Before the Central Otago District Council

In the matter of	The Resource Management Act 1991
And	A requested change to the Central Otago District Council's Operative District Plan – Plan Change 13 (PC13)

STATEMENT OF EVIDENCE OF ANDY CARR for

River Terrace Developments Limited

Dated 22 April 2019

Introduction and Qualifications

1 My full name is Andrew (Andy) David Carr.

2 I am a Chartered Professional Engineer and an International Professional Engineer (New Zealand section of the register). I hold a Masters degree in Transport Engineering and Operations and also a Masters degree in Business Administration.

3 I served on the national committee of the Resource Management Law Association between 2013-14 and 2015-17, and I am a past Chair of the Canterbury branch of the organisation. I am also a Chartered Member of Engineering New Zealand (formerly the Institution of Professional Engineers New Zealand), and an Associate Member of the New Zealand Planning Institute.

4 I have more than 29 years' experience in traffic engineering, over which time I have been responsible for investigating and evaluating the traffic and transportation impacts of a wide range of land use developments, both in New Zealand and the United Kingdom.

5 I am presently a director of Carriageway Consulting Ltd, a specialist traffic engineering and transport planning consultancy which I founded five years ago. My role primarily involves undertaking and reviewing traffic analyses for both resource consent applications and proposed plan changes for a variety of different development types, for both local authorities and private organisations. I am also a Hearings Commissioner and have acted in that role for Greater Wellington Regional Council, Ashburton District Council, Waimakariri District Council and Christchurch City Council.

6 Prior to forming Carriageway Consulting Ltd I was employed by traffic engineering consultancies where I had senior roles in developing the business, undertaking technical work and supervising project teams primarily within the South Island.

7 I have been involved in a number of proposals which have involved assessing the traffic generation and effects of large sites and plan change areas. Within the district, this includes Plan Change 12 (Wooing Tree) and RC170378 which facilitated residential development at the Cromwell Top Ten Holiday Park. I also provided advice for the Perriam Cove subdivision.

8 Further afield, within the Queenstown Lakes district, these have included the residences facilitated by Plan Changes 4 (North Three Parks, 600 residences), 39 (Arrowtown South, 215 residences), 41 (Shotover Country, 770 residences plus commercial development), and 45 (Northlake, 1,600 residences). I have also provided advice for Stonebrook (460 sections in Rolleston), Awatea (Christchurch, 139 residences) and numerous others.

9 I have carried out commissions in the Cromwell area for more than 12 years, including at the Highlands Motorsport Park. I am familiar with the wider Cromwell area and have visited the town centre and historic precinct on several occasions and I have also visited the area as part of preparing my evidence.

10 As a result of my experience, I consider that I am fully familiar with the environs of Cromwell and the particular traffic-related issues associated with residential plan changes and resource consent applications.

11 I have read the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2014. This evidence has been prepared in accordance with it and I agree to comply with it. The matters addressed in this Statement of Evidence are within my area of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

Scope of Evidence

12 In this matter, I have been asked by the plan change requestor, River Terrace Developments Limited, to consider the submissions made on private Plan Change 13 to the Central Otago District Plan, and to respond to the Council Officers' reports.

13 I have been involved with the plan change since early 2017, and have provided advice in a number of transportation-related areas. I subsequently produced a Transportation Assessment for the plan change request, dated 14 December 2017.

14 The Transportation Assessment was subsequently reviewed by consultants Stantec on behalf of the Council. Stantec raised a number of matters, which directly affect the analysis included within the Transportation Assessment. Accordingly, I have responded to each of these matters in a separate Technical Report, which is attached as Annexure A to this Statement of Evidence.

15 I adopt these reports as the primary part of my evidence, and accordingly, have not replicated much of the detail within this evidence, other than what is relevant by way of background.

Summary of Evidence

16 As a result of the comments made through the engineering review, the assessment of the plan change request has been updated. However this continues to show that the traffic that will be generated can be accommodated on the transportation networks.

17 A number of revisions have been made to the plan change provisions, including the proposal for sealing the full length of Sandflat Road, and the provision of an

off-road walking and cycling route which will link to Bannockburn Road towards the southeast.

18 I remain able to support the plan change request and consider that there are no transportation reasons why the plan change request could not be recommended for approval.

Response to Submissions

19 I have read the summary of submissions and identified those that refer to transportation-related matters, and I comment on these below. For clarity, the matters are not set out in any particular order.

20 At the outset however, given the importance of the state highway connection to the plan change area, I have reviewed the submission made by the New Zealand Transport Agency (**NZTA**).

21 NZTA raises issues of non-car connectivity, and I consider that these are addressed through the Technical Report, including the provision of a cycle route to/from the plan change area, and the sealing of Sandflat Road.

22 NZTA also seeks to amend Rule 20.7.7(ii) such that it does not refer to the State Highway 6 / Sandflat Road intersection being upgraded in accordance with the Austroads Guides, but refers to NZTA standards instead. This is on the basis that it allows for a layout that meets the Agency's requirements at the time that the upgrade is justified.

23 I generally support the principle of the point that NZTA makes, but note that the suggested wording does not allow for a situation where the upgrades do not meet the Agency's requirements but the Agency itself is satisfied that the alternative solution will operate safety and efficiently. For this reason, I support in part the submission, but recommend that the wording is amended to "... *the State Highway 6 / Sandflat Road intersection to the NZ Transport Agency standards* ***or as otherwise agreed with the NZ Transport Agency***".

24 Otherwise I note that the NZTA submission is generally supportive of the provisions within the plan change.

Submitter Concern: The measures proposed to address the traffic effects are not adequate

25 The plan change provisions include upgrading the State Highway 6 / Sandflat Road intersection, sealing Sandflat Road, upgrading Pearson Road (east), and providing an off-road walking and cycling route between the site and Bannockburn Road.

26 My analysis shows that the traffic associated with development of the plan change, allowing for these upgrades, can be accommodated on the roading networks.

Submitter Concern: An alternative access onto the highway should be formed / the Sandflat Road intersection is unsuitable

27 My analysis shows that there is no need for a new access onto the highway, but rather, an upgraded Sandflat Road intersection has sufficient capacity to accommodate the increase in traffic flows.

Submitter Concern: Speed limits should be changed

28 Changing a speed limit is a process that is not within the scope of a plan change request, but is a separate statutory process followed by a road controlling authority. As such, it is not possible to assume changes in speed limits within my analysis.

Submitter Concern: The analysis does not take into account the access on the opposite side of the highway

29 It is unusual in my experience to take private accesses into account when modelling the transportation effects of any development. However, in the Technical Note, I set out an updated analysis for the State Highway 6 / Sandflat Road intersection. I have added the northernmost intersection into this, and this shows that in the morning peak hour with the plan change fully developed, delays for exiting traffic would be around 14 seconds, with delays in the evening peak hour being around 21 seconds.

30 On this basis, I do not consider that the functioning of this access would be adversely affected by the plan change.

Submitter Concern: Traffic volumes on Pearson Road will increase

31 Pearson Road is a Collector Road under the District Plan roading hierarchy, indicating that it provides for both a property access function and for through traffic.

32 My analysis shows that the increase on Pearson Road to the west of Sandflat Road will be minimal, since the state highway generally provides a faster route to travel in this direction. To the east of Sandflat Road, the development of the plan change area will result in up to an additional 225 vehicle movements in the peak periods. As a result, the road will need to be upgraded from the current layout. However the carriageway has wide grassed verges on each side and will continue to have these even when improved. These provide for informal walking and equestrian movements.

33 The plan change provisions allow for the introduction of an off-road walking and cycling route along Pearson Road (east).

Submitter Concern: Traffic volumes on Cemetery Road will increase queues and delays at the state highway intersection

34 The State Highway 6 / Cemetery Road intersection is presently formed as a priority 'give-way' intersection. It does not have an auxiliary right-turn lane but there is shoulder widening to allow one vehicle to pass another vehicle that is waiting to turn right.

35 I considered whether Cemetery Road could form a route that may be used by the traffic associated with the plan change. Based on timed runs, the journey from the northern part of the plan change area to the McNulty Road / Gair Avenue intersection takes around 6 seconds longer than via McNulty Road. Further, there is greater potential for delays on the Cemetery Road / Gair Avenue route due to more driveways and hence maneouvring vehicles, and the need to give way to other traffic streams four times rather than just once if travelling on McNulty Road.

36 In addition, at the McNulty Road / Gair Avenue intersection, any traffic travelling via Cemetery Road / Gair Avenue will have to give-way to traffic travelling via State Highway 6 / McNulty Road. For northbound traffic, this movement also requires waiting for a gap in the traffic on McNulty Road, compared to a simple left-turn movement from McNulty Road onto Gair Avenue.

37 On this basis I do not consider that there will be any significant increase in traffic flows turning at the State Highway 6 / Cemetery Road intersection.

Submitter Concern: No analysis has been carried out when there is an event at the Highlands Motorsports Park

38 The additional traffic counts carried out in response to Stantec's concerns coincidentally were taken at a time when the Festival of Speed was underway at Highlands Motorsports Park.

39 On Friday, there was no noticeable change in traffic flows before 11am. At this time, the bulk of vehicles associated with the plan change area will have already made their journey. On Friday afternoon, most people appear to have left Highlands before the typical commuter peak hour, meaning that after 5pm, there were only an extra 20 vehicles on Sandflat Road compared to the typical weekday peak volumes.

40 On this basis, I do not consider that the motorsports park will interact adversely with the traffic generated by the plan change area during weekdays.

41 On both Saturday and Sunday, an increase in traffic turning into Sandflat Road was observed between 9am and 11am, with a commensurate departing peak flow between 3pm to 5pm. However at these times, the traffic generation of residential development is much lower than in the 'commuter' peaks, and there is also more ability to choose the time of travel. Further, traffic is travelling into Sandflat Road when arriving at the motorsports park whereas vehicles associated with the plan change area will mainly be departing and heading northwards (with this situation being reversed in the afternoon).

42 On this basis, I do not consider that there will be adverse effects arising from traffic associated with the motorsports park and from the plan change area over and above the effects identified for the weekday peak periods on the network.

Submitter Concern: As students may not be eligible for school transport, there may be an increase in walking and cycling

43 The proposal now includes for an off-road walking/cycling route on Sandflat Road / Pearson Street to link to the existing route on Bannockburn Road.

Submitter Concern: The proposal will result in more traffic movements through the Kawarau Gorge

44 While I agree that there will be an increase on the highway through the gorge, this situation will arise with any development in the vicinity of Cromwell where residents work in the Queenstown area. As such, it is not an issue that is unique to this site.

Submitter Concern: The traffic lanes for Road Type A are too wide

45 The carriageway width is consistent with the width set out in the national Standard NZS4404:2010 taking into account the expected traffic volumes.

Submitter Concern: Insufficient residential car parking is proposed

46 The car parking ratio proposed is as per the operative District Plan (although I discuss this further below).

Response to Council Officers Reports

47 As noted above, the Council commissioned a review of my Transportation Assessment which was carried out by Mr Andrew Metherell of Stantec. This raised a number of matters, and I have responded to each of these within the Technical Note.

48 The matters raised by Mr Metherell are reflected in the s42a report of Mr Whitney. In this regard I comment as follows:

(a) s42a report paragraph 7.3.2: additional traffic counts have been carried out to support the analysis;

(b) s42a report paragraphs 7.3.3 and 7.3.4: Bannockburn Road and Pearson Road have now been included within the analyses, with their geometry, traffic flows and road safety records all considered;

(c) s42a report paragraph 7.3.6: As requested, the proportion of traffic exiting the plan change area in the morning peak hour has been amended to 75%;

(d) s42a report paragraph 7.3.6: When considering the traffic generation of the retirement village, the requested rate of 2.6 vehicle movements per day has been used;

(e) s42a report paragraph 7.3.7: The analysis has been updated to address a trip distribution which allows for considerably more traffic to travel to and from Cromwell (rather than a bias towards the direction of Queenstown);

(f) s42a report paragraph 7.3.8: Taking into account the new traffic count information, the revised traffic generation rates and in/out split, and the revised trip distribution, the whole of the analysis has been revised and updated. As a result, the assessment also evaluates changes on the district roading network, specifically Bannockburn Road and Pearson Road;

(g) s42a report paragraph 7.3.9: The proposal now includes for an off-road walking/cycling route on Sandflat Road / Pearson Street to link to the existing route on Bannockburn Road.

(h) s42a report paragraph 7.3.10: In view of the revised trip distribution, the road safety analysis has been updated.

(i) s42a report paragraph 7.3.12: The Technical Note discusses a range of matters relating to the internal roading network proposed for the plan change area.

49 On the basis of the revised assessment, I consider that I have addressed the technical matters raised by the Council in their review of the Transportation Assessment.

50 I have been asked to comment on any safety-related effects which may arise from the cycleway crossing Sandflat Road, as would necessarily be the case if the cycleway was constructed on the eastern side of the road. I expect that in

common with all cycleways, this will result in a formal crossing point being constructed to ensure that pedestrians and cyclists are guided to cross in a position that provides a safe environment (such as through ensuring that appropriate sight distances are available). Typically this is formed by a small structure (such as a short section of fence) by the side of the carriageway, and signage indicating destinations and distances.

51 Peak hour traffic flows on Sandflat Road at full development of the plan change area will be 310 vehicles (two-way). On this basis, I do not consider that any other provision (such as a refuge) for crossing cyclists/pedestrians is justified on Sandflat Road.

52 The cycleway would also need to cross Bannockburn Road, since the existing cycleway lies on the eastern side of the road. Bannockburn Road traffic flows are greater than on Sandflat Road, and my analysis shows that a refuge or similar provision may be required but this depends on the extent of use. With fewer than 100 children crossing the road in the peak hours, no provision is required but at volumes greater than this, a refuge would be beneficial.

53 Mr Whitney raises concerns as to the use of the state highway for trips between Cromwell and the plan change area (s42a report paragraphs 7.3.10, 8.1, 9.3.5 and others). My revised analysis allows for a greater proportion of trips to be made using the district roading network (as requested) but I note that NZTA has not raised concerns in this regard.

54 Similarly, while I acknowledge Mr Metherell's comments regarding the form of the State Highway 6 / Sandflat Road intersection (s42a report, paragraph 7.3.11), I note that NZTA's submission does not raise these concerns but appears to be satisfied with the level of provision proposed.

55 I confirm the roads internal to the plan change area have been designed to reflect current thinking and therefore are different to the Council's Engineering Standards which are based on an older version of the relevant national Standard. With regard to Road Type C, Mr Whitney sets out that in his view, "*significant congestion*" will arise on the road due to cars being parked within the movement lanes (s42a report, paragraph 7.3.13). The layout proposed is aligned with Standard NZS4404:2010, and I therefore do not share these concerns. However that the placement of driveways can assist in forming localised passing places on the road, or conversely, poor placement of driveways means that the movement of vehicles can be limited. As such, this is a matter than can be addressed at the subdivision stage. I also note that all road types are noted as being minimums, and there is nothing which precludes the layout from being widened when subdivision consent is applied for. Finally, at least some of Mt Whitney's concerns appear to be related to the extent of on-street parking, and I discuss this below.

56 Mr Whitney sets out that having driven along Sandflat Road, the current sight distances are insufficient for overtaking (s42a report, paragraph 7.3.15). Within the Transportation Assessment I identified that minor lowering of the carriageway may be required to improve sightlines. In my view this is a matter than can be dealt with when consents are sought, since the legal width of Sandflat Road does not preclude any improvements from being implemented.

57 In respect of car parking, Mr Whitney considers that there will be a shortfall, highlighting that garages could be converted to additional living spaces and that residents may have boats or jet-skis (s42a report, paragraph 7.3.16). As such, he considers that many households will have more than one vehicle and that significant on-street parking will arise. In turn, coupled with the narrower carriageways, he considers that this will lead to difficulties in the ability of traffic to move through the area.

58 This matter has been addressed by Mr Ray (his paragraphs 7.52 to 7.54) but in brief, I understand that in practice most lots provide two on-site car parking spaces. This represents a greater amount of car parking than required by the District Plan. As such, taking into account the potential for vehicles to also be parked on-street, I do not consider that there will be a parking shortfall nor that the extent of on-street parking will give rise to congestion.

59 With regard to the distance between the State Highway 6 / Sandflat Road intersection and the Primary Road (s42a report, paragraph 7.3.17), this is not a matter that has been raised by NZTA in their submission. In respect of the separation from the entrance to Highlands Motorsports Park, this is expected to be 60m and therefore will comply with the separation distance specified in the District Plan.

60 Mr Whitney raises the possibility that the neighbourhood centre may attract people from outside the immediate plan change area, and that this additional traffic has not been taken into account within the Transportation Assessment (s42a report paragraph 7.11.3). I confirm that no traffic generation arising from the Neighbourhood Centre was included in the Transportation Assessment, nor the later Technical Report.

61 As noted in the ME Consulting report, any use of the Neighbourhood Centre by non-residents will be limited as the centre will not be particularly conspicuous, and the ME report does not quantify the expected movements. In my view, a high proportion of these movements will be made from Sandflat Road (south) where my analysis shows ample available capacity, and from Highlands Motorsports Park where the trips will be east-west across Sandflat Road and again, where the intersections have ample spare capacity.

62 While there may also be some additional traffic movements associated with the highway, these will be small compared to the forecast flows with the plan change fully developed.

63 Overall, I do not consider that the analyses of the intersections will be adversely affected by any small increase in volumes arising from people external to the plan change area using the Neighbourhood Centre.

64 Mr Whitney has highlighted (s42a report, paragraphs 7.12 and 9.2.2) that there is no proposed walking and cycling connectivity external to the plan change area. This is now addressed through the proposed provision of a route along Sandflat Road leading to Bannockburn Road. He also highlights the use of the highway for shorter distance journeys, but as I noted previously, this has not been raised as a concern by NZTA. Finally, he raises the issue of on-street parking and the potential for congestion, but I consider that this is addressed provided the parking rules provide for at least one on-site car parking space per residential lot and a total of at least 2 car parking spaces per residential lot when on-street parking spaces are also included.

65 Overall, I consider that many of Mr Whitney's concerns have been specifically addressed through the updated analysis of the plan change request, as set out in the Technical Report.

Conclusions

66 On the basis of my updated assessment, which takes into account the issues raised in respect of the background traffic data, traffic generation, and trip distribution, and taking account of the revisions made to the plan change provisions with regard to roading and walking/cycling improvements, I remain able to support the plan change request. While there will undoubtedly be more traffic on the roading network, my assessment shows that there is sufficient capacity to accommodate this, and the crash records do not indicate that road safety issues would arise.

67 Consequently, I consider that there are no transportation reasons why the plan change request could not be recommended for approval.

Dated 22 April 2019

Annexure A

Response to Stantec Peer Review

CARRIAGEWAY
CONSULTING
traffic engineering | transport planning

Table of Contents

Main Report

Photographs

Figures

Tables

Annexures A to J

CCL file reference	14326 cromwell stantec response final.docx
Status	Final
Issued	20 April 2019

1. Introduction

1.1. River Terrace Developments Limited is requesting a private plan change to the operative Central Otago District Plan to rezone land in the western part of Cromwell for residential purposes. If approved, the plan change area ("*the site*") would be able to accommodate around 840 residential properties (comprising of approximately 690 residential lots plus 150 retirement village villa units). As is common with a plan change, the exact number of units will only be determined at the time of subdivision.

1.2. A Transportation Assessment was previously prepared to support the plan change request. This has been reviewed by consultants Stantec on behalf of Central Otago District Council, as a result of which, a number of queries have been raised. This report responds to these matters.

1.3. The Stantec review does not include any paragraph numbering and therefore for ease of reference, their comments are reproduced in full prior to a response.

2. Existing Transport Environment

2.1. Stantec Comment: Scope of Assessment

2.1.1. The discussion of the existing transport environment is particularly focused on the northern end of Sandflat Road and SH6 intersections. For such a larger scale development, where increases in movement could be expected along other surrounding roads, consideration of some of the other road links in the network should have been considered for context, including Pearson Road (a collector road), Bannockburn Road (an arterial road) and intersections. This should cover function, formation, traffic volumes, and road safety. It appears the author has predetermined that all traffic (and non-car road users) will travel to and from the site via SH6.

2.2. Response

2.2.1. The Transportation Assessment considered the use of district roads (paragraphs 6.2.4 and 6.2.5) and determined that vehicle movements would be likely to be via SH6 on the basis that the highway provided the shortest route to key destinations. This was supported by timed runs which had the same outcome, of travel via SH6 being the faster option in each case. There is/was also likely to be an effect on trip distribution associated with drivers choosing to avoid the unsealed section of Sandflat Road south of the plan change area.

2.2.2. Since the plan change request was lodged, it has been confirmed that as part of the plan change provisions, the whole of Sandflat Road will be sealed. This will reduce the journey times for drivers using the southern part of the road and remove any effects associated with drivers seeking to avoid the unsealed road, and therefore means that the routes towards the south (Pearson Road and Bannockburn Road) will become more attractive.

2.2.3. Overall, we consider that the roads which may be affected by the redistribution of the plan change traffic are Pearson Road and Bannockburn Road.

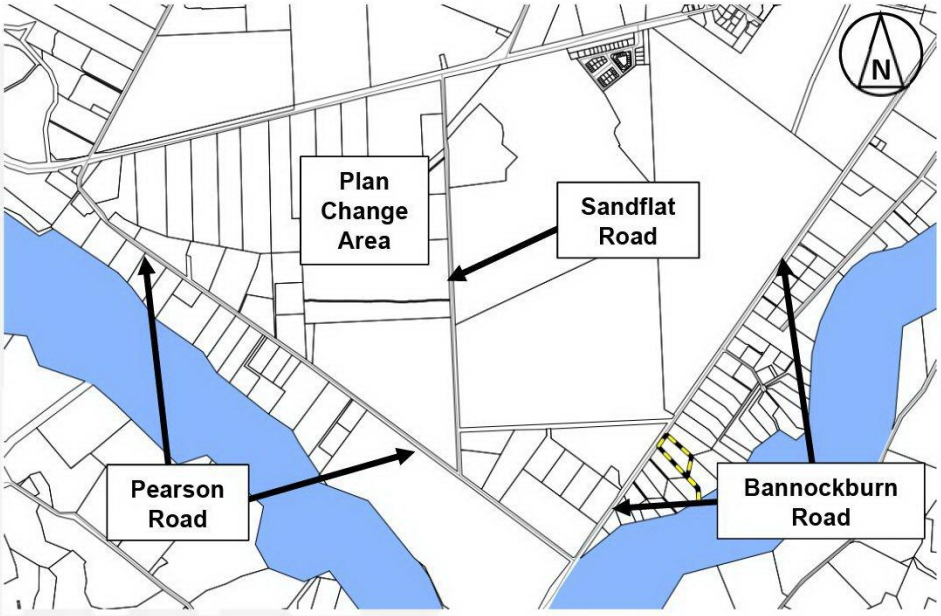


Figure 1: Routes Affected by Sealing of Sandflat Road

2.2.4. Even allowing for the route via Sandflat Road (south) to be faster than at present, it will remain the longer route in most cases and therefore will not be the route taken by the majority of traffic. We address this in more detail later, when considering traffic distribution.

Geometry of Additional Roads Assessed

2.2.5. The Sandflat Road / Pearson Road intersection is give-way controlled, and has excellent sight distances in each direction for turning traffic. There are no auxiliary turning lanes provided, and Sandflat Road presently has one approach lane only.

Photograph 1: Sandflat Road / Pearson Road Intersection

2.2.6. Towards the west of this, Pearson Road is sealed and has a carriageway width of 6.5m with a centreline but no edgeline markings. The speed limit is 100km/h. The road alignment is flat and straight, but further west (and close to the intersection with State Highway 6), the road curves northwards and there is a 45km/h advisory speed limit.

Photograph 2: Pearson Road Looking West

Photograph 3: Curve in Pearson Road

2.2.7. Pearson Road meets State Highway 6 at a priority ('give-way') controlled crossroads, where Ripponvale Road forms the fourth approach (from the north). Due to the angle at which the minor approaches cross the highway, there are large painted islands on the carriageway with auxiliary traffic lanes for vehicles turning right and left off the highway.

2.2.8. There appears to be a slight shortfall in sight distance towards the west with 230m provided compared to NZTA's requirement for 282m due to a horizontal curve in the highway, but there are no such issues towards the east where the highway is flat and straight.

Photograph 4: State Highway 6 / Pearson Road Intersection Looking West

2.2.9. Towards the east of the Sandflat Road / Pearson Road intersection, Pearson Road continues with a 6.5m carriageway and meets Bannockburn Road at a priority 'give-way' intersection some 650m southeast of Sandflat Road. Sightlines in each direction at the intersection are excellent due to the flat and straight alignment of Bannockburn Road. There is an auxiliary lane for vehicles turning right off Bannockburn Road and onto Pearson Road.

Photograph 5: Bannockburn Road / Pearson Road Intersection Looking East

2.2.10. Bannockburn Road has a straight and gently undulating alignment, and is subject to a 100km/h speed limit. The carriageway is 6.5m wide with a centreline and edgelines over much of its length.

Photograph 6: Bannockburn Road Looking North

2.2.11. Over much of its length, Bannockburn Road is fronted by rural activities but around 2.9km northeast of Pearson Road the road becomes more urbanised. There is a 'gateway' feature just north of Richards Beach Road and the speed limit then reduces to 50km/h. Beyond this,

the road is known as Barry Avenue and has kerb and channel, and the carriageway increases to a 14m width with parking permitted on both sides.

Photograph 7: Barry Avenue Road Looking North

2.2.12. Barry Avenue continues further north, passing the town centre and connects to State Highway 8B at a priority intersection.

Road Safety

2.2.13. We have used the NZTA Crash Analysis System to identify reported crashes on Pearson Road, Bannockburn Road and the southern part of Sandflat Road.

2.2.14. For Pearson Street and the southern part of Sandflat Road, a ten-year period was selected (2009 to 2018 and the partial year of 2019) due to the low traffic flows. This showed that no crashes had been recorded on the southern part of Sandflat Road, or the bulk of Pearson Street, but with four crashes recorded on the westernmost section.

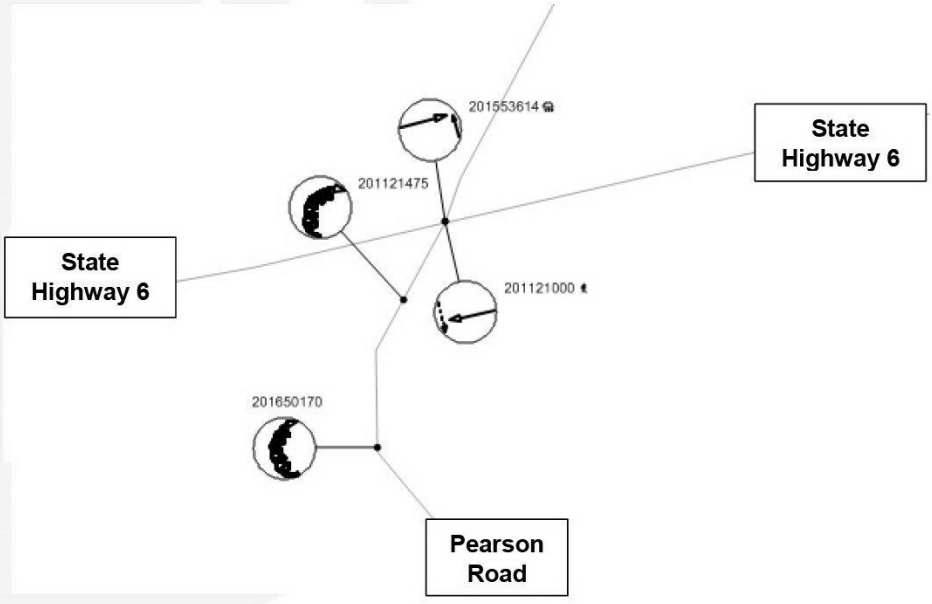


Figure 2: Crashes at Western End of Pearson Road

2.2.15. From south to north:

- A northbound driver lost control on the sharp curve due to high speeds. This crash did not result in any injuries;
- A northbound motorcyclist lost control on the sharp curve. This crash resulted in minor injuries;
- Tw pedestrians were crossing the highway in the vicinity of Pearson Road, and ran in front of southbound traffic. This crash resulted in minor injuries or one pedestrian and serious injuries to the other pedestrian;
- A car emerging from Pearson Road and failed to give-way to a vehicle that was on the highway and travelling to Cromwell. This crash did not result in any injuries.

2.2.16. The locations and/or contributing factors are different in each crash, although excessive speed around the sharp corner is a factor in two crashes. We note that this curve is signed with an advisory speed limit and a single chevron board, and there may be merit in the Council replacing this with a chevron board that is more conspicuous.

2.2.17. On Bannockburn Road, between (and including) the intersections with Pearson Road and Richards Beach Road, over the past five years there have been three crashes recorded.

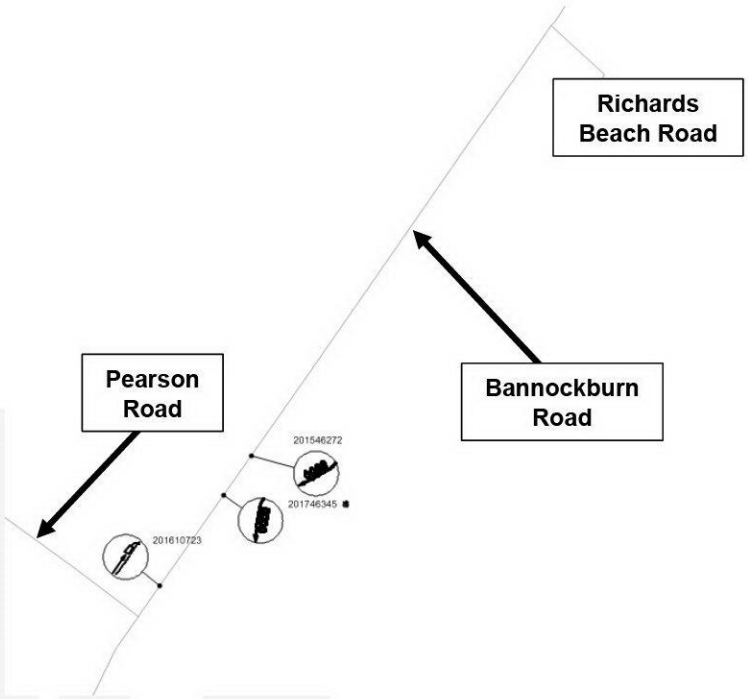


Figure 3: Crashes on Bannockburn Road

2.2.18. From south to north:

- A motorcyclist was following a car northbound when the car slowed and indicated right. The motorcyclist failed to notice and ran into the rear of the car, resulting in serious injuries;
- A southbound driver lost control on black ice and left the road. This crash did not result in any injuries;
- A child in the front passenger seat grabbed the vehicle steering wheel, causing the car to leave the road. This crash did not result in any injuries.

2.2.19. The locations and/or contributing factors are different in each crash, including road user error (for different reasons).

2.2.20. Overall, we do not consider that the crash records indicate any latent safety concerns in the roading network.

2.3. Stantec Comment: Traffic Information

2.3.1. The traffic information from NZTA CAS system is considered unreliable. For such a large-scale development more robust traffic counts would be warranted, as they would impact the potential transport assessment and requirements for road network upgrades. Other sources of traffic information, such as Mobileroad.org which links to updated versions of the Council asset management database, suggest that the "counts" are only estimates, and updated estimates are of a higher volume than referenced in CAS.

2.4. Response

2.4.1. In order to provide the most up-to-date information possible, new automatic traffic counts were commissioned at Sandflat Road (just south of SH6), McNulty Road (just east of SH6) and Bannockburn Road (just south of Richards Beach Road).

2.4.2. The automatic traffic counts showed:

- Sandflat Road: 583 vehicles per weekday, 34 vehicles in the morning peak hour, 52 vehicles in the evening peak hour;
- McNulty Road: 5,107 vehicles per weekday, 520 vehicles in the morning peak hour, 430 vehicles in the evening peak hour; and
- Bannockburn Road: 2,908 vehicles per weekday, 240 vehicles in the morning peak hour, 264 vehicles in the evening peak hour.

2.4.3. No specific survey has been carried out on Pearson Road. However the MobileRoad website shows that traffic volumes on Pearson Road are around 25% of those on Bannockburn Road, which in turn indicates peak hour flows of around 65 vehicles (two-way) and daily flows of 500 vehicles (two-way).

2.4.4. These volumes have been taken forwards into the calculations set out subsequently within this assessment.

2.4.5. We have also taken the opportunity to update the through-traffic on the state highway, since additional information is available. In the Transportation Assessment, the weekday traffic flows were reported as:

- Morning peak hour, 7am to 8am: 254 vehicles southbound, 77 vehicles northbound; and
- Evening peak hour, 5pm to 6pm: 171 vehicles southbound, 290 vehicles northbound

2.4.6. Taking into account the most recent information recorded by NZTA, these have been revised to:

- Morning peak hour, 7am to 8am: 284 vehicles southbound, 90 vehicles northbound; and
- Evening peak hour, 5pm to 6pm: 179 vehicles southbound, 325 vehicles northbound

2.4.7. The intersections assessed within the earlier Transportation Assessment were:

- State Highway 6 / Sandflat Road; and
- State Highway 6 / State Highway 8B.

2.4.8. We have also now carried out a turning count survey at the State Highway 6 / McNulty Road intersection. This showed McNulty Road carried 490 vehicles in the morning peak hour and 498 vehicles in the evening peak hour (compared to 520 vehicles and 430 vehicles from the automatic traffic count). We have therefore factored up the morning peak hour turning count by 6% and factored down the evening peak hour turning count by 16% in order to reflect the data observed over the course of the week.

2.4.9. The baseline traffic volumes are shown on Annexures A and B.

2.4.10. We have then synthesized turning volumes at the locations with lower traffic volumes, based on the relative proportions of the daily traffic flows on each approach. These are shown on Annexures C and D.

2.5. Stantec Comment: Non-Car Modes of Travel

2.5.1. For a large development, identification of available links to the site for non-car modes of travel would be appropriate. For example, Bannockburn Road includes some informal off-road facility for walking and cycling. No data is provided on actual numbers of users on the surrounding road network.

2.6. Response

2.6.1. We attach below a plan showing the extent of existing and proposed provision.

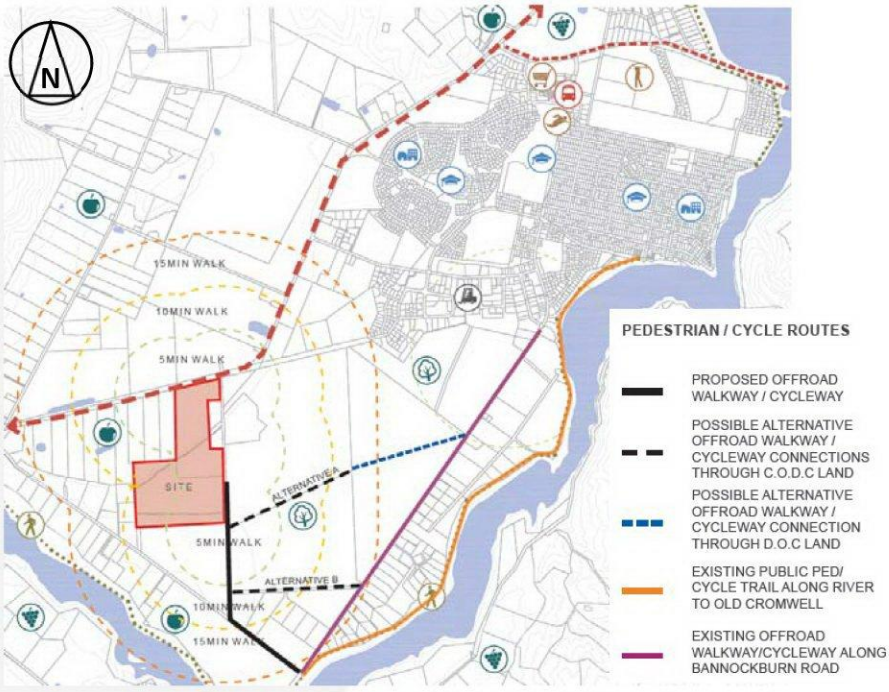


Figure 4: Existing and Future Walking and Cycling Infrastructure

2.6.2. The plan change provisions now include for an off-road route running along Sandflat Road and Pearson Road to connect to the existing route on the southern side of Bannockburn Road.

This will be 3m wide, complying with Table 7.4 of the Austroads Guide to Road Design Part 6A ('Pedestrian and Cyclist Paths')

2.6.3. No data has been collected in respect of walking and cycling in the area. Given that the area is predominantly rural at present, we expect that pedestrian and cyclist numbers will be relatively low and predominately associated with recreational travel. As such, they will not occur during the peak hours on the adjacent road network. However future volumes in the area will be dominated by the residents of the plan change area, if the request is approved. It is therefore appropriate to allow for a low existing baseline of usage.

3. Future Transport Environment

3.1. Stantec Comment

3.1.1. The author has not referenced the strategies or guides referenced (at section 3.2). Consideration should be given to the CODC Infrastructure Strategy, and NZTA plans for the highway network. It is understood a masterplan is being developed for Cromwell, and some consideration of how the development fits within the initial considerations would be useful for context.

3.1.2. There is no discussion of other future large scale residential and commercial development in the surrounding area, which could substantially influence traffic volumes on the road network, and the need for integration of transport facilities.

3.2. Response

3.2.1. We have reviewed the CODC Infrastructure Strategy and note that there are four mentions of roading infrastructure upgrades in Cromwell:

- Intersection, pedestrian and cycling improvements are proposed in Cromwell town centre in 2021;
- Construct a pathway on the side of the Bannockburn Bridge to accommodate the NZ Cycle Trail from Queenstown to Cromwell (2021/22);
- Intersection upgrades within Cromwell town centre (2019/21); and
- Seal extension of Sandflat Road (2021/22).

3.2.2. It is not considered that these will affect the transportation analyses carried out to date. It is also noted that the sealing of Sandflat Road is now proposed as part of the plan change provisions.

3.2.3. We are not aware of any plans which NZTA has for the state highway network in this location. We also note that NZTA has made a submission to the plan change request which is neutral, and which has not set out that there are any strategies which could affect, or be affected by, the plan change request.

3.2.4. The Cromwell Masterplan remains a work in progress and a recent (26 March 2019) press release from the Council identifies that the masterplan is not adopted nor costed. It does not appear that there is a copy within the public domain, but rather, only options for which the community's support is not known. As such, we do not consider at this stage that the masterplan is sufficiently certain that reference can be made to it or that it can reliably inform the plan change.

3.2.5. With regard to other developments in the surrounding area, and their associated traffic generation, in common with other Transportation Assessments, the approach taken was to apply traffic growth to the prevailing volumes in order to account for new developments on the roading network. As such, the prevailing traffic flows were increased in line with the prevailing annual rate, and an allowance of ten years of growth was used (paragraphs 4.1.13 and 7.1.1 of the Transportation Assessment) resulting in the traffic volumes being increased by 46%.

3.2.6. If the traffic generated by individual developments was to be specifically used in order to derive a local growth rate, this would not only mean that proposals in the immediate vicinity of Cromwell would have to be included, but also developments further afield which could

potentially influence traffic flows on the highway (especially as there would be many of these, each of which having a small effect in isolation but potentially a large cumulative effect).

3.2.7. It is considered that the approach of applying ten years of background traffic growth is appropriate to recognise that there will be growth in the existing traffic volumes in the area.

3.2.8. Annexures E and F show the traffic flows with an additional 46% of traffic growth added to the baseline volumes (but for clarity does not include for any traffic associated with the plan change request).

4. Proposed Development

4.1. Stantec Comment

4.1.1. The discussion of the masterplan indicates approximately 690 residential units and 140 retirement units. Whilst the structure plan includes a Neighbourhood Centre and Education Overlay, there is no discussion of those activities in the assessment, which should be addressed.

4.1.2. This is a large-scale development and warrants an Integrated Transport Assessment. The Transport Assessment does not cover matters expected of an Integrated Transport Assessment of a new development of this type including:

- Consistency with the policy framework for transport, set by higher order planning documents. That may include policy around integrating development with non-car modes of transport to ensure it is accessible, safe, protects SH6 as strategic infrastructure, consistency with surrounding rural amenity expectations (from a transport perspective) and addresses overall efficiency of travel and use of non-car modes.
- Consideration of the implications for other parts of the road network, and how that may influence improvements that might need to be planned due to cumulative effects from this and other development.
- How the surrounding area may be developed in response to the Plan Change, and whether the connections shown are adequate to support future integrated development.

4.1.3. It is considered reference should be made to the content included in the NZTA Integrated Transport Assessment Guidelines, to ensure a robust and full assessment.

4.2. Response

4.2.1. Our understanding is that the Neighbourhood Centre is intended to be of a size and scale that will serve the immediate area. As such, if there are any trips from locations external to the plan change area, these will form only a small proportion of the total number. We consider that many of these will be made from Sandflat Road (south) where the analysis shows ample available capacity, and from Highlands Motorsports Park where the trips will be east-west across Sandflat Road and again, where the intersections have ample spare capacity. Overall, we do not consider that the analyses of the intersections will be adversely affected by any small increase in volumes arising from people external to the plan change area using the Neighbourhood Centre.

4.2.2. In respect of the Education Overlay, we understand that the initial intention of the plan change was to make provision for a new school in view of the increased resident population in the area. As such, it was also expected that the school would also draw from the plan change area and therefore there would be few, if any, effects on the external road network.

4.2.3. The Ministry of Education has lodged a submission to the plan change request that sets out that the existing schools within Cromwell have the capacity to accommodate further growth associated with the development of the plan change area, and that Cromwell College also has sufficient available capacity. As such, the Ministry confirms through the submission that it does not intend to establish a school within this area.

4.2.4. In view of this, we expect that any education facilities establishing in this area will be limited to preschools. These typically draw from the immediate area and therefore we do not expect that there will be any external transportation effects that arise from this activity.

4.2.5. In the event that there remains a concern that a school could establish, and that it would draw from a wider catchment, we note that the Ministry has advised that the most effective way of establishing a school is via a designation. When a designation is sought, an assessment is required of the effects on infrastructure and this includes the transportation networks. In other words, a designation could not be put in place without an evaluation of the effects of this in Sandflat Road, SH6 and other roads in the area.

4.2.6. If there remain residual concerns then from a transportation perspective we consider that the plan change provisions could be amended such that establishment of a school is a restricted discretionary activity, with discretion being limited to the effects of the activity on the transportation networks.

4.2.7. Stantec has sought additional information in respect of consistency with the policy framework for transport set by higher order planning documents. We understand that this is addressed by others.

4.2.8. Stantec also seeks information as to how the surrounding area may be developed in response to the plan change, and whether the connections shown are adequate to support future integrated development. To our knowledge, the surrounding land cannot be developed as of right, and it is therefore highly premature to undertake assessments of what other (presently unknown) consents might be lodged in future and how the plan change could take these into account.

4.2.9. That said, Sandflat Road bounds the site towards the east with the highway towards the north, and therefore any potential development in the immediate area would need to be to the south and the west of the plan change area. To ensure that connectivity is promoted, the Movement Plan shows two connections towards the south of the plan change area as well as three greenway connections. We consider that these facilitate an integrated transportation solution to land development in future.

4.2.10. We note that connectivity towards the west is presently not precluded by the Movement Plan since it would be possible to extend the east-west road types A and B as far as the western boundary, if desired.

5. Traffic Generation

5.1. Stantec Comment

5.1.1. The assessment of traffic generation references 8vpd, and 1vph per household for residential dwellings. This would be typical of a suburban type of development. In the peak hours the assessment of those exiting the site in the morning peak is 90%. In our experience the typically adopted percentage exiting in the morning peak is 75%. Assessment of effects in the morning peak should consider this percentage, at least as a sensitivity test.

5.1.2. For a retirement village, industry data suggests a higher level of daily movements are made, being approximately 2.6vpd/unit.

5.2. Response

5.2.1. The ratio of 90% of traffic exiting the site in the morning peak hour with 10% exiting was selected to be consistent with the Top Ten Holiday Park development in Cromwell, which Stantec reviewed and accepted. In respect of the recent Wooing Tree Plan Change, the proportions were 80% exiting and 20% entering for the residential component of the proposal.

5.2.2. However, as requested, we have used the proportion of 75% / 25% within our updated analyses set out below.

5.2.3. The Transportation Assessment used a rate of 2.0 vehicle movements per day for retirement units, whereas Stantec suggests a rate of 2.6 vehicle movements per day. The difference would result in an additional 84 vehicle movements on the roading network. Stantec does not disagree with the peak hour generation, which means that these additional trips would take place in the off-peak periods, and consequently the difference equates to around 8 vehicle movements per off-peak hour.

5.2.4. Since the transportation networks have much lower traffic flows in the off-peak hours, this level of additional traffic is easily able to be accommodated, equating to an average of 1 extra vehicle entering the development every 15 minutes and 1 extra vehicle exiting every 15 minutes.

6. Travel Distribution

6.1. Stantec Comment

6.1.1. The assessment provides expectations of travel distribution, without supporting information. The assessed distribution appears to be:

- 25% to/from Cromwell,
- 60% to/from Queenstown,
- 7.5% to/from Alexandra,
- 7.5% to/from Wanaka.

6.1.2. The distribution appears to assume the site will act as a commuter suburb for Queenstown. In order to provide some initial consideration of the validity of this distribution, we have considered information available from the latest available Census information, and the NZTA Household Travel Summary.

Reason for Vehicle Trip

6.1.3. The NZTA Household Travel Survey summary for 2015-2018 indicates the main purpose for trips (across all of New Zealand).

Table 1: NZTA Household Travel Survey Trip Purpose

Purpose of travel	Share of trip legs
01. Went home	29%
02. Went to work	11%
03. Shopping/personal appointments/services/volunteer	28%
04. Social visit/entertainment	13%
05. Made a trip for work	10%
06. Completed study/education	1%
07. Accompany someone/dropped someone off/picked someone up	6%
08. Sport and exercise	2%
09. Other (incl unknown)	0%
Total	100%

6.1.4. Commuting work trips make up a relatively small proportion of trips during the day (up to approximately 22% of all vehicle driver trips). When considering the other types of trips made, it is clear that a new suburb in Cromwell will generate a lot of movements that are likely to have a local focus, such as shopping, personal appointments, social visits and entertainment. Many of these can occur in the peak hours.

6.1.5. This suggests the Transport Assessment may be too heavily skewed to consideration of commuter travel. In addition, across the course of the day, the other trips (assuming each household generally has only one vehicle travelling to/from Queenstown) of up to 6vpd/household would most likely be local trips, indicating a different traffic distribution across the day than the peak period.

Journey to Work

6.1.6. Even though journey to work trips only make up part of the trip making to and from a new development, journey to work data relevant to Cromwell is available from Statistics NZ Census data. The most recent census data available is from 2013, and shows the following journey to work pattern, for those that drove a private vehicle:

Table 2: Statistics NZ 2013 Census Travel to Work by Vehicle from Cromwell

Work Destination of those Employed in Cromwell	Percentage (of those that Drove to Work from Cromwell)	Direction from Site / Road Network Used	Potential Routes
Cromwell Township	64%	East	Via SH6, Some lesser use via Sandflat Road & Bannockburn Road (eg 10-20%)
Dunstan Area Unit	18%	East – South - North	Via SH6, Some lesser use via Sandflat Road & Bannockburn Road (eg 10%)
Alexandra / Clyde	6%	East	Via SH6
Wakatipu / Queenstown	9%	West	Via SH6, Some lesser use via Sandflat Road and Pearson Road
Wanaka	3%	North	Via SH6

6.1.7. The data suggests approximately 9% to and from the west (ie Queenstown), with a majority to the east. Only 3% are to Wanaka.

6.1.8. This suggests the Transport Assessment has assessed a very significant change in commuting patterns from Cromwell, and does not recognize the high level of local trips made by a household each day. In our opinion, their assumption is unsubstantiated and a much higher proportion to and from Cromwell (and the northeast generally) could be expected. That would require reworking of the assessment undertaken.

Route Choice

6.1.9. As many of the movements made to and from the development will not be related to commuting, and there are likely to be a higher number than assessed to and from Cromwell, it is considered a more comprehensive assessment of the sensitivity to the use of local roads is necessary. That should include matters such as safety, and potential change in function of different roads.

6.1.10. For example, if the volume travelling to and from Cromwell is closer to say 70%, that represents over 4,000vpd to/from Cromwell, of which at least some will travel via the local road network. As indicated by the existing traffic volumes which are low on adjacent rural roads, even a small portion of the 4,000vpd could result in the need for modifications to the road design and provision for other transport modes. By not upgrading the connection via Sandflat Road and Pearson Road through to Bannockburn Road, there is very little resilience in the transport network.

Mode of Travel

6.1.11. The Census data from 2013 also shows the mode of travel to work for those from Cromwell.

Table 3; Census Travel To Work 2013 – Mode of Transport

Mode of Travel	Proportion that Worked
Worked at home	6%
Drove a private car, truck, or van	52%
Drove a company car, truck, or van	21%
Passenger in a car, truck, van, or company bus	7%
Motorbike or powercycle	0%
Bicycle	6%
Walked or jogged	7%
Other	1%

6.1.12. This indicates over 13% of commuting trips are by bicycle and walking and there are opportunities for people to use modes of travel other than a motor vehicle to travel to work. Further trips are likely to be made by a household such as for school, recreation, and social visits. The assessment assumes there will be practically no trips by these modes, which indicates the site is not accessible for other modes of travel. As discussed, there is a gap in consideration of the assessment against higher level policy direction which typically promote development that supports use of non-car modes. It is recommended that further information is sought on walking and cycling in the area, and potentially from comparable developments.

6.2. Response

Traffic Distribution

6.2.1. The Transportation Assessment noted that "*ultimately the extent of movements that are made externally to Cromwell will depend on the amount of employment and community services provided locally, and this cannot be confirmed at present as it is likely to change as the extent of development in the town and the number of residents increases*". That said, the distribution of 60% of traffic being associated with the west and the direction of Queenstown is consistent with what is expected by the plan change proponents. We therefore consider that the initial distribution used within the Transportation Assessment remains appropriate.

6.2.2. Taking the matters raised in order set out by Stantec, the household travel survey (which relates to the travel across the whole day), shows a range of purposes for travel. However in the peak periods, which is when the road network is under the most pressure, Stantec has not queried the traffic generation rates used in the Transportation Assessment. We have therefore not addressed the matter of peak hour traffic generation further.

6.2.3. It appears from the comments made that the issue of concern to Stantec is that of the distribution of trips where it is stated that "many" of the trips for shopping, personal appointments, social visits and entertainment can take place at the peak times. While it is not stated by Stantec, it is implied that these trips could take place to/from Cromwell, which suggests a greater weighting in this direction. While we do not dispute that *some* trips could be made at peak times, in our view travel for work dominates travel in the peak hours. We note that Stantec does not suggest an overall trip distribution for the peak hours that includes non-work journeys.

6.2.4. Stantec suggests that the off-peak trip distribution will be different to that during the peak hour and we agree. This is common to developments of all types, not only residential or this particular location. However at non-peak times, traffic flows on the roading network are lower than in the peak times, and as a result of this, the transportation network is better able to accommodate additional traffic volumes.

6.2.5. Further, at these times, a typical household generates fewer trips. That is, allowing for a residence to generate 1 vehicle movement in each of the peak hours, then it will generate on average around 0.6 vehicle movements in the off-peak periods[1].

6.2.6. Consequently we remain of the view that if the traffic generation can be accommodated on the roading network in the peak hours, then it can be accommodated in the off-peak periods. We therefore do not consider that a specific assessment is required of the roading network in the non-peak periods.

6.2.7. In respect of the journey to work, Stantec highlights the current directions of travel. However it should also be noted that the distribution in the Transportation Assessment is not just based on existing patterns but also patterns which may emerge in future. In this regard, the CODC Infrastructure Strategy sets out that "*Central Otago's growth is influenced largely by increasing demand in the Queenstown area, and the relative affordability of property in Central Otago relative to Queenstown. In addition to the growth from Queenstown, there is a strong local economy with many people moving to the district for work and business opportunities. The influence of demand from the Queenstown Lakes area is reflected in terms of the geographic spread of population growth in Central Otago. The fastest rate of growth has been experienced in the Cromwell ward…*" (page 12). It is therefore not unreasonable in our view to anticipate a strong movement to/from Queenstown, rather than the low proportion suggested by Stantec. This is also what the plan change proponents expect.

6.2.8. The Wooing Tree plan change (Plan Change 12) set out a distribution for residential development which was accepted by the Council. We have shown this below, together with the distribution from the Transportation Assessment and the journey to work distribution set out by Stantec:

Destination	Transportation Assessment	Stantec Report	Wooing Tree Plan Change
Cromwell	25%	64%	75%
Dunstan Area Unit	-	18% (split north, south, and east)	-
Queenstown	60%	9%	10%
Wanaka	7.5%	3%	5%
East (Alexandra / Omarama)	7.5%	6%	10%

Table 1: Trip Distributions

6.2.9. Given that Stantec has highlighted that not all travel in the peak times relates to commuter travel and that there therefore may be more travel to/from Cromwell, we have adopted the

[1] 8 vehicle movements per day of which 2 occur at peak times leaves 6 vehicle movements per day. These are most likely to occur between the hour preceding the morning peak hour and the hour after the evening peak hour.

distribution accepted by Council for Wooing Tree in order to assess the robustness of our earlier conclusions.

6.2.10. In view of the now-proposed sealing of Sandflat Road we consider that drivers are likely to make greater use of the roading network to the south of the plan change area. We have therefore re-evaluated the assignment of the vehicle movements.

6.2.11. Towards the west, the two options are via Pearson Road and via SH6.

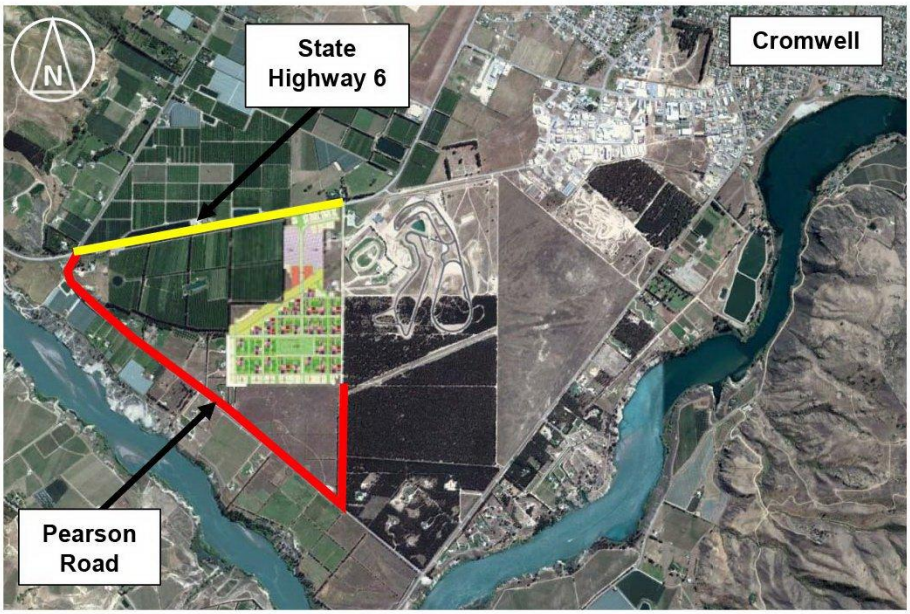


Figure 5: Roading Network Towards West (Plan Change Area Superimposed)

6.2.12. The timed runs showed:

- Southern edge of plan change area to SH6 / Pearson Road intersection, via Pearson Road: 2:29 minutes;
- Southern edge of plan change area to SH6 / Pearson Road intersection, via SH6: 2:26 minutes;
- Northern edge of plan change area to SH6 / Pearson Road intersection, via Pearson Road: 3:32 minutes; and
- Northern edge of plan change area to SH6 / Pearson Road intersection, via SH6: 1:23 minutes.

6.2.13. Allowing for the sealing of Sandflat Road and therefore a faster travel time, we consider that the properties served by the southernmost of the east-west routes within the plan change area will use Pearson Road with the remainder using SH6. This equates to around 15% of the plan change area.

6.2.14. Towards the east, for travel towards Cromwell, the two options are via Pearson Road / Bannockburn Road and via SH6 / McNulty Road.

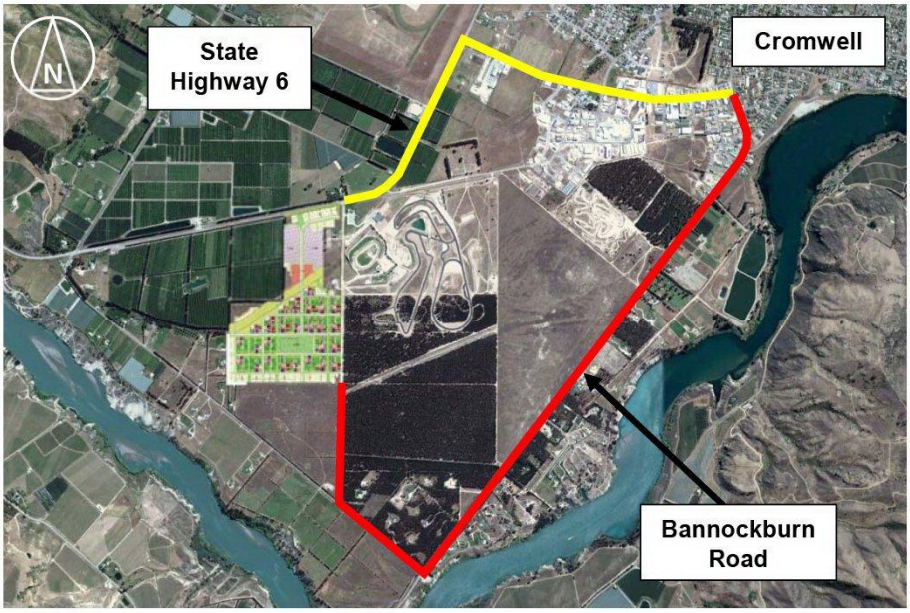


Figure 6: Roading Network Towards East (Plan Change Area Superimposed)

6.2.15. The timed runs showed:

- Southern edge of plan change area to Bannockburn Road / McNulty Road intersection, via Bannockburn Road: 4:02 minutes;
- Southern edge of plan change area to Bannockburn Road / McNulty Road intersection, via McNulty Road: 4:26 minutes;
- Northern edge of plan change area to Bannockburn Road / McNulty Road intersection, via Bannockburn Road: 5:05 minutes; and
- Northern edge of plan change area to Bannockburn Road / McNulty Road intersection, via McNulty Road: 3:18 minutes.

6.2.16. In respect of the first bullet point, there was a coding error within the earlier analysis meaning that the route via Bannockburn Road was faster than previously allowed for. Allowing for the sealing of Sandflat Road this will become faster again.

6.2.17. We estimate that the point at which the two travel times become equal is around 350m from the southern site boundary, and therefore the properties served by the southern three east-west routes will use Bannockburn Road with the remainder using SH6. This equates to around 50% of the plan change area.

6.2.18. Further timed runs showed:

- Southern edge of plan change area to town centre via Bannockburn Road: 6:33 minutes;
- Southern edge of plan change area to town centre via SH6 / SH8B: 4:38 minutes;
- Northern edge of plan change area to town centre via Bannockburn Road: 7:36 minutes; and
- Northern edge of plan change area to town centre via SH6 / SH8B: 3:14 minutes.

6.2.19. This indicates that trips into the town centre will be fastest via the highway (due to the higher speed limit on much of the road).

6.2.20. Given that trips to employment will be split between Bannockburn Road and the highway, we have allowed for 40% of the Cromwell-bound traffic to use Bannockburn Road. This provides a higher bias towards the southern roads and hence meets Stantec's concerns.

6.2.21. Taking account of the destinations previously set out, this leads to the following assignment.

Destination	Proportion of Traffic	Assignment
Cromwell	75%	Bannockburn Road: 30% McNulty Road:35% SH6 (east): 10%
Queenstown	10%	Pearson Road: 1% SH6 (west): 9%
Wanaka	5%	SH6 (east): 5%
East (Alexandra / Omarama)	10%	SH6 (east): 10%
Total	100%	100%

Table 2: Trip Assignment

6.2.22. Allowing for the peak hour traffic generation proposed previously (a total of 750 vehicle movements, two-way) and the 75% / 25% split between outbound and inbound traffic requested by Stantec, this leads to the following traffic generation:

Destination	Assignment	Morning Peak Hour		Evening Peak Hour	
		Out of Site	Into Site	Out of Site	Into Site
Cromwell	Bannockburn Road: 30%	169	56	79	146
	McNulty Road: 35%	197	66	92	171
	SH6 (east): 10%	56	19	26	49
Queenstown	Pearson Road: 1%	6	2	3	5
	SH6 (west): 9%	51	17	24	44
Wanaka	SH6 (east): 5%	28	9	13	24
East (Alexandra / Omarama)	SH6 (east): 10%	56	19	26	49
	Total	562	188	262	488

Table 3: Vehicle Movements Assigned in the Peak Periods

6.2.23. The traffic generated by the development of the plan change area is shown in Annexures G and H. The expected volumes in 2029, allowing for background traffic growth plus full development of the plan change area, are shown in Annexures I and J.

Intersection Analysis

6.2.24. It can be seen that the extent of increase in traffic on Pearson Road (west) and at the State Highway 6 / Pearson Road intersection is small. Even if the trip distribution was to be amended such that 60% of all traffic was to travel to/from Queenstown, the increase in traffic on Pearson Road would be only be 45 vehicles in the peak hours, equivalent to less than one additional vehicle per minute. Furthermore, this intersection has high capacity with turning lanes on each approach and therefore ample ability to absorb additional traffic. Accordingly, we have not addressed this intersection in any further detail as it our view it is largely unaffected by the proposed plan change.

6.2.25. We have used the computer software package Sidra Intersection to model the performance of the intersections at 2029 with and without the traffic generated by the plan change and the results are set out below.

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
Sandflat Road	L	10.1	0	B	9.1	0	A
	R	13.7	0	B	17.7	0	C
State Highway 6 (east)	L	7.9	0	A	7.9	0	A
State Highway 6 (west)	R	10.0	0	A	8.9	0	A

Table 4: Performance of State Highway 6 / Sandflat Road Intersection in 2029 (No Plan Change)

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
Sandflat Road	L	10.3	0	B	9.1	0	A
	R	46.2	14	E	49.3	6	E
State Highway 6 (east)	L	7.9	0	A	7.9	0	A
State Highway 6 (west)	R	10.9	0	B	11.0	0	B

Table 5: Performance of State Highway 6 / Sandflat Road Intersection in 2029 (WITH Plan Change)

6.2.26. It can be seen that the right-turn movement out of Sandflat Road has Level of Service E, which is less than might be expected. We have carried out a sensitivity test and find that Level of Service D is achieved when the right-turn movement reduces from 337 vehicles in the morning peak hour to 312 vehicles, and from 157 vehicles in the evening peak hour to 116 vehicles. The differences equate to very small changes in the trip assignments, and would be achieved for example if an allowance is made for 20% of trips to be made to Queenstown rather than 10%. The figure of 20% is considerably lower than the expectations of the plan change proponents, and therefore we consider that the levels of service will be better than shown above.

6.2.27. In practice, ***if*** there is a bias towards the direction of Cromwell rather than Queenstown, we expect that drivers will turning east will simply find a route that is appropriate for them, and if they are not willing to wait in the peak hours, then this will make the Bannockburn Road route more popular. In the event that more vehicles turn towards Queenstown, then levels of service will improve commensurately.

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
State Highway 6 (south)	R	8.9	0	A	8.7	1	A
McNulty Road	L	8.8	1	A	8.0	0	A
	R	16.4	2	C	22.2	2	C
State Highway 6 (north)	L	9.1	1	A	10.3	1	B

Table 6: Performance of State Highway 6 / McNulty Road Intersection in 2029 (No Plan Change)

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
State Highway 6 (south)	R	9.4	1	A	9.5	2	A
McNulty Road	L	9.7	2	A	9.4	2	A
	R	51.3	6	F	49.3	4	E
State Highway 6 (north)	L	10.9	1	B	10.1	1	B

Table 7: Performance of State Highway 6 / McNulty Road Intersection in 2029 (WITH Plan Change)

6.2.28. The State Highway 6 / McNulty Road intersection is anticipated to experience high levels of delays for the right-turn movement out in both peak hours.

6.2.29. As set out above, the plan change proponents consider that most vehicle movements will be to/from the west and the direction of Queenstown rather than Cromwell. We have therefore evaluated the trip distribution at which this turning movement changes from Level of Service D to Level of Service E. For this assessment we have allowed for the same extent of traffic travelling to Alexandra / Omarama and Wanaka (10% and 5% respectively) as set out on Tables 1 and 2 above.

6.2.30. Under this scenario, 50% of the total traffic generation of the plan change could continue to travel to Cromwell before Level of Service E arises. This in turn would mean that 35% of the traffic generated by the plan change area would travel to/from Queenstown, much less than presently expected by the plan change proponents. Consequently, we anticipate that in practice, at worst, the right-turn movement out of McNulty Road will be Level of Service D.

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
State Highway 6 (south)	R	7.5	1	A	7.2	1	A
State Highway 8B	L	7.2	1	A	6.9	1	A
	R	13.8	2	B	21.9	5	C
State Highway 6 (north)	L	8.2	1	A	8.5	1	A

Table 8: Performance of State Highway 6 / State Highway 8B Intersection in 2029 (No Plan Change)

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
State Highway 6 (south)	R	7.2	1	A	7.4	1	A
State Highway 8B	L	6.9	1	A	7.1	1	A
	R	21.9	5	C	31.5	7	D
State Highway 6 (north)	L	8.5	1	A	8.9	1	B

Table 9: Performance of State Highway 6 / State Highway 8B Intersection in 2029 (WITH Plan Change)

6.2.31. Although delays at the State Highway 6 / State Highway 8B intersection increase, Level of Service D or better is provided even with a bias in favour of traffic movements to/from Cromwell.

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
Bannockburn Road (south)	L	8.0	0	A	8.0	0	A
Bannockburn Road (north)	R	8.1	0	A	8.2	0	A
Pearson Road	L	8.7	0	A	8.5	0	A
	R	9.8	0	A	10.2	0	B

Table 10: Performance of Bannockburn Road / Pearson Road Intersection in 2029 (No Plan Change)

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
Bannockburn Road (south)	L	8.0	0	A	8.0	0	A
Bannockburn Road (north)	R	8.1	0	A	8.2	1	A
Pearson Road	L	8.5	1	A	8.5	1	A
	R	10.8	1	B	12.0	1	B

Table 11: Performance of Bannockburn Road / Pearson Road Intersection in 2029 (WITH Plan Change)

6.2.32. The modelling shows that the Bannockburn Road / Pearson Road intersection continues to have low delays even with full development of the plan change area and a bias in favour of traffic movements to/from Cromwell.

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
Pearson Road (east)	R	7.8	0	A	7.9	0	A
Sandflat Road	L	8.2	0	A	8.2	0	A
	R	8.1	0	A	8.2	0	A
Pearson Road (west)	L	8.0	0	A	8.0	0	A

Table 12: Performance of Pearson Road / Sandflat Road Intersection in 2029 (No Plan Change)

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
Pearson Road (east)	R	7.8	0	A	7.9	1	A
Sandflat Road	L	8.2	1	A	8.2	0	A
	R	8.5	1	A	9.1	0	A
Pearson Road (west)	L	8.0	0	A	8.0	0	A

Table 13: Performance of Pearson Road / Sandflat Road Intersection in 2029 (WITH Plan Change)

6.2.33. The modelling shows that the Pearson Road / Sandflat Road intersection continues to have low delays even with full development of the plan change area and a bias in favour of traffic movements to/from Cromwell.

Roading Formation

6.2.34. In terms of the formation of the state highways, there are numerous highways around the country that have the same formation as State Highways 6 and 8B and which carry larger amounts of traffic. We also note that the Transportation Assessment loaded all traffic onto the highway, thereby increasing the traffic volume to the maximum extent, but NZTA's submission did not raise capacity or design issues with the highway. We have therefore not considered the highways in any more detail.

6.2.35. Based on the trip distribution set out above, traffic flows on the district roading network would increase as follows:

Road	Traffic Volumes					
	2029 Base		As Per Revised Distribution		Total	
	Per Weekday	Peak Hour	Per Weekday	Peak Hour	Per Weekday	Peak Hour
Sandflat Road (north)	851	50 (AM) 75 (PM)	+4,081	+518	4,932	568 (AM) 593 (PM)
Sandflat Road (south)	851	50 (AM) 75 (PM)	+1,836	+233	2,687	283 (AM) 308 (PM)
Pearson Road (west)	730	95	+63	+8	793	103
Pearson Road (east)	730	95	+1,773	+225	2,503	320
Bannockburn Road	4,246	350 (AM) 385 (PM)	+1,773	+225	6,019	575 (AM) 610 (PM)
McNulty Road	7,456	728 (AM) 630 (PM)	+2,072	+263	9,528	991 (AM) 893 (PM)

Table 14: Change in Traffic Volumes on District Road Network

6.2.36. For the roading network external to the site, we agree with Stantec that a consistent roading layout should be provided and therefore have reviewed the Council's Engineering Standards. These are based on the 2004 version of Standard NZS4404, which is now superseded. We have then evaluated the level of roading required with and without the plan change in place.

Road	2029 Base		With Plan Change Area Fully Developed	
	Daily Traffic Volumes	Road Type	Daily Traffic Volumes	Road Type
Sandflat Road (north)	851	Collector (7m carriageway, 0.25m metalled shoulders)	4,932	Above 2,500 so required specific design (Note 1)
Sandflat Road (south)	851	Collector (7m carriageway, 0.25m metalled shoulders)	2,687	Above 2,500 so required specific design (Note 1)
Pearson Road (west)	730	Collector (7m carriageway, 0.25m metalled shoulders)	793	No change
Pearson Road (east)	730	Collector (7m carriageway, 0.25m metalled shoulders)	2,503	Above 2,500 so required specific design (Note 1)
Bannockburn Road	4,246	Above 2,500 so required specific design (Note 1)	6,019	No change
McNulty Road	7,456	Collector (7m carriageway, 2.5m parking lanes, 1m cycle lanes)	9,528	No change

Table 15: Road Types With/Without Plan Change

6.2.37. It can be seen that there is no change required to Pearson Road (west) due to the slight increase in traffic flow. No change is required on McNulty Road either, and we confirm that the current layout of the road meets this standard.

6.2.38. Traffic flows on Bannockburn Road justify a specific design (in fact, current volumes already justify a specific design as existing volumes exceed 2,500 vehicles per day). Since no further guidance is provided in the Council's Engineering Standards, we have reverted to the 2004 Standard on which the Council's provisions are based. This sets out the following design criteria:

- Road carrying 1,000 to 2,500 vehicles per day: 3.5m traffic lanes, 1.0m shoulder (0.5m sealed); and
- Road carrying more than 2,500 vehicles per day: 3.5m traffic lanes, 1.5m shoulder (1.0m sealed).

6.2.39. If this design criteria is adopted, then the plan change does not give rise to the need for any improvements to Bannockburn Road over and above what is already justified.

6.2.40. It is already proposed to seal Sandflat Road and as part of this we expect that the road will be brought to current standards. We suggest that this is aligned with the overarching (but superseded) Standard, of a 7m carriageway plus 1m sealed shoulder and 0.5m metalled shoulder.

6.2.41. The same level of provision would be appropriate for Pearson Road (east). When compared to the level of provision required without the plan change, the difference is simply that sealed shoulders are to be provided. The legal width of Pearson Road is 20, meaning there are no impediments to achieving the upgrade.

7. Road Safety

7.1. Stantec Comment

7.1.1. As advised, the changes in traffic distribution would warrant reconsideration of the assessment of road safety. In our opinion, the road safety assessment for such a large development fronting rural high-speed roads should consider the ability of surrounding roads to accommodate the level of extra traffic, not just the design parameters of intersections.

7.1.2. Whilst any development in Cromwell has the potential to add to longer distance highway movements, the site access provisions place a higher reliance on the use of SH6 over a short distance for local movements, which are not part of the desired function of the highway if a supporting local road network can reduce the use of the road. The large increase in travel, eg potentially 4,000 to 5,000vpd on the highway, will more than double volumes. Consideration of whether improvements to the road layout are necessary should be considered.

7.1.3. The improvements proposed have not considered the potential improvements required to side road approaches, delineation at intersections, and other associated infrastructure such as lighting and kerbing, expected of higher volume intersections. Based on the assessed traffic distribution, Sandflat Road could carry a volume close to the equivalent of SH8B, which has a much higher standard intersection layout to support existing through traffic volumes. It is considered the Transport Assessment has set expectations of a minor intersection upgrade, which may not be the appropriate provision in practice.

7.2. Response

7.2.1. The safety records of the district roads in the area have been set out previously in this report. These do not show any latent road safety concerns with the road network. We expect that the upgrades of Sandflat Road and Pearson Road (east) and the SH6 / Sandflat Road intersection will meet current standards. Overall then, we do not consider that adverse safety-related effects will arise from the plan change proposals.

7.2.2. At some point, the proposed cycleway between the site and Bannockburn Road will need to cross Sandflat Road. We expect that this will be constructed as a formal crossing point such that pedestrians and cyclists are guided to cross in that particular location, and that this will be determined through locating a position that provides a safe environment (such as through ensuring that appropriate sight distances are available). Taking into account the peak hour traffic flows (310 vehicles, two-way), we do not consider that any other provision (such as a refuge) is justified.

7.2.3. We have also assessed whether a refuge or similar would be required for the cycleway to cross Bannockburn Road, since this road would carry more traffic than Sandflat Road due to the existing north-south movement. Our analysis shows that a median refuge or similar *may* be required, but this depends on the extent of use. With up to around 100 pedestrian or cyclist movements in the peak hours, no provision is required but at volumes above this, a refuge would be beneficial.

Photograph 7: Example of Layout for a Cycleway Crossing a Road

7.2.3. With regard to the increase in traffic flows on the highway, NZTA has made a submission to the plan change which does not highlight any concerns with the current highway formation. On this basis, we do not consider that improvements to the highway layout are necessary. NZTA also confirms their support for the nature of the proposed improvement scheme on the highway.

8. Site Layout

8.1. Stantec Comment: Road Layout

8.1.1. The assessment does not provide assessment of the structure plan layout, or proposed road hierarchy from a transportation perspective. As the structure plan layout will largely constrain future subdivision patterns, it is recommended that the justification for the layout and hierarchy is explained by the Applicant. Some matters for consideration include:

- Expected traffic volumes on each road, to confirm the road cross-sections are appropriate;
- The potential for lots directly accessing Sandflat Road, and what changes may be required to Sandflat Road;
- Changes in formation on Sandflat Road to assist with integration with the development including speed;
- The grid layout results in a lot of minor road intersections on Sandflat Road and the Primary Road, and further consideration should be given to the block orientation to maximise safety;
- Interaction of proposed connections to Sandflat Road with existing accesses, and confirmation that appropriate intersection design will be achievable.
- The disconnect between the east-west and north-south primary roads.
- The definition of roads, and how they relate to other District Plan rules eg is a Primary Road a Collector Road?

8.2. Response

8.2.1. We have addressed each of these matters in turn.

8.2.2. The cross-sections of the internal roading network are based on the 2010 version of NZS 4404:

- Road Type A corresponds to Standard Road Type E13, suitable for up to 800 residences. The only transportation difference relates to one wider footpath as a result of it being shared with cyclists
- Road Type B corresponds to Standard Road Type E12, suitable for up to 200 residences. The only transportation difference relates to the parking lane meandering from one side of the road to the other.
- Road Type C also corresponds to Standard Road Type E13, suitable for up to 200 residences. The only point of (transportation) difference is that there is no ability to provide indented parking and therefore the road is suitable only for serving up to 100 residences.

8.2.3. Given the scale of the development facilitated by the plan change, we do not consider that it is necessary to undertake a detailed evaluation of the traffic flows on each road. Rather, the maximum capacities of the roads (as defined through the Standard) are in excess of the number of residences that they will serve.

8.2.4. With regard to the potential for lots to directly access Sandflat Road, this is a non-complying activity under Rule 20.7.5(ii). Consequently any effects will be assessed at the time an application is made, and the Council is able to decline consent if the safety or efficiency of Sandflat Road will be adversely affected to a more than minor extent.

8.2.5. The grid layout which results in "*a lot of minor road intersections on Sandflat Road*" has been designed to support a permeable transportation network. However the separation between the intersections on Sandflat Road is 120m. The Council's Engineering Standards adopt the provisions of Standard NZS4404:2004, which sets out that a separation of 40m is required between Local Roads intersecting other Local Roads, with 150m being the separation between road intersecting with a Collector Road (or above). In this instance, Sandflat Road is a Local Road and there is no provision for this to be changed. As such, 40m is the appropriate separation distance.

8.2.6. If the classification of Sandflat Road was to be changed in future, then there would be a slight shortfall in the separation distances if assessed under this Standard. However the more recent version of the Standard sets out that 150m is required only between intersections of Collector Roads with Collector or Arterial Roads. This would not be the case here.

8.2.7. In practice, the traffic flows on Sandflat Road will be dominated by those that live in the area and who therefore will be regular users of the road. Thus, *if* there is a slightly shortfall in the intersection separation, then the familiarly of drivers will mitigate this.

8.2.8. In respect of existing accesses onto Sandflat Road, the District Plan requires a separation of 30m between an access and an intersection, or 60m where the access is more heavily trafficked, and the plan change provisions do not seek to change this. The location of the northernmost Road A connects to Sandflat Road 60m from the access into the motorsports park.

8.2.9. There are no accesses directly opposite the southernmost section of the plan change area, and the closest access is into the forestry block some 50m (and more than 100m) from the nearest proposed intersection.

8.2.10. The disconnect between the east-west and north-south primary roads has been put in place to encourage drivers to exit onto Sandflat Road at the earliest opportunity, rather than to travel within the site. This is to reduce the extent of traffic volumes within the site and thereby improve residential amenity and road safety.

8.2.11. We agree that in some respects Road Type A will function as a Collector Road, but it will also provide for property access. We would not object to this road type being considered to be a Collector Road for the purposes of the application of other District Plan rules.

8.3. Stantec Comment: Road Widths

8.3.1. The proposed Plan Change proposes new road widths that differ from CODC practice. It is acknowledged that the NZS4404:2010 includes cross-sections similar to those proposed and they are now well utilised elsewhere in New Zealand. However, NZS4404:2010 also includes a range of other provisions that require the road to be considered in context of the place function, traffic volumes, design speed, and place in the road hierarchy. Design statements are required to support the provisions, as are staged road safety audits.

8.3.2. The rule proposed of three cross-sections is simplistic (a one size fits all approach) which in our experience can cause concern following implementation, particularly around adequacy of on-street parking, design speeds, vehicle access, and pedestrian and cycling provision. It is our opinion a more robust assessment framework should be provided, or reference to or inclusion of the many other provisions relating to road cross-section and design that are referenced in NZS4404:2010.

8.3.3. As we consider a lot more supporting information is required in the rules (or ensuring a high level of discretion for Council officers assessing the roading provisions), we have not commented in depth but make the following general comments for context.

- Road A – Primary Road is a term not defined elsewhere in the District Plan. It will most likely act as a Collector Road and should be defined as such so other applicable rules can be applied. A Collector Road requires consideration of cycle facilities, and none are provided. There may be some place context such as through a neighborhood centre, retirement village, residential area, and education area where a different cross-section will be desired, and different provisions for footpaths may be desirable.
- Road B – It is assumed Secondary Road is equivalent of a local road. It has an overall width of approximately 8.2m, but the diagram could be interpreted such that parking is always only on one side of the road. This may result in under provision of street parking. Differing footpath provisions may be desirable in different place context within the site.
- Road C - This is typically only applied to short residential lanes, and development with rear lanes. Additional indented parking should be provided in the cross-section as a matter for consideration, which would then necessitate a wider road reserve in some cases.

8.4. Response

8.4.1. We consider that design statements and road safety audits are premature, given that this is a plan change request, but can be provided in due course once consents are sought for subdivision.

8.4.2. The approach of having three road types shown on the Movement Plan Stantec was adopted to avoid creating a plethora of different variants, and it is not uncommon in our view to have a restricted palette. By way of comparison, the Council's Engineering Standards only have five different types of residential roads for the whole district. That said, Rule 20.7.3(iii)(b) makes it clear that the road widths provided are minimums, and that there is scope for variation of these to increase widths as required ("*…and shall be in general accordance with the other features of those cross-sections...*").

8.4.3. Road Type A shows an off-road cycle route provided on one side. The footpath widths meet the requirements of the Standard, and Rule 20.7.3(iii)(b) enables localised widening of these if thought desirable in the more heavily-used pedestrian areas.

8.4.4. Road Type B has one parking lane with this potentially switching from one side to the other. We therefore confirm that it is not expected to create a car-orientated environment with two parking lanes on both sides.

8.4.5. Stantec seeks that indented parking is provided for Road Type C, whereas the layout anticipates that parking will take place in the movement lanes. We consider that this level of provision is appropriate for a low-trafficked neighbourhood road.

9. Planning Matters

9.1. Stantec Comment

9.1.1. The Transport Assessment is silent on the provisions of the Plan Change, and whether they are reflective of the assessment undertaken. It is considered further consideration is made of each of the provisions that contribute to the transport outcome.

9.1.2. We have not undertaken a detailed review, but note that some matters of concern include the absence of justification for transport-related provisions including car parking provisions, and driveway length.

9.2. Response

9.2.1. The transportation-related provisions of the operative District Plan were set out within section 9 of the Transportation Assessment.

9.2.2. The transportation-related provisions of the plan change are shown below. We have grouped these by the objectives and relevant policies:

20.3.5 Objective – Parks and open space network

Parks and open spaces that cater for the recreation and amenity needs of residents, and a network of pedestrian and cycle connections and greenways that are safe and convenient and which, along with the road network, allow easy connections within and beyond the Resource Area (Ref Policies 20.4.1, 20.4.2, 20.4.4)

20.4.1 Policy – Masterplanned Development

Policy 20.4.1A: Provide for the River Terrace Resource Area Structure Plan to manage the spatial layout of development in the Resource Area, including:

(a) Roads, and the roading hierarchy;

20.4.2 Policy – Built environment, density and diversity

Require development to:

(a) provide for a high quality public realm that is coordinated throughout the Resource Area, including by way of consistent road cross-sections, landscaping, road lighting and paving.

20.4.4 Policy – Parks and Open Spaces

Require development to address the recreation and amenity needs of residents by:

(c) requiring pedestrian and/or cycle linkages (including cycle lanes within the road environment) to connect with the public open spaces, the neighbourhood centre, the school area, and the retirement living area.

9.2.3. We consider that all of these policies support the provisions of the Movement Plan in ensuring that the roading network is appropriately located, and that walking/cycle links are formed which connect to locations to which people could reasonably be encourage to travel via these modes.

20.3.6 Objective – Road network

A safe and efficient road network within the Resource Area that provides for all transport modes, including walking and cycling, while also integrating with the existing transport network and possible future development in surrounding areas. (Ref Policy 2.4.6)

20.4.6 Policy – Transport

Require development to be designed to provide a road and block pattern which:

(a) is easy and safe to use for motorists, pedestrians and cyclists;
(b) is safely and efficiently connected to State Highway 6, Sandflat Road and any nearby public transport routes;
(c) limits cul-de-sac roads where practicable;
(d) is public;

9.2.4. The policy reflects current best practice in respect of avoiding dead-end roads, and supporting road safety and efficiency.

9.2.5. In respect of the Rules package, the transportation provisions are set out below.

Rule 20.7.1(ii)(h) Driveways

Driveways shall be a minimum of 5m in length or a maximum of 1.5m in length (but not between 1.5 – 5m).

9.2.6. The rationale for having a minimum length of 5m arises from advice that Stantec provided for the Jade Lake development in Queenstown. In that case, they were concerned to ensure that any person choosing to park their vehicle in their driveway would have sufficient length to do so without the possibility that the vehicle would protrude from the site and block the footpath. This rule reflects this advice and prevents driveways being formed which have a length where a parked car could inadvertently block part or all of any adjacent footpath.

9.2.7. With regard to car parking, the parking rates are set out in Rules 20.7.1(ii)(j), 20.7.3(ii)(e), 20.7.3(iii)(b), 20.7.3(iv)(g), and 20.7.2(v)(e). We have collated these below for ease of reference:

- Residential parking: Proposed to be 1 space per dwelling, provided that an additional carpark shall be provided in association with a home occupation. This is as per the operative District Plan.
- Retirement units: Proposed to be 0.7 spaces per independent unit. In practice, if units are stand-alone then this cannot be achieved and 1 space per unit will be provided. This aligns with the operative District Plan and the rate identified through the Queenstown Lakes District Plan review and aligns with the Christchurch and Auckland District Plans. Where units (and parking) are provided communally, such as for serviced apartments, it equates to 7 spaces for every 10 units which is greater than the ratios of the Queenstown, Christchurch and Auckland Plans.
- Retirement units: For central facilities or Care Centre, one carpark for every 40m2 GFA of the central facilities or Care Centre and in addition one carpark for every 100m2 GFA for visitors. These facilities include food preparation and related activities, residential care and communal facilities. For residents a rate of 1 or 2 parking space per 5 beds is typically applies which covers staff and well as residents. The rate proposed endeavours to convert this into a floor area but will result in a greater amount of parking being provided.

- Retail activities: Proposed to be 1 space per 30sqm GFA. This is as per the operative District Plan.
- Café/restaurant activities: Proposed to be 1 space per 30sqm GFA. This is based on the rate identified through the Queenstown Lakes District Plan review (1 space per 30sqm Public Floor Area), but with an additional allowance made for assessment as GFA rather than PFA;
- Childcare facilities: Proposed to be 0.10 carparks per child or other person other than employees, plus 0.5 carparks per full time employee. This is the rate identified through the Queenstown Lakes District Plan review and aligns with the Christchurch and Auckland District Plans;
- Community facilities: Proposed to be 1 space per 10sqm public floor area. This is as per the operative District Plan.
- Medical facilities: Proposed to be 1 space per 10sqm public floor area. The operative District Plan stipulates a rate based on professional staff but this detail is typically not known when a consent is sought. The rate is based on a notional 20sqm consulting room with provision made for 1 space per patient and 1 space per staff (hence 1 space per 10sqm). It is twice the rate expected in the Auckland Unitary Plan and is the same as the Christchurch District Plan.
- Education: 0.5 carparks per full time equivalent employee plus 1 visitor carpark per classroom. This is the rate identified through the Queenstown Lakes District Plan review and aligns with the Christchurch and Auckland District Plans.

Rule 20.7.3(iii) (b) Roading

All roads shall comply with the minimum overall width and minimum carriageway widths of the Indicative Road Cross Section Plans in Rule 20.7.10 below; and shall be in general accordance with the other features of those cross-sections.

9.2.8. We consider that this ensures that the roading cross-sections are applied while still enabling some level of variation to the layouts in response to particular design elements (such as a wider footpath near to the Neighbourhood Centre, if desired).

20.7.3 DISCRETIONARY (RESTRICTED) ACTIVITIES

(vii)(c) Development Parcels

An application to subdivide any Development Parcel shown on the Development Parcel Plan at Rule 20.7.10 within Residential Sub-Area A shall include an access lane that:

(ii) Have a width of 5m – 6m (for two-way access) or 3m (for a subsidiary one-way access or pedestrian only access);
(iii) Integrates with the adjoining road(s);
(iv) Integrates with the adjoining Development Parcel(s) where it is logical to connect the access lane to access lanes in the adjoining Development Parcels.

9.2.9. We consider that this provision ensures that the widths of the accesses will be suitable for one-way or two-way operation and that they connect in a safe and efficient manner with the adjacent roads and/or other access lanes.

Rule 20.7.5 NON-COMPLYING ACTIVITIES

(ii) Direct Access onto Sandflat Road

Any direct vehicle access from a private property onto Sandflat Road.

9.2.10. This provision ensures that while direct accesses onto Sandflat Road are not completely prohibited, they are strongly discouraged.

20.7.6 PROHIBITED ACTIVITIES

(i) Any road or direct vehicle access from the River Terrace Resource Area onto State Highway 6.

9.2.11. This provision eliminates the potential for any new access (public road or private) onto the highway. This supports the safe and efficient functioning of the highway network.

20.7.7 GENERAL STANDARDS

(ii) State Highway 6 / Sandflat Road intersection upgrade

(a) No more than 40 residential lots shall be created within the Resource Area until a left-turn deceleration lane is constructed at the State Highway 6 / Sandflat Road intersection in accordance with Austroads Guide to Road Design Part 4A ("Unsignalised and Signalised Intersections").

(b) No more than 300 residential lots shall be created within the Resource Area until a left-turn acceleration lane is constructed at the State Highway 6 / Sandflat Road intersection in accordance with Austroads Guide to Road Design Part 4A ("Unsignalised and Signalised Intersections").

9.2.12. This provision ensures that the intersection of Sandflat Road with the highway is upgraded in response to the increasing traffic flows on the road. We note that this is based on all traffic travelling to the highway, meaning that if the Stantec assessment is adopted, these thresholds will be conservatively low (because some traffic instead will use Bannockburn Road). They have been commented on by NZTA in their submission but in essence, the thresholds are not disputed.

20.7.11 RIVER TERRACE RESOURCE AREA: INDICATIVE ROAD TYPE CROSS-SECTIONS

9.2.13. The road cross-sections have been discussed previously.

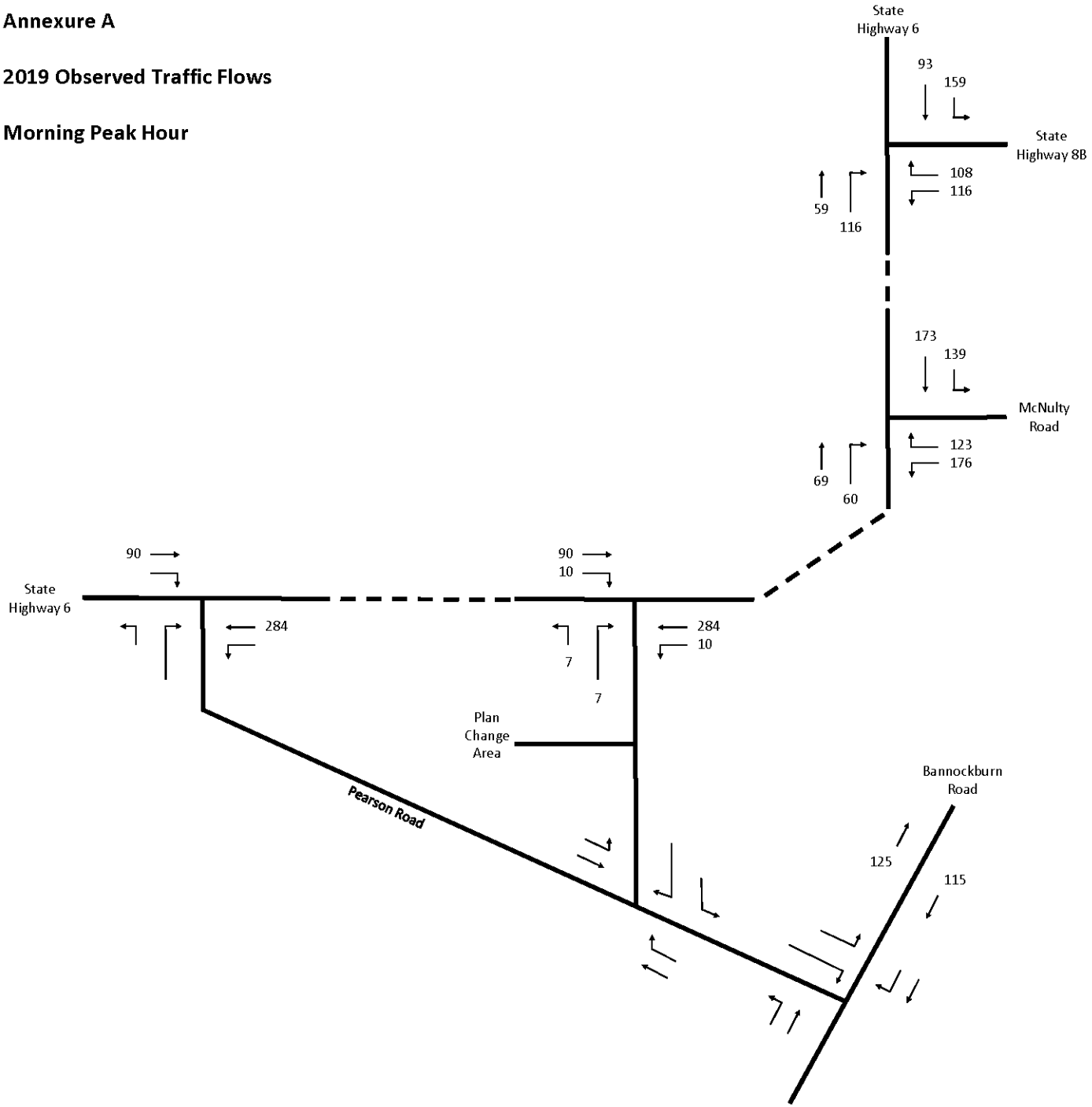
Carriageway Consulting Limited
April 2019

Annexures

Annexure A

2019 Observed Traffic Flows

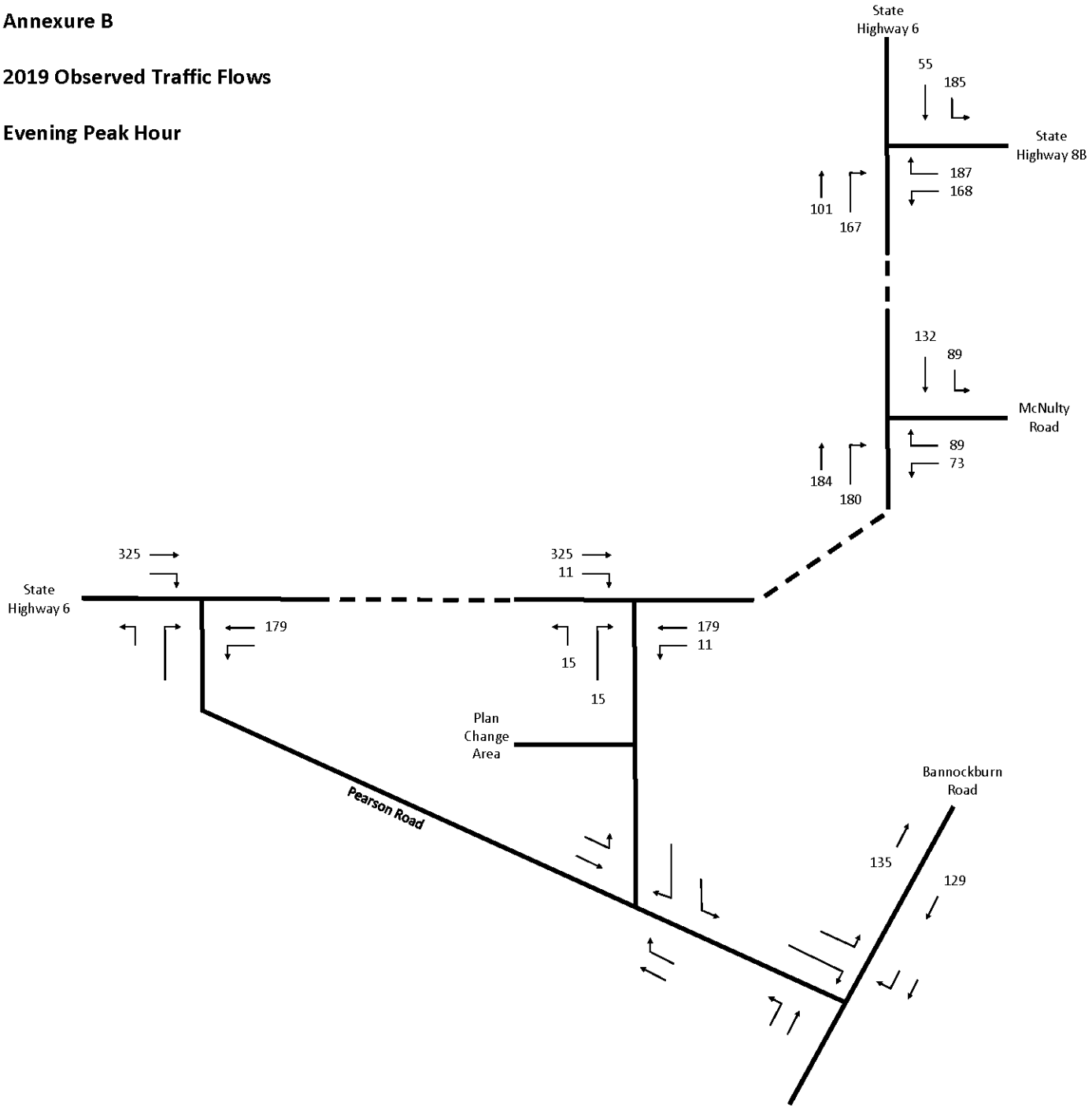
Morning Peak Hour



Annexure B

2019 Observed Traffic Flows

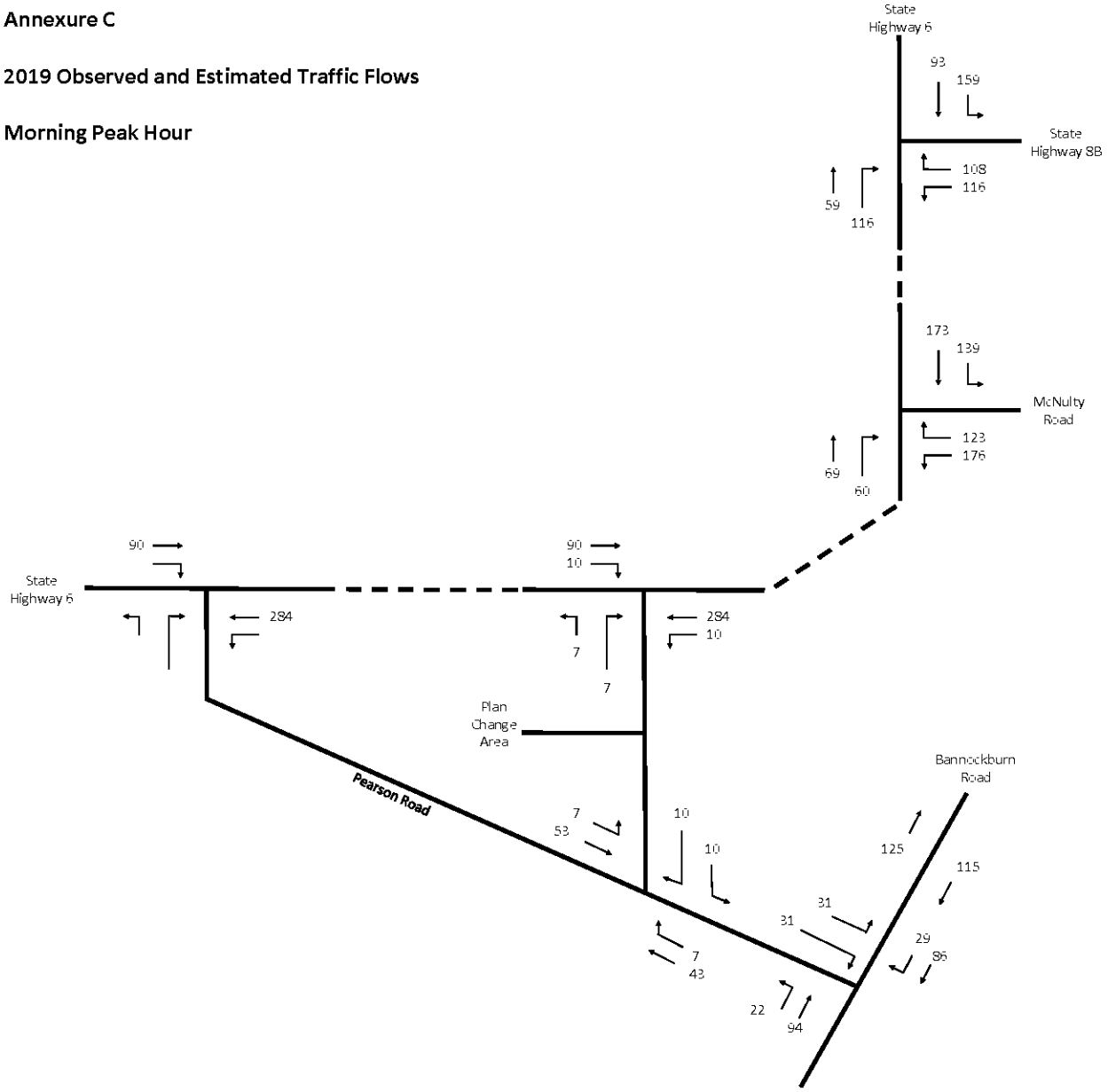
Evening Peak Hour



Annexure C

2019 Observed and Estimated Traffic Flows

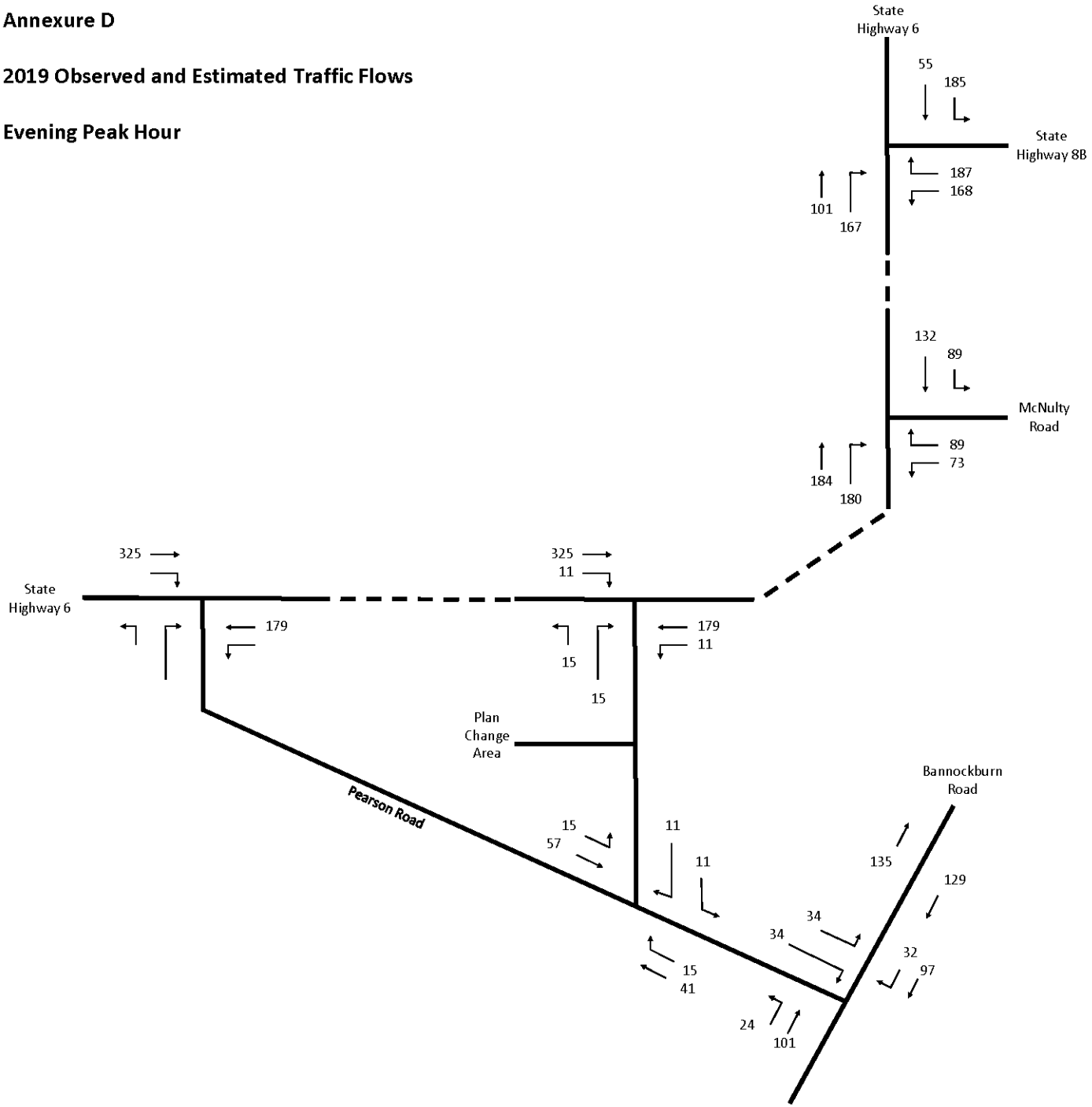
Morning Peak Hour



Annexure D

2019 Observed and Estimated Traffic Flows

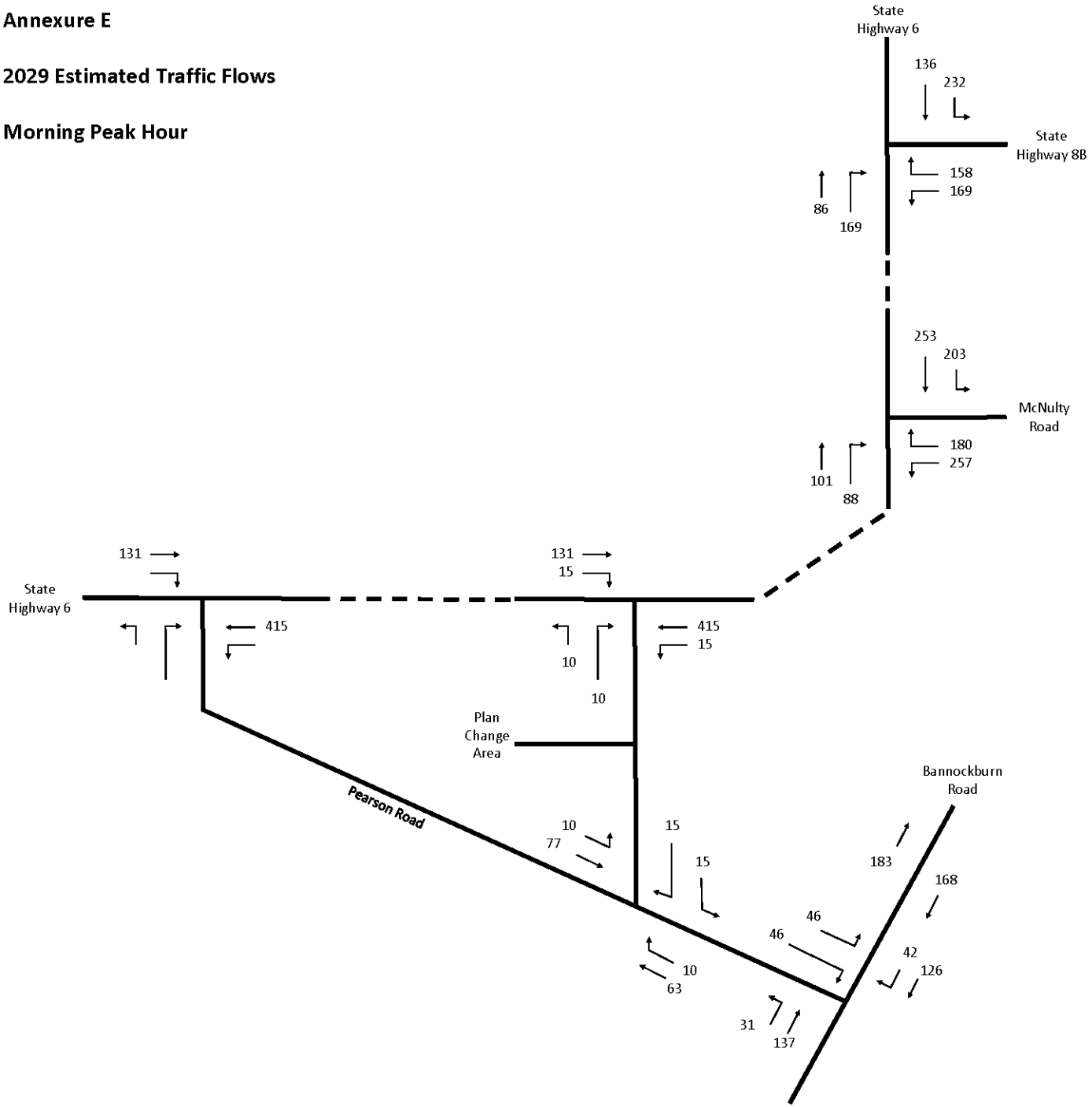
Evening Peak Hour



Annexure E

2029 Estimated Traffic Flows

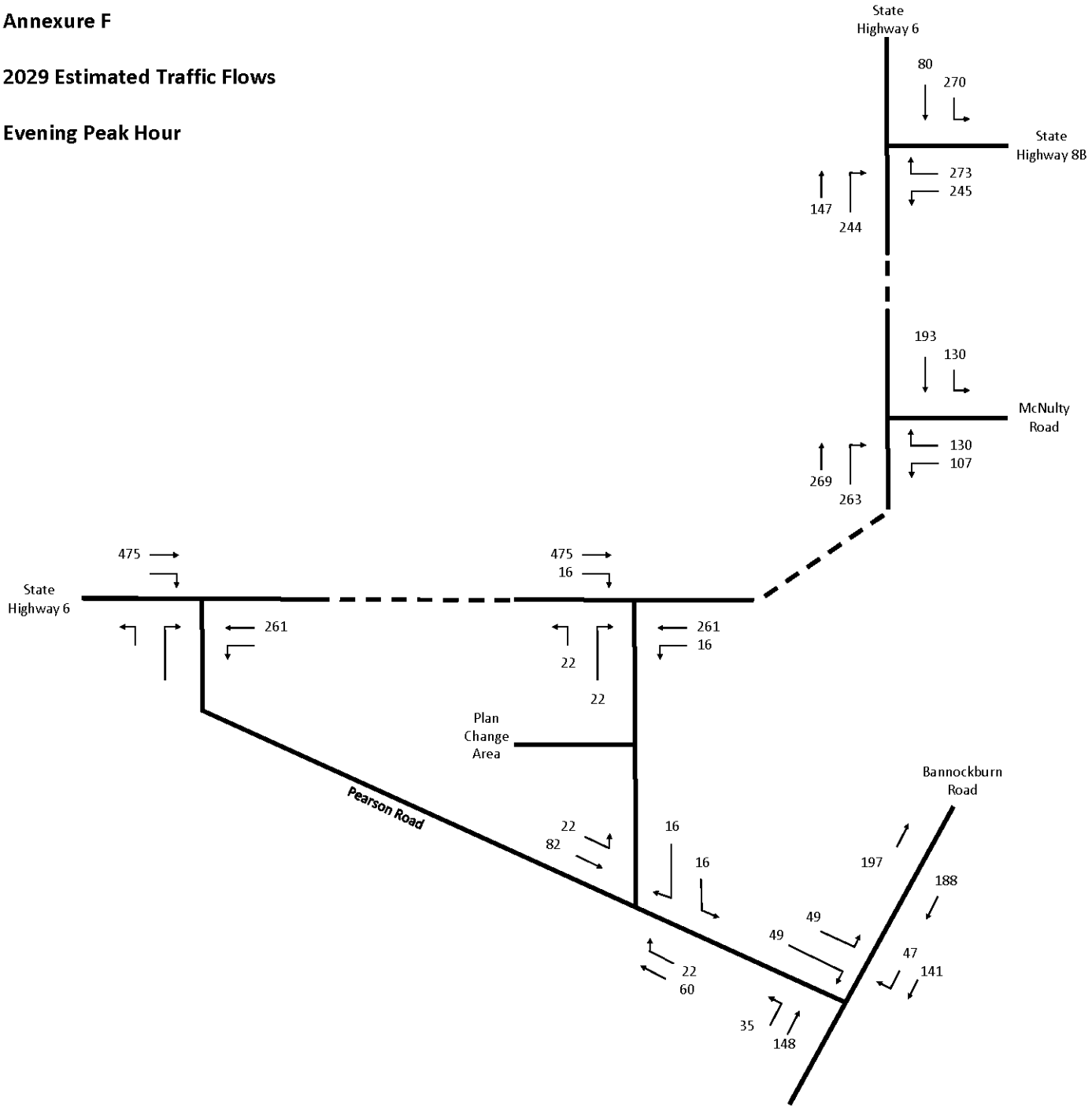
Morning Peak Hour



Annexure F

2029 Estimated Traffic Flows

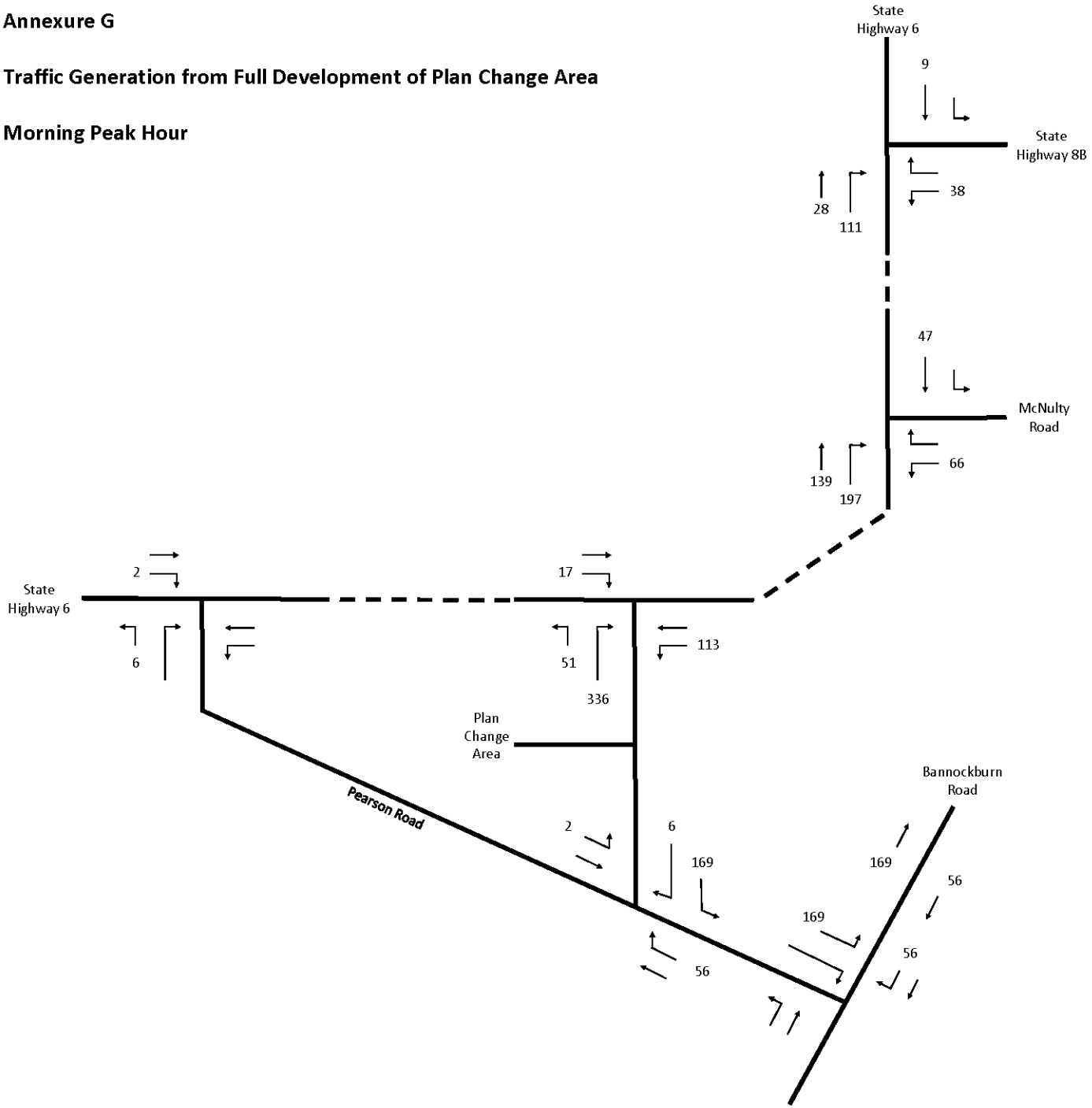
Evening Peak Hour



Annexure G

Traffic Generation from Full Development of Plan Change Area

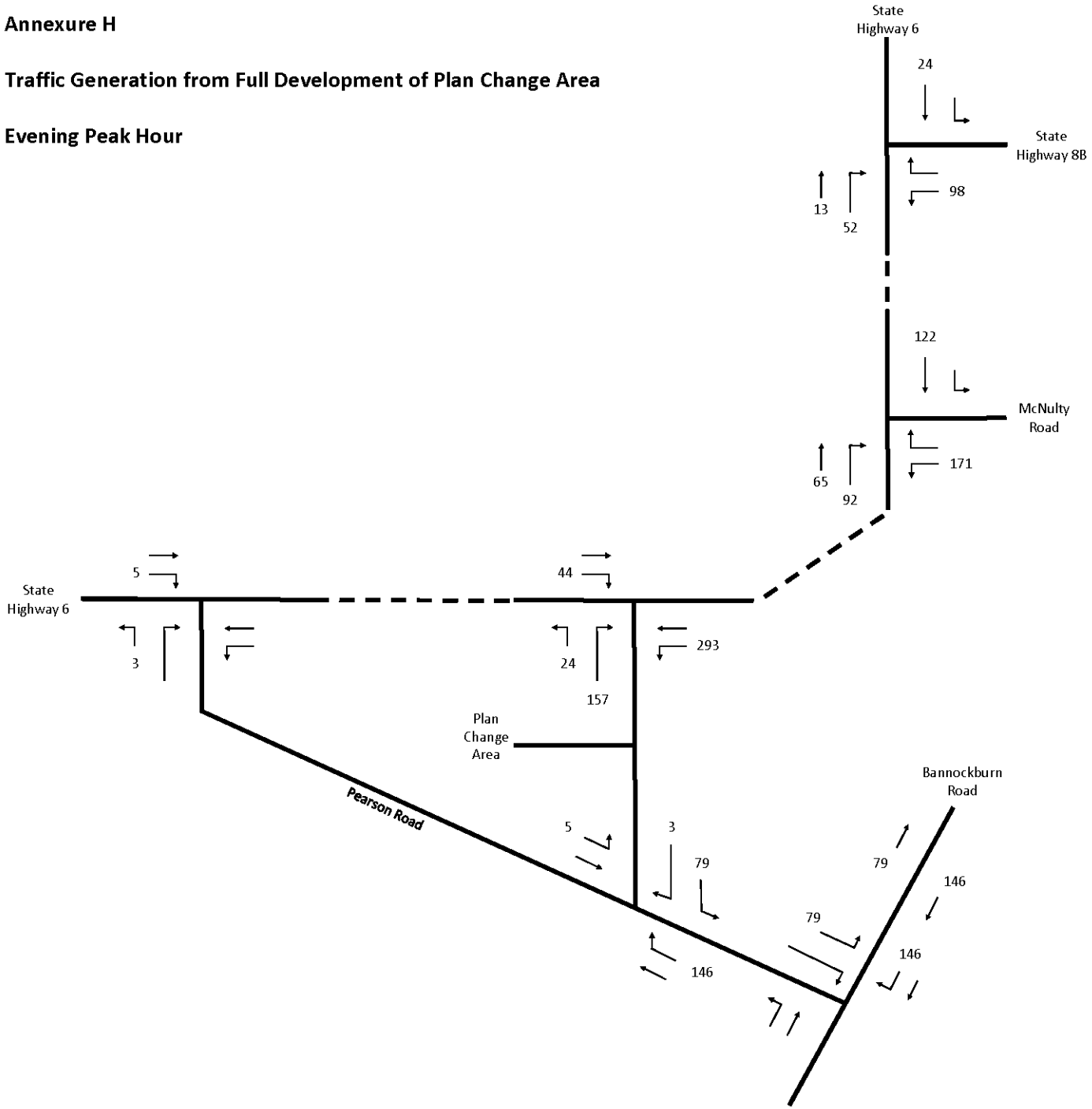
Morning Peak Hour



Annexure H

Traffic Generation from Full Development of Plan Change Area

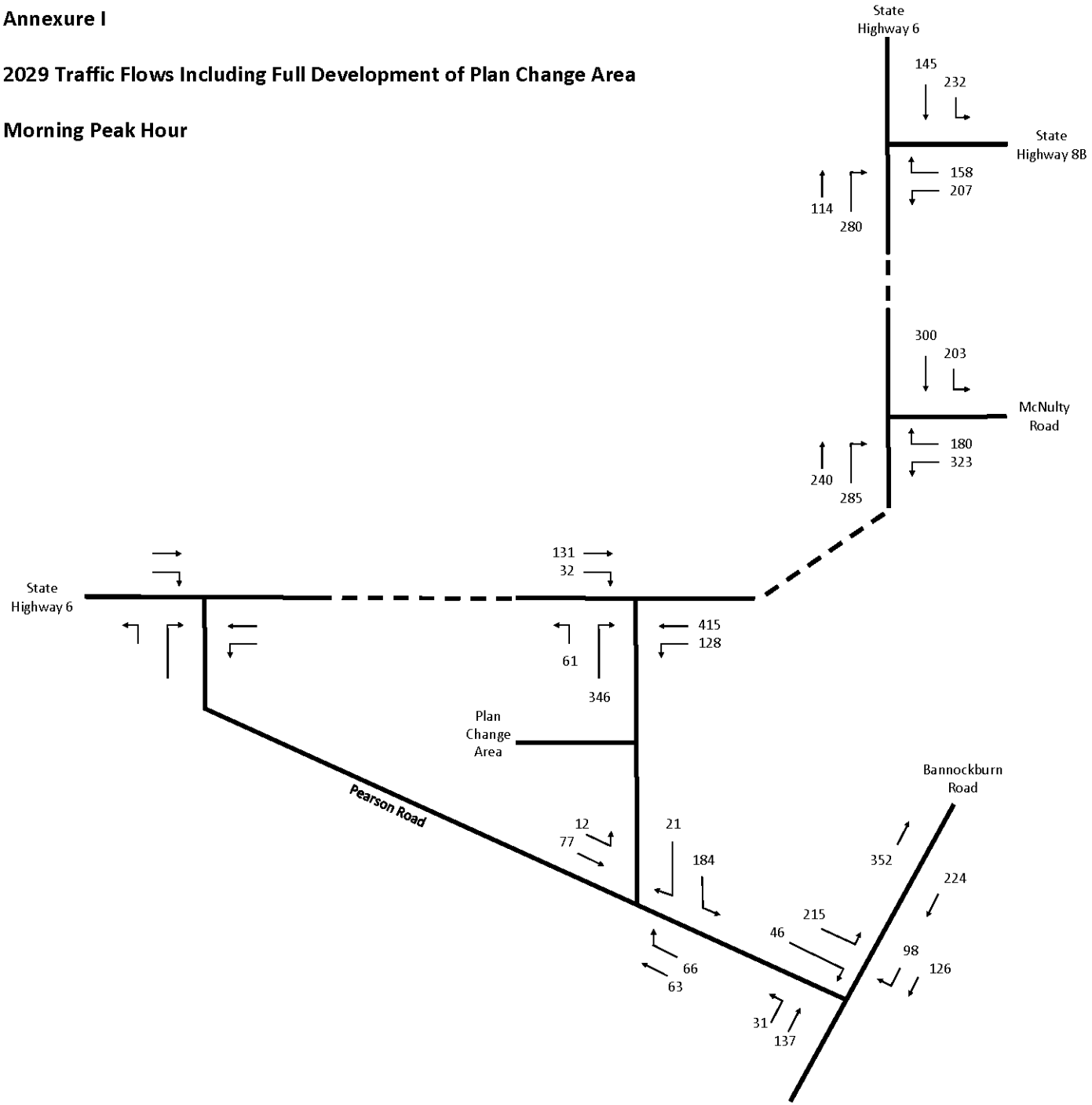
Evening Peak Hour



Annexure I

2029 Traffic Flows Including Full Development of Plan Change Area

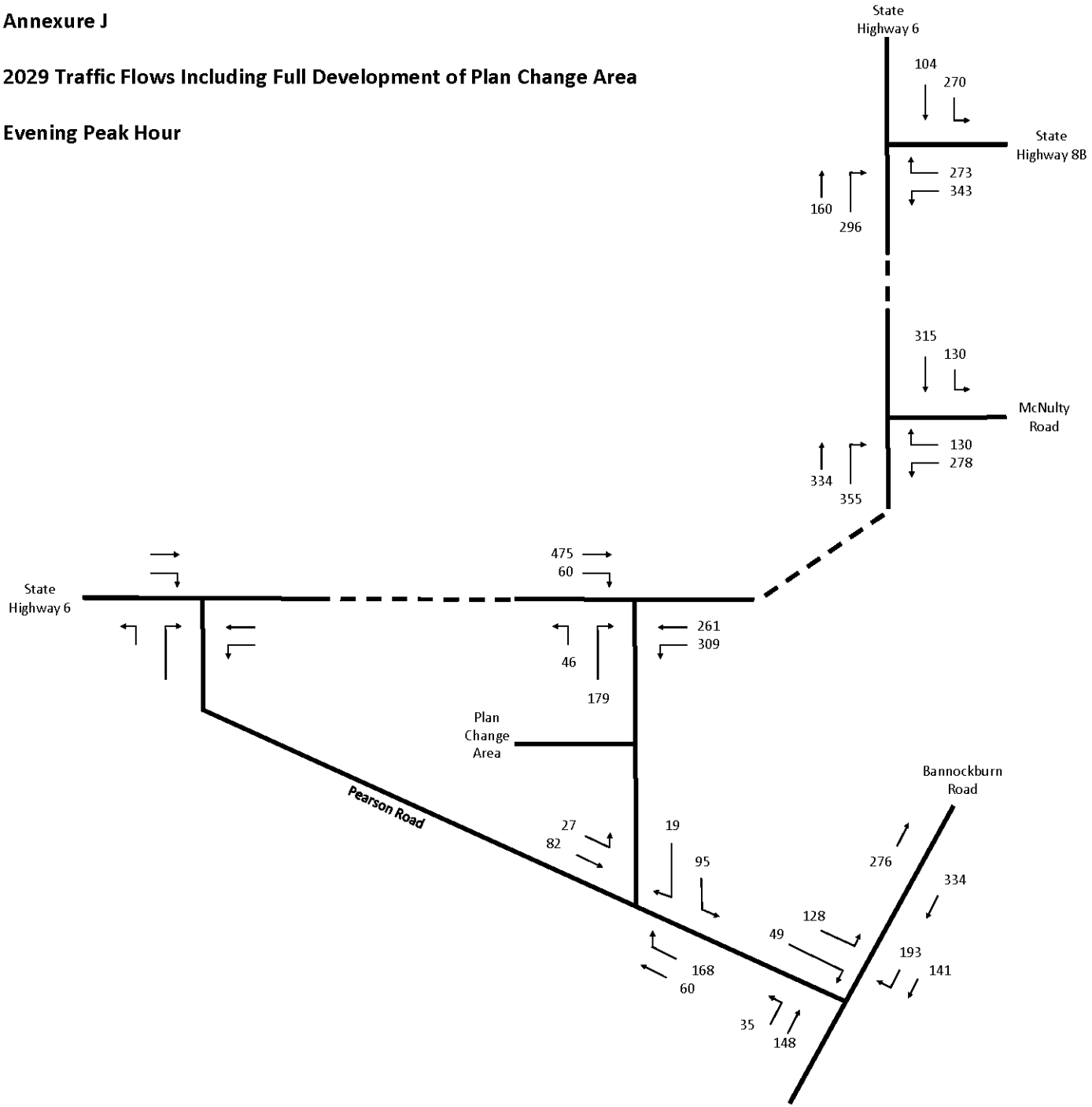
Morning Peak Hour



Annexure J

2029 Traffic Flows Including Full Development of Plan Change Area

Evening Peak Hour



CARRIAGEWAY
CONSULTING

traffic engineering | transport planning

A. PO Box 29623, Christchurch, 8540 P. 03 377 7010 E. office@carriageway.co.nz