

**CARBON, COST AND PROGRAMME SAVINGS**  
COMPOSITE NOISE WALL PANELS

**Delivered in partnership with Transport for NSW (TfNSW), the project constructed a noise barrier along Lackey Road to protect the local community from operational train noise. Rather than relying solely on a conventional precast concrete wall, the project incorporated an innovative composite panel system for part of the structure, delivering measurable benefits in carbon reduction, cost, construction efficiency and community outcomes.**

**The Challenge**

The stabling yard extension required removal of the existing security fence and low-height noise wall along Lackey Road and replacement with a longer barrier capable of meeting stringent acoustic performance requirements for the new intercity train fleet. The base design specified a conventional precast concrete noise wall, which carried a high embodied carbon footprint due to the volume of concrete and reinforcing steel required.

To support the project's Platinum sustainability ambitions under the TfNSW Sustainable Design Guidelines v4.0 (SDGv4), the project team sought an alternative solution that reduced environmental impact without compromising acoustic or structural performance.

**The Solution: Composite Material Noise Wall**

Through a value engineering process, Degnan identified a sound-absorbing composite panel system comprising an aluminium-clad, recycled PET core (Modular Walls AcoustiSorb) as a replacement for sections of the precast concrete wall.

The composite system delivered equivalent acoustic performance while significantly reducing embodied carbon. The material substitution was incorporated into the civil and structural design and formed part of the project's formal carbon mitigation strategy submitted to TfNSW.

As the noise wall was located adjacent to a heavy vehicle route, vehicle impact requirements prevented full replacement of the precast concrete solution. Instead, the project adopted a hybrid approach, combining composite panels with lower-carbon precast concrete panels containing 25% Supplementary Cementitious Material (SCM). This provided the most effective solution across the full length of the noise wall.



Completed noise wall showing pre-cast concrete panels and landscaping.

**Programme and Cost Benefits**

The composite panel system delivered both programme and cost advantages compared with the precast concrete alternative. On a supply basis, the panels were less expensive per square metre than equivalent precast concrete units, providing immediate procurement savings. Their lower weight also reduced foundation and structural support requirements, generating genuine capital cost savings rather than simply shifting costs elsewhere.

The system also simplified construction. Unlike precast concrete walls, which require extended manufacturing lead times, large crane lifts and complex delivery logistics, the lightweight modular panels enabled a more efficient installation methodology. Reduced lifting requirements and faster installation shortened the construction programme for this work package.

Additional efficiencies were achieved through integration of the security fence within the wall structure, eliminating a separate procurement and installation package. Across materials, foundations, crane hire, labour and programme duration, the composite solution delivered a lower overall out-turn cost than the precast concrete baseline.



Noise barrier constructed along rail line on Lackeys Road measuring 250m in length and 5.5m high. View from rail corridor.



Acoustic wall upgrades replaced sections of the concrete wall with sound-absorbing aluminium-clad composite panels featuring a recycled PET core.



Previous security fencing before being replaced with noise barrier wall.

**Carbon Benefits**

The composite noise wall delivered one of the largest carbon reduction initiatives on the project. The design avoided 52.7 tonnes of precast concrete and 2.5 tonnes of reinforcing steel, generating an estimated 15.8 tCO<sub>2</sub>e saving through material substitution.

Additional savings were achieved through reduced transport requirements. At 9.2 kg/m<sup>2</sup>, the composite panels were significantly lighter than the precast concrete they replaced, reducing transport emissions and handling requirements. The integrated fence-and-wall design eliminated the need for separate fencing, bollards and structural steel. Together, these contributed to a total carbon mitigation outcome of 438.9 tCO<sub>2</sub>e. The project achieved a 29% reduction in greenhouse gas emissions against a 15% target.

**Community and Operational Benefits**

The AcoustiSorb<sup>®</sup> system incorporated sound absorption directly into the panel, eliminating the need for separate recycled-glass acoustic panels that would otherwise have been required to achieve equivalent performance with a precast concrete wall.

Rather than reflecting noise back across the rail corridor, the absorptive surface reduced overall noise energy within the environment. This simplified construction, removed a separate supply and installation activity, and delivered the required acoustic outcome through a single integrated system.

The integrated fence-and-wall design also improved the visual appearance of the corridor by presenting a single, cohesive structure rather than multiple independent elements. Complementary landscaping and flora screening further softened residents visual impact of the noise wall.

**This case study demonstrates how early design-stage engagement between construction, sustainability and engineering teams can identify material substitution opportunities that simultaneously reduce carbon, cost and programme risk, setting a benchmark for future rail infrastructure projects across the TfNSW network.**

CASE STUDY

KEY OUTCOMES

**CARBON**



15.8 tCO<sub>2</sub>e avoided through reduced concrete and steel usage (52.7 t and 2.5 t respectively)

**EFFICIENCY**



Fence integrated into wall, reducing materials, complexity and installation time.



Improved acoustic absorption performance, supporting Platinum SDGv4 rating and a 29% GHG reduction.



Reduced noise impact and improved visual amenity through an integrated, absorptive wall design.