

Seven Oaks Kinloch Integrated Transportation Assessment

Traffic Modelling Review

Prepared for	Taupo District Council
Project Number	TPDC-J017
Revision	Final
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Reviewed by	Jared White, Principal Transportation Modeller

1. Introduction

Abley were commissioned to perform a peer review of the modelling undertaken in the Seven Oaks Kinloch Integrated Transport Assessment (ITA), prepared by CKL NZ Ltd (CKL) on the 7th March 2023 and the subsequent Section 92 response modelling submitted on the 9th February 2024.

A peer review technical note was prepared by Abley dated 13th March 2024 with the outcome of the review including several recommendations and requests for additional information.

Subsequently a new application has been lodged with Taupō District Council with an updated ITA dated 20 September 2024. Although a formal response to the Abley technical note was not received at the time it is understood that the Abley review has informed the updated ITA. Abley subsequently issued an updated technical note with updated request for information (RFI) on the 5th December 2024.

Following several meetings with CKL a further RFI response dated 5th April 2025 which we have subsequently reviewed.

The contents of this technical note are as follows:

- Section 2 revisits the outcomes from the prior March 2024 review and provides an update on whether the issues raised have been addressed in part or full.
- Section 3 includes a review of the model outputs included in the September 2024 ITA.
- Section 4 provides the updated RFI issues on 5th December to address any outstanding matters from the prior review and issues raised in relation to the modelling in the updated ITA.
- Section 5 presents the outcomes of our review of the 5th April 2025 response to the updated RFI.
- Section 6 documents the conclusion of the peer review.

2. Outcomes of prior review revisited

The following table includes the Abley summary from section 4 of the March 2024 review technical note with additional commentary in relation to whether the issues raised have been addressed in part or full.

Reference in original application	Abley March 2024 technical note comment	Abley comment in relation to September 2024 ITA	Is issue resolved?
Traffic volumes ITA section 3.3	Please provide information relating to heavy vehicle volumes at key intersections	Included on page 30 of ITA for immediate intersections and can be extracted from Appendix F for Wairakei network intersections	Resolved
Trip generation ITA section 7.2	Assumed trip rates are considered highly conservative and could be scaled back on the basis of likely trip generation for future Kinloch households	Page 44 of ITA refers to hourly and daily trip rates from NZTA RR453. The hourly trip rate is an 85 th %ile and daily is 50 th %ile. The hourly trip rate is unchanged from the prior ITA is still considered highly conservative.	Partially resolved – it is helpful to understand the source of the trip rates but in our view the development is unlikely to generate this quantum of traffic in the context of the Kinloch residential area, and the impacts of the development may be overstated.
Trip distribution ITA section 7.3	Assumed distribution of trips across network is considered appropriate	Comment only – this remains unchanged	Resolved
Intersection modelling – ITA section 7.4	Results generally in line with expectations although base year intersection models are not presented or calibrated. This is only considered to be of concern for the Wairakei / Poihipi intersection in the morning peak hour.	Page 53 includes the use of Google Maps as basic calibration of queue lengths for the Poihipi Road approach in the evening peak only. No calibration of the morning peak is presented.	Partially resolved – morning peak calibration of the Poihipi Road approach is requested.
	Please provide commentary on observed Poihipi Road right turn out delays or queue lengths and extent to which the model reflects observed intersection performance.	As above	As above
Section 92 modelling	What date has the base data for each intersection been sourced from?	Appendix A states November 2023 for immediate intersections and Appendix B also November 2023 for Wairakei intersections	Resolved
	What is the base hour for each modelled period?	Addressed in Appendix A for immediate intersections. It would be helpful to report the same for Wairakei intersections	Partially resolved – please include reporting of actual peak hour for the Wairakei intersections from TDC surveys and also supply and label whether these are morning and evening peak (or a hybrid).

Reference in original application	Abley March 2024 technical note comment	Abley comment in relation to September 2024 ITA	Is issue resolved?
	What (if any) data is available for the calibration of delays and/or queue lengths at each intersection? Please provide evidence of model calibration.	Pages 56 and 58 include calibration of queue lengths for both intersections. This is considered to be satisfactory in the context of the modelling undertaken.	Resolved
	Assumed heavy vehicle percentages are lower than likely observed at 2% and pedestrian volumes may also be higher than likely observed flows. Please update where information is available	Actual heavy vehicle percentages have been adopted in the outputs in Appendix F. It is unclear from the outputs whether pedestrian volumes have been changed.	Partially resolved – please confirm pedestrian volumes assumptions which were considered conservatively high in the previous modelling.
	Note that the trip rates assumed are highly conservative. Some sensitivity tests around this may be appropriate including making provision for background growth in traffic over and above the known Kinloch and Nukuhau developments	Not addressed	Unresolved
	Please provide commentary about the likely split in traffic crossing the CGB between turning at the Poihipi Road and Norman Smith Street intersections	Not addressed	Unresolved
	The Wairakei Drive / Norman Smith Street intersection is operating over capacity and this result should be reviewed in light of the recommendations arising from this review	This continues to operate over capacity, as does the Tongariro St / Spa Rd intersection in the updated modelling. More discussion of intersection performance has been included. We provide more commentary on this matter in Section 3.	Resolved
	The northbound merge on the CGB has the potential to be a pinchpoint on the network during the evening peak period. Additional assessment is requested of the Tongariro / Spa intersection in the evening peak with particular consideration of the operation of the northbound merge pinchpoint and likely future performance with the growth in traffic	The merge has been included within the modelling as is evident from the Appendix F outputs.	Resolved

3. Review of updated ITA modelling

There are two key issues arising from the updated modelling in the September 2024 ITA.

3.1 Future development assumptions

Section 7.2 helpfully outlines nearby future known developments including traffic generation assumptions. These include:

- **11 other Kinloch developments** totalling 228 lots and 205 peak hour trips – it is noted that an 0.9 trip per peak hour trip rate has also been assumed here which is considered conservatively high in the Kinloch context – please see commentary in section 2.2 of the Abley March 2024 technical note.
- **Nukuhau Plan Change including 780 residential lots and neighbourhood centre** generating 712 trips in peak hour (including 0.85 trips per lot).
- **Lochviews Estate Subdivision including 570 lots** generating 513 trips in peak hour.

Across these developments a total of 1,508 peak hour trips (including Seven Oaks) are forecast.

Immediate Intersections Modelling

It is evident that the other Kinloch developments have been taken into consideration in the modelling of the effects on the immediate intersections although it is observed that:

- The proposed 20% Oakdale Drive / 80% Kinloch Rd split has been loaded more evenly between the two corridors;
- There are some minor reconciliation issues in relation to the traffic accessing Whangamata Road (via both Oakdale and Kinloch) and those accessing the wider network via the Whangamata / Poihipi Rd intersection, although these are not considered to impact on the results.
- 57 and 56 trips in morning and evening peak hour (respectively) from Seven Oaks development are modelled to pass through the Whangamata / Poihipi Rd intersection. This implies that a trip rate of $(56.5 / 87) = 0.65$ trips in peak hour per household has been assumed which is more in line with the Abley feedback in section 2.2 of the March 2024 review.
- 250 and 193 trips in morning and evening peak hour (respectively) from other developments are modelled to pass through the Whangamata / Poihipi Rd intersection. This implies that a trip rate of $(250 / 228) = 1.1$ or $(193 / 228) = 0.85$ trips in peak hour per household has been assumed. As above these are considered conservatively high rates.
- The heavy vehicle percentage at all intersections is set to 0%.

Request for further information: Check and confirm the trip rates assumed in the modelling of the immediate intersections and re-run the models if required.

Poihipi / Wairakei Modelling

Traffic modelling results are presented on page 52 of the ITA by turning movement prior to the realignment and signalisation of the intersection. No detailed SIDRA outputs are included in the appendices to enable traffic volumes and other parameters to be checked.

The with development scenarios modelled with the traffic signals in place include an additional 84 and 83 trips in peak hour which is much greater than the quantum of traffic modelled at the immediate intersections and equates to 0.95 trips per household. Subsequently the impacts of the development are likely to be over-stated.

Request for further information: Please supply:

- ***model outputs for the current intersection configuration accompanying the page 52 summary.***
- ***confirmation of the trip rates assumed in the modelling including those for the background Kinloch development and Nukuhau Plan Change***

Control Gate Bridge Intersections Modelling

The surveyed turning movement volumes for the two intersections are included in Appendix B although it is not stated as to whether these are morning or evening peak. Based on the traffic volumes provided these may even be a hybrid of both. Irrespective they do not reconcile with the existing traffic volumes in Appendix F.

Outputs are provided for the modelling of the two intersections at either end of the Control Gate Bridge. It is observed that the future models include 144 additional vehicles (over the existing flows) passing through each intersection in both morning and evening peak hours.

Noting that from 7.2 up to 1,550 additional trips (including Seven Oaks) may be generated by known developments to the west of the Control Gate Bridge, it is not clear how much of this development has been included as future background traffic and what proportion of this traffic crosses the bridge. The modelling appears to include less than 10% of this potential development traffic.

It is further noted that in the 'with development' scenarios 55 and 57 vehicles from Seven Oaks are added to each intersection in each peak hour. Noting our concerns raised with respect to trip rates and consistency of traffic loading at other intersections, please confirm this increment in traffic aligns with other modelling in the ITA.

Request for further information: Please supply:

- ***both morning and evening peak turning movement volumes (separately and confirming observed peak hour times) for each survey day at both Spa Road and Norman Smith Street intersections.***
- ***the development assumptions including trip rates assumed for the future model scenarios.***
- ***confirmation of the trip rates assumed in the modelling for Seven Oaks development traffic.***

3.2 Significance of the traffic effects

Notwithstanding the prior queries regarding trip rates and future development assumptions, the intersection modelling outputs in Appendix F demonstrate that the development traffic has the following impacts:

- Delays on the Norman Smith St approach to Wairakei Drive signals increases by 19 seconds in the morning peak period with queue lengths increasing by 97 metres.
- Delays on the Tongariro St approach to the Spa Road roundabout increases by 111 seconds in the evening peak period with queue lengths increasing by 201 metres.

These impacts are considered to have the potential to impact on road users in the context of travel into and out of the town centre during peak periods, and likely queuing effects blocking back through upstream intersections and connecting corridors.

Request for further information: Provide additional commentary as to the likely implications of the additional delay and queueing on road users and the operation of the Nukuhau and town centre networks.

4. December 2024 RFI Summary

A summary of our RFI is presented in the below table including the criticality of each request:

Request for further information	Criticality
1. Provide details of calibration of queue lengths or delays in morning peak on Poihipi Road approach to Poihipi Rd / Wairakei Drive intersection	Minor
2. Confirm pedestrian volume assumptions in modelling of Norman Smith / Wairakei intersection	Moderate
3. Note that the trip rates assumed are highly conservative. Some sensitivity tests around this may be appropriate including making provision for background growth in traffic over and above the known Kinloch and Nukuhau developments	Moderate
4. Please provide commentary about the likely split in traffic crossing the CGB between turning at the Poihipi Road and Norman Smith Street intersections	Moderate
5. Check and confirm the trip rates assumed in the modelling of the immediate intersections to ensure consistency throughout and re-run the models if required	Moderate
6. For the modelling of Wairakei / Poihipi please supply model outputs for the current intersection configuration accompanying the page 52 summary	Significant
7. Confirmation of the trip rates assumed in the modelling including those for the background Kinloch development and Nukuhau Plan Change	Significant
8. For the modelling of Wairakei / Tongariro / Spa and Wairakei / Norman Smith Street please supply: <ul style="list-style-type: none"> a) both morning and evening peak turning movement volumes (separately and confirming observed peak hours times) for each survey day at both intersections. b) the future development assumptions including trip rates assumed for the future model scenarios. c) confirmation of the trip rates assumed in the modelling for Seven Oaks development traffic. 	Significant
9. With respect to the Norman Smith St approach in the morning peak and Tongariro St south approach in the evening peak, provide additional commentary as to the likely implications of additional delay and queueing on road users and the operation of the Nukuhau and town centre networks.	Significant

5. Updated RFI Response

The nine matters raised in section 4 of this technical note have been addressed in a memorandum prepared by CKL dated 5th April 2025. This includes addressing feedback provided by Abley in relation to interim assessments between publishing the December 2024 RFI and receiving the March 2025 response.

Each item is addressed in the table below.

Request for further information	Abley review of response
1. Provide details of calibration of queue lengths or delays in morning peak on Poihipi Road approach to Poihipi Rd / Wairakei Drive intersection	Basic calibration has been undertaken using Google Maps “typical traffic layer” results at peak time. This is considered to be consistent with model calibration and is considered acceptable. This issue is resolved.

Request for further information	Abley review of response
2. Confirm pedestrian volume assumptions in modelling of Norman Smith / Wairakei intersection	Additional modelling was undertaken to test the impact of pedestrian volumes on intersection model performance. The modelling concluded the pedestrian volume had no bearing as a result of the signal phasing arrangements. This issue is resolved.
3. Note that the trip rates assumed are highly conservative. Some sensitivity tests around this may be appropriate including making provision for background growth in traffic over and above the known Kinloch and Nukuhau developments	The trip generation and distribution data has been revised based on a Gulf Harbour site and based on typical occupancy rates in Kinloch (for generation) and Waka Commuter data (for distribution). The revised analysis is agreed to be acceptable. This issue is resolved.
4. Please provide commentary about the likely split in traffic crossing the CGB between turning at the Poihipi Road and Norman Smith Street intersections	No development traffic is assumed to use Norman Smith Street. This is accepted and this issue is resolved.
5. Check and confirm the trip rates assumed in the modelling of the immediate intersections to ensure consistency throughout and re-run the models if required	Addressed through the additional assessment under RFI item 3. This issue is resolved.
6. For the modelling of Wairakei / Poihipi please supply model outputs for the current intersection configuration accompanying the page 52 summary.	Four scenarios have been modelled based on the current intersection configuration including with and without development traffic and with and without traffic from other known developments. The intersection modelling demonstrates this operates well under all scenarios. This issue is resolved.
7. Confirmation of the trip rates assumed in the modelling including those for the background Kinloch development and Nukuhau Plan Change	Addressed through the additional assessment under RFI item 3. This issue is resolved.
<p>8. For the modelling of Wairakei / Tongariro / Spa and Wairakei / Norman Smith Street please supply:</p> <ul style="list-style-type: none"> a) both morning and evening peak turning movement volumes (separately and confirming observed peak hours times) for each survey day at both intersections. b) the future development assumptions including trip rates assumed for the future model scenarios. c) confirmation of the trip rates assumed in the modelling for Seven Oaks development traffic. 	<p>The modelling has been revised and is based on the traffic demands from recent PC37 Nukuhau modelling. This is considered acceptable. Noting that the configuration of the Tongariro / Spa intersection has changed (specifically the Tongariro St number of approach lanes has reduced from 2 to 1) since the prior PC37 modelling an assumption has been made that 50% of the Tongariro St approach traffic volume will switch to Spa Road. This is considered appropriate.</p> <p>The updated modelling results demonstrate an increase in overall intersection delays of 5-9 seconds in peak hours. At my request additional sensitivity testing was undertaken to understand the impact of changes in signal cycle and phase times on the Norman Smith / Wairakei signal performance. This demonstrated that the modelling is generally robust and that appropriate signal timing parameters were being selected.</p> <p>This issue is resolved.</p>

Request for further information	Abley review of response
<p>9. With respect to the Norman Smith St approach in the morning peak and Tongariro St south approach in the evening peak, provide additional commentary as to the likely implications of additional delay and queueing on road users and the operation of the Nukuhau and town centre networks.</p>	<p>Additional commentary has been provided which includes <i>“the development is expected to add only 32 vehicles per hour to the Norman Smith Street / Wairakei Drive and Tongariro Street / Spa Road intersections”</i> and <i>“the practical increase of one vehicle every two minutes is low and therefore unlikely to have a practical effect on the road network”</i>.</p> <p>These conclusions are generally consistent with my interpretation of the modelling that has been undertaken.</p> <p>This issue is resolved.</p>

6. Conclusion

Abley were commissioned to perform a peer review of the modelling undertaken in the Seven Oaks Kinloch Integrated Transport Assessment (ITA), prepared by CKL NZ Ltd (CKL) on the 7th March 2023. We have subsequently received an updated ITA dated 20 September 2024 and a memorandum from CKL dated 5th April 2025 presenting further modelling and addressing Abley’s RFI feedback.

We are satisfied that the modelling that has been presented in the 5th April 2025 memorandum is fit-for-purpose and can be relied upon to demonstrate the potential effects of traffic from the Kinloch proposal on intersection performance.

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