PRICEWATERHOUSECOOPERS

In association with
Maunsell AECOM

Economic Regulation Authority (WA)

Review of WestNet Rail's 2009 Floor and Ceiling Costs for Certain Rail Lines

Final Report

June 2009

Disclaimer

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1 Introduction

Under Schedule 4 of the Railways (Access) Code 2000, (the Code) the Economic Regulation Authority of Western Australia (ERA) is required to approve the floor and ceiling costs for railway routes subject to, or likely to be subject to, third party access requests. The ERA has approved arrangements, as specified in WestNet Rail's (WNR) Costing Principles document, for the floor and ceiling costs to be reviewed every three years with escalation via a Consumer Price Index at intervening years.

The previous review was carried out in 2006 and included the lines

1. Grain line - Avon to Goomalling
2. Grain Line - Katanning to Tambellup
3. Grain Line - Kulin to Yilminning
4. Kwinana to Bunbury Inner Harbour
5. Forrestfield to Kalgoorlie
6. Kalgoorlie to Leonora
7. Kalgoorlie to Esperance
8. Brunswick to Premier
9. Terminal Ends

In the WNR submission to the ERA (October 2008) for access costs to apply from 1 July 2009, WNR has submitted revised costs for the above nine lines and additionally included the costs for the tenth line from:

10. Kwinana to Soundcem

1.1 Scope of Work

The scope of work agreed to in the PwC engagement letter to the ERA (25 July, 2008) and based on the brief from ERA is shown in Table 1.

Table 1: Agreed scope of works

Category	Task Description
Financial & Economic Evaluation	Review WNR's submission and supporting information.
	Verify the costing model provided in WNR's submission.
	Assess WNR's proposed Modern Equivalent Asset (MEA) assumptions for administrative/overhead costs.
	Assess the input costs submitted by WNR.
	Review all submissions received by the Authority on WNR's submission following completion of the public comment period.
Engineering Evaluation	Review WNR's submission and supporting information.
	Assess WNR's proposed engineering input cost parameters, which encompasses maintenance and capital costs.
	Review and evaluate the capital expenditure forecasts over the three year period from 1 July 2009 submitted by WNR in its submission.
	Review all submissions received by the Authority on WNR's submission following completion of the public comment period.
	Prepare an Engineering Report providing recommendations to the Authority on the input costs.
First Report to the Authority	Prepare a 1st draft for the Authority based on the information provided in WNR's submission and the public submissions and analysis by PwC and Maunsell. Incorporate feedback from the Authority on the 1st draft report and submit a final first report for public release.
Review of Draft Determination	Review draft of the Draft Determination and provide track-changes comments.
Stakeholder Consultation Time	Consider and evaluate the issues raised by stakeholders in submissions. Meetings and / or telephone consultations with stakeholders to clarify issues.
Second Report to the Authority	Review of submissions for the 2nd round of public comment.
	Refine and expand analysis in 1st report to address submission feedback & submit a 2nd report to the Authority.
Review the Authority's Final Determination	Review the draft of the Final Determination and provide track-changes comments.

This report details the sample testing of the accuracy and reasonableness of the pricing model, and provides some recommendations on changes to unit cost assumptions proposed by WNR, based on assessment of the independent supplier quotes obtained from the market.

1.2 Proposed costs

A summary of the WNR's proposed new floor and ceiling costs in aggregate for the relevant ten lines, compared to 2006 determination costs is presented in Table 2 with a line by line breakdown being provided in Table 3.

Table 2: WNR's approved 2006 and proposed 2009 ceiling costs

Summary	$
Old APM Ceiling for 2006	$223,755,935
Changes due to revised methodology	$4,584,092
New APM ceiling for 2006	$228,340,027
Revised ceiling for 2008 as per old APM	$303,816,680
Revised ceiling for 2008 as per new APM	$309,615,029
Difference	$5,798,349
Ceiling proposed for 2009	$349,923,461
Kwinana to Soundcem Ceiling	**$2,438,948**
Total proposed ceiling	**$352,362,409**
Total increase in ceiling cost over 2008 (using new APM & excluding Kwinana to Soundcem)	**13%**

Source: WNR.

Some of the main reasons for the magnitude of the increase in the ceiling costs include:

1. The commodity prices boom over much of the 2006-2008 period which resulted in sizable increases in input costs especially for steel and concrete.
2. The strength of the Western Australian economy, which has driven up the cost of labour. Specifically, the ABS Wage Price Index for WA has risen 10.7% over the period from June 2006 to June 2008.
3. Australian annual inflation levels being at the higher end (or on occasions above) the 2-3% range targeted by the Reserve Bank, which is reflected in the ABS indices used by WNR to escalate some of the components of the floor and ceiling costs. The ABS Eight Capital Cities All Groups CPI increased by 6.2% from Jun 2006 to Jun 2008. The Perth CPI over the same period rose 7.8%.
4. The escalation indexes primarily used by WNR in adjusting input costs are:

    - The Producer Price Index Number for road and bridge construction (4121) Western Australia which has increase by 15.4% between March 2006 and June 2008. This is used for escalating GRV values of bridges, surfacing costs, signs and other miscellaneous components.
    - The Producer price index for non building construction in WA has been used in escalation of cost of culverts. The index increased by 15.4% between March 2006 and June 2008.
    - The ABS Transportation Index (6401.0) has been used to escalate the transport cost between June 2006 and June 2008. The index increased by 8.2% between June 2006 and June 2008.

- Escalation factors for increase in signal equipment and labour costs obtained from various organizations in Australia, estimated at 17.5% between 2006 and 2008 is used for estimating level crossing costs.
- Escalation factors for various signalling and communication components as obtained form multiple vendors and used in estimating the costs in signalling and communication.
- The unit costs for 2009 are calculated by escalating the 2008 prices by 2.75%. This escalation factor is higher than the CPI forecast of 2% estimated by the Commonwealth Government in the Updated Economic and Fiscal Outlook for 2008-09.[1]

It must be noted that WNR has obtained prices for components prior to October 2008. Due to the changed economic environment, some of these prices are likely to undergo a downward revision. This has been validated through the lower quotes obtained for some of the key components like ballast and sleepers.

1.3 Report structure

The remainder of this report is structured in the following order:

- Section 2 will sample test the changes between old and new APM models to ascertain whether the new model calculates the ceiling costs as described in the submissions. The section also details sample tests to assess whether the WNR model assumptions and calculations are consistent and valid;
- Section 3 will summaries the views from Public Submissions and explanations in addressing the issues raised;
- Section 4 discuss the reasonableness of the prices of materials and capital items used as inputs to the calculations of floor and ceiling costs;
- Section 5 will outline the conclusions; and
- Appendix A provides a breakdown of recommended floor and ceiling costs by route section.
- Appendix B - The engineering report prepared by Maunsell.
- Appendix C provides the PwC comments on the review of Old and New APM reconciliation.

[1] http://www.budget.gov.au/2008-09/content/uefo/html/part_1.htm

2 Cost model review

As per the WNR submission, the costs for 2006 have then been escalated to the 2008 costs as per the new APM and this is further escalated to set the 2009 floor and ceiling costs. The 2009 ceiling costs are 13% more than the 2008 ceiling costs. The proposed 2009 ceiling costs for the 9 original lines (excluding Kwinana to Soundcem) is 48.6% higher than the 2006 final determination ceiling. The WNR proposed and PwC recommended costs discussed in this report relate to the 2009 prices.

Table 3: WNR's approved 2006 and proposed 2009 ceiling costs by line ($A)

Line		ERA Approved 2006 Ceiling	WNR's Proposed 2008 Ceiling- New APM	WNR's Proposed 2009 New APM Ceiling	% Increase in 2009 over 2008	% rise attributed to change in APM
1	Avon to Goomalling	$4,385,906	$5,651,024	$5,989,441	6%	0.9%
2	Katanning to Tambellup	$3,113,891	$4,315,177	$4,724,402	9%	8.2%
3	Kulin to Yilminning	$6,497,751	$8,516,505	$9,053,351	6%	3.7%
4	Kwinana to Bunbury	$25,723,536	$31,376,872	$36,057,170	15%	-0.8%
5	Brunswick to Premier	$7,729,445	$10,059,590	$11,608,900	15%	6.5%
6	Forrestfield to Kalgoorlie	$121,900,516	$164,271,186	$189,569,904	15%	2.7%
7	Kalgoorlie to Leonora	$23,217,467	$30,456,664	$32,171,074	6%	0.2%
8	Kalgoorlie to Esperance	$39,852,414	$51,845,364	$57,338,924	11%	1.0%
9	Terminal end bits	$3,111,869	$3,122,648	$3,410,293	9%	-11.2%
10	Kwinana to Soundcem	n.a.	n.a.	$2,438,948	n.a.	n.a.
Total		**$235,532,795**	**$309,615,030**	**$349,923,460***	**13%**	**1.9%**

* Note: The total figure does not include Kwinana to Soundcem ceiling

The 13% rise in ceiling costs between 2008 and 2009 proposed by WNR is due to four main factors:

- An increase in the WACC (from 6.7% to 9.77%);
- Estimated CPI escalation of 2.75%;
- The addition of some crossing loops (Burekup) and the escalated GRV; and
- Changes made to the APM methodology leading to an increase in the cost by 1.9%.

2.1 MEA Standards Assumptions used in the model

The assumptions made with regard to the current MEA for the grain and main lines have not undergone any changes since the 2007 final determination. The WNR standard for calculation of the GRV for the grain lines and main lines is summarised in Table 4 and Table 5 below. These are consistent with the final determination report released in July 2007.

Table 4: WNR proposed MEA standard for the grain lines

Grain line	Avon to Goomalling (1) and Katanning to Tambellup (2)	Kulin to Yilminning (3)
Axle Load – Freight (tonnes)	19 tal	16 tal
Rail weight (min Kg/m)	41	31 (if 31 not available, then 41 to be substituted)
Sleeper type, pattern and spacing	1:4 steel/timber "B' type 2100mm x225mm x130mm – 1320/km min	1:4 steel/timber "A" type 2100mm x225mm x115mm – 1320/km min

Grain line	Avon to Goomalling (1) and Katanning to Tambellup (2)	Kulin to Yilminning (3)
Ballast type & min depth (mm) for Continuously Welded Rail (CWR)	Metal – 150	Gravel/Metal - 150
Ballast type & min depth (mm) for Mechanically Jointed Rail	Not Applicable	Gravel/Metal - 100
Fasteners	Plated timber sleepers, elastic fasteners throughout	Plated curves <800 radius, non-elastic fasteners in timber
Formation depth (m)	1.0 (including capping layer)	1.0 (including capping layer)
Target speed maximum (kph)	80 (subject to operating requirements)	60 (subject to operating requirements)

Source: ERA October 2003 WNR Grain lines Floor & Ceiling Cost Determination.

The WNR standard for calculation of the GRV for the six main lines is summarised in Table 5. The MEA standards are as referred in the GHD report attached and there appears to be no change from the last determination except for the Kwinana to Soundcem Line which is a new line.

Table5: WNR proposed MEA standard for the main lines (excluding the terminal ends[2])

Main line	Kwinana to Bunbury (SWM) (4)	Brunswick to Premier (5)	Forrestfield to Kalgoorlie (EGR) (6)	Kalgoorlie to Leonora (7)	Kalgoorlie to Esperance (8)	Kwinana to Soundcem (9)
Axle Load Freight (tn) & Max. Speed Freight (kph) [loaded/empty]	At 21tn: 115/115 (NG) At 23tn: 80/80 (NG)	At 21tn: 50/70 (NG)	At 21tn: 115/115 (DG & SG) At 23tn: 80/80 (DG & SG)	At 21tn: 50/70 (SG)	At 23tn: 70/80 (SG)	24 tn
Max. Speed Passenger (kph)	160 (NG)	N/A	160 (SG)/100 (DG)	N/A	N/A	N/A
Assumed Ave. Formation height (m)	1.0	1.5 (Brunswick East to Worsley) 1.0 (Worsley to Hamilton & Worsley to Premier)	1.5	1.5	1.5	1.5
Rail (kg/m)	50	50	60	50	50	50
Ballast depth (mm)	250	250 (Concrete sleepers)[3] 150 (timber sleepers)[4]	300	200	250	250
Sleeper Type & number/km	Concrete/ 1,500	Concrete/1,500 Timber/1,470	Concrete/1,500	1 in 4 Steel/1,500	1 in 2 Steel/1,640	Concrete/ 1,500

Sources: ERA September 2007 WNR Floor & Ceiling Cost Determination. Kwinana to Soundcem Specifications from WNR new submissions

[2] The WNR standard for calculating the GRV for the mainline 'Terminal ends' are similar to the standard for the adjoining mainline.
[3] For the section Brunswick East to Worsley.
[4] For sections East and North of Worsley.

2.2 Tests to review the costing model

PwC undertook two main types of sample testing in reviewing the pricing model: line-specific tests and general model tests. For each of the line-specific tests that were undertaken, PwC selected a number of lines which would be covered by those tests. The guiding principle was that, although such sampling would increase the efficiency of the review, rotating the selection of the lines being tested would ensure sufficient coverage across the ten lines.

The pricing model was checked to ensure that floor and ceiling prices reported by WNR in their submission were consistent with those being calculated within the model. The model was tested to check the integrity of the workings and to ensure that the methodology used for the GRV, ceiling and floor calculations was consistent with the approved Costing Principles. The track distances for routes and route sections were checked to ensure consistency with the previous determination and the changes based on the new reconciliations as per the new APM. The review also looked at the consistency in the figures used for WACC, CPI and other assumptions as reported in the submission and as used in the model.

The route-specific tests applied to assess consistency with prior determinations included reviewing the:

- MEA standard and the actual current standards.
- Cost escalation for capital components on a sample basis.
- The uniformity and consistency in pricing model calculations.

The review of operating and overhead costs focused on assessing:

- Operating cost and overhead cost efficiency.
- The application and consistency of escalation of costs with ABS indices.
- Breakdowns for maintenance costs across the WNR network.
- Budgeted employee numbers and variations from previous determination.

Table 6 lists the line-specific tests that were undertaken and presents their outcomes.

Table 6: Outcomes of the line specific tests undertaken

Test	Grain lines			Main lines						
	1	2	3	4	5	6	7	8	9	10
Consistent use of 2006 line length as approved in ERA final determination 2006 in the WNR submission	✔	✔	✔	✔	✔	✔	✔	✔	✔	n.a.
Agree the line length data reported in the submissions and the ENR model	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Agree on the line length for calculations for floor and ceiling in 2008 as reported in the WNR and as used in the model	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Sample testing to assess whether the model has a consistent calculation process	✔	✔	✔	✔	✔	✔	✔		✔	✔
Sample testing to confirm train number and GTK information	**Figures Matched in samples tested**									

Note: Line numbers refer to those given in Table 3.

The outcomes of the general model tests are summarised in Table 7.

Table 7: Outcomes of the general tests undertaken

<table>
<tr><th>Test</th><th>Outcome</th></tr>
<tr><td>Test for GRV and Capital Cost Calculations</td><td>To check for consistency in the calculation of capital costs, the GRV and capital cost projections for 2009 was compared with the revised new APM capital costs for 2008. The % Change in capital costs is found to be mathematically correct and consistent.

<table>
<tr><th></th><th>2008 New APM $m</th><th>2009 New APM Proposed $m</th><th>% Change</th></tr>
<tr><td>GRV</td><td>2,326</td><td>2,670</td><td>14.8%</td></tr>
<tr><td>Capital Cost</td><td>240</td><td>276</td><td>14.8%</td></tr>
</table>
Note: Kwinana to Soundcem line excluded for comparison. 2008 APM figures as obtained from WNR Reconciliation sheets</td></tr>
<tr><td>Analysis of the cost drivers between 2008 & 2009</td><td>
<table>
<tr><th>$m</th><th>2006 APM Approved</th><th>2008 New APM After Escalations</th><th>2009 New APM proposed</th><th>% Change between 2008 & 2009</th></tr>
<tr><td>Overhead</td><td>16.2</td><td>17.1</td><td>15.5[5]</td><td>-9.2%</td></tr>
<tr><td>Operating</td><td>4.6</td><td>11.0</td><td>11.2</td><td>2.4%</td></tr>
<tr><td>Working Capital</td><td>5.7</td><td>11.7</td><td>13.5</td><td>14.8%</td></tr>
<tr><td>Maintenance</td><td>28.4</td><td>29.7</td><td>33.7</td><td>13.2%</td></tr>
<tr><td>Capital</td><td>168.8</td><td>240.5</td><td>276.0</td><td>14.8%</td></tr>
<tr><td>Overall</td><td>223.7</td><td>309.98</td><td>349.9</td><td>12.9%</td></tr>
</table>
Note: Kwinana to Soundcem line excluded for comparison, 2008 APM costs from additional data provided by WNR

▪ In absolute value, the overhead costs of WNR are proposed to decline by 9.2% from 2008 costs.
▪ The operating expense is proposed to be higher by 2.4% and is in line with the inflation index of 2.75 used.
▪ A bigger increase of 13-15% is seen in the capital costs due to a higher GRV. But this is in line with the increase in GRV value by 14.8% between 2008 and 2009 proposed values.
▪ The higher GRV also leads to increased working capital expenditure by 14.8% as the working capital calculation is Working Capital = (Route Segment Annuity) /2 X WACC.

<table>
<tr><th>Cost Components</th><th>2006 Approved</th><th>2008 New APM</th><th>2009 Proposed</th></tr>
<tr><td>Overhead</td><td>7.3%</td><td>5.5%</td><td>4.4%</td></tr>
<tr><td>Operating</td><td>2.1%</td><td>3.5%</td><td>3.2%</td></tr>
<tr><td>Working Capital</td><td>2.5%</td><td>3.8%</td><td>3.9%</td></tr>
<tr><td>Maintenance</td><td>12.7%</td><td>9.6%</td><td>9.6%</td></tr>
<tr><td>Capital</td><td>75.5%</td><td>77.6%</td><td>78.9%</td></tr>
<tr><td>Overall</td><td>100.0%</td><td>100.0%</td><td>100.0%</td></tr>
</table>
On an overall cost basis , an analysis of the various components of the ceiling costs reveal that the contribution of overhead expenditure to total ceiling costs is declining on a relative basis. Due to the increased unit prices WNR has an increased GRV which results in increased annuity and is the biggest contributor to the costs in absolute terms. A more rational unit pricing inputs as discussed in the later sections would lead to a lower ceiling cost.</td></tr>
</table>

[5] The WNR model shows a total overhead cost of $15.5m against the figure of $17.9m as submitted in section 4.22 of the submission

Employee numbers and functional distribution

As per the submissions, WNR's manpower budget is 183 employees for 2008 against the 194 employees as per the 2006 submission. While the staff involved in Train Control and regional perway management has increased, the number of employees in the corporate functions has been reduced as per the 2008 WNR budget.

The employee numbers projections by WNR appear reasonable.

Employees and functional distribution		
	Budget 2006*	**Budget 2008**
Total no of Employees	**194**	**183**
Functional Distribution		
Corporate	12%	4%
Head Office Infrastructure Mgmt	1%	5%
Infrastructure Mgmt	2%	1%
Network Access Mgmt	5%	3%
Projects	3%	3%
Regional Perway Management	19%	22%
Regional Signal Maintenance	29%	23%
Signal & Comms	6%	7%
Standards & Compliance	2%	3%
Train Control	21%	28%
	100%	100%

* As per 2006 review

Agree the escalation of costs to ABS indices

For unit costs where WNR did not have recent market price information for a large scale order, WNR generally proposed escalation by an ABS Index (e.g. the Producer Price Index: Road and Bridge Construction Costs for WA). This is an appropriate indicator for cost escalation in certain components like roads, bridges, signs etc and the same index has been used in the 2006 determination and therefore is a consistent measure. An error was noted in the use of Road & Bridges/Non building construction index. While the GHD report escalated prices based on escalation factor between March 2006 and June 2008, WNR in the submissions have reported to have escalated prices between June 2006 and June 2008. This issue needs to be clarified with WNR.

Index	ABS Escalation factor for June 2008 to June 2008	Escalation factor for June 2006 to June 2008 applied by WNR	WNR Escalation factor for June 2008 to June 2009 (WA Treasury)	Escalation factor applied by WNR between June 2006 and June 2009	Consistency Check
Perth All Group CPI Index	7.80%	7.80%	2.75%	10.73%	Mathematically Correct
ABS Road and Bridge Construction Index	12%	15.40%	2.75%	18.60%	WNR has considered the escalation factor between March 2006 and June 2008 (15.4%) in place of the escalation factor between June 2006 and June 2008 (12%). The actual escalation factor for 2006 June to 2009 June to be applied is 15.1%.
ABS Transportation Index	8.20%	8.20%	2.75%	11.20%	Correct
ABS Non Building Construction and Road and Bridge Construction	12%	15.40%	2.75%	18.60%	WNR has considered the escalation factor between March 2006 and June 2008 (15.4%) in place of the escalation factor between June 2006 and June 2008 (12%). The actual escalation factor for 2006 June to 2009 June would be 15.1% if all escalation is considered between June 2006 and June 2009 as detailed to in the WNR report.

Unit price escalation of 2.75% to reflect the 2009 costs	WNR$ has used the Western Australian Treasury estimated CPI for 2009-10 of 3.5% as the basis of escalation of 2008 prices to 2009. This escalation factor is higher than the CPI forecast of 2% estimated by the Commonwealth Government for 2008-09.[6] However, the ERA has advised that the appropriate escalation factor to use would be 1.50%, the forecast by Reserve Bank of Australia for year ending June 2009. Therefore the PwC recommended costs for 2009 are based on an escalation factor of 1.50 % against the 2.75% proposed by WNR.
Overhead, Operating and Network cost escalations for 2009	The Perth All Groups CPI was used for the June 06 to June 08 periods was 7.8%. For the 2008/09 period, a projected escalation of 2.75% has been applied and this is consistent with the description in the report. In PwC's opinion the more appropriate escalation factor is the Eight City Weighted Average CPI. This is 6.2% for the period from June 2006 to June 2008. The appropriate escalation factor to use for 2009 prices would be 1.50% as advised by the ERA. Therefore the PwC recommended costs for 2009 are based on an escalation factor of 1.50% against the 2.75% proposed by WNR.
WACC Used	Approved value of WACC is as per the WACC determined by ERA in February 2009 and is 8.63% .This has been used to calculate the 2009 ceiling costs.
MEA compliance	PwC has reviewed the new APM input assumptions for consistency with the approved MEA and no inconsistency was identified. For Kwinana to Soundcem, the MEA is yet to be approved by ERA.
Economic Lives of Assets Used	The samples tests found that the approved Economic Life values defined in the 2006 final determination has been applied in the new 2008 APM.

[6] http://www.budget.gov.au/2008-09/content/uefo/html/part_1.htm

<table>
<tr><td>Remoteness factor</td><td>Sample testing of Remoteness Factor values have been found to be the same as approved in the 2006 final determination.</td></tr>
<tr><td>Network Management Costs</td><td>
<table>
<tr><th colspan="4">Network management Costs</th></tr>
<tr><th></th><th>Actual July-Dec 08</th><th>Prorated full year estimate for 2008-09</th><th>As per 2009 APM Projection</th></tr>
<tr><td>Train control costs</td><td>$2,594,022</td><td>$5,188,043</td><td>$1,263,432</td></tr>
<tr><td>Access management costs</td><td>$1,397,304</td><td>$2,794,608</td><td>$3,847,287</td></tr>
<tr><td>Total</td><td>$3,991,326</td><td>$7,982,651</td><td>$5,110,719</td></tr>
</table>

The WNR actual network management costs incurred were approximately $3.99m on network management for the six months from July to Dec 2008. The 2009 APM cost of $5.11m is 36% lower than actual expenses (on a pro-rata basis) and consequently does not appear to be overstated.</td></tr>
</table>

3 Public submissions

3.1 Submissions on WNR Submission (October 2008)

As part of the public consultation process, ERA received one submission from BHP Billiton Worsley Alumina in December 2008. In response to this submission, WNR submitted a response to ERA in January 2009. All submissions to this review are available on the ERA web site. (www.era.wa.gov.au). The issues are summarised below.

Table 8: Responses to issues highlighted in public submission

Issue	Analysis & Conclusion
Issue of meeting the Modern Equivalent Assets Standards	The previous definition of MEA was developed by the ERA in 2003 and the submission advocates that MEA specifications might need to be refined and the assets under review need to be examined to ensure that they meet the MEA specified standards. In the 2003 determination, the ERA committed to monitoring of the service level through key performance indicators as per ERA's Costing Principles. The 2003 Determination also stated that the MEA standards would be revised if it was found that WNR failed to provide the expected standards and service. The current submission by BHP Worsley Alumna proposes that the ERA examine the progress of upgrading of culverts and bridges and revise the MEA standard downwards if these works were yet to be completed. As stated in the 2006 review, it was not the intention of the ceiling price calculation within the WA Regime to require the network owner to provide a completely MEA compliant network. MEA is a theoretical concept to establish a value for assets if they were built today and is not intended as an indicator for asset upgrades. However, it may be commercially sensible for the network owner to progressively implement components of the MEA specification (e.g. replacing timber sleepers with concrete) over a nominated timeframe. The intention of the MEA was to facilitate the setting of the absolute upper limit of prices using a simplifying set of modern construction assumptions, with prices to be negotiated to appropriate levels below the ceiling to reflect the standard of the infrastructure concerned. This approach: • reduces regulatory costs by simplifying and streamlining ceiling price calculations, • provides some potential to pass onto to customers gains from technological innovation (e.g. centralised train control); • precludes inefficient outcomes which could require the network owner to replace otherwise fitfor- purpose assets prior to their life expiry (e.g. timber bridges or lower height formations); whilst protecting access seekers from abuse of monopoly power by containing the upper limit of prices to the efficient cost levels which would prevail if the network was totally replaced. WNR during the 2003 Determination provided SWM stakeholders with summary level capital works planning documents which outlined a series of sleeper and ballast upgrades to move closer to the MEA for most components. A supplementary submission to this 2006 review by WNR stated that it has completed 55% of the SWM upgrade for concrete sleepers and that the remaining 76km of timber sleeper would be targeted for upgrading to concrete in 2008/09. In the current review, WNR, in the response to public submissions by BHP Billiton Worsley Alumina has submitted that the project to install concrete sleepers and replace turnouts on 75 km of track from Pinjara to Brunswick Junction is 40% complete and is expected to be completed by 30 June 2009.

Issue	Analysis & Conclusion
Gross Replacement Value	In the submissions Worsley Alumina raises the concerns that the current methodology of reviewing unit prices to set ceiling prices is sub-optimal due to the following reasons: • Several of the 2006 prices were indexed upwards from 2002/03 prices, and to again index the 2006 prices may result in significant deviations from the actual current replacement unit costs. • Some of the cost components are obtained from single sources and therefore may not represent the most efficient or competitive cost. • The process provides only a short time-period for users to validate these costs with independent sources in order to establish that these are realistic current costs. The determination process undertaken by ERA includes validation of the unit costs quoted by WNR through an independent process in which multiple vendors are contacted wherever possible to obtain quotes on the current costs for a similar asset. The validation process covers key components of the assets like rail track costs, sleeper costs, ballast costs, transportation charges and communication infrastructure. If a significant difference is found between the rates quoted by WNR and those quoted by other suppliers, these are further examined to understand the reasons for the difference and the lowest quote is selected in most cases. In the current review, as explained in Section 5, some of the unit rates used by WNR in the new APM are below the rates quoted by suppliers to Maunsell. One reason for this is the bargaining power of WNR as well as the imposition of an economy of scale principle in calculating the regulatory ceiling costs that unit costs be based on a minimum 100km new track establishment in a greenfield construction environment. On other instances when the WNR proposed rates were found to be higher than rates obtained by Maunsell, the rates have been set to the lowest quote from a supplier for a comparative asset. Therefore the concern that the process of establishing GRV favours the railway owner is addressed by the process of independent review.
APM reconciliation	The current submission by BHP Worsley Alumina raises concerns over the discrepancies that were identified in the 2006 APM compared to the new 2008 APM. The discrepancies have resulted in a total change in the 2008 ceilings due of $ 5.8 million or increase of 1.9% of previous ceiling. BHP has recommended that WNR submit a route-level public version of the reconciliation statement for clarity in the methodology. WNR in the supplementary submission has provided a note explaining the reconciliation process and the modified APM model. Further to this, during the current review PwC has again tested the reconciliation statements on a sample basis and the summary observations have been noted in Appendix C of the report.
GTK Validity	Worsley Alumina had attempted to reconcile the route section GTKs with own data and had found discrepancies between the GTK figures reported by WNR and Worsley's data. Worsley proposes that ERA undertake an audit of the WNR GTK capture process to ensure that there are no discrepancies in the data. PwC is not aware of any issues related to material inaccuracies in the GTK data used by WNR. However should stakeholders have a concern, the issue would need to be clarified through of a detailed joint reconciliation exercise with WNR and interested parties.

3.2 Submissions on the Draft Determination by the Authority (March 2009)

As a further part of the public consultation process, the ERA requested submissions on its Draft Determination and the accompanying draft report by PwC/Maunsell AECom. One submission was received from WNR dated 8 May 2009. PwC and Maunsell AECom evaluated the revised WNR May 2009 submission and the WNR four issues raised by WNR, plus a brief response are summarised in the table below. However, the Maunsell AECom February 2009 Report provided in Appendix B has not been adjusted to reflect this later submission.

Table 9: Responses to issues highlighted in WNR submission to Draft Determination

Issue	Analysis & Conclusion
CPI escalation	The May 2009 WNR submission proposed to use 2.2% which is the ABS CPI for Perth for the year to March 2009.[7] The October 2008 WNR submission was based on an earlier estimate of CPI of 2.75% and the Draft Determination utilised an escalation of 2.0%. For March quarter CPI, Perth was the only city to see a decrease this quarter of -0.1% compared to the 8-city average for the March2009 quarter of 0.1%. The ABS reported that the Perth decrease was mainly due to the larger decrease in transportation than seen in other cities. Based on this slowdown in inflation which is so far accompanying the Global Financial Crisis (GFC) the Perth CPI for June 2008-June 2009 appears more likely to fall below 2% when this result is released on 22 July 2009. Consequently, after further consideration during June 2009, the Authority has formed the view that a reasonable escalation for estimated Perth CPI for 2008/09 is 1.5% which is the Reserve Bank of Australia forecast for this period.
Unit cost for 41kg rail (delivered to Midland)	WNR, based on GHD advice, propose an increase in the unit rate by 8.9% from the level specified in the Draft Determination from $1,400 to $1,525. WNR/GHD view this a justified due to extra manufacturing costs involved in 41kg rail having more lengths per tonne and similarly having higher transport costs for 41kg rail in 27.5 metre lengths. A 27.5m length of 50kg rail weighs 22% more than 41kg (or 1,375kg versus 1,127.5kg). At present, production volumes of 41kg rail are relatively low and its use is mainly on branch and grain lines. But this costing exercise is for regulatory pricing purposes and it assumes replacement of a 100km section which should be adequate or 8.2m tonnes of 41/kg/mt rail which should be adequate to produce economies of scale. In considering theWNR arguments, transport is moreoften priced per tonne km rather than per length of rail ie for high density/heavy materials trucks / rail wagon load to their mass limit rather than being constrained by space to a limited number of lengths per load. Additionally, the GFC has seen demand for steel reduce plus falls in the costs of input commodities consequently, pricing should be more competitive than when benchmark prices were obtained some months ago. Additionally, transport costs have become slightly more competitive in recent months. The May 2009 WNR submission stated that 41kg rail currently had a higher cost of $1,525/tonne as for each tonne of lighter weight rail produced there is more distance rolled and transport. PwC/Maunsell retain the view that transport pricing for rail is moreoften expressed on a per net tonne kilometre (negating the argument that transport costs rise due to moving more rails per tonne) and that the current price premium is due to lower production volumes and that an order for 100 track km (or 200km or rail) would be likely to generate lower prices. Hence PwC/Maunsell see no compelling justification for changing the unit rate from $1,400/tn for 41kg rail.
Unit prices of Standard Gauge (SG) and Dual Gauge (DG) Concrete Sleepers (including fasteners & delivery to Perth Metro):	WNR based on GHD advice, propose an increase from the level specified in the Draft Determination of 9.6% from $125 to $137 due to a view that prevailing Perth prices remain at this higher level due to new track construction activity in the Mid-West and Pilbara. For highly similar reasons, WNR seek 12% more for their DG concrete sleepers (to $195 from $174). A May 2009 Inland Railway Report led by PB for ARTC examined sleeper costs and reported that ..."ROCLA Australia's website detailed that they were awarded the contract to supply sleepers to the ARTC at a contract value of $115m for 1.35 million SG sleepers (or $85 per SG sleeper). However, in a separate enquiry to ROCLA on costs for sleepers, they advised of a cost of between $115 and $120 per sleeper ex-works would be the standard rate. An additional cost of $25 per sleeper was suggested to be appropriate for delivery to the site(s). A rate of $145 per sleeper will be used in the cost model. Although given the information on the website of ROCLA regarding their awarded contract, there is potential opportunity to reduce the cost which will be investigated further in the next stage."[8] We note that spot unit prices do vary from long term (take-or-pay) contract prices. Overall, in the period since the price benchmarking was undertaken (December 2008), sleeper demand levels are viewed as being either stable or potentially weakening as some iron ore railway projects are deferred. The WNR May 2009 submission also raised the question as to whether the draft determination rates required upward adjustment to reflect the amortisation costs of using project sleeper plants of approximately $13/sleeper. However, the $125 assumption is based on a firm quote from a Perth based concrete supplier and the need to construct a new project sleeper plant for our assumed 100km new line build, gieven the potential of supply from Perth remains unclear. Such a project plant approach is also more common for distances of 300+km. Whilst the ROCLA rate for ARTC of $115-$120 was negotiated in May 2006 and was for a larger volume (1.35m) of SG sleepers, it remains a valid as a supporting reference point to our primary reference being the recent benchmark price of $125/unit from the WA based concrete sleeper supplier. Hence, after further consideration of theWNR May 2009 submission PwC/Maunsell believe that for an order of 160,000 sleepers that competitive rates of approximately $125/SG sleeper remain likely to be achievable. We also believe the premium for dual gauge sleepers should remain at the 39% identified in the Draft PwC/Maunsell Draft Report (or $174).

7 See: http://www.abs.gov.au/AUSSTATS/abs@.nsf/Latestproducts/6401.0Main%20Features2Mar%202009?opendocument&tabname=Summary&prodno=6401.0&issue=Mar%202009&num=&view=

8 PB Report available at: http://www.artc.com.au/library/IRAS%20WP3%20Stage%201%20Capital%20Works%20Costings%20090505.pdf

Cost of ballast transportation	WNR based on GHD advice, seek a 67% rise from the $5.40/tonne specified in the Draft Determination (based on 60km @ 9c/tonne) to $9/tonne (based on 75km @ 12c/tonne). This claim is mainly based on the shorter nature of the hauls, the specialised nature of equipment/wagons and the subsequent poor asset utilisation. GHD also state that distances exceed 75km on the EGR/Leonora and Esperance lines but are shorter on the SWM. For this regulatory costing exercise, a ballast order of 300,000 tonnes is assumed providing adequate economies of scale for lower cost delivery compared to smaller scale and more disparate ballast top-up programs which are used by some track owners. This relatively high assumed volume is also likely to stimulate some project based quarries to reduce distance between source and delivery points. The March quarter 2009 CPI result also notes some transportation price reductions as demand for the haulage of commodities moderates. Ballast transport: after considering the new arguments, our view remains unchanged & we support using 9c NTK at 60km as the universal average. The construction of new rail lines requires the establishment of borrow pits at regular intervals to supply formation material. Some of these pits are likely to be also suitable as project ballast pits. By way of example the recently built railway TPI railway in the Pilbara for FMG sourced ballast from a number of project pits along this 180km line. Current WNR ballast haul distances can be 100-200+ km as the quantities involved are lower as they relate mainly to top-up activities rather than full ballast insertions and for top-ups establishing project pits is usually less viable vis-a-vis paying more for longer haulage. The WNR May 2009 submission reiterated the point that ballast transport costs on recent projects had averaged $15 per net tonne. However, these were of a smaller scale than the 300,000 tonnes is assumed for regulatory costing purposes, with the smaller scale reducing the viability of establishing project pits and reducing the likely discounts available for higher fleet utilisation. After further considering theWNR/GHD position, PwC/Maunsell see no compelling justification for changing the unit rate from $5.40/tonne and we believe an order size of 300,000 tonnes would be likely to see the establishment of some project based quarries leading to shorter distances and scale discounts on haulage rates.

4 Review of WNR input prices

4.1 Approach to assessing the reasonableness & efficiency of input prices

WNR has provided the unit costs for the assets based on the defined / approved MEA where reasonable current costs for the infrastructure are estimated to arrive at the Gross Replacement Value (GRV) of the assets. WNR has used the cost review carried out by GHD in October 2008 as the basis for costs in 2008, building upon the final unit rates approved in the ERA final Determination in 2006. In the current unit price review, GHD has updated the costs based on the pricing schedule prepared by WorleyParsons in 2006.

For components that are readily available and specifications well defined, GHD has contacted component suppliers to obtain the rates for the potential project quantities of the component. For items and services that are not specifically defined, suitable uplift escalation factors have been used to arrive at the current costs.

The PwC-Maunsell approach to assessing the reasonableness and efficiency of input prices has been to:

- Assess reasonable cost movements between 2006 and 2008 for select key components and compare with WNR estimates over the intervening period;
- For key costs which form a significant proportion of the ceiling cost, we have requested and reviewed the supporting third-party documentation of actual costs or cost quotations which WNR based the unit rates upon; and
- Hold discussions with major input suppliers and with other rail network operators to seek benchmark / comparative unit rate information for major cost items (e.g. rail, sleepers, earthworks) with the benchmark prices being obtained in late 2008.

In obtaining quotes for components from independent suppliers, the process followed by Maunsell in estimating the costs were based on:

- Product Specifications: Specification and categorisation of products has been taken to be as described in the 2008 WNR Report which refers back to "Pricing of Rail Infrastructure" Report of November 2002 and "Determination of Floor and Ceiling Costs to Apply to WestNet Rail" of September 2003. Unless there appears to be a material effect on the determination of the unit costs today (e.g. if an originally specified product is no longer available) then the same product specifications have been applied.
- Liaison with suppliers for direct quotes: if a direct and corresponding validation of costs is achieved then this is seen as a valid process for cross-checking.
- Liaison with rail construction contractors for quotes: undertaken through Maunsell's relationships with some major contractors.
- Utilisation of cost data used by Maunsell for recent work and leveraging experience of personnel: Maunsell have undertaken recent cost estimation for several large rail projects, these unit prices have been used to compare with WNR's estimation. Also a cross-check based on the personal knowledge and experience of Maunsell personnel has been used to judge the reasonableness of costs.
- Liaison with Maunsell's Shanghai office for supply of rail and steel sleepers from China.

However, PwC/Maunsell has not audited the WNR proposed floor and ceiling costs nor have we completed a full bottom up replication of the proposed floor and ceiling costs by calling for tenders/quotations for all network components. The detailed Maunsell report is attached as an appendix **(appendix B)** for reference.

Following the assessment of WNR's unit prices using the method above, and the assessment of any product specification issues, a check for reasonableness was made. Typically, if Maunsell's unit cost benchmarking identified that unit prices were above WNR's assessment, then WNR's assessment was considered to be reasonable. Where the costs obtained by Maunsell were below WNR's proposed prices, then further clarification was sought on the reasons for variance. If no reasonable account can be made for WNR prices being above those obtained by Maunsell, then recommendation has been made to assess the cost at the lower price. If the Maunsell obtained costs are less, and no reasonable account can be made for this, a recommendation has been made to assess the cost at the lower price. Issues affecting the reasonableness of costs are discussed in detail in the Maunsell report attached as Appendix B. A brief analysis of costs of certain key components is provided below.

4.2 Mix of Rail Sizes used on WNR Network

A key issue in determining the reasonableness of WNR proposed ceiling prices relates to relative prices of rail by weight category per tonne. WNR has sought a premium of 7.1% and 14.3% for the 50 kg and 41kg rails respectively as compared to the standard 60kg rail. The most popular (highest volume) size for new rail being layed in Australia is 60kg per tonne rail with its price being considered to be the more readily established efficient / high volume market benchmark price. Since there is a lack of supply for the 31kg rails used in the Kulin to Yilminning line, the 41 kg rail prices are assumed for determining the GRV.

The general reasons behind the current price differences for 50kg and 60kg per tonne are understood to be mainly based on economies of scale, but there is no available cost data to establish the actual relativity of production costs between these weight categories when both are produced at high volumes. However, we expect that the costs of inputs (raw materials, energy etc) would represent a large percentage within the total cost structure of rail production, and that those input costs would not vary to any significant degree on a $/tonne basis in the production of the different rail categories. This general characteristic of the production cost structure would serve to moderate the effect of any diseconomies of scale on total production costs. Consequently, under high volumes assumptions, the current prevailing premium for 50kg (due to its lower economies of scale than 60kg) is expected to dissipate and total production costs expressed on a $/tonne basis is unlikely to be significantly different. Hence it appears reasonable, under high volume assumptions for competitive market-based prices for both weight categories to broadly align.

It should be noted that in assuming that large volumes of 60kg and 50kg rail can be purchased for the same price in $/tonne, the 50kg rail will remain 17% cheaper than 60kg rail when assessed on a $ per km basis. Hence we recommend the use of the same price per tonne for all three rail sizes as per the table below.

Table 9: Rail cost comparisons

Rail Cost ($A per tonne)	2006 Approved by ERA	2008 Proposed by WNR*	% Increase proposed BY WNR	PwC recommended prices for July 2008
41kg/m rail	$1440/tonne	$1600/tonne	14.3%	$1400/tonne
50kg/m rail	$1440/tonne	$1500/tonne	7.1%	$1400/tonne
60kg/m rail	$1440/tonne	$1400/tonne	0%	$1400/tonne

4.3 Ballast Costs & Transportation

WNR has proposed some substantial increases in the 2009 proposed unit price for ballast in comparison to 2006 approved prices. This includes a 142% rise in the 2008 proposed price for ballast on the Esperance line and 64% increase in the Perth Metro area.

In assessing the cost of ballast supply, Maunsell approached both a major contractor and a major supplier for quotations. Inconsistent information was received between the two sources, with one quote being similar to WNR's proposed ballast unit price and the other suppliers quote being significantly lower. As observed by Maunsell, between mid 2008 and early 2009 with the decline in commodity prices there has been some recent postponements of capital projects, and it is not unreasonable to assume that any downward movement in ballast prices will endure for some time. For large scale orders, it is also foreseeable that some project based quarries would be developed to service this demand (as occurred for the Alice-Darwin railway construction) leading to lower unit costs. Therefore lower prices based on recent supplier quotes are recommended.

For Esperance, the WNR proposed prices are significantly above the prices witnessed in other locations. A rise of 142% does not appear reasonable for a large scale order (over 300,000 Tonnes) when compared to price increases witnessed in other regions. The enquiries from Maunsell indicated that the high supplier quote could be on the basis of ballast ex-Kalgoorlie and trucked to Esperance. With the establishment of a local quarry, suggested supply rate would be in the order of other supply centres.

Table 10: Ballast cost comparisons

Ballast Cost ($A per tonne)	2006 Approved by ERA	2008 Proposed by WNR	% Increase proposed by WNR	PwC recommended prices for July 2008
Bunbury	20.7	32	55%	27
Esperance	20.7	50	142%	25
Kalgoorlie	17	27	59%	23
Perth Metro	20.7	34	64%	24

Transportation Costs

The 2008 WNR submission proposes a rise in delivery costs of 250% from the ERA approved $4.80/tn (60km at $0.08 per tonne per km) to $12/tonne (with WNR stating this assumes a 150km haul at $0.09 per tonne per km). However these assumptions (150km @ 9c/tonne) actually result in a cost of $13.50/tonne. Maunsell's experience shows that haulage rates will vary depending on volumes, location and distance. In addition, there are other variables such as method of transportation (e.g. split between mode – road or rail).

In the review conducted in 2007 by PwC it was recommended that a uniform average haulage length should be assumed across the network and this was set at 60km. WNR has not provided significant new justifications for increasing the assumed average haulage length. The assumed shorter haul length is based on:

- the potential to establish some new project quarries if existing quarries are not within a reasonable proximity;
- where longer hauls are required, the potential to make some use of rail haulage at a lower unit rate than $0.09 cents per NTK;

PwC also reviewed a recent example of TPI new railway construction in the Pilbara for FMG sourced ballast from five points along this 180km line. The construction of new rail lines requires the establishment of borrow pits at regular intervals to supply formation material. Part of the pits price benchmarking is also suitable as project ballast pits. The current WNR ballast haul distances appear to be higher as the estimated haulages are between 0 and 335 km that provides saving in transport unit cost. On the other hand, the WNR submission related mainly to top-up activities rather than full ballast

insertions and, for top-ups, establishing project pits is usually less viable that leads to higher ballast transport cost.

PwC therefore recommends retaining the original transport cost methodology including the shorter average haulage distance of 60km, but permitting a rise in rate from 8c to 9c per NTK. This results in a ballast haulage cost of $5.40/tonne.

4.4 Sleeper Costs

As per WNR submissions, there has been a 50% to 70% increase in the costs of concrete/steel sleepers compared to the 2006 approved prices. The reasons attributed to this are the rapid increase in material costs for fasteners and steel prestressing strands. But enquiries made to suppliers have resulted in substantially lower quotes which could be attributed to the recent volatility in the markets.

Based on a firm quote provided by a WA based concrete supplier, PwC reaffirms its original recommendation of a revised price of $125 for the SG concrete sleeper cost. Although the need for constructing a new project sleeper plant for the assumed 100km new line build remains unclear, the business case for such a project plant is stronger for distances of 300+km. Whilst the ROCLA rate for ARTC of $115-$120 was negotiated in May 2006 based on a large volume (1.35m) of SG sleepers, it remains valid as a supporting reference point to our primary reference, being the recent benchmark price of $125/unit from the WA based concrete sleeper supplier. Full inputs from suppliers are explained in table 3.3 of appendix B, with the WNR proposed price and PwC recommendation of a revised price detailed in section 5.

For the NG sleepers, the prices have historically been lower by 8 to 10% compared to the SG sleepers. This differential has been considered in recommending the NG sleeper costs.

4.5 Earthwork Costs

The Authority had approved earthworks costs on a per kilometre basis in the 2006 determination. As per the submissions by WNR, the proposed increase between 2006 and 2008 is 7.7%. The escalation factor appears reasonable. The submission assumes a per km earthwork cost of $187,936 for the Kwinana – Soundcem line (2008). The MEA formation height for the Kwinana-Soundcem line is 1.5m.

Table 11 Earthwork cost unit rates

Earthworks $/ linear km	Section Length	Formation Height	2006 Approved by ERA	2008 Proposed by WNR	% Increase proposed	PWC recommended rates 2008
Earthwork SWM	181.693	1	$140,000	$150,780	7.7%	$150,780
Earthworks Worsley to Premier	44.48	1	$140,000	$150,780	7.7%	$150,780
Earthworks Brunswick to Worsley	23.94	1.5	$174,500	$187,936	7.7%	$187,936
Earthwork Grain Lines	204.21	1	$140,000	$150,780	7.7%	$150,780
Forrestfield to Avon (DG)	230.93	1	$182,692	$196,759	7.7%	$196,759
Earthwork Avon to Kalgoorlie	587.25	1.5	$218,750	$235,593	7.7%	$235,593
Earthwork Leonora to Kalgoorlie	262.36	1.5	$218,750	$235,593	7.7%	$235,593
Earthwork Esperance to Kalgoorlie	399.73	1.5	$218,750	$235,593	7.7%	$235,593
Earthwork Kwinana to Soundcem	13.08	1.5	n.a	$187,936	na	$187,936

Following the Draft Report, Worsley Alumina identified that a section distance for Kwinana to Soundcem of 18.583km was utilised which is overstated and a that the correct distance for this section is 13.08km. Following confirmation with WNR, the APM has been adjusted to reflect this position.

Source: ERA Final Determination July 07

Based on quotes obtained by Maunsell from suppliers, the proposed rates appear reasonable.

4.6 Operating and Overhead Costs

WNR has escalated the overhead and operating costs by CPI between June 2006 and June 2008 and has further escalated the costs by 2.75% to arrive at the 2009 projected costs. In terms of allocation methodology, WNR has not notified any change in methodology from the 2006 approvals. The overhead and operating costs consist of:

1. Operating costs
2. Train control costs
3. WestNet Overheads
4. Working capital costs

Working Capital Costs: Working capital costs comprise around 4% of the total ceiling prices and have increased from 2.5% of the total ceiling in 2006. The increase is in proportion to the increase in GRV values. The working capital costs are determined as per the costing principles approved by ERA in 2007 under which working capital is half the WACC multiplied by the annuity. The methodology adopted in the WNR model is the same.

Operating and Overhead costs: The operating and overhead costs consist of the network operating costs, train control costs and the WestNet overheads. The estimation of overhead and operating costs is not based on the actual costs incurred by WNR and is a theoretical cost based on efficient best practice based on escalation of the 2006 approved costs. As part of this review, PwC has also examined WNR actual operating and overhead expenses.

The operating and overhead costs of a railway would be dependent on multiple variables like the technology used in signalling and communications, density of train operations, diverse nature of operations etc. WNR has proposed a 10.7% increase from 2006 approved operating and overhead costs to 2009. This is based on an escalation of 7.8% between 2008 and 2006 costs and a further 2.75% escalation for 2009 June prices. PwC's view is that the appropriate escalation factor to be used for historic escalation should be the ABS 8 cities CPI. The increase in the eight city weighted average CPI (6401.0) for June 2006 to June 2008 is 6.2% For cost escalations 2008 to 2009, the more appropriate escalation factor would be the ERA recommended forecast of 1.50% for 2009-10. The recommended overhead costs have been revised based on this.

Table 12 Operating and Overhead costs of WNR

	2006 ERA Approved	2009 WNR Proposed	2009 Recommended Costs
GTK	19,331,878,343	23,532,105,711	
Total Track km	1,983.7	1996.80	
Centralized Train Control	$3,474,437	$3,847,287	$3,847,287
Operating : Network Management	$1,140,990	$1,263,432	$1,248,062
Operating: Infrastructure Management	$6,477,000	$7,172,062	$7,084,811
Total Operating	**$11,092,427**	**$12,282,781**	$12,180,160
Operating overhead per track km	**$5,591**	**$6,151**	
Operating overhead per 000 GTK	**$0.57**	**$0.52**	
Overhead WestNet	$11,701,868	$12,957,623	$12,799,987
WNS Corporate Support Services	$3,629,500	$4,018,990	$3,970,079
Overhead Corporate	$862,158	$954,678	$943,064
Total Overheads	$16,193,526	$17,931,291	$17,713,148
Overheads per track km	**$8,163**	**$8,980**	
Overheads per 000 GTK	**$0.84**	**$0.76**	
Total Operating and Overheads	$27,285,953	$30,214,072	$29,893,309
Operating & Overheads per track km	**$13,755**	**$15,131**	
Operating & Overheads per 000 GTK	**$1.41**	**$1.28**	

*The total actual overhead costs are as additional information from WNR

Overheads - Budgeted for 2009 and operating overheads prorated based on Jun-Dec actual

On comparison of the proposed costs and the actual costs as budgeted/incurred by WNR, the actual costs were found to be significantly lower than the proposed cost. The approved regulatory costing principles[9] prescribe various efficiency tests for operating costs such as:

a) Benchmarking costs where it is available and comparable;

b) Use of unit costs from competitive tendering for certain activities;

c) Actual costs may be used where the consumption and scope are efficient (e.g. Train controller's salaries if the number of controllers and their range of duties are efficient by benchmarking);

d) Actual costs may be used where the costs come from a competitive market such as insurance or are regulatory costs (such as the cost of Rail Safety Accreditation).

The test undertaken to assess the operating cost efficiency was benchmarking of costs with other operators based on available data. As an external point of reference for comparison, PwC has compared WNR's per km and per GTK overhead costs with that of ARTC. The data was obtained from the April 2008 review by ACCC[10] .

[9] ERA –WNR's costing principles, Sep 2007

[10] Operations and maintenance cost and cost allocation method and ARTC performance data for 2007-08

Table 13 Operating and Overhead cost external references

	WNR 2009 Proposed	ARTC 2006-07 Costs As per ACCC review	WNR 2009 Costs as % of ARTC costs
Train control and access management costs per 000 train km	$198	$343*	**57.7%**
Operating & Overheads per track km	$15,131	$14,400	**105%**
Operating & Overheads per 000 GTK	$1.28	$1.59	**81%**
Operating & Overheads per 000 train km	$546	$411*	**133%**

* Data from ARTC Public KPI reporting for 2006-07

- The train control and access management cost per 000 train km proposed by WNR for 2009 was 42% lower compared to ARTC's 2006-07 costs. This could be due to the difference in density of operations.
- The 2009 proposed operating and overheads per track km for WNR is 5% higher than ARTC's 2006-07 costs.
- On a per 000 GTK basis, the WNR operating and overhead costs for 2009 are lower by 19% compared to ARTC's cost 2006-07 costs.
- The total operating and overhead costs per 000 train km for WNR in 2009 is 33% higher than ARTC's 2006-07 costs.
- A comparison was also made with PTA's submissions for 2008. The overhead costs proposed for 2009 per 1000 train km for WNR is $323 against the overhead cost per 1000 train km of $348 for PTA in 2008. The operating and overhead costs per 1000 train km for WNR in 2009 were $546 against PTA's $538 for 2008. Though the networks are different and not comparable, this was done as a cross-check.

In the ACCC draft determination in April 2008, the overhead costs of WNR and ARTC were compared to assess the efficient cost of operating and administration for a rail network.

As noted in the ACCC review[11] :

"To assess ARTC's operating costs on the NSW and non-NSW parts of the Interstate network, PWC used various reference points including ARTC's operating costs at the expiry of the 2002 Undertaking and the operating expenses of WestNet rail on its Forrestfield to Kalgoorlie rail line.

After assessing ARTC's operating costs against the above reference points, PWC noted that it is difficult to make meaningful comparisons across track-owners/managers, given the diversity in individual operations and the differing technologies employed by operators. However, PWC concluded that the Interstate Network and Forrestfield-Kalgoorlie line are essentially equivalent operations.

Against this benchmark PwC notes that: The average operating expenditure for the non-NSW segments over the Undertaking is $7,773 per track km is approximately 44 per cent lower than the WestNet Rail reference point. Meanwhile, the operating expenditure on the NSW segments is $19,697 per track km over the ten year period of the Undertaking, which is approximately 41 per cent higher than the WestNet Rail reference point.

[11] Draft Decision Access Undertaking – Interstate Rail Network Australian Rail Track Corporation, APRIL 2008

Overall, PWC concluded that, given ARTC's costs in NSW are driven by its lease arrangements, ARTC's overall operating costs are reasonable."

A comparison of the costs across the two networks is not possible on a one–to-one basis due to the variations in nature of operations in the networks. But considering the costs of other operators as a reference point, WNR's proposed operating and overhead costs do not appear unreasonable. However, given PwC considers that a 1.50% escalation for 2008 to 2009 is more appropriate than 2.75% these costs have been revised accordingly.

4.7 Track Maintenance Costs

WNR has proposed an escalation of the ERA approved track maintenance costs per km by 15.4% between June 2006 and March 2008 using the producer price index for non building construction. This has been further escalated by 2.75% to arrive at the 2009 proposed maintenance rates. Analysis by Maunsell indicates that efficient track maintenance costs for mainlines and secondary lines typically vary based on the axle loads, traffic volume, signalling system etc and can be classified broadly as an average for higher Volume Trunk Lines and lower volume lines. As per information obtained by Maunsell, the trunk line maintenance costs for Queensland Rail (QR) vary between $21,000/km to $41,000/km for various axle loads (maximum of 26 tonnes).

However, these benchmarks are for ageing lines and do not reflect the commencing as a new line assumption imposes for WNR APM costs. The WNR proposed costs exclude the Major Periodical Maintenance undertaken to extend the life of the asset. As a cross check to the reasonableness of the WNR APM costs, WNR was asked to provide its recent actual maintenance costs per line and these were considered as part of the benchmarking process.

Table 14: WNR's approved 2006 and proposed 2008 maintenance costs by line

Line		2006 Approved Maintenance Costs $/km	2008 WNR proposed maintenance costs $/km
1	Kulin to Yilminning	9,392/km	10,838/km
2	Kwinana to Bunbury	17,610/km	20,322/km
3	Brunswick to Premier	17,610/km	20,322/km
4	Kalgoorlie to Leonora	9,392/km	10,838/km
5	Kalgoorlie to Esperance	11,740/km	13,584/km

Source: GHD & WNR

The comparison of proposed maintenance costs for ceiling cost/regulatory purposes and the actual costs being incurred by WNR illustrates that the actual costs are not directly comparable when considering an MEA principle. As part of this review, PwC assessed WNR actual maintenance cost for various line segments. However, these vary considerably between years due to changes is usage and peaks in maintenance cycles. Considering that the maintenance costs for a new line (as per MEA) would be lower, and are within the range obtained by Maunsell from QR, we recommend that the WNR proposed rates for the maintenance costs be used.

4.8 Other Capital Costs

For other key input prices such as level-crossing, turnouts, surfacing etc the WNR prices have been sample tested for efficiency and economies of scale. Following this sample testing, PwC/Maunsell did not identify any instances where WNR's proposed costs were significantly above efficient cost benchmarks.

For operating and overheads, WNR has presented costs in 2009 dollars. In this case the escalation factor for 2008-2009 has been reduced in the PwC recommended costs from 2.75% to 1.50%. The recommended operating costs are as per table 12.

Table 16 lists the floor and ceiling costs as recommended by PwC based on the changed unit prices.

5 Conclusions

The costs that PwC recommends are shown below in Table 15.

Table 15: Recommended cost changes

Item	2006 ERA Approved Price ($A)	2008 WNR Proposed Prices ($A)	2008 PwC-Maunsell Recommended Price ($A)	Justification
Cost per 60 kg/m Rail per tonne (delivered Midland)	1,440	1,400	1,400	The prices provided by suppliers are in the same range as proposed by WNR - refer sec 3.1, Appendix B. Since the 41 Kg /m rail is sourced in lesser quantity and therefore does not have economies of scale in manufacturing, it is recommended that an average price of $1,400 be used for all rails.
Cost per 50 kg/m Rail per tonne (delivered Midland)	1,440	1,500	1,400	Same unit price for 41/50/60 kg/m rails- based on economies of scale for large quantities (sec 3.1, Appendix B)
Cost per 41 kg/m Rail per tonne (delivered to Perth Metro, Includes rail fasteners)	1,440	1,600	1,400	Same unit price for 41/50/60 kg/m rails- based on economies of scale for large quantities (sec 3.1, Appendix B)
Concrete sleeper cost SG (delivered to Perth Metro, Includes rail fasteners)	90	155 (Revised to 137 in May 2009)	125	Assessment based on the current forward order for sleepers indicate that the price fluctuation in sleepers cost has been minimal. As per some of the suppliers, the 6 month outlook on steel strand supply (one of the key components for sleepers), forecasted a decrease in price. Therefore the WNR prices appear to be significantly higher than those quoted by suppliers. Refer Sec 3.3, Appendix B.
Concrete sleeper cost DG (delivered to Perth Metro, Includes rail fasteners)	na	210 (Revised to 195 in May 2009)	174	Based on supplier quotes
Concrete sleeper cost NG (delivered to Perth Metro, Includes rail fasteners)	82	120	120	The NG prices are less by around 8-10% of cost for SG and the previous determination considered this in determining price for NG sleepers. The quoted prices confirm this

Item	2006 ERA Approved Price ($A)	2008 WNR Proposed Prices ($A)	2008 PwC-Maunsell Recommended Price ($A)	Justification
Steel DG M7.5 non insulated system	n.a.	198	110	As per enquiries made to a major domestic supplier, the component is available at a much lower price. The WNR argument that that manufacturing requirements for DG sleepers increases costs significantly is not validated by suppliers. Refer Sec 3.3, Appendix B.
Steel DG M8.5 insulated system	n.a.	210	136	Based on supplier quotes. Refer Sec 3.3, Appendix B
Rail Flashbutt Welding	n.a.	400 ea	400 ea	The quote provided by a rail contractor was higher than 400 ea , but considering the economies of scale that a large order from WNR can provide, the cost proposed by WNR appears reasonable.
Ballast cost per tonne Bunbury (ex quarry)	20.70	32	27	Supplier quote is 15% lower than WNR proposed rates.
Ballast Cost per tonne – Perth Metro	20.70	34	24	Supplier quote was approx. 30% lower while the contractor quote was closer to WNR rates. It appears that the suppliers quote is more reasonable given the postponement of demand due to postponement of capital railway works in Pilbara region.
Ballast cost per tonne Esperance (ex quarry)	20.70	50	25	The supplier quoted cost for ballast ex Kalgoorlie and trucked to Esperance. Supply from local quarries would be lower and for a large-scale order, the prices would be comparable to ballast prices in other regions.
Ballast cost per tonne Kalgoorlie (ex quarry)	17.00	27	23	The estimate is based on the Supplier quote for delivery to Bunbury which was 16% lower than WNR rates.
Ballast transport costs	4.80/Tn	12.00/Tn (Revised to 9.00-12.00/Tn in May 2009)	5.40/tn	The supplier quotes was 25% higher for the highest quote. The WNR proposed rates of 9c/km appear to be at the lower end of the spectrum and are reasonable based on the ABS Transportation Index. The average distance of haulage has been standardized at 60 km as per the 2006 final determination to arrive at the recommended cost. See explanation in Section 4.1 of this report.
Tracklay South West Main Kwinana to Bunbury (NG)	110.35/m	132.45/m	132.45/m	The quotes obtained were higher than WNR rates. Considering the fact that WNR has an incumbent contractor who can offer better rates, WNR rates appear reasonable.

Item	2006 ERA Approved Price ($A)	2008 WNR Proposed Prices ($A)	2008 PwC-Maunsell Recommended Price ($A)	Justification
Tracklay EGR dual gauge track Forrestfield to Kalgoorlie (DG)	144.30/m	168.55/m	168.55/m	The quotes obtained were higher than WNR rates. Considering the fact that WNR has an incumbent contractor who can offer better rates, WNR rates are reasonable.
Tracklay EGR standard gauge track Forrestfield to Kalgoorlie (SG)		146.20	146.20/m	The quotes obtained were higher than WNR rates. Considering the fact that WNR has an incumbent contractor who can offer better rates, WNR rates are reasonable.
Tracklay Kalgoorlie to Leonora and Leonora to Esperance (SG)	110.35/m	112.30	112.30/m	The quotes obtained were higher than WNR rates. Considering the fact that WNR has an incumbent contractor who can offer better rates, WNR rates are reasonable.
Bridges	na	2,981 to 4,606 per m2	2,981 to 4,606 per m2	WNR has fixed the GRV for Bridges based on unit rates as per the GHD report. The GHD report escalated costs between March 2006 and June 2008 (15.4%). Since WNR has adopted escalation factors for all costs for the period June 2006 to June 2008, this figure should be 12% and not 15.4%.
Culverts $ per m^2	na	Various rates based on size	As per WNR quotes after correcting for escalation factor	WNR proposes a 15.4% increase in the costs based on the indexes published by ABS and based on a 2.75% CPI till June 2009. The Index for Road and Bridge construction in WA is 15.4% between March 2006 and June 2008. But as per the WNR report all costs have been escalated between June 2006 and June 2008. Therefore this figure should be 12% between June 2006 and June 2008 and a further 2% for 2009 prices.
Comms & signals escalation factor: Materials	7.8%	14.71%	14.71%	Based on the weighted average cost increases for each component, the escalation factor works out to be reasonable.
Maintenance SWM Kwinana to Bunbury and Kwinana to Soundcem	17,610/km	20,322/km	20,322/km	As per enquiries by Maunsell and knowledge about the maintenance costs of Queensland Rail, the proposed rates fall within the quoted range (between 21000 and 41000). Details in Appendix B section 3.13.
Terminal Ends	9,392/km	10,838/km	10,838/km	Proposed rates are reasonable as ascertained from contractor quotes and compared to QR maintenance costs.
Maintenance EGR Forrestfield to	18,784/km			Proposed rates are reasonable as ascertained from contractor quotes and

Item	2006 ERA Approved Price ($A)	2008 WNR Proposed Prices ($A)	2008 PwC-Maunsell Recommended Price ($A)	Justification
Kalgoorlie		21,677/km	21,677/km	compared to QR maintenance costs.
Kalgoorlie to Leonora	9,392/km	10,838/km	10,838/km	Proposed rates are reasonable as ascertained from contractor quotes and compared to QR maintenance costs.
Maintenance Leonora to Esperance	11,740/km	13,548/km	13,548/km	Proposed rates are reasonable as ascertained from contractor quotes and compared to QR maintenance costs.
Grain line (Axle load 19)	9,392/km	10,838/km	10,838/km	Proposed rates are reasonable as ascertained from contractor quotes and compared to QR maintenance costs.
Other grain line – (Axle load 16)	5,400/km	6,232/km	6,232/km	Proposed rates are reasonable as ascertained from contractor quotes and compared to QR maintenance costs.
Earthwork SWM per km	$140,000	$150,780	$150,780	The rates obtained by Maunsell for Mid West were in the same range as specified by WNR.
Earthworks Worsley to Premier per km	$140,000	$150,780	$150,780	Supplier rates are comparable to WNR proposed prices.
Earthworks Brunswick to Worsley per km	$174,500	$187,936	$187,936	Supplier rates are comparable to WNR proposed prices.
Earthwork Grain Lines per km	$140,000	$150,780	$150,780	Supplier rates are comparable to WNR proposed prices.
Forrestfield to Avon (DG) per km	$182,692	$196,759	$196,759	Supplier rates are comparable to WNR proposed prices.
Earthwork Avon to Kalgoorlie per km	$218,750	$235,593	$235,593	Supplier rates are comparable to WNR proposed prices.
Earthwork Leonora per km	$218,750	$235,593	$235,593	Supplier rates are comparable to WNR proposed prices.
Earthwork Esperance per km	$218,750	$235,593	$235,593	Supplier rates are comparable to WNR proposed prices.
Earthwork Kwinana to Soundcem per km	n.a	na	$187,936	As per new MEA.

Table 16: WNR Proposed and Draft PwC Recommended floor and ceiling costs.

2009 New APM - WNR Proposed	Total	Main Lines							Grain Lines		
Section Cost Components		Kwinana to Bunbury	Brunswick to Premier	Forrestfield to Kalgoorlie	Kalgoorlie to Leonora	Kalgoorlie to Esperance	Terminal Ends	Kwinana to Soundcem	Avon to Goomalling	Katanning to Tambellup	Kulin to Yilminning
Section Length (km)	1996.80	181.69	68.41	856.78	262.36	399.73	10.52	13.08	57.69	46.71	99.81
GRV	$2,690,607,188	$252,397,229	$85,412,025	$1,410,436,236	$280,079,962	$452,646,261	$14,192,494	$20,240,121	$53,629,867	$39,021,296	$82,551,696
Floor Costs	$14,367,451	$2,418,433	$459,270	$7,762,662	$821,793	$2,106,811	$132,424	$143,164	$210,985	$169,155	$142,754
Overhead	$15,510,030	$3,364,440	$1,186,065	$6,717,884	$292,669	$2,314,101	$1,539,193	$0	$48,411	$35,039	$12,228
Operating	$11,244,187	$2,374,509	$351,273	$5,486,465	$297,149	$1,652,025	$337,573	$0	$151,000	$438,084	$156,109
Working Capital	$13,585,039	$1,235,365	$421,682	$7,371,970	$1,334,814	$2,226,662	$65,966	$100,873	$252,464	$184,071	$391,169
Maintenance	$33,926,149	$3,793,905	$1,017,692	$19,083,251	$2,921,686	$5,564,511	$117,173	$273,122	$369,411	$299,115	$486,283
Capital	$278,097,004	$25,288,951	$8,632,188	$150,910,334	$27,324,756	$45,581,624	$1,350,387	$2,064,954	$5,168,155	$3,768,093	$8,007,562
Total Ceiling	$352,362,409	$36,057,170	$11,608,900	$189,569,904	$32,171,074	$57,338,924	$3,410,293	$2,438,948	$5,989,441	$4,724,402	$9,053,351

2009 New APM -As recommended	Total	Main Lines							Grain Lines		
Section Cost Components		Kwinana to Bunbury	Brunswick to Premier	Forrestfield to Kalgoorlie	Kalgoorlie to Leonora	Kalgoorlie to Esperance	Terminal Ends	Kwinana to Soundcem	Avon to Goomalling	Katanning to Tambellup	Kulin to Yilminning
Section Length	1996.80	181.69	68.41	856.78	262.36	399.73	10.52	13.08	57.69	46.71	99.81
GRV	$2,468,292,569	$243,057,044	$81,941,804	$1,278,355,824	$260,802,684	$412,855,531	$13,774,618	$18,635,538	$50,122,815	$35,930,784	$72,815,926
Floor Costs	$14,538,254	$2,410,073	$540,542	$7,762,127	$813,796	$2,080,504	$132,257	$140,269	$209,973	$168,336	$280,378
Overhead	$15,321,344	$3,323,510	$1,171,636	$6,636,158	$289,109	$2,285,949	$1,520,468	$0	$47,822	$34,613	$12,079
Operating	$11,154,201	$2,359,623	$347,800	$5,439,322	$295,534	$1,637,928	$334,666	$0	$150,718	$433,994	$154,616
Working Capital	$9,924,633	$955,712	$326,612	$5,308,786	$990,619	$1,618,535	$51,294	$75,128	$187,939	$134,974	$275,034
Maintenance	$34,536,852	$3,747,751	$1,411,164	$18,851,094	$2,886,143	$5,496,816	$115,748	$269,799	$364,917	$295,476	$1,097,945
Capital	$230,003,085	$22,148,599	$7,569,216	$123,030,957	$22,957,566	$37,509,502	$1,188,740	$1,741,095	$4,355,478	$3,128,026	$6,373,905
Total Ceiling	$300,940,114	$32,535,195	$10,826,428	$159,266,317	$27,418,970	$48,548,731	$3,210,917	$2,086,022	$5,106,874	$4,027,083	$7,913,578

Difference Proposed Vs Recommended	Total	Main Lines							Grain Lines		
Section		**Kwinana to Bunbury**	**Brunswick to Premier**	**Forrestfield to Kalgoorlie**	**Kalgoorlie to Leonora**	**Kalgoorlie to Esperance**	**Terminal Ends**	**Kwinana to Soundcem**	**Avon to Goomalling**	**Katanning to Tambellup**	**Kulin to Yilminning**
Cost Components											
Section Length											
GRV	**-8.26%**	-3.70%	-4.06%	-9.36%	-6.88%	-8.79%	-2.94%	-7.93%	-6.54%	-7.92%	-11.79%
Floor Costs	**1.19%**	-0.35%	17.70%	-0.01%	-0.97%	-1.25%	-0.13%	-2.02%	-0.48%	-0.48%	96.41%
Overhead	**-1.22%**	-1.22%	-1.22%	-1.22%	-1.22%	-1.22%	-1.22%		-1.22%	-1.22%	-1.22%
Operating	**-0.80%**	-0.63%	-0.99%	-0.86%	-0.54%	-0.85%	-0.86%		-0.19%	-0.93%	-0.96%
Working Capital	**-26.94%**	-22.64%	-22.55%	-27.99%	-25.79%	-27.31%	-22.24%	-25.52%	-25.56%	-26.67%	-29.69%
Maintenance	**1.80%**	-1.22%	38.66%	-1.22%	-1.22%	-1.22%	-1.22%	-1.22%	-1.22%	-1.22%	125.78%
Capital	**-17.29%**	-12.42%	-12.31%	-18.47%	-15.98%	-17.71%	-11.97%	-15.68%	-15.72%	-16.99%	-20.40%
Total Ceiling	**-14.59%**	-9.77%	-6.74%	-15.99%	-14.77%	-15.33%	-5.85%	-14.47%	-14.74%	-14.76%	-12.59%

Appendix A provides a more detailed breakdown of the above route costs into floor and ceilings by route section including the capital and operating cost components.

Appendix A Recommended Floor & Ceiling Costs by Route Section

A1. Kwinana ro Bunbury Inner Harbour

Segment	Description	Section Length	Total Ceiling	Capital	Maintenance	Working Capital	Operating	Overhead	Floor	GRV
SWM_KWI_MDJ	Kwinana to Mundijong Jn	29.11	$5,416,957	$3,787,163	$600,385	$163,416	$367,906	$498,087	$364,421	$40,919,659
SWM_MDJ_PNJ	Mundijong Jn to Pinjarra	47.73	$7,948,572	$5,557,651	$984,436	$239,813	$502,938	$663,734	$538,485	$60,542,694
SWM_PNJ_PNE	Pinjarra to Pinjarra East	1.47	$634,128	$228,055	$30,342	$9,841	$144,467	$221,424	$117,529	$2,448,361
SWM_PNE_ALU	Pinjarra East to Alumina Jn	0.23	$651,915	$130,420	$4,806	$5,628	$199,768	$311,294	$155,655	$1,355,267
SWM_PNE_PNS	Pinjarra East to Pinjarra South	1.06	$296,664	$116,697	$21,864	$5,035	$60,169	$92,899	$49,828	$1,263,148
SWM_PNJ_WGR	Pinjarra to Wagerup	33.52	$4,798,609	$3,406,090	$691,473	$146,973	$233,829	$320,244	$252,254	$38,651,320
SWM_WGR_BWK	Wagerup to Brunswick Jn	42.97	$6,698,927	$4,956,144	$886,294	$213,858	$273,510	$369,122	$351,355	$55,075,323
SWM_BWK_PIJ	Brunswick Jn to Picton Jn	22.08	$4,507,794	$3,073,470	$455,502	$132,620	$347,667	$498,535	$377,464	$33,196,295
SWM_PIJ_BIJ	Picton Jn to Bunbury Inner Harb	3.52	$1,581,628	$892,911	$72,648	$38,529	$229,369	$348,171	$203,080	$9,604,977
Total Route		**181.69**	**$32,535,195**	**$22,148,599**	**$3,747,751**	**$955,712**	**$2,359,623**	**$3,323,510**	**$2,410,073**	**$243,057,044**

A2. Brunswick to Premier

Segment	Description	Section Length	Total Ceiling	Capital	Maintenance	Working Capital	Operating	Overhead	Floor	GRV
WOR_BWN_BWE	Brunswick North - East	0.91	$178,795	$94,701	$18,791	$4,086	$12,362	$48,854	$10,351	$1,023,148
WOR_BWK_BWE	Brunswick - Brunswick East	1.03	$513,762	$294,444	$21,143	$12,705	$34,387	$151,083	$37,857	$2,872,644
WOR_BWE_WOR	Brunswick East - Worsley	22.00	$3,382,752	$2,530,767	$453,811	$109,203	$85,570	$203,401	$223,413	$27,184,677
WOR_WOR_WON	Worsley - Worsley North	2.32	$641,404	$370,670	$47,772	$15,994	$41,140	$165,828	$34,830	$3,872,944
WOR_WON_HML	Worsley North - Hamilton	8.58	$1,195,097	$751,539	$177,061	$32,429	$57,255	$176,813	$53,909	$8,259,692
WOR_WOE_WON	Worsley East - Worsley North	1.07	$180,422	$103,201	$22,009	$4,453	$10,710	$40,049	$9,373	$1,111,511
WOR_WOR_WOE	Worsley - Worsley East	1.89	$344,174	$165,833	$38,882	$7,156	$23,250	$109,054	$14,982	$1,843,754
WOR_WOE_EWJ	Worsley East - Ewington Jn	28.24	$3,938,084	$2,898,728	$582,502	$125,080	$78,048	$253,726	$143,473	$31,965,344
WOR_EWJ_PRE	Ewington Jn - Premier	2.39	$451,939	$359,333	$49,195	$15,505	$5,077	$22,828	$12,355	$3,808,090
Total Route		**68.41**	**$10,826,428**	**$7,569,216**	**$1,411,164**	**$326,612**	**$347,800**	**$1,171,636**	**$540,542**	**$81,941,804**

A3. Forrestfield to Kalgoorlie

Segment	Description	Section Length	Total Ceiling	Capital	Maintenance	Working Capital	Operating	Overhead	Floor	GRV
EGR_FOR_MID	F'Field Sth to Midland	25.71	$7,624,038	$5,535,392	$565,697	$238,852	$645,155	$638,941	$802,983	$57,051,591
EGR_MID_MLJ	Midland to Millendon Jn	28.25	$6,697,733	$5,101,880	$621,561	$220,146	$391,798	$362,348	$493,733	$52,344,352
EGR_MLJ_TYW	Millendon Jn to Toodyay West	125.14	$23,591,870	$18,510,740	$2,753,306	$798,738	$836,521	$692,565	$1,305,422	$193,705,847
EGR_TYW_AVN	Toodyay West to Avon Yard	51.83	$10,436,094	$8,054,852	$1,140,306	$347,567	$475,204	$418,165	$653,461	$83,662,558
EGR_AVN_WEM	Avon Yard to West Merredin	190.94	$36,388,912	$28,848,088	$4,201,069	$1,244,795	$891,609	$1,203,351	$1,484,019	$299,966,659
EGR_WEM_KOE	West Merredin to Koolyanobbing	191.98	$33,102,884	$25,829,025	$4,223,996	$1,114,522	$820,665	$1,114,676	$1,297,622	$270,060,957
EGR_KOE_WKW	Koolyanobbing to West Kalgoorlie	204.33	$35,731,259	$26,710,110	$4,495,678	$1,152,541	$1,279,725	$2,093,204	$1,463,402	$276,463,500
EGR_WKW_XAF	West Kalgoorlie to Border	6.21	$1,921,410	$1,508,148	$136,633	$65,077	$98,644	$112,908	$101,094	$15,460,982
EGR_AVN_WEM_SID	Avon to West Merredin Sidings	18.05	$2,101,391	$1,633,777	$397,117	$70,497	$0	$0	$89,351	$16,511,656
EGR_WEM_KOE_SID	West Merredin to Koolyanobbing Sidings	9.61	$1,118,281	$869,435	$211,331	$37,516	$0	$0	$47,549	$8,786,883
EGR_KOE_WKW_SID	Koolyanobbing to W Kal Sidings	4.75	$552,446	$429,512	$104,400	$18,533	$0	$0	$23,490	$4,340,839
Total Route		**856.78**	**$159,266,317**	**$123,030,957**	**$18,851,094**	**$5,308,786**	**$5,439,322**	**$6,636,158**	**$7,762,127**	**$1,278,355,824**

A4. Kalgoorlie to Leonora

Segment	Description	Section Length	Total Ceiling	Capital	Maintenance	Working Capital	Operating	Overhead	Floor	GRV
SGL_KLG_MLC	Kalgoorlie to Malcolm	237.50	$24,482,149	$20,555,318	$2,612,613	$886,962	$197,006	$230,249	$670,045	$233,653,745
SGL_MLC_LNR	Malcolm to Leonora	24.54	$2,908,480	$2,378,507	$269,954	$102,633	$98,527	$58,860	$142,947	$26,878,308
SGL_KLG_MLC_SID	Menzies sidings	0.33	$28,341	$23,741	$3,575	$1,024	$0	$0	$804	$270,631
Total Route		**262.36**	**$27,418,970**	**$22,957,566**	**$2,886,143**	**$990,619**	**$295,534**	**$289,109**	**$813,796**	**$260,802,684**

A5. Kalgoorlie to Esperance

Segment	Description	Section Length	Total Ceiling	Capital	Maintenance	Working Capital	Operating	Overhead	Floor	GRV
SGE_WKW_HPN	West Kalgoorlie to Hampton	17.88	$2,911,514	$2,152,336	$245,899	$92,873	$219,910	$200,495	$239,268	$23,277,747
SGE_HPN_KMA	Hampton to Kambalda	38.25	$5,209,034	$3,773,250	$525,984	$162,816	$339,084	$407,901	$312,975	$41,393,063
SGE_KMA_SGM	Kambalda to Salmon Gums	229.60	$26,642,077	$20,750,710	$3,157,211	$895,393	$707,518	$1,131,245	$928,653	$229,861,927
SGE_SGM_ESP	Salmon Gums to Esperance	111.60	$13,560,650	$10,648,820	$1,534,609	$459,497	$371,417	$546,308	$592,157	$116,272,872
SGE_HPN_KMA_SID	Kambalda siding	0.61	$56,766	$46,390	$8,374	$2,002	$0	$0	$1,884	$516,586
SGE_KMA_SGM_SID	Norseman Siding	0.52	$48,843	$39,915	$7,206	$1,722	$0	$0	$1,621	$444,484
SGE_SGM_ESP_SID	Salmon Gums Siding	1.28	$119,847	$98,082	$17,533	$4,232	$0	$0	$3,945	$1,088,852
Total Route		**399.73**	**$48,548,731**	**$37,509,502**	**$5,496,816**	**$1,618,535**	**$1,637,928**	**$2,285,949**	**$2,080,504**	**$412,855,531**

A6. Terminal Ends

Segment	Description	Section Length	Total Ceiling	Capital	Maintenance	Working Capital	Operating	Overhead	Floor	GRV
SWM_BIJ_ALC_In	Inner Harbour 485 Pt to Alcoa (Inbound)	0.51	$463,885	$74,539	$5,632	$3,216	$66,760	$313,736	$21,862	$828,290
SWM_486_ALC_Out	Inner Harbour 486 Pt to ALCOA (Outbound)	0.38	$321,981	$80,965	$4,180	$3,494	$40,248	$193,094	$13,694	$881,069
SWM_487_WOR_Out	Inner Harbour 487 Pt to Worsley (Outbound)	0.33	$217,905	$68,151	$3,608	$2,941	$24,677	$118,527	$8,643	$743,563
SWM_BIJ_486	Inner Harbour 485 Pt to 486 pts	0.08	$422,627	$44,136	$891	$1,904	$64,530	$311,165	$20,786	$460,391
SWM_486_487	Inner Harbour 486 Pt to 487 pts	0.06	$162,766	$18,466	$605	$797	$24,535	$118,363	$7,968	$195,474
SWM_487_WCH	Inner Harbour 487 Pt to Woodchips	3.18	$450,124	$395,645	$35,015	$17,072	$466	$1,925	$7,999	$4,768,135
SWM_KWI_ABJ	Kwinana no3 points to bauxite junction	1.85	$498,849	$192,303	$20,384	$8,298	$55,801	$222,063	$25,833	$2,137,104
SWM_ABJ_ABA	Alcoa Bauxite Jn - Alcoa Bauxite Sdg	1.30	$325,154	$108,391	$14,268	$4,677	$38,943	$158,876	$13,143	$1,278,720
SWM_ABJ_ACA	Alcoa Bauxite Jn - Alcoa Caustic Sdg Pts	1.89	$237,798	$138,215	$20,824	$5,964	$13,491	$59,304	$8,489	$1,663,163
SWM_ACA_ALA	Alcoa Caustic Sdg Pts - Alcoa Alumina Sdg Pts	0.94	$109,828	$67,930	$10,341	$2,931	$5,213	$23,414	$3,840	$818,710
Total Route		**10.52**	**$3,210,917**	**$1,188,740**	**$115,748**	**$51,294**	**$334,666**	**$1,520,468**	**$132,257**	**$13,774,618**

A7. Kwinana to Soundcem

Segment	Description	Section Length	Total Ceiling	Capital	Maintenance	Working Capital	Operating	Overhead	Floor	GRV
SWM_KWI_SOU	Kwinana to Soundcem	13.08	$2,086,022	$1,741,095	$269,799	$75,128	$0	$0	$140,269	$18,635,538

A8. Grain Lines

Segment	Description	Section Length	Total Ceiling	Capital	Maintenance	Working Capital	Operating	Overhead	Floor	GRV
GRN_AVN_GOM	Avon to Goomalling	57.69	$5,106,874	$4,355,478	$364,917	$187,939	$150,718	$47,822	$209,973	$50,122,815
GRN_KAT_TAM	Katanning to Tambellup	46.71	$4,027,083	$3,128,026	$295,476	$134,974	$433,994	$34,613	$168,336	$35,930,784
GRN_KUL_YIL	Kulin to Yilminning	99.81	$7,913,578	$6,373,905	$1,097,945	$275,034	$154,616	$12,079	$280,378	$72,815,926

Appendix B Engineering Report by Maunsell

ERA Costing Review
Review of WestNet Rail Unit Costs

Prepared for
PricewaterhouseCoopers
9 February 2009

Review of WestNet Rail Unit Costs

Prepared for

PriceWaterhouseCoopers

Prepared by

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Table of Contents

1 Introduction

This report presents Maunsell's assessment and validation of unit prices assessed in WestNet Rail's "Report for Review of Unit Prices for Clause 9 Ceiling Price Review" dated October 2008. This report is designed to be standalone, but it is understood that some or all of its contents may be incorporated into a wider review of WestNet Rail's floor and ceiling costs to be submitted to the Economic Regulation Authority of WA by PricewaterhouseCoopers.

2 Maunsell's Methodology

This report is confined to the review of WNR's "Report for Review of Unit Prices for Clause 9 Ceiling Price Review" of October 2008 (hereafter referred to as "the 2008 WNR Report"). As such the methodology outlined below is designed to validate the contents of this report and check its reasonableness. In addition, Maunsell's review considers some of the wider assumptions and context that may affect the determination of unit prices for input into the Floor and Ceiling Cost review process.

Unit Price Checking

In checking of unit prices Maunsell have adopted the following approach:

- Liaison with suppliers for direct quotes – due to the limited numbers of suppliers of railway construction materials in Perth this has included liaising with some of the same suppliers that WNR have used for their source information. However, if a direct and corresponding validation of costs is achieved then this is seen as a valid process for cross-checking.
- Liaison with rail construction contractors for quotes – this is undertaken through Maunsell's relationships with some major contractors. John Holland were not approached due to their current contractual relationship with WNR.
- Utilisation of cost data used by Maunsell for recent work – Maunsell have undertaken recent cost estimation for several large rail projects in the Pilbara and Mid West and, where available, these unit prices have been used to compare with WNR's estimation.
- Knowledge and experience of Maunsell personnel – as a cross-check, and typically where there may be some spread of costs depending on the source, personal knowledge and experience of Maunsell personnel has been used to judge the reasonableness of costs.
- Liaison with Maunsell's Shanghai office for supply of rail and steel sleepers from China – this process and the conditions attached to information received is described in more detail below.
- Liaison with other Maunsell offices in Australia – this was undertaken specifically for validation of maintenance costs.

In terms of precedence, direct supplier quotes will be given precedence over other sources, even if other sources provide corroborating prices to that provided by WNR.

Product Specifications

Specification and categorisation of products has been taken to be as described in the 2008 WNR Report which typically refers back to "Pricing of Rail Infrastructure" Report of November 2002 and "Determination of Floor and Ceiling Costs to Apply to WestNet Rail" of September 2003. Unless there appears to be a material effect on the determination of the unit costs today (e.g. if an originally specified product is no longer available) then the same product specifications have been applied.

Product Specific Assumptions or Determinants of Cost

If the 2008 WNR Report refers to specific assumptions or determinants of cost for the purposes of the unit cost assessment then typically these will be discussed for validity. In each product section as part of Section 3 below, these assumptions will be discussed accordingly.

Cost Reasonableness

Following the assessment of WNR's unit prices using the method above, and the assessment of any product specification issues, or other assumptions, a check for reasonableness will be made. Typically, if Maunsell's unit cost check results in a corroborating price that is +/-10% of WNR's assessment, then WNR's assessment will be considered to be reasonable. This is based on the estimating range most achievable when costing a project from detailed design for construction. If the costs obtained by Maunsell fall outside of this range then further clarification will have been sought from Maunsell's sources and/or identification of the issues driving the cost differences will be made. If the Maunsell obtained costs are less, and no reasonable account can be made for this, a recommendation will be made to assess the cost at the lower price. Issues affecting the reasonableness of costs as set will be discussed where appropriate.

3 Global Assumptions

WNR in their assessment, and Maunsell in this validation exercise, have made some similar assumptions in the assessment of the unit costs. In addition, Maunsell have identified some wider issues that have been taken into consideration either across the review or for specific items. They are as follows:

- **Economies of scale utilised to reflect required quantum of asset replacement**
  In order to properly reflect the requirement for the modern equivalent replacement value of the infrastructure all unit costs have been assessed in "project sized" quantities. This means that all quotes are in the basis of large orders required to replace significant quantities of infrastructure. Where this quantity has been set in the 2008 WNR Report, Maunsell has used this quantity for the purposes of quotation.

- **Prices need to be free of unusual volatility (i.e. aside from rise and fall resulting from typical domestic economic conditions)**
  Given the current market uncertainties it is possible that costs and prices quoted as part of the assessment of this report (undertaken in December 2008) may be affected by factors that were not present during WNR's determination (undertaken in September 2008). Further, there is likely to be unusual volatility driven by uncertainties in the iron ore industry which typically can restrict market supply of rail materials in the short term due to large and long term demand for expansion projects. Assessed prices may be currently artificially high or low for these reasons, but may not reflect the long term situation (over a

number of years). It is difficult to accurately assess these effects within the scope and context of this study. However, anecdotal and qualitative evidence will be discussed, where appropriate. This issue is likely to be most relevant for large volume, limited (domestic) capacity products such as rail, sleepers and ballast.

- **Prices considered that production capacity was available and were not adjusted to reflect current market supply constraints for the product (although they did take into account supply constraints on components to the product)**
  Notwithstanding the above, suppliers were asked to provide quotations on the basis of the requested quantities being available (i.e. at their typical "list" price), in order to avoid the possibility of price adjustments to reflect currently applicable specific supply constraints. Theoretically, this should result in a quoted price that only reflects long term price movements due to supply and demand. Again, whether this is absolutely the case is difficult to properly assess without an in depth analysis of the particular market for that product, and all its associated drivers.

- **Assessment of costs by direct comparison / confirmation of quotes vs. acceptance of use of escalation**
  The 2008 WNR Report uses a combination of direct quotation and escalation to assess cost movements. In many cases, without revisiting the detailed make up of some cost items (such as for signalling and communications) the use of escalation is an reasonable methodology. However, where possible and appropriate, Maunsell have assessed absolute costs against known data, whether quotes or project experience. This may also be in addition to assessing the appropriateness of the escalation that has been used.

- **Acceptance of generalisations and groupings used**
  Where some items have been grouped or generalised for ease of categorisation, Maunsell have not challenged this, and have used the groupings to assess the costs as practically as possible. The downside of this is that there is a greater risk of mis-interpretation between the WNR cost assessment, undertaken by one party, and Maunsell's cost assessment undertaken by another, third party. Specific instances where these risks are apparent are identified for the specific items.

- **Acceptance that all unit costs identified are sufficient for complete costing of new build**
  Maunsell have not analysed whether all the items and unit costs as a totality are sufficient to indicate the total cost of replacement for the railway infrastructure in question. This is assumed to be addressed elsewhere within the assessment process.

Cost Review

4 Rail

The following definitions and assumptions have been considered:

- **Rail specifications**
  Rail has been quoted as plain carbon rail supplied in 27.5m lengths with delivery to Midland for welding to 110m lengths. The potential for supply of rail from China is discussed below. Chinese supplied rail would be delivered in 25m lengths if this option was pursued.

- **Use of lesser rail weights in large scale construction projects**
  Prices have been obtained for 41kg/m rail, as a comparison to the price presented in the 2008 WNR Report. However, it does not seem reasonable to use 41kg/m rail in new construction particularly as there is a higher cost in relation to higher rail weights. It is understood that these higher costs are driven by the typically lower manufacturing volumes for lower rail weights, and the manufacturers have indicated that higher production volumes would drive this price down. Maunsell have noted that this issue has been discussed in depth for previous reviews (and will also be re-addressed for this review), and as a result, consider that this issue has been adequately addressed.

Item	WNR Proposed Price ($)	Reasonable?	Justification
41kg/m rail	$1600/tonne	No	Recent quote from a domestic rail producer for delivery to Midland Flashbutt Welding Facility on the basis of significant (>500km) order, corroborated these rates. Rates for each rail type are 6% to 8% higher for orders less than 500km in length, but the lower rates are reasonable in the context of this study. These unit costs have been further corroborated by historical data held by Maunsell on an estimate for a WA based project produced two years ago considered with an appropriate escalation factor ($1,300/tonne for 60kg/m rail).
50kg/m rail	$1500/tonne	No	
60kg/m rail	$1400/tonne	Yes	

Table 1: Cost Review of Rail

Enquiries were made through AECOM's offices in Shanghai, China for supply of rail to the Australian market from Chinese manufacturers. A rate of US$1100/tonne was quoted FOB (Free On Board) at a Chinese port for all rail weights except 41kg/m. A cost per tonne for shipment from China to Western Australia then needs to be considered. This shipment cost will need to include marine freight costs, insurance, unloading and shipment to the final destination (in this case, Midland Flashbutt Welding Facility). This is in comparison to the rate of AU$1500/tonne quoted in the 2008 WNR Report.

Of importance in considering the economic viability of supplying rail from China is the consideration of exchange rate fluctuations. There has been considerable volatility in the AUD to USD exchange rates in Q3 and Q4 of 2008 that need to be taken into consideration with the AECOM quotes. These quotes were received from an enquiry made in the first week of December 2008, whereas the 2008 WNR Report is dated 25th September 2008. On 1st September 2008 1USD = 1.166AUD, whereas on 1st December 2008 1USD=1.529AUD representing a 31.1% reduction in relative value of the Australian Dollar, and an FOB price of approximately AU$1700 per tonne. This suggests that supply of rail from China is currently uneconomical. Furthermore, in the context of setting a unit price with confidence to input into Floor and Ceiling access pricing that has a two-year validity, it cannot be recommended that an overseas supply price be relied upon. Contractual mechanisms (such as hedging) can be used to reduce uncertainty from exchange rate movements, but typically a long lead forward order with supply over a reasonable period of time would be required (e.g. to meet a continuous network expansion or renewal target).

AECOM's Chinese procurement office also confirmed that although the supplier "had confidence" in meeting AS code requirements for rail quality, their quotes were based on supply to UK code only.

5 Rail Welding

The following definitions and assumptions have been considered:

- **Adequately addressing logistics of Greenfields construction**
  The 2008 WNR Report describes the separation of the consideration of flashbutt welding on manufactured rail lengths (27.5m) at Midland into 110m strings, and the welding of these strings on site using Thermit welds, the cost of which is considered as part of the tracklaying activity. As the tracklaying activity, as defined in Section 3.5.2 of the 2008 WNR Report, also includes for transportation to site, this is reasonable.

- **WNR rates are directly from Midland Facility**
  Assuming that the facility at Midland is available for the task of rail welding for the purposes of the context of this report, using this facility will be the most cost effective way of welding rail strings. There are other potential options (mobile welding, or creation of a separate fixed welding facility which is typically

undertaken for the purposes of large construction projects), but they are unlikely to offer a cost saving on the use of an existing facility.

Item	WNR Proposed Price ($)	Reasonable?	Justification
Flashbutt Weld	$400 ea	Yes	A recent quote from a rail contractor indicated a higher price than this figure. However, WNR's dedicated facility provides for economy and efficiency. In addition, the rate quoted by WNR is consistent with recent Maunsell project experience.

Table 2: Cost Review of Welding

6 Sleepers

The following definitions and assumptions have been considered:

- **Order quantities**
  All sleeper quotes are based on the same order quantities specified in the 2008 WNR report (e.g. 160,000 sleepers).

- **Concrete and steel sleepers**
  All concrete and steel sleepers were quoted as supplied with rail fasteners.

- **Use of timber sleepers relevant to asset replacement**
  The 2008 WNR Report states that timber sleeper supply may not be relevant to the large scale asset replacement. This is a reasonable position on the basis that it would be difficult to secure a supply of timber sleepers sufficient to meet the requirements of a large project, and that the requirements of MEA criteria would suggest the use of concrete or steel sleepers to be more appropriate.

- **Concrete sleeper forward orders**
  In accordance with the assumptions set out in Section 2.2, the unit costs for sleepers have been obtained on the basis of supply being available. It should be noted that Maunsell are aware of a current potential supply issue for concrete sleepers in Australia, on the basis of current forward orders for the purposes of iron ore network expansions, and other projects. This was as of November 2008. It is understood that procurement of sleepers in large quantities is extremely difficult before 2010. However, due to very recent events in the iron ore industry, and the domestic economy in general, this situation may no longer be current. It is obvious that there is some volatility in the market at the moment, which may have short and long term effects on sleeper pricing. Notwithstanding this, Maunsell's liaison with suppliers did not

result in any unusual information regarding pricing, aside from that described below.

Item	WNR Proposed Price ($)	Reasonable?	Justification
Concrete NG	$120 ea	Yes	WNR reports higher component costs for concrete sleepers. Our discussions with suppliers have indicated that fluctuations in component costs have been minimal and that costs for components such as steel reinforcing strand are decreasing. Costs quoted to Maunsell shown in bracketed red.
Concrete SG	$155 ea [$125 ea]	No	
Concrete DG	$210 ea [$174 ea]	No	
Steel NG M7.5 non-insulated system	$88 ea	Yes	Based on recent quotations from a domestic producer these costs are consistent and reasonable.
Steel NG M8.5 insulated system	$110 ea	Yes	
Steel SG M7.5 non-insulated system	$102 ea	Yes	
Steel SG M8.5 Insulated system	$123 ea	Yes	
Steel DG M7.5 non-insulated system	$198 ea [$110 ea]	No	WNR report that manufacturing requirements significantly increase costs for dual gauge sleepers (e.g. welding of rail support plates). Maunsell enquiries have indicated that these sleepers can be obtained from a major domestic supplier for the cost shown in bracketed red.
Steel DG M8.5 insulated system	$210 ea [$136 ea]	No	
Timber SG	$55 ea	Yes	Recent costs from a rail contractor indicated timber sleeper costs as 20% higher than those quoted by WNR. The costs in the 2008 WNR report have been discounted by 5% to reflect possible supply in larger numbers.
Timber NG	$65 ea	Yes	
Baseplate	$19 ea	Yes	Consistent with recent Maunsell project quotations.
Lockspike	$1.15 ea	Yes	
Rail Clip	$2.60 ea	Yes	

Table 3: Cost Review of Sleepers and Fasteners

Maunsell sought to clarify comments made in the 2008 WNR Report regarding the price of concrete sleepers being affected by supply constraints on components such as steel pre-stressing strand. The suppliers consulted did not indicate that there was an issue in this respect and that the prices quoted for concrete sleepers were not fluctuating significantly for any reason. In addition, the supplier indicated that the 6-month outlook on steel strand supply was such that a decrease in price may be expected. Additional information was received from WNR in January 2009 that corroborates this view. As a result it is recommended that a lower price be adopted on the basis of supplier quotations and comments received.

Maunsell also sought to clarify comments made in the 2008 WNR Report regarding the price of dual gauge steel sleepers. The supplier confirmed that the prices quoted to Maunsell were correct, and whilst acknowledging the additional complexity in manufacture of a dual gauge steel sleeper, the supplier re-iterated that the prices quoted were reasonable and that they took this additional manufacturing effort into account. As a result it is recommended that a lower price be adopted on the basis of supplier quotations and comments received.

7 Ballast

The following definitions and assumptions have been considered:

- **Minimum order quantities**
  As per the 2008 WNR Report, quotes were obtained for an order of 300,000 tonnes of ballast supplied ex quarry at the locations specified.

- **How to account for delivery**
  The 2008 WNR Report accounted for delivery costs on the basis of $0.09 per tonne kilometre and an average haulage distance of 150km. Maunsell's experience shows that haulage rates will vary depending on location and distance. In addition, there are other variables such as method of transportation (e.g. split between mode – road or rail). Accounting for these variables in a meaningful way requires some considerable analysis of reliable information. Although the method used in the 2008 WNR Report is simplistic, it does provide a benchmark to be tested. Maunsell did so by obtaining a haulage cost from a supplier in comparison.

Item	WNR Proposed Price ($)	Reasonable?	Justification
Ballast – Perth Metro	$34 / tonne [$24 / tonne]	No	WNR cost corroborated by recent cost established by major rail contractor. However, supplier quote is 29% lower (shown in bracketed red). Please see discussion below.

Item	WNR Proposed Price ($)	Reasonable?	Justification
Ballast – Bunbury	$32 / tonne [$27 / tonne]	No	WNR cost corroborated by recent cost established by major rail contractor. However, supplier quote is 16% lower (shown in bracketed red). Please see discussion below.
Ballast – Kalgoorlie	$27 / tonne [$23 / tonne]	No	Supplier quote is 16% lower (shown in bracketed red). Please see discussion below.
Ballast – Esperance	$50 / tonne [$25 / tonne]	No	Supplier quote (shown in bracketed red) suggest lower prices are achievable for high volumes. Please see discussion below.
Transport Cost	$12 / tonne [$5.40 / tonne]	No	Quotes indicate an average of 9c per tonne km for a large volume movement over a 60km trip would be efficient cost.

Table 4: Cost Review of Ballast

In assessing the cost of ballast supply Maunsell approached both a major contractor and a major supplier for quotations. As indicated above, inconsistent information was received between the two sources, with the contractor's quote corroborating WNR's pricing and the supplier's significantly lower. The supplier indicated that ballast prices had fallen recently, by more than had been anticipated. It is difficult to assess whether such a decrease is long term, but with the recent postponement and cancellation of capital railway works in the Pilbara, it is not unreasonable to assume that any downward movement in ballast prices will endure for some time, particularly for supply in the Perth Metro area. In addition, the supplementary submission of information by WNR in January 2009 corroborates this with a quotation of $24 per tonne for supply to the Perth metropolitan area. As a result, it is recommended that the lower prices be utilised.

8 Turnouts

The following definitions and assumptions have been considered:

- **Definitions**
  Turnout supply has been quoted to Maunsell inclusive of all bearers (except for timber turnouts) and exclusive of switchmotors and levers (which is assumed to be included in the signalling and communications costs). All turnout costs were inclusive of delivery to the Perth metro area only.

- **Greenfield installation only**
  There are potentially significant cost differentials in installation of turnouts into an existing railway line, and installation as part of a new build. The latter has been considered in the assessment of installation costs.

Item	WNR Proposed Price ($)	Reasonable?	Justification
SG 1:12 60kg on concrete sleepers	$166,250	Yes	WNR price corroborated by supplier.
DG 1:16 60kg on concrete sleepers	$359,950	Yes	WNR price 16% lower than that quoted by supplier.
NG 1:12 60kg on concrete sleepers	$146,650	Yes	WNR price 12% lower than that quoted by supplier.
SG 1:12 60kg on timber sleepers	$166,250	Yes	WNR price 28% higher than that quoted by supplier. However, the quote obtained by Maunsell did not include for bearers. It is assumed (although not explicitly stated) that WNR prices include for bearers. If so, it is reasonable that the quoted total price will be within 10% of WNR costs.
DG 1:16 60kg on timber sleepers	$359,950	Yes	WNR price corroborated by supplier.
NG 1:12 60kg on timber sleepers	$146,650	Yes	WNR price 12% higher that that quoted by supplier. However, the quote obtained by Maunsell did not include for bearers. It is assumed (although not explicitly stated) that WNR prices include for bearers. If so, it is reasonable that the quoted total price will be within 10% of WNR costs.
SG 1:12 50kg on timber sleepers	$139,800	?	Maunsell were unable to obtain a supplier quote for 50kg turnouts on timber sleepers. However, if it is accepted that the 60kg on timber turnout prices are reasonable, the 50kg prices are comparable.
DG 1:16 50kg on timber sleepers	$372,500	?	
NG 1:12 50kg on timber sleepers	$131,700	?	
Installation SG Concrete	$115,000	Yes	Refer to discussion below regarding installation rates.
Installation DG Concrete	$130,000	Yes	

Item	WNR Proposed Price ($)	Reasonable?	Justification
Installation NG Concrete	$115,000	Yes	
Installation SG Timber	$115,000	Yes	
Installation DG Timber	$130,000	Yes	
Installation NG Timber	$115,000	Yes	

Table 5: Cost Review of Turnouts and Installation

Maunsell obtained quotes for turnout installation from a major rail contractor that has recently undertaken rail construction in New South Wales, and has access to recent construction information from projects in the Pilbara. The prices obtained were typically 70% higher for installation of turnouts in concrete bearers and 90% higher for installation of turnouts on timber bearers, than those provided by WNR. This is likely to be for the following reasons:

- WNR's long standing contract with John Holland for the maintenance and renewal of the WNR network.
- Higher installation costs interstate and for the Pilbara network.
- Potential differences in perceived installation scope.

An incumbent contractor will offer significant savings on turnout installation costs in comparison to a third party who will need to account for a number of items in their cost estimation, including:

- Overheads
- Mobilisation and establishment
- Profit
- Contingency

As such, it appears that the 2008 WNR Report has reasonably taken these savings from an incumbent contractor into account, when assessing installation costs for turnouts.

9 Tracklaying

The following definitions and assumptions have been considered:

- **Extent of works**
  The extent of works included for tracklaying is defined in Section 3.5.2 of the 2008 WNR Report. This was the extent of works used by Maunsell to obtain quotes. Note that this extent does not include for the delivery of turnouts to site, although it does account for rail delivery.

Item	WNR Proposed Price ($)	Reasonable?	Justification
NG – Kwinana to Bunbury Inner Harbour	$132.45 per m	Yes	Refer to discussion below regarding tracklay rates.
SG – Forrestfield to Kalgoorlie	$146.50 per m	Yes	
SG – Kalgoorlie to Leonora	$112.30 per m	Yes	
SG – Kalgoorlie to Esperance	$112.30 per m	Yes	
DG – Forrestfield to Kalgoorlie	$168.55 per m	Yes	

Table 6: Cost Review of Tracklaying

A similar situation exists when assessing tracklaying costs to that encountered when considering the installation of turnouts. The incumbent contractor offers price advantages that need to be considered in assessing the reasonableness of the proposed price against an alternative contractor quote. The same contractor as used for the turnout quotations was used to obtain quotes for tracklaying. The result was a 30% higher cost for tracklay on the SWM and EGR, and a 75-90% higher cost for tracklay from Leonora to Esperance. This is likely to be for the same reasons as described in Section 3.5.

10 Bridges

The following definitions and assumptions have been considered:

- **Definitions**
  It is noted in the 2008 WNR Report that the cost of bridge construction is highly dependent on a number of site specific factors including hydrology, foundation requirements, and geotechnical conditions. As a result, categorisations have been determined on the basis of previously undertaken work. These categorisations have been used by Maunsell to undertake a price comparison of the per square metre rates.

- **Absolute cost comparisons**
  The 2008 WNR Report applies an escalation factor to a rate previously determined in a 2006 assessment (which in turn had been escalated from a base established in 2002). It is preferable to undertake an absolute cost comparison for each bridge category. However, given the difficulty in determining the scope, and hence obtaining quotes that can be considered to be on a comparable basis, the escalation factor has been considered for reasonableness.

Item	WNR Proposed Price ($)	Reasonable?	Justification
Simple <12m span 4m wide	$3116 per m^2	Yes	Refer to discussion below.
Simple <12m span 8m wide	$2981 per m^2	Yes	
Simple <12m span 3.6m wide	$2981 per m^2	Yes	
Medium 12m to 20m span 4m wide	$3793 per m^2	Yes	
Medium 12m to 20m span 8m wide	$3658 per m^2	Yes	
Medium 12m to 20m span 3.6m wide	$3522 per m^2	Yes	
Complex >20m span 4m wide	$4606 per m^2	Yes	
Complex >20m span 8m wide	$4471 per m^2	Yes	
Complex >20m span 3.6m wide	$4335 per m^2	Yes	

Table 7: Cost Review of Bridges

Maunsell experience has shown that escalation factors in railway bridge construction have been high over the last few years, particularly for remote locations. As a result the claimed escalation factor is not unreasonable.

11 Culverts

The following definitions and assumptions have been considered:

- **Sizes used as basis of quote**
  For the purposes of this unit cost review, culverts have been considered as small, medium or large, within the size ranges shown in Table 8. However, it is not stated in the 2008 WNR Report how the price has been set for the range that exists for each category. Maunsell sought prices using the category descriptor and received quotes for culverts at the upper end of the size range.

- **Supply and Install**
  It is not explicit in the 2008 WNR Report whether the rates are for supply only or whether they include installation. It is assumed they are for supply only, due to the quantum of cost quoted.

Item	WNR Proposed Price ($)	Reasonable?	Justification
Small – Culvert <1000mm	$288.98 / m	?	Supplier quote was 24% higher. Please refer to discussion below.
Small – End Treatment (650mm ave)	$880.62	?	Please refer to discussion below.
Medium – Culvert 1000mm to 2000mm	$1255.27 / m	?	Supplier quote was 50% higher. Please refer to discussion below.
Medium – End Treatment (1450mm ave)	$1964.46	?	Please refer to discussion below.
Large – Culvert >2000mm	$2853.21 / m	?	Supplier quote was 40% higher. Please refer to discussion below.
Large – End Treatment (2850mm ave)	$3,861.18	?	Please refer to discussion below.

Table 8: Cost Review of Culverts

Although supplier quotes were sought, there was a difficulty in establishing a common basis for the quote against the scope of the categorisations for each culvert type and end treatment. This is a similar situation as to that of bridges. As a result, the validity of the quotes received is called into question. However, as prices quoted were higher, this suggests that the escalation factors quoted are not unreasonable, assuming a valid base cost, as determined in previous reviews.

12 Level Crossings

The following definitions and assumptions have been considered:

- **Absolute cost comparisons**
  The 2008 WNR Report uses an escalation factor to previous cost estimates to arrive at an equivalent 2008 price. Maunsell have had sufficient recent experience with the costing of level crossing equipment to be able to undertake a direct cost comparison, rather than assess the validity of the escalation factor.

- **Surfacing inclusive of supply**
  In examination of the rates proposed, and the methodology used to form the base rates in 2002, which have since been escalated, it is understood that the surfacing rates are inclusive of labour for installation.

Item	WNR Proposed Price ($)	Reasonable?	Justification
DC Westrak Controlled – Lights	$124,774 ea	Yes	Maunsell have recently undertaken pricing for a rail project in the Mid West and, through obtaining direct quotes from suppliers, have priced crossing equipment to a similar level as WNR.
DC Westrak Controlled – Lights & Boom Gates	$175,773 ea	Yes	Maunsell have recently undertaken pricing for a rail project in the Mid West and, through obtaining direct quotes from suppliers, have priced crossing equipment to a similar level as WNR.
Predictor Controlled – Lights	$156,982 ea	Yes	Recent quotes obtained by Maunsell show that predictor equipment for a lights only crossing to be $30k more than for a DC Westrak controlled crossing.
Predictor Controlled – Lights & Boom Gates	$226,613 ea	Yes	Recent quotes obtained by Maunsell show that predictor equipment for a lights and gates crossing to be $40k more than for a DC Westrak controlled crossing.
Surfacing – Bitumen	$85.00 per m^2	Yes	Corroborated by contractor quote. The WNR proposed price is reasonable on the basis that it is inclusive of labour.
Surfacing – Concrete	$101.61 per m^2	Yes	Corroborated by recent quote for asphalt concrete for the purposes of level crossing construction.
Surfacing – Gravel	$81.29 per m^2	?	Recently received contractor quote was significantly lower.
Surfacing – Metal Dust	$33.87 per m^2	Yes	Corroborated by contractor quote.
Surfacing – Rock Ballast	$27.10 per m^2	Yes	Reasonable on the basis of supplier quotes for railway ballast.

Item	WNR Proposed Price ($)	Reasonable?	Justification
Surfacing – Timbered	$47.42 per m^2	?	Maunsell have been unable to obtain a reliable quote for this item due to the difficulty in properly establishing the requirements for a new build project.

Table 9: Cost Review of Level Crossings

Maunsell have been unable to obtain reliable quotes for Gravel Surfacing or Timbered Surfacing for level crossing construction, sufficient to be able to corroborate or otherwise the WNR costs. As a result, it is recommended that the escalation factor be applied as suggested in the 2008 WNR Report.

13 Earthworks

The following definitions and assumptions have been considered:

- **Earthworks profile specification**
  The specification of earthworks embankment profile utilised for quoting and cost comparison is as stated in Section 3.5.6 of the 2008 WNR Report. Recent quotes obtained by Maunsell for projects in the Mid West indicate earthworks costs per km at levels above those proposed by WNR. The WNR approach to escalating earthworks from 2006 to 2008 appears reasonable.

14 Miscellaneous

The following definitions and assumptions have been considered:

- **Uncertainty of scope**
  For all of the items in this category, except fencing, there is an identified lack of clear scope as to what constitutes each of the items, and hence how the cost is made up. This then makes it very difficult to ensure that the basis of quotation is the same between two separate parties.

Item	WNR Proposed Price ($)	Reasonable?	Justification
Trackside signage	$2,709 per km	Yes	On the basis of the escalation factors applied, these costs are not unreasonable. Contractor quotes for these items ranged from 25% (for provision of a shunter's walkway) to 200% (for
Shunters walkway	$4,720 per km	Yes	
Access roads	$6,774 per km	Yes	

1.8m chainlink fence w. 3 strands barbed wire	$39.50 per m	Yes	provision of an access road) higher than that quoted. The contractor was asked to price a "typical" railway construction project.

Table 10: Cost Review of Miscellaneous Items

It is impossible to undertake a direct price comparison for these items due to the scope uncertainties that exist. However, on the basis of the quotations that were received it is not likely that these items have been unreasonably priced.

15 Signalling and Communications

The following definitions and assumptions have been considered:

- **Use of escalation rates vs. absolute cost assessment**
  The 2008 WNR Report applies an assessed escalation rate to signalling and communications costs that were assessed through a previously undertaken detailed review of costs to replace infrastructure for each line section. For the purposes of this report it is impractical to undertake a thorough review of the make up of these costs. A review of the escalation factors will be undertaken.

A review of Table 22 of the 2008 WNR Report was undertaken. Maunsell undertook a "dummy" estimate of signalling replacement costs for a crossing loop on the Avon Yard to Merredin section of line to establish a breakdown comparison for each of the activities of Engineering, Materials, Installation and Management. In addition, the percentage split was considered from an overall judgement based on experience. Maunsell assessed the breakdown to be within +/-5% of the split in the 2008 WNR Report and hence consider that the percentage splits shown in Table 22 to be reasonable.

The escalation factors used in Table 23 are in line with ABS published factors and are not unreasonable in this context.

16 Maintenance

John Holland have the long term contract for maintenance and renewals of the WNR network. As a result, making an assessment as to whether the absolute cost of maintaining the WNR network is reasonable is difficult due to the difficulty in obtaining a direct comparison from third parties. In addition, maintenance rates depend upon a number of variables associated with the specific nature of the line being considered:

- Axle loading – higher axle loads lead to greater wear and tear per train movement.
- Traffic volume – higher volumes lead to the need for more frequent maintenance and renewal intervention.

- Asset age – newer assets will require less maintenance than those that have been in service for a long time.
- Structures number and type – more structures on the route will result in the need for increased requirements for activities such as bridge audits and resulting renewals
- Route geometry – Higher numbers of low radii curves will increase the need for maintenance effort
- Signalling system type – fixed signalling equipment will require higher maintenance effort
- Strategic value of route – a railway infrastructure company as a private entity may make strategic decisions as to the business value of specific route infrastructure and direct investment accordingly

These variables are recognised in the 2008 WNR Report assessment and on the basis of the initial determinations of maintenance rates being an accurate reflection of these variables, the rates have been escalated, rather than reviewed. Table 25 in WNR's 2008 assessment provides a $/km maintenance rate for various routes on the network. The routes identified could be broadly divided into two categories as shown in Table 11.

Category	Line Sections	WNR Average Maintenance Rate ($/km)
Higher Volume Trunk	Southwest Main, Eastern Goldfields (EGR), East Collie to Premier	$21,000
Lower Volume	Leonora, Esperance & Grain Lines	$10,000

Table 11: WNR Line Sections by Category

Maunsell have recently undertaken work on the QR system in Queensland that indicates maintenance costs per km ranging from $21,000 to $41,000 for trunk freight and passenger routes with axle loads up to 26tal. The need to maintain passenger ride comfort on routes on the QR network will also drive maintenance costs up, as an additional variable to those provided. This provides an indication that the average maintenance rates provided by WNR are at a reasonable level for the traffic being carried.

Appendix C Changes in the WNR Access Pricing Model

WNR has made a large number of changes in the 2008-09 APM since the version used for calculating floor and ceiling costs in 2006. In overhauling the model from 2006, WNR has identified a series of omissions and calculation issues which have been corrected in the new APM used for 2008. Details of these issues have been provided by WNR in their Supplementary Submission of October 2008. PwC has completed a review of the new 2008 APM through sample testing and this review did not identify any further material accuracy issues.

The impact of the changes in the APM has been an increase of 1.9% (or $4.6 million) in the aggregate 2008 ceiling costs for nine lines.

The costs for 2006 have then been escalated to the 2008 costs as per the new APM and this is further escalated to set the 2009 floor and ceiling costs. The 2009 ceiling prices are 13% more than the 2008 ceiling prices. The proposed 2009 ceiling prices for the 9 original lines (excluding Kwinana to Soundcem) is 48.6% higher than the 2006 final determination ceiling.

Table A: WNR's approved 2006 and proposed 2009 ceiling costs by line ($A)

Line		ERA Approved 2006 Ceiling	WNR's Proposed 2008 Ceiling- Old APM	WNR's Proposed 2008 Ceiling- New APM	WNR's Proposed 2009 New APM Ceiling	% Increase in 2009 over 2008	% rise attributed to change in APM
Grain lines							
1	Avon to Goomalling	$4,385,906	$5,601,741	$5,651,024	$5,989,441	6%	0.9%
2	Katanning to Tambellup	$3,113,891	$3,961,758	$4,315,177	$4,724,402	9%	8.2%
3	Kulin to Yilminning	$6,497,751	$8,203,248	$8,516,505	$9,053,351	6%	3.7%
Main lines							
4	Kwinana to Bunbury	$25,723,536	$31,642,191	$31,376,872	$36,054,544	15%	-0.8%
5	Brunswick to Premier	$7,729,445	$9,402,700	$10,059,590	$11,608,900	15%	6.5%
6	Forrestfield to Kalgoorlie	$121,900,516	$159,842,073	$164,271,186	$189,556,587	15%	2.7%
7	Kalgoorlie to Leonora	$23,217,467	$30,385,669	$30,456,664	$32,171,074	6%	0.2%
8	Kalgoorlie to Esperance	$39,852,414	$51,306,286	$51,845,364	$57,338,924	11%	1.0%
9	Terminal end bits	$3,111,869	$3,471,013	$3,122,648	$3,409,938	9%	-11.2%
10	Kwinana to Soundcem	n.a.	n.a.	n.a.	$3,206,148	n.a.	n.a.
Total		**$235,532,795**	**$303,816,679**	**$309,615,030**	**$349,907,161***	**13%**	**1.9%**

* Note: The total figure does not include Kwinana to Soundcem ceiling

Validation of the Reconciliation to the new APM

The previous version of the APM has undergone changes into a new MS Excel framework (from a dual MS Access-MS Excel framework) and certain omissions and calculation issues were identified in the 2006 APM. This has resulted in restating the cost base of 2008 to a value higher by $4.58 million. The key reasons for the changes are summarised in Table B below:

Table B: Key issues resulting in changes in ceiling costs between 2006 and 2008 APMs

Issue	Unit	Old APM	New APM	Impact on ceiling
Gross Tonne Kilometre for Overhead allocation	GTK	19,331,878,343	22,707,023,912	-$3,360,279
Train nos total	Nos	247,439	305,937	
Omission of Perway region and infrastructure manager overheads	$	$0	$5,978,000	$5,907,747
Signal GRV Calculation revised due to double allocation in earlier model	$	$3,487,176	$1,743,588	-$189,157
Communication GRV being higher in 2008 due to inclusion of assets omitted in previous version	$	$43,384,682	$57,082,920	$1,712,190
Sleeper GRV-Cost of Timber sleepers understated since the material cost was omitted in earlier version	$		$7,215,719	$748,871
Changes due to economic life change of timber bearers				-$230,009
Other changes				-$5,271
Total				$4,584,092

Source: WNR Floor and Ceiling Cost Supplementary Submission October 2008

Other minor changes include changes in the value of communication backbone, change in grain distances, variations in culvert data, variation due to change in economic life of timber bearers etc. All the changes have been as per the reconciliation statement submitted by WNR to the ERA in the supplementary submission.

To validate the reconciliation process, PwC examined the worksheets and calculations used for the reconciliation process and on a sample test based examined:

- GTKs
- Train Numbers
- Final reconciliation worksheets for the new and old methodology as provided by WNR

Table C: Summary of reconciliation of old and new APMs

	APM Old Methodology			APM new Methodology
Reconciliation of Old and New APM	**2008 Ceilings as per WNR Submission***	**2008 Ceiling as per reconciliation sheet****	**Difference**	**2008 Ceilings as per WNR Submission***
Section				
Kwinana to Bunbury	$31,642,191	$31,642,191	$0	$31,376,872
Brunswick to Premier	$9,402,700	$9,402,700	$0	$10,059,590
Forrestfield to Kalgoorlie	$159,842,073	$159,842,073	$0	$164,271,186
Kalgoorlie to Leonora	$30,385,669	$30,385,669	$0	$30,456,664
Kalgoorlie to Esperance	$51,306,286	$51,306,286	$0	$51,845,364
Terminal Ends	$3,471,013	$3,470,972	$41	$3,122,648
Grain Lines	$17,766,747	$17,766,546	$201	$18,482,706
Total	**$303,816,679**	**$303,816,437**	**$242**	**$309,615,030**

Source: *WNR Proposed Floor and Ceiling Costs, pg 7
**Filename: Reconciliation of Models Workbook, Jul 1sourced from WNR