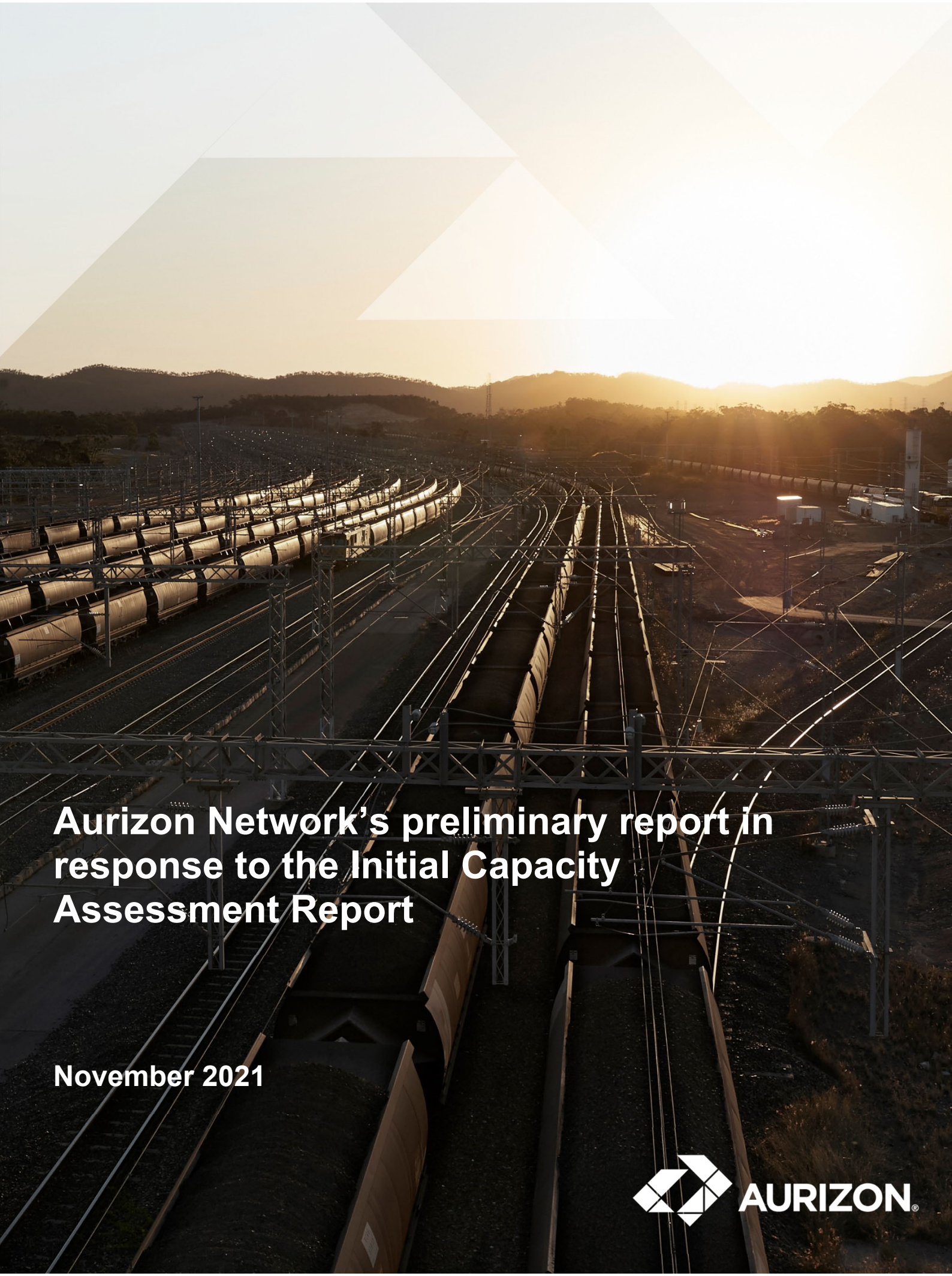

Aurizon Network's preliminary report in response to the Initial Capacity Assessment Report

November 2021

AURIZON

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Introduction

Overview

This report details Aurizon Network's preliminary review of the Initial Capacity Assessment Report (**ICAR**) released on 28 October 2021 by Coal Network Capacity Co Pty Ltd, the Independent Expert jointly appointed by Aurizon Network and its customers under Aurizon Network's UT5 Access Undertaking (**UT5**).

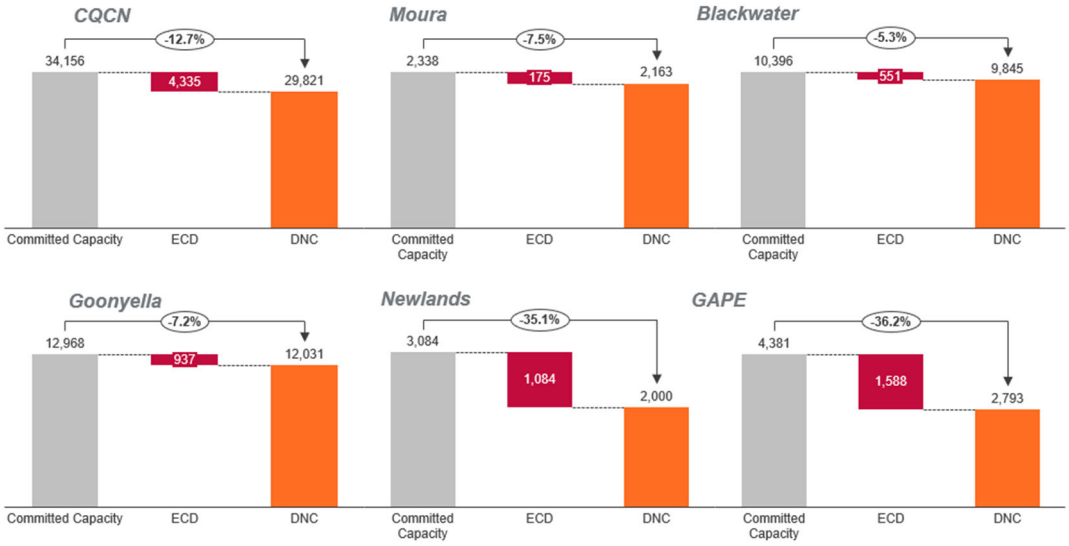
In this preliminary response to the ICAR, Aurizon Network seeks to begin the consultation process by providing our Customers with Aurizon Network's view as to the causes of the Existing Capacity Deficits identified in the ICAR, for each of the Newlands, GAPE, Goonyella, Blackwater, and Moura Systems. Aurizon Network provides proposed options that could most effectively and efficiently address the Existing Capacity Deficits (**Transitional Arrangements**), and indicative timeframes within which these Transitional Arrangements could be implemented.

Capitalised terms in this report have the meaning given to those terms in UT5 unless otherwise defined.

ICAR Findings

The Independent Expert's ICAR indicates that the Central Queensland Coal Network (CQCN) can deliver on average across the assessment period, 87.3% of Committed Capacity[1]. The ICAR indicates Existing Capacity Deficits exist in each of the Coal Systems, affecting most Access Holders. Figure 1 below provides a summary of the results for each system.

Figure 1 – ICAR Deliverable Network Capacity Results Summary for FY23 - Train Paths



[1] The ICAR refers to Coal traffic only. The SOP indicates that non-coal services, plus an allowance for preserved paths has been included in the modelling. Aurizon Network assumes that all non-coal and preserved path requirements are achieved.

The ICAR provides an indication as to the likely cause of the constraint in each Coal System. A summary of the constraints identified by the Independent Expert is provided below. The ICAR also considers whether projects identified previously through Aurizon Network's Expansion process may assist in mitigating the constraints. Aurizon Network has reviewed each of these projects and considers in this report whether they are necessary.

Table 1 – Summary of constraints identified in the ICAR

System	Constraint
Newlands	Pring to Newlands Junction Branch Lines
GAPE	Pring to Newlands Junction Branch Lines
Goonyella	Cargo Assembly operations at DBCT and yard congestion
Blackwater	Yard congestion
Moura	Yard congestion

Aurizon Network's Intent

Aurizon Network has made the commitment to our customers to increase capacity of the Rail Infrastructure where the Independent Expert identifies shortfalls. Our objective is to recommend options that would most efficiently and effectively address the Existing Capacity Deficits. In proposing Transitional Arrangements, Aurizon Network has largely focused on solutions that we can implement.

As required by UT5, the ICAR sets out the Deliverable Network Capacity of the Rail Infrastructure based on a given set of assumptions, modelling between the boundaries at the loadouts and unloaders and consideration of the operating mode of each port. The ICAR necessarily focuses on the capacity of the Rail Infrastructure without regard to constraints outside of these boundaries.

Within any supply chain, the capacity and operation of each element of the supply chain impacts on the capacity and operation of each other element. The Independent Expert will soon commence its System Capacity Assessment, which will consider the capacity of the supply chain in its entirety, having regard to the capacity and operation of the loading facilities, load out facilities and export terminals for information purposes only for the benefit of Aurizon Network, Access Holders, Access Seekers and their respective Customers and Train Operators.

Aurizon Network considers that investment in the Rail Infrastructure must balance cost and efficiency against investment in other elements of the supply chain to increase overall supply chain capacity. There is a risk that new constraints are identified as part of the System Capacity Assessment, and that Transitional Arrangements proposed for the Rail Infrastructure may not be the most effective way to create capacity within the supply chain. Customers have the option to review the merits of investment in each component of the supply chain, and to choose which element to optimise. Through consultation with our Customers, Aurizon Network will be seeking to better understand preference for investment to provide a fit for purpose supply chain.

Customer Engagement

Aurizon Network will engage with our customers to discuss the outcomes of the ICAR and seek to agree on a plan that best addresses the Existing Capacity Deficits for the relevant Coal Systems. This

report provides the intended process for Aurizon Network's engagement on Transitional Arrangements, and further information on the process once Transitional Arrangements have been either agreed or proposed to the QCA, the Independent Expert and the Chair of the RIG.

We recognise the need to balance the commitment of expenditure with the provision of cost-effective solutions and we understand that our customers may have varying strategic plans for longer term activity in the CQCN. We understand that in the short term, actual demand levels may influence whether there is a need for solutions to be immediately implemented.

Aurizon Network is committed to working with our customers to develop a sensible plan to address the Existing Capacity Deficits as needed.

Process Overview

Regulatory Process Overview

In accordance with Part 7A.2 of UT5, the Independent Expert has been appointed to undertake an assessment of the Deliverable Network Capacity **(DNC**) of Aurizon Network's Rail Infrastructure. This assessment seeks to simulate the maximum throughput of each of the Coal Systems, taking into consideration real world performance inputs detailed in the System Operating Parameters (**SOPs**).

The results detailed in the ICAR are not representative of the capability of the supply chain in its totality. For supply chain throughput to be assessed, other elements, from coal availability through to port stockpile and ship loading capacity, must be considered. The System Capacity Assessment to be undertaken by the Independent Expert will further inform the industry of overall supply chain capability.

The modelling approach for the DNC analysis differs from the historical way that Aurizon Network has undertaken capacity modelling and that has been required by previous undertakings, which was largely based on parameters specified in Access Agreements and assessed the capability of the Rail Infrastructure without consideration of the effect of constraints and operational losses in other parts of the supply chain. The DNC assessment is required to consider all constraints in the network including external factors outside of Aurizon Network's control, such as rollingstock capability, mine and port availability, delays and failures, and the supply chain operating mode.

With these changes, the DNC differs from what Aurizon Network has previously reported. Where the Independent Expert has identified an Existing Capacity Deficit, Aurizon Network is committed to addressing this through proposed Transitional Arrangements. To do so, the following process applies:

IE releases the ICAR	The ICAR has identified Existing Capacity Deficits in the Newlands, GAPE, Goonyella, Blackwater, and Moura Systems
Preliminary Report	Aurizon Network's Preliminary Report provides our Customers with our initial views on the causes of the Existing Capacity Deficits, and potential Transitional Arrangements.
Customer Engagement	Aurizon Network commences consultation with affected End Users to seek agreement on Transitional Arrangements required to address the Existing Capacity Deficits.
Detailed Report	By 1 February 2022, Aurizon Network will consolidate customer feedback and finalise our recommendations on Transitional Arrangements in the Detailed Report and provide to the QCA, the Independent Expert and the Chair of the RIG.
Transitional Arrangement Approval	If agreement is reached on the proposed Transitional Arrangements, the Independent Expert will consider and approve the efficiency of any capital spend before it's incurred. If no agreement is reached, the Independent Expert will make a recommendation to the QCA for its determination as to the most efficient way of addressing capacity deficits.
Implementation	Following QCA determination, Aurizon Network will implement those Transitional Arrangements which are within its control and which would not place it in breach of UT5, any Access Agreements or any applicable Safeworking Procedures and Safety Standards.

Transitional Arrangements to create capacity

Transitional Arrangements are changes that can be made to address any Existing Capacity Deficits identified within the ICAR. These changes can be classified under five different categories:

- Changes to the operation and maintenance practices for the Rail Infrastructure;
- Changes to the operations of Rollingstock by Railway Operators;
- Changes to the operation and maintenance practices in respect of load-out facilities by customers and other interfaces forming part of the Supply Chain;
- Voluntary relinquishment of Access Rights by Access Holders, where they are entitled to do so in accordance with their Access Agreement; and
- Options for Expansions.

Levers that can influence Capacity

The following elements of the supply chain have the potential to contribute to an Existing Capacity Deficit, either individually or collectively. These levers have been reviewed in determining what the potential cause of an Existing Capacity Deficit is.

Loadouts	Speed and availability of loadouts influences the number of trains that can be loaded and time between trains. When a system operates as a cargo assembly system this is important to achieve parcel builds within the required timeframes.
Rail Infrastructure configuration	In both Goonyella and Blackwater, the mainline is fully duplicated. Branch lines are generally single line sections, with passing loops. The longest section between passing loops sets the headway that defines the separation time between trains and hence the maximum number of trains in a period.
Yards	The function of a rail yard is to dispatch empty trains to jobs and to stage loaded trains to the port destination pit. Other activities including provisioning, maintenance, examinations and shunting of trains may occur. Yards are used for trains to wait until their next connection and dispatch. The ability for a train to move through a yard influences its overall cycle velocity, and the capability of the Rail Infrastructure.
Port Unloading & Operating Mode	The time it takes a train to unload sets the number of port unloading slots each day. Port operating modes influence rail capacity through specification on the sequence that trains unload. This can affect demand through parcel build requirements. Where a port operates in a Cargo Assembly mode, often the rail components of the supply chain become less efficient, acting as additional storage.
Rollingstock Fleet	For a set demand, the number of consists required can be calculated by focusing on the turnaround time of each consist. When too many consists are installed, the Rail Infrastructure becomes congested, and cycle velocity is impacted. Misalignment between above rail contracts and below rail contracts can lead to under or over delivery of contracted Train Service Entitlements.
Availability	Availability of the Rail Infrastructure is influenced by the amount and delivery of maintenance activities that occur on the network. Availability is increased through taking less time to deliver maintenance activities or performing less maintenance. This may lead to increased cost of undertaking maintenance or lower reliability.
Reliability	Incidents or restrictions on the Rail Infrastructure can delay trains and cause schedule variation. This often manifests in day of operation loss and variability.
Scheduling	The way scheduling is conducted can influence throughput and the reliability of the schedule. Reliable schedules require sufficient ability to account for variations that occur. Optimising turnaround time requires reliable alignment of connection times between services.

Aurizon Network's Review Process

Aurizon Network's preparations to respond to the ICAR have been progressing for over 18 months. Where an Existing Capacity Deficit has been identified, for the purpose of this Preliminary Report, Aurizon Network has performed in-house analysis to determine the potential cause and options to resolve.

MODEL DEVELOPMENT

As Aurizon Network does not have a copy of the Independent Expert's simulation model, Aurizon Network has recently enhanced the capability of our own Central Queensland Capacity Simulation Model (CQCSM) to reflect the requirements of the definition of DNC under UT5. Key changes include:

- Development of a 5 year forward maintenance plan, based on approved Maintenance and Renewals Strategies and Budgets for each Coal System (**MRSB**), with adjustments for major upcoming works
- Adjustments to load and unload time distributions to reflect historical performance
- Updated Sectional Running Times (**SRTs**) to reflect currently scheduled SRTs
- Inclusion of above rail delays and incidents, and updates to below rail delays
- Calibration of yard time to reflect average time spent in the yard for activities other than provisioning
- Adjustment to consist numbers to reflect actual operations plus planned consist numbers.

The CQCSM has been calibrated and verified to align with the actual performance of the CQCN. Calibration has been carried out by adjusting a range of input parameters such that model outputs replicate real world performance for a sample year, ensuring alignment between modelled and historical actual parameters for:

- Achieved throughput
- Number of consists
- Cycle times
- Turnaround times
- Delays due to faults and failures.

This provides confidence that when modelling the performance of the Rail Infrastructure at levels not historically achieved, for example at Committed Capacity, the results will be a reasonably accurate representation of the expected reality.

ASSESSMENT PROCESS

To evaluate which levers are contributing to an Existing Capacity Deficit and potential solutions, the following process was undertaken. Information from planning and scheduling reviews, as well as consultation with Rail Operators and our Customers has informed areas for review and potential solutions.

Base Model	A simulation is run to reflect DNC by solving for contracted capacity, with real world parameters. This provides base results to test causes and solutions.
Evaluate TSEs	From the results of the base scenario, the first focus was on individual TSEs achieved. Where certain mine-port combinations saw larger shortfalls, this could point to a port specific issue, or a branch line issue. Where all contracts performed equally, this indicates a common constraint
Evaluate Cycle Time	To evaluate further issues, cycle time was analysed to determine where trains are spending time on the network, and where delays are being seen. This provides insight into whether trains are waiting in the yard to get to a port slot, or meeting delays on the network due to congestion downstream.
Sensitivity Analysis	To test specific causes, sensitivity tests are modelled. For example, tests have been performed to determine whether port unload times are constraining throughput, whether yard time is contributing to shortfalls, and whether balloon loop infrastructure is constraining contracts from being achieved.
Develop Solutions	Where a constraint is identified, options to rectify that constraint have been tested. Options have been identified based on operational projects currently being considered, previous expansion studies, and from sensitivities run above.
Develop Results	To select the proposed solutions, we have focused on balancing time to deliver, efficiency of cost, and certainty of capacity created. In some cases where a constraint is identified, there is only one solution. To achieve contracted demand, generally a portfolio of Transitional Arrangements is required. As one bottleneck is resolved, another may appear upstream, so to realise the full benefit, both must be resolved.

RESULTS VERIFICATION

As outlined above, the capacity benefits of each option are based on Aurizon Network's internal modelling. Verification by the Independent Expert's dynamic simulation model is required to confirm the respective capacity created. Aurizon Network and the Independent Expert have discussed this and intend to undertake this verification process as Aurizon Network works through to developing the Detailed Report and final recommendations.

In any event, the Independent Expert will be required to review and approve the efficiency and prudency of any proposed Expansions prior to construction[2].

[2] Process as described in Part 7A.5 (i) of UT5

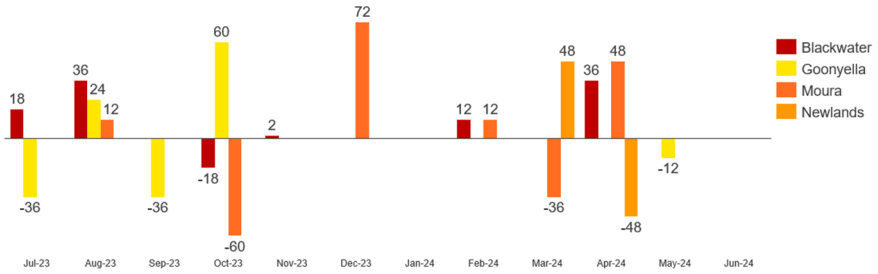
Modelling Limitations

There are limitations in how accurately any modelling can reflect actual operations. Modelling limitations can influence the accuracy of modelled outputs and effectiveness of solutions to address Existing Capacity Deficits.

The ICAR contains a list of improvements highlighting where the Independent Expert's current model can be further developed. Aurizon Network has reviewed this and seeks to provide context as to the potential impact on Deliverable Network Capacity. Where possible, we have considered these additional factors in proposing potential Transitional Arrangements.

Focus	*Details*
Scheduling Environment	• Simulation modelling takes a set demand input and seeks to achieve this demand. It assumes that at all times demand remains constant and available. • In reality, variation exists during each stage of the scheduling process from ordering through to execution. Variation comes from commercial overlays for ordering, coal availability, port availability, and issues from the previous schedule carrying forward. • Aurizon Network understands this variation is not considered in a DNC modelling but acknowledges that, in reality, variation to schedule creates lost opportunity for system throughput.
Schedule Delivery and Pathing	• Aurizon Network's train planning and scheduling process produces a schedule of services that seeks to optimise for throughput. Each crossing activity is planned. In the day of operations, Network Control manages out of course running in accordance with the Traffic Management Principles in UT5. • This varies from the approach used by in the Independent Expert's dynamic simulation model. While the simulation model includes a dispatch methodology that seeks to mimic pathing separation used in each system, once dispatched, the model applies a run when ready approach, and traffic management is determined as a congestion situation arises. • Aurizon Network considers that modelled outcomes are likely to produce longer cycle times, and result in higher congestion on branch lines. There is also the risk that with this approach, the impact on yard congestion is underestimated as trains are simulated to depart the yard as soon as they are ready, rather than to meet scheduled connections.
Yard Management	• Simulating the number of activities that occur in each of the yards requires a large amount of detail to be constructed in the model. • The Independent Expert's model replicates yards at a macro level. This means that specific roads for activities such as provisioning are not represented, and unplanned activities have not been recognised. In addition, other activities in the yard, such as above rail shunting and connection requirements may not be captured. • Aurizon Network's model seeks to replicate the operation of the yard by ensuring dwells on each road represent activities as they occur in specific locations. This enables identification of potential constraints associated with yard capacity and operations.
Maintenance Activities - FY23 Maintenance input	• Aurizon Network provided maintenance inputs for FY23 and FY24 to the Independent Expert prior to the FY23 MRSB process commencing. As such, the maintenance input was largely based on FY22's program, with some changes for known major works. • Aurizon Network has reviewed the now developed draft FY23 closure program with the FY23 maintenance input. The following variation was identified (hrs):

Figure 2 – Variance in FY23 MRSB proposed system closures from SOP assumption (hrs)



- Aurizon Network considers that the above-described variations are minimal when considered annually, and unlikely to materially affect the Deliverable Network Capacity.

Maintenance Activities – Moving Maintenance

- Moving maintenance includes resurfacing, ballast trains, turnout and mainline grinding, rail inspection vehicles, vegetation management traffic, and work trains carrying materials to job sites.
- Over the past 4 years, these services account for 4500 trains each year. This is an additional 6.3% of Train Paths above Committed Capacity.
- Historical information on the number and location of each moving maintenance train was provided to the Independent Expert, along with a schedule for Hi-rail track inspections.
- It is unclear in the SOP and ICAR whether moving maintenance to this level has been included within the simulations, or whether sufficient pathing in between trains is available to service these maintenance activities.
- If these maintenance activities have not been adequately accounted for, there is the potential that the Existing Capacity Deficit could be understated. Aurizon Network has sought to address this in our response, by testing all Transitional Arrangements with simulations inclusive of moving maintenance activities.

Delays

- Aurizon Network understands that the Independent Expert's model generates a delay output that represents total delay minutes. This includes time that is generally included in the schedule as planned dwell.
- Aurizon Network also understands that all delays have been grouped as a single input, regardless of cause.
- The data that the Independent Expert has provided can therefore not be directly compared against actual results to ensure that the simulation is applying delays adequately.
- Aurizon Network agrees that further work is required in this space to ensure the simulated cycle times better reflect the impact of delays.

System Review - Newlands and GAPE

ICAR Review

The ICAR indicates that there is an Existing Capacity Deficit in both the Newlands and GAPE Systems. It indicates that the cause of the constraint is common across both systems. As such, Aurizon Network has reviewed the potential Transitional Arrangements for these systems jointly. The ICAR findings and key SOP assumptions are summarised below:

Table 2 - ICAR Summary for Newlands and GAPE – FY23 Results

		Newlands[3]		GAPE[4]	
Committed Capacity		3,145 Train Paths	21.5mtpa	4,381 Train Paths	29.7mtpa
Deliverable Network Capacity		2,077 Train Paths	14.2mtpa	2,793 Train Paths	19mtpa
Existing Capacity Deficit		1,084 Train Paths	7.3mtpa	1,588 Train paths	10.8mtpa
Key SOP & Output Parameters[5]	*Total Consists Modelled*	18 Consists across 3 Operators			
	Average System Cycle Time	24.6hrs across GAPE and Newlands			
	Port Assumptions	Even Railings, average unload time of 1:17 (based on nominal payload of 7038t).			
	Total Maintenance Scope Hours	867 hours			

The ICAR indicates that the GAPE and Newlands systems combined can achieve a throughput of 33mtpa in FY23. This represents an Existing Capacity Deficit of 34% and 36% in the Newlands and GAPE Systems respectively.

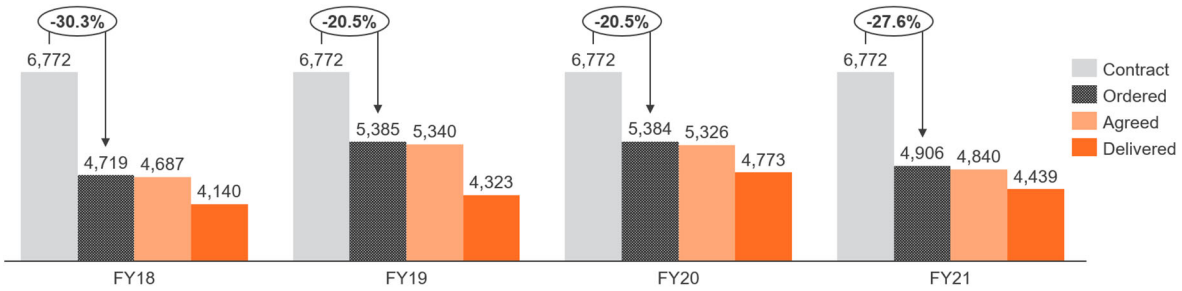
The highest level of historical throughput to North Queensland Export Terminal (**NQXT**) was achieved in FY20, at 31.6mt or just over 70% of the contracted volume. In that year, customers ordered 20% less than Committed Capacity. Actual performance was a further 9% lower than ordered, due to variance from the agreed schedule to execution.

[3] Calculated using Nominal Train Payload of 6846t for Newlands Services

[4] Calculated using Nominal Train Payload of 6846t for GAPE Services

[5] Based on the SOP and supplementary information provided by the Independent Expert

Figure 3 – Historical Newlands & GAPE System Performance - Train Cycles



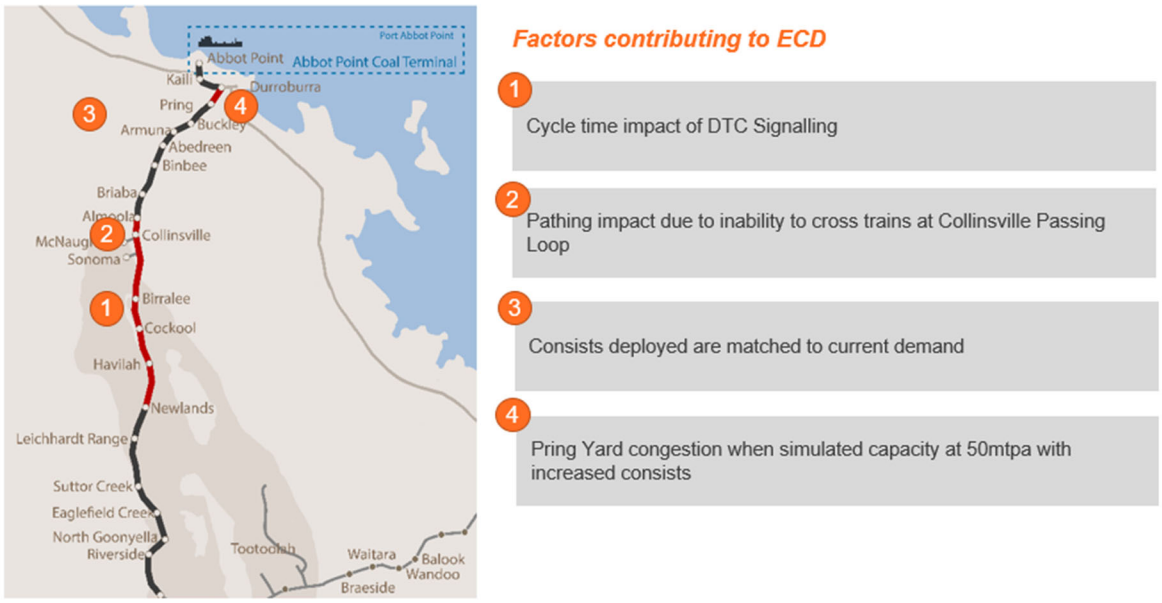
Today, the majority of Newlands and GAPE users are achieving close to contracted demand. In FY21, Access Seekers that were actively ordering services achieved 94% of contracted volumes on average. Contracted capacity under certain contracts is being underutilised, allowing other customers to rail above the DNC identified in the ICAR.

Aurizon Network recognises that demand in the Newlands and GAPE Systems is likely to influence the timing for rectification of the Existing Capacity Deficit, or parts thereof. We anticipate discussion on this point as we move into consultation. Aurizon Network seeks to develop a plan jointly agreed with our customers to ensure that capacity can be installed to meet demand when our customers need it.

Factors contributing to Newlands and GAPE Existing Capacity Deficit

Aurizon Network has reviewed the information provided in the ICAR, and undertaken analysis to determine the cause. These are summarised below:

Figure 4 – Factors contributing to Newlands and GAPE Existing Capacity Deficit



The ICAR indicates that the constraining section for both the Newlands and GAPE Systems is the branch line between Pring and Newlands Junction. Aurizon Network's review has isolated specific operational factors within this section that are the contributing to this constraint:

DTC Signalling	Between Sonoma Junction and Havilah, a Direct Train Control (DTC) signalling system is in place. This signalling system includes power operated turnouts on passing loops 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. This form of signalling requires train services to come to a stop in order to change the points, making crossing activity slower than more automated signalling systems. Aurizon Network has reviewed the actual time taken to perform these crosses. Each cross can add 30 to 50 minutes. With the potential for three crosses across the loaded and empty journeys, this can contribute two to three hours per service.
Almoola to Birralee section	The section between Almoola and Birralee takes 28 minutes travel time plus DTC crossing time at Birralee. It is the longest single section on the Newlands mainline without the ability to cross a train. With DTC crossing, this sets the dispatch separation of trains to 60 minutes. The Collinsville Passing Loop lies within this section and is not currently used due to the consist configuration operating in the system. All Rail Operators in the system are currently operating an 84 wagon consist. This consist has a maximum comparison length of 1404m long. The available length in Collinsville Passing Loop is 1397m. If the Collinsville Passing Loop was reinstated and lengthened to accommodate the consist configuration, there is the potential to reduce the average cycle time by 1.4 hours. In combination with the installation of remote control signalling (**RCS**), the headway and dispatch

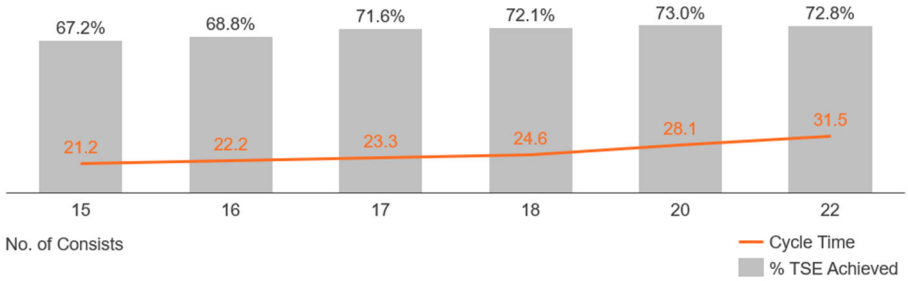
separation could be reduced from 60 minutes to 36 minutes, enabling additional train paths to be scheduled.

Rollingstock Fleet and Demand

Aurizon Network has reviewed fleet numbers to determine whether the number of consists is sufficient to meet Committed Capacity. Reviewing the currently operating fleet, with consideration for planned fleet, the peak assumed fleet across GAPE and Newlands systems is 18 consists.

Simulations have been undertaken to test whether this number is appropriate. Figure 5 below provides the results of these simulations, indicating the percentage of contracted TSEs achieved and cycle time outcomes when increasing consists numbers.

Figure 5 – Percentage of Newlands & GAPE TSEs achieved at varying consists numbers



From the above, it can be determined that the number of consists in the system is not an initial constraining factor, as only marginal capacity improvements are seen when adding consists. This indicates that the network constraints listed above must first be rectified before additional capacity benefits would be realised with additional consists.

This also indicates that the fleet currently employed has been right sized to meet the current levels of demand. It is reasonable to assume that should real demand equal Committed Capacity, Rail Operators would look to support this demand with increased fleet, or through productivity improvements. Further analysis has been undertaken to determine the optimal fleet number to achieve Committed Capacity should the mainline constraints be resolved. This is detailed below under Transitional Arrangements.

Yard Congestion

Pring yard was expanded as part of the GAPE project to provide four holding roads, a mainline and loop road. Its original design was to facilitate staging to NQXT. As detailed above, demand across the GAPE and Newlands systems has been lower than contracted levels and as such, provisioning and train examinations have been permitted within the yard, while capacity permitted. Prior assessments indicated that should system demand reach 50mtpa, other arrangements for provisioning and train examinations would need to be set in place.

At Committed Capacity levels, analysis indicates that Pring yard congestion is a factor influencing the Existing Capacity Deficit and that measures to relieve yard congestion will be required. This is particularly evident when assessing the impact of increased consist numbers above the current peak of 18 consists.

Proposed Transitional Arrangements

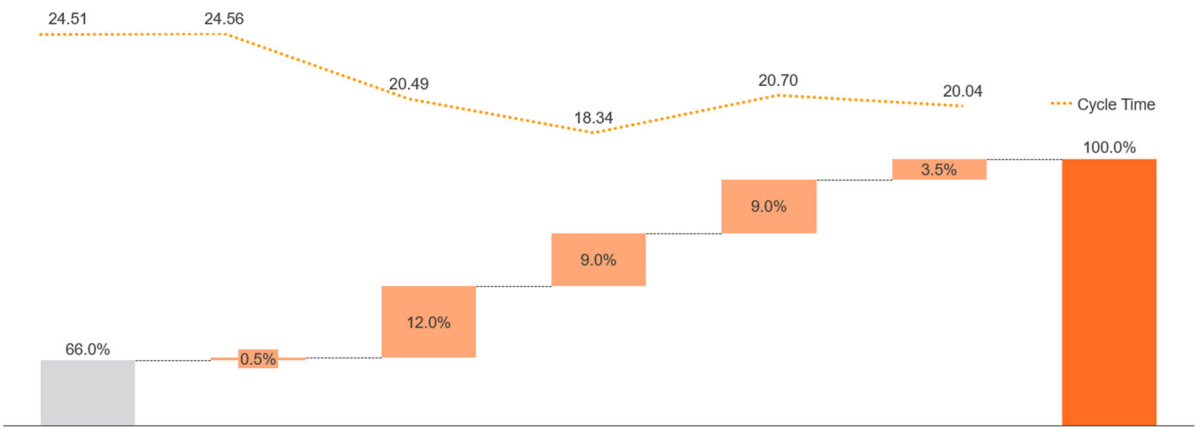
OVERVIEW

Aurizon Network has analysed changes to the Newlands and GAPE Systems to improve overall system capacity:

- Each Customer has the option to relinquish Access Rights in accordance with the terms of their Access Agreements. Where requests are made, these will be considered first in resolving an Existing Capacity Deficit.
- Changes to operating and maintenance programs have been assessed to determine potential impact, and implementation. Analysis indicates that the options assessed can contribute to a minor improvement in capacity.
- Expansions tested through our modelling have proven most effective at improving capacity. The Expansions recommended are directly linked to resolving the constraints identified between Newlands Junction and Pring.

A preliminary proposal is provided below with recommended Transitional Arrangements required to achieve full Committed Capacity. Aurizon Network's proposal seeks to achieve Committed Capacity across an annual period, and to ensure Committed Capacity originating on each branch line is consistently serviced. Please see **Appendix 1** for detailed results for FY23, and for each branch line.

Figure 6 - Newlands and GAPE Systems Transitional Arrangement bridge[6]



Capacity Created	0.25 – 0.5mtpa	5 - 6mpta	3 – 4mpta	4 – 5mtpa	1.5 – 2mtpa	**16.5 – 19.5mtpa**
Cost Range	Nil	$15m - $20m	$0.4m		$15m - $20m	**$30.4m - $40.4m**

[6] The capacity improvements outlined are based on Aurizon Network's assessment for FY23, using Aurizon Network's modelling. To ensure consistency with the DNC, verification of the proposed capacity benefits will be undertaken in consultation with the Independent Expert, using their dynamic simulation model.

RELINQUISHMENT

Access Holders may choose to relinquish Access Rights if they are entitled to do so under and in accordance with a relinquishment provision in their Access Agreement. A relinquishment fee will not be payable where Access Rights are relinquished through this process.

As the constraint for Newlands and GAPE has been identified as the common infrastructure that all customers use, any relinquishments are likely to assist in resolving the Existing Capacity Deficit. The following number of TSEs are estimated to be required to be relinquished to resolve the Existing Capacity Deficit:

Table 3 – TSEs required to be relinquished to resolve Newlands & GAPE Existing Capacity Deficit

	FY22	FY23	FY24
Monthly TSEs	440	445	440
Total TSEs	5282	5344	5272

Aurizon Network will be requesting customers to formally notify it whether they wish to relinquish Access Rights through the consultation process. Where requests for relinquishment are received, they will be factored into the final Transitional Arrangements recommendations.

Where there is a desire across many Access Holders to relinquish Access Rights in excess of the Existing Capacity Deficit, the number of Train Service Entitlements that can be relinquished will be capped at the maximum Existing Capacity Deficit and apportioned to Access Holders on a pro-rata basis, up to this maximum amount.

Aurizon Network will advise those Access Holders that have submitted a request to relinquish whether their full request can be accommodated prior to the Detailed Report being released. The Access Holder and Aurizon Network will then have 30 days to administer the required contract variation to finalise the relinquishments.

RECOMMENDED TRANSITIONAL ARRANGEMENTS

The following Transitional Arrangements are recommended to rectify the Existing Capacity Deficit in Newlands/GAPE. A summary of each project is provided below[7].

Installation of RCS Signalling

This project provides both Expansion and Operational changes to the Newlands mainline. It involves installation of Remote-Control Signalling (**RCS**) for all points between McNaughton Junction and Newlands Junction.

11 - 12% TSE increase
6 - 7 mtpa throughput

Cost: $15m - $20m
$3.00 per nt of Capacity
Up to $0.09nt tariff impact

Time to implement: <2 years

- The primary benefit of RCS signalling is the reduction in crossing times between McNaughton Junction and Newlands Junction.
- Analysis indicates that installing RCS has the potential to reduce the turnaround time of the system by up to 4 hrs per cycle. This increase in velocity means that trains can cycle quicker and achieve more throughput.
- With this project, pathing in the Newlands System can be reduced from a 60-minute dispatch to 36-minute dispatch.
- There are also additional safety benefits with RCS, with a simplification in safe working systems.

Lengthening of Collinsville Passing Loop

This initiative involves lengthening Collinsville Passing Loop to make it fit for use as a crossing location by the currently operating fleet. Movement of the signals at the southern end of Collinsville Passing Loop to increase the passing loop length by 16 metres will enable this.

9 - 10% TSE increase
4.5 – 5 mtpa throughput

Cost: $400,000
$0.02 per nt of Capacity
nil tariff impact

Time to implement: <2 years

- Increasing the length of Collinsville Passing Loop will allow the current fleet operating in the network to cross and will result in reduction in cycle time.
- With RCS installed, reinstating Collinsville Passing Loop has the potential to reduce the average cycle time in GAPE and Newlands further, by 1.5 - 2.5 hours.
- Previously, noise issues have been raised by the Collinsville community. There is a risk that these issues remain. It is likely that if the loop was put back into service, noise mitigation work may be required. While the cost to move the signalling in the loop is low, estimated at $400,000, any noise mitigation work may increase this cost significantly.
- An alternative to the Collinsville Loop is to install a new passing loop. Coral Creek Passing Loop has been assessed as the next best alternative, however due to the estimated cost of $24m, it is recommended that Collinsville Passing loop be pursued first.
- Aurizon Operations' consists are the longest fleet currently operating and would have to reduce train handling allowances by 4 metres. This is considered safe and achievable.

[7] Cost estimates provided for each project are indicative only. Further study is required to confirm capital estimates.

Increase in Consist Numbers

To achieve all Committed Capacity, modelling indicates that an increase in the overall fleet operating across GAPE and Newlands from the 18 modelled to 22 consists is required.

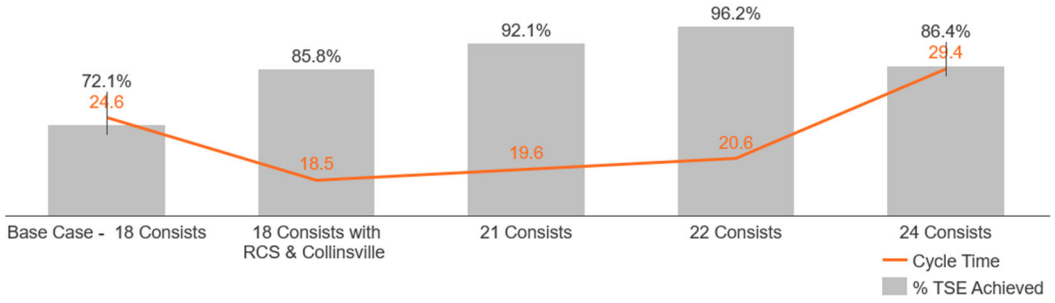
8 - 10% TSE increase
4 - 5 mtpa throughout

Costs will vary based on commercial arrangement

Time to implement: >3 years

- Aurizon Network has analysed the optimal number of consists to cater for full Committed Capacity. The chart below provides the simulated TSEs achieved, and cycle time variance with changing intervals of consists numbers, assuming both RCS and Collinsville Passing Loop are installed.
- This indicates that with 22 consists installed, a significant increase in throughput is achieved, while balancing overall cycle time. The additional consists enable the pathing created by the proposed reduction in headway to be utilised.
- Should more than 22 consists be installed, detrimental impacts on cycle time are seen, and no gains in throughput are achieved.
- The increase in consists numbers should be progressively matched to demand increases, as not to create yard congestions issues.

Figure 7 – Percentage of Newlands & GAPE TSEs achieved at varying consists numbers & Infrastructure



Additional Holding Road at Pring

This project involves installing an additional holding road within Pring Yard to accommodate current and future simulated rollingstock and staging activities

3 - 4% TSE increase
1.5 - 2 mtpa throughput

Cost: $15m - $20m
$6.60 per nt of Capacity
Up to $0.12nt tariff impact

Time to implement: <2 years

- An additional holding road in Pring has been identified as a potential option to improve capacity when an increase from the peak assumed fleet of 18 is seen.
- Where delays or possessions occur, trains that have been generally scheduled evenly, tend to lose this even distribution. Combined with the dwell times in Pring for provisioning, maintenance and connection time, this variation results in periods of high yard congestion when the system is modelled at Committed Capacity.

- Yard congestion reduces the velocity of train movements through the yard to the port and return empty (the yard port mini cycle), increasing cycle time and reducing throughput.
- Installing an additional road in the yard provides additional capacity to store and stage consists, reducing congestion, improving cycle time, and increasing throughput.
- A similar outcome can be achieved to an extent by improving yard performance. This is discussed in the section below.

OTHER POTENTIAL TRANSITIONAL ARRANGEMENTS

Aurizon Network's recommended Transitional Arrangements largely focus on elements that Aurizon Network can influence and deliver. Other options have been tested to determine the most effective and efficient Transitional Arrangements. Levers also exist across the broader supply chain to improve capacity.

The following options exist to increase capacity from a below rail perspective, and across the supply chain:

Improve Network Availability by lowering time on track	The Independent Expert has modelled a 10% reduction across the board for all planned maintenance activities and achieves a 0.4% improvement in capacity. Aurizon Network has also reviewed options to increase availability through changes to planned maintenance. Aurizon Network's approach to modelling this sensitivity is to reduce the duration of a single system closure, rather than across all maintenance hours. Results indicate a similar outcome, with a minimal increase of 0.4% in throughput seen. At this stage, this option is not recommended on the basis of the marginal increase in capacity seen. Should customers wish to explore this further, investigations to determine the additional resourcing requirements, and costs associated with delivering the same maintenance scope within reduced maintenance windows would be required.
Improve Network Reliability through less delays	To achieve better reliability, additional preventative maintenance would be required, as well as resourcing to respond and rectify incidents quicker. A 10% improvement has been modelled. Cycle time improvements are seen; however, this change contributes to less than 0.1% improvement in throughput. This approach is similar to the reduction in general delays as proposed in the ICAR. In the ICAR, a 0.5% capacity improvement is reported. The difference between Aurizon Network's approach is that we have focused only on below rail delays. To reach the 0.5% indicated by the Independent Expert, improvements in rollingstock, mine and port delays would be required.
Stop/Start delays	The ICAR reports a potential improvement in capacity of up to 1.4%, by reducing Stop/Start delays by 1 minute. Aurizon Network has reviewed the practicality of achieving this. Based on the below, Aurizon Network does not consider reductions achievable: - Starting Time is governed by the available tractive power of locomotives. To accelerate a loaded coal train from standstill to 80 km/h on a level gradient takes 3 minutes 15 seconds longer than to travel the same distance at a constant speed of 80 km/h. - Stopping time is governed by the layout of signalling and the requirements of safety standards[8]. This standard requires that stopping trains reduce speed to 20 km/h

[8] Safety standard HWD-00995 Version 2.1 Observance and Reaction to Signals

	below boarded speed when passing the approach signal to a signal set at stop. The distance between the approach and target signal in the Newlands system would typically be about 1500m depending on gradient and other factors. A stopping train takes at least 4 minutes more to travel this distance than a train travelling at line speed.
Coral Creek Passing Loop	This initiative is an alternative to reinstatement of Collinsville Passing Loop. Similar capacity benefits are identified, with a 4% increase in TSEs achieved. However, this project has previously been estimated to cost $24m. It is therefore recommended that the extension of Collinsville Passing Loop be progressed ahead of this option.
Teviot Brook Passing Loop	Aurizon Network has previously identified Teviot Brook Passing Loop as required for expansion volumes across the North Goonyella section. However, modelling indicates that the change in assumptions from theoretical to DNC parameters does not cause added congestion on this section. Aurizon Network does not consider that this passing loop is essential to resolve an Existing Capacity Deficit. Teviot Brook Passing Loop provides a 10-minute cycle time benefit, and overall TSE improvement of 0.1%.
ATIS	Automatic Track Inspection Systems are being trialled in Blackwater. The immediate quantifiable capacity benefit is a reduction in access required for the track recording car. Aurizon Network considers this could improve capacity marginally. More frequent data collection may lead to improvements in reliability and condition-based maintenance strategies; however the extent of these benefits has not been quantified at this stage.
Yard performance to plan	On average, Rail Operators are spending 2 - 3hrs in Pring yard. This time is in addition to provisioning and maintenance examinations, and represents time waiting to meet a connection, unplanned dwell, maintenance activities, and shunting time. Modelling indicates that a 1hr reduction in this time can improve capacity by 3%. To achieve this, Rail Operators may focus on reducing shunting activities, improving rollingstock reliability, and compliance to plan, which means planned connections can be met.
Port Unloading Time	The ICAR reports that a 10% increase in the unload rate at NQXT can achieve a 0.3% increase in capacity. Aurizon Network has similarly tested whether a 10% improvement in the overall time at port can contribute to a capacity increase. Clear of any other initiatives, a 1% improvement in TSEs achieved is seen. Aurizon Network considers that this result is limited by other constraining factors. Full benefits are not seen due to congestion through Pring Yard, and insufficient consists to take advantage of additional port slots. Should these constraints be resolved, there is potential for further capacity gains.
Mine Cancellations	In FY21, 33% of cancellations across GAPE and Newlands were due to mine cancellations, contributing to a 3.4% reduction in performance to plan. When a train is cancelled, the train will likely store in the yard until a new job is found, creating yard congestion. When the yard is congested, further delays are seen on the mainline, as other trains stage for a yard slot. Decreasing the number of mine cancellation could contribute to improved accuracy of the schedule, reducing the time in yards, and translating to increased throughput.
Above Rail Cancellations	In FY21, 45% of cancellations across GAPE and Newlands were due to Rail Operator cancellations, contributing to a 4.6% reduction in performance to plan. Improvements in the reliability of Rollingstock may improve overall system throughput. Further discussion will be had with Rail Operators to determine whether improvement initiatives underway can assist in resolving the Existing Capacity Deficit.

System Review – Goonyella

The ICAR indicates that there is an Existing Capacity Deficit in the Goonyella System. The ICAR findings and key SOP assumptions are summarised below:

Table 4 - ICAR Summary for Goonyella – FY23 Results

			Goonyella[9]
Committed Capacity[10]		13,905 Train Paths	142.3mtpa
Deliverable Network Capacity		12,968 Train Paths	132.7mtpa
Existing Capacity Deficit		937 Train Paths	9.5mpta
Key SOP & Output Parameters	*Total Consists Modelled*	44 Consists across 4 Operators	
	Average System Cycle Time[11]	27.6hrs	
	Port Assumptions	DBCT - Cargo Assembly, average unload time of 1:47	
		HPCT - Even Railings, unload time of 1:42	
	Total Maintenance Scope Hours	6511 hours	

The ICAR indicates an Existing Capacity Deficit of up to 8% in the Goonyella System, and indicates that the primary cause of this deficit is cargo assembly operations at Dalrymple Bay Coal Terminal (**DBCT**).

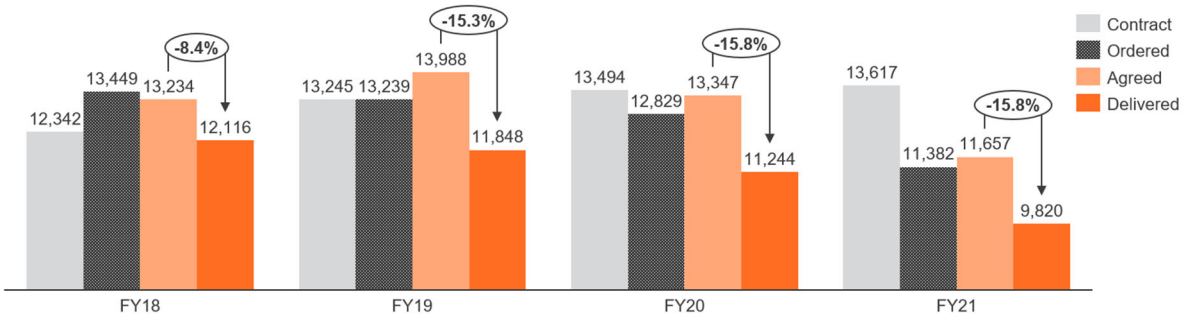
Historically, the Goonyella System has experienced demand close to Committed Capacity levels, which is often scheduled. The highest level of historical throughput in the Goonyella System was achieved in FY18, at 121.2mt. In that year, demand was in excess of contracted TSEs, which was scheduled. However, variability between the schedule, and the day of operations lead to the system delivering closer to contracted capacity.

[9] Based on a Nominal Train Payload of 10,236t

[10] Excludes all non-coal services operating in the system, and preserved path requirements

[11] Based on the SOP and supplementary information provided by the Independent Expert

Figure 8 – Historical Goonyella System Performance – Train Cycles



Contracted demand in Goonyella has grown since 2018 by over 10%. However, the level of system performance remains relatively consistent. Across the previous four years' performance, the system has consistently delivered 85% of ordered services.

Cargo assembly operations may be contributing to this overall system loss. To facilitate cargo assembly operations, the rail components of the supply chain must meet port demand. This results in an inefficient use of the Rail Infrastructure as trains are not evenly distributed, leading to periods of peak demand, and congestion on branch lines and in yards. Where variation in the day of operation occurs, there is the potential for significant further impact as the rail systems seek to recover to meet delivery windows.

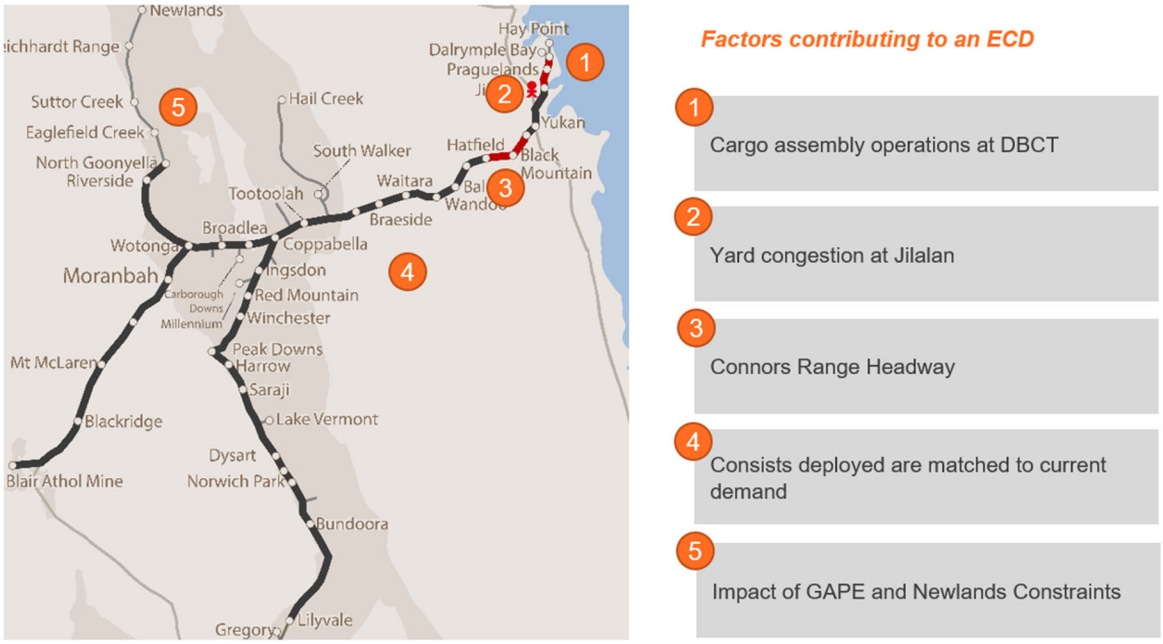
Aurizon Network has focused its proposed Transitional Arrangements on areas of the network that see high congestion, and options to deliver coal to the port more efficiently. Options such as improving the capability of Jilalan yard to stage trains to the ports will help manage congestion. Other options such as expanding the network to accommodate longer trains will enable our customers to deliver coal to the port more efficiently, reducing the number of paths needed to deliver a cargo.

The focus for Goonyella is to ensure that the Rail Infrastructure is sufficient to accommodate variability and improving the robustness of our plans to minimise change. Each partner in the supply chain can contribute to reduced variation through improvements in forecasting and reliability. Aurizon Network will be seeking to better understand any initiatives underway with our customers to improve performance, which may improve overall system throughput.

Factors Contributing to Goonyella Existing Capacity Deficit

Aurizon Network has reviewed the information provided in the ICAR, and undertaken analysis to determine the cause, and potential solutions. These are summarised below in Figure 9 and described in detail in the proceeding sections.

Figure 9 – Factors contributing to Newlands and GAPE Existing Capacity Deficit



The ICAR indicates that Cargo Assembly operations at DBCT is the primary cause of the Existing Capacity Deficit. Aurizon Network has explored how these operations impact on capacity of the system and highlighted some other areas of constraint.

Cargo Assembly Operations of DBCT

The Independent Expert has identified that cargo assembly operations at DBCT are contributing to 5% of the overall system deficit. Aurizon Network has historically not included cargo assembly operations in its modelling.

Loss due to cargo assembly manifests due to the following factors:

- Loadout capability, recharge rates and cargo build times

  With cargo assembly operations, port operators request to build cargos in a short amount of time. This results in back-to-back loading of trains. The number of trains that can be loaded back-to-back depends on the balloon loop infrastructure, load rate and recharge time between loading.

- Additional variability

  In a cargo assembly operation, where mines are co-shipping, there is the potential for additional cancellations and delays. If one mine does not have coal available, this can lead to consequential cancellations for other customers who are co-shippers.

- Yard congestion

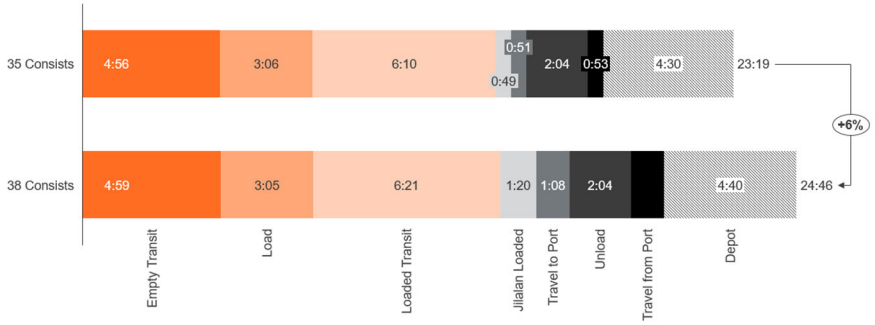
  Cargo assembly operations require trains to be staged to loading requirements of the port. This creates yard congestion from loaded trains waiting for a particular port slot, and empty trains waiting for their connection, aligning with loadout capability.

Yard Congestion and Port Mini-cycle

Analysis indicates that Jilalan yard is capacity constrained when the system is modelled at full contract volumes. As consist numbers rise to meet all committed capacity, demand for roads in Jilalan yard causes a significant increase in yard occupancy time. This is due to trains waiting for port slots, and the associated increase in activity in the yards by virtue of more fleet. The resulting yard congestion has a flow on effect to transit time for loaded trains into and through Jilalan and empty trains back from the port.

This is evident when examining the results of adding additional consists into simulation, and the effect of the yard to port mini-cycle. Figure 10 below demonstrates that when adding an additional three consists, the overall cycle time increased by 16%, with over 95% of the increase attributed to the yard to port mini-cycle. It has also been identified that changes to the system to improve mainline transit time result in any cycle time savings being lost in the yard port mini-cycle, demonstrating a downstream bottleneck.

Figure 10 – FY21 Goonyella Turnaround Time Breakdown (h:mm)



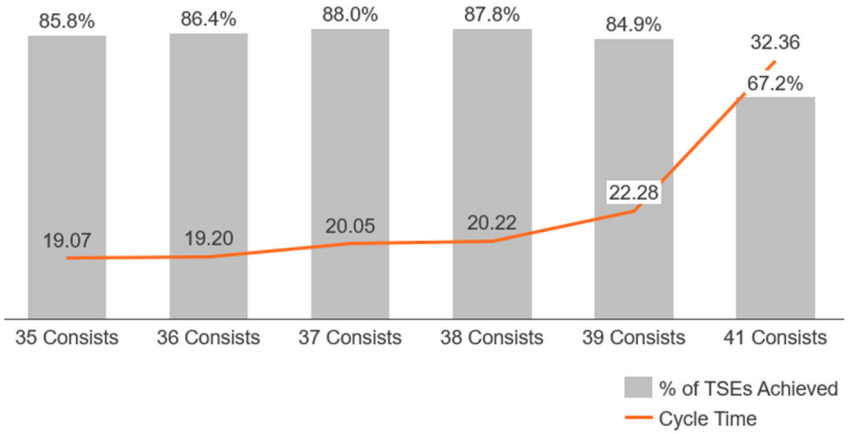
Rollingstock Fleet

With the yard constraints detailed above, analysis indicates that the throughput of the Goonyella System is particularly sensitive to the number of consists operating in the system. Reviewing the current operating fleet, together with consideration for planned fleet, the peak assumed fleet in the Goonyella System is 35 consists. By simulating a gradual increase in the number of consists, there is a tipping point where additional consists have a detrimental effect on achieving contracted demand and cycle time.

The Independent Expert has modelled a maximum fleet of 44 consists. Aurizon Network's analysis does not support this number, as we consider cycle time would be excessive with 44 consists, and further yard constraints would be seen.

From Figure 11 below, Aurizon Network considers that the optimal number of consists operating in the system to achieve contracted demand is between 37 and 38 consists. After this point, throughput reduces with each additional consist that is added to the system

Figure 11 – Percentage of Goonyella TSEs achieved with varying consist numbers



Rail Infrastructure – Connors Range

The Connors Range is a steep downhill gradient on the trunk of the Goonyella System between Coppabella and Jilalan. This section (Hatfield to Yukan) carries all Goonyella traffic to the ports and has the longest headway on the Goonyella trunk. To increase capacity in the system, shorter headways facilitate more train services on this section.

There is a known heat risk on Connors Range, which can cause delays and cancellations to trains when the temperature of the track is too high. This heat is caused by the rail-wheel interface and ambient heat. In FY20, heat delays contributed to 1.8mt opportunity loss.

Proposed Transitional Arrangements

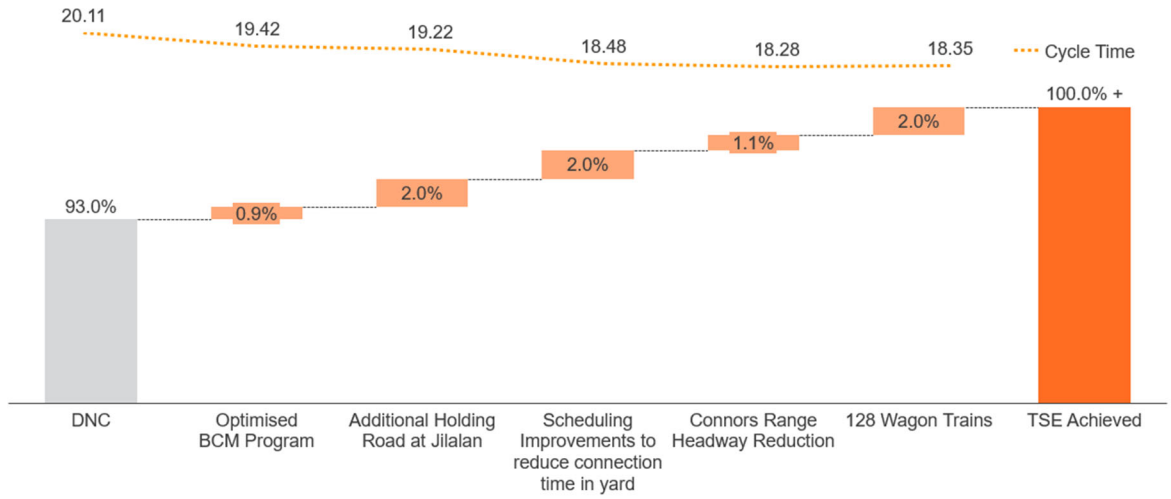
OVERVIEW

Aurizon Network has analysed a number of changes to the Goonyella System to improve overall system capacity.

- Each Customer has the option to relinquish Access Rights in accordance with the terms of their Access Agreements. Where requests are made, these will be considered first in resolving an Existing Capacity Deficit.
- Changes to operating and maintenance programs have been included in the program of works to improve network availability and to reduce variability. The operational changes highlighted below could resolve 50% of the Existing Capacity Deficit once implemented.
- Expansions have also been recommended as part of the Transitional Arrangements. The initiatives highlighted below will assist in providing additional rail flexibility.

A preliminary proposal is provided below on Transitional Arrangements required to achieve full Committed Capacity. Figure 12 below provides the preliminary bridge to achieve this. Aurizon Network's proposal seeks to achieve Committed Capacity across an annual period, and to ensure Committed Capacity originating on each branch line is consistently serviced. Please see **Appendix 2** for detailed results across the year, and for each branch line.

Figure 12 - Goonyella System Transitional Arrangement bridge[12]



Capacity Created	0.7 – 1.8mtpa	2.5 – 3.5mtpa	2.5 – 3.5mtpa	1.4 – 2mtpa	3 – 4mtpa	**10 – 14.8mtpa**
Cost Range	$400,000	$10m – $15m	Up to $1m	$250,000	$6m – $10m	**$17.65m - $26.65m**

[12] The capacity improvements outlined are based on Aurizon Network's assessment for FY23, using Aurizon Network's modelling. To ensure consistency with the DNC, verification of the proposed capacity benefits will be undertaken in consultation with the Independent Expert, using their dynamic simulation model.

RELINQUISHMENT

Access Holders may choose to relinquish Access Rights if they are entitled to do so under, and in accordance with a relinquishment provision in their Access Agreement. A relinquishment fee will not be payable where Access Rights are relinquished through this process.

As the primary constraint for Goonyella system has been identified as cargo assembly operations at DBCT, there is the potential that relinquishment of paths from various mines may have differing impacts on the overall Deliverable Network Capacity. Any relinquishment is likely to assist in resolving the Existing Capacity Deficit, but the impact of each request will need to be confirmed once such requests have been received. The following number of TSEs are estimated to be required to be relinquished to resolve the Existing Capacity Deficit:

Table 5 – TSEs required to be relinquished to resolve Goonyella Existing Capacity Deficit

	FY22	FY23	FY24
Monthly TSEs	158	156	184
Total TSEs	1,892	1,874	2,198

Aurizon Network will be requesting customers to formally notify it whether they wish to relinquish Access Rights through the consultation process. Where requests for relinquishment are received, they will be factored into the final Transitional Arrangement recommendations.

Where there is a desire across many Access Holders to relinquish Access Rights in excess of the Existing Capacity Deficit, the number of Train Service Entitlements that can be relinquished will be capped at the maximum Existing Capacity Deficit, and apportioned on a pro-rata basis, up to this maximum amount. Aurizon Network will advise those customers that have submitted a request to relinquish whether their full request can be accommodated prior to the Detailed Report being released. The Customer and Aurizon Network will then have 30 days to administer the required contract variation to finalise the relinquishments.

Recommended Transitional Arrangements

The following Transitional Arrangements are recommended to rectify the Existing Capacity Deficit[13].

Aurizon Network has proposed each of these arrangements, and analysed improvements based on an elevated number of consists operating in the system. As detailed in the SOP, the Independent Expert has assumed that up to 44 consists are operating to achieve the Deliverable Network Capacity. In line with Aurizon Network's analysis described above, we consider 38 consists to be the maximum number before seeing a detrimental effect on throughput and cycle time. This is an increase of 3 consists from the current peak available fleet.

Additionally, each Transitional Arrangement below has been modelled assuming the Transitional Arrangements for Newlands and GAPE are in place. As noted in the ICAR, GAPE traffic can impact the throughput of Goonyella, due to the interaction of cross system traffic. The improvements of RCS and lengthening of Collinsville loop improve Goonyella throughput by up to 0.5%, by improving the headway in Newlands.

Optimised BCM Program

This project involves changes to the way Aurizon Network manages the BCM program. The Optimised single BCM program uses the RM902, auxiliary equipment and organisational structure. The current operating methodology is to have the ballast cleaning operation locate in the North for five months and then the south for five months. The proposed change in this option is to instead move the machine between closures to reduce the reliance on single line closures.

0.5 – 1.5% TSE increase

0.7 – 1.8mt mtpa throughput

Cost: $400,000 opex increase p.a

$0.44 per nt of Capacity

Minor impact on AT1 Tariff

Time to implement: <1 year

- This project does not involve any capital investment and can generate increased throughput by making more paths available for coal services.
- It also provides for better utilisation of the Ballast Cleaning Machine and staff. No additional supporting plant or assets are required.
- This project does involve some changes to the maintenance plan to enable sufficient time between system closures for BCM travel. These changes are being incorporated in the FY23 MRSB.
- To ensure the benefits from this change are seen, compliance to plan is required. There will be limited ability to move the program or to accommodate additional scope in future years, without additional access impacts.

Installation of an additional road at Jilalan

This project involves design and conduction of an additional holding road within the Jilalan complex. The road can be used for staging of services to the port, provisioning, and maintenance examinations, or to provide a 'no touch' pathway through the yard for trains that do not require provisioning

1.5 – 2.5% TSE increase

2.5 – 3.5 mtpa throughput

Cost: $10 - 15m

$5.15 per nt of Capacity

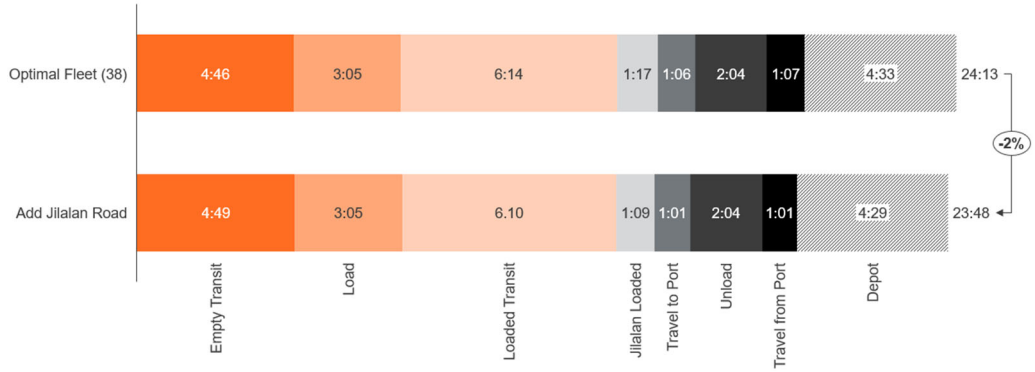
Up to $0.02nt tariff impact

Time to implement: <2 years

[13] Cost estimates provided for each project are indicative only. Further study is required to confirm capital estimates.

- A key bottleneck identified at Committed Capacity is the amount of time trains spend in Jilalan. This time is well above design parameters for the yard and occurs across multiple operators.
- With the yard at capacity, a new holding road will help support cargo assembly operations by creating an additional staging location for trains to wait or sequence to the port.
- Early works have already been undertaken on this when Jilalan Bypass road was constructed, including formation, structures and drainage which will provide for simple and cost-effective implementation.
- Modelling indicates that an additional road in Jilalan provides cycle time reduction as shown in the chart below. Further study will be required to refine the yard operations to best use.

Figure 13 – Impact of additional holding road on turnaround time (h:mm)



Scheduling improvements focused on reducing yard time

This initiative focuses on optimal planning to reduce variability in the schedule. Initiatives include Integrated Rail Planning for schedule optimisation and development of a robust schedule, focusing on yard road management and inclusion of a dedicated 'no touch' road, and overall reduction in unplanned time in the yard.

1.5 – 2.5% TSE increase
2.5 – 3.5 mtpa throughput

Cost: $0 - $1m
$0.27 per nt of Capacity
nil tariff impact

Time to implement: <1 year

- A series of yard operational improvements have been tested to determine potential capacity benefits. This initiative aims to reduce cancellations due to missed connections through better planning and reduce the overall time trains spend in the yard by a target of one hour. Modelling indicates that a reduction of depot time by one hour has a significant impact on overall cycle time and system throughput.
- Depot dwell time consists of time for provisioning and examination, train maintenance activities, shunting and waiting for next dispatch connection. Unplanned rollingstock maintenance and connection wait times are the largest elements of modelled depot dwell time. Consideration should be given to the possibility of achieving depot dwell time savings by measures such as minimisation of shunting activities and better performance to plan.
- Integrated Rail Planning will help to facilitate this by improving schedule reliability, ensuring plans are deconflicted and can be reliably achieved and accommodate variation, which will assist in reducing the effect of yard congestion associated with missed connections.
- Better yard scheduling and management can be achieved through operational rules, and enhanced technology. Aurizon Network has modelled whether providing a dedicated 'no touch' road will assist in congestion management. Through simulations, TSEs achieved increased by 0.5%. While this may

be minor, tools such as Roadie for better road management can also assist in combatting the impact of cargo assembly operations.

Connors Range headway reduction

Changes to the signalling arrangement and method of train operations between Yukan and Hatfield will provide a reduction in headway time from the current average of 24 minutes, to 16 minutes.

1 – 1.5% TSE increase
1.4 – 2 mtpa throughput

Cost: $250,000, potential risk of $30m plus
$0.20 per nt of Capacity
nil tariff impact

Time to implement: <2 years

- Improving the headway on this section will allow for additional services to travel down Connors Range each day.
- By implementing the change, static calculations indicate that an additional 30 trains per day could travel through that section. Consideration must however be given to constraints both downstream and upstream.
- There is a risk that reducing train separation may lead to an increase in track stability problems due to track heat input from train braking. This is an existing risk that materialises in delays currently due to excessive heat on the track. Substantial investment in track strengthening works may be required to alleviate this risk This work is likely to be in excess of $30m. If undertaken, further capacity improvements are possible through a reduction in cancellations due to heat restrictions. Further studies are required to quantify the increased risk from additional services, and to develop concept studies for the solution.

Increasing consist sizes to 128 wagons

Currently, most fleet run 126 wagon services. Adjustments to the lengths of some passing loops and holding locations could facilitate an increase in consist sizes to 128 wagons across the board.

2 % TSE reduction
3 - 4 mtpa throughput

Cost: $6 – 10m
$2.20 per nt of Capacity
$0.01nt tariff impact

Time to implement: >3 years

- To facilitate 128 wagons, a high-level study has indicated the following changes to the Goonyella system:

Location	*Change*	*Cost (high level)*
Riverside balloon loop entry	Relocate signal and track circuits	$0.33m
Riverside balloon loop exit	Movement of crossover, signalling and track circuits	$2m
Jilalan mainline	Relocation of road crossing and signalling	$3m
Peak Downs Passing Loop	Relocate signal and track circuits	$0.33m
Bundoora Passing Loop	Relocate signal and track circuits	$0.33m
Saraji balloon loop exit	Relocate signal and track circuits	$0.16m
Dalrymple Bay exit road	Relocate signal and track circuits	$0.5m

- By extending the holding locations listed above, each Rail Operator may be able to increase productivity by adding an additional two wagons to the consists. Consultation with Rail Operators would need to confirm rollingstock availability to increase consist length.
- To achieve the capacity benefit, this initiative requires changes to contracted Train Service Entitlements to reflect the increase in consist size.
- This results in an overall reduction in the number of Train Service Entitlements required by 1.5%.
- The impact of the longer consists on load, unload and section running times is expected to be minimal.

Other Potential Transitional Arrangements

Aurizon Network's recommended Transitional Arrangements largely focus on elements that Aurizon Network can influence and deliver. Other options have been tested to determine the most effective and efficient Transitional Arrangements. Levers also exist across the broader supply chain to improve capacity.

The following options exist to increase capacity from a below rail perspective, and across the supply chain:

Improve Network Availability by lowering time on track	The IE has modelled a 10% reduction across the board for all planned maintenance activities and achieves a 1.1% improvement in capacity. Aurizon Network has also reviewed options to increase availability through changes to planned maintenance. Aurizon Network's approach to modelling this sensitivity is remove a 36hr system closure. Results indicate a similar outcome, with a minimal increase of 0.4% in throughput seen. At this stage, this option is not recommended based on the marginal increase in capacity seen. Should customers wish to explore this further, investigations to determine the additional resourcing and costs associated with delivering the same maintenance scope within reduced maintenance windows would be required.
Improve Network Reliability through less delays	To achieve better reliability, additional preventative maintenance would be required, as well as resourcing to respond and rectify incidents quicker. A 10% improvement has been modelled. Cycle time improvements are seen; however, this change contributes to less than 0.1% improvement in throughput. This approach is similar to the reduction in general delays as proposed in the ICAR. In the ICAR, a 1.5% capacity improvement is reported. The difference between Aurizon Network's approach is that we have focused only on below rail delays. To reach the 1.5% indicated by the IE, improvements in rollingstock, mine and port delays would be required.
Stop/Start delays	The ICAR reports a potential improvement in capacity of up to 2%, by reducing Stop/Start delays by 1 minute. Aurizon Network has reviewed the practicality of achieving this. Based on the below, Aurizon Network does not consider reductions achievable: • Starting Time is governed by the available tractive power of locomotives. In order to accelerate a loaded coal train from standstill to 80 km/h on a level gradient takes 3 minutes 15 seconds longer than to travel the same distance at a constant speed of 80 km/h. • Stopping time is governed by the layout of signalling and the requirements of safety standards[14]. This standard requires that stopping trains reduce speed to 20 km/h

[14] Safety standard HWD-00995 Version 2.1 Observance and Reaction to Signals

	below boarded speed when passing the approach signal to a signal set at stop. The distance between the approach and target signal in the Goonyella system would typically be about 2000m depending on gradient and other factors. A stopping train takes at least 4.5 minutes more to travel this distance than a train travelling at line speed.
Dunsmure Passing Loop	Aurizon Network has previously identified Dunsmure Passing Loop as required for expansion volumes across the South Goonyella section. However, the change from theoretical to DNC modelling does not show a constraint in this section. Aurizon Network does not consider that this passing loop is essential to resolve an Existing Capacity Deficit. Dunsmure Passing Loop provides a 10-minute cycle time benefit, and overall TSE improvement of less than 1%.
Teviot Brook Passing Loop	Aurizon Network has previously identified Teviot Brook Passing Loop as required for expansion volumes across the North Goonyella section. However, modelling indicates that the change in assumptions from theoretical to DNC parameters does not cause added congestion on this section. Aurizon Network does not consider that this passing loop is essential to resolve an Existing Capacity Deficit. Teviot Brook Passing Loop provides a 10-minute cycle time benefit, and overall TSE improvement of less than 1%.
Connors Range Track Stability works	As highlighted above, there is a known heat risk on Connors Range, which can cause delays and cancellations to trains when the temperature of the track is too high. This heat is caused by the rail-wheel interface, and ambient heat. Additional traffic can magnify this risk. Options exist to explore track stability solutions, to remove or lower this restriction. There is the potential for a 1 - 2% capacity improvement to be seen, however works are expected to cost in excess of $30m.
ATIS	Automatic Track Inspection systems are being trialled in Blackwater. The immediate quantifiable capacity benefit is a reduction in access required for the track recording car. Aurizon Network considers this could improve capacity marginally. More frequent data collection may lead to improvements in reliability and condition-based maintenance strategies, however the extent of these benefits has not been quantified at this stage.
Port Unloading Time & Operating Mode	The ICAR reports that a 10% increase in the unload rate at DBCT and HPCT can achieve a 1.2% increase in capacity. Aurizon Network has similarly tested whether a 10% improvement in the overall time at port can contribute to a capacity increase. Clear of any other initiatives, a 0.5% improvement in TSEs achieved is seen. Additionally, Aurizon Network considers there is the potential for improvements to be seen where relaxation to delivery window timeframes at DBCT can be achieved. This will allow for more flexibility in the rail schedule and reduce variation.
Mine Cancellation Improvements	In FY21, 30% of cancellations across Goonyella were due to mine cancellations, contributing to a 5% reduction in performance to plan. When a train is cancelled, the train will likely store in the yard until a new job is found, or schedules are adjusted. This creates missed connections, and yard congestion. When the yard is congested, further delays are seen on the mainline, as other trains stage for a yard slot.
Above Rail Cancellation Improvements	In FY21, 40% of cancellations across Goonyella were due to Rail Operator cancellations, contributing to a 6.9% reduction in performance to plan. Improvements in the reliability of Rollingstock may improve overall system throughput. Further discussion will take place with Rail Operators to determine whether improvement initiatives underway can assist in resolving the Existing Capacity Deficit.
Terminal Delivery Windows	Aurizon Network notes the DBCT supply chain has been reviewing the operational benefits of expanding delivery windows to provide for greater rail order management flexibility. Delivery windows constrain traffic flow and force the positioning of Rail Operators fleet throughout the system with no regard paid towards alignment with below rail availability.

	Further discussion with terminals, Rail Operators and Customers will take place to determine whether this initiative can assist in resolving the Existing Capacity Deficit.

System Review – Blackwater and Moura

The ICAR indicates that there is an Existing Capacity Deficit in both the Blackwater and Moura Systems. It indicates that the cause of the constraint is common across both systems, and as such, Aurizon Network has reviewed the potential Transitional Arrangements for these systems jointly. The ICAR findings and key SOP assumptions are summarised below:

Table 6 - ICAR Summary for Blackwater & Moura – FY23 Results

		Blackwater		Moura	
Committed Capacity[15]		10,404 Train Paths	87mtpa	2,338 Train Paths	16.4mtpa
Deliverable Network Capacity[16]		9,854 Train Paths	82.4mtpa	2,163 Train Paths	15.2mtpa
Existing Capacity Deficit		550 Train Paths	4.6mtpa	175 Train paths	1.2mtpa
Key SOP & Output Parameters	*Total Consists Modelled*	41 Consists across 2 operators		7 Consists from one Operator	
	Average System Cycle Time[17]	32.3 hours		25.5 hours	
	Port Assumptions	Even Railings, average unload time of 1:46 and 1:01 for Moura short trains (nominal payload 4800t)			
	Total Maintenance Scope Hours	8,926 hours		623 hours	

The Independent Expert has identified that there is an Existing Capacity Deficit of up to 5% in the Blackwater system and 7% in the Moura system. As summarised above, the underlying cause identified by the Independent Expert is congestion within Callemondah yard.

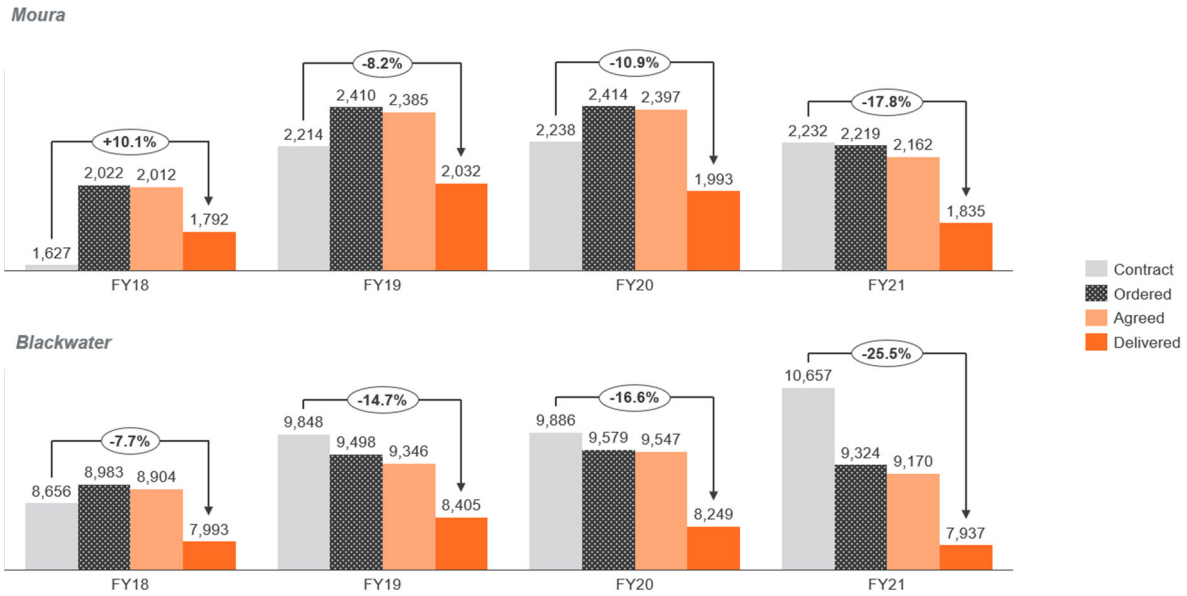
Figure 14 below provides a snapshot of Blackwater and Moura System historical performance. In both Coal Systems, most ordered services are scheduled, discrepancy remains between the agreed schedule, and what is actually delivered. In the Moura system for the past 3 years, the agreed schedule was higher than the Deliverable Network Capacity reported in the ICAR. This means that while the Rail Infrastructure has the capability to schedule all Committed Capacity, loss in throughput is seen through variance to schedule and day of operation loss.

[15] Excludes all non-coal services operating in the system, and preserved path requirements. Includes IE Scaling for days in the month

[16] Based on Nominal Train Payload of 8,369t, and 4955 for Callide and QAL services

[17] Supplementary information provided by the Independent Expert

Figure 14 - Historical Blackwater & Moura System Performance – Train Cycles



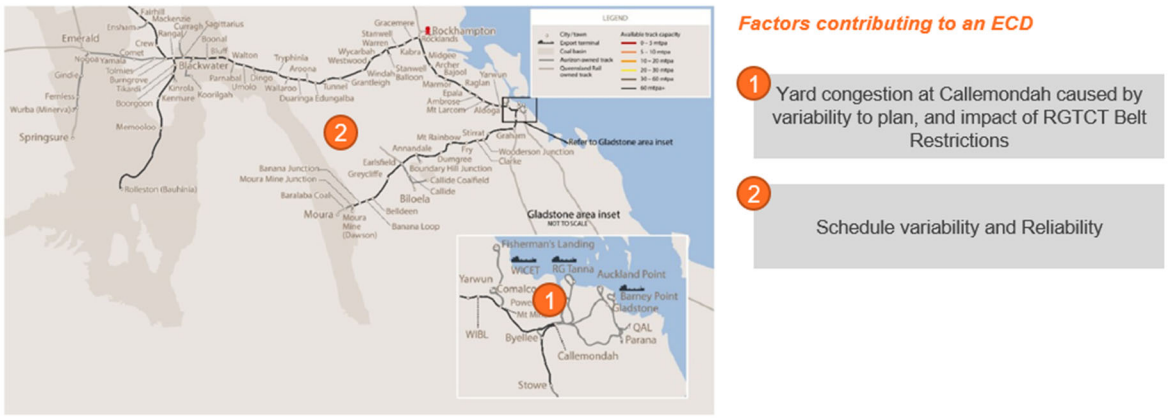
Aurizon Network has also reviewed the outcomes of the ICAR to determine whether any specific branch line issues were apparent. None were specifically highlighted by the Independent Expert. This is supported by Aurizon Network's review and modelling, which indicates that no branch lines appear to be performing better or worse than others.

Focus for Blackwater and Moura are therefore centred on improving the operation of Callemondah Yard, and other operational improvements that can help to improve network availability.

Factors Contributing to Existing Capacity Deficits in the Blackwater System

Aurizon Network has reviewed the information provided in the ICAR, and undertaken analysis to determine the cause, and potential solutions. These are summarised below in Figure 15 and described in detail in the proceeding sections.

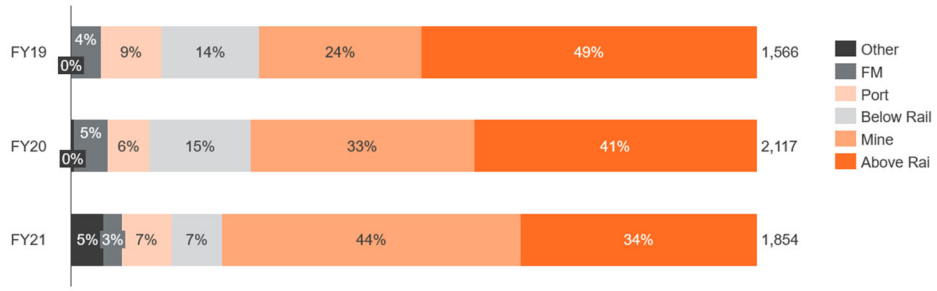
Figure 15 – Factors contributing to Blackwater and Moura Existing Capacity Deficit



The ICAR indicates that the cause of the Existing Capacity Deficit at Committed Capacity across both the Blackwater and Moura Systems is as a result of the Callemondah to RGTCT section, or in other words, the Callemondah mini cycle. Aurizon Network has examined factors that are contributing to this constraint:

Yard Congestion	Callemondah is a critical facility for both the Blackwater and Moura systems, as it provides the location where all services undertake provisioning, maintenance inspections, minor maintenance work and shunting activities. The yard was originally designed to stage services to RGTCT and is now used by both RGTCT and WICET services to provision, as Rail Operators cycle their fleet. On average, trains are occupying the yard for 1 - 3 hours longer than planned activities. This is due to time waiting for connections, missed connections, rollingstock repairs and additional time taken for planned activities such as provisioning. Aurizon Network notes that the modelled yard congestion at Callemondah is against full Committed Capacity and assumes more consists than has historically been seen operating across Blackwater and Moura.
Scheduling and Reliability	The Blackwater and Moura systems follow the same pattern as other systems, with a large amount of variability being contributed by mine and above rail cancellations. Figure 16 below indicates cancelled services by responsibility for FY21.

Figure 16 – Historical cancellation cause allocation



This level of variability often manifests in trains spending additional time in the yards while they wait for connections, which creates congestion and prevents trains from entering the yard, placing more delays on the mainline.

RGTCT Belt Restrictions

Simulations have been performed to determine the impact of belt route restrictions at RGTCT on the capacity of the Rail Infrastructure. Aurizon Network's results indicate that by removing the belt restrictions, an additional 3.2% of Train Service Entitlements are achieved across both the Blackwater and Moura systems. There is also a significant benefit to cycle time, with a 1-hour reduction seen.

Figure 17 - Effect of Belt route restrictions on Cycle Time (h:mm)

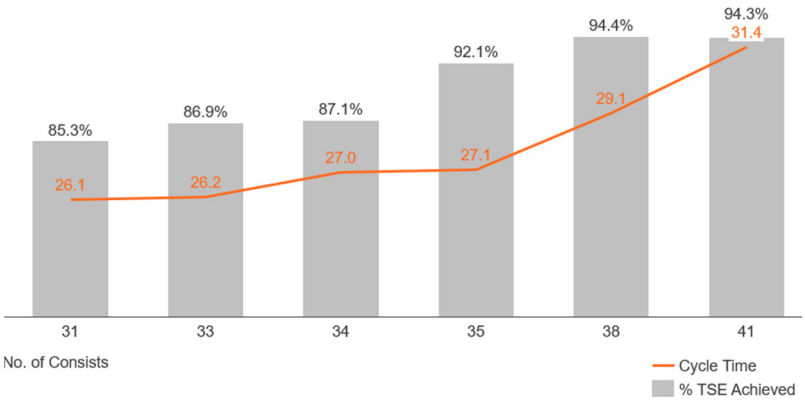
This operating mode has a significant impact on the overall capability of the Rail Infrastructure, which manifests in yard congestion. Changes to the operating mode provide an option for consideration to resolve the Existing Capacity Deficit. Aurizon Network is not aware of the costs and practicalities of achieving this, it is assumed that large investment would be required. Should this be resolved, it is likely that infrastructure and improvements in the yard operations would no longer be necessary.

Rollingstock Fleet

The results of the ICAR assume 41 consists are operating in Blackwater, and 7 consists are operating in Moura. Aurizon Network has reviewed the current fleet operating across the Blackwater and Moura systems, in line with the contracted demand. Similar to the other systems, it is acknowledged that there are discrepancies between Committed Capacity, and what each above rail operator may be contracted to deliver. There is also a small amount of Committed Capacity not currently operating.

Figure 18 below shows the incremental improvements in throughput seen when modelling increased consist numbers for Blackwater. Any increase in consist numbers will however have a detrimental impact on cycle time. In addition, the balance between Rail Operators to service their contracts is important. If one Rail Operator has too many consists in the system, this will detrimentally impact performance, as consists wait for demand and store on the network.

Figure 18 – Percentage of Blackwater TSEs achieved with varying consist numbers



Proposed Transitional Arrangements

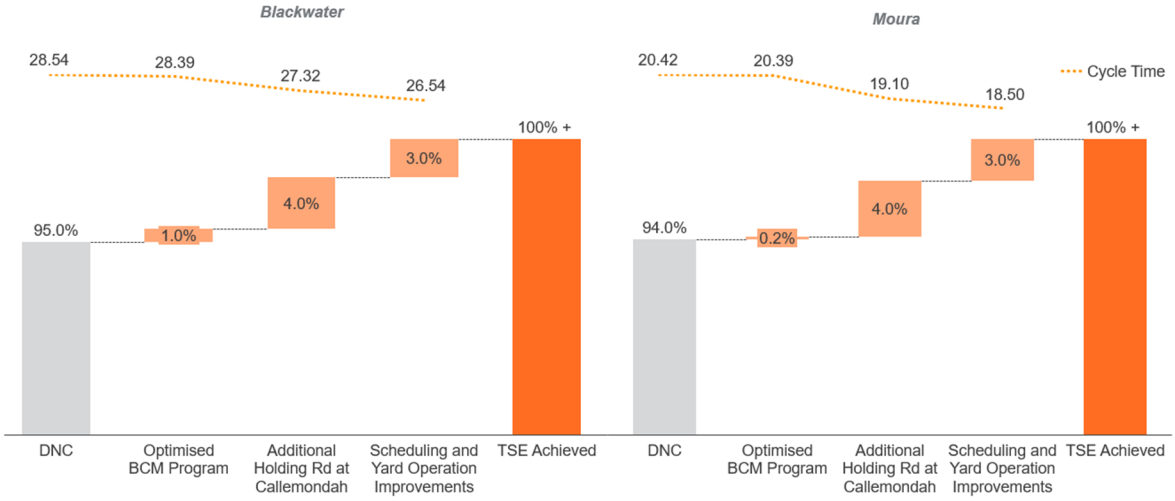
OVERVIEW

Aurizon Network has analysed a number of changes to the Blackwater and Moura Systems to improve overall system capacity.

- Each Customer has the option to relinquish in accordance with the terms of their Access Agreements. Where requests are made, these will be considered first in resolving an Existing Capacity Deficit.
- Changes to operating and maintenance programs have been included in the program of works to improve network availability and reduce variability. The operational changes highlighted below have the ability to resolve 25% of the Existing Capacity Deficit once implemented. Additionally, operational improvements that improve performance to plan, and contribute to reduced time in yard may be considered as an alternative to yard infrastructure, however there is delivery risk, which could lead to targets not being achieved.
- An Expansion of Callemondah yard has also been recommended as part of the Transitional Arrangements. The initiative highlighted below will assist in providing additional yard capacity.

A preliminary proposal is provided below on Transitional Arrangements required to achieve full Committed Capacity. Figure 19 below provides the preliminary bridge to achieve this. Aurizon Network's proposal seeks to achieve Committed Capacity across an annual period, and to ensure Committed Capacity originating on each branch line is consistently serviced. Please see **Appendix 3** for detailed results across FY23, and for each branch line.

Figure 19 - Blackwater & Moura Systems Transitional Arrangement bridge[18]



Capacity Created	0.7 – 1.4mtpa	3.5 – 4.5mtpa	2 – 2.5mtpa	**6.2 – 8.4mpta**	*Capacity Created*	0.04mtpa	0.5 - 0.8 mtpa	0.3 - 0.5 mtpa	**0.85 – 1.3mtpa**
Cost Range	$300,000	$20 – $30m	Up to $1m	**$20.3m - $30.3m**	*Cost Range*	Nil	$20 – $30m	Up to $1m	**$20 – $30m**

[18] The capacity improvements outlined are based on Aurizon Network's assessment for FY23, using Aurizon Network's modelling. To ensure consistency with the DNC, verification of the proposed capacity benefits will be undertaken in consultation with the Independent Expert, using their dynamic simulation model.

RELINQUISHMENT

Access Holders may choose to relinquish Access Rights if they are entitled to do so under, and in accordance with a relinquishment provision in their Access Agreement. A relinquishment fee will not be payable where Access Rights are relinquished through this process.

As the constraint for Blackwater and Moura Systems has been identified as predominately congestion within Callemondah yard, there is the potential that relinquishment of TSEs from either the Blackwater or the Moura systems may assist in addressing a deficit across both systems. The following number of TSEs are estimated to be required to be relinquished to resolve the Existing Capacity Deficit:

Table 7 – TSEs required to be relinquished to resolve Blackwater & Moura Existing Capacity Deficit

		FY22	FY23	FY24
Blackwater	***Monthly TSEs***	36	92	74
	Total TSEs	428	1,100	886
Moura	***Monthly TSEs***	16	30	33
	Total TSEs	194	350	398

Aurizon Network will be requesting customers to formally notify it whether they wish to relinquish Access Rights through the consultation process. Where requests for relinquishment are received, they will be factored into the final Transitional Arrangements recommendations.

Where there is a desire across many Access Holders to relinquish Access Rights in excess of the Existing Capacity Deficit, the number of Train Service Entitlements that can be relinquished will be capped at the maximum Existing Capacity Deficit, and apportioned on a pro-rata basis, up to this maximum amount.

Aurizon Network will advise those customers that have submitted a request to relinquish whether their full request can be accommodated prior to the Detailed Report being released. The Customer and Aurizon Network will then have 30 days to administer the required contract variation to finalise the relinquishments.

Recommended Transitional Arrangements

The following Transitional Arrangements are recommended to rectify the Existing Capacity Deficit[19].

Optimised BCM Program

This project involves changes to the way Aurizon Network manages the BCM program. The Optimised single BCM program uses the RM902, auxiliary equipment and organisational structure. The current operating methodology is to have the ballast cleaning operation locate in the North for five months and then the south for five months. The proposed change in this option is to instead move the machine between closures to reduce the reliance on single line closures.

0.5 - 1% TSE increase
0.7 – 1.4mt mtpa throughput

Cost: $300,000 opex increase p.a
$0.30 per nt of Capacity
Minor impact on AT1 Tariff for Blackwater

Time to implement: <1 year

- This project does not involve any capital investment and can generate increased throughput by making more paths available for coal services.
- It also provides for better utilisation of the Ballast Cleaning Machine, and staff. No additional supporting plan or assets are required.
- This project does *involve* some changes to the maintenance plan to enable sufficient time between system closures for BCM travel. These changes are being incorporated in the FY23 MRSB.
- To ensure the benefits from this change are seen, compliance to plan is required. There will be limited ability to move the program or to accommodate additional scope in future years, without additional access impacts.

Installation of an additional road at Callemondah

This project involves design and conduction of an additional holding road within the Callemondah complex. The road can be used for staging of services to the port, provisioning, and maintenance examinations, or to provide a 'no touch' pathway through the yard for trains that do not require provisioning.

3 - 4% TSE increase
3 - 4 mtpa throughput

Cost: $20 – 30m
$7.50 per nt of Capacity
Up to $0.04nt tariff impact

Time to implement: <3 years

- A key bottleneck identified is the amount of time trains spend in Callemondah. This time is well above design parameters for the yard and occurs across multiple operators.
- Construction of a new road between the existing yard and Powerhouse loop will assist in providing a location for trains to stage to the port. Simulations indicate that cycle time improvements are seen on the loaded journey and loaded wait time in the port.

[19] Cost estimates provided for each project are indicative only. Further study is required to confirm capital estimates.

Figure 20 – Impact of additional road in Callemondah on Blackwater Turnaround Time (h:mm)

- There is the potential to make provisions for better use of Road 5 in Callemondah yard through upgrades to the access road. Upgrades could facilitate mobile provisioning of lead and remote locomotives, or access for other on-train activities.
- Further study is required to determine feasibility, and to maximise the potential benefits.

Scheduling improvements focused on reducing yard time

This initiative focuses on optimal yard planning to reduce variability in the schedule. Initiatives include Integrated Rail Planning for schedule optimisation and development of a robust schedule, focusing on yard road management and inclusion of a dedicated 'no touch' road, and overall reduction in unplanned time in the yard.

2 - 3% TSE increase
4 - 5 mtpa throughput

Cost: $0 - $1m
$0.20 per nt of Capacity
nil tariff impact

Time to implement: <1 year

- A series of yard operational improvements have been tested to determine potential capacity benefits. This initiative aims to reduce cancellations due to missed connections through better planning and reduce the overall time trains spend in the yard by a target of 1 hour. Modelling suggests that if 1 hour of yard time can be reduced, a 3% increase in Train Service Entitlements achieved is seen.
- Depot dwell time consists of time for provisioning and examination, train maintenance activities, shunting and waiting for next dispatch connection. Unplanned rollingstock maintenance and connection wait times are the largest elements of modelled depot dwell time. Consideration should be given to the possibility of achieving depot dwell time savings by measures such as minimisation of shunting activities and better performance to plan.
- Integrated Rail Planning will help to facilitate this by improving schedule reliability, ensuring plans are deconflicted and can be reliably achieved and accommodating variation, which will assist in reducing the effect of yard congestion associated with missed connections.
- This initiative will require support from all Above Rail Operators to achieve the target reductions. Some initiatives are already underway to support improvements, including changes to the way maintenance activities are occurring in the yard, through Block Maintenance change outs, and better planning of yard roads through technology improvements using the Roadie tool.
- There is however implementation risk associated with any operational improvement. Should the target not be met, then a shortfall will remain. This initiative should be considered as an alternative to an additional holding road in Callemondah, but also reviewed further to quantify implementation risk.

Other Potential Transitional Arrangements

Aurizon Network's recommended Transitional Arrangements largely focus on elements that Aurizon Network can influence and deliver. There are other changes that have been tested to determine their potential benefit. Other levers that exist across the broader supply chain are identified below.

The following options exist to increase capacity from a below rail perspective, and across the supply chain:

Improve Network Availability by lowering time on track	The IE has modelled a 10% reduction across the board for all planned maintenance activities and achieves a 0.5% improvement in capacity for Blackwater, and 0.2% improvement in Moura. Aurizon Network has also reviewed options to increase availability through changes to planned maintenance. Aurizon Network's approach to modelling this sensitivity is remove a 36hr system closure in Blackwater, to simulate an achievable outcome. Results indicate a similar outcome, with a minimal increase of 0.3% in throughput seen. At this stage, this option is not recommended based on the marginal increase in capacity seen. Should customers wish to explore this further, investigations to determine the additional costs and resourcing required to deliver the same maintenance scope within reduced maintenance windows would be required.
Improve Network Reliability through less delays	To achieve better reliability, additional preventative maintenance would be required, as well as resourcing to respond and rectify incidents quicker. A 10% improvement has been modelled. Cycle time improvements are seen; however, this change contributes to less than 0.1% improvement in throughput. This approach is similar to the reduction in general delays as proposed in the ICAR. In the ICAR, a 0.2% capacity improvement is reported for both Blackwater and Moura. The difference between Aurizon Network's approach is that we have focused only on below rail delays. To reach the 0.2% indicated by the Independent Expert, improvements in rollingstock, mine and port delays would be required.
RCS on the Bauhinia Branch	The ICAR indicates that RCS on the Bauhinia branch line may assist in improving capacity for services on that branch line. Aurizon Network has assessed the potential improvements from installing RCS. RCS assists in lowering cycle times for customers on that branch by 23 minutes and has a marginal (<0.3%) improvement in capacity. While there is some benefit from installing RCS, given the constraint identified is in and around Callemondah yard, and the ICAR does not specifically identify a constraint on the Bauhinia branch, Aurizon Network considers that the Existing Capacity Deficit can be better resolved through Transitional Arrangements that address the direct constraint.
ATIS	Automatic Track Inspection systems are being trialled in Blackwater. The immediate quantifiable capacity benefit is a reduction in access required for the track recording car. Aurizon Network considers this could improve capacity marginally. More frequent data collection may lead to improvements in reliability and condition-based maintenance strategies, however the extent of these benefits has not been quantified at this stage.
Port operations and unloading time improvements	It is estimated that by reducing restrictions around belt routes, throughput improvements of 3.2% can be seen. While it is acknowledged that this presents challenges and investment requirements, any minimisation of these restrictions will assist in supply chain performance. Additionally, Aurizon Network has modelled a reduction in port unload time of 10%. This provides an overall increase in Train Service Entitlements achieved of 0.9%. This result

	is larger than the sensitivity presented in the ICAR and is likely due to differences in the modelling approach around yards.
Mine Cancellation Improvements	In FY21, 44% of cancellations across Blackwater and Moura systems were due to mine cancellations, contributing to a 7.1% reduction in performance to plan. When a train is cancelled, the train will likely store in the yard until a new job is found, or schedules are adjusted. This creates missed connections, and yard congestion. When the yard is congested, further delays are seen on the mainline, as other trains stage for a yard slot. Decreasing this variability will assist in minimising time in yards.
Above Rail Cancellation Improvements	In FY21, 34% of cancellations across Blackwater and Moura systems were due to Rail Operator cancellations, contributing to a 5.6% reduction in performance to plan. Improvements in the reliability of Rollingstock may improve overall system throughput. Further discussion will take place with Rail Operators to determine whether improvement initiatives underway can assist in resolving the Existing Capacity Deficit.

Customer Consultation

Overview

Aurizon Network commenced early engagement with our Customers prior to the ICAR being delivered. This has informed our engagement approach. This plan sets out how we will engage further with Customers that are affected by an Existing Capacity Deficit as detailed in the ICAR.

In accordance with Part 7A.5(a)(iii) of UT5, Aurizon Network must prepare a Detailed Report within three months of the ICAR being published by the QCA, or by 1 February 2022.

Accordingly, over the next three months Aurizon Network will consult with its Customers to:

- Provide to Customers Aurizon Network's analysis on the cause of the Existing Capacity Deficit and how it may be addressed through Transitional Arrangements.
- Understand whether any Access Holders wish to voluntarily relinquish their Access Rights (where they have a right to do so under their Access Agreement).
- Identify and consider whether changes can be made to the operations of Rollingstock by Railway Operators.
- Identify and consider whether changes can be made to the operation and maintenance practices of load-out facilities.
- Where possible, agree with all affected End Users in the relevant system on the final Transitional Arrangements.

Key Stakeholders

Table 8 below identifies the stakeholders that we will be consulting with for each Coal System.

Table 8 - Stakeholder List

	Newlands & GAPE	Goonyella	Blackwater	Moura
Access Holders & End Users	BMC Bravus Mining Glencore Jellinbah Middlemount QCoal Rio Tinto	Anglo BMA BMC Fitzroy Glencore Jellinbah Kestrel Middlemount QMetco Peabody Pembroke Stanmore Terracom	Anglo Aquila BMA Cement Australia Coronado Glencore Idemitsu Jellinbah Kestrel QCoal Sojitz Yancoal	Anglo Baralaba Coal Batchfire NEC
Operators	Aurizon Operations Bowen Rail Company Pacific National	Aurizon Operations BMA Rail OneRail Pacific National	Aurizon Operations Pacific National	Aurizon Operations

Detailed Consultation Activities

	Timing	Engagement Activity	Method	Stakeholders
Preparation Period **Month 1**	✓ **Day 1**	Aurizon Network to publish on its Website: - The ICAR on a redacted basis - The System Operating Parameters of each Coal System	Upload to Website	All
	✓ **Week 1**	**Schedule** Group Forum at Aurizon offices for Stakeholder Group Presentation in Week 5 **Schedule** in 1:1 Stakeholder meetings in Week 5-7	Email invites	All
	✓ **Week 3**	Aurizon publish Preliminary Report on website and submit to QCA **Report due 20 Business Days after ICAR published**	Upload to Aurizon website Upload to QCA submissions	QCA Chair of the RIG
	Week 4	Aurizon Network send formal request to Customers for Voluntary Relinquishments **Reponses due Week 10 at the latest**	Email with Letter Template for Voluntary relinquishment response	All
Consultation Period **Month 2**	**Week 5 - 7**	1:1 Stakeholder meetings on Preliminary Report and consultation on Transitional Arrangements.	Face to face/Online Meeting	All
	Week 8	System Forum presentation. Session will detail - Overview of Aurizon Network's view on causes of Existing Capacity Deficits - Initial feedback on Transitional Arrangements - Areas of alignment across industry - Details on decision making criteria for final Transitional Arrangements	Face to face/ Online Meeting	All
	Week 8	Aurizon Network send formal request to Customers for agreement to Transitional Arrangements	Face to face/ Online Meeting	All
Endorsement Period **Month 3**	**Week 9**	Follow up 1:1 Stakeholder meetings on Transitional Arrangements.	Email with Letter of Support/No Support	All
	Week 10	Customer responses due for Support/No Support of Transitional Arrangements, and Voluntary Relinquishments	Email letters back to Aurizon Network	All
	Week 11 - 12	Aurizon Network consolidate formal customer responses and prepare Detailed report	Aurizon Internal Preparation	Aurizon Network
Detailed Report	**Week 12**	Aurizon Network submit detailed report to QCA, the Chair of the Rail Industry Group and the Independent Expert showing outcome of analysis and consultation on Transitional Arrangements	Upload to QCA Email to RIG Chair Email to IE CEO	QCA Chair of Rail Industry Group Independent Expert

Customer Decision Points

Through the consultation process, Aurizon Network will be seeking three key decisions from End Users:

1. Whether the End User is willing to voluntarily relinquish Access Rights in accordance with the terms of its Access Agreement, within 30 days of notice from Aurizon Network.
2. Where an Expansion is proposed, that the Expansion is the most effective and efficient option to address the Existing Capacity Deficit, and where possible, agree the terms of an Expansion Proposal; and
3. Overall agreement on the Transitional Arrangements plan.

These commitments will be sought by no later than Week 10 after release of the ICAR. Aurizon Network proposes to seek these commitments via letters from each of the affected End Users. A template for requesting a voluntary relinquishment is available in **Appendix 4**.

Detailed Report Process

Post consultation, Aurizon Network will develop and publish a Detailed Report. This report will contain the outcome of Aurizon Network's analysis and consultation on causes of the Existing Capacity Deficit, and the Transitional Arrangements which are considered to most effectively and efficiently address the Existing Capacity Deficit. That report will indicate where the affected End Users have agreed to the Transitional Arrangements.

If End Users and Aurizon Network have not reached an agreement as to which of the Transitional Arrangements should be implemented, the Independent Expert must review Aurizon Network's Detailed Report, and promptly make a recommendation to the QCA with respect to which of the Transitional Arrangements (including Expansions) it considers will most effectively and efficiently resolve the Existing Capacity Deficit. The QCA will then make a determination as to which of the Transitional Arrangements will most efficiently and effectively resolve the Existing Capacity Deficit.

Contact Information

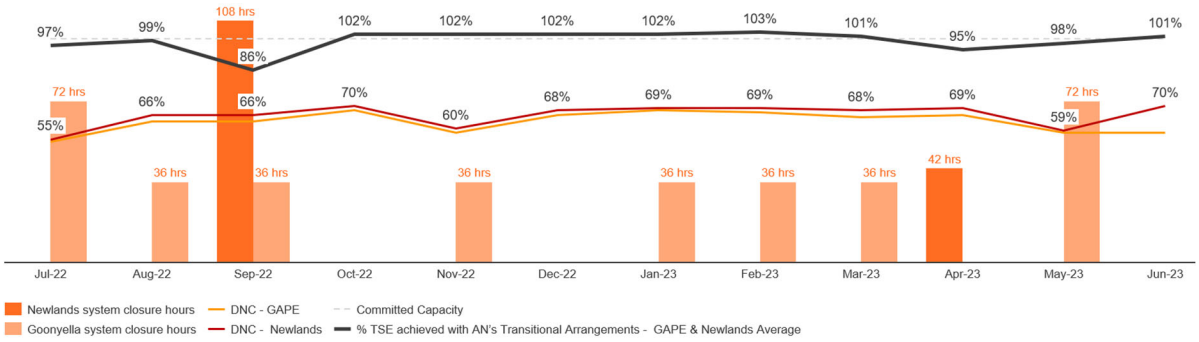
Aurizon Network will be reaching out to our customers to schedule meetings. If you would like any more information on this report, please feel free to contact your Customer Account Manager directly, or email access.services@aurizon.com.au.

Appendix 1: Newlands & GAPE proposed Transitional Arrangements Results

Monthly Variation

Aurizon Network's proposed solution seeks to achieve Committed Capacity across the annual period. With the current maintenance program deployed in the Newlands System, large system closures significantly reduce the throughput achieved in those months where maintenance activity occurs. This means that peaking capacity is available to rail additional trains on clear months, which offset for the months with maintenance. Figure 7 below highlights the impact of maintenance closures on achieving throughput and demonstrates the amount of peaking capacity required to be used on other months.

Figure 21 – FY23 Newlands and GAPE Monthly TSE achieved[20]



Branch Line Performance

Aurizon Network's proposal also seeks to ensure Committed Capacity originating on each branch line is consistently serviced, and no constraints remain which could hinder one Access Holder over another. The table below shows results for each branch line, assuming all Transitional Arrangements are implemented.

Table 9 – FY23 Newlands and GAPE Monthly TSE achieved by Branch Line

	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23
Blair Athol Branch	98%	99%	84%	103%	102%	103%	102%	103%	100%	95%	98%	100%
GAPE	96%	98%	86%	102%	102%	102%	101%	102%	101%	96%	97%	100%
Newlands Mainline	97%	99%	89%	102%	102%	102%	102%	103%	101%	94%	98%	101%
North Goonyella	98%	99%	85%	103%	101%	103%	102%	103%	101%	96%	97%	101%
South Goonyella	97%	99%	84%	102%	101%	103%	101%	103%	101%	92%	98%	101%

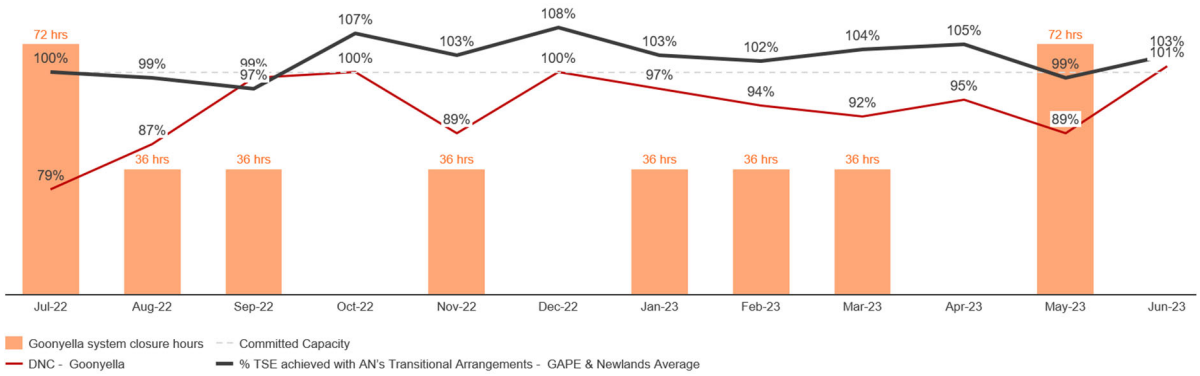
[20] Based on FY23 SOP Maintenance Plan. Updates are required to align with the proposed MRSB for FY23

Appendix 2: Goonyella proposed Transitional Arrangements Results

Monthly Variation

Aurizon Network's proposed solution seeks to achieve Committed Capacity across the annual period. The Goonyella System has a regular pattern of 36hr maintenance closures, with two larger 72hr closures. With the Transitional Arrangements proposed above, the system should have sufficient capacity to still deliver contracted throughput across most months, and peaking capacity in other months to account for the impact of the larger 72hr closures. Figure 14 below highlights the impact of maintenance closures on achieving throughput and demonstrates the amount of peaking capacity required to be used on other months.

Figure 22 – FY23 Goonyella Monthly TSE achieved[21]



Branch Line Performance

Aurizon Network's proposal also seeks to ensure Committed Capacity originating on each branch line is consistently serviced, and no constraints remain which could hinder one Access Holder over another. The table below shows results for each branch line, assuming all Transitional Arrangements are implemented.

Table 10 – FY23 Goonyella Monthly TSE achieved by Branch Line

	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23
Blair Athol Branch	100%	98%	96%	103%	102%	104%	104%	104%	104%	104%	99%	102%
Coppabella/Wotonga	108%	106%	102%	111%	106%	113%	109%	104%	110%	109%	106%	106%
Goonyella Mainline	97%	96%	94%	103%	102%	103%	103%	103%	103%	104%	95%	102%
Hail Creek Branch	101%	100%	98%	105%	102%	105%	102%	101%	102%	103%	100%	102%
North Goonyella	99%	98%	97%	112%	102%	112%	103%	102%	103%	108%	98%	102%
South Goonyella	99%	98%	96%	106%	102%	106%	102%	101%	103%	102%	98%	102%

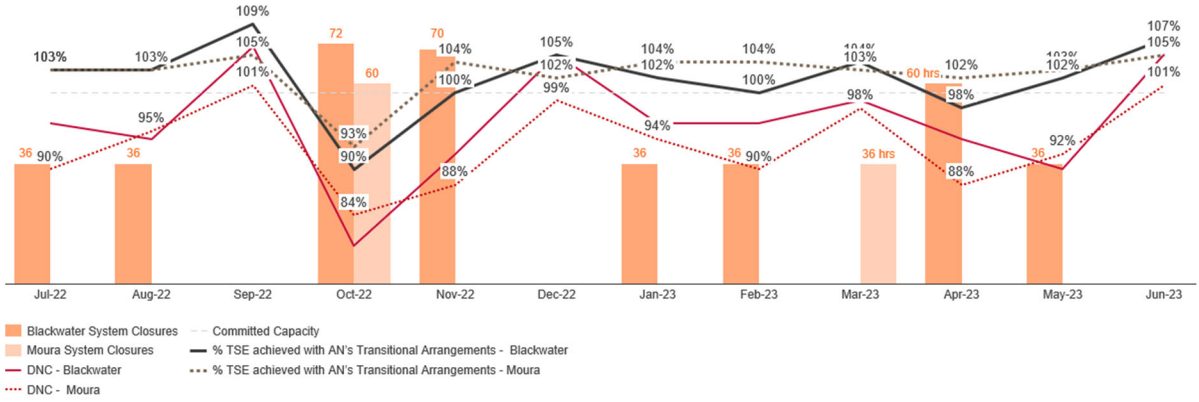
[21] Based on FY23 SOP Maintenance Plan. Updates are required to align with the proposed MRSB for FY23

Appendix 3: Blackwater and Moura proposed Transitional Arrangements Results

Monthly Variation

Aurizon Network's proposed solution seeks to achieve Committed Capacity across the annual period. The Blackwater System has a regular pattern of 36hr maintenance closures, with some larger closures. Moura has two system closures. With the Transitional Arrangements proposed above, the systems should have sufficient capacity to deliver Committed Capacity across most months, and peaking capacity in other months to account for the impact of the larger closures. Figure 21 below highlights the impact of maintenance closures on achieving throughput and demonstrates the amount of peaking capacity required to be used on other months.

Figure 23 – FY23 Blackwater & Moura Monthly TSE achieved[22]



Branch Line Performance

Aurizon Network's proposal also seeks to ensure Committed Capacity originating on each branch line is consistently serviced, and no constraints remain which could hinder one Access Holder over another. The table below shows results for each branch line, assuming all Transitional Arrangements are implemented.

Table 11 – FY23 Moura Monthly TSE achieved by Branch Line

	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23
Callide Branch	100%	100%	103%	83%	101%	96%	103%	99%	97%	95%	98%	103%
Moura Branch	104%	104%	104%	99%	104%	104%	104%	104%	104%	104%	104%	104%
Moura Mainline	104%	104%	106%	94%	106%	103%	106%	106%	105%	104%	105%	106%

[22] Based on FY23 SOP Maintenance Plan. Updates are required to align with the proposed MRSB for FY23

Table 12 – FY23 Blackwater Monthly TSE achieved by Branch Line

	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23
Bluff/Burngrove	102%	104%	105%	88%	96%	104%	102%	100%	103%	97%	100%	105%
Gregory Branch	104%	104%	112%	91%	99%	106%	102%	101%	104%	99%	102%	108%
Laleham Branch	107%	113%	120%	97%	100%	117%	108%	112%	110%	100%	110%	120%
Rolleston Branch	101%	101%	104%	87%	96%	102%	100%	99%	102%	96%	101%	104%
South Goonyella	104%	103%	105%	88%	99%	104%	103%	101%	103%	98%	103%	105%

Appendix 4: Template Voluntary Relinquishment Letter

Voluntary Relinquishment

I _____ (**Authorised Representative**), duly representing _____ (**Access Holder**) hereby indicate our willingness to voluntarily relinquish the following minimum and maximum Access Rights based on Train Service Entitlements (TSEs) in accordance with the Access Agreement/s listed below. The below Access Rights are based on Annual TSEs for each respective financial year being 1 July – 30 June period, example FY22 is the period 1 July 2021 – 30 June 2022.

Access Agreement: [insert list]

Date of Access Agreement:

Origin	*Destination*	*FY22*	*FY23*	*FY24*	*FY25*	*FY26*
Mine A		Min. TSEs				
		Max TSEs				
Mine A		Min. TSEs				
		Max TSEs				

Please copy and paste the above table for multiple Access Agreements.

We hereby acknowledge that we are entitled to relinquish the above Access Rights in accordance with the relinquishment provision of the above-mentioned Access Agreement/s, and Aurizon Network has the right to determine in accordance with Part 7A of the UT5 Access Undertaking the number of Access Rights that may be relinquished.

Signed: _____ (Signature of Authorised Representative)

Dated: _____