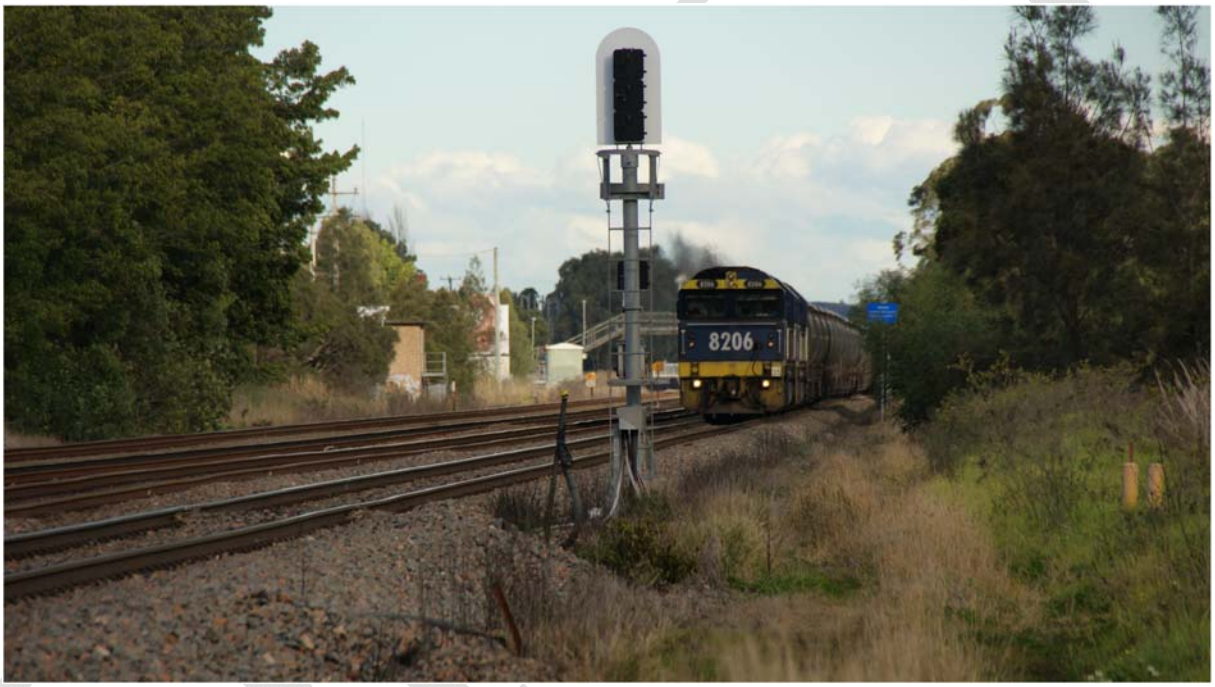
AUSTRALIAN RAIL TRACK CORPORATION LTD

Hexham Freight Loop



Supplementary Benefit Cost Analysis

March 2011

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Introduction

The Hexham Freight Loop has been developed and analysed as part of the NSFC Stage 1 Program. The Benefit Cost Analysis (BCA) for Stage 1 is included elsewhere in this submission.

However, as the project is being progressed in advance of the remaining projects in Stage 1, a supplementary BCA has also been undertaken which examines the costs and benefits of the project on a stand-alone basis (i.e. as an individual project rather than as part of the overall Stage 1 Program).

The results of the supplementary BCA are documented in this paper and the attached modelling results.

Methodology

This supplementary BCA is based, to the maximum extent possible, on the assumptions and key parameters in the overall Stage 1 BCA.

The specific approach adopted in this supplementary analysis is to consider the improvement in freight train reliability flowing from the project, due to:

- the ability to advance trains close to the ARTC-RailCorp boundary rather than holding them on the lower north coast some xx km further north.
- improved flexibility in train management (e.g. the ability to resequence trains) in the Hexham-Broadmeadow area

The project will allow for optimisation of path utilisation on the ARTC and RailCorp networks and provide for the ability to deal with late and out-of-sequence trains on the approach to the RailCorp network.

This will flow through to a small improvement rail's competitiveness against road and result in a modest transfer of traffic to rail.

The improvement in reliability and the consequential mode shift generate benefits in the form of operating cost savings, externality cost reductions, reductions in congestion and vehicle accident costs, and end-customer benefits.

Table S1 details the key parameters and assumptions adopted in this BCA.

Table S1: Key Parameters and Assumptions

Item	Treatment	Comment
Demand		
Base case	Base ntk – as per Stage 1 BCA	
Project case	Diverted ntk – 1% increase in base ntk (ramped up over two years from project completion)	Minor road-rail shift. This is equivalent to an increase in rail market share of 0.2%
Costs		
Project Cost	$17m	P90 estimate
Maintenance costs	$50,000 pa	Based on typical ARTC Routine Maintenance and Major Periodic Costs Maintenance costs
Benefits		
Transit time saving	Not included	
Customer Benefits	Availability benefit – Nil Reliability benefit – Unit rate assumed to be 10% of that used in the Stage BCA, applied to base + diverted ntk.	The resulting customer benefit is approximately 5% of the total Stage 1 customer benefit
Operating cost savings Externality costs Crash costs	Unit rates as per Stage 1 BCA, applied to diverted ntk only.	The resulting benefits are approximately 2% of the equivalent Stage 1 benefit.
Road freight decongestion	Unit rate as per Stage 1 BCA, applied to avoided truck vehicle kilometres travelled (vkt).	The resulting benefit is approximately 2% of the equivalent Stage 1 benefit.
Wider economic benefits	Not included	
Other parameters		
Evaluation Period	To 2045/46	As per Stage 1 BCA
Discount rate	7%, with sensitivity testing at 4% and 10%	As per Stage 1 BCA
Residual value	Assumes 100 year economic life.	As per Stage 1 BCA. Asset service potential is maintained by Major Periodic Maintenance expenditure, hence long economic life.
Real cost & benefit inflation	1% pa	As per as per Stage 1 BCA

Results

The results of the analysis are summarised in Table S2 below.

Table S2: Economic Evaluation Results at 7% Real Discount Rate

Total Undiscounted Capital Costs ($m)	**17.0**
Project Costs (Present value (PV) $m):	
Capital costs	15.9
Maintenance costs	0.7
Total Project Costs (PV $m)	**16.6**
Benefits (PV $ m)	
Transit time savings	-
Operating cost savings	20.7
Road freight decongestion	0.1
Customer reliability benefits	5.6
Externality cost savings	2.2
Crash cost savings	2.8
Total benefits (PV $ m)	**31.4**
Residual value (PV $ m)	1.4
Summary	
NPV ($m)	16.2
NPV/I	1.0
BCR	2.1
IRR (%)	13%

The results shows that, evaluated on a stand-alone basis and using a very conservative set of assumptions, the Hexham Freight Loop demonstrates strong economic performance, with a benefit cost ratio (BCR) of 2.1 and a net present value of $16.2m.

Sensitivity Testing

The results of sensitivity testing is shown in Table 3. Even at a discount rate of 10%, the results show good performance with a BCR of 1.4.

Table S3: Range of Economic Results

	Discount Rate		
	4%	**7%**	**10%**
NPV ($m)	34.7	16.2	6.4
BCR	3.5	2.1	1.4

Model outputs

Additional detail is included in the BCA model outputs included in Table S4 (attached).

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TABLE S4: HEXHAM FREIGHT LOOP BENEFIT COST ANALYSIS MODEL OUTPUT

RESULTS SUMMARY			
	4%	7%	10%
NPV ($mn)	34.7	**16.2**	6.4
BCR	3.5	**2.1**	1.4
IRR (%)	**13%**	**13%**	**13%**
NPV/I	2.1	**1.0**	0.4

Year	Usage parameters				Costs			Residual value	Benefits							Net benefits
	Base Rail M NTK	Diverted Rail M NTK @ 1% diversion rate	Total Rail M NTK	Avoided Truck M VKT @ 31 tonnes per truck	Capital costs	Operating costs	Total costs		Transit time	Operating costs	Road freight decongestion	Customer benefits - reliability	Externality costs	Crash costs	Total benefits	
									Nil	2.70 c per diverted ntk	0.41 c per avoided vkt	0.01 c per total ntk	0.29 c per diverted ntk	0.36 c per diverted ntk		
2010	3,076															
2011	3,392		3,392	-	17	-	17.00	-	-	-	-	-	-	-	-	- 17.00
2012	3,741	19	3,760	1	-	0.05	0.05	-	-	0.52	0.00	0.27	0.06	0.07	0.91	0.86
2013	4,126	41	4,167	1	-	0.05	0.05	-	-	1.15	0.01	0.30	0.12	0.15	1.73	1.68
2014	4,550	46	4,596	1	-	0.05	0.05	-	-	1.28	0.01	0.33	0.14	0.17	1.93	1.88
2015	5,018	50	5,068	2	-	0.05	0.05	-	-	1.42	0.01	0.37	0.15	0.19	2.15	2.10
2016	5,278	53	5,331	2	-	0.05	0.05	-	-	1.51	0.01	0.40	0.16	0.20	2.28	2.23
2017	5,551	56	5,607	2	-	0.05	0.05	-	-	1.61	0.01	0.42	0.17	0.22	2.42	2.37
2018	5,839	58	5,897	2	-	0.05	0.05	-	-	1.71	0.01	0.45	0.18	0.23	2.57	2.52
2019	6,141	61	6,202	2	-	0.05	0.05	-	-	1.81	0.01	0.47	0.19	0.24	2.74	2.68
2020	6,459	65	6,524	2	-	0.06	0.06	-	-	1.93	0.01	0.50	0.21	0.26	2.91	2.85
2021	6,459	65	6,524	2	-	0.06	0.06	-	-	1.95	0.01	0.51	0.21	0.26	2.93	2.88
2022	6,459	65	6,524	2	-	0.06	0.06	-	-	1.97	0.01	0.51	0.21	0.26	2.96	2.91
2023	6,459	65	6,524	2	-	0.06	0.06	-	-	1.98	0.01	0.52	0.21	0.27	2.99	2.94
2024	6,459	65	6,524	2	-	0.06	0.06	-	-	2.00	0.01	0.52	0.22	0.27	3.02	2.97
2025	6,459	65	6,524	2	-	0.06	0.06	-	-	2.02	0.01	0.53	0.22	0.27	3.05	3.00
2026	6,459	65	6,524	2	-	0.06	0.06	-	-	2.04	0.01	0.54	0.22	0.27	3.08	3.03
2027	6,459	65	6,524	2	-	0.06	0.06	-	-	2.07	0.01	0.54	0.22	0.28	3.12	3.06
2028	6,459	65	6,524	2	-	0.06	0.06	-	-	2.09	0.01	0.55	0.22	0.28	3.15	3.09
2029	6,459	65	6,524	2	-	0.06	0.06	-	-	2.11	0.01	0.55	0.23	0.28	3.18	3.12
2030	6,459	65	6,524	2	-	0.06	0.06	-	-	2.13	0.01	0.56	0.23	0.29	3.21	3.15
2031	6,459	65	6,524	2	-	0.06	0.06	-	-	2.15	0.01	0.56	0.23	0.29	3.24	3.18
2032	6,459	65	6,524	2	-	0.06	0.06	-	-	2.17	0.01	0.57	0.23	0.29	3.27	3.21
2033	6,459	65	6,524	2	-	0.06	0.06	-	-	2.19	0.01	0.57	0.24	0.29	3.31	3.24
2034	6,459	65	6,524	2	-	0.06	0.06	-	-	2.21	0.01	0.58	0.24	0.30	3.34	3.28
2035	6,459	65	6,524	2	-	0.06	0.06	-	-	2.24	0.01	0.59	0.24	0.30	3.37	3.31
2036	6,459	65	6,524	2	-	0.06	0.06	-	-	2.26	0.01	0.59	0.24	0.30	3.41	3.34
2037	6,459	65	6,524	2	-	0.07	0.07	-	-	2.28	0.01	0.60	0.25	0.31	3.44	3.38
2038	6,459	65	6,524	2	-	0.07	0.07	-	-	2.30	0.01	0.60	0.25	0.31	3.48	3.41
2039	6,459	65	6,524	2	-	0.07	0.07	-	-	2.33	0.01	0.61	0.25	0.31	3.51	3.44
2040	6,459	65	6,524	2	-	0.07	0.07	-	-	2.35	0.01	0.62	0.25	0.32	3.55	3.48
2040	6,459	65	6,524	2	-	0.07	0.07	-	-	2.37	0.01	0.62	0.25	0.32	3.58	3.51
2040	6,459	65	6,524	2	-	0.07	0.07	-	-	2.40	0.01	0.63	0.26	0.32	3.62	3.55
2040	6,459	65	6,524	2	-	0.07	0.07	-	-	2.42	0.01	0.63	0.26	0.32	3.65	3.58
2045	6,459	65	6,524	2	-	0.07	0.07	11	-	2.37	0.01	0.62	0.25	0.32	3.58	14.90
Total					17.0	2.0	19.0	11.4	-	65.3	0.3	17.2	7.0	8.8	98.7	91.1
PV 4%					16.3	1.0	17.4	3.4	-	32.2	0.2	8.5	3.5	4.3	48.6	34.7
PV 7%					15.9	0.7	16.6	1.4	-	20.7	0.1	5.6	2.2	2.8	31.4	16.2
PV 10%					15.5	0.5	15.9	0.6	-	14.3	0.1	3.9	1.5	1.9	21.7	6.4