DON McKENZIE CONSULTING
Traffic Engineering & Transportation Planning

Memorandum

To: Andrew Brown (Mitchell Daysh)

cc: Tracey Morse (NZCE)

From: Don McKenzie

Date: 3 September 2024

Re: **Kiwi Rail Level Crossing Safety Impact Assessment – Preliminary Response**

Introduction

The proposed agrivoltaic facility to be developed by Darfield Solar and Energy Storage Limited ("**DSES**") will involve the generation of additional traffic movements (both staff/contractor and heavy vehicle deliveries) via Homebush Road across a rail level crossing of the Midland Line railway. The increased number of traffic movements over the Homebush Road level crossing generated by the construction and subsequent operation of the agrivoltaic facility triggers a 'change in use' in terms of KiwiRail's consideration of the level crossing, and hence requires a Level Crossing Safety Impact Assessment ("**LCSIA**") to be completed. The LCSIA process followed by Kiwi Rail (and its consultants) attempts to identify and quantify the potential risks (and change in risk) at level crossing due to changes in operating condition associated with the additional traffic volumes.

DSES engaged Stantec New Zealand to prepare an LCSIA for the Homebush Road level crossing. Stantec has provided its draft report to DSES (dated 124 August 2024) outlining the findings of the assessment and identifying several recommended measures to address the identified risks.

Representatives of DSES and KiwiRail met on 2 September 2024 to discuss the findings of the draft LCSIA especially in respect of the recommendations made in the Stantec draft LCSIA.

LCSIA Safety Criteria

There are two criteria applicable to and referenced within the LCSIA process relating to the safety of level crossings, which differ depending on whether the crossing is a new crossing facility or an upgrade to an existing crossing facility. The two criteria used in the LCSIA process are:

- Criterion 1: requires the Proposed Design and Future Score of a level crossing to achieve a 'Low' or 'Medium-Low' level of risk as determined by the Level Crossing Safety Score ("**LCSS**").
- Criterion 2: requires the Proposed Design and Future Score of a level crossing to achieve an LCSS number (out of 60) lower than, or equal to, the Updated Existing LCSS number.

The assessed LCSS values determined by Stantec in its draft LCSIA for the Homebush site were reported as follows:

Scored Items	Updated Existing	Change in Use	Proposed Design	Future Score	Comments
ALCAM score	14	19	19	14	The effects of the temporary change in traffic volumes for 'Change in Use' and 'Proposed Design' is mitigated for future scenarios by implementing the safety recommendations.
Crash & incident history score	1	2	2	1	There is one reported near miss at the level crossing due to lack of compliance to level crossing controls. Updating the road signs and markings to the current standard will raise more awareness of the crossing.
Site specific safety score	4	5	3	3	Improving the current road surface condition reduces the SSSS in future scenarios.
Engineer risk score	7	10	8	7	The scoring reflects the existing issues and how these issues will be addressed with by bringing the road conditions to compliance.
LCSS	**26**	**36**	**32**	**25**	
LCSS RISK BAND	Medium Low	Medium	Medium	Medium Low	
CRITERION MET	C1	FAIL	FAIL	C1 +C2	
FORM OF CONTROL	Stop Signs	Stop Signs	Stop Signs	Stop Signs	

Figure 1: LCSS Scoring (Source: Stantec LCSIA – draft report dated 14 August 2024, Figure 4.8)

As can be seen in the above table, neither the Change in Use (i.e. current crossing without modification, existing traffic plus DSES traffic) nor the Proposed Design (i.e. current crossing modified in accordance with the recommendations made in the Stantec LCSIA, serving background traffic plus DSES traffic) meet Criterion 1 (LCSS Risk Band value is Low or Medium-Low) or Criterion 2 (LCSS Risk Band lower than or equal to Existing Risk Band). Noting that KiwiRail's approach within the LCSIA process for an existing facility upgrade (as is the case for Homebush Road), is that where changes to an existing facility are proposed, the revised crossing must meet Criterion 1. Where the modifications required to meet Criterion 1 are not reasonably practicable, then KiwiRail would permit a process of documented risk assessment discussion between KiwiRail and DSES to agree on the required crossing treatment.

While the Proposed Design (i.e. upgraded crossing as per the Stantec LCSIA recommended actions discussed below), remains greater that the Updated Existing, it is considered that the risk assessment process (referred to by KiwiRail as the thee So Far As Is Reasonably Practicable – "SFAIRP") provided for within the LCSIA procedures should be pursued.

LCSIA Recommendations and Findings

Stantec's LCSIA draft report concludes that over the period of the agrivoltaic facility construction (12 – 18 months in duration) the crossing/activity operates within a risk band of 'Medium Low', and during the Change in Use (i.e. during construction, and assuming peak construction/contractor vehicle volumes across the full 12-18 month construction period) the risk band increases to the middle of the 'Medium' band.

In order to achieve Criterion 1 (i.e. to maintain operation within the Medium-Low risk band) Stantec identified a range of recommended treatments or modifications to both the DSES proposal (including diversion of heavy construction traffic away from the crossing) and a number of physical measures including:

- Construction traffic management plan to provide clear guidance on level crossing protocols;
- Confirm whether the heavy vehicle construction traffic can travel via Tramway Road to avoid the level crossing Criterion 1;
- Address poor condition of existing signage (both approaches);
- Extend seal on eastern approach to exceed Traffic Control Devices ("**TCD**") Part 9 minimum requirements, and amend linemarking accordingly;
- Repair seal edge break on western approach
- Replace track panel (timber sleepers within crossing)
- Widen the level crossing (per TCD Part 9) to a minimum of 6m (preferred width 7m);
- Paint yellow cross hatching at level crossing to raise the conspicuity of the crossing for approaching vehicles.

Consultation with KiwiRail

The recommendations made in the Stantec draft LCSIA were discussed with KiwiRail personnel at the meeting held with them on 2 September 2024. A summary of the key discussion points and further agreed actions is presented in the Attachment 1 to this memo.

It was agreed (in part), that several of the recommendations related to required maintenance and that the general upgrade of signs, seal and the track panel (sleepers between rails across the level crossing) , while the proposed recommendation to include a Site Traffic Management Supervisor ("**STMS**") and/or Rail Protection Officer ("**RPO**") as part of a manual traffic control and management presence at the level crossing should be included in the updated LCSIA and associated risk calculations (being prepared by Stantec at the time of writing this memo).

The KiwiRail personnel present at the 2 September meeting noted that pending the completion of the updated LCSIA risk assessment to account for the inclusion of the STMS/RPO during the peak construction period and an associated outcome where both Criterion 1 and 2 (discussed above) were to be satisfied, then the requirement to install "active control" (such as half arm barriers and flashing lights and bells) and associated train detection would not be required. The funding and implementation of the other LCSIA recommendations such as linemarking, signs, seal widening and track panel maintenance could be agreed between DSES and KiwiRail by way of contribution made by DSES reflecting the wider benefit to all level crossing users not required as a direct result of the DSES project.

Overall Considerations

The LCSIA process (at least draft reporting stage) has been undertaken in accordance with the procedures developed by KiwiRail for the purposes of assessing risk at level crossings in New Zealand. The quantified and risk-based procedures followed by Stantec in preparing the draft LCSIA necessarily adopted a number of simplifying assumptions not least of which is that the construction period activity – comprising of both heavy and light traffic – will be at the peak level adopted within the LCSIA calculations throughout the 12-18 month construction period. In reality, the construction activity will ramp up and down such that this level of "peak" activity would generally only occur for a period of up to approximately 3-4 months during the busiest period of on-site activity.

In addition, and as part of the agreements being reached with NZTA in respect of the operation of the SH73/Homebush intersection, a quantified monitoring and limitation of number and timing of traffic movements will be undertaken by DSES and its construction contractor to minimize the risk of traffic movements through the intersection.

In a similar way, the Construction Traffic Management Plan ("**CTMP**") including STMS personnel can and will extend to consider and mitigate risk associated with movement across the level crossing. The inclusion of a qualified RPO (either the same person as the STMS or another qualified KiwiRail RPO) has been discussed with KiwiRail and is currently being considered within the context of the finalized LCSIA being prepared presently. These further enhancements and extensions to the CTMP/RPO will be agreed in detail with KiwiRail, however based on the discussion held with the KiwiRail personnel on 2 September meeting, it is considered that such active management measures will positively address the risk associated with the reduced duration of the "peak" construction period activity. The inclusion of the RPO on-site at the crossing for the duration of the peak construction phase was agreed by KiwiRail and Stantec representatives at the 2 September meeting as reducing the risk score within the LCSIA process, and could result in both of the LCSIA Risk Criteria being satisfied. This will be reported in the final LCSIA to be received shortly.

It is considered that on the basis of these (and other potential) measures being adopted by DSES, the risk associated with the addition of the DSES construction traffic over a limited period of time can be reasonably addressed to such a level that is appropriate for the continued safe operation of the Homebush Road level crossing. At the completion of the construction phase and through the operation of the agrivoltaic facility there is expected to be negligible change in risk compared to current operation of the crossing on the basis that the long-term traffic movements generated by the facility will rest entirely within the ordinary day-to-day variation in existing traffic volumes along Homebush Road.

Don McKenzie Consulting Ltd.