

# Rail Safety Investigation Report



Rail Worksite Protection in NSW — Report 1 Picton, 16  
August 2022

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**Rail Worksite Protection in NSW – Report 1**

Picton

16 August 2022

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# Preface

The Office of Transport Safety Investigations (OTSI) is delivering a Systemic Investigation into worksite protection in NSW. The scope of the investigation includes, but is not limited to:

- What controls Rail Infrastructure Managers have in place to manage worksite protection
- Common causal pathways to worksite protection incidents
- Patterns of incidents specifically related to particular planning phases, or types of protection
- Technology controls proposed, researched, trialled, or currently being used to improve worksite protection in NSW and elsewhere
- Examination of whether there are common barriers to the adoption of higher order controls that minimise or eliminate workers on track including enabler to support uptake
- Actions taken to improve worksite protection in general in NSW and elsewhere
- How others, both interstate and internationally, are managing worksite protection and in particular introduction of higher order controls
- The conduct of risk assessments and how they address worksite protection risks and controls.

Report 1 focuses on an incident at Picton on 16 August 2022 and is being delivered to provide insights and observations that will help support the findings of the final investigation.

# Executive summary

At 0942 on Tuesday 16 August 2022, NSW Trains Endeavour passenger service SN42 travelling from Moss Vale to Sydney departed Picton platform and encountered an excavator on the Up Main line approximately 300 m ahead. This incident was high risk with the potential consequence being a loaded passenger train striking a piece of heavy equipment at speed, putting at risk not only the operator of the excavator, but the people on the train should it derail and overturn.

The excavator had been placed on the track by the excavator operator after being permitted to occupy the line by a Protection Officer (PO) from AustCorp, a contracted company providing services to the Rail Infrastructure Manager (RIM), the Australian Rail Track Corporation (ARTC).

The excavator operator was performing tamping work to remove track defects and the speed restrictions associated with those defects. The PO was using a form of worksite protection called a Track Work Authority (TWA). This allowed for work to be performed between rail traffic movements using handsignallers who give instructions to rail traffic crew to stop or proceed based on directions from the PO.

The PO had authorised the handsignaller closest to the worksite to permit SN42 to travel unrestricted, however the PO also permitted the excavator operator to occupy the track before the train had passed safely through the work area.

The investigation made several observations including:

- the PO lost situational awareness while managing the work due to a range of factors, including high cognitive workload, fatigue, and the noisy, distracting location of the work
- the ARTC rules and procedures for managing TWA do not contain specific details in how to manage rail traffic through a worksite.

Full details of the observations of this rail safety investigation are contained in Part 3.

# Part 1 – Factual information

## Events leading up to the occurrence

- 1.1 During August 2022, the Australian Rail Track Corporation (ARTC) had operated a maintenance inspection vehicle called the AK cars<sup>1</sup> on the Main South lines through the Southern Highlands in NSW for the purpose of checking on the geometry of the track. The track faults were communicated to ARTC engineering staff for analysis and prioritisation for repairs.
- 1.2 ARTC hired a team of workers to conduct repairs to prioritised defects on this section of the network. The team consisted of an engineering supervisor, an excavator operator with an excavator (fitted with a special tamping attachment), a Protection Officer (PO) and a group of four handsignallers. The engineering supervisor was engaged on a longer term assignment to ARTC and was not engaged under the same contract as the other workers.
- 1.3 ARTC defined the scope of the task within the contract to be ‘to assist with AK Car defect removal within Moss Vale to Botany area from 8 to 17 August 2022’. Different forms of worksite protection are available within ARTC’s Network Rules and Procedures and each method has its own procedure which defines how the worksite protection is to be applied. There was no indication within the ARTC scope about what method of worksite protection was to be used.
- 1.4 The ARTC manager raised a work order in their engineering system for AustCorp to carry out the contracted works and nominated TWA as the method of protection to be used. Neither AustCorp nor the PO involved were consulted about the method of protection.
- 1.5 No other correspondence was exchanged between ARTC and AustCorp for this work. No WHS or rail safeworking requirements were explored or discussed.
- 1.6 The AustCorp work team were given a work order by ARTC on 14 August requesting track repairs at Picton on the Up Main line.<sup>2</sup> The work order said the defect repair was originally due to be attended to on 10 August, however it was changed due to altered priorities based on other defects.
- 1.7 The repairs at Picton were re-scheduled by ARTC to be undertaken on 16 August. The engineering supervisor was informed late in the evening of 15 August (the night before the incident) of the need to repair three defects at Picton.
- 1.8 The engineering supervisor told the PO of the location of the work at 0600 that morning. The PO organised the handsignallers to meet at Picton rail yard to plan and brief the workers on the method of protection prescribed in the ARTC work order which was TWA
- 1.9 A TWA is a spoken authority, with agreed arrangements between the PO and the ARTC Network Controller (NC) in the Junee Network Control Centre South (NCCS) about placement of the worksite and handsignallers to manage the passage of rail traffic.

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<sup>1</sup> The AK cars are a set of rail hauled inspection cars that contain inspection and testing equipment to detect faults on the track.

<sup>2</sup> The Up direction refers to the direction of travel for trains heading towards Sydney. The Down direction refers to trains heading away from Sydney.

- 1.10 Handsignallers act on the instructions of the PO to place protection on the rails in the form of Railway Track Signals (often called detonators) and to display handsignals to oncoming rail traffic in the form of coloured flags or lights to indicate the speed to travel or to stop.
- 1.11 ARTC's procedure ANPR 702, Using a Track Work Authority, defines the PO's responsibilities and requirements for managing rail traffic through worksites. The PO planned the worksite protection using these requirements and completed an ARTC Worksite Protection Plan (WPP) form. To get access to the defect on the Up Main the excavator was to cross the Down Main line first, then position itself onto the Up Main near the defect area.
- 1.12 The excavator was to be placed on track at 84.920 km and driven on the rail head to the location of the defect at 84.830 km on the Up Main line. The plan indicated there would be a TWA on both the Up and Down Main lines, with two handsignallers in each direction to help manage the passage of rail traffic.
- 1.13 The workers arrived on site at Picton at 0700. The work supervisor briefed the team about the work activity, and the PO briefed them about the worksite protection arrangements. The handsignallers signed onto the plan, went to their respective locations, tested their radio communications, and awaited instruction.
- 1.14 The PO called the NC at Junee and arranged for the two Track Work Authorities (TWAs) to be authorised, which was done by 0805 and the handsignallers were advised that the TWAs were authorised. Due to the frequency of train running, several Up direction trains (towards Sydney) were allowed to pass the worksite unimpeded before the first opportunity was available to get the excavator onto the Up Main.
- 1.15 Based on the train running forecast, the window of opportunity to do the work would be after SN42 passed through the worksite at around 0940.

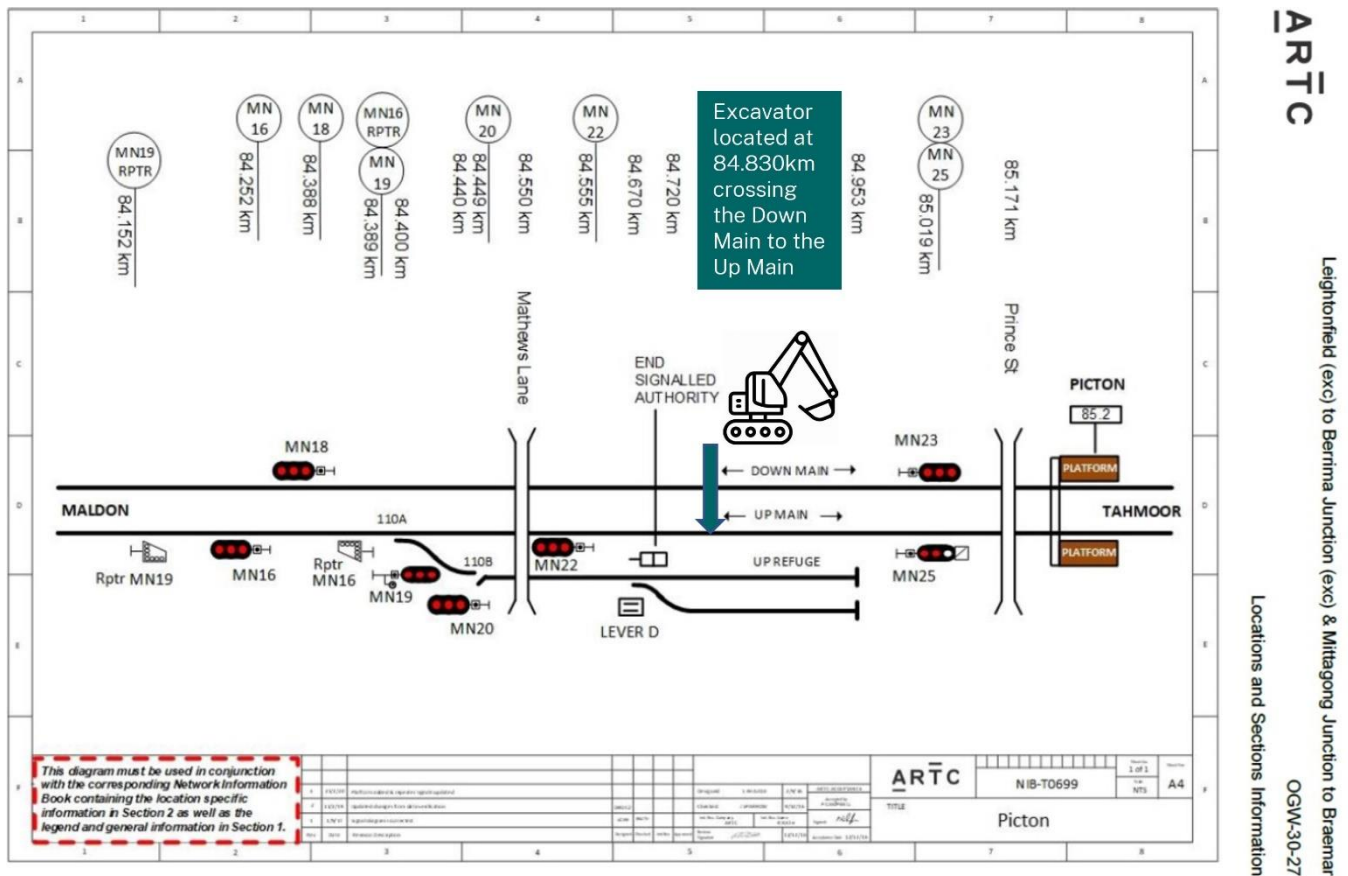
## The occurrence

- 1.16 At 0935, NSW Trains passenger service SN42 passed the outer handsignaller at 90.200 km on the Up Main line, with no handsignal being displayed, meaning there was no impediment to the train operating normally. There was a deliberate decision by the PO to permit trains to run unimpeded at this time as the window for doing the work was still approaching.
- 1.17 SN42 travelled through a temporary speed restriction on the Up Main line of 40 km/h starting at 89.050 km passing into the worksite. The speed restriction ended at 82.200 km.
- 1.18 At 0938, SN42 passed the inner handsignaller on the Up Main, stationed at 87.550 km, also with no handsignal being displayed, again meaning there was no impediment to the train operating normally. The PO gave no instructions to either handsignaller on the Up Main line to warn or stop trains approaching the worksite, as there was no work yet occurring.
- 1.19 The PO received a confirmation from the inner handsignaller that SN42 had passed their location, and the PO acknowledged this via a radio message. The PO did not record these details in the section of the WPP provided for that purpose. ANWT 306 Track Work Authority requires the PO to keep records of train running information, but does not specify how this is to be done. This was provided for in the WPP form in this event.



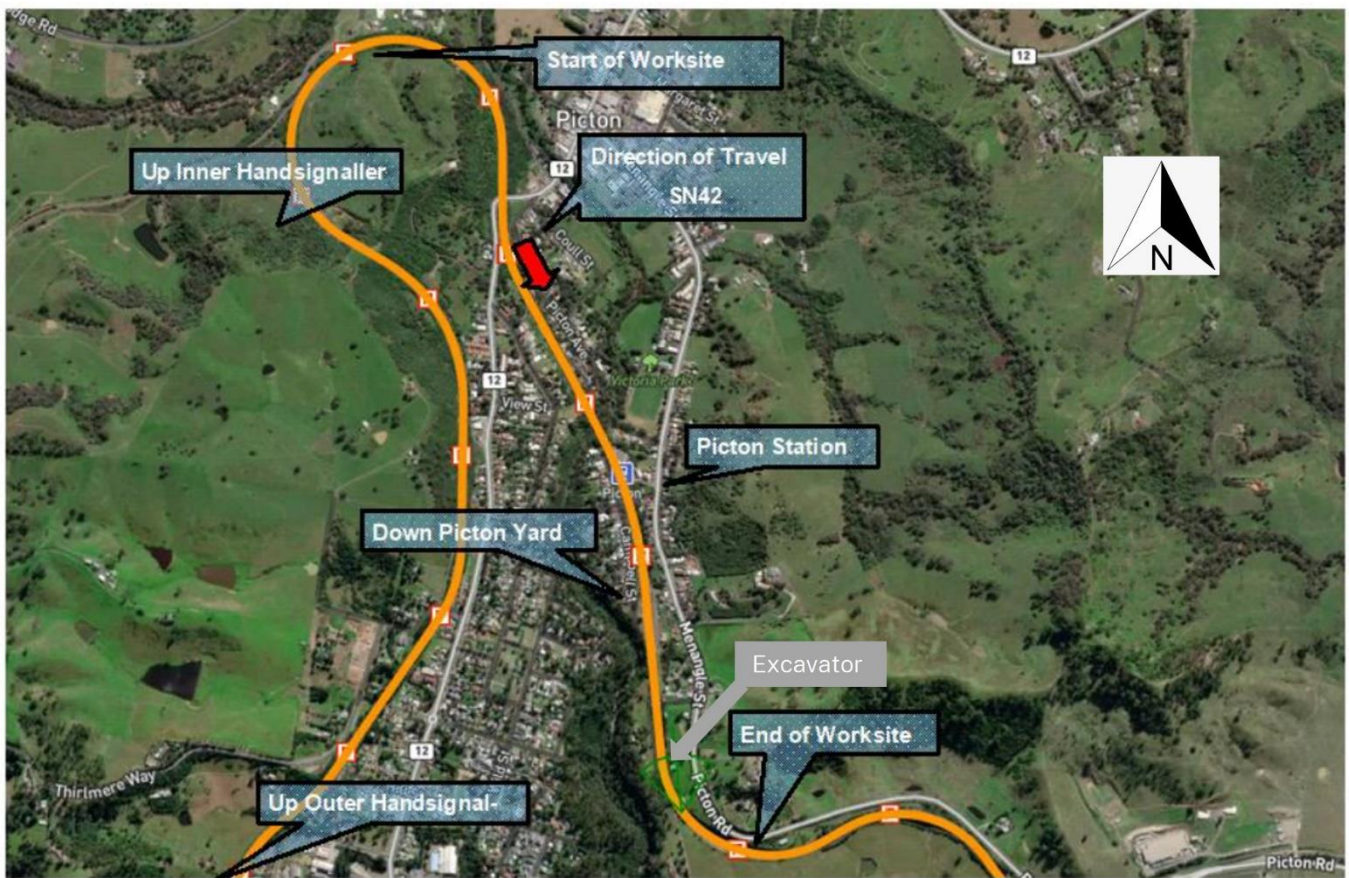
- 1.20 At 0940, the PO gave permission to the excavator operator to occupy the Down Main line with their machine. The excavator operator manoeuvred their machine onto the Down Main line from the Down cess<sup>3</sup> side of the rail corridor.
- 1.21 At 0941, SN42 arrived at Picton station and stopped at platform 1 to perform passenger pick up and drop off. After passenger working, the driver of SN42 then received confirmation from the on-board staff that the train was permitted to leave Picton station, and the driver applied power ready to proceed.
- 1.22 At 0942, the PO gave permission to the excavator operator to occupy the Up Main line and the operator moved their machine over onto the Up Main line.
- 1.23 At 0942, SN42 departed Picton platform 1 and proceeded towards Sydney. The driver of SN42 reported seeing an item of plant (the excavator) on the track ahead that was on the adjacent Down Main line. The train was reported to be travelling at approximately 30 km/h at this point. When the driver realised the excavator was on the Up Main, they stopped the train near the 85.000 km mark, 50-100 m away from the excavator.
- 1.24 The excavator operator and the PO noted the presence of SN42 and arranged for the excavator to be removed from the Up and Down Main lines. The driver of SN42 reported the incident to the NC at Junee NCCS. There were no injuries to any person, or damage to the train and equipment resulting from the incident.

Figure 1: Picton Yard



<sup>3</sup> Cess: the area between the outermost rail and the boundary of the rail corridor.

Figure 2: Incident details



Source: ARTC Safety investigation report TCR 9225 2022, annotated by OTSI

### Events following the occurrence

- 1.25 At approximately 0944, the driver of SN42 reported the incident to the NC at Junee NCCS. The excavator operator removed the excavator from the danger zone of both the Up and Down Main lines. The PO then provided the driver of SN42 a handsignal to proceed. SN42 continued its journey to Sydney.
- 1.26 No conversation was reported to have occurred between the driver of SN42 and the work crew.
- 1.27 At 0953 the NC contacted the PO about the incident and instructed them to fulfil the TWA and cancel the work.

Figure 3: Incident location



Source: spatial.nsw.gov.au – annotated by OTSI

## Incident location

1.28 The incident occurred at Picton on the Main South rail line between Sydney and Goulburn at approximately 84.830 km (Figure 2).

## The work activity

1.29 The work being performed at Picton on the day of the incident was track geometry repairs on the Up Main line at 84.830 km. The repairs were required to address track geometry defects identified previously by a set of specially fitted rail cars (AK cars). These defects can lead to poor ride quality and for the more severe ones, derailment risks to rail traffic and may require temporary speed restrictions to be imposed.

1.30 The work being done was tamping<sup>4</sup> of the track ballast using an excavator with a specially fitted tamping attachment. The excavator was put on the railhead and was in the process of

<sup>4</sup> Tamping is a process of packing the ballast under the rail track to make the formation more durable.

travelling to the site to be tamped. A special attachment was to be used to dig into the rail ballast and compact it into a solid base. An example of a rail mounted excavator with a tamping attachment is shown at Figure 4.

**Figure 4: Example of rail mounted excavator with tamping attachment**



Source: Google Images

- 1.31 The work team consisted of a PO, an engineering supervisor, an excavator operator and four handsignallers. The PO, engineering supervisor and handsignallers were contractors sourced from a labour hire company, AustCorp Pty Ltd. The excavator operator was a sole trader, contracted directly to ARTC.
- 1.32 The contract for the work was for 10 hours per day for 10 consecutive days, with no provision for rest periods or breaks between shifts. The contract did not specify the hours of work, but the ARTC Work, Health and Safety Work Instruction WHS-WI-423 states in section 2.2 that the maximum hours worked in a seven day period should be no more than 60.
- 1.33 The engineering supervisor was not engaged under this particular contract but they worked with the other team members on the same task.

## Environmental conditions

1.34 The morning of 16 August 2022 was clear and dry. The Bureau of Meteorology recorded a temperature of 10.1°C at 0900 at the Camden Airport weather station about 17.6 km north-east of Picton. There was no rainfall recorded for this day. At 0900 the wind was recorded from the north at 2 km/h. Environmental conditions were not considered as a contributing factor to the incident.

## Train and track information

- 1.35 The rail network at Picton consists of two main lines, the Up and Down Main line, and two refuge sidings (see Figure 1). The Up Main line directs rail traffic to the north towards Sydney, and the Down Main heads south towards Goulburn. Picton is unusual because of the topography and the curve of the rail line. At this location, the Up Main line directs rail traffic towards Sydney to the north but faces south and the Down Main line faces north. A location south of Sydney would normally have the rail lines in the opposite orientation. The physical direction of the track runs south-west until Maldon where the line turns to the north, curves around after Picton station, then heads back in a southerly direction towards Goulburn (see Figure 2).
- 1.36 The system of safeworking in use at Picton is Rail Vehicle Detection (RVD)<sup>5</sup>, that consists of a set of interlocked points and signals that are operated by the NC at the Junee NCCS.
- 1.37 The NSW Trains Endeavour service SN42 was a four-car set with lead car 2809. The crew on SN42 were a driver trainer who was driving the train, a trainee driver who was under instruction in the crew cab and a guard at the rear of the train. There were 91 passengers on board when SN42 departed Picton.
- 1.38 SN42 was timetabled to leave Moss Vale at 0836. It was running approximately 19 minutes late when it arrived at Picton station.

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<sup>5</sup> The portions of line where the system of safeworking relies on track-circuiting or axle counters.

Figure 5: NSW Trains Endeavour rail cars



Source: Sydney Trains

## Related occurrences

- 1.39 A very similar incident to this event occurred on 16 April 2022 at Picton. ARTC had a worksite on the Up Main line to undertake repairs following damage to infrastructure from heavy rain. The work was being protected by a TWA on both tracks. In this incident, a PO permitted a loaded NSW Trains passenger train, SN56, to approach the worksite and stop at Picton platform 1 to undertake passenger pick up and drop off. SN56 then proceeded to leave Picton station and soon after encountered a loaded hi-rail dump truck on the Up Main line.
- 1.40 The PO had allowed the full dump truck to occupy the Up Main line while a loaded passenger train was still approaching the work area. The potential safety risk was a collision between a piece of heavy plant (loaded dump truck) and a loaded passenger train.
- 1.41 The ARTC report into this incident, completed in December 2022, attributed the cause to:
- insufficient communications on site between the PO and other workers
  - a confused planning regime, where arrangements for the worksite like extending the length of the worksite, were not subject to consultation with the PO protecting the work
  - insufficient working radios on site to allow for effective communication with all workers
  - uncoordinated activity between the contracted supply companies

- lack of risk assessment by ARTC into the safeworking solution of running two concurrent TWAs to protect the work
  - change in the protection arrangements from a full track closure under a Local Possession Authority (LPA) to being done under live traffic using TWA protection
  - the length of the worksite, as the inner handsignaller on the Up main was over 2.5 km away from the location of the work, but technically within the approved distance from the worksite.
- 1.42 The ARTC report into the incident in April 2022 recommended prohibiting the use of TWA protection for this type of work and allowing it to only be used for adjacent line protection. This recommendation was not in place at the time of the incident in August 2022.
- 1.43 ARTC issued Flash Alert F0016 on 20 April 2022 that described the incident and included actions required of POs when using TWA protection in the ARTC network. These actions included the PO having to visibly observe rail traffic passing the exit end of the worksite or using clearance handsignallers to perform this task. The actions in this Flash Alert provided instructions not included in the existing Network Rules and Procedures for TWA.
- 1.44 The PO involved in the incident at Picton in August 2022 was not issued a copy of the Flash Alert. Although a supplier of safeworking labour hire used by ARTC, the PO's employer AustCorp Pty Ltd was not issued with a copy of the Flash Alert to an active email address.

## **OTSI OBSERVATIONS**

The ARTC final report into the incident in April 2022 recommended prohibiting the use of TWA as a means of primary protection for work in the ARTC network. The report recommended allowing TWA to only be used as adjacent line protection. The prohibition was not enacted until December 2022, after the incident in August 2022.

The ARTC Flash Alert issued for the incident in April 2022 contained actions required of POs working in their network when using TWA. The PO involved in the incident in August 2022 was not issued a copy of the April 2022 Flash Alert and AustCorp Pty Ltd was not issued with a copy of the Flash Alert to an active email address.

Instructions about the use of safeworking Network Rules and Procedures were issued by ARTC in the form of a temporary Flash Alert, with no distribution control to affected parties, and no assurances that those required to apply the changes had received or understood the requirements.

# Part 2 – Analysis

## Introduction

- 2.1 The focus of the investigation was primarily about the factors leading to the PO permitting the excavator to be placed on track before SN42 had passed the worksite.

## Procurement and planning activity

- 2.2 The work being performed for ARTC was to remove track defects and the scope and resources were subject to a contract let by ARTC. While the contract did not specify the method of worksite protection to be used, the inclusion of four handsignallers as part of the resource allocation means the likelihood was that TWA would be used for protection on both tracks.
- 2.3 The rules for authorising, issuing and using a TWA are prescribed in ARTC's Work on Track Network Rules and Procedures documents ANWT 306 Track Work Authority (rule) and ANPR 702 Using a Track Work Authority (procedure). These prescribe the requirements but do not specify the methodology to be used.
- 2.4 There was no reference in the planning and contract documentation to there being any exclusive occupancy of the line under a TOA or LPA to perform the work. ARTC Network Rule ANWT 300 Planning Work in the Rail Corridor stated on page 4:

Local Possession Authorities and Track Occupancy Authorities are the preferred methods of working on track.

There was no exchange of documented information about proposed protection arrangements between ARTC and AustCorp or the PO once the contract was let.

- 2.5 The work orders subsequently raised by ARTC associated with this contract indicated the work was to be protected using TWA. These work orders were raised by an ARTC manager, not the PO managing the work.
- 2.6 ARTC manages access to its network through application of a set of requirements in procedure RLS-PR-003 'Rail Safety Workers accessing the ARTC Rail Corridor'. This procedure required all work planned for the ARTC rail corridor to be submitted for a risk assessment of the scope of the work. The procedure does not identify who produces the risk assessment and what is done with it.
- 2.7 A Corridor Access order (which is a product of the ARTC Corridor Access System) was raised and the worksite was listed as being between Berrima signal BJ82 at 141.021 km to Leightonfield LF12 signal at 24.483 km, nearly 117 km. The Corridor Access request was a blanket approval request covering a large section of the rail corridor and did not specifically relate to the work area at Picton.
- 2.8 ARTC issued an approval through its Corridor Access system on 11 August 2022 for the work on 16 August. There was no evidence of a risk assessment process, mentioned in RLS-PR-003, being undertaken for the application for work in the rail corridor.



- 2.9 The ARTC procurement process for the work occurred under a provision that regarded the PO and handsignallers as temporary ARTC employees. Under this provision, the PO was not required to have their Worksite Protection Plan (WPP) reviewed and approved by ARTC management as is normally the case for a contractor.
- 2.10 If the PO was engaged under normal circumstances as a contractor, their WPP would need to be submitted to ARTC for review and approval. The results of these arrangements meant that the PO had been given a blanket approval by ARTC to operate between Berrima and Leightonfield with no managerial oversight of their specific work plans on the daily tasks assigned to them.
- 2.11 The engineering supervisor was informed by ARTC engineers late in the evening of 15 August of the need to attend Picton to repair three defects the next day. The PO was advised of the specific location of the defects at 0600 on 16 August, the day of the incident. The PO then prepared their WPP on the morning of the work.

### **OTSI OBSERVATIONS**

ARTC engaged external contractors to perform work within the delegations of their procurement framework that regarded them as temporary ARTC employees, and this arrangement removed a normal requirement to review the PO's Worksite Protection Plan.

The PO was advised early in the morning of the day of the work of the intended work locations.

## **Track Work Authority**

- 2.12 A TWA is a type of work on track system in use in the ARTC network that allows work to be performed between traffic movements. It does not give exclusive occupancy of the track. A PO must manage rail traffic by using handsignallers stationed at predetermined points on the approach to the worksite. These handsignallers will relay instructions and give handsignals to approaching rail traffic about how to proceed, or to stop, prior to the worksite.
- 2.13 Under a TWA the PO must not only manage the worksite and handsignallers but must also manage the passage of rail traffic approaching and travelling through the worksite. The PO must understand the nature and density of rail traffic in proximity to the worksite to be able to give suitable directions to handsignallers and the work crew about how and when access to the track is safe.
- 2.14 The PO must have a picture in their mind about the worksite, the handsignallers and what rail traffic is approaching and how to manage that. From that perspective, the task of managing a TWA includes an element of a train control function, without the benefit of an operating display panel that shows what rail traffic is around, and where they are. The PO must absorb, retain and process this information to safely manage the worksite.

Figure 6: ARTC Worksite Protection Plan

**ARTC WORKSITE PROTECTION PLAN** - PO/TWPC/TW IS RESPONSIBLE TO COMPLETE, IMPLEMENT AND BRIEF THIS PLAN

No. 099503

Date: 16/8/22 | Start Time: 0700 | Scope/Type of Work: AN CAR DEFECTS | Site Supervisor: [Redacted]

PO/TWPC/TW: [Redacted] | RW# [Redacted] | Phone: [Redacted] | Signature: [Redacted]

NETWORK CONTROL / PPD: [Redacted] | Authority: TAPS J225794

Hand Signaller/Outlook Name: 1. DJ TRICE, 2. DJ ATBE, 3. UP JAMES, 4. [Redacted]

WORKSITE LOCATION VALIDATION: 0299 8899 8700 | On V/20W track at: 84.830 kms | PICTON DOWN ROAD

SAFeworking METHOD IMPLEMENTED: TWA (TWO PERSON ROAD/RoadWAY VEHICLE/TWA) | WORKSITE PROTECTION IS IN PLACE AS PER WORKSITE PROTECTION PLAN

EMERGENCY SERVICES ACCESS POINT: CAMPBELL ST, PICTON ACCESS

DIAGRAM: ← STONEY | → COUNTRY

84.800 - 87.000

UP TRACK - AN TAMPING  
DN TRACK - HOV-LINE PROTECTION

LEGEND: Stop Sign, Detonator, RTS, Flag, Lockout, Perch, Assembly Point, Train Stop

Source: ARTC

- 2.15 A TWA was a spoken authority. Some details are recorded including the length and location of the worksite, and the location of handsignallers. There was a handsignallers' logbook available where the handsignallers record details of rail traffic that pass their location and their actions (see Figure 6). There was a similar arrangement in the WPP, where a table was provided for the PO to record train running. In this incident, that table was not used to record train running information by the PO, see Figure 7.
- 2.16 TWA had a variety of ways that handsignallers could be used to help the PO manage rail traffic approach and travel through the worksite. Handsignallers could be stationed at rail signals (both absolute and automatic signals) and work with the Network Controller and PO to manage rail traffic. Handsignallers can also be stationed away from signals and use handsignals and railway traffic signals (RTS, also called detonators) to convey instructions to rail traffic crew.
- 2.17 The TWA in use on the day of this incident involved the use of handsignallers not stationed at rail signals. There were three rail defects to be repaired at Picton on this day. To include the three defects, the length of the worksite in this incident was 2.8 km, running from 84.800 km to 87.000 km. The location where the excavator was being placed on track was at 84.920 km and the location of the defect to be repaired was 84.830 km.
- 2.18 With handsignallers only, the Inner Handsignaller must be placed at least 500 m and not more than 1000 m from the worksite in the direction of approaching rail traffic. An Outer

Handsignaller must be placed at least 2500 m and not more than 3000 m from the Inner Handsignaller in the direction of approaching rail traffic.

- 2.19 On the Up Main line there were two handsignallers. The Inner Handsignaller was located at 87.550 km (550m from the worksite boundary) and the Outer Handsignaller was located at 90.200 km (2650 m from the Inner Handsignaller).
- 2.20 Because of the length of the worksite, and the distance of the handsignallers from the worksite there was a time lag between the handsignallers' interaction with rail traffic, and when the rail traffic reached and passed through the worksite. This can introduce the risk of distraction or forgetfulness on the part of the PO.
- 2.21 There was no limit to the distance of a worksite under the ARTC TWA rule and procedure.
- 2.22 In this instance, the handsignallers were instructed not to provide any handsignals to rail traffic crew. All rail traffic was allowed to operate normally as the work had not yet commenced, and there was no obstruction on the track.

Figure 7: ARTC Worksite Protection Plan extract

No. 099503

## ARTC WORKSITE LOG AND DIARY

THE PO/TPPC/TW IS RESPONSIBLE FOR RECORDING SAFETY CRITICAL INFORMATION

Date/Time	SAFETY CRITICAL INFORMATION
0700	ARRIVE ON SITE
0730	BRIEF WORKERS
0805	TWA UP ON TRACKS AT PICTON
0818	108 A POINTS CLIPPED & LOCKED
0826	STAFF SECURED FOR THROUGH LINE -
	106 POINTS SECURED & BLOK
	CLIP & LOCK 108A
	112 POINTS NORMAL & BLOKED
	112 " " " "
0859	CALLY 540 "3" OK TO RES SIGNALS AT STOP IN AUTOMATIC
0906	W/C 372850 TO REPLACE LOW C&A.
0940	EXCAVATOR PLACED ON TRACK
0942	TRAIN WAS STILL IN PLATFORM, PO PLACED EXCAVATOR ON UP TRACK IN FRONT OF TRAIN.
0953	CALLED BY STONEY 3 (CALLY) TOLD TO CLOSE DOWN WORKSITE -
1004	CALLED STONEY 3 - FULFILL TWA'S.

SIGHTING DISTANCE for Lookout Working (LOW)				
	Seconds	Maximum permanent track		km/h
A. Reaction time				
B. Warning time (NSW)		Minimum sighting distance required:		
C. Moving time				
D. Time to be in Safe				
				Metres

MINIMUM WARNING		TRAIN INFORMATION				
ID #	Time Arrived	Time Departed	Speed through worksite	Cleared Worksite time	Cleared Signal time	Notes

Source: ARTC

2.23 ANWT 306 page 2 states “Protection Officers must manage rail traffic approach to and passage through the portion of track within the TWA limits”. No method existed in the ARTC rule or procedure for TWA to positively identify rail traffic as it passed the worksite, just the requirement to do it. The rule and procedure stipulate what must be done, not how it was required to be done.

2.24 The Handsignallers Log and the WPP contained space to record the identification of rail traffic passing however there was no instructional detail in the rule or procedure to describe how this was to be done. Common practice was to record the leading locomotive or car number of approaching rail traffic, and this detail could be recorded on the appropriate form or logbook, but it was not mandated in the rule or procedure.

## OTSI OBSERVATIONS

There was no limit to the length of a worksite in the ARTC rule for TWA.

There was no prescribed method in the ARTC TWA rule and procedure for positively identifying rail traffic passing a worksite.

## Workload of the PO and fatigue

- 2.25 The PO was managing two TWAs concurrently. The nature of a TWA means there is constant communication between the PO and two handsignallers, the engineering supervisor, the excavator operator, and the Network Controller, to manage all the activities. This workload was doubled because of the use of a TWA on both the Up and Down Main lines. The PO also must keep track of all rail traffic approaching the worksite to determine the best way to manage it.
- 2.26 The nature of the work and positioning of the excavator on the Down side of the corridor meant the PO had to wait for a suitable window of time when both tracks would be clear of rail traffic for long enough to get the excavator across the Down Main, onto the Up Main and to the worksite, complete the work, and then get off again safely.
- 2.27 This means the PO must have a mental picture of all the resources and rail traffic involved, to be able to manage the worksite safely and effectively.
- 2.28 There was no indication from the ARTC documentation associated with the contract and work order that there was any consideration of the PO's workload.
- 2.29 The team had been working for nine days straight, which was consistent with the contract that had been let for the work. The contract contained no consideration of rest breaks or days off for the crew to manage their fatigue.
- 2.30 The contract was let on the basis that the workers were to be treated as temporary employees of ARTC, but there were no fatigue management considerations or requirements built into the contract or the work schedule.
- 2.31 ARTC, as the Rail Infrastructure Manager, has accountabilities for having a fatigue risk management program. There was no evidence that fatigue management considerations were applied as part of the contract.
- 2.32 AustCorp has general duties under NSW WHS legislation to ensure the safety of its workers, including consideration of the effects of fatigue. Neither ARTC nor AustCorp included any fatigue management considerations in the contract for these works.
- 2.33 The PO indicated at interview that they were feeling the combined effects of fatigue, having worked nine days straight, and the amount of activity involved in managing the two concurrent TWAs.

## OTSI OBSERVATION

There was no indication that fatigue or workload for the PO were considered by ARTC or AustCorp when the contract was let, or during the work.

## Use of two TWAs concurrently

- 2.34 The ARTC contract let with AustCorp for the safeworking component did not specify or include information about what type of method of protection would be used or expected. The resource allocation of four handsignallers was a suggestion or inference that two TWAs would be used, otherwise these resources would not be required.
- 2.35 The work order raised by ARTC in its engineering management system showed that TWA protection was to be applied, but that was not a detail included in the contract. There was no discussion, exchange, or consultation between the PO and ARTC about how the work was to be managed.

### OTSI OBSERVATION

There was no evidence of consultation between ARTC and the PO about how the work would be managed and the method of worksite protection.

## Choice of location to access worksite

- 2.36 The PO chose to use the Down side of the rail corridor to access the worksite on the Up main line, as the Up side of the rail corridor was taken up by two other sidings and there was an active worksite in that area. ARTC were moving ballast spoil and rocks from a recent landslide that had been stockpiled there. The activity and congestion meant this location was unsuitable to move the excavator around.
- 2.37 The noise and activity of this other worksite likely provided a distraction to the PO.

### OTSI OBSERVATION

The PO's options to access the track were limited because of ARTC work occurring on the Up side of the line. The work occurring there created a noisy and busy site where trucks were loading up rocks and spoil and there was movement and considerable activity, providing a potential distraction to the PO.

## The error by the PO

- 2.38 The PO mistakenly thought train SN42 had passed the location within the worksite where the excavator was to be put on track under the protection of a TWA. SN42 was still at Picton station and yet to pass through the worksite when the excavator was put on the track as directed by the PO.

### OTSI OBSERVATION

There was no cross check or other assurance process under a TWA to confirm that rail traffic has passed the worksite when a PO gives an instruction to obstruct the track with people or equipment. If the PO makes an error, there is no opportunity to identify and correct that error.

## Part 3 – Observations

From the evidence available, the following observations are made with respect to the near hit between train SN42 and an excavator at Picton on 16 August 2022.

- The ARTC final report into a related incident in April 2022 recommended prohibiting the use of TWA as a means of primary protection for work in the ARTC network. The report recommended allowing TWA to only be used as adjacent line protection. The prohibition was not enacted until December 2022.
- The ARTC Flash Alert issued for the related incident in April 2022 contained actions required of POs working in their network when using TWA. The PO involved in the incident in August 2022 was not issued a copy of the April 2022 Flash Alert. AustCorp Pty Ltd was not issued with a copy of the Flash Alert to an active email address.
- Instructions about the use of safeworking Network Rules and Procedures were issued by ARTC in the form of a temporary Flash Alert, with no distribution control to affected parties.
- ARTC engaged external contractors to perform work within the delegations of their procurement framework that regarded them as temporary ARTC employees. There was little evidence they were treated like internal employees, apart from removal of an ARTC checking function for the proposed worksite protection.
- The PO was advised early in the morning of the day of the work of the intended work locations, limiting the time to prepare a worksite protection plan.
- There was no limit to the length of a worksite in the ARTC rule for TWA.
- There is no prescribed method in the ARTC TWA rule and procedure for positively identifying rail traffic passing a worksite.
- There was no evidence fatigue or workload for the PO were considered by ARTC or AustCorp when the contract was let, or during the work.
- There was no evidence of consultation between ARTC and the PO about how the work would be managed and the method of worksite protection.
- The options available to the PO to access the track was limited because of ARTC work occurring on the Up side of the line. The work occurring here created a noisy and busy site where trucks were loading up rocks and spoil and there was movement and considerable activity, providing a potential distraction to the PO.
- There was no cross check or other assurance process under a TWA to confirm that rail traffic has passed the worksite when a PO gives an instruction to obstruct the track with people or equipment. If the PO makes an error, there is no opportunity to identify and correct that error.

## Safety action

ARTC has taken, or intends to take, the following proactive safety action in response to the incident:

- Undertake a review of the NSW TWA rule and procedure. The review to include applicability of process to positively identify rail traffic as clear of a work site.
- Updated procedure COR-PR-029 that supports and reinforces the requirements of ANWT 306.

## Further investigation

The Systemic Investigation into worksite protection in NSW is progressing. To date, OTSI has:

- gathered and undertaken analysis of data relating to worksite protection incidents in NSW
- reviewed a number of transport operator investigation reports for common causal factors
- reviewed previously published investigation reports by OTSI, ATSB and other transport safety bodies
- interviewed interested parties and stakeholders
- reviewed the safety management systems of the major Rail Infrastructure Managers in NSW as they apply to worksite protection
- reviewed bodies of research applicable to the application of technologies for worksite protection.

The investigation is continuing and will include:

- further detailed examination of the safety management systems of the Rail Infrastructure Managers in NSW
- examination of the uptake of technology solutions to improve the performance of worksite protection
- detailed analysis of the common causal factors for worksite protection incidents.

Should a critical safety issue be identified during the investigation, OTSI will notify relevant parties so appropriate and timely safety action can be taken.

A final report will be released at the conclusion of the investigation.



## Part 4 – Appendices

### Appendix 1: Sources, submissions, and acknowledgements

#### Sources of information

- ARTC Network Rule ANWT 306 Track Work Authority
- ARTC Network Procedure ANPR 702 Using a Track Work Authority
- ARTC Investigation report 9225 2022
- ARTC Investigation report 4395 2022
- ARTC work order
- ARTC Worksite Protection Plan
- ARTC Letters of Engagement
- Interview with Protection Officer
- NSW Trains incident report

#### Submissions

The Chief Investigator forwarded a copy of the Draft Report to the Directly Involved Parties (DIPs) to provide them with the opportunity to contribute to the compilation of the Final Report by verifying the factual information, scrutinising the analysis, findings and recommendations, and to submit recommendations for amendments to the Draft Report that they believed would enhance the accuracy, logic, integrity and resilience of the Investigation Report. The following DIPs were invited to make submissions on the Draft Report:

- ARTC
- AustCorp
- NSW Trains
- Office of the National Rail Safety Regulator (ONRSR).

Submissions were received from the following DIPs:

- ARTC
- AustCorp
- ONRSR

The Chief Investigator considered all representations made by DIPs and responded to the author of each of the submissions advising which of their recommended amendments would be incorporated in the final report, and those that would not. Where any recommended amendment was excluded, the reasons for doing so were explained.

# About the Office of Transport Safety Investigations

The Office of Transport Safety Investigations (OTSI) is the independent transport safety investigator for NSW.

The role of OTSI is to improve safety and enhance public confidence in the safety of the NSW transport network through:

- independent investigation of transport incidents and accidents
- identifying system-wide safety issues and their contributing factors
- sharing safety lessons and making recommendations or highlighting actions that transport operators, regulators and other stakeholders can take to improve the safety of bus, ferry and rail passenger and rail freight services.

OTSI is empowered under the *Transport Administration Act 1988* to investigate rail, bus, and ferry accidents and incidents in accordance with the provisions of the *Passenger Transport Act 1990* and *Marine Safety Act 1998*. It also conducts rail investigations under the provisions of the *Transport Safety Investigation Act 2003* (Cth) and a Collaboration Agreement with the Australian Transport Safety Bureau (ATSB).

The aim of an OTSI investigation is to enhance transport safety by sharing safety lessons and insights with those organisations that can implement actions to improve safety. OTSI uses a ‘no-blame’ approach to identify and understand contributing safety factors and underlying issues. It does not assign fault or determine liability in relation to the matters it investigates.

An OTSI investigation is independent of any investigation or inquiry that a regulator, NSW Police or the Coroner may undertake. Evidence obtained through an OTSI investigation cannot be used in any criminal or civil proceedings. While information gathered by OTSI in the conduct of its work is protected, the Chief Investigator, under the *Transport Administration Act 1988*, may disclose information if they think it is necessary for the safe operation of a transport service.

OTSI is not able to investigate all transport safety incidents and accidents or matters that are reported. The Chief Investigator focuses the agency’s resources on those investigations considered most likely to enhance bus, ferry or rail safety by providing new safety lessons and insights that may be shared.

Many accidents result from individual human or technical errors which do not involve safety systems so investigating these in detail may not be justified. In such cases, OTSI will not generally attend the scene, conduct an in-depth investigation, or produce an extensive report.

OTSI may request additional information from operators or review their investigation reports which may lead to several activities, such as the release of a Safety Advisory or Alert to raise industry awareness of safety issues for action.

OTSI investigators normally seek to obtain information cooperatively when conducting an investigation. However, where it is necessary to do so, OTSI investigators may exercise statutory powers to conduct interviews, enter premises and examine and retain physical and documentary evidence.

## Publication of the investigation report

OTSI produces a written report on every investigation for the Minister for Transport, as required under section 46BBA of the *Passenger Transport Act 1990*.

Investigation reports strive to reflect OTSI's balanced approach to the investigation, explaining what happened and why in a fair and unbiased manner. All Directly Involved Parties in the investigation are given the opportunity to comment on the draft investigation report.

The final investigation report will be provided to the Minister for tabling in both Houses of the NSW Parliament in accordance with section 46D of the *Passenger Transport Act 1990*. The Minister is required to table the report within seven days of receiving it.

Following tabling, the report is published on the OTSI website – [www.otsi.nsw.gov.au](http://www.otsi.nsw.gov.au) – and information on the safety lessons promoted to relevant stakeholders.

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