BEFORE INDEPENDENT HEARINGS COMMISSIONERS APPOINTED BY SELWYN DISTRICT COUNCIL

IN THE MATTER	of the Resource Management Act 1991 ("the Act")
AND	
IN THE MATTER	Lodgement of Private Plan Change 61 with Selwyn District Council to rezone approximately 30.76ha of Rural Outer Plains to Business 2 and Living 1 Zones, east of Darfield

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STATEMENT OF EVIDENCE OF JAMES ANDREW LONG ON BEHALF OF WAKA KOTAHI NZ TRANSPORT AGENCY

Dated 8 April 2021

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1 Qualifications and Experience

1.1 My full name is **JAMES ANDREW LONG**. I am a Senior Safety Engineer for Waka Kotahi New Zealand Transport Agency. I am based in the Christchurch office, covering the South Island, specifically Canterbury and West Coast. I have been practicing for 10 months in my current role.

1.2 I hold the qualifications Bachelor of Science in Civil Engineering from Leeds Metropolitan University, UK.

1.3 I have over 15 years civil engineering experience, specialising in highways engineering with a focus on geometric design of roads and intersections, design of safety upgrades, and, partaking in and leading Road Safety Audits on a wide range of projects.

1.4 I have completed the NZTA safe systems engineering workshop and more recently the Safe System Assessment training run by Safe System Solutions Pty

1.5 In relation to Plan Change 61, I have been requested by Waka Kotahi to provide evidence in relation to transportation matters. My evidence considers the traffic and transportation impacts of Plan Change 61, specifically the effects of the functionality, efficiency and safety of the state highway network.

2 Expert Witness Practice Note

2.1 While not a court hearing, I have read, and agree to comply with, the Environment Court's Code of Conduct for Expert Witnesses contained in the Practice Note 2014. Unless I state otherwise, my evidence is within my scope expertise and I have not omitted to consider any material facts known to me which might alter or qualify the opinions I express.

3 Scope of Evidence

3.1 The Private Plan Change request has been lodged by Rupert and Catherine Wright to rezone approximately 30.76 hectares of land from Rural Outer Plains to Business 2 and Living 1 zones. The land is located east of Darfield and has frontages to both West Coast Road (SH73) and Creyke Road. The Plan Change seeks to insert an Outline Development Plan (Darfield East ODP) with site-specific rules to facilitate the development of a business zone adjacent to SH73 and up to 35 residential sections.

3.2 The application, section 42A reports and evidence of experts on behalf of the applicant have provided detailed descriptions of the proposal including assessment of the various aspects of the proposed activity. The submission of Waka Kotahi

was in opposition to the proposed Private Plan Change and the content of the submission was limited to concerns around intersection safety and efficiency, multi modal transport options, Urban Development Strategy (UDS) and the Canterbury Regional Policy Statement (CRPS).

3.3 This evidence is limited to those matters within my expertise and those matters within the scope of the submission lodged.

3.4 My statement will address the following matters:

a. Road to Zero, the Ministry of Transport's long-term Strategy.

b. Waka Kotahi's Safe System approach to road safety

c. Intersection improvements at SH73 / Creyke Road

d. Multi Modal Connections

e. The Integrated Transportation Assessment (ITA) prepared as part of the application for Proposed Plan Change 61.

2.2 I have read the Section 42A Planning Report prepared by Mr Trewin for Selwyn District Council (SDC), and the Integrated Transportation Assessment and subsequent evidence provided by Mr Carr for the applicant.

4 Road to Zero Strategy

4.1 Road to Zero is the Ministry of Transport's Long-Term Strategy that sets a target to reduce deaths and serious injuries on New Zealand's roads, streets, cycleways and footpaths by 40 percent over the next 10 years. Reaching that target would mean reducing annual road deaths to 227 and serious injuries to 1,680 by 2030. The long-term goal is for zero deaths and serious injuries to occur on New Zealand's roads.

4.2 There are five focus areas that form the strategy, these include infrastructure improvements and speed management, vehicle safety, work related road safety, road user choices, and, system management. The scope of this evidence relates to the infrastructure improvements and speed management only.

5 Safe System

5.1 Waka Kotahi's Safe System Approach to Road Safety guides the Government's Road to Zero Strategy. The Safe System's approach to road safety is internationally accepted as the highest standard of road safety engineering.

5.2 The safe system creates a transport system which is safe and forgiving, and overall prioritises the safety of its users above all else.

5.3 To create a safe system, there are four key focus areas as well as some wider focus areas as shown in Figure 1.

Figure 1 – Safe system framework

5.4 For any new infrastructure, or infrastructure upgrades, the industry standard is to undertake a Safe System Assessment (SSA). An SSA would compare any potential options to each other, and in this case, the existing layout based on exposure, likelihood, and, severity. Exposure is related to a specific crash type and if a road user can be exposed to that crash following the upgrade, likelihood and severity relate to the likelihood of a crash occurring, and the severity of any injuries sustained as a result of that crash occurring.

6 Strategic Transport Network in Darfield

6.1 SH73 is classified as a Regional Arterial Road and carries 5,856 vehicles per day, of which 16.1% are classified as heavy commercial vehicles (source: www.mobileroad.org). Regional Arterial Roads are designed to move people and goods around and through regions. SH73 is a crucial transport link between Canterbury and the West Coast, as well as Christchurch to Arthurs Pass. SH73 provides direct linkage between desirable locations for commuters, freight, and tourists alike.

6.2 Creyke Road is a low volume rural road which carries approximately 123 vehicles per day to the south of SH73, of which 13.9% are classified as heavy commercial vehicles (source: www.mobileroad.org).

6.3 The posted speed limit on both SH73 and Creyke Road is 100km/h. The mean travel speed of vehicles on SH73 is 90 – 95km/h (source: MegaMaps III)

6.4 The cross section of SH73 typically comprises of two traffic lanes with a seal shoulder adjacent, approximately 1 – 1.5m in width. Noting the shoulders are wider in the vicinity of the Creyke Road intersection.

6.5 Creyke Road is approximately 5-6m wide and does not have centre or edge line marking. There are narrow unsealed shoulders adjacent to the carriageway with grass verges beyond.

6.6 Mr Carr reported on the crash data in the area of the intersection in section 4.3.1 of the transport assessment. I agree with Mr Carr that there have been three non injury crashes in the vicinity of the intersection.

7 Proposed Intersection Upgrade

7.1 I have read the ITA prepared by Mr Carr and believe the predicted traffic generation appears reasonable given the proposed development as part PC61.

7.2 The applicant has proposed a trigger rule where by 35 residential lots could be constructed prior to any intersection upgrade at SH73 / Creyke Road The intersection should be upgraded prior to any development. I do not believe the current intersection is safe to accommodate the traffic generated by PC61 given the current form of the intersection.

7.3 The proposed intersection upgrade includes the provision of a right turn bay (from SH73 to Creyke Road south), a left turn auxiliary lane (from SH73 to Creyke Road south) and some minor geometric changes to Creyke Road south resulting in a 90-degree approach to SH73. Figure 2 shows the proposed layout;

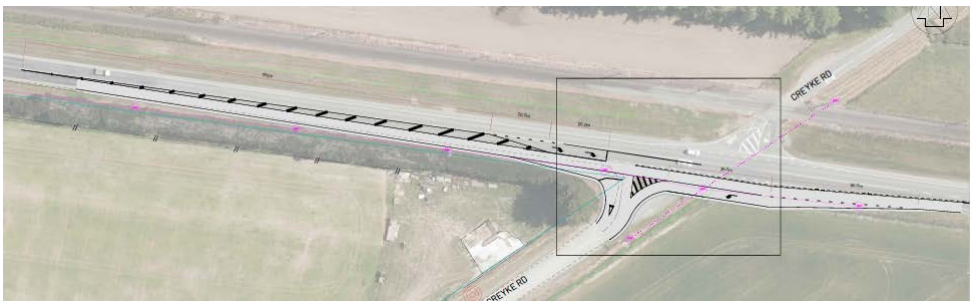

Figure 2 – Proposed intersection layout

7.4 The proposed changes to the southern leg of Creyke Road result in the wider intersection forming an offset T arrangement with the northern leg and would still be classified as a rural crossroads.

7.5 Whilst Figure 2 was prepared by the applicant as a ‘proof of concept’, the proposed intersection layout has several geometric deficiencies which will affect both the safe operation and efficiency of the intersection following implementation. The

squaring up of the northbound approach appears unlikely to accommodate the vehicle tracking of the appropriate design vehicle, considered to be the maximum legal 18m semi-trailer. The left turn auxiliary lane appears to be short, promoting a higher speed for vehicles entering Creyke Road and also has a masking affect for vehicles traveling straight through the intersection in a westbound direction, and the eastbound merge appears to be short, resulting in increased lateral shift and reduced merge time. I disagree with Mr Carr that this layout is feasible due to the constraints noted prior.

7.6 The existing traffic numbers using the intersection are shown below in Figure 3. Figure 3 was provided in a Technical Note prepared by Carriageway Consulting.

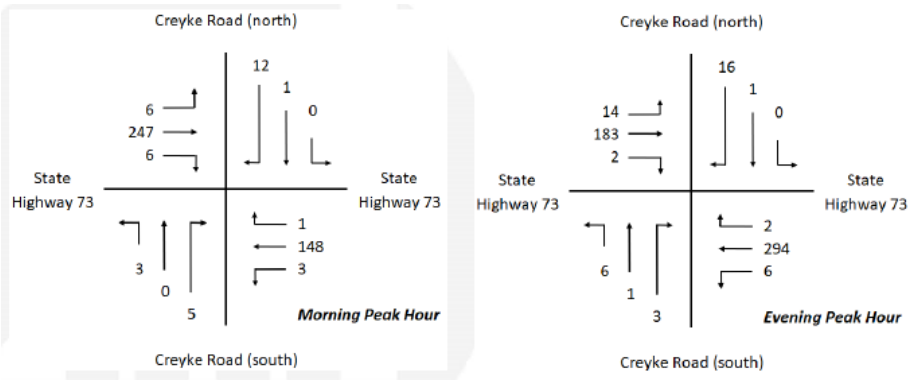

Figure 3 – Traffic survey results

7.7 The Transport Assessment submitted by the applicant, also prepared by Carriageway Consulting considers the traffic generation caused by Plan Change 61, including commercial and residential areas and is shown in Figure 4;

Activity	Trip Generation (Vehicle Movements)					
	Morning Peak Hour		Evening Peak Hour		Daily	
	In	Out	In	Out	In	Out
Residential	3	29	21	11	140	140
Business	264	48	103	241	1,017	1,017
Total	267	77	124	252	1,157	1,157

Figure 4 – Traffic generation taken from Transport Assessment

7.8 In the sample taken, there are currently eight right turn movements from Creyke Road to proceed east on SH73 in the peak hours. The transport assessment estimates Plan Change 61 will result in 329 movements.

7.9 The transport assessment assumes a trip distribution of 45% of turning traffic to/from the east, 45% to/from the west and 10% to/from the north. This assumption is fair, in my opinion.

7.10 Based on the trip generation noted in 7.7 (above), the number of right turn out movements from Creyke Road to proceed east on SH73 will be 148 movements. This is a significant increase and therefore there is also a significant increase in risk to road users.

7.11 As part of Mr Carr's evidence, he has provided updated traffic flows on SH73 and Creyke Road. I agree with Mr Carr's commentary on the latest traffic data.

7.12 The NZ Transport Agency High Risk Intersection Guide (July 2013) includes data for the expected number of deaths and serious injuries in a five-year period relative to the form of an intersection. Figure 5 shows the data for a rural crossroads

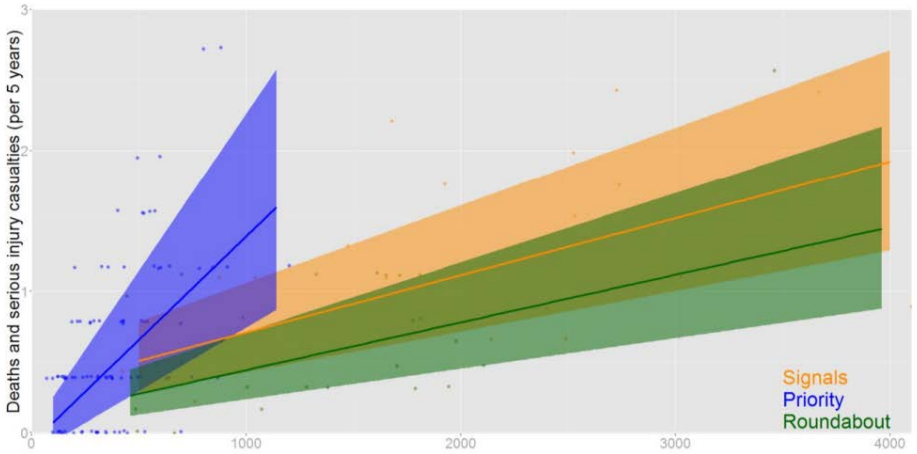

Figure 5 – Predictive crash data for rural crossroads intersections

7.13 Figure 5 shows that the number of deaths or serious injuries which could be expected at this intersection in a five-year period is approximately 2.6, although this expectation could be factored up due to the significantly higher traffic volumes on SH73 and increase turning movements from Creyke Road.

7.14 Figure 5 clearly demonstrates that roundabouts offer the safest form of intersection. This is because roundabouts are considered a 'primary treatment' in the safe system framework. This means there is a feature at the intersection that physically slows vehicles to an appropriate speed at an intersection in case of a crash occurring. This is particularly relevant for the right turn out movement.

7.15 As part of the ITA, there has been no consideration of working towards a safe system, and, a safe system assessment has not been undertaken to assess any proposed intersection layouts.

7.16 Figure 6 shows the crash survivability for various crash types as the collision speed increases. For right turn out crashes, a 50km/h impact speed results in a 10% chance of a fatal crash, an impact speed of 70km/h increase that risk to 90%, an

impact speed of 90km/h which is marginally lower than the mean travel speed of SH73 results in an unsurvivable collision.

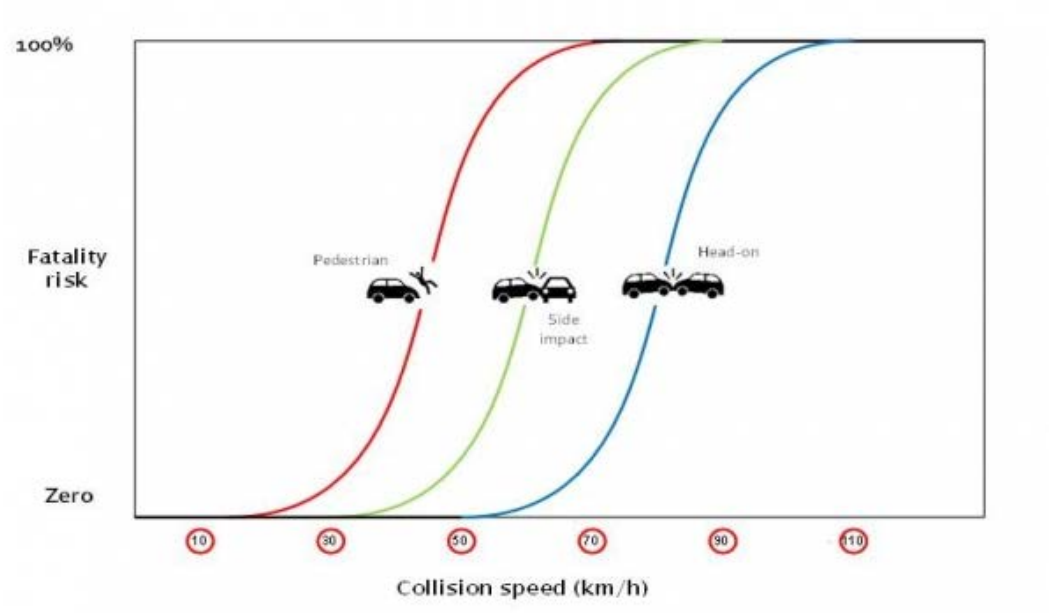

Figure 6 – Likelihood of fatal injury crashes at different collision speeds

7.17 The most significant safety risk at the intersection is for vehicle turning right from Creyke Road to head east on SH73 towards Christchurch. A T-bone type crash (through vehicle collides with driver's door of turning vehicle) is most likely to result in a death or serious injury particularly in high speed areas where the collision speed exceeds 50km/h.

7.18 The intersection layout proposed by the applicant, in my opinion, is not aligned with safe systems principles.

7.19 One option for the intersection which has not been debated is making Creyke Road a left in left out intersection, however this may be unpalatable due to the detour lengths for vehicles to the north and south of SH73. This would however alleviate some key safety concerns and better align with safe system principles due to the restriction of turning movements.

7.20 I agree with both Mr Smith and Mr Pearson, that any intersection upgrade should ideally be constructed as one project and not split into separable portions. This approach limits disruption to the network and results in an overall shorter construction period, exposing construction works and the travelling public to less risk.

7.21 At the prehearing meeting held on 11 March 2021, there was some discussion as to the potential for a reduction of the posted speed limit on SH73. I agree with Mr

Smith's commentary of the safe and appropriate speed for SH73 and Creyke Road, and the commentary regarding the speed management programme.

7.22 Mr Carr suggested that the technical assessment document which is used as the basis for any speed limit review could be funded by the applicant such that the speed could be reduced at an appropriate point in the future, in line with the development of PC61. Whilst this is true, Waka Kotahi cannot commit to acting upon that technical review or reducing the speed limit based on the applicant's timeline due to the national nature of the speed management programme.

7.23 If the speed limit of SH73 was reduced (to 80km/h), significant residual risk would remain. Based on Figure 6 above, the outcome severity of a side impact or vulnerable user collision remains unchanged.

7.24 If the posted speed limit was to be reduced, the likelihood of a crash occurring may be slightly reduced due to the increase reaction time available to a driver, cyclist, or pedestrian.

8 Multi-modal Transportation

8.1 Walking and cycling are a key part of any transport system, reducing congestion and vehicular use, as well as a reduction in emissions which works towards the Government's targets to cut emissions and limit global warming. Appropriate walking and cycling facilities can also improve quality of life and reduces dependency on motorised vehicles.

8.2 PC61 relies on other development areas to be able to provide safe an appropriate walking and cycling connections. Whilst I agree with this in principle, there is no suitable alternative should those developments (PC24 and Development Area 5) not proceed. I agree with Mr Smith and Mr Carr that this is essentially a timing issue.

8.3 There are four key groups which need to be considered in the design of any walking and cycling schemes / connections. These are families / leisure cyclists, commuter cyclists, road cyclists, and, pedestrians.

8.4 Families / leisure cyclists are likely to be generated by the residential development proposed as part of PC61. Typically, this group would ride on residential streets as a family to cafes, parks, and the like. This group includes young children and inexperienced cyclists.

8.5 Commuter cyclists vary in ability and generally would commute to a maximum distance of 10km. The proposed commercial development may attract commuter cyclists from the Darfield township and existing residential areas. Not only would

this require commuter cyclists to ride on the shoulder of SH73, it would require them to cross SH73 in the morning peak traffic.

8.6 Road cyclists generally are highly confident and ride much longer distances for fitness / enjoyment. It is generally accepted that this group of cyclists will stay on the road regardless of the off-road facilities provided.

8.7 Pedestrians travel by foot and typically use well defined facilities which are physically and / or spatially separated from any carriageway, similar to the examples noted in Mr Carr's evidence (Little River Rail Trail, Lincoln to Rolleston). I do note Mr Carr is not proposing that as a solution for the concerns raised by myself and Mr Smith regarding walking and cycling on SH73. As this is not proposed I have not specifically commented on the safety aspects of these paths.

8.8 If PC61 proceeds in advance of the adjacent PC24 and Development Area 5, there is a likelihood that pedestrians and cyclists of all abilities and confidence levels will travel along SH73 to access the local amenities. This exposes the user to very high level of risk due to the 100km/h posted speed limit, narrow road shoulders, and uneven verge.

8.9 The distance along SH73 these users would have to travel is 1.5km, measure from the SH73 / Creyke Road to the 50km/h speed threshold. It is likely to take an average pedestrian 18 minutes to cover this distance, assuming a walking pace of 5km/h. This is a significant amount of time for pedestrians to be exposed to high speed vehicular traffic with a high percentage of heavy commercial vehicles.

8.10 It is accepted under the safe systems principles the speed and energy of any vehicle vs vulnerable user collision should be managed to 30km/h to give the best chance of survival. This is illustrated in Figure 5, above. I do not believe that it is possible to achieve this outcome with the proponents of PC61.

8.11 I agree with Mr Smith and his concerns regarding walking and cycling on SH73.

8.12 If a shared path was to be provided along SH73 to facilitate a walking and cycling connection to the township, a minimum width of 2.5m would be required to facilitate safe opposing movements. Further to the width of the physical path, I would expect a roadside safety barrier and adequate separation to allow that roadside barrier to deflect upon impact without affecting users on the path. I consider anything less than this wholly inappropriate for a high-speed rural environment where a vehicle vs pedestrian / cyclist collision would be catastrophic.

9 Summary

9.1 For the reasons outlined above, my opinion is that PC61 results in significant effects on the safety of users at the intersection of Creyke Road / SH73. The proposed upgrade does not manage vehicle speeds or movements, or more critically energy if a crash occurs and as such provides only a marginal safety benefit when assessed against safe system principles and the existing intersection.

9.2 A roundabout should be provided as the primary safety treatment at the intersection to manage the traffic and safety issues as a result of PC61. If a roundabout is not deemed appropriate for any reason, any lesser upgrade should be constructed as one project and not as separable portions, and, before any development occurs as part of PC61 rather than adopting the proposed trigger rule.

9.3 I accept the proposed walking and cycling connections to the adjacent development areas are appropriate, however it is unclear how the timing of these developments will occur and as such there remains a likelihood of pedestrians and cyclists using the shoulder of SH73. I do not believe PC61 should be approved until the connectivity issues for walking and cycling are resolved in full.

9.4 PC61 should only be accepted if the matters of the trigger rule, multi modal connections and intersection safety are appropriately addressed.

James Long

8 April 2021