

No 93-105
Train 520
Collision with Motor Vehicle
Near Levin
28 May 1993

ABSTRACT

This report relates to a collision between a train and a motor vehicle on a level crossing near Levin on 28 May 1993. The driver, the sole occupant of the motor vehicle, was seriously injured. Safety issues discussed in the report are design criteria for level crossings adjacent to main road intersections and the display of warnings to motorists following the disablement of crossing warning devices.

this intersection.

1.9 The features of the State Highway 1/Kimberley Road intersection were discussed with Transit New Zealand, the authority responsible for the road design. They indicated that there were no mandatory standards applicable, except for signs and signals, which were covered by the Road Traffic Act and its Regulations. Transit New Zealand employed codes of practice to establish uniformity and good traffic engineering practice in its designs. In respect of intersections, use was made of the "Guide to Traffic Engineering Practice: Part Seven: Intersections at Grade", published by the National Association of Australian State Roading Authorities (NAASRA). Another reference document was a Transit New Zealand report entitled "Planning for a Safe and Efficient Roading Network Under the Resource Management Act 1991".

1.10 The NAASRA guide did not deal with railway level crossings, or with the situation where a railway crossing was close to an intersection. The Transit New Zealand report did refer to intersections with adjacent level crossings, but only dealt with the need to provide a distance sufficient to accommodate a long truck and trailer unit between the level crossing and the intersection.

1.11 Neither document discussed the concept of a "recovery zone" between the intersection and the railway crossing, of sufficient distance for a driver leaving the intersection at the maximum practicable speed to have enough time to sight the crossing, react to signals and/or signs, and take appropriate action.

1.12 The Ministry of Transport's Land Transport Division and Transit New Zealand conducted a joint Road Accident Investigation Study on "black spots" (sections of road on which significant numbers of accidents had occurred) on State Highway 1 in the Horowhenua District in late 1992, and the report was completed in February 1993. The study team examined the Kimberley Road intersection but did not take into account the accident history of the level crossing. NZRL was not represented on this study.

1.13 The siting of the level crossing alarms was designed by NZRL, after discussion with the roading authority. The flashing lights used were an American-designed type in world-wide use. They were rugged, weatherproof, and featured special low-powered long-life bulbs, the light from which was directed through coloured lenses of 200 mm diameter. These produced a diverging beam of 30° (i.e. ±15° from the axis of the lens). This gave good

visibility within the cone of the beam, but limited visibility from points outside of the cone.

1.14 The crossing alarms also incorporated bells, but these were intended to alert pedestrians, and were not intended to attract the attention of motorists.

1.15 The driver, heading north on State Highway 1 and intending to turn into Kimberley Road, would have entered the area covered by the primary 30° beam of the flashing lights at 25 to 30 m from the turning point at the intersection. The lights would have been visible directly ahead of the driver only after the turn into Kimberley Road was commenced. Sighting of the lights would have been possible from outside of the 30° beam only if the driver had looked directly at them.

1.16 This accident resulted in the crossing alarms being out of operation for five days. NZRL placed unlit reflective signs at the crossing warning road users that the alarms were not working. However, not all road users paid attention to these signs, and many passed over the crossing at speed, without checking for approaching trains. The roading authority, Transit New Zealand, did not post any signs or speed restrictions.

1.17 In accordance with standard practice, NZRL placed a speed limit of 10 km/h on all trains over the crossing while the alarms were inoperative. This was effected by written train advice and the placing of temporary speed boards by the track. The risk of collision would have been further reduced if a clear speed restriction had been placed on motorists as well.

1.18 The motorist involved in this accident had flown that afternoon from Nelson to Wellington, where he collected his car. After an evening meal with relatives, he set out for Palmerston North. He had owned a car only for a matter of months, and had not previously driven from Wellington to Palmerston North. The stretch of State Highway 1 between Wellington and Levin had a reputation of being particularly demanding, even in good driving conditions. Night driving, inexperience and unfamiliarity with the road would have required a high degree of concentration on the part of the driver.

1.19 A marked increase in his workload would have been likely as he interpreted the junction signs and road markings in addition to manoeuvring the car and observing the oncoming traffic for an opportunity to turn. The speed at which he made his turn may have been influenced by the gaps in the oncoming stream of traffic,

which would have been travelling at or close to the open road speed limit. These factors may have combined to divert his attention from the crossing warning lights.

1.20 Although the train was travelling in the same direction as the car, the car driver may have been unaware of its presence. As he approached the intersection, the train would have been in a “blind spot” to his right rear, and even had he seen the glare of its headlight, it would

have been possible for him to attribute it to following road traffic. The locomotive engineer observed that the car made a rapid turn into Kimberley Road. Given the proximity of the crossing to the main highway, the driver probably had insufficient “recovery time” to react even if he had noticed the warning lights or the train while making the turn.

FINDINGS

2.1 The train was being operated properly prior to the accident.

2.2 The crossing alarms were functioning normally at the time of the accident.

2.3 One set of warning lights was aligned towards the approaching motor vehicle driver as he made his turn into Kimberley Road.

2.4 The motorist turned right into Kimberley Road from State Highway 1, but did not stop before the railway crossing.

2.5 The motor vehicle collided with the side of the locomotive, and was thrown off the road.

2.6 A secondary collision with a crossing alarm standard caused substantial damage to the motor vehicle.

2.7 The motorist did not respond to the road signs or crossing alarms which were intended to draw his attention to the crossing.

2.8 A number of factors could have contributed to the motorist’s failure to notice the crossing, but the workload for him to negotiate the State Highway 1/ Kimberley Road intersection was probably the major influence.

2.9 If the driver failed to notice the railway crossing before turning off State Highway 1 into Kimberley Road, he would have little time or distance in which to brake safely.

2.10 A “black spot” study of State Highway 1 south of Levin late in 1992 examined the intersection with Kimberley Road. The study did not take into account the accident history of the nearby level crossing, nor did it involve NZRL.

2.11 Transit New Zealand did not have detailed design and construction standards for road intersections with adjacent railway crossings, which took into account the combined risks of the road intersections and the railway crossings.

3. SAFETY RECOMMENDATIONS

As a result of the investigation of this accident, it was recommended to Transit New Zealand that:

The Road Accident Investigation study team be reconvened at an early date, with representatives of NZRL, to review the traffic engineering aspects of the State Highway 1/Kimberley Road intersection and the adjacent railway crossing on Kimberley Road, to determine what practical steps could be taken to reduce the likelihood of accidents

(055/93), and

They develop a code of practice for the design of intersections with closely adjacent railway crossings, taking into account the combined risks of accident that the two hazards present (056/93), and

They develop a programme to review the adequacy of warnings to motorists at all intersections on State Highways which have railway cross-

ings in close proximity (057/93), and
When railway level crossing alarms are disabled,
a temporary road traffic speed restriction and
suitable warning signs, accompanied by suitable
hazard lighting during the hours of darkness, be
placed on the approaches to the crossing (058/93).

Transit New Zealand responded as follows:

*“Recommendation 055/93 has been actioned. The
accident investigating team examined proposals
for modifying the intersection and as a result some
minor changes were made to the design.*

*Recommendation 057/93 is being actioned through
a working party involving Transit New Zealand,
Land Transport Safety Authority, New Zealand
Rail and local authority representatives consider-*

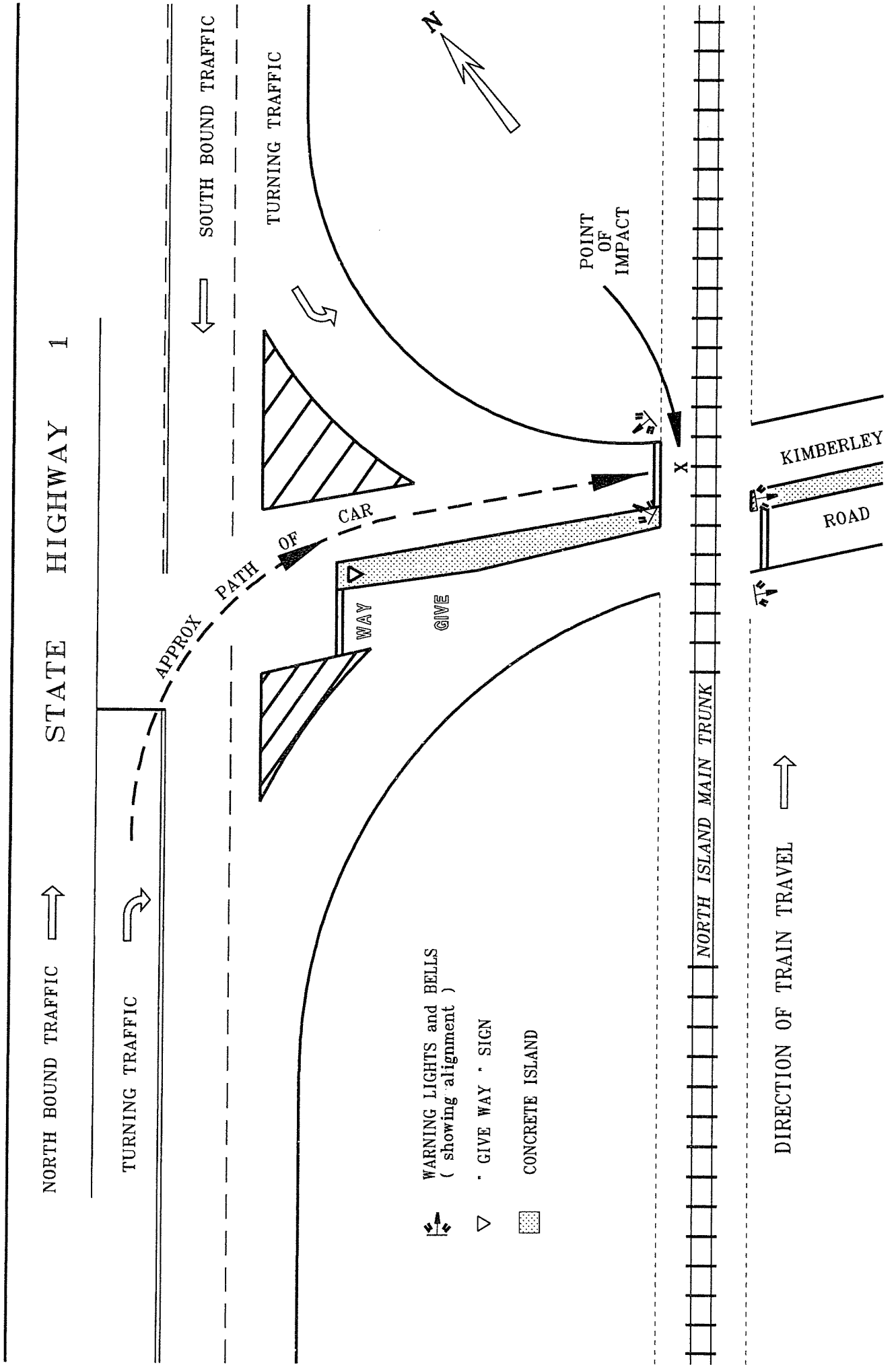
*ing revisions to signing and road marking at rail
crossings. This activity is also a first stage toward
developing a code of practice as in recommenda-
tion 056/93.*

*Recommendation 058/93 will be further discussed
with New Zealand Rail and Land Transport Au-
thority to define responsibility for placing tempo-
rary speed limits.”*

3 December 1993

M F Dunphy
Chief Commissioner

KIMBERLEY ROAD LEVEL CROSSING , LEVIN



▲ WARNING LIGHTS and BELLS
(showing alignment)

▽ GIVE WAY SIGN

▨ CONCRETE ISLAND

