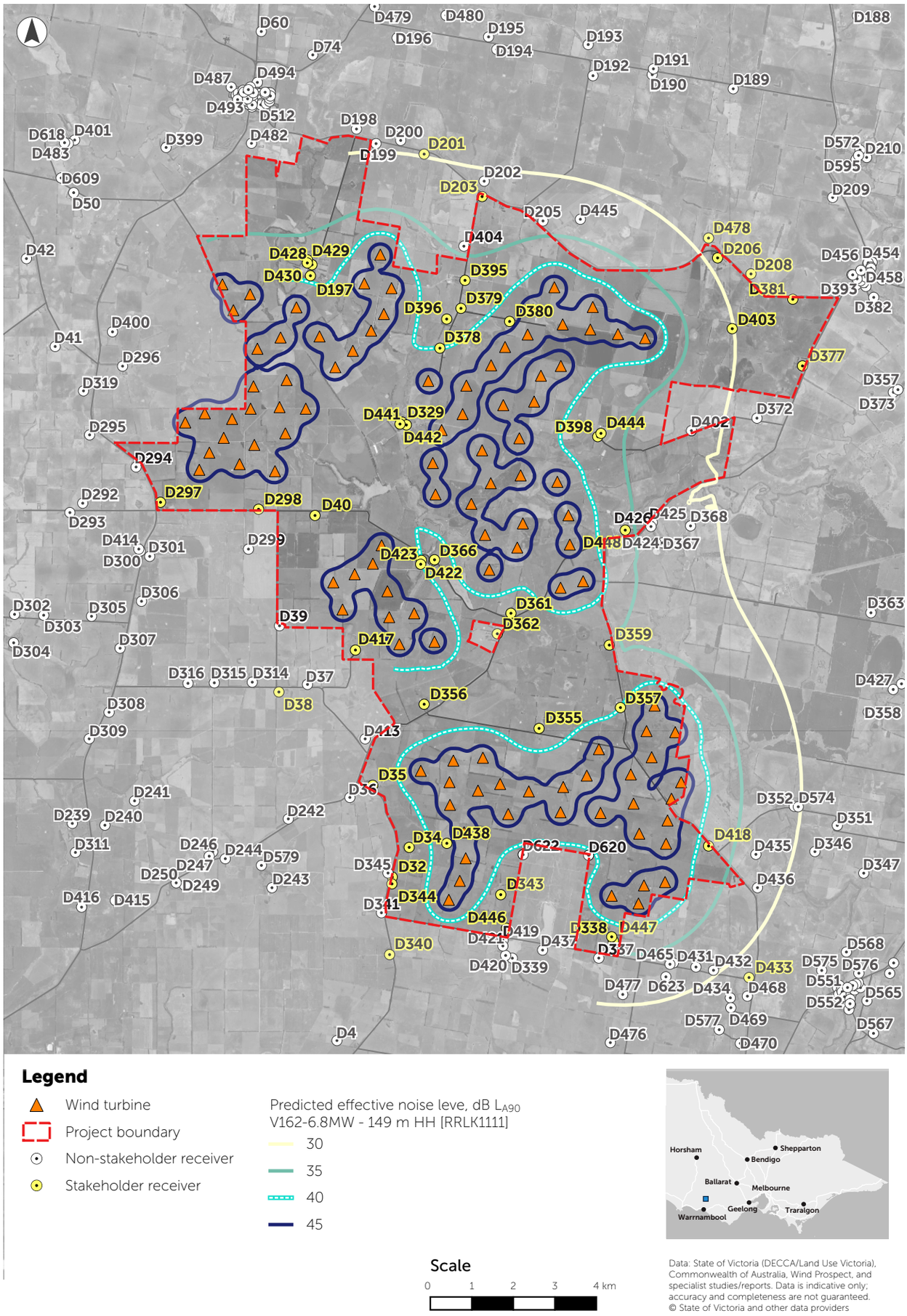

Legend

- Wind turbine
- Project boundary
- Non-stakeholder receiver
- Stakeholder receiver

Predicted effective noise leve, dB L_{A90}
V162-6.8MW - 149 m HH [RRLK1111]

- 30
- 35
- 40
- 45

Scale
0 1 2 3 4 km

Figure 17.5 Highest predicted noise level contours, dB L_{A90}

Terminal station and battery energy storage system noise

The following obligations apply under the *Environment Protection Act 2017* and Environment Protection Regulations 2021:

- Operation of the terminal station and battery energy storage system must not cause noise that is prescribed to be unreasonable or assessed to be unreasonable according to the listed factors set out in the *Environment Protection Act 2017*.
- The risk of harm from noise associated with the terminal station and battery energy storage system must be minimised so far as reasonably practicable, in accordance with the general environmental duty under the *Environment Protection Act 2017*.

Noise levels associated with the proposed on-site terminal station and battery energy storage system were predicted for at all receivers within three kilometres of these sites. An adjustment of +2 dB was applied to the predicted noise levels to account for the potential tonal characteristics of transformer noise and battery energy storage system equipment. The predicted noise levels at stakeholder and non-stakeholder dwellings are provided in the ***Environmental Noise and Vibration Impact Assessment*** (Appendix E1) in tabulated form for the on-site substation and battery energy storage system.

Noise levels are predicted below the applicable night-time noise limit set (i.e., 34 dB ENL, refer to Table 17.5 of Section 17.3.2) by at least nine dB at all receivers with the exception of two stakeholder receivers. At these receivers, effective noise levels are predicted at or within one dB of the night-time noise limit. These results indicate that the proposed on-site terminal station and battery energy storage system are capable of being designed and operated such that the applicable noise limits are achieved, and that the noise levels are unlikely to represent a risk of harm to the environment.

The predicted noise contours indicate that the cumulative terminal station and battery energy storage system noise level is predicted to be significantly below 10 dB ENL at the nearest natural area (i.e., Lake Connewarren, approximately 10 kilometres from the proposed terminal station and battery energy storage system). As such, operation of these facilities is not expected to be audible at this natural area.

The locations of the predicted noise contours for the terminal station and battery energy storage system are shown in Figure 17.6.

With the implementation of management measure NV07, the selection of equipment with low noise emissions, and the inclusion of OEM noise attenuation kits, where practical, the residual impact would be low. Predicted noise levels would be reviewed once the project design, equipment numbers and selections are finalised.

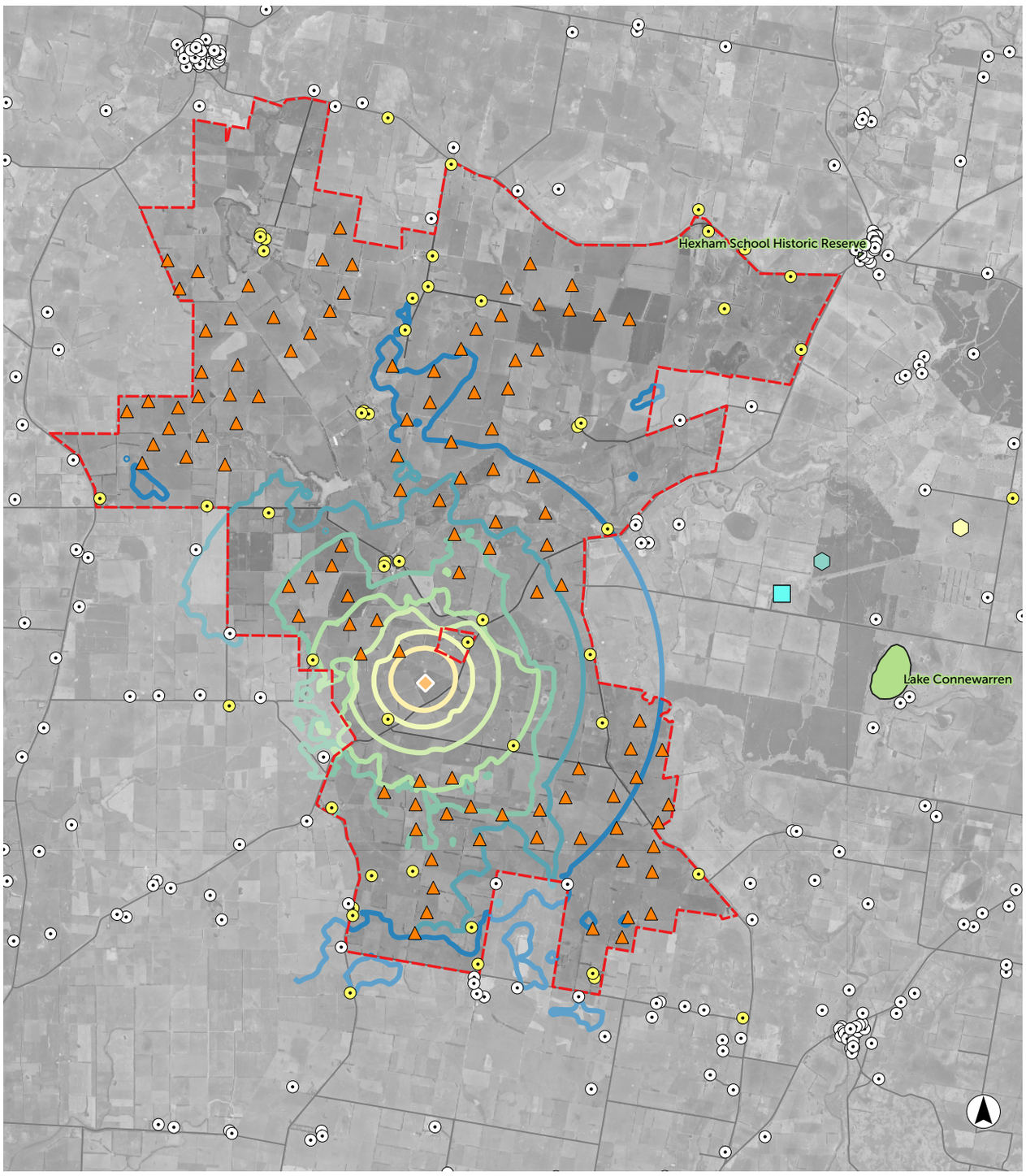

Figure 17.6 Predicted battery energy storage system /terminal station effective noise level contours, dB ENL

Decommissioning noise

Decommissioning activities would be expected to be similar in terms of noise generated by some construction activities, including involvement of large equipment (cranes, excavators and graders) and the transport of large project components from the site (e.g., wind turbine towers and blades).

A Decommissioning Noise and Vibration Management Plan will be prepared and submitted to the Responsible Authority for endorsement that would provide a detailed assessment of decommissioning noise and vibration from project activities, and proposed measures to minimise potential impacts (NV08).

17.7.5 Cumulative impacts

The approved and operating projects, identified within 15 kilometres of the project, that may be relevant for assessing cumulative impacts are:

- Mortlake Power Station (operational), located approximately four kilometres to the east
- Hawkesdale Wind Farm (operational), located approximately 14.1 kilometres to the south-west
- Salt Creek Wind Farm (operational), located approximately 14.7 kilometres to the north-east
- Mortlake Energy Hub (approved), adjacent to the east of the Mortlake Power Station, comprising a 360-megawatt solar energy facility and a 300-megawatt battery energy storage system
- Mortlake Power Station battery energy storage system (approved), on the eastern side of the Mortlake Power Station site, with a capacity of 300 megawatts /650 megawatt-hours.

Construction

Consideration was given to the potential cumulative noise of the on-site quarry and concrete batching plants in combination with the operational Mortlake Power Station and approved Mortlake Energy Hub.

The receivers nearest to the project are located far enough from these other projects so that the noise of these projects is not expected to approach the noise limits. For receivers to the east of the project site that are nearest to the Mortlake Power Station and Mortlake Energy Hub, the combined predicted noise level of the project's on-site quarry and concrete batching plants is less than 30 dB ENL and would not materially affect compliance margins for these receivers (noting that the on-site quarry and concrete batching plants are restricted to daytime operation).

Operation

Due to the significant separation distance to the nearest approved and/or operating wind farm, a cumulative impact assessment of noise levels from the project and other surrounding wind farm(s) is not warranted.

The minimum distance between the noise generating infrastructure associated with the terminal station and battery energy storage system and the operational Mortlake Power Station, approved Mortlake Energy Hub and approved Mortlake Power Station battery energy storage system is approximately eight kilometres. Given this, the nearest receivers to the terminal station and battery energy storage system are sufficiently far from the other projects such that the noise from these sites is not expected to approach the noise limits, particularly due to the proximity of other receivers nearer to them which would dictate their noise control requirements.

At the receivers to the east of the project site that are nearest to these other projects, the combined predicted noise levels of the on-site terminal station and battery energy storage system is less than 10 dB ENL and therefore would not materially affect the compliance margins for these receivers.

17.7.6 Impact assessment summary

A summary of the assessment findings against the relevant noise and vibration criteria, and how the project construction and operation activities achieve these criteria with the implementation of management controls (outlined in Section 17.7.3), is provided in Table 17.11.

Table 17.11 Noise and vibration impact assessment summary

Impact pathway	Project phase	Mitigation and management	Likely impact (considering magnitude, extent and duration)	Residual impact
All construction activity (wind turbines, terminal station and battery energy storage system, access tracks, cable trench digging, site compounds)	Pre-construction Construction	• Approved Construction Noise and Vibration Management Plan [EMM NV01] would include provisions to notify neighbouring residents in advance of noisy works occurring, and measures relating to selection of low noise emission plant and restriction of construction activities to normal working hours	The highest noise levels are expected occur during the construction of access roads near a non-stakeholder receiver (i.e., D482, with a predicted level range of 55-60 dB L_{Aeq}), followed by cable trench digging. As these activities will progress quickly, these levels would be reached for a short period of time (typically significantly less than three to four weeks for the construction of access roads and less than one week for cable trench digging). Vibration impacts are considered a low risk for the project and vibration monitoring is not expected to be required.	The impact is considered **low**.
Off-site traffic	Pre-Construction Construction	• Approved Construction Noise and Vibration Management Plan [EMM NV01] including measures for informing local communities and other relevant stakeholders (e.g. local council) about the peak periods of construction traffic and the measures that will be implemented to minimise the noise, so far as reasonably practicable	Noise modelling predicts that noise levels would be above the ERS objectives (i.e., 40 dB $L_{Aeq,16h}$ during the day and 35 dB $L_{Aeq,8h}$ at night) along off-site traffic routes, particularly for off-site material sourcing and the receivers adjacent the Hamilton Highway in Mortlake	The impact is considered **medium**.
On-site quarry and concrete batching plants	Pre-Construction Construction	• Approved Quarry Noise Management Plan prepared as part of the Quarry Work Plan [EMM NV02] • The design and operation of the temporary concrete batching plants would be in accordance with the control measures outlined in EPA Publications and Noise Protocol [EMM NV03]	At the nearest non-stakeholder dwelling (D299, located approximately 3.9 kilometres from the quarry site), quarry noise levels are predicted to be 9 dB below the applicable daytime noise limit. As such, noise from the proposed on-site quarry and concrete batching plants are not likely to be a project design constraint provided that the operations are limited to the daytime.	The impact is anticipated to be **low**.

Impact pathway	Project phase	Mitigation and management	Likely impact (considering magnitude, extent and duration)	Residual impact
Wind turbine noise	Pre-construction Operation	• A pre-construction noise assessment would be completed and approved by the Responsible Authority [EMM NV04] • Before commencement of wind turbine operations, a schedule of sound power level testing would be prepared, additional noise monitoring would be undertaken at intervals required by the *Environment Protection Act 2017* to verify compliance with the applicable noise limits [EMM NV05] • Approved Operational Noise Management Plan [EMM NV06]	Wind turbine noise levels are predicted to comply with the noise limits for all receivers. The highest predicted noise level is at Lake Connewarren (26 dB L_{A90}). On the limited occasions when wind turbine noise may be audible, it is likely to be difficult to distinguish from other ambient noise sources, particularly in the presence of any wind disturbance of vegetation in the area.	The impact is considered to be **low**.
Terminal station and battery energy storage system	Pre-Construction Operation	• Pre-construction noise assessment is to be submitted to the Responsible Authority demonstrating that the design and operation of the on-site terminal station and battery energy storage system [EMM NV07]. • An annual statement would be prepared detailing the actions undertaken to ensure compliance [NV06]	These results indicate that the proposed on-site terminal station and battery energy storage system are capable of being designed and operated such that the applicable noise limits are achieved, and that the noise levels are unlikely to represent a risk of harm to the environment.	Impact is considered to be **low**.

17.8 Conclusions

As assessment has been undertaken of potential noise and vibration impacts of the construction, operation and decommissioning of Hexham Wind Farm. This chapter is based on the findings of the ***Environmental Noise and Vibration Impact Assessment*** (provided in Appendix E), prepared by Marshall Day Acoustics. The findings of the noise assessment have demonstrated that the proposed Hexham Wind Farm complies with the requirements of the applicable Victorian legislation and guidelines, and that the proposed wind turbines are predicted to achieve compliance with the applicable noise limits determined in accordance with NZS 6808 for all receivers based on a candidate wind turbine model.

The assessment has also considered operational noise associated with the proposed on-site terminal station and battery energy storage system, in accordance with EP Act and EP Regulations. The assessment demonstrates that the operational noise levels from the on-site terminal station and battery energy storage system are predicted below the noise limits determined in accordance with the Noise Protocol.

Noise and vibration during the construction and decommissioning of the project has been assessed and can be satisfactorily addressed with good practice measures, accounting for the guidance of EPA Publication 1834.2 and subject to dedicated controls to address the noise of off-site construction traffic.

The assessment has also considered the proposed on-site quarry and concrete batching plants, in accordance with the Noise Protocol. The results demonstrate that the predicted noise levels associated with operation of the on-site quarry and concrete batching plants during the construction period are below the