



FIVE
ESTUARIES
OFFSHORE WIND FARM

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OFFSHORE WIND FARM
PRELIMINARY ENVIRONMENT
INFORMATION REPORT

VOLUME 5, ANNEX 9.2: ONSHORE
AIRBORNE NOISE CONSTRUCTION
SOUND POWER DETAILS

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Five Estuaries Offshore Wind Farm Limited
Five Estuaries Offshore Wind Farm – Onshore Airborne Noise
Construction Sound Power Details

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1 Introduction

- 1.1.1 Bow Acoustics has been appointed by SLR Consulting Limited on behalf of Five Estuaries Offshore Wind Farm Limited to conduct an airborne noise and vibration assessment of the onshore elements of the proposed Five Estuaries Offshore Wind Farm (hereafter referred to as VE). This report provides details of the sound power levels of the construction activities associated with VE and is written as an annex to the Noise and Vibration chapter of the Preliminary Environmental Impact Report (PEIR).
- 1.1.2 The study area for the noise and vibration assessment of the onshore elements of VE is separated into three main areas:
- the Landfall, where the offshore export cables are brought ashore and jointed to the onshore export cables in the Transition Joint Bays (TJBs);
 - the Export Cable Corridor (ECC); and
 - the Onshore Substation (OnSS).
- 1.1.3 The construction activities reflect the above three areas of assessment. Further details regarding the construction of VE are described in Volume 3, Chapter 1: Onshore Project Description.

2 Sound Power Data

2.1 Landfall

2.1.1 Landfall construction activities will take place in three potential locations:

- Beach operation Temporary Construction Compound (TCC) off Manor Way;
- Landfall Horizontal Directional Drilling (HDD) compound; and
- Beach compound

2.1.2 Each area will host different construction activities, as described below.

Beach Operations TCC

2.1.3 A TCC compound at Manor Way may be required to support beach operations, to allow laydown of equipment / materials and to provide a hard standing area for the use of plant. The TCC would be located immediately east of an existing hardstanding yard.

2.1.4 The following sequence of construction activities will take place at the Manor Way TCC:

- TCC establishment;
- TCC operations; and then
- TCC removal.

2.1.5 It is understood that the existing hardstanding yard may be incorporated into the TCC; therefore, as a worst case noise generated during the TCC operations is assumed to take place in this area as it is closer to the nearby properties.

2.1.6 Each of the above activities will involve the usage of multiple items of plant for a percentage of the working day, which is defined in British Standard 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites' (BS 5228)⁽¹⁾ as weekdays 0700 hours to 1900 hours and Saturday mornings 0700 hours to 1300 hours. Set out in the tables below for each of the construction activities are the plant type, the number used, the sound pressure level (SPL) at a reference 10 m from one item of plant, the percentage of the working day that the plant will be operating and an overall sound power level. The overall sound power level combines all the individual sound pressure levels logarithmically and accounts for the number of plant and the time that they are generating noise, assuming a single total source for all noise.

Table 1: Establish Manor Way TCC Plant Sound Power Details

Plant description	Nº	SPL at 10m, dB LAeq	Percent of working day operating	Source BS 5228
D6 dozer	1	81	100	Table C2 - Ref 12
30T excavator	2	75	100	Table C2 - Ref 16
20T Dumper	3	87	100	Table C2 - Ref 31
Smooth drum vibro road roller	1	75	100	Table C5 - Ref 20
21T excavator	1	78	100	Table C2 - Ref 3
5T forward tipping dumper	1	78	100	Table C4 - Ref 7
Loading shovel	1	80	100	Table C2 - Ref 27
Tractor & fencing kit	1	80	100	Table C4 - Ref 74

Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
Tractor & trailer	1	79	70	Table C4 - Ref 75
Tractor & fuel bowser	1	89	10	Table C6 - Ref 36
Tractor & water bowser	1	83	25	Table C6 - Ref 38
Grader	1	86	100	Table C6- Ref 31
Telehandler	1	79	70	Table C4 - Ref 54
Mobile self-contained welfare unit	2	66	25	Table C4 - Ref 78
Mobile generator	2	74	25	Table C4 - Ref 84
Temporary lighting	6	65	25	Table C4 - Ref 86
Road surface paver & roller	1	84	25	Table C5 - Ref 32
Total Sound Power Level: 122 dB L_{WA}				

Table 2: TCC Operations Plant Sound Power Details

Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
Generator	2	74	100	Table C4 - Ref 84
Telehandler	1	79	75	Table C4 - Ref 54
Road sweeper	1	76	10	Table C4 - Ref 90
Total Sound Power Level: 109 dB L_{WA}				

Table 3: Removal of Manor Way TCC Plant Sound Power Details

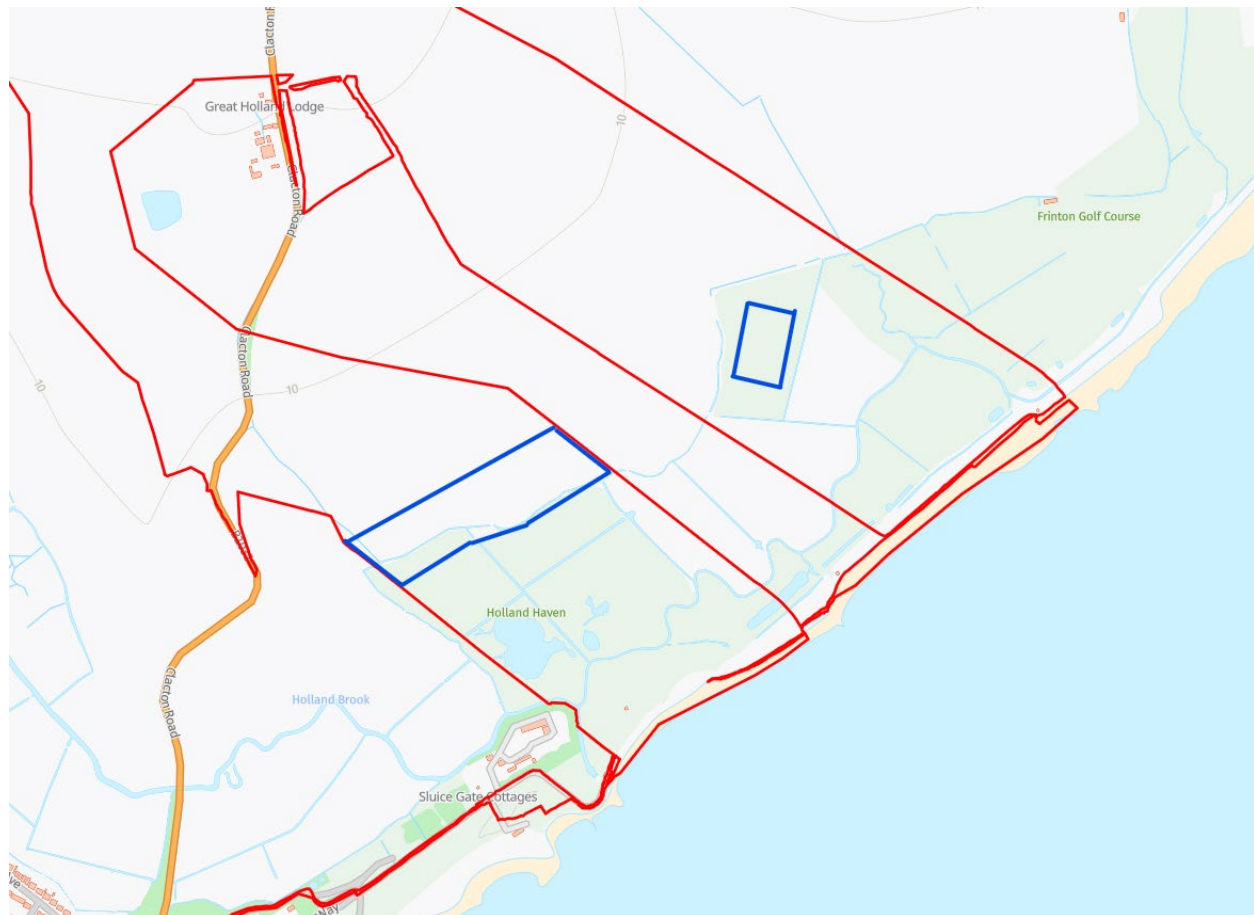
Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
D6 dozer	2	81	100	Table C2 - Ref 12
30T excavator	2	75	100	Table C2 - Ref 16
20T dumper	2	87	100	Table C2 - Ref 31
Smooth drum vibro road roller	1	75	50	Table C5 - Ref 20
21T excavator	1	78	100	Table C2 - Ref 3
5T forward tipping dumper	1	78	100	Table C4 - Ref 7
Loading shovel	2	80	100	Table C2 - Ref 27
Tractor & fencing kit	1	80	50	Table C4 - Ref 74
Tractor & trailer	1	79	50	Table C4 - Ref 75
Tractor & fuel bowser	1	89	10	Table C6 - Ref 36
Tractor & water bowser	1	83	25	Table C6 - Ref 38
Tractor & soil tiller, roller, seeder	1	80	25	Table C4 - Ref 74

Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
Mobile self-contained welfare unit	2	66	25	Table C4 - Ref 78
Mobile generator	2	74	25	Table C4 - Ref 84
Temporary lighting	6	65	25	Table C4 - Ref 86
Total Sound Power Level: 121 dB L_{WA}				

Landfall HDD Compound

2.1.7 At the current PEIR stage of the development there are two potential locations for the Landfall HDD compound which reflect the two possible cable route ‘legs’, as shown in Figure 1. The approximate potential TCC compound locations have a blue outline and the possible cable route legs are in red.

Figure 1: Landfall HDD Compound Potential Locations / Areas within which the compound could be located



2.1.8 The same level of construction activity is anticipated regardless of which cable route leg the Landfall HDD compound resides. The following sequence of construction activities will take place at the Landfall HDD compound:

- Landfall HDD compound establishment;
- Excavation of entry pits;
- HDD operations;
- Excavation of transition joint bays (TJB);
- Construction of TJBs;
- Pull-in of export cables from offshore;
- Open trenching of onshore cables up to and into TJBs with the following sub-activities:
 - Trench excavation;
 - Trench backfilling; and
 - Trench reinstatement.
- Jointing of onshore and offshore cables;
- Roof and backfill over TJBs; and then
- HDD compound removal.

2.1.9 The plant details for each of the construction activities are set out in the tables below, using the same principles as discussed for the beach operations TCC. It is noted that up to two HDDs may take place at the same time; therefore 3 dB has been added to the sound power level in Table 6, which equates to doubling the entire list of plant within the table.

Table 4: Establish Landfall HDD Compound Plant Sound Power Details

Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
D6 dozer	1	81	100	Table C2 - Ref 12
30T excavator	2	75	100	Table C2 - Ref 16
20T dumper	3	87	100	Table C2 - Ref 31
Smooth drum vibro road roller	1	75	100	Table C5 - Ref 20
21T excavator	1	78	100	Table C2 - Ref 3
5T forward tipping dumper	1	78	100	Table C4 - Ref 7
Loading shovel	1	80	100	Table C2 - Ref 27
Tractor & fencing kit	1	80	100	Table C4 - Ref 74
Tractor & trailer	1	79	70	Table C4 - Ref 75
Tractor & fuel bowser	1	89	10	Table C6 - Ref 36
Tractor & water bowser	1	83	25	Table C6 - Ref 38
Grader	1	86	100	Table C6- Ref 31
Telehandler	1	79	70	Table C4 - Ref 54
Mobile self-contained welfare unit	2	66	25	Table C4 - Ref 78
Mobile generator	2	74	25	Table C4 - Ref 84
Temporary lighting	6	65	25	Table C4 - Ref 86
Total Sound Power Level: 122 dB L_{WA}				

Table 5: Excavation of Entry Pit Plant Sound Power Details

Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
30T excavator	1	75	100	Table C2 - Ref 16
20T dumper	2	87	100	Table C2 - Ref 31
Smooth drum vibro road roller	1	75	10	Table C5 - Ref 20
21T excavator	1	78	50	Table C2 - Ref 3
5T forward tipping dumper	1	78	50	Table C4 - Ref 7
Tractor & fuel bowser	1	89	10	Table C6 - Ref 36
Tractor & water bowser	1	83	25	Table C6 - Ref 38
Mobile self-contained welfare unit	1	66	25	Table C4 - Ref 78
Mobile generator	2	74	25	Table C4 - Ref 84
Temporary lighting	4	65	25	Table C4 - Ref 86
Pump	2	78	100	Table C6 - Ref 41
Total Sound Power Level: 119 dB L_{WA}				

Table 6: HDD Operations Plant Sound Power Details

Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
Generator	1	74	100	Table C4 - Ref 84
Telehandler	2	79	75	Table C4 - Ref 54
Vibratory piling rig	1	88	10	Table C3 - Ref 8
Directional drill generator	1	77	100	Table C4 - Ref 96
Mounting supports for directional drill (hydraulic hammer)	1	87	25	Table C4 - Ref 92
Mud pump	1	80	100	Provided by Riggall & Assoc. based on historic data.
Mixing tank	1	75	100	
Cuttings / recycling tank	1	80	100	
Total Sound Power Level: 116 dB L_{WA} (one HDD)				

Table 7: Excavation of TJB Plant Sound Power Details

Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
30T excavator	1	75	100	Table C2 - Ref 16
20T dumper	2	87	100	Table C2 - Ref 31
Smooth drum vibro roller	1	75	10	Table C5 - Ref 20

Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
21T excavator	1	78	50	Table C2 - Ref 3
5T forward tipping dumper	1	78	50	Table C4 - Ref 7
Tractor & fuel bowser	1	89	10	Table C6 - Ref 36
Tractor & water bowser	1	83	25	Table C6 - Ref 38
Mobile self-contained welfare unit	1	66	25	Table C4 - Ref 78
Mobile generator	2	74	25	Table C4 - Ref 84
Temporary lighting	4	65	25	Table C4 - Ref 86
Pump	2	78	100	Table C6 - Ref 41
Total Sound Power Level: 119 dB L_{WA}				

Table 8: Construction of TJB Plant Sound Power Details

Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
Tractor & trailer	1	79	50	Table C4 - Ref 75
Tractor & fuel bowser	1	89	10	Table C6 - Ref 36
Tractor & water bowser	1	83	25	Table C6 - Ref 38
Mobile concrete pump / concrete mixer truck	1	80	50	Table C4 - Ref 20
Telehandler	1	79	50	Table C4 - Ref 54
Mobile self-contained welfare unit	1	66	25	Table C4 - Ref 78
Mobile generator	2	74	50	Table C4 - Ref 84
Temporary lighting	4	65	25	Table C4 - Ref 86
Pump	2	78	100	Table C6 - Ref 41
Total Sound Power Level: 114 dB L_{WA}				

Table 9: Pull-in of Export Cables from Offshore Plant Sound Power Details

Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
Tractor & fuel bowser	1	89	10	Table C6 - Ref 36
Tractor & cable drum trailer	1	80	50	Table C4 - Ref 74
Cable winch	1	83	50	Assumed value
Mobile self-contained welfare unit	1	66	25	Table C4 - Ref 78
Mobile generator	2	74	25	Table C4 - Ref 84
Temporary lighting	4	65	25	Table C4 - Ref 86
Pump	2	78	100	Table C6 - Ref 41
Total Sound Power Level: 114 dB L_{WA}				

Table 10: Open Trenching Works (Trench Excavation) Plant Sound Power Details

Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
30T excavator	2	75	100	Table C2 - Ref 16
20T dumper	2	87	100	Table C2 - Ref 31
21T excavator	2	78	100	Table C2 - Ref 3
5T forward tipping dumper	2	78	100	Table C4 - Ref 7
Loading shovel	2	80	50	Table C2 - Ref 27
Trench roller	2	73	50	Table C2 - Ref 40
Tractor & trailer	1	79	50	Table C4 - Ref 75
Tractor & fuel bowser	1	89	10	Table C6 - Ref 36
Tractor & water bowser	1	83	25	Table C6 - Ref 38
Telehandler	1	79	50	Table C4 - Ref 54
Mobile self-contained welfare unit	1	66	25	Table C4 - Ref 78
Crawler crane	1	75	10	Table C4 - Ref 52
Mobile generator	2	74	25	Table C4 - Ref 84
Temporary lighting	8	65	25	Table C4 - Ref 86
Pump	2	78	100	Table C6 - Ref 41
Total Sound Power Level: 121 dB L_{WA}				

Table 11: Open Trenching Works (Trench Backfilling) Plant Sound Power Details

Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
30T excavator	2	75	100	Table C2 - Ref 16
20T dumper	2	87	100	Table C2 - Ref 31
21T excavator	2	78	100	Table C2 - Ref 3
5T forward tipping dumper	2	78	100	Table C4 - Ref 7
Loading shovel	2	80	50	Table C2 - Ref 27
Trench roller	2	73	50	Table C2 - Ref 40
Tractor & trailer	1	79	50	Table C4 - Ref 75
Tractor & fuel bowser	1	89	10	Table C6 - Ref 36
Tractor & water bowser	1	83	25	Table C6 - Ref 38
Telehandler	1	79	50	Table C4 - Ref 54
Mobile self-contained welfare unit	1	66	25	Table C4 - Ref 78
Mobile generator	2	74	25	Table C4 - Ref 84
Temporary lighting	8	65	25	Table C4 - Ref 86
Pump	2	78	100	Table C6 - Ref 41
Total Sound Power Level: 121 dB L_{WA}				

Table 12: Open Trenching Works (Trench Reinstatement) Plant Sound Power Details

Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
D6 dozer	2	81	100	Table C2 - Ref 12
30T excavator	2	75	100	Table C2 - Ref 16
20T dumper	2	87	100	Table C2 - Ref 31
Smooth drum vibro roller	1	75	50	Table C5 - Ref 20
21T excavator	1	78	100	Table C2 - Ref 3
5T forward tipping dumper	1	78	100	Table C4 - Ref 7
Loading shovel	2	80	100	Table C2 - Ref 27
Tractor & fuel bowser	1	89	10	Table C6 - Ref 36
Tractor & water bowser	1	83	25	Table C6 - Ref 38
Mobile self-contained welfare unit	1	66	25	Table C4 - Ref 78
Mobile generator	2	74	25	Table C4 - Ref 84
Temporary lighting	8	65	25	Table C4 - Ref 86
Total Sound Power Level: 121 dB L_{WA}				

Table 13: Jointing of Onshore and Offshore Cable Plant Sound Power Details

Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
Tractor & trailer	1	79	50	Table C4 - Ref 75
Tractor & fuel bowser	1	89	10	Table C6 - Ref 36
Tractor & water bowser	1	83	25	Table C6 - Ref 38
Mobile crane	1	82	25	Table C4 - Ref 45
Cable laying tracked crane	1	75	25	Table C4 - Ref 52
Telehandler	1	79	50	Table C4 - Ref 54
Mobile self-contained welfare unit	1	66	20	Table C4 - Ref 78
Crawler crane	1	75	25	Table C4 - Ref 52
Mobile generator	2	74	100	Table C4 - Ref 84
Temporary lighting	4	65	50	Table C4 - Ref 86
Pump	2	78	100	Table C6 - Ref 41
Total Sound Power Level: 115 dB L_{WA}				

Table 14: Roof and Backfilling Over TJB Plant Sound Power Details

Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
D6 dozer	1	81	100	Table C2 - Ref 12
30T excavator	1	75	100	Table C2 - Ref 16
20T dumper	2	87	100	Table C2 - Ref 31
21T excavator	1	78	100	Table C2 - Ref 3
5T forward tipping dumper	1	78	100	Table C4 - Ref 7
Loading shovel	1	80	100	Table C2 - Ref 27
Trench roller	1	73	75	Table C2 - Ref 40
Tractor & trailer	1	79	25	Table C4 - Ref 75
Tractor & fuel bowser	1	89	10	Table C6 - Ref 36
Tractor & water bowser	1	83	25	Table C6 - Ref 38
Cement mixer	1	61	25	Table C4 - Ref 23
Mobile crane	1	82	25	Table C4 - Ref 45
Pre-cast concrete truck	1	83	5	Table C6 - Ref 22
Telehandler	1	79	25	Table C4 - Ref 54
Mobile self-contained welfare unit	1	66	25	Table C4 - Ref 78
Mobile generator	2	74	25	Table C4 - Ref 84
Temporary lighting	4	65	25	Table C4 - Ref 86
Pump	2	78	100	Table C6 - Ref 41
Total Sound Power Level: 120 dB L_{WA}				

Table 15: HDD Compound Removal Plant Sound Power Details

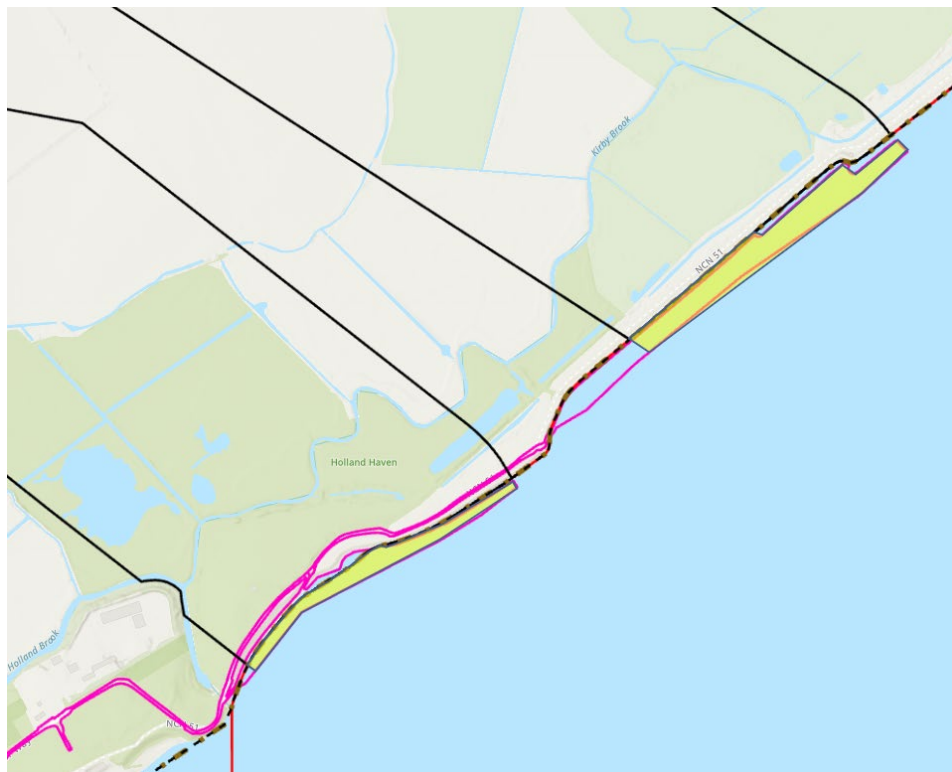
Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
D6 dozer	2	81	100	Table C2 - Ref 12
30T excavator	2	75	100	Table C2 - Ref 16
20T dumper	2	87	100	Table C2 - Ref 31
Smooth drum vibro road roller	1	75	50	Table C5 - Ref 20
21T excavator	1	78	100	Table C2 - Ref 3
5T forward tipping dumper	1	78	100	Table C4 - Ref 7
Loading shovel	2	80	100	Table C2 - Ref 27
Tractor & fencing kit	1	80	50	Table C4 - Ref 74
Tractor & trailer	1	79	50	Table C4 - Ref 75
Tractor & fuel bowser	1	89	10	Table C6 - Ref 36

Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
Tractor & water bowser	1	83	25	Table C6 - Ref 38
Tractor & soil tiller, roller, seeder	1	80	25	Table C4 - Ref 74
Mobile self-contained welfare unit	2	66	25	Table C4 - Ref 78
Mobile generator	2	74	25	Table C4 - Ref 84
Temporary lighting	6	65	25	Table C4 - Ref 86
Total Sound Power Level: 121 dB L_{WA}				

Beach Works/Compound

- 2.1.10 For an intertidal exit a small compound may be required on the beach. A reception pit may be constructed at the end point of the HDD to allow pullback of the HDD into the bores and allow installation of the offshore export cable. The facilities within the beach exit compound would be minimal and may include stores / workshop, a tool laydown area, drill pipe rack and an office / welfare. This compound may be able to be situated at an onshore location where direct access to the beach is available in close proximity to the HDD exit locations. It is assumed that a Landfall HDD exit compound on the beach would not consist of hard standing and would only comprise a fenced off area on the beach. Any vehicular traffic to this compound would run directly on the beach sediments.
- 2.1.11 The beach compound will be located at end of the cable route leg. As discussed earlier, there are currently two potential legs and therefore, the beach compound may be positioned in one of two large yellow areas illustrated in Figure 2.
- 2.1.12 The same level of construction activity is anticipated regardless of which cable route leg the beach compound resides. The following sequence of construction activities will take place at the beach compound:
- Beach compound establishment;
 - Excavation of inter-tidal exit pit;
 - Excavation on the beach of open trench; and then
 - Pull-in of export cables from offshore and backfilling open trench on the beach.

Figure 2: Beach Compound Potential Locations



2.1.13 The plant details for each of the construction activities are set out in the tables below, using the same principles as discussed for the beach operations TCC. The plant listed in Table 16 will be used during each of the four construction stages described above. Additional construction activity will be carried out during the second stage of the beach compound works, excavation of inter-tidal exit pit, Table 17 details the plant associated with that stage. The calculation for this second stage assumes that all plant listed in Table 16 and Table 17 will be utilised (total sound power level of 115 dB L_{WA}).

Table 16: Landfall Beach Operations Plant Sound Power Details

Plant description	N ^o	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
21T excavator	2	78	10	Table C2 - Ref 3
Cable winch	1	83	10	Assumed value
Temporary lighting	4	65	25	Table C4 - Ref 86
Pump	2	78	50	Table C6 - Ref 41
Total Sound Power Level: 108 dB L_{WA}				

Table 17: Excavation of Inter-Tidal Exit Pit Plant Sound Power Details

Plant description	N ^o	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
Percussive piling rig	1	88	70	Table C3 - Ref 3
Total Sound Power Level: 114 dB L_{WA}				

2.2 ECC

2.2.1 There are 13 key construction activities associated with the ECC:

- Site access point establishment (Table 4);
- Temporary haul route installation along sections of route;
- HDD / trenchless duct installation (Table 6);
- Trench excavation (Table 10);
- Trench backfilling (Table 11);
- Trench reinstatement (Table 12);
- Excavation of joint bays;
- Construction of joint bays (Table 8);
- Jointing of ECC cables;
- Roof and backfill over joint bays;
- Removal of haul roads, fencing and ground reinstatement;
- Construction of TCC (Table 4); and
- Removal of TCC (Table 15).

2.2.2 The plant details for each of the construction activities are set out in the tables below, using the same principles as discussed for the beach operations TCC. Where a table is referenced in the list above, the plant associated with the construction activity has been deemed comparable to an earlier listed construction activity found in the table and these data are used.

Table 18: Temporary Haul Road Installation Plant Sound Power Details

Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
D6 dozer	1	81	100	Table C2 - Ref 12
30T excavator	2	75	100	Table C2 - Ref 16
20T dumper	3	87	100	Table C2 - Ref 31
Smooth drum vibro road roller	1	75	100	Table C5 - Ref 20
21T excavator	1	78	100	Table C2 - Ref 3
5T forward tipping dumper	1	78	100	Table C4 - Ref 7
Loading shovel	1	80	100	Table C2 - Ref 27
Tractor & fencing kit	1	80	100	Table C4 - Ref 74
Tractor & trailer	1	79	70	Table C4 - Ref 75
Tractor & fuel bowser	1	89	10	Table C6 - Ref 36
Tractor & water bowser	1	83	25	Table C6 - Ref 38
Grader	1	86	100	Table C6 - Ref 31
Telehandler	1	79	70	Table C4 - Ref 54
Mobile self-contained welfare unit	1	66	25	Table C4 - Ref 78
Mobile generator	2	74	25	Table C4 - Ref 84
Temporary lighting	12	65	25	Table C4 - Ref 86
Total Sound Power Level: 122 dB L_{WA}				

Table 19: Excavation of Joint Bay Plant Sound Power Details

Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
30T excavator	2	75	100	Table C2 - Ref 16
20T dumper	2	87	100	Table C2 - Ref 31
Smooth drum vibro roller	1	75	10	Table C5 - Ref 20
21T excavator	1	78	50	Table C2 - Ref 3
5T forward tipping dumper	1	78	50	Table C4 - Ref 7
Tractor & fuel bowser	1	89	10	Table C6 - Ref 36
Tractor & water bowser	1	83	25	Table C6 - Ref 38
Mobile self-contained welfare unit	1	66	25	Table C4 - Ref 78
Mobile generator	2	74	25	Table C4 - Ref 84
Temporary lighting	4	65	25	Table C4 - Ref 86
Pump	2	78	100	Table C6 - Ref 41
Total Sound Power Level: 119 dB L_{WA}				

Table 20: Jointing of ECC Cable Plant Sound Power Details

Plant description	Nº	SPL at 10m, dB LAeq	Percent of working day operating	Source BS 5228
Tractor & fuel bowser	1	89	10	Table C6 - Ref 36
Tractor & cable drum trailer	1	80	50	Table C4 - Ref 74
Cable winch	1	83	50	Assumed value
Mobile self-contained welfare unit	1	66	25	Table C4 - Ref 78
Mobile generator	2	74	25	Table C4 - Ref 84
Temporary lighting	4	65	25	Table C4 - Ref 86
Pump	2	78	100	Table C6 - Ref 41
Total Sound Power Level: 114 dB L_{WA}				

Table 21: Roof and Backfilling Over Joint Bay Plant Sound Power Details

Plant description	Nº	SPL at 10m, dB LAeq	Percent of working day operating	Source BS 5228
D6 dozer	2	81	100	Table C2 - Ref 12
30T excavator	2	75	100	Table C2 - Ref 16
20T dumper	2	87	100	Table C2 - Ref 31
21T excavator	1	78	100	Table C2 - Ref 3
5T forward tipping dumper	1	78	100	Table C4 - Ref 7
Loading shovel	1	80	100	Table C2 - Ref 27
Trench roller	1	73	75	Table C2 - Ref 40
Tractor & fuel bowser	1	89	10	Table C6 - Ref 36
Tractor & water bowser	1	83	25	Table C6 - Ref 38
Mobile self-contained welfare unit	1	66	25	Table C4 - Ref 78
Mobile generator	2	74	25	Table C4 - Ref 84
Temporary lighting	4	65	25	Table C4 - Ref 86
Pump	2	78	100	Table C6 - Ref 41
Total Sound Power Level: 121 dB L_{WA}				

Table 22: Haul Road Removal Plant Sound Power Details

Plant description	Nº	SPL at 10m, dB LAeq	Percent of working day operating	Source BS 5228 operating
D6 dozer	2	81	100	Table C2 - Ref 12
30T excavator	2	75	100	Table C2 - Ref 16
20T dumper	2	87	100	Table C2 - Ref 31
Smooth drum vibro roller	1	75	50	Table C5 - Ref 20
21T excavator	1	78	100	Table C2 - Ref 3
5T forward tipping dumper	1	78	100	Table C4 - Ref 7
Loading shovel	2	80	100	Table C2 - Ref 27
Tractor & fencing kit	1	80	50	Table C4 - Ref 74
Tractor & trailer	1	79	50	Table C4 - Ref 75
Tractor & fuel bowser	1	89	10	Table C6 - Ref 36
Tractor & water bowser	1	83	25	Table C6 - Ref 38
Tractor & soil tiller, roller, seeder	1	80	25	Table C4 - Ref 74
Mobile self-contained welfare unit	2	66	25	Table C4 - Ref 78
Mobile generator	2	74	25	Table C4 - Ref 84
Temporary lighting	12	65	25	Table C4 - Ref 86
Total Sound Power Level: 121 dB L_{WA}				

2.3 OnSS

2.3.1 There are five key construction activities associated with the OnSS:

- Site enabling works: site clearance, ground works and formation of site platform;
- Construction of TCC (Table 4).
- Access road construction;
- Building foundation works;
- Building fabrication and HV plant installation; and

2.3.2 Each of the above activities will involve the usage of multiple items of plant for a percentage of the working day. Set out in the tables below for each of the construction activities are the plant type, the number used, the SPL at a reference 10 m from one item of plant, the percentage of the working day that the plant will be operating and an overall sound power level. The overall sound power level combines all the individual sound pressure levels logarithmically and accounts for the number of plant and the time that they are generating noise, assuming a single total source for all noise. Where a table is referenced in the list above, the plant associated with the construction activity has been deemed comparable to an earlier listed construction activity found in the table and the these data are used.

Table 23: OnSS Site Enabling Works Plant Sound Power Details

Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
32T excavator (earthworks)	6	75	100	Table C2 - Ref 16
44T tracked excavator breaking rubble	4	82	100	Table C1 - Ref 12
28T Dozer	4	79	75	Table C2 - Ref 11
Air compressor	4	75	100	Table C3 - Ref 19
29T dump truck tipping	8	79	70	Table C2 - Ref 30
Mobile generator	2	74	100	Table C4 - Ref 84
Crusher	2	90	80	Table C9 - Ref 14
Total Sound Power Level: 123 dB L_{WA}				

Table 24: Access Road Construction Plant Sound Power Details

Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
32T excavator	6	75	100	Table C2 - Ref 16
29T dump truck	8	79	70	Table C2 - Ref 30
Asphalt spreader with support lorry	1	80	100	Library data
Smooth drum vibro roller	1	75	70	Table C5 - Ref 20
Grader	1	82	100	Table C5 - Ref 7
Mobile generator	2	74	100	Table C4 - Ref 84
Total Sound Power Level: 116 dB L_{WA}				

Table 25: OnSS Building Foundation Works Plant Sound Power Details

Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
Large rotary bored piling rig	1	83	100	Table C3 - Ref 14
Tracked drilling rig with hydraulic drifter	1	82	100	Table C3 - Ref 15
Crane mounted auger	1	79	100	Table C3 - Ref 16
Mini piling rig	2	76	100	Table C3 - Ref 17
Compressor for mini piling	1	75	100	Table C3 - Ref 19
Dump truck	4	79	50	Table C2 - Ref 30
Truck mixer with pump	2	75	10	Table C4 - Ref 28
Excavator (earthworks)	3	75	80	Table C2 - Ref 16
Grinder	5	80	50	Table C4 - Ref 93

Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
Compressor	2	75	100	Table C3 - Ref 19
Mobile generator	5	74	100	Table C4 - Ref 84
Total Sound Power Level: 119 dB L_{WA}				

Table 26: OnSS Building Fabrication and HV Installation Works Plant Sound Power Details

Plant description	Nº	SPL at 10m, dB L _{Aeq}	Percent of working day operating	Source BS 5228
Mobile crane	1	71	50	Table C4 - Ref 41
Lorry	3	77	25	Table C4 - Ref 53
MEWP	2	67	75	Table C4 - Ref 57
Dump truck	4	79	10	Table C2 - Ref 30
Compressor	1	75	100	Table C2 - Ref 16
Forklift truck	2	71	50	Table C2 - Ref 35
Grinder	5	80	50	Table C4 - Ref 93
Pneumatic chipper/drill	3	83	50	Table C1 - Ref 6
Scaffolding	1	72	25	Library data
Mobile generator	2	74	100	Table C4 - Ref 84
Total Sound Power Level: 117 dB L_{WA}				

3 References

1. British Standards Institution. 2014. 'British Standard 5228-1: 2009+A1:2014 Code of practice for noise and vibration control on construction and open sites'.



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