Before the Selwyn District Council

under: the Resource Management Act 1991

in the matter of: Proposed Private Plan Change 80 to the Operative District Plan

and: **Two Chain Road Limited**
Applicant

Evidence of Chris Blackmore (transport modelling)

Dated: 5 October 2022

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EVIDENCE OF CHRIS BLACKMORE

INTRODUCTION

1 My full name is Christopher John Blackmore.

2 I hold a Bachelor of Science and a Bachelor of Commerce (with Honours) in Operations Research from the University of Canterbury. I am a Young Professional Member of the Chartered Institute of Logistics and Transport, an affiliate member of Engineering New Zealand, and a member of the NZ Modelling User Group sub-group of ENZ.

3 I hold the position of Senior Transportation Planner at Abley. I have been in this position since 2020 and have been at Abley for five years. My experience during this time includes undertaking transportation modelling and analysis within a wide range of development and transportation planning projects, for both public and private sector clients.

4 I have undertaken modelling of the future transport environment using the Rolleston Paramics microsimulation model. The model was updated in 2019 for Council by myself and the Abley team and has subsequently been used to support transportation planning across the township.

5 I am familiar with private plan change 80 (*PC80*).

CODE OF CONDUCT

6 Although this is not an Environment Court hearing, I note that in preparing my evidence I have reviewed the Code of Conduct for Expert Witnesses contained in Part 7 of the Environment Court Practice Note 2014. I have complied with it in preparing my evidence. I confirm that the issues addressed in this statement of evidence are within my area of expertise, except where relying on the opinion or evidence of other witnesses. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

SCOPE OF EVIDENCE

7 My evidence covers the following:

7.1 Response to matters raised in Mr Collins' Transport Hearing Report; and

7.2 Sensitivity testing of proposed State Highway 1 intersection forms as requested by Mr Fuller.

MATTERS RAISED IN TRANSPORTATION HEARING REPORT

8 My evidence responds to Mr Collins' review of the modelling presented in his Transportation Hearing Report, namely the cumulative transport effects of the multiple private plan changes discussed in Section 4, and on this basis I have updated the modelling accordingly for Mr Fuller's consideration. This update addresses the difference in activity between the modelling undertaken as part of the individual PC81 and PC82 transport assessments and how the combined western boundary plan changes interact with Plan Change 80. I have also updated the intersection configurations to align with the configuration released for public consultation as part of NZUP referenced by Mr Collins in Section 4 of his Transportation Hearing Report.

9 This modelling is consistent with the updated traffic modelling presented at the recent Hearing for Plan Changes 81 and 82. I consider this represents a consolidated assessment for the Rolleston Plan Changes. The total development I have included is distributed as notated in Mr Fuller's evidence, covering the following plan changes:

9.1 PPC64: Rolleston, 969 residential lots;

9.2 PPC66: Rolleston, rural zone to industrial zone;

9.3 PPC70: Rolleston, 800 residential lots plus commercial;

9.4 PPC71: Rolleston, 660 residential lots;

9.5 PPC73: Rolleston, 2100 residential lots plus commercial;

9.6 PPC75: Rolleston, 280 residential lots;

9.7 PPC76: Rolleston, 150 residential lots;

9.8 PPC78: Rolleston, 750 residential lots;

9.9 PPC80: Rolleston, rural to industrial zone;

9.10 PPC81: Rolleston, 350 residential lots; and

9.11 PPC82: Rolleston, 1320 residential lots.

10 Vehicle trip generation for the industrial land use within Plan Change 80 has been modelled at a rate of 11 trips per hectare in the morning peak hour and 10.16 trips per hectare in the evening peak hour. These rates have been based on the rates calculated in Plan Change 10, establishing the IPort industrial area, and it is my view

that they are consistent with the scale and intensity of the activity anticipated in the Plan Change 80 area.

11 Vehicle trip generation for the residential activity within the private plan changes has been modelled at a rate of 0.9 trips in peak hour per dwelling. This is as instructed by Mr Fuller for Plan Changes 73, 81 and 82 but is also the default rate adopted for all the residential Plan Changes included in the model.

12 As noted by Mr Collins and Mr Fuller, the amount of activity in the model is in excess of the Waka Kotahi Rolleston NZUP 2038 project model. The plan change model represents a full development scenario and includes all currently zoned residential, commercial, and industrial land, as well as development of the private plan changes listed above.

13 As a full development model, the cumulative plan change model does not represent a fixed future year and is intended as a planning tool to provide a robust assessment of the long-term performance of the network. Significantly, the 2033 modelled year is a nominal year at which all current residential zoned land and the Plan Changes are fully developed. As such, the 2033 transportation model includes 17,513 households compared to 6,745 households in 2018, a 160% increase. The total growth is then 10,768 households over 15 years, as well as extensive commercial and industrial development over this period. This equates to 11% growth per annum. As noted in section 3.1 of the Assessment of Economic Impacts, population growth in the past 20 years in the Selwyn District has been very high at 7.4% per annum but this is well below the modelled growth included in my modelling assessment.

14 I have accessed the Selwyn District Population Projections from the Statistics New Zealand website 'NZ-Stat' service and identified that across the Statistical Areas in Rolleston the medium and high population growth forecasts anticipate 58% and 76% growth (respectively) between 2018-2033 which equates to 3.9% and 5.1% growth per annum over this period (refer Table One below showing high growth forecasts). The modelled scenario with 11% growth per annum is clearly well in excess of even the highest population projection. I have further identified that the quantum of development in the 2033 model aligns with five additional years of growth above the Statistics New Zealand 2048 high growth forecast, so by proxy represents a 35 year high-growth forecast.

15 As such the 2033 future year is a nominal year which corresponds to the full development of all of the Plan Changes that have been lodged and assessed, and is realistically a high growth 35 year forecast model. It is important to bear this in mind when considering my modelling assessment.

High forecasts by year for:	**2018**	**2033**	**2048**
Rolleston Izone	40	60	80
Rolleston North West	3,980	5,050	5,800
Rolleston Central	3,410	4,270	5,200
Rolleston North East	4,780	6,630	8,340
Rolleston South West	2,970	4,920	6,430
Rolleston South East	3,220	11,500	17,450
Total Rolleston High	**18,400**	**32,430**	**43,300**
Growth from 2018		**76%**	**135%**
Growth p.a.		**5.1%**	**4.5%**

16 Updated modelling results demonstrate that in the morning peak hour the State Highway 1/ Dunns Crossing Road/ Walkers Road roundabout operates acceptably at LOS D for the intersection overall. The northern Walkers Road approach operates at LOS D, indicating that approach is operating withing capacity limits. The 38 seconds of total delay on the Walkers Road approach accounts for all delay on the approach experienced by average vehicles including stop-line delay, any delay experienced traversing the roundabout, and reduction in free-flow speed travelling as part of a rolling queue while approaching the roundabout.

17 In the evening peak hour modelling results indicate that the northern Walkers Road approach operates at LOS E, with 68 seconds of delay. This indicates that the Walkers Road approach is approaching the functional capacity limit in the evening peak hour when all current plan change proposal developments are included.

18 Whilst I have left the interpretation of the modelling to Mr Fuller, I consider that this updated modelling addresses the concern regarding capturing the cumulative effects of development raised by Mr Collins. I am of the view that the modelling has been undertaken in line with best practice and appropriately demonstrates the cumulative effects of the multiple private plan changes on the Rolleston transport network.

TESTING OF STATE HIGHWAY 1 INTERSECTION FORMS

19 As part of assessing the effects of Plan Changes 81 and 82 Mr Fuller has also asked me to undertake a modelling sensitivity test to explore the impact of altering the infrastructure constructed at the State Highway 1/ Rolleston Drive South intersection as part of the Waka Kotahi State Highway 1 Rolleston Transport Improvements programme, from the proposed left-in left-out configuration to an appropriately sized roundabout. These tests are relevant to Plan Change 80 and I have summarised them here also.

20 I have modelled the State Highway 1/ Rolleston Drive South intersection as a dual circulating lane roundabout with dual-lane approaches on all sides. Infrastructure changes have been limited to the State Highway 1/ Rolleston Drive South intersection only, and wider network changes to support the operation of the intersection have not been considered at this time. For this reason, it is my belief that the improvements in network operation enabled by the additional connectivity and capacity are conservative.

21 It is my view that overall, the State Highway 1 connections to Rolleston operate much more efficiently with the inclusion of the State Highway 1/ Rolleston Drive South roundabout.

22 The additional connectivity leads to reductions in circulating volumes at the State Highway 1/ Dunns Crossing Road/ Walkers Road roundabout of between 15% and 20% in the morning peak hour. Delays are also significantly improved, with a reduction of 36 seconds of delay on the Dunns Crossing Road southern approach and a 12 second reduction in delay on the intersection overall. Improving the performance of the southern approach reduces the number of gaps available for the Walkers Road approach, leading to an increase in delay of 16 seconds for Walkers Road although the level of service in unchanged at LOS D. In my opinion the overall intersection performance improves such that the outcome would still generally be preferred in practice. The changes are indicated in the results contained in Appendix 1 (refer to 'With Rolleston Dr S RBT' columns).

23 A second test was also requested by Mr Fuller comprising of converting the State Highway 1/ Dunns Crossing Road/ Walkers Road roundabout to an appropriately sized traffic-signal controlled crossroads, while maintaining the State Highway 1/ Rolleston Drive South intersection as a left-in left-out only, priority-controlled intersection.

24 My modelling of this intersection configuration demonstrates a significant increase in capacity at the State Highway 1/ Dunns Crossing Road/ Walkers Road intersection, compared to the currently proposed roundabout configuration. Vehicle delay on the

Dunns Crossing Road southern approach reduces in peak hour from 97s to 48s, while intersection delay and the delay on Walkers Road remain similar overall (refer to 'With Signalised Crossroads' column in Appendix 1).

25 In my opinion the intersection layout demonstrates sufficient reserve capacity to be operated in a way which maintains low delays along the State Highway while providing a higher level of flexibility than a roundabout configuration.

CONCLUSION

26 I have undertaken modelling of cumulative transport effects of private plan change traffic using the Rolleston Paramics microsimulation model. Following Mr Collins' review of the modelling presented in his Transportation Hearing Report, I have revisited several assumptions and updated the modelling accordingly for Mr Fuller's consideration. This is appended to this report as Appendix 1.

27 I consider that the modelling has been undertaken in line with best practice and appropriately demonstrates the cumulative effects of the Plan Changes on the Rolleston transport network.

Dated: 5 October 2022

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Chris Blackmore

APPENDIX ONE – STATE HIGHWAY 1/ DUNNS CROSSING ROAD/ WALKERS ROAD INTERSECTION PERFORMANCE

SH1 / Dunns Crossing Road / Walkers Road roundabout

		Updated Baseline 07:00 to 08:00						With Rolleston Dr S Rbt 07:00 to 08:00						With Signalised Corssroads 07:00 to 08:00					
Approach	Movement	Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS	Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS	Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS
Walkers Road North	Left	26	96	19	B	38	D	37	156	31	C	54	D	27	95	44	D	48	D
Walkers Road North	Through	88	136	43	D			83	291	65	E			89	128	50	D		
Walkers Road North	Right	23	115	43	D			24	211	51	D			24	100	46	D		
SH1 East	Left	91	13	5	A	8	A	83	11	5	A	7	A	70	73	21	C	46	D
SH1 East	Through	731	37	8	A			708	26	7	A			711	173	49	D		
SH1 East	Right	157	35	11	B			128	31	9	A			140	105	42	D		
Dunns Crossing Road South	Left	113	306	75	F	97	F	136	159	42	D	61	E	137	128	40	D	48	D
Dunns Crossing Road South	Through	194	402	128	F			240	234	82	F			244	130	42	D		
Dunns Crossing Road South	Right	559	362	91	F			540	211	57	E			727	150	52	D		
SH1 West	Left	139	74	21	C	37	D	92	82	22	C	32	C	129	82	31	C	35	C
SH1 West	Through	416	179	30	C			575	152	30	C			418	95	34	C		
SH1 West	Right	214	219	60	E			96	164	50	D			223	86	38	D		
Intersection Total		2752		46	D	46	D	2739		34	C	34	C	2938		44	D	44	D

SH1 / Dunns Crossing Road / Walkers Road roundabout

		Updated Baseline 17:00 to 18:00						With Rolleston Dr S Rbt 17:00 to 18:00						With Signalised Crossroads 17:00 to 18:00					
Approach	Movement	Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS	Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS	Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS
Walkers Road North	Left	51	167	27	C	68	E	67	100	23	C	33	C	58	114	45	D	47	D
Walkers Road North	Through	246	247	76	F			264	136	35	D			264	126	48	D		
Walkers Road North	Right	57	226	72	F			69	123	36	D			69	122	48	D		
SH1 East	Left	649	54	12	B	16	B	604	21	7	A	10	B	607	68	24	C	32	C
SH1 East	Through	773	90	19	B			750	61	12	B			758	95	37	D		
SH1 East	Right	100	82	22	C			81	47	14	B			100	90	39	D		
Dunns Crossing Road South	Left	89	24	6	A	12	B	103	22	6	A	11	B	88	90	36	D	43	D
Dunns Crossing Road South	Through	149	51	14	B			144	56	14	B			148	162	48	D		
Dunns Crossing Road South	Right	254	77	13	B			146	55	12	B			255	125	42	D		
SH1 West	Left	78	21	6	A	9	A	50	15	5	A	6	A	71	68	28	C	34	C
SH1 West	Through	499	47	8	A			606	29	6	A			497	92	34	C		
SH1 West	Right	220	47	13	B			134	29	9	A			224	93	37	D		
Intersection Total		3165		19	B	19	B	3017		12	B	12	B	3139		36	D	36	D