HyNet North West

ENVIRONMENTAL STATEMENT (VOLUME III)

Appendix 15.3 Noise and Vibration Assessment Results

HyNet Carbon Dioxide Pipeline DCO

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 – Regulations 8(1)(c)

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TABLES

1. NOISE

1.1. CONSTRUCTION

CONSTRUCTION NOISE MODEL RESULTS

This section presents the results of the noise predictions for the Construction Stage of the DCO Proposed Development.

~~This **Revision B** of **Appendix 15.3: Noise and Vibration Assessment Results** replaces and supersedes **Revision A (APP-146)**. **Appendix 15.3 (Revision B)** provides updated baseline information in response to the proposed design changes as outlined in **Table i.i** of **Chapter I** of the **ES Addendum 2023 Change Request 1**.~~

As discussed in **Chapter 15 – Noise and Vibration (Volume II**), a noise model was produced using CadnaA software. The following activities have been included in the model:

- Open cut trenches: daytime only;
- Trenchless crossings: daytime, evening and night-time;
- Compounds: daytime only;
- AGIs and BVSs: daytime only; and
- Access locations for heavy vehicles: daytime only.

Open cut trenches have been modelled in three potential locations in order to predict the potential variation in noise impact. The following scenarios were modelled:

- Indicative Newbuild Carbon Dioxide Pipeline route, as presented in **Figure 3.2 DCO Proposed Development (Volume IV);**
- Indicative Newbuild Carbon Dioxide Pipeline route near the north west part of the Newbuild Infrastructure Boundary, therefore closer to noise sensitive receptors located north west of the boundary; and
- Indicative Newbuild Carbon Dioxide Pipeline route near the south east part of the Newbuild Infrastructure Boundary, therefore closer to noise sensitive receptors located south east of the boundary.

Table 1, **Table 2,** and **Table 3** present the number of noise sensitive receptors subject to a negligible to high magnitude of impact in accordance with the criteria presented in **Table 15.14** in **Chapter 15 – Noise and Vibration (Volume II)**. The tables show the number of receptors for both unmitigated and mitigated scenarios.

Table 1 - Magnitude of Construction Noise Impact – Indicative Route

Magnitude of Impact	Number of Receptors – Unmitigated			Number of Receptors – Mitigated		
	Day	Evening	Night	Day	Evening	Night
Negligible	1087	2431	1851	2858	3403	3057
Low	1991	685	533	956	271	379
Medium	502	366	638	37	131	202
High	276	374	834	5	51	218

Table 2 - Magnitude of Construction Noise Impact – Route near North West Boundary

Magnitude of Impact	Number of Receptors – Unmitigated			Number of Receptors – Mitigated		
	Day	Evening	Night	Day	Evening	Night
Negligible	1016	2315	1779	2826	3329	2968
Low	2034	710	499	949	299	372
Medium	513	410	657	59	168	228
High	293	421	921	22	60	288

Table 3 - Magnitude of Construction Noise Impact – Route near South East Boundary

Magnitude of Impact	Number of Receptors – Unmitigated			Number of Receptors – Mitigated		
	Day	Evening	Night	Day	Evening	Night
Negligible	1064	2332	1819	2861	3429	3028
Low	2004	688	491	919	243	416
Medium	487	465	646	55	130	191
High	301	371	900	21	54	221

Table 4, **Table 5** and **Table 6** present a range of predicted noise levels associated with the three open trench routes modelled for both unmitigated and mitigated scenarios. The values shown in the tables correspond to façade noise levels at a height of 4m for receptors within the Study Area. Values for evening and night-time relate to associated variations in the locations for trenchless crossings.

Table 4 - Predicted Noise Levels – Indicative Newbuild Carbon Dioxide Pipeline Route

Magnitude of Impact	Unmitigated Central L_{Aeq} dB			Mitigated Central L_{Aeq} dB		
	Day	Evening	Night	Day	Evening	Night
Negligible	15 – 65	9 – 59	9 – 57	15 – 63	9 – 59	9 – 57
Low	48 – 70	43 – 65	40 – 54	48 – 70	42 – 64	40 – 55
Medium	65 – 75	55 – 69	46 - 60	65 – 69	55 – 68	45 – 59
High	70 - 82	60 - 82	50 - 82	70 - 72	42 – 64	50 – 72

Table 5 - Predicted Noise Levels – Route near North West Boundary

Magnitude of Impact	Unmitigated South-East Boundary L_{Aeq} dB			Mitigated South-East Boundary L_{Aeq} dB		
	Day	Evening	Night	Day	Evening	Night
Negligible	15 – 65	9 – 59	9 – 57	15 – 65	9 – 59	9 – 57
Low	52 – 70	43 – 65	41 – 54	47 – 70	42 – 65	40 – 53
Medium	65 – 75	55 – 70	46 – 60	65 – 74	55 – 68	45 – 60
High	70 - 88	60 - 83	50 - 83	70 - 78	60 - 74	50 – 74

Table 6 - Predicted Noise Levels – Route near South East Boundary

Magnitude of Impact	Unmitigated North-West Boundary L_{Aeq} dB			Mitigated North-West Boundary L_{Aeq} dB		
	Day	Evening	Night	Day	Evening	Night
Negligible	15 – 65	9 – 59	9 – 57	15 – 63	9 – 59	9 – 57
Low	48 – 70	43 – 65	42 – 45	47 – 69	42 – 59	40 – 55
Medium	65 – 75	55 – 69	45 – 60	65 – 70	55 – 60	45 – 60
High	70 - 92	60 - 86	50 - 86	70 - 82	60 - 74	50 – 74

Important Areas and Noise Action Planning Priority Areas

Table 7 shows a Noise Important Areas (IA) where there are noise sensitive receptors likely to experience either a medium or a high magnitude of noise impact during the construction period. However, no significant adverse effects were identified within IAs or Noise Action Planning Priority Areas (NAPPAs).

Table 7 - Adverse Effects within IAs

Alignment Variant	Period	NIA ID
		10784
Central Indicative Alignment	Day	0
	Evening	0
	Night	X
North-West Boundary Alignment	Day	0
	Evening	0
	Night	X
South-East Boundary Alignment	Day	0
	Evening	0
	Night	X

Construction Road Traffic Noise

An assessment of the potential noise impact due to road traffic noise impact during the Construction Stage was undertaken. **Table 8** presents the changes in noise levels predicted for the following scenarios:

- Year 2025 with DCO Proposed Development (2025 Do-Something) versus Year 2025 without DCO Proposed Development (2025 Do-Minimum).

The noise levels presented in the tables correspond to $L_{A10,18hr}$ dB in accordance with guidance in the Calculation of Road Traffic Noise (CRTN). For road links where the road traffic flows are low and outside the scope of CRTN, then noise levels $L_{Aeq,18hr}$ have been compared using guidance in the Advisory Council (1978): A guide to measurement and prediction of sound level L_{eq}.

Road links IDs referred in the tables are described in **Appendix 17-4 Baseline Traffic Data (Volume III).**

Table 8 - 2025 Road Traffic Basic Noise Levels Comparison

Link ID	2025 Do-Minimum					2025 Do-Something					Change in Noise Level (dB)
	HGV	HGV (%)	Total	18 Hour Basic Noise Level (L_{A10} dB) at 10m	18 Hour Noise Level (L_{Aeq} dB) at 10m	HGV	HGV (%)	Total	18 Hour Basic Noise Level (L_{A10} dB) at 10m	18 Hour Noise Level (L_{Aeq} dB) at 10m	
1	654	7.5 %	8,682	71	-	~~684~~ 703	7.~~97~~ %	8,925~~8,~~ ~~831~~	71	-	0
2	612	2.4 %	25,085	76	-	656	2.6 %	25,304	76	-	0
3	22	1.5 %	1,475	66	-	42	2.7 %	1,577	66	-	0
4	12	0.8 %	1,449	64	-	25	1.6 %	1,512	64	-	0
5	8	2.6 %	304	60	49	21	5.6 %	367	60	50	1
6	9	0.6 %	1,497	63	-	40	2.4 %	1,654	63	-	0
7	256	1.5 %	16,610	73	-	289	1.7 %	16,775	73	-	0
8	24	0.7 %	3,340	67	-	76~~57~~	2.1~~1.6~~ %	~~3,504~~3, 598	67	-	0

Link ID	2025 Do-Minimum					2025 Do-Something					Change in Noise Level (dB)
	HGV	HGV (%)	Total	18 Hour Basic Noise Level (L_{A10} dB) at 10m	18 Hour Noise Level (L_{Aeq} dB) at 10m	HGV	HGV (%)	Total	18 Hour Basic Noise Level (L_{A10} dB) at 10m	18 Hour Noise Level (L_{Aeq} dB) at 10m	
9	23	0.4 %	6,076	69	-	~~33~~ 23	~~0.5~~0.4 %	6,076~~1~~ ~~23~~	69	-	0
10	8	0.5 %	1,640	62	-	~~18~~ 36	2.0~~1.0~~ %	~~1,687~~1, 781	62	-	0
11	86	1.1 %	7,633	69	-	~~95~~ 114	~~1.2~~1.5 %	~~7,680~~7, 774	69	-	0
12	130	1.2 %	11,254	69	-	~~149~~ 158	~~1.3~~1.4 %	~~11,348~~ 11,395	69	-	0
13	226	3.9 %	5,792	66	-	235	4.0 %	5,839	66	-	0
14	348	9.5 %	3,664	65	-	358	9.6 %	3,711	65	-	0
15	514	12.4 %	4,144	67	-	542	12.7 %	4,285	67	-	0
16	6	1.8 %	311	60	49	15	4.2 %	358	60	49	0

Link ID	2025 Do-Minimum					2025 Do-Something					Change in Noise Level (dB)
	HGV	HGV (%)	Total	18 Hour Basic Noise Level (L_{A10} dB) at 10m	18 Hour Noise Level (L_{Aeq} dB) at 10m	HGV	HGV (%)	Total	18 Hour Basic Noise Level (L_{A10} dB) at 10m	18 Hour Noise Level (L_{Aeq} dB) at 10m	
17	1	0.8 %	141	63	47	11	5.6 %	188	62	48	1
18	6	1.9 %	340	61	50	38	7.6 %	497	60	52	2
19	228	1.5 %	15,679	74	-	247	1.6 %	15,773	74	-	0
202~~1~~	4	0.2 %	1,753	61	-	23	1.2 %	1,847	61	-	0
212~~2~~	7	0.5 %	1,462	61	-	26	1.6 %	1,556	61	-	0
222~~4~~	273	5.5 %	4,991	66	-	292	5.7 %	5,085	66	-	0
232~~5~~	12	0.6 %	1,928	62	-	30	1.5 %	2,022	62	-	0
242~~6~~	3	4.0 %	80	64	43	22	12.6 %	174	61	46	3
252~~7~~	360	7.8 %	4,630	63	-	378	8.0 %	4,724	63	-	0

Link ID	2025 Do-Minimum					2025 Do-Something					Change in Noise Level (dB)
	HGV	HGV (%)	Total	18 Hour Basic Noise Level (L_{A10} dB) at 10m	18 Hour Noise Level (L_{Aeq} dB) at 10m	HGV	HGV (%)	Total	18 Hour Basic Noise Level (L_{A10} dB) at 10m	18 Hour Noise Level (L_{Aeq} dB) at 10m	
2628	129	9.0 %	1,423	64	-	147	9.7 %	1,517	64	-	0
2729	30	2.0 %	1,525	64	-	49	3.0 %	1,619	65	-	01
2830	95	2.1 %	4,612	69	-	114	2.4 %	4,706	69.	-	0
2931	318	2.2 %	14,696	73	-	351 370	2.42.5 %	14,861 14,955	73	-	0
3032	9	0.1 %	8,159	67	-	42 61	0.50.7 %	8,3248, 418	67	-	0
3133	5	1.8 %	284	62.	50	36	8.3 %	441	61	52	2
3234	7	0.3 %	2,518	62	-	17 35	0.71.3 %	2,5652, 659	6263	-	0
3335	4,853	7.1 %	68,223	80	-	4,872	7.1 %	68,317	80	-	0

Link ID	2025 Do-Minimum					2025 Do-Something					Change in Noise Level (dB)
	HGV	HGV (%)	Total	18 Hour Basic Noise Level (L_{A10} dB) at 10m	18 Hour Noise Level (L_{Aeq} dB) at 10m	HGV	HGV (%)	Total	18 Hour Basic Noise Level (L_{A10} dB) at 10m	18 Hour Noise Level (L_{Aeq} dB) at 10m	
3436	10	2.3 %	406	62	52	28	5.7 %	500	61	53	1
3537	1	2.9 %	35	70	42	20	15.4 %	129	64	48	6
3638	37	0.5 %	8,187	66	-	56	0.7 %	8,281	66	-	0
37	399	3.5 %	11,479	69	-	408	3.5 %	11,526	69	-	0
38	528	18.1 %	2,916	64	-	537	18.1 %	2,963	64	-	0

Biodiversity Receptors

Table 9 presents the mitigated construction noise levels predicted at locations representative of biodiversity receptors. A description of the associated receptors and the assessment are presented in **Chapter 9 - Biodiversity (Volume II)**.

Table 9 - Predicted Mitigated Construction Noise Levels at Biodiversity Receptors

Biodiversity Receptor	Noise Level L_{Aeq} dB								
	Indicative Route			Route near North West Boundary			Route near South East Boundary		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
B113	64	17	17	61	22	22	79	34	34
T49	63	44	44	61	46	46	68	40	40
T102	32	32	32	32	32	32	32	32	32
T190	64	57	57	65	54	54	60	52	52
T200	57	48	48	62	59	59	63	62	62
T220	65	58	58	68	62	62	64	50	50
T325 – T327	65	52	52	61	51	51	73	52	52
T365	63	< 10	< 10	76	< 10	< 10	60	< 10	< 10
T371	60	58	58	58	56	56	74	64	64
T111	65	52	53	61	52	5	82	53	53
T166	64	56	56	63	56	56	63	55	55
T321	63	49	49	74	49	49	59	48	48
L5455	71	13	13	71	13	13	71	13	13
L5455	66	15	15	66	15	15	66	15	15
L6455	61	54	54	68	55	55	59	52	52

DECOMMISSIONING

AGI and BVS

Table 10 presents the number of receptors that would receive either a medium or high magnitude of impact from noise levels during decommissioning of AGIs and BVSs. The receptor experiencing a medium magnitude of impact after mitigation is near the BVS proposed on Cornist Lane, south of Bryn Awel.

Table 10 - Number of Receptors during Decommissioning

Unmitigated		Mitigated	
Medium	**High**	**Medium**	**High**
133	39	1	0

1.2. VIBRATION

CONSTRUCTION

Piling and Ground Compaction

Table 11 and **Table 12** present the peak particle velocities predicted for the vibratory piling and ground compaction activities during the Construction Stage. The values correspond to steady state operation.

The predictions presented in the table are presented for a range of distances including the SOAEL and LOAEL defined for human perception in **Chapter 15 – Noise and Vibration (Volume II).**

No significant sources of vibration are expected during decommissioning.

Table 11 - Peak Particle Velocity During Vibratory Piling

Distance (m)	Peak Particle Velocity (mm/s)		
	95 % Confidence Level	67 % Confidence Level	50 % Confidence Level
5	27.9	13.2	6.3
10	10.6	5.0	2.4
15	6.0	2.8	1.4
20	4.0	1.9	0.9
25	2.9	1.4	0.7
30	2.3	1.1	0.5
35	1.8	0.9	0.4

Distance (m)	Peak Particle Velocity (mm/s)		
	95 % Confidence Level	67 % Confidence Level	50 % Confidence Level
40	1.5	0.7	0.3
45	1.3	0.6	-
50	1.1	0.5	-
55	1.0	0.5	-
60	0.9	0.4	-
65	0.8	0.4	-
70	0.7	0.3	-
75	0.6	-	-
80	0.6	-	-
85	0.5	-	-
90	0.5	-	-
95	0.5	-	-
100	0.4	-	-
105	0.4	-	-
110	0.4	-	-
115	0.3	-	-

Table 12 - Peak Particle Velocity During Ground Compaction

Distance (m)	Peak Particle Velocity (mm/s)		
	95 % Confidence Level	67 % Confidence Level	50 % Confidence Level
5	19.6	10.2	5.3
10	8.5	4.4	2.3
15	5.0	2.6	1.4
20	3.4	1.7	0.9
25	2.5	1.3	0.7
30	1.9	1.0	0.5
35	1.5	0.8	0.4
40	1.3	0.7	0.3
45	1.1	0.6	-

Distance (m)	Peak Particle Velocity (mm/s)		
	95 % Confidence Level	67 % Confidence Level	50 % Confidence Level
50	0.9	0.5	-
55	0.8	0.4	-
60	0.7	0.4	-
65	0.6	0.3	-
70	0.6	-	-
75	0.5	-	-
80	0.5	-	-
85	0.4	-	-
90	0.4	-	-
95	0.4	-	-
100	0.3	-	-