

# Norfolk Boreas Offshore Wind Farm

# Appendix 25.3

## Operational Phase Assessment

## Environmental Statement

## Volume 3

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*Photo: Ormonde Offshore Wind Farm*

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## Glossary of Terminology

dB(A)	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people’s assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
Decibel (dB)	A unit of noise level derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 µPa, the threshold of normal hearing is 0dB, and 140dB is the threshold of pain. A change of 1dB is only perceptible under controlled conditions. Under normal conditions a change in noise level of 3dB(A) is the smallest perceptible change.
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.
R <sub>w</sub>	The weighted sound reduction index, R <sub>w</sub> , is a single figure description of sound reduction index which is defined in BS EN ISO 717-1: 1997. The R <sub>w</sub> is calculated from measurements in an acoustic laboratory to BS EN ISO 140-3:1997 and ratings to BS EN ISO 717-1:1997. Sound insulation ratings derived from site (which are invariably lower than the laboratory figures) are referred to as the R’ <sub>w</sub> ratings (apparent weighted sound reduction index) and measured to BS EN ISO 140-4:1998

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## 1 Introduction

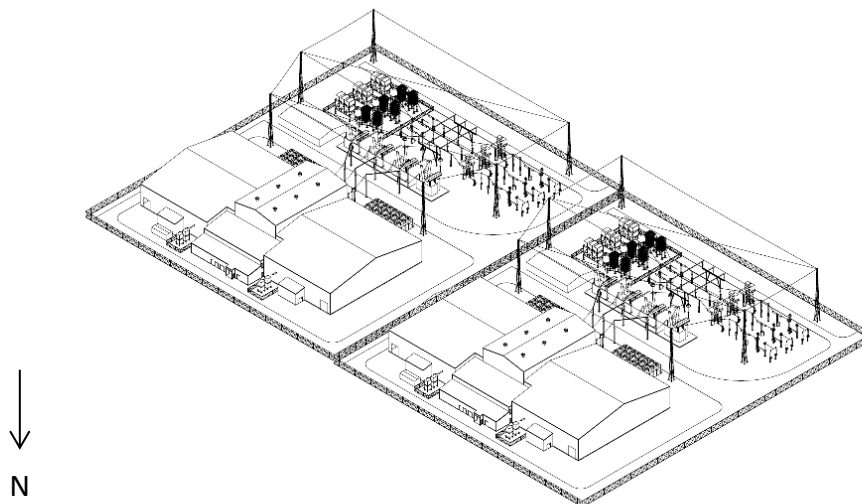
1. This appendix to Chapter 25 Noise and Vibration details the results of the operational noise impact assessment modelling for Norfolk Boreas Scenario 2 and Scenario 1.
2. Chapter 25 Noise and Vibration details the methodology, assessment criteria and assumptions relevant to the assessment of operational phase noise impacts.

## 2 Operational Phase Noise Modelling

3. The operational phase was modelled using SoundPLAN noise modelling software. This package directly implements the calculation methods outlined in ISO9613-2 (International Organization for Standardization, 1996) and other nationally and internationally recognised acoustic standards.

## 3 Plates

4. This section provides images referenced in Chapter 25 Noise and Vibration, covering the indicative onshore project substation, predicted unmitigated operational noise for Norfolk Boreas and, predicted mitigated operational noise for Norfolk Boreas. Plate 3.1 to Plate 3.5 show some of the inputs and outputs from the modelling software as part of the assessment undertaken. The onshore project substation equipment shown in Plate 3.1 was modelled with the converter hall buildings toward the northern boundary, and external plant to the south.



**Plate 3.1 Indicative onshore project substation layout – HVDC**

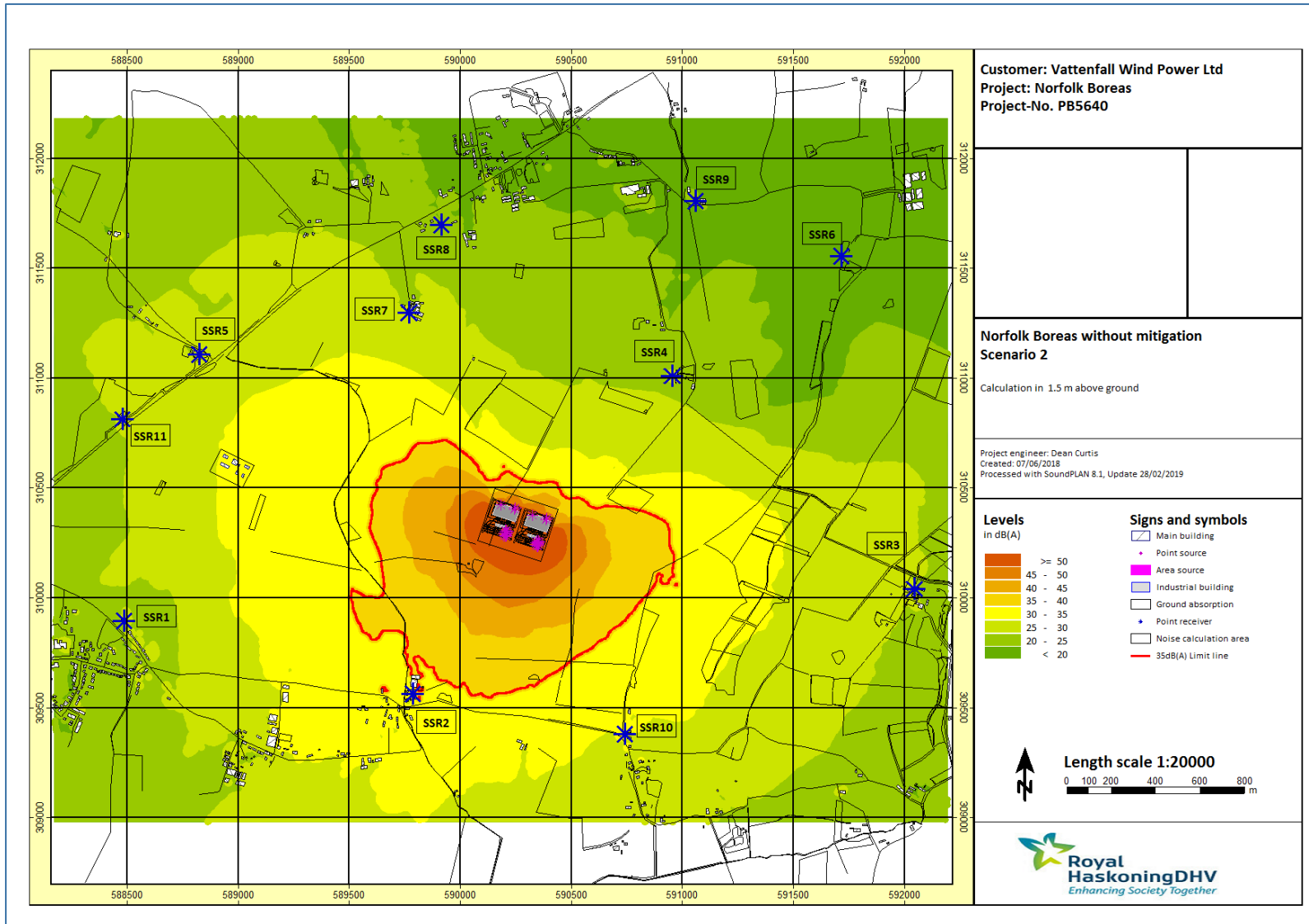


Plate 3.2 Norfolk Boreas Scenario 2 onshore project substation without mitigation (calculation in 1.5m above ground)



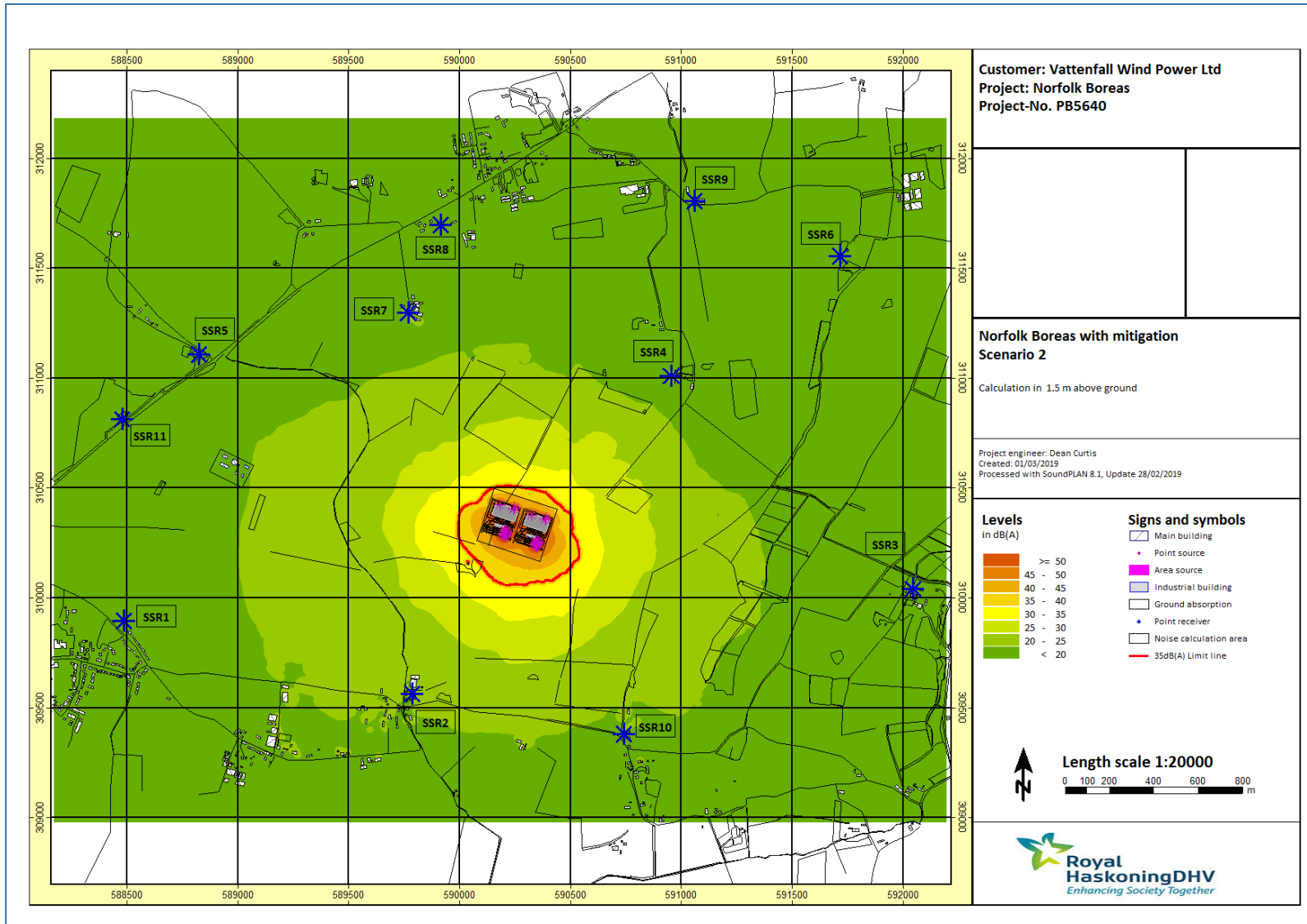


Plate 3.3 Norfolk Boreas Scenario 2 onshore project substation with mitigation (calculation in 1.5m above ground)

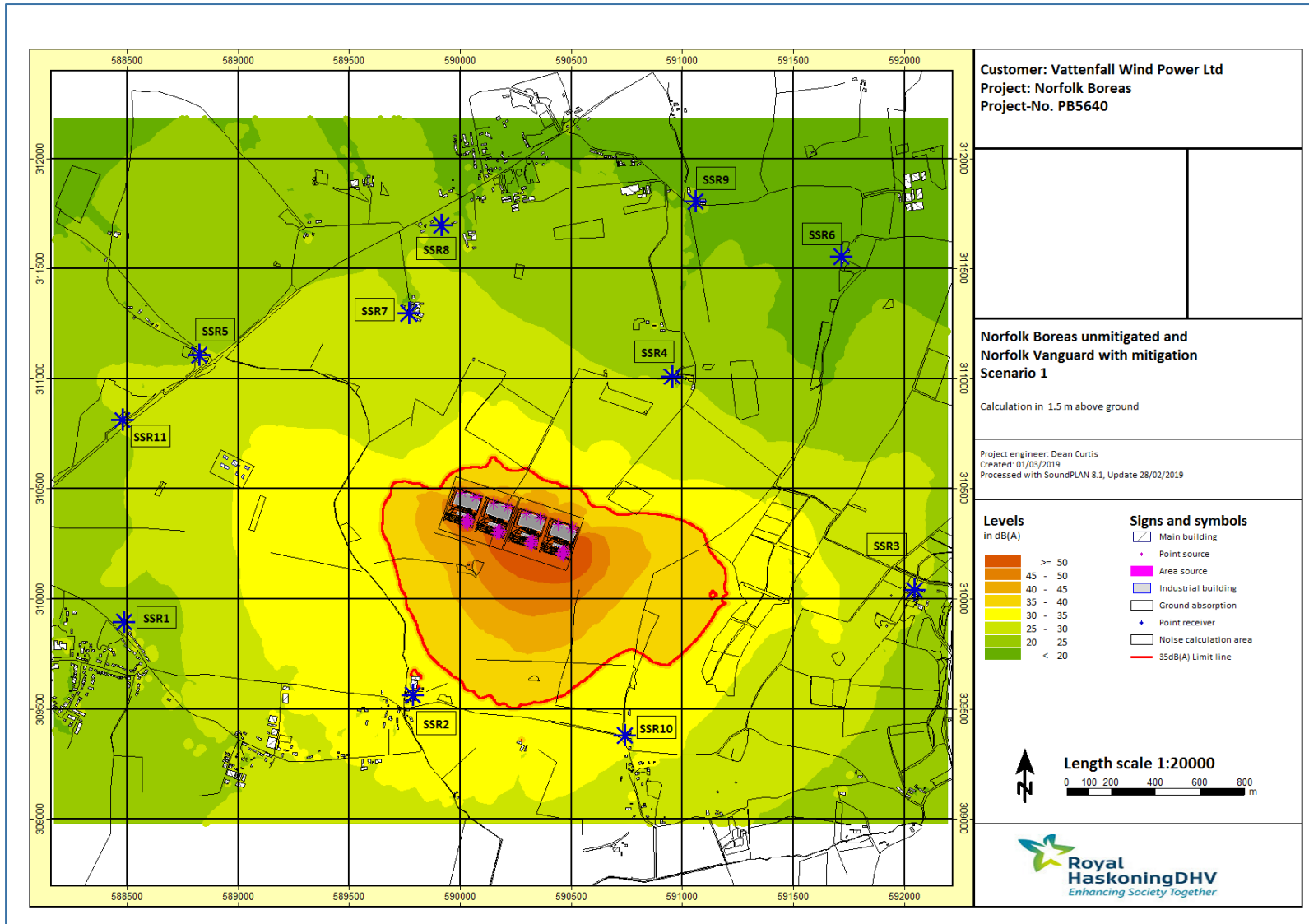


Plate 3.4 Norfolk Boreas Scenario 1 onshore project substation without mitigation (calculation in 1.5m above ground)

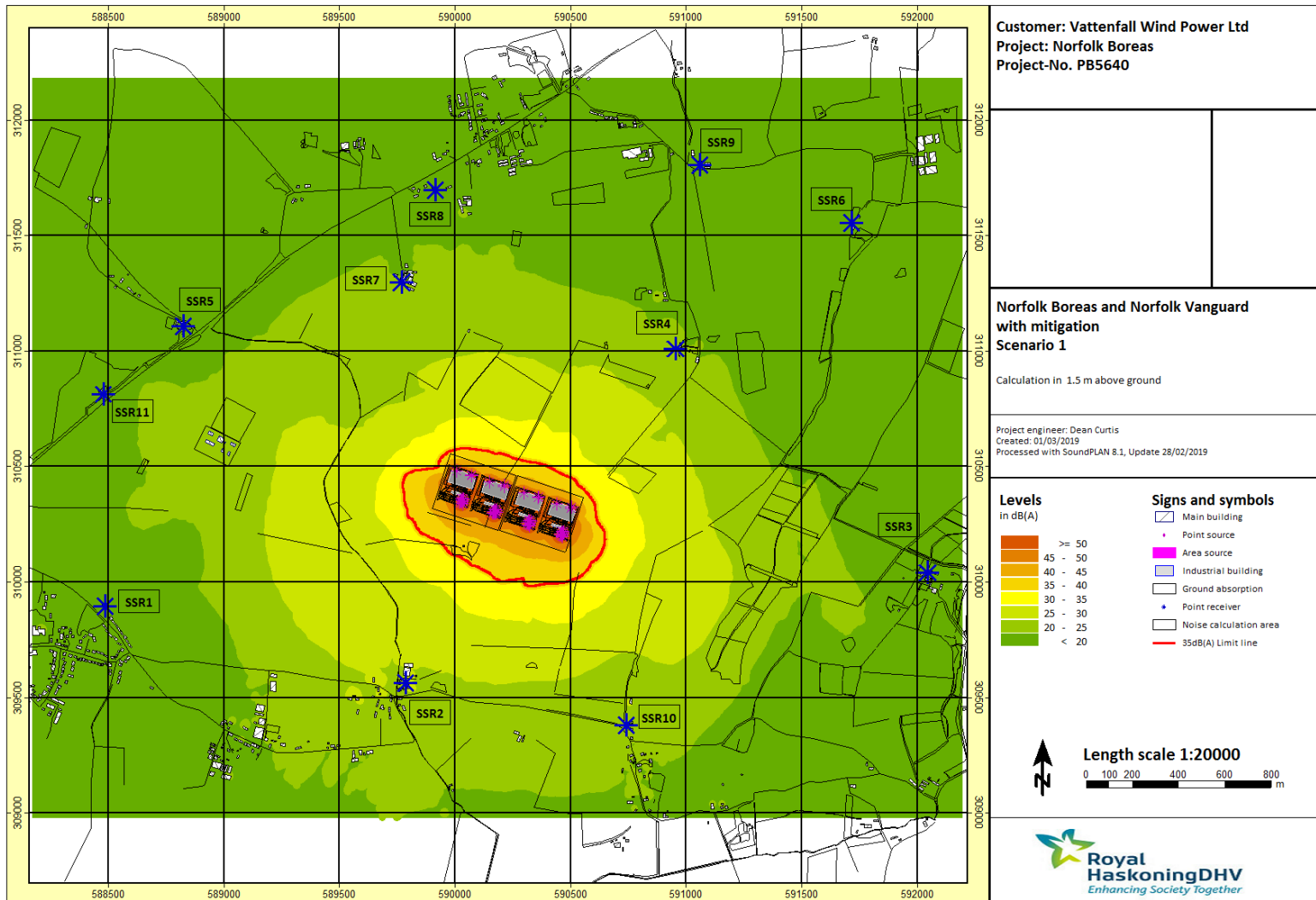


Plate 3.5 Norfolk Boreas Scenario 1 onshore project substation with mitigation (calculation in 1.5m above ground)

## 4 References

International Organization for Standardization (1996). ISO9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation. ISO, Switzerland.