

ENVIRONMENTAL IMPACT STATEMENT

RED HILL
MINING LEASE

Section 14
Transport

Section 14 Transport

14.1 Description of Environmental Values

This section of the Red Hill Mining Lease Environmental Impact Statement (EIS) responds to the requirements related to the management of traffic and transport, as outlined in the Coordinator-General's Terms of Reference (TOR).

The transport assessment investigates the potential impacts on the safety and efficiency of the road, rail, air and sea transport network servicing the Red Hill Mining Lease area. Further information is provided in **Appendix N**.

This transport assessment is contained to the potential future GRM incremental expansion and the RHM underground expansion option. This assessment does not include the proposed extension to the BRM (Broadmeadow extension), as the extension will not intensify existing activities within BRM, the existing BRM workforce will complete the work associated with the extension and no additional infrastructure is proposed.

14.2 Existing Conditions

14.2.1 Road Network

To inform the Road Impact Assessment (**Appendix N**), an inspection of the existing road network was undertaken in February 2011. In addition to the inspection, data pertaining to the existing condition of various roads has been sourced from the Department of Transport and Main Roads (TMR) and Isaac Regional Council (IRC). This includes data relating to existing traffic volumes, the existing pavement condition, existing school bus routes and historic crashes, as well as information pertaining to planned future road works. To supplement the information received from the road authorities, traffic counts were also independently undertaken at a number of intersections in May 2013.

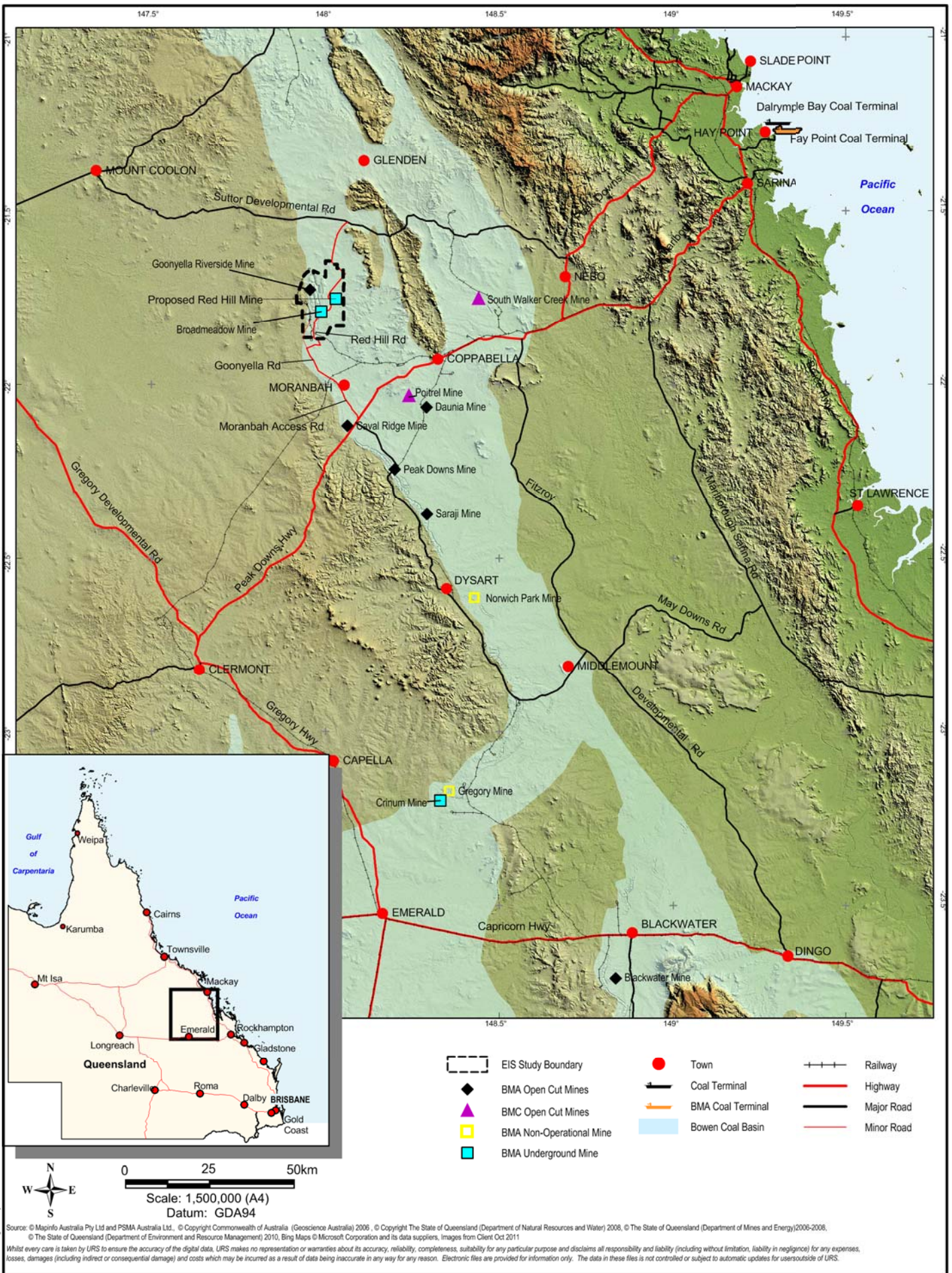
The road network in the vicinity of the study area is depicted in **Figure 14-1** and **Figure 14-2**. Outlined below is a description of the key characteristics of the roads expected to be primarily utilised by traffic associated with the GRM incremental expansion and the RHM underground expansion option.

14.2.1.1 Peak Downs Highway

The Peak Downs Highway is a state-controlled road which extends approximately 276 kilometres from Mackay to Clermont. It functions as a major link within the Isaac Regional Council area, providing the primary road connection between a number of townships and mines within Central Queensland and the regional hub of Mackay. The Peak Downs Highway between Nebo and Moranbah Access Road, typically comprises a sealed, undivided, two lane cross-section with a seal width of approximately nine metres.

14.2.1.2 Moranbah Access Road

Moranbah Access Road is a council-controlled road. It extends approximately 12 kilometres north from the Peak Downs Highway to intersect with Mills Avenue in Moranbah, thus providing the only route between Moranbah and the Peak Downs Highway. Moranbah Access Road is an undivided, sealed, two lane road with sealed shoulders.



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RED HILL MINING LEASE ENVIRONMENTAL IMPACT STATEMENT

REGIONAL LOCATION



TRANSPORT

Figure: 14-1



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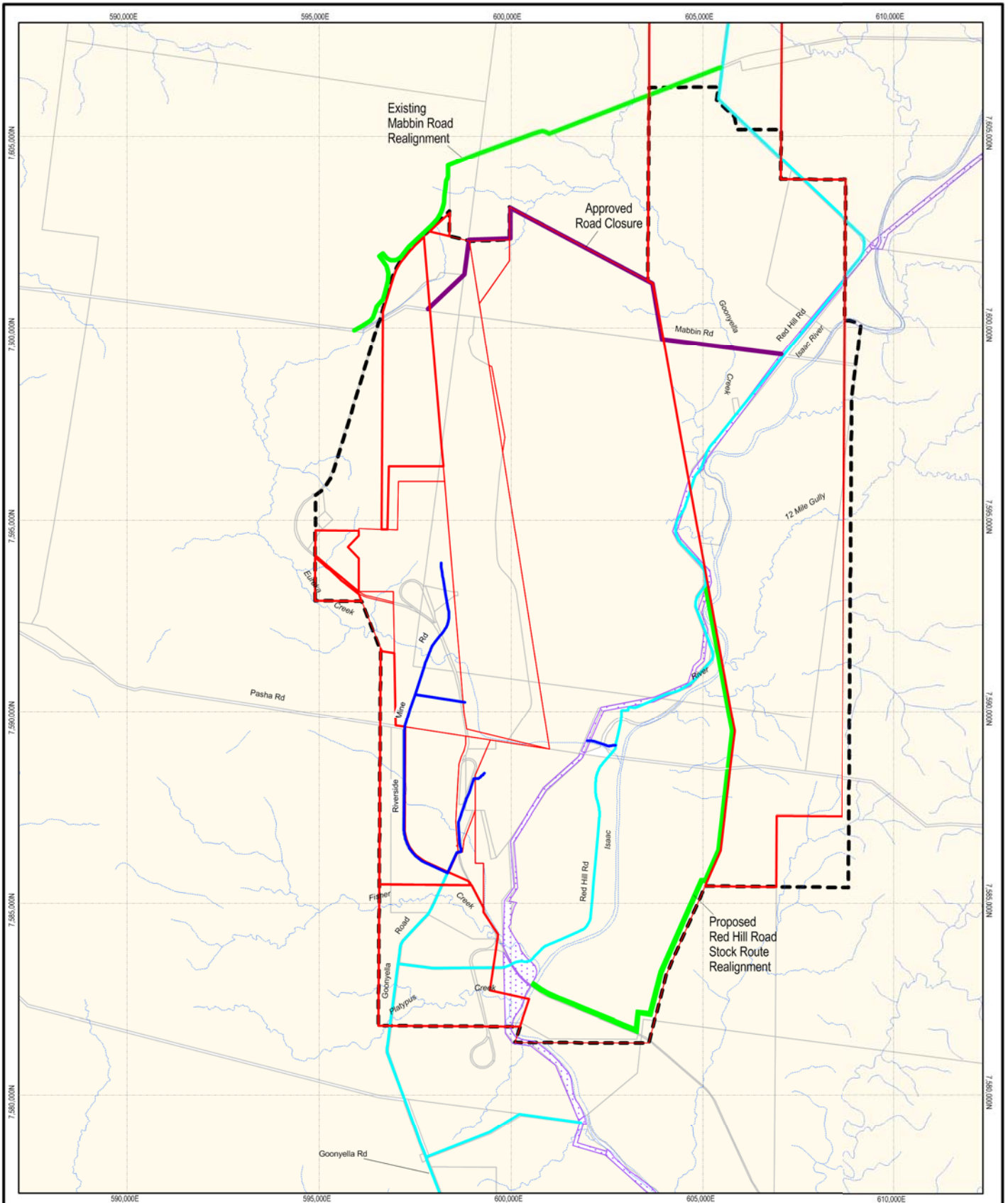
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Approved: CT

Date: 26-11-2013

Rev. C

A4



0 1.25 2.5km
Scale 1:140 000 (A4)
Datum: GDA94, MGA Zone 55

- EIS Study Boundary
- BMA Tenure/Tenement
- Existing Stockroute (U831)
- Realignments
- Road Closure
- Mine Access Road (BMA)
- Constructed Roads

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EXISTING TRANSPORT AND ACCESS



TRANSPORT

Figure: 14-2

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14.2.1.3 Goonyella Road

Goonyella Road extends approximately 26 kilometres north from Mills Avenue in Moranbah to the Goonyella mine industrial area. It provides the only route between the mine and Moranbah. Goonyella Road is a council-controlled road between Mills Avenue and the Blair Athol Railway line crossing. North of the railway line, the road is controlled and maintained by BHP Billiton Mitsubishi Alliance (BMA). Goonyella Road is an undivided, sealed, two lane road.

14.2.1.4 Red Hill Road

Red Hill Road extends approximately 35 kilometres north from its intersection with Goonyella Road to its intersection with Suttor Developmental Road. Between Goonyella Road and Broadmeadow Mine access road, Red Hill Road is an undivided, sealed, two lane road. From the Broadmeadow Mine access road north to the Suttor Developmental Road, Red Hill Road is unsealed.

14.2.1.5 Road Realignments

Separate to any planning approvals required, realignment of Red Hill Road may be required to allow for the progression of mining from west to east. The design of any road realignments will be in accordance with the guidelines, standards and thresholds appropriate for the function and use of the roads and will be informed by discussions with the local authority.

14.2.2 Road Crash History

Road crash data obtained from the Department of Transport and Main Roads (TMR) indicates that there have been 18 crashes on the subject roads north of Moranbah (depicted in **Figure 14-3**). The data include non-serious crashes between January 2006 and December 2010; hospitalisation crashes between January 2006 and December 2012; and fatal crashes between January 2006 and April 2013.

A review of the supplied crash data did not identify any temporal or spatial clustering of crashes. In addition, no fatal crashes have been observed during the reviewed period. This finding suggests that there are no significant safety concerns north of Moranbah.

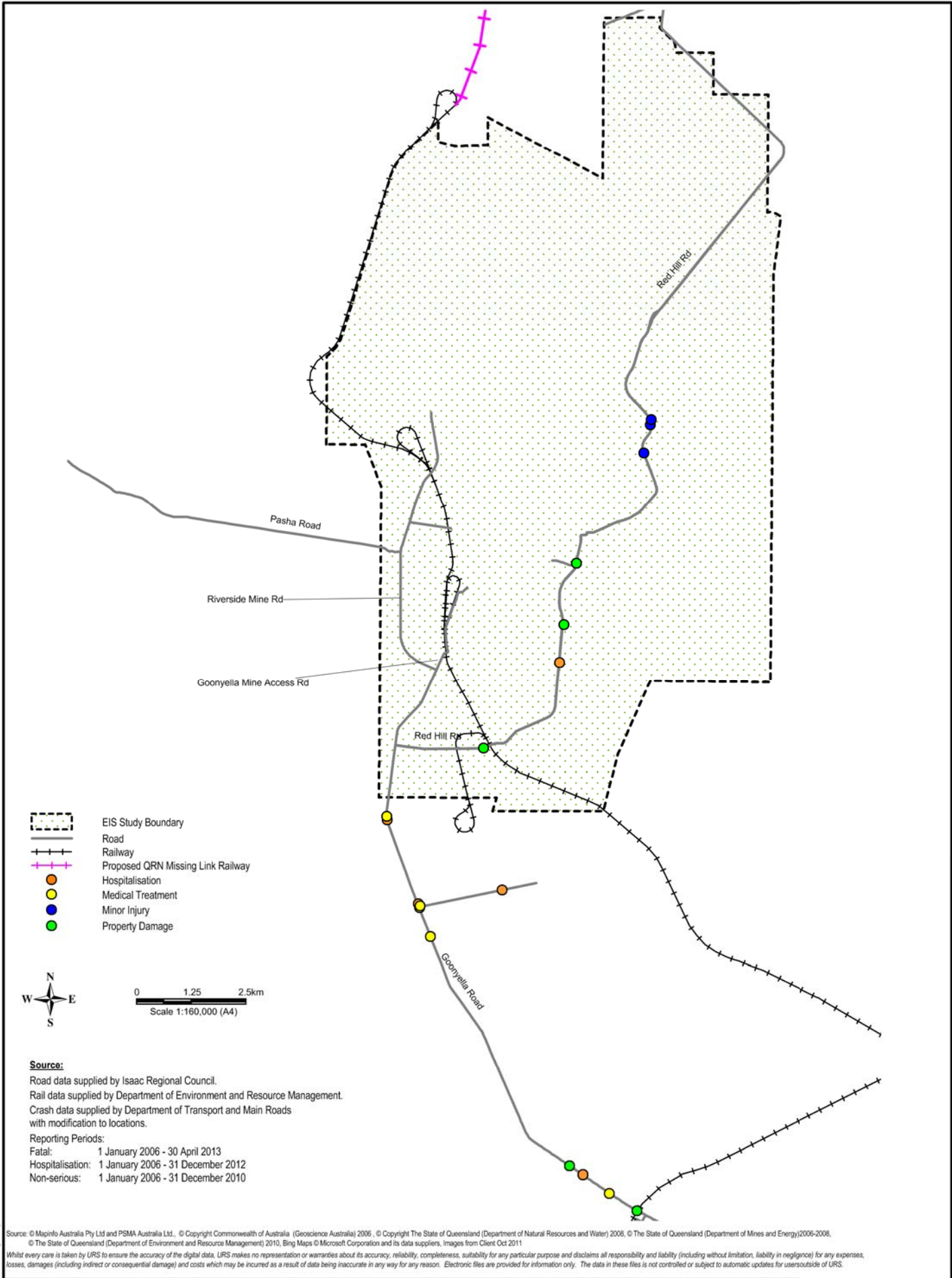
14.2.3 Scheduled Road Improvement Projects

Queensland Transport and Roads Investment Program 2012-13 to 2015-16 (QTRIP) was reviewed to identify any planned upgrades to sections of the road network expected to be used by traffic associated with the Red Hill Mining Lease. The QTRIP identified that works are planned to be undertaken on the Peak Downs Highway to upgrade or replace roadside delineation over the next two years.

An upgrade of the Peak Downs Highway/Moranbah Access Road intersection to include a “seagull treatment” (where separate lanes for both right and left turns are provided) is understood to be close to completion. This treatment provides additional capacity for the right turn movement out of Moranbah Access Road.

14.2.4 School Bus Routes

School bus routes currently use the Peak Downs Highway and Moranbah Access Road to service schools in Moranbah. School bus routes typically operate outside of shift start and end times for mine workers and are therefore not anticipated to be affected.



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ENVIRONMENTAL IMPACT STATEMENT

ROAD CRASHES
NORTH OF MORANBAH
JANUARY 2006 - JUNE 2013



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Figure: 14-3



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14.2.6 Background Traffic

14.2.6.1 Existing Traffic Volumes

Existing traffic volume estimates have been obtained from intersection movement counts undertaken by Austraffic for Cardno.

The base surveys indicate the following average peak hour volumes (light and heavy vehicles):

- Peak Downs Highway (east of Moranbah Access Road) – 310 vehicles;
- Moranbah Access Road (south of Moranbah) – 790 vehicles;
- Goonyella Road (north of Moranbah) – 731 vehicles; and
- Red Hill Road (east of Goonyella Road) – 135 vehicles.

14.2.6.2 Forecast Traffic Volumes

The traffic growth rates that were adopted when forecasting traffic growth in the absence of the Red Hill Mining Lease are summarised in **Table 14-1**.

Table 14-1 Adopted Traffic Growth Rates

Road	Rate	Time Span	Rate	Time Span
Peak Downs Highway	8%	2012 to 2020	4%	2020 to 2034
Moranbah Access Road and Goonyella Road (Mills Avenue to Curtin Street)	6%	2012 to 2020	3%	2020 to 2034
Goonyella Road (north of Curtin Street)	1%	2012 to 2020	1%	2020 to 2034

This growth rate was applied to all the assessed roads in the study (**Section 14.2.1**) and was applied to the total traffic volumes (heavy and light vehicles). The adopted growth rates include an allowance for the cumulative impacts of the various known projects in the vicinity of the study area.

Selection of the adopted growth rate was informed by the following data sources:

- historic traffic volume data supplied by TMR and IRC;
- the Queensland Office of Economic and Statistical Research forecasts that the population of the Isaac Region will grow by 3.6 per cent per annum between 2011 and 2031; and that the full time equivalent population will grow by 8.4 per cent per annum between 2011 and 2018; and
- traffic assessments undertaken for other projects in the area.

14.2.7 Rail Networks

Aurizon operates the railway from Goonyella to the ports of Hay Point, Dalrymple Bay and Abbot Point. These railways transport coal from the mines in Central Queensland to the coal terminals for shipping.

The current Goonyella, Riverside and Broadmeadow (GRB) mine complex utilises two train load-out facilities at two turnaround rail loops to load and transport the product. These are known as the Goonyella train load-out and the Riverside train load-out. Currently, approximately five trains are loaded each day. Each train holds approximately 12,700 tonnes of coal.

14.2.8 Port Infrastructure

Product from the GRB mine complex is currently exported via the ports of Hay Point, Dalrymple Bay and Abbot Point. BMA is currently undertaking an expansion of its existing asset at Hay Point, which is due for completion in 2015.

14.2.9 Air Transport

The nearest airport to the proposed project is the Moranbah Airport which is a BHP Billiton asset and services a number of BMA, BHP Billiton Mitsui Coal (BMC) and other mines in the district through commercial and charter flights. Operation of this airport and approvals to expand airport facilities is subject to separate regulatory processes.

14.3 Traffic Generation

14.3.1 Construction Phase

As it is difficult to estimate traffic volumes at the feasibility stage, conservative assumptions have been made, leading to a likely over-estimation of traffic volumes. It may be necessary to review the traffic assessment if detailed design results in significantly different traffic volume estimates. The assessed traffic generation of the construction phase is based on an up to 100 per cent remote workforce, which will reside in the proposed Red Hill accommodation village and typically working 12 hour shifts, generally operating on a three weeks on/one week off roster. A peak of 2,000 construction workers may be required. It is anticipated that at the start and end of rostered periods, the up to 100 per cent remote workforce will transit through Moranbah Airport; however, in order to present a worst case scenario in terms of road usage for the road impact assessment, it was assumed that 75 per cent will transit through Moranbah Airport and 25 per cent will transit through Mackay.

Personnel will be transported between the Red Hill accommodation village and EIS study area by bus at the start and end of each shift.

During the construction phase, a daily average of 19 two-way delivery trips (heavy vehicles) to site is anticipated. Although these will generally occur outside of peak hours, a conservative allowance has been made for five two-way delivery trips to occur during peak hours when completing the road performance assessment. At this stage, it is not known if any over-dimensional loads will be required.

To provide an additional level of conservatism within the traffic modelling for the EIS, a traffic generation 'factor of safety' for traffic modelling was incorporated. An additional 75 light vehicle peak hour return trips (i.e. 75 light vehicle movements to the EIS study area and 75 light vehicle movements from the EIS study area) was included each way between Moranbah and the EIS study area. This ensures that the performance of the road network is unlikely to be worse than that presented herein.

In summary, during the construction phase the following peak hour one-way trips have been modelled for the performance assessment of the road network:

- Red Hill accommodation village ↔ various Red Hill Mining Lease components: 76 buses per peak hour (personnel);
- Red Hill accommodation village ↔ Moranbah Airport: 6 buses per peak hour (personnel);
- Red Hill accommodation village ↔ Mackay: 18 light vehicles per peak hour (personnel);
- Moranbah ↔ EIS study area: 150 light vehicles per peak hour (factor of safety); and

- Mackay ↔ EIS study area: 10 heavy vehicles per peak hour (deliveries).

14.3.2 Operation Phase

The traffic generation profile for the operational workforce is the same as the construction phase; however, based on current assumptions, up to a peak of 1,500 operational personnel on a one week on/one week off roster will be required during the operations phase when the proposed mine is at full production.

During the operations phase, a daily average of three two-way deliveries (heavy vehicle) to site is anticipated. However, for modelling purposes allowance has been made for five trips to occur during peak hours. Over-dimensional vehicles are not generally anticipated except during major maintenance activities.

As it is difficult to estimate traffic volumes at the feasibility stage, conservative assumptions have been made, leading to a likely over-estimation of traffic volumes. To provide a factor of safety in terms of traffic generation numbers used for traffic modelling, an additional 75 light vehicle peak hour return trips (i.e. 75 light vehicle movements to the EIS study area and 75 light vehicle movements from the EIS study area) was included each way between Moranbah and the EIS study area. This assumption provides an additional level of conservatism within the traffic modelling and ensures that the performance of the road network is unlikely to be worse than that presented herein. Should detailed design studies indicate that the traffic generation is significantly different than that presented in this study, then the road impact assessment may be reviewed.

Therefore, during the operation phase the following peak hour one-way trips have been modelled:

- Red Hill accommodation village ↔ EIS study area: 38 buses per hour (personnel);
- Red Hill accommodation village ↔ Moranbah Airport: 8 buses per hour (personnel);
- Red Hill accommodation village ↔ Mackay: 26 light vehicles per hour (personnel);
- Moranbah ↔ EIS study area: 150 light vehicles per hour (factor of safety); and
- Mackay ↔ EIS study area: 10 heavy vehicles (deliveries) per hour.

14.3.3 Overlap Scenario

Given the potential for an overlap with the construction workforce and operations workforce, the traffic assessment has considered the traffic impacts of the 2,000 peak construction workforce with a peak 1,000 person operations workforce. This results in a potential peak overlap workforce of 3,000 which presents a worst-case scenario.

14.4 Potential Impacts and Mitigation Measures

14.4.1 Traffic Impact Assessment

14.4.1.1 Assessment Network Volumes

The assessed peak hour traffic volumes are based on the traffic generation identified in **Sections 14.3.1, 14.3.2 and 14.3.3** for the construction and operation phases, respectively. BMA will revisit traffic modelling when actual generation data are available if this is significantly different to the data presented in this EIS. However, this is unlikely given the level of conservatism adopted.

14.4.1.2 Investigation Scope and Assessment Scenarios

The following five intersections (identified on **Figure 14-4**) were assessed:

- Goonyella Road/Riverside Access Road intersection;
- Goonyella Road/Red Hill Road intersection;
- Goonyella Road/Curtin Street intersection;
- Goonyella Road/Moranbah Access Road/Mills Avenue intersection; and
- Peak Downs Highway/Moranbah Access Road intersection.

In addition, three rural road links north of Moranbah (identified on **Figure 14-4**) were assessed:

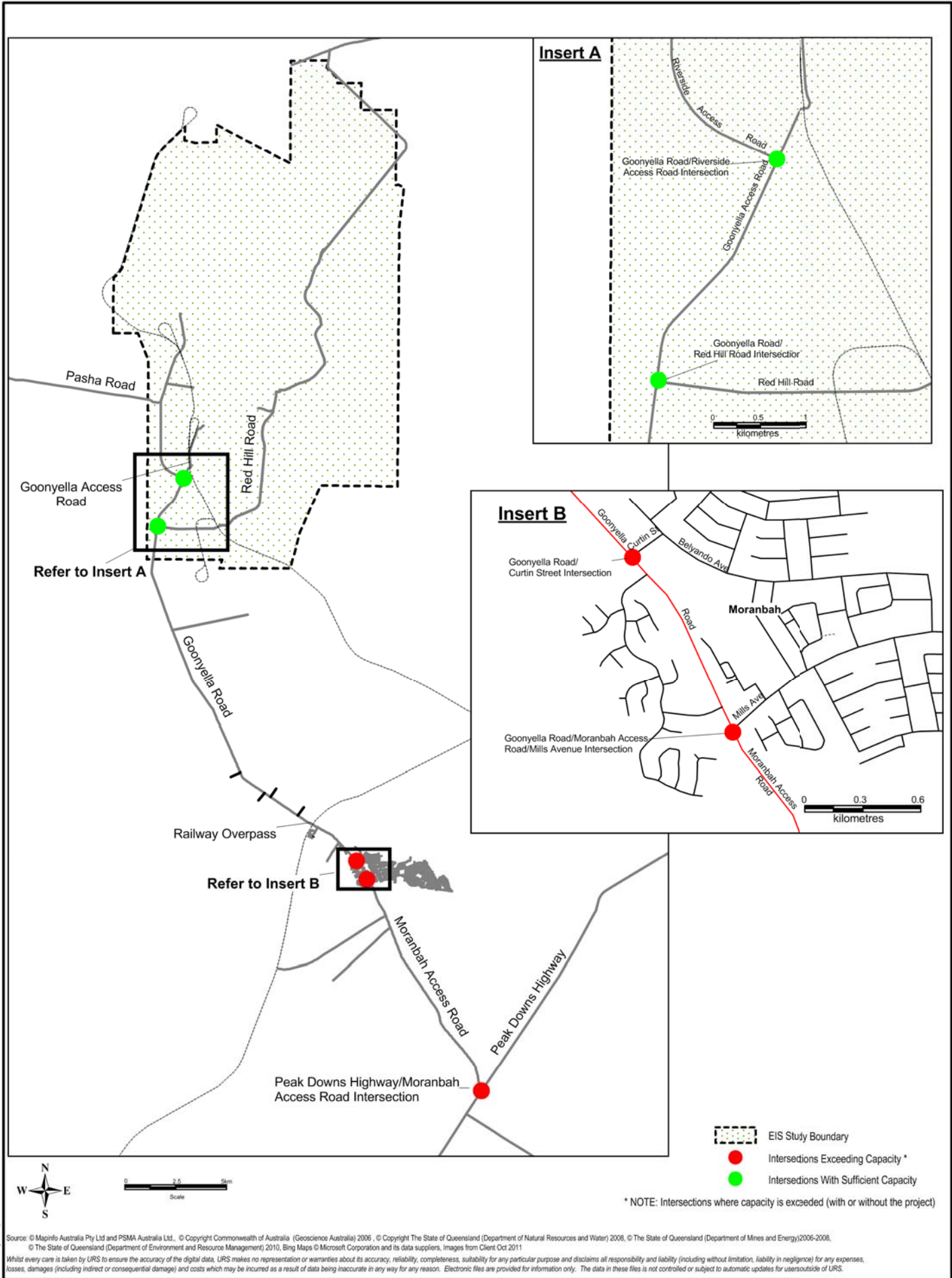
- Goonyella Road between Red Hill Road and Railway Overpass;
- Goonyella Road between Riverside Access Road and Red Hill Road; and
- Riverside Access Road between Goonyella Road and the EIS study area.

Impacts on Peak Downs Highway were not considered further as the proportional traffic increase was considered low, and can be accounted for within background traffic growth predictions.

In accordance with industry standard practice, the performance of the road network both with and without projected traffic volumes was assessed for the following scenarios:

- 2013 - traffic survey year (provides validation of the road performance models);
- 2020 - first year of construction phase;
- 2023 - overlap scenario (final year of construction phase);
- 2024 - first year of exclusive operations activities phase; and
- 2034 - ten year horizon following commencement of operations.

These dates are indicative only as the timing for commencement, the rate of development and scale of future production on the GRM incremental expansion and Red Hill underground expansion option have not been determined and are subject to the owner's approvals. Further details in relation to traffic volumes and their proportional impact on baseline traffic volumes are presented in **Appendix N**.



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RED HILL MINING LEASE ENVIRONMENTAL IMPACT STATEMENT

INTERSECTION AND ROAD LOCATIONS

14.4.1.3 Intersection Impacts and Mitigation

The performance analysis undertaken for the five scoped intersections identified that the following two intersections will continue to operate within generally accepted performance thresholds irrespective of the RHM underground expansion option and associated GRM incremental expansion proceeding:

- Goonyella Road/Riverside Access Road intersection; and
- Goonyella Road/Red Hill Road intersection.

The analysis indicated that the existing forms of the Goonyella Road/Curtin Street, Goonyella Road/Moranbah Access Road/Mills Avenue and Peak Downs Highway/Moranbah Access Road intersections are likely to operate outside generally accepted performance thresholds irrespective of the RHM underground expansion option and associated GRM incremental expansion proceeding. It is considered that these intersections will warrant upgrading (based on traffic growth projections) regardless of the timing for the RHM underground expansion option and associated GRM incremental expansion. It is therefore reasonable for the proponent to make a proportionate contribution towards upgrade costs (i.e. not fully fund) once the project owners have determined that the project will proceed and have determined the final staging for execution.

14.4.1.4 Rural Road Links

For the rural road links, a level of service (LOS) assessment was undertaken. A LOS of 'C' or better is acceptable. The analysis indicated that all assessed road sections will operate at a LOS C or better for all assessed scenarios.

14.4.2 Pavement Impact Assessment

An assessment was undertaken of the potential impact on the pavement of nearby state-controlled roads, including the Peak Downs Highway from Moranbah Access Road to Nebo. Assessment of pavement impacts is not typically undertaken for council-controlled roads as councils have other mechanisms for collecting contributions, such as rates and infrastructure charging schemes.

The proportional increase in equivalent standard axles (a key measure for pavement distress) would be a maximum of 2.5 per cent which is below the accepted threshold of five per cent documented in TMR's *Guidelines for Assessment of Road Impacts of Development* (2006). The assessed scenario included consideration of an overlap of construction and operations phases.

In accordance with TMR's guidelines and significance criteria, this means that no contribution is required towards state-controlled pavement impacts. It is noted that reassessment may potentially be warranted should the estimated material movements change significantly.

Impacts on Red Hill Road are addressed in **Section 5.1**.

14.4.3 Haulage of Dangerous Goods and Wastes

Haulage will occur in accordance with the *Transport Operations (Road Use Management) Act 1995*. It is noted that approvals and transport of dangerous materials are the consignor and/or transporter's responsibility and will be made in accordance to the TMR (2008) Australian Dangerous Goods Code, Seventh Edition (ADG Code 2008) requirements.

Waste materials will be transported by waste transport contractors authorised under the *Sustainable Planning Act 2009* and *Environmental Protection Act 1994* using the waste transport system established under the *Environmental Protection Act 1994*.

14.4.4 Rail Impacts

It is not expected that rail transport will be utilised during the construction stage.

For operations, it is intended that 100 per cent of coal mined at the Red Hill Mine (RHM) will be transported to port facilities by rail. When operating at peak production (14 mtpa), up to four trains will be required each day, with a nominal train capacity of 12,000 tonnes and loading time of 2.5 hours per train.

The GRB mine complex is serviced by an Aurizon rail network, the Goonyella System, which transports coal from two existing rail loops on the west of the mine complex to the existing Hay Point, Dalrymple Bay and Abbot Point Coal Terminals for shipping. A conveyor will be constructed from the Red Hill CHPP to the Riverside rail loop and a new dedicated train load-out facility provided for Red Hill coal. BHP Billiton is currently undertaking an expansion of its existing coal export facilities at Hay Point and coal from the future RHM would be exported through this terminal and the Dalrymple Bay and Abbot Point Coal Terminals

14.4.5 Shipping

As discussed above and in **Section 3** of this EIS, product coal from RHM will be railed to the Hay Point, Dalrymple Bay and Abbot Point Coal Terminals for shipping.

The additional product coal from the project will require approximately 150 extra ships per year to transport the product to market. Current expectations are that shipping will be spread across Handymax, Panamax, Small Cape, and Large Cape vessels of approximate sizes of 50,000 dead weight tons (dwt), 80,000 dwt, 150,000 dwt, and 220,000 dwt, respectively. BHP Billiton has recently completed a strategic assessment of potential shipping impacts associated with its Bowen Basin coal projects.

14.4.6 Air Transport

Air traffic associated with the project is proposed to utilise Moranbah Airport. During operations, the project will result in approximately 30 additional round trips per week.

14.4.7 Impacts to Existing Infrastructure

Details of the potential impacts on existing infrastructure are included in **Section 5.1**. These include potential impacts on the following:

- existing structures – **Section 5.1.8.4**;
- power infrastructure – **Section 5.1.9.1**;
- water infrastructure – **Section 5.1.9.2**; and
- gas infrastructure – **Section 5.1.9.3**.