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# Hornsea Project Three

# **Offshore Wind Farm**

## **Environmental Statement:** Volume 6, Annex 8.2 – Construction Noise Model Output

**PINS Document Reference: A6.6.8.2 APFP Regulation 5(2)(a)** 





### **Environmental Impact Assessment**

**Environmental Statement** 

Volume 6

Annex 8.2 – Construction Noise

Liability

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This report is also downloadable from the Hornsea Project Three offshore wind farm website at: <u>www.hornseaproject3.co.uk</u>

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## Glossary

| Term   | Definition   |
|--|--|
| Baseline sound levels/Baseline sound environment | The existing sound levels before construction or operation of the Authorised Development commences.  |
| Decibel  | Units of sound measurement and noise exposure measurement.   |
| Equivalent continuous sound pressure level       | Defined in BS 7445 (BSI, 2003) as the "value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time" (i.e. it is a measure of the noise dose or exposure over a period). It is a unit commonly used to describe construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise. It is also the unit best suited to assessing community response.             |
| Onshore elements of Hornsea<br>Three             | Hornsea Three landfall area, onshore cable corridor, the onshore HVAC booster station, the onshore HVDC converter/HVAC substation and the interconnection with the Norwich Main National Grid substation.  |
| Receptor   | A component of the natural or man-made environment that is affected by an impact, including people.  |
| Sound Pressure Level                             | Sound pressure is the dynamic variation of the static pressure of air and is measured in force per unit area. Sound pressure is normally represented on a logarithmic amplitude scale, which gives a better relationship to the human perception of hearing. The sound pressure level is expressed in decibels and is equal to 20 times the logarithm to the base 10 of the ratio of the sound pressure at the measurement location to a reference sound pressure. The reference sound pressure in air is normally taken to be 20 $\mu$ Pa, which roughly corresponds to the threshold of human hearing. |

## Acronyms

| Acronyms           | De  |
|--------------------|---|
| AAWT               | Annual Average Weekday Traffic                    |
| BPM                | Best Practicable Means                            |
| BS                 | British Standard                                  |
| CoPA               | Control of Pollution Act                          |
| CRTN               | Calculation of Road Traffic Noise                 |
| DMRB               | Design Manual for Roads and Bridges               |
| HDD                | Horizontal Directional Drilling                   |
| HDV                | Heavy Duty Vehicle                                |
| HGV                | Heavy Goods Vehicle                               |
| HVAC               | High Voltage Alternating Current                  |
| HVDC               | High Voltage Direct Current                       |
| L <sub>Aeq,T</sub> | See "Equivalent continuous sound pressure level". |
| L <sub>Amax</sub>  | Maximum value of the A-weighted sound pressure    |
| SPL                | Sound pressure level                              |

## Units

| Unit | De  |
|------|---|
| dB   | Sound pressure level referenced to 20 $\mu$ Pa. |
| GW   | Gigawatt (power)                                |
| kVA  | 1000 volt-amperes (apparent power)              |



### Annex 8.2 – Construction Noise Model Output Environmental Statement May 2018

| escription  |
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| level, measured using the fast (F) time weighting (in dBA). |
|   |

escription





#### **Construction Noise** 1

#### Introduction 1.1

1.1.1.1 This annex presents the assumptions applied to and the results of modelling the noise emissions from the construction of the onshore elements of Hornsea Three (i.e. landfall area, onshore cable corridor, onshore HVAC booster station and onshore HVDC converter/HVAC substation and the interconnection with the Norwich Main National Grid substation) together with compounds, storage areas and accesses. The results from the modelling informs the assessment carried out in volume 3, chapter 8: Noise and Vibration.

#### Legislation and Guidance 1.2

#### **Control of Pollution Act** 1.2.1

- The key legislative driver for noise management in the UK is Section 60, Part III of the Control of Pollution 1.2.1.1 Act 1974 (CoPA). It provides local planning authorities the ability to regulate noise from construction sites to prevent noise disturbance from occurring.
- 1.2.1.2 Measures to control noise from construction works include notices issued by the local planning authorities which stipulate the following:
  - specify the plant or machinery which is, or is not, to be used; •
  - specify the hours during which the works may be carried out;
  - specify the level of noise which may be emitted from the premises in question or at any specified point on those premises or which may be so emitted during specified hours; and
  - provide for any change of circumstances. •
- 1.2.1.3 Developers should apply for prior consent for work on construction sites setting out the construction methods and hours of work. The process of applying for prior consent is set out in Section 61, Part III of the CoPA. Consent under S.61 should be granted if after having considered the application the Local Authority is satisfied that it would not serve a notice under S.60. Further it will be a defence to a notice served under S.60 if consent is granted under S.61.
- Section 72, Part III of the CoPA introduces the concept of the 'best practicable means' (BPM), which is 1.2.1.4 defined that:

"In that expression "practicable" means reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications.

The means to be employed include the design, installation, maintenance and manner and periods of operation of plant and machinery, and the design, construction and maintenance of buildings and acoustic structures."

#### 1.2.2 British Standard 5228

1.2.2.1 British Standard (BS) 5228 is a two-part standard which comprises:

- sites Part 1: Noise'; and
- sites Part 2: Vibration'.
- 1.2.2.2 The Standard provides guidance, information and procedures for the control of noise and vibration from demolition and construction sites. BS 5228-1:2009+A1:2014 and BS 5228-2:2009+A1:2014 gained approval for the purpose of giving guidance on appropriate methods for minimising noise from construction and open sites under the relevant sections of the Control of Pollution Act 1974.
- 1.2.2.3 There are no set standards for the definition of the significance of construction noise effects; however, for noise example criteria are provided in BS 5228-1:2009+A1:2014 Annex E. For vibration, example criteria are provided in BS 5228-2:2009+A1:2014 Annex B.
- 1.2.2.4 BS 5228-1:2009+A1:2014 provides basic information and recommendations for methods of noise control relating to construction and open sites where work activities/operations generate significant noise levels. It includes sections on: community relations; noise and persons on site; neighbourhood nuisance; project supervision; and control of noise. The annexes include: information on legislative background; noise sources, remedies and their effectiveness (mitigation options); current and historic sound level data on site equipment and site activities; significance of noise effects; calculation procedures estimating sound emissions from sites and sound level monitoring; types of piling; and air overpressure.
- 1.2.2.5 BS 5228-2:2009+A1:2014 covers basic information and recommendations for basic methods of vibration control relating to construction and open sites where work activities/operations generate significant vibration levels. It includes sections on: community relations; vibration and persons on site; neighbourhood nuisance; project supervision; control of vibration and measurement. BS 5228-2:2009+A1:2014 refers to BS ISO 4866:2010; BS 7385-2:1993; BS 6472-1:2008, and BS 6472-2:2008 for further advice on the significance of vibration.



BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open

BS 5228-2:2009+A1:2014 'Code of practice for noise and vibration control on construction and open





#### **Methodology** 1.3

- 1.3.1.1 This section outlines the technical methods used to determine the noise arising from the construction of Hornsea Three and the likely magnitude of impacts. Various calculation methods have been employed dependent upon the nature of the works and the most effective modelling technique. A summary of each of the modelling methodologies is provided below, along with a list of where these methodologies have been employed.
- 1.3.1.2 The level of noise generated from construction activities is inherently variable, and is influenced by factors such as the type of plant used, weather conditions, ground conditions and working methods. Assumptions regarding these factors are incorporated into the noise model. The assumptions used in the construction noise model for Hornsea Three are set out below.

#### Study area 1.3.2

- 1.3.2.1 For the assessment of construction noise impacts, the extent of the study area is dependent upon the source of noise or vibration, the duration of works and the times of day at which works are likely to take place. This is necessary as some works are likely to generate higher levels of noise over distance, and the time and duration of work has been taken into account when determining the threshold at which a significant noise effect is likely to occur.
- The Hornsea Three noise and vibration study area considers noise sensitive receptors (NSR) and Public 1.3.2.2 Rights of Way (PRoWs) within approximately 1 km of the onshore elements of Hornsea Three (namely the Hornsea Three landfall area, the onshore cable corridor, the onshore HVAC booster station, the onshore HVDC converter/HVAC substation and the interconnection with the Norwich Main National Grid substation) together with storage areas, compounds and accesses. This study area aligns with the upper end of RPS standard practice study areas for construction projects, which typically range between 300 m and 1 km.
- 1.3.2.3 Locations of potentially NSRs have been identified from the Ordnance Survey Address Base data, used across the project. Approximately 5,000 residential properties have been identified within the noise and vibration study area. However, no schools or hospitals, or any other particularly NSR class were identified.
- A number of PRoWs cross the Hornsea Three noise and vibration study area including two National Trails 1.3.2.4 (see chapter 6: Land Use and Recreation). Whilst users might experience elevated noise levels for short periods when using PRoWs in the area, this is not considered a mechanism for significant effect. From any publicly accessible locations, noise levels would be below the threshold for discomfort or auditory damage and most users of the PRoW would experience only transitory exposure to construction noise as they pass by.

#### 1.3.3 **Baseline noise levels**

- 1.3.3.1 The baseline sound levels have been evaluated for each identified NSR. NSRs have been grouped to the most appropriate monitoring location and a numerical level has been applied for the appropriate periods (e.g. night-time, evening etc) based on an appraisal of the survey data as reported in annex 8.1: Baseline Noise Survey. For example, for NSRs around the onshore HVDC converter/HVAC substation, a representative daytime ambient level of 55 dB LAeq,16hr is identified; for the onshore HVAC booster station, a representative daytime ambient level of 52 dB L<sub>Aeq,16hr</sub> applies.
- 1.3.3.2 Existing baseline vibration is not a significant factor with regard to the assessment of construction vibration. No significant existing vibration sources near the onshore HVDC converter/HVAC substation have been identified. Therefore, no baseline vibration measurements have been undertaken.
- 1.3.3.3 The future baseline traffic data indicate that there would be a minor increase in baseline noise levels from road traffic due to natural growth. However, the increases are very low (calculated as less than 0.1 dB from the reported 3.5% increase in flow reported within the volume 3, chapter 7 Traffic and Transport) and are unlikely to have an influence on the assessment. Therefore, these changes have only been accounted for within the road traffic noise assessment as they are unlikely to influence other assessments. In the circumstance where construction traffic noise is identified as a potentially significant impact, its cumulative effect with other construction noise impacts will be considered in the determination of effect.

#### 1.3.4 Guidance specific to noise and vibration

#### BS 5228-2:2009+A1:2014 calculation method

- If works were likely to produce potentially significant levels of vibration, calculations would be carried out 1.3.4.1 based upon the appropriate methodologies in Table E.1 of BS 5228-2:2009+A1:2014. However, no works likely to produce potentially significant levels of vibration have been identified.
- 1.3.4.2 For other works that have potential to generate vibration, effects have been considered qualitatively.

### **Calculation of Road Traffic Noise**

1.3.4.3 Road traffic on the public highway has been modelled using noise change procedure based on the methodology in the 'Calculation of Road Traffic Noise' (CRTN) (Department for Transport, 1988). This considers the increase in noise from individual road links, based on the change in flow, speed and Heavy Goods Vehicle (HGV) composition. Within the assessment, HGVs and heavy-duty vehicles (HDVs) are regarded as having comparable noise emissions.





1.3.4.4 The noise changes identified in Table 1.1 have been used in the assessment of noise impacts associated with construction traffic on the local road network and from temporary diversion routes resulting from construction of Hornsea Three. These are based on the guidance in Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, Part 7 'Noise and Vibration' for the classification of magnitude of noise impacts in the long term. These DMRB criteria best reflect the temporary nature of the construction noise impacts; the short-term response to a temporary change is found to best match the long-term response to a permanent change.

#### Table 1.1: Classification of Magnitude of Temporary Noise Impacts within DMRB.

| Magnitude of Impact | Noise Change, L <sub>Aeq,T</sub> /L <sub>A10,18h</sub> |
|---------------------|--|
| No change           | 0  |
| Negligible          | 0 1– 2.9   |
| Minor               | 3 – 4.9  |
| Moderate            | 5 – 9.9  |
| Major               | 10+  |

#### Construction noise criteria from BS 5228-1:2009+A1:2014

1.3.4.5 The magnitude of construction noise impacts has been determined in accordance with Annex E of BS 5228-1:2009+A1:2014. The criteria for assessing noise impact from construction works have been based on Example Method 2 contained within Annex E.3.3 of BS 5228-1:2009+A1:2014, which indicates that:

> "Noise levels generated by site activities are deemed to be potentially significant if the total noise (preconstruction ambient plus site noise) exceeds the pre-construction ambient noise by 5 dB or more. subject to lower cut-off values of 65 dB, 55 dB and 45 dB LAeg, T, from site noise alone, for the daytime, evening and night-time periods, respectively; and a duration of one month or more, unless works of a shorter duration are likely to result in significant effect."

1.3.4.6 Whilst these criteria reference the pre-construction ambient noise, in practice for a relatively guiet area such as the Hornsea Three noise and vibration study area, the lower cut-off values apply. Consequently, fixed lower noise limits have been adopted for the construction works, which are independent of existing noise levels. This also aligns with the precautionary approach.

1.3.4.7 Table 1.2 summarises the criteria that have been used to inform the assessment of construction noise effects for residential dwellings and other NSRs of medium and high sensitivity, based on the guidance in BS 5228-1:2009+A1:2014. Determination of impact also includes consideration of duration, absolute noise levels and management of the noise sources, all of which make up the context. For NSRs that have low sensitivity, professional judgement has been applied to determine the overall level of impact.

| able 1.2: | Construction noise levels lower cut-off values which migh |
|-----------|---|
|           |   |

| Assessment category   | Impact Magnitude Threshold value ª, in decibels (dB) |         |                  |               |  |  |  |
|---|--|---------|------------------|---------------|--|--|--|
| and threshold value<br>period (L <sub>Aeq</sub> )   | No/Negligible Minor Adverse                          |         | Moderate Adverse | Major Adverse |  |  |  |
| Night-time (23.00 to 07.00 hours)   | <40  | 40 - 45 | 45 – 55          | >55           |  |  |  |
| Evenings (19.00 to<br>23.00 hours weekdays).<br>Weekends (13.00 to<br>23.00 hours Saturdays<br>and 07.00 to 23.00<br>hours Sundays) | <50  | 50 - 55 | 55 – 65          | >65           |  |  |  |
| Daytime (07.00 to 19.00<br>hours) weekdays and<br>Saturdays (07.00 to<br>13.00 hours)   | <60  | 60 - 65 | 65 - 75          | >75           |  |  |  |
| <sup>a</sup> Subject to duration criteria and where ambient noise levels are low.   |  |         |                  |               |  |  |  |

- 1.3.4.8 the 'on-time'; and the attenuation of sound due to distance, ground attenuation and barrier effects. The assessment is based on reasonably expected construction phases, plant items and on-times based on the information provided within BS 5228-1:2009+A1:2014. The average percentage on-time comes from estimates of the time that the plant will be operating at full power.
- 1.3.4.9 Where predicted construction noise levels are <5 dB below the lower cut-off values in paragraph 1.3.4.5 for the relevant time period, or of short duration (<1 month), the magnitude of impact is considered to be 'no change' or a negligible adverse as appropriate.
- 1.3.4.10 For works of longer duration (>1 month) where predicted noise levels are between 5 dB below and equal to the lower cut-off values in paragraph 1.3.4.6, this is considered to result in a minor adverse impact depending on the context and duration of the works. Where the lower cut-off values are exceeded by up to 10 dB, this is considered to be a moderate adverse impact depending on the context and duration of the works. Predicted noise levels greater than 10 dB above the lower cut-off values are considered to result in a major adverse impact depending on the context and duration of the works.

### t result in adverse impact at residential building facades.

The calculation method of BS 5228-1:2009+A1:2014 takes account of the duration of an activity per hour,





1.3.4.11 The levels provided in Table 1.2 apply when the existing ambient noise levels are low; for daytime this equates to ambient noise levels of 62 dB or below. As set out in volume 6, annex 8.1: Baseline Noise Survey, levels of 52 dB and 55 dB L<sub>Aeg,day</sub> are given as representative of the onshore HVDC converter/HVAC substation and onshore HVAC booster station areas. Consequently, existing daytime noise levels result in the criteria set within the lower cut-off values given in Table 1.2 above (i.e. the most stringent limits). As such, the lower cut-off values are used throughout the construction assessment. This follows a precautionary approach.

#### Assumptions and limitations 1.4

- The acoustics standards and guidance adopted for Hornsea Three are based on the subjective response 1.4.1.1 of the majority of the population. This is the widely used approach, considered by RPS to be the best that can be achieved in a population of varying subjective responses, which are dependent upon a wide range of factors. Individual responses to noise may vary greatly from the effects identified for the populace.
- 1.4.1.2 Sound monitoring at all NSRs (approximately) identified within the Hornsea Three noise and vibration study area is not required or practicable. Rather, monitoring has been carried out at select representative NSRs in close proximity to the onshore HVDC converter/HVAC substation and onshore HVAC booster station areas, in order to determine existing noise levels to inform the operational noise assessment. Where existing noise levels are relatively low (such as for the Hornsea Three noise study area), determination of impacts due to construction noise are independent of the existing noise level.
- Uncertainty in the baseline data has been reduced significantly by: 1.4.1.3
  - Carrying out monitoring over a period of at least seven days, allowing analysis of how representative the baseline data is given the naturally varying noise level at the receptors (see annex 8.1: Baseline Noise Survey);
  - Introduction of modern instrumentation; and
  - By ensuring that all instrumentation is calibrated before and after each measurement period and is within accepted calibration intervals.
- 1.4.1.4 Where quantitative assessments have been undertaken, these are based on likely source levels provided by manufacturers, existing empirical data, and relevant British Standards. This approach minimises uncertainty associated with the source inputs in sound propagation models that have been used.
- There are uncertainties in any sound propagation prediction methodology. The methodology in Annex F 1.4.1.5 of BS 5228-1:2009+A1:2014 is generally only applicable for distances of up to 300 m due to the exclusion of meteorological effects, which has a greater bearing on the propagation of sound as the distance between the source and receiver is increased. In general, this method is more likely to result in an overestimate than an underestimate of effects at receptors.

- International Organization for Standardization 9613-2 (ISO, 1996) is applicable in practice to a great 1.4.1.6 variety of noise sources and environments. The standard estimates accuracy for values of an A-weighted sound level down-wind is stated as +/-3 dB for a mean source/receptor height of up to 5 m and source/propagation separation distance of up to 1 km. For a mean source height between 5 and 30 m, the estimated accuracy is given as +/-1 dB for a source/propagation separation distance of 0 to 100 m and +/-3 dB for a source/propagation separation distance of >100 m. This is a standard approach and is considered to be an acceptable and robust prediction methodology.
- 1.4.1.7 For the traffic noise model, predicted noise levels consider noise only from road links for which traffic data have been provided. The prediction does not include noise from any other sources, such as wind/environmental noise, agricultural activity or industry.

#### Measures adopted as part of Hornsea Three 1.5

- 1.5.1.1 Numerous mitigation measures have been integrated into Hornsea Three and therefore have been included in the construction noise model.
- Works would be undertaken in accordance with the Outline Code of Construction Practice (CoCP) 1.5.1.2 (document reference A8.5), which sets out the overarching principles of construction, contractor protocols and pollution prevention measures covering the intertidal and onshore environments. The Outline CoCP (document reference A8.5) also sets out the standard working hours. While construction works will generally be limited to the daytime, works may also occur during the evening or night-time periods. Further detail will be added to the CoCP during the detailed design stage on construction-related environmental management measures, the selection of appropriate construction techniques, construction noise management measures and monitoring processes These construction noise management measures will be agreed with the relevant local authorities.
- 1.5.1.3 Activities outside of the standard working hours will follow the processes identified within the Outline CoCP (document reference A8.5). In summary, this requires agreement with the relevant local authority Environmental Health Officer (EHO) in consultation with relevant stakeholders (e.g. third-party asset owner) as required. Assessment of noise impacts associated with works outside the standard working hours will be undertaken as appropriate to support any application for agreement with the Local Authorities and will only be considered within the Environmental Statement where out of hours works are specifically identified in the Outline CoCP (document reference A8.5).







Two plant items required for the intertidal cable installation by Horizontal Directional Drilling (HDD) were 1.5.1.4 identified as warranting additional mitigation: the Prime Drilling PD250/90 Drilling Rig and Ingersoll Rand 250 kVA Generator in paragraph 1.6.1.11. Based on the source levels indicated by the manufacturer, the main drilling rig will be attenuated by -10 dB to a noise level of approximately 89 dB at 10 m distance; the 250 kVA generator will be attenuated by -5 dB to a noise level of approximately 83 dB at 10 m distance. It is considered that this mitigation can be readily achieved by appropriate plant selection, for example, a silenced version of the plant items, and form part of reasonably practicable measures (see paragraph 1.1.1.1).

#### **Construction phase model input** 1.6

- 1.6.1.1 The impacts of the onshore construction of Hornsea Three have been assessed with regards to noise and vibration. The full assessment, along with the maximum design scenario against which each construction phase impact has been assessed, are provided in volume 3, chapter 8: Noise and Vibration.
- 1.6.1.2 For the purposes of the Environmental Statement, construction effects are typically temporary or shortterm. This would include effects resulting from construction of the onshore elements of Hornsea Three including compounds, storage areas and accesses, such as noise and vibration from construction plant and machinery.
- A set of construction plant source data, including sound power levels, level source, heights, numbers, 1.6.1.3 percentage operating times, are provided in Appendix A of this annex. The key working scenarios are described below.
- 1.6.1.4 The onshore elements of Hornsea Three (together with the compounds, storage areas and accesses) and the associated construction activities are described in volume 1, chapter 3: Project Description. The maximum design scenario for the assessment of noise during construction, operation and maintenance, and decommissioning is presented in volume 3, chapter 8: Noise and Vibration.
- Construction vibration is considered qualitatively, given the unlikelihood of significant construction 1.6.1.5 vibration propagating beyond the immediate areas of works.

The temporary impact of open cut cable installation during construction may affect receptors sensitive to noise or vibration.

- Construction effects associated with the trenched cable route works would be temporary at any one 1.6.1.6 receptor, occurring for only a fraction of the overall construction period. On similar projects, the onshore cable was installed at a rate of approximately 5 km in 3 months.
- 1.6.1.7 The open cut cable installation would primarily comprise excavator and HDV movements. For this assessment, averaged over a working day, one excavator for 100% operation and one HGV for 50% operation have been assumed to be operating at or near maximum capacity of the assessment period.

The temporary impact of cable installation by HDD (excluding duct installation at the Hornsea Three intertidal area) may affect receptors sensitive to noise or vibration.

- 1.6.1.8 Cable installed by HDD will involve potentially more noisy works than for most of the cable laying. If required, HDD compounds would be located within the Hornsea Three onshore cable corridor.
- 1.6.1.9 The HDD crossing installations would primarily comprise the directional drill with generator, supporting equipment, plus excavator and HGV movements. For this assessment, averaged over a working day, all plant has been assumed to be operating at, or near, maximum capacity for 100% of the assessment period.

The temporary impact of cable installation at the Hornsea Three landfall area may affect receptors sensitive to noise or vibration.

- 1.6.1.10 Landfall may be either HDD or open cut. Construction by open cut would be similar to that for the onshore cable corridor, albeit of greater duration. However, if the intertidal and undersea cable is installed by HDD from the landfall worksite, this will involve potentially noisier and longer works than for most of the cable laying or other HDD sites. As a worst-case assessment, construction by HDD is assessed.
- 1.6.1.11 An example set of construction plant is outlined below, which reflects the potential noisiness of the HDD plant. While this refers to particular brands and models of equipment, other similar plant would result in comparable noise levels off site. The plant identified comprises:
  - Prime Drilling PD250/90 Drilling Rig;
  - Ingersoll Rand 250KVA Generator;
  - Weatherford Mud Pump T270A;
  - Prime Drilling Pump House;
  - Clear Solutions Mixing System; and
  - WB 2000 Re-cycling System.
- 1.6.1.12 In addition, this is likely to be supported by plant including: an excavator; HGV; dump truck and mobile tracked crane.

The temporary impact of constructing the cable route construction accesses may affect receptors sensitive to noise or vibration.

- The installation of construction accesses and haul roads allowing vehicular access will require earth 1.6.1.13 moving plant, such as excavators, rollers and HGVs. Temporary access will be removed upon reinstatement. Details of construction are provided within volume 1, chapter 3: Project Description.
- 1.6.1.14 Construction effects associated with the construction of accesses for Hornsea Three onshore cable corridor would occur for only a fraction of the overall construction period, and are considered temporary.







1.6.1.15 The construction of the cable route construction accesses would primarily comprise generator, excavator, roller and HGV movements. For this assessment, averaged over a working day, all plant has been assumed to be operating at, or near, maximum capacities as shown in Appendix A.

The temporary impacts of onshore HVDC converter/HVAC substation and HVAC booster station construction may affect receptors sensitive to noise or vibration.

- 1.6.1.16 Construction of the onshore HVDC converter/HVAC substation and HVAC booster station will involve potentially more noisy works than for most of the cable laying. Work will occur over the permanent site and the temporary construction areas associated with the onshore HVAC booster station and HVDC converter/HVAC substation.
- 1.6.1.17 During construction, noise will be generated from small scale plant operations such as earth moving activity and general construction activity associated with the onshore HVDC converter/HVAC substation and HVAC booster station.
- 1.6.1.18 Assessment has been undertaken for construction activities. These give an indication of typical noise levels that would be expected during the construction of the onshore HVDC converter/HVAC substation and HVAC booster station. The scale of the respective sites is most likely to affect the duration for which construction works occur, rather than the emitted noise levels.
- 1.6.1.19 The activities considered are:
  - Stripping of topsoil and installation of stone capping;
  - Piling;
  - Installation of equipment; and
  - Concrete pouring.
- 1.6.1.20 The plant and operating regime assumed for each activity is shown in Appendix A.
- 1.6.1.21 From calculation of the overall sound emission from each activity, that associated with concrete pouring has resulted in the highest noise levels. Within the ES, only activity with this noise emission has been considered within the assessment.

The temporary impact of increased vehicles on the existing road network associated with all construction works may affect receptors sensitive to noise or vibration.

- 1.6.1.22 The construction works will result in additional vehicle movements on the existing road network. A high proportion of these additional vehicles will be HGVs.
- 1.6.1.23 Traffic flows have been provided by the transportation consultant and are discussed in volume 3, chapter 7: Traffic and Transport. Noise change calculations follow the protocol within CRTN. Calculations allow for changes in flow, HGV composition and speed, between without and with the construction traffic for the year 2022. The traffic data modelled is provided in Table 1.3 (see volume 3, chapter 7: Traffic and Transport for construction vehicle generation assumptions).







|   | 18hr AAWT 2022 without Hornsea Three |      |      |             | 18hr AAWT 2022 with construction of Hornsea Three |      |      |             |
|---|--------------------------------------|------|------|-------------|---|------|------|-------------|
| Link Name   | Total vehicles                       | HDV  | %HDV | Speed (kph) | Total vehicles                                    | HDV  | %HDV | Speed (kph) |
| (1) A148, west of The Street and east of Green Lane                             | 13860                                | 1607 | 12   | 97          | 14225   | 1833 | 13   | 97          |
| (2) A148 west of Holt and east of Letheringsett                                 | 11499                                | 1306 | 11   | 97          | 11865   | 1532 | 13   | 97          |
| (3) A148, east of the B1149 roundabout and west of Station Road                 | 12536                                | 1345 | 11   | 64          | 12798   | 1523 | 12   | 64          |
| (4) B1354 between the Swanton Road junction and B1110 junctions                 | 4150                                 | 580  | 14   | 97          | 4150  | 580  | 14   | 97          |
| (5) B1354 east of Melton Constable and west of Briston                          | 5928                                 | 801  | 14   | 48          | 5928  | 801  | 14   | 48          |
| (6) B1149 at Edgefield, north of the village hall and south of Hempstead Road   | 4709                                 | 415  | 9    | 64          | 5070  | 639  | 13   | 64          |
| (7) A148 at High Kelling, south of Kelling Hospital                             | 14214                                | 1370 | 10   | 64          | 14476   | 1548 | 11   | 64          |
| (8) A148, east of Bodham and west of the Woodlands Leisure centre               | 13458                                | 1336 | 10   | 97          | 13909   | 1543 | 11   | 97          |
| (9) A148, west of the B1436 junction and east of the Lion's Mouth junction      | 14592                                | 1423 | 10   | 80          | 15132   | 1641 | 11   | 80          |
| (10) B1436, east of Felbrigg  | 9806                                 | 944  | 10   | 48          | 10346   | 1162 | 11   | 48          |
| (11) A140, south of Roughton and north of the Topshill Road junction            | 11723                                | 1067 | 9    | 64          | 12263   | 1285 | 10   | 64          |
| (12) A149 west of Weybourne and east of The Pheasant Hotel                      | 3451                                 | 260  | 8    | 48          | 3451  | 260  | 8    | 48          |
| (13) A149 east of Weybourne, west of the North Norfolk Railway Line             | 4651                                 | 299  | 6    | 97          | 4895  | 410  | 8    | 97          |
| (14) A1067, north of Bridge Road and east of Little Ryburgh                     | 9789                                 | 1304 | 13   | 97          | 9988  | 1432 | 14   | 97          |
| (15) B1145 at Bawdeswell, between The Street junction and Hall Road junction    | 3522                                 | 393  | 11   | 48          | 3522  | 393  | 11   | 48          |
| (16) B1145, west of Reepham and east of the Old Lane junction                   | 3195                                 | 414  | 13   | 97          | 3195  | 414  | 13   | 97          |
| (17) B1145 east of Cawston, west of the B1149 crossroads                        | 4357                                 | 413  | 9    | 97          | 4790  | 602  | 13   | 97          |
| (18) B1145 east of the B1149 crossroads junction, west of Cawston Park Hospital | 5099                                 | 460  | 9    | 97          | 5180  | 460  | 9    | 97          |
| (19) A140, south of Aylsham's B1145 / A140 roundabout, and north of Marsham     | 15844                                | 1636 | 10   | 97          | 16344   | 1854 | 11   | 97          |
| (20) A1067, between Attlebridge and the Fir Covert Road junction                | 11036                                | 1416 | 13   | 97          | 11468   | 1573 | 14   | 97          |
| (21) A140 between the A47 and B1113 junctions                                   | 25714                                | 2669 | 10   | 97          | 26296   | 2933 | 11   | 97          |
| (22) B1113, south of the A47 near Norwich Sports ground                         | 9296                                 | 725  | 8    | 97          | 9878  | 989  | 10   | 97          |
| (23) A47 at Honingham (Highways England)  | 31067                                | 3350 | 11   | 97          | 31475   | 3597 | 11   | 97          |
| (24) A47 at Bawburgh (Highways England)   | 50926                                | 4020 | 8    | 113         | 51349   | 4268 | 8    | 113         |
| (25) A47 at Intwood (Highways England)  | 60291                                | 5131 | 9    | 113         | 60982   | 5405 | 9    | 113         |
| (26) A11 at Hethersett (Highways England)                                       | 54115                                | 5136 | 9    | 113         | 54441   | 5334 | 10   | 113         |
| (27) A47, between A140 and A146 junctions                                       | 57262                                | 4873 | 9    | 113         | 57903   | 5103 | 9    | 113         |
| (28) A1065, North of Swaffham   | 8307                                 | 963  | 12   | 97          | 8580  | 1142 | 13   | 97          |

#### Table 1.3: Construction Traffic Noise Data - 18hr AAWT Forecast 2022.







|  |                | 18hr AAWT 2022 wit | thout Hornsea Three |             | 18hr AAWT 2022 with construction of Hornsea Three |      |      | Three       |
|--|----------------|--------------------|---------------------|-------------|---|------|------|-------------|
| Link Name  | Total vehicles | HDV                | %HDV                | Speed (kph) | Total vehicles                                    | HDV  | %HDV | Speed (kph) |
| (29) A1065, east of Weasenham  | 5560           | 645                | 12                  | 80          | 5833  | 824  | 14   | 80          |
| (30) A1082, South of Sheringham  | 8915           | 140                | 2                   | 48          | 9159  | 251  | 3    | 48          |
| (31) A1270 Northern Distributor Road between A1067 and B1149 junction        | 22314          | 1553               | 7                   | 113         | 22686   | 1710 | 8    | 113         |
| (32) B1149 between A1270 Northern Distributor Road and Buxton Road junctions | 11833          | 616                | 5                   | 97          | 12496   | 863  | 7    | 97          |
| (33) A1270 Northern Distributor Road between B1149 and A140 junctions        | 25986          | 1809               | 7                   | 113         | 26945   | 2161 | 8    | 113         |
| (34) A1270 Northern Distributor Road between A140 and A47 junctions          | 23838          | 1659               | 7                   | 113         | 24579   | 1936 | 8    | 113         |
| (35) A140 between A1270 and B1145  | 15557          | 550                | 4                   | 97          | 16058   | 767  | 5    | 97          |
| (36) A1270 between A140 and A47 (Near junction with A47)                     | 36762          | 2559               | 7                   | 113         | 37503   | 2835 | 8    | 113         |
| (37) A47 East of A1270 junction  | 47018          | 3272               | 7                   | 113         | 47472   | 3325 | 7    | 113         |







#### **Construction phase model output** 1.7

#### 1.7.1 Construction activity noise

- 1.7.1.1 For each activity, the assumed construction plant and operating characteristics have been assessed. The construction plant source data, identifying items, number, noise level and percentage time operating over a working day is provided in Appendix A. Within a spreadsheet model, the transmission of noise from construction works has been calculated following the procedure within BS 5228-1:2009+A1:2014 (see section 1.3.4).
- 1.7.1.2 To provide a robust assessment, the effects of the construction works when closest to any NSR is considered. The distances between the worksite and receptor, and the construction noise threshold criteria are calculated for each activity, for day, evening and night works. Although levels are calculated for evening and night works, this assessment does not consider the likelihood of any particular works occurring outside the daytime hours. A discussion of hours of working is provided in the Outline CoCP (document reference A8.5) which accompanies the Development Consent Order application.
- Predicted noise levels for each activity, at a range of distances up to 1 km from the relevant worksite edge 1.7.1.3 are provided in Appendix B, calculated following the procedure within BS 5228-1:2009+A1:2014. Table B. also contains calculations of the distances from which construction noise will fall into the negligible, minor, moderate or major categories, for day workings, based on the BS 5228-1:2009+A1:2014 criteria set out in Table 1.1.
- 1.7.1.4 Figures illustrating the distance bands for which a range of construction activities will result in minor, moderate or major adverse magnitude of impact are provided in Figure 1.1 to Figure 1.6. The figures also identify where residential properties fall within the minor, moderate or major bands. A summary of the residential NSRs within each band of minor, moderate or major impact are provided in Table 1.4.

| Table 1.4: | Construction Noise Impact Residential Property Count. |
|------------|---|
|------------|---|

| Impact   | Figure 1.1:<br>Trenched cable-<br>route | Figure 1.2:<br>Route HDDs | Figure 1.3:<br>Access<br>construction | Figure 1.4:<br>Substation<br>construction | Figure 1.5:<br>Landfall HDD | Figure 1.6:<br>Landfall HDD<br>with mitigation |
|----------|---|---------------------------|---------------------------------------|---|-----------------------------|--|
| Major    | 1                                       | 11                        | 8                                     | 0   | 0                           | 0  |
| Moderate | 12                                      | 70                        | 27                                    | 0   | 0                           | 0  |
| Minor    | 17                                      | 123                       | 21                                    | 0   | 6                           | 0  |

1.7.1.5 Where clusters of properties are affected by a single works activity, such as from HDD, construction noise control measures may be required. The Outline CoCP (document reference A8.5) sets out the general construction principles, working hours and a commitment to apply the best practicable means to managing noise. Construction noise control measures for specific activities (e.g. HDD) will be identified and agreed with the relevant local authorities prior to construction. These measures will be documented and implemented through the CoCP.

#### 1.7.2 Construction traffic noise

1.7.2.1 Noise change calculations have been undertaken for each of the thirty-seven links where traffic data has been provided, not constrained by the scoping distance. The calculations consider total flows, percentage HGV/HDV and average speed, using the formula from CRTN. The noise changes forecast in Table 1.5 represent the expected noise change at any NSR for which that traffic link is already the dominant noise source. For NSRs where a link contributes only a portion towards their overall existing noise environment, the noise change reported for that link forms an upper limit to the noise change which a NSR might experience due to the increased traffic flows. As a result, where existing flows are particularly low (CRTN cites <1000 vehicles per 18-hour), this will also result in an over-calculation of any potential noise change at these NSRs. This therefore represents a precautionary approach.

| Link Identity   | Base Flow, 2022<br>18hr AAWT | Additional Future<br>Flow, 2022 from<br>construction of<br>Hornsea Three | dB noise<br>change | Impact<br>magnitude |
|---|------------------------------|--|--------------------|---------------------|
| (1) A148, west of The Street and east of Green Lane                           | 13860                        | 366  | 0.3                | Negligible          |
| (2) A148 west of Holt and east of Letheringsett                               | 11499                        | 366  | 0.4                | Negligible          |
| (3) A148, east of the B1149 roundabout and west of Station Road               | 12536                        | 262  | 0.3                | Negligible          |
| (4) B1354 between the Swanton Road junction and B1110 unctions                | 4150                         | 0  | 0.0                | No change           |
| (5) B1354 east of Melton Constable and west of Briston                        | 5928                         | 0  | 0.0                | No change           |
| 6) B1149 at Edgefield, north of the village hall and south of Hempstead Road  | 4709                         | 361  | 1.0                | Negligible          |
| (7) A148 at High Kelling, south of Kelling Hospital                           | 14214                        | 262  | 0.3                | Negligible          |
| (8) A148, east of Bodham and west of the Woodlands<br>Leisure centre          | 13458                        | 451  | 0.3                | Negligible          |
| (9) A148, west of the B1436 junction and east of the Lion's<br>Mouth junction | 14592                        | 540  | 0.3                | Negligible          |

### Table 1.5: Construction Traffic Noise Impact Calculation - 18hr AAWT Forecast.







| Link Identity   | Base Flow, 2022<br>18hr AAWT | Additional Future<br>Flow, 2022 from<br>construction of<br>Hornsea Three | dB noise<br>change | Impact<br>magnitude |
|---|------------------------------|--|--------------------|---------------------|
| (10) B1436, east of Felbrigg  | 9806                         | 540  | 0.6                | Negligible          |
| (11) A140, south of Roughton and north of the Topshill Road junction            | 11723                        | 540  | 0.5                | Negligible          |
| (12) A149 west of Weybourne and east of The Pheasant Hotel                      | 3451                         | 0  | 0.0                | No change           |
| (13) A149 east of Weybourne, west of the North Norfolk<br>Railway Line          | 4651                         | 243  | 0.5                | Negligible          |
| (14) A1067, north of Bridge Road and east of Little Ryburgh                     | 9789                         | 199  | 0.2                | Negligible          |
| (15) B1145 at Bawdeswell, between The Street junction and Hall Road junction    | 3522                         | 0  | 0.0                | No change           |
| (16) B1145, west of Reepham and east of the Old Lane junction                   | 3195                         | 0  | 0.0                | No change           |
| (17) B1145 east of Cawston, west of the B1149 crossroads                        | 4357                         | 433  | 0.9                | Negligible          |
| (18) B1145 east of the B1149 crossroads junction, west of Cawston Park Hospital | 5099                         | 81   | 0.0                | No change           |
| (19) A140, south of Aylsham's B1145 / A140 roundabout, and north of Marsham     | 15844                        | 500  | 0.3                | Negligible          |
| (20) A1067, between Attlebridge and the Fir Covert Road junction                | 11036                        | 432  | 0.3                | Negligible          |
| (21) A140 between the A47 and B1113 junctions                                   | 25714                        | 581  | 0.2                | Negligible          |
| (22) B1113, south of the A47 near Norwich Sports ground                         | 9296                         | 581  | 0.6                | Negligible          |
| (23) A47 at Honingham (Highways England)  | 31067                        | 408  | 0.1                | Negligible          |
| (24) A47 at Bawburgh (Highways England)   | 50926                        | 422  | 0.1                | Negligible          |
| (25) A47 at Intwood (Highways England)  | 60291                        | 692  | 0.1                | Negligible          |
| (26) A11 at Hethersett (Highways England)                                       | 54115                        | 326  | 0.1                | Negligible          |
| (27) A47, between A140 and A146 junctions                                       | 57262                        | 641  | 0.1                | Negligible          |
| (28) A1065, North of Swaffham   | 8307                         | 273  | 0.4                | Negligible          |
| (29) A1065, east of Weasenham   | 5560                         | 273  | 0.6                | Negligible          |
| (30) A1082, South of Sheringham   | 8915                         | 243  | 0.5                | Negligible          |
| (31) A1270 Northern Distributor Road between A1067 and B1149 junction           | 22314                        | 372  | 0.2                | Negligible          |

| Link Identity  | Base Flow, 2022<br>18hr AAWT | Additional Future<br>Flow, 2022 from<br>construction of<br>Hornsea Three | dB noise<br>change | Impact<br>magnitude |
|--|------------------------------|--|--------------------|---------------------|
| (32) B1149 between A1270 Northern Distributor Road and Buxton Road junctions | 11833                        | 663  | 0.5                | Negligible          |
| (33) A1270 Northern Distributor Road between B1149 and A140 junctions        | 25986                        | 959  | 0.3                | Negligible          |
| (34) A1270 Northern Distributor Road between A140 and A47 junctions          | 23838                        | 741  | 0.3                | Negligible          |
| (35) A140 between A1270 and B1145  | 15557                        | 500  | 0.4                | Negligible          |
| (36) A1270 between A140 and A47 (Near junction with A47)                     | 36762                        | 741  | 0.2                | Negligible          |
| (37) A47 East of A1270 junction  | 47018                        | 454  | 0.0                | No change           |

- 1.7.2.2 From Table 1.5 it can be seen that for the road links identified, any noise increase will be below 3 dB; of no or negligible impact.
- 1.7.2.3 No significant construction traffic is forecast during the night hours, so no significant change would result at night.
- 1.7.2.4 In the circumstance where noise arising from construction traffic is identified as a potentially significant impact, its cumulative effect with other construction noise impacts would be considered in the determination of effect. However, given that for all road links, noise from construction traffic is demonstrated to be negligible or no change, no cumulative effects with other construction noise impacts would occur.

#### 1.7.3 **Construction vibration**

1.7.3.1 Construction vibration will be minimised as far as is reasonably practicable. At this stage, blasting or impact piling is considered unlikely. As such, construction vibration would be unlikely to be significant beyond the immediate works boundary. Off-site vibration from HGVs etc. on haul roads or the public highway would be negligible impact at all locations assuming the roads are maintained. No significant vibration-generation plant will be used during the trenched cable construction process so vibration is unlikely to be greater than a minor adverse impact.









Figure 1.1: Construction noise impact magnitude boundaries – day – trenched cable installation.



| 345000       |   | ornsea Three onshore cab<br>rridor  | le                   |  |  |  |
|--------------|---|---|----------------------|--|--|--|
|              | La<br>Co  | ndfall construction compo<br>ompound<br>orage Area  | und                  |  |  |  |
| þ            | 1k  | m study area - constructio  | n                    |  |  |  |
| 4400         | Impact Magnitude Bands  |   |                      |  |  |  |
| n.           | Major : 0 - 12 m  |   |                      |  |  |  |
|              | Mo  | oderate : >12 - 29 m  |                      |  |  |  |
|              | Mi  | nor : >29 - 47 m  |                      |  |  |  |
|              | Ne  | ealiaible : >47 m   |                      |  |  |  |
| 343000       | o Re  | esidential properties within<br>nds   | impact               |  |  |  |
| 41000 342000 |   |   |                      |  |  |  |
| 'n           | Reference S<br>Projection : E                                     | ystem : OSGB36 Scale@A3:1:3<br>BNG Vertical refere  | 0,000<br>nce: Newlyn |  |  |  |
|              |   |   |                      |  |  |  |
|              | REV   | REMARK  | DATE                 |  |  |  |
| 000          | 00  | Initial Issue   | 29/03/2018           |  |  |  |
| 340          |   |   |                      |  |  |  |
|              | Constructi  | Hornsea Project Three<br>ion Noise Impact Magnitude Boundar<br>Trenched Cable Installation<br>Sheet 1 | ies - Day            |  |  |  |
|              | Doc no: RPS-9<br>Created by: CR<br>Checked by: S<br>Approved by:S | 337-0470-12<br>S RPS OI   | rsted                |  |  |  |





Figure 1.1: Construction noise impact magnitude boundaries – day – trenched cable installation.



| Big Storage Area         Ikm study area - operation         Ikm study area - construction         Impact Magnitude Bands         Major : 0 - 12 m         Moderate : >12 - 29 m         Minor : >29 - 47 m         Negligible : >47 m         Negligible : >47 m         Reference System : OSGB36         Projection : BNG         Vertical reference         0       0.5         Ikiometers         0       0.5         Ikiometers         Rev       Refmark         Doc no: RPS-9337-0470-12         Construction Noise Impact Magnitude Boundaries         Trenched Cable Installation         Sheet 2         Doc no: RPS-9337-0470-12         Checked by: SS         Checked by: SS         Checked by: SS  | le         | Hornsea Three onshore cable corridor   |
|---|------------|--|
| 000000000000000000000000000000000000  |            | Storage Area   |
| 000000000000000000000000000000000000  |            | 1km study area - operation   |
| Impact Magnitude Bands           Major : 0 - 12 m           Moderate : >12 - 29 m           Minor : >29 - 47 m           Negligible : >47 m           Negligible : >47 m           Reference System : OSGB36           Projection : BNG           Vertical reference           0           0.5           1 Kilometers           REV           REV           Noise Impact Magnitude Boundaries           Trenched Cable Installation           Sheet 2           Doe no: RPS-9337-0470-12           Created by: CR           Checked by: SS           Doe no: RPS-9337-0470-12           Created by: CR           Checked by: SS           Doe no: RPS-9337-0470-12           Created by: CR           Checked by: SS  | on         | 1km study area - construction  |
| 000000000000000000000000000000000000  |            | Impact Magnitude Bands<br>Major : 0 - 12 m   |
| 000000000000000000000000000000000000  |            | Moderate : >12 - 29 m  |
| Negligible : >47 m           Negligible : >47 m           Reference System : OSGB36         Scale@A3:1:30,0           Projection : BNG         Vertical reference           0         0.5         1 Kilometers           Rev         REMARK         D           00         initial Issue         29           OCC         OCC         Hornsea Project Three<br>Construction Noise Impact Magnitude Boundariess<br>Trenched Cable Installation<br>Sheet 2         Doc no: RPS-9337-0470-12<br>Created by: CR<br>Checked by: SS         DEFS         Or Iss   |            | Minor : >29 - 47 m   |
| Reference System : OSGB36         Scale@A3:1:30,0           Projection : BNG         Vertical reference           0         0.5         1 Kilometers           REV         REMARK         D           00         Initial Issue         29           Hornsea Project Three<br>Construction Noise Impact Magnitude Boundariess<br>Trenched Cable Installation<br>Sheet 2         Doc no: RPS-8337-0470-12<br>Created by: CR<br>Checked by: SS         DCFS  |            | Negligible : >47 m   |
| Reference System : OSGB36         Scale@A3:1:30,0           Projection : BNG         Vertical reference           0         0.5         1 Kilometers           Imitial Issue         29           OO         Initial Issue         29           Imitial Issue         20  <   |            |  |
| 000000000000000000000000000000000000  |            |  |
| 000000000000000000000000000000000000  |            |  |
| Reference System : OSGB36         Scale@A3:1:30,0           Projection : BNG         Vertical reference           0         0.5         1 Kilometers           Image: Structure in the structure |            |  |
| Reference System : OSGB36         Scale@A3:1:30,0           Projection : BNG         Vertical reference           0         0.5         1 Kilometers           Image: State of the s |            |  |
| Reference System : OSGB36     Scale@A3:1:30,0       Projection : BNG     Vertical reference       0     0.5     1 Kilometers       Imitial Issue     29       Imitial Issue     20 <t< th=""><td></td><td></td></t<>   |            |  |
| Reference System : OSGB36       Scale@A3:1:30,0         Projection : BNG       Vertical reference         0       0.5       1 Kilometers         Image: State of the state o         |            |  |
| Reference System : OSGB36       Scale@A3:1:30,0         Projection : BNG       Vertical reference         0       0.5       1 Kilometers         I Kilometers         REV REMARK       D         00       Initial Issue       29         Hornsea Project Three<br>Construction Noise Impact Magnitude Boundariess<br>Trenched Cable Installation<br>Sheet 2         Doc no: RPS-9337-0470-12<br>Created by: CR<br>Checked by: SS<br>Approved by:SS       CPCS       Or start  |            |  |
| Reference System : OSGB36       Scale@A3:1:30,0         Projection : BNG       Vertical reference         0       0.5       1 Kilometers         Image: Strategy of the strat         |            |  |
| Reference System : OSGB36       Scale@A3:1:30,0         Projection : BNG       Vertical reference         0       0.5       1 Kilometers         Image: Strategy of the strat         |            |  |
| Reference System : OSGB36       Scale@A3:1:30,0         Projection : BNG       Vertical reference         0       0.5       1 Kilometers         Image: State of the state o         |            |  |
| Reference System : OSGB36       Scale@A3:1:30,0         Projection : BNG       Vertical reference         0       0.5       1 Kilometers         Image: Structure of the structure of th         |            |  |
| Reference System : OSGB36       Scale@A3:1:30,0         Projection : BNG       Vertical reference         0       0.5       1 Kilometers         Image: State of the state o         |            |  |
| 0       0.5       1 Kilometers         REV       REMARK       D         00       Initial Issue       29         00       Construction Noise Impact Magnitude Boundaries         Trenched Cable Installation       Sheet 2         Doc no: RPS-9337-0470-12       Created by: CR         Checked by: SS       RPS  | 30,000     | Reference System : OSGB36 Scale@A3:1:30,000<br>Projection : BNG Vertical reference: New                                |
| REV     REMARK     D       00     Initial Issue     29       Hornsea Project Three<br>Construction Noise Impact Magnitude Boundaries<br>Trenched Cable Installation<br>Sheet 2       Doc no: RPS-9337-0470-12<br>Created by: CR<br>Checked by: SS     Dress       Openal     Openal   |            | 0 0.5 1 Kilometers   |
| 00     Initial Issue     29       Hornsea Project Three       Construction Noise Impact Magnitude Boundaries       Trenched Cable Installation       Sheet 2       Doc no: RPS-9337-0470-12       Created by: CR       Checked by: SS       Approved by: SS   | DATE       | REV REMARK DATE  |
| Hornsea Project Three<br>Construction Noise Impact Magnitude Boundaries<br>Trenched Cable Installation<br>Sheet 2<br>Doc no: RPS-9337-0470-12<br>Created by: CR<br>Checked by: SS<br>Approved by:SS   | 29/03/2018 | 00 Initial Issue 29/03/201   |
| Hornsea Project Three<br>Construction Noise Impact Magnitude Boundaries<br>Trenched Cable Installation<br>Sheet 2   |            |  |
| Doc no: RPS-8337-0470-12<br>Created by: CR<br>Checked by: SS<br>Approved by:SS<br>Checked by: SS  | ies - Day  | Hornsea Project Three<br>Construction Noise Impact Magnitude Boundaries - Da<br>Trenched Cable Installation<br>Sheet 2 |
|   | rsted      | Doc no: RPS-9337-0470-12<br>Created by: CR<br>Checked by: SS<br>Approved by:SS   |







Figure 1.1: Construction noise impact magnitude boundaries – day – trenched cable installation.



| 4000         |  | rrisea Three onshore cab<br>rridor   | le                   |  |  |  |  |
|--------------|--|--|----------------------|--|--|--|--|
| 33           | Co   | Compound<br>Storage Area   |                      |  |  |  |  |
|              | Pe Or  | nshore HVAC booster stati<br>rmanent   | on -                 |  |  |  |  |
| 00           | Or<br>Te   | ishore HVAC booster stati<br>mporary   | on -                 |  |  |  |  |
| 3330         | 1k   | m study area - operation   |                      |  |  |  |  |
|              | 1k   | m study area - constructio   | n                    |  |  |  |  |
|              | Impact   | Magnitude Bands<br>ajor : 0 - 12 m   |                      |  |  |  |  |
|              | Mo   | oderate : >12 - 29 m   |                      |  |  |  |  |
| 2000         | Mi   | nor : >29 - 47 m   |                      |  |  |  |  |
| 33.          | Ne   | gligible : >47 m   |                      |  |  |  |  |
|              |  |  |                      |  |  |  |  |
|              |  |  |                      |  |  |  |  |
|              |  |  |                      |  |  |  |  |
| 2            |  |  |                      |  |  |  |  |
| 3100         |  |  |                      |  |  |  |  |
| . <b>.</b> ว |  |  |                      |  |  |  |  |
|              |  |  |                      |  |  |  |  |
|              |  |  |                      |  |  |  |  |
|              |  |  |                      |  |  |  |  |
| 00           |  |  |                      |  |  |  |  |
| 330(         | Reference Sy<br>Projection : E                     | ystem : OSGB36 Scale@A3:1:3<br>BNG Vertical referen  | 0,000<br>nce: Newlyn |  |  |  |  |
|              | 0  | 0.5 1 Kilometers   |                      |  |  |  |  |
|              | REV  | REMARK   | DATE                 |  |  |  |  |
|              | 00   | Initial Issue  | 29/03/2018           |  |  |  |  |
| 2            |  |  |                      |  |  |  |  |
| 3290(        | Constructi   | Hornsea Project Three<br>on Noise Impact Magnitude Boundar<br>Trenched Cable Installation<br>Sheet 3 | ies - Day            |  |  |  |  |
|              | Doc no: RPS-93                                     | 337-0470-12  |                      |  |  |  |  |
|              | Created by: CR<br>Checked by: SS<br>Approved by:SS | RPS 🗢  | sted                 |  |  |  |  |
|              |  |  |                      |  |  |  |  |







Figure 1.1: Construction noise impact magnitude boundaries – day – trenched cable installation.



|       |   | ornsea Three<br>rridor                                    | onshore cab  | le                    |
|-------|---|---|--|-----------------------|
| 29000 | Co  | ompound<br>orage Area                                     |  |                       |
| ň     | 1k  | m study area  | - constructio  | on                    |
|       | Impact  | Magnitude E   | Bands  |                       |
|       |   | ajor : 0 - 12 m   | 1  |                       |
| _     |   | oderate : >12   | - 29 m   |                       |
| auur  | Mi Mi   | nor : >29 - 47  | 'n   |                       |
| 32    | Ne  | gligible : >47  | m  |                       |
|       | <mark>○</mark> Re<br>ba   | esidential prop<br>nds                                    | perties withir   | impact                |
|       |   |   |  |                       |
| 000/  |   |   |  |                       |
| 32    |   |   |  |                       |
|       |   |   |  |                       |
|       |   |   |  |                       |
|       |   |   |  |                       |
| 20    |   |   |  |                       |
| 3200  |   |   |  |                       |
|       |   |   |  |                       |
|       |   |   |  |                       |
|       |   |   |  |                       |
| nnnez | Reference S<br>Projection : E<br>0                                  | ystem : OSGB36<br>8NG<br>0.5                              | Scale@A3:1:3<br>Vertical refere<br>1 Kilometers          | 30,000<br>nce: Newlyn |
| ñ     |   |   |  |                       |
|       | REV 00  | REMARK<br>Initial Issue                                   |  | DATE<br>29/03/2018    |
|       |   |   |  |                       |
| 24000 | Constructi  | Hornsea Pro<br>on Noise Impact M<br>Trenched Cabl<br>Shee | oject Three<br>agnitude Bounda<br>e Installation<br>et 4 | ries - Day            |
| ·)    | Doc no: RPS-9<br>Created by: CR<br>Checked by: SS<br>Approved by:SS | 337-0470-12<br>5<br>5                                     | RPS 🕐  | rsted                 |







Figure 1.1: Construction noise impact magnitude boundaries – day – trenched cable installation.



| 2      |  |  |                      |
|--------|--|--|----------------------|
| 32400  |  | ornsea Three onshore cab<br>rridor   | le                   |
|        | Co<br>St   | ompound<br>orage Area  |                      |
|        |  | matudu araa sanatrustia  |                      |
|        | L IK   |  |                      |
| 323000 | Impact Ma  | Magnitude Bands<br>ajor : 0 - 12 m   |                      |
| 8      | Mc   | oderate : >12 - 29 m   |                      |
|        | Mi   | nor : >29 - 47 m   |                      |
|        | Ne   | aliaible : >47 m   |                      |
|        | Re   | sidential properties within  | impact               |
| 322000 | ba   | nds  | Inpact               |
|        |  |  |                      |
|        |  |  |                      |
|        |  |  |                      |
| 20     |  |  |                      |
| 3210   |  |  |                      |
| 0.00   |  |  |                      |
|        |  |  |                      |
|        |  |  |                      |
|        |  |  |                      |
| 20000  |  |  |                      |
|        | Reference S<br>Projection : E<br>0                 | ystem : OSGB36 Scale@A3:1:3<br>NG Vertical refere<br>0.5 1 Kilometers                                | 0,000<br>nce: Newlyn |
|        | REV  | REMARK   | DATE                 |
| 8      | 00   | Initial Issue  | 29/03/2018           |
| 3190   |  |  |                      |
|        | Constructi   | Hornsea Project Three<br>on Noise Impact Magnitude Boundar<br>Trenched Cable Installation<br>Sheet 5 | ies - Day            |
| 2      | Doc no: RPS-9                                      | 337-0470-12  |                      |
|        | Created by: CR<br>Checked by: SS<br>Approved by:SS | RPS 🕐  | rsted                |







Figure 1.1: Construction noise impact magnitude boundaries – day – trenched cable installation.



| 1   |   |  | 1                    |  |  |  |
|---|---|--|----------------------|--|--|--|
|   |   | ornsea Three onshore cab<br>rridor                 | le                   |  |  |  |
|   | St.   | orage Area   |                      |  |  |  |
| 8000  | 1k  | m study area - constructio                         | n                    |  |  |  |
| S   | Impact  | Magnitude Bands                                    |                      |  |  |  |
|   | Ma Ma   | ajor : 0 - 12 m                                    |                      |  |  |  |
|   | Mo  | oderate : >12 - 29 m                               |                      |  |  |  |
|   | Minor : >29 - 47 m  |  |                      |  |  |  |
| 2   | Negligible : >47 m  |  |                      |  |  |  |
| 31/0  | <ul> <li>Residential properties within impact<br/>bands</li> </ul>  |  |                      |  |  |  |
|   |   |  |                      |  |  |  |
|   |   |  |                      |  |  |  |
| 0000  |   |  |                      |  |  |  |
| 315   |   |  |                      |  |  |  |
|   |   |  |                      |  |  |  |
|   |   |  |                      |  |  |  |
|   |   |  |                      |  |  |  |
| 000   |   |  |                      |  |  |  |
| 31.01   |   |  |                      |  |  |  |
|   |   |  |                      |  |  |  |
|   |   |  |                      |  |  |  |
|   | Reference S<br>Projection : E                                       | ystem : OSGB36 Scale@A3:1:3<br>BNG Vertical refere | 0,000<br>nce: Newlyn |  |  |  |
| 14000   | 0<br>   | 0.5 1 Kilometers                                   |                      |  |  |  |
| ·)  | REV   | REMARK   | DATE                 |  |  |  |
|   | 00  | Initial Issue                                      | 29/03/2018           |  |  |  |
|   |   |  |                      |  |  |  |
| Hornsea Project Three<br>Construction Noise Impact Magnitude Boundaries<br>Trenched Cable Installation<br>Sheet 6 |   |  |                      |  |  |  |
| 370   | Doc no: RPS-9<br>Created by: CR<br>Checked by: St<br>Approved by:St | 337-0470-12<br>S RPS 0                             | rsted                |  |  |  |







Figure 1.1: Construction noise impact magnitude boundaries – day – trenched cable installation.



| 313000 |  | ornsea Three ons<br>rridor   | shore cabl                                   | e                    |
|--------|--|--|--|----------------------|
|        | Co   | mpound   |  |                      |
|        | Sto  | orage Area   |  |                      |
|        | 1k   | m study area - c   | onstructio                                   | n                    |
| 000    | Impact<br>Ma   | Magnitude Ban<br>ajor : 0 - 12 m   | ds   |                      |
| 312    |  | derate : >12 - 2   | 9 m  |                      |
|        |  | nor: >29 47 m  |  |                      |
|        |  | 101 : 23 - 47 m  |  |                      |
|        | Ne   | egligible : >47 m  |  |                      |
| 311000 |  |  |  |                      |
|        |  |  |  |                      |
| 310000 |  |  |  |                      |
| 309000 |  |  |  |                      |
|        | Reference Sy<br>Projection : E<br>0                                  | ystem : OSGB36<br>ING<br>0.5 1 Kil                                       | Scale@A3:1:30<br>Vertical referen<br>ometers | 0,000<br>ice: Newlyn |
| 8      | REV  | REMARK   |  | DATE                 |
|        | 00   | Initial Issue  |  | 29/03/2018           |
| 800    |  |  |  |                      |
| 30     | Constructi   | Hornsea Projec<br>on Noise Impact Magni<br>Trenched Cable Ins<br>Sheet 7 | t Three<br>tude Boundari<br>stallation       | es - Day             |
|        | Doc no: RPS-93<br>Created by: CR<br>Checked by: SS<br>Approved by:SS | 337-0470-12  | RPS Or                                       | sted                 |







Figure 1.1: Construction noise impact magnitude boundaries – day – trenched cable installation.



|      | Ho  | rnsea Three onshore ca                                   | ble           |
|------|---|--|---------------|
|      | CO CO   | rridor   |               |
|      | Co  | ompound  |               |
|      | Ste   | orage Area   |               |
| 00   | 1k  | m study area - operation                                 | e<br>L        |
| 30/1 | 1k  | m study area - construct                                 | ion           |
|      | Impact  | Magnitude Bands  |               |
|      | Ma  | ajor : 0 - 12 m  |               |
|      | M   | oderate : >12 - 29 m                                     |               |
|      | Mi  | nor · >29 - 47 m   |               |
| 00   |   | aligible : >47 m   |               |
| 3000 |   |  |               |
|      | o Re<br>ba  | sidential properties with<br>nds                         | in impact     |
|      |   |  |               |
|      |   |  |               |
| _    |   |  |               |
| 2000 |   |  |               |
| 20   |   |  |               |
|      |   |  |               |
|      |   |  |               |
|      |   |  |               |
| 2    |   |  |               |
| 0400 |   |  |               |
| ที   |   |  |               |
|      | Pafaranaa   | Intern : OSCE26  | 1/20.000      |
|      | Projection : E  | NG Vertical refe   | rence: Newlyn |
|      | 0<br>L  | 0.5 1 Kilometers   |               |
| 3    |   | BEMARK   | DATE          |
| 030  | 00  | Initial Issue  | 29/03/2018    |
| n    |   |  |               |
|      |   |  |               |
|      | Constructi  | Hornsea Project Three<br>on Noise Impact Magnitude Bound | aries - Day   |
|      |   | Trenched Cable Installation<br>Sheet 8                   |               |
| 5    |   |  | I             |
| -    | Doc no: RPS-9   | 337-0470-12  |               |
| 0700 | Doc no: RPS-93<br>Created by: CR<br>Checked by: SS<br>Approved by: SS | 337-0470-12  | Drsted        |







Figure 1.1: Construction noise impact magnitude boundaries – day – trenched cable installation.



| 1       |   |   |   |                           |
|---------|---|---|---|---------------------------|
|         |   | ornsea Three<br>rridor  | onshore ca  | ble                       |
|         | Co<br>Ste   | ompound<br>orage Area   |   |                           |
| 202000  | Or<br>su<br>Or<br>su  | nshore HVDC<br>bstation - Pe<br>nshore HVDC<br>bstation - Ter | C converter/l<br>rmanent<br>C converter/l<br>mporary        | HVAC<br>HVAC              |
|         | 1k  | m study area  | a - operation   |                           |
|         | 1k  | m study area  | a - construct   | ion                       |
| 000     | Impact  | <b>Magnitude</b> I<br>ajor : 0 - 12 n                         | Bands   |                           |
| 3040    | Mo  | oderate : >12   | 2 - 29 m  |                           |
|         | Mi  | nor : >29 - 4   | 7 m   |                           |
|         | Ne  | gligible : >47  | 7 m   |                           |
| 303000  | ● Re<br>ba  | sidential pro<br>nds  | perties with  | n impact                  |
| 30,2000 |   |   |   |                           |
|         | Reference S<br>Projection : E<br>0                                  | ystem : OSGB36<br>3NG<br>0.5                                  | Scale@A3:<br>Vertical refe<br>1 Kilometers                  | I:30,000<br>rence: Newlyn |
| 3       | REV   | REMARK  |   | DATE                      |
| 3010    | 00  | Initial Issue   |   | 29/03/2018                |
|         | Constructi  | Hornsea Pr<br>on Noise Impact M<br>Trenched Cat<br>She        | oject Three<br>/lagnitude Bound<br>ole Installation<br>et 9 | aries - Day               |
|         | Doc no: RPS-9<br>Created by: CR<br>Checked by: SS<br>Approved by:SS | 337-0470-12<br>5<br>5   | RPS C   | Orsted                    |







Figure 1.2: Construction noise impact magnitude boundaries – day – HDD trenchless technology crossings. (excluding landfall – see Figures 1.5 and 1.6)



| 345000 |  | ornsea Thre<br>rridor                                 | e onshore o  | cable                          |
|--------|--|---|--|--------------------------------|
|        | K HC   | D (except l   | andfall)   |                                |
|        | HC   | D compou  | nd   |                                |
|        | Sto  | orage area  | related to H   | IDD                            |
| 1000   | 1k   | m study are   | a - constru  | ction                          |
| 344    | Impact<br>Ma   | <b>Magnitude</b><br>ajor : 0 - 39                     | Bands<br>m   |                                |
|        |  | -<br>oderate : >3                                     | 9 - 97 m   |                                |
|        | Mi   | nor : >97 - 1   | 154 m  |                                |
| 0      | Ne   | gligible : >1   | 54 m   |                                |
| 34300  | • Re<br>ba   | sidential pr<br>nds                                   | operties wit   | thin impact                    |
| 342000 |  |   |  |                                |
| 341000 |  |   |  |                                |
|        | Reference Sy<br>Projection : E<br>0                                  | vstem : OSGB36<br>NG<br>0.5                           | Scale@A<br>Vertical n<br>1 Kilometers                    | 3:1:30,000<br>eference: Newlyn |
|        | REV  | REMARK  |  | DATE                           |
| 000    | 00   | Initial Issue   |  | 06/03/2018                     |
| 340    |  |   |  |                                |
|        | Constructi<br>HI   | Hornsea F<br>on Noise Impact<br>DD Trenchless T<br>Sh | roject Three<br>Magnitude Bou<br>echnology Cros<br>eet 1 | ndaries - Day<br>sings         |
|        | Doc no: RPS-93<br>Created by: CR<br>Checked by: SS<br>Approved by:SS | 337-0476-08<br>5<br>5                                 | RPS  | Orsted                         |





Figure 1.2: Construction noise impact magnitude boundaries – day – HDD trenchless technology crossings.

|                             |  | rnson Thron onshoro cak   |  |
|-----------------------------|--|---|--|
|                             | 00   | rridor  | ble  |
|                             |  | D (except landfall)   |  |
| 0                           | HC   | D compound  |  |
| 3900(                       | Ste  | orage area related to HDI   | c  |
| ઌ૽                          | 1k   | m study area - operation  |  |
|                             | 1k   | m study area - constructio  | on   |
|                             | Imnact   | Magnitude Bande   |  |
|                             | Ma   | ajor : 0 - 39 m   |  |
| 000                         |  | oderate : >39 - 97 m  |  |
| 338(                        |  | nor : >97 - 154 m   |  |
|                             |  | aligible : >154 m   |  |
|                             |  | gligible : >154 m   |  |
|                             | e ba   | nds   | 1 Impact   |
| 0                           |  |   |  |
| 3700(                       |  |   |  |
| ઌૻ                          |  |   |  |
|                             |  |   |  |
|                             |  |   |  |
|                             |  |   |  |
|                             |  |   |  |
| 000                         |  |   |  |
| 336000                      |  |   |  |
| 336000                      |  |   |  |
| 336000                      | Reference St   | /stem : OSGB36 Scale@A3:1:  | 30.000   |
| 336000                      | Reference S)<br>Projection : E   | /stem : OSGB36 Scale@A3:1:<br>ING Vertical refere   | 30,000<br>ance: Newlyn   |
| 0 336000                    | Reference Sy<br>Projection : E<br>0  | ystem : OSGB36 Scale@A3:1:<br>NG Vertical refere<br>0.5 1 Kilometers  | 30,000<br>ance: Newlyn   |
| 35000 336000                | Reference Sy<br>Projection : E<br>0<br>REV   | ystem : OSGB36 Scale@A3:1:<br>ING Vertical refere<br>0.5 1 Kilometers   | 30,000<br>ance: Newlyn   |
| 335000 336000               | Reference Sy<br>Projection : E<br>0<br><br>REV<br>00   | ystem : OSGB36 Scale@A3:1:<br>ING Vertical refere<br>0.5 1 Kilometers<br>REMARK   | 30,000<br>ance: Newlyn<br>DATE<br>06/03/2018                     |
| 335000 336000               | Reference Sy<br>Projection : E<br>0<br>REV<br>00   | ystem : OSGB36 Scale@A3:1:<br>NG Vertical refere<br>0.5 1 Kilometers<br>REMARK<br>Initial Issue   | 30,000<br>ance: Newlyn<br>DATE<br>06/03/2018                     |
| 335000 336000               | Reference Sy<br>Projection : E<br>0<br>REV<br>00   | vstem : OSGB36 Scale@A3:1:<br>NG Vertical refere<br>0.5 1 Kilometers<br>REMARK<br>Initial Issue   | 30,000<br>ance: Newlyn<br>DATE<br>06/03/2018                     |
| 335000 336000               | Reference Sy<br>Projection : E<br>0<br>REV<br>00<br>Constructio  | /stem : OSGB36 Scale@A3:1:<br>NG Vertical refere<br>0.5 1 Kilometers<br>REMARK<br>Initial Issue<br>Hornsea Project Three<br>on Noise Impact Magnitude Bounda  | 30,000<br>ence: Newlyn<br>DATE<br>06/03/2018<br>rries - Day      |
| 335000 336000               | Reference Sy<br>Projection : E<br>0<br>  | ystem : OSGB36 Scale@A3:1:<br>NG Vertical refere<br>0.5 1 Kilometers<br>REMARK<br>Initial Issue<br>Hornsea Project Three<br>on Noise Impact Magnitude Bounda<br>DD Trenchless Technology Crossing<br>Sheet 2                | 30,000<br>nnce: Newlyn<br>DATE<br>06/03/2018<br>cies - Day<br>s  |
| 335000 335000 336000        | Reference Sy<br>Projection : E<br>0<br>REV<br>00<br>Construction<br>HI                                     | rstem : OSGB36 Scale@A3:1:<br>NG Vertical refere<br>0.5 1 Kilometers<br>REMARK<br>Initial Issue<br>Hornsea Project Three<br>on Noise Impact Magnitude Bounda<br>DD Trenchless Technology Crossing<br>Sheet 2                | 30,000<br>ence: Newlyn<br>DATE<br>06/03/2018<br>ries - Day<br>IS |
| 334000 335000 335000 336000 | Reference Sy<br>Projection : E<br>0<br>REV<br>00<br>Construction<br>HI<br>Doc no: RPS-93<br>Created by: SS | rstem : OSGB36 Scale@A3:1:<br>NG Vertical refere<br>0.5 1 Kilometers<br>REMARK<br>Initial Issue<br>Hornsea Project Three<br>on Noise Impact Magnitude Bounda<br>DD Trenchless Technology Crossing<br>Sheet 2<br>137-0476-08 | 30,000<br>ance: Newlyn<br>DATE<br>06/03/2018<br>ries - Day<br>s  |







Figure 1.2: Construction noise impact magnitude boundaries – day – HDD trenchless technology crossings.



| 000000000000000000000000000000000000   |        |  |  |  |                  |
|--|--------|--|--|--|------------------|
| 80       WDD (except landfall)         Image: HDD compound         Image: Storage area related to HDD         Image: Onshore HVAC booster station - Permanent         Image: Onshore HVAC booster station - Temporary         Image: Temporary         Image: Temporary         Image: Magnitude Bands         Major : 0 - 39 m         Moderate : >39 - 97 m         Minor : >97 - 154 m         Negligible : >154 m         Negligible : >154 m         Residential properties within impact bands         Projection : BNG         Vertical reference: Newlyn         Image: Temporary         Image: Temporary         Noterate: Date: Scale@A3:1:30.000         Vertical reference: Newlyn         Image: Temporary  | 4000   |  | rnsea Three ons<br>rridor  | hore cable                                       | )                |
| 0000       When the second secon | с<br>С | 🕅 НС   | D (except landfa   | all)   |                  |
| 000000000000000000000000000000000000   |        | HC   | D compound   |  |                  |
| 000000000000000000000000000000000000   |        | Sto  | orage area relate  | ed to HDD  |                  |
| 000000000000000000000000000000000000   | 000    |  | shore HVAC boo<br>rmanent  | oster statio                                     | n -              |
| 000000000000000000000000000000000000   | 333(   | Te   | mporary  |  | n -              |
| 0000       Ikm study area - construction         Impact Magnitude Bands         Major : 0 - 39 m         Moderate : >39 - 97 m         Minor : >97 - 154 m         Negligible : >154 m         Negligible : >154 m         Residential properties within impact bands         Projection : BNG         Scale@A3:1:30,000         Projection : BNG         Vertical reference: Newlyn         0       0.5         1 <kilometers< td="">         REV       REMARK         001       Initial Issue         002       Hornsea Project Three         Construction Noise Impact Magnitude Boundaries - Day HDD Trenchless Technology Crossings Sheet 3         Doc no: RPS-9337-0476-08         Created by: SS         Approved by: SS</kilometers<>   |        | 1k   | m study area - o <sub>l</sub>  | peration   |                  |
| Impact Magnitude Bands         Major: 0 - 39 m         Moderate: >39 - 97 m         Minor: >97 - 154 m         Negligible: >154 m         Residential properties within impact bands         Noderate: >0000         Reference System: OSGB36         Scale@A3:1:30.000         Projection: BNG         Notice Reference: Newlyn         0       0.5         1         Kilometers         REV       REMARK         00       initial issue         00       initial issue         00       initial issue         00       Hornsea Project Three         Construction Noise Impact Magnitude Boundaries - Day         HDD Trenchless Technology Crossings<br>Sheet 3         Doc m: RPS-9937-0476-08<br>Created by: CR<br>Checked by: SS   |        | 1k   | m study area - co  | onstruction                                      |                  |
| 000000000000000000000000000000000000   |        | Impact   | Magnitude Ban  | ds   |                  |
| 000000000000000000000000000000000000   | 00     | Ma Ma  | ajor : 0 - 39 m  |  |                  |
| 000000000000000000000000000000000000   | 3320(  | Mc   | oderate : >39 - 97   | 7 m  |                  |
| 000000000000000000000000000000000000   |        | Mi   | nor : >97 - 154 m  | ı  |                  |
| Residential properties within impact bands         Reference System: OSGB36         Projection: BNG         0       0.5         1         Kilometers         REV         REMARK         0         1         Kilometers         REV         REV </td <td></td> <td>Ne</td> <td>gligible : &gt;154 m</td> <td>1</td> <td></td>   |        | Ne   | gligible : >154 m  | 1  |                  |
| 000000000000000000000000000000000000   |        | Re   | sidential propert  | ies within i                                     | mpact            |
| 000000000000000000000000000000000000   |        | ba   | nds  |  |                  |
| Reference System : OSGB36       Scale@A3:1:30,000         Projection : BNG       Vertical reference: Newlyn         0       0.5       1 Kilometers         Imitial Issue       06/03/2018         Hornsea Project Three         Construction Noise Impact Magnitude Boundaries - Day         HDD Trenchless Technology Crossings         Sheet 3         Doc no: RPS-9337-0476-08         Created by: SR         Approved by: SS   | 000    |  |  |  |                  |
| Reference System : OSGB36       Scale@A3:1:30,000         Projection : BNG       Vertical reference: Newlyn         0       0.5       1 Kilometers         Image: State  | 331    |  |  |  |                  |
| Reference System : OSGB36       Scale@A3:1:30,000         Projection : BNG       Vertical reference: Newlyn         0       0.5       1 Kilometers   |        |  |  |  |                  |
| Reference System : OSGB36       Scale@A3:1:30,000         Projection : BNG       Vertical reference: Newlyn         0       0.5       1 Kilometers         Image: State of the state of t  |        |  |  |  |                  |
| Reference System : OSGB36       Scale@A3:1:30,000         Projection : BNG       Vertical reference: Newlyn         0       0.5       1 Kilometers         Image: State  |        |  |  |  |                  |
| Reference System : OSGB36<br>Projection : BNG       Scale@A3:1:30,000<br>Vertical reference: Newlyn         0       0.5       1 Kilometers         Image: State of the state o   |        |  |  |  |                  |
| Reference System : OSGB36       Scale@A3:1:30,000         Projection : BNG       Vertical reference: Newlyn         0       0.5       1 Kilometers         REV       REMARK       DATE         00       Initial Issue       06/03/2018         00       Stepson Construction Noise Impact Magnitude Boundaries - Day HDD Trenchless Technology Crossings Sheet 3         Doc no: RPS-9337-0476-08 Created by: CR Checked by: SS Approved by:SS       CMESS   | 0      |  |  |  |                  |
| 0       0.5       1 Kilometers         REV       REMARK       DATE         00       Initial Issue       06/03/2018         00       Initial Issue       06/03/2018         Hornsea Project Three<br>Construction Noise Impact Magnitude Boundaries - Day<br>HDD Trenchless Technology Crossings<br>Sheet 3       Doc no: RPS-9337-0476-08<br>Created by: CR<br>Checked by: SS<br>Approved by: SS   | 33000  | Reference Sy<br>Projection : E                                       | vstem : OSGB36<br>NG   | Scale@A3:1:30,<br>Vertical referenc              | 000<br>e: Newlyn |
| REV     REMARK     DATE       00     Initial Issue     06/03/2018       Hornsea Project Three       Construction Noise Impact Magnitude Boundaries - Day       HDD Trenchless Technology Crossings       Sheet 3       Doc no: RPS-9337-0476-08       Created by: CR       Checked by: SS       Approved by:SS   |        | 0<br>  | 0.5 1 Kile   | ometers  |                  |
| 00     Initial Issue     06/03/2018       Hornsea Project Three<br>Construction Noise Impact Magnitude Boundaries - Day<br>HDD Trenchless Technology Crossings<br>Sheet 3       Doc no: RPS-9337-0476-08<br>Created by: CR<br>Checked by: SS<br>Approved by:SS     CPS   |        | REV  | REMARK   | 1  | DATE             |
| Hornsea Project Three<br>Construction Noise Impact Magnitude Boundaries - Day<br>HDD Trenchless Technology Crossings<br>Sheet 3<br>Doc no: RPS-9337-0476-08<br>Created by: CR<br>Checked by: SS<br>Approved by:SS  |        | 00   | Initial Issue  | 0  | 6/03/2018        |
| Hornsea Project Three<br>Construction Noise Impact Magnitude Boundaries - Day<br>HDD Trenchless Technology Crossings<br>Sheet 3<br>Doc no: RPS-9337-0476-08<br>Created by: CR<br>Checked by: SS<br>Approved by:SS  | 0      |  |  |  |                  |
| Doc no: RPS-9337-0476-08<br>Created by: CR<br>Checked by: SS<br>Approved by:SS<br>RPS Orsted   | 3290(  | Constructi<br>HI   | Hornsea Project<br>on Noise Impact Magnit<br>DD Trenchless Technolo<br>Sheet 3 | t <b>Three</b><br>ude Boundarie<br>ogy Crossings | s - Day          |
|  |        | Doc no: RPS-93<br>Created by: CR<br>Checked by: SS<br>Approved by:SS | 337-0476-08  | PS Ors   | ted              |







Figure 1.2: Construction noise impact magnitude boundaries – day – HDD trenchless technology crossings.







Figure 1.2: Construction noise impact magnitude boundaries – day – HDD trenchless technology crossing.







Figure 1.2: Construction noise impact magnitude boundaries – day – HDD trenchless technology crossings.



|        |  | ornsea Three<br>rridor  | onshore cab   | le                   |
|--------|--|---|---|----------------------|
| ~      | HE   | D (except la  | ndfall)   |                      |
| 8000   | HC   | D compound  | ł   |                      |
| 31     | Sto  | orage area re   | lated to HDD  | )                    |
|        | 1k   | m study area  | - constructio   | n                    |
|        | Impact   | Magnitude E   | Bands   |                      |
|        | C Ma   | ajor : 0 - 39 m   | i -   |                      |
| 000    | Mo   | oderate : >39   | - 97 m  |                      |
| 3170   | Mi   | nor : >97 - 15  | 64 m  |                      |
|        | Ne   | gligible : >15  | 4 m   |                      |
|        | • Re<br>ba   | esidential prop<br>nds  | perties within  | impact               |
| 316000 |  |   |   |                      |
| 315000 |  |   |   |                      |
| 4000   | Reference Sy<br>Projection : E<br>0                                  | ystem : OSGB36<br>ING<br>0.5                                  | Scale@A3:1:3<br>Vertical refere<br>1 Kilometers             | 0,000<br>nce: Newlyn |
| 'n     | REV  | REMARK  |   | DATE                 |
|        | 00   | Initial Issue   |   | 06/03/2018           |
|        |  |   |   |                      |
| 3000   | Constructi<br>H  | Hornsea Pro<br>on Noise Impact M<br>DD Trenchless Tec<br>Shee | oject Three<br>agnitude Boundar<br>hnology Crossing<br>et 6 | ies - Day<br>s       |
| 313    | Doc no: RPS-9:<br>Created by: CR<br>Checked by: SS<br>Approved by:SS | 337-0476-08<br>S  | RPS O   | rsted                |







Figure 1.2: Construction noise impact magnitude boundaries – day – HDD trenchless technology crossings.



|                         | — Ho  | ornsea Three onshore   | e cable  |
|-------------------------|---|--|--|
| 313                     |   | rridor   |  |
|                         | K HC  | DD (except landfall)   |  |
|                         | HC  | D compound   |  |
|                         | Sto   | orage area related to  | HDD  |
| 0                       | 1k  | m study area - const   | ruction  |
| 11200                   | Impact  | Magnitude Bands  |  |
| (T)                     | Ma  | ajor : 0 - 39 m  |  |
|                         | Mc  | oderate : >39 - 97 m   |  |
|                         | Mi  | nor : >97 - 154 m  |  |
|                         | Ne  | aligible · >154 m  |  |
| 000                     | Re  | sidential properties v   | within impact  |
| 311                     | ba  | nds  | Munin Impact   |
|                         |   |  |  |
|                         |   |  |  |
|                         |   |  |  |
|                         |   |  |  |
| 0                       |   |  |  |
| 310000                  |   |  |  |
| 310000                  |   |  |  |
| 310000                  |   |  |  |
| 310000                  |   |  |  |
| 310000                  |   |  |  |
| 000 310000              |   |  |  |
| 309000 310000           | Reference S<br>Projection : E   | ystem : OSGB36 Scale<br>SNG Vertic   | @A3:1:30,000<br>al reference: Newlyn   |
| 309000 310000           | Reference S<br>Projection : E   | ystem : OSGB36 Scale<br>NG Vertic<br>0.5 1 Kilometer   | @A3:1:30,000<br>al reference: Newlyn<br>s  |
| 309000 310000           | Reference S<br>Projection : E<br>0<br>REV   | ystem : OSGB36 Scale<br>SNG Vertic<br>0.5 1 Kilometer  | @A3:1:30,000<br>al reference: Newlyn<br>s<br>DATE  |
| 00 309000 310000 310000 | Reference S<br>Projection : E<br>0<br>  | ystem : OSGB36 Scale<br>NG Vertic<br>0.5 1 Kilometer<br>REMARK<br>Initial Issue  | @A3:1:30,000<br>al reference: Newlyn<br>s<br>DATE<br>06/03/2018                                      |
| 310000 309000 310000    | Reference Sp<br>Projection : E<br>0<br>   | ystem : OSGB36 Scale<br>SNG Vertic<br>0.5 1 Kilometer<br>REMARK<br>Initial Issue   | @A3:1:30,000<br>al reference: Newlyn<br>s<br>DATE<br>06/03/2018                                      |
| 308000 309000 310000    | Reference S<br>Projection : E<br>0<br>  | ystem : OSGB36 Scale<br>SNG Vertic<br>0.5 1 Kilometer<br>REMARK<br>Initial Issue<br>Hornsea Project Thro<br>on Noise Impact Magnitude B<br>DD Trenchless Technology Cr<br>Sheet 7                | @A3:1:30,000<br>al reference: Newlyn<br>s<br>DATE<br>06/03/2018<br>Cee<br>oundaries - Day<br>ossings |
| 308000 309000 310000    | Reference S:<br>Projection : E<br>0<br>REV<br>00<br>Constructi<br>H<br>Doc no: RPS-9:<br>Constructi | vstem : OSGB36 Scale<br>SNG Vertic<br>0.5 1 Kilometer<br>REMARK<br>Initial Issue<br>Hornsea Project Thru<br>on Noise Impact Magnitude B<br>DD Trenchless Technology Cr<br>Sheet 7<br>337-0476-08 | @A3:1:30,000<br>al reference: Newlyn<br>s<br>DATE<br>06/03/2018<br>coundaries - Day<br>rossings      |







Figure 1.2: Construction noise impact magnitude boundaries – day – HDD trenchless technology crossings.

|      |                  | rnsea Three or<br>rridor  | ishore cab                                    | e           |
|------|------------------|---|---|-------------|
|      | 🕅 НС             | D (except land  | fall)   |             |
|      | НС               | D compound  |   |             |
| 00   | Sto              | orage area rela   | ted to HDD                                    |             |
| 3070 | 1k               | m studv area -  | operation                                     |             |
|      |                  | m study area -  | constructio                                   | n           |
|      | Impact           | Magnitudo Ba  | nde   |             |
|      |                  | nior: 0 - 39 m  | nus   |             |
| ~    |                  | oderate : >39 - 9   | 97 m  |             |
| 6000 |                  | nor: >97 154  | m   |             |
| 30   |                  | aliaible : >154   |   |             |
|      |                  |   |   |             |
|      | e ba             | sidential prope   | rties within                                  | impact      |
|      |                  |   |   |             |
| 00   |                  |   |   |             |
| 3050 |                  |   |   |             |
|      |                  |   |   |             |
|      |                  |   |   |             |
|      |                  |   |   |             |
| ~    |                  |   |   |             |
| 4000 |                  |   |   |             |
| 30   |                  |   |   |             |
|      |                  |   |   |             |
|      | Projection : E   | NG  | Vertical referen                              | nce: Newlyn |
|      | 0                | 0.5 11  | Kilometers                                    |             |
| 00   | REV              | REMARK  |   | DATE        |
| 3030 | 00               | Initial Issue   |   | 06/03/2018  |
|      |                  |   |   |             |
|      | Constructi<br>HI | Hornsea Proje<br>on Noise Impact Mag<br>DD Trenchless Techno<br>Sheet 8 | ct Three<br>nitude Boundar<br>blogy Crossings | es - Day    |
| 00   | Doc no: RPS-93   | 337-0476-08   | _   |             |
| õ    | Created by: CR   |   |   |             |







Figure 1.2: Construction noise impact magnitude boundaries – day – HDD trenchless technology crossings.









Figure 1.3: Construction noise impact magnitude boundaries – day – access construction.



| 345000 |                                  | ornsea Three onshore<br>rridor  | cable                            |  |  |  |
|--------|----------------------------------|---|----------------------------------|--|--|--|
|        | A                                | ccess corridor  |                                  |  |  |  |
|        | <b>1</b> k                       | m study area - constru  | uction                           |  |  |  |
| 344000 | Impact                           | <b>Magnitude Bands</b><br>ajor : 0 - 20 m<br>oderate : >20 - 50 m<br>inor : >50 - 79 m<br>egligible : >79 m |                                  |  |  |  |
| 343000 | • Ri<br>ba                       | esidential properties w<br>ands   | ithin impact                     |  |  |  |
| 342000 |                                  |   |                                  |  |  |  |
| 341000 |                                  |   |                                  |  |  |  |
|        | Reference S<br>Projection :<br>0 | iystem : OSGB36 Scale@<br>BNG Vertical<br>0.5 1 Kilometers  | A3:1:30,000<br>reference: Newlyn |  |  |  |
|        | REV                              | REMARK  | DATE                             |  |  |  |
| 00     | 00                               | Initial Issue   | 06/03/2018                       |  |  |  |
| 400    |                                  |   |                                  |  |  |  |
| σ      | Construc                         | Hornsea Project Three<br>tion Noise Impact Magnitude Bo<br>Access Construction<br>Sheet 1                   | e<br>undaries - Day              |  |  |  |
|        |                                  |   |                                  |  |  |  |





Figure 1.3: Construction noise impact magnitude boundaries – day – access construction.



|                  | н  |   |   |
|------------------|--|---|---|
|                  |  | lornsea Three onshore<br>orridor  | cable   |
|                  | A  | ccess corridor  |   |
| ~                | (101   | km study area - operati   | on  |
| 39000            | 1  | km study area - constru   | iction  |
| ŝ                | Impos  | t Magnituda Banda   |   |
|                  |  | laior : 0 - 20 m  |   |
|                  |  | ladarata : >20  |   |
|                  |  | ioderale : >20 - 50 m   |   |
| 0                |  | linor : >50 - 79 m  |   |
| 800              | N  | legligible : >79 m  |   |
| 33               |  |   |   |
|                  |  |   |   |
|                  |  |   |   |
|                  |  |   |   |
| 0                |  |   |   |
| 3700             |  |   |   |
| ŝ                |  |   |   |
|                  |  |   |   |
|                  |  |   |   |
|                  |  |   |   |
|                  |  |   |   |
| 00               |  |   |   |
| 36000            |  |   |   |
| 336000           |  |   |   |
| 336000           |  |   |   |
| 336000           | Reference -  | System : OSGB36 Scale@<br>. BNG Vertical  | A3:1:30,000   |
| 336000           | Reference<br>Projection :<br>0                             | System : OSGB36 Scale@<br>: BNG Vertical i<br>0.5 1 Kilometers  | A3:1:30,000<br>reference∶ Newlyn  |
| <i>00</i> 336000 | Reference<br>Projection :<br>0                             | System : OSGB36 Scale@<br>BNG Vertical<br>0.5 1 Kilometers  | A3:1:30,000<br>reference: Newlyn  |
| 335000 336000    | Reference Projection :<br>0                                | System : OSGB36 Scale@/<br>BNG Vertical i<br>0.5 1 Kilometers   | A3:1:30,000<br>reference: Newlyn<br>DATE  |
| 335000 336000    | Reference<br>Projection :<br>0<br>REV<br>00                | System : OSGB36 Scale@)<br>: BNG Vertical I<br>0.5 1 Kilometers   | A3:1:30,000<br>reference: Newlyn<br>06/03/2018                                  |
| 335000 336000    | Reference a<br>Projection :<br>0<br>REV<br>00              | System : OSGB36 Scale@/<br>BNG Vertical i<br>0.5 1 Kilometers   | A3:1:30,000<br>reference: Newlyn<br>06/03/2018                                  |
| 335000 336000    | Reference a<br>Projection :<br>0<br>REV<br>00<br>Construct | System : OSGB36 Scale@/<br>BNG Vertical i<br>0.5 1 Kilometers<br>REMARK<br>initial Issue<br>Hornsea Project Three<br>ction Noise Impact Magnitude Bot<br>Access Construction<br>Sheet 2 | A3:1:30,000<br>reference: Newlyn<br>06/03/2018<br>06/03/2018<br>0<br>06/03/2018 |







Figure 1.3: Construction noise impact magnitude boundaries – day – access construction.



| 4000          | с – т He  |  |  |
|---------------|---|--|--|
|               |   | ornsea Three onshore cab<br>orridor  | le   |
| 33            | A   | ccess corridor   |  |
|               |   | nshore HVAC booster stati<br>ermanent<br>nshore HVAC booster stati<br>emporary   | on -<br>on -                               |
| 00            | 1771  | m study area - operation   |  |
| 3330          | 1   | km study area - constructio  | n  |
|               | Impact  | Magnitude Bands  |  |
|               | M   | ajor : 0 - 20 m  |  |
|               | M   | oderate : >20 - 50 m   |  |
| 0             | М   | inor : >50 - 79 m  |  |
| 3200          | N   | egligible : >79 m  |  |
| ઌ૾            | R   | esidential properties within   | impact                                     |
|               | ba  | ands   | impuot                                     |
|               |   |  |  |
|               |   |  |  |
| 000           |   |  |  |
| 331           |   |  |  |
|               |   |  |  |
|               |   |  |  |
|               |   |  |  |
|               |   |  |  |
| 00            |   |  |  |
| 330000        | Reference S<br>Projection :                                     | -<br>§ystem : OSGB36 Scale@A3:1:3<br>BNG Vertical referei  | 0,000<br>nce: Newlyn                       |
| 330000        | Reference S<br>Projection :<br>0                                | System : OSGB36 Scale@A3:1:3<br>BNG Vertical referen<br>0.5 1 Kilometers   | 0,000<br>nce: Newlyn                       |
| 330000        | Reference S<br>Projection :<br>0<br>L                           | System : OSGB36 Scale@A3:1:3<br>BNG Vertical referen<br>0.5 1 Kilometers   | 0,000<br>nce: Newlyn<br>DATE               |
| 330000        | Reference S<br>Projection :<br>0<br>L<br>REV<br>00              | System : OSGB36 Scale@A3:1:3<br>BNG Vertical referen<br>0.5 1 Kilometers<br>REMARK   | 0,000<br>nce: Newlyn<br>DATE<br>06/03/2018 |
| 330000        | Reference S<br>Projection :<br>0<br>L<br>REV<br>00              | System : OSGB36 Scale@A3:1:3<br>BNG Vertical referen<br>0.5 1 Kilometers<br>REMARK   | 0,000<br>nce: Newlyn<br>DATE<br>06/03/2018 |
| 329000 330000 | Reference S<br>Projection :<br>0<br>L<br>REV<br>00<br>Construct | System : OSGB36 Scale@A3:1:3<br>BNG Vertical referent<br>0.5 1 Kilometers<br>REMARK<br>Initial Issue<br>Hornsea Project Three<br>tion Noise Impact Magnitude Boundar<br>Access Construction<br>Sheet 3 | 0,000<br>nce: Newlyn<br>DATE<br>06/03/2018 |







Figure 1.3: Construction noise impact magnitude boundaries – day – access construction.



|         |  | ornsea Three onshore cat<br>rridor   | ble                    |  |  |  |  |
|---------|--|--|------------------------|--|--|--|--|
| 0       | Access corridor  |  |                        |  |  |  |  |
| 2900    | 1k   | m study area - constructio   | on                     |  |  |  |  |
| en<br>G | Impact   | Magnitude Bands  |                        |  |  |  |  |
|         |  | oderate : >20 - 50 m   |                        |  |  |  |  |
|         | Mi   | nor : >50 - 79 m   |                        |  |  |  |  |
| 000     | Ne   | aliaible : >79 m   |                        |  |  |  |  |
| 328     | • Re<br>ba   | esidential properties withir<br>nds  | n impact               |  |  |  |  |
| 327000  |  |  |                        |  |  |  |  |
| 326000  |  |  |                        |  |  |  |  |
| 325000  | Reference S<br>Projection : E<br>0                                   | ystem : OSGB36 Scale@A3:1:<br>3NG Vertical refere<br>0.5 1 Kilometers                        | 30,000<br>ence: Newlyn |  |  |  |  |
|         | REV  | REMARK   | DATE                   |  |  |  |  |
|         | 00   | Initial Issue  | 06/03/2018             |  |  |  |  |
| 24000   | Construct  | Hornsea Project Three<br>ion Noise Impact Magnitude Bounda<br>Access Construction<br>Sheet 4 | nries - Day            |  |  |  |  |
| ю́      | Doc no: RPS-93<br>Created by: CR<br>Checked by: S3<br>Approved by:S3 | 337-0472-08<br>5 <b>RPS</b>  | rsted                  |  |  |  |  |







Figure 1.3: Construction noise impact magnitude boundaries – day – access construction.



| 324000 |   | ornsea Three onshore cab<br>rridor  | le                   |
|--------|---|---|----------------------|
|        | Ac  | ccess corridor  |                      |
|        | 11k   | m study area - constructio  | n                    |
| 323000 | Impact  | <b>Magnitude Bands</b><br>ajor : 0 - 20 m<br>oderate : >20 - 50 m<br>mor : >50 - 79 m |                      |
|        | Ne<br>  | egligible : >79 m   |                      |
| 322000 | • ba  | esidential properties within<br>inds  | Impact               |
| 321000 |   |   |                      |
| 320000 |   |   |                      |
|        | Reference S<br>Projection :  <br>0                                | Vystem : OSGB36 Scale@A3:1:3<br>BNG Vertical referen<br>0.5 1 Kilometers              | 0,000<br>nce: Newlyn |
|        | REV   | REMARK  | DATE                 |
| 19000  | 00  | Initial Issue   | 06/03/2018           |
| e      | ies - Day   |   |                      |
|        | Doc no: RPS-9<br>Created by: CF<br>Checked by: S<br>Approved by:S | 337-0472-08<br>S RPS Or<br>S  | sted                 |







Figure 1.3: Construction noise impact magnitude boundaries – day – access construction.



|       | (°  |  | )               |  |  |  |  |
|-------|---|--|-----------------|--|--|--|--|
|       |   | ornsea Three onshore c<br>rridor   | able            |  |  |  |  |
|       | Access corridor   |  |                 |  |  |  |  |
| 8000  | <b>1</b> k  | m study area - construc  | tion            |  |  |  |  |
| 31    | Impact  | Magnitude Bands  |                 |  |  |  |  |
|       | Ma Ma   | ajor : 0 - 20 m  |                 |  |  |  |  |
|       | M M   | oderate : >20 - 50 m   |                 |  |  |  |  |
|       | 🔲 Mi  | nor : >50 - 79 m   |                 |  |  |  |  |
| 000   | Ne  | egligible : >79 m  |                 |  |  |  |  |
| 317   | <mark>₀</mark> Re<br>ba   | esidential properties witl<br>nds  | hin impact      |  |  |  |  |
|       |   |  |                 |  |  |  |  |
|       |   |  |                 |  |  |  |  |
| 6000  |   |  |                 |  |  |  |  |
| 31    |   |  |                 |  |  |  |  |
|       |   |  |                 |  |  |  |  |
|       |   |  |                 |  |  |  |  |
|       |   |  |                 |  |  |  |  |
| 15000 |   |  |                 |  |  |  |  |
| è     |   |  |                 |  |  |  |  |
|       |   |  |                 |  |  |  |  |
|       | Reference S   | ystem : OSGB36 Scale@A3  | 3:1:30,000      |  |  |  |  |
| 14000 |   | 0.5 1 Kilometers   | icience. Newlyn |  |  |  |  |
| Ś     | REV   | REMARK   | DATE            |  |  |  |  |
|       | 00  | Initial Issue  | 06/03/2018      |  |  |  |  |
|       |   |  |                 |  |  |  |  |
| 000   | Construct   | Hornsea Project Three<br>ion Noise Impact Magnitude Bour<br>Access Construction<br>Sheet 6 | ndaries - Day   |  |  |  |  |
| 313   | Doc no: RPS-9<br>Created by: CF<br>Checked by: S<br>Approved by:S | 337-0472-08<br>S RPS   | Orsted          |  |  |  |  |







Figure 1.3: Construction noise impact magnitude boundaries – day – access construction.



| 1      |  |  |            |  |  |  |  |  |  |
|--------|--|--|------------|--|--|--|--|--|--|
| 313000 |  | ornsea Three onshore cabl<br>rridor  | e          |  |  |  |  |  |  |
|        | Access corridor  |  |            |  |  |  |  |  |  |
|        | <b>1</b> 1k  | m study area - constructio   | n          |  |  |  |  |  |  |
|        | Impact   | Magnitude Bands  |            |  |  |  |  |  |  |
|        | Ma   | ajor : 0 - 20 m  |            |  |  |  |  |  |  |
| 2000   |  | -<br>oderate : >20 - 50 m  |            |  |  |  |  |  |  |
| 31     | Mi   | nor <sup>·</sup> >50 - 79 m  |            |  |  |  |  |  |  |
|        |  | aliaible : >70 m   |            |  |  |  |  |  |  |
|        | Ne   | gligible : >79 m   |            |  |  |  |  |  |  |
|        |  |  |            |  |  |  |  |  |  |
| 0      |  |  |            |  |  |  |  |  |  |
| 1100   |  |  |            |  |  |  |  |  |  |
|        |  |  |            |  |  |  |  |  |  |
|        |  |  |            |  |  |  |  |  |  |
|        |  |  |            |  |  |  |  |  |  |
|        |  |  |            |  |  |  |  |  |  |
| 000    |  |  |            |  |  |  |  |  |  |
| 3100   |  |  |            |  |  |  |  |  |  |
|        |  |  |            |  |  |  |  |  |  |
|        |  |  |            |  |  |  |  |  |  |
|        |  |  |            |  |  |  |  |  |  |
| 0      |  |  |            |  |  |  |  |  |  |
| 006    |  |  |            |  |  |  |  |  |  |
| 30     | Reference Sy   | ystem : OSGB36 Scale@A3:1:30   | 0,000      |  |  |  |  |  |  |
|        | Projection : E   | 0.5 1 Kilometers   | ce: Newlyn |  |  |  |  |  |  |
|        |  |  |            |  |  |  |  |  |  |
|        | REV  | REMARK   | DATE       |  |  |  |  |  |  |
| 0      | 00   | Initial Issue  | 06/03/2018 |  |  |  |  |  |  |
| 800    |  |  |            |  |  |  |  |  |  |
| 30     | Construct  | Hornsea Project Three<br>Construction Noise Impact Magnitude Boundaries - Day<br>Access Construction |            |  |  |  |  |  |  |
|        | Doc no: RPS-93<br>Created by: CR<br>Checked by: SS<br>Approved by:SS | 137-0472-08<br>RPS Or  | sted       |  |  |  |  |  |  |











|        |                               |  |                            | 1                   |
|--------|-------------------------------|--|----------------------------|---------------------|
|        |                               | ornsea Three onsho<br>rridor   | re cabl                    | e                   |
|        | Ac                            | cess corridor  |                            |                     |
|        | <b>1</b> k                    | m study area - oper  | ation                      |                     |
| 000    | <b>1</b> k                    | m study area - cons  | tructio                    | n                   |
| 307    | Impact                        | Magnitude Bands  |                            |                     |
|        | Ma Ma                         | ajor : 0 - 20 m  |                            |                     |
|        | Mc Mc                         | oderate : >20 - 50 m   | ı                          |                     |
|        | Mi                            | nor : >50 - 79 m   |                            |                     |
| 00     | Ne                            | egligible : >79 m  |                            |                     |
| 3060   | <mark>∘</mark> Re<br>ba       | esidential properties<br>nds   | within                     | impact              |
| 305000 |                               |  |                            |                     |
| 304000 |                               |  |                            |                     |
|        | Reference S<br>Projection : E | ystem : OSGB36 Sca<br>SNG Vert   | le@A3:1:3(<br>ical referen | ),000<br>ce: Newlyn |
|        | 0                             | 0.5 1 Kilomet  | ers                        |                     |
| 3000   | REV                           | REMARK   |                            | DATE                |
| 303    | 00                            | Initial Issue  |                            | 06/03/2018          |
|        | Construct                     | Hornsea Project Th<br>ion Noise Impact Magnitude<br>Access Constructior<br>Sheet 8 | Iree<br>Boundari<br>1      | es - Day            |
| 000    | Doc no: RPS-93                | 337-0472-08  |                            |                     |







Figure 1.3: Construction n

Construction noise impact magnitude boundaries – day – access construction.



|        |                           | Hornsea Three onshore cab<br>corridor  | ble                    |  |  |  |  |
|--------|---------------------------|--|------------------------|--|--|--|--|
|        |                           | Access corridor  |                        |  |  |  |  |
| 305000 |                           | Onshore HVDC converter/H<br>substation - Permanent<br>Onshore HVDC converter/H<br>substation - Temporary | IVAC<br>IVAC           |  |  |  |  |
|        | 1111                      | 1km study area - operation   |                        |  |  |  |  |
|        | 1121                      | I km study area - constructio  | on                     |  |  |  |  |
|        | Impa                      | ct Magnitude Bands   |                        |  |  |  |  |
| ~      |                           | Major : 0 - 20 m   |                        |  |  |  |  |
| 1400   |                           | /loderate : >20 - 50 m   |                        |  |  |  |  |
| ы      | <br>Minor : >50 - 79 m    |  |                        |  |  |  |  |
|        | 1                         | Negligible : >79 m   |                        |  |  |  |  |
|        | F                         | Residential properties withir  | n impact               |  |  |  |  |
|        | ł                         | bands  |                        |  |  |  |  |
| 000    |                           |  |                        |  |  |  |  |
| 303    |                           |  |                        |  |  |  |  |
|        |                           |  |                        |  |  |  |  |
|        |                           |  |                        |  |  |  |  |
|        |                           |  |                        |  |  |  |  |
|        |                           |  |                        |  |  |  |  |
| ~      |                           |  |                        |  |  |  |  |
| 5000   |                           |  |                        |  |  |  |  |
| 302    |                           |  |                        |  |  |  |  |
|        |                           |  |                        |  |  |  |  |
|        | Reference<br>Projection   | e System : OSGB36 Scale@A3:1:<br>: BNG Vertical refere   | 30,000<br>ence: Newlyn |  |  |  |  |
|        | 0                         | 0.5 1 Kilometers   |                        |  |  |  |  |
|        |                           |  |                        |  |  |  |  |
| 000    | REV                       | REMARK   | DATE                   |  |  |  |  |
| 3011   | 00                        |  | 00/03/2018             |  |  |  |  |
| 1.53   |                           |  |                        |  |  |  |  |
|        | Constr                    | Hornsea Project Three<br>uction Noise Impact Magnitude Bounda<br>Access Construction<br>Sheet 9          | ries - Day             |  |  |  |  |
|        | Doc no: RP                | S-9337-0472-08   |                        |  |  |  |  |
|        | Created by:<br>Checked by | cr<br>ss<br>RPS  | rsted                  |  |  |  |  |
|        | Approved b                | y.oo   |                        |  |  |  |  |







Figure 1.4: Cons

Construction noise impact magnitude boundaries – day – site construction works (noisiest works).







Figure 1.4: Construction noise impact magnitude boundaries – day –site construction works (noisiest works).

| 304000  | <ul> <li>Hornsea Three onshore cable corridor</li> <li>Onshore HVDC converter/HVAC substation - Permanent</li> <li>Onshore HVDC converter/HVAC substation - Temporary</li> <li>1km study area - operation</li> <li>1km study area - construction</li> <li>Impact Magnitude Bands</li> <li>Major : 0 - 18 m</li> <li>Moderate : &gt;18 - 45 m</li> <li>Minor : &gt;45 - 71 m</li> <li>Negligible : &gt;71 m</li> </ul> |   |                             |                          |  |  |  |  |
|---|---|---|-----------------------------|--------------------------|--|--|--|--|
| 000505  |   |   |                             |                          |  |  |  |  |
| 03000   | Reference S<br>Projection : E<br>0 50   | ystem : OSGB36<br>NG<br>100 Meters<br>∟ | Scale@A3:1<br>Vertical refe | I:7,500<br>rence: Newlyn |  |  |  |  |
| ກ   | REV   | REMARK                                  |                             | DATE                     |  |  |  |  |
|   | 00  | Initial Issue                           |                             | 06/03/2018               |  |  |  |  |
|   |   |   |                             |                          |  |  |  |  |
| Hornsea Project Three<br>Construction Noise Impact Magnitude Boundaries – D<br>Site Construction Works (noisiest works) |   |   |                             |                          |  |  |  |  |
|   | Doc no: RPS-9337-0473-07<br>Created by: CR<br>Checked by: SS<br>Approved by:SS  |   |                             |                          |  |  |  |  |







Figure 1.5: Construction noise impact magnitude boundaries – day – landfall HDD trenchless technology – without mitigation.

![](_page_43_Picture_3.jpeg)

| 0      |  |  |                                   |                   |  |  |
|--------|--|--|-----------------------------------|-------------------|--|--|
| 34450  |  | ornsea Three ons<br>rridor             | shore cabl                        | e                 |  |  |
|        | 🔀 La   | ndfall/intertidal H                    | IDD                               |                   |  |  |
|        | <b>1</b> k   | m study area - co                      | onstructio                        | n                 |  |  |
|        | Impact   | Magnitude Ban                          | ds                                |                   |  |  |
|        | Ma Ma  | ajor : 0 - 118 m                       |                                   |                   |  |  |
|        | Mc   | oderate : >118 - 2                     | 297 m                             |                   |  |  |
|        | Mi   | nor : >297 - 471                       | m                                 |                   |  |  |
|        | Ne   | gligible : >471 m                      | ı                                 |                   |  |  |
| 344000 | ● Re<br>ba   | esidential propert<br>nds              | ies within                        | impact            |  |  |
|        |  |  |                                   |                   |  |  |
|        |  |  |                                   |                   |  |  |
|        |  |  |                                   |                   |  |  |
|        |  |  |                                   |                   |  |  |
|        |  |  |                                   |                   |  |  |
|        |  |  |                                   |                   |  |  |
|        |  |  |                                   |                   |  |  |
|        |  |  |                                   |                   |  |  |
|        |  |  |                                   |                   |  |  |
| 200    |  |  |                                   |                   |  |  |
| 3435   |  |  |                                   |                   |  |  |
|        |  |  |                                   |                   |  |  |
|        |  |  |                                   |                   |  |  |
|        | Reference Sy<br>Projection : E   | ystem : OSGB36<br>BNG                  | Scale@A3:1:8,<br>Vertical referen | 000<br>ce: Newlyn |  |  |
|        | 0 50 1   | 00 Meters                              |                                   |                   |  |  |
|        | REV  | REMARK                                 |                                   | DATE              |  |  |
|        | 00   | Initial Issue                          |                                   | 06/03/2018        |  |  |
|        |  |  |                                   |                   |  |  |
|        | Hornsea Project Three<br>Construction Noise Impact Magnitude Boundaries -<br>Day. Landfall HDD Trenchless Technology – |  |                                   |                   |  |  |
| 2      | Day. L   | andfall HDD Trenchle<br>Without Mitiga | ess Technolo                      | ogy –             |  |  |
| 13000  | Day. L   | andfall HDD Trenchle<br>Without Mitiga | ess Technolo<br>Ition             | ogy –             |  |  |
| 343000 | Doc no: RPS-92<br>Created by: CR<br>Checked by: SS   | andfall HDD Trenchle<br>Without Mitiga | ess Technolo<br>ation             | sted              |  |  |

![](_page_43_Picture_7.jpeg)

![](_page_44_Picture_0.jpeg)

![](_page_44_Figure_1.jpeg)

![](_page_44_Figure_2.jpeg)

![](_page_44_Picture_3.jpeg)

|   | ornsea Three<br>rridor   | e onshore ca                                       | able                                       |  |  |  |  |  |
|---|--|--|--|--|--|--|--|--|
| Eandfall/intertidal HDD   |  |  |  |  |  |  |  |  |
| Impact Magnitude Bands  |  |  |  |  |  |  |  |  |
| C Ma  | ajor : 0 - 53 i  | m  |  |  |  |  |  |  |
| Mo  | oderate : >5   | 3 - 133 m  |  |  |  |  |  |  |
| 🛄 Mi  | nor : >133 -   | 211 m  |  |  |  |  |  |  |
| Ne  | gligible : >2  | 11 m   |  |  |  |  |  |  |
|   |  |  |  |  |  |  |  |  |
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|   |  |  |  |  |  |  |  |  |
|   |  |  |  |  |  |  |  |  |
|   |  |  |  |  |  |  |  |  |
| Reference Sy<br>Projection : E  | ystem : OSGB36<br>3NG  | Scale@A3:<br>Vertical refe                         | 1:6,000<br>erence: Newlyn                  |  |  |  |  |  |
| 0 50 100 Meters   |  |  |  |  |  |  |  |  |
|   |  |  | DATE                                       |  |  |  |  |  |
| REV<br>00   | Initial Issue  |  | 02/02/2018                                 |  |  |  |  |  |
|   |  |  |  |  |  |  |  |  |
|   | Hornsea P  | roject Three                                       |  |  |  |  |  |  |
| Hornsea Project Three<br>Construction Noise Impact Magnitude Boundaries -<br>Day. Landfall HDD Trenchless Technology – with |  |  |  |  |  |  |  |  |
| Constructi<br>Day. Lan  | on Noise Impa<br>dfall HDD Tren<br>Specific Pla                | ct Magnitude B<br>chless Technol<br>ant Mitigation | oundaries -<br>ogy – with                  |  |  |  |  |  |
| Constructi<br>Day. Lan  | on Noise Impa<br>dfall HDD Tren<br>Specific Pla<br>337-0475-07 | ct Magnitude B<br>chless Technol<br>ant Mitigation | oundaries -<br>ogy – with                  |  |  |  |  |  |
| Constructi<br>Day. Lan<br>Doc no: RPS-9:<br>Created by: SS<br>Approved by: SS   | on Noise Impa<br>dfall HDD Tren<br>Specific Pla<br>337-0475-07 | ct Magnitude B<br>chless Technol<br>ant Mitigation | oundaries -<br>ogy – with<br><b>Drsted</b> |  |  |  |  |  |

![](_page_44_Picture_7.jpeg)

![](_page_45_Picture_0.jpeg)

### 1.8 References

British Standards Institution (BSI) (2014) British Standard 5228: Code of practice for noise and vibration control on construction and open sites. Part 1: Noise+A1:2014. Milton Keynes, BSI.

British Standards Institution (BSI) (2014) British Standard 5228: Code of practice for noise and vibration control on construction and open sites. Part 2: Vibration+A1:2014. Milton Keynes, BSI.

Department of Transport (1988) Calculation of Road Traffic Noise (CRTN). London, HMSO.

Highways Agency (2011) Design Manual for Roads and Bridges (DMRB). London, The Stationary Office.

International Organization for Standardization (1996) ISO 9613-2:1996 Acoustics -- Attenuation of sound during propagation outdoors -- Part 2: General method of calculation.

![](_page_45_Picture_7.jpeg)

![](_page_45_Picture_10.jpeg)

![](_page_46_Picture_0.jpeg)

## Appendix A Construction Plant Source Data

Table A.1: Construction Plant Source Data.

| Reference | Activity                                  | Plant Requirements       | BS:5228 Table No. | L <sub>Aeq,T</sub> at 10m, dB | Source Height | Sound Power Level,<br>dB(A) | No. of Plant | Percentage on-time<br>(average % of time<br>that plant will be<br>operating at full<br>power) | Resultant Sound<br>Power Level, dB(A) |
|-----------|---|--------------------------|-------------------|-------------------------------|---------------|-----------------------------|--------------|---|---------------------------------------|
|           |   | Excavator                | C6.12             | 74                            | 1.8           | 102                         | 1            | 50  | 99                                    |
| 1         |   | Roller                   | C2.37             | 79                            | 0.5           | 107                         | 1            | 25  | 101                                   |
|           | Stripping /Excavating Topsoil &           | Dump truck               | C4.6              | 79                            | 1.8           | 107                         | 1            | 10  | 97                                    |
|           |   | HGV                      | C6.21             | 80                            | 1.8           | 108                         | 1            | 10  | 98                                    |
|           |   |                          |                   |                               |               |                             |              | Total   | 105                                   |
| 2         |   | Piling rig - CFA         | C3.21             | 79                            | 2             | 107                         | 1            | 50  | 104                                   |
|           |   | Generator for piling rig | C4.79             | 64                            | 1.5           | 92                          | 1            | 50  | 89                                    |
|           | Plling                                    | Excavator                | C6.12             | 74                            | 1.8           | 102                         | 1            | 25  | 96                                    |
|           |   |                          |                   |                               |               |                             |              | Total   | 105                                   |
|           | Installation of equipment                 | Mobile tracked crane     | C3.29             | 70                            | 2             | 98                          | 1            | 50  | 95                                    |
| 3         |   | MEWP                     | C4.57             | 67                            | 1.8           | 95                          | 1            | 50  | 92                                    |
|           |   |                          |                   |                               |               |                             |              | Total   | 97                                    |
|           | Concrete Pouring                          | Concrete mixer truck     | C4.20             | 80                            | 1.5           | 108                         | 1            | 50  | 105                                   |
| 4         |   | Concrete pump            | C3.25             | 78                            | 1.5           | 106                         | 1            | 50  | 103                                   |
|           |   |                          |                   |                               |               |                             |              | Total   | 107                                   |
| _         |   | Generator for piling rig | C4.79             | 64                            | 1.5           | 92                          | 1            | 100   | 92                                    |
| 5         | Site Welfare                              |                          |                   |                               |               |                             |              | Total   | 92                                    |
|           |   | Excavator                | C6.12             | 74                            | 1.8           | 102                         | 1            | 50  | 99                                    |
|           |   | Breaker attachment       | C1.9              | 90                            | 1.5           | 118                         | 1            | 25  | 112                                   |
| 6         | Breaking Foundations<br>(decommissioning) | Dump truck               | C4.6              | 79                            | 1.8           | 107                         | 1            | 10  | 97                                    |
|           |   | HGV                      | C6.21             | 80                            | 1.8           | 108                         | 1            | 10  | 98                                    |
|           |   |                          |                   |                               |               |                             |              | Total   | 112                                   |

![](_page_46_Picture_4.jpeg)

![](_page_46_Picture_7.jpeg)

![](_page_47_Picture_0.jpeg)

| Reference | Activity                   | Plant Requirements                   | BS:5228 Table No.  | L <sub>Aeq,T</sub> at 10m, dB | Source Height | Sound Power Level,<br>dB(A) | No. of Plant | Percentage on-time<br>(average % of time<br>that plant will be<br>operating at full<br>power) | Resultant Sound<br>Power Level, dB(A) |
|-----------|----------------------------|--------------------------------------|--------------------|-------------------------------|---------------|-----------------------------|--------------|---|---------------------------------------|
|           |                            | Excavator                            | C6.12              | 74                            | 1.8           | 102                         | 1            | 100   | 102                                   |
|           |                            | HGV                                  | C6.21              | 67                            | 1.2           | 95                          | 1            | 50  | 92                                    |
| 7         | Cable Route Worksite       | Dump truck                           | C4.6               | 79                            | 1.8           | 107                         | 1            | 10  | 97                                    |
|           |                            | Mobile tracked crane                 | crane C3.29 70 1.8 | 1.8                           | 98            | 1                           | 50           | 95  |                                       |
|           |                            |                                      |                    |                               |               |                             |              | Total   | 104                                   |
|           |                            | Excavator                            | C6.12              | 74                            | 1.8           | 102                         | 1            | 100   | 102                                   |
| 8         | Cable Route                | HGV                                  | C6.21              | 67                            | 1.5           | 95                          | 1            | 50  | 92                                    |
|           |                            |                                      |                    | Total                         | 1.65          |                             |              | Total   | 102                                   |
|           |                            | Excavator                            | C6.12              | 74                            | 1.8           | 102                         | 1            | 50  | 99                                    |
|           |                            | Roller                               | C2.37              | 79                            | 1.8           | 107                         | 1            | 25  | 101                                   |
| 9         | Access Construction        | HGV                                  | C6.21              | 80                            | 1.8           | 108                         | 1            | 50         99           25         101           20         101           Total         105   | 101                                   |
|           |                            |                                      |                    |                               |               |                             |              | Total   | 105                                   |
|           |                            |                                      |                    |                               |               | Road Length                 | 200 m        | Total per m   | 82                                    |
|           |                            | Supports for directional drill       | C4.92              | 87                            | 1.8           | 115.4                       | 1            | 100   | 115                                   |
| 10        | HDD crossings              | Directional drill (generator 106 kW) | C4.96              | 77                            | 1.8           | 105.4                       | 1            | 100   | 105                                   |
|           |                            |                                      |                    | Total                         | 1.8           |                             |              | Total   | 116                                   |
|           |                            | Drilling Rig                         | n/a                | 99.4                          | 2.4           | 127.4                       | 1            | 100   | 127                                   |
|           |                            | Ingersoll Rand 250KVA Generator      | n/a                | 88.4                          | 1.52          | 116.4                       | 1            | 100   | 116                                   |
|           |                            | Weatherford Mud Pump T270A           | n/a                | 79                            | 1.73          | 107                         | 1            | 100   | 107                                   |
| 11        | Intertidal HDD unmitigated | Prime Drilling Pump House            | n/a                | 69.7                          | 1.73          | 97.7                        | 1            | 100   | 98                                    |
|           |                            | Clear Solutions Mixing System        | n/a                | 77                            | 1.8           | 105                         | 1            | 100   | 105                                   |
|           |                            | WB 2000 Re-cycling System            | n/a                | 77.7                          | 1.8           | 105.7                       | 1            | 100   | 106                                   |
|           |                            |                                      |                    |                               |               |                             |              | Total   | 128                                   |

![](_page_47_Picture_2.jpeg)

![](_page_47_Picture_5.jpeg)

![](_page_48_Picture_0.jpeg)

| Reference | Activity                 | Plant Requirements                                 | BS:5228 Table No. | L <sub>Aeq,T</sub> at 10m, dB | Source Height | Sound Power Level,<br>dB(A) | No. of Plant | Percentage on-time<br>(average % of time<br>that plant will be<br>operating at full<br>power) | Resultant Sound<br>Power Level, dB(A) |
|-----------|--------------------------|--|-------------------|-------------------------------|---------------|-----------------------------|--------------|---|---------------------------------------|
| 12        |                          | Mitigated -10dB: Drilling Rig                      | n/a               | 89.4                          | 2.4           | 117.4                       | 1            | 100   | 117                                   |
|           |                          | Mitigated -5dB: Ingersoll Rand<br>250KVA Generator | n/a               | 83.4                          | 1.73          | 111.4                       | 1            | 100   | 111                                   |
|           |                          | Weatherford Mud Pump T270A                         | n/a               | 79                            | 1.73          | 107                         | 1            | 100   | 107                                   |
|           | Intertidal HDD Mitigated | Prime Drilling Pump House                          | n/a               | 69.7                          | 1.73          | 97.7                        | 1 100        | 100   | 98                                    |
|           |                          | Clear Solutions Mixing System                      | n/a               | 77                            | 1.8           | 105                         | 1            | 100   | 105                                   |
|           |                          | WB 2000 Re-cycling System                          | n/a               | 77.7                          | 1.8           | 105.7                       | 1            | 100   | 106                                   |
|           |                          |  |                   |                               |               |                             |              | Total   | 119                                   |

 Table A.2:
 Construction plant scenarios – onshore HVDC converter/HVAC substation and HVAC booster station works.

| Situation in Model                                   | Activities (from Table A.1) Included in Situation | Total Sound Power Level, dB(A) |
|--|---|--------------------------------|
| Stripping of Topsoil & Installation of Stone Capping | 1,5   | 105                            |
| Piling   | 2,5   | 105                            |
| Installation of Equipment                            | 3,5   | 98                             |
| Concrete Pouring                                     | 4,5   | 107                            |
| Access Road Construction                             | 9,5   | 105                            |
| Cable Route  | 8   | 102                            |
| Cable Route with worksite                            | 7,8   | 106                            |
| HDD Crossing   | 8,10  | 116                            |
| Intertidal/landfall HDD (unmitigated)                | 7,11  | 128                            |
| Intertidal/landfall HDD (mitigated)                  | 7,12  | 119                            |

![](_page_48_Picture_4.jpeg)

![](_page_48_Picture_7.jpeg)

![](_page_49_Picture_0.jpeg)

#### Table A.3: Onshore cable corridor works

| Reference | Activity  | Plant Requirements        | BS:5228 Table No. | L <sub>Aeq,T</sub> at 10m, dB | Source Height | Sound<br>Power Level,<br>dB(A) | No. of plant | Percentage on-<br>time (average % of<br>time that plant will<br>be operating at full<br>power) | Resultant Sound<br>Power Level,<br>dB(A) |
|-----------|---|---------------------------|-------------------|-------------------------------|---------------|--------------------------------|--------------|--|--|
| 11        | Construction of Cable Installation/open cut trenching | Tracked Excavator         | C6.12             | 75                            | 1.8           | 103                            | 1            | 100  | 103                                      |
| 12        | Horizontal Directional Drilling Compounds/trenchless  | Large HDD Compound        | C2.44             | 88                            | 1.8           | 116                            | 1            | 100  | 116                                      |
|           |   | Tracked Excavator         | C2.16             | 75                            | 1.8           | 103                            | 1            | 100  | 103                                      |
| 13        | Construction of Access Roads                          | Dump Truck (tipping fill) | n/a               | 79                            | 1.8           | 107                            | 1            | 100  | 107                                      |
|           |   |                           |                   |                               |               |                                |              | Total  | 108                                      |

![](_page_49_Picture_3.jpeg)

![](_page_49_Picture_6.jpeg)

## Hornsea 3 Offshore Wind Farm

## Appendix B Construction Noise Model Results

 Table B.1:
 Construction Noise Level Impact and Distance Bands Day, Evening, Night.

|  | Distance bands from Hornsea Three (m) |                       |                     |  |  |  |  |
|--|---------------------------------------|-----------------------|---------------------|--|--|--|--|
| Impact Magnitude   | Day (0700 - 1900)                     | Evening (1900 - 2300) | Night (2300 - 0700) |  |  |  |  |
| Onshore cable corridor construction (cable installation) |                                       |                       |                     |  |  |  |  |
| Negligible   | >47                                   | >117                  | >294                |  |  |  |  |
| Minor  | >29 - 47                              | >74 - 11              | >185 - 294          |  |  |  |  |
| Moderate   | >12 - 29                              | >29 - 74              | >74 - 185           |  |  |  |  |
| Major  | 0 - 12                                | 0 - 29                | 0 - 74              |  |  |  |  |
| Horizontal Directional Drilling                          | Compounds/trenchless                  |                       |                     |  |  |  |  |
| Negligible   | >154                                  | >388                  | >975                |  |  |  |  |
| Minor  | >97 - 154                             | >245 - 388            | >615 - 975          |  |  |  |  |
| Moderate   | >39 - 97                              | >97 - 245             | >245 - 615          |  |  |  |  |
| Major  | 0 - 39                                | 0 - 97                | 0 - 245             |  |  |  |  |
| Construction of Access Road                              | 5                                     |                       |                     |  |  |  |  |
| Negligible   | >79                                   | >198                  | >497                |  |  |  |  |
| Minor  | >50 - 79                              | >125 - 198            | >314 - 497          |  |  |  |  |
| Moderate   | >20 - 50                              | >50 - 125             | >125 - 314          |  |  |  |  |
| Major  | 0 - 20                                | 0 - 50                | 0 - 125             |  |  |  |  |
| Stripping of Topsoil & Installa                          | tion of Stone Capping                 |                       |                     |  |  |  |  |
| Negligible   | >59                                   | >148                  | >371                |  |  |  |  |
| Minor  | >37 - 59                              | >93 - 148             | >234 - 371          |  |  |  |  |
| Moderate   | >15 - 37                              | >37 - 93              | >93 - 234           |  |  |  |  |
| Major  | 0 - 15                                | 0 - 37                | 0 - 93              |  |  |  |  |
| Piling   |                                       |                       |                     |  |  |  |  |
| Negligible   | >57                                   | >144                  | >362                |  |  |  |  |
| Minor  | >36 - 57                              | >91 - 144             | >228 - 362          |  |  |  |  |
| Moderate   | >14 - 36                              | >36 - 91              | >91 - 228           |  |  |  |  |
| Major  | 0 - 14                                | 0 - 36 0 - 91         |                     |  |  |  |  |

|                                 | Distance bands from Hornsea Three (m)   |                       |                     |  |  |  |
|---------------------------------|---|-----------------------|---------------------|--|--|--|
| Impact Magnitude                | Day (0700 - 1900)                       | Evening (1900 - 2300) | Night (2300 - 0700) |  |  |  |
| nstallation of Equipment        |   |                       |                     |  |  |  |
| Negligible                      | >30                                     | >76                   | >191                |  |  |  |
| Minor                           | >19 - 30                                | >48 - 76              | >120 - 191          |  |  |  |
| Moderate                        | >8 - 19                                 | >19 - 48              | >48 - 120           |  |  |  |
| Major                           | 0 - 8                                   | 0 - 19                | 0 - 48              |  |  |  |
| Concrete Pouring                |   |                       |                     |  |  |  |
| Negligible                      | >71                                     | >178                  | >447                |  |  |  |
| Minor                           | >45 - 71                                | >112 - 178            | >282 - 447          |  |  |  |
| Moderate                        | >18 - 45                                | >45 - 112             | >112 - 282          |  |  |  |
| Major                           | 0 - 18                                  | 0 - 45                | 0 - 112             |  |  |  |
| Cable Route with worksite       |   |                       |                     |  |  |  |
| Negligible                      | ole >65 >163                            |                       | >411                |  |  |  |
| Minor                           | >41 - 65                                | >103 - 163            | >259 - 411          |  |  |  |
| Moderate                        | >16 - 41                                | >41 - 103             | >103 - 25           |  |  |  |
| Major                           | 0 - 16                                  | 0 - 41                | 0 - 103             |  |  |  |
| HDD Crossing                    |   |                       |                     |  |  |  |
| Negligible                      | >154                                    | >388                  | >975                |  |  |  |
| Minor                           | >97 - 154                               | >245 - 388            | >615 - 975          |  |  |  |
| Moderate                        | >39 - 97                                | >97 - 245             | >245 - 615          |  |  |  |
| Major                           | 0 - 39                                  | 0 - 97                | 0 - 245             |  |  |  |
| Landfall Construction (without  | mitigation)                             |                       |                     |  |  |  |
| Negligible                      | >471                                    | >1183                 | >2971               |  |  |  |
| Minor                           | >297 - 471                              | >746 - 1183           | >1875 - 2971        |  |  |  |
| Moderate                        | >118 - 297                              | >297 - 746            | >746 - 1875         |  |  |  |
| Major 0 - 118                   |   | 0 - 297               | 0 - 746             |  |  |  |
| Landfall Construction (with mit | Landfall Construction (with mitigation) |                       |                     |  |  |  |
| Negligible                      | >211                                    | >530                  | >1330               |  |  |  |
| Minor                           | >133 - 211                              | >334 - 530            | >839 - 1330         |  |  |  |

![](_page_50_Picture_5.jpeg)

![](_page_50_Picture_8.jpeg)

| langet Megnitude | Distance bands from Hornsea Three (m)   |            |                     |  |  |
|------------------|---|------------|---------------------|--|--|
| impact magnitude | Day (0700 - 1900) Evening (1900 - 2300) |            | Night (2300 - 0700) |  |  |
| Moderate         | >53 - 133                               | >133 - 334 | >334 - 839          |  |  |
| Major            | 0 - 53                                  | 0 - 133    | 0 - 334             |  |  |

| Impact Magnitude, Day | Distance bands from Hornsea Three (m) | Residential Property Count |  |
|-----------------------|---------------------------------------|----------------------------|--|
| Moderate              | >53 - 133 m                           | 0                          |  |
| Major                 | 0 - 53                                | 0                          |  |

#### Table B.2: Construction distance bands and property counts (day).

| Impact Magnitude, Day   | Distance bands from Hornsea Three (m)   | Residential Property Count                 |  |  |  |  |  |
|---|---|--|--|--|--|--|--|
| Summary of property count within construction noise impact band – open cut sections of the onshore cable corridor |   |  |  |  |  |  |  |
| Minor   | >29 - 47  | 17   |  |  |  |  |  |
| Moderate  | >12 - 29  | 12   |  |  |  |  |  |
| Major   | 0 - 12  | 1  |  |  |  |  |  |
| Summary of property count within c  | onstruction noise impact band – HDD sections  | of the onshore cable corridor              |  |  |  |  |  |
| Minor   | >97 - 154   | 123  |  |  |  |  |  |
| Moderate  | >39 - 97  | 70   |  |  |  |  |  |
| Major   | 0 - 39  | 11   |  |  |  |  |  |
| Summary of property count within c  | Summary of property count within construction noise impact band – Access construction |  |  |  |  |  |  |
| Minor   | >50 - 79  | 21   |  |  |  |  |  |
| Moderate  | >20 - 50  | 27   |  |  |  |  |  |
| Major   | 0 - 2   | 8  |  |  |  |  |  |
| Summary of property count within c  | onstruction noise impact band – onshore HVD   | C converter/HVAC substation construction   |  |  |  |  |  |
| Minor   | >45 - 71  | 0  |  |  |  |  |  |
| Moderate  | >18 - 45  | 0  |  |  |  |  |  |
| Major   | 0 - 18  | 0  |  |  |  |  |  |
| Summary of property count within co<br>mitigation)  | onstruction noise impact band – HDD at the Ho   | rnsea Three landfall area (without         |  |  |  |  |  |
| Minor   | >297 - 471  | 6  |  |  |  |  |  |
| Moderate  | >118 - 297  | 0  |  |  |  |  |  |
| Major   | 0 - 118   | 0  |  |  |  |  |  |
| Summary of property count within c  | onstruction noise impact band; HDD at the Hor   | nsea Three landfall area (with mitigation) |  |  |  |  |  |
| Minor   | >133 - 211 m  | 0  |  |  |  |  |  |

![](_page_51_Picture_5.jpeg)

![](_page_51_Picture_8.jpeg)