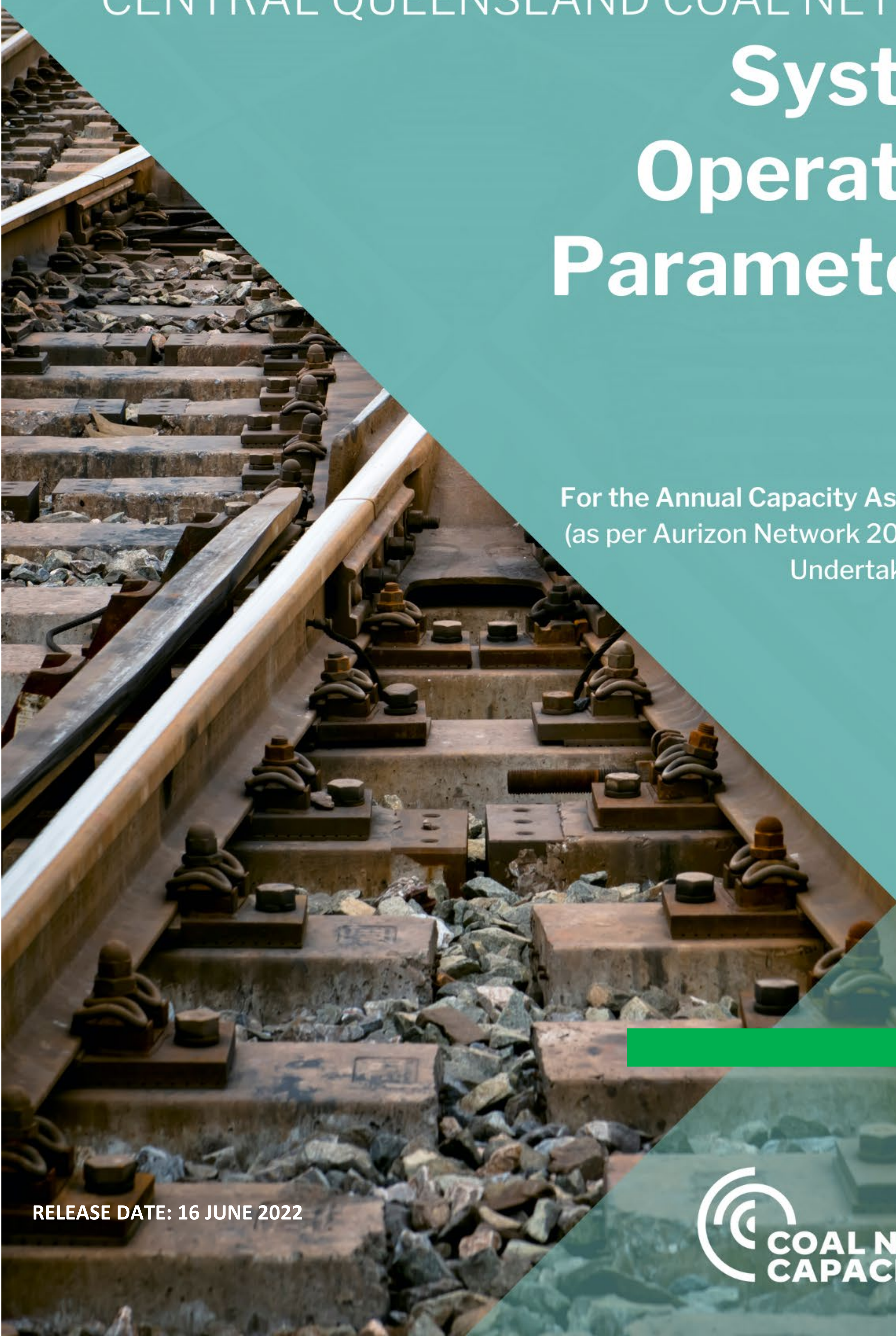
CENTRAL QUEENSLAND COAL NETWORK

System Operating Parameters

2022

For the Annual Capacity Assessment
(as per Aurizon Network 2017 Access Undertaking (UT5))



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COAL NETWORK CAPACITY CO.

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Contents

Abbreviations

The following abbreviations are used throughout this document.

Table 1 Abbreviations

Abbreviation	Meaning
AIC	Akaike Information Criterion
AN	Aurizon Network
AO	Aurizon Operations
BCM	Ballast Cleaning Machine
BRC	Bowen Rail Company
CQCN	Central Queensland Coal Network
CQCSM	Central Queensland Supply Chain Model
DBT	Dalrymple Bay Terminal
DNC	Deliverable Network Capacity
DTC	Direct Train Control
DTP	Daily Train Plan
DSM	CQCN Dynamic Simulation Model
FL	Fisherman's Landing
FSS	Full System Shut
FY	Financial Year
GAPE	Goonyella to Abbott Point Expansion
GLR	Gross Load Rate
GUR	Gross Unload Rate
HPT	Hay Point Terminal
ICAR	Initial Capacity Assessment Report
IE	Independent Expert
IL	Inloader (Rail Receival Station)
ITP	Intermediate Train Plan
MBD	Model Basis Document
MLPI	Main Line Points Indicators
MTP	Monthly Train Plan

Abbreviation	Meaning
MTTF	Mean Time to Fail
MTTR	Mean Time to Repair
NQXT	North Queensland Export Terminal
NRG	Gladstone Powerhouse
NTSF	Nebo Train Support Facility
OHLE	Overhead Line Equipment
OR	OneRail
PCAR	Preliminary Capacity Assessment Report 2019
PN	Pacific National
QR	Queensland Rail
QAL	Queensland Alumina Limited
QCA	Queensland Competition Authority
RCS	Remote Control Signalling
RGTCT	RG Tanna Coal Terminal
RRS	Rail Receival Station (Inloader)
SAT	Ship Arrival table
SOP	System Operating Parameters
SRT	Sectional Running Time
TLO	Train Load Out
TBF	Time Between Failures
TSE	Train Service Entitlement
TSR	Temporary Speed Restriction
TTF	Time to Fail
TTR	Time to Repair
UT5	Aurizon Network 2017 Access Undertaking
UTM	Unit Train maintenance
WICET	Wiggins Island Coal Export Terminal

Definitions

Terms that are capitalised within this document are defined terms as per **Part 12** of Aurizon Network's 2017 Access Undertaking (UT5). The following additional definitions are provided:

Measure	Definition	Required per cycle
Train Service Entitlement (TSE)	An Access Holder's entitlement pursuant to an Access Agreement to operate or cause to be operated a specified number and type of Train Services over the Rail Infrastructure including within a specified time period, in accordance with specified scheduling constraints and for the purpose of either carrying a specified commodity or providing a specified transport service.	2
Train Cycle	In general, train cycles typically proceed as follows: 1. Dispatch from Yard; 2. Travel Empty to Mine; 3. Load at TLO; 4. Travel Loaded to Rail Receival Station; 5. Unload; 6. Travel Empty to Yard for possible provisioning and/or maintenance; and 7. Wait for next dispatch at yard. Cycle Time measures items 1 to 6 Turnaround Time measures items 1 to 7	1
Train Path	Is the occupation of a specified portion of Rail Infrastructure, which may include multiple sections in sequential order, for a specified time. UT5 outlines that such Train Paths needing to be useable including in respect of return journeys	1
Direct Train Control	As described in Section 4.5.2 Direct Train Control (DTC)	N/A
Rail Job	Rail Jobs represent rail orders equating to one train cycle each (consuming 2 TSEs)	N/A
Train Loadout	The upstream boundaries of the model are the Train Loadout (TLO) facilities at each mine, with their associated Balloon Loop. Coal enters the model at these facilities.	N/A
Train Consists	Train consists are classified by their motive power, as either Diesel or Electric.	N/A

1. Introduction

1.1. Requirements of 2017 Access Undertaking (UT5)

UT5 as approved by the Queensland Competition Authority (QCA), requires Capacity Assessments of each of the Central Queensland Coal Network's Coal Systems to be performed, as detailed in **Part 7A: Capacity**.

The Initial Capacity Assessment Report (**ICAR**) and associated System Operating Parameters (SOP) was issued in November 2021.

UT5 specifies an Annual Capacity Assessment is required after the ICAR has been issued, and this assessment will determine the Deliverable Network Capacity as defined in section **7A.2 Definition of Deliverable Network Capacity (DNC).**

UT5 also requires that:

- the assessment of capacity shall be based on an analysis using a Dynamic Simulation Model (DSM) of the Central Queensland Coal Network (**CQCN**); and
- the System Operating Parameters (SOP) be documented. The SOP include the assumptions, inputs and methods used in the DSM for the analysis of DNC.

When an Annual Capacity Assessment is undertaken, it is based on a definition of Capacity and the application of a defined methodology and input parameters. This document is the System Operating Parameters (**SOP**) and describes:

- the definition of DNC;
- the methodology;
- the input parameters used; and
- an explanation of why these inputs have been used when undertaking the Annual Capacity Assessment.

1.2. Definition of Deliverable Network Capacity

The following extract defining Deliverable Network Capacity is taken from **Part 7A.2** of UT5.

7A.2 Definition of Deliverable Network Capacity

*(a) For the purpose of this **Part 7A, Deliverable Network Capacity** means the capacity of the Rail Infrastructure, expressed as the maximum number of Train Paths (calculated on a Monthly and annual basis) that can be utilised in each Coal System (such Train Paths needing to be useable including in respect of return journeys), and the mainline and each branch line of that Coal System, taking into account the operation of that Coal System, having regard to:*

(i) the way in which the relevant Coal System operates in practice, including those matters taken into consideration in formulating the System Operating Parameters;

(ii) reasonable requirements in respect of planned maintenance and a reasonable estimate of unplanned maintenance, repair, renewal and Expansion activities on the Rail Infrastructure;

(iii) reasonably foreseeable delays or failures of Rollingstock occurring in the relevant Supply Chain, both planned delays and failures and a reasonable estimate of unplanned delays and failures;

(iv) reasonably foreseeable delays associated with any restrictions (including speed restrictions, dwell times within Train Services and between Train Services and other operating restrictions)affecting the Rail Infrastructure;

(v) the context in which the Rail Infrastructure interfaces with other facilities forming part of, or affecting, the relevant Supply Chain (including loading facilities, load out facilities and coal export terminal facilities);

(vi) the need for Aurizon Network to comply with its obligations to provide access to non-coal traffic under

Access Agreements, Passenger Priority Obligation or Preserved Train Path Obligations;

(vii) *the Supply Chain operating mode (including at the loading facilities, load out facilities and coalexport terminal facilities);*

(viii) *interfaces between the different Coal Systems; and*

(ix) *the terms of Access Agreements (including the number of Train Service Entitlements for each origin and destination combination in that Coal System) relating to Train Services operating inthat Coal System.*

The DNC must be reported in Train Paths. All reference to DNC will be in Train Paths. Train service entitlements (TSE's) and tonnes will only be used for reporting and explanatory purposes.

1.3. Addressing Deliverable Network Capacity

The analysis of DNC must take into account the operation of each Coal System, having regard to the factors identified in **Table 2** below. The table lists the sections of the SOP where consideration of these factors is addressed.

Table 2 Deliverable Network Capacity factors to be considered

UT5 Clause 7A.2(a)	Addressed in SOP Section
(i) the way in which the relevant Coal System operates in practice, including those matters taken into consideration in formulating the System Operating Parameters;	All
(ii) reasonable requirements in respect of planned maintenance and a reasonable estimate of unplanned maintenance, repair, renewal and Expansion activities on the Rail Infrastructure;	**Section 8** Below Rail Operations **Section 10** System Delays
(iii) *reasonably foreseeable delays or failures of Rollingstock occurring in the relevant Supply Chain, both planned delays and failures and a reasonable estimate of unplanned delays and failures;*	**Section 9** Above Rail Operations **Section 10** System Delays
(iv) reasonably foreseeable delays associated with any restrictions (including speed restrictions, dwell times within Train Services and between Train Services and other operating restrictions) affecting the Rail Infrastructure;	**Section 9** Above Rail Operations **Section 10** System Delays
(v) the context in which the Rail Infrastructure interfaces with other facilities forming part of, or affecting, the relevant Supply Chain (including loading facilities, load out facilities and coal export terminal facilities);	**Section 6** Train Loadouts **Section 7** Inloaders
(vi) the need for Aurizon Network to comply with its obligations to provide access to non-coal traffic under Access Agreements, Passenger Priority Obligation or Preserved Train Path Obligations;	**Section 11** Non-coal traffic
(vii) the Supply Chain operating mode (including at the loading facilities, load out facilities and coal export terminal facilities);	**Section 6** Train Loadouts **Section 7** Inloaders **Section 8** Below Rail Operations **Section 10** System Delays
(viii) *interfaces between the different Coal Systems; and*	**Section 4** Rail Infrastructure

(ix) *the terms of Access Agreements (including the number of Train Service Entitlements for each origin and destination combination in that Coal System) relating to Train Services operating in that Coal System.*	**Section 5** Demand

1.4. Information and Redaction

To the extent possible, this document has been drafted on an unredacted basis. Where the SOP contains information that is confidential to an Access Holder, Customer or Train Operator and is unable to be disclosed, it has been redacted in this document or incorporated into Appendices to this document which will be redacted when published.

2. System Operating Parameters

The Independent Expert uses three layers of documentation to record and determine the Deliverable Network Capacity:

- **Model Basis Documents/Detailed Data Analysis**
  Internal documentation showing detailed statistical and data analysis and commentary on assumptions used to manage the DSM.

- **System Operating Parameters**
  External document that accompanies the ACAR each year. The SOP as outlined in UT5, represent the assumptions on the operation of each element of the coal Supply Chain and the interfaces between those elements including the Supply Chain operating mode, seasonal variations, and live run losses.

  The SOP is also aimed to provide sufficient detail and data consistent with all the requirements outlined in UT5 such as Access Agreement key performance indicators and rebate determination.

- **Annual Capacity Assessment Report**
  External capacity report that is completed annually, which shows the specific capacity values and associated impact on the network and each individual coal system. These reports will highlight any differences in DSM inputs and outputs from year to year.

These assumptions are used in the DSM for the analysis of DNC. This document aims to provide the reader with an understanding of the SOP and how they are measured and treated within the DSM for each Coal System.

2.1. Structure of System Operating Parameters

The SOP is broken down into the following key areas:

- General Assumptions
- Rail Infrastructure;
- Demand;
- Train Loadout (TLO) which represents the upstream boundary of the DSM;
- Below Rail Operations;
- Above Rail Operations;
- Terminal Inloader for both export and domestic users which represents the downstream boundary of the DSM;
- System Delays; and
- Non-Coal Traffic.

For each key area, the parameters that impact the determination of DNC have been analysed and this document outlines how the DSM treats each of these.

2.2. DSM Scope

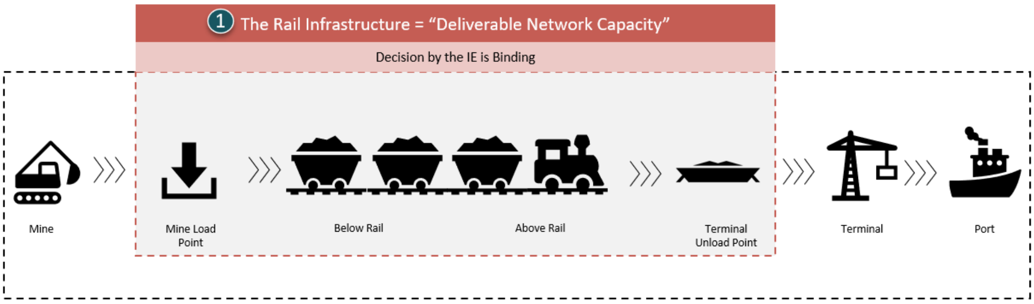
A DSM has been developed using the AnyLogic modelling software to determine the DNC of the CQCN and for each Coal System.

As a result, the scope of the DSM reflects the DNC definition and is between the boundaries of:

- Coal flow into wagons at Train Loadouts (TLOs); and
- Coal flow out of wagons at Rail Receival Stations (Inloaders).

and includes the components as outlined in Figure 1.

Figure 1 – Deliverable Network Capacity Boundaries



3. General Assumptions

There are several general assumptions used in the DSM and SOP:

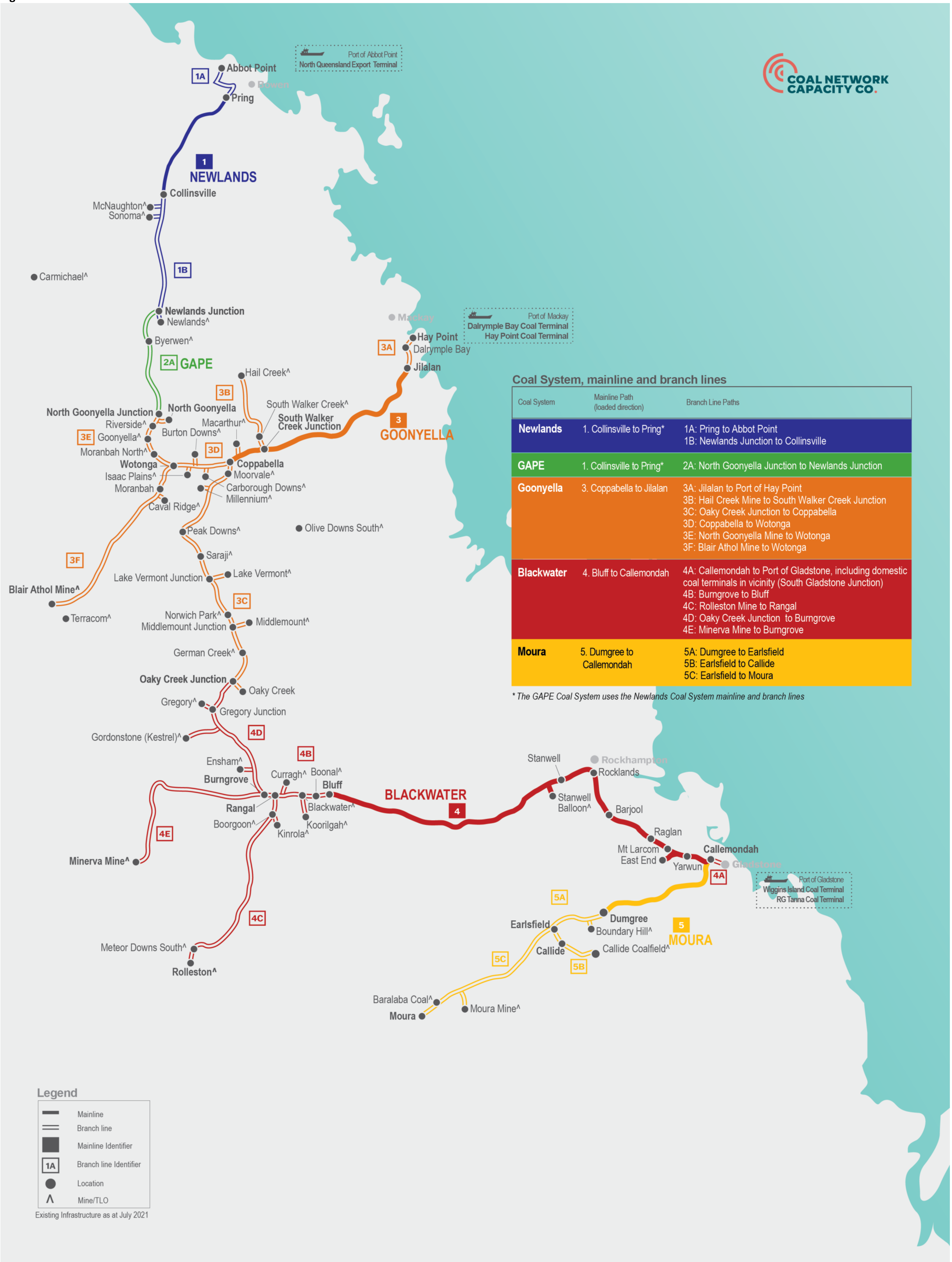
- The Independent Expert has had to exercise judgement on a large range of issues in developing the SOP assumptions and application of these within the DSM. These are called out as appropriate in each section of the SOP;
- The Capacity Assessment Period for the ACAR is for the five (5) financial years FY23 to FY27 inclusive i.e. 1st July 2022 to the 30th June 2027, noting that UT5 defines the Capacity Assessment Period as the later of five (5) years, or peak capacity under the Access Agreements and the completion and commissioning of any Expansion that Aurizon Network is obliged to construct (other than as a result of a Deliverable Network Capacity Shortfall). Based on a review of the data, the ACAR has determined the Capacity Assessment Period is the five-year period outlined above as peak capacity occurs within this period;
- Unless stated otherwise in the relevant SOP section, the most recent historical data from January 2020 to January 2022 has been used and analysed along with previous years historical data to develop key data statistical distributions which feed into SOP assumptions and the DSM;
- Train paths include coal for export through terminals, domestic coal users and non-coal traffic;
- Where various statistical distributions have been used and compared, the ranking of which distribution method was ultimately chosen was done using the Akaike Information Criterion (**AIC**) where applicable to do so; and
- At the time of preparing the ACAR, the Queensland Competition Authority had not made a determination on Transitional Arrangements to resolve the Existing Capacity Deficits identified in the 2021 ICAR. As a result, no capital projects have been assumed or modelled. Some operational improvements identified in the Transitional Arrangement options such as the optimised ballast cleaning machine program that was approved through the annual RIG process, has been included.

4. Rail Infrastructure

4.1. Coal Systems

Figure 2 shows the modelled Rail Infrastructure which covers the five (5) Coal Systems of the CQCN (as outlined in UT5). Newlands Coal System and the GAPE Coal System are not modelled independently of each other as they share common infrastructure. The GAPE project required a single GAPE derived and combined SOP to deliver the contracted capacity of both coal systems.

Figure 2: Extent of Modelled Rail Infrastructure



Coal System, mainline and branch lines

Coal System	Mainline Path (loaded direction)	Branch Line Paths
Newlands	1. Collinsville to Pring*	1A: Pring to Abbot Point 1B: Newlands Junction to Collinsville
GAPE	1. Collinsville to Pring*	2A: North Goonyella Junction to Newlands Junction
Goonyella	3. Coppabella to Jilalan	3A: Jilalan to Port of Hay Point 3B: Hail Creek Mine to South Walker Creek Junction 3C: Oaky Creek Junction to Coppabella 3D: Coppabella to Wotonga 3E: North Goonyella Mine to Wotonga 3F: Blair Athol Mine to Wotonga
Blackwater	4. Bluff to Callemondah	4A: Callemondah to Port of Gladstone, including domestic coal terminals in vicinity (South Gladstone Junction) 4B: Burngrove to Bluff 4C: Rolleston Mine to Rangal 4D: Oaky Creek Junction to Burngrove 4E: Minerva Mine to Burngrove
Moura	5. Dumgree to Callemondah	5A: Dumgree to Earlsfield 5B: Earlsfield to Callide 5C: Earlsfield to Moura

** The GAPE Coal System uses the Newlands Coal System mainline and branch lines*

The five (5) CQCN Coal Systems and the associated branch lines and main lines used in the DSM to assess the DNC are outlined in **Table 3.**

Table 3 Coal System, Mainline and Branch lines

Coal System	Mainline Path (loaded direction)	Branch Line Paths
Newlands	1.Collinsville to Pring*	1A: Pring to Abbot Point 1B: Newlands Junction to Collinsville
GAPE	1.Collinsville to Pring*	2A: North Goonyella Junction to Newlands Junction
Goonyella	3. Coppabella to Jilalan	3A: Jilalan to Port of Hay Point 3B: Hail Creek Mine to South Walker Creek Junction 3C: Oaky Creek Junction to Coppabella 3D: Coppabella to Wotonga 3E: North Goonyella Mine to Wotonga 3F: Blair Athol Mine to Wotonga
Blackwater	4. Bluff to Callemondah	4A: Callemondah to Port of Gladstone, including domestic coal terminals in vicinity (South Gladstone Junction) 4B: Burngrove to Bluff 4C: Rolleston Mine to Rangal 4D: Oaky Creek Junction to Burngrove 4E: Minerva Mine to Burngrove
Moura	5. Dumgree to Callemondah	5A: Dumgree to Earlsfield 5B: Earlsfield to Callide 5C: Earlsfield to Moura

**the GAPE Coal System uses the Newlands Coal System Mainline and branch lines.*

The specific sections of each Coal System that have been modelled in the DSM are listed in **table 4.** Some smaller balloon loops between TLO's and a branch line or mainline are modelled in the DSM however may not be noted in **table 4.**

Table 4 Extent of Modelled Rail Infrastructure

Goonyella System	• DBT to Jilalan	
	• HPT to Jilalan	
	• Jilalan to Coppabella	*(the Trunk, Goonyella Mainline)*
	• Coppabella to Wotonga	*(the Trunk)*
	• South Walker Junction to Hail Creek mine	*(the Hail Creek branch)*
	• Coppabella to Oaky Creek Junction	*(the South Goonyella branch)*
	• Wotonga to North Goonyella	*(the North Goonyella branch)*
	• Wotonga to Blair Athol	*(the West Goonyella branch)*
Newlands System	• NQXT to Kaili	
	• Kaili to Durroburra	*(North Coast Line)*
	• Durroburra to Pring	
	• Pring to Collinsville	*(Newlands Mainline)*
	• Collinsville to Newlands Mine	
	• McNaughton to Collinsville	

GAPE System	• Newlands Junction to North Goonyella Junction	*(the Goonyella Newlands connection)*
Blackwater System	• Oaky Creek Junction to Burngrove	
	• Minerva to Nogoa	
	• Rolleston to Rangal	*(including Bauhinia branch)*
	• Nogoa to Burngrove to Rangal to Bluff	
	• Bluff to Rocklands	*(Blackwater Mainline)*
	• Rocklands to Aldoga	*(North Coast Line)*
	• Aldoga to WICET	*(North Coast Line)*
	• Aldoga to Callemondah	*(North Coast Line)*
	• Callemondah to RGTCT	
	• Callemondah to NRG (Gladstone Powerhouse)	
	• Mt Miller to Comalco and Fisherman's Landing	
	• East End Junction to East End Balloon Loop	
	• Oaky to Oaky Creek Junction	
Moura System	• Callemondah to South Gladstone to QAL	*(Moura Short Line)*
	• Callemondah to Dumgree	*(Moura Mainline)*
	• Dumgree to Earlsfield	
	• Earlsfield to Callide	
	• Earlsfield to Baralaba	

4.2. Private Infrastructure

DNC is determined on Rail Infrastructure as defined in UT5. Private Infrastructure does not form part of the definition of Rail Infrastructure, however, it is included in the DSM to simulate infrastructure interfaces within the Rail Infrastructure. Private Infrastructure is not used in calculating DNC of the Rail Infrastructure.

The DSM considers all Private Infrastructure for coal and non-coal traffic as included in **Appendix D**.

Boundary locations where non-coal traffic may enter the CQCN include:

- Newlands/GAPE Coal System Kaili, Durroburra
- Goonyella Coal System: Yukan, Mt McLaren
- Blackwater Coal System: Rocklands, Nogoa, Parana
- Moura Coal System: N/A

4.3. Modelled Rail Infrastructure for New Mines

Yet-to-be-built Rail Infrastructure is included in the DSM to service new mines for which Access Agreements exist and is shown in **Appendix D.**

4.4. Electrification

Most of the CQCN is electrified and can operate Electric Trains. Those parts that are not electrified, and therefore can only operate Diesel Trains are shown below. The DSM has the capability, of these sections of the Network, being serviced by both diesel and electric trains if required.

- Newlands Coal System
    - the Goonyella Newlands Connection, and
    - the Carmichael branch line
- Goonyella Coal System
    - Terracom branch line at Blair Athol
- Blackwater Coal System
    - Burngrove to Nogoa to Minerva; and
    - Mt Miller to Comalco and Fisherman's Landing
    - QAL siding
- Meteor Downs South Balloon loop
- Moura Coal System (all)

4.5. Signalling

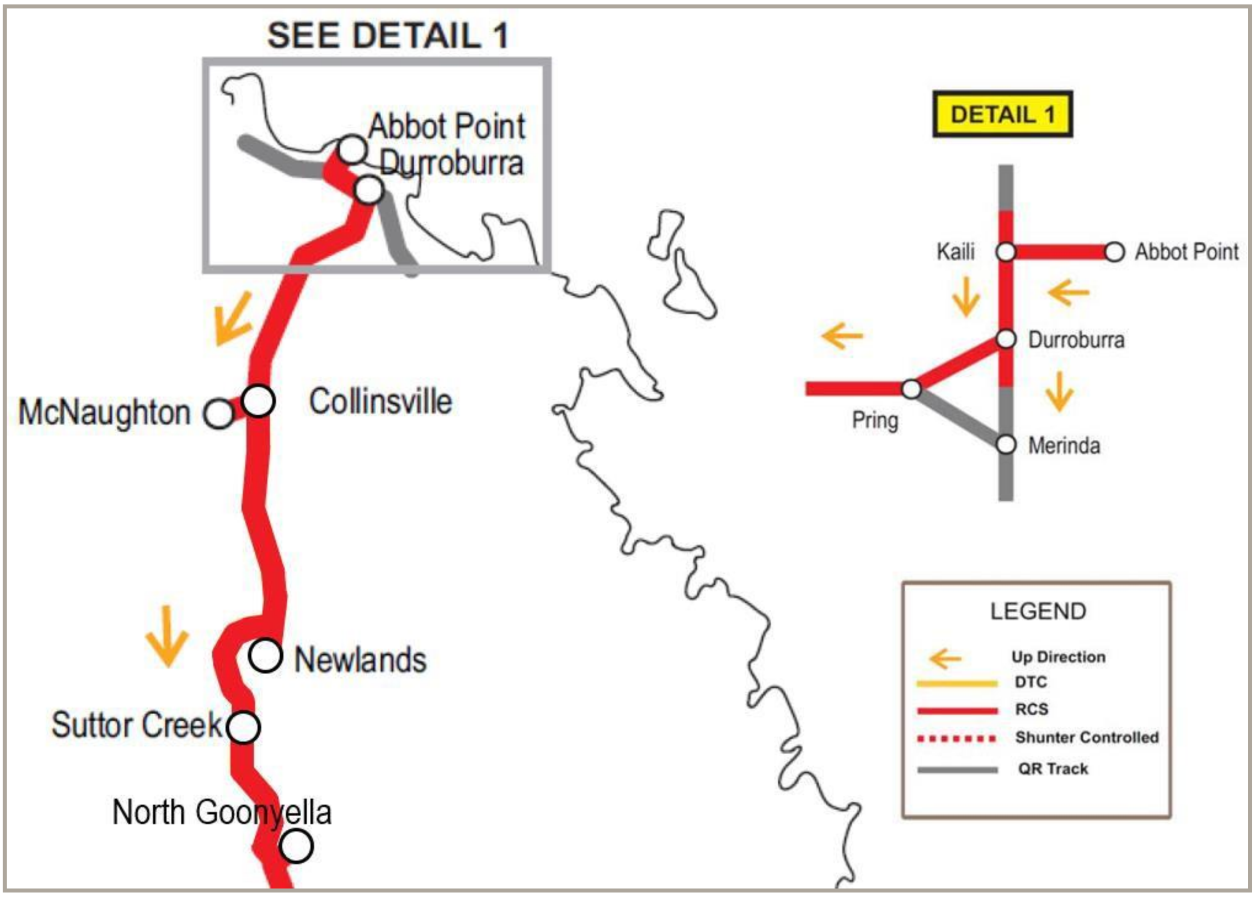
The CQCN uses Remote Control Signalling (RCS) and Direct Train Control (DTC). The DSM considers signalling that is installed in the CQCN.

The signalling configuration (consistent with the 2021 System Operating Parameters) for each Coal System is shown below. There have been no known changes to signalling (as advised by AN) since publication of the 2021 System Operating Parameters.

Newlands Coal System/GAPE Coal System

The Newlands Coal System currently operates with a mix of RCS and DTC-MLPI signalling. The Birralee, Cockool and Havilah passing loops operate with DTC-MLPI.

Figure 3 Newlands Coal System/GAPE Coal System Signalling

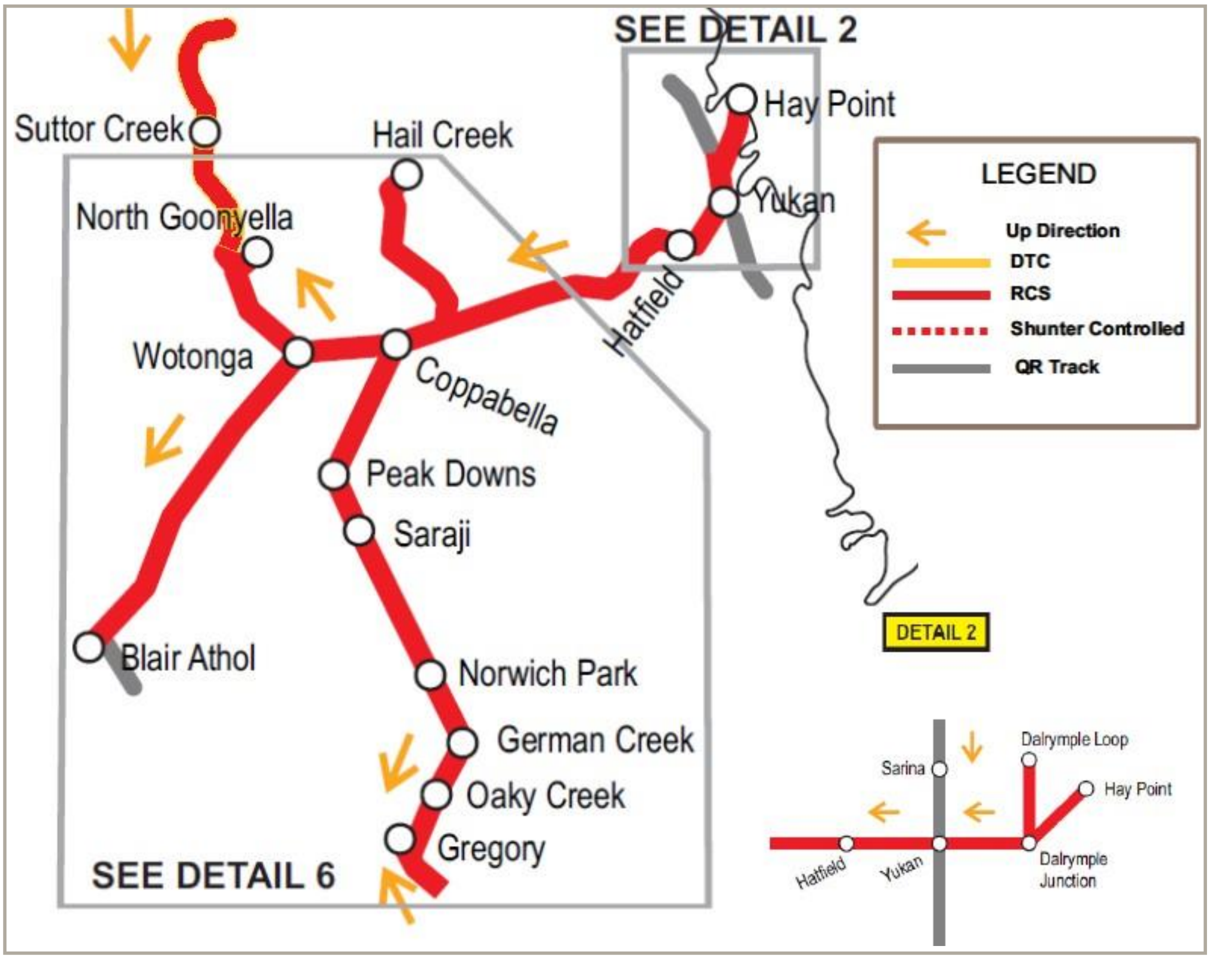


Note RCS is not installed as shown between McNaughton Junction and Newlands Junction.

Goonyella Coal System

The Goonyella Coal System has RCS installed throughout.

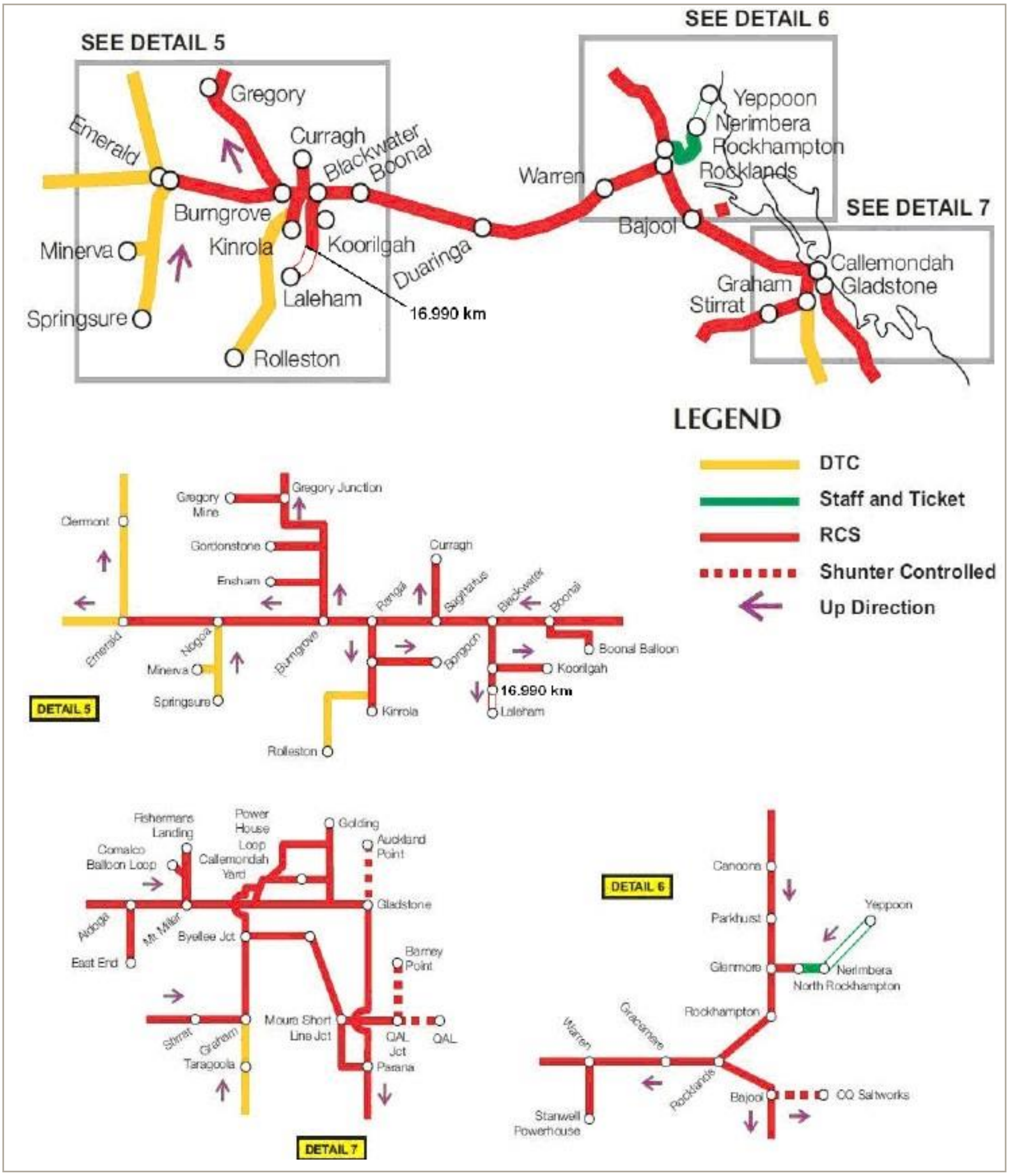
Figure 4 Goonyella Coal System Signalling



Blackwater Coal System

The Blackwater Coal System has RCS installed throughout except for the Rolleston and Minerva branches, Memooloo and Starlee passing loops which have DTC Directional Running installed.

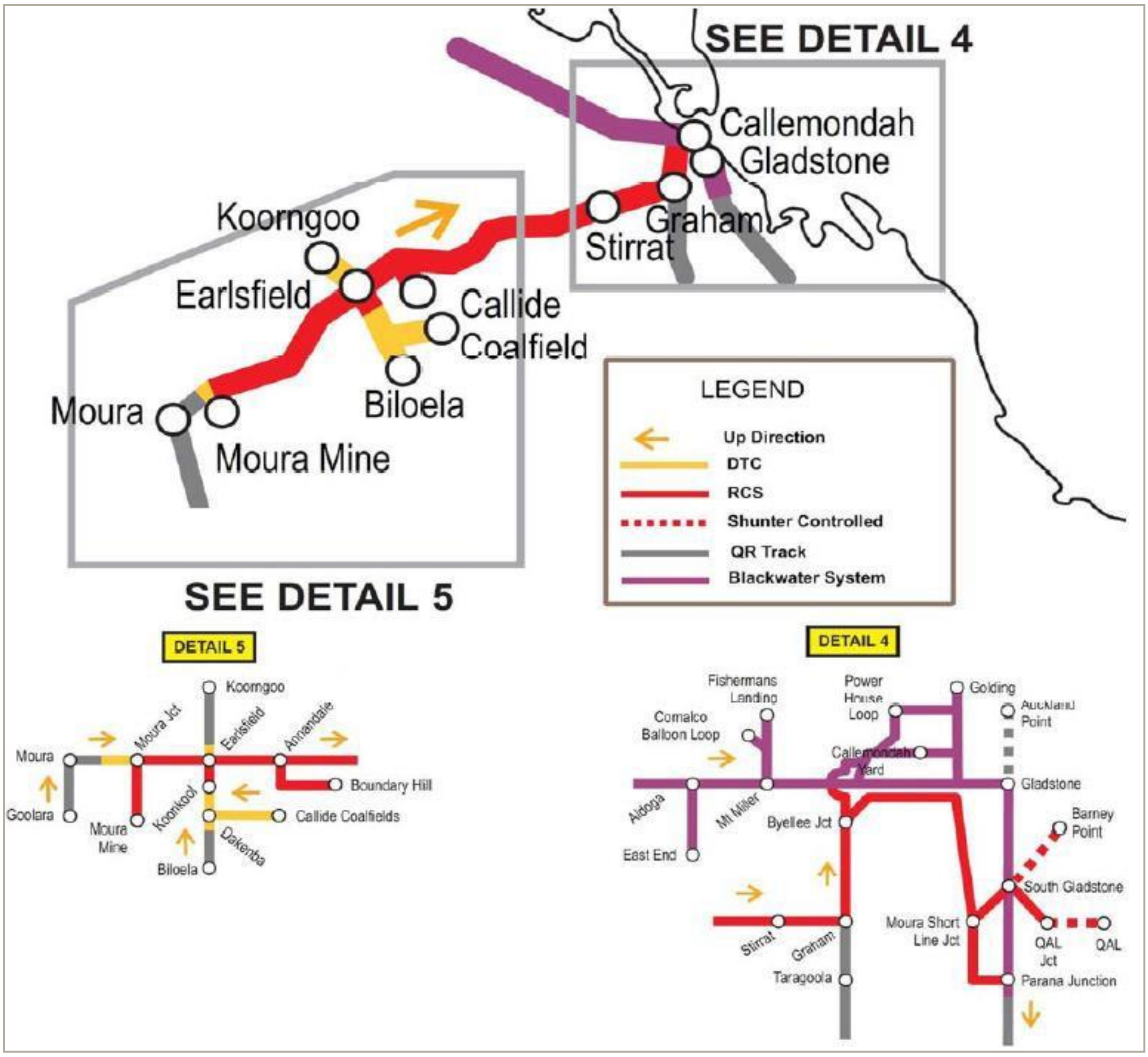
Figure 5 Blackwater Coal System Signalling



Moura Coal System

The Moura Coal System is largely RCS except for DTC on the Dakenba branch (to Callide) and DTC-MLPI west of Moura mine junction to Baralaba.

Figure 6 Moura Coal System Signalling



4.5.1. Remote Control Signalling (RCS)

Rail traffic movements are regulated by signals controlled from a remote location and/or automaticallyby the passage of rail traffic. Only one rail traffic movement can be on a signalled section at one time. This is the default mode of operation of the DMS.

4.5.2. Direct Train Control (DTC)

Rail traffic movement is governed by instructions contained in DTC Authorities issued by the AN network control officer to rail traffic crew. DTC Authorities give rail traffic possession of blocks of track. The crossing of trains at passing loops incurs delays that are in addition to the time the first train spends waiting for the second train to cross. There are two types of DTC, as follows. The time impacts of DTC are described in **Section 4.5.3** DTC Signalling.

Directional Running

Passing loop turnouts are arranged with trailable facing points such that trains can travel through the passing loop without requiring the train crews to operate turnouts.

Main Line Points Indicators (DTC-MLPI)

Passing Loops have power operated turnouts and illuminated indicators to give train crews advanced indication of the direction the turnout is set. Train crews can set the turnout using a hand-held remote control.

4.5.3. DTC Signalling

When trains cross at passing loops in DTC territory, delays apply depending on the type of DTC implemented. All delays are in addition to Sectional Running Times and stopping and starting durations.

DTC Directional Running

- The first train to arrive at the passing loop stops and incurs a delay of 10 minutes.
- The second train must also stop at the passing loop, and incurs a delay of 10 minutes, then departs.
- Once the second train has departed the passing loop, the first train incurs a further delay of 6 minutes before being allowed to depart.

DTC with Main Line Point Indicators

- The first train to arrive at the passing loop stops and incurs a delay of 20 minutes.
- The second train must also stop at the passing loop, and incurs a delay of 10 minutes, then departs.
- Once the second train has departed the passing loop, the first train incurs a further delay of 21 minutes before being allowed to depart.

4.6. Rail Depots

The modelled rail depots are listed in **Table 5.**

Table 5: Modelled Rail Depots

Coal Systems	Modelled Depots
Newlands, GAPE	Pring, BRC
Goonyella	Jilalan,Nebo
Blackwater, Moura	Callemondah

Depots are modelled at a macro, rather than micro, level. AN's **Line Diagrams** shows the yards with red roads (owned and operated by AN) and blue roads (typically owned by Above Rail operators). The blue roads are where major wagon and locomotive maintenance is done.

The break-up/make-up and shunting of consists from red roads to blue roads, is not modelled explicitly, neither are the maintenance works performed on blue roads.

From a modelling perspective, the DSM assumes:

- Queueing roads for loaded trains waiting for an IL and for empty trains waiting for dispatch;
- Locations where trains may be provisioned, examined, attended by trade staff, or have crew changes; and
- Uses data assumptions provided by Above Rail operators on provisioning cycles, time for provisioning, crew change timing within yards and unit time maintenance for each consist type.

The number of roads modelled at each of the Rail Yards are listed in **Table 6**.

Table 6: Default Number of Roads at each Rail Yard

Rail Yard	Roads
Pring	6
BRC	5
Jilalan	12
Nebo	6
Callemondah	12

At Callemondah, the DSM does not distinguish between arrival roads and departure roads. All roads are pooled and can be used for queueing either loaded or empty trains. The powerhouse roads are considered separate to the yard. Restrictions on the number of trains that can be provisioned or maintained at the same time effectively mimic the limited number of arrival and departure roads.

4.7. Location Specific Features

The following location specific features are noted:

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

4.8. Sectional Running Times

Sectional Running Times (SRTs) describe how long it takes an empty or loaded train to traverse each track section:

- For coal traffic, the SRTs have been updated to reflect current times as at January 2022 and are shown in **Appendix A** – Sectional Running Times.
- For non-coal traffic the SRT's have been updated to reflect current times as at January 2022 and see **Section 11** Non-coal traffic and **Appendix A** – Sectional Running Times.

In some instances, sections have been divided into two to accommodate a proposed new mine and its balloon loop/TLO (see **Section 6**). Where this has been done, the SRT has been distributed across the two sections in proportion to their length.

4.9. Stopping and Starting Delays

While SRTs reflect the travel time for a continuously moving train (in the absence of any speed restrictions), if a train needs to start or stop, additional travel time is incurred on the relevant section. Starting and stopping delays included in the DSM are included in **table 7.** The times were based on a statistical analysis of recent historical data.

Table 7: Stopping and Starting Delays by Coal System

Coal System	Starting Delay (mins)	Stopping Delay (mins)
Newlands	4	3
Goonyella	4	3
Blackwater	2	3
Moura	2	3

5. Demand

5.1. Measurement of demand

DNC is measured in Train Paths.

The DSM considers demand as a critical primary driver for coal services, i.e., requests for the delivery of coal, from mines to terminals and domestic users and non-coal traffic.

Demand can be expressed in TSEs for the purposes of railing demand (consistent with Access Agreements), or in tonnes to describe the quantity of coal to deliver.

The DSM uses TSEs as the input for demand.

Demand and in particular Committed Capacity is determined by the Access Agreements.

UT5 requires the ACAR to be determined on a DNC analysis linked to "the extent to which the Deliverable Network Capacity can deliver the Committed Capacity". Committed Capacity is the portion of Capacity that is required to meet Train Service Entitlements, renewal obligations, and Passenger Priority Obligations or Preserved Path Obligations, to provide Access Rights where AN has contractually committed to Expansion or Customer Specific Branch line in relation to those Access Rights.

Committed Capacity is used as the base demand profile against which DNC is assessed, and if necessary, demand for all Committed Capacity is scaled up linearly until DNC of the Rail Infrastructure is reached. This is undertaken at Coal System level.

Demand data was sourced from Aurizon Network as of May 2022. This represented contracted TSEs per 30-day month up to and beyond the end of the capacity assessment period from July 2022 (FY23) to June 2027 (FY27). UT5 defines the Capacity Assessment Period as the later of 5 years or peak capacity under the Access Agreements. The IE has determined from the data, that peak capacity occurs within the five-year capacity assessment period outlined above.

Where Access Agreements have rights for renewal occurring during the Capacity Assessment Period, contracted TSEs per month were extended up to June 2027, using the value of the final month of the existing contract.

5.2. DSM Implementation

Demand is drawn in the DSM from a list of Rail Jobs. Each Rail Job corresponds to a set of one or more train orders for a given origin/destination pair, with a timestamp of when it becomes available to process. A destination can be a coal terminal, domestic user and/or a non-coal traffic exit of the network.

The input for demand is based on the contracted TSEs per 30-day month, where it is assumed that every one Train Path consumes 2 TSEs: one for empty travel, one for loaded travel. Contracted TSEs for each month are adjusted according to the number of days in each month:

$$\text{Actual TSEs} = 2 \times \text{round}\left(\frac{\text{Contract TSEs per 30-day month} \times \text{days in month}}{30 \times 2}\right)$$

The list of individual Rail Jobs to determine DNC, is created in two parts from the monthly contracted TSE totals: one is even railings and the other is campaign railings. Given the timeframe between the 2021 ICAR and the first ACAR no changes have been made to the assumptions around each coal terminal to understand its designed mode of operation and its impact on Rail Infrastructure capacity. Other domestic users and non-coal traffic destinations were assumed as even railing.

A. Even Railings:

- The list of Rail Jobs for all terminals excluding DBCT, consists of single train cycle orders, based on the monthly contracted TSEs. Each Rail Job's priority is the percentage satisfaction of its contract up to that point in the list (see **figure 7** below).
- Rail jobs are not restricted within the month, rather they are available to rail at any time. In this way the intended even railing pattern is targeted by the prioritisation while allowing the use of sprint capacity in some parts of a month to compensate for maintenance in other parts.

B. Campaign Railings:

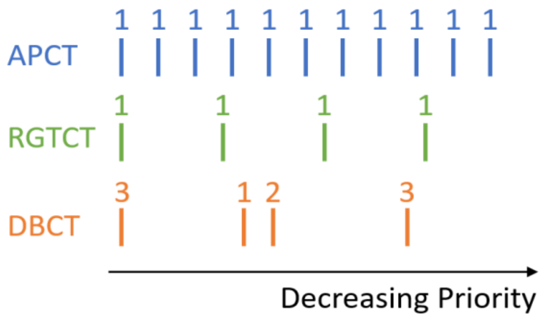
- In contrast, DBCT operates as a cargo assembly terminal. To mimic the typical campaign railing pattern without modelling the terminal's internal operation, a dynamic ship arrival table (SAT) is generated from the expected tonnes carried by each mine/terminal contract. The expected tonnes consider light loading and all other loading considerations, inducing train trips as close to the contracted TSEs as possible, as well as historical cargo size information.
- As train payloads vary randomly, and the ships are discrete, the total of the required train cycles cannot always be a perfect match with the contracted TSEs. The Rail Job for each shipping cargo is created with a priority equal to the ship's arrival time in the month as a percentage. No terminal stockyard is modelled that could restrict the number of ships being processed in parallel, therefore all jobs are available to be railed from the beginning of the month, analogously to the even railings jobs described above.
- For campaign railing only to DBCT, TSEs are converted into tonnes using tonnes = TSE/2 * expected payload, where expected payload includes the effects of light loading on the mean payload as outlined in **section 6.4**. This is required as a result of the linkage to ship parcel size. This is not applicable to even railing terminals.

When a campaign railing job commences, it locks the TLO from being used by another job until that job is finished. If there is another TLO in the balloon loop, this is not locked.

When multiple mines use the same balloon loop, the DSM assumes they are using the same TLO. However, even railings can still dispatch trains to the same TLO. As an example, for Balloon Loop 1, if both Mine 1 and Mine 2 parcel are in the cargo assembly queue for DBCT, they will be processed sequentially i.e. the DSM first sends all trains for Mine 1, then all trains for Mine 2 and at the same time RGTCT can send its even railings trains to Mine 2 regardless of which cargo assembly parcel is being processed at that time.

The two prioritisations are then merged and ordered by the Rail Jobs' priorities.

Figure 7: Illustrative example of Rail Job prioritisation. DBT operates as cargo assembly while others prioritise based on individual contract satisfaction



When the DSM is used to test the ability of the Rail Infrastructure to meet contracts within a month, at the end of each month any pending Rail Jobs (i.e., the train is not dispatched prior to month end), are removed, and may no longer be railed for. Jobs are considered railed for within a month so long as the train is dispatched within that month.

5.3. Cross-System Traffic

Cross-system traffic is included in the DSM and demand profile. Cross-system traffic includes any origin that is in one coal system and delivers to a destination in a different coal system. GAPE Coal System train services are not considered as cross-system traffic as outlined in UT5.

There are only a handful of cross-system origin/ destinations which operate in the Blackwater and Goonyella Coal Systems.

6. Train Loadouts

6.1. Overview

The upstream boundaries of the DSM are the Train Loadout (TLO) facilities at each mine, with their associated balloon loop. Coal enters the DSM at these facilities. Coal is considered always available subject to the constraints of the load point capability. In the DSM, the duration that trains spend in the balloon loops is based on the following components and conditions of the use of TLOs, including:

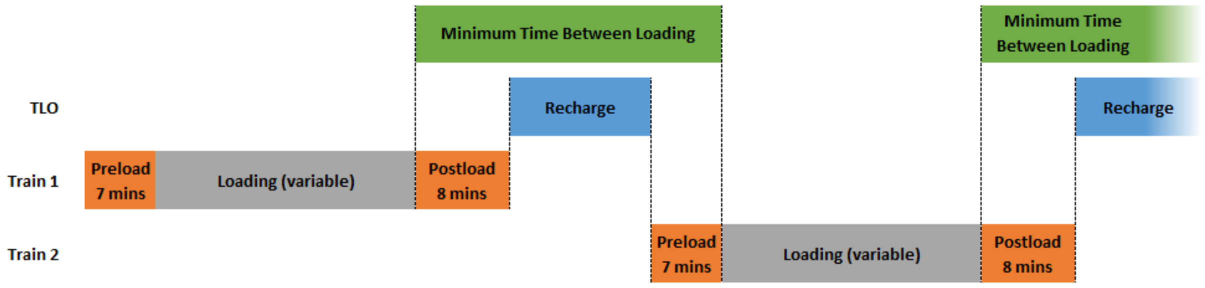
- Access to the TLO facility, regulated by:
    - how many trains the balloon loop can hold **(**see **Section 6.2)** – this determines whether trains can queue for loading at the TLO in the balloon loop, or on the network in a passing loop; and
    - the availability of the TLO itself, allowing for planned maintenance (see **Section 6.3**).

- The duration that each train spends at the TLO, determined from the parameters of train loading:
    - the duration of other activities such as pre and post load;
    - the train payloads **(**see **Section 6.4);**
    - the equipment gross loading rates (GLRs), which include the effect of unplanned delays to both the loading equipment and the operations immediately beyond the TLOs **(**see **Section 6.5**); and
    - the minimum separation time between loading of trains, including the time taken for loading equipment to be ready for their next job, i.e., recharge.
- Cycle-related activities such as crew changes, as applicable for the origin/destination pair.
- The duration that trains spend waiting for access back on to the network, which is dependent on the state of local network traffic.

The sequence of events that a train undergoes upon arrival at a TLO is summarised below, and shown graphically in **figure 8:**

- The TLO becomes ready to load after the minimum time between loading duration has passed, following completion of loading of the previous train. Its length is based on observations of a sustainable minimum separation in historical data. **Appendix F** has the TLO dispatch separation times;
- The train becomes ready to load after the pre-load duration of 7 minutes. The pre-load duration is allowed to occur in parallel with the minimum time between loading*;*
- The train is loaded by the TLO, with the train loading duration being based on payload and gross load rate values. The DSM samples a distribution representing train payload, and a second distribution representing GLR, and then calculates load duration by dividing the sampled payload by the sampled GLR; and
- On completion of loading, the following two activities commence in parallel:
    - the train must wait a post-load duration of 8 minutes before it can try to move out of the balloon loop to access the network; and
    - the TLO begins its minimum time between loading in preparation for loading the next train.

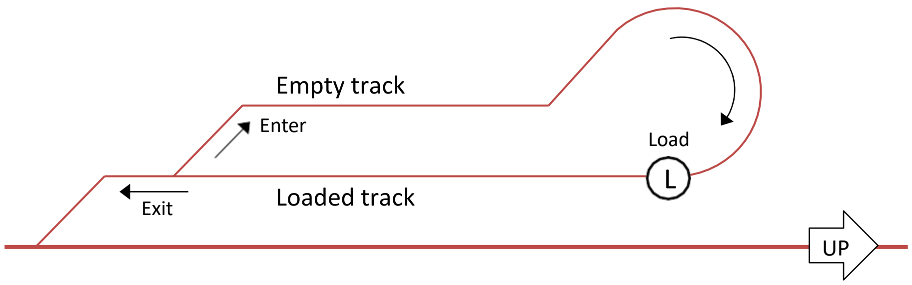
Figure 8: Gantt Chart for choke feeding of TLO



6.2. Balloon Loop Capacities

The infrastructure properties of balloon loops differ between mines, with consequences for the queueing of trains for TLO access**. Figure 9** shows a typical balloon loop arrangement.

Figure 9: Generic Balloon Loop Layout



The following configurations were identified:

- For some mines, trains have to queue on the network if the TLO is in use and wait until the currently loading train has exited the balloon loop;
- Some mines can accept an empty train while the loaded train is still in the balloon loop, but only once the loaded train has had its loading completed;
- Some mines can accept the next train into the balloon loop while the previous train is still loading; and
- Some mines can queue more than one train in the balloon loop before the loaded train has to exit.

In all of these cases, the already loaded train has to move off the loaded track and exit the balloon loop before the next train can commence its actual loading phase. The DSM track booking mechanism will make the train wait on the last "safe to stop" section before the TLO's balloon loops. They will only be able to move off towards the balloon loop once the previously loaded train has exited and crossed at the respective passing loop.

The maximum trains in a balloon loop used by the DSM is shown in **table 8**. For a number of TLO's where in practice they can hold one full train while another is being loaded these have been shown as two train capacity in the DSM. Note that not-yet-built TLOs are assumed to have maximum standard balloon loops.

Table 8: TLO Balloon Loop Parameters

Coal System	Mine	Maximum Trains in Balloon Loop
Newlands, GAPE	Byerwen	[redacted]
	Carmichael	[redacted]
	Collinsville	[redacted]
	Newlands	[redacted]
	Sonoma	[redacted]
Goonyella	Blair Athol (Terracom)	[redacted]
	Burton	[redacted]
	Carborough Downs	[redacted]
	Caval Ridge	[redacted]
	Clermont	[redacted]
	Coppabella	[redacted]
	German Creek	[redacted]
	Goonyella	[redacted]
	Hail Creek	[redacted]
	Isaac Plains	[redacted]
	Lake Vermont	[redacted]
	Middlemount	[redacted]
	Moorvale	[redacted]
	Moranbah North	[redacted]
	North Goonyella	[redacted]
	Norwich Park	[redacted]
	Oaky Creek	[redacted]
	Olive Down South	[redacted]
	Peak Downs	[redacted]
	Millenium	[redacted]
	Riverside	[redacted]
	Saraji	[redacted]
	South Walker Creek	[redacted]
Blackwater	Boonal	[redacted]
	Boorgoon	[redacted]
	Curragh	[redacted]
	Ensham	[redacted]
	Gregory	[redacted]
	Kestrel	[redacted]
	Kinrola	[redacted]
	Koorilgah	[redacted]
	Meteor Downs South	[redacted]
	Minerva	[redacted]
	Rolleston	[redacted]
	Washpool	[redacted]
Moura	Baralaba	[redacted]
	Boundary Hill	[redacted]
	Callide	[redacted]
	Moura	[redacted]

6.3. TLO Availability

The availability of the TLOs can be limited due to planned maintenance of the train loading system.

Data was reviewed for all TLO's (using Above Rail operator provided data) for the period 1 February 2020 to 31 January 2022 and also the ICAR period of assessment data. Maintenance events were compared with full system shuts (using one-year FSS data as comparison) to determine the alignment of maintenance outside of FSS events. TLO possession events between 1 hour and 14 days were retained.

Any overlaps of maintenance and FSS events were plotted, however no overlap patterns could be identified concerning the overlap type and/or duration. Any event that did not completely overlap was retained in the analysis. The following TLO possession events by overlap category against FSS events have been used to predict the TLO planned maintenance events in the DSM:

- Are within the below rail Full System Shut (FSS);
- Overlap with the FSS (start earlier and/or end later than the comparable FSS); or
- Are outside of the FSS.

To simplify the application of TLO planned maintenance events in the DSM, they were applied independently of FSS's, and at regular intervals, having equal duration at each occurrence. The number of events per year and the duration per event adopted was guided by the historical data for each TLO. To avoid maintenance events across TLOs being unrealistically aligned, a random time offset was added for the first event on each mine.

For TLOs that show no planned maintenance, the maintenance is assumed to occur during full system shuts only and hence no additional maintenance time outside of FSS events was allowed for in the DSM.

6.4. Payloads

Analysis of actual payload data for the period 1 February 2020 to 31 January 2022 was undertaken and included and compared with previous historical results. The data indicated two categories: full Payloads and light Payloads. Payloads were light if they were below a specified threshold. A different threshold can apply to each TLO and Coal System as the train lengths and axle load limits vary.

The payload analysis fitted probability distributions by Coal System and at origin/destination level for full payloads, light payloads and light load probability. Ranking of various probability distributions was undertaken using the AIC.

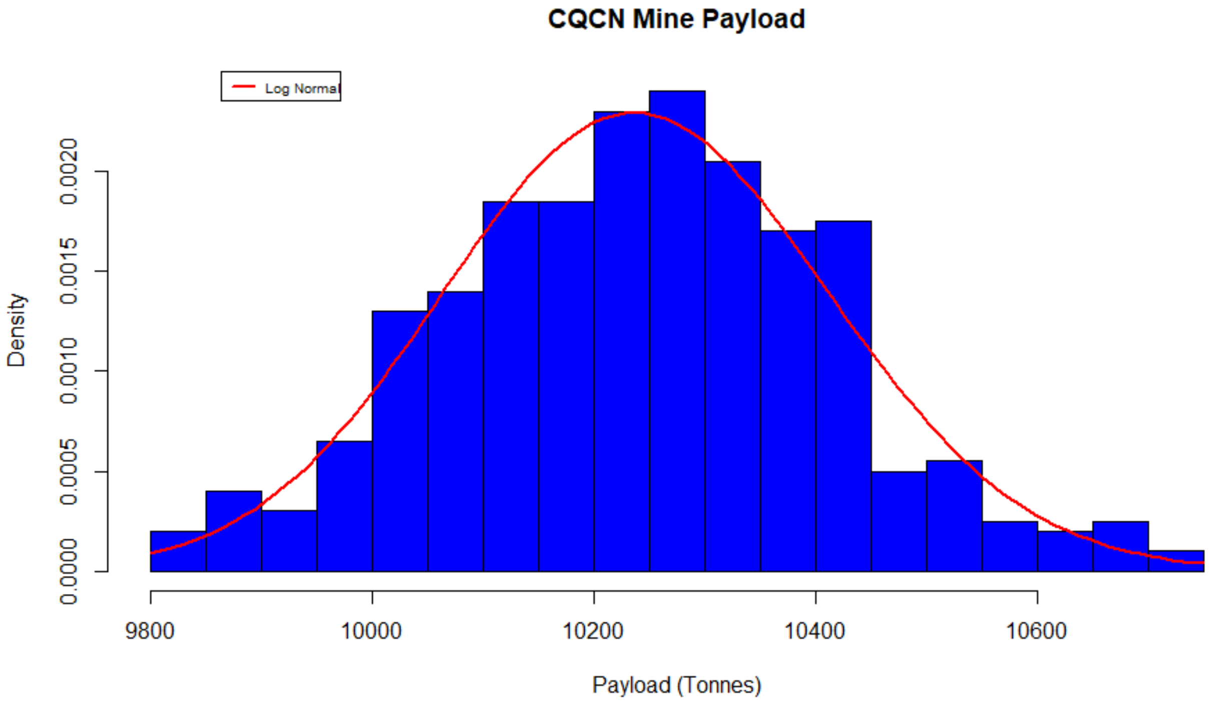
For non-operational, and for a small number of mines/TLO's with small data sets, a light loading threshold and light loading probability was applied at Coal System level rather than an individual mine/TLO level. When this was used the light load threshold for each Coal System is shown in **table 9**.

Table 9: Light Loading by Coal System

Coal System	Light Load Threshold (t)	Chance of Light Load
Newlands/GAPE	6,000	4.4%
Goonyella	9,500	10.95%
Blackwater	7,000	5.4%
Moura	7,000	10.25%

For all other mine/TLO's they have an individually fitted light loading threshold and light loaded probability has been applied. An example of a Payload histogram and fitted distribution for an unidentified TLO is shown in **figure 10.**

Figure 10: Example of a distribution fitted to historical full Payloads for a Goonyella Coal System TLO



For DSM implementation, a test is performed every time a train presents at a TLO to determine whether the Payload will be a light load or a full load. The Payload is then sampled from the corresponding distribution.

No light loads are used for the short Moura Coal System trains. Minerva Payloads are limited by the branch line axle load limit of 20 tonnes.

6.5. TLO Gross Load Rates

Train loading job data was provided by Above Rail operators for the two-year period from 1 February 2020 to 31 January 2022 and this was analysed and reviewed with previous years data. Unload rate could only be determined to a TLO level. i.e. utilising that TLO did not identify the mine. As a result, the TLO load rate does not vary between users and the same load rate distribution has been used where this applies.

The gross load rate (GLR) for each job was calculated by dividing actual Payload by the difference between the start and end loading timestamps (i.e., the gross loading time).

$$\boldsymbol{Load\ Time = Loading\ Complete - Loading\ Commenced}$$

$$\boldsymbol{GLR = \frac{Train\ Payload}{(Loading\ Complete - Loading\ Commenced)}}$$

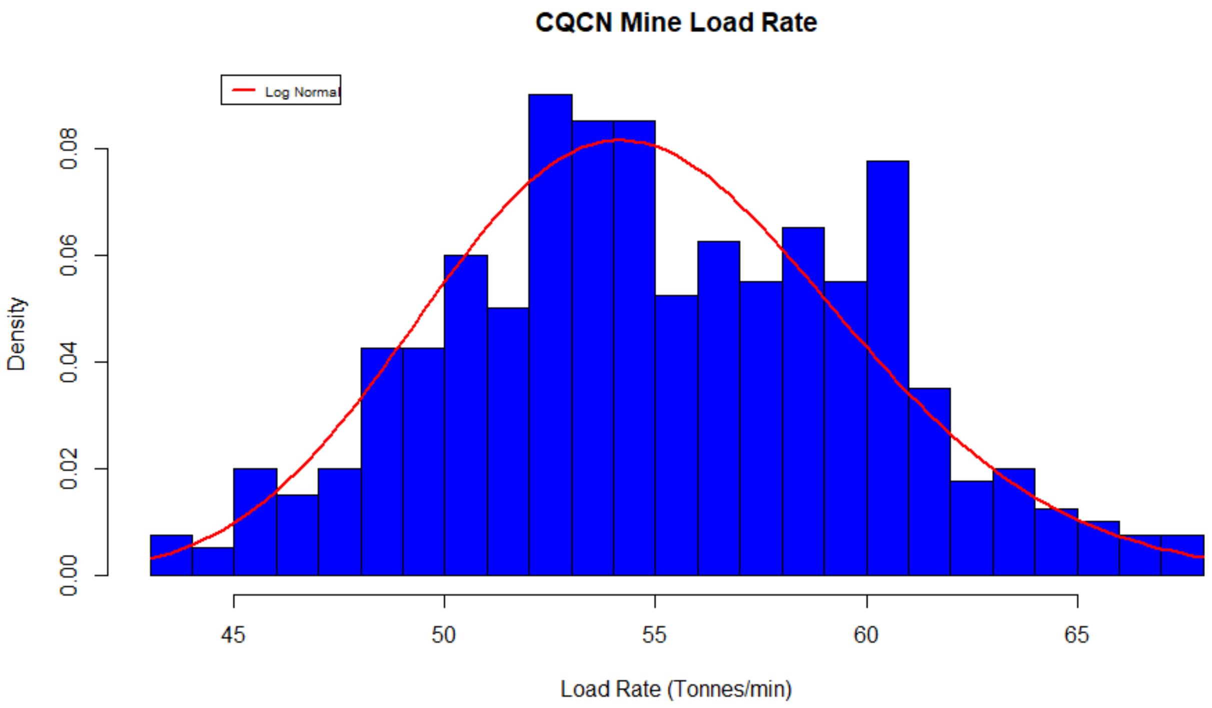
The data for each TLO was fitted to potential distributions and then a ranking of various probability distributions was undertaken using the AIC.

The TLO load rate is intrinsically tied to the TLO payload (and other TLO related parameters) therefore the data range timeframe analysed for both sets of data was identical. For non-operational, and for a small number of TLO's with small data sets, there was no change to existing ICAR parameters.

The use of the gross loading time captures any delays that occur during loading, removing the need to explicitly model delay events. This does not capture any delays to the start of loading.

Distributions were fitted to the GLR data for each TLO. An example of a GLR histogram and fitted distribution for an unidentified TLO is shown in **figure 11.**

Figure 11: Example GLR histogram and fitted distribution for a single TLO



6.6. TLO Data

Appendix F contains data used within the DSM for each TLO modelled, including load time, gross loading rate, planned maintenance outside FSS, light loading assumptions, pre and post load times and TLO dispatch separation times.

7. Inloaders

7.1. Overview

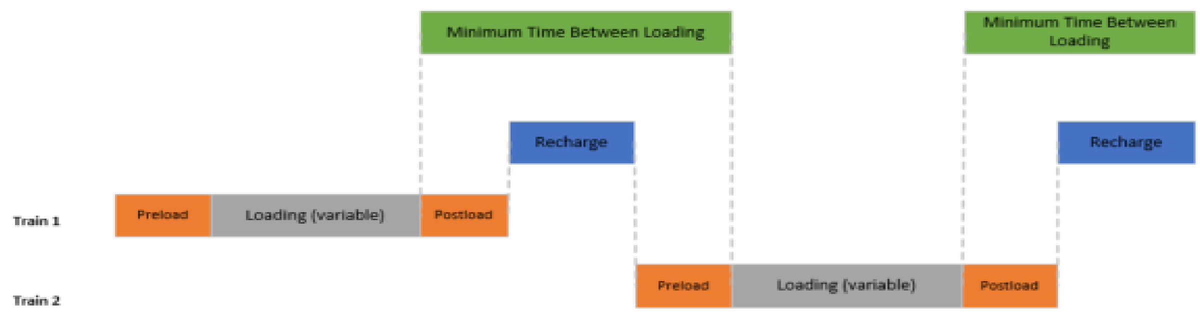
The downstream boundaries of the DSM are the Rail receival stations (RRS), or Inloaders (IL), at each export terminal and domestic user facility. Coal exits the DSM at these facilities. To model the duration that trains spend in the unloading balloon loops, the following components and conditions of the use of ILs are captured:

- The availability of the ILs for trains to enter, allowing for planned maintenance;
- The duration that trains spend at the ILs, allowing for:
    - the duration of activities such as pre- and post-unload;
    - the train Payloads;
    - the equipment gross unloading rates (GUR), which include the effect of short delays stemming from both the unloading equipment and the operations immediately beyond the ILs; and
    - unplanned delays longer than those captured in GUR variation.
- Availability of network infrastructure for trains to leave the ILs and return to maintenance/dispatch locations.

Previously a cut-off point was determined and all unload events with an unload rate lower than the cut-off were considered delayed. 'Non-delayed' data was used to compute unload rate, while 'delayed' data was used to estimate distribution of unscheduled delays. Now additional data has been sourced directly from each of the terminals, which contained the explicit beginning and end of each unscheduled delay event. This allowed for the direct calculation of unscheduled delays (both the length and frequency) without any assumption of the terminal delays.

The modelled sequence of activities in the unloading process is illustrated in **figure 12.**

Figure 12: Gantt Chart for Unloading of Trains



At terminals with multiple ILs, loaded trains arriving at the terminal are placed in a queue awaiting an available IL. Loaded trains are only allocated to an available IL when the next one becomes available. ILs serve trains on a first-come first-served basis.

Once allocated an IL, the train moves to the IL, waits for the pre-unload delay duration, and begins unloading its payload at a sampled GUR. **Appendix G** shows the pre and post load times for each terminal used in the DSM.

Additional failure events (based on operating time) represent the unplanned delays in the unloading process **(**see **section 7.3).** After unloading, the train waits for the post-unload delay duration and is then ready to depart for its next task. The train may potentially have to wait for the network to become available to leave the IL departure track.

At the completion of post-unload, the IL becomes available for selection by the next train waiting to unload, or for completing pending planned maintenance. However, the next train can only commence unloading once the departure track has been vacated.

At RGTCT there are some operating practices and/or restrictions that apply for some belts for some origin/destinations. A review of the historical data has been undertaken and changes made that reduce the impact of restrictions on some mines. **Appendix G** shows the restrictions used in the DSM.

7.2. Inloading Loop Capacities

IL balloon loops are assumed to possess one arrival track and one departure track each, which are both used during the unloading process. Each arrival track can only hold one train.

7.3. Inloader Availability

The availability of the terminal ILs is constrained by planned maintenance of the inloading system, and additionally by unplanned outages during operating time. For terminals with multiple ILs the DSM treats each IL separately.

Data was reviewed for all Terminals for the period 1 February 2020 to 31 January 2022 along with previous years data. The data contained unload information and unplanned delay data.

With the delay data now being supplied separately, a review of each unload event was undertaken and any event that was an overlapping delay event identified.

Maintenance events were compared with full system shuts to determine the alignment of maintenance outside of FSS events. Outages may be scheduled such that they:

- Are within the below rail Full System Shut (FSS);
- Overlap with the FSS (start earlier and/or end later than the comparable FSS); or
- Are outside of the FSS.

Any overlaps of maintenance and FSS events were plotted and any event that did not completely overlap was retained in the analysis and then applied as an IL unplanned maintenance event in the DSM.

The historical data analysis showed some outages outside FSS events for all terminals, however the way the network currently operates at current demand levels cannot be extrapolated directly to how the IL maintenance would perform at maximum contract demand. Additionally, IL maintenance outside FSS could be captured as a port cancellation in the DSM. It has been assumed therefore that any IL planned maintenance will occur within FSS events however given the total FSS hours (Network and for most Coal Systems) has increased from ICAR levels, the total allowable time allocated to IL planned maintenance has therefore increased.

When a specific IL undergoes planned maintenance, it is not available for selection by arriving trains. If a train is currently being unloaded at the scheduled start time of a planned maintenance event, the unloading process is allowed to finish first **(**see **figure 12** above).

Unplanned outages are modelled as randomised delay events during the unloading process, during which the train still occupies the IL, but no unloading takes place. These delays are applied using a time-to-failure (TTF) and a time-to-repair (TTR), which are sampled from distributions for each IL.These distributions have been derived from recent historical unloading duration data received from export terminals.

Some terminals were able to supply recent data that provided sufficient detail to determine the pre and post load times from actual data and these have now been applied in the DSM. For other terminals, the pre and post load times have been assumed to remain at 7 and 8 minutes respectively.

7.4. IL Gross Unload Rates

Train unloading job data was provided by Coal Terminals and Above Rail operators for the two-year period from 1 February 2020 to 31 January 2022 and combined with previous historical data. The data contained unload information and unplanned delay data.

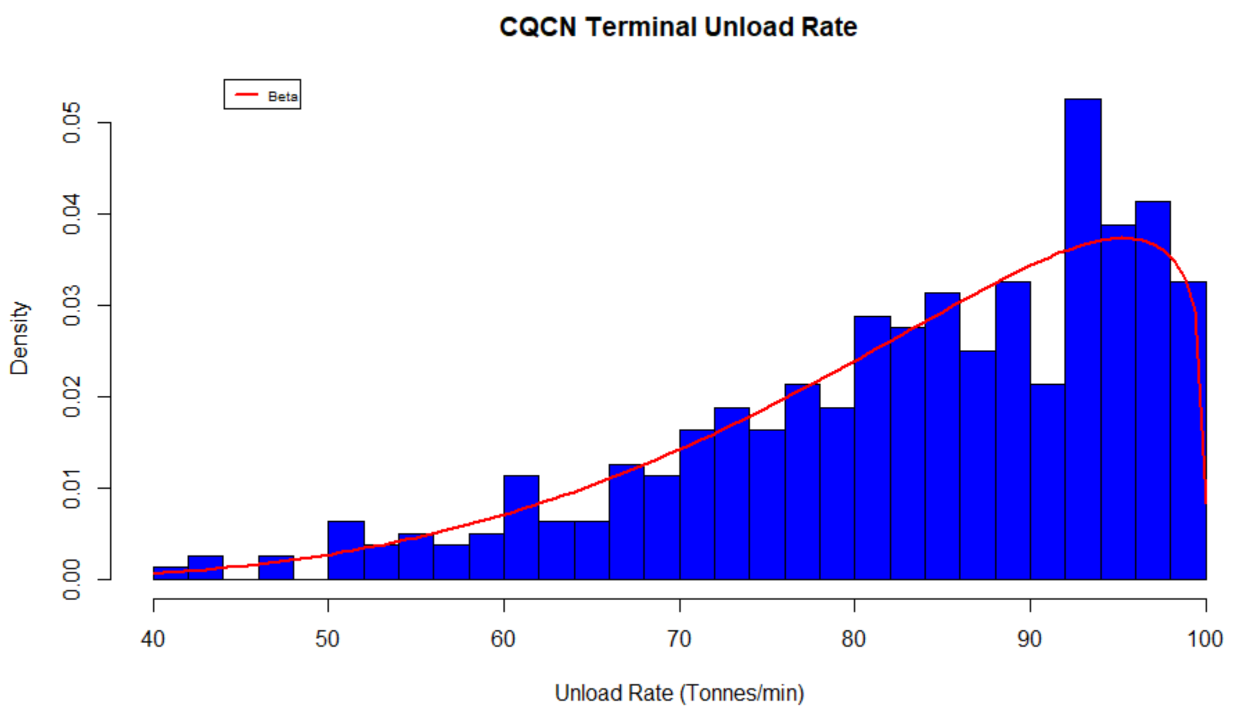
The gross unload rate (GUR) for each job was calculated by dividing actual Payload by the unload time using the start and end unloading timestamps.

$$GUR = \frac{Train\ Payload}{Unload\ Time}$$

The data for each IL was fitted to potential distributions and then a ranking of various probability distributions was undertaken using the AIC.

The typical spread of GUR is illustrated in the example in **Figure 13**. The majority of unload jobs complete at a rate close to equipment capability, with some variability due to downstream activities and individual attributes of a train load, e.g., sticky coal, free-flowing coal etc.

Figure 13: Example Terminal Unload Rate Distribution



7.5. IL Data

Appendix G contains data used within the DSM for each IL modelled including unload time, gross unload rate, planned maintenance outside FSS, time at terminal and pre and post unload times.

8. Below Rail Operations

This section describes how the DSM captures the way in which the Coal Systems operate in practice. The DSM does not explicitly copy real world operations step by step. For instance, the DSM does not generate an Intermediate Train Plan, however, instead, the DSM captures how the end result of the real-world operations planning process plays out.

8.1. Pathing

The travel of trains over mainline sections of track is governed by network Train Paths. Such paths typically originate at dispatch locations such as Pring, Jilalan and Callemondah for empty travel, and staging locations such as Bluff and Coppabella for loaded travel. Paths are defined by their frequency and clockface departure time at the origin, as shown in **table 10**.

Separation times are applied as shown in **table 10** between paths.

Table 10: Path Frequencies and Clockface Times

Coal System	Mainline Path	Separation	Clockface Time
Newlands	ex Pring, empty	60 minutes	0:50, 1:50, 2:50, …
Newlands	ex Collinsville, loaded	60 minutes	0:22, 1:22, 2:22, …
Goonyella	ex Jilalan, empty	20 minutes	0:00, 0:20, 0:40, …
Goonyella	ex Coppabella, loaded	20 minutes	0:10, 0:30, 0:50, …
Blackwater	ex Callemondah, empty	15 minutes	0:00, 0:15, 0:30, 0:45, …
Blackwater	ex Kabra, empty	15 minutes	0:00, 0:15, 0:30, 0:45, …
Blackwater	ex Bluff, loaded	20 minutes	0:10, 0:30, 0:50, …
Blackwater	ex Rocklands, loaded	20 minutes	0:10, 0:30, 0:50, …
Moura	ex Callemondah, empty	90 minutes	0:15, 1:45, 3:15, …
Moura	ex Dumgree, loaded	90 minutes	0:17, 1:47, 3:17, …

When a train arrives at a path-controlled section of track, it requests a path and dwells in its current location until it is allowed to depart on a path along the mainline. The departure time is calculated based on the next path that is available for use, and from the travel time required from the current location to meet a path at the mainline entry point. Once the train has departed to meet the path, its movements are not scheduled in advance, and its progress along the route is managed by the track control algorithm of the rail microsimulation.

In practice, a disciplined schedule is used to ensure crossing activities are managed and optimised. The DSM consider paths are network Train Paths, as opposed to System Paths, whereby a loaded train departs a staging point (e.g., Coppabella) on a path that is aligned to meet a pre-scheduled terminal inloading slot. Hence loaded trains are not sequenced when taking their final path to the terminal from a staging point. Instead, trains leave on a network Train Path and travel to the corresponding rail yard to queue, if necessary, for the first available suitable terminal IL.

The DSM enforces pathing separation of 15 mins west of Kabra and 20 mins east of Rocklands in the Blackwater Coal System to accommodate non-coal traffic that operates on preserved paths.

Network Train Paths can be used in whole or in part. In addition to coal train traffic, paths are also used for freight train traffic. Paths are marked unavailable for use if they are reserved for timetabled passenger trains or would coincide with track closures on path-controlled sections.

In contrast to mainline sections of track, travel on branch lines is not path-controlled, but instead governed by headway and track booking requirements. This means that trains do not need to wait for a clock-face path to travel from a mainline turn-off to the loadout balloon loop. Conversely, trains leave balloon loops after they have finished loading, and travel run-when-ready until they arrive at a network location from which the onwards location mainline paths are enforced.

8.2. Dispatch

In the real-world operation of the CQCN, railing is planned with weeks of look-ahead in a complex vertically separated planning regime designed to coordinate between numerous Access Holders and service providers. These plans are then implemented and adjusted in day of operations management.

The DSM does not attempt to replicate this process and its various actors with their individual objectives and constraints. Instead, it aims to capture the outcome of a successful planning process through the modelled dispatching algorithm.

The dispatching algorithm decides how Rail Jobs are assigned to available trains.

Rail jobs are generated from the demand described in **section 5.**

For each idle train arriving at a dispatch location, the list of available Rail Jobs is searched in order until one is found that satisfies the following criteria:

- There is outstanding demand to rail remaining in the Rail Job;
- The Rail Job's TLO is available at the expected time of the train's arrival, in particular:
  - The maximum number of trains per day dispatched to the TLO has not been reached;
  - The maximum number of simultaneous trains on the way to the TLO has not been reached; and
  - The estimated loading period is not expected to clash with another train;
- The selected train is suitable for railing between the mine and terminal in question. This takes into account both above rail contracts and physical constraints; and
- The train's journey to the loadout is not expected to be interrupted by network closures or planned maintenance.

If a Rail Job has been found that passes all of the above checks, the train is assigned to be dispatched to the respective mine for delivery to the respective terminal. It then embarks on the first step of its train cycle task sequence (see **section 9.2** - Train Cycles). Typically, this involves requesting a path for mainline travel.

If no Rail Job is found for a given train, the search for a matching train job for the next train commences.

8.3. Rail Microsimulation

The travel of trains between points on the network is handled by the DSM's rail microsimulation engine. This engine monitors and directs the movement of trains over tracks,respecting the following principles:

- Train routing: The rail microsimulation engine chooses the route from each train's current location to the next task in the current train cycle. The travel of the train along the chosen route is controlled in increments that depend on the current network status;
- Plan and execute train movements: For each train movement along a route, a sequence of tracks is

chosen and booked to the next "safe to stop" section. When the sequence of bookings is made, the train travels along the booked sequence of tracks, with the rail engine monitoring its progress and applying travel-related events (such as delays, see **section 10 System Delays**) until the train reaches the last booked track. This process is repeated until the train reaches the destination of its route; and

- Negotiation of train meets to avoid deadlocks. The track booking algorithm is designed to manage the meeting of trains on a local scale, employing a first-come first-served approach. It considers track availability and usage by other trains at the time of booking in a way that ensures that trains only stop in locations where oncoming traffic is able to go around them.

8.4. Planned maintenance

8.4.1. Types of Maintenance

There are 5 types of planned maintenance that need to be considered in the DSM:

1. Possessions: Maintenance, Renewals and Construction;
2. System Closures (Full System Shuts);
3. Infrastructure Inspection;
4. The transport of material or work trains to and from the site of maintenance; and
5. Maintenance on the move, e.g., rail grinding

From a capacity modelling perspective, the main distinction between these types of maintenance is whether they prevent network Train Paths and/or rail assets from being used for train traffic, or not.

Possessions, system closures and maintenance on the move events occupy track resources for a predetermined amount of time. They are modelled explicitly by applying a schedule of track maintenance events that identifies which track assets are unavailable at what time and for how long. The DSM applies the time allocation for the activities monthly.

The transport of material or work trains to and from site and maintenance on the move activities are scheduled to occur as required and could impact Train Paths.

8.4.2. Data – Planned Maintenance and System Shuts

The data sets for below rail planned maintenance and full system shuts used in the DSM was provided by AN and represents the actual, planned and future CQCN maintenance calendars. The data represented:

- forecasts as agreed with the Rail Industry Group for FY23; and
- forecast assumptions for FY24 through to FY27 using the data from FY23.

The planned maintenance and system shut data does not include unplanned maintenance, emergency maintenance, or maintenance on the move, all of which are captured separately and represented as General Delays, using historical data.

Planned maintenance is broken down to a track section level in the DSM.

The planned maintenance for each Financial Year of the capacity period for each Coal System, main line and branch line is summarised in **Appendix B.**

8.4.3. Possessions

Possessions are the temporary closure and/or occupation by AN on part of the Rail Infrastructure for the purposes of carrying out work on or in the proximity of the Rail Infrastructure which may affect the safety of any person or property. In real-life operations, only part of the Possessions for a Financial Year is known ahead of its start. Additional possessions are added as the need for works on specific assets arises. In the DSM, the look-ahead for train dispatch and running is short enough that both long and short term planned possessions can be assumed to be known at the time needed, therefore they are all included in the maintenance calendar.

Where possessions occur on one track in a duplicated section, the DSM allows the remaining track to be occupied for both up and down traffic.

In the DSM, planned maintenance events will commence whether a train is on that section of track or not. If a train is occupying the track the DMS allows it to move off. After that, the DSM does not allow another train to occupy the section of track until the planned maintenance activity is complete.

Planned maintenance events can occur in the DSM whilst the track is experiencing a failure. As failures are triggered by a train passing over the track, this case implies that there is a train on the track in that moment. The DSM will allow the failure to run and end independently of the planned maintenance, and let the train go away in either case.

8.4.4. Full System Shuts (FSS)

FSSs are pre-planned periods for which all traffic in a Coal System is shut down in order to allow for major works on a variety of assets in multiple locations. The duration of such events ranges from 36 to 108 hours at a time. During such events, trains are typically stowed at rail yards, balloon loops, and other parts of the network. The exact planning of locations and timing depends on the works of the individual closure.

FSSs are modelled as planned maintenance events that stop the travel of trains and the dispatch of train services to any mines. In addition, all ILs of all terminals in the respective Coal System are made unavailable for the duration of the closure (mainlines only). In Blackwater if there is an FSS that does not impact common infrastructure utilised by Moura, then Moura will be able to continue to operate. The implementation of stowage and the related staggered shutdown and restart of operations is described in **Section 9.4 Stowage.**

For a FSS, the DSM assumes a train is not dispatched if travel intersects a FSS based on a minimum travel time. For each Coal System a multiplier of 1.5 of minimum travel time is used to account for any delays.

8.4.5. Infrastructure Inspection

Infrastructure inspections are carried out using a hi rail vehicle, a car fitted with wheels that allow the car to travel on the rail infrastructure. These inspections are scheduled and the DSM has assumed the section of the track is deemed unavailable for coal services during the time when hi rail is on the section. Historical data of actual movement track possessions and timestamps were analysed.

8.4.6. Transport material or work trains to and from the site of maintenance

In practice, it is typical for moving equipment to be scheduled around coal and other services.

8.4.7. Maintenance on the move

The predicted schedule for maintenance on the move is not included in the maintenance calendar described in this section. While technically distinct from possessions, they both generate the same capacity outcome in terms of the inability of the DSM to schedule Rail Jobs.

9. Above Rail Operations

9.1. Consists and Fleets

Assumptions are made for the number and type of trains available in each coal system to reflect the expected fleet sizes required to meet the demand. This may differ from the amount allocated by each Above Rail operator to meet their Above Rail Committed Capacity. A consist type is applied to each origin/destination as per historical data and Access Agreements.

Train consists are classified as either diesel or electric. Diesel consists can access the whole CQCN while electric consists can only access the electrified parts of the CQCN, see **Section 4.4 Electrification.** Diesel and electric locomotives have different maintenance and provisioning requirements.

Consist lengths, and hence Payloads, also vary from Coal System to Coal System, and also within a given Coal System. Consist length is not considered directly in the DSM however is accounted for through the varying origin/destination groupings and relevant Above Rail operators. The DSM determines Payloads for TLO related activities based on historical data, as described **in Section 6.4 Payloads.**

Consists are grouped into fleets based on their Above Rail operator, their motive power, the Coal System they are based in (as defined by the terminals they service), and the yard where they are maintained and provisioned.

The DSM does not include the temporary transfer of consists of one Coal System's fleet to another to accommodate demand fluctuations between Coal Systems. All consists stay based in the Coal System they are defined in while allowing travel between Coal Systems. For example, Blackwater Coal System-based consists can travel to Goonyella Coal System TLOs for haulage to Gladstone Port, but they do not load at a Blackwater or Goonyella Coal Systems TLO for haulage to the Port of Hay Point. Further, it is assumed that Moura Coal System fleet consists service only the Moura Coal System TLOs.

The number of consists in each fleet is considered in the following ways within the DSM:

1. When assessing the DNC, the capacity should not be constrained by the current number of consists (as DNC is a measure of maximum number of Train Paths for the Rail Infrastructure), and so the number is artificially inflated, under the assumption that the Above Rail operators will provide the consists needed to realise the DNC.
2. When inflating the consist numbers, which can increase DNC, the cycle and turnaround time are considered, to ensure the number of consist impacts do not materially exceed what happens in practice.

Haulage from a TLO to a terminal can only be assigned to consists in fleets for which the Above Rail operator has a haulage contract. Ad-hoc services with an alternate Above Rail operator are not included in the DSM. In some instances, the haulage task is contracted to more than one fleet. In this case, the proportion of haulage by fleet is not input to the DSM, but rather is an output, as dictated by fleet availability at dispatch.

9.2. Train Cycles

In general, train cycles typically proceed (standard) as follows:

- Dispatch from Yard (Pring, Jilalan, Nebo, Callemondah, BRC);
- Travel empty to TLO;
- Load at TLO;
- Travel loaded to IL;

- Unload; and
- Travel empty to yard for possible provisioning and/or maintenance, then dispatch.

Exceptions to the typical train cycles are described in **Section 9.3 Non-standard Cycles.**

Throughout train cycles, consists obey all necessary pathing and separation rules relevant to their network locations.

9.2.1. Planned maintenance

Planned maintenance activities include examinations/inspections, unit train maintenance, trade staff attendance, provisioning and cab cleaning. Each activity is described generally with a frequency, duration, capacity to service multiple train consists simultaneously, and any restriction on working hours. This is based on information provided by the Above Rail operators. Maintenance activities are all assumed to take place at the rail depots at which the fleet is based, as per **Section 4.6 Rail Depots.**

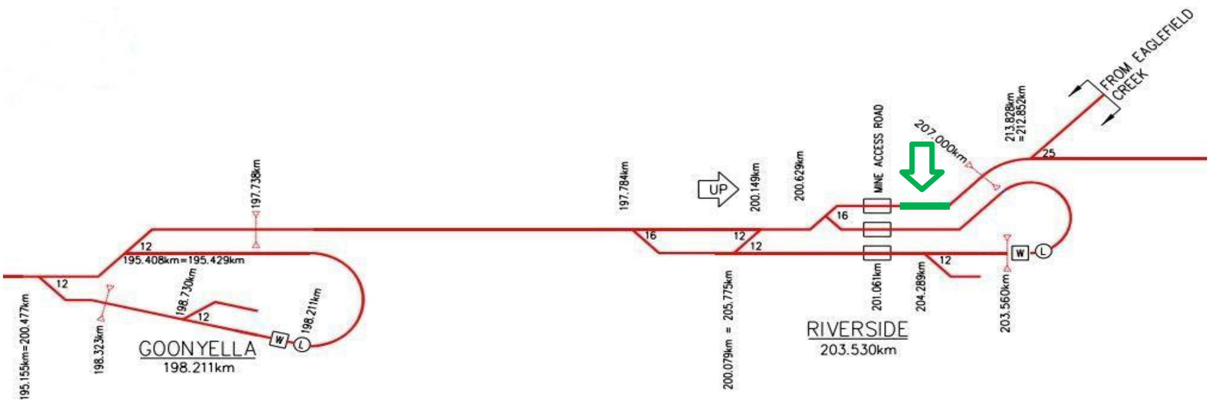
It is noted that planned maintenance affects the availability of consists, and hence only contributes to system performance when testing scenarios with actual consist numbers. When testing capacity scenarios, the number of consists in each Coal System is increased artificially so that the fleet size is not a constraint, avoiding the need to model availability constraints.

9.2.2. Crew changes

At various stages in this cycle, crew changes will take place. These occur most commonly at yards, TLOs and/or staging points such as Coppabella, Bluff and Kabra, but actual locations depend on the individual cycle. All crew changes involve the application of stopping and starting time allowances and a time for the actual crew change. Crew change times are different when they occur within a yard. **Appendix I** has the detailed information on times for each location.

Crew changes for Pring based services travelling into the Goonyella Coal System (i.e., GAPE Coal System services) occur on the track indicated in **figure 14**.

Figure 14: Riverside crew change location



9.3. Non-Standard Cycles

9.3.1. General

Exceptions to the standard train cycle identified in **section 9.2** include:

- [redacted]

[redacted]

- Trains that have unloaded at the following locations do not return to the Callemondah yard until the end of their following cycle; instead, these trains are dispatched from their unload point;
  - WICET;
  - Rio Tinto Aluminium;
  - Fisherman’s Landing;
  - Stanwell Powerhouse (in the DSM, trains that unload at Stanwell Powerhouse then return to Bluff to be dispatched); and

[redacted]

- Most loaded trains passing through Callemondah are provisioned while loaded before unloading at RGTCT;
- There is no provisioning of trains at the WICET balloon loop or at the Stanwell Powerhouse;
- WICET trains only carry out one cycle before being allocated back to Callemondah for provisioning; and
- Further specific occurrences of non-standard cycles are listed in **section 8.**

9.3.2. NQXT trains for Riverside, Goonyella, and Moranbah North

Entry to the Riverside, Goonyella and Moranbah North balloon loops is from the south only. NQXT trains for the Riverside, Goonyella and Moranbah North TLOs must travel south past the balloon loop entry, change ends, and then reverse into the loop. Similarly, when the loaded train departs these balloon loops, the train must travel south until it has cleared the balloon loop, then change ends and return to NQXT. These manoeuvres take place on the North Goonyella Junction to Newlands Junction branch line, with an average delay of around 30 minutes.

9.3.3. Other Considerations

The DSM has made assumptions that are non-standard for the following Above Rail train cycles:

[redacted]

9.4. Stowage

In actual operations, consists are stowed in suitable locations during FSS, typically rail yards, balloon loops, and on the network, as there are insufficient roads at the main rail yards to store all consists. Stowage locations are customised to the specific works of each FSS to allow a quick return to normal operation, so their planning varies between individual FSSs.

Therefore, the DSM does not explicitly implement stowage procedures. Instead, it simulates their effects as follows:

- Trains are not dispatched to a mine if their predicted travel to the mine will coincide with a scheduled FSS;
- For a FSS, the DSM assumes a train is not dispatched if travel intersects a FSS based on a minimum travel time. For each system a multiplier of 1.5 of minimum time is used to account for any delays;
- Already dispatched trains are allowed to travel up until the beginning of a shut, and are then stopped at strategic locations, forcing them to queue on the network. This captures the staggered restart outcome of well-organised stowage; and
- An additional look-ahead for shuts of 48 hours is applied for cross-system train services from the Newlands Coal System to Goonyella Coal System mines. This is done to ensure that the trains have enough time to return from the mine, and do not become trapped due to a Newlands Coal System shut, effectively imposing a Goonyella Coal System FSS.

Appendix J has detailed information by month, mine and terminal level of dwell times.

10. System Delays

Large force majeure events such as infrequent extreme weather events that disrupt operations in part of the supply chain (e.g. cyclones) are not included in the DSM and are removed from relevant data sets. These large force majeure events are not modelled. However, all smaller events that may be classified as force majeure for commercial purposes, are captured as General Delay data and included in the model assumptions.

Catastrophic equipment and infrastructure failures are not included in the DSM. An example of this is the washout of the dual track truck on the Sarina Range caused by rainfall associated with Cyclone Debbie in March 2017.

10.1. General Delays

At times, trains must fully stop due to breakdowns, failures and faults that occur within the supply chain (Faults).

These Faults may be due to various reasons such as rollingstock defects, track defects, signal failures, telemetry failures, objects on the track, etc. These stops are recorded as delays (Delays). Several trains may be delayed by the same Fault.

When considering Delays in the DSM, Fault events need to be generated, with the DMS then determining the consequential Delay impact of these faults, i.e., how many trains are delayed, and for how long. That is, Faults are a DSM input, and Delays are a DSM output. General delays are any delays above the assumed SRT.

Historical data on delays that impact train services were analysed and the total delay duration calculated through the DSM. The delay frequency TTF was then back calculated to closely match actual data outputs. Distributions were then applied and manually calculated to determine a breakdown of delays to Above Rail, Below Rail and Other.

Delay data was filtered to use only those Delays that are not explicitly captured elsewhere in the DSM. For instance, Temporary Speed Restrictions (TSRs) are explicitly modelled (see **Section 10.3 Temporary Speed Restrictions)**, and so Delays due to TSRs were not included in the analysis.

Similarly, Delays due toTLOs and ILs were excluded, as were Delays due to large force majeure events.

Faults are represented in the DMS as *Track Failures* that only occur when a train is on the track, and hence are a property of the track sections and the distance travelled by each train. The inputs include distributions that describe:

- the number of times a track section is crossed between Faults; and
- the duration of the Faults.

10.2. Crew Change Delays

Crew change delays are handled separately from other delays as they are attached to specific activities (crew changes) and their locations. Crew change delays are delays on top of the regular train crew change durations provided by the Above Rail operators. i.e. additional to the planned crew change times.

Historical data from January 2020 to December 2021, along with previous years data, was analysed for each specific duration value and count, individual probability and cumulative probability was determined. The average crew change delay duration from the individual durations and probability values for all data sets were then calculated.

Crew change delays are applied **at the end** of the modelled crew changes. The train then waits the delay length at the crew change location before moving off as normal. Each crew change has:

- a chance to delay the train after completion: 73% of historical crew changes incur some delay; and
- the average crew change delay duration is 12.4 minutes.

10.3. Temporary Speed Restrictions

Occasionally, circumstances will require the placement of Temporary Speed Restrictions (TSRs) on different track sections. When a TSR is in place, trains must travel at a slower speed across the relevant speed-restricted length, effectively adding extra time to the SRT for the relevant section. This extra time consists of:

- the time it takes the train to decelerate to the lower speed;
- the time spent travelling the restricted length at the lower speed; and
- the time it takes the train to accelerate back up to the usual speed for that section.

Historical TSR data for the period between 1 January 2020 and 31 December 2021 and previous years data was analysed to derive DSM inputs that would generate TSR events. Only events with a duration of between 1 and 365 days was used. Geographic and seasonal factors impact TSR's.

To account for these factors, each track section is split into four (4) groups based upon their total time under TSRs: no TSRs, and low, mid and high impact TSRs. Each of the three (3) groups of sections with TSRs was given their own:

- time between TSR events on individual track sections (Time between Failures (TBF));
- Duration of individual TSR events (Time to repair (TTR)); and
- Time penalty applied to consists that traverse the impacted sections during the event.

Exponential distributions were then applied to the TBF and TTR data for each of the three groups of TSR's.
The most appropriate distribution was then applied to the Time Penalty data.

TSR's were applied in the DSM by month and per track section (where the historical data showed a TSR had been applied). A summary of these parameters is provided in **table 11.**

When TSRs are applied to a double track section, there is an equal probability (1/3) of the TSR being applied to the Up Track, Down Track, or Both Tracks, regardless of whether the section falls into the Low, Mid, or High TSR group.

Table 11: Temporary Speed Restriction parameters

Description	Expected Value
Low TSR	
Number of sections TSR applied	122
Time Between events per section (TBF) (mins)	115,000
Event Duration (TTR) (mins)	33,000
Individual consist time penalty (mins)	2.5
Mid TSR	
Number of sections TSR applied	51
Time Between events per section (TBF) (mins)	53,000
Event Duration (TTR) (mins)	37,000
Individual consist time penalty (mins)	2.1
High TSR	
Number of sections TSR applied	10
Time Between events per section (TBF) (mins)	38,000
Event Duration (TTR) (mins)	39,000
Individual consist time penalty (mins)	2.2

10.4. Cancellations

A Train Service can be cancelled in practice for a number of reasons and the cause of each cancellation is allocated to either Above Rail, Below Rail or Other (includes Mine, Port and Force Majeure).

Cancellation data was reviewed for the period July 2019 to January 2022 along with previous years historical data. The data was reviewed and the status of each cancellation of each Train Service allocated to a cancelled status, terminated status or an arrived status. The methodology used to calculate the cancellation percentage probability is:

$$\boldsymbol{Cancellation}\ \%\ (\boldsymbol{probability}) = \frac{\boldsymbol{Cancelled} + \boldsymbol{Terminated}}{(\boldsymbol{Cancelled} + \boldsymbol{Terminated} + \boldsymbol{Arrived})}$$

The variation in cancellation was analysed and the probability for each record was calculated for the status of the Train Services. Data for each Coal System was aggregated and separately analysed. The cancellation percentage was analysed both at annual level and at monthly level. The absolute change in the probability was also calculated.

A probability of cancellation of a Train Service at every dispatch is specified for each Coal System. A cancellation is considered to occur after a train has been assigned a Rail Job and a dispatch path.

The consequence of a cancellation is that the train and the Rail Job are delayed from running again for a given duration. Cancellations are assumed to delay a particular Rail Job from being serviced for the separation time between paths from the dispatch location.

Table 12 shows the cancellations assumptions used in the DSM per Coal System.

Table 12 – Cancellation Assumptions

Coal System	Total Cancellation assumption %	Below Rail Cancellation %	Above Rail Cancellation %	Other Cancellation %
Newlands/GAPE	11.5	1.3%	4.9%	5.3%
Goonyella	16.3	2%	6.3%	8%
Blackwater	16	1.7%	5.8%	8.5%
Moura	19.4	2.8%	8%	8.6%

Note: (1) The mean of total monthly cancellation percentages using data covering 1-Jul-2019 to 31-Dec-2021 (2) The number of cancellation due to below rail (above rail, other causes) divided by the number of total cancellations, multiplied by the mean of total monthly cancellation %s using data from 1-Jul-2019 to 31-Dec-2021.

11. Non-coal traffic

11.1. Overview

Aurizon Network is obliged to provide access to non-coal traffic under Access Agreements, Passenger Priority Obligation or Preserved Train Path Obligations, including the obligations under sections 265 and 266 of the Transport Infrastructure Act, 1994 (Qld). Aurizon Network must prioritise Timetabled Traffic services ahead of Cyclic Traffic (i.e., coal traffic, unless the unloading destination is a domestic power station). There has been no change to maximum preserved path allocations since the 2021 SOP.

The DMS includes non-coal traffic that runs on a regular weekly schedule and is prioritised over all coal traffic. The DSM does not include non-coal traffic that runs on an ad hoc basis.

Contracted and preserved Train Path data used for non-coal services current as at mid-May 2022. The DSM considers delays, maintenance, FSS, etc of below rail impacts on the Coal System where non-coal operates however does not allow for any maintenance, provisioning, and trips to/from rail yards and Above Rail delays. The DSM assumes these activities typically occur outside the AN Rail Infrastructure.

The DSM allows for entry and exit paths into the Coal System that may include Private Infrastructure.

Non-coal timetabled traffic includes:

- Passenger trains;
- Rockhampton Tilt Train (between Brisbane and Rockhampton);
- Spirit of Queensland (between Brisbane and Cairns);
- Spirit of the Outback (between Brisbane and Longreach, via Emerald);
- Livestock;
- Freight;
- Limestone; and
- Grain.

In the DSM, non-coal traffic types run to their own:

- Timetable, as documented in **Appendix C – Non-coal traffic timetables.**
- Sectional Running Times, as documented in **Appendix A – Sectional Running Times.**

11.2. Non-passenger traffic

Timetables were provided by AN. Where appropriate, all timetables were adjusted to fit within an MTP-style plan, for compatibility with path dispatch within the DSM.

Timetables are input to the DSM as regular weekly schedules with a start junction, an end junction, and a departure time. A path aligned with each timetabled departure is reserved ahead of time to ensure the timetable is met. Once injected into the network, non-passenger traffic then interacts with coal traffic.

SRTs for non-passenger traffic were calculated from the scheduled section run times given in the data provided. Distinct SRT inputs were derived for each of the following traffic types:

- Limestone;
- Livestock and Freight; and
- Grain.

11.3. Passenger traffic

Passenger traffic travels on:

- the Blackwater Coal System on the North Coast Line between Parana (at Gladstone) and Rocklands;
- the Blackwater Coal System on the Central West Line between Rocklands and Nogoa; and
- the Newlands Coal System on the North Coast Line between Durroburra and Kaili.

Timetables were sourced from the published latest timetables.

11.3.1. Blackwater Coal System

The DSM ensures priority for passenger traffic over all other types of traffic by preserving paths without actually dispatching a train. The key assumption here is that in any potential interaction with other traffic,the passenger train would be given priority. Most passenger traffic travels faster than other kinds of traffic, so it is necessary to remove the preceding path as well. Timetables are input to the DSM as:

- a start junction (the path dispatch location);
- an end junction;
- a departure time (as at the location of the path dispatcher); and
- the number of paths to remove.

11.3.2. Newlands Coal System

The Spirit of Queensland travels in the Newlands Coal System at a location upstream of the path dispatcher at Pring, so this traffic is input as a regular timetable, similar to other non-passenger traffic in **Section 11.3** above. This traffic runs to its own SRTs (see **SRT Type PASSENGER** in **Appendix A – Sectional Running Times).**

Appendix A: Sectional Running Times

This Appendix contains input Sectional Running Times for:

- Coal Trains in the CQCN; and
- Non-coal trains in the CQCN

A1 Coal trains

Newlands and GAPE Coal Systems

The following tables of SRTs for Empty and Loaded running are for Pring-based diesel trains travelling in the Newlands and GAPE Coal Systems. Only Sections that Pring-based trains travel on are included.

Location from	Location to	Empty	Loaded
Newlands Trunk			
Abbot Point	BRC Junction	7	11
BRC Junction	Kaili	6	6
Kaili	Durroburra	8	10
Durroburra	Pring	11	3
Pring	Buckley	5	6
Buckley	Armuna	13	15
Armuna	Aberdeen	12	10
Aberdeen	Binbee	12	9
Binbee	Briaba	14	15
Briaba	Almoola	16	31
Almoola	Collinsville	6	6
Collinsville	McNaughton Junction	4	4
McNaughton Junction	Sonoma Junction	7	6
Sonoma Junction	Birralee	10	10
Birralee	Cockool	15	16
Cockool	Havilah	15	18
Havilah	Newlands Junction	13	13
Northern missing link (GAP)			
Newlands Junction	Leichardt Range	8	7
Leichhardt Range	Byerwen Junction	11	12
Byerwen Junction	Suttor Creek	11	11
Suttor Creek	Eaglefield Creek	21	24
Eaglefield Creek	North Goonyella Junction	8	8
North Goonyella Branch			
North Goonyella	Junction Riverside	15	14
Riverside	Goonyella	6	7
Goonyella	Moranbah North Junction	5	4
Moranbah North Junction	Wotonga	16	15
West Goonyella Branch			
Wotonga	Moranbah	19	15
Moranbah	Caval Ridge Junction	3	5

Location from	Location to	Empty	Loaded
West Goonyella Branch			
Caval Ridge Junction	Villafranca	13	17
Villafranca	Mount Mclaren	18	22
Mount Mclaren	Blackridge	21	23
Blackridge	Blair Athol Junction	15	21
Wotonga to Coppabella			
Wotonga	Isaac Plains Junction	3	2
Isaac Plains Junction	Mallawa	3	3
Mallawa	Carborough Downs Junction	8	12
Carborough Downs Junction	Broadlea	5	5
Broadlea	Coppabella	13	19
South Goonyella Branch			
Coppabella	Moorvale Junction	5	16
Moorvale Junction	Ingsdon	2	4
Ingsdon	Millennium Junction	5	8
Millennium Junction	Red Mountain	7	7
Red Mountain	Winchester	9	9
Winchester	Peak Downs	13	12
Peak Downs	Harrow	13	15
Harrow	Saraji	6	8
Saraji	Lake Vermont Junction	16	18
Lake Vermont Junction	Dysart	4	3
Dysart	Stephens	7	7
Stephens	Norwich Park	9	11
Norwich Park	Middlemount Junction	12	17
Mine Spurs			
Blair Athol Junction	Blair Athol	3	2
Byerwen Junction	Byerwen	10	10
Caval Ridge Junction	Caval Ridge	15	12
Lake Vermont Junction	Lake Vermont	11	7
McNaughton Junction	McNaughton	8	6
Middlemount Junction	Middlemount	21	11
Newlands Junction	Newlands	8	9
Riverside	Riverside Balloon	4	1
Sonoma Junction	Sonoma	9	1

Goonyella Coal System

The following tables of SRTs for empty and loaded running are for Jilalan and Nebo-based electric and diesel trains travelling in the Goonyella Coal System.

Location from	Location to	Empty	Loaded
Goonyella Trunk			
Dalrymple Bay	Dalrymple Bay Staging	3	3
Dalrymple Bay Staging	Dalrymple Crossover Points	4	6

Location from	Location to	Empty	Loaded
Goonyella Trunk			
Hay Point	Hay Point Entry	4	8
Hay Point Entry	Dalrymple Crossover Points	9	4
Dalrymple Crossover Points	Praguelands	7	6
Praguelands	Jilalan	6	1
Jilalan	Yukan	7	10
Yukan	Black Mountain	13	19
Black Mountain	Hatfield	12	12
Hatfield	Bolingbroke	12	12
Bolingbroke	Balook	13	14
Balook	Wandoo	7	14
Wandoo	Waitara	11	14
Waitara	Braeside	10	6
Braeside	Mindi	9	14
Mindi	South Walker Junction	7	7
South Walker Junction	Tootoolah	6	6
Tootoolah	Macarthur Junction	4	4
Macarthur Junction	Coppabella	9	5
Coppabella	Broadlea	11	19
Broadlea	Carborough Downs Junction	2	5
Carborough Downs Junction	Mallawa	9	9
Mallawa	Isaac Plains Junction	2	4
Isaac Plains Junction	Wotonga	2	3
South Goonyella Branch			
Coppabella	Moorvale Junction	6	13
Moorvale Junction	Ingsdon	2	2
Ingsdon	Millennium Junction	5	7
Millennium Junction	Red Mountain	6	6
Red Mountain	Olive Downs Junction	6	5
Olive Downs Junction	Winchester	3	3
Winchester	Peak Downs	13	11
Peak Downs	Harrow	13	14
Harrow	Saraji	6	13
Saraji	Lake Vermont Junction	15	22
Lake Vermont Junction	Dysart	4	3
Dysart	Stephens	7	7
Stephens	Norwich Park	9	11
Norwich Park	Middlemount Junction	12	17
Middlemount Junction	Bundoora	2	3
Bundoora	German Creek	4	6
German Creek	Oaky Creek	15	20
Oaky Creek	Lilyvale	13	12
Lilyvale	Gregory Junction	1	2

Location from	Location to	Empty	Loaded
North Goonyella Branch			
Wotonga	Moranbah North Junction	16	17
Moranbah North Junction	Goonyella	4	3
Goonyella	Riverside	4	4
Riverside	North Goonyella Junction	12	15
West Goonyella Branch			
Wotonga	Moranbah	16	16
Moranbah	Caval Ridge Junction	4	3
Caval Ridge Junction	Villafranca	12	16
Villafranca	Mount Mclaren	17	21
Mount Mclaren	Blackridge	21	22
Blackridge	Blair Athol Junction	16	19
Mine Spurs			
South Walker Junction	Bidgerley Junction	5	1
Bidgerley Junction	South Walker (Bidgerley Balloon)	6	2
Bidgerley Junction	Hail Creek	38	30
Blair Athol Junction	Blair Athol	2	3
Carborough Downs Junction	Carborough Downs	9	1
Caval Ridge Junction	Caval Ridge	13	11
Goonyella	Goonyella Balloon	2	1
Isaac Plains Junction	Isaac Plains	5	2
Macarthur Junction	Macarthur (Coppabella Mine)	5	1
Mallawa	Burton	3	1
Middlemount Junction	Middlemount	19	9
Millennium Junction	Millennium	2	2
Moorvale Junction	Moorvale	6	1
Moranbah North Junction	Moranbah North	3	4
North Goonyella Junction	North Goonyella	3	3
Peak Downs	Peak Downs Balloon	5	2
Riverside	Riverside Balloon	4	1
Saraji	Saraji Balloon	1	2

Blackwater Coal System

The following tables of SRTs for empty and loaded running are for Callemondah-based electric and dieseltrains travelling in the Blackwater Coal System and Goonyella Coal System.

Location from	Location to	Empty	Loaded
North Coast Line			
Callemondah	Mount Miller	12	14
Mount Miller	Wiggins Island Junction	2	2
Wiggins Island Junction	Yarwun	1	2
Yarwun	Aldoga	6	7
Aldoga	Mount Larcom	9	12
Mount Larcom	Ambrose	4	4

Location from	Location to	Empty	Loaded
North Coast Line			
Ambrose	Epala	5	7
Epala	Raglan	9	8
Raglan	Marmor	11	10
Marmor	Bajool	8	9
Bajool	Archer	9	10
Archer	Midgee	7	8
Midgee	Rocklands	8	9
Blackwater Trunk			
Rocklands	Gracemere	7	8
Gracemere	Kabra	11	15
Kabra	Warren	6	6
Warren	Wycarbah	11	10
Wycarbah	Westwood	9	10
Westwood	Windah	10	19
Windah	Grantleigh	10	12
Grantleigh	Tunnel	8	9
Tunnel	Edungalba	10	19
Edungalba	Aroona	11	10
Aroona	Duaringa	7	10
Duaringa	Wallaroo	13	15
Wallaroo	Tryphinia	11	10
Tryphinia	Dingo	12	14
Dingo	Umolo	7	8
Umolo	Parnabal	3	4
Parnabal	Walton	8	4
Walton	Bluff	11	13
Bluff	Boonal Balloon Points	9	12
Boonal Balloon Points	Blackwater	12	13
Blackwater	Sagittarius	3	6
Sagittarius	Rangal	5	5
Rangal	Burngrove	7	8
South Goonyella Branch			
Burngrove	Washpool Junction	7	8
Washpool Junction	Crew	1	1
Crew	Mackenzie	12	14
Mackenzie	Fairhill	11	12
Fairhill	Yan Yan	12	13
Yan Yan	Gregory Junction	9	10
Gregory Junction	Lilyvale	2	2
Lilyvale	Oaky Creek Junction	13	15
Oaky Creek Junction	German Creek Junction	16	16
German Creek Junction	Bundoora	2	4
Bundoora	Middlemount Junction	2	2
Middlemount Junction	Norwich Park	14	14
Norwich Park	Stephens	10	12
Stephens	Dysart	8	7
Dysart	Lake Vermont Junction	3	5

Location from	Location to	Empty	Loaded
Rolleston (Bauhinia) Branch			
Rangal	Tikardi	7	6
Tikardi	Boorgoon Junction	5	6
Boorgoon Junction	Kinrola Junction	6	8
Kinrola Junction	Kenmare	23	22
Kenmare	Memooloo	27	34
Memooloo	Starlee	31	30
Starlee	Meteor Downs Junction	17	18
Meteor Downs Junction	Rolleston	8	8
Minerva Branch			
Burngrove	Tolmies	3	2
Tolmies	Comet	23	35
Comet	Yamala	20	24
Yamala	Nogoa	18	21
Nogoa	Minerva Balloon	92	98
Domestic and Export Terminals			
Golding	Gladstone Powerhouse Junction	8	5
Gladstone Powerhouse Junction	Callemondah	10	7
Gladstone Powerhouse	Callemondah	11	2
Wiggins Island	Wiggins Island Staging	8	6
Wiggins Island Staging	Wiggins Island Junction	6	7
Comalco Balloon Junction	Fisherman's Landing	9	6
Stanwell Powerhouse	Warren	5	3
Mine Spurs			
Boonal Balloon Points	Boonal Balloon	3	1
German Creek	German Creek Balloon	5	4
Kinrola Junction	Kinrola	6	4
Lake Vermont Junction	Lake Vermont	12	19
Mackenzie	Ensham	12	10
Oaky Creek Junction	Oaky Creek	6	6
Sagittarius	Curragh	13	11
Yan Yan	Gordonstone Balloon	13	12

Moura Coal System

The following tables of SRTs for empty and loaded running are for Callemondah-based diesel trains travelling in the Moura Coal System.

Location from	Location to	Empty	Loaded
Moura Trunk			
Callemondah	Byellee	8	11
Byellee	Stowe	15	13
Stowe	Graham	5	9
Graham	Stirrat	10	9
Stirrat	Clarke	20	24
Clarke	Fry	10	11

Location from	Location to	Empty	Loaded
Fry	Mount Rainbow	21	24
Mount Rainbow	Dumgree	19	29
Dumgree	Boundary Hill Junction	13	17
Boundary Hill Junction	Annandale	3	1
Annandale	Earlsfield	7	14
Earlsfield	Belldeen	23	23
Belldeen	Moura Mine Junction	21	39
Callide Branch			
Earlsfield	Koonkool	7	5
Koonkool	Dakenba	26	20
Dakenba	Callide Coalfields	17	21
Mine Spurs			
Boundary Hill Junction	Boundary Hill	7	4
Moura Mine Junction	Moura Mine	2	2
Moura Mine Junction	Baralaba Balloon Loop	31	31
Gladstone Surrounds			
Gladstone QAL SDG	South Gladstone	5	7
Parana	Callemondah	11	10
South Gladstone	Parana	7	10

A2 Non-coal Trains

Limestone

The following table of SRTs for up and down running is for diesel trains carrying Limestone and travelling between East End and Fisherman's Landing in the Blackwater Coal System. Only sections that these trains travel on are included.

Location from	Location to	Up	Down
East End Mine	East End Junction	10	10
East End Junction	Aldoga	15	15
Aldoga	Yarwun	9	9
Yarwun	Mt Miller	6	6
Mt Miller	Comalco Junction	3	3
Comalco Junction	Fisherman's Landing Unloader	10	10
Callemondah	Mt. Miller	5	5
Wiggins Island Junction	Yarwun	2	2
Mt Miller	Wiggins Island Junction	4	4
Stowe	Graham	14	14
Byellee	Stowe	6	6
NCL Moura	Byellee	1.65	1.65
Callemondah	NCL Moura	3.11	3.11
Callemondah	Byellee	4.76	4.76

Passenger

The following table of SRTs for up and down running is for the diesel Spirit of Queensland passenger trains travelling in the Newlands Coal System. Only sections that these trains travel on are included.

Location from	Location to	Up	Down
QNIP02	Durroburra	2	2
Durroburra	Kaili	6	6
Kaili	QNIP01	3	3

Freight and Livestock

The following table of SRTs for up and down running is for diesel Freight and Livestock trains travelling in the Blackwater and Newlands Coal Systems. Only sections that these trains travel on are included.

Location from	Location to	Up	Down
Parana	Callemondah	8.7	8.7
Callemondah	Mt Miller	7.6	6
Mt Miller	Yarwun	5.2	4.5
Yarwun	Aldoga	8.3	7.6
Aldoga	Mt Larcom	8	7
Mt Larcom	Ambrose	4	4
Ambrose	Epala	4.6	4.2
Epala	Raglan	5.6	6.4
Raglan	Marmor	7.5	7.4

Location from	Location to	Up	Down
Marmor	Bajool	6.2	7
Bajool	Archer	7	7.5
Archer	Midgee	5.8	5.4
Midgee	Rocklands	5.4	7
Rocklands	Gracemere	9	10
Gracemere	Kabra	4	4
Kabra	Warren	10	11
Warren	Wycarbah	9	10
Wycarbah	Westwood	7	9
Westwood	Windah	9	13
Windah	Grantleigh	10	10
Grantleigh	Tunnel	7	9
Tunnel	Edungalba	11	13
Edungalba	Aroona	8	8
Aroona	Duaringa	8	8
Duaringa	Wallaroo	10	11
Wallaroo	Tryphinia	11	11
Tryphinia	Dingo	11	11
Dingo	Umolo	6	6
Umolo	Parnabal	6	6
Parnabal	Walton	4	4
Walton	Bluff	6	7
Bluff	Boonal Balloon Points	9	8
Boonal Balloon Points	Boonal	1	1
Boonal	Blackwater	9	10
Blackwater	Sagittarius	3	3
Sagittarius	Rangal	4	4
Rangal	Burngrove	6	6
Burngrove	Tolmies	2	2
Tolmies	Comet	17	23
Comet	Yamala	18	19
Yamala	Nogoa	19.5	19.5
QNIP02	Durroburra	1	1
Durroburra	Kaili	7.4	6.4
Kaili	QNIP01	2	2

Grain

The following table of SRTs for up and down running is for diesel Grain trains travelling in the Blackwater and Goonyella Coal Systems. Only sections that these trains travel on are included.

Location from	Location to	Up	Down
Parana	Callemondah	9	9
Callemondah	Mt Miller	9	6
Mt Miller	Yarwun	6	4
Yarwun	Aldoga	8	8

Location from	Location to	Up	Down
Aldoga	Mt Larcom	8	7
Mt Larcom	Ambrose	5	4
Ambrose	Epala	5	4
Epala	Raglan	6	7
Raglan	Marmor	7	7
Marmor	Bajool	7	7
Bajool	Archer	7	7
Archer	Midgee	7	6
Midgee	Rocklands	5	7
Rocklands	Gracemere	9	10
Gracemere	Kabra	4	4
Kabra	Warren	10	11
Warren	Wycarbah	9	10
Wycarbah	Westwood	7	9
Westwood	Windah	9	13
Windah	Grantleigh	10	10
Grantleigh	Tunnel	7	9
Tunnel	Edungalba	11	13
Edungalba	Aroona	8	8
Aroona	Duaringa	8	8
Duaringa	Wallaroo	10	11
Wallaroo	Tryphinia	11	11
Tryphinia	Dingo	11	11
Dingo	Umolo	6	6
Umolo	Parnabal	6	6
Parnabal	Walton	4	4
Walton	Bluff	6	7
Bluff	Boonal Balloon Points	9	8
Boonal Balloon Points	Boonal	1	1
Boonal	Blackwater	9	10
Blackwater	Sagittarius	3	3
Sagittarius	Rangal	4	4
Rangal	Burngrove	6	6
Burngrove	Tolmies	2	2
Tolmies	Comet	17	23
Comet	Yamala	18	19
Yamala	Nogoa	20	20
Yukan	Black Mountain	12	16
Black Mountain	Hatfield	11	13
Hatfield	Bolingbroke	9	9
Bolingbroke	Balook	13	13
Balook	Wandoo	9	9
Wandoo	Waitara	12	14

Location from	Location to	Up	Down
Waitara	Braeside	6	6
Braeside	Mindi	11	11
Mindi	South Walker Junction	6	6
South Walker Junction	Tootoolah	5	5
Tootoolah	Macarthur Junction	4	4
Macarthur Junction	Coppabella	5	6
Coppabella	Broadlea	13	13
Broadlea	Carborough Downs Junction	3	4
Carborough Downs Junction	Mallawa	7	11
Mallawa	Isaac Plains Junction	3	5
Isaac Plains Junction	Wotonga	2	3
Wotonga	Moranbah	13	14
Moranbah	Caval Ridge Junction	3	3
Caval Ridge Junction	Villafranca	15	15
Villafranca	Mt McLaren	16	18

Appendix B: Summary of Planned Track Maintenance

Below Rail planned maintenance for FY23 was supplied by AN and consistent with RIG (where applicable) approvals. The same hours have then been used for FY24 to FY27.

FY23 – FY27 Maintenance hours by mainline and branch line

Includes Network shut, Hi-Rail inspection and Below Rail Planned Mtce hrs + minor mcte

Main / Branch Line	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
B.L. - Blair Athol Mine to Wotonga	12	7	14	16	23	6	18	5	13	6	18	10	**148**
B.L. - Burngrove to Bluff	28	26	136	24	13	66	17	21	32	27	18	32	**439**
B.L. - Callemondah to Port of Gladstone	139	223	149	36	139	124	431	150	56	92	122	446	**2,107**
B.L. - Coppabella to Wotonga	-	3	226	7	496	12	17	187	64	13	103	36	**1,165**
B.L. - Earlsfield to Callide	18	10	10	8	2	3	2	2	5	3	5	6	**73**
B.L. - Earlsfield to Dumgree	5	1	7	13	8	20	8	-	2	12	6	2	**83**
B.L. - Earlsfield to Moura	18	12	9	9	15	4	13	8	7	12	18	8	**133**
B.L. - Gregory Junction to Coppabella	157	34	42	52	163	71	33	16	89	48	69	67	**841**
B.L. - Gregory Mine to Burngrove	12	1	4	66	33	13	2	14	6	13	7	33	**204**
B.L. - Hail Creek Mine to South Walker Creek Junction	1	-	1	1	2	9	1	4	2	11	-	-	**31**
B.L. - Jilalan to Port of Hay Point	8	32	4	20	7	19	13	15	57	54	25	35	**289**
B.L. - Minerva Mine to Burngrove	16	14	25	9	37	17	12	5	13	10	14	13	**184**
B.L. - Newlands Mine to Collinsville	14	11	4	8	3	4	9	6	10	20	8	10	**108**
B.L. - North Goonyella Junction to Newlands Junction	1	1	3	1	13	1	7	2	-	1	-	1	**30**
B.L. - North Goonyella Mine to Wotonga	7	6	1	2	7	2	3	2	71	1	2	4	**108**
B.L. - Pring to Abbot Point	2	2	7	3	3	3	4	3	9	8	4	2	**49**
B.L. - Rolleston Mine to Rangal	18	25	20	380	27	11	61	3	9	13	24	20	**610**
M.L. - Bluff to Callemondah	332	433	447	337	351	149	345	497	174	391	576	360	**4,392**
M.L. - Collinsville to Pring	3	19	125	11	3	8	8	13	80	112	9	12	**402**
M.L. - Coppabella to Jilalan	263	304	259	149	88	30	90	68	472	97	302	77	**2,200**
M.L. - Dumgree to Callemondah	27	37	12	6	15	97	12	17	9	83	25	23	**364**
Total	**1,079**	**1,201**	**1,502**	**1,158**	**1,448**	**669**	**1,106**	**1,039**	**1,182**	**1,025**	**1,355**	**1,197**	**13,960**

FY23 – FY27 Maintenance hours by Coal System

Includes Network shut, Hi-Rail inspection and Below Rail Planned Mtce hrs

Coal System	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
Blackwater	470	635	703	833	493	298	864	689	287	535	702	854	**7,362**
Goonyella	452	391	554	265	834	161	180	297	773	234	523	234	**4,900**
Moura	142	146	111	42	114	199	36	28	25	118	111	88	**1,160**
Newlands	15	29	133	18	6	11	26	24	97	138	19	21	**537**
Total	**1,079**	**1,201**	**1,502**	**1,158**	**1,448**	**669**	**1,106**	**1,039**	**1,182**	**1,025**	**1,355**	**1,197**	**13,960**

Appendix C: Non-coal Traffic Timetables

Summary of non-coal traffic timetables

Traffic type		From	To	Number of modelled services per week
Passenger	Rockhampton Tilt	Gladstone	Rocklands	8
		Rocklands	Gladstone	8
	Spirit of QLD	Gladstone	Rocklands	8
		Rocklands	Gladstone	8
		Durroburra	Kaili	5
		Kaili	Durroburra	5
	Spirit of Outback	Gladstone	Nogoa	2
		Nogoa	Gladstone	2
Limestone		East End mine	Fisherman's Landing	42
		Fisherman's Landing	East End mine	42
		Graham	Fisherman's Landing	14
		Fisherman's Landing	Graham	14
Livestock		Parana	Rocklands	9
		Rocklands	Parana	9
		Rocklands	Nogoa	8
		Nogoa	Rocklands	8
		Durroburra	Kaili	4
		Kaili	Durroburra	4
Freight		Parana	Rocklands	63
		Rocklands	Parana	64
		Parana	Mt Miller siding	2
		Mt Miller siding	Rocklands	2
		Rocklands	Nogoa	2
		Nogoa	Rocklands	2
		Durroburra	Kaili	37
		Kaili	Durroburra	36
Grain		Parana	Rocklands	3
		Rocklands	Parana	3
		Rocklands	Nogoa	3
		Nogoa	Rocklands	3
		Yukan	Mt McLaren	4
		Mt McLaren	Yukan	4

Non-coal traffic timetable inputs

Route	Departure day and time
Spirit of Queensland Merinda – Wathana	Sun 07:20
Spirit of Queensland Merinda – Wathana	Tue 07:20
Spirit of Queensland Merinda – Wathana	Wed 07:20
Spirit of Queensland Merinda – Wathana	Thu 07:20
Spirit of Queensland Merinda – Wathana	Sat 07:20
Spirit of Queensland Wathana – Merinda	Sun 17:07
Spirit of Queensland Wathana – Merinda	Mon 17:07
Spirit of Queensland Wathana – Merinda	Wed 17:07
Spirit of Queensland Wathana – Merinda	Thu 17:07
Spirit of Queensland Wathana – Merinda	Fri 17:07
East End – Fisherman's Landing	Sun 03:17
East End – Fisherman's Landing	Mon 03:17
East End – Fisherman's Landing	Tue 03:17
East End – Fisherman's Landing	Wed 03:17
East End – Fisherman's Landing	Thu 03:17
East End – Fisherman's Landing	Fri 03:17
East End – Fisherman's Landing	Sat 03:17
East End – Fisherman's Landing	Sun 07:17
East End – Fisherman's Landing	Mon 07:17
East End – Fisherman's Landing	Tue 07:17
East End – Fisherman's Landing	Wed 07:17
East End – Fisherman's Landing	Thu 07:17
East End – Fisherman's Landing	Fri 07:17
East End – Fisherman's Landing	Sat 07:17
East End – Fisherman's Landing	Sun 11:41
East End – Fisherman's Landing	Mon 11:41
East End – Fisherman's Landing	Tue 11:41
East End – Fisherman's Landing	Wed 11:41
East End – Fisherman's Landing	Thu 11:41
East End – Fisherman's Landing	Fri 11:41
East End – Fisherman's Landing	Sat 11:41
East End – Fisherman's Landing	Sun 15:57
East End – Fisherman's Landing	Mon 15:57
East End – Fisherman's Landing	Tue 15:57
East End – Fisherman's Landing	Wed 15:57
East End – Fisherman's Landing	Thu 15:57
East End – Fisherman's Landing	Fri 15:57
East End – Fisherman's Landing	Sat 15:57
East End – Fisherman's Landing	Sun 19:57

Route	Departure day and time
East End – Fisherman's Landing	Mon 19:57
East End – Fisherman's Landing	Tue 19:57
East End – Fisherman's Landing	Wed 19:57
East End – Fisherman's Landing	Thu 19:57
East End – Fisherman's Landing	Fri 19:57
East End – Fisherman's Landing	Sat 19:57
East End – Fisherman's Landing	Sun 23:13
East End – Fisherman's Landing	Mon 23:13
East End – Fisherman's Landing	Tue 23:13
East End – Fisherman's Landing	Wed 23:13
East End – Fisherman's Landing	Thu 23:13
East End – Fisherman's Landing	Fri 23:13
East End – Fisherman's Landing	Sat 23:13
Fisherman's Landing – East End	Sun 01:00
Fisherman's Landing – East End	Mon 01:00
Fisherman's Landing – East End	Tue 01:00
Fisherman's Landing – East End	Wed 01:00
Fisherman's Landing – East End	Thu 01:00
Fisherman's Landing – East End	Fri 01:00
Fisherman's Landing – East End	Sat 01:00
Fisherman's Landing – East End	Sun 05:13
Fisherman's Landing – East End	Mon 05:13
Fisherman's Landing – East End	Tue 05:13
Fisherman's Landing – East End	Wed 05:13
Fisherman's Landing – East End	Thu 05:13
Fisherman's Landing – East End	Fri 05:13
Fisherman's Landing – East End	Sat 05:13
Fisherman's Landing – East End	Sun 09:32
Fisherman's Landing – East End	Mon 09:32
Fisherman's Landing – East End	Tue 09:32
Fisherman's Landing – East End	Wed 09:32
Fisherman's Landing – East End	Thu 09:32
Fisherman's Landing – East End	Fri 09:32
Fisherman's Landing – East End	Sat 09:32
Fisherman's Landing – East End	Sun 14:00
Fisherman's Landing – East End	Mon 14:00
Fisherman's Landing – East End	Tue 14:00
Fisherman's Landing – East End	Wed 14:00
Fisherman's Landing – East End	Thu 14:00
Fisherman's Landing – East End	Fri 14:00
Fisherman's Landing – East End	Sat 14:00

Route	Departure day and time
Fisherman's Landing – East End	Sun 18:19
Fisherman's Landing – East End	Mon 18:19
Fisherman's Landing – East End	Tue 18:19
Fisherman's Landing – East End	Wed 18:19
Fisherman's Landing – East End	Thu 18:19
Fisherman's Landing – East End	Fri 18:19
Fisherman's Landing – East End	Sat 18:19
Fisherman's Landing – East End	Sun 22:00
Fisherman's Landing – East End	Mon 22:00
Fisherman's Landing – East End	Tue 22:00
Fisherman's Landing – East End	Wed 22:00
Fisherman's Landing – East End	Thu 22:00
Fisherman's Landing – East End	Fri 22:00
Fisherman's Landing – East End	Sat 22:00
Parana – Rocklands	Mon 04:15
Parana – Rocklands	Tue 04:15
Parana – Rocklands	Wed 04:15
Parana – Rocklands	Fri 04:15
Parana – Rocklands	Sat 04:15
Rocklands – Parana	Mon 19:16
Rocklands – Parana	Tue 19:16
Rocklands – Parana	Wed 19:16
Rocklands – Parana	Fri 19:16
Rocklands – Parana	Sat 19:16
Rocklands – Nogoa	Mon 05:04
Rocklands – Nogoa	Tue 05:04
Rocklands – Nogoa	Thu 05:04
Rocklands - Nogoa	Fri 05:04
Nogoa – Rocklands	Mon 11:08
Nogoa – Rocklands	Tue 11:08
Nogoa – Rocklands	Thu 11:08
Nogoa – Rocklands	Fri 11:08
Parana – Rocklands	Sun 01:02
Parana – Rocklands	Sun 02:47
Parana – Rocklands	Sun 14:36
Parana – Rocklands	Sun 16:48
Parana – Rocklands	Sun 19:17
Parana – Rocklands	Mon 05:06
Parana – Rocklands	Mon 06:57
Parana – Rocklands	Mon 11:34
Parana – Rocklands	Tue 05:06

Route	Departure day and time
Parana – Rocklands	Tue 06:57
Parana – Rocklands	Tue 12:01
Parana – Rocklands	Tue 20:00
Parana – Rocklands	Wed 05:06
Parana – Rocklands	Wed 06:57
Parana – Rocklands	Wed 12:01
Parana – Rocklands	Wed 20:00
Parana – Rocklands	Thu 04:50
Parana – Rocklands	Thu 06:57
Parana – Rocklands	Thu 12:01
Parana – Rocklands	Thu 20:00
Parana – Rocklands	Fri 04:50
Parana – Rocklands	Fri 06:57
Parana – Rocklands	Fri 12:01
Parana – Rocklands	Sun 03:00
Parana – Rocklands	Mon 03:00
Parana – Rocklands	Tue 03:00
Parana – Rocklands	Wed 03:00
Parana – Rocklands	Thu 03:00
Parana – Rocklands	Fri 03:00
Parana – Rocklands	Sat 03:00
Parana – Rocklands	Sun 06:15
Parana – Rocklands	Mon 06:15
Parana – Rocklands	Tue 06:15
Parana – Rocklands	Wed 06:15
Parana – Rocklands	Thu 06:15
Parana – Rocklands	Fri 06:15
Parana – Rocklands	Sat 06:15
Parana – Rocklands	Sun 11:15
Parana – Rocklands	Mon 11:15
Parana – Rocklands	Tue 11:15
Parana – Rocklands	Wed 11:15
Parana – Rocklands	Thu 11:15
Parana – Rocklands	Fri 11:15
Parana – Rocklands	Sat 11:15
Parana – Rocklands	Sun 15:15
Parana – Rocklands	Mon 15:15
Parana – Rocklands	Tue 15:15
Parana – Rocklands	Wed 15:15
Parana – Rocklands	Thu 15:15
Parana – Rocklands	Fri 15:15

Route	Departure day and time
Parana – Rocklands	Sat 15:15
Parana – Rocklands	Sun 19:15
Parana – Rocklands	Mon 19:15
Parana – Rocklands	Tue 19:15
Parana – Rocklands	Wed 19:15
Parana – Rocklands	Thu 19:15
Parana – Rocklands	Fri 19:15
Parana – Rocklands	Sat 19:15
Parana – Rocklands	Mon 23:30
Parana – Rocklands	Tue 23:30
Parana – Rocklands	Wed 23:30
Parana – Rocklands	Thu 23:30
Parana – Rocklands	Fri 23:30
Rocklands – Parana	Sat 00:06
Rocklands – Parana	Sat 03:56
Rocklands – Parana	Sat 04:36
Rocklands – Parana	Sat 09:36
Rocklands – Parana	Mon 03:56
Rocklands – Parana	Tue 03:56
Rocklands – Parana	Wed 03:56
Rocklands – Parana	Thu 03:56
Rocklands – Parana	Fri 03:56
Rocklands – Parana	Mon 05:56
Rocklands – Parana	Tue 05:56
Rocklands – Parana	Wed 05:56
Rocklands – Parana	Thu 05:56
Rocklands – Parana	Fri 05:56
Rocklands – Parana	Sat 05:56
Rocklands – Parana	Sun 07:56
Rocklands – Parana	Mon 07:56
Rocklands – Parana	Tue 07:56
Rocklands – Parana	Wed 07:56
Rocklands – Parana	Thu 07:56
Rocklands – Parana	Fri 07:56
Rocklands – Parana	Sat 07:56
Rocklands – Parana	Sun 10:56
Rocklands – Parana	Mon 10:56
Rocklands – Parana	Tue 10:56
Rocklands – Parana	Wed 10:56
Rocklands – Parana	Thu 10:56

Route	Departure day and time
Rocklands – Parana	Fri 10:56
Rocklands – Parana	Sat 10:56
Rocklands – Parana	Sun 12:56
Rocklands – Parana	Mon 12:56
Rocklands – Parana	Tue 12:56
Rocklands – Parana	Wed 12:56
Rocklands – Parana	Thu 12:56
Rocklands – Parana	Fri 12:56
Rocklands – Parana	Sat 12:56
Rocklands – Parana	Sun 15:16
Rocklands – Parana	Mon 15:16
Rocklands – Parana	Tue 15:16
Rocklands – Parana	Wed 15:16
Rocklands – Parana	Thu 15:16
Rocklands – Parana	Fri 15:16
Rocklands – Parana	Sat 15:16
Rocklands – Parana	Sun 17:56
Rocklands – Parana	Mon 17:56
Rocklands – Parana	Tue 17:56
Rocklands – Parana	Wed 17:56
Rocklands – Parana	Thu 17:56
Rocklands – Parana	Fri 17:56
Rocklands – Parana	Sat 17:56
Rocklands – Parana	Sun 20:36
Rocklands – Parana	Mon 20:36
Rocklands – Parana	Tue 20:36
Rocklands – Parana	Wed 20:36
Rocklands – Parana	Thu 20:36
Rocklands – Parana	Fri 20:36
Rocklands – Parana	Sat 20:36
Rocklands – Parana	Sun 23:16
Rocklands – Parana	Mon 23:16
Rocklands – Parana	Tue 23:16
Rocklands – Parana	Wed 23:16
Rocklands – Parana	Thu 23:16
Rocklands – Parana	Fri 23:16
Rocklands – Parana	Sat 23:16
Parana – Mt Miller	Wed 07:30
Mt Miller – Rocklands	Tue 17:51
Rocklands – Nogoa	Wed 12:38
Rocklands – Nogoa	Sun 15:08

Route	Departure day and time
Nogoa – Rocklands	Tue 06:37
Nogoa – Rocklands	Fri 06:37
Merinda – Wathana	Sun 01:25
Merinda – Wathana	Mon 01:25
Merinda – Wathana	Tue 01:25
Merinda – Wathana	Wed 01:25
Merinda – Wathana	Thu 01:25
Merinda – Wathana	Fri 01:25
Merinda – Wathana	Sat 01:25
Merinda – Wathana	Sun 06:20
Merinda – Wathana	Mon 06:20
Merinda – Wathana	Tue 06:20
Merinda – Wathana	Wed 06:20
Merinda – Wathana	Thu 06:20
Merinda – Wathana	Fri 06:20
Merinda – Wathana	Sat 06:20
Merinda – Wathana	Sun 09:40
Merinda – Wathana	Mon 09:40
Merinda – Wathana	Tue 09:40
Merinda – Wathana	Wed 09:40
Merinda – Wathana	Thu 09:40
Merinda – Wathana	Fri 09:40
Merinda – Wathana	Sat 09:40
Merinda – Wathana	Sun 10:40
Merinda – Wathana	Mon 10:40
Merinda – Wathana	Tue 10:40
Merinda – Wathana	Wed 10:40
Merinda – Wathana	Thu 10:40
Merinda – Wathana	Fri 10:40
Merinda – Wathana	Sat 10:40
Merinda – Wathana	Mon 12:35
Merinda – Wathana	Fri 12:35
Merinda – Wathana	Sun 15:28
Merinda – Wathana	Mon 15:28
Merinda – Wathana	Tue 15:28
Merinda – Wathana	Wed 15:28
Merinda – Wathana	Thu 15:28
Merinda – Wathana	Fri 15:28
Merinda – Wathana	Sat 15:28

Route	Departure day and time
Wathana – Merinda	Sun 01:40
Wathana – Merinda	Mon 01:40
Wathana – Merinda	Tue 01:40
Wathana – Merinda	Wed 01:40
Wathana – Merinda	Thu 01:40
Wathana – Merinda	Fri 01:40
Wathana – Merinda	Sat 01:40
Wathana – Merinda	Sun 03:50
Wathana – Merinda	Mon 03:50
Wathana – Merinda	Tue 03:50
Wathana – Merinda	Wed 03:50
Wathana – Merinda	Thu 03:50
Wathana – Merinda	Fri 03:50
Wathana – Merinda	Sat 03:50
Wathana – Merinda	Sun 10:50
Wathana – Merinda	Mon 10:50
Wathana – Merinda	Tue 10:50
Wathana – Merinda	Wed 10:50
Wathana – Merinda	Thu 10:50
Wathana – Merinda	Fri 10:50
Wathana – Merinda	Sat 10:50
Wathana – Merinda	Wed 12:35
Wathana – Merinda	Sun 16:30
Wathana – Merinda	Mon 16:30
Wathana – Merinda	Tue 16:30
Wathana – Merinda	Wed 16:30
Wathana – Merinda	Thu 16:30
Wathana – Merinda	Fri 16:30
Wathana – Merinda	Sat 16:30
Wathana – Merinda	Sun 20:10
Wathana – Merinda	Mon 20:10
Wathana – Merinda	Tue 20:10
Wathana – Merinda	Wed 20:10
Wathana – Merinda	Thu 20:10
Wathana – Merinda	Fri 20:10
Wathana – Merinda	Sat 20:10
Parana – Rocklands	Mon 01:45
Parana – Rocklands	Thu 01:45
Parana – Rocklands	Sat 01:45
Rocklands – Parana	Sun 21:36

Route	Departure day and time
Rocklands – Parana	Tue 21:36
Rocklands – Parana	Fri 21:36
Rocklands – Nogoa	Mon 10:00
Rocklands – Nogoa	Thu 10:00
Rocklands – Nogoa	Sat 10:00
Nogoa – Rocklands	Mon 02:56
Nogoa – Rocklands	Wed 02:56
Nogoa – Rocklands	Sat 02:56
Yukan – Mt McLaren	Mon 05:05
Yukan – Mt McLaren	Tue 05:05
Yukan – Mt McLaren	Thu 05:05
Yukan – Mt McLaren	Fri 05:05
Mt McLaren – Yukan	Mon 09:15
Mt McLaren – Yukan	Tue 09:15
Mt McLaren – Yukan	Thu 09:15
Mt McLaren – Yukan	Fri 09:15

Passenger traffic path removal inputs

Traffic	Path dispatch location	End location	Departure day and time	Number of paths removed
Spirit of Outback	Callemondah	Nogoa	Wed 02:45	2
Spirit of Outback	Callemondah	Nogoa	Sat 23:15	2
Spirit of Outback	Bluff	Parana	Mon 21:30	1
Spirit of Outback	Bluff	Parana	Thu 21:30	1
Rockhampton Tilt	Callemondah	Rocklands	Sun 17:00	2
Rockhampton Tilt	Callemondah	Rocklands	Mon 17:00	2
Rockhampton Tilt	Callemondah	Rocklands	Tue 17:00	2
Rockhampton Tilt	Callemondah	Rocklands	Thu 17:00	2
Rockhampton Tilt	Callemondah	Rocklands	Fri 17:00	2
Rockhampton Tilt	Callemondah	Rocklands	Sat 17:00	2
Rockhampton Tilt	Callemondah	Rocklands	Sun 23:15	2
Rockhampton Tilt	Callemondah	Rocklands	Tue 23:15	2
Rockhampton Tilt	Bluff	Parana	Sun 03:30	2
Rockhampton Tilt	Bluff	Parana	Mon 03:30	2
Rockhampton Tilt	Bluff	Parana	Mon 12:00	2
Rockhampton Tilt	Bluff	Parana	Tue 03:30	2
Rockhampton Tilt	Bluff	Parana	Wed 03:30	2
Rockhampton Tilt	Bluff	Parana	Thu 03:30	2

Traffic	Path dispatch location	End location	Departure day and time	Number of paths removed
Rockhampton Tilt	Bluff	Parana	Fri 03:30	2
Rockhampton Tilt	Bluff	Parana	Sat 03:30	2
Spirit Queensland	Callemondah	Rocklands	Sun 22:15	2
Spirit Queensland	Callemondah	Rocklands	Mon 22:15	2
Spirit Queensland	Callemondah	Rocklands	Tue 22:15	2
Spirit Queensland	Callemondah	Rocklands	Wed 22:15	2
Spirit Queensland	Callemondah	Rocklands	Thu 08:15	2
Spirit Queensland	Callemondah	Rocklands	Thu 22:15	2
Spirit Queensland	Callemondah	Rocklands	Fri 22:15	2
Spirit Queensland	Callemondah	Rocklands	Sat 22:15	2
Spirit Queensland	Bluff	Parana	Sun 20:50	2
Spirit Queensland	Bluff	Parana	Mon 20:50	2
Spirit Queensland	Bluff	Parana	Tue 06:49	2
Spirit Queensland	Bluff	Parana	Tue 20:50	2
Spirit Queensland	Bluff	Parana	Wed 20:50	2
Spirit Queensland	Bluff	Parana	Thu 20:50	2
Spirit Queensland	Bluff	Parana	Fri 20:50	2
Spirit Queensland	Bluff	Parana	Sat 20:50	2
Livestock	Parana	Rocklands	Sun 04:16	1
Livestock	Parana	Rocklands	Thu 04:16	1
Livestock	Rocklands	Parana	Sun 19:17	1
Livestock	Rocklands	Parana	Thu 19:17	1
Livestock	Rocklands	Nogoa	Tue 17:05	1
Livestock	Rocklands	Nogoa	Wed 05:05	1
Livestock	Rocklands	Nogoa	Sat 05:05	1
Livestock	Rocklands	Nogoa	Sat 17:05	1
Livestock	Nogoa	Rocklands	Tue 23:09	1
Livestock	Nogoa	Rocklands	Wed 11:09	1
Livestock	Nogoa	Rocklands	Sat 11:09	1
Livestock	Nogoa	Rocklands	Sat 23:09	1
Freight	Parana	Mt Miller	Fri 7:31	1
Freight	Mt Miller	Rocklands	Sat 15:56	1
Freight	Parana	Rocklands	Sun 07:01	1
Freight	Parana	Rocklands	Sun 19:01	1
Freight	Parana	Rocklands	Mon 07:01	1
Freight	Parana	Rocklands	Mon 19:01	1
Freight	Parana	Rocklands	Tue 07:01	1
Freight	Parana	Rocklands	Tue 19:01	1
Freight	Parana	Rocklands	Wed 07:01	1

Traffic	Path dispatch location	End location	Departure day and time	Number of paths removed
Freight	Parana	Rocklands	Wed 19:01	1
Freight	Parana	Rocklands	Thu 07:01	1
Freight	Parana	Rocklands	Thu 19:01	1
Freight	Parana	Rocklands	Fri 07:01	1
Freight	Parana	Rocklands	Fri 19:01	1
Freight	Parana	Rocklands	Sat 07:01	1
Freight	Parana	Rocklands	Sat 19:01	1
Freight	Parana	Rocklands	Tue 14:31	1
Freight	Rocklands	Parana	Sun 03:31	1
Freight	Rocklands	Parana	Sun 15:31	1
Freight	Rocklands	Parana	Mon 03:31	1
Freight	Rocklands	Parana	Mon 15:31	1
Freight	Rocklands	Parana	Tue 03:31	1
Freight	Rocklands	Parana	Tue 15:31	1
Freight	Rocklands	Parana	Wed 03:31	1
Freight	Rocklands	Parana	Wed 15:31	1
Freight	Rocklands	Parana	Thu 03:31	1
Freight	Rocklands	Parana	Thu 15:31	1
Freight	Rocklands	Parana	Fri 03:31	1
Freight	Rocklands	Parana	Fri 15:31	1
Freight	Rocklands	Parana	Sat 03:31	1
Freight	Rocklands	Parana	Sat 15:31	1
Freight	Rocklands	Parana	Sat 23:01	1
Limestone	Fisherman's Landing	Graham	Sun 01:52	1
Limestone	Fisherman's Landing	Graham	Mon 02:02	1
Limestone	Fisherman's Landing	Graham	Tue 02:12	1
Limestone	Fisherman's Landing	Graham	Wed 02:22	1
Limestone	Fisherman's Landing	Graham	Thu 02:32	1
Limestone	Fisherman's Landing	Graham	Fri 02:42	1
Limestone	Fisherman's Landing	Graham	Sat 02:52	1
Limestone	Fisherman's Landing	Graham	Sun 13:52	1
Limestone	Fisherman's Landing	Graham	Mon 14:02	1
Limestone	Fisherman's Landing	Graham	Tue 14:12	1
Limestone	Fisherman's Landing	Graham	Wed 14:22	1
Limestone	Fisherman's Landing	Graham	Thu 14:32	1
Limestone	Fisherman's Landing	Graham	Fri 14:42	1
Limestone	Fisherman's Landing	Graham	Sat 14:52	1
Limestone	Graham	Fisherman's Landing	Sun 00:28	1
Limestone	Graham	Fisherman's Landing	Mon 00:28	1
Limestone	Graham	Fisherman's Landing	Tue 00:28	1

Traffic	Path dispatch location	End location	Departure day and time	Number of paths removed
Limestone	Graham	Fisherman's Landing	Wed 00:28	1
Limestone	Graham	Fisherman's Landing	Thu 00:28	1
Limestone	Graham	Fisherman's Landing	Fri 00:28	1
Limestone	Graham	Fisherman's Landing	Sat 00:28	1
Limestone	Graham	Fisherman's Landing	Sun 12:28	1
Limestone	Graham	Fisherman's Landing	Mon 12:28	1
Limestone	Graham	Fisherman's Landing	Tue 12:28	1
Limestone	Graham	Fisherman's Landing	Wed 12:28	1
Limestone	Graham	Fisherman's Landing	Thu 12:28	1
Limestone	Graham	Fisherman's Landing	Fri 12:28	1
Limestone	Graham	Fisherman's Landing	Sat 12:28	1

Appendix D: Modelled Rail Infrastructure for Private Infrastructure and new Mines

[redacted]

[redacted]

[redacted]

- [redacted]
- [redacted]
- [redacted]
- [redacted]

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[redacted]

- [redacted]

Appendix E: Committed Capacity Demand (TSEs) (scaled)

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Appendix F: Train Loadout Parameters

The following data relates to train loadout key parameters used in the DSM.

Pre and post load times are applied equally across all TLO's and is summarised in the main body of the SOP.

Planned Maintenance (outside FSS events)

[redacted]

For TLOs in the table above (or are not shown) that show no planned maintenance, the maintenance is assumed to occur during FFSs only and hence is not explicitly modelled.

Gross Load Rate

[redacted]

[redacted]

[redacted]

Payload

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Lightload Payload

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

TLO Light Loading Probability

[redacted]

[redacted]

Loading Time at Mine

[redacted]

[redacted]

Train Loadout Dispatch Separation Time

[redacted]

[redacted]

Appendix G: Inloader Parameters (per Terminal)

The following data relates to inloader key parameters used in the DSM.

Pre and post unload times are applied equally across all Inloaders and is summarised in the body of the SOP.

Historical recent data provided by the terminals has been analysed and maintenance outside FSS events has now been included in the DSM.

Where there was more than one inloader, assumptions were applied equally to each.

Inloader planned maintenance

[redacted]

Inloader Gross Unload Rate

[redacted]

Inloader unplanned maintenance – cycle

[redacted]

Inloader unplanned maintenance - duration

[redacted]

Unload time at Terminal

[redacted]

[redacted]

Export Terminal Pre and Post Delay Times

Pre and post unload times used in the DSM for each Terminal.

[redacted]

RGTCT Restrictions

[redacted]

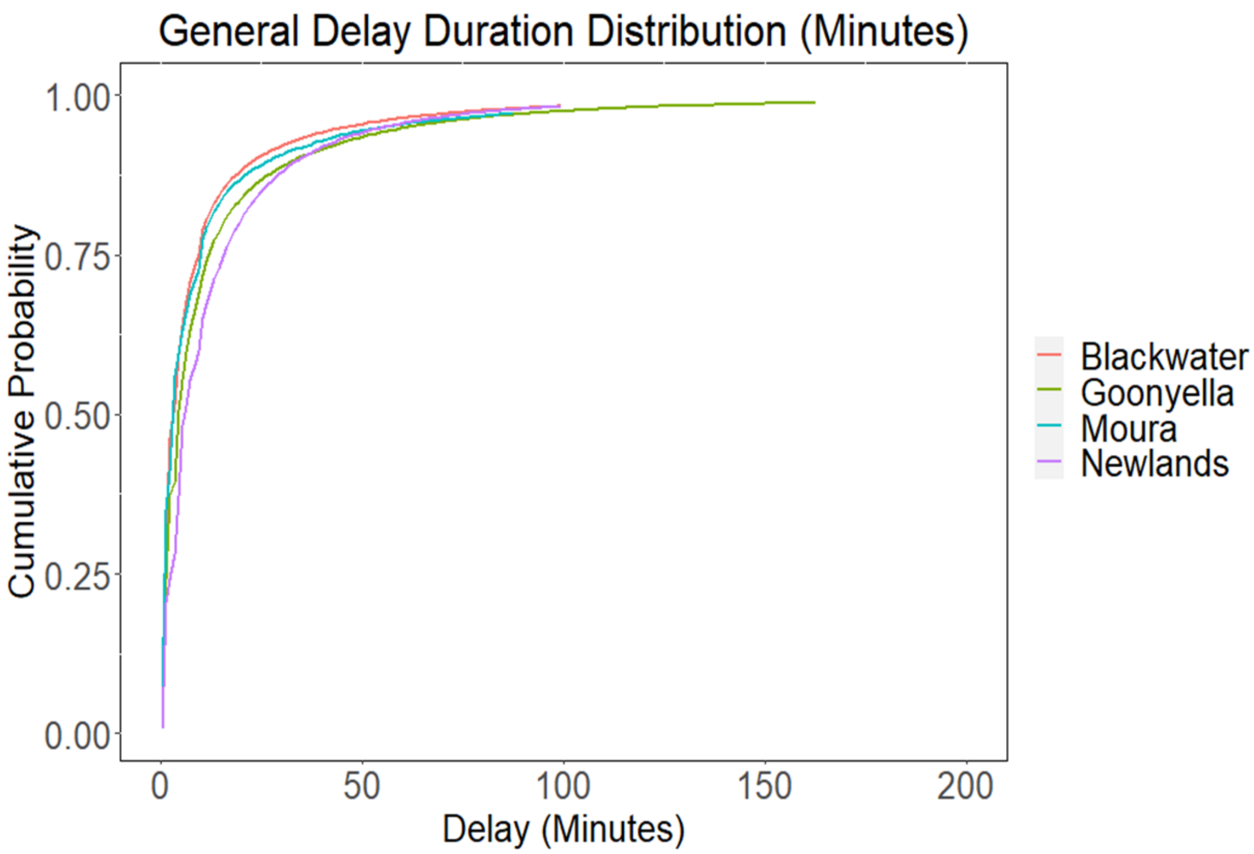
Appendix H: Below Rail Parameters

General delays frequency per Coal System

Coal System	Expected track usage between general delays (metres)	Track usage between general delays distribution (metres)	Rate	Upper bound
Goonyella	274,341.50	EXPONENTIAL	3.65E-06	1,371,708
Newlands	312,439.10	EXPONENTIAL	3.20E-06	1,562,196
Blackwater	600,933.10	EXPONENTIAL	1.66E-06	3,004,666
Moura	155,870.20	EXPONENTIAL	6.42E-06	779,351

General delays duration per Coal System

Coal System	Expected general delays (minutes)	Delay Lower Limit (minutes)	Delay Upper Limit (minutes)
Goonyella	18.0	0.5	2,148.0
Newlands	18.6	0.5	1,500.0
Blackwater	15.2	0.5	2,158.0
Moura	17.3	0.5	850.0



Coal System Delay mins allocation

The allocation of delays for each Coal System for the five-year assessment period.

FY	System	Type	Delay mins
FY2023	Blackwater	Above	3,630,099
		Below	1,911,146
		Unallocated	1,501,811
		Sub Total	**7,043,056**
FY2023	Goonyella	Above	5,869,647
		Below	3,174,324
		Unallocated	1,095,130
		Sub Total	**10,139,102**
FY2023	Moura	Above	682,414
		Below	439,453
		Unallocated	171,396
		Sub Total	**1,293,262**
FY2023	Newlands/GAPE	Above	2,173,666
		Below	1,896,174
		Unallocated	316,225
		Sub Total	**4,386,065**
FY2023 Total			**22,861,486**
FY2024	Blackwater	Above	3,619,888
		Below	1,905,771
		Unallocated	1,497,587
		Sub Total	**7,023,247**
FY2024	Goonyella	Above	5,956,217
		Below	3,221,141
		Unallocated	1,111,282
		Sub Total	**10,288,641**
FY2024	Moura	Above	686,417
		Below	442,031
		Unallocated	172,401
		Sub Total	**1,300,849**
FY2024	Newlands/GAPE	Above	2,345,501
		Below	2,046,073
		Unallocated	341,224
		Sub Total	**4,732,798**
FY2024 Total			**23,345,534**
FY2025	Blackwater	Above	3,624,071
		Below	1,907,973
		Unallocated	1,499,318
		Sub Total	**7,031,361**
FY2025	Goonyella	Above	5,920,349
		Below	3,201,743
		Unallocated	1,104,590
		Sub Total	**10,226,683**
FY2025	Moura	Above	684,832
		Below	441,010
		Unallocated	172,003
		Sub Total	**1,297,845**
FY2025	Newlands/GAPE	Above	2,293,549
		Below	2,000,753
		Unallocated	333,666
		Sub Total	**4,627,967**
FY2025 Total			**23,183,856**

FY	System	Type	Delay mins
FY2026	Blackwater	Above	3,616,595
		Below	1,904,037
		Unallocated	1,496,225
		Sub Total	**7,016,857**
FY2026	Goonyella	Above	5,923,941
		Below	3,203,686
		Unallocated	1,105,260
		Sub Total	**10,232,888**
FY2026	Moura	Above	679,253
		Below	437,418
		Unallocated	170,602
		Sub Total	**1,287,273**
FY2026	Newlands/GAPE	Above	2,300,927
		Below	2,007,189
		Unallocated	334,739
		Sub Total	**4,642,856**
FY2026 Total			**23,179,874**
FY2027	Blackwater	Above	3,623,541
		Below	1,907,694
		Unallocated	1,499,098
		Sub Total	**7,030,333**
FY2027	Goonyella	Above	6,004,806
		Below	3,247,418
		Unallocated	1,120,348
		Sub Total	**10,372,571**
FY2027	Moura	Above	681,375
		Below	438,784
		Unallocated	171,135
		Sub Total	**1,291,293**
FY2027	Newlands/GAPE	Above	2,299,612
		Below	2,006,042
		Unallocated	334,548
		Sub Total	**4,640,203**
FY2027 Total			**23,334,400**

Appendix I: Above Rail Parameters (per Operator)

The following data relates to Above Rail operators that is used in the DSM.

Consist Type and numbers per Coal System and per Above Rail operator

[redacted]

Crew Change Locations

[redacted]

Crew Change Delay

The Crew Change delay shown for each train path (round trip) system the total assuming the duration of change and probability of a delay being incurred above the planned crew change time.

Year	System	Total Crew Change Delay (in mins)	Crew Change Average Delay (in mins)
FY 2023	Blackwater	412,154	7.83
FY 2023	Goonyella	313,741	8.11
FY 2023	Moura	63,645	8.11
FY 2023	Newlands	86,618	8.40
FY 2023 Overall		**876,157**	**8.16**
FY 2024	Blackwater	412,176	7.83
FY 2024	Goonyella	306,711	7.92
FY 2024	Moura	63,941	8.13
FY 2024	Newlands	86,252	8.20
FY 2024 Overall		**869,080**	**8.06**
FY 2025	Blackwater	412,132	7.83
FY 2025	Goonyella	302,869	7.81
FY 2025	Moura	63,637	8.14
FY 2025	Newlands	87,753	8.33
FY 2025 Overall		**866,392**	**8.04**
FY 2026	Blackwater	412,846	7.86
FY 2026	Goonyella	305,592	7.88
FY 2026	Moura	63,272	8.08
FY 2026	Newlands	87,570	8.29
FY 2026 Overall		**869,280**	**8.06**
FY 2027	Blackwater	412,913	7.84
FY 2027	Goonyella	296,578	7.72
FY 2027	Moura	63,758	8.12
FY 2027	Newlands	87,799	8.33
FY 2027 Overall		**861,048**	**8.01**

Depot Assumptions

The following parameters are used by the DSM for yards/depots:

[redacted]

[redacted]

Appendix J: Other Parameters

Temporary Speed Restrictions (TSRs)

TSRs time between events

Allocation of frequency between events by Low, Mid and High by month. Applies for all five years of the assessment period.

Group	Expected Value (in mins)	Month	Distribution	Rate
LowTSR	87,719	January	EXPONENTIAL	1.14E-05
	60,606	February	EXPONENTIAL	1.65E-05
	68,027	March	EXPONENTIAL	1.47E-05
	93,458	April	EXPONENTIAL	1.07E-05
	81,301	May	EXPONENTIAL	1.23E-05
	83,333	June	EXPONENTIAL	1.20E-05
	110,742	July	EXPONENTIAL	9.03E-06
	98,039	August	EXPONENTIAL	1.02E-05
	96,154	September	EXPONENTIAL	1.04E-05
	149,701	October	EXPONENTIAL	6.68E-06
	107,527	November	EXPONENTIAL	9.30E-06
	118,343	December	EXPONENTIAL	8.45E-06
MidTSR	25,907	January	EXPONENTIAL	3.86E-05
	38,610	February	EXPONENTIAL	2.59E-05
	30,303	March	EXPONENTIAL	3.30E-05
	31,153	April	EXPONENTIAL	3.21E-05
	40,323	May	EXPONENTIAL	2.48E-05
	52,632	June	EXPONENTIAL	1.90E-05
	52,910	July	EXPONENTIAL	1.89E-05
	40,650	August	EXPONENTIAL	2.46E-05
	59,524	September	EXPONENTIAL	1.68E-05
	64,935	October	EXPONENTIAL	1.54E-05
	52,083	November	EXPONENTIAL	1.92E-05
	40,161	December	EXPONENTIAL	2.49E-05
HighTSR	18,248	January	EXPONENTIAL	5.48E-05
	12,594	February	EXPONENTIAL	7.94E-05
	25,907	March	EXPONENTIAL	3.86E-05
	26,596	April	EXPONENTIAL	3.76E-05
	27,248	May	EXPONENTIAL	3.67E-05
	34,130	June	EXPONENTIAL	2.93E-05
	35,088	July	EXPONENTIAL	2.85E-05
	33,557	August	EXPONENTIAL	2.98E-05
	39,216	September	EXPONENTIAL	2.55E-05
	41,667	October	EXPONENTIAL	2.40E-05
	53,763	November	EXPONENTIAL	1.86E-05
	34,364	December	EXPONENTIAL	2.91E-05

TSR Delay Duration – Section level

[redacted]

[redacted]

[redacted]

[redacted]

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[redacted]

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[redacted]

TSR Duration (mins)

Application - After waiting the sampled time between events, the TSR will sample to determine if it applies to all tracks with probability 1/3 or if it applies to a random track (chosen uniformly) with probability 2/3.

Group	Expected Value	Distribution	Rate	Upper Bound
LowTSR	33,279	EXPONENTIAL	3.00E-05	525,600
MidTSR	36,532	EXPONENTIAL	2.74E-05	525,600
HighTSR	38,601	EXPONENTIAL	2.59E-05	525,600

TSR Penalty (mins)

Group	Expected Value	Distribution	Parameter	Value
LowTSR	2.467775	WEIBULL	alpha	1.401
			beta	2.708
MidTSR	2.121783	WEIBULL	alpha	1.202
			beta	2.257
HighTSR	2.193048	WEIBULL	alpha	1.506
			beta	2.431

TSR by section

[redacted]

[redacted]

[redacted]

[redacted]

Maximum Dispatch Time (Hours)

[redacted]

[redacted]

Maximum Unload Time

Maximum unload time is the 95th percentile of results for the **maximum** time that a train may spend unloading at a terminal.

[redacted]

Maximum Load Time

Maximum load time is the 95th percentile of results for the **maximum** time that a train may spend being loaded at a TLO.

[redacted]

[redacted]