Technical Appendix 14.1 – 14.4: Noise and Vibration

Technical Appendix 14.1 - Baseline Noise Survey

Introduction

1.1.1 This technical appendix contains information relating to the baseline noise survey that was conducted in September 2023 to inform the proposed development assessments. The results of the baseline noise survey have been used to determine construction noise thresholds and to set plant noise limits.

Methodology

1.1.2 The baseline noise survey was conducted to establish the existing environmental noise around the Falmouth Docks development site and nearby noise sensitive receptors.

1.1.3 The assessment methodology has been undertaken in accordance with the scoping and consultation report methodology utilising procedures within BS 7445 (Parts 1 and 2) at three unattended locations near to potential sensitive receptors,

1.1.4 The baseline noise survey comprised both attended short term survey locations (ST1 – ST3) and unattended long term survey locations (LT1 to LT3) around the development site. Unattended surveys were completed between 7-18 September 2023. Attended measurements were completed on 7 September 2023.

1.1.5 The survey locations LT1, LT2 and LT3 were selected as unattended survey locations to establish what the ambient, background and typical maximum noise levels are at the nearby sensitive receptors. The unattended survey locations were:

- LT1 – Near to Residential properties to the South of the docks (Maritime Studios R1), OS Grid SW 81819 32355. This was located to obtain existing ambient noise propagating from the site and influencing noise the environment noise at the receptor.
- LT2 – Near Falmouth Lifeboat Station, Tinners Walk Falmouth and Residential Apartments Challenger Quay, Falmouth (R2) , OS Grid SW 81555 32414. This was positioned to obtain environmental noise levels from the site and wider Falmouth Harbour and town waterfront at the receptors around R2.
- LT3 – Quay Street, Falmouth to obtain existing ambient noise levels on the harbour facing facades of Residential properties along Church Street (R3), OS Grid SW 81106 32625.

1.1.6 The survey locations ST1, ST2 and ST3 were selected as attended survey locations:

- ST1 - On the site, near to offices on the Falmouth Docks site. This location was positioned to obtain specific plant and shipyard activity. OS Grid SW 81746 32454
- ST2 - Prince of Wales Pier, Falmouth was positioned to be representative of existing noise on the pier and occasional dockyard activity noise from the site. OS Grid SW 80820 33004.
- ST3 - Pier at Trefusis Road Trefusis, Flushing which was to obtain the existing ambient noise level and determine any significant noise propagating from the site. This was positioned to be representative of Residential properties in Trefusis facing Falmouth. OS Grid SW 81557 33630.

Equipment

1.1.7 The attended and unattended noise survey equipment is in Table 1.

Table 1: Summary of Noise Survey Equipment

Position	Equipment Type	Model Number	Serial Numbers
LT1	Sound Level Meter	01 dB Fusion (Class 1)	14937
	Microphone	GRAS 40CD	504863
LT2	Sound Level Meter	01 dB Fusion (Class 1)	14152
	Microphone	GRAS 40CD	428359
LT3	Sound Level Meter	01 dB Fusion (Class 1)	14148
	Microphone	GRAS 40CD	466808
	Calibrator	Cirrus CR:515	96164
ST1-ST3	Sound Level Meter	Svantek 971A	127625
	Microphone	Svantek 7152	81999
	Calibrator	Svantek SV33B	138089

1.1.8 All measurements undertaken with equipment owned or hired and operated by Ramboll, is field calibrated before and after use and periodically calibrated by external companies to national standards. Copies of any calibration records are retained by Ramboll and can be provided upon request.

1.1.9 Attended noise measurements were completed on 7 September 2023 with the sound level meter at an approximate height of 1.5 metres from the ground and a minimum of 3 metres from any reflecting surfaces such as building façades or walls. These measurements are therefore considered representative free field conditions. The calibration of the sound level meters was checked before and after measurements were taken with no significant drift being observed. Refer to figure (8 to 16) for photographs of these locations.

1.1.10 The unattended noise surveys were installed and secured as follows:

- LT1 - Secured to a perimeter fence at a height of approximately 1.5 m above the ground.
- LT2 - Secured to a fence at a height of approximately 1.5 m above the ground.
- LT3 - Secured to a storage compound fence at a height of approximately 2.0 m above the ground.
- Attended measurements were secured on a tripod at a height of approximately 1.5 m height

Weather

1.1.11 Weather during the attended and unattended surveys is summarised in Table 2. Data were obtained from the Spernen IFALM02 weather station (located in Falmouth)[3].

Table 2: Summary of Weather – IFALM02 Weather Station

Date	Temperature °C	Precipitation (mm)	Average Wind Speed (km/hr)	Wind Direction
7 September 2023	18 - 24	0.0	0.0	East
8 September 2023	18 - 22	0.0	0.0	NNE
9 September 2023	17 - 26	0.25	0.0	NW
10 September 2023	18 – 25	8.64	0.5	SW
11 September 2023	17 - 20	0.25	0.3	WSW
12 September 2023	13 – 21	0.0	1.3	WNW
13 September 2023	11 – 22	0.0	0.2	WSW
14 September 2023	11 - 21	0.0	0.5	SW

[1] British Standards Institution, 2003. 'BS 7445-1:2003. 'Description and measurement of environmental noise – Part 1: Guide to quantities and procedures'. BSI.
[2] British Standards Institution, 1991. 'BS 7445-2:1991. 'Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use'. BSI.
[3] Weather Underground, 2024. www.wunderground.com

Table 2: Summary of Weather – IFALM02 Weather Station

Date	Temperature °C	Precipitation (mm)	Average Wind Speed (km/hr)	Wind Direction
15 September 2023	13 – 23	0.0	0.3	ENE
16 September 2023	15 - 21	2.03	0.8	ENE
17 September 2023	16 – 19	22.1	1.1	ENE
18 September 2023	15 – 19	3.56	2.7	WSW

1.1.12 Adverse weather conditions occurred on 17 September 2023.

Survey Results and Observations

1.1.13 Both attended and unattended survey measurements are presented in Tables 3-6.

Table 3: Summary of Daily Noise Levels at LT1

Date	Long-term equivalent continuous SPL	
	[dB $L_{Aeq,16\ hour}$]	[dB $L_{Aeq,8\ hour}$]
	Daytime [07:00-23:00]	Night-time [23:00-07:00]
7 September 2023	49*	51
8 September 2023	71**	53**
9 September 2023	53	52
10 September 2023	51***	49
11 September 2023	60	50
12 September 2023	59	50
13 September 2023	55	48
14 September 2023	59	49
15 September 2023	54	51
16 September 2023	51	47
17 September 2023	54***	49
18 September 2023	55*	-

Notes
*Incomplete Day
**Local lawnmowing or strimming during the day
***Weather was wet on this day and therefore measurements should be treated with caution

Table 4: Summary of Daily Noise Levels at LT2

Date	Long-term equivalent continuous SPL	
	[dB $L_{Aeq,16\ hour}$]	[dB $L_{Aeq,8\ hour}$]
	Daytime [07:00-23:00]	Night-time [23:00-07:00]
7 September 2023	44*	42
8 September 2023	48	47
9 September 2023	51	50
10 September 2023	52***	48
11 September 2023	54	45
12 September 2023	62	48
13 September 2023	57	49
14 September 2023	52	48
15 September 2023	52	49
16 September 2023	52	49
17 September 2023	54***	50
18 September 2023	53*	-

Notes
*Incomplete Day
***Weather was wet on this day and measurements should be treated with caution

Table 5: Summary of Daily Noise Levels at LT3

Date	Long-term equivalent continuous SPL	
	[dB $L_{Aeq,16\ hour}$]	[dB $L_{Aeq,8\ hour}$]
	Daytime [07:00-23:00]	Night-time [23:00-07:00]
7 September 2023	52*	33
8 September 2023	58	38
9 September 2023	58	41
10 September 2023	56***	36
11 September 2023	57	38
12 September 2023	56	39
13 September 2023	58	39
14 September 2023	58	44
15 September 2023	61	44
16 September 2023	58	47
17 September 2023	57***	42
18 September 2023	58*	-

Notes
*Incomplete Day

***Weather was wet on this day and measurements should be treated with caution

1.1.14 The following observations were made at the attended locations ST1-3.

- ST1 – General plant and shipyard activity which includes heavy good vehicles, mobile plant, metal 'clanging' and conversation.
- ST2 - Busy pedestrian activity and associated noise from people visiting the pier. St. Mawes Ferry activity was observed from this location and the rumbling/ chugging noise from the engine is audible.
- ST3 – Local activity with conversation. Boats in the bay and harbour were audible. Dockyard activity was audible with rocks/aggregate being loaded and pecker was audible, including reversing bleepers and sirens.

Table 6: Summary of Daytime Attended Measurements 7th September 2023

Location	Time	Ambient noise levels / dB $L_{Aeq,15min}$	Background noise levels / dB $L_{A90,15min}$	Maximum noise levels / dB $L_{AFmax,15min}$
ST1	13:35:37	56.3	51.2	72.1
	13:51:27	57.5	51.7	73.4
ST2	14:37:22	50.0	45.3	68.9
	14:53:25	53.1	45.8	72.5
ST3	15:29:04	54.0	47.4	71.8
	15:54:23	56.5	49.0	78.5
	16:12:36	51.9	46.2	70.0

1.1.15 During the unattended survey, the following cruise ships were scheduled to visit Falmouth. Data for this schedule was obtained from the website www.falmouthcsa.co.uk (Falmouth Cruise Ship Ambassadors).

Table 7: Cruise Ship Arrival & Departure Information - Falmouth

Date	Vessel	Scheduled Arrival Time	Scheduled Departure Time	Anchor Location	Approx. Passengers aboard
07/09/2024	Silver Moon	08:00	17:00	County	600
09/09/2024	Island Princess	07:00	17:00	Anchor	2000
10/09/2024	MSC Fantasia	08:00	18:00	Anchor	3000
11/09/2024	Viking Neptune	07:10	18:00	County	900
12/09/2024	AID Aaura	07:30	16:40	North Queens	1250
12/09/2024	Seabourn Ovation	07:00	17:00	County	550
13/09/2024	Viking Jupiter	08:00	18:00	County	900
17/09/2024	Ambition	09:00	17:00	County	1250

1.1.16 Table 8 presents the average daytime average noise levels ($L_{Aeq,16hr}$ dB) at the unattended LT2 location. It demonstrates a clear difference in noise level at this location when a cruise ship docks at the nearby County Wharf. Table 8 includes noise data at LT2 for days with and without cruise ships in dock.

Table 8: Measured noise levels with cruise ships docked at County Wharf

Scenario	Average noise level dB $L_{Aeq,16hr}$	Range dB $L_{Aeq,16hr}$
Cruise Ships Visiting County Wharf (07:00-23:00) (1, 12, 13 and 17 September 2023)	58	54 to 62
No Cruise Ships Visiting County Wharf (07:00-23:00) (9, 10, 14 and 15 September 2023)	52	51 to 52

Background Noise Analysis

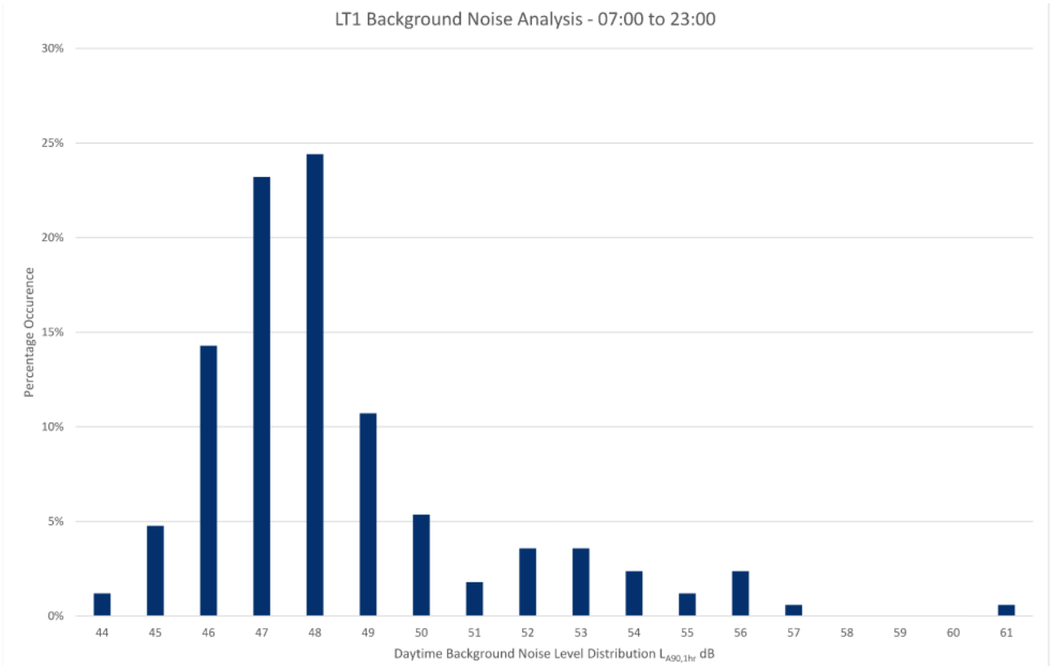

Figure 1: LT1 Daytime 1hr Background Noise Analysis

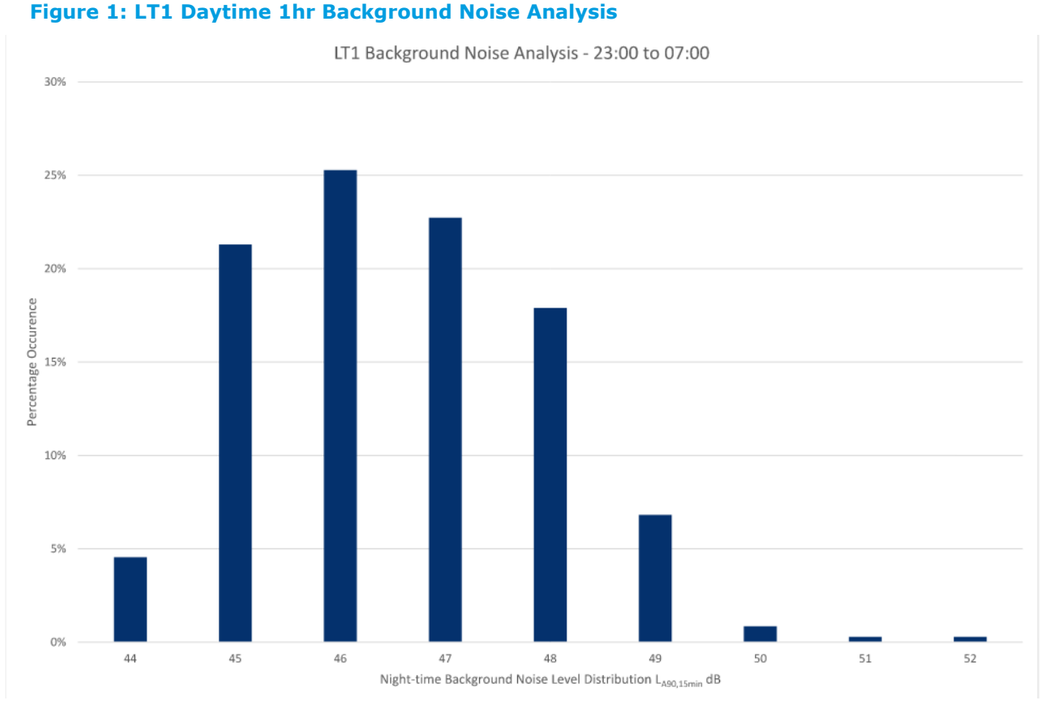

Figure 2: LT1 Night-time 15min Background Noise Analysis

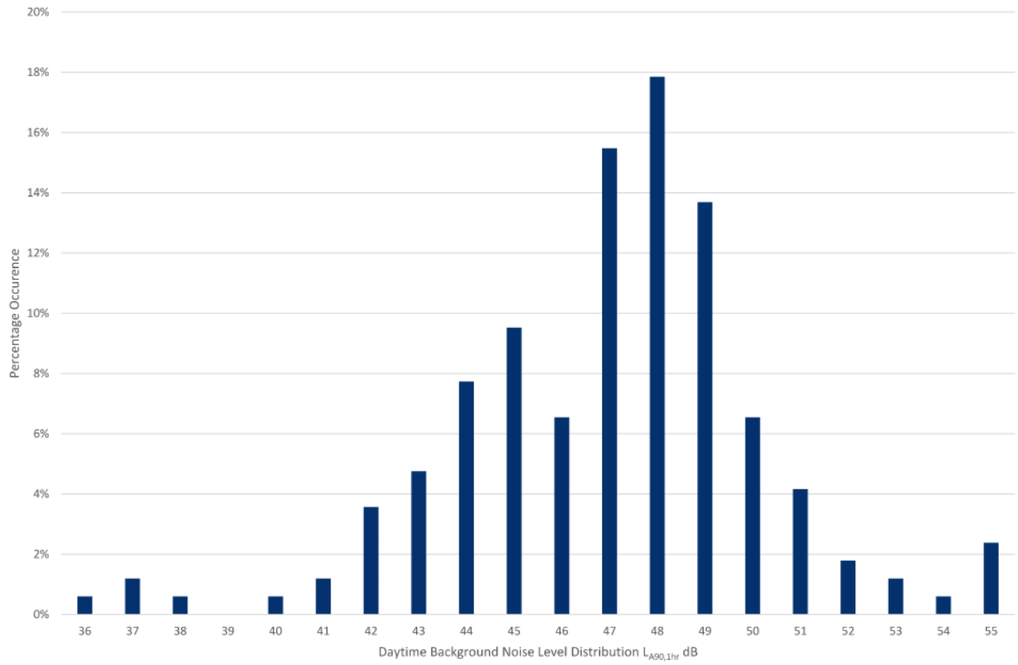

Figure 3: LT2 Daytime 15min Background Noise Analysis

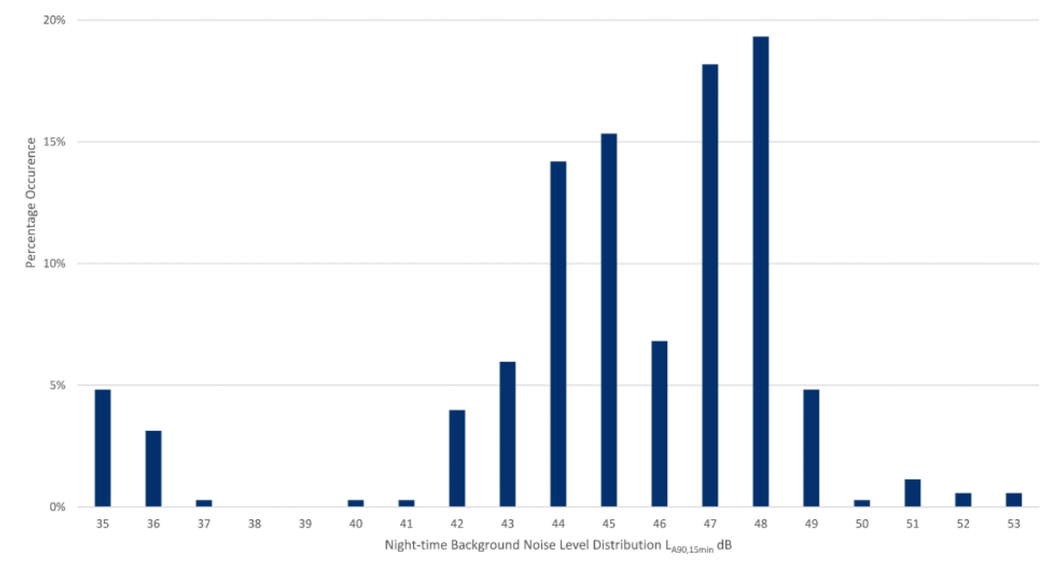

Figure 4: LT2 Night-time 5min Background Noise Analysis

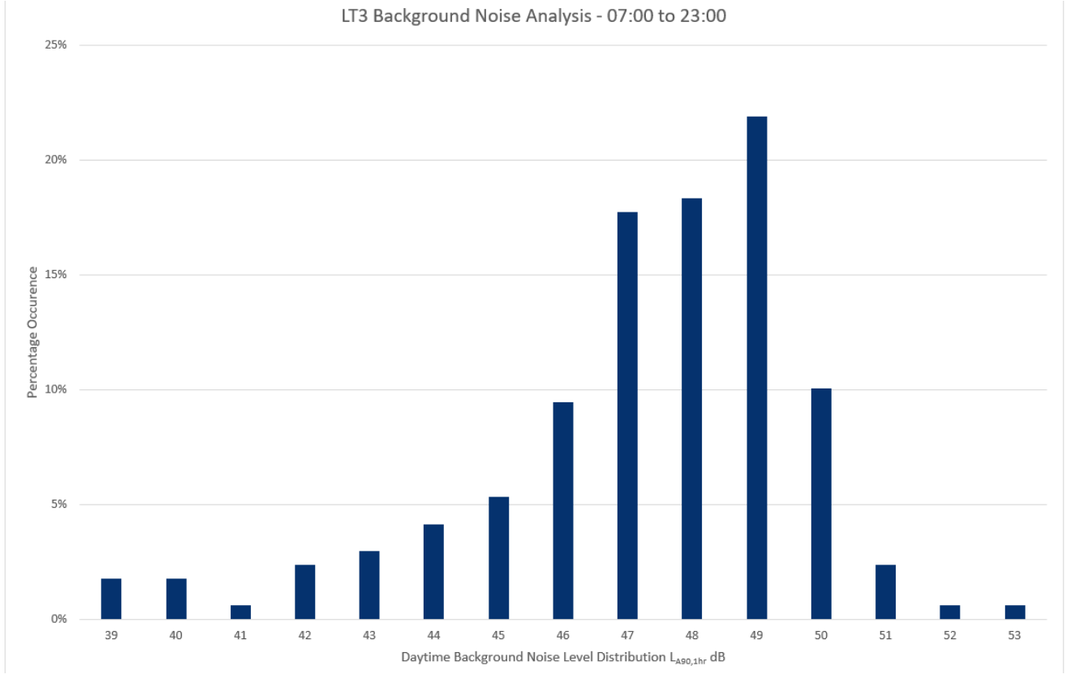

Figure 5: LT3 Daytime 15min Background Noise Analysis

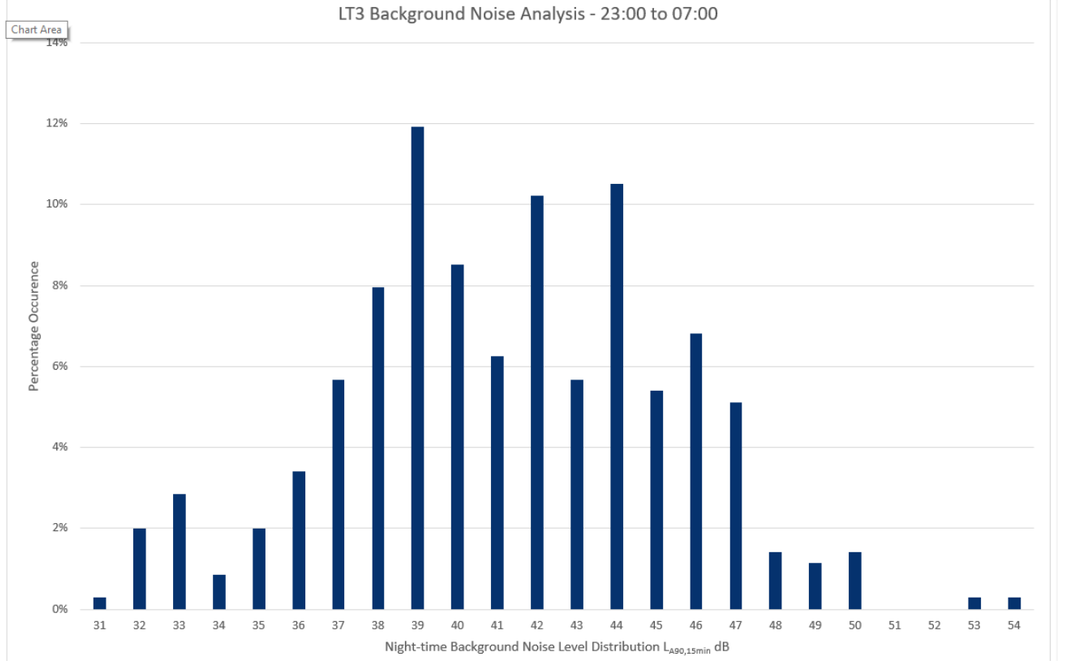

Figure 6: LT3 Night-time 5min Background Noise Analysis

Survey Location Photographs

Figure 7: LT1 Photograph 1

Figure 8: LT2 Photograph 2

Figure 9: LT2 Photograph 1

Figure 10: LT2 Photograph 2

Figure 11: LT3 Photograph 1

Figure 12: LT3 Photograph 2

Figure 13: ST1 Photograph 1

Figure 14: ST2 Photograph 2

Figure 15: ST3 Photograph 3

Technical Appendix 14.2 Demolition and Construction Noise

1.1.1 The following appendix outlines the supplementary information for the demolition and construction noise and vibration assessment conducted for the proposed development.

Methodology

1.1.2 Demolition and construction noise thresholds have been set for the nearest NSRs (R1 to R6) closest to the site boundary. Thresholds have been set based on the baseline noise survey results presented in Technical Appendix 14.1 for the daytime, evening and night-time according to the 'ABC Method' in Annex E of BS 5228:2009+A1:2014. Where buildings contain more than one type of receptor (residential and commercial), the most sensitive has been assessed.

1.1.3 The demolition and construction noise thresholds are detailed in Table 9.

Table 9: Demolition and construction noise thresholds

Receptor	BS 5228:2009+A1:2014 Threshold		
	Daytime 07:00-19:00 dB $L_{Aeq,12hour}$	Evening (19:00 to 23:00) dB $L_{Aeq,4hour}$	Night-Time (23:00 to 07:00) dB $L_{Aeq,8hour}$
R1	Category A - 65	Category A - 55	Category C - 55
R2	Category A - 65	Category A - 55	Category C - 55
R3	Category A - 65	Category B - 60	Category C - 55
R4	Category A - 65	Category A - 55	Category A - 45

Demolition and Construction Scenarios

1.1.4 The construction noise assessments have considered 5 demolition and construction scenarios based on descriptions given in Chapter 5 Demolition and Construction Description programme. The construction scenarios that were assessed were compiled by determining potential concurrent works around the Falmouth Docks on a quarterly timeline for stages of peak noisy activities.

1.1.5 The assessed scenarios are in Table 10.

Table 10: Demolition and Construction Noise Assessment Scenarios

Scenario	**Description of Development** **Daytime Weekday Operations**
Scenario 1	Dredging Northern and Queens Wharf (single dredging operation), enabling & strengthening on Queens Wharf, loading of dredged arisings on Duchy Wharf, demolition of terrestrial buildings, breaking & Demolition of Western Wharf.
Scenario 2	Piling on Western Wharf, dredging near FLOW Deck and Duchy Wharf, enabling / strengthening of Duchy Wharf, loading of dredged arisings on Duchy Wharf.
Scenario 3	Concrete works (Deck construction) on Western Wharf, Piling Works on Queens and Northern Wharf, loading dredged arising on Duchy Wharf (including Concrete Batching)
Scenario 4	Concrete works (Deck construction) on Northern Wharf, concrete works (Deck construction) on Western Wharf, Piling on FLOW Deck area, loading on dredged arisings and concrete batching on Duchy Wharf.
	Reduced Operation evening and Night-time operations
Scenario 5	Dredging Queens Wharf (single dredging operation), revetment removal (digging, not breaking), Loading dredged arisings on Duchy Wharf.
Scenario 6	Dredging on Western Wharf, loading dredged arisings on Duchy Wharf, revetment digging and removal on near FLOW Deck and Duchy Wharf areas.
Scenario 7	Dredging Flow and Duchy area, loading dredged arisings on Duchy Wharf including concrete batching plant, concrete works on Duchy for crane pads.

Demolition and Construction Equipment

1.1.6 Proposed demolition and construction work on site would involve the use of a variety of working methods, and operations would vary across the site throughout the demolition and construction stage. Noise levels from the works are likely to vary significantly over time as the distance from the noise sources and the type of construction activity vary relative to the sensitive receptors.

1.1.7 The exact working methodology and plant to be employed on site have not been established at this stage in the design. This level of detail will only be available when specialist demolition and civil engineering contractors are engaged as part of the scheme. However, following best practice, an estimate of the expected noise levels and resultant magnitude of impact for each phase of the demolition and construction stage has been completed to BS 5228:2009+A1:2014. The noise generating plant that has been assumed for each demolition and construction scenario is provided in Table 11.

Table 11 Plant Spectral information – Breaking (Scenario 1)

BS5228 Ref	**Plant Description**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**No. of Plant**	**% Use**
C2.14	Tracked excavator; 226kW; 40 t	85	78	77	77	73	71	68	63	1	50
C2.30	Dump truck (tipping fill); 306kW; 29 t	85	74	78	73	73	74	67	63	1	80
C1.2	Breaker mounted on wheeled backhoe ; 380 kg / 1700 mm tool / 74 mm dia. / 125 bar	79	84	82	84	88	85	84	82	1	50
D7.1	Scaffold construction	71	71	71	71	71	71	71	71	1	20
C3.21	Crawler mounted rig; 150kW; 35 t	81	81	78	76	74	72	68	63	1	40
C4.76	Diesel generator; 6.5kW	80	74	57	54	53	48	45	37	1	100
D6.54	Electric drill	80	80	80	80	80	80	80	80	1	30
C1.18	Gas cutter	72	72	69	72	73	72	71	71	1	10
C4.88	Water pump (diesel); 10kW; 100 kg	70	65	66	64	64	63	56	46	1	60
	Combined Sound Pressure Level @ 10m (dB)	88	85	83	83	86	84	82	81		
	Total Sound Power Level (dB)	116	113	111	111	114	112	110	109		

Table 12 Plant Spectral information – Building Demolition (Scenario 1)

BS5228 Ref	Plant Description	63	125	250	500	1000	2000	4000	8000	No. of Plant	% Use
C2.14	Tracked excavator; 226kW; 40 t	85	78	77	77	73	71	68	63	1	50
C2.30	Dump truck (tipping fill); 306kW; 29 t	85	74	78	73	73	74	67	63	1	25
C1.2	Breaker mounted on wheeled backhoe ; 380 kg / 1700 mm tool / 74 mm dia. / 125 bar	79	84	82	84	88	85	84	82	1	50
D7.1	Scaffold construction	71	71	71	71	71	71	71	71	1	10
C3.21	Crawler mounted rig; 150kW; 35 t	81	81	78	76	74	72	68	63	1	40
C4.76	Diesel generator; 6.5kW	80	74	57	54	53	48	45	37	1	100
D6.54	Electric drill	80	80	80	80	80	80	80	80	1	10
C2.3	Tracked excavator; 102kW; 22 t	80	83	76	73	72	70	69	66	1	30
C1.18	Gas cutter	72	72	69	72	73	72	71	71	1	10
C4.88	Water pump (diesel); 10kW; 100 kg	70	65	66	64	64	63	56	46	1	25
	Combined Sound Pressure Level @ 10m (dB)	87	85	82	83	86	83	82	80		
	Total Sound Power Level (dB)	115	113	110	111	114	111	110	108		

Table 13 Plant Spectral information – Loading of Dredged Material on Land (Scenarios 1-7)

BS5228 Ref	Plant Description	63	125	250	500	1000	2000	4000	8000	No. of Plant	% Use
c10.6	Loading sand to lorry; 221kW; 30 t	93	78	73	72	76	83	71	57	1	25
C2.33	Articulated dump truck; 187kW; 23 t	85	87	77	75	76	73	69	62	1	10
C4.88	Water pump (diesel); 10kW; 100 kg	70	65	66	64	64	63	56	46	1	50
c2.27	Wheeled loader; 193kW	85	83	76	75	75	72	72	61	1	50
D6.10	Concrete Batching Plant	71	71	71	71	71	71	71	71	1	25
D7.94	Fork lift	79	79	79	79	79	79	79	79	1	25
	Combined Sound Pressure Level @ 10m (dB)	89	83	77	77	77	79	75	74		

Table 13 Plant Spectral information – Loading of Dredged Material on Land (Scenarios 1-7)

	Total Sound Power Level (dB)	117	111	105	105	105	107	103	102		

Table 14 Plant Spectral information – Dredging Excavator Type, used in Scenario 1,2 5-7

BS5228 Ref	Plant Description	63	125	250	500	1000	2000	4000	8000	No. of Plant	% Use
C7.1	Long reach tracked excavator; 178kW; 21m arm / 39 t	74	83	76	75	70	71	63	57	1	50
C10.6	Loading sand to lorry; 221kW; 30 t	93	78	73	72	76	83	71	57	1	10
C4.88	Water pump (diesel); 10kW; 100 kg	70	65	66	64	64	63	56	46	1	60
c2.33	Articulated dump truck; 187kW; 23 t	85	87	77	75	76	73	69	62	1	50
	Combined Sound Pressure Level @ 10m (dB)	89	83	77	77	77	79	75	74		
	Total Sound Power Level (dB)	117	111	105	105	105	107	103	102		

Table 15 Plant Spectral information – Piling (Scenarios 2-4)

BS5228 Ref	Plant Description	63	125	250	500	1000	2000	4000	8000	No. of Plant	% Use
C2.14	Tracked excavator; 226kW; 40 t	85	78	77	77	73	71	68	63	1	50
C2.30	Dump truck (tipping fill); 306kW; 29 t	85	74	78	73	73	74	67	63	1	50
C4.88	Water pump (diesel); 10kW; 100 kg	70	65	66	64	64	63	56	46	1	60
C1.18	Gas cutter	72	72	69	72	73	72	71	71	1	10
D6.54	Electric drill	80	80	80	80	80	80	80	80	1	30
C4.76	Diesel generator; 6.5kW	80	74	57	54	53	48	45	37	1	100
C3.10	Power pack; 147kW; 6 t	80	75	69	67	61	55	49	43	1	50
C3.1	Hydraulic hammer rig; 145kW; 16 m length / 5 t hammer / plywood dolly	85	85	85	92	86	81	78	73	1	50
	Combined Sound Pressure Level @ 10m (dB)	88	84	84	89	84	81	78	76		
	Total Sound Power Level (dB)	116	112	112	117	112	109	106	104		

Table 16 Plant Spectral information – Substructure / Concrete Works (Scenarios 3, 4 and 7)

BS5228 Ref	Plant Description	63	125	250	500	1000	2000	4000	8000	No. of Plant	% Use
C2.14	Tracked excavator; 226kW; 40 t	85	78	77	77	73	71	68	63	1	30
C2.30	Dump truck (tipping fill); 306kW; 29 t	85	74	78	73	73	74	67	63	1	5
D7.1	Scaffold construction	71	71	71	71	71	71	71	71	1	20
C4.76	Diesel generator; 6.5kW	80	74	57	54	53	48	45	37	1	100
C4.29	Truck mounted concrete pump + boom arm ; 26 t	83	77	75	75	74	75	67	63	1	50
D7.94	Forklift	79	79	79	79	79	79	79	79	1	50
D7.20	Compressor	67	67	67	67	67	67	67	67	1	50
C1.18	Gas cutter	72	72	69	72	73	72	71	71	1	10
	Combined Sound Pressure @ 10m	86	81	79	79	78	78	77	77		
	Total Lw	114	109	107	107	106	106	105	105		

Table 17 Plant Spectral information – Enabling & Strengthening (Scenarios 1 & 2)

BS5228 Ref	Plant Description	63	125	250	500	1000	2000	4000	8000	No. of Plant	% Use
C2.14	Tracked excavator; 226kW; 40 t	85	78	77	77	73	71	68	63	1	50
C2.30	Dump truck (tipping fill); 306kW; 29 t	85	74	78	73	73	74	67	63	1	50
C4.88	Water pump (diesel); 10kW; 100 kg	70	65	66	64	64	63	56	46	1	60
C1.18	Gas cutter	72	72	69	72	73	72	71	71	1	10
D6.54	Electric drill	80	80	80	80	80	80	80	80	1	30
C4.76	Diesel generator; 6.5kW	80	74	57	54	53	48	45	37	1	100
C3.12	Rig power pack ; 5t	74	70	66	60	54	51	46	42	1	50
C3.8	Vibratory piling rig ; 52 t / 14 m length / soft clay	89	88	85	88	90	88	83	73	1	40
	Combined Sound Pressure Level @ 10m (dB)	89	86	83	85	87	85	81	76		
	Total Sound Power Level (dB)	117	114	111	113	115	113	109	104		

Table 18 Plant Spectral information – Revetment Digging (Scenarios 5-7)

BS5228 Ref	Plant Description	63	125	250	500	1000	2000	4000	8000	No. of Plant	% Use
C7.1	Long reach tracked excavator; 178kW; 21m arm / 39 t	74	83	76	75	70	71	63	57	1	60
C10.6	Loading sand to lorry; 221kW; 30 t	93	78	73	72	76	83	71	57	1	10
C2.30	Dump truck (tipping fill); 306kW; 29 t	85	74	78	73	73	74	67	63	1	10
C2.31	Dump truck (empty); 306kW; 29 t	86	79	79	79	79	84	69	60	1	10
C4.88	Water pump (diesel); 10kW; 100 kg	70	65	66	64	64	63	56	46	1	60
	Combined Sound Pressure Level @ 10m (dB)	85	81	75	73	71	75	64	56		
	Total Sound Power Level (dB)	113	109	103	101	99	103	92	84		

Changes in Road Traffic Noise during Demolition and Construction

1.1.8 Road traffic noise levels have been determined at a position representing receptors positioned 10 m from each road link. The traffic flows have been provided for the 2026 baseline and 2026 baseline + Development, including HGV deliveries and removal of dredged arisings during daytime working hours only.

Table 19: Road Traffic Data for the Construction Traffic Assessment

Road Link & Ref	2026 Adjusted Baseline			Construction			2026 Adjusted Baseline + Construction		
	18h AAWT Total Vehicles	06:00-24:00 HGVs	% HGVs	18h AAWT Total Vehicles	06:00-24:00 HGVs	% HGVs	18h AAWT Total Vehicles	06:00-24:00 HGVs	% HGVs
Melvill Road	4475	531	12	373	238	64	4848	769	16
Bar Road (West of Tinners Walk)	1920	294	15	0	0	n/a	1920	294	15
Tinners Walk	2409	146	6	373	238	64	2782	384	14
Avenue Road	3720	217	6	0	0	n/a	3720	217	6

Table 19: Road Traffic Data for the Construction Traffic Assessment

Road Link & Ref	2026 Adjusted Baseline			Construction			2026 Adjusted Baseline + Construction		
Bar Road (East of Tinners Walk)	3823	177	5	373	238	64	4196	415	10

Technical Appendix 14.3 Operational Assessment

1.1.9 This section presents additional information on the operational noise assessments conducted for the Falmouth Docks Development.

Changes in road traffic noise during the operational development

1.1.10 Basic Noise Levels have been determined at 10 m from each road link. The traffic flows have been provided for the 2027 baseline and 2027 baseline + development including freight.

Table 20: Road Traffic Data for the Operational Development Assessment

Road Link & Ref	2027 Adjusted Baseline DOFY			Development + Development (Freight)			2027 Adjusted Baseline + Development DSOY		
	18h AAWT Total Vehicles	06:00-24:00 HGVs	% HGVs	18h AAWT Total Vehicles	06:00-24:00 HGVs	% HGVs	18h AAWT Total Vehicles	06:00-24:00 HGVs	% HGVs
Melvill Road	4502	532	12	43	25	57	4545	557	12
Bar Road (West of Tinners Walk)	1931	295	15	8	6	76	1940	302	16
Tinners Walk	2424	146	6	51	31	61	2475	177	7
Avenue Road	3743	217	6	0	0	n/a	3743	217	6
Bar Road (East of Tinners Walk)	3847	178	5	43	25	57	3890	203	5

New noise sources at from FLOW/ Offshore Renewable Technology.

1.1.11 At this time is it not known exactly what equipment will be used during the FLOW works at the Falmouth Docks. However, an assumed list of noise generating equipment has been developed based on the description of the works in Chapter 4: Proposed Development Description.

Table 21: Plant Spectral information – Assumed FLOW Activities

BS5228 Ref	Plant Description	63	125	250	500	1000	2000	4000	8000	No. of Plant	% Use
C4.38	Wheeled mobile telescopic crane; 610kW; 400 t	80	79	73	74	73	73	64	55	2	25
C3.31	Hand-held welder (welding piles)	67	68	69	68	69	66	61	56	1	10
C3.32	Generator for welding	75	72	67	68	70	66	62	60	1	10
C3.35	Hand-held gas cutter ; 230 bar	74	76	66	58	56	56	55	55	1	10
C4.59	Diesel scissor lift; 24kW; 6 t	80	77	74	74	74	71	65	63	2	25
D7.94	Fork lift	79	79	79	79	79	79	79	79	1	25
D7.1	Scaffold construction	71	71	71	71	71	71	71	71	1	20
	Combined Sound Pressure @ 10m	81	80	77	77	77	76	74	74		
	Total Lw	109	108	105	105	105	104	102	102		

1.1.12 Cadna modelling has then been used to predict the noise levels at the nearest receptors R1 to R4 in accordance with ISO 9613-2 methodology. The predicted noise level has then combined with the typical/most common daytime noise level to determine the potential dB change caused by the FLOW activities during daytime operations. This is considered to be a worst-case assessment.

Table 22: Predicted Operational FLOW activity noise levels at Receptors

Receptor	Predicted Façade noise levels at the receptors, dB $L_{Aeq,16hr}$
R1	43
R2	48
R3	43
R4	39

1.1.13 The predicted noise levels will be added to the existing ambient noise levels at each receptor and is presented in the noise and vibration chapter.

Technical Appendix 14.4 Legislation and Guidance

National Legislation and Policy

The Control of Pollution Act, 1974 Part III – Noise

1.1.1 The Control of Pollution Act, 1974[4] (CPA) is a combination and refinement of earlier Acts including: The Public Health Act, 1936[5] (replaced by the Public Health Act 1990, Part III) and the Noise Abatement Act 1960[6].

1.1.2 Section 60 enables a Local Authority to serve a notice on a person (this includes a company) who is carrying out, or who is planning to carry out, works of construction, demolition, road-works, railway maintenance etc. in order to control the noise from those operations.

1.1.3 Section 61 also enables such a person to apply to the Local Authority for consent in respect of such works. The Act introduces the concept of using 'Best Practicable Means' (BPM) to control the impact of noise, where significant impacts are likely to occur. BPM refers to the selection of plant, techniques and equipment to reduce noise whilst considering local conditions, current state of technical knowledge and the financial implications. Factors such as timing, duration, location and opportunities for acoustic screening or separation are employed; to ensure that impacts are controlled in so far as is reasonably practicable. The demonstrable use of BPM can also be used as a defence to enforcement action under nuisance legislation.

Environmental Protection Act, 1990 (as amended)

1.1.4 Section 79 of the Environmental Protection Act 1990[7] (EPA) declares that a number of matters, including noise, are to be statutory nuisances. Under the provisions of the Environmental Protection Act, the Local Authority is required to inspect its area periodically to detect any nuisance and, where a complaint of a statutory nuisance is made by a person living within its area, to take such steps as are reasonably practicable to investigate the complaint.

National Planning Policy Framework, 2024

1.1.5 The NPPF adopted in December 2024 in England outlines the Government's planning policies and requirements for the planning system. The NPPF forms a material consideration in planning decisions and hence must be complied with for planning permission to be granted.

1.1.6 Paragraph 198 of the NPPF states that the planning system should seek to:

- *"Mitigate and reduce to a minimum, potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- *Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason".*

1.1.7 To achieve these aims the NPPF refers to the Noise Policy Statement for England 2010.

Noise Policy Statement for England, 2010

1.1.8 The Noise Policy Statement[8] for England sets out the long-term vision of Government noise policy: to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

1.1.9 The NPSE outlines the following three aims for the effective management and control of environmental, neighbour and neighbourhood noise:

- "Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life; and
- Where possible, contribute to the improvement of health and quality of life."

1.1.10 The guidance defines two concepts applied to noise impacts. These are:

- NOEL is defined as: "This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.";
- LOAEL which is defined as: "This is the level above which adverse effects on health and quality of life can be detected."; and
- SOAEL which is defined as the level above which significant adverse effects on health and quality of life occur.

1.1.11 The three aims can therefore be interpreted as follows:

- The first aim is to avoid noise levels above the SOAEL;
- The second aim considers situations where noise levels are between the LOAEL and SOAEL. In such circumstances, all reasonable steps should be taken to mitigate and minimise the effects. However, this does not mean that such adverse effects cannot occur; and
- The third aim considers situations where noise levels are between the LOAEL and NOEL. In these circumstances, where possible, reductions in noise levels should be sought through the pro-active management of noise.

1.1.12 The NPSE recognises that it is not possible to have single objective noise-based measures that define the SOAEL, LOAEL and NOEL that are applicable to all sources of noise in all situations. The levels are likely to be different for different noise sources, receptors and at different times of the day.

Planning Practice Guidance: Noise, 2017

1.1.13 The Government's Planning Practice Guidance[9] (PPG) on noise provides guidance on the effects of noise exposure, relating these to people's perception of noise, and linking the effects to the NOEL and, as exposure increases, the LOAEL and SOAEL.

1.1.14 As exposure increases above the LOAEL, noise begins to have an adverse effect and consideration needs to be given to mitigating and minimising those effects, taking account of the economic and social benefits being derived from the activity causing the noise. As the noise exposure increases, it will then at some point cross the SOAEL boundary.

1.1.15 The LOAEL is described in PPG as the level above which "noise starts to cause small changes in behaviour and/or attitude e.g. turning up the volume of the television, speaking more loudly, or, where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life."

1.1.16 PPG identifies the SOAEL as the level above which "noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening, and difficulty in getting back to sleep."

1.1.17 For the purposes of this assessment, the magnitude of effect is assigned by reference to the guidance in PPG-Noise, as summarised in Table 23.

[4] Secretary of State, 1974, Control of Pollution Act, HMSO. Available: http://www.legislation.gov.uk/ukpga/1974/40/contents

[5] Secretary of State, 1960, Noise Abatement Act, HMSO.

[6] Secretary of State, 1960, Noise Abatement Act, HMSO. Available: http://www.legislation.gov.uk/ukpga/1960/68/section/1/enacted

[7] Secretary of State, 1990. Environmental Protection Act 1990, The Stationary Office. Available: http://www.legislation.gov.uk/ukpga/1990/43/contents

[8] Ministry of Housing, Communities and Local Government, 2017. Planning practice guidance. HMSO. London.

[9] GOV.UK. 2018. Noise. [ONLINE] Available at: https://www.gov.uk/guidance/noise--2. [Accessed 01 April 2024].

Table 23: Plant Spectral information

Perception	Examples of outcome	Increasing effect level	Action
Not noticeable	No effect	No Observed Effect	No specific measures
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

1.1.18 Factors to be considered in determining if noise is a concern are identified including the absolute noise level of the source, the existing ambient noise climate, time of day, frequency of occurrence, duration, character of the noise and cumulative impacts.

Guidance

BS 5228: 2009+A1: 2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and 2

1.1.19 BS 5228[10] gives recommendations for basic methods of noise and vibration control relating to construction work.

1.1.20 Part 1 provides guidance concerning methods of predicting and measuring noise and assessing their impacts on those exposed to it. The prediction method considers the noise emission level of proposed plant, the separation distance between the source and the receiver and the effect of the intervening topography and structures.

1.1.21 Part 2 of the standard gives recommendations for basic methods of vibration control relating to construction and open sites where work activities/operations generate significant vibration.

1.1.22 The legislative background to vibration control is described and recommendations are given regarding procedures for the establishment of effective liaison between developers, site operators and local authorities. The standard also provides guidance on measuring vibration and assessing its effects on the environment.

BS 4142:2014+A1:2019 - 'Methods for Rating and Assessing Industrial and Commercial Sound'

1.1.23 BS 4142[11] - Method for rating and assessing industrial and commercial sound provides a method for assessing the significance of noise emissions from industrial and/or commercial sound source.

1.1.24 The significance of industrial and commercial sound is assessed based on the difference between the **rating level (defined in Appendix 12.5)** resulting from plant operation measured or predicted at the nearest noise sensitive premises, and the existing background noise level **(defined in Appendix 12.5)** in the area, as determined by a noise survey. BS 4142 states:

- 'Typically, the greater this difference, the greater the magnitude of the impact.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.'
- A representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either the minimum or modal value.'

1.1.25 BS4142 also sets out the following rating penalties based on the characteristics of the noise source:

- Tonality: up to 6 dB rating penalty applicable depending on its perception;
- Impulsivity: up to 9 dB rating penalty applicable depending on its perception;
- Intermittency: a 3 dB penalty applicable for specific sound that has identifiable on/off conditions; and
- Other sound characteristics: a 3 dB penalty applicable for readily distinctive sound feature characteristics that are neither tonal or impulsive.

[10] British Standards Institution, 2009 and 2014. British Standard 5228: 2009 +A1 2014 Code of practice for noise and vibration control on construction and open sites. BSI.

[11] British Standards Institute, 2014. British Standard BS 4142: Methods for rating and assessing industrial and commercial sound. BSI.