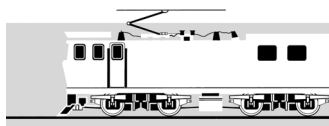
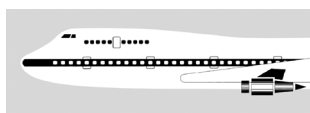


## RAILWAY OCCURRENCE REPORT

03-112

diesel multiple unit Train 2153, collision with truck,  
St Georges Road level crossing, Avondale

28 October 2003



TRANSPORT ACCIDENT INVESTIGATION COMMISSION  
NEW ZEALAND

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## **Report 03-112**

### **diesel multiple unit Train 2153**

### **collision with truck**

### **St Georges Road level crossing, Avondale**

**28 October 2003**

### **Abstract**

On Tuesday 28 October 2003 at about 1940, Train 2153, a Tranz Metro<sup>1</sup> Waitakere to Auckland diesel multiple unit passenger service collided with a truck at St Georges Road level crossing at Avondale.

The truck driver suffered minor injuries. The crew and passengers on the train were not injured.

The truck was substantially damaged. The train, with only minor damage, was able to complete its journey after the collision.

Safety issues identified included:

- the approval of a right-of-way to join St Georges Road between the level crossing warning devices and the railway line
- the adequacy of the design, layout, signage and warning devices of existing level crossings to meet existing and projected levels of road and rail traffic volumes.

Several safety recommendations covering these issues have been made to the relevant parties.

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<sup>1</sup> Tranz Metro was the group within Tranz Rail with responsibility for the operation of suburban train services in Auckland.



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## Abbreviations

DMU	Diesel Multiple Unit
km/h	kilometres per hour
m	metre(s)
Toll NZ	Toll NZ Consolidated Limited <sup>2</sup>
Tranz Rail	Tranz Rail Limited
UTC	coordinated universal time

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<sup>2</sup> New owner of Tranz Rail, effective 5 May 2004

## Data Summary

<b>Date and time:</b>	28 October 2003 at about 1940 <sup>3</sup>
<b>Location:</b>	Avondale
<b>Persons on board:</b>	train crew: 2 train passengers: 3  truck crew: 1
<b>Injuries:</b>	train crew: nil train passengers: nil truck crew: minor
<b>Damage:</b>	minor to train, substantial to truck
<b>Operator:</b>	Tranz Rail Limited (Tranz Rail)
<b>Investigator-in-charge:</b>	D L Bevin

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<sup>3</sup> Times in this report are New Zealand Daylight Saving Times (UTC+13) and are expressed in the 24 hour mode.





# 1 Factual Information

## 1.1 Narrative

- 1.1.1 On Tuesday 28 October 2003, Train 2153 was the scheduled 1905 diesel multiple unit (DMU) passenger service from Waitakere to Auckland. It consisted of 2 powered passenger cars in multiple and was crewed by a DMU driver and a train manager.
- 1.1.2 At about 1940, as Train 2153 rounded the curve approaching St Georges Road level crossing, the DMU driver became aware of a medium-sized truck reversing towards the level crossing from a private right-of-way adjacent to the railway line. The DMU driver initially thought that the truck would stop clear of the railway line but, as he got closer, he saw the truck continuing to reverse so he sounded the DMU horn to warn of his approach.
- 1.1.3 The DMU driver realised that the truck driver would not be able to clear the level crossing before the train arrived and that a collision was imminent, so he applied the brakes and got down behind his seat to protect himself from the impact. The rear of the truck was about one metre foul of the railway line when the DMU struck it. The impact spun the truck around and tipped it over, trapping the truck driver in the cab.
- 1.1.4 When the DMU had stopped, the driver went back to the truck. He found that the truck driver had been pulled from the cab by bystanders and was sitting in a chair. After confirming that he was conscious and not seriously injured the DMU driver returned to the train and confirmed with train control that emergency services had been notified.

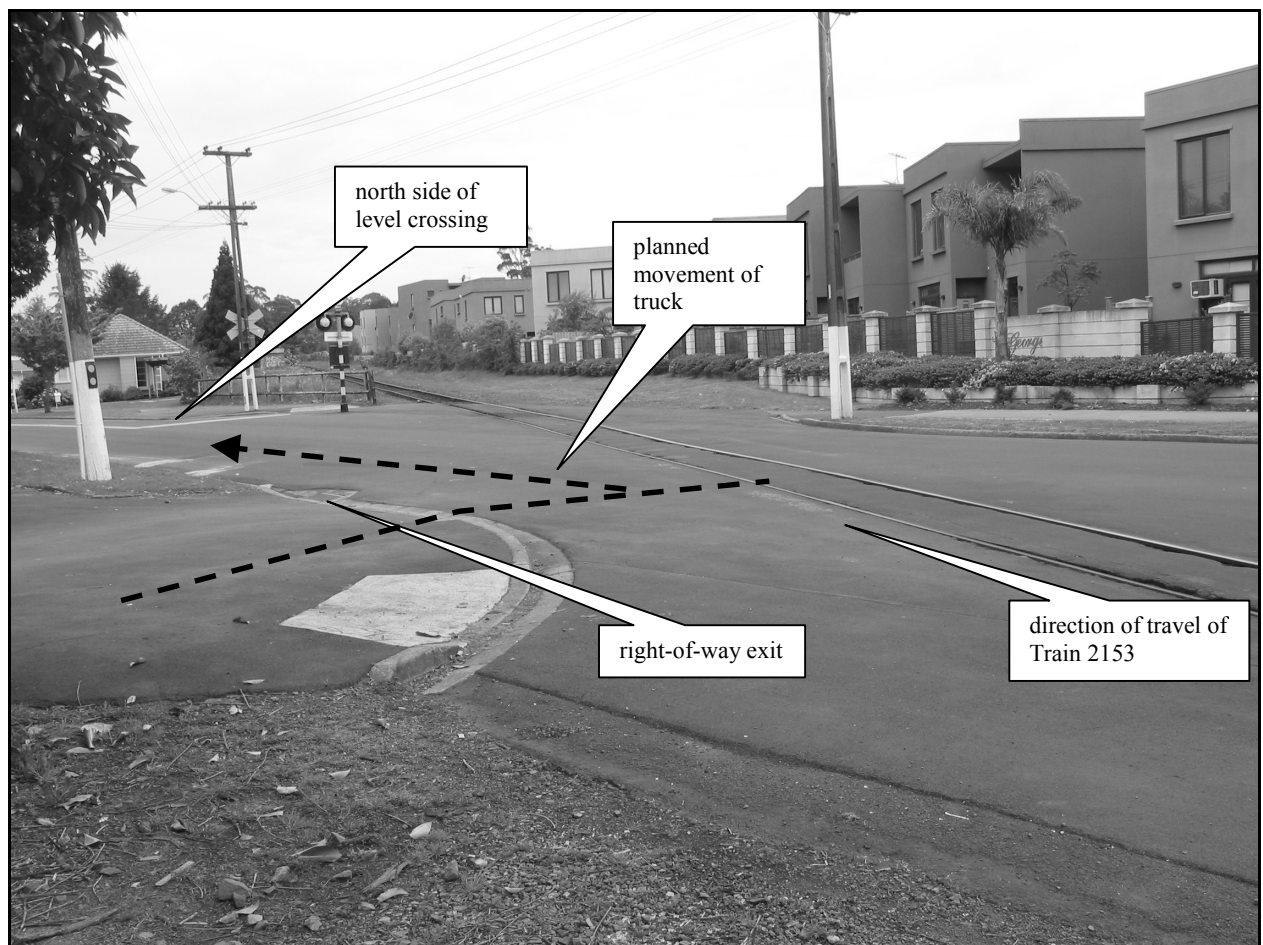
## 1.2 Site information

- 1.2.1 St Georges Road ran in a north - south direction and was bisected at an acute angle by the North Auckland railway line running east to west (see Figure 1).



**Figure 1**  
**St Georges Road level crossing looking north**

- 1.2.2 The level crossing was protected on both sides by signs, road markings, flashing lights and bells. All signage was in accordance with the “Manual of Traffic Signs and Markings”. The level crossing was not equipped with barriers.
- 1.2.3 Visibility for road traffic approaching from the north side of the level crossing was restricted because of the angle of approach of the railway line, the presence of houses and vegetation. There were no such restrictions when approaching from the south side of the level crossing.
- 1.2.4 Auckland City Council advised that at the latest count, 7800 road vehicles used the crossing in each 24-hour period.
- 1.2.5 A private right-of-way, which serviced 3 houses near the railway line, joined St Georges Road between the railway line and the level crossing warning devices to the north . The distance from the right-of-way exit to the warning devices was about 20 m, and to the railway line about 5 m (see Figure 2). There was no signage or warning devices directed towards the right-of-way.



**Figure 2**  
**Where the private right-of-way joined St Georges Road on the north side of the level crossing**

- 1.2.6 When exiting the right-of-way, line-of-sight in the direction from which Train 2153 approached was restricted by a boundary fence, a row of trees along the fence line and by the fact that the right-of-way joined St Georges Road almost parallel to the railway line (see Figure 3).



**Figure 3**  
**Looking east from the right-of-way exit in the direction from which Train 2153 approached**  
**St Georges Road**

1.2.7 On 30 January 2004 the Signals Planning Engineer for Tranz Rail advised in part:

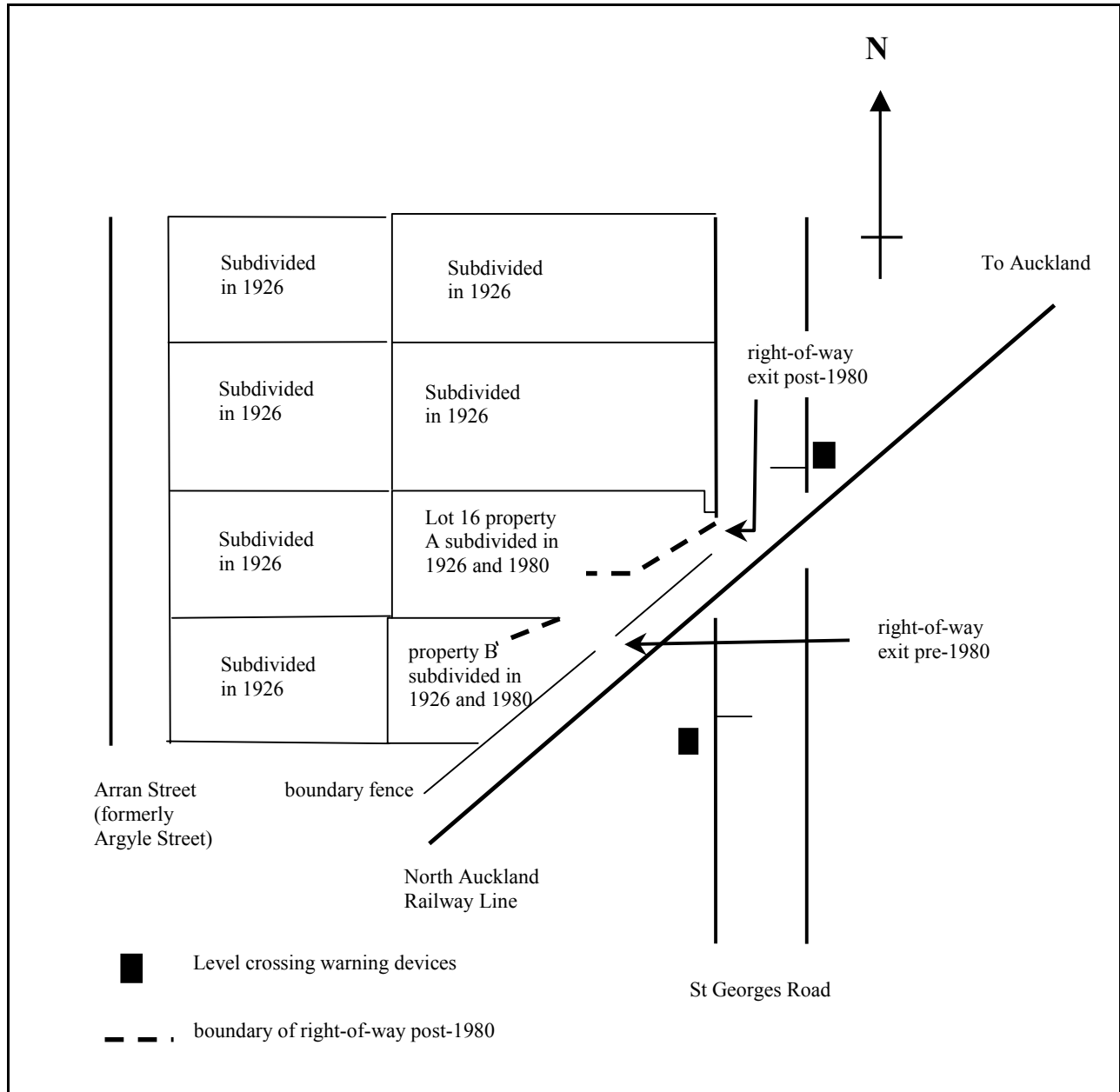
The St Georges Road level crossing has had flashing light and bell alarms installed since 1942. At that time the corner of the crossing in question was not developed. I have no record of the position of any subsequently constructed driveways having been formally discussed with the railway operator. Private driveways are not covered by Tranz Rail level crossing safety standards. It is often impossible to avoid driveways closer to a level crossing than public access would be permitted. However, if a private land owner requests that a pair of flashing lights be directed towards a private driveway we will consider additional lights at the private owner's expense.

Furthermore, collisions caused by vehicles exiting private driveways at level crossings are extremely rare...

1.2.8 Historical records supplied by Auckland City Council and Land Information New Zealand showed that a large portion of land between St Georges Road and Arran Street (formerly Argyle Street) had been surveyed and approved for subdivision into 16 lots in 1926.

1.2.9 Before 1980 the right-of-way for the single residence on Lot 16, property A, exited on to St Georges Road near to the railway line (see Figures 3 and 4), although the legal frontage of the property to St Georges Road was further north. As a result, traffic exiting the right-of-way did so on to the railway corridor and not on to a public street. It was not possible to determine when the right-of-way had been established or if approval to exit on to the railway corridor had been received, either from the local authority of the time or from New Zealand Railways as the predecessor of Tranz Rail.

1.2.10 Lot 16 was about twice as big as the surrounding lots, and in 1980 it was again subdivided to allow for the construction of a second residence, property B. Included in this subdivision was the provision of a new right-of-way for property B, crossing the front of property A to connect with St Georges Road at the legal frontage. Because the location of the exit was the only option for access between the properties and St Georges Road, it then provided access for both properties. Figure 4 shows the location of these lots in relation to St Georges Road and the railway line.



**Figure 4**  
**Diagram showing locations of properties (not to scale)**

1.2.11 In 1996 plans were approved for the construction of a second dwelling on property A, bringing the number of residences served by the right-of-way to 3.

### 1.3 Locomotive event recorder

1.3.1 The DMU was not equipped with a locomotive event recorder.

## **1.4 Personnel**

### **The DMU driver**

- 1.4.1 The driver was a senior locomotive engineer and had been driving DMUs in Auckland for about 10 years.
- 1.4.2 The driver said that as he rounded the curve approaching St Georges Road level crossing, he saw that the lights at the level crossing were operating. The ditch lights and the headlight on the DMU were illuminated at the time and he sounded the horn. He thought his speed when he first saw the truck was about 60km/h, but this had reduced under braking to about 40 km/h at the time of impact.
- 1.4.3 The driver said that he had encountered many near misses at that particular level crossing, including some involving traffic exiting from the right-of-way.

### **The truck driver**

- 1.4.4 The truck driver was employed as a clothes salesman and visited houses selling directly from his truck. After completing a sales call to one of the properties, he had reversed along the right-of-way towards St Georges Road. He exited on to St Georges Road and turned the rear of his truck towards the railway line in preparation for driving in a northerly direction along St Georges Road away from the level crossing.
- 1.4.5 As he reversed towards the level crossing the truck driver had not heard the horn of the approaching DMU, nor had he heard any warning alarms. The first he knew of the train was when it struck the rear of his truck, spinning it around and tipping it over. He was trapped in the cab but was pulled free by bystanders.
- 1.4.6 The truck driver was a regular caller to the house, often visiting 2 or 3 times per week. He was therefore aware of the existence of the railway line and its close proximity to the exit of the right-of-way but, from previous experience, having never encountered a train, he had not expected any trains as he undertook his reversing manoeuvre.
- 1.4.7 The physical constraints of the right-of-way and the limited turning area available, meant that turning the truck within the confines of the property, although not impossible, would have been difficult.

## **2 Analysis**

- 2.1 The level crossing signage and road markings met the recommended guidelines, were clearly visible and in good condition for traffic using St Georges Road. However, the private right-of-way joined St Georges Road between the railway line and the warning devices and signage. As a result, vehicles exiting the right-of-way did so behind the warning devices, making the devices and signage ineffective from that direction.
- 2.2 The flashing lights on both sides of the level crossing were facing away from the right-of-way exit and therefore they would not have alerted the truck driver. The warning bells were about 20 m distant and were probably difficult to hear in the cab over the noise of the truck engine when reversing. Although the flashing lights would not have been visible, the driver of a vehicle going forward, rather than reversing, from the right-of-way would have had other opportunities to become aware of the approaching train by either sighting the train or noticing the cars stopped at the warning devices.

- 2.3 Because he was reversing, the truck driver would not have had such opportunities to warn him of the approaching train, as he would have been concentrating on his rear vision mirrors, with his attention on what was happening at the rear of the truck rather than on anything within his peripheral vision. Even if he had looked briefly to the side, the boundary fence and the trees along the fence line would have prevented him from seeing Train 2153 as it approached.
- 2.4 The truck driver expected to be able to complete his manoeuvre without any consequences, as had always been the case previously, when he reversed from the right-of-way. This expectation would have arisen from his past experiences, as he had not previously had to stop for a train to pass while reversing his truck from the right-of-way and seldom, if ever, had to stop while using the right-of-way.
- 2.5 Because there was no warning signage for the right-of-way, motorists joining St Georges Road had to rely on their local knowledge of the existence of the level crossing and the potential for approaching trains. For regular users, the recognised warning of an approaching train was more likely to be the stopped cars at the warning devices on either side of the railway line rather than the devices themselves.
- 2.6 St Georges Road carried significant vehicle traffic volumes, so gaps in traffic created by the passage of a train provided opportunities for vehicles exiting from the right-of-way to enter St Georges Road by either turning left and travelling away from the level crossing or, when turning right, and depending on the distance of the approaching train, crossing ahead of it and the traffic waiting at the warning devices. Such manoeuvres were illegal and highly dangerous and probably accounted for the near misses referred to by the DMU driver.
- 2.7 At the time Lot 16 was further subdivided in 1980, planners probably realised that the then existing right-of-way exited on to the railway corridor rather than on to St Georges Road through the property's legal frontage. The opportunity was taken at that time to rectify the situation by moving the exit slightly north but, while this ensured the right-of-way did not exit on to the railway corridor, its new position meant that because of the acute angle at which the railway line crossed St Georges Road, the exit was actually no further away from the railway than it had originally been. Because of the angle at which vehicles now exited the new right-of-way, the line-of-sight when looking for approaching trains was degraded. As a result, because the original exit approached the railway line almost at right angles, it was ironically probably safer. A safety recommendation has been made to the relevant local authorities covering planning and consent procedures for future applications involving side roads and exits from private right-of-ways in the immediate vicinity of railway level crossings to include adequate protection.
- 2.8 Increased suburban train services are expected as a result of the proposed duplication of the railway line through much of West Auckland and a safety recommendation has been made to the Director of Land Transport Safety and the relevant local authorities covering the adequacy of the design, layout, signage and warning devices of existing level crossings within the Auckland metropolitan area to meet these projected increases.
- 2.9 Exact speeds of the DMU when it approached the level crossing could not be ascertained because the DMU was not equipped with a locomotive event recorder, but there was nothing to suggest that speed or train handling had been a contributing factor in the collision.

### **3 Findings**

- 3.1 The acute angle at which the North Auckland Railway Line bisected St Georges Road restricted the visibility of motorists approaching the level crossing, but there was adequate protection in the form of signage, road markings, flashing lights and bells to warn them of approaching trains.
- 3.2 Before 1980 the right-of-way in use on Lot 16 exited on to the railway corridor beside the North Auckland Line and not on to St Georges Road at the property's legal frontage.

- 3.3 In 1980 the repositioning of the right-of-way exit ensured compliance with the legal frontage on to St Georges Road, but the view lines for motorists approaching the level crossing from the right-of-way deteriorated as a result.
- 3.4 There were no warning signs or devices in place to alert motorists exiting the right-of-way of approaching trains.
- 3.5 The truck driver was familiar with the level crossing and its proximity to the right-of-way exit, but his previous experiences of never seeing trains had conditioned him to not expect them.
- 3.6 Train 2153 was being operated correctly and the actions of the DMU driver did not contribute to the accident.

## 4 Safety Recommendations

- 4.1 On 12 May 2004 the Commission recommended to the Director of Land Transport Safety that he:

undertake, in conjunction with Toll NZ, Papakura District Council, Auckland and Waitakere City Councils, a review of all existing railway level crossings within the Auckland metropolitan area, to ensure that their design, layout, signage and warning devices are adequate for current road and rail traffic volumes and will be adequate to meet projected increases in rail traffic on the Auckland rail corridors (008/04).

- 4.2 On 25 May 2004 the Director of Land Transport Safety replied in part:

This Authority considers the above recommendation with regards to the LTSA participation is unnecessary because we are already pursuing a strategy for ensuring that safety strategies are being implemented on the Auckland metropolitan rail corridor, including level crossings, during the changes that are now in progress. To further this strategy, the Director of Land Transport Safety intends to meet representatives of the relevant territorial authorities and the Auckland Regional Council within the next few weeks to seek a broad agreement on how progress should be made to develop an agreed set of policies, procedures and plans for:

- Closure of any level crossings that are not essential to the road network;
- Grade separation of level crossings where the safety risks and/or the traffic delays are deemed unacceptable, including the setting of priorities;
- The types of protection to be provided at level crossings that remain open;
- The safe use of the fringes of the rail corridor for walkways and cycle ways;
- The design and maintenance of fencing of the rail corridor;
- Land use planning adjacent to the rail corridor;
- Publicity and education about the safe use of the rail corridor; and
- Funding of rail corridor safety measures.

The purpose of this work is to ensure an appropriate level of safety in the use of the railway corridor in the Auckland region.

It is intended that once the councils agree on the methodology, the rail operators and infrastructure provider will also be involved in the development of the policies, procedures and plans. The LTSA will take an observer role, contributing where there is value in doing so, however, the principal responsibility must lie with the railways and the roading authorities.

For this reason, it is the LTSA's view that leadership for the work must come from within Auckland rather than the LTSA itself.

4.3 On 12 May 2004 the Commission recommended to the Chief Executive of Toll NZ Consolidated Limited (Toll NZ) that he:

participate with the Land Transport Safety Authority, Papakura District Council, Auckland and Waitakere City Councils in a review of all existing railway level crossings within the Auckland metropolitan area, to ensure that their design, layout, signage and warning devices are adequate for current road and rail traffic volumes and will be adequate to meet projected increases in rail traffic on the Auckland rail corridors (009/04).

4.4 On 14 June 2004 the Chief Executive of Toll NZ Consolidated Ltd replied in part:

- We will need to carry out further work before deciding whether to implement the recommendation.
- We will need to enter into a discussion with other stakeholders, particularly NZRC (TrackCo), who are soon to take ownership of the infrastructure.
- NZRC (TrackCo) should confirm acceptance or otherwise of this safety recommendation.

4.5 On 12 May 2004 the Commission recommended to the Chief Executive of the Auckland City Council that he:

4.5.1 participate with the Land Transport Safety Authority, Toll NZ, Papakura District Council and Waitakere City Council in a review of all existing railway level crossings within the Auckland metropolitan area, to ensure that their design, layout, signage and warning devices are adequate for current road and rail traffic volumes and will be adequate to meet projected increases in rail traffic on the Auckland rail corridors (010/04)

and

4.5.2 ensure that Council's planning and consent procedures for future applications involving side roads and exits from private rights-of-way joining public roads in the immediate vicinity of railway level crossings include a requirement for the provision of adequate protection (011/04).

4.6 On 3 June 2004 the Manager Transport Assets, Auckland City Council replied in part:

In respect of the Commission's recommendation 10/04 I would advise that we would be quite happy to participate in any safety focused reviews of level crossings. There are in fact 24 level crossings (3 are pedestrian only) within the territory of Auckland City. Sixteen of these will be subject to proposed increases in commuter rail traffic in the next few years. The balance are on the little used Onehunga Branch Line. A study with the high level objective of determining a means of eliminating level crossings, by grade separation or redirection of traffic in the City is nearing completion. Public consultation, resource consent and funding issues will however all need resolution prior to changes from the current form of the level crossings

As to the Commission's recommendation 011/04 the procedure of how this can be addressed is still to be worked through.



- 4.7 On 12 May 2004 the Commission recommended to the Chief Executive of Papakura District Council that he:
- 4.7.1 participate with the Land Transport Safety Authority, Toll NZ, Auckland and Waitakere City Councils in a review of all existing railway level crossings within the Auckland metropolitan area, to ensure that their design, layout, signage and warning devices are adequate for current road and rail traffic volumes and will be adequate to meet projected increases in rail traffic on the Auckland rail corridors (012/04)

and

  - 4.7.2 ensure that Council's planning and consent procedures for future applications involving side roads and exits from private rights-of-way joining public roads in the immediate vicinity of railway level crossings include a requirement for the provision of adequate protection (013/04).
- 4.8 On 24 May 2004 the Director of Regulatory Services, Papakura District Council replied, in part:
- With respect to the final safety recommendations set out in your letter of the 12<sup>th</sup> May 2004, the Papakura District Council is currently taking the following actions.
- The Council is seeking Transfund New Zealand support for a project to investigate and improve the safety of the road intersections that cross the North Island main trunk railway line which runs through Papakura District. This project was identified in Council's submission to Transfund New Zealand's 2004/05 National Land Transport programme. The terms of reference for the railway level crossing study are attached to this letter.
- The Papakura District Council is willing to provide the results of its study to the Land Transport Safety Authority, Toll New Zealand, Auckland and Waitakere City Councils as part of the review of existing railway level crossings within the Auckland Metropolitan area.
- The Council's planning and consent procedures involving side roads and exits from private rights-of-way, joining public roads, within the vicinity of railway level crossings are subject to scrutiny and input from the Council's traffic engineers. The Council's traffic engineers are fully aware of the safety issues with railway level crossings and access from nearby properties onto the railway line, or roads in the vicinity of the railway line.
- When completed, the Papakura District Council railway level crossing study results will be forwarded to the Land Transport Safety Authority, Toll New Zealand, Auckland and Waitakere City Councils and the Transport Accident investigation Commission.
- 4.9 On 12 May 2004 the Commission recommended to the Chief Executive of Waitakere City Council that he:
- 4.9.1 participate with the Land Transport Safety Authority, Toll NZ, Papakura District Council and Auckland City Council in a review of all existing railway level crossings within the Auckland metropolitan area, to ensure that their design, layout, signage and warning devices are adequate for current road and rail traffic volumes and will be adequate to meet projected increases in rail traffic on the Auckland rail corridors (016/04)

and

4.9.2 ensure that Council's planning and consent procedures for future applications involving side roads and exits from private rights-of-way joining public roads in the immediate vicinity of railway level crossings include a requirement for the provision of adequate protection (017/04).

4.10 On 13 April 2004 the Chief Executive of Waitakere City Council responded to the preliminary safety recommendations, which were subsequently adopted unchanged as the Commission's final safety recommendations. That response was, in part:

I can confirm that Council will carry out a review of the safety of all road rail crossings in the City, in consultation with key stakeholders such as Land Transport Safety Authority, Auckland City Council, Manukau City Council, Papakura District Council, and Tranz Rail.

The Terms of Reference will be as per your recommendation [016/04 and 017/04].

It is timely to do this work as we are making decisions on crossings at Waitakere Central and also as the double tracking engineering investigation is being done. Our focus will be on a safe and cost effective solution for crossings (road and pedestrian) and also the walk/cycle way alongside the rail line.

We have sufficient resources to participate in this review. However, any recommendations arising from the review will need to be considered by Council as presently no funding has been provided in the Long Term Council Community Plan for improvements to railway level crossings.

Waitakere City Council has a clear objective to protect public safety and I would like to thank you for bringing this to our attention.

Approved on 26 May 2004 for publication

Hon W P Jeffries  
Chief Commissioner



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