NZ TRANSPORT AGENCY WAKA KOTAHI

AGENDA NO. 5.3

BOARD PAPER

Paper no:	**2017/12/1205**
Meeting date:	8 December 2017
Prepared by:	s9(2)(a) – Safe Roads Alliance s9(2)(a) – Safe Roads Alliance
Recommended by:	Tommy Parker, General Manager, System Design and Delivery
Board function:	Significant planning, investment and operational matters
Subject:	**State Highway 16: Brigham Creek to Waimauku Safety and Capacity Improvements – Option endorsement and Funding approval**

It is recommended that the NZ Transport Agency Board resolves to …

- **Endorse** the options recommended for sections A to E in the single stage business case for the NZ Transport Agency's State Highway 16: Brigham Creek to Waimauku.
- **Approve** $4.0 million for pre-implementation works for the NZ Transport Agency's State Highway 16: Brigham Creek to Waimauku Project.
- **Approve** $65.2 million for implementation of the NZ Transport Agency's State Highway 16: Brigham Creek to Waimauku Project (including $6.1 million for property acquisitions, $8.9 million for contingency and $1.5 million for escalation).
- **Approve** the public communication by the NZ Transport Agency regarding the options' endorsement and funding approvals connected to State Highway 16: Brigham Creek to Waimauku in December 2017 in order to progress project delivery.

SH16 between Brigham Creek to Waimauku is a 10 kilometre section of the State highway in the North West region of Auckland

Improvements to SH16 have been identified as part of the Supporting Growth programme

- The Supporting Growth programme was approved by the NZ Transport Agency Board in October 2016 [Board paper *16/10/1074* refers], and included a range of improvements to the transport network in North West Auckland
- These improvements included an upgrade to the SH16 corridor between Brigham Creek Roundabout and Waimauku (item 12 on map), as well as other improvements that will reduce long term pressure on SH16
- The table summarises how the Supporting Growth Programme and Safe Roads SH16 Project align

Supporting Growth Strategy	Safe Roads Project Alignment
Improved Public Transport Corridor	Additional lanes provide public transport opportunities between Kumeu / Huapai to Westgate and the City
New and Improved Road Corridors	• 75% of the route is improved to a 3.5 KiwiRAP star rating • Future proofing of online demand from high growth areas in Kumeu / Huapai and Coatesville Riverhead area • Cycling opportunities on 2.0m shoulders throughout the corridor • Corridor adaptable to future urban layout
Safety Improvements	Supporting Growth programme specifically identified need for Safety Improvement along SH16 corridor

The SH16 corridor between Brigham Creek to Waimauku is experiencing significant growth, has poor safety performance and is congested

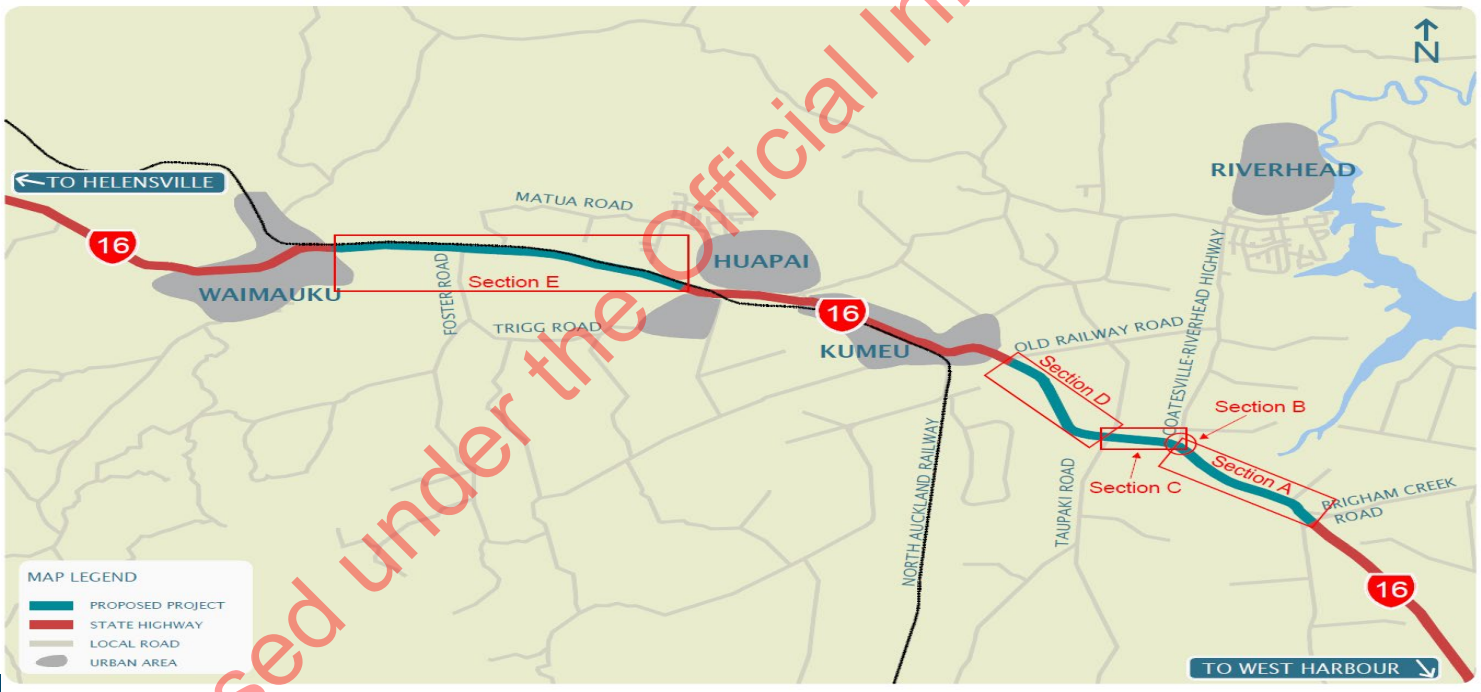
- SH16 is a vital link for the North West of Auckland to the City, airport and to SH20 and SH1 South
- Land use from Brigham Creek Roundabout to Waimauku is rapidly changing from a rural base to intensive housing and commercial use
- The Brigham Creek Roundabout to Coatesville Riverhead Highway section has 30,000 vehicles per day on average and is currently at capacity
- 115% growth in traffic demand is expected by 2046
- There have been four deaths and 30 serious injuries from 2006 to 2015; the corridor has a 2 star overall KiwiRAP safety rating, including a high collective risk and 62% of the corridor measured as high head-on outcome risk

Stakeholder engagement has been ongoing and investment objectives agreed

- SH16 safety improvements were identified in the Safer Journeys Programme Business Case endorsed by the Transport Agency Board in 2014 to deliver against the Transport Agency's commitment to Safer Roads and Roadsides
- A single stage business case has been prepared to identify preferred options to address safety and short term capacity improvements within sections of the SH16 corridor
- Engagement with stakeholders commenced in June 2016, with a stakeholder workshop and has continued through 2016 and 2017
- The Project's investment objectives were developed with stakeholders and are:
  - reduce the probability and severity of predicted death and serious injury crashes by at least 30 – 50% (12 – 20) within 10 years
  - increase the length of existing below 3.5 star rated sections of the corridor to 3.5 star or above within 10 years
  - maintain travel times between Kumeu and Brigham Creek Road over the next 10 years
- The focus on travel times over the next 10 years reflects the need for the wider Supporting Growth programme to support accessibility to Kumeu over the longer term

The corridor was split into five sections for investigation

- The corridor was split into sections A to E for investigation
- The Kumeu to Huapai urban section was excluded from the Project scope as other projects delivered by the Transport Agency and Auckland Transport to upgrade this urban centre will be carried out in the near future as a result of growth and Special Housing Area developments in the surrounding region



Multiple options were evaluated for each section

- Fourteen options were considered across the five sections, as part of the business case investigation
- Options have been evaluated on section by section basis to address unique characteristics of each section, but the economic assessment has been undertaken on a corridor wide basis
- Attachment One contains further details on each option considered
- Key metrics for the options are shown below. Preferred options are shown in bold

Criteria		Sections A-B-C			Section D					Section E			
		A1BC	A2BC	**A3BC**	D1	D2	**D3**	D4	D5	E1	E2	E3	**E4**
Deaths and Serious Injury (DSI) Reduction		9.9 (62%)	9.9 (62%)	**10.0 (63%)**	2.0 (23%)	4.4 (50%)	**4.4 (50%)**	5.7 (65%)	5.7 (65%)	3.6 (26%)	3.6 (26%)	7.1 (51%)	**9.2 (66%)**
KiwiRAP star improvement		1.2km (80%)	1.2km (80%)	**1.2km (80%)**	0.5km (46%)	0.7km (64%)	**0.7km (64%)**	0.7km (64%)	0.7km (64%)	1.8km (62%)	1.8 km (62%)	2.3km (79%)	**2.3 km (79%)**
Travel time	AM Peak - Eastbound	No change	Improve 55s	**Improve 55s**	Improve 40s	Improve 40s	**Improve 40s**	Improve 40s	Improve 45s	N/A	N/A	N/A	**N/A**
	AM Peak - Westbound	Delay 5s	Delay 5s	**Delay 5s**	No change	No change	**No change**	No change	No change				
	PM Peak - Eastbound	Delay 10s	Delay 5s	**Delay 5s**	Improve 35s	Improve 35s	**Improve 35s**	Improve 35s	Improve 35s				
	PM Peak - Westbound	Improve 160s	Improve 160s	**Improve 305s**	No change	No change	**No change**	No change	No change				
Overall KiwiRAP Star Rating		3.7	3.7	**3.7**	3.1	3.6	**3.6**	3.9	3.9	3.3	3.3	3.7	**4.0**
Estimated Capital Cost		$23.6M	$25.2M	**$31.0M**	$7.7M	$8.0M	**$9.1M**	$8.8M	$10.3M	$20.5M	$20.8M	$22.3M	**$23.7M**
Indicative BCR (40 Year period)		1.82	1.88	**1.87**	0.08	0.16	**0.18**	0.24	0.43	0.07	0.24	0.44	**0.74**
Predicted DSI saved / 10 years / $100M spent		46	41	**42**	27	57	**50**	67	59	18	18	33	**40**

Recommended options have been identified for each section

At the option endorsement workshop, stakeholders endorsed the following option for each section:

- **Section ABC – Option A3BC is recommended**
  - Option A2 and A3 provide similar benefits, but Option 3 future proofs Section A against residual demand from high growth areas in Riverhead, Kumeu and Huapai
  - Additional westbound lane provides Public Transport opportunities in the future as identified in Supporting Growth programme
  - Option 3 addressed the strong community desire for easing congestion in advance to the future implementation of offline solutions

- **Section D – Option D3 is recommended**
  - Option D4 provided a better safety outcome with the incorporation of median barrier; however this section of corridor is fast approaching an urban function and requires full turning movements to be maintained. Option 3 meets investment objectives and does not preclude the future function of this section by maintaining the turning movements

- **Section E – Option E4 is recommended**
  - Option E3 and E4 both meet the investment objectives. Option E4 provides two additional DSI savings for an additional cost of $1.4 million and was agreed to be the best outcome

- Various option combinations provided a BCR range of 1.0 to 1.34, and the recommended options 'combination' of A3, B, C, D3 and E4 has a BCR of 1.26

The recommended options meet investment objectives and have stakeholder support

Investment objective	Project outcome
Reduce the probability and severity of predicted DSI crashes by at least 30 – 50% (12 – 20 DSI) within 10 years	A DSI Reduction of 23.6 (60% of DSIs) in 10 years
Increase the length of existing below 3.5 star rated corridor to 3.5 star or above within 10 years	75% of the route is improved to a 3.5 KiwiRAP star rating
Maintain travel times between Kumeu and Brigham Creek Road over the next 10 years	Travel time is improved by 95 seconds in the AM peak eastbound direction and by 305 seconds in the PM peak westbound direction, between Brigham Creek and Kumeu

- Proposed solutions are well received by local community and external stakeholders
- Remaining community concerns are on limited right turns, property impacts and speed management which are being managed through ongoing engagement
- Customers have expectations for additional laning through to Kumeu town centre - these are not addressed in this project as they will be considered as part of the Supporting Growth programme

The project has a high strategic fit and high effectiveness

- The project has been assessed against the Transport Agency's Investment Assessment Framework and is High strategic fit, High effectiveness
- The total cost estimate (including contingency, escalation, Agency 2.6% administrative fee and net property) is $69.2 million
- The benefit cost ratio of the recommended option is 1.26
- The Project is in the Transport Agency's business plan, in the Regional Land Transport Plan and National Land Transport Plan and funding is available
- Improvements to capacity are aligned to the Transport Agency's Supporting Growth Programme in the north west region
- It is recommended that design and construction delivery is staged to deliver less complex solutions earlier and more complex solutions later
- Approval of funding for pre-implementation and implementation is therefore requested to provide this flexibility around delivery

Mitigation for key risks has been identified

- **Designation alterations and property requirements**
  - The Project impacts approximately 44 landowners and 49 parcels
  - A property strategy has been prepared to mitigate potential delays and cost risks and to prioritise property acquisition for critical areas
- **Engagement**
  - Stakeholder engagement is supportive, but there has been some concern about the use of median barriers and access and request for additional lanes
  - Public engagement will continue to clarify short term and long term capacity strategies
- **Consistency of messaging**
  - Potential for misalignment in messaging across various projects currently planned for the region - including Special Housing Area activities, Town Centre upgrades, Supporting Growth projects, Safer Speeds and this Project
  - Communications coordination with Auckland Transport and other key stakeholders will continue

Processes will run in parallel to enable early delivery of safety initiatives

- The recommended options would be delivered in two stages:
  - Stage 1 is Huapai to Waimauku
  - Stage 2 is Brigham Creek Roundabout to Kumeu
- Alteration to the designation, consenting and property acquisition will run in parallel for both stages of delivery and will commence in early 2018; designation alterations and consents will be lodged in May 2018
- The contractor would be procured for Stage 1 in October 2018 and for Stage 2 in March 2019
- Practical Completion of Stage 1 is expected in October 2019 and Stage 2 in February 2021

The following information will be made available on the Transport Agency website

- Under section 20D(2) of the Land Transport Management Act 2003, after approving or declining funding for activities or combinations of activities, the Transport Agency must place a copy of the decision, and the reasons for the decision, on its website
- If the Board agrees to the recommendations in this paper the following information will be made available on the Transport Agency website:
    - *The SH16 Safety and Capacity improvement project from Brigham Creek to Waimauku will be implemented over a 3 year period with completion planned in February 2021. The project will deliver the following outcomes:*
        - *contribute to a safe road system increasingly free of deaths and serious injuries by providing significantly enhanced road safety features*
        - *provide short term congestion easing in anticipation of offline solution*
        - *align corridor to an anticipated future function in the form of a local road servicing residents and businesses within an urban setting with walking, cycling and improved public transport services*

Attachments and supporting information

There is one attachment:

- **Attachment One:** Summary of Options A - E and respective sub-options

Note:

Sections A, B, C and D identified safety and efficiency problems, while Section E only identified safety problems

All Project options considered incorporate a baseline safety improvement of 2.0m wide shoulders (for cycling) and edge barriers into the design

Supporting information:

- Available in Resource Centre in Board Books: Investment quality assurance

Attachment One:
Three options were considered for Section A; safety improvements with additional lanes east and westbound recommended

Section A:

- Three options were considered for the section from the Brigham Creek Roundabout to the Coatesville Riverhead Highway intersection:
  - (Option A1) - safety improvements only (baseline and wire median barrier)
  - (Option A2) - safety improvements with an additional eastbound lane to improve city bound efficiency
  - (Option A3) - safety improvements with additional lanes east and westbound.
- Assessment of the evidence showed all options met the investment benefits
- Option A3 is recommended as it provides additional benefits by meeting strong community stakeholder interest in improving travel time, provides for anticipated residual traffic demand following the longer term offline solution identified in the Transport Future Urban Growth programme, and provides land capacity for future prioritised public transport

Attachment One:
Sections B and C comprise roundabouts

Section B:

- This is the Coatesville Riverhead Highway intersection, and as such a number of intersection designs were considered - including signals, a seagull design and a two-lane roundabout
- A roundabout design provides the best outcomes overall by meeting stakeholder expectations, providing the best safety outcomes and improving the intersection level of service and is the preferred option

Section C:

- This is a short section between the existing Taupaki roundabout and the Coatesville Riverhead Highway intersection
- Both the existing and proposed roundabouts have two circulating lanes, and as a result, preferred option for Section C is to implement additional east and west bound lanes for geometric consistency and capacity improvement between the roundabouts

Attachment One:
Section D explored five options ranging from yellow centreline through to additional lane with median barrier

Section D:

- This extends from Taupaki roundabout to Old Railway Road (Kumeu). This section is developing from rural to a semi-urban environment. There are multiple access points (private and commercial) along this section. Maintaining the correct balance of access is an important consideration for this section
- Options considered include:
  - (Option D1) - Existing road layout with double yellow centreline plus baseline safety improvements
  - (Option D2) - Existing road layout with wide centreline plus baseline
  - (Option D3) - Existing road layout with 2.5m flush median plus baseline
  - (Option D4) - Existing road layout with wire-rope median barrier plus baseline; turn around facilities required
  - (Option D5) - Existing westbound road layout with provision for an additional lane eastbound, with wire median plus baseline; turn around facilities required
- Following the assessment, the preferred option is a 2.5m flush median, which provides safety improvements and balances access requirements. The additional lane was not shown to provide significant efficiency benefits, given the existing and future constraints within the Kumeu township

Attachment One:
Section E comprises four options from simple baseline safety improvements through to wire rope median barrier

Section E

- Safety was the only consideration in this section from Huapai to Waimauku - as the efficiency problem is not apparent in Section E.
- The following four options were assessed:
  - (Option E1) - Existing layout with baseline safety improvements
  - (Option E2) - Existing layout with double yellow centreline and baseline
  - (Option E3) - Existing layout with wide centreline median and baseline
  - (Option E4) - Existing layout with wire-rope median barrier and baseline
- Option E4 with the wire-rope median barrier was considered the preferred option for Section E. Whilst Option E3 (wide centreline) meets the necessary investment objectives, Option E4 provides for a better safety outcome (with two additional DSIs saved) with a small additional cost of $1.4 million
- Sensitivity testing of the options based on a reduced speed limit (potentially identified for this corridor in the future) showed no significant differences to the relative safety outcomes of Option E3 and E4