

Appendix A

Investment Logic Map

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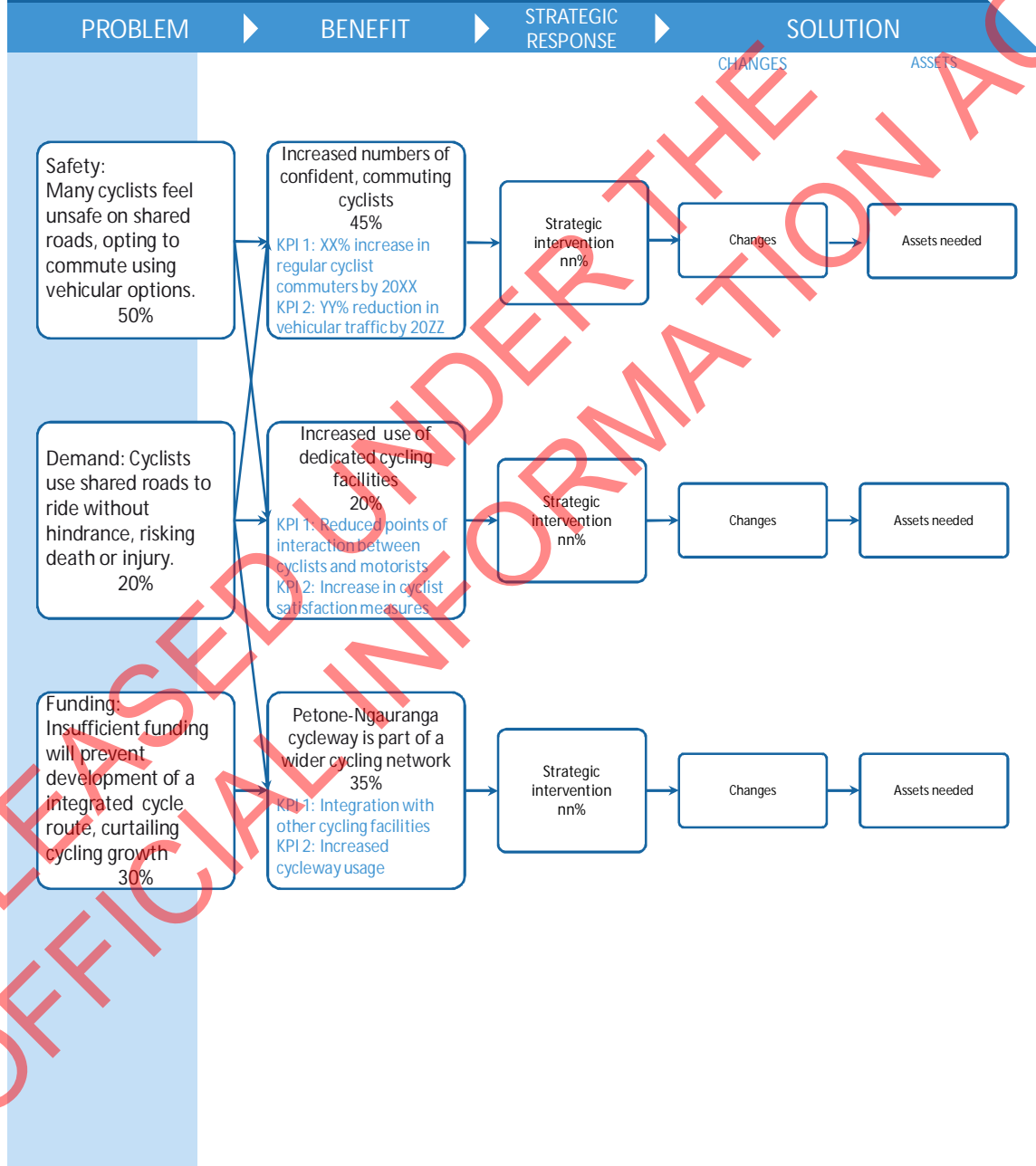
Investment Logic Map

New Zealand Transport Authority

Petone – Ngauranga Cycleway

Increasing the number of cycling commuters

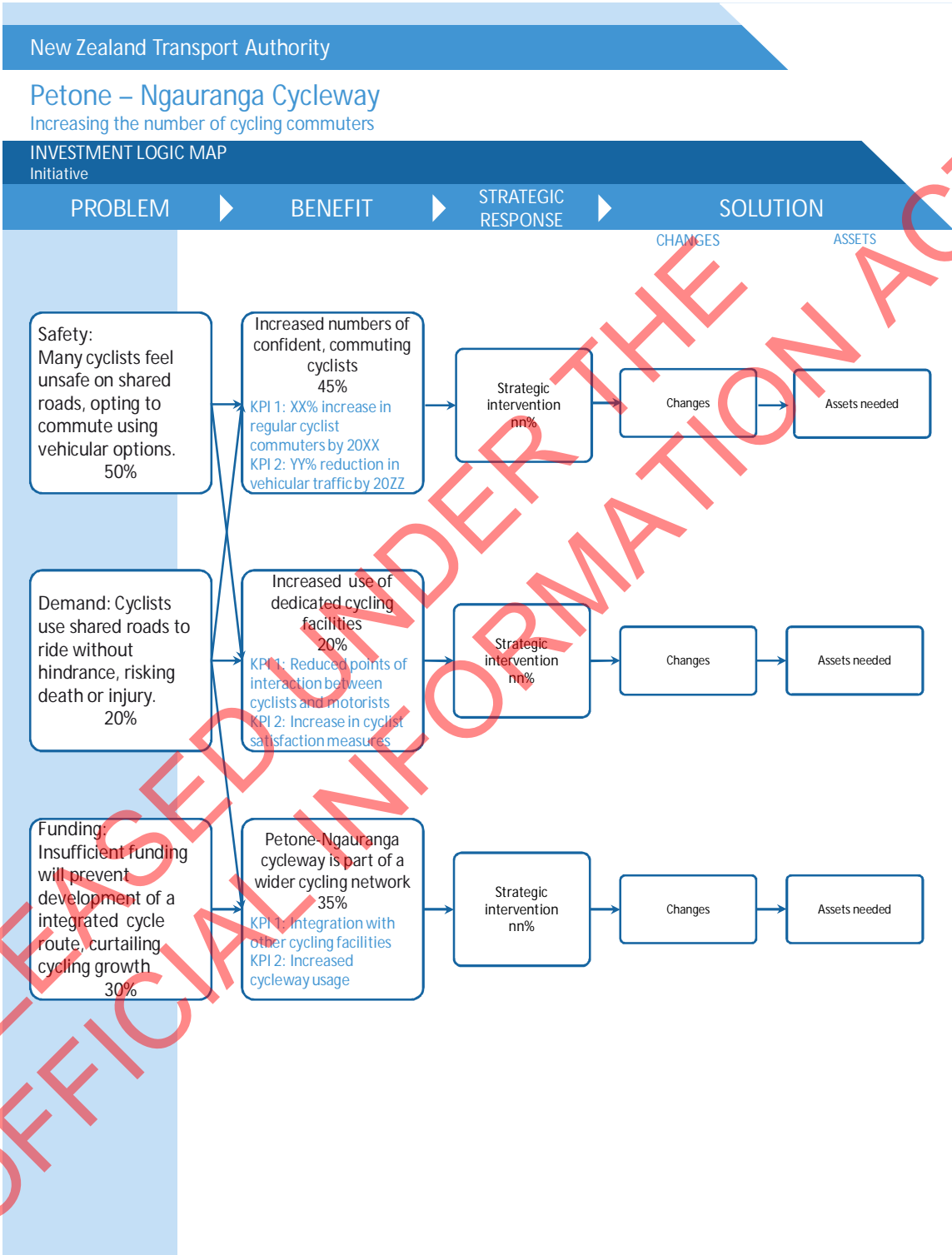
INVESTMENT LOGIC MAP
Initiative



Investor: Jo Draper
Facilitator: Jim McMahon
Accredited Facilitator: Yes

Version no: 0.1
Initial Workshop: 25/01/2013
Last modified by: Jim McMahon
Template version: 5.0

Benefits Map



Investor: Jo Draper
Facilitator: Jim McMahon
Accredited Facilitator: Yes

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Appendix B

Alternatives Assessment Summary

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Section 1 2000 m	Section 2 1500 m	Section 3 4000 m	Section 4 800 m	Section 5 700 m	Section 6 300 m	Section 7 1200 m	Section 8 2500 m
<p>S1 Option 1 - 3m shared Harbour path (based on assumption that P2N GHW ends on eastern side of railway). The cycleway ends at Aotea Stream. Safety concerns regarding cycle path through ferry port. No connection points (only Hutt and Wellington CBD). (Opus 2013 Nauranga to CBD PIR - Option 1 Harbour Primary Option) (preferred). Harbourway</p>	<p>S2 Option 1 - 3m shared Harbour path (based on assumption that P2N GHW ends on eastern side of railway). The cycleway ends at Aotea Stream. Safety concerns regarding cycle path through ferry port. No connection points (only Hutt and Wellington CBD). (Opus 2013 Nauranga to CBD PIR - Option 1 Harbour Primary Option) (preferred). Harbourway</p>	<p>S3 Option 1 - Improved maintenance, drainage and surfacing of existing cycle path. Below minimum width in parts (any reduction in SH2 unacceptable). New retaining wall & lifting cycleway to increase width where possible (Opus SAR, 2006). Two way Cycle Path</p>	<p>S4 Option 1 - Cycleway Bridge at Horokiwi over rail onto newly reclaimed land for seaward cycleway to Petone. Links to existing cycleway, and to Western Hutt Road (SH2) and a connection to the Hutt Road and the Esplanade via a new contraflow lane over the southbound onramp. Most suitable method for crossing rail (Option 1 - OPUS SAR, 2006). Harbourway</p>	<p>S5 Option 1 - Pharazyn to Hutt Road cycleway, either road 1.5m cycle either side of road or combined ped/cyclist path. Both options have hazard with car door and turning vehicles, historically higher crash rates than SH2, less efficient for long distance cyclists (Barclays (2012) Provision for Cyclists SW Petone). Hutt and Pharazyn Road Cycle Facility</p>	<p>S6 Option 1 - Pharazyn to Hutt Road cycleway, either road 1.5m cycle either side of road or combined ped/cyclist path. Both options have hazard with car door and turning vehicles, historically higher crash rates than SH2, less efficient for long distance cyclists (Barclays (2012) Provision for Cyclists SW Petone). Hutt and Pharazyn Road Cycle Facility</p>	<p>S7 Option 1 - Pharazyn to Hutt Road cycleway, either road 1.5m cycle either side of road or combined ped/cyclist path. Both options have hazard with car door and turning vehicles, historically higher crash rates than SH2, less efficient for long distance cyclists (Barclays (2012) Provision for Cyclists SW Petone). Hutt and Pharazyn Road Cycle Facility</p>	<p>S8 Option 1 - Pharazyn to Hutt Road cycleway, either road 1.5m cycle either side of road or combined ped/cyclist path. Both options have hazard with car door and turning vehicles, historically higher crash rates than SH2, less efficient for long distance cyclists (Barclays (2012) Provision for Cyclists SW Petone). Hutt and Pharazyn Road Cycle Facility</p>
<p>S1 Option 2 - Variation 1 is to pass under railway at Ngauranga station using existing underpass extended further east of rail. Variation 2 (preferred) would initially be located on west side of rail the cycle path could use the existing SH bank (500m south of Ngauranga) to cross the track access the primary option which is located on the eastern side of the railway. (assumption of P2N GHW section not built or if constructed on western side of railway). (Opus 2013 Nauranga to CBD PIR - Option 1Nx (1 & 2) Northern Connections). Harbourway</p>	<p>S2 Option 2 - Variation 1 is to pass under railway at Ngauranga station using existing underpass extended further east of rail. Variation 2 (preferred) would initially be located on west side of rail the cycle path could use the existing SH bank (500m south of Ngauranga) to cross the track access the primary option which is located on the eastern side of the railway. (assumption of P2N GHW section not built or if constructed on western side of railway). (Opus 2013 Nauranga to CBD PIR - Option 1Nx (1 & 2) Northern Connections). Harbourway</p>	<p>S3 Option 2 - Improve existing cycle path with improved drainage, surfacing, resealing, widening where possible, more rigorous maintenance regime (SKM PIR, 2010) Two way Cycle Path</p>	<p>S4 Option 2 - Cycleway underpass at Horokiwi under rail onto newly reclaimed land for seaward cycleway to Petone. Links to existing cycleway, and to Western Hutt Road (SH2) and a connection to the Hutt Road and the Esplanade via a new contraflow lane over the southbound onramp. Buildability a concern (Opus SAR, 2006). Harbourway</p>	<p>S5 Option 2 - continued use of State Highway 2 shoulders (Barclays (2012) Provision for Cyclists SW Petone) NB & SB Shoulder</p>	<p>S6 Option 2 - continued use of State Highway 2 shoulders (Barclays (2012) Provision for Cyclists SW Petone). NB & SB Shoulder</p>	<p>S7 Option 2 - continued use of State Highway 2 shoulders (Barclays (2012) Provision for Cyclists SW Petone). NB & SB Shoulder</p>	<p>S8 Option 2 - continued use of State Highway 2 shoulders (Barclays (2012) Provision for Cyclists SW Petone). NB & SB Shoulder</p>
<p>S1 Option 3 - Variation 1 over the port by building a new structure for cyclists adjacent to the Thorndon Overbridge and Aotea Quay SH1 off-ramp. Variation 2 (preferred) cross the motorway and rail to the Hutt Road by constructing a new pedestrian and cycle over bridge. Variation 3 cross the SH and rail to Hutt Road by building a new subway under SH1 and Railway beside Kaiwharawhara Stream (Opus 2013 Nauranga to CBD PIR - Option 15x Southern Connections). Harbourway</p>	<p>S2 Option 3 - Variation 1 over the port by building a new structure for cyclists adjacent to the Thorndon Overbridge and Aotea Quay SH1 off-ramp. Variation 2 (preferred) cross the motorway and rail to the Hutt Road by constructing a new pedestrian and cycle over bridge. Variation 3 cross the SH and rail to Hutt Road by building a new subway under SH1 and Railway beside Kaiwharawhara Stream (Opus 2013 Nauranga to CBD PIR - Option 15x Southern Connections). Harbourway</p>	<p>S3 Option 3 - Close the gap by land reclamation, overbridge, two-way upgrade to existing cycleway (NZTA/OPUS SFS, 2012) Two way Cycle Path</p>	<p>S4 Option 3 - Level crossing to cross rail, onto newly reclaimed land for seaward cycleway to Petone. Links to existing cycleway, and to Western Hutt Road (SH2) and a connection to the Hutt Road and the Esplanade via a new contraflow lane over the southbound onramp. Sig. safety issues & journey reliability (Option 3 - OPUS SAR, 2006). Harbourway</p>	<p>S5 Option 3 - New P2G interchange with cycleway under overbridge and links for NB cyclists over McKenzie overbridge (AECOM option 2, 2013) Shared Path</p>	<p>S6 Option 3 - New Routes. 1. Pito-one-Road at Korokoro to London Road, cross Hutt Rd. or continue on western side of SH2 to Dowse Drive through Percy's Reserve. This would provide NB only cycle facility. Unlikely to attract cyclists. 2. Rail Corridor - with continuous route from Melling Bridge to Wakefield Street (off-road, one lane) if the Melling rail line closed. With rail still in place space may be available within the rail corridor. Terminate at Petone Station. (Barclays (2012) Provision for Cyclists SW Petone) Cycle Path</p>	<p>S8 Option 3 - 1. Pito-one-Road at Korokoro to London Road, cross Hutt Rd. or continue on western side of SH2 to Dowse Drive through Percy's Reserve. This would provide NB only cycle facility. Unlikely to attract cyclists. 2. Rail Corridor - with continuous route from Melling Bridge to Wakefield Street (off-road, one lane) if the Melling rail line closed. With rail still in place space may be available within the rail corridor. Terminate at Petone Station. (Barclays (2012) Provision for Cyclists SW Petone) Cycle Path</p>	<p>S9 Option 3 - 1. Pito-one-Road at Korokoro to London Road, cross Hutt Rd. or continue on western side of SH2 to Dowse Drive through Percy's Reserve. This would provide NB only cycle facility. Unlikely to attract cyclists. 2. Rail Corridor - with continuous route from Melling Bridge to Wakefield Street (off-road, one lane) if the Melling rail line closed. With rail still in place space may be available within the rail corridor. Terminate at Petone Station. (Barclays (2012) Provision for Cyclists SW Petone) Cycle Path</p>
<p>S1 Option 4 - widen the outer traffic lane on each side of Hutt Road from 3.3 metres to 4.2 metres to provide improved on-road cycle lane. Option doesn't remove conflict points with turning vehicles and unlikely to attract new users (Opus 2013 Nauranga to CBD PIR - Option 2a widen on-road cycle lane/shoulder). Cycle Path</p>	<p>S2 Option 4 - widen the outer traffic lane on each side of Hutt Road from 3.3 metres to 4.2 metres to provide improved on-road cycle lane. Option doesn't remove conflict points with turning vehicles and unlikely to attract new users (Opus 2013 Nauranga to CBD PIR - Option 2a widen on-road cycle lane/shoulder). Cycle Path</p>	<p>S3 Option 4 - Northbound Improvements (sub-option) (AECOM option 3, 2013) NB Shoulder</p>	<p>S4 Option 4 - Rail realignment and reclamation. Cycleway in new area between road and rail. Links to existing cycleway, and to Western Hutt Road (SH2) and a connection to the Hutt Road and the Esplanade via a new contraflow lane over the southbound onramp. Most attractive for cyclists. (Option 4 -OPUS SAR, 2006) - Two way cycle path</p>				
<p>S1 Option 5 - provides additional space on-road for cyclists through a 1.5 metre cycle lane on each side of the corridor. Parking shifted between ped. Path and cycle path. Accidents expected to increase under this scenario. (Opus 2013 Nauranga to CBD PIR - Option 2b provide on-road 1.5m lanes). Cycle Path</p>	<p>S2 Option 5 - provides additional space on-road for cyclists through a 1.5 metre cycle lane on each side of the corridor. Parking shifted between ped. Path and cycle path. Accidents expected to increase under this scenario. (Opus 2013 Nauranga to CBD PIR - Option 2b provide on-road 1.5m lanes). Cycle Path</p>	<p>S3 Option 5 - land reclamation (3.5m) with seaward cycleway and bridge at Ngauranga (AECOM option 4a, 2013) Harbourway</p>	<p>S4 Option 5 - Partial Rail realignment from Petone station to rowing club & reduction in SB merge lane. Cycleway in new area between road and rail. Links to existing cycleway. Compromised widths for SH, rail & cycle path. (Option 5 - Opus SAR, 2006). Two way Cycle Path</p>				
<p>S1 Option 6 - proposes to build on-road shared bus and cycle lanes on each side of the corridor rather than the on road cycle only lane. Parallel parking shifted to between a shared bus/cycle lane and narrowed footpath on the east side of Hutt Road. Unlikely to attract cyclists (Opus 2013 Nauranga to CBD PIR - Option 2c on-road shared bus/cycle lane). Shared Path</p>	<p>S2 Option 6 - proposes to build on-road shared bus and cycle lanes on each side of the corridor rather than the on road cycle only lane. Parallel parking shifted to between a shared bus/cycle lane and narrowed footpath on the east side of Hutt Road. Unlikely to attract cyclists. (Opus 2013 Nauranga to CBD PIR - Option 2c on-road shared bus/cycle lane). Shared Path</p>	<p>S3 Option 6 - land reclamation (5m) with seaward cycleway and bridge at Ngauranga (AECOM option 4b, 2013) Harbourway</p>	<p>S4 Option 6 - Reclamation to provide a seaward cycleway (3.5m wide) and a bridge over rail at Horokiwi. Links to existing cycleway, widened where possible to 3m and 0.3m clearance from fence either side. Bridge not attractive to high-speed commuters. (SKM PIR, 2010) Two way Cycle Path</p>				
<p>S1 Option 7 - two way cyclists only "Copenhagen" lane. Relocate parking to the back of the private properties, to between the traffic lanes + cyclists or into clearways on the Hutt Road in off peak. High quality facility and safe for cyclists through dedicated facility + reduction in side friction (Opus 2013 Nauranga to CBD PIR - Option 2d) (Preferred option). Cycle Path</p>	<p>S2 Option 7 - two way cyclists only "Copenhagen" lane. Relocate parking to the back of the private properties, to between the traffic lanes + cyclists or into clearways on the Hutt Road in off peak. High quality facility and safe for cyclists through dedicated facility + reduction in side friction. (Opus 2013 Nauranga to CBD PIR - Option 2d) (Preferred option). Cycle Path</p>	<p>S3 Option 7 - Rail realignment and reclamation to increase the width of the existing cycle to 5m (AECOM option 1, 2013) Two way Cycle Path</p>	<p>S4 Option 7 - Botla Miskal (2009) Great Harbour Way - 3.0m ped/cycle walkway from Petone & overbridge to SH2 path. Harbourway</p>				
<p>S1 Option 8 - Existing traffic lane arrangement, improve current shared pedestrian and cycle path through point. Provide visual warning to vehicles turning (Opus 2013 Nauranga to CBD PIR - Option 2e) Shared Path</p>	<p>S2 Option 8 - Existing traffic lane arrangement, improve current shared pedestrian and cycle path through point. Provide visual warning to vehicles turning. (Opus 2013 Nauranga to CBD PIR - Option 2e) Shared Path</p>		<p>S4 Option 8 - Close the gap by land reclamation, overbridge, two-way upgrade to existing cycleway (NZTA/OPUS (2012, SFS)) Harbourway</p>				
<p>S1 Option 9 - Great Harbour Way, Hutt & Thorndon route remain in medium term (Botla Miskal, 2009) Harbourway</p>	<p>S2 Option 9 - Great Harbour Way, Hutt & Thorndon route remain in medium term (Botla Miskal, 2009) Harbourway</p>		<p>S4 Option 9 - Cycleway (5m wide) between rail and road to link to the existing (rail realignment and reclamation) (AECOM option 1, 2013) Two way Cycle Path</p>				
			<p>S4 Option 10 - Northbound Improvements (sub-option) (AECOM option 3, 2013) NB Shoulder</p>				
			<p>S4 Option 11 - option to construct and/or relocate a roadside barrier closer to the southbound traffic lane, relocate furniture (street poles etc.) and construct a new fence to segregate cyclists from the adjacent railway lines. The cycle lane would be 1.5m however serious safety concerns recommended this option is not built (MWH (2012)) Cycleway</p>				
			<p>S4 Option 12 - land reclamation (3.5m) with seaward cycleway and bridge at Ngauranga (AECOM option 4a) Harbourway</p>				
			<p>S4 Option 13 - land reclamation (5m) with seaward cycleway and cycle/ped crossing at Ngauranga (AECOM option 4b) Harbourway</p>				

	Section 1									Section 2 1500 m									Section 3 4000 m					
	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Project Objective 1 To improve safety perceptions of walking and cycling modes of transport between Petone and Ngauranga by improving connections and integrating walking and cycling activities with other networks in Lower Hutt and Wellington.																								
Objective 1 KPI's																								
1.1 Improves safety for cyclists and pedestrians between Petone and Ngauranga (including north/south connections).	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	1	1	1	1	0	1
1.2 Improves walking and cycling connections between Wellington and Lower Hutt.	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	1	1
1.3 Integrates with existing (or planned) walking and cycling networks in Wellington and Lower Hutt.	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	1	1	1	0	1	1
Project Objective 2 To provide infrastructure that is a catalyst for increased usage of the Lower Hutt to Wellington corridor by walkers and cyclists regardless of ability.																								
Objective 2 KPI's																								
2.1 Is likely to increase demand for walking or running between Petone and Wellington (or part of the route).	1	1	1	0	0	0	1	0	1	1	1	1	0	0	0	0	1	1	0	0	0	0	1	1
2.2 Is likely to increase demand for cycling between Petone and Wellington. Particularly 'enthusied and confident' and 'interested but concerned' cyclists.	1	1	1	0	0	0	1	0	1	1	1	1	0	0	0	0	1	1	1	1	1	0	1	1
2.3 Is likely to be used by existing cyclists.	0	0	0	1	1	1	1	1	0	0	0	0	1	1	1	1	1	0	1	1	1	1	1	1
Project Objective 3 To consider transport network resilience in providing a walking and cycling facility with enhanced safety standards and capacity.																								
Objective 3 KPI's																								
3.1 Provides an opportunity to support the resilience of the transport corridor against future environmental scenarios. Roadside = 0 Coastal =1	1	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	1	0	0	0	0	1	1
Project Objective 4 To manage the social, cultural, land use and other environmental impacts of the project in the project area and its communities by so far as practicable avoiding, remedying or mitigating any such A28 effects through route and alignment selection, design																								
Objective 4 KPI's																								
4.1 Potential environmental impacts can possibly be avoided, remedied or mitigated or enhanced. Roadside =1 Coastal =0	0	0	0	1	1	1	1	1	0	0	0	0	1	1	1	1	1	0	1	1	1	1	1	1
4.2 Potential landscape and urban design impacts, including physical & visual impacts on the coastal environment and escarpment, existing views for other corridor users and loss of amenity for adjacent properties can potentially be avoided, remedied, mitigated or enhanced.	0	0	0	1	1	1	1	1	0	0	0	0	1	1	1	1	1	0	1	1	1	1	1	1
4.3 Potential to provide improved pedestrian/cyclist amenity, including design quality and aesthetics, and landscape experience (views and access to the coastal environment).	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
4.4 Potential to improve the urban form and quality of the transportation corridor and streetscape for all users.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4.5 Potential social or cultural impacts can possibly be avoided, remedied or mitigated or enhanced.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total	6	6	7	6	6	6	11	8	6	6	6	6	6	6	6	8	11	6	10	10	10	7	10	12
Details of scoring for each option	This option does not connect to eastern suburbs along Hutt Road nor does it improve safety due to the ferry terminal. Sig. landscape & environmental impacts likely due to coastal reclamation.	Same issues as option 1. Option does not provide the most direct route, if P2N built on western side of railway then would involve an additional crossing for cyclists.	Pedestrian/cyclist overbridge likely to improve safety. Sig. landscape and environmental issues likely due to structures. Also does provide most direct route for commuters.	Unlikely to improve safety for cyclists because provides no separation from motor vehicles, also wider traffic lane likely to increase traffic speeds.	Same issues as option 4, although does provide some separation for cyclists. Is unlikely to attract less confident cyclists or increase the level of cycling.	Doesn't significantly increase safety for cyclists, as potential conflict between parked car doors and cyclists, and also bus movement to/from bus stops conflicting with cyclists.	This option improves safety through increased separation, rationalisation of parking, increased visual awareness. This option is however unviable and is not supported by WCC.	This option provides modest improvements, but does not deal with conflict between cyclists turning vehicles, although provides visual warning. Is similar to existing cycleway.	This option has similar issues to options 1,2,3.	This option has similar issues to option 1/ section 1, and does not improve safety from the existing shared path.	This option has similar issues to option 2/ section 1.	This option has similar issues to option 3/ section 1.	This option has similar issues to option 4/ section 1, and would be likely to reduce safety in comparison to the existing shared path.	This option has similar issues to option 5/ section 1, and would be likely to reduce safety in comparison to the existing shared path.	This option has similar issues to option 6/ section 1.	This option is not likely to improve demand or safety along section 2 because the current facilities are sufficient.	The existing shared path provides sufficient facilities for ped/cycles, therefore, as this option proposes, only minor improvements are needed.	This option has similar issues to options 1,2,3.	Improve existing cycleway. The options to improve the existing cycleway along SH2, and depending on the detail of the improvements, widening, improved surfacing, drainage and maintenance are likely to increase usage and safety of the path. The specifics of the improvements will be developed as part of the shortlist of options.	Northbound improvements may increase safety for existing cyclists, however will not attract new cyclists (or walkers) and do not improve walking and cycling connections.	This option improves safety for cyclists by closing the missing link and providing a continuous cycle path from Petone to Ngauranga.	Land reclamation (5m) with seaward cycleway and bridge at Ngauranga improves connections, is likely to increase demand, improve connections and safety for cyclists and pedestrians.		

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Horokivi Road	Section 4 800 m												Petone Interchange			Section 5 700 m			McKenzie Avenue			Section 6 300 m			Korokoro Road			Melling Intersection			Section 7 1200 m			Section 8 2500 m			Dowse Drive
Option 7	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10	Option 11	Option 12	Option 13	Option 1	Option 2	Option 3	Option 1	Option 2	Option 3	Option 1	Option 2	Option 3	Option 1	Option 2	Option 3	Option 1	Option 2	Option 3	Option 1	Option 2	Option 3						
1	1	1	0	1	1	1	1	1	1	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1						
1	1	1	0	1	1	1	1	1	1	0	0	1	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1						
1	0	0	0	1	1	0	1	0	1	0	0	1	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1						
1	0	0	0	1	0	0	1	0	1	0	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1							
1	0	0	0	1	0	0	1	0	1	0	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1							
1	1	0	1	1	0	1	1	1	1	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
1	1	1	0	1	1	1	1	1	1	0	0	1	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1						
1	0	0	0	1	0	0	1	0	1	0	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1							
1	1	0	1	1	0	1	1	1	1	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							
1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							
1	0	0	0	1	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							
12	8	4	5	12	8	8	12	8	12	6	5	10	12	6	6	12	6	6	10	6	6	10	6	6	10	6	5	8	8	8							
Realign railway line to increase width of existing cycleway to 5m (meets project objectives and KPIs but is Cost prohibitive)	This option improves safety by closing the gap, however it is unlikely to be used by existing cyclists due to the detour for a small distance nor does it integrate well with existing facilities.	This option scores similarly to option 1, however scores worse for environmental and design KPIs due to the likely impacts of the underpass.	This option scores similarly to options 1 and 2, however is likely to reduce safety for cyclists and pedestrians because of the level crossing.	This option connections well to existing paths, improves safety and is likely to increase demand and be used by existing cyclists due to the direct and segregated route.	This option is similar to option 4 in terms of the connections, however is below minimum width and reduce safety for both cars and cyclists.	This option scores similarly to option 1.	This option score similarly to option 4.	This option score similarly to option 1.	This option links well to north, south connections, is likely to attract existing cyclists and new users because the detour is for a greater distance compared to option 1 and is wide.	This option may improve safety slightly for existing cyclists, however is unlikely to attract new cyclists.	This option would significantly reduce safety for cyclists and other vehicles.	This option improves safety for cyclists by closing the missing link and providing a continuous cycle path from Petone to Ngauranga.	Land reclamation (5m) with seaward cycleway and bridge at Ngauranga improves connections, is likely to increase demand, improve connections and safety for cyclists and pedestrians.	This option does not improve safety for cyclists.	This option does not improve safety for cyclists.	This option provides safe connections for cyclists from/to Petone esplanade, and further north into Lower Hutt.	This option does not improve safety for cyclists.	This option does not improve safety for cyclists.	Potential new routes provide segregated, safe and connected cycle routes for northbound cyclists.	This option does not improve safety for cyclists.	This option does not improve safety for cyclists.	Potential new routes provide segregated, safe and connected cycle routes for northbound cyclists.	This option does not improve safety for cyclists.	This option does not improve safety for cyclists.	Potential new routes provide segregated, safe and connected cycle routes for northbound cyclists.	This option does not improve safety for cyclists.	This option does not improve safety for cyclists.	Potential new routes provide segregated, safe and connected cycle routes for northbound cyclists.	This option does not improve safety for cyclists.	This option does not improve safety for cyclists.	Potential new routes provide segregated, safe and connected cycle routes for northbound cyclists.						

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Wellington to Hutt Valley Walking and Cycling Link - Short List Options MCA

Category	Criteria / Indicators	Weight	Notes	Rank Score					Comments	Assumptions
				3 16	2 19	1 30	Option 1 - Roadside 16	Option 2 - Roadside (raised path) 19		
Safety		%								It is assumed that the options do not include the proposed Petone to Grenada new road link.
	Safety for cyclists	14	Safety for cyclists at connection points (Ngauranga Interchange and Petone Interchange) and interaction with motor vehicles.	Good	1	Good	1	Best	2	Option 3 scores the best because there would be no constrictions or deficiencies in the shared path width. Whereas options 1 and 2 would use the existing (upgraded) shared path which has a number of narrow sections and constrictions that cannot all be removed.
	Safety for pedestrians		Safety for pedestrians at connection points (Ngauranga Interchange and Petone Interchange) and interaction with motor vehicles.	Good	1	Good	1	Best	2	Options 1 and 2 also score less because pedestrians and cyclists would be required to use a separated shared path on the Petone on-ramp to exit and enter the shared path (unless connecting onto the Petone Esplanade).
	Safety between cyclists and pedestrians		Safety between cyclists and pedestrians.	Good	1	Good	1	Best	2	All options provide an improvement in safety for pedestrians and cyclists at intersections compared to the existing or do min. option because a dedicated, separated shared path would be provided.
	Safety for other road users (cars, lorries etc.) as a result of the removal of cyclists/pedestrians from SH2.		Sightlines, intersection crossings, speed controls, parking, footpath width, footpath location / connections.	Good	1	Neutral	0	Best	2	Option 3 would reduce any potential conflict between cyclists and pedestrians because there would be no constrictions or narrow sections along the shared path, whereas options 1 and 2 would include some constrictions. All options would improve safety between cyclists and pedestrians due to the wider shared path.
	Efficiency for cyclists		Travel time savings for cyclists and efficiency of connections.	Good	1	Good	1	Best	2	Option 3 provides the greatest safety improvement because of the consistent path width that can be provided, improved connections at Petone Interchange and separation from the road and rail corridors.
	Access and connectivity		Connectivity to Petone, Lower Hutt and further north, and Wellington.	Good	1	Good	1	Best	2	Option 1 provides an improvement, but less than option 3. It provides a segregated path for cyclists and pedestrians through closing the existing missing link. However the width is not consistent and the connections at Petone Interchange are less desirable.
Planning		%								
	National Policy - Connecting New Zealand	14	Consistent with policy or strategy	Best	2	Best	2	Best	2	Option 3 provides greater time savings for cyclists because the width is a consistent 3.0m which will make passing other cyclists or pedestrians travelling in the opposite direction easier and the connections at Petone and Wellington provide better connectivity.
	Wellington & Hutt District Plan(s)		Consistent with statutory requirements	Best	2	Best	2	Good	1	Connections into Hutt City are greater and more convenient for option 3 because it links directly onto the Petone foreshore and not the Petone Interchange. It also links into the existing shared path in Petone (which is proposed to be upgraded).
	Wellington Regional Plan(s)		Consistent with statutory requirements	Good	1	Good	1	Neutral	0	All of the options are in line with National policy because they will improve connections between urban areas (Wellington and Lower Hutt).
	Hutt Cycling Strategy (2006)		Consistent with policy or strategy	Good	1	Good	1	Best	2	Consenting more challenging for greater land reclamation required for option 1.
	GWRC Regional Cycling Plan (2008)		Consistent with policy or strategy	Good	1	Good	1	Best	2	Consenting more challenging for greater land reclamation required for option 1.
	Wellington Cycling Policy (2008)		Consistent with policy or strategy	Good	1	Good	1	Good	1	Option 3 links to into the Hutt walking and cycling network Road, with improvements along the Hutt Road in Petone. Options 1 and 2 are less connected to the existing walking and cycling network.
										Option 3 scores more highly because it would provide a seaward shared path in line with the Great Harbour Way concept (supported by GWRC in the 2008 cycling policy). Although the seaward path (option 1) would be primarily provided for commuters.
										The options are in line with the Wellington Cycling Policy because all of the options will improve safety for cyclists and pedestrians commuting into Wellington City from the north.
Social		%								All scoring against social impacts is for the options unmitigated.
	Property Impacts	14	Impacts on properties along the corridor, including land take/ existing activities parking/connectivity impacts.	Neutral	0	Neutral	0	Neutral	0	None of the option impact on properties along the corridor.

	CTEPD		Crime prevention through environmental design - passive surveillance, response access etc.	Neutral	0	Best	2	Poor	-1	Option 1 would be as per existing/no change. Option 2 would provide greater surveillance of the shared path through raising the existing shared path to the same level as SH2 (where possible). Option 3 would be remote from SH2 and passive surveillance/natural deterrence factors would be reduced on the shared path due to distance, possible intervening structures and light levels at night (unmitigated). This score is based on the unmitigated option.	
	Business Opportunities and impacts		Flow on economic benefits due to improved connectivity/quality of streetscape and waterfront/aligned infrastructure.	Good	1	Good	1	Best	2	Option 3 would provides wider tourism benefits. For instance it would link the Rimutaka trail into Wellington City.	
			Impacts on business along Hutt Road (Wellington end), including land (covered under property impacts)/ existing activities and parking/connectivity impacts.	Neutral	0	Neutral	0	Neutral	0	All of the options include the same alignment and improvements along the Hutt Road in Wellington.	
			Impact on KiwiRail impacts.	Good	1	Good	1	Best	2	Option 3 would provide the most benefit to KiwiRail because of the benefits provided by greater land reclamation. Options 1 and 2 provide some benefit due to the minimal land reclamation.	
Environmental		%			0		0		2		All scoring against social impacts is for the options unmitigated.
	Air and noise impacts	14	Exposure to emissions noise and air quality.	Neutral	0	Neutral	0	Best	2	Option 3 is furthest away from SH2 which means pedestrians and cyclists would be least exposed to air pollution and noise from traffic.	
	Environmental impact		Impact on streams, indigenous vegetation, coastal habitats, from discharge, carbon footprint.	Neutral	0	Neutral	0	Poor	-1	Option 3 would have the most impact on the environment due to the increased level of land reclamation required. This score is based on pre-mitigation and details will be resolved in the next stage of the study.	
	Landscape and visual		Impact on important landforms, natural character and existing views for all public/private 'audience' types.	Neutral	0	Neutral	0	Poor	-1	Option 3 would have the greatest visual and landscape impact due to the coastal alignment and bridge structures that would be required. Options 1 and 2 would have a neutral impact because they would be located within the SH2 road corridor. This score is based on pre-mitigation. Option 3, with urban design and landscape treatments has the potential to improve the corridor.	
	Urban design		Impact on pedestrian/cyclist amenity, landscape experience and connections to 'other' activities. Urban quality/form - corridor, streetscape, waterfront.	Neutral	0	Neutral	0	Best	2	Option 3 would provide the greatest landscape experience and connection to the sea, with opportunities to improve the urban quality of the corridor and the waterfront. Option 1 and 2 would provide minor benefits - an improved 'edge treatment' along the route.	
Cultural		%			0		0		0		
	Archaeology and Heritage	14	Impact on archaeological or heritage sites.	Neutral	0	Neutral	0	Neutral	0	There is a former Pa site at Ngauranga, Petone foreshore area and Korokoro Park. Two other sites identified to west of SH2. Consultation with Port Nicholson Settlement Trust has occurred.	
	Cultural sites		Impact on sites of significant cultural importance	Neutral	0	Neutral	0	Neutral	0		
Constructability		%			0		2		5		
	Constructability	14	Traffic management, construction time. Consider full life costs of the design e.g. minimal maintenance of plantings, street components signs, pavement etc.	Neutral	0	Neutral	0	Good	1	Option 3 scores highest because KiwiRail services would not be interrupted nor would utility services along the existing shared path need to be relocated.	
	Maintenance		Ease of Maintenance and ensuring long term design life of facility	Neutral	0	Good	1	Best	2	Option 3 scores the highest in terms of ease of maintenance because the shared path would be a consistent 3.0m wide without constrictions, compared to options 1 and 2 which would include some constrictions. Option 2 scores better than option 1 because it would be raised and so would reduce the amount debris falling onto the path from SH2.	Costs have not been considered in scoring.
	Utility services		Impact on utility services	Neutral	0	Good	1	Best	2	Option 3 scores the highest because utility services would be least impacted by a new coastal path. Option 2 scores better than option 1 because the path would be raised above the existing cycle path which will reduce the need to dig down to where utility services are located along the existing path.	

Scoring	
Best	2
Good	1
Neutral	0
Poor	-1

Appendix C

Assessment Summary Tables

RELEASED UNDER THE
OFFICIAL INFORMATION ACT

DETAILED BUSINESS CASE – ASSESSMENT OF OPTIONS – SUMMARY TABLE

Proposal Details			
Activity Name:	Wellington to Hutt Valley Walking and Cycling link	Name of Project Manager & Region:	Maggie Buttle, Wellington
Activity Description:	Investigate and develop a recommended option for a dedicated walking and cycling facility between Petone and Ngauranga, while also considering the connections to the north at Petone and up to the Melling Interchange, and also to the south at the Ngauranga Interchange and along the Hutt Road in Wellington.		
	Background Information		
Geographic Context:	The 4.7km stretch of SH2 between Petone and Ngauranga comprises a transport corridor bordered to the west by the Wellington Fault escarpment and to the east by Wellington Harbour. The transport corridor contains SH2, a high volume national strategic route with a posted speed limit of 100km/h which carries over 60,000 vehicles per day. It has two lanes in each direction with a median barrier, and a north and southbound shoulder of variable width. To the east of the motorway is the Wellington suburban rail network which is part of the North Island Main Trunk operated by KiwiRail. SH2, the Hutt Road and the railway line provide the main transport route between Wellington and Petone. Along the corridor are also connections to the northern suburbs of Khandallah, Ngaio and Kaiwharawhara.		
Social Context:	The corridor is located between Wellington City and Hutt Valley. Wellington City accounts for 41% of the region's population and 5% of New Zealand's population. The population of Wellington is young with 55.9% aged between 18 -49 years compared with 45.1% in New Zealand. ¹		
Economic Context:	There are 25,184 Wellington-based businesses including creative industries and property and business services. Incomes in Wellington City are well above the average for New Zealand, with over 40% of households having an annual income of over \$89,000. The main industries people are employed in are diverse, and include property and business services, government administration and defence.		
OPTION 1 – Roadside Shared Path			
Option Description:	Upgrade the existing shared path along SH2 from 250m north of Horokiwi to Ngauranga Interchange to provide a shared path that is mainly 3.0m wide, with some narrow sections along the path. Where there is currently a gap in a dedicated walking and cycling facility along SH2 shoulder, which is from north of Horokiwi to the Petone Interchange, the railway lines will be realigned towards to the sea onto newly reclaimed land. The gap created will then be used to continue the path, which will link onto the Petone Esplanade and under the Petone Interchange for cyclists and pedestrians to continue north up to the Petone		

¹ Wellington City Council, Profiles of Wellington, online - <http://wellington.govt.nz/about-wellington/profile-of-wellington>

	train station.					
Estimated Total Public Sector Funding Requirement:		Lower		Upper		
	Capital Cost (\$m):	\$13,183,855		\$20,358,000		
	Net Property Cost (\$m):	Not costed		Not costed		
	Opex (\$m/30yr):	Not costed		Not costed		
	Maintenance (\$m/30yr):	Not costed		Not costed		
	Present Value of Cost to Govt. (\$m):	Not costed		Not costed		
Estimated BCR Range:		3.8				
Timing of need:	Optimal Programme:		Likely:			
IRS Profile:	Strategic Fit:	H	Effectiveness:	H	Efficiency:	M
Planning Objectives						
Project Objectives:		Performance against planning objective:				
<ul style="list-style-type: none"> To provide walking and cycling infrastructure linking Hutt Valley to Wellington that improves safety for pedestrians and cyclists, and that is a catalyst for increased use of walking and cycling between these destinations. To improve the connections and integration of walking and cycling infrastructure between Petone and Ngauranga and the strategic cycling/ walking planning of Hutt City and Wellington City. To consider transport resilient in providing a walking and cycling facility. To manage the social, cultural, land use and other environmental impacts of the project in the project area and its communities 		<p>Option 1 would improve safety for pedestrians and cyclists at intersections and along SH2 compared to the existing situation and the do minimum because a dedicated, separated and wider path (where possible) would be provided. Option 1 would provide less protection for cyclists and pedestrians because the path would still be located on SH2 with a wire rope barrier which would provide some protection. Cyclists and pedestrians exiting at Petone, if continuing north, would still be required to use the Petone off-ramp, albeit with a barrier. The path would also have a sub-standard width in parts which may compromise safety for pedestrians and cyclists.</p> <p>The north and south connections of the proposed SH2 shared path are the same for options 1, 2 and 3. All of the options achieve improved walking and cycling connections between Petone and Ngauranga, and link into existing and improved pedestrian and cyclist routes. Option 1 was assessed as providing good access and connectivity in the multi-criteria assessment but less than option 3 because of inadequate widths in parts and less convenient connections.</p> <p>Option 1 would not improve the resilience of the transport corridor, with only minimal land reclamation required to move the railway line east in order to fit a 3.0m wide shared path between SH2 and railway line.</p> <p>Only minor land reclamation would be required and the majority of the shared path would be located within the existing road corridor. The social and environmental impact of option 1 is therefore</p>				

<p>by so far as practicable avoiding, remedying or mitigating any such effects through route and alignment selection, design and conditions.</p>	<p>considered low.</p> <p>There are known former Pa sites at Ngauranga, Petone foreshore and Korokoro park, and two other sites identified to the west of SH2.</p>
<p>Rationale for Selection or Rejection of Option:</p>	<p>This option does not meet all of the project objectives. The shared path would be an inadequate width which may compromise pedestrian and cyclist safety. This option would still be located within the SH2 corridor, albeit with a wire rope barrier, which is less likely to attract new users and would not be as safe as option 3 (which is located outside the road and rail corridors).</p>
<p>Implementability Appraisal of Option 1</p>	
<p>Technical:</p>	<p>To implement this option a number of known utility cables / lines would be affected and would need to be relocated. This would make the implementation more problematic.</p> <p>This option requires the relocation of the railway corridor, which is required to accommodate the proposed Petone to Granada link road and new interchange at Petone</p>
<p>Consentability</p>	<p>Considering the seaside and roadside options both contain reclamation there will also be the need to consider how the deposition of fill will occur and how discharges to air, land or the coastal marine area will be managed. Subject to modern construction practices and appropriate controls these factors can be appropriately managed.</p>
<p>Operational/Maintenance:</p>	<p>The maintenance of option 1 is problematic because of the constrictions in width which mean that the path is not consistently 3.0m in width. Consequently it will not be possible for a mechanical sweeper to maintain the path, and so sections of the path will need to be hand swept.</p> <p>Option 1 would also be located next to SH2, which means that the path will be more susceptible to debris from the SH2 road lanes gathering on the path.</p>
<p>Financial:</p>	<p>Option 1 could be funded from the existing money allocated in the NLTIP 2012 – 14. The proposed improvements along the Hutt Road in Wellington are likely to be funded by Wellington City Council (this is similar across all of the options).</p>
<p>Public/Stakeholders:</p>	<p>The public were consulted on option 1 (along with option 3) and public feedback was sought on the option. A total of 778 submission were received from the public, out of this 32% said they support option 1 and the majority said they support option 3 (seaside). A number of issues were raised by the public on option 1, including the lack of consistent width, pinch points in the width, noise and pollution issues associated with being located next to SH2 and potential problems with debris from SH2. Supportive comments for option 1 were that it is cheaper, could be implemented quicker than option 3 and the connections were better because cyclists would not need to cross the railway lines via a bridge. Overall the majority of people do not support option 1.</p>

	The majority of stakeholders including Port Nicolson Trust, Wellington City Council and Cycle Aware Wellington do not support option 1, and instead support option 3.
	Assessment of Option 1
Criterion	Supporting Information
Safety:	<p>Option 1 will enhance safety for cyclists and pedestrians through providing a segregated path along the whole of SH2 and improving the connections to the north and south. This option does not entirely improve safety however because the path would still be located within the SH2 road corridor and so there would still be a potential risk of crashes between motor vehicles and pedestrians / cyclists.</p> <p>There will be no impacts on the safety of motorists. Segregating cyclists and pedestrians on the SH2 will reduce possible conflict between motorists and cyclists/ pedestrians through reducing potential crashes and potential problems of cyclists blocking the flow of traffic at merges such as the Petone off-ramp.</p>
Economy:	Option 1 will improve journey times for cyclists, but not as effectively as option 3. Option 1 will provide less tourist and recreational benefits because the width is not consistently 3.0m and is within the SH2 road corridor.
Integration:	<p>Option 1 is consistent with national government policy to improve safety and complete missing cycle and pedestrian links in major urban areas. Option 1 is also consistent with and support regional and local policies and strategic which identify the 'missing link' along SH2 in various documents. Option 1 is less consistent with the 'Great Harbour Way' concept which supports a seaside option.</p> <p>Option 1 will provide a continuous pedestrian and cyclist link between Wellington and Hutt Valley. The existing provision is poor in terms of width, safety, separation from motorised vehicles and maintenance, so option 1 will provide a level of improvement.</p>
Social:	Option 1 will improve connections between Wellington and Hutt Valley. This will improve accessibility to jobs through providing improved travel choice so people can choose to safely cycle between the two urban areas for jobs, shops, services and other facilities.
Bio-Physical:	Option 1 has minimal land reclamation required, compared to option 3. This extent of the impact on the harbour edge anecdotally affects largely modified land. Areas of particular ecological, terrestrial or landscape sensitivity have not been fully investigated; however it is considered that the negative impacts can largely be mitigated.

Human Health:	<p>Option 1 will help to encourage people to walk and cycle between Wellington and Hutt Valley rather than drive alone. It will encourage less people when compared to option 3, however by providing a segregated path the perception of safety is likely to improve and so the current suppressed demand are more likely to consider walking or cycling when compared to the existing situation.</p> <p>Increased numbers of people walking or cycling between Wellington and Hutt Valley rather than driving along will help improve air quality and contribute to reducing emissions of CO2 and other pollutants. Encouraging walking and cycling between Wellington and Hutt Valley through providing a complete cyclist and pedestrian link will not increase noise.</p> <p>Option 1, although to a lesser extent than option 3, will provide a safe link between Wellington and Hutt Valley for cyclists and pedestrians. This will benefit existing and potential cyclists / pedestrians along the corridor. Increased active travel by commuters and for recreation will also contribute to improving individual's health.</p>
Cultural:	<p>There are former Pa sites at Ngauranga, Petone foreshore area and Korokoro Park. Two other sites are also identified to west of SH2.</p> <p>The Port Nicolson Block Settlement Trust and Wellington Tenths trust have expressed support for options that provide positive health benefits however they felt option 3 would rely on on-going maintenance from Kiwirail which they felt would be unreliable. Ongoing consultation will be required with Iwi in the next stage of detailed design.</p>
Property:	<p>The property impact of option 1 is minimal with the majority of the path located within the existing SH2 road corridor. The rail realignment is required for the proposed Petone to Granada interchange.</p>

DETAILED BUSINESS CASE – ASSESSMENT OF OPTIONS – SUMMARY TABLE

Proposal Details			
Activity Name:	Wellington to Hutt Valley Walking and Cycling link	Name of Project Manager & Region:	Maggie Buttle, Wellington
Activity Description:	Investigate and develop a recommended option for a dedicated walking and cycling facility between Petone and Ngauranga, while also considering the connections to the north at Petone and up to the Melling Interchange, and also to the south at the Ngauranga Interchange and along the Hutt Road in Wellington.		
	Background Information		
Geographic Context:	The 4.7km stretch of SH2 between Petone and Ngauranga comprises a transport corridor bordered to the west by the Wellington Fault escarpment and to the east by Wellington Harbour. The transport corridor contains SH2, a high volume national strategic route with a posted speed limit of 100km/h which carries over 60,000 vehicles per day. It has two lanes in each direction with a median barrier, and a north and southbound shoulder of variable width. To the east of the motorway is the Wellington suburban rail network which is part of the North Island Main Trunk operated by KiwiRail. SH2, the Hutt Road and the railway line provide the main transport route between Wellington and Petone. Along the corridor are also connections to the northern suburbs of Khandallah, Ngaio and Kaiwharawhara.		
Social Context:	The corridor is located between Wellington City and Hutt Valley. Wellington City accounts for 41% of the region's population and 5% of New Zealand's population. The population of Wellington is young with 55.9% aged between 18 -49 years compared with 45.1% in New Zealand. ¹		
Economic Context:	There are 25,184 Wellington-based businesses including creative industries and property and business services. Incomes in Wellington City are well above the average for New Zealand, with over 40% of households having an annual income of over \$89,000. The main industries people are employed in are diverse, and include property and business services, government administration and defence.		
OPTION 2 – Roadside shared Path, raised to SH2 level			
Option Description:	Upgrade the existing shared path along SH2 from 250m north of Horokiwi to Ngauranga Interchange to provide a shared path that is mainly 3.0m wide, with some narrow sections along the path. Where there is currently a gap in a dedicated walking and cycling facility along SH2 shoulder, which is from north of Horokiwi to the Petone Interchange, the railway lines will be realigned towards to the sea onto newly reclaimed land. The gap created will then be used to continue the path, which will link onto the Petone Esplanade and under the Petone Interchange for cyclists and pedestrians to continue north up to the Petone		

¹ Wellington City Council, Profiles of Wellington, online - <http://wellington.govt.nz/about-wellington/profile-of-wellington>

	train station.			
	Option 2 is different to option 1 in that the shared path would be raised in height to the same level of SH2, where possible.			
Estimated Total Public Sector Funding Requirement:		Lower		Upper
	Capital Cost (\$m):	\$13,843,047		\$21,375,900
	Net Property Cost (\$m):	Not costed		Not costed
	Opex (\$m/30yr):	Not costed		Not costed
	Maintenance (\$m/30yr):	Not costed		Not costed
	<i>Present Value of Cost to Govt. (\$m):</i>	Not costed		Not costed
Estimated BCR Range:				
Timing of need:	<i>Optimal Programme:</i>		<i>Likely:</i>	
IRS Profile:	<i>Strategic Fit:</i>	H	<i>Effectiveness:</i>	H
			<i>Efficiency:</i>	M
Planning Objectives				
Project Objectives:		Performance against planning objective:		
<ul style="list-style-type: none"> To provide walking and cycling infrastructure linking Hutt Valley to Wellington that improves safety for pedestrians and cyclists, and that is a catalyst for increased use of walking and cycling between these destinations. To improve the connections and integration of walking and cycling infrastructure between Petone and Ngauranga and the strategic cycling/ walking planning of Hutt City and Wellington City. To consider transport resilient in providing a walking and cycling facility. To manage the social, cultural, land use and other environmental 		<p>Option 2 would improve safety for pedestrians and cyclists at intersections and along SH2 compared to the existing situation and the do minimum because a dedicated, separated and wider path (where possible) would be provided. Option 2 would provide less protection for cyclists and pedestrians because the path would still be located on SH2 with a wire rope barrier which would provide some protection. Cyclists and pedestrians exiting at Petone, if continuing north, would still be required to use the Petone off-ramp, albeit with a barrier. The path would also have a sub-standard width in parts which may compromise safety for pedestrians and cyclists.</p> <p>The north and south connections of the proposed SH2 shared path are the same for options 1, 2 and 3. All of the options achieve improved walking and cycling connections between Petone and Ngauranga, and link into existing and improved pedestrian and cyclist routes. Option 2 was assessed as providing good access and connectivity in the multi-criteria assessment but less than option 3 because of inadequate widths in parts and less convenient connections.</p> <p>Option 2 would not improve the resilience of the transport corridor, with only minimal land reclamation required to move the railway line east in order to fit a 3.0m wide shared path between SH2 and railway line.</p> <p>Only minor land reclamation would be required and the majority of the shared path would be located</p>		

impacts of the project in the project area and its communities by so far as practicable avoiding, remedying or mitigating any such effects through route and alignment selection, design and conditions.	within the existing road corridor. The social and environmental impact of option 1 is therefore considered low. There are known former Pa sites at Ngauranga, Petone foreshore and Korokoro park, and two other sites identified to the west of SH2.
Rationale for Selection or Rejection of Option:	This option does not meet all of the project objectives. The shared path would be an inadequate width which may compromise pedestrian and cyclist safety. This option would still be located within the SH2 corridor, albeit with a wire rope barrier, which is less likely to attract new users and would not be as safe as option 3 (which is located outside the road and rail corridors).
Implementability Appraisal of Option 2	
Technical:	To implement this option a number of known utility cables / lines would be affected and would need to be relocated. This would make the implementation more problematic. The impact on utilities would be less than option 1 because the new path would be raised above the existing. This option requires the relocation of the railway corridor, which is required to accommodate the proposed Petone to Granada link road and new interchange at Petone
Consentability	Considering the seaside and roadside options both contain reclamation there will also be the need to consider how the deposition of fill will occur and how discharges to air, land or the coastal marine area will be managed. Subject to modern construction practices and appropriate controls these factors can be appropriately managed.
Operational/Maintenance:	The maintenance of Option 2 is problematic because of the constrictions in width which mean that the path is not consistently 3.0m in width. Consequently it will not be possible for a mechanical sweeper to maintain the path, and so sections of the path will need to be hand swept. Option 2 would also be located next to SH2, which means that the path will be more susceptible to debris from the SH2 road lanes gathering on the path. The path would be same height as SH2 where possible, so it is likely to be less susceptible to debris collecting on the path.
Financial:	Option 2 could be funded from the existing money allocated in the NLTIP 2012 – 14. The proposed improvements along the Hutt Road in Wellington are likely to be funded by Wellington City Council (this is similar across all of the options).
Public/Stakeholders:	The public were not specifically consulted on option 2 because of its similarities to option 1 in terms of alignment and to avoid confusion between the two options.
Assessment of Option 2	

Criterion	Supporting Information
Safety:	<p>Option 2 will enhance safety for cyclists and pedestrians through providing a segregated path along the whole of SH2 and improving the connections to the north and south. This option does not entirely improve safety however because the path would still be located within the SH2 road corridor and so there would still be a potential risk of crashes between motor vehicles and pedestrians / cyclists.</p> <p>There will be no impacts on the safety of motorists. Segregating cyclists and pedestrians on the SH2 will reduce possible conflict between motorists and cyclists/ pedestrians through reducing potential crashes and potential problems of cyclists blocking the flow of traffic at merges such as the Petone off-ramp.</p>
Economy:	<p>Option 2 will improve journey times for cyclists, but not as effectively as option 3. Option 2 will provide less tourist and recreational benefits because the width is not consistently 3.0m and is within the SH2 road corridor.</p>
Integration:	<p>Option 2 is consistent with national government policy to improve safety and complete missing cycle and pedestrian links in major urban areas. Option 2 is also consistent with and support regional and local policies and strategic which identify the 'missing link' along SH2 in various documents. Option 2 is less consistent with the 'Great Harbour Way' concept which supports a seaside option.</p> <p>Option 2 will provide a continuous pedestrian and cyclist link between Wellington and Hutt Valley. The existing provision is poor in terms of width, safety, separation from motorised vehicles and maintenance, so option 2 will provide a level of improvement.</p>
Social:	<p>Option 2 will improve connections between Wellington and Hutt Valley. This will improve accessibility to jobs through providing improved travel choice so people can choose to safely cycle between the two urban areas for jobs, shops, services and other facilities.</p>
Bio-Physical:	<p>Option 2 has minimal land reclamation required, compared to option 3. This extent of the impact on the harbour edge anecdotally affects largely modified land. Areas of particular ecological, terrestrial or landscape sensitivity have not been fully investigated; however it is considered that the negative impacts can largely be mitigated.</p>

Human Health:	<p>Option 2 will help to encourage people to walk and cycle between Wellington and Hutt Valley rather than drive alone. It will encourage less people when compared to option 3, however by providing a segregated path the perception of safety is likely to improve and so the current suppressed demand are more likely to consider walking or cycling when compared to the existing situation.</p> <p>Increased numbers of people walking or cycling between Wellington and Hutt Valley rather than driving along will help improve air quality and contribute to reducing emissions of CO2 and other pollutants. Encouraging walking and cycling between Wellington and Hutt Valley through providing a complete cyclist and pedestrian link will not increase noise.</p> <p>Option 2, although to a lesser extent than option 3, will provide a safe link between Wellington and Hutt Valley for cyclists and pedestrians. This will benefit existing and potential cyclists / pedestrians along the corridor. Increased active travel by commuters and for recreation will also contribute to improving individual's health.</p>
Cultural:	<p>There are former Pa sites at Ngauranga, Petone foreshore area and Korokoro Park. Two other sites are also identified to west of SH2.</p> <p>The Port Nicolson Block Settlement Trust and Wellington Tenths trust have expressed support for options that provide positive health benefits however they felt option 3 would rely on on-going maintenance from Kiwirail which they felt would be unreliable. Ongoing consultation will be required with Iwi in the next stage of detailed design.</p>
Property:	<p>The impact of option 2 is minimal with the majority of the path located within the existing SH2 road corridor. The rail realignment is required for the proposed Petone to Granada interchange.</p>

DETAILED BUSINESS CASE – ASSESSMENT OF OPTIONS – SUMMARY TABLE

Proposal Details			
Activity Name:	Wellington to Hutt Valley Walking and Cycling link	Name of Project Manager & Region:	Maggie Buttle, Wellington
Activity Description:	Investigate and develop a recommended option for a dedicated walking and cycling facility between Petone and Ngauranga, while also considering the connections to the north at Petone and up to the Melling Interchange, and also to the south at the Ngauranga Interchange and along the Hutt Road in Wellington.		
	Background Information		
Geographic Context:	The 4.7km stretch of SH2 between Petone and Ngauranga comprises a transport corridor bordered to the west by the Wellington Fault escarpment and to the east by Wellington Harbour. The transport corridor contains SH2, a high volume national strategic route with a posted speed limit of 100km/h which carries over 60,000 vehicles per day. It has two lanes in each direction with a median barrier, and a north and southbound shoulder of variable width. To the east of the motorway is the Wellington suburban rail network which is part of the North Island Main Trunk operated by KiwiRail. SH2, the Hutt Road and the railway line provide the main transport route between Wellington and Petone. Along the corridor are also connections to the northern suburbs of Khandallah, Ngaio and Kaiwharawhara.		
Social Context:	The corridor is located between Wellington City and Hutt Valley. Wellington City accounts for 41% of the region's population and 5% of New Zealand's population. The population of Wellington is young with 55.9% aged between 18 -49 years compared with 45.1% in New Zealand. ¹		
Economic Context:	There are 25,184 Wellington-based businesses including creative industries and property and business services. Incomes in Wellington City are well above the average for New Zealand, with over 40% of households having an annual income of over \$89,000. The main industries people are employed in are diverse, and include property and business services, government administration and defence.		
OPTION 3 – Seaside shared Path			
Option Description:	The northern connections at Petone and the southern connections at Ngauranga are the same for all options (1, 2 and 3) so they have not been assessed in this table. The main difference for option 3 is that a bridge is required at Ngauranga to allow cyclists to cross over the railway line from the existing path. A second bridge is required at McKenzie Avenue in Petone to allow cyclists and pedestrians to cross the railway line to continue north along SH2 or Pito-one Road.		

¹ Wellington City Council, Profiles of Wellington, online - <http://wellington.govt.nz/about-wellington/profile-of-wellington>

Estimated Total Public Sector Funding Requirement:			Lower	Upper
	Capital Cost (\$m):		\$36,727,079	\$56,326,000
	Net Property Cost (\$m):		Not costed	Not costed
	Opex (\$m/30yr):			
	Maintenance (\$m/30yr):		Not costed	Not costed
<i>Present Value of Cost to Govt. (\$m):</i>		Not costed	Not costed	
Estimated BCR Range:		3.1		3.7
Timing of need:	<i>Optimal Programme:</i>		<i>Likely:</i>	2019
IRS Profile:	<i>Strategic Fit:</i>	H	<i>Effectiveness:</i>	H
			<i>Efficiency:</i>	M
Planning Objectives				
Project Objectives:		Performance against planning objective:		
<ul style="list-style-type: none"> To provide walking and cycling infrastructure linking Hutt Valley to Wellington that improves safety for pedestrians and cyclists, and that is a catalyst for increased use of walking and cycling between these destinations. To improve the connections and integration of walking and cycling infrastructure between Petone and Ngauranga and the strategic cycling/ walking planning of Hutt City and Wellington City. To consider transport resilient in providing a walking and cycling facility. To manage the social, cultural, land use and other environmental impacts of the project in the project area and 		<p>Option 3 would provide the best improvement in pedestrian and cyclist infrastructure links between Wellington and Hutt Valley because it is fully separated from the SH2 traffic lines and the railway corridor. The path will also provide a consistent 3.0m width, with no pinch points or inadequacies in the width. Providing a seaside path that is a consistent width is more likely to increase walking and cycling between Wellington and Hutt Valley because of the greater safety it provides being away from SH2 traffic, its consistent width and improve amenity. This is reflected in the consultation feedback we have received.</p> <p>Option 3 provides convenient connections onto the Petone foreshore and links into existing but improved facilities along the Hutt Road in Petone. The connection into Petone would allow cyclists and pedestrians to link into Hutt Valley. Cyclists and pedestrians wishing to continue north can cross over a bridge near McKenzie Avenue to either link into SH2 or onto Pito-one Road.</p> <p>Option 3 improves the resilience of the transport corridor through providing a barrier between the harbour and the railway tracks and SH2. However it is important to note that resilience is not the primary outcome of option 3 - cyclist and pedestrian safety and also improved level of service is the primary outcome of this option. To fully meet the resilience objective a separate resilience option has been developed and can be overlaid onto this option.</p> <p>Option 3 would have the greatest environmental impact because of the land reclamation that would be</p>		

Project Name – Assessment of Options – Option 3 Seaside shared path

<p>its communities by so far as practicable avoiding, remedying or mitigating any such effects through route and alignment selection, design and conditions.</p>	<p>required.</p> <p>The shared path would have positive social improvements not only by improving the current provision for cyclists and pedestrians which is poor and unsafe, but through providing the local community with access to the sea along this section of the coast.</p>
<p>Rationale for Selection or Rejection of Option:</p>	<p>On balance, option 3 has been selected as the recommended option because it meets all the project objectives to a greater extent than options 1 and 2. Option 3 will improve safety and the perception of safety to a greater degree than options 1 and 2; it will provide an improved level of service for cyclists and pedestrians and will link effectively link into existing and approved cycle and pedestrian links.</p> <p>While resilience is not the main outcome of option 3, this option provides a level of resilience because of the land reclamation which will provide improved protection compared to the existing protection. In addition to option 3 there is a separate resilience option that can be overlaid.</p> <p>Option 3 will have the greatest environmental impact because of the land reclamation that is required. It provides the opportunity to enhance to the corridor from an urban design perspective and positively impact on the existing coastal environment which is poor.</p>
<p>Implementability Appraisal of Option 3</p>	
<p>Technical:</p>	<p>The implementation of option 3 would be less complex than options 1 and 2 because no realignment of the railway is required nor is the relocation of any utility cables required. This is because the shared path would be on coastal side next to the railway on newly reclaimed land.</p> <p>The technical requirements for the land reclamation would need to be assessed in greater detail in the next study stage.</p>
<p>Consentability</p>	<p>An alteration to the Railway Purposes designation will be required and a new designation for the cycle and pedestrian path east of the railway line. This would be in the name of the NZTA as the requiring authority taking responsibility for the implementation of the work.</p> <p>The most significant matter is the requirement for a coastal permit to reclaim land. The NZ Coastal Policy Statement, the Wellington Regional Policy Statement and the provisions of the Wellington Regional Coastal Plan must all be considered and taken into account. Advice from DoC is that it will be up to the applicant to justify any reclamation specifically in recognition of the NZ Coastal Policy Statement (Policies 10 and 14 in particular) and the Project team will bear that in mind when considering the form of the reclamation, while addressing effects and providing mitigation.</p> <p>Considering the seaside and roadside options both contain reclamation there will also be the need to consider how the deposition of fill will occur and how discharges to air, land or the coastal marine area</p>

	will be managed. Subject to modern construction practices and appropriate controls these factors can be appropriately managed.
Operational/Maintenance:	<p>The proposed path width for this option will be a consistent 3.0m, which means that a mechanical sweeper could fit along the path. This would make maintenance quicker and more effective than options 1 and 2.</p> <p>The path would be located away from SH2 and so would be less prone to SH2 debris than the roadside options. Option 3 will however be more exposed to debris from the sea, particularly after strong winds and other adverse weather conditions.</p>
Financial:	It is unknown what financial contributions can be made by the Transport Agency, and other stakeholders including Wellington City Council, Hutt City Council, Greater Wellington Regional Council and KiwiRail.
Public/Stakeholders:	<p>The public consultation revealed strong support for option 3, with 67% of respondents expressing support for option 3 compared to 33% for the roadside option (option 1).</p> <p>The reasons people supported option 3 was for reasons including; that it would provide safe access to the sea, greater amenity and views of the harbour, it would be safer, consistent width could be provided and it could also be future proofed so a wider path could be provided in the future if the number of users was significant. Issues and concerns raised included exposure to bad weather (high winds, sea spray etc.), safety issues because there would be no passive surveillance and concerns about the potential cost and delay.</p> <p>Stakeholders including Wellington City Council, Hutt Council, Cycle Aware Wellington and the Great Harbour Way Trust expressed support for option 3.</p>
	Assessment of Option 3
Criterion	Supporting Information
Safety:	<p>Option 3 will improve safety for cyclists and pedestrians to a greater extent than options 1 and 2 because the path would be located outside the SH2 road corridor and the railway corridor. Segregating cyclists and pedestrians from motorists along SH2 will reduce conflict between motorists and cyclists, particularly at merges and interchanges such as Petone. The risk of crashes between motorists and cyclists / pedestrians along SH2 will be completely removed by option 3.</p> <p>The perception of safety is a key reason why people are not choosing to cycle or walk between Wellington and Hutt Valley. The lack of separation from motorised vehicles and the connections on and off the path, particularly at Petone Interchange, are a significant safety concern for people. Option 3 will help to improve the perception of safety along the corridor and unlock the suppressed demand.</p>

	<p>Option 3 would provide a greater level of safety for users through providing a consistent 3.0m wide path (4 to 5m wide corridor) with no deficiencies or pinch points. This will enable safe bi-directional movement and safe provision for cyclists and pedestrians to share the path. It is assumed however that there will be fewer pedestrians using the path compared to cyclists because of the location and the distance of the path.</p> <p>There is a potential for CPTED issues because there will be no passive surveillance of the path from SH2 traffic. This can however be mitigated through urban design features such as lighting</p>
Economy:	<p>Option 3 provides the opportunity to contribute more directly to the regional economy through resilience and tourism benefits. Option 3 provides an opportunity to provide a high quality seaside shared facility that will realise a wide range of benefits for cyclists and pedestrians and for all types of users from commuters to recreational users and tourists.</p>
Integration:	<p>Option 3 is consistent with national government policy to improve safety and complete missing cycle and pedestrian links in major urban areas. Option 1 is also consistent with and support regional and local policies and strategic which identify the 'missing link' along SH2 in various documents. Option 3 is also consistent with the 'Great Harbour Way' concept which supports a seaside option, and is supported by Wellington City Council and Greater Wellington Regional Council.</p>
Social:	<p>Option 3 will improve connections between Wellington and Hutt Valley. This will improve accessibility to jobs through providing improved travel choice so people can choose to safely cycle between the two urban areas for jobs, shops, services and other facilities.</p>
Bio-Physical:	<p>Option 3 has a negative environment impact due to the reclamation required. This extent of the impact on the harbour edge anecdotally affects largely modified land. Areas of particular ecological, terrestrial or landscape sensitivity have not been fully investigated; however it is considered that the negative impacts can largely be mitigated. The evidence for this is provided by the Ecological Report by Boffa Miskell. The report recommendations cover the mitigation measures for reclamation.</p>
Human Health:	<p>Option 3 will help to encourage people to walk and cycle between Wellington and Hutt Valley rather than drive alone. It will encourage less people when compared to option 3, however by providing a segregated path the perception of safety is likely to improve and so the current suppressed demand are more likely to consider walking or cycling when compared to the existing situation.</p> <p>Increased numbers of people walking or cycling between Wellington and Hutt Valley rather than driving along will help improve air quality and contribute to reducing emissions of CO2 and other pollutants. Encouraging walking and cycling between Wellington and Hutt Valley through providing a complete cyclist and pedestrian link will not increase noise.</p> <p>One of the key findings in NZTA Research Report 457 'Determination of personal exposure to traffic pollution while travelling by different modes', (see - http://nzta.govt.nz/resources/research/reports/457/index.html)</p>

	<p>suggests that locating cycle paths just a short distance from roads can reduce pollution exposure significantly: for example, locating a cyclist 5–7m away can reduce exposure by 20–40%. This would provide more support for Option 3 over other options.</p> <p>Option 3 will provide a safe link between Wellington and Hutt Valley for cyclists and pedestrians. This will benefit existing and potential cyclists / pedestrians along the corridor. Increased active travel by commuters and for recreation will also contribute to improving individual's health.</p> <p>Option 3 would be remote from SH2 with little passive surveillance of the shared path.</p>
Cultural:	<p>There are former Pa sites at Ngauranga, Petone foreshore area and Korokoro Park. Two other sites are also identified to west of SH2.</p> <p>The Port Nicolson Block Settlement Trust and Wellington Tenth trust have expressed support for options that provide positive health benefits however they felt option 3 would rely on on-going maintenance from Kiwirail which they felt would be unreliable. Ongoing consultation will be required with Iwi in the next stage of detailed design.</p>
Property:	<p>The property impact of option 3 is minimal with the majority of the path located within the existing shared path corridor along SH2 and newly reclaimed land along the harbour. Some Port Nicolson Trust land will be affected – as shown in the Property Requirement Plans. Rail realignment will be required for this option at the northern end. Investigations are on-going to determine the amount of Kiwirail land affected.</p> <p>On-going discussions with potentially affected property owners are occurring. A separate Property Strategy will be available.</p>

Appendix D

Capital Cost Estimates and Parallel Cost Review

RELEASED UNDER THE
OFFICIAL INFORMATION ACT

**Wellington to Hutt Valley Cycle & Pedestrian Link
Roadside Shared-use Path
Option 1 - Summary**

OE

Indicative Business Case Estimates

12-Aug-14

Item	Description	Base Estimate	Expected Estimate	95%ile Estimate
1	Section 1	\$1,425,335	\$1,645,600	\$2,078,000
	Project Property Cost	\$0	\$0	\$0
	D&PD & NZTA Management Costs	\$91,653	\$105,403	\$128,313
	Constrution & MSQA	\$1,333,682	\$1,540,197	\$1,949,687
2	Section 2	\$420,918	\$487,800	\$619,000
	Project Property Cost	\$0	\$0	\$0
	D&PD & NZTA Management Costs	\$32,259	\$37,099	\$45,159
	Constrution & MSQA	\$388,660	\$450,701	\$573,841
3	Section 3	\$5,601,644	\$6,554,500	\$8,435,000
	Project Property Cost	\$0	\$0	\$0
	D&PD & NZTA Management Costs	\$301,193	\$346,373	\$421,673
	Constrution & MSQA	\$5,300,452	\$6,208,127	\$8,013,327
4	Section 4	\$4,383,116	\$5,295,500	\$7,099,000
	Project Property Cost	\$0	\$0	\$0
	D&PD & NZTA Management Costs	\$249,989	\$287,489	\$349,989
	Constrution & MSQA	\$4,133,126	\$5,008,011	\$6,749,011
5	Section 5	\$3,362,936	\$3,920,400	\$5,019,000
	Project Property Cost	\$0	\$0	\$0
	D&PD & NZTA Management Costs	\$207,121	\$238,191	\$289,971
	Constrution & MSQA	\$3,155,815	\$3,682,209	\$4,729,029
6	Section 6	\$126,241	\$145,800	\$183,000
	Project Property Cost	\$0	\$0	\$0
	D&PD & NZTA Management Costs	\$12,614	\$14,504	\$17,654
	Constrution & MSQA	\$113,627	\$131,296	\$165,346
7	Section 7	\$535,987	\$621,300	\$788,000
	Project Property Cost	\$0	\$0	\$0
	D&PD & NZTA Management Costs	\$39,184	\$45,064	\$54,864
	Constrution & MSQA	\$496,803	\$576,236	\$733,136
Total Base Estimate		\$15,856,177		
Expected Estimate			\$18,670,900	
95th Percentile Estimate				\$24,221,000

**Wellington to Hutt Valley Cycle & Pedestrian Link
Option 1 - Section 1 (Roadside Shared Path)**

OE

Option Estimate

Item	Description	Base Estimate	Expected Estimate	95%ile Estimate
A	Project Property Cost	0	0	0
B	Investigation and Reporting	0	0	0
C	D&PD & NZTA Managed Costs	91,653	105,403	128,313
	Construction:			
	MSQA, NZTA Managed Costs, & Consent Monitoring Fees	67,902		
	Physical Works (\$1,265,780)			
D1	Preliminary And General	261,300		
D2	Survey & Setout	5,600		
D3	Traffic Management & Temporary Works	25,500		
D4	Site Clearance & Earthworks - Shared Path	62,236		
D5	Kerb, Channel, Traffic Islands, Footpaths, Crossings	10,350		
D6	Pavement Layer Construction	5,544		
D7	Pavement Surfacing	302,400		
D8	Pavement Markings And Signs	81,800		
D9	Street And Traffic Lighting	79,250		
D10	Structures	415,000		
D11	Relocation Of Services	16,800		
D12	(blank)			
D13	(blank)			
D14	(blank)			
D15	(blank)			
D16	(blank)			
D17	(blank)			
D18	(blank)			
D19	(blank)			
D20	(blank)			
D21	(blank)			
D22	(blank)			
D	Total Construction & MSQA	1,333,682	1,540,197	1,949,687
Total Base Estimate		1,425,335		
Note: These estimates are exclusive of escalation and GST.				
E	Assessed / Analysed Contingency	220,265		
Expected Estimate			1,645,600	
F	Assessed / Analysed Funding Risk		432,400	
95th Percentile Estimate				2,078,000

Note: These estimates are exclusive of escalation and GST.

Base Date of Estimate	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

Wellington to Hutt Valley Cycle & Pedestrian Link Option 1 - Section 1 (Roadside Shared Path)

Job 60306339
Base date 6 Aug 14
Quantities by VK
Rates by JM

Elemental Breakdown for Construction Costs - Option Estimate

OE Draft

Item	Description	Units	Quantity	Rate	Sub-Element Totals	Element Totals
D1	Preliminary and General					\$261,300.00
1.01	Establishment and Dis-establishment	LS	1	\$20,100.00	\$20,100.00	
1.02	On-site overheads	LS	1	\$90,500.00	\$90,500.00	
1.03	Off-site overheads incl. profit	LS	1	\$150,700.00	\$150,700.00	
D2	Survey & setout					\$5,600.00
2.01	Survey & Setout	LS	1	\$5,600.00	\$5,600.00	
D3	Traffic Management & Temporary Works					\$25,500.00
3.01	Preparation of Temporary Traffic Management Plans	LS	1	\$1,500.00	\$1,500.00	
3.02	Implementation of Temporary Traffic Management Plans	week	8	\$3,000.00	\$24,000.00	
D4	Site Clearance & Earthworks - Shared Path					\$62,236.00
4.01	Management of Environmental Compliance Requirements	LS	1	\$1,000.00	\$1,000.00	
4.02	Mill and remove to waste existing shared path surfacing	sq.m	5040	\$12.00	\$60,480.00	
4.03	Cut to waste	cu.m	50	\$15.00	\$756.00	
D5	Kerb, Channel, Traffic Islands, Footpaths, Crossings					\$10,350.00
5.01	Kerb and channel	m	138	\$75.00	\$10,350.00	
D6	Pavement Layer Construction					\$5,544.00
6.01	M/4 AP40 Basecourse	cu.m	50	\$110.00	\$5,544.00	
D7	Pavement Surfacing					\$302,400.00
7.01	Asphaltic Concrete (AC Mix 7) 20mm depth	sq.m	6720	\$45.00	\$302,400.00	
D8	Pavement Markings and Signs					\$81,800.00
8.01	Pavement markings	km	2.24	\$15,000.00	\$33,600.00	
8.02	Green cycle lane marking	sq.m	336	\$75.00	\$25,200.00	
8.03	Sign relocation	ea	2	\$250.00	\$500.00	
8.04	Install new Clearway Signs	ea	30	\$750.00	\$22,500.00	
D9	Street and Traffic Lighting					\$79,250.00
9.01	Relocate existing streetlights (incl. cabling)	ea	41	\$1,750.00	\$71,750.00	
9.02	Relocate existing traffic lights	ea	3	\$2,500.00	\$7,500.00	
D10	Structures					\$415,000.00
10.01	Kaiwharawhara Stream - Bridge widening	PS	1	\$100,000.00	\$100,000.00	
10.02	Kaiwharawhara Stream - Relocation of Services	PS	1	\$300,000.00	\$300,000.00	
10.03	Relocate / remove obstructions (planter boxes etc)	LS	1	\$15,000.00	\$15,000.00	
D11	Relocation of Services					\$16,800.00
11.01	Relocate existing services	PS	1	\$15,000.00	\$15,000.00	
11.02	Contractor's on-costs on above item(s).	%	\$15,000	12%	\$1,800.00	
TOTAL ELEMENTAL COSTS						\$1,265,780.00

Note: These estimates are exclusive of contingency, funding risk, escalation and GST.

Base Date of Estimate:	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

**Wellington to Hutt Valley Cycle & Pedestrian Link
Option 1 - Section 2 (Roadside Shared Path)**

OE

Option Estimate

Item	Description	Base Estimate	Expected Estimate	95%ile Estimate
A	Project Property Cost	0	0	0
B	Investigation and Reporting	0	0	0
C	D&PD & NZTA Managed Costs	32,259	37,099	45,159
	Construction:			
	MSQA, NZTA Managed Costs, & Consent Monitoring Fees	28,480		
	Physical Works (\$360,180)			
D1	Preliminary And General	74,500		
D2	Survey & Setout	3,100		
D3	Traffic Management & Temporary Works	13,500		
D4	Site Clearance & Earthworks - Shared Path	35,740		
D5	Kerb, Channel, Traffic Islands, Footpaths, Crossings	6,200		
D6	Pavement Layer Construction	9,240		
D7	Pavement Surfacing	167,400		
D8	Pavement Markings And Signs	24,500		
D9	Lighting	8,750		
D10	Relocation Of Services	17,250		
D11	(blank)			
D12	(blank)			
D13	(blank)			
D14	(blank)			
D15	(blank)			
D16	(blank)			
D17	(blank)			
D18	(blank)			
D19	(blank)			
D20	(blank)			
D21	(blank)			
D22	(blank)			
D	Total Construction & MSQA	388,660	450,701	573,841
Total Base Estimate		420,918		
Note: These estimates are exclusive of escalation and GST.				
E	Assessed / Analysed Contingency	66,882		
Expected Estimate			487,800	
F	Assessed / Analysed Funding Risk		131,200	
95th Percentile Estimate				619,000

Note: These estimates are exclusive of escalation and GST.

Base Date of Estimate	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

**Wellington to Hutt Valley Cycle & Pedestrian Link
Option 1 - Section 2 (Roadside Shared Path)**

Job 60306339
Base date 6 Aug 14
Quantities by VK
Rates by JM

Elemental Breakdown for Construction Costs - Option Estimate

OE Draft

Item	Description	Units	Quantity	Rate	Sub-Element Totals	Element Totals
D1	Preliminary and General					\$74,500.00
1.01	Establishment and Dis-establishment	LS	1	\$5,800.00	\$5,800.00	
1.02	On-site overheads	LS	1	\$25,800.00	\$25,800.00	
1.03	Off-site overheads incl. profit	LS	1	\$42,900.00	\$42,900.00	
D2	Survey & setout					\$3,100.00
2.01	Survey & Setout	LS	1	\$3,100.00	\$3,100.00	
D3	Traffic Management & Temporary Works					\$13,500.00
3.01	Preparation of Temporary Traffic Management Plans	LS	1	\$1,500.00	\$1,500.00	
3.02	Implementation of Temporary Traffic Management Plans	week	4	\$3,000.00	\$12,000.00	
D4	Site Clearance & Earthworks - Shared Path					\$35,740.00
4.01	Management of Environmental Compliance Requirements	LS	1	\$1,000.00	\$1,000.00	
4.02	Mill and remove to waste existing shared path surfacing	sq.m	2790.00	\$12.00	\$33,480.00	
4.03	Cut to waste	cu.m	84.00	\$15.00	\$1,260.00	
D5	Kerb, Channel, Traffic Islands, Footpaths, Crossings					\$6,200.00
5.01	Kerb and channel	m	124	\$50.00	\$6,200.00	
D6	Pavement Layer Construction					\$9,240.00
6.01	M/4 AP40 Basecourse	cu.m	84	\$110.00	\$9,240.00	
D7	Pavement Surfacing					\$167,400.00
7.01	Asphaltic Concrete (AC Mix 7) 20mm depth	sq.m	3720	\$45.00	\$167,400.00	
D8	Pavement Markings and Signs					\$24,500.00
8.01	Pavement markings	km	1.24	\$7,500.00	\$9,300.00	
8.02	Green cycle lane marking	sq.m	186	\$75.00	\$13,950.00	
8.03	Sign relocation	ea	5	\$250.00	\$1,250.00	
D9	Lighting					\$8,750.00
9.01	Relocate existing streetlights	ea	5	\$1,750.00	\$8,750.00	
D10	Relocation of Services					\$17,250.00
10.01	Relocate / remove obstructions	LS	1	\$10,000.00	\$10,000.00	
10.02	Relocate existing services	PS	1	\$5,000.00	\$5,000.00	
10.03	Contractor's on-costs on above item(s).	%	\$15,000	15%	\$2,250.00	
TOTAL ELEMENTAL COSTS						\$360,180.00

Note: These estimates are exclusive of contingency, funding risk, escalation and GST.

Base Date of Estimate:	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

**Wellington to Hutt Valley Cycle & Pedestrian Link
Option 1 - Section 3 (Roadside Shared Path)**

OE

Option Estimate

Item	Description	Base Estimate	Expected Estimate	95%ile Estimate
A	Project Property Cost	0	0	0
B	Investigation and Reporting	0	0	0
C	D&PD & NZTA Managed Costs	301,193	346,373	421,673
	Construction:			
	MSQA, NZTA Managed Costs, & Consent Monitoring Fees	197,124		
	Physical Works (\$5,103,327)			
D1	Preliminary And General	1,053,300		
D2	Survey & Setout	10,000		
D3	Traffic Management & Temporary Works	121,500		
D4	Site Clearance & Earthworks - Shared Path	65,113		
D5	Site Clearance & Earthworks - Land Reclamation	1,055,831		
D6	Drainage	374,764		
D7	Kerb, Channel, Traffic Islands, Footpaths, Crossings	151,080		
D8	Pavement Layer Construction	19,020		
D9	Pavement Surfacing	397,950		
D10	Pavement Markings And Signs	51,495		
D11	Guardrail & Fencing	567,525		
D12	Lighting	78,000		
D13	Structures	1,136,250		
D14	Landscaping	5,000		
D15	Relocation Of Services	16,500		
D16	(blank)			
D17	(blank)			
D18	(blank)			
D19	(blank)			
D20	(blank)			
D21	(blank)			
D22	(blank)			
D	Total Construction & MSQA	5,300,452	6,208,127	8,013,327
Total Base Estimate		5,601,644		
Note: These estimates are exclusive of escalation and GST.				
E	Assessed / Analysed Contingency	952,856		
Expected Estimate			6,554,500	
F	Assessed / Analysed Funding Risk		1,880,500	
95th Percentile Estimate				8,435,000

Note: These estimates are exclusive of escalation and GST.

Base Date of Estimate	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

**Wellington to Hutt Valley Cycle & Pedestrian Link
Option 1 - Section 3 (Roadside Shared Path)**

Job 60306339
Base date 6 Aug 14
Quantities by VK
Rates by JM

Elemental Breakdown for Construction Costs - Option Estimate

OE Draft

Item	Description	Units	Quantity	Rate	Sub-Element Totals	Element Totals
D1	Preliminary and General					\$1,053,300.00
1.01	Establishment and Dis-establishment	LS	1	\$81,100.00	\$81,100.00	
1.02	On-site overheads	LS	1	\$364,600.00	\$364,600.00	
1.03	Off-site overheads incl. profit	LS	1	\$607,600.00	\$607,600.00	
D2	Survey & setout					\$10,000.00
2.01	Survey & Setout	LS	1	\$10,000.00	\$10,000.00	
D3	Traffic Management & Temporary Works					\$121,500.00
3.01	Preparation of Temporary Traffic Management Plans	LS	1	\$1,500.00	\$1,500.00	
3.02	Implementation of Temporary Traffic Management Plans	week	40	\$3,000.00	\$120,000.00	
D4	Site Clearance & Earthworks - Shared Path					\$65,112.50
4.01	Site clearance - General	LS	1	\$9,000.00	\$9,000.00	
4.02	Management of Environmental Compliance Requirements	LS	1	\$15,000.00	\$15,000.00	
4.03	Remove to waste existing retaining wall	sq.m	1495	\$20.00	\$29,900.00	
4.04	Cut to waste	cu.m	748	\$15.00	\$11,212.50	
D5	Site Clearance & Earthworks - Land Reclamation					\$1,055,830.97
5.01	Strip and Stockpile existing rock armouring	cu.m	849	\$40.00	\$33,941.13	
5.02	Prepare existing embankment surface	sq.m	1697	\$5.00	\$8,485.28	
5.03	Import and place self compacting fill	cu.m	3120	\$80.00	\$249,600.00	
5.04	Import and place structural fill (granular)	cu.m	1560	\$60.00	\$93,600.00	
5.05	Cut to waste soft alluvial areas	cu.m	660	\$25.00	\$16,500.00	
5.06	Supply and place high strength geotextile to new embankment surface	sq.m	1697	\$12.00	\$20,364.88	
5.07	Supply rock armouring	cu.m	594	\$175.00	\$103,944.70	
5.08	Place rock armouring (stockpiled or imported)	cu.m	976	\$25.00	\$24,395.18	
5.09	Geotech monitoring (boreholes, piezometers etc.)	LS	1	\$5,000.00	\$5,000.00	
5.10	Rail relocation - all elements	LS	1	\$500,000.00	\$500,000.00	
D6	Drainage					\$374,764.00
6.01	Single catchpit	ea	65	\$1,100.00	\$71,500.00	
6.02	RCRRJ 225 dia	m	2333	\$130.00	\$303,264.00	
D7	Kerb, Channel, Traffic Islands, Footpaths, Crossings					\$151,080.00
7.01	Dish channel	m	3888	\$35.00	\$136,080.00	
7.02	Supply and install street furniture	PS	1	\$15,000.00	\$15,000.00	
D8	Pavement Layer Construction					\$19,020.00
8.01	M/4 AP40 Basecourse	cu.m	238	\$80.00	\$19,020.00	
D9	Pavement Surfacing					\$397,950.00
9.01	Asphaltic Concrete (AC Mix 7) 20mm depth	sq.m	11370	\$35.00	\$397,950.00	
D10	Pavement Markings and Signs					\$51,495.00
10.01	Shared path pavement markings	km	3.888	\$5,000.00	\$19,440.00	
10.02	Green cycle lane marking	sq.m	227	\$75.00	\$17,055.00	
10.03	Sign relocation	ea	10	\$1,500.00	\$15,000.00	
D11	Guardrail & Fencing					\$567,525.00
11.01	Remove existing roadside barrier (wire rope or TL-3)	m	1325	\$25.00	\$33,125.00	
11.02	Supply and install new roadside barrier (TL-4)	m	1325	\$350.00	\$463,750.00	
11.03	Supply and install new fence (galvanised diamond mesh)	m	2826	\$25.00	\$70,650.00	
D12	Lighting					\$78,000.00
12.01	Modify existing columns to add shared path outreaches	ea	78	\$1,000.00	\$78,000.00	
D13	Structures					\$1,136,250.00
13.01	New retaining wall	sq.m	1495	\$750.00	\$1,121,250.00	
13.02	Relocate / modify gantry	LS	1	\$15,000.00	\$15,000.00	
D14	Landscaping					\$5,000.00
14.01	Landscape to areas identified	PS	1	\$5,000.00	\$5,000.00	
D15	Relocation of Services					\$16,500.00
15.01	Relocate existing services	PS	1	\$15,000.00	\$15,000.00	
15.02	Contractor's on-costs on above item(s).	%	\$15,000	10%	\$1,500.00	
TOTAL ELEMENTAL COSTS						\$5,103,327.47

Note: These estimates are exclusive of contingency, funding risk, escalation and GST.

Base Date of Estimate:	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

**Wellington to Hutt Valley Cycle & Pedestrian Link
Option 1 - Section 4 (Roadside Shared Path)**

OE

Option Estimate

Item	Description	Base Estimate	Expected Estimate	95%ile Estimate
A	Project Property Cost	0	0	0
B	Investigation and Reporting	0	0	0
C	D&PD & NZTA Managed Costs	249,989	287,489	349,989
	Construction:			
	MSQA, NZTA Managed Costs, & Consent Monitoring Fees	165,122		
	Physical Works (\$3,968,004)			
D1	Preliminary And General	818,900		
D2	Survey & Setout	2,500		
D3	Traffic Management & Temporary Works	81,500		
D4	Site Clearance & Earthworks - Shared Path	24,605		
D5	Site Clearance & Earthworks - Land Reclamation	2,520,229		
D6	Drainage	133,000		
D7	Kerb, Channel, Traffic Islands, Footpaths, Crossings	29,750		
D8	Pavement Layer Construction	47,320		
D9	Pavement Surfacing	152,100		
D10	Pavement Markings And Signs	9,350		
D11	Guardrail & Fencing	106,250		
D12	Lighting	17,000		
D13	Landscaping	20,000		
D14	Relocation Of Services	5,500		
D15	(blank)			
D16	(blank)			
D17	(blank)			
D18	(blank)			
D19	(blank)			
D20	(blank)			
D21	(blank)			
D22	(blank)			
D	Total Construction & MSQA	4,133,126	5,008,011	6,749,011
Total Base Estimate		4,383,116		
Note: These estimates are exclusive of escalation and GST.				
E	Assessed / Analysed Contingency	912,384		
Expected Estimate			5,295,500	
F	Assessed / Analysed Funding Risk		1,803,500	
95th Percentile Estimate				7,099,000

Note: These estimates are exclusive of escalation and GST.

Base Date of Estimate	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

**Wellington to Hutt Valley Cycle & Pedestrian Link
Option 1 - Section 4 (Roadside Shared Path)**

Job 60306339
Base date 6 Aug 14
Quantities by VK
Rates by JM

Elemental Breakdown for Construction Costs - Option Estimate

OE Draft

Item	Description	Units	Quantity	Rate	Sub-Element Totals	Element Totals
D1	Preliminary and General					\$818,900.00
1.01	Establishment and Dis-establishment	LS	1	\$63,000.00	\$63,000.00	
1.02	On-site overheads	LS	1	\$283,500.00	\$283,500.00	
1.03	Off-site overheads incl. profit	LS	1	\$472,400.00	\$472,400.00	
D2	Survey & setout					\$2,500.00
2.01	Survey & Setout	LS	1	\$2,500.00	\$2,500.00	
D3	Traffic Management & Temporary Works					\$81,500.00
3.01	Preparation of Temporary Traffic Management Plans	LS	1	\$1,500.00	\$1,500.00	
3.02	Implementation of Temporary Traffic Management Plans	week	16	\$5,000.00	\$80,000.00	
D4	Site Clearance & Earthworks - Shared Path					\$24,605.00
4.01	Site clearance - General	LS	1	\$2,000.00	\$2,000.00	
4.02	Management of Environmental Compliance Requirements	LS	1	\$15,000.00	\$15,000.00	
4.03	Cut to waste	cu.m	507.00	\$15.00	\$7,605.00	
D5	Site Clearance & Earthworks - Land reclamation					\$2,520,229.00
5.01	Strip and Stockpile existing rock armouring	cu.m	1386	\$40.00	\$55,440.00	
5.02	Prepare existing embankment surface	sq.m	2772	\$5.00	\$13,860.00	
5.03	Import and place self compacting fill	cu.m	6974	\$80.00	\$557,920.00	
5.04	Import and place structural fill (granular)	cu.m	3487	\$60.00	\$209,220.00	
5.05	Cut to waste soft alluvial areas	cu.m	1430	\$25.00	\$35,750.00	
5.06	Supply and place high strength geotextile to new embankment surface	sq.m	2772	\$12.00	\$33,264.00	
5.07	Supply rock armouring	cu.m	971	\$175.00	\$169,925.00	
5.08	Place rock armouring (stockpiled or imported)	cu.m	1594	\$25.00	\$39,850.00	
5.09	Geotech monitoring (boreholes, piezometers etc.)	LS	1	\$5,000.00	\$5,000.00	
5.10	Rail relocation - all elements	LS	1	\$1,400,000.00	\$1,400,000.00	
D6	Drainage					\$133,000.00
6.01	Single catchpit	ea	15	\$1,100.00	\$16,500.00	
6.02	RCRRJ 225 dia	m	850	\$130.00	\$110,500.00	
6.03	Extend existing outfall drains	ea	2	\$3,000.00	\$6,000.00	
D7	Kerb, Channel, Traffic Islands, Footpaths, Crossings					\$29,750.00
7.01	Dish Channel	m	850	\$35.00	\$29,750.00	
D8	Pavement Layer Construction					\$47,320.00
8.01	Preparation of subgrade	sq.m	3380	\$2.00	\$6,760.00	
8.02	M/4 AP40 Basecourse	cu.m	507	\$80.00	\$40,560.00	
D9	Pavement Surfacing					\$152,100.00
9.01	Asphaltic Concrete (AC Mix 7) 20mm depth	sq.m	3380	\$45.00	\$152,100.00	
D10	Pavement Markings and Signs					\$9,350.00
10.01	Shared path pavement markings	km	0.85	\$5,000.00	\$4,250.00	
10.02	Green cycle lane marking	sq.m	68	\$75.00	\$5,100.00	
10.03	Sign relocation	ea	0	\$1,500.00	\$0.00	
D11	Guardrail & Fencing					\$106,250.00
11.01	Supply and install new fence (galvanised diamond mesh)	m	850	\$125.00	\$106,250.00	
D12	Lighting					\$17,000.00
12.01	Modify existing columns to add shared path outreaches	ea	17	\$1,000.00	\$17,000.00	
D13	Landscaping					\$20,000.00
13.01	Landscape to areas identified	PS	1	\$20,000.00	\$20,000.00	
D14	Relocation of Services					\$5,500.00
14.01	Relocate existing services	PS	1	\$5,000.00	\$5,000.00	
14.02	Contractor's on-costs on above item(s).	%	\$5,000	10%	\$500.00	
TOTAL ELEMENTAL COSTS						\$3,968,004.00

Note: These estimates are exclusive of contingency, funding risk, escalation and GST.

Base Date of Estimate:	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

**Wellington to Hutt Valley Cycle & Pedestrian Link
Option 1 - Section 5 (Roadside Shared Path)**

OE

Option Estimate

Item	Description	Base Estimate	Expected Estimate	95%ile Estimate
A	Project Property Cost	0	0	0
B	Investigation and Reporting	0	0	0
C	D&PD & NZTA Managed Costs	207,121	238,191	289,971
	Construction:			
	MSQA, NZTA Managed Costs, & Consent Monitoring Fees	138,330		
	Physical Works (\$3,017,485)			
D1	Preliminary And General	622,800		
D2	Survey & Setout	2,500		
D3	Traffic Management & Temporary Works	51,500		
D4	Site Clearance & Earthworks - Shared Path	9,190		
D5	Site Clearance & Earthworks - Land Reclamation	520,000		
D6	Drainage	113,750		
D7	Kerb, Channel, Traffic Islands, Footpaths, Crossings	26,775		
D8	Pavement Layer Construction	13,620		
D9	Pavement Surfacing	43,650		
D10	Pavement Markings And Signs	21,850		
D11	Guardrail & Fencing	278,750		
D12	Lighting	102,600		
D13	Structures	1,200,000		
D14	Landscaping	5,000		
D15	Relocation Of Services	5,500		
D16	(blank)			
D17	(blank)			
D18	(blank)			
D19	(blank)			
D20	(blank)			
D21	(blank)			
D22	(blank)			
D	Total Construction & MSQA	3,155,815	3,682,209	4,729,029
Total Base Estimate		3,362,936		
Note: These estimates are exclusive of escalation and GST.				
E	Assessed / Analysed Contingency	557,464		
Expected Estimate			3,920,400	
F	Assessed / Analysed Funding Risk		1,098,600	
95th Percentile Estimate				5,019,000

Note: These estimates are exclusive of escalation and GST.

Base Date of Estimate	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

Wellington to Hutt Valley Cycle & Pedestrian Link Option 1 - Section 5 (Roadside Shared Path)

Job 60306339
Base date 6 Aug 14
Quantities by VK
Rates by JM

Elemental Breakdown for Construction Costs - Option Estimate

OE Draft

Item	Description	Units	Quantity	Rate	Sub-Element Totals	Element Totals
D1	Preliminary and General					\$622,800.00
1.01	Establishment and Dis-establishment	LS	1	\$47,900.00	\$47,900.00	
1.02	On-site overheads	LS	1	\$215,600.00	\$215,600.00	
1.03	Off-site overheads incl. profit	LS	1	\$359,300.00	\$359,300.00	
D2	Survey & setout					\$2,500.00
2.01	Survey & Setout	LS	1	\$2,500.00	\$2,500.00	
D3	Traffic Management & Temporary Works					\$51,500.00
3.01	Preparation of Temporary Traffic Management Plans	LS	1	\$1,500.00	\$1,500.00	
3.02	Implementation of Temporary Traffic Management Plans	week	10	\$5,000.00	\$50,000.00	
D4	Site Clearance & Earthworks - Shared Path					\$9,190.00
4.01	Site clearance - General	LS	1	\$2,000.00	\$2,000.00	
4.02	Management of Environmental Compliance Requirements	LS	1	\$5,000.00	\$5,000.00	
4.03	Cut to waste	cu.m	146	\$15.00	\$2,190.00	
D5	Site Clearance & Earthworks - Land reclamation					\$520,000.00
5.01	Rail relocation - all elements	LS	1	\$520,000.00	\$520,000.00	
D6	Drainage					\$113,750.00
6.01	Single catchpit	ea	13	\$1,100.00	\$14,300.00	
6.02	RCRRJ 225 dia	m	765	\$130.00	\$99,450.00	
D7	Kerb, Channel, Traffic Islands, Footpaths, Crossings					\$26,775.00
7.01	Dish channel	m	765	\$35.00	\$26,775.00	
D8	Pavement Layer Construction					\$13,620.00
8.01	Preparation of subgrade	sq.m	970	\$2.00	\$1,940.00	
8.02	M/4 AP40 Basecourse	cu.m	146	\$80.00	\$11,680.00	
D9	Pavement Surfacing					\$43,650.00
9.01	Asphaltic Concrete (AC Mix 7) 20mm depth	sq.m	970	\$45.00	\$43,650.00	
D10	Pavement Markings and Signs					\$21,850.00
10.01	Shared path pavement markings	km	0.765	\$5,000.00	\$3,825.00	
10.02	Green cycle lane marking	sq.m	20	\$75.00	\$1,500.00	
10.03	Sign relocation	ea	0	\$1,500.00	\$0.00	
10.04	Esplanade east & west bound cycle lane - std road markings	km	0.9	\$5,000.00	\$4,500.00	
10.05	Esplanade east & west bound cycle lane - green cycle markings	sq.m	27	\$75.00	\$2,025.00	
10.06	McKenzie Ave - road remarking	LS	1	\$10,000.00	\$10,000.00	
D11	Guardrail & Fencing					\$278,750.00
11.01	Supply and install new fence (galvanised diamond mesh)	m	1530	\$125.00	\$191,250.00	
11.02	Supply and install new roadside barrier (TL-4) - Hutt Rd onramp	m	250	\$350.00	\$87,500.00	
D12	Lighting					\$102,600.00
12.01	Install new columns and outreaches and connect to power supply	ea	16	\$4,500.00	\$72,000.00	
12.02	Trenching and cabling	m	765	\$40.00	\$30,600.00	
D13	Structures					\$1,200,000.00
13.01	McKenzie Ave - Parallel structure	LS	1	\$1,200,000.00	\$1,200,000.00	
D14	Landscaping					\$5,000.00
14.01	Landscape to areas identified	PS	1	\$5,000.00	\$5,000.00	
D15	Relocation of Services					\$5,500.00
15.01	Relocate existing services	PS	1	\$5,000.00	\$5,000.00	
15.02	Contractor's on-costs on above item(s).	%	\$5,000	10%	\$500.00	
TOTAL ELEMENTAL COSTS						\$3,017,485.00

Note: These estimates are exclusive of contingency, funding risk, escalation and GST.

Base Date of Estimate:	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

**Wellington to Hutt Valley Cycle & Pedestrian Link
Option 1 - Section 6 (Roadside Shared Path)**

OE

Option Estimate

Item	Description	Base Estimate	Expected Estimate	95%ile Estimate
A	Project Property Cost	0	0	0
B	Investigation and Reporting	0	0	0
C	D&PD & NZTA Managed Costs	12,614	14,504	17,654
	Construction:			
	MSQA, NZTA Managed Costs, & Consent Monitoring Fees	12,287		
	Physical Works (\$101,340)			
D1	Preliminary And General	21,100		
D2	Survey & Setout	1,238		
D3	Traffic Management & Temporary Works	20,500		
D4	Site Clearance & Earthworks - Shared Path	2,000		
D5	Kerb, Channel, Traffic Islands, Footpaths, Crossings	14,925		
D6	Pavement Surfacing	6,750		
D7	Pavement Markings And Signs	11,928		
D8	Lighting	12,300		
D9	Landscaping	5,000		
D10	Relocation Of Services	5,600		
D11	(blank)			
D12	(blank)			
D13	(blank)			
D14	(blank)			
D15	(blank)			
D16	(blank)			
D17	(blank)			
D18	(blank)			
D19	(blank)			
D20	(blank)			
D21	(blank)			
D22	(blank)			
D	Total Construction & MSQA	113,627	131,296	165,346
Total Base Estimate		126,241		
Note: These estimates are exclusive of escalation and GST.				
E	Assessed / Analysed Contingency	19,559		
Expected Estimate			145,800	
F	Assessed / Analysed Funding Risk		37,200	
95th Percentile Estimate				183,000

Note: These estimates are exclusive of escalation and GST.

Base Date of Estimate	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

**Wellington to Hutt Valley Cycle & Pedestrian Link
Option 1 - Section 6 (Roadside Shared Path)**

Job 60306339
Base date 6 Aug 14
Quantities by VK
Rates by JM

Elemental Breakdown for Construction Costs - Option Estimate

OE Draft

Item	Description	Units	Quantity	Rate	Sub-Element Totals	Element Totals
D1	Preliminary and General					\$21,100.00
1.01	Establishment and Dis-establishment	LS	1	\$1,700.00	\$1,700.00	
1.02	On-site overheads	LS	1	\$7,300.00	\$7,300.00	
1.03	Off-site overheads incl. profit	LS	1	\$12,100.00	\$12,100.00	
D2	Survey & setout					\$1,237.50
2.01	Survey & Setout	LS	1	\$1,237.50	\$1,237.50	
D3	Traffic Management & Temporary Works					\$20,500.00
3.01	Preparation of Temporary Traffic Management Plans	LS	1	\$500.00	\$500.00	
3.02	Implementation of Temporary Traffic Management Plans	week	4	\$5,000.00	\$20,000.00	
D4	Site Clearance & Earthworks - Shared Path					\$2,000.00
4.01	Site clearance - General	LS	1	\$1,000.00	\$1,000.00	
4.02	Management of Environmental Compliance Requirements	LS	1	\$1,000.00	\$1,000.00	
4.03	Cut to waste	cu.m	0.00	\$15.00	\$0.00	
D5	Kerb, Channel, Traffic Islands, Footpaths, Crossings					\$14,925.00
5.01	Kerb and channel	m	40	\$45.00	\$1,800.00	
5.02	Concrete infill to traffic islands	sq.m	15	\$50.00	\$750.00	
5.03	New concrete footpath	sq.m	495	\$25.00	\$12,375.00	
D6	Pavement surfacing					\$6,750.00
6.01	Asphaltic Concrete (AC Mix 7) 20mm depth	sq.m	150	\$45.00	\$6,750.00	
D7	Pavement Markings and Signs					\$11,927.50
7.01	Shared path pavement markings	km	0.495	\$5,000.00	\$2,475.00	
7.02	Shared path signs	LS	1	\$3,000.00	\$3,000.00	
7.03	SH north & south bound cycle lane - std road markings	km	0.89	\$5,000.00	\$4,450.00	
7.04	SH north & south bound cycle lane - green cycle markings	sq.m	26.7	\$75.00	\$2,002.50	
D8	Lighting					\$12,300.00
8.01	Install new columns and outreaches and connect to power supply	ea	3	\$2,500.00	\$7,500.00	
8.02	Trenching and cabling	m	120	\$40.00	\$4,800.00	
D9	Landscaping					\$5,000.00
9.01	Landscape to areas identified	PS	1	\$5,000.00	\$5,000.00	
D10	Relocation of Services					\$5,600.00
10.01	Relocate existing services	PS	1	\$5,000.00	\$5,000.00	
10.02	Contractor's on-costs on above item(s)	%	\$5,000	12%	\$600.00	

TOTAL ELEMENTAL COSTS						\$101,340.00
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Note: These estimates are exclusive of contingency, funding risk, escalation and GST.

Base Date of Estimate:	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

**Wellington to Hutt Valley Cycle & Pedestrian Link
Option 1 - Section 7 (Roadside Shared Path)**

OE

Option Estimate

Item	Description	Base Estimate	Expected Estimate	95%ile Estimate
A	Project Property Cost	0	0	0
B	Investigation and Reporting	0	0	0
C	D&PD & NZTA Managed Costs	39,184	45,064	54,864
	Construction:			
	MSQA, NZTA Managed Costs, & Consent Monitoring Fees	34,251		
	Physical Works (\$462,552)			
D1	Preliminary And General	95,600		
D2	Survey & Setout	2,900		
D3	Traffic Management & Temporary Works	31,500		
D4	Site Clearance & Earthworks - Shared Path	44,802		
D5	Kerb, Channel, Traffic Islands, Footpaths, Crossings	13,400		
D6	Pavement Layer Construction	19,140		
D7	Pavement Surfacing	135,720		
D8	Pavement Markings And Signs	23,590		
D9	Lighting	85,300		
D10	Landscaping	5,000		
D11	Relocation Of Services	5,600		
D12	(blank)			
D13	(blank)			
D14	(blank)			
D15	(blank)			
D16	(blank)			
D17	(blank)			
D18	(blank)			
D19	(blank)			
D20	(blank)			
D21	(blank)			
D22	(blank)			
D	Total Construction & MSQA	496,803	576,236	733,136
Total Base Estimate		535,987		
Note: These estimates are exclusive of escalation and GST.				
E	Assessed / Analysed Contingency	85,313		
Expected Estimate			621,300	
F	Assessed / Analysed Funding Risk		166,700	
95th Percentile Estimate				788,000

Note: These estimates are exclusive of escalation and GST.

Base Date of Estimate	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

**Wellington to Hutt Valley Cycle & Pedestrian Link
Option 1 - Section 7 (Roadside Shared Path)**

Job 60306339
Base date 6 Aug 14
Quantities by VK
Rates by JM

Elemental Breakdown for Construction Costs - Option Estimate

OE Draft

Item	Description	Units	Quantity	Rate	Sub-Element Totals	Element Totals
D1	Preliminary and General					\$95,600.00
1.01	Establishment and Dis-establishment	LS	1	\$7,400.00	\$7,400.00	
1.02	On-site overheads	LS	1	\$33,100.00	\$33,100.00	
1.03	Off-site overheads incl. profit	LS	1	\$55,100.00	\$55,100.00	
D2	Survey & setout					\$2,900.00
2.01	Survey & Setout	LS	1	\$2,900.00	\$2,900.00	
D3	Traffic Management & Temporary Works					\$31,500.00
3.01	Preparation of Temporary Traffic Management Plans	LS	1	\$1,500.00	\$1,500.00	
3.02	Implementation of Temporary Traffic Management Plans	week	6	\$5,000.00	\$30,000.00	
D4	Site Clearance & Earthworks - Shared Path					\$44,802.00
4.01	Site clearance - General	LS	1	\$5,000.00	\$5,000.00	
4.02	Management of Environmental Compliance Requirements	LS	1	\$1,000.00	\$1,000.00	
4.03	Mill and remove to waste existing shared path surfacing	sq.m	3016.00	\$12.00	\$36,192.00	
4.04	Cut to waste	cu.m	174.00	\$15.00	\$2,610.00	
D5	Kerb, Channel, Traffic Islands, Footpaths, Crossings					\$13,400.00
5.01	Kerb and channel	m	40	\$45.00	\$1,800.00	
5.02	New concrete footpath (100mm)	sq.m	464	\$25.00	\$11,600.00	
D6	Pavement Layer Construction					\$19,140.00
6.01	M/4 AP40 Basecourse	cu.m	174	\$110.00	\$19,140.00	
D7	Pavement Surfacing					\$135,720.00
7.01	Asphaltic Concrete (AC Mix 7) 20mm depth	sq.m	3016	\$45.00	\$135,720.00	
D8	Pavement Markings and Signs					\$23,590.00
8.01	Shared path pavement markings	km	1.16	\$5,000.00	\$5,800.00	
8.02	Shared path signs	LS	1	\$3,000.00	\$3,000.00	
8.03	SH north & south bound cycle lane - std road markings	km	2.04	\$5,000.00	\$10,200.00	
8.04	SH north & south bound cycle lane - green cycle markings	sq.m	61.2	\$75.00	\$4,590.00	
D9	Lighting					\$85,300.00
9.01	Install new columns and outreaches and connect to power supply	ea	24	\$2,500.00	\$60,000.00	
9.02	Install new outreaches on existing columns for shared path	ea	5	\$1,500.00	\$7,500.00	
9.03	Trenching and cabling	m	445	\$40.00	\$17,800.00	
D10	Landscaping					\$5,000.00
10.01	Landscape to areas identified	PS	1	\$5,000.00	\$5,000.00	
D11	Relocation of Services					\$5,600.00
11.01	Relocate existing services	PS	1	\$5,000.00	\$5,000.00	
11.02	Contractor's on-costs on above item(s).	%	\$5,000	12%	\$600.00	
TOTAL ELEMENTAL COSTS						\$462,552.00

Note: These estimates are exclusive of contingency, funding risk, escalation and GST.

Base Date of Estimate:	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

**Wellington to Hutt Valley Cycle & Pedestrian Link
Seaside Shared-use Path
Option 3 - Summary**

OE

Indicative Business Case Estimates

11-Nov-14

Item	Description	Base Estimate	Expected Estimate	95%ile Estimate
1	Section 1	\$1,445,454	\$1,668,800	\$2,107,000
	Project Property Cost	\$0	\$0	\$0
	D&PD & NZTA Management Costs	\$111,772	\$128,542	\$156,482
	Constrution & MSQA	\$1,333,682	\$1,540,258	\$1,950,518
2	Section 2	\$427,999	\$495,900	\$629,000
	Project Property Cost	\$0	\$0	\$0
	D&PD & NZTA Management Costs	\$39,340	\$45,240	\$55,070
	Constrution & MSQA	\$388,660	\$450,660	\$573,930
3	Section 3	\$24,154,640	\$28,910,100	\$38,292,000
	Project Property Cost	\$0	\$0	\$0
	D&PD & NZTA Management Costs	\$1,863,855	\$2,143,435	\$2,609,395
	Constrution & MSQA	\$22,290,786	\$26,766,665	\$35,682,605
4	Section 4	\$4,627,641	\$5,600,600	\$7,517,000
	Project Property Cost	\$0	\$0	\$0
	D&PD & NZTA Management Costs	\$402,314	\$462,664	\$563,244
	Constrution & MSQA	\$4,225,327	\$5,137,936	\$6,953,756
5	Section 5	\$8,245,322	\$9,485,000	\$11,927,000
	Project Property Cost	\$0	\$0	\$0
	D&PD & NZTA Management Costs	\$498,186	\$572,916	\$697,466
	Constrution & MSQA	\$7,747,136	\$8,912,084	\$11,229,534
6	Section 6	\$129,010	\$149,000	\$187,000
	Project Property Cost	\$0	\$0	\$0
	D&PD & NZTA Management Costs	\$15,383	\$17,693	\$21,543
	Constrution & MSQA	\$113,627	\$131,307	\$165,457
7	Section 7	\$544,588	\$631,100	\$800,000
	Project Property Cost	\$0	\$0	\$0
	D&PD & NZTA Management Costs	\$47,786	\$54,956	\$66,906
	Constrution & MSQA	\$496,803	\$576,144	\$733,094
Total Base Estimate		\$39,574,655		
Expected Estimate			\$46,940,500	
95th Percentile Estimate				\$61,459,000

**Wellington to Hutt Valley Cycle & Pedestrian Link
Option 3 - Section 1 (Seaside Shared Path)**

OE

Option Estimate

Item	Description	Base Estimate	Expected Estimate	95%ile Estimate
A	Project Property Cost	0	0	0
B	Investigation and Reporting	0	0	0
C	D&PD & NZTA Managed Costs	111,772	128,542	156,482
	Construction:			
	MSQA, NZTA Managed Costs, & Consent Monitoring Fees	67,902		
	Physical Works (\$1,265,780)			
D1	Preliminary And General	261,300		
D2	Survey & Setout	5,600		
D3	Traffic Management & Temporary Works	25,500		
D4	Site Clearance & Earthworks - Shared Path	62,236		
D5	Kerb, Channel, Traffic Islands, Footpaths, Crossings	10,350		
D6	Pavement Layer Construction	5,544		
D7	Pavement Surfacing	302,400		
D8	Pavement Markings And Signs	81,800		
D9	Street And Traffic Lighting	79,250		
D10	Structures	415,000		
D11	Relocation Of Services	16,800		
D12	(blank)			
D13	(blank)			
D14	(blank)			
D15	(blank)			
D16	(blank)			
D17	(blank)			
D18	(blank)			
D19	(blank)			
D20	(blank)			
D21	(blank)			
D22	(blank)			
D	Total Construction & MSQA	1,333,682	1,540,258	1,950,518
Total Base Estimate		1,445,454		
Note: These estimates are exclusive of escalation and GST.				
E	Assessed / Analysed Contingency	223,346		
Expected Estimate			1,668,800	
F	Assessed / Analysed Funding Risk		438,200	
95th Percentile Estimate				2,107,000

Note: These estimates are exclusive of escalation and GST.

Base Date of Estimate	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

Wellington to Hutt Valley Cycle & Pedestrian Link Option 3 - Section 1 (Seaside Shared Path)

Job 60306339
Base date 6 Aug 14
Quantities by VK
Rates by JM

Elemental Breakdown for Construction Costs - Option Estimate

OE Draft

Item	Description	Units	Quantity	Rate	Sub-Element Totals	Element Totals
D1	Preliminary and General					\$261,300.00
1.01	Establishment and Dis-establishment	LS	1	\$20,100.00	\$20,100.00	
1.02	On-site overheads	LS	1	\$90,500.00	\$90,500.00	
1.03	Off-site overheads incl. profit	LS	1	\$150,700.00	\$150,700.00	
D2	Survey & setout					\$5,600.00
2.01	Survey & Setout	LS	1	\$5,600.00	\$5,600.00	
D3	Traffic Management & Temporary Works					\$25,500.00
3.01	Preparation of Temporary Traffic Management Plans	LS	1	\$1,500.00	\$1,500.00	
3.02	Implementation of Temporary Traffic Management Plans	week	8	\$3,000.00	\$24,000.00	
D4	Site Clearance & Earthworks - Shared Path					\$62,236.00
4.01	Management of Environmental Compliance Requirements	LS	1	\$1,000.00	\$1,000.00	
4.02	Mill and remove to waste existing shared path surfacing	sq.m	5040	\$12.00	\$60,480.00	
4.03	Cut to waste	cu.m	50	\$15.00	\$756.00	
D5	Kerb, Channel, Traffic Islands, Footpaths, Crossings					\$10,350.00
5.01	Kerb and channel	m	138	\$75.00	\$10,350.00	
D6	Pavement Layer Construction					\$5,544.00
6.01	M/4 AP40 Basecourse	cu.m	50	\$110.00	\$5,544.00	
D7	Pavement Surfacing					\$302,400.00
7.01	Asphaltic Concrete (AC Mix 7) 20mm depth	sq.m	6720	\$45.00	\$302,400.00	
D8	Pavement Markings and Signs					\$81,800.00
8.01	Pavement markings	km	2.24	\$15,000.00	\$33,600.00	
8.02	Green cycle lane marking	sq.m	336	\$75.00	\$25,200.00	
8.03	Sign relocation	ea	2	\$250.00	\$500.00	
8.04	Install new Clearway Signs	ea	30	\$750.00	\$22,500.00	
D9	Street and Traffic Lighting					\$79,250.00
9.01	Relocate existing streetlights (incl. cabling)	ea	41	\$1,750.00	\$71,750.00	
9.02	Relocate existing traffic lights	ea	3	\$2,500.00	\$7,500.00	
D10	Structures					\$415,000.00
10.01	Kaiwharawhara Stream - Culvert extension	PS	1	\$100,000.00	\$100,000.00	
10.02	Kaiwharawhara Stream - Relocation of Services	PS	1	\$300,000.00	\$300,000.00	
10.03	Relocate / remove obstructions (planter boxes etc)	LS	1	\$15,000.00	\$15,000.00	
D11	Relocation of Services					\$16,800.00
11.01	Relocate existing services	PS	1	\$15,000.00	\$15,000.00	
11.02	Contractor's on-costs on above item(s).	%	\$15,000	12%	\$1,800.00	
TOTAL ELEMENTAL COSTS						\$1,265,780.00

Note: These estimates are exclusive of contingency, funding risk, escalation and GST.

Base Date of Estimate:	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

**Wellington to Hutt Valley Cycle & Pedestrian Link
Option 3 - Section 2 (Seaside Shared Path)**

OE

Option Estimate

Item	Description	Base Estimate	Expected Estimate	95%ile Estimate
A	Project Property Cost	0	0	0
B	Investigation and Reporting	0	0	0
C	D&PD & NZTA Managed Costs	39,340	45,240	55,070
	Construction:			
	MSQA, NZTA Managed Costs, & Consent Monitoring Fees	28,480		
	Physical Works (\$360,180)			
D1	Preliminary And General	74,500		
D2	Survey & Setout	3,100		
D3	Traffic Management & Temporary Works	13,500		
D4	Site Clearance & Earthworks - Shared Path	35,740		
D5	Kerb, Channel, Traffic Islands, Footpaths, Crossings	6,200		
D6	Pavement Layer Construction	9,240		
D7	Pavement Surfacing	167,400		
D8	Pavement Markings And Signs	24,500		
D9	Lighting	8,750		
D10	Relocation Of Services	17,250		
D11	(blank)			
D12	(blank)			
D13	(blank)			
D14	(blank)			
D15	(blank)			
D16	(blank)			
D17	(blank)			
D18	(blank)			
D19	(blank)			
D20	(blank)			
D21	(blank)			
D22	(blank)			
D	Total Construction & MSQA	388,660	450,660	573,930
Total Base Estimate		427,999		
Note: These estimates are exclusive of escalation and GST.				
E	Assessed / Analysed Contingency	67,901		
Expected Estimate			495,900	
F	Assessed / Analysed Funding Risk		133,100	
95th Percentile Estimate				629,000

Note: These estimates are exclusive of escalation and GST.

Base Date of Estimate	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

**Wellington to Hutt Valley Cycle & Pedestrian Link
Option 3 - Section 2 (Seaside Shared Path)**

Job 60306339
Base date 6 Aug 14
Quantities by VK
Rates by JM

Elemental Breakdown for Construction Costs - Option Estimate

OE Draft

Item	Description	Units	Quantity	Rate	Sub-Element Totals	Element Totals
D1	Preliminary and General					\$74,500.00
1.01	Establishment and Dis-establishment	LS	1	\$5,800.00	\$5,800.00	
1.02	On-site overheads	LS	1	\$25,800.00	\$25,800.00	
1.03	Off-site overheads incl. profit	LS	1	\$42,900.00	\$42,900.00	
D2	Survey & setout					\$3,100.00
2.01	Survey & Setout	LS	1	\$3,100.00	\$3,100.00	
D3	Traffic Management & Temporary Works					\$13,500.00
3.01	Preparation of Temporary Traffic Management Plans	LS	1	\$1,500.00	\$1,500.00	
3.02	Implementation of Temporary Traffic Management Plans	week	4	\$3,000.00	\$12,000.00	
D4	Site Clearance & Earthworks - Shared Path					\$35,740.00
4.01	Management of Environmental Compliance Requirements	LS	1	\$1,000.00	\$1,000.00	
4.02	Mill and remove to waste existing shared path surfacing	sq.m	2790.00	\$12.00	\$33,480.00	
4.03	Cut to waste	cu.m	84.00	\$15.00	\$1,260.00	
D5	Kerb, Channel, Traffic Islands, Footpaths, Crossings					\$6,200.00
5.01	Kerb and channel	m	124	\$50.00	\$6,200.00	
D6	Pavement Layer Construction					\$9,240.00
6.01	M/4 AP40 Basecourse	cu.m	84	\$110.00	\$9,240.00	
D7	Pavement Surfacing					\$167,400.00
7.01	Asphaltic Concrete (AC Mix 7) 20mm depth	sq.m	3720	\$45.00	\$167,400.00	
D8	Pavement Markings and Signs					\$24,500.00
8.01	Pavement markings	km	1.24	\$7,500.00	\$9,300.00	
8.02	Green cycle lane marking	sq.m	186	\$75.00	\$13,950.00	
8.03	Sign relocation	ea	5	\$250.00	\$1,250.00	
D9	Lighting					\$8,750.00
9.01	Relocate existing streetlights	ea	5	\$1,750.00	\$8,750.00	
D10	Relocation of Services					\$17,250.00
10.01	Relocate / remove obstructions	LS	1	\$10,000.00	\$10,000.00	
10.02	Relocate existing services	PS	1	\$5,000.00	\$5,000.00	
10.03	Contractor's on-costs on above item(s).	%	\$15,000	15%	\$2,250.00	
TOTAL ELEMENTAL COSTS						\$360,180.00

Note: These estimates are exclusive of contingency, funding risk, escalation and GST.

Base Date of Estimate:	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

**Wellington to Hutt Valley Cycle & Pedestrian Link
Option 3 - Section 3 (Seaside Shared Path)**

OE

Option Estimate

Item	Description	Base Estimate	Expected Estimate	95%ile Estimate
A	Project Property Cost	0	0	0
B	Investigation and Reporting	0	0	0
C	D&PD & NZTA Managed Costs	1,863,855	2,143,435	2,609,395
	Construction:			
	MSQA, NZTA Managed Costs, & Consent Monitoring Fees	709,992		
	Physical Works (\$21,580,794)			
D1	Preliminary And General	4,453,300		
D2	Survey & Setout	20,000		
D3	Traffic Management & Temporary Works	253,500		
D4	Site Clearance & Earthworks - Shared Path	133,000		
D5	Site Clearance & Earthworks - Land Reclamation	11,184,744		
D6	Drainage	73,600		
D7	Kerb, Channel, Traffic Islands, Footpaths, Crossings	254,125		
D8	Pavement Layer Construction	101,840		
D9	Pavement Surfacing	399,000		
D10	Pavement Markings And Signs	42,540		
D11	Guardrail & Fencing	283,125		
D12	Lighting	350,520		
D13	Structures	4,000,000		
D14	Landscaping	15,000		
D15	Relocation Of Services	16,500		
D16	(blank)			
D17	(blank)			
D18	(blank)			
D19	(blank)			
D20	(blank)			
D21	(blank)			
D22	(blank)			
D	Total Construction & MSQA	22,290,786	26,766,665	35,682,605
Total Base Estimate		24,154,640		
Note: These estimates are exclusive of escalation and GST.				
E	Assessed / Analysed Contingency	4,755,460		
Expected Estimate			28,910,100	
F	Assessed / Analysed Funding Risk		9,381,900	
95th Percentile Estimate				38,292,000

Note: These estimates are exclusive of escalation and GST.

Base Date of Estimate	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mike McGavin	Signed

**Wellington to Hutt Valley Cycle & Pedestrian Link
Option 3 - Section 3 (Seaside Shared Path)**

Job 60306339
Base date 6 Aug 14
Quantities by VK
Rates by JM

Elemental Breakdown for Construction Costs - Option Estimate

OE Draft

Item	Description	Units	Quantity	Rate	Sub-Element Totals	Element Totals
D1	Preliminary and General					\$4,453,300.00
1.01	Establishment and Dis-establishment	LS	1	\$342,600.00	\$342,600.00	
1.02	On-site overheads	LS	1	\$1,541,500.00	\$1,541,500.00	
1.03	Off-site overheads incl. profit	LS	1	\$2,569,200.00	\$2,569,200.00	
D2	Survey & setout					\$20,000.00
2.01	Survey & Setout	LS	1	\$20,000.00	\$20,000.00	
D3	Traffic Management & Temporary Works					\$253,500.00
3.01	Preparation of Temporary Traffic Management Plans	LS	1	\$1,500.00	\$1,500.00	
3.02	Implementation of Temporary Traffic Management Plans	week	84	\$3,000.00	\$252,000.00	
D4	Site Clearance & Earthworks - Shared Path					\$133,000.00
4.01	Site clearance - General	LS	1	\$5,000.00	\$5,000.00	
4.02	Management of Environmental Compliance Requirements	LS	1	\$126,000.00	\$126,000.00	
4.03	Remove to waste existing retaining wall	sq.m	100.00	\$20.00	\$2,000.00	
D5	Site Clearance & Earthworks - Land Reclamation					\$11,184,744.00
5.01	Strip and Stockpile existing rock armouring	cu.m	6311	\$40.00	\$252,440.00	
5.02	Prepare existing embankment surface	sq.m	12622	\$5.00	\$63,110.00	
5.03	Import and place self compacting fill	cu.m	34875	\$80.00	\$2,790,000.00	
5.04	Import and place structural fill (granular)	cu.m	11870	\$60.00	\$712,200.00	
5.05	Cut to Waste (general)	cu.m	930	\$17.00	\$15,810.00	
5.06	Cut to waste soft alluvial areas	cu.m	10205	\$25.00	\$255,125.00	
5.07	Supply and place high strength geotextile to new embankment surface	sq.m	19957	\$12.00	\$239,484.00	
5.08	Supply rock armouring	cu.m	33394	\$175.00	\$5,843,950.00	
5.09	Place rock armouring (stockpiled or imported)	cu.m	39705	\$25.00	\$992,625.00	
5.10	Geotech monitoring (boreholes, piezometers etc.)	LS	1	\$20,000.00	\$20,000.00	
D6	Drainage					\$73,600.00
6.01	Single catchpit	ea	9	\$1,100.00	\$9,900.00	
6.02	RCRRJ 225 dia	m	490	\$130.00	\$63,700.00	
D7	Kerb, Channel, Traffic Islands, Footpaths, Crossings					\$254,125.00
7.01	Dish channel	m	2975	\$35.00	\$104,125.00	
7.02	Layby Areas	PS	3	\$50,000.00	\$150,000.00	
D8	Pavement Layer Construction					\$101,840.00
8.01	M/4 AP40 Basecourse	cu.m	1273	\$80.00	\$101,840.00	
D9	Pavement Surfacing					\$399,000.00
9.01	Asphaltic Concrete (AC Mix 7) 20mm depth	sq.m	11400	\$35.00	\$399,000.00	
D10	Pavement Markings and Signs					\$42,540.00
10.01	Shared path pavement markings	km	3.888	\$5,000.00	\$19,440.00	
10.02	Green cycle lane marking	sq.m	228	\$75.00	\$17,100.00	
10.03	Sign relocation	ea	4	\$1,500.00	\$6,000.00	
D11	Guardrail & Fencing					\$283,125.00
11.01	Remove existing roadside barrier (wire rope or TL-3)	m	490	\$25.00	\$12,250.00	
11.02	Supply and install new roadside barrier (TL-4)	m	490	\$350.00	\$171,500.00	
11.03	Supply and install new fence (galvanised diamond mesh)	m	3975	\$25.00	\$99,375.00	
11.04	Supply and install new barrier with handrail (seaside)	m	0	\$500.00	\$0.00	
D12	Lighting					\$350,520.00
12.01	Install new columns and outreaches and connect to power supply	ea	78	\$2,500.00	\$195,000.00	
12.02	Trenching and cabling		3888	\$40.00	\$155,520.00	
D13	Structures					\$4,000,000.00
13.01	Shared Path Bridge over Railway (incl. possible viewing area)	LS	1	\$500,000.00	\$500,000.00	
13.02	Urban Design elements to Bridge	PS	1	\$500,000.00	\$500,000.00	
13.03	Shared Path Ramps - Double-T pre-cast concrete	LS	1	\$2,250,000.00	\$2,250,000.00	
13.04	Urban Design elements to Ramps	PS	1	\$750,000.00	\$750,000.00	
D14	Landscaping					\$15,000.00
14.01	Landscape to areas identified	PS	1	\$15,000.00	\$15,000.00	
D15	Relocation of Services					\$16,500.00
15.01	Relocate existing services	PS	1	\$15,000.00	\$15,000.00	
15.02	Contractor's on-costs on above item(s).	%	\$15,000	10%	\$1,500.00	
TOTAL ELEMENTAL COSTS						\$21,580,794.00

Note: These estimates are exclusive of contingency, funding risk, escalation and GST.

Base Date of Estimate:	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mike McGavin	Signed

**Wellington to Hutt Valley Cycle & Pedestrian Link
Option 3 - Section 4 (Seaside Shared Path)**

OE

Option Estimate

Item	Description	Base Estimate	Expected Estimate	95%ile Estimate
A	Project Property Cost	0	0	0
B	Investigation and Reporting	0	0	0
C	D&PD & NZTA Managed Costs	402,314	462,664	563,244
	Construction:			
	MSQA, NZTA Managed Costs, & Consent Monitoring Fees	179,557		
	Physical Works (\$4,045,770)			
D1	Preliminary And General	835,000		
D2	Survey & Setout	4,250		
D3	Traffic Management & Temporary Works	131,500		
D4	Site Clearance & Earthworks - Shared Path	44,000		
D5	Site Clearance & Earthworks - Land Reclamation	2,739,595		
D6	Drainage			
D7	Kerb, Channel, Traffic Islands, Footpaths, Crossings	29,750		
D8	Pavement Layer Construction	30,600		
D9	Pavement Surfacing	114,750		
D10	Pavement Markings And Signs	8,075		
D11	Guardrail & Fencing	21,250		
D12	Lighting	76,500		
D13	Landscaping	5,000		
D14	Relocation Of Services	5,500		
D15	(blank)			
D16	(blank)			
D17	(blank)			
D18	(blank)			
D19	(blank)			
D20	(blank)			
D21	(blank)			
D22	(blank)			
D	Total Construction & MSQA	4,225,327	5,137,936	6,953,756
Total Base Estimate		4,627,641		
Note: These estimates are exclusive of escalation and GST.				
E	Assessed / Analysed Contingency	972,959		
Expected Estimate			5,600,600	
F	Assessed / Analysed Funding Risk		1,916,400	
95th Percentile Estimate				7,517,000

Note: These estimates are exclusive of escalation and GST.

Base Date of Estimate	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

Wellington to Hutt Valley Cycle & Pedestrian Link Option 3 - Section 4 (Seaside Shared Path)

Job 60306339
Base date 6 Aug 14
Quantities by JK
Rates by JM

Elemental Breakdown for Construction Costs - Option Estimate

OE Draft

Item	Description	Units	Quantity	Rate	Sub-Element Totals	Element Totals
D1	Preliminary and General					\$835,000.00
1.01	Establishment and Dis-establishment	LS	1	\$64,300.00	\$64,300.00	
1.02	On-site overheads	LS	1	\$289,000.00	\$289,000.00	
1.03	Off-site overheads incl. profit	LS	1	\$481,700.00	\$481,700.00	
D2	Survey & setout					\$4,250.00
2.01	Survey & Setout	LS	1	\$4,250.00	\$4,250.00	
D3	Traffic Management & Temporary Works					\$131,500.00
3.01	Preparation of Temporary Traffic Management Plans	LS	1	\$1,500.00	\$1,500.00	
3.02	Implementation of Temporary Traffic Management Plans	week	26	\$5,000.00	\$130,000.00	
D4	Site Clearance & Earthworks - Shared Path					\$44,000.00
4.01	Site clearance - General	LS	1	\$2,000.00	\$2,000.00	
4.02	Management of Environmental Compliance Requirements	LS	1	\$39,000.00	\$39,000.00	
4.03	Cut to waste	cu.m	200.00	\$15.00	\$3,000.00	
D5	Site Clearance & Earthworks - Land reclamation					\$2,739,595.00
5.01	Strip and Stockpile existing rock armouring	cu.m	1497	\$40.00	\$59,880.00	
5.02	Prepare existing embankment surface	sq.m	2994	\$5.00	\$14,970.00	
5.03	Import and place self compacting fill	cu.m	6703	\$80.00	\$536,240.00	
5.04	Import and place structural fill (granular)	cu.m	2193	\$60.00	\$131,580.00	
5.05	Cut to waste soft alluvial areas	cu.m	2318	\$25.00	\$57,950.00	
5.06	Supply and place high strength geotextile to new embankment surface	sq.m	4897	\$50.00	\$244,850.00	
5.07	Supply rock armouring	cu.m	8246	\$175.00	\$1,443,050.00	
5.08	Place rock armouring (stockpiled or imported)	cu.m	9743	\$25.00	\$243,575.00	
5.09	Geotech monitoring (boreholes, piezometers etc.)	LS	1	\$7,500.00	\$7,500.00	
D6	Drainage					\$0.00
6.01	Single catchpit	ea		\$1,100.00		
6.02	RCRRJ 225 dia	m		\$130.00		
D7	Kerb, Channel, Traffic Islands, Footpaths, Crossings					\$29,750.00
7.01	Dish Channel	m	850	\$35.00	\$29,750.00	
D8	Pavement Layer Construction					\$30,600.00
8.01	M/4 AP40 Basecourse	cu.m	382.5	\$80.00	\$30,600.00	
D9	Pavement Surfacing					\$114,750.00
9.01	Asphaltic Concrete (AC Mix 7) 20mm depth	sq.m	2550	\$45.00	\$114,750.00	
D10	Pavement Markings and Signs					\$8,075.00
10.01	Shared path pavement markings	km	0.85	\$5,000.00	\$4,250.00	
10.02	Green cycle lane marking	sq.m	51	\$75.00	\$3,825.00	
10.03	Sign relocation	ea	0	\$1,500.00	\$0.00	
D11	Guardrail & Fencing					\$21,250.00
11.01	Supply and install new fence (galvanised diamond mesh)	m	850	\$25.00	\$21,250.00	
11.02	Supply and install new barrier with handrail (seaside)	m		\$500.00		
D12	Lighting					\$76,500.00
12.01	Install new columns and outreaches and connect to power supply	ea	17	\$2,500.00	\$42,500.00	
12.02	Trenching and cabling	m	850	\$40.00	\$34,000.00	
D13	Landscaping					\$5,000.00
13.01	Landscape to areas identified	PS	1	\$5,000.00	\$5,000.00	
D14	Relocation of Services					\$5,500.00
14.01	Relocate existing services	PS	1	\$5,000.00	\$5,000.00	
14.02	Contractor's on-costs on above item(s).	%	\$5,000	10%	\$500.00	
TOTAL ELEMENTAL COSTS						\$4,045,770.00

Note: These estimates are exclusive of contingency, funding risk, escalation and GST.

Base Date of Estimate:	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

**Wellington to Hutt Valley Cycle & Pedestrian Link
Option 3 - Section 5 (Seaside Shared Path)**

OE

Option Estimate

Item	Description	Base Estimate	Expected Estimate	95%ile Estimate
A	Project Property Cost	0	0	0
B	Investigation and Reporting	0	0	0
C	D&PD & NZTA Managed Costs	498,186	572,916	697,466
	Construction:			
	MSQA, NZTA Managed Costs, & Consent Monitoring Fees	264,200		
	Physical Works (\$7,482,936)			
D1	Preliminary And General	1,544,200		
D2	Survey & Setout	2,850		
D3	Traffic Management & Temporary Works	105,500		
D4	Site Clearance & Earthworks - Shared Path	26,486		
D5	Drainage	129,450		
D6	Kerb, Channel, Traffic Islands, Footpaths, Crossings	29,225		
D7	Pavement Layer Construction	46,370		
D8	Pavement Surfacing	153,900		
D9	Pavement Markings And Signs	33,355		
D10	Guardrail & Fencing	102,500		
D11	Lighting	88,100		
D12	Structures	5,200,000		
D13	Landscaping	10,000		
D14	Relocation Of Services	11,000		
D15	(blank)			
D16	(blank)			
D17	(blank)			
D18	(blank)			
D19	(blank)			
D20	(blank)			
D21	(blank)			
D22	(blank)			
D	Total Construction & MSQA	7,747,136	8,912,084	11,229,534
Total Base Estimate		8,245,322		
Note: These estimates are exclusive of escalation and GST.				
E	Assessed / Analysed Contingency	1,239,678		
Expected Estimate			9,485,000	
F	Assessed / Analysed Funding Risk		2,442,000	
95th Percentile Estimate				11,927,000

Note: These estimates are exclusive of escalation and GST.

Base Date of Estimate	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

**Wellington to Hutt Valley Cycle & Pedestrian Link
Option 3 - Section 5 (Seaside Shared Path)**

Job 60306339
Base date 6 Aug 14
Quantities by VK
Rates by JM

Elemental Breakdown for Construction Costs - Option Estimate

OE Draft

Item	Description	Units	Quantity	Rate	Sub-Element Totals	Element Totals
D1	Preliminary and General					\$1,544,200.00
1.01	Establishment and Dis-establishment	LS	1	\$118,800.00	\$118,800.00	
1.02	On-site overheads	LS	1	\$534,500.00	\$534,500.00	
1.03	Off-site overheads incl. profit	LS	1	\$890,900.00	\$890,900.00	
D2	Survey & setout					\$2,850.00
2.01	Survey & Setout	LS	1	\$2,850.00	\$2,850.00	
D3	Traffic Management & Temporary Works					\$105,500.00
3.01	Preparation of Temporary Traffic Management Plans	LS	1	\$1,500.00	\$1,500.00	
3.02	Implementation of Temporary Traffic Management Plans	week	52	\$2,000.00	\$104,000.00	
D4	Site Clearance & Earthworks - Shared Path					\$26,486.00
4.01	Site clearance - General	LS	1	\$15,000.00	\$15,000.00	
4.02	Management of Environmental Compliance Requirements	LS	1	\$5,000.00	\$5,000.00	
4.03	Cut to waste	cu.m	432	\$15.00	\$6,486.00	
D5	Drainage					\$129,450.00
5.01	Single catchpit	ea	19	\$1,100.00	\$20,900.00	
5.02	RCRRJ 225 dia	m	835	\$130.00	\$108,550.00	
D6	Kerb, Channel, Traffic Islands, Footpaths, Crossings					\$29,225.00
6.01	Dish channel	m	835	\$35.00	\$29,225.00	
D7	Pavement Layer Construction					\$46,370.00
7.01	Preparation of subgrade	sq.m	2505	\$2.00	\$5,010.00	
7.02	M/4 AP40 Basecourse	cu.m	376	\$110.00	\$41,360.00	
D8	Pavement Surfacing					\$153,900.00
8.01	Asphaltic Concrete (AC Mix 7) 20mm depth	sq.m	3420	\$45.00	\$153,900.00	
D9	Pavement Markings and Signs					\$33,355.00
9.01	Shared path pavement markings	km	1.14	\$5,000.00	\$5,700.00	
9.02	Green cycle lane marking	sq.m	68.4	\$75.00	\$5,130.00	
9.03	Sign relocation	ea	4	\$1,500.00	\$6,000.00	
9.04	Esplanade east & west bound cycle lane - std road markings	km	0.9	\$5,000.00	\$4,500.00	
9.05	Esplanade east & west bound cycle lane - green cycle markings	sq.m	27	\$75.00	\$2,025.00	
9.06	McKenzie Ave - road remarking	LS	1	\$10,000.00	\$10,000.00	
D10	Guardrail & Fencing					\$102,500.00
10.01	Supply and install new fence (galvanised diamond mesh)	m	820	\$125.00	\$102,500.00	
D11	Lighting					\$88,100.00
11.01	Install new columns and outreaches and connect to power supply	ea	17	\$2,500.00	\$42,500.00	
11.02	Trenching and cabling	m	1140	\$40.00	\$45,600.00	
D12	Structures					\$5,200,000.00
12.01	Shared path bridge over railway (incl. possible viewing area)	LS	1	\$500,000.00	\$500,000.00	
12.02	Urban Design elements to Bridge	PS	1	\$500,000.00	\$500,000.00	
12.03	Shared path ramps - Double-T pre-cast concrete	LS	1	\$2,250,000.00	\$2,250,000.00	
12.04	Urban Design elements to Ramps	PS	1	\$750,000.00	\$750,000.00	
12.05	McKenzie Ave - Parallel structure	LS	1	\$1,200,000.00	\$1,200,000.00	
D13	Landscaping					\$10,000.00
13.01	Landscape to areas identified	PS	1	\$10,000.00	\$10,000.00	
D14	Relocation of Services					\$11,000.00
14.01	Relocate existing services	PS	1	\$10,000.00	\$10,000.00	
14.02	Contractor's on-costs on above item(s).	%	\$10,000	10%	\$1,000.00	
TOTAL ELEMENTAL COSTS						\$7,482,936.00

Note: These estimates are exclusive of contingency, funding risk, escalation and GST.

Base Date of Estimate:	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

**Wellington to Hutt Valley Cycle & Pedestrian Link
Option 3 - Section 6 (Seaside Shared Path)**

OE

Option Estimate

Item	Description	Base Estimate	Expected Estimate	95%ile Estimate
A	Project Property Cost	0	0	0
B	Investigation and Reporting	0	0	0
C	D&PD & NZTA Managed Costs	15,383	17,693	21,543
	Construction:			
	MSQA, NZTA Managed Costs, & Consent Monitoring Fees	12,287		
	Physical Works (\$101,340)			
D1	Preliminary And General	21,100		
D2	Survey & Setout	1,238		
D3	Traffic Management & Temporary Works	20,500		
D4	Site Clearance & Earthworks - Shared Path	2,000		
D5	Kerb, Channel, Traffic Islands, Footpaths, Crossings	14,925		
D6	Pavement Surfacing	6,750		
D7	Pavement Markings And Signs	11,928		
D8	Lighting	12,300		
D9	Landscaping	5,000		
D10	Relocation Of Services	5,600		
D11	(blank)			
D12	(blank)			
D13	(blank)			
D14	(blank)			
D15	(blank)			
D16	(blank)			
D17	(blank)			
D18	(blank)			
D19	(blank)			
D20	(blank)			
D21	(blank)			
D22	(blank)			
D	Total Construction & MSQA	113,627	131,307	165,457
Total Base Estimate		129,010		
Note: These estimates are exclusive of escalation and GST.				
E	Assessed / Analysed Contingency	19,990		
Expected Estimate			149,000	
F	Assessed / Analysed Funding Risk		38,000	
95th Percentile Estimate				187,000

Note: These estimates are exclusive of escalation and GST.

Base Date of Estimate	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

**Wellington to Hutt Valley Cycle & Pedestrian Link
Option 3 - Section 6 (Seaside Shared Path)**

Job 60306339
Base date 6 Aug 14
Quantities by VK
Rates by JM

Elemental Breakdown for Construction Costs - Option Estimate

OE Draft

Item	Description	Units	Quantity	Rate	Sub-Element Totals	Element Totals
D1	Preliminary and General					\$21,100.00
1.01	Establishment and Dis-establishment	LS	1	\$1,700.00	\$1,700.00	
1.02	On-site overheads	LS	1	\$7,300.00	\$7,300.00	
1.03	Off-site overheads incl. profit	LS	1	\$12,100.00	\$12,100.00	
D2	Survey & setout					\$1,237.50
2.01	Survey & Setout	LS	1	\$1,237.50	\$1,237.50	
D3	Traffic Management & Temporary Works					\$20,500.00
3.01	Preparation of Temporary Traffic Management Plans	LS	1	\$500.00	\$500.00	
3.02	Implementation of Temporary Traffic Management Plans	week	4	\$5,000.00	\$20,000.00	
D4	Site Clearance & Earthworks - Shared Path					\$2,000.00
4.01	Site clearance - General	LS	1	\$1,000.00	\$1,000.00	
4.02	Management of Environmental Compliance Requirements	LS	1	\$1,000.00	\$1,000.00	
4.03	Cut to waste	cu.m	0.00	\$15.00	\$0.00	
D5	Kerb, Channel, Traffic Islands, Footpaths, Crossings					\$14,925.00
5.01	Kerb and channel	m	40	\$45.00	\$1,800.00	
5.02	Concrete infill to traffic islands	sq.m	15	\$50.00	\$750.00	
5.03	New concrete footpath	sq.m	495	\$25.00	\$12,375.00	
D6	Pavement surfacing					\$6,750.00
6.01	Asphaltic Concrete (AC Mix 7) 20mm depth	sq.m	150	\$45.00	\$6,750.00	
D7	Pavement Markings and Signs					\$11,927.50
7.01	Shared path pavement markings	km	0.495	\$5,000.00	\$2,475.00	
7.02	Shared path signs	LS	1	\$3,000.00	\$3,000.00	
7.03	SH north & south bound cycle lane - std road markings	km	0.89	\$5,000.00	\$4,450.00	
7.04	SH north & south bound cycle lane - green cycle markings	sq.m	26.7	\$75.00	\$2,002.50	
D8	Lighting					\$12,300.00
8.01	Install new columns and outreaches and connect to power supply	ea	3	\$2,500.00	\$7,500.00	
8.02	Trenching and cabling	m	120	\$40.00	\$4,800.00	
D9	Landscaping					\$5,000.00
9.01	Landscape to areas identified	PS	1	\$5,000.00	\$5,000.00	
D10	Relocation of Services					\$5,600.00
10.01	Relocate existing services	PS	1	\$5,000.00	\$5,000.00	
10.02	Contractor's on-costs on above item(s).	%	\$5,000	12%	\$600.00	

TOTAL ELEMENTAL COSTS **\$101,340.00**

Note: These estimates are exclusive of contingency, funding risk, escalation and GST.

Base Date of Estimate:	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

**Wellington to Hutt Valley Cycle & Pedestrian Link
Option 3 - Section 7 (Seaside Shared Path)**

OE

Option Estimate

Item	Description	Base Estimate	Expected Estimate	95%ile Estimate
A	Project Property Cost	0	0	0
B	Investigation and Reporting	0	0	0
C	D&PD & NZTA Managed Costs	47,786	54,956	66,906
	Construction:			
	MSQA, NZTA Managed Costs, & Consent Monitoring Fees	34,251		
	Physical Works (\$462,552)			
D1	Preliminary And General	95,600		
D2	Survey & Setout	2,900		
D3	Traffic Management & Temporary Works	31,500		
D4	Site Clearance & Earthworks - Shared Path	44,802		
D5	Kerb, Channel, Traffic Islands, Footpaths, Crossings	13,400		
D6	Pavement Layer Construction	19,140		
D7	Pavement Surfacing	135,720		
D8	Pavement Markings And Signs	23,590		
D9	Lighting	85,300		
D10	Landscaping	5,000		
D11	Relocation Of Services	5,600		
D12	(blank)			
D13	(blank)			
D14	(blank)			
D15	(blank)			
D16	(blank)			
D17	(blank)			
D18	(blank)			
D19	(blank)			
D20	(blank)			
D21	(blank)			
D22	(blank)			
D	Total Construction & MSQA	496,803	576,144	733,094
Total Base Estimate		544,588		
Note: These estimates are exclusive of escalation and GST.				
E	Assessed / Analysed Contingency	86,512		
Expected Estimate			631,100	
F	Assessed / Analysed Funding Risk		168,900	
95th Percentile Estimate				800,000

Note: These estimates are exclusive of escalation and GST.

Base Date of Estimate	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

Wellington to Hutt Valley Cycle & Pedestrian Link Option 3 - Section 7 (Seaside Shared Path)

Job 60306339
Base date 6 Aug 14
Quantities by VK
Rates by JM

Elemental Breakdown for Construction Costs - Option Estimate

OE Draft

Item	Description	Units	Quantity	Rate	Sub-Element Totals	Element Totals
D1	Preliminary and General					\$95,600.00
1.01	Establishment and Dis-establishment	LS	1	\$7,400.00	\$7,400.00	
1.02	On-site overheads	LS	1	\$33,100.00	\$33,100.00	
1.03	Off-site overheads incl. profit	LS	1	\$55,100.00	\$55,100.00	
D2	Survey & setout					\$2,900.00
2.01	Survey & Setout	LS	1	\$2,900.00	\$2,900.00	
D3	Traffic Management & Temporary Works					\$31,500.00
3.01	Preparation of Temporary Traffic Management Plans	LS	1	\$1,500.00	\$1,500.00	
3.02	Implementation of Temporary Traffic Management Plans	week	6	\$5,000.00	\$30,000.00	
D4	Site Clearance & Earthworks - Shared Path					\$44,802.00
4.01	Site clearance - General	LS	1	\$5,000.00	\$5,000.00	
4.02	Management of Environmental Compliance Requirements	LS	1	\$1,000.00	\$1,000.00	
4.03	Mill and remove to waste existing shared path surfacing	sq.m	3016.00	\$12.00	\$36,192.00	
4.04	Cut to waste	cu.m	174.00	\$15.00	\$2,610.00	
D5	Kerb, Channel, Traffic Islands, Footpaths, Crossings					\$13,400.00
5.01	Kerb and channel	m	40	\$45.00	\$1,800.00	
5.02	New concrete footpath (100mm)	sq.m	464	\$25.00	\$11,600.00	
D6	Pavement Layer Construction					\$19,140.00
6.01	M/4 AP40 Basecourse	cu.m	174	\$110.00	\$19,140.00	
D7	Pavement Surfacing					\$135,720.00
7.01	Asphaltic Concrete (AC Mix 7) 20mm depth	sq.m	3016	\$45.00	\$135,720.00	
D8	Pavement Markings and Signs					\$23,590.00
8.01	Shared path pavement markings	km	1.16	\$5,000.00	\$5,800.00	
8.02	Shared path signs	LS	1	\$3,000.00	\$3,000.00	
8.03	SH north & south bound cycle lane - std road markings	km	2.04	\$5,000.00	\$10,200.00	
8.04	SH north & south bound cycle lane - green cycle markings	sq.m	61.2	\$75.00	\$4,590.00	
D9	Lighting					\$85,300.00
9.01	Install new columns and outreaches and connect to power supply	ea	24	\$2,500.00	\$60,000.00	
9.02	Install new outreaches on existing columns for shared path	ea	5	\$1,500.00	\$7,500.00	
9.03	Trenching and cabling	m	445	\$40.00	\$17,800.00	
D10	Landscaping					\$5,000.00
10.01	Landscape to areas identified	PS	1	\$5,000.00	\$5,000.00	
D11	Relocation of Services					\$5,600.00
11.01	Relocate existing services	PS	1	\$5,000.00	\$5,000.00	
11.02	Contractor's on-costs on above item(s).	%	\$5,000	12%	\$600.00	
TOTAL ELEMENTAL COSTS						\$462,552.00

Note: These estimates are exclusive of contingency, funding risk, escalation and GST.

Base Date of Estimate:	6 Aug 2014	Cost Index
Estimate prepared by:	Dawie Maritz	Signed
Estimate internal peer review by:	David van Staden	Signed
Estimate external peer review by:	Ian Bond (Mike Caulfield)	Signed
Estimate approved by NZTA Project Mgr:	Mark McGavin	Signed

13th August 2014.

New Zealand Transport Agency

Level 7, PSIS House
20 Ballance Street
PO Box 5084, Lambton Quay
Wellington 6145

Attention: Mark McGavin - Project Manager

Dear Mark,

**Wellington – Hutt Valley Shared Path
IE Parallel Estimate Report for the Feasibility Study Options 1 & 3**

NZTA engaged BondCM (email 19 June 14) to undertake an independent parallel cost estimate for the two options for this project and reconcile these with consultants AECOM.

AECOM and Bond CM exchanged Summary Estimates for the base construction costs on 1st August 2014 and entered into price reconciliation discussions from that date.

A summary of the outcome of the reconciliation process is tabulated below:

	Reconciled Expected Estimates
OPTION 1	
BondCM	\$18.78 million
AECOM	\$18.67 million
OPTION 3	
BondCM	\$37.18 million
AECOM	\$39.92 million

Bond Construction Management Ltd

- 45 Alma Street North / Renwick / Marlborough 7204 / New Zealand / t: 03 572 8496
- 55 Fisher Point Drive / Freemans Bay / Auckland 1010 / New Zealand / t: 09 377 5294

These estimates are risk adjusted and represented the Most Likely or P50 outturn cost of the project and are inclusive of the Design and Project Documentation and MSQA costs. The I&R costs have not been included and we understand this work is in progress and a fee has been agreed with AECOM. You may choose to include this in the overall project cost estimate.

The estimates also include an assessment of the NZTA Managed Costs, which for BondCM is an assessment based on experience on other NZTA project estimates and not on pricing input from NZTA (you may choose to adjust these values).

BondCM's risk contingency allowance used to derive the Project Expected Estimate is not based on any formal risk analysis as we did not participate in any risk workshops. It is our assessment based on experience on many other recent NZT projects. SMO14 provides for such an assessment at the Options Estimate stage.

It is important to note that the estimates are based on rates and conditions applying at 2nd qtr 2014 and include no provision for cost escalation beyond that date.

Attached is a comparative Priced Summary for each option post the reconciliation process.

Scope of Work Description:

The scope of Option 1 consisted of mainly upgrading the existing shared path route including rail relocation and land reclamation in order to provide additional width and a shared path bridge crossing the expressway (at McKenzie Road).

The scope of Option 2 consisted of a mix of upgrading of existing route and construction of new shared path on a new designation including land reclamation (to a greater extent than Option 1), 2 x rail crossing bridges and a bridge at McKenzie Rd.

Basis of Estimates:

The estimates for each option were based on a bill of quantities, drawings and background reports provided by AECOM and a site visit.

Our assessment of the

An explanation of the principal changes that occurred during reconciliation is:

Structures (1 x structure in Option 1; 3 x structures in Option 3):

AECOM appeared to have an excessively high value on the bridges, especially the rail crossings.

- AECOM advised during reconciliation that they still had some urban design allowances in the structure costs so these were subsequently moved to the provisional sum allowance for urban design.
- AECOM reviewed their structure costs and made subsequent reductions
- Bond CM increased allowances for unknowns based on these discussions.

Preliminary & General, Margin & Off-site Overheads (both Options):

- AECOM agreed that their allowances appeared low and subsequently increased their percentages.

Rough Order Costs for Increased Extent of Land Reclamation

In addition to the parallel estimate of the options as presented, we were also requested to investigate the “rough order” costs for increasing the land reclamation platform width from 5m to 10m and 15m respectively to utilise potential excess fill from the proposed adjacent Petone to Grenada project.

Based on the section provided on plan CV3306 (rev A) and interpolation, the estimated extra over cost based on importing quarry products would be in the order of:

- Extend to 10m platform: +\$7,000,000 excluding GST
- Extend to 15m platform: +\$20,000,000 excluding GST

By utilising material from the Petone to Granada project (as opposed to purchasing from the adjacent Okiwi Quarry) would provide a potential saving of \$900,000 for the 10m option and \$3,500,000 for the 15m option. It is critical however that this material is suitable for reclamation adjacent to the Coastal Marine Environment as well as meeting engineering specifications. If able to be used, there would also be an additional saving on disposal fees for the Petone to Grenada project of \$1,300,000 & \$4,900,000 respectively.

We trust this report meets with your expectations but would be pleased to provide any clarification or additional information you require.

Yours faithfully,
Bond Construction Management

Ian Bond
Director

Enclosed: Summary of Comparisons

Hinton, Matthew

From: Ian Bond <ian@bondcm.co.nz>
Sent: Tuesday, 4 November 2014 8:08 a.m.
To: Hinton, Matthew
Cc: Mike Caulfield
Subject: W2H CW

Hi Matthew

Your summary spreadsheet of yesterday showed our August pricing which has changed signif due to the incr in rock armouring plus we incr our risk following our meeting with you. The net result is that our Exp Estimate is now approx. \$46.3m - awaiting confirmation from MC.

At my meeting with NZTA on 21 August Selwyn B requested that the NZTA managed costs in B be increased to \$1m to cater for his expected consenting costs and I understood Maggie was to advise you of that. If you make that adjustment yr Exp Estimate would be \$46.7m.

Very good alignment so that should make yr reporting to NZTA easier.

Happy to discuss. I will send through our revised Summary once confirmed by MC.

Regards
Ian

Ian Bond

BondCM
45 Alma Street North
Renwick
Marlborough 7204.
Ph: 03 572 8496 Mob: 0274 392234.
Email: ian@bondcm.co.nz



RELEASED UNDER THE
OFFICIAL INFORMATION ACT

Appendix E

Project Risk Analysis and Constructability Review

RELEASED UNDER THE OFFICIAL INFORMATION ACT

Risk Register

Project/Contract:	Petone to Ngauranga Cycleway / Pedestrian Improvements
Project/Contract ID:	655PN
NZTA Office:	Wellington
NZTA Lead:	Mark McGavin

Document Date:	10/10/2014	
Supplier Lead 1:	Rob Napier	AECOM
Supplier Lead 2:	Jason Miezio	AECOM
Supplier RM Specialist:	Adam Ashford	AECOM

Rank	RID	Risk Title	Description/ Cause/ Consequence	Risk Owner	Risk Owning Org	Date Raised	Risk Status	Phase	Established Controls	Current Exposure			Treatment Strategy <small>(refer to Actions Register for detail)</small>	Residual (Target) Exposure			Commentary & Closure Statement
										Consq.	Prob	Risk Score		Semi-Quantitative			
														Consq.	Prob	Risk Score	
1	DBC-15	Urban Design and Landscape benefits	Description: There is an opportunity to integrate additional UD benefits including enhanced landscape experience/access to the coastal environment, mixed (recreation/tourism) use, improved streetscape and urban form and flow on economic benefits. Cause: The cause of the opportunity is from the possible benefits of additional UD treatments. Consequence: The consequence of the opportunity is higher uptake from less confident and recreational cyclists, positive selling point/PR for the project, more likely to attract additional funding sources, key stakeholder support, consent process benefits.	LR	Isthmus	29/10/2013	Emerging	Detailed Business Case	Urban desing and landscape screening.	High	Medium	19	EEM and RMA process,	High	Medium	19	
1	DBC-16	Public health promotion	Description: There is an opportunity to enhance public health for people living along the cycleway corridor. Cause: The cause of the opportunity is that physical activity has tremendous health benefits. Consequence: The consequence of the opportunity is a higher uptake in cycleway use.	MM	NZTA	11/09/2013	Emerging	Detailed Business Case	Benefits demonstrated by the project are increased due to health benefits	High	Medium	19	Buy-in from a variety of organisations.	High	Medium	19	
2	DBC-40	Change to project priority/scope	Description: There is a threat that the focus of the cycleway changes from only providing a facility for ped/cyclists to providing a resilience solution. Cause: The cause of the threat is a change in NZTA priorities and wider stakeholders such as KiwiRail and GWRC priorities. Consequence: The consequence of the threat is that the focus of the study may change from just providing a cycleway to providing a resilience solution, likely to increase timescales and scale of solution.	RN	AECOM/NZTA	12/09/2013	Live - Treat	Detailed Business Case	Ongoing consultation. Focus on the cycleway aspect of the study, with a separate investigation into resilience.	Very High	High	24	Ongoing consultation with stakeholders and managing expectations. Separate study on reillance.	High	Medium	19	See PFR-10
1	DBC-40	Change to project priority/scope	Description: There is a threat that the changes to the proposed P2G interchange does not adequately support safe movement for cyclists and pedestrians, for instance at the proposed new Petone roundabout. Cause: The cause of the threat is a change to design of the proposed P2G interchange. Consequence: The consequence is that cyclists and pedestrians are not provided with a safe and efficient link at the Petone Interchange and that the proposed seaside path has to be shifted east.	RN	AECOM/NZTA	2/04/2014	Live - Treat	Detailed Business Case	Ongoing consultation. Focus on the cycleway aspect of the study, with a separate investigation into resilience.	Very High	Very High	25	Ongoing consultation with stakeholders and managing expectations. Separate study on reillance.	High	High	21	
3	DBC-50	Alignment with P2G project	Description: There is a threat that consultation and programme alignment with P2G delays consultation and extends the consultation period, and increases or decreases the overall project programme. Cause: The cause of the threat is the need to align P2N and P2G consultation and also options development. Consequence: The consequence of the threat is that consultation is duplicated, consultation messages are not aligned and the preferred option is not aligned with P2G.	MM and RN	NZTA and AECOM	4/11/2013	Live - Treat	Detailed Business Case	Guidance from NZTA regarding alignment of the consultation and project programme.	High	Very High	22	Dialogue with the P2G project team to ensure options are aligned and consultation is consistant between the two projects.	Medium	Medium	15	
3	DBC-13	Amenity and Safety features	Description: There is an opportunity to establish amenity value along the route e.g. bike pump and refreshment stations, 111 alert facilities, lookout areas and seating, lighting. Cause: The cause of the opportunity is the route overlooks Somes Island and the harbour. Consequence: The consequence of the opportunity is a potential extra selling point for the cycling route.	MM	NZTA / WCC	11/09/2013	Emerging	Detailed Business Case	Possibly contact WCC around viability, and also business requirements	Medium	Low	11	Raise it in initial discussion, enquiry by design. Access and servicing may be an issue. May need to build a permanent structure rather than allow stallholder to bring cart every day. Safety also an issue.	Medium	Medium	15	

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										Consq.	Prob	Risk Score		Semi-Quantitative			
														Consq.	Prob	Risk Score	
73	DBC-04	Impact on landforms due to destruction of embankments and removal of vegetation leading to harmful damage to the environment	Description: There is a threat that landforms will be impacted Cause: The cause of the threat is destruction of embankment and removal of vegetation Consequence: The consequence of the threat is damage to the local environment	LR	Isthmus	28/10/2013	Live - Parked	Detailed Business Case	Urban and Landscape design consultation, and environmental screening	Low	Very Low	2	Urban and Landscape design consultation	Very Low	Very Low	1	
4	DBC-11	Site visits	Description: There is a threat that safety could be an issue during the site visits. Cause: The cause of the threat is Wellington's current poor cycling provisions. Consequence: The consequence of the threat is potential injury to AECOM or NZTA personnel.	RN	AECOM	11/09/2013	Live - Treat	Detailed Business Case	SWMS document prior to visiting site	Very High	Low	20	Ensure all parties on the site visits are confident on Wellington streets.	High	Low	16	
5	DBC-05	Uptake of the route does not meet projections (either more or less cyclists than anticipated)	Description: There is a threat that the uptake in cyclists will not meet projections. Cause: The cause of the threat is the lack of solid, reliable count data. Consequence: The consequence of the threat is that project benefits will not be fully realised or less uptake than anticipated.	MM	NZTA	11/09/2013	Emerging	Detailed Business Case	Robust Economic model, consultation and cycle counts.	High	Medium	19	Ongoing monitoring	Low	Low	6	
59	DBC-07	Significant threats to marine life/ecology, air pollution and other environmental impacts through reclamation of the harbour and other construction/operational effects	Description: There is a threat that reclamation and the implementation of the project damages the environment. Cause: The cause of the threat is not managing and mitigating impacts effectively. Consequence: The consequence of the threat is that the local environment is negatively affected.	MG	NZTA	28/10/2013	Live - Parked	Detailed Business Case	Robust RMA process and Ecology screening and EEM.	Medium	Very Low	4	Condition and mitigation to avoid significant impact. Contracts Documents (PR's) will control and mitigate	Medium	Very Low	4	
5	DBC-06	NZTA / KiwiRail needs	Description: There is a threat that KiwiRail and NZTA have disparate needs. Cause: The cause of the threat is two organisations with differing priorities. Consequence: The consequence of the threat is lack of clarity around best outcomes.	MM	NZTA / KiwiRail	11/09/2013	Emerging	Detailed Business Case	Ongoing consultation on designs and options, and robust RMA process.	High	Medium	19	Accept actively	Medium	Medium	15	
45	DBC-09	Consents not achieved	Description: There is a threat that consents will not be achieved Cause: The cause of the threat is the project not meeting RMA rules and policies. Consequence: The consequence of the threat is development not proceeding	MG	NZTA	28/10/2013	Live - Parked	Pre Implementation	Engagement with consenting authorities and following a robust RMA process.	Low	Low	6	Discuss with Council	Low	Very Low	2	
5	DBC-18	High SE	Description: There is a threat that the SE will be much greater than expected. Cause: The cause of the threat is cost fluctuations, expensive options. Consequence: The consequence of the threat is a limited option is taken forward for the next stage.	RN	AECOM	11/09/2013	Emerging	Detailed Business Case	QS engaged early to help define cost of major items, and implications of any changes. This info will be passed on regularly during the option phase.	High	Medium	19	Accept actively. Robust options evaluation	High	Low	16	
5	DBC-26	Unknown services and costly relocation	Description: There is a threat that service relocation may become very costly and some services may not be identified. Cause: The cause of the threat is the limited space available. Consequence: The consequence of the threat is a much larger cost to NZTA.			11/09/2013	Emerging	Detailed Business Case	Consultation with service authorities. Constraints map	High	Medium	19	Design refinements if necessary to provide greater cover to underground plant.	High	Low	16	

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										Consq.	Prob	Risk Score		Semi-Quantitative			
														Consq.	Prob	Risk Score	
5	DBC-31	Inadequate temporary/permanent access/crossings	Description: There is a threat that the facility provides inadequate design components e.g. paving, path configuration, marking, signage, signals, crossings, amenity features etc are not appropriate. Cause: The cause of the threat is limited options available within the space available. Consequence: The consequence of the threat is fewer than expected cyclists use the new facility.	JM	AECOM	12/09/2013	Emerging	Detailed Business Case	Austrorads, NZTA guidelines. NZTA research reports. A railway crossing (level or bridge) may not be developed as a preferred option.	High	Medium	19		Very Low	Very Low	1	
5	DBC-27	Land acquisition problem	Description: There is a threat that land acquisition is not agreed Cause: The cause of the threat is lack of agreement with Kiwirail Consequence: The consequence of the threat is a delay to the project and/or a substandard design		AECOM/NZTA	28/10/2013	Live - Parked	Detailed Business Case	Ongoing and open consultation with KiwiRail and other key stakeholders.	High	Medium	19	Start discussions with stakeholder at an early stage	High	Very Low	8	
5	DBC-44	Client-initiated variations to scope have time/cost implications	Description: There is a threat of additional variations and changes to the scope. Cause: The cause of the threat is variations to scope. Consequence: The consequence of the threat is that the programme would be extended for the project.	RN	AECOM	12/09/2013	Live - Treat	Detailed Business Case	Clear communication on the programme implication for any change in scope.	High	Medium	19		High	Medium	19	See DBC-10
5	DBC-46	Topographical data coverage inadequate or not extensive	Description: There is a threat that further survey data is required. Cause: The cause of the threat is the extent of the works is larger than originally planned. Consequence: The consequence of the threat is additional cost to the client to obtain extra data.	RN	NZTA	12/09/2013	Live - Treat	Detailed Business Case	Current survey data has been received. Additional topographical data if needed.	High	Medium	19		High	Low	16	
5	DBC-48	Poor/partly complete knowledge of ground conditions due to inadequate geotechnical data	Description: There is a threat that geotechnical data is inadequate. Cause: The cause of the threat is no current information. Consequence: The consequence of the threat is large cost to the client.	RN	NZTA	12/09/2013	Live - Treat	Detailed Business Case	Geotechnical investigation is a provisional sum in this contract. Extent of works to be determined.	High	Medium	19	Geotechnical investigations	High	Low	16	
5	PFR-20	BCR insufficient for funding	Description: There is a threat that Cause: The cause of the threat is Consequence: The consequence of the threat is		NZTA AECOM	28/10/2013	Emerging	Detailed Business Case	Robust Economic model and consultation	High	Medium	19	Ensure all available information is provided	High	Medium	19	
16	DBC-17	Limitation on options	Description: There is a threat that space constraints make a viable option difficult. Cause: The cause of the threat is the proximity of the railway and SH2 corridor. Consequence: The consequence of the threat is that all potential options have some significant drawbacks leading to reduced ridership gains where design standards are compromised.	JM	NZTA	11/09/2013	Live - Treat	Detailed Business Case	LD to manage consultation with immediate planning input. The economic model and evaluation will commence early-on and there will be ongoing discussion with NZTA regarding the approach.	Medium	Very High	18	Avoid: Work closely with NZTA, P2G project team and KiwiRail reps to ensure option meets needs of the stakeholders, and that it can lead to safe operations.	Low	Medium	10	
17	DBC - 50	Delay in the development of the website and launch date of the website	Description: There is a threat that the launch of the project website is delayed. Cause: The cause of the threat is increased timeframes for completing and approving the project website Consequence: The consequence of the threat is that stakeholders cannot be directed to the website to provide comments before the next workshop planned for the 03/12/13	RN	AECOM	4/11/2013	Live - Treat	Detailed Business Case		Medium	High	17	Ongoing discussion with the website developer and communication with NZTA regarding need to approve the website	Medium	Medium	15	
22	DBC-19	Approvals threaten programme	Description: There is a threat that NZTA's approvals could lead to project delays. Cause: The cause of the threat is approvals take longer than expected. Consequence: The consequence of the threat is late project completion			11/09/2013	Live - Parked	Pre Implementation	Define approval timeframes at start of project and build into programme.	Medium	Medium	15	This can be transferred to NZTA, the peer reviewer will be appointed by the client; their responsibility to manage this resource.	Medium	Low	11	

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										Consq.	Prob	Risk Score		Semi-Quantitative			
														Consq.	Prob	Risk Score	
18	DBC-41	Adverse reaction of local councils	Description: There is a threat that WCC, HCC may not view the project favourably Cause: The cause of the threat is failure to review their needs. Consequence: The consequence of the threat is disruption to the completion of this project.	RN	AECOM	12/09/2013	Emerging	Detailed Business Case	Consultation plan and ongoing consultation	High	Low	16		High	Very Low	8	
18	DBC-22	Construction issues	Description: There is a threat that construction will be difficult inside the cycleway corridor. Cause: The cause of the threat is the limited space available. Consequence: The consequence of the threat is cost escalation due to use of limited construction techniques.			11/09/2013	Live - Parked	Implementation		High	Low	16	Liaise with contractor to get specialist input into construction methodology.	High	Very Low	8	
32	DBC-23	TTM effectiveness	Description: There is a threat that traffic management will be ineffective. Cause: The cause of the threat is the site limitations. Consequence: The consequence of the threat is cyclists and motorists will be affected during construction.			11/09/2013	Live - Parked	Implementation		Medium	Low	11	Liaison with contractor over construction methodology and incorporate into phasing plans.	Medium	Very Low	4	
22	DBC-08	P2G Project	Description: There is a threat that the P2G project may reduce the number of viable cycleway options. Cause: The cause of the threat is the outcome of the P2G study in unknown - the potential outcome of six-laning from Petone to Ngauranga has been mentioned. Consequence: The consequence of the threat is there will be few potential options available for assessment.	RN	NZTA	11/09/2013	Live - Treat	Detailed Business Case	P2G SAR underway. It's likely that concept designs will be released to the P2N team during their investigations	Medium	Medium	15	This risk could be passed onto the P2G project team. Determine in conjunction with NZTA PM.	Low	Medium	10	
22	DBC-01	Count data	Description: There is a threat that cycle count data is not consistent enough. Cause: The cause of the threat is there are no permanent cycle count sites within Wellington. Consequence: The consequence of the threat is benefit calculations may not reflect actual cyclist numbers.	MM	NZTA	11/09/2013	Live - Treat	Detailed Business Case	Various existing counts have been used by Opus, SKM and the NZTA.	Medium	Medium	15	Client direction required to determine the best data to take forward to the economic analysis. Additional count data where required.	Low	Low	6	
22	DBC-20	Reputation affected by campaign against the option.	Description: There is a threat that cyclist advocates will oppose the preferred option. Cause: The cause of the threat is the design is unlikely to satisfy absolutely everyone. Consequence: The consequence of the threat is negative media coverage and rework to revise the design.	AKF	AECOM/NZTA	11/09/2013	Emerging	Detailed Business Case	Robust consultation, enquiry by design.	Medium	Medium	15	Ongoing consultation with the advocate groups and consiscommunication.	Medium	Low	11	
22	DBC-24	Cost of bridge option	Description: There is a threat that the bridging option may become very costly. Cause: The cause of the threat is the lack of geotechnical data. Consequence: The consequence of the threat is another option may then become more favourable.	JM	AECOM	11/09/2013	Emerging	Detailed Business Case	Very limited geotechnical database at present. Difficult to reduce grades up to bridge. Safety issues associated with steep gradients. Cost of structure. Other options explored.	Medium	Medium	15	Geotechnical investigation will fill in a lot of gaps. Study potential materials to determine most cost effective. Thorough analysis of potential vertical alignment to provide best outcome for cyclists. The recommended options may not include a bridge	Low	Medium	10	
32	DBC-30	Contractor delays affect programme	Description: There is a threat that the Contractor will not be able to meet their construction programme. Cause: The cause of the threat is resource levels, constrained site Consequence: The consequence of the threat is a much later finish than planned.	MM	NZTA	12/09/2013	Live - Parked	Implementation	Tender evaluation	Medium	Low	11		Medium	Very Low	4	

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										Consq.	Prob	Risk Score		Semi-Quantitative			
														Consq.	Prob	Risk Score	
22	PFR-5	Incomplete consultation	Description: There is a threat that consultation may not be completed. Cause: The cause of the threat is time management and availability of consultees. Consequence: The consequence of the threat is not all of the issues and opportunities are identified.	RN	AECOM	28/10/2013	Emerging	Detailed Business Case	Prepare and utilise consultation strategy	Medium	Medium	15	Ongoing consultation, including IBD workshops.	Medium	Low	11	
32	PFR-29	Erosion and sedimentation effects on the natural drainage channels and terrian, i.e Korokoro stream.	Description: There is a threat that Cause: The cause of the threat is Consequence: The consequence of the threat is			28/10/2013	Emerging	Pre Implementation	Environmental screening and robust RMA process	Medium	Low	11	RMA process and EEM to identify and mitigate or avoid significant impacts. Implement erosion and sediment control measures (Sediment Control Plan).	Medium	Very Low	4	
32	DBC-49	Dispute over cost-sharing	Description: There is a threat that costs may be higher than expected to relocate services. Cause: The cause of the threat is the amount of cost sharing to apply Consequence: The consequence of the threat is higher cost to NZTA than anticipated; delay to project while issue is resolved.	MM	NZTA	12/09/2013	Emerging	Pre Implementation	Consultation plan; current cost-sharing agreements in place.	Medium	Low	11	ongoing consultation	Low	Low	6	
43	DBC-10	Use of SH2 shoulder	Description: There is a threat that cyclists will not stop using the SH2 shoulder even if a new facility is provided. Cause: The cause of the threat is that the SH2 shoulder is more attractive. Consequence: The consequence of the threat is much lower use of the facility than anticipated.	RN	AECOM	11/09/2013	Live - Treat	Detailed Business Case	Robust Economic model, consultation and cycle counts. Assumption that not all cyclists will transfer from the shoulder to a new cycle route.	Low	Medium	10		Low	Medium	10	
59	DBC-36	Building consent approval delayed	Description: There is a threat that the building consent will not be available when required Cause: The cause of the threat is late application Consequence: The consequence of the threat is impacts on project construction programme			12/09/2013	Live - Parked	Detailed Business Case	Consultation plan, consenting strategy	Medium	Very Low	4		Medium	Very Low	4	
59	DBC-37	Unable to advance purchase of land within designation	Description: There is a threat that land purchase may not be able to proceed. Cause: The cause of the threat is purchase is opposed. Consequence: The consequence of the threat is late start to construction phase.			12/09/2013	Live - Parked	Pre Implementation	NZTA's property consultant; land requirement plans.	Medium	Very Low	4				0	
59	DBC-38	Establishment/borrow/dump area requirements not covered by designation	Description: There is a threat that these items will not be allowed for. Cause: The cause of the threat is issue being overlooked. Consequence: The consequence of the threat is delay to construction		AECOM	12/09/2013	Live - Parked	Detailed Business Case	Construction methodology	Medium	Very Low	4				0	
59	DBC-39	Entry agreement conditions breached; litigation possible	Description: There is a threat that Cause: The cause of the threat is Consequence: The consequence of the threat is			12/09/2013	Live - Parked	Detailed Business Case	Consultation plan with affected parties.	Medium	Very Low	4		Medium	Very Low	4	
45	DBC-12	Advocacy groups	Description: There is a threat that some groups will be overlooked during this project. Cause: The cause of the threat is there are a large number of advocacy groups; the RFP did not list which groups would definitely be contacted. Consequence: The consequence of the threat is negative publicity and reduced effectiveness of consultation	MM	NZTA	11/09/2013	Live - Treat	Detailed Business Case	Review existing consultation material and list currently consulted groups. Website established to obtain inputs from cycle reference group, as on previous projects.	Low	Low	6	Monitor how it proceeds during the project.	Very Low	Very Low	1	

Risk Register

Project/Contract:	Petone to Ngauranga Cycleway / Pedestrian Improvements
Project/Contract ID:	655PN
NZTA Office:	Wellington
NZTA Lead:	Mark McGavin

Document Date:	10/10/2014	
Supplier Lead 1:	Rob Napier	AECOM
Supplier Lead 2:	Jason Miezio	AECOM
Supplier RM Specialist:	Adam Ashford	AECOM

Rank	RID	Risk Title	Description/ Cause/ Consequence	Risk Owner	Risk Owning Org	Date Raised	Risk Status	Phase	Established Controls	Current Exposure			Treatment Strategy <small>(refer to Actions Register for detail)</small>	Residual (Target) Exposure			Commentary & Closure Statement
										Consq.	Prob	Risk Score		Semi-Quantitative			
														Consq.	Prob	Risk Score	
45	DBC-14	Impact on rowing club	Description: There is a threat that the rowing club will be severely disadvantaged. Cause: The cause of the threat is their property is very close to the potential cycleway. Consequence: The consequence of the threat is poor relationships with this stakeholder.	RN	AECOM	11/09/2013	Emerging	Detailed Business Case	Previous consultation, on-going discussions	Low	Low	6	Ongoing consultation around potential options, and their proximity to the rowing club.	Low	Low	6	
45	DBC-25	Signage and markings standard	Description: There is a threat that the marking standard to use is not clearly defined. Cause: The cause of the threat is having a variety of standards. Consequence: The consequence of the threat is the markings and signage adopted is not acceptable to certain stakeholders.	JM	NZTA	11/09/2013	Live - Treat	Detailed Business Case	MOTSAM available, but it's not known if WCC have other requirements, or the requirements of the GHW will come into play.	Low	Low	6	Liaison with stakeholders over this aspect of the design. Confirm requirements early in the project.	Very Low	Very Low	1	
45	DBC-29	Protracted consultation affects programme	Description: There is a threat that the consultation could take longer than expected. Cause: The cause of the threat is the number of advocacy groups / interested parties / stakeholders. Consequence: The consequence of the threat is late completion of major project deliverables.	RN	AECOM	12/09/2013	Parked	Detailed Business Case	Consultation Plan Enquiry by Design process	Low	Low	6		Low	Low	6	
45	DBC-33	Error in design assumptions that affect design concept not recognised prior to project funding commitment	Description: There is a threat that the preferred option will not meet expectations Cause: The cause of the threat is incorrect assumptions during the design period Consequence: The consequence of the threat is an option that needs significant rework to meet standards.	JM	AECOM	12/09/2013	Emerging	Detailed Business Case	Enquiry by design process; consultation plan, and formation of a Cycle Reference Group	Low	Low	6	Ongoing consultation and communication with stakeholders	Low	Very Low	2	
32	PFR-15	Safety Audit issues with preferred design and excessive claims by the contractor due to project risks	Description: There is a threat that the safety issues are raised with the preferred design. Cause: The cause of the threat is inadequate safety in design. Consequence: The consequence of the threat is the preferred option cannot be implemented and/or excessive claims by the contractor			28/10/2013	Live - Parked	Detailed Business Case	Peer Review design and keep good relationship with contractor. Engage with Road Safety Audit team early in design process.	Medium	Low	11	Peer Review design and keep good relationship with contractor. Engage with Road Safety Audit team early in design process.	Low	Very Low	2	
45	PFR-19	Redesign required to achieve scheme objectives.	Description: There is a threat that the design does not deliver the project objectives Cause: The cause of the threat is inadequate design Consequence: The consequence of the threat is additional design work is required			28/10/2013	Live - Parked	Pre Implementation		Low	Low	6	Peer review design	Very Low	Very Low	1	
45	PFR-49	Visual impact of cycleway impacts on road users/communities	Description: There is a threat that 'effects on amenity and connectivity for adjacent road and rail users are high. Cause: The cause of the threat is potentially through visual screening/structures. Consequence: The consequence of the threat is loss of amenity and objection to scheme.	LR	Isthmus	28/10/2013	Emerging	Detailed Business Case	Urban and landscape design consultation, EEM screening to inform the preferred option.	Low	Low	6	AEE and robust RMA process.	Very Low	Very Low	1	
45	PFR-21	Future maintenance burden on NZTA greater than anticipated increasing whole of life costs.	Description: There is a threat that Cause: The cause of the threat is Consequence: The consequence of the threat is			28/10/2013	Live - Parked	Operation		Low	Low	6	Whole-of-life cost assessment will be carried out during detailed design options	Very Low	Very Low	1	
45		Unforeseen ground conditions during construction have time/cost implications	Description: There is a threat that ground conditions will be inadequate during construction Cause: The cause of the threat is gaps in the site investigation. Consequence: The consequence of the threat is construction delays, additional costs to NZTA.	MM	NZTA	12/09/2013	Live - Parked	Implementation	Further investigation requirements to be determined after the completion of this phase.	Low	Low	6		Low	Low	6	

Risk Register

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Rank	RID	Risk Title	Description/ Cause/ Consequence	Risk Owner	Risk Owning Org	Date Raised	Risk Status	Phase	Established Controls	Current Exposure			Treatment Strategy <small>(refer to Actions Register for detail)</small>	Residual (Target) Exposure			Commentary & Closure Statement
										Consq.	Prob	Risk Score		Semi-Quantitative			
														Consq.	Prob	Risk Score	
70	PFR-31	Works delayed due to ongoing complaints from residents.	Description: There is a threat that construction results in complaints from residents Cause: The cause of the threat is construction disturbing residents Consequence: The consequence of the threat is delayed construction period			28/10/2013	Live - Parked	Implementation	Consultation throughout development of project. Residents not located within the corridor, only intersections likely to have an impact.	Very Low	Low	3	Public relations consultation and local project office	Very Low	Low	3	
45	PFR-33	Current cost estimate/design does not allow for adequate earthworks.	Description: There is a threat that cost estimates do not allow for adequate earthwork. Cause: The cause of the threat is inadequate costs Consequence: The consequence of the threat is costs overrun/project delay			28/10/2013	Live - Parked	Detailed Business Case		Low	Low	6	Site Survey needed	Very Low	Low	3	
43	PFR-36	Proportion of suitable fill reduced and shortfall of fill.	Description: There is a threat that there is a shortfall of suitable fill Cause: The cause of the threat is lack of suitable fill and adequate planning Consequence: The consequence of the threat is construction delay			28/10/2013	Live - Parked	Pre Implementation		Low	Medium	10	Use experienced contractor	Very Low	Medium	5	
32	PFR-37	Unsuitable weather conditions cause delay to reclamation works	Description: There is a threat that Cause: The cause of the threat is Consequence: The consequence of the threat is			28/10/2013	Live - Parked	Implementation		Medium	Low	11		Medium	Low	11	
32	PFR-39	Inadequate culvert/pipe design resulting in insufficient capacity	Description: There is a threat that Cause: The cause of the threat is Consequence: The consequence of the threat is			28/10/2013	Live - Parked	Pre Implementation		Medium	Low	11	Further investigation needed	Low	Very Low	2	
32	PFR-40	Poor drainage design resulting in surface ponding	Description: There is a threat that Cause: The cause of the threat is Consequence: The consequence of the threat is			28/10/2013	Live - Parked	Operation		Medium	Low	11	Further investigation needed	Low	Very Low	2	
22	PFR-41	Poor pavement design resulting in uneven road surface	Description: There is a threat that the design tolerance of the running surface is inappropriate/incorrect. Cause: The cause of the threat is poor research of end-user requirements. Consequence: The consequence of the threat is that walking/cycling patronage doesn't increase to extent predicted.			28/10/2013	Live - Parked	Detailed Business Case		Medium	Medium	15	Peer review of design	Low	Very Low	2	
45	PFR-45	Extent of retaining walls underestimated	Description: There is a threat that Cause: The cause of the threat is Consequence: The consequence of the threat is			28/10/2013	Live - Parked	Implementation	Robust design process and detailed design	Low	Low	6	Peer review of design and additional geotech investigation	Very Low	Very Low	1	
59	AEC-4	Client imposes unrealistic timeframe	Description: There is a threat that NZTA will request unworkable timeframes. Cause: The cause of the threat is budgetary-related and programme pressure at NZTA Consequence: The consequence of the threat is a poor project outcome	RN	AECOM	12/09/2013	Live - Treat	Detailed Business Case	Clear scope of services in the RFP	Medium	Very Low	4				0	
59	DBC-03	Iwi unwilling to support options	Description: There is a threat that Iwi are unwilling to support any options that involve partial reclamations Cause: The cause of the threat is from previous knowledge that Iwi are concerned. Consequence: The consequence of the threat is that Iwi oppose the cycleway	RN	AECOM	1/10/2013	Emerging	Detailed Business Case		Medium	Very Low	4	Ongoing consultation by Iwi consultation specialist	Medium	Very Low	4	

Risk Register

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Rank	RID	Risk Title	Description/ Cause/ Consequence	Risk Owner	Risk Owning Org	Date Raised	Risk Status	Phase	Established Controls	Current Exposure			Treatment Strategy <small>(refer to Actions Register for detail)</small>	Residual (Target) Exposure			Commentary & Closure Statement
										Semi-Quantitative				Semi-Quantitative			
										Consq.	Prob	Risk Score		Consq.	Prob	Risk Score	
70	PFR-54	Effects on the escarpment landform	Description: There is a threat that the bridge structures will have an adverse visual impact on the values of the escarpment landform. Cause: bridge structures. Consequence: Consent risk (s6a), loss of key stakeholder support			28/10/2013	Live - Parked	Implementation		Very Low	Low	3	KPI and design parameter framework to avoid effects in consultation with UD/LA and ecologist	Very Low	Low	3	
45	PFR-6	Project taken to Environment Court	Description: There is a threat that Cause: The cause of the threat is Consequence: The consequence of the threat is			28/10/2013	Live - Parked	Pre Implementation	Robust RMA process and Ecology screening and EEM.	Low	Low	6	Discuss project with council and stakeholders. Robust RMA process and Ecology screening and EEM.	Low	Low	6	
73	PFR-8	Changes in legislation and/or global conditions result in rate changes over and above those allowed for	Description: There is a threat that Cause: The cause of the threat is Consequence: The consequence of the threat is	MG	NZTA	28/10/2013	Live - Parked	Pre Implementation		Low	Very Low	2	Follow Cost Estimation Procedures to analyses expected and 95%ile costs and update rates. Peer Review.	Low	Very Low	2	
45	PFR-9	Requirement to apply for a relaxation to the designation as project progresses	Description: There is a threat that the designation is not sufficient to build the project. Cause: The cause of the threat is designation does not define the required extent of the cycleway. Consequence: The consequence of the threat is additional consents are required and programme delay.			28/10/2013	Live - Parked	Pre Implementation	Ensure investigation stage correctly defines extent of designation	Low	Low	6	Ensure investigation stage correctly defines extent of designation	Low	Very Low	2	
59	DBC-32	Safety audit findings disputed / not completed	Description: There is a threat that the safety audit may return with inappropriate findings. Cause: The cause of the threat is this project is that cycle projects are less familiar in the engineering field. Consequence: The consequence of the threat is there could be uncertainty in NZTA's mind around the final design.	JM		12/09/2013	Emerging	Detailed Business Case	New safety audit guidelines, clear direction on signage and marking from NZTA	Medium	Very Low	4	Enquiry by Design process, KPI process and further development into a framework of design parameters to be used as a base for the NoR UDLF			0	

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**WELLINGTON TO HUTT VALLEY WALKING AND
CYCLE LINK:
CONSTRUCTABILITY ASSESSMENT**

7 AUGUST 2014: Version 01

1. EXECUTIVE SUMMARY

The constructability of two options (1 and 3) were considered for the construction of shared pedestrian and cycleway running between Wellington and Hutt Valley through or adjacent to commercial, rail, motorway, expressway, marine and reserve environments .

The proposed works consists of upgrades to existing paths, construction of new shared path, land reclamation of the coast, rail relocation (Option 1 only), retaining wall construction (Option 1 only), 2 x bridges over rail (Option 3 only) and a bridge over the expressway.

The key risks or issues affecting constructability identified were:

- Rail relocation by 3rd party (Kiwirail) and associated programme risks (Option 1)
- Excavation for new retaining walls adjacent to existing SH2 expressway (Option 1)
- Access from Kiwirail land for upgrading path adjacent to expressway (Option 1)
- Access and restrictions for crossing Kiwirail tracks (both options but greater for 3)
- Services relocation adjacent to bridge crossing Kaiwharawhara Stream (both options)
- Unknown geotechnical and contamination data for reclamation (both options but greater for 3)

In summary, Option 3, albeit a greater scope of work, would be the preferred option purely based on ease of construction and limitation of risks and issues.

2. INTRODUCTION

2.1 SCOPE OF BRIEF

Bond CM was engaged by NZTA to assess and provide comment on the constructability of Options 1 and 3 for the proposed Shared Path between Wellington and Hutt Valley.

3. ENVIRONMENT & SCOPE OF WORKS

3.1 LOCAL ENVIRONMENT

The proposed route traverses along the footpath (predominantly) on local arterial roads through mostly commercial environments (including crossing of roads), through land adjacent to the rail lines and motorway, on the SH2 Expressway shoulder and through discrete areas in reserve land.

3.2 SCOPE OF PROPOSED CONSTRUCTION

Two options are currently being considered, each comprising seven sections.

3.2.1 Option 1

The proposed works comprise:

Sections 1 & 2 (Wellington – Ngauranga)

- Upgrade of existing paths on local road (Hutt Rd from Thorndon Quay to Ngauranga)

consisting of surface replacement & marking, relocation of obstructions and local widening of the bridge over the Kaiwharawhara Stream culvert to accommodate proposed width

Sections 3 & 4 (Ngauranga – Petone)

- Upgrade of approximately 3700m of existing path adjacent to expressway consisting of surface replacement & marking and relocation of obstructions and including 1050m widening with new retaining wall.
- Construction of approximately 1150m of new shared path adjacent to the shore line consisting of land reclamation of the CMA, pavement construction including drainage, kerbing, surfacing and marking, lighting, fencing and guardrail
- Rail relocation 1500m (extending into section 5)

Section 5 (Petone & Lower Hutt Connections)

- Construction of approximately 750m of new shared path (continuation of Section 4) generally discrete but short section adjacent to Hutt Rd
- Upgrade of approximately 550m of existing path adjacent to motorway ramp & discreet
- Construction of shared path bridge over motorway at McKenzie Ave
- Rail relocation (extending from Section 4)

Sections 6 & 7 (Northbound Pito-One Rd Shared Path)

- Construction of approximately 500m shared path on local roads
- Upgrade of approximately 1300m of existing discrete path consisting of surface replacement & marking and new lighting

3.2.2 Option 3

The proposed works comprise:

Sections 1 & 2 (Wellington – Ngauranga)

(As for Option 1)

Sections 3 & 4 (Ngauranga – Petone)

- Upgrade of approximately 500m of existing path adjacent to motorway or ramp consisting of surface replacement & marking and relocation of obstructions
- Construction of shared path bridge over railway consisting of piles, cross-heads, double-Ts, in-situ deck and safety railing for ramps and steel truss with precast deck for bridge
- Construction of approximately 3800m of new shared path adjacent to the shore line consisting of land reclamation of the CMA, pavement construction including drainage, kerbing, surfacing and marking, lighting, fencing and guardrail

Section 5 (Petone & Lower Hutt Connections)

- Construction of approximately 150m of new shared path (continuation of Section 4).
- Construction of approximately 250m shared path or cycleway on local roads (northern end).
- Upgrade of approximately 550m of existing path discrete & adjacent to Hutt Road
- Construction of shared path bridge over railway
- Construction of shared path bridge over motorway at McKenzie Ave

Sections 6 & 7 (Northbound Pito-One Rd Shared Path)

(As for Option 1)

4 CONSTRUCTION METHODS & RISKS

4.1 OPTION 1

4.1.1 SECTIONS 1 & 2

Construction activities will generally be standard minor upgrading activities undertaken with active traffic management in accordance with COPTTM. This will generally consist of sectional footpath closure and diversion of pedestrians and off-peak lane closure adjacent to the works for construction vehicle access.

The only major risk is associated with the widening of the bridge over the Kaiwharawhara Stream in Section 1 due to significant services requiring relocation in order to provide sufficient clearance to enable the widening. The viability and cost of the relocation is, as yet, unknown. Please refer to photo in Appendix A.

4.1.2 SECTIONS 3 & 4

Reclamation Works

Reasonable truck and plant access can be provided from the northern end through the motorway underpass at Ngauranga Interchange and through the existing Kiwirail gate (assuming agreement by Kiwirail). Both rail lines will then need to be traversed to provide materials for and remove waste from the reclamation. This can best be achieved by providing a Kiwirail approved crossing point in the vicinity of the proposed bridge where the existing reclamation begins to widen (but off line from the proposed pedestrian ramp to enable access during construction of the ramp).

There is excellent truck and plant access from the northern end of the reclamation from The Esplanade and past the Rowing Club, which provides access on the sea side of the rail lines.

The land reclamation will require installation of silt curtains in the Coastal Marine Environment, safe access for existing path users at construction access crossing points for existing path users and separation fencing from rail operations.

Potential construction risks associated with the reclamation may arise from unknown geotechnical information for the reclamation footprint, unknown history of the existing reclamation materials (potential for contaminated materials) and limitations by Kiwirail on access across their tracks at the southern end of Section 3.

Rail Relocation

Relocation of the rail east of its existing location will be undertaken by Kiwirail. There is potential for the programme to be adversely affected by the timing of this work, which would be mitigated by advance agreement.

Shared Path Construction

The shared path would be constructed upon staged completion of the land reclamation and rail relocation. Separation fencing will be relocated to the western side of the new rail location and the rail crossing point will no longer be required at the southern end of Section 3. The shared path will be constructed adjacent to the Expressway from the eastern side. Safe access and diversions for existing users should be provided where possible but, due to the tight corridor between rail and motorway, temporary closures will be inevitable for most construction activities.

Significant risks exist with the location of the proposed retaining walls close to the Expressway edge. It is likely that temporary reconfiguration of the live traffic lanes (to minimum widths and hard to the medium) will be required in order to provide a safety zone between the live lanes and the wall construction with TL-3 barriers and end treatment provided for separation. It is also likely that temporary support (sheet piles) will be required where excavation is >1m high to maintain the stability of the adjacent Expressway until the new wall is constructed.

Agreement will also be required to gain access from the coastal side of the existing path due to the limited construction width.

4.1.3 SECTION 5

Rail Relocation

As for Sections 3 & 4 above

Shared Path Construction

The shared path would be constructed utilising access as per Section 4 above except for upgrading the section of the existing path, including installation of barrier, adjacent to the Petone southbound on ramp, which will require off peak level 3 closures (achieved by pushing the traffic out to the right hand hatched shoulder). Similarly, the section of new path adjacent to SH2 will require off-peak closure of the adjacent lane for construction vehicle access. Rail separation fencing will be required for the sections adjacent to the rail lines.

McKenzie Ave Bridge

There is good access of Pito-One Rd (on the northern side) and McKenzie Rd (on the southern side) for construction of the ramps and abutments. A full expressway night time closure will be required for lifting in of the steel truss bridge structure over the expressway.

Potential geotechnical risks associated with piling depths should be minimised by information available from the recent McKenzie Ave road bridge piling.

4.1.4 SECTIONS 6 & 7

Shared Path Construction

Construction activities for Section 6 will generally be standard minor upgrading activities undertaken with active traffic management in accordance with COPTTM. This will generally consist of sectional footpath closure and diversion of pedestrians and off-peak lane closure adjacent to the works for construction vehicle access.

Section 7 and the adjacent section of Section 6 is a discrete path running through scenic reserve. An existing retaining wall and timber footbridge provide construction plant and materials access restrictions for a 600m section in the vicinity of the Expressway. Access can be obtained from the

motorway for construction vehicles by removing a section of existing guardrail protected by installing a semi-permanent shoulder closure with TL-3 barriers and end treatment. Ingress & egress would be undertaken off-peak using a lane closure or mobile closure.

4.2 OPTION 3

4.2.1 SECTIONS 1 & 2

(As for Option 1)

4.2.2 SECTIONS 3 & 4

Reclamation Works

Reasonable truck and plant access can be provided from the northern end through the motorway underpass at Ngauranga Interchange and through the existing Kiwirail gate (assuming agreement by Kiwirail). Both rail lines will then need to be traversed to provide materials for and remove waste from the reclamation. This can best be achieved by providing a Kiwirail approved crossing point in the vicinity of the proposed bridge where the existing reclamation begins to widen (but off line from the proposed pedestrian ramp to enable access during construction of the ramp).

There is excellent truck and plant access from the northern end of the reclamation from The Esplanade and past the Rowing Club, which provides access on the sea side of the rail lines.

The land reclamation will require installation of silt curtains in the Coastal Marine Environment, safe access for existing path users at construction access crossing points and separation fencing from rail operations.

Potential construction risks associated with the reclamation may arise from unknown geotechnical information for the reclamation footprint, unknown history of the existing reclamation materials (potential for contaminated materials) and limitations by Kiwirail on access across their tracks at the southern end of Section 3. This option will be more sensitive to access restrictions due to the significantly greater quantities of material to be removed and imported.

Rail Bridge

Access for the northern ramp construction may be achieved by using the same access as proposed for the reclamation crossing the railway tracks. Access for the southern ramp construction may be achieved by using both the proposed route as for the reclamation (but without the need to cross the lines) and from an existing access just off the start of the southbound Expressway off-ramp.

Construction over and adjacent to the rail will be in accordance with Kiwirail requirements.

Restrictions on use of the existing path will be inevitable for piling & lifting operations.

Piling design will be subject to geotechnical investigations.

Shared Path Construction

The shared path would be constructed upon staged completion of the land reclamation utilising the same protection and access controls as for the reclamation work. The shared path will be constructed on the reclamation.

4.2.3 SECTION 5

Rail Bridge

Good access exists from of McKenzie Road and adjacent to Hutt Rd respectively for construction of the ramps. A lockable access gate and pedestrian separation fencing will be required on Hutt Rd as well as separation fencing from the live rail.

Construction over and adjacent to the rail will be in accordance with Kiwirail requirements.

A key hazard will be the close vicinity of the rail electrification lines to construction activities such as piling and lifting.

Piling design will be subject to geotechnical investigations.

Shared Path Construction

The new shared path would be constructed utilising access as per Section 4. The sections of existing path to be upgraded will be undertaken using active traffic management (as for Sections 1 and 2). Rail separation fencing will be required for the sections adjacent to the rail lines.

McKenzie Ave Bridge

There is good access of Pito-One Rd (on the northern side) and McKenzie Rd (on the southern side) for construction of the ramps and abutments. A full expressway night time closure will be required for lifting in of the steel truss bridge structure over the expressway.

Potential geotechnical risks associated with piling depths should be minimised by information available from the recent McKenzie Ave road bridge piling.

4.2.4 SECTIONS 6 & 7

(As for Option 1)

APPENDIX A



Figure 1: Kaiwharawhara Stream Bridge – Existing Services

Peer Review: Wellington to Hutt Valley Walking and Cycling Link (W2HV) (Beca, 2014)

Updated 5 September 2014

No.	Peer Reviewer's Comments	Level of Importance	Designer's Response
Coastal Issues			
1	Assess the performance of existing rock armour during recent storms.	Medium	Would require further geotechnical testing which could be undertaken for Specimen Design.
2	Swell conditions need to be assessed as well as wind generated waves as part of the design process	High (for next stage of project)	Wave and wind energy and disbursement options may require investigation during subsequent design phases.
3	Resilience level is too high as this level should be based on overtopping criteria and/or managed approach rather than "blue water" run-up.	High (although current design hasn't designed for this level)	Current design level is considered adequate, but will need further investigation once platform width is agreed.
4	To aid drainage it would be better to have the rock armour crest and the reclamation at the same level.	Medium	Comment noted. This will be considered further at detailed design stage. Urban Design and commuter/user safety also needs to be considered.
5	Rock armour design for the 1000 year return period event is probably too extreme	High (for next stage of project)	Subsequent design phase.
6	Rock armour should be slightly larger if allowance were made for swell conditions and for the 100 year return period event. Toe and crest detail needs to be more robust.	High (in terms of project cost)	We would require more geotechnical information to assess adequately.
7	For wider reclamation options more detail on the bathymetry is required to understand the extent of reclamation volumes and armour protection.	High (in terms of project cost)	Information can be sought for Specimen Design.
Geotechnical Issues			
8	Site investigations are very limited. Have recommendations for additional investigations, including from water, been covered?	Medium (in terms of project cost), High (relative to design cost)	AECOM have advised NZTA that further geotechnical testing is required as the current testing has been limited. Testing within the harbour area is essential to ensure a robust design. Paolo to confirm / agree.
9	Site investigations are very limited. The risk profile relating to presence of weak sandy sediment beneath the footprint and effect on the overall reclamation design should be further evaluated, particularly for Option 3 and the southern end of the project.	High (in terms of project cost if significant areas of weak ground encountered)	Agree. AECOM recommend thorough and more detailed investigations during upcoming design phases (specimen design).
10	Seismic Design standard with respect to Importance Level, design life and design code should be confirmed.	High (in terms of project cost)	We believe the risk cost of this item is covered although difficult to address with the level of current investigations.
11	With respect to 10 above, update seismic and liquefaction assessment along complete length of project.	High (in terms of project cost)	We have a lack of scope and detail for sections outside section 3 and 4.
12	With respect to 10 above, stability assessed along complete length of project which may require confirmation of liquefied shear strengths for analyses and estimated extent of movement. This is potentially critical for Option 3 with reclamation at the southern end, and may require additional stability measures.	High (in terms of project cost)	We believe the risk cost of this item is covered although difficult to address with the level of current investigations.
13	Foundation requirements for structures need to be assessed, particularly for the pedestrian bridge on the reclamation that crosses the railway line. Interaction with respect to seismic performance of reclamation to be advised.	Medium (only a few structures)	Agree - Specimen Design.
14	Effect of the performance of the reclamation on adjacent existing structures, services and railway line with respect to settlement and stability.	Medium	Agree - Specimen Design.
15	The ability to obtain the required volumes of structural fill should also be reviewed with respect to potential timing of other projects such as the extension to the Wellington airport runway.	Current allowance unknown?	P2G project could potentially supply fill. The quality and quantity of the fill is yet to be determined.
16	Given the very conceptual level of this design, allowance for provision of additional or currently unknown elements in the risk profile and therefore the project cost estimate should be made.	Medium to High (in terms of project cost)	Risk register updates and associated contingencies have been made or provided.

Appendix F

Economic Analysis and Peer Review

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NZ Transport Agency
Wellington to Hutt Valley Cycleway
Worksheet A1.1: Summary of Time Streams of Benefits and Costs

Worksheet A1.1

Scheme (1)	NZ Transport Agency																						Base date (2)	1-Jul-13		Time zero (3)															1-Jul-13							
	Time																																															
Benefits (4) Option 1	2013	2014	2015	2016	2017	2018	2019	2020	2021	###	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	###	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053							
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Benefits (5) Option 3																																																
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Section 7																																																
Costs (6) Option 1	2013	2014	2015	2016	2017	2018	2019	2020	2021	###	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	###	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053							
Section 1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40							
Section 2																																																
Section 3																																																
Section 4																																																
Section 5																																																
Section 6																																																
Section 7																																																
Costs (7) Option 3	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40							
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P2N Cycleway
Summary of Results

Section	Option 1 (3%)				Option 3 (6%)			
	PV benefit	cost	PV cost	bcr	PV benefit	cost	PV cost	bcr
1	10,396,943	1,645,600	1,552,453	6.7	16,587,335	1,668,800	1,574,340	11
2	5,605,748	495,900	467,830	12	6,410,211	495,900	467,830	14
3	16,723,037	6,554,500	5,833,482	2.9	55,050,089	28,910,100	26,501,783	2.1
4	5,030,094	5,295,500	4,995,755	1.0	21,294,315	5,600,600	5,283,585	4.0
5	1,304,951	3,920,400	3,291,643	0.4	3,944,737	9,485,000	7,738,399	0.5
6	341,335	149,000	125,103	2.7	341,335	149,000	125,103	2.7
7	1,609,264	631,100	529,884	3.0	1,609,264	631,100	529,884	3.0
total	41,011,372	18,692,000	16,796,150	2.4	105,237,286	46,940,500	42,220,923	2.5
				Impact of P2G fill		7,000,000	6,416,874	
							35,804,049	2.9

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P2N Cycleway
Summary of Itemised Results

Section	design	property	construction	funding risk	total	contingency	total	costs (ex risks)	NPV costs (ex risk)	NPV ratio
1	91,653		1,333,682	220,265	1,645,600	432,400	2,078,000	1,857,735	1,752,580	0.94
2	39,340		388,660	133,100	561,099	67,901	629,000	495,900	467,830	0.94
3	1,863,855		22,290,786	9,381,900	33,536,540	4,755,460	38,292,000	28,910,100	26,501,783	0.92
4	402,314		4,225,327	1,916,400	6,544,041	972,959	7,517,000	5,600,600	5,283,585	0.94
5	498,186		7,747,136	2,442,000	10,687,322	1,239,678	11,927,000	9,485,000	7,738,399	0.82
6	15,383		113,627	38,000	167,010	19,990	187,000	149,000	125,103	0.84
7	47,786		496,803	168,900	713,488	86,512	800,000	631,100	529,884	0.84
total	2,958,517	0	36,596,019	14,300,565	53,855,101	7,574,899	61,430,000	47,129,435	42,399,164	

Section	design	property	construction	risk	total	contingency	total	TT	VOC	CO2	acc	cycle	walk	tourism	resilience	total
1	86,465		1,258,190	207,797	1,552,453	407,925	1,960,377	-541,582	895,698	35,828	3,618,064	8,546,204	2,491,796	1,541,327		16,587,335
2	37,113		366,660	125,566	529,339	64,057	593,396	-1,395,303	611,886	24,475	948,796	4,316,822	747,539	1,155,995		6,410,211
3	1,708,589		20,433,881	8,600,353	30,742,824	4,359,312	35,102,136	-3,206,096	1,671,020	66,841	12,761,810	26,368,433	5,387,909	3,082,654	8,917,517	55,050,089
4	379,541		3,986,158	1,807,925	6,173,624	917,886	7,091,509	-680,819	131,294	5,252	9,155,153	2,071,805	1,077,582	616,531	8,917,517	21,294,315
5	406,449		6,320,551	1,992,322	8,719,321	1,011,399	9,730,720	-92,640	111,141	4,446	934,110	1,576,088	872,129	539,465		3,944,737
6	12,916		95,403	31,906	140,225	16,784	157,009	-21,114	27,872	1,115		333,462				341,335
7	40,122		417,125	141,812	599,059	72,637	671,695	-84,456	111,489	4,460	346,051	1,231,720				1,609,264
total	2,671,195	0	32,877,969	12,907,680	48,456,843	6,850,000	55,306,843	-6,022,010	3,560,401	142,416	27,763,983	44,444,534	10,576,955	6,935,972	17,835,035	105,237,286

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P2N Cycleway
Sensitivity

Section	design	property	construction	funding risk	total	contingency	total	costs (ex risks)	NPV costs (ex risk)	NPV ratio
1	91,653		1,333,682	220,265	1,645,600	432,400	2,078,000	1,857,735	1,752,580	0.94
2	39,340		388,660	133,100	561,099	67,901	629,000	495,900	467,830	0.94
3	1,863,855		22,290,786	9,381,900	33,536,540	4,755,460	38,292,000	28,910,100	26,501,783	0.92
4	402,314		4,225,327	1,916,400	6,544,041	972,959	7,517,000	5,600,600	5,283,585	0.94
5	498,186		7,747,136	2,442,000	10,687,322	1,239,678	11,927,000	9,485,000	7,738,399	0.82
6	15,383		113,627	38,000	167,010	19,990	187,000	149,000	125,103	0.84
7	47,786		496,803	168,900	713,488	86,512	800,000	631,100	529,884	0.84
total	2,958,517	0	36,596,019	14,300,565	53,855,101	7,574,899	61,430,000	47,129,435	42,399,164	

Section	design	property	construction	risk	total	contingency	total	TT	VOC	CO2	acc	cycle	walk	tourism	resilience	total
1	86,465		1,258,190	207,797	1,552,453	407,925	1,960,377	-541,582	895,698	35,828	3,618,064	8,546,204	2,491,796	1,541,327		16,587,335
2	37,113		366,660	125,566	529,339	64,057	593,396	-1,395,303	611,886	24,475	948,796	4,316,822	747,539	1,155,995		6,410,211
3	1,708,589		20,433,881	8,600,353	30,742,824	4,359,312	35,102,136	-3,206,096	1,671,020	66,841	12,761,810	26,368,433	5,387,909	3,082,654	8,917,517	55,050,089
4	379,541		3,986,158	1,807,925	6,173,624	917,886	7,091,509	-680,819	131,294	5,252	9,155,153	2,071,805	1,077,582	616,531	8,917,517	21,294,315
5	406,449		6,320,551	1,992,322	8,719,321	1,011,399	9,730,720	-92,640	111,141	4,446	934,110	1,576,088	872,129	539,465		3,944,737
6	12,916		95,403	31,906	140,225	16,784	157,009	-21,114	27,872	1,115		333,462				341,335
7	40,122		417,125	141,812	599,059	72,637	671,695	-84,456	111,489	4,460	346,051	1,231,720				1,609,264
total	2,671,195	0	32,877,969	12,907,680	48,456,843	6,850,000	55,306,843	-6,022,010	3,560,401	142,416	27,763,983	44,444,534	10,576,955	6,935,972	17,835,035	105,237,286

	BCR	BCR
construction	42,399,164	33,919,331
accidents	27,763,983	22,211,187
cycling	44,444,534	35,555,627
resilience	17,835,035	14,268,028
W&C	55,021,488	44,017,191

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P2N Cycleway

Cycling volume assignment to facility: Sections 1 to 4

Section	option	sub-option	element	speed (kph)	existing cyclists	new cyclists	split (%)				split (cyclists)				total cyclists	Average speed (kph)	
							road northbound	road southbound	path northbound	path southbound	road northbound	road southbound	path northbound	path southbound			
Section 1 2.0	Do Minimum Option 1	existing	on-road	20	450		10%	10%			45	45			450	16	
			on path	15	450				40%	40%				180	180		
		Option 1A (3%)	on-road	20	450		8%	8%			36	36					20
			on path	20	450	190			42%	42%				284	284	640	
Option 1D (6%)	on-road	20	450		0%	0%			0	0					25		
	on path	25	450	280			50%	50%				365	365	730			
Section 2 1.5	Do Minimum Option 1	existing	on-road	20	450		10%	0%			45	0			450	24	
			on path	25	450				45%	45%				200	200		
		Option 1 (3%)	on-road	20	450		0%	0%			0	0					25
		on path	25	450	190			50%	50%				320	320	640		
Section 3 4.0	Do Minimum Option 1 Option 3	existing	on-road	25	430		50%	40%			215	172			430	24	
			on path	15	430				0%	10%				0	43		
		Option 1 (3%)	on-road	25	430		20%	12%			86	52					21
			on path	20	430	190			30%	38%				224	258	620	
		Option 3 (6%)	on-road	25	430		12%	12%			52	52					25
		on path	25	430	280			38%	38%				303	303	710		
Section 4 0.8	Do Minimum Option 1 Option 3	existing	on-road	25	430		50%	50%			215	215			430	25	
			on path	25	430												
		Option 1 (3%)	on-road	25	430		20%	12%			86	52					21
			on path	20	430	190			30%	38%				224	258	620	
Option 3 (6%)	on-road	25	430		12%	12%			52	52					25		
		on path	25	430	280			38%	38%				303	303	710		

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P2N Cycleway

Cycling volume assignment to facility: Sections 5 to 7

Section	option	sub option	element	speed (kph)	existing cyclists	new cyclists	split (%)				split (cyclists)				total cyclists	Average speed (kph)
							road northbound	road southbound	path northbound	path southbound	road northbound	road southbound	path northbound	path southbound		
Section 5	Do Minimum	Existing	all over	15	170		50%	50%			85	85			15	
0.7	Option 1	Option 1 (3%)	on-road	15	170		40%	40%			68	68			240	17
			on path	20	170	70			10%	10%			52	52		
Option 3	Option 3 (6%)	on-road	on path	15	170		25%	25%			43	43			280	22
			on path	25	170	110			25%	25%			98	98		
Section 6	Do Minimum	Existing	all over	20	170		50%	50%			85	85			170	20
0.3		Option 1&3	on-road	25	170		40%	40%			68	68			240	25
			on path	25	170	70			10%	10%			52	52		
Section 7	Do Minimum	Existing	on-road	20	170		50%	50%			85	85			170	20
1.2		Option 1&3	on-road	25	170		40%	40%			68	68			240	25
			on path	25	170	70			10%	10%			52	52		

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P2N Cycleway Miscellaneous Data

Option	growth rate 1 - 10	growth rate 10 +	Miscellaneous	value
Do Minimum	3%	3%	annualisation (days)	365
Option 1A	3%	3%	time value (\$/h)	7.80
Option 1D	6%	3%	car occupancy	1.2
Option 1A + Option 3	5%	3%	new cyclists from cars	80%
Option 1D + Option 3	6%	3%	new cyclists from elsewhere	20%
			VO unit cost for 50 kph (c/km)	29.7
			VO unit cost for 80 kph (c/km)	30.7

Section	Length (km)	speed (kph)	acc growth
Section 1	2.0	60	-3%
Section 2	1.5	80	-1%
Section 3	4.0	100	-1%
Section 4	0.8	100	-1%
Section 5	0.7	80	-1%
Section 6	0.3	80	-1%
Section 7	1.2	80	-1%

Capacity of Cycleway

	max cyclists (b/d)	per direction (b/day)	peak hour (b/h)	peak hour (b/h)
	2018	0.5	0.4	2053
Section 1 Option 1D + tourists	730			
	70			
total	800	400	160	328

Austrroads Part 14 (1999) Section 6.3.3 stipulates the capacity of the cycle path as 150b/h for a 1.5m width. FHWA-RD-98-108 (1998) Capacity Analysis of Pedestrian and Bicycle Facilities shows the capacity of the mixed-use path Cycling capacity depends on the directional split, pedestrian volumes, pedestrian and cyclist speeds, and the geometric c

Conclusion - if peak hour carries 40% of daily cyclists, a 3.0m wide shared path will be OK in 2053.

P2N Cycleway
Health Benefits

Methodology	Scenario	Health benefit (\$/km cycling)	Health benefit (\$/cyclist)	Health benefit (\$/km walking)
SP11	Average	1.40		2.70
SP11	Average		4.20	
NZTA Res Rpt 359	Low	1.77		3.53
NZTA Res Rpt 359	Medium	2.14		4.27
NZTA Res Rpt 359	High	2.51		5.01

SOURCE:
Genter et al (2008) *Valuing the health benefits of active transport modes*, NZTA Research Report 359.

scenario	cummulative bike miles		cummulative bike kilometres	health care savings (\$)	savings (\$/km)	savings (\$/mile)
L	2,200,000,000	1.6	3,520,000,000	338,000,000	0.10	0.15
M	2,800,000,000	1.6	4,480,000,000	441,000,000	0.10	0.16
H	3,400,000,000	1.6	5,440,000,000	594,000,000	0.11	0.17

SOURCE:
Gotschi, T (2011) Costs and benefits of bicycling investments in Portland, Oregon, *Journal of Physical Activity and Health*, 8 (Suppl 1), S49-S58

NOTE
Peer reviewer recommends using the health benefit value of \$4.20 (SP11 improvement of hazardous site) rather than \$2.14 (RR 359 health benefit)

P2N Cycleway

New Cyclists and Cycling Growth Rate

Option	Suboption	Section	New Cyclists	growth rate 1 - 10 years (%)	growth rate 11 + years (%)	Section	existing cyclists
Option 3D	Option 1D & 3	Sections 1 - 4	280	6%	3%	1	450
		Sections 5 - 7	110	6%	3%	2	450
							3
Option 3A	Option 1A & 3	Sections 1 - 4	250	5%	3%	4	430
		Sections 5 - 7	100	5%	3%	5	170
							6
Option 1D	Option 1 (1D) & 1	Sections 1 - 4	220	4%	3%	7	170
		Sections 5 - 7	80	4%	3%		
Option 1A	Option 1 (1A) & 1	Sections 1 - 4	190	3%	3%		
		Sections 5 - 7	70	3%	3%		

NOTE: Ultimately there are 4 BCRs. The first attempt is to produce the best (Option 3B = 1B + 3) and the worst (Option 1A = 1A + 1) cases.

Other Applicable Growth Rates

Accidents	Cycling growth less 1%
Health	Same as cycling
Walking	2%
Tourism	2%
Resilience	0%
Vehicular traffic	0%

P2N Cycleway Cycling Accidents

Section	From	To	Speed	Fatal	Serious	Minor	Non Injury
Section 1	Thorndon Quay	214 Hutt Road	70	0	2	18	7
Section 2	214 Hutt Road	Ngauranga Interchange	70	0	0	3	3
Section 3	Ngauranga Interchange	Horokiwi Road	100	0	3	0	0
Section 4	Horokiwi Road	Petone Interchange	70	0	2	2	2
Section 5	Petone Interchange	McKenzie Avenue	50	1	0	4	0
Section 6	McKenzie Avenue	Korokoro Road	100	0	0	0	0
Section 7	Korokoro Road	Dowse Drive	100	0	1	1	0
Section 8	Dowse Drive	Melling Intersection	100	0	1	1	0

Movement Category All movements
 Vehicle Push Cycle
 Road Category Urban Arterial
 Background Traffic Growth Rate 2.0%

Accident Reduction
 Option 1 50%
 Option 2 70%
 Option 3 50%

<u>Under Reporting Factors</u>	<u>50, 60 & 70 Kph</u>	<u>100 Kph</u>
Fatal	1.00	1
Serious	3.30	5
Minor	5.50	15.9
Non-Injury	7.00	18.5

Notes
 Accident benefits will be same for Regional growth and target regional growth rates. Background Growth rate of 2% used for accident benefits.

Accident Reduction

section	option 1A	option 1D	option 1	option 3
1	20%	100%		
2			100%	
3			80%	100%
4			80%	100%
5			20%	50%
6			no accidents	
7			20%	

NOTE Out of all 51 cycling accidents 50 involved vehicles on the road (C = car, V = van, 4 = SUV, B = bus, X = taxi, T = truck) while 1 involved two cyclists (#201013321) resulting in minor injury. This accident must have occurred on the shared path. Other suspect accidents occurred at an intersection, in Section 4 or in 2013, outside the analysis period. In this case therefore 2% of the accidents occurred on the path.

P2N Cycleway

Resilience

scenario	cost (\$)	storm frequency (years)	annual impact (storm/year)	annual cost (\$/year)	prevention success rate (%)	annual savings (\$/year)	Section 3 annual savings (\$/year)	Section 4 annual savings (\$/year)	DF	NPV benefit (\$)
L	12,000,000	20	0.05	600,000	100%	600,000	300,000	300,000	22.86	13,716,599
M	22,000,000	20	0.05	1,100,000	100%	1,100,000	550,000	550,000	22.86	25,147,098
H	32,000,000	20	0.05	1,600,000	100%	1,600,000	800,000	800,000	22.86	36,577,597

SOURCE MoT (2013) *The transport impacts of the 20 June 2013 storm*, November

ASSUMED Storm frequency; the report classifies the 2013 storm as an 1:50 event, but we argue that these events will occur more frequently

NOTE Resilience applies to Sections 3 and 4 only, distributed at 50% and 50% as recommended by Peer Reviewer

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P2N Cycleway

Tourism

trail name	year	existing annual users	potential annual W2H users	Distance (km)	Health benefit (\$/km cycling)	potential annual benefit (\$/year)	Health benefit hazard improvement (\$/cyclist)	potential annual benefit (\$/year)
Hutt River	2012	1,000,000						
Rimutaka Rail	2011	36,000						
Rimutaka Rail	2012	48,000						
Section 1	2018		14,000	2.0	2.14	59,920	4.20	58,800
	2019		19,000	2.0	2.14	81,320	4.20	79,800
	2020		24,000	2.0	2.14	102,720	4.20	100,800
	2021		24,480	2.0	2.14	104,774	4.20	102,816
Section 2	2018		14,000	1.5	2.14	44,940	4.20	58,800
	2019		19,000	1.5	2.14	60,990	4.20	79,800
	2020		24,000	1.5	2.14	77,040	4.20	100,800
	2021		24,480	1.5	2.14	78,581	4.20	102,816
Section 3	2018		14,000	4.0	2.14	119,840	4.20	58,800
	2019		19,000	4.0	2.14	162,640	4.20	79,800
	2020		24,000	4.0	2.14	205,440	4.20	100,800
	2021		24,480	4.0	2.14	209,549	4.20	102,816
Section 4	2018		14,000	0.8	2.14	23,968	4.20	58,800
	2019		19,000	0.8	2.14	32,528	4.20	79,800
	2020		24,000	0.8	2.14	41,088	4.20	100,800
	2021		24,480	0.8	2.14	41,910	4.20	102,816
Section 5	2018		14,000	0.7	2.14	20,972	4.20	58,800
	2019		19,000	0.7	2.14	28,462	4.20	79,800
	2020		24,000	0.7	2.14	35,952	4.20	100,800
	2021		24,480	0.7	2.14	36,671	4.20	102,816

SOURCES MBIE (2012) *The New Zealand Cycle Trail - Potential Routes*
Meikle et al (2012) *New Zealand Cycle Trail Project - "Great Ride" Wellington/Wairarapa*, MBIE, November

PROPOSED by MBIE Wellington to Wairarapa, one branch south at Featherston towards the coast and Wainuiomata (Petone)

NOTES Tourism benefits apply to Sections 1, 2, 3, 4 and 5
Peer reviewer recommends using the health benefit \$4.20/cyclist (SP11 hazard improvement) rather than \$1.77/km (RR 359 health benefit)

CONCLUSION Hazardous site value gives less benefits than RR 359; increased \$1.77/cycle-km (low) to \$2.14/cycle-km (medium)

P2N Cycleway Benefit Timeline

section	option	benefit	start	section	option	benefit	start	
1	1A	travel time	2015	4	1	travel time	2017	
		voc	2015			voc	2017	
		accidents	2015			accidents	2017	
		cycling health	2015			cycling health	2017	
		walking health	2015					
	1D	travel time	2018			3	travel time	2018
		voc	2018		voc		2018	
		accidents	2018		accidents		2018	
		cycling health	2018		cycling health		2018	
		walking health	2018		walking health		2018	
2	1	travel time	2015	5	1	travel time	2017	
		voc	2015			voc	2017	
		accidents	2015			accidents	2017	
		cycling health	2015			cycling health	2017	
		walking health	2015					
	3	travel time	2018			3	travel time	2018
		voc	2018		voc		2018	
		accidents	2018		accidents		2018	
		cycling health	2018		cycling health		2018	
		walking health	2018		walking health		2018	
3	1	travel time	2017	6	1	travel time	2017	
		voc	2017			voc	2017	
		accidents	2017			accidents	2017	
		cycling health	2017			cycling health	2017	
		walking health	2017					
	3	travel time	2018			7	travel time	2017
		voc	2018		voc		2017	
		accidents	2018		accidents		2017	
		cycling health	2018		cycling health		2017	
		walking health	2018		walking health		2017	
		tourism health	2018			tourism health	2018	
		resilience	2018			resilience	2018	

NOTES

Option 1: A 3 year construction period for all sections ends in 2016; Sections 1 and 2 end 2014 and benefits start

Option 1: benefits in Sections 1 & 2 start in 2015. New W & C demand generated locally and from Ngauranga.

Option 1: benefits in Sections 3 - 7 start in 2017 when all sections completed. No walking or tourism benefits.

Section 2: only one level of improvement, but in 2018 new trips from completed section 3ff

Option 3: A 4 year construction period for all sections ends in 2017.

Option 3: benefits in all sections start in 2018 when all sections completed. Full range of benefits.

Option 3: resilience in Sections 3 and 4 at 50% per section.

NZ TRANSPORT AGENCY

WELLINGTON TO HUTT VALLEY CYCLEWAY

KEY ASSUMPTIONS

General Economic Analysis:

- Evaluation period – 40 years assumed from the first year when major expenditure occurs;
- Real discount rate – 6% assumed as per current New Zealand Treasury guidance;
- Assumed Construction Start – July 2014;
- Expected duration of construction, all sections – 3 years Option 1, 4 years Option 3;
- Annualisation – 365 days;
- Value of time (all users) - \$7.80/h, source: *NZTA Economic Evaluation Manual*, Table A4.1, commuters;
- Vehicle operating costs 29.7c/km for 50kph speed and 30.7c/km for 80kph speed, source: *NZTA Economic Evaluation Manual*, Table A5.7, urban arterial.

Vehicular traffic in SH2:

- SH2 traffic volume 67,000 vehicles per day both directions, based on 5 year counts;
- Annual traffic growth rate of 0.0% - no traffic growth since 2008;
- HCV 5.9%;
- Car occupancy – 1.2.

Accident reduction:

The severity of accidents for Option 3 was reduced one notch from the existing (Do Minimum) situation, i.e. the serious injury accidents were converted to minor injury, etc. For Option 1 the cost of accidents was derived as an average of the Do Minimum and Option 3 costs.

Cycling:

- Annual cycling growth rate:
 - Do Minimum – 3%;
 - Option 1 – 3%;
 - Option 3 – 6% for Years 1 – 10, 3% thereafter.

NB. Growth rates based on the historical trends in the region.

- New cyclists:
 - Option 1 – 190 in Sections 1 to 4, 70 in Sections 5 to 7;
 - Option 3 – 280 in Sections 1 to 4, 110 in Section 5;
 - Source of new cyclists – 80% current car occupants, 20% rail passengers.

NB. New cyclist estimates based on the forecasting procedure presented in McDonald, A *et al* (2007) *Estimating demand for new cycling facilities in New Zealand*, Research Report 340, Land Transport New Zealand.

- Transfer from the road to the off-road facility:

All new cyclists will travel on the off-road facility. Some of the existing cyclists will transfer from the road to the new (or upgraded) facility, as shown below:

- Section 1 Option 1A – 20%
 - Section 1 Option 1D – 100%
 - Section 2 – 100%
 - Section 3 Option 1 – 60% northbound and 70% southbound cyclists
 - Section 3 Option 3 – 76% northbound and southbound cyclists will travel on the path
 - Section 4 Option 1 - 60% northbound and 70% southbound cyclists
 - Section 4 Option 3 – 76% northbound and southbound cyclists will travel on the path
 - Section 5 Option 1 - 20%
 - Section 5 Option 3 - 50%
 - Section 6 – 20%
 - Section 7 – 20%.
- Health benefits of cycling – \$2.14 per cycling kilometre.
NB. This is the value of a medium estimate presented in Genter, JA *et al* (2008) *Valuing the health benefits of active transport modes*, Research Report 359, New Zealand Transport Agency.
 - Cycling speed:
 - Urban environment on-road in street network – 15kph;
 - Urban environment on-road on an arterial – 20kph;
 - Out of town on-road – 25kph;
 - Shared path constrained – 15kph;
 - Shared path, minor upgrading – 20kph;
 - Shared path, major upgrading – 25kph.

Walking:

- Annual walking growth rate - 2%;
- Health benefits of walking – \$4.27 per walking kilometre.
NB. This is the value of a medium estimate presented in Genter, JA *et al* (2008) *Valuing the health benefits of active transport modes*, Research Report 359, New Zealand Transport Agency.

Tourism:

- Annual number of cyclists to use the new facility between Petone and Wellington – 14,000 in 2018, 19,000 in 2019 and 24,000 in 2020;
 - After 2020 annual tourism growth rate - 2%.
- NB. The number of tourists to cycle the route was conservatively assessed from the documents provided by MBIE. The Rimutaka Rail Cycling Trail in 2012 attracted nearly 50,000 tourists. Most of these tourists came from Wellington. As there is no suitable cycling facility between Ngauranga and Petone, they had to be transported by bus or ferry to Petone.

Storms necessitating the closure of railway line:

- Frequency of major storms – one in 20 years;
- Annual cost of storm damage \$1,100,000. Since two sections (Section 3 and Section 4) are vulnerable, to avoid duplication this amount was split into \$550,000 per section.

NB. The source of this data is the Ministry of Transport report MoT *et al* (2013) *The transport impacts of the 2013 storm: the effects of closing the Hutt Valley rail line*. Although the report considers the analysed storm as a 1 in 50 year event, we argue that in the future due to climate change these events will occur more frequently. The cost of the damage assumed in our analysis was based on the medium cost estimate of the damage - \$22M (the highest estimate was \$32M).

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OFFICIAL INFORMATION ACT

WELLINGTON TO HUTT VALLEY CYCLE AND PEDESTRIAN LINK

Initial Response to Peer Review by Pinnacle Research of 6 July 2014

Final Response and Sign Off 15 June 2015

1.0 Final Response to Comments 15 June 2015

Email Dated 25 May 2015

Hello Maggie & Matthew,

I agree to sign off the business case and economic evaluation of the Petone to Ngauranga cycle way prepared by AECOM as being technically sound and delivering the agreed project objectives. The points I raised and errors I observed have been addressed satisfactorily (though I still am of the view that the growth rates may be too high, but the sensitivity analysis gives some comfort in that regard). In doing so, I note there are a few amendments required to finalise the business case report:

Section 8.0 – the ‘red box’ – refers reader to section 7, Economic Analysis – should be section 9

Table 14 – commentary about lower accident rates for cyclists along the corridor – needs adjusting to align with revised accident calculations & italicised comment should be addressed/removed.

Section 9.1.3 – this needs to be replaced with the revised accident methodology, as per the word file “Assumptions 120814”. Also, while I probably do not disagree with the

assumption, there should be an explanation as to why you chose “For Option 1 the cost of accidents was derived as an average of the Do Minimum and Option 3 costs.”

Section 9.1.6 – tourism – use the first bullet point from the ‘assumptions’ file, as this gives a clearer picture of what is expected (at the moment it reads as if 25,000 is the peak number of tourists expected)

Section 11.4 – the name of my consultancy is Pinnacle Research & Policy Ltd. Please correct this!

Excel w/b ‘P2N Supporting Analysis Rev C’ – has earlier accident reduction assumptions (this workbook may not be made publicly available, but just in case it is, you may wish to adjust it).

Kind regards,

Carolyn

Carolyn O’Fallon

Pinnacle Research & Policy Ltd

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Email: Carolyn@pinnaclesearch.co.nz

Web: www.pinnaclesearch.co.nz

AECOM Comments dated 15 June 2015

AECOM Responses and Comments in Blue

Section 8.0 – the ‘red box’ – refers reader to section 7, Economic Analysis – should be section 9

Corrected

Table 14 – commentary about lower accident rates for cyclists along the corridor – needs adjusting to align with revised accident calculations & italicised comment should be addressed/removed.

New text: “With Option 1D in Hutt Road and Option 3 in other sections of the route a high proportion of cyclists are expected to transfer to shared path or cycleway. This would reduce the cycling accidents in some sections by up to 90%”.

Section 9.1.3 – this needs to be replaced with the revised accident methodology, as per the word file “Assumptions 120814”. Also, while I probably do not disagree with the assumption, there should be an explanation as to why you chose “For Option 1 the cost of accidents was derived as an average of the Do Minimum and Option 3 costs.”

New text: “The severity of accidents for Option 3 was reduced by one notch from the existing (Do Minimum) situation, i.e. serious injury accidents were replaced with minor injury, etc. For Option 1 the costs of accidents was derived as an average of the Do Minimum and Option 3 costs, because the improvements associated with Option 1 were lesser but harder to define than those of Option 3”.

Section 9.1.6 – tourism – use the first bullet point from the ‘assumptions’ file, as this gives a clearer picture of what is expected (at the moment it reads as if 25,000 is the peak number of tourists expected)

New text: “Annual number of cyclists expected to use the new facility between Petone and Wellington is 14,000 in 2018, 19,000 in 2019 and 24,000 in 2021”.

Section 11.4 – the name of my consultancy is Pinnacle Research & Policy Ltd. Please correct this!

Corrected

Excel w/b ‘P2N Supporting Analysis Rev C’ – has earlier accident reduction assumptions (this workbook may not be made publicly available, but just in case it is, you may wish to adjust it).

The worksheet has been amended and is now consistent with the text in the report.

2.0 Response to Draft Comments 6 July 2014

AECOM Responses and Comments in Blue

Overall comment

This project is quite complex given its relative size, having seven sections and between one and three options per section, which makes getting every detail correct in an economic evaluation and DBC all the more challenging.

On the face of it, the overall BCR appears quite robust and the choice of Option 3 a sound recommendation. However, there are three serious issues that need addressing before there can be certainty about the BCR and choice of Option 3:

1. Underlying assumptions for different parameters in the economic evaluation require clear justification and support. In many cases none is provided and in some cases, consideration of the assumption may result in changing a parameter value.

The “Key Assumptions” text has been revised (file dated 12 August 2014), providing explanations for most of the assumptions. Cycling speeds in different environments (e.g. “on road”, “constrained shared path”, etc. were based on previous AECOM studies and surveys.

Annual walking growth rate at 2% seems to be conservative in view of historical studies in NZ urban areas. Growth of tourism at 2% is also conservative in comparison with the national tourism growth figures. An assumption of 14,000 tourist cyclists on the route in the first year after its opening is also conservative, because the potential source - current annual number of tourists on the Rimutaka Rail Cycling Trail - is around 50,000.

It was assumed that most of the new cyclists will be people who currently travel by car. The cyclist survey conducted by NZTA in 2012 revealed a high latent demand – 60% of the respondents indicated that the only obstruction to cycling between Hutt Valley and Wellington is the dangerous stretch of SH2.

2. Timing of benefit streams and construction costs – in the DBC, it is stated that Option 3 will take 4 years to complete construction, which implies that some sections of the cycleway will not be operational to year 5 after the project starts. Despite this, all benefits are shown as beginning in 2015, or year 2 of the project. If the W2H cycleway is timed to coincide with construction of the P2G road link, the timing of the benefit streams and construction costs could be pushed further out.

The analysis was revised to account for that, resulting in a reduction of the Benefit Cost Ratios for both options.

3. There appear to be calculation errors in the worksheets for the individual sections in the 'full procedures' which need to be rectified. Some of these could have quite noticeable impacts on the BCR.
The worksheets were thoroughly checked and the calculation errors eliminated.

These matters and others are discussed below.

Implications of using P2G fill

The potential cost savings of using fill from the construction of the Petone to Grenada link - \$7 million - is highlighted, but the fact that this would mean a significant delay in the construction of the Sections 3, 4, and 5 of the cycle link is not (the current timeline for P2G indicates construction in 2018-2023). Project staging is mentioned in Section 10, but the likelihood that the cycleway would not be completed until sometime beyond 2020 is not detailed.

The delay in the construction of Sections 3 & 4 would significantly impact the benefit streams for these sections. Could it be that the potential cost savings of \$7 million are more than offset by realising these benefits sooner, particularly recognising the risk that P2G is delayed and/or does not go ahead? The DBC needs to address this issue with more attention.

In view of the potential economic benefits NZTA has decided to co-ordinate the time-frames of the two projects. Delaying the W2H cycleway project would be a strategic decision with a minor impact on the economic efficiency, as the delay will have a similar impact on both the capital costs and project benefits. Obtaining the fill free of charge would increase the benefit cost ratio of Option 3 by roughly 0.5.

Cycling tourists

To prevent the perception of double counting, the DBC needs to make it clear that the tourism benefits are based on international visitors and recreationalists expected to use the cycle way, and are distinct from the forecast growth in 'local' cyclists largely using the route for commuting reasons. The report should also clarify, possibly in Section 9.1.6 and elsewhere, that the benefit assigned to new visitors is limited to health benefits from cycling – there is a need to justify the \$1.77 value used. There are potential WEBs, but there is also the risk that these could be re-allocated visitor spend, rather than increased spend, and would be difficult to calculate.

Table 14 states 'Tourism related use of Option 3 is tied to the demand from the Rimutaka Cycle Trail and related types of activities, and could increase by up to 24,000 trips per year (or 65 trips per day).' The 65 trips per day figure is repeated at least a couple of times in the DBC. However, Section 9.1.6 Tourism states 'Annual number of cyclists to use the new facility between Petone and Wellington – 30,000' and 30,000 is what is used in the worksheets.

Which is the preferred estimate and why? Please provide some justification for it (then correct the DBC &/or worksheets accordingly). Is it feasible to expect the numbers to go from zero to 24000 in the first year Section 3 & 4 open?

The approach to cycling tourists has been revised and clarified:

- The cycling tourists and recreational cyclists will be phased in over three years: 14,000 in Year 1, 19,000 in Year 2 and 24,000 in Year 3. Afterwards a linear growth at 2% annually was adopted.
- The analysis makes a clear distinction between the approach to the commuting cyclists and tourist/recreational cyclists. Commuting cyclists enjoy the health benefits and are instrumental in the reduction in the number of vehicles on SH2. Their travel time is also a consideration, as on some

sections of the route cycling travel time in the shared path might be slower than cycling on SH2. The tourist/recreational cyclists only enjoy the health benefits.

Annual tourism growth rate – the international visitor growth rate for tourism is and has been about 6% for several years, though of course cycle trail visitor rates may be different. Do you have any basis for the 2% proposed here – are there any growth figures from the Great cycle trails specifically?

There are no growth figures available from the cycle trails. We have adopted a conservative growth rate of cycling tourists, since we feel that their growth is not related to the general tourism growth.

This section should identify which sections of the cycleway are expected to experience the tourism benefits. The Analysis worksheet states that the benefits apply to sections 1-4. However, I understand that Section 4 is treated as terminating at the Petone Interchange, while the connection with the Rimutaka Rail Trail, Hutt Valley river trail, and Petone itself would actually be made through cycling along Section 5. This suggests that the Section 5 worksheet for Option 3 should also include tourism benefits (unless my understanding is incorrect).

The tourism benefits for Option 3 have been added to section 5.

Key Assumptions - Resilience

There is a need for a 9.1.7 Resilience section to explain the basis for the resilience values derived in the evaluation – for example, a brief explanation of the MOT study, with a full reference to it, as the source of the values for resilience generally and then an explanation as to why the medium value was used, as opposed to the low or high? Why is a 1 in 20 occurrence used when MOT used 1 in 50? Why is a 90% prevention success rate used?

Sensitivity testing should be carried out using the low and the high values, if the medium forms the basis of the analysis.

We believe that the climate change will make the future situation worse than the historical trends. Therefore we used a 1 in 20 flood occurrence rather than the historical 1 in 50.

We have introduced the 90% prevention rate as a safety factor. On the recommendation of the peer reviewer it was removed.

We agree with the reviewer's comment made elsewhere that to avoid the duplication of the benefits, only 50% of the resilience benefits would apply to each of the Sections 3 and 4. The analysis has been revised accordingly.

The sensitivity testing for the low and high values has been carried out. The impact on Section 3 was relatively small, reducing/increasing the BCR by ± 0.3 . The impact on Section 4 was more pronounced, since this is a short section and has fewer other benefits. The low resilience value reduced BCR by 0.7, while the high value increased it by 1.5.

Key Assumptions – Construction

Construction duration: is it 4 years for Option 1 and Option 3? I would have thought Option 1 would be completed in a shorter timeframe?

The longer construction period means that the project benefits will not come on stream for some sections of the cycle way until year 4/5 of the analysis period, but this is not currently reflected in the worksheets, although the discussion in the DBC around *staging* implies it has been considered. It should be spelt out clearly in the DBC and economic evaluation.

We agree with the reviewer's comment and have made appropriate revision of the project time frames for both options. We assumed that for Option 1 Sections 1 and 2 will be constructed in 2014 and the benefits will start in 2015. Section 3 will be constructed in 2015, but the benefits will start only in 2017 after Section 4 have been completed. Sections 5, 6 and 7 will also be completed in 2016.

For Option 3 Sections 1 and 2 will be constructed in 2014, Section 3 in 2014 and 2015, Sections 4 in 2016, Section 5 in 2016 and 2017, and Sections 6 and 7 in 2017. The benefits for all the sections will however start in 2018, when the new cycleway with connections has been completed, enabling the safe and convenient riding between Hutt Valley and Wellington.

Key Assumptions – Accidents

It is unclear what this statement means 'Since all reported accidents occurred on the road', particularly since the single fatality reported in the crash analysis (that AECOM provided to me) occurred in the cycle lane on SH2.

Our accident analysis was based on the 51 cycling accidents which were reported on the route between 2009 and 2013. We have checked the record and can confirm that only one of these accidents occurred on the shared path, when two absent minded cyclists bumped into each other. This shows that 98% of cycling accidents occurred on the road, including the fatal accident on the northbound SH2 off-ramp into Petone, where a truck veered onto the cyclist.

It is highly unlikely, based on international evidence, that the shared cycle path will be 100% accident free, rather it is (as Via Strada report suggests) more likely that they are (1) infrequent and (2) some will have low or moderate injury as opposed to serious or fatal. This should be reflected in the economic analysis for the appropriate sections.

Following the Via Strada comments we have changed the approach to the accident analysis. We assumed that for Option 3 all cycling accidents would be reduced in severity by one level, therefore a serious injury accident in Do Minimum becomes a minor injury accident in Option 3, etc. This approach left Option 1 improvements undefined – we assumed then that the accident cost reduction for Option 1 would lie in between the Do Minimum and Option 3.

We still feel that our original approach based on the number of cyclists remaining in the road was more rational as it allowed us to better distinguish between the improvement of Option 1 and Option 3.

I agree with the transfer rates approach for reduction of accidents.

Key Assumptions – Cyclist growth and transfer

Do Minimum and Option 1 cyclist growth – given the comments above about resilience and capacity on the existing cycle route, is it reasonable to assume a constant growth rate of 3% over the 40 year period, or is there a point when it could be labelled as 'congested' and unlikely to accommodate further growth? Coming off quite a low base, this may not be an issue in the study period, but could at least be mentioned.

The capacity of cycle lanes is difficult to define. The Austroads *Guide to Traffic Engineering Practice Part 14 Bicycles*, Subsection 6.3.3, states that the capacity of a 1.5 metre wide path in one direction is in the order of 150 cyclists per hour. Such a width is not sufficient for overtaking, therefore the capacity is limited by the speed of the slowest cyclist on the path.

The proposed Wellington to Hutt Valley shared cycleway will be 3.0 metres wide, therefore its capacity will be higher. Typically, the FHWA publication *Capacity Analysis of Pedestrian and Bicycle Facilities* (FHWA-RD-98-108) indicates that the capacity of such a facility may exceed 400 cyclists per hour, depending on the range of factors, such as pedestrian volumes, pedestrian speed, cycling speed and the directional split.

At a 3% growth rate the maximum number of cyclists would reach 800 per day per direction in 2053, thus is not likely to exceed the capacity of the shared cycleway.

Source of new cyclists – 80% as car occupants – please justify (I don't agree or disagree with this figure at this stage but there has to be a rationale for it). I note that the worksheet calculations recognise that some of these people will be car passengers, i.e. the number of vehicles removed from the road reflects this, which is appropriate.

This assumption was based on the survey of cyclists conducted by NZTA in 2012, which revealed a high latent demand – 60% of the respondents indicated that the only obstruction to cycling between Hutt Valley and Wellington was the danger of riding on the stretch of SH2.

Transfer of existing cyclists on Section 1 if Option 1D is adopted – is it realistic to assume 100% will shift given the characteristics of the cyclists using the route, particularly if they intend to go to Khandallah via Onslow Road or on through Ngauranga Gorge in the afternoon peak?

An upgraded Section 2 would offer high quality cycling conditions on the shared path. The cyclists from Section 2 will automatically continue into Section 1. The reservations expressed by the reviewer are acknowledged - the shift rate had originally a major impact on the accident benefits. Once the principle of accident savings was changed to the reduction of accident severity, the shift rate disconnected from the accident reduction has only a minor impact on the project economics.

Transfer of existing cyclists on Section 2 – I guess that the 100% transfer of existing cyclists from road to path is due to the assumption that 100% of existing cyclists will transfer to the path for Option 1D. This needs to be clearly stated, as on the face of it, nothing is really changing on Section 2, and hence we would not expect there to be any change in where existing cyclists cycle.

That said, I challenge the assumption that 100% of the current road using cyclists will switch to the path.

See comments on Section 1 above.

Transfer of existing cyclists on Sections 3 & 4 if Option 3 is adopted – NZTA has indicated that it is highly unlikely that cyclists would be completely banned from SH2, even if Option 3 was constructed. That being the case, it cannot be assumed that 100% of existing cyclists will transfer to the new cycleway. Hence, based on the document 'Assumptions to support calculation of benefits' (version 2, dated 11 March 2014), where '80% of existing cyclists class themselves as "Bold and Fearless" and "Confident and Enthused", meaning that they will try new things' and '70% of existing cyclists would prefer a "Harbourside" option while 30% would prefer a "Roadside" option', I would suggest that the analysis assumes that *at the very least* 24% (i.e. the 30% of the 80% of existing B&F/C&E cyclists who prefer a roadside option) of existing cyclists would remain on the road and perform a sensitivity test with higher proportions (50% and 80%) remaining there. As shown in the current sensitivity testing, this is unlikely to impact the BCR significantly, but would better reflect the likely outcome.

Note that, if some cyclists remain on SH2 even if Option 3 is adopted, there will be an impact on the accident reduction costs calculations in the economic analysis, so this will require adjusting.

The recommendation of the reviewer was accepted. The analysis has been revised for 76% of cyclists transferred from SH2, and sensitivity testing for 20% and 50% transfer. As noted above, since the accident analysis is no longer based on the transfer rate, the impact on BCR was small. Also, all new cyclists have been assumed to ride on the path, and this assumption has not changed.

Key Assumptions – value of health benefit

Some explanation of why the value from RR359 is being used rather than that provided in the EEM is required. Using a higher value could be considered reasonable, as the SP11 value is an average value for a straightforward cycleway and the H2V removes cyclists from hazardous sites at some points along the route, which could potentially attract the higher SP11 health benefit of \$4.20.

The health benefit of a removal of the hazardous location is \$4.20 per location rather than the one we use in the analysis, which is \$2.14 per kilometre of cycling. Using the rate for the health benefits for the length of the route produces higher amount of benefits than using the rate for removing a single hazard. An exception is a very short Section 6, but for the consistency of the analysis this exception was not explored.

Sensitivity Analysis

The parameters tested in the sensitivity analysis are largely sufficient, but the testing will have to be adjusted and re-run once the modifications suggested in this report (including those in the worksheets noted below) are taken in to account.

To the best of my knowledge, I did not disagree with the calculated safety benefits for section 1 – rather we discussed the fact that Via Strada disagreed with AECOM, and considered how it could best be handled in the context of the DBC & economic evaluation. Please correct this bullet point and the discussion about it under sensitivity testing.

The methodology was changed to adopt the Via Strada concept of a reduction of the accident severity for the options.

Sensitivity testing was done for all other elements of the analysis.

Worksheets - General

It would be useful to have a copy of the worksheet which amalgamates all sections into the overall BCR for the economic evaluation.

The file showing the amalgamation of all sections will be provided. This is important, since the revised analysis deals with the timeframe of construction of the individual sections of the project over a 3-year (Option 1) and 4-year (Option 3) periods.

'Option 2' (raised shoulder)

In the detailed analysis provided in the worksheets, there doesn't appear to be any distinction made between option 1A for Sections 3 & 4 and option 1B or 2 (shoulder raised to height of SH2) for Sections 3 & 4. Is there no difference in benefits? If there is no difference in costs or benefits, then this should be clearly stated somewhere and the distinction dropped from the DBC.

Option 2 has not been progressed, so it is excluded from the analysis.

Walking benefits

These benefits are rather haphazardly dealt with in the economic evaluation on a section-by-section basis: e.g. Section 1 shows new walkers for Options 1 & 3; Section 2 has new walkers as for Option 1 of the analysis; Sections 3 & 4 have new walkers for Options 1 & 3; and Section 5 has no new walkers at all (neither do Sections 6 & 7, but that is as expected). The expectations around walkers should be explained, including underlying assumptions, in Section 9.1.5.

The reviewer's comments have been addressed. The analysis has been tidied up.

Section 1

1. Travel time costs & VOC – 'daily cyclists 2023' uses 4% growth rate for years 1-10 (labelled as Option 1D) while VOC & Health table uses 6% for Option 1D (apparently using Option 1D + Option 3 growth rate) – shouldn't they all use the same factor?
2. As noted above, it does not seem realistic to assume that Option 1D has 100% transfer to shared cycle path, and has 100% reduction in accident costs.
3. Health benefits – I can accept walkers will increase along the route, as they would probably do so in the Do Minimum, however, I am uncertain that there would be an incremental increase due to the adoption of Option 1D – is there an explanation for this assumption? Also note comment above about treatment of walking benefits in the economic evaluation.

The use of the growth rates has been reviewed and corrected. The transfer rates have been discussed above. The increase in the number of walkers is connected to Option 3 in other sections; therefore the benefits would start in 2018 rather than immediately after the completion of the upgrading of Section 1.

Section 2

1. Table 5 and Table 12 in the main report read: 'The section is already sufficient and provides a good level of service for cyclists and pedestrians, which means improvements won't generate any benefits. The existing shared path to be upgraded and minor safety improvements' – this is contradicted by the economic evaluation for Section 2 as per the worksheets.
2. Again, it does not seem realistic to assume that Option 1D has 100% transfer to shared cycle path.
3. Health benefits – I can accept walkers will increase along the route, as they would probably do so in the Do Minimum, however, I am uncertain that there would be an incremental increase due to the minor changes proposed – is there an explanation for this assumption? (NB. I suspect it may have something to do with the proposed increased walkers on Sections 3 & 4, but it needs to be clearly stated & also justified. In my view, any incremental increase in walker numbers are likely to be as a result of people extending their walks from the Petone foreshore, rather than walking from Ngauranga Gorge out to Section 3. Section 5 currently does not include any walking benefits.)

Although a minor upgrading of Section 2 would not by itself attract cyclists, more cyclists and walkers will use this section when it becomes part of the route between Hutt Valley and Wellington. The benefits will start in 2018, after Sections 3 and 4 have been completed.

The reservations expressed by the reviewer concerning the transfer rate are acknowledged. We believe however that the cyclists from Section 3 will automatically continue into Section 2. The shift rate had originally a major impact on the accident benefits, but once the principle of accident savings was changed to the reduction of accident severity, the shift rate disconnected from the accident reduction will have only a minor impact on the project economics.

Section 3

1. Travel time cost – cyclists in 2023 for option 3 – shouldn't this be calculated using a combination of the 3% and 6% growth rate (rather than the Do Minimum 3% currently used), based on completion of construction, which I assume is year 4?
2. Ditto the VOC calculation for Option 3.
3. VOC cell A10 should be labelled Option 3
4. Accidents for Option 1 – what is the justification for a 78% reduction?
5. Accidents worksheet for Option 3 – cannot assume 100% migration to cycleway plus cannot assume cycleway would be completely accident free.
6. Health worksheet includes new walkers for Option 1 – is this an error and should they be excluded?
7. Resilience – in the Supporting Analysis worksheet, it appears that the annual savings per year in column G is for the whole foreshore railway line, as the costs given in column B are the total costs as derived in

- the MOT (2013) report. If the resilience benefits are to be attributed to Section 3 and Section 4 of the cycle route individually, they would need to be divided in half (i.e. \$495,000 assigned to each section).
8. Resilience – the update factor used in WS A1.2 Option 3-2 is different for Section 3 (1.40) and Section 4 (1.12).
 9. WS A1.2 Option 3-1 & 3-2 appear to use a cycling growth rate of 3% for the entire analysis period for TTC, VOC, and cycling health benefits. The bolded figures for 2023 in the TTC and VOC columns, represents a 6% growth on the base 2013 estimate, whereas I expected the 6% growth from completion of construction for a 10 year period.
 10. Sensitivity testing – I note that resilience is tested for Section 4, but not Section 3 (still using the full value rather than 50% of the value for each). Refer comments above, the logical test here, assuming the medium value is chosen, is to use low and high values.

The application of the growth rates has been corrected. The accident analysis has been disconnected from the transfer rate (see the discussion above). Walkers in Section 3 have been eliminated from considerations of Option 1.

The benefits of resilience have been split between Sections 3 and 4, and sensitivity test were done for high and low values. The impact on Section 3 was relatively small, reducing/increasing the BCR by ± 0.3 .

Section 4

1. Travel time cost – cyclists in 2023 for option 3 – shouldn't this be calculated using a combination of the 3% and 6% growth rate (rather than the Do Minimum 3%), based on completion of construction, which I assume is year 4?
2. Ditto the VOC calculation for Option 3.
3. Accidents worksheet for Option 1 – I would assume the transfer rate of existing cyclists would be the same for Section 3 & Section 4.
4. Accidents worksheet for Option 3 – cannot assume 100% migration to cycleway plus cannot assume cycleway would be completely accident free. Note that it also labels the option as '1B' in two places, rather than Option 3.
5. Health worksheet includes new walkers for Option 1 – is this an error and should they be excluded?
6. Resilience – refer to comments for Section 3 above.
7. WS A1.2 Option 3-1 & 3-2 appear to use a cycling growth rate of 3% for the entire analysis period for TTC, VOC, and cycling health benefits. The bolded figures for 2023 in the TTC and VOC columns, represents a 6% growth on the base 2013 estimate, whereas I expected the 6% growth from completion of construction (about 2018?) for a 10 year period.

The application of the growth rates has been corrected. The accident analysis has been disconnected from the transfer rate (see the discussion above). Walkers in Section 4 have been eliminated from considerations of Option 1.

The benefits of resilience have been split between Sections 3 and 4. Sensitivity testing of resilience showed that the impact on Section 4 was more pronounced, since this is a short section and has fewer other benefits. The low value of resilience benefits reduced BCR by 0.7, while the high value increased it by 1.5.

Section 5

1. As discussed above, tourism benefits should probably be included for this section of the cycleway.
2. Consideration needs to be made of when the project benefits for Option 3 would kick in, given the 4 year construction period.
3. The TTC appears to use a 3% growth rate for Option 3 while the VOC uses a 6% - is there a rationale for this?

The tourism benefits have been added to Section 5. The benefits of Option 3 would start in 2018, after all sections would have been completed. The application of the growth rates has been corrected.

ISSUES FOR DISCUSSION

Done, all discussed and turned into action

- P2G fill timeline 2018 – 2023 means it is too late for W2H, correct?
- Cycling tourists:
 - a. Are they above the organic growth rates? Benefits limited to health, this would require splitting future cyclists into local (enjoying all benefits) and tourists.
 - b. Inconsistence – 24,000 or 30,000pa? Can it happen in the first year?
 - c. Annual tourism growth rate is 6%, I am using 2% - any growth rates from Great Cycle Trails?
 - d. Which sections of the route will benefit? Why not Section 5 through Petone?
- Resilience:
 - a. Assumed a 90% prevention rate, why not?
- Construction duration:
 - a. Option 1 three years, Option 3 four years.
- Accidents:
 - a. "All reported accidents occurred on the road", they did, and the fatality was on the ramp, not in the cycle lane. **Check!**
 - b. Shared path won't be 100% accident free. Via Strada say – minor injuries. It won't help much, because the current accidents are minor injury.
- Cyclists growth rates and transfer:
 - a. DoM and Option 1. Constant growth rate at 3% will saturate the facility before 40 years. **Check!**
 - b. New cyclists mainly from cars, 80%. **Explain!**
 - c. Section 1 – still not 100% transferred to the path, even for Option 1D.
 - d. Section 2 – no upgrade, so no reason for a 100% transfer, unless a dubious assumption of the 100% transfer in Section 1 is upheld.
 - e. Sections 3 and 4 with Option 3. NZTA opposed to banning cyclists from SH2. Again no 100% transfer. Recommended 24% on the road, with sensitivity test for more likely 50% and 80%.
- Option 2 in Sections 3 and 4. Why no difference between Options 1A, 1B and 2, benefits or costs would be different.
- Walking benefits are haphazard. Sections 1, 3 and 4 have new walkers for both options, Section 2 has new walkers for Option 1, and Section 5 has no new walkers.
- Section 2, the report says, "no more benefits", but the analysis shows benefits. Dubious transfer cyclist rate. Then why more walkers, probably from Section 3?

ISSUES FOR ECONOMIC ANALYSIS

Done, all addressed in the revised analysis.

- Resilience:
 - a. Occurrence 1 in 20, but MoT uses 1 in 50.
 - b. Why the medium value? Sensitivity test for high and low.
- Construction duration:
 - a. Option 1 three years, Option 3 four years.
 - b. Check what *Staging* says.
- Cyclists growth rates and transfer:
 - a. Sections 3 and 4 with Option 3. NZTA opposed to banning cyclists from SH2.
 - b. Again no 100% transfer. Recommended 24% on the road, with sensitivity test for more likely 50% and 80%. If cyclists remain on SH2, there will be impact on accident costs.
- Health benefits:
 - a. Justification for RR359 value; using a higher value is reasonable, potentially the higher SP11 value of \$4.20 for hazardous sites.
 - b. Justification of the \$1.77 value of health benefits (probably the same as above).
- Amalgamated worksheet of the BCR for all sections. Yes, I probably did not give it to her as it was in a different file.
- Section 1 has messed up growth rates for TT, VOC and health, 100% transfer is suspect, and why higher walking in Option 1D.
- Section 2, the report says, "no more benefits", but the analysis shows benefits. Dubious transfer rate. Then why more walkers, probably from Section 3?
- Section 3:
 - a. Use a combination of 3% and 6% growth rate for Option 3 (it is 3% now). Somewhere there is also a 6% growth applied from 2013 instead of from the end of construction for 10 years.
 - b. Correct VOC cell A10, should be "Option 3".
 - c. Accident reduction 78%, justify! No 100% transfer, thus no 100% accident reduction.
 - d. New walkers for Option 1 should not be there.
 - e. Total resilience benefits allocated to Sections 3 and 4. Should be halved per section.
 - f. Resilience update factors for Sections 3 and 4 are different (1.40 and 1.12).
- Section 4:
 - a. Use a combination of 3% and 6% growth rate for Option 3 (it is 3% now). Somewhere there is also a 6% growth applied from 2013 instead of from the end of construction for 10 years.
 - b. Accidents should be consistent with the transfer adopted for Section 3.
 - c. Incorrect labelling of Option 3 as Option 1B.
 - d. New walkers in Option 1 incorrect.
 - e. Total resilience benefits allocated to Sections 3 and 4. Should be halved per section.
- Section 5:
 - a. Add tourism benefits.
 - b. Start of Option 3 benefits only when construction completed.
 - c. Confusion with growth rate for Option 3, 3% for travel time and 6% for VOC.
- Sensitivity testing:
 - a. Re-run when the recommended amendments done.
 - b. Testing the *Via Strada* view on the accidents.
 - c. Resilience tested for Section 4 but not Section 3.

Appendix G

Hutt Road Wellington Report

RELEASED UNDER THE
OFFICIAL INFORMATION ACT

Wellington to Hutt Valley Walking and Cycling Link Project

Hutt Road - Ngauranga to Thorndon Quay



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Wellington to Hutt Valley Walking and Cycling Link Project

Hutt Road - Ngauranga to Thorndon Quay

Client: New Zealand Transport Agency

ABN: N/A

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DRAFT**Quality Information**

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1.0 Introduction

1.1 Background

The Wellington to Hutt Valley Walking and Cycling Link (W2H) project is currently investigating scheme options for the construction of a high quality cycling and walking facility between Wellington and Hutt City. The project outcome will be a Detailed Business Case for the section between Ngauranga and Petone, while considering connections north of Petone and south of Ngauranga.

Investigations currently shortlist three design options along the corridor, with all shortlisted options relying on the Hutt Road connection between Ngauranga and Thorndon Quay.

The investigation identifies the Hutt Road (Ngauranga to Thorndon Quay) section as having the poorest safety record for cyclists. This highlights an opportunity to maximise economic return along the Hutt Road section of the corridor through implementing a high quality path for cyclists that provides a direct and safe facility for cyclists and pedestrians.

Meetings were held with Wellington City Council who has indicated a way forward with a facility upgrade for cyclists providing certain conditions can be met.

This report will outline the feasible options along the Hutt Road for cyclists taking into account findings from previous studies, traffic conditions and land use conditions along the corridor.

It is noted that the Hutt Road section of the full study corridor comprises two out of the eight sections investigated. This study only addresses what is referred to as “**Section 1**”, being the part of the corridor between Thorndon Quay and the Caltex Service Station on Hutt Road.

A map of the study area is shown in **Figure 1**. The map shows the area subject to the poor safety record where the opportunity to provide a high quality facility exists.

Figure 1 Hutt Road Study Area



1.2 Project Objectives and Strategic Context

1.2.1 W2H Project Objectives

Being an NZTA funded project it is noted that the problem definition and objectives are focussed around transport related outcomes.

The project objectives are:

- To improve safety perceptions of walking and cycling modes of transport between Petone and Ngauranga by improving connections and integrating walking and cycling activities with other networks in Lower Hutt and Wellington.
- To provide infrastructure that is a catalyst for increased usage of the Lower Hutt to Wellington corridor by walkers and cyclists regardless of ability.
- To consider transport network resilience in providing a walking and cycling facility with enhanced safety standards and capacity.

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- To manage the social, cultural, land use and other environmental impacts of the project in the project area and its communities by so far as practicable avoiding, remedying or mitigating any such effects through route and alignment selection, design and conditions.

While these are the transport related project objectives it is important to recognise other external benefits associated with the improvements being investigated, such as those for recreational and tourist users, pedestrians, and other users of the transport corridor including rail passengers, freight and vehicles.

1.2.2 WCC Cycling Policy (2008)

Wellington City Council Cycling Policy sets out the council's objectives for improving facilities for cyclists. However it is noted that WCC supports the concept of the Great Harbour Way as an important regional connection, while noting that its development would be challenging and expensive and that it is a regional project.

The cycling objectives set out in the strategy are:

- To improve cycle safety throughout Wellington
- To improve the convenience of cycling in Wellington
- To improve the experience of cycle trips to and from the Central Area
- To improve the experience of cycle trips to and from Suburban Centres
- To improve the experience of cycle trips to and from educational centres
- To improve the experience of cycle trips for recreation

Walking Policy (2008)

The purpose of the walking policy is to provide a framework for initiatives to collaboratively improve the pedestrian walking environment in Wellington. The primary focus is to on promoting walking trips that would otherwise be undertaken by car.

The walking objectives set out in the strategy are:

- Objective 1: To promote the benefits of walking so that more people walk
- Objective 2: To improve pedestrian safety throughout the city
- Objective 3: To improve the experience of those walking through or about the Central Area
- Objective 4: To increase the number of commuter trips taken by foot to and from the Central Area
- Objective 5: To improve the experience of those walking to and from public transport stops
- Objective 6: To increase the number of short walking trips to and from Suburban Centres
- Objective 7: To increase the number of walking trips made to and from educational centres and the regional hospital

Long Term Plan (2012-2022)

Wellington City Council's Long Term Plan sets out the long term vision and plan for Wellington City Council. In term of cycling it is highlighted in the long term plan that the council is investing in cycle safety projects and new cycling routes.

Summary

Wellington City Council strategic context provides support for cycling and walking modes for all trip types throughout the region, recognising its importance to relieve congestion, provide transport choice and improve health and wellbeing.

Both policy documents are relevant along the Hutt Road due to its importance as a strategic thorough-fare (the only option form walking and walking between Hutt City and Wellington) and a key attractor in terms of retail and commercial activity.

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1.3 Current Hutt Road Options

1.3.1 Purpose

The purpose of this study is to investigate the Hutt Road section of the corridor at a level of detail that will enable alternative options to be developed for consideration as part of the Detailed Business Case.

The outcome is considered to be a recommendation to Wellington City Council and NZTA that will inform a decision to alter the current recommended option for the Hutt Road. The decision may be derived from a combination of qualitative and quantitative assessment including incremental economic analysis (using simplified procedures) for the Hutt Road section.

NZTA are expected to make the final recommendation as to which option is included in the preferred option for detailed business case.

1.3.2 Previous Studies

Wellington Cycleway Feasibility Study Ngauranga to CBD Preliminary Funding Report

Opus was commissioned by WCC to complete a cycleway feasibility study for a coastal route between Ngauranga and Aotea Key.

The project primary objectives were focussed around the Ngauranga to CBD route being for commuter cyclists while the secondary objectives included the desirability with alignment to the Great Harbour Way project where possible and practical.

The report assessed the following options:

Option 1 – Harbour Primary Option

This option is a 3.0m wide shared path that follows the harbour from Ngauranga SH2 off-ramp to Aotea Quay. It assumes that the Great Harbour Way concept connects from the north of Ngauranga. Various connection points at the northern and southern ends of the route are considered, including northern connections across the rail corridor at Ngauranga (if a Harbourside option was not constructed between Petone and Ngauranga) and a southern connection to Hutt Road at Kaiwharawhara.

This option was deemed as having significant environmental and regulatory considerations and poor connectivity to existing land use along the Hutt Road, however would “serve the purpose” of a recreational and tourism facility consistent with the Great Harbour Way concept. The expected construction cost of this option is \$23m, with a BCR of 0.5.

- Option 2: Hutt Road Improvements

Options 2a to 2d consider the use of wide shoulders, cycle lanes or bus lanes along both sides of Hutt Road plus a cycle path option to provide a 3.0m wide two-way “Copenhagen style” cycle facility separated from traffic. Copenhagen-style refers to the desire to separate cyclists from other modes, in this case achieved through a raised median between the cycle path and general traffic.

The on-road facilities were deemed to offer fewer safety benefits and be less attractive for new cyclists than the Copenhagen-style cycle lanes which were evaluated as a preferred option (Option 2d) with a cost of \$3.98m and a BCR of 1.7.

Option 2d involves relocating the existing parking along the Hutt Road to either the back of the private properties, kerbside or onto clearways on the Hutt Road during off-peak times. The report recommends undertaking more detailed designs and cost estimates and a staged construction approach to spread costs over a greater period. The initial focus was recommended as constructing the section south of Caltex service station as this is where many of the deficiencies of the existing route are located.

1.3.3 AECOM Options

Investigations currently underway on the Detailed Business Case have shortlisted a total of three options along the corridor. The three options include two “roadside” options and one “harbourside” option between Petone and Ngauranga. Common to all shortlisted options is the use of Hutt Road south of Ngauranga over any harbourside option.

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Harbourside Options

The AECOM investigations considered the harbourside alignment south of Ngauranga to be feasible however unrealistic for the following reasons:

- Not connected to commercial land use (attractors) along Hutt Road or residential land use (origins) via Onslow Road and, therefore less attractive for commuter cyclists;
- Not addressing the existing safety issues along the Hutt Road;
- Complexity of crossing options at Kaiwharawhara such as safety and security (CPTED), groundwater issues, services, and gradient.

It is noted that the above evaluation of Kaiwharawhara options are not insurmountable – a preferred option here would be relatively more expensive than alternative options and incrementally with less economic benefit.

Hutt Road Options

For the draft Detailed Business Case the current “recommended option, common to all three shortlisted design options, comprises relatively minor improvements to the existing two-way cycle facility such as the removal of obstructions, line-marking and signage.

While this option delivers a solution consistent with project objectives it is evident through draft economic procedures that further improvements would have incrementally greater benefits along Hutt Road. This report investigates the improved options.

2.0 Existing Conditions

2.1 Traffic

Hutt Road is a four lane urban arterial road with an average traffic count of 18,000 vehicles per weekday. The speed limit within Section 1 is posted at 60 kph. A flush median allows for the safe access of northbound vehicles into the businesses along the eastern side of the road. The northbound direction has low side friction due to the lack of adjoining land use, while the southbound direction has high side friction due to vehicles entering and existing from businesses and accessways.

Mid-block analysis identifies approximately 1500 – 1700 vehicles travelling towards Wellington during the morning peak hour of 7.00 – 8.00am. Approximately 1500 – 1600 vehicles travel towards Ngauranga in the evening peak hour of 5.00 – 6.00pm. The typical mid-block capacity of four-lane roads is about 2000 – 2400 per hour per direction.

The main signalised intersection in the study area is the three-way intersection of Hutt Road and Kaiwharawhara Road. The layout allows two continuous through-lanes along the Hutt Road with dedicated turning lanes into Kaiwharawhara Road. This is the main constraint point for vehicles within the study area. Analysis considers that the through movement along Hutt Road operates within intersection capacity, and with only minor queuing.

2.2 Growth

Traffic growth within Wellington, including on the Hutt Road has been relatively stable for the last 5 years. The 2026 traffic model for Transmission Gully show some growth along Hutt Road but at a level that could be accommodated within the level of current analysis. Anecdotally some intensification of business practices along the Hutt Road could mean increased traffic along Hutt Road, however land for additional development is relatively constrained throughout the corridor.

2.3 Safety

Crash types and frequency is generally well documented in the Opus and AECOM reports. High risk areas for vehicles are recognised around the Kaiwharawhara Road intersection while high risk locations for cyclists are along the cycle path, mainly due to vehicle manoeuvring over and along the footpath. Much of the vehicle manoeuvring occurs in areas where parking is provided on the footpath outside the businesses.

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2.4 Footpath / Cycle Path

The study area contains a two-way cycle path along the top of the kerb directly adjoining the footpath. The cycle path is generally 2.5m wide while the footpath is generally 2 to 3m wide.

Cycle counts show up to 450 cycle trips along the corridor on a typical working day. These are generally commuter trips so display inbound morning and outbound evening characteristics.

The main safety risk for cyclists (and pedestrians) is the occurrences of vehicles crossing the footpath to access private and customer car parking or the marked parking spaces on the footpath typically adjoining the building frontages. Safety is also compromised due to the instances of light poles within the cycle path (unusually in the middle) and the pedestrians using the cycle path where there is little to no footpath in locations where parking spaces are provided within road reserve, outside the buildings (see below).

2.5 Car Parking

Parking along Section 1 of Hutt Road is a mixture of on-road parallel and angle spaces, generally time restricted, at the southern end of Hutt Road and on Westminster Street. At the northern end of Section 1 there is generally no parking within the carriageway both northbound and southbound. Parking for the businesses along the eastern side of Hutt Road is either within private property (for business owners and customers) or within road reserve on the footpath outside the front of the buildings. **Figure 2** shows the location and scale of the parking, both “on street” (actually parked on the footpath) and “off-street” (being the availability of off road private spaces).

Approximately 190 spaces for vehicles are available on the footpath over a length of approximately 1.4 km. In almost all occurrences the use of these parking spaces limit the space available for pedestrians on the footpath.

Analysis of the public space between the kerb and channel and adjoining property boundaries shows an average of between 2.5 to 3.0m of total available space for the cycle path and pedestrian path. The removal of the parking spaces would increase the space available to at least 5.0 m for the vast majority of the problematic section of the Hutt Road.

Figure 2 Hutt Road Parking Issues



Discussions with Wellington City Council reveal that a portion of the parking spaces on the footpath are leased to adjoining businesses, for example the BMW Showroom. The “Spotlight carpark” adjoining Kaiwharawhara intersection also utilises part of the footpath, which looks to be a formalised use due to the fact the carpark fence has been moved off the property boundary.

More recent changes in consented land use activities such as the Daycare centres may start to “legitimise” the use of informal car parking spaces and placed increased pressure on Council to provide appropriate parking in the future.

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3.0 Hutt Road Options

3.1 Summary of Options

The draft Detailed Business Case investigated a long list of options which were shortlisted to three Options (Options 1, 2 and 3). All three options included a common option for the Hutt Road, which comprises minor improvements to the existing path such as removal of obstructions and line markings.

For the purpose of this assessment the options are numbered by the corridor section number – Section 1, or as follows.

The option cross sections are shown in **Figure 1**. The draft design drawings are attached in **Appendix A**.

Section 1 Option A: Minor Improvements to Existing Path

Provides improvements to the existing cycle path and is currently included in W2H design Options 1 – 3. This option is evaluated in the W2H project report as the “default” option for Section 1 of the corridor.

Section 1 Option B: Indented Parking

This option removes car parking from the footpath and provides indented parking where possible (and where necessary). The provision of indented parking reduces the remaining combined (cyclist and pedestrian) path width to about 3 metres, therefore cyclists and pedestrians cannot be easily separated.

Section 1 Option C: Single northbound lane with permanent parking

This option reallocates road space to provide one northbound lane, two southbound lanes and 24 hour kerbside parking adjoining eastern side of Hutt Road. The cycle path stays in its current location and is improved as per Section 1A.

This layout provides a similar level of parking to that which currently exists. For the purpose of this assessment the parking is shown as 3.5m wide, however in reality this provides an opportunity to further widen the adjoining cycle path.

Section 1 Option D: Southbound Clearway

Section 1 Option D investigates the opportunity of providing an inbound clearway traffic lane operating in the peak direction during the hours of 7.00am – 9.00am. This period was determined to cater for the bulk of peak period traffic according to the traffic flow profile shown in **Appendix B**.

During the clearway operation the road layout and operation would be identical to that which currently exists. Outside of the morning inbound peak period, between 9.00am – 7.00am the southbound direction only provides one traffic lane, while the outside lane is used as car parking. It is believed (anecdotal) that the provision of a wide flush median is essential to maintaining southbound capacity during the off-peak period due to the lower lane utilisation due to vehicles pulling in / out of car parking spaces.

3.2 Option Evaluation

3.2.1 Evaluation Criteria and Scoring

The evaluation of options is based on achieving a higher degree of safety for cyclists and pedestrians while maintaining traffic flow and property access along the Hutt Road. Business needs are considered through the desire to maintain current levels of car parking. In order of importance the following criteria are considered:

1. Meeting W2H project objectives
2. Meeting Wellington City Council strategic policy objectives
3. Safety of cyclists – provide separated cycle facilities and reduce vehicle crossing conflict
4. Safety of pedestrians – provide separated pedestrian facilities and reduce vehicle crossing conflict
5. Traffic level of service – maintain traffic capacity along Hutt Road
6. Property access – maintain vehicle access to commercial properties

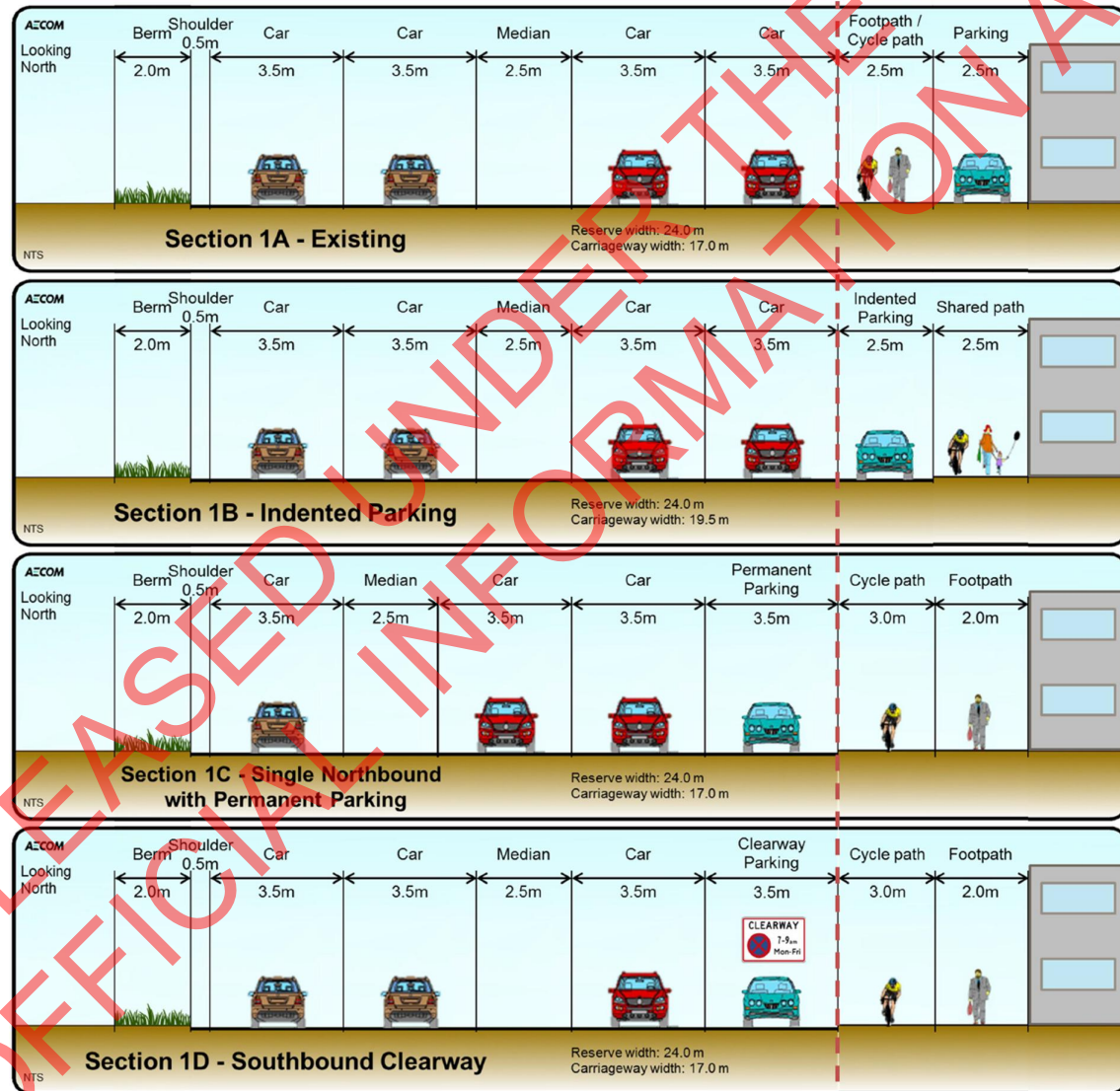
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- 7. Vehicle parking for customers – maintain current levels of car parking for customers where possible, while reducing the need to cross over the cycle and pedestrian path
- 8. Vehicle parking for staff – maintain current levels of parking for staff where possible.

The following includes an evaluation of Sections 1B to 1D against the criteria suggested above.

Scoring is based on positive (+), neutral (0) and negative (-) scores. Weighting of criteria is not considered necessary.

Figure 3 Option Typical Cross Sections



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3.2.2 Evaluation

The option evaluation summary is shown in **Figure 2**.

Figure 4 Option Evaluation

	Section 1 Option B	Section 1 Option C	Section 1 Option D
Meet projects objectives	0	+	+
WCC strategic policy	0	+	+
Cyclist safety	-	+	+
Pedestrian safety	-	+	+
Traffic level of service	0	-	0
Maintain property access	0	0	0
Customer parking	-	-	-
Staff parking	0	0	0
TOTAL	-3	+2	+3

Section 1 Option B: Indented parking

The Section 1 Option B evaluation identifies a negative overall impact. This is largely due to not providing a consistent and separated path width for cyclists and pedestrians considered to have a negative impact on cyclist and pedestrian safety. While some kerbside parking will be provided on a “needs” basis this layout will result in a net loss of parking, thereby having a negative impact on customer parking availability.

The negative impact is considered to be a fatal flaw for this option.

Section 1 Option C: Single northbound lane with permanent parking

The positive evaluation is due to consistency with project objectives and policy objectives plus the provision of a consistent cycle and pedestrian path resulting in improvements to user safety.

The option would result in a net decrease in parking availability due to loss of some angle spaces on the footpath. A total of about 150 spaces would be provided on-street. However this is considered to cater for the reasonable needs of short stay users such as customers. In this regard the management of parking would be aimed at providing efficient turn-over of customers for adjoining businesses.

The primary negative aspect is the impact on traffic flow along the Hutt Road. Traffic flow counts identify the opportunity to remove one northbound lane due to lower evening peak flows and less side friction than morning peak flows. However detailed analysis using traffic counts and SCATS data (see **Appendix B**) shows that reducing northbound traffic flow into one lane during the evening peak period would be result in unsatisfactory queuing and delay.

In particular, analysis of the Kaiwharawhara Road intersection identifies queuing and delay at the southern approach plus the need for a long downstream merge northbound from Kaiwharawhara Road. This would reduce the ability to reallocate road space and therefore minimise the availability of space for car parking. Traffic is also more likely to queue back from the Onslow Road intersection unless significant two-lane queue lengths were provided.

Any induced growth resulting from the completion of Transmission Gully would add to congestion and delay along the corridor if the northbound capacity was reduced to a single lane.

Section1D: Southbound Clearway

The positive evaluation reflects consistency with project and policy objectives as per Section 1 Option C. The assessment of parking for Section 1 Option D indicates the availability of approximately 150 kerbside spaces. The net loss of parking would be mitigated by improved parking management aimed at optimising parking turn-over to support adjoining economic activity.

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Traffic operations along the Hutt Road are expected to remain relatively consistent with existing conditions. This point is considered to be the differentiator between the Section 1 Option D and Section 1 Option C.

Traffic analysis shows no change in conditions during the 7am – 9am period (as the layout is identical to existing) but slightly increased chance of queuing southbound during the interpeak period, however the level of service remains acceptable. The mitigating factor is that through-capacity at the Kaiwharawhara Road intersection can be maintained through the provision of two-lane approach and departures. The analysis supporting these conclusions is included in **Appendix B**.

Anecdotally, higher southbound delay during the non-peak period is likely to be caused by drivers slowing to look for car parking or cars pulling in / out of car parking spaces. Mitigating factors include the wider (3.5m) car parking lane and the constant provision of a wide flush median.

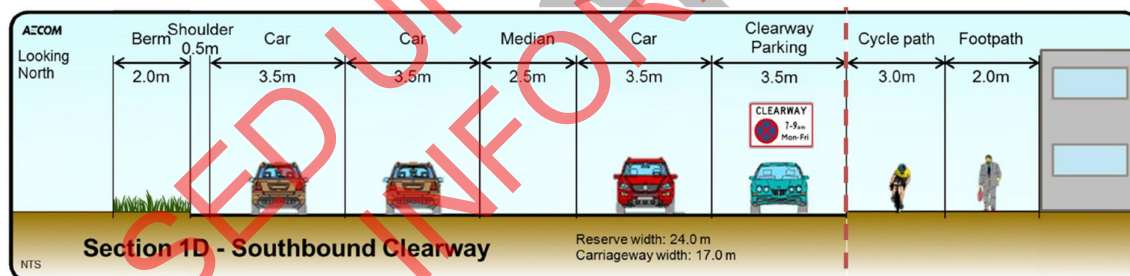
3.3 Recommended Option

On the balance of positive and negative qualitative effects Section 1 Option D is considered to be the recommended option.

Section 1 Option D provides the desired space to provide separated cyclist and pedestrian paths, and removes all parking from the footpath. Public parking for business customers is reduced from 190 spaces on the footpath to about 150 spaces on-street. This would be mitigated through the provision of improved parking management that would optimise parking turnover.

The availability of parking is reduced to outside the hours of 7.00am to 9.00am, which is deemed appropriate to cater for customer-based parking.

A typical cross section for Option 1D is provided below.



3.4 Quantitative Assessment

Draft economic analysis has been undertaken for the W2H project. The figures below have been used from the W2H report for the purpose of high level economic testing.

The NPV cost to construct Section 1 Option D is in the order of \$1M¹. The NPV benefit is approximately \$16M. This suggests an approximate BCR of 16 for Section 1 Option D.

In terms of incremental benefits over the current recommended scheme option (Options 1, 2 and 3), the incremental BCR of Section 1 Option D is 10, which suggests that Section 1 Option D should be the recommended option for Section 1 of the project.

¹ The draft cost estimate is about \$500,000, however an additional \$500,000 is allocated to the provision of a culvert at Kaiwharawhara Road.
 \\nzwl1p001\transport\PROJECTS\W2H NZTA 009 P2N Cycleway NZL-B13-928 (60306339)\6. Draft Docs\6.2 Technical Notes\Hutt Road WCC Report\Wellington to Hutt Valley Shared Path - Hutt Road Report Rev A.docx
 Revision A – 10-Mar-2014
 Prepared for – New Zealand Transport Agency – ABN: N/A

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4.0 Conclusion

The purpose of this study was to investigate the Hutt Road section of the Wellington to Hutt City corridor at a level of detail that will enable alternative options to be developed for consideration as part of the W2H Detailed Business Case.

The study investigated three alternative options for the Hutt Road, being:

- Section 1 Option B: Indented Parking
- Section 1 Option C: Single northbound lane with permanent parking
- Section 1 Option D: Southbound Clearway

The options were assessed against a range of criteria.

Section 1 Option B was deemed to fail based on not meeting the project and WCC policy objectives of providing a basic level of service and safety for cyclists and pedestrians.

The assessment of Section 1 Option C and D resulted in similar outcomes. Both options resulted in the loss of about 40 car parking spaces from about 190 to 150 spaces. However, mitigation for both options is considered to be improved ability to control and manage parking for customer use.

The main differentiator between the final options is the consequential traffic conditions along the Hutt Road corridor. Section 1 Option D was analysed to have the least impact on traffic conditions. During the clearway operation (7.00 – 9.00am) there were negligible traffic impacts, while during the non-peak period (9.00 – 7.00am) some queuing and southbound delay would result however this would be mitigated through the road layout providing adequate passing spaces utilising the flush median and having a wide (clearway width) parking lane. Optimisation of the Kaiwharawhara Road intersection would potentially mitigate any loss of southbound traffic flow.

Economic assessment was carried out as part of the W2H project. Section 1 Option D was assessed as having a standalone BCR of 16.

Incremental analysis of Section 1 Option D in comparison to current project options (Options 1, 2 and 3) provides a BCR of 10, which suggests that Section 1 Option D should proceed as the recommended option.

Section 1 Option D is therefore suggested to NZTA and Wellington City Council as the recommended option to investigate as part of the future corridor upgrade.

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Appendix A

Option Design Drawings

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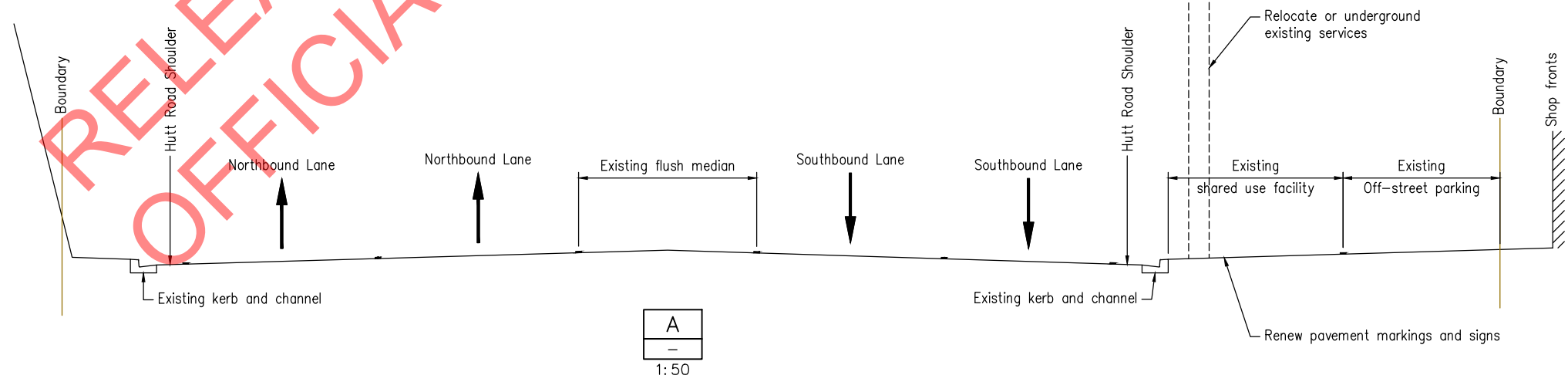
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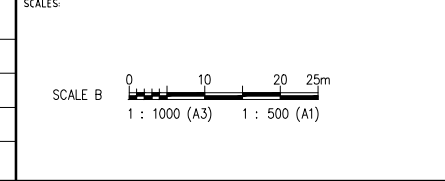
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WELLINGTON TO HUTT VALLEY WALKING AND CYCLING PATH

SECTION 1
THORNDON QUAY & HUTT RD CYCLE IMPROVEMENTS
OPTION A - MINOR SAFETY IMPROVEMENTS

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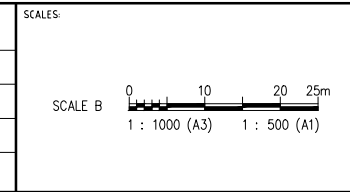
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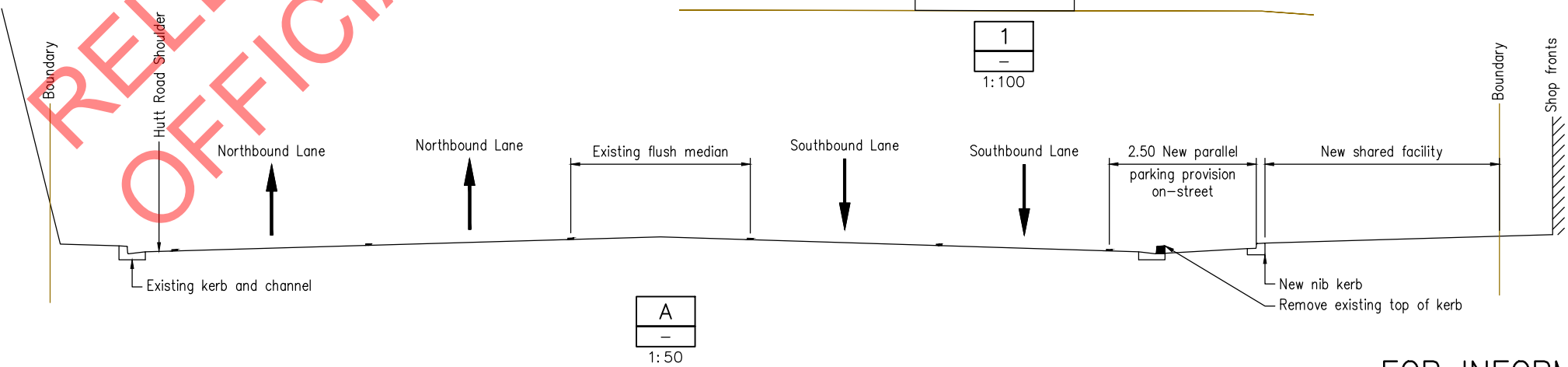
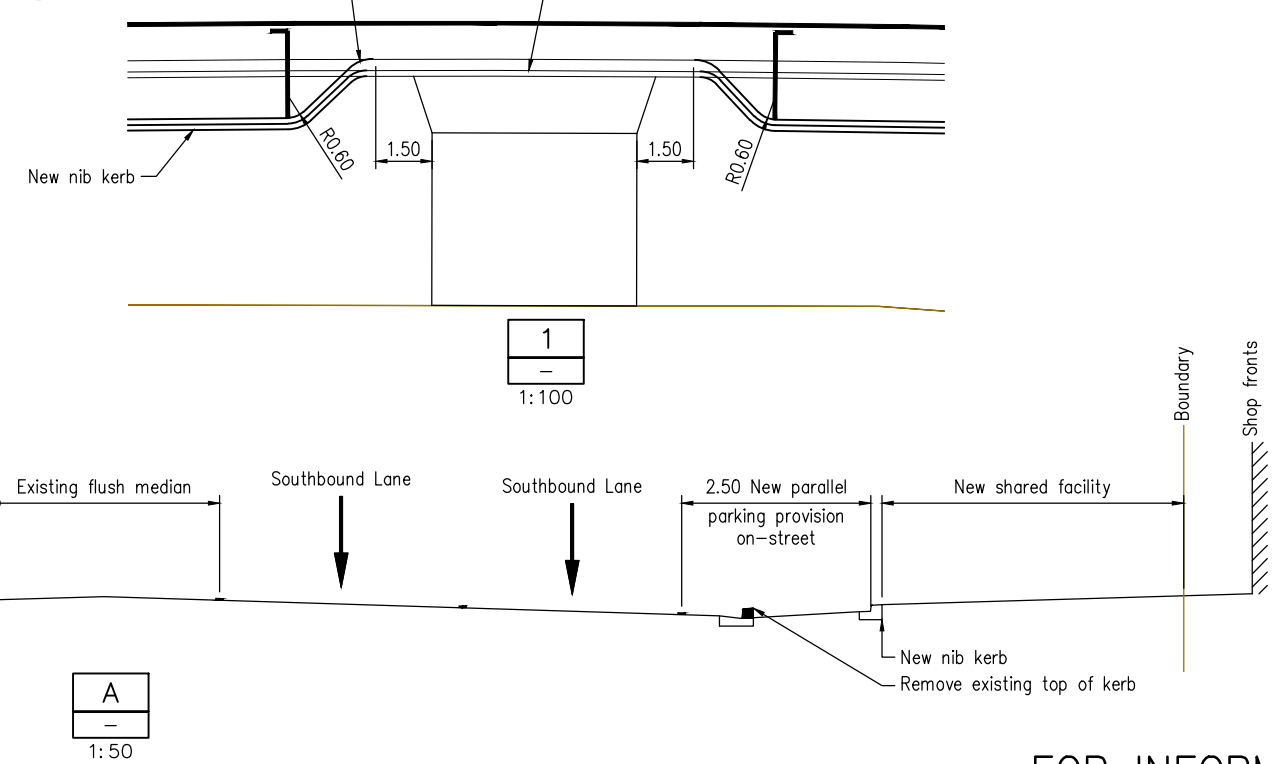
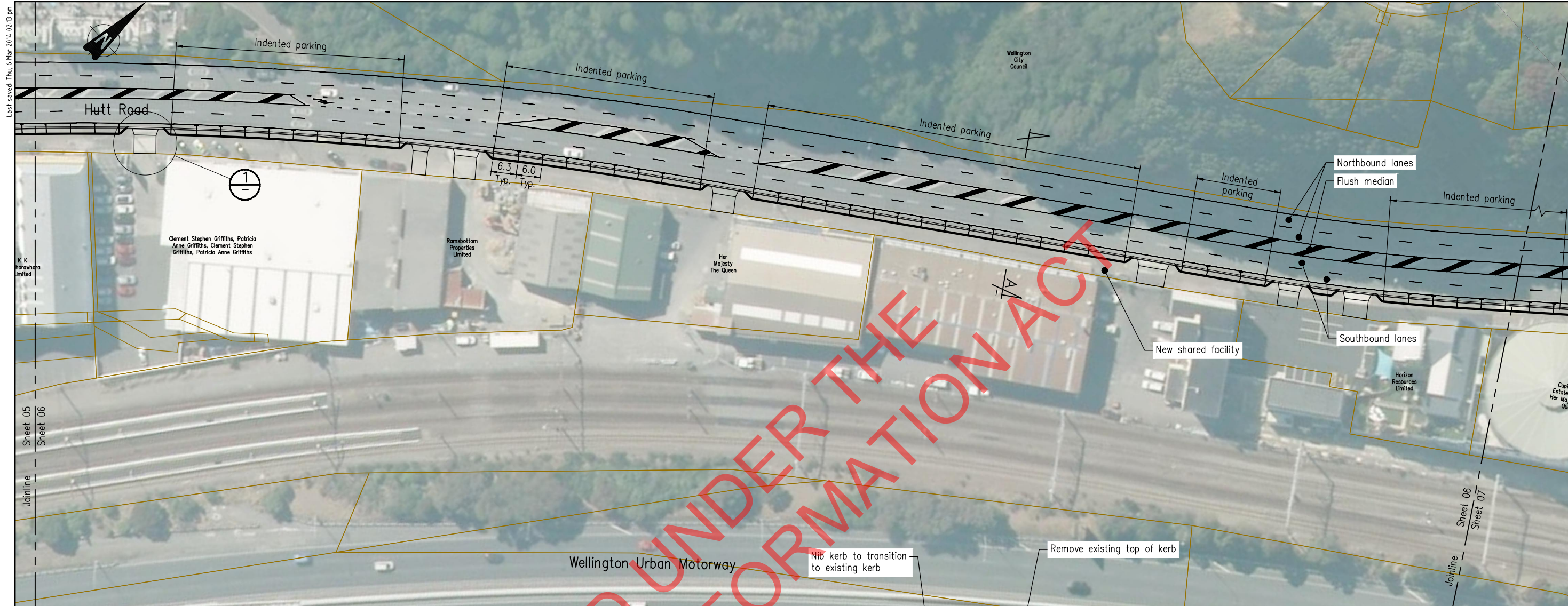
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WELLINGTON TO HUTT VALLEY WALKING AND CYCLING PATH			
SECTION 1			
THORNDON QUAY & HUTT RD CYCLE IMPROVEMENTS			
OPTION B - INDENTED PARKING			
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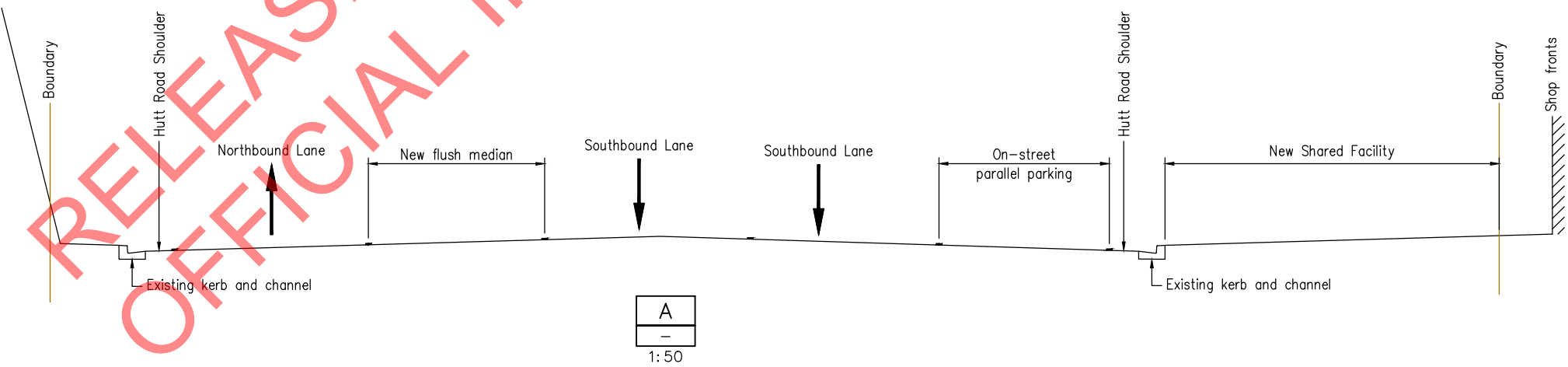
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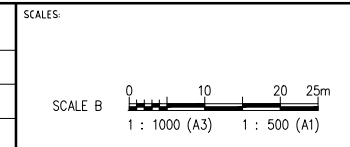
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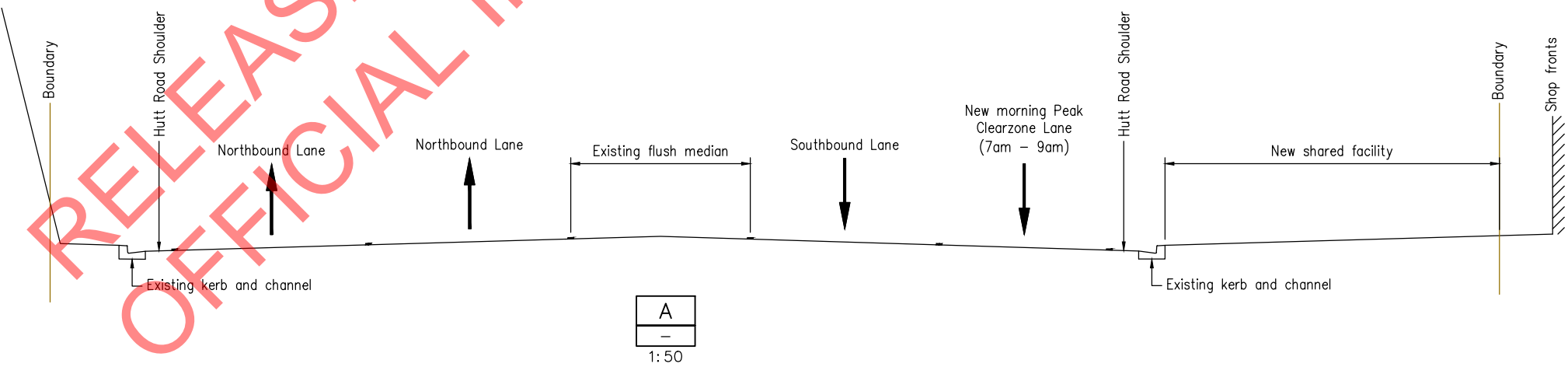


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WELLINGTON TO HUTT VALLEY WALKING AND CYCLING PATH

SECTION 1
THORNDON QUAY & HUTT RD CYCLE IMPROVEMENTS
OPTION C - PERMANENT PARKING (LOSING NB LANE)

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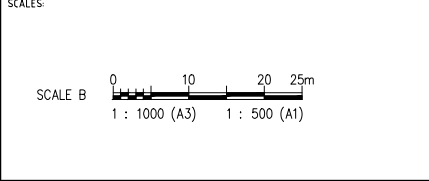
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WELLINGTON TO HUTT VALLEY WALKING AND CYCLING PATH			
SECTION 1			
THORNDON QUAY & HUTT RD CYCLE IMPROVEMENTS OPTION D - SOUTHBOUND CLEARWAY (MORNING PEAK)			
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		DRAWING NO.	SK-1117

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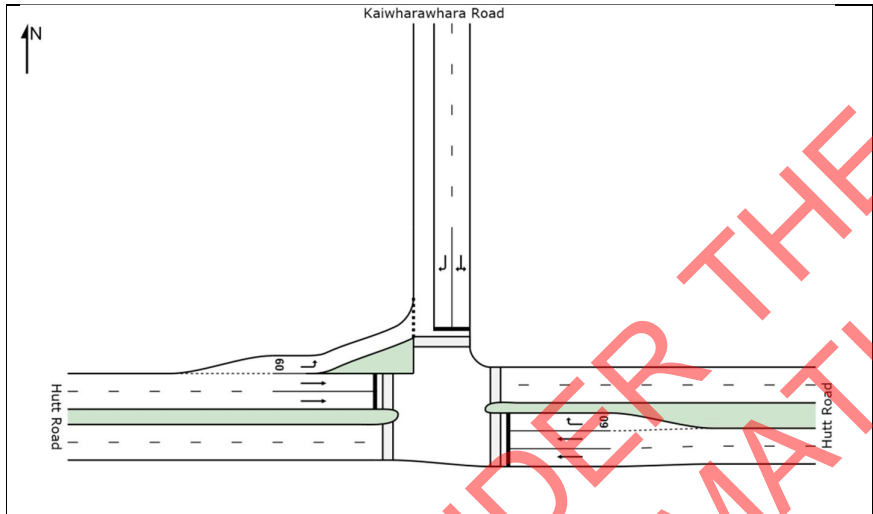
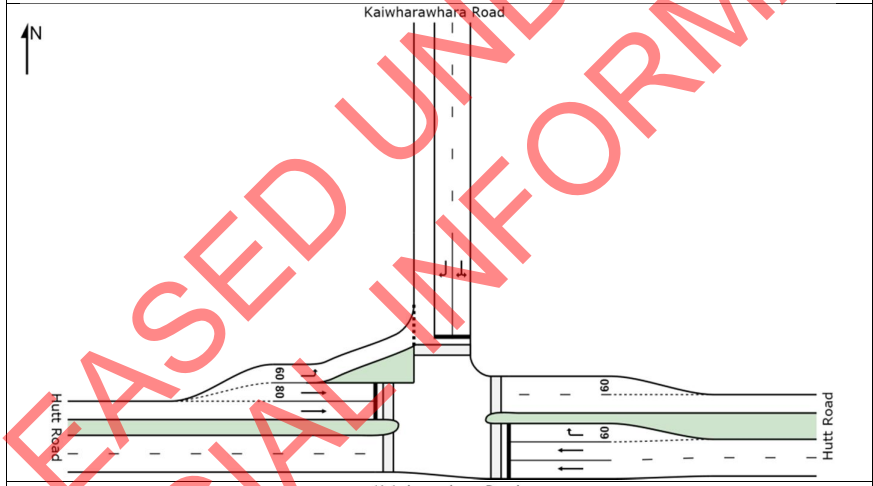
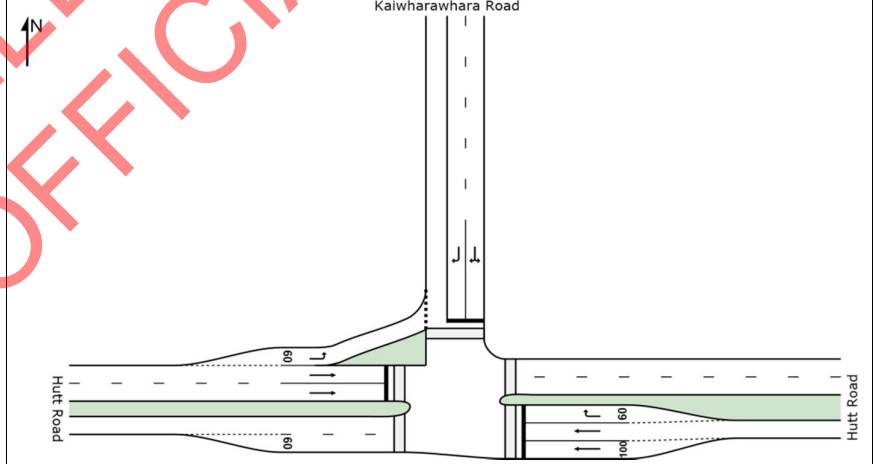
Appendix B

Traffic Flow Analysis

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SIDRA modelling for Hutt Road Midblock Analysis

2014 Hutt Road / Kaiwharawhara Road Model Outputs

	<p><u>Base Layout:</u></p> <p><u>AM Peak</u> LOS - C DoS - 0.92</p> <p><u>MD Peak</u> LOS - C DoS - 0.71</p> <p><u>PM Peak</u> LOS - C DoS - 0.89</p>
	<p><u>Option C Layout:</u></p> <p><u>AM Peak</u> LOS - C DoS - 0.92</p> <p><u>MD Peak</u> LOS - C DoS - 0.71</p> <p><u>PM Peak</u> LOS - F DoS - 1.24</p>
	<p><u>Option D Layout:</u></p> <p><u>AM Peak</u> Same as Base</p> <p><u>MD Peak</u> LOS - C DoS - 0.71</p> <p><u>PM Peak</u> LOS - C DoS - 0.94</p>

SIDRA modelling was undertaken to analyse the Hutt Road midblock east and west of the Hutt Road / Kaiwharawhara Road intersection. SIDRA model Outputs above shows that Section 1 Option C layout cannot support PM peak flows (level of service F). This layout would result in a very slow moving northbound queue during an extended PM peak period.

The Section 1 Option D layout can be supported during the morning peak period as the layout would retain an existing level of service for inbound vehicles. The graph below shows that the clear way would cater for the bulk of the peak inbound traffic movements. The SIDRA outputs show consistent level of service to existing conditions during the inter peak and evening peak periods.

