Queensland Government

Transport and Main Roads

Moranbah Investigation Report

Fatal collision - 8 July 2010 - Occupational crossing 5805 Goonyella Riverside Mine - Near Moranbah

Final report, Rail Safety Investigation TMR3584

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Contents

Preface

This investigation has been conducted by the Department of Transport and Main Roads (the department) in accordance with provisions of Queensland's Transport *(Rail Safety) Act 2010* (TRSA). This investigation has been conducted by a team from the Rail Safety Regulation Branch (RSR).

At the time of the incident, the *Transport Infrastructure Act 1994* (TIA) was in effect and applicable to the circumstances relating to the incident. On 1 September 2010, TRSA came into effect. The investigation was conducted utilising the transitional provisions of Section 311 of TRSA to determine if a breach of TIA had occurred.

Rail safety in Queensland is regulated by the department. All railway managers and/or railway operators within Queensland were required at the time of the incident to be accredited in accordance with TIA. The department's role in rail safety includes investigation of rail transport collisions and other safety occurrences.

In 1993 when the rail corridor was established, Queensland Rail was the relevant railway manager and was a government owned corporation. With the introduction of TIA in 1994, Queensland Rail was accredited as a railway operator and railway manager in accordance with the provisions of TIA. In 2007 Queensland Rail became QR Limited.

In 2008 a variation to accreditation for QR Limited created three separate entities. QR Network Pty Ltd became a subsidiary company within QR Limited and was accredited as a railway operator and a railway manager in accordance with the provisions of TIA.

On 1 July 2010 a variation to accreditation for QR Network Pty Ltd and QR Limited occurred. QR Limited was rebranded as QR National Limited (ACN 146 335 622) and is the parent entity for the QR National Group. QR National Limited is not itself an accredited railway operator or railway manager.

QR Limited (ACN 124 649 967) was re-accredited as a railway operator and railway manager and is a subsidiary company of QR National Limited. QR Limited was the railway operator at the time of the incident. Trains operated by QR Limited are branded as QR National.

QR Network Pty Ltd (ACN 132 818 116) is a subsidiary company of QR Limited and was re-accredited as a railway operator and railway manager. QR Network Pty Ltd was the railway manager at the time of the incident.

The QR National Group adopted the existing safety management systems and procedures of the former accredited entity QR Limited.

In this report the former entities Queensland Rail, QR Limited and the current entity QR Network are referred to as the railway manager.

Goonyella Riverside Mine is operated by BHP Billiton Mitsubishi Alliance (BMA) and was formed in 2001. BMA is jointly owned by BHP Billiton Ltd and Mitsubishi Development Pty Ltd. BHP Billiton Ltd was formed in 2001 with the merger of the BHP and Billiton companies.

BHP and BMA are referred to as the mine operator in this report.

Terms of Reference

As the Rail Safety Regulator, the Director-General, Transport and Main Roads, has requested an investigation into the level crossing collision at Moranbah in accordance with the terms of reference outlined below.

As Rail Safety Regulator pursuant to the *Transport (Rail Safety) Act 2010* I hereby require you to conduct an investigation in accordance with Section 183 (2) of the *Transport (Rail Safety) Act 2010* and report to me on the circumstances and causes of the level crossing collision between a QR National coal train and a road vehicle at Moranbah resulting in the death of the road vehicle driver on 8 July 2010.

Your investigation will:

- clearly establish the factual circumstances of the incident
- conduct an analysis of the cause or causes of the incident to determine if a breach of rail safety legislation has occurred
- assess human factors to identify any underlying matters, the interface and the actions of relevant parties which may have caused or contributed to the incident
- assess the adequacy and effectiveness of actions taken as a result of the incident to protect the rail corridor
- if necessary, make appropriate recommendations designed to prevent a recurrence of these failures.

The investigation team will be comprised of members of the Rail Safety Regulation Branch of the Department of Transport and Main Roads.

A report is to be provided to me by 31 March 2011. The report must include advice as to whether:

- the incident being investigated is a notifiable occurrence
- the reasons for considering the occurrence to be a notifiable occurrence.

David Stewart
Director-General
Transport and Main Roads

Executive Summary

At 10.36 am on 8 July 2010 a four wheel drive utility turned into the path of an empty QR National coal train at Occupational Crossing 5805, near Goonyella Riverside Mine on the Riverside – North Goonyella section of the Goonyella Coal System, near Moranbah, Queensland. As a result of the collision, the driver of the utility was fatally injured and a passenger received serious injuries. The lead locomotive received minor damage and the rail traffic crew (RTC) were uninjured.

An investigation was conducted by the railway manager and reviewed by the department. As a result of the review, the department conducted an independent investigation of the incident.

The department investigation determined the immediate cause of the incident was that the driver of the road vehicle failed to give way to rolling stock on a railway track and turned into the path of the oncoming train.

The department investigation determined that the basic cause of the incident was that the railway manager failed to properly assess the risks associated with change in the land surrounding the rail corridor and put in place or maintain adequate control measures to prevent unauthorised persons entering the rail corridor.

The investigation found that the underlying causes of the incident were:

- the railway manager failed to identify a change in the use of the land surrounding Occupational Crossing 5805 in 1994 and assess the risks that may relate to the use of the crossing and rail corridor
- the railway manager failed to conduct any maintenance on the corridor access road in the vicinity of Occupational Crossing 5805 or on the crossing itself between 1993 and 2008
- the railway manager failed to put in place appropriate control measures in 2008 after detecting that the crossing did not conform to it's standards.

The investigation recommendations include:

- QR Network Pty Ltd shall ensure that QR Standard SAF/STD/0044/CIV/NET Level Crossing Safety is complied with in respect to contact with land owners and review of crossing use.
- QR Network Pty Ltd shall ensure that audits are conducted of all crossings in accordance with QR Standard SAF/STD/0044/CIV/NET Level Crossing Safety.
- QR Network Pty Ltd should put in place procedures to identify occupational crossings that the railway manager considers to present a high risk because of the nature and use of the crossing.
- QR Network Pty Ltd should develop a formal communication strategy with the relevant land owner(s) of occupational crossings that present a high risk.
- QR Network Pty Ltd should develop and implement written procedures to address risks involved in respect to the use of any occupational crossings that are identified by the railway manager as high risk.
- QR Limited should provide further education and ongoing training to RTC in respect to Module EP – 1-20 Persons on QR right of way in QR Operational Safety Manual SAF/STD/0036/SWK/NET Trespassing on QR Property.

For the purposes of this report, the incident was a notifiable occurrence as defined in Schedule 3 of TRSA. The reasons that it is considered a notifiable occurrence are:

- the operation or movement of rolling stock on a railway track is defined in Section 9 of the TRSA as railway operations
- rolling stock as defined in Schedule 3 of the TRSA was involved in this incident
- the incident occurred on a railway as defined in Schedule 3 of the TRSA
- the incident caused death
- the operator of the rolling stock was accredited under TIA at the time of the incident
- the incident was an occurrence that was required to be reported by the railway operator and the railway manager under the conditions of accreditation.

1 Factual Information

1.1 Overview

At 10.36 am on 8 July, 2010 a four wheel drive utility turned into the path of an empty QR National coal train at Occupational Crossing 5805, near Goonyella Riverside Mine on the Riverside – North Goonyella section of the Goonyella Coal System, near Moranbah, Queensland. As a result of the collision, the driver of the utility was fatally injured and the passenger received serious injuries. The lead locomotive received minor damage and the rail traffic crew (RTC) were uninjured.

1.1.1 Location

Moranbah is located 194 kilometres south west of Mackay in central Queensland (refer Figure 1). The town was established in 1969 as a service centre for the coal mines in the region and has a population of approximately 7500 people.

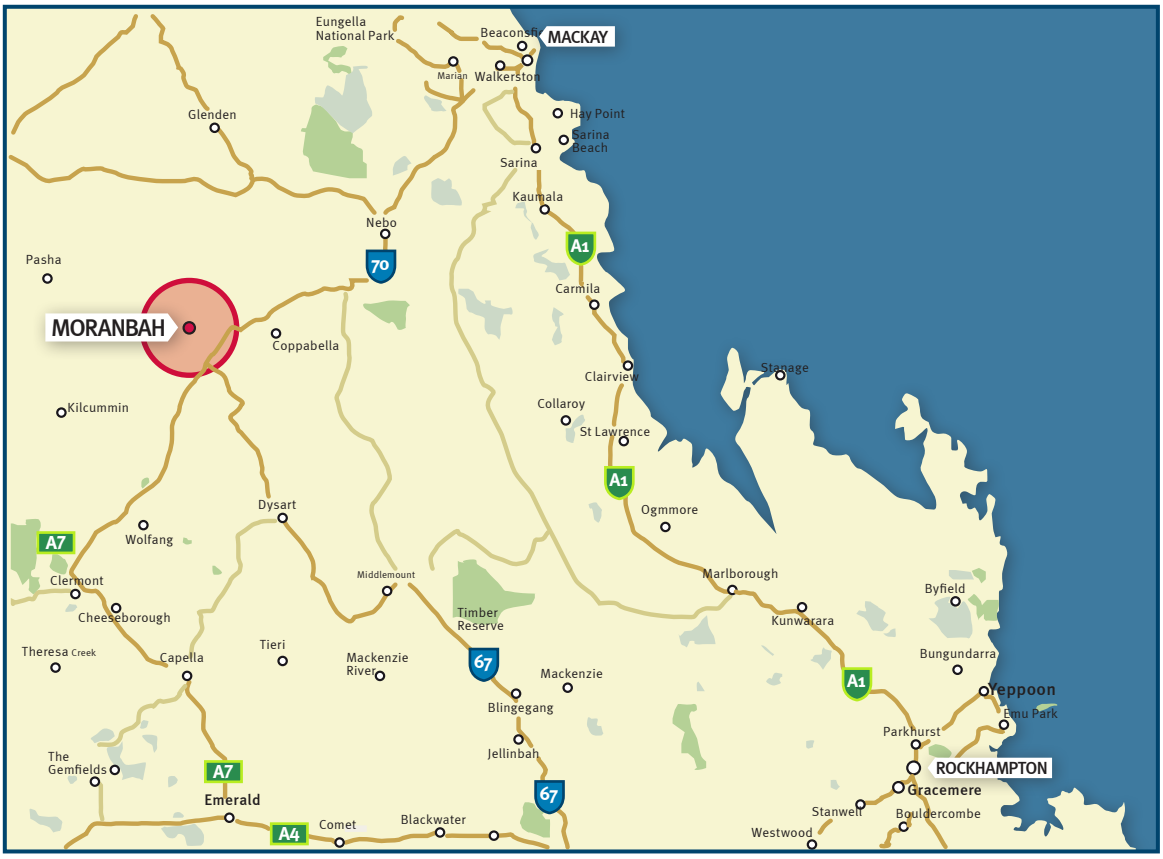

Figure 1: Location of Moranbah

The Goonyella Riverside Mine is located 30 kilometres north of Moranbah (refer Figure 2) and is operated by BHP Billiton Mitsubishi Alliance (BMA), Australia's largest coal miner and exporter. BMA also own and operate the Hay Point Coal Terminal near Mackay.

The Goonyella railway system forms a part of the Queensland coal rail network and allows the movement of coal from the Bowen Basin to the ports of central Queensland at Hay Point and Dalrymple Bay near Mackay. The Goonyella Riverside Mine loading facility is near the northernmost end of the rail system with only the North Goonyella Mine further along the rail system.

The collision occurred on Occupational Crossing 5805 near the Goonyella Riverside Mine (refer Figure 3). Occupational Crossing 5805 is a dirt track that crosses the rail corridor between two mining leases of the Goonyella Riverside Mine. Occupational Crossing 5805 is located at the 203.400 kilometre mark on the railway system, approximately two kilometres south east of the Goonyella Riverside Mine industrial area.

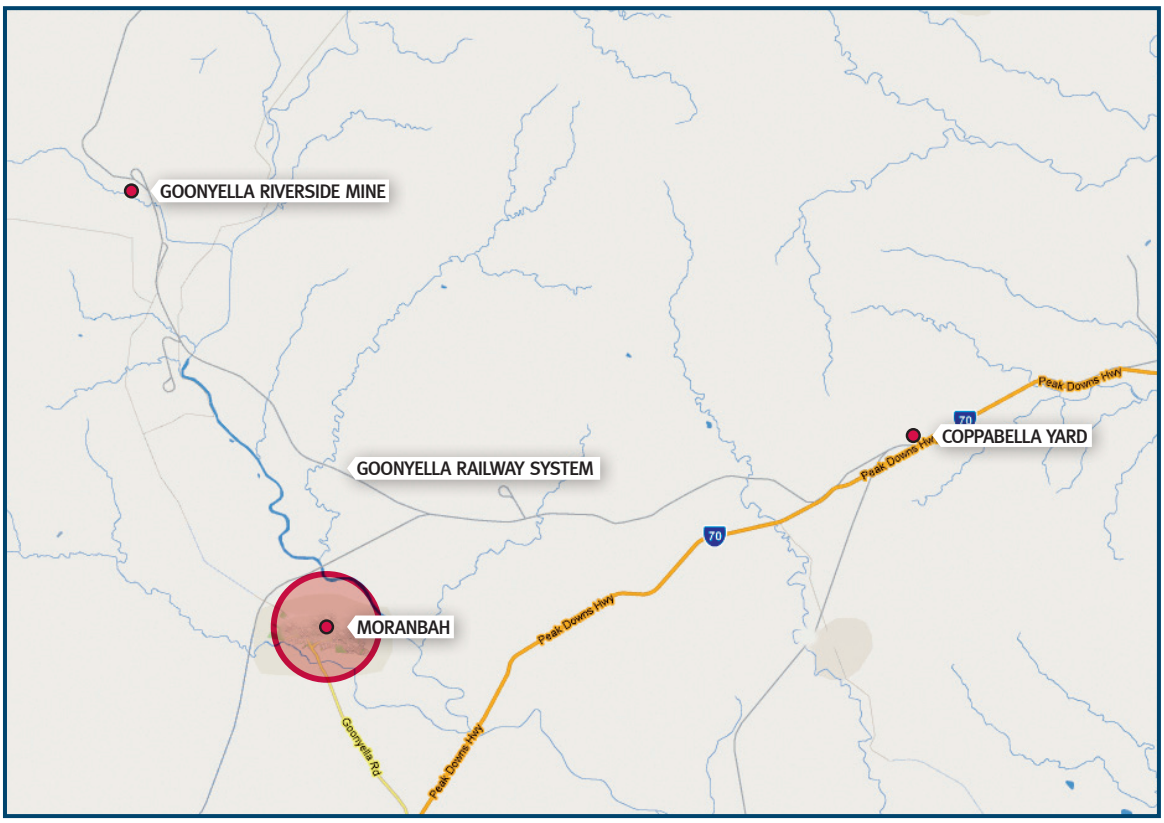

Figure 2: Location of Goonyella Riverside Mine

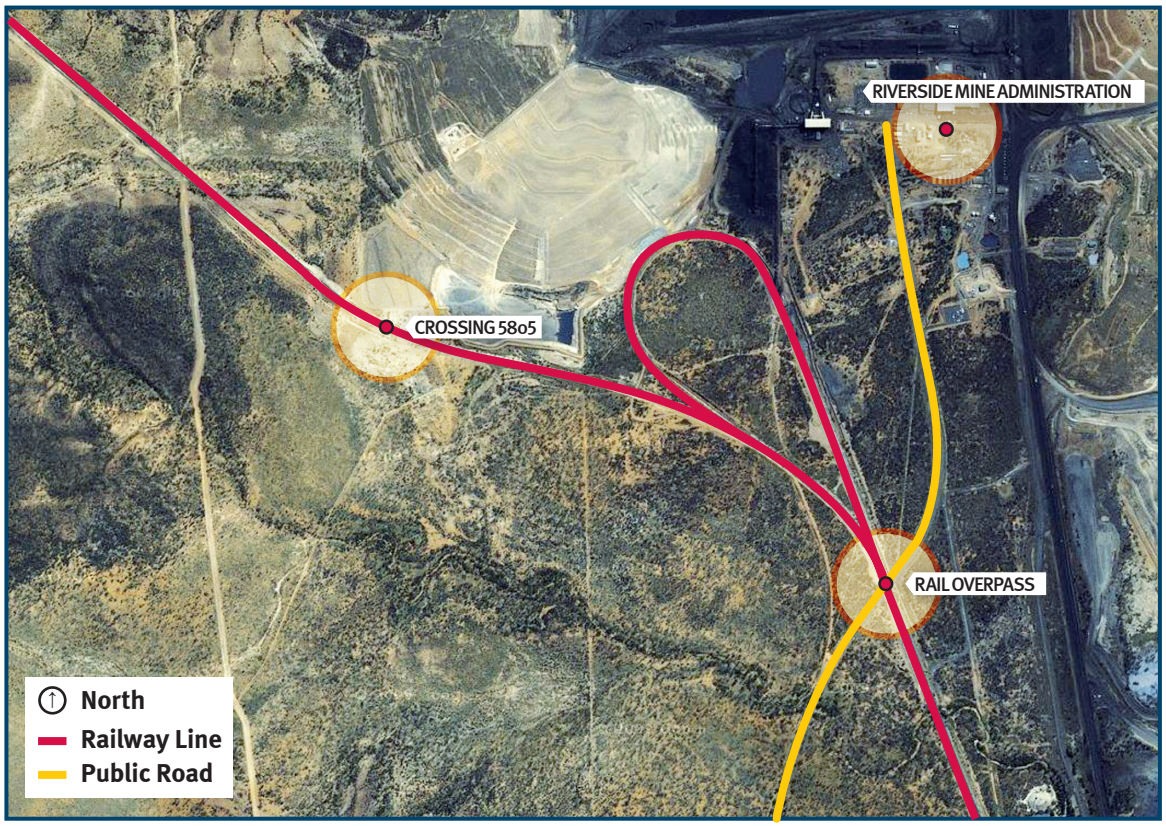

Figure 3: Overview of incident site

1.1.2 Railway operator

At the time of the incident, QR Limited was accredited as a railway operator and railway manager in Queensland and was the largest rail freight haulage operator in Australia. QR Limited is a subsidiary company of QR National Limited. A core activity of QR Limited is the haulage of coal from the mines in the Bowen Basin. QR Limited utilise staff located in the townships of Moranbah, Coppabella and Mackay to operate the coal services.

QR Limited was the railway operator at the time of the incident. Trains operated by QR Limited are branded as QR National.

1.1.3 Railway manager

QR Limited operates the subsidiary company, QR Network Pty Ltd, that is accredited as a railway manager and railway operator. QR Network Pty Ltd is responsible for design, construction, maintenance and management services on the QR National rail network. QR Network Pty Ltd manages approximately 2300 kilometres of rail infrastructure as the central Queensland coal network.

QR Network Pty Ltd was the railway manager at the time of the incident.

1.1.4 Train information

On 8 July 2010, train number E918 was designated to operate to North Goonyella to load coal. The train consist comprised of three electric Class 3800 locomotives, hauling 121 empty coal wagons. Locomotive 3808 and 3833 were the lead locomotives trailing 60 wagons with locomotive 3824 in the centre of the train consist. A further 61 coal wagons were trailing the centre locomotive. The train had an overall length of 1919.7 metres with a tare weight of 2468.50 tonnes.

1.1.5 Rail traffic crew

The lead locomotive was operated by two drivers who were based at Coppabella. The operating driver at the time of the collision was a Stage 4 Trainee Driver under tuition. The trainee driver commenced employment with the railway operator in February 2010.

The trainee driver had been assessed as competent by the railway operator to operate the train. The trainee driver had not been assessed as route competent and relied upon guidance supplied by a tutor driver.

The tutor driver commenced employment as a train driver in 2000 with the railway operator. In 2007 he was assessed as appropriately qualified to act as a tutor driver. The tutor driver was assessed as competent to operate the train and had route knowledge of the Goonyella rail system.

The railway operator uses the National Transport Commission National Standard for Health Assessment of Rail Safety Workers as a basis for health assessment of its 'Safety Critical Workers'. The RTC were assessed as 'Fit for Duty' as prescribed in the National Health Standard at the time of the incident.

The qualifications and medical fitness of the RTC are not considered to have contributed to the collision.

1.1.6 Road vehicle information

The road vehicle involved in the collision was a white 2008 Nissan Patrol four wheel drive utility registered to Ecowise Environmental Pty Ltd. Ecowise Environmental Pty Ltd was taken over by Australian Laboratory Services (ALS) in November 2009. ALS is a division of Campbell Brothers Ltd. ALS provide analytical chemistry and testing services for a range of industries including coal mining. ALS has a laboratory in Mackay and conduct water sampling for BMA on dams within the mining lease.

1.1.7 Road vehicle driver information

The driver of the utility was a 28 year old male from Mackay, Queensland. The driver had been employed by ALS as an Instrument Technician on a full time basis for approximately three years before the collision.

The driver of the utility was licensed to operate a road vehicle in Queensland in 2007 after transferring from an overseas issued licence. The driver passed a theory and practical driving test at the time. A review of the driver's Queensland traffic history revealed four minor speeding offences.

To operate a vehicle at Goonyella Riverside Mine, the prospective driver must complete risk specific driving courses to operate a vehicle on the mining lease. The driver was assessed as competent to operate a light vehicle on 13 May 2008 and was subsequently issued with a Goonyella Riverside light vehicle authorisation. The site authorisation was required to be renewed every two years however it had expired in April 2010.

The driver of the road vehicle had travelled to the Goonyella Riverside Mine on a monthly basis to check telemetry equipment. His work often took several days to complete and he was considered to have good area knowledge and was familiar with local driving conditions.

1.1.8 Road vehicle passenger information

The passenger of the utility was a 24 year old male who was employed by FS Holmes and Sons as a labourer. The passenger had worked on the mine site for approximately three months and had been asked to travel with the driver of the utility while the driver attended to calibration of telemetry equipment at two dams near the rail corridor. The mine operator has work instructions that require two persons to be present when working on water.

The passenger suffered life threatening head and chest injuries as a result of the incident and at the time the investigation was conducted did not have any recollection of the event. Investigators spoke with his mother by telephone however no information was able to be obtained in respect to the incident as the passenger suffers long and short term memory loss.

1.2 The occurrence

At 8.50 am on Thursday 8 July 2010, the RTC signed on for duty at Coppabella. The RTC were tasked to take empty coal train E918 from Coppabella to North Goonyella to load with coal and return.

The train departed Coppabella at 09.20 am and the RTC reported no significant events during the journey to Goonyella Riverside. As train E918 approached the neutral section at Level Crossing 5803 of Goonyella Riverside at 10.29 am, train E918 slowed to around 30 kilometres an hour.

At 10.30 am the RTC had increased the power controller setting and train E918 began to pick up speed from 29 kilometres an hour to around 50 kilometres an hour by 10.32 am. As train E918 approached public Level Crossing 5804 at the Recycle Yard, the RTC sounded the 'town horn' for three seconds. At this time train E918 was travelling at 78 kilometres an hour and coasted through the neutral section at the crossing. After clearing the crossing, the RTC increased the power controller setting incrementally, accelerating train E918 to around 74 kilometres an hour at 10.34 am.

The RTC adjusted the power controller settings continuously to maintain speed around 75 kilometres an hour. At about 10.35 am as train E918 approached the whistle board prior to Occupational Crossing 5805, the RTC observed two road vehicles on the left hand side of their direction of travel.

The RTC noted that the vehicles were travelling inside the rail corridor on a dirt road. One of the vehicles (the utility involved in the collision) was travelling in the same direction as train E918. The other vehicle was travelling in the opposite direction to the utility, towards train E918 and pulled over to the side of the access road to allow the utility to pass. The utility was observed to continue on towards Occupational Crossing 5805 and stop near the crossing. The utility was ahead of train E918 at all times.

Train E918 continued towards the crossing at 74 kilometres per hour. At 10.35.49 am train E918 sounded the 'town horn' for a period of four seconds as it passed the whistle board located 375 metres prior to the crossing.

At 10.36 am the utility made a right turn across the railway track at Occupational Crossing 5805. The RTC saw the utility turn and sounded the 'county horn' for one second and the 'town horn' for four seconds.

At 10.36.10 am train E918 collided with the vehicle between the driver's door and the front right hand wheel of the vehicle. The vehicle was pushed sideways along the track for approximately 50 metres before coming to a rest on the left hand side of the track in the direction of travel, clear of the train.

The RTC applied emergency braking at 10.36.11 am and at 10.36.48 am train E918 came to a stop some 535 metres from the point of collision.

1.3 Post occurrence

1.3.1 Response

When train E918 came to a stop, the trainee driver returned to the point of collision on foot to assess the incident. The second member of the RTC contacted Network Control with an emergency broadcast and reported the incident.

Network Control promptly alerted emergency services including the Queensland Police Service, Queensland Fire and Rescue Service and the Queensland Ambulance Service.

The occupants of the second vehicle heard the train brake heavily, and became concerned something had happened to the train. They travelled back to the incident site and arrived within two minutes. The occupants of the second vehicle advised the mine operator of the incident by radio. The mine operator also advised Emergency Services and dispatched a mine rescue vehicle and paramedic to assist.

An investigation was commenced by the Queensland Police Service, Work Health Safety Queensland, the railway manager and the mine operator. The Department of Transport and Main Roads was notified of the occurrence at 11.47 am by the railway operator.

The Queensland Police Service has prepared a report for the Coroner. The Department of Employment, Economic Development and Innovation has also commenced an investigation into the mine related aspects of the incident.

1.3.2 Injuries

The passenger of the vehicle was seriously injured with chest and head injuries and was unresponsive. The BMA rescue personnel arrived within ten minutes of the incident occurring and treated the passenger until the Queensland Ambulance Service arrived on scene. The passenger was evacuated to Townsville Hospital by the Queensland Ambulance Service. He was later released from hospital to recover from his injuries at home.

The driver of the utility had suffered severe injuries and appeared to the RTC and occupants of the second vehicle to be deceased. A paramedic from the Queensland Ambulance Service attended to the driver of the utility and could not detect signs of life.

1.3.3 Loss and damage

Minor superficial damage was caused to the lead locomotive on the left hand front corner below the level of the locomotive cabin (refer Picture 1).

Picture 1: Damage to locomotive

The utility suffered extensive damage as a result of the collision and was unrepairable (refer Picture 2). The impact was evident on the driver's side of the vehicle with the chassis being bent and substantial structural damage caused to the entire vehicle.

Picture 2: Damage to road vehicle

1.4 Environmental information

Official weather data for the Moranbah area was not available for the day of the incident, however the RTC report that visibility was good and there was light rain (drizzle) in the area of the incident. The sun was behind the road vehicle and the train and was not considered to have impeded vision.

Environmental factors are not considered to be a contributory factor to this incident.

2 Analysis

2.1 QR Network Pty Ltd investigation

As a condition of accreditation, the railway manager was required to provide an investigation report to the department, in accordance with Attachment C - Queensland Transport Rail Accidents/Incidents Response Requirements Major Rail Accident/Incident.

Attachment C states:

> *Within 90 days, the Railway Manager/Railway Operator shall provide to the Queensland Department of Transport and Main Roads a final report of the major rail accident/ incident investigation, including findings, causes, contributing factors, conclusions and any agreed actions. The railway must also confirm when the agreed actions have been implemented.*

The investigation should therefore describe what happened, how it happened and more importantly why it happened. The investigation should where necessary provide recommendations to enhance rail safety.

The final investigation report was due on 11 October 2010. An extension was not sought for the completion of the report until December 2010. The department was required to ask for the report on several occasions before it was submitted by the railway manager on 14 December 2010.

The railway manager's investigations are conducted for the core purpose of enhancing safety in accordance with QR Standard SAF/STD/0012/COM – *Accident and Incident Reporting, Recording and Investigation and Australian Standard AS4292.7 – Rail Safety Investigation.*

The railway manager's final report established an immediate cause of the incident and two basic causes. The immediate cause was attributed to individual actions of the driver of the road vehicle and the basic causes were attributed to individual actions of the driver of the road vehicle.

The railway manager's investigation did not differentiate between witnesses who may provide information in respect to the incident and witnesses who viewed the incident occur. As such the railway manager's investigation team obtained the minimum of information to base their report upon.

While the railway manager's investigation made reference to passive warning signs not being visible to the driver of the road vehicle, the investigation did not consider issues relating to how the driver of the road vehicle came to be in the rail corridor or why the signage was not visible to the driver. Because the investigation did not consider broader issues of the incident, the investigation did not properly identify the basic cause and contributing circumstances to the incident.

Upon review of the railway manager's investigation, the department considered it necessary to undertake an independent investigation of the incident to determine the causal factors to the incident.

The departmental investigation took a broader approach to identify organisational issues that may have been contributing factors to the rail incident. In the course of the investigation, the department investigation team consistently found that witnesses, including persons who were present at the scene had not been interviewed and background information that may reveal systemic issues had not been explored.

Some witnesses interviewed by the department expressed frustration at being interviewed about the incident a significant time after the event. The frustration could have been avoided had the railway manager's investigation team conducted a thorough investigation in which conversations were properly recorded for further analysis.

2.2 Rail corridor management

2.2.1 Establishment of Occupational Crossing 5805

In 1992 the Queensland Government acquired land from the owners of Riverside Station to establish the rail corridor between the Goonyella and Riverside Mines and North Goonyella Mine (refer Figure 4). The rail corridor was opened to rail traffic in August 1993.

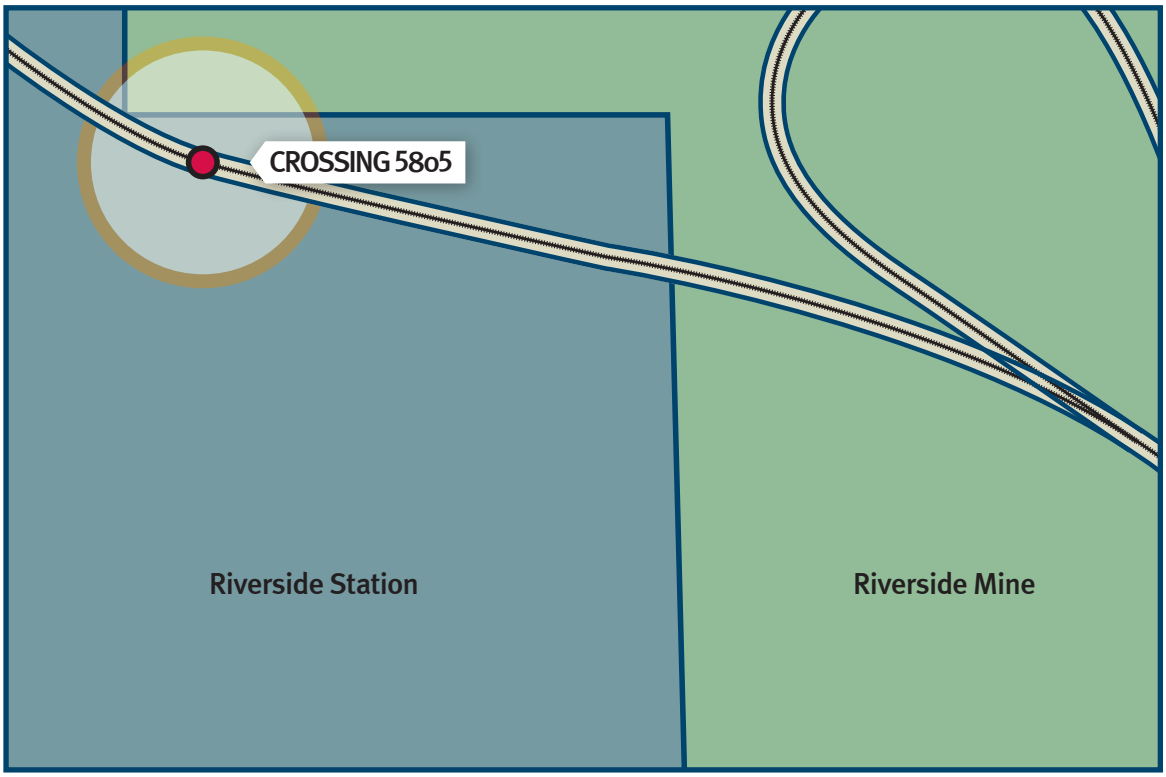

Figure 4: Land boundaries 1993

As part of the acquisition of the land, an occupational crossing was established to allow the owners of Riverside Station access to land on the northern side of the rail corridor. The occupational crossing is located on Lot 3 Plan RP858201 and identified by the railway manager as Occupational Crossing 5805.

Occupational Crossing 5805 was designed to cross the railway track at a perpendicular angle to provide clear vision to road traffic of rail traffic. The boundaries of the rail corridor were fenced to prevent stock wandering on the railway track and gates were installed. The gates were intended to be locked as a risk control measure to ensure the landholder checked for rail traffic. The crossing was constructed in accordance with relevant Queensland Rail civil engineering drawings.

In 1994 land was leased from the owners of Riverside Station by the mine operator. Land acquired on the northern side of the rail corridor forms Mining Lease 70193 and land to the south of the corridor forms Mining Lease 70194. As a result of the grant of the lease, Occupational Crossing 5805 was now located between two parcels of land utilised for mining activities rather than pastoral use (refer Figure 5).

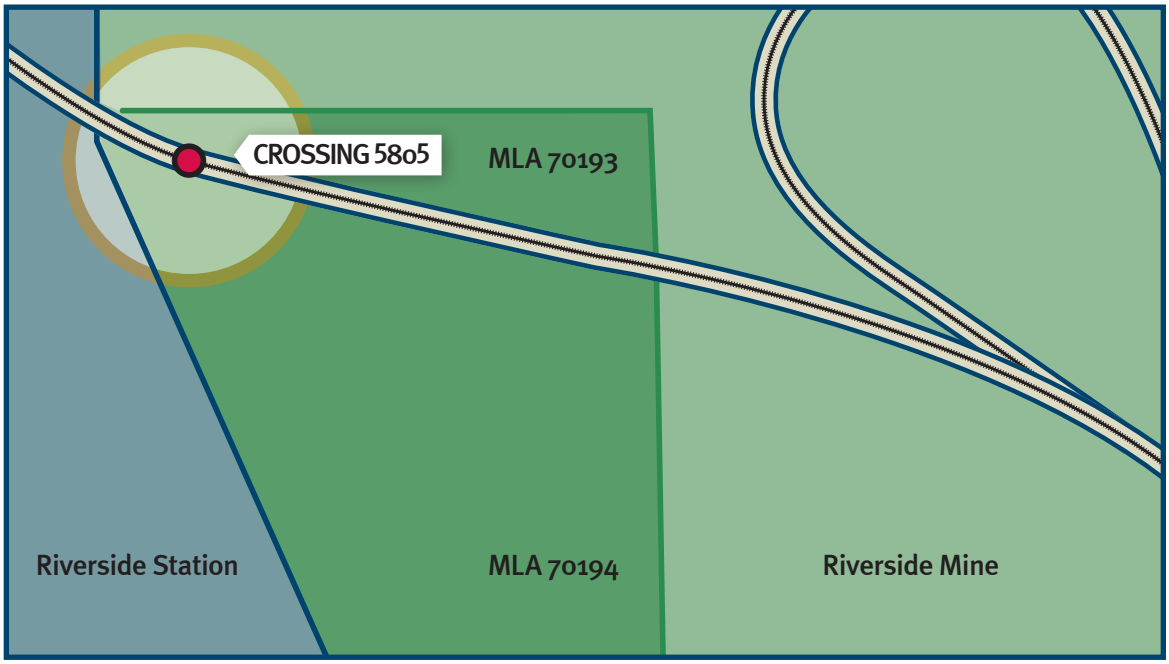

Figure 5: Land boundaries 2005

The mine operator did not seek and was not given permission by the railway manager to access the rail corridor that divided the mining leases.

In 2005 the Goonyella Riverside Mine expansion project commenced and the mine leaseholder began to utilise the land surrounding Occupational Crossing 5805 for further mining operations.

2.2.1.1 Risk management

The expansion of the mine created significant changes in the use of the land bordering Occupational Crossing 5805. The leasing of the land surrounding the crossing by Riverside Station to the mine operator meant that the pastoralists no longer required use of the crossing to access the paddocks that were now located on Mining lease 70193 and 70194.

Riverside Station continued to use Level Crossing 5805 to cross the railway track in order to monitor pumps and waterholes further to the north of the railway corridor.

With the expansion of the mine in 2005 and particularly when construction of the Eureka Creek accommodation camp commenced in 2008, the crossings began to be used frequently for mining activities. Over time, roads have been developed within the mine lease that interact with the rail corridor. Figure 6 depicts the roads surrounding the rail line at the time of the incident.

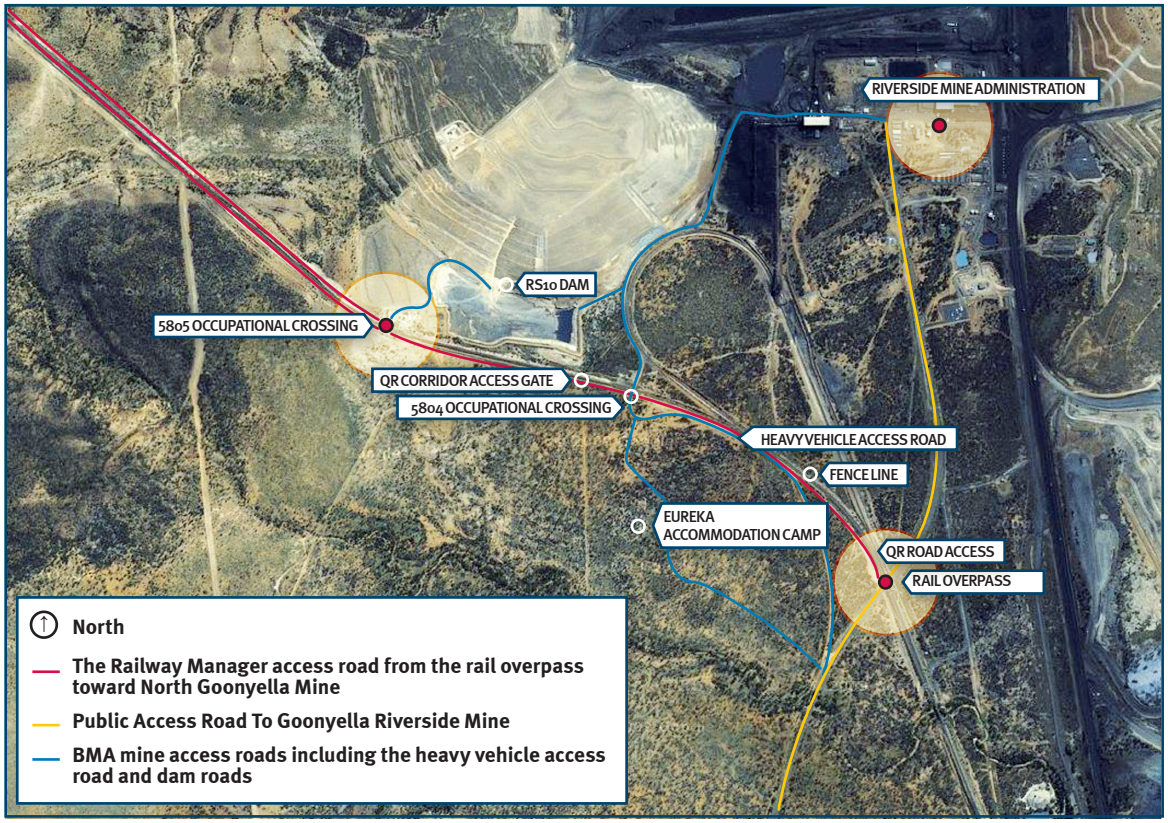

Figure 6: Goonyella roads

Occupational Crossing 5805 began to be used by mine employees and contractors to access the RS10 Dam on the mine site on a weekly basis. A road was also established by the mining company for heavy vehicles to access the mine through Occupational Crossing 5804 known by the mine operator as Heavy Vehicle Access Gate 12.

In August 2009 an accommodation camp was completed at Eureka Creek to house 550 persons working at the mine site. A graded road was established from the northern corner of the camp to Occupational Crossing 5804 to utilise Heavy Vehicle Access Gate 12.

Anecdotal evidence obtained during the department investigation was that the rail corridor was being used as a short cut to the North Goonyella mine site by persons staying at the Eureka Creek accommodation camp.

The railway manager reports conducting since 1993:

- 96 hourly track inspections
- a six weekly track inspection
- a general four weekly and annual inspection
- a detailed four yearly inspection of the crossing and surface details
- signal equipment inspections on a six weekly, 13 weekly 25 weekly and annual basis.

Despite the routine inspections, the railway manager appears either to have not observed or not adequately responded to increased activity around Occupational Crossings 5804 and 5805 during this time. The risks that may be associated with the change of use of the land surrounding the rail corridor, from pastoral use to mining activities do not appear to have been appreciated by the railway manager. As such, the railway manager did not conduct a risk assessment in respect to the changes that occurred.

QR Standard SAF/STD/0044/CIV/NET *Level Crossing Safety* was established 1 July 2008. The standard required the railway manager to conduct an annual review of ownership and use of level crossings including Occupational Crossing 5805.

The standard placed a responsibility on the railway manager for the strategic management of level crossings, and the coordination of all issues associated with level crossing control measures and maintenance. The railway manager was not able to produce records that it had audited or maintained Occupational Crossing 5805 in the period from 1993 to 2008.

2.2.2 Rail corridor safety concerns

The day after the incident occurred, the Rail Tram and Bus Union (RTBU) released a media statement that the union had warned the railway manager about the dangers of the occupational crossing where the incident had occurred. The warning reported in the media related to a series of e-mails sent to the railway manager by the RTBU in May and June 2009 about the sighting distance and the perimeter security of the rail corridor in the vicinity of the crossing.

The department investigation team conducted enquiries to determine whether the safety concerns that had been raised by rail workers about the sighting distances in respect to Occupational Crossing 5804 and the condition of the gates and signage at that crossing had any substance.

Mainly the concerns were generated by the development of the Eureka Creek accommodation camp and the potential for workers to access the camp site utilising the rail corridor. Despite the concerns being raised in respect to a different crossing to where the incident occurred, the information provided by the RTBU had some relevant application to this incident.

QR Standard SAF/STD/0044/CIV/NET Level Crossing Safety outlines responsibilities for stakeholders as follows:

The rail infrastructure manager is responsible for:

- *maintaining all signage relating to the level crossing*
- *maintaining the road surface of the crossing and of the roadway within QR*
- *property*
- *maintaining the sight distance free of obstructing vegetation within the rail corridor*

The property owner is responsible for:

- *the requirements as defined in the level crossing agreement for the operation of the crossing*
- *where locked gates are required, keeping them locked except during use*
- *making visitors aware of the safety aspects of using the crossing*.

In 2008, the railway manager had conducted an inspection of Occupational Crossings 5804 and 5805 in response to a request by the mine operator to access the crossings. The audit determined that the crossings did not meet existing standards with respect to sighting distance and corridor security for any vehicular traffic utilising the crossings.

2.2.2.1 Sighting distance

The 2008 safety audit conducted by the railway manager determined that the sighting distances were inadequate. QR Standard SAF/STD/0044/CIV/NET *Level Crossing Safety* requires a minimum of 16 seconds to clear a railway track. The 16 second interval requires a minimum sighting distance of 360 metres for trains travelling at 80 kilometres per hour.

At the time of the incident the sighting distances were 321m in the direction from which the collision occurred and 358 metres in the opposite direction, if stopped at a stop sign at 90 degrees to the track. A sighting distance of 320 metres is suitable for a train on a single track travelling at 60 kilometres per hour, not 80 kilometres per hour as was the line speed at the time of the incident.

Although the sighting distance is below the required standard, it is not considered a contributing factor to this incident because it appears that the driver of the road vehicle did not see the train approaching. The RTC did see the vehicle, however did not brake as they had assumed the vehicle was stationary and would remain stationary at the crossing.

2.2.2.2 Corridor security

TIA and QR Standard SAF/STD/0044/CIV/NET *Level Crossing Safety* require that where a rail corridor is fenced, the private level crossing must be accessed through locked gates.

The 2008 safety audit by the railway manager identified that Occupational Crossing 5805 did not conform to the standard. The following points relevant to this incident were identified in the audit:

- the STOP assemblies at the crossing were poorly constructed
- a tree was growing under the height barrier on the left side of the crossing
- the STOP assemblies were not positioned or aligned for vehicles using the rail corridor access road
- the gate on the northern side of the crossing was damaged, permanently open and unlocked
- the crossing appeared to only be used by vehicles travelling along the rail corridor access road.

The audit recommended that closure of the crossing should be investigated otherwise substantial work should be undertaken for the crossing to meet standards. In December 2008, the railway manager provided a copy of the audit report to the mine operator to discuss with a view to resolving the safety issues related to the crossing.

QR Standard SAF/STD/0012/COM – *Accident and Incident Reporting, Recording and Investigation* requires business groups to forge formal links with unions where they shall agree on the frequency and content of the exchange of safety information, including relevant information on accidents and incidents, affecting their membership.

No evidence was discovered by the department investigation that the railway manager communicated advice to the RTBU of what action was undertaken to ensure the crossings were safe in 2009 when the safety concerns were raised or after the incident occurred in 2010.

2.2.3 BMA crossing deed

Following the audit in 2008, the railway manager and the railway manager undertook a project to upgrade Occupational Crossing 5805 along with all other occupational crossings that were on BMA mining leases. The intention was that the railway manager would maintain the crossings and BMA would pay the maintenance costs in exchange for use of the crossings. A draft crossing deed was prepared in 2008 however was not signed as negotiations continued between the two companies over the costs of upgrades. While the costs were being negotiated no work was conducted on the crossing and the railway manager did not close the crossing.

In August 2010, following this incident the crossing deed was signed between the two parties and upgrade work has now commenced.

2.2.4 Trespassing on the rail corridor

The leaseholder of the land on which the rail corridor exists has been the railway manager since 1993. QR Operational Safety Manual SAF/STD/0036/SWK/NET *Trespassing on QR Property* applies to the management of unauthorised persons on the rail corridor.

The standard defines a rail corridor as:

From fence-line to fence-line, and where there is no fence, ten metres from the centre line of the outside track.

The rail corridor is considered by the railway manager to be a prohibited area. Up until October 2009, the railway manager required that at any time a person wished to access the rail corridor, the Rail Corridor Induction Checklist to be completed. The checklist applied to all staff (including contractors) and visitors on every occasion they entered the rail corridor. The only exception to this was if staff (including contractors) and visitors could show a valid Corridor Safety and Security Card.

Since October 2009, the railway manager has required all persons who enter the railway corridor to be accompanied by a Track Protection Officer (TPO). Subject to limited exceptions such as at designated pedestrian or authorised use of occupational crossings, anyone found in a rail corridor who is not a TPO or escorted by a TPO is in breach of the QR Standard.

The railway manager had installed a gate on the rail corridor to prevent access to unauthorised persons to the corridor in 1993. Beside the gate a sign was installed by the railway manager to provide advice the area was a prohibited area. The location of the gate is depicted in Figure 6: Goonyella Roads.

At the time of the incident, the gate was damaged and had a large tree growing in front of it (refer Picture 3) that prevented the gate being closed and locked. The tree in front of the gate also obscured the prohibited access sign (refer Picture 4). The condition of the gate and sign appears not to have been identified in the safety audit conducted by the railway manager in 2008.

Picture 3: Damaged gate

Picture 4: Overgrown sign

2.2.5 Access to Dam RS10

Dam RS10 is located near the rail corridor on the mining lease (refer Figure 6). The dam had been formed from a mining pit and had sheer walls. The dam water level prior to late 2010 had been at least 20 metres below the height of the access road exposing the walls of the dam. The walls were not able to be climbed down to access the pumping station below.

The only other access available for the contractors was to travel along the rail corridor for approximately two kilometres, parallel to the railway track and to cross at Occupational Crossing 5805. A dirt road then accessed the western side of the dam at a shallow bank where a boat was used to get to the pumping station. Contractors for the mine operator had been accessing the rail corridor for several years on at least a weekly basis in order to access the dam.

Enquiries conducted by the department reveal that none of the mine contractors involved in this incident had received trackside awareness training in accordance with QR Standard SAF/STD/0144/SWK/NET – *Accessing the Rail Corridor* or had the railway manager's authorisation to be on the rail corridor. The only training that had been provided to the mine operator's staff by the railway manager was for personnel involved in the loading of coal wagons.

The contractors interviewed by the department who had accessed the rail corridor on a regular basis had no understanding that permission was required from the railway manager to access the rail corridor. Some of the persons interviewed thought that permission had to be sought from the mine operator to access the area as they provided weekly briefings on their activities within the mine to the mine operator.

The mine operator had never formally requested permission to access the rail corridor from the railway manager. Communication had occurred between the mine operator and the railway manager informally however in respect to the development of the crossing deed.

2.3 Vehicle condition

The utility was manufactured in 2008 and had been delivered to the registered owner on 25 February 2009. The utility was the DX specification Nissan Patrol and was fitted with basic equipment. It was not equipped with electric windows or airbags. The vehicle was fitted with the standard side view mirrors on the right and left hand side of the vehicle. The utility was white in colour and had a reflective yellow stripe along the driver and passenger side of the vehicle to aid visibility.

At the time of the collision the utility had approximately 65 000 kilometres on the odometer. The utility was serviced on 5 July 2010 by an authorised mechanic for its 60 000 kilometre service. During the service the utility's steering and braking were checked and found to be operating normally.

The utility contained a log book in which the driver completed a checklist to ensure the utility was operating correctly. The driver had completed the log book on the day of the incident and noted no defects in the vehicle.

The mechanical condition of the utility is not considered as having contributed to the collision.

2.4 Road vehicle driver behaviour

The driver of the utility was licensed to operate a road vehicle in Queensland and should have been aware of the requirement to give way to trains. The driver of the utility grew up in an area where cane farming occurs and is reported to have had a good awareness of cane trains and level crossings.

Enquiries reveal that the driver of the utility did not have any psychological problems and did not require visual aids to drive a vehicle. There were no reported problems with his hearing.

The driver and passenger of the road vehicle that passed the utility also stated that both windows were up and that the driver appeared to be talking as they passed. Phone records from the driver of the utility's mobile telephone indicate that a phone call was made immediately prior to the collision that lasted for 1 minute 20 seconds.

The driver and passenger of the vehicle that passed the utility stated that the driver of the utility did not have enough time to stop after passing them and take a phone call prior to the collision. The utility was fitted with a hands free mobile phone kit that had been installed by the driver. It is probable that the driver was talking on the mobile phone as he passed the other vehicle and disconnected the call around the time that he reached Occupational Crossing 5805. The driver may therefore have been distracted by the telephone call and lost situational awareness of his vehicle's position in respect to the track.

2.5 Road visibility and vehicle positioning

The vehicle was observed by the RTC on the left hand side of Occupational Crossing 5805 beside the railway track. The RTC observed that the vehicle was stationary very close to the rail.

The mine operator's investigation team conducted a re-enactment in the course of their investigation to determine the visibility of the train from a similar vehicle. The re-enactment was conducted in the opposing direction of travel and the geography of the land and track geometry is substantially different. As a result, the visibility of the train to the driver in the rear view mirror or side mirrors was not able to be accurately determined.

The department investigation team attempted to determine the field of vision that the driver of the utility may have had prior to entering the intersection of the crossing. This was done by examining the scene of the incident including the track geometry and topography of the land. Measurements were taken in the vicinity and compared to the technical specifications of the turning circle for the utility, provided by the manufacturer.

The rail corridor access road runs in a westerly direction and from Occupational Crossing 5804 to Occupational Crossing 5805 is one kilometre in length. The access road is a graded dirt track that is clearly defined. There is minimal vegetation on the track and the railway manager's lease of land is devoid of any substantial trees that may obscure visibility of the railway line.

Between Occupational Crossings 5804 and 5805 the access road dips into a gully and then gradually rises towards Occupational Crossing 5805. The railway track is on the right hand side of the access road when heading west (in the direction of the train and the utility). The railway track has a gradual rise from Occupational Crossing 5804 to 5805 and as a result the vertical separation of the access road and railway track varies. Picture 5 shows the difference in elevation from the access road and railway track when exiting the gully. The railway track is over two metres in height and above the vehicle driver's field of vision.

The departmental investigation team found that the railway line and any subsequent train on the railway track could not be seen from a light road vehicle such as the vehicle involved in this incident.

Picture 5: Track elevation

Picture 6: View east from Occupational Crossing 5805

In the immediate vicinity of Occupational Crossing 5805, the rail corridor access road and railway track meet. Picture 6 shows the view from the crossing back towards the east and demonstrates the rise of the rail corridor access road to meet the railway track at the crossing.

The overhead line equipment (OHLE) masts in the picture are located 50 metres apart. The OHLE mast in the foreground of the picture is 4.5 metres from the crossing and the second mast is therefore located 54.5 metres from the crossing. At the second OHLE mast, the height of the access road is nearing the height of the railway track.

Between Occupational Crossings 5804 and 5805 the railway track has a curve to the right when travelling westbound. The curve straightens 50 metres from Occupational Crossing 5805, near the point where the access road is nearing the height of the railway track. Picture 7 depicts the curve as viewed from Occupational Crossing 5805.

It is noted that the event recorder from the lead locomotive had the headlight assembly operating. The headlight is mounted near the roof of the locomotive, approximately four metres above the rail height.

As a result of the geography of the land and the curvature of the track, the vision directly behind the utility involved in the collision would have precluded a view of the railway track to the east and the train headlight that would have been above the driver's field of vision in the rear view mirror.

Picture 7: Curvature of track (showing distances from 5805)

The RTC recalled that the utility commenced the right hand turn onto the occupational crossing when the train was about 60 metres from the intersection. This recollection is consistent with the event recorder where the town and country horn were both sounded just prior to the collision.

If the driver of the utility had been able to see the oncoming train in the side mirror, the opportunity to view the train would have been as the train was approximately 50 metres from the crossing. Immediately prior to the collision, train E918 was travelling at 74 kilometres an hour and would have covered the 50 metres before the crossing in about 2.5 seconds.

An inspection was made of the corridor access road at the intersection of Occupational Crossing 5805. Figure 7 depicts the layout of the crossing and the approximate position of the utility prior to the collision.

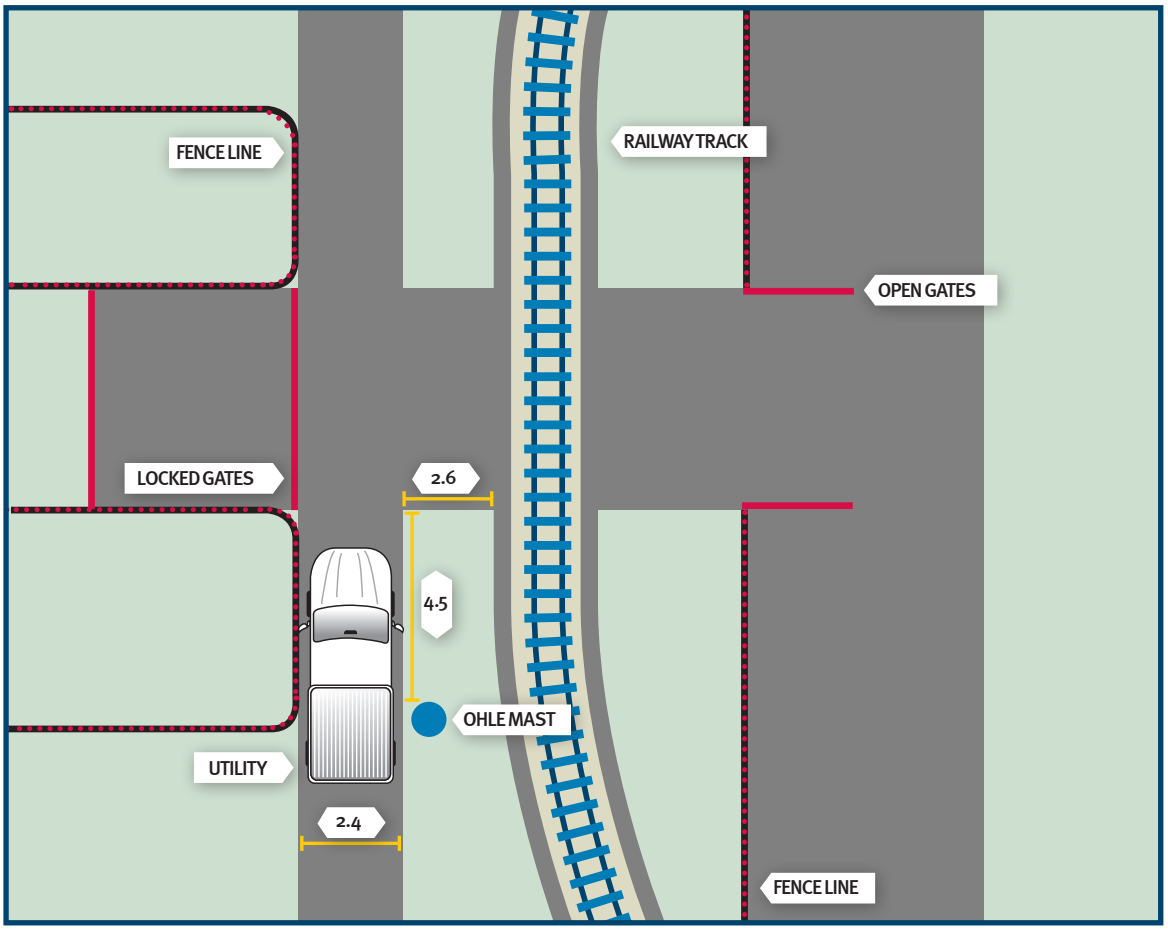

Figure 7: Placement of vehicle (distances are shown in metres)

The driver of the road vehicle had limited opportunity to move left to improve visibility of the track or improve his approach to the crossing because of the closed gates and the narrow track. The driver also had limited opportunity to turn early because of the obstruction of the OHLE mast near the intersection on the vehicles right hand side.

Using measurements of the scene and the known turning circle of the utility it is possible to approximate the path of the vehicle. The manufacturer of the vehicle advises that the utility had a turning circle of 12.5 metres.

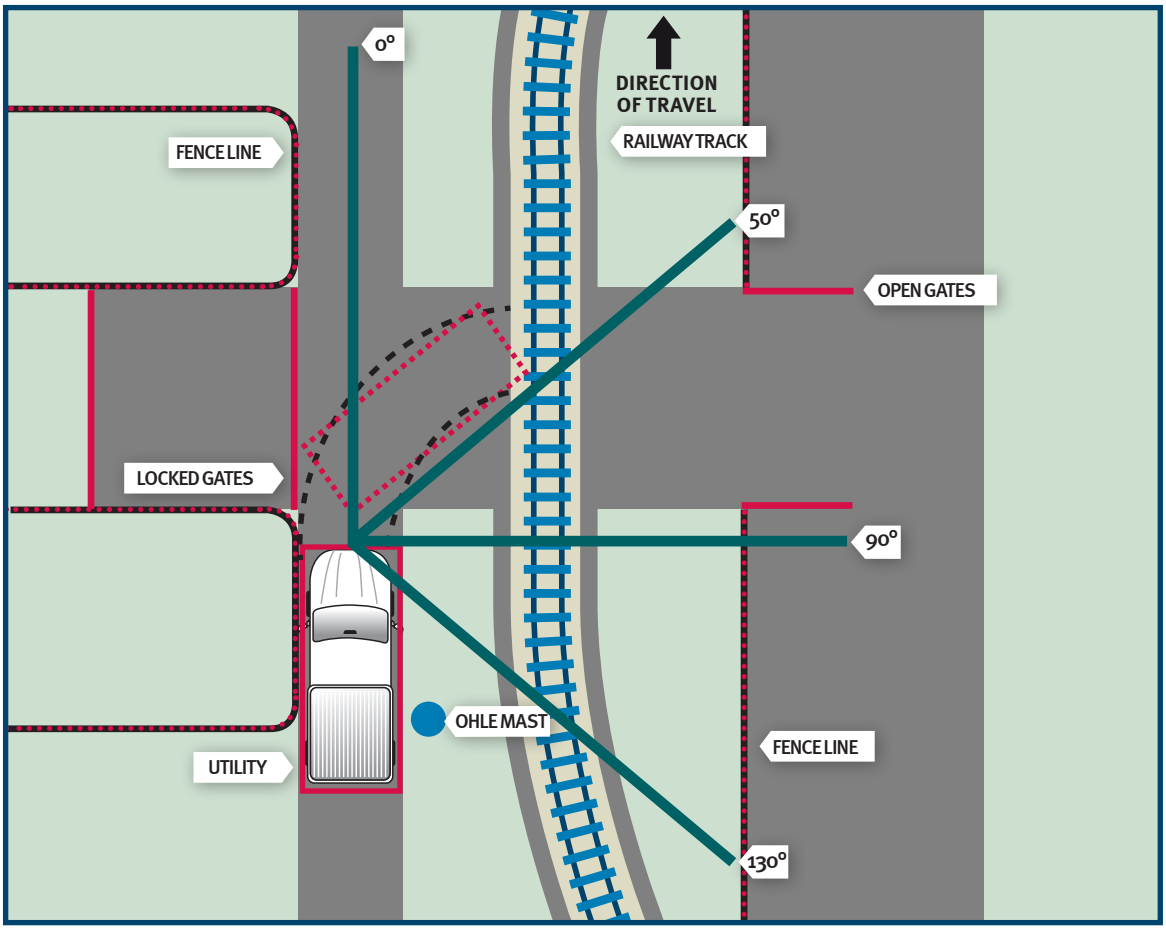

Figure 8: Turning circle of vehicle

While it was not possible for the departmental investigation team to determine the exact path the utility took turning onto the crossing, Figure 8 depicts the best possible approach the driver of the utility could have made in turning towards the crossing.

Australian Standard 1742.7-2007 Manual of Uniform Traffic Control Devices determines that the ideal angle to approach a rail crossing at is 90 degrees to provide maximum opportunity to sight rail traffic in both directions. The maximum recommended sighting angle to view oncoming rail traffic from the right hand side at a stop sign is 140 degrees.

The department investigation team concluded that the angle of approach of the utility to the crossing was near to 50 degrees to the rail, meaning that the sighting angle from the driver of the utility to the train was in the vicinity of 130 degrees.

In determining the best possible approach, the departmental investigation team has assumed that the utility was stationary and that the driver applied full lock to the steering before setting the vehicle into forward motion. If the driver did not either stop the utility or apply full lock, the turning circle would have been wider and increased the angle of approach to the crossing. It is probable that the driver would not have applied full lock to the utility before putting it in motion.

The utility was fitted with a drop side tray with a large chequer plate aluminium toolbox fitted to the tray (refer Picture 8). The toolbox is positioned longitudinally on the right hand side of the tray behind the driver and opens to the right hand side of the vehicle.

The train approached the vehicle from the right hand rear quarter. Had the driver or passenger attempted to look for the approaching train, the height and width of the toolbox may have substantially obscured their field of vision.

The turning circle would have been wider and increased the angle of approach to the crossing. It is probable that the driver would not have applied full lock to the utility before putting it in motion.

Picture 8: Right hand side of utility showing toolbox mounted to the tray.

2.6 Train condition

On 10 July 2010, the lead locomotives were inspected for defects by rolling stock engineers employed by the railway operator at Jilalan. Locomotive 3808 had suffered damage as a result of the collision however the inspection revealed that the headlights, horn and brakes were operating within service parameters. Visibility, step, ground and coupler lights of the leading end of the locomotive were found to have been damaged in the collision and were not operational at the time of the inspection.

The second locomotive, 3833 did not suffer any damage and was found on inspection to be serviceable. The locomotives were in operational condition at the time of the incident and are not considered to be contributing factors to the incident.

2.7 RTC risk assessment and threat perception

Enquiries were conducted by the departmental investigation team in respect to the risk assessment and threat perception that the RTC considered in operating the train.

The event recorder for the lead locomotive indicates that the train increased power to the traction motors continuously after exiting the neutral section at Crossing 5803. The train maintained a speed around 75 kilometres per hour on the section between Occupational Crossings 5804 and 5805. The track speed in this section is 80 kilometres an hour.

The RTC were conscious of the gradient of the track and having sufficient power to maintain momentum of the train consist but stated there was more than adequate traction available as the train was unloaded. The RTC stated that the primary reason for maintaining power was to place 'stretch' on the trailing carriages to prevent them 'bunching up' which creates wear and tear to rolling stock components. The RTC considered good train handling practices to be an important factor in the operation of the train.

In practice, a failure to maintain stretch on the trailing carriages may result in train surge and may lead to damage to rollingstock and the risk of the train parting.

The driver of train E918 was seated on the right hand side of the cab and the tutor driver was seated on the left hand side. Both were facing forwards and stated they had a good view ahead of them because of the height of the cab from the ground. The RTC also stated they had a good view to their respective sides of the train and a slightly restricted view to the opposing side.

The department investigation team consider that the RTC were operating the train in accordance with normal operating procedures.

The RTC stated that they both had sighted the vehicles inside the rail corridor after passing Occupational Crossing 5804, a distance of about one kilometre before the collision point. The event recorder indicates that the RTC did not slow the train after sighting the two vehicles inside the rail corridor.

QR Operational Safety Manual SAF/STD/0036/SWK/NET *Trespassing on QR Property* required the RTC on a moving train who see a trespasser on the railway manager's property, to give details to the Train Controller as soon as possible.

The RTC did not consider the two vehicles they observed within the rail corridor as trespassing. The RTC often saw unidentified vehicles in the corridor. The RTC were unaware if vehicles had been granted permission to access the rail corridor and as such they did not report them to the train controller. When asked about the frequency that reports were made to Network Control, the departmental investigation team were advised this was rarely done as it seemed pointless when vehicle details were not able to be obtained.

On 23 December 2009 the State Coroner issued findings in respect to a triple fatality that occurred at Goodna in March 2006 . The Coroner identified that at the time QR Limited's written policies regulating the response of train drivers to people being within the rail corridor were inadequate in that they were uncertain, and gave too much unstructured discretion to train drivers.

The Coroner was satisfied however that QR Limited had satisfactorily addressed this concern by developing *Module EP – 1-20 Persons on QR right of way in* QR Operational Safety Manual SAF/STD/0036/SWK/NET *Trespassing on QR Property* which imposes on RTC an obligation to notify train control whenever they see persons suspected of being unauthorised on or near the rail corridor and to relay numerous particulars about the person and their activity.

The train controller has an obligation to manage the situation with support from his/her superiors. The train driver has the option of stopping the train if necessary, having regard to risk factors set out in a flow chart annexed to the module. It appears to balance the need for a clear decision making process while allowing train drivers to retain an appropriate degree of discretion. It directs the drivers' attention to aspects of the incident that increase the risk of injury or death and provides for the stopping of rail traffic in high risk situations.

The use of horns and the reduction of train speed are mandated when the risk matrix leads to a conclusion that the risk is lower and does not warrant the cessation of train movements.

The RTC stated that they were only concerned with the operation of the train and did not pay attention to the vehicles or consider what actions they may take.

The RTC of train E918 sounded the town horn at the whistle board located 375 metres prior to Occupational Crossing 5805. The driver stated that sounding the horn is not compulsory at occupational crossings but is good practice in areas where you know or routinely expect road vehicles to be present.

STD/0036/SWK *General Operational Safety Manual* at Section 10 GS4.5 requires train crews to sound the whistle when approaching level crossings not fitted with boom gates and/or flashing lights. The standard does not distinguish between public or occupational level crossings.

The RTC stated that the town horn was sounded as a courtesy to the road vehicles and not because the RTC had any particular concern about the movements of the road vehicles. The RTC stated that they perceived a risk that the road vehicle driver may step out of the vehicle and onto the track at Occupational Crossing 5805 due to the vehicles close proximity to the track.

The RTC stated that they were aware that a collision may occur when they were within 60 metres of the occupation crossing when the road vehicle turned into their path. At this point the RTC sounded the town horn and the country horns however they do not recall doing so.

The horn can be activated by either driver. The horn is physically operated by a lever on a pivot that is located in the proximity of the RTC. When the lever is pushed forward the town horn is activated and when the lever is pulled back, the country horn is activated. When the country horn is activated the town horn is also activated. If pressure on the lever is released, the lever will return to the neutral position and the horn is deactivated.

The event recorder shows that immediately prior to the collision, the country horn was sounded for a period of one second and the town horn was sounded for four seconds. It is likely that one driver pulled their lever forward while the other pulled their lever back and that they were released at separate times. The driver who operated the country horn appears to have released their lever before the other driver.

In any emergency situation the task demands upon the RTC increase substantially. The mechanical arrangement to sound the horn by pushing or pulling a lever while performing other tasks may account for the short duration that the country horn was sounded for.

The driver and passenger of the second vehicle stated that at no time did they hear a train horn being sounded. The occupants of the second vehicle stated that they had their windows up.

The RTC and occupants of the second vehicle both stated that the windows of the vehicle involved in the collision were up. The BMA investigation team conducted a re-enactment in which they observed that a train horn could not be heard from 375 metres away with the vehicle windows up and the radio of the vehicle operating. The mine operator's investigation determined that the horn could be heard from 60 metres away.

It is probable that the driver of the vehicle did not see the train prior to turning onto the crossing because of the vehicle positioning. It is also probable that he did not hear the train horn when it was sounded at the whistle board or see the headlights of the approaching train.

3 Conclusions

3.1 Offences

The department investigation team considered whether any offences had been committed under the relevant legislation, TIA, at the time of the incident.

The overall objective of TIA is to provide a regime that allows for and encourages effective integrated planning and efficient management of a system of transport infrastructure.

For rail this means to establish a regime that:

- contributes to overall transport effectiveness and efficiency
- provides for the safety of railways and persons at, on or near railways
- contributes to lower transport costs by allowing the maximum flexibility in rail transport operations consistent with achieving safety objectives
- allows railway managers and operators to make decisions on a commercial basis.

TIA contains offence provisions for individuals who interact with the rail network. Section 254 is the most relevant to this incident and states:

254 Level crossings

1. Pedestrians and drivers of vehicles must give way to—
   a. *a railway operator's rolling stock on railway tracks at a level crossing; and*
   b. *a railway manager's rail vehicle on railway tracks at a level crossing.*
2. *If an accident happens at a level crossing because a person does not comply with subsection (1)—*
   a. *the railway manager or operator is not liable for any injury or damage caused in the accident; and*
   b. *the person must pay the railway manager or operator the cost of any damage caused to property of the manager or operator.*
3. *However, subsection (2) does not apply if the manager or operator, or its agents or employees, were negligent in relation to the accident.*

Section 260 of TIA has application to the rail corridor. The relevant sub sections of Section 260 are:

260 Works for existing railways

1. This section applies—
   a. *while a railway existing at the commencement (the existing railway) continues to be operated as a railway; and*
   b. *to the owners and occupiers of land next to the existing railway (the neighbouring land).*
2. *The relevant railway manager must, within a reasonable time, construct and maintain—*
   a. *works that are necessary to make good any interruptions caused by the existing railway to the use of the neighbouring land; and*
   b. *works that are necessary to—*
      i. *separate the existing railway from the neighbouring land; and*
      ii. *protect the stock straying from the neighbouring land onto the railway; and*
   c. *sufficient works to ensure the neighbouring land's drainage is as good, or nearly as good, as it was before the existing railway was constructed.*

3. *The relevant railway manager may satisfy its obligation under subsection (2)(b) by constructing and maintaining a fence of substantially similar quality to any fence around the neighbouring land when the railway was constructed.*
4. *A person must shut and lock a gate set up under this section at either side of an existing railway as soon as the person, and any vehicles or livestock in the person's care, have passed through the gate.*

Maximum penalty for subsection (12)—10 penalty units.

TIA does not contain offence provisions for railway managers and railway operators.

Under TRSA which came into effect on 1 September 2010, the railway infrastructure manager and the rolling stock operator both have general rail safety duties and a requirement to comply with their safety management systems. The departmental investigation makes recommendations to ensure compliance with the TRSA to ensure rail safety is achieved.

3.2 Findings

The department investigation determined the immediate cause of the incident was that the driver of the road vehicle failed to give way to rolling stock on a railway track and turned into the path of the oncoming train.

The departmental investigation determined that the underlying cause of the incident was that the railway manager failed to properly assess the risks associated with changes in the land surrounding the rail corridor and put in place or maintain adequate control measures to prevent unauthorised persons entering the rail corridor.

3.2.1 Major contributing safety factors

1. The driver of the road vehicle used the rail corridor access road to enter Dam RS10 (refer 2.2.4).
2. The driver of the road vehicle could not see the approaching train prior to turning onto the crossing because of the geometry of the track and the topography of the land in relation to the rail corridor access road (refer 2.5).
3. The driver of the road vehicle was unable to approach the crossing at a safe angle from the rail corridor access road, because of the restrictions to the manoeuvrability created by the position of the fence line and OHLE mast in relation to the railway track (refer 2.5).
4. The driver of the road vehicle failed to give way to the approaching rolling stock.
5. The railway manager failed to conduct any maintenance on the rail corridor access road in the vicinity of Occupational Crossing 5805 or on the crossing itself until after the incident occurred in July 2010 (refer 2.2.3).

3.2.2 Other contributing factors

1. The railway manager failed to identify a change in the use of the land surrounding Occupational Crossing 5805 in 1994 and assess the risks that may relate to the use of the crossing and rail corridor. (refer 2.2.1).
2. The railway manager failed to conduct any maintenance on the corridor access road in the vicinity of Occupational Crossing 5805, or on the crossing itself between 1993 and 2008 (refer 2.2.1.1).
3. The railway manager failed to put in place appropriate control measures in 2008 after detecting that Occupational Crossing 5805 did not conform to QR Standard SAF/STD/0044/CIV/NET Level Crossing Safety (refer 2.2.2.2).
4. The mine operator failed to identify the rail corridor as private land and allowed access to their employees (refer 2.2.4).
5. The mine operator failed to put in place adequate procedures to access the RS10 dam through the rail corridor (refer 2.2.4).
6. The driver of the road vehicle was probably distracted by the phone call received while driving the vehicle, immediately prior to the collision (refer 2.4).
7. The driver of the road vehicle probably did not hear the town horn that was activated by the train at the whistle board located 375 metres prior to the crossing (refer 2.7).
8. RTC have become accustomed to vehicles in the rail corridor on the mining lease and as such the movement of the vehicles in the rail corridor are not considered by the RTC to be a threat (refer 2.7).
9. The RTC did not perceive a threat from the vehicle near the crossing and therefore did not take any pre-determined action to prevent or minimise a possible collision (refer 2.7).
10. The railway manager failed to adequately address the concerns raised by the RTBU in respect of occupational crossings on the mining lease (refer 2.2.2.2).

4 Safety Actions

4.1 Safety actions undertaken

4.1.1 QR Network Pty Ltd

1. QR Network Pty Ltd has reinstated signage and locked the access gate across the rail corridor access road to prevent non-authorised use of the rail corridor. Occupational Crossing 5805 has also been barricaded to prevent use.
2. The gates to the road that otherwise provided access to Occupational Crossing 5805 were padlocked by QR Network Pty Ltd. The key is kept by the railway manager and access to the level crossing is only possible with the railway manager's consent and by arranging for the railway manager to unlock the gates.
3. QR Network Pty Ltd has submitted a capital funding request for project funding for Private (Occupation) and QR Level Crossing survey assessments. The project scope of works includes the survey and an estimate of cost for the private and QR National owned level crossings on the Moura, Blackwater, Goonyella and Newlands CQ Coal Networks to remove or upgrade the crossings based on the prioritised assessment.
4. QR Network Pty Ltd has updated the training package for *Rail Safety at Loading and Unloading Facilities version 1* dated August 2010, to incorporate accessing the rail corridor outside of the facilities.

4.1.2 BMA

1. On 10 July 2010 BMA issued a Site Safety Brief "Use of Rail Corridor Access Road and Crossings" to all workers and contractors effective immediately. The safety brief prohibited the use of the rail corridor access road and crossings not equipped with flashing lights for use for any purpose without the required approvals from the appropriate manager.
2. Access to all level crossings in proximity to the mining lease was prohibited, with the exception of those controlled by boom gates and lights or those directly relating to Train Load Out procedures.
3. Communication to coal mine workers mandating the restriction around access to rail level crossings/rail corridors was issued via a safety alert and supporting map.
4. Restriction signage was placed at all potential access points to rail line/level crossings, including Occupational Crossing 5805.
5. Where access is required by coal mine workers to Occupational Crossing 5805 a documented risk assessment is require to be conducted prior to each occasion of access by coal mine workers.
6. A work instruction for High Vehicle Access Crossing 5804 was also developed.

4.2 Recommended safety actions

4.2.1 QR Network Pty Ltd

1. QR Network Pty Ltd shall ensure that QR Standard SAF/STD/0044/CIV/NET *Level Crossing Safety* is complied with in respect to contact with land owners and review of crossing use.
2. QR Network Pty Ltd shall ensure that audits are conducted of all crossings in accordance with QR Standard SAF/STD/0044/CIV/NET *Level Crossing Safety*.
3. QR Network Pty Ltd should put in place procedures to identify occupational crossings that the railway manager considers to present a high risk because of the nature and use of the crossing.
4. QR Network Pty Ltd should develop a formal communication strategy with the relevant land owner(s) of occupational crossings that present a high risk.
5. QR Network Pty Ltd should develop and implement written procedures to address risks involved in respect to the use of any occupational crossings that are identified by the railway manager as high risk.

4.2.2 QR Limited

6. QR Limited should provide further education and ongoing training to RTC in respect to *Module EP – 1-20 Persons on QR right of way* in QR Operational Safety Manual SAF/STD/0036/SWK/NET *Trespassing on QR Property*.

5 Sources of Information

Transport and Main Roads is grateful for the co-operation and assistance provided in the compilation of this investigation report by:

- QR Network Pty Ltd
- QR Limited
- BMA
- FS Holmes and Sons
- Mines Assist
- Workplace Health and Safety Queensland
- Department of Employment, Economic Development and Innovation
- Riverside Station
- The wife of the deceased
- The mother of the injured passenger
- Nissan Australia

6 References

Legislation:

- Transport (Rail Safety) Act 2010
- *Transport Infrastructure Act 1994*

Investigations:

- QR Network Pty Ltd Final Report - Collision Occupational Crossing ID5805 QT3584
- BMA Incident Investigation Report
- BMA Supplementary Report
- WHSQ Investigation file

Coronial Report:

- Coroners Report into Triple Rail Fatality Goodna, Queensland 11 March 2006

Rail Corridor Lease:

- Lot 3 Plan RP858201 and identified by QR National as Occupational Crossing 5805.

Mining Lease:

- Plan of ML1900 Parish – Goonyella County – Grosvenor Mining District – Emerald Cat No. – 36433
- GRM Mining Tenements 23.06.2010
- Mining Lease 70193
- Mining Lease 70194

National Standards:

- Australian Standard 1742.7-2007 Manual of Uniform Traffic Control Devices
- National Code of Practice - Volume 2 Glossary 2004
- National Transport Commission *National Standard for Health Assessment of Rail Safety Workers*

QR Standards:

- SAF/STD/0012/COM *Accident and Incident Reporting, Recording and Investigation*
- SAF/STD/0044/CIV/NET *Level Crossing Safety*
- SAF/STD/0096/CIV/NET *Fencing and Signage of the Right of Way and Electrification Infrastructure*
- SAF/STD/0049/RSK *Rolling Stock Visibility and Audibility*
- SAF/STD/0036/SWK/NET *Trespassing on QR Property*
- STD/0037/SWK *Observance of Signals Manual - Overview*
- SAF/STD/0037/SWK *Observance of Signals*
- SAF/STD/0144/SWK/NET *Accessing the Rail Corridor*
- STD/0036/SWK *General Operational Safety Manual*

Notes: