

**BEFORE THE INDEPENDENT HEARINGS PANEL**

**IN THE MATTER** of the Resource Management Act 1991 ("**RMA**")

**AND**

**IN THE MATTER** resource consent applications by Te Puna Industrial  
Limited in relation to 297 Te Puna Station Road

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**STATEMENT OF EVIDENCE OF BRETT HARRIES ON BEHALF OF  
TE PUNA INDUSTRIAL LIMITED**

**(PEER REVIEW OF TRAFFIC ASSESSMENT)**

**25 JUNE 2024**

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## 1. EXECUTIVE SUMMARY

- 1.1 My name is Brett Harries and I am a director of Harries Transportation Engineers Limited which is a specialist transportation engineering consultancy.
- 1.2 I was engaged by TPIL in August 2023 to undertake a peer review of traffic engineering work undertaken to date (including the Transportation Assessment Report prepared by Harrison Transportation), particularly in terms of the operation and safety of the Te Puna Road / Te Puna Station Road intersection.
- 1.3 My peer review of the TAR was focussed on five key matters:
- (a) **Trip generation.** In my view, the TAR assessment of trip generation as a result of the proposal has resulted in appreciably higher estimated trip totals than are likely to occur in practice given the TAR uses published trip rates for generic industrial activities, as opposed to the trip rates of the specific type of activity proposed. However, I consider this is acceptable as it is appropriate to be conservative.
  - (b) **The future base intersection traffic demands.** The future base of traffic demands took into account travel patterns recorded prior to the closure of the southern end of Te Puna Station Road and considered a scenario with it reopening. I confirm that those analyses were appropriately derived.
  - (c) **The assessment of the Te Puna Station Road / State Highway 2 intersection.** The TAR recommends that should the southern end of Te Puna Station Road remain fully or partially closed to southbound traffic, no improvements to this intersection are required. I agree with this conclusion. I also agree that regardless, heavy vehicles should be prevented from accessing the Site by left turn from Te Puna Station Road, given the uncertainty regarding the future operation of the southern end of Te Puna Station Road.
  - (d) **The assessment of the TPSR / TPR intersection.** The TAR considers that the TPSR / TPR intersection should be upgraded if the southern end of Te Puna Station Road is not re-opened. This is

irrespective of whether the Application is granted. I agree with this conclusion. I also consider that if southern end of Te Puna Station Road is re-opened, the addition of a right turn bay is still required to accommodate the additional traffic expected to be generated as a result of the Application. This right turn bay is proposed as part of this Application. This will ensure the intersection is safe for all users and is a significant positive effect of the Application.

- (e) **The assessment of the proposed Te Puna Station Road access intersection into / from the Site.** I agree with the TAR that a right turn bay on Te Puna Station Road for turning into in the Site should be established. I also agree with Mr Harrison that this right turn bay does not compromise the safe or efficient movement of vehicles to or from the properties on the opposite (northern) side of Te Puna Station Road.

#### **Upgrade to Te Puna Station Road / Te Puna Road intersection**

- 1.4 The proposed upgrade to the TPSR / TPR intersection as described in the statement of evidence of Mr Harrison will achieve the objective of accommodating the right turn bay in a manner that is, in my view, appropriate for the roading environment within which it will sit. This proposed upgrade design will significantly enhance the safety and operation of the TPSR / TPR intersection, for all users (ie not just the traffic generated as a result of this Application). In this regard, I consider it is a significant positive effect of the Application.

#### **Sight Distances**

- 1.5 The proposed upgrade of the TPSR / TPR intersection will not further compromise sight distances. Sight distances on Te Puna Road to the south of the TPSR / TPR intersection are presently constrained by the topography of the area. However, I am comfortable that the sight distances for both trucks and cars, to the south and to the north of the TPSR / TPR intersection, meet the appropriate standards in the Austroads guides.

## 2. INTRODUCTION

2.1 My full name is Brett Harries. I am a director of Harries Transportation Engineers Limited which is a specialist transportation engineering consultancy. Prior to my current role, I was:

- (a) Transport Sector Leader (New Zealand) for Stantec (NZ) Limited (2018 to 2022); and
- (b) traffic engineer at and, later, Managing Director of Traffic Design Group Limited (1982 to 2018).

### **Qualifications and experience**

2.2 I hold a Bachelor of Civil Engineering degree from the University of Auckland (1982).

2.3 I have 41 years' post-graduate professional experience as a practising specialist traffic and transportation engineer.

2.4 I am:

- (a) a Fellow of Engineering New Zealand;
- (b) a Fellow of the Institute of Transportation Engineers (USA);
- (c) a Life Member of the Association of Consulting and Engineering (NZ); and
- (d) an Associate Member of the NZ Planning Institute.

2.5 Throughout my 41 years as a specialist transportation engineer, I have been engaged by both public and private sector clients throughout New Zealand, Australia and the South Pacific to provide designs, assessments and advice on all manner of traffic engineering and transport planning projects.

2.6 I have had considerable experience in the assessment of a wide range of traffic-generating activities, including those (predominantly industrial activities) that involve the traffic generation and movement effects associated with heavy commercial vehicles. These include assessments and designs associated with ports, inland ports, distribution centres, large manufacturing / industrial

operations, warehouses, logging operations, quarry operations, transport interchanges, truck depots and truck stops.

### **Code of conduct**

- 2.7 I confirm that I have read the Expert Witness Code of Conduct set out in the Environment Court's Practice Note 2023. I have complied with the Code of Conduct in preparing this evidence and I agree to comply with it while giving oral evidence before the Hearings Commissioners. Except where I state that I am relying on the evidence of another person, this written evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed in this evidence.

### **3. SCOPE OF EVIDENCE**

- 3.1 My evidence relates to the resource consent applications by Te Puna Industrial Limited ("**TPIL**") in relation to the proposed development of its site at 297 Te Puna Station Road ("**Site**"). The applications are to authorise the development of the Site for the establishment and operation of industrial activities, with associated earthworks and discharge to water, within the Site. The proposed development will give effect to the Te Puna Business Park Structure Plan ("**Structure Plan**") and industrial zoning provisions that apply to the Site under the Western Bay of Plenty District Plan. ContainerCo will be the anchor tenant of the Site. ContainerCo intends to store, repair, and lease out / sell shipping containers.
- 3.2 Regional resource consents to enable the development of the Site ("**Project**") are required from Bay of Plenty Regional Council and land use consents are required from Western Bay of Plenty District Council ("**WBOPDC**") (together, the "**Application**"). The specific consent requirements are set out in the planning evidence of Mr Murphy.
- 3.3 I was engaged by TPIL in August 2023 to undertake a peer review of traffic engineering work undertaken to date by Bruce Harrison in his Traffic Assessment Report ("**TAR**"),<sup>1</sup> including regarding the operation and safety of the Te Puna Road / Te Puna Station Road intersection ("**TPSR / TPR intersection**"), and to provide supplementary traffic engineering advice on the

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<sup>1</sup> Harrison Transportation "Traffic Assessment Report" (dated September 2023).

same intersection.

3.4 In undertaking my peer review, I have examined the following documents:

- (a) The report: Application for Land-Use Consent - Assessment of Environmental Effects – Yard Based Industrial Activities, prepared by Momentum Planning and Design (January 2023).
- (b) The report: Environment Court Mediation, Te Puna Business Park – Impact of Te Puna Station Road Slips, prepared by Traffic Planning Consultants, (1 June 2023).
- (c) The letter: Te Puna Business Park Mediation – Review of Traffic Planning Consultants Report, prepared by Harrison Transportation (2 June 2023).
- (d) The Transportation Assessment Report: Te Puna Industrial Ltd - Yard Based Industrial Development - Te Puna Station Road Te Puna, prepared by Harrison Transportation (July 2023), ("**TAR**").
- (e) The decision report: Tinex Group Limited – Application RC13924L to Western Bay of Plenty District Council prepared by WBOPDC Independent Hearing Commissioners (22 October 2023).
- (f) Design Plans: Te Puna Industrial Ltd – Te Puna & Te Puna Station Road Intersection – Indicative Right Turn Bay prepared by Harrison Transportation (7 December 2023).
- (g) The technical memo: Te Puna Station Road Intersection Constructability prepared by Harrison Grierson (25 March 2024), ("**Harrison Grierson Memo**").
- (h) Evidence of Bruce Harrison dated 25 June 2024.

3.5 I am familiar with the Site and the surrounding locale. I last visited the Site specifically in relation to this Application on 20 May 2024.

3.6 In this statement of evidence, I will summarise my peer review of the assessment of potential effects of the Application upon the transportation network, with a particular focus on the safety and performance of the TPSR /

TPR intersection.

### **PRELIMINARY PEER REVIEW OF TRAFFIC ASSESSMENT REPORT**

3.7 In August 2023 I was asked to undertake a preliminary peer review of the TAR. My peer review was focussed on five key matters, being:

- (a) trip generation;
- (b) the future base intersection traffic demands;
- (c) the assessment of the Te Puna Station Road / State Highway 2 ("SH2") intersection;
- (d) the assessment of the TPSR / TPR intersection; and
- (e) the assessment of the proposed Te Puna Station Road access intersection into / from the Site.

3.8 My key findings in relation to each of the above-listed matters are summarised below.

#### **Trip Generation**

3.9 The trip generating potential of the proposed development as described in the TAR has,<sup>2</sup> in my opinion, resulted in appreciably higher estimated trip totals than are likely to occur in practice. This is because in the TAR, more weight was given to published trip rates for generic industrial activities, whereas trip generation surveys undertaken at a similar facility to the one proposed in this Application, in Auckland, revealed lower actual travel demands.

3.10 The implication of this is that the subsequent analyses of access and intersection performances are likely to be conservatively demanding. I note in this regard that it is always more appropriate to err on the side of conservatism when determining travel demands (as the TAR has), because this ensures that access and intersection performances will likely be better in practice than is suggested by the TAR analyses.

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<sup>2</sup> Harrison Transportation "Transportation Assessment Report" (dated September 2023) at [8.2].

### **Future Base Intersection Traffic Demands**

- 3.11 Analyses were required to determine the future base traffic demands at surrounding intersections, as they had to take into account:
- (a) travel patterns that were recorded prior to the closure of the southern end of Te Puna Station Road; and
  - (b) the two potential future base traffic scenarios, being with the southern end of Te Puna Station Road either remaining closed, or re-opened.
- 3.12 The analyses used to derive those base travel demands were informed by the Traffic Planning Consultants report.<sup>3</sup> Having reviewed those analyses of the future base travel demands, I am able to confirm that they had been appropriately derived through consideration of the patterns of intersection turning movements at the TPSR / TPR intersection as existed prior to closure of the southern end of Te Puna Station Road, and assumptions made about redistribution of those flows to account for future scenarios that include either the southern end of Te Puna Station Road remaining closed, or partially re-opening to provide for southbound traffic only.

### **Assessment of the Te Puna Station Road / SH2 Intersection**

- 3.13 The TAR recommends that if Te Puna Station Road remains closed, or is confined to southbound traffic only, then no improvement works are required at the Te Puna Station Road / SH2 intersection.<sup>4</sup> I agree with this conclusion.
- 3.14 If, however, Te Puna Station Road is reopened to provide access from SH2, then I also agree with the TAR that it will be necessary to impose controls on vehicle movements to prevent any heavy vehicle access into the Site by way of a left turn from Te Puna Station Road.<sup>5</sup>
- 3.15 In this regard, I understand that regardless of whether or not the southern end of Te Puna Station Road is fully or partially opened, TPIL has committed to ensure that all heavy vehicles exit from the Site by way of a left turn toward Te Puna Road, except that if Te Puna Station Road eastbound is reopened,

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<sup>3</sup> "Environment Court Mediation, Te Puna Business Park – Impact of Te Puna Station Road Slips", Traffic Planning Consultants (dated 1 June 2023).

<sup>4</sup> Harrison Transportation "Transportation Assessment Report" (dated September 2023) at [16].

<sup>5</sup> Harrison Transportation "Transportation Assessment Report" (dated September 2023) at [9.2].



light vehicles only may exit right from the Site.<sup>6</sup> I agree that this is an appropriate restriction, given there is currently no certainty regarding the future of the southern end of Te Puna Station Road which intersects with SH2.

### **Assessment of Te Puna Station Road / Te Puna Road Intersection**

- 3.16 The TAR describes that if Te Puna Station Road is not re-opened for access from SH2, then regardless of whether or not the Application proceeds, the TPSR / TPR intersection should be upgraded by way of the establishment of a new right turn bay for turning into Te Puna Station Road from Te Puna Road. This is in order to achieve acceptable levels of performance (including safety).<sup>7</sup>
- 3.17 The TAR was less definitive about the need for a new right turn bay from Te Puna Road into Te Puna Station Road in the event that the southern end of Te Puna Station Road was reopened.<sup>8</sup> My response to that was that even if the southern end of Te Puna Station Road is re-opened, the addition of a new right turn bay from Te Puna Road into Te Puna Station Road would still be required to accommodate the additional traffic expected to be generated by the Application.
- 3.18 I have discussed my peer review of this aspect of the TAR with Mr Harrison and I understand we are both now agreed that the addition of a new right turn bay from Te Puna Road into Te Puna Station Road will ensure significant improvements to the safety and performance of the TPSR / TPR intersection (for the benefit of all users).<sup>9</sup> I am also aware of the Commissioners' decision to decline consent to Tinex to authorise its existing industrial activities on its neighbouring site at 245 Te Puna Station Road. A key reason for the decline of that consent application was that the Commissioners were concerned that traffic generated by the activities on the Tinex site would result in unacceptable safety effects at the TPSR / TPR intersection.<sup>10</sup>
- 3.19 The Application now proposes a new right turn bay for the TPSR / TPR intersection. I endorse this approach, for the reasons explained above.
- 3.20 I provide further discussion on the proposed design for upgrading the

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<sup>6</sup> Evidence of Bruce Harrison dated 25 June 2024 at [6.4]  
<sup>7</sup> Harrison Transportation "Transportation Assessment Report" (dated September 2023) at [9.3].  
<sup>8</sup> Harrison Transportation "Transportation Assessment Report" (dated September 2023) at [9.3]  
<sup>9</sup> Evidence of Bruce Harrison dated 25 June 2024 at [6.31] - [6.32].  
<sup>10</sup> Decision Report Tinex Group Limited Application RC13924L (22 October 2023) at [116].

intersection in Section 4 of my evidence below.

### **Assessment of Site Access Intersection with Te Puna Station Road**

- 3.21 The TAR provided a design for the location and layout of a proposed access intersection into the Site from Te Puna Station Road.<sup>11</sup> The layout was designed principally according to Diagram E of the Waka Kotahi Planning Policy Manual, with further enhancements to align with Austroads recommendations relating to the provision of the right turn bay. My evaluation of that design was that it represented a best-practice layout that is appropriate for the nature and volumes of traffic that are expected to use the access; and it is appropriately located to achieve optimum sight distances, and appropriate separations from existing driveways to the east and west.
- 3.22 Since preparing my preliminary peer review, I have been asked to further consider the access intersection design particularly in relation to its potential to affect the existing driveway that serves the properties on the opposite (northern) side of Te Puna Station Road at 288A and 288B Te Puna Station Road. In this regard, I note that the hatched taper that precedes the right turn bay into the Site will extend back to a point just to the west of the driveway to 288A and 288B Te Puna Station Road. I understand that concerns have been expressed by the owners of those properties that this will create a road safety hazard due to potential conflicts between vehicles wishing to turn right into that driveway, and any eastbound vehicles that may choose to start moving into the hatched taper in order to turn right into the Site.
- 3.23 I have reviewed Mr Harrison's responses to this concern,<sup>12</sup> and have undertaken my own independent assessment. Having considered the design in detail, and closely examined the road environment on the Site, I agree with Mr Harrison that the relationship between the existing driveway serving 288A and 288B Te Puna Station Road, and the Site access intersection designed as proposed, will produce a negligible, if not nil, potential for adverse road safety interactions.<sup>13</sup>
- 3.24 In my opinion, drivers approaching in both directions will have more than satisfactory inter-visibility of each other well before reaching the point that an

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<sup>11</sup> Harrison Transportation "Transportation Assessment Report" (dated September 2023) "Proposed Site Layout" attachment.

<sup>12</sup> Evidence of Bruce Harrison (dated 25 June 2024) at [6.39] - [6.40]

<sup>13</sup> Evidence of Bruce Harrison (dated 25 June 2024) at [6.39] - [6.40]

eastbound driver will have an awareness of the commencement of the hatched taper, let alone be attempting to manoeuvre onto that taper.

- 3.25 Even regardless of that inter-visibility, I consider that the particularly narrow width of the taper adjacent to the shared driveway serving 288A and 288B Te Puna Station Road will be insufficient to enable any behaviours or actions by either eastbound and / or westbound vehicle drivers that could potentially result in conflict between those vehicles. In my opinion, it would therefore be fanciful to suggest that the presence of the beginning of a hatched taper at the 288A and 288B Te Puna Station Road driveway could materially impact on road safety.

#### **4. TE PUNA STATION ROAD / TE PUNA ROAD INTERSECTION UPGRADE DESIGN**

- 4.1 In his evidence, Mr Harrison has provided and discussed a design for the upgrade of the TPSR / TPR intersection in order for it to accommodate the additional traffic demands due to the Application (notwithstanding the view I have expressed in paragraph 3.17 above that the existing operation of the TPSR / TPR intersection already justifies the need for the addition of the right turn bay, especially if the southern end of Te Puna Station Road is to remain closed).<sup>14</sup> The TPSR / TPR intersection upgrade that Mr Harrison proposes will achieve the required enhancements to capacity and safety by way of the addition of a right turn bay from Te Puna Road northbound into Te Puna Station Road.<sup>15</sup>

- 4.2 Mr Harrison's design has, in my opinion, taken into account the various geometric and operational constraints that exist, including:

- (a) The constraints of the existing road reserve. The design as proposed is fully contained within the existing road reserve without the need for any intrusion into private land. I note that the Harrison Grierson memo has confirmed the constructability of the design within the existing road reserve.<sup>16</sup>

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<sup>14</sup> Evidence of Bruce Harrison (dated 25 June 2024) at [6.36] - [6.38].

<sup>15</sup> Evidence of Bruce Harrison (dated 25 June 2024) at [6.38].

<sup>16</sup> Harrison Grierson Technical Memo (dated 25 March 2024) at [3.0].

- (b) The fixed width of the railway overbridge located to the north of the intersection.
- (c) The curved downhill approach on the Te Puna Road northbound approach to the TPSR / TPR intersection.
- (d) The 80km/h speed limit that currently applies to Te Puna Road in the vicinity of the TPSR / TPR intersection (noting also that the speed limit north of the railway overbridge is currently 50km/h).<sup>17</sup> With regards to the existing speed limit, I understand that the WBOPDC proposes to reduce the general speed limit on Te Puna Road to 60km/h, and that this is expected to occur within the next two years.
- (e) The actual existing travel speeds in the northbound direction toward the TPSR / TPR intersection, which Mr Harrison has measured as being 69km/h for the 85<sup>th</sup> percentile speed<sup>18</sup>, and 61.5km/h for the mean speed.<sup>19</sup>

4.3 The TPSR / TPR intersection design layout produced by Mr Harrison achieves the objective of accommodating the right turn bay in a manner that I consider to be appropriate for the roading environment within which it will sit.

4.4 In terms of the road safety record of the existing TPSR / TPR intersection, I have examined the Waka Kotahi Crash Analysis System for crashes that have been recorded within a 50m radius of the intersection over the past 20 years. There were nine recorded crashes over that 20-year period (representing a crash rate of less than 0.5 crashes per annum). Of the nine crashes:

- (a) Three involved a minor injury and the remaining six were non-injury.
- (b) Five involved a southbound vehicle losing control while turning left into Te Puna Station Road.
- (c) Two involved northbound vehicles losing control while turning right into Te Puna Station Road.

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<sup>17</sup> Evidence of Bruce Harrison (dated 25 June 2024) at [6.41].

<sup>18</sup> The 85<sup>th</sup> percentile speed is the measured speed within which 85% of motorists travel, and which is typically applied for design purposes.

<sup>19</sup> Evidence of Bruce Harrison (dated 25 June 2024) at [6.26].

- (d) Two involved a northbound vehicle hitting the rear of a vehicle in front that was slowing / stopping to turn right into Te Puna Station Road.

4.5 While the existing TPSR / TPR intersection has demonstrably operated with a good road safety record, the proposed modified design will further enhance its safety and operation by:

- (a) better providing for northbound right turners from Te Puna Road into Te Puna Station Road by way of the separate right turn bay (with a resultant reduced potential for northbound rear-end crashes);
- (b) better providing for right turners from Te Puna Station Road into Te Puna Road northbound by way of a merge taper (with a reduced potential for "right turn against" type crashes, notwithstanding that they have not appeared in the 20-year crash data); and
- (c) better providing for truck turning by way of enhanced turn radii for left and right turns out of Te Puna Station Road, and northbound right turns into Te Puna Station Road.

## 5. SIGHT DISTANCES

5.1 An important consideration in relation to the design and acceptability of the modified TPSR / TPR intersection layout is the extent of achievement of appropriate sight distances, particularly to and from the south where they are currently constrained by the topography of Te Puna Road. Sight distances to and from the north are largely unconstrained.

5.2 From measurements that I have taken on Site, I concur with Mr Harrison's descriptions of the sight distances that will be available to / from the south following the proposed enhancements to the intersection layout as being:

- (a) 135m as measured southward from a car driver's eye height of 1.1m to a point 5m back into Te Puna Station Road from the southbound through lane (using target height 1.25m).
- (b) 159m as measured southwards from a car driver's eye height of 1.1m to a potential "conflict point" (using target height 1.25m) in the northbound through lane.

- (c) 172m as measured southwards from a truck driver's eye height of 2.4m to a potential "conflict point" (using target height 1.25m) in the northbound through lane.
- (d) 146m as measured southwards from a car driver's eye height of 1.1m to a point 7m back from a potential "conflict point" (using target height 1.25m) in the northbound through lane.
- (e) Approximately 146m as measured southwards from a truck driver's eye height of 2.4m to a point 7m back from a potential "conflict point" (using target height 1.25m) in the northbound through lane.<sup>20</sup>

5.3 When considering the adequacy of these sight distances, there are, in my opinion, three key criterion that are applicable to consideration of the nature and operation of the TPSR / TPR intersection as exists and as proposed.<sup>21</sup> These are:

- (a) **Safe Intersection Sight Distance ("SISD")** which is described as being the distance measured along the carriageway from an approaching vehicle to a point 7m back toward the side road from the "conflict point" (in this case, the conflict point is within the middle of the modified northbound lane). This distance is intended to provide sufficient distance for a driver of a vehicle on the major road to observe a vehicle emerging from the side road approach moving into a collision situation (eg in the worst case, stalling across the traffic lanes), and to decelerate to a stop before reaching the collision point.
- (b) **Safe Stopping Distance ("SSD")** is the distance to enable a normally alert driver travelling at the design speed on a wet pavement, to perceive, react and brake to a stop before reaching a hazard on the road ahead.
- (c) **Minimum Gap Sight Distance ("MGSD")** which is described as the critical acceptance gap that drivers are prepared to accept when undertaking a turning manoeuvre at the intersection. It is measured

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<sup>20</sup> The truck driver eye height sight distance is estimated to be the same as the car driver eye height. Direct measurement is currently not possible because of overhanging tree branches.

<sup>21</sup> Per Austroads "Guide to Road Design Part 4A – Unsignalised and Signalised Intersections" 2023, ("AGRD Part 4A"), Section 3.2.

from the point of conflict between approaching and entering vehicles back along the travel lane of the approaching vehicle.

- 5.4 The SISD and SSD visibility requirements and availabilities with the modified TPSR / TPR intersection layout will remain essentially unchanged from existing, particularly when viewing to and from the north where the straight and level southbound approach to the TPSR / TPR intersection ensures largely unrestricted visibilities. In this case, it will be the views to and from the south that require closer examination, as the curved downhill approach to the TPSR / TPR intersection for northbound traffic limits the extents of visibility that will be available.
- 5.5 Determination of each of the sight distance standards requires five primary inputs, being:
- (a) The 85th percentile speed ("**V**") of northbound vehicles on approach to the intersection, which in this case has been measured by Mr Harrison as being 69km/h, which is equivalent to 19.2m/s.<sup>22</sup>
  - (b) The longitudinal grade ("**a**") of Te Puna Road on the northbound approach to the intersection, which based on WBOPDC contour information is approximately 7% downhill toward the intersection.
  - (c) The coefficient of deceleration of the road ("**d**"), which the Austroads Guide to Road Design Part 4A ("**AGRD Part 4A**") recommends as 0.46 for cars, and 0.29 for trucks.
  - (d) The reaction time of drivers ("**R<sub>T</sub>**") which the AGRD Part 3 recommends as 2.0 seconds.
  - (e) The decision time ("**D<sub>T</sub>**") which AGRD Part 3 recommends as R<sub>T</sub> plus 3 seconds.

#### **Safe Intersection Sight Distance (SISD)**

- 5.6 The SISD incorporates both an observation distance and a stopping distance.

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<sup>22</sup> Evidence of Bruce Harrison (dated 25 June 2024) at [6.26].

It uses the formula as below (where g is the gravitational constant):

$$\text{SISD} = D_T V + \frac{V^2}{2g(d-a)}$$

- 5.7 Calculation of SISD results in required versus available sight distances as per Table 1 below.

| SISD   | Required | Available | Achieved? |
|--------|----------|-----------|-----------|
| Cars   | 144m     | 146m      | √         |
| Trucks | 181m     | 146m      | X         |

Table 1: Required versus available SISD

- 5.8 Table 1 demonstrates that SISD can be achieved for cars, but not for trucks.

### Stopping Sight Distance Using Extended Design Domain Criteria

- 5.9 In circumstances where the normal design domain SISD cannot be achieved, the Austroads guides provide for an alternative lesser requirement for sight distance which is referred to as Stopping Sight Distance ("**SSD**"), and which is applied using Extended Design Domain ("**EDD**") criteria. Austroads states that EDD can be appropriate for application where:<sup>23</sup>

- (a) The road is existing.
- (b) A few geometric elements on the existing road are being realigned and it is impractical to achieve the normal design domain criteria.
- (c) The crash data indicates that there are no sight distance related crashes. As described in paragraphs 4.4 and 4.5, this applies in this case with no sight distance related crashes having occurred at the TPSR / TPR intersection for at least the past 20 years.
- (d) Geometric and other features of the road will not be misleading and will not distract drivers, which in my opinion is the situation in this case.

<sup>23</sup>

Refer Appendix A of AGRD Part 3.



- 5.10 For the purposes of calculating SSD using EDD criteria, the same formula and inputs apply as per the SISD calculation, with the following exceptions:
- (a) Decision time does not apply.
  - (b) The reaction time of drivers ( $R_r$ ) is recommended as being 1.5 - 2.0 seconds.<sup>24</sup>
- 5.11 The calculation of SSD using EDD criteria results in required versus available sight distances as per Table 2 below.

| SISD   | Required    | Available | Achieved? |
|--------|-------------|-----------|-----------|
| Cars   | 77m – 88m   | 159m      | √         |
| Trucks | 114m – 125m | 172m      | √         |

Table 2: Required versus available SSD

- 5.12 Table 2 demonstrates that SSD is comfortably achieved for both cars and trucks.

### Minimum Gap Sight Distance

- 5.13 MGSD is based on the distances corresponding to the critical acceptance gap that drivers are prepared to accept when undertaking a crossing or turning manoeuvre at intersections. As with the other sight distance criteria, it is visibility to the south from that is of most relevance, given that visibility to the north is largely unrestricted.
- 5.14 Tables 3.5 and 3.6 of AGRD Part 4A provide the critical acceptance gaps and corresponding minimum gap sight distances. Given that Te Puna Road is a two-lane two-way road, a right turn from Te Puna Station Road will require a minimum acceptance gap of 5 seconds, which with an 85<sup>th</sup> percentile northbound approach speed of 69km/h, corresponds to a minimum gap sight distance of 97m. This distance is achieved by the 115m that will be available from a driver's position at the limit line.

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<sup>24</sup> Refer Table A 5 of AGRD Part 3 which specifies that 1.5 seconds is appropriate for alert driving conditions, including in the case of "a horizontal curve that requires a reduction in operating speed from the previous geometric element"; while 2.0 seconds is appropriate for "normal situations in rural areas".

### **Sight Distance Summary**

- 5.15 It is acknowledged that the topography of Te Puna Road to the south of the TPSR / TPR intersection somewhat constrains the available sight distances. This is an existing situation that is not further compromised by the proposed enhancements to the TPSR / TPR intersection. The Austroads guides have allowed for such situations by providing EDD criteria that provide sight distance standards that are relevant to the environmental context (as outlined at paragraph 5.9 above) and that can ensure appropriately acceptable and safe operations. Of key relevance in this regard is the SSD standard which is comfortably achieved at this location.

## **6. CONCLUSIONS**

- 6.1 Having reviewed the TAR prepared by Harrison Transportation and the evidence of Mr Harrison, I am able to confirm my opinions that:
- (a) The analyses of trip generation and the resultant Site access design for accommodating the generated traffic movements into and from the Site are both appropriate and acceptable.
  - (b) The Site access design as proposed will not compromise the safe or efficient movement of vehicles to or from the properties on the opposite (northern) side of Te Puna Station Road.
  - (c) The design that Mr Harrison has proposed to enhance the TPSR / TPR intersection is an appropriate and acceptable one that is consistent with the relevant design standards as prescribed by the Austroads guides.
- 6.2 I also note that the TPSR / TPR intersection design as proposed will not only fully provide for the additional traffic demands (particularly truck traffic demands) that are likely to be generated by the Application, but will also provide significant overall improvements to the operation and safety of the TPSR / TPR intersection that will benefit all its users. Most particularly, it will remedy the recent changed traffic demands that have occurred at the TPSR / TPR intersection by the closure of the southern end of Te Puna Station Road. In this regard, it is my opinion that the proposed upgrading of the intersection

represents a significant positive effect of the Application.

- 6.3 Overall, I am able to support Mr Harrison's conclusion regarding the transportation effects of the TPIL Application, and I confirm my own opinion that there are no transportation engineering reasons to preclude its acceptance.

**Brett Harries**

25 June 2024