

ENVIRONMENTAL STATEMENT (VOLUME III)

Appendix 15.2 Noise and Vibration Assessment Assumptions

HyNet Carbon Dioxide Pipeline DCO

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 –
Regulations 5(2)(a)

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1. CONSTRUCTION ASSUMPTIONS

1.1. NOISE MODEL SETTINGS

A noise model as created using software CadnaA. The following configuration settings were assumed:

- Calculations were set to construction noise in accordance with BS 5228:2009+A1:2014 - Code of practice for noise and vibration control on construction and open sites;
- Default ground absorption setting was set to 50 %;
- The maximum order of reflections was set to a value of two; and
- Façade noise levels have been obtained from the noise predictions. They include a +3dB correction to the free-field noise levels.

PLANT ITEM ASSUMPTIONS

The following tables show the noise levels associated with the construction activities with reference to BS 5228:2009+A1:2014. In each table, the number of items and the percentage – on time during a typical working day are presented. The results relate to a noise level at 10m from the activity.

The resultant noise levels presented in the tables correspond to key stages identified with the highest noise levels, as a worst-case. For instance, noise levels associated with the vegetation removal stage of the open cut trenches have been used to assess the potential impact from that activity. Other stages will include the sequence described in **Chapter 3 - Description of the DCO Proposed Development (Volume II)**.

Table 1 - Open Cut Trench Noise Levels - Fencing and Vegetation Removal

Plant Item	BS 5228 Reference	L _{Aeq,T} at 10m dB from plant	Number of Items	On-time %	L _{Aeq,T} at 10m dB from plant items	Resultant L _{Aeq,T} at 10m dB
Tractor	-	79	2	80	81	
Post Rammer	-	85	1	1	65	
Nail Gun	-	92	1	1	72	
Tracked Excavator	C.02 #19	77	1	80	76	

Plant Item	BS 5228 Reference	L _{Aeq,T} at 10m dB from plant	Number of Items	On-time %	L _{Aeq,T} at 10m dB from plant items	Resultant L _{Aeq,T} at 10m dB
Wood Chipper	C.04 #72	79	1	80	78	85
Chainsaw	C.04 #72	79	1	50	76	
Strimmer	-	80	1	50	77	

Table 2 presents the noise levels associated with the trenchless crossings. Noise levels associated with horizontal directional drilling (HDD) have been used in the assessment.

Table 2 - Trenchless Crossing Noise Levels - HDD

Plant Item	BS 5228 Reference	L _{Aeq,T} at 10m dB from plant	Number of Items	On-time %	L _{Aeq,T} at 10m dB from plant items	Resultant L _{Aeq,T} at 10m dB
Generator for site cabins	C.04 #78	66	1	50	63	82
Tracked excavator 21t	C.02 #21	71	1	40	67	
HDD Rig	C.04 #96	77	1	100	77	
Crane 50t	C.04 #46	67	1	40	63	
Mud segregation plant	-	79	1	100	79	
Bentonite mixing unit	-	69	1	100	69	
High pressure pump	-	68	1	100	68	

Table 3 - AGI and BVS Noise Levels – Main Construction

Plant Item	BS 5228 Reference	L _{Aeq,T} at 10m dB from plant	Number of Items	On-time %	L _{Aeq,T} at 10m dB from plant items	Resultant L _{Aeq,T} at 10m dB
Mini Excavator	C.02 #5	76	2	100	79	84
Vibrating Roller	C.05 #20	75	2	50	75	
Telehandler	C.02 #35	71	2	50	71	
Dumper	C.02 #30	79	2	80	81	
Grader	C.02 #11	79	2	10	72	
Generator	C.04 #80	60	1	100	60	

Table 4 - Construction Compound Noise Levels – Vegetation Removal

Plant Item	BS 5228 Reference	L _{Aeq,T} at 10m dB from plant	Number of Items	On-time %	L _{Aeq,T} at 10m dB from plant items	Resultant L _{Aeq,T} at 10m dB
25t tracked excavator	C.02 #19	77	1	80	76	82
Chainsaw	C.04 #72	79	1	50	76	
Strimmer	-	80	1	50	77	
Wood chipper	C.04 #72	79	1	50	76	

Resultant L_{Aeq,T} at 10m dB used as the noise level that would not be exceeded at compound boundary.

ABC NOISE CATEGORIES

The construction noise assessment is based on the BS 5228 ABC method described in **Table 15.6 of Chapter 15 – Noise and Vibration (Volume II)**. Categories have been assigned to group of noise sensitive receptors based on their proximity to the long-term noise monitoring locations, see **Figure 15.1 – Environmental Noise Survey Locations and Noise Constraints (Volume IV)**. **Table 5** shows the baseline noise levels and their associated ABC assessment category for day, evening and night.

Table 5 - Long Term Summary of Ambient Noise Levels

Location	Average $L_{Aeq, T}$ (dB)		
	Daytime (07:00 – 19:00)	Evening (19:00 – 23:00)	Night-time (23:00 – 07:00)
LT 1	65 (B)	58 (C)	56 (C)
LT 2	55 (A)	51 (A)	55 (A)
LT 3	61 (A)	59 (C)	56 (C)
LT 4	57 (A)	51 (A)	49 (C)
LT 5	57 (A)	50 (A)	45 (B)
LT 6	52 (A)	42 (A)	40 (A)
LT 7	47 (A)	41 (A)	40 (A)
LT 8	51 (A)	46 (A)	49 (C)
LT 9	52 (A)	52 (A)	44 (B)
LT 10	53 (A)	50 (A)	46 (B)
LT 11	63 (B)	59 (C)	57 (C)
LT 12	46 (A)	43 (A)	40 (A)
LT 13	50 (A)	43 (A)	44 (B)
LT 14	51 (A)	46 (A)	49 (C)
LT 15	53 (A)	50 (A)	48 (C)
LT 16	49 (A)	42 (A)	41 (A)

ACCESS LOCATION ASSUMPTIONS

Noise levels arising from the access locations shown in **Figure 17.5 Access Locations (Volume IV)** have been included in the model. Heavy vehicle movements in these areas have been included in the noise model using an adjusted sound power level L_w of 77 dB. This value includes an ‘on-time’ correction to allow for the potential number of movements in each of the access locations.

1.2. VIBRATION ASSUMPTIONS

The following assumptions relate to the construction vibration assessment:

- Nominal energy in joules for hammer in use in piling – 85000 W;
- Scaling factor depending on probability of predicted value being exceeded for vibratory piling set to 60 for 50 %, 126 for 67 %, and 266 for 95 %;
- Scaling factor depending on probability of predicted value being exceeded for steady state vibratory rollers and compactors set to 65 for 50 %, 106 for 67 %, and 177 for 95 %; and
- Vibratory roller and compactor data from TRL 429, shown in **Table 6** below.

Table 6 - Assumptions for Construction Vibration Assessment

Plant Model	Type	No. of Drums	Drum Width (m)	Mass per m width (kg/m)		High Setting		
				Front	Rear	Amplitude of Drum Vibration (mm)	Frequency (Hz)	Centrifugal Force (kN)
Bomag BW161 AD	Twin Smooth Drum roller – JCB Size	2	1.68	2680	2740	0.91	30	58