Assessment of AN's UT5 Submission

B&H Strategic Services Pty Ltd

Assessment of AN UT5 BH Final.docx

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Executive Summary

Aurizon Network has made a submission to the Queensland Competition Authority (QCA) in accordance with legislation for its Access Undertaking, UT5.

As the name implies, this is the fifth Undertaking, a process begun in 1999 with UT1.

Aurizon Network (AN) is the subsidiary of the privatized entity, Aurizon, responsible for managing the Central Queensland Coal Network (CQCN) which succeeded Queensland Rail in 2010.

B&H Strategic Services has been commissioned to provide an overview of the maintenance related information gathered by QCA over an extended and UT4 & UT5 information synthesized by QCA's consultant, GHD, as well as review the historical information about AN's management of the network and all other data available publicly though the QCA website. The overview encompasses a comparison with AN's UT5 and historical submissions with the way a "well run" railway would behave.

The term "well run" is a subjective term except that various attributes can be given that provide some qualitative evidence. In particular, a "well run" railway is one that embarks upon continuous improvement brought on through economies of scale, new technology, equipment investment and growth of knowledge.

AN and its predecessors have a long history of managing the network with many existing employees having worked on the railway for their whole careers. They know the history well and are a valuable asset to optimize the network. A "well run" railway has this knowledge on hand, and is able to articulate its rationale for various decisions and change of course.

AN and its predecessors also have a long history of submitting Access Undertakings and in liaising with the QCA. A process of Request for Information was followed in the assessment by GHD and the QCA for UT5. A "well run" railway would have information on hand, particularly of the type that the QCA has been asking for over nearly two decades.

A "well run" railway makes use of its asset base strength in expansion of the task with natural economies of scale amongst the activities that are relatively fixed in their scope.

A "well run" railway invests in productive machinery that produces higher output at lower cost. A "well run railway" looks for productivity improvements and flexibility in the way it deploys its human and equipment resources.

The AN UT5 submission displays none of these attributes. It could have been written in 1999, except that the task numbers have changed. Most items appear to have been simply scaled up by a linear quantity. GHD has reported frustration with obtaining information as that reported in 2000 with the first UT1. Cost ratios have remained the same despite significant capital investments and new technology in asset management and survey.

AN's UT5 shows little measure of continuous improvement. In fact, it identifies new methods and investments, much like previous submissions, but does not reflect any of the benefits that were forecast to accrue with the original investments or with the new methods. Costs delivered to customers on a per tonne, gtk or ntk basis are stagnant. Service levels are not dropping to justify increases in expenditure. Only one item of data provides some respite from rising costs; the results for FY2017. In that year total costs were down in many maintenance categories including General Track and Signalling as well as in the larger expenditure items such as ballast

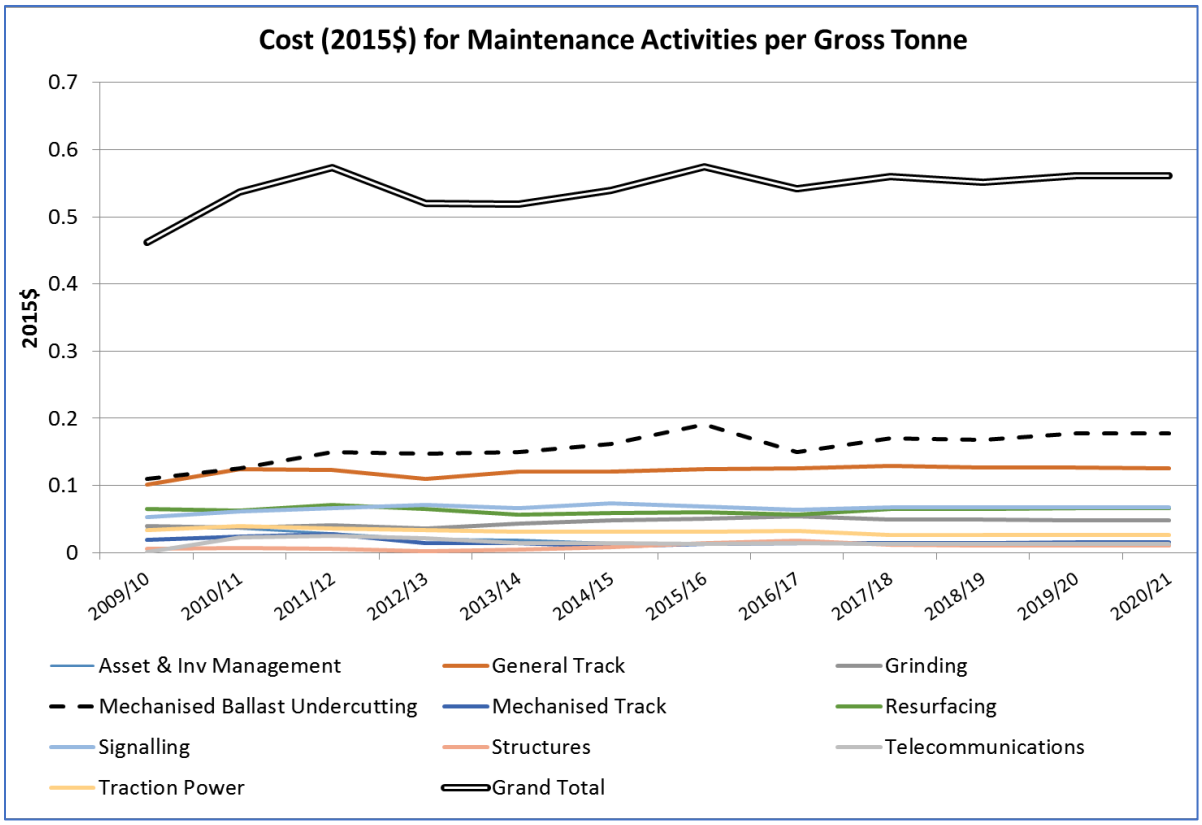
undercutting and resurfacing. These activities may have benefitted from increased track access time, but the activities that do not require possessions also show are noticeable reduction.

The FY2017 result is not reflected in the expenditure projections in the UT5 submission. Instead, it's back to the same rising total cost scenario on the same trajectory as before FY2017.

For UT5, the efficiency of CQCN maintenance services is the same as it was in UT1. There has been no improvement in efficiency over nearly 20 years, except for FY2017. The fact that GHD was not advised of the improved FY2017 cost projections during its detailed consultation process with AN raises more questions than it answers, with all of GHD's projected costs based on an average UT4 cost based on a higher Corporate Plan FY2017 planned cost base. It would appear to indicate that AN was not aware of its own cost trends in FY2017. This, in and of itself, is a strong indicator that the CQCN is not a "well run" railway. It is concerning that AN had a series of workshops with GHD in August and September 2017 and did not identify a need to revise the forecast UT5 maintenance cost base in light of the evidence emerging from FY2017.

The AN UT5 submission contains little if any projected improvement in efficiency (measured on a unit cost basis) and provides no justification for this on a category by category, service level standards, or on a system by system basis. AN's projects a reduction in productive efficiency during UT5, compared to UT3. Figure 1 is indicative of the stagnation in AN's performance.

Figure 1 Maintenance Cost by Maintenance Categories per Gross Tonne



AN's UT5 submission was written in late 2016, too early for any lessons learned in FY2017 to be directly translated into plans for the future but timely to incorporate projected improvements from labour reforms and equipment investment. This improvement was not reflected in the submission. Then in October 2017 the results of FY2017 were revealed and the results of industrial relations reform and capital investments became evident. It is clear that AN, either did not comprehend the implications of those investments or sought to blur the benefits in anticipation of retaining the upside via the regulatory lockdown of an inflated UT5 maintenance allowance. It is an insult to those reforms and productivity initiatives that the UT5 submission did not reflect the full extent of the productivity improvements that have been underway since UT3.

The FY2017 reported results reinforce GHD's key findings in its final report. GHD's cost reductions can now be a reality and amount to 20-30% reductions for some activities such as resurfacing. Importantly, the recent performance data from AN for FY2017 shows that these savings are realistic.

In FY2017 AN's direct costs were 8.3% lower than the average UT5 proposed expenditure. This bucked the underlying historical trend, resulting in a reduction in the total unit cost of maintenance per gross tonne. In the FY2017 maintenance cost report, AN quotes a reduction in tonnage, and that some activities were conducted with better management processes Surprisingly, some maintenance activities appear to be over-scoped compared to AN's own asset management logic. However, AN does not mention the impact of the new industrial agreements (EBA's) or the capital investment in the new fleet of resurfacing machines which we believe are more impactive than transitory tonnage changes.

When the unassessed portions of GHD's analysis are factored in at reductions equivalent to the other areas, AN could achieve cost reductions by locking in the reported gains of FY2017 amounting to approximately 8% and reducing costs at the rate of approximately 3% per annum over the UT5 regulatory period.

Contents

1 Background

The Queensland Competition Authority (QCA) has made available

- all public records including past AN submissions and QCA consultant reports on CQCN maintenance activities from UT1 to UT4
- the UT5 Access Undertaking (AN's Submission)[1] and its appendices, in order for an overview analysis to be conducted that will provide a framework for budgetary adjustments in QCA's assessment of UT5
- GHD final report on the UT5 submission, dated November 2017
- AN's FY2017 annual maintenance cost report, dated 31 October 2017, and, where requested, access to the UT5 data sets provided to the QCA during the UT5 information gathering process (RFI's).

AN's UT5 submission is concerning given the continually rising maintenance cost base. It is also unexpected given AN makes strong points about its

- labour market reforms, improvements in technology and UT4 investments in machinery with high productive capability
- focus on delivering an innovative asset management regime in accordance with global best practice

AN's submission is focused on engendering a "we know what we are doing" confidence, but does so without any evidence of the benefits that should have flown through to their customers in terms of productivity improvements and long-term reductions in maintenance costs.

In AN's Submission, AN do not point to any network performance deficiencies that may justify increased or stagnant maintenance scope and cost outcomes from UT4 to UT5. The network is not falling apart requiring correction, the train operators are not complaining, and the engineering indicators point to a network that is in tip-top shape.

The answers to these types of questions are not revealed in any response to the QCA's RFI's process. GHD indicates a paucity of reasoning from AN, which ultimately only justifies future annual expenditure based on past UT4 expenditure (and FY2015 expenditure in particular).

So, from a backdrop of claimed improvements, initiatives and investments, to the results showing "business as usual" and the same as in all previous Undertakings, this report considers whether the AN Submission offers its customers value for money (cost-effectiveness) and whether it is reflective of a "well run" railway[2]. This report also identifies the specific areas of the CQCN maintenance program where cost gains can be made, using key GHD recommendations on the productivity improvements available in certain maintenance categories.

Unfortunately, due to the lack of information from AN, GHD has had to make several unsubstantiated assumptions about the efficiency of AN's existing operations on the premise that GHD didn't have any information to judge otherwise. This is most prominent in GHD's review of the non-mechanised maintenance program where GHD has effectively deemed UT4 expenditure

[1] Aurizon Network Submission 2017 Draft Access Undertaking Prepared by Aurizon Network 30 November 2016

[2] A "well run" railway is defined by B&H as a railway where its owner embarks upon continuous improvement brought on through economies of scale, new technology, equipment investment and growth of knowledge.

to be efficient because it has been spent. Even though GHD has generally adopted an annual averaging approach to UT4 expenditures they still remain upward biased as GHD adopted AN's FY2017 Corporate Plan costs which were above the FY2017 reported actuals[3]. This is not the best outcome and further degrades the efforts made by Aurizon to implement labour market reforms and investments to deliver a 10% increase in labour productivity and further drive down its cost base. Aurizon's focus on driving down its cost base was again in evidence at the FY2017 AGM, where Andrew Harding indicated that transformation had delivered $129 million of benefits in FY2017 and that Aurizon was on track to deliver $380 million of benefits between FY2016 and FY2018.[4]

[3] GHD's report was finalised using the FY2017 Corporate Plan forecasts
[4] Aurizon, FY2017 AGM Transcript:9

2 Unit Cost and Scope Definition

The unit cost per gross tonne is an important consideration given that all stakeholders ultimately reference the sale price of the commodity being transported in tonnes. Gross tonnes reflect the net tonne quantum very closely because the train consists and method of operation in CQCN is uniform.

The gross tonne unit is often quoted in other benchmarks and is also reflects of the contribution to damage and contamination by empty trains with heavy locomotives and undercarriages that drop coal. The budget elements in this report have therefore focussed on this unit.

It is not unreasonable therefore to focus on the cost contribution in the gross tonne unit and to expect that over time the unit cost would show a trend downward as new technologies and investments, along with better knowledge and maturity of the total system of operation provide opportunities for reduction in cost.

In particular, if recent reforms to enterprise bargaining agreements (EBAs) and investments in new capital equipment are not reflected in cost efficiencies for the revenue providers then the AN Board business case governance process is deficient.

The UT5 Submission shows that AN has derived no benefit from the roll-out of labour reforms or from investments in the new fleet of mechanised maintenance machines. If there are no benefits from “business as usual with refinement” then other solutions must be found to halt the ever-increasing costs within AN’s maintenance business operations.

These “other solutions” are ones that have been adopted by all other Australian railways. Those solutions involve outsourcing the maintenance functions. Outsourcing’s main benefit has not been in reducing unit costs, but in better defining scope, productivity improvements and a focus on utilising labour and capital resources. Paying others to perform work requires much more owner discipline rather than delivering maintenance products based on how they were delivered the previous year. AN’s maintenance philosophy shows all the signs of being a supply driven regime. That is, labour and equipment are available and these must be used. AN should seriously consider outsourcing[5] their work to realise these benefits.

While most railways in Australia have now insourced their maintenance, they have done this after the cycle of outsourcing that occurred during the 1990’s and 2000’s. This resulted in an application of the discipline needed in outsourcing with lessons learned now being applied to an insourced maintenance product.

[5] Rail grinding is not considered by this author to be outsourced at AN at present

3 AN Maintenance Policy

3.1 Initiatives

AN is to be applauded for introducing initiatives into its maintenance regime as make the statement in their Submission[6]:

> *Aurizon Network has incorporated several additional cost saving initiatives in its maintenance cost proposal:*
>
> - *Aurizon Network has adjusted with labour market expectations and has sought efficient costs for activities and skills. The recent re-negotiation of Aurizon Network's enterprise bargaining agreements sought to remove the premiums paid for skilled personnel, in particular, telecommunications and signalling electricians, and has had the result of labour cost savings of up to $3.6 million per annum. This benefit will flow directly to Access Holders through reductions in maintenance costs within the UT5 regulatory period; and*
> - *investment in new equipment has increased Aurizon Network's mechanised production capability. Higher rates of production have the following benefits:*
>   - *a greater amount of maintenance task scope can be delivered during track possessions;*
>   - *more productive machinery means fewer shifts are required to deliver the scope, reducing the need for double-shifting and realising labour-hire savings; and*
>   - *new modern plant requires less corrective maintenance, realising labour and material cost savings.*

These would all seem to indicate lower costs to stakeholders but they are not apparent on a Gross Tonne basis.

We note that some obvious areas of labour cost reduction are identified but these represent a very small percentage of total costs. Labour reform should manifest in greater equipment utilisation, reduction in middle management bureaucracy and less disruption to train services. These savings identified should only be the tip of the iceberg.

The new Aurizon industrial agreements[7], Construction and Maintenance Enterprise Agreement 2015 and the Aurizon Staff Enterprise Agreement 2015, activated in mid-2015 provide for types of employment that were rare in the older public service agreements such as Part Time, Temporary and Casual employment. In addition, the provision of Individual Flexibility Agreements now provides mechanisms for mutually agreed arrangements. These types of employment conditions go beyond saving a few dollars in unit rate "premiums" and open up the possibilities of much higher rates of productivity and efficiency.

[6] Section 9.2.5

[7] AG2015/3420 (Construction and Maintenance), AG2014/7891 (Staff), AG2015/4553 (Train Crew and Transport). These three agreements replaced 13 older style public service type awards

3.2 Maintenance Philosophies

Appendix R2 of the AN UT5 Submission goes into some detail about the determination of the required maintenance scope and notes that the time to perform work is carefully planned on intervention levels. These are trigger circumstances explained as follows[8]:

> Intervention levels can be:
>
> - usage-based, e.g. track resurfacing is required every 50 million gross tonnes;
> - time-based (for example, turnouts require weekly visual inspections and a detailed annual inspection);
> - age-based (for example, replace 22.5 tonne axle load PSC concrete sleepers every 40 years); or
> - fix on failure.

In Appendix R3 of the Submission further explanation is given as to the derivation of scope.

The problem that this assessment and GHD's assessment has in determining whether AN is efficient in its maintenance is that there are inconsistencies in AN's stated position and its outcomes as if post-justification is required to explain anomalies.

In FY2017 more resurfacing was achieved than budgeted in UT4 despite lower tonnage levels and yet there was no sign that the network was in maintenance deficit[9]. The new labour arrangements may have been so good that more was achieved than imagined.

Time based inspections are a norm for the railway industry although modern monitoring methods are eroding that requirement. Electronic remote monitoring and automated inspections are reducing the risk and need for the strict application for every process of time related inspections.

Age-based intervention is a deceptive method of determining when to spend money. 22.5 tonne axle load sleepers will not be replaced EVERY 40 years because they are not made any more. If the condition of track is deteriorating because of earlier designs then a trigger is needed.

Missing entirely from this list is the use of condition monitoring. Ground Penetrating Radar is identified[10] as a valuable tool in determining the scope of ballast undercutting. The Track Geometry Recording Car is mentioned as a tool for helping to determine the scope of resurfacing. In fact a well-run railway in today's environment uses condition monitoring as its primary tool.

In AN's defence, a broad-brush estimate needs to be used to plan out the future program however one could expect that with all the investment and all the labour reform, a change to the rising cost trajectory would be a reasonable outcome.

3.3 Labour Costs

Aurizon has been through a significant change to the industrial relations regime. During 2015 many industrial Agreements were terminated and three new Agreements ratified by the Fair Work Commission and the Federal Court. The Full bench decision included the following:

[8] Appendix R2 of AN's UT5 Submission
[9] Advisian's CQCN Condition Based Assessment FY2016, 5 May 2017
[10] Appendix R3 of AN's UT5 Submission

Many of the provisions sought to be removed or varied are not common in most enterprise agreements. They restrict Aurizon in making business changes that it wishes to make in response to a competitive market situation. The restrictive provisions restrain Aurizon's capacity to effectively manage its labour resource needs. Aurizon has endeavoured to negotiate changes to those provisions but the lengthy and comprehensive negotiations have not led to an agreement. Many of the changes sought by Aurizon in the negotiations seem to us to be rationally based. We readily understand its desire that its now private sector business no longer be restrained by provisions that were effectively imposed through the privatisation process.

It was perhaps not until the first full year of the application of these new agreements that one could have expected to see any large change. That year was FY2017.

Co-incidentally, FY2017 is the first year where the costs appear to have a downward trajectory. The only significant cost to increase was the contracted Rail Grinding.

The effect of new labour arrangements may also not become apparent until the Aurizon Network management understand what may now be possible. After years of being constrained and that constraint becoming part of the "norm", being able to be more flexible and efficient in the deployment of labour resources will be a shock to management. They themselves will need to change as well, most likely more than the workers.

AN has been justifying "efficiency" based on a background of labour constraints that were embedded in its operations, not knowing what may have been possible and enjoying the protection of the State Government in outdated public service industrial agreements.

Now that Aurizon is properly privatised, in more than just a change of ownership, the effect of more flexible working arrangements will be a challenge for the management to make the best of the new industrial agreements. If other railways in Australia are anything to judge by, once the gates of labour flexibility were opened, then a further decade of reform eventuated.

There is no reason to think that the aberration of FY2017 will not be repeated and enhanced, and that FY2017 will become somewhat of a base for further productivity improvements in UT5.

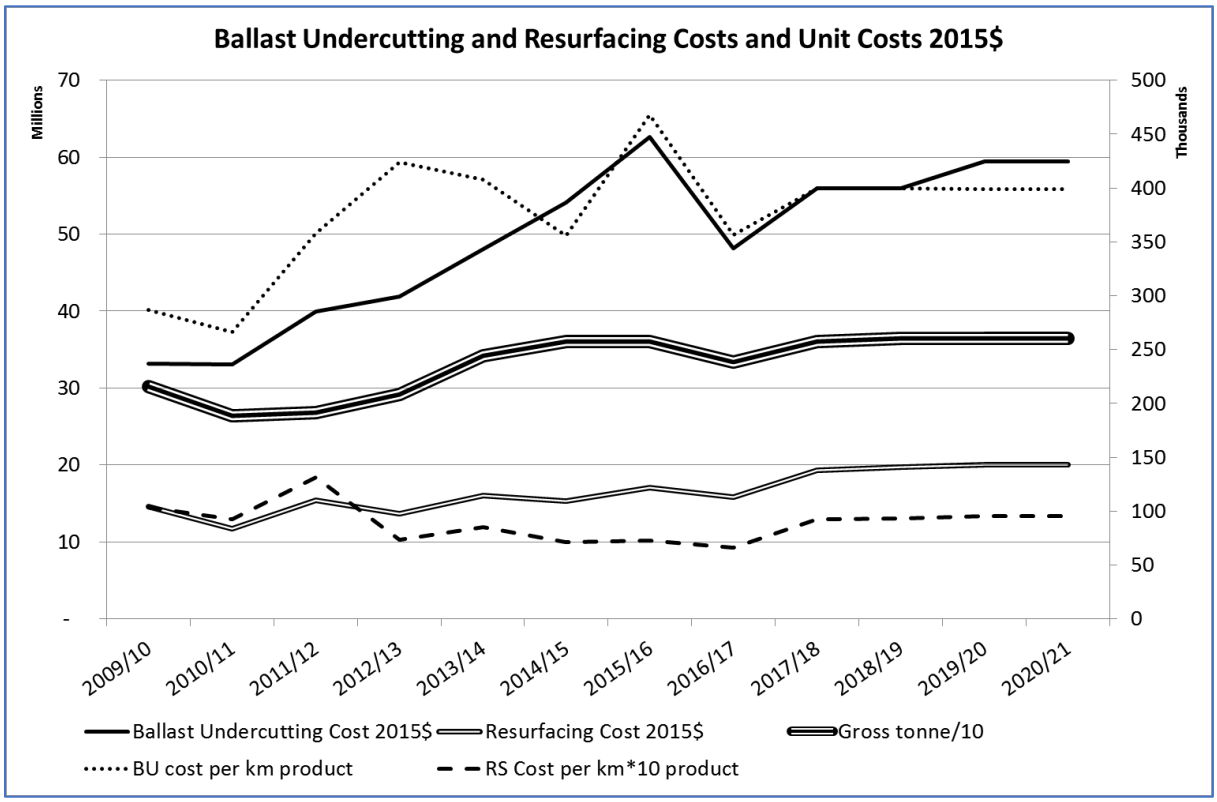
3.4 Cost Outcomes for FY2017

The FY2017 Maintenance Cost Report indicates some data that is contrary to historical trends and also contrary to AN's forward projections for UT5. These are shown in **Error! Reference source not found.** along with gross tonnes.

According to AN, in FY2017 the output products (km) of ballast undercutting and resurfacing were higher or on budget[11], due to improved track possession time and other initiatives according to AN, but the unit costs were lower and the total costs were lower than either recent historical values or projected values. Although tonnages were down there is a distinct indication of greater productivity and lower unit cost in FY2017.

[11] Notwithstanding 5km under-delivery due to cyclone Debbie

Figure 2 Costs and Unit Costs for Ballast Undercutting and Resurfacing



We also observed in Figure 6 and Figure 7 that these costs were reduced on a per gross tonne basis. This is good news but the improvements are not evident in the forward projections in the UT5 submission. The reduction in FY2017 tonnage has assisted or is coincidental with a productivity boost which has probably been assisted by the acquisition of new resurfacing machines. Cost reductions in the resurfacing category have occurred at a rate greater than the reduction in tonnage.

4 Major Maintenance Cost Categories

It is instructive to understand the AN budgeting process by taking some large and significant maintenance cost categories for focus.

All cost figures in this report refer to real (June) 2015 dollars which have been generated from AN's own reports with the application of the Maintenance Cost Index (MCI). The analysis extends from UT3 through to UT5. Lessons should also have been learned from UT1 and UT2.

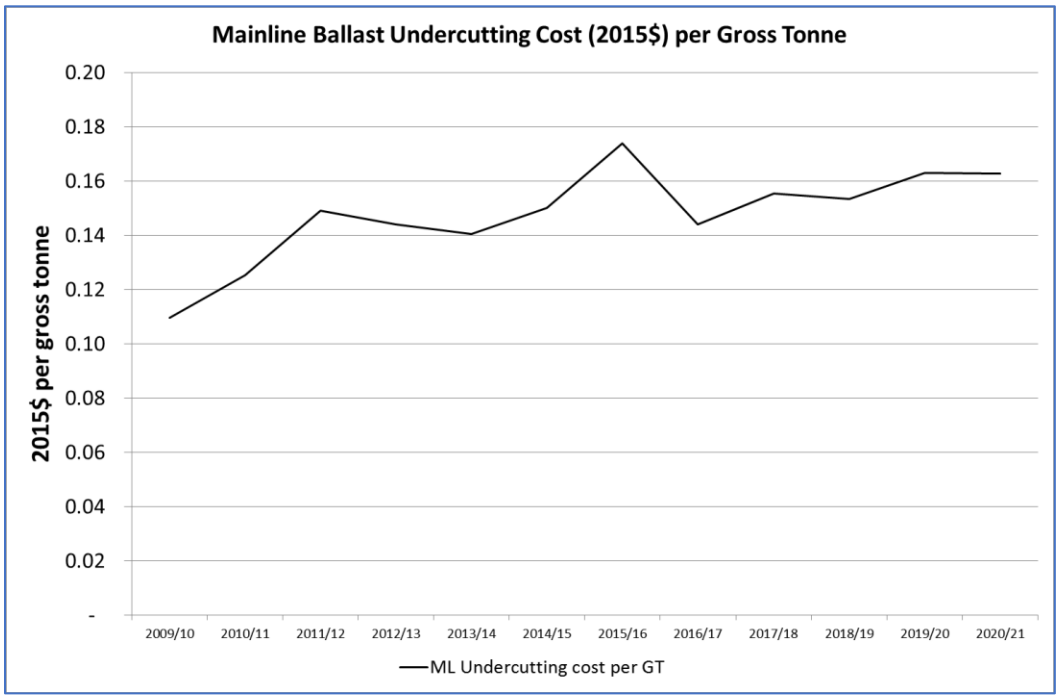
The budget elements examined represent a significant part, but not the entire suite, of UT5 maintenance products, but they nevertheless provide an insight into the larger picture.

The elements chosen represent some large activities and also some streams of cost drivers.

4.1 Ballast Undercutting (Mainline)

Ballast undercutting, sometimes called "cleaning" in this context is a very large part of the UT5 budget and has been since 1999. Figure 3 shows the recent historical costs of this activity.

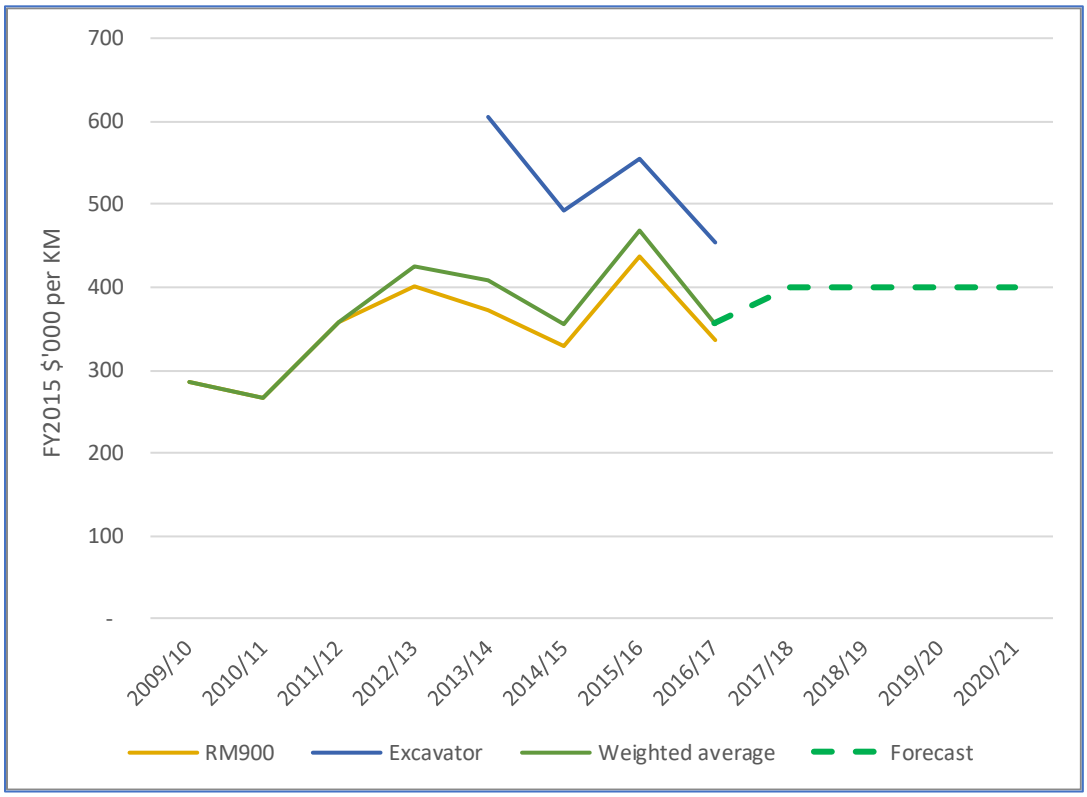
Figure 3 Mechanised Ballast Undercutting Costs



In FY2017, the total cost of mainline ballast undercutting was around $6 million lower than in FY2015. AN has reported that in their FY2017 annual maintenance cost report that undercutting efficiencies were achieved due to better track access, ballast screenability and resourcing.

However, our analysis of the FY2017 cost data shows that only 135km of scope was delivered (compared to 152km in FY2015). This means that the FY2017 average mainline ballast undercutting cost per kilometre remains consistent with the FY2015 average mainline undercutting cost (see Figure 4 below) that was assessed by GHD to be inefficient.

Figure 4 Mainline ballast undercutting cost per km



The UT5 submission appears to simply roll forward the UT4 approved scope and unit rate cost of the ballast undercutting maintenance category. This is despite the fact that AN will commission a new undercutting machine in the last two years of UT5. The investment was made by AN's Board to counter the combination of the older machine and the forecast reduced track time brought on by increased tonnages. However, AN's tonnage forecast for UT5 does not mirror the coal volumes that were used to justify the Board's investment decision. Given the movement in the underlying market dynamics since this investment decision was made, the arrival of the new machine will prove costly with the undercutting cost per gross tonne being higher in FY2020 and FY2021 than the cost per gross tonne of the older machine.[12]

Figure 6 shows the scope of work over the same period as forecast by AN. The lines are closely aligned. This means that AN perceives or has measured a relationship where ballast fouling is directly related to the number of gross tonnes. The undercutting quantities shown are actuals up to FY2017 and UT5 forward projections (FY2018-FY2021).

AN uses an undercutting intervention rate directly related to gross tonnes so it would at first seem to be a reasonable approach in the UT5 submission. However, a Ballast Review[13] found that while QCA's consultant (CMT) did indicate a requirement to undercut an average of 140km per year during FY2015- FY2017 in its review of Aurizon Network's ballast undercutting proposal for UT4 this analysis also identified significant methodological and data quality issues with the Ground

[12] At the present time, it must be concluded that AN will have purchased a machine well above its needs. Disappointingly, in 2019 and 2020 the UT5 undercutting cost per gross tonne increases.
[13] Aurizon Network Review Of Ballast Undercutting Scope And Costs 20 November 2015, CMT

Penetrating Radar (GPR) calculations. Depending on the methodology used by CMT to analyse the data a scope of between 81 KM and 175 KM per year could be justified. Since that time, and apparently not available to those responsible for developing the UT5 Submission, a further GPR survey was carried out in September 2016.

AN has been investing in GPR surveys since 2009[14] at a substantial cost (approximately $1.5m per run in UT5). It would appear that GPR has had no effect on scope volume or cost outcomes of the UT5 undercutting maintenance product.

An undercutting scope forecast of 140kms or thereabouts appears to be based on the capabilities of the machine rather than on CQCN needs. While 140kms is within the range identified by CMT in their Ballast Review, a more detailed explanation of the need for 140kms would support this large expense more adequately.

We also note that there appears to have been no benefits derived from the coal load profiling or surfactant (veneer) spraying that were introduced in 2012 to reduce the scope and cost of the ballast undercutting mechanised product. Based on the UT5 Submission, it would appear that these programs have been a waste of money. AN only provides a small window of hope for improvements in its UT5 Submission in the following paragraph:

> *The veneering program was rolled out progressively from 2012 onwards, until the majority of mines were completing this task. Veneering has proven to have benefits to the reduction of both airborne coal dust along with coal fines entering into the ballast, requiring it to be undercut earlier. As the veneering program was rolled out before the completion of the first GPR run, the exact benefits to the ballast undercutting program are difficult to quantify.*
>
> *However, as the GPR program is 100% data based, the results that will be sourced from all subsequent GPR run's, will inherently take into account the reduction in coal dust, attributable to veneering and other programs*.[15]

This statement is at variance with the assertion in AN's GPR 2016 project – Phase 2 - Civil and Electrical Engineering Close-out Report 12 May 2017, where it is stated:

> *Aurizon has engaged various external organisations to perform GPR testing on the CQCN since approximately 2000. Since 2010, Aurizon has engaged Zetica to capture and process GPR data from extensive sections of the CQCN, with this data currently captured and processed approximately every 2 years*.

Whatever the actual facts about timing of the use of GPR, the UT5 cost projections point to profiling, veneering and GPR having little, if any effect. It is as though a ballast undercutting program and all its costs are immutable regardless of whether efficiency improvements are available or not.

[14] Aurizon Network has included the cost of two GPR runs during UT5 in FY2019 and FY2021 at a cost of approximately $1.5M per run. Previous GPR runs were completed in 2012, 2014 and 2017. No evidence was provided by Aurizon Network to justify why GPR runs are now required on a two yearly schedule, rather than the approved three year schedule in UT4 and the forecast of GPR costs were based on the cost incurred by Aurizon Network in 2014. AN started experimenting with GPR in 2001

[15] Appendix R3, Description of CQCN maintenance activities

This situation leads one to conclude that labour arrangements and other supplier contracts[16] prevent cost efficiencies in this area. But evidence at an Aurizon level appears to contradict the UT5 Submission and it would be expected that once the effects of reform in the labour arrangements have been rolled out in the delivery of CQCN maintenance then some benefits and costs savings will flow through to the annual maintenance spend in UT5.

In the UT5 Submission there is no evidence that the CQCN is suffering from a maintenance deficit such that there is no need for "catch up". In AN's annual FY2017 Maintenance Cost Report, according to Advisian's "CQCN Condition Based Assessment FY2016, 5 May 2017, "…there is no evidence to support that the CQCN has deteriorated in excess of what could be reasonably expected…".

In coal fouling, tonnage is a leading indicator, since coal will be fouled by a cumulatively greater amount since the last undercutting. AN's undercutting scope appears to be very closely aligned to the tonnage of the year.

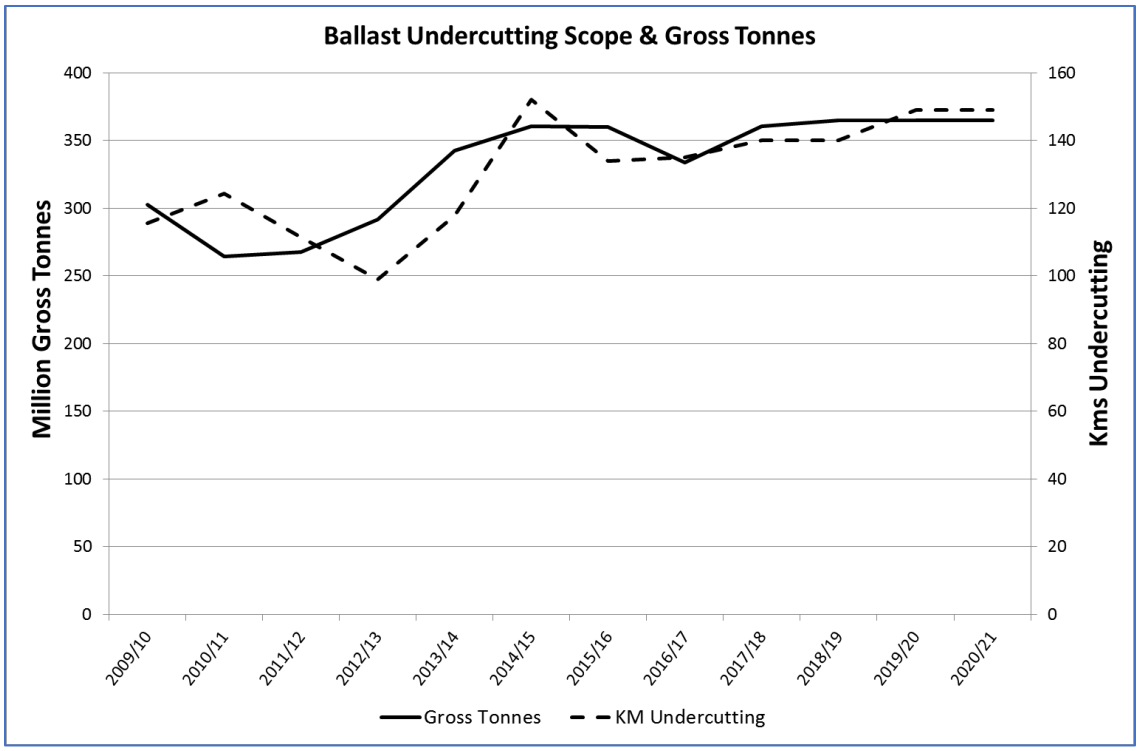
Figure 5 is an extract from AN's "Ballast Fouling Removal Project — Ballast Cleaning Fleet Tranche 2", November 2013, a document that shows how ballast cleaning requirements will be met. Prior to 2017 the requirements were met with "extra shifts", plus an "off track option", the excavator and "extra spoil wagons". AN notes that the Total Cost of Ownership (TOC) is to be lowest with the acquisition of the Hi Production Machine. It's not clear from the document how TOC minimisation is in the best interests of the stakeholders, as in lower costs per tonne of coal.

The timetable for the delivery of the new machine has been delayed for start up given in AN's UT5 Submission, of FY2020. Nevertheless, one could expect some improvement in cost per tonne in the final two years of UT5.

[16] Such as with Aurizon Operations for grinding or any other supplier

AN shows no signs of being a well-run railway if its investments have no effect and this is reflected in Figure 6 where economies of scale, investment in GPR, veneering, profiling and investment in new equipment have had no effect on the scope of undercutting work. In the last 2 years of the UT5 period the amount of undercutting increases despite static tonnage and more effective equipment.

Figure 6 Ballast Undercutting (Mainline) Scope of Work, Historical & Projected by AN



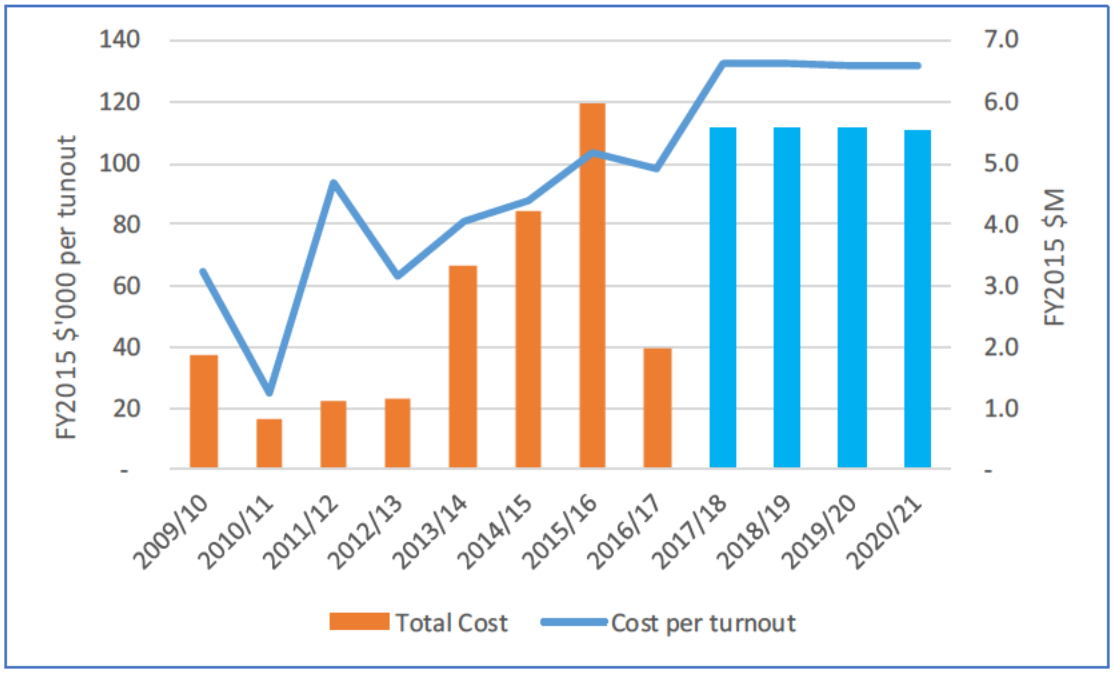
4.2 Turnout Undercutting

In contrast to mainline undercutting, turnout undercutting is outsourced to contractors. AN's FY2017 Maintenance Cost Report indicates that the full UT4 turnout undercutting scope had been delivered by mid-2017 and therefore only 20 of the planned 41 turnouts had been completed. According to AN, the contract provides "resource flexibility". Why doesn't AN adopt "resource flexibility" for its mainline undercutting?

This pattern is not evident at all in any of AN's owned and manned activities. There appears to be no "resource flexibility" in mainline ballast undercutting or mainline resurfacing.

Turnout ballast undercutting costs reduced in aggregate in FY2017 but the average cost per turnout was higher than achieved in FY2015 (see Figure 7). Aurizon's UT5 forecast assumes a significant increase in the average cost per turnout above that achieved in FY2017 and the average cost per turnout achieved over the period of UT4. Evidence from FY2017 provides no justification for the proposed increase in costs in UT5.

Figure 7 Ballast undercutting cost per turnout



4.3 Resurfacing (Mainline)

Resurfacing is the activity involving tamping machines and ballast regulators that lift the track where it has subsided and align ("line") the track where it has become out of lateral alignment. Track is best left undisturbed until it needs to be corrected but before it becomes unrecoverable and too badly out of alignment. Any resurfacing should be strictly determined by the deterioration in track geometry. The increase in FY2017 as reported by AN, in a lower tonnage year is concerning as there was no indication that a deficit had accumulated in Advisian's report.

AN has recently purchased high capacity tamping and ballast regulating machines in order to replace older equipment and to add to productivity in the face of rising tonnages. Those tonnages have not yet arrived but the capacity is present to accomplish a large amount of work.

GHD's analysis indicates that there is excess capacity and that at least one of the machines is not required. AN's UT5 submission quotes a productivity which justifies the operation of all machines but that productivity is lower than the AN Capex submission for the machines and lower than GHD's assessment of the productivity.

The historical and projected costs of mainline resurfacing are shown in Figure 8.

The unit cost of resurfacing has essentially remained the same since FY2010 and will so into the future despite the purchase of 5 new consists (tamper & ballast regulators) in 2014. It is clear that the new machinery can perform well, as AN took advantage of lower tonnages and greater track access to achieve above its target in FY2017.

Figure 8 Cost of Mainline Resurfacing per Gross Tonne Reported by AN

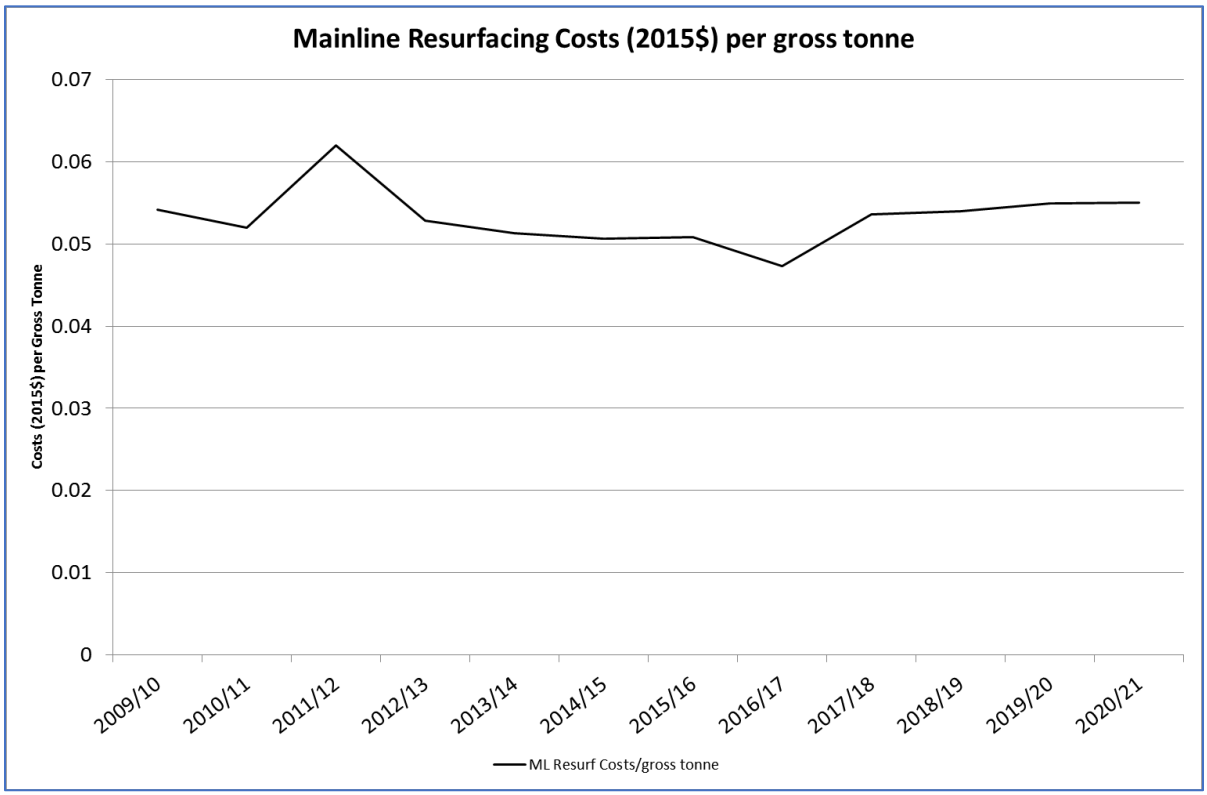


Figure 9 is part of the AN business case where stated requirements and capacity show that the machines were purchased for a large increase in tonnage. No doubt this projection was made in good faith. The purchase was made for the peak of the requirement due to occur around 2023 when further capacity would be required. The purple line indicates “Mainline Capacity Requirement TOTAL SCOPE _ Base”. The brown line is “low” and the blue line is “high”. Even in 2023 it is projected that AN would be deficient in capacity with the current purchase.

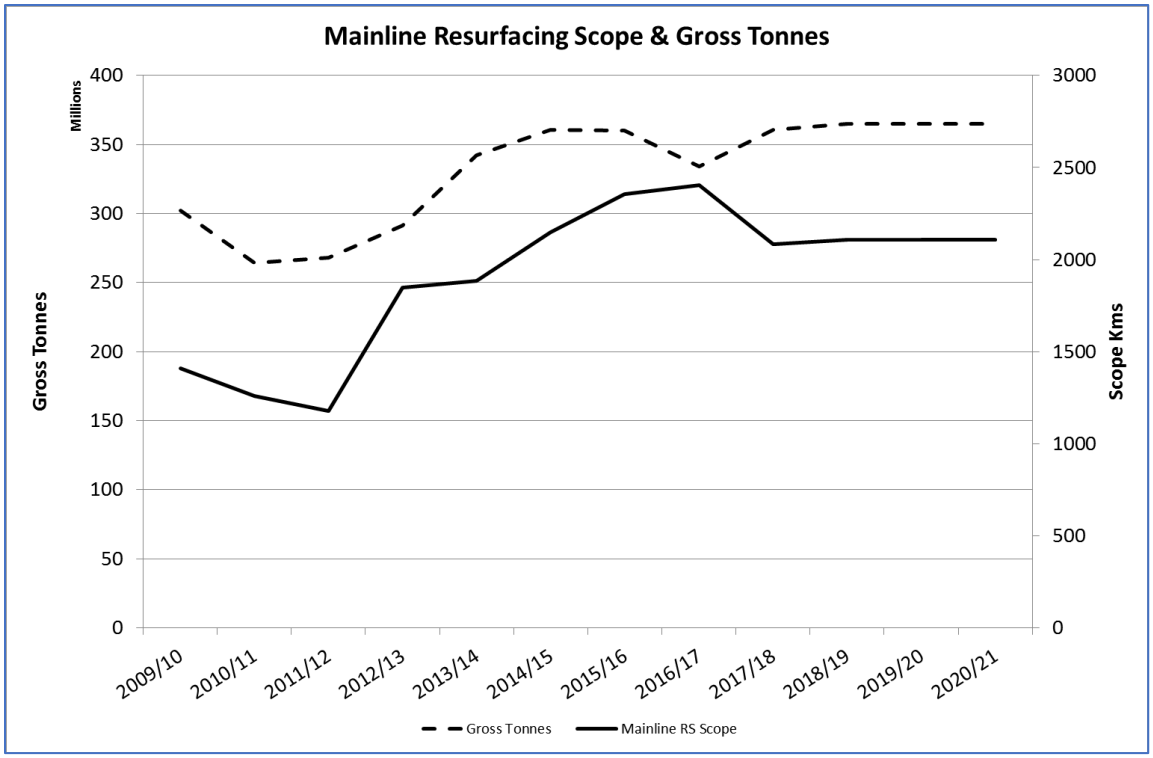
The capacity stepped to a maximum with the commissioning of the 5th new consist in 2017, and now there will be surplus capacity until at least 2021.

Surplus capacity not only means surplus (capital) machine capacity but also surplus operating capacity. Employees may still need to be employed and time based servicing would be required while the machines remained the property of, and operated by, AN.

[redacted]

In Figure 10 the scope of historical and project resurfacing is shown.

Figure 10 Scope of Mainline Resurfacing, Historical & Projected by AN



The scope of mainline resurfacing and gross tonnage shows a close relationship. AN's asset management policy indicates an intervention rate based on tonnage[17]. The projection in UT5 is below the capacity as indicated in Figure 9 by approximately 22%. This surplus was anticipated in the Aurizon "Resurfacing Plant Investment Project November 2013, Capital Expenditure Feasibility Investment Approval Request". No doubt one of the difficulties with owning equipment is that it arrives in steps, unlike the strategy with turnout ballast cleaning where AN uses "resource flexibility".

In its FY2017 Maintenance Cost Report, AN report greater track access for the undercutting activity and so presumably for resurfacing where more kms were achieved than budgeted. Achieving more work when the tonnage has decreased is an opportunity to be made use of and it could be expected that the future scope will be reduced, unless the sole reason the activity was performed because it was available to be performed or that a maintenance deficit had developed. No evidence of deficit is apparent. Lower tonnage and more production raised mainline resurfacing costs per tonne during FY2017. This should surely be an aberration in the trend but this trend shows during the projected UT5 period.

If AN's resurfacing scope is based on tonnage intervention, then the amount of resurfacing should have decreased in FY2017 given AN reported (Advisian) that there was no evidence to suggest maintenance deficit.

It is not unreasonable therefore to conclude that there are further reduced costs, building on 8% reduced cost already shown in FY2017 and further 3% per annum available during the flat tonnage period of UT5 when the full capacity of a reduced number of machines can be utilised.

4.4 Mainline Rail Grinding

Rail grinding is arguably the most important part of the maintenance mix because the wheel rail interface is where the forces emanate that have such a large impact of the other maintenance components. Get that wrong and there will be big problems in other areas.

AN appear to have done everything right in rail grinding. The introduction of one-pass grinding has given improvements in the unit cost of a finished kilometre of grinding.

Figure 11 shows the improvement in unit cost of mainline grinding per track kilometre finished. This is showing an improvement of approximately 15% over the decade.

[17] Appendix R2 of AN's UT5 Submission

On the other hand, on a gross tonne basis, Figure 12 shows that unit costs have risen. This is because more kilometres are being ground with one pass and while the unit cost on a finished pass-km basis has come down, the overall cost has risen. Grinding now occurs about every 88,000 gross tonnes whereas in 2009 it occurred every 140,000 gross tonnes[18]. Only one pass is required now to finish the grinding. There are good reasons to adopt one-pass grinding including a reduced likelihood of disrupting trains but the results are not as favourable for the owners of coal.

[18] These “tonnes” are tonnes at the port. Individual sections will experience return frequencies much higher than this ratio.

FY2017 is a surprising result for rail grinding. Track time should have been greater and production should have shown the improvements shown in undercutting and resurfacing. There was a 5.6% under variance in scope (forecast 3,874 kms: actual 3,657kms) but a $5m overspend on the UT4 “allowance”. Apparently, the terms of contract with Aurizon are not on the basis of payment of finished kms.

Unlike other maintenance activities, FY2017 rail grinding costs appear not to have benefitted from the new labour arrangements. The rail grinding contract may have not yet responded to the opportunities available from the employment agreements instituted in 2015 by Aurizon, or in the rail profile developments and strategies which are always evolving.

5 Projection for UT5

5.1 Projected Unit Rates

The observed unit costs, on a product basis and a gross tonne basis should not be regarded as an aberration. In fact, there are good reasons to expect that type of outcome.

Labour reform has taken its first steps and considerable investment made. Unit costs were lower for all categories of maintenance including those categories where possession time has little impact such as inspections.

FY2017 should therefore be taken as a benchmark base for the development of a UT5 maintenance allowance.

5.2 GHD Report

For the activities assessed[19], GHD forecast that a 16% reduction in costs is possible in the basket of maintenance activities it reviewed. This translates to an 12.5% reduction in the total UT5 forecast cost base. But GHD also did not have the benefit of hindsight in their assessment since the results for FY2017 were not yet available from AN.

Since GHD's assessment, the AN FY2017 report has shown that all maintenance categories have reported lower absolute costs than forecast by AN in UT4 and forecast by AN in their UT5 submission.

It is not unreasonable based on those results and GHD's bottom up analysis to suggest that at least a 15% reduction in costs could be achieved by AN, without any alteration to the scope, in the UT5 period.

GHD's analysis assumed "efficiency" for items not assessed by GHD, but since most items they assessed showed some improvement our recommendation is for a continued reduction on all of AN's forecast costs in the UT5 Submission, based on the same ratios of improvement being applied to all categories, locking in the 8% achieved in FY2017 and then applying a cumulative 3% per annum efficiency factor thereafter.

The acquisition of new resurfacing equipment was summarised in the AN business case[20] as:

> A new plant fleet, which will provide:
> - lower operating costs;
> - increased labour productivity;
> - improved reliability; and
> - lower parts inventory holding and logistic costs.

And the financial analysis is stated in Figure 13 as:

[19] As no data was available for a quantum assessment, GHD made qualifications indicating those not assessed as "efficient".
[20] Resurfacing Plant Investment Project November 2013

[redacted]

Given these benefits and the financials there is no doubt then that a return to AN's customers in the form of lower costs should be expected. In fact, GHD's report also suggests that one of the five machines is not required for the projected UT5 workload. Taking into account the lower projection on tonnages, this type of gain would apply to four of the machines, with the fifth machine mothballed to reduce operational (but not capital) expenses.

While ballast cleaning improvements will not come quite as fast on account of the delivery timing for the new equipment, expected for FY2020 and FY2021, the business case[21] and [redacted]

[21] Ballast Fouling Removal Project — Ballast Cleaning Fleet Tranche 2 November 2013

Fortuitously, since this business case was constructed, CPI has been tracking at less than 2% in Brisbane and most other places[22] and fuel has had a negative effect on CPI of 0.64 index points meaning that fuel has been tracking at under CPI during that period.

With the start of the new industrial arrangements[23] a 4% increment was scheduled for the first 24 months for all employees, no doubt a sweetener to get the new arrangements in place. But with all Wages Price Index across Australia and in Queensland operating at less than 2%, the sweeteners are unlikely to be sustained. In fact, it would be inefficient for AN to sustain those types of increase in the face of wider industry increases.

Given the above economic benefits, there is some evidence that AN's UT4 investment in a new fleet of mechanised maintenance equipment will be higher than the QCA's regulated WACC. On this basis, it is reasonable to presume that these additional investment benefits will manifest themselves in future cost savings in the UT5 CQCN maintenance program.

[22] ABS series A2325817T
[23] Aurizon's Construction & Maintenance Agreement ae415356

5.3 Savings in FY2017

The total cost of FY2017 maintenance (identified in FY2015 dollars) was 8.3% lower than AN's forecast UT5 annual average cost. Even when an adjustment is made to reflect the lower than forecast coal volumes for FY2017, it is still apparent that there has been a 3% reduction in the FY2017 maintenance per gross tonne rate. This is a very positive trend.

5.4 Target Savings

8.3% has already been achieved in savings, albeit at a lower tonnage volume. If AN locked in this result then much of the transition will have already occurred.

For the remaining period, AN could achieve further reductions by holding nominal spend below MCI by 0.9%. That is, the projected MCI is 2.1% and to forego that increment and further reduce by 0.9% per annum. A real decline from 3% per year from the FY2017 cost base.

We consider there is every possibility that AN can meet this cost reduction in UT5 in the same way that they delivered significant cost improvements in FY2017, by:

- delivering maintenance activities consistent with efficient possession management principles (i.e. not rescheduled and interrupted) as noted by GHD,
- further rolling-out of industrial reforms for another full year,
- utilising the new resurfacing fleet of maintenance assets more efficiently

If the above is implemented then AN will be able to deliver the UT5 maintenance program less expensively than in its UT5 Submission.