



## Appendix 3: Drawings of EB3 options

- EB3 Residential Online
- EB3 Residential Offline
- EB3 Commercial Online
- EB3 Commercial Offline



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REV	DATE	DRAWN	REVISION DESCRIPTION

DRAWN	DRAWING CHECK
DESIGNED	DESIGN REVIEW
APPROVED	APPROVED DATE

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1:1000

LEGEND	CUT	DESIGNATION BOUNDARY CONSTRUCTION	DESIGNATION BOUNDARY FINAL
BUSWAY	FILL	RETAINING WALL	PARCEL BOUNDARY
BUS STOP	RETAINING WALL	PARCEL BOUNDARY	
PAVEMENT			
SUP			
CYCLEWAY			
FOOTPATH			

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**AUCKLAND MANUKAU EASTERN TRANSPORT INITIATIVE**  
**EASTERN BUSWAY STAGES 2, 3 AND 4**  
**(PAKURANGA TO BOTANY)**

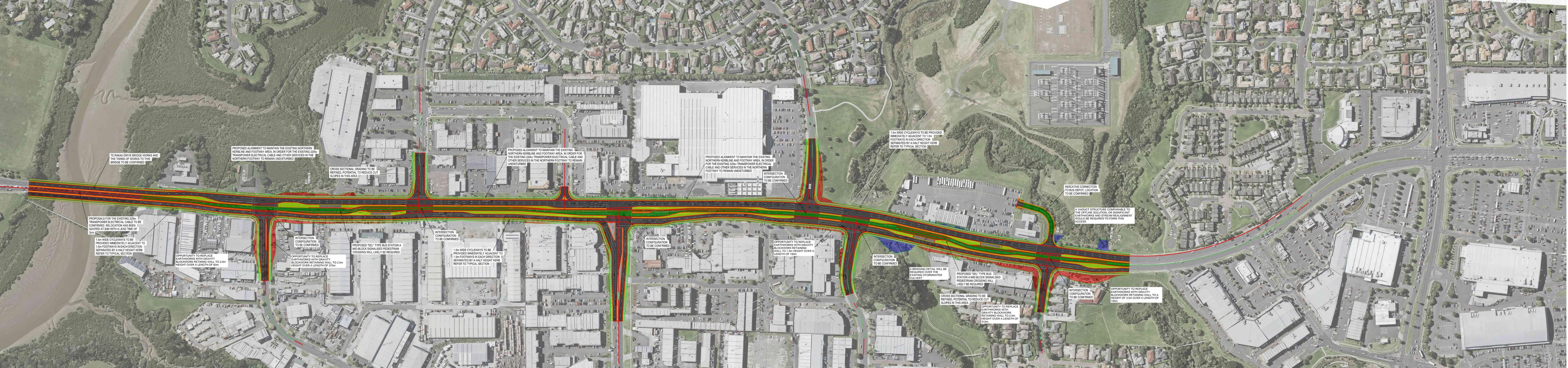
**Eastern Busway Alliance**  
 Fletcher | Jacobs | ABCOM | Jacobs

DRAWING STATUS: DRAFT  
 DRAWING TITLE: EB3 RESIDENTIAL ONLINE OPTION  
 SCALE: 1:1000  
 SHEET SIZE: A1  
 DRAWING NO: EB234-1-RD-SK-ZZ-00024

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TE RAKAU DRIVE BRIDGE WORKS AND THE TIMING OF WORKS TO THIS BRIDGE TO BE CONFIRMED

PROPOSED ALIGNMENT TO MAINTAIN THE EXISTING NORTHERN KERBLINE AND FOOTWAY AREA, IN ORDER FOR THE EXISTING 220kV TRANSPOWER ELECTRICAL CABLE AND OTHER SERVICES IN THE NORTHERN FOOTWAY TO REMAIN UNDISTURBED

CROSS SECTIONAL GRADING TO BE REFINED, POTENTIAL TO REDUCE CUT SLOPES IN THIS AREA

PROPOSED ALIGNMENT TO MAINTAIN THE EXISTING NORTHERN KERBLINE AND FOOTWAY AREA, IN ORDER FOR THE EXISTING 220kV TRANSPOWER ELECTRICAL CABLE AND OTHER SERVICES IN THE NORTHERN FOOTWAY TO REMAIN UNDISTURBED

PROPOSED ALIGNMENT TO MAINTAIN THE EXISTING NORTHERN KERBLINE AND FOOTWAY AREA, IN ORDER FOR THE EXISTING 220kV TRANSPOWER ELECTRICAL CABLE AND OTHER SERVICES IN THE NORTHERN FOOTWAY TO REMAIN UNDISTURBED

INTERSECTION CONFIGURATION TO BE CONFIRMED

1.5m WIDE CYCLEWAYS TO BE PROVIDED IMMEDIATELY ADJACENT TO 1.5m FOOTWAYS IN EACH DIRECTION SEPARATED BY A HALF HEIGHT KERB REFER TO TYPICAL SECTION

INDICATIVE CONNECTION TO BUS DEPOT, LOCATION TO BE CONFIRMED

A VIADUCT STRUCTURE COMPARABLE TO THE OFFLINE SOLUTION OR SIGNIFICANT EARTHWORKS AND STREAM REALIGNMENT WOULD BE REQUIRED TO FORM THIS ACCESS

PROPOSALS FOR THE EXISTING 220kV TRANSPOWER ELECTRICAL CABLE TO BE CONFIRMED. RELOCATION HAS BEEN QUOTED AT \$3M WITH A LEAD TIME OF 9yrs

1.5m WIDE CYCLEWAYS TO BE PROVIDED IMMEDIATELY ADJACENT TO 1.5m FOOTWAYS IN EACH DIRECTION SEPARATED BY A HALF HEIGHT KERB REFER TO TYPICAL SECTION

OPPORTUNITY TO REPLACE EARTHWORKS WITH GRAVITY BLOCKWORK RETAINING WALL TO 2.0m HEIGHT OVER A LENGTH OF 60m

INTERSECTION CONFIGURATION TO BE CONFIRMED

OPPORTUNITY TO REPLACE EARTHWORKS WITH GRAVITY BLOCKWORK RETAINING WALL TO 2.5m HEIGHT OVER A LENGTH OF 270m

PROPOSED "EEL" TYPE BUS STATION A MID-BLOCK SIGNALISED PEDESTRIAN CROSSING WILL LIKELY BE REQUIRED

1.5m WIDE CYCLEWAYS TO BE PROVIDED IMMEDIATELY ADJACENT TO 1.5m FOOTWAYS IN EACH DIRECTION SEPARATED BY A HALF HEIGHT KERB REFER TO TYPICAL SECTION

INTERSECTION CONFIGURATION TO BE CONFIRMED

INTERSECTION CONFIGURATION TO BE CONFIRMED

OPPORTUNITY TO REPLACE EARTHWORKS WITH GRAVITY BLOCKWORK RETAINING WALL TO 5m HEIGHT OVER A LENGTH OF 195m

INTERSECTION CONFIGURATION TO BE CONFIRMED

A BRIDGING DETAIL WILL BE REQUIRED OVER THE EXISTING STORMWATER CULVERT

PROPOSED "EEL" TYPE BUS STATION A MID-BLOCK SIGNALISED PEDESTRIAN CROSSING WILL LIKELY BE REQUIRED

CROSS SECTIONAL GRADING TO BE REFINED, POTENTIAL TO REDUCE CUT SLOPES IN THIS AREA

INTERSECTION CONFIGURATION TO BE CONFIRMED

OPPORTUNITY TO REPLACE EARTHWORKS WITH GRAVITY BLOCKWORK RETAINING WALL TO A HEIGHT OF 3.5m OVER A LENGTH OF 155m

ASSUME AN MSE WALL APPROXIMATELY 140m WITH 8.9m RETAINED HEIGHT. WILL REQUIRE GROUND IMPROVEMENT UNDER THE BACKFILL WITH RIGID INCLUSION EXTENDED TO ROCK TO CONTROL SETTLEMENT (eg. 20m+ CFA PILES TO ROCK WITH LOAD TRANSFER PLATFORM) REFER TO THE TYPICAL MSE WALL SECTION

ALTERNATIVELY CONSIDER CONTINUING THE ELEVATED STRUCTURE BY ANOTHER 4-5 SHORTER SPANS (22-25m) OF BRIDGE. THIS WOULD REQUIRE AN ADDITIONAL 1,400m<sup>2</sup> OF BRIDGE AREA. A TYPICAL SUPERSTRUCTURE MAY ENTAIL 4 x 1225 SUPER-T OR 800 DEEP HOLLOW CORE BEAMS.

OPPORTUNITY TO RELOCATE THE BUSWAY TO THE EAST AND SOUTH. THIS WOULD REQUIRE GREATER LAND PURCHASE BUT COULD SIGNIFICANTLY REDUCE THE GROUND IMPROVEMENT WORKS OR STRUCTURE IN THIS AREA

BRIDGE STRUCTURE ACROSS COASTAL MARINE AREA. TOTAL LENGTH APPROXIMATELY 140m. WIDTH APPROXIMATELY 9.3m BASED ON A 600mm SHOULDER. TOTAL BRIDGE AREA APPROXIMATELY 1,400m<sup>2</sup>

ASSUMED SUPERSTRUCTURE OF BRIDGE: 5 x 28m SPANS, 4 x 1225 SUPER-T OR 4 x 35m SPANS, 5 x 1525 SUPER-T (REFER TO TYPICAL BRIDGE CROSS SECTION)

ASSUMED SUBSTRUCTURE OF BRIDGE: 10-12m DEPTH TO ROCK WITH POOR GROUND ABOVE. ASSUME 1 x 1500DIA COLUMN ON 1800DIA PILE. ASSUMED PILE LENGTHS 20-25m. DIMENSIONS SUBJECT TO STRUCTURAL ASSESSMENT AND GROUND INVESTIGATION. (REFER TO TYPICAL BRIDGE CROSS SECTION)

TE RAKAU DRIVE BRIDGE WORKS AND THE TIMING OF WORKS TO THIS BRIDGE TO BE CONFIRMED

PROPOSALS FOR THE EXISTING 220kv TRANSPOWER ELECTRICAL CABLE TO BE CONFIRMED. RELOCATION HAS BEEN QUOTED AT \$3M WITH A LEAD TIME OF 3yrs

OFFLINE BUSWAY TO REJOIN CENTRE RUNNING BUSWAY THROUGH THIS INTERSECTION

A CYCLEWAY IS PROPOSED ALONG TE RAKAU DRIVE IN EACH DIRECTION. THIS WOULD BE CONSTRUCTED ALONG THE CURRENT FOOTPATH AND IMMEDIATELY ADJACENT TO IT, TO PROVIDE A 1m BERM TO THE CARRIAGEWAY, A 1.5m CYCLEWAY AND A 1.5m FOOTPATH SEPARATED BY A HALF-HEIGHT KERB. NO FURTHER WORKS ARE PROPOSED WITHIN THE CARRIAGEWAY ITSELF

ACCESS TO THE BUS DEPOT WOULD BE PROVIDED FROM THE BUSWAY, INCLUDING A TURNING AND PARKING AREA WITHIN THE BUS DEPOT. DETAILS TO BE CONSIDERED

REQUIRED EMBANKMENTS SHOWN HERE LIKELY CAN BE REMOVED THROUGH DETAILED DESIGN PROCESS OR AS A MINIMUM REPLACED WITH LOW (<800mm) MASS CONCRETE RETAINING STRUCTURES) ASSUME 100m OF 600mm HIGH WALL AT THIS STAGE

OPPORTUNITY TO PROVIDE LOWER COST SUSTAINABLE DRAINAGE SOLUTIONS IN THIS AREA IF ADDITIONAL LAND IS AVAILABLE TO THE NORTH

RISK THAT THE BUSWAY CANNOT BE SAFELY CONSTRUCTED IN THE AVAILABLE SPACE BEHIND THE COMMERCIAL PROPERTIES AND ADDITIONAL RESIDENTIAL LAND MUST BE PURCHASED. A DETAILED TOPOGRAPHICAL SURVEY IS REQUIRED TO CONFIRM THIS

CULVERT FOR OVERLAND FLOOD FLOW REQUIRED BENEATH THE BUSWAY IN THIS AREA

GROUND WILL REQUIRE RETENTION IN THIS AREA, WHICH COULD BE THROUGH EARTHWORKS OR BY MEANS OF A RETAINING WALL AT THIS LOCATION

A SIGNALISED INTERSECTION WILL BE REQUIRED HERE DUE TO THE ANGLE OF APPROACH ON THE WESTBOUND BUSWAY

38m SINGLE SPAN BRIDGE CREATED BY BRINGING THE BRIDGE APPROACHES INTO THE EXISTING CHANNEL AREA BY APPROXIMATELY 10m. ASSUME 5 x 1525 SUPER-T BEAMS WITH A SINGLE SPAN AND A BRIDGE AREA OF APPROXIMATELY 600m<sup>2</sup>. THIS WILL REQUIRE A HYDROLOGICAL ASSESSMENT AND ENVIRONMENTAL ASSESSMENT TO CONFIRM ACCEPTABILITY. ALTERNATIVELY CONSIDER SHORTER SPANS OF 25m EACH TO PROVIDE A LARGER OPENING, WHICH COULD THEREFORE BE SHALLOWER, SAY 125 SUPER-T OR 900mm DEEP HOLLOW CORE BEAMS. HOWEVER MULTI-CELL BOXES WOULD BE REQUIRED TO PROVIDE AN ADEQUATE OPENING. LARGE SETTLEMENTS WOULD ALSO BE LIKELY DUE TO THE 6-20m OF COMPRESSIBLE FILL IN THIS AREA, REQUIRING LONG PRE-LOADING DURING CONSTRUCTION. BOX CULVERTS WOULD ALSO HAVE A MUCH LARGER HYDROLOGICAL AND ECOLOGICAL IMPACT

RETAINING WALLS REQUIRED FOR THIS ALIGNMENT OVER APPROXIMATELY 50m AT 1-2m HEIGHT. THESE COULD BE GRAVITY WALLS OR REINFORCED CONCRETE AND MAY REQUIRE SCOUR PROTECTION AT THE TOE DUE TO THE PROXIMITY TO THE CREEK. PROVIDING EMBANKMENTS AS CURRENTLY SHOWN WOULD REQUIRE SUBSTANTIAL STREAM REALIGNMENT

ASSUME AN ELEVATED STRUCTURE THROUGH THIS AREA. ASSUME 100m LENGTH, 9.3m TOTAL WIDTH AND APPROXIMATELY 930m<sup>2</sup> AREA IN TOTAL. THIS STRUCTURE WOULD ALSO BE ON A TIGHT CURVE, WHICH IS NOT IDEAL. ASSUME 4 x 28m SPANS, 4 x 1225 SUPER-T BEAMS (REFER TO THE TYPICAL BRIDGE SECTION). NOTE THAT THE BRIDGE SOFFIT WOULD BE CLOSE TO THE EXISTING GROUND AND FLOOD LEVELS AND A HYDROLOGICAL AND ECOLOGICAL ASSESSMENT WOULD BE REQUIRED. AN ALTERNATIVE WOULD BE TO CREATE AN EMBANKMENT AND REALIGN THE STREAM, AND THIS WAS CONSIDERED DURING THE SPECIMEN DESIGN. HOWEVER, EXTENSIVE GROUND IMPROVEMENTS IN THE FORM OF A LOAD TRANSFER PLATFORM WITH RIGID INCLUSIONS WOULD BE REQUIRED TO CONTROL SETTLEMENT

COVER TO 220kv TRANSPOWER ELECTRICAL CABLE TO BE MAINTAINED. CABLE TO BE PROTECTED. DETAILS TO BE CONFIRMED WITH TRANSPOWER

OPPORTUNITY TO RELOCATE BUSWAY TO THE SOUTH, ENCRANCHING FURTHER INTO THE BUS DEPOT, TO REDUCE THE IMPACT OF EARTHWORKS. RETAINING WALLS AND STREAM REALIGNMENT REQUIRED. TO BE CONFIRMED WITH AT

OFFLINE BUSWAY TO REJOIN CENTRE RUNNING BUSWAY THROUGH THIS INTERSECTION

## Appendix 3C: MCA scoring outcome

The following is a copy of the spreadsheet that provides the scoring output from the technical assessors. The spreadsheet provides scores with and without mitigation.

If mitigation cannot be applied or is not required, the scores are the same for both with and without mitigation.





# Appendix 3D: Technical Assessors score sheets

The following is a copy of the technical assessors score sheets, including reasons for the scores provided.

**IPAA SHORTLISTED SCHEMES CONSTRUCTION MCA**

Item	Topic	Weighting	Description	Weighted score					
				Scheme 1 - EB3R online		Scheme 2 - EB3R offline		Scheme 1 - EB3R online	Scheme 2 - EB3R offline
				Score	Notes / Comments	Score	Notes / Comments		
1	Health & Safety	12	Assess level of HSE risk in construction activities required in the option beyond BAU risks (i.e. option requires considerable additional working at height, working close to live traffic and live services etc.)	-3	Working in live service and traffic corridor. Considered risk of asbestos removal considered neutral	-1	Less interaction with Live traffic and Services	-36	-12
2	Quality	6	Does the option require construction methods or contains constraints that results in a higher risk profile in achieving Quality requirements (further costs or resources)	-2	Tieing into existng will require more quality	-1	Offline works least quality issues	-12	-6
3	Environmental	6	Does the option require construction methods or contains constraints that results in a higher risk profile in achieving and maintaining Environmental compliance (further costs or resources)	0	Sediment control considerations etc.	0		0	0
4	Resourcing	2	Assess level of risk in availability of key resources (plant items, trade skills etc.) required to construct option	-1	Additional profiling / shaping required	0		-2	0
		2	Assess level of risk in availability of key subcontractors required in the option	0		0		0	0
		2	Assess level of risk in availability of key materials required in the option	0		0		0	0
5	COVID Risk	6	Assess level of risk in acquiring any key overseas resources (non-availability due to restrictions)	0		0		0	0
6	Access	2.7	Does the options access points result in restrictions to any current traffic movements or access to public areas	-3	Access constaints when central	-1		-8	-3
		2.7	Does the options construction footprint restrict access (consider deliveries to commercial properties, access to amenities, residential properties)	-1		-2	Working on residential boundaries	-3	-5
		2.7	Does the option have access, work area or method constraints that result in a reduction in productivity (increased cost)	-3	Less productive when central	-1		-8	-3
7	Out of Hours works	8	Does the option require considerable nightshift or weekend works to construct	-3		-1		-24	-8
8	Proximity to residential and commercial buildings	10	Does the option require construction works in close proximity to existing commercial and residential buildings (vibration, noise, dust, settlement risk etc.)	-1		-3	Working on residential boundaries	-10	-30
9	Services	10	Does the option involve interfacing with live services that cannot be eliminated or isolated	-3	More length in online over watermain. Works over HV cable and sewer are considered neutral	-2		-30	-20
10	Ground Conditions	4	Does the option increase the likelihood of unforeseen ground conditions (requiring additional ground improvement works)	0		-1	Latent geotech conditions (~greenfields)	0	-4
11	Programme	5.0	Assess the overall programme duration for the option	-2	1 work front / 1 crew. Circa 3 months longer than offline	-1	Limited to 3 work fronts only / 2 crews.	-10	-5
		2.5	Does the programme for the option have flexibility to adjust should constraints arise (ability to amend the critical path)	0	max crew sizes / open work fronts in both options	0		0	0
		2.5	Is the resource levelling for the options programme manageable	-1	Lack of ability to move around crews / work areas. Further reliance on traffic control resources	0		-3	0
12	Traffic	2.5	What are the perceived vehicle traffic / pedestrian / cyclist impacts associated with this scheme? eg. significant road or lane closures, increased congestion, delays, disruptions; for both private vehicles and PT etc.	-3	More traffic impacts working central. Pedestrians / cyclists neutral	-1		-8	-3
		2.5	Does there appear to be excessive temporary pavements required for traffic staging / traffic switches?	0		-1	Temporary pavement due to realignment of where busway comes back online	0	-3
		2.5	Does the scheme result in considerable 'ghost marking' or cost to manage 'ghost arking' due to traffic staging / switches?	-2		-1		-5	-3
		2.5	Does the scheme require perceived prolonged weekend and night closures and major traffic diversions over extended periods?	-3		-1		-8	-3
13	Constructability	2	Can the scheme be easily built with conventional and traditional methods and with local expertise and materials? Does it appear simple?	0	Construction methodolgies similar. Online has traffic management risks. Offline has potential ground condition issues (subgrade)	0		0	0
		2	Does the scheme present opportunities for repetition and re-use of materials if planned correctly? Is it smart and logical?	0		0		0	0
		100						-165	-106
									-60

**Assumptions**

Ratings can be up to + or - 4 considering Regional effects  
 Pavement overlay only on EastBound EB3R and EB3C, otherwise new  
 Not considering effects / impacts of Ti Rakau Dr. Bridge  
 Aquisition of Property is included in Property team MCA

**IPAA SHORTLISTED SCHEMES CONSTRUCTION MCA**

Item	Topic	Weighting	Description	Scheme 3 - EB3C online		Scheme 4 - EB3C offline		Weighted score	
				Score	Notes / Comments	Score	Notes / Comments	Scheme 3 - EB3C online	Scheme 4 - EB3C offline
1	Health & Safety	12	Assess level of HSE risk in construction activities required in the option beyond BAU risks (i.e. option requires considerable additional working at height, working close to live traffic and live services etc.)	-2	Work in live traffic corridor and live services	-3	Working at heights. More craneage. Working over water. Need to do online works for tie ins	-24	-36
2	Quality	6	Does the option require construction methods or contains constraints that results in a higher risk profile in achieving Quality requirements (further costs or resources)	-1		-2	Controlled environment, but restricted by property	-6	-12
3	Environmental	6	Does the option require construction methods or contains constraints that results in a higher risk profile in achieving and maintaining Environmental compliance (further costs or resources)	-1		-4	CMA, noise and vibration, dust	-6	-24
4	Resourcing	2	Assess level of risk in availability of key resources (plant items, trade skills etc.) required to construct option	-1	1 structure for Bus depot	-3	More plant & equipment / specialist skills for structures. Piling over water	-2	-6
		2	Assess level of risk in availability of key subcontractors required in the option	-1	1 structure for Bus depot	-3	Piling	-2	-6
		2	Assess level of risk in availability of key materials required in the option	-1	1 structure for Bus depot	-3	Precast bridge elements, temporary works	-2	-6
5	COVID Risk	6	Assess level of risk in acquiring any key overseas resources (non-availability due to restrictions)	0		-1	more items to construct	0	-6
6	Access	2.7	Does the options access points result in restrictions to any current traffic movements or access to public areas	-3		-2	online ties in and local business	-8	-5
		2.7	Does the options construction footprint restrict access (consider deliveries to commercial properties, access to amenities, residential properties)	-4	more impact on commercial frontages working central	-1		-11	-3
		2.7	Does the option have access, work area or method constraints that result in a reduction in productivity (increased cost)	-3		-4	constrained corridor, highly restricted due to limited access	-8	-11
7	Out of Hours works	8	Does the option require considerable nightshift or weekend works to construct	-2		-2	material movements / deliveries at night. Tie in works at night	-16	-16
8	Proximity to residential and commercial buildings	10	Does the option require construction works in close proximity to existing commercial and residential buildings (vibration, noise, dust, settlement risk etc.)	-3		-4	We will be working back to back with residential properties. Will still effect commercial properties. Slightly worse than the online option because of the skinny corridor	-30	-40
9	Services	10	Does the option involve interfacing with live services that cannot be eliminated or isolated	-3	not effecting HV. Watermain and sewer. Overhead lines neutral as structure is in similar location	-2		-30	-20
10	Ground Conditions	4	Does the option increase the likelihood of unforeseen ground conditions (requiring additional ground improvement works)	-1		-4	CMA, earth bund (potentially contaminated). Latent geotech conditions (~greenfields)	-4	-16
11	Programme	5.0	Assess the overall programme duration for the option	-3	circa 6 months longer than offline. 1 work front / 1 crew (1 structure + 1 civils)	-2	Limited to 3 work fronts only / 2 crews (2 structures + 2 civils).	-15	-10
		2.5	Does the programme for the option have flexibility to adjust should constraints arise (ability to amend the critical path)	-1	max crew sizes / open work fronts in both options	0	more structures / less flexibility. More linear programme. Ability to open up more work fronts with additional crews	-3	0
		2.5	Is the resource levelling for the options programme manageable	-1		0	Ability to open up more work fronts with additional crews	-3	0
12	Traffic	2.5	What are the perceived vehicle traffic / pedestrian / cyclist impacts associated with this scheme? eg. significant road or lane closures, increased congestion, delays, disruptions; for both private vehicles and PT etc.	-3	Considerable traffic interfacing - staging / sequencing in busy commercial area. Restrictions to turning movements	-1	Tie in work online but maintaining original traffic	-8	-3
		2.5	Does there appear to be excessive temporary pavements required for traffic staging / traffic switches?	0		-1	Temporary pavement due to realignment of where busway comes back online	0	-3
		2.5	Does the scheme result in considerable 'ghost marking' or cost to manage 'ghost arking' due to traffic staging / switches?	-2		-1		-5	-3
		2.5	Does the scheme require perceived prolonged weekend and night closures and major traffic diversions over extended periods?	-3		-1		-8	-3
13	Constructability	2	Can the scheme be easily built with conventional and traditional methods and with local expertise and materials? Does it appear simple?	-1	live traffic, narrow traffic corridor	-2	potential ground improvements. Conventional bridge methods	-2	-4
		2	Does the scheme present opportunities for repetition and re-use of materials if planned correctly? Is it smart and logical?	-1		0	Introduction of multiple structures leads to repetition of formwork etc. but more work	-2	0
		100						-193	-231
							<b>Net Difference</b>		<b>38</b>

**Assumptions**

Ratings can be up to + or - 4 considering Regional effects  
 Pavement overlay only on EastBound EB3R and EB3C, otherwise new  
 Not considering effects / impacts of Ti Rakau Dr. Bridge  
 Acquisition of Property is included in Property team MCA

## Multi Criteria Assessment Scoring Sheet

Name of assessor: James Arman

Area of assessment: Utilities

Guidance criteria considered: Built Environment – Impact on Utilities

Option 1: EB3R ON

Notes:

Impacted utilities:

- Watercare’s transmission watermain - Hunua No. 2 (approx. 750m)
- Watercare’s transmission wastewater main – Howick Interceptor (approx. 1 manhole)
- Transpower’s joint bay located outside 206 Ti Rakau Dr
- Local underground service networks

### Comments

Local networks – individual impact

Road widening will impact the existing water and wastewater network lining the footpath/berm of the existing westbound lane. These networks require to be relocated to the new footpath/berm, therefore, properties connected to the local network will be impacted.

Transmission networks – regional impact

Hunua no.2 (H2) is a transmission watermain which distributes to feeder networks, covering the East Auckland area. Road widening will uncover approx. 750m of H2 which runs parallel to the road alignment. It is assumed that the pipe has poor structural integrity due to poor bedding and deteriorating conditions due to being constructed in 1957. Uncovering the pipe will require some sort of treatment which is currently undetermined at this stage as asset surveys and consultation with Watercare has not taken place at the stage of this MCA workshop. However, works on the H2 network may impact the wider community if the service had to be temporarily shut down, or if the pipe burst during construction. It is also expected to have a high cost due to the scale of the pipe. Howick Interceptor is the wastewater transmission main which also serves the wide East Auckland area. Approx. one transmission manhole will require relocation near Gossamer Drive as it is an expectation from Watercare that all manholes be out of the carriageway.

In terms of Transpower’s joint bay, it is also an expectation from the utility operator that access to the joint bay be available at all times. Relocation of the joint bay may require temporary shutdown of power as works cannot be carried out on live power. As Transpower distributes power from the national grid, any feeder networks depend on Transpower’s distribution may experience temporary shutdown. Additionally, the cost of joint bay relocation is associated in the millions.

Scoring justification

This option has an impact on a local area level as the alignment impacts several transmission assets which service the wider community outside the project works area, thus having potential to affect at a regional level.

With mitigation, the impact on utilities will be neutral as relocation procedures will cover the construction risks, and utilities will be laid into the new original location ie. From existing footpath to new footpath.

### Assumptions

- H2 in EB1 had poor structural integrity due to bedding issues, it is assumed the same conditions prevail in EB3

- The existing asbuilts for H2 date back to 1957, it is assumed the pipe's condition is deteriorating and will require treatment if impacted by the road design.
- Road levels above the Transpower PAK-PEN 220kV underground cable will remain similar, if not the same, thus having no thermal effect.

Other information relied upon

- Specimen design Watercare meeting minutes (Watercare Scheme Design, 7 November 2018) for requirement of manholes to be out of the carriageway.
- Specimen design Transpower meeting (Transpower Meeting No.1, 2 May 2018) minutes for requirement to maintain access to joint bay.
- Meeting minutes with Transpower (30 November 2020) – any level changes from existing depth of cover will create extra insulation on cables, rule of thumb is to keep current finished levels.

No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Option 2: EB3R OFF

Notes:

Impacted utilities:

- Approx. 2x Watercare's Howick Interceptor manhole (1x near Gossamer Dr, 1x near Marriott Rd)
- Local underground service networks

Comments

This option mainly affects the local water and wastewater network, and the transmission wastewater main Howick Interceptor. Other electrical and communication networks are in the existing carriageway and is assumed to be unaffected from the addition of the offline busway.

In terms of the local network relocations, there will only be an individual to local level impact. However, the impacts on the transmission main may impact the wider community as the offline route traverses over the Howick Interceptor. Approx. two manholes will require relocation as it is an expectation from Watercare that manholes be moved out of the carriageway. This transmission main serves a wider network outside of the project works area, therefore any modifications on may have a significant impact on the wider community. The impacts could be reduced through early consultation with Watercare as relocation designs of any Watercare assets will be done by EBA.

Scoring Justification

Without mitigation, a score of -2 has been given as the alignment affects manholes which are localised in the project area. With mitigation, the impact on utilities will be neutral as relocation procedures will cover the construction risks, and utilities will be laid into the new original location ie. From existing footpath to new footpath.

Assumptions

- Road levels above the Transpower's PAK-PEN 220kV underground cable which runs throughout Ti Rakau Dr will remain similar, if not the same, thus having no thermal effect.

Other information relied upon

- Specimen design Watercare meeting minutes (Watercare Scheme Design, 7 November 2018) for requirement of manholes to be out of the carriageway
- Meeting minutes with Transpower (30 November 2020) – any level changes from existing depth of cover will create extra insulation on cables, rule of thumb is to keep current finished levels.

No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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**Option 3: EB3C ON**

- Notes:
- Impacted utilities:
- Low to medium voltage Vector cables throughout the westbound lane, and Burswood Reserve
  - Approx. 4 Vector transformers located in the existing berm of the westbound lane
  - Transpower’s OTA-PEN 220kV overhead OTA-PEN line through Burswood Reserve to Warehouse Stationery
  - Transpower’s joint bay in front of Z fuel station, and pulling pit near Bunnings
  - Local underground service networks in the westbound lane

Comments

Local Networks – individual to local impact  
 This option will likely have impacts at an individual to local level by affecting the users connected to the local electrical, water and wastewater network.  
 Majority of the local water and wastewater network will end up on the proposed carriageway and will require to be relocated into the new footpath/berm in order to meet Watercare’s standards of utilities to be in the footpath berm/area with access. Therefore, those buildings connected to the local network may experience service disruption.  
 The same applies for Vector’s underground low to medium voltage cables. The cables exist throughout the westbound lane with a high concentration of near the Harris Rd – Ti Rakau Dr intersection, crossing perpendicularly to Ti Rakau Dr. It is highly likely there will be temporary power shut off in order to relocate the electrical cables as works cannot be done on live power. Similar to the water and wastewater network, those buildings which operate by Vector distribution will be impacted.  
 Additionally, road widening will affect approx. four Vector transformers which are located in the footpath/berm of the existing westbound lane. All transformers will require relocation in order to suit the road alignment, as they will end up on the proposed road carriageway.  
 Transpower – local area impact  
 The effect of Transpower asset relocation is predicted to be more widespread due to the project works area being in the vicinity of the substation which distributes power to the nearby communities (OTA-PEN distributes power to Otara to Penrose, PAK-PEN distributes power to Pakuranga to Penrose). Therefore, any modifications to the service network is likely to impact on a community level as Transpower distributes power from the national grid, any feeder networks depend on Transpower’s power may experience temporary shutdown. Additionally, any works on existing cables

could compromise the power efficiency, where the efficiency is linked to the end user's rates (ie. better efficiency = cheaper)

In terms of the joint bay and pulling pit, it was an expectation from Transpower during the specimen design phase that access to be maintained at all times. It was additionally noted that the overhead line at Burswood Reserve may require raising in order to meet the standard minimum clearance of 10.5m above ground. Therefore, modifications and relocations would be required in order to suit the road alignment.

Unlike the local network which needs relocation to suit the road alignment, there may be possible work around for the Transpower assets by engaging the utility prover early on, and consulting the assets affected based. Additionally, any works on the overhead line is expected to impact a smaller area of land as the line crosses perpendicularly to Ti Rakau Dr.

Scoring Justification

Due to the considerable number of transmission and distribution electrical assets, a score of -4 has been given without mitigation due to the potential of affecting the wider community outside of the project area, potentially into the regional level as the assets here are distribution mains.

With mitigation, the impact on utilities will be neutral as relocation procedures will cover the construction risks, and utilities will be laid into the new original location ie. From existing footpath to new footpath.

Assumptions

- Transpower PAK-PEN 220kV unaffected as road levels will remain similar if not the same, thus having no impact on the cable.

Other information relied upon

- Specimen design Transpower meeting minutes (2 May 2018, 10am) states the OTA-PAK line in Burswood/Greenmount will likely require raising to meet standard of 10.5m above ground.
- Specimen design Transpower meeting (Transpower Meeting No.1, 2 May 2018) minutes for requirement to maintain access to joint bay.
- Meeting minutes with Transpower (30 November 2020) – any level changes from existing depth of cover will create extra insulation on cables, rule of thumb is to keep current finished levels.

No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Option 4: EB3C OFF

Notes:

Impacted utilities:

- Transpower's PAK-PEN-B 220kV underground cable through Burswood Reserve
- Transpower's OTA-PAK-A 220kV overhead cable in Burswood Reserve
- Vector's 33kV medium voltage cables through Burswood Reserve
- Local underground service networks

Comments



**Local Networks – individual impact**

In terms of the local network, only those water and wastewater assets where the alignment crosses perpendicularly to Burswood Drive will be impacted. Therefore, only having impact on an individual level to those properties connected to these networks.

**Electrical Assets –local area impact**

This option will largely impact electrical assets located in Burswood Reserve as the cables and lines connect to the substation located behind the reserve/bus depot.

Similar to the EB3C online option, relocation of these assets connected to the substation may have a widespread community impact as the cables and lines distributes as far as Otara, Penrose and Pakuranga. Likewise, any works on existing cables could compromise the power efficiency, where the efficiency is linked to the end user’s rates (ie. better efficiency = cheaper). Therefore, any modifications to the transmission service network is likely to impact on a community level.

Vector’s 33kV medium voltage underground cables will also be impacted and may require relocation in order to suit the road design. This will have an impact to the end users connected to Vector’s power network.

**Scoring Justification**

Without mitigation, a score of -2 has been given due to the localised impact the affected utilities will have.

With mitigation, the impact on utilities will be neutral as relocation procedures will cover the construction risks, and utilities will be laid into the new original location ie. From existing footpath to new footpath.

Assumptions

- Road levels above the Transpower’s PAK-PEN 220kV underground cable will remain similar, if not the same, thus having no thermal effect.

Other information relied upon

- Specimen design Transpower meeting minutes (Transpower Meeting No.1, 2 May 2018) states the OTA-PAK line in Burswood/Greenmount will likely require raising to meet the minimum clearance of 10.5m above ground level
- Meeting minutes with Transpower (30 November 2020) – any level changes from existing depth of cover will create extra insulation on cables, rule of thumb is to keep current finished levels.

No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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## Multi Criteria Assessment Scoring Sheet

Name of assessor: Fenella Fischer

Area of assessment: Residential Option Online

Guidance criteria considered:

Option 1: RESIDENTIAL ONLINE

Notes:

25 Partial Acquisitions – these are driveways - 9 are cross lease properties, 16 freehold, 2 unit title

9 Full Acquisitions – 2 commercial properties (105-107 Ti Rakau), similar both options

Of the total 34 affected properties, 3 are Reserves/AC land affected

Total properties affected 34

Land required from 3 reserves (33R Edgewater, 159R Edgewater, 168R Gossamer approx. 7,700sqm)

Comments

Small partial acquisitions of driveways, less land impacted do not need to relocate and provide new accesses to the properties. Difference in forecast under two options is approx \$10 million, online more favourable.

Auckland Councils assets are being revalued and book value of reserves/AC owned land will increase in June 2021.

Assumptions

Assumed full acquisitions on 2/1 Roseburn, 2 Wheatley, 191 Ti Rakau (could be possible to retain rear dwelling, however as a freehold title assumed full)

177R removed, not required.

219 and 229 Ti Rakau (Church land), assumed carparks can be redesigned to compensate for the loss.

Other information relied upon

JLL completed high level assessment on the value of the residual land, looking at the land use opportunity enabled under the Auckland Unitary Plan and National Policy Statement for Urban Development. A reintegration strategy has been produced by Boffa Miskell, for the online option of approx 728 houses/apartments could be developed, compared to offline option of approx 630 houses/apartments. A difference of no. 98. JLL have assessed the online option at a higher value – \$42.5 million, compared to the offline version at \$38 million (aggregate value). The online version based on Boffa plans is more developable to the market, with greater potential in the number of apartments/houses that could potentially be developed.

Book value of AC land holdings.

No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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## Option 2: Residential OFFLINE

### Notes:

25 Partial Acquisitions – 9 cross lease properties, 16 freehold, 2 unit title - driveways

15 Full Acquisitions – 2 commercial properties (105-107 Ti Rakau)

Land required from 3 reserves (33R Eddgewater, 159R Eddgewater, 168R Gossamer approx. 11,000 sqm)

Total properties affected 40

### Comments

Partial acquisitions of driveways, access to properties is severed from Ti Rakau Drive. New roads will need to be constructed for access. More complex acquisitions as will need to include the new accessways, can become difficult and time consuming.

Cost to acquire land more, difference approx \$10 million.

Auckland Council assets are being revalued and book value of reserves will increase in June 2020

### Assumptions

Assumed full acquisitions on 2/1 Roseburn, 2 Wheatley, 191 Ti Rakau (may be possible to retain rear dwelling, however as a freehold title assumed full). 165A and 165B Eddewater assumed full, very close to building.

177R removed, not required.

7 Mattson, acquired 118sqm in 2014, have assumed no land required can be built in land already acquired.

6 Mattson – included 2 cross lease properties, have assessed as partial possibility this could revert to a full.

219 and 229 Ti Rakau (Church land), assumed carparks can be redesigned to compensate for the loss.

200 Burswood can be designed out with land take from 219 Burswood.

### Other information relied upon

JLL completed high level assessment on the value of the residual land, looking at the land use opportunity enabled under the Auckland Unitary Plan and National Policy Statement for Urban Development. A reintegration strategy has been produced by Boffa Miskell, for the online option of approx 728 houses/apartments could be developed, compared to offline option of approx 630 houses/apartments. A difference of no. 98. JLL have assessed the online option at a higher value – \$42.5 million, compared to the offline version at \$38 million (aggregate value). The online version based on Boffa plans is more developable to the market, with greater potential in the number of apartments/houses that could potentially be developed.

Book Value of AC land holdings

No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
Mitigation Score (please circle or highlight score):										
-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
Option 3: COMMERCIAL ONLINE										
<p>Notes:</p> <p>Unit Title - 13 partial acquisitions - 3 of these properties have their carparking affected (common area) with 6 units (AU) affected, meaning two agreements (BC and owner), more complex, costly and time consuming.</p> <p>Freehold – 17 Partial acquisitions, of this 10 properties have carparking affected.</p> <p>Freehold – 1 Full acquisition, may require buyout/relocation of lessee interest.</p> <p>337 and 279 Ti Rakau – lose right hand turn into properties.</p> <p>Total number of properties affected 31, however could involve compensating lessee, too early to determine extent as not privileged to lease information.</p> <p>Unit Titles acquisitions are expensive, time consuming and complex acquisitions and often involve 2 agreements with an Owner and the Body Corporate.</p> <p>Mitigation around carparking will be difficult and in some cases not possible. Substantially more carparks and businesses affected under this option.</p> <p>AC/Reserve land, 1R Burswood, 23R Kenwick, 49R Greenmount, 183 Harris, 400R Ti Rakau – approx. 2100 sqm</p> <p><u>Comments</u></p> <p>Complex acquisitions with a number of Unit Titles, carparks are affected (10 of the unit title properties have carparks affected (4 in the common area and 6 in ROT).</p> <p>Large number of carparks affected, unknown as to the effect on businesses/leases. Lessee information not available to determine if there any other interests to compensate.</p> <p>Acquisitions at 241, 247, 249 and 257 same under each option with carparking affected and relocation of a building.</p> <p>Disruption to businesses, unknown, these are large commercial tenancies that rely on road frontage and access to their buildings, i.e car yards, restaurants, retail premises.</p> <p><u>Assumptions</u></p> <p>386 Ti Rakau, assume this area can be designed out.</p> <p>181R Guys Rd, not included in EB3, to be included in EB4</p> <p>154 Harris Road, Unit Title, affects common area and Unit, can be designed out.</p> <p>53 Huntingtree full cannot redesign parking and entrance way</p> <p>47C Huntingtree, land take could affect the operation of the playground.</p> <p>347 Ti Rakau – traffic circulation is not adversely affected as it a key to the operation of car wash business.</p> <p>90 Greenmount – assumed no carparking affected, retaining will be completed in berm area.</p>										

Access during construction to commercial premises will be provided.

Other information relied upon

Gribble Churton Taylor (valuers) provided a high level review of high value properties along the commercial section particularly around injurious affection.

Book value of AC land holdings.

No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Option 4: COMMERCIAL OFFLINE

Notes:

Unit Title – 2 partial acquisitions in common area, earth bund area.

Freehold – 17 partial acquisitions (16 commercial and 1 residential, of 14 commercial 5 land requirements - affect carparking 241 Ti Rakau, 247 Ti Rakau, 249 Ti Rakau, 257 Ti Rakau, 22 Torrens)

Freehold Full – 6 residential, this could reduce if we can retain some of the units at 21 Burswood where 3 properties are being built. (21, 26,207, 209, 211, 213 Burswood)

Total number of properties affected 25, however could involve compensating lessee, too early to determine extent as not privileged to lease information.

AC/Reserve land, 1R Burswood, 23R Kenwick, 252R Ti Rakau, 254 Ti Rakau – approx 7,920 sqm.

Large land requirements at 320 Ti Rakau, 262 Ti Rakau and 8 Torrens, over 2000sqm.

Comments

Total number of properties affected 25, full residential acquisitions considered less complex, than commercial properties with multiple ownership. Only 2 properties with multiple owners (unit titles) land in common area.

Acquisitions at 241, 247, 249 and 257 same under each option require relocation of building.

Area that is affected on commercial appears to have less affect on the operation of the businesses – with land required at the rear, expect for properties at 241, 247 and 257 which are the same under both options.

Assumptions

Assumed 200 Burswood can be designed out and land take will be off 219 Burswood with substation relocated to adjacent site.

53 Huntingtree – designed out

320 Ti Rakau – no adverse effect on business operation i.e trucks can still access loading bays, turn around, this needs confirmation.

400R Ti Rakau – removed from design

Assumed the busway can be constructed within narrow area at the rear, with minimal adverse effect on the surrounding residential properties, i.e vibration, noise and temporary relocation.

21 Burswood is being developed - 3 units are being constructed, may be able to retain some of the dwellings, assumed it is a full acquisition of 3 units, however this could be minimised.

Other information relied upon

Gribble Churton Taylor (valuers) reviewed costings of high value properties along the commercial section.

Book value of AC land holdings.

No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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## Multi Criteria Assessment Scoring Sheet

Name of assessor: Joe Grimes

Area of assessment: Acoustics consideration

Guidance criteria considered: Guidance for EB3 Options Assessment Workshop (EB234-1-PL-GL-Z3-00000-1)

### Option 1: EB 3 – Online Residential

Notes:

#### Comments

The option involves the widening of Ti Rakau Drive and construction of bus lanes in the centre of the road and road traffic lanes closer to residential properties to the south of Ti Rakau Drive. The new road traffic lanes will be constructed closer to residential receptors than the existing road configuration.

The drawings provided show that Ti Rakau Drive will be elevated above the residential receptors to the south of the road. This combined with the removal of the existing residential properties nearest to Ti Rakau Drive will mean that residential properties south of those to be removed, who are currently screened from traffic on Ti Rakau Drive, will no longer benefit from this screening.

With mitigation from a quieter road surface and noise barriers located in optimum locations, it is considered that a -1 score is appropriate for this option. Without mitigation, a score of -2 would be appropriate.

Construction noise and vibration effects will be of limited duration and can be mitigated/ managed through a CNVMP.

#### Assumptions

- Quieter road surface than existing road.
- Noise barriers will be used along the southern edge of Ti Rakau Drive to reduce traffic noise to receptors to the south.
- Properties currently located along southern side of Ti Rakau Drive will be demolished.

#### Other information relied upon

- Options assessment workshop guidance – EB234-1-PL-GL-Z3-00000-1

No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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### Option 2: EB 3 – Offline Residential

Notes:

#### Comments

Construction noise and vibration may be slightly worse with this option as the busway appears to run closer to sensitive receivers than the online option meaning construction works will be closer. Construction noise and vibration effects will be of limited duration and can be mitigated/ managed through a CNVMP.

The busway moves closer to sensitive receivers than the online option, so therefore traffic noise levels may increase at these properties compared to the online option. Properties that currently experience limited road traffic noise will be located immediately adjacent to the new bus lanes and will experience increased road traffic noise levels from Ti Rakau Drive, due to the demolition of existing properties located along the southern side of Ti Rakau Drive.

Vibration levels could also increase at some properties. In addition to barriers, any increase in noise and/or vibration can be mitigated by selection of a low noise road surface and by ensuring that the surface is free from defects.

Assumptions

- Quieter road surface will be used for the bus lanes and for Ti Rakau Drive than current situation.
- Noise barriers along the new offline busway.
- Properties currently located along southern side of Ti Rakau Drive will be demolished.

Other information relied upon

- Options assessment workshop guidance – EB234-1-PL-GL-Z3-00000-1

No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Option 3: EB 3 – Online Commercial

Notes:

Comments

This option has a minimal impact on noise-sensitive receivers and, with the construction of a quieter road surface, is scored as a 0 when compared with the current situation.

Whilst road traffic will be closer to commercial/industrial receivers than the current situation, these receivers are not considered to be noise-sensitive, and their existing use is not likely to be impacted by marginal increase in road traffic noise.

This option does not adversely impact noise sensitive receivers, with the exception of a very small number of properties at the eastern end of the alignment by the intersection with Huntingdon Drive, where road traffic lanes are being constructed nearer to receivers than the existing situation.

Assumptions

- Quieter road surface will be used for the bus lanes and for the widened road traffic lanes on Ti Rakau Drive than exists in the current situation.
- Noise barriers to screen sensitive receivers near the intersection with Huntingdon Drive.

Other information relied upon

- Options assessment workshop guidance – EB234-1-PL-GL-Z3-00000-1

No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Option 4: EB 3 – Offline Commercial

Notes:

Comments

Construction noise and vibration effects will be worse with this option as the busway appears to run through a residential area whilst previous options followed the existing road through the commercial area. Construction works are therefore much closer to sensitive receivers than the other options.

Construction noise and vibration effects will be of limited duration and can be mitigated/ managed through a CNVMP.

The busway moves much closer to sensitive receivers which were not impacted at all by the other options that followed the existing road alignment. Noise effects are therefore worse with this option than other options. Further to this, the construction of the busway involves the removal of a bund that currently exists to the north of commercial premises on Torrens Road, thereby removing the benefit of screening provided by this bund to residential receptors located immediately to the north.

Vibration levels may also increase at some properties. In addition to barriers, any increase in noise and/or vibration can be mitigated by selection of a low noise road surface and by ensuring that the surface is free from defects.

Due to the adverse effect on residential properties to the north of the alignment, this option has been scored a -3 without mitigation, and a -2 with mitigation.

Assumptions

- Low-noise road surface will be used for the construction of bus lanes.
- Noise barriers to screen sensitive receivers from bus lanes at Heathridge Place, Dulwich Place, Tullis Place and Burswood Drive.

Other information relied upon

- Options assessment workshop guidance – EB234-1-PL-GL-Z3-00000-1

No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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## Appendix 2: Multi Criteria Assessment Scoring Sheet

### Multi Criteria Assessment Scoring Sheet

**Name of assessor:** Dr Jacqui Bell

**Area of assessment:** The area potentially affected by the EB3 proposed alignments including Pakuranga and the area adjacent to and within the Tamaki Estuary and its' tributaries.

**Guidance criteria considered:**

The criteria set out within the appended memo has been used to assess marine ecological values.

The EIANZ. (2018). Ecological impact assessment (EclA): EIANZ guidelines for use in New Zealand: Terrestrial and freshwater ecosystems. 2nd EDITION. Environment Institute of Australia and New Zealand were used for assessing magnitude and level of effect on marine ecological values.

**Option 1:** Online Residential

**Notes:**

Comments

Proposed alignment has potential effects through downstream discharges of sediment (construction phase) and stormwater contaminants (operational phase) on Low marine ecological values characterized by:

- upper estuary tidal mudflats and mangrove habitat, some of which forms part of Pakuranga Creek Significant Ecological Area SEA-M2-45b
- low benthic invertebrate abundance, species richness and diversity
- a benthic invertebrate assemblage dominated by tolerant organisms.
- fine sediment comprising 50-80% silt and clay
- low levels of surface sediment oxygenation
- elevated contaminant concentrations in surface sediment for zinc
- Highly modified through coastal infrastructure, dumped rubbish and stormwater discharges

Potential effects on the marine environment associated with Option 1 include:

- Treated discharges of sediment (during construction), and
- Treated discharges of stormwater (operational phase)

The magnitude of effects is considered Low for sediment and Negligible for stormwater. In combination with Low marine ecological values, the overall level of effect is assessed as very Low (-1). Mitigation is not considered necessary for a very Low level of effect on marine ecological values.

Assumptions

Information on extents and areas of identified sites and presence of threatened and/or at risk species relies solely on current available information and desktop analysis. Actual extents and values may differ from those described.

Where there is a lack of information on species distribution within identified habitats a precautionary approach of assuming the species is present in the area has been taken.

Where mapping detail of map sources is low and there is uncertainty of whether identified features are impacted by the proposed alignment a precautionary approach of assuming the identified feature is impacted by the proposed alignment has been taken.

Other information relied upon

Existing information on marine ecological values was extracted from the:

- Auckland Unitary Plan - Operative
- AMETI Eastern Busway 2 and 3 - Assessment of Effects on Marine Ecology and Coastal Avifauna. Document Number. AMETI-SD-RPT-ALL-163-0033. Contract NO. 344-17-782-PS. Prepared for Auckland Transport. 11 December 2018.



**No Mitigation Score (please circle or highlight score):**

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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**Mitigation Score (please circle or highlight score):**

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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**Option 2: Offline Residential**

**Notes:**

Comments

Proposed alignment has potential effects through downstream discharges of sediment (construction phase) and stormwater contaminants (operational phase) on Low marine ecological values characterized by:

- upper estuary tidal mudflats and mangrove habitat, some of which forms part of Pakuranga Creek Significant Ecological Area SEA-M2-45b
- low benthic invertebrate abundance, species richness and diversity
- a benthic invertebrate assemblage dominated by tolerant organisms.
- fine sediment comprising 50-80% silt and clay
- low levels of surface sediment oxygenation
- elevated contaminant concentrations in surface sediment for zinc
- Highly modified through coastal infrastructure, dumped rubbish and stormwater discharges

Potential effects on the marine environment associated with Option 2 include:

- Treated discharges of sediment (during construction), and
- Treated discharges of stormwater (operational phase)

The magnitude of effects is considered Low for sediment and Negligible for stormwater. In combination with Low marine ecological values, the overall level of effect is assessed as Very Low (-1). Mitigation is not considered necessary for a Very Low level of effect on marine ecological values.

Assumptions

Information on extents and areas of identified sites and presence of threatened and/or at risk species relies solely on current available information and desktop analysis. Actual extents and values may differ from those described.

Where there is a lack of information on species distribution within identified habitats a precautionary approach of assuming the species is present in the area has been taken.

Where mapping detail of map sources is low and there is uncertainty of whether identified features are impacted by the proposed alignment a precautionary approach of assuming the identified feature is impacted by the proposed alignment has been taken.

Other information relied upon

Existing information on marine ecological values was extracted from the:

- Auckland Unitary Plan - Operative
- AMETI Eastern Busway 2 and 3 - Assessment of Effects on Marine Ecology and Coastal Avifauna. Document Number. AMETI-SD-RPT-ALL-163-0033. Contract NO. 344-17-782-PS. Prepared for Auckland Transport. 11 December 2018.



No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Option 3: Online Commercial

Notes:

Comments

Proposed alignment has potential effects through downstream discharges of sediment (construction phase) and stormwater contaminants (operational phase) on Low marine ecological values characterized by:

- upper estuary tidal mudflats and mangrove habitat, some of which forms part of Pakuranga Creek Significant Ecological Area SEA-M2-45b
- low benthic invertebrate abundance, species richness and diversity
- a benthic invertebrate assemblage dominated by tolerant organisms.
- fine sediment comprising 50-80% silt and clay
- low levels of surface sediment oxygenation
- elevated contaminant concentrations in surface sediment for zinc
- Highly modified through coastal infrastructure, dumped rubbish and stormwater discharges

Potential effects on the marine environment associated with Option 3 include:

- Permanent habitat loss including mangrove removal within Pakuranga Creek associated with a new bridge structure to replace the existing Ti Rakau Bridge,
- Temporary habitat loss and disturbance associated with works within the CMA
- Temporary disturbance to contaminated marine sediments associated with works within the CMA;
- Treated discharges of sediment (during construction), and
- Treated discharges of stormwater (operational phase)

The magnitude of these effects are considered Moderate for habitat loss, Low for temporary habitat disturbance, Negligible for temporary disturbance to contaminated sediments, Low for sediment discharges and negligible for stormwater discharges. In combination with Low marine ecological values, the overall level of effect is assessed as Low (-2). Mitigation is not considered necessary for a low level of effect on marine ecological values.

Assumptions

Information on extents and areas of identified sites and presence of threatened and/or at risk species relies solely on current available information and desktop analysis. Actual extents and values may differ from those described.

Where there is a lack of information on species distribution within identified habitats a precautionary approach of assuming the species is present in the area has been taken.

Where mapping detail of map sources is low and there is uncertainty of whether identified features are impacted by the proposed alignment a precautionary approach of assuming the identified feature is impacted by the proposed alignment has been taken.

Other information relied upon

Existing information on marine ecological values was extracted from the:

- Auckland Unitary Plan - Operative
- AMETI Eastern Busway 2 and 3 - Assessment of Effects on Marine Ecology and Coastal Avifauna. Document Number. AMETI-SD-RPT-ALL-163-0033. Contract NO. 344-17-782-PS. Prepared for Auckland Transport. 11 December 2018.



No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Option 4: Offline Commercial

Notes:

Comments

Proposed alignment has potential effects through downstream discharges of sediment (construction phase) and stormwater contaminants (operational phase) on low marine ecological values characterized by:

- upper estuary tidal mudflats and mangrove habitat, some of which forms part of Pakuranga Creek Significant Ecological Area SEA-M2-45b
- low benthic invertebrate abundance, species richness and diversity
- a benthic invertebrate assemblage dominated by tolerant organisms.
- fine sediment comprising 50-80% silt and clay
- low levels of surface sediment oxygenation
- elevated contaminant concentrations in surface sediment for zinc
- Highly modified through coastal infrastructure, dumped rubbish and stormwater discharges

Potential effects on the marine environment associated with Option 3 include:

- Permanent habitat loss including mangrove removal within Pakuranga Creek associated with a new bridge section that runs alongside china town and a new bridge structure to replace the existing Ti Rakau Bridge,
- Permanent habitat loss including mangrove removal
- Temporary habitat loss and disturbance associated with works within the CMA
- Temporary disturbance to contaminated marine sediments associated with works within the CMA;
- Treated discharges of sediment (during construction), and
- Treated discharges of stormwater (operational phase)
- 

The magnitude of these effects are considered High for permanent habitat loss, Low for temporary habitat disturbance, Negligible for temporary disturbance to contaminated sediments, Low for sediment discharges and negligible for stormwater discharges. In combination with Low marine ecological values, the overall level of effect is assessed as Low (-2). Mitigation is not considered necessary for a Low level of effect on marine ecological values.

Assumptions

Information on extents and areas of identified sites and presence of threatened and/or at risk species relies solely on current available information and desktop analysis. Actual extents and values may differ from those described.

Where there is a lack of information on species distribution within identified habitats a precautionary approach of assuming the species is present in the area has been taken.

Where mapping detail of map sources is low and there is uncertainty of whether identified features are impacted by the proposed alignment a precautionary approach of assuming the identified feature is impacted by the proposed alignment has been taken.

Other information relied upon

Existing information on marine ecological values was extracted from the:

- Auckland Unitary Plan - Operative
- AMETI Eastern Busway 2 and 3 - Assessment of Effects on Marine Ecology and Coastal Avifauna. Document Number. AMETI-SD-RPT-ALL-163-0033. Contract NO. 344-17-782-PS. Prepared for Auckland Transport. 11 December 2018.



**No Mitigation Score (please circle or highlight score):**

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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**Mitigation Score (please circle or highlight score):**

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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# Memorandum

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Attention: Jarrod Snowsill

Company: Eastern Busway Alliance

Date: 27<sup>th</sup> January 2021

From: Dr Jacqui Bell (Marine)

Message Ref: Methodology and criteria used to assess significance of effects on marine ecological values

Project No: BM19638

## Introduction

Boffa Miskell Ltd have been asked by Eastern Busway Alliance to a Multicriteria Analysis for the EB3 component of the eastern Busway Project. This will enable the development of a final alignment, in a manner that meets the tests of section 171 of the RMA. This memo outlines the criteria used to assess the significance of potential effects on marine ecological values of the proposed four options.

## Methodology

A Multi Criteria Assessment (MCA) scoring sheet has been used to assess the magnitude and significance of effect of each alignment option on marine ecological values using an adaptation of the EIANZ 2018 ecological impact assessment guidelines. Assumptions and information relied is specified within each sheet.

Assessments have been carried out using a precautionary approach whereby both likely and potential habitat for threatened or at-risk species has been identified and considered in scoring. An assumption of best practice construction methodology has been applied.

Ecological value is assessed following the guidance provided in Table 1. Magnitude of effect is assess following the guidance outlined in Table 2. These two assessments are then used to determine a level of ecological effect following the matrix outlined in Table 3. Table 4 sets out the MCA scoring scale for the project aligned against the EIANZ guidelines for level of effect. The value of the benthic marine habitat within the predicted area of effect was assessed based on the existing information using the characteristics in Table 1.<sup>1</sup>

Table 1: Criteria for assigning ecological value to soft sediment marine/estuarine habitats

ECOLOGICAL VALUE	CHARACTERISTICS
<b>Very low</b>	<ul style="list-style-type: none"> <li>Benthic invertebrate community degraded with very low species richness, diversity and abundance.</li> <li>Benthic invertebrate community dominated by tolerant organisms with no sensitive taxa present.</li> <li>Marine sediments dominated by silt and clay grain sizes (&gt;85%).</li> </ul>

<sup>1</sup> Currently there are no guidelines for how to assess the ecological values of marine environments in New Zealand. The characteristics of estuarine sites with low, medium and high ecological values have been developed by Dr De Luca, Boffa Miskell Ltd, to guide valuing estuarine environments, and to provide a transparent approach that can be replicated. The characteristics have been applied in Environment Court and Board of Inquiry hearings, including a number of NZTA projects (Transmission Gully, MacKays to Peka Peka, and Puhoi to Warkworth). The characteristics have been modified over the years as improvements are recognised.



ECOLOGICAL VALUE	CHARACTERISTICS
	<ul style="list-style-type: none"> <li>• Surface sediment anoxic (lacking oxygen).</li> <li>• Elevated contaminant concentrations in surface sediment, above GV threshold concentrations (Australian and New Zealand Governments, 2018).</li> <li>• Invasive, opportunistic and disturbance tolerant species highly dominant.</li> <li>• Vegetation/macroalgae absent.</li> <li>• Habitat extremely modified.</li> </ul>
<b>Low</b>	<ul style="list-style-type: none"> <li>• Benthic invertebrate community degraded with low species richness, diversity and abundance.</li> <li>• Benthic invertebrate community dominated by tolerant organisms with few/no sensitive taxa present.</li> <li>• Marine sediments dominated by silt and clay grain sizes (&gt;75%).</li> <li>• Surface sediment predominantly anoxic (lacking oxygen).</li> <li>• Elevated contaminant concentrations in surface sediment, above GV threshold concentrations (Australian and New Zealand Governments, 2018).</li> <li>• Invasive, opportunistic and disturbance tolerant species dominant.</li> <li>• Vegetation/macroalgae provides minimal/limited habitat for native fauna.</li> <li>• Habitat highly modified.</li> </ul>
<b>Medium</b>	<ul style="list-style-type: none"> <li>• Benthic invertebrate community typically has moderate species richness, diversity and abundance.</li> <li>• Benthic invertebrate community has both tolerant and sensitive taxa present.</li> <li>• Marine sediments typically comprise less than 75% silt and clay grain sizes.</li> <li>• Shallow depth of oxygenated surface sediment.</li> <li>• Contaminant concentrations in surface sediment generally below GV threshold concentrations (Australian and New Zealand Governments, 2018).</li> <li>• Few invasive opportunistic and disturbance tolerant species present.</li> <li>• Vegetation/macroalgae provides moderate habitat for native fauna.</li> <li>• Habitat modification limited.</li> </ul>
<b>High</b>	<ul style="list-style-type: none"> <li>• Benthic invertebrate community typically has high diversity, species richness and abundance.</li> <li>• Benthic invertebrate community contains many taxa that are sensitive.</li> <li>• Marine sediments typically comprise &lt;50% smaller grain sizes.</li> <li>• Surface sediment oxygenated.</li> <li>• Contaminant concentrations in surface sediment rarely exceed DGV threshold concentrations (Australian and New Zealand Governments, 2018).</li> <li>• Invasive opportunistic and disturbance tolerant species largely absent.</li> <li>• Vegetation/macroalgae provides significant habitat for native fauna.</li> <li>• Habitat largely unmodified.</li> </ul>
<b>Very high</b>	<ul style="list-style-type: none"> <li>• Benthic invertebrate community typically has very high diversity, species richness and abundance.</li> <li>• Benthic invertebrate community contains dominated taxa that are sensitive.</li> <li>• Marine sediments typically comprise &lt;25% smaller grain sizes.</li> <li>• Surface sediment oxygenated with no anoxic sediment present.</li> <li>• Contaminant concentrations in surface sediment significantly below DGV threshold concentrations (Australian and New Zealand Governments, 2018).</li> <li>• Invasive opportunistic and disturbance tolerant species absent.</li> <li>• Vegetation/macroalgae sequences intact and provides significant habitat for native fauna.</li> <li>• Habitat unmodified.</li> </ul>



Table 2: Criteria for describing the magnitude of effect (from EIANZ 2018)

MAGNITUDE	DESCRIPTION
<b>Very High</b>	Total loss or very major alteration to key elements/ features of the existing baseline conditions, such that the post development character/ composition/ attributes will be fundamentally changed and may be lost from the site altogether AND/OR loss of a very high proportion of the known population or range of the elements/feature.
<b>High</b>	Major loss or major alteration to key elements/ features of the baseline (pre-development) conditions such that post development character, composition and/or attributes will be fundamentally changed; AND/OR Loss of a high proportion of the known population or range of the element/feature.
<b>Moderate</b>	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/composition/attributes of baseline will be partially changed; AND/OR Loss of a moderate proportion of the known population or range of the elements/feature.
<b>Low</b>	Minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible but underlying character/composition/attributes of baseline condition will be similar to pre-development circumstances/patterns AND/OR having a minor effect on the known population or range of the elements/feature.
<b>Negligible</b>	Very slight change from baseline condition. Change barely distinguishable, approximating to the “no change” situation AND/OR having negligible effect on the known population or range of the elements.



Table3: Matrix of level of adverse effect (modified from EIANZ (2018)).

		ECOLOGICAL VALUE				
		Very High	High	Moderate	Low	Negligible
MAGNITUDE	Very High	--- (Very High)	--- (Very High)	--- (High)	-- (Moderate)	- (Low)
	High	--- (Very High)	--- (Very High)	-- (Moderate)	- (Low)	0 (Very Low)
	Moderate	--- (High)	--- (High)	-- (Moderate)	- (Low)	0 (Very Low)
	Low	-- (Moderate)	- (Low)	- (Low)	0 (Very Low)	0 (Very Low)
	Negligible	- (Low)	0 (Very Low)	0 (Very Low)	0 (Very Low)	0 (Very Low)
Positive	+ (Net gain)	+ (Net gain)	+ (Net gain)	+ (Net gain)	+ (Net gain)	

Table4: MCA scoring scale for the Eastern Busway Project aligned against EIANZ level of effect scores.

Scoring	MCA	EIANZ Level of Effect Score
Very High Adverse Effect	-5	Very High
High Adverse Effect	-4	High
Moderate Adverse Effect	-3	Moderate
Low Adverse Effect	-2	Low
Very low Adverse Effect	-1	Very Low
Neutral	0	Negligible
Very Low Positive Effect	+1	Positive
Low Positive effect	+2	Positive
Moderate Positive Effect	+3	Positive
High Positive Effect	+4	Positive
Very High Positive Effect	+5	Positive

## References

Australian and New Zealand Governments. (2018). *Australian and New Zealand guidelines for fresh and marine water quality*. [www.waterquality.gov.au/anz-guidelines](http://www.waterquality.gov.au/anz-guidelines)

EIANZ. (2018). *Ecological impact assessment (EiA): EIANZ guidelines for use in New Zealand: Terrestrial and freshwater ecosystems. 2nd EDITION*. Environment Institute of Australia and New Zealand.

## Multi Criteria Assessment Scoring Sheet

**Name of assessor:** Caitlin Smith and Fiona Davies

**Area of assessment:** Natural Environment/Ecological Effects

**Guidance criteria considered:** Guidance for EB3 Options Assessment Workshop (EB234-1-PL-GL-Z3-00000-1)

### Option 1: EB 3 Residential Component - Online

**Notes:**

- One piped stream was identified along the busway, crossing Ti Rakau Drive, near Edgewater Drive (unlikely to be impacted). This piped stream appears to connect an upstream/northern riparian habitat with downstream marine Significant Ecological Area (SEA) - SEA-M1-45a.
- Vegetation within the roading corridor will be permanently removed close-cropped grassy vegetation – negligible ecological value.
- A mixture of exotic and native (mainly pohutakawa) vegetation – roadside, residential, amenity plantings, parkland trees - low ecological value.
- Lizard habitat - two lizard species are potentially present within this habitat type – copper skink (*Oligosoma aeneum*; threat status = ‘not threatened’) and ornate skink (*Oligosoma ornatum*; threat status = ‘at risk - declining’).
- Some of vegetation present may provide some roosting and/or nesting habitat of birds; although all bird species identified as potentially present are either ‘introduced or naturalised’ or ‘native - not threatened’.
- The closest known population of native bat is a population of long-tailed bat (*Chalinolobus tuberculatus*) within the Clevedon Scenic Reserve; approximately 12 km east of the busway footprint. However, as the busway is located within a heavily developed area in which long-tailed bats are unlikely to be active, effects to native bat populations are considered to be negligible.

Comments

This is the preferred residential option.

Assumptions

Coastal ecology (i.e. habitat and fauna below the Mean Highwater Springs) has not been considered in this assessment (to be covered by Coastal Ecologist).

Stormwater discharges are into the CMA and have been covered by the coastal ecologist specialist.

Other information relied upon

Auckland Council Geomaps (AUP(OP)– rivers and streams, significant ecological areas overlay. Aerial imagery. DOC Bioweb records.

**Overall no mitigation score of -1.**

**No Mitigation Score (please circle or highlight score):**

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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**Mitigation Score (please circle or highlight score):**

-5	-4	-3	-2	-1	<u>0</u>	+1	+2	+3	+4	+5
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**Mitigations:**

- Lizard salvage will be required where habitat for native skinks is identified and will be removed.
- Landscape planting with ecological enhancements.
- Avoid bird nesting season (September to February) during vegetation removal, where possible.

**Option 2: EB 3 Residential Component - Offline**

**Notes:**

- One piped stream was identified along the busway, crossing Ti Rakau Drive, near Edgewater Drive (unlikely to be impacted). This piped stream appears to connect an upstream/northern riparian habitat with downstream marine SEA - SEA-M1-45a.
- A mixture of exotic and native vegetation within residential properties impacted (no vegetation clearance on Ti Rakau Drive from this option) - low ecological value.
- Lizard habitat - two lizard species are potentially present within this habitat type – copper skink (*Oligosoma aeneum*; threat status = 'not threatened') and ornate skink (*Oligosoma ornatum*; threat status = 'at risk - declining').
- Some of vegetation present may provide some roosting and/or nesting habitat of birds; although all bird species identified as potentially present are either 'introduced or naturalised' or 'native - not threatened'.
- The closest known population of native bat is a population of long-tailed bat (*Chalinolobus tuberculatus*) within the Clevedon Scenic Reserve; approximately 12 km east of the busway footprint. However, as the busway is located within a heavily developed area in which long-tailed bats are unlikely to be active, effects to native bat populations are considered to be negligible.

Comments

Some pockets of residual land are too small to be developed and therefore should be considered for use as mitigation/enhancement planting.

Assumptions

Coastal ecology (i.e. habitat and fauna below the Mean Highwater Springs) has not been considered in this assessment (to be covered by Coastal Ecologist).

Stormwater discharges are into the CMA and have been covered by the coastal ecologist.

Other information relied upon

Auckland Council Geomaps (AUP(OP)–rivers and streams, significant ecological areas overlay, aerial imagery. DOC Bioweb records

**Overall no mitigation score of -1.**

**No Mitigation Score (please circle or highlight score):**

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
----	----	----	----	----	---	----	----	----	----	----

**Mitigation Score (please circle or highlight score):**

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
----	----	----	----	----	---	----	----	----	----	----

**Mitigations:**

- Lizard salvage will be required where habitat for native skinks is identified and will be removed.
- Avoid bird nesting season (September to February) during vegetation removal, where possible.
- There is opportunity for ecological enhancement planting in some of the residual land left between the existing road and busway and this space could also be used to provide further stormwater treatment devices and enhance stormwater quality and retention capacity.

**Option 3: EB 3 – Commercial Component – online option**

**Notes:**

- Three stream crossings – along Ti Rakau Drive and within Burswood Reserve.
- The current design within Burswood Reserve shows stream realignment – considered to be a high effect on stream ecological values. Nearby macroinvertebrate communities are considered to be indicative of low to moderate stream water quality.
- Potential riparian wetlands are present alongside the portion of stream being realigned within the Burswood Reserve, but wetland delineation is required to understand their full extent. The status of these riparian wetlands as NPS-FM Natural wetlands is unconfirmed.
- Terrestrial vegetation is made up of a mixture of exotic and native– roadside, residential, amenity plantings, parkland trees – low ecological value.
- Lizard habitat - two lizard species are potentially present within this habitat type – copper skink (*Oligosoma aeneum*; threat status = ‘not threatened’) and ornate skink (*Oligosoma ornatum*; threat status = ‘at risk - declining’).
- The closest known population of native bat is a population of long-tailed bat (*Chalinolobus tuberculatus*) within the Clevedon Scenic Reserve; approximately 12 km east of the busway footprint. However, as the busway is located within a heavily developed area in which long-tailed bats are unlikely to be active, effects to native bat populations are considered to be negligible.
- Some of vegetation present may provide some roosting and/or nesting habitat of birds; although all bird species identified as potentially present are either ‘introduced or naturalised’ or ‘native - not threatened’.
- Nearby fish records list eight species within the Pakuranga Creek. Of these, three are ‘introduced and naturalised’, three are ‘not threatened’ (banded kokopu [*Galaxias fasciatus*], common bully [*Gobiomorphus cotidianus*] and shortfin eel [*Anguilla australis*]) and two are ‘at risk - declining’ (longfin eel [*Anguilla dieffenbachii*] and inanga [*Galaxias maculatus*]). The riparian and estuarine wetland within Burswood Reserve would potentially be suitable spawning habitat for inanga [*Galaxias maculatus*]). Inanga spawn amongst riparian vegetation in estuarine areas, near the upper limit of the saltwater influence, associated with

spring high tides. Effects to fish habitat is considered to be high as a result of the proposed stream realignment.

Comments

This assessment is based on the ecological value only of stream/wetland habitats. Status under NPS-FM/NES-FM considered to be covered by planning specialist.

***This is the preferred commercial option.***

Assumptions

Assume culverts along existing road alignment are not being extended, except for bridge added over existing stormwater culvert in Ti Rakau Drive on Greenmount Drainage Reserve crossing but will not have structures within the stream channel or riparian zone.

There will be approximately 80 m of stream realigned (in Burswood Reserve) which may potentially include areas of riparian wetland (stream/wetland system of moderate ecological value). No bridge.

There will be some discharge of treated stormwater to the stream system at several locations (where there is likely to be existing untreated runoff occurring currently). Stormwater will be appropriately treated.

Coastal ecology (i.e. habitat and fauna below the Mean Highwater Springs) has not been considered in this assessment (to be covered by Coastal Ecologist).

Other information relied upon

Auckland Council Geomaps (AUP(OP)– rivers and streams, significant ecological areas overlay, aerial imagery. DOC Bioweb records. NZ Freshwater Fish Database.

A site walkover to Burswood Reserve was undertaken on 26/01/21.

**Overall no mitigation score of -3.**

**No Mitigation Score (please circle or highlight score):**

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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**Mitigation Score (please circle or highlight score):**

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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**Mitigations:**

- Lizard salvage will be required where habitat for skink is identified and will be removed.
- Avoid bird nesting season (September to February) during vegetation removal, where possible.
- Stormwater treatment.
- Appropriate erosion and sediment control measures must be in place during construction.
- Offset/compensation for loss in ecological value (wetland/stream) due to stream realignment. Preferably stream/wetland system should be bridged, rather than realigned.

**Option 4: EB 3 – Commercial Component – offline option**

**Notes:**

- Four stream crossings – along Ti Rakau Drive and within Burswood Reserve.

- There are at least four potential NPS-FM 'Natural' wetlands within Burswood Reserve (one may be directly impacted and two indirectly impacted by this option). Some of the wetland habitat is classified as 'Endangered' and 'Critically Endangered' (Singers et al, 2017). This is considered to have a very high/high ecological value.
- Terrestrial vegetation is made up of a mixture of exotic and native – roadside, residential, amenity plantings, parkland trees – low ecological value.
- There is potential loss of habitat connectivity within Burswood Reserve streams/wetlands as a result of the road and bridge infrastructure.
- Lizard habitat - two lizard species are potentially present within this habitat type – copper skink (*Oligosoma aeneum*; threat status = 'not threatened') and ornate skink (*Oligosoma ornatum*; threat status = 'at risk - declining').
- The closest known population of native bat is a population of long-tailed bat (*Chalinolobus tuberculatus*) within the Clevedon Scenic Reserve; approximately 12 km east of the busway footprint. However, as the busway is located within a heavily developed area in which long-tailed bats are unlikely to be active, effects to native bat populations are considered to be negligible.
- Some of vegetation present may provide some roosting and/or nesting habitat of birds; although all bird species identified as potentially present are either '*introduced or naturalised*' or '*native - not threatened*'. Effects to terrestrial avifauna considered to be moderate (particularly if vegetation removal is timed to be completed outside of the nesting season).
- Nearby fish records list eight species within the Pakuranga Creek. Of these, three are '*introduced and naturalised*', three are '*not threatened*' (banded kokopu [*Galaxias fasciatus*], common bully [*Gobiomorphus cotidianus*] and shortfin eel [*Anguilla australis*]) and two are '*at risk - declining*' (longfin eel [*Anguilla dieffenbachii*] and inanga [*Galaxias maculatus*]). The riparian and estuarine wetland within Burswood Reserve would potentially be suitable spawning habitat for inanga [*Galaxias maculatus*]). Inanga spawn amongst riparian vegetation in estuarine areas, near the upper limit of the saltwater influence, associated with spring high tides. Nearby macroinvertebrate communities are considered to be indicative of low to moderate water quality. Effect to fish habitat considered to be high as a result of stream realignment.

#### Comments

Design of bridge structures within the stream in Burswood Reserve should be hydrologically sensitive, to allow natural flow. Round or oval shaped piers should be considered rather than square piers.

The opportunity to relocate the busway (within Burswood Reserve) to the south (as per the design drawings), encroaching further into the bus depot should be considered to avoid stream and wetland impacts.

This assessment is based on the ecological value only of wetland/stream habitats. Status under NPS-FM/NES-FM considered to be covered by planning specialist.

#### Assumptions

Assume culverts along existing road alignment are not being extended but there will be approximately 80m of stream/riparian realignment and 50m stream impacts from bridge or multi cell box culvert (at Burswood Reserve).

There will be some discharge of treated stormwater to the stream system at several locations (where there is likely to be existing untreated runoff occurring currently). Stormwater will be appropriately treated.

At least four potential NPS-FM 'Natural' wetlands of very high/high ecological value within Burswood Reserve - one directly impacted and two indirectly impacted by this option.

Coastal ecology (i.e. habitat and fauna below the Mean Highwater Springs) has not been considered in this assessment (to be covered by Coastal Ecologist).

Other information relied upon

Auckland Council Geomaps (AUP(OP)– rivers and streams, significant ecological areas overlay, aerial imagery. DOC Bioweb records. NZ Freshwater Fish Database.

A site walkover to Burswood Reserve was undertaken on 26/01/21.

**Overall no mitigation score of -4.**

**No Mitigation Score (please circle or highlight score):**

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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**Mitigation Score (please circle or highlight score):**

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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**Mitigations:**

- Lizard salvage will be required where habitat for native skinks is identified and will be removed.
- Avoid bird nesting season (September to February) during vegetation removal, where possible.
- Stormwater treatment.
- Appropriate erosion and sediment control measures must be in place during construction.
- Hydrologically sensitive design of bridge structures within Burswood Reserve to allow natural stream flow. As far as possible bridge piers should be placed outside of the active stream channel. Round or oval shaped piers should be considered rather than square piers.
- A bridge structure should be considered for the stream crossing on the western end of the Burswood Reserve rather than box culverts.
- Offset/compensation for loss in ecological value due to stream realignment. Preferably stream/wetland system should be bridged, rather than realigned.
- Offset/compensation for loss in ecological value of wetlands, but ideally should be avoided through design.
- Ensure hydrological balance to wetlands are maintained.

## Appendix 2: Multi Criteria Assessment Scoring Sheet

Name of assessor: Chris Bentley

Area of assessment: Urban Design

### Guidance criteria considered:

- Provide a multi modal transport corridor that connects Pakuranga and Botany to the wider network and increases access to a choice of transport options
- Provide transport infrastructure that integrates with land uses and supports a quality, compact urban form in Pakuranga and along the Pakuranga to Botany Busway Corridor
- Contribute to place shaping in Pakuranga town centre and along the Busway Corridor by providing better connections and accessibility between and within the centre and along the corridor for all transport users, including public transport users, pedestrians and cyclists.
- Permanent effects – activities/use/ connectivity (URBAN DESIGN)
- Permanent effects – visual amenity (URBAN DESIGN)

### Option 1: Online Residential Component

#### Notes:

##### Comments

- Positive that we are providing a multi modal transport corridor in line with case objectives
- Integrates well with existing land uses and provides for a range of development opportunities along new interface.
- Redeveloping residential land adjacent to existing housing is maintaining the character of the existing neighbourhood
- New development will provide a buffer between existing residential properties that were one back from the road/highway.
- A good outcome is that by widening the existing corridor and redeveloping existing residential land results in a compact urban form and maintains the residential character of the existing environment.
- Small impact on Riverhills park – slight reduction in open space although noting it is just the interface with the road.
- Limited / no CPTED issues in this scenario

##### Assumptions

- Assume fill batter not retaining to integrate footpath with residual land.
- Assume redevelopment of residual residential land along southern edge as a residential land use
- Consider that the redevelopment of the southern side residual land is essentially THAB zone in line with NPS Urban Development and anticipated/visualised by NPS.
- Assume limited tree loss in Riverhills park with the assumption that some of the trees can be transplanted i.e. Totara

##### Mitigation

- Need to mitigate the effect on Riverhills Park
- Streetscape improvements through tree planting and street furniture, quality pavements/surfaces signage, lighting etc. to reinforce placemaking and high quality streetscape

Other information relied upon

**No Mitigation Score (please circle or highlight score):**

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

**Mitigation Score (please circle or highlight score):**

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

**Option 2: Offline Residential Component**

**Notes:**

Comments

- Positive that we are providing a multi modal transport corridor in line with case objectives
- Doesn't integrate well with existing land uses. Development opportunities are limited where residual land is very narrow – particularly along the Fremantle/eastern end
- Long service lanes to access properties reduces connectivity/access to the houses. Particularly off Freemantle Drive.
- Busway against previous backlots results in amenity effects
- Small impact on Riverhills park – slight reduction in open space although noting it is just the interface with the road.
- CPTED issues in this scenario within new busway

Assumptions

- Assume fill batter not retaining
- Assume redevelopment of residual residential land along southern edge as a residential land use
- Consider that the redevelopment of the southern side is essentially THAB zone in line with NPS Urban Development and anticipated/visualised by NPS
- Assume limited tree loss in Riverhills park with the assumption that some of the trees can be transplanted i.e. Totara

Mitigation

- Need to mitigate the effect on Riverhills Park in some way.
- Streetscape improvements through tree planting and street furniture, quality pavements/surfaces signage, lighting etc. to reinforce placemaking and high quality streetscape
- Will need noise walls along busway and planting within existing residential gardens to the south to integrate the noise wall and screen the busway.
- CCTV cameras – will not necessarily stop or discourage antisocial behaviour.

Other information relied upon

**No Mitigation Score (please circle or highlight score):**

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

**Mitigation Score (please circle or highlight score):**

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

### Option 3: Online Commercial Component

#### Notes:

#### Comments

Positive that we are providing a multi modal transport corridor in line with case objective albeit 1.5m wide cycleway appears to be minimal/marginal.

- Integrates well with neighbouring land uses and within the transport corridor directly between centres and represents a compact urban form
- Visibly within the transport corridor – reinforces that Ti Rakau Drive is a transport corridor – increased awareness etc. and not tucked around the back.
- Some opportunity for amenity improvements along Ti Rakau Drive.
- Impact of retaining walls along carriageway to be considered
- Limited impact on parks (Access from eastern busway depot is – prefer elevated structure)
- Limited / no CPTED issues in this scenario

#### Assumptions

- Assuming some retaining with and without visual mitigation
- 3.5m high wall at Guys homestead – assume that assume planting slope to better relate to reserves on either side of the road. Noting that Heritage may want a basalt stone wall – we are considering mitigation for the respective areas.
- Assuming the road from bus depot is raised Super T

#### Mitigation

- Streetscape improvements through tree planting and street furniture, quality pavements/surfaces signage, lighting etc. to reinforce placemaking and high quality streetscape
- Need to mitigate the effect on Burswood reserve interface
- Planting beside super T bus depot ramp to integrate

#### No Mitigation Score (please circle or highlight score):

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

#### Mitigation Score (please circle or highlight score):

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

#### Option 4: Offline Commercial Component

##### Notes:

##### Comments

Positive that we are providing a multi modal transport corridor in line with case objective albeit 1.5m wide cycleway appears to be minimal/marginal.

Very limited opportunity to provide amenity improving along Ti Rakau Drive and almost no opportunity for amenity improvement along offline busway given restricted space.

- Doesn't integrate particularly well with neighbouring land uses
- Impact on Burswood reserve – further fragmentation of the reserve
- Some CPTED issues in this scenario
- Busway against residential lots results in amenity effects

##### Assumptions

- 2 Bus stations considered (instead of a centralised one)
- Bus Depot access will be a super T
- Assume that treatment in front of Guys homestead is integrated with rest of streetscape (batter or wall)

##### Mitigation

- Need to mitigate the effect on Burswood reserve.
- Will need noise walls along busway and planting within existing residential gardens to the south to integrate the noise wall and screen the busway.
- Will need noise walls along busway and planting within existing residential gardens to the north to integrate the noise wall and screen the busway.

##### No Mitigation Score (please circle or highlight score):

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

##### Mitigation Score (please circle or highlight score):

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

## Appendix 2: Multi Criteria Assessment Scoring Sheet

Name of assessor: Tom Lines

Area of assessment: Landscape and Visual

### Guidance criteria considered:

- Natural Environment/ Ecological Effects
- Extent of effects on landscapes and natural features including geological features, landform, vegetation
- Extent of effects (and ability to manage effects) on indigenous vegetation.
- Freshwater Ecology - Adverse physical effects on freshwater receiving environments (any works within or in proximity to a stream or wetland).
- Coastal Ecology - Extent of effects on significant marine areas (i.e. significant ecological areas) and physical footprint within the coastal marine area. (including trees), watercourses etc.
- Permanent effects – activities/use (Landscape/ Physical)
- Permanent effects – visual amenity (Landscape/Visual)

### Option 1: Online Residential Component

#### Notes:

#### Comments

- Little or no tree loss along northern edge of project
- Some tree / vegetation loss within road corridor and within the front of neighbouring residential properties which meet the road corridor Trees are a mix of exotic and native species of low to moderate value/significance.
- No impact on waterways
- No impact on Terrestrial SEA or Marine SEA including streams
- Limited earthworks in an area which has been modified
- Retaining the existing land use and related character along road corridor
- Visual – residential properties one lot back from road corridor will remain adjoined to residential properties – retaining their level of amenity
- Visual – north residents. Little perceived change in terms of road width. Some greater level of amenity through provision of cycleway etc. Will see a greater intensity of development along the southern side of the road corridor however it is considered that this is anticipated/inline with the NPS.
- Little/no adverse effect on road users however some increase in amenity for cyclists and walkers.
- Small impact on Riverhills park – slight reduction in open space although noting it is just the interface with the road.
- Impact on the connection to the Freemantle esplanade reserve – cut off by the busway

#### Assumptions

- Assume fill batter not retaining
- Assume redevelopment of residual residential land along southern edge as a residential land use
- Consider that the redevelopment of the southern side is essentially THAB zone in line with NPS Urban Design and anticipated/visualised by NPS
- Assume limited tree loss in Riverhills park with the assumption that some of the trees can be transplanted i.e. Totara.

#### Mitigation

- Tree planting along southern boundary and within the islands where possible.
- Assume batter would just be grass.
- Some form of mitigation for loss of portion of Riverhills Park.

#### Other information relied upon

#### No Mitigation Score (please circle or highlight score):

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

#### Mitigation Score (please circle or highlight score):

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

### Option 2: Offline Residential Component

#### Notes:

#### Comments

- Little or no tree loss along northern edge of project
- Some tree / vegetation loss within road corridor and new busway. Trees are a mix of exotic and native species of low to moderate value/significance.
- No impact on waterways.
- No impact on Terrestrial SEA or Marine SEA including streams
- Limited earthworks in an area which has been modified
- Visual impact on the back lots (south) with the busway now forming the primary interface to these properties (instead of a residential development / same land use). Creating a new urban edge to sensitive viewing audiences.
- Visual – north residents. Little perceived change in terms of road width. Some greater level of amenity through provision of cycleway etc. Will see a greater intensity of development along the southern side of the road corridor however it is considered that this is anticipated/inline with the NPS.
- Little/no adverse effect on road users however some increase in amenity for cyclists and walkers.
- Small impact on Riverhills park – slight reduction in open space although noting it is just the interface with the road.

#### Assumptions

- Assume fill batter not retaining
- Assume redevelopment of residual residential land along southern edge as a residential land use.
- Consider that the redevelopment of the southern side is essentially THAB zone in line with NPS Urban Design and anticipated/visualised by NPS.
- Assume limited tree loss in Riverhills park with the assumption that some of the trees can be transplanted i.e. Totara.
- Cutting off access to Freemantle Esplanade Reserve.

#### Mitigation

- Need to mitigate the effect on Riverhills Park in some way.
- Streetscape improvements through tree planting and street furniture, quality pavements/surfaces signage, lighting etc. to reinforce placemaking and high quality streetscape.
- Will need noise walls along busway.

- CCTV cameras – will not necessarily stop or discourage antisocial behaviour.
- Some mitigation opportunities to provide better interface with greater amenity for resident's interface with Busway including potential to plant in residents gardens

**No Mitigation Score (please circle or highlight score):**

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

**Mitigation Score (please circle or highlight score):**

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

**Option 3: Online Commercial Component**

**Notes:**

Comments

- Integrates well with neighbouring land uses and within the transport corridor directly between centres and
- Transport corridor/busway in the middle impacts least sensitive viewing audiences (Commercial) and builds on existing/established landscape character of the area.
- Opportunity for amenity improvements along the corridor (streetscape improvements including tree planting)
- Some perceived road widening on viewing audiences although these are not particularly sensitive to change and planting within road corridor as mitigation would assist in reducing this perceived road widening.
- Limited effect on local parks.

Assumptions

- Planting in the middle of the road will help to assist in reducing the perceived width of the widened road.
- Limited impact on parks (Access from eastern busway depo is – prefer elevated structure)

Mitigation

- Streetscape improvements through tree planting and street furniture, quality pavements/surfaces signage, lighting etc. to reinforce placemaking and high quality streetscape.

Other information relied upon

**No Mitigation Score (please circle or highlight score):**

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

**Mitigation Score (please circle or highlight score):**

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

#### Option 4: Offline Commercial Component

##### Notes:

##### Comments

Positive that we are providing a multi modal transport corridor in line with case objective albeit 1.5m wide cycleway appears to be minimal/marginal.

Very limited opportunity to provide amenity improving along Ti Rakau Drive and almost no opportunity for amenity improvement along offline busway given restricted space.

- Doesn't integrate particularly well with neighbouring land uses
- Impact on Burswood reserve – further fragmentation of the reserve
- Some CPTED issues in this scenario
- Busway against residential lots results in amenity effects
- Visual impact on residential properties to north of busway.

##### Mitigation

- Some mitigation opportunities to provide better interface with greater amenity for residents interface with Busway.
- Elevated structures to minimise impact on CMA and Burswood Reserve. Mitigation may include a black structure through the CMA and a planted MSE wall by China Town.
- Redevelop Burswood Reserve to mitigate loss of openspace

##### No Mitigation Score (please circle or highlight score):

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

##### Mitigation Score (please circle or highlight score):

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

## Multi Criteria Assessment Scoring Sheet

Name of assessor: John Daly

Area of assessment: Social Impacts

Guidance criteria considered: Guidance for EB3 Options Assessment Workshop (EB234-1-PL-GL-Z3-00000-1)

Option 1: EB 3 – Online Residential

Criteria for Consideration:

Notes:

Community facilities exist at the following locations along the alignment:

- 96 Ti Rakau Drive (Pakuranga Pharmacy)
- 96-98 Ti Rakau Drive (Eastside Family Doctor)
- 107-115 Ti Rakau Drive (corner store (Liquor store, bakery, takeaways, dairy))
- 207 Ti Rakau Drive (Pakuranga Counselling Centre)
- 209 Ti Rakau Drive (Pakuranga Chinese Baptist Church)
- 2 Fremantel Place (Pakuranga Baptist Kindergarten)
- 219 Ti Rakau Drive (Pakuranga Baptist Church)
- 229 Ti Rakau Drive (EFKS Pakuranga)
- 157 Edgewater Drive (Ambridge Rose Manor – Care home).
- 32 Edgewater Drive (Edgewater College)
- 14 Edgewater Drive (Edgewater Village - Metlifecare Retirement Village)

Businesses (limited businesses located along the route)

- 107-115 Ti Rakau Drive (corner store (Liquor store, bakery, takeaways, dairy))
- Small home-based businesses along northern and southern side of Ti Rakau (Security company, pavement company, computer repairs etc.)

Social connectivity

- Proposed busway occupies existing alignment along Ti Rakau Drive, requiring widening of the road to the south and acquisition of the frontage of those properties.
- Bus lane traverses through centre of Ti Rakau Drive. Three bus stops are identified along the route.

### Impacts upon Community Facilities / Open Space

Construction Phase:

- Significant construction disruption due to proposed busway being located within the existing roading alignment. Driving times along Ti Rakau Drive will increase, adversely impacting accessibility to community facilities along the route and vicinity in the short / medium term.
- Construction impacts; impacts to amenity value (communities' enjoyment and use) of Riverhills Park.
- Car parking to 'Community Shops' will need to be removed. This will reduce accessibility to these shops. Greater impacts if shops are demolished.
- Edgewater College: accessibility for School bus potentially impacted due to construction (short term). Traffic Management Required.



- Proposed cycling/ walking facilities which area close to existing Church and Counselling centre are overlapped by the corridor – likely to cause disruption (noise / air quality) in the short term.

Permanent:

- Accessibility to community facilities within and outside study area will be improved due to enhanced bus network and transport choice (continuous and connected walking and cycling facilities).
- Access / parking impacts largely unaffected.
- Edgewater College: Long term benefit – improved transport choice and travel times for school children. Improved transport choice results in reduction in parent 'drop offs', reducing congestion and improving travel times along Ti Rakau.
- Counselling centre, Churches, Kindergarten – southern side of Ti Raku Drive, near bridge (approx. 209 Ti Rakau Drive).
  - Access to these facilities are achieved via Fremantle Place
  - Approx. 12 carparks from EFKS Church will be lost, approx. 23 carparks (Baptist Church, Kindergarten, Counselling Centre) will be lost due to southern road widening.
  - Impact to these facilities predominantly associated with permanent loss of parking (considered minor only as there is space for additional car parking)
  - Road widening looks to intersect northern section of counselling centre building.. Alignment also very close to Chinese Baptist Church structure. Relocation to alternative site potentially required.

Impacts upon viability / productivity of business land areas

Construction Phase:

- Significant construction disruption for businesses due to proposed busway being located within the existing roading alignment. Driving times along Ti Rakau Drive will increase, adversely impacting accessibility to businesses within and outside the study area in the short / medium term.
- Road widening looks to demolish stores located on the corner of Edgewater and Ti Rakau Drive. If parking impacted only then impacts relate to:
  - Reduced visibility of these businesses due to construction equipment / activities.
  - Reduced accessibility. Cars will be forced to park along Edgewater drive to access shops.

Permanent

- Accessibility to businesses within and outside study area will be improved due to enhanced bus network and transport choice (continuous and connected walking and cycling facilities).
  - Stores located on the corner of Edgewater and Ti Rakau Drive. Potential demolishing required due to road winding. If demolition not required there will be permanent loss of car parking impacting accessibility and business viability.

Impacts upon social connectivity

Construction phase

- Significant construction disruption due to proposed busway being located within the existing roading alignment. Driving times along Ti Rakau Drive will increase, adversely impacting

accessibility and connectivity to communities of interest within and outside the study area in the short / medium term.

- Restriction on North/South travel and restrictions to left in left out (LILO) assumed.

**Permanent**

- Assumed centrally located bus stop will enhance pedestrian/cycling crossing / connectivity, thereby addressing severance issues created by the existing heavily trafficked road layout (Ti Rakau Drive).
- Fragmentation of communities through displacement of people (noted that Auckland Council owns the land).
- Continuous cycleways and footpaths provided. Bus only lane – more transport choice for users and enhances connectivity and accessibility:
  - Reduced reliance on cars when accessing Pakuranga Plaza Shops or heading east towards Botany, or when travelling into the city centre
  - Quicker journey times for busses as less conflict. This is because the proposed busway does not intersect southern streets off Ti Rakau Drive, whereby the offline option does.
  - Reduced congestion on roads due to enhanced PT network and transport choice (Walking / cycling facilities, mode shift transformative).

Assumptions

- Crossing points are provided at each bus stop along the route – providing safe north-south pedestrian access
- Existing signalled traffic lights: Edgewater Drive and Chevs Place near corner store and Freemantle Place and Gossamer Drive, will remain and continue to enable north south access. No restrictions on right turns.

Other information relied upon

- EB3 Options Assessment Workshop Guidance - EB234-1-PL-GL-Z3-00000-1

Reason for scoring:

- Significant construction impacts due to road widening and bus lane being constructed within existing roading corridor.
- Low number of community facilities within study area impacted.
- Low number of businesses within study area impacted (stores on corner of Edgewater Drive and Ti Rakau Drive).
- Fragmentation of communities and displacement of people.
- Provision of continuous walking and cycling facilities, enhanced PT network improving social connectivity. Provision of pedestrian / cycling crossing points across improved Ti Rakau Drive reduces severance associated with existing road layout. Likely local board level benefits, including those living in Pakuranga, Botany and Howick. Long term benefits expected given continuous transport choice options offered.

No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation Score (please circle or highlight score):



-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
<p>Mitigation:</p> <ul style="list-style-type: none"> <li>• Regular communication with affected community facilities / business owners / residents</li> <li>• Displacement strategy for impacted residents.</li> <li>• Provision of Traffic Management Plans (TMPs) to ensure access to key community facilities are provided throughout construction. Construction Management Plan (CMP's) to limit disruption impacts. Development response initiatives.</li> <li>• Refinements to road widening and alignment to avoid impacts to Church / Counselling centre and community shops</li> <li>• Restrictions to hours of operation / restrictions during sensitive hours in order to reduce impacts during construction.</li> </ul> <p>With effective mitigation in place (direct busway, cycling and walking facilities provided, improvement to severance issue, less businesses / community facilities permanently affected, no additional severance created</p>										
Option 2: EB 3 – Offline Residential										
<p><u>Impacts upon Community Facilities / Open Space</u></p> <p>Construction Phase</p> <ul style="list-style-type: none"> <li>• Reduced construction disruption (compared to online option) due to offline busway.</li> <li>• Very minor disruption to accessibility of Pakuranga Pharmacy, Eastside Family doctor during construction.</li> <li>• Road widening located close proximity to Riverhills Park – construction disruption likely to impact amenity / enjoyability of the park. <ul style="list-style-type: none"> <li>◦ Upgrade of intersection likely to have minor impacts upon accessibility to the park (along Gosmanner Drive).</li> </ul> </li> </ul> <p>Permanent</p> <ul style="list-style-type: none"> <li>• Less disruption to community facilities located on northern side of Ti Rakau Drive (Pakuranga Pharmacy, Eastside Family doctor).</li> <li>• Construction impacts; impacts to amenity value (communities' enjoyment and use) of Riverhills Park.</li> <li>• Corner store: 107-115 Ti Rakau Drive (Liquor store, bakery, takeaways, dairy). <ul style="list-style-type: none"> <li>◦ Stores will need to be acquired and demolished to make way for the bus stop and busway (which traverses directly through these shops).</li> <li>◦ Loss of a key community store. Surrounding catchment will need to travel elsewhere to access these amenities.</li> </ul> </li> <li>• The Counselling centre, Churches, Kindergarten located on the southern side of Ti Raku Drive (near bridge at approx. 209 Ti Rakau Drive) and accessed to via Fremantle Place: <ul style="list-style-type: none"> <li>◦ Will lose approx. 12 carparks (EFKS Church) and approx. 23 carparks (Baptist Church, Kindergarten, Counselling Centre), due to land being required for road widening.</li> <li>◦ Impact to these facilities predominantly associated with permanent loss of parking (considered minor only as there is space for additional car parking).</li> <li>◦ Northern section of counselling centre building potentially required for alignment (alignment very close to Chinese Baptist Church structure).</li> </ul> </li> </ul>										



- Potential disruption issues both during construction and operation.

#### Impacts upon viability / productivity of business land areas

##### Construction Phase

- Construction disruption; less impact to remaining community facilities due to offline busway.
- Limited businesses along the alignment impacted.

##### Permanent

- Corner store (corner of Edgewater drive and Ti Rakau Drive) will be demolished.
- Acquisition of a small number of businesses along the southern side of Ti Rakau Drive required.

#### Impacts upon social connectivity

##### Construction Phase

- Reduced construction disruption (compared to online option) due to offline busway.
- Fragmentation of communities and displacement of people.

##### Permanent

- Offline Busway will result in displacement of people within road fronting properties on southern side of Ti Rakau Drive.
  - Assumed residual land will be redeveloped in some capacity.
- Offline Busway creates an additional severance issue (including Burswood residential community).
  - It is assumed that additional north/south pedestrian and cycle crossing facilities will be provided along Ti Rakau Drive to enable access to new bus stops.
  - Separate busway creates additional buffer for residents living south of Ti Rakau Drive. Pedestrians / cyclists and vehicles accessing Ti Rakau from southern streets will need to cross this busway before accessing Ti Rakau Drive.
    - Residents living south may feel trapped (trapped in by busway and Ti Rakau Drive).
    - Assumed right hand turning from these southern streets on to Ti Rakau Drive is still illegal (or ill-advised due to being dangerous).
- Busway location results in more conflicts along the route (as the busway intersects with existing roads to the south of Ti Rakau). Potential to create queueing on residential streets.
- Bus stop location on corner of Edgewater and Ti Rakau Drive enhances PT accessibility to facilities along Edgewater Drive (Edgewater College and retirement homes).

#### Assumptions

- Safe pedestrian crossings along Ti Rakau Drive provided to enable access to proposed bus stops.
- No right hand turns from southern streets (except for at signalised traffic intersections).
- Location/design of bus stop still enable north south vehicle access where this was enabled previously.

#### Other information relied upon

- EB3 Options Assessment Workshop Guidance - EB234-1-PL-GL-Z3-00000-1

Reason for scoring

- Creates an improved bus service for the community with reduced construction disruption along Ti Rakau Drive due to offline busway. Likely to result in local level benefits for the local catchment, particularly those located south of busway alignment. However:
- Existing severance issue maintained, and additional severance issue created – particularly for residents located south of Ti Rakau Drive (including vulnerable communities within school and care homes). Impacts to these residents will be long lasting / permanent.
- More people displaced due to bus way alignment being located further south of Ti Rakau Drive (including a small number of businesses).
- Additional conflict points for busway, as this busway must intersect streets located south of Ti Rakau, resulting in a slower bus service.
- Bus stops further away from residential communities to the north.
- Lack of continuous cycling and walking facilities reduces number of people benefitted as well as the longevity of the option.

No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation:

- Regular communication with affected community facilities / business owners / residents
- Displacement strategy for impacted residents.
- Provision of Traffic Management Plans (TMPs) to ensure access to key community facilities are provided throughout construction. Construction Management Plan (CMP's) to limit disruption impacts. Development response initiatives.
- Restrictions to hours of operation / restrictions during sensitive hours in order to reduce impacts during construction.
- Urban design to reduce severance.

With effective mitigation in place (direct busway, cycling and walking facilities provided, improvement to severance issue (but not sufficient to warrant an increase in scoring), less businesses / community facilities permanently affected, no additional severance created.

Option 3: EB 3 – Online Commercial

Notes:

List of community facilities within Study area (non-exhaustive)

- 219 Burswood Drive: East City Wesleyan Church / Wesleyan Methodist Church of New Zealand
- 2 Torrens Road: Protestant Church
- 325 Ti Rakau Drive: Stirred Water Christian Fellowship



- 380 Ti Rakau Drive: Howick and Eastern Bus Depot
- 150C Harris Road: FCNZ Evangelical Formosan Church of New Zealand
- 154 / 160 Harris Road: Korean Peace Church
- 272 Ti Rakau Drive: BotanyLife Community Trust
- 262 Ti Rakau Drive: Yans Chinese Medicine
- 316 Ti Rakau Drive: The Doctors Ti Rakau
- 316 Ti Rakau Drive: Auckland Radiology Group
- 12 Amara Place: Botany Dental Practice | Lumino The Dentists
- Corner of Burswood Drive and Ti Rakau Drive: Burswood Esplanade Reserve
- Opposite bus depot: Greenmount Drainage Reserve

#### Impacts upon Community Facilities / Open Space

##### Construction Phase

- Significant construction disruption due to proposed busway being located within the existing roading alignment. Driving times along Ti Rakau Drive will increase, adversely impacting accessibility and connectivity to community facilities within and outside the study area in the short / medium term.

##### Permanent

- Most community facilities are setback from Ti Rakau Drive and will be largely unaffected by the proposed widening.
- A number of road fronting properties to the south of Ti Rakau Drive will lose some car parking / servicing space. This includes Lumino the Dentists (12 Amara Place).
- Once operational, accessibility to community facilities within study area will be improved (transport choice (bus, walking, cycling facilities)).

#### Impacts upon viability / productivity of business land areas

##### Construction Phase

- Significant construction disruption due to proposed busway being located within the existing roading alignment. Driving times along Ti Rakau Drive will increase, adversely impacting accessibility and connectivity to businesses within and outside the study area in the short / medium term.
- Filling required on corner of Trugood Drive and Huntington Drive – construction related impacts only (assumed land will be returned post construction). Businesses impacted include Piccolo Park and Lighting Plus.

##### Permanent

- Car parking and servicing areas for road fronting properties south of Ti Rakau Drive will be affected. Access and service arrangements may be required).
- Frontages and carparking of many businesses along the southern side of Ti Rakau will be impacted, impacting customer numbers (but bus providing alternative).
- Small businesses, including 'the chocolate cake company' and 'Pots More' (257 Ti Rakau Drive) will potentially need to be relocated.
- Carparking and servicing areas for businesses located at 166c Harris Road will be permanently acquired – alternative parking / servicing arrangements will be required.



- Parking and servicing for businesses located at 12 Amera Place (and vicinity) impacted by road widening south.

long term, better transit with alternative transport modes for customers but less car parking on site. Short term, construction impacts will deter customers.

Impacts upon social connectivity

Construction Phase:

- Significant construction disruption due to proposed busway being located within the existing roading alignment. Driving times along Ti Rakau Drive will increase, adversely impacting accessibility and connectivity to communities within and outside the study area in the short / medium term
- Asian business community – particularly businesses and facilities on northern side of Ti Rakau Drive (including China Town). Accessibility to businesses facilities enjoyed by the Asian community will be impacted in the short term.
- North-south severance created due to construction along Ti Rakau Drive.

Permanent

- Assumed centrally located bus Stop will enhance pedestrian/cycling crossing / connectivity, thereby addressing severance issues created by the existing road layout (Ti Rakau Drive).
- Continuous cycleways and footpaths provided. Bus only lane – more transport choice for users.
- Some access points will be restricted to Left in Left out, but existing road is heavily trafficked reducing right turns, so may not be a big barrier for businesses / customers.

Assumptions

- Crossing points are provided at bus stops along Ti Rakau Drive to provide accessibility to each bus stop along the route. Results in reduced severance and improved north-south connections.
- Existing signalled traffic lights will remain and continue to enable north south access.
- Existing limitations of turning right out of certain streets remain.

Reason for Score

- Major construction disruption in the short medium term.
- Permanent loss of carparking with potential to create operational impacts for businesses.
- Provision of continuous walking / cycling facilities and enhanced bus service provides travel choice, likely to benefit those living in Pakuranga, Botany and Howick. Long term benefits expected given continuous transport choice options offered.
- Busway close to business / industrial community (but further away from residential community).
- Severance issues improved near bus stops. Severance created during construction and mitigated by implementation of CMP / TMP.

No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation Score (please circle or highlight score):										
-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
<p>Mitigation:</p> <ul style="list-style-type: none"> <li>• Regular communication with affected community facilities / business owners / residents</li> <li>• Displacement strategy for impacted businesses</li> <li>• Provision of Traffic Management Plans (TMPs) to ensure access to key community facilities are provided throughout construction. Construction Management Plan (CMP's) to limit disruption impacts. Development response initiatives.</li> <li>• Restrictions to hours of operation / restrictions during sensitive hours in order to reduce impacts during construction.</li> </ul> <p>With effective mitigation in place (direct busway, cycling and walking facilities provided, improvement to severance on Ti Rakau Drive, less businesses / community facilities permanently affected, no additional severance created)</p>										
Option 4: EB 3 – Offline Commercial										
<u>Impacts upon Community Facilities / Open Space</u>										
Construction Phase										
<ul style="list-style-type: none"> <li>• Proposed roading upgrades along bridge, east of the bridge (stopping just west of the Ti Rakau / Burswood Drive intersection) results in construction disruption impacts. <ul style="list-style-type: none"> <li>○ Community facilities within vicinity of Project are largely unaffected (with the exception of): <ul style="list-style-type: none"> <li>▪ East City Wesleyan Church, Wesleyan Methodist Church of New Zealand located close to bus way – construction disruption impacts likely.</li> <li>▪ Burswood Esplanade Reserve dissected by busway – impacting on useability and enjoyment of this green space.</li> </ul> </li> </ul> </li> </ul>										
Permanent										
<ul style="list-style-type: none"> <li>• Loss of park space (Burswood Esplanade Reserve) – less attractive for park users.</li> <li>• Potential operation noise disruption impacts from busway on Wesleyan Church (noting land is zoned light industrial, so reduced amenity value expected).</li> </ul>										
<u>Impacts upon viability / productivity of business land areas</u>										
Construction phase										
<ul style="list-style-type: none"> <li>• Proposed roading upgrades along bridge, east of the bridge (stopping just west of the Ti Rakau / Burswood Drive intersection) results in construction disruption impacts.</li> <li>• This construction disruption is not as significant compared to the online option</li> <li>• Businesses east of Hunting Drive impacted by road widening and fill works.</li> <li>• Businesses east of Trugood Drive impacted by road widening and fill works.</li> <li>• Chinatown (and associated businesses) likely impacted by construction due to location of busway.</li> </ul>										
Permanent										
<ul style="list-style-type: none"> <li>• Assume rear service yard of China Town and associated parking access are unaffected by busway alignment.</li> </ul>										

- Parking, access and service areas of businesses in light industrial area south of proposed alignment unaffected.
- Businesses generally remain operation with alternative travel choices created for customers, but less convenient for businesses located to the north of Ti Rakau Drive.

Impacts upon social connectivity

Construction Phase

- Construction impacts experienced by residential properties north of proposed busway.
- Significant noise mitigation likely required (residents and potentially businesses to the south).

Permanent

- Additional intersection created for residents north of proposed busway alignment (creating severance).
- Lack of continuous cycling and walking facilities – option does not provide transport choice for users.
- Busway alignment located closer to residential areas (Burswood). Creating choice for the community.
- Severance of Burswood esplanade reserve from community.

Reason for Score

- Reduced construction disruption. Disruption to residents / business along offline alignment (parallel to Torrens Road). Lack of continuous walking / cycling facilities (less people benefit from the Project and reduces longevity of Project). Benefits likely to be realised at a local catchment level (i.e. employees of local industry / businesses, Burswood residents).
- Severance created to Burswood residential community (no obvious mitigation (urban design?)). Burswood reserve severed (people need to cross busway to access reserve from the west and north).
- Bus stop located close to residents living in Burswood, potentially enhancing PT use. Also serves industrial / business community north of Ti Rakau Drive.
- Relatively low number of businesses / community facilities impacted, and people displaced.

No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation:

- Regular communication with affected community facilities / business owners / residents
- Displacement strategy for impacted residents.
- Provision of Traffic / Construction Management Plan (CMP's) to limit disruption impacts. Development response initiatives.
- Restrictions to hours of operation / restrictions during sensitive hours in order to reduce impacts during construction.
- Urban design to reduce severance.



With effective mitigation in place (direct busway, cycling and walking facilities provided, improvement to severance issue (but not sufficient to warrant an increase in scoring), less businesses / community facilities permanently affected, no additional severance created.

## Multi Criteria Assessment Scoring Sheet

Name of assessor: Tim Brown

Area of assessment: Transport – Temporary Effects

Guidance criteria considered: Guidance for EB3 Options Assessment Workshop (EB234-1-PL-GL-Z3-00000-1)

Option 1: EB 3 – Online Residential

Notes:

### Comments

Key elements with the potential for temporary transport network effects:

- Construction of the Reeves Road flyover and at-grade improvements
- Construction of the William Roberts Link
- Construction of the busway and busway station in EB2
- Construction of the cycleway on Pakuranga Road
- Construction of the central running busway on Ti Rakau Drive between Pakuranga Highway and Pakuranga Creek Bridge; noting that the current proposal is to largely construct a new carriageway off-line then repurposing the westbound traffic carriageway as the busway

The area of construction for EB2 is the focal point for east-west movements between East Auckland and areas west of the Tamaki River, with limited redundancy in the transport system to accommodate activities with a significant impact on the network capacity.

The Project is to be largely constructed within the confines of the existing road network and as a result there will likely be adverse effects on the operation of the transport network during construction. Broadly, the following impacts are anticipated:

- Effects on congestion levels around the already heavily congested Town Centre during construction of the Reeves Road flyover and busway section as a result of general construction activity and temporary traffic management layouts.
- Effects on Ti Rakau Drive, particularly at the Edgewater Drive shops and Gossamer Drive intersection to facilitate construction of the busway.
- Potential for people to use alternative routes to avoid areas of the project under construction, likely to be via Pakuranga Road to Panmure, or via East Tamaki (e.g. Highbrook Drive) which will place additional demand on other areas of the transport network;
- Delays and disruption to public transport routes, including possible temporary re-routing of buses and relocation of bus stops;
- Disruption / restrictions to walking and cycling routes and paths, including localised footpath closures;
- Potential conflicts between construction vehicles and pedestrians and other road users;
- Potential parking restrictions (public and private parking) and temporary loss of parking as a result of car parking areas being used as construction compounds (particularly in the area of Pakuranga Town Centre; and
- Potential access restrictions to businesses and residences.

Other information relied upon

- Plans issued as part of the MCA Package



- Knowledge and review of the critical elements of the project
- Workshop participation
- Specialist knowledge

#### Assumptions and Mitigation (BAU)

- All options will result in negative impact
- Construction is completed within 5 years
- Construction of EB2 and EB3 will be concurrent, and not sequential.
- The construction staging minimises the impact to current users (across all modes). This could be as follows:
  - o Enabling the construction of the Reeves Road flyover by:
    - Early construction of the southern end of William Roberts Road and the intersection with Ti Rakau Drive, combined with completion of the Cortina Place extension to maintain access from the Reeves Road area to Ti Rakau Drive.
    - Early construction of the Pakuranga Highway (SEART) on and offramps to allow for traffic to be diverted around the construction area required for the Reeves Road flyover. The off-ramp will need to cater for two lanes at the start of the ramp, and flare out to 5 lanes (2 left turn lanes and 3 right turn lanes) during the construction of the flyover
    - Early construction of the section of Ti Rakau Drive between the Pakuranga Highway intersection and the new intersection with William Roberts Road
  - o Once the flyover is complete, works required on Ti Rakau Drive to enable construction of the busway could commence, as can the works on Pakuranga Road to reduce the carriageway down to 4 lanes (plus median)
- A Construction Traffic Management Plan (CTMP) prepared detailing specific measures that must be put in place. All potential construction traffic and transportation effects would be managed using a CTMP, supported by a number of Site Specific Traffic Management Plans (SSTMPs). The CTMP prepared will set out the objectives and procedures required to produce SSTMPs and to manage the actual and potential effects of construction traffic. The CTMP should give due consideration to:
  - o Restricting hours when temporary traffic management that require lane closures is in place to outside peak travel times. During peak times, all lanes that are available prior to construction should be available on weekdays from 6am – 10am and 3pm – 7pm and on weekends from 10am – 3pm;
  - o Effective communication with stakeholders and the public around likely disruption;
  - o Temporary access ways using metal plates or other methods. Construction methodologies that allow property access to be maintained;
  - o Provision of alternative parking or manoeuvring areas. Possible locations for temporary car parking include residential land not required for the Reeves Road flyover construction along William Roberts Road and Reeves Road;

- o Temporary pedestrian and cyclist access in accordance with the Code of Practice for Temporary Traffic Management (COPTTM). Temporary diversions or alternative routes will be provided to maintain access for pedestrians and cyclists;
- o Safety fences for restricted access zones; and
- o Use of the Priority Freight network by construction traffic wherever possible to access the site and move materials to and from the site.

Potential Mitigation beyond BAU

- A demand management and communication strategy that includes measures to manage the private vehicle demand during peak periods, by encouraging people to re-route, re-mode or re-time their trips to offset the potential effects of the construction activity.

Measures could include:

- o Increased public transport services (including ferries from Half Moon Bay and bus services to either Panmure, Otahuhu train station or Half Moon bay ferry)
- o Either retention of or increasing public transport priority measures along Ti Rakau Drive and Pakuranga Road (for example peak time Transit Lanes)
- o Ride-sharing and/or public transport incentives
- o Provide Park 'n' Ride opportunities
- o Traveller information systems and real time monitoring and display of traveller information (either on-road or through Auckland Transport channels)
- o Minor intersection improvements along Ti Rakau Drive and Pakuranga Road

No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Option 2: EB2 + EB 3 – Offline Residential

Notes:

Comments

- As per previous option around the Pakuranga Town Centre; however the construction of the busway would be off-line with limited traffic management along Ti Rakau Drive, except for the construction of the cycle paths. This is likely to have a lower impact (either scale or duration) than the construction of Option 1 in the residential area.

Assumptions and mitigation (BAU)

- As per Option 1 plus alternative access provided to residential properties south of the busway alignment provided before access to Ti Rakau Drive is lost.

Other information relied upon

- As per Option 1

Summary of outcomes



- The construction of EB2 is likely to be the major source of temporary traffic impact; however this option is likely to have a lower impact on the operation of Ti Rakau Drive depending on the number and location of site access points. Effects in EB3R localised, with the exception of Edgewater School.

No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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### Option 3: EB 3 – Online Commercial

Notes:

- Major reconstruction of Ti Rakau Drive with the potential for long term lane closures which would have a significant impact on the all users of the corridor. The area is a regionally/nationally significant industrial area (part of Auckland’s industrial belt) albeit with alternative access to the motorway network via Highbrook Drive.
- Impact is highly dependent on construction methodology. If access is retained to adjacent businesses AND there are no reduction in lanes in the peak periods, the impact may be contained.

#### Assumptions

- As per Options 1 and 2 plus access to businesses on Ti Rakau Drive and those with access to Burswood are maintained during the business operating hours (including deliveries).

#### Other information relied upon

- As per Options 1 and 2

#### Summary of outcomes

No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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### Option 4: EB 3 – Offline Commercial

Notes:

#### Comments

- Construction is mainly off-line with the exception of the reconstruction of Pakuranga Creeak Bridge and the cycling infrastructure on Ti Rakau Drive.

#### Assumptions and mitigation (BAU)

- As per Option 3 plus access to businesses on Ti Rakau Drive and those with access to Burswood are maintained during the business operating hours (including deliveries).

<u>Other information relied upon</u>										
<ul style="list-style-type: none"> <li>As per other options</li> </ul>										
No Mitigation Score (please circle or highlight score):										
-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
Mitigation Score (please circle or highlight score):										
-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5

## Traffic and Transport Permanent Effects – EB3 Residential

Considerations (in-line with business case KPIs):

1. Travel times for buses, cars and trucks
2. Reliability for buses, cars and trucks
3. Pedestrian and cyclist connectivity and infrastructure quality
4. Safety
5. Access to the RTN
6. Access to the road network
7. Access to properties
8. Loss of parking

Information relied upon:

- Design plans
- Specialist knowledge
- High level analysis
- Prior assessment of Off-line option

Assumptions:

- Refer to marked up plans attached
- Bus pre-emption has not been considered in this assessment, but will be an option to improve bus reliability
- All services use the busway (including Harris Road services)
- Signalised intersections have pedestrian and cyclist crossings on all approaches

### EB3 – Residential Area

General comments: The difference between the options are minor in comparison to the overall positive effect that either proposal has on the transport system. The provision of a busway is expected to save up to 15 minutes for public transport passengers and the provision of cycle paths facilities that are compliant for a QoS2 provide a safe facilities for cycling.

The differentiators are as follows:

1. Safety versus reliability for the off-line option – with the busway being offset by 20-30m, the operation of the intersection with the local road (signalised) adjacent to uncontrolled intersections with Ti Rakau introduces a risk that queues will block the busway crossover intersection. To design this out is likely to mean:
  - a. Controlling Ti Rakau Drive – therefore having linked signals, which may then impact the reliability of the bus services
  - b. Reduce the priority for the busway to allow the queue to clear before allowing buses to proceed through the intersection with the local road.
2. Reliability – less chance of variability in travel times with the on-line option than with the off-line option. The off-line option would be reliant on almost absolute priority to deliver the same results as the on-line option; however the scale of the difference is not significant.

For EB3 residential – not much to differentiate from a transport perspective in the context of the overall project benefits to the transport system.

Comments are as follows:

Travel Time and Reliability for Buses



With regard to busway reliability the alternate design is not expected to be a significant difference (either positive or negative) between Pakuranga Highway and Gossamer Drive intersection when compared to the On-line option and we could expect a decrease in performance for the busway at the Gossamer Drive intersection as a result of requiring a dedicated phase (or phases) to cross back to the central running when compared to the On-line option; however, this could be mitigated.

The assessment on busway reliability is as follows:

- There is not expected to be a significant difference (either positive or negative) between Pakuranga Highway and Gossamer Drive intersection between the two options
- A decrease in performance is anticipated for the busway at the Gossamer Drive intersection as a result of requiring a dedicated phase (or phases) to cross back to the central running when compared to the On-line option.

#### Reliability better for the on-line option.

##### Access to the RTN

For the off-line option, the busway stations located back from Ti Rakau Drive provide better accessibility to the busway for the residents on the southern side of the corridor and Edgewater College (slightly closer to the redeveloped higher density area). However, accessibility to the busway is reduced for the residents on the northern side of the corridor.

For the off-line option, moving the Gossamer Drive bus station further west and on the southern side is likely to reduce the accessibility for those living along Gossamer Drive and adjacent streets.

#### Access slightly better for the off-line option due to potential development density - marginal

##### Travel Time and Reliability for Other Traffic

With regard to general traffic and reliability there may not be a significant difference (either positive or negative) on Ti Rakau Drive between Pakuranga Highway and Gossamer Drive intersection when compared to the On-line option, there would likely be better access to Ti Rakau Drive by removing the “barrier” (i.e. the central running busway) preventing right turn movements into and out of the local streets and we could expect a decrease in performance for general traffic and freight at the Gossamer Drive intersection as a result of busway phases, the removal of the left turn lane for eastbound traffic and the reduction in left turn lanes from Gossamer Drive into Ti Rakau Drive (eastbound); however, this could be mitigated.

#### Reliability better for the on-line option.

##### Pedestrian and cyclist connectivity

The proposal to provide uni-directional cycleways along Ti Rakau Drive has a better degree of alignment with the recently released Transport Design Manual. The design may need more crossing facilities to provide better connectivity between the existing signalised intersections for cyclists to travel in the opposite direction (i.e. for cyclists from the southern side to travel east, and from the northern side to travel west).

Potential advantage of the off-line busway is that it provides the opportunity to reduce the potential for pedestrian overcrowding at the intersections where the busway stations are located, more so than the On-line option. This can be designed out

#### Connectivity – positive impact with both options mainly due to cycling infrastructure

##### Safety

Potential advantage of the off-line busway is that it provides the opportunity to reduce the potential for pedestrian overcrowding at the intersections where the busway stations are located, more so than the on-line option.



Gossamer Drive intersection is very large and complex – moreso with the off-line option. For the off-line option, the busway intersections with the local roads where that are not adjacent to the signalised intersections on Ti Rakau Drive can be set up in a similar fashion to railway level crossings where traffic is held such that there is no delay for the busway. The potential issues that may arise at these intersections due to the short space between the busway and Ti Rakau Drive (20 – 30m) are

- If there is a queue of traffic on the local road waiting to turn into Ti Rakau Drive. This scenario cannot be managed to avoid delay on the busway without signal intervention on Ti Rakau Drive.
- If there is a queue on the local road that extends back into Ti Rakau Drive when the busway phase is operating, which is a risk to user safety. This scenario can be managed with queue detection on the local road next to Ti Rakau Drive to ensure that the queue does not extend into Ti Rakau Drive. Under this scenario, the management of queues would be prioritised over the busway.

#### Access to the Road Network

Better access is provided to Ti Rakau Drive by removing the “barrier” (i.e. the central running busway) preventing right turn movements into and out of the local streets.

#### Local access to the road network better with the off-line option

#### Access to properties

Access to properties is maintained under both options. The off-line option provides service lanes to access properties that would no longer have direct access to Ti Rakau Drive

#### Neutral score

#### Loss of parking

There is no on-street parking on Ti Rakau Drive except for the parking area near the Edgewater Shops. With the on-line option, it is assumed that this will be replaced as per what was indicated in the Draft Specimen Design (AECOM), but with the off-line option the shops would be acquired and removed.

Local street parking would be affected more by the off-line option than the on-line option.

SCORE EB3 Residential		
Option	Non-mitigated score	Mitigated score
Online	4	4
Offline	3	3

## Traffic and Transport Effects – EB3 Commercial

Considerations (in-line with business case KPIs):

9. Travel times for buses, cars and trucks
10. Reliability for buses, cars and trucks
11. Pedestrian and cyclist connectivity and infrastructure quality
12. Safety
13. Access to the RTN
14. Access to the road network
15. Access to properties
16. Loss of parking

Information relied upon:

- Design plans
- Specialist knowledge
- High level analysis
- Prior assessment of Off-line option

Assumptions:

- Refer to marked up plans attached
- Bus pre-emption has not been considered in this assessment, but will be an option to improve bus reliability
- All services use the busway (including Harris Road services)
- Signalised intersections have pedestrian and cyclist crossings on all approaches

### EB3 – Commercial Area

General comments: The difference between the options are minor in comparison to the overall positive effect that either proposal has on the transport system. The provision of a busway is expected to save up to 15 minutes for public transport passengers and the provision of cycle paths facilities that are compliant for a QoS3 provide better facilities for cycling, although being short of what is desired.

The differentiators are as follows:

3. Accessibility – The busway stations located further away from Ti Rakau Drive provide better accessibility to the busway for the residents living in the Burswood area but at the expense of people living on Huntington Drive.
4. Bus Reliability – less chance of variability in travel times with the off-line option than with the on-line option; however Harris Road services from Botany would travel further.
5. Safety – much less exposure to conflict with the off-line option and avoiding major complex intersections

For EB3 commercial – there is a sufficient difference to select the off-line option over the on-line with the caveat that the access to commercial properties allows for the continued operation of the business.

Comments are as follows:

#### Travel Time and Reliability for Buses

The key differences between the on-line option and the off-line option with respect to the reliability of the busway are:

- Off-line option has a longer travel distance
- A partial crossover of the busway from the northern side to central running at the Trugood Drive intersection in the Off-line option compared with no crossover in the On-line option
- A partial crossover of the busway from the northern side to central running at a new intersection, notionally at a location aligned with a potential extension to Botany (EB4) intersection in the Off-line option compared compared to no crossover in the On-line option
- Signalised intersections at 2 local roads – Burwood Drive at the eastern and western ends, as opposed to 4 fully signalised intersections along the Ti Rakau Drive corridor.
- Busway running on the northern side of the bus depot with a new access for the bus depot to and from the busway, whereas it is unlikely that access to the depot FROM the busway will be provided (important for EB4 – dead running or services turning around)



- The local Harris Road services are likely to have a longer travel time as a result of deviating from Ti Rakau Drive, and in the case of the services running to Botany, doubling back to complete the route between the busway and Harris Road.

Average time better for the ON-line option (but likely to be marginal).

Reliability better for the OFF-line option.

Access to the RTN

The busway stations located away from Ti Rakau Drive provide better accessibility to the busway for the residents living in the Burswood area, whilst still covering a reasonable walking catchment for employees along the Ti Rakau Drive corridor. However, accessibility to the busway is reduced for reduced for people living near Huntington Drive.

This was one of the reasons for scoring a “northern side” busway lower than a central running busway in the previous 2017 FOA. The patronage forecasts from the Auckland Regional Transport models (MSM) using the stations in the Burswood and Huntington stations are expected to be low (AMETI Functional Specification Version 3) with the central running busway, hence the off-line option provides a better opportunity for a walk-up catchment.

In addition to this, a station could be provided at the end of the off-line section to serve a Huntington Drive catchment, either in addition to, or at the expense of, one of the stations on Burswood Drive.

Access better for the off-line option

Travel Time and Reliability for Other Traffic

When compared to the 2017 SAR northern side option, the spacing between the busway and Ti Rakau Drive addresses the issue identified in relation to impacts to left turn traffic and the requirement for service lanes to access the directly adjacent properties.

The key differences between the on-line option and the off-line option with respect to the reliability of general traffic and freight are:

- The off-line busway allowing for the retention of the existing road layout (including median breaks) which retains 3 westbound lanes (Te Irirangi to Harris Road) and effectively 2 eastbound lanes through the Greenmount intersection, then flaring out to 3 lanes. The on-line option has 2 westbound lanes and 3 westbound lanes.
- The option has a partial crossover of the busway from the northern side to central running at the Trugood Drive intersection in the Off-line option compared with no crossover in the On-line option. This is likely to have some impact on eastbound travel; however, the retention of 3 through lanes travelling eastbound may offset this potential impact and achieve levels of service that are closer to the current scenario.
- Retention of the eastbound lane between Te Koha Road and Harris Road will be a benefit for general traffic compared to the On-line option and expected to be consistent with the existing environment.
- The new signalised T-intersection near Te Koha Road may have a minor impact for eastbound travel; however, this intersection will not govern the performance of the corridor and is not considered to be significant.

Reliability: Neutral compared to existing environment.

Pedestrian and cyclist connectivity



The proposal to provide uni-directional cycleways along Ti Rakau Drive has a better degree of alignment with the recently released Transport Design Manual, albeit with lower than desirable widths

Connectivity – positive impact with both options mainly due to cycling infrastructure

Safety

Off-line option:

1. Fewer pedestrian/vehicle conflict around the bus station with the off-line option. (Lower exposure)
2. Avoids widening the complex major intersections

Off-line option better with the caveat around CPTED principles (personal security)

Access to the Road Network

No change to turning movements from the side streets.

Local access to the road network better with the off-line option

Access to properties

As per the existing environment for the off-line option for access to Ti Rakau Drive (with the assumption that these will be reinstated in accordance with the requirements in AuP (E27)); however access to the back of the commercial properties may be significantly compromised, particularly if used for deliveries and trade.

Neutral score with a caveat on the commercial property access and operation – could be a fatal flaw

Loss of parking

There is no on-street parking on Ti Rakau Drive. Maybe some minor loss of on-street parking on Burswood Drive with the off-line option. Not a differentiator.

Local street parking would be slightly more affected by the off-line option than the on-line option.

SCORE EB3 Commercial		
Option	Non-mitigated score	Mitigated score
Online	3	3
Offline	4	4

## Multi Criteria Assessment Scoring Sheet

Name of assessor: Laura Laurenson

Area of assessment: Legislative consideration

Guidance criteria considered: Guidance for EB3 Options Assessment Workshop (EB234-1-PL-GL-Z3-00000-1)

Option 1: EB 3 – Online Residential

Notes:

### Comments

- Includes the widening of an existing road within an existing transport corridor
- Provides improved public transport connections/opportunity to a sub-region of Auckland because of a dedicated busway
- Increased use of public transport will support an overall reduction in traffic volume, particularly single-occupant private vehicles
- Offers dedicated walking and cycling facilities
- Impacts residential and commercial property (including total removal) by widening of existing corridor to provide a dedicated busway
- Provision of infrastructure in land zoned for residential, commercial, open space (minimal) use/development
- Will contribute to a reduction in the effects of climate change through dedicated busway on existing road alignment resulting in a reduction in overall traffic volume
- No direct/indirect impacts to the coastal environment
- Includes provision of infrastructure in overland flow paths (2000m<sup>2</sup> to >3ha), flood prone areas, and flood plains (note functional need to be in these areas)
- Project area does not include:
  - coastal, wetland, river and/or stream environment(s)
  - outstanding natural features and/or landscape(s)
  - significant indigenous vegetation and significant habitats for indigenous fauna
  - cultural/historic heritage
- Works are anticipated to be required in the following relevant Auckland Unitary Plan zones/overlays/designations:
  - Residential – terrace housing and apartment buildings zone
  - Residential – mixed housing urban zone
  - Business – neighbourhood centre zone
  - Open space – sport and active recreation zone
  - Designation: 8507 - electricity transmission (Transpower New Zealand Ltd)
  - Infrastructure - national grid corridor overlay

### Assumptions

- All options will result in positive effect experienced by a sub-regional audience
- All options require the use of natural resources
- The following will be managed accordingly (construction and operation):
  - Potential adverse effects to freshwater and coastal environments (i.e. potential adverse effects resulting from stormwater (quality/quantity)
  - Potential adverse effects (including temporary disruption during construction) to national telecom facilities/network

- Potential adverse effects (including temporary disruption during construction) to the national grid/overhead electricity transmission infrastructure
- Potential discharges resulting from the disturbance of contaminated soil

Other information relied upon

- Knowledge and review of the critical elements of the project
- Workshop participation
- Specialist knowledge
- Eastern Busway Alliance's Geocortex Viewer
- Auckland Council's GeoMaps
- The Resource Management Act (RMA) 1991 (specifically Part 2 matters)
- High level policy documents/frameworks relevant to the project e.g. NZCPS and relevant NPS, RPS and NES
- The Auckland Unitary Plan: Operative in Part

Summary of outcomes

- NPS on Urban Development 2020: Includes removal of existing residential development and use of land zoned for residential use to provide infrastructure. Residual land can be rezoned to provide for higher intensity development
- NPS for Freshwater Management 2020: No watercourses present in project area. Stormwater will be managed appropriately (all options). Potential for water quality to be improved overall
- NPS on Electricity Transmission and NES for Electricity Transmission Activities: Option impacts national grid yard/overhead and underground transmission cables. Impacts limited to construction and can be managed/mitigated
- NZ Coastal Policy Statement: All options will manage stormwater and other indirect effects to CMA. No works required in CMA. Potential for water quality to be improved overall
- NES for Freshwater: No direct impacts to freshwater and indirect impacts (e.g. stormwater discharge and associated contaminants) can be managed
- NES for Air Quality: Impacts can be managed to achieve requirements during both construction and operation overall
- NES for Telecommunications Facilities: Impacts can be managed to achieve requirements during both construction and operation overall
- NES for Assessing and Managing Contaminants in Soil to Protect Human Health: Impacts can be managed to achieve requirements during both construction and operation overall. Potential for remediation
- Auckland Unitary Plan: Impacts a reserve. Includes provision of infrastructure in overland flow paths (2000m<sup>2</sup> to >3ha), flood prone areas and flood plains (note that construction has functional need to be in these areas). Engineering options can mitigate potential adverse impacts

No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Option 2: EB 3 – Offline Residential



Notes:

#### Comments

- Includes the widening of an existing road within an existing transport corridor
- Includes construction of a new offline alignment (i.e. widening of the existing transport corridor resulting in a larger overall project area and less efficient use of land)
- Provides improved public transport connections/opportunity to a sub-region of Auckland because of a dedicated busway
- Increased use of public transport will support an overall reduction in traffic volume, particularly single-occupant private vehicles
- Offers dedicated walking and cycling facilities
- Affects commercial and increased number of residential property (including total removal and direct impacts to current rear properties) by construction of a new offline alignment and overall widening of existing corridor
- Provision of infrastructure in land zoned for residential, commercial, open space (minimal) use/development
- Will contribute to a reduction in the effects of climate change through dedicated busway on existing road alignment resulting in a reduction in overall traffic volume
- Includes provision of infrastructure in overland flow paths (2000m<sup>2</sup> to >3ha), flood prone areas and flood plains (note that there is a functional need to be in these areas)
- No direct/indirect impacts to the coastal environment
- Project area does not include:
  - coastal, wetland, river and/or stream environment(s)
  - outstanding natural features and/or landscape(s)
  - significant indigenous vegetation and significant habitats for indigenous fauna
  - cultural/historic heritage
- Works are anticipated to be required in the following relevant Auckland Unitary Plan zones/overlays/designations:
  - Residential – terrace housing and apartment buildings zone
  - Residential – mixed housing urban zone
  - Business – neighbourhood centre zone
  - Open space – sport and active recreation zone
  - Open space – informal recreation zone
  - Designation: 8507 – electricity transmission (Transpower New Zealand Ltd)
  - Infrastructure – national grid corridor overlay

#### Assumptions

- All options will result in positive effect experienced by a sub-regional audience
- All options require the use of natural resources
- The following will be managed accordingly (construction and operation):
  - Potential adverse effects resulting to freshwater and coastal environments because of stormwater (quality/quantity)
  - Potential adverse effects (including temporary disruption during construction) to national telecom facilities/network
  - Potential adverse effects (including temporary disruption during construction) to the national grid/overhead electricity transmission infrastructure
  - Potential discharges resulting from the disturbance of contaminated soil

Other information relied upon



- Knowledge and review of the critical elements of the project
- Workshop participation
- Specialist knowledge
- Eastern Busway Alliance's Geocortex Viewer
- Auckland Council's GeoMaps
- The Resource Management Act (RMA) 1991 (specifically Part 2 matters)
- High level policy documents/frameworks relevant to the project e.g. NZCPS and relevant NPS, RPS and NES

Summary of outcomes

- NPS on Urban Development 2020: Includes removal of existing residential development and use of land zoned for residential use to provide infrastructure. Residual land can be rezoned to provide for higher intensity development. Potential for busway to segregate land (i.e. land creation of a residential 'island' in a transport corridor) and/or less efficient use of land
- NPS for Freshwater Management 2020: No watercourses present in project area. Stormwater will be managed appropriately (all options). Potential for water quality to be improved overall
- NPS on Electricity Transmission and NES for Electricity Transmission Activities: Option impacts national grid yard/overhead and underground transmission cables. Impacts limited to construction and can be managed/mitigated
- NZ Coastal Policy Statement: All options will manage stormwater and other indirect effects to CMA. Potential for water quality to be improved overall
- NES for Freshwater: No direct impacts to freshwater and indirect impacts (e.g. stormwater discharge and associated contaminants) can be managed
- NES for Air Quality: Impacts can be managed to achieve requirements during both construction and operation overall
- NES for Telecommunications Facilities: Impacts can be managed to achieve requirements during both construction and operation overall
- NES for Assessing and Managing Contaminants in Soil to Protect Human Health: Impacts can be managed to achieve requirements during both construction and operation overall
- Auckland Unitary Plan: Impacts a reserve. Includes provision of infrastructure in overland flow paths (2000m<sup>2</sup> to >3ha), flood prone areas and flood plains (note that construction has functional need to be in these areas). Engineering options can mitigate potential effects

No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Option 3: EB 3 – Online Commercial

Notes:

- Includes the widening of an existing road within an existing transport corridor
- Provides improved public transport connections/opportunity to a sub-region of Auckland because of a dedicated busway



- Increased use of public transport will support an overall reduction in traffic volume, particularly single-occupant private vehicles
- Offers dedicated walking and cycling facilities
- Affects commercial property (including total removal, loss of carparking) by widening of existing corridor to provide a dedicated busway
- Provision of infrastructure in land zoned for residential and business use/development
- Will contribute to a reduction in the effects of climate change through dedicated busway on existing road alignment resulting in a reduction in overall traffic volume
- Includes works in the coastal and freshwater (stream and wetland) environment
- Includes provision of infrastructure in overland flow paths (2000m<sup>2</sup> to >3ha), flood prone areas, flood plains and areas susceptible to coastal inundation (1% AEP +1m sea level rise) Construction required to accommodate busway and has functional need to be in these areas
- Works are required in the following relevant Auckland Unitary Plan zones/overlays/designations:
  - Business – light industrial zone
  - Business – neighbourhood centre zone
  - Open space – Informal recreation zone
  - Coastal – general coastal marine zone
  - Coastal – general coastal transition zone
  - Designation – 8507 - Electricity transmission, Transpower New Zealand Ltd
  - Infrastructure – national grid corridor overlay
  - Built environment - identified growth corridor overlay
  - Natural resources – significant ecological area (SEA) overlay - SEA-M2-45b, Marine 2
  - Historic heritage and special character – historic heritage overlay (extent of place 2114), McCallum's Wharf and Quarry R11\_1263
  - Mana Whenua: sites and places of significance to mana whenua overlay (024 - Urupā 1)

#### Assumptions

- All options will result in positive effect experienced by a sub-regional audience
- All options require the use of natural resources
- The following will be managed accordingly (construction and operation):
  - Potential adverse effects resulting to freshwater and coastal environments because of stormwater (quality/quantity)
  - Potential adverse effects (including temporary disruption during construction) to national telecom facilities/network
  - Potential adverse effects (including temporary disruption during construction) to the national grid/overhead electricity transmission infrastructure
  - Potential discharges resulting from the disturbance of contaminated soil

#### Other information relied upon

- Knowledge and review of the critical elements of the project
- Workshop participation
- Specialist knowledge
- Eastern Busway Alliance's Geocortex Viewer
- Auckland Council's GeoMaps
- The Resource Management Act (RMA) 1991 (specifically Part 2 matters)
- High level policy documents/frameworks relevant to the project e.g. NZCPS and relevant NPS, RPS and NES



Summary of outcomes

- NPS on Urban Development 2020: Includes removal of existing commercial development and use of land zoned for business use to provide infrastructure including loss/reconfiguration of carparking. Mitigation options available
- NPS for Freshwater Management 2020: Includes works in the freshwater environment (stream and potential wetland – possible realignment). This results from both construction of offline busway and access to bus depot (stream/wetland). Stormwater will be managed appropriately (all options) and water quality can potentially be improved
- NPS on Electricity Transmission and NES for Electricity Transmission Activities: Option impacts national grid yard/overhead and underground transmission cables. Impacts limited to construction and can be managed/mitigated
- NZ Coastal Policy Statement: All options will manage stormwater and other indirect effects to CMA. Potential for water quality to be improved overall. Works required in CMA to upgrade/replace bridge a functional need to be located here and will be required regardless of EB2 due to current estimated lifespan
- NES for Freshwater: Direct impacts to freshwater – temporary permanent effects to streams and wetlands. Indirect impacts (e.g. stormwater discharge and associated contaminants) can be managed/improved
- NES for Air Quality: Impacts can be managed to achieve requirements during both construction and operation overall
- NES for Telecommunications Facilities: Impacts can be managed to achieve requirements during both construction and operation overall
- NES for Assessing and Managing Contaminants in Soil to Protect Human Health: Impacts can be managed to achieve requirements during both construction and operation overall
- Auckland Unitary Plan: impacts reserve, significant ecological area (SEA) in CMA, historic heritage (McCallum's Wharf and Quarry) and a site/place of significance to mana whenua (urupā). Auckland Unitary Plan: impacts a reserve. Includes provision of infrastructure in overland flow paths (2000m<sup>2</sup> to >3ha), flood prone areas and flood plains and areas susceptible to coastal inundation, the 1% AEP (plus 1m), and sea level rise. Construction/reconstruction of existing bridge and widening at eastern end of Ti Rakau Dive to accommodate busway has functional need to be in these areas. Engineering options can mitigate potential effects

No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Option 4: EB 3 – Offline Commercial

Notes:

- Provides improved public transport connections/opportunity to a sub-region of Auckland because of a dedicated busway
- Increased use of public transport will support an overall reduction in traffic volume, particularly single-occupant private vehicles
- Offers dedicated walking and cycling facilities



- Affects commercial and residential property (including total removal, loss of carparking) by widening of existing corridor to provide a dedicated busway
- Provision of infrastructure in land zoned for commercial residential use/development
- Will contribute to a reduction in the effects of climate change through dedicated busway on existing road alignment resulting in a reduction in overall traffic volume
- Includes significant works and structures in the coastal and freshwater (stream and wetland environment (bridge structures for busway)
- Includes provision of infrastructure in coastal inundation zone (1% AEP +1m sea level rise) (construction/reconstruction of existing bridge to accommodate busway – functional need to be in CMA questionable – alternative options available)
- Works are anticipated to be required in the following relevant Auckland Unitary Plan zones/overlays/designations:
  - Residential – terrace housing and apartment buildings zone
  - Residential – mixed housing suburban zone
  - Business – light industrial zone
  - Business – neighbourhood centre zone
  - Open space – Informal recreation zone
  - Coastal – general coastal marine zone
  - Coastal – general coastal transition zone
  - Designation – 8507 - Electricity transmission, Transpower New Zealand Ltd
  - Infrastructure – national grid corridor overlay
  - Built environment - identified growth corridor overlay
  - Natural resources – significant ecological a (SEA) overlay - SEA-M2-45b, Marine 2
  - Historic heritage and special character – historic heritage overlay (extent of place 2114), McCallum's Wharf and Quarry R11\_1263
  - Mana Whenua: sites and places of significance to mana whenua overlay (024 - Urupā 1)

#### Assumptions

- All options will result in positive effect experienced by a sub-regional audience
- All options require the use of natural resources
- The following will be managed accordingly (construction and operation):
  - Potential adverse effects resulting to freshwater and coastal environments because of stormwater (quality/quantity)
  - Potential adverse effects (including temporary disruption during construction) to national telecom facilities/network
  - Potential adverse effects (including temporary disruption during construction) to the national grid/overhead electricity transmission infrastructure
  - Potential discharges resulting from the disturbance of contaminated soil

#### Other information relied upon

- Knowledge and review of the critical elements of the project
- Workshop participation
- Specialist knowledge
- Eastern Busway Alliance's Geocortex Viewer
- Auckland Council's GeoMaps
- The Resource Management Act (RMA) 1991 (specifically Part 2 matters)
- High level policy documents/frameworks relevant to the project e.g. NZCPS and relevant NPS, RPS and NES



Summary of outcomes

- NPS on Urban Development 2020: includes removal of existing commercial development and use of land zoned for business use to provide infrastructure including loss/reconfiguration of carparking. Mitigation options available
- NPS for Freshwater Management 2020: Includes works in the freshwater environment (stream and potential wetland – possible realignment). This results from both construction of offline busway and access to bus depot (stream/wetland). Consideration re functional need/alternative option. Stormwater will be managed appropriately (all options) and water quality can potentially be improved overall
- NPS on Electricity Transmission and NES for Electricity Transmission Activities: Option impacts national grid yard/overhead and underground transmission cables. Impacts limited to construction and can be managed/mitigated
- NZ Coastal Policy Statement: All options will manage stormwater and other indirect effects to CMA. Potential for water quality to be improved overall. Works required in CMA to upgrade/replace bridge a functional need to be located here and will be required regardless of EB2 due to current estimated lifespan
- NES for Freshwater: Includes works in the freshwater environment (stream and potential wetland – possible realignment). This results from both construction of offline busway and access to bus depot (stream/wetland). Consideration should be given to functional need/alternative option. Stormwater will be managed appropriately (all options) and water quality can potentially be improved overall
- NES for Air Quality: Impacts can be managed to achieve requirements during both construction and operation overall
- NES for Telecommunications Facilities: Impacts can be managed to achieve requirements during both construction and operation overall
- NES for Assessing and Managing Contaminants in Soil to Protect Human Health: Impacts can be managed to achieve requirements during both construction and operation overall
- Auckland Unitary Plan: impacts reserve, significant ecological area (SEA) in CMA, historic heritage (McCallum's Wharf and Quarry) and a site/place of significance to mana whenua (urupā). Auckland Unitary Plan: impacts a reserve. Includes provision of infrastructure in overland flow paths (2000m<sup>2</sup> to >3ha), flood prone areas and flood plains and areas susceptible to coastal inundation, the 1% AEP (plus 1m), and sea level rise. Construction/reconstruction of existing bridge and widening at eastern end of Ti Rakau Dive to accommodate busway has functional need to be in these areas. Engineering options can mitigate potential effects

No Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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Mitigation Score (please circle or highlight score):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
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[Business case/ objectives assessment here]



Eastern Busway Alliance

