AUSTRALIAN RAIL TRACK CORPORATION LTD

AN ASSESSMENT OF ARTC MAINTENANCE COST RELATIVE TO EFFICIENT INDUSTRY PRACTICE

INTRODUCTION

ARTC's proposed 2007 Interstate Access Undertaking ("Undertaking") was submitted to the Australian Competition and Consumer Commission ("ACCC") on 7 June 2007.

Clause 1.1(e) of the Introduction to the Undertaking states:

'As an access provider, maintenance of the Network and Associated Facilities is a large component of ARTC's current cost structure. These services are either, outsourced and managed under maintenance contracts entered into on commercial terms as a result of a competitive tender process, or otherwise managed on an efficient basis. ARTC has adopted this practice with a view to ensuring that ARTC's cost structure will reflect efficient infrastructure practice.'

The track maintenance of ARTC's rail network in Victoria, South Australia and Western Australian has been undertaken via alliance arrangements with private sector engineering firms established via an open competitive tendering process for many years.

ARTC commenced operations in relation to certain parts of the NSW network (including those parts incorporated in the Undertaking) in September 2004. At the time, ARTC took responsibility for the maintenance of the interstate network in NSW. Routine and major periodic maintenance activity has been conducted by ARTC through a workforce seconded to ARTC by the NSW Government. The workforce was established through a process of ARTC identifying what it considered to an efficient resource level needed to undertake the task, and aligning the workforce to that requirement.

In order to vailidate the above statement in it's Undertaking that these practices ensure that ARTC's cost structure reflects efficient infrastructure practice, ARTC is providing additional information showing a comparison of ARTC forecasted costs associated with the maintenance of the network with efficient practice.

ARTC commissioned WorleyParsons to independently determine industry efficient benchmarks for maintaining the Network (subject to the Undertaking) given the condition and usage of the network over the term of the Undertaking. WorleyParsons has been involved in a number of similar assessments in relation to regulatory inquiries in Victoria[1] and Western Australia[2].

[1] Essential Services Commission (Victoria) – Maintenance Cost Benchmarking for the Victorian Freight Network. January 2006

[2] WestNet Rail – Review of Unit Prices for Clause 9 Ceiling Price Review August 2006.

WORLEYPARSONS EFFICIENT MAINTENANCE COST ASSESSMENT

WorleyParsons has derived a set of unit costs for maintenance activities applicable to the efficient maintenance of the ARTC interstate network. The method uses zero base costs that are derived by determining the individual activities necessary, the frequency of performing those activities and then applying a unit rate to those activities.

In compiling benchmarks, the following major assumptions were made:

- The approach to maintenance was for long term sustainability of the asset
- Maintenance is regarded as like for like replacement or repair
- The approach to maintenance in the past has been for long term sustainability of the asset
- The traffic characteristic for a line is that which has been in place for the last 5 years or which has been definitively committed for the next 5 years, the latter being adopted.

As such, WorleyParsons have sought to determine what might be considered to be an efficient scope and cost of activity in relation to ongoing steady-state maintenance of the ARTC interstate network. It should be noted however that such circumstances outlined in the assumptions are not always the case. As an example, increased scope of maintenance activity may be needed for a period in order to undertake deferred maintenance activities that have resulted from circumstances beyond the control of the track manager.

For example, ARTC has found it necessary to increase its scope of maintenance on the North-South network in NSW in order to catch up a substantial backlog of maintenance deferred prior to ARTC take-up of the NSW interstate network. The NSW Auditor-General's Report to Parliament[3] made the following report:

'RIC [Rail Infrastructure Corporation] has advised that there is a maintenance backlog of at least $596 million for country lines and $80 million for metropolitan lines as at 30 June 2004. Of this amount, $268m relates to rail lines that have been leased to ARTC.'

The effect of this will become evident later in this paper.

Also, a steady state assessment presumes assets are maintained evenly of their life. In practice life cycles of infrastructure components vary meaning that when a short time period is considered, maintenance costs could vary from a life cycle average.

[3] Auditor-General's Report to Parliament 2004 Volume Four, p282

There are a range of other reasons why there may be scope and cost variations to what might be considered an efficient steady state cost level. Other variations to the circumstances created by the assumptions made above that may result in scope and cost differentials might be:

- Change in traffic levels.
- The need to maintain a network to achieve a performance level that may be higher the asset is designed for.
- Network investment that may deliver lower scope and cost.
- Improved maintenance practices
- Improved materials purchasing and handling arrangements.

Following establishment of the existing ARTC network asset base, WorleyParsons applied its best judgement of what constitutes efficient maintenance practices to each component of existing track, structures and signals & communications assets to determine maintenance cost. Considerations included:

- Type of asset (eg sleeper type and spacing, rail weight, bridge type).
- Asset configuration (eg curvature)
- MPM maintenance cycles.
- Remoteness impacts
- Materials cost and transport
- Unit labour rates (including on-costs)
- Overhead allowance

Many of the assumptions and judgements made by WorleyParsons were either drawn from previous regulatory assessments, or consistent with previous assessments and adjusted to reasonable be applied to ARTC's network. Judgements were also based on evidence provided by ARTC through its dealings in competitive maintenance markets where considered appropriate by WorleyParsons.

Maintenance activities included in the assessment are described in Table 1 below.

Table 1 Maintenance Activities

No	Type	Activity
1	MPM	Tie Renewal – installation
2	MPM	Tie Renewal - ballast & tamp
3	MPM	Ballast Delivery - tie cycle
4	MPM	Sleeper Delivery - tie cycle
5	MPM	Turnouts
6	MPM	Surfacing (Concrete)
7	MPM	Ballast Delivery
8	MPM	Surfacing (Timber) - alternate with tie cycle
9	MPM	Ballast Delivery

No	Type	Activity
10	MPM	Surfacing (Steel or mixed Timber/Steel)
11	MPM	Ballast Delivery
12	MPM	Grinding
13	MPM	Undercutting
14	MPM	Rail Replacement (MPM)
15	MPM	Formation Maintenance & Vegetation Control
16	MPM	Level Crossings - panel renewal (Sealed road)
17	MPM	Level Crossings - panel renewal (Gravel road)
18	MPM	Signals Fixed – Maintenance
19	MPM	Communications – Maintenance
20	MPM	Bridges – Timber
21	MPM	Bridges - Concrete/ Steel
22	MPM	Bridges – Major
23	MPM	Culverts
24	MPM	Tunnels
25	RM	Track Inspection (incl. flaw detection)
26	RM	Reactive Maintenance (Civil)
27	RM	Signals Inspection & Reactive Maintenance
28	RM	Communications Inspection & Reactive Maintenance
29	RM	Mechanical Rail Joint Maintenance

Other relevant assumptions made by WorleyParsons in deriving efficient maintenance cost included:

- asset configuration on the ARTC interstate network as at 2006-07
- major structural elements, including concrete and steel bridges (but not timber bridges), formations, culverts and tunnels and their major components, will not require replacement. WorleyParsons assumed that bridge concrete wingwalls will not require replacement despite the fact that replacements of these elements are occasionally required due to inadequate designs or unforseen ground movements.
- concrete sleepers will have an indefinite life, as will rail and formation. This assumption would result in an under-estimation of the full cost of maintenance but without a full audit of the network as to the likelihood of these events occurring (not undertaken by WorleyParsons) any such estimation would be purely speculative. The effect of these matters is unlikely to be greater than the tolerance of the estimates overall.
- Unit labour rates (including on-costs) for infrastructure workers and labourers and supervisors of $50,000 and $80,000 respectively, normally equating to an average $35,000 and $56,000 salary respectively.

With regard to an allowance for maintenance and corporate overheads, WorleyParsons have applied a single loading of 20%, based on consideration of the overhead loading in other similar studies. Provision has been made for overheads associated with the planning and supervision and mobilisation of maintenance resources, provisioning

centres, and a share of corporate functions such as Finance and Accounting, Information Technology and Human Resources, together with management costs to support the workforce undertaking those maintenance activities. WorleyParsons considered it impractical, in a zero based exercise, to apportion these costs to activities; therefore a "below the line" add-on was considered appropriate.

ARTC MAINTENANCE COST COMPARISON

Against the efficient benchmark scope and cost of maintaining ARTC's interstate network derived by WorleyParsons, ARTC has sought to compare its actual cost of maintenance, and a reasonable allocation of overheads. The comparison below considers ARTC's east-west interstate network and north-south interstate network separately. This is done so as to distinguish the comparison over different maintenance cost structures inherent in ARTC's organisation.

For the comparison, the east-west and north-south interstate network consist of the following Segments.

East-West Network Segments	North-South Network Segments
Dry Creek – Parkeston	Tottenham – Macarthur
Pt Augusta – Whyalla	Islington – Queensland Border
Crystal Brook – Parkes	Moss Vale - Unanderra
Parkes – Cootamundra	
Dry Creek – Spencer Street	
Dry Creek – Outer Harbour	

In determining appropriate costs for the comparison, ARTC has extracted forecast maintenance expenditure (expenditure directly allocated to line segments) from financial forecast information determined as part of ARTC's annual Corporate Planning process. Forecasts are prepared for the five year term of the Undertaking. This information has been provided to the ACCC as part of ARTC's confidential financial modelling. Maintenance expenditure directly identified with line segments has been used for comparison with WorleyParsons efficient maintenance benchmarks (excluding overheads).

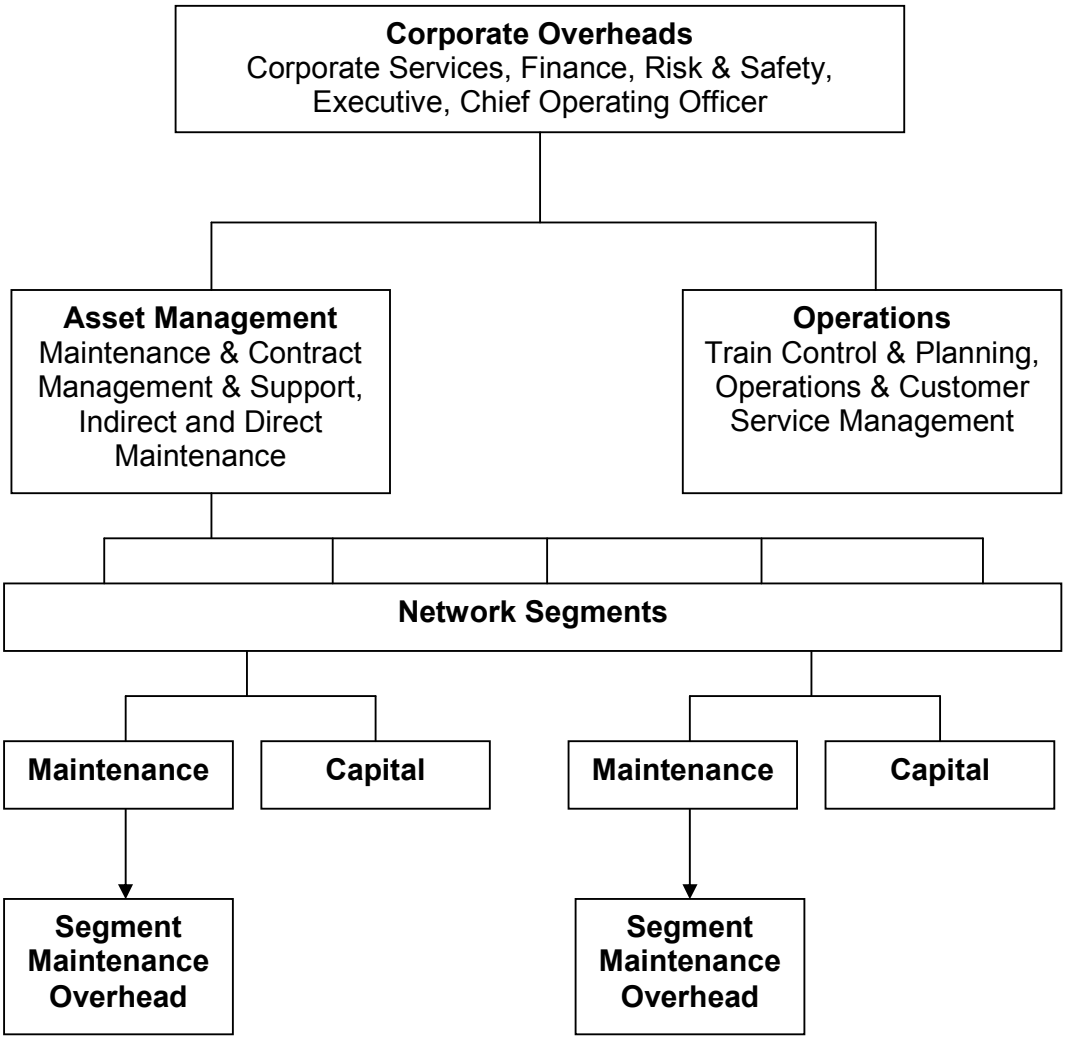
Other operating expenditure forming part of ARTC's financial forecasts (and provided to the ACCC) relates to the following ARTC functions:

- Indirect maintenance expenditure (not directly identifiable with a network segment) and asset management overheads.
- Network operations and train management
- Network performance and strategy
- Corporate and financial services
- Risk and safety
- Executive

In many cases, this operating expenditure has been identified with corridors and locations on the network. Certain elements of this expenditure have been allocated to ARTC's maintenance function by way of an allocation of indirect and overhead expenditure.

The allocation of indirect and overhead expenditure has been undertaken using the same approach as adopted for cost allocation in the Undertaking, except that the allocation is being made on a functional (maintenance) basis rather than on a geographic (segment) basis. Nevertheless, where expenditure can be identified with a corridor or location it is only allocated to those relevant parts of the network. Broadly, the allocation takes the line shown in Figure 1 below.

Figure 1



COMPARISON RESULTS

The WorleyParsons assessment of efficient maintenance scope and cost with respect to the east-west and north-south interstate networks respectively is shown in Table 2.

Table 2 – WorleyParsons efficient cost benchmarks.

	East-West ARTC Interstate Network	North-South ARTC Interstate Network	Total ARTC Interstate Network
Maintenance Expenditure (excluding overheads)			
$ per 000GTK	1.72	3.18	2.17
$000 per km	16.5	27.5	20.2

It is difficult to draw comparisons with other benchmarking studies in Australia largely due to differences in network characteristics and costing assumptions the following figures are drawn for comparison. Further, there have been very few comprehensive studies undertaken. ARTC has sought to compare the WorleyParsons efficient cost benchmarks with what it considers to be the most applicable previous work below.

Western Australia – Forrestfield to Kalgoorlie (Economic Regulation Authority (ERA))

Maintenance cost per track kilometre (excluding overheads) - $18,780[4]

Applicability – Similar track configuration and usage to ARTC east-west interstate network. Unit cost includes network maintenance only and excludes maintenance management and engineering support, and other overheads related to human resources, IT and other corporate functions. As such, it should compare with the WorleyParsons efficient cost benchmark excluding overheads above. This would suggest the WA benchmark is around 10-15% higher. The ERA has reported that in comparison to WA

Queensland – Moura Coal and North Coast Lines (Queensland Competition Authority (QCA))

Moura Coal Line – Maintenance cost per track kilometre - $29,350 ($2006)[5]

[4] Economic Regulation Authority, Corrigenda for the Final Determination and Approval of WestNet Rail's Proposed Floor and Ceiling Costs For Certain Rail Lines, p4.

(12mGT, concrete, CTC, coal only, 60kph, 22tonne axle load)

North Coast Line – Maintenance cost per track kilometre - $22,750 ($2005)[6]
(5mGT, timber, passenger/freight 120kph, 19T axle load)

Applicability – It should be noted that this figures reflect actual Queensland maintenance costs rather than efficient costs. It is also not clear as to whether the above figures include maintenance and/or corporate overheads but the context of the source documents suggest that overheads are not included. Based on this, there is some comparison that can be drawn with the WorleyParsons efficient cost benchmark for north-south ARTC interstate network excluding overheads, where configuration, terrain and utilisation are similar. ARTC would expect the unit cost to fall somewhere between the Moura Coal and North Coast Lines, where the coal line is more heavily utilised and higher axle load, and the North Coast Line is not as heavily utilised but with similar sleepering, and speed axle load characteristics.

Historical Estimates of 'World's Best Practice' in Australian Rail

A number of benchmarking and zero based assessment of efficient ('world's best practice') were conducted in the early to mid 1990's. Table 3 below shows what was considered then to be best practice for infrastructure maintenance represented in $2006-07.

Table 3 Comparison of ARTC infrastructure maintenance unit costs with historical average and WBP ($06/07)

Infrastructure Maintenance	Scope	Expenditure ($m)	GTK (b)	Unit Cost ($/000GTK).
1990/91 Actual[1] average	National	707	102.6	6.89
1993/94 Actual[2]	National average	676	116.9	5.78
1993/94 WBP[2]	National average	564	116.9	4.82

[1]International Performance Indicators –Rail Freight, Research Report 41, Bureau of Industry Economics,1992
[2]Rail Freight 1995 International Benchmarking, Report 95/22, Bureau of Industry Economics, December 1995. WBP was estimated by Symonds TraversMorgan based on the experiences of BP railways in a number of countries and adjusted for Australian conditions.

This evidence would suggest a substantial improvement in productivity (scope and cost) is implied in the WorleyParsons efficient cost benchmarks over the past 10-15 years, possibly in the order of 50%.

[5] Essential Services Commission (Victoria) – Maintenance Cost Benchmarking for the Victorian Freight Network prepared by WorleyParsons. Tables 5 and 6. Derived from figures contained in Working Paper 2, Draft Decision QR Draft Undertaking, Dec 2000 (QCA).
[6] Ibid

Notwithstanding difficulties in establishing applicability, the above evidence suggests that the WorleyParsons efficient cost benchmarks are consistent with previous benchmarking studies.

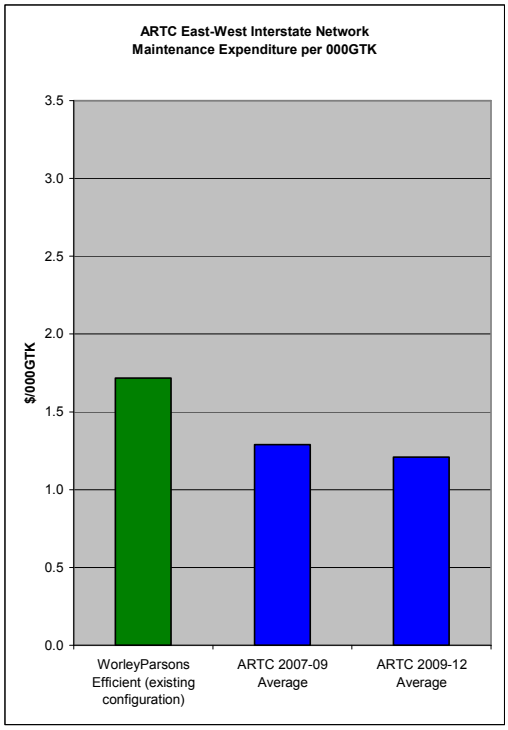
As noted earlier, the WorleyParsons efficient cost benchmarks are predicated on the ARTC network asset configuration as it was in 2006-07. On the other hand, ARTC maintenance forecasts complete changes to the network of the term of the undertaking some of which may affect maintenance scope and cost. To this end, by far the most significant impact on ARTC maintenance scope and cost over the term of the Undertaking results from the concrete sleepering program on the north-south ARTC interstate corridor in 2007-2009, which effectively replaces all non-concrete sleepers on the ARTC network between Melbourne and the Queensland border.

In order to improve the comparison, ARTC has adjusted the WorleyParsons modelling on the north-south ARTC interstate corridor to create full concrete sleepering, to derive efficient cost benchmarks adjusted for this effect.

Figure 2 below shows a comparison of ARTC forecasts maintenance expenditure ($/000GTK) over the term of the Undertaking with the WorleyParsons efficient cost benchmarks for the east-west and north-south ARTC interstate networks respectively. Figure 3 below shows the same comparison on a $000 per km basis. Comparisons are with ARTC actual average annual expenditure over the first 2 years of the Undertaking, and the last 3 years of the Undertaking respectively. All actual expenditures are incorporated in ARTC ceiling and floor limits as determined under the Undertaking and are shown in $2007-08.

The WorleyParsons benchmarks in relation to the existing ARTC interstate network, and the ARTC interstate network with concrete configuration (concrete sleepering north-south) is shown separately for comparison.

Figure 2



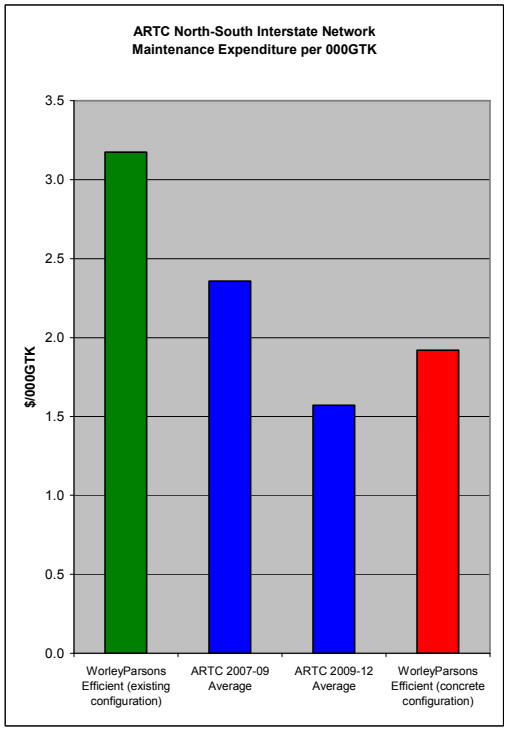
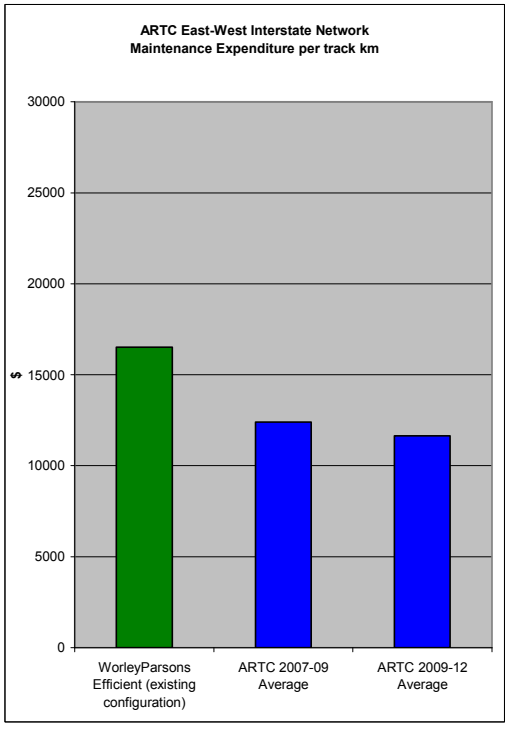
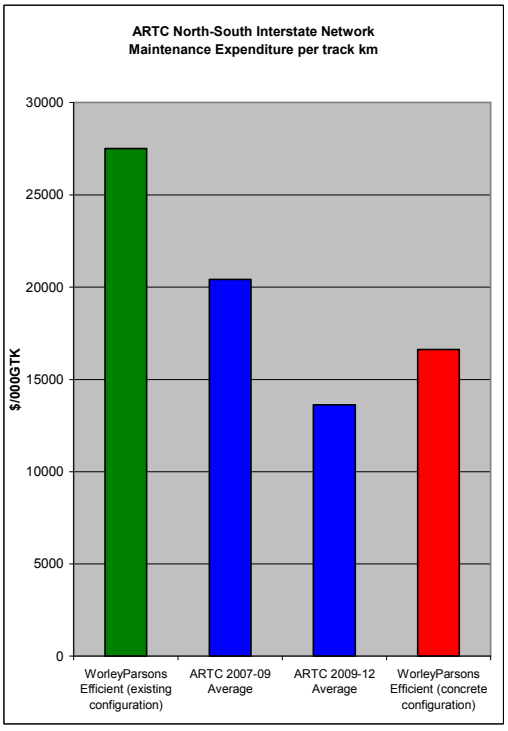


Figure 3





ARTC OBSERVATIONS AND CONCLUSIONS

WorleyParsons Assumptions

- WorleyParsons have assumed a 'steady state' existing configuration for the ARTC network. This is reasonable with respect to the east-west ARTC interstate network, but not reflective of north-south ARTC interstate network configuration. ARTC has adjusted the WorleyParsons efficient cost benchmarks to reflect concrete sleepered track in the future, in order to enable better comparison with ARTC maintenance cost forecasts.

- WorleyParsons have assumed unit labour rates (including on-costs) for infrastructure workers and labourers and supervisors of $50,000 and $80,000 respectively, normally equating to an average $35,000 and $56,000 salary respectively. ARTC considers this to be conservative. ARTC's experience in relation to competitively tendered maintenance contracts suggests a labour rate for track workers to be substantially higher when on-costs and overtime are allowed for. As a guide, the Australasian Rail Industry annually produces a remuneration report[7] that produces surveyed remuneration levels (base salary, and total remuneration cost) currently applying to various career categories and levels in the Australian rail industry. The June 2007 report shows relevant benchmarks for labourer and supervisory levels as shown in Table 4.

  Table 4

Infrastructure Maintenance	Average Base Salary	Average Total Remuneration Cost (excludes overtime)
Level 2 Transitional (labourer)	$53,407	$71,672
Level 3 Proficient (Workgroup Leader)	$63,143	$74,819

  The report suggests that the additional overtime and standby/on-call allowances associated with infrastructure workers, which is also a cost of employment, could add a further 15-30% to the Total Remuneration Cost. The WorleyParsons labour rate assumptions fall well short of these benchmarks.

- WorleyParsons have applied a single loading of 20%, based on consideration of the overhead loading in other similar studies. This markup is similar to observations by ARTC in relation to markups associated with maintenance contracts (including its own alliance contracts) by maintenance/engineering firms. WorleyParsons have included

[7] Australasian Rail Industry Remuneration Report, June 2007. Available via the Australian Railways Association website.

similar elements of maintenance management and support costs (described) above to that which might be expected for this sort of entity. ARTC is, however, not just a track maintainer (responsible for conducting maintenance activities in accordance with prescribed scope), but is a **network manager**. As such, ARTC needs to carry out a number of network governance functions in excess of that carried out by a maintenance company as it is not just responsible for maintenance but also for long term planning, asset sustainability, performance standards, property management and holistic management. As an example a track maintainer would not have a standards or infrastructure strategy function, as does ARTC. ARTC therefore considers that whilst WorleyParsons assumption in this regard may be reasonable in the context of a network maintenance company, it leads to an underestimate of required management and support cost for a network management company such as ARTC.

Existing Track Configuration

- ARTC's existing cost of maintaining compares favourably with WorleyParsons efficient benchmarks with respect to the east-west and north-south ARTC interstate networks. The efficient benchmark for the north-south network is substantially higher than that for the east-west network (around 80%). This could be expected given the more difficult terrain and climate, substantially higher curvature and pre-dominance of timber sleepers.

- On the east-west network, ARTC maintenance cost lies around 25% below WorleyParsons efficient benchmark. ARTC would expect a favourable outcome on this corridor given the track condition generally and 'steady state' maintenance requirements of this part of the network. Also, much of this track is presently concrete sleepered, with benign terrain, and unit costs at the lower end of the range of different networks could be expected. In some cases, WorleyParsons have applied unit cost assumptions across the whole network. ARTC maintenance cost is expected to fall further by around 5% through productivity improvements over the term of the Undertaking with track configuration remaining largely the same.

- On the north-south network, ARTC maintenance cost lies 20-25% below the WorleyParsons efficient benchmark. This is because the increased maintenance scope needed in the first two years in the Undertaking to address deferred maintenance (as described earlier) is more than offset by reduced scope associated with replacing an ongoing timber sleeper replacement program (MPM) with concrete sleepering (capital). ARTC's maintenance costs on the north-south network are expected to fall substantially (30%) in line with changed track configuration (a benefit associated with the concrete sleeper investment by ARTC).

Future Track Configuration

ARTC has adjusted the WorleyParsons efficient benchmarks to reflect the concrete sleeper investment on the north-south corridor, which could be expected to have the most significant impact on maintenance cost. This shows and efficient cost benchmark on the north-south network around 40% lower than existing benchmarks. ARTC's average maintenance cost over the final three years of the Undertaking shows 15-20% lower than efficient benchmarks. ARTC would expect maintenance expenditure to track closer to WorleyParsons efficient benchmarks over time. This is because ARTC's maintenance scope in the first few years relates to a newer and improved asset following concrete resleepering and other rehabilitation works. This would be below the scope reflecting long term steady state requirements, and is not sustainable beyond the short term.

Reduced maintenance scope associated with concrete sleepering the north-south ARTC interstate network has a significant impact on maintenance cost, bringing the efficient benchmark for these corridors to within 10-15% of the east-west ARTC interstate network efficient cost benchmarks. This would now largely reflect on differences in climate, terrain and curvature on the north-south ARTC interstate network.

Overhead Cost Allocation

WorleyParsons have assessed that a total of around $25m represents an efficient level of overhead that might be applied to maintenance work the ARTC interstate network, and have allocated this to parts of the network as a single loading (20%) to maintenance cost.

Whilst ARTC has sought to allocate overheads to its maintenance function, such allocation in the end is somewhat arbitrary. Further, the line between what is considered maintenance activity and what is considered maintenance support activity (overhead) is not always able to be clearly distinguished as ARTC maintenance often includes other activity such as rail safety inspections and assessments. Despite ARTC's efforts to align its cost classifications to those used by WorleyParsons, some uncertainty at the boundary will always exist.

Nevertheless, on the basis of the approach described earlier, ARTC has allocated a total overhead to the maintenance function of around $38m to the ARTC interstate network. For the reasons described earlier, ARTC would expect a substantially higher overhead than that assumed by WorleyParsons. As a manager, rather than maintainer, ARTC needs to undertake a number of other stewardship/governance functions that are not needed by a simple track maintainer. These functions need to be additionally contemplated in resourcing both ARTC's asset management and corporate areas.