

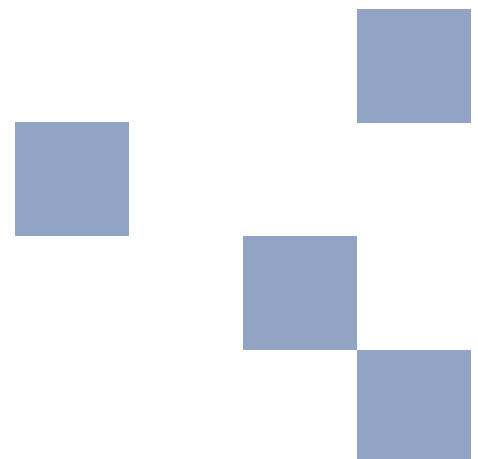


Transport
Roads & Traffic
Authority

ADDITIONAL CROSSING OF THE CLARENCE RIVER AT GRAFTON

Supplementary information to the
Preliminary Route Options Report - Final

MARCH 2012



Road user benefit-cost ratio analysis and strategic cost estimates of the 25 preliminary options

- Supplementary information for the *Preliminary Route Options Report – Final* (January 2012)

Roads and Maritime Services (RMS) is currently undertaking investigations to identify an additional crossing of the Clarence River at Grafton to address short-term and long-term transport needs.

RMS has released a summary of the benefit-cost ratio (BCR) analysis and strategic cost estimates that were developed for the 25 preliminary route options for the *Preliminary Route Options Report – Final* (January 2012).

The BCR and cost estimates were developed for relative comparison of the economic performance of the options within each of the five strategic corridors, and to identify which option(s) in each corridor provided the best value for money. The BCR analysis and strategic cost estimates involved a number of assumptions.

Strategic cost estimates

Strategic high-level cost estimates were prepared for the *Preliminary Route Options Report – Final* (January 2012) to allow a comparison of likely relative costs of options within each corridor. Actual costs may vary from these strategic estimates due to a range of factors including the outcomes of further investigations, changes to the extent (or scope) of the project, design refinements and timing of construction. However, the relative costs of options within a corridor are not expected to change significantly.

Costs are given in 2011 dollars and include an allowance for concept development, detailed design and documentation, property acquisition, utility adjustment, infrastructure construction and handover costs. A contingency allowance was included for each cost item for each option in accordance with normal RMS procedures. No allowance for any major potential future upgrades to the Summerland Way has been included at this stage.

The construction cost component of the estimates was derived by multiplying unit rates (from historical data on similar types of work) by the estimated quantities (based on the preliminary road and bridge layout for each option) to derive comparative costs for each option.

Attachment 1 provides a summary of the strategic cost estimates for each of the 25 preliminary route options as identified in the *Preliminary Route Options Report – Final* (January 2012).

For the six short-listed route options, Attachment 2 provides a comparison between the strategic cost estimates identified in the *Feasibility Assessment Report* (June 2011) with the strategic cost estimates identified in the *Preliminary Route Options Report – Final* (January 2012).

Benefit-cost ratio methodology and assumptions

The methodology used to estimate the BCR values presented in the *Preliminary Route Options Report – Final* (January 2012) follows the guidelines in the *Economic Analysis Manual Version 2* (Roads and Traffic Authority, 1999) and provides a comparative assessment of the economic performance of the various options. The analysis is based on the estimated project cost and road user costs and benefits for each option in comparison to the “base case” or “do-nothing” option without a new bridge. Additional information on the BCR assumptions and methodology is provided below:

- For the purpose of the analysis, the assumption was made that the new bridge would open to traffic in 2019 and that the upgrade of the Pacific Highway between Glenugie and Tyndale, bypassing Grafton, would be open by 2019.
- Project costs used are the strategic cost estimates from the *Preliminary Route Options Report – Final* (January 2012). An allowance was included for maintenance costs for the new bridge and approach road network. Maintenance costs for the existing road network were not included because they are common to all options.
- The BCR for each option was obtained by dividing the anticipated benefits of the option by its anticipated costs over an assumed 30 year economic life of the new bridge. The analysis period was 2011 until 2049, ie 30 years after the assumed year of opening of the new bridge. All future costs and benefits were discounted to 2011 values for the BCR calculations.
- Road user costs and benefits were determined by comparing modelled vehicle operating costs, travel time costs, and accident costs for each option against the model of the base case over the assumed life of the project.
- Vehicle operating costs are based on the strategic traffic model forecasts for vehicle kilometres travelled. Road user travel time costs are based on the strategic traffic model forecasts for vehicle hours travelled. Crash costs have been estimated based on yearly vehicle kilometres travelled over the whole of the modelled network, adopting the existing crash rate of 71 accidents per 100 million vehicle kilometres travelled for both the base case and upgrade options. This approach is likely to slightly underestimate the road safety benefits provided by lower crash rates on the new bridge and approach roads.
- The cost rates used for vehicle operating costs, travel time costs and crash costs are based on the RTA *Economic Analysis Manual Version 2* (1999), *Appendix B Economic Parameters* (2009). Most of the future savings result from savings in travel time costs.

Refer to the summary table below for the BCR estimates for each of the 25 preliminary options as identified in the *Preliminary Route Options Report – Final* (January 2012).

Corridor 1

Option	Strategic cost estimate	Benefit-cost ratio (BCR)
F	\$170	2.3
E	\$163	2.5

Corridor 2

Option	Strategic cost estimate	Benefit-cost ratio (BCR)
5	\$261	1.6
A	\$192	2.1
B	\$214	1.8
6	\$217	1.9
C	\$177	2.2
D	\$220	1.8
I	\$207	1.9
8	\$216	1.8
9	\$209	1.8
10	\$229	1.6

Corridor 3

Option	Strategic cost estimate	Benefit-cost ratio (BCR)
11	\$205	1.6
J	\$212	1.5
K	\$280	1.0
12	\$292	1.0
L	\$335	0.8

Corridor 4

Option	Strategic cost estimate	Benefit-cost ratio (BCR)
14	\$357	0.7
20	\$408	0.5
21	\$416	0.6
M	\$416	0.5

Corridor 5

Option	Strategic cost estimate	Benefit-cost ratio (BCR)
15	\$389	0.6
23	\$434	0.4
25	\$458	0.3
26	\$463	0.3

Attachment 1 - summary of the strategic cost estimates for each of the 25 preliminary route options as identified in the *Preliminary Route Options Report – Final* (January 2012)

PRELIMINARY OPTION F

TOTAL OPTION LENGTH	=	1.39	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.73	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.00	km
VIADUCT LENGTH	=	0.00	km
ROAD LENGTH (EMBANKMENT)	=	0.66	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.00	km
PACIFIC HWY BRIDGE WORKS	=	0.00	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 5	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 16	Partial or total acquisition of 15 private properties and 5 community facilities
4	Public Utility Adjustments	\$ 2	1.5% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 25	
	(a) Main crossing	\$ 16	\$12M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ -	-
	(c) Intersection upgrades	\$ 4	5 major and 2 minor upgrades
	(d) Other miscellaneous	\$ 5	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 97	\$8,400/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ -	
5.4	Viaducts	\$ -	
5.5	Overpass (above existing roads / creek)	\$ -	
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 5	4% of 5.1 to 5.6 incl.
	Sub total	\$ 128	
6	Handover	\$ 1	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 170	

Note:

Incrementally launched superstructure assumed for bridge over Clarence River

PRELIMINARY OPTION E

TOTAL OPTION LENGTH	=	1.41	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.69	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.00	km
VIADUCT LENGTH	=	0.00	km
ROAD LENGTH (EMBANKMENT)	=	0.72	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.00	km
PACIFIC HWY BRIDGE WORKS	=	0.00	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 5	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 15	Partial or total acquisition of 8 private properties and 5 community facilities
4	Public Utility Adjustments	\$ 2	1.5% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 26	
	(a) Main crossing	\$ 16	\$11M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ -	-
	(c) Intersection upgrades	\$ 4	5 major and 2 minor upgrades
	(d) Other miscellaneous	\$ 6	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 92	\$8,400/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ -	
5.4	Viaducts	\$ -	
5.5	Overpass (above existing roads / creek)	\$ -	
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 5	4% of 5.1 to 5.6 incl.
	Sub total	\$ 123	
6	Handover	\$ 1	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 163	

Note:

Incrementally launched superstructure assumed for bridge over Clarence River

COMMUNITY SUGGESTION 5

TOTAL OPTION LENGTH	=	2.10	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.00	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.61	km
VIADUCT LENGTH	=	0.15	km
ROAD LENGTH (EMBANKMENT)	=	1.34	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.00	km
PACIFIC HWY BRIDGE WORKS	=	0.00	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 8	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 49	Partial or total acquisition of 36 private properties and 7 community facilities
4	Public Utility Adjustments	\$ 5	3% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 36	
	(a) Main crossing	\$ 25	\$12M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ -	-
	(c) Intersection upgrades	\$ 6	5 major and 6 minor upgrades
	(d) Other miscellaneous	\$ 6	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 121	\$12,600/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ -	
5.4	Viaducts	\$ 15	\$6,300/sq.m. (incl. Cont)
5.5	Overpass (above existing roads / creek)	\$ -	
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 7	4% of 5.1 to 5.6 incl.
	Sub total	\$ 180	
6	Handover	\$ 2	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 261	

Note:

Balanced cantilever superstructure assumed for bridge over Clarence River

PRELIMINARY OPTION A

TOTAL OPTION LENGTH	=	2.15	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.37	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.09	km
VIADUCT LENGTH	=	0.14	km
ROAD LENGTH (EMBANKMENT)	=	1.55	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.00	km
PACIFIC HWY BRIDGE WORKS	=	0.00	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 6	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 33	Partial or total acquisition of 27 private properties and 7 community facilities
4	Public Utility Adjustments	\$ 4	3% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 35	
	(a) Main crossing	\$ 26	\$12M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ -	-
	(c) Intersection upgrades	\$ 4	4 major and 4 minor upgrades
	(d) Other miscellaneous	\$ 6	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 76	Av. \$9,200/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ -	
5.4	Viaducts	\$ 15	\$6,300/sq.m. (incl. Cont)
5.5	Overpass (above existing roads / creek)	\$ -	
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 5	4% of 5.1 to 5.6 incl.
	Sub total	\$ 132	
6	Handover	\$ 1	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 192	

Note:

Incrementally launched and partly balanced cantilever superstructure assumed for bridge over Clarence River

PRELIMINARY OPTION B

TOTAL OPTION LENGTH	=	2.24	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.43	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.11	km
VIADUCT LENGTH	=	0.25	km
ROAD LENGTH (EMBANKMENT)	=	1.46	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.00	km
PACIFIC HWY BRIDGE WORKS	=	0.00	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 7	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 29	Partial or total acquisition of 26 private properties and 3 community facilities
4	Public Utility Adjustments	\$ 4	3% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 35	
	(a) Main crossing	\$ 26	\$12M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ -	-
	(c) Intersection upgrades	\$ 4	4 major and 4 minor upgrades
	(d) Other miscellaneous	\$ 5	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 87	Av. \$9,200/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ -	
5.4	Viaducts	\$ 27	\$6,300/sq.m. (incl. Cont)
5.5	Overpass (above existing roads / creek)	\$ -	
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 6	4% of 5.1 to 5.6 incl.
	Sub total	\$ 156	
6	Handover	\$ 2	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 214	

Note:

Incrementally launched and partly balanced cantilever superstructure assumed for bridge over Clarence River

COMMUNITY SUGGESTION 6

TOTAL OPTION LENGTH	=	2.29	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.55	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.00	km
VIADUCT LENGTH	=	0.22	km
ROAD LENGTH (EMBANKMENT)	=	1.52	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.00	km
PACIFIC HWY BRIDGE WORKS	=	0.00	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 6	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 40	Partial or total acquisition of 34 private properties and 3 community facilities
4	Public Utility Adjustments	\$ 4	3% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 37	
	(a) Main crossing	\$ 27	\$12M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ -	-
	(c) Intersection upgrades	\$ 4	4 major and 3 minor upgrades
	(d) Other miscellaneous	\$ 6	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 81	\$8,400/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ -	
5.4	Viaducts	\$ 24	\$6,300/sq.m. (incl. Cont)
5.5	Overpass (above existing roads / creek)	\$ -	
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 6	4% of 5.1 to 5.6 incl.
	Sub total	\$ 148	
6	Handover	\$ 2	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 217	

Note:

Incrementally launched superstructure on refined alignment assumed for bridge over Clarence River

PRELIMINARY OPTION C

TOTAL OPTION LENGTH	=	2.16	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.44	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.00	km
VIADUCT LENGTH	=	0.21	km
ROAD LENGTH (EMBANKMENT)	=	1.52	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.00	km
PACIFIC HWY BRIDGE WORKS	=	0.00	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 5	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 30	Partial or total acquisition of 30 private properties and 2 community facilities
4	Public Utility Adjustments	\$ 3	3% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 37	
	(a) Main crossing	\$ 28	\$13M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ -	-
	(c) Intersection upgrades	\$ 3	4 major and 1 minor upgrades
	(d) Other miscellaneous	\$ 5	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 58	\$8,400/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ -	
5.4	Viaducts	\$ 20	\$6,300/sq.m. (incl. Cont)
5.5	Overpass (above existing roads / creek)	\$ -	
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 4	4% of 5.1 to 5.6 incl.
	Sub total	\$ 120	
6	Handover	\$ 1	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 177	

Note:

Incrementally launched superstructure assumed for bridge over Clarence River

PRELIMINARY OPTION D

TOTAL OPTION LENGTH	=	2.27	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.44	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.00	km
VIADUCT LENGTH	=	0.32	km
ROAD LENGTH (EMBANKMENT)	=	1.48	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.04	km
PACIFIC HWY BRIDGE WORKS	=	0.00	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 6	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 52	Partial or total acquisition of 54 private properties and 3 community facilities
4	Public Utility Adjustments	\$ 4	3% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 42	
	(a) Main crossing	\$ 32	\$14M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ -	-
	(c) Intersection upgrades	\$ 3	4 major and 1 minor upgrades
	(d) Other miscellaneous	\$ 7	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 58	\$8,400/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ -	
5.4	Viaducts	\$ 31	\$6,300/sq.m. (incl. Cont)
5.5	Overpass (above existing roads / creek)	\$ 4	\$6,800/sq.m. (incl. Cont)
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 5	4% of 5.1 to 5.6 incl.
	Sub total	\$ 140	
6	Handover	\$ 1	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 220	

Note:

Incrementally launched superstructure assumed for bridge over Clarence River

PRELIMINARY OPTION I

TOTAL OPTION LENGTH	=	2.10	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.42	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.00	km
VIADUCT LENGTH	=	0.32	km
ROAD LENGTH (EMBANKMENT)	=	1.33	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.04	km
PACIFIC HWY BRIDGE WORKS	=	0.00	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 6	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 46	Partial or total acquisition of 48 private properties and 3 community facilities
4	Public Utility Adjustments	\$ 4	3% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 37	
	(a) Main crossing	\$ 28	\$13M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ -	-
	(c) Intersection upgrades	\$ 3	4 major and 1 minor upgrades
	(d) Other miscellaneous	\$ 6	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 56	\$8,400/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ -	
5.4	Viaducts	\$ 32	\$6,300/sq.m. (incl. Cont)
5.5	Overpass (above existing roads / creek)	\$ 4	\$6,800/sq.m. (incl. Cont)
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 5	4% of 5.1 to 5.6 incl.
	Sub total	\$ 134	
6	Handover	\$ 1	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 207	

Note:

Incrementally launched superstructure assumed for bridge over Clarence River

COMMUNITY SUGGESTION 8

TOTAL OPTION LENGTH	=	2.80	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.53	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.00	km
VIADUCT LENGTH	=	0.42	km
ROAD LENGTH (EMBANKMENT)	=	1.86	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.00	km
PACIFIC HWY BRIDGE WORKS	=	0.00	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 7	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 18	Partial or total acquisition of 36 private properties and 1 community facility
4	Public Utility Adjustments	\$ 4	3% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 49	
	(a) Main crossing	\$ 39	\$14M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ -	-
	(c) Intersection upgrades	\$ 4	5 major upgrades
	(d) Other miscellaneous	\$ 6	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 70	\$8,400/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ -	
5.4	Viaducts	\$ 41	\$6,300/sq.m. (incl. Cont)
5.5	Overpass (above existing roads / creek)	\$ -	
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 6	4% of 5.1 to 5.6 incl.
	Sub total	\$ 167	
6	Handover	\$ 2	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 216	

Note:

Incrementally launched superstructure on refined alignment assumed for bridge over Clarence River

COMMUNITY SUGGESTION 9

TOTAL OPTION LENGTH	=	3.53	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.57	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.00	km
VIADUCT LENGTH	=	0.08	km
ROAD LENGTH (EMBANKMENT)	=	2.87	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.00	km
PACIFIC HWY BRIDGE WORKS	=	0.02	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 7	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 18	Partial or total acquisition of 21 private properties and 2 community facilities
4	Public Utility Adjustments	\$ 4	3% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 68	
	(a) Main crossing	\$ 54	\$15M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ -	-
	(c) Intersection upgrades	\$ 4	4 major and 4 minor upgrades
	(d) Other miscellaneous	\$ 10	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 75	\$8,400/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ 3	\$8,400/sq.m. (incl. Cont)
5.4	Viaducts	\$ 8	\$6,300/sq.m. (incl. Cont)
5.5	Overpass (above existing roads / creek)	\$ -	
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 6	4% of 5.1 to 5.6 incl.
	Sub total	\$ 161	
6	Handover	\$ 2	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 209	

Note:

Incrementally launched superstructure on refined alignment assumed for bridge over Clarence River

COMMUNITY SUGGESTION 10

TOTAL OPTION LENGTH	=	3.61	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.70	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.00	km
VIADUCT LENGTH	=	0.08	km
ROAD LENGTH (EMBANKMENT)	=	2.81	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.00	km
PACIFIC HWY BRIDGE WORKS	=	0.02	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 8	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 13	Partial or total acquisition of 23 private properties
4	Public Utility Adjustments	\$ 5	3% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 73	
	(a) Main crossing	\$ 55	\$15M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ -	-
	(c) Intersection upgrades	\$ 6	5 major and 6 minor upgrades
	(d) Other miscellaneous	\$ 13	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 93	\$8,400/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ 3	\$8,400/sq.m. (incl. Cont)
5.4	Viaducts	\$ 8	\$6,300/sq.m. (incl. Cont)
5.5	Overpass (above existing roads / creek)	\$ -	
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 7	4% of 5.1 to 5.6 incl.
	Sub total	\$ 185	
6	Handover	\$ 2	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 229	

Note:

Incrementally launched superstructure assumed for bridge over Clarence River

COMMUNITY SUGGESTION 11

TOTAL OPTION LENGTH	=	2.58	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.42	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.00	km
VIADUCT LENGTH	=	0.45	km
ROAD LENGTH (EMBANKMENT)	=	1.71	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.00	km
PACIFIC HWY BRIDGE WORKS	=	0.00	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 7	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 19	Partial or total acquisition of 18 private properties and 1 community facility
4	Public Utility Adjustments	\$ 2	1% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 51	
	(a) Main crossing	\$ 36	\$14M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ -	-
	(c) Intersection upgrades	\$ 6	6 major and 5 minor upgrades
	(d) Other miscellaneous	\$ 9	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 56	\$8,400/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ -	
5.4	Viaducts	\$ 45	\$6,300/sq.m. (incl. Cont)
5.5	Overpass (above existing roads / creek)	\$ -	
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 6	4% of 5.1 to 5.6 incl.
	Sub total	\$ 158	
6	Handover	\$ 2	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 205	

Note:

Incrementally launched superstructure assumed for bridge over Clarence River

PRELIMINARY OPTION J

TOTAL OPTION LENGTH	=	2.44	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.45	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.00	km
VIADUCT LENGTH	=	0.51	km
ROAD LENGTH (EMBANKMENT)	=	1.48	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.00	km
PACIFIC HWY BRIDGE WORKS	=	0.00	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 7	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 18	Partial or total acquisition of 18 private properties and 1 community facility
4	Public Utility Adjustments	\$ 2	1% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 49	
	(a) Main crossing	\$ 31	\$13M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ -	-
	(c) Intersection upgrades	\$ 6	6 major and 5 minor upgrades
	(d) Other miscellaneous	\$ 13	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 60	\$8,400/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ -	
5.4	Viaducts	\$ 51	\$6,300/sq.m. (incl. Cont)
5.5	Overpass (above existing roads / creek)	\$ -	
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 6	4% of 5.1 to 5.6 incl.
	Sub total	\$ 167	
6	Handover	\$ 2	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 212	

Note:

Incrementally launched superstructure assumed for bridge over Clarence River

PRELIMINARY OPTION K

TOTAL OPTION LENGTH	=	4.25	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.55	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.00	km
VIADUCT LENGTH	=	0.67	km
ROAD LENGTH (EMBANKMENT)	=	2.96	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.08	km
PACIFIC HWY BRIDGE WORKS	=	0.00	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 10	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 20	Partial or total acquisition of 23 private properties and 2 community facilities
4	Public Utility Adjustments	\$ 2	1% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 71	
	(a) Main crossing	\$ 52	\$13M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ 3	\$6M/km road (incl. Cont)
	(c) Intersection upgrades	\$ 8	7 major and 10 minor upgrades
	(d) Other miscellaneous	\$ 9	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 72	\$8,400/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ -	
5.4	Viaducts	\$ 66	\$6,300/sq.m. (incl. Cont)
5.5	Overpass (above existing roads / creek)	\$ 9	\$6,800/sq.m. (incl. Cont)
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 8	4% of 5.1 to 5.6 incl.
	Sub total	\$ 228	
6	Handover	\$ 2	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 280	

Note:

Incrementally launched superstructure assumed for bridge over Clarence River

COMMUNITY SUGGESTION 12

TOTAL OPTION LENGTH	=	4.37	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.52	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.00	km
VIADUCT LENGTH	=	0.80	km
ROAD LENGTH (EMBANKMENT)	=	2.98	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.08	km
PACIFIC HWY BRIDGE WORKS	=	0.00	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 10	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 22	Partial or total acquisition of 29 private properties and 4 community facilities
4	Public Utility Adjustments	\$ 4	1.5% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 71	
	(a) Main crossing	\$ 51	\$13M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ 4	\$6M/km road (incl. Cont)
	(c) Intersection upgrades	\$ 7	7 major and 6 minor upgrades
	(d) Other miscellaneous	\$ 8	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 68	\$8,400/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ -	
5.4	Viaducts	\$ 79	\$6,300/sq.m. (incl. Cont)
5.5	Overpass (above existing roads / creek)	\$ 9	\$6,800/sq.m. (incl. Cont)
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 9	4% of 5.1 to 5.6 incl.
	Sub total	\$ 236	
6	Handover	\$ 3	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 292	

Note:

Incrementally launched superstructure assumed for bridge over Clarence River

PRELIMINARY OPTION L

TOTAL OPTION LENGTH	=	5.15	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.56	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.00	km
VIADUCT LENGTH	=	1.00	km
ROAD LENGTH (EMBANKMENT)	=	3.51	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.08	km
PACIFIC HWY BRIDGE WORKS	=	0.00	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 12	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 22	Partial or total acquisition of 41 private properties
4	Public Utility Adjustments	\$ 6	2% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 82	
	(a) Main crossing	\$ 59	\$13M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ 8	\$6M/km road (incl. Cont)
	(c) Intersection upgrades	\$ 7	8 major and 5 minor upgrades
	(d) Other miscellaneous	\$ 8	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 74	\$8,400/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ -	
5.4	Viaducts	\$ 100	\$6,300/sq.m. (incl. Cont)
5.5	Overpass (above existing roads / creek)	\$ 9	\$6,800/sq.m. (incl. Cont)
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 10	4% of 5.1 to 5.6 incl.
	Sub total	\$ 275	
6	Handover	\$ 3	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 335	

Note:

Incrementally launched superstructure assumed for bridge over Clarence River

COMMUNITY SUGGESTION 14

TOTAL OPTION LENGTH	=	5.28	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.74	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.00	km
VIADUCT LENGTH	=	1.05	km
ROAD LENGTH (EMBANKMENT)	=	3.41	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.08	km
PACIFIC HWY BRIDGE WORKS	=	0.00	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 13	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 8	Partial or total acquisition of 18 private properties and 1 community facility
4	Public Utility Adjustments	\$ 5	1.5% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 82	
	(a) Main crossing	\$ 55	\$13M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ 11	\$6M/km road (incl. Cont)
	(c) Intersection upgrades	\$ 7	7 major and 5 minor upgrades
	(d) Other miscellaneous	\$ 9	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 101	\$8,400/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ -	
5.4	Viaducts	\$ 107	\$6,300/sq.m. (incl. Cont)
5.5	Overpass (above existing roads / creek)	\$ 9	\$6,800/sq.m. (incl. Cont)
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 12	4% of 5.1 to 5.6 incl.
	Sub total	\$ 311	
6	Handover	\$ 3	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 357	

Note:

Incrementally launched superstructure on refined alignment assumed for bridge over Clarence River

COMMUNITY SUGGESTION 20

TOTAL OPTION LENGTH	=	5.46	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.97	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.00	km
VIADUCT LENGTH	=	1.16	km
ROAD LENGTH (EMBANKMENT)	=	3.28	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.06	km
PACIFIC HWY BRIDGE WORKS	=	0.00	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 15	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 7	Partial or total acquisition of 17 private properties and 3 community facilities
4	Public Utility Adjustments	\$ 6	1.5% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 88	
	(a) Main crossing	\$ 59	\$13M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ 13	\$6M/km road (incl. Cont)
	(c) Intersection upgrades	\$ 7	8 major and 4 minor upgrades
	(d) Other miscellaneous	\$ 9	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 131	\$8,400/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ -	
5.4	Viaducts	\$ 118	\$6,300/sq.m. (incl. Cont)
5.5	Overpass (above existing roads / creek)	\$ 7	\$6,800/sq.m. (incl. Cont)
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 13	4% of 5.1 to 5.6 incl.
	Sub total	\$ 359	
6	Handover	\$ 4	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 408	

Note:

Incrementally launched superstructure assumed for bridge over Clarence River

COMMUNITY SUGGESTION 21

TOTAL OPTION LENGTH	=	5.62	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.99	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.00	km
VIADUCT LENGTH	=	1.13	km
ROAD LENGTH (EMBANKMENT)	=	3.44	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.06	km
PACIFIC HWY BRIDGE WORKS	=	0.00	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 15	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 11	Partial or total acquisition of 18 private properties and 3 community facilities
4	Public Utility Adjustments	\$ 6	1.5% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 91	
	(a) Main crossing	\$ 62	\$14M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ 13	\$6M/km road (incl. Cont)
	(c) Intersection upgrades	\$ 6	7 major and 4 minor upgrades
	(d) Other miscellaneous	\$ 9	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 135	\$8,400/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ -	
5.4	Viaducts	\$ 115	\$6,300/sq.m. (incl. Cont)
5.5	Overpass (above existing roads / creek)	\$ 7	\$6,800/sq.m. (incl. Cont)
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 13	4% of 5.1 to 5.6 incl.
	Sub total	\$ 362	
6	Handover	\$ 4	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 416	

Note:

Incrementally launched superstructure on refined alignment assumed for bridge over Clarence River

PRELIMINARY OPTION M

TOTAL OPTION LENGTH	=	5.57	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.97	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.00	km
VIADUCT LENGTH	=	1.19	km
ROAD LENGTH (EMBANKMENT)	=	3.36	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.06	km
PACIFIC HWY BRIDGE WORKS	=	0.00	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 16	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 10	Partial or total acquisition of 18 private properties and 3 community facilities
4	Public Utility Adjustments	\$ 6	1.5% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 90	
	(a) Main crossing	\$ 61	\$14M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ 14	\$6M/km road (incl. Cont)
	(c) Intersection upgrades	\$ 7	8 major and 4 minor upgrades
	(d) Other miscellaneous	\$ 9	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 131	\$8,400/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ -	
5.4	Viaducts	\$ 121	\$6,300/sq.m. (incl. Cont)
5.5	Overpass (above existing roads / creek)	\$ 7	\$6,800/sq.m. (incl. Cont)
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 14	4% of 5.1 to 5.6 incl.
	Sub total	\$ 364	
6	Handover	\$ 4	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 416	

Note:

Incrementally launched superstructure on refined alignment assumed for bridge over Clarence River

COMMUNITY SUGGESTION 15

TOTAL OPTION LENGTH	=	6.40	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.72	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.00	km
VIADUCT LENGTH	=	1.05	km
ROAD LENGTH (EMBANKMENT)	=	4.49	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.15	km
PACIFIC HWY BRIDGE WORKS	=	0.00	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 15	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 8	Partial or total acquisition of 19 private properties and 3 community facilities
4	Public Utility Adjustments	\$ 5	1.5% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 106	
	(a) Main crossing	\$ 80	\$15M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ 11	\$6M/km road (incl. Cont)
	(c) Intersection upgrades	\$ 6	7 major and 3 minor upgrades
	(d) Other miscellaneous	\$ 8	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 98	\$8,400/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ -	
5.4	Viaducts	\$ 107	\$6,300/sq.m. (incl. Cont)
5.5	Overpass (above existing roads / creek)	\$ 16	\$6,800/sq.m. (incl. Cont)
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 13	4% of 5.1 to 5.6 incl.
	Sub total	\$ 340	
6	Handover	\$ 4	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 389	

Note:

Incrementally launched superstructure assumed for bridge over Clarence River

COMMUNITY SUGGESTION 23

TOTAL OPTION LENGTH	=	6.14	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.76	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.00	km
VIADUCT LENGTH	=	1.47	km
ROAD LENGTH (EMBANKMENT)	=	3.75	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.17	km
PACIFIC HWY BRIDGE WORKS	=	0.00	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 16	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 9	Partial or total acquisition of 15 private properties
4	Public Utility Adjustments	\$ 4	1% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 97	
	(a) Main crossing	\$ 69	\$14M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ 13	\$6M/km road (incl. Cont)
	(c) Intersection upgrades	\$ 6	8 major and 1 minor upgrades
	(d) Other miscellaneous	\$ 9	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 103	\$8,400/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ -	
5.4	Viaducts	\$ 150	\$6,300/sq.m. (incl. Cont)
5.5	Overpass (above existing roads / creek)	\$ 19	\$6,800/sq.m. (incl. Cont)
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 14	4% of 5.1 to 5.6 incl.
	Sub total	\$ 384	
6	Handover	\$ 4	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 434	

Note:

Incrementally launched superstructure on refined alignment assumed for bridge over Clarence River

COMMUNITY SUGGESTION 25

TOTAL OPTION LENGTH	=	6.53	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.78	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.00	km
VIADUCT LENGTH	=	1.53	km
ROAD LENGTH (EMBANKMENT)	=	3.92	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.18	km
PACIFIC HWY BRIDGE WORKS	=	0.13	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 17	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 7	Partial or total acquisition of 24 private properties
4	Public Utility Adjustments	\$ 6	1.5% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 97	
	(a) Main crossing	\$ 70	\$13M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ 14	\$6M/km road (incl. Cont)
	(c) Intersection upgrades	\$ 6	8 major and 1 minor upgrades
	(d) Other miscellaneous	\$ 7	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 105	\$8,400/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ 11	\$8,400/sq.m. (incl. Cont)
5.4	Viaducts	\$ 156	\$6,300/sq.m. (incl. Cont)
5.5	Overpass (above existing roads / creek)	\$ 20	\$6,800/sq.m. (incl. Cont)
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 15	4% of 5.1 to 5.6 incl.
	Sub total	\$ 405	
6	Handover	\$ 4	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 458	

Note:

Incrementally launched superstructure assumed for bridge over Clarence River

COMMUNITY SUGGESTION 26

TOTAL OPTION LENGTH	=	7.45	km
BRIDGE LENGTH (CLARENCE RIVER) Incrementally launched	=	0.59	km
BRIDGE LENGTH (CLARENCE RIVER) Balanced cantilever	=	0.00	km
VIADUCT LENGTH	=	1.57	km
ROAD LENGTH (EMBANKMENT)	=	4.90	km
OVERPASS LENGTH (ABOVE EXISTING ROADS / CREEKS)	=	0.27	km
PACIFIC HWY BRIDGE WORKS	=	0.13	km

No.	Section	Estimate (including contingency) (\$Millions) (\$2011)	Comments
1	Project Development	\$ 17	
2	Investigation and Design	\$ 17	4.5% of 5.1 to 5.6 incl.
3	Property Acquisitions	\$ 12	Partial or total acquisition of 31 private properties
4	Public Utility Adjustments	\$ 4	1% of 5.1 to 5.6 incl.
5	Construction		
5.1	Roadworks	\$ 120	
	(a) Main crossing	\$ 87	\$14M/km road (incl. Cont)
	(b) HV Connection to CBD	\$ 18	\$6M/km road (incl. Cont)
	(c) Intersection upgrades	\$ 6	8 major and 2 minor upgrades
	(d) Other miscellaneous	\$ 9	Landscaping, noise mitigation, lowering Villiers St
5.2	Bridge over Clarence River	\$ 80	\$8,400/sq.m. (incl. Cont)
5.3	Pacific Hwy Bridge Works	\$ 4	\$8,400/sq.m. (incl. Cont)
5.4	Viaducts	\$ 160	\$6,300/sq.m. (incl. Cont)
5.5	Overpass (above existing roads / creek)	\$ 30	\$6,800/sq.m. (incl. Cont)
5.6	Flood Mitigation	\$ 1	3,000m @ \$280/m (incl. Cont)
5.7	Project Management and Insurance	\$ 15	4% of 5.1 to 5.6 incl.
	Sub total	\$ 409	
6	Handover	\$ 4	1% of 5.1 to 5.6 incl.
	TOTAL	\$ 463	

Note:

Incrementally launched superstructure on refined alignment assumed for bridge over Clarence River

Attachment 2 - comparison between the strategic cost estimates identified in the *Feasibility Assessment Report* (June 2011) with the strategic cost estimates identified in the *Preliminary Route Options Report – Final* (January 2012)

Route Option	Strategic cost estimate from Feasibility Assessment Report June 2011 (\$million)	Strategic cost estimate from Preliminary Route Options Development Report January 2012 (\$million)	Updates to strategic cost estimates
E	\$127	\$163	<p>The strategic cost estimate for this option increased from the June 2011 <i>Feasibility Assessment Report</i> to the January 2012 <i>Preliminary Route Options Report</i> due to refinement of the preliminary design and updates to the property acquisition costs.</p> <ul style="list-style-type: none"> - Project development costs were revised to include all anticipated costs through to project approval. - The bridge width was increased to provide a median between traffic lanes to improve traffic safety. - The bridge length was increased to reduce potential flooding impacts, following advice from the flooding subconsultant. - The route alignment was refined which has altered property impacts. Property acquisition costs have been updated.
A	\$158	\$192	<p>The strategic cost estimate for this option increased from the June 2011 <i>Feasibility Assessment Report</i> to the January 2012 <i>Preliminary Route Options Report</i> due to refinement of the preliminary design and bridge type, and updates to the property acquisition costs.</p> <ul style="list-style-type: none"> - Project development costs were revised to include all anticipated costs through to project approval. - The bridge width was increased to provide a median between traffic lanes to improve traffic safety. - The route alignment was refined which has altered property impacts. Property acquisition costs have been updated. - The bridge type was changed from incrementally launched to balanced cantilever, due to alignment constraints. The estimated construction cost increased to reflect the higher cost of balanced cantilever construction.
C	\$206	\$177	<p>The strategic cost estimate for this option decreased from the June 2011 <i>Feasibility Assessment Report</i> to the January 2012 <i>Preliminary Route Options Report</i> due to refinement of the preliminary design. While some cost items increased for this option, the overall cost estimate decreased.</p> <ul style="list-style-type: none"> - Project development costs were revised to include all anticipated costs through to project approval. - The June 2011 strategic cost estimate for this option included a second connection to the Pacific Highway south of South Grafton. Following the results of the strategic traffic modelling, this connection was removed. This reduced the overall road length of this option which reduced the estimated construction costs. - The bridge width was increased to provide a median between traffic lanes to improve traffic safety. - The bridge length was increased slightly to reduce potential flooding impacts, following advice from the flooding subconsultant. - The route alignment was refined which has altered property impacts. Property acquisition costs have been updated.
11	\$226	\$205	<p>The strategic cost estimate for this option decreased from the June 2011 <i>Feasibility Assessment Report</i> to the January 2012 <i>Preliminary Route Options Report</i> due to refinement of the preliminary design. While some cost items increased for this option, the overall cost estimate decreased.</p> <ul style="list-style-type: none"> - Project development costs were revised to include all anticipated costs through to project approval. - The viaduct length over the floodplain in South Grafton was reduced following advice from the flooding subconsultant. - The allowance for the length of Pacific Highway upgrade in South Grafton was reduced, following design refinements to the intersection at the Pacific Highway. This reduced the estimated construction costs of this option. - The route alignment was refined which has altered property impacts. Property acquisition costs have been updated.
14	\$373	\$357	<p>The strategic cost estimate for this option decreased from the June 2011 <i>Feasibility Assessment Report</i> to the January 2012 <i>Preliminary Route Options Report</i> due to refinement of the preliminary design. While some cost items increased for this option, the overall cost estimate decreased.</p> <ul style="list-style-type: none"> - Project development costs were revised to include all anticipated costs through to project approval. - The viaduct length over the floodplain in South Grafton was reduced following advice from the flooding subconsultant. - The bridge length over the river was reduced following advice from the flooding subconsultant. - The route alignment was refined which has altered property impacts. Property acquisition costs have been updated.
15	\$368	\$389	<p>The strategic cost estimate for this option increased from the June 2011 <i>Feasibility Assessment Report</i> to the January 2012 <i>Preliminary Route Options Report</i> due to refinement of the preliminary design and updates to the property acquisition costs. While some cost items decreased for this option, the overall cost estimate increased.</p> <ul style="list-style-type: none"> - Project development costs were revised to include all anticipated costs through to project approval. - The viaduct length over the floodplain in South Grafton was reduced following advice from the flooding subconsultant. - The design has been refined to allow for additional bridges / culverts over minor creeks in the Great Marlow area, following advice from the flooding subconsultant. This increased the estimated construction costs of this option. - The route alignment was refined which has altered property impacts. Property acquisition costs have been updated.