IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of a Private Plan Change to the Matamata-Piako District Plan under Schedule 1 of the RMA by Rings Scenic Tours Limited to introduce a Development Concept Plan, to enable the ongoing operation and growth of tourism activities at Hobbiton Movie Set within an appropriate planning framework

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STATEMENT OF EVIDENCE OF ALASTAIR BLACK

Dated 9 April 2019

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2 Alfred Street
PO Box 14178
Hamilton, 3252
Tel: 07 853 8997

gray matter

INTRODUCTION

1. My name is Alastair James Black. I hold a Bachelor of Engineering degree (Civil, 2002) from the University of Canterbury. I am a Corporate Member of the Engineering New Zealand (MEngNZ) and a Chartered Professional Engineer (CPEng). I have worked in the transportation field for 17 years.

2. I am based in Hamilton and have worked for Gray Matter Ltd as a transportation engineer since March 2009. For two years prior to that I was a Project Engineer for the London Borough of Hammersmith and Fulham. For the previous six years I was a civil/transportation engineer with Opus International Consultants Ltd in Hamilton.

3. I am familiar with the transport issues arising in and around the Waikato, having provided advice to Matamata Piako District Council (MPDC) and other local authorities, NZ Transport Agency (NZTA) and developers on range of transport related projects in the area. I have the following specific experience relevant to the matters within the scope and purpose of this statement of evidence:

   (a) Consultant traffic engineer assisting Hamilton City Council with developing the transportation provisions of the Proposed District Plan (PDP);

   (b) Consultant traffic engineer/transportation planner for the Access Hamilton Strategy (2010), and the Waikato Expressway Network Plan (2012);

   (c) Consultant traffic engineer/transportation planner assisting Council's with the development of structure plans and District Plan provisions, including St Leger Concept Plan for Waipa District Council and Matamata Precinct F for Matamata Piako District Council;

   (d) Consultant civil/transportation engineer for Road Controlling Authorities assisting in the review of consent applications including quarries, industrial, commercial and residential developments within wider Waikato region;

   (e) Consultant civil/transportation engineer for developers, landowners and local authorities preparing traffic impact assessments for development proposals including quarries, rest homes, museums and commercial developments.

(f) Consultant project manager for HCC and NZTA for the Southern Links Investigation relating to a Notice of Requirement for 32km of proposed arterial road network to the south of Hamilton; and

(g) I have completed the NZTA Road Safety Engineering Workshop and have led safety audits on urban and rural improvement projects for local roads and state highways.

EXPERT CODE OF CONDUCT

4. I confirm that I have read and am familiar with the Code of Conduct for Expert Witnesses in the Environment Court, Practice Note (2014), and agree to comply with that Code of Conduct. I state where I have relied on the statements of evidence of others for my assessment. I have not omitted to consider material facts known to me that might alter or detract from my opinions.

STATEMENT OF INTEREST

5. I have previously been engaged by the Applicant to provide transportation advice for this site. In 2011/12 I prepared the Traffic Impact Assessment supporting a consent application for 150,000visitors/year. My last involvement on their behalf was preparation on the Traffic Impact Assessment Addendum in September 2014 and subsequent discussions with Council in early 2015 that led to amendments to the consent allowing up to 300,000visitors/year. That consent forms the baseline environment.

6. Following construction of improvements on Buckland Road (RP2950-4220) by MPDC, I was engaged by MPDC and Rings Scenic Tours to complete a post-construction safety audit for the route between the Matamata i-site and Hobbiton. The safety audit report was completed in December 2013.

7. Since November 2016, I have been engaged by MPDC to provide advice on the Private Plan Change.

OVERVIEW OF EVIDENCE

8. I have been retained by MPDC to provide traffic engineering and transportation planning advice relating to the Private Plan Change by Rings Scenic Tours Ltd (the Applicant). I prepared the 'Transportation Review' (Issue 2, 14 February 2018) and the 'Updated Transportation Review' (Issue 2, 11 March 2019).

9. The purpose of this statement of evidence is to address matters raised as part of the applicant's evidence, submitter's evidence and during presentation of the proposal by the applicant; including

   (a) The Memorandum of Understanding (MOU) for advanced mitigation;
   (b) Trip generation;
   (c) Overnight accommodation
   (d) Effects at 385 and 399 Buckland Road;
   (e) Puketutu Road/ Buckland Road Intersection;
   (f) Rangitunuku Road;
   (g) Sign strategy; and
   (h) Vehicle crossings for farm access.

10. In preparing this evidence I have reviewed the following:

   (a) Council's s42A hearing report, 18 March 2019, which includes my assessment dated 11 March 2019;
   (b) Evidence of Mr Inder, 25 March 2019;
   (c) Rebuttal evidence of Mr Inder, 5 April 2019;
   (d) Evidence of Mr Bigwood, 25 March 2019;
   (e) Evidence of Mr Swears, 1 April 2019; and
   (f) Evidence of Mr Alexander, 8 April 2019.

SUMMARY

11. Since my previous involvement providing advice to the applicant and MPDC in the period 2011-2015 there have been changes in strategic direction for funding of land transport as set out in the GPS, including a move towards 'Vision Zero' for road deaths. These strategic changes have altered my view on road safety and subsequent opinion on the scale of mitigation required to address road safety issues associated with Hobbiton.

12. I confirm the conclusion of my transportation assessment review that, with appropriate mitigation through revised Performance Standards and amendments to the MOU including additional financial contributions, the traffic related effects of the proposal are likely to be acceptable.

13. I consider that the Performance Standards should include manage demand using visitor numbers or trip generation or equivalent measure of traffic, minimum car park numbers, minimum standards for site access, and a framework for managing travel to events at the site. A monitoring and reporting

framework is extremely desirable to monitor trip generation of tours and provision of information to tour operators, deliveries and staff.

REASONS FOR CHANGE

14. Since my previous involvement advising the applicant, the Government Policy Statement on Land Transport (GPS) 2018-28 has been released. This GPS adopts a new approach to funding land transport through four clear priorities: a safer transport network free of death and injury, accessible and affordable transport, reduced emissions, and value for money. Safety and access are the key strategic priorities[1]. This represents a shift from the three key priorities of GPS 2015-25 which were economic growth and productivity, road safety, and value for money. In terms of my opinion, this affects funding priorities and a wider sense of community interests, reflecting the value for money for investment in safety.

15. This change in direction has been reflected in both the 2018 Update to the Regional Land Transport Plan 2015-2045 (RLTP) and the Regional Road Safety Strategy 2017-2021 (RRSS).

16. The regional vision for road safety as set out in the RRSS is *"Working together towards zero deaths and serious injuries on Waikato's roads"*. The policies and actions in the strategy aim to achieve progress toward five outcome areas: safe speeds, safe roads and roadside, safe road users, safe vehicles, and leadership, collaboration and accountability.

17. Vision Zero and the Safe System recognise that people make mistakes and are vulnerable in a crash. Mistakes are inevitable – deaths and serious injuries from road crashes are not. The Safe System approach to road safety aims to ensure that in a crash impact energy remains below the thresholds likely to results in death or serious injury.

18. These changes in strategic direction and the move towards 'Vision Zero' for road deaths have altered my view on road safety and subsequent opinion on the scale of mitigation to address road safety issues.

INTRODUCTION

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[1] Government Policy Statement on land transport (GPS) 2018 - Questions and Answers as at 28 June 2018

19. At Section 3.13 of my Updated Transportation Review I provided a table summarising whether I considered further mitigation necessary. I have updated this table to indicate whether these matters have been addressed through evidence presented at the hearing. Several of the items are discussed in more detailed later in this statement.

Topic	Submitter Concerns and Discussion	Prehearing - Reviewer's opinion on whether further mitigation is required to manage effects?	Updated view on need for further mitigation
Buckland Road (east)	• Not all proposed works completed (refer ITA, Appendix B) • Amenity effects at 21 Buckland Road	Yes • Applicant should complete planned infrastructure upgrades • Install no-stopping signs and markings adjacent to 21 Buckland Road (to mitigate amenity effects)	Amend MOU -further financial contribution required to complete the previously agreed infrastructure upgrades. To clarify - No stopping lines adjacent to 21 Buckland Road are not required for transportation reasons. If required to address amenity effects, there would be no adverse transportation effects from marking no-stopping lines and erecting signs except that this would require additional maintenance and parking enforcement by Council.
Puketutu Road/ Buckland Road Intersection	• Intersection difficult to see, and people miss the intersection • Concern about sign location and messaging • Loss of control crashes	Yes • Further mitigation required to improve intersection conspicuity and layout, e.g. splitter island or intersection realignment.	Applicant's proposal to remove line marking arrow is acceptable.
Buckland Road (west)	• Lack of delineation at out of context curves and along the route • Increasing use by visitors, traffic volumes have doubled since 2014	Yes • Install chevron and speed advisory signs near 1241 Buckland Road • Install centreline along length of Buckland Road (west), this will require line marking within Waipa DC • Travel information identifying the preferred route should be supplied to staff and deliveries	Applicant has accepted installed of motorist service signs and signs near 1241 Buckland Road. This should be reflected in the MOU and updated financial contribution. I support a Performance Standard requiring a Site Management and Monitoring Plan, although my view on limits on trip generation has changed.

Topic	Submitter Concerns and Discussion	Prehearing - Reviewer's opinion on whether further mitigation is required to manage effects?	Updated view on need for further mitigation
Private entrances – 385 and 399 Buckland Road	• Poor sight distance • Increased risk of rear-end and turning crashes	Yes • Improvements to sight distance are required to mitigate the crash risk. This appears likely to require lowering of Buckland Road.	Applicant should be responsible for lowering Buckland Road to provide 114m SSD at these vehicle crossings.
Pull-off Areas	• Risk of crashes when tourist park at in appropriate locations to take photos • Well designed and signed pull off areas should reduce the risk	Yes • Only one of the two pull off areas proposed in the ITA has been constructed. • Recommend that signs are erected indicating location of pull-off areas	Amend MOU - further financial contribution required to complete the previously agreed infrastructure upgrades. Amend MOU - Applicant has accepted installation of motorist service signs (camera) at pull-off areas
Hobbiton Entrance and Underpass	• Risk of pedestrian crashes when crossing the road • Increase in bus movements between the two precincts • Submitter request for underpass • Construction of an underpass would likely required reconfiguration of the site at significant cost. Likely to be beyond what is considered reasonably practicable.	Yes • Applicant should provide further mitigation of pedestrian crash risk by improving barriers to pedestrians crossing the road and providing designated photo opportunities. • Setting speed limits requires bylaw change by Council and is beyond the scope of this application. We recommend that Council consider a slower speed restriction at the Hobbiton entrance.	Applicant has provided further information on current management methods and recommended additional "No Pedestrian" signs be installed. I support the Applicant's proposed amendments to the Performance Standard and MOU relating to pedestrian safety.
SH29/ Hopkins Road Intersection	• High crash rate	No • NZTA implementing Intersection Speed Zone to address crash risk. No further mitigation by applicant required.	No further mitigation by applicant required.
Rangitanuku Road	• Improvements to SH29/ Rangitanuku Road intersection (e.g. right-turn bay) • Widening of Rangitanuku Road sought.	No • Provided good travel information is provided to staff, visitors and tourist companies, the use of Rangitanuku Road by Hobbiton traffic should be low. • No mitigation by applicant required.	I support Council's proposed Performance Standards requiring annual notices to discourage the use of Rangitanuku Road and requiring a Site Management and Monitoring Plan

Topic	Submitter Concerns and Discussion	Prehearing - Reviewer's opinion on whether further mitigation is required to manage effects?	Updated view on need for further mitigation
Speed Management	• Submitters seek speed limits of 80km/h or lower • Changing speed limits requires a change to Council bylaw outside of the plan change process.	Yes • Setting speed limits requires bylaw change by Council and beyond scope of this application. • We support Council reviewing speed limits on affected roads including a slower speed restriction at Hobbiton entrance. • No mitigation by applicant required.	No further mitigation by applicant required.
Effects within Matamata	• Effects covered in our earlier review • Increased parking demand over a longer period.	No • No mitigation by applicant required.	No further mitigation by applicant required.
Visitor Cap	• NZTA prefer a cap based on trip generation, rather than visitors • The transport effects are directly related to the trip generation. • Restricting activities at the site by the number of visitors does not take into account change in vehicle occupancy or vehicle type (car vs bus).	Yes • Agree a cap on the activity is required • Providing a limit based on vehicle numbers is a more appropriate measure. • The ITA assessed trip generation excluding trips generated by events. Therefore the cap should be set at 387,000veh/year and 2,084veh/day (or rounded to 2,100veh/day).	I support a Performance Standard requiring a Site Management and Monitoring Plan, although my view on limits on trip generation has changed. Annual trip generation relates to pavement effects which are managed through a financial contribution required under the MOU (not Performance Standard)

Table 1: Transportation Submission Summary

MEMORANDUM OF UNDERSTANDING (MOU) FOR ADVANCED MITIGATION

20. There are several items of the previously agreed advanced mitigation that have not been yet implemented, including construction of a pull-off bay and line marking at the site entrance. My understanding is that the Memorandum of Understanding (MOU) did not provide sufficient funding to complete these works. MPDC has advised me that the cost to complete these works is $12,000 (including convex mirrors). This should be addressed through an amendment to the MOU.

21. Through evidence, the Applicant has agreed to implement additional mitigation, including but not limited to chevron signs near 1241 Buckland Road and centreline on Buckland Road (west). I consider that this additional mitigation should be implemented by MPDC through a further financial contribution made through amendment to the MOU.

TRIP GENERATION

22. I agree with Mr Swears (para 19) that *"From a transport engineering perspective, the key matters of interest in relation to the Plan Change are the safe and efficient movement of vehicles ... to, from, and on the state highway network"* although I have considered the effects on the affected local road network.

23. The ITA (Section 6.2) describes the expected trip generation of the proposal, excluding events held outside normal operating hours, as:
    (a) A daily average of 1,060veh/day assuming 650,000visitors/year; and
    (b) Peak traffic of 2,084veh/day when there are 3,500visitors/day.

24. The ITA includes an assessment of efficiency, safety and pavement effects which are based on the number of vehicle movements not visitor numbers. I have based my assessment of effects on the trip generation set out in the ITA. In my opinion it is the number of vehicle movements that influence the transport effects of the proposed plan change, not the number of visitors. The greater the number of trips, the higher the risk of adverse effects occurring. Restricting the number of visitors does not take into account potential changes in vehicle occupancy (e.g. change in proportion of visitors arriving by bus vs car).

25. Mr Inder (para 4.31) states that the increase in percentage of heavy vehicles recorded between January 2018 and February 2019 indicates an increase in the number of buses being used. The difference between the counts is 40 heavy

vehicle movements/day. It is important to note that the NZTA Vehicle Classification Scheme includes some larger campervans as heavy vehicles. For example, a 6-berth campervan is typically 7.2m long[2] and is similar in length and axle configuration to a medium rigid truck. Therefore, the increase in heavy vehicles could be due to variations in both bus and campervan numbers during the two period of the traffic counts.

Daily Trip Generation Limit

26. I prefer that the Plan Change to incorporate daily limits on vehicle movements due to potential changes in vehicle occupancy (number of people per vehicle) and vehicle type. Based on the information provided by the Applicant, the daily limit should be 2,100veh/day. I agree with Mr Inder (Rebuttal para 2.20) that the *"Traffic effects on the network are not suddenly going to be significant if the average daily maximum daily volume of 2084vpd is exceeded by 12% on one or two days of the week."* However, the effects of greater trip generation have not been presented or assessed by the Applicant.

27. I acknowledge that monitoring daily trip generation at the site will require ongoing effort by the Applicant, but technology is available that can provide continuous recording of traffic volumes on Buckland Road through telemetry counting devices. Recording traffic volumes on both sides of the site would enable the Applicant to determine the trip generation of the site using the same methodology as set out in the ITA.

28. If the Plan Change limits visitor numbers to 3,500 visitors/day with no limit on trip generation, the trip generation and traffic effects will vary depending on vehicle occupancy and vehicle type. BBO have assessed the current average vehicle occupancy as 3.36 people/vehicle (ITA, Table 6 shows 1,855 visitors generating 1,105veh/day).

29. While Mr Inder (Rebuttal para 2.19) states that the assessment is *"based on extensive data collection correlating existing vehicle movements with visitor numbers"* detailed information on vehicle occupancy is only provided for one week from February 2016 when daily visitor numbers were less than 2,200visitors/day. Vehicle occupancy for that period varied in the range of 3.01-3.83people/vehicle.

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[2] http://www.maui-rentals.com/nz/en/motorhome-hire/6-berth-campervan-river

30. In the following table I have illustrated how trip generation for the activity varies with average vehicle occupancy.

Vehicle Occupancy (people/vehicle)	Trip Generation (veh/day)	Change in trip generation compared to BBO assessment	Comments
1	7,000	+4,917 (+236%)	This level of vehicle occupancy appears unlikely
2	3,500	+1,417 (+68%)	This level of vehicle occupancy appears unlikely
2.32	3,010	+934 (+45%)	Based on assumed vehicle occupancy (refer Swears para 54-56)
2.5	2,800	+717 (+34%)	
3	2,333	+250 (+12%)	Lowest vehicle occupancy recorded in 2016 count data
3.36	2,084	0	Based on 2016 count data
4	1,750	-333 (-16%)	

Table 2: Trip Generation based on 3,500visitors/day and Variable Vehicle Occupancy

31. Based on the nature of the activity and my observations of arriving visitors, I consider an average vehicle occupancy less than 2people/vehicle appears very unlikely.

32. An option to partially address the Applicant's concerns with a daily trip generation cap would be to increase the cap above 2,100veh/day. Mr Inder (Rebuttal para 2.20) notes that observed trip generation varies by 12% up to 2,325veh/day. I agree that the traffic effects from 2,100veh/day are unlikely to be significantly different to the effects arising from 2,325veh/day.

33. I have considered a scenario of 2,500veh/day, or 20% more trips than assessed by Mr Inder. I have completed an assessment of efficiency for Buckland Road using the Austroads methodology for uninterrupted flow facilities[3] which indicates that the volume/capacity ratio is approximately 0.5. I consider that adverse efficiency effects of 2,500veh/day on Buckland Road are likely to be acceptable. While I have not completed a specific assessment of efficiency effects at the affected intersections, I consider that the effect on capacity of intersections near the Hobbiton site is also likely to be acceptable for at least 2,500veh/day.

[3] Austroads, Guide to Traffic Management Part 3, Traffic Studies and Analysis

34. Using the product flow models in NZTA's Crash Estimation Compendium[4] for priority controlled intersections, the increase in crash risk at the SH29/ Hopkins Road intersection from 2,500veh/day is approx. 7% higher than for 2,100veh/day.

35. In summary, I agree with Mr Inder that the traffic effects are not suddenly going to be significant if the daily maximum daily volume of 2,100veh/day is exceeded. In my opinion the effects are likely to be acceptable at a level of 2,500veh/day provided that the mitigation identified in the MOU and this statement is completed.

Hourly Trip Generation

36. I agree with Mr Swears that analysis of peak hour trip generation would enhance the understanding of the potential effects, especially at the SH29/Hopkins Road intersection. Mr Inder (Rebuttal, Attachment 1) has provided information showing that visitor numbers, and by inference trip generation, is relatively constant throughout the day.

37. In my opinion, monitoring and enforcing a limit on peak hour trip generation will be very difficult due to the nature of arrivals to Hobbiton. I have discussed the variability of trip generation relating to vehicle occupancy above. Hourly trip generation will depend on arrival and departures times for individual vehicles. While tour operators may arrival close to their tour time, other independent travellers may arrive early and stay longer after the tour, for example, to shop or eat at The Shires Rest at Precinct 1. It is unclear how this could be managed by the Applicant.

38. I do not consider that a hourly trip generation limit will be an efficient or effective tool to manage transport effects due to the difficulty in monitoring or enforcing such a limit.

Annual Trip Generation Limit

39. Based on my understanding of the activity based on previous visitor information provided to me by the Applicant as part of our work for them in 2011-2015, there is distinct seasonal variation in visitor numbers. This is illustrated at Figure 5 of the ITA. While the worst case for visitor numbers could be 1,274,000 visitors/year (364 days/year x 3,500 visitors/day), in my opinion this appears an

[4] NZTA's Crash Estimation Compendium (First Edition, Amendment 1, effective from 01/06/2018)

unlikely outcome of the Plan Change unless there is a significant change in the seasonal variation of visitor numbers to Hobbiton.

40. The assessment of pavement effects is based on the annual visitor numbers converted to a daily average traffic volume. If this daily average trip generation is exceeded the financial contribution set out in the MOU will be insufficient to mitigate the expected pavement effects. As the mitigation of pavement effects is specified in the MOU, and I understand there is the ability to amend the MOU outside the Plan Change process I do not consider there is a specific reason relating to transport effects for a performance standard to limit annual trip generation. It would be more accurate for the MOU to refer to both 387,000trips/year and 650,000visitors/year.

Trip Generation Summary

41. In summary:

(a) I prefer a limit on daily trip generation as the number of vehicle movements directly influences the safety and efficiency effects of the activity, not visitor numbers. I recognise that this would require additional management and monitoring by the Applicant. The selection of traffic data or visitor data is a balance between effects reliability and efficiency of data collection.

(b) Trip generation is influenced by vehicle occupancy which is variable due to the nature of the activity. In my opinion, setting a daily trip generation cap at 2,500veh/day is likely to result in transport effects that are not significantly different to those arising from 2,100veh/day and may address some of the Applicant's concerns relating to a cap.

(c) As mitigation of pavement effects is specified in the MOU, which could be amended outside the Plan Change process, I do not consider there is a specific reason relating to transport effects for a performance standard to limit annual trip generation.

OVERNIGHT ACCOMODATION

42. In my Transportation Assessment (2018), I summarised my assessment of the accommodation activities as *"...that the transport effects of the park-over and accommodation activities should be positive in removing vehicles parking on the side of the road at night and* [reducing] *the frequency of fatigued drivers on rural roads. However, there is a risk of this activity becoming popular and resulting in an increase in night-time traffic which may have adverse safety effects."*

43. By actively providing camping and accommodation facilities the Plan Change potentially encourages the frequency of late arrivals compared to the current environment where no specific facilities are provided to attract late arrivals.

44. I am concerned about the potential for the accommodation activities to grow and be actively promoted potentially increasing the frequency of late arrivals to the site with the risk of fatigued drivers driving at night. I consider it desirable to limit the scale of accommodation activities to limit the frequency of late arrivals.

385 AND 399 BUCKLAND ROAD

Assessment of Sight Distance

45. I am concerned about the safety effects at the vehicle crossings to 385 and 399 Buckland Road from an increase in exposure to a crash from the additional traffic and the increased risk from a lack of sight distance.

46. My Updated Transport Review (2019) includes references to potential sight distance improvements completed by Council staff and a Gray Matter designer which used different assumptions and design speeds which make that discussion difficult to follow. In this Statement I have relied upon Council's design drawing for the area wide pavement treatment project completed in 2013[5]. My assessment of sight distance is based on a design speed of 80km/h and reaction time (R_T) of 2s. Based on Austroads standards the required ASD and SSD is 114m and SISD is 181m.

47. Austroads describes these sight distances as follows:

    (a) ASD (approach sight distance) is the minimum level of sight distance which must be available on the minor road approaches to all intersections to ensure that drivers are aware of the presence of an intersection

    (b) SSD (stopping sight distance) is the distance to enable a normally alert driver, travelling at the design speed on wet pavement, to perceive, react and brake to a stop before reaching a 0.2m high hazard on the road ahead.

[5] MPDC Buckland Road (RAMM 2950-4220) Area Wide Pavement Treatment. Plan No. 2216, Sheet No 5 of 13

(c) SISD (safe intersection sight distance) is the minimum sight distance which should be provided on the major road at any intersection. It provides sufficient distance for a driver of a vehicle on the major road to observe a vehicle on a minor road approach moving into a collision situation (e.g. in the worst case, stalling across the traffic lanes), and to decelerate to a stop before reaching the collision point

48. Austroads[6] states that *"Desirably, sight distances at accesses should comply with the sight distance requirements for intersections, i.e. that approach sight distance (ASD), safe intersection sight distance (SISD), and minimum gap sight distance (MGSD) are achieved."* It acknowledges that *"Obtaining ASD at domestic accesses is preferable but may not always be necessary due to the familiarity with their location of the users. At other than domestic accesses, ASD will need to be provided only if adequate perception of the access is not provided through other means."*

49. In my previous reports there are inconsistencies in my reporting of sight distance at these two property accesses. The main constraints limiting sight distance are the vertical curve and bank located between the two vehicle crossings. In this Statement I have relied upon Council's design drawing from which I have determined the available sight distance as described in the following table.

Property	SISD looking left	SISD looking right	SSD looking left	SSD looking right
	181m required		115m required	
385 Buckland Road	125m – does not comply	140m – does not comply when limited by road reserve boundary	110m – does not comply	Complies
399 Buckland Road	110m – does not comply when limited by road reserve boundary	70m – does not comply (limited by bank)	Complies	55m – does not comply

Table 3: Compliance of available sight distance with Austroads requirements for SSD and SISD for an 80km/h design speed

50. I have limited my assessment of SISD to sight distance available within the road reserve. Due to the rural nature of the property's drivers can achieve greater sight distances by looking across the paddocks that front Buckland Road.

[6] Austroads, Guide to Road Design par 4a: Unsignalised and Signalised Intersections

51. Based on assessment of the design long-section by my designer, approximately 900mm of cut is required to achieve complying SSD of 114m. The vertical curve radius is unlikely to comply with recommended values from Austroads[7] for an 80km/h design speed. This non-compliance may reduce driver comfort but is unlikely to result in adverse safety effects.

52. SISD for 80km/h design speed (181m) is not currently achieved at either access and would require significantly more cut (>2m).

Predicted Increase in Crash Rate

53. In my earlier assessments of crash risk prepared in 2012/13 for the Applicant, I relied upon product of flow crash prediction models in the NZTA's Economic Evaluation Manual (First Edition, Amendment 0, effective from January 2010). In that earlier assessment (Traffic Impact Assessment, Issue 7, March 2012) I stated that *"... this analysis is based upon crash prediction models for intersections and the private access flows used in this assessment fall outside the applicable flow ranges. Therefore, our conclusions should be used with care."*

54. As these vehicle crossings fall outside the applicable flow ranges and have visibility deficiencies I now prefer to rely on the conflicting flow models in the NZTA's Crash Estimation Compendium (First Edition, Amendment 1, effective from 01/06/2018) which should more accurately reflect the crash risk. The following assessment only considers crashes resulting from the crossing/turning movement shown below.

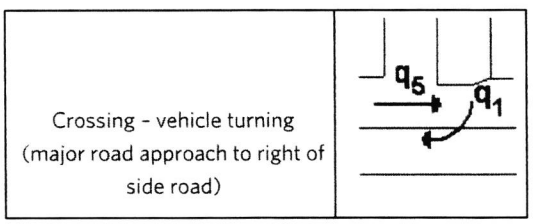

Figure 1: Diagram of Conflict Modelled use for 385 and 399 Buckland Road

55. The following table replaces the assessment of the predicted injury crash rate presented as Table 6 of my Updated Transportation Review (2019). It is based on sight distance required for a design speed of 80km/h. In summary:

(a) The proposal increases the predicted injury crash rate by 12%;

(b) Lowering the road by >2m to achieve SISD reduces the predicted injury crash rate by 300%; and

[7] Austroads, Guide to Road Design Part 3: Geometric Design

(c) Lowering the road by approx. 0.9m achieves 114m SSD (but does not achieve SISD) and reduces the predicted injury crash rate by 50%.

Scenario	Major Road Flow (q_1) (veh/day) [8]	Turning flow (q_5) (veh/day)	Actual SISD	Visibility Deficiency (V_D)	Injury Crashes per Year (% change)
Consented	245veh/day	10veh/day	180m	-182m	0.00012
Proposed volumes with no change to sight distance	530veh/day	10veh/day	180m	-182m	0.00013 (12% increase)
Proposed volumes with complying SISD (i.e. lowering by >2m)	530veh/day	10veh/day	362m	0m	0.00002 (300% reduction)
Proposed volumes with SSD = 114m (i.e. lowering by 0.9m)	530veh/day	10veh/day	230m	-132m	0.00012 (11% reduction)

Table 4: Crash Rate Assessment based on Visibility Deficiency at 399 Buckland Road (at 80km/h design speed)

56. Providing complying SISD has a significant reduction in the predicted crash rate but requires significant road lowering at a high cost.

57. Lowering the road by 0.9m to achieve SSD of 114m (and improve SISD by approximately 50m) mitigates the effects of the increased traffic so that the predicted crash rate is no greater than the crash rate of the consented environment.

Convex Mirror as a Mitigation Option

58. In section 3.2 my Updated Transportation Review (2019) when referring to convex mirrors I stated *"... that the property owners #339 (sic) and #385 do not want them installed."* I have subsequently discussed this with Mr Radermeyer and believe I have overstated their concerns. My understanding is the submitter (Mr Evans) will be presenting at the hearing and does not believe that a mirror will fully resolve their safety concerns.

59. I have previously supported the use of convex mirrors as an option to improve sight distance at vehicle crossings on Buckland Road. At the time of my previous assessments and safety audit recommendations I considered them to be low cost solutions that may improve sight distance. At that time I could not find guidance on the use and potential limitations of these types of mirrors.

[8] Traffic volumes for q1 only considers Hobbiton related traffic and relies on information provided on page 24 of the ITA.

Guidance has now been published by State of Queensland[9], Vicroads[10], South Australia[11] and Wellington City Council[12].

60. This guidance highlights the limitations of convex mirrors which include:

(a) The convex shape of the mirror results in the image, speed and distance of the object being distorted.

(b) The degree of distortion depends on the radius of the curvature and the size of the convex mirror. The larger the radius of curvature the lesser the distortion and vice versa.

(c) The image appears to be smaller, further away and travelling at a slower speed in a mirror with a smaller radius of curvature. It is difficult for road users to distinguish detail shown on, understand, and interpret the information provided by a convex mirror with a small radius because of the distortion effect.

(d) In addition to distortion effects, the image of a vehicle in a convex mirror appears to be on the wrong side of the road due to the 'mirror image' effect, where left appears to be right and vice versa. This 'mirror image' effect can result in road users misinterpreting the images.

(e) Dark blue, black and other dark colours are difficult to detect in these mirrors in the early morning or late afternoon as these colours appear to be absorbed by the road surface.

61. Wellington City Council restricts the use of mirror to roads with 50km/h speed limit or less. The three Australian guides state that 85th percentile speed on the road should be 60km/h or less. The NZTA Safer Journeys Risk Assessment Tool to Edition II indicates that the mean (not 85th percentile) speed is 60-65km/h on Buckland Road (east). The 85th percentile speed are likely to be higher than 60-65km/h indicating that the use of convex mirrors may not be appropriate for this speed environment.

62. The Queensland guidance states that generally the traffic volume on the road should be less than 300 vehicles/peak three hour period. Based on the most recent traffic count on Buckland Road (east), the peak three hour period was 2-

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[9] Department of Transport and Main Roads, Traffic and Road Use Management Volume 2 – Guide to Road Safety Part 4: Local Government and Community Road Safety (2009) April 2015

[10] Additional Network Standards & Guidelines Part 2.10 – Installation of Convex Mirrors on Public Roads – Edition 1, October 2015

[11] Department of Planning, Transport and Infrastructure. Operational Instruction 2.2 Concealed Driveways and Intersections, Issue 5, 15/10/2018

[12] Wellington City Council, Road Mirror Operational Procedure,

5pm with 495 vehicles in that period, indicating that the use of convex mirrors may not be appropriate due to the traffic volume.

63. The basis for Mr Inder's opinion (para 6.15) that *"...convex mirrors added opposite each access will **significantly** improve the sight distance for each access"* (emphasis added) is unclear. No specific assessment of the likely sight distance improvements has been provided. As discussed above, recent guidance on the use of convex mirrors discusses limitations on their effectiveness in improving sight distance at vehicle crossings.

64. I agree with Mr Inder that convex mirrors are used at certain locations including some corners and property accesses on the coastal section of SH25. However, I am not aware of the specific circumstances that lead to their installation, but the coastal alignment and topography appear to be significant constraints to improving sight distance.

65. I am concerned that using convex mirrors by themselves may not be effective in mitigating the increased crash risk at these vehicle crossings. No assessment of the improvement to sight distance from using mirrors has been provided. In my opinion, mirrors should only be used as a last resort where there are no alternative solutions. The option to use mirrors may appropriate if the Plan Change is approved but will not fully mitigate the adverse effects on safety.

Summary of Assessment for 385 and 399 Buckland Road

66. Providing complying SISD at 385 and 399 Buckland Road requires significant lowering of the road. Lowering Buckland Road by approximately 0.9m achieves SSD of 114m and mitigates the increased crash risk at these vehicle crossings.

67. I am concerned that using convex mirrors may not be effective in mitigating the increased crash risk at these vehicle crossings. Recent guidance on the use of these mirrors highlights a number of limitations relating to distortion of the image and that images can be difficult to understand and interpret.

68. I consider that lowering of Buckland Road to provide 114m SSD is appropriate to mitigate the safety effects at the vehicle crossings to 385 and 399 Buckland Road.

PUKETUTU ROAD/ BUCKLAND ROAD INTERSECTION

69. I have reviewed Mr Inder's comments and agreed that removing the northbound white arrow marked on Puketutu Road may assist in reducing the crash risk at

this intersection. In the past five years there have been two reported non-injury crashes within 50m of the intersection. I agree with Mr Inder that the crash history does not warrant installation of a splitter island and that changes to the line marking are appropriate.

70. I support the Applicant's proposed amendments to the MOU that remove the requirement for a splitter island but require removal of the northbound white arrow on Puketutu Road.

RANGITANUKU ROAD

71. In the past Council has received complaints from residents about Hobbiton related traffic using Rangitanuku Road. I understand that the frequency of complaints has reduced over the past few years, which appears related to changes in Google Maps and improved travel management by the Applicant. Without continued management and communication of the most appropriate travel routes by Applicant to bus operators and visitors there is the potential for traffic to use this route. Based on current traffic volumes and the recent reduction in complaints to Council, the risk appears low.

72. I note that the Applicant has accepted the Performance Standard requiring an annual notice be sent to bus operators discouraging the used of Buckland Road (west). This same annual notice could be used to discourage the use of Rangitanuku Road by bus operators.

73. Rather than including a specific Performance Standard requiring the annual notice, it may be more appropriate for travel routes and communication methods to be addressed through Council's proposed Performance Standard for a Site Management and Monitoring Plan. I note that the Applicant does not consider this Performance Standard necessary.

74. In my opinion, the Site Management and Monitoring Plan should identify the preferred routes, routes to be avoided and methods used by the Applicant to communicate this information to staff, bus operators, delivery companies and visitors. This Plan could then be updated and modified to suit changes in communication methods and messages.

SIGNS STRATEGY

75. The Traffic Control Devices Manual states that *"Tourist signs that identify a specific facility should only be used in the immediate vicinity of the tourist facility.*

For example, a specific tourist facility located in Taupo should not be signed in Auckland". I cannot find specific guidance on a maximum distance that signs should be located from a tourist facility.

76. I share Mr Swears concerns (para 46) relating to widespread use of tourist signage on the state highway network being inconsistent with national standards and potentially leading to confusion for road users. However, *"Hobbiton is one of New Zealand's leading tourist destinations ..."* (Mr Inder, para 3.1) and providing the correct travel information is a key method to manage potential road safety effects from the development of the site. I agree with Mr Inder (para 5.21) that there are likely to be some road safety benefits from providing some additional way-finding signs at key decision making locations. Quantifying any benefits or dis-benefits from additional sign is difficult. Installing signs within the road reserve requires authorisation from NZTA and the challenge for NZTA and the Applicant is to find a balance between providing sufficient information at key locations without creating confusion for road users.

77. Mr Inder (para 5.18) states that the Applicant is modifying the "Getting Here" interactive map by providing red 'x' marks on Buckland Road (east). It is unclear why Buckland Road (east) needs to be shown on the map as other local roads that could be used to access the site are not shown on the map. For example, Puketutu Road is not shown north of the intersection with Buckland Road but provides an alternative route northwards towards Matamata. I would prefer that Buckland Road (east) is not shown on the map or greyed out and annotated with text to the effect that the route is "not suitable for tourist traffic".

78. Mr Swears (para 85) considers *"... that the Plan Change provisions should prevent the Applicant from installing advertising signs on private land in lieu of tourist signs on state highways."* I note that southern sections of Rangitanuku Road and SH28 are located in the South Waikato District and it is unclear how the Plan Change could limit signage located outside the Matamata Piako District.

79. In summary, I support the use of appropriate way-finding signage at key decision making locations to reinforce the preferred routes to access the site.

VEHICLE CROSSINGS FOR FARM ACCESS

80. The Applicant is seeking a change to the performance standards that would result in four vehicles crossings from the site to Buckland Road, the site entry, site exit, plus two separate farm accesses.

81. Based on the most recent aerial photos[13], the eastern farm access appears to be located within the property and shared with the car park exit. The location of the western farm access also appears to be inside the site and combined with the car park entry. The red stars on the figures below shows my understanding of the farm accesses.

Figure 2: Aerial photo of eastern site access (car park exit)

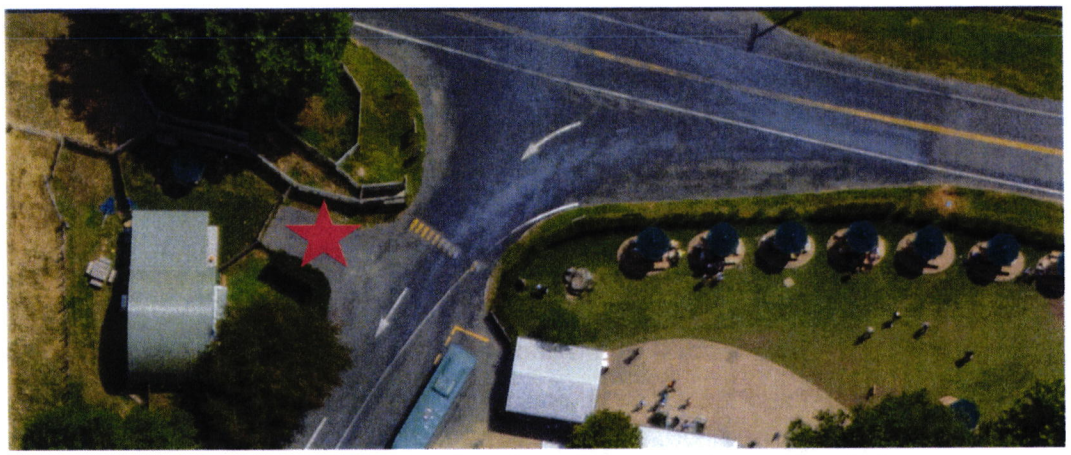

Figure 3: Aerial photo of eastern site access (car park entry)

[13] The Applicant (via Steve Bigwood) provided updated aerial photos to MPDC via email on 21 February 2019

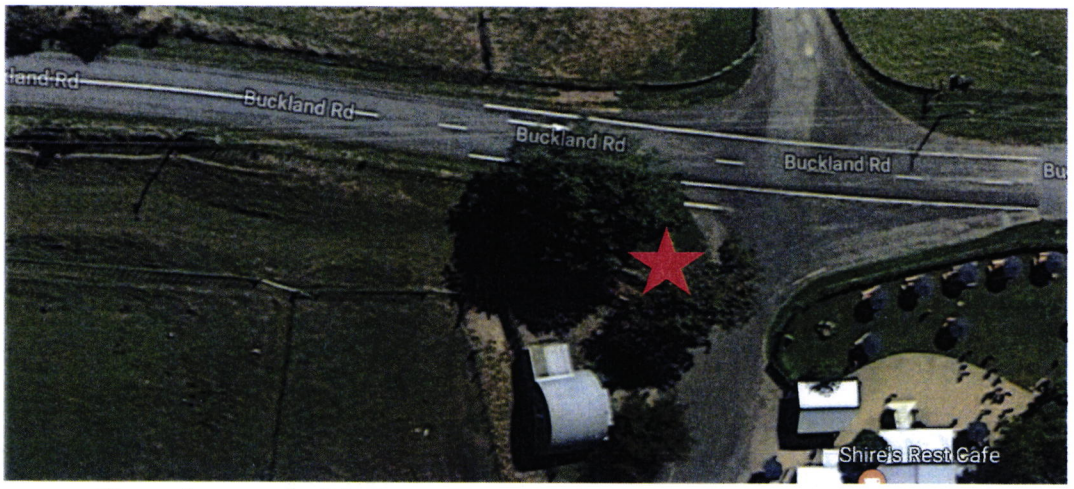

Figure 4: Aerial photo of eastern site entry (source: Google Maps)

82. It would be helpful for the Applicant to confirm the location of the farm accesses if they are different to that shown above.

83. Increasing the number of vehicle crossings beyond two increases the exposure of passing traffic to conflict with manoevuering vehicles. There has been no assessment of any separate farm accesses, including sight distance, formation, separation distances to ensure that any adverse safety effects can be managed.

84. I prefer that farm activities use the currently formed car park entry and exit points with no separate vehicle crossings to Buckland Road.

CONCLUSION

85. Since my previous involvement providing advice to the applicant and MPDC in the period 2011-2015 there have been changes in strategic direction for funding of land transport as set out in the GPS, including a move towards 'Vision Zero' for road deaths. These changes have altered my view on road safety and subsequent opinion on the scale of mitigation required to address road safety issues associated with Hobbiton.

86. In summary, I:

(a) Consider a limit of daily trip generation appropriate as the number of vehicle movements influences the safety and efficiency effects of the activity, not visitor numbers.

(b) Trip generation is influenced by vehicle occupancy which is variable for this activity. In my opinion, setting a daily trip generation cap at 2,500veh/day is unlikely to result in transport effects that are significantly

different to those arising from 2,100veh/day and may address some of the Applicant's concerns relating to a daily cap.

(c) As mitigation of pavement effects is specified in the MOU, which can be amended outside the Plan Change process, I do not consider there is a specific reason relating to transport effects for a performance standard to limit annual trip generation.

(d) Consider it desirable to limit the scale of accommodation activities to limit the frequency of late arrivals by fatigued drivers.

(e) Consider that lowering the road by 0.9m to achieve SSD of 114m at 385 and 399 Buckland Road mitigates the effects of the increased traffic so that the predicted crash rate is no greater than the crash rate of the consented scenario.

(f) Am concerned that using convex mirrors by themselves may not be effective in mitigating the increased crash risk at these vehicle crossings. I consider that mirrors should only be used as a last resort once other physical treatments have been discounted.

(g) Support amendments to the MOU that remove the requirement for a splitter island at the Buckland Road/ Puketutu Road intersection but requires removal of the northbound white arrow on Puketutu Road.

(h) I support the use of appropriate way-finding signage at key decision making locations to reinforce the preferred routes to access the site.

(i) I prefer that farm activities use the currently formed car park entry and access points with no separate vehicle crossings to Buckland Road.

87. I confirm the conclusion of my transportation assessment review that, with appropriate mitigation through revised Performance Standards and amendments to the MOU including additional financial contributions, the traffic related effects of the proposal are likely to be acceptable.

Alastair Black

Dated 9 April 2019