2024

COAL NETWORK CAPACITY CO.

SYSTEM OPERATING PARAMETERS

REDACTED VERSION

Prepared By:

COAL NETWORK CAPACITY CO

Independent Expert

07 3518 5333 coalnetwork.com.au info@coalnetwork.com.au

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Contents

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 October 2021.

UT5 specifies an Annual Capacity Assessment ("ACAR") is required after the ICAR has been issued, and this assessment will determine the Deliverable Network Capacity ("DNC") 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 ("Model") of the Central Queensland Coal Network ("CQCN"); and
- the SOP be documented. The SOP include the assumptions, inputs and methods used in the Model for the analysis of DNC.

When an ACAR is undertaken, it is based on a definition of Capacity and the application of a defined methodology and input parameters. This document is the 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 ACAR.

1.2. Definition of Deliverable Network Capacity (DNC)

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 takeninto 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 references to DNC will be in Train Paths. 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 1** below. The table lists the sections of the SOP where consideration of these factors is addressed.

Table 1 - 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 combinationin that Coal System) relating to Train Services operating in that Coal System.*	**Section 5** Demand

1.4. Information and Redaction

To avoid any confusion with industry standard terminology conventions, including the reference to gross or net values, the names of loading and unloading rates have been expanded to clarify whether parameters include or exclude operational delays. Explanations of all operating parameters are outlined in the relevant sections of this document and where applicable defined in **Section 12 - Abbreviations & Definitions**.

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 or incorporated into appendices, which will be redacted when published.

2. System Operating Parameters

The Independent Expert ("IE") uses three layers of documentation to record and determine the DNC:

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

- **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.

- **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 Model inputs and outputs from year to year.

These assumptions are used in the Model 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 Model 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 Model;
- Below Rail Operations;
- Above Rail Operations;
- Terminal Inloader for both export and domestic users which represents the downstream boundary of the Model;
- 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 Model treats each of these.

2.2. Model Scope

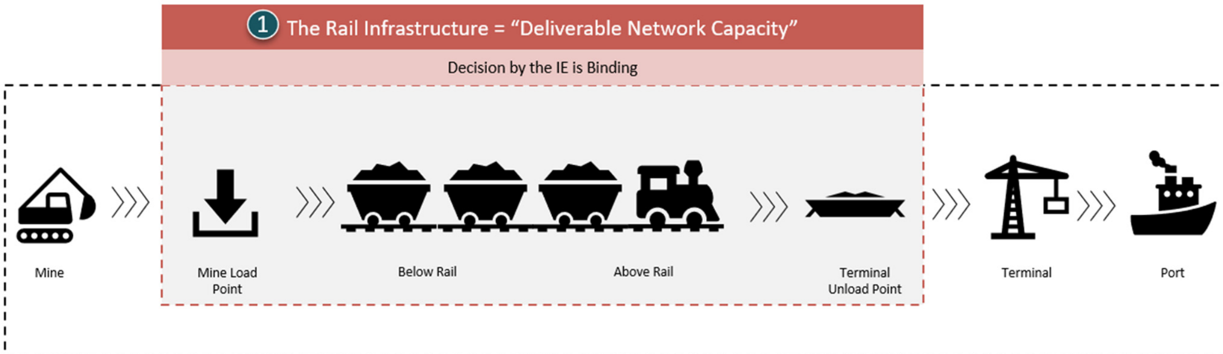
A Model has been developed using the AnyLogic modelling software to determine the DNC of the CQCN and for each coal system.

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

- Coal flow into wagons at 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 Model and SOP:

- The IE has had to exercise judgement on a large range of issues in developing the SOP assumptions and application of these within the Model. These are called out as appropriate in each section of the SOP;
- UT5 requires that the Capacity Assessment Period of each ACAR to be five years or if peak capacity under the Access Agreements is expected to occur outside of five years, a longer period of time to include that peak contracted capacity. The IE has determined from the data, that for ACAR24 peak capacity occurs within the five-year capacity assessment period of FY25 to FY29 as outlined above. The Capacity Assessment Period for the ACAR is for the five financial years FY25 to FY29 inclusive i.e. 1 July 2024 to 30 June 2029;
- Unless stated otherwise in the relevant SOP section, the most recent historical data from January 2023 to December 2023 has been used and analysed along with previous years historical data to develop key data statistical distributions which feed into SOP assumptions and the Model;
- 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
- Transitional Arrangements (i.e. capital investment or operating practice changes for the purposes of resolving an Existing Capacity Deficit) that have been approved by the QCA and that are either implemented by Aurizon Network or have been approved by the IE as "Prudent and Efficient" are included in capacity modelling from their expected completion date.

4. Rail Infrastructure

4.1. Coal Systems

Figure 2 shows the modelled rail infrastructure which covers the five coal systems of the CQCN (as outlined in UT5). Newlands System and the GAPE System are not modelled independently of each other as they share common infrastructure.

Figure 2 - Extent of Modelled Rail Infrastructure

The five CQCN coal systems and the associated branch lines and main lines used in the Model to assess the DNC are outlined in **Table 2.**

Table 2 - 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 **the GAPE System uses the Newlands System Mainline and branch lines.*	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
Moura	5. Dumgree to Callemondah	5A: Dumgree to Earlsfield 5B: Earlsfield to Callide 5C: Earlsfield to Moura

The specific sections of each coal system that have been modelled in the Model are listed in ***Table 3.*** Some smaller spur lines between TLO's and a branch line or mainline are modelled in the Model however may not be noted in **Table 3.**

Table 3 - Extent of Modelled Rail Infrastructure

Goonyella System	• DBCT to Jilalan	
	• HPCT 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 Junction	
GAPE System	• Newlands Junction to North Goonyella Junction	*(the Goonyella-Newlands connection)*

Blackwater System	• Oaky Creek to Burngrove	*(Gregory Branch)*
	• Rolleston to Rangal	*(Bauhinia branch)*
	• Burngrove to Rangal to Bluff	
	• Bluff to Rocklands	*(Blackwater Mainline)*
	• Rocklands to Aldoga	*(North Coast Line)*
	• Aldoga to WICET	
	• Aldoga to Callemondah	*(North Coast Line)*
	• Callemondah to RGTCT	
	• Callemondah to NRG (Gladstone Powerhouse)	
	• Mt Miller to RTA Yarwun and Fisherman's Landing	
	• East End Junction to East End Balloon Loop	
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 Model to simulate infrastructure interfaces within the rail infrastructure.

The Model considers all Private Infrastructure for coal and non-coal traffic as included in **Appendix D: Modelled Rail Infrastructure for Private Infrastructure.**

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

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

4.3. Electrification

Much 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.

- Newlands System - entirely unelectrified including
  - the Goonyella-Newlands Connection; and
  - the Carmichael branch line
- Goonyella System
  - Wotonga angle allowing West Goonyella branch line trains to turn onto the North Goonyella branch line; and
  - Blair Athol mine at Clermont Spur TLO [redacted]

- Blackwater System
  - Mt Miller to RTA Yarwun and Fisherman's Landing; and
  - QAL siding
  - Meteor Downs South Balloon loop (modelled as being serviced by diesel or electric trains)
- Moura System – entirely unelectrified

4.4. Signalling

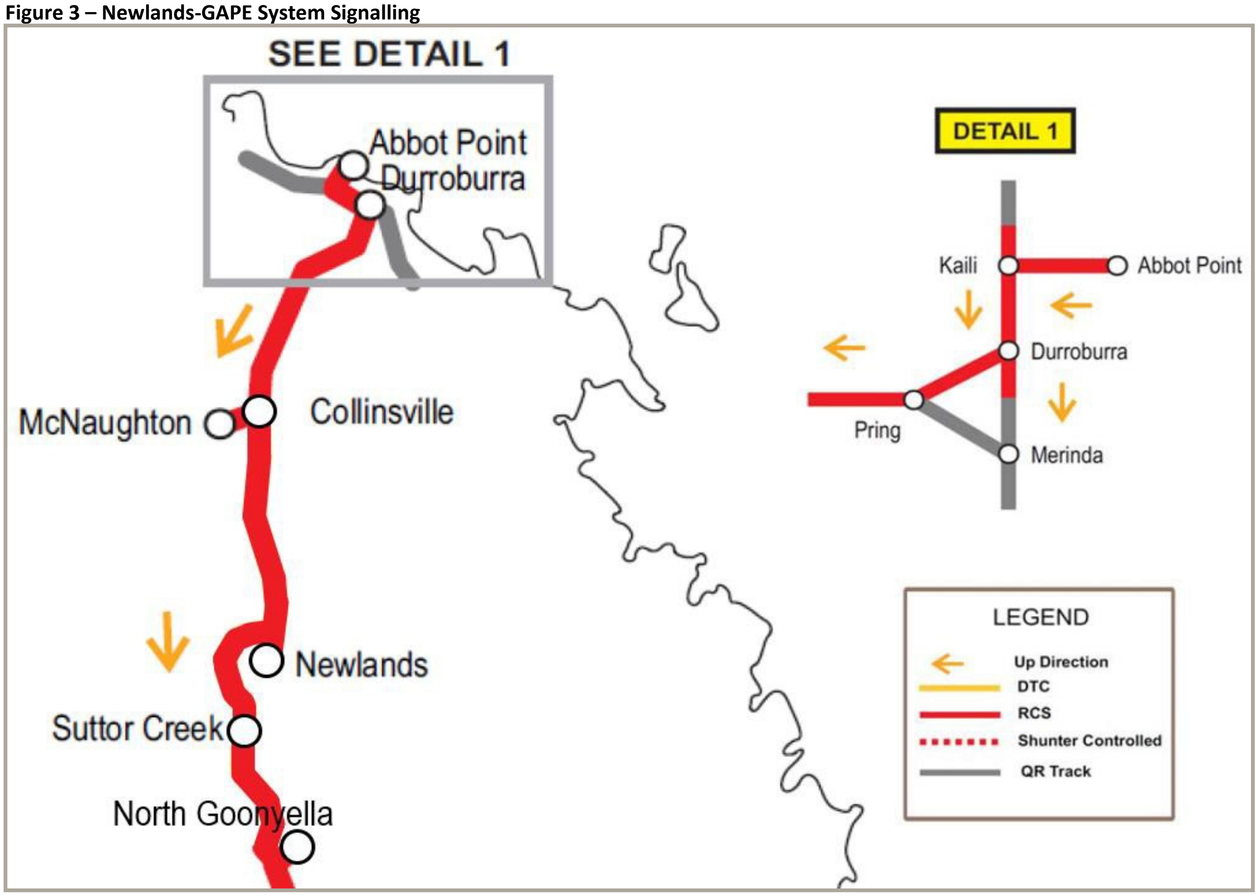
The CQCN uses Remote Control Signalling ("RCS") and Direct Train Control ("DTC"). The Model considers signalling that is installed in the CQCN.

The signalling configuration for each coal system as shown below is sourced from AN's Information Pack which was last updated in March 2017. The System Operating Parameters and Model include implementation of the transitional arrangement to convert from DTC to RCS signalling for the section of the Newlands System between McNaughton and Newlands Junction ("NG1-RCS") from July 2024. Further detail on this change is outlined in **4.4.2 - Direct Train Control (DTC) Signalling.**

Newlands-GAPE System

The Newlands System currently operates with a mix of RCS and DTC-MLPI signalling. See **4.4.2 - Direct Train Control (DTC) Signalling** regarding changes from July 2024.

Figure 3 – Newlands-GAPE System Signalling



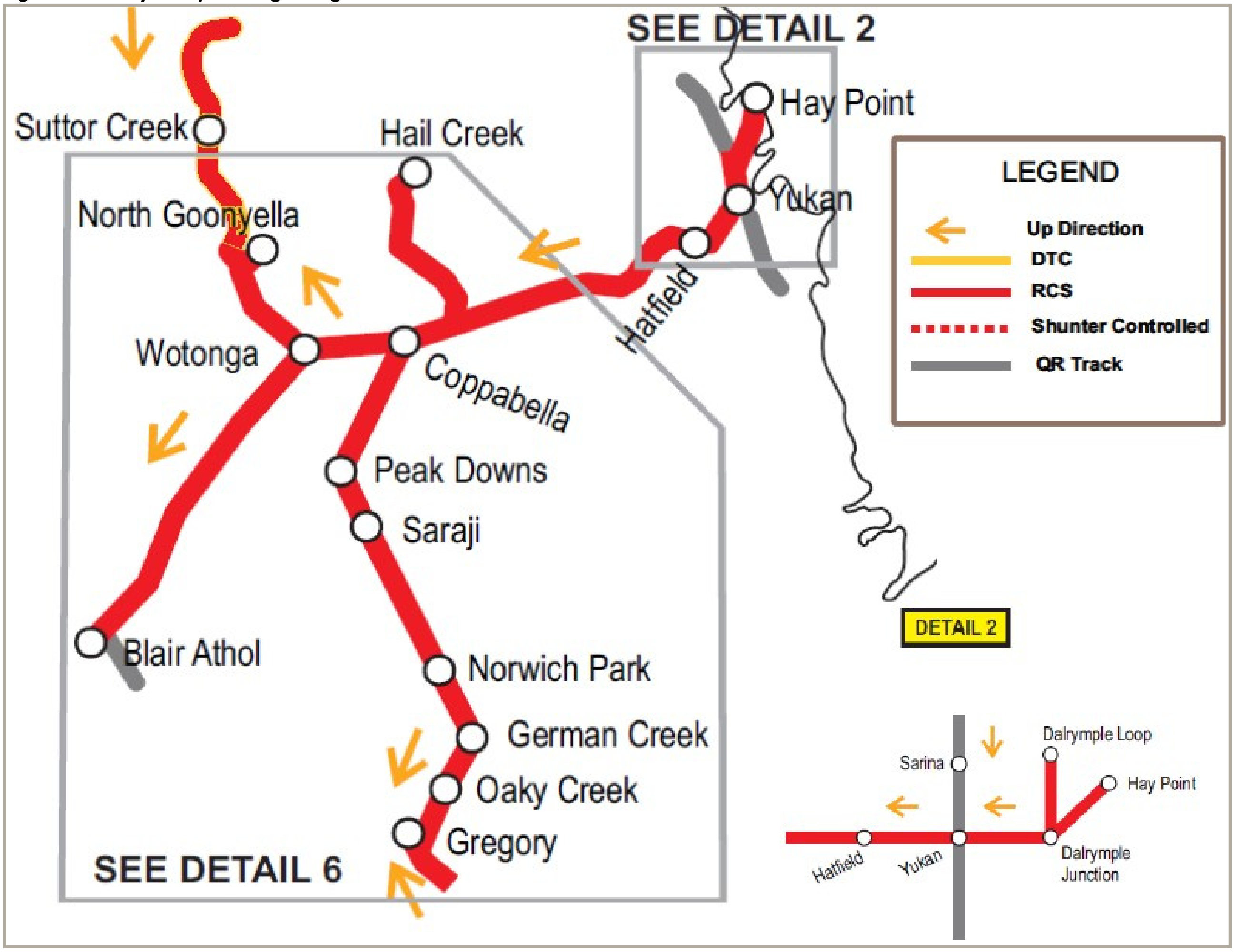
SOURCE: Aurizon Network Report: Newlands System Information Pack – Issue 7.0 March 2017

Note: Contrary to Figure 3 above, RCS is *not* installed as shown between McNaughton Junction and Newlands Junction.

Goonyella System

The Goonyella System has RCS installed throughout.

Figure 4 - Goonyella System Signalling

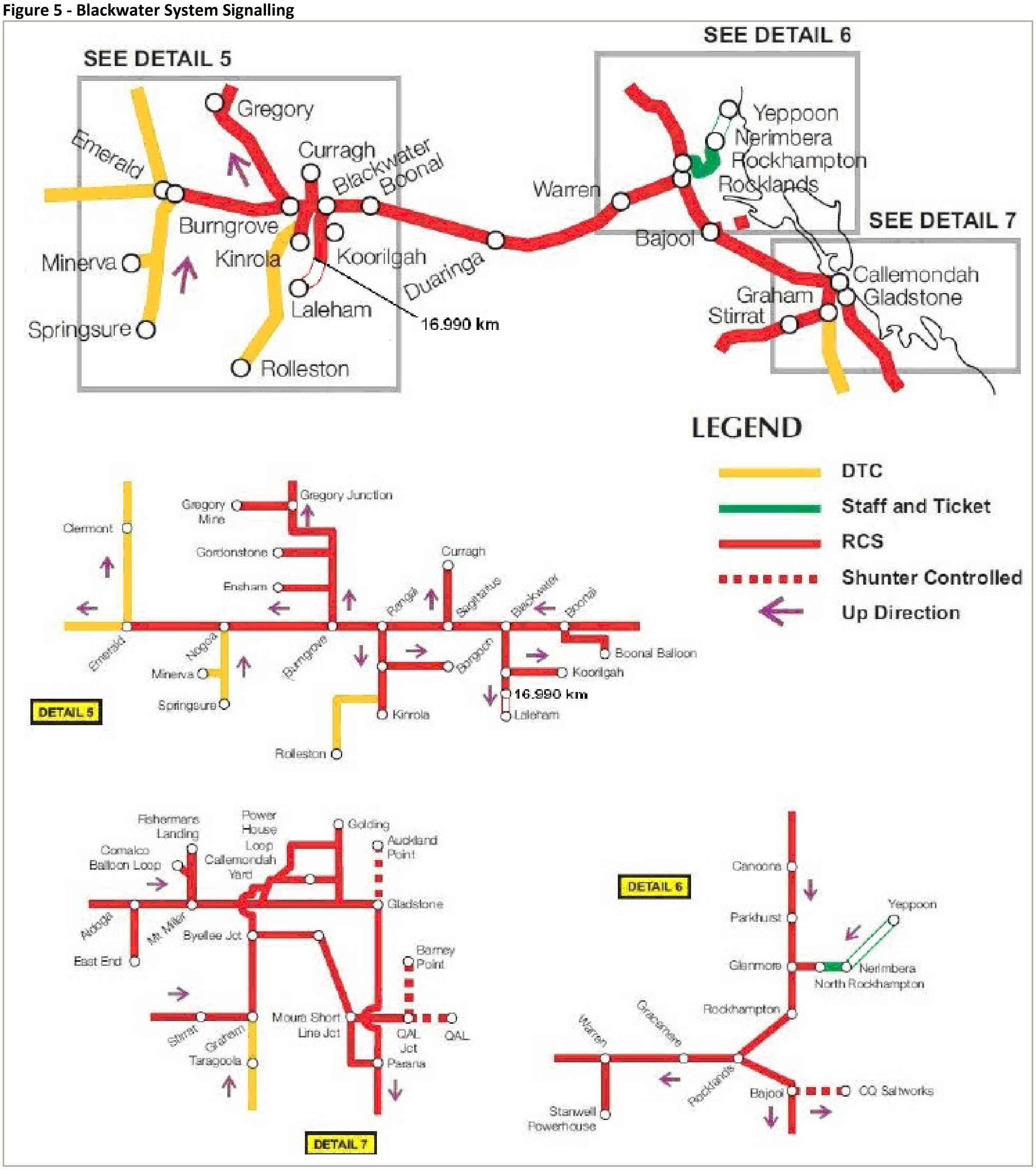


SOURCE: Aurizon Network Report: Goonyella System Information Pack – Issue 7.0 March 2017

Blackwater System

The Blackwater System has RCS installed throughout except for the section of the Bauhinia Branch from the Kenmare passing loop to the Rolleston mine where DTC Directional Running operates.

Figure 5 - Blackwater System Signalling

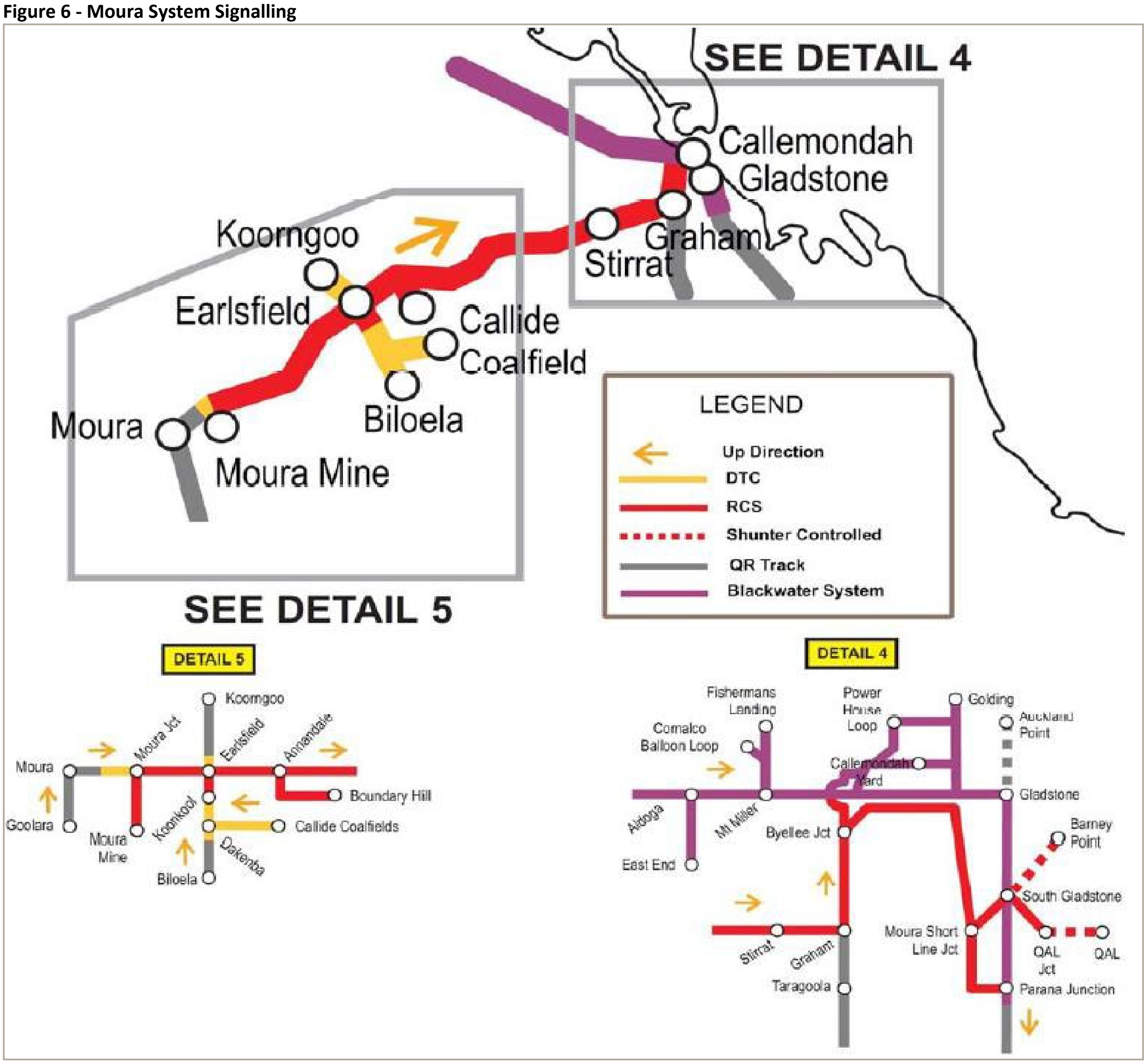


SOURCE: Aurizon Network Report: Blackwater System Information Pack – Issue 7.0 March 2017

Moura System

The Moura 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 System Signalling



SOURCE: Aurizon Network Report: Moura System Information Pack – Issue 7.0 March 2017

4.4.1. Remote Control Signalling (RCS)

Rail traffic movements are regulated by signals controlled from a remote location and/or automatically by 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 Model.

4.4.2. Direct Train Control (DTC) Signalling

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.

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.

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 ("SRT") and stopping and starting durations.

Through the evaluation of AN's transitional arrangement NG1-RCS, it was established that the actual times for the crossing of trains in DTC-MLPI territory were less than assumed within the operating parameters. The revised crossing times (for DTC sections remaining after the installation of RCS in the Newlands system) have been incorporated into the 2024 System Operating Parameters.

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 six minutes before being allowed to depart.

DTC with Main Line Points Indicators (for passing loops)

- The first train to arrive at the passing loop stops and waits for the second train.
- Further delays for the first train depend on the second train
    - If the second train arrives when expected (at 20 minutes), it can continue without delay; the first train waits a further ten minutes then departs (crossing time 30 minutes)
    - If the second train arrives later than expected, the first train must wait until it arrives and crosses, the first train waits a further ten minutes then departs (crossing time 30+ minutes)
    - If the second train arrives early, the first train may be able to leave slightly earlier (crossing time approximately 25 minutes)
- AN data shows most DTC crossings taking 25-30 minutes. This is a reduction from the previously modelled 40-50 minute crossing time.

Conversion from DTC-MLPI to RCS in the Newlands System

- As outlined above, current signalling between McNaughton and Newlands Junction is DTC-MLPI.
- Execution of the transitional arrangement to convert this section to RCS (consistent with the remainder of the Newlands System) is underway with an anticipated completion date of July 2024.
- ACAR24 assumes operation of RCS in this section from July 2024 onwards.
- Consistent with Aurizon's implementation plans, the model reduces clockface departures from Pring (empty trains) and Collinsville (loaded trains) from 60 mins to 45 minutes.

4.5. Rail Depots

The modelled rail depots are listed in ***Table 4*.**

Table 4 - Modelled Rail Depots

Coal Systems	Modelled Depots
Newlands-GAPE	Pring, BRC (adjacent to Abbot Point)
Goonyella	Jilalan, Nebo
Blackwater, Moura	Callemondah

Depots are modelled at a macro, rather than micro, level. AN's line diagrams show the depots with red roads (owned and operated by AN), blue roads (owned by Aurizon Operations) and yellow roads (other Above Rail operators). The blue and yellow 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 that are performed off the red roads.

From a modelling perspective, the Model assumes:

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

The number of roads modelled at each of the Above-Rail Depots are listed in ***Table 5*.**

Table 5 - Number of roads at each Rail Depot

Rail Depot	Number of Roads
Pring	6
BRC	1
Jilalan	15
Nebo	3
Callemondah	12

At Callemondah, the Model 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 depot. 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.

4.6. Location Specific Features

The following location specific features are noted:

1. Pring based trains are currently too long to use the Collinsville passing loop so this loop has been temporarily removed from the model's network infrastructure. Instead, trains will cross at the Birralee passing loop or the Briaba to Almoola section;

[redacted]

[redacted]

[redacted]

6. The following passing loops will be removed from the network definition as they are not used by coal trains:
    a. Mt Larcom not used for coal traffic; and
    b. Bajool not used as a passing loop but to store equipment such as yellow plant before and after maintenance.
7. The track from South Gladstone to Barney Point is not included in the Model.
8. Not all the sections of the North Coast Line are included in the Model.

[redacted]

4.7. Sectional Running Times

SRTs describe how long it takes an empty or loaded train to traverse each track section. SRTs are sourced from AN's operational data. When AN changes scheduled SRTs, these changes are reviewed by the IE with comparison to observed SRT performance.

- Coal traffic SRTs are shown in ***Appendix A: Sectional Running Times.***
- Non-coal traffic SRT's are shown in ***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 - Train Loadouts***). Where this has been done, the SRT has been distributed across the two sections in proportion to their length.

4.8. 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 model are included in **Table 6.**

No changes have been made to starting and stopping delays since the ACAR23 assumptions:

Table 6 - Stopping and Starting Delays by Coal System

System	Aurizon Network 2019 SOP		IE 2023 SOP		IE 2024 SOP	
	Start delay (mins)	Stop delay (mins)	Start delay (mins)	Stop delay (mins)	Start delay (mins)	Stop delay (mins)
Newlands	4	2	4	2	4	2
Goonyella	5	4	5	4	5	4
Blackwater	2	3	2	3	2	3
Moura	2	3	2	3	2	3

5. Demand

5.1. Measurement of demand

DNC is measured in Train Paths.

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

The Model uses TSEs as the input for demand, with two TSEs required for each coal service (reflecting empty and loaded journeys).

UT5 requires the ACAR to be based 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.

Consistent with UT5, demand and Committed Capacity is determined by the aggregate of users' Access Agreements. 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 (i.e. equally for all users) until DNC of the Network is reached. This assessment is undertaken at a coal system level.

Demand data for the DNC is based on AN contractual capacity at the end of May 2024. This data represents contracted TSEs per 30-day month up to and beyond the end of the FY25 to FY29 capacity assessment period (1 July 2024 to June 2029). Where Access Agreements have rights for renewal occurring during the Capacity Assessment Period, contracted TSEs per month are extended up to June 2029, based on the location and capacity level of the final month of the existing contract.

5.2. Model Implementation of Demand

To simulate demand for train services in the Model, a list of rail "jobs" is created for each system (including all destinations in that system). 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. Contracted TSEs, which are expressed as per 30 day month, are scaled and adjusted according to the number of days in each month. The adjustment of contracted TSEs to the demand input TSEs is calculated as follows:

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

The Model determines the priority of Rail Jobs from the demand input using one of two methods: even railings or campaign railings. The method the Model applies is determined by the mode of operation of the relevant coal export terminal/destination.

A. Even railings:

- Applies to rail jobs with the destination of NQXT, HPCT, RGTCT, WICET; domestic users and non-coal traffic destinations.
- The list of rail jobs for all terminals excluding DBCT consists of single train cycle orders.

- Each rail job's priority is the percentage satisfaction of its contract up to that point in the list.
- 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 (including variable cargo assembly):

- Can be applied to terminals requiring cargo assembly (currently only DBCT).
- 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 as well as historical shipping cargo size information. Based on the SAT, rail jobs are created for each shipping cargo by dividing each parcel by expected payload to convert each shipping cargo into the number of train paths required (the last parcel for each month is adjusted such that rail jobs are the same as contracted TSE's).

[redacted]

In systems where both methods apply (currently only the Goonyella system), the two methods are each used to assign rail jobs across a series of six-day periods within each month for the respective terminal volumes. The six-day period allows five days from first train dispatch to last train dispatch and one day for the final train to return to the terminal. The two methods are then merged and sequenced by the rail jobs' priorities. This approach is used to ensure that one terminal or railing mode is not prioritised over another.

When the Model is used to test the ability of the Network to meet Committed Capacity 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 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 Model 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 System train services are not considered as cross-system traffic as outlined in UT5.

There are only a handful of contractual cross-system origin-destination routes which operate in the Blackwater and Goonyella systems.

6. Train Loadouts

6.1. Overview

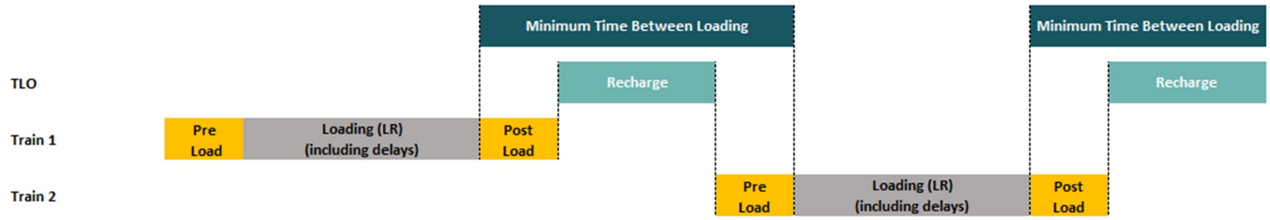
The upstream boundaries of the Model are the TLO facilities at each mine, with their associated balloon loop. Coal enters the Model at these facilities. Coal is considered always available subject to the constraints of the load point capability. In the Model, the duration that trains spend in the balloon 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 - Balloon Loop Capacities)** – 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 - TLO Availability**).
- 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 activities;
  - the train payloads (see **Section 6.4 - Payloads);**
  - the equipment Loading Rates ("LRs"), which include the effect of unplanned delays to both the loading equipment and the operations immediately beyond the TLOs (see **Section 6.5 - TLO Load Rates (including unplanned delays)**); 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 7:**

- The TLO becomes ready to load after the minimum time between loading duration has passed, following completion of loading of the previous train. **Appendix F: Train Loadout Parameters** has the TLO dispatch separation times which reflect the minimum time between loading;
- The train becomes ready to load after the pre-load duration of seven 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 load rate values. The Model samples a distribution representing train payload, and a second distribution representing load rate, and then calculates load duration by dividing the sampled payload bythe sampled load rate; and
- On completion of loading, the following two activities commence in parallel:
  - the train must wait a post-load duration of eight 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.

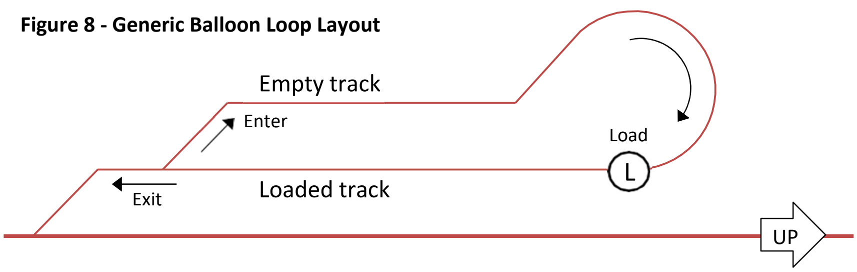
Figure 7 - Chart for choke feeding of TLO



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 8** shows a typical balloon loop arrangement.

Figure 8 - Generic Balloon Loop Layout



The following configurations have been identified across the CQCN:

- 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 must exit.

In all these cases, the already loaded train must move off the loaded track and exit the balloon loop before the next train can commence its loading phase.

The maximum number of trains in a balloon loop used by the Model is shown in **Appendix F1 TLO Balloon Loop Parameters (Model Inputs)**. For TLO's which can hold one full train while another is being loaded these have been shown as two train capacity in the Model. Note that loop capacity is not merely based on the physical dimensions of the balloon loop, but also considers the location of signalling and AN's operating practices.

6.3. TLO Availability

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

Historical data for 2023 and prior years was reviewed for events where TLOs were unavailable due to maintenance. As many planned TLO events are intentionally aligned with port or track shutdowns, the data was examined and maintenance events that overlapped with Full System Shut ("FSS"), branch line closures and/or port shutdowns were excluded. Also excluded were TLO shutdowns associated with a long-term mine shutdown and/or refurbishment.

For 2023, actual TLO shutdown hours were determined to be ~4,100 hours which is comparable in magnitude to previous historical results of ~4,000 hours.

For ACAR24 CNCC has maintained the TLO shutdown profile consistent with ACAR23. CNCC notes that any more definitive assessment of the impact of TLO shutdowns on network capacity will require extensive engagement with producers regarding their long term TLO shutdown strategy.

To simplify the application of TLO planned maintenance events in the Model, 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 Model.

6.4. Payloads

As per previous years, Payload parameters are determined based on analysis of data provided by Above Rail operators. The approach for the review was to only consider changes to the payload assumptions if the comparative analysis highlighted significant variation from last year's assessment.

Payload data was evaluated to determine full payload, light payload and the probability that a light load event could occur. Payloads are considered light if values fall below a specified threshold for each system (with adjustments for routes to restricted unloading locations). The payload analysis fits probability distributions for each TLO on a system by system-basis (i.e. a single TLO going to two different systems will have two sets of payload information). For TLOs without sufficient historical data, average system payload information is used.

For ACAR24 the payload analysis determined that:

- Full payload:
  - the best fit probability distribution type was modified for five TLO destination combinations.
  - best fit probability distribution parameters were modified for all other TLO destination combinations.
  - the observed variability in expected full payload outcome was quite minimal and in most cases was within one percent of prior year values.
- Light payload:
  - the best fit probability distribution type was modified for two TLO destination combinations.
  - best fit probability distribution parameters were modified for all other TLO destination combinations.
  - the probability of light load reduced in Newlands-GAPE and increased slightly in Goonyella and Moura.
  - the observed variability in expected light payload show improvement in loading performance across most TLO destinations.

Table 7 summarises the relevant light loading threshold and light loading probability parameters.

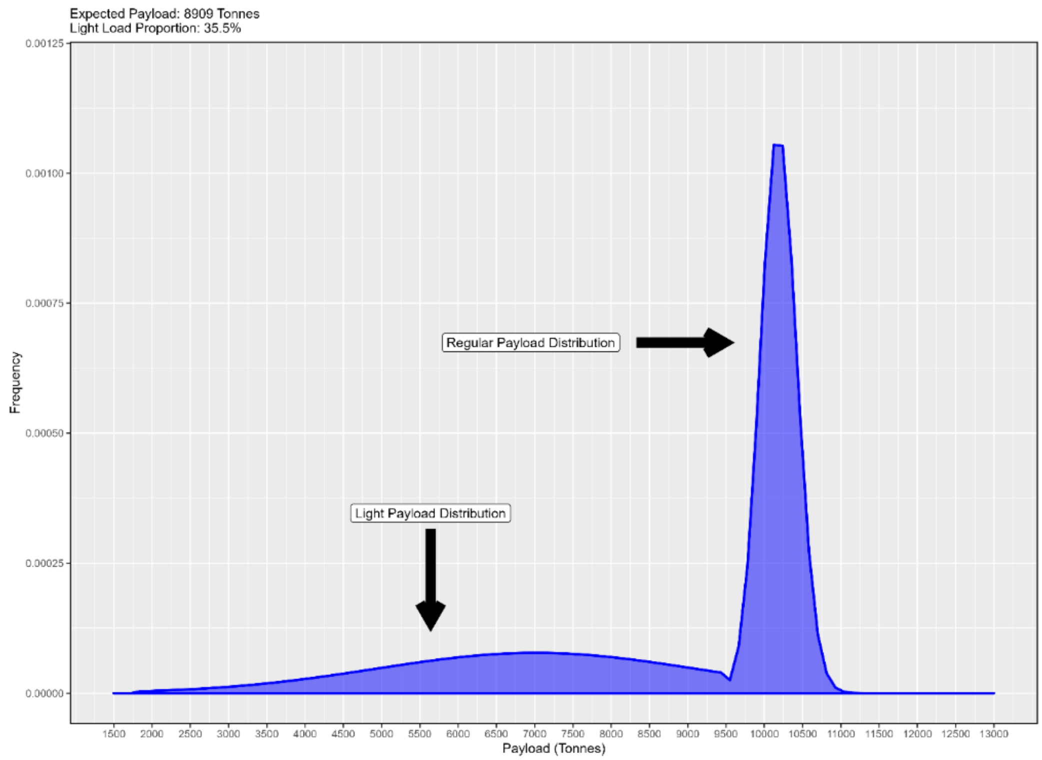
Table 7 - Light Loading by Coal System

System	Light Load Threshold (tonnes)	ACAR23 Chance of Light Load (%)	ACAR24 Chance of Light Load (%)
Newlands-GAPE	6,000	16.7%	10.8%
Goonyella	9,500	16.5%	16.9%
Blackwater	7,000	9.2%	9.2%
Moura	7,000	9.2%	11.3%

Note: 1. Short trains operate for some TLOs in the Moura system. The light load threshold for Moura short trains is 4,500 tonnes (58 wagon trains) and 5,100 tonnes (70 wagon trains).

An example of a Payload histogram and fitted distribution for an unidentified TLO is shown in **Figure 9**.

Figure 9 - Example of a distribution fitted to historical full Payload and light Payload for a Goonyella System TLO



In the Model 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.

6.5. TLO Load Rates (including Unplanned Delays)

Similar to the assessment of Payload parameters, TLO load rates are determined using data provided by Above Rail operators and changes to current model assumptions will only be considered if material changes were highlighted from the analysis.

The LR for each TLO was calculated by dividing actual Payload by the difference between start and end loading times.

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

$$\boldsymbol{Load\ Rate\ (including\ unplanned\ delays) = \frac{Train\ Payload}{(Loading\ Complete - Loading\ Commenced)}}$$

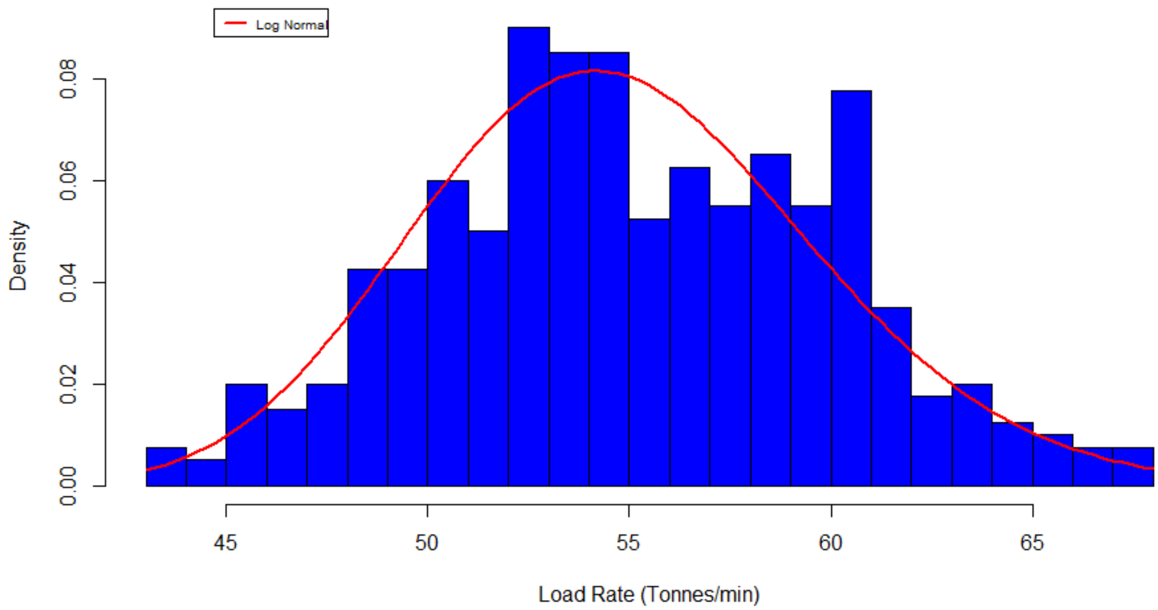
The data for each TLO was fitted to statistical probability distributions. For ACAR24, a change to the “best fit” distribution type was observed for 8 TLOs and the probability parameters were updated for all TLOs. As a result, observations on the expected load rate performance identified changes (both increases and decreases to LR) for most TLOs:

- No change for 2 TLOs
- 20 TLOs LR varied within 5%
- 11 TLOs LR varied within the range of 5% to 10%
- 7 TLOs LR varied by more than 10%.

The LR captures any delays that occur during loading, removing the need to explicitly model specific delay events on loading of trains. This does not capture any delays to the start of loading.

An example of a LR histogram and fitted distribution for an unidentified TLO is shown in **Figure 10.**

Figure 10 - Example LR histogram and fitted distribution for a single TLO



6.6. TLO Data

Appendix F: Train Loadout Parameters contains data used within the Model for each TLO modelled, including load time, load rate (including unplanned delays), planned maintenance outside FSS, light loading assumptions, pre and post load times and TLO dispatch separation times.

7. Inloaders

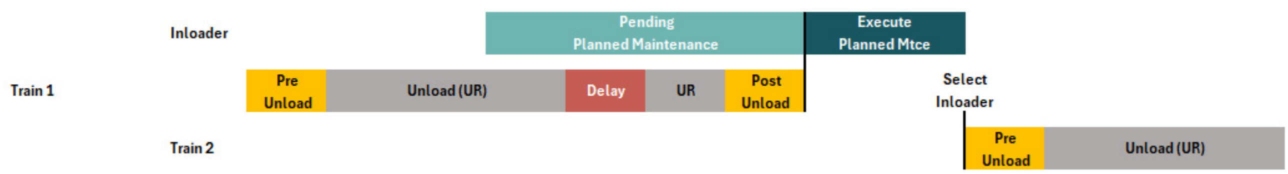
7.1. Overview

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

- The availability of the Inloaders for trains to enter, allowing for planned maintenance;
- The duration that trains spend at the Inloaders, allowing for:
    - the duration of activities such as pre and post unload;
    - the train Payloads;
    - the equipment Unloading Rates ("UR") (excluding unplanned delays);
    - the effect of delays stemming from both the unloading equipment and the operations immediately beyond the Inloaders.
- Availability of network infrastructure for trains to leave the Inloaders and return to maintenance/dispatch locations.

The modelled sequence of activities in the unloading process is illustrated in **Figure 11.**

Figure 11 - Gantt Chart for Unloading of Trains



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

Once allocated an Inloader, the train moves to the Inloader, waits for the pre-unload delay duration, and begins unloading its payload at a sampled unload rate.

Appendix G: Inloader Parameters shows the pre and post load times for each terminal used in the Model.

Data has been sourced from each terminal which provides details of unscheduled delay events and allows for the direct calculation of unscheduled delays (both the length and frequency) without any assumption of delays beyond the Inloader. These are reflected in the Model as additional failure events (based on operating time) that represent the unplanned delays in the unloading process (see **Section 7.3 - Inloader Availability**). 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 Inloader departure track.

At the completion of post-unload, the Inloader 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 have historically been operating practices and/or restrictions that applied, reducing the flexibility of the Inloaders to serve all origin mines. These restrictions were included in the Model. In consultation with the terminal, the model restrictions have been reviewed for ACAR24 and only one such restriction still exists.

Appendix G: Inloader Parameters shows the remaining restriction used in the Model.

7.2. Inloading Loop Capacities

Inloader balloon loops are assumed to possess one arrival track and one departure track each, which are both used during the unloading process. Each loop can only hold one train with the exception [redacted]

7.3. Inloader Availability

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

7.3.1. Planned Maintenance

In ACAR23 the approach adopted contemplates the potential for planned terminal maintenance to occur outside of AN track closures - Full System Shuts (FSS).

In consultation with the terminal operators and/or owners, a forward view of anticipated maintenance activities for each terminal from FY25 till FY29 period was reviewed. Planned maintenance activities were compared with the planned FSS to determine the expected level of maintenance outside of FSS events. Where possible, the start date of inloader maintenance events is adjusted to maximise alignment with FSS events, but outages may be scheduled such that they:

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

This data has been adjusted in consultation with the terminals to reflect the potential to refine maintenance plans as demand increases to mitigate where possible any impacts on coal throughput.

When a specific Inloader 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 11**).

7.3.2. Unplanned Maintenance

Unplanned outages are modelled as randomised delay events during the unloading process, during whicha train still occupies the Inloader, 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 Inloader. These distributions have been derived from recent historical unloading duration data received from export terminals.

A review of historical unloading events was undertaken and any event that overlapped with another delay event was identified and removed. The remaining data was used to derive the required TTF and TTR parameters for each terminal Inloader.

Unplanned maintenance performance for most terminals was comparable with ACAR23 unplanned maintenances. One terminal had an observable increase in expected unplanned maintenance duration of ~20% which has been adjusted in the Model assumptions.

7.3.3. Pre and Post Unload Delays

Some terminals supplied data that provided sufficient detail to determine the pre and post load times from actual data and these are applied in the Model. For other terminals, the pre and post load times have been assumed to remain at seven and eight minutes respectively.

7.4. Inloader Unload Rates

Train unloading job data was provided by coal terminals and Above Rail operators for the calendar year 2023 and combined with previous historical data. The data contained unload information and unplanned delay data.

The unload rate for each Inloader was calculated by dividing actual Payload by the unload time using the start and end unloading times.

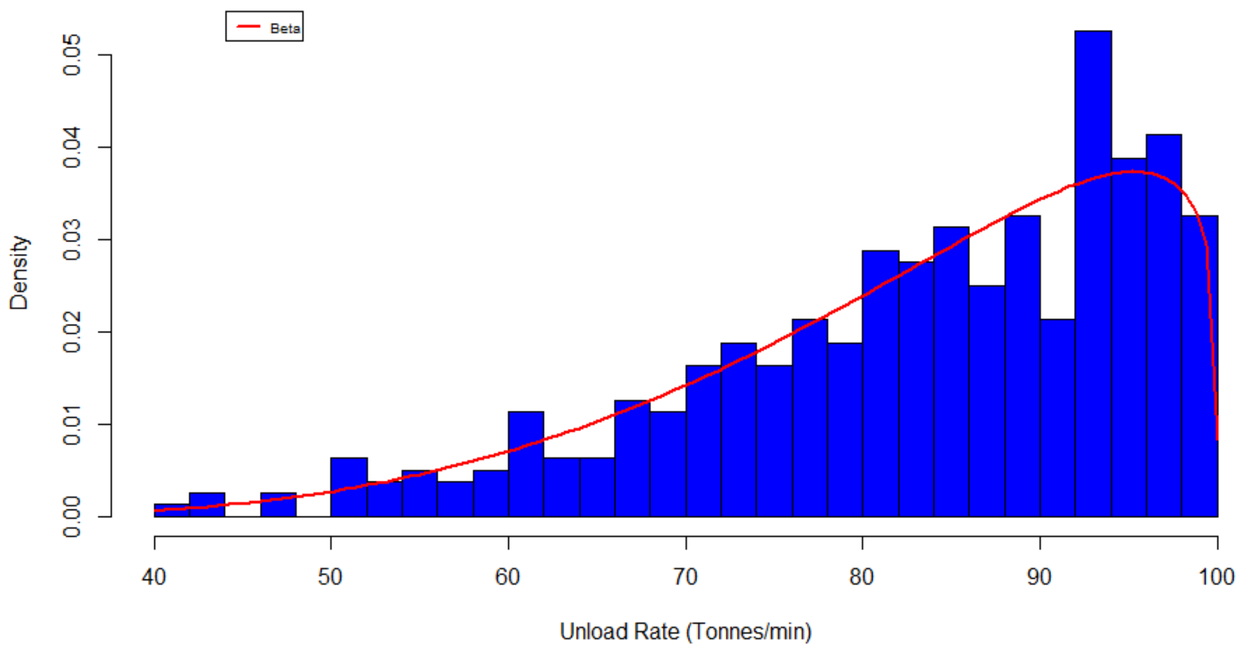
$$\boldsymbol{Unload\ Rate}\ (\boldsymbol{excluding\ unplanned\ delays}) = \frac{\boldsymbol{Train\ Payload}}{\boldsymbol{Unload\ Time}}$$

The data for each Inloader was then fitted to probability distributions which are used by the Model.

The typical spread of unload rate is illustrated in the example in ***Figure 12***. 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.

The unload rate performance for all terminals was comparable with ACAR23 unload rates.

Figure 12 - Example Terminal Unload Rate Distribution



7.5. Inloader Data

Appendix G: Inloader Parameters contains data used within the Model for each inloader modelled including unload time, UR, planned maintenance outside FSS, time at terminal and pre and post unload times.

8. Below Rail Operations

This section describes how the Model captures the way in which the coal systems operate in practice. The Model does not explicitly copy real world operations step by step. For instance, the Model does not generate a Train Plan, however, instead, the Model 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.

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.

The Model does not include train paths per se, but instead simulates the effect of pathing by applying separation times and clockface departures at key network nodes as shown in **Table 8**. For ACAR24, pathing in the Newlands-GAPE system has been reduced from 60 minutes to 45 minutes, consistent with AN's proposed operational changes following the anticipated completion of RCS signalling installation in that system.

Table 8 - Path Frequencies

Coal System	Mainline Path	Separation
Newlands-GAPE	ex Pring, empty	45 minutes
Newlands-GAPE	ex Collinsville, loaded	
Goonyella	ex Jilalan, empty	20 minutes
Goonyella	ex Coppabella, loaded	
Blackwater	ex Callemondah, empty	15 minutes
Blackwater	ex Kabra, empty	
Blackwater	ex Bluff, loaded	20 minutes
Blackwater	ex Rocklands, loaded	
Moura	ex Callemondah, empty	90 minutes
Moura	ex Dumgree, loaded	

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 Model 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 - Demand.**

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 Model'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. For dual track sections, the rail microsimulation engine has a designated "preferred" track for both empty and loaded travel. 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. Track maintenance

AN's track maintenance activities are represented by track possessions which are temporary closures 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.

In real-life operations, only part of the possessions for a financial year are known ahead of its start. Additional possessions are added as the need for works on specific assets arises. In the Model, 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 Model allows the remaining track to be occupied for both up and down traffic. In the Model, planned track maintenance events will commence whether a train is on that section of track or not. If a train is occupying the track the Model allows it to move off. After that, the Model does not allow another train to occupy the section of track until the planned maintenance activity is complete.

There are four types of track maintenance activities that are considered in the forward maintenance schedule within the Model:

1. Integrated Closures - full system shuts (“FSS”) and branch line shuts which are included in AN’s Maintenance Renewal and Strategy Budget (“MRSB”) scope;
2. Major Maintenance – maintenance and renewal tasks included in the MRSB program, excluding integrated closures;
3. Minor Maintenance – smaller-scale maintenance activities (excluding emergency maintenance); and
4. Infrastructure Inspection – track inspection (Hi-rail movements) and other vehicle movements which are represented within AN’s systems as track possessions.

The transport of materials and work trains and maintenance on the move (e.g. rail grinding) is not considered in the Model as in practice, it is typical for moving equipment to be scheduled around coal and other services.

8.4.1. Maintenance data

The IE receives information from AN regarding historical and future CQCN track maintenance activities, which is used in the preparation of maintenance-related Model inputs. This information includes:

- Integrated closures and major planned maintenance as agreed with the Rail Industry Group for FY25 via the MRSB process;
- actual maintenance events during CY23; and
- actual Hi-Rail movement for infrastructure inspection during CY23.

8.4.2. Integrated Closures

Integrated closures refer to those period of track possession in which a whole system is closed for maintenance (FSS) or one or more branch lines are closed to rail traffic (branch line shutdowns).

Integrated closures are for pre-planned periods with the duration of such events ranging from 36 to 108 hours at a time. During integrated closures, trains are typically stowed at rail depots, balloon loops, and other parts of the network. The exact planning of locations and timing depends on the works of the individual closure.

Model assumptions regarding integrated closures for future years are based on the industry approved MRSB scope.

Integrated closures are modelled as planned maintenance events that stop the travel of trains and the dispatch of train services to the mines impacted by the integrated closure.

For FSSs, all Inloaders of all terminals in the respective coal system are made unavailable for the duration of the closure. 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. Similarly, in Goonyella, if there is an FSS that affects DBCT and HPCT but does not affect certain branch lines, GAPE trains can continue to service accessible mines.

The implementation of stowage and the related staggered shutdown and restart of operations is described in **Section 9.4 - Stowage.**

For an integrated closure, the Model assumes a train is not dispatched if travel intersects an integrated closure 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.

8.4.3. Major maintenance

Major maintenance are maintenance tasks occurring outside of integrated closures periods, that are accommodated within less extensive possessions, including single-line closures within duplicated track sections.

Model assumptions regarding major maintenance for future years are based on the industry approved MRSB scope.

8.4.4. Minor maintenance

While AN scopes tasks and schedules possessions for integrated closures and major maintenance well in advance, other track maintenance tasks are required across the network. This includes planned maintenance activities as well as “breakdown” maintenance.

As minor maintenance activities are often not known well in advance, historical data on below rail maintenance activities is analysed to understand the expected future minor maintenance profile. The IE receives from AN detailed records of historical minor maintenance possessions which detail the location, start and end times (both scheduled and actual) and other categorising information.

In determining minor maintenance possessions, maintenance activities that occur in the shadow of integrated closures and major maintenance possessions are excluded.

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 Model assumes 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.

The anticipated maintenance for each year of the capacity period for each Coal System, mainline and branch line and per type of maintenance is summarised in **Appendix B: Below Rail Maintenance.**

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 4.3 - 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 Model however is accounted for through the varying origin/destination groupings and relevant Above Rail operators. The Model 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 depot where they are maintained and provisioned.

The Model 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 System-based consists can travel to Goonyella System TLOs for haulage to Gladstone Port, but they do not load at a Blackwater or Goonyella systems TLO for haulage to the Port of Hay Point. Further, it is assumed that Moura System fleet consists service only the Moura System TLOs.

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

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 Model. 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 Model, but rather is an output, as dictated by fleet availability at dispatch.

To align the allocation of different Above Rail operators with recent practice, 2023 historical data was reviewed. Where more than 80% of a mine's railing in each system was provided by one rail operator, only that operator is allocated to that mine in the Model. Where railings were split such that a second or third rail operator railed more than 20% of services, each relevant rail operator is allocated to that mine in the Model. Updates were made to Above Rail operator allocation for 17 mine/system combinations.

9.2. Train Cycles

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

- Dispatch from Depot (Pring, Jilalan, Nebo, Callemondah, BRC);
- Travel empty to TLO;

- Load at TLO;
- Travel loaded to Inloader;
- Unload; and
- Travel empty to Depot 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 that are considered in the Model include examinations/inspections, unit train maintenance and provisioning. 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 4.5 - 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 depots, TLOsand/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 depot.

Appendix I: Above Rail Parameters has the detailed information on times for each location.

9.3. Non-Standard Cycles

9.3.1. General

Exceptions to the standard train cycle identified in **Section 9.2 – Train Cycles** include:

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

[redacted]

[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;

[redacted]

[redacted]

9.4. Stowage

In actual operations, consists are stowed in suitable locations during FSS, typically rail depots, balloon loops, and on the network, as there are insufficient roads at the main rail depots 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 Model 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 Model 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 staggeredrestart 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-GAPE System to Goonyella 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 System shut, effectively imposing a Goonyella System FSS.

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 Model and are removed from relevant data sets. These large force majeure events are not modelled. However, many smaller events that may be classified as force majeure for commercial purposes, are captured within General Delay data and used in the model assumptions.

Catastrophic equipment and infrastructure failures are not included in the Model. 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.

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. Several trains may be delayed by the same fault.

When considering delays in the Model, fault events need to be generated, with the Model then determining the consequential delay impact of these faults, i.e., how many trainsare delayed, and for how long. That is, faults are a Model input, and delays are a Model output. General delays are any delays above the assumed SRT.

Delay data was filtered to use only those delays that are not explicitly captured elsewhere in the Model.

For instance, 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 to TLOs and Inloaders were excluded, as were delays due to large force majeure events.

Faults are represented in the Model 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.

ACAR24 retains existing delay model inputs for Goonyella, Blackwater and Moura Systems. Although the Model does not distinguish between the causes of delay, CNCC continues to allocate cause pro-rata to the proportions observed in the historical delay data.

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.

AN's delay data for 2023 was examined for evidence of crew change events and deviations to scheduled crew change times. Crew changes that occur faster than scheduled were ignored. The refinement of the interpretation of crew change data resulted in a reduction in crew change delay duration and frequency for ACAR24:

- a scheduled crew change has a chance of overrun of 16%; and
- a median duration of overrun of 5 minutes.

10.3. Temporary Speed Restrictions

Occasionally, circumstances will require the placement of 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.

Data for TSRs for period from January 2021 to December 2023 has been reviewed.

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 groups based upon their total time under TSRs: no TSRs, and low, mid and high impact TSRs. Each of the three 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 Model 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 9.**

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.

In general, temporary speed restriction settings in the model are marginally worse in ACAR24 compared with ACAR23. The frequency of TSRs reduced by between 18% to 27%. The duration of events generally increased however, with increases of 13% and 15% for Low TSR sections and Medium TSR sections, and High TSR sections increasing by 22%. The magnitude of TSRs was relatively stable with penalties remaining between 2 to 2½ minutes. The number of High TSR sections increased from 10 to 15.

Table 9 - Temporary Speed Restriction parameters

TSR Group	Description	Expected Value
Low TSR	Number of sections TSR applied	113
	Time Between events per section (TBF) (minutes)	117,000
	Event Duration (TTR) (minutes)	38,000
	Individual consist time penalty (minutes)	2.5
Mid TSR	Number of sections TSR applied	48
	Time Between events per section (TBF) (minutes)	56,000
	Event Duration (TTR) (minutes)	42,000
	Individual consist time penalty (minutes)	2.2
High TSR	Number of sections TSR applied	14
	Time Between events per section (TBF) (minutes)	38,000
	Event Duration (TTR) (minutes)	47,000
	Individual consist time penalty (minutes)	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, Mine or other (includes port and force majeure).

Cancellation data was reviewed for the calendar year 2023 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.

To derive cancellation rates to be applied in the model, cancellation data from 2021 to 2023 inclusive was reviewed and summarised monthly and annually by Responsible Party for each mine/system combination.

In general, Below Rail cancellations were similar in most systems, while Above Rail cancellations increase slightly, except for Blackwater which showed a stronger increase.

2023 data showed a continuation of significant cancellations attributed to the code 'Adjoining Operations Loading (Direct)'. While some TLO functional issues may be included here, the scale of these cancellations suggests that this code is reflective of situations where mines have no coal available for a scheduled train service.

The four worst performing mines are all in the Blackwater system where 8.8% of all scheduled services are cancelled due to no coal.

Any ACAR estimate of network capacity is intended to occur in an environment of "full demand" for train services. In such an environment, cancellations for lack of coal should be quite rare. Thus the IE has had to consider how to adjust cancellation rates to reflect a full demand environment and the absence of substantial "no coal" cancellations.

In ACAR23 this factor was addressed by capping "no coal" cancellations for a system to 5% of that system's scheduled services before deriving the system's cancellation rate. In ACAR24, given the concentration of such cancellations to a relatively small number of mines, this approach has been modified such that "no coal" cancellations are capped to 5% of each mine's scheduled services before calculation of a system's cancellation rate. Details of the effects of this adjustment are shown in ***Table 10***.

Following this adjustment, Model cancellation rates have reduced in all systems.

Table 10 - Cancellation Assumptions (model inputs)

Coal System	ACAR23 Total Cancellation	ACAR24 Total Cancellation				
		Total	Below Rail	Above Rail	Mine	Other
Newlands-GAPE	13.2%	13.1%	**1.5%**	**7.4%**	2.6%	**1.7%**
Newlands-GAPE Adjusted [1]		**11.8%**			**1.2%**	
Goonyella	17.8%	19.5%	**2.6%**	**8.3%**	5.7%	**2.8%**
Goonyella Adjusted [1]		**16.0%**			**2.2%**	
Blackwater	16.0%	19.6%	**1.5%**	**7.2%**	9.6%	**1.2%**
Blackwater Adjusted [1]		**14.0%**			**4.0%**	
Moura	18.5%	19.8%	**2.7%**	**8.5%**	6.8%	**1.7%**
Moura Adjusted [1]		**15.2%**			**2.2%**	

Note: 1. Cancellation rates are adjusted to exclude the impact of cancellations due to lack of coal

11. Non-coal traffic

11.1. Overview

AN 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). AN must prioritise timetabled traffic services ahead of cyclic traffic (i.e., coal traffic, unless the unloading destination is a domestic power station).

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

Contracted and preserved Train Path data used for non-coal services are current as at January 2024. The Model 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 depots and Above Rail delays. The Model assumes these activities typically occur outside the AN rail infrastructure.

The Model 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);
- Agricultural products – grain and livestock;
- Freight; and
- Limestone.

In the Model, non-coal traffic types run to their own timetable, and 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 Model.

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

Timetables were sourced from the published QR latest timetables.

11.3.1. Blackwater System

The Model 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 Model 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 System

The Spirit of Queensland travels in the Newlands 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 – Passenger Traffic** above.

This traffic runs to its own SRTs (see ‘SRT Type PASSENGER’ in **Appendix A2.2 Passenger**).

12. Abbreviations & Definitions

12.1. Abbreviations

The following abbreviations are used throughout this document:

ABBREVIATION	MEANING
ACAR	Annual Capacity Assessment Report
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
DBCT	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
HPCT	Hay Point Coal Terminal
ICAR	Initial Capacity Assessment Report
IE	Independent Expert
ITP	Intermediate Train Plan
LR	Load Rate (including unplanned delays)
MBD	Model Basis Document
MLPI	Main Line Points Indicators
Model	CQCN Dynamic Simulation Model
MTP	Monthly Train Plan
MTTF	Mean Time to Fail
MTTR	Mean Time to Repair
NQXT	North Queensland Export Terminal

ABBREVIATION	MEANING
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
QCL	Cement Australia (Fisherman’s Landing)
RCS	Remote Control Signalling
RGTCT	RG Tanna Coal Terminal
RRS	Rail Receival Station (Inloader)
RTA Yarwun	Rio Tinto’s Yarwun Alumina Refinery
SAT	Ship Arrival table
SOP	System Operating Parameters
SRT	Sectional Running Time
Stanwell	Stanwell Powerhouse
TLO	Train Load Out
TBF	Time Between Failures
TSE	Train Service Entitlement
TSR	Temporary Speed Restriction
TTF	Time to Fail
TTR	Time to Repair
UR	Unload Rate (excluding unplanned delays)
UT5	Aurizon Network 2017 Access Undertaking
UTM	Unit Train maintenance
WICET	Wiggins Island Coal Export Terminal

12.2. 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
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. Note that two TSEs are required per train cycle.
Train Cycle	In general, train cycles typically proceed as follows: 1. Dispatch from Depot; 2. Travel Empty to Mine; 3. Load at TLO; 4. Travel Loaded to Rail Receival Station; 5. Unload; 6. Travel Empty to Depot for possible provisioning and/or maintenance; and 7. Wait for next dispatch at Depot. Cycle Time measures items 1 to 6 Turnaround Time measures items 1 to 7
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
Direct Train Control	As described in **Section 4.4.2 Direct Train Control (DTC) Signalling**
Rail Job	Rail Jobs represent rail orders equating to one train cycle each (consuming 2 TSEs)
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.
Train Consists	Train consists are classified by their motive power, as either Diesel or Electric.

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

A1.1 Newlands-GAPE

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

Location from	Location to	Empty (minutes)	Loaded (minutes)
Newlands Trunk			
Abbot Point	BRC Junction	7	11
BRC Junction	Kaili	5	6
Kaili	Durroburra	8	10
Durroburra	Pring	8	3
Pring	Buckley	5	6
Buckley	Armuna	13	14
Armuna	Aberdeen	12	10
Aberdeen	Binbee	12	9
Binbee	Briaba	14	15
Briaba	Almoola	16	31
Almoola	Collinsville	6	6
Collinsville	McNaughton Junction	2	4
McNaughton Junction	Sonoma Junction	8	7
Sonoma Junction	Birralee	10	10
Birralee	Cockool	17	16
Cockool	Havilah	16	18
Havilah	CRN Junction	12	12
CRN Junction	Newlands Junction	2	2
Northern missing link (GAPE)			
Newlands Junction	Leichardt Range	4	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	13	14
Riverside	Goonyella	5	6
Goonyella	Moranbah North Junction	5	4

Location from	Location to	Empty (minutes)	Loaded (minutes)
Moranbah North Junction	Wotonga	16	15
West Goonyella Branch			
Wotonga	Moranbah	19	15
Moranbah	Caval Ridge Junction	3	5
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	4
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	Olive Downs Junction	4	4
Olive Downs Junction	Winchester	4	4
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 (Clermont Mine)	3	2
Byerwen Junction	Byerwen	2	6
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
Millennium Junction	Millennium Balloon	2	4

A1.2 Goonyella

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

Location from	Location to	Empty (minutes)	Loaded (minutes)
Goonyella Trunk			
Dalrymple Bay	Dalrymple Bay Staging	3	3
Dalrymple Bay Staging	Dalrymple Crossover Points	4	6
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	9	12
Wandoo	Waitara	11	14
Waitara	Braeside	8	8
Braeside	Mindi	10	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	8	6
Red Mountain	Olive Downs Junction	4	5
Olive Downs Junction	Winchester	4	4
Winchester	Peak Downs	13	11
Peak Downs	Harrow	13	14
Harrow	Saraji	6	10
Saraji	Lake Vermont Junction	15	22
Lake Vermont Junction	Dysart	4	3
Dysart	Stephens	7	7

Location from	Location to	Empty (minutes)	Loaded (minutes)
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
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 (Clermont Mine)	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
Olive Downs Junction	Olive Downs Balloon	12	16
Peak Downs	Peak Downs Balloon	5	2
Riverside	Riverside Balloon	4	1
Saraji	Saraji Balloon	1	2

A1.3 Blackwater

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

Location from	Location to	Empty (minutes)	Loaded (minutes)
North Coast Line			
Callemondah	Mount Miller	12	14
Mount Miller	Wiggins Island Junction	5	4
Wiggins Island Junction	Yarwun	1	2
Yarwun	Aldoga	6	7
Aldoga	Mount Larcom	9	12
Mount Larcom	Ambrose	5	4
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	12	19
Edungalba	Aroona	11	10
Aroona	Duaringa	7	10
Duaringa	Wallaroo	13	15
Wallaroo	Tryphinia	11	13
Tryphinia	Dingo	12	14
Dingo	Umolo	5	8
Umolo	Parnabal	6	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

Location from	Location to	Empty (minutes)	Loaded (minutes)
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
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	33	33
Starlee	Meteor Downs Junction	19	20
Meteor Downs Junction	Rolleston	8	13
Domestic and Export Terminals			
Golding	Gladstone Powerhouse Junction	8	5
Gladstone Powerhouse Junction	Callemondah	10	10
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
Kinrola Junction	Kinrola	6	4
Mackenzie	Ensham	12	10
Sagittarius	Curragh	13	11
Yan Yan	Gordonstone Balloon	13	12
Blackwater	Taurus	40	32
Taurus	Koorilgah	7	4

A1.4 Moura

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

Location from	Location to	Empty (minutes)	Loaded (minutes)
Moura Trunk			
Callemondah	Byellee	8	11
Byellee	Stowe	15	13
Stowe	Graham	4	9
Graham	Stirrat	10	9
Stirrat	Clarke	20	24
Clarke	Fry	10	11
Fry	Mount Rainbow	21	24
Mount Rainbow	Dumgree	19	29
Dumgree	Boundary Hill Junction	11	14
Boundary Hill Junction	Annandale	3	1
Annandale	Earlsfield	7	14
Earlsfield	Belldeen	25	23
Belldeen	Moura Mine Junction	23	39
Callide Branch			
Earlsfield	Koonkool	7	5
Koonkool	Dakenba	31	30
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

A2.1 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 System. Only sections that these trains travel on are included.

Location from	Location to	Up (minutes)	Down (minutes)
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	2	2
Callemondah	NCL Moura	3	3
Callemondah	Byellee	5	5

A2.2 Passenger

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

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

A2.3 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 Systems. Only sections that these trains travel on are included.

Location from	Location to	Up (minutes)	Down (minutes)
Parana	Callemondah	9	9
Callemondah	Mt Miller	8	6
Mt Miller	Yarwun	5	5
Yarwun	Aldoga	8	8
Aldoga	Mt Larcom	8	7
Mt Larcom	Ambrose	4	4
Ambrose	Epala	5	4
Epala	Raglan	6	6
Raglan	Marmor	8	7

Location from	Location to	Up (minutes)	Down (minutes)
Marmor	Bajool	6	7
Bajool	Archer	7	7
Archer	Midgee	6	5
Midgee	Rocklands	5	5
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	10	19
Edungalba	Aroona	10	11
Aroona	Duaringa	10	7
Duaringa	Wallaroo	10	11
Wallaroo	Tryphinia	11	11
Tryphinia	Dingo	11	11
Dingo	Umolo	7	8
Umolo	Parnabal	3	4
Parnabal	Walton	8	4
Walton	Bluff	13	11
Bluff	Boonal Balloon Points	12	9
Boonal Balloon Points	Boonal	1	1
Boonal	Blackwater	10	10
Blackwater	Sagittarius	6	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
QNIP02	Durroburra	1	1
Durroburra	Kaili	6	6
Kaili	QNIP01	2	2

A2.4 Grain

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

Location from	Location to	Up (minutes)	Down (minutes)
Parana	Callemondah	9	9
Callemondah	Mt Miller	9	6
Mt Miller	Yarwun	6	4
Yarwun	Aldoga	8	8
Aldoga	Mt Larcom	8	7

Location from	Location to	Up (minutes)	Down (minutes)
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 (minutes)	Down (minutes)
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: Below Rail Maintenance

B1 FY25 – FY29 Maintenance hours by mainline and branch line

Includes integrated closures (full system and branch line shuts), below rail maintenance (major and minor) and infrastructure inspection.

	FY25													FY26 - FY29
Main / Branch Line	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Annual Total	Annual Total
1. M.L. - Collinsville to Pring	10	0	0	0	13	10	3	12	10	10	4	0	**72**	**72**
1A: B.L. - Pring to Abbot Point	42	16	43	22	40	22	18	35	28	14	25	17	**323**	**323**
1B: B.L. - Newlands Junction to Collinsville	269	216	291	91	379	167	225	450	410	284	507	150	**3,440**	**3,364**
2A: B.L. - North Goonyella Junction to Newlands Junction	106	81	118	38	73	53	240	61	99	85	45	78	**1,079**	**1,079**
3. M.L. - Coppabella to Jilalan	9	3	9	2	5	8	10	8	10	16	7	5	**93**	**93**
3A: B.L. - Jilalan to Port of Hay Point	9	11	13	9	25	7	19	4	52	26	15	23	**213**	**213**
3B: B.L. - Hail Creek Mine to South Walker Creek Junction	1	7	9	32	33	1	3	46	19	3	15	1	**173**	**173**
3C: B.L. - Oaky Creek Junction to Coppabella	74	109	24	36	32	46	15	82	29	53	106	25	**633**	**633**
3D: B.L. - Coppabella to Wotonga	0	0	5	2	0	0	14	0	0	1	0	0	**24**	**24**
3E: B.L. - North Goonyella Mine to Wotonga	52	22	22	39	7	60	29	31	17	14	35	19	**346**	**346**
3F: B.L. - Blair Athol Mine to Wotonga	99	1	127	10	34	9	22	41	70	22	48	20	**503**	**503**
4. M.L. - Bluff to Callemondah	20	106	14	20	11	21	13	100	26	15	81	14	**442**	**442**
4A: B.L. - Callemondah to Port of Gladstone	38	27	33	21	17	44	11	32	7	9	43	38	**320**	**320**
4B: B.L. - Burngrove to Bluff	13	2	3	2	8	2	21	2	2	7	30	18	**110**	**110**
4C: B.L. - Rolleston Mine to Rangal	9	99	2	26	56	5	6	15	12	8	7	18	**262**	**262**
4D: B.L. - Oaky Creek Junction to Burngrove	36	9	12	83	18	1	10	13	24	10	63	20	**300**	**300**
5. M.L. - Dumgree to Callemondah	12	9	6	9	7	13	6	12	4	3	6	3	**90**	**90**
5A: B.L. - Dumgree to Earlsfield	85	75	47	68	39	20	35	156	34	51	64	35	**710**	**710**
5B: B.L. - Earlsfield to Callide	241	88	231	240	125	84	71	220	244	139	114	67	**1,864**	**1,864**
5C: B.L. - Earlsfield to Moura	8	-	10	6	-	-	-	-	8	4	8	-	**44**	**44**
Total	**1,134**	**882**	**1,020**	**755**	**924**	**573**	**773**	**1,320**	**1,107**	**776**	**1,224**	**551**	**11,038**	**10,962**

B2 FY25 – FY29 Maintenance hours by Coal System

Includes integrated closures (full system and branch line shuts), below rail maintenance (major and minor) and infrastructure inspection.

	FY25													FY26 - FY29
Coal System	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Annual Total**	**Annual Total**
Newlands-GAPE	150	30	168	35	59	55	68	76	80	40	120	76	**957**	**881**
Goonyella	454	300	347	474	273	159	154	521	411	288	385	172	**3,936**	**3,936**
Blackwater	478	434	476	216	556	306	519	592	566	404	620	282	**5,449**	**5,449**
Moura	52	118	29	31	36	53	32	131	50	44	99	21	**697**	**697**
Total	**1,134**	**882**	**1,020**	**755**	**924**	**573**	**773**	**1,320**	**1,107**	**776**	**1,224**	**551**	**11,038**	**10,962**

B3 FY25 – FY29 Maintenance hours by maintenance type and coal system

Includes integrated closures (full system and branch line shuts), below rail maintenance (major and minor) and infrastructure inspection.

		FY25													FY26 - FY29
System	**Maintenance Type**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Annual Total**	**Annual Total**
CQCN	Integrated Closures	232	252	287	136	60	-	72	84	174	60	228	-	**1,585**	**1,509**
	Major Maintenance	268	228	227	276	360	38	270	691	376	181	258	38	**3,210**	**3,210**
	Minor Maintenance	529	314	438	258	430	463	344	461	484	438	643	420	**5,222**	**5,222**
	Hi-Rail Movement	105	88	68	85	74	72	87	84	73	96	96	93	**1,022**	**1,022**
	Total	**1,134**	**882**	**1,020**	**755**	**924**	**573**	**773**	**1,320**	**1,107**	**776**	**1,224**	**551**	**11,038**	**10,962**
Newlands-GAPE	Integrated Closures	76	-	108	-	-	-	-	-	60	-	-	-	**244**	**168**
	Major Maintenance	-	-	-	-	-	-	-	-	-	-	-	-	**-**	**-**
	Minor Maintenance	51	17	45	19	46	43	54	59	10	25	106	63	**537**	**537**
	Hi-Rail Movement	23	14	15	16	13	12	14	17	10	14	14	14	**175**	**175**
	Total	**150**	**30**	**168**	**35**	**59**	**55**	**68**	**76**	**80**	**40**	**120**	**76**	**957**	**881**
Goonyella	Integrated Closures	60	84	104	136	-	-	36	-	54	60	60	-	**594**	**594**
	Major Maintenance	168	65	50	174	88	6	20	362	152	46	53	-	**1,183**	**1,183**
	Minor Maintenance	189	119	174	137	157	128	70	133	186	148	242	141	**1,825**	**1,825**
	Hi-Rail Movement	37	31	19	27	27	25	28	26	20	33	30	31	**335**	**335**
	Total	**454**	**300**	**347**	**474**	**273**	**159**	**154**	**521**	**411**	**288**	**385**	**172**	**3,936**	**3,936**
Blackwater	Integrated Closures	96	84	75	-	60	-	36	-	60	-	108	-	**519**	**519**
	Major Maintenance	100	163	177	102	272	32	250	329	225	135	206	38	**2,027**	**2,027**
	Minor Maintenance	250	158	200	81	202	255	204	235	254	236	273	209	**2,558**	**2,558**
	Hi-Rail Movement	32	29	24	32	22	20	28	29	28	33	33	35	**345**	**345**
	Total	**478**	**434**	**476**	**216**	**556**	**306**	**519**	**592**	**566**	**404**	**620**	**282**	**5,449**	**5,449**
Moura	Integrated Closures	-	84	-	-	-	-	-	84	-	-	60	-	**228**	**228**
	Major Maintenance	-	-	-	-	-	-	-	-	-	-	-	-	**-**	**-**
	Minor Maintenance	39	20	19	20	24	38	15	34	34	28	22	8	**302**	**302**
	Hi-Rail Movement	13	14	11	10	12	15	17	13	15	16	18	12	**166**	**166**
	Total	**52**	**118**	**29**	**31**	**36**	**53**	**32**	**131**	**50**	**44**	**99**	**21**	**697**	**697**

Appendix C: Non-coal Traffic Timetables

C1 Summary of non-coal traffic timetables

Traffic type		From	To	Number of modelled services per week	Number of coal train paths used
Passenger	Rockhampton Tilt	Gladstone	Rocklands	8	2
		Rocklands	Gladstone	8	2
	Spirit of QLD	Gladstone	Rocklands	6	2
		Rocklands	Gladstone	6	2
		Durroburra	Kaili	6	1
		Kaili	Durroburra	6	1
	Spirit of Outback	Gladstone	Nogoa	3	2
		Nogoa	Gladstone	3	2
Limestone		East End mine	Fisherman's Landing	44	1
		Fisherman's Landing	East End mine	44	1
Livestock		Parana	Rocklands	5	1
		Rocklands	Parana	5	1
		Rocklands	Nogoa	4	1
		Nogoa	Rocklands	4	1
		Durroburra	Kaili	4	1
		Kaili	Durroburra	4	1
Freight		Parana	Rocklands	63	1
		Rocklands	Parana	64	1
		Rocklands	Nogoa	2	1
		Nogoa	Rocklands	2	1
		Durroburra	Kaili	30	1
		Kaili	Durroburra	31	1
Grain		Parana	Rocklands	1	1
		Rocklands	Parana	1	1
		Rocklands	Nogoa	-	1
		Nogoa	Rocklands	-	1
		Yukan	Mt McLaren	4	1
		Mt McLaren	Yukan	4	1

Appendix D: Modelled Rail Infrastructure for Private Infrastructure

Private Infrastructure

Private Infrastructure that has been modelled within the Model includes:

In the Newlands and GAPE Systems:

- Boundaries to QR managed track: Kaili and Durroburra;
- Byerwen Junction to Byerwen balloon loop.
- Carmichael Junction to Carmichael Mine balloon loop. This infrastructure has been updated to include actual private rail network including passing loops along with scheduled sectional run times
- BRC Rail Yard (adjacent to Abbot Point terminal)

In the Goonyella System:

- Nebo Depot;
- Caval Ridge Junction to Caval Ridge balloon loop;
- Olive Downs Junction to Olive Downs balloon loop; and
- Middlemount Junction to Middlemount balloon loop;

In the Blackwater System:

- East End Junction to East End balloon loop;
- Meteor Downs South Spur line and balloon loop;

In the Moura System:

- QAL junction to QAL siding; and
- Baralaba Junction to Baralaba balloon loop

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

E1 FY25 Committed Capacity - Scaled (TSEs)

[redacted]

[redacted]

[redacted]

E2 FY26 Committed Capacity - Scaled (TSEs)

[redacted]

[redacted]

[redacted]

E3 FY27 Committed Capacity - Scaled (TSEs)

[redacted]

[redacted]

[redacted]

E4 FY28 Committed Capacity - Scaled (TSEs)

[redacted]

[redacted]

[redacted]

E5 FY29 Committed Capacity - Scaled (TSEs)

[redacted]

[redacted]

[redacted]

Appendix F: Train Loadout Parameters

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

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

F1 TLO Balloon Loop Parameters (Model Inputs)

[redacted]

F2 TLO 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.

F3 TLO Load Rate (including unplanned delays) (Model Inputs)

[redacted]

[redacted]

[redacted]

[redacted]

F4 Payload

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

F5 Lightload Payload (Model Inputs)

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

F6 Load Time at Mine (Model Output)

Loading times represent the median (50th percentile) and maximum (90th percentile) values that a train may spend loading at a train loadout (TLO) across the five-year assessment period.

[redacted]

[redacted]

F7 TLO Dispatch Separation Time & Maximum Dispatch Time

Modelled dispatch times represent the median (50th percentile) and maximum (95th percentile) values that a train may spend waiting in the depot to be dispatched to the mine for loading for the five-year assessment period.

[redacted]

[redacted]

Appendix G: Inloader Parameters

The following data relates to Inloader key parameters used in the Model.

G1 Inloader planned maintenance (Model Inputs)

[redacted]

[redacted]

G2 Inloader Unload Rate (excluding unplanned delays) (Model Inputs)

[redacted]

G3 Inloader unplanned maintenance – cycle (Model Inputs)

[redacted]

G4 Inloader unplanned maintenance – duration (Model Inputs)

[redacted]

[redacted]

G5 Unload time at Terminal

Unloading times represent the median (50th percentile) and maximum (95th percentile) values that a train may spend unloading at a terminal across the five-year assessment period.

[redacted]

G6 Export Terminal Pre and Post Delay Times (Model Inputs)

Pre and post unload times used in the Model for each terminal.

[redacted]

G7 RGTCT Restrictions (Model Inputs)

The Model applies the following restrictions. Where a mine is not listed no restrictions apply.

[redacted]

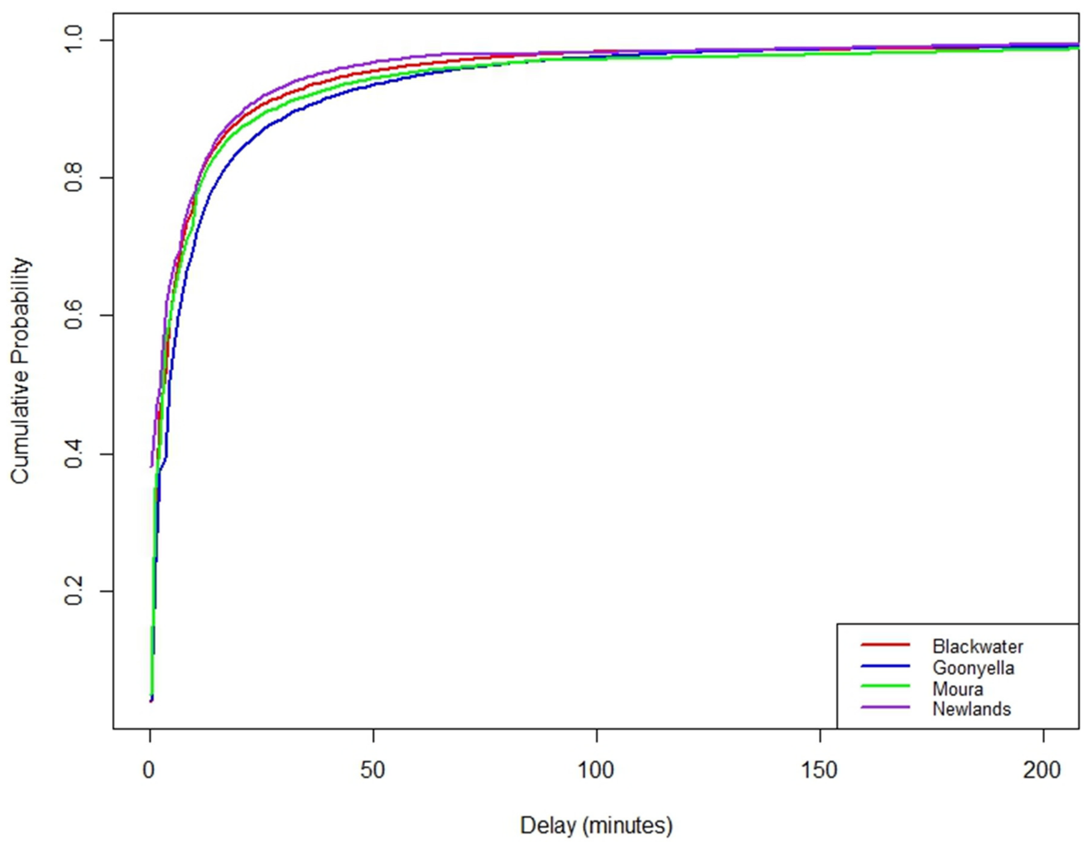
Appendix H: Delay Parameters

H1 General delays frequency per Coal System (Model Inputs)

Coal System	Expected track usage between general delays (kilometres)	Track usage between general delays distribution		
		Distribution	Rate	Upper bound (kilometres)
Newlands-GAPE	406	EXPONENTIAL	2.46E-06	2,031
Goonyella	274	EXPONENTIAL	3.65E-06	1,372
Blackwater	601	EXPONENTIAL	1.66E-06	3,005
Moura	156	EXPONENTIAL	6.42E-06	779

H2 General delays duration per Coal System (Model Inputs)

Coal System	Expected general delays (minutes)	Lower Limit (minutes)	Upper Limit (minutes)
Newlands-GAPE	13	0.4	1,477
Goonyella	18	0.5	2,148
Blackwater	15	0.5	2,158
Moura	17	0.5	850



H3 Coal System Delay minutes allocation (Model Output)

The allocation of delays for each coal system. Values represent the median for the five-year assessment period.

System	Type	Delays per Responsibility (minutes)
Newlands-GAPE	Below	1,154,082
	Above	2,204,455
	Other	260,945
	Sub Total	**3,619,482**
Goonyella	Below	2,856,251
	Above	4,393,793
	Other	1,001,922
	Sub Total	**8,251,966**
Blackwater	Below	1,220,089
	Above	3,571,282
	Other	1,620,039
	Sub Total	**6,411,410**
Moura	Below	182,761
	Above	568,503
	Other	158,451
	Sub Total	**909,715**
Total		**19,192,573**

H4 TSR Frequency (Model Inputs)

Group	Expected Time between TSR Events (hours)	Month	Distribution	Rate
LowTSR	1,421	January	EXPONENTIAL	1.17E-05
	1,734	February	EXPONENTIAL	9.61E-06
	2,095	March	EXPONENTIAL	7.96E-06
	2,000	April	EXPONENTIAL	8.33E-06
	1,885	May	EXPONENTIAL	8.84E-06
	2,097	June	EXPONENTIAL	7.95E-06
	2,184	July	EXPONENTIAL	7.63E-06
	1,769	August	EXPONENTIAL	9.42E-06
	2,202	September	EXPONENTIAL	7.57E-06
	2,557	October	EXPONENTIAL	6.52E-06
	1,903	November	EXPONENTIAL	8.76E-06
	1,651	December	EXPONENTIAL	1.01E-05
MidTSR	720	January	EXPONENTIAL	2.31E-05
	790	February	EXPONENTIAL	2.11E-05
	661	March	EXPONENTIAL	2.52E-05
	658	April	EXPONENTIAL	2.53E-05
	930	May	EXPONENTIAL	1.79E-05
	923	June	EXPONENTIAL	1.81E-05
	1,011	July	EXPONENTIAL	1.65E-05
	1,086	August	EXPONENTIAL	1.53E-05
	1,142	September	EXPONENTIAL	1.46E-05
	1,379	October	EXPONENTIAL	1.21E-05
	1,030	November	EXPONENTIAL	1.62E-05
	905	December	EXPONENTIAL	1.84E-05
HighTSR	465	January	EXPONENTIAL	3.58E-05
	670	February	EXPONENTIAL	2.49E-05
	573	March	EXPONENTIAL	2.91E-05
	495	April	EXPONENTIAL	3.37E-05
	524	May	EXPONENTIAL	3.18E-05
	791	June	EXPONENTIAL	2.11E-05
	727	July	EXPONENTIAL	2.29E-05
	639	August	EXPONENTIAL	2.61E-05
	742	September	EXPONENTIAL	2.25E-05
	736	October	EXPONENTIAL	2.27E-05
	536	November	EXPONENTIAL	3.11E-05
	612	December	EXPONENTIAL	2.72E-05

H5 TSR Duration (Model Inputs)

Group	Expected TSR Duration (hours)	Distribution	Rate	Upper Bound (hours)
LowTSR	628	EXPONENTIAL	2.65E-05	8,760
MidTSR	698	EXPONENTIAL	2.39E-05	8,760
HighTSR	783	EXPONENTIAL	2.13E-05	8,760

H6 TSR Penalty (Model Inputs)

Group	Expected TSR Impact (minutes)	Distribution	Parameter	Value (minutes)
LowTSR	2.50	WEIBULL	alpha	1.549
			beta	2.783
MidTSR	2.24	WEIBULL	alpha	1.348
			beta	2.449
HighTSR	2.22	WEIBULL	alpha	1.201
			beta	2.364

H7 TSR Delay, Duration and TSR Group per Section (Model Inputs & Model Outputs)

System	Line	Section	Model Outputs TSR delay (minutes)	Model Outputs TSR Duration (Proportion of time in a year during which TSR delay is applied)	Model Inputs TSR Group
Newlands	B.L. - Newlands Mine to Collinsville	sBirralee2ToDrakeJunction	2.5	45%	MidTSR
		sCockool2ToHavilah1	2.2	39%	MidTSR
		sCollinsville2ToMcNaughtonJunction	1.7	25%	LowTSR
		sDrakeJunctionToCockool1	2.0	41%	MidTSR
		sHavilah2ToAdaniCarmichaelJunction	1.9	42%	MidTSR
		sMcNaughtonJunctionToSonomaJunction	2.5	14%	LowTSR
		sSonomaJunctionToBirralee1			NoTSR
		sSonomaJunctionToSonomaBalloon	1.8	32%	LowTSR
		sMcNaughtonBalloonToMcNaughtonLoadout	2.4	28%	LowTSR
		sSonomaBalloonToSonomaLoadout	2.1	28%	LowTSR
	B.L. - North Goonyella Junction to Newlands Junction	sByerwenJunctionToSuttorCreek1			NoTSR
		sEaglefieldCreek2ToNorthGoonyellaJunction	2.3	23%	LowTSR
		sNewlandsJunctionToLeichhardtRange1	2.7	16%	LowTSR
		sByerwenLoadoutToByerwenBalloon	1.6	20%	LowTSR
		sLeichhardtRange2ToByerwenJunction	2.5	29%	LowTSR
		sSuttorCreek2ToEaglefieldCreek1	2.5	15%	LowTSR
	B.L. - Pring to Abbot Point	sAbbotPointEntryToAbbotPoint1			NoTSR
		sAbbotPointEntryToAbbotPoint2			NoTSR
		sDurroburraToPring1			NoTSR
		sKailiToWathana1			NoTSR
		sKailiToDurroburra	2.2	18%	LowTSR

			Model Outputs		Model Inputs
System	Line	Section	TSR delay (minutes)	TSR Duration (Proportion of time in a year during which TSR delay is applied)	TSR Group
		sKincorth4ToKaili	4.4	28%	LowTSR
GAPE	M.L. - Collinsville to Pring	sAberdeen2ToBinbee1	3.2	24%	LowTSR
		sAlmoolaToCollinsville1	2.2	32%	LowTSR
		sArmuna2ToAberdeen1	2.3	27%	LowTSR
		sBinbee2ToBriaba	2.1	25%	LowTSR
		sBriabaToPelicanCreek			NoTSR
		sBuckley2ToArmuna1	1.6	57%	HighTSR
		sPelicanCreekToAlmoola	2.1	19%	LowTSR
		sPring2ToBuckley1	2.7	26%	LowTSR
Goonyella	B.L. - Blair Athol Mine to Wotonga	sBlackridge2ToBlairAtholGrainlineJunction	2.1	31%	LowTSR
		sCarmichaelBranchJunctionToVillafranca1			NoTSR
		sCavalRidgeJunctionToCarmichaelBranchJunction	2.8	31%	LowTSR
		sCavalRidgeJunctionToCavalRidgeBalloon			NoTSR
		sMoranbah2ToCavalRidgeJunction	2.3	24%	LowTSR
		sMountMcLaren2ToBlackridge1	2.0	20%	LowTSR
		sVillafranca2ToMountMcLaren1	2.2	26%	LowTSR
		sWotongaAngleSouthToMoranbah1	2.2	22%	LowTSR
		sBlairAtholGrainlineJunctionToBlairAtholJunction	2.5	25%	LowTSR
	B.L. - Coppabella to Wotonga	sBroadlea2ToCarboroughDownsJunction	2.5	11%	LowTSR
		sCoppabellaAngleWestToBroadlea1	1.9	46%	HighTSR
		sIsaacPlainsJunctionToWotonga	1.6	25%	LowTSR
		sMallawaToIsaacPlainsJunction	2.3	18%	LowTSR
		sWotongaToWotongaAngleNorth	2.1	37%	MidTSR
		sCarboroughDownsJunctionToMallawa	2.3	27%	LowTSR

System	Line	Section	Model Outputs: TSR delay (minutes)	Model Outputs: TSR Duration (Proportion of time in a year during which TSR delay is applied)	Model Inputs: TSR Group
		sCoppabella2ToCoppabellaAngleSouth	2.7	20%	LowTSR
		sCoppabella2ToCoppabellaAngleWest	2.4	56%	HighTSR
	B.L. - Gregory Junction to Coppabella	sBundoora2ToGermanCreekJunction	2.2	20%	LowTSR
		sDunsmure1ToDunsmure2			NoTSR
		sDunsmure2ToLakeVermontJunction	2.3	46%	MidTSR
		sDysart2ToStephens1	2.2	22%	LowTSR
		sGermanCreekJunctionToIronpotCreekJunction			NoTSR
		sIngsdon2ToMillenniumJunction	2.4	33%	MidTSR
		sIronpotCreekJunctionToOakyCreekJunction	2.6	26%	LowTSR
		sLakeVermontJunctionToDysart1	2.1	25%	LowTSR
		sMillenniumJunctionToRedMountain1			NoTSR
		sNorwichPark2ToSiennaJunction	2.1	13%	LowTSR
		sOakyCreekJunctionToOakyCreekBalloon	2.7	19%	LowTSR
		sOakyCreekJunctionToOakycreekpassingloop1	2.9	21%	LowTSR
		sOliveDownsSouthJunctionToWinchester1	2.3	18%	LowTSR
		sPeakDowns2ToHarrow1	2.1	41%	MidTSR
		sRedMountain2ToOliveDownsSouthJunction	1.9	21%	LowTSR
		sSaraji2ToDunsmure1	2.0	41%	MidTSR
		sSiennaJunctionToMiddlemountJunction	2.8	26%	LowTSR
		sStephens2ToNorwichPark1	2.0	50%	MidTSR
		sWinchester2ToPeakDowns1	2.3	37%	MidTSR
		sDysartEastBalloonToDysartEastLoadout	2.2	27%	LowTSR
		sHarrow2ToSaraji1	1.9	25%	LowTSR
		sLakeVermontBalloonToLakeVermontLoadout	2.5	24%	LowTSR

			Model Outputs		Model Inputs
System	Line	Section	TSR delay (minutes)	TSR Duration (Proportion of time in a year during which TSR delay is applied)	TSR Group
		sLakeVermontJunctionToDysartEastBalloon	2.6	34%	LowTSR
		sOakyCreekPassingLoop2ToGregoryJunction	2.4	32%	LowTSR
		sPeakDowns1ToPeakDownsBalloon	2.1	22%	LowTSR
		sPeakDownsBalloonToPeakDownsLoadout	3.0	33%	LowTSR
	B.L. - Hail Creek Mine to South Walker Creek Junction	sBeeCreekJunctionToHailCreekBalloon			NoTSR
		sBidgerleyJunctionToBeeCreekJunction			NoTSR
		sBidgerleyJunctionToBidgerleyBalloon	2.8	19%	LowTSR
		sSouthWalkerJunctionToBidgerleyJunction	2.4	26%	LowTSR
		sHailCreekBalloonToHailCreekLoadout	2.0	23%	LowTSR
	B.L. - Jilalan to Port of Hay Point	sDalrympleBay1ToDalrympleBayExit			NoTSR
		sDalrympleBay2ToDalrympleBayExit			NoTSR
		sDalrympleBay3ToDalrympleBayExit			NoTSR
		sDalrympleBay4ToDalrympleBayExit			NoTSR
		sDalrympleBayEntryToDalrympleBay1	2.1	24%	LowTSR
		sDalrympleBayEntryToDalrympleBay2	2.4	22%	LowTSR
		sDalrympleBayEntryToDalrympleBay3	1.6	21%	LowTSR
		sDalrympleBayEntryToDalrympleBay4	2.5	25%	LowTSR
		sDalrympleCrossoverPointsToDalrympleBayEntry			NoTSR
		sDalrympleCrossoverPointsToHayPointEntry	2.1	19%	LowTSR
		sDalrympleCrossoverPointsToPraguelands	1.7	48%	MidTSR
		sHayPointEntryToHayPoint1			NoTSR
		sHayPointEntryToHayPoint2			NoTSR
		sHayPointEntryToHayPoint3			NoTSR
		sPraguelandsToJilalan1	1.8	23%	LowTSR

			Model Outputs		Model Inputs
System	Line	Section	TSR delay (minutes)	TSR Duration (Proportion of time in a year during which TSR delay is applied)	TSR Group
		sDalrympleBayStagingToDalrympleCrossoverPoints	2.5	29%	LowTSR
	B.L. - North Goonyella Mine to Wotonga	sFisherCreekJunctionToGoonyellaJunction			NoTSR
		sGoonyellaJunctionToRiverside1	2.0	22%	LowTSR
		sNorthGoonyellaJunctionToNorthGoonyellaBalloon	2.9	25%	LowTSR
		sRiversideJunctionToRiversideBalloon	2.8	26%	LowTSR
		sWotongaAngleNorthToMoranbahNorthPassingLoop1			NoTSR
		sWotongaAngleNorthToWotongaAngleSouth			NoTSR
		sGrosvenorWestJunctionToFisherCreekJunction	3.4	25%	LowTSR
		sMoranbahNorthJunctionToGrosvenorWestJunction	3.4	15%	LowTSR
		sMoranbahNorthPassingLoop2ToMoranbahNorthJunction	2.5	38%	MidTSR
		sRiversideBalloonToRiversideLoadout	2.0	31%	LowTSR
		sRiversideJunctionToMabbinCreekJunction	1.9	17%	LowTSR
	M.L. - Coppabella to Jilalan	sBalookToWandoo	2.4	44%	HighTSR
		sBlackMountainToHatfieldChoke	3.0	28%	LowTSR
		sBolingbrokeToBalook	1.7	47%	HighTSR
		sBraesideToMindi	2.0	42%	MidTSR
		sHatfield2ToBolingbroke	1.6	44%	HighTSR
		sHatfieldChokeToHatfield1			NoTSR
		sJilalan2ToYukan1	2.2	26%	LowTSR
		sMacarthurJunctionToCoppabella1	1.9	39%	MidTSR
		sMindiToSouthWalkerJunction	2.3	58%	HighTSR
		sSouthWalkerJunctionToTootoolah	2.3	27%	LowTSR
		sTootoolahToMacarthurJunction	2.1	37%	MidTSR
		sWaitara2ToBraeside	2.0	42%	MidTSR

			Model Outputs		Model Inputs
System	Line	Section	TSR delay (minutes)	TSR Duration (Proportion of time in a year during which TSR delay is applied)	TSR Group
		sWandooToWaitara1	3.3	20%	LowTSR
		sYukan2ToBlackMountain	2.0	37%	MidTSR
		sNebo3ToBraeside	2.5	28%	LowTSR
		sWaitara2ToNebo1	1.9	23%	LowTSR
Blackwater	B.L. - Burngrove to Bluff	sBlackwater2ToSagittarius	2.6	23%	LowTSR
		sBlackwaterAngleToTaurusJunction			NoTSR
		sBluff2ToBoonalPoints	2.3	44%	MidTSR
		sBoonalPointsToBoonal	2.5	29%	LowTSR
		sBoonalToBlackwater1	2.0	36%	MidTSR
		sRangalToBurngroveJunction	2.6	35%	MidTSR
		sTaurusJunctionToKoorilgahBalloon			NoTSR
		sCurraghBalloonToCurraghLoadout	1.9	37%	MidTSR
		sSagittariusToCurraghBalloon	1.4	42%	MidTSR
		sSagittariusToRangal	3.2	23%	LowTSR
	B.L. - Callemondah to Port of Gladstone	sCallemondahEntryToByellee	1.9	47%	MidTSR
		sCallemondahEntryToMtMillerCrossover	3.0	16%	LowTSR
		sCallemondahYard2ToGladstonePowerhouseJunction1	2.6	29%	LowTSR
		sComalcoJunctionToComalcoBalloon	2.4	26%	LowTSR
		sComalcoJunctionToFishermansLandingBalloon			NoTSR
		sGladstonePowerhouseToCallemondahYard2			NoTSR
		sMtMillerToComalcoJunction	3.4	19%	LowTSR
		sMtMillerToWigginsIslandJunction			NoTSR
		sNCLMoura2ToCallemondahYard2			NoTSR
		sNCLMoura2ToParana	2.0	14%	LowTSR

			Model Outputs		Model Inputs
System	Line	Section	TSR delay (minutes)	TSR Duration (Proportion of time in a year during which TSR delay is applied)	TSR Group
		sWigginsIslandBalloonToWigginsIslandEntry	2.8	21%	LowTSR
		sWigginsIslandBalloonToWigginsIslandJunction	2.1	23%	LowTSR
		sCallemondahEntryToNCLMoura1	2.6	23%	LowTSR
		sComalcoBalloonToComalcoUnloader	2.6	23%	LowTSR
		sParanaToSouthGladstone	2.6	13%	LowTSR
	B.L. - Gregory Mine to Burngrove	sCrew2ToWashpoolJunction	3.3	20%	LowTSR
		sEnshamJunctionToCrew1	2.0	36%	MidTSR
		sFairhill2ToEnshamJunction	2.1	27%	LowTSR
		sGregoryJunctionToGregoryBalloon			NoTSR
		sGregoryJunctionToYanYan2	2.4	26%	LowTSR
		sWashpoolJunctionToBurngroveJunction			NoTSR
		sYanYan1ToFairhill1	1.6	41%	MidTSR
		sYanYan2ToKestrelBalloon			NoTSR
		sEnshamBalloonToEnshamLoadout	2.2	39%	LowTSR
		sEnshamJunctionToEnshamBalloon	1.9	30%	LowTSR
		sGregoryBalloonToGregoryLoadout	1.2	16%	LowTSR
		sKestrelBalloonToKestrelLoadout	2.5	35%	LowTSR
	B.L. - Rolleston Mine to Rangal	sBoorgoonJunctionToKinrolaJunction	1.9	22%	LowTSR
		sKenmare2ToMemooloo1	2.3	33%	MidTSR
		sKinrolaJunctionToKenmare1			NoTSR
		sKinrolaJunctionToKinrolaBalloon	3.0	20%	LowTSR
		sMemooloo2ToStarlee1	1.7	38%	MidTSR
		sMeteorDownsSouthJunctionToRollestonBalloon	3.8	26%	LowTSR
		sRangalToTikardi1	2.3	28%	LowTSR

			Model Outputs		Model Inputs
System	Line	Section	TSR delay (minutes)	TSR Duration (Proportion of time in a year during which TSR delay is applied)	TSR Group
		sStarlee2ToMeteorDownsSouthJunction	2.6	39%	MidTSR
		sTikardi2ToBoorgoonJunction	2.8	30%	LowTSR
		sKinrolaBalloonToKinrolaLoadout	3.0	25%	LowTSR
		sRollestonBalloonToRollestonLoadout	2.2	21%	LowTSR
	M.L. - Bluff to Callemondah	sAldoga2ToEastEndJunction	1.9	46%	MidTSR
		sAmbroseToEpala1	2.0	32%	MidTSR
		sArcherToMidgee	1.9	58%	HighTSR
		sAroona2ToDuaringa1	2.5	65%	HighTSR
		sBajool2ToArcher	1.4	60%	HighTSR
		sCuttingToTunnel			NoTSR
		sDingoToUmolo	2.6	21%	LowTSR
		sDuaringa2ToWallaroo	2.1	45%	HighTSR
		sEastEndJunctionToMtLarcom1			NoTSR
		sEdungalbaToAroona1			NoTSR
		sEpala2ToRaglan1	1.9	43%	MidTSR
		sGracemereToScrubbyCreek			NoTSR
		sGrantleigh2ToCutting	1.8	23%	LowTSR
		sKabra2ToWarren	2.6	21%	LowTSR
		sKennedyCreekToWycarbah			NoTSR
		sMarmorToBajool1			NoTSR
		sMidgeeToRocklands1			NoTSR
		sMtLarcom2ToAmbrose	2.4	16%	LowTSR
		sParnabalToWalton	2.3	39%	MidTSR
		sRaglan2ToTwelveMileCreek	1.7	36%	MidTSR

			Model Outputs		Model Inputs
System	Line	Section	TSR delay (minutes)	TSR Duration (Proportion of time in a year during which TSR delay is applied)	TSR Group
		sRocklands2ToSheepwash	2.7	28%	LowTSR
		sScrubbyCreekToKabra1	1.9	17%	LowTSR
		sSheepwashToGracemere	2.2	23%	LowTSR
		sTryphinia2ToDingo	2.7	25%	LowTSR
		sTunnelToEdungalba	1.4	43%	MidTSR
		sTwelveMileCreekToMarmor	1.9	31%	MidTSR
		sUmoloToParnabal	1.3	47%	MidTSR
		sWallarooToTryphinia1	2.1	52%	MidTSR
		sWaltonToBluff1	2.6	21%	LowTSR
		sWarrenToKennedyCreek	2.2	31%	MidTSR
		sWigginsIslandJunctionToYarwun	2.5	23%	LowTSR
		sWindah2ToGrantleigh1	2.4	38%	MidTSR
		sWycarbahToWestwood1	1.9	41%	MidTSR
		sYarwunToAldoga1	1.7	47%	MidTSR
		sWestwood2ToWindah1	1.3	42%	MidTSR
Moura		sCallemondahEntryToByellee			NoTSR
		sNCLMoura2ToParana			NoTSR
	B.L. - Earlsfield to Callide	sDakenba2ToCallideBalloon	1.7	36%	MidTSR
		sKoonkool2ToDakenba1	2.1	25%	LowTSR
		sCallideBalloonToCallideLoadout	2.0	41%	MidTSR
	B.L. - Earlsfield to Dumgree	sAnnandale2ToEarlsfield	2.1	34%	MidTSR
		sBoundaryHillJunctionToAnnandale1			NoTSR
		sDumgree2ToBoundaryHillJunction	2.8	24%	LowTSR
	B.L. - Earlsfield to Moura	sBaralabaInterfaceToBaralabaBalloon			NoTSR

			Model Outputs		Model Inputs
System	Line	Section	TSR delay (minutes)	TSR Duration (Proportion of time in a year during which TSR delay is applied)	TSR Group
		sBelldeen2ToMouraJunction	1.7	42%	MidTSR
		sEarlsfieldToBelldeen1	1.7	51%	HighTSR
		sMouraJunctionToBaralabaJunction	1.9	24%	LowTSR
	M.L. - Dumgree to Callemondah	sClarke2ToFry1	2.3	49%	HighTSR
		sFry2ToMtRainbow1	2.6	15%	LowTSR
		sGrahamToStirrat1	2.0	25%	LowTSR
		sMtRainbow2ToDumgree1	2.1	42%	MidTSR
		sStirrat2ToClarke1	1.8	60%	HighTSR
		sStowe2ToGraham	1.9	15%	LowTSR

Appendix I: Above Rail Parameters

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

I1 Modelled Consists

[redacted]

I2 Crew Change Locations (Model Inputs)

[redacted]

I3 Crew Change Delay (Model Outputs)

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. Values represent the median for the five-year assessment period.

	Model Outputs	
System	**Crew Change Average Delay (minutes)**	**Total Crew Change Delay (minutes)**
Newlands-GAPE	6.9	42,878
Goonyella	9.4	132,017
Blackwater	13.1	136,879
Moura	8.1	19,678
Total	**9.4**	**331,449**

I4 Above Rail Maintenance per Depot Assumptions (Model Inputs)

[redacted]

[redacted]