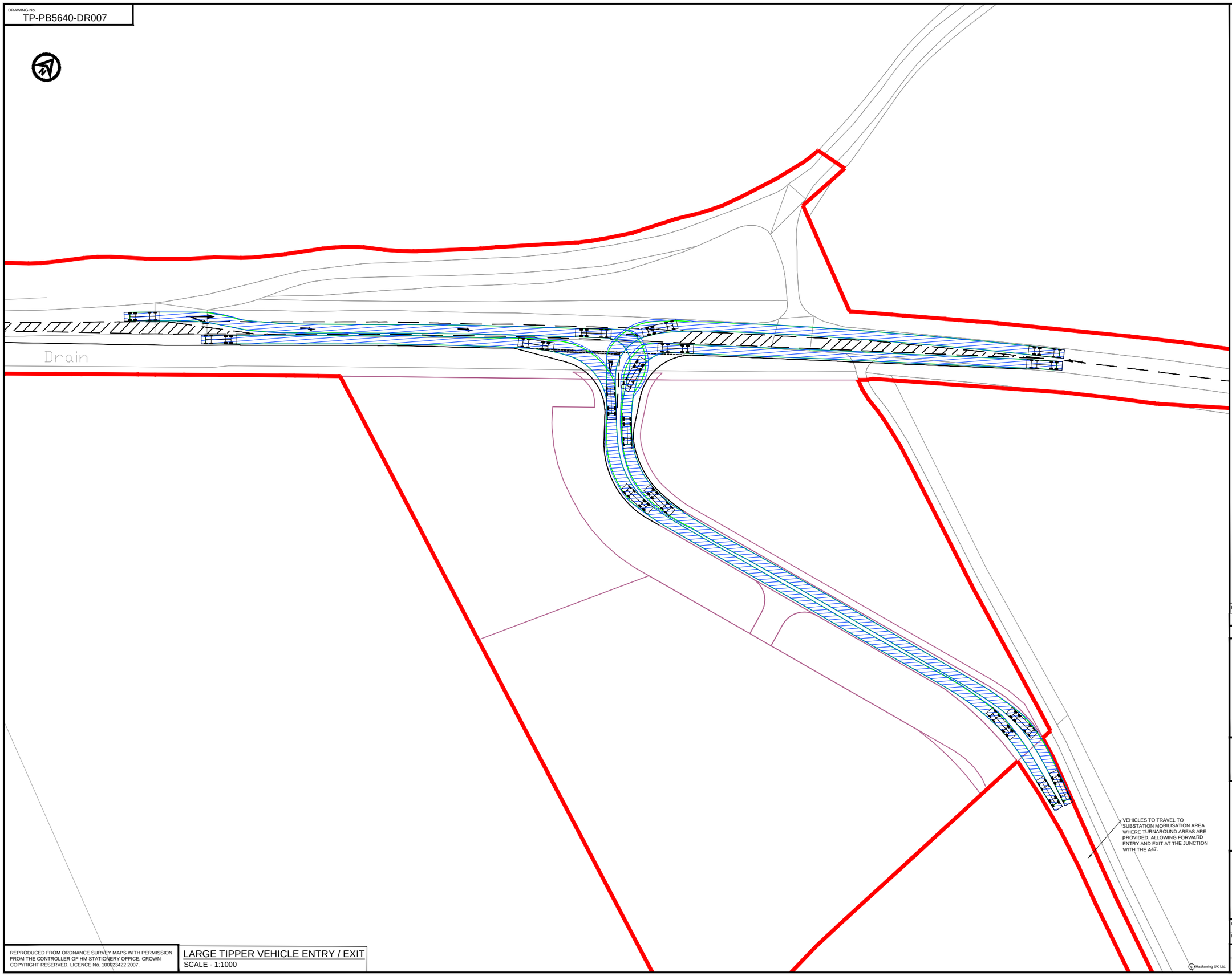
DRAWING No. TP-PB5640-DR006

REVISION F1.0

CLIENT DWG No.

ARTICULATED VEHICLE ENTRY / EXIT
SCALE - 1:1000

DRAWING No.
TP-PB5640-DR007



LARGE TIPPER VEHICLE ENTRY / EXIT
SCALE - 1:1000

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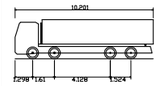
KEY

ORDER LIMITS

VEHICLE TRACKING



Large Tipper	
Overall Length	10.201m
Overall Width	2.495m
Overall Body Height	2.890m
Min Body Ground Clearance	0.341m
Track Width	2.471m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	11.550m

VEHICLE BODY SWEPT PATH (FORWARD GEAR)

VEHICLE CHASIS SWEPT PATH

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REV	DATE	DESCRIPTION	BY	CHK	APP
F1.0		FIRST ISSUE			

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PROJECT
NORFOLK BOREAS OFFSHORE WIND FARM

TITLE
A47 SUBSTATION
ACCESS AC180 CONCEPT
LARGE TIPPER SPA

Rightwell House, Bretton
Peterborough, Cambridgeshire, PE3 8DW
Tel +44(0)1733 334455
Email info@rhdhv.com
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DRAWING No.	REVISION
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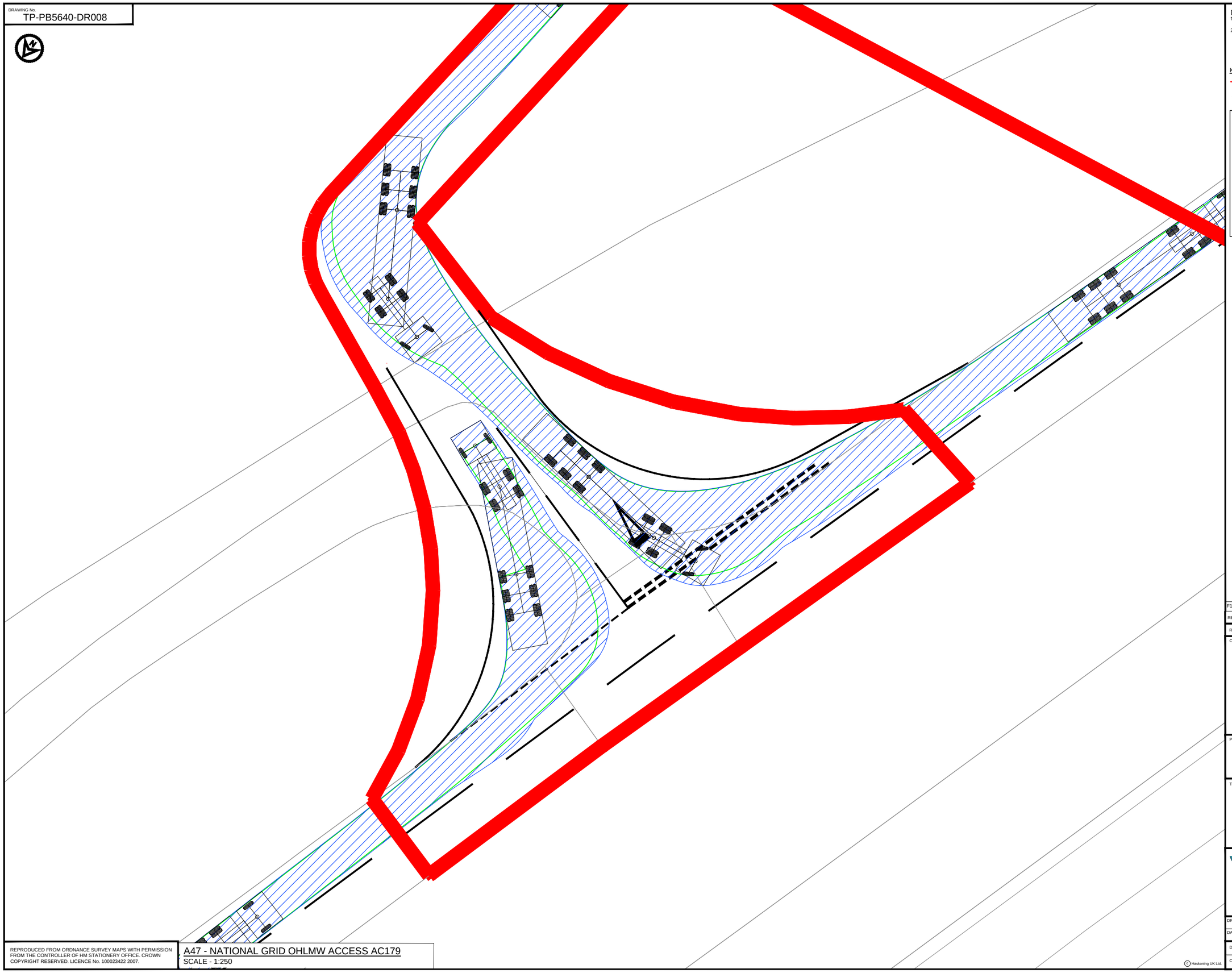
DRAWING No.
TP-PB5640-DR008



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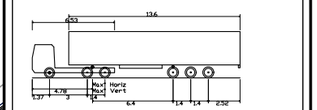
KEY

ORDER LIMITS

VEHICLE TRACKING



Max Legal Length (UK) Articulated Vehicle (16.5m
Overall Length 16.500m
Overall Width 2.550m
Overall Body Height 3.081m
Min Body Ground Clearance 0.411m
Max Track Width 2.900m
Lock to lock time 6.00s
Kerb to Kerb Turning Radius 6.330m

VEHICLE BODY SWEPT PATH (FORWARD GEAR)

VEHICLE CHASSIS SWEPT PATH

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PROJECT
NORFOLK BOREAS OFFSHORE WIND FARM

TITLE
A47 NATIONAL GRID OHLMW ACCESS AC 179 ARTICULATED VEHICLE SWEPT PATH ANALYSIS

Rightwell House, Bretton
Peterborough, Cambridgeshire, PE3 8DW
Tel +44(0)1733 334455
Email info@rhdhv.com
www.royalhaskoningDHV.com

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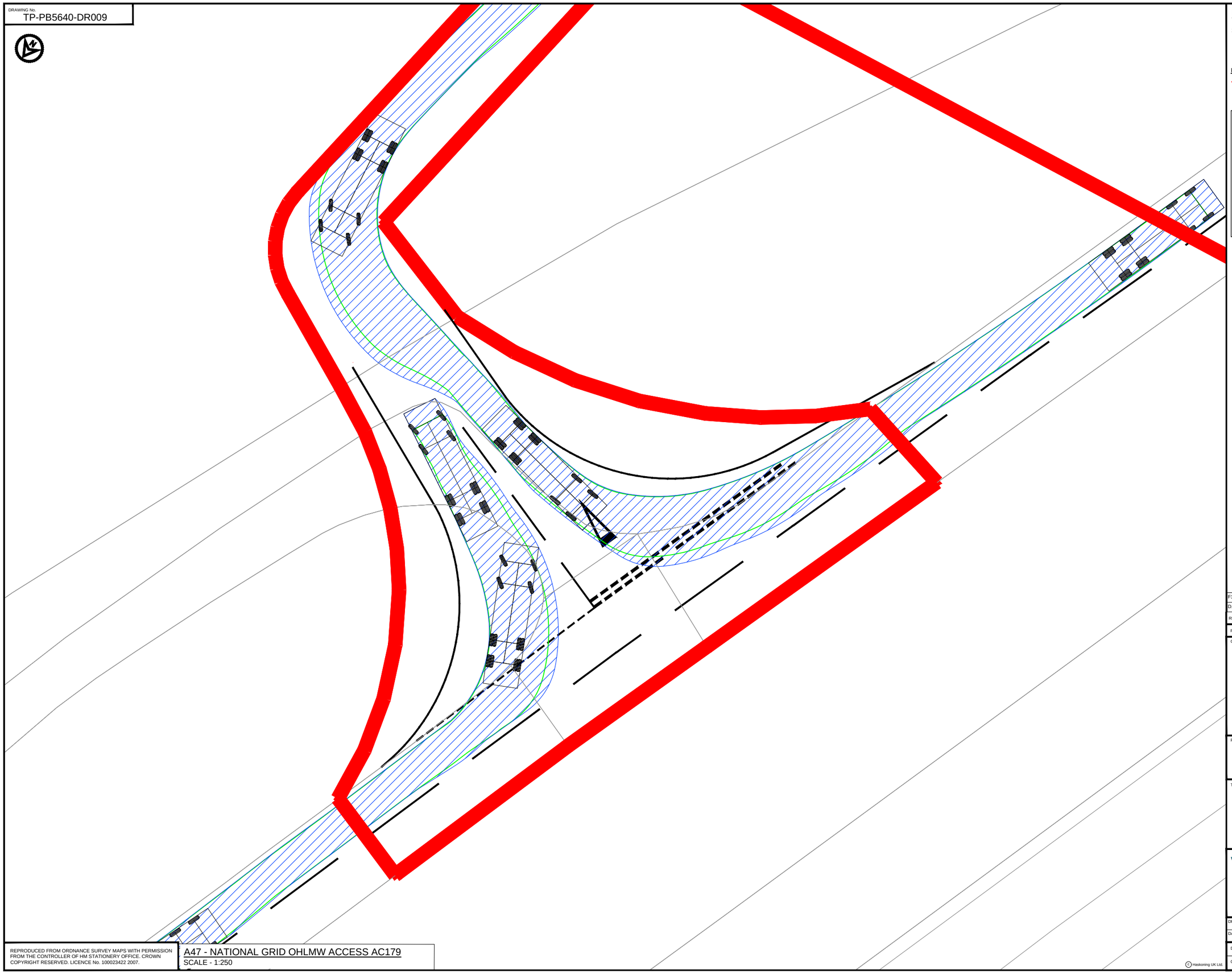
CLIENT DWG No.	

A47 - NATIONAL GRID OHLMW ACCESS AC179
SCALE - 1:250

DRAWING No.
TP-PB5640-DR009



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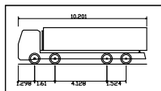
KEY

ORDER LIMITS

VEHICLE TRACKING



Large Tipper	
Overall Length	10.201m
Overall Width	2.495m
Overall Body Height	3.870m
Min Body Ground Clearance	0.341m
Track Width	2.471m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	11.550m

VEHICLE BODY SWEPT PATH (FORWARD GEAR)

VEHICLE CHASSIS SWEPT PATH

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PROJECT
NORFOLK BOREAS OFFSHORE WIND FARM

TITLE
A47 NATIONAL GRID OHLMW ACCESS AC179
LARGE TIPPER SWEPT PATH ANALYSIS

Rightwell House, Bretton
Peterborough, Cambridgeshire, PE3 8DW
Tel +44(0)1733 334455
Email info@rhdhv.com
www.royalhaskoningDHV.com

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CLIENT DWG No.

A47 - NATIONAL GRID OHLMW ACCESS AC179
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DRAWING No.
TP-PB5640-DR011

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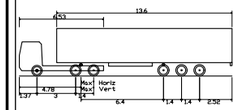
KEY

ORDER LIMITS

VEHICLE TRACKING



Max Legal Length (UK) Articulated Vehicle (16.5m)

Overall Length	16.380m
Overall Width	2.550m
Overall Body Height	3.681m
Min Body Ground Clearance	0.411m
Max Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	6.530m

VEHICLE BODY SWEPT PATH (FORWARD GEAR)

VEHICLE CHASSIS SWEPT PATH

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PROJECT
NORFOLK BOREAS OFFSHORE WIND FARM

TITLE
ACCESS AC159
ARTICULATED VEHICLE
SWEPT PATH ANALYSIS

Rightwell House, Bretton
Peterborough, Cambridgeshire, PE3 8DW
Tel +44(0)1733 334455
Email info@rhdhv.com
www.royalhaskoningDHV.com

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TP-PB5640-DR011	F1.0
CLIENT DWG No.	

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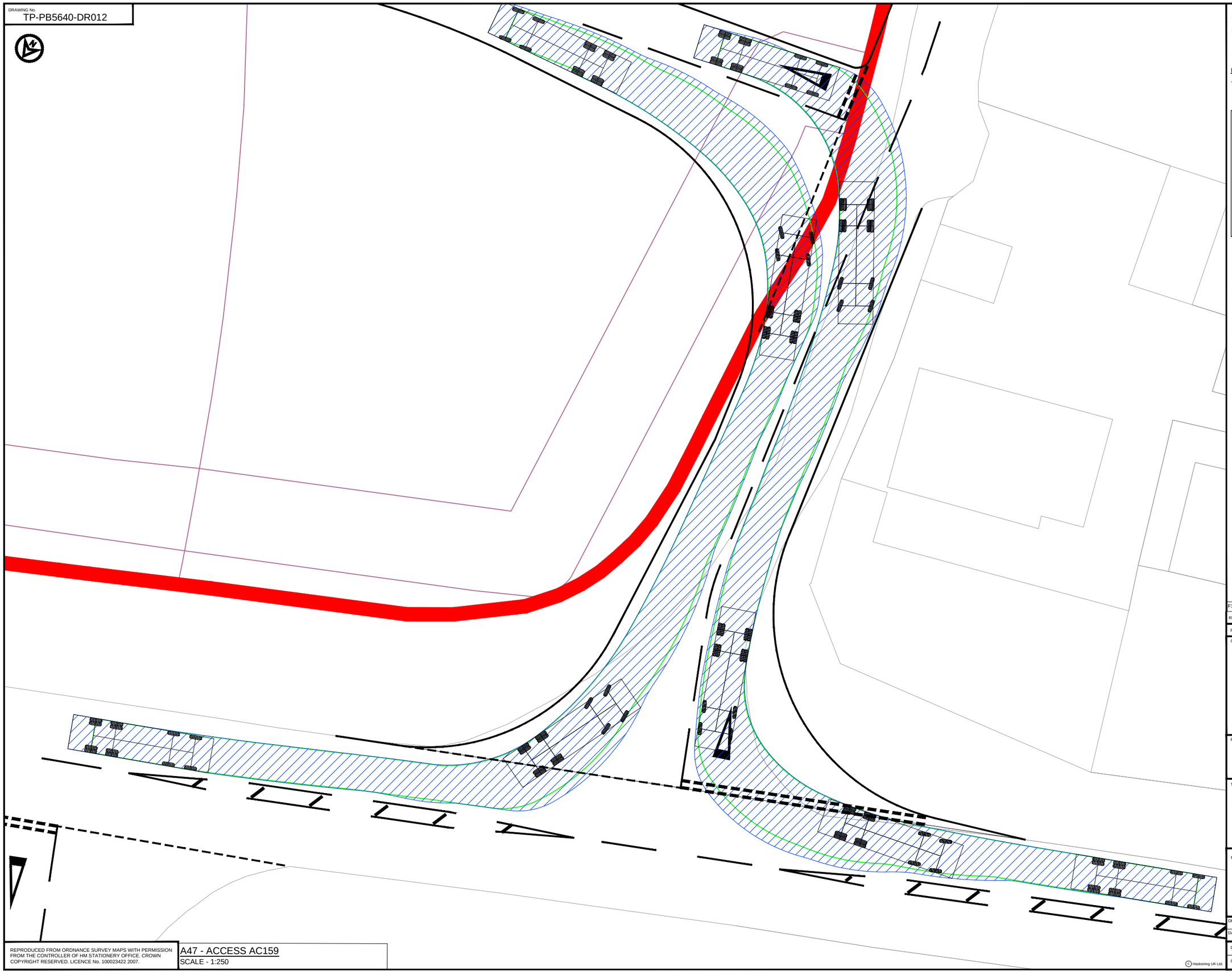
SCALE - 1:250

DRAWING No.
TP-PB5640-DR012



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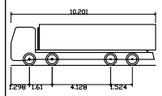
VEHICLE TRACKING



Large Tipper	
Overall Length	10.201m
Overall Width	2.499m
Overall Body Height	3.890m
Min Body Ground Clearance	0.341m
Track Width	2.471m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	11.550m

VEHICLE BODY SWEPT PATH (FORWARD GEAR)

VEHICLE CHASIS SWEPT PATH

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REV	DATE	DESCRIPTION	BY	CHK	APP
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NORFOLK BOREAS OFFSHORE WIND FARM

TITLE
ACCESS AC159
LARGE TIPPER
SWEPT PATH ANALYSIS

Rightwell House, Bretton
Peterborough, Cambridgeshire, PE3 8DW
Tel +44(0)1733 334455
Email info@rhdhv.com
www.royalhaskoningDHV.com

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CLIENT DWG No.

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