



Safeworking incident Junee, NSW 4 August 2010

Abstract

At about 0840 on Wednesday 4 August 2010 a safeworking incident occurred within the Junee station yard limits when a locomotive was moved from one road to another without authority while a Track Occupancy Authority (TOA)¹ was in force. No injuries or damage resulted.

The investigation identified the following:

- non-conformances to the rules in regard to communication by the train drivers and protection of the fixed worksite
- deficiencies in the rules relating to lines of communication and protection of infrastructure booked out of service.

The investigation concluded that it was unlikely the safeworking incident would have resulted in a breach of the worksite at Junee station yard.

FACTUAL INFORMATION

Location

Junee station is located on the Sydney to Melbourne rail corridor, 486 track km from Sydney and 468 track km from Melbourne. Junee station is the main train crew change point on the Sydney to Melbourne corridor and the junction for the north-western branch line to Narrandera/Griffith and points beyond. The Australian Rail Track Corporation (ARTC) Junee Network Control Centre manages rail movements and track access over much of southern and western NSW as well as the main line from Albury to Tottenham Yard (Melbourne) in Victoria.

Junee station yard, apart from the main lines, consists of a back platform road, nine sidings of between 388 m and 310 m in length and a number of other sidings in and about the Junee locomotive depot (see Figure 2).

The Junee station yard (unlike a private yard) is a multi-user facility that is under the management and control of the ARTC. It is an attended location as defined by the ARTC Glossary.²

Freight train derailment, 16 July 2010

On Friday 16 July 2010, just under 3 weeks before the safeworking incident that is the subject of this investigation, a southbound freight train derailed as it was departing Junee station yard. Extensive damage resulted and, as a consequence, the southern end of the Junee station yard was booked 'out of use' for all rail traffic except that associated with repair work.

In order to prevent unauthorised rail traffic from gaining access to the damaged infrastructure, temporary stop blocks (painted red), consisting of a number of sleepers strapped together and resting on the track, had been erected. The photograph in Figure 1 was taken from Junee station platform looking south and shows two of the three temporary stop blocks on the southern side of the Kemp Street 'road over rail' bridge.

All points that could be used to route a rail movement towards the track repair worksite from the south were locked and booked out of use. The worksite between stop blocks was 300 m long; between (about) the 486.350 km point and the 486.050 km point at the southern end of the

1 A Track Occupancy Authority (TOA) is used to occupy a defined portion of track for a specified period.

2 Attended location – A signalling location or block location that is switched in and controlled by a qualified worker either on-site or at a remote location.

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Junee station yard. The worksite is also illustrated in Figure 2.

Figure 1: Worksite (looking south from Junee station platform) showing temporary stop blocks



Train and crew information

Train 3391N was operated by Pacific National (PN) Intermodal and originated at Junee³. The primary purpose of the train was to convey loaded container wagons from Junee to the Bomen Rail Terminal that is located about 45 km to the south of Junee. The loaded container wagons had been detached at Junee from the Melbourne to Griffith train (3MC3) the previous evening. The Bomen Rail Terminal loading is routinely detached at Junee because of limited infrastructure that allows only southbound trains to efficiently shunt at the Bomen Rail Terminal.

Train 3391N was rostered with two drivers, one to perform the on-ground testing and shunting duties

and the other, the train driving duties⁴. The driver performing the on-ground duties had commenced his railway service in 1968 and became a locomotive driver in 1976. The driver performing the train driving duties had commenced his rail service in 1981 and became a locomotive driver in 1990. Both drivers had spent many years operating trains in the Junee region. As at 4 August 2010, one driver was employed by PN Intermodal on a casual basis and the other driver was employed by Momentum Rail⁵. In these roles, both drivers regularly drove trains in the Junee area.

The occurrence

At about 0725 on Wednesday 4 August 2010, the Protection Officer (PO) arrived at the derailment worksite to prepare for the day's (repair) work. Shortly before 0730 the PO obtained a verbal TOA⁶ from 0730 until 0930 from the Junee network controller on the Main South C Board⁷. The TOA was applicable to the back platform road and the nine adjacent sidings as well as the sidings in and about the Junee locomotive depot (the area under TOA is illustrated by green shading in Figure 2). In addition, the PO requested and was granted adjacent line protection on the main line. The protection put in place was Controlled Signal Blocking (CSB) whereby the network controller applied blocks on main line signals in order to prevent unauthorised movement on the main line (the area under CSB is illustrated by yellow shading in Figure 2). This protection was in place by 0734 and work commenced on site after the PO conducted a pre-work brief with the 13 track workers under his control.

3 At the time of the occurrence train 3391N did not actually exist. The locomotive and crew were in the process of making train 3391N up when the locomotive was moved without authority.

4 On this occasion a third driver, who had been rostered on training duties, was also used to assist with the on-ground duties. At the time of the incident, this person had played no part in the safeworking incident.

5 Momentum Rail is a provider of services and personnel to the Australian railroad and related industries.

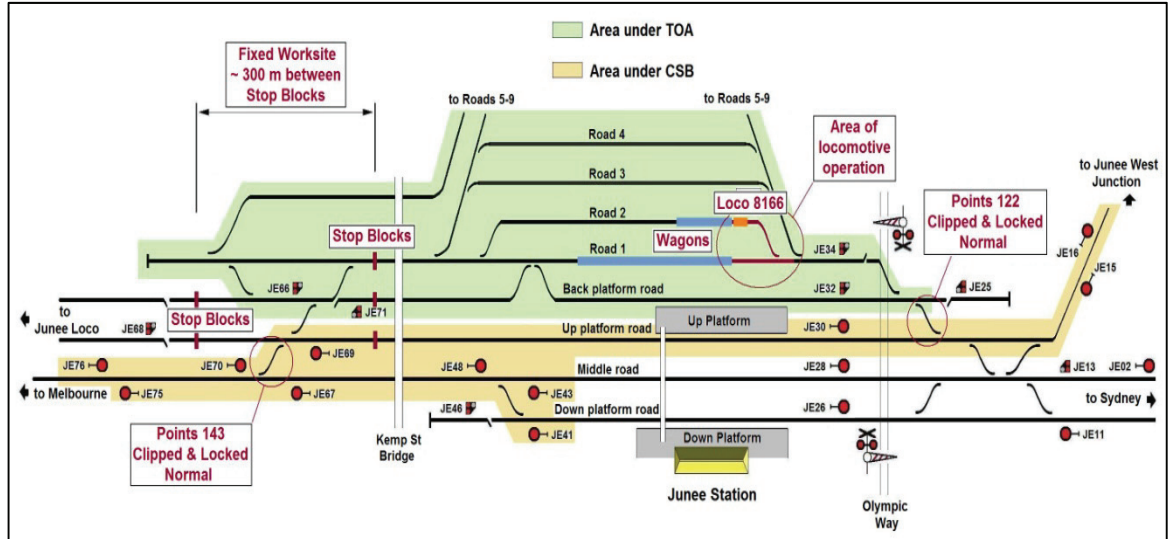
6 A verbal track occupancy authority is a TOA that is issued without a TOA form. This type of TOA is discussed further in the analysis section of this report.

7 The Main South C Board territory extends from Tottenham Yard in Melbourne up to and including the Junee station yard limits.

The drivers of train 3391N signed on duty at the PN Intermodal office at Junee at 0800. The PN Intermodal office is at the northern end of the

Junee station yard on the station platform, about 500 m from the temporary stop blocks protecting the worksite.

Figure 2: Junee station yard



At this time the drivers and local PN management were aware that the southern end of the Junee station yard was still booked out of use on account of the derailment that occurred on 16 July 2010. However, they were not aware of the verbal TOA that applied to the Junee station yard.

At the time of driver sign on, locomotive 8166 and the rakes of wagons that were to form train 3391N were stabled at the northern end of the Junee station yard in number one and two roads, a short walk from the PN Intermodal office. Because the wagons were stabled in two roads both rakes were to have been shunted together and brake tested before departure.

The track repair worksite prevented the departure of train 3391N from the southern end of the Junee station yard. This meant that train 3391N, although a southbound train, would have to depart the Junee station yard from the north. As a result, it was decided that train 3391N would depart north and proceed to the Junee 'sub terminal' that is located about 2 km away on the branch line to Narrandera and Griffith. At the 'sub terminal' locomotive 8166 would be able to run around the train and be placed on the southern end for its southbound journey. Train 3391N would then travel southbound through Junee via the mainline en route to the Bomen freight terminal.

In order to minimise delay to road traffic at the Olympic Highway level crossing (about 50 m to the north of Junee station) during the train preparation process, it was decided that it would be best to perform a brake test⁸ on the two rakes of wagons separately and to then do a modified brake test⁹ once the two rakes of wagons were shunted together. Given that a modified test only takes a few minutes to complete, it was planned to conduct this test while blocking the level crossing (rather than pushing back in clear).

During the planning of this move, the local PN manager at Junee contacted the Train Transit Manager (TTM) at the Junee Network Control Centre and asked if the newly installed points at the Junee 'sub terminal' had been commissioned yet. The TTM replied in the affirmative and reminded the PN manager that the drivers needed to contact the network controller before they 'start going'. The TTM made no reference to a verbal TOA being in force during this conversation.

8 A brake test involves a retention test on the three wagons at each end of the wagon consist. That is, the brakes must remain applied on the last three wagons for a set period.

9 A modified brake test is to ensure that the three wagons behind the point of attach or detach apply and release correctly.

The driver who was to perform the driving duties went to locomotive 8166 to start the engine and charge the brake system with air and the driver who was to perform the shunt duties proceeded to the two rakes of wagons to check the wagon numbers against the train list and the continuity of the brake-pipe.

At 0840 locomotive 8166 was moved from number two road to number one road and, at 0905, the same locomotive was moved from number one road back to number two road in the Junee station yard. Both movements were in conjunction with the brake test method decided upon and involved travelling about 90 m in one direction before traversing a set of hand operated points and travelling a similar distance in the reverse direction. No electrically operated points or colour light signals were encountered and, as such, the network controller was unaware of the movement when it occurred. The extent of the train movement is illustrated in Figure 2.

At 0920 the network controller overheard a conversation between the drivers of train 3391N that indicated to him that a shunting movement may have previously taken place. At 0930 the network controller contacted the PO and advised him that he would have to suspend the current TOA due to an 'issue' with the shunt locomotive.

At 0934 the driver of locomotive 8166, in the process of logging the locomotive on to the CountryNet radio system, called the network controller. During this conversation, the network controller asked the driver if he had previously moved the locomotive; the driver confirmed that he had. The network controller told the driver that a TOA was in force for the Junee station yard and that he was not to move again until authorised.

Both drivers said they saw no track workers or worksite protection measures such as red flags or points clips during the train preparation process and emphasised that the movement of the locomotive was nowhere near the worksite as they understood it to be. The PO also said he did not see or hear the locomotive when it was moved while the TOA was in force.

Both drivers were subsequently tested for the presence of drugs and alcohol and suspended from duty. Both drivers returned negative results and were reinstated on 10 August 2010 when the

results of the drug tests were received from a Canberra laboratory.

ANALYSIS

ATSB investigators interviewed involved persons at Junee on Thursday 5 August 2010, the day following the safeworking incident. Evidence such as voice logs, site protection documentation and train control Phoenix logs were also obtained.

The information was examined to determine whether procedures were in place to ensure train drivers contact the relevant network controller before undertaking a rail movement within the Junee station yard. Similarly, the information was examined to determine whether or not the rules pertaining to worksite protection were followed or were adequate.

Actions of train crew

Both train drivers said that they knew that the derailment repair worksite at the southern end of the Junee station yard was still booked out of use when they signed on for duty on 4 August 2010. The driver who performed the driving duties said that he had passed near the worksite on the Kemp Street overbridge when arriving to sign on for duty and noticed that the red temporary stop blocks were still in place and that workers and machinery were present. Both drivers said they saw no other visual cues of a TOA such as red flags or track workers anywhere near the northern end of the Junee station yard, the area in which they were intending to perform shunt movements.

The evidence obtained at interview and via logs of communication between the PN personnel and the Junee Network Control Centre corroborates the evidence from the PN personnel (train crew and management) that they had no knowledge of the existence of a verbal TOA either before or after moving locomotive 8166. The first sign to the train crew of 3391N that something was amiss was when the driver contacted the network controller in order to log locomotive 8166 on to the CountryNet Radio System. This call was placed at about 0934, some 24 minutes after the completion of the second (and final) movement of locomotive at 0910.

Notwithstanding this, all PN personnel involved (including the driver who moved locomotive 8166) agreed that the locomotive should have been

logged on to the CountryNet radio system, thereby necessitating contact with the network controller, before the initial shunt movement at 0840 took place and that this requirement was well known.

Worksite protection

The derailment that resulted in track damage at Junee occurred almost 3 weeks before the safeworking incident on 4 August 2010. During this time, the area was designated a fixed worksite that required protection from unauthorised train movements, both while the site was occupied by repair crews and while the site was unoccupied.

Protection when worksite unoccupied

To prevent access by rail traffic, stop blocks were installed on the Up platform road, the back platform road and number one road. In addition, points 143 were clipped and locked in the normal position so that rail traffic from the south could not be routed directly into the track repair worksite.

While the stop blocks provided a barrier between rail traffic and the worksite, there did not appear to be any systems in place to protect rail traffic approaching the barriers. For example, access to the barriers was available from the back platform road and roads 1 to 9. Also, similar access was available via the Up platform road, which was a signalled running line.

A common approach would be to inhibit signalled routes onto the Up platform road and issue a Safe Notice¹⁰ that sets out alternative arrangements. No such notice appeared to have been issued for Junee in this instance. Similarly, the NSW rules and procedures do not clearly address the requirements relating to protection of 'out of service' track infrastructure. Conversely, the rules applicable to the ARTC network in Victoria, South Australia and Western Australia specify requirements for protecting 'out of service' track infrastructure. The rules generally require securing of points away from the track which is out of service or using a combination of signs and detonators to warn approaching rail traffic that the track is unsafe or obstructed.

Protection when worksite occupied

Access to and occupancy of the worksite by repair crews had consistently been authorised by a verbal TOA supplemented on occasions by controlled signal blocking on the adjacent main line for additional protection.

In the context of the safeworking incident on 4 August 2010, ANWT 304 *Track Occupancy Authority* describes the general purpose and limits of a TOA (in part) as:

A TOA authorises occupation of track, within specified limits, for an agreed period.

A TOA is issued to the Protection Officer for the agreed period of the occupancy.

The limits of a TOA must be stated as being between:

- defined clearance points wholly within one yard's limits...

In this case, the track work was conducted within a fixed worksite that was bounded by stop blocks. On the day of the safeworking incident (4 August 2010), the limits of the TOA extended to cover all siding roads, as illustrated by green shading in Figure 2.

The PO said that the reason he requested the extended TOA limits, rather than the immediate vicinity of the fixed worksite, was to provide additional protection. He also said that, apart from machinery access in the immediate vicinity of the Kemp Street road overbridge, no work was intended to be performed outside the boundaries of the fixed worksite.

In regard to fixed worksites, ANWT 304 *Track Occupancy Authority* states (in part) that:

Fixed worksites must have the extra protection of three detonators and a red flag/red light, at least 500m on each side of the worksite, or at the limits of the Authority. If there is only one fixed worksite within the limits of the TOA, detonator protection is not required:

- in Train Order territory, or
- if a staff or half pilot staff can be secured for the duration of the TOA¹¹...

It appears that the limits of the TOAs that were used to protect the fixed worksite varied from day to day, probably due to differing work

10 A Safe Notice gives additional advice related to the ARTC Network Rules, Procedures or Local Appendices.

11 RailCorp rule NWT 304 reads the same.

requirements. What should have been consistent though, are the protection measures applied at the limits of the TOA. It was reported that on some days red flags were to be seen at or from the northern end of the Junee station yard and on other days there were no visual cues other than the red stop blocks that were in the immediate vicinity of the fixed worksite. For example, on 4 August 2010, no red flags, lights or detonators were installed at the limits of the TOA yet the following day red flags were visible from the Junee station platform.

ANWT 304 also states:

Unless a set of points can be secured to prevent access to the portion of track within the TOA limits, the distance between the signal protecting the limits of the Authority and the fixed worksite must not be less than 500m.

In this case, points 143 (south end of TOA) and points 122 (north end of TOA) had been clipped and locked normal, thereby preventing access to the area under the protection of the TOA from the main lines. However, there was no evidence that similar protection was implemented for access from the Junee locomotive depot.

It was evident that the Up platform road was not within the limits of the TOA and therefore not subject to the requirements documented above. However, ANWT 304 also states that:

If rail traffic can travel on adjacent lines, the Protection Officer must arrange for safety measures to be taken to reduce the risk from rail traffic on the adjacent lines.

In this case, the PO arranged for CSB protection to be applied, as illustrated by yellow shading in Figure 2. While most routes appeared to be protected under CSB, the route from the Sydney down line crossing to the Junee Up platform road did not appear to be included.

In short, scenarios existed whereby rail vehicles could obtain unprotected access to within 500 m of the fixed worksite which is contrary to the intent of rule ANWT 304.

Communications

For purposes of communication and liaison, rule ANWT 304 stipulates:

The Protection Officer must tell workers about the kinds and limits of protection in place:

- before the work begins, and
- if the protection arrangements change.

And further on:

The Protection Officer must be the only point of contact between Network Control and work parties for matters of worksite protection...

On the day of the safeworking incident PN Intermodal personnel, who were within the boundaries of the TOA, were not given any advice regarding the existence of the TOA. However, this raises the question as to whether the PN personnel are regarded as one of the 'work parties' or 'workers' as described in rule ANWT 304 or whether 'work parties' or 'workers' are only those that are performing work associated with the TOA. While no specific definition of the term 'work parties' or 'workers' exists in the ARTC Glossary, it seems logical to assume that the intent of these terms as described in rule ANWT 304 is that they would be those persons who are performing work associated with the TOA. If this rationale is accepted then the PO was not required to inform the PN Intermodal personnel of the existence of the TOA.

Rule ANWT 304 stipulates that the PO must be the only point of contact between the 'work parties' and network control. This is a logical requirement since a single point of contact is desirable for safe management of worksite protection. However, in this instance, the situation arose where other operational personnel were performing train preparation duties within the boundaries of the TOA that, prior to the movement of the locomotive, did not require communication with the network controller.

It has been reported that since the TOA safeworking incident on 4 August 2010 that PN Intermodal personnel at Junee (who have been within the boundaries of a given TOA) have, on occasions, been advised of the existence of a TOA by the PO.

Verbal TOA's, attended locations

The Sydney suburban and interurban rail network is owned and operated by Rail Corporation New South Wales (RailCorp). The interstate and Hunter Valley network of NSW is leased to the ARTC.

The rules and procedures pertaining to the use of TOA's on the RailCorp network are NWT 304 *Track*

Occupancy Authority, NWT 300 Work on Track, Planning Work in the Rail Corridor and procedure NPR 701 Using a Track Occupancy Authority.

The rules and procedures pertaining to the use of TOA's on the NSW rail network leased to the ARTC are ANWT 304 Track Occupancy Authority, ANWT 300 Work on Track, Planning Work in the Rail Corridor and procedure ANPR 701 Using a Track Occupancy Authority.

The two sets of rules and procedures virtually mirror each other with only a few exceptions, one of which is the issuing of a TOA at an attended location. Specifically, ARTC rule ANWT 304 permits verbal TOA's within the yard limits of an attended location while RailCorp rule NWT 304 does not. In this regard, rule ANWT 304 (the ARTC rule) reads as follows:

If the limits of the proposed TOA are wholly within the yard limits of the attended location, the Protection Officer must ask the Signaller to issue the TOA.

A TOA form is not needed.

Prior to 4 March 2007, verbal TOA's at attended locations were also permitted on the RailCorp rail network. Rule NWT 304 was amended from 4 March 2007 to require the compilation of a TOA form when a TOA is issued within yard limits, regardless of whether the location is attended or not. A RailCorp employee publication dated February 2007 read in part:

From 0001 hours Sunday 4 March 2007 it will now be necessary to compile a NRF 002 Track Occupancy Authority form for all TOA's issued for fixed worksites within yard limits.

NOTE: A TOA must not be issued for fixed worksites within yard limits.

Why are these changes necessary?

Owing to a number of incidents involving the issue of TOA's within yard limits it has been decided to improve the communication process between Network Control Officers and Protection Officers by formalising the TOA process.

In response to concerns raised by the NSW Independent Transport Safety Regulator and its own internal investigations, the ARTC has indicated an intention to phase out the use of verbal TOA's on the NSW ARTC leased network by December 2010.

However, it is considered that, in this instance, the 'formalisation' of communication via the use of a

TOA form (ANRF 002) would not have prevented this incident because the line of communication between the PO and the network controller did not include the PN personnel who were already within the boundaries of the TOA.

It is noted though that the act of compiling a written TOA may, on occasions, be an additional prompt in reminding a network controller that a TOA has been issued. However, it is also noted that there is nowhere on the existing TOA form to record the details of protection measures enacted or whether all persons who may be within the boundaries of a TOA have been informed of its existence. This is regardless of whether or not these persons fit the definition of 'work parties' or 'workers'.

FINDINGS

Contributing safety factors

- The train crew did not obtain permission from the ARTC network controller before moving the locomotive of train 3391N within the ARTC controlled yard.
- Rule ANWT 304 and Rule NWT 304 do not stipulate that the Protection Officer must inform all persons or work groups who may be within the boundaries of a Track Occupancy Authority of its existence. This is regardless of whether or not these persons or work groups fit the definition of 'work parties' or 'workers'. *[Significant safety issue]*

Other safety factors

- The NSW rules and procedures do not clearly address the requirements relating to protection of 'out of service' track infrastructure. *[Minor safety issue]*
- The TOA at Junee on 4 August 2010 was not protected in accordance with rule ANWT 304 in that red flag/red lights and detonators were not in place at the limits of the authority.
- The current TOA form (ANRF 002) does not allow the user to record details of protection measures enacted or whether all persons or work groups within the boundaries of the Track Occupancy Authority have been informed of its existence. *[Minor Safety Issue]*

Other key findings

- The proposed shunt movements, the distance between these movements and the fixed worksite, and the temporary stop blocks erected meant that there was little likelihood of a breach of the fixed worksite by train 3391N on 4 October 2010.
- The ARTC has indicated an intention to phase out the use of verbal TOA's on the NSW ARTC leased network by December 2010.

SAFETY ACTION

The safety issues identified during this investigation are listed in the Findings and Safety Actions sections of this report. The Australian Transport Safety Bureau (ATSB) expects that all safety issues identified by the investigation should be addressed by the relevant organisations. In addressing those issues, the ATSB prefers to encourage relevant organisations to proactively initiate safety action, rather than to issue formal safety recommendations or safety advisory notices.

Australian Rail Track Corporation

Communication to persons within TOA boundaries

Significant safety Issue

Rule ANWT 304 does not stipulate that the Protection Officer must inform all persons or work groups who may be within the boundaries of a Track Occupancy Authority of its existence. This is regardless of whether or not these persons or work groups fit the definition of 'work parties' or 'workers'.

ATSB safety recommendation RO-2010-SR-006

The Australian Transport Safety Bureau recommends that the Australian Rail Track Corporation take action to address this safety issue.

Protection of 'out of service' infrastructure

Minor safety Issue

The NSW rules and procedures do not clearly address the requirements relating to protection of 'out of service' track infrastructure.

ATSB safety advisory notice RO-2010-SAN-004

The Australian Transport Safety Bureau advises that the Australian Rail Track Corporation should consider the implications of this safety issue and take action where considered appropriate.

TOA form ANRF 002

Minor safety Issue

The current TOA form (ANRF 002) does not allow the user to record details of protection measures enacted or whether all persons or work groups within the boundaries of the Track Occupancy Authority have been informed of its existence.

ATSB safety advisory notice RO-2010-007-SAN-005

The Australian Transport Safety Bureau advises that the Australian Rail Track Corporation should consider the implications of this safety issue and take action where considered appropriate.

RailCorp

Communication to persons within TOA boundaries

Significant safety Issue

Rule NWT 304 does not stipulate that the Protection Officer must inform all persons or work groups who may be within the boundaries of a Track Occupancy Authority of its existence. This is regardless of whether or not these persons or work groups fit the definition of 'work parties' or 'workers'.

ATSB safety recommendation RO-2010-SR-007

The Australian Transport Safety Bureau recommends that RailCorp take action to address this safety issue.

SOURCES AND SUBMISSIONS

Sources of Information

Information for this report was obtained from:

- Pacific National (Asciano)
- The Australian Rail Track Corporation
- Train drivers of train 3391N.

References

Submissions

Under Part 4, Division 2 (Investigation Reports), Section 26 of the Transport Safety Investigation Act 2003, the ATSB may provide a draft report, on a confidential basis, to any person whom the ATSB considers appropriate. Section 26 (1) (a) of the Act allows a person receiving a draft report to make submissions to the ATSB about the draft report.

A draft of this report was provided to:

- Independent Transport Safety Regulator (NSW)
- Pacific National (Asciano)
- RailCorp
- The Australian Rail Track Corporation
- The drivers of train 3391N
- The network controllers
- The protection officer.

Submissions were received from the Australian Rail Track Corporation, the Independent Transport Safety Regulator and Pacific National. The submissions were reviewed and where considered appropriate, the text of the report was amended accordingly.





