Attachment 3: West Moreton System DAU2 Capital Expenditure Submission

West Moreton System
DAU2 Capital Expenditure Submission

14 August 2018

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1. Overview

1.1 Context

Queensland Rail's West Moreton System provides rail infrastructure access to two coal mines on the West Moreton System—New Hope Coal's New Acland Stage 2 mine at Jondaryan and Yancoal's Cameby Downs mine that rails from Columboola. These two mines are forecast to produce around [redacted] tonnes of saleable coal in 2018-19. New Hope Coal's New Acland Stage 2 mine is nearing the end of its life, with it being likely that coal reserves at this mine may be exhausted by mid-2020.

In September 2017, under section 133 of the *Queensland Competition Authority Act 1997* (QCA Act), the Queensland Competition Authority (QCA) requested Queensland Rail to submit a draft access undertaking for the period 1 July 2020 to 30 June 2025 (DAU2), by 31 July 2018. If approved by the QCA, DAU2 will become the Queensland Rail Access Undertaking 2 (AU2).

As part of the development of DAU2 , Queensland Rail has proposed reference tariffs for the West Moreton System based on the 'building blocks' approach. This submission provides information supporting Queensland Rail's proposed capital expenditure for the period.

The DAU2 submission has been developed in the context of considerable uncertainty about the future coal volumes likely to be moved on West Moreton coal system.

In particular, New Hope Coal is yet to receive approval to develop the New Acland Stage 3 mine. New Hope Coal is continuing to progress with its development application, although there is no certainty about the potential outcome of this process. For this reason, two capital expenditure scenarios have been developed and are presented in this submission:

- a [redacted] (mtpa) scenario—assuming that only Yancoal's mine at Cameby Downs is producing coal for hauling
- a [redacted] scenario—assuming the New Acland mine is developed and produces [redacted] of coal for railing from Jondaryan, in addition to the [redacted] from Cameby Downs.

1.2 Proposed DAU2 West Moreton System capital expenditure

Queensland Rail has proposed 25 capital expenditure projects for the West Moreton System over the DAU2 period, with two cost estimates to take account of those projects considered to be tonnage dependent. The two proposed capital expenditure forecast for 2020–21 to 2024–25 (the DAU2 period), both excluding Interest During Construction (IDC) are:

- $144.495 million ($2020–21) to support the movement of [redacted]
- $159.384 million ($2020–21) to support the movement of [redacted]

Table 1 and Table 2 show the proposed DAU2 capital expenditure by corridor and year for the movement of [redacted] per annum of coal and [redacted] of coal. These are the total costs for all common network assets, before allocation between coal and non-coal services.[1]

Table 1—Proposed capital expenditure [redacted] by year and corridor ($2020-21 million), excluding IDC

Corridor	2020-21	2021-22	2022-23	2023-24	2024-25	Total
Rosewood—Jondaryan	$20.878	$20.747	$12.460	$12.265	$7.158	$73.508
Jondaryan—Columboola	$15.163	$9.835	$14.454	$13.670	$17.864	$70.986
Total	**$36.041**	**$30.582**	**$26.914**	**$25.936**	**$25.022**	**$144.495**

Table 2—Proposed capital expenditure [redacted] by year and corridor ($2020-21 million), excluding IDC

Corridor	2020-21	2021-22	2022-23	2023-24	2024-25	Total
Rosewood—Jondaryan	$22.808	$23.067	$16.621	$17.440	$8.461	$88.397
Jondaryan—Columboola	$15.163	$9.835	$14.454	$11.058	$20.476	$70.986
Total	**$37.971**	**$32.902**	**$31.075**	**$28.498**	**$28.937**	**$159.384**

Queensland Rail has proposed that these capital expenditure projects identified in this submission be included in the capital indicator for DAU2, The efficient actual capital expenditure will be included in the Regulated Asset Base (RAB) on an ex post basis after the QCA has reviewed the projects for prudency of scope, scale and cost.

For the purpose of developing the proposed reference tariffs for DAU2, Queensland Rail has assumed that all of the individual projects (including individual projects that are part of a larger program of works) will be completed within a single year, and as a result forecast expenditure is capitalised in the year it is spent.

1 It should be noted that the Queensland Government's investment to increase the height of tunnels on the Toowoomba range has not been included in this submission, as the beneficiaries of this project will be agricultural transport, not coal transport.

1.3 Capital projects for the DAU2 period

1.3.1 Proposed capital expenditure [redacted] and [redacted]

Table 3 sets out the capital projects proposed for the DAU2 period. The capital projects proposed are primarily asset renewal projects. No growth projects are proposed for the DAU2 period for either of the two scenarios.

Table 3—Total proposed DAU2 capital expenditure by project—[redacted] and [redacted] ($2020-21 million), excluding IDC

Project Name	Tonnage dependent	Regulatory driver	[redacted]	[redacted]
Civil projects				
Timber Bridge Replacement	No	Asset Renewal	[redacted]	[redacted]
Formation Repairs	Yes	Asset Renewal	[redacted]	[redacted]
Culvert Replacement	No	Asset Renewal	[redacted]	[redacted]
Sub-total			***$63.570***	***$66.536***
Track projects				
Track Reconditioning	Yes	Asset Renewal	[redacted]	[redacted]
Re-sleepering	No	Asset Renewal	[redacted]	[redacted]
Re-railing	Yes	Asset Renewal	[redacted]	[redacted]
Level Crossing Reconditioning	No	Asset Renewal	[redacted]	[redacted]
Concrete Sleepers With Gauge Issues On Tight Radius Curves	No	Asset Renewal	[redacted]	[redacted]
Level Crossing Transitions	No	Asset Renewal	[redacted]	[redacted]
Greasers Replacement / Upgrades	No	Asset Renewal	[redacted]	[redacted]
Sub-total			*$43.908*	*$55.832*
Signalling projects				
Trailable Facing Points Detection (Monitoring)	No	Service improvement	[redacted]	[redacted]
West Moreton Minor Signalling Renewals	No	Asset Renewal / Compliance	[redacted]	[redacted]
Signalling Pole Route Yarongmulu — Laidley	No	Asset Renewal	[redacted]	[redacted]
Level Crossing Signalling Upgrade	No	Asset Renewal / Compliance	[redacted]	[redacted]
Location Case Renewal	No	Asset Renewal / Compliance	[redacted]	[redacted]
Rangeview SER/PER Upgrade	No	Asset Renewal	[redacted]	[redacted]
Signalling LED Upgrade	No	Asset Renewal	[redacted]	[redacted]
Gatton Interlocking Renewal	No	Asset Renewal	[redacted]	[redacted]
Relay Interlocking Refurbishments	No	Asset Renewal	[redacted]	[redacted]
Sub-total			***$28.943***	***$28.943***
Telecommunications projects				
Replacement of Weather Stations	No	Asset Renewal	[redacted]	[redacted]
RMS Rollout	No	Asset Renewal / Compliance	[redacted]	[redacted]
Telecoms Rectifiers Regional	No	Asset Renewal / Compliance	[redacted]	[redacted]
Digital Telemetry Rollout	No	Asset Renewal / Compliance	[redacted]	[redacted]
Rangeview Cable Route Upgrade Copper to Fibre	No	Asset Renewal	[redacted]	[redacted]
Nera Microwave Refresh	No	Asset Renewal	[redacted]	[redacted]
Sub-total			***$8.073***	***$8.073***
Grand total			**$144.495**	**$159.384**

Only three of the 25 proposed capital expenditure projects are considered to be tonnage dependent—these projects are for formation repair, track reconditioning and re-railing.

Timber bridge replacement

Continuation of the timber bridge replacement project is the largest single project proposed for the DAU2 period.

The majority of existing bridges in the West Moreton System are rated to 15.75 tal. These bridges were originally designed for 12 tal (Imperial) or dynamic loads imparted by B16 steam locomotives. The bridges from Rosewood to Miles have been assessed with respect to their suitability for the axle configuration and loading of existing traffic. The desktop assessment has shown that, under the existing loadings, these bridges are operating at the limit of their capability. Due to the existing gross tonnages on the West Moreton System, timber bridges are incurring high maintenance costs, increased closure requirements and carry an elevated risk of derailment compared to concrete and steel replacement alternatives.

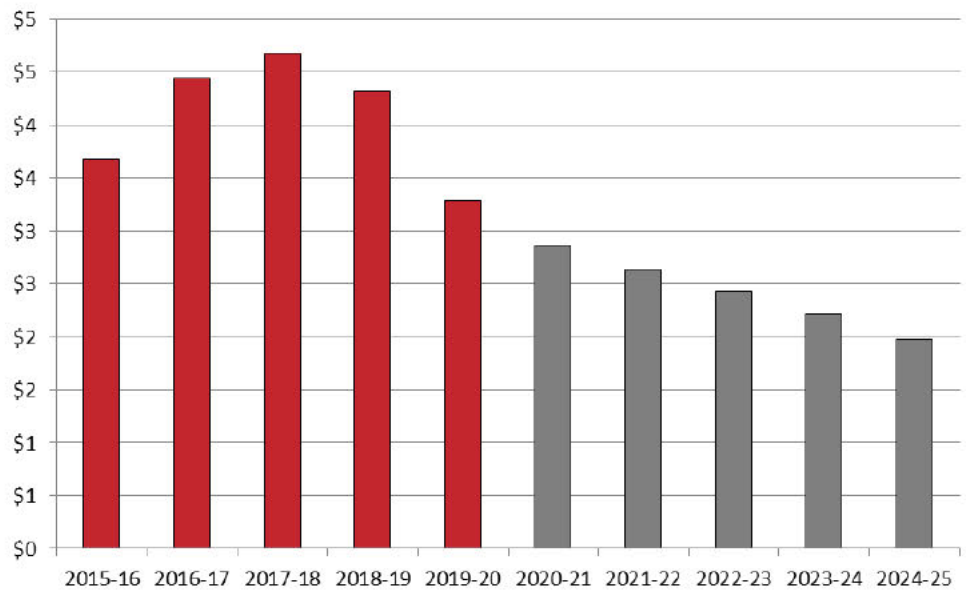
The timber bridge replacement project is part of an ongoing program to replace timber bridges across the West Moreton System. Queensland Rail is replacing timber bridges in the West Moreton System, predominantly with prestressed concrete or steel bridges. This is being undertaken to replace close-to-life-expired bridges with more durable infrastructure.

Timber bridges are prioritised for replacement based on a risk ranking. The ranking takes into inconsideration the defects in the bridge, tonnage over the bridge, temporary speed restrictions and priorities of the structures inspectors.

Timber bridge replacement on the West Moreton System is at a 200A standard (20tal), consistent with the West Moreton System Asset Management Plan. This is a key change in the capital project over the DAU2 period, relative to AU1, where prior to the Australian Government's announcement to proceed with the Inland Rail project in May 2017, bridges were designed to a 300A (30tal) standard.

Maintenance cost savings as a result of the timber bridge replacement program are reflected in the proposed maintenance budget for DAU2, with proposed expenditure to more than halve in real terms from 2015-16 to 2024-25.

Figure 1: Reduction in forecast structure maintenance allowance AU1 to DAU2 constant tonnes [redacted] ($2020-21 million)



Formation repairs and track reconditioning

Queensland Rail is proposing [redacted] ($2020–21) for the [redacted] scenario and [redacted] ($2020–21) for the [redacted] scenario (around 20 per cent of proposed capital expenditure proposal) to undertake formation repairs and track reconditioning. These two projects are ongoing and are a function of the original railway construction between 1865 and 1880, which was not designed to be a heavy haul railway.

Treatment of re-sleepering/track lowering (ballast undercutting)

Capital expenditure proposed for both the [redacted] and [redacted] scenarios include [redacted] ($2020-21) for resleepering, noting that this expenditure was treated as maintenance in the consideration of AU1 costs. Re-sleepering is proposed for inclusion as capital expenditure for the DAU2 period, consistent with the asset definition set out in Queensland Rail's *Specification—Capitalisation of Expenditure—MD12-376*.

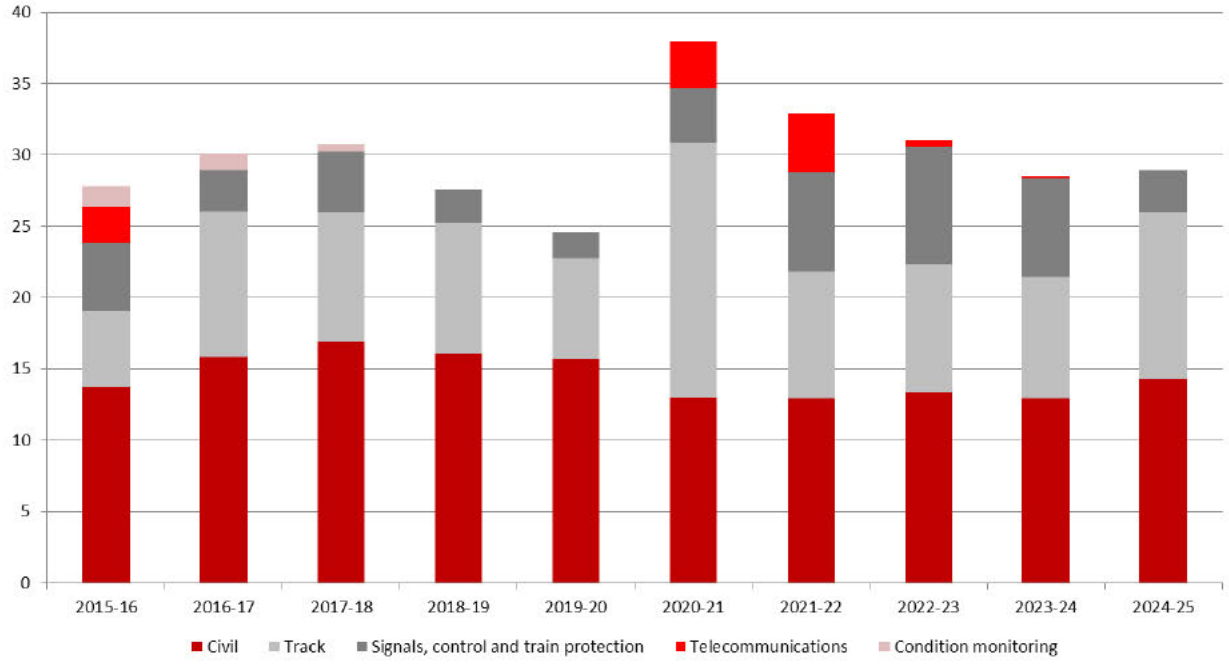
However, for the same reason that re-sleepering is proposed to be treated as capital expenditure, Queensland Rail is also seeking the QCA to reclassify approximately $7.5 million ($2020–21) track lowering costs over the DAU2 period as maintenance.

1.4 Comparison to capital expenditure in AU1

Proposed capital expenditure of $144.495 million ($2020-21) for the [redacted] scenario for DAU2 is 3 per cent higher than the capital expenditure allowance for 2015-16 to 2019-20 $140.876 million ($2020 21), noting that this includes [redacted] for resleepering. Compared to AU1, capital expenditure on structures is proposed to be $14.8 million ($2020-21) lower. Capital expenditure for signals, control and train protection equipment for the DAU2 period is $9.6 million ($2020 21) higher (50 per cent) than for 2015 16 to 2019 20, largely to replace life expired assets.

Proposed capital expenditure of $159.384 million ($2020-21) for the [redacted] scenario for DAU2 is 13 per cent higher than the capital expenditure allowance included for AU1 of $140.876 million ($2020-21). The comparison of capital expenditure 2015-16 to 2019-20 to the proposed DAU2 capital expenditure is shown in **Figure 2**.

Figure 2—Proposed capital expenditure AU1 and DAU2, by year and function—[redacted] ($2020–21, million)



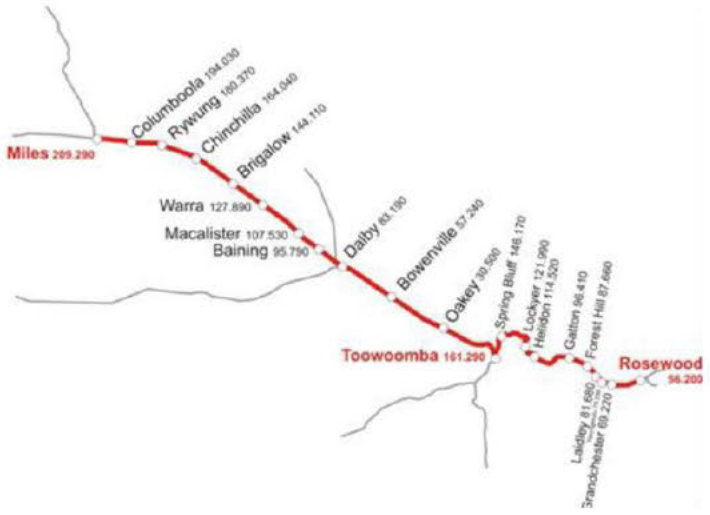
2. System description

2.1 Overview of system characteristics and current infrastructure

The West Moreton System is an important link in the supply chains that export coal and agricultural products from areas of south-west Queensland through the Port of Brisbane. The system begins on the western side of Rosewood on the Main Line and runs through Toowoomba to Miles on the Western Line. This section is the predominant coal corridor for the system. The West Moreton System does not include the Glenmorgan Line which runs from Dalby and now stops at Meandarra, the Southern Western Line from Toowoomba to Wyreema and beyond the Ebenezer loading loop, which is part of the Metropolitan System.

Figure 3: West Moreton System characteristics and infrastructure

Route length	321 km narrow gauge
Track length	407 km narrow gauge
Rail size	41, 50, 60 kg/m
Mainline sleepers	Concrete, interspersed steel and timber sleepers, predominantly 1 in 2
Maximum axle load	15.75 tonne axle load (tal)
Max. operating speed	80 km/h
Signalling	RCS and DTC
Reference train length	673.8 metres



2.2 Current traffic types, operators and key customers

The West Moreton network is a multi-use system with coal, freight and passenger trains utilising paths. Coal trains are the dominate traffic from west of Toowoomba and are the predominant driver of the asset strategies for the system. Trains are limited to 15.75tal with a train length of 670m.

As at 30 June 2018, Aurizon is the only freight service operator on the West Moreton System. However, Graincorp has announced that it has contract with Watco from 2019 for the movement of bulk grain in Queensland, including from south west Queensland.

Rail traffic from the South West system joins West Moreton System at Toowoomba. The South West system primarily carries bulk grain.

Queensland Rail is the passenger service operator running the Westlander from Brisbane to Charleville. This is the only passenger services that transits through the West Moreton System.

3. Business environment/key drivers

3.1 History of the West Moreton System and relationship to capital expenditure

The West Moreton System was constructed and opened to traffic in 1865 between Ipswich and Grandchester, with subsequent extensions reaching Toowoomba in 1867. Historically the line catered for passenger, livestock, freight and agricultural products (e.g. grain and cotton).

Coal carrying rail services commenced in 1982 initially from mines located just west of Ipswich. Coal export using the West Moreton System commenced from Jondaryan in 1984, from Macalister in 1994 (closing in 2014) and from Columboola in 2010.

The System's historical origins present continuing challenges for its capital expenditure and ongoing maintenance. The West Moreton System was initially constructed on black soil plains with no engineered formation; resulting in regular failures requiring reconstruction to ensure suitable track geometry is maintained.

Early track standards have resulted in an alignment that is lower than contemporary standards for stand-alone heavy haul railway built specifically for coal carrying services. As a consequence of the network's age and track standard, the section between Rosewood and Miles in particular requires a higher level of intervention than would be required for a modern, stand-alone heavy haul railway in order to safely and reliably deliver contracted tonnages.

The age and condition of the West Moreton System, particularly the relationship between maintenance and the value of assets was considered expensively as part of the QCA's approval of AU1—including approval of the RAB and maintenance cost allowance. While Queensland Rail has been slowly improving the quality of the track through the capital program, the same continue to affect the capital expenditure requirements for DAU2.

3.2 Access holder requirements

The major business for the West Moreton System is the transportation of coal from the Surat Basin to the Port of Brisbane. Typical coal trains are comprised of double header 94.5t locomotives with forty-one 63t (gross) wagons at nominal 15.75 tal.

To ensure the supply chain delivers the product to the Port of Brisbane on time, the above rail operator's services are timetabled to meet the requirements of the SEQ System. Delays in coal carrying train services can result in trains waiting for a new time slot in the SEQ network and delaying delivery of product to the port.

Queensland Rail has a contractual obligation with access holders to minimise below rail transit time. However, access holders also seek:

- a known cap on the number, location and time interval between track possessions
- best possible response times to any network disruption (including force majeure events)
- some spare capacity for peak production rates, or catch up capacity
- coordinated supply chain shutdowns and track possessions.

Queensland Rail aims to meet access holder /operator / supply chain requirements by reasonably limiting the number of speed restrictions and the total number of unavailable days for rail traffic. However, transit times can also be impacted by factors that are not within the control of Queensland Rail.

3.3 Investment drivers and triggers

3.3.1 Inland Rail

The Inland Rail route is divided into 13 projects for delivery with three of these projects in Queensland. The three projects are New South Wales/Queensland Border to Gowrie; Gowrie to Helidon; and Helidon to Calvert.

In view of the Inland Rail Project, The West Moreton System's asset renewal strategy has been revised to modify the loading requirements and design life requirements of new bridges (ie. the loading requirements for new bridges between Rosewood and Jondaryan have been reduced from 300A to 200A. This change will reduce the amount of capital expenditure which is at risk from future projects and changes in the freight market.

The West Moreton System will be affected by the above-mentioned factors in two ways:

- Between Rosewood and Gowrie Inland Rail will directly compete with the existing rail corridor, therefore the design life of renewals should align to the expected remaining life of the line; and
- Between Gowrie and Miles the design life of renewals should take into account the potential for freight customers to cease operations (coal customers) or to change modes (bulk grain).

It should be noted that the design life of structures contributes to, but is independent of the future economic life of the West Moreton System. If Inland Rail is deferred or does not get constructed east of Gowrie, the bridges with the revised design life can be replaced at the end of their useful life.

3.3.2 Strategic Investment by the Queensland Government

Queensland Rail's market share of the agricultural freight task in regional Queensland has declined significantly over the last 10 years. This has placed increased pressure on the regional road network while the regional rail lines continue to be significantly under-utilised. (The exception is the West Moreton System—Miles to the Port of Brisbane, although the higher utilisation of this network is due to coal haulage). The reduction in regional rail freight volumes has also resulted in a significant increase in truck movements through Brisbane to the Port of Brisbane.

In October 2017, the State Government approved Queensland Rail to proceed with a $47.5 million project to complete tunnel clearance works on the Toowoomba and Little Liverpool Ranges as part of the implementation of a rail freight growth strategy. The work is being delivered through a contract with the private sector.

3.4 Traffic assumptions

Rail traffic is limited by the capacity of the Toowoomba Range with a maximum of 113 possible return paths per week. Of these, 14 are preserved for freight and two for passenger rail traffic.

Table 2: West Moreton System traffic assumptions DAU2

Train type	Considerations
Coal	There are up to 97 return paths available for coal to contract. Final approval of New Hope's New Acland Stage 3 development is still to be obtained, and will take total West Moreton railings to approximately [redacted] If New Acland Stage 3 development is not approved, total West Moreton railings drop to [redacted] from mid-2020. If the New Acland Stage 3 mine is developed, this will likely consume the existing paths available for contracting for coal, and additional capacity options will need to be considered.
Non-coal freight	As at 30 June 2018, Aurizon is the only freight service operator on the West Moreton System. [redacted] It is assumed that non-coal freight traffic will remain a or around historic averages over the DAU2 period.
Passenger	The Westlander currently operates twice a week from Brisbane to Charleville and return.

3.5 Capacity constraints

The West Moreton System is constrained by four aspects:

- All timber and steel structures are limited to 15.75tal, noting that a network is only as strong as its 'weakest link'
- Most of the formation material was not engineered and is considered under-strength for 15.75tal;
- Without additional infrastructure investment, the Toowoomba Range capacity is restricted to 113 return paths per week; and
- Passing loops at Fisherman Islands and Kingsthorpe are 690 metres long, which restricts the maximum length of trains on the system (a coal reference train is 673.8 meters long).
- The steep grades of the Toowoomba Range and the Little Liverpool Range cause trains to traverse these sections slowly, which combined with single line workings in both locations causes capacity constraints.

The Toowoomba Range is subject to landslides in extraordinary rain events (>Q100 levels) with major reconstruction repairs to the track being required in recent years. Geotechnical monitoring and assessments have been undertaken and have shown that further investment is required to reduce the risk of further landslides.

Traffic from the West Moreton System must arrive at the entry to the SEQ network at the timetabled time to ensure its path through the network to the Port of Brisbane. Any growth potential on the West Moreton System must consider the capacity and capability of the SEQ System for paths and train length.

3.6 Relationship to West Moreton System Asset Management Plan

Queensland Rail has developed the 2018–19 West Moreton System Asset Management Plan, which provides the strategic framework for planning capital and maintenance activities on a rolling 10-year basis. The capital expenditure projects for the DAU2 period have been developed consistent with the Asset Management Plan.

The West Moreton Asset Management Plan 2018–19 clearly sets out that the axle load (tal) assumptions in the asset strategy for the West Moreton System. In aiming to accommodate potential future increased axle loadings (20tal), all new structures east of Jondaryan will be constructed to 200A loading. All track components are to provide minimum of 20tal capacity.

4. DAU2 proposed capital expenditure

Chapters 5 8 outlines the individual project scopes and estimates that make up the proposed capital program for the West Moreton System for the DAU2 period. The scopes have been developed collaboratively by the Regional West Infrastructure Planning Team and Networks Group Asset Manager's Office.

The vision for the West Moreton System is to provide a safe and reliable network that is trusted by customers and represents sound value for money for Queensland Rail's stakeholders.

Key strategies that are being implemented or introduced by Queensland Rail for its asset management strategies are:

- Preventative, not reactive maintenance—to be achieved through better collection and analysis of asset condition data so that faults can be prevented instead of repaired
- Undertake asset renewals that introduce modern, reliable, low maintenance, less disparate and (where possible) future-proof infrastructure assets
- More effective planning of works delivery with the aim of minimising the impacts of capital works and major maintenance on network availability and delivering improved productivity outcomes from closures
- Focus on improved cost-effectiveness by reviewing internal works processes and cost contributors and more effective utilisation of the private sector through appropriate packaging and tendering of works and management of delivery.

4.1 Assumptions

4.1.1 Capital planning assumptions

The following assumptions were made when developing the capital expenditure program:

- 5 x 4 day closures (planned possession); 2 x 3 day closures; 2 x 2 day closures; and 6 x 12 hour closures per year
- 15.75 tonne axle load
- Speed of 60km/hr (loaded train) and speed of 80km/hr for empty trains
- A reference train comprised of 2 x 94.5 tonne locomotives plus 41 coal wagons
- An annual coal tonnage of [redacted] or [redacted] plus non-coal freight moved at historic averages and two return Westlander services per week.

4.1.2 Cost indexation

The $2017–18 cost estimates have been indexed to $2020–21 using and CPI of 1.71 per cent for 2017-18 and an assumed rate of 2.5 per cent per annum thereafter. This is based on the inflation trend implied by the Statement on Monetary Policy issued by the Reserve Bank of Australia.[2]

4.1.3 Independent peer review

The projects presented in this document have been subject to independent peer review by GHD. GHD's report has been provided separately to the QCA for its consideration.

2 See RBA, Statement on Monetary Policy—May 2018, Economic Outlook. https://www.rba.gov.au/publications/smp/2018/may/economic-outlook.html

4.2 DAU2 capital expenditure by project and year—[redacted]

Table 3—Proposed capital expenditure by year and project—[redacted] ($2020–21 million)

Project	2020-21	2021-22	2022-23	2023-24	2024-25	Total
Civil						
Timber Bridge Replacement	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Formation Repairs	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Culvert Replacement	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Sub-total	*$12.435*	*$12.317*	*$12.781*	*$12.377*	*$13.660*	*$63.570*
Track						
Track Reconditioning	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Re-sleepering	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Re-railing	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Level Crossing Reconditioning	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Concrete Sleepers with gauge issues on tight radius curves	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Level Crossing Transitions	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Greasers replacement / upgrades	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Sub-total	***$16.505***	***$7.179***	***$5.348***	***$6.479***	***$8.397***	***$43.908***
Signalling						
Trailable Facing Points Detection (Monitoring)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
West Moreton Minor Signalling Renewals	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Signalling Pole Route Yarongmulu—Laidley	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Level Crossing Signalling Upgrade	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Location Case Renewal	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Rangeview SER/PER Upgrade	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Signalling LED Upgrade	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Gatton Interlocking Renewal	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Relay Interlocking Refurbishments	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Sub-total	***$3.799***	***$7.010***	***$8.250***	***$6.919***	***$2.965***	***$28.943***
Telecommunications						
Replacement of Weather Stations	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Remote monitoring system rollout	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Telecoms Rectifiers Regional	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Digital Telemetry Rollout	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Rangeview Cable Route Upgrade Copper to Fibre	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Nera microwave refresh	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Sub-total	***$3.302***	***$4.077***	***$0.534***	***$0.160***	-	***$8.073***
Total	**$36.041**	**$30.582**	**$26.914**	**$25.936**	**$25.022**	**$144.495**

4.3 DAU2 capital expenditure by project and year—[redacted]

Table 4—Proposed capital expenditure by year and project—[redacted] ($2020–21 million)

Project	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Civil						
Timber Bridge Upgrade	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Formation Repairs	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Culvert Replacement	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Sub-total	***$13.028***	***$12.910***	***$13.374***	***$12.971***	***$14.253***	***$66.536***
Track						
Track Reconditioning	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Resleepering	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Rerailing	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Level Crossing Reconditioning	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Replace concrete sleepers on tight radius curves	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Level Crossing Transitions	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Greasers replacement / upgrades	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Sub-total	***$17.842***	***$8.906***	***$8.916***	***$11.061***	***$9.107***	***$55.832***
Signalling						
Trailable Facing Points Detection (Monitoring)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
West Moreton Minor Signalling Renewals	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Signalling Pole Route Yarongmulu—Laidley	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Level Crossing Signalling Upgrade	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Location Case Renewal	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Rangeview SER/PER Upgrade	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Signalling LED Upgrade	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Gatton Interlocking Renewal	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Relay Interlocking Refurbishments	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Sub-total	***$3.799***	***$7.010***	***$8.250***	***$6.919***	***$2.965***	***$28.943***
Telecommunications						
Replacement of Weather Stations	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Remote monitoring system rollout	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Telecoms Rectifiers Regional	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Digital Telemetry Rollout	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Rangeview Cable Route Upgrade Copper to Fibre	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Nera microwave refresh	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Sub-total	***$3.302***	***$4.077***	***$0.534***	***$0.160***	-	***$8.073***
Total	**$37.971**	**$32.902**	**$31.075**	**$28.498**	**$28.937**	**$159.384**

5. Civil projects

5.1 Timber bridge replacement

5.1.1 DAU2 proposed costs and scope

Table 5: Proposed DAU2 timber bridge replacement costs by corridor—[redacted] and [redacted] ($'000, 2020-21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Table 6: Proposed DAU2 timber bridge replacement scope, by corridor (metres)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	213	152	0	91	0	457
Jondaryan—Columboola	0	57	224	120	259	661
Total	**213**	**209**	**224**	**211**	**259**	**1,118**

5.1.2 Project description

Summary	
Background	Timber bridge replacement is part of an ongoing program to replace timber bridges across the West Moreton System. Timber bridges are prioritised for replacement based on a risk ranking. The ranking takes into consideration the defects in the bridge, tonnage over the bridge, temporary speed restrictions and priorities of the structures inspectors. Timber bridge replacement on the West Moreton is at a 200A standard (20tal), consistent with the West Moreton System Asset Management Plan.
Project scope	Replace timber bridges, between Rosewood and Columboola, with prestressed concrete or steel bridges. Reinstatement of associated trackwork is included and is minimised by ensuring bridges are designed on the current alignment where practicable. The DAU2 estimates are based on contracted rates and have been estimated using an average cost of [redacted] ($2020-21) for a concrete ballast deck structure.
Project benefits	Project benefits include: • Reduction in maintenance costs associated with component degradation/replacement and detailed inspections as shown within the structures maintenance costs proposed for DAU2. • Reduction in exposure to old technology and labour intensive practices. • Reduction in exposure to defect and work related speed restrictions on bridges and their approaches. • Reduction in exposure to the expected scarcity of skilled workers and the supply of timber components in the long term.
Tonnage dependent?	No
Regulatory driver	Asset renewal
Project beneficiaries	This project benefits all traffic on the West Moreton System. However, Queensland Rail notes the works that comprise this project are being undertaken in response to the traffic volume proposed by coal carrying customers. The project would otherwise not be required to be delivered within the DAU2 period.
Delivery provider	An external contractor under the management of Queensland Rail will be engaged to complete this project excluding track work, which will be undertaken by Queensland Rail.
Consideration of alternative options	All bridge replacements are put out to tender without specifying a replacement structure type. This allows industry to drive reductions in prices through innovation and packaging multiple sites.

5.2 Formation repairs

5.2.1 DAU2 proposed costs and scope

Table 7: Proposed DAU2 formation repairs, by corridor— [redacted] ($'000, 2020-21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Table 8: Proposed DAU2 formation repairs by corridor— [redacted] ($'000, 2020-21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Note: totals may not add due to rounding

Table 9: Proposed DAU2 formation repairs, scope by corridor— [redacted] (kms)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	0.8	0.8	0.8	0.8	0.8	4.0
Jondaryan—Columboola	4.3	4.3	4.3	4.3	4.3	21.5
Total	5.1	5.1	5.1	5.1	5.1	25.5

Table 10: Proposed DAU2 formation repairs, scope by corridor— [redacted] (kms)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood— Jondaryan	1.6	1.6	1.6	1.6	1.6	8.0
Jondaryan— Columboola	4.3	4.3	4.3	4.3	4.3	21.5
Total	5.9	5.9	5.9	5.9	5.9	29.5

5.2.2 Project description

Summary	
Background	Formation repairs are part of a continuing program to manage formation issues on the West Moreton System. Issues with formation on the West Moreton System are longstanding and are the result of the original railway construction between 1865 and 1880. In 2013, WorleyParsons noted that the result is that the formation is sub-standard even for a semi-heavy haul operation, and the track at present requires regular resurfacing (in the order of once every three to four months). The improvement from resurfacing in top and line soon deteriorates. Areas where there is major weakness in the foundation the sleepers start pumping and the black soil mud soon permeates the track structure.[3] Formation strengthening was recommended by the Transportation and Technology Centre Inc (TTCI) in 2010 following its review of the West Moreton System with concerns about derailment and increasing speed restrictions.[4] Formation repairs have occurred during the AU1 period and will continue for DUA2.
Project scope	Repair of formation failure, mud holes and ballast pockets throughout the West Moreton System. An average provision of 5.1 km per year has been provided for the [redacted] scenario and 5.9 km per year in the [redacted] scenario. Estimated costs per km are based on the delivery costs by corridor achieved during 2015-16 to 2016-17 are: • Rosewood—Jondaryan: [redacted] ($2020-21) • Jondaryan—Columboola [redacted] ($2020-21) The formation repairs program is expected to continue past 2024-25.
Project benefits	Project benefits include: • Reduced ballast contamination reducing the risk of speed restrictions and derailments • Reduced top and line deterioration reducing the risk of speed restrictions and derailments
Tonnage dependent?	Yes
Regulatory driver	Asset renewal
Project beneficiaries	This project benefits all traffic on the West Moreton System. However, Queensland Rail notes the works are being undertaken in response to the traffic volume proposed by coal carrying customers. The project would otherwise not be required to be delivered within the DAU2 period.
Delivery provider	Queensland Rail will remove and replace rail assets. Formation rehabilitation will be undertaken by an external contractor.
Consideration of alternative options	Depending on the soil strengths at each location different options are considered. This includes varying depths of new formation material and the use of geogrids and geotextiles.

3 Queensland Rail has previously provided the QCA with a copy of the report— Worley Parsons, AU1 West Moreton Reference Tariff Submission Review (2013)

4 Queensland Rail has previously provided the QCA with a copy of the report—TTCI Evaluation of Queensland Rail West Moreton Coal Corridor (2010)

5.3 Culvert replacement

5.3.1 DAU2 proposed costs and scope

Table 11: Proposed DAU2 culvert replacement costs by corridor—[redacted] and [redacted] ($'000, 2020-21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Note: totals may not add due to rounding

Table 12: Proposed DAU2 culvert replacement, scope by corridor (number of culverts)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	6	8	3	1	0	18
Jondaryan—Columboola	2	0	5	7	7	21
Total	**8**	**8**	**8**	**8**	**7**	**39**

5.3.2 Project description

Summary	
Background	Replacement of life expired assets
Project scope	Queensland Rail proposes to replace 39 life expired culverts between Rosewood and Columboola over the DAU2 period. Culverts have been identified as requiring replacement as part of regular network inspection. These structures are at risk of failure under operations or washout in the event of a high rainfall event. Failure of these structures would significantly impact throughput.
Project benefits	Project benefits include: • Improved safety and reliability of the network by reducing risk of derailments and network outages due to culvert collapse • Reduced risk of flood damage to adjacent properties due to blocked or restricted culverts; and, • Reduced risk of service delays caused by speed restrictions posed due to culverts failing prior to renewal
Tonnage dependent?	No
Regulatory driver	Asset renewal
Project beneficiaries	This project benefits all traffic on the West Moreton System. However, Queensland Rail notes the works are being undertaken in response to the traffic volume proposed by coal carrying customers. The project would otherwise not be required to be delivered within the DAU2 period.
Delivery provider	Culvert replacement will be undertaken by Queensland Rail with support from external subcontractors as appropriate.
Consideration of alternative options	Replacement of life expired culverts will be in line with Queensland Rail's Network Track and Civil Asset Strategy policy which is for culvert design to be as simple and standardised as possible. The two preferred culvert designs for Queensland Rail are: • Concrete Box Culverts which should be designed in accordance with AS1597.1:2010 and AS1567.2:2013. • Concrete Reinforced Pipes which should be designed in accordance with AS3725:2007 and manufactured in accordance with AS4508:2007.[5]

5 Queensland Rail, Network Track and Civil Asset Strategy (2017), p 61

6. Track projects

6.1 Track reconditioning

6.1.1 DAU2 proposed costs and scope

Table 13: Proposed DAU2 track reconditioning by corridor—[redacted] ($'000 2020–21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Table 14: Proposed DAU2 track reconditioning by corridor—[redacted] ($'000 2020–21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Table 15: Proposed DAU2 track reconditioning scope by corridor—[redacted] (kms)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	2.45	0.00	0.00	0.00	0.00	2.45
Jondaryan—Columboola	0.00	2.23	1.04	1.96	1.00	6.23
Total	**2.45**	**2.23**	**1.04**	**1.96**	**1.00**	**8.68**

Table 16: Proposed DAU2 track reconditioning scope by corridor—[redacted] (kms)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	2.92	0.76	2.14	2.90	0.00	8.72
Jondaryan—Columboola	0.00	2.23	1.04	0.00	2.96	6.23
Total	**2.92**	**2.99**	**3.18**	**2.90**	**2.96**	**14.95**

6.1.2 Project description

Summary	
Background	Track reconditioning work in the West Moreton System involves reconstructing the formation and track. The scope of works includes: • track deconstruction • formation reconstruction from the subgrade • replacement of fastenings, rail (41 kg/m to 50 kg/m) and sleepers • welding and stressing • tamping and resurfacing • quality components (NDT of welds, formation compactness etc.) • follow-up inspections, as needed.
Project scope	The project scope includes undertaking track reconditioning for: the remaining interspersed timber and steel track on the Mainline between Helidon to Toowoomba, selected portions of the track on the Mainline Up Road between Rosewood and Helidon selected portions west of Jondaryan are to be re-laid with 50kg/m rail on medium depth concrete sleepers and 250mm of fresh ballast. It will include track being installed to a designed and monumented alignment at a stress free neutral temperature of 38 degrees Celsius. Track reconditioning is considered to be tonnage dependent, with 8.68 km of reconditioning planned for the [redacted] scenario and 14.95 km of reconditioning planned for the [redacted] scenario. Estimates have been developed using a rate of [redacted]/km ($2020-21). These sites prioritised for relay, target areas where a high maintenance requirement is being experienced, including resurfacing, rail defect propagation and high wear. A provision has been made for formation lowering and capping where required. High shoulders and cesses are to be graded throughout to ensure sufficient drainage of the formation. This work program is expected to continue beyond 2024–25.
Project benefits	Project benefits include: • Improvements in the reliability of heavily used sections, reducing derailment likelihood • Improvements in track geometry, stability and a reduction in significant creep limiting pull aparts and buckles • Reduction in the occurrence of rail defects, traffic interruptions, broken rail derailments • Reduction in future maintenance requirements such as rail repairs and rail joint maintenance, saving labour and improving trackside safety
Tonnage dependent?	Yes
Regulatory driver	Asset renewal
Project beneficiaries	This project benefits all traffic on the West Moreton System. However, Queensland Rail notes the works are being undertaken in response to the traffic volume proposed by coal carrying customers. The project would otherwise not be required to be delivered within the DAU2 period.
Delivery provider	Queensland Rail will perform the majority of the work associated with this project with limited use of external contractors for earthworks and cranage hire.
Consideration of alternative options	The use of steel sleepers has been considered, however given the proposal is to remove all sleepers, ballast and rail, the use of concrete sleepers is prefer as the most reliable and cost effective option.

6.2 Re-sleepering

6.2.1 DAU2 proposed costs and scope

Table 17: Proposed DAU2 re-sleepering by corridor—[redacted] and [redacted] ($'000, 2020-21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Table 18: Proposed DAU2 re-sleepering scope by corridor (number of sleepers)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	2,600	0	0	0	11,000	**13,600**
Jondaryan—Columboola	38,500	0	0	0	0	**38,500**
Total	**41,100**	**0**	**0**	**0**	**11,000**	**52,100**

6.2.2 Project description

Summary

Background

Re-sleepering comprises the replacement of defective timber sleepers in a pattern or at random using specialised, internal, resleepering teams and machines to achieve high production rates. The teams typically include resurfacing support, ensuring the integrity of the top and line is maintained.

Network requirements for re-sleepering in each corridor are forecasted for a 10 year period using a robust 'one pass maintenance' cyclic renewal program. This program is based on residual ineffective sleepers (at the time of the last renewal cycle) and/or the most current sleeper testing results (typically undertaken using the proprietary ZetaTech system on five yearly intervals). The forecast includes a degradation rate of 5 per cent per year of the total timber sleeper population.

Mechanised re-sleepering is proposed for inclusion as capital expenditure for the DAU2 period, consistent with the asset definition set out in *Queensland Rail Specification—Capitalisation of Expenditure—MD12-376.*[6]

Large scale re-sleepering replaces old sleepers with new—and avoids increasing costs of sleeper management and other related costs if sleepers are not routinely replaced.

The table below sets out the asset definition used to distinguish between resleepering as operating and capital expenditure. Queensland Rail's DAU2 submission has been developed consistent with this definition, i.e. sleeper replacement for lengths longer than 500 meters.

Queensland Rail guidelines for capitalisation of track specific costs as operating expenditure[7]

Asset condition	Expenditure Type	Area	Rail	Ballast	Sleepers
Not expired / Expired / Damaged	Like replacement	Regional	< 2000 meters	< 2000 meters	< 1 in 4 (25%) or less than 500 meters
	Improvement	Regional	< 2000 meters	N/A	< 1 in 4 (25%) or less than 500 meters
	Single rail	Statewide	Any length	N/A	N/A
	Undercutting (track height adjustment only)	Statewide	N/A	Any length	N/A
	Resurfacing(top up)	Statewide	N/A	Any length	N/A

Project scope

Queensland Rail plans to replace 52,100 sleepers over the DAU2 period.

Re-sleepering costs have been estimated at [redacted] ($2020–21).

Project benefits

Project benefits include:

Reduction of maintenance costs associated with individual sleeper failure

Reduction in top and line defects and thus the related risk of derailments

Improvement to the safety and reliability of the network

Tonnage dependent?

No

Regulatory driver

Asset renewal

Project beneficiaries

This project benefits all traffic on the West Moreton System and is part of the scheduled renewal program.

Delivery provider

Queensland Rail will perform the majority of the work associated with this project.

Consideration of alternative options

Re-sleepering is a routine capital renewal function of operating a railway. No alternative options have been considered.

6 Queensland Rail Specification—Capitalisation of Expenditure—MD12-376, 59

7 Queensland Rail Specification—Capitalisation of Expenditure—MD12-376, p 20

6.3 Re-railing

6.3.1 DAU2 proposed costs and scope

Table 19: Proposed DAU2 re-railing by corridor—[redacted] ($'000, 2020–21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Table 20: Proposed DAU2 re-railing by corridor—[redacted] ($'000, 2020–21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Table 21: Proposed DAU2 re-railing scope by corridor—[redacted] (meters)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	4,106	4,002	4,000	3,809	5,320	21,237
Jondaryan—Columboola	0	0	0	0	0	0
Total	**4,106**	**4,002**	**4,000**	**3,809**	**5,320**	**21,237**

Table 22: Proposed DAU2 re-railing scope by corridor (meters)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	6,106	6,002	6,000	5,809	7,320	31,237
Jondaryan—Columboola	0	0	0	0	0	0
Total	**6,106**	**6,002**	**6,000**	**5,809**	**7,320**	**31,237**

6.3.2 Project description

Summary	
Project scope	The re-railing project proposes to replace an average of 1.4 km/year under the [redacted] scenario and 2.1 km/year under the [redacted] scenario. The project includes a combination of: • Replacement of life expired 41kg/m rail in Rosewood—Jondaryan corridor. Some 41kg/m rail is showing increased susceptibility to rail wear and defect discovery rate. The 41kg/m rail will be replaced with 50kg/m rail. • Replacement of life expired 50kg/m rail at a rate of 2km/year in locations where rail wear will result in gauge related defects, and in these instances both the high leg and low leg rails will be replaced. As part of the re-railing operation, track is to be installed on a monumented designed alignment with rail at a stress free neutral temperature of 38 degrees. Estimates are based on a rate of [redacted] ($2020-21).
Project benefits	Project benefits include: • Reduces the likelihood of broken rail derailments • Reduces exposure to service defects which require shutdowns to remove defective rail and expensive welding in, and match grinding of, the inserted closure rails • Improves the safety and reliability of the track.
Tonnage dependent?	Yes
Regulatory driver	Asset renewal
Project beneficiaries	This project benefits all traffic on the West Moreton System. However, Queensland Rail notes the works that comprise this project are being undertaken in response to the traffic volume proposed by coal carrying customers. The project would otherwise not be required to be delivered within the DAU2 period.
Delivery provider	Queensland Rail will perform the majority of the work associated with this project with limited use of external contractors for earthworks and cranage hire.
Consideration of alternative options	Re-railing is a routine capital renewal function of operating a railway. No alternative options have been considered.

6.4 Level crossing reconditioning

6.4.1 DAU2 proposed costs

Table 23: Proposed DAU2 level crossing reconditioning by corridor—[redacted] and [redacted] ($'000, 2020-21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Note: totals may not add due to rounding

6.4.2 Project description

Summary	
Project scope	Reconditioning of level crossings within the West Moreton System with an aim to increase the useful life of the asset. Works will typically seek to either prevent the occurrence of defects or address specific defects in the formation, ballast and rail componentry (pads, biscuits, spacers etc.).
Project benefits	Project benefits include: • Reduced likelihood of broken rail derailments • Reduced exposure to service defects which require shutdowns to remove defective rail and expensive welding in, and match grinding of, the inserted closure rails • Improves the safety and reliability of the track
Tonnage dependent?	No
Regulatory driver	Asset renewal
Project beneficiaries	This project benefits all traffic on the West Moreton System and is part of the scheduled renewal program.
Delivery provider	Queensland Rail will perform the majority of the work associated with this project with limited use of external contractors for earthworks and cranage hire.
Consideration of alternative options	This is a routine capital renewal project. No other alternative options have been considered.

6.5 Replacement of concrete sleepers on tight radius curves

6.5.1 DAU2 proposed costs

Table 24: Proposed DAU2 replacement of concrete sleepers with gauge issues on tight radius curves by corridor—[redacted] and [redacted] ($'000, 2020-21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Note: totals may not add due to rounding

6.5.2 Project description

Summary	
Background	Concrete sleepers in the Toowoomba and Little Liverpool ranges are deteriorating at a rate faster than the expected 50 year life for concrete sleepers due to the high track forces in tight radius curves. Note that these curves are not those that are part of the check-rail capital works program for AU1.
Project scope	It is proposed to replace out of tolerance concrete sleepers causing gauge defects on tight radius curves where rail wear is high. Sleepers will be replaced with full depth concrete sleepers.
Project benefits	Project benefits include: • Reduction in gauge-related defects thereby reducing maintenance expenditure and the risk of derailments • Improved network reliability
Tonnage dependent?	No
Regulatory driver	Asset renewal
Project beneficiaries	The works that comprise this project will be undertaken in response to the traffic volume proposed by coal carrying customers on the West Moreton System. The project would otherwise not be required to be delivered within DAU2 period.
Delivery provider	Queensland Rail crews will perform the work associated with this project.
Consideration of alternative options	The 'do noting' option is not an option given the risk associated with gauge defects and the additional maintenance from the deteriorating sleepers determined to be inconsistent with Queensland Rails reliability strategic network objectives. Also considered was the replacement of rail—deemed to be an inefficient use of material—and the use of spacers to bring the rail back into gauge—which proved to be unfeasible.

6.6 Level crossing transitions

6.6.1 DAU2 proposed costs

Table 25: Proposed DAU2 level crossing transitions, by corridor—[redacted] and [redacted] ($'000, 2020-21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Note: totals may not add due to rounding

6.6.2 Project description

Summary	
Project scope	The improved track structure at level crossings consists of 50kg/m rail on concrete sleepers. An increase in junction weld failures has been experienced where this improved structure has been implemented in areas of 41kg/m rail on timber sleepers. To reduce the frequency of this failure it is proposed to extend the concrete sleepers and 50kg/m for a minimum of 20 sleepers past the level crossings.
Project benefits	Project benefits include: • Reduced likelihood of broken rail derailments • Reduced exposure to service defects which require shutdowns to remove defective rail and expensive welding in and match grinding of the inserted closure rails • Improves the safety and reliability of the track
Tonnage dependent?	No
Regulatory driver	Asset renewal
Project beneficiaries	The works that comprise this project will be undertaken in response to the traffic volume proposed by coal carrying customers on the West Moreton System. The project would otherwise not be required to be delivered within DAU2 period.
Delivery provider	Queensland Rail crews will perform the work associated with this project.
Consideration of alternative options	This is a routine capital renewal project. No alternative options have been considered.

6.7 Greasers replacements / upgrades

6.7.1 DAU2 proposed costs

Table 26: Proposed DAU2 greasers replacement, by corridor—[redacted] and [redacted] ($'000, 2020-21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

6.7.2 Project description

Summary	
Project scope	Existing rail lubrication devices are expected to become life expired within the DAU2 period, in addition to this the availability of componentry for maintenance is likely to become restricted as new products are introduced and support for existing systems is phased out. As a result, a replacement program is proposed, allowing for the introduction of new, potentially more efficient, technology. The opportunity also exists to rationalise the locations of the existing devices to be able to provide a more cost effective coverage of applicable locations.
Project benefits	Project benefits include: • Reduced exposure to obsolete and unsupported technology • Reduction in maintenance expenditure associated with maintenance of life expired assets • Reduction in the operational expenditure as a result of a more efficient lubrication network (materials, labour)
Tonnage dependent?	No
Regulatory driver	Asset renewal
Project beneficiaries	This project benefits all traffic on the West Moreton System and is part of the scheduled renewal program.
Delivery provider	Project will be delivered by external suppliers with support from Queensland Rail personnel where required.
Consideration of alternative options	This is a routine capital renewal project. The 'do nothing' option will result in an undesirable exposure to life expired assets and the resultant increased maintenance expenditure.

7. Signalling projects

7.1 Trailable facing points detection (monitoring)

7.1.1 DAU2 proposed costs

Table 27: Proposed DAU2 trailable facing points detection (monitoring), by corridor—[redacted] and [redacted] ($'000, 2020-21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Note: totals may not add due to rounding

7.1.2 Project description

Summary	
Project scope	The project will install monitoring/detection system for trailable points in Direct Train Control (DTC) Territory west of Toowoomba. The system will detect the position of the turnout for a facing move—which is the high risk movement. The system will detect and send notification to maintenance staff allowing them to respond and repair before fault potentially becomes a delay to train operations.
Project benefits	Project benefits include: • Reduce reactive maintenance • Gain in reliability • Reduced system down time
Tonnage dependent?	No
Regulatory driver	Asset renewal
Project beneficiaries	This project benefits all traffic on the West Moreton System.
Delivery provider	Work for this project will be undertaken by Queensland Rail, supplemented by external contractors if required.
Consideration of alternative options	Technology options will be considered in the project. Construction options will be considered in the project.

7.2 West Moreton minor signalling renewals

7.2.1 DAU2 proposed costs

Table 28: Proposed DAU2 West Moreton minor signalling renewals, by corridor—[redacted] and [redacted] ($'000, 2020-21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Note: totals may not add due to rounding

7.2.2 Project description

Summary	
Project scope	The purpose of this project is to renew prioritised life-expired signalling infrastructure on the West Moreton System—specifically solar track circuits; model 10 boom mechanisms; and alternators. A number of location cases are known to contain asbestos components. To remove the risks associated with asbestos, these location cases have been identified for renewal. These renewals are required to reduce system downtime and reactive maintenance, remove risks associated with asbestos, and to ultimately improve overall system reliability. This is a continuation of is an existing program commenced in the AU1 period.
Project benefits	Renewal of these assets is required to reduce signalling system downtime and reactive maintenance, remove risks associated with asbestos, and to ultimately maintain overall system reliability. Project benefits include: • Reliability and maintainability of signalling infrastructure on the West Moreton System • Increased safety of equipment by removing asbestos • A reduction in maintenance interventions and impacts to On Time Running
Tonnage dependent?	No
Regulatory driver	Asset renewal/compliance
Project beneficiaries	This project benefits all traffic on the West Moreton System.
Delivery provider	Work for this project will be undertaken by Queensland Rail, supplemented by external contractors if required.
Consideration of alternative options	Technology options will be considered in the project. Construction options will be considered in the project.

7.3 Signalling pole route Yarongmulu—Laidley

7.3.1 DAU2 proposed costs

Table 29: Proposed DAU2 Signalling pole route Yarongmulu—Laidley, by corridor—[redacted] and [redacted] ($'000, 2020-21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

7.3.2 Project description

Summary	
Project scope	Signalling Pole Route Upgrade Yarongmulu to Laidley includes the replacement of sections of deteriorated aerial pole route carrying life-expired signalling multicore circuits with re-enterable cable route, cable and pits from Yarongmulu North 77.030—77.900km (0.870km); and Laidley 79.780—80.800km (1.020km) This is a continuation of is an existing program commenced in the AU1 period.
Project benefits	Project benefits include: • Upgrade to modern equipment • Reduce reactive maintenance • Gain in reliability • Enables maintainability due to lack of spare parts for existing equipment • Reduced system down time
Tonnage dependent?	No
Regulatory driver	Asset renewal
Project beneficiaries	This project benefits all traffic on the West Moreton System.
Delivery provider	Work for this project will be undertaken by Queensland Rail, supplemented by external contractors if required.
Consideration of alternative options	This is a routine capital renewal project. No alternative options have been considered.

7.4 Level crossing signalling upgrade

7.4.1 DAU2 proposed costs

Table 30: Proposed DAU2 level crossing signalling upgrade, by corridor—[redacted] and [redacted] ($'000, 2020-21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Note: totals may not add due to rounding

7.4.2 Project description

Summary	
Project scope	The project will deliver level crossing upgrades at 18 sites. Upgrades range from: • complete replacement of hut and associated equipment—seven sites • Replacement of obsolete QR Flasher Modules and upgrade of flashing lights to LED—eight sites • Removal level crossings—3 sites.
Project benefits	Project benefits include: • Upgrade to modern equipment • Reduce reactive maintenance • Gain in reliability • Enables maintainability due to lack of spare parts for existing equipment • Reduced system down time
Tonnage dependent?	No
Regulatory driver	Asset renewal/compliance
Project beneficiaries	This project benefits all traffic on the West Moreton System.
Delivery provider	Work for this project will be undertaken by Queensland Rail, supplemented by external contractors if required.
Consideration of alternative options	• Replacement of Flasher Module required as unit is obsolete hence no other option considered • Complete replacement of 7 sites considered necessary as numerous compliance issues as well as general age and reliability - therefore no other option considered

7.5 Location case renewal

7.5.1 DAU2 proposed costs

Table 31: Proposed DAU2 location case renewal, by corridor—[redacted] and [redacted] ($'000, 2020-21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

7.5.2 Project description

Summary	
Project scope	This project will replace life expired signalling location boxes in the West Moreton System. These locations have been damaged and are no longer structurally sound. The project will replace the locations with new modern more reliable equipment. Additional safety barriers will be installed around locations to prevent further incidents.
Project benefits	Project benefits include: • Repair damaged equipment • Gain in reliability
Tonnage dependent?	No
Regulatory driver	Asset renewal/compliance
Project beneficiaries	This project benefits all traffic on the West Moreton System.
Delivery provider	Work for this project will be undertaken by Queensland Rail, supplemented by external contractors if required.
Consideration of alternative options	• Technology options will be considered in the project. • Construction options will be considered in the project.

7.6 Rangeview Signalling Equipment Room / Power Equipment Room upgrade

7.6.1 DAU2 proposed costs

Table 32: Proposed DAU2 Rangeview SER/PER upgrade, by corridor—[redacted] and [redacted] ($'000, 2020-21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

7.6.2 Project description

Summary	
Project scope	This project will replace the existing wooden station building containing vital signalling equipment with a new Signalling Equipment Room (SER)and Power Equipment Room (PER). A new alternator will also be installed with the PER. The replacement building and equipment will be more reliable, have improved access and increased levels of safety for maintenance staff. Some location work including electrical compliance issues is assumed in the scope.
Project benefits	Project benefits include: • Reduce reactive maintenance • Gain in reliability • Reduced system down time • Improvement for safety • Modern building
Tonnage dependent?	No
Regulatory driver	Asset renewal
Project beneficiaries	This project benefits all traffic on the West Moreton System.
Delivery provider	Work for this project will be undertaken by Queensland Rail, supplemented by external contractors if required.
Consideration of alternative options	'Do nothing' is not an option as building is likely to be condemned and requires replacement.

7.7 Signalling LED upgrade

7.7.1 DAU2 proposed costs

Table 33Proposed DAU2 signalling LED upgrade, by corridor—[redacted] and [redacted] ($'000, 2020-21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

7.7.2 Project description

Summary	
Project scope	Incandescent lamps are obsolete and have a number of inherent failure modes that the LED signal module system has designed out. The train driver—signal interface relies on the signal aspect indicating a clear and unambiguous indication. LEDs have far greater intensity than incandescent signals and have a greater life expectancy therefore improving signal sighting and driver response. This project will replace 34 incandescent signals with LED signals. Project work includes installing LEDs, necessary location changes including relays changes but does not include any cable upgrades.
Project benefits	Project benefits include: • Reduce reactive maintenance • Gain in reliability • Reduced system down time • Improvement for safety—driver visibility and LED alarms
Tonnage dependent?	No
Regulatory driver	Asset renewal
Project beneficiaries	This project benefits all traffic on the West Moreton System.
Delivery provider	Work for this project will be undertaken by Queensland Rail, supplemented by external contractors if required.
Consideration of alternative options	This is a routine capital renewal project. No alternative options have been considered.

7.8 Gatton interlocking renewal

7.8.1 DAU2 proposed costs

Table 34: Proposed DAU2 Gatton interlocking renewal, by corridor—[redacted] and [redacted] ($'000, 2020-21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Note: totals may not add due to rounding

7.8.2 Project description

Summary	
Project scope	This project renews life expired Westrace Mk1 interlocking at Gatton.
Project benefits	Renewing life-expired network equipment and assets will provide the following benefits: • maintain network performance and integrity; • enhance reliability; and • enhance capacity for future upgrades • maintain reliability of the signalling system, thereby supporting safe and reliable operations; and • reduction in unplanned maintenance interventions and service disruptions due to equipment failure.
Tonnage dependent?	No
Regulatory driver	Asset renewal
Project beneficiaries	This project benefits all traffic on the West Moreton System.
Delivery provider	Work for this project will be undertaken by Queensland Rail, supplemented by external contractors if required.
Consideration of alternative options	Technology options will be considered in the project. Construction options will be considered in the project.

7.9 Relay interlocking refurbishments

7.9.1 DAU2 proposed costs

Table 35: Proposed DAU2 relay interlocking refurbishments, by corridor—[redacted] and [redacted] ($'000, 2020-–21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Note: totals may not add due to rounding

7.9.2 Project description

Summary	
Project scope	This project will refurbish the 12 relay based signal interlockings in the West Moreton System, including: • replacement of the relays of 12 interlockings. • replacement of relay bases where condition is not suitable for reuse. • recovery and refurbishment of the removed relays.
Project benefits	Renewing life-expired network equipment and assets will provide the following benefits: • maintain network performance and integrity; • enhance reliability; and • enhance capacity for future upgrades • maintain reliability of the signalling system, thereby supporting safe and reliable operations; and • reduction in unplanned maintenance interventions and service disruptions due to equipment failure.
Tonnage dependent?	No
Regulatory driver	Asset renewal
Project beneficiaries	This project benefits all traffic on the West Moreton System.
Delivery provider	Work for this project will be undertaken by Queensland Rail, supplemented by external contractors if required.
Consideration of alternative options	Technology options will be considered in the project. Construction options will be considered in the project.

8. Telecommunications projects

8.1 Replacement of weather stations

8.1.1 DAU2 proposed costs

Table 36: Proposed DAU2 replacement of weather stations, by corridor—[redacted] and [redacted] ($'000, 2020-21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Note: totals may not add due to rounding

8.1.2 Project description

Summary	
Project scope	There are seven weather monitoring stations within the West Moreton network that are monitored via the existing Remote Monitoring System (RMS-V1). This system (RMS-V1) is outdated technology, no longer available and the system is inflexible to improvement or expansion. Another project is currently underway to type approve a new version of this system (RMS-V2) that can be supported into the future. This project is to rollout the new Remote Monitoring System (RMS-V2) at sites within the West Moreton network that are currently monitored by the existing Remote Monitoring System, as follows. Weather stations: • Yarongmalu (ML 76.250km) • Forest Hill—Laidley (ML 85.050km) • Spring Bluff (145.740km) • Holmes (ML 139.420km) • Murphy's Creek (ML 139.420km) • Oakey (WL 30.645km) • Macalister (WL 117.750km).
Project benefits	Project benefits include: • Maintain train operations safety • Early warning of track and environment condition.
Tonnage dependent?	No
Regulatory driver	Asset renewal
Project beneficiaries	This project benefits all traffic on the West Moreton System.
Delivery provider	Work for this project will be undertaken by Queensland Rail, supplemented by external contractors if required.
Consideration of alternative options	This is a routine capital renewal project. Off the shelf options were considered however nothing meets Queensland Rail's requirements, hence this is being developed internally. Hardware systems are off the shelf.

8.2 Remote monitoring system (RMS) rollout

8.2.1 DAU2 proposed costs

Table 37: Proposed DAU2 RMS rollout, by corridor—[redacted] and [redacted] ($'000, 2020-21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Note: totals may not add due to rounding

8.2.2 Project description

Summary	
Project scope	There are currently 18 level crossings within the West Moreton system that are monitored via the existing Remote Monitoring System (RMS-V1). This current system (RMS-V1) is outdated technology, no longer available and the system is inflexible to improvement or expansion. Another project is currently underway to type approve a new version of this system (RMS-V2) that can be supported into the future. This project is to rollout the new Remote Monitoring System (RMS-V2) at sites within the West Moreton system that are currently monitored by the existing Remote Monitoring System, as follows. Level crossings: • Station Rd, Calvert (ML 64.232km) • Gaul St, Gatton (ML 96.122km) • Old Toowoomba Rd, Gatton (ML 98.360km) • Jones St, Toowoomba (ML 159.212km) • Bacon Factory Entrance, Willowburn (WL 4.293km) • Junction Rd, Gowrie (WL 11.620km) • Kingsthorpe (WL 20.051km) • Clark St, Oakey (WL 29.743km) • Cooyar Rd, Oakey (WL 30.915km) • Sabine Rd, Jondaryan (WL 44.570km) • Irvingdale St, Bowenville (WL 57.150km) • Cunningham St, Dalby (WL 83.480km) • Condamine St, Dalby (WL 83.740km) • Nicholson St, Dalby (WL 84.160km) • Jandowae Rd, Dalby (WL 85.805km) • Wambo St, Chinchilla (WL 163.180km) • Warrego Hwy, Rywung (WL 179.385km) • Warrego Hwy, Columboola (WL 194.670km)
Project benefits	Project benefits include: • Maintain train operations safety • Early identification and intervention of operational and mechanical errors so that risk of road and rail accidents can be reduced • Early warning of track and environment condition
Tonnage dependent?	No
Regulatory driver	Asset renewal/compliance
Project beneficiaries	This project benefits all traffic on the West Moreton System.
Delivery provider	Work for this project will be undertaken by Queensland Rail, supplemented by external contractors if required.
Consideration of alternative options	This is a routine capital renewal project. Off the shelf options were considered however nothing meets Queensland Rail's requirements, hence this is being developed internally. Hardware systems are off the shelf.

8.3 Telecommunications rectifiers

8.3.1 DAU2 proposed costs

Table 38: Proposed DAU2 telecommunications rectifiers, by corridor—[redacted] and [redacted] ($'000, 2020-21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Note: totals may not add due to rounding

8.3.2 Project description

Summary	
Project scope	This project will replace life expired telecommunications rectifier and battery equipment at 18 telecommunications sites support signalling telemetry and train control radio systems. • Grandchester • Yarongmulu • Laidley • Forest Hill • Gatton • Grantham • Helidon • Stringybark • Lockyer • Murphy's Creek • Holmes • Ballard East • Spring Bluff • Bowenville • Mt Mowbullan • Chinchilla • Rywung • Miles
Project benefits	End of life assets will be replaced, thereby reducing the risk of failure in the case of power outage.
Tonnage dependent?	No
Regulatory driver	Asset renewal/compliance
Project beneficiaries	This project benefits all traffic on the West Moreton System.
Delivery provider	Work for this project will be undertaken by Queensland Rail.
Consideration of alternative options	This is a routine capital renewal project.

8.4 Digital Telemetry Rollout

8.4.1 DAU2 proposed costs

Table 39: Proposed DAU2 digital telemetry rollout, by corridor—[redacted] and [redacted] ($'000, 2020-21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

8.4.2 Project description

Summary	
Project scope	The Universal Traffic Control (UTC) system is used to manage train movements within Queensland Rail's remote controlled signalling territory. For the West Moreton network, UTC is used from Rosewood to Willowburn. The existing telemetry used to provide communications between the UTC system and the signalling system is based on a life-expired analogue based system that requires an upgrade. Queensland Rail is progressing with a project to support a migration to a new telemetry system. This will include development of the core UTC system to support the new telemetry system, as well as trials to prove the system. This project will replace end of life Siemens S2 SOF and Scanner hardware with a digital telemetry product operating over Ethernet/IP at 13 sites Grandchester to Toowoomba: • Grandchester • Yarongmulu • Laidley • Forest Hill • Gatton • Grantham • Lockyer • Murphy's Creek • Holmes • Spring Bluff • Rangeview • Toowoomba • Willowburn
Project benefits	Project benefits include: • Maintain reliable operations in the remote controlled signaling territory within the West Moreton network. • The project will replace end of life equipment no longer supported by the manufacturer
Tonnage dependent?	No
Regulatory driver	Asset renewal/compliance
Project beneficiaries	This project benefits all traffic on the West Moreton network.
Delivery provider	Work for this project will be undertaken by Queensland Rail, supplemented by external contractors if required.
Consideration of alternative options	This is a routine capital renewal project.

8.5 Rangeview cable route upgrade copper to fibre

8.5.1 DAU2 proposed costs

Table 40: Proposed DAU2 Rangeview cable route upgrade copper to fibre, by corridor—[redacted] and [redacted] ($'000, 2020-21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

8.5.2 Project description

Summary	
Project scope	This project will renew 5km of direct buried copper communications cable from Toowoomba CER to Rangeview SER, supporting signalling telemetry. The cable will be replaced with new cable route supporting copper and optical fibre services.
Project benefits	The project will reduce the risk of failure due to life expired copper cable.
Tonnage dependent?	No
Regulatory driver	Asset renewal
Project beneficiaries	This project benefits all traffic on the West Moreton network.
Delivery provider	Work for this project will be undertaken by Queensland Rail.
Consideration of alternative options	Radio option is not feasible due to obstructed line if sight. Construction options will be considered in the project.

8.6 Nera microwave refresh

8.6.1 DAU2 proposed costs

Table 41: Proposed DAU2 Nera microwave, by corridor—[redacted] and [redacted] ($'000, 2020-21)

Corridor	2020–21	2021–22	2022–23	2023–24	2024–25	Total
Rosewood—Jondaryan	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jondaryan—Columboola	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

8.6.2 Project description

Summary	
Project scope	This project will replace end of support Nera microwave indoor equipment at five sites supporting signalling telemetry and train control radio. • Helidon • Stringybark • Murphy's Creek • Toowoomba Reservoir • Toowoomba.
Project benefits	The existing equipment is no longer supported by the manufacturer and will be replaced.
Tonnage dependent?	No
Regulatory driver	Asset renewal
Project beneficiaries	This project benefits all traffic on the West Moreton network.
Delivery provider	Work for this project will be undertaken by Queensland Rail.
Consideration of alternative options	This is a routine capital renewal project. This is a replacement of the indoor equipment only. The outdoor equipment is still supported by the manufacturer.