

Acoustics review

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Date:	6 March 2025
From:	Jamie Exeter / Jon Styles
To:	Bevan Hudson
Application reference:	RC14513
Applicant:	Glen Isla Protection Society
Application details:	Glen Isla Coastal Protection Project
Location:	Glen Isla Dune, Waihi Beach
Zoning:	Rural Zone
Activity status:	Discretionary

1.0 Introduction

Western Bay of Plenty District Council (**WBPDC**) has engaged Styles Group to review the acoustic information submitted with the resource consent application for the Glen Isla Coastal Protection Project (**GICPP**) at Glen Isla Dune, Waihi Beach. We have reviewed the following documents:

- The Marshall Day Acoustics (**MDA**) noise and vibration memo¹
- The MDA section 92 response².

We have also read the relevant sections of the AEE, other application plans and documents, and submissions made on the application. Jon Styles visited the on 30 October 2024.

We understand that the occupants of the dwellings at 9, 11, 12, 13, 14, 15 and 16 Glen Isla Place are members of the Glen Isla Protection Society and have all provided written approval to the application based on potential infringements of the Western Bay of Plenty District Plan (**WBPDP**) construction noise limits for permitted activities. The proposed potential infringements of the permitted construction noise limits at these sites are a reason for consent, but we have disregarded any potential construction noise and vibration effects on them.

The application is based on compliance with the permitted construction noise limits at all sites where the owners and occupiers have not provided written approval (the potentially affected sites).

¹ Glen Isla Protection Society – Coastal Protection Project, Noise and vibration trial summary, dated 12 July 2024

² Glen Isla Coastal Protection Project – Response to s92 queries, dated 6 December 2024

2.0 Assessment of construction noise and vibration

The applicant has undertaken site specific measurements of the plant and methodologies that will generate the highest levels of construction noise and vibration during proposed construction work.

The measurements and assessments have been undertaken in accordance with the relevant Standards (NZS 6803:1999 and DIN 4150–3:2016).

We consider the data used to predict the highest construction noise and vibration levels during the proposed work is robust and reliable, and we agree with the predicted levels.

The application is based on an estimated construction duration of six months to allow for contingencies. The proposed general construction hours are 07:00 AM to 17:00 PM, Monday to Friday. On three days every two weeks the construction hours may be 06:00 AM to 20:00 PM and could include a Saturday. No work will be undertaken on Sundays or Public Holidays.

The WBPDP permitted construction noise limits relevant to the proposal are:

General construction hours Monday to Friday

- 07:00 to 07:30 – 55 dB L_{Aeq} and 75 dB L_{Amax}
- 07:30 to 17:00 – 70 dB L_{Aeq} and 85 dB L_{Amax} .

On three days every two weeks not including Sundays or public holidays

- 06:00 to 06:30 – 45 dB L_{Aeq} and 75 dB L_{Amax}
- 06:30 to 07:30 – 55 dB L_{Aeq} and 75 dB L_{Amax}
- 07:30 to 18:00 – 70 dB L_{Aeq} and 85 dB L_{Amax}
- 18:00 to 20:00 – 65 dB L_{Aeq} and 80 dB L_{Amax} .

The MDA acoustic advice demonstrates that the noisiest construction activities can comply with the permitted construction noise limits at any potentially affected site between the hours of 07:30 and 18:00, Monday to Saturday. These activities could not take place before 07:30 without infringing the permitted construction noise limits.

The construction activities that would take place outside of the hours of 07:30 to 18:00, Monday to Saturday have not been stated. No assessment has been provided to demonstrate that the proposed works will comply at the potentially affected sites when the permitted noise limits are lower.

It may be difficult for trucks and heavy machinery to operate on the site between 07:00 and 07:30 AM without infringing the permitted noise limit of 55 dB L_{Aeq} at the nearest potentially affected sites. Noisy construction work could not take place on the site between 06:00 and 06:30 AM without infringing the permitted noise limit of 45 dB L_{Aeq} . The construction activities that can take place on site before 07:30 AM are therefore limited.

We consider that perceptible vibration (more than 0.3 mm/s PPV within any occupied dwelling on a potentially affected site) generated before 07:00 AM may cause annoyance and sleep disturbance. We have recommended a vibration amenity limit to avoid these effects. This will limit the activities that can take place on site before 07:00 AM.

We agree with the MDA recommendation to adopt the guideline vibration values of the German vibration Standard DIN 4150–3:2016 for the project to avoid building damage. This Standard is typically adopted for construction projects in New Zealand.

We recommend that a Construction Noise and Vibration Management Plan (**CNVMP**) is prepared for the project that clearly sets out the construction activities that cannot take place before 07:30 AM to avoid non-compliance with the permitted construction noise limits and before 07:00 AM to avoid unreasonable disturbance within dwellings during the night-time period. The CNVMP should also include the requirements for communication with the nearest potentially affected sites before the works begin, the construction noise and vibration monitoring to be undertaken, and a procedure for receiving and responding to complaints. The final CNVMP should be verified by WBPDC before any work begins on the site because the application has not assessed the proposed works that will occur outside of the general construction hours.

We consider that the noise and vibration from the proposed construction work will not cause unreasonable disturbance at any potentially affected site if our recommended conditions in Section 4.0 of this memo are adopted.

3.0 Submissions

We have reviewed the submissions with respect to potential construction noise and vibration effects.

Submitters have raised general concerns about unacceptable construction noise. The predicted construction noise levels do not exceed the limits set by the District Plan for permitted activities at any potentially affected site, so we consider them to be reasonable. We have recommended a condition for a CNVMP that will set out mitigation and management measures to ensure that the permitted standards are complied with.

Several submitters have raised concerns about potential building damage from vibration. Based on the results of the site and plant specific measurements undertaken by MDA, and our experience in monitoring similar activities, we expect that the guideline vibration values of DIN 4150–3:2016 will be complied with.

Section 4.2 of DIN 4150–3:2016 states:

This document gives guideline values for vibration velocities obtained by experience from numerous measurements.

Experience shows that no damage due to vibration adversely affecting serviceability (see 4.5) will occur if these guideline values are complied with. If damage nevertheless occurs, it is to be assumed that other causes are responsible. Exceeding the guideline values does not necessarily lead to damage. Should they be exceeded, however, further investigations may be necessary, such as determining and evaluating the stresses as detailed in 4.3 and 4.4.

The following examples of reductions in serviceability that will not occur in dwellings if the guideline values are complied with are provided in Section 4.5 of the Standard:

- Impairment of the stability of the building
- A reduction in the load-bearing capacity of floors and other components

- Cracks form in plastered or rendered surfaces of walls
- Existing cracks in a structure are enlarged
- Partitions become detached from load-bearing walls or floor slabs.

The predicted vibration levels are considerably lower than the most stringent values of the Standard, including those for structures that are particularly sensitive to vibration.

Based on the guidance of the Standard, we do not expect vibration from the proposed work to cause damage in any building. However, to address the concerns raised by submitters we have recommended a vibration monitoring condition.

4.0 Recommended conditions

We recommend that the following conditions are imposed and complied with:

1. The consent holder must submit a Construction Noise and Vibration Management Plan (CNVMP) to WBPDC for verification no less than 14 days before the construction works authorised by this consent begin. The objectives of the CNVMP are to identify and adopt the best practicable option for minimising adverse construction noise and vibration effects on neighbours, and to define the procedures to be followed to ensure that the authorised noise and vibration limits are complied with.

The CNVMP must include the details of all work that will be undertaken outside the hours of 07:30 AM to 18:00, Monday to Saturday, and provide specific details of the mitigation measures that will be adopted to ensure that the project construction noise and vibration limits are complied with at these times.

The CNVMP must be prepared with reference to Annex E of NZS 6803:1999 *Acoustics – Construction Noise* and by a suitably qualified and experienced person.

2. The consent holder must advise the occupants of all buildings within 100 m of the site boundary of the construction works at least five days before the work begins. The advice must be provided in writing and include the following information:
 - i. A general description of the construction works including the duration of the project and the working hours on site.
 - ii. The approximate dates and durations of the activities that will generate the highest levels of construction noise and vibration.
 - iii. A contact name and phone number to advise of any sensitive times for high noise levels and for any questions or complaints regarding noise and vibration throughout the project.
3. Construction work and heavy vehicle movements must only take place on site between 07:00 and 17:00 Monday to Friday, except on three days in every two-week period when the construction hours may be 06:00 AM to 20:00 PM Monday to Saturday. No construction work is permitted on Sundays or Public Holidays. A record

of all days and times when construction work has taken place outside of 07:00 and 17:00, Monday to Friday must be kept by the consent holder and provided to WBPDC on request.

4. Construction vibration must not exceed 0.3 mm/s PPV outside the hours of 07:00 AM to 20:00 within any occupied building on any site where written approval to the application was not provided.
5. Construction vibration must comply with the guideline values set out in the German Industrial Standard DIN 4150-3:2016: *Vibrations in buildings – Part 3: Effects on structures* when measured in accordance with that Standard on any structure not on the same site and where written approval to the application was not provided.
6. Construction noise must comply with the following noise limits at any site where written approval to the application was not provided:
 - 06:00 AM to 06:30 AM – 45 dB L_{Aeq} and 75 dB L_{Amax}
 - 06:30 AM to 07:30 AM – 55 dB L_{Aeq} and 75 dB L_{Amax}
 - 07:30 AM to 18:00 PM – 70 dB L_{Aeq} and 85 dB L_{Amax}
 - 18:00 PM to 20:00 PM – 65 dB L_{Aeq} and 80 dB L_{Amax} .

Construction noise must be measured and assessed in accordance with NZS 6803:1999 *Acoustics – Construction noise*.

7. Vibration monitoring must be undertaken by a suitably qualified person during the first two weeks of heavy machinery being used on the site. The results must be used to assess compliance with the project vibration limits for avoiding building damage and reported in writing to WBPDC within two weeks of the measurements being undertaken. If non-compliance with the relevant limits is identified, the work responsible must stop and not resume until a report has been provided to, and verified by, WBPDC to set out the measures and methodology that will be adopted to ensure ongoing compliance. In the event of any non-compliance, building condition surveys must also be undertaken at the affected buildings by a suitably qualified person before the construction work continues. Further vibration monitoring must be undertaken once the construction work resumes for a period of at least one week to determine compliance with the project limits.

5.0 Summary

Styles Group has reviewed the acoustic information submitted with the resource consent application for the GICPP.

The proposed potential infringements of the permitted construction noise limits at the sites where written approval has been provided are a reason for consent, but we have disregarded any potential construction noise and vibration effects on these sites. The application is otherwise based on consistent compliance with the WBPDP permitted construction noise limits.

We agree that the guideline vibration values of DIN 4150–3:2016 are appropriate vibration limits for the project to avoid building damage. We consider that a vibration amenity limit within occupied dwellings to avoid annoyance and sleep disturbance from vibration before 07:00 AM is also appropriate.

The acoustic advice provided with the application demonstrates that the noisiest construction activities can comply with the permitted construction noise limits at any potentially affected site between the hours of 07:30 and 18:00 Monday to Saturday. There is no assessment of the proposed activities outside of these hours.

The construction activities that can take place on site before 07:30 AM are limited by the requirement to comply with the permitted construction noise limits. Our recommended vibration amenity limit for the project also limits the activities that can take place on site in the early morning. We recommend that the applicant identifies and assesses the construction activities that will take place outside of the general construction hours. We can review these assessments and then update our advice if necessary.

We recommend that a CNVMP is prepared for the project that clearly sets out any mitigation, management and restrictions required for compliance during the timeframes that have varying limits for construction noise and vibration. The CNVMP should also include requirements for communication with the nearest potentially affected sites before the works begin, the construction noise and vibration monitoring to be undertaken, and a procedure for receiving and responding to any complaints. The final CNVMP should be verified by WBPDC before any work begins on the site.

Submitters have raised general concerns about construction noise and concerns about potential building damage from vibration. We consider that construction noise levels will remain reasonable if the permitted construction noise limits are complied with at all potentially affected sites. Based on the guidance of DIN 4150–3:2016, we do not expect vibration from the proposed work to cause damage in any building. However, we recommend that vibration monitoring is undertaken to address the concerns raised by submitters.

We have recommended conditions based on our review of the information provided and our experience with similar construction projects. We consider that noise and vibration generated by the proposed construction work will not cause unreasonable disturbance at any potentially affected site if our recommended conditions are adopted.

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Date:	12 June 2025
From:	Jon Styles
To:	Bevan Hudson
Application reference:	RC14513
Applicant:	Glen Isla Protection Society
Application details:	Glen Isla Coastal Protection Project
Location:	Glen Isla Coast, Waihi Beach
Zoning:	Rural Zone
Activity status:	Discretionary

1.0 Introduction

Western Bay of Plenty District Council (**WBPDC**) has engaged Styles Group to review the acoustic information submitted with the resource consent application for the Glen Isla Coastal Protection Project (**GICPP**) at Glen Isla Dune, Waihi Beach.

We prepared an initial review dated March 6, 2025 (the **Review**). The Review sought further clarification regarding the timing of proposed construction works and compliance with the construction noise limits that apply before 07:30 and after 18:00:

“The acoustic information provided with the application demonstrates that the noisiest construction activities can comply with the permitted construction noise limits at any potentially affected site between the hours of 07:30 and 18:00 Monday to Saturday. However, there is no assessment of the proposed activities outside of these hours. Please identify and assess the noise and vibration effects of construction activities that will take place outside of the general construction hours”.

WBPDC has engaged Styles Group to review the response prepared by Marshall Day Acoustics (MDA) dated 2 April 2025 (the **Response**) and to provide recommendations based on the information provided in the Response.

2.0 The proposed construction hours

The proposal is based on an estimated construction duration of six months (which allows for contingencies). The applicants' proposed general construction hours are 07:00 AM to 17:00 PM, Monday to Friday, and on three days every two weeks the construction hours may be 06:00 AM to 20:00 PM and could include a Saturday. No work will be undertaken on Sundays or Public Holidays.

The construction noise limits permitted by the WBPDP are set out in Rule 4C.1.3.1. This rule adopts the guideline noise limits from NZS6803:1999¹. Table 2 of NZS6803:1999 is set out below with the correct set of permitted noise limits for this proposal in the right-most column:

Table 2 – Recommended upper limits for construction noise received in residential zones and dwellings in rural areas

Time of week	Time period	Duration of work					
		Typical duration		Short-term duration		Long-term duration	
		(dBA)		(dBA)		(dBA)	
		L_{eq}	L_{max}	L_{eq}	L_{max}	L_{eq}	L_{max}
Weekdays	0630-0730	60	75	65	75	55	75
	0730-1800	75	90	80	95	70	85
	1800-2000	70	85	75	90	65	80
	2000-0630	45	75	45	75	45	75
Saturdays	0630-0730	45	75	45	75	45	75
	0730-1800	75	90	80	95	70	85
	1800-2000	45	75	45	75	45	75
	2000-0630	45	75	45	75	45	75
Sundays and public holidays	0630-0730	45	75	45	75	45	75
	0730-1800	55	85	55	85	55	85
	1800-2000	45	75	45	75	45	75
	2000-0630	45	75	45	75	45	75

¹ Section 2.0 of our original advice dated 6 March 2025 mixes the permitted construction noise standards with the applicants' proposed days and hours of work. This created a confusing arrangement, particularly for Saturdays where the noise limits differ from those applying on weekdays. We recommend that the tables and descriptions in this advice are referred to.

The Response is reproduced below. We have highlighted the relevant sections that confirm construction work before 07:30, after 20:00 on weekdays and after 18:00 on Saturdays cannot comply with the relevant construction noise limits.

In our Section 92 response, we quoted the application which says 'No work will take place before 6am or after 8pm'. This means that there are two windows (1.5 hrs in the early morning and 2 hrs in the evening) where works could occur outside the 0730 – 1800hrs daytime period (as defined by NZS 6803). We have reviewed our predicted rock drop noise levels. The table below shows, for each time slice between 6am and 8pm, whether those levels comply with the NZS 6803:1999 long-term construction noise limits at the closest non-GIPS dwelling (7 Glen Isla Place). Note that we predict an infringement at the closest GIPS dwelling for every time slice.			
Time slice	L _{Aeq} limit	L _{AFmax} limit	Complies at 7 Glen Isla? (Predicted levels are 61 dB L _{Aeq} and 77 dB L _{AFmax})
0600 – 0630hrs	45	75	No
0630 – 0730hrs	55	75	No
0730 – 1800hrs	70	85	Yes
1800 – 2000hrs	65	80	Yes
This means that, in order to comply with the construction noise limits at non-GIPS receivers, no rock drops must occur before 7.30am. As for construction activities other than the rock drop, in our Mm002 r02 we predicted these noise levels and presented them in a 3D noise map. These results indicate the same compliance status as the rock drop. Infringement before 0730hrs and compliance after this. We understand that the applicant will update their proposed hours of operation accordingly.			

We agree with the MDA advice that there will be infringements of the permitted standards at 7 Glen Isla Place if works are undertaken before 0730.

3.0 Updated summary

We have provided a summary below that is taken from our original advice (dated 6 March) with minor updates following the applicants' responses and this advice.

The proposal seeks consent for infringements of the permitted construction noise limits at the sites where written approval has been provided. We have disregarded any potential construction noise and vibration effects on these sites. For all other sites the proposal is to comply with the WBPDP permitted construction noise limits.

The acoustic advice provided with the application demonstrates that the noisiest construction activities can comply with the permitted construction noise limits at any potentially affected site provided the work is only undertaken between the hours of 07:30 and 20:00 Monday to Friday and 07:30 and 18:00 on Saturdays. There is no assessment of the proposed activities outside of these hours.

We recommend that a CNVMP is prepared for the project that clearly sets out any mitigation, management and restrictions required for compliance during the timeframes that have varying limits for construction noise and vibration. The CNVMP should also include requirements for communication with the nearest potentially affected sites before the works begin, the construction noise and vibration monitoring to be undertaken, and a procedure for receiving and responding to any complaints. The CNVMP should also apply to future maintenance activities. The final CNVMP should be certified by WBPDC before any work begins on the site.

In the absence of any WBPDP standards, we agree with MDA that the guideline vibration values of DIN 4150–3:2016 are appropriate vibration limits for the project to avoid building damage. Vibration will be noticeable at affected properties.

Submitters have raised general concerns about construction noise and concerns about potential building damage from vibration. We consider that construction noise levels will remain reasonable if the permitted construction noise limits are complied with at all potentially affected sites. Based on the guidance of DIN 4150–3:2016, we do not expect vibration from the proposed work to cause damage in any building. However, we recommend that the CNVMP requires vibration monitoring to be undertaken to address concerns raised by submitters.

We have recommended conditions based on our review of the information provided and our experience with similar construction projects. We consider that noise and vibration generated by the proposed construction work will not cause unreasonable disturbance at any potentially affected site if our recommended conditions are adopted.

4.0 Recommended conditions

The Response confirms that construction work before 07:30 cannot comply with the relevant construction noise limits and states that the applicant will update their proposed hours of operation. We agree that modification to the proposed construction hours will be required to ensure compliance with the relevant construction noise limits that apply before 07:30, after 20:00 on weekdays and after 18:00 on Saturdays.

The Response states that MDA understand that the applicant will update their proposed hours of work accordingly. We have recommended days and hours of work to accord with the findings in the Response.

4.1 Updated recommended conditions

We provided recommended conditions of consent in our Review. We recommend the following updates to these conditions, in accordance with the information provided in the Response.

We have used ~~strike through~~ and **bold underline** to show recommended changes (except for rearranging the order of conditions):

1. The consent holder must submit a Construction Noise and Vibration Management Plan (CNVMP) to WBPDC for ~~verification~~ **certification** no less than 14 days before the construction works authorised by this consent begin. The objectives of the

CNVMP are to identify and adopt the best practicable option for minimising adverse construction noise and vibration effects on neighbours, and to define the procedures to be followed to ensure that the authorised noise and vibration limits are complied with.

The CNVMP must include the details of all work ~~that will be undertaken~~ **between** ~~outside the hours of 07:30 AM to 18:00~~ **07:30 and 20:00**, Monday to Saturday, and provide specific details of the mitigation measures that will be adopted to ensure that the **consented** ~~project~~ construction noise and vibration limits are complied with at these times.

The CNVMP must be prepared with reference to Annex E of NZS 6803:1999 *Acoustics – Construction Noise* and by a suitably qualified and experienced person.

The CNVMP must set out methods and procedures requiring vibration monitoring to demonstrate compliance with the limits set out in this consent.

All construction work and subsequent maintenance work must be carried out in accordance with the certified CNVMP.

2. The consent holder must advise the occupants of all buildings within 100 m of the site boundary of the construction **and maintenance** works at least five days before the **construction** work **or maintenance** begins. The advice must be provided in writing and include the following information:
 - i. A general description of the construction **or maintenance** works including the duration of the project and the working hours on site.
 - ii. The approximate dates and durations of the activities that will generate the highest levels of construction noise and vibration.
 - iii. A contact name and phone number to advise of any sensitive times for high noise levels and for any questions or complaints regarding noise and vibration throughout the project.
3. **The permitted days and hours for** construction work **and maintenance** and **associated** heavy vehicle movements **are:** ~~must only take place on site~~ between ~~07:00~~
 - i) **Between 07:30** and 17:00 Monday to Friday; ~~except~~
 - ii) ~~On~~ **up to** three days in every two-week period:
 - a. **Between 07:30 and 20:00 from Monday to Friday**
 - b. **Between 07:30 and 18:00 on a Saturday** ~~when the construction hours may be 06:00 AM to 20:00 PM Monday to Saturday.~~

No construction work is permitted on Sundays or Public Holidays.

A record of all days and times when construction work has taken place outside of ~~07:00~~ **07:30** and 17:00, Monday to Friday must be kept by the consent holder and provided to WBPDC on request.

4. Construction noise must comply with the following noise limits at any **occupied building site that is not part of the application site or** where written approval to the application was not provided:

- ~~06:00 AM to 06:30 AM – 45 dB L_{Aeq} and 75 dB L_{Amax}~~
- ~~06:30 AM to 07:30 AM – 55 dB L_{Aeq} and 75 dB L_{Amax}~~
- 07:30 AM to 18:00 PM – 70 dB L_{Aeq} and 85 dB L_{Amax} **Monday to Saturday**
- 18:00 PM to 20:00 PM – 65 dB L_{Aeq} and 80 dB L_{Amax} **Monday to Friday**

Construction noise must be measured and assessed in accordance with NZS 6803:1999 *Acoustics – Construction noise*.

5. ~~Construction vibration must not exceed 0.3 mm/s PPV outside the hours of 07:00 AM to 20:00 within any occupied building on any site where written approval to the application was not provided.~~
6. Construction vibration must comply with the guideline values set out in the German Industrial Standard DIN 4150-3:2016: *Vibrations in buildings – Part 3: Effects on structures* **at all times** when measured in accordance with that Standard on any structure not on the same site and where written approval to the application was not provided.
7. Vibration monitoring must be undertaken by a suitably qualified person during the first two weeks of heavy machinery being used on the site. The results must be used to assess compliance with the project vibration limits for avoiding building damage and reported in writing to WBPDC within two weeks of the measurements being undertaken. If non-compliance with the relevant limits is identified, the work responsible must stop and not resume until a report has been provided to, and verified by, WBPDC to set out the measures and methodology that will be adopted to ensure ongoing compliance. In the event of any non-compliance, building condition surveys must also be undertaken at the affected buildings by a suitably qualified person before the construction work continues. Further vibration monitoring must be undertaken once the construction work resumes for a period of at least one week to determine compliance with the project limits.