MWP

ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR)

Ros an Mhíl Deep Water Quay

Chapter 11: Noise & Vibration

Department of Agriculture, Food and the Marine

November 2025

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11. Noise & Vibration

11.1 Introduction

This chapter considers the potential effects on noise and vibration sensitive receptors arising from the proposed development. A full description of the project and its history are provided in Chapter 2 of this EIAR. The nature and probability of effects on noise and vibration sensitive receptors arising from the works to be completed have been assessed herein.

11.1.1 Fundamentals of Noise

Fundamentally, noise is vibrations of the air which are detectable by the ear. Sound waves radiate out spherically from a sound source in three dimensions. The human ear can detect a very wide range of pressure variations. In order to cope with this wide range, a logarithmic scale (decibel (dB) scale) is used to translate pressure values into manageable numbers from 0 dB to 140 dB. 0 dB is the threshold of hearing, and 120 dB is the threshold of pain.

Measuring in decibels means that a 3 dB increase is equivalent to a doubling of the sound energy and a 10 dB increase is a tenfold increase in energy. For broadband sounds which are very similar in all but magnitude, a change or difference in noise level of 1 dB is just perceptible under laboratory conditions, 3 dB is perceptible under most normal conditions, and a 10 dB increase generally appears twice as loud.

A healthy human ear is also sensitive to a large range of frequencies (approximately 20 Hz to 20,000 Hz) and varies in sensitivity depending on the frequency. The human ear is not equally sensitive to sound at all frequencies and is less sensitive to sound at low frequencies and high frequencies. A-weighting (dB A) is the main way of adjusting measured sound pressure levels (noise) to take account of the uneven human response to frequencies.

Figure 11-1 illustrates some everyday sounds on the dB(A) scale. A quiet bedroom is around 35 dB(A), a busy office around 60dB(A) and a rock concert around 100 dB(A).

11.2 Methodology

The methodology consists of the following activities:

- An environmental noise survey has been undertaken at the proposed development site to characterise the existing baseline noise environment (Refer to Section 11.3)
- A review of the most applicable standards and guidelines has been conducted in order to set a range of acceptable noise and vibration criteria for the construction and operational phases of the proposed development (Refer to Section 11.2.1, and Section 11.2.4).
- Predicted noise levels have been assessed against relevant noise limit criteria for both operational and construction phases at the nearest sensitive receptors (Refer to Section 11.4).
- Where necessary, mitigation measures to reduce noise and vibration effects are detailed (Refer to Section 11.5).

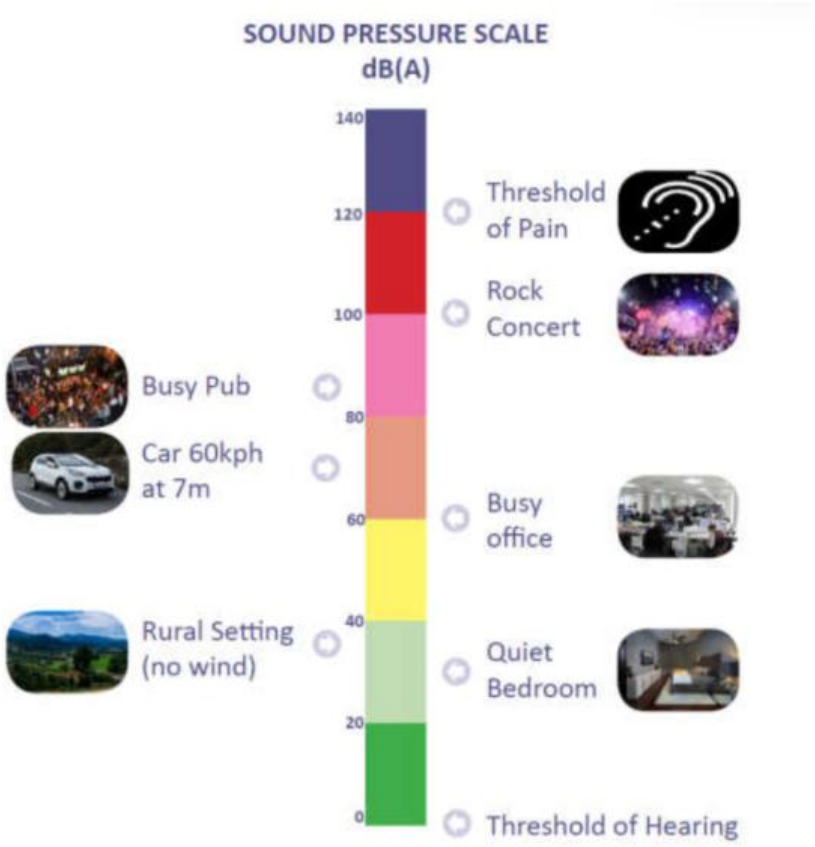

Figure 11-1: The level of Typical Common Sounds on the dB(A) Scale

11.2.1 Guidelines and Best Practice

The noise and vibration impacts assessment has been undertaken having regard to the following standards and best practise guidance documents:

- British Standard 5228 Part 1 and Part 2 Code of Practice for Noise and Vibration Control on Construction and Open Sites (2009+A1:2014) (BS 5228:2009+A1:2014);
- British Standard 8233:2014 Sound Insulation and Noise Reduction for Buildings – Code of Practice;
- British Standard 4142:2014 - Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas;
- Environmental Protection Agency (EPA), Guidance Note for Noise: Licence Applications, Surveys, and Assessments in Relation to Scheduled Activities (NG4), January 2016); and
- World Health Organisation (WHO) - Guidelines for Community Noise.

11.2.2 Study Area and Sensitive Receptors

The key sensitive receptors with regards to the potential noise and vibration impact of the proposed development are those in the vicinity of the existing harbour.

Ros an Mhíl village is located approximately 1km on the approach to the existing harbour. A number of discrete one-off residential dwellings, a local shop, community hall and a church are located within the village.

The primary school, Scoil Naisiunta Colm Cille, is located approximately 1.7 km from the proposed deep-water quay adjacent to the R372. There are also a number of localised industries providing support to the harbour.

Road access to the harbour is provided by two alternative routes, R372 known as the school road, and the Ballynahown Road or Back Road. Both routes are spurs from the R336, which is the main coast road to Galway.

The closest sensitive receptor to the proposed deep water quay is a dwelling owned by the Ferry Company and is approximately 590m to the north west. There are no other residential properties located within 500m of the proposed development site boundary. There are a number of discrete one-off houses located along the Ballynahown Road. Colaiste Chamis is also located on this road.

The noise measurement positions, at sensitive receptors closest to the proposed development site are indicated in the aerial imagery shown at **Figure 11-2**, a corresponding position number has been arbitrarily assigned. Photographs of each of the measurement locations are provided in **EIAR Volume III Appendix 11B** to help further inform the baseline noise survey locations.

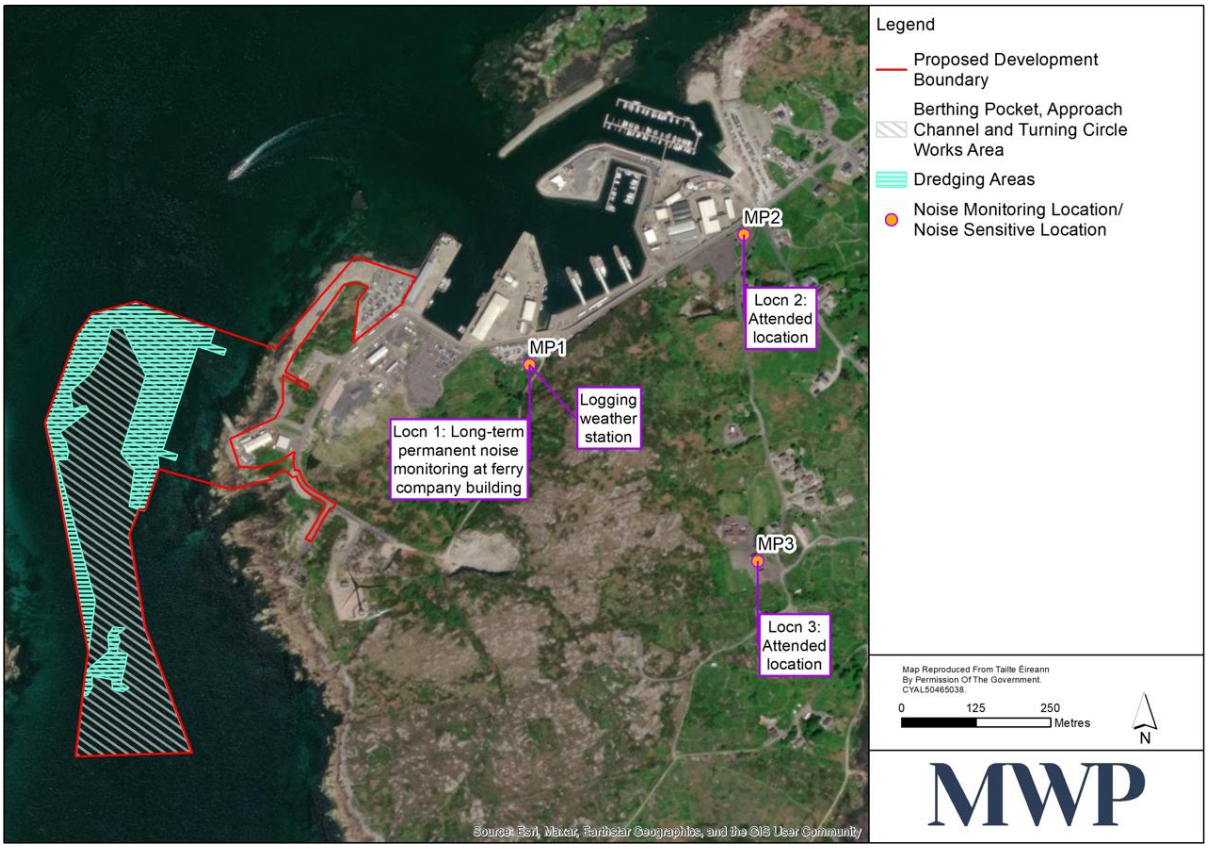

Figure 11-2: Noise Monitoring Locations and Nearest Receptors

11.2.3 Baseline Noise Survey

To characterise the baseline noise environment, noise monitoring was undertaken at the nearest noise sensitive locations to the proposed development, illustrated in **Figure 11-2**.

MWP personnel (Kieran Barry and William Murphy) conducted the noise monitoring on 8th April 2025.

Noise measurements were conducted at the 3 Noise Monitoring Locations identified, Measurements were conducted with sample periods of 15 minutes for daytime, evening and night-time periods.

The survey results were noted onto a Survey Record Sheet immediately following each sample, and were also saved to the instrument memory for later analysis where appropriate. Survey personnel noted the primary sources contributing to noise build up during the survey.

Noise survey results are summarised in Section 11.3.

11.2.3.1 Instrument and Setup

The sound level meter was located away from reflective surfaces, in open ground. The microphone was at a height of 1.5m above the ground. The measurements were performed using the following equipment:

Table 11-1: Noise Monitoring Equipment

Manufacturer	Equipment Model	Serial Number	Microphone	Calibration Date
Larson Davis	831	0003826	PCB PCB377B02	11th June 2024
Larson Davis	CAL200	11262	-	10th June 2024

The microphone was protected using a propriety Larson Davis windshield. Before and after the survey the measurement apparatus was check calibrated using a Larson CAL200 Sound Level Calibrator Serial Number 11262 that produces a sound level of 93.96dB re. 2 x 10^{-5} PA, at a frequency of 1k Hz.

The calibration certificates are attached as EIAR Volume III Appendix 11A. Weather conditions were warm and dry with occasional sunshine and light to moderate winds less than 5m/s.

11.2.3.2 Measurement Parameters

The noise survey results are presented in terms of the following parameters:

L_{Aeq} is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period. This parameter is representative of the specific noise from plant when plant is the dominant noise source, i.e. there is no extraneous noise from sources such as traffic.

L_{A90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

L_{A90} is the sound level that is exceeded for 10% of the sample period. It is typically used as a descriptor for traffic noise.

The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear nature of human hearing. All sound levels in this report are expressed in terms of decibels (dB) relative to 2x10-5 Pa.

11.2.4 Assessment Criteria

11.2.4.1 Significance of Effects

Impacts will be identified, and significance will be attributed taking into account the interaction between magnitude criteria and sensitivity criteria as presented in the significance matrix in **Table 11-2**. The methodologies and scales used to assess the magnitude of impact and sensitivity for the key impacts expected during construction and operation are set out in **Table 11-2** and **Table 11-3**. Impacts considered of moderate or major significance after application of mitigation measures are highlighted as significant.

Table 11-2: Impact Evaluation and Determination of Significance

Magnitude of Impact	Sensitivity			
	Negligible	Low	Medium	High
Negligible	Not Significant	Not Significant	Not Significant	Not Significant
Minor	Not Significant	Not Significant	Minor	Minor
Moderate	Not Significant	Minor	Moderate	Moderate
Major	Not Significant	Minor	Moderate	Major

11.2.4.2 Sensitivity

The criteria for noise and vibration receptors sensitivity are provided in **Table 11-3**. The variation in the sensitivity of receptors in terms of environmental impacts is considered by applying different scales to classify magnitude of impacts (e.g. by using different scales for daytime and night-time) rather than by varying the assignment of sensitivity to specific types of receptors.

Table 11-3: Criteria for determining Receptor Sensitivity

Category	Description/Examples
High	Residential, Educational, Institutional and healthcare and place of worship
Medium	Public Assembly and Entertainment
Low	Commercial and Light Industrial
Negligible	Heavy Industrial

11.2.4.3 Magnitude of Impacts

Construction Phase

Construction phase of a development is often the period over which any potential for noise impact is greatest. 'British Standard 5228 provides comprehensive guidance on construction noise including details of typical noise levels associated with various items of plant or activities, prediction methods and measures and procedures that have been found to be most effective in reducing impacts. These guidelines are considered as transferable and appropriate for construction projects in Ireland. The Standard also provides advice on good site practice in the control of noise. The contractor may be required to follow that advice under the terms of a contract.

BS5228 does not define strict criteria to determine the significance of noise impacts. However, examples of how limits of acceptability have been applied historically and some examples of assessing significance are provided within the Standard. 'Example Method 2-5dB (A) change (Annex E 'Significance of Noise Effects' E.3.3) has been adopted for the assessment of effects at sensitive receptors as this approach considers the expected changes in ambient noise levels and better reflects conventional environmental assessment methodologies compared with the use of fixed/absolute noise limits.

The noise levels measured during the baseline noise survey (refer to **Section 11.3**), determine that noise sensitive locations MP1 to MP3, shown in in **Figure 11-2** of **Section 11.2.2** will be afforded a Category A designation for the daytime, evening and night-time periods.

Table 11-4: Construction Phase Noise Assessment Criteria

Assessment category and threshold value period (T)	Threshold Values, L_{AeqT} dB		
	Category A [Note A]	Category B [Note B]	Category C [Note C]
Nighttime (23:00 to 07:00hrs)	45	50	55
Evenings and Weekend [Note D]	55	60	65
Daytime (07:00 to 19:00hrs) and Saturdays (07:00 to 13:00hrs)	65	70	75

Note A: Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.

Note B: Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.

Note C: Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.

Note D: 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

Construction noise levels are considered as set out in BS5228, if;

- Total noise (pre-construction baseline noise plus construction noise) exceeds the pre-construction baseline by 5 dB or more, subject to lower cut-off values of 65dB (Daytime), 55dB (evening) and 45dB L_{Aeq} (night-time); and
- Duration of construction noise exceeds one month, unless works of a shorter duration are likely to result in significant impact.

Table 11-5: Criteria for determining magnitude of impact – construction noise

Receptor Sensitivity	Noise from Construction Alone LAeq, 1 h dB			Magnitude of Impact			
	Threshold			Negligible	Minor	Moderate	Major
	Day-time	Evening-time	Night-time				
High	65	55	45	Threshold not exceeded	Threshold exceeded and total noise 5 dB less pre-construction baseline for any duration	Threshold exceeded and total noise exceeds baseline noise by 5dB or more for less than one month	Threshold exceeded and total noise exceeds baseline noise by 5dB for one month or more

Source: BS5228-1

Construction Phase – Additional Traffic on Public Roads (EIAR)

There are no specific Irish guidance or limits relating to existing local traffic sources along the local or surrounding road network. As traffic from the proposed development will make use of these existing roads already carrying traffic volumes it is appropriate to assess the calculated increase in traffic noise levels that will arise because of vehicular movements associated with the development.

In order to assess the potential impact of construction traffic, the following two guidelines are referenced:

- Design Manual for Roads and Bridges (DMRB) Sustainability & Environment Appraisal LA 111 Noise and Vibration Revision 2
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports

Table 11-6 offers guidance on the likely impact associated with any particular change in traffic noise level.

Table 11-6: Magnitude of Impact – Construction Phase Traffic

Change in Sound Level (dB)	DMRB Magnitude of Impact	EPA Significance of Effect
Greater than or equal to 5.0	Major	Significant
Greater than or equal to 3.0 and less than 5.0	Moderate	Moderate
Greater than or equal to 1.0 and less than 3.0	Minor	Not Significant – Slight
Less than 1.0	Negligible	Imperceptible

In accordance with the DMRB Noise and Vibration, construction noise and construction traffic noise impacts shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

- Ten or more days or night in any 15 consecutive day or nights;
- A total number of days exceeding 40 in any 6 consecutive months.

11.2.4.4 Construction Phase – Vibration Impacts

There are two aspects that require consideration;

- Potential vibration effects on people; and
- Potential vibration effects on buildings.

There are no British Standards that provide a methodology for predicting levels of vibration from demolition and construction activities other than BS5228, which relates to percussive, or vibratory or piling. Vibration arising from construction activities is generally ground-borne. In the case of typical earthworks projects, it may be generated by operations such as ground compaction, piling, blasting and the movement of vehicles over irregular surfaces.

The magnitude of vibration is expressed in terms of peak velocity (ppv) in millimetres per second (mm/s).

BS 5228-2: provides guidance on the effect of vibration and the likelihood this would cause compliant and cosmetic damage to buildings BS5228-2 does not indicate whether particular vibrations are significant. The standard states:

“Vibration above these levels [0.14mm/s to 0.3mm/s] can disturb, startle, cause annoyance or interfere with work activities. At higher levels they can be described as unpleasant or even painful. In residential accommodation, vibrations can promote anxiety…”

BS5228-2 provides the following guidance on effects and perceptibility at various vibration levels:

- Vibration level of 0.14mm/s-vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction;
- Vibration level of 0.3mm/s-vibration might be just perceptible in residential environments;
- Vibration level of 1.0mm/s-it is likely that vibration of this level in residential environments would cause compliant, but can be tolerated if prior warning and explanation has been given to residents; and
- Vibration level of and over 10mm/s-vibration is likely to be intolerable for any more than a very brief exposure to this level.

BS5228-2 also considers vibration in terms of disturbance and potential cosmetic and structural damage to buildings. It states that transient levels of vibration, expressed as peak particle velocity (PPV) of 15mm/s at low frequency may cause cosmetic damage in un-reinforced or light framed structures e.g. for residential/light commercial use. However, dynamic loafing due to more continuous vibration and a resonant response of the structure can give rise to dynamic magnification especially at lower frequencies. BS5228-2 advises that, in these cases, thresholds are reduced by 50% to test for the onset of damage. Therefore, sustained PPVs of 7.5 mm/s are considered to be an appropriate indicator where risks of damage become significant.

Having regard to information contained in the Standards, **Table 11-7** details the distance at which certain activities may give rise to just perceptible levels of vibration. The actual distance is dependent on a number of factors, such as vibration characteristics, underlying geology, ground conditions, distance from source to receiver and screening and duration of works.

Table 11-7: Distance at which vibration may just be perceptible

Typical Construction Activity	Indicative distance from Activity when vibration may just be perceptible (Meter)
Excavation	10-15
Continuous Flight Auger Piling	15-20
Rotary Bored Piling	20-30
Vibratory Piling	40-60

With reference to the BS 5228-2, it notes that the probability of damage tends towards zero at 12.5mm/s peak component particle velocity. Therefore, the criteria given in **Table 11-8** has been derived on the basis of the thresholds described above. The criteria in **Table 11-8** is given as a reference to inform monitoring during blasting and vibration activities. The contractor will be obliged to adhere to these limits.

Table 11-8: Criteria for determining magnitude of impact transient vibration due to blasting

	Magnitude of Impact			
	Negligible	Minor	Moderate	Major
Vibration peak particle velocity	Less than 1	1 to 7.5	More than 7.5 and less than 12.5	12.5 and above

11.2.4.5 Operational Phase – Noise Impacts

BS 4142 Methods for Rating and assessing Industrial and Commercial Sound 2014 (BS4142:2014) provides a method for the rating and assessment of sound of an industrial and/or commercial nature. The assessment method allows the likely effects of sound on people to be determined. The significance of the sound upon the margin by which the rating level $L_{Ar,T}$ exceeds the background level L_{A90T}. The greater the difference the greater the magnitude of impact. Depending on the acoustic feature an acoustic correction may be applied to obtain the

rating noise level. Table 11-9 presents the significance of impact based on noise difference between the rating noise and background level.

BS4142:2014 states that where the rating noise level due to new industrial noise does not exceed the background sound level L_{A90T}, it is an indication of the specific sound source having a low impact. It is also noted that adverse impacts include but are not limited to annoyance and sleep disturbance. However, not all adverse impacts will lead to complaints and not every complaint is proof of adverse impact.

Table 11-9: Significance of Impact – Operational Phase

Noise Difference	Significance
+10dB	Likely to be an indication of a significance adverse impact
+5dB	Likely to be an indication of adverse impact

With reference to Section 11.4.2, the proposed deep water quay is not expected to generate any significant change in traffic volumes on the surrounding road network, and, as such, will not significantly affect the existing noise environment.

11.2.4.6 Operational Phase – Vibration Impacts

Given the existing baseline bedrock conditions, maintenance dredging is not expected to be required during the operation of the deep water quay. As such vibrational impacts on sensitive receptors arising from these activities can be scoped out.

11.2.5 Statement on Limitation and Difficulties Encountered

No limitations or difficulties were encountered during the preparation of this chapter.

11.3 Baseline Noise Survey Results

Table 11-10 to Table 11-12 summarise results from the baseline noise surveys undertaken by MWP personnel (Kieran Barry and William Murphy) on 8th April 2025.

Table 11-10: MP1 Baseline Noise Results

MP1	Time and Date	$L_{Aeq\ 15min}$ dB	$L_{A90\ 15min}$ dB	$L_{A10\ 15min}$ dB
Daytime	08/04/2025 12:20	49	30	49
	08/04/2025 14:07	39	29	42
	08/04/2025 15:53	41	30	45
Average		**43**	**30**	**45**
Evening	08/04/2025 21:28	**35**	**25**	**36**
Night	08/04/2025 23:00	40	33	41
	08/04/2025 23:16	38	34	40
Average		**39**	**34**	**41**

Table 11-11: MP2 Baseline Noise Results

MP2	Time and Date	$L_{Aeq\ 15min}$ dB	$L_{A90\ 15min}$ dB	$L_{A10\ 15min}$ dB
Daytime	08/04/2025 12:47	51	35	54
	08/04/2025 14:34	58	37	49
	08/04/2025 16:18	54	33	55
Average		**54**	**35**	**53**
Evening	08/04/2025 21:47	**38**	**25**	**40**
Night	08/04/2025 23:34	46	31	40
	08/04/2025 23:50	33	29	35
Average		**40**	**30**	**38**

Table 11-12: MP3 Baseline Noise Results

MP3	Time and Date	$L_{Aeq\ 15min}$ dB	$L_{A90\ 15min}$ dB	$L_{A10\ 15min}$ dB
Daytime	08/04/2025 13:24	43	30	48
	08/04/2025 15:06	40	27	41
	08/04/2025 16:44	37	26	39
Average		**40**	**28**	**43**
Evening	08/04/2025 22:06	**36**	**31**	**39**
Night	09/04/2025 00:10	35	30	38
	09/04/2025 00:25	34	28	36
Average		**35**	**29**	**37**

11.3.1 Baseline Noise Survey Results Discussion

At MP1 during the day, the main continuous source of noise was intermittent passing traffic within the harbour. There were pavement works being carried out nearby also and the operation of a small excavator was faintly audible in distance. People working in harbour and conversing were occasionally audible. Other noise sources contributing to soundscape was birdsong and light breeze. There was no notable noise from nearby quarry operations on day of monitoring. There was no notable noise from wind turbine during day.

During the evening and night-time measurements at MP1 the main source of noise was occasional cars passing by in harbour. Noise from the nearby wind turbine was more audible during these periods. Also contributing to soundscape was noise of slight breeze.

At MP2, the main source of noise during daytime was intermittent passing traffic. Other contributions included excavator noise which was faintly audible in background and birdsong.

During evening and night-time periods, there was less traffic and only noise from occasional passing vehicles contributed to soundscape. The noise of nearby wind turbine was also faintly audible in background. There was also a light breeze which was audible throughout monitoring.

At MP3, during daytime monitoring, the main noise contribution was rustling of trees and birdsong. Traffic only passed occasionally on road adjacent to school. Intermittent traffic from harbour was only faintly audible in background.

Evening and night-time measurements at MP3 were mainly low. Intermittent traffic at harbour was barely audible. Rustling of trees were also audible during monitoring.

11.4 Description of Likely Effects

11.4.1 Construction Phase Effects

In order to complete the development permitted under Planning Reg. Ref. 17/967, there are works not yet carried out that are still required. Key activities to be completed include the following:

1. Works to complete a Deep Water Quay development as previously permitted by Galway County Council under Planning Ref 17/967 comprising
   (i) Completion of a 200m quay wall construction using precast beams, precast caissons and precast L-wall units to full height of the quay wall;
   (ii) Dredging of a 30m wide x 200m long berthing pocket adjacent to the new quay to a depth of -10.0m CD (previously permitted to -12.0m CD);
   (iii) Dredging for a turning circle of 150m diameter (previously permitted at 200m diameter) to a depth of -7.0m CD (previously permitted to -8.0m CD) ;
   (iv) Backfilling behind the quay wall and raising ground level of reclaimed lands using rockfill up to +7mCD;
   (v) Reinforced concrete deck behind the quay wall;
   (vi) Surfacing of the reclaimed lands;
   (vii) Asphalt roadway connecting the concrete apron at the quayside to the existing road;
   (viii) Install lighting columns, underground ducts, surface water drainage, outfalls, interceptor, foul water drainage system including pumping station;
   (ix) Placement of rock armour for revetments along northern and southern extent of reclaimed land;
   (x) Excavation by dredging and rock blasting (if required) of the navigation channel to provide for a fully dredged navigation channel of -7m CD and minimum width of 100m (previously permitted to -8.0m CD and minimum width of 74m);
   (xi) A temporary site compound for contractor personnel including an effluent holding tank;
   (xii) A temporary concrete batching plant to provide on-site concrete for the quay wall construction;
   (xiii) Install palisade fencing, roadside guard rails, gates and traffic barrier around land boundary of quay area; and
2. Further development comprising:
   (i) A wastewater pipeline to connect proposed wastewater discharge points along the proposed quay to a new pumping station for onward discharge to an Údarás na Gaeltachta wastewater treatment network and plant at Ros an Mhíl; and
   (ii) A new ESB electrical sub-station for dedicated power provision to the new deep water quay

11.4.1.1 Construction Noise

The noise levels described in this section are indicative only and are based on theoretical worst-case assumptions to demonstrate that the works can be carried out without resulting in significant noise effects. Construction activities are by nature temporary, intermittent, and mobile, and typically only affect a small number of receptors at any given time. Due to variations in equipment use, duration, and site conditions, construction noise is inherently difficult to predict with precision for any specific future point in time.

Construction has the potential to generate significant noise from inherently noisy activities such as rock blasting, together with the on-site operation of both fixed and mobile construction plant and equipment. Off-site movement of construction related traffic also has the potential for significant noise generation.

The equipment required for each stage of the proposed development works will be similar in nature to that used during the previous works completed to date. The main stages of work and activities that are expected to involve noise emitting work are summarised in Table 11-13.

Table 11-13: Main Stages of work and activities

Stage	Activity	List of Typical Equipment and Plant	Overall Predicted LAeq 1hr
MobiliSation to site	MobiliSation	Flat top barges and drill towers	80
		Tugs/Workboats	
		Backhoe Dredger	
		Self propelled flat bottom /split hopper barges	
		Safety boat	
		Slipform	77
		Mobile Cranes	
		Fabrications	
		Mobile Pumps	
Dredging Works (i.e. drilling, blasting, dredging)	On-shore Operations (to support offshore works will be restricted to daytime only)	Excavators	91
		Dump Trucks	
		Bulldozers/wheel loader	
	Off-shore Operations	Flat top barges and drill towers	82
		Tug/Workboat	
		Backhoe Dredger	
		Self-propelled barges	
		Drilling blast	
	Off-shore Operations	Floating dock/submersible barge	77
		Tugs/workboats	
		Barge	
		Excavators	
		Safety Boat	

Stage	Activity	List of Typical Equipment and Plant	Overall Predicted LAeq 1hr
Dredging Works (i.e. drilling, blasting, dredging)	Causeway Filling	Wheel Loaders	78
	Caisson wall construction off-shore	Soil compactor	72
		Excavators	
	Caisson wall construction on-shore	Slipform concreting	76
		Mobile Cranes	
		Fabrications	
		Mobile Pumps	
	Pavement	Mobile pumps	77
		Mobile Cranes	
		Trucks	
	Fendering and Misc	Mobile cranes trucks	77

Blasting will not take place at night and audible warning signals will be used prior to blasting. Dredging works are likely to be carried throughout the 24 hour working day, 7 days per week, as is traditional in the dredging industry. The dredging equipment and associated support craft will all be diesel powered and, thus, the sound of diesel engines running will be commonplace throughout the working period. This type of noise is not unusual in a working port and is, therefore, assumed acceptable given that work of this nature has occurred within Ros an Mhíl harbour without complaint thus far. In addition, it is likely that casting the concrete caissons will involve a considerable amount of 24 hour working. There may also be a requirement to supply concrete over 24 hours which would require the re-establishment of the temporary concrete batching plant to provide on-site mass concrete for the quay wall construction.

Predicted noise levels due to the combined noise impact of plant utilisation for deep water quay construction and dredging area affecting the sensitive receptors are presented in Table 11-14 for daytime works and Table 11-15 if activities are conducted during the night-time period. All the receptors considered are residential and are therefore assessed as having high sensitivity.

The associated noise levels have been sourced from *BS 5228 Noise and Vibration from open and construction sites*, totalled, and extrapolated to the nearest noise sensitive locations MP1, MP2 and MP3. Only attenuation due to distance is accounted for in the prediction of resultant noise levels at different distances. The resultant noise level is then compared against the relevant noise threshold.

The result is a theoretical worst case, as it assumes all machinery will be operating simultaneously which will not be the case and accounts for attenuation due to distance only. In reality there will be further noise attenuation due to atmospheric absorption, ground absorption, and landform screening. Therefore, the noise levels presented herein are an overestimate.

Using the following equation, noise emissions from the construction site are extrapolated to distances of the nearest sensitive receptors, MP1, MP2 and MP3.

$$SPL2 = SPL1 - 20\log(r2/r1)$$

Where:

- Sound Pressure Level 1 (SPL1) = Known noise level at 10m from construction site
- Sound Pressure Level 2 (SPL2) = Unknown noise level at nearest receptor
- r2 = Distance between noise sensitive receptor and construction site
- r1 = 10 m

Table 11-14: Prediction of noise impacts due to construction activities – magnitude of impact for daytime and evening time works[1]

Stage	Activities	Reference noise level LAeq, 10 dB	Threshold level	Predicted Noise Levels LAeq		
				MP1	MP2	MP3
Mobilisation to site	Mobilisation	80	65/55	49	31	39
Dredging Works (i.e. drilling, blasting, dredging)	On-shore Operations	91	65/55	51	40	48
	Off-shore operations	82	65/55	48	33	41
Deep Water Quay Construction	On-shore operations	77	65/55	49	28	36
	Off-shore operations	77	65/55	34	26	34
	Causeway Filling	78	65/55	47	29	34
	Caisson wall construction off-shore	76	65/55	33	25	33
	Caisson wall construction On-shore	77	65/55	49	42	40
	Pavement	77	65/55	46	38	36

[1] Green-negligible; yellow – minor; orange – moderate; and red – major

Stage	Activities	Reference noise level LAeq, 10 dB	Threshold level	Predicted Noise Levels LAeq		
				MP1	MP2	MP3
	Fendering and Misc.	77	65/55	46	28	36

In reference to **Table 11-14**, the onshore and offshore proposed construction works noise at sensitive receptors are predicted to be below construction noise threshold limits during daytime and evening periods and therefore no significant effects are predicted.

Table 11-15: Prediction of noise impacts due to construction activities – magnitude of impact for night-time works[2]

Stage	Activities	Reference noise level LAeq, 10 dB	Threshold level	Predicted Noise Levels LAeq		
				MP1	MP2	MP3
Mobilisation to site	Mobilisation	80	65/55	49	31	39
Dredging Works (i.e. drilling, blasting, dredging)	On-shore Operations	91	65/55	51	40	48
	Off-shore operations	82	65/55	48	33	41
Deep Water Quay Construction	On-shore operations	77	65/55	49	28	36
	Off-shore operations	77	65/55	34	26	34
	Causeway Filling	78	65/55	47	29	34
	Caisson wall construction offshore	76	65/55	33	25	33

[2] Green-negligible; yellow – minor; orange – moderate; and red – major

Stage	Activities	Reference noise level LAeq, 10 dB	Threshold level	Predicted Noise Levels LAeq		
				MP1	MP2	MP3
	Caisson wall construction Onshore	77	65/55	49	42	40
	Pavement	77	65/55	46	38	36
	Fendering and Misc.	77	65/55	46	28	36

During the night-time period, no blasting will take place. However, off shore drilling and dredging activities will take place over a 24 hour period which is traditional in the dredging industry. It is also likely that casting the concrete caissons will involve 24 hour working. All supporting activities will be limited to daytime only.

For the purposes of this assessment the worst case scenario is considered and the closest sensitive receptor to the proposed development works is assumed to be approximately 914m from the proposed offshore works area. The predicted night-time noise levels resulting from the proposed off shore dredging works do not exceed the night time noise criteria. The predicted noise levels effects on the sensitive noise receptors due to offshore operations at night therefore predicted to be not significant.

As noted above concrete caissons and its associated works including supporting works within the site compound will involve 24 hour working for approximately 5 months. The closest receptor (MP1) to the onshore site boundary is approximately 236m. It is noted that this property is owned by the Ferry Company and whilst it is unoccupied it is occasionally used by Ferry Company crew members for sleep overs. The predicted night-time noise levels resulting from the proposed concrete caisson works (46 dB) will marginally exceed the night time noise criteria of 45 dB. The predicted noise levels effects on the sensitive noise receptors due to concrete caisson at night are assessed as not significant.

It should be noted, however, that the predicted noise levels are indicative only and the actual effects will be dependent on the final location of plant/operations, together with the sound power of the plant /operations used and schedule of works.

In the absence of mitigation, effects of construction works noise are predicted to be **negative**, **not significant**, **local** and **short-term.**

Table 11-16: Construction Works Noise Effect 1: Construction Works Noise Effects

Construction Works Noise Effect 1: Construction Works Noise Effects					
	Quality Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria
Pre-Mitigation	Negative	Not significant	Local	Short-Term	Direct

11.4.1.2 Construction Road Traffic Noise

Construction traffic is assessed in **Chapter 14** of this **EIAR** and served as a reference for assessment of traffic noise.

The assessment predicted a worst-case scenario consisting percentage increase in traffic movements along the R372 and R366. The proposed construction works would increase morning and evening peak hour traffic volumes by four vehicles and 14 vehicles, respectively, on the R372; and by two vehicles and seven vehicles, respectively, on the R336. The equivalent predicted typical daily increases would be 80 vehicles and 40 vehicles, respectively.

Where the total volume of total traffic increases by 25% or reduces by 20% there is a corresponding expected change in noise from traffic of 1dB.

The increase in daily vehicular activity is not expected to increase total traffic by 25%.

Therefore, in the absence of mitigation, the construction traffic noise will result in a **negative, not significant, short-term**, **local** and **direct** effect on sensitive receptors.

Table 11-17 Construction Works Noise Effect 2: Construction Traffic Noise Effects

Construction Works Noise Effect 2: Construction Traffic Noise Effects					
	Quality Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria
Pre-Mitigation	Negative	Not significant	Local	Short-Term	Direct

11.4.1.3 Construction Vibration

Blasting may cause air overpressure which is an impulsive noise event with energy within and below the audible range (concussive component). The latter propagates more readily than the audible component and can result in impulsive vibration. Blasting is proposed offshore. In reference to **Section 11.2.4.4**, **Table 11-7 (Distances at which vibration may just be perceptible),** perceptible effects from vibration are unlikely due to the distances between the proposed works and the closest sensitive receptors.

For construction works previously undertaken on site (between January 2023 and May 2024), vibration monitoring stations were installed at the closest structure/services to the site, as well as Martello Tower which was more than 1000m south of the site. Vibration monitoring stations were capable of continuous measurements of Peak Particle Velocity (PPV) in mm/sec.

The outcome of vibration monitoring undertaken between January 2023 and May 2024, gives an indication of how future blasting events, as part of proposed works, will affect sensitive locations.

Vibration monitoring was undertaken by NVM Ltd. Vibration monitors which were placed are listed in **Table 11-18** and shown in **Figure 11-3**.

Table 11-18: Vibration Monitoring Details

Location Details		Instrument Details		
Location ref	Description	Model	Serial Number	Date Installed
V1	Coast Guard Building	AvaTrace m80	11657	16th May 2023
V2	Storage Shed (cold store)	AvaTrace m80	13045	16th May 2023
V3	Lighthouse Signal Building	AvaTrace m80	13061	16th May 2023
V4	House at Harbour car park	AvaTrace m80	12822	19th May 2023
V5	Martello Tower	AvaTrace m80	3696	31st May 2023
V6	Martello Tower	AvaTrace m80	11303	12th Feb 2024

During previous monitoring, particular interest was given to the historic building, Martello Tower. Prior to the commencement of works and vibration monitoring, the tower was subject to a Pre commencement Structural Assessment on 25th of January 2023. A report was prepared detailing the condition and structural integrity of the Tower and is included in EIAR Volume III Appendix 11C.

Following completion of the pre-commencement structural assessment, a vibration monitoring device was installed at the foot of the tower and recorded peak particle velocity and frequency during the scheduled works. NVM Ltd have completed their 'Continuous Vibration Monitoring Survey Report' for previous works, refer to EIAR Volume III Appendix 11D. The recorded vibration values noted from the monitoring device were in the range of ≤ 1mm/s - ≤ 4mm/s PPV at a frequency range of 10-50 Hz, for the entire monitoring period. These values were noted as being below the guidance threshold values provided for the project, refer to Section 11.2.4.4 which details construction vibration criteria.

On their review of the collected measurement data from the completed monitoring programme, it was also concluded that further works including the blasting is likely to have a low to medium level consequence in terms of cosmetic damage to buildings.

A post structural report was completed in October 2024. The conclusion noted "from the visual inspections which the assessor undertook, that the works carried out to date at the DWQ site, including the blasting, did not have any negative impact on the Martello Tower and did not cause any structural or superficial damage to the tower." It was also noted that the very robust nature of the Martello Tower combined with the dry ashlar facing and its position remote from the proposed construction works make it unlikely that any damage should occur to its structure during course of proposed works. A full note on the report is included in EIAR Volume III Appendix 11C.

Therefore, in the absence of mitigation, effects from construction works vibration are therefore predicted to be neutral, not significant, local and short-term.

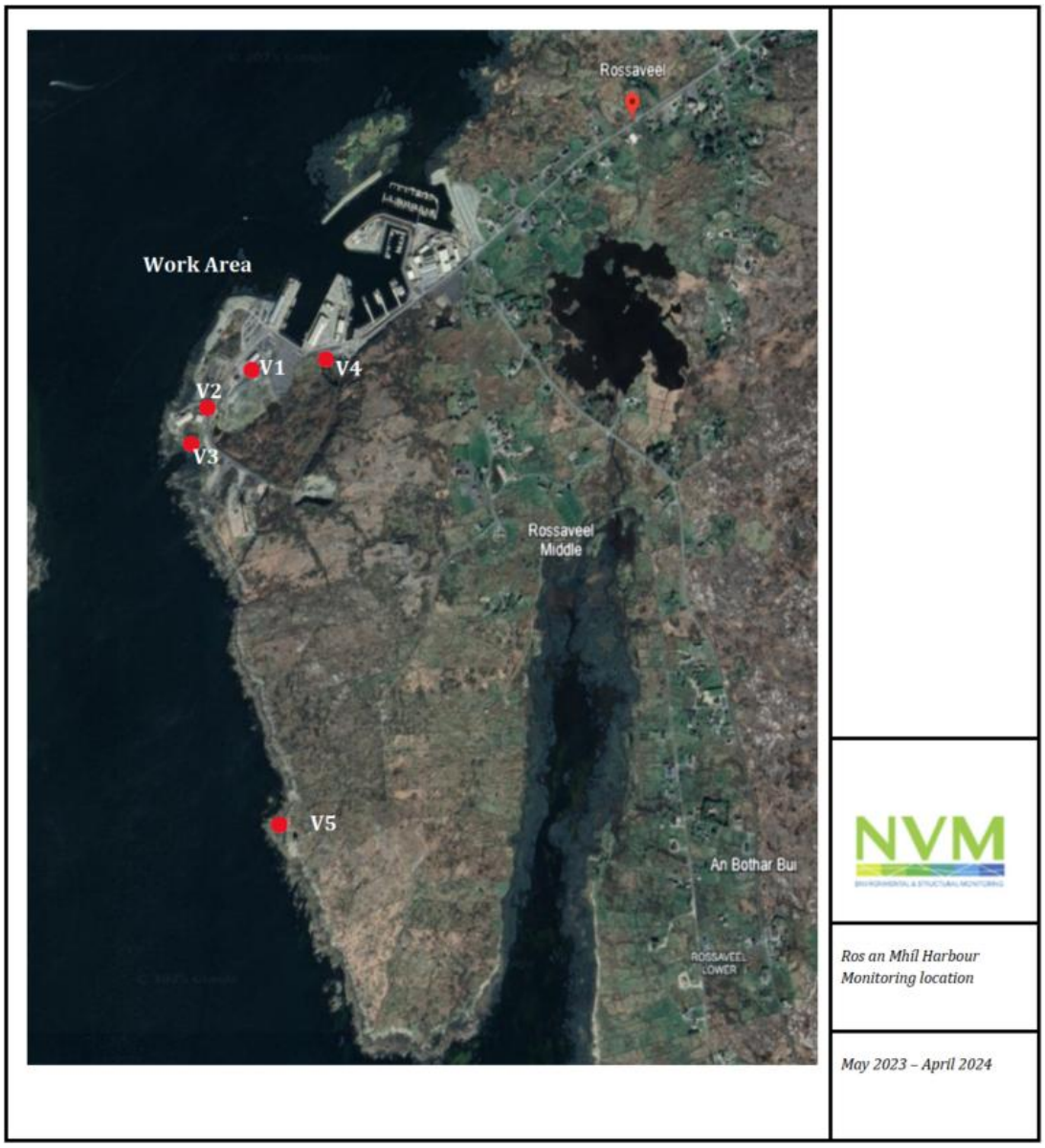

Figure 11-3 Map of Vibration Monitor Locations

Table 11-19 Construction Works Vibration Effects

Construction Works Vibration Effects					
	Quality Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria
Pre-Mitigation	Neutral	Not significant	Local	Short-Term	Direct

11.4.2 Operational Phase Effects

A traffic assessment was carried out for the development and is included **Chapter 14** of this **EIAR**.

The Ros an Mhíl Deep Water Quay will provide enhanced space for fishing operations. There will be no increase in fishing quotas and no increase in fishing generated road traffic volumes.

The fishing season is from October to April and does not coincide with the peak summer tourist season, when peak seasonal traffic volumes are generated, including by the Aran Island Ferries and Wild Atlantic Way, on the local road and transport network. Fishing traffic during the October to April season is typically generated during the early morning and late evening/night, with up to circa 20 fishing truck loads on one day, weekly.

Therefore, there is no increase change in Annual Average Daily Traffic (AADT) predicted.

Given that there is no increase change in AADT predicted, the operational traffic noise will therefore result in a **neutral, imperceptible, local** and **long-term** effect on sensitive receptors.

Table 11-20: Operational Phase Noise Effects

Operational Phase Noise Effects					
	Quality Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria
Pre-Mitigation	Neutral	Imperceptible	Local	Long-Term	Direct

11.5 Mitigation Measures

11.5.1 Construction Phase Mitigation Measures

The following mitigation measures are recommended to prevent significant effects:

- Unnecessary revving of engines will be avoided and equipment will be switched off when not in use;
- Internal haul routes will be kept well maintained;
- Plant and vehicles will be sequentially started up rather than all together;
- Use of effective exhaust silence systems or acoustic engine covers as appropriate;
- Plant will always be used in accordance with manufacturer's instructions. Care will be taken to site equipment away from noise sensitive areas. Where possible, loading and unloading will also be carried out away from such areas;
- Regular and effective maintenance by trained personnel will be undertaken to keep plant and equipment working to manufacturers specification;
- Screening e.g. noise barriers and bunds will be used as appropriate;
- Vibration barriers can provide limited attenuation and will be used as appropriate;
- Procedures for handling noise and vibration complaints;
- Advance notification of at least 24 hours to all sensitive receptors during critical phases of construction and during blasting events; and
- Blasting will be limited to daytime works only.

In addition to the above, specific mitigation measures outlined in the NVM Ltd '**Continuous Vibration Monitoring Report,** refer to **EIAR Volume III Appendix 11D**, will also be implemented:

In order to avoid any potential for cosmetic damage due to the site activities, it is advisable for the contractor to conduct further monitoring at identified sensitive locations to continue the collection of measurement data during the project as a means of mitigation.

As a location of noted heritage, the location of the Martello Tower should be considered as one of the sensitive receptor points.

Extract from post Structural Report on the Martello Tower

"*The very robust nature of the Martello Tower combined with the dry ashlar facing and its position remote from the proposed construction works make it unlikely that any damage should occur to its structure during the course of construction of the works. Nevertheless, it is recommenced that during the course of construction which will involve blasting works, vibration monitoring of the Martello Tower should take place on a continuous basis over the period of construction works".*

In the instance of vibration levels giving rise to what could be deemed as human discomfort, the following measures shall be applied during any further work phases.

- Restriction of works which have a potential to cause significant vibration effects with respect to human response to allocated time periods as noted in planning guidance.
- Appropriate mitigation measures applied to all activities in respect to vibration.
- A coordinated communication programme to inform occupants of the buildings and visitors to the port area informing the likelihood of potential vibration impacts from activities being generated on site. (by means of signage or alert notifications on residential alert platforms, local press, SMS notification).

11.5.2 Operational Phase Mitigation Measures

No noise and vibration effect mitigation measures are required for the operational phase of development.

11.6 Monitoring

11.6.1 Construction Phase Monitoring Measures

It is recommended that a comprehensive noise and vibration monitoring protocol will be set out within the Noise and Vibration Construction Management Plan. Construction noise and vibration levels will be monitored and assessed in accordance with the noise criteria set out in BS5228:

- At ongoing intervals throughout the construction, but not at pre-arranged times;
- As and when required, during critical phases of construction, i.e. when possible exceedance of the project noise criteria is anticipated;
- In response to reasonable noise complaints being received;
- At locations representative of sensitive receptors in the vicinity; and
- For blasting activities, each blast will be monitored by the blasting contractor at high-risk receptors.

11.6.2 Operational Phase Monitoring Measures

No noise and vibration monitoring will be required during the operational phase of development.

11.7 Residual Effects

Table 11-21 shows the proposed development Noise and Vibration residual effects after mitigation measures are applied. There will be no significant negative residual noise effects from the construction or operational phase of the proposed development.

Table 11-21: Noise and Vibration Residual Effects

Impact/Activity /Receptor	Quality Of Effect	Pre-Mitigation Significance Rating	Mitigation Measures	Post-Mitigation / Residual Significance Rating
CONSTRUCTION EFFECTS				
Construction Works Noise Effect 1: Construction Works	Negative	Not Significant	Best practice mitigations and mitigations set out in **Appendix 11D**	Imperceptible to Not Significant
Construction Works Noise Effect 2: Construction Traffic	Negative	Not Significant	Best practice mitigations and mitigations set out in **Appendix 11D**	Imperceptible to Not Significant
Construction Works Vibration Effects	Neutral	Not Significant	Best practice mitigations and mitigations set out in **Appendix 11D**	Imperceptible to Not Significant
OPERATIONAL EFFECTS				
Operation Phase Effects	Neutral	Imperceptible	No mitigations required	Imperceptible

11.8 Cumulative Effects

The majority of works around the Bay are related to residential developments and are not considered to have a significant cumulative effect with the proposed development. Other developments that were refused or had an 'incomplete application' status were also screened out from the assessment for cumulative impacts. There are three planning applications identified that were considered for potential cumulative effect.

Table 11-22: Relevant Projects Assessed for Cumulative Impact

File No.	Description	Decision Date	Decision	No. Conditions
221076	For the reclamation of a waterlogged area to the south of the Department of Agriculture, Food and the Marine's public carpark	26/01/2023	Granted (Conditional)	5
21300	For a new small craft harbour, reclamation of foreshore and dredging of a new small craft harbour basin at Rossaveel Fishery Harbour Centre	18/01/2021	Granted (Conditional)	9
201633	For; 1. Boat Maintenance & Repair Centre with Office and Storage space as well as other Ancillary Works, 2. New Pier and Mobile Boat Lift, 3. Boat & Car Storage Space on site, 4. Construction of a Sewage Treatment Plant. The Planning Authority has	25/05/2021	Granted (Conditional)	12

File No.	Description	Decision Date	Decision	No. Conditions
	submitted a Natura Impact Statement with the application. Gross floor area of the proposed works: 1268 sqm			

A review of nearby developments indicates that there are no notable cumulative noise or vibration impacts associated with construction activities. Similarly, no future developments are anticipated during the operational phase that would result in significant cumulative noise or vibration effects.

11.9 Conclusion

The assessment of potential construction and operational noise and vibration effects associated with the proposed development at Ros an Mhíl Deep Water Quay indicates that, in the absence of mitigation, effects are generally predicted to be negative but not significant, short-term, local, and direct during the construction phase. This applies to both onshore and offshore construction activities, including dredging, caisson casting, and associated works.

Construction noise predictions, based on worst-case scenarios using BS 5228 methodologies, remain below threshold levels at all sensitive receptors for both daytime and night-time periods, with the exception of a marginal exceedance of 1 dB (A) at MP1 during night-time caisson works, which is not considered significant.

Similarly, predicted impacts from construction traffic and vibration, including those arising from offshore blasting, are also assessed as not significant, with historical monitoring and structural inspections indicating no damage or adverse effects on sensitive structures such as the Martello Tower.

Operational noise effects, primarily from fishing-related traffic, are anticipated to be neutral, imperceptible, and long-term, due to the absence of any significant increase in traffic volumes.

A suite of standard best practice noise and vibration mitigation measures has been identified and will be implemented to minimise potential impacts further. These include operational controls on equipment use, advanced notification of blasting events, vibration barriers where appropriate, and adherence to recommendations from the NVM Ltd monitoring report.

Overall, with the implementation of these mitigation measures, no significant negative noise or vibration effects are expected on the environment or on sensitive receptors during either the construction or operational phases of the proposed development.

References

BS 4142: 2014: Methods for Rating and Assessing Industrial and Commercial Sound.

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

BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2 – Vibration.

BS 6472 Guide to evaluation of human exposure to vibration in buildings (2008): Part 1 - Vibration sources other than blasting.

BS 7385-2:1993 Evaluation and measurement for vibration in buildings. Guide to damage levels from ground borne vibration.

Manual for Roads and Bridges (DMRB) Sustainability & Environment Appraisal LA 111 Noise and Vibration Revision 2 (DMRB, 2020)

Guidance Note for Noise: License Applications, Surveys and Assessments in Relation to Scheduled Activities (EPA, 2016).

ISO 1996: 2017: Acoustics – Description, measurement, and assessment of environmental noise.

British Standard 8233:2014 Sound Insulation and Noise Reduction for Buildings – Code of Practice;

World Health Organisation (WHO) - Guidelines for Community Noise.