Supplementary Report Master

Relating to

Submissions by Stakeholders

In Response to the QCA's Draft Decision

Of the Queensland Rail DAU 2015

Including Matters in Parts:
Maintenance and Capex Estimates (Part 1)
Asset Valuation (Part 2)
Network Capacity (Part 3)
Categorisation of Maintenance Costs (Part 4)

May 2016

Executive Summary

This Supplementary Report responds to comments made by stakeholders including Queensland Rail, New Hope, Aurizon, Glencore and Yancoal relating to analysis undertaken by B&H in a report "Review of Queensland Rail's DAU 2015"[1] (September 2015) and subsequently reissued redacted in February 2016.

This Supplementary Report is structured into four parts corresponding to major themes of the stakeholder submissions.

Two sets of stakeholder submissions were receive by the QCA. The first set corresponded to the release of the Draft Decision. Comments were received during December 2015. The second set corresponded to a specific request by the QCA for stakeholders such that "The QCA will consider all comments, but we are particularly interested in comments on new matters that are raised in the submissions on the draft decision" and which was published as 'Request for comment' on 19 January 2016. These comments were received in March 2016.

Comments have been made primarily to the Queensland Rail submissions as they are substantially directed at the B&H Review and where specific comment from other stakeholders that does not overlap with the Queensland Rail comments, the stakeholder is identified in this report.

This Supplementary Report also responds to submissions from Aurizon, New Hope, Yancoal.

The following Parts are included in this Supplementary Report:

Part 1 - Maintenance and Capital Estimates

Part 2 - Valuation of Asset

Part 3 - Calculation of Infrastructure Capacity

Part 4 - Categorisation of Maintenance Costs

[1] Hereafter the B&H Review

Documentation Reviewed

In addition to the documentation reviewed as part of the B&H Review, material presented during the post-Draft Decision period by the stakeholders (December 2015 and March 2016) was provided by QCA to B&H and reviewed for the purposes of compiling this Supplementary Report and includes items in Table 1

Many of the listed references have been specifically referred in the B&H Review (September 2015) as well as in these Supplementary Reports. All listed documentation was personally viewed by Martin Baggott, Principal and Director, B&H and informed B&H in its estimates and conclusions.

Table 1 Documentation Provided by Stakeholders in the Review of Matters assessed by B&H

QR 2015 DAU – May 2015
Queensland Rail. May 2015. Letter and Explanatory Submission – Queensland Rail's Draft Access Undertaking 1 (2015), Volume 1.
Queensland Rail. May 2015. Explanatory Submission – Queensland Rail's Draft Access Undertaking 1 (2015), Volume 2.
QR May 2015 DAU model files (confidential): Revised Tonnage Profile - QCA Sub 23.04.15.xlsm West Moreton System Model AU1 - QCA Sub 23.04.15 (BM).xlsm West Moreton System Model AU1 - QCA Sub 23.04.15 (Combo).xlsm West Moreton System Model AU1 - QCA Sub 23.04.15 (J2C).xlsm West Moreton System Model AU1 - QCA Sub 23.04.15 (R2J).xlsm
Queensland Rail. June 2015. Submission on "A preliminary view: Regulatory economics assessment of the proposed Western System asset Valuation approaches".
Queensland Rail. June 2015. Submission on Queensland Rail's Draft Access Undertaking 1 (2015) – Response to request for comments.
QR response to s185 information request – July-Aug 2015

17 Jul 2015 – access agreements, revenue and opex, tmr letters:

1.1 Access Agreements
1.2 Revenue and Opex information for QCA
2 TMR letters

TMR Re West Moreton Coal Paths to 2042_PW.pdf
TMR Supporting West Moreton Coal Paths to 2024_PW.pdf
TMR Supporting West Moreton Coal Paths to 2032_PW.pdf
TMR_Preserved West Moreton Non-Coal Paths_PW.pdf
Access Agreements Listing for QCA Request July 2015_PW.xlsx
Section 185 Rev and Op Info for QCA (Consolidated) PW.xlsx

19 Aug 2015 –WM Capacity and Maintenance:

Queensland Rail cover letter/submission[2]

Attachment 1 QCA requested delay groups

Attachment 2 WM capacity calculations

QCA Info Request_WM Capacity 18082015_Final_QCA.pdf
Attachment 2_WM Capacity Calculations 082015_QCA.XLS
Attachment 1_QCA Requested Delay Groups_QCA.XLSX

20 Aug 2015 –QR Response to Information:

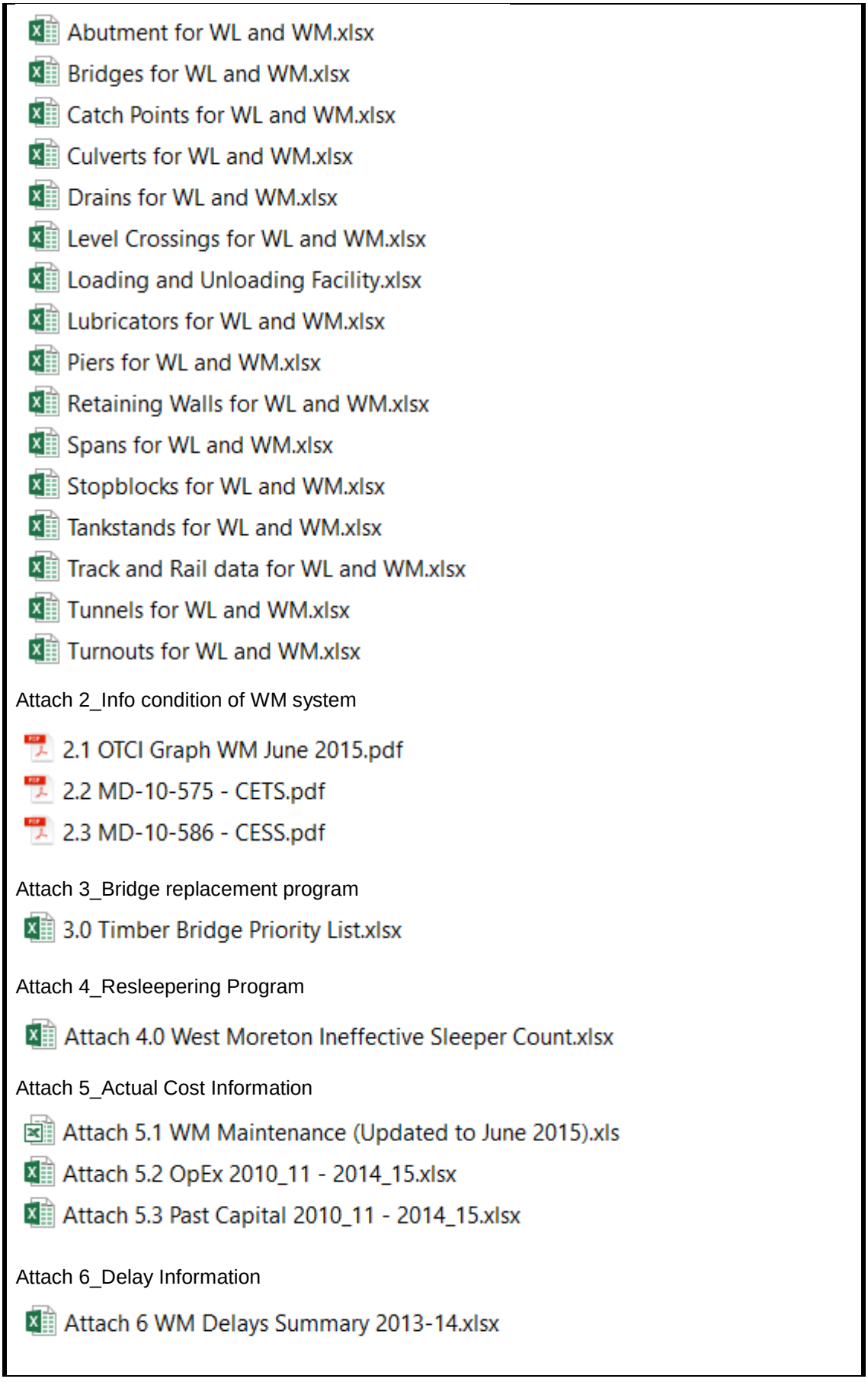
Cover letter: "19082015_Response_QCA Info Request_M_Baggott_Final_QCA.PDF"

Various files in 6 Attachment folders.

Attach 1_Network Configuration Info
Attach 2_Info condition of WM system
Attach 3_Bridge replacement program
Attach 4_Resleepering Program
Attach 5_Actual Cost Information
Attach 6_Delay Information
19082015_Response_QCA Info Request_M_Baggott_Final_QCA.PDF

Attach 1_Network Configuration Info

[2] This cover letter includes information on both capacity and maintenance.


Abutment for WL and WM.xlsx
Bridges for WL and WM.xlsx
Catch Points for WL and WM.xlsx
Culverts for WL and WM.xlsx
Drains for WL and WM.xlsx
Level Crossings for WL and WM.xlsx
Loading and Unloading Facility.xlsx
Lubricators for WL and WM.xlsx
Piers for WL and WM.xlsx
Retaining Walls for WL and WM.xlsx
Spans for WL and WM.xlsx
Stopblocks for WL and WM.xlsx
Tankstands for WL and WM.xlsx
Track and Rail data for WL and WM.xlsx
Tunnels for WL and WM.xlsx
Turnouts for WL and WM.xlsx
Attach 2_Info condition of WM system
2.1 OTCI Graph WM June 2015.pdf
2.2 MD-10-575 - CETS.pdf
2.3 MD-10-586 - CESS.pdf
Attach 3_Bridge replacement program
3.0 Timber Bridge Priority List.xlsx
Attach 4_Resleepering Program
Attach 4.0 West Moreton Ineffective Sleeper Count.xlsx
Attach 5_Actual Cost Information
Attach 5.1 WM Maintenance (Updated to June 2015).xls
Attach 5.2 OpEx 2010_11 - 2014_15.xlsx
Attach 5.3 Past Capital 2010_11 - 2014_15.xlsx
Attach 6_Delay Information
Attach 6 WM Delays Summary 2013-14.xlsx

21 Aug 2015 – TSC & Metro capex:

1 TSC capex information

21082015_QCA Infor Request_TSC Capex_Final_PW.pdf

2 Metro capex information

21082015_QCA Infor Request_Metro Capex_Final_PW.pdf

Stakeholder submissions on QR 2015 DAU – June-Aug 2015
Queensland Rail. July 2015. Further Submission—DORC valuation and roll forward of asset base for West Moreton Network.
Queensland Rail. July 2015. Final Report[3]—Review of QR Pricing Models (CONFIDENTIAL).
Asciano. June 2015. Submission in relation to the Queensland Rail 2015 Draft Access Undertaking.
Aurizon. June 2015. Submission in relation to the Queensland Rail 2015 Draft Access Undertaking.
Glencore. June 2015. Submission on Queensland Rail's Draft Access Undertaking 1.
New Hope Corporation. June 2015. Submission on Queensland Rail's 2015 Draft Access Undertaking, Cover Letter and Volume 1.
New Hope Corporation. June 2015. Submission on Queensland Rail's 2015 Draft Access Undertaking, Volume 2—West Moreton Coal Reference Tariff.
New Hope Corporation. June 2015. Submission on Queensland Rail's 2015 Draft Access Undertaking, Volume 3—Access Undertaking.
New Hope Corporation. June 2015. Submission on Queensland Rail's 2015 Draft Access Undertaking, Volume 4—Standard Access Agreement.
New Hope Corporation. June 2015. Submission on Queensland Rail's 2015 Draft Access Undertaking, Volume 5—Response to comments paper.
Port of Brisbane. June 2015. Submission on Queensland Rail's 2015 Draft Access Undertaking.
Queensland Resources Council. June 2015. Submission on Queensland Rail's 2015 Access Undertaking.

[3] By PwC

Sekitan Resources. June 2015. Submission on Queensland Rail's 2015 Draft Access Undertaking.
Yancoal. June 2015. Submission on Queensland Rail's 2015 Draft Access Undertaking.
New Hope. August 2015. Additional submission on Queensland Rail 2015 DAU.
Submissions on QCA Draft Decision – December 2015
Queensland Rail. December 2015. Cover Letter and Response to QCA's Draft Decision on Queensland Rail's 2015 DAU.
Aurizon. December 2015. Cover letter and Response to QCA Draft Decision on the Queensland Rail 2015 DAU.
New Hope Corporation. December 2015. Submission on QCA's 2015 Draft Decision on Queensland Rail's 2015 DAU, Cover Letter and Volume 1—Introduction to NHC Submissions & regulatory framework.
New Hope Corporation. December 2015. Submission on QCA's 2015 Draft Decision on Queensland Rail's 2015 DAU, Volume 2—West Moreton Coal Reference Tariff.
New Hope Corporation. December 2015. Submission on QCA's 2015 Draft Decision on Queensland Rail's 2015 DAU, Volume 3—Access Undertaking.
New Hope Corporation. December 2015. Submission on QCA's 2015 Draft Decision on Queensland Rail's 2015 DAU, Volume 4—Standard Access Agreement.
Glencore. December 2015. Submission on the Draft Decision on the Queensland Rail 2015 DAU.
Yancoal. December 2015. Submission on QCA's Draft Decision on Queensland Rail's 2015 DAU.
Submissions on other submissions - March 2016
Queensland Rail. March 2016. Submission—Queensland Rail's Draft Access Undertaking 1 (2015). Response to Queensland Competition Authority's Comments Paper.
Asciano. March 2016. Submission to the Queensland Competition Authority in relation to the Queensland Competition Authority Draft Decision on the Queensland Rail Draft Access Undertaking.
Aurizon. March 2016. Submission to Queensland Competition Authority Request for Comments on Stakeholder Submissions to the 2015DAU Draft Decision.
Glencore. March 2016. Submission on the Draft Decision on the Queensland Rail 2015 Draft Access Undertaking.
New Hope. March 2016. Queensland Rail's 2015 Draft Access Undertaking: Volume 1—Submissions on QCA's Request for Comments Paper.

New Hope. March 2016. Queensland Rail's 2015 Draft Access Undertaking: Volume 2—Submissions on other stakeholders' submissions on QCA Draft Decision.
Queensland Resources Council. March 2016. Letter re: Submission on Queensland Competition Authority's Draft Decision of 8 October 2015.
Yancoal. March 2016. Yancoal submission on Queensland Rail 2015 Draft Access Undertaking.

Supplementary Report Part 1

Discussion Relating to

Maintenance and Capital Estimates

Identified in

"Submission – Queensland Rail's Draft Access Undertaking 1 (2015) Response to Queensland Competition Authority's Draft Decision to refuse to approve draft access undertaking December 2015"

Which quotes from
"Review of Queensland Rail's
DAU 2015
B&H Strategic Services Pty Ltd
September 2015

As well as Other Stakeholder Comments
Relating to the B&H Review

May 2016

Executive Summary

This Supplementary Report Part 1 responds to comments made by stakeholders including Queensland Rail, New Hope, Aurizon, and Yancoal relating to analysis undertaken by B&H in relation to maintenance and capital expenditures proposed by Queensland Rail in their 2015DAU and included in the QCA Draft Decision. Supplementary Report Part 2 will address issues associated with the valuation of Queensland Rail's assets, Supplementary Report Part 3 will address issues associated with network capacity and Supplementary Report Part 4 will address the categorisation of maintenance costs.

In making this response we note that Queensland Rail have presented new evidence in the form of more detailed explanation of scope of works[1]. This clarification has not materially altered the primary results of the B&H Review[2] and each area of Queensland Rail's response is addressed individually.

This Supplementary Report also responds to Aurizon[3] and New Hope[4] comments which specifically point to the B&H analysis of maintenance and capital expenditure. Yancoal have similar comments to B&H that are included in the QCA Draft Decision to Queensland Rail's 2015DAU and no further discussion is offered.

In addition this Supplementary Report assesses Queensland Rail's Transport Services Contract (TSC) Capex which occurred during the period 2007/08 to 2012/13.

In summary, our estimate for maintenance cost of $112.4m compares to Queensland Rail's submission of $128.3m (that is, 88%) in June 2015$ and our estimate for capex of $124.4m compares to QR's $122.3m (that is, 102%) in June 2015$.

[1] The Queensland Rail document "Submission – Queensland Rail's Draft Access Undertaking 1 (2015) Response to Queensland Competition Authority's Draft Decision to refuse to approve draft access undertaking December 2015" will be referred to as "Submission".
[2] "Review of Queensland Rail's DAU 2015 B&H Strategic Services Pty Ltd September 2015" identified hereafter as B&H Review
[3] Response to Queensland Competition Authority Draft Decision on the Queensland Rail 2015 Draft Access Undertaking 22 December 2015
[4] Submission on Queensland Rail's 2015 Draft Access Undertaking Submission on QCA's Draft Decision Volume 2 West Moreton Coal Reference Tariff December 2015

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1 QUEENSLAND RAIL'S COMMENTS ON THE MAINTENANCE PLAN

1.1 B&H Approach to Response

The same structure of report has been adopted as that submitted by Queensland Rail's Submission with each sub-heading addressed.

We note an item in Queensland Rail's Submission that "all dollars noted in this document are shown as current dollars", but we are unsure as to what "current dollars" refers to since Queensland Rail have previously used both nominal and real dollars. Where amounts indicate reference to B&H material we assume that Queensland Rail is referring to the B&H reference.

Queensland Rail has also provided further comments on the cost categorisation of maintenance costs[5] and these have been addressed in Supplementary Report Part 4.

While recognising that a deep review of the network for the forecast traffic levels could reveal redundant assets, B&H has not optimised the network. Rather we have noted the low utilisation during the Regulatory Period but acknowledged Queensland Rail and stakeholder views that coal volumes will increase. Thus our maintenance costs estimates are higher than would be the case for indefinitely low volumes. Some assets will attract disproportionately high unit costs due to the low utilisation and many costs such as inspections are time dependent and therefore fixed to some degree.

Except for specific items discussed in this Supplementary Report the views and observations in our September 2015 report (B&H Review) are valid.

1.2 Steel Bridge Painting (B&H Ref. 2.3.3)

B&H have not previously been provided with any scope for this activity so B&H had no information from which to "understand the task at hand"[6]. But B&H's own experience with major bridge painting of the Grafton rail bridge provides a suitable benchmark.

Painting of the Lockyer Creek Bridge is obviously a large undertaking and the expenditure of $4.9m represents approximately 40 man years' work not including materials. The tasks will include the erection of scaffolding, spot repairs to bolts and rivets, bearing pad repair, sandblasting and painting in a logical order. This work will need to be achieved while trains are operating and with weather permitting and there will be a high degree of lost productivity due to those constraints. There will be multiple teams but not so many that safety is compromised due to the inability to coordinate and ensure the safety of each person. There might be only 10-15 persons working at any one time. Considering the complexity of the work we are of the view that the total estimate is not excessive as suggested by New Hope[7] but the timing of the expenditure should be altered.

Our own experience with tasks of this type is that as individual steps of repair, cleaning and painting are undertaken in series, with some overlaps in different parts of a bridge, the work is unlikely to fit neatly within one financial year. If 20 persons were to work continuously a 2 year period is envisaged and this 24 month period is likely to fall across 3 financial years.

Further, the contract is not likely to be lump sum upon completion which would otherwise be shown as one payment in one financial year. The reasons that the contract is unlikely to be lump sum is that cash flow considerations for a contractor would prevent a single lump sum and that the repair task is often only known in detail once cleaning and demolition (of bearing

[5] Submission – Queensland Rail's Draft Access Undertaking 1 (2015) Response to Queensland Competition Authority's Comments Paper March 2016
[6] A phrase used in the Submission
[7] New Hope, Mar 2016, volume 2, page 23

pads for example). Likely, a variable rate would be applied to latent conditions which are not able to be inspected and progressive part payments for more fixed and known tasks such as painting.

We conclude that the expenditure is more likely to actually occur over a three year period than a one year period and the "lumpiness" in Queensland Rail's estimates is not required. Therefore there is no change to our estimate.

1.3 Ballast Undercutting (B&H Ref. 2.3.4.1)

Queensland Rail 2015DAU submission[8] for this activity was:

> The ballast undercutting product includes all works involved in either undercutting of track sections and lowering of excessively ballasted sections of track. Undercutting works are performed in the district by the use of an excavator mounted under cutter bar. Track lowering is generally carried out in large sections and is done by removing the track and grading ballast away and then replacing the track. Ballast during track lowering exercises is generally reused however new ballast is required for undercutting works.

In Queensland Rail's December 2015 submission it is asserted that this activity is (only) track lowering to remove excessive ballast. It involves, according to Queensland Rail's 2015DAU "carried out in large section and is done by removing the track and grading ballast away…", a highly invasive activity involving the cutting of rail, removal of sleepers, grading the ballast and replacement of same. It appears to be a reconstruction of the track.

This activity is not Ballast Undercutting as would normally be termed in the Australian rail industry: it is track reconstruction.

Queensland Rail's December 2015 submission does not indicate whether any "district….excavator mounted" activity is involved in the program.

As Track Reconstruction the activity is definitely capital works and also for the large single portion of expenditure at an average of approximately $1.5m per year, this is not maintenance activity.

It is also astounding that so much "excessive ballast depth" has been created during maintenance (or Capex) activity and changes to maintenance methods are required. Therefore there is no change to our estimate.

1.4 Minor Yard Maintenance (B&H Ref. 2.3.4.11)

Queensland Rail's explanation in the Submission clarifies many aspects although it is still unclear as to where in Dalby or Toowoomba a coal train could be stored if not in the passing loop or mainline since yard tracks are not long enough. Track machines do need to use sidings for stowage.

Previous expenditure by Queensland Rail was 2010/11, [redacted]; 2011/12, [redacted]; 2012/13, [redacted]; 2013/14, [redacted]; 2014/15, [redacted][9]. Queensland Rail have submitted in their 2015DAU that over the period 2015/16 to 2019/20 an expenditure of $240,000 indexed is required for this task. This is about 2.5 times more than the expenditure Queensland Rail has incurred on average in the previous five years.

[8] Section 7.3.1 Appendix 4 – West Moreton Reference Tariff 2015 DAU Maintenance Submission

[9] Response to Information Request with spreadsheet Attach 5.1 WM Maintenance (Updated to June 2015).xls dated 19/08/2015 Douglas Jasch

Given the virtual elimination of non-coal traffic, as well as the very limited use by coal trains or track machines, the estimate provided by Queensland Rail is excessive.

Considering the projected very low use of these assets and the historical expenditure we estimate $50,000 per annum for this task is sufficient and should be added to the current estimate.

1.5 Rail Renewal (B&H Ref. 2.3.4.5)

We acknowledge the Queensland Rail Submission assessment of quantum to $700,000 (real$) per annum as per B&H's September 2015 review as well as recognising that the reduced quantum as well as the smaller individual scope items would render this activity maintenance.

Therefore, rather than the previous B&H estimate that this activity should be capitalised, and considering the smaller scope and estimate submitted by Queensland Rail, we now suggest that $700,000 (real$) per annum is added to the current maintenance estimates and reduced from the current capital estimates which had been included in the program called APR 12545.

As to Queensland Rail's internal treatment of maintenance and capital expenditure, the assessment by B&H has been conducted according to the Regulatory principles.

1.6 Maintenance Ballast (B&H Ref. 2.3.4.15)

We acknowledge Queensland Rail's Submission proposition that maintenance ballast expenditures be reduced in the first three years and while not explicitly stated, appears to be due to the resleepering program and so called undercutting.

The mechanised resleepering will affect approximately 100kms or one third of the mainline and will involve resurfacing (tamping) and therefore it is unrealistic to expect a full program of resurfacing will begin in the following few years. Taking into account the modifications made by Queensland Rail to the expenditure in the first three years and that Queensland Rail's estimates in the last two years of the program are not grossly different to B&H, we are satisfied that these costs are efficient which is contrary to New Hope's assertion[10].

We note that despite Queensland Rail's comment that "Queensland Rail has reviewed the maintenance costs and will reduce the number of ballast trains", no change to the expenditure is shown for 2015/16 when a heavy workload will already be imposed due to the resleepering (which separately expends ballast for its operations) for the first three years in response to the B&H report.

Therefore our interpretation of Queensland Rail's comments and our own estimates that had previously recognised a reduced quantum of work has an expenditure profile as follows:

2015/16, $600,000; 2016/17, $600,000; 2017/18, $550,000; 2018/19, $630,000; 2019/20, $620,000.

1.7 Rail Stress Adjustment (B&H Ref. 2.3.4.18)

We acknowledge Queensland Rail's Submission re-estimate of this item and agree $630,000 per annum is a reasonable estimate. This re-estimate considers reduced but more targeted scope in areas of rail creep, pulling-in of curves, rolling out of rail and track resurfacing effects and responds to New Hope's concern[11] that the costs are excessive.

[10] New Hope, Mar 2016, volume 2, page 24
[11] New Hope, Mar 2016, volume 2, section 6.1

The profile of expenditure for this item is thus:

2015/16, $630,000; 2016/17, $630,000; 2017/18, $630,000; 2018/19, $630,000; 2019/20, $630,000

1.8 Mechanised Resurfacing (B&H Ref. 2.3.4.7)

Mechanised resurfacing work hand in hand with maintenance ballast and the expenditure profiles should be consistent because ballast is the primary material used in resurfacing. Queensland Rail have acknowledged the relationship and the other work scopes involving resurfacing. We agree with Queensland Rail's estimate that $500,000 is a reasonable reduction of their original budget of $3m in 2015/16 on the grounds that resleepering and other activities will lessen the requirement for separate resurfacing. We also agree that toward the latter portion of the Regulatory Period the influence of those other activities will wane and therefore an increase in activity is warranted. Our intermediate years' estimates are retained because the influence of the new work will provide a level of reliability to the track structure. The expenditure profile is now as follows:

2015/16, $2,500,000; 2016/17, $2,500,000; 2017/18, $2,250,000; 2018/19, $2,850,000; 2019/20, $2,800,000

1.9 Level Crossing Maintenance (B&H Ref. 2.3.4.24)

We acknowledge Queensland Rail's inclusion of $100,000 in 2015/16 which is in response to the changes we propose for Level Crossing Construction/Reconditioning.

1.10 Level Crossing Construction/Recon (B&H Ref. 2.3.4.25)

We acknowledge Queensland Rail's inclusion of this item in capital expenditure as per our suggestion.

In relation to quantum, Queensland Rail has not addressed the alternatives that may be available given lower tonnages during the Regulatory Period. There is also an opportunity to modify the scope of the activity and/or make use of the extra productivity likely to emanate due to the lower tonnages. Therefore the result of this review is that there is no change to the estimate of $0.2m per annum made by B&H.

1.11 Mechanised Resleepering (B&H Ref. 2.3.5)

We acknowledge Queensland Rail's reference to the standard "2.D.4.2 West Moreton System – Oakey to Miles". We understand the primary reason for this section of the standard dealing with "Locations where Different Lengths of Rails in Curves have been Approved", dealing with "variations" of the standard and which differs from Table 3.7 (for normal track), is that the coal trains are causing rail creep and that the one in two steel sleepers with their elastic fasteners are not sufficient to prevent the creep.

In the section Oakey to Miles, rail lengths have been approved to 220m and this will help to address some of the problem by providing a greater length of restraint as longer rail lengths have less propensity to creep. Nevertheless, rail creep can lead to rail "bunching" and heat related buckling is more likely under this situation. The standard has been changed specifically to address the approval for longer rail lengths as the provision is in the "different lengths of rail" section of the appendix in the standard. In Queensland Rail's "Explanatory Submission - Draft Access Undertaking 1 (2015) - Volume2 - Final.pdf" the issue was identified as "Sections of track are creeping east on the Western Line between Malu and Bowenville". Further "While they (timber sleepers) supply load bearing support, they do not

provide any longitudinal rail constraint. Malu to Bowenville is a distance of 9 kilometres. The standard covers the area Oakey to Miles, a distance of 179 kilometres.

There is considerable expenditure planned in Queensland Rail's proposal for the cost of Double Shouldered Sleeper Plates with Pandrol fastenings, which is so significant that a closer look at the practices and the standard is warranted.

The standard was created prior to the downturn in tonnage when McAlister was operating and the outlook was more encouraging with rising tonnages. The current circumstance of increasing unit maintenance cost per tonne requires a closer examination of the reasons for the DSSP expenditure.

A review of the application of the standard is warranted in the context of the circumstances and the reduction in propensity for adverse track behaviour given the longer rail lengths, specific location, resleepering and the 6 conditions enumerated in the standard for rail in the Oakey to Miles section.

The standard provides a blanket approval for expenditure over a 179km section of track and this may have been warranted in the circumstances of the day. An examination of the behaviour of the track in each section is recommended and application of the DSSP standard only where required. To date only the 9 kilometre section from Malu to Bowenville has been mentioned.

We therefore recommend no change to our previous conclusions which acknowledge the use of some DSSP but not to the full extent proposed by Queensland Rail.

1.12 Summary of Maintenance Costs

The summary of considerations in this section (using Queensland Rail format) is in Table 1.

Table 1 Maintenance Cost Estimates

West Moreton Maintenance Plan 2015/2016 Budget	FY16 ($'000)				FY17 ($'000)				FY18 ($'000)				FY19 ($'000)				FY20 ($'000)			
Product Description ($'000)	QR	B&H	New QR	New B&H	QR	B&H	New QR	New B&H	QR	B&H	New QR	New B&H	QR	B&H	New QR	New B&H	QR	B&H	New QR	New B&H
Steel Bridge Paint (Contract)	0	0	0	0	0	1,900	0	1,900	5,700	1,900	5,700	1,900	0	1,900	0	1,900	500		500	
Ballast Undercutting Other	1,170	0	1,170	0	1,400	0	1,400	0	1,400	0	1,400	0	1,400	0	1,400	0	1,400	0	1,400	0
Minor Yard Maintenance	230	0	230	50	230	0	230	50	230	0	230	50	230	0	230	50	230	0	230	50
Rail Renewal	931	0	[redacted]	700	931	0	[redacted]	700	931	0	[redacted]	700	931	0	[redacted]	700	931	0	[redacted]	700
Maintenance Ballast	1,035	1,035	1,035	600	690	600	600	600	660	550	550	550	630	500	630	630	620	500	620	620
Rail Stress Adjustment	794	500	630	630	790	500	630	630	790	500	630	630	790	500	630	630	790	500	630	630
Mechanised Resurfacing	3,000	1,800	2,500	2,500	2,950	2,500	2,950	2,500	2,900	2,250	2,900	2,250	2,850	2,000	2,850	2,850	2,800	2,000	2,800	2,800
Level crossing maintenance	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Level crossing constr/recond.	569	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mechanised Resleepering	16,334	13,249	16,334	13,249	0	0	0		0	0	0		0	0	0		0	0	0	

2 QUEENSLAND RAIL'S COMMENTS ON THE CAPITAL PLAN

2.1 Formation Strengthening (B&H Ref. 6.3.1)

The "Ballast Undercutting" described by Queensland Rail in its December 2015 submission is highly invasive and reconfigures the ballast layer. In addition it involves reconstruction of the track structure where the track is firstly totally demolished and then rebuilt with recycled ballast of lesser quantity and therefore involving premature life expiry of the surplus ballast.

We therefore remain satisfied that this is a capital expenditure. We also suggest a renaming of the activity because it is Track Reconstruction, not Undercutting. Undercutting is so called because it does not disturb the rail and sleepers. Undercutting is also subject to the classification of capital expenditure if it is highly invasive and effectively repairing the capping or the formation. Some undercutting is localised and minor in nature, but this is not shown here. Therefore there is no change to our estimates.

2.2 Steel Bridge Strengthening (B&H Ref. 6.3.2)

Queensland Rail has now provided new information in their Submission for this assessment in that they state "Design and investigation works have been completed by an engineering consultant". Previously this work was not completed.

Contractually, the best time of the year for repairs of this type is in the dry season due to excavation and construction occurring in watercourses and this timing falls across the financial years. As well, since design and investigation works have only just been completed the extensive program is likely to extend over a lengthy period which, at the beginning of 2016, may have only just begun. Given this timing we suggest an expenditure profile which provides for half of the expenditure in 2015/16 and half in 2016/17.

New Hope's estimate[12] of $4m and for the Lockyer Bridge appears to be misplaced. While steam locomotives do have a high impact as a percentage of their axle load, the axle loads are lower and are not as frequent as the axles on a coal train. So it is highly likely that Queensland Rail's assertion about fatigue is plausible.

Hence our estimate is 2015/16, $1m; 2016/17, $1m.

2.3 Toowoomba Range Slope Stabilisation (B&H Ref. 6.3.3)

On the basis of Queensland Rail's recent years' expenditure which was detailed in its response to an information request[13], and the consultant's reports[14] which were included in their December 2015 submission, as well as the delay in the starting of any work pending further analysis, we are satisfied that our original assessment is reasonable.

2.4 Toowoomba Plant Maintenance Depot (B&H Ref. 6.3.6)

We acknowledge Queensland Rail's assessment that "Queensland Rail agrees that this project does not relate to the declared service and will be removed from the submission".

2.5 Check Rail Curves (B&H Ref. 6.3.7)

Queensland Rail reasserts its estimates on the basis that the estimates were made "after approximately 10 curves had been completed" and "efficient costs based on experience from the original installations". It is unknown how many curves were in the "original installations".

[12] New Hope, Mar 2016, volume 2, page 25

[13] Response to Information Request with spreadsheet Attach 5.1 WM Maintenance (Updated to June 2015).xls dated 19/08/2015 Douglas Jasch

[14] Golders Associates

Nevertheless, as the estimates were clearly made at the beginning of the program we suggest there must be room for continuous improvement in costs as the program matures.

Presumably, in order to get the best value, the worst curves were addressed first. That is, the curves with the biggest problems. The actual details of the first 2 years are unknown.

Now with lower tonnages it is possible that the incidence of damage is lessening compared to when the original estimates and actual results were made because the timing of these works coincided with tonnages occurring and forecast in 2013 & 2014. Also with reduced train paths, presumably the efficiency of the works is better.

In the Explanatory Submission of 2015 DAU we note that the first 10 curves with total length 1.848 kms[15] were completed with a total cost of [redacted] (2013/14) and [redacted] (2014/15), totalling $4,028,000 excluding capitalised interest[16]. This approximates to a unit rate of $2,180,000 per km ($2,180 per metre). The forward looking estimates are also on the basis of excluding capitalised interest[17] so it is unknown how the higher unit rate of [redacted] per metre used by Queensland Rail was derived.

Since the scope of the work is so extensive, involving not only the installation of a checkrail but also wholesale reconstruction of the track and surrounding infrastructure this program should be progressed cautiously and therefore our timing of the expenditure proposed by Queensland Rail is the moderation we believe is required.

We also note from the response to the Information Request 28 July 2015, that Queensland Rail has not considered any alternatives indicating that the purpose of the check rail is to prevent flange climb derailment of the high wheel if it attempts to climb the outer rail. But check rails are not the only way to reduce the risk of flange climb or reduce rail wear and B&H expected an explanation from Queensland Rail that it had considered other methods with a cost/benefit analysis of the other methods and the chosen method. The program therefore appears not to have been as well thought out as possible and that's why a more cautious program is suggested.

2.6 Rerailing Rosewood to Hellidon (B&H Ref. 6.3.8)

We acknowledge Queensland Rail's classification and quantum and we have included this item in maintenance expenditure.

2.7 Level Crossing Reconditioning (B&H Ref. 6.3.10)

We acknowledge Queensland Rail's inclusion of this item for 2015/16 in capital expenditure.

For the other years and quantum we have found no reference to the scope of work to verify the possibility of $400,000 being required, and since no expenditure has occurred in this item for the previous 5 years and a large expenditure[18] ($3.93m over the next 3 years) is planned for "Level Crossing Compliance – Regional" and for which only $370,000 has been expended over the last 2 years, we estimate $200,000 per annum is sufficient. In addition, we have not observed any attempt to make use of lower train numbers circumstances by looking at alternatives. A continuous though more modest program is suggested as per our original estimate.

[15] "Curves completed to the end of 14/15 include:……", Item 8 Concrete Sleeper Check Rail Curves
[16] Item 8. Concrete Sleeper Check Rail Curves of Pre-2015 DAU Capex
[17] 2015DAU Track Improvement Projects, Item 6. Check Rail Curves, Toowoomba and Little Liverpool Ranges
[18] Although classified as "signalling" works, the compliance involves road surfacing works, sighting and other level crossing characteristic improvements

2.8 Summary of Capital Costs

The comments made in this section relate to the scenario of NO embargo (suburban) in 2032 and the summary of capital costs for the (with) embargo scenario is unaltered.

The summary of considerations for the NO embargo scenario in this section (using Queensland Rail format) is in Table 2

Table 2 Capital Cost Estimates

For NO embargo scenario

No 2032 Embargo Scenario																				
West Moreton Capital	2015/16				2016/17				2017/18				2018/19				2019/20			
Plan 2015/2016 Budget	($'000)				($'000)				($'000)				($'000)				($'000)			
Product Description ($'000)	QR	B&H	New QR	New B&H	QR	B&H	New QR	New B&H	QR	B&H	New QR	New B&H	QR	B&H	New QR	New B&H	QR	B&H	New QR	New B&H
Formation Strengthening	3,006	4,176	3,006	4,176	3,112	4,512	3,112	4,512	3,006	4,406	3,006	4,406	3,006	4,406	3,006	4,406	3,006	4,406	3,006	4,406
Steel Bridge Strengthening	2,000	0	2,000	1,000	0	2000		1000	0	0	0	0	0	0	0	0	0	0	0	0
Toowoomba Range Slope Stabilisation	1,500	1,000	1,500	1,000	1,500	1,000	1,500	1,000	1,500	1,000	1,500	1,000	1,500	1,000	1,500	1,000	1,500	1,000	1,500	1,000
Toowoomba Plant Maintenance Depot	500	0	0	0	3,500	0	0	0	1,000	0	0	0	0	0	0	0	0	0	0	0
Check Rail Curves	3642	3278	3642	3278	4,805	3,210	4,805	3,210	4,911	3,200	4,911	3,200	1,899	3,200	1,899	3,200	0	843	0	843
Rerailing Rosewood - Helidon	0	700	0	0	2,022	2,722	2,022	2,022	2,059	2,759	2,059	2,059	2,059	2,759	2,059	2,059	2,059	2,759	2,059	2,059
Level Crossing Reconditioning	0	200	569	200	400	200	400	200	400	200	400	200	400	200	400	200	400	200	400	200

Note: Queensland Rail's table of Summary of Capital Costs inadvertently shows Rerailing Rosewood – Helidon in FY17 New QR as "2002" and not "2022" as is implied in the text.

3 TSC CAPITAL

3.1 Background

At the request of the QCA, B&H was asked to include an assessment of the TSC Capital for its scope, standard and prudency. These assets have been represented by Queensland Rail as being on the common network and of benefit to the common network.

Queensland Rail submitted details of the TSC Capex in response to an Information Request dated 28th July 2015. An assessment has been made for each element of the program, the element number and followed by a description.

We note that with every project reported here and also in all other documentation of Queensland Rail with respect to Capex, no other functional alternatives are reported as being evaluated. Alternatives for constructing the chosen solution are provided in some instances but no operational, procedural, maintenance or partial replacement solutions are considered or reported and this does not provide confidence that a cost effective solution has been found.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted] [redacted]

[redacted]

[redacted]

[redacted]

[redacted] [redacted]

[redacted]

[redacted]

[redacted]

[redacted] [redacted]

[redacted]

[redacted]

[19] Note use of the word axel rather than axle.

[redacted]

[redacted]

3.3 Conclusion

With the exception of some minor works all of the TSC Capex benefits the common network. Some works are not now required for the projected task of the Regulatory period.

Without a comparison of alternative solutions to the problems being addressed by the works it has not been possible to conclude whether the scope of each of those works is the most efficient but the scopes indicated in the Queensland Rail documentation are common for these types of situation in the railway industry.

Within the context of the engineering solutions submitted by Queensland Rail they use standards that are appropriate and the costs fall within the range expected.

A more appropriate approach to the Capex requirements would have been to consider a number of options for each situation and, on a whole of life basis, consider the least cost alternative.

4 AURIZON'S COMMENTS

4.1 Maintenance Costs

4.1.1 Ballast Undercutting

Aurizon makes the observation that:

> Aurizon Operations would, however, caution the QCA reasoning of treating ballast undercutting as capital due to its assessment that it is a substitute for 'formation repair where the damage is not deep'[3] and, therefore, combining formation repair and ballast undercutting together. Ballast undercutting is completed for a range of reasons, including drainage and interlocking of the other rail infrastructure elements to prevent movements under load. Formation repair and ballast undercutting should be considered separate activities that are clearly benchmarked and measurable. Notwithstanding, Aurizon Operations also acknowledges that some railway owners capitalise ballast undercutting for accounting purposes and that capitalisation reduces the quantum of the maintenance costs in the building blocks and can reduce tariff volatility where these activities are not expected to have a consistent and stable scope over time.

B&H has suggested capitalisation because the work scope described by Queensland Rail is actually track reconstruction involving lowering of the track by removing the track and grading the ballast[20].

4.1.2 Resurfacing

Aurizon comments that (and subsequently):

> Although it generally supports the QCA's review of maintenance costs, Aurizon Operations has concerns over the reduction in the resurfacing allowance.

B&H has suggested a reduction on the basis of a number of observations. Firstly, the resleepering work, track reconstruction/undercutting, capital outlays in formation strengthening and Relay Oakey to Jondaryan, all suggest that the actual plan cannot be completed in some years, at least in 2015/16. Secondly, the amount of resurfacing is not efficient in any context because it amounts to the resurfacing of approximately the entire track once per year and where some large sections only receive 2 to 3 million gross tonnes. This means many sections are receiving resurfacing more than once per year in addition to the "spot surfacing" that occurs as part of routine maintenance.

In addition, there was no evidence that there were catastrophic failures occurring badly affecting train reliability with the number of temporary speeds restrictions at very low levels except for the restrictions applied for works.

B&H does not wish to see a track geometry deterioration that is irrecoverable but also does not wish to see the ballast deteriorated through over tamping and there is very great risk of that occurring with the frequency planned.

B&H believes it has balanced these needs in a more practical program.

Queensland Rail's own report provided as a response to QCA's information request in Figure 2 indicates track condition (actual in black) very much better than any "Review Threshold" (in Blue) or "Exceedence Threshold" (in Red) and B&H believes there is room for improvement in the use of resurfacing.

[20] Track lowering is generally carried out in large sections and is done by removing the track and grading ballast away and then replacing the track. West Moreton Reference Tariff 2015 DAU Maintenance Submission Product C02: Ballast Undercutting P23

Figure 2 Queensland Rail Track Condition

Source: Queensland Rail response to Information Request from QCA

5 NEW HOPE'S COMMENTS

References to numbering indicates New Hope's submission[21] numbering. The following comments are applicable to more general observations not previously addressed in this report in specific maintenance or capital items.

5.1 Maintenance Costs

5.1.1 8.5.1 (b)

B&H acknowledges New Hope's observation that with the dropping demand on the system there is a high probability that there are many redundant assets. This is enumerated in the maintenance item "Minor Yard Maintenance" where B&H have indicated that very little need for yard maintenance exists.

With further clarification from Queensland Rail B&H has adjusted its estimate to $50,000 per year for areas where track machines and coal train storage is required but there is considerable scope of Queensland Rail to eliminate many unused lengths of track.

5.1.2 8.5.1. (d)

B&H acknowledges New Hope's view that variability can be high in the maintenance activities of rail joint management and turnout maintenance and these factors have been taken into account in our review of the costs.

5.1.3 8.6 Operating Costs

A previous review of the overall level of Queensland Rail's operating costs indicated an acceptable level and commensurate with other similar railways. It represents a very large improvement over previous years' costs. Therefore a separate review of overall operating costs was not repeated.

B&H does however also share concern with New Hope that there is an allocation mismatch and an opportunity to review these costs could occur with meaningful data at the next Regulatory Review.

[21] Submission on Queensland Rail's 2015 Draft Access Undertaking Submission on QCA's Draft Decision Volume 2 West Moreton Coal Reference Tariff December 2015

Supplementary Report Part 2

Discussion Relating to the

Valuation of Assets

Identified in Queensland Rail's

"Submission – Queensland Rail's Draft Access Undertaking 1 (2015) Response to Queensland Competition Authority's Draft Decision to refuse to approve draft access undertaking December 2015"

and

"Submission – Queensland Rail's Draft Access Undertaking 1 (2015) Response to Queensland Competition Authority's Comments Paper March 2016"

And from Other Stakeholders

May 2016

EXECUTIVE SUMMARY

This review is a response to submissions from stakeholders on the QCA Draft Decision and a later QCA Discussion Paper relating to the 2015DAU of Queensland Rail for the West Moreton Railway System in South West Queensland. The submissions received from stakeholders include those from Queensland Rail being "Submission – Queensland Rail's Draft Access Undertaking 1 (2015) Response to Queensland Competition Authority's Draft Decision to refuse to approve draft access undertaking December 2015"[1] and "Submission – Queensland Rail's Draft Access Undertaking 1 (2015) Response to Queensland Competition Authority's Comments Paper March 2016"[2] respectively, as well as others from stakeholders. In this report the focus will be on the valuation of assets.

This Supplementary Report Part 2[3] forms part of a consolidated package responding to Queensland Rail's post-draft submissions as well as other stakeholder submissions. There are four such reports.

Queensland Rail's response in relation to asset valuation is in Section 6 of their post Draft Submission.

Queensland Rail's "fears" have been addressed in this report which sets out the rationale for the treatment of each asset.

Queensland Rail's assertion that "A failure by the QCA to include numerous post-1995 assets in its valuation" is shown to be baseless. Indeed, Queensland Rail had every incentive to submit its data to QCA and there is no reason to believe that the data is not included in the various documents and spreadsheets submitted to QCA for the purpose of asset valuation. One identified asset was that of King's Bridge (135.490) which was subject of flood damage works in 2011. In addition, the B&H Review[4] discovered other assets that were known to be in existence which were not in Queensland Rail's submitted data. This data was sourced from a previous Draft Decision process in 2009 and known as the Connell Hatch report ("Hatch").

Where applicable this Supplementary Report also responds to Aurizon, Glencore, Yancoal and New Hope comments to the B&H analysis of the asset valuation in the B&H Review.

1 Hereafter referred to as "post Draft Submission"

2 Hereafter referred to as "Comments Paper"

3 This paper hereafter referred to as "Supplementary Report"

4 "Review of Queensland Rail's DAU 2015 (September 2015, redacted version February 2016)", Hereafter referred to as "B&H Review"

Table of Contents

1 PRELIMINARY MATTERS

1.1 Matters of Accuracy in Queensland Rail's Response

1.1.1 Network Configuration

From Queensland Rail's Comments Paper:

> "The matter of spare capacity in the West Moreton Network is more properly, if anything, one of asset optimisation. Queensland Rail remains of the view, and the QCA's own technical advisor has confirmed[14] that the West Moreton Network is appropriately sized for the forecast network demand."

B&H has never "confirmed" the West Moreton network to be appropriately sized. In fact in the B&H Review (September 2015)[5] Section 2.1 it is stated:

> "A comment about Track Length must be made at this point. In Queensland Rail's Asset Management Plan 2015/16 at Appendix 6 of the Explanatory Submission of the 2015 DAU, it states at section 2.1 that the track length is 435 km narrow gauge.
>
> The details of this Track Length are not shown but could include all of the Queensland Rail sidings, dead ends, and other sundry track that will now be used by two passenger return paths per week and one other return path. In effect, Queensland Rail now has many redundant assets but in the absence of closure, these assets continue to be inspected and maintained, presumably at minimal but safe levels.
>
> The amount of effort going into those assets is disproportionately high compared to the ratio of coal and non-coal traffic task because as Queensland Rail notes in its section 6.2 Tonnage Forecast Impacts of the 2015 DAU Maintenance Submission many activities are not tonnage dependent, only time dependent. In fact a deep review of this network at the forecast traffic levels could conclude that it contained many redundant assets and that an entirely different RAB is constructed and a new maintenance plan conceived".

Due to the fact that Queensland Rail did not give details of the actual track lengths involved and their position on the network, nor of the single freight train that would operate on the system, nor at any time in the past given details of this nature, B&H gave Queensland Rail the benefit of the doubt in adopting the maintenance costs estimated by Queensland Rail as a base case being mindful that the costs for all the sundry tracks were included. The base costs were subsequently amended by B&H on the basis of efficiency and not on the basis of change of network configuration as Section 2.1 of the B&H Review indicates.

That is, that if a deep review of the configuration was to occur there would be many redundant assets consuming a disproportionate amount of cost.

[5] Hereafter referred to as "B&H Review"

An “optimistic” view was taken by B&H that in the medium term but beyond the Regulatory Period[6], tonnages would be restored and that the Regulatory Period was a temporary aberration as indicated in the 2015DAU by PwC at their Section 3.1:

> “The thermal coal export industry has experienced a sharp decline in prices over the last three years, with the FOB price for thermal coal halving between 2012 and 2014 (see Figure 2). Weaker than forecast demand, a lack of supply discipline at producer-level and greater than expected cost cutting were the main drivers of this underperformance in the coal sector.[9] This commodity price decline, however, is expected to be temporary with prices expected to settle at $75 per tonne (US$) by late 2016,and trend positively thereafter[10].

Without that optimism a different view would have been taken about the asset configuration appropriate for the forecast tonnages.

1.2 Asset Appropriateness

B&H has had regard to the appropriateness of an asset to be included in the analysis.

B&H has considered all assets that have been identified by Queensland Rail as capital assets and indicated by the term Capex or capital project. In addition B&H has identified assets that were created as maintenance and sometimes referred to as Operating Expenditure or Opex.

In total, the Capex and Opex assets provide a list of all assets. In general, assets are physical assets except where specifically referred such as interest on capital expenditure.

[6] The period of the DAU

2 QUEENSLAND RAIL'S COMMENTS ON ASSET VALUATION

2.1 Section 6 of Queensland Rail's Response

In this section Queensland Rail have indicated that:

> Queensland Rail has real fears that the QCA is proposing to exclude or zero-value assets that had been renewed or replaced – that is, which are not life expired as claimed by the QCA.

The following paragraphs address those "fears".

2.1.1 Information Requests

During 2015, the QCA, with advice from B&H, sought information from Queensland Rail relating to asset configuration, asset condition and capital expenditure.

Queensland Rail responded to these requests with large amounts of information with much in the form of spreadsheets.

For the B&H analysis these spreadsheets took two forms; some with configuration data and some with financial models indicating historical[7] capital costs (Historical Capex) and project specific capital costs.

The configuration data showing asset components such as bridges, sleepers, rail, and curves did not contain data on installation date but some deduction by B&H was used and cross-referencing with Queensland Rail's project specific data to pin-point the age of the assets. For example, if a bridge was timber in construction then it was known the bridge was very old. We were aware that some timber bridges had received upgrades or substantial work and we looked for data in other sources for those capital expenditures. In some cases they were found in spreadsheets indicating historical costs but these only covered expenditures from 1995 and bridges have asset lives of 100 years. We sought further data from a report prepared by Connell Hatch[8] for Queensland Rail with 2007 data, which was compiled principally for the calculation of Optimised Replacement Cost (ORC[9]) at that time. Fortuitously records showed when upgrades or other capital works were performed. Whether all capital works were included was not verified. Queensland Rail had offered no data. The data in the Connell Hatch report were used except where it had been superseded by Queensland Rail's own Historical Capex or Project specific data. All concrete bridge data was used as was any steel bridge construction shown.

In another example, all concrete bearered turnouts were included as shown in the configuration spreadsheets and this was cross-referenced with the project information provided in the details of the Western System Asset Replacement, Jondaryan Track Upgrade and Columboola to Fisherman's Island (Mainline) projects. Timber beared turnouts were not included because there was no data to indicate that they had been capitalised in the last 50

[7] Historical Capex or Historical capital costs in this paper refers to spreadsheets supplied by Queensland Rail that list capital costs in the period 1996 to 2007. Data after 2007, "post 2007", is provided in the form of project assigned expenditure

[8] "DORC Valuation 080715 Appendix B - Excel - Historical application.xls" (Author "stacyn"), produced for Report called "Final Estimate Report Western System – Depreciated Optimised Replacement Cost (DORC) Assessment Queensland Rail 6 August 2008"

[9] ORC is the estimated cost of a new asset that is then depreciated to calculate a DORC

years and in any event the usual method of maintenance for timber bearered turnouts is by way of progressive maintenance where individual components are replaced one at a time.

The value of the concrete bearered turnouts is incorporated in the graphic known as "Figure 17 – Timeline Analysis of Queensland Rail Assets on the West Moreton System" in the line showing Western System Asset Replacement in the B&H Review. In this instance they were identified in Queensland Rail's "Stage Gate Process: Capital Expenditure Feasibility Investment Approval Request, Project Title: Western System Asset Replacement (WSAR) Project, Date: September 2010".

In any event, even if individual assets were not identified by Queensland Rail in its documents as individual assets, all of the expenditure was included for every project and for all historical costs provided.

As the Connell Hatch report was primarily created for the calculation of ORC and provided no data on condition and with many default values[10] for installation, it was used as a last resort where more current information was available.

2.1.2 QCA Asset Valuation Methodology

The QCA's asset valuation approach considers the extent to which assets have remaining Life[11] by assessing their age against their expected Regulatory Life. That assessment considers the capex information Queensland Rail submitted (including Historical Capex information for the period 1996/97 to 2006/07). It also considers the Connell Hatch 2007 asset assessment, which has some information about asset replacement and upgrades, in particular for the pre-1995 period, which Queensland Rail did not provide in 2015 but which was available to QCA from earlier QCA Draft Decisions.

The Hatch data was used as a last resort to track down applicable assets that may still have a Regulatory Life. Where other data submitted by Queensland Rail was available such as Historical Capex or project Capex, that data has been used in preference to the Hatch data where there has been an overlap in time.

In general Queensland Rail provided capex information by broad asset category. In addition, in response to the information requests, Queensland Rail submitted information about the configuration of the network which provided specific information about selected items of configuration but with no date details. Therefore the details of all individual asset items for the purposes of valuation were not available from those sources and we cross-referenced with other data such as Hatch and/or Historical Capex. Where Queensland Rail submitted projects detailing the financial allocation to each asset class we have used that information.

The full asset calculation includes the capex information Queensland Rail provided as well as the Hatch report. That calculation is explained in the B&H Review in section 9.

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[10] A large series of assets all installed on the same date which did not coincide with construction of line in the 19th Century.

[11] The life of an asset identified by Queensland Rail at Table 12, Section 3.2.3, 2015 DAU Submission – Volume 2 except for Bridges that were ascribed a life of 100 years in accordance with Table **Error! Main Document Only.** Notes Accompanying **Error! Reference source not found.**

3 PROCESS FOR IDENTIFYING ASSETS

3.1 Opportunity for Identification

The B&H has been at pains to provide Queensland Rail every opportunity to identify assets that qualify for the purposes of being included in the Initial Asset Value. These are assets that Queensland Rail have identified as Capex or Capital Expenditure.

Not all assets automatically qualify for inclusion in Capex either directly as an asset themselves or as part of a larger asset. There are a number of reasons for this as follows:

- An asset may be recorded as an asset on a management accounting asset register but was purchased with operating cost monies (opex). It is common for opex budgets to include a "minor capital" category for the purchase of small value assets or for occasions when the usual process of approvals of capital monies (capex) would be too cumbersome, such as in an emergency. If an asset hasn't been identified by Queensland Rail as Capex then it has not been included.
- Assets that remain on an assets register may have been removed and the benefit to the network is lost
- Some assets form part of a general "catch-all" recognised by QCA as working capital and include items associated with facilities for plant and equipment in maintenance activities.
- Some assets have been removed or are of no relevance to the network. B&H carried out a cursory sensibility check on each Queensland Rail identified asset such that it aligned with Queensland Rail's network shown on Queensland Rail drawing number NAG 046 (Issue 6) and the Western System Information Pack (Issue #2).

3.2 Information Requests

The QCA has sought information both before the 2014 draft decision, and in the process of considering the 2015 DAU, while preparing for the 2015 draft decision, for the purposes of clarification or to seek data thought to be relevant to the process of asset assessment.

The B&H Review and this Supplementary Report encapsulate Queensland Rail's responses and their applicability.

3.3 Data Required for Inclusion in the Asset List

For an asset to be included in the asset list compiled by B&H certain data is required to verify:

- Its funding source (Capex or not)
- Its quantum
- Its location
- That there is a benefit to the network
- Its benefit to the common network or as coal specific

None of this information has been provided in Queensland Rail's Attachment 4 to its March 2016 submission so it is not possible to definitively determine the assets' status. B&H have estimated various quanta for information that may assist in identification.

4 GUIDE TO VALUATIONS

4.1 Graphic Format of Representation

In the B&H Review a graphic has been provided in Figure 17 that shows the detail of asset type, Initial Asset Value (IAV) and Remaining Initial Asset Value, the year in which the asset type was first created and the year in which the asset was last created, each for the sections of track, Rosewood to Jondaryan, Jondaryan to Macalister and Macalister to Columboola. After an asset's Regulatory Life is extinguished the graphic shows the asset being maintained (in green). The time between the first creation of the asset and last creation is shown in yellow. A copy of the graphic is shown in Appendix 1.

Some assets were never Capex assets because they were created with maintenance funds, such as timber sleepers or steel sleepers, unless they were specifically identified as capital funded. All expenditure in Queensland Rail capital projects was acknowledged in the analysis and further detail is provided in Section 5 of this report relating to Queensland Rail's assertion that certain assets were not included.

Table 1 below is a guide as to how to interpret *Figure 17 - Timeline Analysis of Queensland Rail Assets on the West Moreton System* shown in the B&H Review. The graphic comprises two parts.

The first, top portion deals with assets that have not been identified as being part of specific projects and are pre-2007. The sources for this data consist of the Connell Hatch report for pre-1995 assets and the Historical Capex data provided by Queensland Rail for the period 1995 to 2007.

The second portion deals with assets created during specific projects. Even if specific assets were not identified in the documentation provided by Queensland Rail, which consisted of spreadsheets of expenditures, project summaries or business case documentation, all asset values were included.

All TSC Historical Assets were dealt with separately by QCA but they have been assessed in Supplementary Report Part 1 for the information of QCA. These are assets that were funded by the Transport Services Contract which primarily funds public services and were initially not included in an asset base for the network. Later QCA decided to include them and account for them appropriately.

In the absence of any Queensland Rail data B&H had to make assumptions and these were explained in the B&H Review and additional explanatory material is provided in Table 1 below.

Table 1 Figure 17 - Timeline Analysis of Queensland Rail Assets on the West Moreton System Interpretation

Asset Class	Notes
Pre-2007 Assets	
• Tunnels	B&H considered all tunnels on the western system to be life expired because they were constructed over 100 years ago and there had been no identified capital funded projects or assets by Queensland Rail.
• Timber Bridges	B&H considered that all original timber bridges on the line were constructed over 100 years ago and that the relevant asset value would consist of various upgrades or partial replacements. Evidence was found in the Hatch spreadsheets indicating various upgrades during the period prior to 2007. No evidence of capital works was found in any other Queensland Rail documentation. The Hatch data was included in the valuation.
• Concrete Bridges	Concrete bridge capital works were indicated in the Hatch spreadsheets as well as in Historical Capex data and were included in the valuation.
• Concrete/steel culverts	Concrete culvert capital works were indicated in the Hatch spreadsheets as well as in Historical Capex data and were included in the valuation.
• Timber sleepers	Timber sleeper asset information was provided by Queensland Rail in the form of Excel spreadsheet information relating to configuration. The sheets were undated so the accuracy of the information is unknown but as there was no capital project record of timber sleepers being installed with capital funds they were treated as maintenance/consumable items.

Asset Class	Notes
• Steel sleepers	Steel sleeper asset information was provided by Queensland Rail in the form of Excel spreadsheet information relating to configuration. The sheets were undated so the accuracy of the information is unknown at a particular time, but as there was no capital project record of steel sleepers being installed with capital funds they were treated as maintenance/consumable items. Section 5.3 of this report provides a rationale in the consideration of steel sleepers and examines four main points in response to Queensland Rail's claim[12] that steel sleeper capital was not taken into account in the B&H analysis. They were that: no record of any steel sleeper capex has been received from Queensland Rail, the claim of upgrade is tenuous, they have been prematurely replaced by concrete sleepers and that no capex has been claimed for the post 1995 period in Queensland Rail's methodology .
• Concrete sleepers	The first record of concrete sleepers NOT being part of a specific project was in 1997. This record is shown in Queensland Rail's spreadsheet tab as Historical Capex and the historical value captured by way of distributing the track component of the capital cost according to the ratio of value of concrete sleepers in the Hatch spreadsheet, that being 45.25%.
• Ballast	The first record of ballast NOT being part of a specific project was in 1997. This record is shown in Queensland Rail's spreadsheet tab as Historical Capex and the historical value captured by way of distributing the track component of the capital cost according to the ratio of value of ballast in the Hatch spreadsheet that being 7.5%.
• Fences	No asset list or capital records were provided by Queensland Rail in any of their Historical Capex or Project specific data that identified this asset as a separable asset. Where fences were included in a project, that value was captured in the total value of the project.

[12] See Footnote 14 of this report

Asset Class	Notes
• Earthworks	This information was derived directly from Queensland Rail's Historical Capex information. The Hatch data prior to 1995 did not reveal any earthwork value.
• Rail	The data for evaluation of asset value prior to 2007 was derived directly from Queensland Rail's configuration data by applying a unit rate for the various rail types. The unit rate included material and installation. Each section of rail indicated in Queensland Rail's configuration data was assessed for its age and the tonnage that had passed and evaluated against an expected life of 50 years. A small amount of rail had been laid since 2007 which was counted in the Post 2007 Project data and this amount was effectively double counted. But as it was not a material quantity no adjustment was applied.
• Turnouts	Turnouts shown in this section of the graphic are those that may have been specifically identified in pre-2007 works. However there were none identified in either the Queensland Rail Historical Capex spreadsheets or the Connell Hatch data. Consequently all turnouts prior to 2007 have been shown as "maintenance".
• Roads	No asset list or capital records were provided by Queensland Rail in any of their Historical Capex or Connell Hatch reports
• Power Systems	Data in the Hatch report was utilised for the period until 1995. After 1996/97 the Queensland Rail submitted Historical Capex data is the most recent.
Post 2007 Capex	
• Projects, Jondaryan Tack Upgrade, Columboola to Fisherman's Island and Western System Asset Replacement	These three projects, with their multi-facets and multiple-years' expenditure, and to June 2013, constitute the capex considered post 2007. All costs were captured for the estimate. For each of the asset classes, Queensland Rail spreadsheet tabs identify the percentage of the expenditure in each asset class and expenditure on a year by year basis. Any other included works of any kind were captured in the project value.

5 INCLUSION OF ASSETS

5.1 Submission by Queensland Rail

In Section 3.3 of the Comments Paper, Queensland Rail refer to assets that may not have been included in the QCA evaluation of post-1995 assets as follows:

> A failure by the QCA to include numerous post-1995 assets in its valuation. A list of the excluded assets that Queensland Rail has been able to identify in the time available is set out in Attachment 4.

Queensland Rail have provided some detail of the assets in Attachment 4 as examples to demonstrate their point. The paragraph above is the full extent of Queensland Rail's submission apart from Attachment 4.

5.2 B&H Method for Inclusion

B&H has had regard to the appropriate pre-qualification needed for an asset to be included in the assets in the graphic and made available to QCA for their calculations.

B&H has reviewed all pieces of data received by Queensland Rail and matched it with the spreadsheet graphical presentation in the B&H Review (September 2015) and supporting tables. In order to ensure all data was included B&H sought information provided by Queensland Rail for their submission in 2009 where the West Moreton network was part of the wider coal group of networks prior to separation into Aurizon and Queensland Rail and discovered a report and spreadsheet compiled by Connell Hatch consultants in their efforts to determine an Optimised Replacement Cost. This data was used as a "last resort" where no other data was apparent.

A review of all the information provided by Queensland Rail in their DAU has revealed no assets that have not been included in the B&H analysis and only one asset that was part of the flood damage works (King's Bridge at 135.490) which, based on a unit rate of $40,000 per metre for new bridge of 24.6m[13], had a construction cost of approximately $1m.

5.3 Queensland Rail's Assertion re Non-Inclusion

In relation to claims by Queensland Rail[14] that certain assets had not been included in the QCA assessment for the purposes of valuation, B&H has no reason to believe that Queensland Rail did not include all appropriate Capex assets in its various documents and spreadsheets when asked to submit the data for inclusion for the QCA calculations. Queensland Rail had every incentive to do so. Confronted with two conflicting pieces of evidence, Queensland Rail's own Capex submissions with cost and scope details, on the one

[13] Hatch report, DORC Valuation 080715 Appendix B - Excel - Historical application.xls" (Author "stacyn"), produced for Report called "Final Estimate Report Western System – Depreciated Optimised Replacement Cost (DORC) Assessment Queensland Rail 6 August 2008, greenfield's cost in 2008 $24,000 uplifted to brownfield's cost in 2013

[14] Section 3.3 Submission – Queensland Rail's Draft Access Undertaking 1 (2015) Response to Queensland Competition Authority's Comments Paper March 2016

hand, and their assertion that certain assets were not included[15] with no detail of scope or cost, B&H has, on the balance of probability, assumed that all assets have been included in their detailed submissions.

As well, in addition to Queensland Rail's documents B&H included assets where there was a reasonable prospect that assets had been missed by Queensland Rail in their submissions. These were the "Hatch" assets identified in their ORC valuation of 2007. These included bridges, culverts, telecommunications and signals assets occurring up to that date and included data with records going back to the middle of the twentieth century.

Certain of the assets were included in Queensland Rail's Attachment 4 and section 5.4 of this report addresses those assets.

One other assertion in section 3.3 of Queensland Rail's March 2016 submission relating to steel sleepers has been investigated. Queensland Rail assert: "As it is an upgrade to steel sleepers it is a capital program and should be treated as such". B&H considered of four primary areas to support an opinion.

Firstly, no record of Capex has been submitted by Queensland Rail in any of their previous submissions.

Secondly, whether steel sleepers, on a one for one replacement in partial resleepering is an upgrade, is questionable. This is where a steel sleeper directly replaces a timber sleeper, in the same position and with the same neighbours. The functionality of the track is not improved through higher speeds or higher axle loads and the main benefit is a longer life asset. The use of steel sleepers is comparative to timber and some benefit has been ascribed to the life of neighbouring timber sleeper and to longitudinal rail anchoring but these benefits are also available with some timber sleeper components. Generally therefore unless the steel sleeper can be laid for near the same cost as a timber sleeper a capital justification is marginal in B&H's experience.

The most comparable administration having previously used steel sleepers in a large program was the Western Australian Government Railways in 1998 to 2001 where capital funds were used for resleepering 3000kms of the system. A timber sleeper ban by Government existed at that time. Subsequent short lengths were funded using operating cost. B&H is also aware of steel sleeper use in Queensland where they have been used in a 100% pattern and this was most likely a capital funded project pre-1995. Queensland Rail's proposed 2015/16 mechanised resleepering program using timber sleepers negates the reason of environmental considerations as was the case in the Western Australian experience.

Thirdly, we note the replacement of timber and steel sleepered sections with concrete sleepered track with upgraded rail size in recent years. The replacement of the steel sleepers, the first inserted in 1985 according to our records, means that they were removed well before their nominal 40 year life.

[15] Submission – Queensland Rail's Draft Access Undertaking 1 (2015) Response to Queensland Competition Authority's Comments Paper March 2016

Finally, “upgrades” do not in themselves qualify for Capex funding and the precedent shown by Queensland Rail in not identifying any post-1995 steel sleepers as Capex was also a factor in our considerations.

In combination these considerations led us to believe that steel sleepers were maintenance opex funded.

5.4 Queensland Rail’s Attachment 4

B&H has compiled Table 2 showing the data presented in Attachment 4 and our response and explanation. B&H has considered Queensland Rail’s Comments Paper and its previous submissions and was faced with conflicting information. On the one hand detailed capital cost (Capex) information had been provided with the DAU and through other channels such as the Historical Capex spreadsheets and responses to QCA information requests, and on the other hand with unquantified assertions that certain assets had not been included.

Only one asset submitted by Queensland Rail has been traced to information not previously submitted and that asset, the so called King’s bridge at kilometre location 135.490[16] , was a bridge constructed after the floods in 2011 and paid for by the Queensland Government and mining companies as part of the restoration works. An estimate has been provided in this report for those works.

[16] Queensland Rail Drawing Number NAG046 indicates 135.500km and the Hatch report

Table 2 Detailed Response and Explanation to Attachment 4 (sheet 1 of 5)

Asset ID	Asset Class	Asset Description	Location Code	km	Location	Acquisition Date	B&H Comment (sheet 1 of 5)
212433	Signal mechanic	MECHANICAL POINTS COTTON CONTAINER TERM	LS463	WL0085.000	DALBYX – TYCANBAX	01.04.1997	The points at the cotton container siding are private siding (yellow in colour) as shown on NAG 046 sheet 11 of 23 and therefore not part of the common network. Also Excel sheet "QR 2015 DAU - R2J - 'Historical Capex' sheet" supplied by Queensland Rail provides all capex to 2007 for all assets and is included in the B&H analysis
225941	Fence	FENCE SECURITY HIGH RISK AREA TRACK SIDE	LS889	ML0069.060	ROSEWOOD – HELIDON	30.04.1998	Excel sheet "QR 2015 DAU - R2J - 'Historical Capex' sheet" supplied by Queensland Rail provides all capex to 2007 for all assets and is included in the B&H analysis
225943	Fence	FENCE SECURITY HIGH RISK AREA TRACK SIDE	LS889	ML0114.520	ROSEWOOD – HELIDON	30.04.1998	Excel sheet "QR 2015 DAU - R2J - 'Historical Capex' sheet" supplied by Queensland Rail provides all capex to 2007 for all assets and is included in the B&H analysis
234095	Fence	FENCE INFRASTRUCTURE INVENTORY DEPOT	18163		HARLAXTON	30.06.1999	Part of working capital for infrastructure maintenance - already in QCA estimates as the 0.3% allowance agreed with Queensland Rail
234107	Fence	FENCE INFRASTRUCTURE INVENTORY DEPOT	27238		CHINCHILLA	30.06.1999	Part of working capital for infrastructure maintenance - already in QCA estimates as the 0.3% allowance agreed with Queensland Rail
234093	Hard stand	HARDSTAND INFRASTRUCTURE INVENTORY DEPOT	17961		HOLMES	30.06.1999	Part of working capital for infrastructure maintenance - already in QCA estimates as the 0.3% allowance agreed with Queensland Rail
234094	Hard stand	HARDSTAND INFRASTRUCTURE INVENTORY DEPOT	18163		HARLAXTON	30.06.1999	Part of working capital for infrastructure maintenance - already in QCA estimates as the 0.3% allowance agreed with Queensland Rail
234106	Hard stand	HARDSTAND INFRASTRUCTURE INVENTORY DEPOT	27238		CHINCHILLA	30.06.1999	Part of working capital for infrastructure maintenance - already in QCA estimates as the 0.3% allowance agreed with Queensland Rail
237694	Fence	FENCE INFRA INVENTORY DEPOT COMPOUND	27473		MILES	01.01.2000	Part of working capital for infrastructure maintenance - already in QCA estimates as the 0.3% allowance agreed with Queensland Rail
247370	Custom prem eqp	RADIO TCR BASE MILES	27473		MILES	31.01.2000	All telecom data pre-2007 for Macalister to Columboola extracted from Hatch report in the absence of any Queensland Rail data, Asset Class 8 Telecom, and included in analysis
237687	Lx protection	PEDESTRIAN CROSSING AND MAZE	LS889	ML0081.520	ROSEWOOD – HELIDON	28.03.2000	For this item, pedestrian crossing and level crossing data pre-2007 extracted from Hatch report in the absence of any Queensland Rail data, Asset Class 2 Signals and included in analysis

Table 2 Continued (sheet 2 of 5)

Asset ID	Asset Class	Asset Description	Location Code	km	Location	Acquisition Date	B&H Comment (sheet 2 of 5)
246856	Lx protection	ACTIVE LEVEL CROSSING PROTECTION	LS889	ML0059.760	ROSEWOOD – HELIDON	01.07.2001	For this item, pedestrian crossing and level crossing data pre-2007 extracted from Hatch report in the absence of any Queensland Rail data, Asset Class 2 Signals and included in analysis
246822	Train protect	DTC TRAIN PROTECTION SW & WESTERN QLD BRANCH LINES	SC013		WESTERN	15.07.2001	For this item, signals data pre-2007 extracted from Hatch report in the absence of any Queensland Rail data, Asset Class 2 Signals and is included in analysis
252317	Rway track lt	RAILWAY TRACK PART WORN TYPE 4	LS356	WL0163.670 - WL0164.271	MACALISTER COAL SIDINGX – CHINCHILLA	28.02.2002	Excel sheet "QR 2015 DAU - J2C - 'Historical Capex' sheet" supplied by Queensland Rail provides all capex to 2007 for trackwork and is included in the B&H analysis
251306	Fence	FENCE	17961		HOLMES	29.05.2003	Excel sheet "QR 2015 DAU - R2J - 'Historical Capex' sheet" supplied by Queensland Rail provides all capex to 2007 for all assets and is included in the B&H analysis
252326	Telephone eqp	PABX TEL DALBY	24838		DALBY	13.05.2003	All telecom data pre-2007 for Macalister to Columboola extracted from Hatch report in the absence of any Queensland Rail data, Asset Class 8 Telecom, and is included in the B&H analysis
252327	Telephone eqp	PABX TEL CHINCHILLA	LS356		MACALISTER COAL SIDINGX – CHINCHILLA	14.05.2003	All telecom data pre-2007 for Macalister to Columboola extracted from Hatch report in the absence of any Queensland Rail data, Asset Class 8 Telecom, and included in the B&H analysis
315333	Sig lock mech	SIGNAL INTERLOCKING MECHANICAL	LS546	ML0131.230	HELIDONX – TOOWOOMBAX	31.10.2003	Excel sheet "QR 2015 DAU - R2J - 'Historical Capex' sheet" supplied by Queensland Rail provides all capex to 2007 for signal assets and is included in the B&H analysis
300116	Link/netwk eqp	SYS MSR PABX # 828 439	SC013		WESTERN	30.11.2003	Excel sheet "QR 2015 DAU - R2J - 'Historical Capex' sheet" and "QR 2015 DAU - J2M - 'Historical Capex' sheet" supplied by Queensland Rail as well as telecom data pre-2007 for Macalister to Columbool extracted from the Hatch report provides all capex to 2007 for all assets including telecom and included in the B&H analysis
301030	Data network	EQPT DATA NET LAN / WAN EQUIPMENT DALBY	24838		DALBY	01.07.2004	All telecom data pre-2007 for Macalister to Columboola extracted from Hatch report in the absence of any Queensland Rail data, Asset Class 8 Telecom, and included in the B&H analysis

Table 2 Continued (sheet 3 of 5)

Asset ID	Asset Class	Asset Description	Location Code	km	Location	Acquisition Date	B&H Comment (sheet 3 of 5)
301031	Data network	EQPT DATA NET LAN / WAN EQUIPMENT CHINCHILLA	LS356		MACALISTER COAL SIDINGX – CHINCHILLA	01.07.2004	All telecom data pre-2007 for Macalister to Columboola extracted from Hatch report in the absence of any Queensland Rail data, Asset Class 8 Telecom, and included in the B&H analysis
300737	Link/netwk eqp	SYS DMR TOOWOOMBA TO ROMA	SC013		WESTERN	01.07.2004	Excel sheet "QR 2015 DAU - R2J - 'Historical Capex' sheet" supplied by Queensland Rail provides all capex to 2007 for all assets including telecom and included in the B&H analysis
309349	Lx protection	PEDESTRIAN CROSSING & MAZES CW ALARMS	LS889	ML0087.490	ROSEWOOD – HELIDON	12.07.2005	Excel sheet "QR 2015 DAU - R2J - 'Historical Capex' sheet" supplied by Queensland Rail provides all capex to 2007 for all assets including telecom and are included in the B&H analysis
309351	Lx protection	PEDESTRIAN CROSSING & MAZES CW ALARMS ID NO. 4234	LS889	ML0096.120	ROSEWOOD – HELIDON	16.10.2005	Excel sheet "QR 2015 DAU - R2J - 'Historical Capex' sheet" supplied by Queensland Rail provides all capex to 2007 for all assets including telecom and are included in the B&H analysis
327896	Trk tnout md/lt	AUSTROLL SWITCH ROLLERS - 1 SET	LS711	WL0011.640	TOOWOOMBAX – OAKEY	31.05.2007	Excel sheet "QR 2015 DAU - R2J - 'Historical Capex' sheet" supplied by Queensland Rail provides all capex to 2007 for all assets including track assets and are included in the B&H analysis
328069	Stl pipeculv md	CULVERT STEEL PIPE LS353		WL0018.425	OAKEY - JONDARYN COAL SIDING	30.09.2009	Culverts in the year 2009/10 are shown in "TSC Historical Capital Expenditure - R2J" source: QR 2015 DAU; "West Moreton System Model AU1 - QCA Sub 23.04.15 (R2J).xlsm" supplied by Queensland Rail and included in the B&H analysis
401339	Conc rlbrdg md	CONCRETE RAIL BRIDGE	LS546	ML0135.490	HELIDONX – TOOWOOMBAX	16.04.2011	Part of the Range Repair following the floods in 2011 estimated by B&H to cost approximately $1m in 2013$
405169	Data network	1X 3750X SWITCH	27238		CHINCHILLA	12.03.2012	The projects "Jondaryan Track Upgrade" or "Columboola Balloon Loop & Main Line Extension (Rosewood - Jondaryan Only)" or TSC Historical Capex encapsulate this project and have been included in the B&H analysis.
405169	Data network	CAPITALISED INTEREST 1X 3750X SWITCH	27238		CHINCHILLA	12.03.2012	Capitalised interest has been included for all capex

Table 2 Continued (sheet 4 of 5)

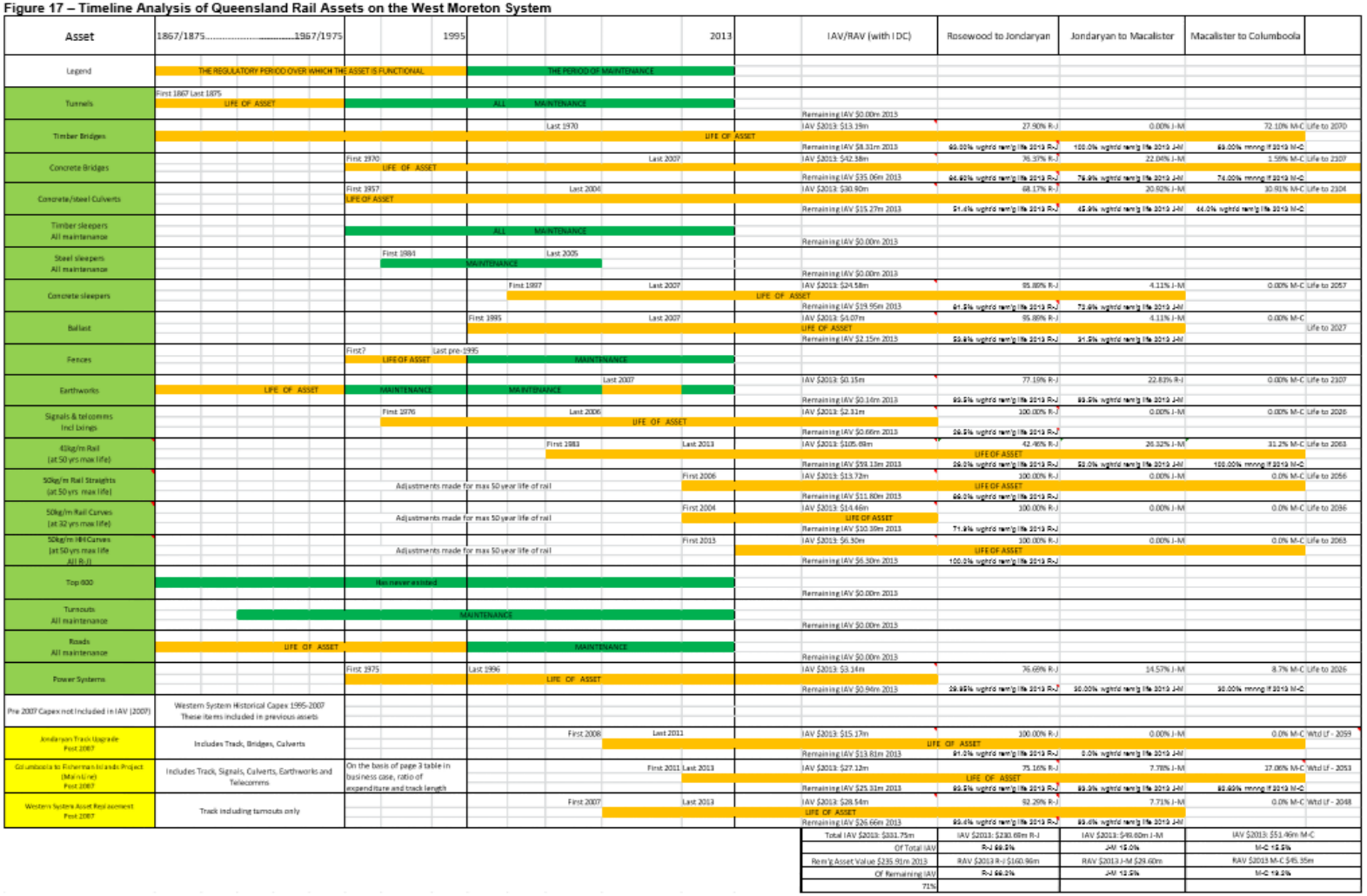
Asset ID	Asset Class	Asset Description	Location Code	km	Location	Acquisition Date	B&H Comment (sheet 4 of 5)
405172	Data network	1X 3750X SWITCH	24838		DALBY	12.03.2012	Capitalised interest has been included for all capex
405172	Data network	CAPITALISED INTEREST 1X 3750X SWITCH	24838		DALBY	12.03.2012	Capitalised interest has been included for all capex
405212	Data network	1X 3750X SWITCH	23210		WILLOWBURN	12.03.2012	Capitalised interest has been included for all capex
405212	Data network	CAPITALISED INTEREST 1X 3750X SWITCH	23210		WILLOWBURN	12.03.2012	Capitalised interest has been included for all capex
405249	Data network	1 X 2951ROUTER	27238		CHINCHILLA	12.03.2012	Capitalised interest has been included for all capex
405249	Data network	CAPITALISED INTEREST 1 X 2951ROUTER	27238		CHINCHILLA	12.03.2012	Capitalised interest has been included for all capex
405252	Data network	1 X 2951ROUTER	24838		DALBY	12.03.2012	Capitalised interest has been included for all capex
405252	Data network	CAPITALISED INTEREST 1 X 2951ROUTER	24838		DALBY	12.03.2012	Capitalised interest has been included for all capex
405282	Data network	1 X 2951ROUTER	23210		WILLOWBURN	12.03.2012	Capitalised interest has been included for all capex
405282	Data network	CAPITALISED INTEREST 1 X 2951ROUTER	23210		WILLOWBURN	12.03.2012	Capitalised interest has been included for all capex
406161	Train protect	DTC TRAIN PROTECTION	LS354	45.808 - WL0(	JONDARYN COAL SIDINGX – DALBY	27.05.2013	The projects "Jondaryan Track Upgrade" or "Columboola Balloon Loop & Main Line Extension (Rosewood - Jondaryan Only)" or TSC Historical Capex encapsulate this project and have been included in the B&H analysis.
162382	Lx protection	PEDESTRIAN CROSSING AND MAZE ID 1007	LS546	ML0146.210	HELIDONX – TOOWOOMBAX	28.02.2015	Pre-2015 DAU Capex was submitted as part of the 2015 DAU and all items were included in the analysis by QCA
408415	Con culvpipe lt	CULVERTS CONCRETE BOX CULVERT	LS354	WL0055.270	JONDARYN COAL SIDINGX – DALBY	21.04.2015	Pre-2015 DAU Capex was submitted as part of the 2015 DAU and all items were included in the analysis by QCA
408416	Con culvpipe lt	CULVERTS CONCRETE BOX CULVERT	LS354	WL0055.280	JONDARYN COAL SIDINGX – DALBY	21.04.2015	Pre-2015 DAU Capex was submitted as part of the 2015 DAU and all items were included in the analysis by QCA
408417	Con culvpipe lt	CULVERTS CONCRETE BOX CULVERT	LS354	WL0056.180	JONDARYN COAL SIDINGX – DALBY	21.04.2015	Pre-2015 DAU Capex was submitted as part of the 2015 DAU and all items were included in the analysis by QCA

Table 2 Continued (sheet 5 of 5)

Asset ID	Asset Class	Asset Description	Location Code	km	Location	Acquisition Date	B&H Comment (sheet 5 of 5)
408419	Fld eqp & cable	AXLE COUNTERS	LS889	ML0087.660 - ML0096.410	ROSEWOOD – HELIDON	30.04.2015	Pre-2015 DAU Capex was submitted as part of the 2015 DAU and all items were included in the analysis by QCA
408420	Fld eqp & cable	AXLE COUNTERS	LS889	ML0087.660 - ML0096.410	ROSEWOOD – HELIDON	30.04.2015	Pre-2015 DAU Capex was submitted as part of the 2015 DAU and all items were included in the analysis by QCA
408421	Fld eqp & cable	AXLE COUNTERS	LS889	ML0096.410 - ML0105.890	ROSEWOOD – HELIDON	30.04.2015	Pre-2015 DAU Capex was submitted as part of the 2015 DAU and all items were included in the analysis by QCA
408422	Fld eqp & cable	AXLE COUNTERS	LS889	ML0096.410 - ML0105.890	ROSEWOOD – HELIDON	30.04.2015	Pre-2015 DAU Capex was submitted as part of the 2015 DAU and all items were included in the analysis by QCA
408423	Fld eqp & cable	AXLE COUNTERS	LS889	ML0105.890 - ML0114.520	ROSEWOOD – HELIDON	30.04.2015	Pre-2015 DAU Capex was submitted as part of the 2015 DAU and all items were included in the analysis by QCA
408424	Fld eqp & cable	AXLE COUNTERS	LS889	ML0105.890 - ML0114.520	ROSEWOOD – HELIDON	30.04.2015	Pre-2015 DAU Capex was submitted as part of the 2015 DAU and all items were included in the analysis by QCA
408594	Surveillance eq	CCTV SURVIELLANCE JONDARYAN	LS354	WL0042.850	JONDARYN COAL SIDINGX – DALBY	31.05.2015	Pre-2015 DAU Capex was submitted as part of the 2015 DAU and all items were included in the analysis by QCA
408595	Surveillance eq	CCTV SURVIELLANCE JONDARYAN	LS354	WL0042.850	JONDARYN COAL SIDINGX – DALBY	31.05.2015	Pre-2015 DAU Capex was submitted as part of the 2015 DAU and all items were included in the analysis by QCA
408596	Surveillance eq	CCTV SURVIELLANCE JONDARYAN	LS354	WL0043.875	JONDARYN COAL SIDINGX – DALBY	31.05.2015	Pre-2015 DAU Capex was submitted as part of the 2015 DAU and all items were included in the analysis by QCA
408597	Surveillance eq	CCTV SURVIELLANCE JONDARYAN	LS354	WL0043.875	JONDARYN COAL SIDINGX – DALBY	31.05.2015	Pre-2015 DAU Capex was submitted as part of the 2015 DAU and all items were included in the analysis by QCA

Appendix 1 – Copy of Figure 17 Graphic from B&H Review (September 2015)

Figure 17 – Timeline Analysis of Queensland Rail Assets on the West Moreton System



B&H Supplementary Report Part 3

Discussion Relating to

Calculation of Infrastructure Capacity

Identified in

"Submission – Queensland Rail's Draft Access Undertaking 1 (2015) Response to Queensland Competition Authority's Draft Decision to refuse to approve draft access undertaking December 2015"

As well as from

Hope Submission

Aurizon Submission

Yancoal Submission

May 2016

Executive Summary

This Supplementary Report Part 3 responds to comments made by stakeholders including Queensland Rail, New Hope, Aurizon, and Yancoal relating to analysis undertaken in the B&H Review[1] in relation to the calculation of capacity and the impact of Metropolitan services and which are subjects included in the QCA Draft Decision to Queensland Rail 2015 DAU. Supplementary Report Part 1 will address issues associated with the maintenance and capital estimates and Supplementary Report Part 2 will address issues associated with asset valuation.

Queensland Rail's response in relation to capacity related items is at "*Annexure 9 Response to B&H Alternative Assessment of Capacity*" of their Submission[2] to the Draft Decision and their response to the impact of Metropolitan operations is at "*Annexure 1 Assessment of Metropolitan Network Impact*"[3]. Queensland Rail also make further comment explaining their rational on calculation of capacity in their March 2016 submission.

We note that a large amount of new information has been provided at Annexure 1 dealing with Metropolitan impact on capacity and that Annexure 9 gives reference to above rail matters.

The main difference observed between the Queensland Rail Submissions and the B&H analysis is that Queensland Rail's analysis focusses on the so called practical implications of operational delays and maintenance scheduling whereas B&H deals with the impact of these factors on the theoretical infrastructure capacity[4].

Thus, where maintenance work or train failures occur, Queensland Rail concludes that "but no cancellations"[5] is sufficient to nullify the effect, whereas B&H concludes that potential or "theoretical" train paths are lost which represent lost capacity. This logic of Queensland Rail's is inconsistent because the 35% discount applied for capacity calculation purposes includes above rail factors including those of the Metropolitan network and "reserve" paths.

We conclude, in response to Queensland Rail, that the term "capacity" used in the context of calculating regulatory capacity has nothing to do with the current utilisation of the network or with above rail performance. Capacity for the purpose of determining the propensity of the network to carry more trains and the degree to which there is space to accommodate trains is a theoretical construct and the fact that the current operation is under-utilised and operates with trains that are not reliable says nothing about the potential of the network.

We also conclude that a program of network shutdowns is of little value without knowledge of the work requirements, including whether the work can be performed at night. Night-time shutdowns generated by the need to perform Metropolitan work at night are, for the Western System, of little help because the work on the Western System is mostly performed during daylight hours. Likewise, Western System work performed during the day has little positive effect on the Metropolitan system work schedule.

New information provided by Queensland Rail does assist to clarify certain work programming procedures and the mis-alignment of the major possession work programs.

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[1] Review of Queensland Rail's DAU 2015 B&H Strategic Services Pty Ltd September 2015
[2] Submission – Queensland Rail's Draft Access Undertaking 1 (2015) Response to Queensland Competition Authority's Draft Decision to refuse to approve draft access undertaking December 2015
[3] Annexure 1
[4] "Theoretical" refers to a scenario where all paths are consumed, representing a saturated system and corresponds to a single direction path every 30 minutes (this is a rounding to half hour units), 24 hours per day, every day, representing 336 single direction train paths per week or 168 return paths per week.
[5] "Assessment of Metropolitan Network Impact Response to B&H Report December 2015"

CONTENTS

1 ASSESSMENT OF CAPACITY

1.1 Queensland Rail's Response

Queensland Rail have submitted that the "practical" capacity of the network is 112 return paths per week, whereas B&H have previously indicated a capacity of 135 return paths per week.

B&H has considered Queensland Rail's Submission and has come to the conclusion that while B&H is addressing the impact on the theoretical capacity[6] of the network, Queensland Rail is addressing the impact on the practical capacity of the network. This is because Queensland Rail considers the impact of above rail factors, where in our view; the infrastructure capacity is only concerned with below rail factors. Above rail factors have variously been identified as train delays, train incidents, "reserve" for robustness and the impact of the Metropolitan network.

In any network theoretical paths will be lost due to outside influences even if the number of required paths in an under-utilised network are not lost or train cancellations do not occur and it is for this reason that the B&H and Queensland Rail analyses do not concur.

This Supplementary Report addresses the issue in detail and quantifies the various elements for consideration. It also includes an analysis and update of information relating to the impact of the Metropolitan system operation on the capacity of the West Moreton system.

[6] Theoretical capacity is the starting point for calculations and represents a scenario where all paths are consumed under ideal conditions in a "saturated" network

2 INFRASTRUCTURE CAPACITY

2.1 Calculation of Infrastructure Capacity

After first calculating the theoretical capacity of the infrastructure Queensland Rail has submitted that the capacity of the system is influenced by a number of factors including above rail[7] factors. We reject that notion in the context of infrastructure capacity because train reliability and such-like are matters to be considered by the above rail operator. Queensland Rail has little control or influence over these matters except by way of contract terms and conditions.

2.2 Recalculation of Capacity by B&H

In the B&H Review the calculation of infrastructure capacity relied on quantification of running time between crossing loops and estimation of losses due to infrastructure activities and failures.

B&H used a running time in its Review of 26 minutes for the longest sectional running time which determined the number of paths available in one week[8]. On reflection this was not realistic and Queensland Rail's rounded 30 minutes is a more likely period given the configuration of the crossing loops which are only the length of a train and have speed restricted turnouts meaning that full speed is not available for the full transit. In addition, the human capability of train controllers to make decisions results in small infrastructure delays.

Using 30 minute headways, the number of return paths (1 per hour) per week is (24*7) or 168 return paths. To be subtracted from this Queensland Rail claim 19 hours (19 return paths) per week for maintenance. This results in 149 paths. To this juncture B&H and Queensland Rail agree.

To calculate the capacity of the infrastructure B&H and Queensland Rail both estimate further factors to discount from 149 paths. Queensland Rail use a factor of 35% apparently learned by experience which includes unplanned maintenance, infrastructure failures and above rail factors, including Metropolitan constraints and "reserve" for unplanned events. The inclusion of above rail factors is inconsistent with their assertion that train paths are not lost because they can be rescheduled or operated via single line in double track sections.

In an information request from the QCA relating to providing background information in categories of lost pathways for the use of 35% as a factor, Queensland Rail submitted:

> …Queensland Rail does not have information that identifies the percentage of pathways lost in these categories. In any event, cancelled paths will often be made up on another occasion where the Network is not operating at full capacity. As such, Queensland Rail has provided information relating to the number of minutes lost compared to plan.

The categories relate to the reasons why pathways are lost such as through infrastructure failures, weather events or train breakdowns.

Effectively, Queensland Rail could not provide any data that might support the use of 35% implying that rarely are trains lost or cancelled, they are simply re-scheduled into an available path. But rescheduling does not avoid the loss of a theoretical path.

[7] Factors emanating from train operation
[8] One train would run in one direction and then another train would run in the opposite direction

B&H was placed in a situation where the only information it had was the "delay" information that Queensland Rail had offered in its response. This was data relating to the reasons for delays to trains, albeit Queensland Rail had qualified its response as:

> It should be noted that Queensland Rail's current data recording codes do not record in many of the six categories sought by the QCA. As such, Queensland Rail has had to make assumptions in relation to existing categories to roll these into the categories that are being sought in order to provide information on minutes lost compared to plan. This will lead to inaccuracies.

There being no other data that would realistically separate above rail factors and below rail factors B&H used the "minutes lost" (delay) information as a proxy for the number of paths that would be lost due to these reasons. This technique is often used in safety statistics analysis where precursors or near misses to accidents are used to predict actual accident probability. Our assumption was the percentage of delays to trains in a particular category is an indicator or precursor to the percentage of lost pathways if and when they occur.

The "minutes lost" information indicates a further reduction after planned maintenance will be lost due to below rail failures. In Queensland Rail's explanation[9] of the 35% reduction claimed, 36 paths are claimed as Metropolitan network impact (12.1% of 298 single paths assuming 30 minute sectional run time), 38 paths are claimed as "reserve" paths (12.8% of 298) and 46 paths due to a change of sectional running time (derived from 344 single paths for 26 minutes and 298 single paths for 30 minutes). Of these "reserve" paths, B&H had previously found that 61% were due to infrastructure unplanned events (using "delay" information as a proxy for actual data) resulting 61% of 12.8% or 7.8% (23 single paths, 12[10] return paths). This reduction applies to 149 return paths (298 single) resulting in 137 return paths infrastructure capacity.

The resultant infrastructure capacity is therefore calculated as 137 return paths per week, not 135 as indicated in the B&H Review report. This difference is brought about by the use of 30 minutes instead of 26 minutes for the longest sectional running time and the use of Queensland Rail's own explanation as to the components of their 35% assumed reduction.

2.3 Other Information on Factors

The B&H Review[11] referred to other benchmark information that was used to provide some measure of context and sensibility to calculations of this nature given that Queensland Rail did not have the data to substantiate an assertion that over one third of its capacity is lost to "practical" issues. It was reasonable to look elsewhere for some level of perspective.

At no time however did B&H rely on information provided in reports that were generated for and by Queensland Rail themselves. All the calculations to arrive at the conclusion that the infrastructure capacity of the network (not including influences from the metropolitan network) is 137 paths are included in this report.

[9] Annexure 1 Table 3, Annexure 9 Section 3.1, Submission – Queensland Rail's Draft Access Undertaking 1 (2015) Response to Queensland Competition Authority's Draft Decision to refuse to approve draft access undertaking December 2015

[10] It is necessary to round down to a greater loss due to the need to return a single path train

[11] Section 11.3

3 IMPACT OF METROPOLITAN MAINTENANCE

3.1 Queensland Rail's Response

Queensland Rail has asserted that 36 paths are lost due to the impact of the Metropolitan system, 30 paths during peak periods[12] and 6 paths for maintenance.

3.1.1 Theoretical Infrastructure Capacity

Neither in the calculation of Western System capacity nor in the impact of Metropolitan maintenance, has Queensland Rail actually indicated the impact on theoretical infrastructure capacity of Metropolitan maintenance. Queensland Rail have concluded only that "no cancellations" result to many of the trains, but this conclusion ignores the fact that the system is under-utilised and that infrastructure capacity is not dependent on above rail factors that are managed by others.

The concept of theoretical paths will be new to Queensland Rail in practical terms because theoretical paths are not plotted on train control charts, only planned trains. However, for any incursion into the network by maintenance or Capex activities[13], identified by "blocks" placed on the chart by the train controller, a path will be lost. An additive lost path (such as one lost in the Metropolitan network) may only be not lost if a path in that location is aligned with the same path in another location that has already been discounted from the calculation of capacity.

Scheduling of maintenance work and possessions of track in one area of the network, such as in Metropolitan, to coincide with scheduled work in another part of the network, such as near Columboola, does not mean that full "alignment" on the impact of trains is automatically assured. The network is over 6 hours in length which means that trains leaving Columboola prior to a Metropolitan possession will need to depart approximately 8 hours earlier in order to avoid the possession. The Metropolitan impact therefore extends far beyond the times at which the possession may be scheduled.

3.1.2 B&H Review

B&H considered Queensland Rail's submission in the 2015 DAU but certain data was not presented that may have clarified the actual extent of the scheduling for both the Western System[14] and the Metropolitan system. Certain Western System ad hoc maintenance programming is still not evident. But Queensland Rail have now provided detailed schedules of work program and the train control line diagrams (Daily Train Plans) that show the planned progress of trains through the system. These have been very helpful.

3.2 Queensland Rail's planned maintenance alignment

3.2.1 Planned Shutdowns[15]

In Queensland Rail's DAU 2015 Vol 2, Appendix 5, Attachment 2, evidence is provided that there will be 48 and 12 hour planned shutdowns on the Western System at regular intervals.

Queensland Rail indicates a maintenance allowance in the calculation of capacity of 19 hours per week, amounting to 76 hours per 4 week period.

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[12] Sometimes called "blackout"
[13] Incursions can be by way of possessions or by ad hoc maintenance windows managed by train controllers as the trains of the day permit
[14] Includes the West Moreton system
[15] Sometimes called "possessions"

Queensland Rail asserts that the planned maintenance shutdowns on the Western System align with the planned maintenance shutdowns in the Metropolitan area and the new data provided gives a good indication of the time alignment. However the data misses the quantification of the theoretical train path alignment detail that would show the effect of the time lag between one end of the system and the other where trains that leave at one end take approximately 8 hours to reach the other. This is particularly relevant for loaded trains departing the Western System and strike the Metropolitan system and the Daily Train Plans provided show this effect well, just not quantified in terms of the number of theoretical paths affected.

Queensland Rail has also emphasised that its submissions included documentation that demonstrates that the majority of West Moreton maintenance works are on weekend daylight hours[16]. B&H acknowledges that planned shutdowns occur on weekends, but weekday maintenance occurs every day and maintenance that is performed in between trains causing no train delays or cancellations still consumes paths that might otherwise be used for trains.

3.2.2 Non-Planned Shutdown Works

In addition to the planned shutdowns, ad hoc work occurs from time to time on both the Metropolitan and Western Systems. On the Metropolitan system this work has a direct effect on the number of theoretical paths lost and is applicable after consideration of constraints of the Western System (West Moreton System). The ad hoc maintenance work on the Western System has a secondary effect in that Queensland Rail is not able to reliably predict, beyond a single day, how trains will be presented to the Metropolitan network and rescheduling is required interactively.

Queensland Rail acknowledge the additional work in their Submission:

> "where alignment is not possible (such as where additional Metropolitan Network maintenance occurs), a line remains open (wherever possible) to allow the operation of coal services. The potential impact of misaligned Metropolitan and West Moreton Network maintenance is, on average, 3 hours per week – which is equivalent to 3 loaded and 3 unloaded paths per week"

But Queensland Rail miss the point. That is, that the impact is not only on actual trains but on theoretical paths. These are paths that could be used but are currently underutilised and represent the capacity of the network.

3.2.3 Cost Effectiveness

We are also of the view that the "alignment" proposed by Queensland Rail does not match with cost effective maintenance because weekend work involves higher wage rates which have to be incurred in the Metropolitan area but which are more optional on the Western System. No doubt the Western System takes advantage of Metropolitan closures where possible, but it is unlikely to be every occurrence, particularly night times.

3.2.4 B&H Own Assessment

Queensland Rail has provided details of the Metropolitan works schedule showing Metropolitan works amounting to 28 occasions of 12 hour possession (C&D Week Type) and 12 occasions of 48 hour possession (A Week Type). This amounts to 912 hours over the year or approximately 10.4% of the year. These are hours outside of the peak periods which have

[16] For example, 2015 DAU Submission – Volume 2, Appendix 5

previously been identified as having an impact of 30 paths per week (298 paths total per week) or 10.1%.

Of the 912 hours of Metropolitan work, some will be of use to the Western System. The Western System already has an estimate of maintenance work of 19 hours per week amounting to 988 hours per year.

It is not unreasonable therefore to expect that a substantial proportion of the 19 hour per week maintenance estimate is not totally aligned to the Metropolitan possession works and that therefore there is not exact alignment of the two work programs. In fact most of this work on the West Moreton system is performed "as traffic permits" during the day. That is, the work is fitted around the train operation and since not all possible paths are consumed by trains much of this maintenance work occurs between trains. No possession is required.

This maintenance work still consumes theoretical paths even if it does not cause train cancellations.

On the basis of the extensive scheduling evidence now provided and the Daily Train Plans provided for one weekend as an example, we note a better alignment than first estimated. But we are mindful of the fact that operating through the Metropolitan system on a single track when the other track is being maintained does not fully ameliorate the loss of theoretical paths since the "possessed" path is still lost.

3.2.5 Other Metropolitan Train Operations

B&H has also become aware of other[17] non-peak train operations and works in the Metropolitan network that will impact the overall capacity of the system.

New Hope has submitted:

> NHC can also point to adjustments which we suggest should be made, which we are unable to quantify. For example, we would suggest that the impact of the significant number of special events on weekends, which require additional passenger services, has not been taken into account, and that an arbitrary adjustment should be made to reflect this impact.

These services are particularly influential at weekends where no impact on coal services has been assumed in the calculations of "blackout" thus far by either Queensland Rail or B&H. Extra services identified include for special events such as:

- The Carnival of Flowers event at Spring Bluff.
- Queensland Reds v Highlanders on Saturday April 9, and include extra services to Ipswich and Springfield shown in

[17] Trains effects other than those already taken account of in the "blackout" peak periods

- Figure 1. Source: accessed 08/04/2016 https://mobile.translink.com.au/plan-your-journey/event-transport/5366

Figure 1 Reds v Highlanders on April 9, 2016 Special Event Additional Services

To the event

Departure station	Departure time	Stops	Arrival station	Arrival time
Springfield Central	5.39pm	All stops	Milton	6.15pm
Beenleigh	5.48pm	All stops	Roma Street	6.52pm
Ferny Grove	6.02pm	All stops	Roma Street	6.37pm
Shorncliffe	6.39pm	All stops	Roma Street	7.20pm

From the event

Departure station	Departure time	Stops	Arrival station	Arrival time
Milton	9.47pm	All stops	Bowen Hills	9.56pm
Milton	9.50pm	All Stops	Springfield Central	10.26pm
Milton	10.05pm	All stops	Ipswich	10.58pm
Roma Street	10.11pm	All stops	Shorncliffe	10.52pm
Milton	10.32pm	All stops	Caboolture	11.40pm

Please note that additional services are not guaranteed to run at advertised times, and may be amended on the day of operations due to customer demand.

Shuttle buses

3.2.6 Other Metropolitan Works

Other works observed in planning include "weeknight closure" works that occur after Metropolitan services cease to operate or at the very end and start of services. For example, night works are shown in the Queensland Rail 12 month calendar at the website (https://www.queenslandrail.com.au/forcustomers/trackclosures/12monthcalendar accessed 08/04/2016) as follows:

Figure 2 Weeknight Closure on the Cleveland Line

					upgrade works and track maintenance.
Murarrie and Cleveland	Evening works	Cleveland	Tuesday 10 May 2016, 09:30 PM	Wednesday 11 May 2016, 04:00 AM	Track Maintenance
Murarrie to Cleveland	Evening works	Cleveland	Wednesday 11 May 2016, 09:30 PM	Thursday 12 May 2016, 04:00 AM	Track Maintance

1 - 10

This particular Weeknight Closure does not appear on Queensland Rail's Attachment 2 " Shutdowns, Closures and Isolations 2016" of Annexure 1.

There are 26 occasions where 6 hour windows are used on a Mon/Tues or Tues/Wed or Wed/ Thurs shown on Queensland Rail's Attachment 2 "Shutdowns, Closures and Isolations 2016" which affect coal trains and include the Western Line and the Cleveland Line. These are not specifically indicated in Attachment 1, "Western Corridor Alignment Corridor 2016", where only Sunday or Monday 12 hour possessions are indicated. These situations, of which there are many, could be rescheduled C or D Week Types, although it is not clear, but it is clear this occurs on a regular basis as evidenced in Queensland Rail's minutes of the SCAS COG Meeting 10 February 2015 where options for alternative arrangements to planned works are discussed.

This rescheduling would have an impact on Aurizon's use of the network, who presumably optimise use of their rollingstock on the basis of track works generated in the 18 month planning horizon. It was surprising to note no representation from Aurizon, the miners or the Port of Brisbane at the SCAS COG meeting. But in any event Weeknight Closures are of little value to the Western System and contribute little to aligning with the works on the West Moreton System.

3.3 Queensland Rail's Analysis and Summary of B&H Response

Whether the consideration of alignment or overall quantity of work is considered we conclude that Queensland Rail's estimate of 12.1% underestimates the impact of the Metropolitan system on the capacity of the West Moreton system. This is because it only calculates a narrow part of the overall picture of works scheduling and train operations. It only deals with large possession works. A calculation must also include "weeknight closures", rescheduled works, special events additional trains and the quantity of work conducted on both systems. Clearly there is a range between the narrow calculation of Queensland Rail's at 12.1% that omits additional trains for special events and maintenance non-alignment, and higher values previously estimated by B&H and other stakeholders in the range of approximately 20%-22%. This was a conservative estimate prior to the detail provided by Queensland Rail that included train charts and maintenance alignment details.

Even allowing for clarification of alignment of the large possession works we are of the view that 17% impact of the Metropolitan system on the capacity of the West Moreton system is still a reasonable estimate as it was made in the B&H Review. This means that after applying a 17%[18] impact on the previously calculated 137 return paths per week, the infrastructure capacity of the West Moreton network including the Metropolitan impact is 113 return paths per week.

[18] The application of the influence of the metropolitan network is additive because train paths generated west of Rosewood are not free to use any path in the metropolitan network and vice versa

4 SUMMARY

Queensland Rail have supplied a large quantity of information about the train path scheduling that is performed in the form of plans for “Shutdowns, Closures and Isolations “, “Master and Daily Train Plans” and the degree of possession scheduling that occurs. This new data has been helpful and points to an increased confidence that maintenance alignment takes place on many occasions.

But there are many other items such as the degree and impact of rescheduling works, the practical use to the Western System of Weeknight Closures in the Metropolitan system, additional trains operated for special events and the uncertainty of the effectiveness of the planning regime given the number of misaligned plans, that provide too much uncertainty to follow the strict regimentation of calculation adopted by Queensland Rail.

Our capacity calculation has been altered to acknowledge the use of 30 minutes as a more realistic sectional running time allowance, resulting in an estimate of 137 return paths per week as the capacity of the West Moreton system west of Rosewood. We see no reason to modify our estimate in relation to the impact of the Metropolitan system as being 17%.

B&H Supplementary Report Part 4

Discussion Relating to

Categorisation of Maintenance Costs

In Section 3 of:

Submission – Queensland Rail's Draft Access Undertaking 1 (2015) Response to Queensland Competition Authority's Comments Paper March 2016

B&H Strategic Services Pty Ltd

May 2016

EXECUTIVE SUMMARY

This review is a response to Queensland Rail's "Submission – Queensland Rail's Draft Access Undertaking 1 (2015) Response to Queensland Competition Authority's Comments Paper March 2016"[1] related to the material in Section 3 that deals with the categorisation of costs and the various references to the determination of fixed and variable costs.

This Supplementary Report[2] forms part of a consolidated package responding to Queensland Rail's post-draft decision submissions as well as other stakeholder submissions. There are four such reports.

Essentially, Queensland Rail's assessment is that the fixed component is higher than that estimated by B&H.

B&H assessed and estimated the maintenance costs in its previous report "Review of Queensland Rail's DAU 2015 B&H Strategic Services Pty Ltd September 2015 (redacted version Feb 2016)" including an assessment of the components of those costs into two categories "fixed" and "variable" costs. This estimate was performed for Queensland Rail's forecast traffic submitted in its 2015 DAU.

Queensland Rail have now submitted a Comments Paper and this Supplementary Report provides comment on that Comments Paper. Queensland Rail have submitted that a three part categorisation is a better representation of the maintenance costs. Its consultants Synergies and Everything Infrastructure have made statements about Queensland Rail's response.

We conclude that categorisation into two components is a robust approach given the lack of data to support the more complicated approach of using three components because distortions can exist when one large component is not dealt with accurately. This is the case with Queensland Rail's Common Costs because these make up a large proportion of the assessment.

The Common Costs are ill-foundered because they are bloated and they are based on Queensland Rail's own maintenance estimates which we have previously found to be in excess of reasonable costs in the September Review.

At the request of the QCA we have also included an estimate of the fixed and variable costs associated with a scenario where the network is operated with the maximum number of trains that Queensland Rail have previously suggested is a practical limit to the network, 112 return paths per week[3]. This number has been used to provide a "book end" to the context and it has used the B&H maintenance estimates that are included in Supplementary Report Part 1, Maintenance and Capex, in which certain costs have been modified in response to Queensland Rail's post-draft decision comments.

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1 Hereafter referred to as "Comments Paper"

2 This paper hereafter referred to as "Supplementary Report"

3 B&H have suggested 113 is a better estimate and which is included in Supplementary Report Part 2, but the difference between 112 and 113 is not material enough to affect the fixed cost ratio

Overall, we conclude that our estimate of fixed and variable components of maintenance is not very different to Queensland Rail's but is more robust because it assesses the costs on the basis of the traffic likely to be on the system rather than notional "minimal" traffic which artificially suppresses the variable component since Queensland Rail have chosen to use high "minimal" or "base" maintenance costs and assigned all those costs as fixed.

Everything Infrastructure has recognised that some of the Common Costs are variable. Queensland Rail's consultant, PWC, in the DAU 2015 Submission[4] concluded that ""Without incurring any additional capital or maintenance expenditure, the Rosewood to Jondaryan (R2J) part of the network could cater for 15.7 gross million tonnes (GMT) (up from 11.5 GMT); while the Jondaryan to Columboola part of the network could cater for 3.6 GMT (up from 3 GMT). (Queensland Rail, May 2015, volume 2, Appendix 1: 13). This implies all costs are fixed across a wide tonnage range and which is not supported by Queensland Rail's Comments Paper.

Together with the flaws identified and summarised in Section 4 of this Supplementary Report the Queensland Rail position is ambiguous.

[4] Hereafter called "Submission"

Table of Contents

1 PRELIMINARY MATTERS

1.1 Background

B&H assessed and estimated the maintenance costs in its previous report "Review of Queensland Rail's DAU 2015 B&H Strategic Services Pty Ltd September 2015 (redacted version Feb 2016)" including an assessment of the components of those costs into two categories "fixed" and "variable" costs. This estimate was performed for Queensland Rail's forecast traffic submitted in its 2015 DAU.

Queensland Rail have now submitted a "Response" and this Supplementary Report provides comment on that Response.

Queensland Rail have submitted that a three part categorisation is a better representation of the maintenance costs. Its consultants Synergies and Everything Infrastructure have made statements about Queensland Rail's response.

1.2 Meaning of Fixed and Variable and Approaches Taken

The word "fixed" is usually meant in the context of a range of tonnages, the construction configuration and the condition of the asset. Thus, the proportion of "fixed" will change with tonnage. At very low tonnage and high quality components the proportion will be very high because the main activity will be inspection. If the track is built with concrete sleepers and has low tonnage this is an example[5]. An estimate is made for the total network taking into account the actual components and the actual condition.

1.2.1 B&H Approach

B&H has taken the approach that an estimate is made for the total network taking into account the actual components and the actual condition. It has specifically oriented its assessment on the configuration and condition of the asset using Queensland Rail configuration data and Queensland Rail condition data.

For example, Figure 3.4 in Working Paper 2, "Usage-related infrastructure maintenance costs in railways", December 2000, QCA Draft Decision, shown in Figure 1, shows how the variability changes, both with tonnage and with sleeper type. This is shown below along with dialogue that is repeated by Everything Infrastructure in the Queensland Rail Response.

[5] However, generally, low tonnage tracks do not attract high levels of investment so the two situations of concrete track and low tonnages do not coincide

Figure 1 Copy of Figure 3.4 Draft Decision 2000

The variability of track maintenance cost (defined as the ratio between marginal and average cost) is used extensively as a short-cut method for calculating the marginal cost of additional traffic. Figure 3.4 shows the variabilities for the two types of track in Figure 3.2.

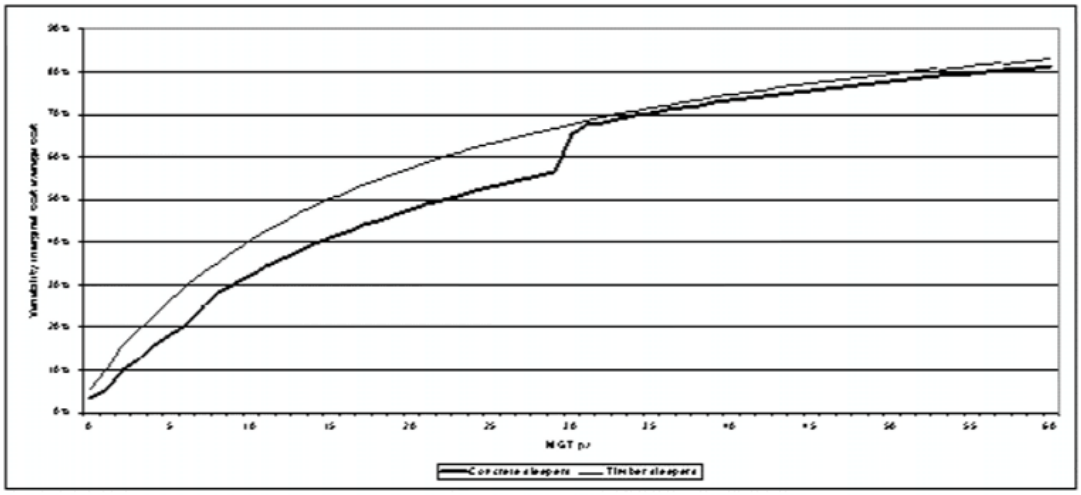


Figure 3.4 Variability of track life-cycle maintenance cost

Timber track is significantly more variable at low tonnages, partly because timber sleepers are more sensitive to tonnage than concrete sleepers, partly because the assumed poorer formation increases the volume of tamping (which is partly volume-driven) and partly because jointed track is more tonnage-sensitive than CWR.

At low tonnages, only a small part of the maintenance cost is variable but this increases to around 20% at 5 MGT and 30% at 10 MGT for concrete and about 10% more for timber. By 20 MGT, the variabilities have increased to about 45% and 55% respectively and they then increase steadily, until they are over 80% at 60 MGT, as asset renewal becomes increasingly

On the West Moreton system, Queensland Rail have been steadily replacing steel and timber sleepers with concrete sleepers on the heaviest usage sections and also on the sections that give them the most trouble. Queensland Rail have also been performing extensive ballasting works and rail replacement with a mixture of maintenance and capital funding. An estimate was made by B&H for each cost component of the maintenance cost using Figure 3.4 and the current configuration and condition of the West Moreton system to arrive at a fixed proportion figure. The analysis took into account the B&H suggested maintenance costs and not the Queensland Rail maintenance costs.

1.2.2 Queensland Rail Approach

Queensland Rail have created three cost categories, Common, Fixed Coal and Variable. The Variable category is the remainder from the total after subtraction of the Common Costs plus Fixed Coal costs, since Queensland Rail has allocated all Common Costs to the fixed category.

The Common Costs have been generated by estimating maintenance costs for a network that carries only “minimal” tonnage and this is to simulate a situation where costs are mostly fixed. In fact Queensland Rail allocates 100% of the Common Costs as fixed. Everything Infrastructure have commented that not all Common Costs are fixed and we regard this matter as one of the fundamental flaws of the Queensland Rail Response.

1.3 Matters of Accuracy in Queensland Rail's Response

1.3.1 Scope of B&H Estimates

In the B&H September Review, no assessment was made of forward Capital Costs.

Queensland Rail's Comments Paper identifies a number of cost areas which are Capex and implies B&H has made a categorisation assessment into fixed and variable components. No such assessment has been made by B&H. This Supplementary Report will only make comment about maintenance costs.

1.3.2 B&H Use of Data

B&H has used the following information in its determination of the proportion of fixed and variable maintenance costs.

- Working Paper 2 of QCA Draft Decision, 2000
- Inspection of the network by hi-rail machine and discussions with field staff
- The proposed program of works submitted in Queensland Rail's 2015 DAU
- The record of works performed and costs in the years 2011 to 2014 provided by Queensland Rail by way of an Information Request in 2015.
- Its own experience

1.4 Comparison of the B&H and Queensland Rail Categorisation

An attempt by any party to compare the B&H assessment and the Queensland Rail assessment of the quantum of fixed and variable components of maintenance cost is not possible.

This is because the B&H assessment was performed in the context of the capacity of the West Moreton System and the Queensland Rail assessment was performed on the basis of hypothetical "minimal" scenario to compile one component of their categorisation which dominates the other components. Amongst other things, a "minimal" scenario should identify a different configuration.

1.5 Context of the Analyses

Queensland Rail has chosen to regard all Common Costs of their categorisation, which were derived for a "minimal" traffic scenario, as fixed costs. Consequently, there will be a heavy bias to the Queensland Rail fixed cost category. However the Queensland Rail term "fixed cost" has a different meaning than in the QCA analysis because the QCA analysis only considered this term in the context of the West Moreton capacity for the purpose of the Regulatory Period and not for a hypothetical situation of so called "minimal" traffic that attracts Common Cost status by Queensland Rail.

In any event our view is that the Common Costs estimated are bloated.

In addition the QCA analysis only considered the categorisation in the context of the actual configuration and condition of the railway. Queensland Rail chose to use data from other railways to create a relationship between tonnage and fixed costs.

2 QUEENSLAND RAIL'S CALCULATION

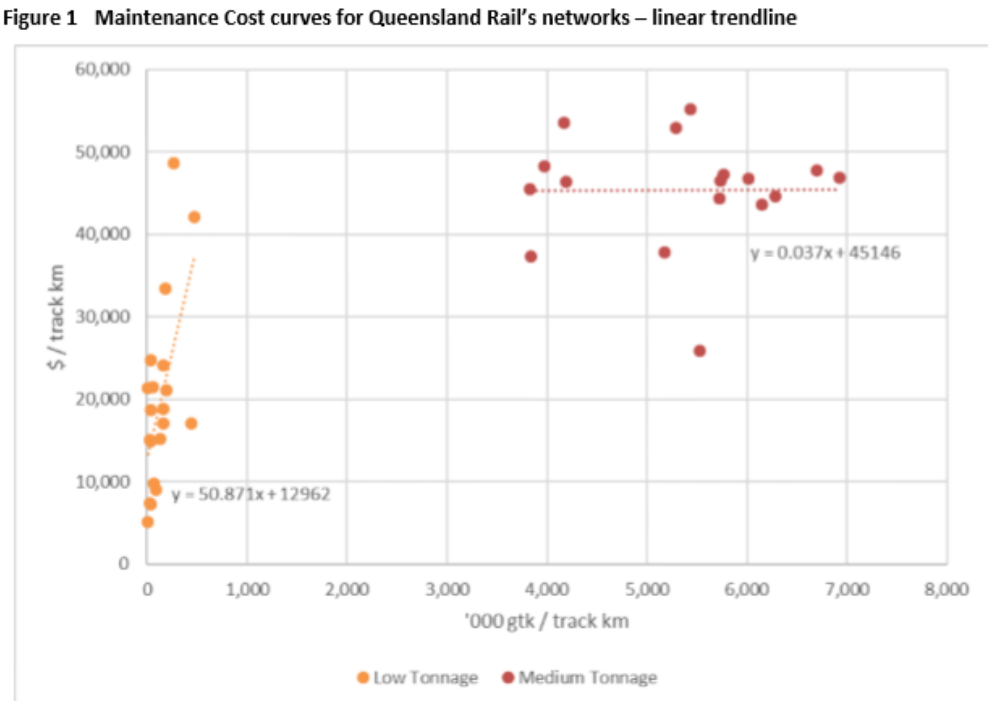
2.1 Derivation of Relationship

Queensland Rail have sought to construct a relationship between the use or tonnage on a network and the fixed and variable components of the network. To do this Queensland Rail have used historical costs of various rail lines in their portfolio that have different usage and different historical costs. Queensland Rail do not identify exactly which historical costs have been used.

Although it is not material to this critique of Queensland Rail's approach, because of other fundamental flaws, the composition of the historical costs is important because fluctuations occur depending on particular activities from period to period, such as timber resleepering.

In Queensland Rail's Figure 1, repeated here as Figure 2, the various dots represent lines or line segments in their total state-wide network with cost of maintenance plotted against tonnage.

Figure 2 Copy of Queensland Rail's Figure 1

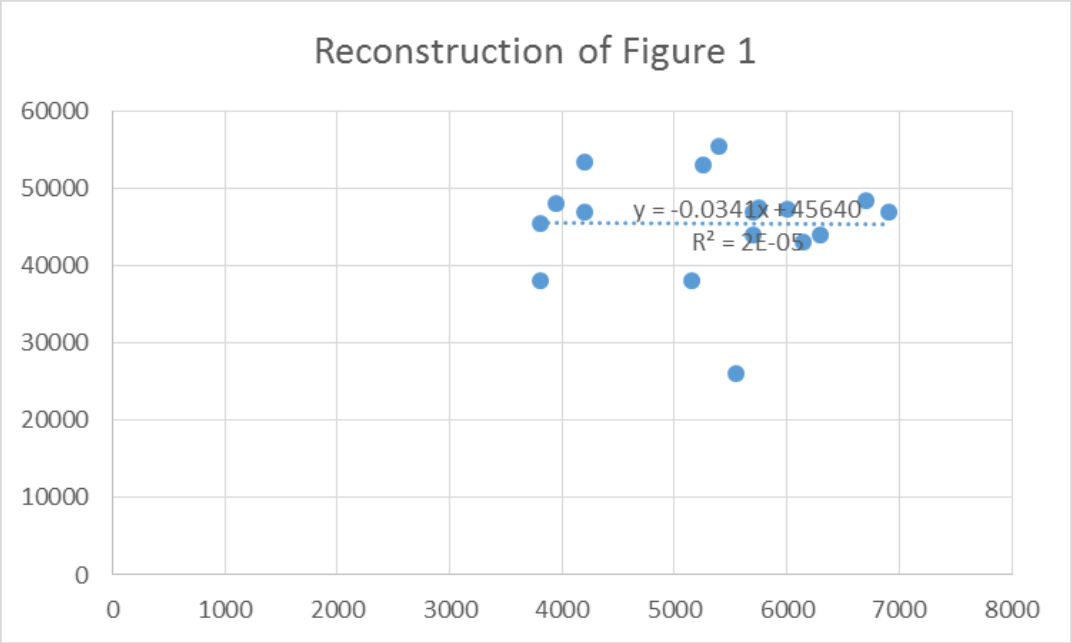


Queensland Rail does not reveal which lines or segments the dots represent but most if not all of the dots are not the West Moreton system. Thus, these are lines or segments that do not have the same configuration and not the same condition as the West Moreton System.

In Figure 3 we have reconstructed Queensland Rail's Figure 1 for the tonnage range most likely to be relevant to West Moreton and included the statistical coefficient of determination which is a measure of the confidence with which a relationship between the two parameters exist. This is represented by the symbol "R squared". This is shown as 0.00002.

An R squared of 1 indicates complete confidence in the relationship.

Figure 3 Reconstruction of Queensland Rail's Figure 1



There is no statistical confidence that there is any relation between the variables.

An F-test is a better test for testing determinacy. The result of the F-test is 4.13E-10. This is an exceptionally low value which means there is no apparent relationship. This is also the result using the Student's t-test of confidence.

2.2 Common Cost Estimate

In Section 3.2 Page 19 of the Queensland Rail Comments Paper it is said:

> "Common cost budget: Queensland Rail has calculated an alternate indicative budget based on the assumption that maintenance need only be completed to facilitate the continual availability of the network to a minimal amount of regular traffic."

We note this budget is approximately (average) 57.3% of the total budget. With a large proportion of the network in concrete or steel sleepers and heavy rail on the most curved sections this is a very high price to pay for "minimal" traffic.

Minimal traffic would not require the full application of ballast undercutting, because high ballast would not be so much of a problem or would be ameliorated because the track would not have to be as stable as for a fully utilised network. In those areas for example, if track stability was thought to be a problem then for a minimal service a speed restriction could be applied in the summer months. Although the signalling system would be vastly different the effect on the maintenance activities would be to reduce the urgency of repair vis a vis call outs and emergency work. The mechanised resleepering scope would be moderated for "minimal" traffic as the loading and stresses on the timber fastenings would be lower. Since a portion of steel bridge repairs and concrete bridge repairs is fatigue tonnage related, a line with "minimal" traffic will have a reduced need for this activity.

We therefore conclude that the "Common cost budget" compiled by Queensland Rail is bloated because it relies on inflated estimates in their current budget and the allocation to Common Costs is high in some categories.

2.3 Queensland Rail's Methodology

Reference to Table 2 Page 20 of Queensland Rail's Comments Paper, the methodology is stated as:

> "Coal Fixed Costs
>
> - first, excluding those costs that have been flagged as variable with tonnage in the indicative maintenance budget provided above (Table 2); and
> - then, where the resulting fixed cost estimate for the whole network (as submitted to the QCA) is higher than the bottom up common cost maintenance estimate, this is treated as a coal fixed cost."

Costs provided in Table 2 have no flag showing which costs are variable and Attachment 1 shows allocations to fixed and variable components without explanation. The "coal fixed" costs are identified but with no criteria.

The fixed cost estimate for the whole network has not been submitted to the QCA and it has no relevance to the bloated bottom up Common Cost maintenance estimate because variable cost components of the Common Cost have not been identified. All Common Costs are presumed to be fixed which clearly they are not if they include full allocations of inspections which are partially dependent on traffic levels and drainage and earthworks/drainage which can also be ameliorated for lower tasks. In any event Queensland Rail, Synergies or EI have offered no explanation of the split to variable except as a remainder after allocations to Common Costs which have been categorised as fixed, and Coal Fixed.

2.4 Standards That Drive Costs

Engineering standards have a significant role in driving maintenance cost especially if the maintenance is a quasi-upgrade and the standard is being met for the first time.

However, the application of standards is not legally binding and is a choice made by an organisation for various reasons. The use of sleeper plates for timber sleepers is a case in point. The reason standards are not legally mandatory is because they are applied in context. Sometimes standards are not altered when circumstances change and the application of the standard is wasteful or indeed the non-application of the standard may be inappropriate.

The majority of the maintenance and engineering standards for the entire section Rosewood to Miles is driven by the passenger train. The evidence of this is the rated speed for the railway which is pitched at the passenger train and which drives the engineering standards. The axle load shows no differentiation between non-coal and coal tasks because the locomotives are common to all traffics and the axle load of the grain trains are the same as coal. Axle load and speed are primary drivers of engineering standards.

Queensland Rail's focus on the coal train is misdirected because, for example, the timetabled speed for the coal train between Columboola to Toowoomba is 25kmph. But the rated line speed is 80 kmph so the standard is oriented toward the fastest train, particularly one with passengers.

Therefore there is ample reason to believe that the characteristics of the coal task has, at best, moderate impact on the way the network is managed for maintenance and capital expenditure notwithstanding the effect of volume.

Thus, in respect to fixed and variable costs, the context of any determination of categorisation of fixed or variable must have a similar context to the line under analysis and the appropriate use of standards. The analysis should not attempt to utilise other lines which have somewhat diverse situations.

3 RECALCULATION OF FIXED AND VARIABLE COMPONENTS

3.1 Method

Following a review of Queensland Rail's comments in its post-Draft submissions, new maintenance estimates have been compiled by B&H and the detailed rationale for the new estimates is shown in Supplementary Report Part 1. Some maintenance cost items have been adjusted and the fixed and variable components have again been estimated and shown in Table 1.

An estimate is provided for a scenario where all paths estimated by Queensland Rail that are possible are consumed, being 112 return paths per week.

The 112 path scenario equates to a pro-rata scaling of tonnage, since the fixed and variable components have been estimated for a tonnage profile, not a path profile.

The ratio of fixed and variable components change slightly as the tonnage increases.

3.2 Summary

From Table 1, the result of the calculations shows that:

At the tonnage associated with 112 paths the fixed component of maintenance costs amounts to 57.3%

Table 1 Post-Draft Fixed and Variable Components

	% Fixed 112 Path	FY16		FY17		FY18		FY19		FY20	
	B&H Estimate	B&H Estimate '$000	Proportion '$000 (112)	B&H Estimate '$000	Proportion '$000 (112)	B&H Estimate '$000	Proportion '$000 (112)	B&H Estimate '$000	Proportion '$000 (112)	B&H Estimate '$000	Proportion '$000 (112)
Structures and Civil	75%	3,167	2,375	3,829	2,872	4,032	3,024	3,724	2,793	2,828	2,121
Ballast Undercutting		0	0	0	0	0	0	0	0	0	0
Earthworks	95%	15	14	150	143	150	143	100	95	100	95
Minor Yard Maintenance	50%	50	25	50	25	50	25	50	25	50	25
Rail Joint Management	80%	1,641	1,313	1,520	1,216	1,260	1,008	1,050	840	1,050	840
Rail renewal	50%	700	350	700	350	700	350	700	350	700	350
Turnout maintenance	30%	150	45	150	45	150	45	150	45	150	45
Track reconditioning & removal	10%	0	0	0	0	0	0	0	0	0	0
Mechanised resleepering	70%	13,249	9,274	0	0	0	0	0	0	0	0
Monument Signage	70%	357	250	360	252	60	42	60	42	60	42
Maintenance Ballast	20%	600	120	600	120	550	110	630	126	620	124
Sleeper Management	40%	375	150	225	90	360	144	540	216	1,080	432
Fire & Veg Management	85%	1,391	1,182	1,400	1,190	1,400	1,190	1,400	1,190	1,400	1,190
Rail Stress Adjustment	30%	630	189	630	189	630	189	630	189	630	189
Track Inspections	80%	781	625	785	628	785	628	785	628	785	628
Track Cleanup	0%	0	0	0	0	0	0	0	0	0	0
Rail Lubrication	50%	256	128	260	130	260	130	260	130	260	130
Top & Line Spot Resurfacing	20%	1,372	274	1,370	274	1,370	274	1,370	274	1,370	274
Rail Repair	50%	1,548	774	1,250	625	1,150	575	1,080	540	1,080	540
Track maintenance(subtotal)											
Resurfacing (incl turnout)	20%	2,500	500	2,590	518	2,340	468	2,940	588	2,890	578
Rail Grinding	5%	781	39	482	24	829	41	496	25	738	37
Track monitoring	70%	415	291	416	291	416	291	416	291	416	291
Plant maintenance		0	0	0	0	0	0	0	0	0	0
TRACK AND CIVIL TOTAL		29,978	0	16,767	0	16,492	0	16,381	0	16,207	0
FACILITIES Total	50%	150	75	150	75	150	75	150	75	150	75
Telecommunications	90%	108	97	114	103	114	103	114	103	114	103
Signal MAINTENANCE	80%	1,873	1,498	1,891	1,513	1,878	1,502	1,866	1,493	1,853	1,482
SIGNALLING Total		1,981	0	2,005	0	1,992	0	1,979	0	1,966	0
GENERAL Total	70%	1,180	826	1,175	823	1,175	823	1,175	823	1,175	823
GRAND TOTAL		33,289	20,415	20,097	11,494	19,809	11,180	19,685	10,880	19,498	10,414
Weight Average per Year			61.3%		57.2%		56.4%		55.3%		53.4%
										Weighted Average of Regulatory Period	57.3%

4 SUMMARY

The fundamental flaws in Queensland Rail's Assessment are:

- The use of unrelated lines or line segments from which to derive a relationship between tonnage and fixed to variable maintenance cost categories.
- The use of Queensland Rail maintenance cost estimates to derive a Common Cost
- The allocation of all Common Costs to the fixed category of maintenance costs
- The use of Capital Costs in their discussion

A modified version of Table 1 shown in the B&H Review (September 2015) has been produced to show amended maintenance estimates since the Draft Decision and a "book end" value recognising a scenario of full use of the network.

ANNEX 1 - Martin Baggott Curriculum Vitae

Profession:	**Railway Manager**
Qualifications:	• Bachelor of Engineering (Civil), University of NSW, 1973 • Master of Engineering Science, University of NSW, 1976 • Diploma, Company Directors Course, University of New England, 1988 • AMP, Mt Eliza Australian Administrative Staff College • FIEAust, CPEng, NPER

Martin's 42 years' experience spans track infrastructure, railway operations and commercial feasibility. He has successfully managed train operations, introduced new train services, electrification and enhanced network configuration. He has consulted to most Australian railways and Access Regulators in matters associated with asset valuations, operations optimisation, network capital and maintenance.

Relevant Experience

- Queensland Competition Authority
    - QR/Aurizon UT1, UT2, UT3, GAPE and West Moreton Systems' maintenance and capital requirements, operations cost and capex verification assignments 1999 to 2016
- Essential Services Commission of Victoria
    - Capital Needs Assessment and Maintenance Optimisation for the Pacific National, MTM, VLine and VicTrack assets in Victoria, 2003 to 2010 Access Arrangements
- Economic Regulation Authority of WA & Government
    - Assessment of WestNet/Brookfield's Access Undertaking 2004
    - For the Public Transport Authority of WA, periodic audit of compliance of the Brookfield track assets in WA.
- World Bank and Asian Development Bank, 2014 to 2016
    - Assessment of maintenance and capex requirements in the railway reform processes of:
        - Vietnam
        - Myanmar
        - Serbia
        - Malaysia
        - Bosnia
        - Croatia

Key Experience Areas

- Maintenance & Operations efficiency;
- Feasibility Studies;
- Due Diligence and asset valuation
- Operational Safety;
- Value Engineering
- Asset Management;
- Chief Operations Officer, Perth;
- Past Chairman – Railway Technical Society of Australasia;
- External Tutor CQU – Rail Operations Management Course;

        - Tajikistan

- Port of Rijeka, Croatia, 2015
    - Assessment of Croatia's freight operator HZ Cargo, optimisation of operations and recommend changes
- Canadian Pacific Railway Company, 2013
    - Railway infrastructure valuation and maintenance costs for the calculation of access charges applicable in the formulation of an "Australian style" tariff for coal
- Deloitte, for the Victorian Government, 2015
    - Scope and costs for the standardisation of various lines for the Murray Basin Rail Project in Victoria
- Adelaide Rail Freight Bypass Feasibility – Australian Federal Government, 2011
    - As Project Director, Martin was responsible for coordinating and delivering the Study deliverables as well as a Team Leadership role in evaluation of the existing rail corridor. This involved the planning and design of a 150 km railway through the Adelaide Hills District in South Australia.
- Hunter Valley Rail Track Construction, Challenge Team – Australian Rail Track Corporation, 2012
    - Design Team Leader of the Challenge Team of the Alliance with John Holland to design and build railway infrastructure in the Hunter Valley for expansion of the Coal Network.
- Sydney North West Metro Design Review – Premier's Department, State Government of NSW
    - Team Leader to review the engineering and commercial arrangements associated with the Reference Design of the North West Metro.
- Alice Springs Darwin Railway Design - Australasian Railway Corporation (AARC), 2003
    - Martin was commissioned to review track design parameters in order for the Corporation to ensure it will receive value for money in its interests in the railway.

- National Competition Council, 2001
    - In relation to the Hamersley Iron Robe River Access dispute, Martin was commissioned by NCC to evaluate the costs associated with various railway construction options in relation to the servicing of the West Angelas mine in the Pilbara region of WA.
- Public Transport Authority of Western Australia, 2007
    - Perth to Mandurah Operational Readiness Review – in preparation for the railway line opening, a review was conducted of the organisation and line assets readiness for operation and maintenance response.
- Australian Rail Track Corporation (ARTC), 1999 (9 months)
    - Contracting Strategy for ARTC. In the acting position of General Manage Infrastructure during a period of outsourcing asset maintenance including inspection, maintenance and audit.
- Rail Access Corporation of NSW
    - Signals Passed at Danger Prevention Strategies. Martin was commissioned by RAC to formulate a strategy aimed at the prevention of SPAD incidents and to kick start an ongoing process of industry consultation and implementation of practical measures to prevent these incidents.
- Westrail (Western Australian Government Railways) 1985 To Jan 1997
    - Chief Operating Officer Westrail - Operation and maintenance of all assets associated with the freight business. Tasks include the day to day operation of the rail network, ongoing efficiency improvements, negotiation with clients and media representation.
    - General Manager Rail Operations - Operation of all train services on the Westrail network including freight, passenger and suburban train services. Provision of client services and the safe operation of train services.
    - Assistant Chief Civil Engineer Maintenance. Responsible for the maintenance of all track and structures on the Westrail system and any upgrading of those assets.
- Mt. Newman Mining Co (BHP Iron Ore), Port Hedland, WA 1979 To 1985
    - Superintendent Permanent Way. Responsible for asset construction and maintenance on the company's railroad which extends 420 km from Newman to Port Hedland.