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Memorandum

To	Darren Utting, Juliet Spagnolo	Page	1
CC			
Subject	Transmission Gully - Post Construction Inspections Summary		
From	Shivam Jakhu		
File/Ref No.		Date	27-Feb-2023

1.0 Introduction

The Transmission Gully (TG) (the Project) motorway was officially opened on the 30th of March 2022. Prior to opening, site inspections were undertaken in order to fulfill the requirements of the following conditions:

- NZTA.81A.c):
    - i. Prior to opening: confirmation of the location of the as-built alignment in the noise model, visual inspection from the far-side carriageway of the relationship of PPFs to earthworks and noise barriers, verification of as-built noise barrier dimensions, and confirmation of as-built road surfaces
- NZTA.81B:
    - A report detailing the results and any corrective actions arising from the post construction validation of the noise assessment shall be provided to the Council within nineteen months of opening of the road in areas with low-noise road surfaces, and within ten months of opening the road in all other areas.

This memorandum has been prepared in order to summarise:

- The verification of the as-built noise barrier dimensions
- Visual inspections from the far-side carriageway of the relationship of PPFs to earthworks and noise barriers
- Confirmation of as-built road surfaces

This memo is an appendix to the report “Post-construction Noise Model Validation, Transmission Gully”, which has been prepared in order to meet the requirements of NZTA.81B.

2.0 Verification of As-Built Noise Barrier Dimensions

Two site visits were carried out in order to inspect the noise walls at Linden and Flightys. The Linden noise walls were inspected on the night of the 26th of September 2021, and the Flightys noise wall and bund was inspected on the 5th November 2021.

The noise wall inspections were undertaken by AECOM Wellington staff under the remote supervision of Shivam Jakhu, an acoustics specialist at AECOM based in Auckland. Shivam could not undertake the inspections himself due to the Covid-19 travel restrictions for the Auckland region at the time.

Noise barriers were measured according to the methodology set out in NZTA P40 “Specification for Noise Mitigation”[1], i.e.

- The height above the local ground level was physically measured every 100m, or where the design height changed by 0.5m or more.
- Noise barriers were checked for gaps.
- Noise barriers were checked that the materials used were in accordance with the design.
- Noise bunds were visually inspected to confirm the heights were approximately as designed.

2.1 Noise barrier designs

Table 1 contains a summary of the noise barrier and bund designs installed as part of the project.

Table 1 Summary of noise walls

ID	Area	Location	Side	Type	Length (m)	Design Height (m)
B1	Flightys	13420 m – 14020 m	East	Bund	430	2.5
N1A*	Flightys	13640 m – 13720 m	East	Bund	90	2.5
N1B	Flightys	13940 m – 14020 m	East	Barrier	80	2.5
N2	Linden	00455 m – 00645 m	East	Barrier	157	2
N3	Linden	00040 m – 00420 m	East	Barrier	380	2-2.5
N4	Linden	00360 m – 00580 m	West	Barrier	213	3
N5	Linden	-00015 m – 00360 m	West	Barrier	376	2-3
N6	Linden	01460 m – 01545m (SH1B)	West	Barrier	85	2

*Note that this was originally a noise wall at Detailed Design but was changed to a bund during construction. Bund B1 and N1A effectively comprise one long bund.

2.2 Linden noise walls inspection

The site visit for inspection of the Linden noise walls was undertaken in rainy weather during the night-time. Because of this, the clarity of most of the images taken were compromised due to low visibility, meaning that images from the far-side carriageway comparing the Detailed Design noise model and as-built noise walls were not useful for noise walls N2, N3 and N6. Despite the low visibility, the site staff still recorded their observations for comparison of the view of PPFs behind the built noise walls to images from the same perspective in the Detailed Design noise model.

2.2.1 Noise walls N4 and N5

These noise walls were inspected and found to have gaps in some locations running under the wall. These gaps were notified to CPB HEB JV and were subsequently backfilled.

The height of the noise wall was recorded along its length and was generally found to be consistent with the noise model; The length of noise wall where the lower height was measured was approximately 10m out of the 470m length inspected. The as-built geometry of the noise wall was

[1] https://www.nzta.govt.nz/assets/resources/noise-mitigation/docs/nzta-p40-noise-mitigation-specification.pdf

included in the post-completion noise model, and noise predictions at nearby PPFs were found to be consistent with the predictions undertaken for the Detailed Design phase.

Figure 1 Typical picture of noise wall N4

Figure 2 Typical picture of gap under noise wall

A visual comparison was made of the noise wall compared to the noise model and was found to be generally consistent as seen when comparing Figure 3 and Figure 4.

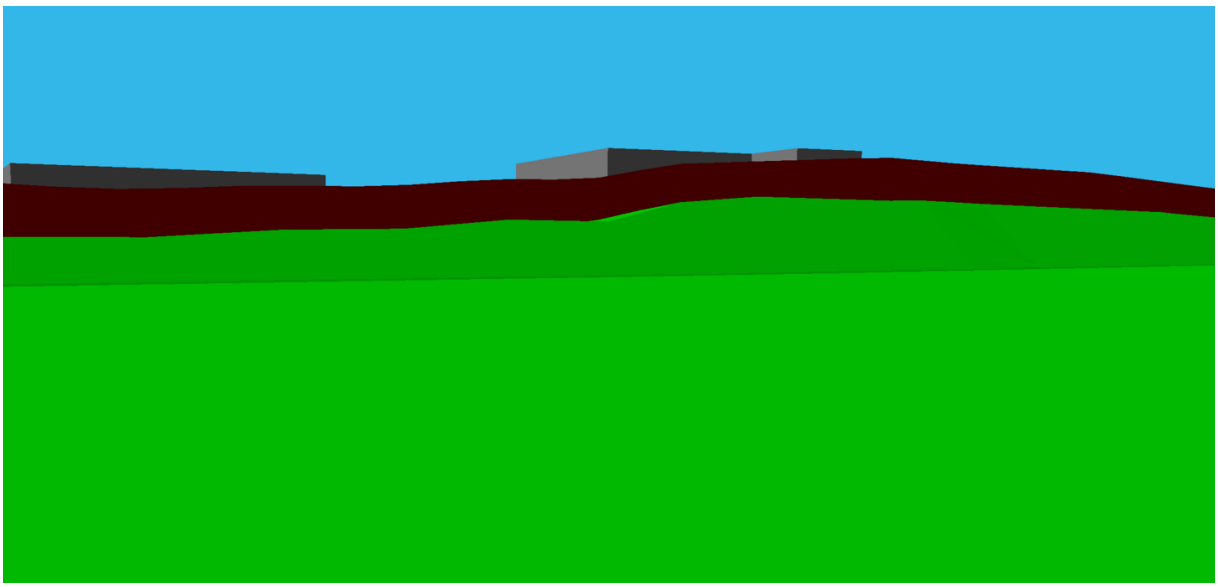

Figure 3 Image of noise wall N4 from noise model

Figure 4 Image of noise wall N4 from site inspection

2.2.2 Noise wall N3

This noise wall was constructed along mostly steep ground with dense vegetation planted in front, and due to safety concerns at the time of the inspection, the noise wall was not physically measured along most of its length. Where the noise wall was measured, its height was found to be lower than the design height by up to 0.8m. The length of noise wall where the lower height was measured was approximately 17m out of the full 376m length of the wall.

CPB HEB JV was notified of the height discrepancy found for this noise wall. Additional noise modelling was undertaken at the time, and the change in noise level due to the lower barrier was

found to be less than 1 dB and would not have changed the NZS 6806 Category of any PPFs behind the noise wall. The full memo summarising the outcome of this is provided in Appendix C of the full post-construction monitoring and noise model validation report. The as-built height of the noise wall was also included in the Post-Construction noise model.

Figure 5 Typical picture of noise wall N3

Figure 6 Typical picture of noise wall N3

Although a clear image of the noise wall from the far-side carriageway was not taken on the night, the site personnel confirmed that visual inspection of the view of the PPFs behind the noise wall from the far-side carriageway on the night of the inspection matched the view in the Detailed Design noise model.

2.2.3 Noise wall N2

This noise wall was constructed along mostly steep ground, and due to safety concerns at the time of the inspection, the noise wall was not physically measured along approximately half of its length. Gaps were found along some parts of this noise wall during the inspection and were reported to CPB HEB JV, which were later rectified by the contractor.

The height of the noise wall was recorded along its length and was generally found to be consistent with the noise model; the height of the noise wall was recorded to be below the design height for a total length of 3m out of the 25m that was inspected. The as-built geometry of the noise wall was included in the post-completion noise model, and noise predictions at nearby PPFs were found to be consistent with the predictions undertaken for the Detailed Design phase.

Figure 7 Typical picture of noise wall N2

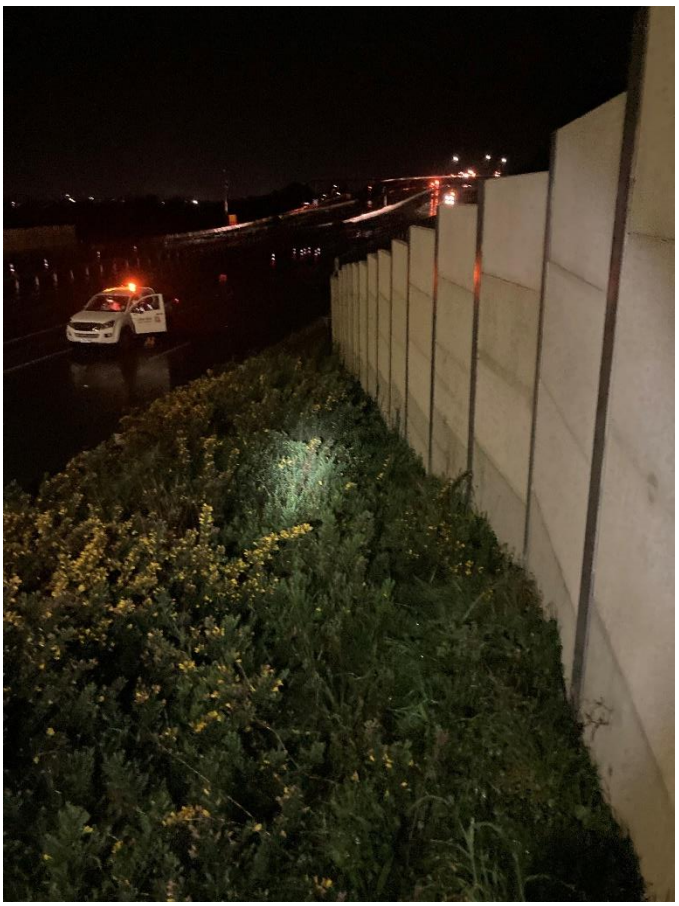

Figure 8 Typical picture of noise wall N2

Although a clear image of the noise wall from the far-side carriageway was not taken on the night, the site personnel confirmed that visual inspection of the view of the PPFs behind the noise wall from the far-side carriageway on the night of the inspection matched the view in the Detailed Design noise model.

2.2.4 Noise wall N6

This noise wall was inspected and found to have gaps in some locations running under the wall. These gaps were notified to CPB HEB JV and were subsequently backfilled.

The height of the noise wall was recorded along its length and was generally found to be consistent with the noise model; the length of noise wall where the lower height was measured was approximately 9m out of the 85m length of the wall that was inspected. The as-built geometry of the noise wall was included in the post-completion noise model, and noise predictions at nearby PPFs were found to be consistent with the predictions undertaken for the Detailed Design phase.

Figure 9 Typical picture of noise wall N6

Figure 10 Typical picture of noise wall N6

Although a clear image of the noise wall from the far-side carriageway was not taken on the night, the site personnel confirmed that visual inspection of the view of the PPFs behind the noise wall from the

far-side carriageway on the night of the inspection matched the view in the Detailed Design noise model.

2.3 Flightys noise wall and bunds inspection

2.3.1 Noise wall N2A

This noise wall was inspected and found to have gaps in several locations running under the wall. These gaps were notified to CPB HEB JV and were subsequently backfilled.

The height of the noise wall was recorded along its length and was generally found to be consistent with the noise model. The as-built geometry of the noise wall was included in the post-completion noise model, and noise predictions at nearby PPFs were found to be consistent with the predictions undertaken for the Detailed Design phase.

We note that a culvert was constructed in one location under the noise wall. This culvert was not included in the Detailed Design noise model, therefore it was included in the Post-Construction noise model in order to account for any noise leakage under the noise wall. Upon running the model, it was found that inclusion of the culvert in under the noise wall did not change the predicted noise levels at any of the PPFs in the local area.

Figure 11 Typical picture of noise wall N2A

Figure 12 Typical picture of noise wall N2A

Figure 13 Picture of culvert under noise wall N2A

2.3.2 Bund B1 / N1A

CPB/HEB JV advised that the constructed height of the bund was 0.5m higher than designed. This bund was inspected, and its height and extents were observed to be consistent with the images from the Detailed Design noise model through visual comparison. A typical image of the bund from the inspection and from the Detailed Design model are presented in Figure 14 and Figure 15 respectively as an example.

Figure 14 Picture of bund B1/N1A from site inspection

Figure 15 Picture of bund B1 from Detailed Design noise model

We note that during construction, noise wall N1A was replaced by extending bund B1 to cover the same extent as the noise wall. This design change was incorporated in the Post-Construction noise model. The extent of the constructed bund where the noise wall was formerly included in the Detailed Design model is shown in Figure 16.

Figure 16 Extent of bund B1 covering location of previous noise wall N1A

3.0 Road surfaces

NZTA.81.A.c.i. requires confirmation of the as-built road surfaces.

The AECOM civil design team confirmed that the road surfaces had been constructed in line with the as-built road surface finish drawings based on their site inspections. The as-built road surface finishes were updated in the Post-Construction noise model to match the as-built drawings.

The one exception to this was at the Kenepuru Link Road interchange; in September 2021 it was raised that that the extents and type of the low-noise road surfaces used at this location were changed compared to the original design. The OGPA extents were shortened, and THSRA was used in its place. It was advised that THSRA is a type of Sealed Mastic Asphalt (SMA), another type of low-noise road surface finish.

This design change was incorporated in the Post-Construction noise model, where it was found that noise levels were generally consistent with the Detailed Design noise model predictions in the area.

4.0 Summary

A post-construction review of the as-built noise walls and road surfacing was undertaken. The review:

- Confirmed noise mitigation had been installed as designed
- Identified remedial actions required (such as backfilling of gaps)
- Confirmed that the road surface finishes were constructed in line with the as-built drawings.

CPB/HEB JV have confirmed that the remedial actions required from the post-construction inspections have been carried out.

Jakhu, Shivam

From: Utting, Darren <Darren.Utting@tg.co.nz>
Sent: Friday, 3 March 2023 3:56 PM
To: Jakhu, Shivam
Subject: TG noise mitigation works statement

Hello Shivam,

This is to confirm that the remedial works recommended in your post-construction inspections have been carried out prior to road opening.

Ngā mihi

Darren Utting
Manager – Stakeholder Approvals | Transmission Gully Project

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