Cowal Gold Project – Addendum to the Transport of Hazardous Materials Study

On 7 February 2017 the Cowal Gold Project's (the Project's) Development Consent (DA 14/98) was modified to reflect approval of the Mine Life Modification. The Mine Life Modification involves an extension of the Project's operational mine life for an additional eight years (i.e. to end 2032) and an increase to the depth of the existing open pit (among other things).

As a result of operations associated with deepening the existing open pit, the approved Project involves an increase in the consumption of ammonium nitrate and ammonium nitrate emulsion and therefore an increase in heavy vehicle deliveries of ammonium nitrate and ammonium nitrate emulsion to the Project. Accordingly, this Addendum to the Transport of Hazardous Materials Study (THMS) has been prepared to reflect the following changes in the frequency of heavy vehicle deliveries of ammonium nitrate and ammonium nitrate emulsion to the Project:

- deliveries of ammonium nitrate would change from 4 per month to 8 per month; and
- deliveries of ammonium nitrate emulsion would change from 4 per month to 12 per month.

This Addendum includes an updated assessment of the likelihood of a hazardous incident as a result of the increase in frequency of deliveries of the ammonium nitrate and ammonium nitrate emulsion to the Project, and an update to the risk analysis results.

It should be noted that the Addendum to the THMS prepared in March 2017 (relevant to the revised transport route for ammonium nitrate and ammonium nitrate emulsion through inland NSW to the Project) replaced Sections 4.6 and 4.7 and Attachments 6A and 7A of the original THMS. Accordingly, reference to Sections 4.6 and 4.7 and Attachments 6A and 7A in this document refers to those provided in the March 2017 Addendum.

COWAL GOLD PROJECT

ADDENDUM TO THE TRANSPORT OF HAZARDOUS MATERIALS STUDY

July 2018
Document No. 919876

1. Replace Table 2 of Attachment 6A of the March 2017 Addendum with:

Table 2
Transport Details

Hazardous Material	Delivery Vehicle	Maximum Volume per Delivery	Maximum Frequency of Deliveries	Transported State	Packaging
Ammonium Nitrate	B-Double	42 t	8 per month	Solid (prilled)	Bulk tippers
Ammonium Nitrate Emulsion	B-Double	42 t	12 per month	Suspension	Bulk tanker

t – tonne.

2. Replace Section 6A6.1.1 of Attachment 6A of the March 2017 Addendum with:

Available accident statistics for Route 1A were obtained from the Roads and Maritime Services (RMS) (formally the RTA) and are summarised in Table 8a.

Table 8a
Summary of Accident Statistics

Route	Length (km)[1]	No. of Heavy Vehicles (per day)[1]	% Increase of Heavy Vehicles due to Project[3]	Heavy Vehicle Accidents (per year)[4]	Annual Million Km of Heavy Vehicle Travel	Heavy Vehicle Accidents/Annual Million km of Heavy Vehicle Travel
1A	503.2	385 – 1,324[2]	0.15% - 0.52%	22.8	50.4 – 173	0.13 – 0.45

[1] Roads and Maritime Services Traffic Volume Viewer (retrieved 23 May 2018).

[2] 2018 values extrapolated from previous years assuming 1% annual growth rate.

[3] Assumes 40 truck movements per month.

[4] Roads and Maritime Services Crash Report Data (1 Jan 2012 to 21 Dec 2016).

The accident statistics for Route 1A are considered to be within normal operating levels for the road types and use. The increase of heavy vehicles due to the Project would be very small (up to approximately 0.52%) and would be unlikely to affect traffic flows or accident statistics. Route 1A is therefore suitable for the transport of hazardous materials with respect to accident statistics.

3. Replace Section 6A6.4.3 of Attachment 6A of the March 2017 addendum with:

Accident data for heavy vehicles utilising Route 1A are detailed in Section 6A6.1.1. Approximately 23 accidents per year involving heavy vehicles occur along Route 1A.

In the event of an accident involving a heavy vehicle, the carried goods may or may not be released. The probability of release is dependent on factors such as speed, shipping conditions (i.e. pressurised compared to non-pressurised), inadequate load securing, and strength and integrity of the container.

Various studies of release probabilities from heavy vehicles involved in an accident have been undertaken. The *Guidelines for Chemical Transportation Risk Analysis* (CCPS, 1995) indicates that the release probability for various road types is between 5 and 10% (i.e. approximately one heavy vehicle accident in every 10 to 20 will result in a release of the material).

An estimation of the likelihood of an accident involving a vehicle transporting ammonium nitrate to the Project resulting in a release of the material must take into account the following:

- the number of vehicles transporting ammonium nitrate to the Project relative to the total number of heavy vehicles already using the same transport route;
- the number of accidents that have involved heavy vehicles; and

- the probability of a release of the material (which is assumed to be 10% of all accidents involving heavy vehicles results in a release of material) (CCPS, 1995).

The likelihood of an accident (based on approximate transport data) involving a vehicle transporting ammonium nitrate to the Project resulting in a release of the material or explosion for Route 1A is estimated to be 0.001/year (i.e. such an accident is estimated to occur on Route 1A once every 560 years) (Pinnacle Risk Management Pty Ltd, 2018).

The risk of the event is determined using the risk matrix in Table 8b and the consequence ratings in Table 8c (Pinnacle Risk Management Pty Ltd, 2018).

Table 8b
Risk Matrix

Likelihood						
Frequent >1/yr	II	II	I	I	I	I
Probable >10^{-1} to 1/yr	III	II	II	I	I	I
Possible >10^{-2} to 10^{-1}/yr	III	III	II	II	I	I
Unlikely >10^{-4} to >10^{-2}/yr	III	III	III	III	II	I
Very Unlikely >10^{-6} to 10^{-4}/yr	III	III	III	III	III	II
Extremely Unlikely <=10^{-6}/yr	III	III	III	III	III	III
Consequence	Minor	Significant	Severe	Serious	Extremely Serious	Catastrophic

Source: Pinnacle Risk Management Pty Ltd (2011; 2018)
Class I: Indicates a high level of risk which is intolerable and where risk reduction is required. This requires the reduction of frequency and/or consequence.
Class II: Indicates a moderate level of risk. Whilst the risk is not unacceptable, there should be practical measures taken to lower the risk if economically viable. For risks where further mitigation is not economically viable, judgement needs to be exercised as to whether the level of risk is acceptable or not. This area is the beginning of the ALARP region (i.e. as low as reasonably practicable).
Class III: indicates a low level of risk and is broadly considered to be acceptable. Further risk mitigation may not be required / appropriate. However, low and accepted risks should be monitored and routinely reviewed to ensure that they remain acceptable. Few risks remain static. This area includes ALARP as well as what are known as trivial or negligible risks.

Table 8c
Consequence Ratings

	Minor	**Significant**	**Severe**	**Serious**	**Extremely Serious**	**Catastrophic**
Safety and Health	One minor injury, First Aid	Recordable or single Medical Treatment Injury	Multiple Medical Treatment Injuries or one Lost Time Injury	Permanent disability casualty or multiple Lost Time Injuries	Multiple permanent disabilities or one fatality	Multiple fatalities

Table 8c (Continued)
Consequence Ratings

	Minor	Significant	Severe	Serious	Extremely Serious	Catastrophic
Environment	Very minor pollution. No offsite escape of material (contained within the operational areas). Onsite nuisance value only	Minor local pollution. Nuisance offsite effect, typically of short duration, e.g. noise, odours, dust and/or visible plumes for less than one hour	Evident pollution, local concern. Minimal duration offsite effects (e.g. waterway slightly discoloured, turbid etc around the point of release with no or very few fish killed)	Significant local pollution. For example, waterways discoloured 10s of metres, fire or smoke affecting people near to the site	Major local pollution. Observable offsite effect (e.g. waterways discoloured 10s to 100s of metres for a few weeks with a significant number of aquatic life adversely affected)	Extremely severe pollution. Ecosystems at high risk of destruction. Only resolved via long term solutions (potentially taking years)
Public Relations	Minor issue, one complaint	Local issue, 10 complaints	Local media, 100 complaints	Regional or state media	Wide media national coverage	Headlines, corporate damage
Financial Impact	< $25,000	$25,000 to $100,000	> $100,000 to $1 million	> $1 million to $20 million	> $20 million to $100 million	> $100 million

Source: Pinnacle Risk Management Pty Ltd (2011; 2018)

For releases of ammonium nitrate from a road traffic accident, the consequence rating is determined to be “Serious” (Pinnacle Risk Management Pty Ltd, 2018). The volume is limited to the size of the tanker (i.e. 40 tonnes) and it is possible that only one of the two barrels is breached (Pinnacle Risk Management Pty Ltd, 2018).

Given a likelihood of 0.001/year and consequence rating of “Serious”, the corresponding risk level is Class III (Pinnacle Risk Management Pty Ltd, 2018). These values indicate a low level of risk associated with the transport of hazardous materials (Pinnacle Risk Management Pty Ltd, 2018).

4. Replace Table 10 of Attachment 6A of the March 2017 Addendum with:

Table 10
Summary of Risk Analysis Assessment Factors

Assessment Factor	Route 1A
Schools	6
Number of School Students	1,613
Hospitals	1
Number of Hospital Beds	36
Aged Care Facilities	1
Churches	3
Items of Heritage or Cultural Significance	2
Other Landuse	Predominantly open space, rural residential and commercial areas
Number of Park Reservations	19
Park Reservations – Approximate Total Road Frontage (m)	74,396
Waterways	56
Emergency Infrastructure	Adequate
RMS and Transport Provider Preferred Route	RMS and Transport Provider preferred route
Length (km)	503.2

Table 10 (Continued)
Summary of Risk Analysis Assessment Factors

Assessment Factor	Route 1A
No. of Heavy Vehicles (per day)[1]	385 – 1,324[2]
% Increase of Heavy Vehicles due to Project[3]	0.15% - 0.52%
Heavy Vehicle Accidents (per year)[4]	22.8
Annual Million Km of Heavy Vehicle Travel	50.4 – 173
Heavy Vehicle Accidents/Annual Million km of Heavy Vehicle Travel	0.13 – 0.45
Availability of Alternative Emergency Routes	Available
Emergency Response Capability	Adequate
Operational Factors	Cost effective

1 Roads and Maritime Services Traffic Volume Viewer (retrieved 23 May 2018).

2 2018 values extrapolated from previous years assuming 1% annual growth rate.

3 Assumes 40 truck movements per month.

4 Roads and Maritime Services Crash Report Data (1 Jan 2012 to 21 Dec 2016).

Source: RMS.

5. Delete Attachment 6B (segment 2 – New England Highway [Hexham] to Newell highway [Dubbo]) of the original THMS as Segment 1 removes the need for this segment.

6. Replace all references to "Segment 3" in Attachment 6C with "Segment 2".

7. Replace Table 2 of Attachment 6C with:

Table 2
Transport Details

Hazardous Material	Delivery Vehicle	Maximum Volume per Delivery	Maximum Frequency of Deliveries	Transported State	Packaging
Ammonium Nitrate	B-Double	42 t	8 per month	Solid (prilled)	Bulk trippers

8. Replace Section 6C6.1.1 of Attachment 6C with:

Available accident statistics for Route 2A were obtained from the RMS and are summarised in Table 7a.

Table 7a
Summary of Accident Statistics

Route	Length (km)	No. of Heavy Vehicles (per day)[1]	% Increase of Heavy Vehicles due to Project[3]	Heavy Vehicle Accidents (per year)[4]	Annual Million km of Heavy Vehicle Travel	Heavy Vehicle Accidents/Annual Million km of Heavy Vehicle Travel
2A	257	746[2] – 1,102[2]	0.07% – 0.1%	11.6	69.99 – 103.41	0.11 – 0.17

1 Roads and Maritime Services Traffic Volume Viewer (retrieved 23 May 2018).

2 2018 values extrapolated from previous years assuming 1% annual growth rate.

3 Assumes 16 truck movements per month.

4 Roads and Maritime Services Crash Report Data (1 Jan 2012 to 21 Dec 2016).

Accident statistics for Route 2A are considered to be within normal operating levels for the road type and use. The increase of heavy vehicles due to the Project would be very small (up to approximately 0.1%) and would be unlikely to affect traffic flows or accident statistics. Route 2A is therefore suitable for the transport of hazardous materials with respect to accident statistics.

9. Replace Section 6C6.4.3 of Attachment 6C with:

Accident data for heavy vehicles utilising Route 2A are detailed in Section 6C6.1.1 and Table 7a. Approximately 12 accidents per year involving heavy vehicles occur for Route 2A.

In the event of an accident involving a heavy vehicle, the carried goods may or may not be released. The probability of release is dependent on factors such as speed, shipping conditions (i.e. pressurised compared to non-pressurised), inadequate load securing, and strength and integrity of the container.

Various studies of release probabilities from heavy vehicles involved in an accident have been undertaken. The *Guidelines for Chemical Transportation Risk Analysis* (CCPS, 1995) indicates that the release probability for various road types is between 5 and 10% (i.e. approximately one heavy vehicle accident in every 10 to 20 will result in a release of the material).

An estimation of the likelihood of an accident involving a vehicle transporting ammonium nitrate to the Project resulting in a release of the material must take into account the following:

- the number of vehicles transporting ammonium nitrate to the Project relative to the total number of heavy vehicles already using the same transport route;
- the number of accidents that have involved heavy vehicles; and
- the probability of a release of the material (which is assumed to be 10% of all accidents involving heavy vehicles results in a release of material) (CCPS, 1995).

The likelihood of an accident (based on averaged accident data) involving a vehicle transporting ammonium nitrate to the Project resulting in a release of the material for Route 2A is estimated to be approximately $3x10^{-4}$/year (i.e. such an accident is estimated to occur on Route 2A once every 2,900 years) (Pinnacle Risk Management Pty Ltd, 2018).

The risk of the event is determined using the risk matrix in Table 7b and the consequence ratings in Table 7c (Pinnacle Risk Management Pty Ltd, 2018).

Table 7b
Risk Matrix

Likelihood						
Frequent >1/yr	II	II	I	I	I	I
Probable $>10^{-1}$ to 1/yr	III	II	II	I	I	I
Possible $>10^{-2}$ to 10^{-1}/yr	III	III	II	II	I	I
Unlikely $>10^{-4}$ to $>10^{-2}$/yr	III	III	III	III	II	I
Very Unlikely $>10^{-6}$ to 10^{-4}/yr	III	III	III	III	III	II
Extremely Unlikely $<=10^{-6}$/yr	III	III	III	III	III	III
Consequence	Minor	Significant	Severe	Serious	Extremely Serious	Catastrophic

Source: Pinnacle Risk Management Pty Ltd (2011; 2018)
Class I: Indicates a high level of risk which is intolerable and where risk reduction is required. This requires the reduction of frequency and/or consequence.
Class II: Indicates a moderate level of risk. Whilst the risk is not unacceptable, there should be practical measures taken to lower the risk if economically viable. For risks where further mitigation is not economically viable, judgement needs to be exercised as to whether the level of risk is acceptable or not. This area is the beginning of the ALARP region (i.e. as low as reasonably practicable).
Class III: indicates a low level of risk and is broadly considered to be acceptable. Further risk mitigation may not be required / appropriate. However, low and accepted risks should be monitored and routinely reviewed to ensure that they remain acceptable. Few risks remain static. This area includes ALARP as well as what are known as trivial or negligible risks.

Table 7c
Consequence Ratings

	Minor	Significant	Severe	Serious	Extremely Serious	Catastrophic
Safety and Health	One minor injury, First Aid	Recordable or single Medical Treatment Injury	Multiple Medical Treatment Injuries or one Lost Time Injury	Permanent disability casualty or multiple Lost Time Injuries	Multiple permanent disabilities or one fatality	Multiple fatalities
Environment	Very minor pollution. No offsite escape of material (contained within the operational areas). Onsite nuisance value only	Minor local pollution. Nuisance offsite effect, typically of short duration, e.g. noise, odours, dust and/or visible plumes for less than one hour	Evident pollution, local concern. Minimal duration offsite effects (e.g. waterway slightly discoloured, turbid etc around the point of release with no or very few fish killed)	Significant local pollution. For example, waterways discoloured 10s of metres, fire or smoke affecting people near to the site	Major local pollution. Observable offsite effect (e.g. waterways discoloured 10s to 100s of metres for a few weeks with a significant number of aquatic life adversely affected)	Extremely severe pollution. Ecosystems at high risk of destruction. Only resolved via long term solutions (potentially taking years)
Public Relations	Minor issue, one complaint	Local issue, 10 complaints	Local media, 100 complaints	Regional or state media	Wide media national coverage	Headlines, corporate damage
Financial Impact	< $25,000	$25,000 to $100,000	> $100,000 to $1 million	> $1 million to $20 million	> $20 million to $100 million	> $100 million

Source: Pinnacle Risk Management Pty Ltd (2011; 2018)

For releases of ammonium nitrate from a road traffic accident, the consequence rating is determined to be “Serious” (Pinnacle Risk Management Pty Ltd, 2018). The volume is limited to the size of the tanker (i.e. 40 tonnes) and it is possible that only one of the two barrels is breached (Pinnacle Risk Management Pty Ltd, 2018).

Given a likelihood of $3x10^{-4}$/year and consequence rating of “Serious”, the corresponding risk level is Class III (Pinnacle Risk Management Pty Ltd, 2018). These values indicate a low level of risk associated with the transport of hazardous materials (Pinnacle Risk Management Pty Ltd, 2018).

10. Replace Table 9 of Attachment 6C with:

Table 9
Summary of Risk Analysis Assessment Factors

Assessment Factor	Route 2A
Schools	#
Number of School Students	#
Hospitals	#
Number of Hospital Beds	#
Aged Care Facilities	#
Churches	#
Items of Heritage or Cultural Significance	#
Other Landuse	Predominantly open space
Number of Park Reservations	5
Park Reservations – Approximate Total Road Frontage (m)	22,500
Waterways	13

Table 9 (Continued)
Summary of Risk Analysis Assessment Factors

Assessment Factor	Route 2A
Emergency Infrastructure	Adequate
RMS and Transporter Preferred Route	RMS and Transporter preferred route
Length (km)	257
No. of Heavy Vehicles (per day)[1]	746[2] – 1,102[2]
% Increase of Heavy Vehicles due to Project[3]	0.07% – 0.1%
Heavy Vehicle Accidents (per year)[4]	11.6
Annual Million km of Heavy Vehicle Travel	69.99 – 103.41
Heavy Vehicle Accidents/Annual Million km of Heavy Vehicle Travel	0.11 – 0.17
Availability of Alternative Emergency Routes	Available
Emergency Response Capability	Adequate
Operational Factors	Cost effective

1 Roads and Maritime Services Traffic Volume Viewer (retrieved 23 May 2018).
2 2018 values extrapolated from previous years assuming 1% annual growth rate.
3 Assumes 16 truck movements per month.
4 Roads and Maritime Services Crash Report Data (1 Jan 2012 to 21 Dec 2016).
Sensitive landuses along Route 2A are relatively uncommon and do not preclude this route from the route evaluation. Further information is provided in Section 6C4.3.1.
RMS Roads and Maritime Services.

11. Replace the last paragraph of Section 6C6.4.4 with:

There are no defined absolute risk criteria for the transport of hazardous materials throughout NSW, therefore the assessment of risk results is a balanced judgement based on experience in accordance with HIPAP No. 6. Overall, the net increase in the number of heavy vehicles due to the transport of this material would be up to approximately 0.1% (i.e. a minor impact on existing traffic volume). Therefore, there would be only a minor increase in transport risk when compared to existing risk levels. From a risk perspective, the results detailed in Tables 9 and 10 deem Route 2A to pose a minimal level of risk to surrounding people, property and the natural environment. This route is therefore suitable for the transport of hazardous materials to the Project.

12. Replace all references to "Segment 4" in Attachment 6D with "Segment 3".

13. Replace Table 2 of Attachment 6D with:

Table 2
Transport Details

Hazardous Material	Delivery Vehicle	Maximum Volume per Delivery	Maximum Frequency of Deliveries	Transported State	Packaging
Ammonium Nitrate	B-Double	42 t	8 per month	Solid (prilled)	Bulk trippers

14. Replace the last 5 paragraphs of Section 6D4.1.2 of Attachment 6D with:

The *Traffic Impact Assessment of the Proposed Cowal Gold Project West Wyalong* (Traffix, 1997) carried out for the EIS identified Route 3A as the preferred access road to the Project. Following submission and approval of the EIS, Route 3A is the approved Project Access Road and has been upgraded in accordance with Project Development Approval Conditions. The road works along the Access Road have been undertaken by Bland Shire Council to relevant AUSTROAD design standards.

Condition (i) of the Part 5 Approval for the Access Road requires that the Project Access Road development be carried out generally in accordance with the *Cowal Gold Project Mine Access Road Upgrade Review of Environmental Factors* (Resource Strategies, 1997), and all other relevant documentation including *Cowal Gold Project Commission of Inquiry Primary Submission* (North Limited, 1998b) and *Cowal Gold Project Commission of Inquiry Submission in Reply* (North Limited, 1998c) to the Commission of Inquiry, as may be modified by the conditions in the Part 5 Approval. Other relevant documentation includes *Traffic Impact Assessment of the Proposed Cowal Gold Project West Wyalong* (Traffix, 1997) and *Section 94 Study and Plan* (Bland Shire Council, 1999).

The Project Access Road has been upgraded to provide a sealed carriageway over its entire length, with appropriate geometric and structural improvements (Traffix, 1997). The Project Access Road upgrade programme included the following (North Limited, 1998b):

- widening and sealing of the existing dirt road within the existing road reserve from the Project site entrance to the Lake Cowal station silo across a gazetted rail crossing;
- sealing the existing gravel road and adjustment of the alignment on some bends within the existing road reserve west along Blow Clear Road for a distance of approximately 10.5 km to its intersection with Wamboyne Road at Blow Clear; and
- intersection improvements and some widening on curves within the existing road reserve (over a distance of 0.5 km to improve bends [Traffix, 1997]) south along Wamboyne Road for a distance of approximately 18.7 km to its intersection with Ungarie Road.

Other improvements that have been undertaken include the provision of passing lanes and road shoulders and the upgrade of several major intersections where increased traffic numbers were identified as having the potential to compromise safety and/or operational efficiency.

The Project Access Road has been specifically designed to provide access to the Project. Other potential transport routes to the Project comprise segments of unsealed local roads of varying condition which, in their present state, would not provide suitable, all-weather access to the Project for heavy vehicles, particularly those carrying hazardous materials. These roads are therefore, not considered to be suitable for heavy vehicles.

15. Replace Section 6D6.1.1 of Attachment 6D with:

Available accident statistics for Route 3A were obtained from the RMS and are summarised in Table 7a.

Table 7a
Summary of Accident Statistics

Route	Length (km)	No. of Heavy Vehicles (per day)[1]	% Increase of Heavy Vehicles due to Project[3]	Heavy Vehicle Accidents (per year)[4]	Annual Million km of Heavy Vehicle Travel	Heavy Vehicle Accidents/Annual Million km of Heavy Vehicle Travel
3A	41	217[2]	0.3%	1	3.24	0.31

1 Roads and Maritime Services Traffic Volume Viewer (retrieved 23 May 2018).

2 2018 values extrapolated from previous years assuming 1% annual growth rate.

3 Assumes 16 truck movements per month.

4 Roads and Maritime Services Crash Report Data (1 Jan 2012 to 21 Dec 2016).

Accident statistics for Route 3A are considered to be within normal operating levels for the road types and use. Improved driving conditions have been achieved due to the upgrading of the Project Access Road (Route 3A) which included sealing of the road to the Project (Section 6D4.1.2). The increase of heavy vehicles due to the Project would be small (approximately 0.3%) and would be unlikely to affect traffic flows or accident statistics. Route 3A is therefore suitable for the transport of hazardous materials with respect to accident statistics.

16. Replace Section 6D6.4.3 of Attachment 6D with:

Accident data for heavy vehicles utilising Route 3A are detailed in Section 6D6.1.1 and Table 7a. Approximately 1 accident per year involving heavy vehicles occurs for Route 3A.

In the event of an accident involving a heavy vehicle, the carried goods may or may not be released. The probability of release is dependent on factors such as speed, shipping conditions (i.e. pressurised compared to non-pressurised), inadequate load securing, and strength and integrity of the container.

Various studies of release probabilities from heavy vehicles involved in an accident have been undertaken. The *Guidelines for Chemical Transportation Risk Analysis* (CCPS, 1995) indicates that the release probability for various road types is between 5 and 10% (i.e. approximately one heavy vehicle accident in every 10 to 20 will result in a release of the material).

An estimation of the likelihood of an accident involving a vehicle transporting ammonium nitrate to the Project resulting in a release of the material must take into account the following:

- the number of vehicles transporting ammonium nitrate to the Project relative to the total number of heavy vehicles already using the same transport route;
- the number of accidents that have involved heavy vehicles; and
- the probability of a release of the material (which is assumed to be 10% of all accidents involving heavy vehicles results in a release of material) (CCPS, 1995).

The likelihood of an accident (based on averaged accident data) involving a vehicle transporting ammonium nitrate to the Project resulting in a release of the material for Route 3A is estimated to be approximately $1x10^{-4}$/year (i.e. such an accident is estimated to occur on Route 3A once every 8,200 years) (Pinnacle Risk Management Pty Ltd, 2018).

The risk of the event is determined using the risk matrix in Table 7b and the consequence ratings in Table 7c (Pinnacle Risk Management Pty Ltd, 2018).

Table 7b
Risk Matrix

Likelihood						
Frequent >1/yr	II	II	I	I	I	I
Probable $>10^{-1}$ to 1/yr	III	II	II	I	I	I
Possible $>10^{-2}$ to 10^{-1}/yr	III	III	II	II	I	I
Unlikely $>10^{-4}$ to $>10^{-2}$/yr	III	III	III	III	II	I
Very Unlikely $>10^{-6}$ to 10^{-4}/yr	III	III	III	III	III	II
Extremely Unlikely $<=10^{-6}$/yr	III	III	III	III	III	III
Consequence	Minor	Significant	Severe	Serious	Extremely Serious	Catastrophic

Source: Pinnacle Risk Management Pty Ltd (2011; 2018)
Class I: Indicates a high level of risk which is intolerable and where risk reduction is required. This requires the reduction of frequency and/or consequence.
Class II: Indicates a moderate level of risk. Whilst the risk is not unacceptable, there should be practical measures taken to lower the risk if economically viable. For risks where further mitigation is not economically viable, judgement needs to be exercised as to whether the level of risk is acceptable or not. This area is the beginning of the ALARP region (i.e. as low as reasonably practicable).
Class III: indicates a low level of risk and is broadly considered to be acceptable. Further risk mitigation may not be required / appropriate. However, low and accepted risks should be monitored and routinely reviewed to ensure that they remain acceptable. Few risks remain static. This area includes ALARP as well as what are known as trivial or negligible risks.

Table 7c
Consequence Ratings

	Minor	Significant	Severe	Serious	Extremely Serious	Catastrophic
Safety and Health	One minor injury, First Aid	Recordable or single Medical Treatment Injury	Multiple Medical Treatment Injuries or one Lost Time Injury	Permanent disability casualty or multiple Lost Time Injuries	Multiple permanent disabilities or one fatality	Multiple fatalities
Environment	Very minor pollution. No offsite escape of material (contained within the operational areas). Onsite nuisance value only	Minor local pollution. Nuisance offsite effect, typically of short duration, e.g. noise, odours, dust and/or visible plumes for less than one hour	Evident pollution, local concern. Minimal duration offsite effects (e.g. waterway slightly discoloured, turbid etc around the point of release with no or very few fish killed)	Significant local pollution. For example, waterways discoloured 10s of metres, fire or smoke affecting people near to the site	Major local pollution. Observable offsite effect (e.g. waterways discoloured 10s to 100s of metres for a few weeks with a significant number of aquatic life adversely affected)	Extremely severe pollution. Ecosystems at high risk of destruction. Only resolved via long term solutions (potentially taking years)
Public Relations	Minor issue, one complaint	Local issue, 10 complaints	Local media, 100 complaints	Regional or state media	Wide media national coverage	Headlines, corporate damage
Financial Impact	< $25,000	$25,000 to $100,000	> $100,000 to $1 million	> $1 million to $20 million	> $20 million to $100 million	> $100 million

Source: Pinnacle Risk Management Pty Ltd (2011; 2018)

For releases of ammonium nitrate from a road traffic accident, the consequence rating is determined to be “Serious” (Pinnacle Risk Management Pty Ltd, 2018). The volume is limited to the size of the tanker (i.e. 40 tonnes) and it is possible that only one of the two barrels is breached (Pinnacle Risk Management Pty Ltd, 2018).

Given a likelihood of $1x10^{-4}$/year and consequence rating of “Serious”, the corresponding risk level is Class III (Pinnacle Risk Management Pty Ltd, 2018). These values indicate a low level of risk associated with the transport of hazardous materials (Pinnacle Risk Management Pty Ltd, 2018).

17. Replace Table 9 of Attachment 6D with:

Table 9
Summary of Risk Analysis Assessment Factors

Assessment Factor	Route 3A
Schools	#
Number of School Students	#
Hospitals	#
Number of Hospital Beds	#
Aged Care Facilities	#
Churches	#
Items of Heritage or Cultural Significance	#
Other Landuse	Predominantly open space
Number of Park Reservations	1
Park Reservations – Approximate Total Road Frontage (m)	5,100
Waterways	22
Emergency Infrastructure	Adequate
Length (km)	41
No. of Heavy Vehicles (per day)[1]	217[2]
% Increase of Heavy Vehicles due to Project[3]	0.3%
Heavy Vehicle Accidents (per year)[4]	1
Annual Million km of Heavy Vehicle Travel	3.24
Heavy Vehicle Accidents/Annual Million km of Heavy Vehicle Travel	0.31
Availability of Alternative Emergency Routes	Available
Emergency Response Capability	Adequate
Operational Factors	Cost effective

1 Roads and Maritime Services Traffic Volume Viewer (retrieved 23 May 2018).

2 2018 values extrapolated from previous years assuming 1% annual growth rate.

3 Assumes 16 truck movements per month.

4 Roads and Maritime Services Crash Report Data (1 Jan 2012 to 21 Dec 2016).

18. Replace the last paragraph of Section 6D6.4.4 with:

There are no defined absolute risk criteria for the transport of hazardous materials throughout NSW, therefore the assessment of risk results is a balanced judgement based on experience in accordance with HIPAP No.6. Overall, the net increase in the number of heavy vehicles due to the transport of this material would be approximately 0.3% (i.e. a minor impact on existing traffic volume). Therefore, there would be only a minor increase in transport risk when compared to existing risk levels. From a risk perspective, the results detailed in Tables 9 and 10 deem Route 3A to pose a minimal amount of risk to surrounding people, property and the natural environment. This route is therefore suitable for the transport of hazardous materials to the Project.

19. Delete Attachment 7B (segment 2 – New England Highway [Hexham] to Newell highway [Dubbo]) of the original THMS as Segment 1 removes the need for this segment.

20. Replace all references to "Segment 3" in Attachment 7C with "Segment 2".

21. Replace Table 2 of Attachment 7C with:

Table 2
Transport Details

Hazardous Material	Delivery Vehicle	Maximum Volume per Delivery	Maximum Frequency of Deliveries	Transported State	Packaging
Ammonium Nitrate Emulsion	B-Double	42 t	12 per month	Suspension	Bulk tanker

22. Replace Section 7C6.1.1 with:

Available accident statistics for Route 2A were obtained from the RMS and are summarised in Table 7a.

Table 7a
Summary of Accident Statistics

Route	Length (km)	No. of Heavy Vehicles (per day)[1]	% Increase of Heavy Vehicles due to Project[3]	Heavy Vehicle Accidents (per year)[4]	Annual Million km of Heavy Vehicle Travel	Heavy Vehicle Accidents/Annual Million km of Heavy Vehicle Travel
2A	257	746[2] – 1,102[2]	0.1% – 0.16%	11.6	69.99 – 103.41	0.11 – 0.17

1 Roads and Maritime Services Traffic Volume Viewer (retrieved 23 May 2018).
2 2018 values extrapolated from previous years assuming 1% annual growth rate.
3 Assumes 24 truck movements per month.
4 Roads and Maritime Services Crash Report Data (1 Jan 2012 to 21 Dec 2016).

Accident statistics for Route 2A are considered to be within normal operating levels for the road type and use. The increase of heavy vehicles due to the Project would be very small (up to approximately 0.16%) and would be unlikely to affect traffic flows or accident statistics. Route 2A is therefore suitable for the transport of hazardous materials with respect to accident statistics.

23. Replace Section 7C6.4.3 with:

Accident data for heavy vehicles utilising Route 2A are detailed in Section 7C6.1.1 and Table 7a. Approximately 12 accidents per year involving heavy vehicles occur for Route 2A.

In the event of an accident involving a heavy vehicle, the carried goods may or may not be released. The probability of release is dependent on factors such as speed, shipping conditions (i.e. pressurised compared to non-pressurised), inadequate load securing, and strength and integrity of the container.

Various studies of release probabilities from heavy vehicles involved in an accident have been undertaken. The *Guidelines for Chemical Transportation Risk Analysis* (CCPS, 1995) indicates that the release probability for various road types is between 5 and 10% (i.e. approximately one heavy vehicle accident in every 10 to 20 will result in a release of the material).

An estimation of the likelihood of an accident involving a vehicle transporting ammonium nitrate emulsion to the Project resulting in a release of the material must take into account the following:

- the number of vehicles transporting ammonium nitrate emulsion to the Project relative to the total number of heavy vehicles already using the same transport route;

- the number of accidents that have involved heavy vehicles; and
- the probability of a release of the material (which is assumed to be 10% of all accidents involving heavy vehicles results in a release of material) (CCPS, 1995).

The likelihood of an accident (based on averaged accident data) involving a vehicle transporting ammonium nitrate emulsion to the Project resulting in a release of the material for Route 2A is estimated to be $5x10^{-4}$/year (i.e. such an accident is estimated to occur on Route 2A once every 1,900 years) (Pinnacle Risk Management Pty Ltd, 2018).

The risk of the event is determined using the risk matrix in Table 7b and the consequence ratings in Table 7c (Pinnacle Risk Management Pty Ltd, 2018).

Table 7b
Risk Matrix

Likelihood						
Frequent >1/yr	II	II	I	I	I	I
Probable $>10^{-1}$ to 1/yr	III	II	II	I	I	I
Possible $>10^{-2}$ to 10^{-1}/yr	III	III	II	II	I	I
Unlikely $>10^{-4}$ to $>10^{-2}$/yr	III	III	III	III	II	I
Very Unlikely $>10^{-6}$ to 10^{-4}/yr	III	III	III	III	III	II
Extremely Unlikely $<=10^{-6}$/yr	III	III	III	III	III	III
Consequence	Minor	Significant	Severe	Serious	Extremely Serious	Catastrophic

Source: Pinnacle Risk Management Pty Ltd (2011; 2018)
Class I: Indicates a high level of risk which is intolerable and where risk reduction is required. This requires the reduction of frequency and/or consequence.
Class II: Indicates a moderate level of risk. Whilst the risk is not unacceptable, there should be practical measures taken to lower the risk if economically viable. For risks where further mitigation is not economically viable, judgement needs to be exercised as to whether the level of risk is acceptable or not. This area is the beginning of the ALARP region (i.e. as low as reasonably practicable).
Class III: indicates a low level of risk and is broadly considered to be acceptable. Further risk mitigation may not be required / appropriate. However, low and accepted risks should be monitored and routinely reviewed to ensure that they remain acceptable. Few risks remain static. This area includes ALARP as well as what are known as trivial or negligible risks.

Table 7c
Consequence Ratings

	Minor	**Significant**	**Severe**	**Serious**	**Extremely Serious**	**Catastrophic**
Safety and Health	One minor injury, First Aid	Recordable or single Medical Treatment Injury	Multiple Medical Treatment Injuries or one Lost Time Injury	Permanent disability casualty or multiple Lost Time Injuries	Multiple permanent disabilities or one fatality	Multiple fatalities

Table 7c (Continued)
Consequence Ratings

	Minor	Significant	Severe	Serious	Extremely Serious	Catastrophic
Environment	Very minor pollution. No offsite escape of material (contained within the operational areas). Onsite nuisance value only	Minor local pollution. Nuisance offsite effect, typically of short duration, e.g. noise, odours, dust and/or visible plumes for less than one hour	Evident pollution, local concern. Minimal duration offsite effects (e.g. waterway slightly discoloured, turbid etc around the point of release with no or very few fish killed)	Significant local pollution. For example, waterways discoloured 10s of metres, fire or smoke affecting people near to the site	Major local pollution. Observable offsite effect (e.g. waterways discoloured 10s to 100s of metres for a few weeks with a significant number of aquatic life adversely affected)	Extremely severe pollution. Ecosystems at high risk of destruction. Only resolved via long term solutions (potentially taking years)
Public Relations	Minor issue, one complaint	Local issue, 10 complaints	Local media, 100 complaints	Regional or state media	Wide media national coverage	Headlines, corporate damage
Financial Impact	< $25,000	$25,000 to $100,000	> $100,000 to $1 million	> $1 million to $20 million	> $20 million to $100 million	> $100 million

Source: Pinnacle Risk Management Pty Ltd (2011; 2018)

For releases of ammonium nitrate from a road traffic accident, the consequence rating is determined to be "Serious" (Pinnacle Risk Management Pty Ltd, 2018). The volume is limited to the size of the tanker (i.e. 40 tonnes) and it is possible that only one of the two barrels is breached (Pinnacle Risk Management Pty Ltd, 2018).

Given a likelihood of $5x10^{-4}$/year and consequence rating of "Serious", the corresponding risk level is Class III (Pinnacle Risk Management Pty Ltd, 2018). These values indicate a low level of risk associated with the transport of hazardous materials (Pinnacle Risk Management Pty Ltd, 2018).

24. Replace Table 9 of Attachment 7C with:

Table 9
Summary of Risk Analysis Assessment Factors

Assessment Factor	Route 2A
Schools	#
Number of School Students	#
Hospitals	#
Number of Hospital Beds	#
Aged Care Facilities	#
Churches	#
Items of Heritage or Cultural Significance	#
Other Landuse	Predominantly open space
Number of Park Reservations	5
Park Reservations – Approximate Total Road Frontage (m)	22,500
Waterways	13
Emergency Infrastructure	Adequate
RMS and Transporter Preferred Route	RMS and Transporter preferred route
Length (km)	257
No. of Heavy Vehicles (per day)[1]	746[2] – 1,102[2]

Table 9 (Continued)
Summary of Risk Analysis Assessment Factors

Assessment Factor	Route 2A
% Increase of Heavy Vehicles due to Project[3]	0.16%
Heavy Vehicle Accidents (per year)[4]	11.6
Annual Million km of Heavy Vehicle Travel	69.99 – 103.41
Heavy Vehicle Accidents/Annual Million km of Heavy Vehicle Travel	0.11 – 0.17
Availability of Alternative Emergency Routes	Available
Emergency Response Capability	Adequate
Operational Factors	Cost effective

1 Roads and Maritime Services Traffic Volume Viewer (retrieved 23 May 2018).

2 2018 values extrapolated from previous years assuming 1% annual growth rate.

3 Assumes 24 truck movements per month.

4 Roads and Maritime Services Crash Report Data (1 Jan 2012 to 21 Dec 2016).

Sensitive landuses along Route 2A are relatively uncommon and do not preclude this route from the route evaluation. Further information is provided in Section 7C4.3.1.

RMS Roads and Maritime Services.

25. Replace the last paragraph of Section 7C6.4.4 with:

There are no defined absolute risk criteria for the transport of hazardous materials throughout NSW, therefore the assessment of risk results is a balanced judgement based on experience in accordance with HIPAP No. 6. Overall, the net increase in the number of heavy vehicles due to the transport of this material would be up to approximately 0.16% (i.e. a minor impact on existing traffic volume). Therefore, there would be only a minor increase in transport risk when compared to existing risk levels. From a risk perspective, the results detailed in Tables 9 and 10 deem Route 2A to pose a minimal level of risk to surrounding people, property and the natural environment. This route is therefore suitable for the transport of hazardous materials to the Project.

26. Replace all references to "Segment 4" in Attachment 7D with "Segment 3".

27. Replace Table 2 of Attachment 7D with:

Table 2
Transport Details

Hazardous Material	Delivery Vehicle	Maximum Volume per Delivery	Maximum Frequency of Deliveries	Transported State	Packaging
Ammonium Nitrate Emulsion	B-Double	42 t	12 per month	Suspension	Bulk tanker

28. Replace the last 5 paragraphs of Section 7D4.1.2 of Attachment 6D with:

The *Traffic Impact Assessment of the Proposed Cowal Gold Project West Wyalong* (Traffix, 1997) carried out for the EIS identified Route 3A as the preferred access road to the Project. Following submission and approval of the EIS, Route 3A is the approved Project Access Road and has been upgraded in accordance with Project Development Approval Conditions. The road works along the Access Road have been undertaken by Bland Shire Council to relevant AUSTROAD design standards.

Condition (i) of the Part 5 Approval for the Access Road requires that the Project Access Road development be carried out generally in accordance with the *Cowal Gold Project Mine Access Road Upgrade Review of Environmental Factors* (Resource Strategies, 1997), and all other relevant documentation including *Cowal Gold Project Commission of Inquiry Primary Submission* (North Limited, 1998b) and *Cowal Gold Project Commission of Inquiry Submission in Reply* (North Limited, 1998c) to the Commission of Inquiry, as may be modified by the conditions in the Part 5 Approval.

Other relevant documentation includes *Traffic Impact Assessment of the Proposed Cowal Gold Project West Wyalong* (Traffix, 1997) and *Section 94 Study and Plan* (Bland Shire Council, 1999).

The Project Access Road has been upgraded to provide a sealed carriageway over its entire length, with appropriate geometric and structural improvements (Traffix, 1997). The Project Access Road upgrade programme included the following (North Limited, 1998b):

- widening and sealing of the existing dirt road within the existing road reserve from the Project site entrance to the Lake Cowal station silo across a gazetted rail crossing;
- sealing the existing gravel road and adjustment of the alignment on some bends within the existing road reserve west along Blow Clear Road for a distance of approximately 10.5 km to its intersection with Wamboyne Road at Blow Clear; and
- intersection improvements and some widening on curves within the existing road reserve (over a distance of 0.5 km to improve bends [Traffix, 1997]) south along Wamboyne Road for a distance of approximately 18.7 km to its intersection with Ungarie Road.

Other improvements that have been undertaken include the provision of passing lanes and road shoulders and the upgrade of several major intersections where increased traffic numbers were identified as having the potential to compromise safety and/or operational efficiency.

The Project Access Road has been specifically designed to provide access to the Project. Other potential transport routes to the Project comprise segments of unsealed local roads of varying condition which, in their present state, would not provide suitable, all-weather access to the Project for heavy vehicles, particularly those carrying hazardous materials. These roads are therefore, not considered to be suitable for heavy vehicles.

29. Replace Section 7D6.1.1 with:

Available accident statistics for Route 3A were obtained from the RMS and are summarised in Table 7a.

Table 7a
Summary of Accident Statistics

Route	Length (km)	No. of Heavy Vehicles (per day)[1]	% Increase of Heavy Vehicles due to Project[3]	Heavy Vehicle Accidents (per year)[4]	Annual Million km of Heavy Vehicle Travel	Heavy Vehicle Accidents/Annual Million km of Heavy Vehicle Travel
3A	41	217[2]	0.5%	1	3.24	0.31

1 Roads and Maritime Services Traffic Volume Viewer (retrieved 23 May 2018).

2 2018 values extrapolated from previous years assuming 1% annual growth rate.

3 Assumes 24 truck movements per month.

4 Roads and Maritime Services Crash Report Data (1 Jan 2012 to 21 Dec 2016).

Accident statistics for Route 3A are considered to be within normal operating levels for the road types and use. Improved driving conditions have been achieved due to the upgrading of the Project Access Road (Route 3A) which included sealing of the road to the Project (Section 7D4.1.2). The increase of heavy vehicles due to the Project would be small (approximately 0.5%) and would be unlikely to affect traffic flows or accident statistics. Route 3A is therefore suitable for the transport of hazardous materials with respect to accident statistics.

30. Replace Section 7D6.4.3 with:

Accident data for heavy vehicles utilising Route 3A are detailed in Section 7D6.1.1. Approximately 12 accidents per year involving heavy vehicles occur for Route 3A.

In the event of an accident involving a heavy vehicle, the carried goods may or may not be released. The probability of release is dependent on factors such as speed, shipping conditions (i.e. pressurised compared to non-pressurised), inadequate load securing, and strength and integrity of the container.

Various studies of release probabilities from heavy vehicles involved in an accident have been undertaken. The *Guidelines for Chemical Transportation Risk Analysis* (CCPS, 1995) indicates that the release probability for various road types is between 5 and 10% (i.e. approximately one heavy vehicle accident in every 10 to 20 will result in a release of the material).

An estimation of the likelihood of an accident involving a vehicle transporting ammonium nitrate emulsion to the Project resulting in a release of the material must take into account the following:

- the number of vehicles transporting ammonium nitrate emulsion to the Project relative to the total number of heavy vehicles already using the same transport route;
- the number of accidents that have involved heavy vehicles; and
- the probability of a release of the material (which is assumed to be 10% of all accidents involving heavy vehicles results in a release of material) (CCPS, 1995).

The likelihood of an accident (based on averaged accident data) involving a vehicle transporting ammonium nitrate emulsion to the Project resulting in a release of the material for Route 3A is estimated to be $1x10^{-4}$/year (i.e. such an accident is estimated to occur on Route 3A once every 5,500 years) (Pinnacle Risk Management Pty Ltd, 2018).

The risk of the event is determined using the risk matrix in Table 7b and the consequence ratings in Table 7c (Pinnacle Risk Management Pty Ltd, 2018).

Table 7b
Risk Matrix

Likelihood						
Frequent >1/yr	II	II	I	I	I	I
Probable $>10^{-1}$ to 1/yr	III	II	II	I	I	I
Possible $>10^{-2}$ to 10^{-1}/yr	III	III	II	II	I	I
Unlikely $>10^{-4}$ to $>10^{-2}$/yr	III	III	III	III	II	I
Very Unlikely $>10^{-6}$ to 10^{-4}/yr	III	III	III	III	III	II
Extremely Unlikely $<=10^{-6}$/yr	III	III	III	III	III	III
Consequence	Minor	Significant	Severe	Serious	Extremely Serious	Catastrophic

Source: Pinnacle Risk Management Pty Ltd (2011; 2018)
Class I: Indicates a high level of risk which is intolerable and where risk reduction is required. This requires the reduction of frequency and/or consequence.
Class II: Indicates a moderate level of risk. Whilst the risk is not unacceptable, there should be practical measures taken to lower the risk if economically viable. For risks where further mitigation is not economically viable, judgement needs to be exercised as to whether the level of risk is acceptable or not. This area is the beginning of the ALARP region (i.e. as low as reasonably practicable).
Class III: indicates a low level of risk and is broadly considered to be acceptable. Further risk mitigation may not be required / appropriate. However, low and accepted risks should be monitored and routinely reviewed to ensure that they remain acceptable. Few risks remain static. This area includes ALARP as well as what are known as trivial or negligible risks.

Table 7c
Consequence Ratings

	Minor	Significant	Severe	Serious	Extremely Serious	Catastrophic
Safety and Health	One minor injury, First Aid	Recordable or single Medical Treatment Injury	Multiple Medical Treatment Injuries or one Lost Time Injury	Permanent disability casualty or multiple Lost Time Injuries	Multiple permanent disabilities or one fatality	Multiple fatalities
Environment	Very minor pollution. No offsite escape of material (contained within the operational areas). Onsite nuisance value only	Minor local pollution. Nuisance offsite effect, typically of short duration, e.g. noise, odours, dust and/or visible plumes for less than one hour	Evident pollution, local concern. Minimal duration offsite effects (e.g. waterway slightly discoloured, turbid etc around the point of release with no or very few fish killed)	Significant local pollution. For example, waterways discoloured 10s of metres, fire or smoke affecting people near to the site	Major local pollution. Observable offsite effect (e.g. waterways discoloured 10s to 100s of metres for a few weeks with a significant number of aquatic life adversely affected)	Extremely severe pollution. Ecosystems at high risk of destruction. Only resolved via long term solutions (potentially taking years)
Public Relations	Minor issue, one complaint	Local issue, 10 complaints	Local media, 100 complaints	Regional or state media	Wide media national coverage	Headlines, corporate damage
Financial Impact	< $25,000	$25,000 to $100,000	> $100,000 to $1 million	> $1 million to $20 million	> $20 million to $100 million	> $100 million

Source: Pinnacle Risk Management Pty Ltd (2011; 2018)

For releases of ammonium nitrate from a road traffic accident, the consequence rating is determined to be "Serious" (Pinnacle Risk Management Pty Ltd, 2018). The volume is limited to the size of the tanker (i.e. 40 tonnes) and it is possible that only one of the two barrels is breached (Pinnacle Risk Management Pty Ltd, 2018).

Given a likelihood of $1x10^{-4}$/year and consequence rating of "Serious", the corresponding risk level is Class III (Pinnacle Risk Management Pty Ltd, 2018). These values indicate a low level of risk associated with the transport of hazardous materials (Pinnacle Risk Management Pty Ltd, 2018).

31. Replace Table 9 of Attachment 7D with:

Table 9
Summary of Risk Analysis Assessment Factors

Assessment Factor	Route 3A
Schools	#
Number of School Students	#
Hospitals	#
Number of Hospital Beds	#
Aged Care Facilities	#
Churches	#
Items of Heritage or Cultural Significance	#
Other Landuse	Predominantly open space
Number of Park Reservations	1
Park Reservations – Approximate Total Road Frontage (m)	5,100
Waterways	22

Table 9 (Continued)
Summary of Risk Analysis Assessment Factors

Assessment Factor	Route 3A
Emergency Infrastructure	Adequate
Length (km)	41
No. of Heavy Vehicles (per day)[1]	217[2]
% Increase of Heavy Vehicles due to Project[3]	0.5%
Heavy Vehicle Accidents (per year)[4]	1
Annual Million km of Heavy Vehicle Travel	3.24
Heavy Vehicle Accidents/Annual Million km of Heavy Vehicle Travel	0.31
Availability of Alternative Emergency Routes	Available
Emergency Response Capability	Adequate
Operational Factors	Cost effective

1 Roads and Maritime Services Traffic Volume Viewer (retrieved 23 May 2018).

2 2018 values extrapolated from previous years assuming 1% annual growth rate.

3 Assumes 24 truck movements per month.

4 Roads and Maritime Services Crash Report Data (1 Jan 2012 to 21 Dec 2016).

Sensitive landuses along Route 3A are relatively uncommon and do not preclude this route from the route evaluation. Further information is provided in Section 7D4.3.1.

32. Replace the last paragraph of Section 7D6.4.4 with:

There are no defined absolute risk criteria for the transport of hazardous materials throughout NSW, therefore the assessment of risk results is a balanced judgement based on experience in accordance with HIPAP No.6. Overall, the net increase in the number of heavy vehicles due to the transport of this material would be approximately 0.5% (i.e. a minor impact on existing traffic volume). Therefore, there would be only a minor increase in transport risk when compared to existing risk levels. From a risk perspective, the results detailed in Tables 9 and 10 deem Route 3A to pose a minimal level of risk to surrounding people, property and the natural environment. This route is therefore suitable for the transport of hazardous materials to the Project.