

BEFORE HEARING COMMISSIONERS
IN THE WESTERN BAY OF PLENTY DISTRICT

UNDER THE Resource Management Act 1991 (“**Act**”)

IN THE MATTER OF an application for resource consent to authorise
four existing industrial activities within part of the Te Puna
Business Park structure plan area, for a term of two years

BETWEEN **TINEX GROUP LIMITED**

Applicant

AND **WESTERN BAY OF BAY OF PLENTY DISTRICT COUNCIL**

Consent authority

REPLY EVIDENCE OF JUSTINE WILTON

Before a Hearing Panel: Rob van Voorthuysen (Chair), James Whetu (Commissioner)

INTRODUCTION

Background, qualifications and experience

1. My full name is Justine Maree Wilton.
2. I am employed by WSP New Zealand Limited as a civil engineer (Principal Traffic and Safety Engineer), I work in the Greerton office and work primarily on the combined Western Bay of Plenty District Council (**Council**) and Waka Kotahi New Zealand Transport Agency (**Waka Kotahi**) maintenance contract, specialising in transportation, road safety and land use development.
3. WestLink is the project name for the maintenance contract. It commenced on 1 November 2014 and includes management and maintenance of Council’s local roads, the Western Bay of Plenty state highways, and Tauranga City state highways by WSP New Zealand Ltd.
4. I hold a Bachelor of Engineering (Hons) Degree from the University of Canterbury which I obtained in 1997. I am a Chartered Professional Engineer CEngNZ.

5. I have more than 20 years' experience.

6. I have worked in the field of transportation, road safety and land use development assessments for almost 25 years. I have been in my current role since November 2014. Previously, I worked with Opus on various State Highway Maintenance Professional Services Contracts in Tauranga and Southland as well as on other projects around the country and with our international offices with similar work. I have also worked for Traffic Design Group over two short time periods, primarily working for developers. I have other work history pre 1998 but that is not relevant to my current field of expertise.

Expert witness code of conduct

7. I am familiar with the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2023 and agree to comply with it. In particular, I confirm that my evidence is within my area of expertise and that the opinions are my own, except where I state that I have relied on the evidence of other witnesses.

Purpose and scope of evidence

8. The purpose of this reply evidence is to respond to the Applicant's transportation evidence, and in particular, I will provide technical response regarding Mr Harrison's methods for reaching conclusions on the stated effects of the activities on the site access and on the intersection of Te Puna Road and Te Puna Station Road. I understand that Mr McLean will provide Council's overall opinion on the three key matters of contention, being Te Puna Road / Te Puna Station Road intersection, the site accessway formation, and sealing (or lack thereof).

EVIDENCE

Peer review

9. Paragraph 13 of Mr Harrison's evidence states that I produced a peer review. I would probably not describe it exactly in this way, in the sense that it is not a peer review as defined by Engineering New Zealand. The assistance I provided Council was to review the transportation assessment provided with the Application, including Mr Harrison's reports and subsequent information, particularly from a traffic safety perspective. I provided input into the s92 request for further information and undertook an assessment to inform Council of any risks to Council and the public, in order to assist with assessment of effects.

1999 Planning Policy Manual (Published 1999 with subsequent amendments)

10. Mr Harrison's evidence (Paragraph 38 (b)) states that he doesn't have a copy of the 1999 Planning Policy Manual (1999 PPM). I obtained a copy and loaned it to Mr Harrison on Monday 9 October 2023. He advised the Commissioners of this on the same day (during his presentation) and has concurred that the 1999 Diagram D is the same layout as the 2007 Diagram E and that the layout is what the structure plan specified for the site access.
11. Full size copies of the title pages, contents page, record of amendments, Section 3 pages 37-45, and Appendices 1, 3 and 4 are appended to this evidence as Appendix A – Extracts from Transit New Zealand's 1999 Planning Policy Manual.
12. This is the layout that was referenced in the structure plan in 2005:

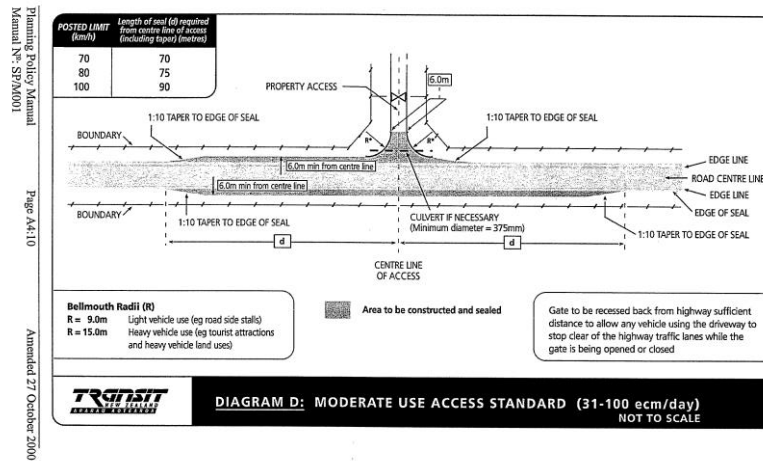


Figure 1: Access layout diagram for 31-100 ecm/day from the 1999 PPM

2007 Planning Policy Manual

- The Planning Policy Manual was re-written in 2007. The following screen snip is evidence of the publication date:

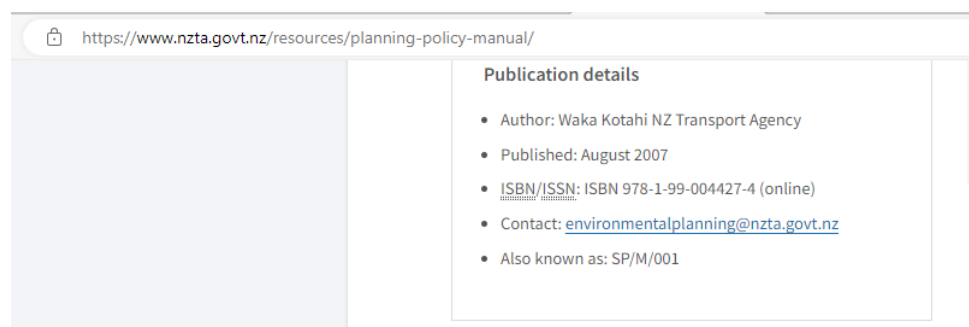


Figure 2: 2007 PPM publication date

- The Planning Policy Manual is now an online document. Full size copies of the access diagrams and the selection matrix, all from Appendix 5B, are appended to this evidence as Appendix B – Extracts from NZTA's 2007 Planning Policy Manual. These were captured on 6/10/23.
- In the 2007 manual, NZTA rearranged the order of the access layout diagrams and renamed them in order of least widening to most. The access layout that is shown above had its title changed to Diagram E in the 2007 manual, as shown below in Figure 3.
- This is the layout that the Structure Plan specifies.

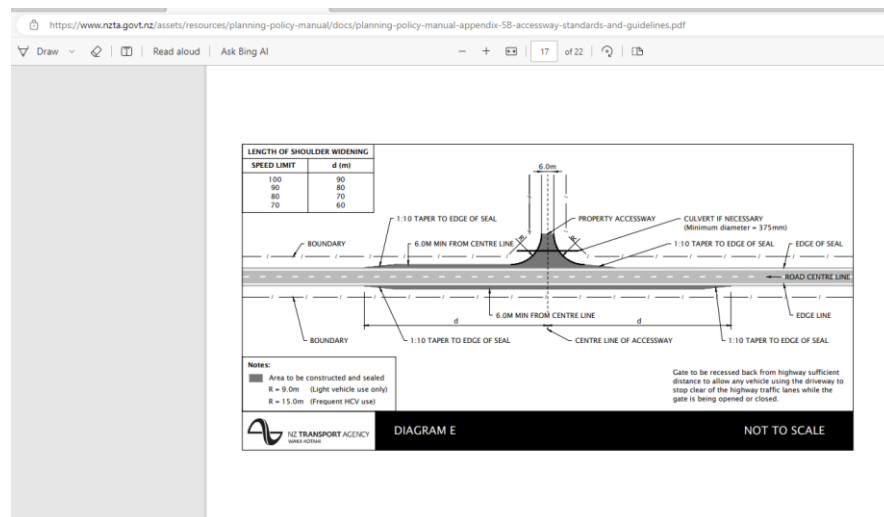


Figure 3: Access layout diagram for 31-100 ecm/day with more than one slow, heavy, or long vehicle movement per week from the 2007 PPM

Equivalent Car Movements, not number of vehicles, dictates the access layout

17. The proposed traffic volume is being described by Mr Harrison as 'low' and his case against widening seems to be based on the 'low' number. However, the absolute number of vehicles is not used for access layout selection in the PPM.
18. The correct parameter is the number of equivalent car movements/day (ecm/day) as is evident in the title block of the 1999 PPM Diagram D drawing and in the table that accompanies the 2007 PPM Diagram E.
19. The concept of Equivalent Car Movements (ecm) is a well understood phrase in road design (some RCAs use a different name for the same concept; WBOPDC uses Passenger Car Equivalents). In the 1999 PPM, ecm is defined in Appendix 1 on Page 2 and in the 2007 PPM, the definition is on page 120. The definition of ecm is the same in each manual.
20. Note that WBOPDC uses the phrase Passenger Car Equivalents (PCE) in the same context as NZTA's term Equivalent Car Movements (ecm). The WBOPDC definition is in Section 3 Definitions in the Operative District Plan; the values assigned to PCE are different to the values that Waka Kotahi use, so it is important to use the correct definition that corresponds to the Waka Kotahi diagram.

21. The additional information provided in the S92 request response clarified that the daily vehicle generation that was observed on the surveyed day was set at 15 HCV/day and 10 light vehicles/day. Mr Harrison's evidence has clarified that this means 15 HCV movements/day and 10 light movements/day, rather than 15 HCVs/day and 10 light vehicles/day, and that for the HCVs, there are 12 truck movements and 3 truck and trailer movements. Based on this clarification, I confirm that the proposed ecm/day for the stated combination of traffic is 61 ecm/day, and the calculations are shown below:

Light vehicle:	5 vehicles/day * 2 ecm/vehicle	= 10 ecm/day
Trucks:	6 vehicles/day * 6 ecm/vehicle	= 36 ecm/day
Truck and Trailers:	1.5 vehicles/day * 10 ecm/vehicle	= 15 ecm/day
Total ecm/day:	10 ecm/day + 36 ecm/day + 15 ecm/day	= 61 ecm/day

22. I am not clear as to whether the surveyed vehicle volume and type is the same every day. Further, I am not clear as to whether the application seeks to set the ecm at 61 ecm/day. For the purpose of my assessment, I have assumed that the applicant does not intend to generate more than 61 ecm/day.

Features of the layout specified in the Structure Plan

23. The structure plan required the layout that is shown in the above two access layout pictures. (The layout is identical; it is just the name of the layout that changed). In particular, note that there is widening opposite the access, there is left turn widening, and the driveway width is 6.0m.
24. The proposed activity meets the criteria for the layout depicted above.
25. Using the 1999 PPM, the above layout was required for accesses that had 31-100 ecm/day as stated in the manual on page A4:2:

Access Design for Rural State highways

All accesses directly to a rural State highway require design appropriate to the highway they are connecting to in order to avoid, remedy, or mitigate the adverse effects. Diagrams C and D provide appropriate standard designs for accesses up to 30 and 100 equivalent car movements per day respectively.

Figure 4: Extract from 1999 PPM showing that accesses with up to 100 ecm/day qualified for the above layout.

26. Using the 2007 PPM, the above layout is required for accesses that have 31-100 ecm/day including more than 1 slow moving, long or heavy vehicle per week.

Appendix 5B – Accessway standards and guidelines

Table App5B/4 – Accessway types

Type of traffic using accessway (more than one slow, heavy or long vehicle movements per week?)	Volume of traffic using accessway (ecm/day ³)	Volume of traffic using state highway (vpd)	Accessway type
No	1-30	< 10,000	Diagram and Perspective C
		>=10,000	Diagram and Perspective D
	31-100	< 10,000	Diagram and Perspective D
		>=10,000	Diagram and Perspective E
Yes	1-30	All	Diagram and Perspective D
	31-100	All	Diagram and Perspective E

Other accessway geometric design detail

Guidance on other aspects of accessway geometric design, such as the requirements where culverts are likely to be needed to accommodate a watercourse or drain, may be found in Transit's Geometric Design Manual available on www.transit.govt.nz.

Figure 5: Access type selection matrix from the 2007 PPM.

27. Therefore, whether one reads the 1999 PPM or the 2007 PPM, the proposed activity meets the criteria for the above access layout.

Proposed access design

28. Mr Harrison describes the proposed access as a (2007) Diagram D without widening opposite the access. However, without the widening, it is not a (2007) Diagram D because the widening is an integral part of the layout.

29. A 2007 Diagram D – Special Use Access is shown in the following picture:

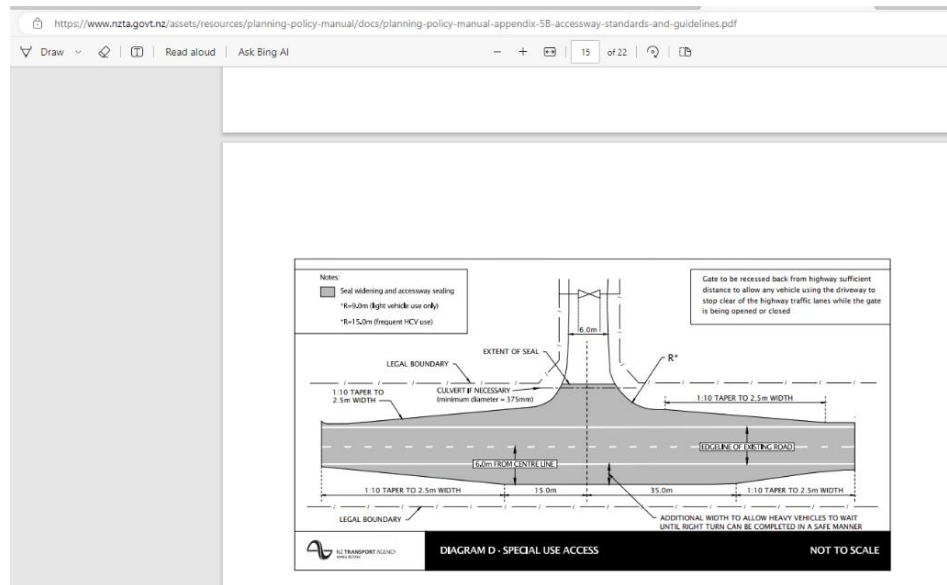


Figure 6: Diagram D from 2007 PPM

30. The picture below is from the S92 information received in May 2023. The drawing date is 11/5/23 and the drawing number is 423022-CIV-D001, and I understand to be the latest iteration of the proposed access design.

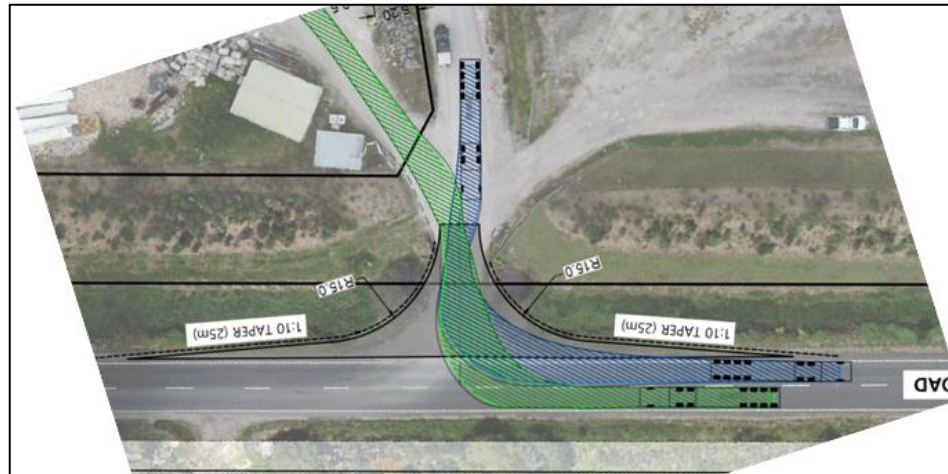


Figure 7: Access layout for subject application, provided in S92 information, May 2023.

31. The picture above doesn't look like 2007 Diagram D. The similarities it has with 2007 Diagram D are the same side tapers and the flare radius. The differences are that driveway width appears to be narrower than Diagram D (5m wide instead of 6m) and there is no widening opposite the access.

32. In both versions of the manual, there is a Diagram C layout. It is for 30 ecm/day or less and is not for use by heavy vehicles. I am showing this for four reasons:

- It is the only layout in either manual that does not have widening opposite the access.
- Mr Harrison's evidence says that he thinks that a layout without widening opposite the access is 'appropriate' (paragraph 37 line 4).
- The proposed activity does not meet either the 1999 or the 2007 criteria for a Diagram C.
- The proposed access design does not have widening opposite the access.

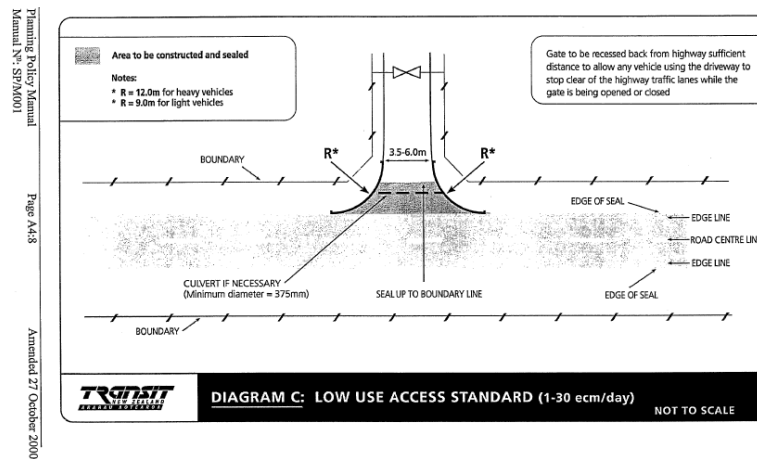


Figure 8: Diagram C: Low use access standard (1-30 ecm/day) from the 1999 PPM

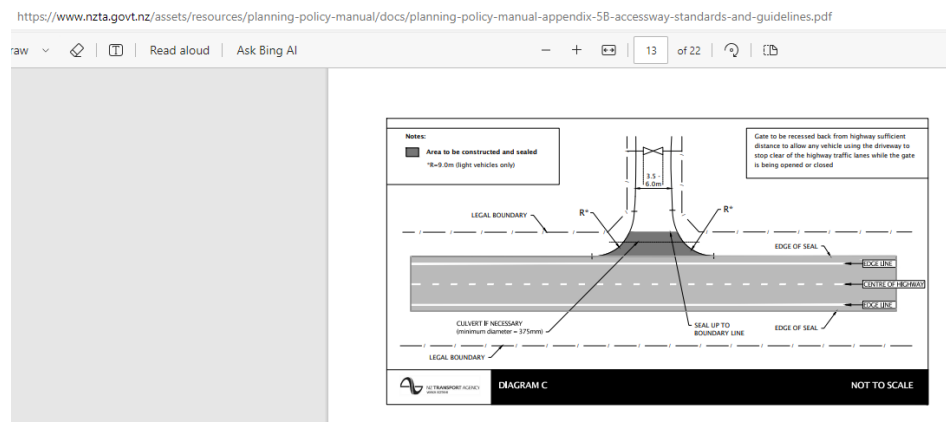


Figure 9: Diagram C from the 2007 PPM. Refer to the access selection matrix from Appendix 5B for criteria for this layout.

Review of the reasons given for not needing localised widening opposite the access

33. In the Transportation Assessment that was initially submitted for this application, Mr Harrison said that there was approximately one vehicle turning right into the site per day and that because there was only one vehicle, widening on the opposite side of the carriageway was not required. The following extract is from that report:

The traffic generation data given in Section 0 of this report identified 10% of vehicles travelling to and from the west. This is approximately one vehicle turning right into the site per day. Given this very low level of traffic generation from the west, it is assessed that the widening on the opposite side of the carriageway, as shown on Diagram A above, is not required. It is therefore recommended that the existing vehicle entrance be upgraded in accordance with Diagram A of the Development Code, however without the widening on the opposite side of the carriageway.

Figure 10: Extract from Mr Harrison's November 2022 Ref 548 TA v1 Transportation Assessment Ref 548 TA v1 that was submitted with the subject application in May 2023.

34. Te Puna Station Road had a significant slip during the summer storms and this meant that eastern end of Te Puna Station Road was, and still is, impassable for vehicular traffic. There is uncertainty about the long-term future of this road section, but Council is working on making it available for eastbound traffic. Mr McLean can provide more information on progress on this issue if required. This means that the statement that there is only one vehicle per day turning right into the site is either not true or the site's traffic is using Clarke Road (which, in itself, would be another issue).
35. I might consider omitting widening opposite the driveway if there truly was only one, light vehicle, using the access per day or if there was no through traffic. Accordingly, I advised Council to request via S92 for proof that there is no right turn conflict.
36. The S92 information shows that the initial statement about only one right turn per day was not correct and that there is right turn demand. Further, the traffic counts that I arranged through WestLink (for the week ending Wednesday 17 May 2023) showed that there is still through traffic on Te Puna Station Road. Accordingly, I am satisfied that both conditions required for right turn conflict to exist, do indeed exist.

37. In the S92 information¹, Mr Harrison changed the reason for omitting the widening. In the S92 Harrison Transportation letter, the reasons for omitting localised access widening are:
- a) That a right turn bay isn't warranted.
 - b) Te Puna Station Road isn't a State Highway.
 - c) That the risk of an individual colliding with a vehicle stopped waiting to turn right is 'low'.
38. I will address the Road Controlling Authority issue and the 'low' risk further down this reply evidence.
39. Regarding the right turn bay warrant, this is an intersection layout assessment tool from Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossing Management. It is used as a guide for right turn bay layout types. It is not used to justify whether or not the standard layouts from PPM should be used for accesses carrying 31-100 ecm/day. In particular, if an access carrying 31-100ecm/day does not meet the warrant for a channelised right turn treatment, this does not mean that the access should not have localised widening. In fact, the lowest form of treatment shown in the warrant has widening opposite the intersection as shown in this manual extract:

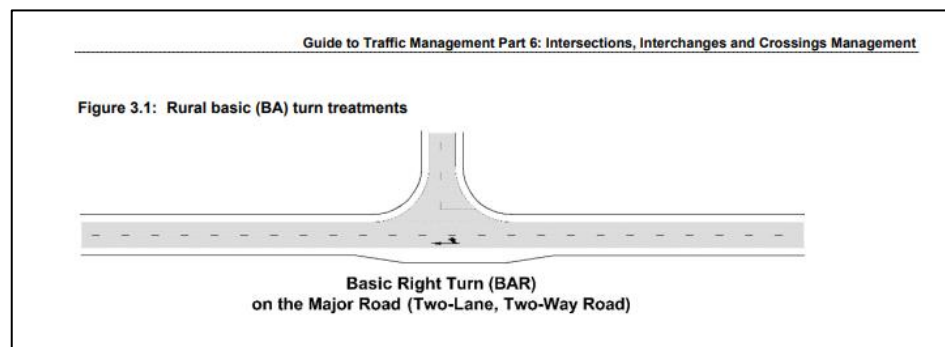


Figure 11: Extract from Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossing Management showing the minimum treatment at intersections.

40. Accordingly, using the right turn bay warrant as an argument against providing localised access widening for the proposed access is not valid.

¹ Harrison Transportation letter to Shae Crossan 30 May 2023, pages 3-5.

All the right turn bay warrant confirms is that the proposed activity does meet the Austroads warrant for a marked right turn bay.

Road hierarchy classification vs actual use

41. Paragraph 44 of Mr Harrison's evidence discusses the District Plan's classification of Te Puna Station Road and that it means that the road principally provides access to the adjoining properties and catering for minimal through traffic. The District Plan roading hierarchy has not been updated for a very long time and it is true that almost all roads in the District are classified as Local roads irrespective of their current traffic volume, mix of traffic and function. To conclude that Te Puna Station Road carries minimal through traffic based on an historic classification rather than observation, particularly when it is known in the community as a 'rat run', is, in my opinion, not valid.
42. Under the One Network Framework, Te Puna Station Road is classified as a Rural Connector. The following extract from the ONF detailed design guidance details the function of Rural Connectors:

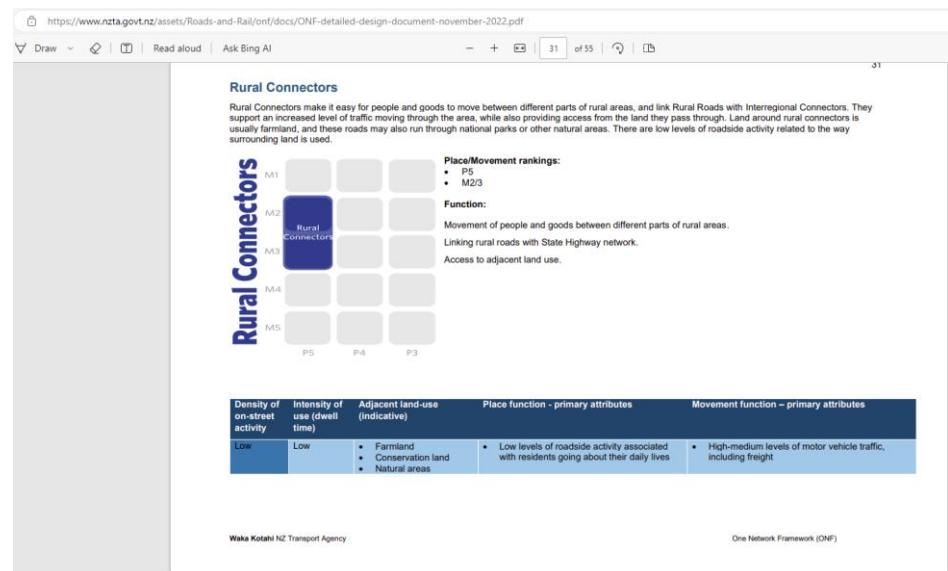


Figure 12: Extract from the Detailed Design guidance for the One Network Framework (ONF).

43. The above extract shows that along with providing access to property, Rural Connectors cater for movement of people and goods between different parts of rural areas and links rural roads with the State Highway network.

Based on my site observations, traffic surveys and network knowledge, this is an accurate description of the traffic on Te Puna Station Road, even with the eastern end closed.

44. It is important to understand that some of the properties that access Te Puna Station Road are industrial in nature. There are existing activities that have heavy vehicles, and indeed the other properties associated with the Business Park as a whole are expected to develop and create significant industrial traffic generation.
45. Knowing the current and expected use of Te Puna Station Road over the proposed two year consent term, I don't expect that Council would have to reclassify the ONF to that of a road that doesn't carry through traffic. Therefore, I don't concur with Mr Harrison's opinion that the road doesn't carry through traffic now. I also do not anticipate that Te Puna Station Road won't carry through traffic during the 2 year consent period.

Using the Road Controlling Authority as justification for not providing widening

46. Paragraph 44 of Mr Harrison's evidence states that Te Puna Station Road differs from a State Highway because of the District Plan's definition of a Local Road and appears to use this as one of the reasons to deviate from the structure plan's access requirement. Whether the road is controlled by Council or Waka Kotahi is, in my opinion, irrelevant.
47. I consider the following issues are relevant:
 - a) Te Puna Station Road carries more than just traffic accessing Te Puna Station Road;
 - b) Te Puna Station Road is not a low volume road;
 - c) Speeds on Te Puna Station Road are high (the 85th percentile speed is above 90km/h) and the roadsides are hazardous to errant vehicles (deep ditches, non-traversable culvert headwalls, trees); and
 - d) There is no evasive manoeuvre space to avoid stationary queues.

48. Obviously, Te Puna Station Road is not controlled by Waka Kotahi, but neither the ownership of the road nor the District Plan definition of Road Hierarchy classifications is a good reason to expose road users to substandard access design that doesn't even meet the Development Code, let alone the PPM.

Review of the assessed effect of not providing localised widening

49. Paragraphs 49 to 52 of Mr Harrison's evidence discuss the effect of not providing widening. Mr Harrison states that the effect is that following drivers will have to slow down/stop behind a vehicle that is about to turn right; and concludes that since compliant sight distance is available and the volumes are 'low', people can react in time, so the safety risk is 'low' without localised widening. This approach is not in line with best practise for several reasons:
- a) Compliant sight distance is a pre-requisite for a standard design. It is not justification for failing to provide the standard design.
 - b) This assumes that every driver will stop.
 - c) The volumes are not 'low' by any of the definitions used by Transit NZ/NZTA/Waka Kotahi for access design or road volume. The access generates between 31 and 100 ecm/day and the road carries more than 500 vehicles/day² so neither the access nor the road meets the definitions of 'low volume'.
 - d) There is potential for a queue to develop behind a stationary/slowng vehicle, so it is not just sight distance to the rear of the turning vehicle, but also sight distance to the rear of the queue that needs to be considered when evaluating stopping distance.
 - e) Potential crash combinations are not limited to light vehicle into rear of truck – there is truck into rear of light vehicle, truck/light vehicle swerving to avoid a rear-end crash either into head-on traffic or into the drainage ditch, truck v truck, etc. There is also potential for a following driver to pull out and overtake.
 - f) In the field of road safety engineering, risk is not solely a function of the number of vehicles since the number of vehicles is the 'exposure' component ie the number of opportunities for a crash.

² In the Code of Practice for Temporary Traffic Management, a low volume road has less than 500vpd.

50. It seems that the assessed effect is that through traffic has to stop for a right turning vehicle. When I consider the effects of not providing widening, I find that the effects are:
- a) Queues are expected.
 - b) A queue creates opportunity for queuing-related crashes.
 - c) Due to the speed of traffic, the composition, and unforgiving road side hazards, that the expected consequence of any queuing-related crash is a high-trauma injury.
51. Regarding Mr Harrison's statement that 'all risk can never be avoided' (paragraph 51, line 5), my opinion is that reasonably foreseeable risks can be avoided and, in this case, there is a standard design solution that speaks directly to the rear-end crash risk.
52. Paragraph 49, lines 7-9 state the purpose of widening opposite the access as being an efficiency benefit, however this is only one of the reasons for the widening. The other reason is that by providing the through traffic with dedicated space to pass stationary vehicle, the through traffic is very unlikely to run into the rear of the stationary vehicle and a stationary queue is unlikely to develop so there are no stopped through vehicles to run in to or swerve left or right away from.
53. Mr Harrison's evidence says that he considers that not having widening opposite the access is 'appropriate' (paragraph 37).
54. To be clear, neither version of the PPM manual says that if there is between 31 and 100 ecm/day using the access, then the depicted localised widening opposite the access is not required.
55. Further, the Development Code does not say that if the access is for a Commercial development and is on a rural road, then widening opposite the access is not required (the Development Code shows that widening opposite the access is required).
56. I am not aware of any guidance that concurs with Mr Harrison's opinion. In my opinion, based on experience and the common guidance documents (Austroads, PPM, Development Code) and Safe System principles, omitting

widening opposite the access is inappropriate. It is inappropriate because omitting the widening does not address the effect of right turning traffic on a high speed rural road.

Industry standard methods to assess the safety risks of a road design

57. Safe System is a philosophy which underpins road design in this country (and many other countries). The premise is that we are human, we make mistakes so, while the road system needs to keep us moving, it must also be designed to protect us.
58. Relying on drivers to never make a mistake instead of using readily available, industry-standard solutions is not a robust design decision and it is the antithesis of Safe System.
59. The safety risk is not solely a combination of sight distance and the alleged low volume. Exposure is a factor (ie traffic volume and composition), but so is the potential for various crash types to occur, and so is the severity should a crash occur.
60. Rear end, run-off road and head-on are reasonably foreseeable crash types and, should this occur, serious to fatal injuries can be expected particularly in a multi-vehicle collision and especially if one of the vehicles in a multi-vehicle collision is an HCV, motorcyclist or cyclist. Using the Safe System Audit Guidelines for Transport Projects Safety Concern Risk Matrix, I consider the probability of the crash to be Likely and the outcome to be Fatal which gives a risk rating of Serious, which is the highest rating. Note that even if a peer considered the probability to be Unlikely, the Safe System Threshold is still breached because the expected severity is high. Normal practise is to amend a design to remove or reduce possibility of reasonably foreseeable crash types to occur (especially when the rating is serious), particularly when there is a standard solution and rule requirement that would normally be adopted as the starting point for design.

		Severity outcome				
		Non-injury	Minor	Serious	Fatal	
		Property damage only (PDO)	Injury which is not 'serious' but requires first aid, or which causes discomfort or pain to the person injured.	Injury (fracture, concussion, severe cuts or other injury) requiring medical treatment or removal to and retention in hospital.	A death occurring as the result of injuries sustained in a road crash within 30 days of the crash.	
Probability of a crash	Very likely	Minor	Moderate	Safe System injury threshold	Serious	Serious
	Likely	Minor	Moderate		Serious	Serious
	Unlikely	Minor	Minor		Significant	Serious
	Very unlikely	Minor	Minor		Significant	Significant

Figure 1 Safety concern risk rating matrix

Figure 13: Safety Concern Risk Rating matrix from Waka Kotahi's Safe System Audit template.

61. Safety by Design is the process of managing health and safety risks through the lifecycle of structures, plant, substance or other products. It is required so that the produce 'thing' does not cause harm to people.
62. For the Operational phase, consideration of the users of the thing that was made/built is required. In road design, there are established design guidelines that road designers can use. For access to property, there is plenty of guidance and none of it that I am aware of suggests that omitting widening opposite an access such as the subject access for the subject application should be considered.
63. I can reasonably foresee a conflict with east-bound through traffic and slow moving/stopped traffic (ie about to turn into the site), and I am aware of commonly used guidelines within this jurisdiction (including but not limited to the PPM and the Development Code) which give industry-accepted solutions for access layouts, so I consider it unreasonable to depart from that and endorse an access design that is obviously not aligned with Safe System principals and obviously not compliant with industry guides, particularly when all criteria for provision of localised widening opposite the access are met.

64. Accordingly, I don't think this layout does everything reasonably practical to avoid reasonably foreseeable crash types and outcomes.
65. Accordingly, the RCA cannot consider that the proposed design meets the requirements that are at the core of Safety by Design.

Minimum layout arrangement required

66. I don't concur with Mr Harrison's conclusion that the 2007 PPM 'Diagram D without widening' (which could also be described as a 'Diagram C with tapers') is appropriate.
67. The absolute minimum that Council could potentially consider is the Development Code's Diagram A on drawing W437. This for a rural commercial development or tanker access. Note that:
 - a) The driveway and vehicle crossing must be wide enough for two-way flow, since two-way flow is expected.
 - b) Without sufficient driveway width for two-way flow, when an inbound driver and an outbound driver approach the access simultaneously, one driver will have to wait (so a person waiting to turn right in has to wait for the outbound driver to leave the driveway), or worse, either the inbound or outbound driver will have to reverse to enable the other driver to finish their movement.
 - c) The widening must be long enough to house the site's vehicles (ie so if the truck and trailers pull to the left to let through traffic pass).
 - d) The widening must be long enough to enable through traffic to pass the site's vehicles that would be stopped to turn right into the site (ie if the truck and trailer unit stops next to the centreline to turn right, the following traffic must be able to get into the widened shoulder to avoid a rear-end collision or stationary queue developing on Te Puna Station Road).
 - e) If this was accepted, it should only be a temporary measure for the volume and mix of traffic that is described in the application.
 - f) To be clear, if this was accepted, it would have localised widening opposite the access and must be designed for the expected vehicles – this means that it would likely end up with the dimensions of the 2007 PPM Diagram D as a minimum.

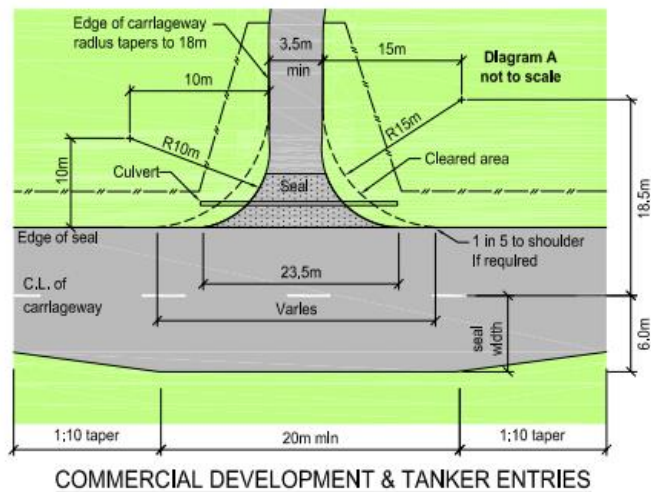


Figure 14: Extract from the Development Code showing the Commercial Development access layout. This is Drawing W437 Diagram A.

68. There are two other standard layouts in the Development Code, but the proposed activity does not meet the requirements for those layouts.
69. The above layout could be built with the future ultimate layout in mind but note that there will be constructability issues in adopting a staged approach and care with seal joins and pavement drainage will be required. Note that this is likely to mean that some of the seal and pavement would need to be broken out and reconstructed for the widening – butt joints are not acceptable because they do not allow the pavement to drain properly to the water table so the pavement fails at the join.

2007 Diagram E is appropriate for the proposed activity

70. The 2007 PPM Diagram E layout is what is required by the Structure Plan. This is appropriate for the current application because all of the criteria for choosing the layout are met – 31-100 ecm/day, more than one HCV per week, a right turn demand, and there is through traffic. There is no guidance that says if all of these conditions are met, then the access shouldn't have the widening that the guidance tells us to select.
71. All of the guidance advises localised widening opposite the access for an access with this volume and composition of traffic.

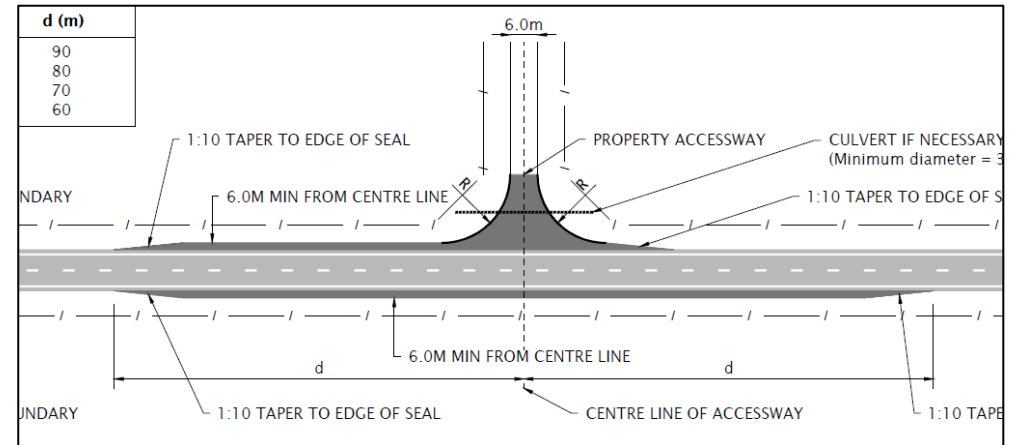
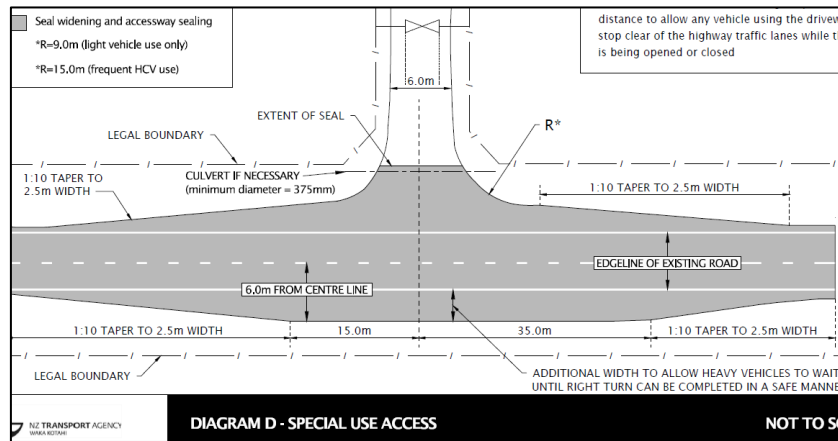
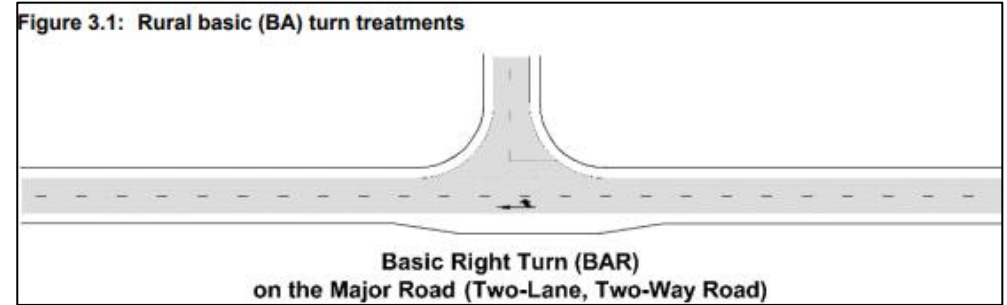
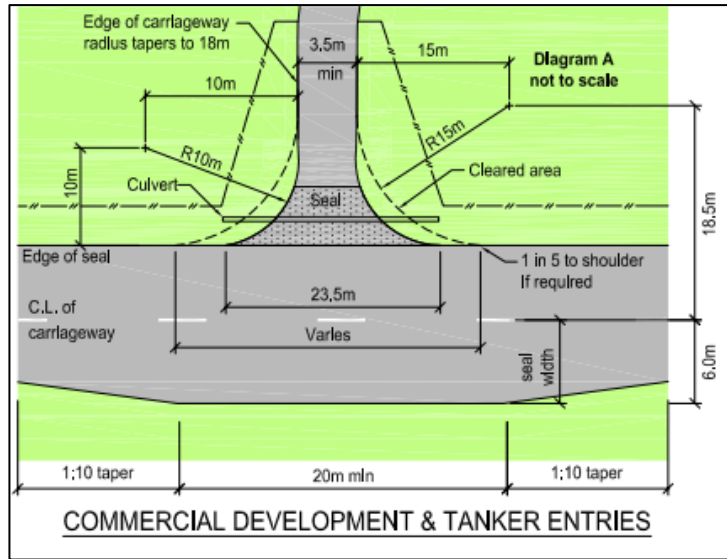


Figure 15 – Copies of all of the standard access layouts, and the BAR from Austroads, that have been discussed above. These are provided on one page for ease of comparison. Of note, they all feature widening opposite the access/intersection

72. There is room within the guidance for bespoke design and I am supportive of bespoke design for this location due to the uncertainty about the Te Puna Station Road slip and the vehicle crossing that is opposite the site. However, the bespoke design is not something to be done by taking a standard layout and simply omitting elements of it; changes to standard layouts should be done with fundamental design and safety principles in mind. Ultimately, bespoke design is not license to provide less than the standard minimum.
73. Having compliant sight distances is a pre-requisite for a vehicle crossing (or an intersection). Having compliant sight distance is not a valid reason to elect to not comply with fundamentals access requirements.
74. To omit the localised widening is contrary to the Development Code, the Planning Policy Manual (both versions), and best practise and in my opinion, is not taking reasonable steps to care for public safety.
75. Some form of basic right turn treatment is required. To be clear, this involves widening opposite the access. The vehicle crossing has to be wide enough for two way flow so that inbound vehicles don't have to wait for outbound vehicles committed to their approach, and that neither the inbound or outbound vehicles have to reverse to get out of the way of an HCV. The flares and tapers for the left turn movements have to be fit for purpose for the expected vehicles.
76. The 2007 Diagram D dimensions should provide sufficient length for the proposed HCVs for the proposed activity for the 2 year consent period. Accordingly, I would expect the access to be set out like either 2007 Diagram D or 2007 Diagram E; there is merit in discussing the necessity of the left lane that is shown in 2007 Diagram E due to the uncertainty about the slip (and hence the left turn demand).

Te Puna Road/Te Puna Station Road

77. With respect to the right turn bay discussion for Te Puna Road, it is fact that there is no provision for right turn movements on Te Puna Road (and all the traffic experts agree that is the case), despite the Structure Plan requirements. There is a clear physical lack of right turn treatment for people turning right from Te Puna Road.

78. In addition, the need for right turn provision on Te Puna Road was agreed to in the Te Puna Business Park Joint Witness Statement, and all experts agreed that the warrant for the right turn bay is already met.
79. Note that since 2005, there has been a change to the give way rule³ which exacerbates the queue arising from traffic turning right from Te Puna Road. Further, the sight distance for through traffic is on the cusp of what is acceptable for braking to avoid collision, and could be below on any given day depending on demand. To be clear, whilst Mr Harrison's evidence (Paragraph 29) references sight distance to the back of one stopped vehicle waiting to turn right, I am most concerned about the queue that arises from the vehicle/s waiting to turn right and the sight distance to the back of that queue.
80. The following figures show the approximate sight lines available. The first figure shows the standard sight distance measurement (ie along the lane) and it is approximately 60m. The second figure shows what might be available in practice if there are no vehicles in the southbound lane. The third figure shows what might be available in practice if the southbound lane is clear and the berm is clear.



Figure 18: Sight line to intersection is shown by the blue line (approximately 60m long).

³ In 2011, the give way rule changed so that right turning traffic now has to give way to left turning traffic. Previously, the left turning traffic had to give way to the right turning traffic.



Figure 19: Sight line to intersection that might be available if there is no traffic in the southbound lane (approximately 77m). Note that this is not how standard sight distance is measured.



Figure 20: Sight line to intersection that might be available if there is no traffic in the southbound lane and if there are no obstructions in the opposing berm (approximately 130m). Note that this is not how standard sight distance is measured.

81. Safe Stopping Distance (SSD) is a design parameter⁴. For a car at 60km/h on this site, it is approximately 84m. At 70km/h, it is approximately 100m. The SSD for trucks is longer; at 60km/h it is approximately 101m and at 80km/h it is approximately 130m.
82. The horizontal geometry limits the sight distance along the traffic lane. So whilst SSD is measured to object height (0.2m), not tail lights (0.8m), the object height becomes moot on the approach from SH 2 due to the horizontal curve.
83. Safe Intersection Sight Distance (SISD) is another design parameter⁶. (For a car at 60km/h, SISD is 130m and at 70km/h it is 161m). The purpose of SISD is two-fold – to enable a driver leaving the side road to see enough to get a safe gap and to enable a through road driver to see a potential conflict arising from the minor road vehicle.
84. SISD is not the critical parameter when considering the sight distance to the back of the right turn queue on the through road.
85. However, when considering the overall safety of the intersection, note that SISD is not available for the approach from SH 2.
86. This means that the available sight distance to the intersection is marginal, and the sight distance to the rear of a queue can be below SSD.
87. The right turn from Te Puna Road is the movement with the highest risk of an associated high energy crash; the left and right turn provisions on Te Puna Station Road and with the left turn from Te Puna Road appear to be more related to efficiency than safety so it is not clear to me why a right turn provision from Te Puna Road should not be provided when best practice even back in 2005 required it.
88. The effects relating to the right turn in from Te Puna Road are:

⁴ Safe Stopping Distance is defined in Austroads Guide to Road Design Part 3: Geometric Design. I have used 2.0s reaction time and an 8% grade correction.

⁶ Safe Intersection Sight Distance is defined in Austroads Guide to Road Design Part 4a: Unsignalised and Signalised Intersections. I have used 2.0s reaction time and grade correction for the maximum grade on the section (10%).

- a) Anyone slowing or stopped in preparation for making a right turn blocks Te Puna Road for traffic heading towards the ocean. This means that a stationary or slow moving queue can form.
- b) When a queue forms, there is opportunity for queuing-related crashes.
- c) Queuing-related crashes are typically rear-end, off road to the left, and cross centreline (including head-on and off road to the right).
- d) Queuing-related crashes can cause injuries (including fatal injuries), depending on the impact speed, impact angle, and the way the energy is dissipated.
- e) There is also an efficiency effect arising from the queue – ie through traffic is delayed.
- f) The other effect is that the tracking into Te Puna Station Road does not work well (if someone is waiting to turn right out of Te Puna Station Road, they get hit by the inbound HCV). Also, the inbound HCV has to swing wide into the left turn slip and this will wear out the flush island markings.

89. The applicant has not proposed any mitigation for the effects a-e.

90. The applicant has proposed mitigation for effect f – the proposal is to shift the centreline of Te Puna Station Road so that the inbound HCV does not have to track over the right-out lane as shown in the picture below:

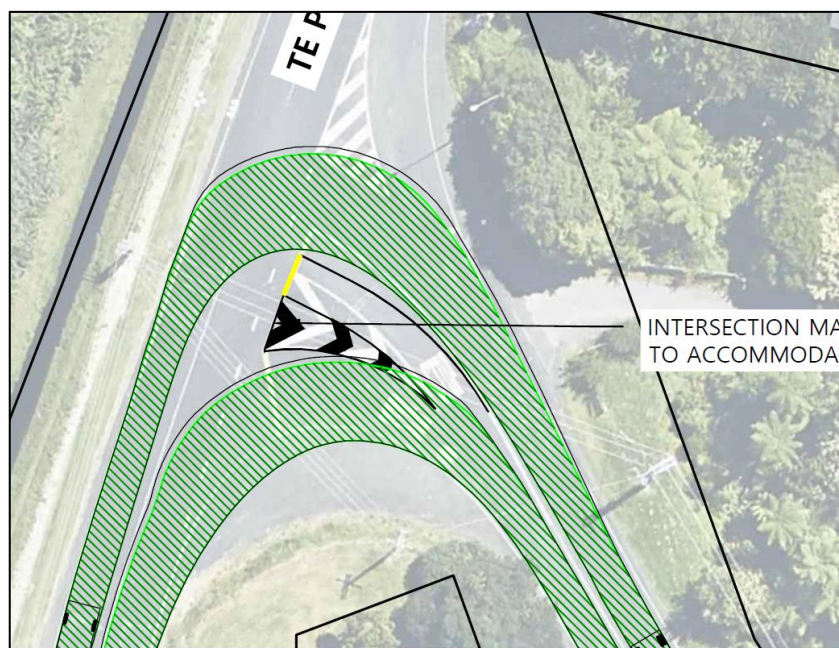


Figure 16: Tracking curve and proposed new markings on Te Puna Station Road. Drawing 423022 CIV D001 from S92 information.

91. This might be acceptable subject to the tracking for the HCV right turn out being satisfied. The right turn out must be checked because shifting the centreline might adversely affect the right turn out, especially for other HCV drivers. Note also that due to the inbound track swinging into the left turn slip (from Te Puna Road), the flush island should be pulled back⁷.

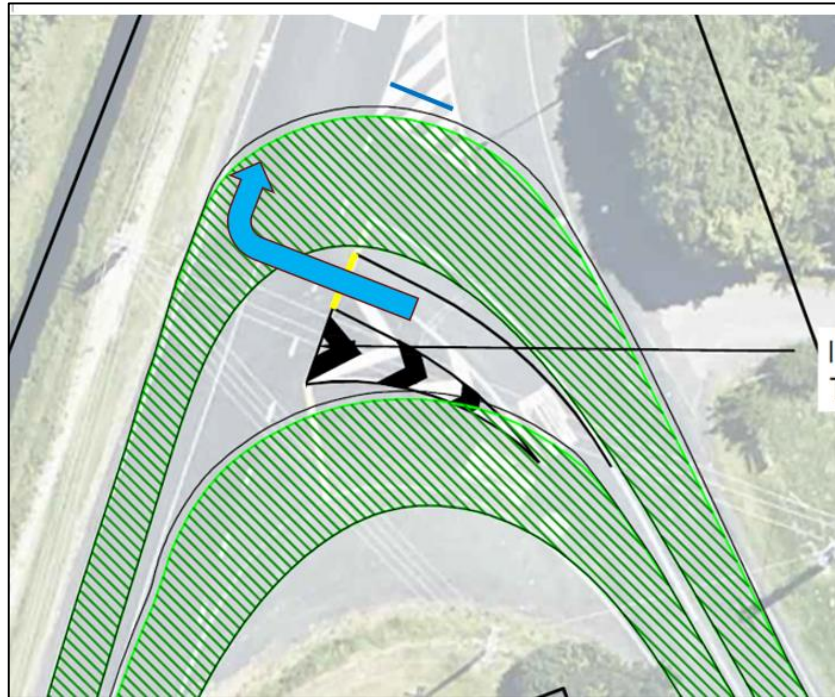


Figure 17: Tracking curve for right turn out to be checked. Flush splitter island to be pulled back.

92. The issue right now is whether or not the subject application requires the right turn provision for its 61 ecm/day. This will be addressed by Mr McLean and Ms Perring.
93. To progress the Business Park traffic without upgrading the right turn protection is not without risk. The intersection has no right turn protection so including Business Park traffic does not make the intersection safer, and could make it less safe. This was recognised in 2005 hence the requirement to provide the right turn treatment prior to any development of the Business Park.

⁷ Flush islands can be driven over but repeated action will wear off the markings very quickly. It would be better to set the island out for the tracking and mark it to fit.

94. From a safety perspective, the risk is Serious⁸ or Fatal injury. If a person is unable to stop prior to the queue (from right turning traffic), their options are to hit the rear of the queue, swerve left and go over the Shared Path into trees or swerve right into the oncoming lane. Due to the speed, possible presence of Shared Path users, trees and/or possible involvement of HCVs, the outcome of a queuing-related crash can be expected to have high forces capable of causing injuries or death.
95. In my opinion, it is clear that the right turn movement from Te Puna Station Road has not had any treatment. This is obvious because there is no right turn bay, no shoulder widening, no alternative treatment (eg lowering the crest to improve sight distance, adding a roundabout, banning right turns, etc). It is also clear to me that in 2005, this right turn movement was identified as a hazard which was to be addressed prior to any development of the Business Park. It is also clear, based on the evidence that Mr Harrison has provided that the right turn bay warrant shows that the criteria for a marked right turn bay is met. In my opinion, to leave the intersection as it is, and to add Business Park traffic, does not remove the potential for queuing-related crashes. Instead, it increases the opportunity for queuing-related crashes and the proposed centreline shift on Te Puna Station Road does not address this effect.

⁸ Serious Injury is defined by Waka Kotahi as '(fracture, concussion, severe cuts or other injury) requiring medical treatment or removal to and retention in hospital'. A copy of this definition is in Section 1.2 Figure 1 of the Safe System Audit Template.

APPENDICES

Appendix A – Extracts from Transit New Zealand's 1999 Planning Policy Manual

Appendix B – Extracts from NZTA's 2007 Planning Policy Manual