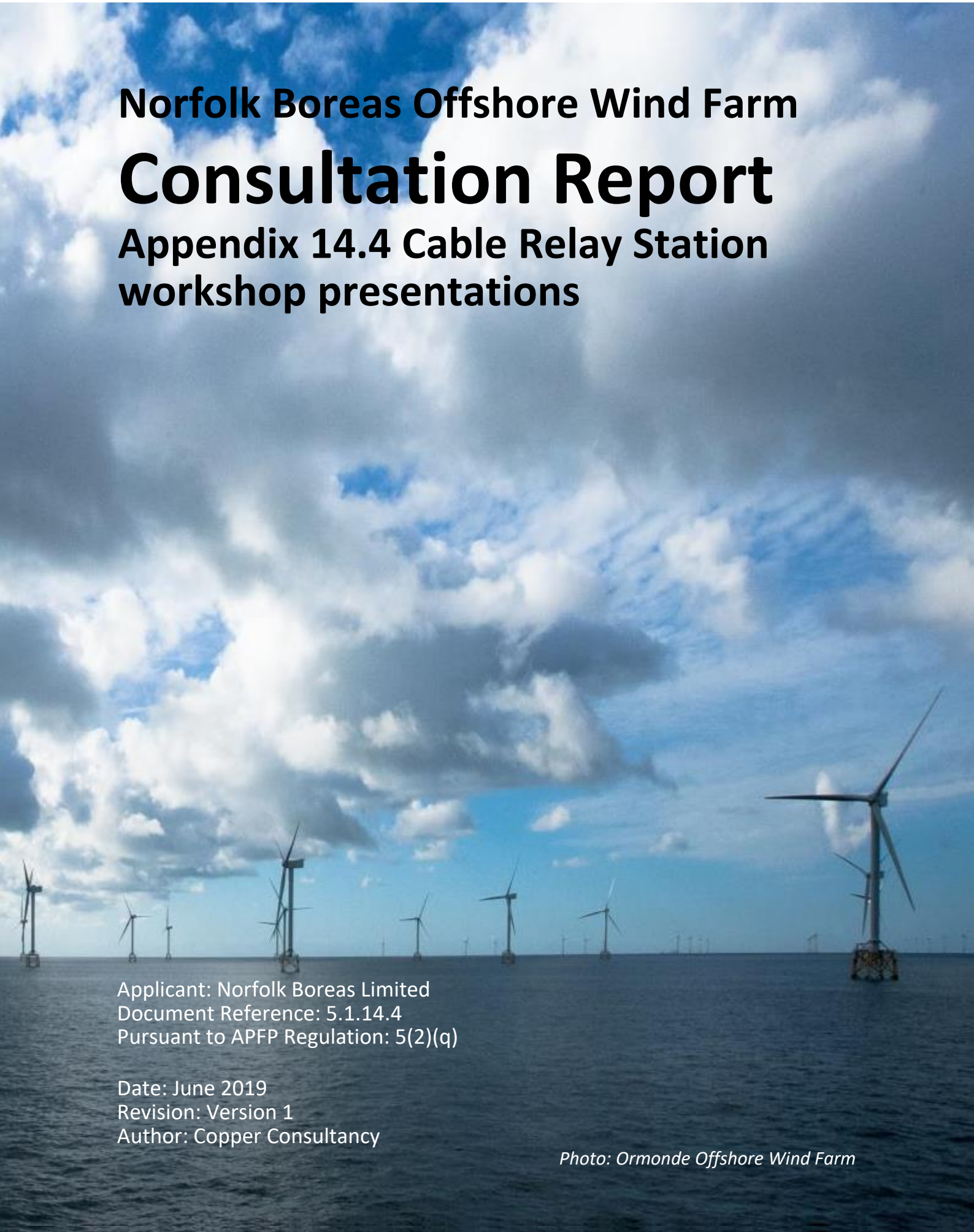
Norfolk Boreas Offshore Wind Farm

Consultation Report

Appendix 14.4 Cable Relay Station workshop presentations



Applicant: Norfolk Boreas Limited
Document Reference: 5.1.14.4
Pursuant to APFP Regulation: 5(2)(q)

Date: June 2019
Revision: Version 1
Author: Copper Consultancy

Photo: Ormonde Offshore Wind Farm

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CABLE RELAY STATION WORKSHOP

July 2017

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INTRODUCTION

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Dear Reader,

About the Norfolk Vanguard and Norfolk Boreas Projects

Over the past 18 months, Vattenfall have been consulting on our proposals to build two new 1.8 Gigawatt wind farms at least 50km off the coast of Norfolk. As of August 2017, we have held 20 public drop in exhibitions and meetings and during this informal consultation more than 1,850 members of the public have participated and shared their knowledge to help shape our proposals. The feedback provided by participants at these events can be found in our consultation reports which are published in full on both of our project websites norfolkvanguard.vattenfall.co.uk and norfolkboreas.vattenfall.co.uk

Once operational, Norfolk Vanguard and Norfolk Boreas together can generate 4% of the UK's electricity requirements, or half of the total energy needs (commercial, industrial and domestic) of the East of England region[1]. The project will save five million tonnes of CO_2 each year[2]. These are significant contributions to our future low carbon economy and electricity needs.

1 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/552059/Chapter_5_web.pdf

2 http://www.renewableuk.com/page/UKWEDExplained

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About this document

In July 2017, workshops were held in the areas where important onshore infrastructure – specifically the Cable Relay Stations and Substations to connect the project to the UK electricity network – might be placed. Those invited to the workshops included parish, district and county councillors, the local campaign group, local residents and property owners potentially most affected, and others active in the local community.

The following day, an open drop-in event was held at a local community venue to enable others to view the materials presented by Vattenfall, including a 3D model of the project options under discussion, to see the comments and questions of local participants and to contribute their perspective.

At these sessions, it was agreed that the visual information presented would be made available so that others could see the information.

A transcribed report of the views gathered at the evening and subsequent drop-in event is available on our website.

This digital book shows the materials presented at the event which focussed specifically on the siting of project Cable Relay Stations.

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What are the visuals and maps – why are they important?

Vattenfall is considering both DC and AC transmission options for these offshore wind projects because:

- Technology is advancing rapidly, and it is not clear which of these options will offer the best solution for the projects when we come to build them (more than 5 years from now).
- Especially given the size and distance from shore of our projects, we need to be able to build the most affordable, efficient and reliable solution for the UK consumer. Making an early decision in favour of one particular technology could lock the project into a transmission solution that is not best.

The purpose of the meeting was to share and explore, with a very local focus, information relating to the siting of project Cable Relay Stations for Norfolk Vanguard and Norfolk Boreas offshore wind farms. We reviewed together, in brief, information from the Environmental Impact Assessment (EIA) work relevant to selecting a potential site, and heard the feedback of those most likely to be affected by the siting of project Cable Relay Stations in the options being considered.

The **maps** illustrate some of the primary constraints that have to be considered as part of the regulated EIA process. Identification of appropriate sites includes consideration of technical and commercial feasibility, environmental impact and stakeholder concerns.

Photomontages are also shown. Visual impact is a major consideration in the EIA process and viewpoint assessments are made in order to seek to site infrastructure where it has the least impact and/or where the opportunities to mitigate against impacts are greatest. The viewpoint assessment is illustrated by a range of visualisations, including photographs and photomontages and a digital model. These were displayed to help people envisage the Cable Relay Station in situ in the proposed siting options being considered.

Example viewpoints illustrated by the digital model showing the potential for screening through planting schemes will be issued in supplementary digital books shortly.

The site selection process is applied at many different levels for projects of this scale and nature. This process is ongoing and iterative in nature.

This material has been issued on 10th August, 2017.

The next phase of consultation will take place in the autumn. Events organised then, as part of our Statutory Consultation, will be widely advertised. Feedback provided then will inform the final Norfolk Vanguard proposals we submit to the Planning Inspectorate in the summer of 2018.

If you have feedback to share in the meantime, please send to info@norfolkvanguard.vattenfall.co.uk

Thank you for your interest.

Best wishes,

Ruari Lean & Graham Davey

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PURPOSE OF THE WORKSHOP

To reflect together on:

- The need to discuss the siting of the project cable relay stations
- How we have arrived at the refined project Cable Relay Station Search Areas, guided by the Environmental Impact Assessment process and local feedback and where we are in the process
- Looking at cable relay station siting options

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EXPLORING KEY CONSIDERATIONS OF SITING PROJECT CABLE RELAY STATIONS

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CONSTRAINTS AND OPPORTUNITIES

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SITE SELECTION

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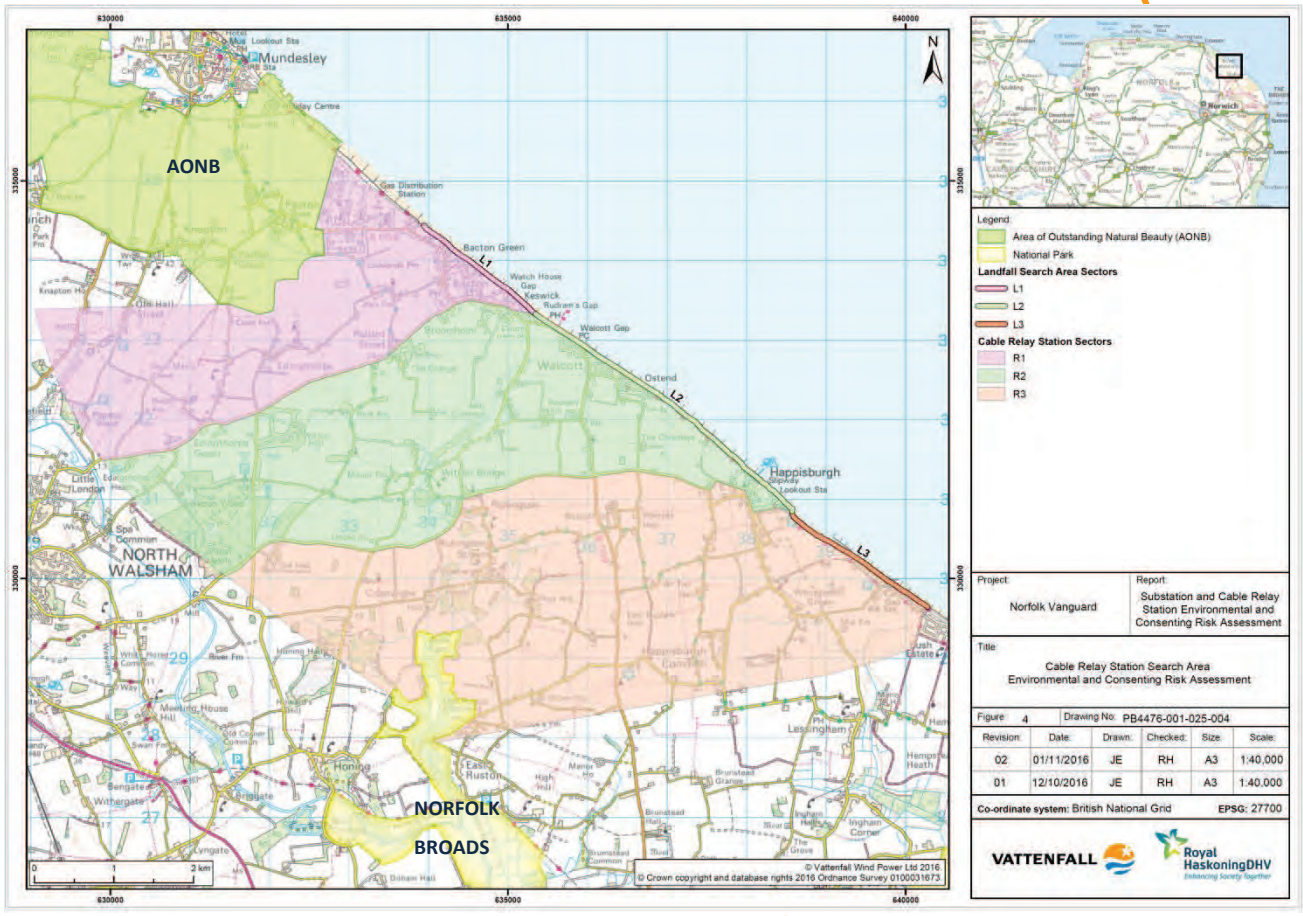
CABLE RELAY STATION SEARCH AREA (SCOPING)



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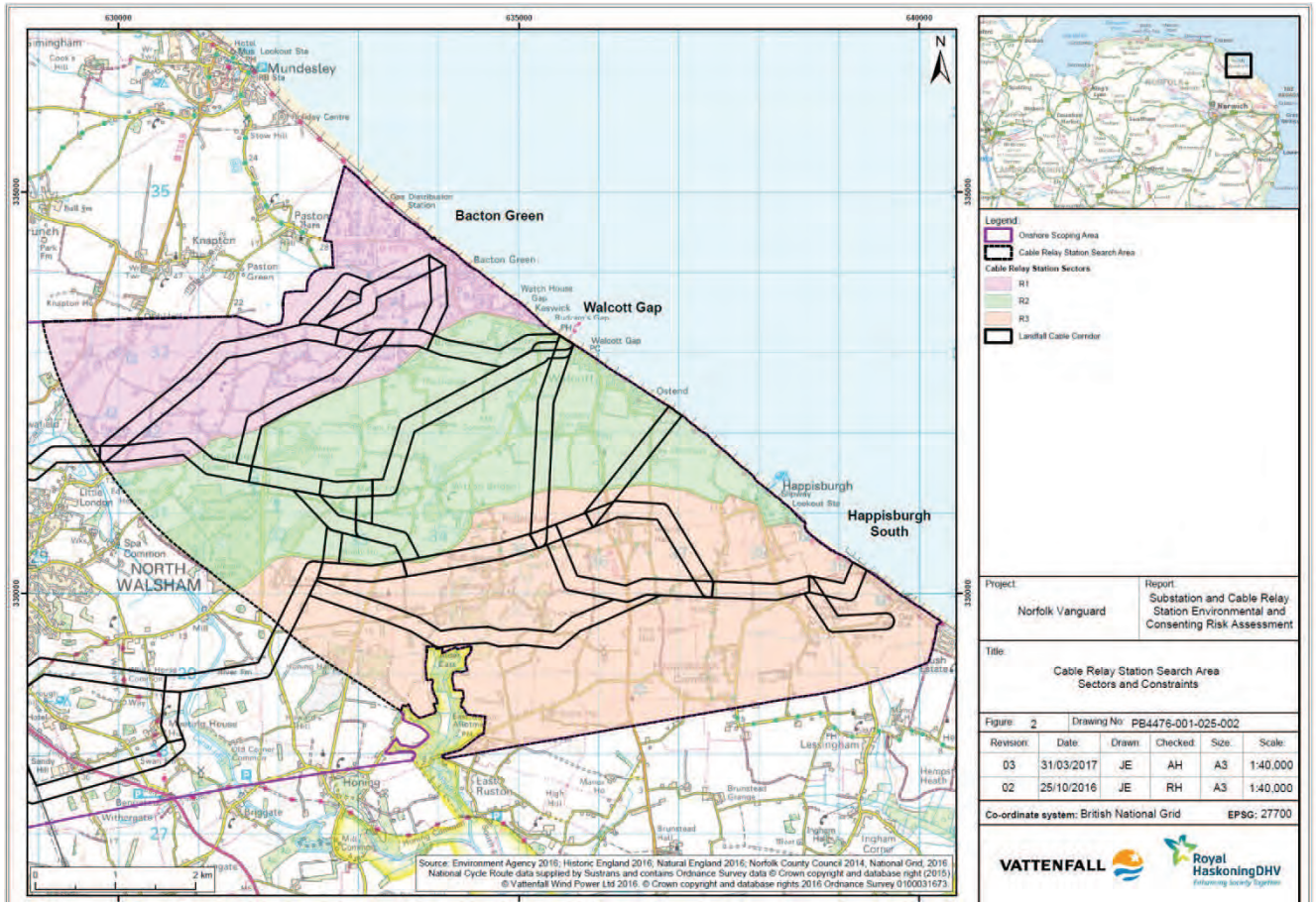
INDICATIVE CABLE CORRIDORS



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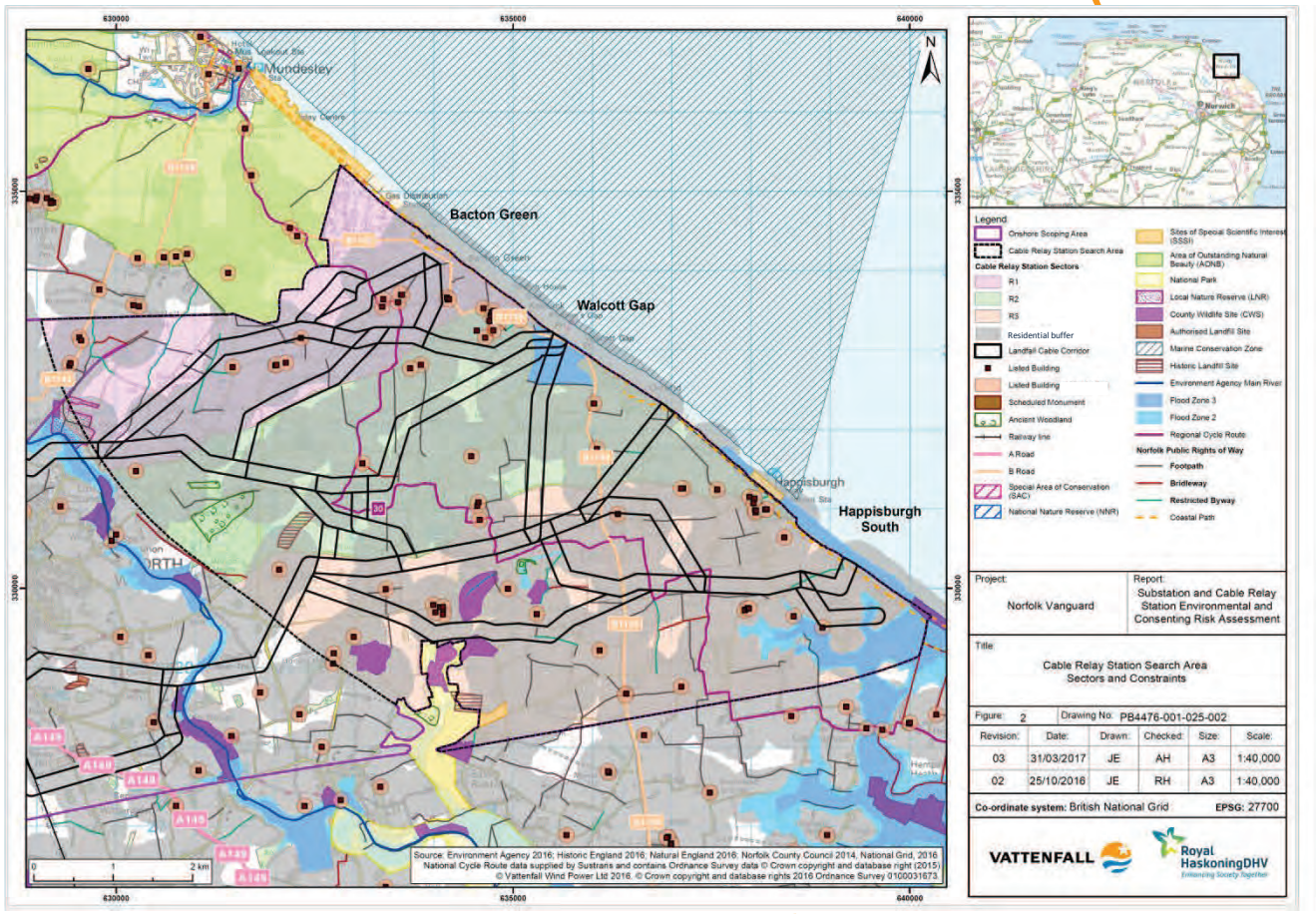
CABLE RELAY STATION SEARCH AREA (CONSTRAINTS)



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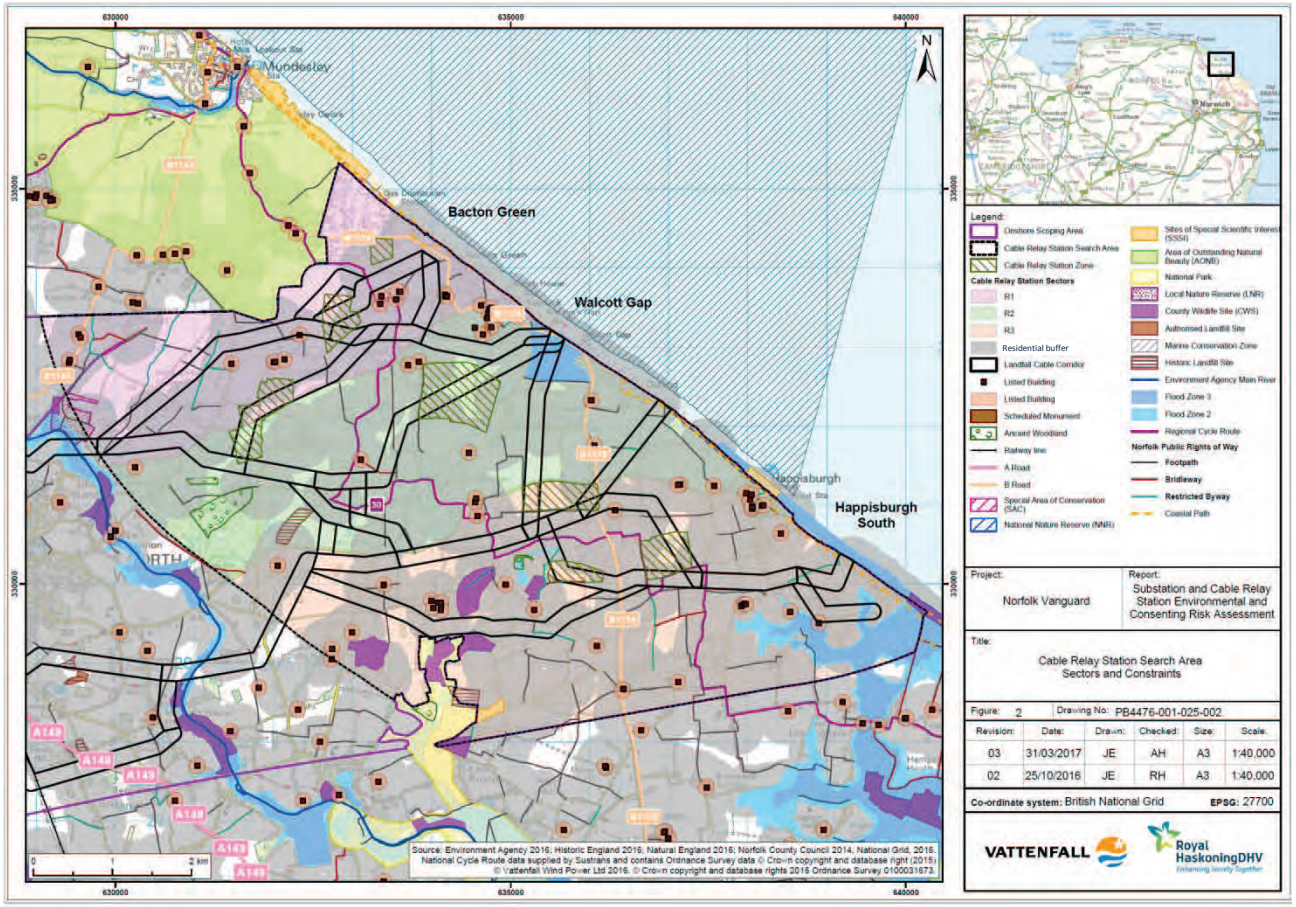
CABLE RELAY STATION ZONES



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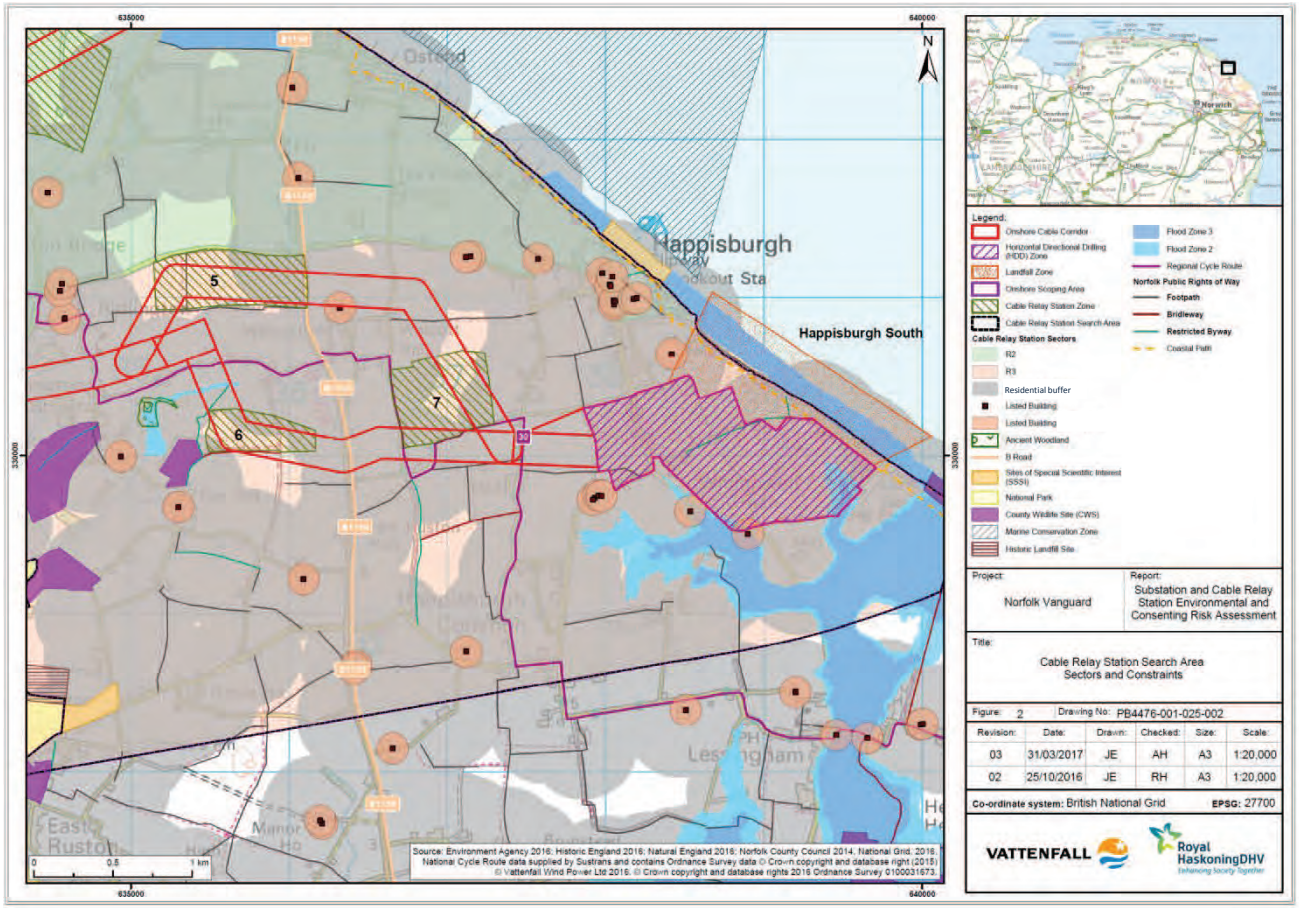
REFINED CABLE RELAY STATION ZONES



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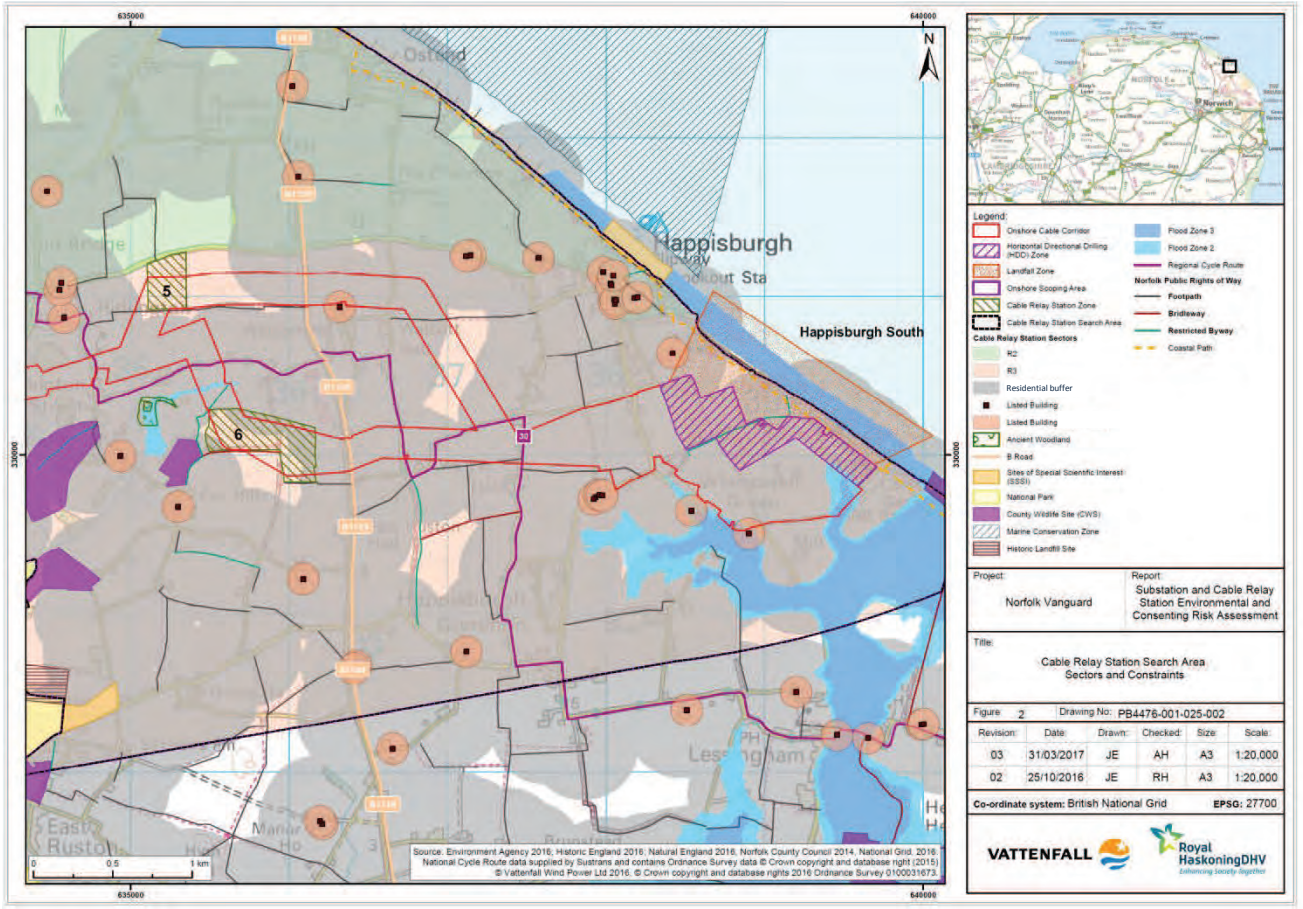
REFINED CABLE RELAY STATION ZONES



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GROUP DISCUSSION

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THE FOOTPRINTS

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CABLE RELAY STATION SITES AND FOOTPRINTS

Vattenfall has identified three alternative sites for the cable relay stations:

- Site 5A – To the east of Ridlington
- Site 6A – West of Munn's Lane
- Site 6B – East of Munn's Lane

For each site, we have developed a 'footprint' for a pair of cable relay stations. The design of each footprint was an engineering-led process. Key considerations included:

- Routing of incoming and outgoing cables from each CRS
- Provision of suitable access roads for delivery of large components
- Known environmental sensitivities and constraints
- Land ownership boundaries

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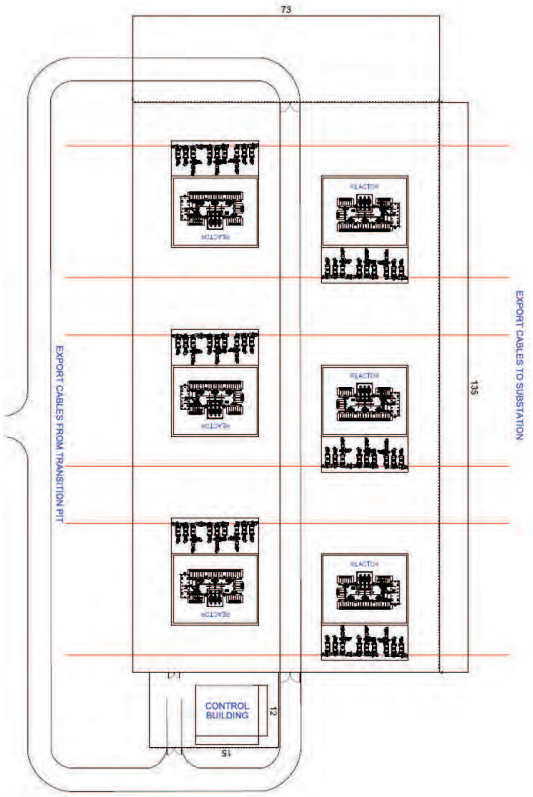
CABLES AND ROADS ~ SINGLE CABLE RELAY STATION



Each CRS will contain up to six reactor units – one unit for each HVAC export cable circuit.

All cable circuits enter the CRS on one side, and exit on the opposite side.

Single roadway through the CRS to allow for off-loading of reactor units and other plant.

- Vehicles enter at one end and exit at the other end
- External 'loop' needed

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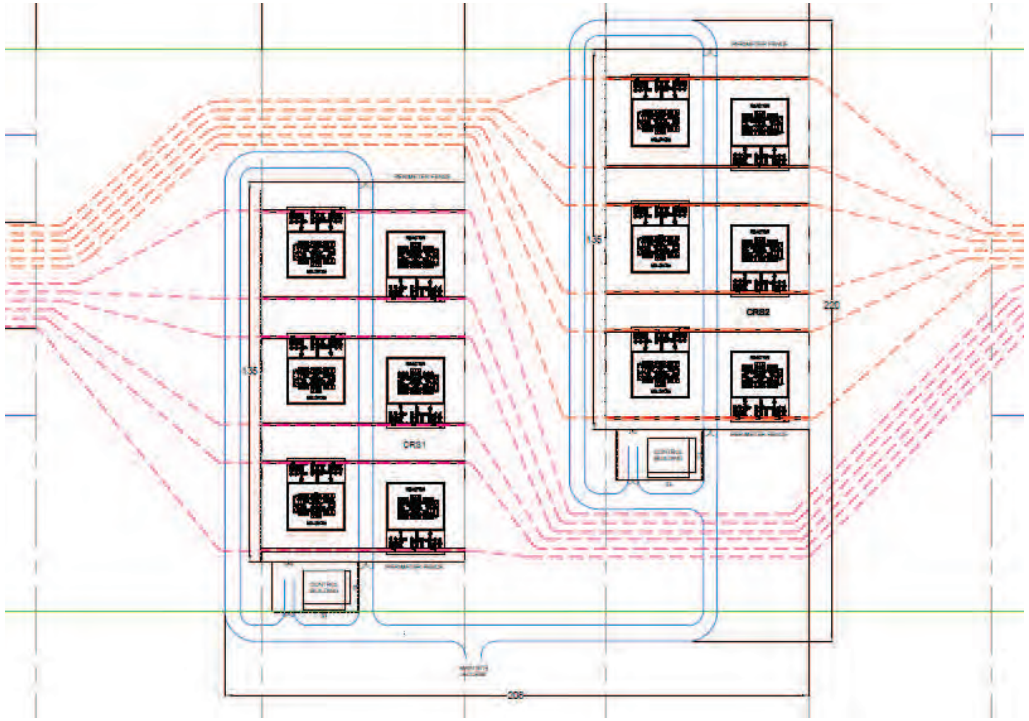
CO-LOCATION OF TWO CABLE RELAY STATIONS



CRS cannot be located directly 'side by side'.

50m gap is needed to allow space for cables and loop road.

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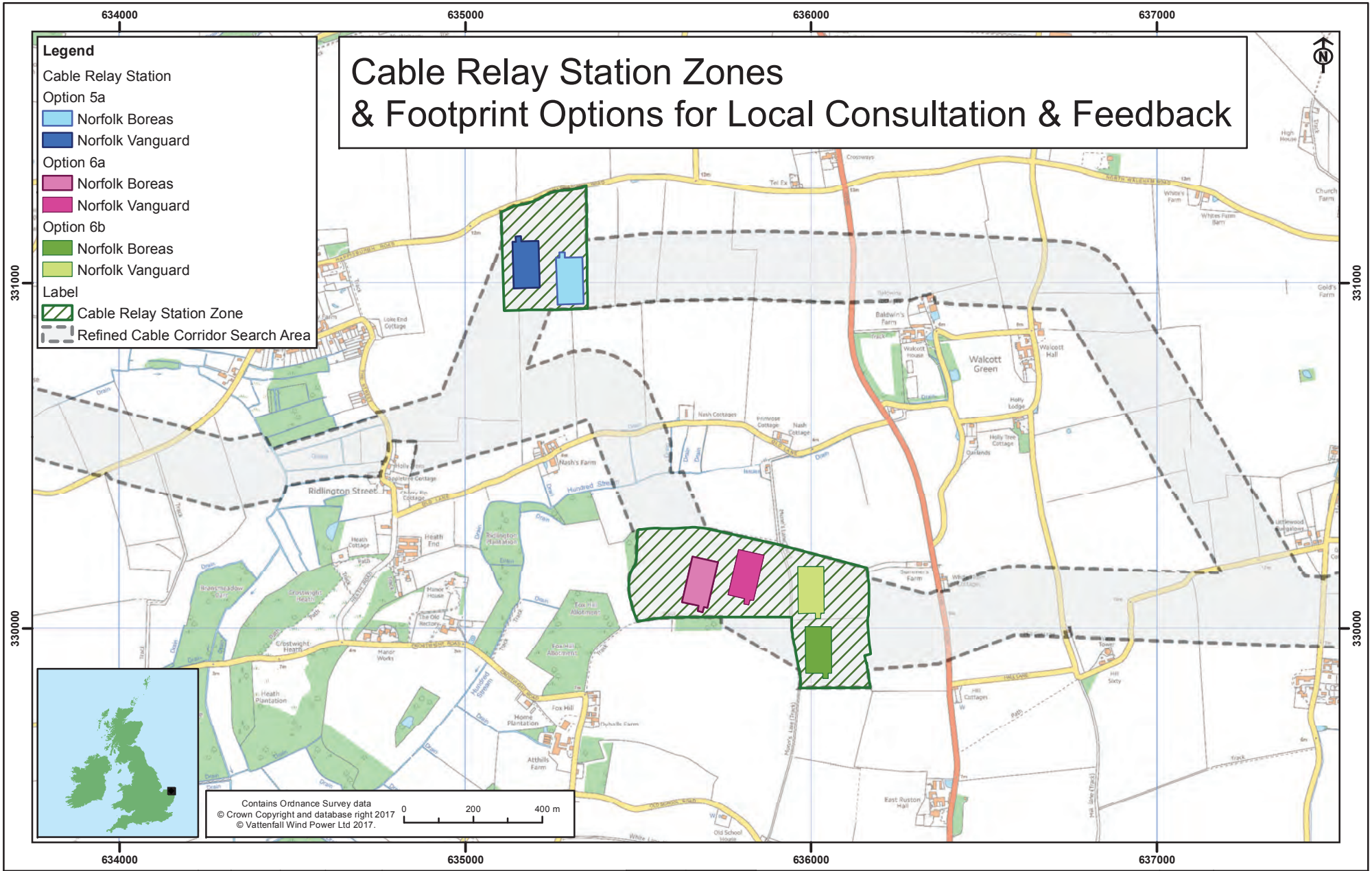
Cable Relay Station Zones & Footprint Options for Local Consultation & Feedback



This drawing/map has been produced to the latest known information at the time of issue. Please consult with the Vattenfall GIS team to ensure the content is still current before using the information contained on this map.

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Vattenfall Wind Power Ltd, St Andrews House, Haugh Lane, Hexham, England. NE46 3QQ. Tel +44 (0) 1434 611300

Rev	Date	Drawn By	Checked By	Comment
A	24/07/17	amah	lmur	First issue

Datum	OSGB36
Projection	OSNG
Plot	A4
Scale	1:15,000

Norfolk Vanguard/Norfolk Boreas

Cable Relay Station Zones & Footprint Options for Local Consultation & Feedback

Purpose	For information
Drg No	57980-1AG-700-056
Rev	A
Layout	-

EAZ_EGEL_OnCabCo_v18_170607am_27700, EAZ_EGEL_WFSrchAreaGrid_v02_1700616am_27700

MAPS AND VISUALISATIONS

Our landscape consultants have prepared visualisations of the cable relay stations at each site. These visualisations based on the defined footprints, and are in accordance with Scottish Natural Heritage Visualisation Guidance.
http://www.snh.gov.uk/planning-and-development/renewable-energy/visual-representation/

Each table has a printed booklet containing hard copies of the visualisations.

Presentation scope:

- Quickly guide you through the viewpoints and visualisations for site 5A
- Brief discussion of mitigation planting and access routes

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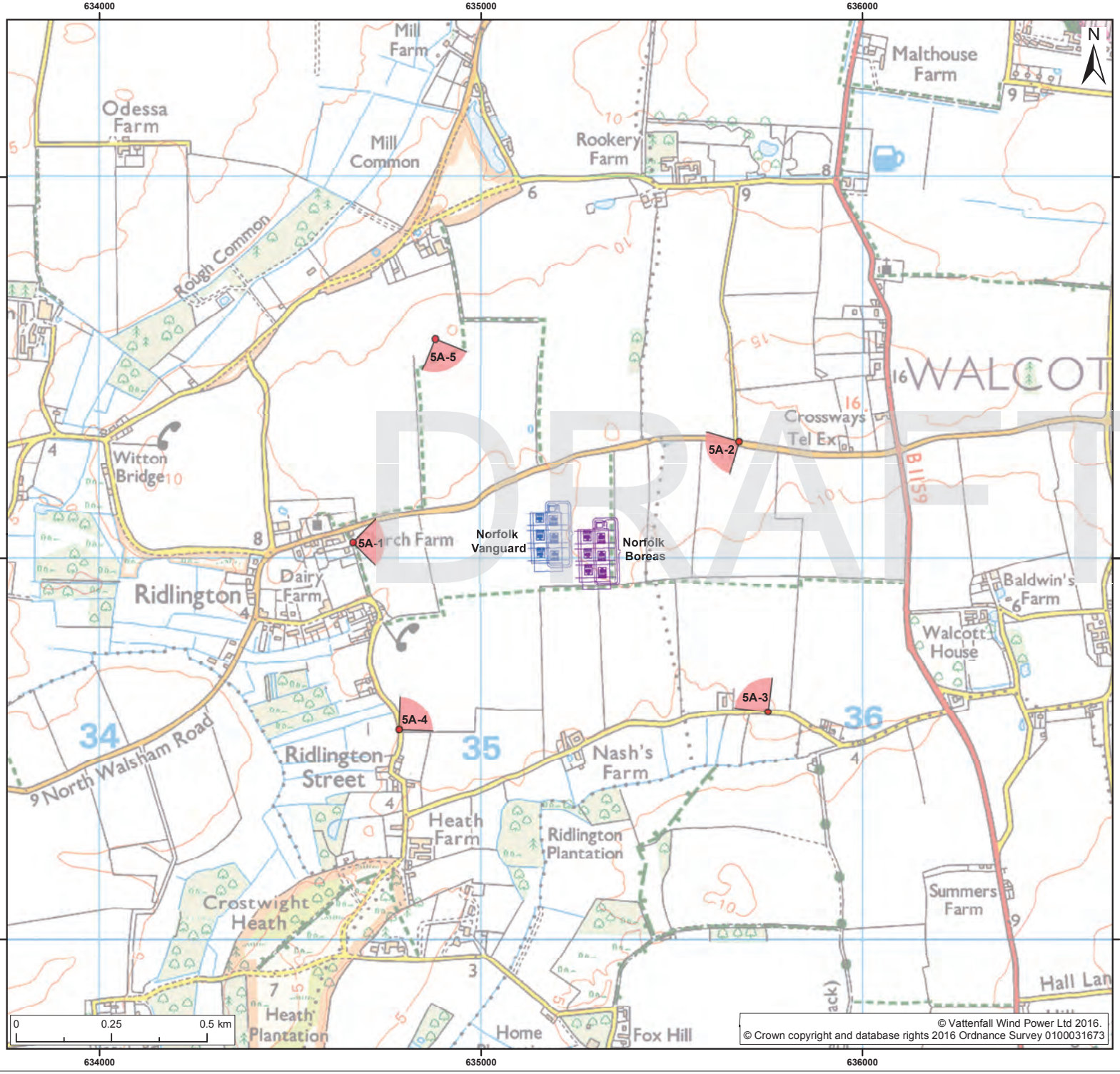

Legend:

Norfolk Vanguard Onshore Infrastructure

- Norfolk Vanguard Cable Relay Station Option 5A
- Norfolk Boreas Cable Relay Station Option 5A
- Viewpoint Location

5A - 1 Riddlington Barn
5A - 2 Back Lane
5A - 3 Nash's Lane
5A - 4 Riddlington Street
5A - 5 PRoW Witton FPS

Project:	Report:
Norfolk Vanguard	Visualisations

Title: Viewpoint Locations - Cable Relay Station Option 5A

Figure: X | Drawing No: PB4476-XXX-XX-XXX

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	10/07/17	LA	JP	A3	1:10,000

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

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Baseline photograph

This image provides landscape and visual context only

Photomontage of the proposed cable relay stations

View flat at a comfortable arm's length

OS reference:	634662 E 331042 N	**Horizontal field of view:**	90° (cylindrical projection)	**Camera:**	Canon EOS 5D Mark II
Eye level:	9.35m AOD	**Principal distance**	522 mm	**Lens:**	50mm (Canon EF 50mm f/1.4)
Direction of view:	90°			**Camera height:**	1.5 m AGL
Nearest distance:	476m			**Date and time:**	12/06/2017, 10:52:54

Figure: xx
Viewpoint 5A-1: Riddlington Barn

OS reference:	635677 E 331306 N	**Horizontal field of view:**	90° (cylindrical projection)	**Camera:**	Canon EOS 5D Mark II
Eye level:	13.94m AOD	**Principal distance**	522 mm	**Lens:**	50mm (Canon EF 50mm f/1.4)
Direction of view:	241°			**Camera height:**	1.5 m AGL
Nearest distance:	410m			**Date and time:**	12/06/2017, 11:27:40

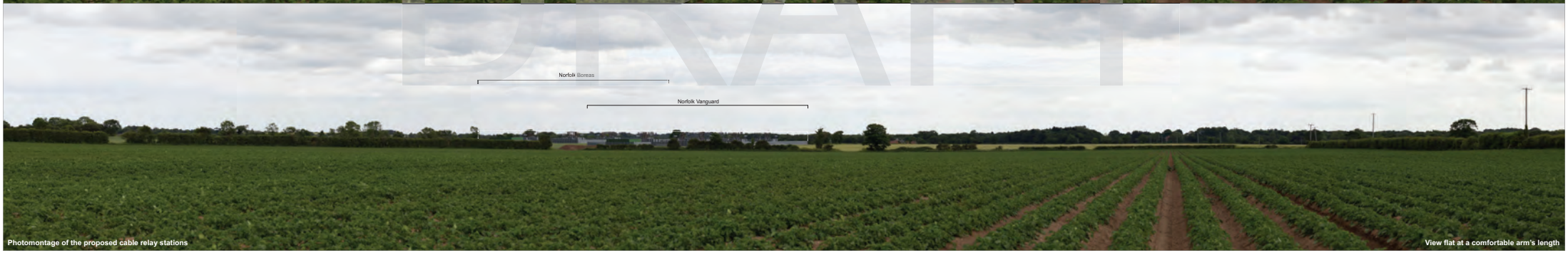
Figure: xx
Viewpoint 5A-2: Back Lane

OS reference:	635750 E 330597 N	**Horizontal field of view:**	90° (cylindrical projection)	**Camera:**	Canon EOS 5D Mark II
Eye level:	6.24m AOD	**Principal distance**	522 mm	**Lens:**	50mm (Canon EF 50mm f/1.4)
Direction of view:	322°			**Camera height:**	1.5 m AGL
Nearest distance:	533m			**Date and time:**	12/06/2017, 12:27:27

Figure: xx
Viewpoint 5A-3: Nash's Lane

OS reference:	634784 E 330550 N	**Horizontal field of view:**	90° (cylindrical projection)	**Camera:**	Canon EOS 5D Mark II
Eye level:	5m AOD	**Principal distance**	522 mm	**Lens:**	50mm (Canon EF 50mm f/1.4)
Direction of view:	47°			**Camera height:**	1.5 m AGL
Nearest distance:	562m			**Date and time:**	12/06/2017, 12:37:27

Figure: xx
Viewpoint 5A-4: Riddlington Street



OS reference:	634880 E 331575 N	**Horizontal field of view:**	90° (cylindrical projection)	**Camera:**	Canon EOS 5D Mark II
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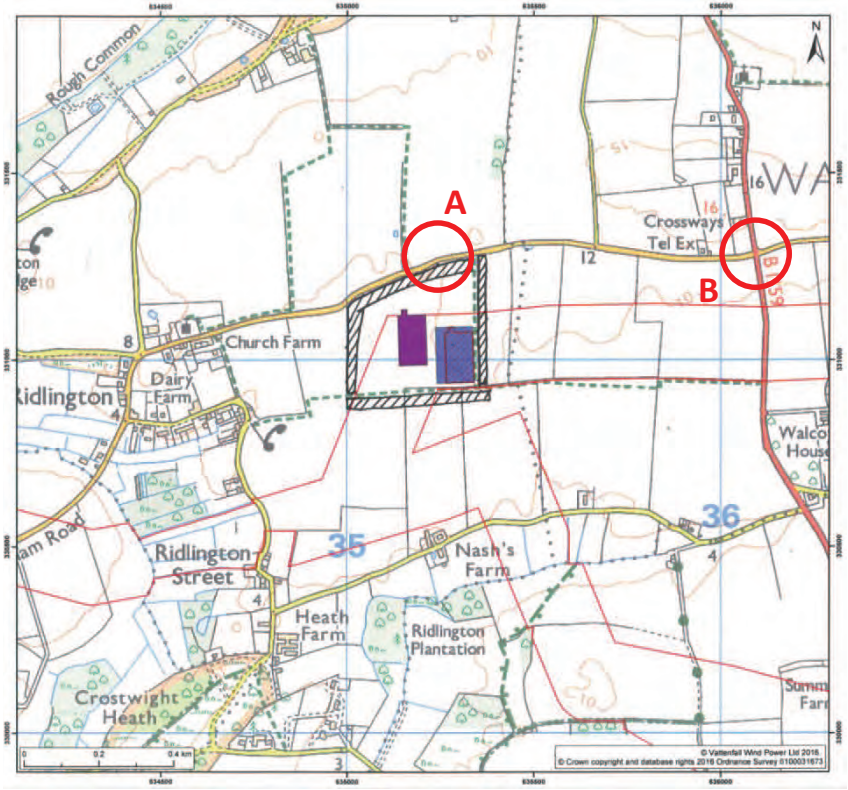
Direction of view:	157°			**Camera height:**	1.5 m AGL
Nearest distance:	515m			**Date and time:**	12/06/2017, 12:53:19

Figure: xx
Viewpoint 5A-5: PRoW Witton FP5

SITE 5A – PLANTING AND ACCESS



Hatched area shows proposed woodland planting scheme.

Access would be directly off Happisburgh Road.

Works traffic would be directed to site via A1151, A149 and B1159.

Some road works would be required:

A. New junction at site entrance

B. Modification to junction at B1159, to allow for turn-in to Happisburgh Road

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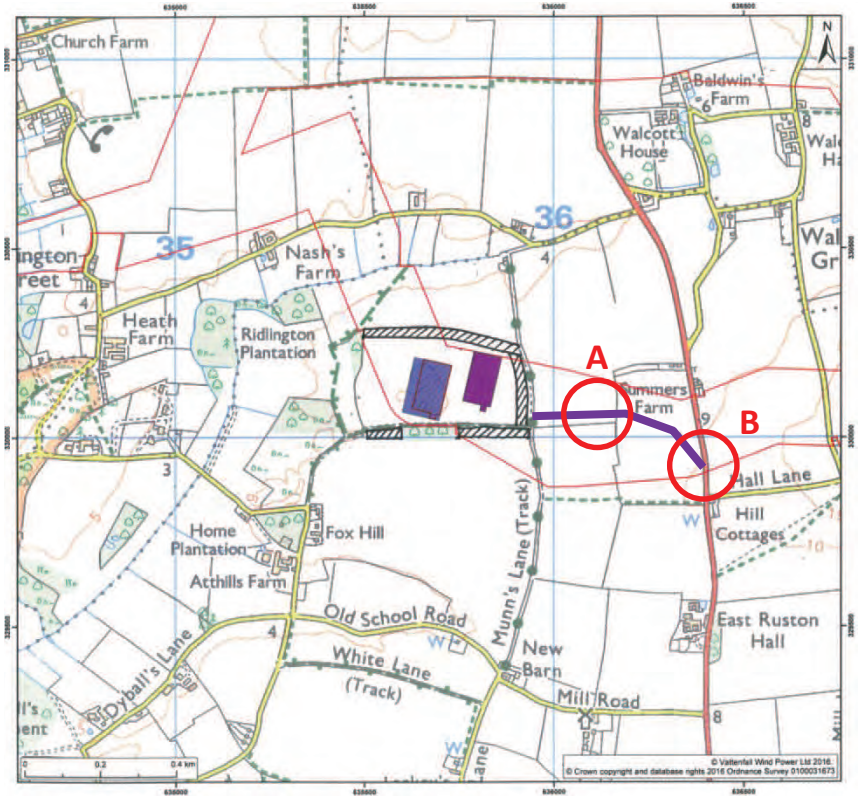
SITE 6A – PLANTING AND ACCESS



Hatched area shows proposed woodland planting scheme.

Access would be directly off B1159, with dedicated access track.

Works traffic would be directed to site via A1151, A149 and B1159.

Some road works would be required:

A. New access road between B1159 and Munn's Lane

B. New junction at B1159

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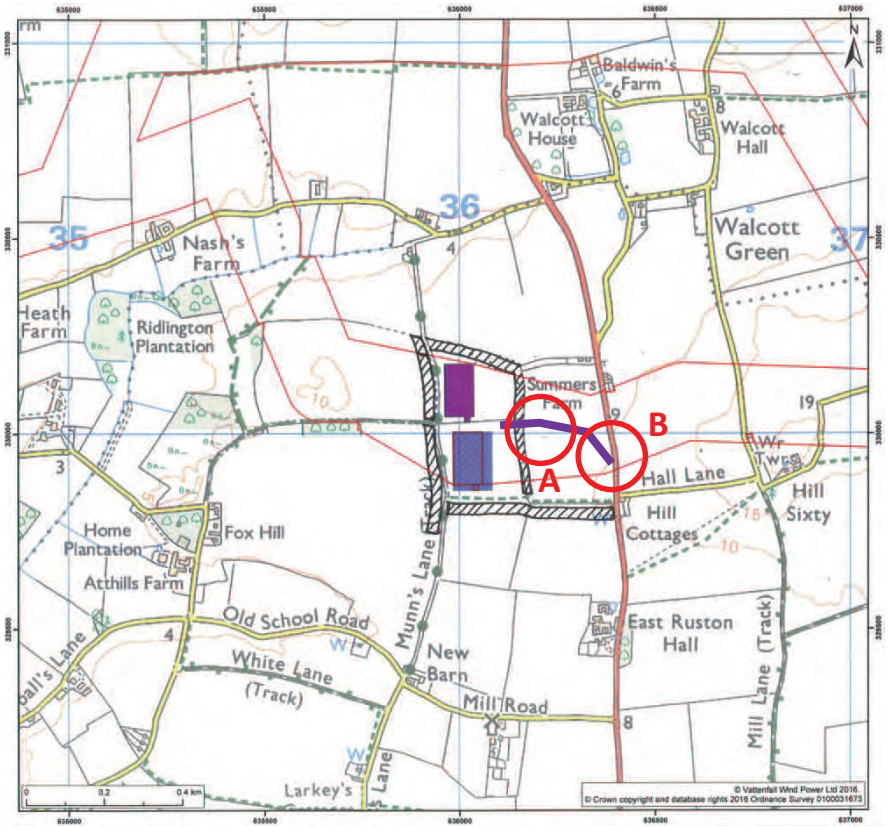
SITE 6B – PLANTING AND ACCESS



Hatched area shows proposed woodland planting scheme.

Access would be directly off B1159, with dedicated access track.

Works traffic would be directed to site via A1151, A149 and B1159.

Some road works would be required:

A. New access road between B1159 and the site

B. New junction at B1159

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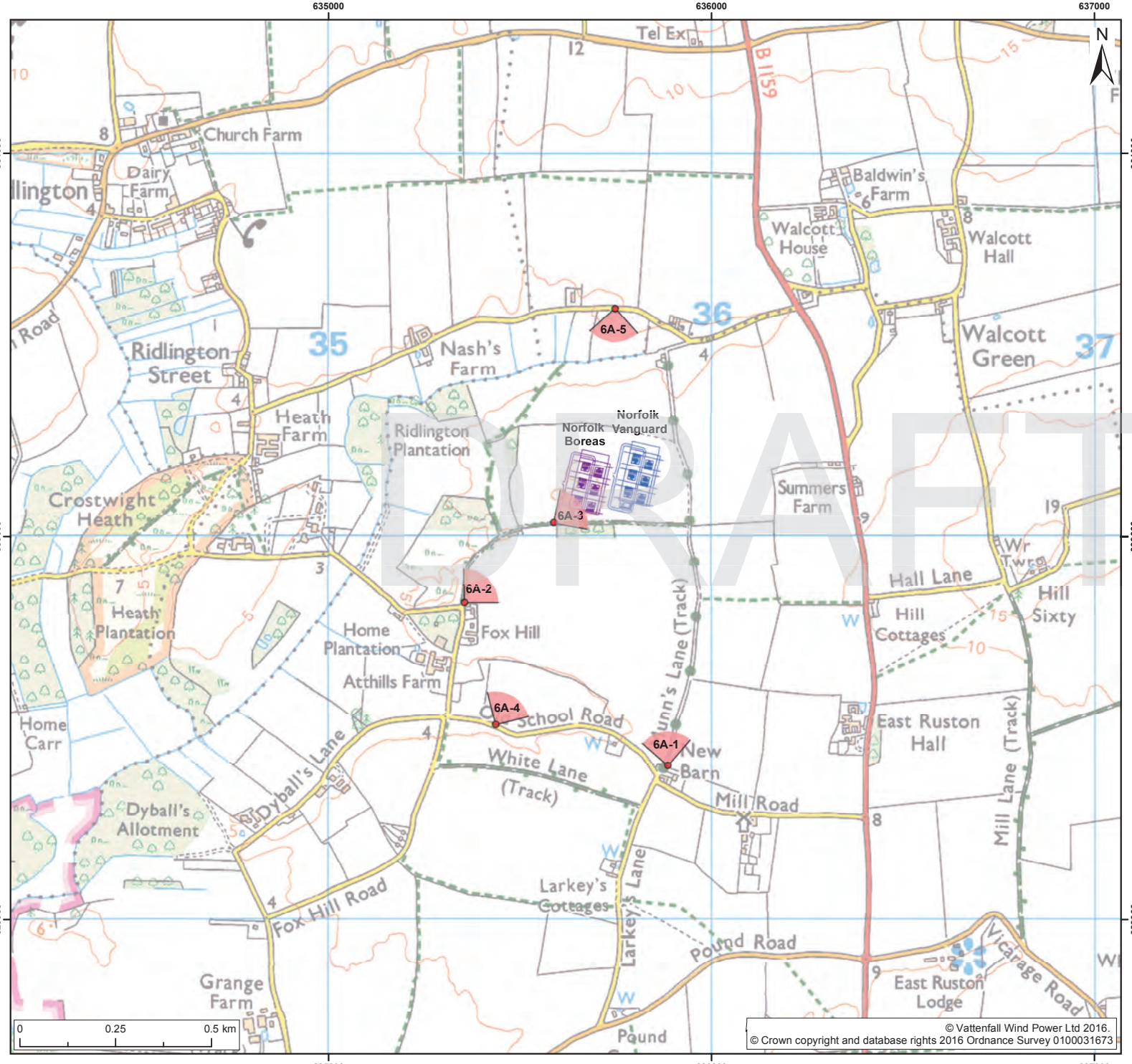

Legend:

Norfolk Vanguard Onshore Infrastructure

- Norfolk Vanguard Cable Relay Station Option 6A
- Norfolk Boreas Cable Relay Station Option 6A
- Viewpoint Location

6A - 1 Munn's Lane
6A - 2 Fox Hill
6A - 3 PRoW East of Ruston BR35
6A - 4 Old School Road
6A - 5 Nash's Lane

Project:	Report:
Norfolk Vanguard	Visualisations

Title: Viewpoint Locations - Cable Relay Station Option 6A

Figure: X | Drawing No: PB4476-XXX-XX-XXX

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	10/07/17	LA	JP	A3	1:10,000

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

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OS reference:	635884 E 329403 N	**Horizontal field of view:**	90° (cylindrical projection)	**Camera:**	Canon EOS 5D Mark II
Eye level:	9m AOD	**Principal distance**	522 mm	**Lens:**	50mm (Canon EF 50mm f/1.4)
Direction of view:	356°			**Camera height:**	1.5 m AGL
Nearest distance:	668m			**Date and time:**	12/06/2017, 13:24:44

Figure: xx
Viewpoint 6A-1: Munn's Lane

OS reference:	635355 E 329829 N	**Horizontal field of view:**	90° (cylindrical projection)	**Camera:**	Canon EOS 5D Mark II
Eye level:	8.26m AOD	**Principal distance**	522 mm	**Lens:**	50mm (Canon EF 50mm f/1.4)
Direction of view:	45°			**Camera height:**	1.5 m AGL
Nearest distance:	367m			**Date and time:**	12/06/2017, 13:07:18

Figure: xx
Viewpoint 6A-2: Fox Hill

OS reference:	635436 E 330036 N	**Horizontal field of view:**	90° (cylindrical projection)	**Camera:**	Canon EOS 5D Mark II
Eye level:	7.53m AOD	**Principal distance**	522 mm	**Lens:**	50mm (Canon EF 50mm f/1.4)
Direction of view:	56°			**Camera height:**	1.5 m AGL
Nearest distance:	61m			**Date and time:**	12/06/2017, 12:53:19

Figure: xx
Viewpoint 6A-3: PROW East Ruston BR35

OS reference: 635436 E 329509 N
Eye level: 5.28m AOD
Direction of view: 31°
Nearest distance: 592m

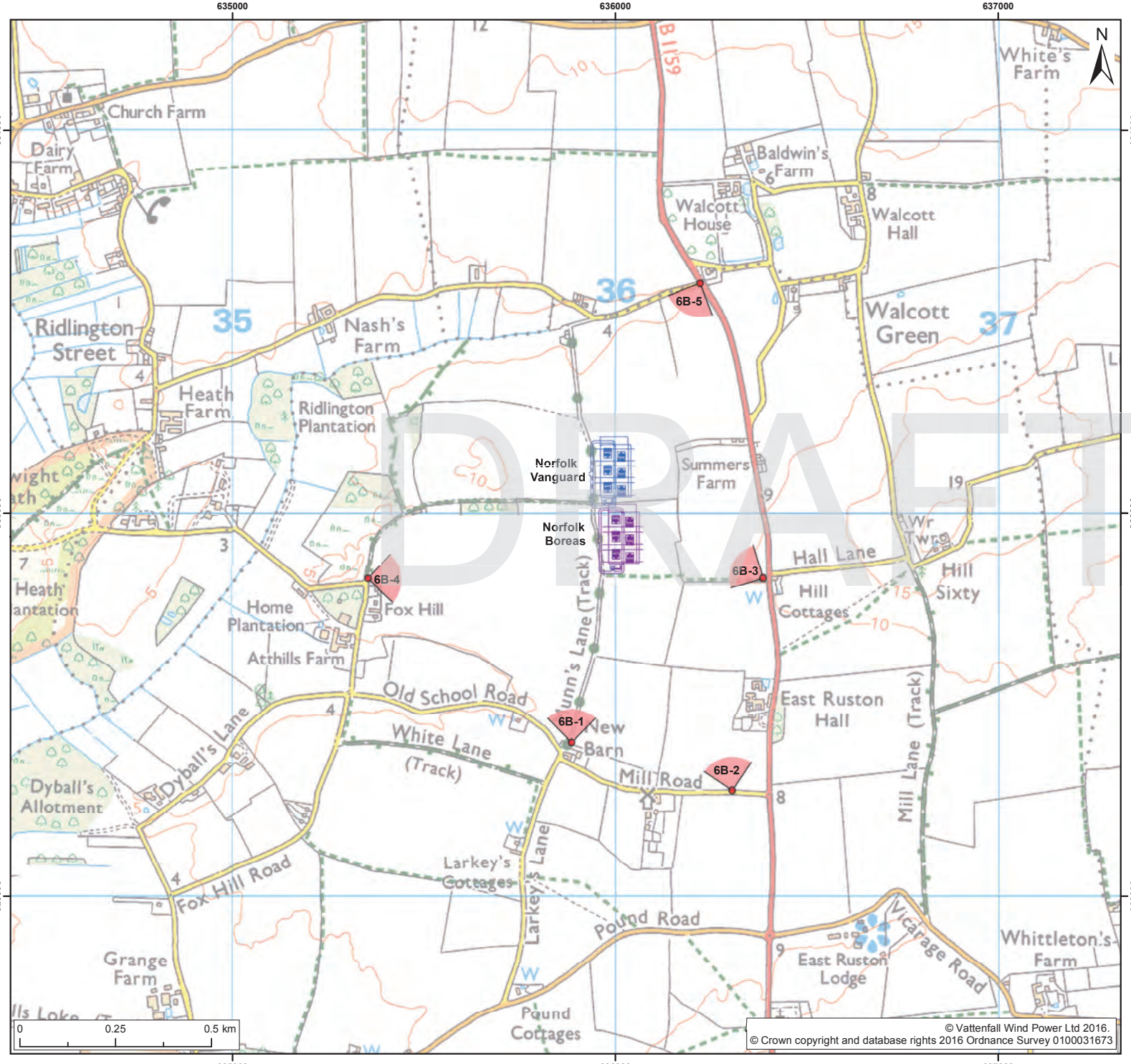
Horizontal field of view: 90° (cylindrical projection)
Principal distance 522 mm

Camera: Canon EOS 5D Mark II
Lens: 50mm (Canon EF 50mm f/1.4)
Camera height: 1.5 m AGL
Date and time: 12/06/2017, 13:14:47

Figure: xx
Viewpoint 6A-4: Old School Lane West

OS reference:	635750 E 330597 N	**Horizontal field of view:**	90° (cylindrical projection)	**Camera:**	Canon EOS 5D Mark II
Eye level:	6.24m AOD	**Principal distance**	522 mm	**Lens:**	50mm (Canon EF 50mm f/1.4)
Direction of view:	183°			**Camera height:**	1.5 m AGL
Nearest distance:	370m			**Date and time:**	12/06/2017, 12:27:27

Figure: xx
Viewpoint 6A-5: Nash's Lane



Legend:

Norfolk Vanguard Onshore Infrastructure

- Norfolk Vanguard Cable Relay Station Option 6B
- Norfolk Boreas Cable Relay Station Option 6B
- Viewpoint Location

6B - 1 Munn's Lane
6B - 2 Mill Road
6B - 3 B1159 Hill Cottages
6B - 4 Fox Hill
6B - 5 Old Lane

Project:	Report:
Norfolk Vanguard	Visualisations

Title: Viewpoint Locations - Cable Relay Station Option 6B

Figure: X | Drawing No: PB4476-XXX-XX-XXX

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	10/07/17	LA	JP	A3	1:10,000

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

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Royal HaskoningDHV
Enhancing Society Together

OS reference:	635878 E 329403 N	**Horizontal field of view:**	90° (cylindrical projection)	**Camera:**	Canon EOS 5D Mark II
Eye level:	8.15m AOD	**Principal distance**	522 mm	**Lens:**	50mm (Canon EF 50mm f/1.4)
Direction of view:	18.5°			**Camera height:**	1.5 m AGL
Nearest distance:	478m			**Date and time:**	12/06/2017, 13:24:44

Figure: xx
Viewpoint 6B-1: Munn's Lane

OS reference:	636303 E 329277 N	**Horizontal field of view:**	90° (cylindrical projection)	**Camera:**	Canon EOS 5D Mark II
Eye level:	8m AOD	**Principal distance**	522 mm	**Lens:**	50mm (Canon EF 50mm f/1.4)
Direction of view:	349°			**Camera height:**	1.5 m AGL
Nearest distance:	632m			**Date and time:**	12/06/2017, 13:36:20

Figure: xx
Viewpoint 6B-2: Mill Road

OS reference:	636385 E 329831 N	**Horizontal field of view:**	90° (cylindrical projection)	**Camera:**	Canon EOS 5D Mark II
Eye level:	11.49m AOD	**Principal distance**	522 mm	**Lens:**	50mm (Canon EF 50mm f/1.4)
Direction of view:	298°			**Camera height:**	1.5 m AGL
Nearest distance:	328m			**Date and time:**	12/06/2017, 13:44:19

Figure: xx
Viewpoint 6B-3: B1159 Hill Cottages

OS reference:	635355 E 329829 N	**Horizontal field of view:**	90° (cylindrical projection)	**Camera:**	Canon EOS 5D Mark II
Eye level:	8.26m AOD	**Principal distance**	522 mm	**Lens:**	50mm (Canon EF 50mm f/1.4)
Direction of view:	88°			**Camera height:**	1.5 m AGL
Nearest distance:	630m			**Date and time:**	12/06/2017, 13:07:18

Figure: xx
Viewpoint 6B-4: Fox Hill

OS reference:	636220 E 330601 N	**Horizontal field of view:**	90° (cylindrical projection)	**Camera:**	Canon EOS 5D Mark II
Eye level:	6.31m AOD	**Principal distance**	522 mm	**Lens:**	50mm (Canon EF 50mm f/1.4)
Direction of view:	204°			**Camera height:**	1.5 m AGL
Nearest distance:	460m			**Date and time:**	12/06/2017, 11:46:08

Figure: xx
Viewpoint 6B-5: Old Lane

GROUP DISCUSSION

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SUMMARY AND NEXT STEPS

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WHAT WE COVERED

Main topics to be discussed:

- Pros and Cons of each footprint
- How might issues be overcome:
  - Landscape
  - Noise
  - Access

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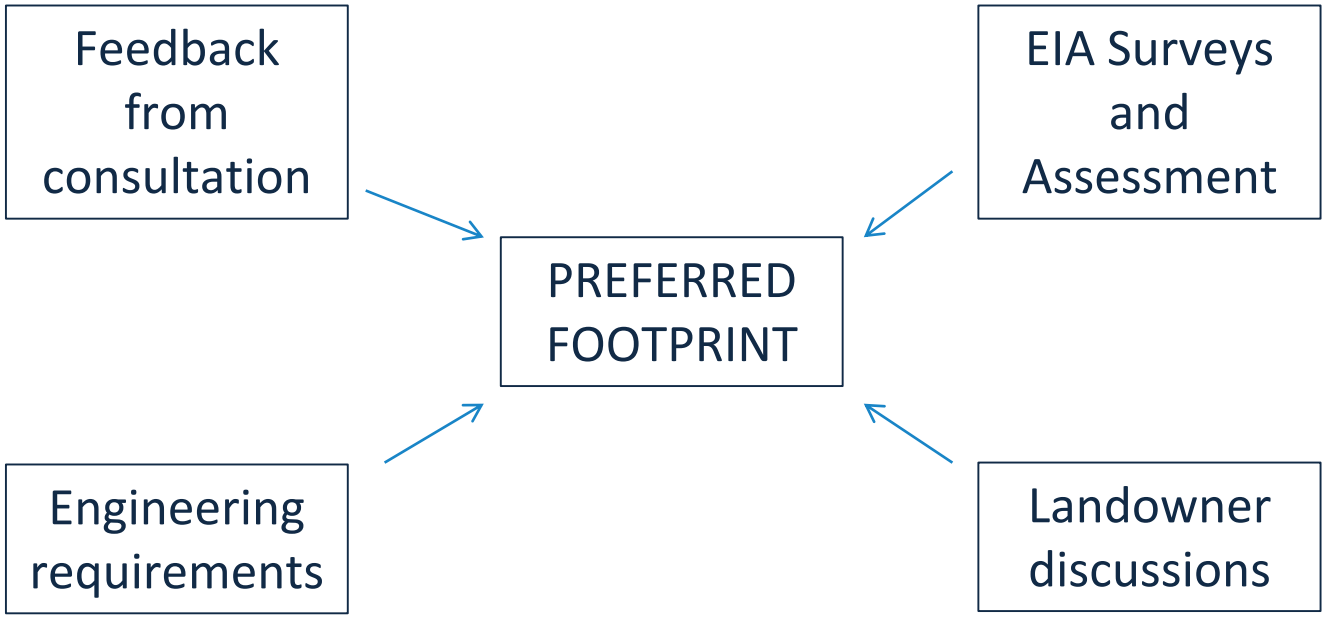
NEXT STEPS: SITE SELECTION



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HOW CAN I STAY INVOLVED?

Step	Provisional Timeline	How you can have your say
PEIR Submission and Consultation	October – November 2017	Your chance to feed into the project before DCO submission
DCO Submission	June 2018	The formal application for development consent to the Planning Inspectorate (PI)
DCO Acceptance	July 2018	28 days for the PI to decide if the application meets set standards
Pre-examination	August – October 2018	You can register with the PI and provide a summary of your views in writing
Examination	November 2018 – April 2019	The PI will carry out an examination. Those who have registered will be invited to provide more details of your views in writing and at hearings
Decision	May – October 2019	The PI will advise the Secretary of State who will make a decision as to whether to grant or refuse development consent
Post decision	November 2019	A six week period when the decision can be legally challenged

HOW CAN I STAY INVOLVED?

https://infrastructure.planninginspectorate.gov.uk/application-process/participating-in-the-process/

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3D VISUALISATIONS

A digital booklet of 3D visualisations will be made available in a separate document. Please see the project website for the most up to date information.

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THANK YOU

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