I hereby give notice that a hearing by commissioners will be held on:

Date:	**Mondays through Thursdays from 18 September until 12 October 2023**
Time:	**9:30am**
Meeting Room:	**Council Chambers**
Venue:	**Level 2, Henderson Civic, 3 Smythe Road, Henderson, Auckland 0612**

NOTIFICATION MATERIAL

VOLUME 04

NORTH-WEST STRATEGIC PROJECTS

TE TUPU NGĀTAHI SUPPORTING GROWTH

AUCKLAND TRANSPORT & WAKA KOTAHI NZ TRANSPORT AGENCY

COMMISSIONERS

Chairperson	**Richard Blakey**
Commissioners	**Mark Farnsworth**
	Vaughan Smith

Patrice Baillargeon
Kaitohutohu Mataamua Whakawā /
Senior Hearings Advisor

Telephone: 09 890 4692 or 027 338 5383
Email: patrice.baillargeon@@aucklandcouncil.govt.nz
Website: www.aucklandcouncil.govt.nz

Note: The reports contained within this agenda are for consideration and should not be construed as a decision of Council. Should Commissioners require further information relating to any reports, please contact the Team Leader Hearings.

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STR-PART 1
North-West Strategic: Whenuapai, Kumeū, Huapai and Redhills – Part 1

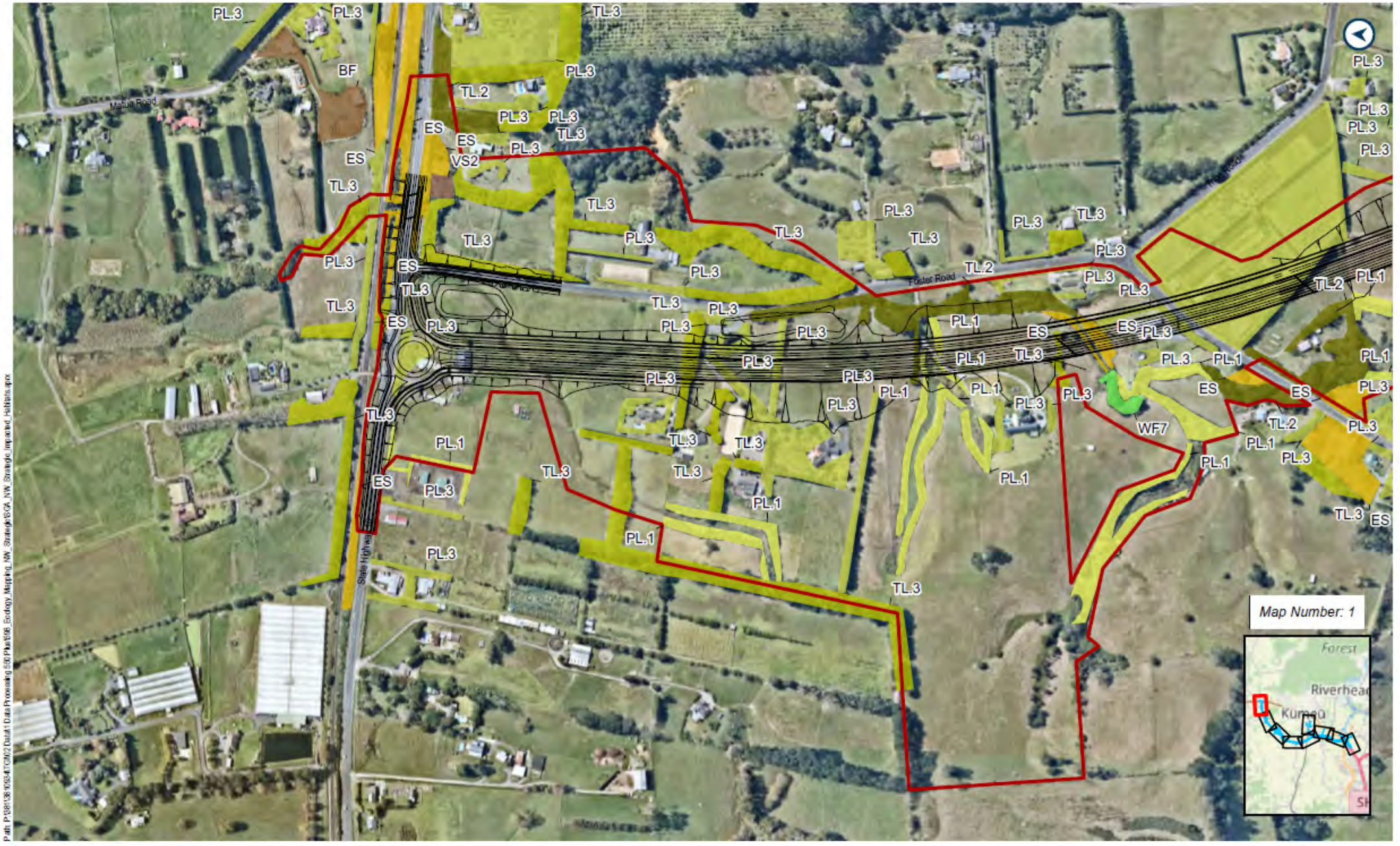
ATTACHMENT 49

NORTH-WEST STRATEGIC ASSESSMENT OF ECOLOGICAL EFFECTS PART 2 OF 3

5 Appendix 5 - Strategic Ecological Habitat Maps

5.1 NoR S1: Alternative State Highway, Including Brigham Creek Interchange

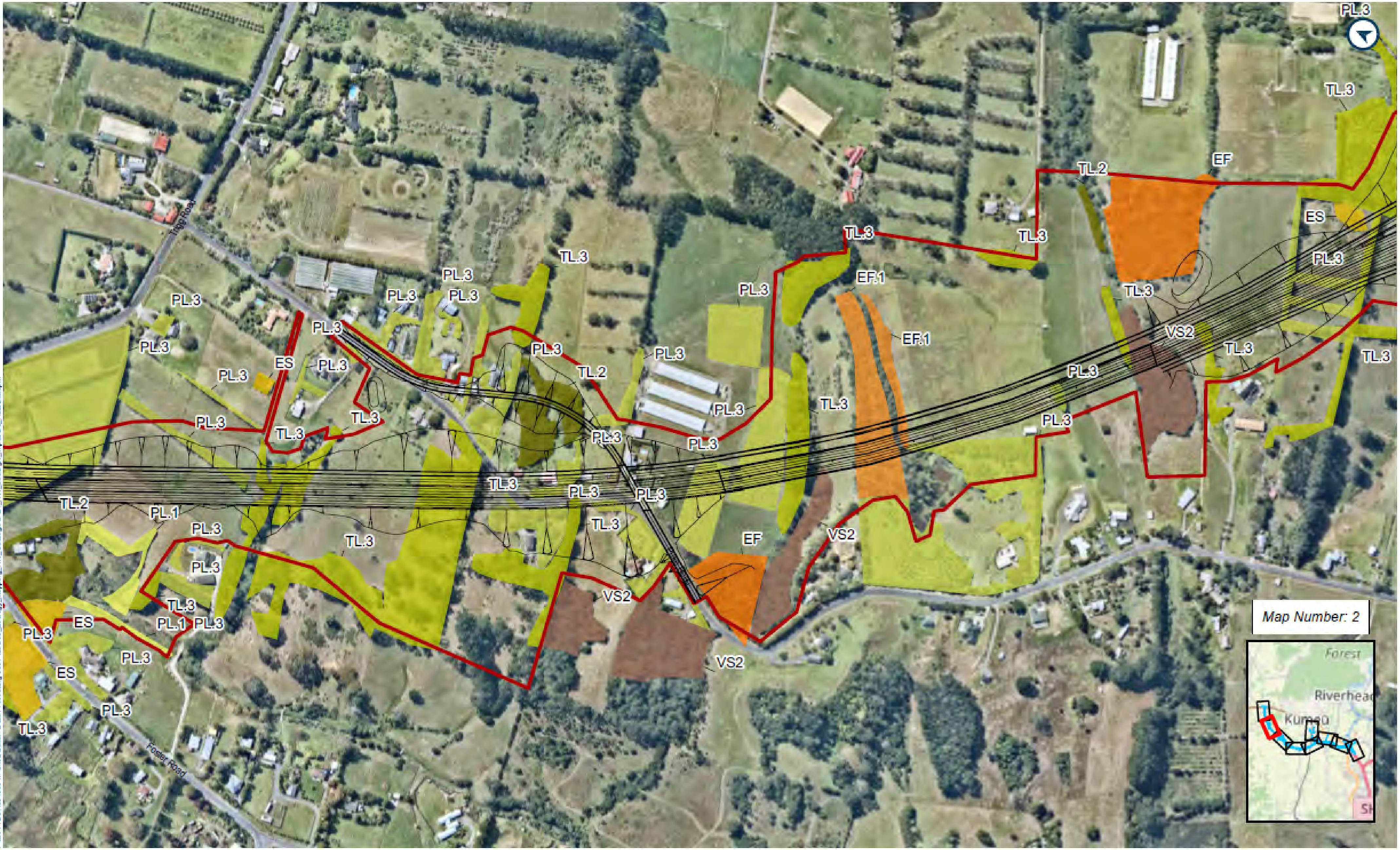
5.1.1 Terrestrial Vegetation



LEGEND

- Route Options
- Designation
- BF-Brownfield (Cropland)
- ES-Exotic Scrub
- PL.1-Planted native (<20 years old)
- PL.3-Amenity planting
- TL.2-Mixed native / exotic treeland
- TL.3-Treeland Exotic
- VS2-Kanuka Scrub/Forest
- WF7-Puriri Forest

0 100 200
Metres

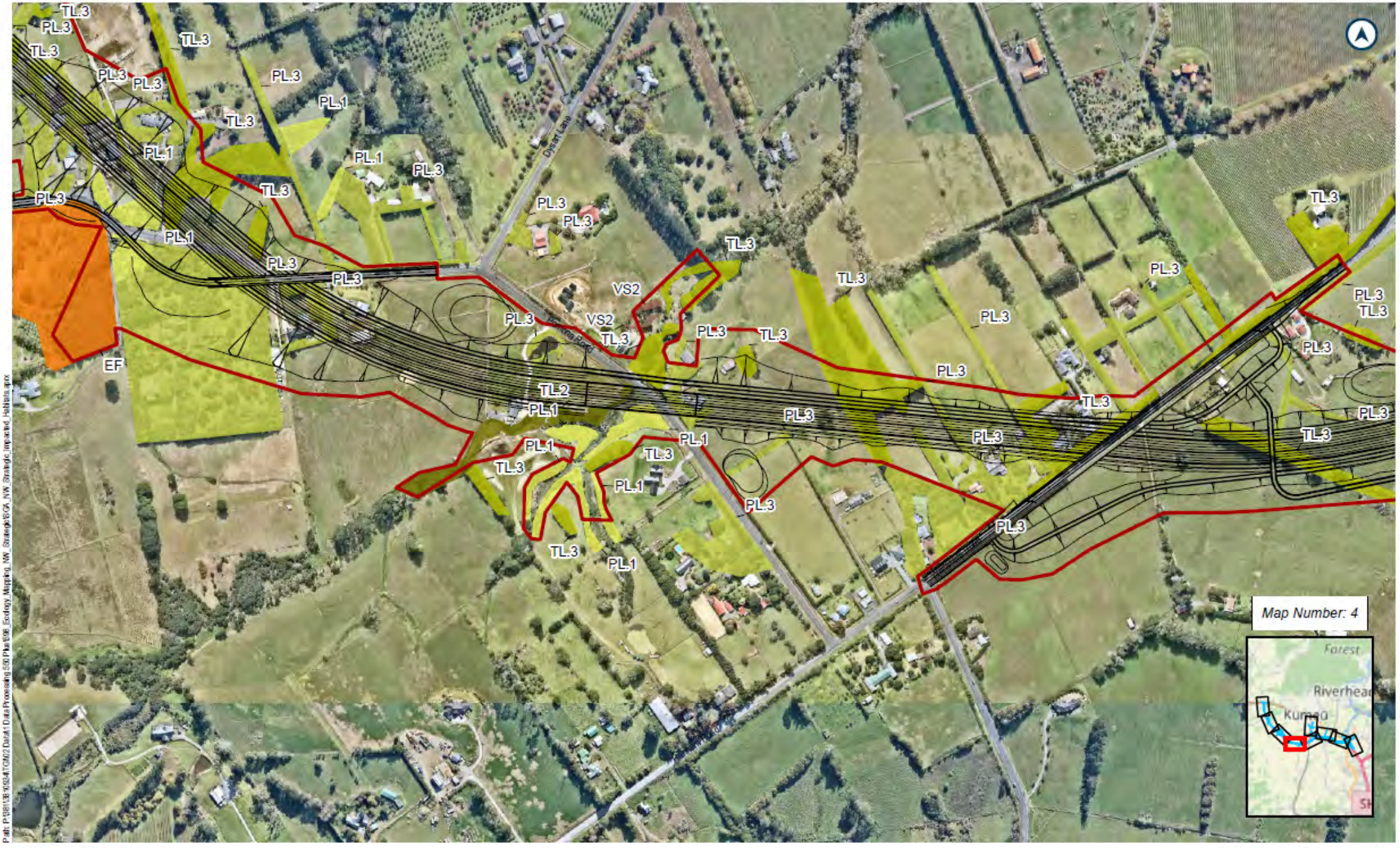


LEGEND

- Route Options
- Designation
- EF-Exotic Forest
- EF.1-Exotic forest (native understory)
- ES-Exotic Scrub
- PL.1-Planted native (<20 years old)
- PL.3-Amenity planting
- TL.2-Mixed native / exotic treeland
- TL.3-Treeland Exotic
- VS2-Kanuka Scrub/Forest

0 100 200

Metres



LEGEND

- Route Options
- Designation
- EF-Exotic Forest
- PL.1-Planted native (<20 years old)
- PL.3-Amenity planting
- TL.2-Mixed native / exotic treeland
- TL.3-Treeland Exotic
- VS2-Kanuka Scrub/Forest

0 100 200

Metres

LEGEND

- Route Options
- Designation
- EF-Exotic Forest
- ES-Exotic Scrub
- PL.3-Amenity planting
- TL.2-Mixed native / exotic treeland
- TL.3-Treeland Exotic

0 100 200
Metres

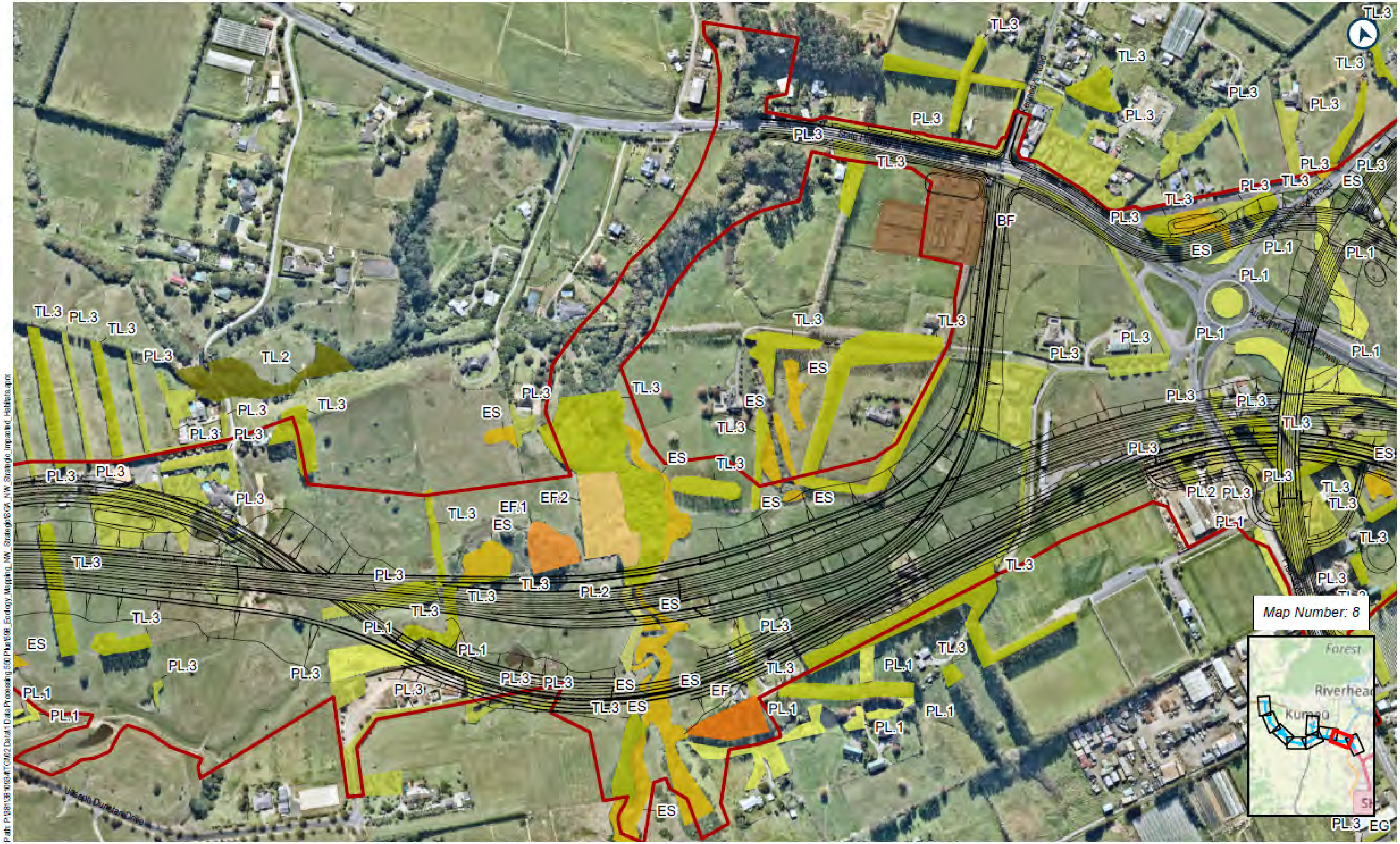
LEGEND

- Route Options
- Designation
- BF-Brownfield (Cropland)
- ES-Exotic Scrub
- PL.3-Amenity planting
- TL.3-Treeland Exotic

LEGEND

- Route Options
- Designation
- EF-Exotic Forest
- ES-Exotic Scrub
- PL.1-Planted native (<20 years old)
- PL.3-Amenity planting
- TL.2-Mixed native / exotic treeland
- TL.3-Treeland Exotic
- VS2-Kanuka Scrub/Forest

0 100 200
Metres



LEGEND

- Route Options
- Designation
- BF-Brownfield (Cropland)
- EF-Exotic Forest
- EF.1-Exotic forest (native understory)
- EF.2 -Exotic forest (exotic understory)
- EG-Exotic Grassland
- ES-Exotic Scrub
- PL.1-Planted native (<20 years old)
- PL.2-Planted native (>20 years old)
- PL.3-Amenity planting
- TL.2-Mixed native / exotic treeland
- TL.3-Treeland Exotic

0 100 200
Metres

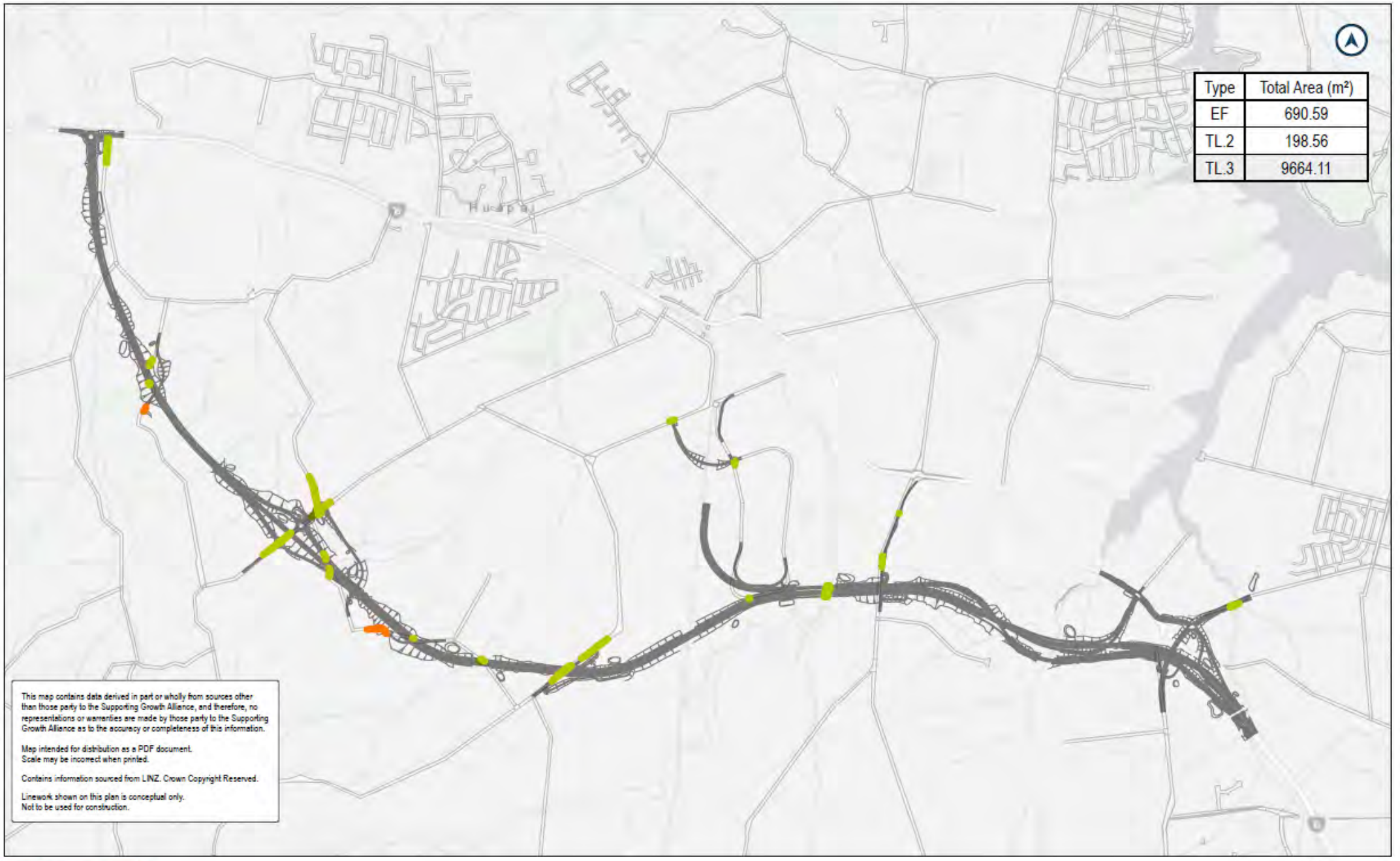
LEGEND

- Route Options
- Designation
- EG-Exotic Grassland
- ES-Exotic Scrub
- PL.1-Planted native (<20 years old)
- PL.2-Planted native (>20 years old)
- PL.3-Amenity planting
- SA1.2-Mangrove forest and scrub
- TL.3-Treeland Exotic

0 100 200

Metres

5.1.2 District Plan Vegetation


Type | Total Area (m²)
EF | 690.59
TL.2 | 198.56
TL.3 | 9664.11
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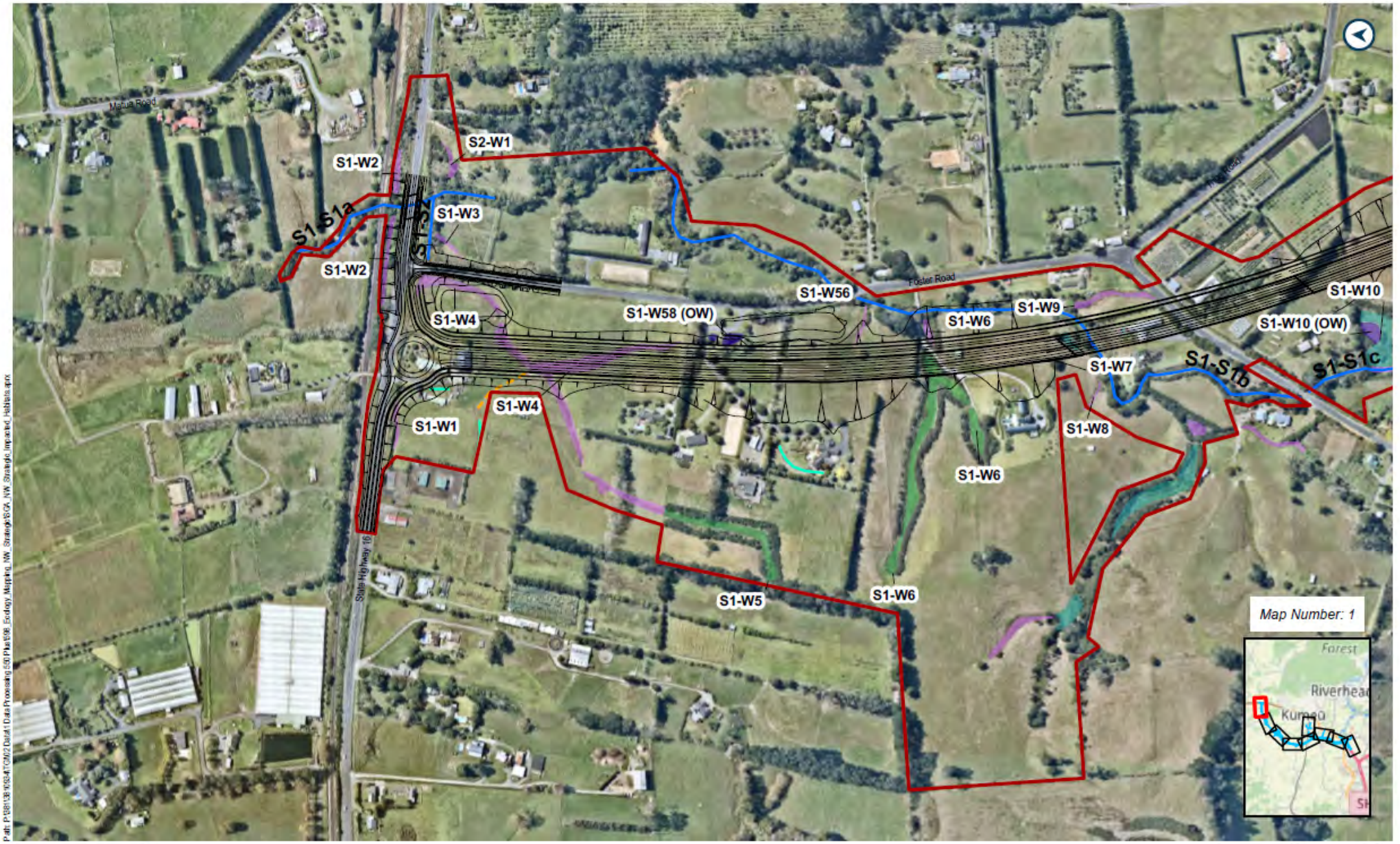
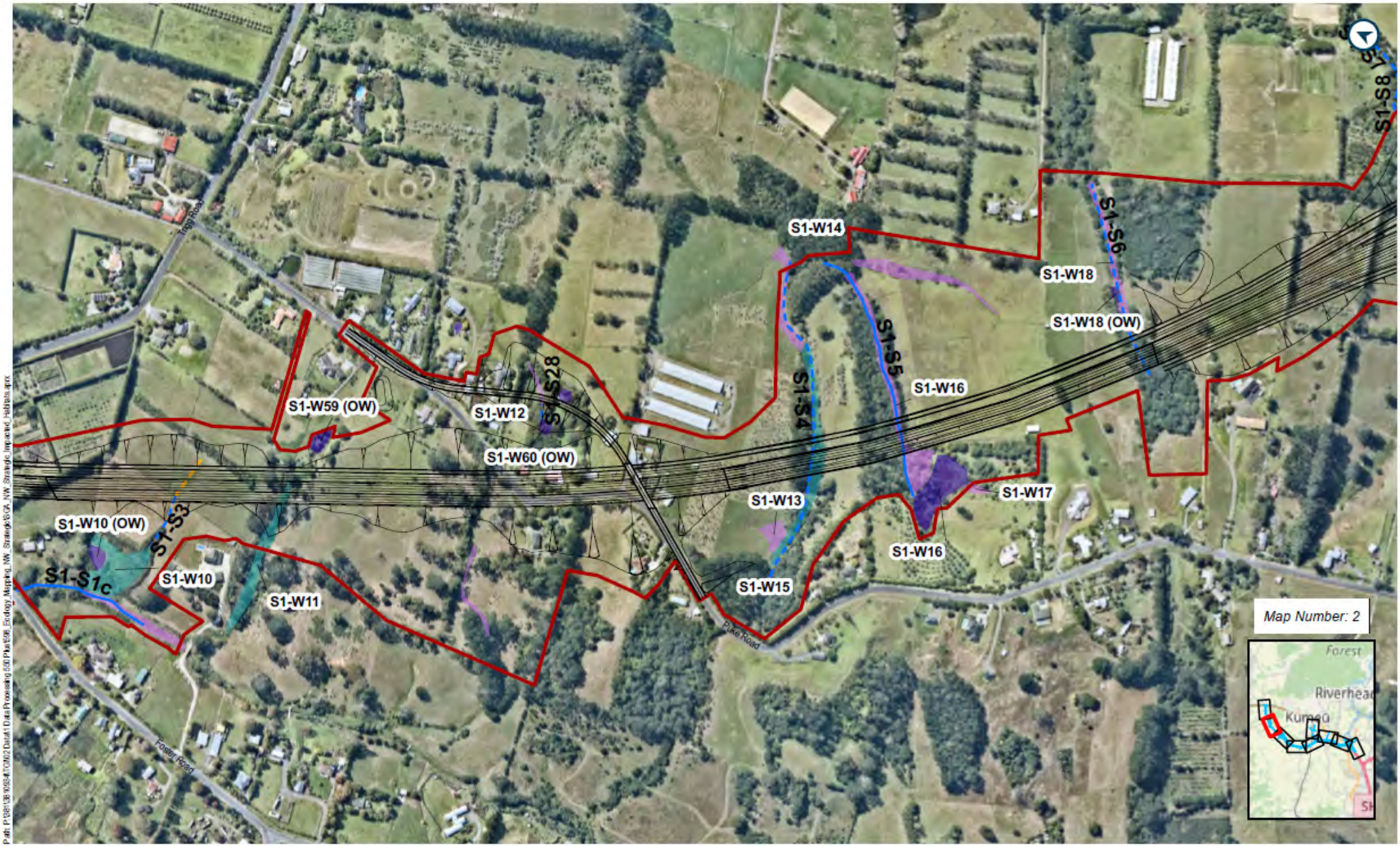
LEGEND
0
0.5
1
Kilometres
Route Option
EF_DPT
TL.2_DPT
TL.3_DPT
Road

5.1.3 Freshwater Streams and Wetland Habitat

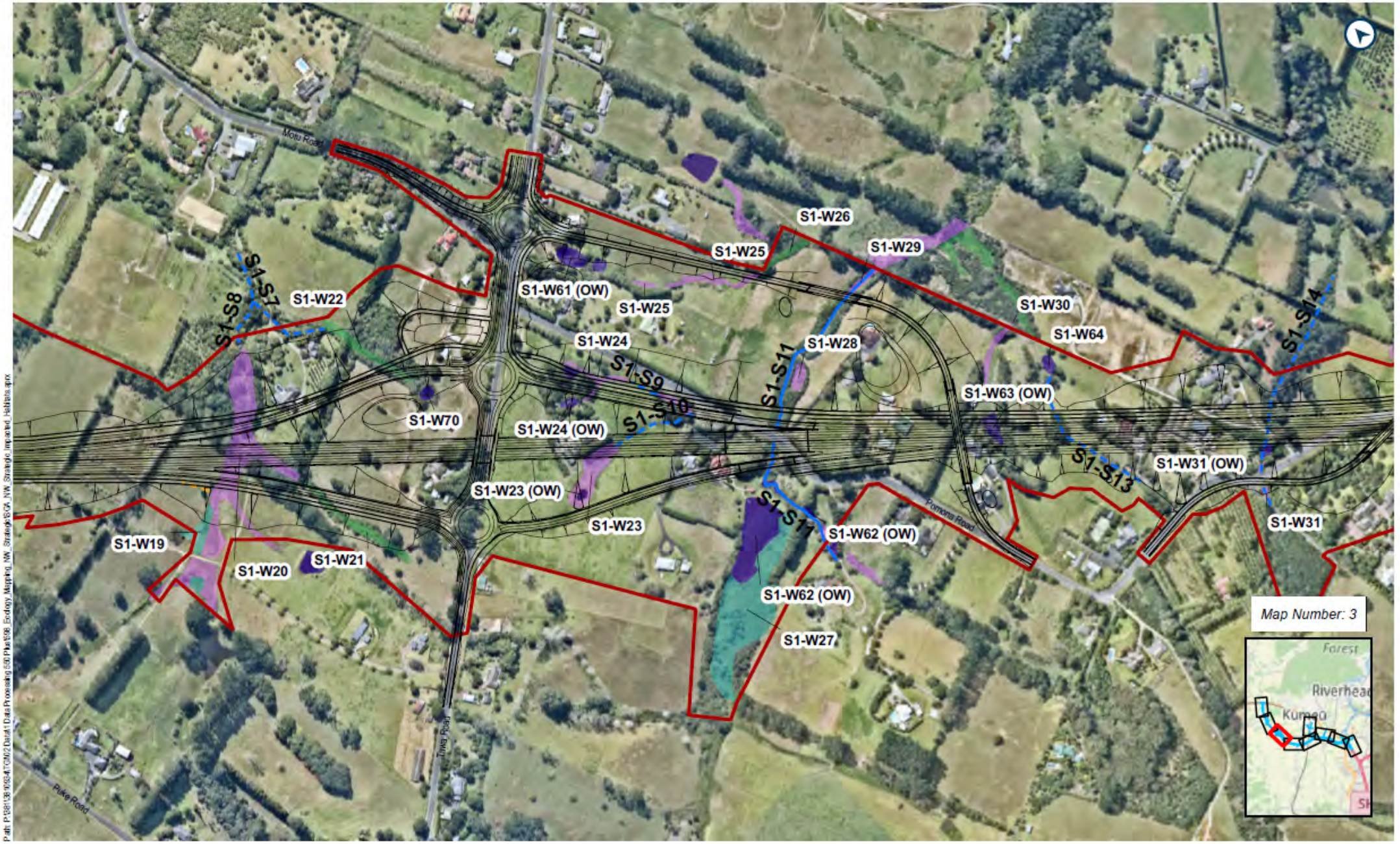




LEGEND

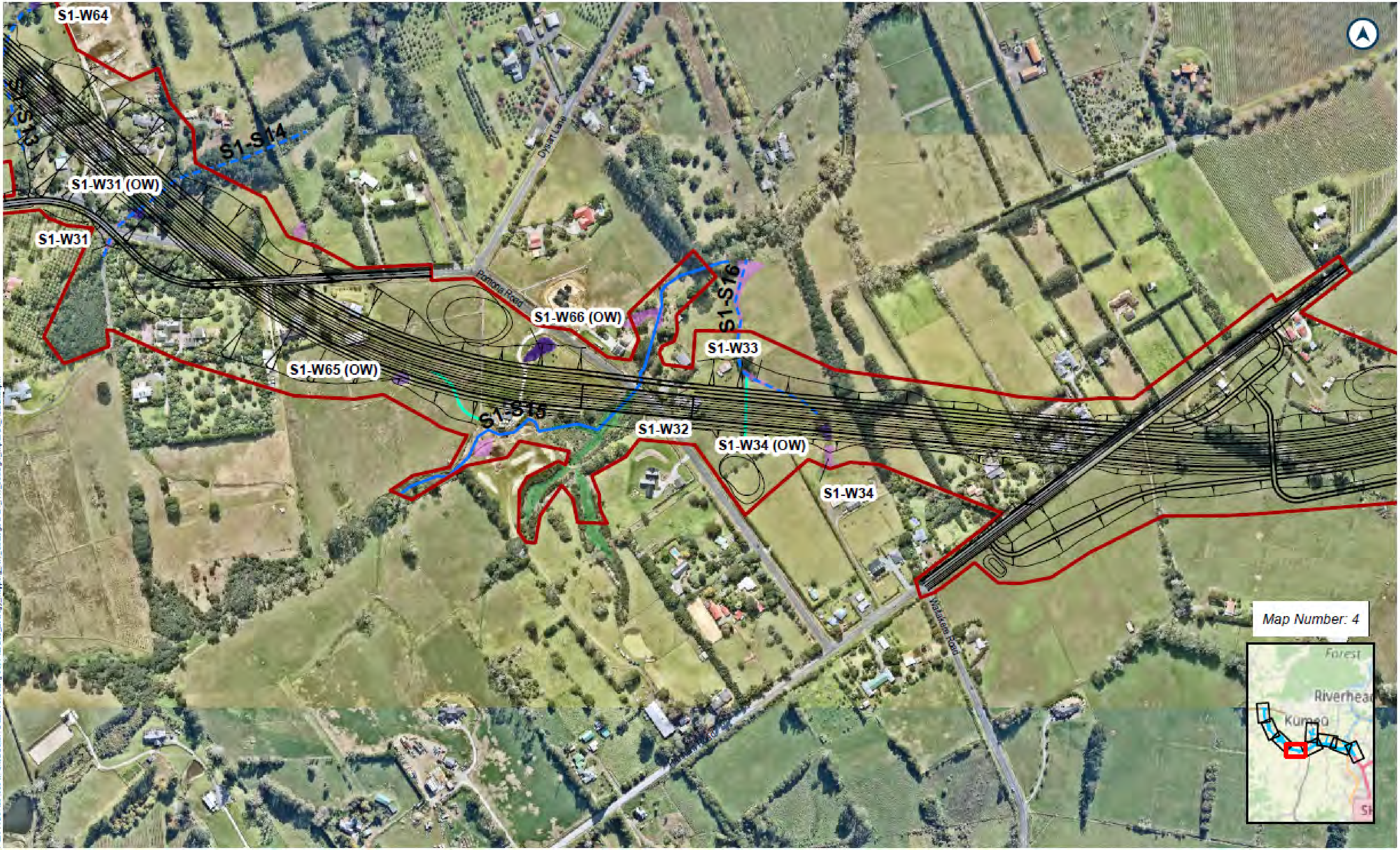
Route Options
Designation
Ephemeral
Intermittent
Permanent
EW-Exotic Wetland
OW-Open Water
WL11

0 100 200
Metres



LEGEND

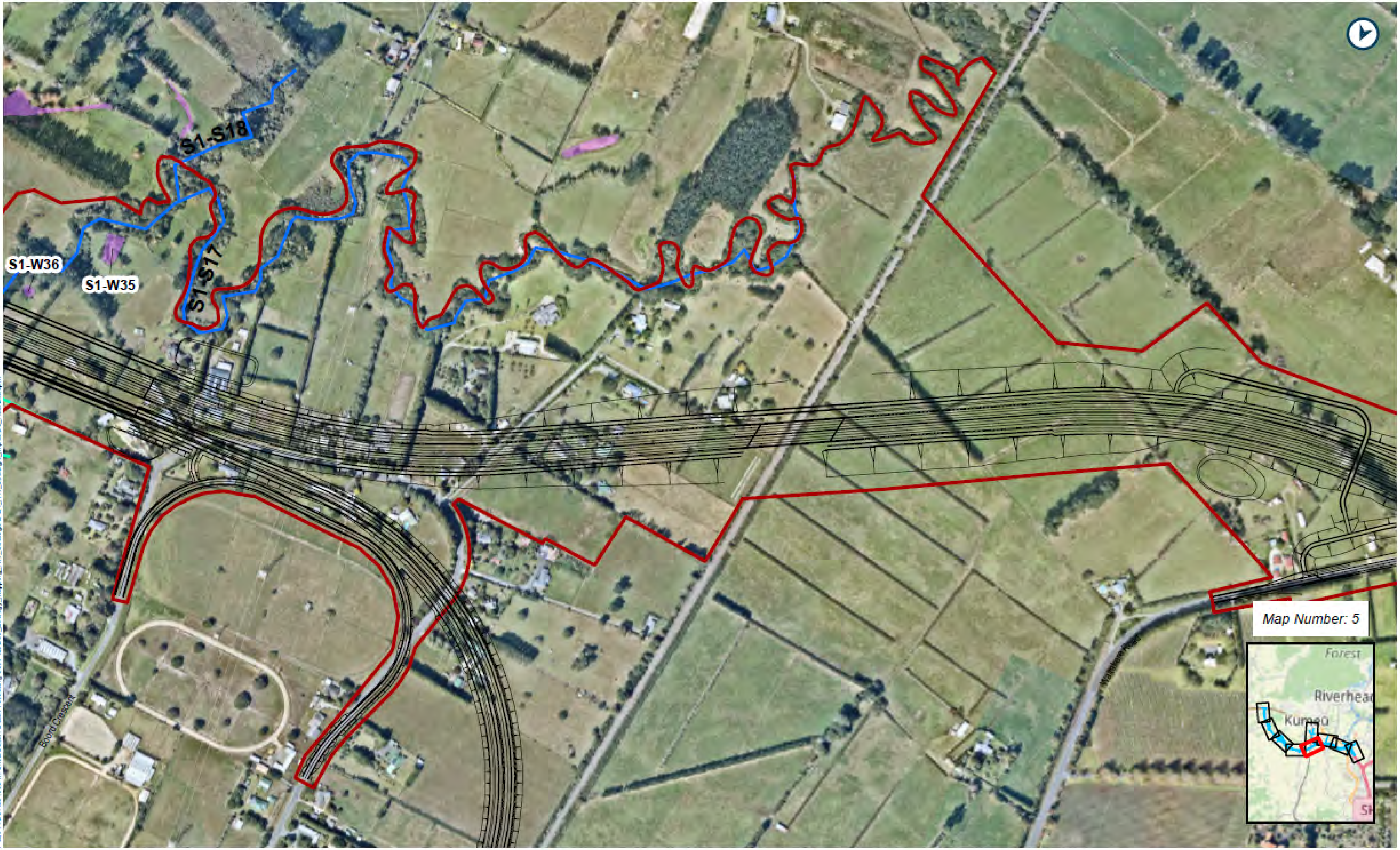
- Route Options
- Designation
- Ephemeral
- Intermittent
- Permanent
- EW-Exotic Wetland
- OW-Open Water
- PLW-Planted Wetland Native (Recent)
- WL11



LEGEND

Route Options
Designation
Artificial swale/drainage ditch
Intermittent
Permanent
EW-Exotic Wetland
OW-Open Water
PLW-Planted Wetland Native (Recent)

0 100 200
Metres



LEGEND

- Route Options
- Designation
- Artificial swale/drainage ditch
- Permanent
- EW-Exotic Wetland

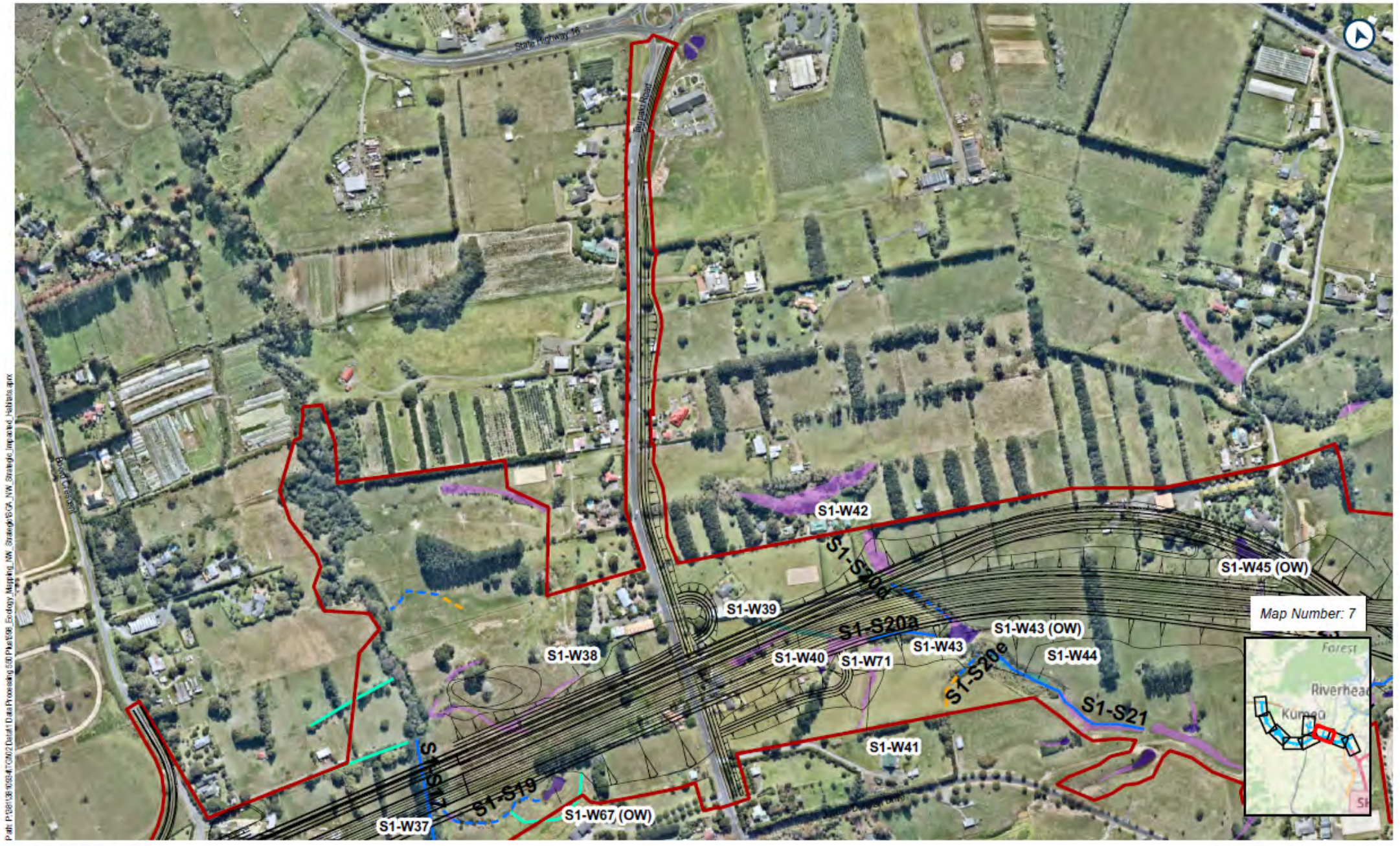
0 100 200

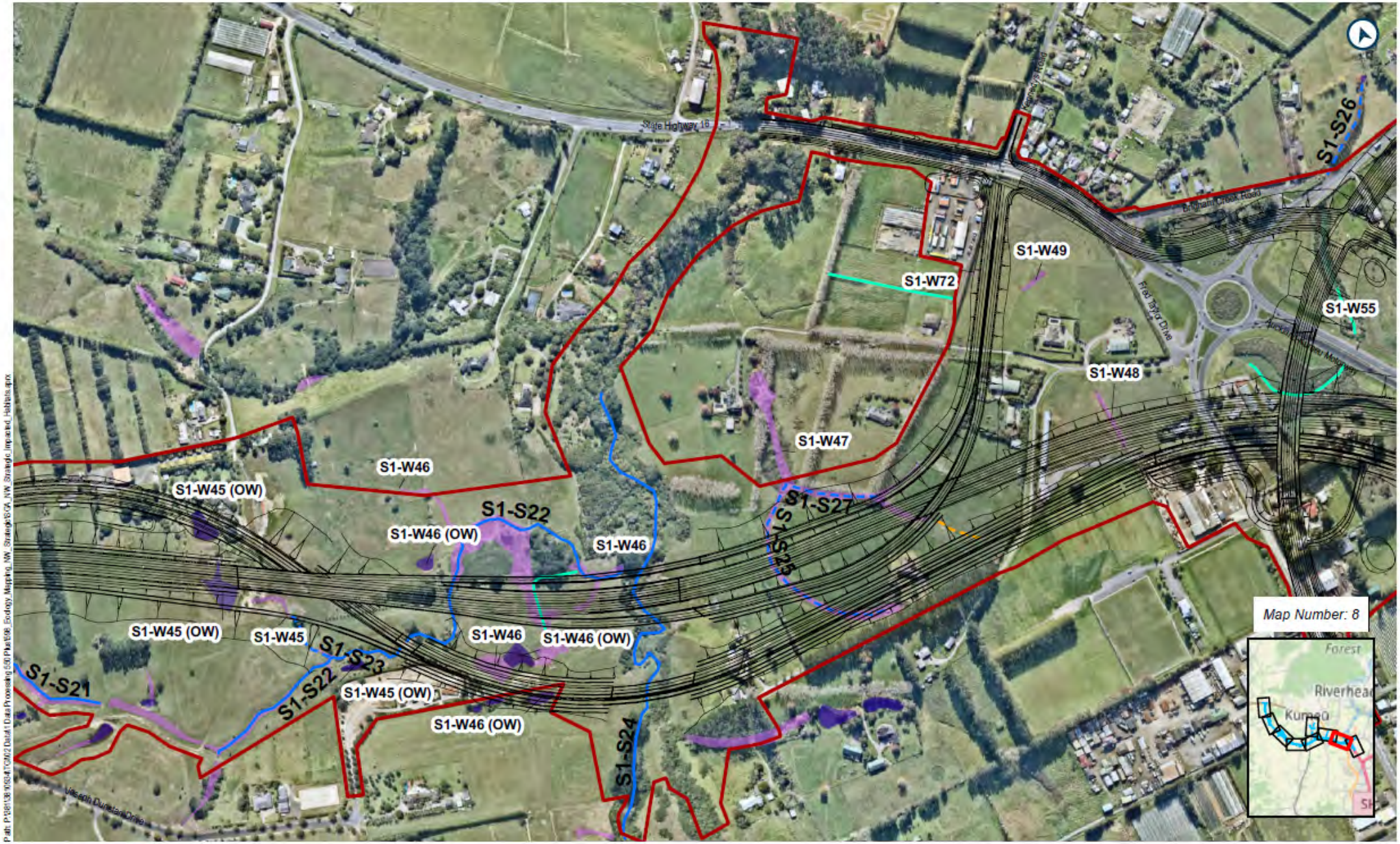
Metres

LEGEND

- Route Options
- Designation
- Artificial swale/drainage ditch
- Permanent
- EW-Exotic Wetland
- WL19

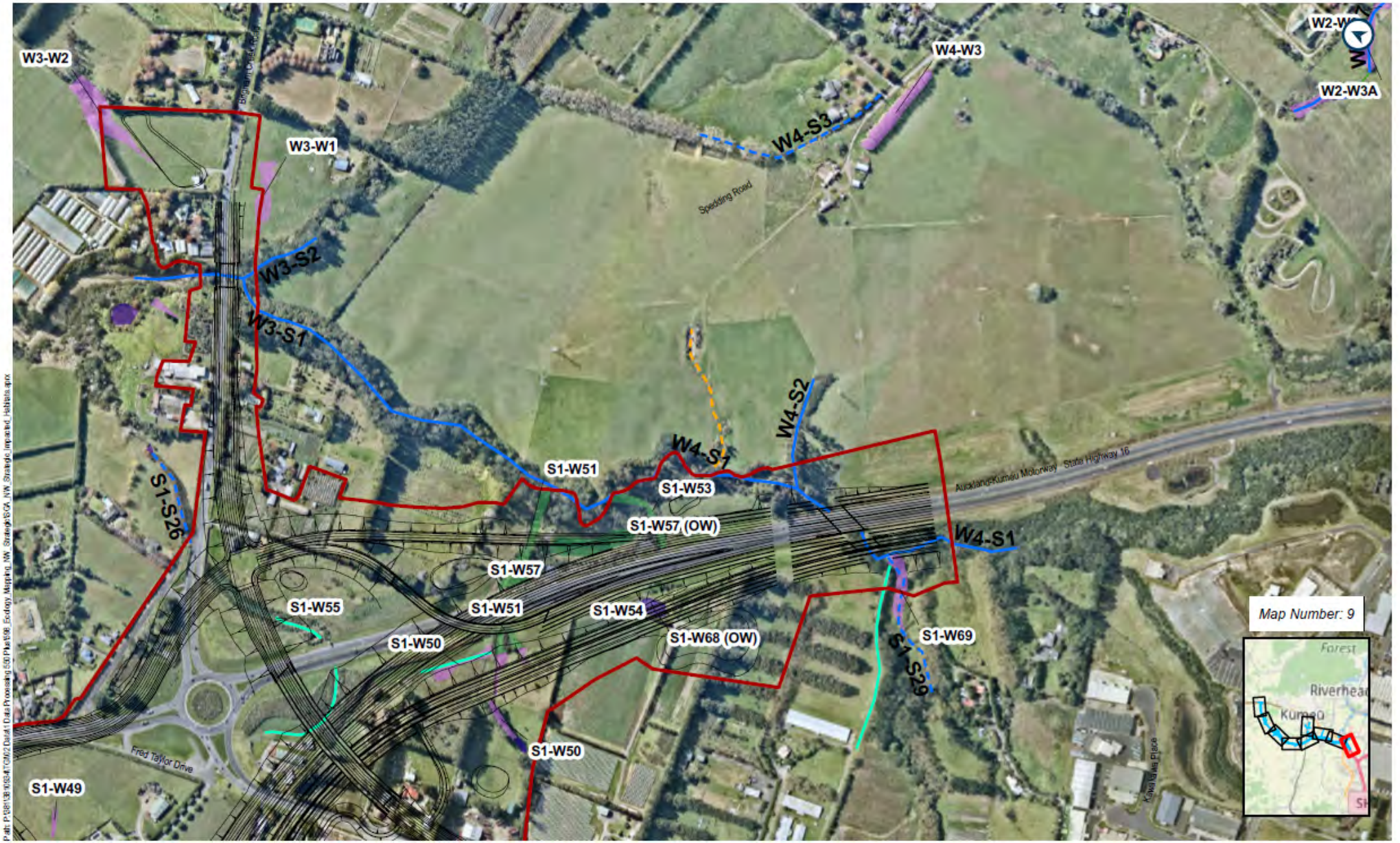
0 100 200
Metres





LEGEND

- Route Options
- Designation
- Artificial swale/drainage ditch
- Ephemeral
- Intermittent
- Permanent
- EW-Exotic Wetland
- OW-Open Water
- PLW.1



LEGEND

- Route Options
- Designation
- Artificial swale/drainage ditch
- Artificial/Piped/Culvert
- Ephemeral
- Intermittent
- Permanent
- EW-Exotic Wetland
- OW-Open Water
- PLW-Planted Wetland Native (Recent)
- PLW.1

0 100 200
Metres

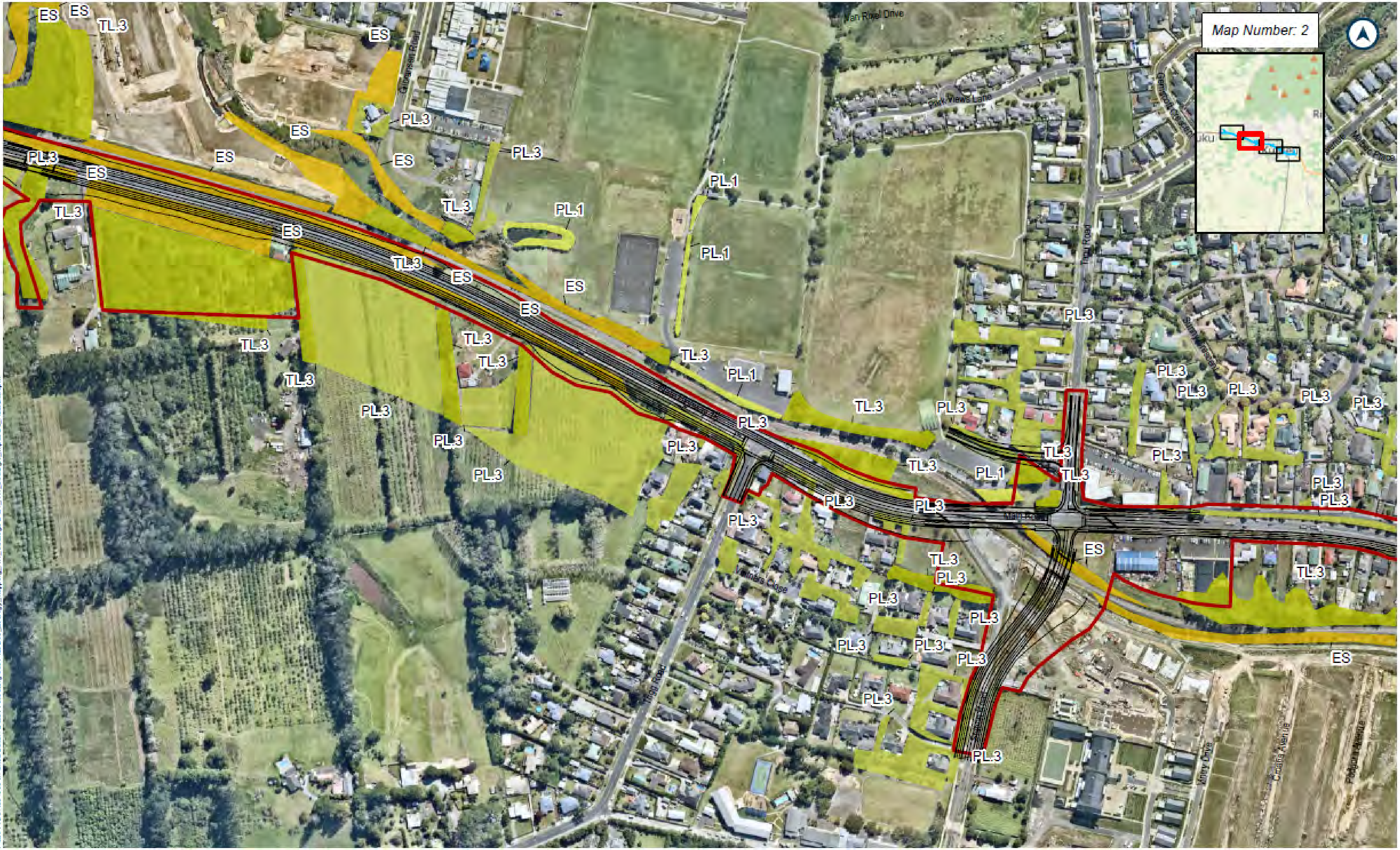
5.2 NoR S2: SH16 Main Road Upgrade

5.2.1 Terrestrial Vegetation

LEGEND

- Route Options
- Designation
- BF-Brownfield (Cropland)
- EF-Exotic Forest
- ES-Exotic Scrub
- PL.1-Planted native (<20 years old)
- PL.3-Amenity planting
- TL.2-Mixed native / exotic treeland
- TL.3-Treeland Exotic

0 100 200
Metres



LEGEND

- Route Options
- Designation
- ES-Exotic Scrub
- PL.1-Planted native (<20 years old)
- PL.3-Amenity planting
- TL.3-Treeland Exotic

0 100 200
Metres

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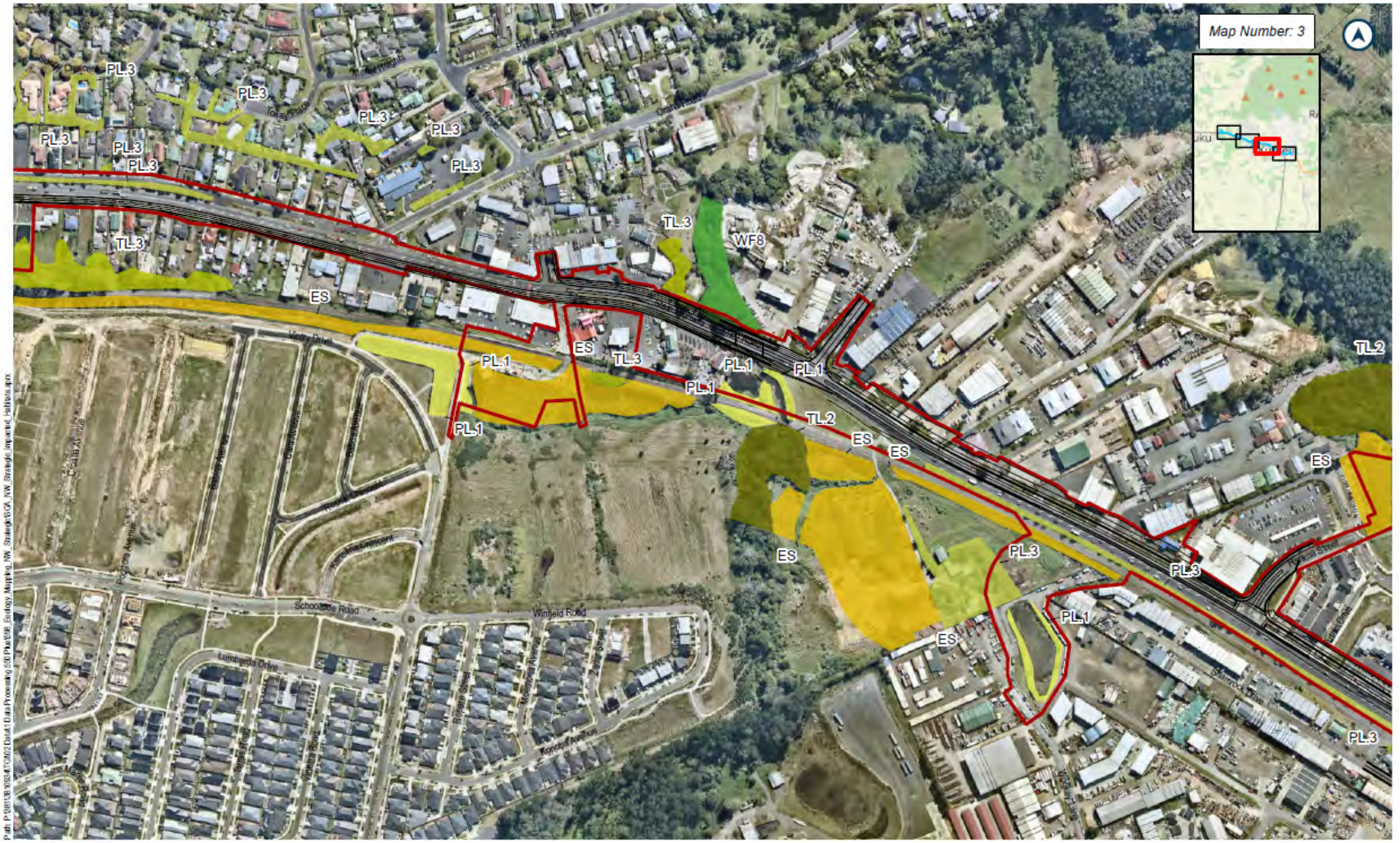
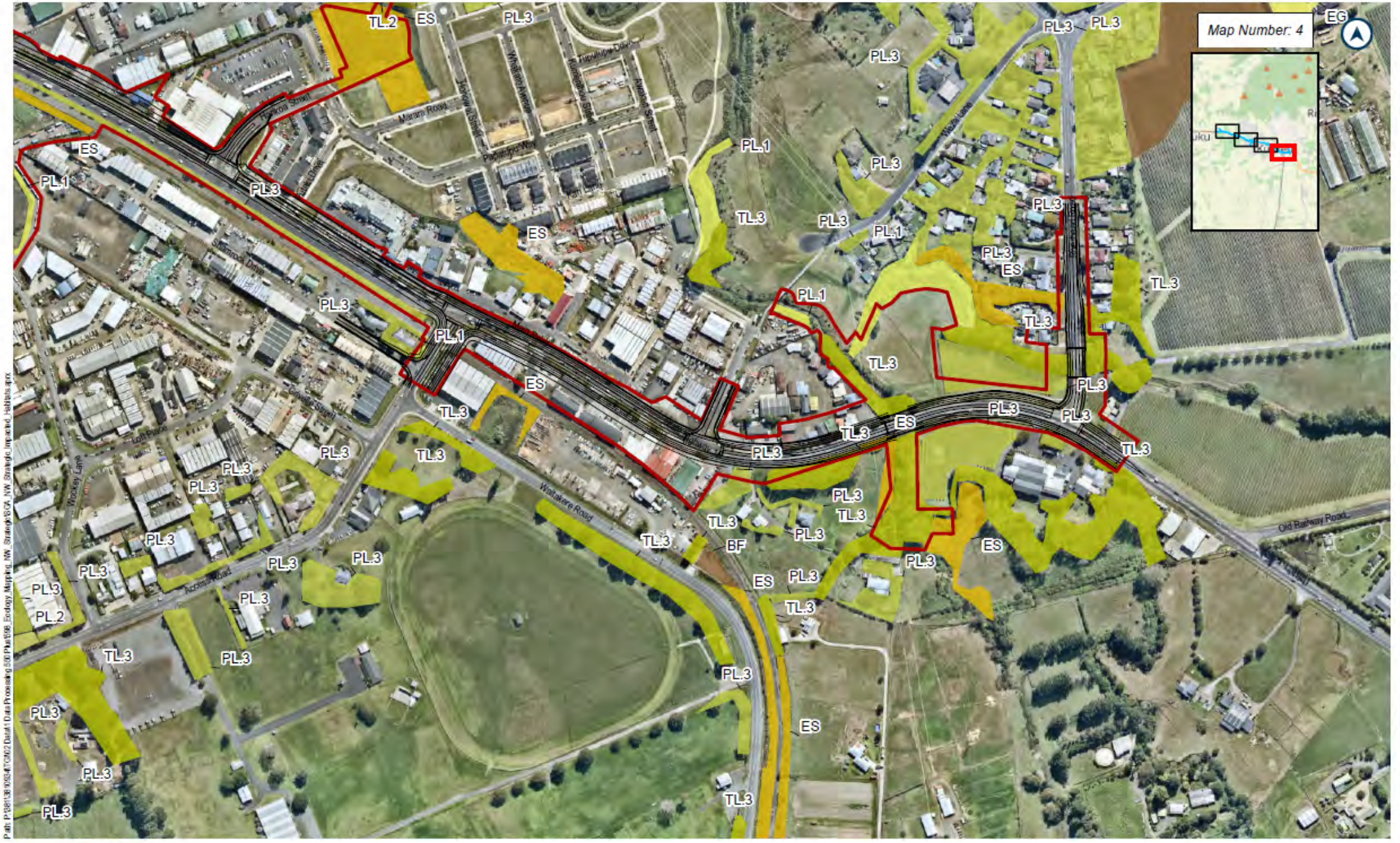


LEGEND

- Route Options
- Designation
- ES-Exotic Scrub
- PL.1-Planted native (<20 years old)
- PL.3-Amenity planting
- TL.2-Mixed native / exotic treeland
- TL.3-Treeland Exotic
- WF8-Kahikatea, Pukatea Forest

0 100 200

Metres



LEGEND

- Route Options
- Designation
- BF-Brownfield (Cropland)
- EG-Exotic Grassland
- ES-Exotic Scrub
- PL.1-Planted native (<20 years old)
- PL.2-Planted native (>20 years old)
- PL.3-Amenity planting
- TL.2-Mixed native / exotic treeland
- TL.3-Treeland Exotic

0 100 200
Metres

5.2.2 District Plan Vegetation

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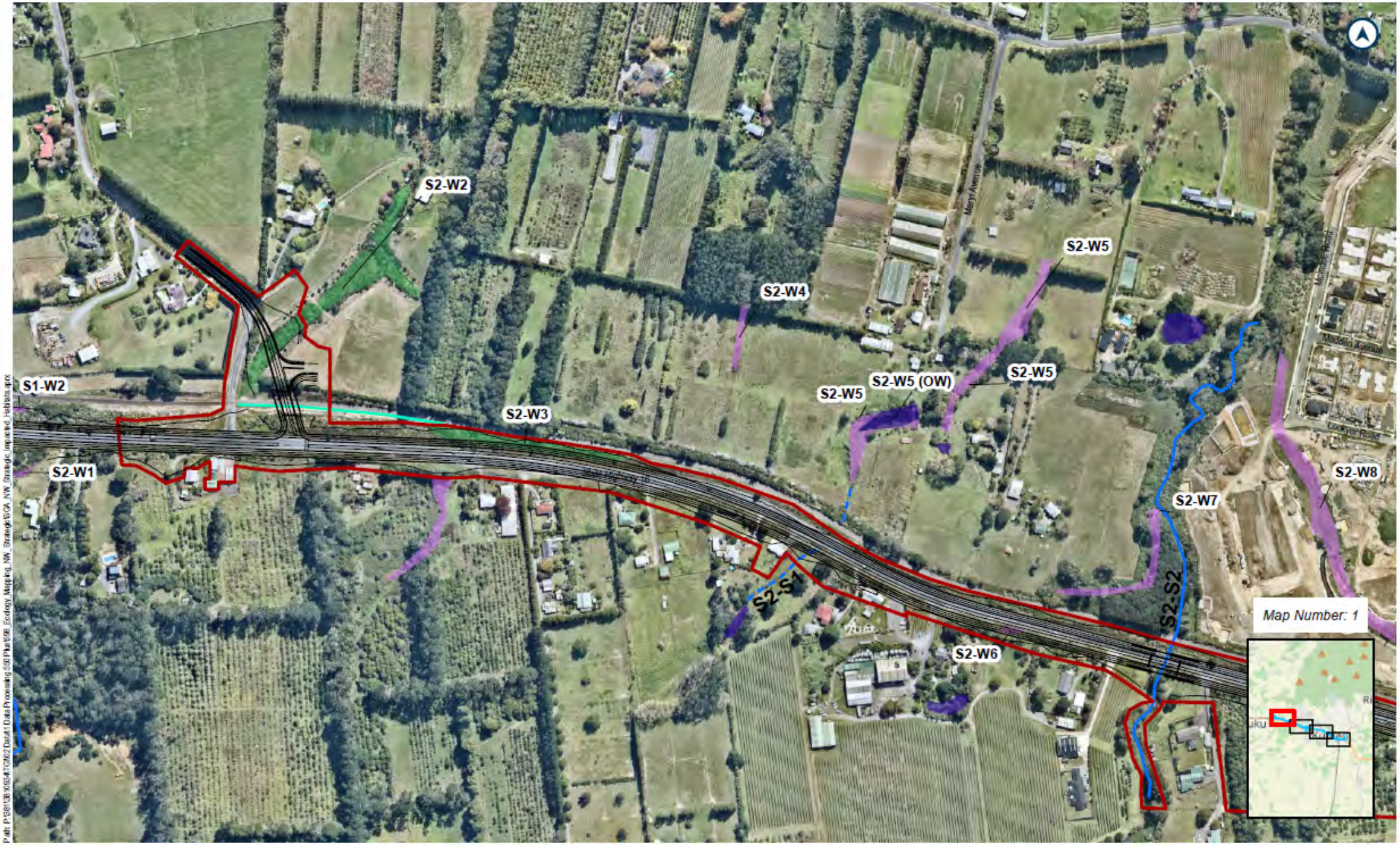
Type	Total Area (m²)
TL.3	214.24
WF8	99.48

LEGEND

0 0.2 0.4
Kilometres

Route Option
TL.3_DPT
WF8_DPT
Road

5.2.3 Freshwater Streams and Wetland Habitat

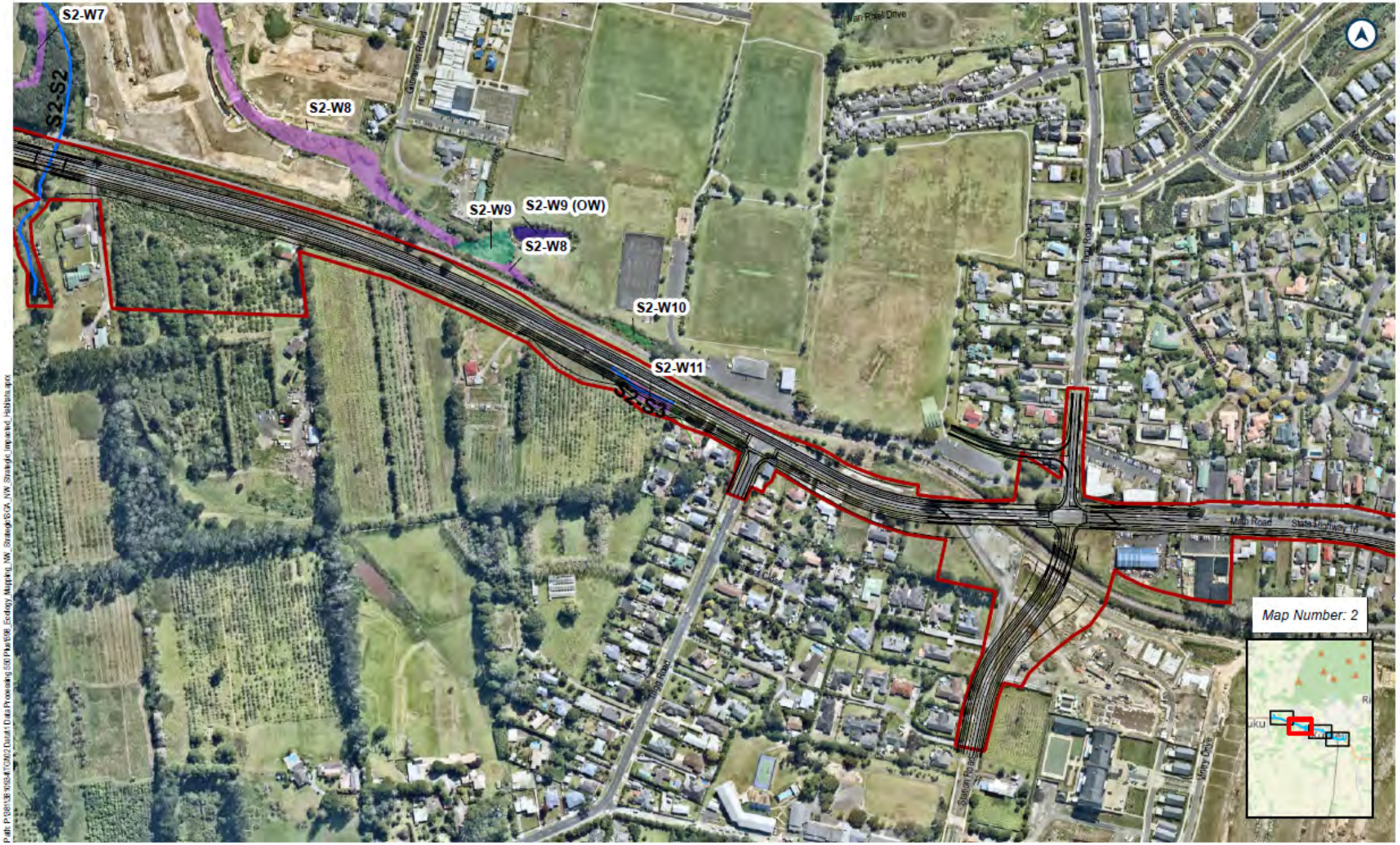


LEGEND

- Route Options
- Designation
- Artificial swale/drainage ditch
- Intermittent
- Permanent
- EW-Exotic Wetland
- OW-Open Water
- PLW-Planted Wetland Native (Recent)

0 100 200

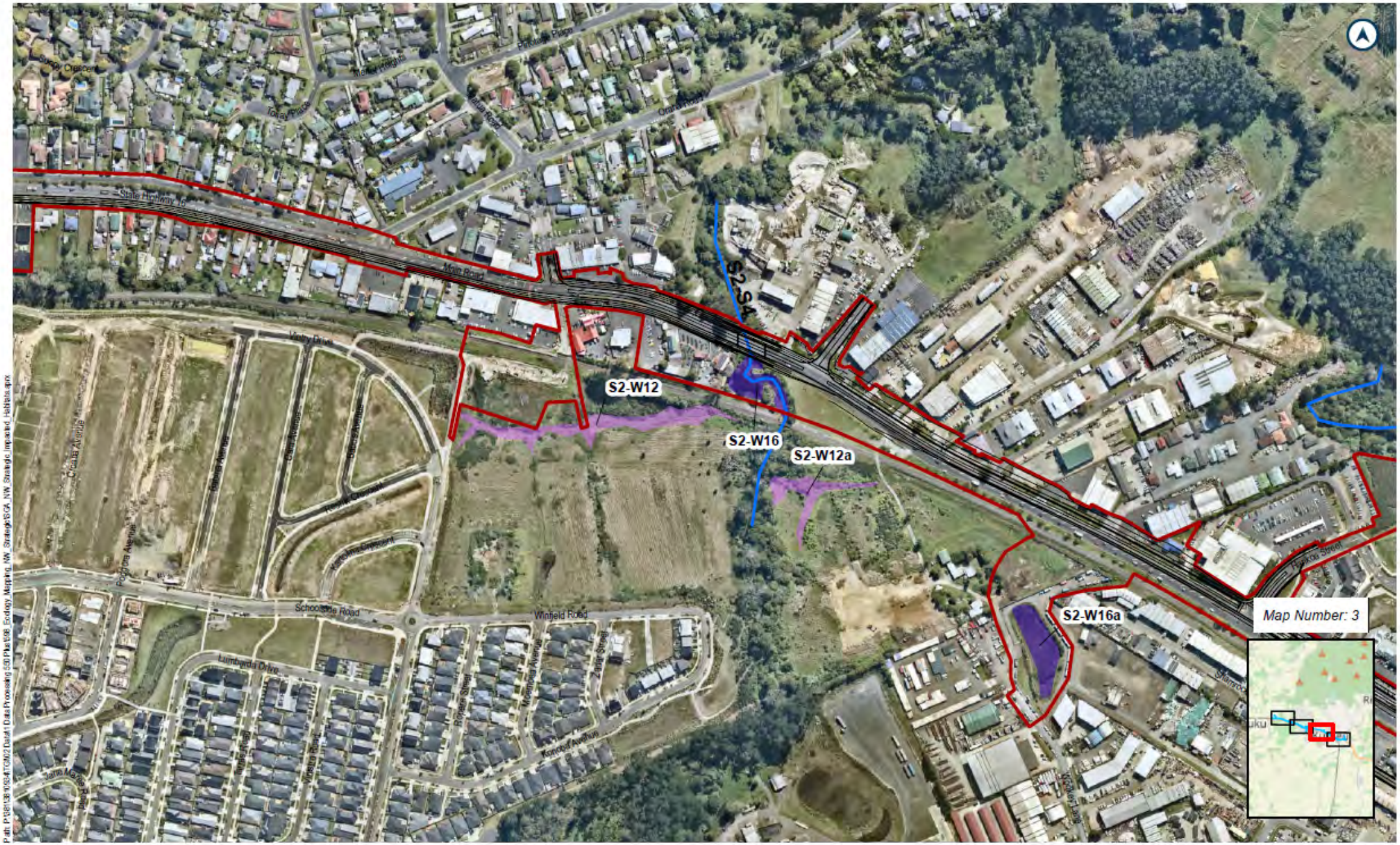
Metres



LEGEND

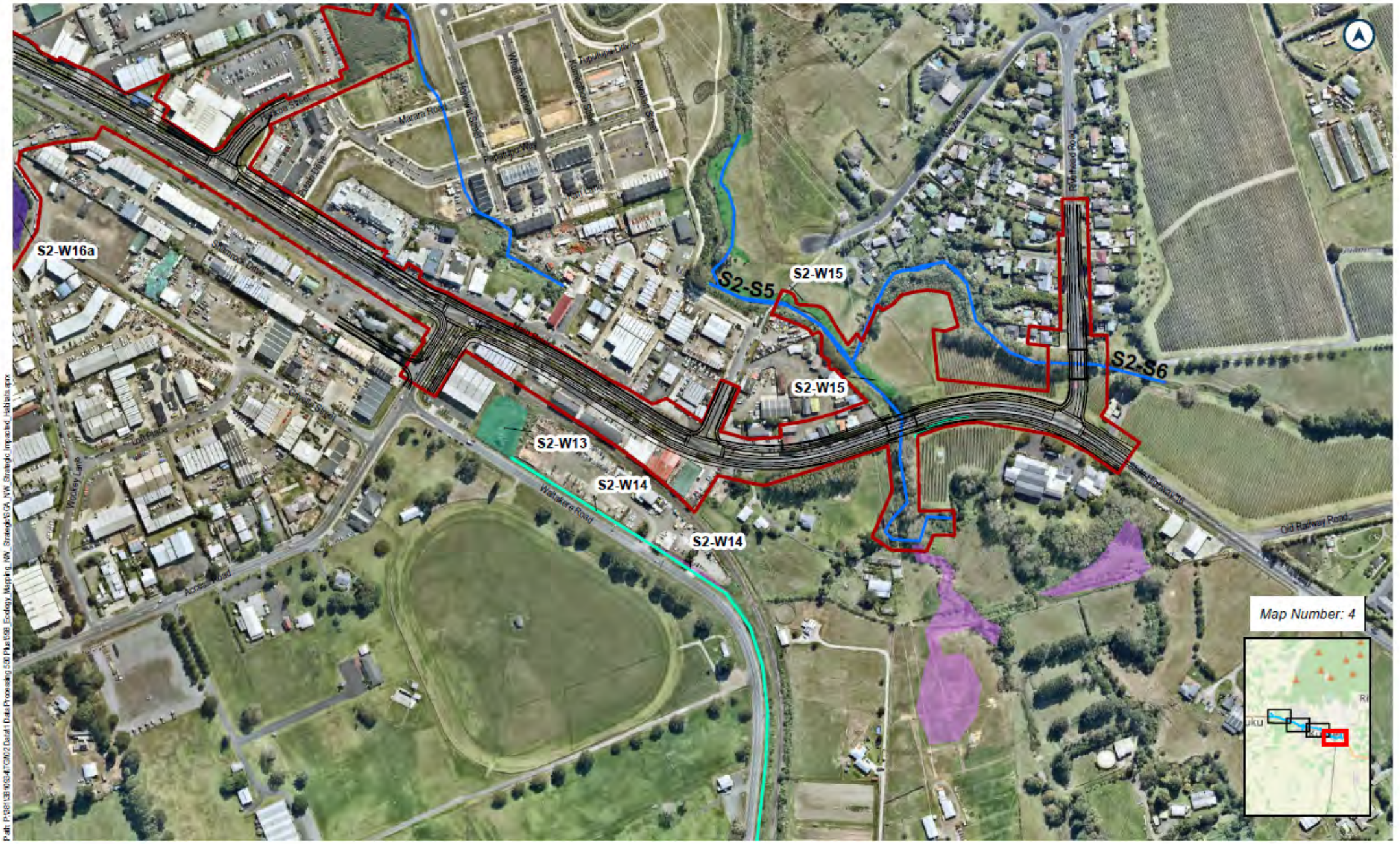
- Route Options
- Designation
- Artificial/Piped/Culvert
- Permanent
- EW-Exotic Wetland
- OW-Open Water
- PLW-Planted Wetland Native (Recent)
- WL19

0 100 200
Metres



LEGEND

Route Options
Designation
Permanent
EW-Exotic Wetland
OW-Open Water



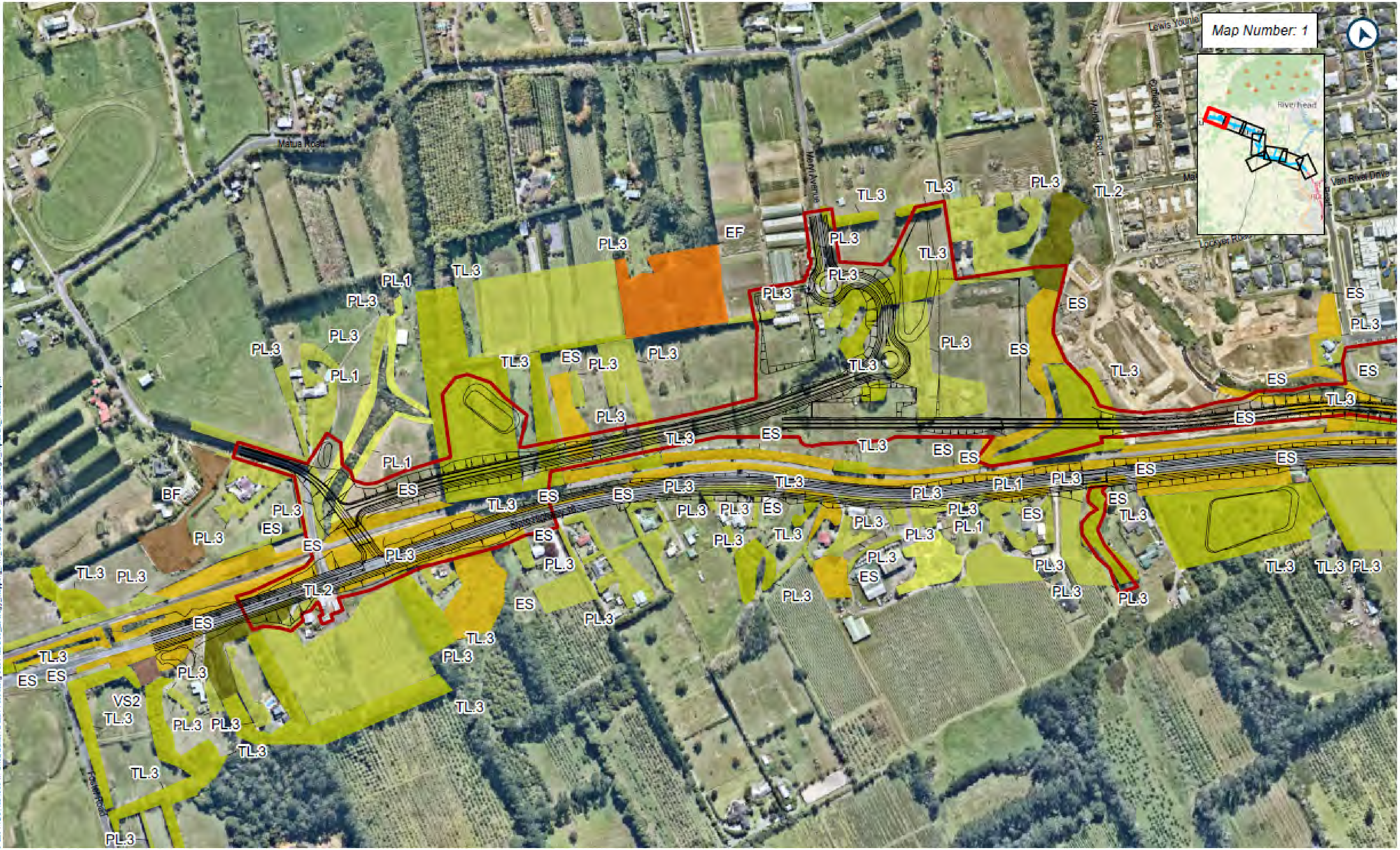
LEGEND

- Route Options
- Designation
- Artificial swale/drainage ditch
- Permanent
- EW-Exotic Wetland
- OW-Open Water
- PLW-Planted Wetland Native (Recent)
- WL19

0 100 200
Metres

5.3 NoR S3: Rapid Transit Corridor and Regional Active Mode Corridor

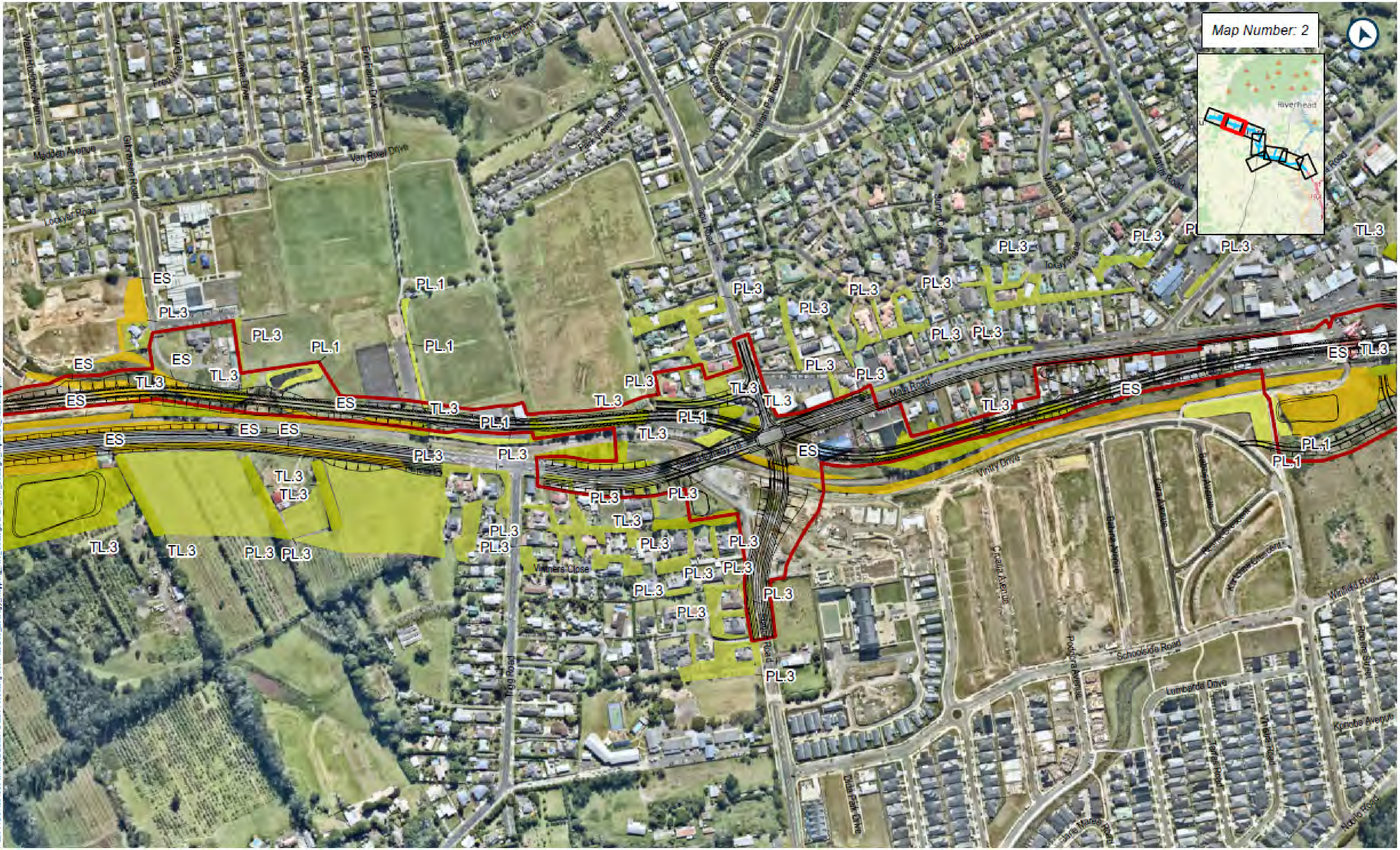
5.3.1 Terrestrial Vegetation



LEGEND

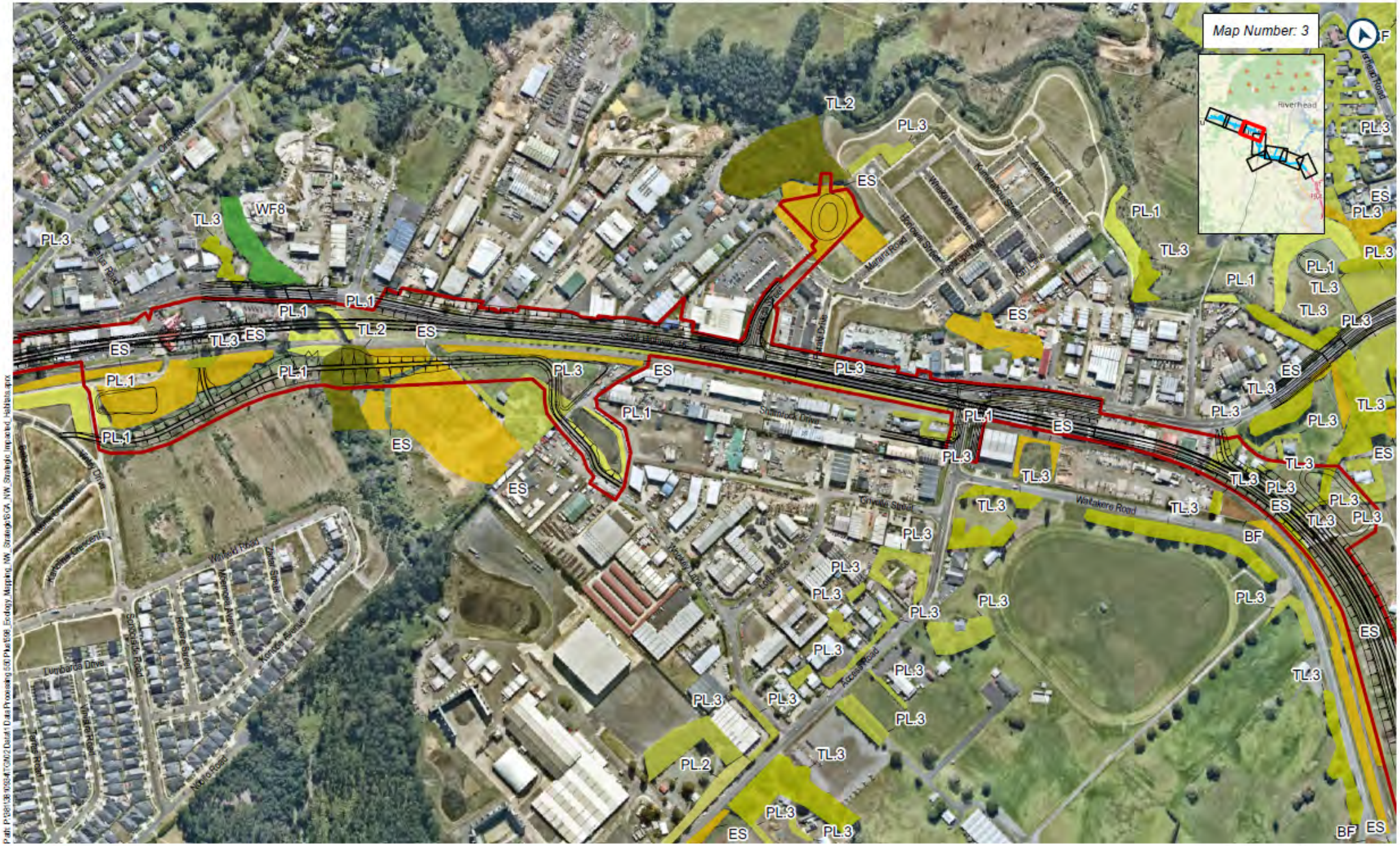
- Route Options
- Designation
- BF-Brownfield (Cropland)
- EF-Exotic Forest
- ES-Exotic Scrub
- PL.1-Planted native (<20 years old)
- PL.3-Amenity planting
- TL.2-Mixed native / exotic treeland
- TL.3-Treeland Exotic
- VS2-Kanuka Scrub/Forest

0 100 200
Metres



LEGEND

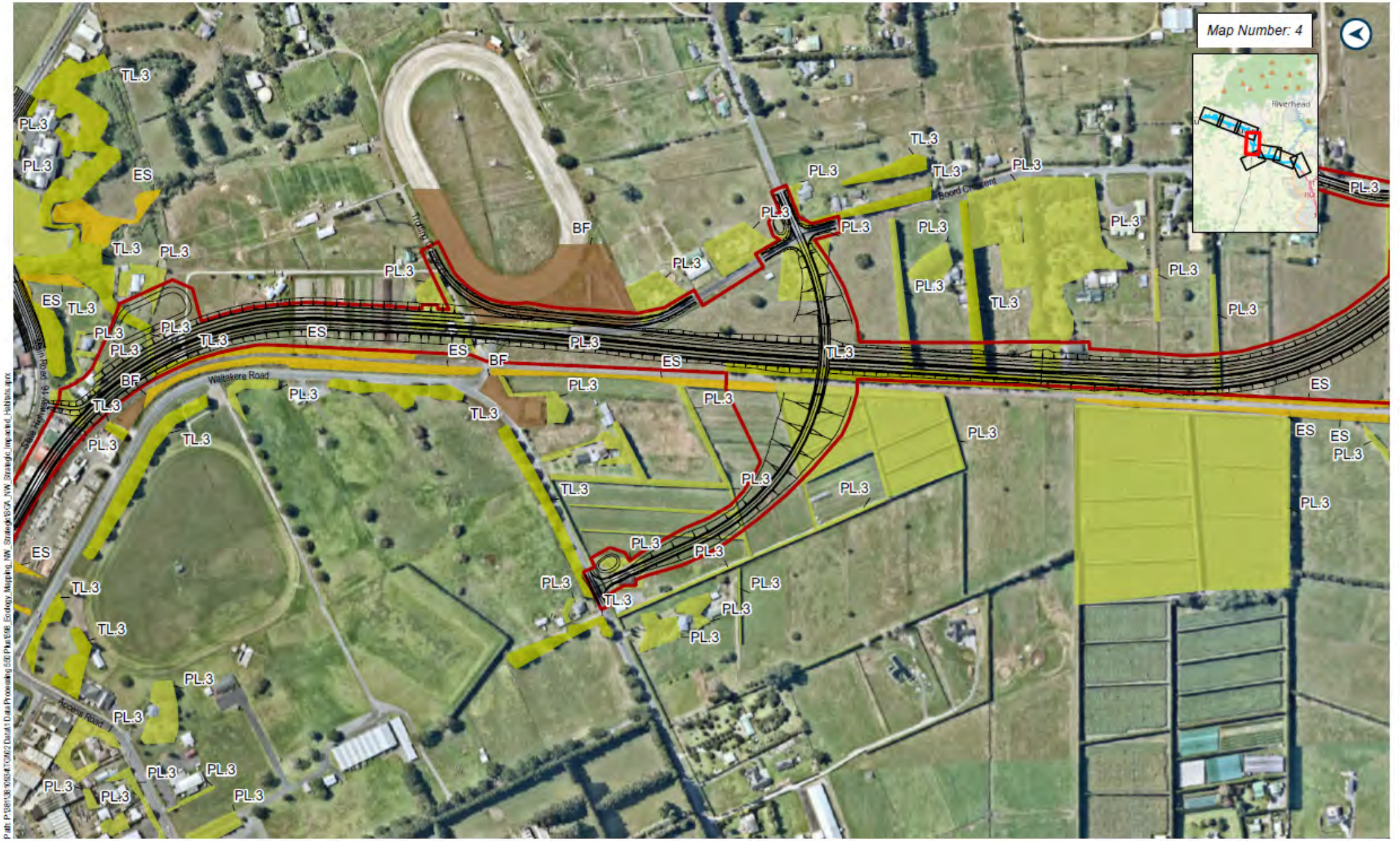
Route Options	ES-Exotic Scrub
Designation	PL.1-Planted native (<20 years old)
PL.3-Amenity planting	TL.3-Treeland Exotic



LEGEND

- Route Options
- Designation
- BF-Brownfield (Cropland)
- ES-Exotic Scrub
- PL.1-Planted native (<20 years old)
- PL.2-Planted native (>20 years old)
- PL.3-Amenity planting
- TL.2-Mixed native / exotic treeland
- TL.3-Treeland Exotic
- WF8-Kahikatea, Pukatea Forest

0 100 200
Metres


Map Number: 4
Riverhead
Waitakere Road
Access Road
Board Crescent
TL.3
PL.3
ES
BF
LEGEND
Route Options
Designation
BF-Brownfield (Cropland)
ES-Exotic Scrub
PL.3-Amenity planting
TL.3-Treeland Exotic
0
100
200
Metres
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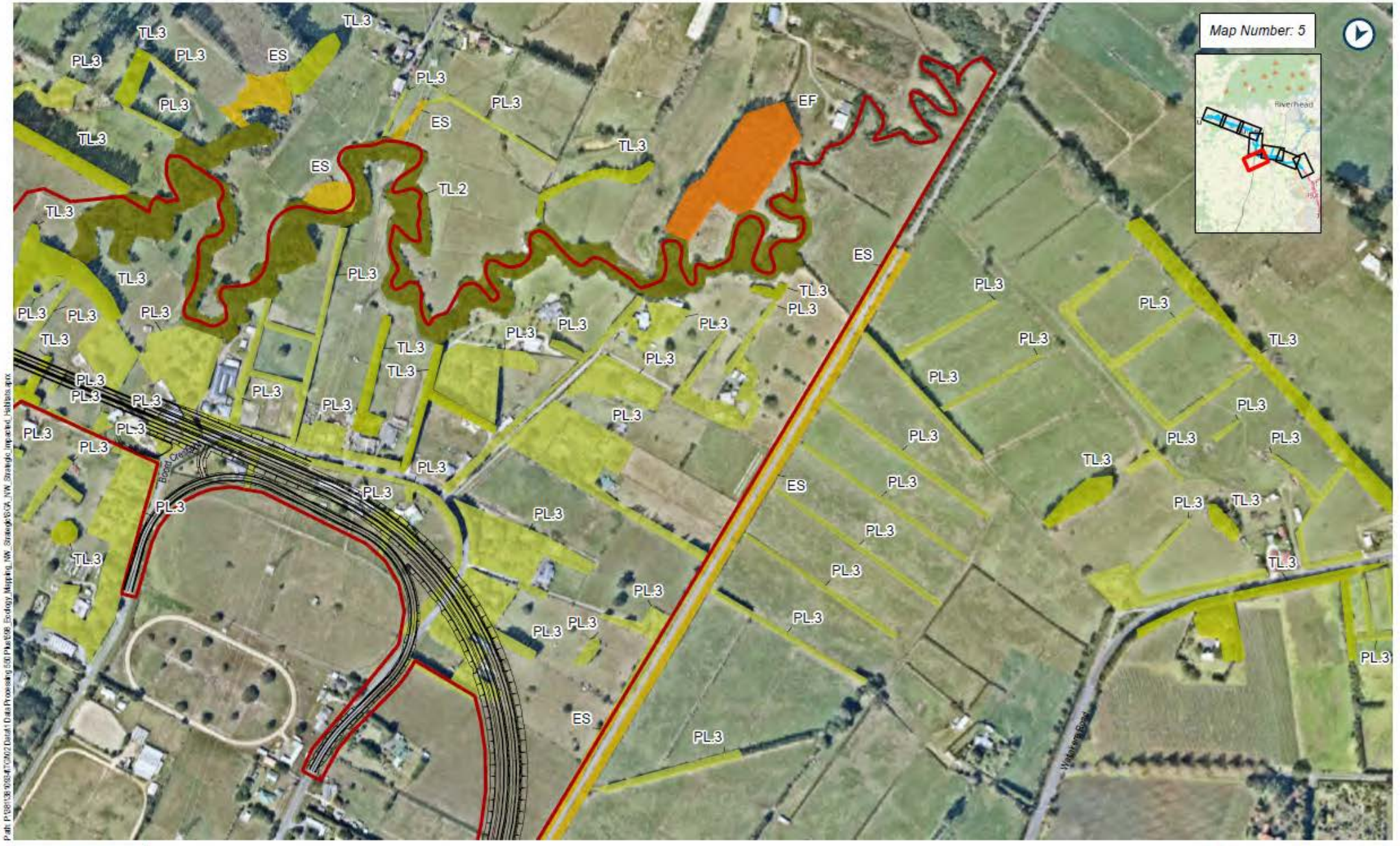


LEGEND

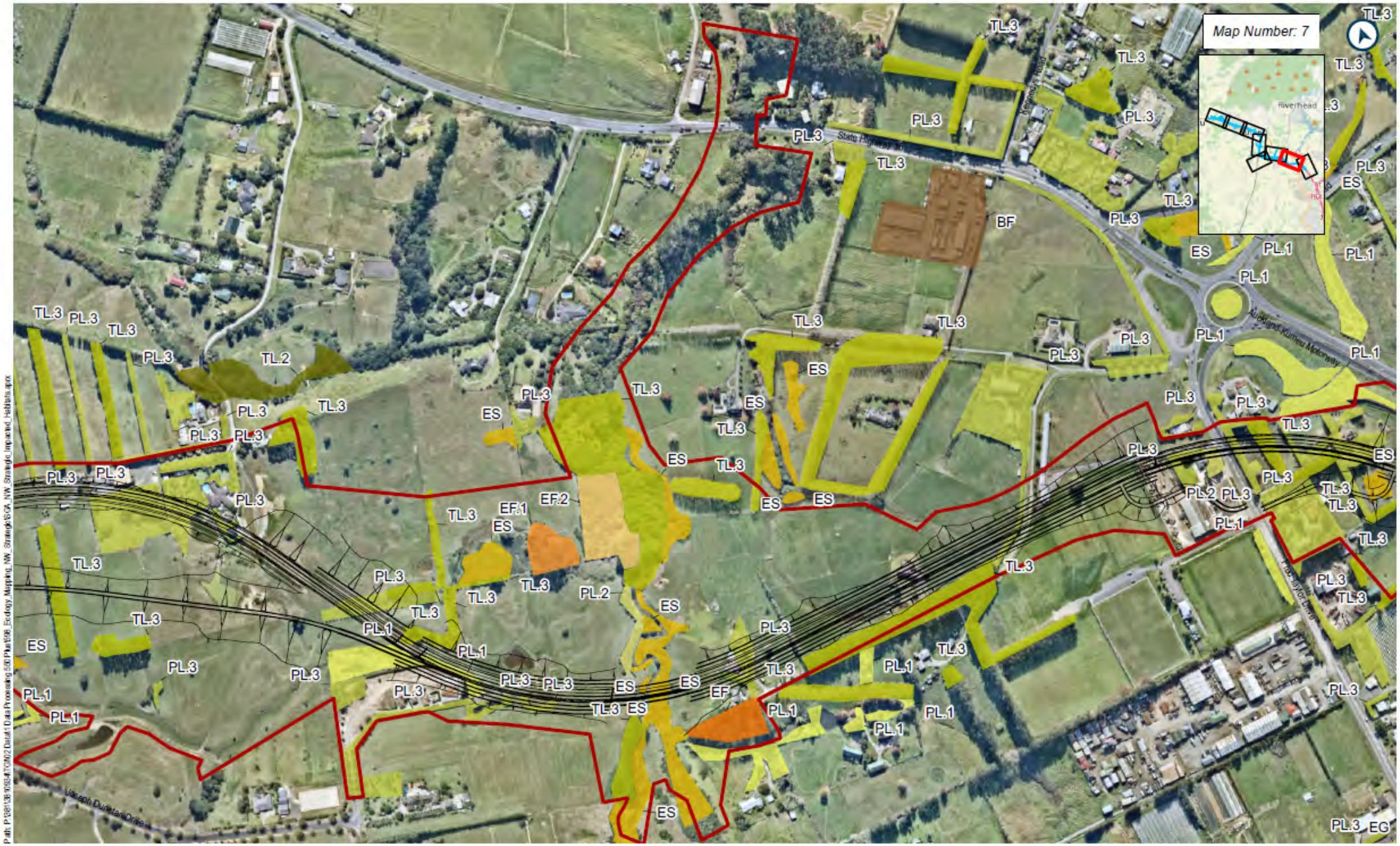
- Route Options
- Designation
- EF-Exotic Forest
- ES-Exotic Scrub
- PL.3-Amenity planting
- TL.2-Mixed native / exotic treeland
- TL.3-Treeland Exotic

0 100 200
Metres

LEGEND

- Route Options
- Designation
- EF-Exotic Forest
- ES-Exotic Scrub
- PL.1-Planted native (<20 years old)
- PL.3-Amenity planting
- TL.2-Mixed native / exotic treeland
- TL.3-Treeland Exotic
- VS2-Kanuka Scrub/Forest

0 100 200
Metres



LEGEND

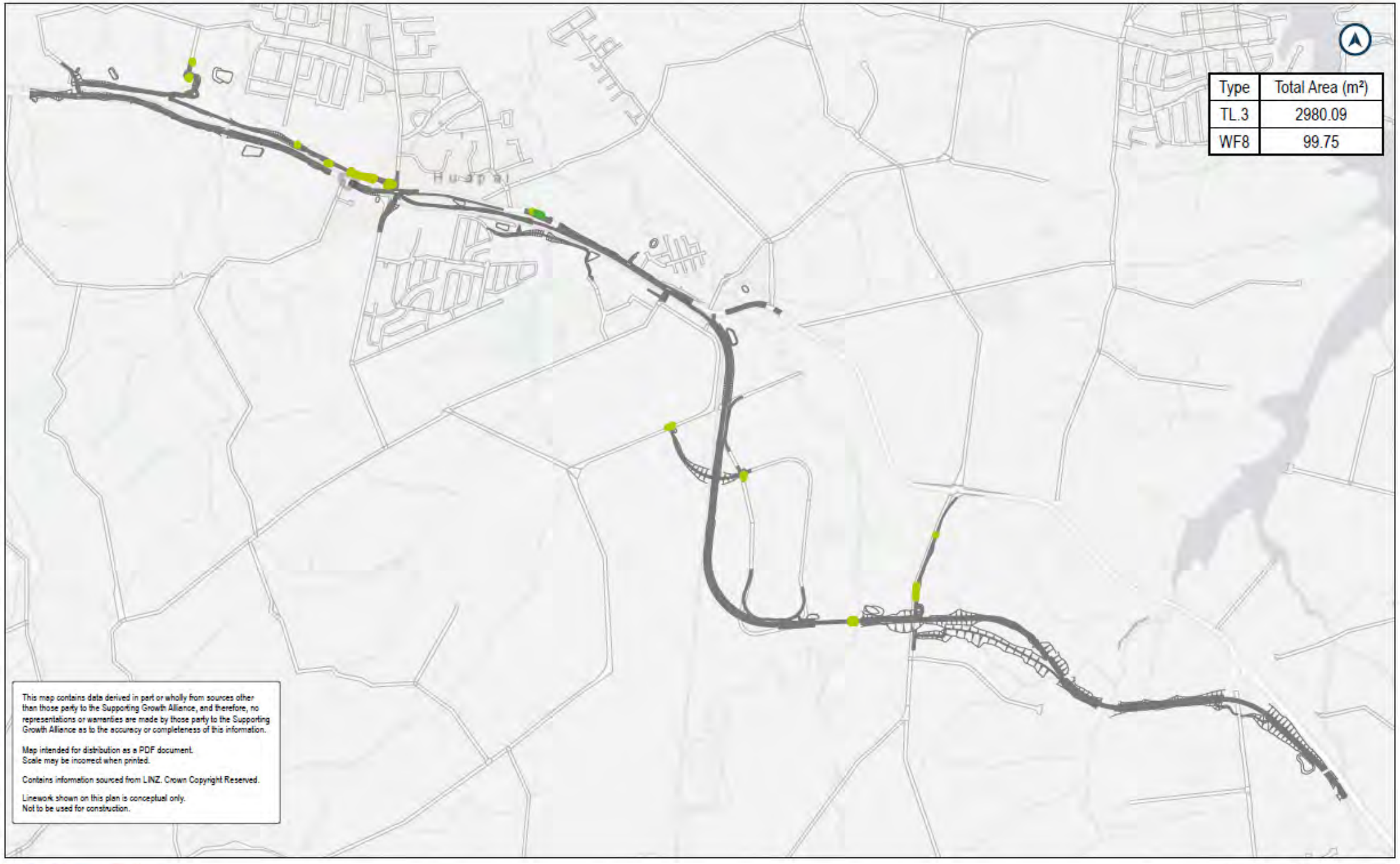
- Route Options
- Designation
- BF-Brownfield (Cropland)
- EF-Exotic Forest
- EF.1-Exotic forest (native understory)
- EF.2 -Exotic forest (exotic understory)
- EG-Exotic Grassland
- ES-Exotic Scrub
- PL.1-Planted native (<20 years old)
- PL.2-Planted native (>20 years old)
- PL.3-Amenity planting
- TL.2-Mixed native / exotic treeland
- TL.3-Treeland Exotic

0 100 200
Metres

LEGEND

- Route Options
- Designation
- EG-Exotic Grassland
- ES-Exotic Scrub
- PL.1-Planted native (<20 years old)
- PL.2-Planted native (>20 years old)
- PL.3-Amenity planting
- SA1.2-Mangrove forest and scrub
- TL.3-Treeland Exotic

5.3.2 District Plan Vegetation


Type | Total Area (m²)
TL.3 | 2980.09
WF8 | 99.75
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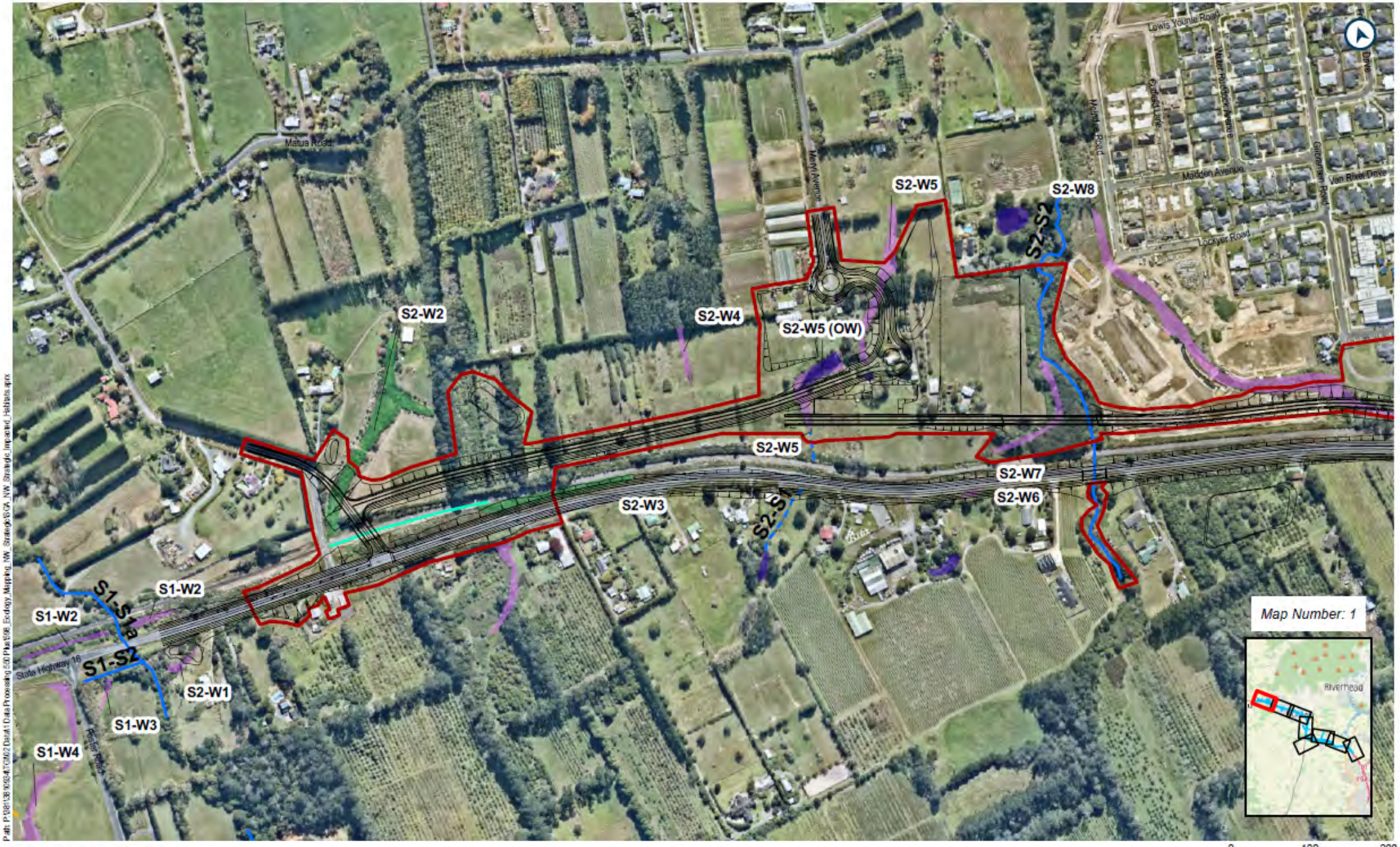
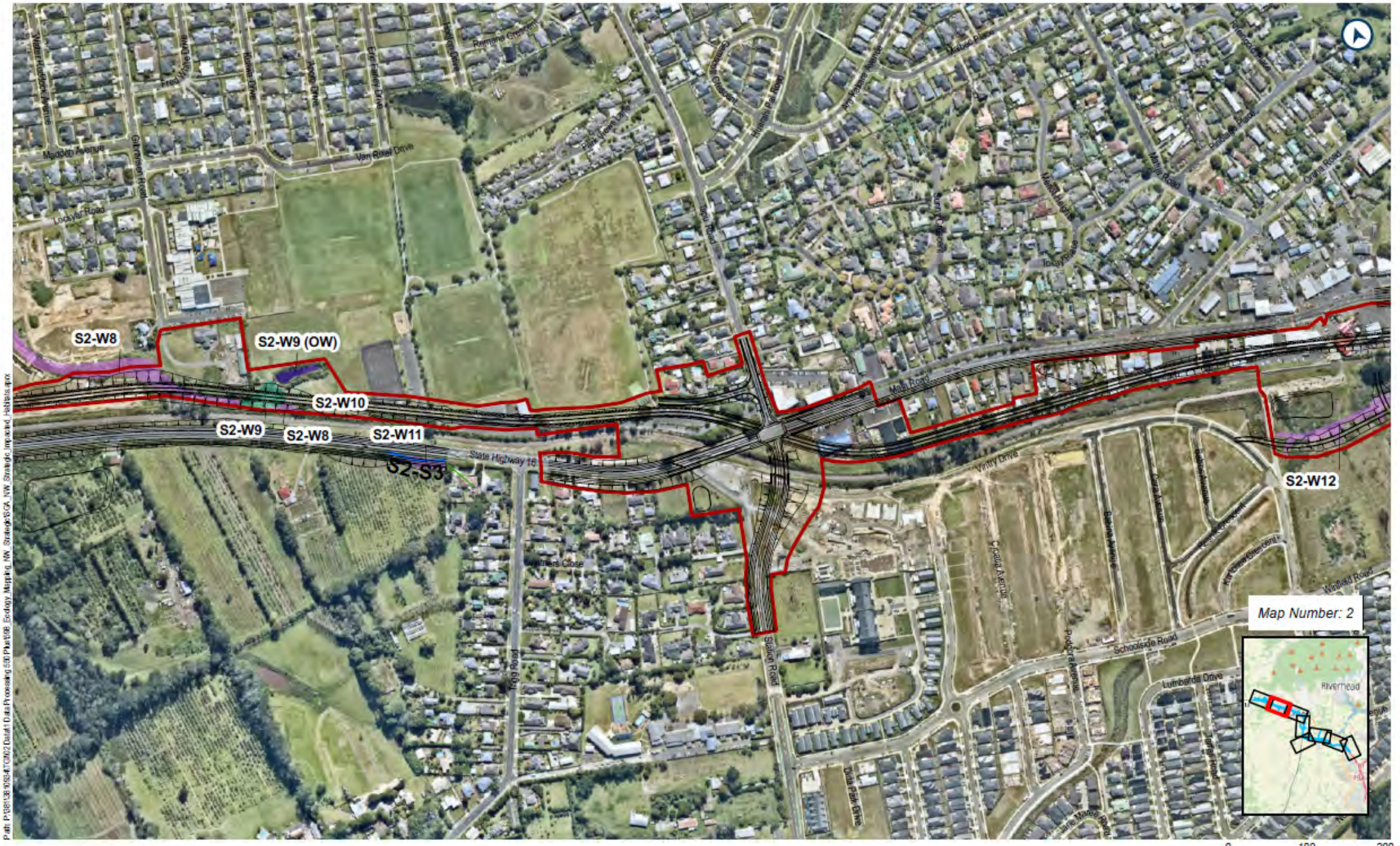
LEGEND
Route Option
TL.3_DPT
WF8_DPT
Road
0
0.5
1
Kilometres

5.3.3 Freshwater Streams and Wetland Habitat



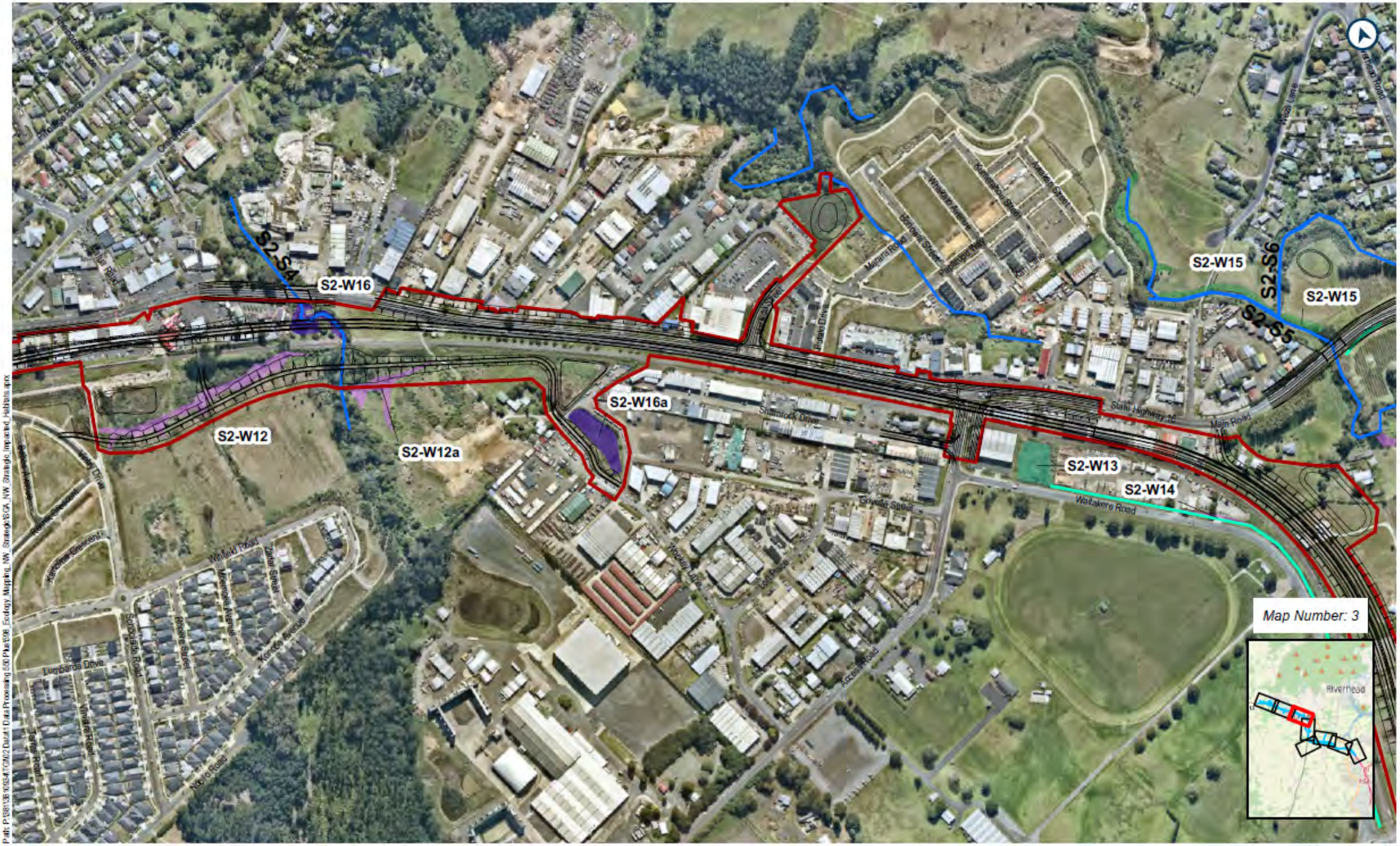
LEGEND

- Route Options
- Designation
- Artificial swale/drainage ditch
- Ephemeral
- Intermittent
- Permanent
- EW-Exotic Wetland
- OW-Open Water
- PLW-Planted Wetland Native (Recent)



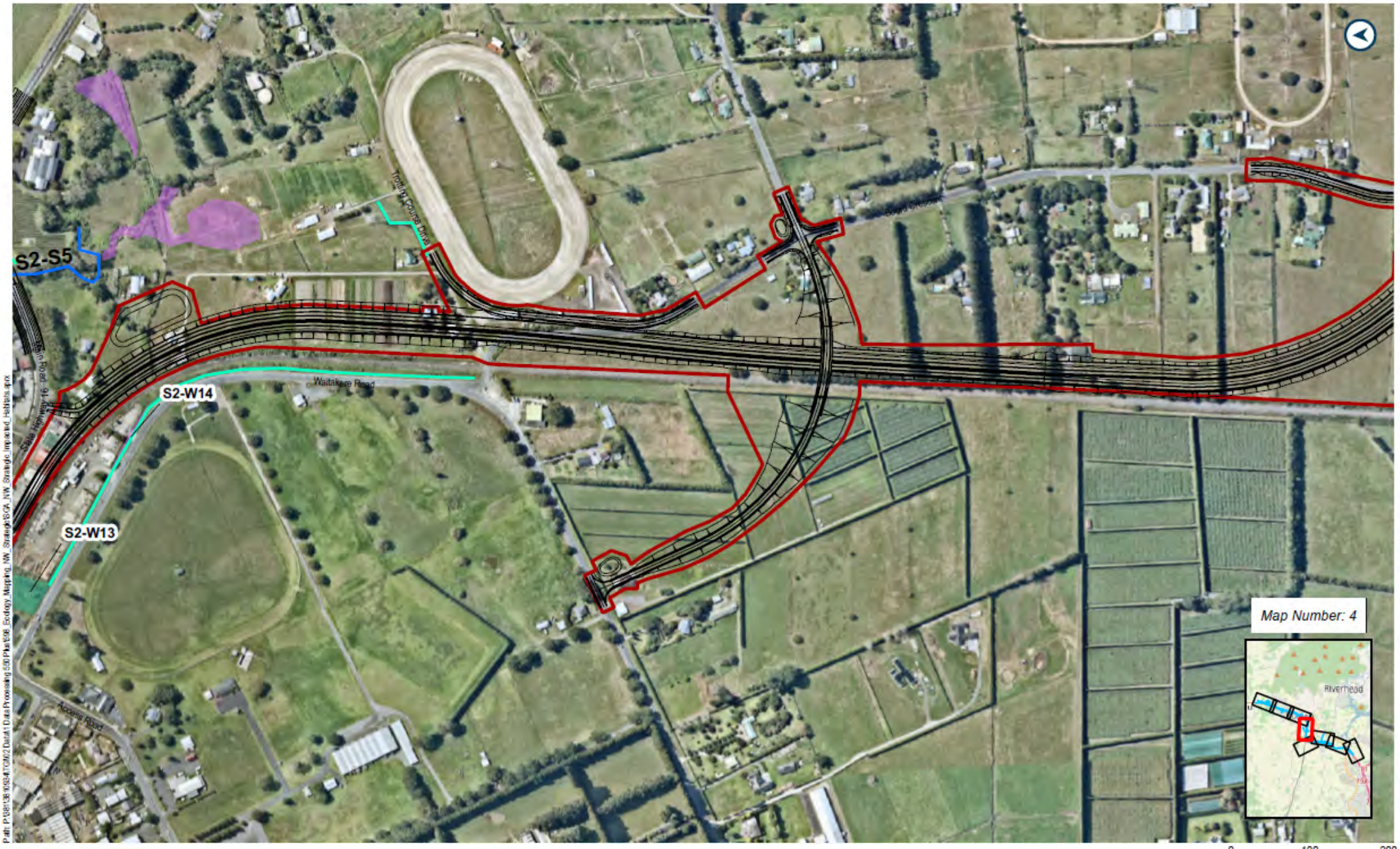
LEGEND

- Route Options
- Designation
- Artificial/Piped/Culvert
- Permanent
- EW-Exotic Wetland
- OW-Open Water
- PLW-Planted Wetland Native (Recent)
- WL19



LEGEND

- Route Options
- Designation
- Artificial swale/drainage ditch
- Permanent
- EW-Exotic Wetland
- OW-Open Water
- PLW-Planted Wetland Native (Recent)
- WL19



LEGEND

- Route Options
- Designation
- Artificial swale/drainage ditch
- Permanent
- EW-Exotic Wetland
- WL19

LEGEND

Route Options
Designation
Artificial swale/drainage ditch
Permanent
EW-Exotic Wetland

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LEGEND

- Route Options
- Designation
- Artificial swale/drainage ditch
- Ephemeral
- Intermittent
- Permanent
- EW-Exotic Wetland
- OW-Open Water
- WL11

LEGEND

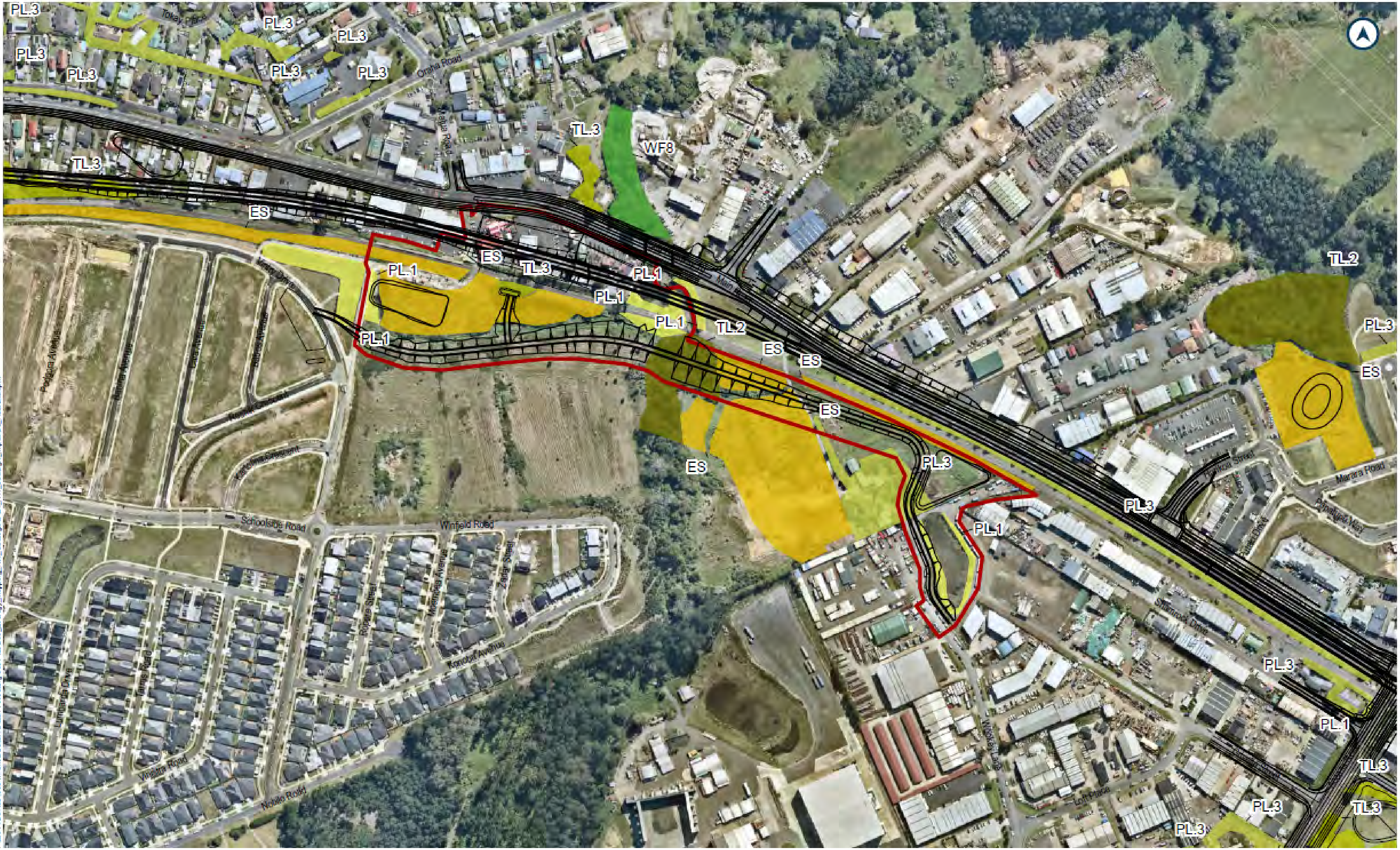
- Route Options
- Designation
- Artificial swale/drainage ditch
- Ephemeral
- Intermittent
- Permanent
- EW-Exotic Wetland
- OW-Open Water
- PLW.1

LEGEND

- Route Options
- Designation
- Artificial swale/drainage ditch
- Artificial/Piped/Culvert
- Ephemeral
- Intermittent
- Permanent
- EW-Exotic Wetland
- OW-Open Water
- PLW-Planted Wetland Native (Recent)
- PLW.1

5.4 NoR KS: Kumeū Rapid Transit Station

5.4.1 Terrestrial Vegetation

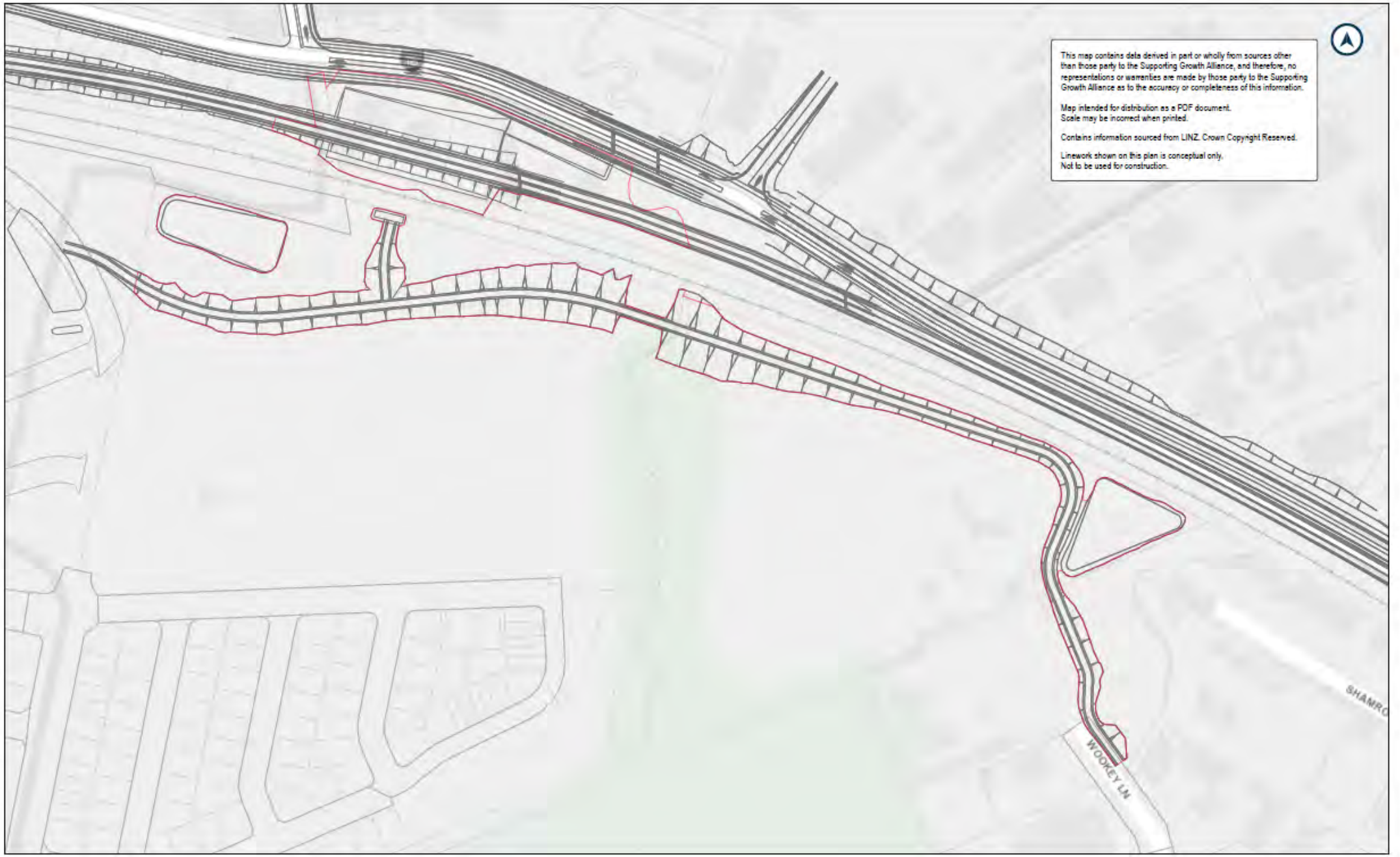


LEGEND

- Route Options
- Designation
- ES-Exotic Scrub
- PL.1-Planted native (<20 years old)
- PL.3-Amenity planting
- TL.2-Mixed native / exotic treeland
- TL.3-Treeland Exotic
- WF8-Kahikatea, Pukatea Forest

0 100 200
Metres

5.4.2 District Plan Vegetation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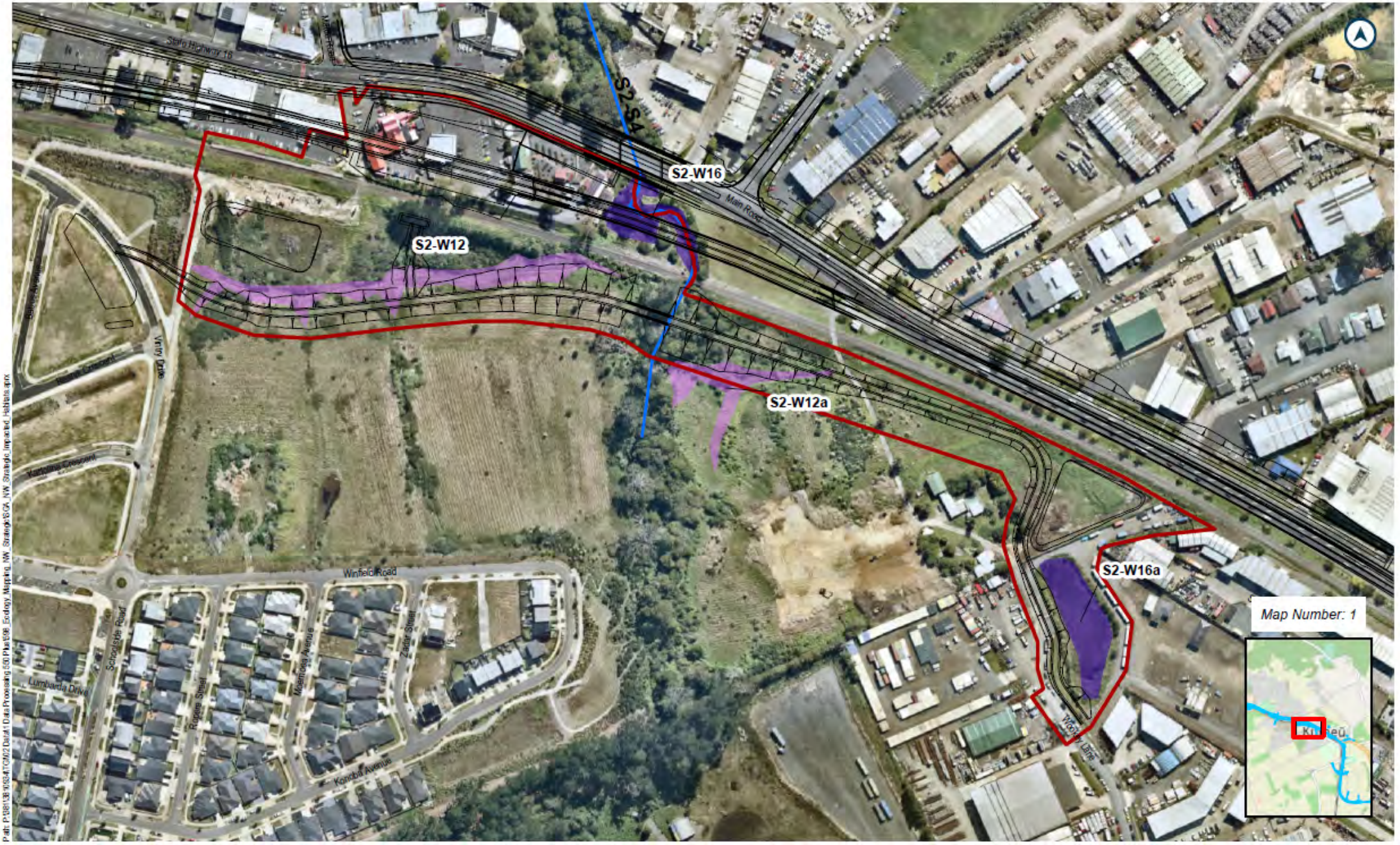
WOOKEY LN
SHAMR
LEGEND
Route Option
Kumeu Station Boundary
Road
0
0.1
0.2
Kilometers

5.4.3 Freshwater Streams and Wetland Habitat



5.5 NoR HS: Huapai Rapid Transit Station

5.5.1 Terrestrial Vegetation

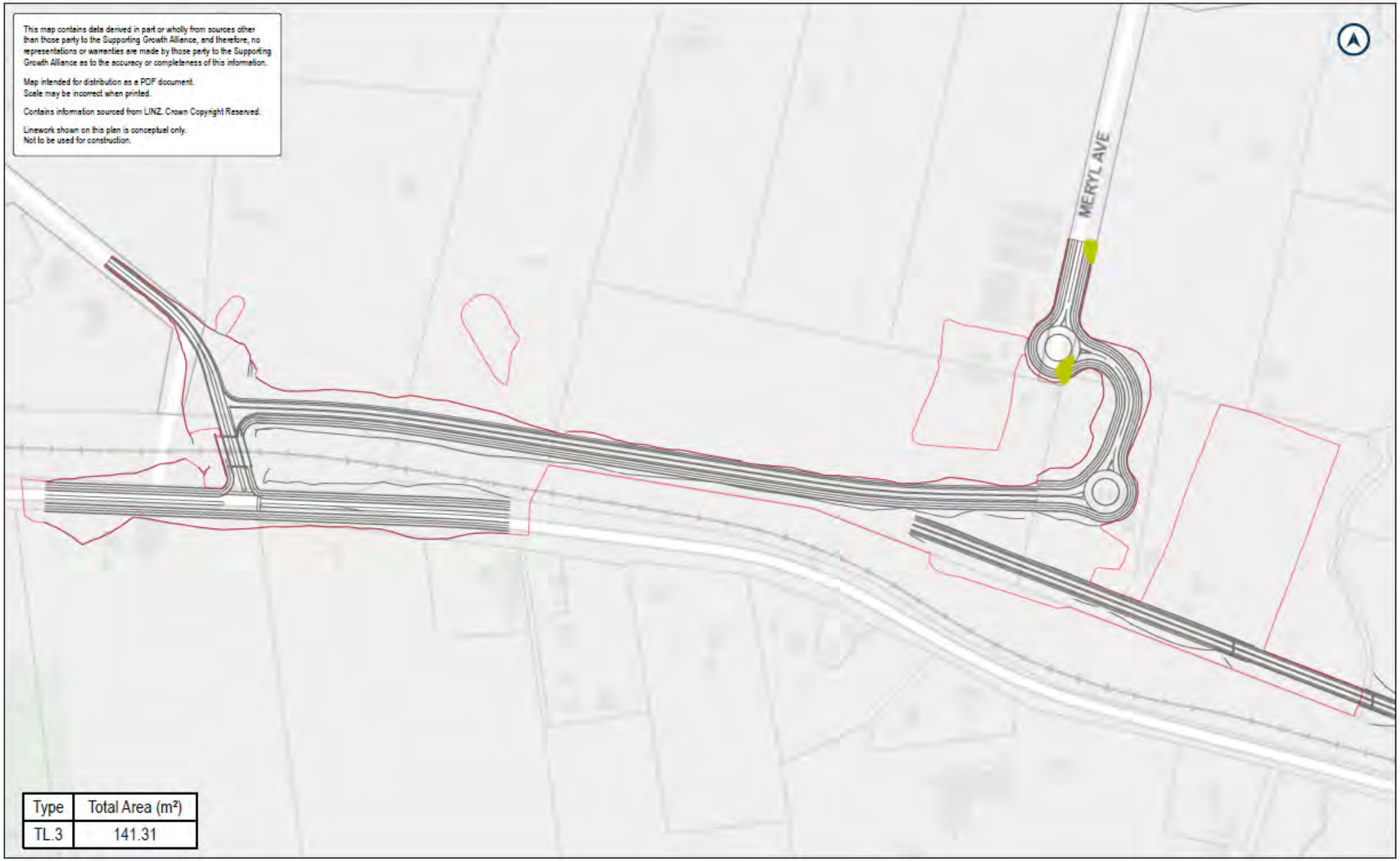
LEGEND

- Route Options
- Designation
- BF-Brownfield (Cropland)
- EF-Exotic Forest
- ES-Exotic Scrub
- PL.1-Planted native (<20 years old)
- PL.3-Amenity planting
- TL.2-Mixed native / exotic treeland
- TL.3-Treeland Exotic

0 100 200

Metres

5.5.2 District Plan Vegetation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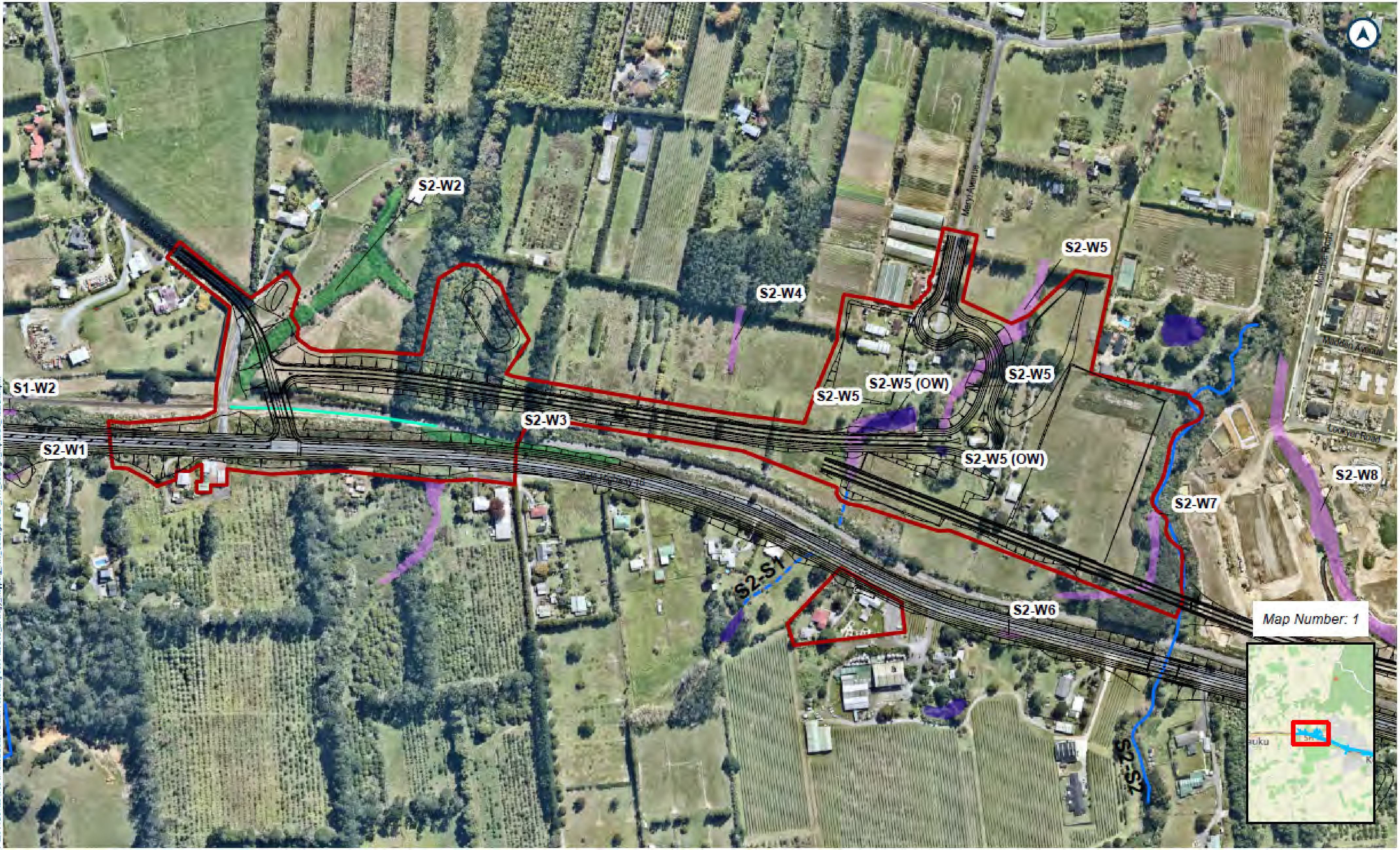
MERYL AVE
Type
Total Area (m²)
TL.3
141.31
LEGEND
Route Option
TL.3_DPT
Huapai Station Boundary
0
0.1
0.2
Kilometres

5.5.3 Freshwater Streams and Wetland Habitat



LEGEND

- Route Options
- Designation
- Artificial swale/drainage ditch
- Intermittent
- Permanent
- EW-Exotic Wetland
- OW-Open Water
- PLW-Planted Wetland Native (Recent)

0 100 200
Metres

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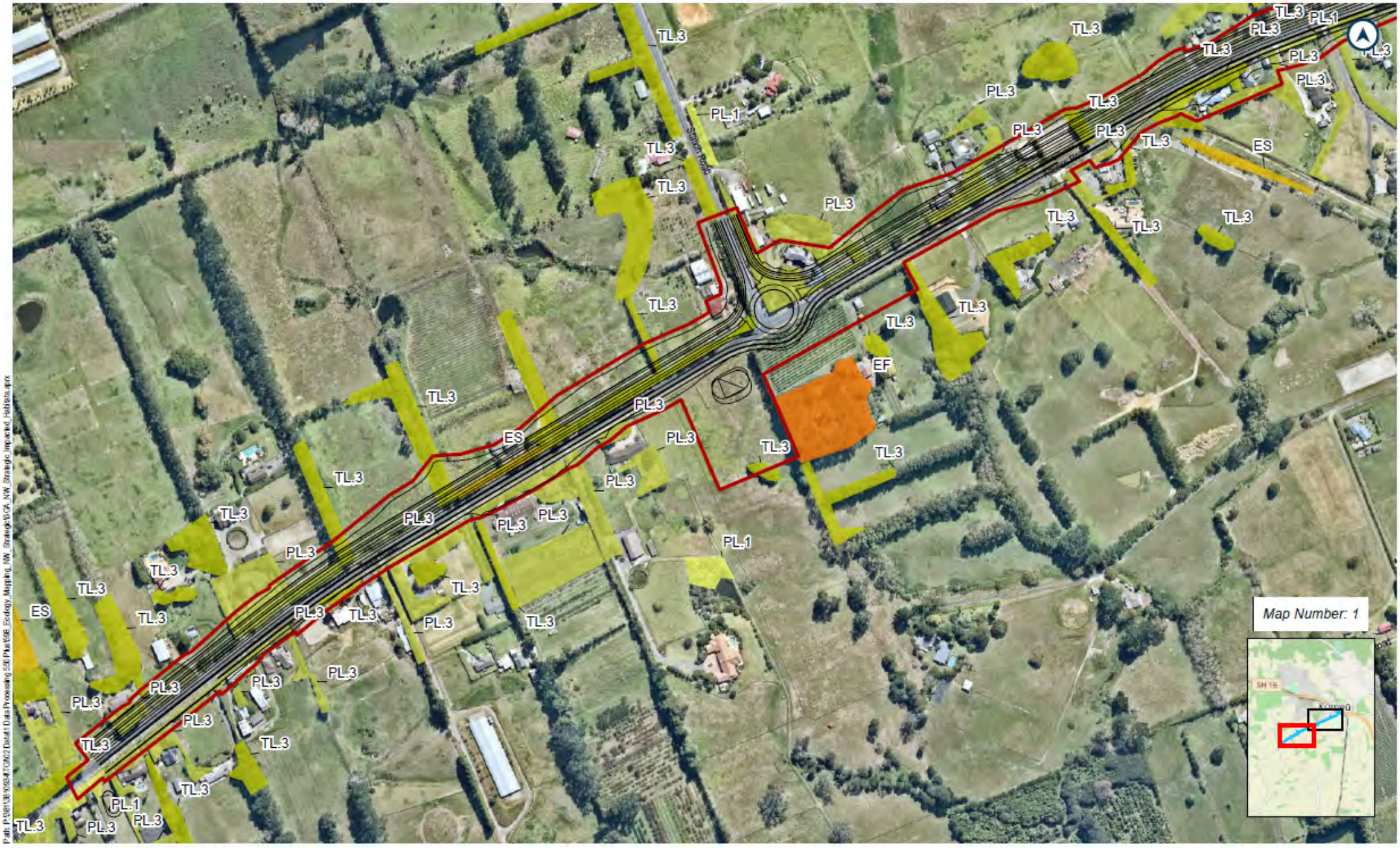
5.6 NoR S4: Access Road Upgrade

5.6.1 Terrestrial Vegetation


TL.3
PL.1
PL.3
ES
EF
Saxton Rd
Map Number: 1
SH 16
LEGEND
Route Options
Designation
EF-Exotic Forest
ES-Exotic Scrub
PL.1-Planted native (<20 years old)
PL.3-Amenity planting
TL.3-Treeland Exotic
0
100
200
Metres
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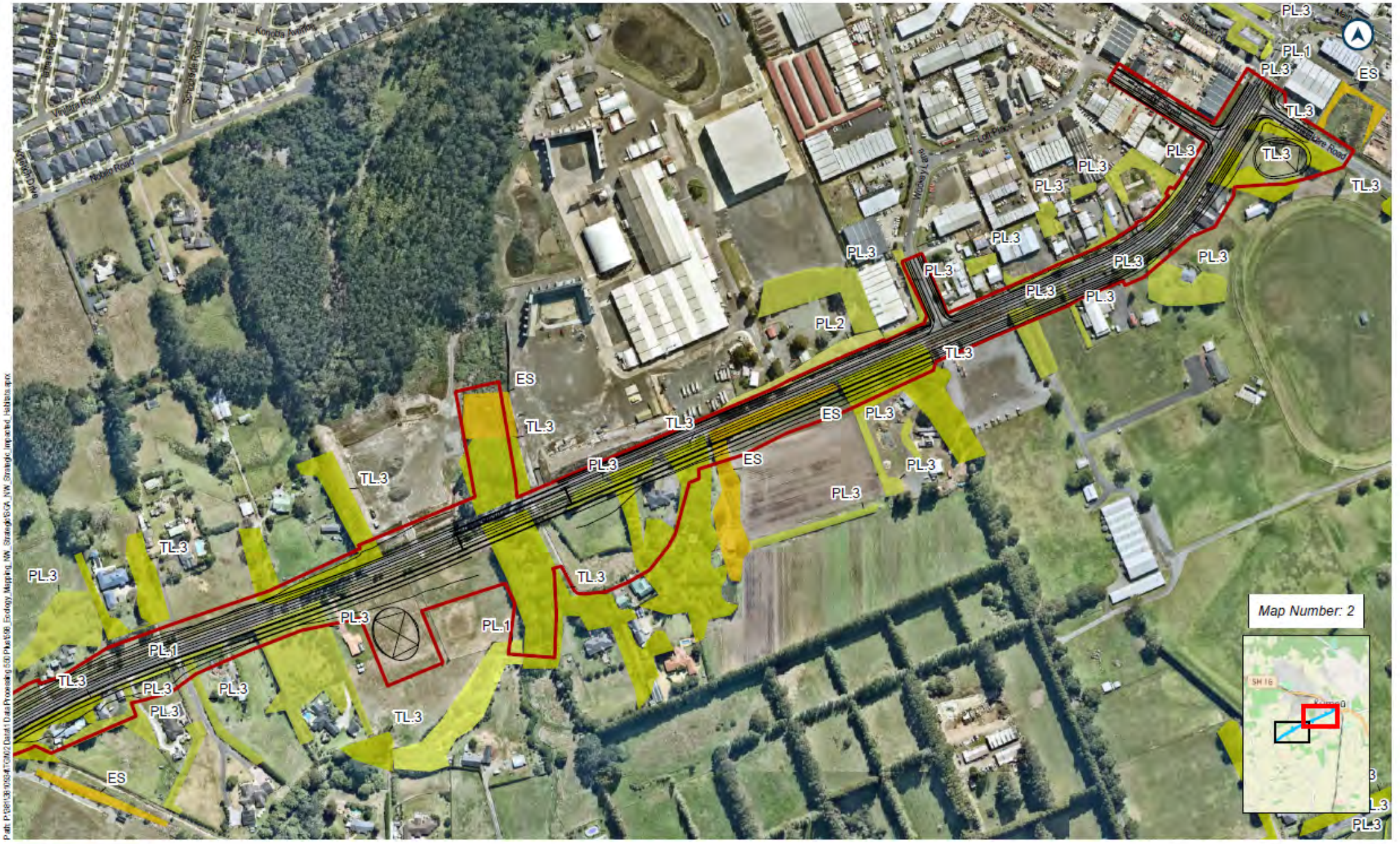

LEGEND

- Route Options
- Designation
- ES-Exotic Scrub
- PL.1-Planted native (<20 years old)
- PL.2-Planted native (>20 years old)
- PL.3-Amenity planting
- TL.3-Treeland Exotic

5.6.2 District Plan Vegetation


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STATION RD
NOBILO RD
WOODLEY
LOFT PL
FARRAND RD
SMITH RD
Type
Total Area (m²)
TL.3
2263.35
LEGEND
Route Option
TL.3_DPT
Road
0
0.1
0.2
Kilometres

5.6.3 Freshwater Streams and Wetland Habitat

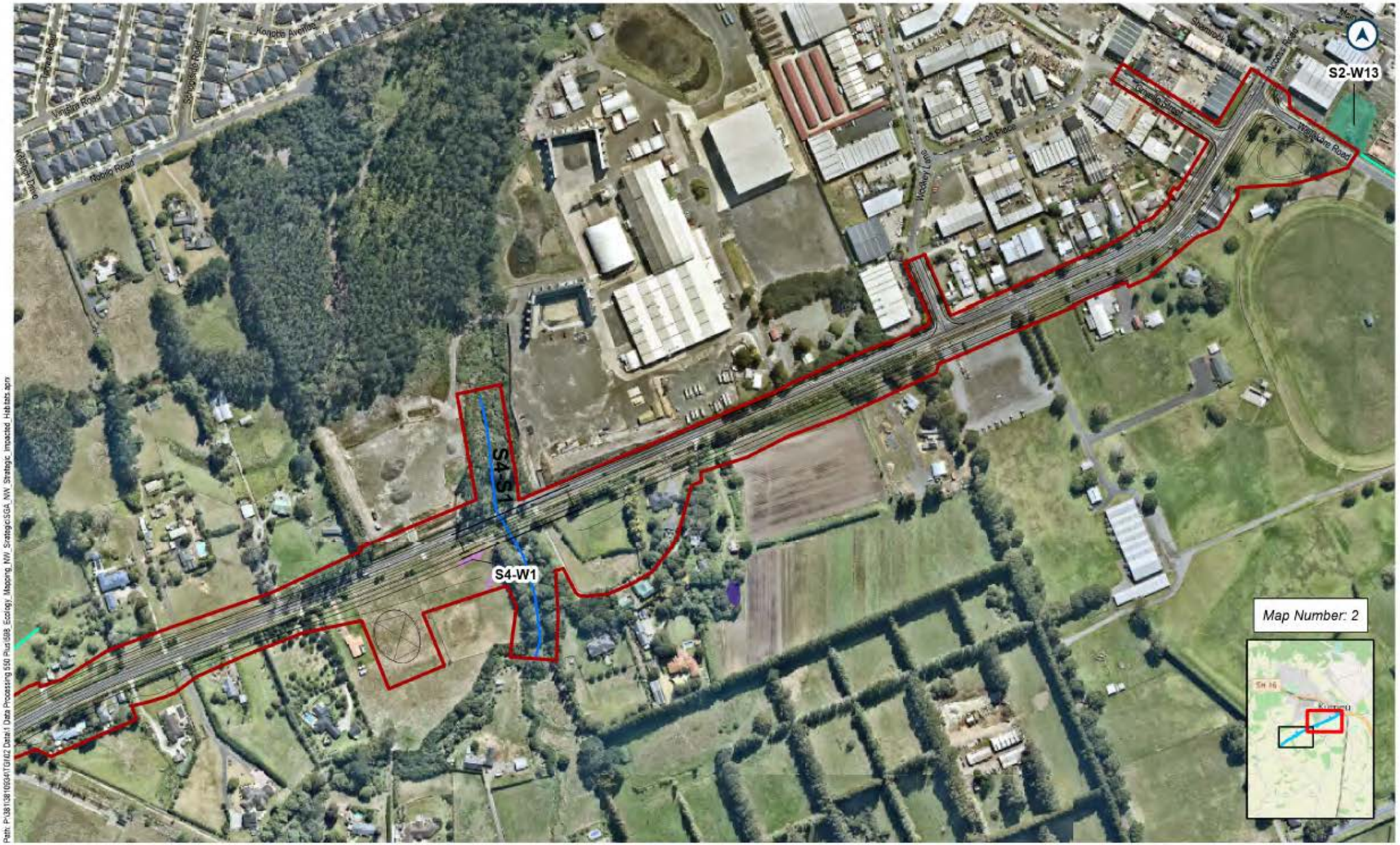
Path: P:\381\381093417\Gis\02 Data\1 Data Processing\50 Plus\598_Ecology_Mapping_NW_Strategic\SGA_NW_Strategic_Impacted_Habitats.aprx

LEGEND

- Route Options
- Designation
- Artificial swale/drainage ditch
- OW-Open Water
- EW-Exotic Wetland

0 100 200

Metres



6 Appendix 6 – Terrestrial Value Assessment

6.1 NoR S1: Alternative State Highway, Including Brigham Creek Interchange

Table 13-9 Assessment of ecological value for terrestrial ecology features for NoR S1 (1 of 2)

Attributes to be considered	S1-BF	S1-EF	S1-EF.1	S1-EF.2	S1-EG	S1-ES	S1-PL.1	S1-PL.2	S1-PL.3	Justification
Representativeness	**1**	**2**	**3**	**2**	**1**	**2**	**4**	**4**	**2**	
Typical structure and composition	1	1	2	1	1	1	2	2	1	BF, EG, ES, EF, EF.2, PL.3: Habitats have been significantly altered by human activities (exotic dominated). PL.1, PL.2, EF.1: Habitat and species have been affected by human activities.
Indigenous representation	1	2	3	2	1	2	4	4	2	BF, EG: <10% of the species are indigenous. EF, EF.2, ES, PL.3: 10-50% of the species are indigenous. EF.1: 50-90% of the species are indigenous. PL.1, PL.2: >90% of the species are indigenous.
Rarity/distinctiveness	**0**	**4**	**4**	**4**	**3**	**3**	**3**	**3**	**3**	
Species of conservation significance	-	4	4	4	3	3	3	3	3	Long-tailed bat (Threatened – Nationally Critical, value score of 4) present and potentially using ecological features associated with the Project Area (EF, EF.1, EF.2). TAR bird species expected to be reliant on ecological features associated with the Project Area, seasonal use by kākā would score 3 (EF, EF.1, EF.2, PL.2). Copper skink (At Risk - Declining, value score 3) likely to utilise ecological features within the Project Area (EF, EF.1, EF.2, EG, ES, PL.1, PL.3)
Distinctive ecological values	-	2	2	2	1	1	2	2	1	BF: Habitat not playing an important role in provisional or regulatory ecosystem services at any scale

Attributes to be considered	S1-BF	S1-EF	S1-EF.1	S1-EF.2	S1-EG	S1-ES	S1-PL.1	S1-PL.2	S1-PL.3	Justification
										EG, ES PL.3: Habitat playing an important role in provisional or regulatory ecosystem services typically on local scale EF, EF.1, EF.2, PL.1, PL.2: Habitat playing an important role in provisional or regulatory ecosystem services typically on Catchment scale
Diversity and pattern	**1**	**3**	**3**	**3**	**1**	**1**	**2**	**3**	**1**	
Habitat diversity	-	1	2	1	1	1	1	2	1	Increased habitat diversity in areas with indigenous species present: EF.1, PL.1, PL.2 Increased habitat diversity in areas with late succession: EF, EF.1, EF.2, PL.2
Species diversity	1	1	2	1	1	1	2	2	1	Increased species diversity in areas with indigenous species present: EF.1, PL.1, PL.2. Increased species diversity in areas with late succession: EF, EF.1, EF.2, PL.2.
Patterns in habitat use	1	3	3	3	1	1	1	3	1	EF, EF.1, EF.2, PL.2 rated high due to potential seasonal utilisation by long-tailed bat and kākā. All other habitats are not important for lifecycle completion or periodic habitat utilisation on any scale.
Ecological context	**0**	**3**	**3**	**3**	**0**	**1**	**1**	**4**	**1**	
Size, shape and buffering	-	1	1	1	-	-	1	1	-	EF, EF.1, EF.2, PL.1 PL.2 are represented by small, patches of habitat but provide buffering to adjacent areas.
Sensitivity to change	-	-	-	-	-	-	-	4	-	PL.2: Intact habitat and late succession. All other habitats are generally modified with no residual sensitive receptors.

Attributes to be considered	S1-BF	S1-EF	S1-EF.1	S1-EF.2	S1-EG	S1-ES	S1-PL.1	S1-PL.2	S1-PL.3	Justification
Ecological networks (linkages, pathways, migration)	-	3	3	3	-	1	1	3	1	Habitat is locally an important breeding and feeding link in terms of connectivity for the survival of species (e.g. native birds): ES, PL.1, PL.3. Habitat is regionally an important breeding and feeding link in terms of connectivity for the survival of species: woody structure EF, EF.1, EF.2, PL.2.
Combined value	**N**	**M**	**H**	**M**	**L**	**L**	**M**	**H**	**L**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

Table 13-10 Assessment of ecological value for terrestrial ecology features for NoR S1 (2 of 2)

Attributes to be considered	S1-TL.2	S1-TL.3	S1-VS2	S1-WF7	S1-Bat	S1-Non-TAR Bird	S1-Lizard	Justification
Representativeness	**3**	**2**	**4**	**4**	**0**	**0**	**0**	
Typical structure and composition	3	1	3	4	-	-	-	TL.3: Habitat has been affected by human activities (exotic-dominated treeland). TL.2 VS2: Habitat has been insignificantly affected by human activities. WF7: Habitat is unchanged from baseline conditions.
Indigenous representation	3	2	4	4	-	-	-	TL.3: 10-50% of the species are indigenous. TL.2: 50-90% of the species are indigenous. VS2, WF7: >90% of the species are indigenous.
Rarity/distinctiveness	**4**	**4**	**4**	**4**	**4**	**2**	**3**	
Species of conservation significance (fauna only)	-	-	-	-	4	2	3	Long-tailed bat (Threatened – Nationally Critical) = value score of 4. Kākā (At Risk - Recovering) and copper skink (At Risk - Declining) = value score of 3. Nationally and locally common native species = value score of 2.

Attributes to be considered	S1-TL.2	S1-TL.3	S1-VS2	S1-WF7	S1-Bat	S1-Non-TAR Bird	S1-Lizard	Justification
Species of conservation significance	4	4	4	4	-	-	-	Long-tailed bat (Threatened – Nationally Critical, value score of 4) present and potentially using ecological features associated with the Project Area (TL.2, TL.3, VS2, WF7). TAR bird species expected to be reliant on ecological features associated with the Project Area, seasonal use by kākā would score 3 (TL.2, TL.3, VS2, WF7). Not Threatened native birds (value score of 2) likely to utilise ecological features within the Project Area (TL.2, TL.3, VS2, WF7). Copper skink (At Risk - Declining, value score 3) likely to utilise ecological features within the Project Area (TL.2, TL.3, VS2, WF7)
Distinctive ecological values	3	1	3	3	-	-	-	TL.3: Habitat playing an important role in provisional or regulatory ecosystem services typically on Local scale. TL.2, VS2, WF7: Habitat playing an important role in provisional or regulatory ecosystem services typically on Regional scale.
Diversity and pattern	**3**	**3**	**3**	**4**	**0**	**2**	**0**	
Habitat diversity	3	1	3	4	-	-	-	Increased habitat diversity in areas with indigenous species present: TL.2, VS2, WF7. Increased habitat diversity in areas with late succession: TL.2, TL.3, VS2, WF7.
Species diversity	3	1	3	3	-	2	-	Increased species diversity in areas with indigenous species present: TL.2, VS2, WF7. Increased species diversity in areas with late succession: TL.2, TL.3, VS2, WF7. VS2 and WF7 rated higher due to higher % indigenous species.
Patterns in habitat use	3	3	3	3	-	-	-	All other habitats are not important for lifecycle completion or periodic habitat utilisation on any scale. (TL.2, TL.3, WF7 rated high due to potential utilisation by long-tailed bat and kākā).
Ecological context	**4**	**3**	**4**	**4**	**0**	**2**	**0**	

Attributes to be considered	S1-TL.2	S1-TL.3	S1-VS2	S1-WF7	S1-Bat	S1-Non-TAR Bird	S1-Lizard	Justification
Size, shape and buffering	2	-	2	2	-	2	-	WF7 is represented by a very small area located along Ahukuramu Stream at 116 Foster Road. VS2 is represented by several patches, approximately 300m2 in size, located on both sides of Puke Road. TL.2 is represented largely by riparian vegetation, part of wider catchment. TL.3 located throughout the NoR.
Sensitivity to change	4	-	4	4	-	-	-	VS2, TL.2, WF7: Intact habitat and late succession. WF7 IUCN Threat Status: Critically Endangered. TL.3: Habitat generally modified with no residual receptors sensitive to change.
Ecological networks (linkages, pathways, migration)	3	3	3	3	-	-	-	Aged woody structure (TL.2, TL.3, VS2 and WF7) increase steppingstone value (connecting other areas of ecological value). TL.2 and TL.3 along Kumeu River (S1-S17) and Pakinui Stream (S1-S18) important ecological network for long-tailed bats (bats confirmed at ABM2) and along Ahukuramu Stream. VS2 is represented by several patches on both sides of Puke Road within close proximity to each other (ranging from approximately 15 - 450 metres). WF7 scored lower due to limited extent, but provides linkage between area of natural wetland, PL.1 and ES/TL.2 along Ahukuramu Stream.
Combined value	**H**	**M**	**H**	**VH**	**VH**	**L**	**H**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

Table 13-11 Assessment of ecological value for terrestrial ecology features for NoR S1 (TAR birds)

Attributes to be considered	S1-TAR Bird (Terrestrial - Moderate Value)	S1-TAR Bird (Terrestrial - High Value)	S1-TAR Bird (Terrestrial - Very High Value)	S1-TAR Bird (Wetland - Moderate Value)	S1-TAR Bird (Wetland - High Value)	S1-TAR Bird (Wetland - Very High Value)	Justification
Representativeness	**3***	**0**	**0**	**3***	**0**	**0**	
Typical structure and composition	3*	-	-	3*	-	-	-
Indigenous representation	-	-	-	-	-	-	-
Rarity/distinctiveness	**0**	**3**	**3**	**0**	**3**	**3**	
Species of conservation significance (fauna only)	-	3	4	-	3	4	Terrestrial (Moderate): North Island kākā Terrestrial (High): New Zealand pipit Terrestrial (Very High): long-tailed cuckoo Wetland (Moderate): little black shag, pied shag Wetland (High): banded rail, North Island fernbird, spotless crake Wetland (Very High): brown teal, dabchick
Species of conservation significance	-	-	-	-	-	-	-
Distinctive ecological values	-	-	-	-	-	-	-
Diversity and pattern	**3***	**0**	**0**	**3***	**0**	**0**	
Habitat diversity	3*	-	-	3*	-	-	-

Attributes to be considered	S1-TAR Bird (Terrestrial - Moderate Value)	S1-TAR Bird (Terrestrial - High Value)	S1-TAR Bird (Terrestrial - Very High Value)	S1-TAR Bird (Wetland - Moderate Value)	S1-TAR Bird (Wetland - High Value)	S1-TAR Bird (Wetland - Very High Value)	Justification
Species diversity	-	-	-	-	-	-	-
Patterns in habitat use	-	-	-	-	-	-	-
Ecological context	**3***	**0**	**0**	**3***	**0**	**0**	
Size, shape and buffering	3*	-	-	3*	-	-	
Sensitivity to change	-	-	-	-	-	-	-
Ecological networks (linkages, pathways, migration)	-	-	-	-	-	-	-
Combined value	**M**	**H**	**VH**	**M**	**H**	**VH**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High. * = Scores not representative of corresponding row, scores required to produce 'Moderate' combined value.

Table 13-12 Assessment of ecological value for terrestrial ecology features for NoR S1 (District Plan vegetation)

Attributes to be considered	S1-EF (District Plan)	S1-TL.2 (District Plan)	S1-TL.3 (District Plan)	Justification
Representativeness	**2**	**3**	**2**	
Typical structure and composition	2	3	2	EF, TL.3: Habitat has been affected by human activities (exotic-dominated treeland). TL.2: Habitat has been insignificantly affected by human activities.
Indigenous representation	2	3	2	EF, TL.3: 10-50% of the species are indigenous. TL.2: 50-90% of the species are indigenous.

Attributes to be considered	S1-EF (District Plan)	S1-TL.2 (District Plan)	S1-TL.3 (District Plan)	Justification
Rarity/distinctiveness	**4**	**4**	**4**	
Species of conservation significance	4	4	4	Some areas of District Plan EF, TL.2, TL.3 are located on the edges of larger habitat areas (EF, TL.2, TL.3) within the vicinity of confirmed bat presence (results of the April 2022 survey). Other areas of EF, TL.2, TL.3 in NoR S1 are isolated and not connected to any significant ecological pathways.
Distinctive ecological values	-	-	-	-
Diversity and pattern	**2**	**3**	**2**	
Habitat diversity	2	3	2	Increased habitat diversity in areas with indigenous species present: TL.2 Increased habitat diversity in areas with late succession: EF, TL.2, TL.3
Species diversity	2	3	2	Increased species diversity in areas with indigenous species present: TL.2 Increased species diversity in areas with late succession: EF, TL.2, TL.3
Patterns in habitat use	2	2	2	EF, TL.2, TL.3: habitat important for lifecycle completion or periodic habitat utilisation by native animal species on a Local scale (EF rated high due to potential utilisation by long-tailed bat and kākā).
Ecological context	2	2	2	
Size, shape and buffering	2	1	2	Some areas of District Plan EF, TL.2, TL.3 are located on the edges of larger habitat areas (EF, TL.2, TL.3), however the extent of District Plan TL.2 vegetation is small in the context of the NoR.
Sensitivity to change	-	2	-	TL.2: Late succession ecosystem. All other habitats are generally modified with no residual sensitive receptors.

Attributes to be considered	S1-EF (District Plan)	S1-TL.2 (District Plan)	S1-TL.3 (District Plan)	Justification
Ecological networks (linkages, pathways, migration)	2	2	2	EF, TL.2, and TL.3 are likely utilised by long-tailed bats.
Combined value	**M**	**M**	**M**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

6.2 NoR S2: SH16 Main Road Upgrade

Table 13-13 Assessment of ecological value for terrestrial ecology features for NoR S2

Attributes to be considered	S2-BF	S2-EG	S2-ES	S2-PL.1	S2-PL.3	S2-TL.2	S2-TL.3	S2-WF8	Justification
Representativeness	**1**	**1**	**2**	**4**	**2**	**3**	**2**	**4**	
Typical structure and composition	1	1	1	2	1	3	2	4	BF, EG, ES, PL.3: Habitats have been significantly altered by human activities (exotic dominated). TL.3: Habitat has been affected by human activities (exotic-dominated treeland). PL.1, TL.2: Habitat has been insignificantly affected by human activities. WF8: Habitat is unchanged from baseline conditions.
Indigenous representation	1	1	2	4	2	3	2	4	BF, EG: <10% of the species are indigenous. ES, PL.3, TL.3: 10-50% of the species are indigenous. TL.2: 50-90% of the species are indigenous. PL.1: >90% of the species are indigenous WF8: >90% of the species are indigenous.
Rarity/distinctiveness	**0**	**3**	**3**	**3**	**3**	**4**	**4**	**4**	

Attributes to be considered	S2-BF	S2-EG	S2-ES	S2-PL.1	S2-PL.3	S2-TL.2	S2-TL.3	S2-WF8	Justification
Species of conservation significance	-	3	3	3	3	4	4	4	Long-tailed bat (Threatened – Nationally Critical, value score of 4) present and potentially using ecological features associated with the Project Area (TL.2, TL.3, WF8). TAR bird species expected to be reliant on ecological features associated with the Project Area, seasonal use by kākā would score 3 (TL.2, TL.3, WF8). Not Threatened native birds (value score of 2) likely to utilise ecological features within the Project Area (EG, ES, PL.1, PL.3, TL.2, TL.3, WF8). Copper skink (At Risk - Declining, value score 3) likely to utilise ecological features within the Project Area (EG, ES, PL.1, PL.3, TL.2, TL.3, WF8).
Distinctive ecological values	-	1	1	2	1	3	1	3	BF: Habitat not playing an important role in provisional or regulatory ecosystem services at any scale EG, ES PL.3: Habitat playing an important role in provisional or regulatory ecosystem services typically on local scale PL.1, TL.2, TL.3: Habitat playing an important role in provisional or regulatory ecosystem services typically on Catchment scale TL.2, WF8: Habitat playing an important role in provisional or regulatory ecosystem services typically on a Regional scale.
Diversity and pattern	**1**	**1**	**1**	**2**	**1**	**3**	**3**	**4**	
Habitat diversity	-	1	1	1	1	3	1	4	Increased habitat diversity in areas with indigenous species present: PL.1, TL.2, WF8. Increased habitat diversity in areas with late succession: TL.2, TL.3, VS2, WF8.
Species diversity	1	1	1	2	1	3	1	3	Increased species diversity in areas with indigenous species present: PL.1, TL.2, WF8 Increased species diversity in areas with late succession: TL.2, TL.3, WF8. WF8 rated higher due to higher % indigenous species.

Attributes to be considered	S2-BF	S2-EG	S2-ES	S2-PL.1	S2-PL.3	S2-TL.2	S2-TL.3	S2-WF8	Justification
Patterns in habitat use	1	1	1	1	1	3	3	3	All other habitats are not important for lifecycle completion or periodic habitat utilisation on any scale. TL.2, TL.3, WF8 rated high due to potential utilisation by long-tailed bat and kākā).
Ecological context	**0**	**0**	**1**	**1**	**1**	**4**	**3**	**4**	
Size, shape and buffering	-	-	-	1	-	2	1	2	TL.2 is represented by an approximately 450m^2 shelterbelt along southern side of SH16. WF8 is represented by an approximately 700m^2 area that provides riparian buffering for stream S2-S4 in a highly urbanised area.
Sensitivity to change	-	-	-	-	-	4	-	4	WF8: Very high species diversity and delayed succession. TL.2: Late succession ecosystem. All other habitats are generally modified with no residual sensitive receptors.
Ecological networks (linkages, pathways, migration)	-	-	1	1	1	3	3	3	Woody structure (PL.1 and PL.3) and aged woody structure (TL.2, TL.3, WF8) increase steppingstone value (connecting other areas of ecological value).
Combined value	**N**	**L**	**L**	**M**	**L**	**H**	**M**	**VH**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

Table 13-14 Assessment of ecological value for terrestrial ecology features for NoR S2 (fauna)

Attributes to be considered	S2-Bat	S2-Non-TAR Bird	S2-Lizard	Justification
Representativeness	**0**	**2***	**0**	

Attributes to be considered	S2-Bat	S2-Non-TAR Bird	S2-Lizard	Justification
Typical structure and composition	-	-	-	-
Indigenous representation	-	2*	-	-
Rarity/distinctiveness	**4**	**2**	**3**	
Species of conservation significance (fauna only)	4	2	3	-
Species of conservation significance	-	-	-	Long-tailed bat (Threatened – Nationally Critical, value score of 4) present and potentially using ecological features associated with the Project Area (TL.2, TL.3, WF8). Not Threatened native birds (value score of 2) likely to utilise ecological features within the Project Area (EG, ES, PL.1, PL.3, TL.2, TL.3, WF8). Copper skink (At Risk - Declining, value score 3) likely to utilise ecological features within the Project Area (EG, ES, PL.1, PL.3, TL.2, TL.3, WF8).
Distinctive ecological values	-	-	-	-
Diversity and pattern	**0**	**0**	**0**	
Habitat diversity	-	-	-	-
Species diversity	-	-	-	-
Patterns in habitat use	-	-	-	-
Ecological context	**0**	**2***	**0**	

Attributes to be considered	S2-Bat	S2-Non-TAR Bird	S2-Lizard	Justification
Size, shape and buffering	-	2*	-	-
Sensitivity to change	-	-	-	-
Ecological networks (linkages, pathways, migration)	-	-	-	-
Combined value	**VH**	**L**	**H**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High. * = Scores not representative of corresponding row, scores required to produce 'Moderate' combined value.

Table 13-15 Assessment of ecological value for terrestrial ecology features for NoR S2 (TAR birds)

Attributes to be considered	S2-TAR Bird (Terrestrial - Moderate Value)	S2-TAR Bird (Terrestrial - High Value)	S2-TAR Bird (Terrestrial - Very High Value)	S2-TAR Bird (Wetland - Moderate Value)	S2-TAR Bird (Wetland - High Value)	S2-TAR Bird (Wetland - Very High Value)	Justification
Representativeness	**3***	**0**	**0**	**3***	**0**	**0**	
Typical structure and composition	3*	-	-	3*	-	-	-
Indigenous representation	-	-	-	-	-	-	-
Rarity/distinctiveness	**0**	**3**	**3**	**0**	**3**	**3**	
Species of conservation	-	3	4	-	3	4	Terrestrial (Moderate): North Island kākā Terrestrial (High): New Zealand pipit

Attributes to be considered	S2-TAR Bird (Terrestrial - Moderate Value)	S2-TAR Bird (Terrestrial - High Value)	S2-TAR Bird (Terrestrial - Very High Value)	S2-TAR Bird (Wetland - Moderate Value)	S2-TAR Bird (Wetland - High Value)	S2-TAR Bird (Wetland - Very High Value)	Justification
significance (fauna only)							Terrestrial (Very High): long-tailed cuckoo Wetland (Moderate): little black shag, pied shag Wetland (High): banded rail, North Island fernbird, spotless crake Wetland (Very High): brown teal, dabchick
Species of conservation significance	-	-	-	-	-	-	-
Distinctive ecological values	-	-	-	-	-	-	-
Diversity and pattern	**3***	**0**	**0**	**3***	**0**	**0**	
Habitat diversity	3*	-	-	3*	-	-	-
Species diversity	-	-	-	-	-	-	-
Patterns in habitat use	-	-	-	-	-	-	-
Ecological context	**3***	**0**	**0**	**3***	**0**	**0**	
Size, shape and buffering	3*	-	-	3*	-	-	
Sensitivity to change	-	-	-	-	-	-	-
Ecological networks (linkages, pathways, migration)	-	-	-	-	-	-	-

Attributes to be considered	S2-TAR Bird (Terrestrial - Moderate Value)	S2-TAR Bird (Terrestrial - High Value)	S2-TAR Bird (Terrestrial - Very High Value)	S2-TAR Bird (Wetland - Moderate Value)	S2-TAR Bird (Wetland - High Value)	S2-TAR Bird (Wetland - Very High Value)	Justification
Combined value	**M**	**H**	**VH**	**M**	**H**	**VH**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High. * = Scores not representative of corresponding row, scores required to produce 'Moderate' combined value.

Table 13-16 Assessment of ecological value for terrestrial ecology features for NoR S2 (District Plan vegetation)

Attributes to be considered	S2-TL.3 (District Plan)	S2-WF8 (District Plan)	S2-Notable Tree	Justification
Representativeness	**2**	**3**	**1**	
Typical structure and composition	2	2	1	-
Indigenous representation	1	3	1	-
Rarity/distinctiveness	**1**	**2**	**0**	
Species of conservation significance	1	2	-	Areas of TL.3 are small, isolated and in suburban areas. One patch of TL.3 is riparian vegetation along a stream (S2-S6) on Riverhead Road, located adjacent to a main road (SH16) and an urban area, therefore unlikely to be utilised by bats. Area of WF8 loss is very small in extent, however it is associated with permanent stream S2-S4 (high ecological value stream). Located

Attributes to be considered	S2-TL.3 (District Plan)	S2-WF8 (District Plan)	S2-Notable Tree	Justification
				adjacent to a main road (SH16) and an urban area, therefore unlikely to be utilised by bats. The current conservation status of kahikatea is 'Not Threatened'.
Distinctive ecological values	1	1	-	-
Diversity and pattern	**1**	**2**	**0**	
Habitat diversity	1	1	-	-
Species diversity	1	2	-	-
Patterns in habitat use	1	2	-	-
Ecological context	**1**	**1**	**0**	
Size, shape and buffering		1	-	-
Sensitivity to change	-	1	-	-
Ecological networks (linkages, pathways, migration)	1	1		-
Combined value	**L**	**L**	**N**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

6.3 NoR S3: Rapid Transit Corridor and Regional Active Mode Corridor

Table 13-17 Assessment of ecological value for terrestrial ecology features for NoR S3

Attributes to be considered	S3-BF	S3-EF.1	S3-EF.2	S3-EG	S3-ES	S3-PL.1	S3-PL.3	S3-TL.2	S3-TL.3	S3-WF8	Justification
Representativeness	1	3	2	1	2	4	2	3	2	4	
Typical structure and composition	1	2	1	1	1	2	1	3	2	4	BF, EF.2, EG, ES, PL.3: Habitats have been significantly altered by human activities (exotic dominated). EF.1, TL.3: Habitat has been affected by human activities (exotic-dominated treeland). PL.1, TL.2: Habitat has been insignificantly affected by human activities. WF8: Habitat is unchanged from baseline conditions.
Indigenous representation	1	3	2	1	2	4	2	3	2	4	BF, EG: <10% of the species are indigenous. EF.2, ES, PL.3, TL.3: 10-50% of the species are indigenous. EF.1, TL.2: 50-90% of the species are indigenous. PL.1, WF8: >90% of the species are indigenous.
Rarity/distinctiveness	**0**	**4**	**4**	**3**	**3**	**3**	**3**	**4**	**4**	**4**	
Species of conservation significance	-	4	4	3	3	3	3	4	4	4	Long-tailed bat (Threatened – Nationally Critical, value score of 4) present and potentially using ecological features associated with the Project Area (EF.1, EF.2, TL.2, TL.3, WF8). Pied shag (At Risk - Recovering) observed at 14 Brigham Creek Road, adjacent to Totara Creek (W3-S1), likely reliant on mangrove system adjacent to Totara Creek (W3-S1) which is outside of designation boundary, rather than reliant on ES. Not Threatened native birds (value score of 2) likely to utilise ecological features within the Project Area (EF.1, EF.2, EG, ES, PL.1, PL.3, TL.2, TL.3, WF8).

Attributes to be considered	S3-BF	S3-EF.1	S3-EF.2	S3-EG	S3-ES	S3-PL.1	S3-PL.3	S3-TL.2	S3-TL.3	S3-WF8	Justification
											Copper skink (At Risk - Declining, value score 3) likely to utilise ecological features within the Project Area (EF1, EF.2, EG, ES, PL.1, PL.3, TL.2, TL.3, WF8)
Distinctive ecological values	-	2	2	1	1	2	1	3	1	3	Scoring reflects value for native animal species (excluding TAR species).
Diversity and pattern	**1**	**3**	**3**	**1**	**1**	**2**	**1**	**3**	**3**	**4**	
Habitat diversity	-	2	2	1	1	1	1	3	1	4	Increased habitat diversity in areas with indigenous species present: EF.1, PL.1, TL.2, WF8. Increased habitat diversity in areas with late succession: EF.1, EF.2, TL.2, TL.3, WF8.
Species diversity	1	2	1	1	1	2	1	3	1	3	Increased species diversity in areas with indigenous species present: EF.1, PL.1, TL.2, WF8. Increased species diversity in areas with late succession: EF.1, EF.2, TL.2, TL.3, WF8. WF8 rated higher due to higher % indigenous species.
Patterns in habitat use	1	3	3	1	1	1	1	3	3	3	TL.2, TL.3, WF8: habitat important for lifecycle completion or periodic habitat utilisation by native animal species on a Local scale (EF.1 and EF.2 rated high due to potential utilisation by long-tailed bat and kākā). All other habitats are not important for lifecycle completion or periodic habitat utilisation on any scale.
Ecological context	**0**	**3**	**3**	**0**	**1**	**1**	**1**	**4**	**3**	**4**	
Size, shape and buffering	-	1	1	-	-	1	1	2	1	2	TL.2 is represented by an approximately 450m^2 shelterbelt along southern side of SH16. WF8 is represented by an approximately 700m^2 area that provides riparian buffering for stream S2-S4 in a highly urbanised area.

Attributes to be considered	S3-BF	S3-EF.1	S3-EF.2	S3-EG	S3-ES	S3-PL.1	S3-PL.3	S3-TL.2	S3-TL.3	S3-WF8	Justification
Sensitivity to change	-	-	-	-	-	-	-	4	-	4	WF8: Very high species diversity and delayed succession. TL.2: Late succession ecosystem. All other habitats are generally modified with no residual sensitive receptors.
Ecological networks (linkages, pathways, migration)	-	3	3	-	1	1	1	3	3	3	Woody structure (PL.1 and PL.3) and aged woody structure (EF.1, EF.2, TL.2, TL.3, WF8) increase stepping stone value (connecting other areas of ecological value). TL.2 and TL.3 along Kumeu River (S1-S17) and Pakinui Stream (S1-S18) important ecological network for long-tailed bats (bats confirmed at ABM2).
Combined value	**N**	**H**	**M**	**L**	**L**	**M**	**L**	**H**	**M**	**VH**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

Table 13-18 Assessment of ecological value for terrestrial ecology features for NoR S3 (fauna)

Attributes to be considered	S3-Bat	S3-Non-TAR Bird	S3-Lizard	Justification
Representativeness	**0**	**2***	**0**	
Typical structure and composition	-	-	-	-
Indigenous representation	-	2*	-	-
Rarity/distinctiveness	**4**	**2**	**3**	

Attributes to be considered	S3-Bat	S3-Non-TAR Bird	S3-Lizard	Justification
Species of conservation significance (fauna only)	4	2	3	-
Species of conservation significance	-	-	-	Long-tailed bat (Threatened – Nationally Critical, value score of 4) present and potentially using ecological features associated with the Project Area (EF.1, EF.2, TL.2, TL.3, WF8). Not Threatened native birds (value score of 2) likely to utilise ecological features within the Project Area (EF.1, EF.2, EG, ES, PL.1, PL.3, TL.2, TL.3, WF8). Copper skink (At Risk - Declining, value score 3) likely to utilise ecological features within the Project Area (EF.1, EF.2, EG, ES, PL.1, PL.3, TL.2, TL.3, WF8)
Distinctive ecological values	-	-	-	-
Diversity and pattern	**0**	**0**	**0**	
Habitat diversity	-	-	-	-
Species diversity	-	-	-	-
Patterns in habitat use	-	-	-	-
Ecological context	**0**	**2***	**0**	
Size, shape and buffering	-	2*	-	-
Sensitivity to change	-	-	-	-
Ecological networks (linkages, pathways, migration)	-	-	-	-

Attributes to be considered	S3-Bat	S3-Non-TAR Bird	S3-Lizard	Justification
Combined value	**VH**	**L**	**H**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High. * = Scores not representative of corresponding row, scores required to produce 'Moderate' combined value.

Table 13-19 Assessment of ecological value for terrestrial ecology features for NoR S3 (TAR birds)

Attributes to be considered	S3-TAR Bird (Terrestrial - Moderate Value)	S3-TAR Bird (Terrestrial - High Value)	S3-TAR Bird (Terrestrial - Very High Value)	S3-TAR Bird (Wetland - Moderate Value)	S3-TAR Bird (Wetland - High Value)	S3-TAR Bird (Wetland - Very High Value)	Justification
Representativeness	**3***	**0**	**0**	**3***	**0**	**0**	
Typical structure and composition	3*	-	-	3*	-	-	-
Indigenous representation	-	-	-	-	-	-	-
Rarity/distinctiveness	**0**	**3**	**3**	**0**	**3**	**3**	
Species of conservation significance (fauna only)	-	3	4	-	3	4	Terrestrial (Moderate): North Island kākā Terrestrial (High): New Zealand pipit Terrestrial (Very High): long-tailed cuckoo Wetland (Moderate): little black shag, pied shag Wetland (High): banded rail, North Island fernbird, spotless crake Wetland (Very High): brown teal, dabchick

Attributes to be considered	S3-TAR Bird (Terrestrial - Moderate Value)	S3-TAR Bird (Terrestrial - High Value)	S3-TAR Bird (Terrestrial - Very High Value)	S3-TAR Bird (Wetland - Moderate Value)	S3-TAR Bird (Wetland - High Value)	S3-TAR Bird (Wetland - Very High Value)	Justification
Species of conservation significance	-	-	-	-	-	-	-
Distinctive ecological values	-	-	-	-	-	-	-
Diversity and pattern	**3***	**0**	**0**	**3***	**0**	**0**	
Habitat diversity	3*	-	-	3*	-	-	-
Species diversity	-	-	-	-	-	-	-
Patterns in habitat use	-	-	-	-	-	-	-
Ecological context	**3***	**0**	**0**	**3***	**0**	**0**	
Size, shape and buffering	3*	-	-	3*	-	-	
Sensitivity to change	-	-	-	-	-	-	-
Ecological networks (linkages, pathways, migration)	-	-	-	-	-	-	-
Combined value	**M**	**H**	**VH**	**M**	**H**	**VH**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High. * = Scores not representative of corresponding row, scores required to produce 'Moderate' combined value.

Table 13-20 Assessment of ecological value for terrestrial ecology features for NoR S3 (District Plan vegetation)

Attributes to be considered	S3-TL.3 (District Plan)	S3-WF8 (District Plan)	S3-Notable Tree (District Plan)	S3-Huapai Domain Trees (District Plan)	Justification
Representativeness	**2**	**3**	**1**	**1**	
Typical structure and composition	2	2	1	1	TL.3: Habitat has been affected by human activities (exotic-dominated treeland).
Indigenous representation	2	3	1	1	TL.3: 10-50% of the species are indigenous.
Rarity/distinctiveness	**3**	**2**	**0**	**3**	
Species of conservation significance	3	2	-	3	TL.3 (District Plan), area of TL.3 located at the southern end of Meryl Avenue part of larger area of TL.3 surrounding an exotic wetland/stream complex (S2-S1). Also located approximately 250 metres west of S2-S2 and associated TL.2 habitat. Long-tailed bats were not detected in this area during ABM survey. Non-TAR birds expected to utilise this area, TAR birds are expected to utilise this area but not be reliant. Other areas of TL.3 are small, isolated and located near roads or pasture. Area of WF8 loss is very small in extent, however it is associated with permanent stream S2-S4 (high ecological value stream). Located adjacent to a main road (SH16) and an urban area, therefore unlikely to be utilised by bats. The current conservation status of kahikatea is 'Not Threatened'. Notable tree is one mature exotic tree (eucalyptus) that is isolated and located on a main road. Huapai Domain trees are TL.3, isolated and along the northern side of the railway. Non-TAR birds are expected to utilise this area.
Distinctive ecological values	-	1	-	-	-
Diversity and pattern	**2**	**2**	**1**	**1**	

Attributes to be considered	S3-TL.3 (District Plan)	S3-WF8 (District Plan)	S3-Notable Tree (District Plan)	S3-Huapai Domain Trees (District Plan)	Justification
Habitat diversity	2	1	1	1	TL.3: Increased habitat diversity in areas with late succession.
Species diversity	2	2	1	1	TL3: Increased species diversity in areas with late succession.
Patterns in habitat use	2	2	1	1	TL.3: Habitat important for lifecycle completion or periodic habitat utilisation by native animal species on a Local scale.
Ecological context	**1**	**1**	**0**	**0**	
Size, shape and buffering	1	1	-	-	-
Sensitivity to change	-	1	-	-	Habitats are generally modified with no residual sensitive receptors.
Ecological networks (linkages, pathways, migration)	1	1	-	-	TL.3 likely utilised by TAR and Non-TAR bird species.
Combined value	**L**	**L**	**N**	**L**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

6.4 NoR KS: Kumeū Rapid Transit Station

Table 13-21 Assessment of ecological value for terrestrial ecology features for NoR KS

Attributes to be considered	KS-BF	KS-EG	KS-ES	KS-PL.1	KS-TL.2	KS-TL.3	Justification
Representativeness	**1**	**1**	**2**	**4**	**3**	**2**	
Typical structure and composition	1	1	1	2	2	2	BF, EG, ES: Habitats have been significantly altered by human activities (exotic dominated). TL.3: Habitat has been affected by human activities (exotic-dominated treeland). PL.1, TL.2: Habitat has been insignificantly affected by human activities.
Indigenous representation	1	1	2	4	3	2	BF, EG: <10% of the species are indigenous. ES, TL.3: 10-50% of the species are indigenous. TL.2: 50-90% of the species are indigenous. PL.1: >90% of the species are indigenous.
Rarity/distinctiveness	**0**	**3**	**3**	**3**	**4**	**2**	
Species of conservation significance	-	3	3	3	4	2	Long-tailed bat (Threatened – Nationally Critical, value score of 4) present and potentially using ecological features associated with the Project Area (TL.2). Long-tailed bats unlikely to use TL.3 in the context of NoR KS. Not Threatened native birds (value score of 2) likely to utilise ecological features within the Project Area (EG, ES, PL.1, TL.2, TL.3). Copper skink (At Risk - Declining, value score 3) likely to utilise ecological features within the Project Area (EG, ES, PL.1, TL.2, TL.3).
Distinctive ecological values	-	1	1	2	3	1	Scoring reflects value for native species (excluding TAR species).
Diversity and pattern	**1**	**1**	**1**	**2**	**3**	**2**	

Attributes to be considered	KS-BF	KS-EG	KS-ES	KS-PL.1	KS-TL.2	KS-TL.3	Justification
Habitat diversity	-	1	1	1	2	2	Increased habitat diversity in areas with indigenous species present: PL.1 Increased habitat diversity in areas with late succession: TL.2, TL.3
Species diversity	1	1	1	2	2	1	Increased species diversity in areas with indigenous species present: PL.1, TL.2 Increased species diversity in areas with late succession: TL.3
Patterns in habitat use	1	1	1	1	3	2	TL.2, TL.3: habitat important for lifecycle completion or periodic habitat utilisation by native animal species on a Local scale. TL.3 in the context of NoR KS is small and isolated. All other habitats are not important for lifecycle completion or periodic habitat utilisation on any scale.
Ecological context	**0**	**0**	**0**	**1**	**4**	**0**	
Size, shape and buffering	-	-	-	-	-	-	Habitat areas small in size within NoR boundary.
Sensitivity to change	-	-	-	-	4	-	TL.2: Late succession ecosystem. All other habitats are generally modified with no residual sensitive receptors.
Ecological networks (linkages, pathways, migration)	-	-	-	1	2	-	Woody structure (PL.1) and aged woody structure (TL.2, TL.3) increase steppingstone value (connecting other areas of ecological value). TL.3 in the context of NoR KS is small and isolated from ecological networks. TL.2 serves as riparian vegetation around S2-S4.
Combined value	**N**	**L**	**L**	**M**	**H**	**L**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

Table 13-22 Assessment of ecological value for terrestrial ecology features for NoR KS (fauna)

Attributes to be considered	KS-Bat	KS-Non-TAR Bird	KS-Lizard	KS-TAR Bird (Terrestrial – Very High Value)	KS-TAR Bird (Terrestrial - High Value)	KS-TAR Bird (Terrestrial - Moderate Value)	KS-TAR Bird (Wetland – Very High Value)	KS-TAR Bird (Wetland - High Value)	KS-TAR Bird (Wetland - Moderate Value)	Justification
Representativeness	**0**	**2***	**0**	**0**	**0**	**3***	**0**	**0**	**3***	
Typical structure and composition	-	-	-	-	-	3*	-	-	3*	-
Indigenous representation	-	2*	-	-	-	-	-	-	-	-
Rarity/ distinctiveness	**4**	**2**	**3**	**4**	**3**	**0**	**4**	**3**	**0**	
Species of conservation significance (fauna only)	4	2	3	4	3	-	4	3	-	-
Species of conservation significance	-	-	-	-	-	-	-	-	-	-
Distinctive ecological values	-	-	-	-	-	-	-	-	-	-
Diversity and pattern	**0**	**2***	**0**	**0**	**0**	**3***	**0**	**0**	**3***	
Habitat diversity	-	2*	-	-	-	3*	-	-	3*	-
Species diversity	-	-	-	-	-	-	-	-	-	-

Attributes to be considered	KS-Bat	KS-Non-TAR Bird	KS-Lizard	KS-TAR Bird (Terrestrial – Very High Value)	KS-TAR Bird (Terrestrial - High Value)	KS-TAR Bird (Terrestrial - Moderate Value)	KS-TAR Bird (Wetland – Very High Value)	KS-TAR Bird (Wetland - High Value)	KS-TAR Bird (Wetland - Moderate Value)	Justification
Patterns in habitat use	-	-	-	-	-	-	-	-	-	-
Ecological context	**0**	**0**	**0**	**0**	**0**	**3***	**0**	**0**	**3***	
Size, shape and buffering	-	-	-	-	-	3*	-	-	3*	-
Sensitivity to change	-	-	-	-	-	-	-	-	-	-
Ecological networks (linkages, pathways, migration)	-	-	-	-	-	-	-	-	-	-
Combined value	**VH**	**L**	**H**	**VH**	**H**	**M**	**VH**	**H**	**M**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High. * = Scores not representative of corresponding row, scores required to produce 'Low' or 'Moderate' combined value.

6.5 NoR HS: Huapai Rapid Transit Station

Table 13-23 Assessment of ecological value for terrestrial ecology features for NoR HS

Attributes to be considered	HS-BF	HS-EG	HS-ES	HS-PL.1	HS-PL.3	HS-TL.2	HS-TL.3	Justification
Representativeness	**1**	**1**	**2**	**4**	**2**	**3**	**2**	
Typical structure and composition	1	1	1	2	1	2	2	BF, EG, ES, PL.3: Habitats have been significantly altered by human activities (exotic dominated). TL.3: Habitat has been affected by human activities (exotic-dominated treeland). PL.1, TL.2: Habitat has been insignificantly affected by human activities.
Indigenous representation	1	1	2	4	2	3	2	BF, EG: <10% of the species are indigenous. ES, PL.3, TL.3: 10-50% of the species are indigenous. TL.2: 50-90% of the species are indigenous. PL.1: >90% of the species are indigenous.
Rarity/distinctiveness	**0**	**3**	**3**	**3**	**3**	**4**	**4**	
Species of conservation significance	-	3	3	3	3	4	4	Long-tailed bat (Threatened – Nationally Critical, value score of 4) present and potentially using ecological features associated with the Project Area (TL.2, TL.3). Not Threatened native birds (value score of 2) likely to utilise ecological features within the Project Area (EG, ES, PL.1, PL.3, TL.2, TL.3). Copper skink (At Risk - Declining, value score 3) likely to utilise ecological features within the Project Area (EG, ES, PL.1, PL.3, TL.2, TL.3).
Distinctive ecological values	-	1	1	2	1	3	1	Scoring reflects value for native species (excluding TAR species).
Diversity and pattern	**1**	**1**	**1**	**2**	**1**	**3**	**3**	

Attributes to be considered	HS-BF	HS-EG	HS-ES	HS-PL.1	HS-PL.3	HS-TL.2	HS-TL.3	Justification
Habitat diversity	-	1	1	1	1	2	2	Increased habitat diversity in areas with indigenous species present: PL.1 Increased habitat diversity in areas with late succession: TL.2, TL.3
Species diversity	1	1	1	2	1	2	1	Increased species diversity in areas with indigenous species present: PL.1, TL.2 Increased species diversity in areas with late succession: TL.3
Patterns in habitat use	1	1	1	1	1	3	3	TL.2, TL.3: habitat important for lifecycle completion or periodic habitat utilisation by native animal species on a Local scale. All other habitats are not important for lifecycle completion or periodic habitat utilisation on any scale.
Ecological context	**0**	**0**	**0**	**1**	**1**	**4**	**2**	
Size, shape and buffering	-	-	-	-	-	-	-	Habitat areas small in size within NoR boundary.
Sensitivity to change	-	-	-	-	-	4	-	TL.2: Late succession ecosystem. All other habitats are generally modified with no residual sensitive receptors.
Ecological networks (linkages, pathways, migration)	-	-	-	1	1	2	2	Woody structure (PL.1 and PL.3) and aged woody structure (TL.2, TL.3) increase steppingstone value (connecting other areas of ecological value).
Combined value	**N**	**L**	**L**	**M**	**L**	**H**	**M**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

Table 13-24 Assessment of ecological value for terrestrial ecology features for NoR HS (fauna)

Attributes to be considered	HS-Bat	HS-Non-TAR Bird	HS-Lizard	HS-TAR Bird (Terrestrial – Very High Value)	HS-TAR Bird (Terrestrial - High Value)	HS-TAR Bird (Terrestrial - Moderate Value)	HS-TAR Bird (Wetland – Very High Value)	HS-TAR Bird (Wetland - High Value)	HS-TAR Bird (Wetland - Moderate Value)	Justification
Representativeness	**0**	**2***	**0**	**0**	**0**	**3***	**0**	**0**	**3***	
Typical structure and composition	-	-	-	-	-	3*	-	-	3*	-
Indigenous representation	-	2*	-	-	-	-	-	-	-	-
Rarity/distinctiveness	**4**	**2**	**3**	**4**	**3**	**0**	**4**	**3**	**0**	
Species of conservation significance (fauna only)	4	2	3	4	3	-	4	3	-	-
Species of conservation significance	-	-	-	-	-	-	-	-	-	-
Distinctive ecological values	-	-	-	-	-	-	-	-	-	-
Diversity and pattern	**0**	**2***	**0**	**0**	**0**	**3***	**0**	**0**	**3***	
Habitat diversity	-	2*	-	-	-	3*	-	-	3*	-
Species diversity	-	-	-	-	-	-	-	-	-	-
Patterns in habitat use	-	-	-	-	-	-	-	-	-	-
Ecological context	**0**	**0**	**0**	**0**	**0**	**3***	**0**	**0**	**3***	

Attributes to be considered	HS-Bat	HS-Non-TAR Bird	HS-Lizard	HS-TAR Bird (Terrestrial – Very High Value)	HS-TAR Bird (Terrestrial - High Value)	HS-TAR Bird (Terrestrial - Moderate Value)	HS-TAR Bird (Wetland – Very High Value)	HS-TAR Bird (Wetland - High Value)	HS-TAR Bird (Wetland - Moderate Value)	Justification
Size, shape and buffering	-	-	-	-	-	3*	-	-	3*	-
Sensitivity to change	-	-	-	-	-	-	-	-	-	-
Ecological networks (linkages, pathways, migration)	-	-	-	-	-	-	-	-	-	-
Combined value	**VH**	**L**	**H**	**VH**	**H**	**M**	**VH**	**H**	**M**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High. * = Scores not representative of corresponding row, scores required to produce 'Low' or 'Moderate' combined value.

Table 13-25 Assessment of ecological value for terrestrial ecology features for NoR HS (District Plan vegetation)

Attributes to be considered	HS-TL.3 (District Plan)	Justification
Representativeness	**2**	
Typical structure and composition	2	TL.3: Habitat has been affected by human activities (exotic-dominated treeland).
Indigenous representation	2	TL.3: 10-50% of the species are indigenous.
Rarity/distinctiveness	**2**	

Attributes to be considered	HS-TL.3 (District Plan)	Justification
Species of conservation significance		
Species of conservation significance	2	TL.3 (District Plan), area of TL.3 located at the southern end of Meryl Avenue part of larger area of TL.3 surrounding an exotic wetland/stream complex (S2-S1). Also located approximately 250 metres west of S2-S2 and associated TL.2 habitat. Long-tailed bats were not detected in this area during ABM survey. Non-TAR birds expected to utilise this area. Potential for TAR birds to visit the area, but not frequently.
Distinctive ecological values		
Diversity and pattern	**2**	
Habitat diversity	2	TL.3: Increased habitat diversity in areas with late succession.
Species diversity	2	TL3: Increased species diversity in areas with late succession.
Patterns in habitat use	2	TL.3: Habitat important for lifecycle completion or periodic habitat utilisation by native animal species on a Local scale.
Ecological context	**1**	
Size, shape and buffering	1	
Sensitivity to change	1	Habitats are generally modified with no residual sensitive receptors.
Ecological networks (linkages, pathways, migration)	1	TL.3 likely utilised by TAR and Non-TAR bird species.
Combined value	**L**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

6.6 NoR S4: Access Road Upgrade

Table 13-26 Assessment of ecological value for terrestrial ecology features for NoR S4

Attributes to be considered	S4-BF	S4-EG	S4-ES	S4-PL.1	S4-PL.2	S4-PL.3	S4-TL.3	S4-Bat	S4-Non-TAR Bird	S4-Lizard	Justification
Representativeness	**1**	**1**	**2**	**4**	**4**	**2**	**2**	**0**	**2**	**0**	
Typical structure and composition	1	1	1	2	2	1	1	-	2	-	BF, EG, ES, PL.3, TL3: Habitats have been significantly altered by human activities (exotic dominated). PL.1, PL.2: Habitat and species have been affected by human activities
Indigenous representation	1	1	2	4	4	2	2	-	-	-	BF, EG: <10% of the species are indigenous. ES, PL.3, TL.3: 10-50% of the species are indigenous. PL.1, PL.2: >90% of the species are indigenous.
Rarity/distinctiveness	**0**	**3**	**3**	**3**	**3**	**3**	**4**	**4**	**2**	**3**	
Species of conservation significance (fauna only)	-	-	-	-	-	-	-	4	2	3	-
Species of conservation significance	-	3	3	3	3	3	4	-	-	-	Long-tailed bat (Threatened – Nationally Critical, value score of 4) present and potentially using ecological features associated with the Project Area (TL.3). TAR bird species expected to be reliant on ecological features associated with the Project Area, seasonal use by kākā would score 3 (PL.2 and TL.3). Not Threatened native birds (value score of 2) likely to utilise ecological features within the Project Area (EG, ES, PL.1, PL.2, PL.3, TL.3). Copper skink (At Risk - Declining, value score 3) likely to

Attributes to be considered	S4-BF	S4-EG	S4-ES	S4-PL.1	S4-PL.2	S4-PL.3	S4-TL.3	S4-Bat	S4-Non-TAR Bird	S4-Lizard	Justification
											utilise ecological features within the Project Area (EG, ES, PL.1, PL.2, PL.3, TL.3).
Distinctive ecological values	-	1	1	2	2	1	2	-	-	-	BF: Habitat not playing an important role in provisional or regulatory ecosystem services at any scale EG, ES PL.3: Habitat playing an important role in provisional or regulatory ecosystem services typically on local scale TL.3, PL.1, PL.2: Habitat playing an important role in provisional or regulatory ecosystem services typically on Catchment scale
Diversity and pattern	**1**	**1**	**1**	**2**	**2**	**1**	**2**	**0**	**0**	**0**	
Habitat diversity	-	1	1	1	2	1	2	-	-	-	Increased habitat diversity in areas with indigenous species present: PL.1, PL.2. Increased habitat diversity in areas with late succession: PL.2, TL.3.
Species diversity	-	1	1	2	2	1	2	-	-	-	Increased species diversity in areas with indigenous species present: PL.1, PL.2. Increased species diversity in areas with late succession: PL.2, TL.3.
Patterns in habitat use	1	1	1	1	2	1	2	-	-	-	PL.2, TL.3: habitat important for lifecycle completion or periodic habitat utilisation by native animal species on a Local scale. All other habitats are not important for lifecycle completion or periodic habitat utilisation on any scale.
Ecological context	**0**	**0**	**1**	**1**	**4**	**1**	**3**	**0**	**2**	**0**	
Size, shape and buffering	-	-	-	1	1	-	1	-	2	-	PL.2 is represented by a small shelterbelt located at 116 Access Road, approximately 350m^2.

Attributes to be considered	S4-BF	S4-EG	S4-ES	S4-PL.1	S4-PL.2	S4-PL.3	S4-TL.3	S4-Bat	S4-Non-TAR Bird	S4-Lizard	Justification
											Large area of TL.3 located at 116 Access Road which also provides riparian buffering for stream S4-S1.
Sensitivity to change	-	-	-	-	4	-	-	-	-	-	PL.2: High species diversity and late succession. All other habitats are generally modified with no residual sensitive receptors.
Ecological networks (linkages, pathways, migration)	-	-	1	1	3	1	3	-	-	-	Habitat is locally an important breeding and feeding link in terms of connectivity for the survival of species (e.g. native birds) ES, PL.1, PL.3 Habitat is regionally an important breeding and feeding link in terms of connectivity for the survival of species (woody structure (EF, EF.1, EF.2, PL.2) increase stepping stone value (connecting other areas of ecological value) Large area of TL.3 located at 116 Access Road and provides riparian buffering for stream S4-S1.
Combined value	**N**	**L**	**L**	**M**	**H**	**L**	**M**	**VH**	**L**	**H**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

Table 13-27 Assessment of ecological value for terrestrial ecology features for NoR S4 (TAR birds)

Attributes to be considered	S4-TAR Bird (Terrestrial - Moderate Value)	S4-TAR Bird (Terrestrial - High Value)	S4-TAR Bird (Terrestrial - Very High Value)	Justification
Representativeness	**3***	**0**	**0**	
Typical structure and composition	3*	-	-	-

Attributes to be considered	S4-TAR Bird (Terrestrial - Moderate Value)	S4-TAR Bird (Terrestrial - High Value)	S4-TAR Bird (Terrestrial - Very High Value)	Justification
Indigenous representation	-	-	-	-
Rarity/distinctiveness	**0**	**3**	**3**	
Species of conservation significance (fauna only)	-	3	4	Terrestrial (Moderate): North Island kākā Terrestrial (High): New Zealand pipit Terrestrial (Very High): long-tailed cuckoo Wetland (Moderate): little black shag, pied shag Wetland (High): banded rail, North Island fernbird, spotless crake Wetland (Very High): brown teal, dabchick
Species of conservation significance	-	-	-	-
Distinctive ecological values	-	-	-	-
Diversity and pattern	**3***	**0**	**0**	
Habitat diversity	3*	-	-	-
Species diversity	-	-	-	-
Patterns in habitat use	-	-	-	-
Ecological context	**3***	**0**	**0**	
Size, shape and buffering	3*	-	-	

Attributes to be considered	S4-TAR Bird (Terrestrial - Moderate Value)	S4-TAR Bird (Terrestrial - High Value)	S4-TAR Bird (Terrestrial - Very High Value)	Justification
Sensitivity to change	-	-	-	-
Ecological networks (linkages, pathways, migration)	-	-	-	-
Combined value	**M**	**H**	**VH**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High. * = Scores not representative of corresponding row, scores required to produce 'Moderate' combined value.

Table 13-28 Assessment of ecological value for terrestrial ecology features for NoR S4 (District Plan vegetation)

Attributes to be considered	S4-TL.3 (District Plan)	Justification
Representativeness	**1**	
Typical structure and composition	1	-
Indigenous representation	1	-
Rarity/distinctiveness	**2**	
Species of conservation significance	2	TL.3 to be removed from edges of approximately 0.15km2 area of treelands that is known to be utilised by long-tailed bat (calls recorded at this location during the April 2022 ABM survey) and also provides hopover connection to S4-S1. However, large amount of trees have recently already been cleared in this area by private landowners (refer image on

Attributes to be considered	S4-TL.3 (District Plan)	Justification
		right), therefore unlikely that bats will be directly killed or injured by tree removal. Other areas of TL.3 in NoR S4 are isolated and not connected to any significant ecological pathways.
Distinctive ecological values	1	-
Diversity and pattern	**1**	
Habitat diversity	1	-
Species diversity	1	-
Patterns in habitat use	1	-
Ecological context	**1**	
Size, shape and buffering	-	-
Sensitivity to change	-	-
Ecological networks (linkages, pathways, migration)	1	-
Combined value	**L**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

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Table 13-29 Assessment of ecological value for aquatic ecology features (S1-S1 to S1-S8)

Attributes to be considered	S1-S1a	S1-S1b	S1-S1c	S1-S2	S1-S3	S1-S4	S1-S5	S1-S6	S1-S7	S1-S8	Justification
Representativeness	**2**	**2**	**2**	**1**	**1**	**1**	**2**	**1**	**1**	**1**	
Riparian habitat modification	2	2	2	1	1	1	2	1	1	1	S1-S1 (Ahukuramu Stream) RHA total score is 40-70% relative to reference. S1-S2 and S1-S3 RHA total scores are <40%. S1-S4, S1-S6, S1-S7 and S1-S8 riparian features have been significantly altered by agricultural/horticultural activities (desktop assessment). S1-S5 riparian features have been affected by agricultural/horticultural activities (desktop assessment).
Rarity/distinctiveness	**3**	**3**	**3**	**3**	**1**	**1**	**3**	**1**	**1**	**1**	
Species of conservation significance	3	3	3	3	1	1	3	1	1	1	Torrentfish (At Risk - Declining) (via desktop) and Īnanga (At Risk - Declining) and unidentified eels (onsite observations) identified in S1-S1 (Ahukuramu Stream). Longfin eel (At Risk - Declining) were identified via desktop in wider catchment and there is a high likelihood that this species utilises permanent streams (S1-S2 and S1-S5) in the area. Common native species were identified via desktop in wider catchment.
Diversity and pattern	**2**	**2**	**2**	**1**	**1**	**1**	**2**	**1**	**1**	**2**	
Level of natural diversity	2	2	2	1	1	1	2	1	1	2	S1-S1a instream RHA score = 23 S1-S1b instream RHA score = 22 S1-S1c instream RHA score = 17

Attributes to be considered	S1-S1a	S1-S1b	S1-S1c	S1-S2	S1-S3	S1-S4	S1-S5	S1-S6	S1-S7	S1-S8	Justification
											S1-S5 instream desktop proxy = SS, P, LO1, LG, perm S1-S8 instream desktop proxy = SS, P, LO1, MG, intermit Zero Order streams have low natural diversity.
Ecological context	**4**	**4**	**4**	**4**	**3**	**3**	**4**	**3**	**3**	**3**	
Stream order	3	3	3	1	1	1	2	1	1	2	S1-S1 (Ahukuramu Stream) is an Order 3 stream. S1-S5 & S1-S8 are Order 1 streams, all others are Zero Order streams.
Hydroperiod	4	4	4	4	3	3	4	3	3	3	S1-S1 (Ahukuramu Stream), S1-S2 and S1-S5 are permanent streams, all others are intermittent streams.
Combined value	**M**	**(M) H***	**M**	**M**	**L**	**L**	**M**	**L**	**L**	**L**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High. * = Combined ecological value has been increased irrespective of initial value scores due to the ecological context in relation to buffer function, connectivity to SEAs, and are considered to be important ecological corridors.

Table 13-30 Assessment of ecological value for aquatic ecology features (S1-S9 to S1-S18)

Attributes to be considered	S1-S9	S1-S10	S1-S11	S1-S13	S1-S14	S1-S15	S1-S16	S1-S17	S1-S18	Justification
Representativeness	**1**	**1**	**2**	**1**	**1**	**2**	**1**	**2**	**2**	
Riparian habitat modification	1	1	2	1	1	2	1	2	2	S1-S11 and S1-S17 (Kumeu River) RHA total scores are 40-70% relative to reference. S1-S9, S1-S10, S1-S12 and S1-S14 RHA total scores are <40% relative to reference.

Attributes to be considered	S1-S9	S1-S10	S1-S11	S1-S13	S1-S14	S1-S15	S1-S16	S1-S17	S1-S18	Justification
										S1-S13 and S1-S16 riparian features have been significantly altered by agricultural/horticultural activities (desktop assessment). S1-S15 and S1-S18 (Pakinui Stream) riparian features have been affected by agricultural/horticultural activities (including culverting at S1-S15) (desktop assessment).
Rarity/distinctiveness	**1**	**1**	**3**	**1**	**1**	**3**	**1**	**3**	**3**	
Species of conservation significance	1	1	3	1	1	3	1	3	3	Īnanga (At Risk - Declining), Longfin eel (At Risk - Declining) (via desktop), Echyridella menziesii (At Risk - Declining) (onsite observation) identified at S1-S17 (Kumeu River). Longfin eel (At Risk - Declining) were identified via desktop in wider catchment and there is a high likelihood that this species utilises permanent streams in the area - S1-S11, S1-S15, S1-S17 (Kumeu River) and S1-S18 (Pakinui Stream). Common native species were identified via desktop in wider catchment.
Diversity and pattern	**1**	**1**	**3**	**1**	**1**	**2**	**1**	**3**	**2**	
Level of natural diversity	1	1	3	1	1	2	1	3	2	S1-S11 instream RHA score = 26 S1-S15 instream desktop proxy = SS, P, MO2, LG, permanent S1-17 (Kumeu River) instream RHA score = 33 S1-S18 (Pakinui Stream) instream desktop proxy = SS, P, M02, LG, permanent Zero Order streams have low natural diversity.
Ecological context	**3**	**3**	**4**	**3**	**3**	**4**	**3**	**4**	**4**	
Stream order	1	1	2	1	1	3	1	4	3	S1-S17 (Kumeu River) is an Order 4 stream. S1-S18 (Pakinui Stream) is an Order 3 stream. S1-S15 is an Order 2 stream.

Attributes to be considered	S1-S9	S1-S10	S1-S11	S1-S13	S1-S14	S1-S15	S1-S16	S1-S17	S1-S18	Justification
										S1-S11 is an Order 1 stream. All others are Zero Order streams.
Hydroperiod	3	3	4	3	3	4	3	4	4	S1-S11, S1-S15, S1-S17 (Kumeu River) and S1-S18 (Pakinui Stream) are permanent streams, all others are intermittent streams.
Combined value	**L**	**L**	**M**	**L**	**L**	**M**	**L**	**(M) H***	**M**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High. * = Combined ecological value has been increased irrespective of initial value scores due to the ecological context in relation to buffer function, connectivity to SEAs, and are considered to be important ecological corridors.

Table 13-31 Assessment of ecological value for aquatic ecology features (S1-S19 to S1-S24)

Attributes to be considered	S1-S19	S1-S20a	S1-S20d	S1-S20e	S1-S21	S1-S22	S1-S23	S1-S24	Justification
Representativeness	**1**	**2**	**2**	**2**	**2**	**2**	**1**	**1**	
Riparian habitat modification	1	2	2	2	2	2	1	1	S1-S20a, S1-S20d, S1-S20e, S1-S21 and S1-S22 (Karure Stream) RHA scores are 40-70% relative to reference. S1-S19, S1-S23 and S1-S24 (Ngongetepara Stream) RHA total scores are <40% relative to reference.
Rarity/distinctiveness	**1**	**3**	**1**	**1**	**3**	**3**	**1**	**3**	

Attributes to be considered	S1-S19	S1-S20a	S1-S20d	S1-S20e	S1-S21	S1-S22	S1-S23	S1-S24	Justification
Species of conservation significance	1	3	1	1	3	3	1	3	Longfin eel (At Risk - Declining) (via desktop) identified at S1-S24 (Ngongetepara Stream). Longfin eel (At Risk - Declining) were identified via desktop in wider catchment and there is a high likelihood that this species utilises permanent streams in the area - S1-S20a, S1-S21, S1-S22 (Karure Stream) and S1-S24 (Ngongetepara Stream). Common native species were identified via desktop in wider catchment.
Diversity and pattern	**1**	**1**	**1**	**1**	**2**	**4**	**1**	**2**	
Level of natural diversity	1	1	1	1	2	4	1	2	S1-S20d instream RHA score = 12 S1-S21 instream RHA score = 15 S1-S22 (Karure Stream) instream RHA score = 38 S1-S24 (Ngongetepara Stream) instream RHA score = 16 Zero Order streams have low natural diversity.
Ecological context	**3**	**4**	**3**	**3**	**4**	**4**	**3**	**4**	
Stream order	1	1	2	1	2	2	1	3	S1-S24 (Ngongetepara Stream is an Order 3 stream. S1-S20d, S1-S21 and S1-S22 (Karure Stream) are Order 1 streams. All other streams are Zero Order.
Hydroperiod	3	4	3	3	4	4	3	4	S1-S20a, S1-S21, S1-S22 (Karure Stream) and S1-S24 (Ngongetepara Stream) are permanent streams, all others are intermittent streams.
Combined value	**L**	**M**	**L**	**L**	**M**	**H**	**L**	**(M) H***	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High. * = Combined ecological value has been increased irrespective of initial value scores due to the ecological context in relation to buffer function, connectivity to SEAs, and are considered to be important ecological corridors.

Table 13-32 Assessment of ecological value for aquatic ecology features (S1-S25 to S2-S6)

Attributes to be considered	S1-S25	S1-S26	S1-S27	S1-S28	S1-S29	S2-S1	S2-S2	S2-S3	S2-S4	S2-S5	S2-S6	Justification
Representativeness	**1**	**1**	**1**	**1**	**2**	**1**	**2**	**1**	**1**	**2**	**2**	
Riparian habitat modification	1	1	1	1	2	1	2	1	1	2	2	S2-S2, S2-S5 (Kumeu River) and S2-S6 RHA scores are 40-70% relative to reference. S1-S26, S1-S28, S2-S1, S2-S3 and S2-S4 RHA total scores <40% relative to reference. S1-S25 and S1-S27 riparian features have been significantly altered by agricultural/horticultural activities (desktop assessment). S1-S29: riparian features have been altered by human activities (desktop assessment).
Rarity/distinctiveness	**1**	**1**	**1**	**1**	**3**	**1**	**3**	**3**	**3**	**3**	**3**	
Species of conservation significance	1	1	1	1	3	1	3	3	3	3	3	Īnanga (At Risk - Declining) and Longfin eel (At Risk - Declining) identified at S2-S5 (Kumeu River). Longfin eel (At Risk - Declining) were identified via desktop in wider catchment and there is a high likelihood that this species utilises permanent streams in the area - S2-S2 to S2-S6. S1-S29: Īnanga (At Risk - Declining) and Longfin eel (At Risk - Declining) (via desktop) identified upstream (Totara Creek). Common native species were identified via desktop in wider catchment.
Diversity and pattern	**2**	**1**	**1**	**1**	**2**	**1**	**3**	**1**	**2**	**2**	**2**	

Attributes to be considered	S1-S25	S1-S26	S1-S27	S1-S28	S1-S29	S2-S1	S2-S2	S2-S3	S2-S4	S2-S5	S2-S6	Justification
Level of natural diversity	2	1	1	1	2	1	3	1	2	2	2	S1-S25 instream desktop proxy = SS, P, LO1, LG, intermittent S1-S29 instream desktop proxy = SS, P, LO1, LG, intermittent. S2-S1 instream RHA score = 9 S2-S2 instream RHA score = 28 S2-S4 instream RHA score = 14 S2-S5 (Kumeu River) instream RHA score = 19 S2-S6 instream RHA score = 14 Zero Order streams have low natural diversity.
Ecological context	**3**	**3**	**3**	**3**	**3**	**3**	**4**	**4**	**4**	**4**	**4**	
Stream order	2	1	1	1	2	2	3	1	3	4	3	S2-S5 (Kumeu River) is an Order 4 stream. S2-S4 is an Order 3 stream. S2-S2 and S2-S6 are Order 2 streams. S1-S25, S1-S29, and S2-S1 are Order 1 streams. All other streams are Zero Order streams.
Hydroperiod	3	3	3	3	3	3	4	4	4	4	4	S2-S2 to S2-S6 are permanent streams, all others are intermittent streams.
Combined value	**L**	**L**	**L**	**L**	**M**	**L**	**M**	**M**	**H***	**H***	**M**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High. * = Combined ecological value has been increased irrespective of initial value scores due to the ecological context in relation to buffer function, connectivity to SEAs, and are considered to be important ecological corridors. Additionally, S2-S4 is considered to be of high cultural value.

Table 13-33 Assessment of ecological value for aquatic ecology features for (S4-S1, W3-S1, and W4-S1)

Attributes to be considered	S4-S1	W3-S1	W4-S1	Justification
Representativeness	**2**	**2**	**3**	
Riparian habitat modification	2	2	3	S4-S1 RHA score is 40-70% relative to reference. W3-S1 RHA score is 40-70% relative to reference. Riparian features of streams W4-S1 have been insignificantly affected by human activities.
Rarity/distinctiveness	**3**	**3**	**3**	
Species of conservation significance	3	3	3	Longfin eel (At Risk - Declining) was identified via desktop in wider catchment and there is a high likelihood that this species utilises S4-S1 in the area. Īnanga (At Risk - Declining) and Longfin eel (At Risk - Declining) (via desktop) identified at W3-S1 and W4-S1. Common native species were identified via desktop in wider catchment.
Diversity and pattern	**2**	**2**	**2**	
Level of natural diversity	2	2	2	S4-S1 instream RHA score = 21 W3-S1 instream RHA score = 24

Attributes to be considered	S4-S1	W3-S1	W4-S1	Justification
				W4-S1 is an Order 3 stream.
Ecological context	**4**	**4**	**4**	
Stream order	3	3	3	S4-S1 is an Order 3 stream. W3-S1 (Totara Creek) is an Order 3 stream. W4-S1 is an Order 3 stream.
Hydroperiod	4	4	4	S4-S1 is a permanent stream. W3-S1 (Totara Creek) and W4-S1 are permanent streams.
Combined value	**M**	**(M) H***	**(M) H***	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High. * = Combined ecological value has been increased irrespective of initial value scores due to the ecological context in relation to buffer function, connectivity to SEAs, and are considered to be important ecological corridors.

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Table 13-34 Assessment of ecological value for wetland ecology features (S1-W1 to S1-W10)

Attributes to be considered	S1-W1	S1-W2	S1-W3	S1-W4	S1-W5	S1-W6	S1-W7	S1-W8	S1-W9	S1-W10	Justification
Representativeness	**1**	**1**	**1**	**1**	**4**	**4**	**4**	**1**	**1**	**4**	
Hydrological modification	1	1	1	1	4	4	4	1	1	4	-
Rarity/distinctiveness	**1**	**1**	**1**	**1**	**2**	**2**	**4**	**1**	**1**	**4**	
Species of conservation significance	1	1	1	1	2	2	2	1	1	2	S1-W5, S1-W6, S1-W7: potential spotless crake habitat.
Vegetation type of conservation significance	-	-	-	-	1	1	4	-	-	4	S1-W5, S1-W6: planted natives. S1-W7, S1-W10: WL11 (critically endangered *machaerina* sedgeland).
Diversity and pattern	**1**	**2**	**1**	**4**	**4**	**4**	**2**	**1**	**2**	**4**	
Diversity of habitat types	1	2	1	4	4	4	2	1	2	4	-
Ecological context	**2**	**2**	**2**	**3**	**3**	**3**	**2**	**2**	**2**	**4**	
Flood attenuation	1	2	1	2	2	2	1	1	1	2	-
Streamflow augmentation	1	2	1	2	2	2	2	1	1	4	-
Sediment trapping	1	2	1	2	2	2	1	1	1	2	-

Attributes to be considered	S1-W1	S1-W2	S1-W3	S1-W4	S1-W5	S1-W6	S1-W7	S1-W8	S1-W9	S1-W10	Justification
Water purification	2	2	2	3	3	3	1	2	2	3	-
Combined value	**L**	**L**	**L**	**M**	**H**	**H**	**M**	**L**	**L**	**VH**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

Table 13-35 Assessment of ecological value for wetland ecology features (S1-W11 to S1-W20)

Attributes to be considered	S1-W11	S1-W12	S1-W13	S1-W14	S1-W15	S1-W16	S1-W17	S1-W18	S1-W19	S1-W20	Justification
Representativeness	**4**	**1**	**1**	**1**	**4**	**1**	**1**	**1**	**4**	**1**	
Hydrological modification	4	1	1	1	4	1	1	1	4	1	-
Rarity/distinctiveness	**4**	**1**	**1**	**1**	**4**	**2**	**1**	**1**	**4**	**1**	
Species of conservation significance	2	1	1	1	2	2	1	1	2	1	-
Vegetation type of conservation significance	4	-	-	-	4	-	-	-	4	-	S1-W11, S1-W15, S1-W19: WL11 (critically endangered *machaerina* sedgeland).
Diversity and pattern	**4**	**2**	**3**	**3**	**4**	**4**	**2**	**4**	**4**	**4**	
Diversity of habitat types	4	2	3	3	4	4	2	4	4	4	-

Attributes to be considered	S1-W11	S1-W12	S1-W13	S1-W14	S1-W15	S1-W16	S1-W17	S1-W18	S1-W19	S1-W20	Justification
Ecological context	**3**	**3**	**3**	**3**	**3**	**4**	**2**	**3**	**3**	**4**	
Flood attenuation	2	1	1	1	2	3	1	2	3	3	-
Streamflow augmentation	3	3	2	2	3	4	2	3	3	3	-
Sediment trapping	2	1	3	3	2	2	2	2	3	3	-
Water purification	3	2	2	2	3	2	2	3	3	4	-
Combined value	**H**	**L**	**L**	**L**	**H**	**M**	**L**	**M**	**H**	**M**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

Table 13-36 Assessment of ecological value for wetland ecology features (S1-W31 to S1-W40)

Attributes to be considered	S1-W31	S1-W32	S1-W33	S1-W34	S1-W36	S1-W37	S1-W38	S1-W39	S1-W40	Justification
Representativeness	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**4**	
Hydrological modification	1	1	1	1	1	1	1	1	4	-
Rarity/distinctiveness	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**4**	
Species of conservation significance	1	1	1	1	1	1	1	1	2	-

Attributes to be considered	S1-W31	S1-W32	S1-W33	S1-W34	S1-W36	S1-W37	S1-W38	S1-W39	S1-W40	Justification
Vegetation type of conservation significance	-	-	-	-	-	-	-	-	4	S1-W40: WL11 (critically endangered *machaerina* sedgeland).
Diversity and pattern	**1**	**4**	**2**	**2**	**1**	**1**	**3**	**3**	**3**	
Diversity of habitat types	1	4	2	2	1	1	3	3	3	-
Ecological context	**2**	**3**	**2**	**2**	**2**	**2**	**3**	**2**	**2**	
Flood attenuation	1	3	1	1	1	1	2	2	2	-
Streamflow augmentation	2	3	2	1	1	2	1	2	2	-
Sediment trapping	1	1	2	2	1	1	3	2	2	-
Water purification	2	3	2	2	2	2	2	2	2	-
Combined value	**L**	**M**	**L**	**L**	**L**	**L**	**L**	**L**	**H**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

Table 13-37 Assessment of ecological value for wetland ecology features (S1-W41 to S1-W50)

Attributes to be considered	S1-W41	S1-W42	S1-W43	S1-W44	S1-W45	S1-W46	S1-W47	S1-W48	S1-W49	S1-W50	Justification
Representativeness	**1**	**1**	**1**	**4**	**1**	**1**	**1**	**1**	**1**	**1**	
Hydrological modification	1	1	1	4	1	1	1	1	1	1	-
Rarity/distinctiveness	**1**	**1**	**2**	**4**	**2**	**2**	**1**	**1**	**1**	**1**	
Species of conservation significance	1	1	2	1	2	2	1	1	1	1	S1-W43, S1-W45, S1-W46: Potential for spotless crake and dabchick.
Vegetation type of conservation significance	-	-	-	4	-	-	-	-	-	-	S1-W44: WL11 (critically endangered *machaerina* sedgeland).
Diversity and pattern	**4**	**3**	**2**	**2**	**1**	**4**	**3**	**1**	**1**	**3**	
Diversity of habitat types	4	3	2	2	1	4	3	1	1	3	-
Ecological context	**3**	**2**	**2**	**2**	**2**	**4**	**3**	**1**	**1**	**2**	
Flood attenuation	2	2	1	1	1	4	2	1	1	2	-
Streamflow augmentation	3	1	2	2	2	4	3	1	1	2	-
Sediment trapping	3	2	2	2	2	3	3	1	1	2	-
Water purification	3	2	2	2	2	3	2	1	1	2	-

Attributes to be considered	S1-W41	S1-W42	S1-W43	S1-W44	S1-W45	S1-W46	S1-W47	S1-W48	S1-W49	S1-W50	Justification
Combined value	**M**	**L**	**L**	**M**	**L**	**M**	**L**	**N**	**N**	**L**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

Table 13-38 Assessment of ecological value for wetland ecology features (S1-W51 to S1-W60)

Attributes to be considered	S1-W51	S1-W53	S1-W54	S1-W55	S1-W56	S1-W57	S1-W58	S1-W59	S1-W60	Justification
Representativeness	**4**	**4**	**4**	**4**	**1**	**2**	**2**	**2**	**2**	
Hydrological modification	4	4	4	4	1	2	2	2	2	-
Rarity/distinctiveness	**2**	**2**	**2**	**2**	**1**	**3**	**2**	**3**	**2**	
Species of conservation significance	2	2	2	2	1	3	2	3	2	S1-W57: likely dabchick and spotless crake.
Vegetation type of conservation significance	2	2	2	2	1	2	1	1	1	S1-W51 to S1-W55: planted natives.
Diversity and pattern	**2**	**4**	**2**	**3**	**1**	**3**	**1**	**1**	**1**	
Diversity of habitat types	2	4	2	3	1	3	1	1	1	-

Attributes to be considered	S1-W51	S1-W53	S1-W54	S1-W55	S1-W56	S1-W57	S1-W58	S1-W59	S1-W60	Justification
Ecological context	**3**	**3**	**2**	**2**	**2**	**3**	**2**	**2**	**2**	
Flood attenuation	2	3	2	2	1	3	2	2	2	-
Streamflow augmentation	3	3	2	2	2	3	2	2	2	-
Sediment trapping	2	2	2	2	1	2	2	2	2	-
Water purification	2	2	2	2	1	2	2	2	2	-
Combined value	**M**	**H**	**M**	**M**	**L**	**M**	**L**	**L**	**L**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

Table 13-39 Assessment of ecological value for wetland ecology features (S1-W61 to S1-W69)

Attributes to be considered	S1-W61	S1-W62	S1-W63	S1-W64	S1-W65	S1-W66	S1-W67	S1-W68	S1-W69	Justification
Representativeness	**2**	**2**	**2**	**2**	**2**	**1**	**1**	**1**	**4**	
Hydrological modification	2	2	2	2	2	1	1	1	4	-
Rarity/distinctiveness	**3**	**3**	**3**	**3**	**1**	**3**	**1**	**1**	**1**	
Species of conservation significance	3	3	3	3	1	3	1	1	1	S1-W67: likely to support dabchick.

Attributes to be considered	S1-W61	S1-W62	S1-W63	S1-W64	S1-W65	S1-W66	S1-W67	S1-W68	S1-W69	Justification
Vegetation type of conservation significance	1	1	1	1	1	1	-	-	1	-
Diversity and pattern	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**2**	
Diversity of habitat types	1	1	1	1	1	1	1	1	2	-
Ecological context	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	
Flood attenuation	2	2	2	2	2	2	1	1	2	-
Streamflow augmentation	2	2	2	2	2	2	2	2	2	-
Sediment trapping	2	2	2	2	2	2	2	2	2	-
Water purification	2	2	2	2	2	2	2	2	2	-
Combined value	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**M**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

Table 13-40 Assessment of ecological value for wetland ecology features (S1-W70 to S1-W72)

Attributes to be considered	S1-W70	S1-W71	S1-W72	Justification
Representativeness	**1**	**1**	**1**	

Attributes to be considered	S1-W70	S1-W71	S1-W72	Justification
Hydrological modification	1	1	1	-
Rarity/distinctiveness	**1**	**1**	**0**	
Species of conservation significance	2	1	-	S1-W70 may support TAR birds.
Vegetation type of conservation significance	-	-	-	-
Diversity and pattern	**2**	**1**	**1**	
Diversity of habitat types	2	1	1	-
Ecological context	**1**	**1**	**1**	
Flood attenuation	1	1	1	-
Streamflow augmentation	1	1	1	-
Sediment trapping	1	1	1	-
Water purification	1	1	1	-
Combined value	**N**	**N**	**N**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

Table 13-41 Assessment of ecological value for wetland ecology features (S2-W1 to S2-W10)

Attributes to be considered	S2-W1	S2-W2	S2-W3	S2-W4	S2-W5	S2-W6	S2-W7	S2-W8	S2-W9	S2-W10	Justification
Representativeness	**1**	**4**	**3**	**1**	**1**	**1**	**2**	**2**	**4**	**2**	
Hydrological modification	1	4	3	1	1	1	2	2	4	2	-
Rarity/distinctiveness	**1**	**2**	**1**	**1**	**2**	**1**	**1**	**2**	**4**	**1**	
Species of conservation significance	1	2	1	1	2	1	1	2	2	1	S2-W2, S2-W5, S2-W8, S2-W9: potential for TAR birds.
Vegetation type of conservation significance	-	1	1	-	-	-	-	-	4	-	S2-W2, S2-W3, S2-W10: planted natives. S2-W9: WL19 - Raupō reedland (endangered).
Diversity and pattern	**2**	**4**	**3**	**1**	**3**	**1**	**2**	**3**	**3**	**1**	
Diversity of habitat types	2	4	3	1	3	1	2	3	3	1	-
Ecological context	**2**	**3**	**3**	**2**	**2**	**2**	**3**	**3**	**2**	**2**	
Flood attenuation	1	3	3	1	2	1	2	3	2	2	-
Streamflow augmentation	2	2	2	1	2	1	3	2	2	1	-
Sediment trapping	1	2	2	1	2	1	2	2	2	2	-
Water purification	2	3	2	2	2	2	2	2	2	2	-

Attributes to be considered	S2-W1	S2-W2	S2-W3	S2-W4	S2-W5	S2-W6	S2-W7	S2-W8	S2-W9	S2-W10	Justification
Combined value	**L**	**H**	**M**	**L**	**L**	**L**	**L**	**M**	**H**	**L**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

Table 13-42 Assessment of ecological value for wetland ecology features (S2-W11 to S2-W16)

Attributes to be considered	S2-W11	S2-W12	S2-W12a	S2-W13	S2-W14	S2-W15	S2-W16	S2-W16a	Justification
Representativeness	**1**	**2**	**2**	**2**	**1**	**2**	**2**	**1**	-
Hydrological modification	1	2	2	2	1	2	2	1	-
Rarity/distinctiveness	**1**	**2**	**2**	**4**	**1**	**2**	**2**	**0**	-
Species of conservation significance	1	2	2	2	1	1	2	-	S2-W12, S2-W12a, S2-W13, S2-W16: potential for TAR wetland birds. S2-16a: artificial pond surrounded by urban area.
Vegetation type of conservation significance	-	-	-	4	-	2	-	-	S2-W15: planted natives. S2-W13: WL19 - Raupō reedland (endangered).
Diversity and pattern	**2**	**3**	**1**	**2**	**1**	**2**	**1**	**1**	-
Diversity of habitat types	2	3	1	2	1	2	1	1	-

Attributes to be considered	S2-W11	S2-W12	S2-W12a	S2-W13	S2-W14	S2-W15	S2-W16	S2-W16a	Justification
Ecological context	**2**	**3**	**4**	**2**	**1**	**2**	**2**	**1**	-
Flood attenuation	2	3	4	2	1	2	2	1	-
Streamflow augmentation	2	1	4	1	1	2	1	1	-
Sediment trapping	2	2	2	2	1	2	2	1	-
Water purification	2	2	2	2	1	2	2	1	-
Combined value	**L**	**M**	**M**	**M**	**N**	**L**	**L**	**N**	-

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

Table 13-43 Assessment of ecological value for wetland ecology features (S4-W1)

Attributes to be considered	S4-W1	Justification
Representativeness	**1**	
Hydrological modification	1	-
Rarity/distinctiveness	**1**	
Species of conservation significance	1	-
Vegetation type of conservation significance	-	-
Diversity and pattern	**1**	

Attributes to be considered	S4-W1	Justification
Diversity of habitat types	1	-
Ecological context	**2**	
Flood attenuation	1	-
Streamflow augmentation	1	-
Sediment trapping	1	-
Water purification	2	-
Combined value	**L**	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

9 Appendix 9 – Impact Assessment

NoR S1													
Phase	Project Activity	Resource	Ecological Value	Main Effect Description	Detailed Effect Description	Type	Extent (ZOI)	Duration	Frequency	Likelihood	Reversibility	Magnitude (pre-mitigation)	Level of Effect (pre-mitigation)
Construction	Lighting and noise	S1-Bat	Very High	Construction- Bats	Disturbance and displacement of (new and existing) roosts and individuals due to lighting and noise/vibration	Indirect	Local	Short-term (<5 years)	Frequently	Highly Likely	Totally	Low	Moderate
Operation	Presence of the road	S1-Bat	Very High	Operation- Bats	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Regional	Permanent (>25 years)	Continuously	Highly Likely	Irreversible	High	Very High
Operation	Lighting and noise	S1-Bat	Very High	Operation- Bats	Disturbance and displacement of (new and existing) roosts and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)	Continuously	Highly Likely	Irreversible	Moderate	High
Construction	Lighting and noise	S1-Non-TAR Bird	Low	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Frequently	Definite	Totally	Moderate	Low
Operation	Presence of the road	S1-Non-TAR Bird	Low	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)	Continuously	Definite	Irreversible	High	Low
Operation	Lighting and noise	S1-Non-TAR Bird	Low	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)	Continuously	Definite	Irreversible	High	Low
Construction	Lighting and noise	S1-Lizard	High	Construction- Herpetofauna	Disturbance and displacement of individuals (existing) due to construction activities (noise, dust etc.)	Indirect	Local	Short-term (<5 years)	Frequently	Highly Likely	Totally	Low	Low
Operation	Presence of the road	S1-Lizard	High	Operation- Herpetofauna	Loss in connectivity due to permanent habitat loss, light and noise/vibration effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)	Continuously	Likely	Irreversible	Low	Low
Operation	Lighting and noise	S1-Lizard	High	Operation- Herpetofauna	Disturbance of nocturnal lizard behaviour due to lighting associated with the infrastructure use	Indirect	Local	Permanent (>25 years)	Continuously	Likely	Irreversible	Low	Low
Construction	Lighting and noise	S1-TAR Bird (Terrestrial - Moderate Value)	Moderate	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Frequently	Unlikely		Negligible	Very Low
Construction	Lighting and noise	S1-TAR Bird (Terrestrial - High Value)	High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Frequently	Unlikely		Negligible	Very Low
Construction	Lighting and noise	S1-TAR Bird (Terrestrial - Very High Value)	Very High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Frequently	Unlikely		Negligible	Low
Construction	Lighting and noise	S1-TAR Bird (Wetland - Moderate Value)	Moderate	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Unlikely		Negligible	Very Low
Construction	Lighting and noise	S1-TAR Bird (Wetland - High Value)	High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Likely		Low	Low
Construction	Lighting and noise	S1-TAR Bird (Wetland - Very High Value)	Very High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Frequently	Likely		Low	Moderate
Operation	Presence of the road	S1-TAR Bird (Terrestrial - Moderate Value)	Moderate	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Regional	Permanent (>25 years)		Unlikely		Low	Low
Operation	Presence of the road	S1-TAR Bird (Terrestrial - High Value)	High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Regional	Permanent (>25 years)		Unlikely		Low	Low
Operation	Presence of the road	S1-TAR Bird (Terrestrial - Very High Value)	Very High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Regional	Permanent (>25 years)		Unlikely		Low	Moderate
Operation	Presence of the road	S1-TAR Bird (Wetland - Moderate Value)	Moderate	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)		Likely		Low	Low
Operation	Presence of the road	S1-TAR Bird (Wetland - High Value)	High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)		Likely		Low	Low
Operation	Presence of the road	S1-TAR Bird (Wetland - Very High Value)	Very High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)		Likely		Low	Moderate
Operation	Presence of the road	S1-TAR Bird (Terrestrial - Moderate Value)	Moderate	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Operation	Presence of the road	S1-TAR Bird (Terrestrial - High Value)	High	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Operation	Presence of the road	S1-TAR Bird (Terrestrial - Very High Value)	Very High	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Operation	Presence of the road	S1-TAR Bird (Wetland - Moderate Value)	Moderate	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Operation	Presence of the road	S1-TAR Bird (Wetland - High Value)	High	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Likely		Low	Low
Operation	Presence of the road	S1-TAR Bird (Wetland - Very High Value)	Very High	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Likely		Low	Moderate
Construction	Vegetation removal	S1-EF (District Plan)	Moderate	Construction- Terrestrial habitat	Permanent loss of habitat/ecosystem, fragmentation and edge effects due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S1-TL.2 (District Plan)	Moderate	Construction- Terrestrial habitat	Permanent loss of habitat/ecosystem, fragmentation and edge effects due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Likely		Low	Low
Construction	Vegetation removal	S1-TL.3 (District Plan)	Moderate	Construction- Terrestrial habitat	Permanent loss of habitat/ecosystem, fragmentation and edge effects due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Likely		Low	Low
Construction	Vegetation removal	S1-Bat	Very High	Construction- Bats	Kill or injure individual bats due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Likely		Low	Moderate
Construction	Vegetation removal	S1-TAR Bird (Terrestrial - High Value)	High	Construction- Birds	Kill or injure individual due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S1-TAR Bird (Terrestrial - Moderate Value)	Moderate	Construction- Birds	Kill or injure individual due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S1-Non-TAR Bird	Low	Construction- Birds	Kill or injure individual due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Highly Likely		Moderate	Low
Construction	Vegetation removal	S1-Bat	Very High	Construction- Bats	Roost loss through vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Construction	Vegetation removal	S1-TAR Bird (Terrestrial - High Value)	High	Construction- Birds	Nest loss due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S1-TAR Bird (Terrestrial - Moderate Value)	Moderate	Construction- Birds	Nest loss due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S1-Non-TAR Bird	Low	Construction- Birds	Nest loss due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Highly Likely		Moderate	Low
Construction	Vegetation removal	S1-Bat	Very High	Construction- Bats	Roost loss through vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Construction	Vegetation removal	S1-TAR Bird (Terrestrial - High Value)	High	Construction- Birds	Nest loss due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S1-TAR Bird (Terrestrial - Moderate Value)	Moderate	Construction- Birds	Nest loss due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S1-Non-TAR Bird	Low	Construction- Birds	Nest loss due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Highly Likely		Moderate	Low
Construction	Vegetation removal	S1-Bat	Very High	Construction- Bats	Loss of foraging habitat due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Construction	Vegetation removal	S1-TAR Bird (Terrestrial - High Value)	High	Construction- Birds	Loss of foraging habitat due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S1-TAR Bird (Terrestrial - Moderate Value)	Moderate	Construction- Birds	Loss of foraging habitat due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S1-Non-TAR Bird	Low	Construction- Birds	Loss of foraging habitat due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Highly Likely		Moderate	Low

NoR S2													
Phase	Project Activity	Resource	Ecological Value	Main Effect Description	Detailed Effect Description	Type	Extent (ZOI)	Duration	Frequency	Likelihood	Reversibility	Magnitude (pre-mitigation)	Level of Effect (pre-mitigation)
Construction	Lighting and noise	S2-Bat	Very High	Construction- Bats	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Unlikely	Totally	Negligible	Low
Operation	Presence of the road	S2-Bat	Very High	Operation- Bats	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Regional	Permanent (>25 years)	Continuously	Unlikely	Irreversible	Low	Moderate
Operation	Lighting and noise	S2-Bat	Very High	Operation- Bats	Disturbance and displacement of (new and existing) roosts and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)	Infrequently	Unlikely	Totally	Negligible	Low
Construction	Lighting and noise	S2-Non-TAR Bird	Low	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Highly Likely	Totally	Moderate	Low
Operation	Presence of the road	S2-Non-TAR Bird	Low	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)	Continuously	Likely	Totally	Low	Very Low
Operation	Lighting and noise	S2-Non-TAR Bird	Low	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)	Continuously	Likely	Irreversible	Low	Very Low
Construction	Lighting and noise	S2-Lizard	High	Construction- Herpetofauna	Disturbance and displacement of individuals (existing) due to construction activities (noise, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Unlikely	Totally	Negligible	Very Low
Operation	Presence of the road	S2-Lizard	High	Operation- Herpetofauna	Loss in connectivity due to permanent habitat loss, light and noise/vibration effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)	Continuously	Unlikely	Irreversible	Low	Low
Operation	Lighting and noise	S2-Lizard	High	Operation- Herpetofauna	Disturbance of nocturnal lizard behaviour due to lighting associated with the infrastructure use	Indirect	Local	Permanent (>25 years)	Continuously	Likely	Totally	Low	Low
Construction	Lighting and noise	S2-TAR Bird (Terrestrial - Moderate Value)	Moderate	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Unlikely		Negligible	Very Low
Construction	Lighting and noise	S2-TAR Bird (Terrestrial - High Value)	High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Unlikely		Negligible	Very Low
Construction	Lighting and noise	S2-TAR Bird (Terrestrial - Very High Value)	Very High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Unlikely		Negligible	Low
Construction	Lighting and noise	S2-TAR Bird (Wetland - Moderate Value)	Moderate	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Unlikely		Negligible	Very Low
Construction	Lighting and noise	S2-TAR Bird (Wetland - High Value)	High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Likely		Low	Low
Construction	Lighting and noise	S2-TAR Bird (Wetland - Very High Value)	Very High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Likely		Low	Moderate
Operation	Presence of the road	S2-TAR Bird (Terrestrial - Moderate Value)	Moderate	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Operation	Presence of the road	S2-TAR Bird (Terrestrial - High Value)	High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Operation	Presence of the road	S2-TAR Bird (Terrestrial - Very High Value)	Very High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Operation	Presence of the road	S2-TAR Bird (Wetland - Moderate Value)	Moderate	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Operation	Presence of the road	S2-TAR Bird (Wetland - High Value)	High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Operation	Presence of the road	S2-TAR Bird (Wetland - Very High Value)	Very High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Operation	Presence of the road	S2-TAR Bird (Terrestrial - Moderate Value)	Moderate	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Operation	Presence of the road	S2-TAR Bird (Terrestrial - High Value)	High	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Operation	Presence of the road	S2-TAR Bird (Terrestrial - Very High Value)	Very High	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Operation	Presence of the road	S2-TAR Bird (Wetland - Moderate Value)	Moderate	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Operation	Presence of the road	S2-TAR Bird (Wetland - High Value)	High	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Operation	Presence of the road	S2-TAR Bird (Wetland - Very High Value)	Very High	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Construction	Vegetation removal	S2-TL.3 (District Plan)	Low	Construction- Terrestrial habitat	Permanent loss of habitat/ecosystem, fragmentation and edge effects due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S2-WF8 (District Plan)	Low	Construction- Terrestrial habitat	Permanent loss of habitat/ecosystem, fragmentation and edge effects due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S2-Bat	Very High	Construction- Bats	Loss of foraging habitat due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Construction	Vegetation removal	S2-Bat	Very High	Construction- Bats	Kill or injure individual bats due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Construction	Vegetation removal	S2-Non-TAR Bird	Low	Construction- Birds	Loss of foraging habitat due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Likely		Low	Very Low
Construction	Vegetation removal	S2-Non-TAR Bird	Low	Construction- Birds	Nest loss due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Highly Likely		Moderate	Low
Construction	Vegetation removal	S2-Non-TAR Bird	Low	Construction- Birds	Kill or injure individual due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Highly Likely		Moderate	Low
Construction	Vegetation removal	S2-TAR Bird (Terrestrial - Moderate Value)	Moderate	Construction- Birds	Loss of foraging habitat due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S2-TAR Bird (Terrestrial - Moderate Value)	Moderate	Construction- Birds	Nest loss due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S2-TAR Bird (Terrestrial - Moderate Value)	Moderate	Construction- Birds	Kill or injure individual due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S2-TAR Bird (Terrestrial - High Value)	High	Construction- Birds	Loss of foraging habitat due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S2-TAR Bird (Terrestrial - High Value)	High	Construction- Birds	Nest loss due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S2-TAR Bird (Terrestrial - High Value)	High	Construction- Birds	Kill or injure individual due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S2-Notable Tree	Negligible	Construction- Terrestrial habitat	Permanent loss of habitat/ecosystem, fragmentation and edge effects due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S2-TAR Bird (Terrestrial - Very High Value)	Very High	Construction- Birds	Loss of foraging habitat due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Construction	Vegetation removal	S2-TAR Bird (Terrestrial - Very High Value)	Very High	Construction- Birds	Nest loss due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Construction	Vegetation removal	S2-TAR Bird (Terrestrial - Very High Value)	Very High	Construction- Birds	Kill or injure individual due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low

NoR S3													
Phase	Project Activity	Resource	Ecological Value	Main Effect Description	Detailed Effect Description	Type	Extent (ZOI)	Duration	Frequency	Likelihood	Reversibility	Magnitude (pre-mitigation)	Level of Effect (pre-mitigation)
Construction	Lighting and noise	S3-Bat	Very High	Construction- Bats	Disturbance and displacement of (new and existing) roosts and individuals due to lighting and noise/vibration	Indirect	Local	Short-term (<5 years)	Frequently	Highly Likely	Totally	Low	Moderate
Operation	Presence of the road	S3-Bat	Very High	Operation- Bats	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)	Continuously	Highly Likely	Irreversible	Moderate	High
Operation	Lighting and noise	S3-Bat	Very High	Operation- Bats	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Permanent (>25 years)	Continuously	Highly Likely	Irreversible	Moderate	High
Construction	Lighting and noise	S3-Non-TAR Bird	Low	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Highly Likely	Totally	Moderate	Low
Operation	Presence of the road	S3-Non-TAR Bird	Low	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)	Continuously	Likely	Irreversible	Low	Very Low
Operation	Lighting and noise	S3-Non-TAR Bird	Low	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)	Continuously	Likely	Irreversible	Low	Very Low
Construction	Lighting and noise	S3-Lizard	High	Construction- Herpetofauna	Disturbance and displacement of (new and existing) roosts and individuals due to lighting and noise/vibration	Indirect	Local	Short-term (<5 years)	Continuously	Unlikely	Totally	Negligible	Very Low
Operation	Presence of the road	S3-Lizard	High	Operation- Herpetofauna	Loss in connectivity due to permanent habitat loss, light and noise/vibration effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)	Continuously	Unlikely	Irreversible	Low	Low
Operation	Lighting and noise	S3-Lizard	High	Operation- Herpetofauna	Disturbance of nocturnal lizard behaviour due to lighting associated with the infrastructure use	Indirect	Local	Permanent (>25 years)	Continuously	Unlikely	Irreversible	Low	Low
Construction	Lighting and noise	S3-TAR Bird (Terrestrial - Moderate Value)	Moderate	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Unlikely		Negligible	Very Low
Construction	Lighting and noise	S3-TAR Bird (Terrestrial - High Value)	High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Unlikely		Negligible	Very Low
Construction	Lighting and noise	S3-TAR Bird (Terrestrial - Very High Value)	Very High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Unlikely		Negligible	Low
Construction	Lighting and noise	S3-TAR Bird (Wetland - Moderate Value)	Moderate	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Unlikely		Negligible	Very Low
Construction	Lighting and noise	S3-TAR Bird (Wetland - High Value)	High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Likely		Low	Low
Construction	Lighting and noise	S3-TAR Bird (Wetland - Very High Value)	Very High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Likely		Low	Moderate
Operation	Presence of the road	S3-TAR Bird (Terrestrial - Moderate Value)	Moderate	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Regional	Permanent (>25 years)		Unlikely		Low	Low
Operation	Presence of the road	S3-TAR Bird (Terrestrial - High Value)	High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Regional	Permanent (>25 years)		Unlikely		Low	Low
Operation	Presence of the road	S3-TAR Bird (Terrestrial - Very High Value)	Very High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Regional	Permanent (>25 years)		Unlikely		Low	Moderate
Operation	Presence of the road	S3-TAR Bird (Wetland - Moderate Value)	Moderate	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)		Likely		Low	Low
Operation	Presence of the road	S3-TAR Bird (Wetland - High Value)	High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)		Likely		Low	Low
Operation	Presence of the road	S3-TAR Bird (Wetland - Very High Value)	Very High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)		Likely		Low	Moderate
Operation	Presence of the road	S3-TAR Bird (Terrestrial - Moderate Value)	Moderate	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Operation	Presence of the road	S3-TAR Bird (Terrestrial - High Value)	High	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Operation	Presence of the road	S3-TAR Bird (Terrestrial - Very High Value)	Very High	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Operation	Presence of the road	S3-TAR Bird (Wetland - Moderate Value)	Moderate	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Operation	Presence of the road	S3-TAR Bird (Wetland - High Value)	High	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Likely		Low	Low
Operation	Presence of the road	S3-TAR Bird (Wetland - Very High Value)	Very High	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Likely		Low	Moderate
Construction	Vegetation removal	S3-TL.3 (District Plan)	Low	Construction- Terrestrial habitat	Permanent loss of habitat/ecosystem, fragmentation and edge effects due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S3-WF8 (District Plan)	Low	Construction- Terrestrial habitat	Permanent loss of habitat/ecosystem, fragmentation and edge effects due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S3-Notable Tree (District Plan)	Negligible	Construction- Terrestrial habitat	Permanent loss of habitat/ecosystem, fragmentation and edge effects due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S3-Huapai Domain Trees (District Plan)	Low	Construction- Terrestrial habitat	Permanent loss of habitat/ecosystem, fragmentation and edge effects due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S3-Bat	Very High	Construction- Bats	Loss of foraging habitat due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Construction	Vegetation removal	S3-Bat	Very High	Construction- Bats	Kill or injure individual bats due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Construction	Vegetation removal	S3-Non-TAR Bird	Low	Construction- Birds	Loss of foraging habitat due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Likely		Low	Very Low
Construction	Vegetation removal	S3-Non-TAR Bird	Low	Construction- Birds	Nest loss due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Highly Likely		Moderate	Low
Construction	Vegetation removal	S3-Non-TAR Bird	Low	Construction- Birds	Kill or injure individual due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Highly Likely		Moderate	Low
Construction	Vegetation removal	S3-TAR Bird (Terrestrial - Moderate Value)	Moderate	Construction- Birds	Loss of foraging habitat due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S3-TAR Bird (Terrestrial - Moderate Value)	Moderate	Construction- Birds	Nest loss due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S3-TAR Bird (Terrestrial - Moderate Value)	Moderate	Construction- Birds	Kill or injure individual due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S3-TAR Bird (Terrestrial - High Value)	High	Construction- Birds	Loss of foraging habitat due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S3-TAR Bird (Terrestrial - High Value)	High	Construction- Birds	Nest loss due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S3-TAR Bird (Terrestrial - High Value)	High	Construction- Birds	Kill or injure individual due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S3-TAR Bird (Terrestrial - Very High Value)	Very High	Construction- Birds	Loss of foraging habitat due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Construction	Vegetation removal	S3-TAR Bird (Terrestrial - Very High Value)	Very High	Construction- Birds	Nest loss due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Construction	Vegetation removal	S3-TAR Bird (Terrestrial - Very High Value)	Very High	Construction- Birds	Kill or injure individual due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low

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Phase	Project Activity	Resource	Ecological Value	Main Effect Description	Detailed Effect Description	Type	Extent (ZOI)	Duration	Frequency	Likelihood	Reversibility	Magnitude (pre-mitigation)	Level of Effect (pre-mitigation)
Construction	Lighting and noise	HS-Bat	Very High	Construction- Bats	Disturbance and displacement of (new and existing) roosts and individuals due to lighting and noise/vibration	Indirect	Local	Short-term (<5 years)	Continuously	Likely	Totally	Low	Moderate
Operation	Presence of the road	HS-Bat	Very High	Operation- Bats	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Regional	Permanent (>25 years)		Unlikely	Irreversible	Low	Moderate
Operation	Lighting and noise	HS-Bat	Very High	Operation- Bats	Disturbance and displacement of (new and existing) roosts and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)	Continuously	Unlikely	Irreversible	Low	Moderate
Construction	Lighting and noise	HS-Non-TAR Bird	Low	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Definite	Totally	Moderate	Low
Operation	Presence of the road	HS-Non-TAR Bird	Low	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)	Continuously	Highly Likely	Irreversible	Moderate	Low
Operation	Lighting and noise	HS-Non-TAR Bird	Low	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)	Continuously	Highly Likely	Irreversible	Moderate	Low
Construction	Lighting and noise	HS-Lizard	High	Construction- Herpetofauna	Disturbance and displacement of (new and existing) roosts and individuals due to lighting and noise/vibration	Indirect	Local	Short-term (<5 years)	Frequently	Unlikely	Totally	Negligible	Very Low
Operation	Presence of the road	HS-Lizard	High	Operation- Herpetofauna	Loss in connectivity due to permanent habitat loss, light and noise/vibration effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)	Continuously	Unlikely	Irreversible	Low	Low
Operation	Lighting and noise	HS-Lizard	High	Operation- Herpetofauna	Disturbance of nocturnal lizard behaviour due to lighting associated with the infrastructure use	Indirect	Local	Permanent (>25 years)	Continuously	Unlikely	Irreversible	Low	Low
Construction	Lighting and noise	HS-TAR Bird (Terrestrial - High Value)	High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Unlikely		Negligible	Very Low
Operation	Presence of the road	HS-TAR Bird (Terrestrial - High Value)	High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Regional	Permanent (>25 years)	Continuously	Unlikely		Low	Low
Operation	Presence of the road	HS-TAR Bird (Terrestrial - High Value)	High	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)	Continuously	Unlikely		Low	Low
Construction	Lighting and noise	HS-TAR Bird (Terrestrial - Moderate Value)	Moderate	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Unlikely		Negligible	Very Low
Operation	Presence of the road	HS-TAR Bird (Terrestrial - Moderate Value)	Moderate	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Regional	Permanent (>25 years)	Continuously	Unlikely		Low	Low
Operation	Presence of the road	HS-TAR Bird (Terrestrial - Moderate Value)	Moderate	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)	Continuously	Unlikely		Low	Low
Construction	Lighting and noise	HS-TAR Bird (Wetland - High Value)	High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Likely		Low	Low
Operation	Presence of the road	HS-TAR Bird (Wetland - High Value)	High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)	Continuously	Likely		Low	Low
Operation	Presence of the road	HS-TAR Bird (Wetland - High Value)	High	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)	Continuously	Likely		Low	Low
Construction	Lighting and noise	HS-TAR Bird (Wetland - Moderate Value)	Moderate	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Likely		Low	Low
Operation	Presence of the road	HS-TAR Bird (Wetland - Moderate Value)	Moderate	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)	Continuously	Likely		Low	Low
Operation	Presence of the road	HS-TAR Bird (Wetland - Moderate Value)	Moderate	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)	Continuously	Likely		Low	Low
Operation	Presence of the road	HS-TAR Bird (Terrestrial - High Value)	High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Direct	Local	Permanent (>25 years)	Infrequently	Unlikely		Negligible	Very Low
Operation	Presence of the road	HS-TAR Bird (Terrestrial - Moderate Value)	Moderate	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Direct	Local	Permanent (>25 years)	Infrequently	Unlikely		Negligible	Very Low
Operation	Presence of the road	HS-TAR Bird (Wetland - High Value)	High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Direct	Local	Permanent (>25 years)	Infrequently	Unlikely		Negligible	Very Low
Operation	Presence of the road	HS-TAR Bird (Wetland - Moderate Value)	Moderate	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Direct	Local	Permanent (>25 years)	Infrequently	Unlikely		Negligible	Very Low
Construction	Lighting and noise	HS-TAR Bird (Terrestrial - Very High Value)	Very High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Infrequently	Likely		Negligible	Low
Construction	Lighting and noise	HS-TAR Bird (Wetland - Very High Value)	Very High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Frequently	Likely		Low	Moderate
Operation	Presence of the road	HS-TAR Bird (Terrestrial - Very High Value)	Very High	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)	Infrequently	Unlikely		Negligible	Low
Operation	Presence of the road	HS-TAR Bird (Terrestrial - Very High Value)	Very High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Operation	Presence of the road	HS-TAR Bird (Wetland - Very High Value)	Very High	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Likely		Low	Moderate
Operation	Presence of the road	HS-TAR Bird (Wetland - Very High Value)	Very High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Construction	Vegetation removal	HS-TL.3 (District Plan)	Low	Construction- Terrestrial habitat	Permanent loss of habitat/ecosystem, fragmentation and edge effects due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	HS-Bat	Very High	Construction- Bats	Loss of foraging habitat due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Construction	Vegetation removal	HS-Bat	Very High	Construction- Bats	Kill or injure individual bats due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Construction	Vegetation removal	HS -Non-TAR Bird	Low	Construction- Birds	Loss of foraging habitat due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Likely		Low	Very Low
Construction	Vegetation removal	HS -Non-TAR Bird	Low	Construction- Birds	Nest loss due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Highly Likely		Moderate	Low
Construction	Vegetation removal	HS -Non-TAR Bird	Low	Construction- Birds	Kill or injure individual due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Highly Likely		Moderate	Low
Construction	Vegetation removal	HS -TAR Bird (Terrestrial - Moderate Value)	Moderate	Construction- Birds	Loss of foraging habitat due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	HS -TAR Bird (Terrestrial - Moderate Value)	Moderate	Construction- Birds	Nest loss due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	HS -TAR Bird (Terrestrial - Moderate Value)	Moderate	Construction- Birds	Kill or injure individual due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	HS -TAR Bird (Terrestrial - High Value)	High	Construction- Birds	Loss of foraging habitat due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	HS -TAR Bird (Terrestrial - High Value)	High	Construction- Birds	Nest loss due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	HS -TAR Bird (Terrestrial - High Value)	High	Construction- Birds	Kill or injure individual due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	HS -TAR Bird (Terrestrial - Very High Value)	Very High	Construction- Birds	Loss of foraging habitat due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Construction	Vegetation removal	HS -TAR Bird (Terrestrial - Very High Value)	Very High	Construction- Birds	Nest loss due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Construction	Vegetation removal	HS -TAR Bird (Terrestrial - Very High Value)	Very High	Construction- Birds	Kill or injure individual due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low

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Phase	Project Activity	Resource	Ecological Value	Main Effect Description	Detailed Effect Description	Type	Extent (ZOI)	Duration	Frequency	Likelihood	Reversibility	Magnitude (pre-mitigation)	Level of Effect (pre-mitigation)
Construction	Lighting and noise	KS-Bat	Very High	Construction- Bats	Disturbance and displacement of (new and existing) roosts and individuals due to lighting and noise/vibration	Indirect	Local	Short-term (<5 years)	Frequently	Likely	Totally	Low	Moderate
Operation	Presence of the road	KS-Bat	Very High	Operation- Bats	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Regional	Permanent (>25 years)		Unlikely	Irreversible	Low	Moderate
Operation	Lighting and noise	KS-Bat	Very High	Operation- Bats	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Permanent (>25 years)	Continuously	Unlikely	Irreversible	Low	Moderate
Construction	Lighting and noise	KS-Non-TAR Bird	Low	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Highly Likely	Totally	Moderate	Low
Operation	Presence of the road	KS-Non-TAR Bird	Low	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)	Continuously	Highly Likely	Irreversible	Moderate	Low
Operation	Lighting and noise	KS-Non-TAR Bird	Low	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)	Continuously	Highly Likely	Irreversible	Moderate	Low
Construction	Lighting and noise	KS-Lizard	High	Construction- Herpetofauna	Disturbance and displacement of (new and existing) roosts and individuals due to lighting and noise/vibration	Indirect	Local	Short-term (<5 years)	Continuously	Unlikely	Totally	Negligible	Very Low
Operation	Presence of the road	KS-Lizard	High	Operation- Herpetofauna	Loss in connectivity due to permanent habitat loss, light and noise/vibration effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)	Continuously	Unlikely	Irreversible	Low	Low
Operation	Lighting and noise	KS-Lizard	High	Operation- Herpetofauna	Disturbance of nocturnal lizard behaviour due to lighting associated with the infrastructure use	Indirect	Local	Permanent (>25 years)	Continuously	Unlikely	Irreversible	Low	Low
Construction	Lighting and noise	KS-TAR Bird (Terrestrial - High Value)	High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Unlikely		Negligible	Very Low
Operation	Presence of the road	KS-TAR Bird (Terrestrial - High Value)	High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Regional	Permanent (>25 years)	Continuously	Unlikely		Low	Low
Operation	Presence of the road	KS-TAR Bird (Terrestrial - High Value)	High	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)	Continuously	Unlikely		Low	Low
Construction	Lighting and noise	KS-TAR Bird (Terrestrial - Moderate Value)	Moderate	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Unlikely		Negligible	Very Low
Operation	Presence of the road	KS-TAR Bird (Terrestrial - Moderate Value)	Moderate	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Regional	Permanent (>25 years)	Continuously	Unlikely		Low	Low
Operation	Presence of the road	KS-TAR Bird (Terrestrial - Moderate Value)	Moderate	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)	Continuously	Unlikely		Low	Low
Construction	Lighting and noise	KS-TAR Bird (Wetland - High Value)	High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Likely		Low	Low
Operation	Presence of the road	KS-TAR Bird (Wetland - High Value)	High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)	Continuously	Likely		Low	Low
Operation	Presence of the road	KS-TAR Bird (Wetland - High Value)	High	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)	Continuously	Likely		Low	Low
Construction	Lighting and noise	KS-TAR Bird (Wetland - Moderate Value)	Moderate	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Likely		Low	Low
Operation	Presence of the road	KS-TAR Bird (Wetland - Moderate Value)	Moderate	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)	Continuously	Likely		Low	Low
Operation	Presence of the road	KS-TAR Bird (Wetland - Moderate Value)	Moderate	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)	Continuously	Likely		Low	Low
Operation	Presence of the road	KS-Non-TAR Bird	Low	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Direct	Local	Permanent (>25 years)	Infrequently	Unlikely		Negligible	Very Low
Operation	Presence of the road	KS-TAR Bird (Terrestrial - High Value)	High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Direct	Local	Permanent (>25 years)	Infrequently	Unlikely		Negligible	Very Low
Operation	Presence of the road	KS-TAR Bird (Terrestrial - Moderate Value)	Moderate	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Direct	Local	Permanent (>25 years)	Infrequently	Unlikely		Negligible	Very Low
Operation	Presence of the road	KS-TAR Bird (Wetland - High Value)	High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Direct	Local	Permanent (>25 years)	Infrequently	Likely		Low	Low
Operation	Presence of the road	KS-TAR Bird (Wetland - Moderate Value)	Moderate	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Direct	Local	Permanent (>25 years)	Infrequently	Likely		Low	Low
Construction	Lighting and noise	KS-TAR Bird (Terrestrial - Very High Value)	Very High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)		Unlikely		Negligible	Low
Operation	Presence of the road	KS-TAR Bird (Wetland - Moderate Value)	Moderate	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Direct	Local	Permanent (>25 years)	Infrequently	Likely		Low	Low
Construction	Lighting and noise	KS-TAR Bird (Terrestrial - Very High Value)	Very High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)		Unlikely		Negligible	Low
Construction	Lighting and noise	KS-TAR Bird (Wetland - Very High Value)	Very High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Frequently	Likely		Low	Moderate
Operation	Presence of the road	KS-TAR Bird (Terrestrial - Very High Value)	Very High	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Operation	Presence of the road	KS-TAR Bird (Terrestrial - Very High Value)	Very High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Operation	Presence of the road	KS-TAR Bird (Wetland - Very High Value)	Very High	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Operation	Presence of the road	KS-TAR Bird (Wetland - Very High Value)	Very High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low

NoR S4													
Phase	Project Activity	Resource	Ecological Value	Main Effect Description	Detailed Effect Description	Type	Extent (ZOI)	Duration	Frequency	Likelihood	Reversibility	Magnitude (pre-mitigation)	Level of Effect (pre-mitigation)
Construction	Lighting and noise	S4-Bat	Very High	Construction- Bats	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Unlikely	Totally	Negligible	Low
Operation	Presence of the road	S4-Bat	Very High	Operation- Bats	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Regional	Permanent (>25 years)	Continuously	Unlikely	Irreversible	Low	Moderate
Operation	Lighting and noise	S4-Bat	Very High	Operation- Bats	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)	Continuously	Unlikely	Irreversible	Low	Moderate
Construction	Lighting and noise	S4-Lizard	High	Construction- Herpetofauna	Disturbance and displacement of individuals (existing) due to construction activities (noise, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Unlikely	Totally	Negligible	Very Low
Operation	Presence of the road	S4-Lizard	High	Operation- Herpetofauna	Loss in connectivity due to permanent habitat loss, light and noise/vibration effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)	Continuously	Unlikely	Irreversible	Low	Low
Operation	Lighting and noise	S4-Lizard	High	Operation- Herpetofauna	Disturbance of nocturnal lizard behaviour due to lighting associated with the infrastructure use	Indirect	Local	Permanent (>25 years)	Continuously	Unlikely	Totally	Low	Low
Construction	Lighting and noise	S4-TAR Bird (Terrestrial - Moderate Value)	Moderate	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Unlikely		#REF!	
Construction	Lighting and noise	S4-TAR Bird (Terrestrial - High Value)	High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Unlikely		#REF!	
Construction	Lighting and noise	S4-TAR Bird (Terrestrial - Very High Value)	Very High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Unlikely		#REF!	
Construction	Lighting and noise	S4-Non-TAR Bird	Low	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Indirect	Local	Short-term (<5 years)	Continuously	Highly Likely		#REF!	
Operation	Presence of the road	S4-TAR Bird (Terrestrial - Moderate Value)	Moderate	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Regional	Permanent (>25 years)		Unlikely		#REF!	
Operation	Presence of the road	S4-TAR Bird (Terrestrial - High Value)	High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Regional	Permanent (>25 years)		Unlikely		#REF!	
Operation	Presence of the road	S4-TAR Bird (Terrestrial - Very High Value)	Very High	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)		Unlikely		#REF!	
Operation	Presence of the road	S4-Non-TAR Bird	Low	Operation- Birds	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Indirect	Local	Permanent (>25 years)		Likely		#REF!	
Operation	Presence of the road	S4-TAR Bird (Terrestrial - Moderate Value)	Moderate	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Unlikely		#REF!	
Operation	Presence of the road	S4-TAR Bird (Terrestrial - High Value)	High	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Unlikely		#REF!	
Operation	Presence of the road	S4-TAR Bird (Terrestrial - Very High Value)	Very High	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Unlikely		#REF!	
Operation	Presence of the road	S4-Non-TAR Bird	Low	Operation- Birds	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Indirect	Local	Permanent (>25 years)		Likely		#REF!	
Construction	Vegetation removal	S4-TL.3 (District Plan)	Low	Construction- Terrestrial habitat	Permanent loss of habitat/ecosystem, fragmentation and edge effects due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Highly Likely		Moderate	Low
Construction	Vegetation removal	S4-Bat	Very High	Construction- Bats	Loss of foraging habitat due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Construction	Vegetation removal	S4-Bat	Very High	Construction- Bats	Kill or injure individual bats due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Construction	Vegetation removal	S4-Non-TAR Bird	Low	Construction- Birds	Loss of foraging habitat due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Likely		Low	Very Low
Construction	Vegetation removal	S4-Non-TAR Bird	Low	Construction- Birds	Nest loss due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Highly Likely		Moderate	Low
Construction	Vegetation removal	S4-Non-TAR Bird	Low	Construction- Birds	Kill or injure individual due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Highly Likely		Moderate	Low
Construction	Vegetation removal	S4-TAR Bird (Terrestrial - Moderate Value)	Moderate	Construction- Birds	Loss of foraging habitat due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S4-TAR Bird (Terrestrial - Moderate Value)	Moderate	Construction- Birds	Nest loss due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S4-TAR Bird (Terrestrial - Moderate Value)	Moderate	Construction- Birds	Kill or injure individual due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S4-TAR Bird (Terrestrial - High Value)	High	Construction- Birds	Loss of foraging habitat due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S4-TAR Bird (Terrestrial - High Value)	High	Construction- Birds	Nest loss due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S4-TAR Bird (Terrestrial - High Value)	High	Construction- Birds	Kill or injure individual due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Very Low
Construction	Vegetation removal	S4-TAR Bird (Terrestrial - Very High Value)	Very High	Construction- Birds	Loss of foraging habitat due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Construction	Vegetation removal	S4-TAR Bird (Terrestrial - Very High Value)	Very High	Construction- Birds	Nest loss due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low
Construction	Vegetation removal	S4-TAR Bird (Terrestrial - Very High Value)	Very High	Construction- Birds	Kill or injure individual due to vegetation removal. District Plan vegetation only.	Direct	Local	Permanent (>25 years)		Unlikely		Negligible	Low

10 Appendix 10 - Rapid Habitat Assessment Results

Table 13-44 Summary of RHA values

Stream ID	Deposited Sediment	Invertebrate habitat diversity	Invertebrate habitat abundance	Fish cover diversity	Fish cover abundance	Hydraulic heterogeneity	Bank erosion	Bank vegetation	Riparian width	Riparian shade	RHA Habitat Quality Score	Corresponding Habitat Value*
S1-S1a	1	5	5	4	4	5	2	4	8	5	43	M
S1-S2	1	2	2	2	3	3	1	3	6	9	32	P
S1-S1b	3	5	2	5	6	4	3	5	7	7	47	M
S1-S1c	4	3	2	3	4	5	7	8	8	8	52	M
S1-S3	1	2	1	2	3	1	4	3	3	2	22	P
S1-S4												
S1-S5												
S1-S6												
S1-S7												
S1-S8												
S1-S9	1	2	1	1	2	1	1	1	1	1	12	P
S1-S10	1	3	1	2	3	4	1	2	1	3	21	P
S1-S11	1	7	4	6	5	4	2	6	6	10	51	M
S1-S13												
S1-S14	1	2	1	2	3	3	1	6	8	10	37	P
S1-S15												
S1-S16												
S1-S17	1	7	2	8	8	8	5	6	5	8	58	M
S1-S18												
S1-S19	1	2	2	2	3	3	4	2	3	3	25	P
S1-S20a	4	2	1	2	3	3	7	8	7	6	41	M

Stream ID	Deposited Sediment	Invertebrate habitat diversity	Invertebrate habitat abundance	Fish cover diversity	Fish cover abundance	Hydraulic heterogeneity	Bank erosion	Bank vegetation	Riparian width	Riparian shade	RHA Habitat Quality Score	Corresponding Habitat Value*
S1-S20d	5	2	1	2	3	4	7	5	7	5	41	M
S1-S20e	5	4	2	4	5	4	7	6	6	8	51	M
S1-S21	5	3	2	3	3	4	7	5	8	4	44	M
S1-S22	5	8	6	8	8	8	4	2	2	5	56	M
S1-S23	1	2	1	1	2	2	1	1	1	2	14	P
S1-S24	3	3	2	3	4	4	3	4	4	5	35	P
S1-S25												
S1-S26	1	2	2	2	4	2	4	5	4	8	34	P
S1-S27												
S1-S28	1	3	1	3	4	4	4	6	6	7	39	P
S2-S1	1	1	1	2	4	1	1	3	2	9	25	P
S2-S2	2	6	4	6	6	6	7	6	6	9	58	M
S2-S3	1	5	1	4	3	2	2	3	3	8	31	P
S2-S4	1	3	1	3	5	2	5	4	2	1	27	P
S2-S5	4	4	3	5	5	2	4	6	7	3	43	M
S2-S6	4	3	2	3	4	2	4	6	6	6	40	P
S4-S1	4	5	4	4	4	4	4	8	9	10	56	M
W3-S1	3	5	4	4	6	5	7	8	9	8	59	M

Notes:

* = Corresponding habitat values for each habitat quality score

P = Poor (Score 10-40)

M = Moderate (Score 41-60)

G = Good (Score 61-80)

E = Excellent (Score 81+)

Light blue shading = Permanent stream

No shading = Intermittent stream

11 Appendix 11 – Long-Tailed Bat Acoustic Monitoring Report (2021-2022)

TE TUPU NGĀTAHI
SUPPORTING GROWTH

North West Long-Tailed Bat Acoustic Monitoring Report 2021-2022

July 2022

Version 1

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1 Executive Summary

As part of the Supporting Growth Programme, Te Tupu Ngātahi Supporting Growth (SG) is preparing Notices of Requirement (NoRs), on behalf of Waka Kotahi NZ Transport Agency (Waka Kotahi) and Auckland Transport (AT), to designate land, under the Resource Management Act 1991 (RMA), for the purpose of constructing, operating and maintaining a proposed strategic and local arterial transport network in the North West (NW) of Auckland, hereinafter referred to as the 'Project'.

Long-tailed bats (pekapeka) (*Chalinolobus tuberculatus*) are considered 'Threatened – Nationally Critical' (O'Donnell et al., 2018) and are known to be present within the Northwest of Auckland. Although desktop records confirm their presence within a 10 km radius of the Project area, the understanding of how bats use the wider landscape is limited. To gain an understanding of the habitat features that are of value to long-tailed bats it is necessary to monitor the landscape in a manner that reflects how they use it. Therefore, to establish an ecological baseline and identify if there are vegetated corridors that bats are using frequently to move through the landscape, acoustic monitoring for bats was undertaken at an areawide level.

Automatic Bat Monitors (ABM)s were deployed across the Project area in two separate survey sessions. The first (December 2021) was completed within the bat maternity period (December - February) and the second (April 2022) within the bat mating season (March - May). ABMs were placed in a network within habitats that would be affected by the Project and would provide suitable habitat for bat roosting, foraging, and commuting. Specifically, pre-determined survey locations were selected based on the current understanding of habitats that are favoured by bats.

During the December 2021 survey, seven of the 32 ABM sites (December sites #2, #11, #17, #21, #23, #25, and #27) detected bat activity. The site with the greatest number of bat passes was December site #27. No foraging calls or social calls were recorded, and no bat passes were recorded within 30 minutes of sunset or sunrise.

During the April 2022 survey, 16 of the 21 ABM sites (April sites #1, #2, #4, #5, #6, #7, #8, #9, #10, #11, #13, #14, #15, #16, #17, and #20) detected bat activity. The site with the greatest number of bat passes was April site #17 with 1370 bat passes recorded during the survey. Foraging calls were recorded at 10 of the ABM sites, with the greatest number recorded at April site #17. No social calls were recorded, and no bat passes were recorded within 30 minutes of sunset or sunrise.

The results suggest that bats are active in the North West Project area. Specifically, the results suggests that bats are active in both the Local Arterials Package area (Whenuapai Arterials, Redhills Arterials, and Riverhead Arterials), and the Strategic Projects and Kumeū Huapai Local Arterials Package area, with the highest bat activity recorded in the Alternative State Highway (ASH) NoR.

2 Introduction

2.1 Background

As part of the Supporting Growth Programme, Te Tupu Ngātahi Supporting Growth (SG) is preparing Notices of Requirement (NoRs), on behalf of Waka Kotahi NZ Transport Agency (Waka Kotahi) and Auckland Transport (AT), to designate land, under the Resource Management Act 1991 (RMA), for the purpose of constructing, operating and maintaining a proposed strategic and local arterial transport network in the North West (NW) of Auckland, hereinafter referred to as the 'Project'.

SG is preparing the NoRs for the individual projects within the NW and the projects have been split into two lodgement packages:

- **Lodgement Package 1** is the **Local Arterial Package** and consists of three area-based assessment volumes (Whenuapai, Redhills and Riverhead) (Table 2-1).
- **Lodgement Package 2** is the **Strategic and Kumeū-Huapai Package**. The assessments have been grouped based upon their strategic role, or in the case of Access and Station Road the relationship with the strategic projects (Table 2-2).

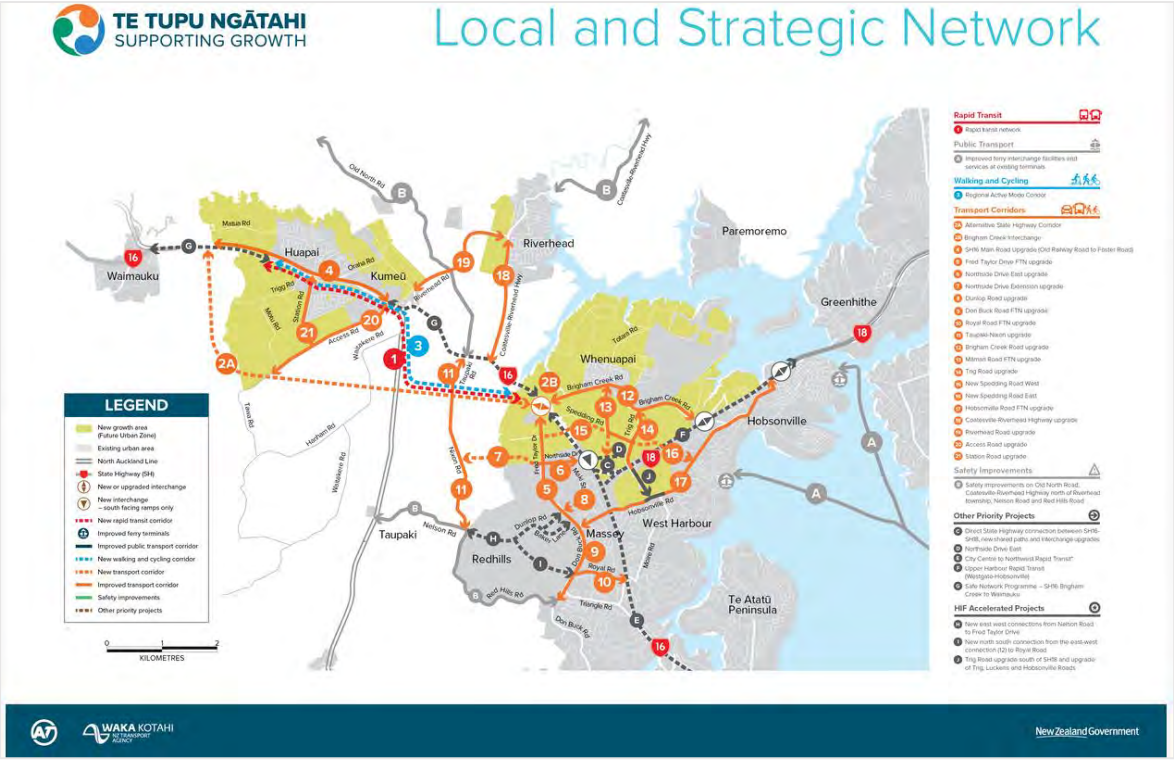

Figure 2-1 North West Growth Area Local and Strategic Network

Table 2-1 Local Arterial Package

Package	Assessment Volume	Proposed NoRs
Local Arterial Package	**Whenuapai Arterials**	Proposed NoRs: • Brigham Creek Road upgrade • Māmari Road FTN upgrade

Package	Assessment Volume	Proposed NoRs
		• Trig Road North upgrade • Spedding Road East and West
		Proposed alternations to existing designations: • Hobsonville Road FTN upgrade
	Redhills Arterials	Proposed NoRs: • Northside Drive East extension • Don Buck Road FTN upgrade • Royal Road FTN upgrade
		Proposed alternations to existing designations: • Fred Taylor Drive Frequent Transport Network (FTN) upgrade
	Riverhead Arterials	• Coatesville – Riverhead Highway Upgrade • Riverhead Road Upgrade

Table 2-2 Strategic Package

Package	Proposed NoRs
Strategic Projects and Kumeū Huapai Local Arterials	Proposed NoRs: • Rapid Transit Corridor (RTC), including Regional Active Mode Corridor (RAMC) • Alternative State Highway (ASH), including Brigham Creek Interchange • Access Road upgrade • Station Road upgrade
	Proposed alternations to existing designations: • SH16 Main Road upgrade

2.2 Acoustic Monitoring

Long-tailed bats (pekapeka) (*Chalinolobus tuberculatus*) are considered 'Threatened – Nationally Critical' (O'Donnell *et al.,* 2018) and are known to be present within the Northwest of Auckland (Waitakere Ranges, Riverhead Forest etc) (DOC, 2022). Although desktop records confirm their presence within a 10 km radius of the NoRs, the understanding of how bats use the wider landscape is limited.

To gain an understanding of the habitat features that are of value to long-tailed bats it is necessary to monitor the landscape in a manner that reflects how they use it. Therefore, to establish an ecological baseline and identify if there are vegetated corridors that bats are using frequently to move through the landscape, acoustic monitoring for bats was undertaken at an areawide level.

3 Methodology

3.1 Acoustic Monitoring

Automatic Bat Monitors (ABM)s (Song Meter SM4BAT-FS Ultrasonic Bat Detectors with SMM-U2 microphones) were deployed across the Project area. ABMs were deployed in two separate survey sessions. The first (December 2021) was completed within the bat maternity period (December - February) and the second (April 2022) within the bat mating season (March - May). The intent of surveying in two sessions was to cover any potential changes in bat activity patterns between the maternity and mating seasons.

Once deployed, ABMs were pre-set to start recording 60 minutes before sunset, and cease recording 60 minutes after sunrise (a 'night'). Each ABM was left *in-situ* for at-least 14 nights with suitable weather conditions (O'Donnell & Sedgeley, 2001). For the purposes of this report suitable weather conditions have been defined as:

- Air temperatures dropped below 10°C in the first four hours after sunset.
- Mean overnight wind speed was considered 'strong breeze' on the Beaufort Scale (39-49 km/h) (Royal Meteorological Society, 2021).
- Maximum overnight wind gust exceeded 60 km/h; and/or
- Persistent heavy rain in the first two hours after sunset (heavy rain is described as >4 mm/h) (United States Geological Survey, 2016).

3.1.1 December 2021 Survey

ABMs were placed in a network within habitats that would be affected by the Project and would provide suitable habitat for bat roosting, foraging, and commuting. Specifically, pre-determined survey locations were selected based on the current understanding of habitats that are favoured by bats, drawing information from recent radio tracking that AECOM has completed on the urban fringe of the Waitakere Ranges, existing bat records (Department of Conservation and Auckland Council), and a heat map produced by Auckland Council (Crewther, 2016).

32 ABMs were left in-situ at various times during the period 17 November 2021 until 23 December 2021. The locations of the December 2021 survey sites are detailed in Table 3-1 and presented in Figure 3-1.

Table 3-1 December 2021 ABM survey locations

Site	NZTM Easting (X)	NZTM Northing (Y)
#1-Dec	1739214	5926273
#2-Dec	1740072	5926623
#3-Dec	1735355	5928284
#4-Dec	1733209	5929146
#5-Dec	1736714	5929643
#6-Dec	1734977	5929358

Site	NZTM Easting (X)	NZTM Northing (Y)
#7-Dec	1742885	5926156
#8-Dec	1738312	5927722
#9-Dec	1745935	5926209
#10A-Dec	1738213	5928889
#10B-Dec	1738211	5928832
#11-Dec	1741815	5924338
#12A-Dec	1736983	5926448
#12B-Dec	1736912	5926867
#13-Dec	1742972	5926641
#14-Dec	1741756	5931165
#15-Dec	1736431	5930302
#16-Dec	1738242	5929512
#17-Dec	1741693	5922045
#18-Dec	1735617	5930473
#19-Dec	1739393	5928689
#20-Dec	1738140	5930302
#21-Dec	1741241	5921934
#22-Dec	1741983	5926912
#23-Dec	1740244	5920178
#24-Dec	1741618	5926346
#25-Dec	1738270	5923934
#26-Dec	1738146	5928249
#27-Dec	1735631	5926833
#28-Dec	1738928	5929152
#29-Dec	1736737	5930863
#30-Dec	1734194	5928226

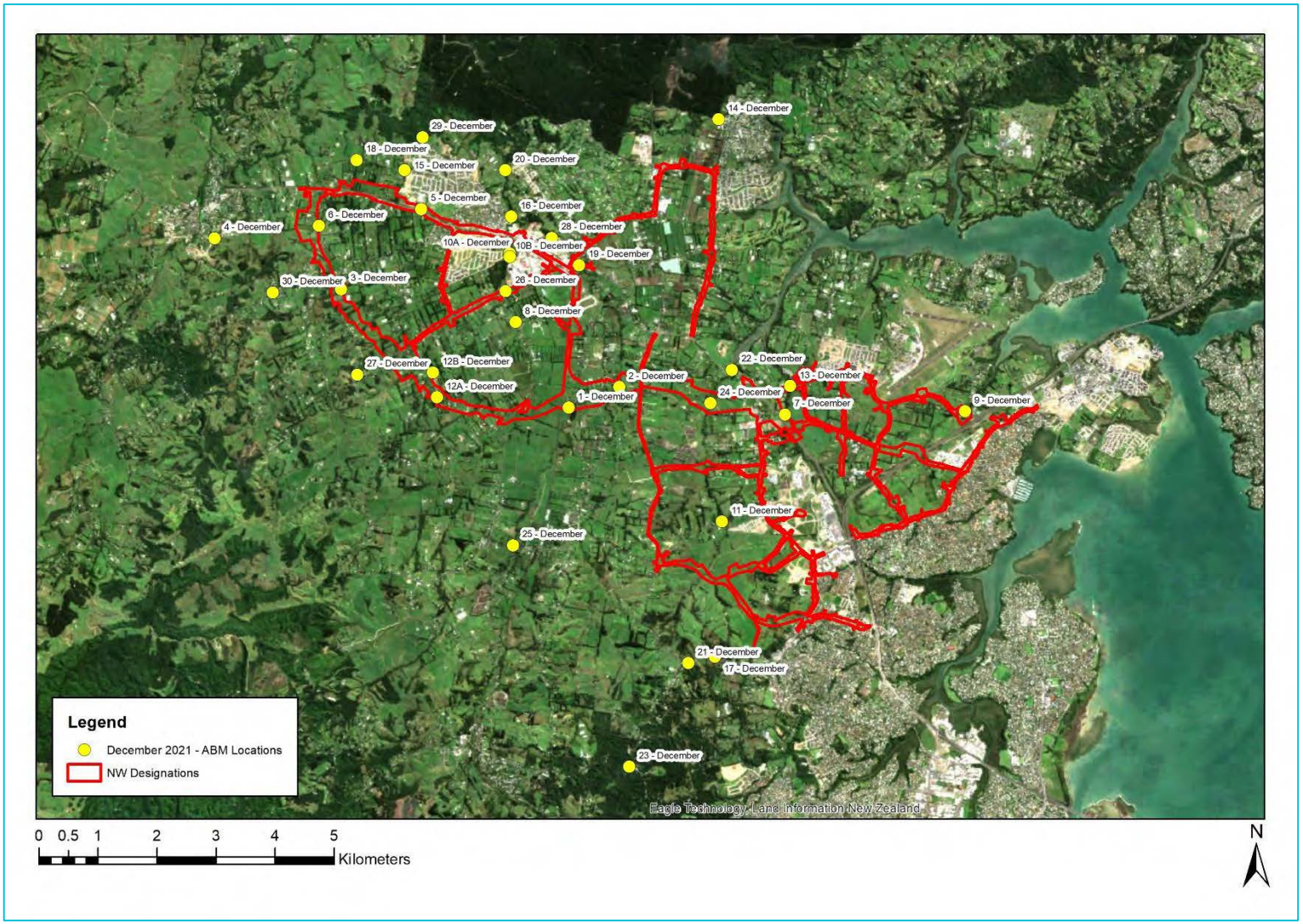

Figure 3-1 ABM locations (December 2021 survey).

3.1.2 April 2022 Survey

Based on the results of the first survey, ABMs locations were specific to the stream and river corridors associated with the proposed Strategic alignment and specifically the Alternative State Highway (ASH).

A total of 21 ABMs were left *in-situ* from 6-7 April 2022 until 3 May 2022. The locations of the April 2022 survey sites are detailed in Table 3-2 and presented in Figure 3-2.

Table 3-2 April 2022 ABM survey locations

Site	NZTM Easting (X)	NZTM Northing (Y)
#1-Apr	1741497	5926010
#2-Apr	1741627	5926348
#3-Apr	1738298	5927729
#4-Apr	1740062	5926649
#5-Apr	1739242	5926255
#6-Apr	1736563	5925866
#7-Apr	1737764	5926415
#8-Apr	1737011	5926448
#9-Apr	1738151	5928249
#10-Apr	1735633	5926835
#11-Apr	1737116	5926987
#12-Apr	1736235	5926691
#13-Apr	1736074	5927368
#14-Apr	1735449	5927854
#15-Apr	1737326	5926729
#16-Apr	1735364	5928281
#17-Apr	1735701	5928158
#18-Apr	1734931	5928655
#19-Apr	1734952	5929326
#20-Apr	1739706	5926337
#21-Apr	1739953	5926092

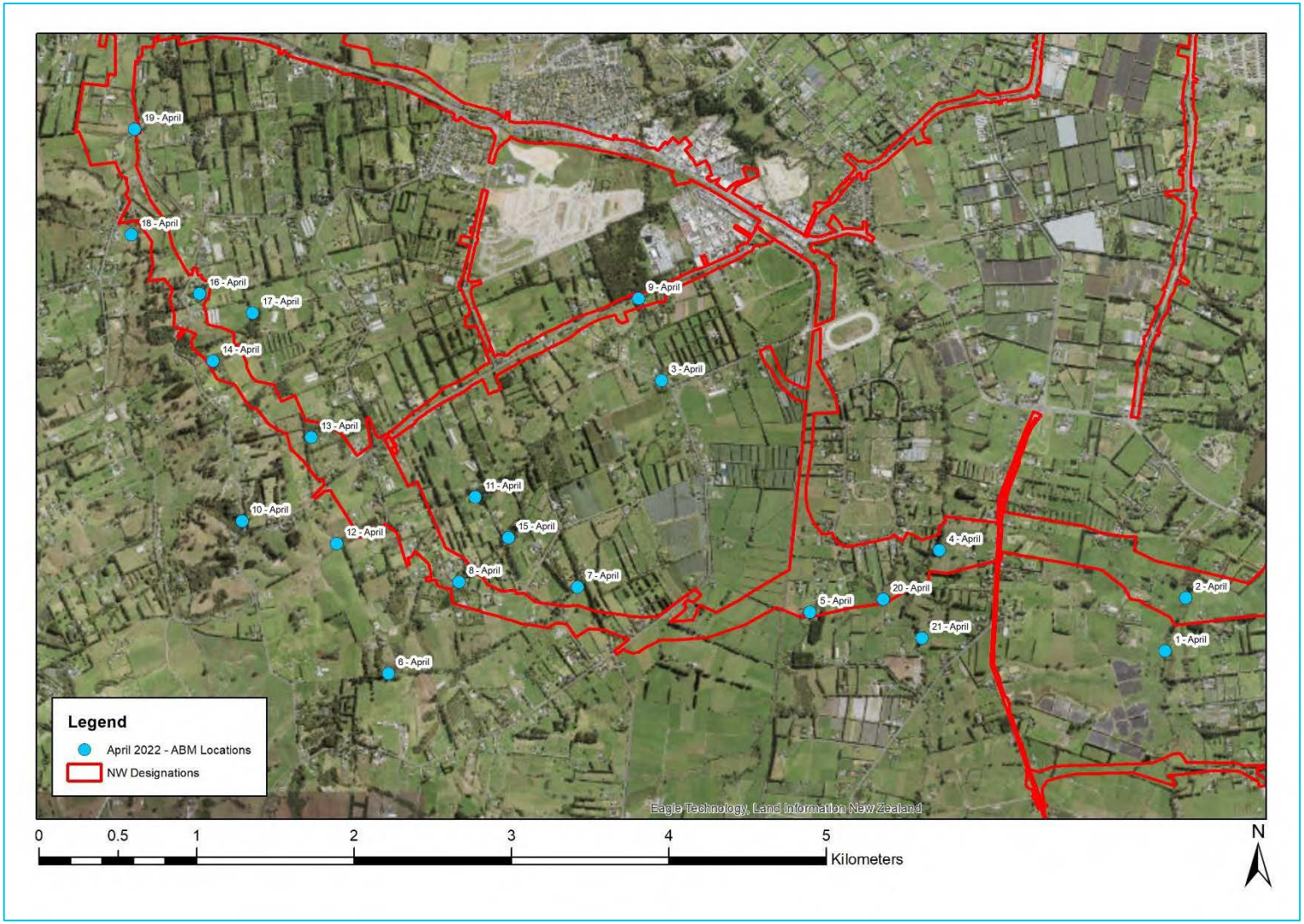

Figure 3-2 ABM locations (April 2022 survey)

3.2 Data Analysis

3.2.1 Long-tailed bat detection and behaviour

The ABM recordings were analysed by an experienced ecologist using Kaleidoscope Pro Analysis[1] software. Confirmed bat recordings (several bat echolocation calls recorded in a sound file) were further classified into:

- Echolocation calls i.e. regularly-spaced calls;
- Echolocation calls with foraging calls (feeding buzzes); and
- Echolocation calls with social calls.

The ABM data was removed from the analysis of trends if there was instrument error or weather conditions overnight were suboptimal for bat activity. Weather data for the survey period was provided by the nearest NIWA CliFlo weather station with relevant data available (North Shore Albany Ews, Agent 37852)[2] and the weather conditions during this period are included in Appendix 1.

3.2.2 First and Last Bat Pass

A review of the ABM data was undertaken to determine when the first and last bat pass was detected in comparison with sunset or sunrise time (data collected from the Time and Date website[3]). The purpose of this analysis was to gain an understanding as to whether bats could potentially be roosting in close proximity to an ABM site. Griffiths (2007) found that long-tailed bats emerged on average 30.1 ± 1.5 minutes after sunset and between January – February bats returned to their roost just before sunrise. However, by March bats were observed to be returning earlier to their roosts and by the end of May they returned as early as 40 minutes after emerging.

The following information was reviewed:

- Percentage of nights at each site where first/last bat pass is recorded within 30 minutes of sunset/sunrise;
- First and last bat pass recorded at each site during the survey period; and
- Minimum time difference between sunset/sunrise and the first/last bat pass.

[1] https://www.wildlifeacoustics.com/download/kaleidoscope-software.
[2] https://cliflo.niwa.co.nz/
[3] https://www.timeanddate.com

4 Results

4.1 December 2021

Table 4-1 and Figure 2-1 present the overall results of the bat surveys completed for the North West during the December 2021 survey. Raw survey data is included in Appendix 2.

Seven of the 32 ABM sites (December sites #2, #11, #17, #21, #23, #25, and #27) detected bat activity during the survey period. The site with the greatest number of bat passes was December site #27, all other sites had similarly low numbers of bat passes (Figure 4-2). No foraging calls or social calls were recorded during the survey.

No bat passes were recorded within 30 minutes of sunset or sunrise (Appendix 3). The site with the lowest minimum time difference between sunset and first bat pass was at December site #17, with a time of one hour 37 minutes. The site with the lowest minimum time difference between sunrise and last bat pass was at December site #25, with a time of 3 hours 9 minutes.

Table 4-1 December 2021 survey results of sites with bat activity

Site	Total Number of Echolocation Calls	Total Number of Foraging Calls	Total Number of Social Calls
#2-Dec	1	0	0
#11-Dec	3	0	0
#17-Dec	2	0	0
#21-Dec	1	0	0
#23-Dec	1	0	0
#25-Dec	3	0	0
#27-Dec	42	0	0

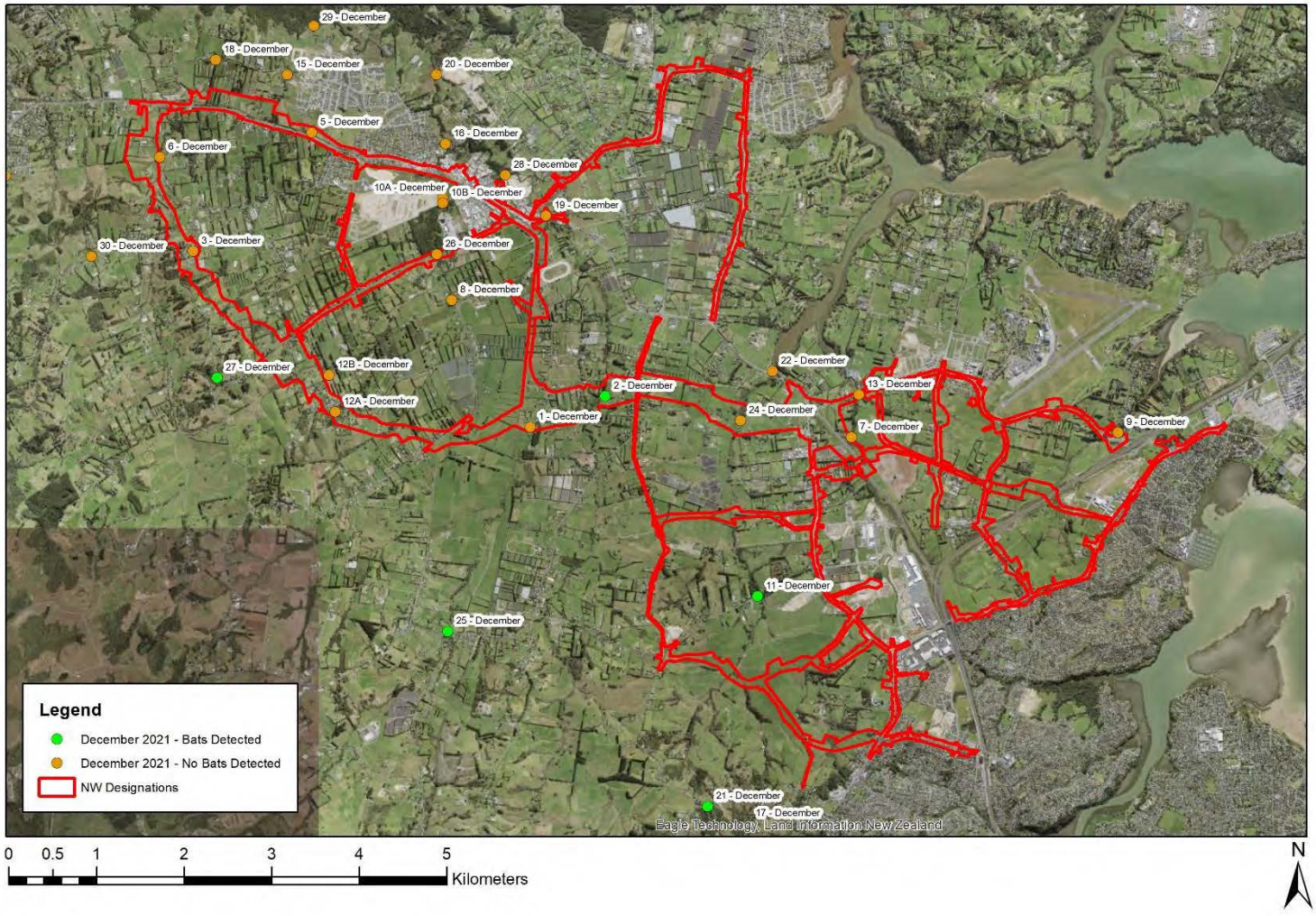

Figure 4-1 Long-tailed bat presence/absence (December 2021 survey)

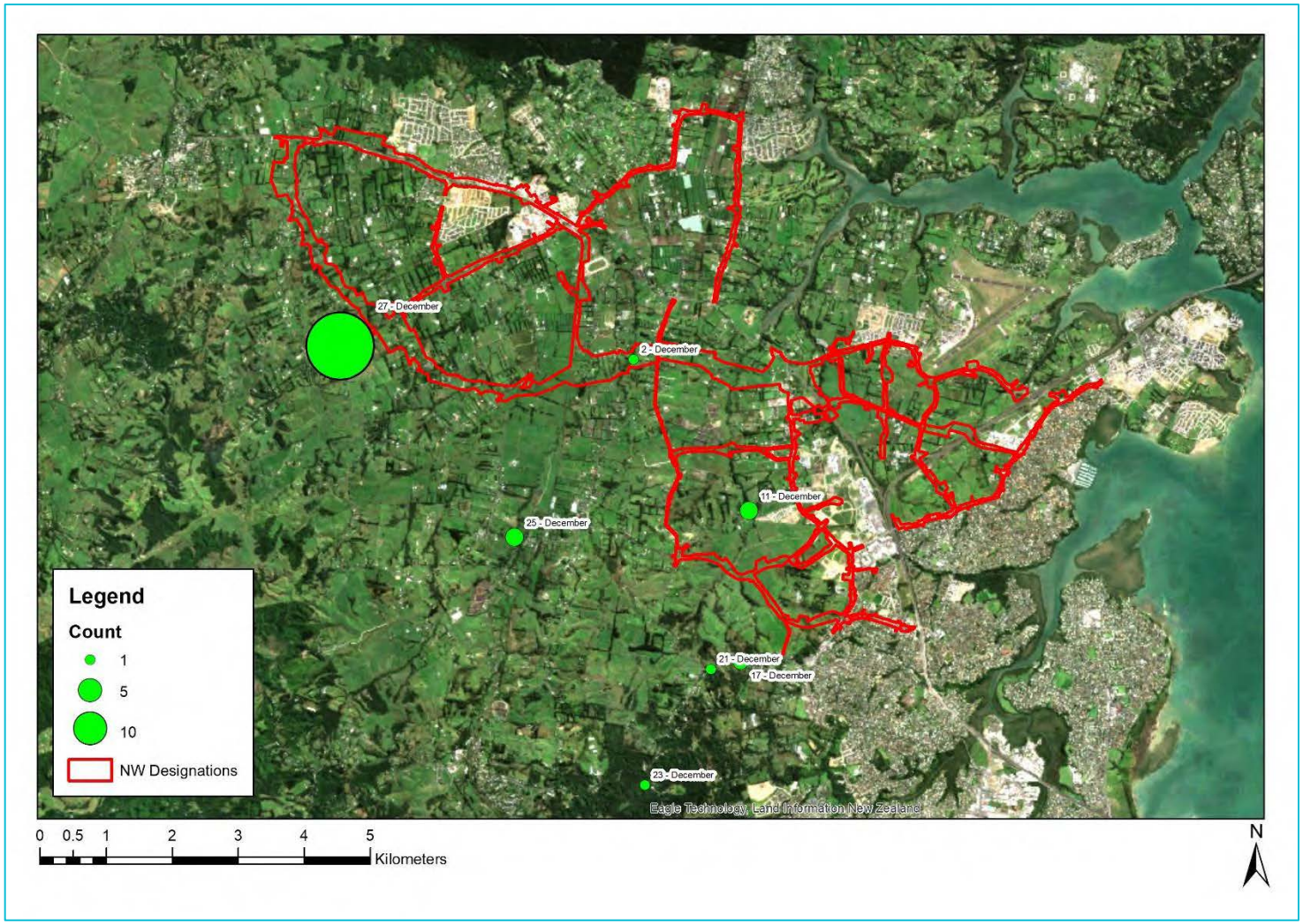

Figure 4-2 Sites with confirmed long-tailed bat presence (December 2021 survey). Proportional symbology indicates the relative proportion of bat passes in relation to the site with the highest number of bat passes (#27-December).

4.2 April 2022

Table 4-2 and Figure 4-3 present the overall results of the bat surveys completed for the North West during the April 2022 survey. Raw survey data is included in Appendix 2.

A total of 16 of the 21 ABM sites detected bat activity during the survey period (April sites #1, #2, #4, #5, #6, #7, #8, #9, #10, #11, #13, #14, #15, #16, #17, and #20). The site with the greatest number of bat passes was April site #17 with 1370 bat passes recorded during the survey (Figure 4-4). Foraging calls were recorded at 10 of the ABM sites, with the greatest number recorded at April site #17, and no social calls were recorded during the survey.

No bat passes were recorded within 30 minutes of sunset or sunrise (Appendix 3). The site with the lowest minimum time difference between sunset and first bat pass was at April site #11, with a time of 46 minutes. The site with the lowest minimum time difference between sunrise and last bat pass was at April site #17, with a time of 1 hour 2 minutes.

Table 4-2 April 2022 survey results of sites with bat activity

Site	Total Number of Echolocation Calls	Total Number of Foraging Calls	Total Number of Social Calls
#1-Apr	1	0	0
#2-Apr	2	0	0
#4-Apr	29	4	0
#5-Apr	21	2	0
#6-Apr	346	15	0
#7-Apr	103	14	0
#8-Apr	35	3	0
#9-Apr	2	0	0
#10-Apr	231	5	0
#11-Apr	162	15	0
#13-Apr	37	1	0
#14-Apr	21	1	0
#15-Apri	18	0	0
#16-Apr	5	0	0
#17-Apr	1370	265	0
#20-Apr	1	0	0

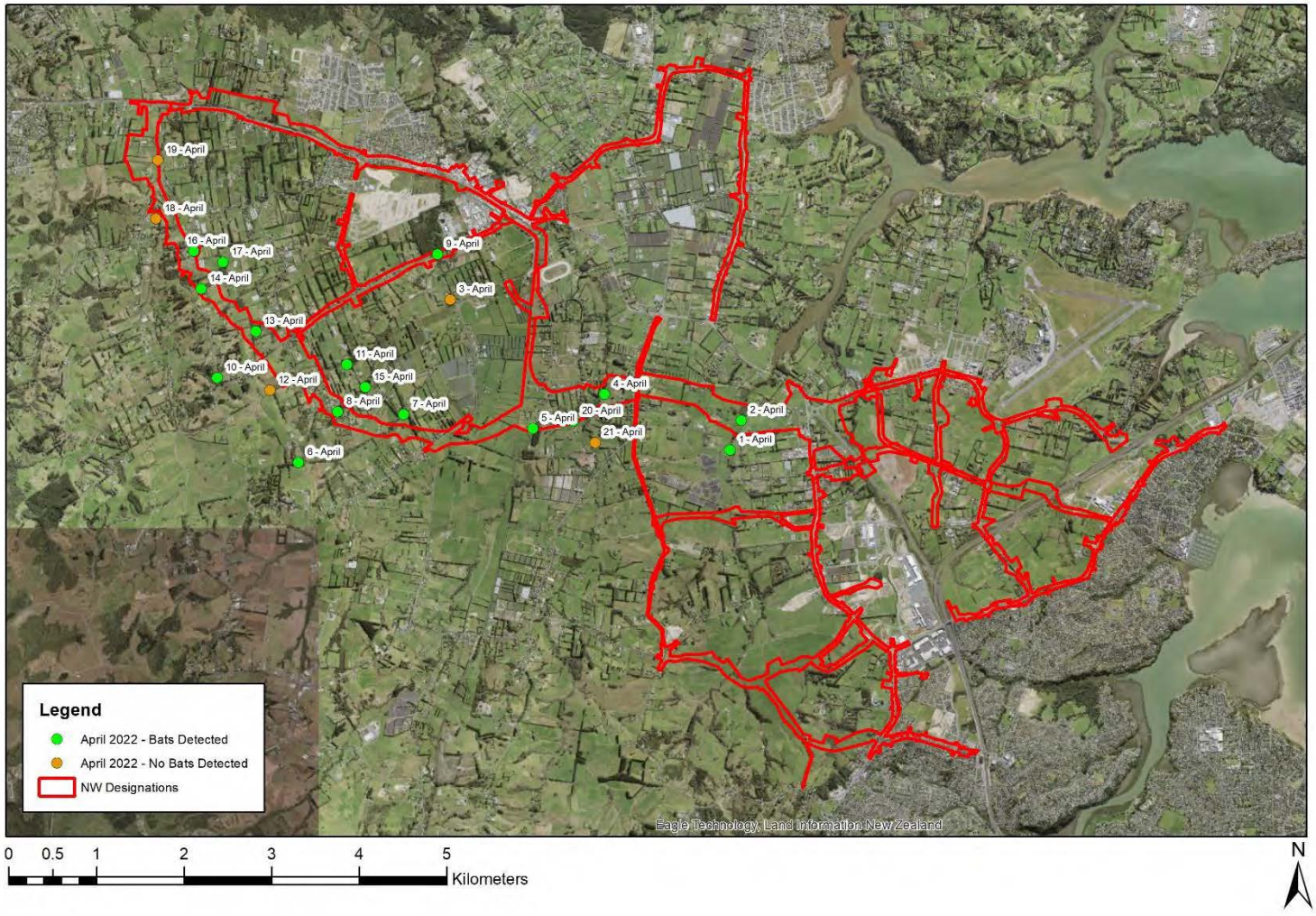

Figure 4-3 Long-tailed bat presence/absence (April 2022 survey)

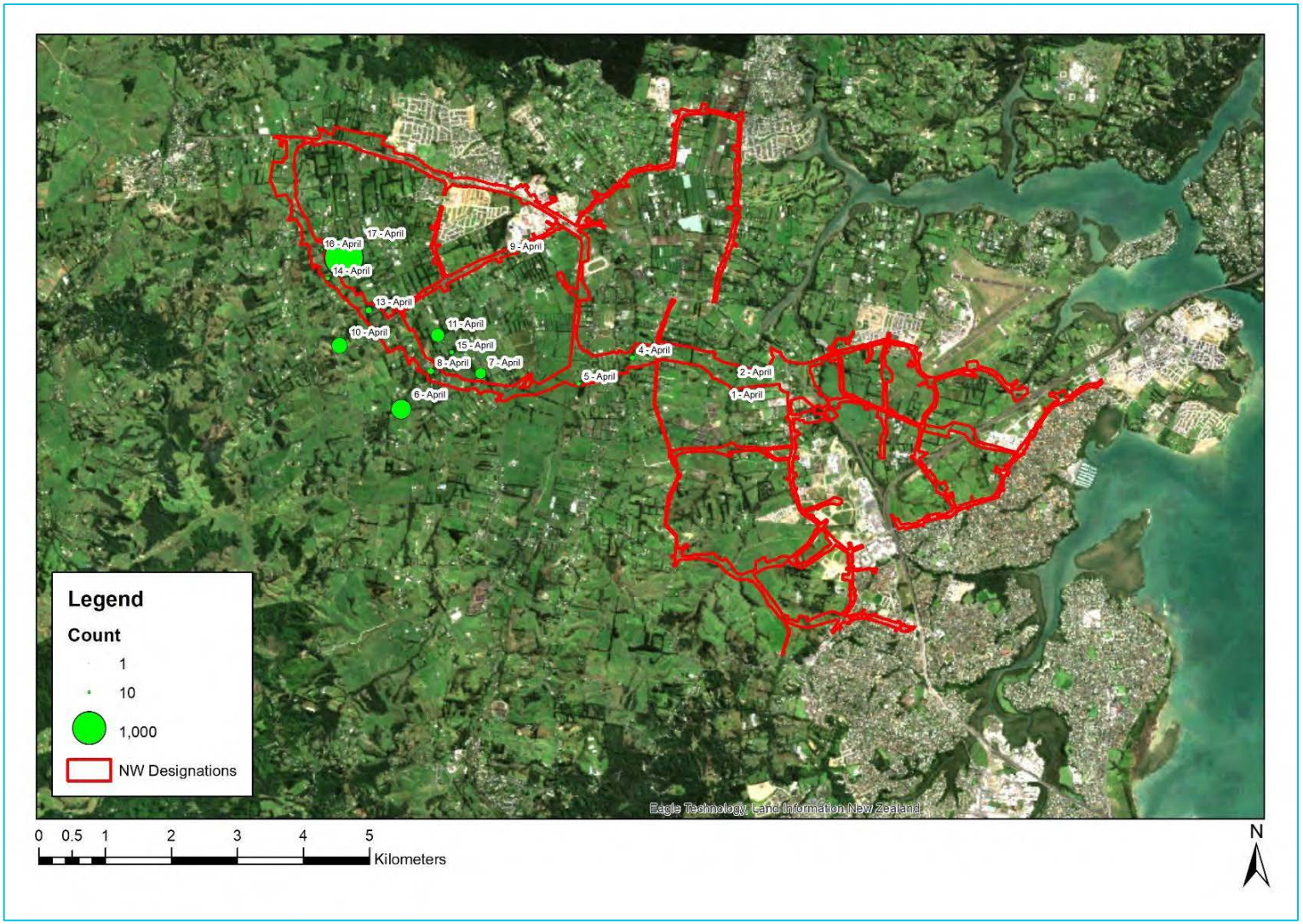

Figure 4-4 Sites with confirmed long-tailed bat presence (April 2022 survey). Proportional symbology indicates the relative proportion of bat passes in relation to the site with the highest number of bat passes (#17-April).

4.3 Survey Limitations

Some survey locations were limited by access to private property. If access was not available for a pre-determined survey location, then an alternative survey location as close as possible to the original survey site was used.

Instrument error was recorded during both the December 2021 and April 2022 surveys. An overview of when and where instrument error occurred is included in Appendix 2.

5 Conclusion

Both the December 2021 and April 2022 surveys found evidence of long-tailed bat activity in the Project area. Bats were observed to be most active during the April 2022 survey (bat mating season) with the highest mean number of 53 nightly bat passes recorded at April site #17. During the December 2021 survey, the highest mean number of bat passes was 1 nightly bat pass at December site #27.

Foraging calls were recorded during the April 2022 survey, with the highest number of foraging calls recorded at April site #17, with a total of 265 calls (19% of the total calls recorded at this site). Foraging calls were not recorded during the December 2021 survey, and social calls were not recorded during either survey.

Analysis of the first and last bat pass suggests that there are no bat roosts within the immediate vicinity of each ABM location. It is possible that bats may be roosting in the vicinity of April sites #6, #8, #11, #15, and #17 with first bat passes recorded within an hour of sunset.

Using the information obtained from the surveys, the results suggest that bats are active in the North West Project area. Specifically, the results suggests that bats are active in both the Local Arterials Package area (Whenuapai Arterials, Redhills Arterials, and Riverhead Arterials), and the Strategic Projects and Kumeū Huapai Local Arterials Package area, with the highest bat activity recorded in the Alternative State Highway (ASH) NoR.

6 References

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1 Appendix 1 - Weather Conditions

Analysis of the nightly weather against the criteria described in Section 3 led to the exclusion of data whilst the ABMs were in situ during the 2021-2022 surveys. The dates that met weather criteria and were selected for data analysis are presented in Table 1 and Table 2.

Table 1 Weather conditions during the December 2021 survey

Date	Maximum overnight wind gust (km/h)	Average Nightly Windspeed (km/h)	Minimum temperature in first four hours after sunset (°C)	Total rainfall in first two hours after sunset (mm)	Suitable Weather Conditions?
17 Nov 2021	13.7	2.62	13.0	0.0	✓
18 Nov 2021	15.8	2.57	11.1	0.0	✓
19 Nov 2021	15.5	3.08	13.2	0.0	✓
20 Nov 2021	26.3	10.3	17.4	0.0	✓
21 Nov 2021	23.4	5.92	18.9	0.0	✓
22 Nov 2021	21.6	7.01	16.6	0.0	✓
23 Nov 2021	28.4	7.76	17.0	0.0	✓
24 Nov 2021	11.9	2.88	15.0	0.0	✓
25 Nov 2021	13.0	2.58	14.4	0.0	✓
26 Nov 2021	9.4	1.66	13.2	0.0	✓
27 Nov 2021	17.3	2.77	17.0	0.0	✓
28 Nov 2021	10.8	2.03	17.3	0.0	✓
29 Nov 2021	16.6	2.23	15.4	0.0	✓
30 Nov 2021	11.2	1.80	16.4	0.0	✓
1 Dec 2021	20.2	4.09	18.7	0.3	✓
2 Dec 2021	32.8	14.56	18.9	0.0	✓
3 Dec 2021	40.0	16.56	19.6	0.0	✓
4 Dec 2021	33.1	14.81	19.2	0.3	✓
5 Dec 2021	36.4	15.45	19.7	0.0	✓
6 Dec 2021	31.7	12.96	20.3	0.0	✓
7 Dec 2021	20.2	5.37	19.8	0.0	✓
8 Dec 2021	16.2	2.53	18.6	0.0	✓

Date	Maximum overnight wind gust (km/h)	Average Nightly Windspeed (km/h)	Minimum temperature in first four hours after sunset (°C)	Total rainfall in first two hours after sunset (mm)	Suitable Weather Conditions?
9 Dec 2021	12.2	2.42	19.1	0.0	✓
10 Dec 2021	19.8	5.22	18.8	0.0	✓
11 Dec 2021	17.3	4.82	19.8	0.4	✓
12 Dec 2021	20.9	5.67	19.3	0.4	✓
13 Dec 2021	38.9	16.14	19.2	2	✓
14 Dec 2021	65.5	21.11	18.8	4.5 (did not exceed >4mm/hr)	X
15 Dec 2021	26.3	7.37	17.7	0.0	✓
16 Dec 2021	33.8	6.08	17.3	0.2	✓
17 Dec 2021	32.0	4.22	14.6	0.0	✓
18 Dec 2021	26.3	3.71	15.2	0.0	✓
19 Dec 2021	19.4	2.85	13.8	0.0	✓
20 Dec 2021	14.8	2.62	17.0	0.0	✓
21 Dec 2021	17.3	4.30	19.0	0.0	✓
22 Dec 2021	28.1	7.89	18.2	0.0	✓
23 Dec 2021	28.1	8.74	19.5	0.0	✓

Table 2 Weather conditions during the April 2022 survey

Date	Maximum overnight wind gust (km/h)	Average Nightly Windspeed (km/h)	Minimum temperature in first four hours after sunset (°C)	Total rainfall in first two hours after sunset (mm)	Suitable Weather Conditions?
6 Apr 2022	28.4	6.56	19.0	0.0	✓
7 Apr 2022	28.1	6.20	15.8	0.0	✓
8 Apr 2022	18.4	3.56	13.9	0.0	✓
9 Apr 2022	22.0	7.02	18.7	0.0	✓
10 Apr 2022	14.8	2.26	15.0	0.0	✓

Date	Maximum overnight wind gust (km/h)	Average Nightly Windspeed (km/h)	Minimum temperature in first four hours after sunset (°C)	Total rainfall in first two hours after sunset (mm)	Suitable Weather Conditions?
11 Apr 2022	31.7	12.99	19.1	0.0	✓
12 Apr 2022	32.4	11.85	18.4	0.0	✓
13 Apr 2022	31.7	8.29	17.9	0.0	✓
14 Apr 2022	28.8	4.02	12.7	0.0	✓
15 Apr 2022	14.0	2.48	14.2	0.0	✓
16 Apr 2022	16.6	4.69	16.6	0.0	✓
17 Apr 2022	54.7	24.78	19.1	0.0	✓
18 Apr 2022	55.1	26.12	17.5	0.8	✓
19 Apr 2022	41.8	15.4	19.4	4 (did not exceed >4mm/hr)	✓
20 Apr 2022	36.4	13.86	19.6	0.0	✓
21 Apr 2022	31.7	9.81	19.9	0.0	✓
22 Apr 2022	43.9	12.42	15.8	0.0	✓
23 Apr 2022	27.7	3.71	12.1	0.0	✓
24 Apr 2022	39.6	4.94	14.5	1.5	✓
25 Apr 2022	23.0	2.54	12.5	0.0	✓
26 Apr 2022	22.7	3.11	15.7	0.0	✓
27 Apr 2022	32.8	6.06	14.5	0.0	✓
28 Apr 2022	19.1	8.16	17.5	0.0	✓
29 Apr 2022	27.4	8.14	16.3	0.0	✓
30 Apr 2022	29.2	10.32	15.8	0.0	✓
1 May 2022	22.3	4.01	15.7	0.0	✓
2 May 2022	19.8	2.36	14.7	0.0	✓
3 May 2022	12.6	1.91	15.0	0.0	✓

2 Appendix 2 - Survey Results

2.1 December 2021

Date	Site																													
	#1-Dec	#2-Dec	#3-Dec	#4-Dec	#5-Dec	#6-Dec	#7-Dec	#8-Dec	#9-Dec	#10A - Dec	#10B - Dec	#11-Dec	#12A - Dec	#12B - Dec	#13-Dec	#14-Dec	#15-Dec	#16-Dec	#17-Dec	#18-Dec	#19-Dec	#20-Dec	#21-Dec	#22-Dec	#23-Dec	#24-Dec	#25-Dec	#26-Dec	#27-Dec	#28-Dec	#29-Dec	#30-Dec
17-Nov-21	N/A	N/A	N/A	0	0	0	0	N/A	N/A	N/A	N/A	0	0	0	N/A	N/A	N/A	0	N/A	N/A	0	0	N/A	N/A	N/A	E	1	0	0	N/A	0	0
18-Nov-21	N/A	N/A	N/A	0	0	0	0	N/A	N/A	N/A	N/A	0	0	0	N/A	N/A	N/A	0	N/A	N/A	0	0	N/A	N/A	N/A	E	0	0	0	N/A	0	0
19-Nov-21	N/A	N/A	N/A	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	0	0	0	E	0	0
20-Nov-21	N/A	N/A	N/A	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	0	0	0	E	0	0
21-Nov-21	N/A	N/A	N/A	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	0	0	0	E	0	0
22-Nov-21	N/A	N/A	N/A	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	0	0	0	E	0	0
23-Nov-21	0	N/A	0	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	0	0	0	E	0	0
24-Nov-21	0	0	0	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	0	0	0	E	0	0
25-Nov-21	0	0	0	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	0	0	0	E	0	0
26-Nov-21	0	0	0	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	0	0	0	E	0	0
27-Nov-21	0	0	0	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	1	0	3	E	0	0
28-Nov-21	0	0	0	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	0	0	7	E	0	0
29-Nov-21	0	1	0	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	0	0	13	E	0	0
30-Nov-21	0	0	0	0	0	0	0	0	0	0	N/A	1	0	0	0	0	0	0	0	0	0	0	1	0	0	E	0	0	10	E	0	0
1-Dec-21	0	0	0	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	E	0	0
2-Dec-21	0	0	0	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	0	0
3-Dec-21	0	0	0	0	0	0	0	0	0	0	N/A	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
4-Dec-21	0	0	0	0	0	0	0	E	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
5-Dec-21	0	0	0	0	0	0	0	E	E	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Dec-21	0	0	0	0	0	0	0	E	E	0	N/A	0	0	0	E	0	0	0	0	0	0	0	0	0	0	0	E	0	0	0	0	0
7-Dec-21	0	0	0	0	0	0	0	0	E	N/A	0	0	0	0	E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8-Dec-21	0	0	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Dec-21	0	0	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10-Dec-21	0	0	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Dec-21	0	0	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
12-Dec-21	0	0	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ATTACHMENT 50

NORTH-WEST STRATEGIC ASSESSMENT OF ECOLOGICAL EFFECTS PART 3 OF 3

Date	Site																													
	#1-Dec	#2-Dec	#3-Dec	#4-Dec	#5-Dec	#6-Dec	#7-Dec	#8-Dec	#9-Dec	#10A - Dec	#10B - Dec	#11-Dec	#12A - Dec	#12B - Dec	#13-Dec	#14-Dec	#15-Dec	#16-Dec	#17-Dec	#18-Dec	#19-Dec	#20-Dec	#21-Dec	#22-Dec	#23-Dec	#24-Dec	#25-Dec	#26-Dec	#27-Dec	#28-Dec	#29-Dec	#30-Dec
13-Dec-21	0	0	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	0	0	0	0	0	0
14-Dec-21	Weather conditions unsuitable.																															
15-Dec-21	0	0	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	0	0	0	0	0	0
16-Dec-21	0	0	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	0	0	0	0	0	0
17-Dec-21	0	0	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	E	1	0	0	0	0	0
18-Dec-21	0	0	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	0	0	0	0	0	0
19-Dec-21	0	0	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	0	0	0	0	0	0
20-Dec-21	0	0	0	0	0	0	0	E	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	E	0	0	0	0	0	0
21-Dec-21	0	0	0	0	0	0	0	E	0	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	0	0	0	0	N/A	0
22-Dec-21	0	0	0	N/A	N/A	N/A	N/A	E	N/A	N/A	0	N/A	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	E	N/A	N/A	0	N/A	N/A	N/A
Total Count of Bat Passes	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**3**	**0**	**42**	**0**	**0**	**0**
# Suitable Nights Recorded	**29**	**28**	**29**	**34**	**34**	**34**	**34**	**27**	**29**	**18**	**15**	**34**	**35**	**35**	**30**	**32**	**32**	**34**	**32**	**32**	**34**	**34**	**32**	**32**	**33**	**12**	**33**	**34**	**35**	**18**	**33**	**34**
Mean # Nightly Bat Passes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**

Notes: N/A = ABM not deployed. E = Instrument error. Highlighted blue cells = Number of bat calls.

2.2 April 2022

Date	Site																		
	#1-Apr	#2-Apr	#3-Apr	#4-Apr	#5-Apr	#6-Apr	#7-Apr	#8-Apr	#9-Apr	#10-Apr	#11-Apr	#12-Apr	#13-Apr	#14-Apr	#15-Apr	#16-Apr	#17-Apr	#18-Apr	#19-Apr	#20-Apr	#21-Apr
6-Apr-22	N/A	0	0	N/A	0	N/A	N/A	1	0	1	N/A	Error	2	0	9	1	N/A	0	0	0	Error
7-Apr-22	1	1	0	0	0	27	15	1	0	21	0	Error	2	0	0	0	44	0	0	0	Error
8-Apr-22	0	0	0	3	1	46	58	1	0	4	4	Error	7	1	0	0	56	0	0	0	Error
9-Apr-22	0	0	0	3	3	62	3	3	0	7	1	Error	1	0	0	0	44	0	0	0	Error
10-Apr-22	0	0	0	8	0	17	3	4	2	5	7	Error	0	0	0	0	41	0	0	0	Error
11-Apr-22	0	0	0	0	0	14	0	0	0	23	26	Error	1	7	3	0	190	0	0	0	Error

Date	Site																			
	#1-Apr	#2-Apr	#3-Apr	#4-Apr	#5-Apr	#6-Apr	#7-Apr	#8-Apr	#9-Apr	#10-Apr	#11-Apr	#12-Apr	#13-Apr	#14-Apr	#15-Apr	#16-Apr	#17-Apr	#18-Apr	#19-Apr	#20-Apr	#21-Apr
12-Apr-22	0	0	0	0	0	9	0	1	0	17	4	Error	3	4	3	1	113	0	0	0	Error
13-Apr-22	0	0	0	5	0	2	0	2	0	2	7	Error	2	0	0	1	16	0	0	0	Error
14-Apr-22	0	0	0	0	0	14	0	3	0	11	3	Error	0	0	0	0	68	0	0	0	Error
15-Apr-22	0	0	0	1	0	7	0	0	0	2	3	Error	2	0	0	0	45	0	0	0	Error
16-Apr-22	0	0	0	1	5	22	0	0	0	22	43	Error	2	0	0	0	71	0	0	0	Error
17-Apr-22	0	0	0	0	0	1	0	3	0	2	0	Error	0	0	0	0	181	0	0	0	Error
18-Apr-22	0	0	0	0	0	0	0	0	0	0	0	Error	0	0	0	0	7	0	0	0	Error
19-Apr-22	0	0	0	0	0	0	0	0	0	0	0	Error	0	0	0	0	66	0	0	0	Error
20-Apr-22	0	0	0	0	0	3	0	0	0	7	2	Error	0	3	0	0	17	0	0	0	Error
21-Apr-22	0	0	0	0	0	0	0	0	0	0	0	Error	0	1	0	0	72	0	0	0	Error
22-Apr-22	0	0	0	0	0	1	0	1	0	0	0	Error	1	0	0	0	1	0	0	0	Error
23-Apr-22	0	0	0	0	3	9	0	1	0	1	1	Error	4	0	2	0	35	0	0	0	Error
24-Apr-22	0	0	0	1	0	4	0	0	0	0	1	Error	0	0	1	0	21	0	0	0	Error
25-Apr-22	0	0	0	0	0	10	3	1	0	8	3	Error	0	0	0	0	29	0	0	0	Error
26-Apr-22	0	0	0	0	2	2	0	2	0	4	5	Error	0	1	0	0	113	0	0	0	Error
27-Apr-22	0	0	0	5	7	3	0	2	0	14	15	Error	0	1	0	1	37	0	0	0	Error
28-Apr-22	0	1	0	1	0	12	0	0	0	12	18	Error	3	0	0	0	19	0	0	0	Error
29-Apr-22	0	0	0	0	0	9	0	0	0	6	0	Error	0	1	0	1	29	0	0	1	Error
30-Apr-22	0	0	0	1	0	27	10	0	0	18	10	Error	1	1	0	0	15	0	0	0	Error
1-May-22	0	0	0	0	0	25	11	2	0	34	6	Error	1	1	0	0	8	0	0	0	Error
2-May-22	0	0	0	0	0	20	0	7	0	10	3	0	5	0	0	0	32	0	0	0	Error
Total Count of Bat Passes	**1**	**2**	**0**	**29**	**21**	**346**	**103**	**35**	**2**	**231**	**162**	**0**	**37**	**21**	**18**	**5**	**1370**	**0**	**0**	**1**	**N/A**
# Suitable Nights Recorded	**26**	**27**	**27**	**26**	**27**	**26**	**26**	**27**	**27**	**27**	**26**	**1**	**27**	**27**	**27**	**27**	**26**	**27**	**27**	**27**	**N/A**
Mean # Nightly Bat Passes	**0**	**0**	**0**	**1**	**1**	**13**	**4**	**1**	**0**	**9**	**6**	**0**	**1**	**1**	**1**	**0**	**53**	**0**	**0**	**0**	**N/A**

Notes: N/A = ABM not deployed. E = Instrument error. Highlighted blue cells = Number of bat calls.

3 Appendix 3 - First and Last Bat Pass Results

Table 3 Times in which the first and last bat call was recorded each night, in relation to sunset and sunrise times (December 2021 survey)

Site	Sunset			Sunrise		
	First bat pass recorded during the survey period (hh:mm)	Minimum time difference between sunset and first bat pass (h:mm)	Percentage of nights where first bat pass is within 30 minutes of sunset (%)	Last bat pass recorded during the survey period (hh:mm)	Minimum time difference between last bat pass and sunrise (h:mm)	Percentage of nights where last bat pass is within 30 minutes of sunrise (%)
#2-Dec	02:14	5:50	0.00	02:14	3:40	0.00
#11-Dec	01:07	4:44	0.00	02:00	3:53	0.00
#17-Dec	01:42	1:37	0.00	01:42	4:13	0.00
#21-Dec	02:01	5:38	0.00	02:01	3:53	0.00
#23-Dec	22:26	2:13	0.00	22:26	7:32	0.00
#25-Dec	01:19	4:42	0.00	02:51	3:09	0.00
#27-Dec	23:55	3:33	0.00	02:10	3:44	0.00

Table 4 Times in which the first and last bat call was recorded each night, in relation to sunset and sunrise times (April 2022 survey)

Site	Sunset			Sunrise		
	First bat pass recorded during the survey period (hh:mm)	Minimum time difference between sunset and first bat pass (h:mm)	Percentage of nights where first bat pass is within 30 minutes of sunset (%)	Last bat pass recorded during the survey period (hh:mm)	Minimum time difference between last bat pass and sunrise (h:mm)	Percentage of nights where last bat pass is within 30 minutes of sunrise (%)
#1-April	19:26	1:20	0.00	19:26	11:11	0.00
#2-April	19:27	1:21	0.00	00:39	6:18	0.00
#4-April	18:55	1:15	0.00	23:27	7:15	0.00
#5-April	19:06	1:16	0.00	00:46	5:53	0.00
#6-April	18:35	0:53	0.00	03:43	3:00	0.00
#7-April	19:02	1:01	0.00	21:24	9:17	0.00

Site	Sunset			Sunrise		
	First bat pass recorded during the survey period (hh:mm)	Minimum time difference between sunset and first bat pass (h:mm)	Percentage of nights where first bat pass is within 30 minutes of sunset (%)	Last bat pass recorded during the survey period (hh:mm)	Minimum time difference between last bat pass and sunrise (h:mm)	Percentage of nights where last bat pass is within 30 minutes of sunrise (%)
#8-April	19:01	0:58	0.00	02:07	4:32	0.00
#9-April	19:46	1:44	0.00	19:52	10:50	0.00
#10-April	19:06	1:10	0.00	03:43	2:56	0.00
#11-April	18:26	0:46	0.00	01:38	5:03	0.00
#13-April	18:53	1:17	0.00	03:27	3:11	0.00
#14-April	19:52	2:16	0.00	02:34	4:16	0.00
#15-April	18:42	0:57	0.00	01:33	5:05	0.00
#16-April	20:18	2:19	0.00	02:51	3:53	0.00
#17-April	18:31	0:52	0.00	05:44	1:02	0.00
#20-April	19:16	1:38	0.00	19:16	11:42	0.00

12 Appendix 12 – Incidental Bird Observations

Common Name	Māori Name	Scientific Name	Conservation Status (Robertson et al., 2021)	Relevant NoR
Barbary dove	-	*Streptopelia risoria*	Introduced and Naturalised	S1, S3
Blackbird	Manu pango	*Turdus merula*	Introduced and Naturalised	S1, S3
Canada goose	-	*Branta canadensis*	Introduced and Naturalised	S1, S3
Chaffinch	Pahirini	*Fringilla coelebs*	Introduced and Naturalised	S1, S3
Common pheasant	Peihana	*Phasianus colchicus*	Introduced and Naturalised	S1, S3
Eastern rosella	-	*Platycercus eximius*	Introduced and Naturalised	S1, S3
Fantail	Pīwakawaka	*Rhipidura fuliginosa placabilis*	Not Threatened	S1, S3
Goldfinch	-	*Carduelis carduelis*	Introduced and Naturalised	S1
Greenfinch	-	*Carduelis chloris*	Introduced and Naturalised	S1, S3
Grey duck x mallard hybrid	-	*Anas platyrhynchos x superciliosa*	Not Threatened	S1, S2, S3
Grey warbler	Riroriro	*Gerygone igata*	Not Threatened	S1, S3
House sparrow	Tiu	*Fringilla coelebs*	Introduced and Naturalised	S1, S3
Kingfisher	Kōtare	*Todiramphus sanctus vagans*	Not Threatened	S1, S3
Magpie	Makipae	*Gymnorhina tibicen*	Introduced and Naturalised	S1, S3
Mallard	-	*Anas platyrhynchos*	Introduced and Naturalised	S1, S2, S3
Myna	-	*Acridotheres tristis*	Introduced and Naturalised	S1, S2, S3
Paradise shelduck	Pūtangitangi	*Tadorna variegata*	Not Threatened	S1, S3

Common Name	Māori Name	Scientific Name	Conservation Status (Robertson et al., 2021)	Relevant NoR
Pied shag	Kāruhiruhi	*Phalacrocorax varius*	At Risk - Recovering	S1, S3
Pūkeko	Pūkeko	*Porphyrio melanotus*	Not Threatened	S1, S3
Shining cuckoo	Pīpīwharauroa	*Chrysococcyx lucidus*	Not Threatened	S1, S3
Silvereye	Tauhou	*Zosterops lateralis*	Not Threatened	S1, S2, S3
Skylark	Kaireka	*Alauda arvensis*	Introduced and Naturalised	S1, S3
Song thrush	-	*Turdus philomelos*	Introduced and Naturalised	S1, S2, S3
Spotted dove	-	*Streptopelia chinensis tigrina*	Introduced and Naturalised	S1
Spur winged plover	-	*Vanellus miles novaehollandiae*	Not Threatened	S1, S3
Swamp Harrier	Kāhu	*Circus approximans*	Not Threatened	S1, S3
Tūī	Tūī	*Prosthemadera novaeseelandiae*	Not Threatened	S1
Welcome swallow	Warou	*Hirundo neoxena*	Not Threatened	S1, S2, S3
White-faced heron	Matuku moana	*Egretta novaehollandiae*	Not Threatened	S1, S3
Yellowhammer	-	*Emberiza citrinella*	Introduced and Naturalised	S1, S3

13 Appendix 13 - External Review of Proposed Long-Tailed Bat Mitigation

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Company number 6535532 | GST number 124340845

MEMORANDUM

To: Michiel Jonker (AECOM)

From: Dr Ian Davidson-Watts (DWEP)

17 August 2022

The North West Future Project - review of effects and proposed mitigation for long-tailed bats

As part of the Supporting Growth Programme, Te Tupu Ngātahi Supporting Growth (SG) is preparing Notices of Requirement (NoRs), on behalf of Waka Kotahi NZ Transport Agency (Waka Kotahi) and Auckland Transport (AT), to designate land, under the Resource Management Act 1991 (RMA), for the purpose of constructing, operating and maintaining a proposed strategic and local arterial transport network in the North West (NW) of Auckland, hereinafter referred to as the 'Project'.

Long-tailed bats (pekapeka) (*Chalinolobus tuberculatus*) are considered 'Threatened – Nationally Critical' (O'Donnell et al., 2018) and are known to be present within the Northwest of Auckland, and surveys undertaken by AECOM in December 2021 and April 2022 have confirmed their presence at various locations within and adjacent to the proposed designation (AECOM 2022).

This memo outlines at a high level, the likely effects of the project on long-tailed bats, and reviews strategic level mitigation to address those effects.

Interpretation of long-tailed bat data in relation to the project

The bat report (AECOM 2022) identified that bats are active in the North West Project area with the highest bat activity recorded in the Alternative State Highway (ASH) NoR.

Wider ABM deployment to the south and north of the project's area also provides useful context in where bats are likely to be originating. These ABMs show a distribution of bat detections generally south of the Kumeu area and the project and no bat detections recorded on ABMs north of Kumeu suggesting bats are originating from the south and west of the project.

Breeding populations of long-tailed bats occur in the northern Waitakere ranges which is less than 10km from the ASH. Commuting ranges, especially after the core breeding period, of over 20km have been recorded for long-tailed bats, and it is possible that the long-tailed bat detections associated with the project could originate from these bats or be associated with a meta-population of the Waitakere long-tailed bat. It is also possible that long-tailed bat populations occur outside of the Waitakere Ranges and roosts could occur in other bush blocks or similar to long-tailed bat populations in Hamilton. These bats could make use of modified landscapes nearer the project.

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The mitigation proposed has been based on the presence and absence of bats and their likely direction of travel based on the presence of suitable habitat, as well as their likely source.

However, the surveys do have a number of limitations, and may not address the information needs to assess the effects at a more detailed level and stakeholders/interested parties may request further information. Although two surveys were undertaken to account for the variance of bat behaviour through the active bat season, the key maternity (post parturition) periods in January/February were not surveyed. Furthermore, ABM's are limited in their ability to determine the presence of roosts and the breeding status of bats if detected.

Notwithstanding these limitations it is possible at this stage of the programme to develop mitigation. This memo focuses on the ASH areas where the potential effects are the greatest.

Potential effects on long-tailed bats from the Project

1. The primary impact of the project is from the fragmentation of habitats being used by long-tailed bats for commuting and foraging. The ASH presents the greatest impact in this respect and the highest levels of long-tailed bat activity were recorded along the proposed ASH alignment, southwest of Kumeu.
2. At the eastern end of the scheme the fragmentation effects of the project would potentially inhibit bats from commuting from the south towards the estuarine and rural habitats south east of Riverhead.
3. Although not strictly related to the project designation, the longer term proposals for residential and commercial development in the area south west of Kumeu would have a cumulative impact on long-tailed bats.
4. In addition, collision risk for bats crossing roads would form part of the same effect, which is considered without mitigation to a be a high-level negative effect on long-tailed bats.
5. Although a Regional consenting matter Direct and indirect foraging habitat loss during the construction phase is an additional negative effect on long-tailed bats.
6. Although significant levels of roosting have not been considered likely given the spread/timings of the ABM data, the limitations of the ABM survey method do not rule out roosting possibilities for these bats locally. Subsequently there could be potential effects on roosting long-tailed bats from the project.

Proposed mitigation

General - The proposed habitat mitigation developed by AECOM is fundamentally sound and is applied appropriately in areas where bats have been detected and suitable commuting and foraging habitat exists. This includes the use of bat hop over in existing vegetated areas and importantly the retention of existing vegetation. Where bridges are present, it will be important to ensure there is

sufficient height for long-tailed bats to pass under to reduce collision risk, and 4-5m would be the minimum with vegetation guiding the bats to these passing points.

Habitat structure is important to long-tailed bats and retaining as much of the mature vegetation, including exotic trees/tree lines etc, will be crucial to reduce fragmentation effects during construction. Early-stage planting of natives etc is essential to address impacts of fragmentation in the medium and long term phases of the project.

Four additional areas are proposed that would extend the mitigation to address the strategic requirements of bats using the area (see attached KML).

AM1 Additional Mitigation 1 (AM1) is in the centre of the strategic route. The proposed mitigation already encompasses a high level of existing and proposed vegetation to the south of the highway including the main water course. The additional mitigation is proposed north of the project to ensure that long-tailed bats have a larger area of positively managed habitats to ensure they can disperse appropriately to foraging areas to the north.

AM2 The aim of AM2 is to ensure bats have a substantial corridor to enable commuting bats to reach the estuarine habitats to the north. This area is already fragmented due to the existing highway 16 and security of the corridor through this area would seek to apply improved connectively for the project and existing infrastructure.

AM3 The part of the project likely receives bats originating from the west and there are wider vegetative linkages that bats could be exploiting. The aim of the additional mitigation is to increase connectively to the near road mitigation. The other advantage this area has is that it will also improve foraging habitat west of the scheme. This takes into account the proposed residential development south west of Kumeu in the future, and effectively this mitigation seeks to provide alternative foraging habitat in the long term as part of addressing the fragmentation effects.

AM4 Has a similar approach to AM3 in that the area identified appears to be best connected from a long-tailed bat commuting perspective also provide opportunities for foraging enhancements in the long-term.

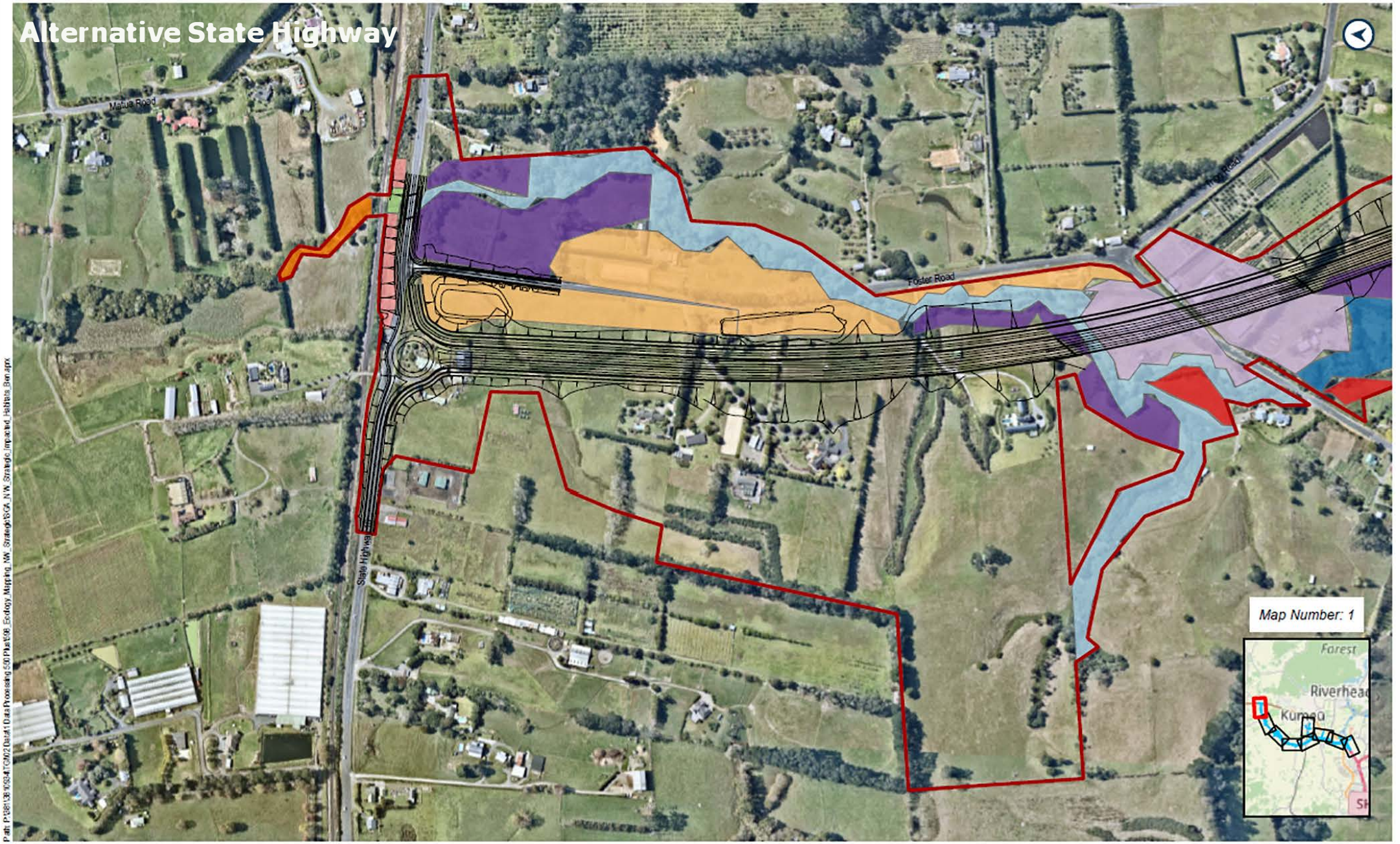
Conclusion

The ABM data has provided a useful baseline from which reasonable assumptions can be made on the likely effects of the project on long-tailed bats at the strategic level. This combined with a widescale approach to mitigation should address the key effects of fragmentation.

However, it will be necessary to obtain further data to refine mitigation and address other potential effects at more local level.

The additional mitigation proposed takes a precautionary approach to ensure that effects of fragmentation of the scheme are addressed at the strategic level.

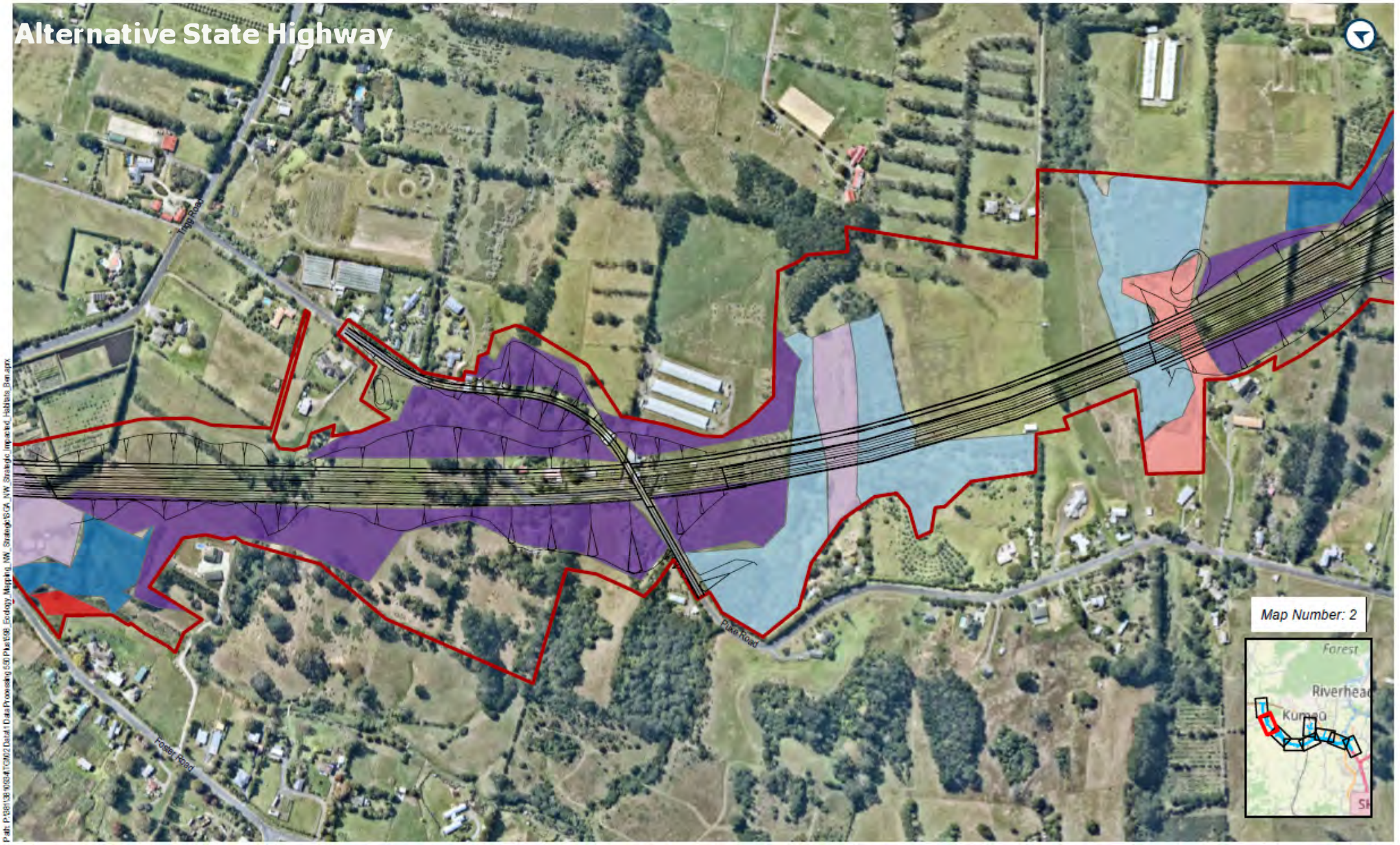
14 Appendix 14 - Long-Tailed Bat Mitigation



LEGEND

- Route Options
- Designation
- Buffer habitat & hop-over/ under - A
- Buffer habitat - A
- Buffer planting & hop-over/ under - A
- Buffer planting & hop-over/ under - B
- Buffer planting & hop-over/ under - C
- Buffer planting - B
- Buffer planting - C
- Hop-over/under - A
- Hop-over/under - B
- Hop-over/under - C

- *A = Retain vegetation*
- *B = Early-stage planting /mature tree planting*
- *C = Late-stage planting*



LEGEND

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- Buffer habitat - A
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- Buffer planting & hop-over/ under - B
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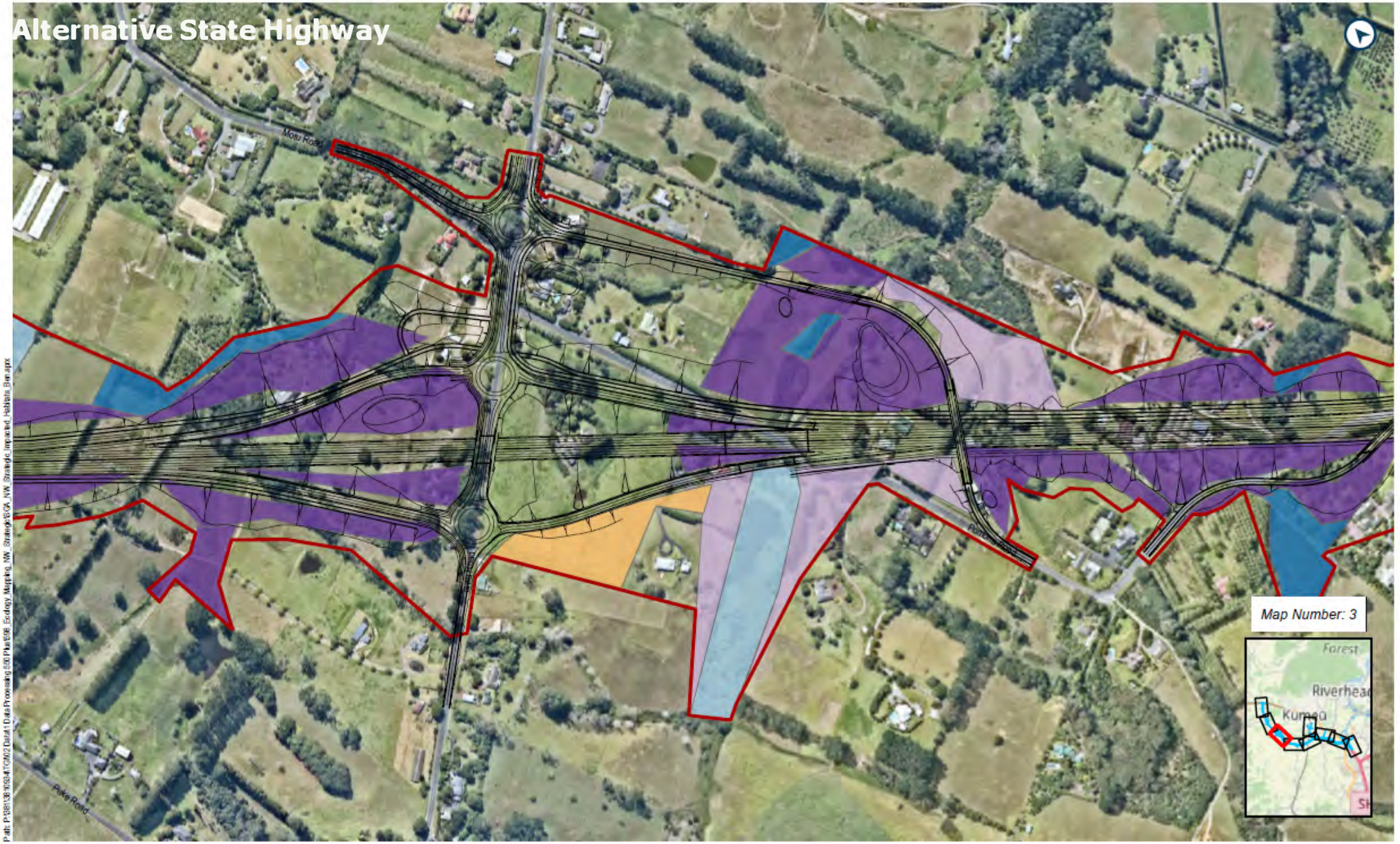

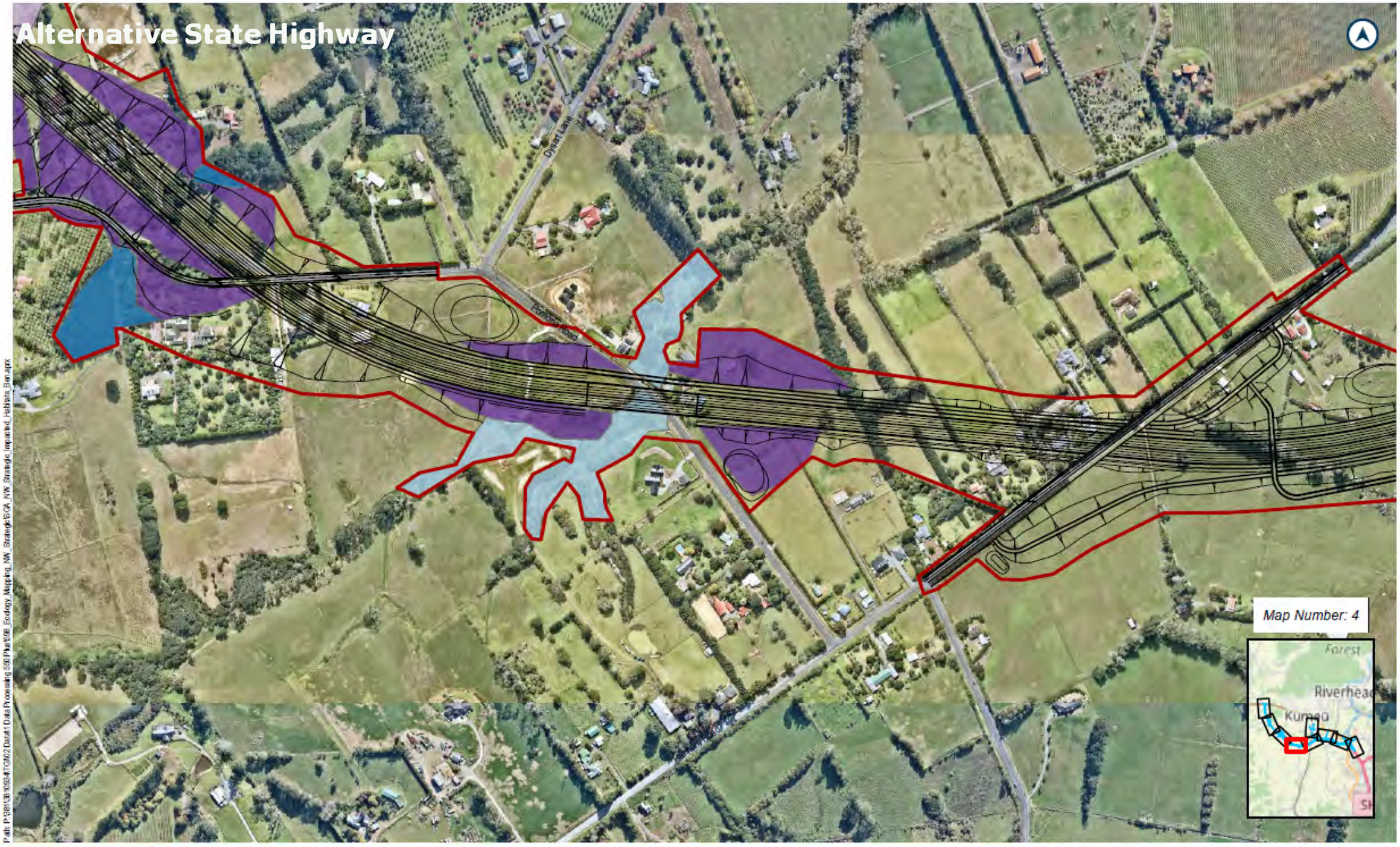

LEGEND

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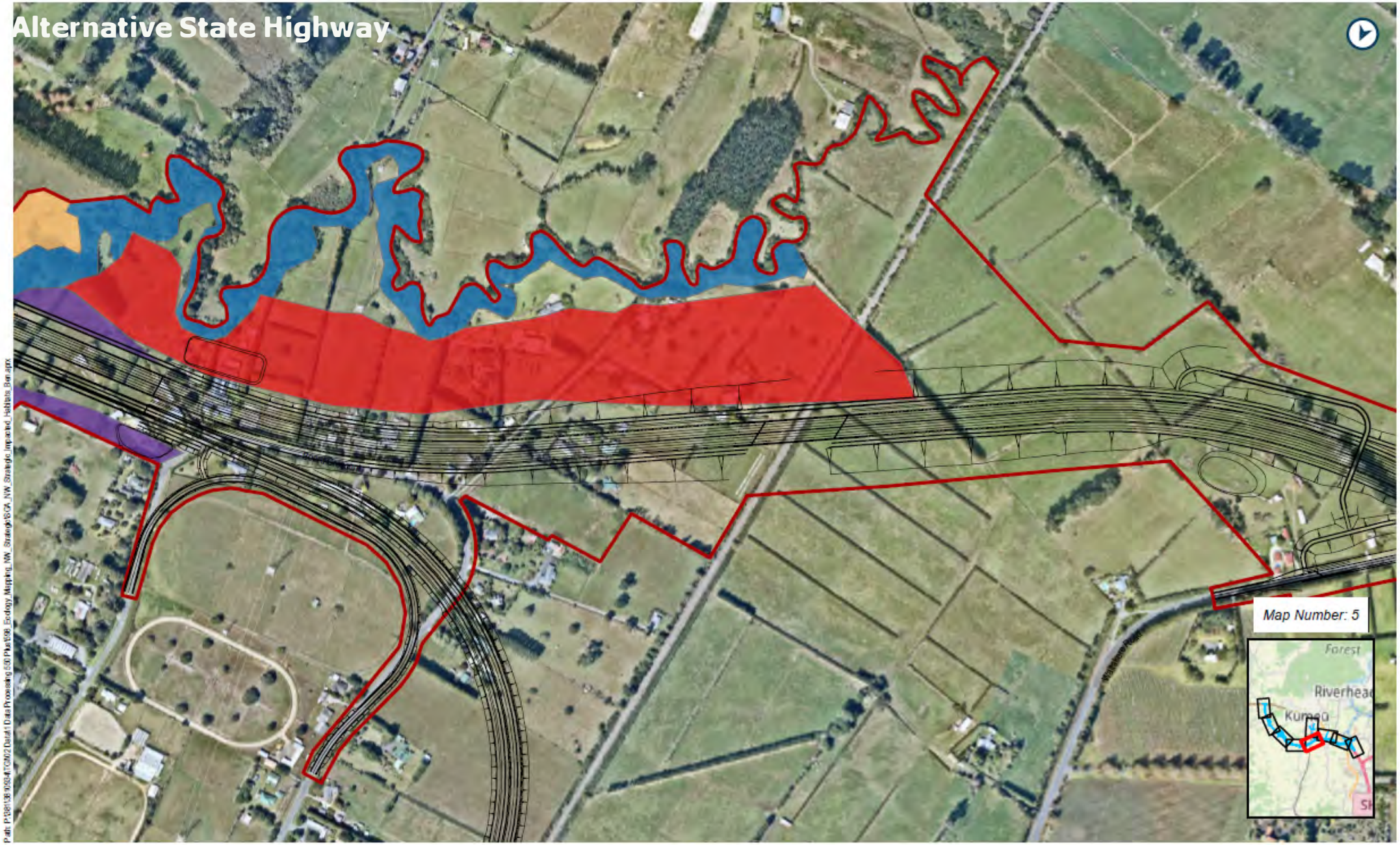
Alternative State Highway
Map Number: 5
Forest
Riverhead
Kumeu
LEGEND
Route Options
Designation
Buffer habitat & hop-over/ under - A
Buffer habitat - A
Buffer planting & hop-over/ under - A
Buffer planting & hop-over/ under - B
Buffer planting & hop-over/ under - C
Buffer planting - B
Buffer planting - C
Hop-over/under - A
Hop-over/under - B
Hop-over/under - C
• A = Retain vegetation
• B = Early-stage planting /mature tree planting
• C = Late-stage planting
0
100
200
Metres
This map contains data derived in part or wholly from sources other than Supporting Growth Alliance, and therefore, no representations or warranties are made by Supporting Growth Alliance as to the accuracy or completeness of this information.
Map intended for distribution as a PDF document.
Scale may be incorrect when printed.
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Aerial imagery supplied by Near Map Australia Pty Ltd

LEGEND

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- Hop-over/under - B
- Hop-over/under - C

0 100 200
Metres

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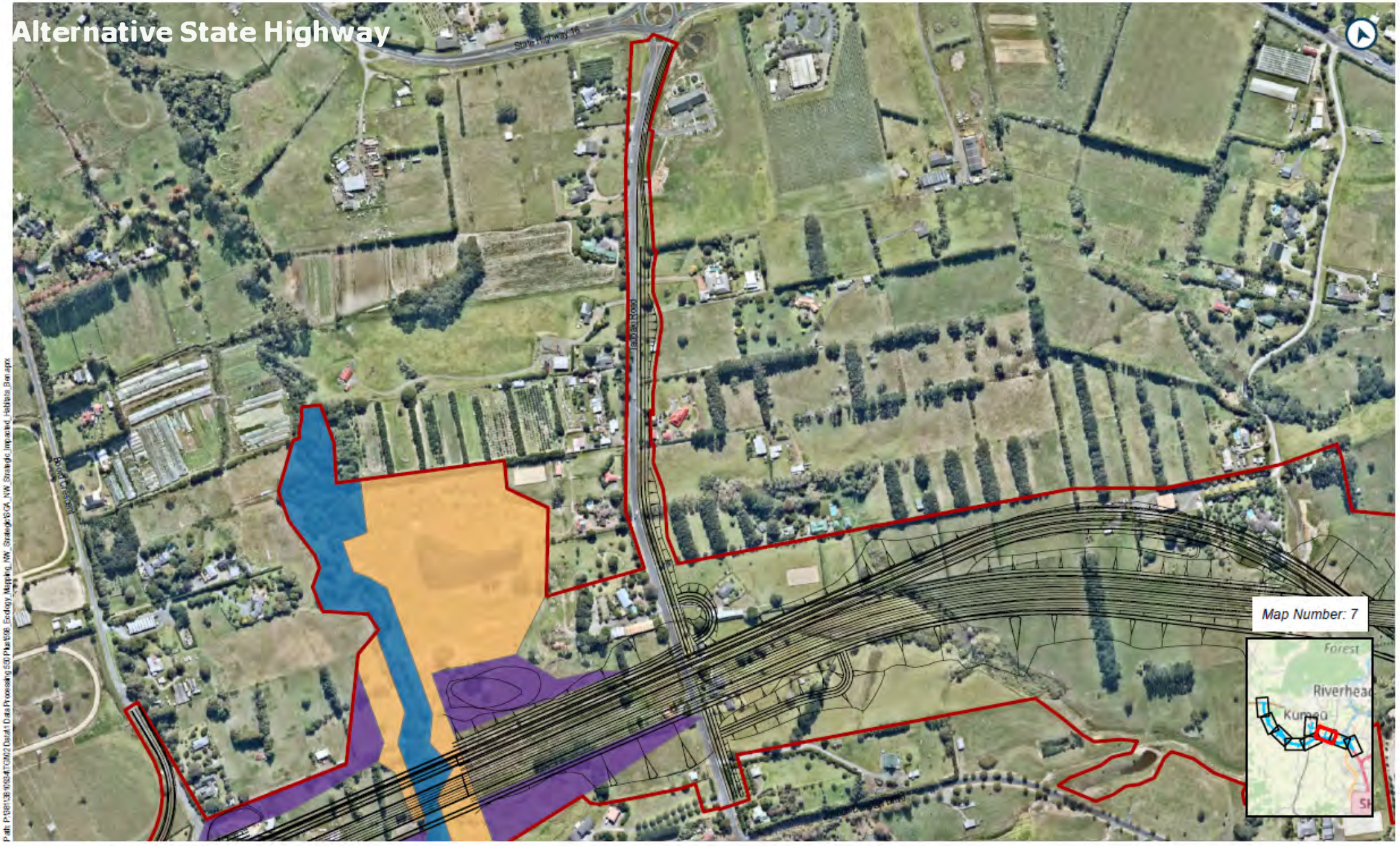
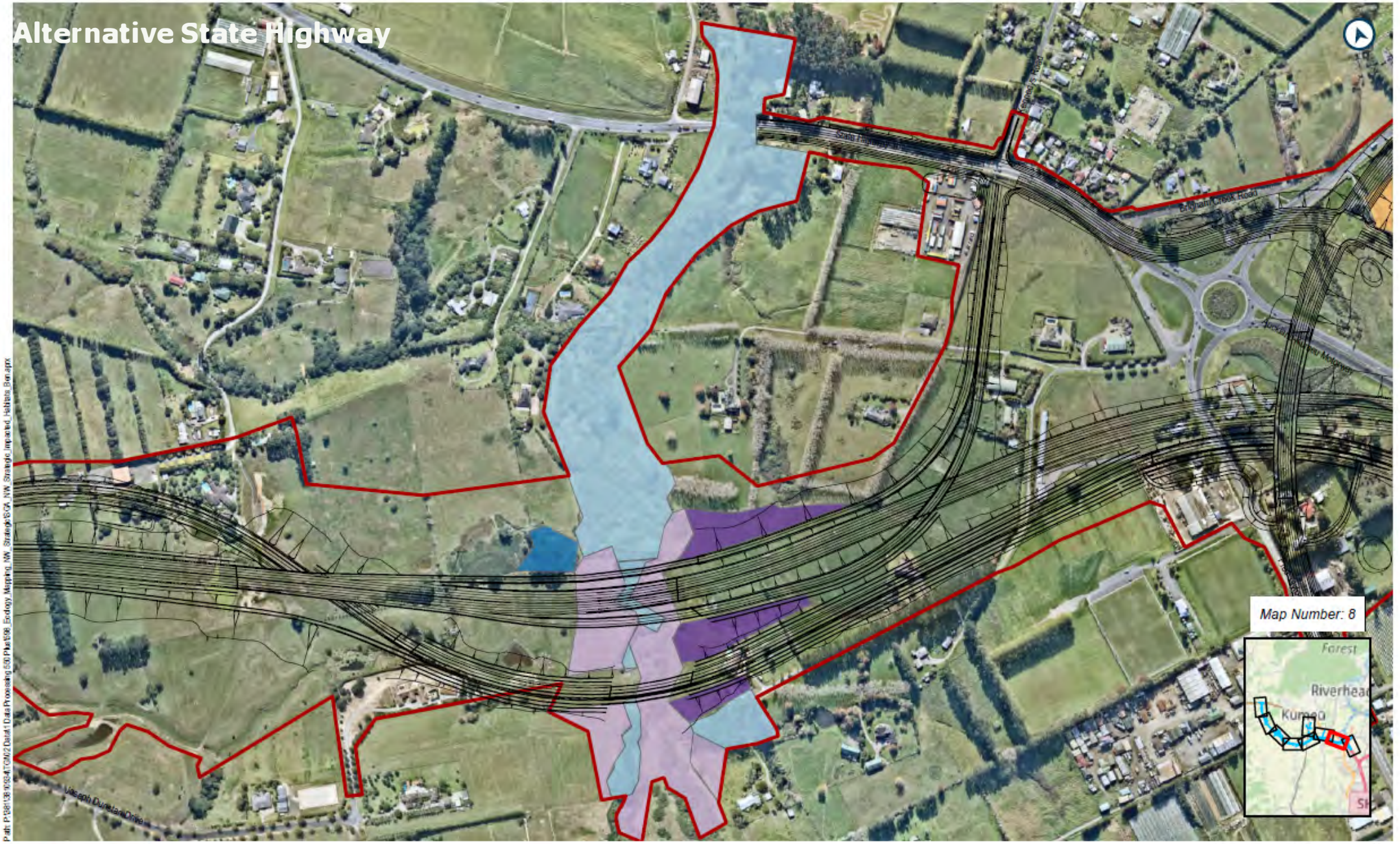


Alternative State Highway



LEGEND

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- Buffer habitat - A
- Buffer planting & hop-over/ under - A
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- Hop-over/under - C

0 100 200
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- Buffer habitat - A
- Buffer planting & hop-over/ under - A
- Buffer planting & hop-over/ under - B
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- Buffer planting - B
- Buffer planting - C
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- Hop-over/under - B
- Hop-over/under - C

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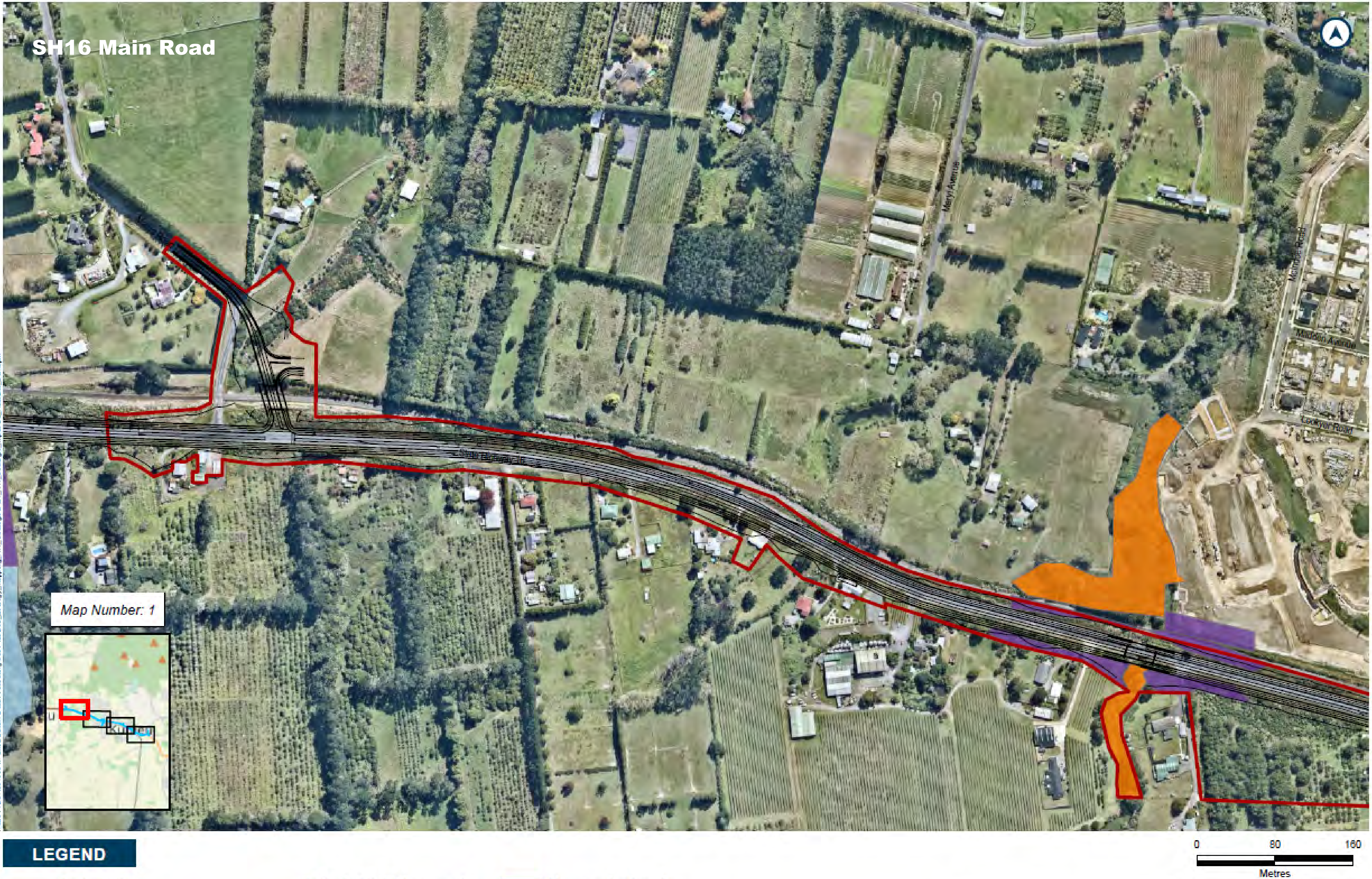

LEGEND

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- Designation
- Buffer habitat & hop-over/under - A
- Buffer planting & hop-over/under - C
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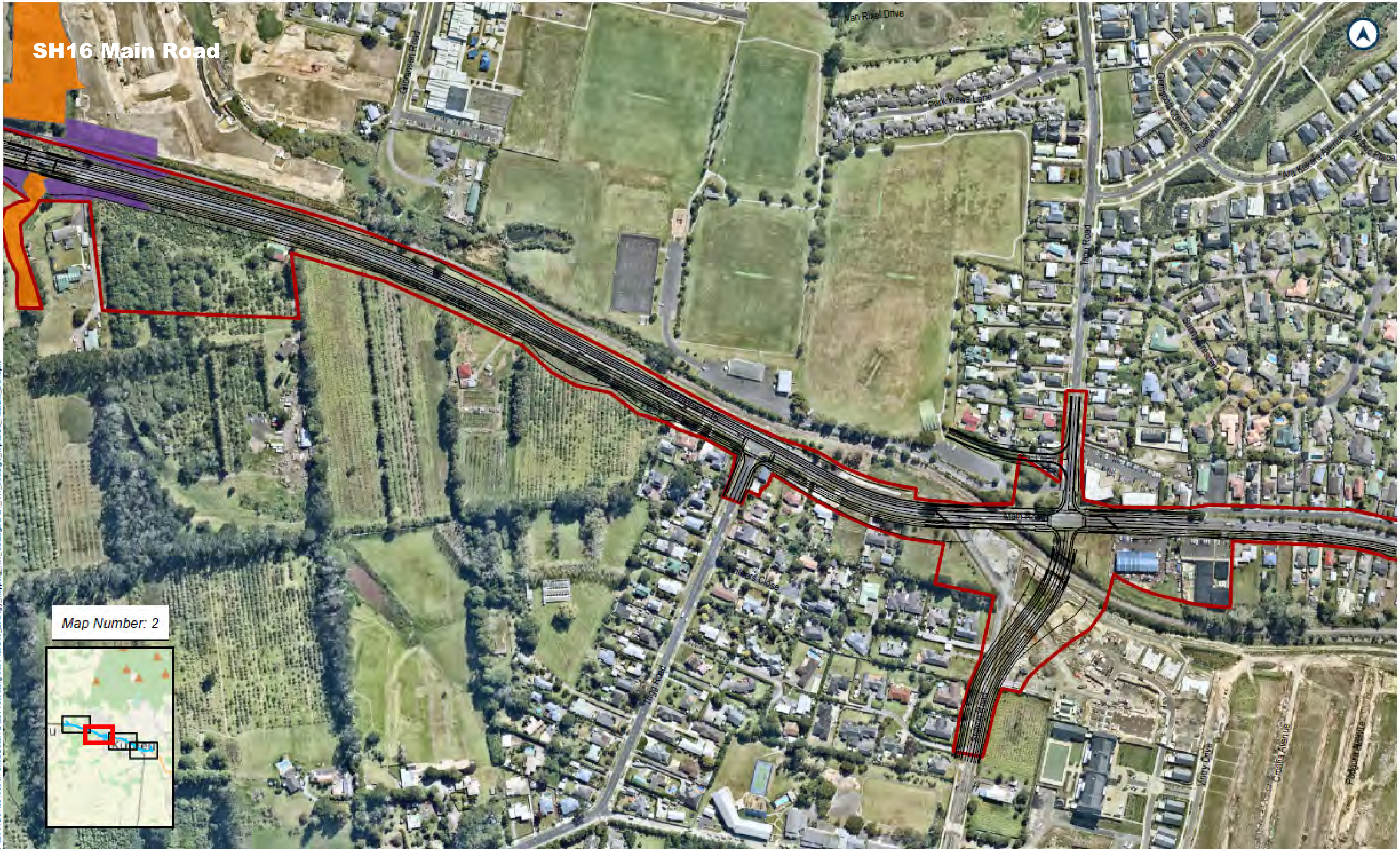

0 80 160
Metres

LEGEND

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- Hop-over/under - C

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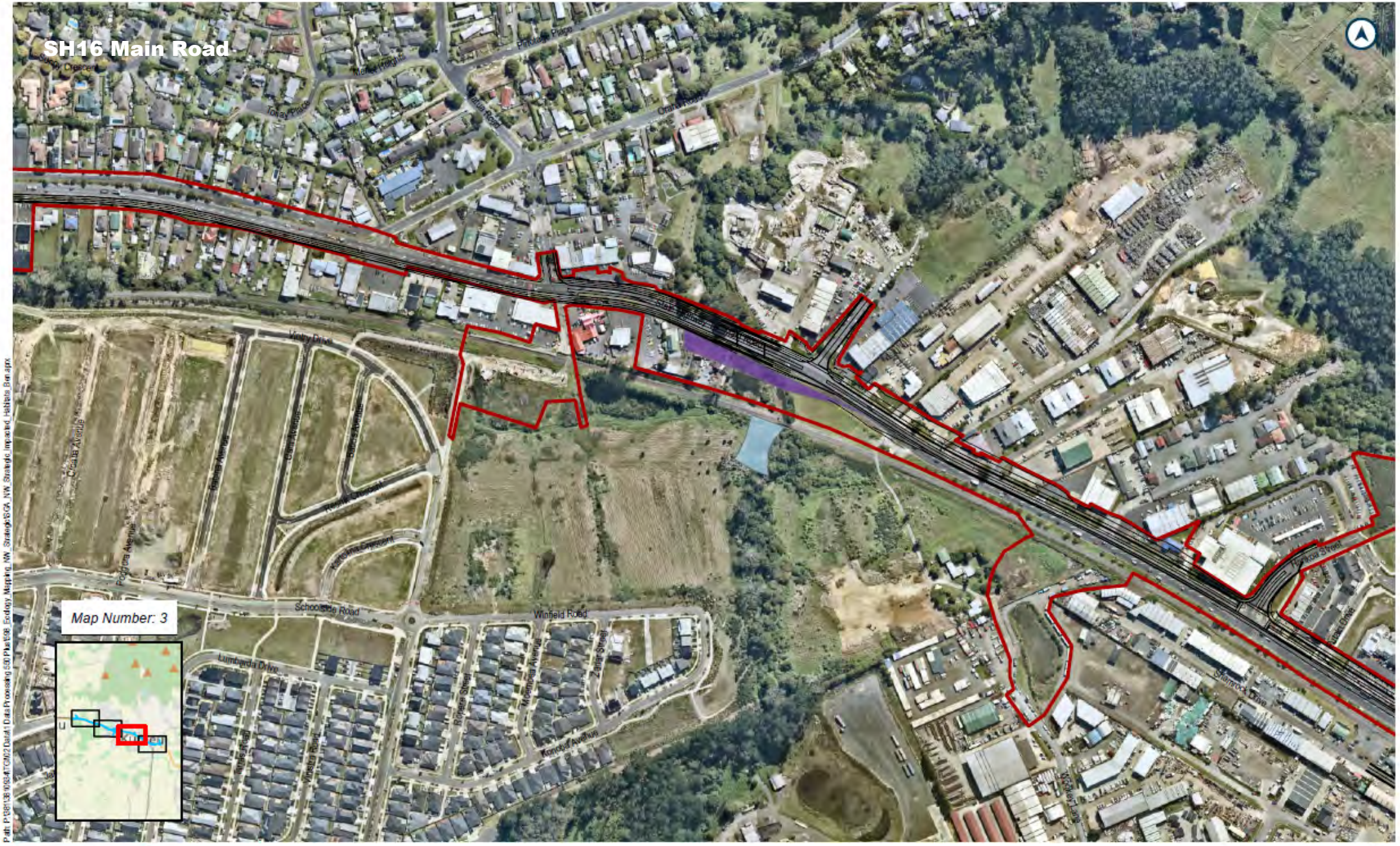

LEGEND

- Route Options
- Designation
- Buffer habitat & hop-over/ under - A
- Hop-over/under - C

0 80 160

Metres

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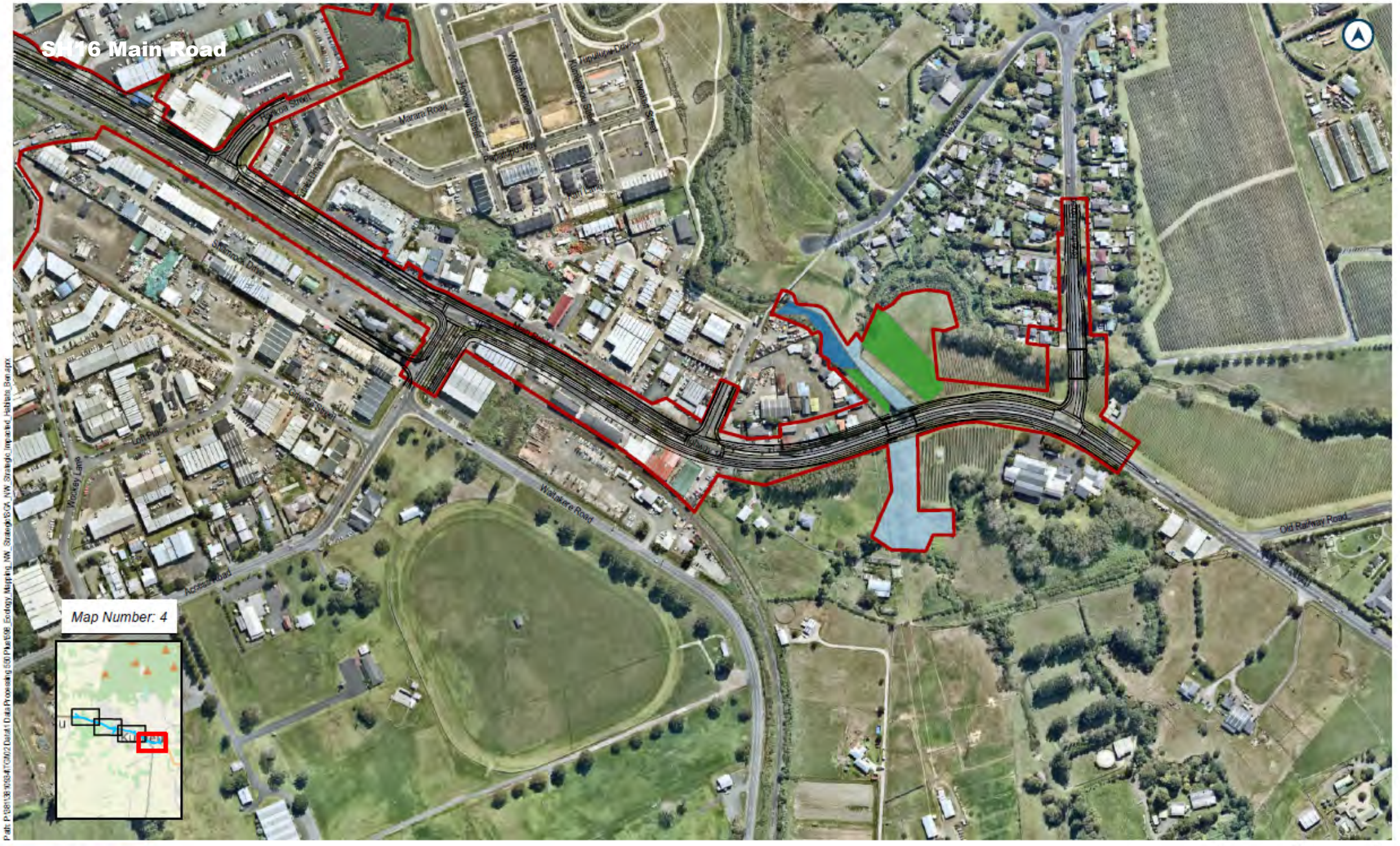
- *B = Early-stage planting /mature tree planting*
- *C = Late-stage planting*

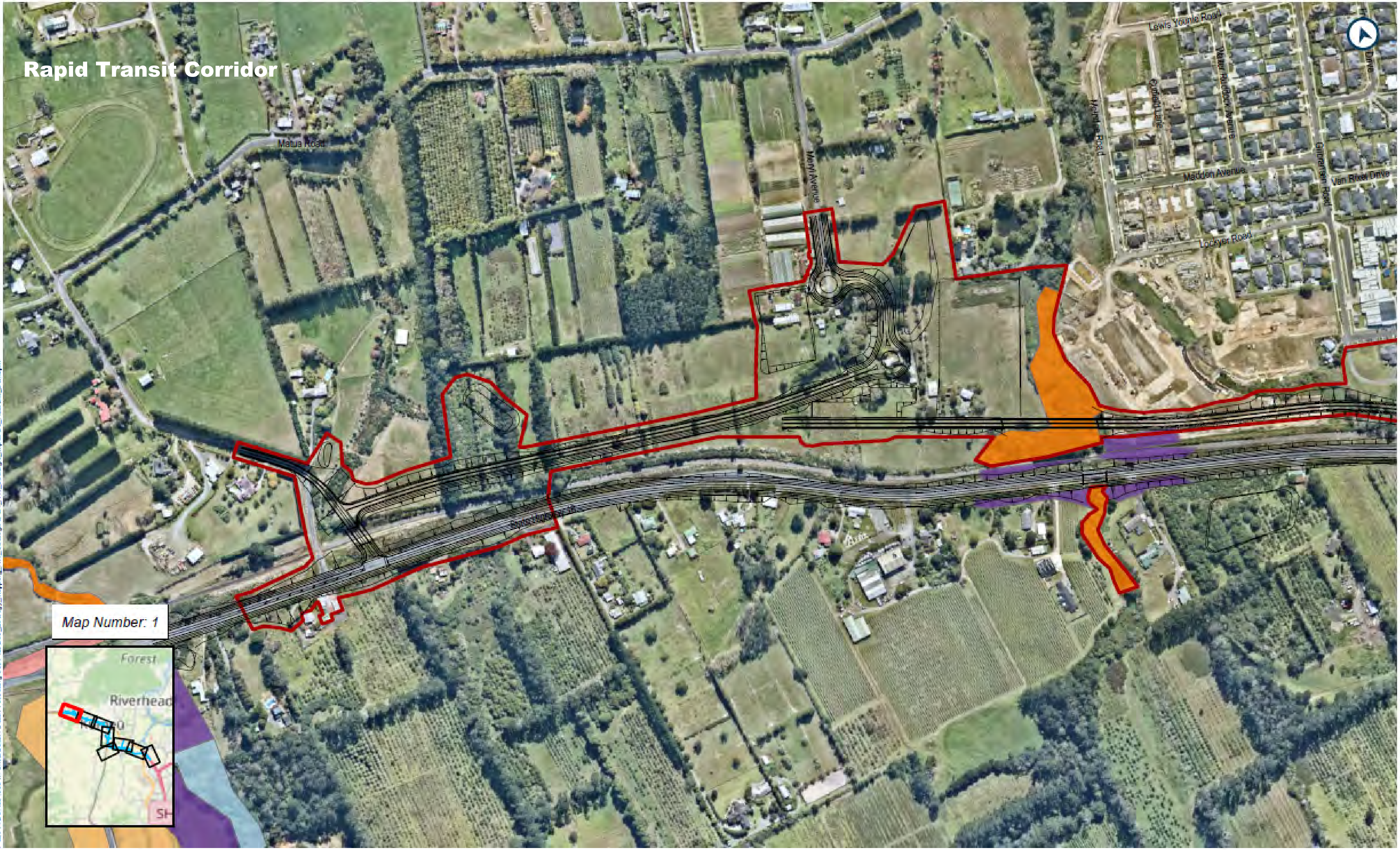


LEGEND

- Route Options
- Designation
- Buffer habitat & hop-over/ under - A
- Buffer habitat - A
- Buffer planting & hop-over/ under - B

0 80 160
Metres

- *A = Retain vegetation*
- *B = Early-stage planting /mature tree planting*
- *C = Late-stage planting*



LEGEND

- Route Options
- Designation
- Buffer habitat & hop-over/under - A
- Buffer planting & hop-over/under - A
- Buffer planting & hop-over/under - C
- Buffer planting - C
- Hop-over/under - A
- Hop-over/under - C

0 100 200
Metres

- *A = Retain vegetation*
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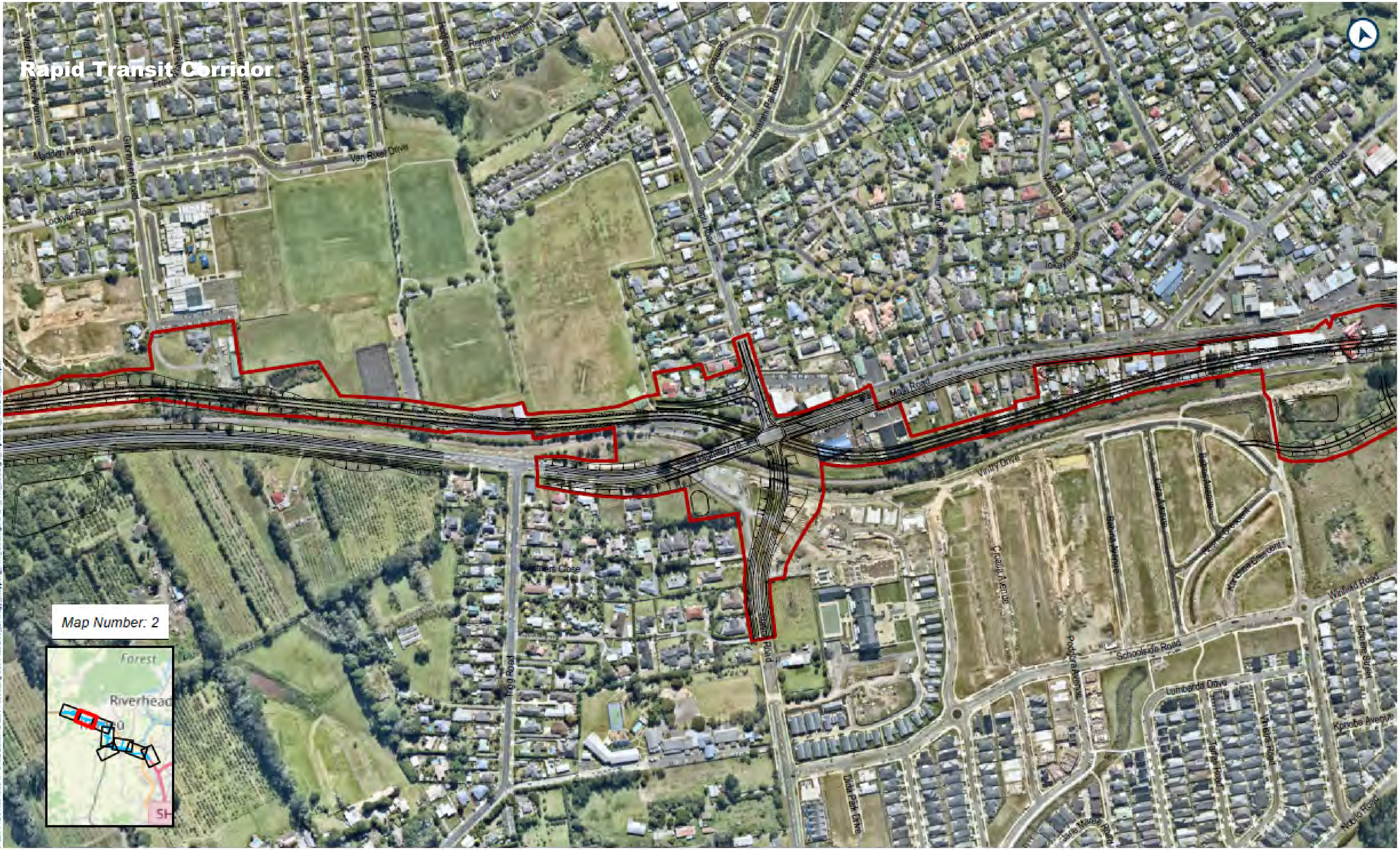

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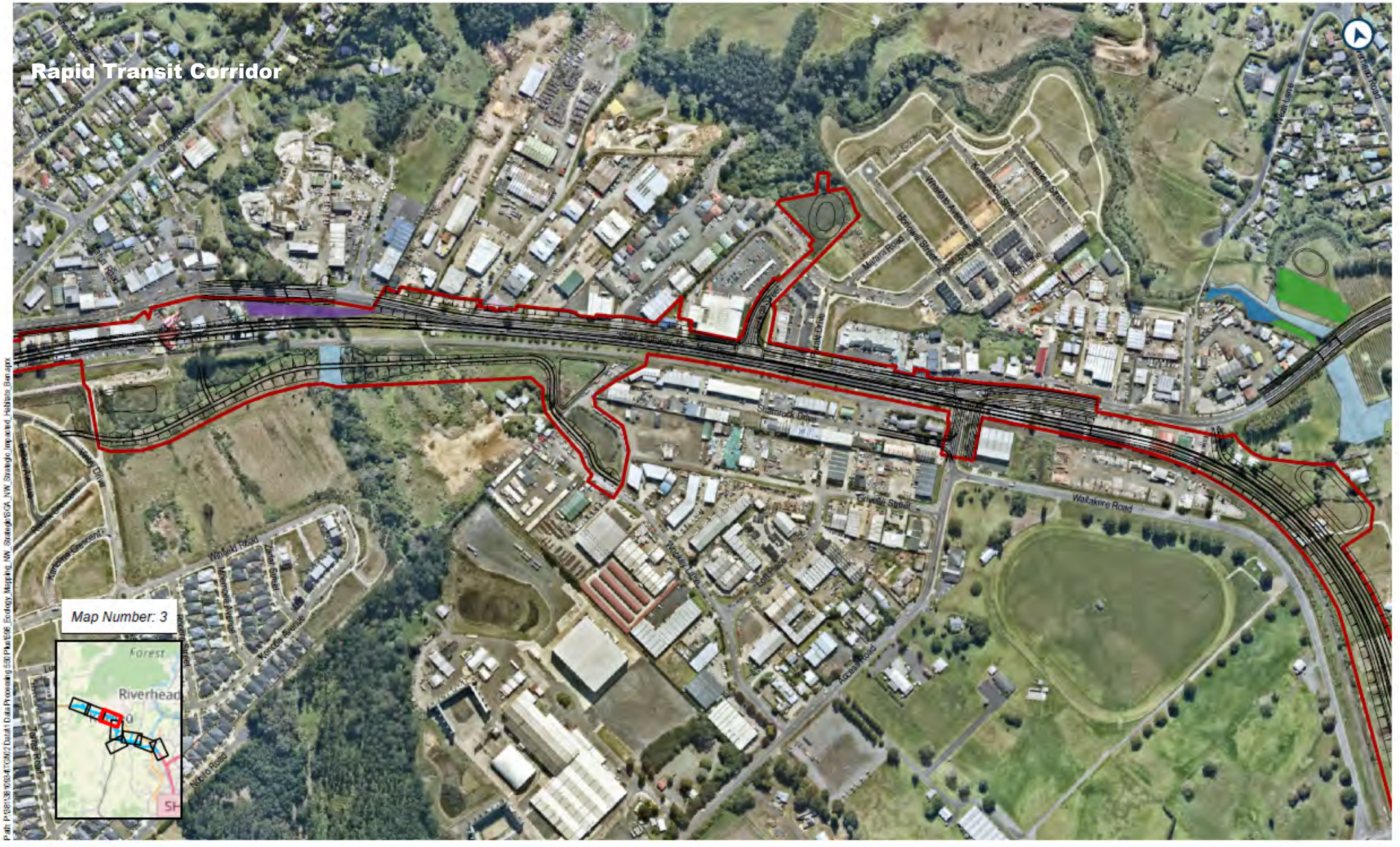

LEGEND

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- Buffer habitat - A
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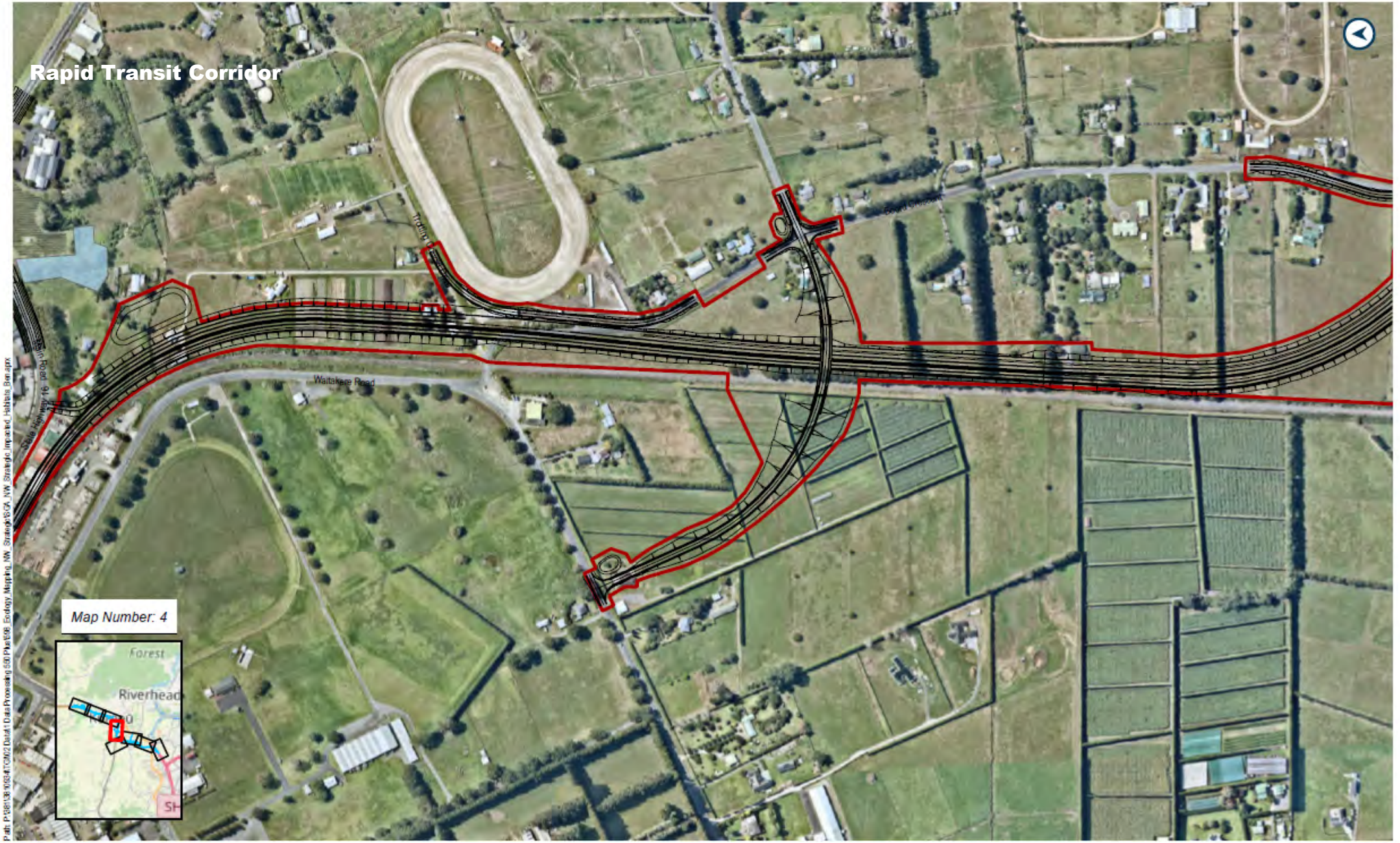

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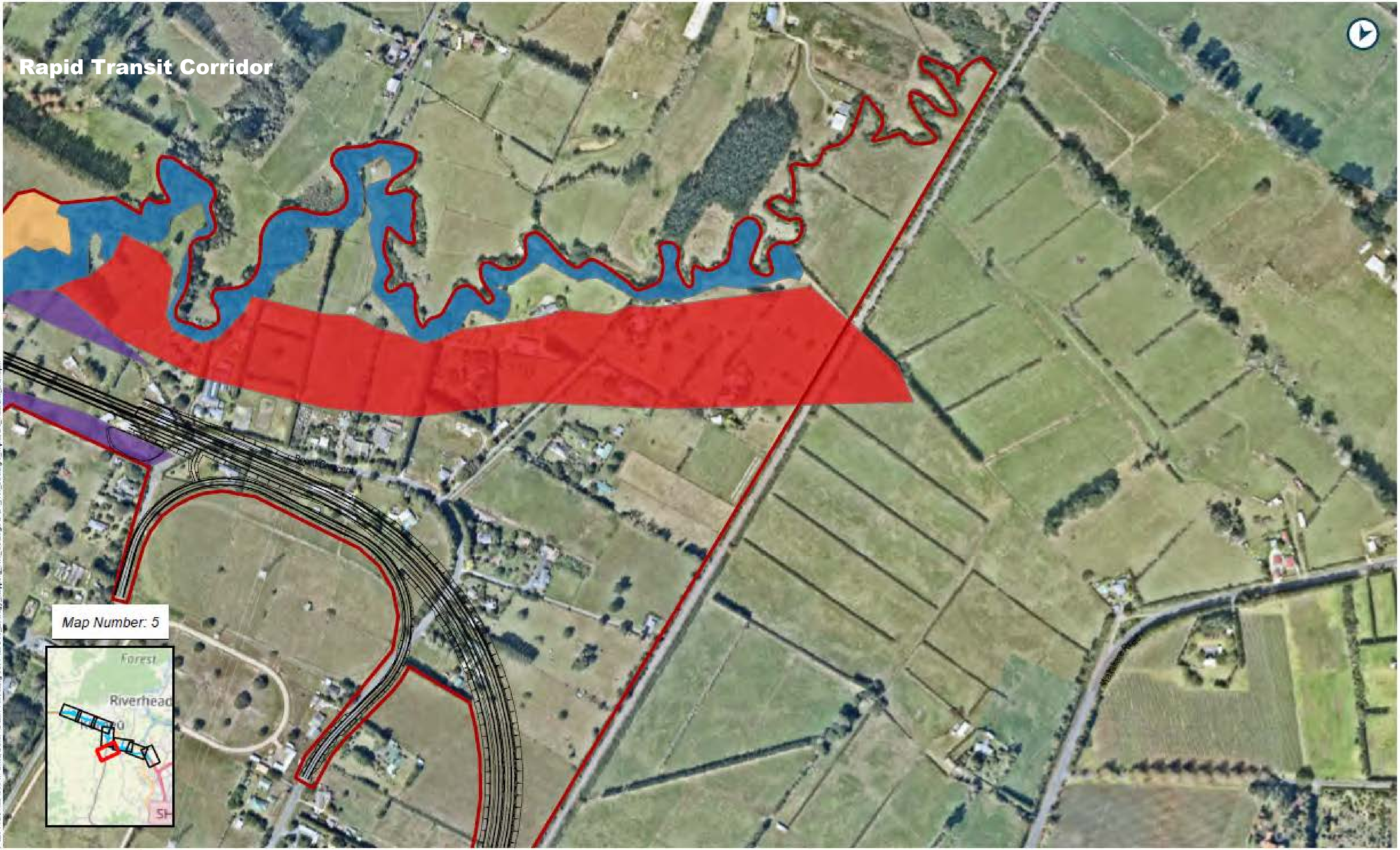

LEGEND

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- Designation
- Buffer habitat - A
- Buffer planting - B
- Buffer planting - C
- Hop-over/under - C

0 100 200
Metres

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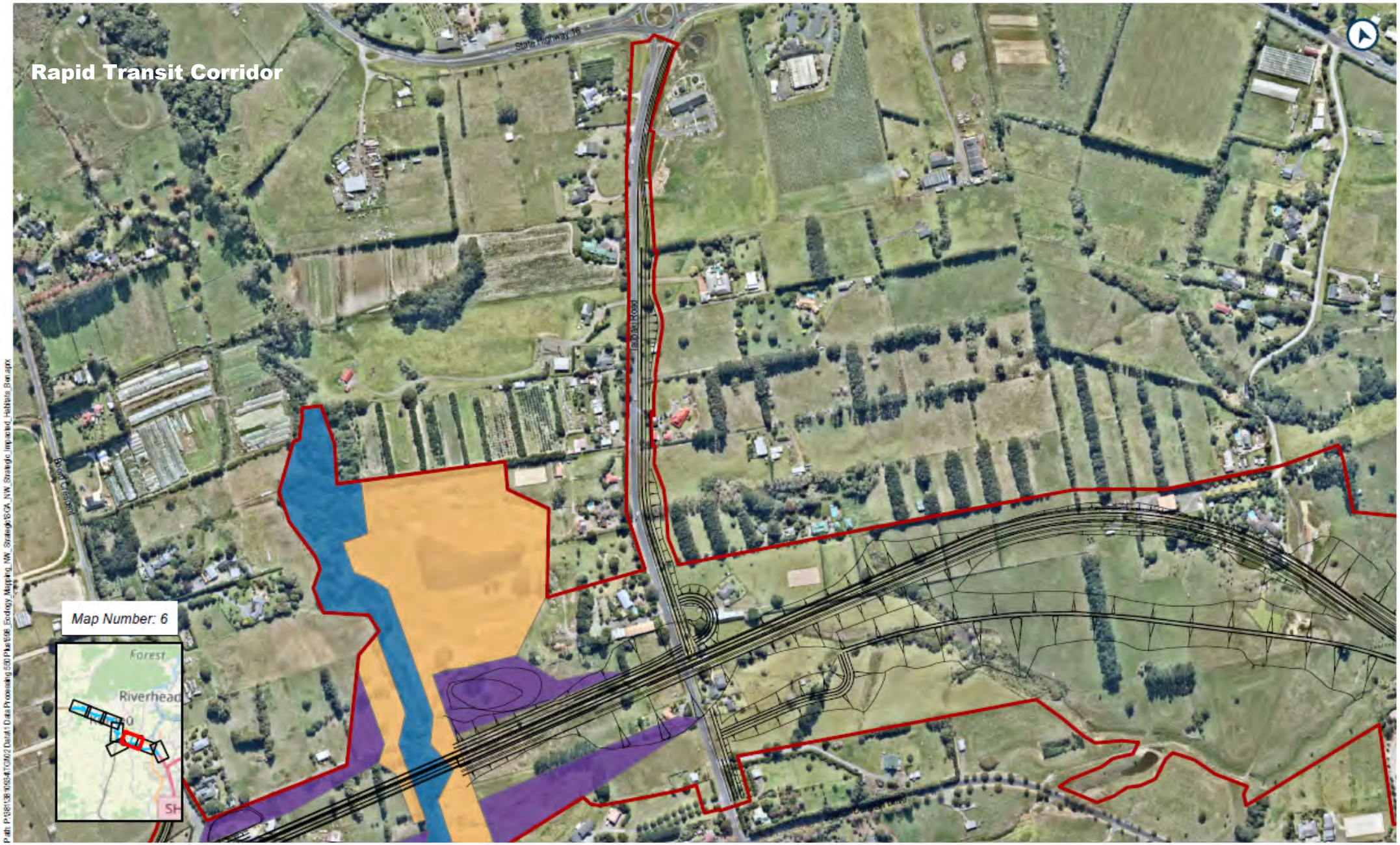

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- Hop-over/under - C

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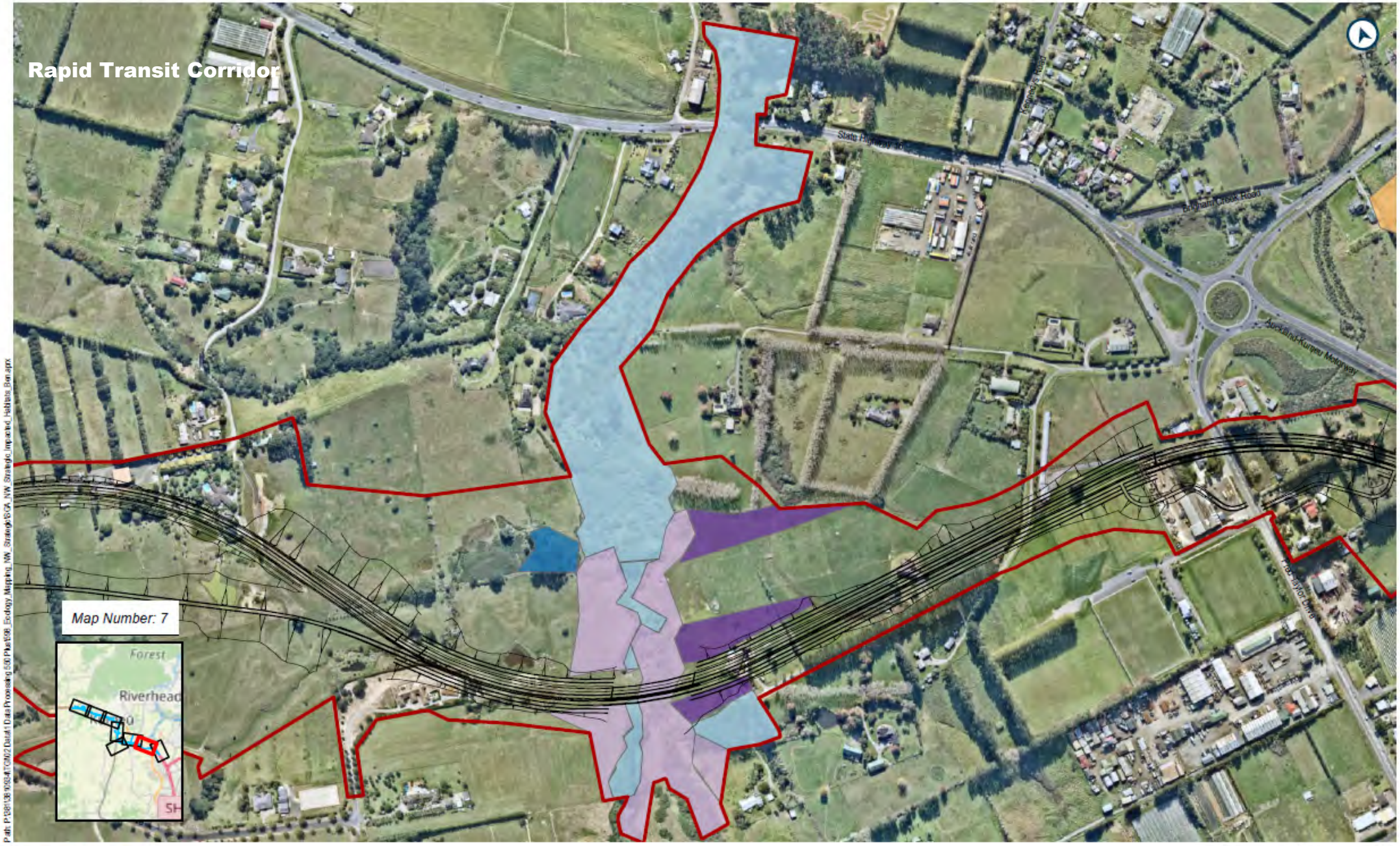

LEGEND

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- Designation
- Buffer habitat & hop-over/ under - A
- Buffer habitat - A
- Buffer planting - C
- Hop-over/under - B
- Hop-over/under - C

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Metres

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LEGEND

- Route Options
- Designation
- Buffer planting - C
- Hop-over/under - B
- Hop-over/under - C

0 100 200
Metres

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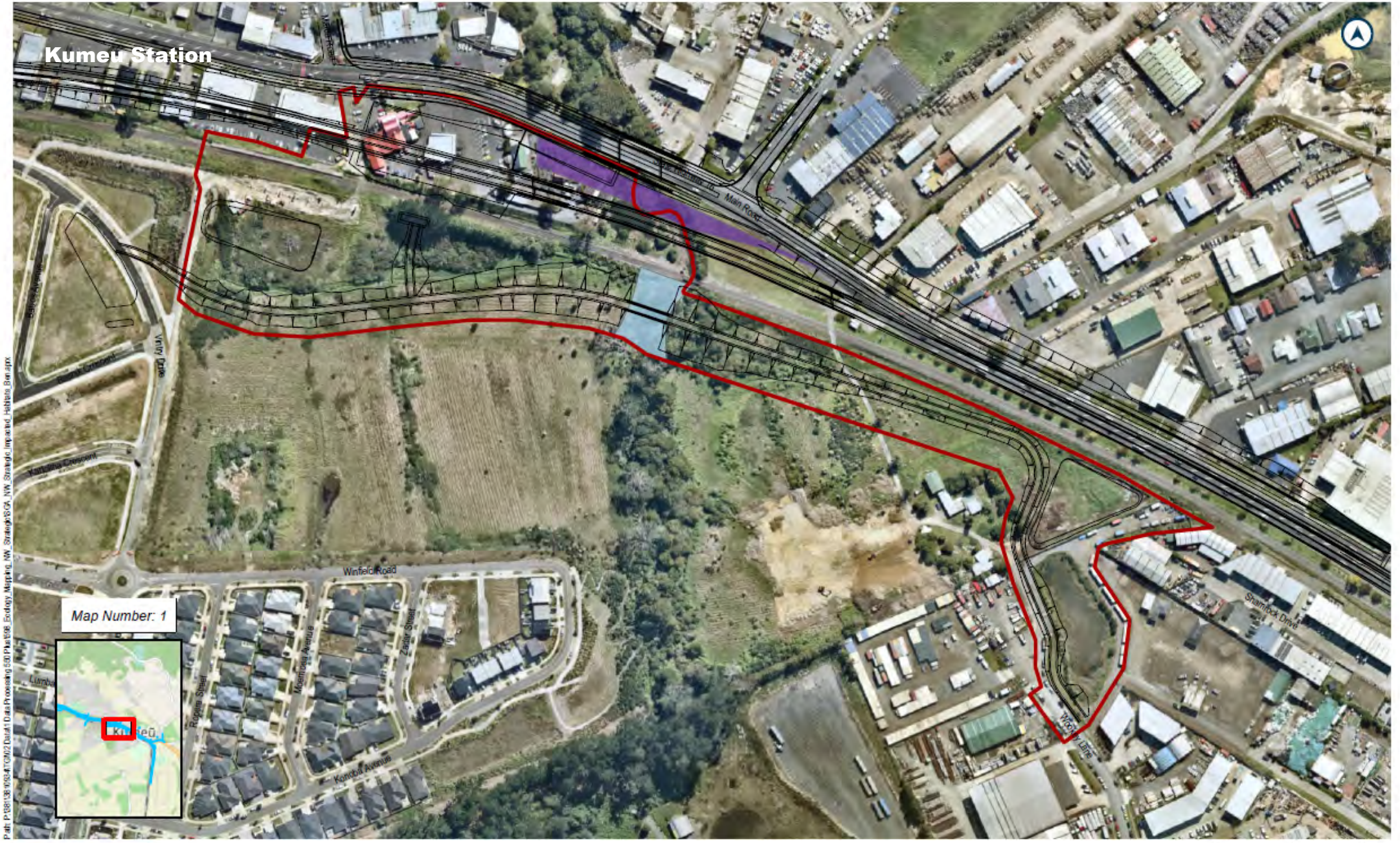

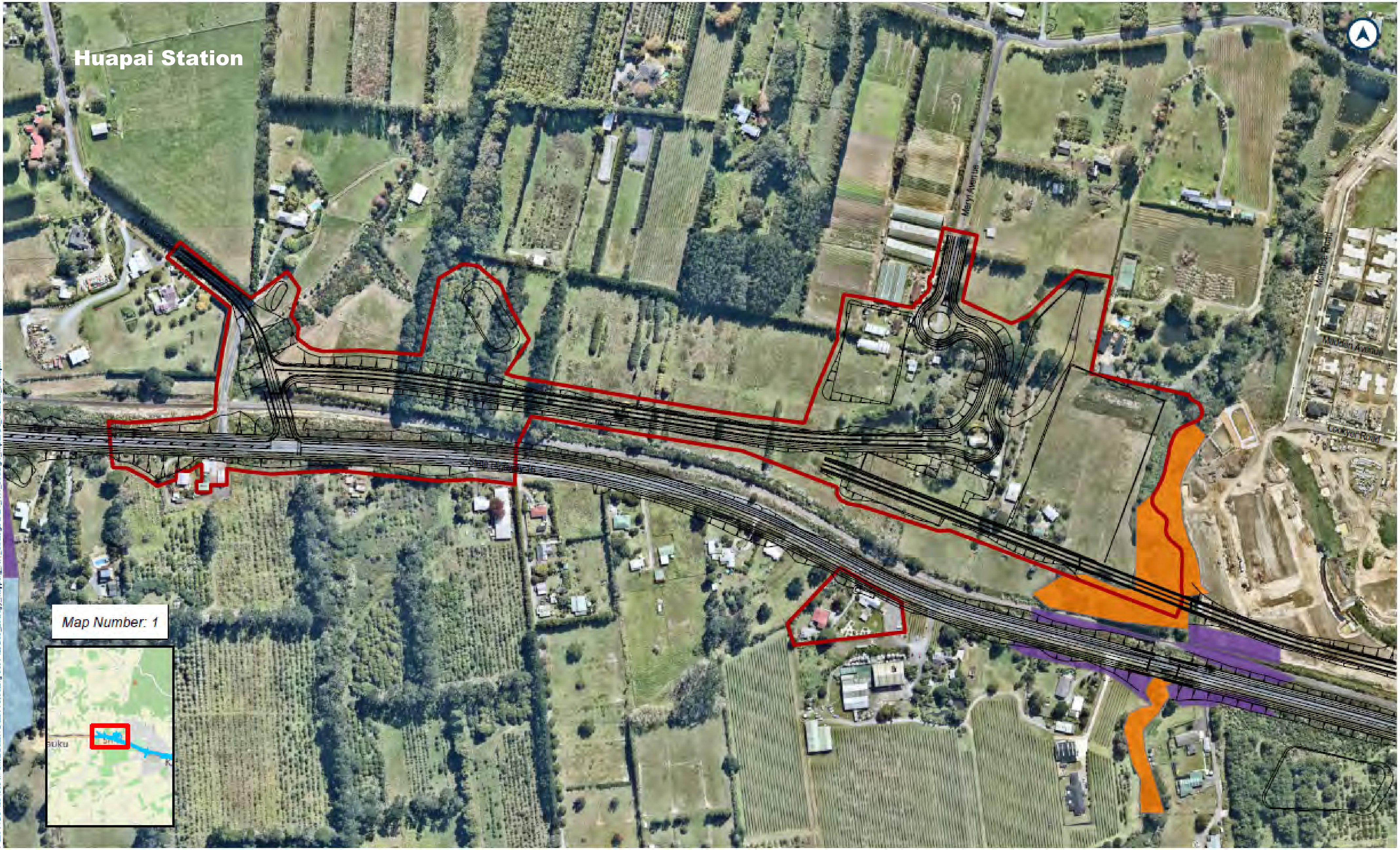

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- Buffer planting & hop-over/under - C
- Hop-over/under - A
- Hop-over/under - C

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- C = *Late-stage planting*

0 80 160

Metres

LEGEND

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- Designation
- Hop-over/under - A

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ATTACHMENT 51

NORTH-WEST STRATEGIC ASSESSMENT OF LANDSCAPE EFFECTS PART 1 OF 4

TE TUPU NGĀTAHI
SUPPORTING GROWTH

North West Strategic Assessment of Landscape Effects

December 2022

Version 1

Document Status

Responsibility	Name
Author	Oliver May
Reviewer	John Goodwin
Approver	John Daly

Revision Status

Version	Date	Reason for Issue
1	16/12/2022	Notice of Requirement Lodgement

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Abbreviations

Acronym / Term	Description
AEE	Assessment of Effects on the Environment
ASH	Alternative State Highway
AT	Auckland Transport
AUP:OP	Auckland Unitary Plan Operative in Part
BCI	Brigham Creek Interchange
CC2W	City Centre to Westgate
CHI	Cultural Heritage Inventory
GIC	Green Infrastructure Corridor
Kumeū River Park	Open Space - Informal Recreation Zone adjacent to the Kumeu river at 296 Main Road
FTN	Frequent Transit Network
FULSS	Future Urban Land Supply Strategy
FUZ	Future Urban Zone
MHS	Residential – Mixed Housing Suburban Zone
NAL	North Auckland Line
NoR	Notice of Requirement (under the Resource Management Act 1991)
NPS-FM	National Policy Statement for Freshwater (2020)
RUB	Rural Urban Boundary
SG	Te Tupu Ngātahi Supporting Growth
SH16	State Highway 16
SHZ	Residential – Single House Zone
The Council	Auckland Council
TCZ	Strategic Transport Corridor Zone
ULDMP	Urban and Landscape Design Management Plan
Waka Kotahi	Waka Kotahi NZ Transport Agency

Glossary of Acronyms / Terms

Acronym / Term	Description
Auckland Council	Means the unitary authority that replaced eight councils in the Auckland Region as of 1 November 2010.
Strategic Assessment Package	Four Notices of Requirement (for ASH, RTC, Station Road and SH16) and one alteration to an existing designation (SH16 Main Road) for the Whenuapai Arterial Transport Network for Auckland Transport.
Change Management	Identification of ways to enhance the landscape and actions to avoid, remedy or mitigate adverse landscape effects.
Designation Boundary	The extent of the proposed NoRs
Landscape	Is the cumulative expression of natural and cultural features, patterns and processes in a geographical area, including human perceptions and associations.[1]
Landscape Character	Is derived from the distinct and recognisable pattern of elements that occur consistently in a particular landscape. It reflects particular combinations of geology, landform, soils, vegetation, land use and features of human settlement. These elements create a unique sense of place defining different areas of the landscape.
Likely Future Environment	The landscape and visual character as a result of the future development proposed in the AUP: OP, including specific precinct plans, structure plans and proposed plan changes relating to the Project area. The likely future environment includes any existing baseline landscape elements (i.e. ONL's, protected vegetation, water ways, landform, sites and / or elements of cultural significance, and existing land-use scenarios) that are likely to endure following anticipated future development resulting from future urban zoning, AUP:OP overlays and land development projects (planned and / or under construction).
Landscape Effects	Landscape effects derive from changes in the physical landscape, which may give rise to changes in its character and how this is experienced. This may in turn affect the perceived value ascribed to the landscape.
Natural Character	The level of natural character (or naturalness) varies within each landscape / seascape and is the result of the combined levels of indigenous nature and perceived nature. These are typically defined by the extent to which natural elements, patterns and processes occur and are legible, and the nature and extent of human modification to the landscape and ecosystems.
Natural Character Effects	Natural character effects arise from landform modification and subsequent vegetation clearance within water bodies including wetlands, lakes and rivers and their margins.[2]
Permanent Effects (Operational Effects)	Describes the effects on the landscape of completed works (including integrated landscape mitigation measures), the significance of physical landscape change and ultimately the resulting effects of the Projects on

[1] NZILA Landscape Assessment and Sustainable Management Practice Note 10.1
[2] Resource Management Act 1991 and New Zealand Coastal Policy Statement 10.1

Acronym / Term	Description
	landscape character, natural character and visual amenity for both public and private viewing audiences.
Project area	Refers to the land being developed within the boundary of the NoRs.
Temporary Effects (Construction Effects)	Describes the anticipated impacts on the bio-physical elements and features of the landscape resource (landform, vegetation and hydrology) resulting from the construction of the Project. It also includes visual amenity effects for both public and private viewing audiences from construction works.
Visual Effects	Visual effects relate to the changes to amenity values of a landscape including the "natural and physical qualities and characteristics of an area that contribute to people's appreciation of its pleasantness, aesthetic coherence, and cultural and recreational attributes".[3]
Visual Catchment	The visual catchment is the area of land from which part or all of the Project area is visible. This is largely determined by landform, land cover and built elements, which in combination may obscure or filter views.

[3] Resource Management Act 1991.

1 Executive Summary

Assessment undertaken

This Landscape Effects Assessment (LEA) has been undertaken with reference to Te Tangi a te Manu, Aotearoa New Zealand Landscape Assessment Guidelines[4]. It assesses the effects resulting from the proposed North West Strategic Arterial Network on the physical landscape, landscape character, natural character and visual amenity. There are no ONLs within the proposed designations for the Project.

Changes and effects during the construction process and / or activities associated with the implementation of development are considered separately to those generated by a completed development.

These assessments cover six separate areas as follows:

NoR S1: Alternative State Highway, including Brigham Creek Interchange

NoR S2 SH16 Main Road Upgrade

NoR S3Rapid Transit Corridor (RTC), including the Regional Active Mode Corridor (RAMC)

NoR KS Kumeu Rapid Transit Station

NoR HS Huapai Rapid Transit Station

NoR S4 Access Road Upgrade

Potential Positive Effects

A number of positive landscape and visual effects are anticipated as a result of the scheme on completion of proposed mitigation.

Positive effects are likely to include:

- A streetscape to support the emerging urban form of the NoR S2 and S4 project corridors;
- A net increase in green infrastructure within the urban Project areas, these have the potential to include new street trees, berm and stormwater plantings and planted stormwater wetland. This is anticipated to result in improved visual amenity for road users and adjacent audiences; and
- Slower speed limits adjacent to existing dwellings and commercial activities improving the experiential qualities of the corridor for users as well as private properties adjacent to an urban road corridor.
- The likely introduction of a large linear band of predominantly native planting along either side of the Alternative State Highway. This will provide linear habitat and landscape integration along the length of the ASH

Construction Effects

Adverse construction effects are expected to be primarily related to construction sites, the presence of construction plant within existing and new road corridors, lighting of night works, and the construction of wetlands. The phasing of the Project will increase the intensity of construction traffic moving along the Project routes throughout the construction period. The phasing of the works along the corridor

[4] 'Te Tangi a te Manu: Aotearoa New Zealand Landscape Assessment Guidelines', [Final Draft subject to final editing, graphic design, illustrations, approved by Tuia Pito Ora/NZILA 5 May 2021]

reduces the length of time audiences are expected to experience adverse effects resulting from construction. Mitigation measures are proposed to reduce the impacts of these construction effects. The anticipated landscape and visual effects are considered with and without the implementation of mitigation measures.

Operational Effects

Adverse operational effects are expected to be as a result of a widened or introduced road corridor resulting in changes in landform and removal of vegetation. It is proposed that during the detailed design phase the mitigation measures will be confirmed as part of a ULDMP. The anticipated landscape and visual effects are considered with and without implementing mitigation measures.

Conclusions

Across all NoRs, the adverse landscape and visual effects without the implementation of mitigation proposals will range from **moderate-high** adverse to **very low** adverse during the construction phase. Landscape and visual effects during the operational phase, without mitigation are anticipated to range from **high** adverse to **low** adverse.

It is anticipated that across all of the NoRs, where mitigation measures are undertaken landscape and visual effects will be reduced and range from **moderate** adverse to **very low** adverse during the construction phase of works. With the project information currently available, during the operational phase of works it is anticipated that landscape and visual effects will range from **low-moderate** adverse to **very low** adverse. Across all NoRs the proposed operational effects are assessed approximately 3-5 years after implementation when proposed planting has become established. After implementation and establishment, it is expected that landscape effects will continue to diminish over time while planting matures.

The highest level of anticipated adverse landscape effects with or without mitigation are related to the landscape and visual effects related to introducing new highway infrastructure into existing rural landscapes, the removal of trees within the Huapai Domain, Kumeu River Park and Fred Taylor Park and the removal of scheduled notable trees adjacent to SH16 (NoR S2 and NoR S3). Wetlands, watercourses and riparian vegetation are also sensitive to the changes proposed in the construction and operation of the projects - in particular where there are new proposed crossing points, structures and culverts including within the Totara Inlet, Totara Creek, Ngongetepara Creek, Karure Stream, Kumeū River (and its branches), Pakinui Stream and the Ahukurama Stream. It is recognised however that there is the potential for positive effects as a result of improvements to degraded watercourses. Although some landscape elements of the proposal fall under the umbrella of regional consent matters (in particular the impacts on water bodies, water courses, wetlands and riparian vegetation) and therefore outside of the scope of the NoRs. Their effects on the landscape have been considered as part of this assessment which, takes a holistic view of the landscape and have formed part of the overall consideration of the designation. These elements will also be considered within the future regional consent assessment.

The highest level of anticipated adverse visual landscape effects across all NoRs is related to retained residential properties where existing screening and filtering vegetation is removed and / or the road corridor moves closer or is introduced to the resident audience. For all of the NoRs it is anticipated that adverse effects can mitigated and will become amalgamated into the emerging urban development.

2 Introduction

This Landscape Assessment has been prepared for the North West Strategic projects and Kumeū Huapai Local Arterials Notices of Requirement (**NoRs**) for Waka Kotahi NZ Transport Agency (**Waka Kotahi**) and Auckland Transport (**AT**) (the "**Strategic Assessment Package**").

The NoRs are to designate land for future strategic and local arterial transport corridors as part of Te Tupu Ngātahi Supporting Growth Programme (**Te Tupu Ngātahi**) to enable the construction, operation and maintenance of transport infrastructure in the North West area of Auckland.

The Strategic Assessment Package will provide route protection for the strategic routes, which include:

- Alternative State Highway (**ASH**), including Brigham Creek Interchange (**BCI**)
- Rapid Transit Corridor (**RTC**), including the Regional Active Mode Corridor (**RAMC**)
- Kumeu Rapid Transit Station
- Huapai Rapid Transit Station
- State Highway 16 (**SH16**) Main Road Upgrade

It also includes the upgrade of Access Road, an existing local arterial corridor within Kumeū-Huapai.

This report assesses the landscape effects of the North West Strategic Assessment Package identified in Figure 4-1 and Table 2-1 below. Refer to the main AEE for a more detailed project description.

Table 2-1: North West Strategic Assessment Package – Notices of Requirements

Notice	Project
NoR S1	Alternative State Highway (**ASH**), including Brigham Creek Interchange (**BCI**)
NoR S2	SH16 Main Road Upgrade
NoR S3	Rapid Transit Corridor (**RTC**), including the Regional Active Mode Corridor (**RAMC**)
NoR KS	Kumeu Rapid Transit Station
NoR HS	Huapai Rapid Transit Station
NoR S4	Access Road Upgrade

2.1 Purpose and Scope of this Report

This assessment forms part of a suite of technical reports prepared to support the assessment of effects within the Strategic Assessment Package. Its purpose is to inform the AEE that accompanies the Strategic Assessment Package sought by Waka Kotahi and AT.

This report considers the actual and potential effects associated with the construction, operation and maintenance of the Strategic Assessment Package on the existing and likely future environment as it relates to landscape effects and recommends measures that may be implemented to avoid, remedy and / or mitigate these effects.

The key matters addressed in this report are as follows:

a) Identify and describe the landscape context of the Strategic Assessment Package area;
b) Identify and describe the actual and potential landscape effects of each NoR corridor within the Strategic Assessment Package;
c) Recommend measures as appropriate to avoid, remedy or mitigate actual and potential landscape effects (including any conditions / management plan required) for each corridor within the Strategic Assessment Package; and
d) Present an overall conclusion of the level of actual and potential landscape effects for each corridor within the Strategic Assessment Package after recommended measures are implemented.

2.2 Report Structure

The report is structured as follows:

a) Overview of the methodology used to undertake the assessment and identification of the assessment criteria and any relevant standards or guidelines;
b) Description of each NoR corridor and project features within the Strategic Assessment Package as it relates to landscape;
c) Identification and description of the existing and likely future landscape;
d) Description of the actual and potential positive effects of the Project;
e) Description of the actual and potential adverse landscape effects of construction of the Project;
f) Description of the actual and potential adverse landscape effects of operation of the Project;
g) Recommended measures to avoid, remedy or mitigate potential adverse landscape effects; and
h) Overall conclusion of the level of potential adverse landscape effects of the Project after recommended measures are implemented.

This report should be read alongside the AEE, which contains further details on the history and context of the Project. The AEE also contains a detailed description of works to be authorised for the Project, likely staging and the typical construction methodologies that will be used to implement this work. These have been reviewed by the author of this report and have been considered as part of this assessment of landscape effects. As such, they are not repeated here, unless a description of an activity is necessary to understand the potential effects, then it has been included in this report for clarity.

2.3 Preparation for this Report

The assessment is derived from the following data collection and field work:

- Online data collection of aerial maps and AUP:OP / GIS overlays, including, but not limited to:
  - Significant Ecological Areas (SEAs)
  - Outstanding Natural Features (ONF) and Outstanding Natural Landscapes (ONL)
  - Outstanding Natural Character (ONC)
  - High Natural Character (HNC)
  - Land Cover Data Base (LCDB)
  - AUP:OP zones; and
  - Catchments and hydrology
- Desktop analysis of the roads, urban areas / future urban areas with Google Maps and Google Streetview.
- Site Visits to each of the NoR areas, was undertaken in July 2020 and February / September 2022

- The purpose of these site visits was to understand and evaluate the existing baseline as part of determining the physical and sensory impacts the schemes would have on the site and the broader landscape, in addition to the identification of the viewing audiences.
- A study of aerial photography including land use, landform and vegetation patterns was undertaken, in addition to the site visit, to determine the visual catchment and viewing audience of the proposal.
- Private properties which are likely to be affected have been visually surveyed from nearby publicly accessible locations where possible, with further reference to aerial imagery to understand the nature of these potential viewing audiences.
- Review of related specialist reports including Ecology, Arboriculture and Urban Design.

3 Assessment Methodology

3.1 Overview

This Landscape Effects Assessment (LEA) has been undertaken with reference to Te Tangi a te Manu, Aotearoa New Zealand Landscape Assessment Guidelines[5]. The same methodology applies to the construction and operational stages of the works and for NoRs (S1, S2, S3, KS, HS and S4).

While natural character, landscape and visual amenity effects assessments are closely related, they form separate procedures. An assessment of the effects on natural character of an activity involves consideration of the proposed changes to the current condition compared to the existing. The assessment of the potential effects on landscape considers effects on physical attributes, landscape character and values. The assessment of visual effects considers how changes to the physical landscape affect the viewing audience.

A detailed description of the methodology is available in Appendix 1 of this assessment.

3.2 Scale of Effects

In determining the magnitude of potential and actual landscape and visual effects of each project, a consistent 7-point rating scale has been used that is based on the recommendations in the Te Tangi a te Manu, Aotearoa New Zealand Landscape Assessment Guidelines. The effects ratings referred to in this assessment are based upon a seven-point scale which ranges from 'very low' to 'very high' (a detailed description of these scales is available in Appendix 1 of this assessment).

3.3 Landscape Values, Landscape Sensitivity

Landscape values consider any scheduled high value landscape areas (ONLs, ONFs. HNCs or ONCs) at a national, regional or district level within or directly adjacent to the NoR areas.

The sensitivity of landscape is influenced by the existing land use, future landscape direction (AUP:OP and also the Whenuapai Structure Plan). The interfaces between lands and water (riparian margins) are particularly sensitive to landscape change. Other landscape attributes may also be sensitive to the effects of landscape change such as topographical and landform features, vegetation, landmarks and landscape features in the contextual landscape.

3.4 Landscape and Natural Character Effects

Landscape effects derive from changes in the physical landscape, which may give rise to changes in its character and how this is experienced over time. This may in turn affect the perceived value ascribed to the landscape.

Effects will be assessed in terms of:

- Temporary / construction effects, which relate to the construction activities required to implement the scheme.

[5] 'Te Tangi a te Manu: Aotearoa New Zealand Landscape Assessment Guidelines', [Final Draft subject to final editing, graphic design, illustrations, approved by Tuia Pito Ora/NZILA 5 May 2021]

- Permanent / operational effects, the effects on the landscape of completed works (including integrated landscape mitigation measures).

Natural character effects pertain to changes to the coastal environment (including the coastal marine area), wetlands, and lakes and rivers[6] and their margins. Effects are primarily concerned with the degree to which natural processes, natural patterns and natural elements have undergone human modification. Alterations to watercourses, water bodies, wetlands, riparian vegetation all are the subject of a separate regional consent process, this will also consider the natural character effects.

The natural character assessment for this Project applies to the existing water bodies and wetlands associated with Totara Creek, Totara Inlet, Ngongetepara Creek, Karure Stream, Kumeū River (and its branches), Pakinui Stream and the Ahukurama Stream.

Figure 3-1: Kumeū River tributary and pond located to the south of the SH16 Main Road adjacent to the Kumeū Garden Hub.

3.5 Visual Effects

Visual effects relate to the changes that arise in the composition of available views as a result of changes to the landscape. Visual effects are considered for both temporary (construction effects) and permanent (operational effects) of the NORs.

Assessment photography was obtained during the Project site visit in November 2021 and September 2022. The outlook from viewpoints that were captured onsite were photographed and assessed in variable weather conditions and at standing eye level.

[6] A 'river' is defined in the RMA as a continually or intermittently flowing body of fresh water; and includes a stream and modified watercourse.

3.6 Limitations and Project Assumptions

This landscape assessment does not specifically address and respond to Mana whenua values from a landscape planning perspective. This report references the latest data available in respect of these matters at the time of issue.

All site assessments have been undertaken from public land and supported through detailed desktop GIS mapping and aerial photograph information.

A range of assumptions have been made in order to establish a consistent approach across the Project and to clearly define the parameters of the context of the construction and operational phases. Detailed list of the Project Assumptions is available in Appendix 1 of this assessment.

The findings of this landscape effects assessment are underpinned by the Project assumptions:

3.7 Statutory Guidance

3.7.1 Notice of Requirement

This assessment has been prepared to support the NoRs for the Project. The process for consideration of a NOR is set out in section 168 of the RMA. This includes consideration of the actual or potential effects (including positive effects) on the environment of allowing the requirement under the Resource Management Act (RMA).

3.7.1.1 Precincts and Subdivisions

A number of Precinct overlays exist that are relevant to the Strategic Package, largely within the Kumeū-Huapai area. These are outlined below and shown in Figure 3-2 below:

- **I516 Kumeū Precinct**: the purpose of the Precinct is to enable the establishment of a town centre to serve the Kumeū and Huapai area with a strong commercial core and associated residential and recreational areas.
- **I517 Kumeū Showgrounds Precinct:** Provides specifically for the activities undertaken by the Kumeū District Agricultural and Horticultural Society at the showgrounds.
- **Special Housing Area - Huapai:2 Precinct:** Provides for the comprehensive and integrated development for residential purposes.
- **Special Housing Area - Huapai Triangle Precinct:** which allows for urban expansion to support Huapai and Kumeū's role as a compact centre.

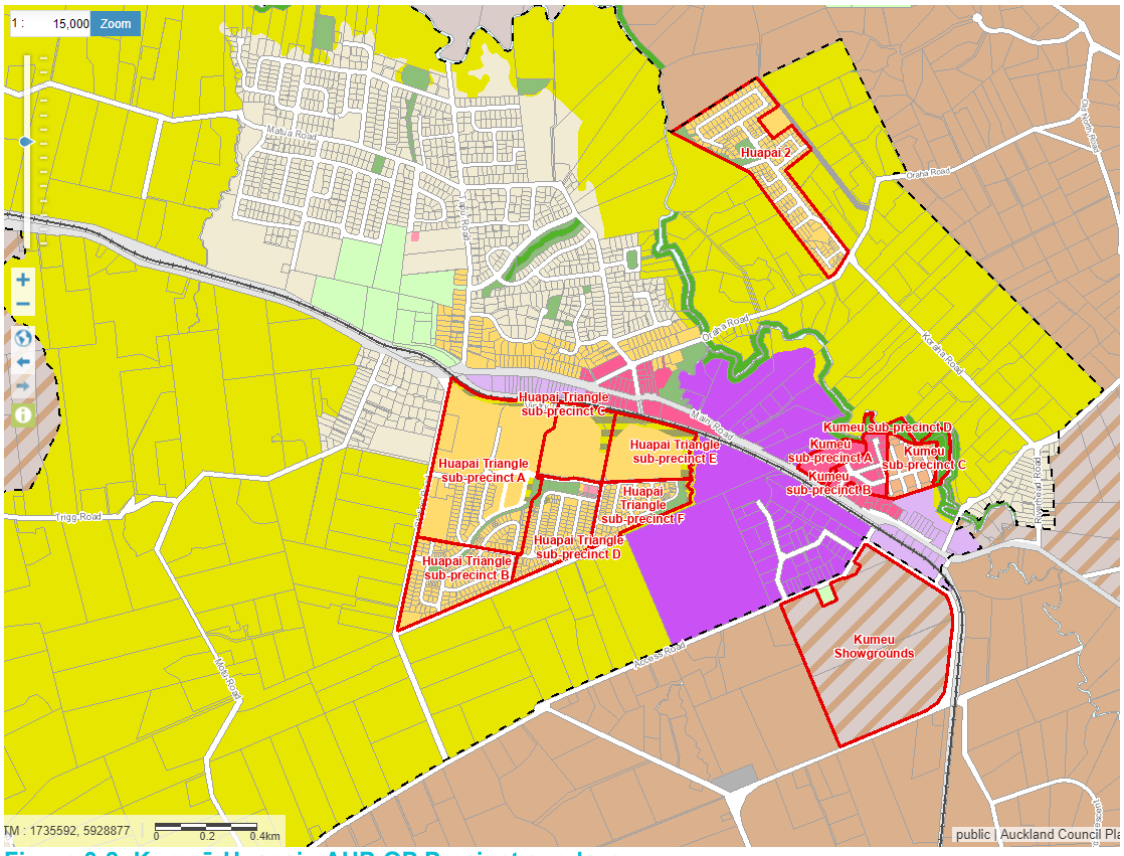


Figure 3-2: Kumeū-Huapai - AUP:OP Precinct overlays

3.8 Non-Statutory Guidance

The Kumeū-Huapai / Riverhead area has not been structure planned. Land release for the Kumeū-Huapai / Riverhead area is identified in the FULSS to occur between 2028 and 2032. Council's current view is that structure planning must occur prior to the release of land currently zoned FUZ. This is indicatively programmed for Kumeū-Huapai / Riverhead in 2025.

The project team has working closely with Auckland Council to support land use integration for the Kumeū-Huapai / Riverhead area.

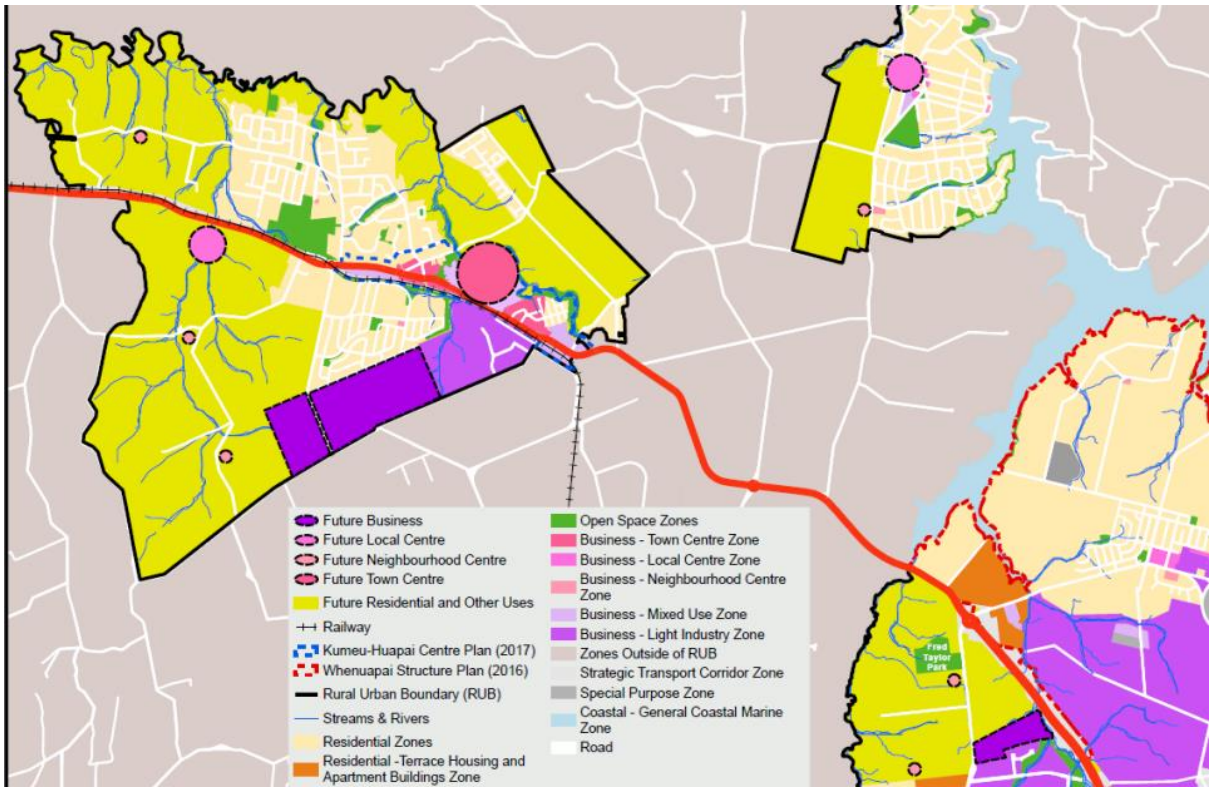


Figure 3-3: Spatial Land Use Strategy - Kumeū-Huapai, Riverhead, and Redhills North.

Note: The Spatial Land Use Strategy is not a detailed structure plan and is only intended to be a high-level outline of the future land uses in the Future Urban zone.

3.8.1 Whenuapai Structure Plan September 2016

Only the NoR S1 Alternative State Highway (**ASH**), including Brigham Creek Interchange (**BCI**) Project will be within the Whenuapai Structure Plan area.

Detailed analysis of the Whenuapai Structure Plan is available in Appendix 1 of this assessment.

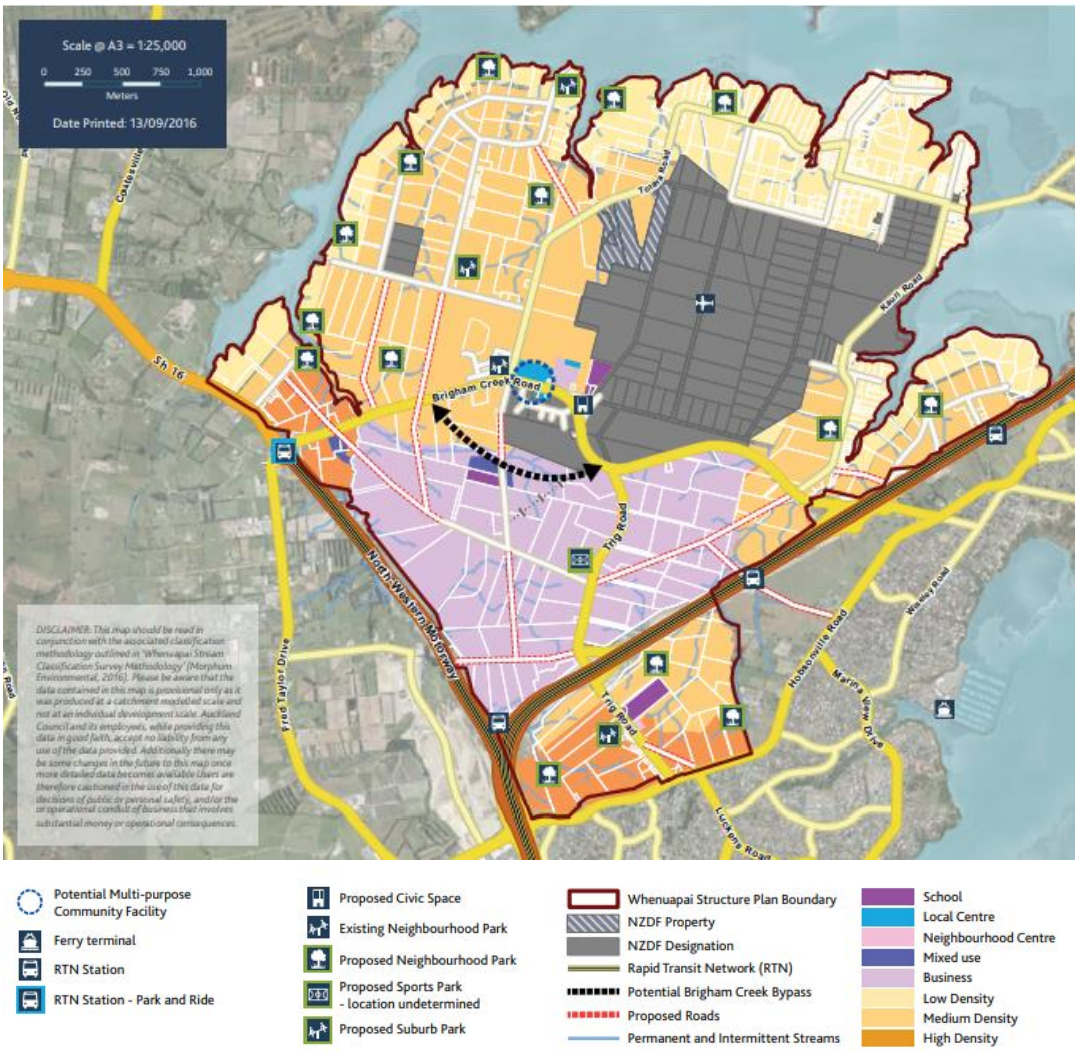


Figure 3-4: Whenuapai Structure Plan Map

3.8.2 National Policy Statement on Urban Development – NPS UD

The National Policy Statement-Urban Development (NPS-UD) came into effect on 20 August 2020 and sets out a list of things that local authorities must do to give effect to the objectives and policies defined within the policy statement.

Detailed analysis of the NPS UD is available in Appendix 1 of this assessment

4 Strategic Assessment Package Overview

An overview of the Strategic Assessment Package is provided in Figure 4-1, with a brief summary of the Strategic Assessment Package projects provided in Table 4-1.

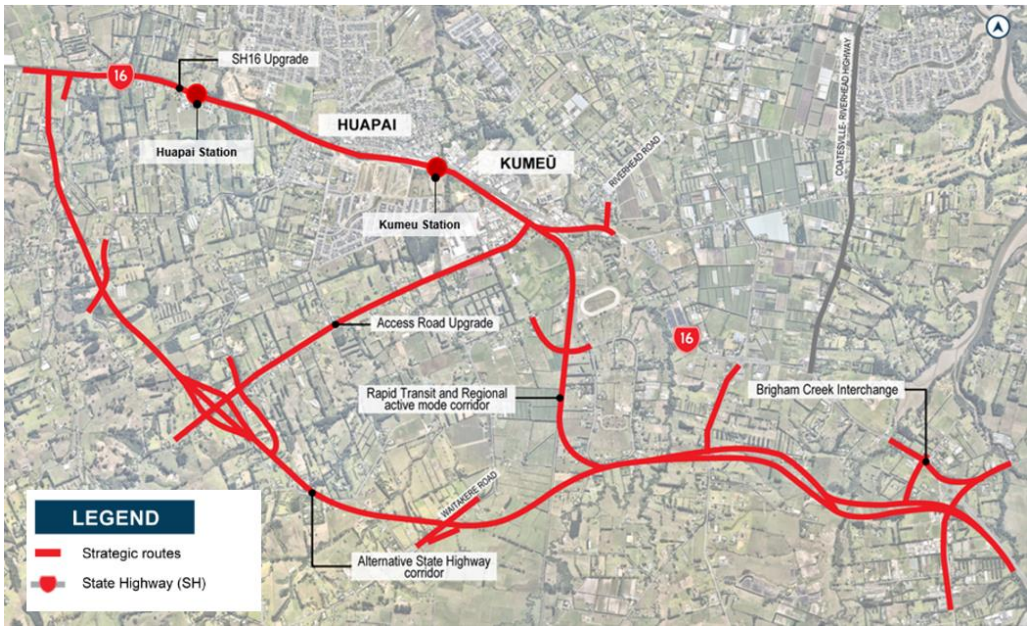


Figure 4-1: North West Strategic Assessment Package – Overview of NoRs for Assessment

Table 4-1: Strategic Assessment Package Project Summary

Corridor	NOR	Description	Requiring Authority
Alternative State Highway	S1	A new four-laned dual carriageway motorway and the upgrade of Brigham Creek Interchange.	Waka Kotahi
State Highway 16 Main Road Upgrade (alteration to existing designation 6766)	S2	Upgrade to urban corridor including active modes and realignment of Station Road intersection with SH16.	Waka Kotahi
Rapid Transit Corridor	S3	New Rapid Transit Corridor and active mode corridor in one co-located corridor.	Waka Kotahi
Kumeū RTC Station	KS	New rapid transit station, including transport interchange facilities and accessway.	Waka Kotahi
Huapai RTC Station	HS	New rapid transit station, including transport interchange facilities, park and ride and accessway.	Waka Kotahi
Access Road Upgrade	S4	Upgrade of Access Road to a four-lane cross-section with separated cycle lanes and footpaths on both sides of the corridor.	Auckland Transport

The purpose of the NoRs within the Strategic Assessment Package is to protect the transport corridors that will support the future urbanisation of Whenuapai, Redhill's North, Kumeū and Huapai. Construction and operation of the new and upgraded corridors will likely not occur until urbanisation has at least been confirmed by way of a plan change or is under development. The AUP:OP permits activities for infrastructure, which will also change the likely future environment. These activities include vegetation clearance and the removal of trees, excluding notable trees and street trees, in urban, FUZ and rural zones. The AUP:OP activities related to infrastructure and relevant to landscape impacts are set out in Appendix 3 of this assessment, Appendix 4 outlines which landscape impacts are relevant to the AUP:OP Regional and District Plans.

Please refer to the AEE for further information on these NOR, including a route description, key features and the planning context.

5 Potential Positive Effects

Positive effects in relation to landscape and visual elements are primarily associated with the provision or improvement of urban design and landscape amenity. Although infrastructure projects often introduce or expand a transportation corridor, there are opportunities to improve the visual amenity, landscape legibility and improve landscape character features. Positive landscape effects may result from general landscape improvements associated with the project and / or specific mitigation measures designed to improve anticipated landscape and / or visual effects.

A number of positive landscape effects are anticipated as a result of the operation of the Projects (including proposed mitigation).

Positive effects are likely to include:

- A streetscape to support the emerging urban form of the NoR S2 and S4 project corridors;
- The potential for a net increase in green infrastructure within the urban Project areas, these have the potential to include new street trees, berm and stormwater plantings and planted stormwater wetlands, resulting in improved visual amenity for road users and adjacent audiences;
- Slower speed limits adjacent to existing dwellings and commercial activities improving the experiential qualities of the corridor for users as well as private properties adjacent to urban road corridor.

The potential to introduce a large linear band of predominantly native planting along either side of the ASH. This would provide a linear habitat and landscape integration along the length of the ASH, which would have ecological and landscape character benefits.

6 Construction and Operational Mitigation Measures

6.1 Site Enabling Works

Construction Areas

Construction compounds, laydowns, construction machinery, earthworks, material storage will be present across all Projects in this Package. Night works, where required, will in places introduce artificial light into an existing unlit environment. Landscape effects related to activities across this package of work will be;

- the construction of a new carriage way and permanent development through undeveloped land (NoR S1, NoR S3, NoR KS and NoR HS);
- the widening of an existing road corridor (All NoRs);
- bridge construction (NoR S1, NoR S2 and NoR S3, NoR S4);
- wetland / dry pond construction (All NoRs); and;
- removal of existing buildings and development (NoR S1, NoR S2, NoR S3 and NoR S4).

A more detailed indicative construction methodology is available in the AEE, this details the sequencing, typical construction impacts and approximate construction timings.

Vegetation Clearance

Broad areas of street-side vegetation are proposed to be removed to accommodate the wider road corridors and batter slopes (all NoRs). This consists of trees and shrubs (including some large mature specimen trees) located within the road-side boundaries of private properties, within the Project area. Exotic pasture, trees, shelterbelt plantings, private gardens, exotic forest patches and cropland make up the majority of vegetation to be removed.

Vegetation clearance within the existing designation within urban routes and within rural zoned land to be removed to facilitate the construction of highway are permitted activities.

6.1.1 Urban and Landscape Design Management Plan (ULDMP) Recommended Measures to to Avoid, Remedy or Mitigate Construction and Operational Effects

As a condition of each NoR it is proposed that a ULDMP with the following recommendations and objectives is submitted. These are proposed measures to remedy and mitigate the adverse operational effects of the Project on the natural and urban landscape and lay out the main design themes, principles and outcomes of the Strategic Assessment Package.

(a) A ULDMP shall be prepared prior to the Start of Construction for a Stage of Work.

(b) Mana Whenua shall be invited to participate in the development of the ULDMP(s) to provide input into relevant cultural landscape and design matters including how desired outcomes for management of potential effects on cultural sites, landscapes and values identified and discussed in accordance with Condition *[xx]* may be reflected in the ULDMP. The objective of the ULDMP(s) is to:

(i) Enable integration of the Project's permanent works into the surrounding landscape and urban context; and

(ii) Ensure that the Project manages potential adverse landscape and visual effects as far as practicable and contributes to a quality urban environment.

(c) The ULDMP shall be prepared in general accordance with:

(i) Waka Kotahi Urban Design Guidelines: Bridging the Gap (2013) or any subsequent updated version;

(ii) Waka Kotahi Landscape Guidelines (2013) or any subsequent updated version;

(iii) Waka Kotahi P39 Standard Specification for Highway Landscape Treatments (2013) or any subsequent updated version; and

(d) To achieve the objective, the ULDMP(s) shall provide details of how the project:

(i) Is designed to integrate with the adjacent urban (or proposed urban) and landscape context, including the surrounding existing or proposed topography, urban environment (i.e. centres and density of built form), natural environment, landscape character and open space zones;

(ii) Provides appropriate walking and cycling connectivity to, and interfaces with, existing or proposed adjacent land uses, public transport infrastructure and walking and cycling connections;

(iii) Promotes inclusive access (where appropriate); and

(iv) Promotes a sense of personal safety by aligning with best practice guidelines, such as:

a. Crime Prevention Through Environmental Design (CPTED) principles;
b. Safety in Design (SID) requirements; and
c. Maintenance in Design (MID) requirements and anti-vandalism/anti-graffiti measures.

(e) The ULDMP(s) shall include:

(i) A concept plan – which depicts the overall landscape and urban design concept, and explain the rationale for the landscape and urban design proposals;

(ii) Developed design concepts, including principles for walking and cycling facilities and public transport; and

(iii) Landscape and urban design details – that cover the following:

a. Road design – elements such as intersection form, carriageway gradient and associated earthworks contouring including cut and fill batters and the interface with adjacent land uses, benching, spoil disposal sites, median width and treatment, roadside width and treatment;
b. Roadside elements – such as lighting, fencing, wayfinding and signage;
c. Architectural and landscape treatment of all major structures, including bridges and retaining walls;
d. Architectural and landscape treatment of noise barriers;
e. Landscape treatment of permanent stormwater control wetlands and swales;
f. Integration of passenger transport;
g. Pedestrian and cycle facilities including paths, road crossings and dedicated pedestrian/ cycle bridges or underpasses;
h. Historic heritage places with reference to the HHMP; and
i. Re-instatement of construction and site compound areas, driveways, accessways and fences.

(f) The ULDMP shall also include the following planting details and maintenance requirements:

(i) planting design details including:

a. Identification of existing trees and vegetation that will be retained with reference to the Tree Management Plan. Where practicable, mature trees and native vegetation should be retained;
b. Street trees, shrubs and ground cover suitable for berms;

c. treatment of fill slopes to integrate with adjacent land use, streams, Riparian margins and open space zones;
d. planting of stormwater wetlands;
e. Identification of vegetation to be retained and any planting requirements ;
f. Integration of any planting requirements required by conditions of any resource consents for the project; and
g. Re-instatement planting of construction and site compound areas as appropriate.

(ii) A planting programme including the staging of planting in relation to the construction programme which shall, as far as practicable, include provision for planting within each planting season following completion of works in each Stage of Work; and

(iii) Detailed specifications relating to the following:
a. Weed control and clearance;
b. Pest animal management (to support plant establishment);
c. Ground preparation (top soiling and decompaction);
d. Mulching; and
e. Plant sourcing and planting, including hydroseeding and grassing, and use of eco-sourced species.

6.1.2 Recommended Measures to Avoid, Remedy or Mitigate Construction Effects

In addition to the ULDMP mitigation measures for all activities and built elements, the following recommended measures during the construction period are proposed for all NoRs are outlined below:

- Provide hoarding around the boundaries of site compounds that face on to adjacent residential properties and outdoor space that overlook the works.
- Interpretation - Where practicable, during construction, install construction hoardings with interpretive panels in selected areas which are in close proximity and visible to the public, to provide information about the Project and its progress.
- Wherever possible, stockpile and re-use topsoil from existing pastoral land (within the Project area),
- Mitigate effects related to lighting during night time works by using directional lighting to prevent sky glow and glare / spill light falling on residential properties.

6.1.3 Recommended Measures to Avoid, Remedy or Mitigate Operational Effects

In addition to the ULDMP mitigation measures for all activities and built elements, the following recommended measures during the construction period are proposed for all NoRs are outlined below:

- Provide robust integration and mitigation vegetation coordinated with the ecological mitigation proposals across the whole Strategic area identified in the NW Strategic Package Assessment of Ecological Effects.

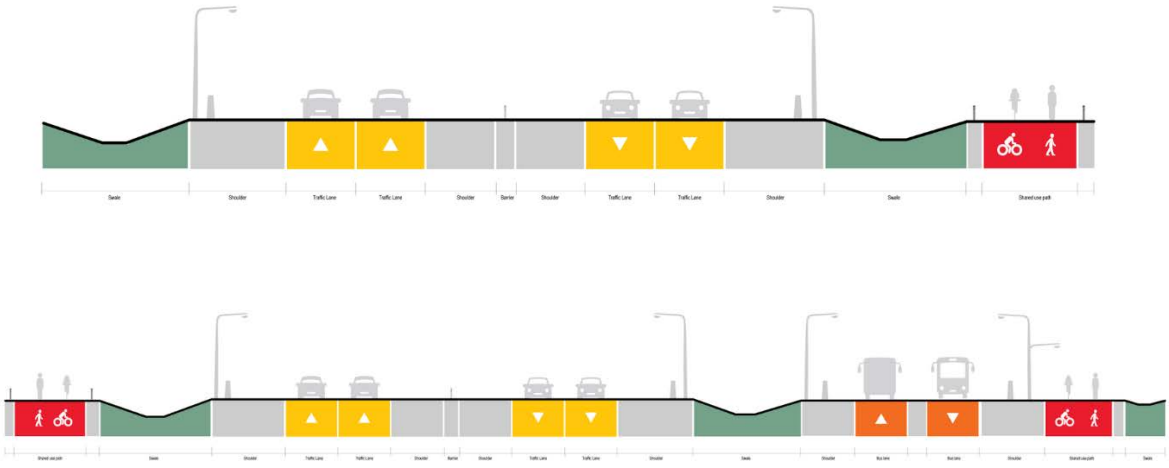
7 NoR S1: Alternative State Highway, including Brigham Creek Interchange

7.1 Project Corridor Features

The proposed Brigham Creek Interchange connects with the existing Brigham Creek Road arterial road at the Totara Inlet bridge to the west of Whenuapai township. The proposed Alternate State Highway connects with the Brigham Creek Road interchange and crosses the undulating rural landscape to the south of Kumeū and Huapai, connecting to SH16 to the west of Huapai.

The key landscape matters addressed for the Alternative State Highway and Brigham Creek Interchange are:

- The nature and extent of impacts on the landscape as a physical resource during the construction period of the scheme. A specific focus on the location of the construction compound, extent of vegetation clearance, the scale and location of proposed cut and fill slopes and the likely impacts of bridge construction.
- Consideration of landscape character effects and urban amenity issues in relation to the permanent landscape change, including specific assessment of how this corridor will integrate into the future urban environment;
- Potential removal of valued trees and consideration of future opportunities to integrate existing trees.
- Culverting, bridging and earthworks within proximity of existing wetlands and watercourses, as far as these relate to designation / district plan matters.
- An underpass at Taupaki Road and bridges over the NAL with further grade separations at Waitakere Road, Pomona Road, Tawa Road, Puke Road and Foster Road. Tawa Road is designed to future proof for a full diamond interchange.
- The construction of a new four-lane motorway corridor into a ‘greenfield’ landscape with a cross-section of approximately 50m to accommodate a four-lane dual carriageway and separated cycle lanes and footpaths. The typical cross section includes an active mode corridor with central and side barriers (See Figure 7-1 below).



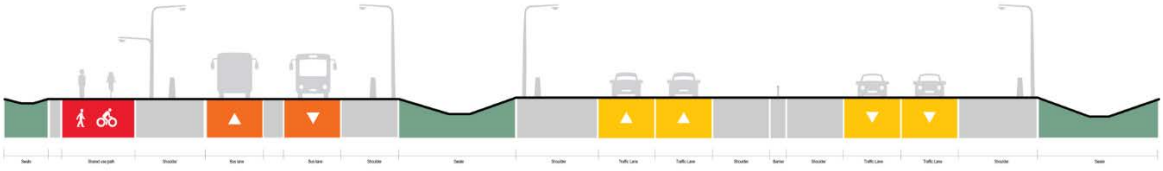


Figure 7-1: Alternative State Highway Typical Cross Sections

7.2 Existing and Likely Future Environment

7.2.1 Planning context

The Alternative State Highway (**ASH**) corridor, including the Brigham Creek Interchange (**BCI**), is largely rural and is proposed to traverse land zoned under the AUP:OP as Rural – Countryside Living Zone, Rural – Mixed Rural Zone and Rural – Rural Production Zones.

The ASH corridor will also traverse two separate areas of FUZ in Redhills North and Kumeū-Huapai with the BCI also currently sitting within FUZ land.

Table 7-1 below provides a summary of the existing and likely future environment as it relates to the ASH and BCI.

Table 7-1: Alternative State Highway and Brigham Creek Interchange Existing and Likely Future Environment

Environment today	Zoning	Likelihood of Change for the environment[7]	Likely Future Environment[8]
Rural	Rural - Mixed Rural Zone, Rural - Countryside Living Zone Rural - Production Zone	Low	Rural
Undeveloped greenfield areas	Future Urban	**High**	Urban

Please refer to the AEE for further information on the planning context.

7.2.2 Baseline / Existing Landscape

7.2.2.1 Baseline Landscape

The route of this scheme traverses west from the existing SH16 / Fred Taylor Drive / Brigham Creek Road Roundabout across the undulating rural landscape characterised to the south of Kumeū and Huapai.

[7] Based on AUP:OP zoning/policy direction
[8] Based on AUP:OP zoning/policy direction

The local landscape character within the scheme corridor is summarised below;

- Vegetation cover comprising stand-alone elements of indigenous vegetation, hedgerows, shelterbelts, trees and shrubs along field boundaries, exotic pastoral grassland, non-native stand-alone trees, agricultural production including viticulture.
- The landscape is characterised by land modification associated with the surrounding rural productive land use and rural countryside living.
- The landscape character values are the existing watercourses, stands of native vegetation and characteristic natural landforms.
- There is the potential to enhance and integrate the road corridor within the FUZ to reduce adverse effects on the emerging or changing urban landscape.

Landform and Hydrology

The scheme corridor traverses an undulating topography that is elevated to the west. High points along the corridor are present at the approaches and intersections with Tawa Road and Puke Road. The lower lying land areas of the route are where the route crosses wetlands, flood plains and watercourses, specifically the Totara Inlet, Totara Creek, Ngongetepara Creek, Karure Stream, Kumeū River (and its branches), Pakinui Stream and the Ahukurama Stream.

Landcover

The landcover across the corridor is characterised as a distinctly modified pastoral landscape. The land has been divided into irregular geometric fields bound in parts by structured hedgerows, shelter belts and small areas of native vegetation. Fields predominantly contain exotic grassland with small pockets of agricultural crops and rural industry and amenity planting in proximity to dwellings. Areas of open pasture are located directly adjacent to the road corridor intermittently along the length of the designation on both sides.

Areas of mature native trees are located in patches throughout the landscape and in proximity to stretches of riparian vegetation along waterways. Although much of the stream and wetland features across the scheme area are bordered with exotic grassland species and managed like farm drains, native riparian vegetation is present within intermittent stretches, particularly within the Kumeū, Ahukamara, and Ngongetepara streams (Figure 7-2 below).

No scheduled notable trees are present within proximity of the designation.

Figure 7-2. Ahukamara Stream located to the rear of a property at 80 Foster Road

Land Use

The scheme corridor traverses four main AUP:OP zones; Rural - Mixed Rural Zone, Rural - Countryside Living Zone, Rural - Production Zone and Future Urban zone.

Land use either side of the scheme corridor is predominantly pastoral farming with associated dwellings, between the RUB and Pomona Road the route is in surrounded by Rural – Countryside Living Zone, which has more of a rural residential focus. The existing road reserve is within a rural context and is predominantly pastoral in nature with associated dwellings. Commercial activities are concentrated to the southern portion of the corridor near to SH18 and Northside Drive. At the eastern extent of the designation within proximity to Fred Taylor Drive the scheme corridor is surrounded by FUZ.

Scheduled Landscape and Ecological Features

There are no scheduled landscape or ecological features within or proximate to the designation area.

Historical and Cultural Associations

There are no scheduled historical and cultural features within or proximate to the designation. There are however 11 Cultural Heritage Inventory (CHI) sites are within or in proximity to the designation (eight historic structures, one archaeological site, one historic botanical site and one reported historical site).

7.2.2.2 Likely Future Environment

Overview

The land surrounding the designation – within the AUP:OP Rural Urban Boundary - will witness a significant change from rural to urban land use character over the next 10 years within the section of the corridor located in the Redhills North (including the Fred Taylor Park sports park) and Kumeu Huapai FUZ land. It is anticipated that the abiotic features of the landscape will be altered over time as the surrounding landscape is urbanised.

It is anticipated that some of the defining biotic (land cover) features of the landscape will undergo substantial change alongside future development, due to the removal of large areas of vegetation to accommodate the future urban areas adjacent to the scheme. This will likely involve the implementation of street tree plantings, public open space areas and general landscaping within the private yards of future housing development for public amenity.

The balance of the scheme area within rural zoned areas will continue to have a rural function by the completion of the project. It is anticipated that the abiotic and biotic features of the landscape outside of the designation will endure.

7.2.2.3 Whenuapai Structure Plan and Spatial Land Use Strategy - Kumeū-Huapai, Riverhead, and Redhills North

The Whenuapai Structure Plan provides general guidance for how the FUZ land adjacent to the designation should be developed over time. The structure plan is illustrated in Appendix 1. The Spatial Land Use Strategy - Kumeū-Huapai, Riverhead, and Redhills North provides a high level overview of the expected future development of Kumeu and Huapai.

Land Use

The Whenuapai Structure Plan indicates that at the eastern extent of the designation around the Brigham Creek Interchange will be urbanised to be High / Medium density residential and for a “Business” land use. The plan envisages this Business use to comprise Industrial, Retail and Services. Industrial activities such as manufacturing, transport and storage, logistics, construction and wholesale trade are expected. Retail and services are expected to be required to support the increased amount of housing within the Structure Plan.

The Spatial Land Use Strategy - Kumeū-Huapai, Riverhead, and Redhills North indicates that the area surrounding scheme will be with “future residential and other uses”.

7.3 Extent of Visibility and Viewing Audience

The extent of visibility of the proposed road corridor is contained by the surrounding vegetation and the changes in topography. Notwithstanding the above, some vantage points within the scheme area are likely to witness heightened adverse visual effects. In summary the viewing audience for the scheme includes:

- *Public Views:* Transient public audience (vehicle users). Key roads where views can be obtained from include: Waitakere Road, Tawa Road, Dysart Lane, Pomona Road, Boord Crescent, Taupaki Road, Nixon Road, Fred Taylor Drive, Brigham Creek Road, Hanham Road, Puke Road, Foster Road, Trigg Road and SH16:

  - Travelers (cars, pedestrians and cyclists) along Puke Road , Foster Road, Waitakere Road, Hanham Road, Tawa Road and Taupaki Road which bisect the site (Refer Appendix Site Photo SP12, SP11, SP7, SP4, SP6);
- *Private Views:* A private viewing audience, comprising views from rural residential and lifestyle dwellings as well as from the commercial and agricultural businesses located either side of the scheme corridor. Specifically:
  - Views from the residential properties within the designation that immediately border the scheme corridor (131 Foster Road, 22, 36, 37A, 35 Awa Road, Puke Road, 79, 83A, 122 Tawa Road, 164 Motu Road, 48, 66, 70, 95, 121, 130 Pomona Road, 660, 646, 682, 703, Waitakere Road, 23, 37, 42, 62, 68A, 82, 88, 96, 108, 130, 190 Boord Crescent; 374 Taupaki Road, 212 SH16; 139, 141 and 180 Fred Taylor Drive, and; 8, 12, 14, 75 Joseph Dunstan Drive and 15 Brigham Creek Road (Refer Appendix Site Photo SP9,SP8, SP10, SP11, SP3, SP5 and SP2);
  - Occupants of nearby commercial buildings and open space adjacent to the proposed corridor. (Refer Appendix 2: Site Photo SP1);

Views are well contained within the immediate surrounding area of the scheme corridor to the east of Waitakere Road, where the landscape is relatively flat and intervening vegetation is present. To the west of Waitakere Road the topography is more undulating which results in the corridor being more visible in elevated areas and less visible in lower lying areas.

Within the Redhills North and Kumeū Huapai FUZ areas the scheme corridor audiences are likely to grow over time to include residents of future urban developments. Rural zoned areas within the corridor are expected to continue to be characterised as they are currently.

7.4 Landscape Values

There are no regionally or nationally significant landscapes (ONLs, ONFs or ONCs) within or proximate to the proposed designation boundary. The nearest ONL is Area 3, Taylor Road, south of Helensville, located approximately 840m to the north of the scheme corridor.

The gently sloping topography and the mature stands of vegetation and braided stream and wetland network, in particular along the Kumeru River and Ahukuramu Stream contribute to the visual amenity across the whole landscape. The value of the landscape is particularly heightened in proximity to the existing stream networks. Within the more modified areas of the landscape, including geometric field division, exotic shelterbelts, managed hedgerows and highly managed pastoral fields. These pastoral fields have limited natural features, with these restricted to individual stands of native vegetation. The rolling topography and steep gullies lined with are a recognisable and distinct feature within the rural landscape. These features are most prominent between Waitakere Road and Foster Road within the scheme area.

At the eastern extent of the scheme corridor the designation around the proposed Brigham Creek Interchange will require the acquisition of 1.62ha of the open space – sports and recreation zoned land within Fred Taylor Park. This parkland open space that it primarily used for sporting activity and is surrounded on two sides by mature shelter belt vegetation along the western and south western boundaries. Three open space – conservation zone areas (Lot 3 DP 109762, 146 Boord Crescent, a portion of Lot 1 and Lot 2 DP 194257, 156 and 162 Boord Crescent and Lot 3 DP 129560, to the rear of 178 and 182 Boord Crescent) along the Kumeū River will be within the proposed designation. Only one of these areas (Lot 3 DP 129560, to the rear of 178 and 182 Boord Crescent) will be directly impacted by the footprint of the Proposed corridor.

7.5 Landscape Sensitivity

This corridor is situated within a broader landscape that is a rural landscape and FUZ areas within the AUP:OP as being suitable for urbanisation. The rural landscape is predominantly a countryside living zone, which anticipates rural residential land use, including countryside living developments. The proposed FUZ area to the east is indicated by the Whenuapai Structure Plan will primarily be high and medium density residential. Rural zoned land which will be retained as rural has medium sensitivity to the type of change proposed. The scheme area within the FUZ is assessed as having a low sensitivity to landscape change.

7.6 Assessment of Landscape Effects

7.6.1 Positive Effects

Generalised positive effects related to the NoR are covered in Section 5 of this report. Additional positive effect specific to this scheme include:

- Improved and / or new opportunities for active modes of transport and the ability to provide improved connectivity between Kumeū- Huapai and Whenuapai.
- The potential for an increased net area of native planting along the length of the footprint of the NoR, replacing pastoral land with structured and diverse native planting.

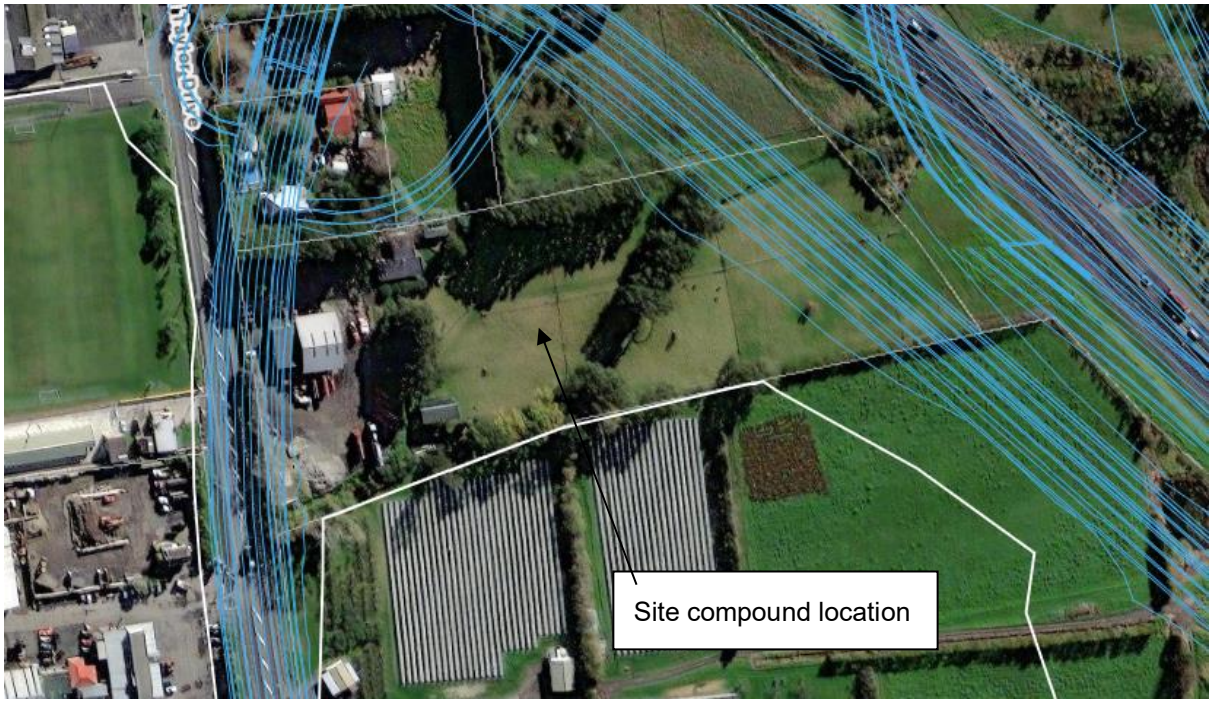
7.6.2 Assessment of Construction Effects

Construction Areas

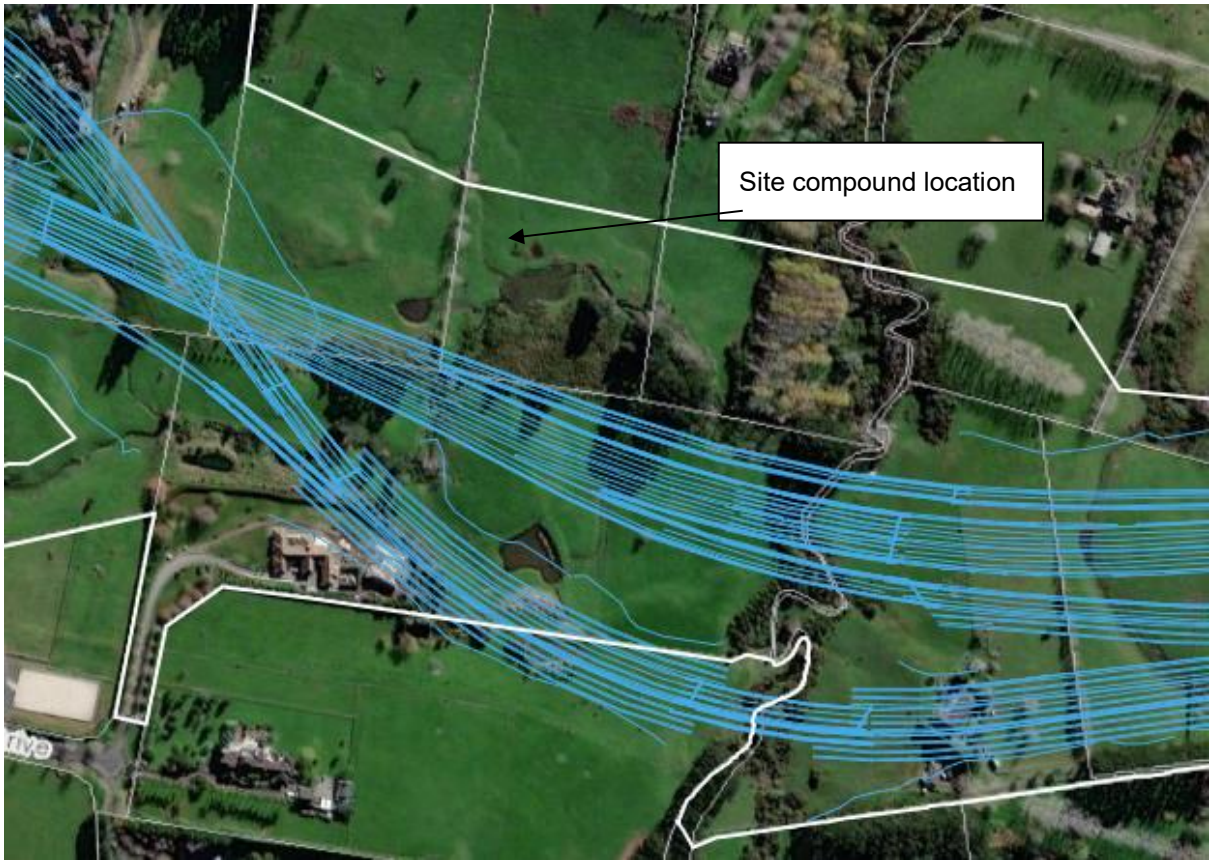
Site compound and construction areas are to be established at eight locations within the scheme area. Construction traffic will be heightened at these locations through the construction period of the scheme.

- Site compound, stockpile, sediment retention pond and lay-down area for bridge or underpass construction are indicatively located at:

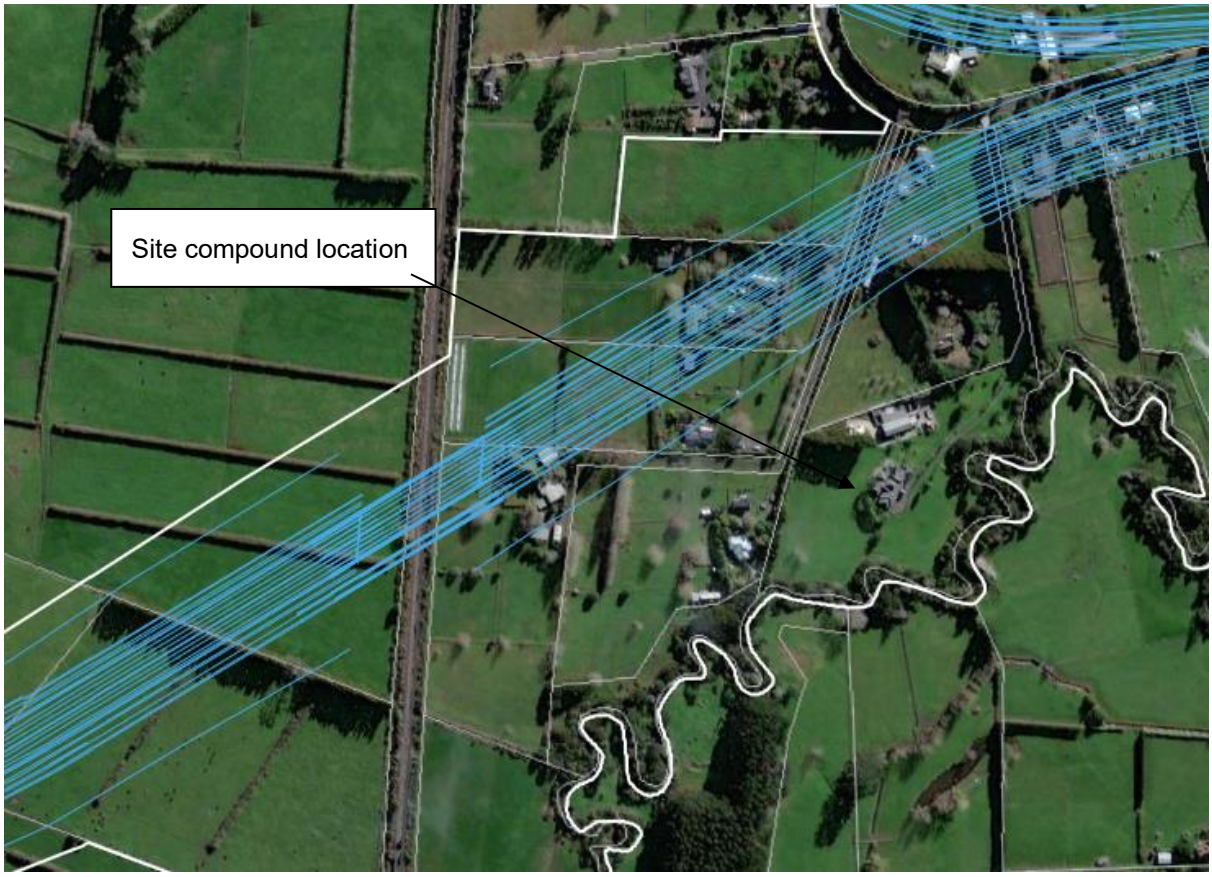
- 149 Fred Taylor Drive



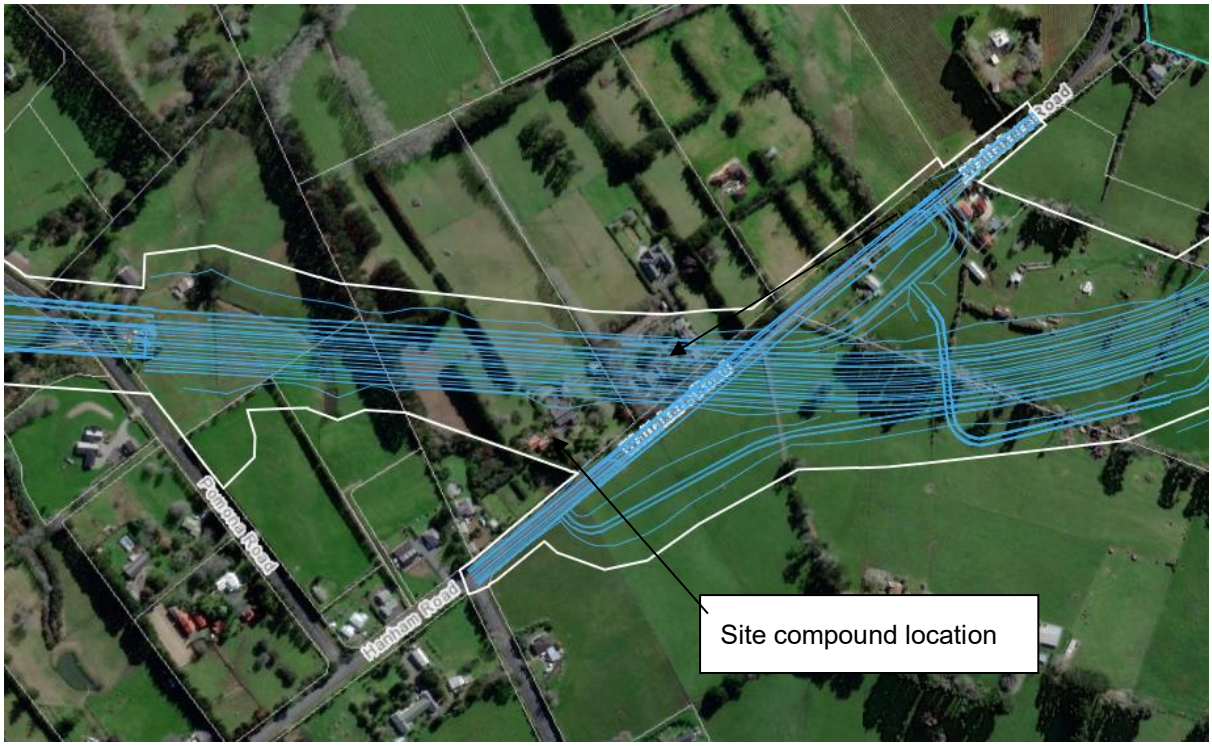
- 260 State Highway 16



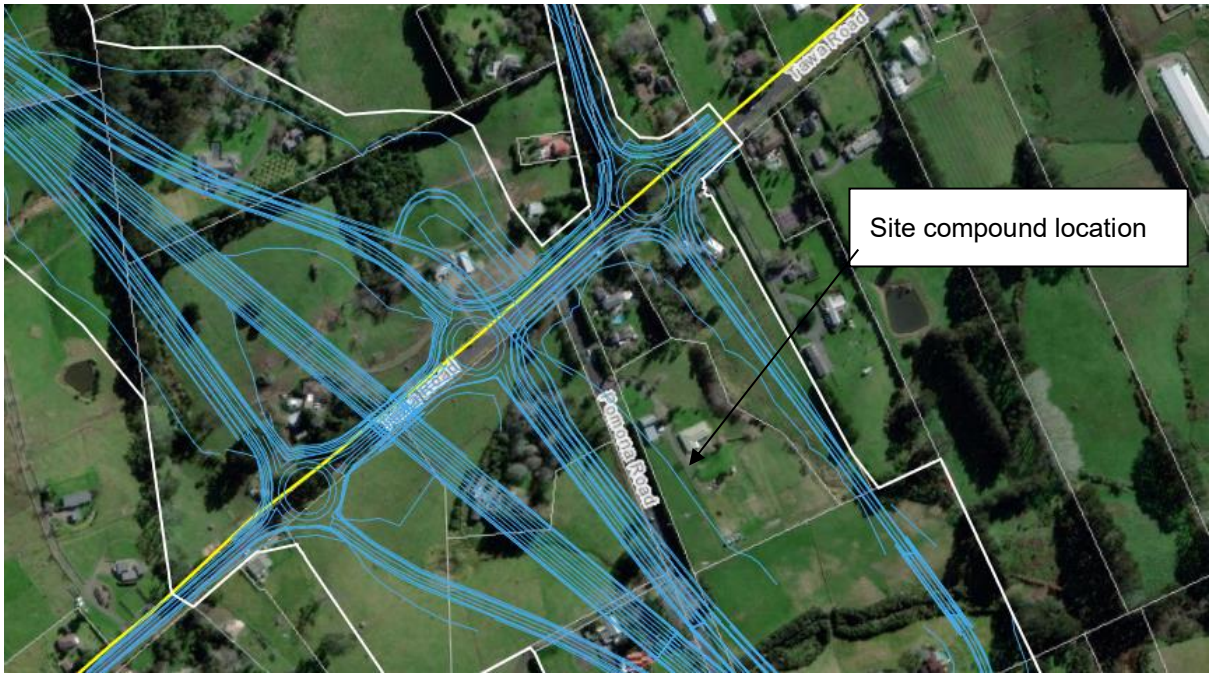
- 154 Boord Crescent (Bridge Laydown Area)



- 660 Waitakere Road



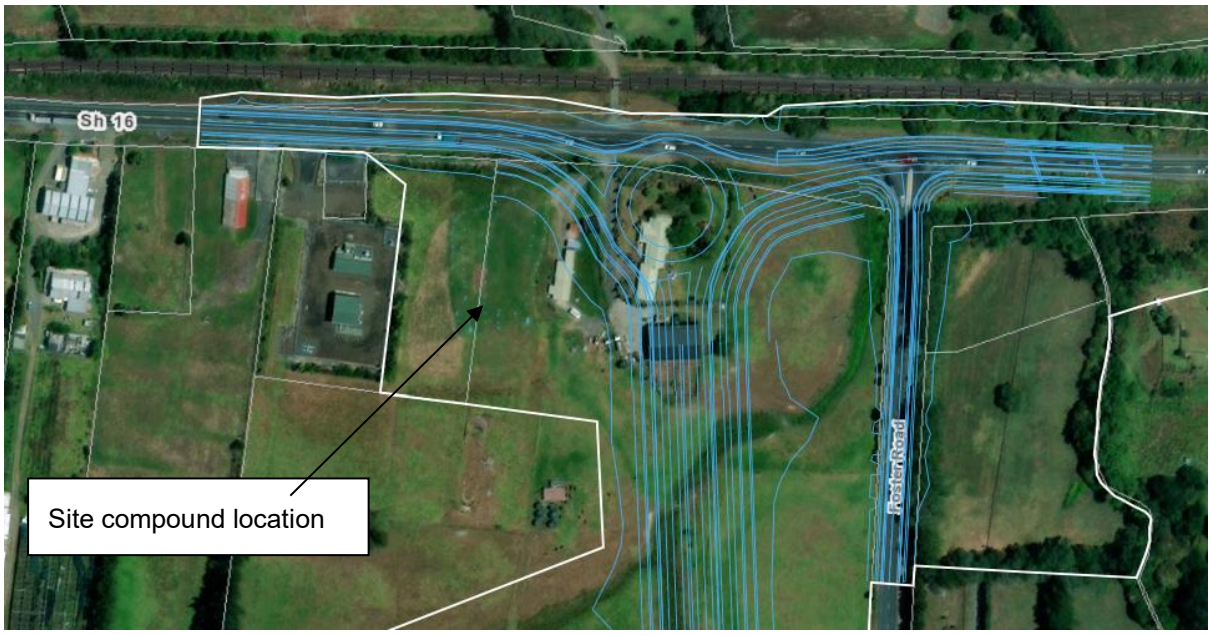
- 9 Pomona Road



- 54 Puke Road

- 40 Foster Road

- 727 State Highway 16



The indicative site compounds and construction areas are primarily located within pastoral land that is already somewhat modified by existing rural land use. It is recommended that all grassed areas are reinstated at the completion of the construction period or alternate arrangements are made in accordance with the wishes of the landowner.

Without any mitigation it is anticipated that the effects on the landscape would be **high** to **moderate-high** adverse. Assuming that mitigation measures are undertaken, the adverse physical landscape effects resulting from establishment and use of the construction work areas within the NoR area are assessed to be **low-moderate** adverse.

Vegetation Clearance

Linear stretches of vegetation typically within field boundaries and rural residential lots will be removed to accommodate the construction and operation of the scheme corridor. This will consist primarily of non-native vegetation including shelterbelts that are archetypal within the wider modified rural landscape. Exotic pasture, trees, shelterbelt plantings, private gardens, exotic stands of trees patches and cropland make up the majority of vegetation to be removed. Riparian vegetation within watercourses and wetlands will be removed to accommodate the bridges and culverts along the corridor. These works are subject to a separate regional consent process, however their potential effects on the landscape and natural character have been included within this assessment and the selection of the designation.

The riparian vegetation is a mixture of native and non-native vegetation within watercourses (Totara Inlet, Totara Creek, Ngongetepara Creek, Karure Stream, Kumeū River (and its tributaries), Pakinui Stream and the Ahukurama Stream). Vegetation at the edge of the SEA along Totara Creek (SEA_T_2034, Terrestrial) will be impacted during the construction of the Brigham Creek Interchange of the scheme corridor.

Without the implementation of mitigation measures to limit the amount of vegetation removed, it is anticipated that effects will be between **moderate high** adverse and **moderate** adverse. With the information available and assuming that the proposed mitigation is undertaken the physical landscape effects likely to arise from vegetation clearance within the designation is assessed as **low-moderate** adverse.

Structures and Earthworks

The scheme corridor design includes eight bridges, these are required to allow the crossing of existing road / rail infrastructure, proposed roads / RTC, to cross wetlands and watercourses or a combination of the two. These will be particularly concentrated at the eastern of the scheme at the BCI, where the connections towards Brigham Creek Road, Fred Taylor Drive, SH16 and the ASH cross.

The bridges will require additional earthworks at the approaches to these crossing points and will appear as new structures within the landscape with the exception of the Totara Creek inlet crossing, which will be an upgrade of the existing bridge.

It is anticipated that across the entirety of the scheme a greater amount of fill earthworks are required. This will require the importation of structural fill and material and some of these earthworks will occur on land with slopes greater than 10 degrees. Overall, the proposed design requires a large amount of fill to accommodate the long sections of raised scheme corridor and bridges.

The impacts and potential landscape effects of the proposed earthworks include the modification of and permanent changes to the underlying landform to create an elevated corridor, overpasses and underpasses, surface level changes in close proximity to private properties and earthworks in proximity to the wetlands and watercourses. The proposed cut and fill slopes range in scale from 1m to 100m wide and will alter the form of the existing marginal pastoral landform.

As a form of mitigation, it is recommended that topsoil from pastoral land impacted by the proposed earthworks[9] is re-used and proposed slopes are integrated into the surrounding landscape.

[9] Refer to NZTA Landscape Guidelines (September 2014), Section 4.12 Topsoil for additional information regarding best practice guidelines for topsoil management and soil stripping.

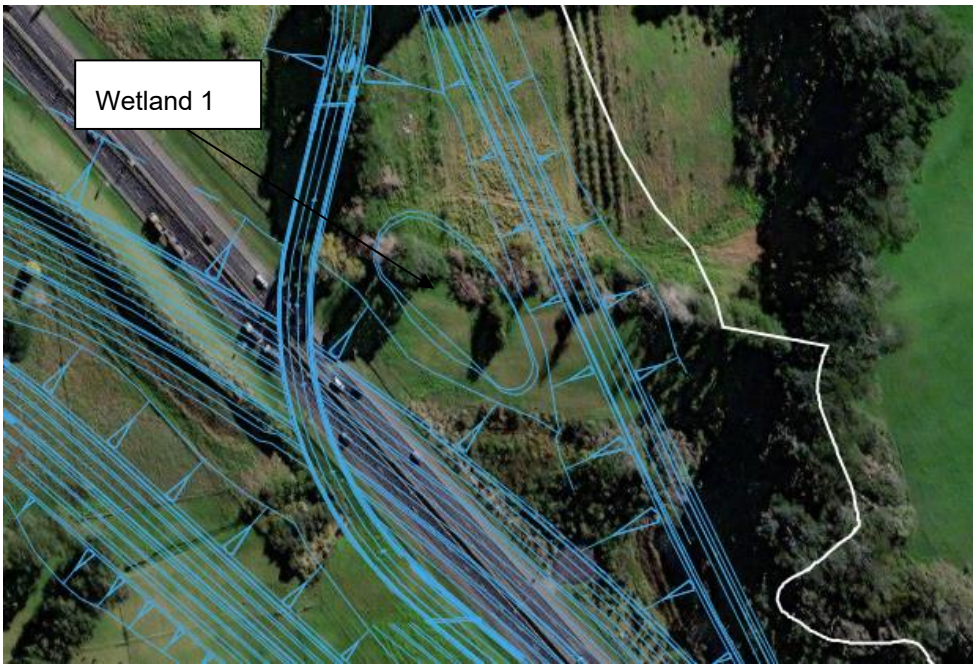
Overall, the earthworks are considered to be of a quantity that is reasonably anticipated with a development of this scope and scale, particularly a landscape with the existing underlying undulating topography. The upgrade to the BCI will be upgraded to a substantial degree that will add an increased verticality compared to the existing interchange. Although bridges and earthworks are largely matters for regional consents, these will be addressed in future regional consenting process.

Without mitigation it is anticipated that adverse effects related to earthworks and structures would be **moderate-high** adverse. With the information at hand and with the implementation of mitigation measures, including all cut and fill slopes being integrated within the existing landform, the proposed works are anticipated to be **moderate** to **low moderate** adverse.

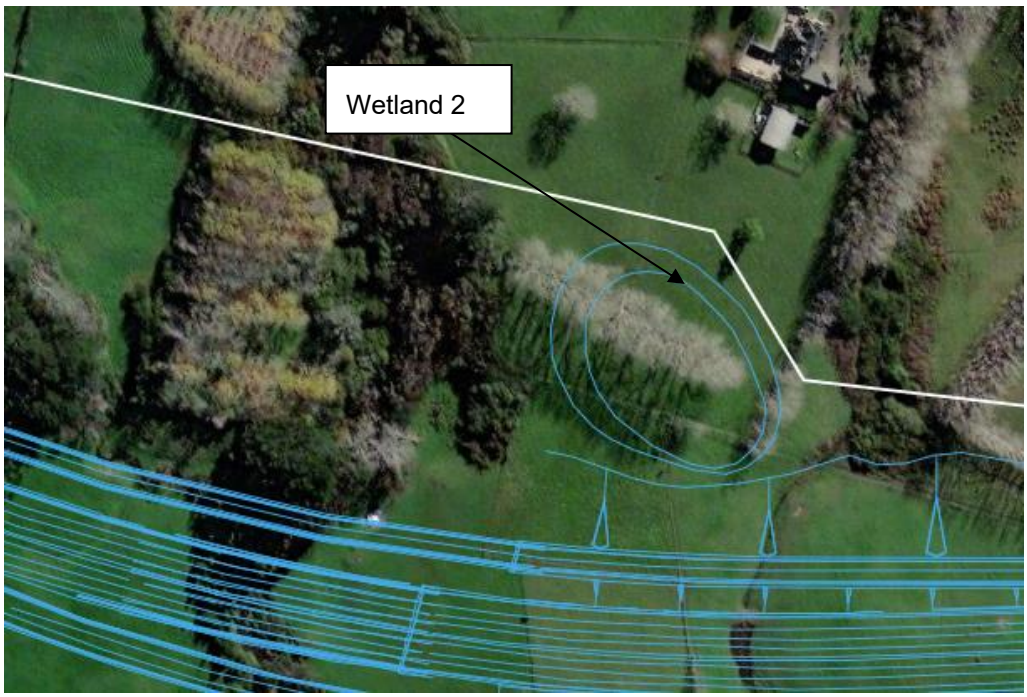
Wetlands, Dry Ponds and Features

Across the scheme corridor 29 wetland ponds are proposed.

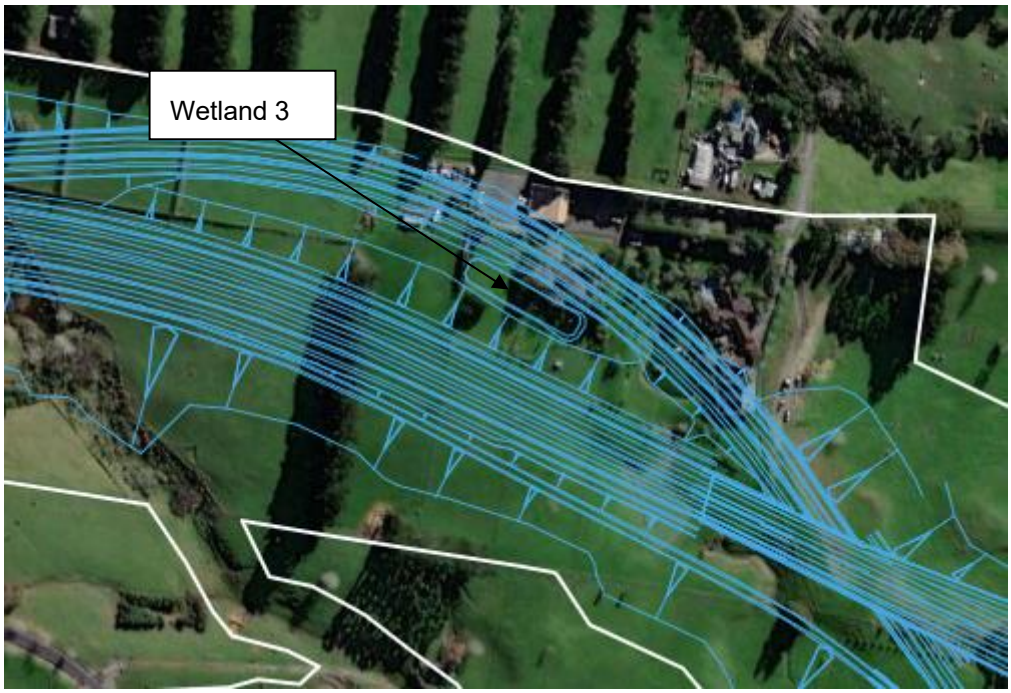
- Wetland 1 is located in an eastern portion of the Brigham Creek Interchange;



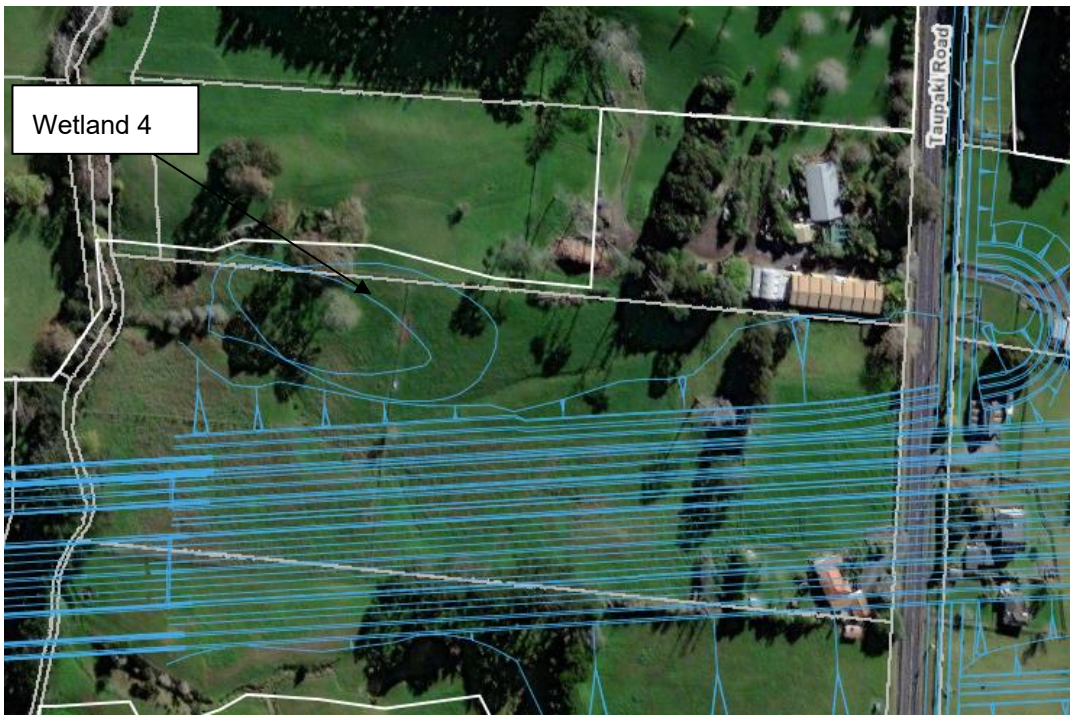
- Wetland 2 is located to the north of the corridor within the boundary of 210 Fred Taylor Drive and approximately 40m of the Ngongetepara;



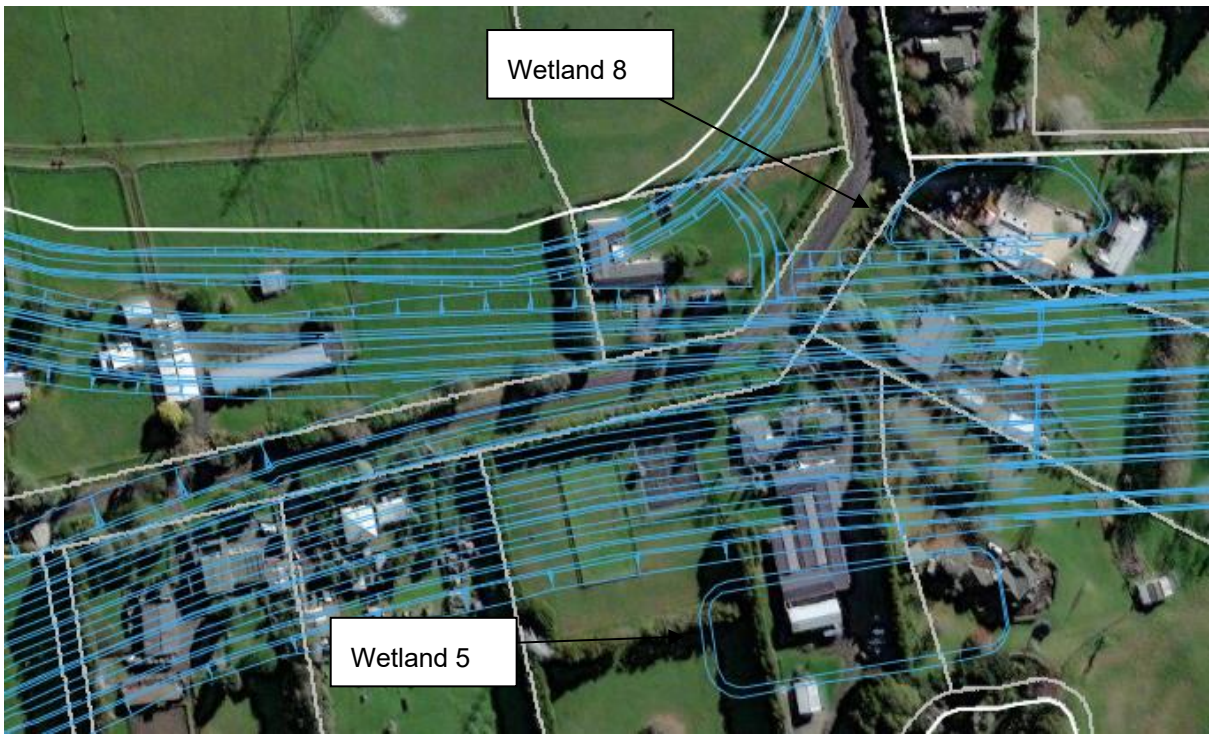
- Wetland 3 is located to the north of the corridor at between the road corridor and the RTC, within the boundary or 280 SH16;



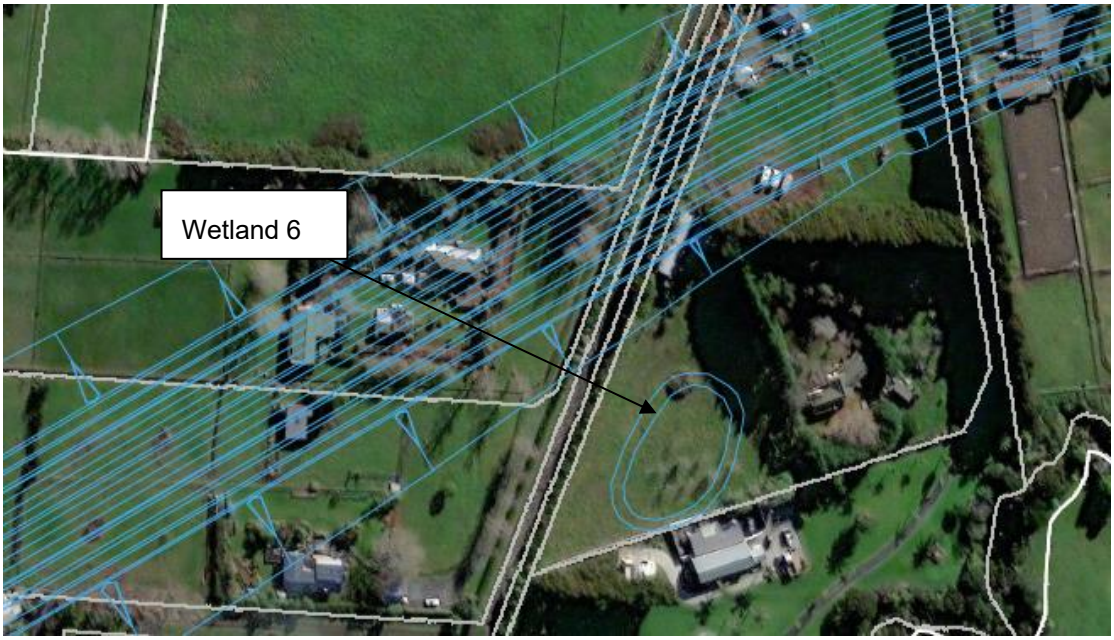
- Wetland 4 is north of the corridor within the boundary of 388 Taupaki approximately 30m of the Kumeū River;



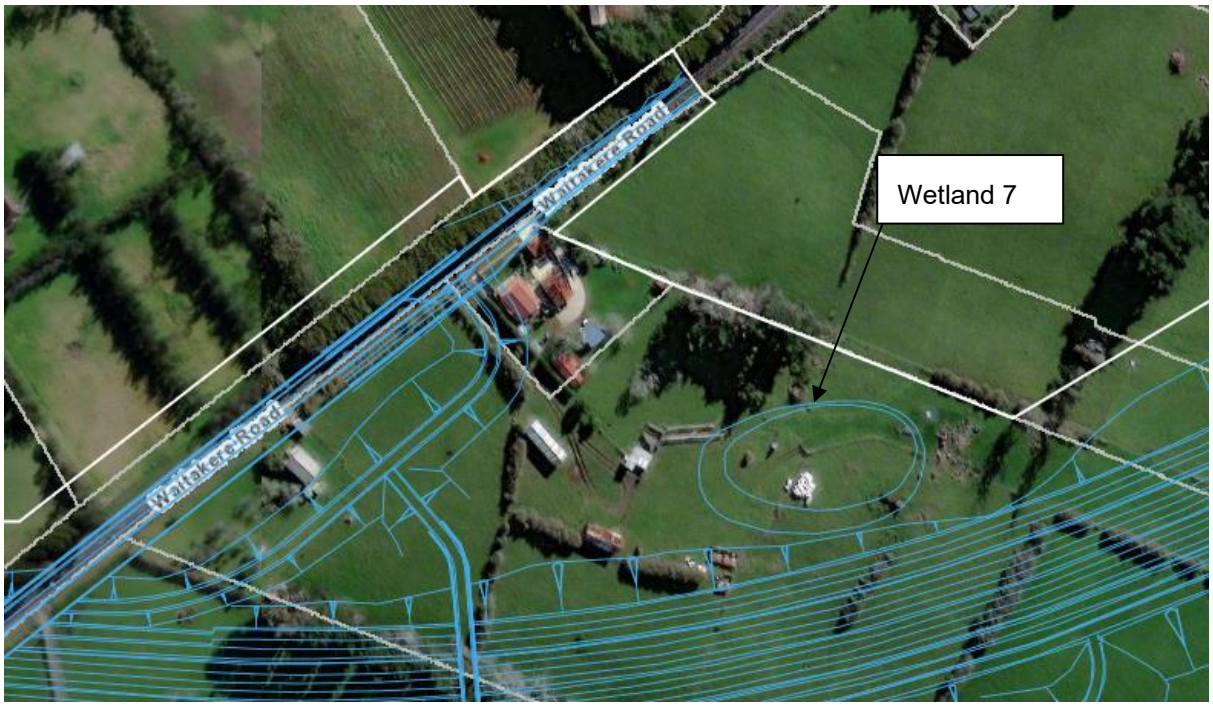
- Wetland 5 is located to the south of the corridor located within the boundary of 176 Boord Crescent approximately 30m of the Kumeū River and Wetland 8 is located to the north of the corridor within the boundary of 178 Boord Crescent within 180m of the Kumeū River;



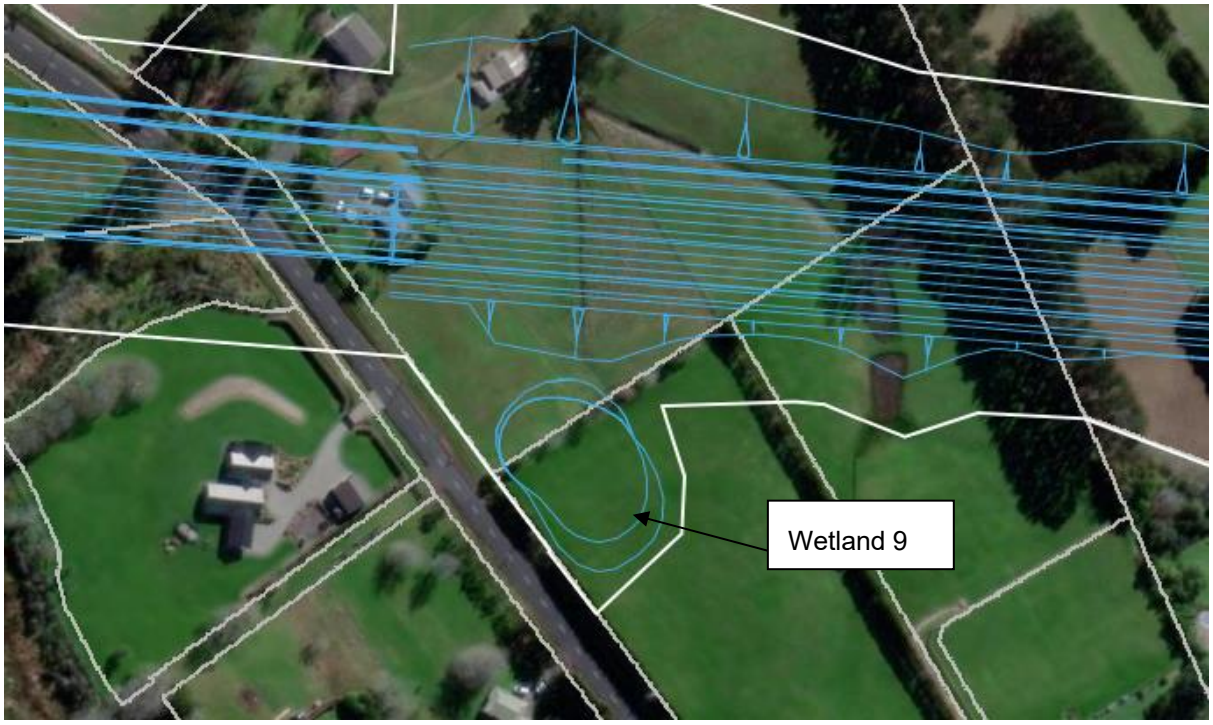
- Wetland 6 is located to the south of the corridor and is located within the boundary of the 152 Boord Crescent approximately 58m of the Kumeū River;



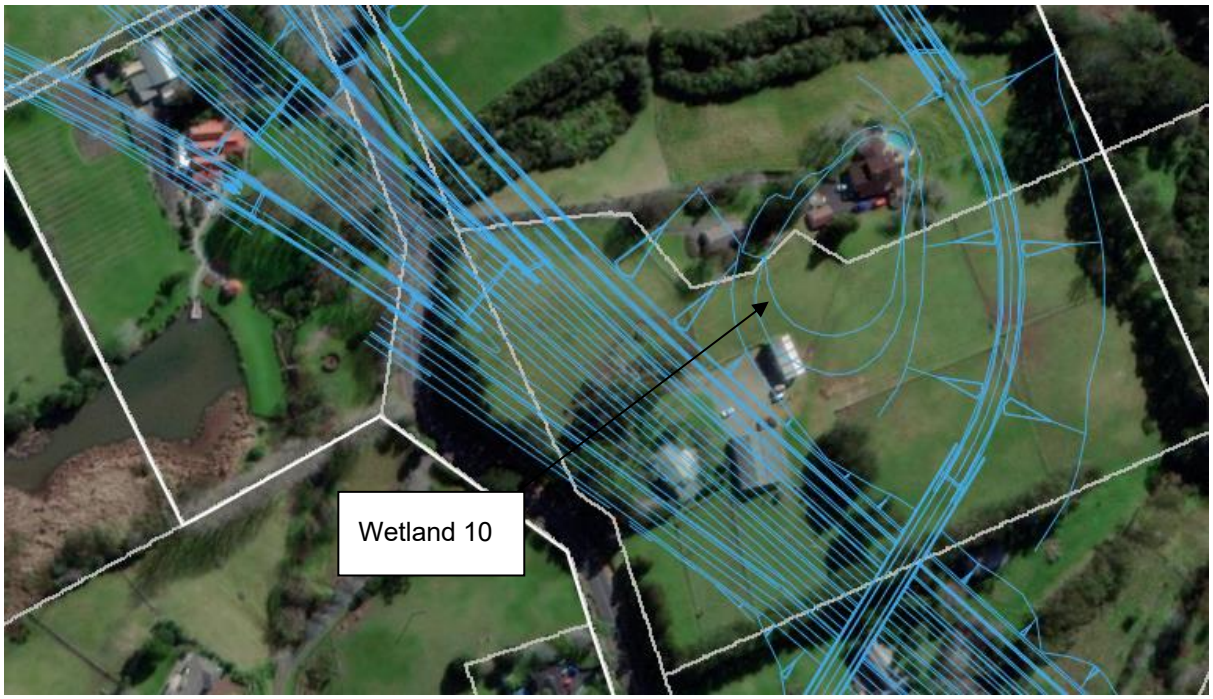
- Wetland 7 is located to the north of the corridor within the boundary of 691 Waitakere Road;



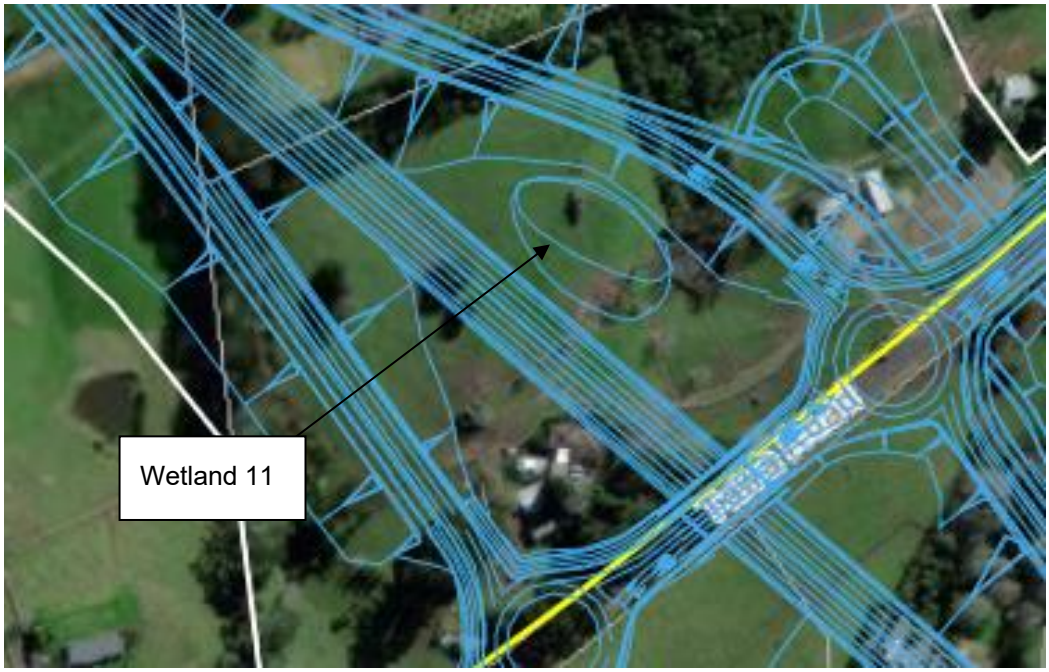
- Wetland 9 is located to the south of the corridor within the boundary of 191 and 219 Pomona Road and is within 100m of a branch of the Kumeū River;



- Wetland 10 is located to the north of the corridor and south of the realigned Pomona Road. It is located within the boundary of 55 and 37 Pomona Road the wetland is within 70m of a branch of the Kumeū River;

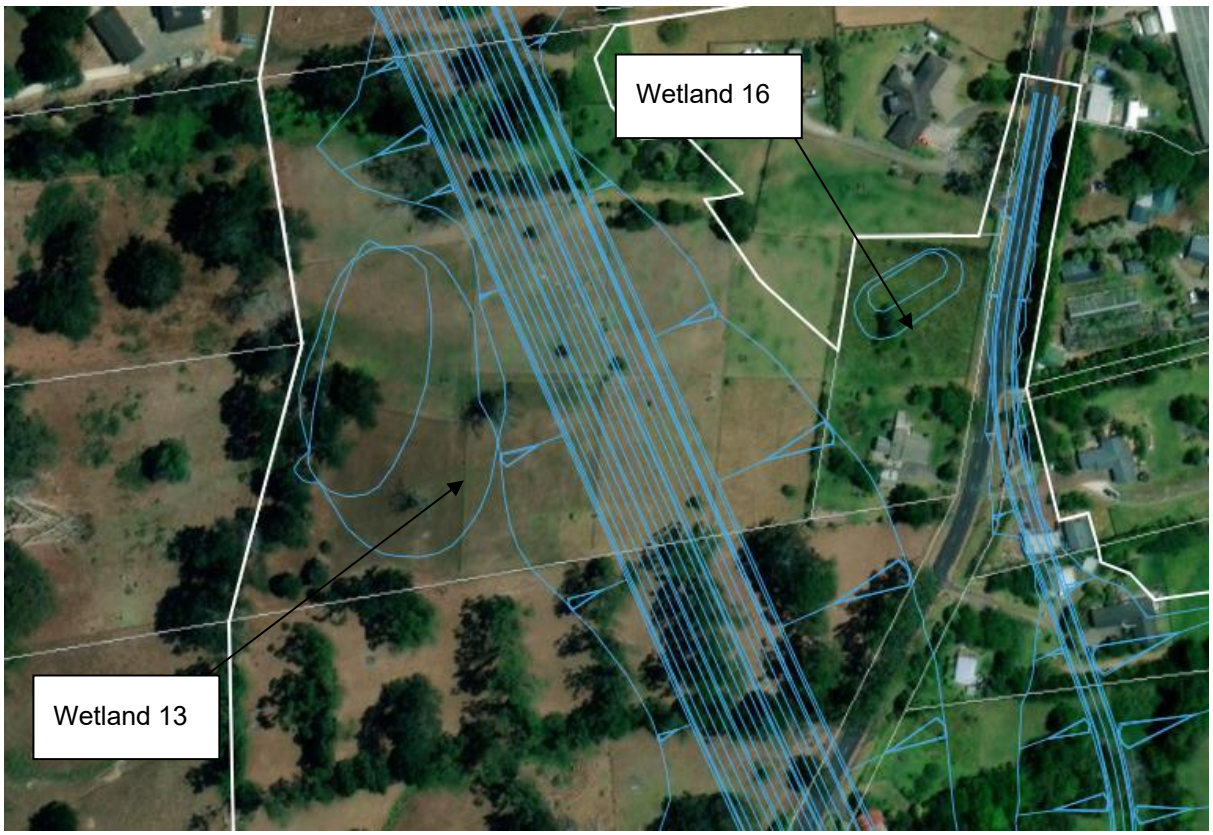


- Wetland 11 is located within a quadrant of the Tawa Road Interchange located within the boundary of 122 Tawa Road;



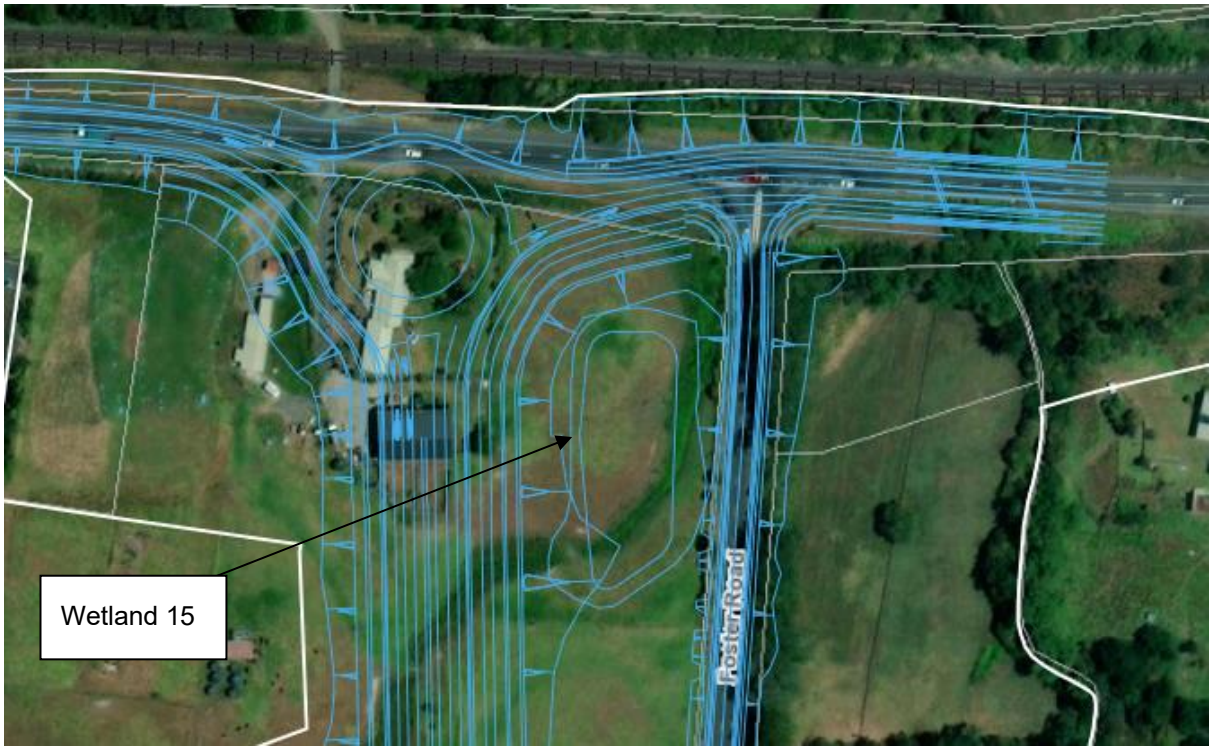
- Wetland 12 is located to the north the corridor within the boundary of 151 and 157 Puke Road and is within 50m of an intermittent branch of the Kumeū River;

- Wetland 13 is located to the south of the corridor within the boundary of 22 Puke Road and is within 80m of the Ahukuramu Stream and Wetland 16 is located to the east of the main corridor close to the realigned Puke Road within the boundary of 41 and 47 Puke Road;



- Dry Pond 14 is located to the east of the corridor next to Foster Road and is located within 40 Foster Road approximately 55m of the Ahukuramu Stream;

- Dry Pond 15 is located to the east of the corridor adjacent to Foster Road and is located within 23 Foster Road, this pond is approximately 20m of the Ahukuramu Stream;



- Wetland 18 is located to the north of the main corridor and the south of the realigned intersection of Pomona Road and Tawa Road, within the boundary of 87 and 97 Tawa Road;

- Wetland 19 is located to the south of the corridor to the north of the realigned Pomona Road and is located within the boundary of 73 Pomona Road;

Wetland 19A is located to the east of the corridor and to the west of the realigned Pomona Road and is located within the boundary of 9 Pomona Road.

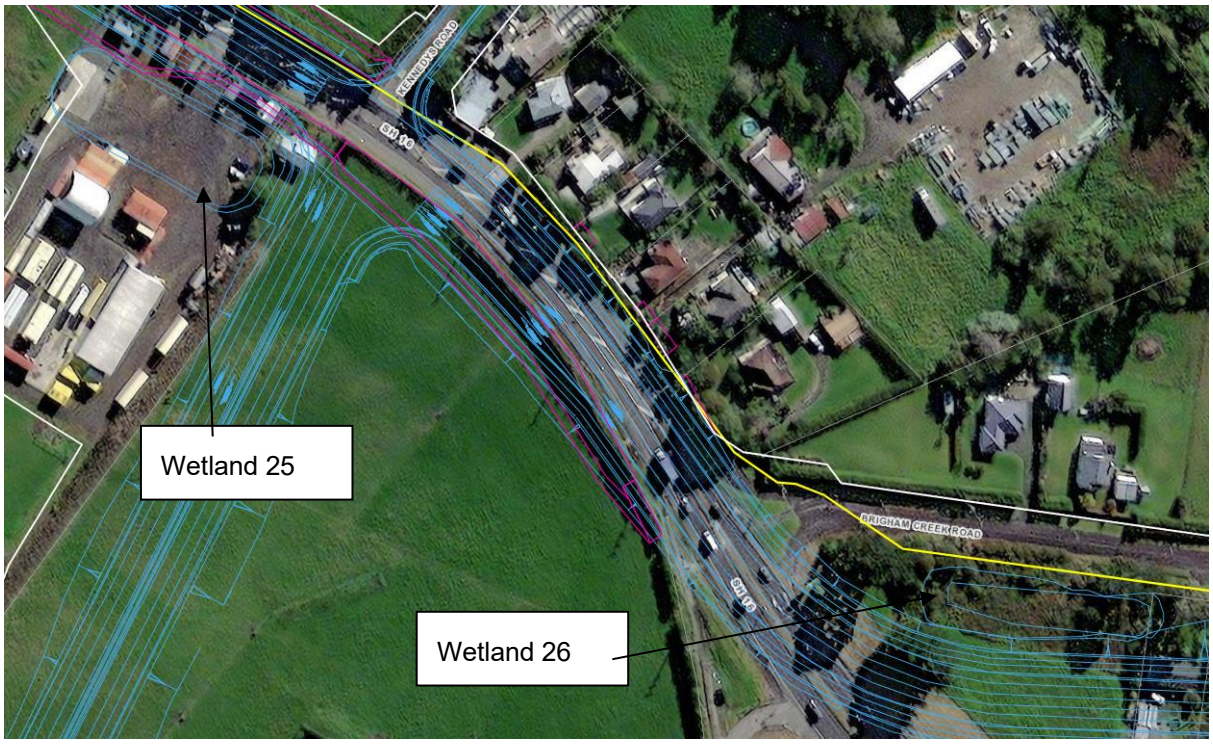
- Wetland 20 is located to the north of the corridor located within the boundary of 144 Pomona Road;

- Wetland 21 is located to the south of the adjacent to the Active Mode Corridor connection to Waitakere Road, located within the boundary of 637 Waitakere Road.

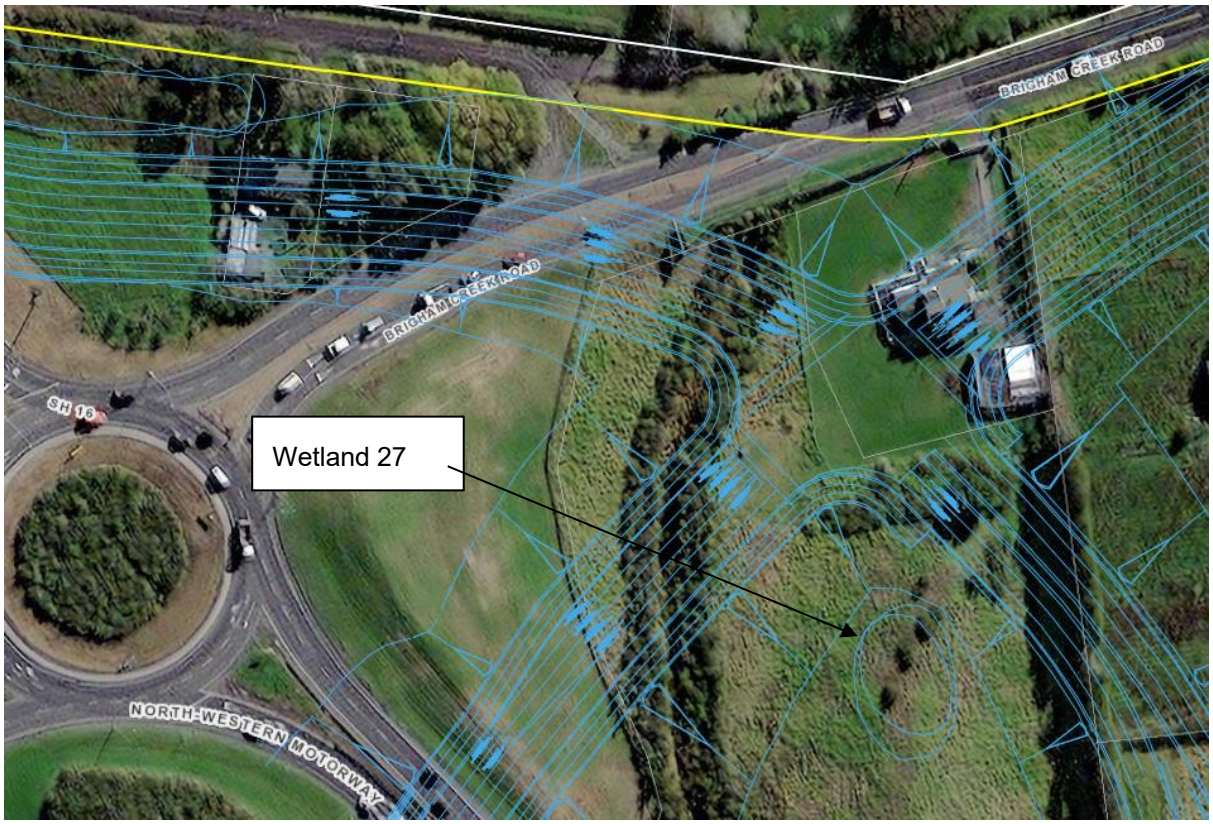
- Wetland 23 is located to the south of the Waitakere Road / Boord Crescent Link Road Bridge located within the boundary of 903 Waitakere Road;

- Wetland 24 is located to the east of the Waitakere Road / Boord Crescent Link Road Bridge located within the boundary of 37 Boord Crescent;

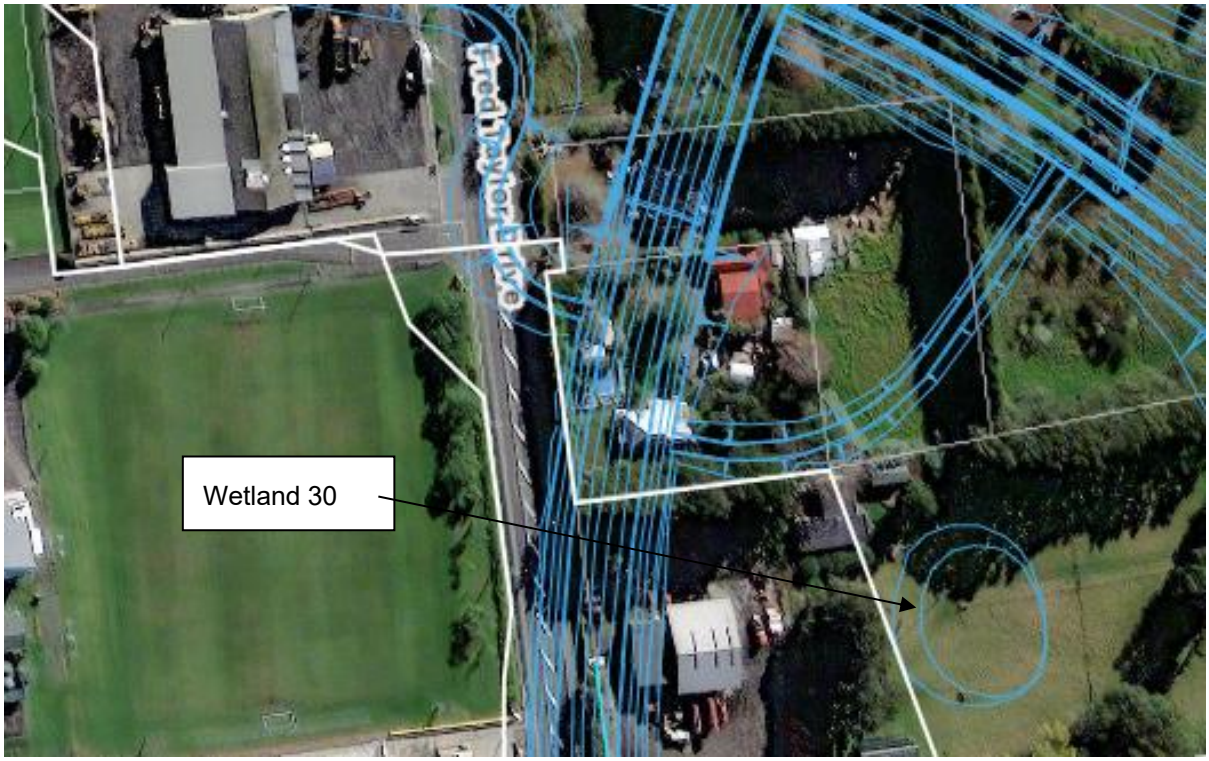
- Wetland 25 is located to the west of the SH16 / Brigham Creek Road Interchange Eastbound off-ramp and is located within the boundary of 216 State Highway 16 and is approximately 215m from the Ngongetepara Creek and Wetland 26 is located to the north of the Brigham Creek Road opposite properties at 2 and 6 Brigham Creek Road and is located within the boundary of 5 Brigham Creek Road;



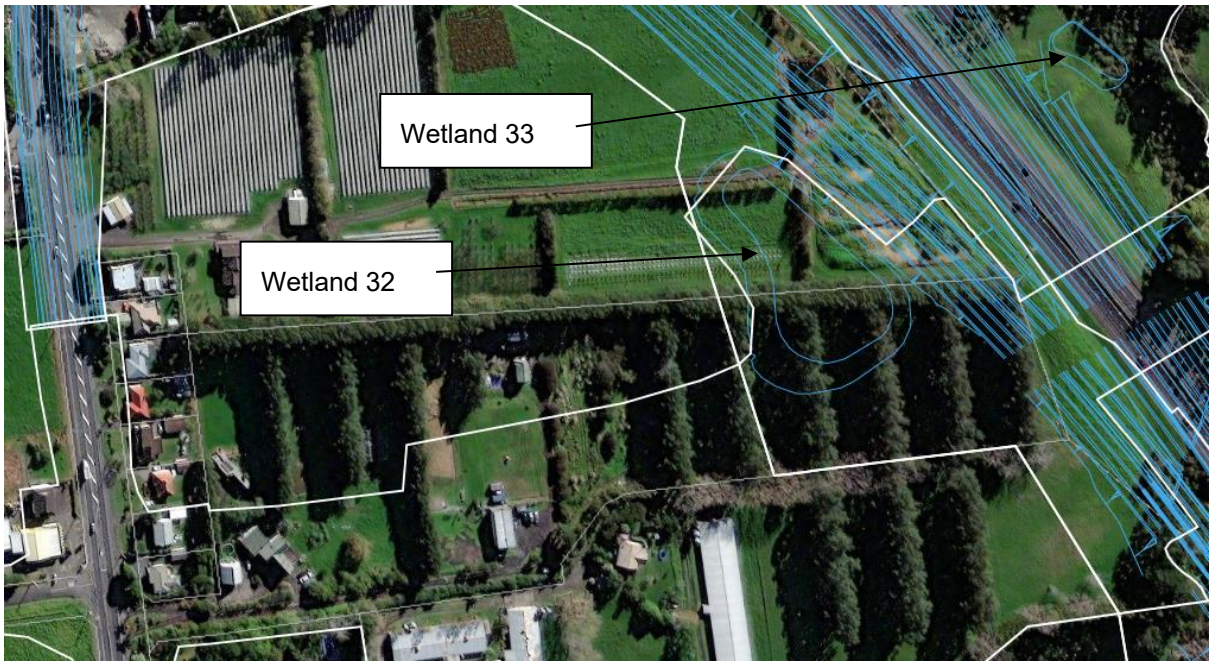
- Wetland 27 is located to the west of the SH16 Brigham Creek Intersection Westbound off-ramp and is located approximately 40m from an existing drainage ditch;



- Wetland 30 is located to the east of the Fred Taylor Drive Bridge over motorway / RT Corridor and is located within the boundary of 149 Fred Taylor Drive.



- Wetland 32 is located to the west of SH16 adjacent to the proposed Spedding Road and Fred Taylor Drive corridors and is located within the boundary of 125 and 125A Fred Taylor Drive and Wetland 33 is located to the east of SH16 at the approach to the Brigham Creek Interchange within the existing road designation, approximately 40m from the Totara Creek



The wetlands and dry ponds will require earthworks to re-shape the land and achieve optimal depths and edge profiles, which will be determined as part of the resource consent phase. With the exception of Wetland 25 which is within a brown field site that is currently used for light industry, all other wetlands and dry ponds will be within rural pastoral or residential land.

It is anticipated that mitigation will reduce adverse effects. However, due to the expected modification of the landscape and relative scale of the water features we consider adverse effects on the physical landscape to implement the proposed dry ponds to be **low** to **very low** with or without mitigation.

Private Properties

Residential properties within and adjacent to the scheme area (either partially or fully designated) will be impacted by the scheme in the following ways:

- Surface level changes between private property boundaries and the upgraded road corridor, requiring existing driveways and private accessways to be regraded;
- Encroachment into private yard areas and the removal of private garden plantings and trees, ancillary buildings and boundary fences;
- Potential impacts related to the construction of noise mitigation measures;
- Visual effects related to night works including light spill and sky glow; and;
- Demolition of existing dwellings and ancillary buildings (required properties)

Approximately 34 partially designated dwellings are anticipated to be directly impacted by the works. Landscape mitigation measures are proposed under 7.6.3 Recommended Measures to Avoid, Remedy or Mitigate Construction Effects below.

Overall, it is assessed that the adverse effects on the physical landscape on private properties will be predominantly **moderate** but **moderate-high** for a small number of properties for part of the construction period. Without mitigation effects for some properties are anticipated be **moderate -high and up** to **high** adverse for some properties or for a limited time during the construction period.

7.6.2.1 Site Finishing Works

Finishing works are expected to include grassing of exposed earth, lighting, signage, line markings, footpath / cycleway details and reinstatement of private property fences and gardens. Streetscape elements and landscaping, including that required as mitigation will also be implemented. These activities are to be determined by detailed design and will occur within the already modified areas of the designation.

Without the implementation of mitigation measures it is anticipated that landscape effects have the potential to be **low-moderate** adverse. With consideration of the information available and providing that mitigation measures are implemented, landscape effects are anticipated to be **low** to **very low** adverse through this final phase of the construction process.

7.6.2.2 Temporary Visual Effects

The construction of the scheme is currently anticipated to be in a number of stages along the proposed corridor over a period of approximately 4-5 years. Visual effects are anticipated to occur progressively through the scheme area and transient viewing audiences may concurrently experience adverse visual effects from multiple stages through the construction period.

The consideration of visual effects through the construction phase acknowledges the full range of activities (and their resultant visual impact), required to construct the Alternative State Highway.

It is anticipated that construction activities required to implement the proposal will introduce a concentrated area of construction activity into the existing rural landscape. Within the FUZ the proposed construction phase will be consistent with the construction activities expected to be associated with the urbanisation of the FUZ. However, these are anticipated to be particularly

intensified where the BCI will be built. Another important consideration is that landscape change by way of vegetation removal and land modification (on private rural property), albeit at a lesser scale, forms part of the expected backdrop of the existing environment. Although the removal of vegetation for the implementation of a highway is permitted under the AUP, this does not diminish the level of change in the landscape or experienced by audiences.

Notwithstanding the above, some vantage points within the scheme area are likely to witness heightened adverse visual effects through the construction phase due to the magnitude of vegetation removal and / or earthworks proposed. These areas are outlined below:

- Private properties where physical landscape effects will occur within their lots.
- Effects on the private properties at 208 and 210 Fred Taylor Drive in proximity to Wetland 2 and the nearby site compound;
- Private property at 284 State Highway 16 in relation to effects during the construction of Wetland 3;
- Properties at 178 and 182 in proximity to the nearby site compound and Wetland 8;
- Private property a 703 Waitakere Road in relation to effects during the construction of Wetland 7, Wetland 22 and the nearby construction compound;
- Private properties at 646 Waitakere Road; 2 and 8 Hanham Road; and; 194 and 214 Pomona Road, in relation to the construction of Wetland 9 and the nearby construction compound;
- Private property at 4 Dysart Lane in relation to effects during the construction of Wetland 2;
- Retained private property at 130 Pomona Road, in relation to effects associated with the nearby construction compound;
- Private properties at 48, 75 and 95 Pomona Road in relation to the construction of Wetland 10, Wetland 19A and the nearby site compound;
- Private properties at 164 Motu Road, 79 and 83 Tawa Road in relation to effects during the construction of Wetland 18;
- Private property at 80 Puke Road in relation to the nearby construction compound ;
- Private properties at 36 and 37 Puke Road in relation to the construction of Wetland 16;
- Private properties at 116, 130 and 131 Foster Road in relation to the nearby construction compound;
- Private properties at 69, 80 and 81 Foster Road in relation to the nearby construction compound;
- Private property at 59 Foster Road in relation to effects associated with the construction of Dry Pond 14;
- Private properties at 23 Foster Road and 695 SH16 in relation to effects associated with the construction of Wetland 15 and the nearby construction compound; and;
- Private properties at 218-220 SH16 in relation to effects associated with the construction of Wetland 25
- Private properties at 2 and 4 Brigham Creek Road in relation to effects associated with the construction of Wetland 26.

The nature and significance of the potential adverse visual effects is considered to be reduced through aspects of the scheme area by the following aspects:

- The existing Brigham Creek / Fred Taylor Drive and SH16 Interchange is already a central element within the visual composition of the surrounding area;
- The existing local road corridor landscape has already been modified by previous works required to shape the existing road connections.

- The Main Works are expected to last approximately 4-5 years and are currently proposed to be implemented in six phases which are expected to allow efficient access to the construction zones while maintaining continued access for the intersecting roads and existing private and commercial driveways.

Within the context of the surrounding area it is anticipated that audiences within a rural context are anticipated to have a greater sensitivity to the changes proposed , compared to urban audiences. Overall, with the implementation of mitigation measures adverse visual effects for the transient public viewing audience are anticipated to range from **moderate** to **low** through the construction phase, taking into account those vantage points listed above where adverse effects are likely to be heightened during the temporary construction period. Without the inclusion of mitigation measures the level of effects experienced by transient audiences are anticipated to range between **moderate** to **low-moderate** adverse.

Adverse visual effects during the construction phase are likely to be heightened for private viewing audiences directly adjacent to the scheme area on the basis of more direct and prolonged engagement with the proposed construction activities . This will include the presence of heavy machinery and the visible disturbance of both the road corridor and also individual private interfaces with the road.

Therefore, with the inclusion of mitigation measures it is anticipated that adverse visual effects will range between **moderate high** to **low** during the construction phase for private viewing audiences, depending on their location, proximity to the works and outlook. Without the inclusion of mitigation measures to it is anticipated that visual effects will range between **high** to **low-moderate** adverse.

7.6.3 Recommended Measures to Avoid, Remedy or Mitigate Construction Effects

Recommendations are in line with the recommendations in Section 6.1.2. In addition to those measures the following specific interventions are recommended:

- Ensure that measures are taken to prevent techniques to manage or avoid the effects of construction activities on ground water and wetlands within proximity to site compounds.

7.6.4 Assessment of Operational Effects

7.6.4.1 Natural Character Effects

Natural character forming elements, features and processes within the scheme area are spread across the length of the schemecorridor, these include: wetlands, rivers and perennial streams. These are set within a predominantly existing modified rural landscape that has been cleared for pastoral land use. Indigenous riparian vegetation within wetlands and waterways are varied and intermittent across the designation. The sections of the Totara Creek, Kumeū River and Pakinui Stream within the scheme corridor designation contain the most concentrated and contiguous native riparian habitats and are largely unmodified within the rural locations of these streams. We consider that the natural character rating of these element, features and processes is moderate in nature.

Clearance of indigenous riparian vegetation and habitat will be necessary to facilitate the crossing of the wetlands and watercourse environments in particular at the crossing of the Totara Creek, Kumeū River and Pakinui Stream. The proposed route design have been aligned to limit the amount of works in proximity to the Kumeū River to the south of Boord Crescent. The interim design proposes bridges

across these watercourses to minimise the impact on the natural flow of water and to enable the riparian habitat to continue underneath the bridge. Although the primary streams are bridged in the interim design subsequent branches of the stream are proposed to be culverted. Adverse effects of natural character will be heightened where watercourses are culverted as a result in the change to the natural watercourse, removal of vegetation and the disconnection of contiguous native riparian vegetation. Any required works within the river bed will be assessed as part of the future regional consents.

It is recommended that during detailed design process the extent of impacts on watercourses are reviewed to limit to the disturbance of existing wetland and watercourse features. A planting plan and vegetation protection plan is recommended as part of the ULDMP which will be developed as part of the detailed design process. It is recommended that any planting proposed as mitigation through the regional consents process is integrated with the planting plan as recommended through this assessment under the ULDMP. This will ensure that natural character values of the watercourses and wetlands are enhanced or protected where possible as an outcome of the proposal.

On the basis of the above (allowing for future landscape mitigation), adverse natural character effects are likely to be **low,** where bridges are used to cross water courses and retain natural character value. Where culverts are required we consider natural character effects to range from **low-moderate** to **moderate**, these effects will be considered further as part of a future regional resource consent.

7.6.4.2 Visual Amenity Effects

Overall, there are likely to be a range of visual amenity effects on public and private viewing audiences relative to proximity to the corridor. For existing properties set back from the designation area around the Brigham Creek Interchange, the visual amenity effects are considered to be lower due to the existing context of the interchange. However, it is anticipated that there will be an incremental increase in existing effects with the introduction of the state highway and arterial road interchange over a larger footprint.

Retained private properties that interface with the scheme corridor will predominantly be within the rural landscape and will experience a change in the view as a result of the introduction of the new elevated state highway. Private properties which have filtered, screened or distant views towards the works are expected to experience a reduced level of change in visual amenity as a result of the works. Properties which front on to the Fred Taylor Drive and SH16 and have existing short distance views will experience very little difference between baseline views and views during operation.

For some properties directly adjacent to the scheme area (which are partially designated), adverse visual amenity and residential character effects will be heightened as a result of the construction impacts including driveway regrading, potential loss of yard space and / or by the introduction of an urban style carriageway and footpaths / cycleways proximate to private dwellings. It is recommended that boundary fences and garden plantings (removed through the scheme works) be reinstated on completion of the works affecting the property. These mitigation measures included within the proposed ULDMP under the lens of neighbourhood character and as such are discussed further in the following section.

Very few rural public viewing audiences in the existing environment have a direct view of the Alternative State Highway due to the lack of connectivity to rural land. FUZ land to at the eastern and western extents of the scheme corridor is developed over time as visual effects are anticipated to be reduced for the public viewing audience, based on improved visual amenity for users associated with streetscape improvements, maturing street trees, berm planting and accessibility to active modes of transport.

Public viewing audiences within proximity to the proposal are primarily active mode users along Brigham Creek Road; Fred Taylor Drive; SH16; Puke Road; Tawa Road; and Fred Taylor Park open space; which are in or on the edge of the FUZ; and; Taupaki Road, Nixon Road, Boord Crescent, Waitakere Road, Hanham Road, Pomona, Awa Road, Foster Road and Trigg Road which have rural zoning.

Overall, some visual effects are anticipated to be mitigated by measures implemented during the finishing phase of the construction period (within the road corridor and private property boundaries), proposed planting will mature through the operational phase of the scheme. Intervening vegetation will reduce some of the long-term residual visual effects of the proposal. However, the approximately 50m wide state highway, which is raised in part, will be a noticeable new feature within the landscape particularly within rural zoned land. The road corridor will be less apparent as the FUZ is urbanised over time and in rural areas where the corridor is in cut and when integration / mitigation planting has matured.

Without the implementation of proposed mitigation it is anticipated that visual effects on transient viewers will be **low** adverse, for transient viewers within the FUZ and **low-moderate** to **moderate** adverse for rural audiences through the operational phase of the proposal. For private viewing audiences, visual effects these are anticipated to range from **high moderate** to **low-moderate** for rural audiences and **low-moderate** to **low** for audiences within FUZ.

On the basis of the above and provided that mitigation measures are undertaken, adverse visual effects within the area are likely to be **low** for transient viewers within the FUZ and **low-moderate for rural audiences** through the operational phase of the scheme. For private viewing audiences, visual effects are likely to range from **low-moderate** to **low** for rural audiences and **low** to **very low** for audiences within FUZ. In both instances effects are anticipated to reduce over an extended period of time as planting matures and forms a more effective screen / filter.

7.6.4.3 Landscape Character Effects

The principal elements of the proposal will permanently alter the character of the rural features of the landscape. The FUZ sections of the surrounding area will experience the proposal within the context of a wider landscape undergoing urbanisation. The rural zoned sections of the surrounding area are characterised by the lack of streetscape features, informal intermittent vegetation, managed and unmanaged watercourses, shelterbelt and hedgerows along field boundaries and existing rural land uses. The existing roadways through the landscape are typically rural in nature and lack urban characteristics such as a kerb and channel roadway, footpath and street lighting.

The scheme is anticipated to enter the operational phase within the context of increased urbanisation where FUZ land is progressively live-zoned and urbanised. Although it is not possible to anticipate the exact future urban land use pattern, Whenuapai Structure Plan suggests that Business, High and Medium density residential development will be introduced at land around the proposed Brigham Creek Interchange, as well as the retained Fred Taylor Park Open Space, at the eastern extent of the designation.

The development of FUZ within the Spatial Land Use Strategy - Kumeū-Huapai, Riverhead, and Redhills North is less structured and is intended to be at a high level. Neighbourhood Centres are proposed along Motu Road and to the south of Fred Taylor Park, which are proximate to the designation. It is reasonable to expect that these centres will be surrounded by a predominantly residential land use. Based on the above the magnitude and nature of landscape change proposed by the proposal we consider to be a match with the changes that will likely occur throughout the localised landscape as it is urbanised over time.

A structured planting design will be implemented through wider designation including on slopes and embankments as part of the ULDMP, to provide integration of the scheme into the landscape. It is also recommended that the ULDMP advises on design strategies to design slopes and embankments to have a more naturalised appearance and integrate with the surrounding rural landscape. These features and design details are expected to improve landscape and urban amenity of the scheme corridor.

As outlined earlier broad areas of vegetation within the existing corridor will not be able to be retained. New tree and forest planting along the length of the corridor will be relied upon to mitigate the loss of that vegetation (from a landscape character perspective).

It is assessed that planting and design interventions within the ULDMP, in conjunction with stormwater management and reinstatement planting, will reduce effects on landscape character associated with broad vegetation clearance within the context of a rural environment.

On the basis of the above without mitigation effects may be as high as **high** to **moderate high** adverse**,** allowing for future landscape mitigation, adverse landscape character effects are anticipated to be **low-moderate** to **low** once mitigation planting has established.

7.6.5 Recommended Measures to Avoid, Remedy or Mitigate Operational Effects

Recommendations are in line with the general recommendations in Section 6.1.3.

In addition to these measures the following specific interventions are recommended:

- Address the visual and landscape effects of the ASH on Fred Taylor Park by providing screening and landscape integration.

7.7 Conclusions

Overall landscape and visual effects without mitigation range from **high** adverse to **low** adverse for the construction phase and **high moderate** adverse to **low** adverse for the operational phase. With the anticipation of mitigation measures being implement landscape and visual effects are anticipated to range from **moderate-high** to **very low** for the construction phase and **low-moderate** to **very low** for the operational phase.

Overall, the adverse effects can be mitigated and reduced over time in relation to the FUZ areas which will experience urbanisation of the surrounding landscape. The FUZ landscape context has a lower level of sensitivity to change due to the anticipated developing urban form of the landscape associated with future urbanisation. The rural areas of the landscape are more sensitive to the introduction of the road corridor, however optimizing landscape integration, through the ULDMP, which will assist with the integration of the slopes and embankments into the landscape through earth shaping and mitigation planting. Heightened adverse visual effects on retained rural properties can be reduced during the construction phase, however adverse effects will be unavoidable in some instances.

8 NoR S2: SH16 Main Road Upgrade

8.1 Project Corridor Features

The proposed SH16 Main Road Upgrade is set primarily within the urban context of the existing state highway through Kumeū Huapai with the exception of the eastern rural and western FUZ ends of the designation.

The key landscape matters addressed for the SH16 Main Road Upgrade:

- The nature and extent of impacts on the landscape as a physical resource during the construction period. A specific focus on the location of the construction compound, extent of vegetation clearance, the scale and location of proposed cut and fill slopes and the likely impacts of bridge construction.
- The widening of the existing corridor to 24m and the requirement to extend into residential properties, this will be limited to sections of the corridor only.
- The expansion of the arterial road into rural 'greenfield' lots and how it will interface with the enduring rural environment that is not zoned as FUZ at the eastern and western extents of the designation.
- Consideration of landscape character effects and urban amenity issues in relation to the permanent landscape change, including specific assessment of how this corridor will integrate into the future urban environment;
- Potential removal of large mature urban trees and consideration of future opportunities to integrate existing trees.
- Consideration of landscape mitigation measures to be included within the recommended Urban and Landscape Design Management Plan (ULDMP) which would address the potential landscape and visual effects arising from the operation the scheme.
- Culverting, bridging and earthworks within proximity of existing wetlands and watercourses, as far as these relate to designation / district plan matters.

The typical cross section includes an active mode corridor with central and side barriers (See Figure 8-1 below).

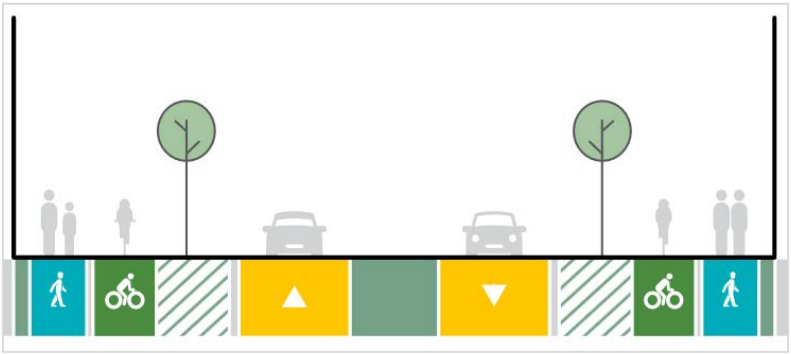


Figure 8-1: SH16 Main Road Upgrade Typical Cross Section

8.2 Existing and Likely Future Environment

8.2.1 Planning context

SH16 Main Road is proposed to be upgraded to a 24m urban corridor along the urban extent of SH16 traversing through well-established retail, commercial and residential environs through Kumeū Huapai. This corridor contains a range of business, residential and open space and rural land uses under the AUP:OP (see zoning column in Table 8-1) between the eastern extent of the Kumeū-Huapai township and the western extent of the upgraded corridor (the intersection with the proposed ASH).

Table 8-1 below provides a summary of the existing and likely future environment as it relates to the SH16 Main Road Upgrade.

Table 8-1: SH16 Main Road Upgrade Existing and Likely Future Environment

Environment today	Zoning	Likelihood of Change for the environment[10]	Likely Future Environment[11]
Rural	Rural Mixed Rural Zone, Rural Countryside Living Zone	Low	Rural
Business	Business (Industrial)	Low	Business (Industrial)
	Business (Local Centre)	Low	Business (Local Centre)
	Business (Mixed Use)	Low	Business (Mixed Use)
Residential	Residential	Low	Residential
Open Space	Open Space – Sport and Active Recreation	Low	Open Space
Undeveloped greenfield areas	Future Urban	High	Urban

8.2.2 Existing / Baseline Landscape

8.2.2.1 Baseline Landscape

The route of this Project runs along the existing SH16 Main Road between Kumeū and Huapai, approximately from Riverhead Road to Foster Road.

The local landscape character within the scheme corridor is summarised below;

- Vegetation cover comprising non-native stand-alone street trees, linear belts of mixed indigenous and non-native vegetation along riparian corridors, shelterbelts along the road corridor, exotic vegetation in around private residential and commercial property boundaries.

[10] Based on AUP:OP zoning/policy direction
[11] Based on AUP:OP zoning/policy direction

- The landscape is characterised by the urban residential and commercial areas of Kumeū and Huapai that border the existing state highway. The NAL to the south of the existing state highway contributes to the character of the landscape as a transport corridor.
- The Huapai Domain and residential zoned land has a low to low-moderate sensitivity to change.
- There is the potential to enhance and integrate the upgraded state highway within the FUZ and provide additional landscape amenity within the corridor.

Landform and Hydrology

The scheme corridor traverses a gently sloping topography that rises from east to west, the topography has been modified over time to accommodate the existing SH16. High points along the corridor are located at the western end of the corridor to the north and west of the route within the undeveloped FUZ and SHZ. The lower lying land areas of the scheme area are located within proximity of the Ahukuramu Stream, Kumeū River and its branches, flood plains and wetlands.

Landcover

The landscape across the study corridor is characterised as a distinctly modified urban landscape within the urban centres of Kumeū Huapai in the eastern portion of the corridor. These urban centres feature a combination of large lot commercial and suburban residential development. The western portion of the designation within rural and FUZ land is characterised by pastoral and arable geometric fields and rural residential properties. These field patterns are bound in parts by structured hedgerows, shelter belts and small areas of native vegetation. Fields predominantly contain exotic grassland with small pockets of agricultural crops, rural industry and amenity planting in proximity to dwellings. Areas of open pasture are more prevalent to the north of the route and agricultural to the south including the Coopers Creek Vineyard.

Areas of mature native trees are located in patches throughout the rural landscape and in proximity to stretches of riparian vegetation along waterways. Although much of the stream and wetland features across the study area, native riparian vegetation are present within intermittent stretches, particularly within the Ahukuramu Stream and Kumeū River (Figure 8-2 below).

Figure 8-2. Riparian vegetation along a tributary of the Kumeū River to the south of SH16 Main road

A single scheduled notable tree [2603, Silver dollar gum at 396] is present within the designation present within a thin strip of land between the existing highway and the NAL at 396 Main Road, Huapai (see Figure 8-3 and Figure 8-4 below). A second notable tree [2591, Poplar] is located to the south of the scheme within the boundary of a private residence at 399 SH16.

Figure 8-3. Scheduled notable Tree - 2603, Silver dollar gum at 396 SH16 viewed from Station Road

Figure 8-4. Scheduled notable Tree - 2603, Silver dollar gum at 396 SH16, viewed across the NAL from the Huapai Domain car park

Land Use

Land use either side of the scheme corridor is predominantly urban commercial the centre of Kumeū and Huapai. Development to the west of Oraha Road has a more residential focus where the corridor is bordered by single house zone and mixed housing urban residential development (with some residential land with a business – mixed use zoning) and the Huapai Domain open space. The western extents of the corridor to the west of Station Road and Huapai Domain comprises developing residential single house zone and FUZ which will be developed over time. The southern side of the route to the west of Matua Road is predicted to continue to have a mixed rural (RMZ) land use into the future.

Scheduled Landscape and Ecological Features

There are two scheduled notable trees within proximity to the scheme 2591, Poplar at 399 SH16 and 2603, Silver dollar gum at 396 SH16

Historical and Cultural Associations

A Historic Heritage and Special Character overlay 482, Huapai Tavern is located within the designation at 301 SH16 Main Road Huapai (Refer Figure 8-5 below). More in depth analysis of this heritage feature can be found in the Cultural Heritage Assessment.

Figure 8-5: Lion Red Huapai Tavern, 301 Main Road SH16, Historic Heritage and Special Character overlay 482.

8.2.2.2 Likely Future Environment

Overview

The FUZ land, at the western extent of the dignation is anticipated to undergo a significant change from rural to urban land use character. It is anticipated that the abiotic features of the landscape, principally the topography, will be altered over time as the surrounding landscape is urbanised. The character of the rural zones land is not anticipated to change, although these areas are adjacent to an existing state highway.

It is anticipated that some of the defining biotic (land cover) features of the landscape within the FUZ will undergo substantial change alongside future development, with the removal of large areas of vegetation to accommodate the proposal. This will likely involve the implementation of street tree plantings, public open space areas and general landscaping within the private yards of future housing development for public amenity.

The balance of the designation will continue to have an urban function by the completion of the scheme, including the change of some residential land for commercial and business uses. It is anticipated that the abiotic and biotic features of the landscape outside of the designation will endure.

8.2.2.3 Kumeū-Huapai / Riverhead area

This area has not undergone a structure planning exercise, it is identified by council that this process will be undertaken before the land is released to be urbanised. This processed is indicatively

programmed to be undertaken in 2025 in order for the land to be released between 2028 and 2032 as indicated in the Future Urban Land Supply Strategy (FULSS).

The Spatial Land Use Strategy for Kumeū-Huapai, Riverhead, and Redhills North has been developed with collaboration between Auckland Council and the project team. This provides a high level framework that outlines the distribution of future land use (see Figure 8-6 below).

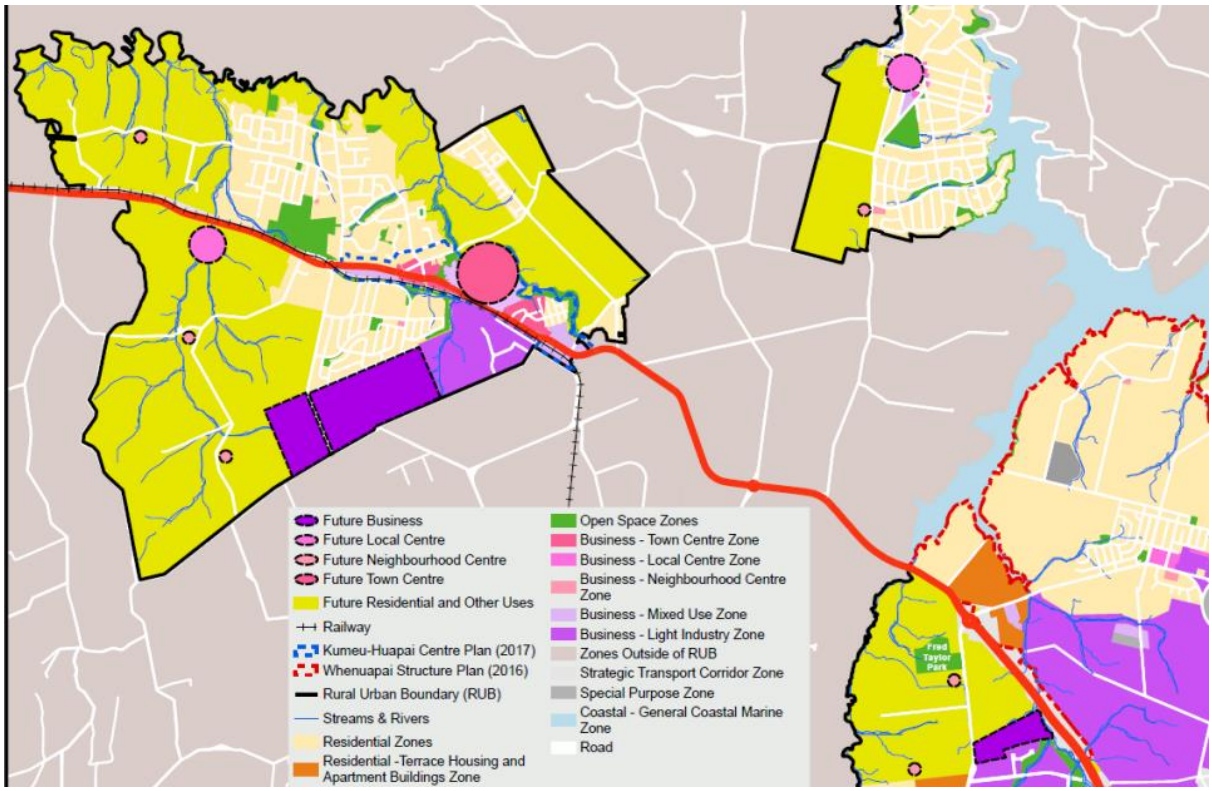


Figure 8-6: Spatial Land Use Strategy - Kumeū-Huapai, Riverhead, and Redhills North.

8.3 Extent of Visibility and Viewing Audience

The extent of visibility of the proposed road corridor is contained by the surrounding vegetation and the changes in topography. Notwithstanding the above, some vantage points within the study area are likely to witness heightened adverse visual effects. In summary the viewing audience for the proposal includes:

- *Public Views:* Transient public audience (vehicle users). Key roads where views can be obtained from include: Station Road, Access Road, Oraha Road, Tapu Road, Matua Road, Trigg Road and SH16 (Main Road) :
  - Travelers (cars, pedestrians and cyclists) along Station Road, Access Road, Oraha Road, Tapu Road, Matua Road and Trigg Road which bisect the site (Refer Appendix Site Photo SP17, SP19, SP20, SP21, SP22);
- *Private Views:* The private viewing audience, comprising views from predominantly urban business are residential properties within Kumeū and Huapai and rural residential and lifestyle dwellings as well as from the commercial and agricultural businesses located at the western end of the designation. Specifically:
  - Views from the residential properties adjacent to the proposed designation that immediately front on to scheme corridor (2, 4, 20, 22, 24, 38 Station Road, 7, 338-382, 391,393, 397, 399,

401,404,405,407, 407A, 529, 551, 573, 583, 587, 609, 619, 623, 631, 641, 643, 677, 693 and 695 Main Road; and 1 Trigg Road. (Refer Appendix Site Photo SP15, SP18, SP16)

- Occupants of nearby commercial buildings and public open space adjacent the proposed corridor (Refer Appendix Site Photo, SP13, SP14)

Views are well contained within the immediate surrounding area of the corridor to the east of the urban core of Kumeū and Huapai, where the landscape is relatively flat and intervening vegetation is present. The visual catchment within the urban core of Kumeū and Huapai is well contained by existing vegetation and built form.

To the west of the designation within the FUZ the topography is gently undulating which results in the scheme corridor being more visible in elevated areas and less visible in areas of depreciation. However, after this area has been urbanised it is expected that the visual catchment will become more contained.

8.4 Landscape Values

There are no regionally or nationally significant landscapes (ONLs, ONFs or ONCs) within or proximate to the proposed designation boundary. The nearest ONL is Area 3, Taylor Road, south of Helensville, located approximately 880m to the north of the scheme corridor.

The majority of the designation will be within an existing heavily urbanised landscape with a limited value overall. However, the Huapai Domain, Kumeū River Park (informally known as the Open Space - Informal Recreation Zone adjacent to the Kumeu river at 296 Main Road) and Kumeū River (and its branches) have a heightened landscape and amenity value within the landscape. On the periphery of the urbanised core of Kumeū and Huapai there are landscape features which contribute to the character and amenity along the road corridor (refer Figure 8-7 below).

Figure 8-7: Mature exotic shelterbelt / screening trees to the south of SH16 adjacent to the property at 7 Main Road SH16.

Towards the centre of the NOR corridor land to the north of the Kumeū River Crossing will be need to be acquisitioned. This acquired land comprises approximately 0.1ha of open space and within the Kumeū River Park (refer Figure 8-8 below). This linear open space is primarily used for informal recreation and provides a green route away from the urban centre along the Kumeū River.

Figure 8-8: View south from Kumeū River Park towards Main Road SH16.

8.5 Landscape Sensitivity

This corridor is situated within the existing SH16 road corridor, the existing two lane corridor and designation are a dominant element within the Kumeū and Huapai town centres. The broader landscape is predominantly urban and also contains areas that have been assessed within the AUP:OP as being suitable for urbanisation. The proposed FUZ area to the west will likely be developed for residential land uses within proximity to the corridor. Rural zoned land which will maintain rural has medium sensitivity to the type of change proposed. The area within existing urban and FUZ is assessed as having a very low sensitivity to landscape change.

8.6 Assessment of Landscape Effects

8.6.1 Positive Effects

Positive effects which relate to all NoRs in the Stategic Assessment Package, including NoR S2, are set out in Section 5 of this report. Additional positive effects related specifically to this NoR include:

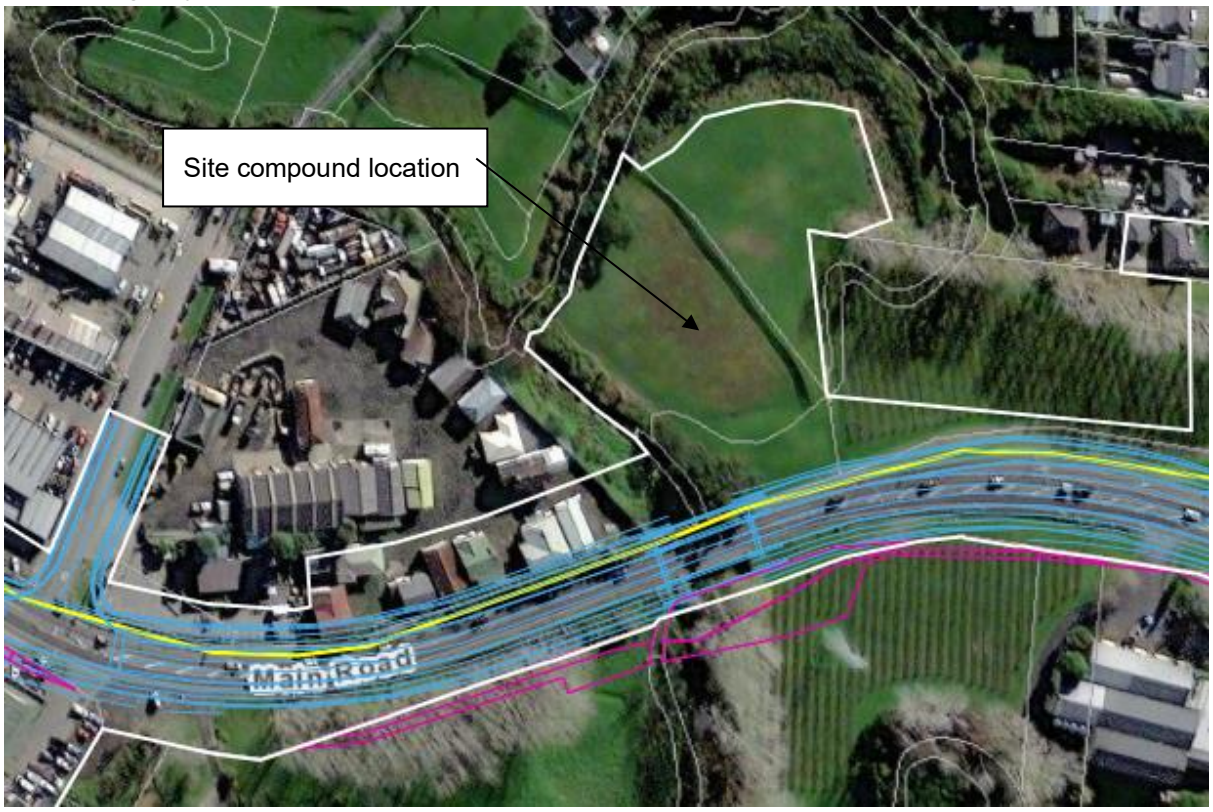
- Improved and / or new opportunities for improve visual connectivity along SH16 Main Road by providing enhanced green infrastructure along the existing car dominated state highway.
- Improved landscape amenity along the scheme corridor by tying into the retained urban landscape and the future urban environment.

8.6.2 Assessment of Construction Effects

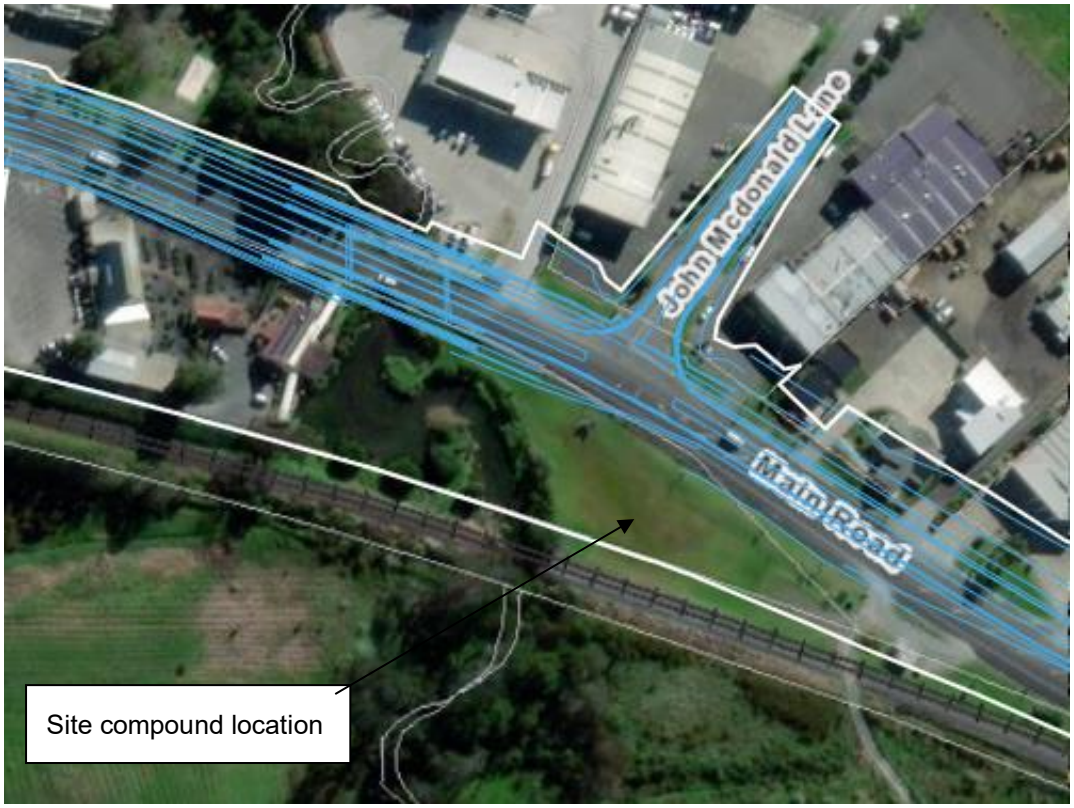
Construction Areas

The site compound and construction areas are to be established at three indicative locations within the designation. Construction traffic will be heightened at these locations through the construction period.

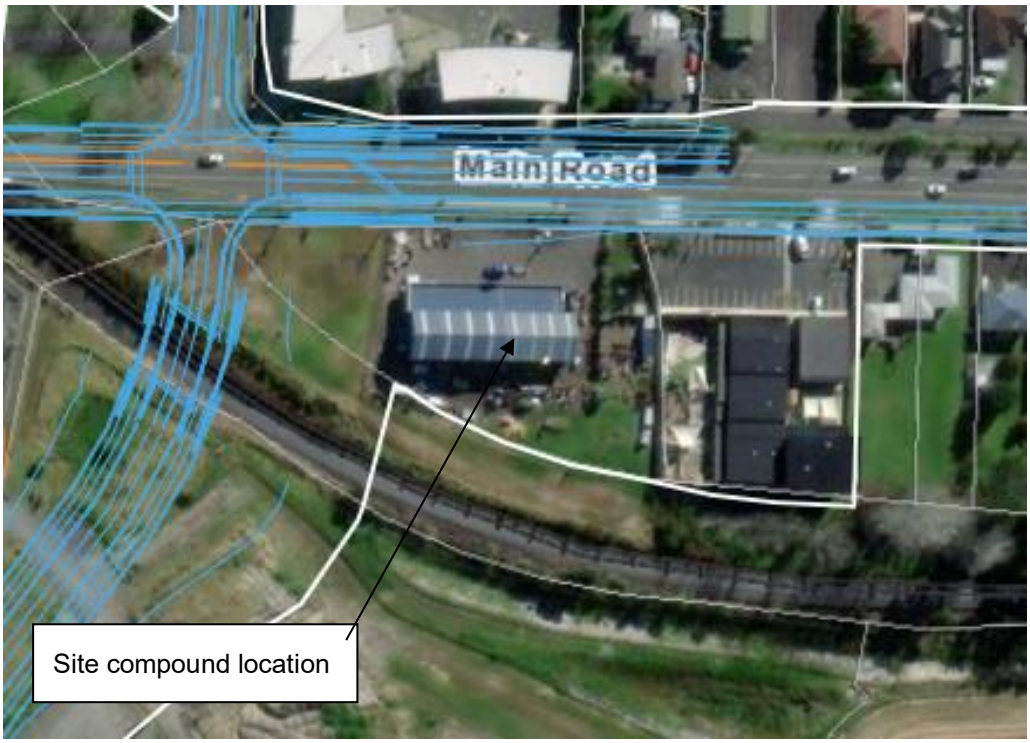
- Site compound, stockpile, sediment retention pond and lay-down area for bridge or underpass construction are located at:
- To the north of the scheme corridor at Sec 2 SO 439526, Main Road Kumeu 0810 to the west of 550 State Highway 16.



- To the south of the scheme corridor with 299 Main Road SH16



- 377 Main Road SH16



Overall, the adverse physical landscape effects resulting from establishment and use of the indicative site compounds and construction work areas within the designation are assessed to be **low** in rural areas and **very low** in existing urban areas.

Vegetation Clearance

Although vegetation clearance is a permitted activity under the AUP and within the existing designation, this does not diminish that there will be a material change that will result in landscape effects.

Linear stretches of vegetation that border the existing state highway and delineate field boundaries will be removed to accommodate the construction and operation of the rural areas of the scheme corridor. This will consist of a mixture of indigenous and non-native vegetation including shelterbelts that are archetypal within the wider modified rural landscape. Exotic pasture, trees, shelterbelt plantings, private gardens, exotic stands of trees and cropland make up the majority of vegetation to be removed. Riparian vegetation within watercourses and wetlands will be removed to accommodate the bridges and culvert along the corridor. The riparian vegetation is a mixture of native and non-native vegetation within watercourses (Kumeū River and its branches, and the Ahukurama Stream). These works are subject to a separate regional consent process, however their potential effects on the landscape and natural character have been included within this assessment and the selection of the designation.

Vegetation proposed to be removed in the urban context of the corridor will typically comprise exotic streets trees, amenity vegetation and vegetation in private backyards. Vegetation removed within the Kumeū River Park will comprise non-native parkland trees and amenity grass. The adverse physical landscape effects likely to arise from vegetation clearance within rural areas are assessed as **low.** Vegetation removal adverse effects in urban areas are assessed as being **very low** with the exception of the open space areas where effects are expected to be **low.**

Structures and Earthworks

The scheme corridor design includes four bridges, one of these bridges is required to cross a watercourses and three of the bridges cross existing or proposed rail / road infrastructure.

The balance of cut and fill earthworks across the designation are anticipated to approximately eb balanced. Overall, the proposed design has balanced of cut and fill in order to sit the expanded existing road corridor within the rural area to the west of the designation.

The impacts and potential landscape effects of the proposed earthworks include the modification of and permanent changes to the underlying landform to widen the existing corridor; replace existing bridges; surface level changes in close proximity to private properties and open space; and earthworks in proximity to the wetlands and watercourses. The proposed cut and fill slopes range in scale from 1m to 38m wide and will alter the form of the existing rural and urban land forms. Although bridges and earthworks are largely matters for regional consents, these will be addressed in future regional consenting process. It is recommended that a condition of the designation is included to promote the stockpile and re-use of topsoil from pastoral land impacted by the proposed earthworks[12]

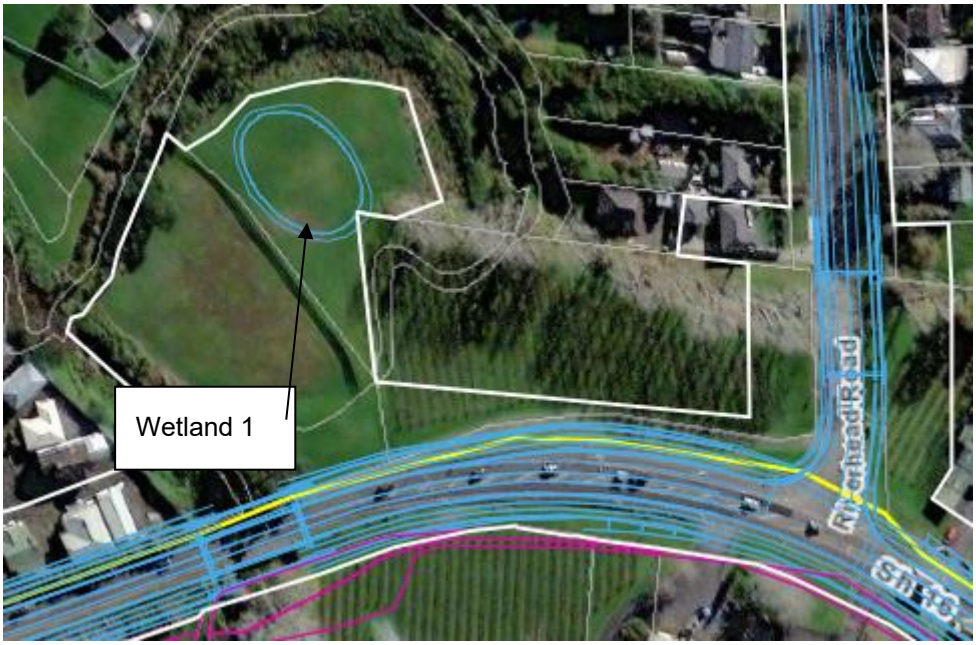
Overall, we consider the earthworks to be of a quantity that is reasonably anticipated with a scheme of this scope and scale and all cut and fill slopes are expected to be integrated with the existing modified urban environment. Provided that the proposed mitigation measures are undertaken we expect that the adverse effects of the earthworks and bridge structure will be **low**.

[12] Refer to NZTA Landscape Guidelines (September 2014), Section 4.12 Topsoil for additional information regarding best practice guidelines for topsoil management and soil stripping.

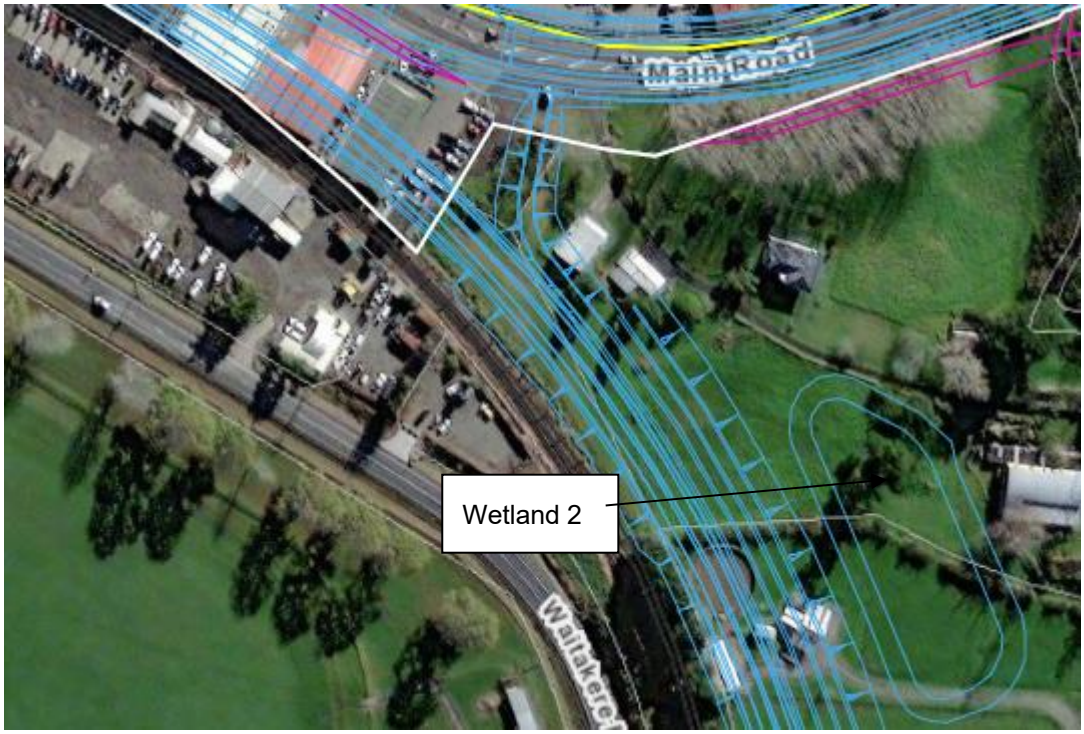
Wetlands, Dry Ponds and features

Across the designation 13 wetland ponds and three dry ponds are proposed.

- Wetland 1 is located to the north of the scheme corridor in proximity to the Kumeū River at Sec 2 SO 439526, Main Road Kumeu 0810 to the west of 550 State Highway 16.

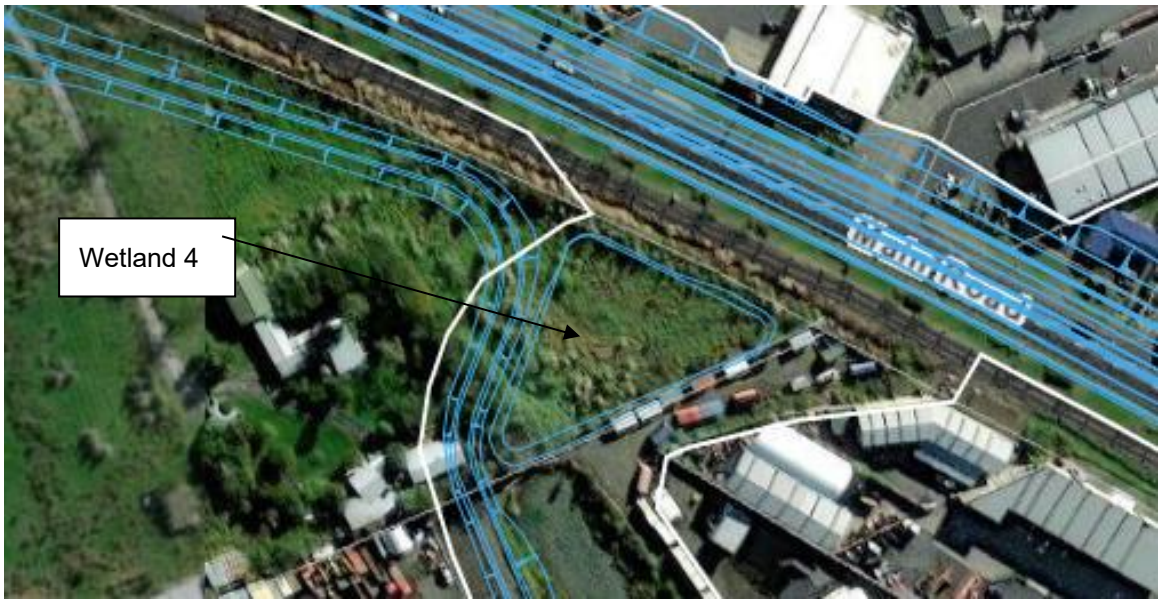


- Wetland 2 is located to the south of the scheme corridor within the boundary of 7 Main Road and approximately 40m of the Kumeū River.

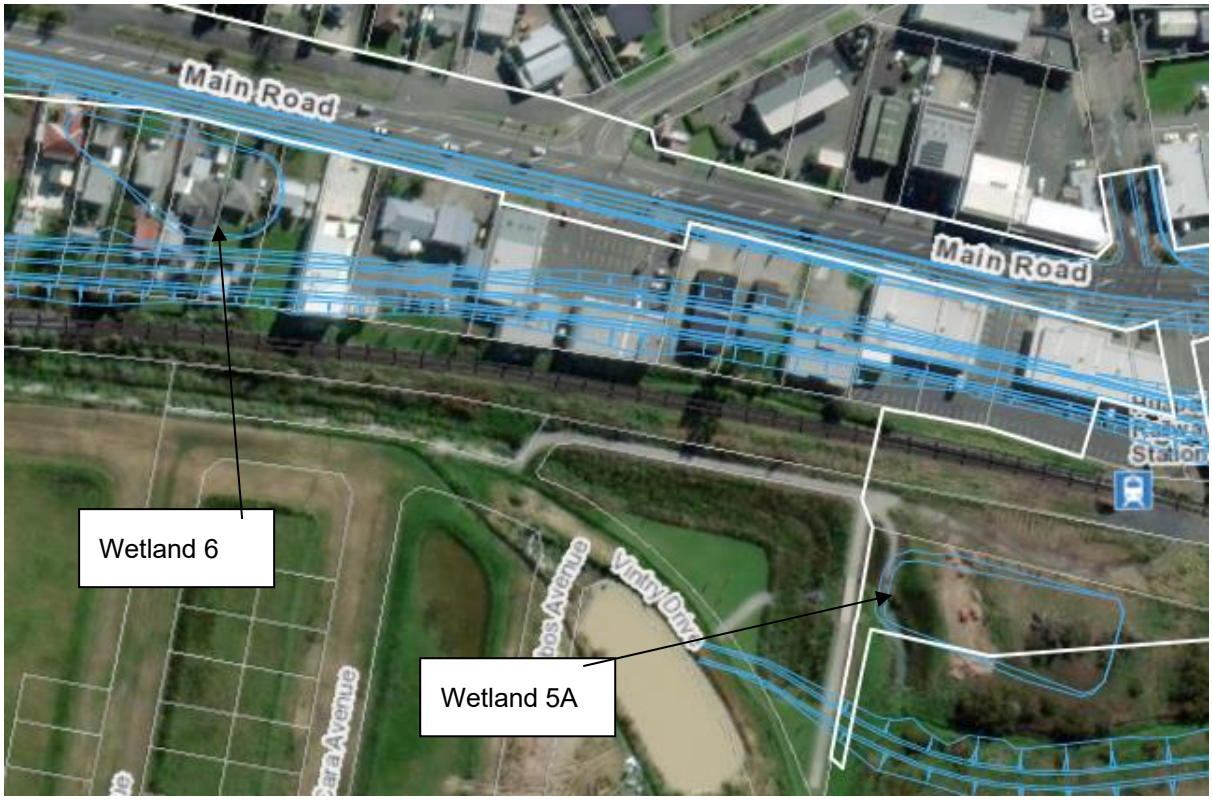


- Wetland 3 is located to the north of the scheme corridor at adjacent to Harikoa Street approximately 150m from the main scheme corridor and 30m form the Kumeū River within the boundary of the property at 108 Main Road;

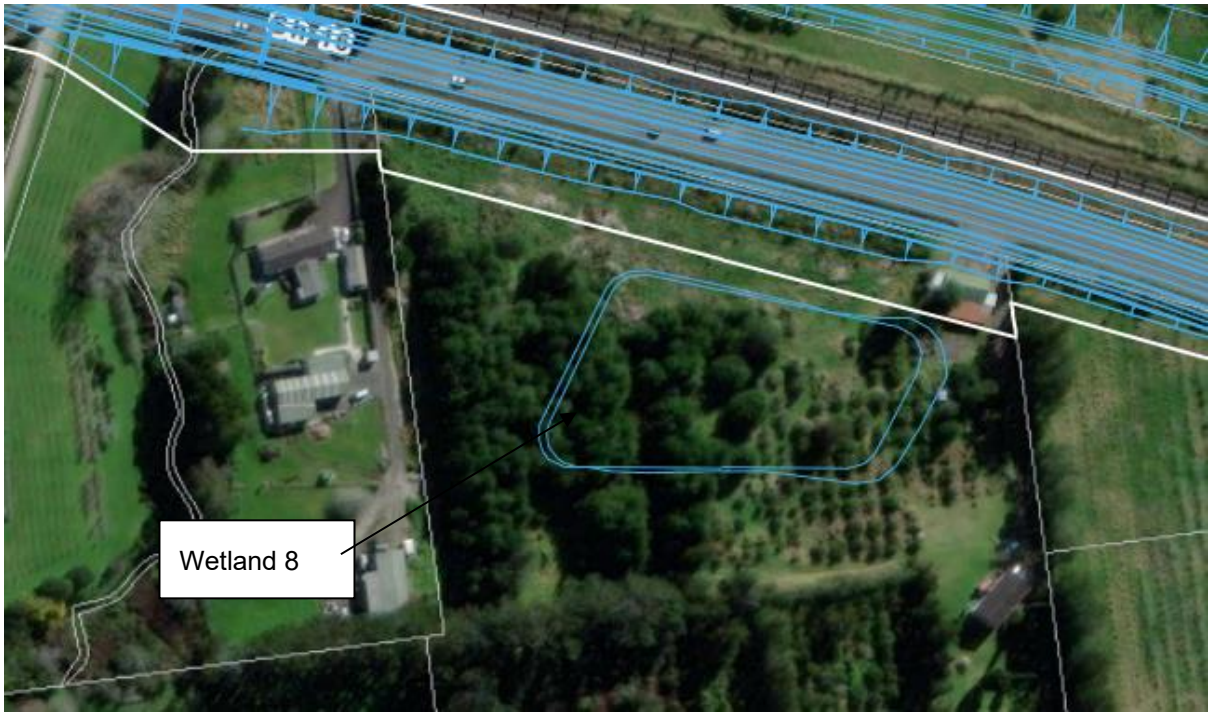
- Wetland 4 is located to the south of the scheme corridor and the NAL at CH1500 within the boundary of 388 Taupaki approximately 30m of the Kumeū River;



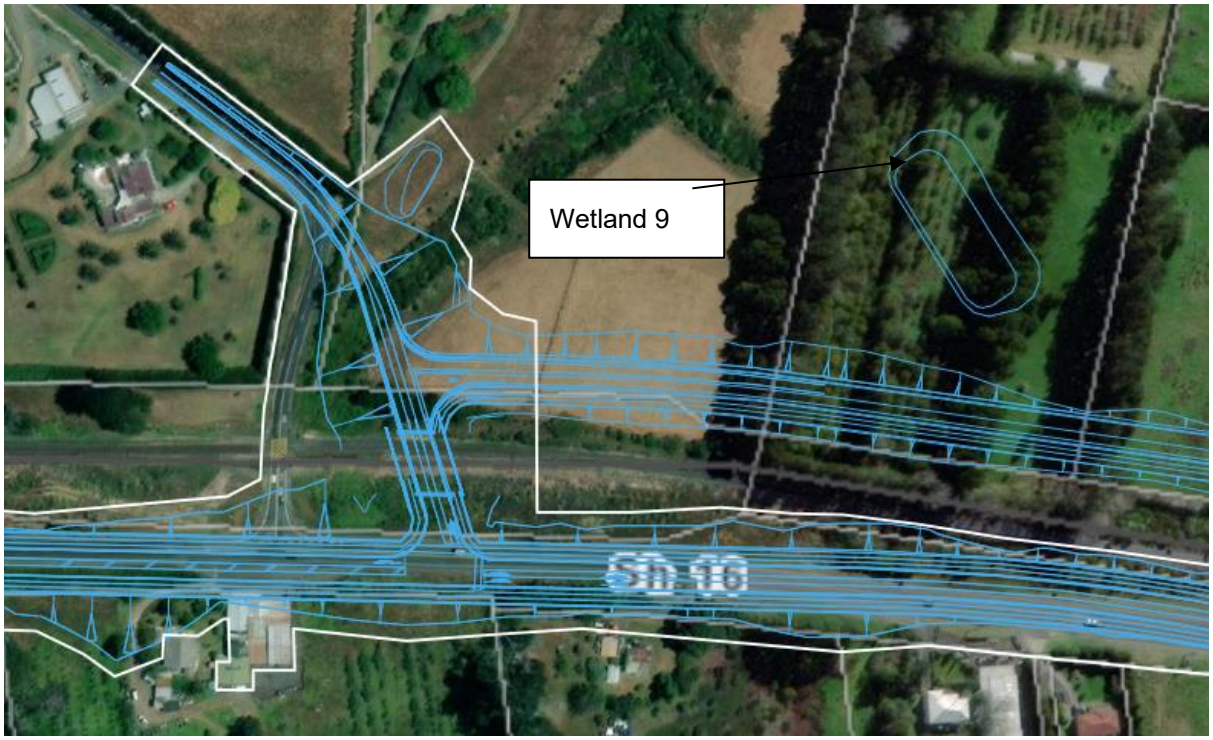
- Wetland 5A is located to the south of the Main Road corridor and the NAL is located within the boundary of 1 Winfield Road approximately 90m of the Kumeū River; and Wetland 6 is located between the expanded Main Road and NAL Corridor and CH2350 from 351, 353, 355 Main Road;



- Wetland 8 is located to the south of the scheme corridor within FUZ land at 551 SH16 Road within 50m of a Kumeū River branch watercourse;

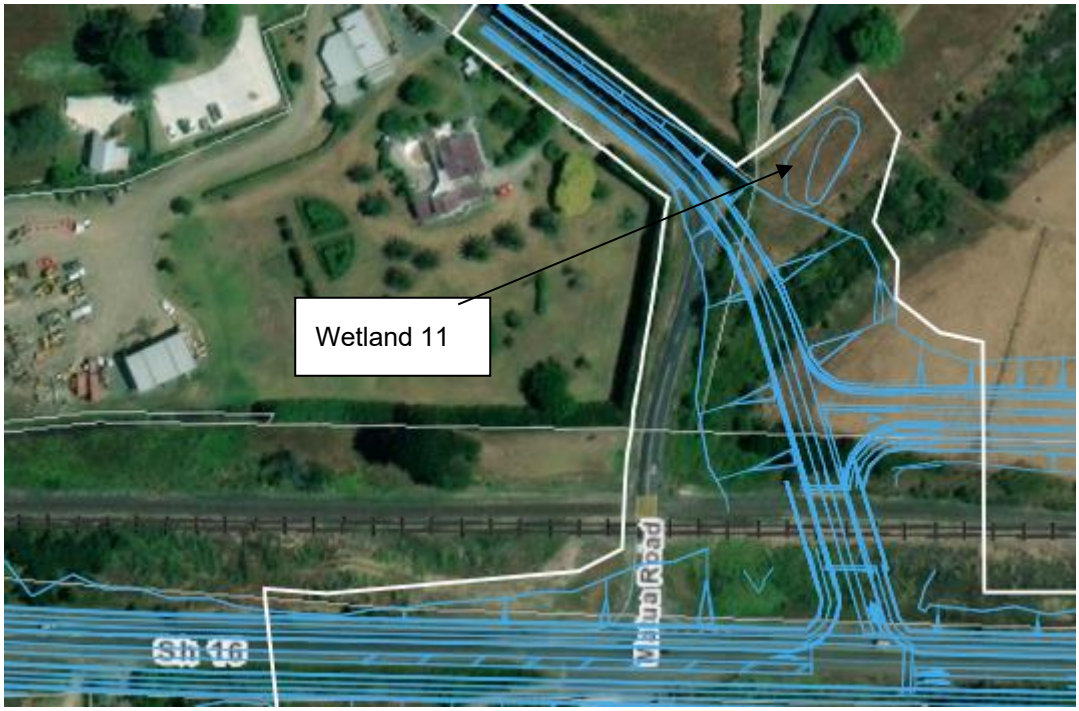


- Wetland 9 is located to the north of the scheme corridor located within the boundary of 307 Matua Road within 25m of a Kumeū River branch watercourse;

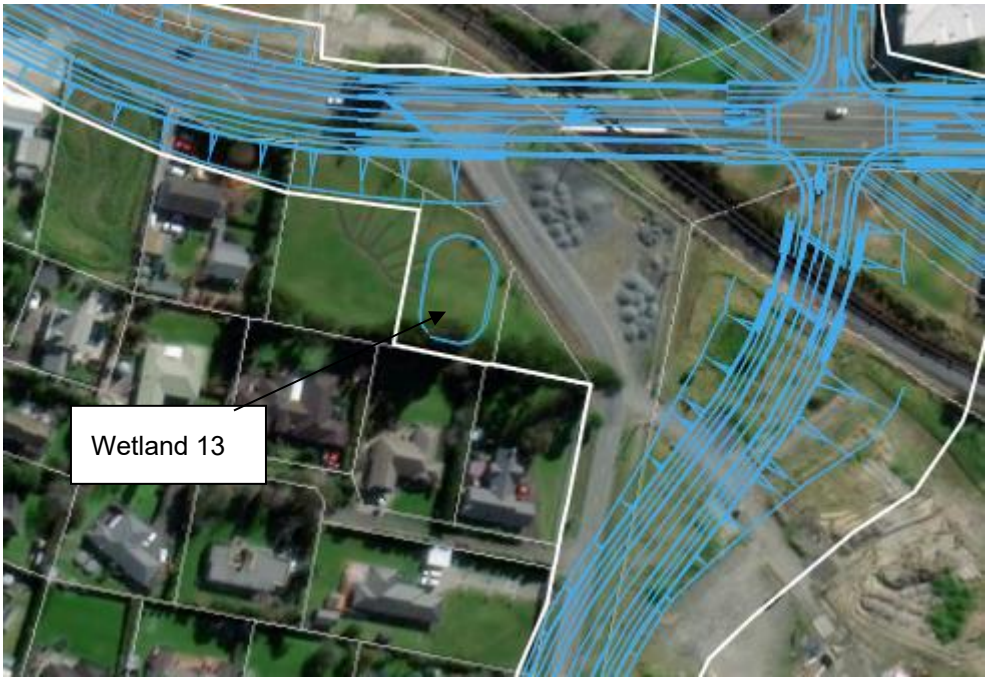


- Wetland 10 is located to the south of the scheme corridor within the boundary of 695 SH16 the wetland is within 22m of the Ahukuramu Stream;

- Wetland 11 is located to the north of the proposed corridor located within the boundary of 411 Matua Road.



- Wetland 13 is located to the south of the scheme corridor located within the boundary of 391 Main Road;



- Wetland 15 is located to the north of the scheme corridor located within the boundary of 239 Matua Road;

The proposed wetlands will require earthworks to re-shape the land and achieve optimal depths and edge profiles, which will be determined as part of the resource consent phase. Wetlands will generally be constructed within greenfield sites in both rural and urban settings with the exception of Wetland 6 and Wetland 15 which are set in set within brownfield lots previously containing built development.

With the information available, it is anticipated that without mitigation it effects on the physical landscape will be **low** adverse. We consider effects on the physical landscape with the implementation of mitigation measures the proposed wetlands to be **very low** adverse.

Private Properties

Residential properties within or adjacent to the designation (either partially or fully designated) will be impacted by the proposal in the following ways:

- Surface level changes between private property boundaries and the upgraded road corridor, requiring existing driveways and private accessways to be regraded;
- Encroachment into private yard areas and the removal of private garden plantings and trees, ancillary buildings and boundary fences;
- Potential impacts related to the construction of noise mitigation measures;
- Visual effects related to night works including light spill and sky glow; and;
- Demolition of existing dwellings and ancillary buildings within the proposed designation.

Approximately 49 retained dwellings will be impacted by the scheme works. Landscape mitigation measures are proposed under 8.6.3 Recommended Measures to Avoid, Remedy or Mitigate Construction Effects below.

Without the implementation of mitigation measures it is anticipated that effects will range between **moderate** and **low-moderate** adverse Overall, it is assessed that the adverse effects on the physical landscape on private properties will be predominantly **low-moderate**, with the implementation to mitigation measures.

8.6.2.1 Site Finishing Works

Finishing works are expected to include grassing of exposed earth, lighting, signage, line markings, footpath / cycleway details and reinstatement of private property fences and gardens. Streetscape elements and landscaping, including that required as mitigation will also be implemented. These activities are to be determined by detailed design and will occur within the already modified areas of the designation. Landscape effects are expected to be **low** through this final phase of the construction process.

Temporary Visual Effects

The construction of the proposal is currently anticipated to be in six stages along the proposed corridor over an estimated period of approximately four years. Visual effects are anticipated to occur progressively through the proposal area and transient viewing audiences may concurrently experience adverse visual effects from multiple stages through the construction period.

The consideration of visual effects through the construction phase acknowledges the full range of activities (and their resultant visual impact), required to implement the upgraded road corridor.

It is anticipated that construction activities required to implement the scheme will introduce a concentrated area of construction activity into the existing busy transportation corridor in the urban and rural landscape. Within the FUZ the proposed construction phase will be consistent with the construction activities expected to be associated with the urbanisation of the FUZ. Another important consideration is that landscape change by way of vegetation removal and land modification (on private rural property), albeit at a lesser scale, forms part of the expected backdrop of the existing environment.

Notwithstanding the above, some vantage points within the scheme area are likely to witness heightened adverse visual effects through the construction phase due to the magnitude of vegetation removal and / or earthworks proposed. These areas are outlined below:

- Private properties where physical landscape effects will occur within their lots.
- Effects on private properties at 21 and 22 Riverhead Road in proximity to a proposed site compound;
- Effects on the private property 7 Main Road, in proximity to Wetland 2 and the nearby site compound;
- Private properties at 4, 6, 8 and 10 Station Road and 395 Main Road in proximity to the proposed temporary road / during the construction of the widened NAL bridges.
- Private property at 695 State Highway 16 during the construction of Wetland 10.
- Private property at 411 Matua Road during the construction of Wetland 11.

The nature and significance of the potential adverse visual effects is considered to be moderated through the scheme area by the following aspects:

- Road works and construction activities can generally be expected to occur within the proximity of the existing road network;
- The existing SH16 is already a central element within the visual composition of the designation;

- The existing road corridor landscape has already been modified by previous works required to shape the existing road corridor.
- The Main Works are expected to last approximately 4 years and is proposed to be implemented in a staged and managed approach along the linear corridor so will not impact all properties for the entirety of the construction period.

Overall, without mitigation measures adverse visual effects for the transient public viewing audience are likely to be **low-moderate** adverse. Assuming that mitigation measures are implemented, adverse visual effects for the transient public viewing audience are anticipated to be **low-moderate** to **low** through the construction phase, taking into account those vantage points listed above where adverse effects are likely to be heightened during the temporary construction period.

Adverse visual effects during the construction phase are likely to be heightened for private viewing audiences directly adjacent to the scheme area on the basis of more direct and prolonged engagement with the construction activities. This will include the presence of heavy machinery and the visible disturbance of both the road corridor and also individual private interfaces with the road.

Therefore, without the implementation of mitigation measures adverse visual effects for private audience are likely to be **moderate** to **low-moderate** adverse. Provided that mitigation measures are implemented adverse visual effects are anticipated to range between **moderate** to **low** during the construction phase for private viewing audiences, depending on their location, proximity to the works and outlook.

8.6.3 Recommended Measures to Avoid, Remedy or Mitigate Construction Effects

Recommendations are in line with the recommendations in Section 6.1.2. In addition to those measures the following specific interventions are recommended:

- Provide hoarding or other screening along the works boundaries of site compounds, wetlands and dry ponds in proximity to residences to reduce visual effects on users of the outdoor space that overlook the works.

8.6.4 Assessment of Operational Effects

8.6.4.1 Natural Character Effects

Natural character forming elements, features and processes within the designation are more prevalent within the existing rural sections however, some features are apparent within the urban landscape. These are typically wetlands, rivers and perennial watercourses that traverse the existing modified rural and urban landscapes. Indigenous riparian vegetation within wetlands and waterways are varied and intermittent. Kumeū River and Ahukuramu Stream within the designation contain the most concentrated and contiguous native riparian habitats that have undergone some modification at bridge crossings. The natural character value of these elements, features and processes are moderate, however at the bridge approaches the existing modification reduces the character value.

Clearance of indigenous riparian vegetation and habitat will be necessary to facilitate the crossing of the wetlands and watercourse environments in particular at the crossing of Kumeū River and Ahukuramu Stream. The interim design proposes bridges across these watercourses to minimise the impact on the natural flow of water and to enable the riparian habitat to continue underneath the bridge. Although the primary watercourse streams are bridged in the design subsequent branches of the stream are proposed to be culverted. Adverse effects on the natural character will be heightened

where culverts are utilised as a result in the change to the natural watercourse, removal of vegetation and the disconnection of contiguous native riparian vegetation.

It is recommended that during detailed design process of the scheme corridor the extent of impacts on watercourses are limited to reduce the size of the area impacted. A planting plan and vegetation protection plan is recommended as part of the ULDMP. It is recommended that any planting proposed as mitigation through the regional consents process is integrated with the planting plan as recommended under the ULDMP. This will ensure that natural character values of the watercourses and wetlands are enhanced or protected where possible as an outcome of the scheme.

On the basis of the above (allowing for future landscape mitigation), adverse natural character effects are likely to be **low**, where bridges are used to cross water courses and retain natural character value. Where culverts are required we consider natural character effects to be **low-moderate** adverse, these effects will be considered further as part of a future regional resource consent. Without mitigation it is anticipated that adverse effects have the potential to be **moderate** adverse.

8.6.4.2 Visual Amenity Effects

Overall, there are likely to be a range of visual amenity effects on public and private viewing audiences relative to proximity to the corridor in the urban and rural landscapes. For existing rural properties set back from the scheme area will result in an incremental increase in the existing effects as a result of the widening of the SH16 corridor. Urban properties that are set back from the proposal experience interrupted views of works, reducing the level of effects experienced.

Retained private properties within the urban landscape that interface directly with the scheme corridor to the north of SH16 Main Road will retain the access road and existing vegetation which provides amenity and filters views towards the road. Retained private properties within the rural landscape will generally experience a heightened change in the view as a result of the state highway carriageway moving closer and established screening vegetation being removed. Retained private properties which have filtered, screened or distant views towards the works are expected to experience a reduced level of change as a result of the works. It is anticipated that residential and commercial development built within the FUZ will be designed and implemented to address the effects of the proposed widened road.

It is recommended that boundary fences and garden plantings (removed through the construction works) be reinstated on completion of the works affecting retained properties. These mitigation measures should be considered within the ULDMP under the lens of neighbourhood character and as such are discussed further in the following section.

FUZ land within proximity of the scheme corridor is expected to be developed over time as visual effects are anticipated to be reduced for the public viewing audience, based on improved visual amenity for users associated with streetscape improvements, maturing street trees, berm planting and accessibility to active modes of transport.

Public viewing audiences within proximity to the scheme are primarily pedestrians and active mode users along SH16 Main Road and to a lesser extent in the Kumeū River Park open space. Views will also be available from Oraha Road, Matua Road, Access Road, Tapu Road, Station Road and Trigg Road, these audiences will have an oblique view towards the proposal.

Overall, some visual effects are anticipated to be mitigated by measures implemented during the finishing phase of the construction period (within the road corridor and private property boundaries), that will mature through the operational phase of the scheme. These will reduce some of the long-

term residual visual effects of the proposal, however the widened transportation corridor and bridges will be a noticeable new feature within the landscape particularly within rural zoned land where the road corridor is widened. The road corridor will be less apparent as the FUZ and existing urbanised landscape and in rural areas with existing screening vegetation or where is proposed UDLMP planting has matured.

Through the operational phase of the works, without the implementation of proposed mitigation it is anticipated that visual effects on transient viewers and audiences will be **low** adverse to **very low** adverse. effects on private viewing audiences are anticipated to be **moderate** to **low-moderate** adverse. For private viewing audiences, visual effects are likely to range from **moderate** to **low** for rural audiences and **low** for audiences within FUZ. Audiences within the existing urban core of Kumeū and Huapai are likely to be **low** during operation.

With the implementation of mitigation measures, visual effects within the local area are likely to be **very low** adverse for transient viewers and audiences and **low** adverse for static audiences through the operational phase of the proposal. For private viewing audiences, visual effects are likely to range from **low-moderate** to **low** for rural audiences and **low** to **very low** for audiences within FUZ. Audiences within the existing urban core of Kumeū and Huapai are likely to be **very low** during operation. In all instances these would reduce over an extended period of time.

8.6.4.3 Landscape Character Effects

The principal elements of the scheme will result in a slight change to the character of the rural sections of the corridor. The FUZ sections of the study area will experience the proposal within the context of a wider landscape undergoing urbanisation. The rural zoned sections of the scheme area are characterised by the lack of streetscape features, informal intermittent vegetation, managed and unmanaged watercourses, shelterbelt and hedgerows along field boundaries and existing rural land uses. The existing rural sections of SH16 generally lacks urban characteristics such as a kerb and channel roadway, footpath and street lighting. These features will be introduced into the landscape by the proposal including a segregated cycleway, footpaths and a kerb and channel roadway. At the completion of the scheme, the upgraded corridor will resemble that of an urban arterial road on account of the pedestrianisation, active modes of transport, structured street tree planting, integrated stormwater management and engineered roading elements that have an inherently urban aesthetic.

The proposal is anticipated to enter the operational phase within the context of increased urbanisation where FUZ land is progressively live-zoned and urbanised. Although it is not possible to anticipate the exact future urban land use pattern, it is expected that residential development will primarily populate the FUZ.

Through the existing urban centres of Kumeū and Huapai the existing character of the landscape will remain. The proposed scheme is expected to improve the structure and amenity of the road corridor by providing a more structured road layout for active modes and consistent landscape pattern.

The development of FUZ within the Spatial Land Use Strategy - Kumeū-Huapai, Riverhead, and Redhills North is less structured and is intended to be at a high level. Neighbourhood Centres are proposed along Motu Road and to the south of Fred Taylor Park, which are proximate to the scheme area. It is reasonable to expect that these centres will be surrounded by a predominantly residential land use. Based on the above the magnitude and nature of landscape change proposed by the proposal we consider to be in alignment with the changes that will likely occur throughout the localised landscape as it is urbanised over time.

The typical cross section above (Figure 8-1) illustrates the proposed upgrade to the road and the expected future use. Although there will not be space along the entire road corridor for green infrastructure elements such as street trees and berm, there is some existing retained green existing infrastructure inside the designation to contribute to the overall amenity of the corridor. A structured planting design will be provided through wider rural and FUZ designation including on slopes and embankments as part of the ULDMP, to provide integration of the scheme into the landscape. It is also recommended that the ULDMP advises on design strategies to design slopes and embankments to have a more naturalised appearance and integrate with the surrounding landscape. These features and design details are expected to improve landscape and urban amenity of the \ corridor.

It is assessed that planting and landscape interventions within the ULDMP, in conjunction with stormwater management and reinstatement planting, will reduce effects on landscape character associated with broad vegetation clearance designation within the rural environment.

On the basis of the above without mitigation effects may be as high as **low** adverse within the urban and FUZ sections of the route and **low-moderate** to **low** adverse in the rural landscape. Allowing for future landscape mitigation, adverse landscape character effects are anticipated to be **very low** adverse within the urban and FUZ sections of the route and **low** adverse in the rural landscape.

8.6.5 Recommended Measures to Avoid, Remedy or Mitigate Operational Effects

Recommendations are in line with the general recommendations in Section 6.1.3.

In addition to these measures the following specific interventions are suggested:

- Optimise the detailed design to integrate with Kumeū River Park. and / or re-establish the boundary to the open space.
- Protect the natural character and processes of the Kumeū River and its branches, particularly at where the river branch crosses SH16 and the route impacts the existing pond. This will be covered within the regional consent process.

8.7 Conclusions

Without the implementation of mitigation measures, overall landscape and visual effects are anticipated to range from **moderate** adverse to **low** adverse for the construction phase and **moderate** adverse to **low** adverse for the operational phase.

With the implementation of a mitigation measures landscape and visual effects are anticipated to range from **moderate** to **low** adverse for the construction phase and **low-moderate** to **very low** adverse for the operational phase. Overall, the adverse effects can be mitigated and reduced over time in relation to the FUZ areas which will experience urbanisation of the surrounding landscape. The FUZ landscape context has a lower level of sensitivity to change due to the anticipated developing urban form of the landscape associated with future urbanisation.

The existing urban core of Kumeū and Huapai also have a reduced sensitivity to change will be experience landscape and visual effects during construction resulting in a **low-moderate** level of effects. However, after the scheme corridor is completed the effects will be **very low**. The rural areas of the landscape are more sensitive to the widening of the road corridor however, integration works proposed by the ULDMP will assist with the integration of the slopes and embankments into the landscape through earth shaping and mitigation planting.

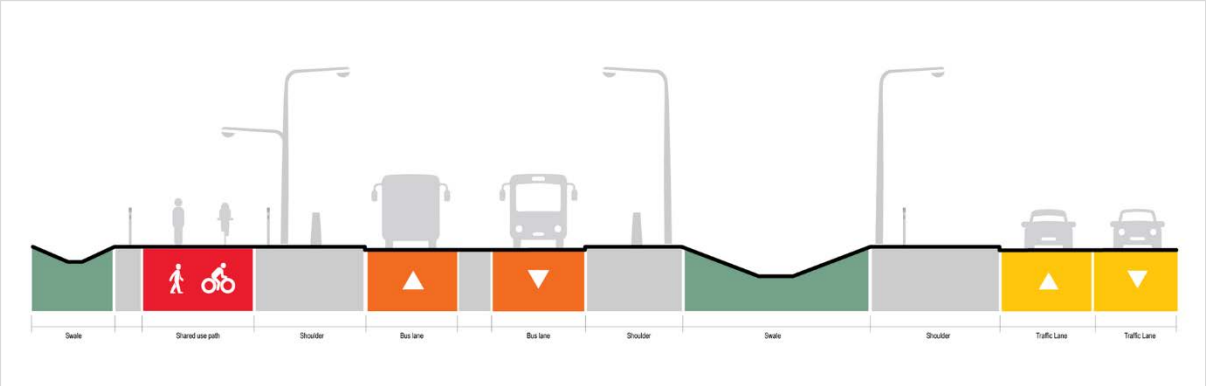
9 NoR S3: Rapid Transit Corridor and Regional Active Mode Corridor; NoR KS: Kumeū Rapid Transit Station and NoR HS: Huapai Rapid Transit Station

9.1 NoR Corridor Features

The proposed RTC, RAMC and two RTC stations are set primarily within the context of the existing transport corridor SH16 and the NAL and undeveloped rural landscape.

The key landscape matters addressed for Rapid Transit Corridor and Regional Active Mode Corridor are:

- The nature and extent of impacts on the landscape as a physical resource during the construction period of the proposal. A specific focus on the location of the construction compound, extent of vegetation clearance, impacts on water courses, the scale and location of proposed cut and fill slopes and the likely impacts of bridge construction.
- The addition of the active mode transport corridor adjacent to the existing SH16 and NAL.
- The introduction of an active mode corridor into residential lots, rural 'greenfield' lots and how this will interface with the enduring rural environment.
- Consideration of landscape character effects and urban amenity issues in relation to the permanent landscape change, including specific assessment of how this corridor will integrate into the future urban environment;
- Potential removal of valued trees consideration of future opportunities to integrate existing trees.
- Consideration of landscape mitigation measures to be included within an Urban and Landscape Design Management Plan (ULDMP) as a condition on the proposed designation to address the potential landscape and visual effects arising from the operational phase.
- Culverting, bridging and earthworks within proximity of existing wetlands and watercourses, as far as these relate to designation / district plan matters.
- The construction of a new four-lane motorway corridor with a cross-section of approximately 50m to accommodate a four-lane dual carriageway and separated cycle lanes and footpaths. The typical cross section includes an active mode corridor with central and side barriers (See and Figure 9-1 below).



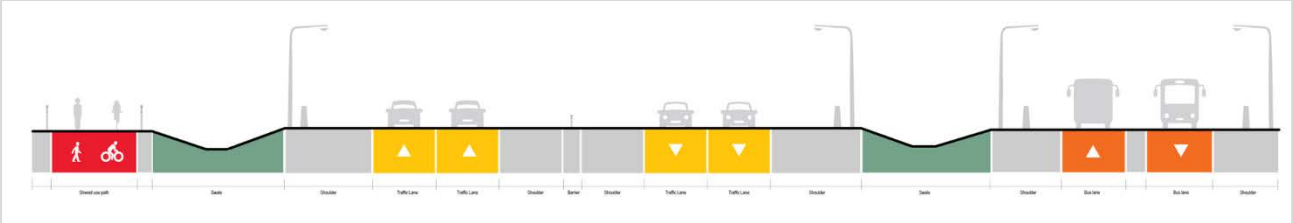


Figure 9-1: Rapid Transit Corridor Potential Cross-Sections

9.2 Existing and Likely Future Environment

9.2.1 Planning context

The Rapid Transit Corridor (**RTC**) and Regional Active Mode Corridor (**RAMC**) form a single, integrated corridor (Note the RAMC only extends to the eastern entrance to Kumeū). This corridor predominately traverses rural land outside of the FUZ, however for assessment purposes it can be split into two sections:

- The **rural section** of the RTC runs from the Brigham Creek Interchange to the entry to Kumeū-Huapai township and is co-located with the RAMC along this section. This rural section traverses land zoned under the AUP:OP as Rural – Countryside Living Zone, with an area zoned as FUZ in Redhills North.
- The **urban section** of the RTC runs from northern end of Waitakere Road to Foster Road and is co-located with the proposed SH16 Main Road upgrade[13] along this section. This urban section contains a range of land uses zoned under the AUP:OP as a mix of business zonings between the eastern extent of the Kumeū-Huapai township and Station Road

Table 9-1 below provides a summary of the North West existing and likely future environment as it relates to the RTC and the RAMC.

Table 9-1: RTC and RAMC Existing and Likely Future Environment

Environment today	Zoning	Likelihood of Change for the environment[14]	Likely Future Environment[15]
Rural	Rural	Low	Rural
Undeveloped greenfield areas	Future Urban	High	Urban
Business	Business (Industrial)	Low	Urban
	Business (Local Centre)	Low	Urban
	Business (Town Centre)	Low	Urban
Residential	Residential	Low	Urban
Open Space	Open Space – Informal Recreation	Low	Open Space

[13] Another North West Strategic project – refer to Section 8 of this report
[14] Based on AUP:OP zoning/policy direction
[15] Based on AUP:OP zoning/policy direction

Environment today	Zoning	Likelihood of Change for the environment[14]	Likely Future Environment[15]
	Open Space – Sport and Active Recreation		
Future Urban Zone / Undeveloped greenfield areas	Future Urban	**High**	Urban

The RTC stations - Kumeū Rapid Transit Station and Huapai Rapid Transit Station - are located in the urban section of the RTC corridors.

Kumeū Station is proposed to be located on land at 299 and 301 Main Road on the western side of a Kumeū River tributary. The land is zoned under the AUP:OP as Business - Town Centre Zone. An active modes overbridge is proposed across the NAL with active mode connections to:

- the Huapai Triangle crossing land zoned in the AUP:OP as Green Infrastructure Corridor and Residential - Mixed Housing Suburban Zone; and
- Wookey Lane crossing land zoned in the AUP:OP as Green Infrastructure Corridor and Residential - Mixed Housing Suburban Zone; and Business - Light Industry Zone.

Table 9-2: Kumeū Rapid Transit Station Existing and Likely Future Environment

Environment today	Zoning	Likelihood of Change for the environment[16]	Likely Future Environment[17]
Business	Business (Industrial)	Low	Urban
	Business (Town Centre)	Low	Urban
Residential	Residential - Mixed Housing Suburban Zone	Low	Urban
Open Space (located to the north of the proposed station location)	Open Space – Informal Recreation Open Space – Sport and Active Recreation	Low	Open Space

Huapai Station is proposed to be located on land at 29 and 31 Meryl Avenue on the western side of the Ahukuramu. The land is zoned under the AUP:OP as Business - Town Centre Zone. An active modes overbridge is proposed across the NAL and SH16 to FUZ land. Future connections will be determined as part of structure plan process.

[16] Based on AUP:OP zoning/policy direction
[17] Based on AUP:OP zoning/policy direction

Table 9-3: Huapai Rapid Transit Station Existing and Likely Future Environment

Environment today	Zoning	Likelihood of Change for the environment[18]	Likely Future Environment[19]
Residential (located to the east of the proposed station location)	Residential – Single House Zone	Low	Urban
Future Urban Zone / Undeveloped greenfield areas	Future Urban	High	Urban

Note: A heritage overlay is located to the west of the station location and contains the Huapai Tavern. The Tavern is impacted by the RTC Corridor; however, there is sufficient room to re-position part of the building within the Overlay. The likelihood is therefore that the Heritage Overlay is retained.

9.2.2 Existing / Baseline Landscape

9.2.2.1 Baseline Landscape

The urban section of the RTC route runs along the existing SH16 Main Road and NAL between Kumeū, Huapai and into the FUZ to the west. The Rural section of the route runs west from the Brigham Creek Interchange across rural residential land and then follows the NAL north up to SH16.

The local landscape character within the scheme corridor is summarised below;

- Vegetation cover comprising non-native stand-alone street trees, linear belts of mixed indigenous and non-native vegetation along riparian corridors, shelterbelts along the road corridor, exotic vegetation in around private residential and commercial property boundaries.
- Native and non-native vegetation within open spaces (Figure 9-2 below).
- The urban residential and commercial centres of Kumeū and Huapai that border the state highway road. The NAL to the south of the existing state highway contributes to the character of the landscape as a transport corridor.
- The Huapai Domain, Fred Taylor Park and residential zoned land have a low to low-moderate sensitivity to change.
- The rural sections of the designation are characterised by rural residential lifestyle blocks with elements of rural production and including shelterbelts and pastoral fields.

[18] Based on AUP:OP zoning/policy direction
[19] Based on AUP:OP zoning/policy direction

Figure 9-2: Linear belt of mature exotic trees along the internal road to the south of Huapai Domain.

Landform and Hydrology

The designations rural section to the east of the corridor traverses a gently sloping topography that gently slopes up from east to west, the landform has been modified over time to accommodate the existing SH16. High points along the corridor are located at the western end of the scheme corridor to the north and west of the route within the undeveloped FUZ and single house zone areas to the west. The urban section of the corridor includes a gently sloping landform from the west to the east and a generally low lying road corridor. The lower lying land areas of the designation are located within proximity of the Ngongetepara Creek, Karure Stream, Pakinui Stream, Ahukurama Stream, Totara Creek, Kumeū River and its branches, flood plains and wetlands.

Figure 9-3: Kumeū River branch and pond between the NAL and Main Road SH16.

Landcover

The landscape across the scheme corridor is characterised as a distinctly modified urban landscape within the centres of Kumeū and Huapai to the west. These urban centres feature a combination of large lot commercial and suburban residential development. The western end of the site is rural but predominantly, areas of open pasture are more prevalent with pastoral and agricultural uses including the Coopers Creek Vineyard, all designated as FUZ.

The section of the designation within rural zoned land is characterised by pastoral and arable geometric fields and rural residential properties. Theses field patterns are bound in parts by structured hedgerows, shelter belts and small areas of native vegetation. Fields predominantly contain exotic grassland with small pockets of agricultural crops, rural industry with amenity planting in proximity to dwellings.

Areas of mature native trees are located in patches throughout the rural landscape and in proximity to stretches of riparian vegetation along waterways. Although much of the stream and wetland features across the designation, native riparian vegetation are present within intermittent stretches, particularly within the Ahukuramu Stream and Kumeū River.

Land Use

The scheme corridor traverses six AUP:OP zones listed in Table 9-1.

Land use either side of the eastern area of the corridor is predominantly rural residential and rural production between the Ngongetepara Creek and SH16. Pastoral fields comprise the rural production land use amongst residential lifestyle blocks and shelterbelts.

An urban commercial land use is present through the centres of Kumeū and Huapai. Land use between to the west of Huapai has a more residential focus where the scheme corridor is bordered by single house zone and mixed housing urbm residential development (with some residential land with a business zoning) and the Huapai Domain open space. The western extents of the designation comprises developing residential SHZ and FUZ which will be developed over time between Trigg Road and Foster Road.

Scheduled Landscape and Ecological Features

A single scheduled notable tree [2603, Silver dollar gum at 396] is present within the designation present within a thin strip of land between the existing highway and the NAL at 396 Main Road, Huapai (see Figure 8-3 and Figure 8-4). A second notable tree [2591, Poplar] is located to the south of the scheme at 399 SH16.

Historical and Cultural Associations

A Historic Heritage and Special Character overlay 482, Huapai Tavern is located within the designation at 301 SH16 Main Road Huapai (Refer Figure 8-5). More in depth analysis of this heritage feature can be found in the Cultural Heritage Assessment: appendix XX of the AEE.

9.2.2.2 Likely Future Environment

Overview

The FUZ land surrounding the designation will witness a significant change from rural to urban land use character over the next 10-15 years at the western extent of the scheme area between Foster Road and Trigg Road of the RTC (west) and between SH16 to the Ngongetepara Creek of the RTC (east). It is anticipated that the abiotic features of the landscape, principally the topography, will be altered over time as the surrounding landscape is urbanised. It is anticipated that some of the defining biotic (land cover) features of the landscape will undergo substantial change alongside future development, with the removal of large areas of vegetation to accommodate the scheme. This will likely involve the implementation of street tree plantings, public open space areas and general landscaping within the private yards of future housing development for public amenity. The balance at the western end of the designation will continue to have an urban function by the completion of the proposal, including the change of some residential land for commercial and business uses.

Rural land between Foster Road and Trigg Road of the RTC (west) and between SH16 to the Ngongetepara Creek of the RTC (east) the land is expected to retain a rural aesthetic and land use and is not anticipated to experience a change in the overall character of the landscape. It is anticipated that the abiotic and biotic features of the landscape outside of the designation will endure.

9.2.2.3 Kumeū-Huapai / Riverhead area

This area has not undergone a structure plan, it is identified by Council that this process will be undertaken before the land is released to be urbanised. This processed is indicatively programmed to be undertaken in 2025 in order for the land to be released between 2028 and 2032 as indicated in the Future Urban Land Supply Strategy (FULSS).

The Spatial Land Use Strategy for Kumeū-Huapai, Riverhead, and Redhills North has been developed with collaboration between Auckland Council and the project team. This provides a high level framework that outlines the distribution of future land use (see Figure 9-4).

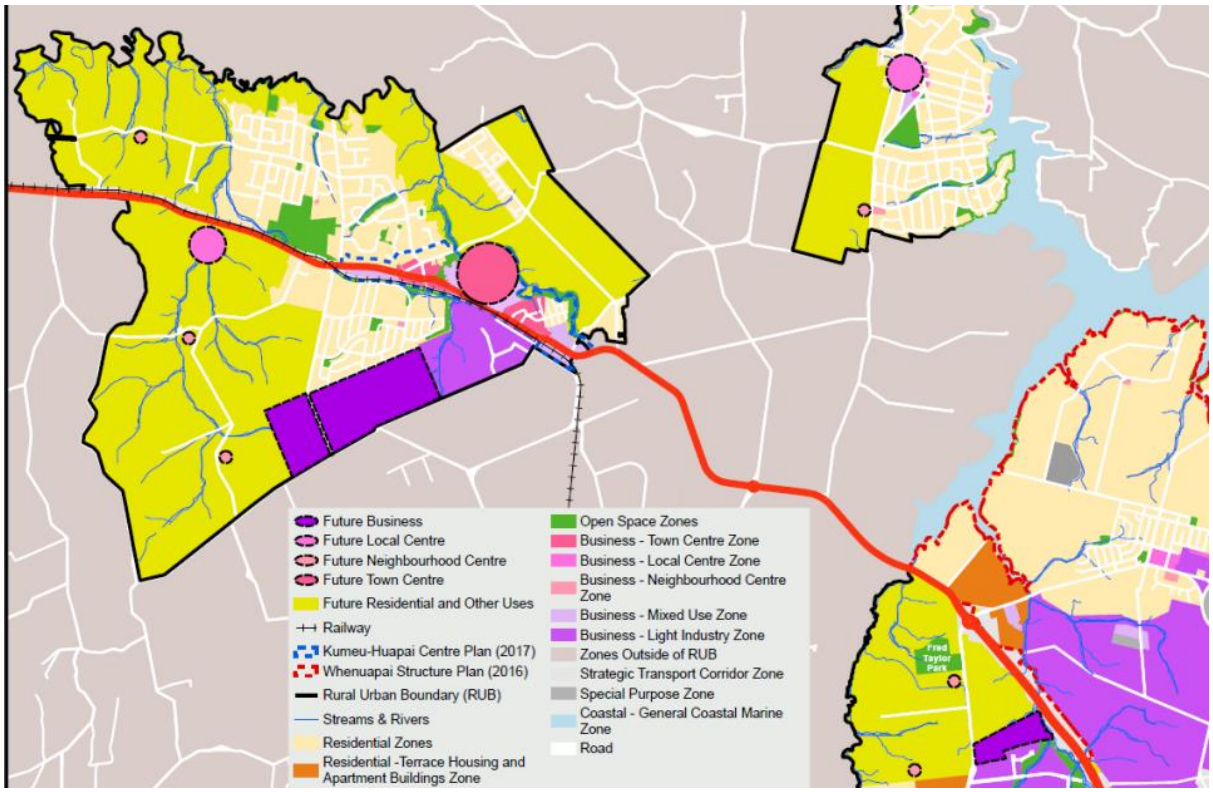


Figure 9-4: Spatial Land Use Strategy - Kumeū-Huapai, Riverhead, and Redhills North.

9.3 Extent of Visibility and Viewing Audience

The extent of visibility of the proposed road corridor is contained by the surrounding vegetation and the changes in topography. Notwithstanding the above, some vantage points within the scheme area are likely to witness heightened adverse visual effects. In summary the viewing audience for the proposal include:

- *Public Views:* Transient public audience (vehicle users). Key roads where views can be obtained from include: Waitakere Road, Tawa Road, Dysart Lane, Pomona Road, Boord Crescent, Waitakere Road, Taupaki Road, Trotting Cross Drive, Access Road, Oraha Road, Tapu Road, Station Road, Trigg Road, Matua Road and SH16:
  - Travelers (cars, pedestrians and cyclists) along SH16 Main Road, Fred Taylor Drive, Waitakere Road and Taupaki Road which bisect the site (Refer Appendix 2 Site Photo SP2, SP4, SP5, 3597, SP27, SP26);
- *Private Views:* The viewing context also includes a relatively small private viewing audience, comprising views from rural residential and lifestyle dwellings as well as from the commercial and agricultural businesses located either side of the scheme corridor. Specifically:
- Views from the residential properties within the designation that immediately front on to scheme corridor (Boord Crescent, Taupaki Road, Joseph Dunstan Drive and SH16 Main Road), (Refer Appendix 2 Site Photo SP23, SP25, SP24);

- Occupants of nearby commercial buildings and open spaces adjacent the proposed corridor. (Refer Appendix 2 Site Photo SP1, SP28, SP29, SP30)

Views are well contained within the immediate surrounding area of the scheme corridor within the urban core of Kumeū and Huapai, where the landscape is relatively flat and intervening vegetation and built form limit views from the wider area. To the west and east of the designation within the FUZ the topography is gently undulating which results in the corridor being more visible in elevated areas and less visible in areas of depreciation. However, after this area has been urbanised it is expected that the visual catchment will become more contained.

The rural eastern section of the RTC is has a flat to gently undulating landform broken up with intermittent sections of shelterbelt trees and riparian vegetation long the watercourses, which will filter and screen views towards the corridor.

9.4 Landscape Values

There are no regionally or nationally significant landscapes (ONLs, ONFs or ONCs) within or proximate to the proposed designation boundary. The nearest ONL is Area 3, Taylor Road, south of Helensville, located approximately 840m to the north of the scheme corridor.

The gently sloping topography and the mature stands of vegetation and braided stream and wetland network contribute to the visual amenity of the landscape. The modified landscape has limited natural features, which are restricted to individual stands of native vegetation.

At the eastern extent of the scheme Corridor the designation around the proposed Brigham Creek Interchange will require the acquisition of 1.62ha of open space recreation land within Fred Taylor Park. This open space is primarily used for sporting activity and is surrounded on two sides by mature shelter belt vegetation along the western and south western boundaries. Three open space conservation zone areas (Lot 3 DP 109762, 146 Boord Crescent, a portion of Lot 1 and Lot 2 DP 194257, 156 and 162 Boord Crescent and Lot 3 DP 129560, to the rear of 178 and 182 Boord Crescent) along the Kumeū River will be within the proposed designation. Only one of these areas (Lot 3 DP 129560, to the rear of 178 and 182 Boord Crescent) will be directly impacted by the footprint of the Proposed corridor.

Kumeū Rapid Transit Corridor Station

There are no regionally or nationally significant landscapes (ONLs, ONFs or ONCs) within or proximate to the proposed designation boundary

The modified landscape has limited natural features, which are restricted to the Kumeū River branch and pond to the east.

Huapai Rapid Transit Corridor Station

There are no regionally or nationally significant landscapes (ONLs, ONFs or ONCs) within or proximate to the proposed designation boundary. The nearest ONL is Area 3, Taylor Road, south of Helensville, located approximately 770m to the north of the scheme corridor.

The gently sloping topography and the mature stands of vegetation and braided stream and wetland network contribute to the visual amenity of the landscape.

9.5 Landscape Sensitivity

This corridor is situated within a broader landscape that is both in a rural and areas that have been assessed within the AUP:OP as being suitable for urbanisation. The proposed FUZ area to the east is indicated by the Whenuapai Structure Plan will be primarily high and medium density residential. Rural zoned land which will maintain rural has medium sensitivity to the type of change proposed. The FUZ areas within the designationare assessed as having a low sensitivity to landscape change.

Views are well contained within the immediate surrounding area of the scheme corridor within the urban core of Kumeū and Huapai, where the landscape is relatively flat and intervening vegetation and built form are present. To the west and east of the designation within the FUZ the topography is gently undulating which results in the scheme corridor being more visible in elevated areas and less visible in areas of depreciation. However, after this area has been urbanised it is expected that the visual catchment will become more contained.

The rural eastern section of the RTC is has a flat to gently undulating landform broken up with intermittent sections of shelterbelt trees and riparian vegetation long the watercourses, which will filter and screen views towards the proposal.

Kumeū Rapid Transit Corridor Station

This corridor is situated within a broader urban landscape that is heavily modified, a busy transportation corridor and adjacent land that is undergoing urbanisation. The immediate Project area within the FUZ areas are assessed as having a very low sensitivity to landscape change.

Huapai Rapid Transit Corridor Station

This Project area is situated within a broader landscape that have been assessed within the AUP:OP as being suitable for urbanisation. The proposed FUZ area to the east is indicated by the Spatial Land Ise Strategy residential and a local centre is located to the south of the NAL. The Project area is assessed as having a low sensitivity to landscape change.

9.6 Assessment of Landscape Effects

9.6.1 Positive Effects

Generalised positive effects related to the Project are covered in Section 5 of this report. Additional positive effects related specifically to this Project include:

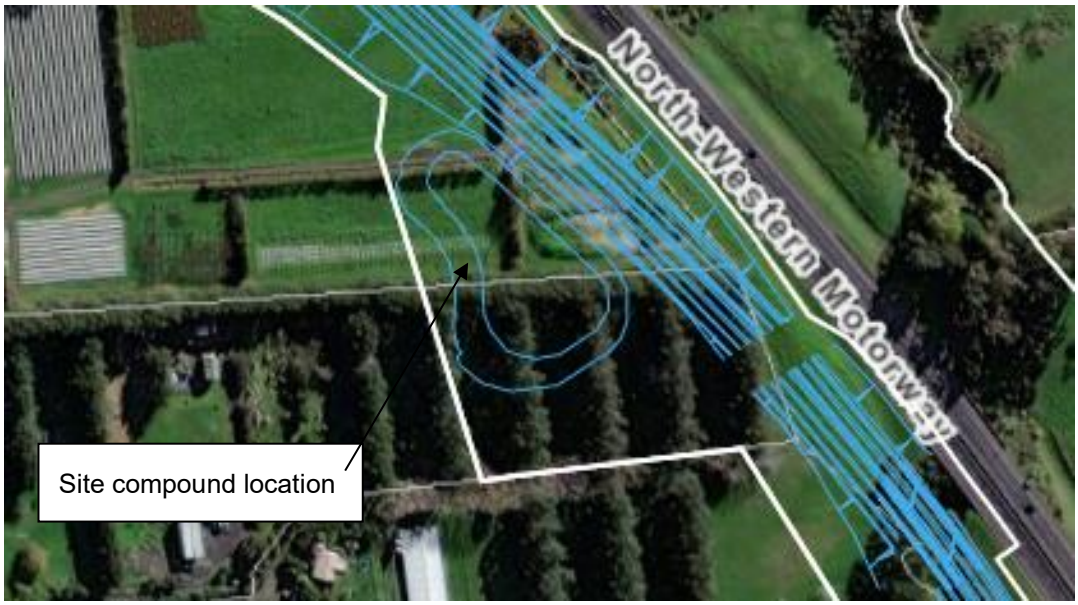
- Improved and / or new opportunities for active modes of transport and the ability to provide improved connectivity along SH16 Main Road.
- Improved and / or new opportunities for active modes of transport and the ability to provide improved connectivity between Kumeū Huapai and Fred Taylor Drive.
- Improved structure amenity along the project corridor tying into the retained urban landscape and the future urban environment.
- Opportunities for active mode transportation links to the Kumeū River Park, Huapai Domain, Fred Taylor Park, Matua Ngaru School, existing and future residential development.
- There is the potential to enhance and integrate the RTC and RAMC with the rural environment to enhance the experience of users, maintain amenity for audiences and integrate with the existing landscape character.

9.6.2 Assessment of Construction Effects

Construction Areas

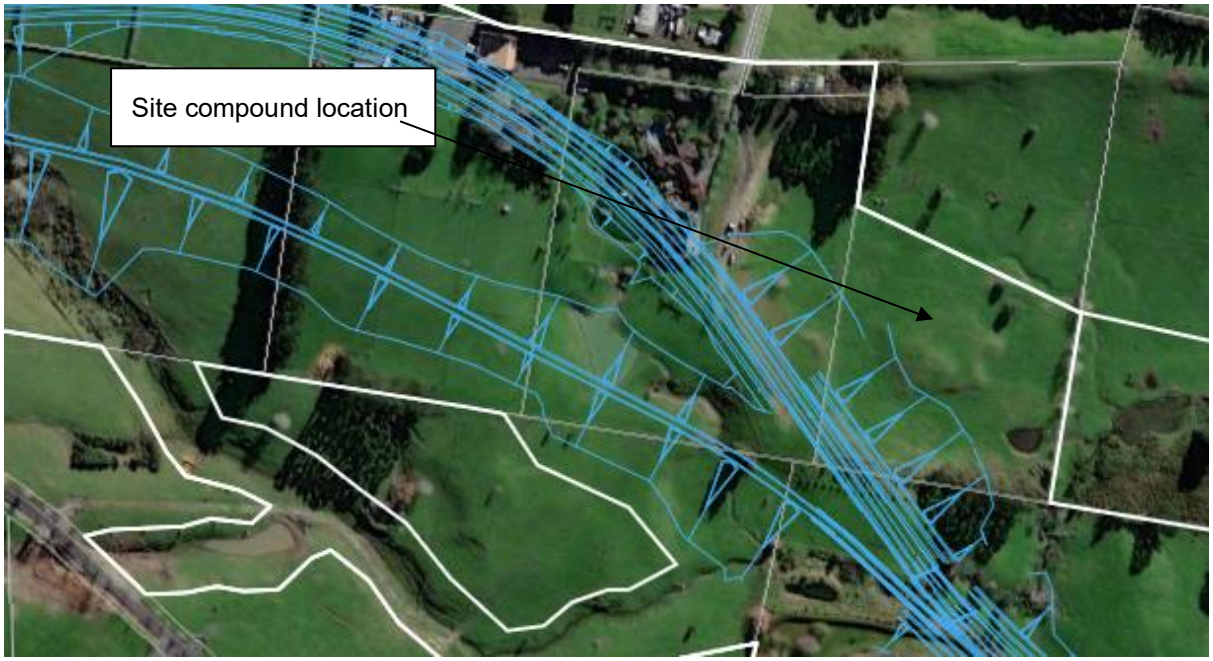
Site compound and construction areas are to be established at nine locations within the Project area. Construction traffic will be heightened at these locations through the construction period of the Project. These will be located at:

- 125 and 143 Fred Taylor Drive

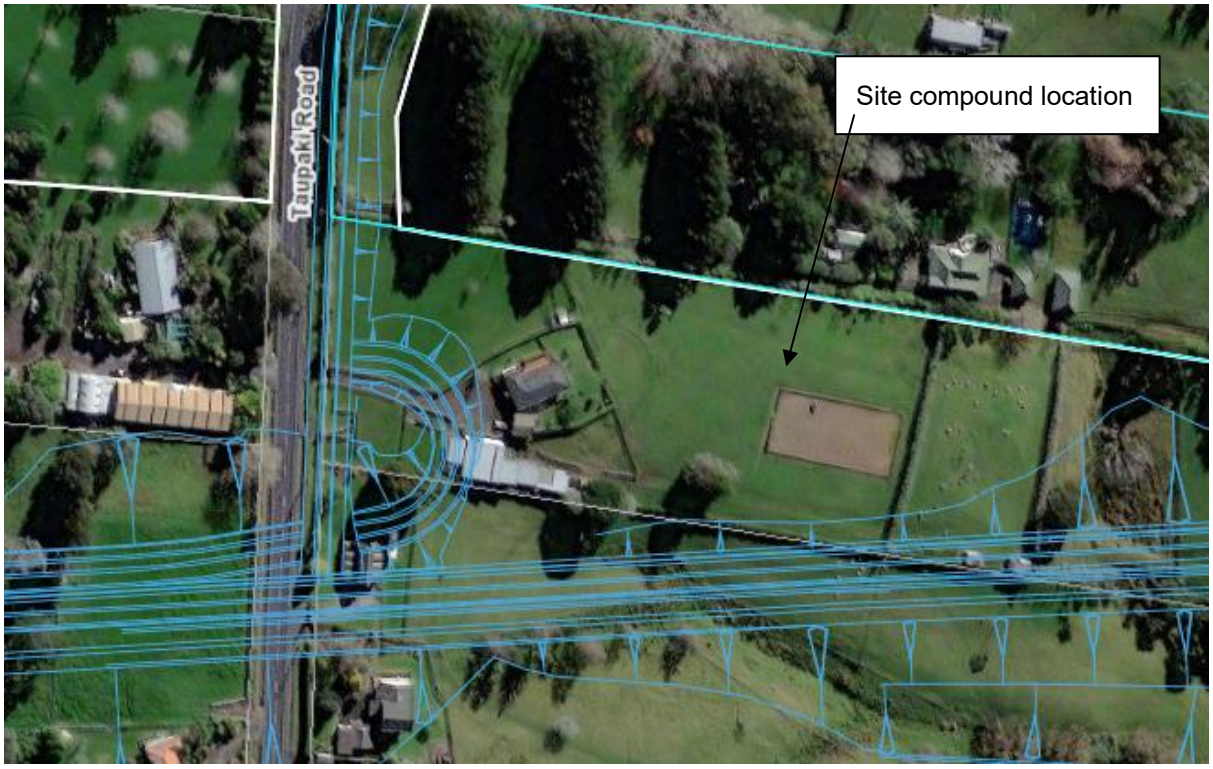


- 202 Fred Taylor Drive

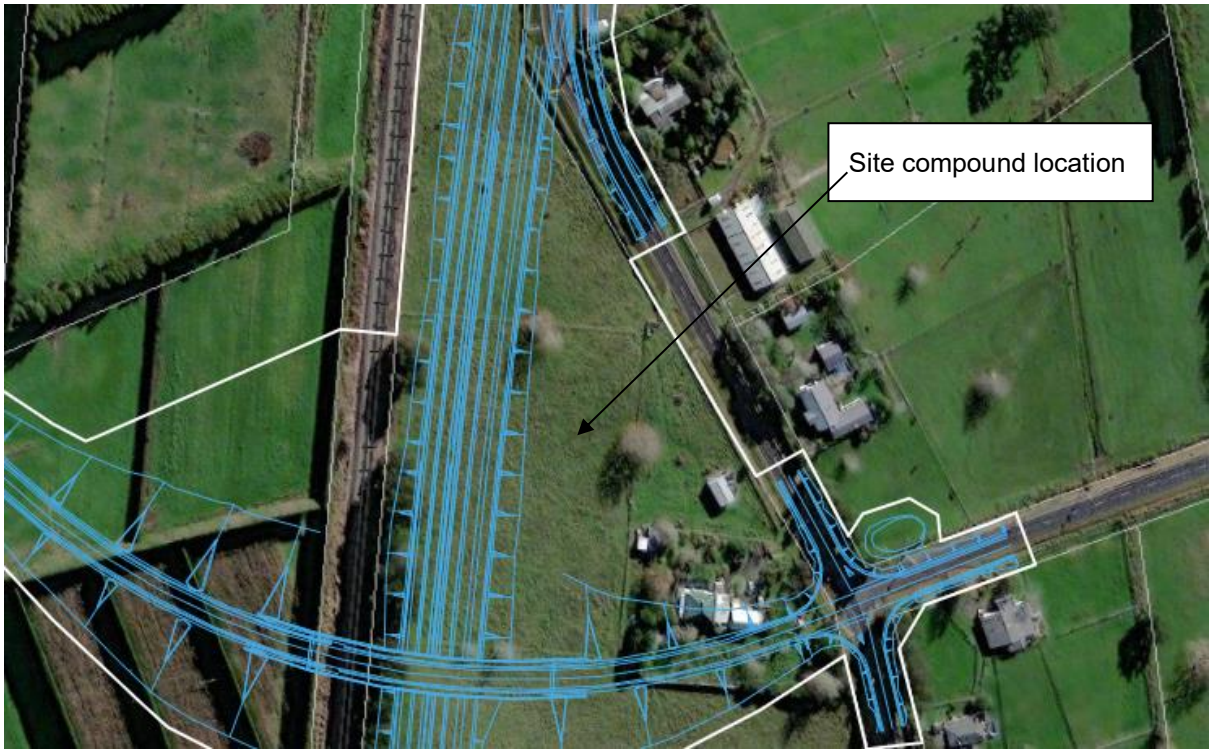
- 278 State Highway 16



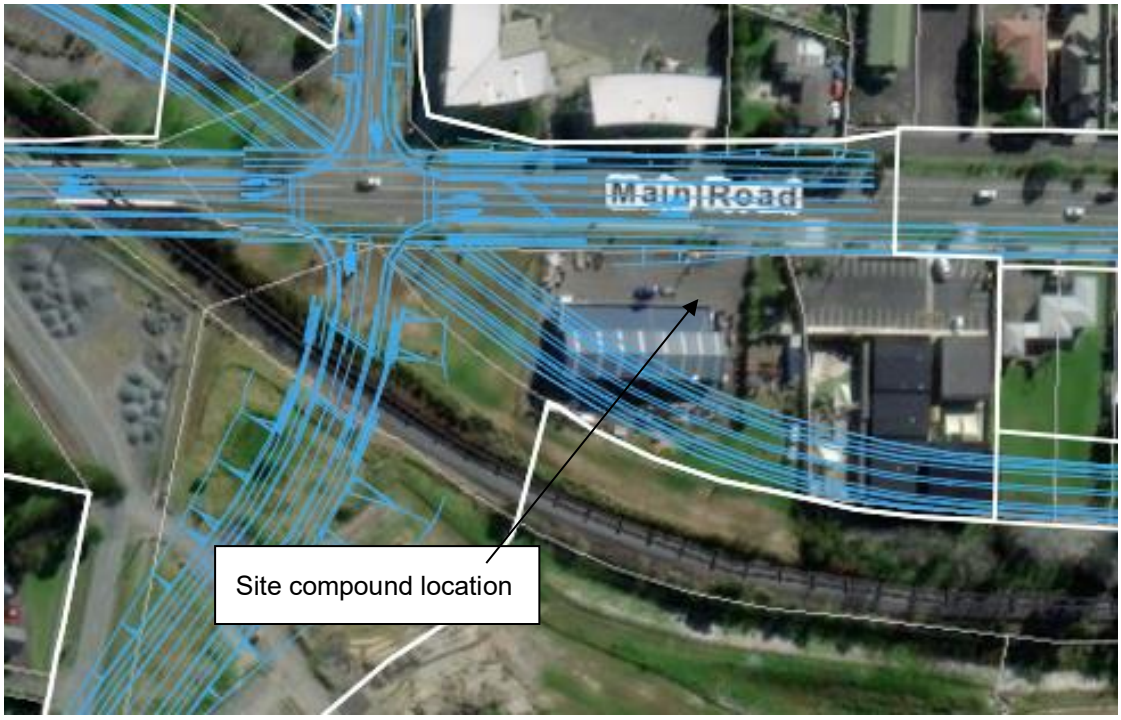
- 401 Taupaki Road



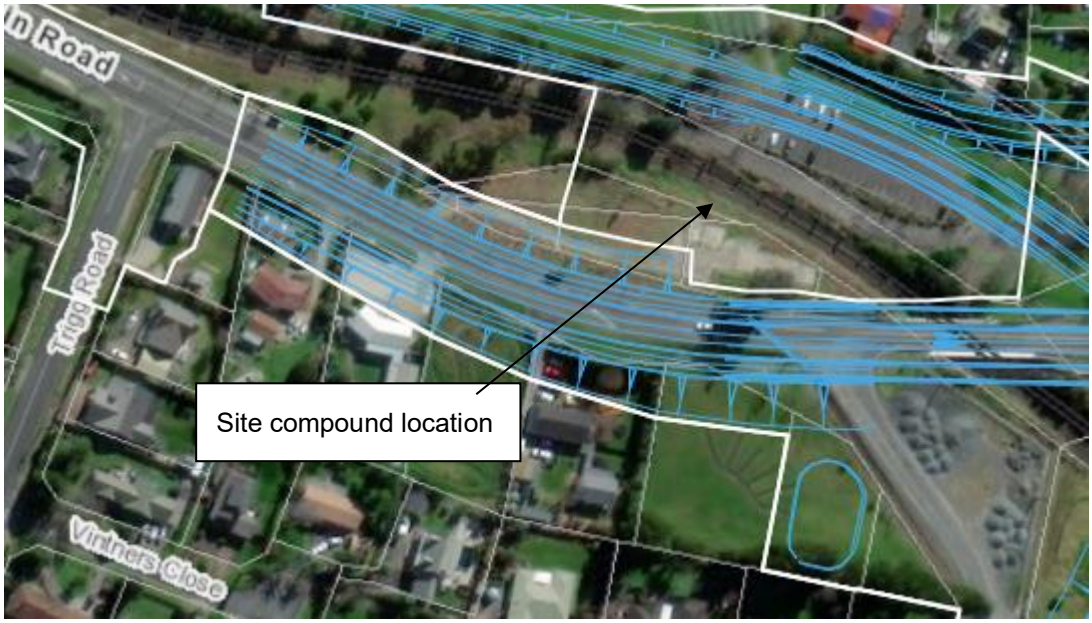
- 42 Boord Crescent



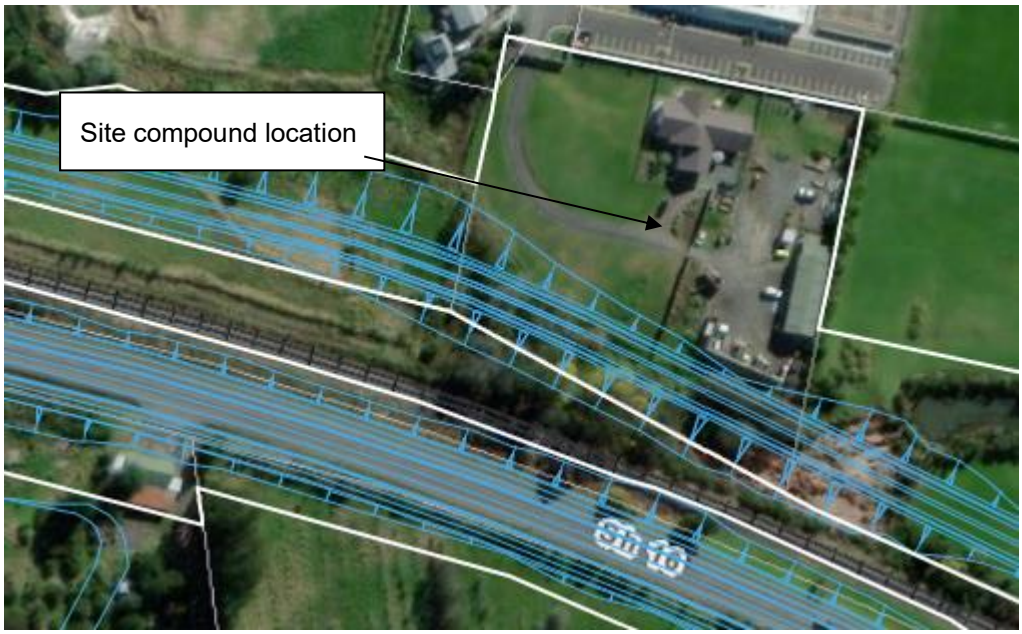
- 377 Main Road SH16



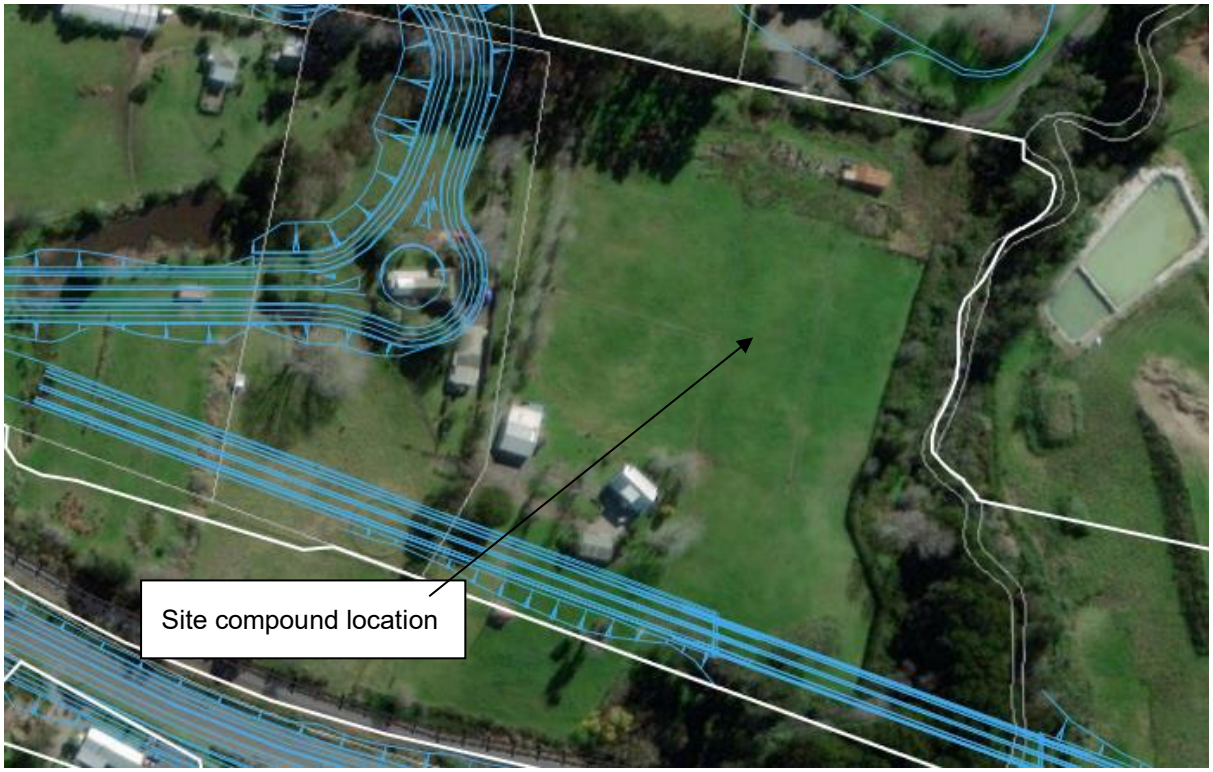
- 396 Main Road SH16



- 51 Gilbransen Road



- 29 Meryl Avenue



Without the implementation of mitigation measures it is anticipated that adverse effects, as a result of the indicative site compounds, will be **low-moderate** to **low** in rural areas and **low** to **very low** in existing urban areas. With the implementation of mitigation measures, the adverse physical landscape effects resulting from establishment and use of the construction work areas within the Project area is assessed to be **low** in rural areas and **very low** in existing urban areas.

Kumeū Rapid Transit Corridor Station

Site compound and construction areas will be entirely contained within the lot between the SH16 and NAL.

Overall, the adverse physical landscape effects resulting from establishment and use of the construction work areas within the Project area is assessed to be **very low** in the existing urban area, the effects are anticipated to be similar with or without the implementation of mitigation measures.

Huapai Rapid Transit Corridor Station

Site compound and construction areas will be entirely contained within the lot at 29, 31 and 32 Meryl Avenue. These areas are anticipated to be urbanised as part of the spatial land use strategy for Kumeū-Huapai.

Without the provision of mitigation measures it is anticipated that adverse physical landscape effects will range between **low-moderate** and **low** adverse.

With the implementation of mitigation measures the adverse physical landscape effects resulting from establishment and use of the construction work areas within the Project area is assessed to be **low** in the existing modified rural landscape.

Vegetation Clearance

Linear stretches of vegetation that border the existing road and rail corridors, within private residential properties and delineate field boundaries will be removed to accommodate the construction and operation of the rural areas of the Project corridor. This will consist of a mixture of indigenous and non-native vegetation including shelterbelts that are archetypal within the wider modified rural landscape. Exotic pasture, trees, shelterbelt plantings, private gardens, exotic stands of trees and cropland make up the majority of vegetation to be removed. Riparian vegetation within watercourses and wetlands will be removed to accommodate the bridges and culvert along the Project corridor. The riparian vegetation is a mixture of native and non-native vegetation within watercourses (Ngongetepara Creek, Karure Stream, Pakinui Stream, Totara Creek, Kumeū River (and its branches) and the Ahukurama Stream). These works are subject to a separate regional consent process, however their potential effects on the landscape and natural character have been included within this assessment and the selection of the designation.

Vegetation proposed to be removed in the urban context of the Project corridor will typically comprise exotic streets trees, amenity vegetation and vegetation in private backyards. Vegetation removed within the Huapai Domain and Fred Taylor Park will comprise non-native parkland trees and amenity grass. The proposed works will require the removal linear mature vegetation which has landscape character amenity value and screening value for the NAL and SH16. The removal of these trees will change the character of the southern portion of the Huapai Domain, reducing the sense of enclosure, landscape amenity and separation form the NAL and SH16 transportation corridor to the south.

Without the implementation of mitigation measures, the adverse physical landscape effects likely to arise from vegetation clearance within the rural Project area is assessed as **low** to **low-moderate** adverse. Vegetation removal in the urban Project area is assessed as resulting in **low** adverse in urban areas and **low** adverse in rural areas, effects in open space areas are anticipated to be **moderate** to **low-moderate** adverse.

With the inclusion of mitigation measures, the adverse physical landscape effects likely to arise from vegetation clearance within the rural Project area is assessed as **low** adverse. Vegetation removal in the urban Project area is assessed as resulting in **very low** adverse in urban areas and **low** adverse in rural areas, effects in open space areas are anticipated to be **low-moderate** adverse.

Kumeū Rapid Transit Corridor Station

Vegetation within the proposed site is limited to the vegetation in and around the Kumeū River pond and a linear belt of trees that follow the NAL. Vegetation within the linear band along the NAL will be removed in order to facilitate the rapid transport Station and overbridge structure. The riparian vegetation within the Kumeū River pond is a mixture of native and non-native vegetation within the flowing watercourse area. Riparian vegetation within the pond is outside of the station footprint but is likely to be impacted by the Wetland 5A associated with the introduction of the RTC.

Overall, the adverse physical landscape effects will arise from vegetation clearance along the NAL corridor. Effects as a result of the project are expected to be **very low** adverse with the implementation of mitigation measures. Without the implementation of mitigation measures it is anticipated that adverse effects will range between **low** and **very low**.

Huapai Rapid Transit Corridor Station

Vegetation within the proposed site is limited, however it is anticipated that the majority of this will be required to be removed in order to facilitate the construction of the station and car park area. During

the detailed design phase and with guidance from the ULDMP it may be determined that a small number of existing mature trees are retained including shelterbelt vegetation around the northern site boundary. Riparian vegetation around the Kumeū River branches are expected to be retained, where possible or practicable.

Overall, the adverse physical landscape effects will arise from the change from a rural to urban land use which is expected to result in the removal of much the vegetation. Without the implementation of mitigation measures Effects as a result of the project are anticipated to be **low -moderate** adverse. With the implementation of mitigation measures, effects as a result of the project are anticipated to be **low** adverse.

Structures and Earthworks

The Project corridor design includes five bridges, three of these bridges are required to cross wetlands and watercourses and two of the bridges cross existing or proposed road / rail infrastructure.

These bridges will be new additions to the landscape however, they will be in the context of other existing bridges and infrastructure but will require additional earthworks at the approaches to these crossing points. The proposed RTC across the northern extent of Access Road will be in the context of surrounding industrial and commercial development either side of the existing road corridor.

It is anticipated that across the length of the Project the earthworks balance will require additional fill material to be imported. The additional fill is required in order to raise the segregated corridor above the surrounding landscape, bridge crossing point and bridge the existing watercourses.

The impacts and potential landscape effects of the proposed earthworks include the modification of and permanent changes to the underlying landform to widen the existing transportation corridor; introduce a new corridor within a rural landscape, provide new bridges; surface level changes in close proximity to private properties and open space; and earthworks in proximity to the wetlands and watercourses. The proposed cut and fill slopes range in scale from 1m to 37m wide and will alter the form of the existing rural and urban landforms. Although bridges and earthworks are largely matters for regional consents, these will be addressed in future regional consenting process.

It is recommended that a condition on the designation is included that promotes the re-use of topsoil from pastoral land impacted by the proposed earthworks[20] and the integration of proposed slopes into the surrounding landscape.

Overall, we consider that the earthworks are of a quantity that is reasonably anticipated with a project of this scope and scale and all cut and fill slopes are expected to be integrated with the existing rural and urban environments. Without the inclusion of proposed mitigation it is anticipated that landscape effects will be **moderate** adverse to **low-moderate** adverse in rural areas and **low-moderate** adverse, to **low** adverse in the urban sections. Provided that the proposed mitigation measures are undertaken we expect that the adverse effects will be **low-moderate** to **low** adverse in rural areas and **low** adverse, to **very low** adverse in the urban sections

Kumeū Rapid Transit Corridor Station

The Project station design includes an overbridge which will cross the proposed RTC, SH16 and NAL. This over bridge will be a new addition to the landscape, however this will be in the context of existing large commercial urban development to the north. The land to the south of the proposed over bridge

[20] Refer to NZTA Landscape Guidelines (September 2014), Section 4.12 Topsoil for additional information regarding best practice guidelines for topsoil management and soil stripping.

is in the context of the existing NAL and MHS land which is expected to be developed for residential use.

Earthworks will be required to imbed the proposed station building, platforms and buildings into the landform, however these are expected to be minimal. It is recommended that a condition on the designation is included that promotes the re-use of topsoil from pastoral land to the south of the NAL. Although bridges and earthworks are largely matters for regional consents, these will be addressed in future regional consenting process.

Overall, the earthworks are considered to be of a quantity that is reasonably anticipated with a project of this scope and scale and all cut and fill slopes are expected to be integrated within the existing modified environment. Without the inclusion of proposed mitigation it is anticipated that landscape effects will be **low-moderate** adverse to **low** adverse. Provided that the proposed mitigation measures are undertaken we expect that the adverse effects of the earthworks and bridge structure will be **low**.

Huapai Rapid Transit Corridor Station

The Project station design includes a proposed over bridge and a Park n' Ride and Bus Lay-over which be to the north west of the proposed station. This will introduce a new large sealed area to the landscape. This will be in proximity to two branches of the Kumeū River. The overbridge over the NAL and SH16 will introduce a new element into the landscape. The land to the south of the proposed over bridge is currently rural but zoned as FUZ, this is expected to be developed as a future local centre in accordance with the Spatial Land Use Strategy.

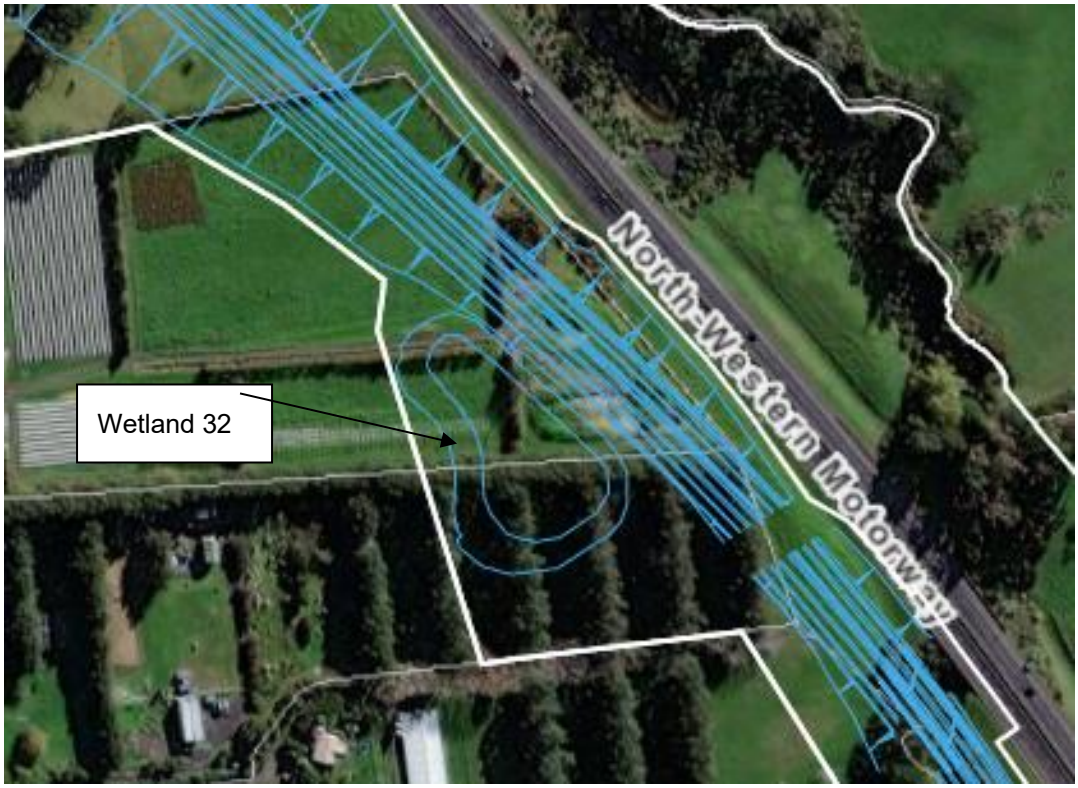
Earthworks will be required to imbed the proposed station building, platforms and buildings into the landform, however these are expected to be minimal. The earthworks required for the Park 'n' Ride and bus layover will be more extensive and cover and area of approximately 25,200m^2. Although bridges and earthworks are largely matters for regional consents, these will be addressed in future regional consenting process.

Overall, the earthworks are considered to be of a quantity that is reasonably anticipated with a project of this scope and scale and all cut and fill slopes are expected to be integrated with the expected urban landscape. Without the inclusion of proposed mitigation it is anticipated that landscape effects will be **low-moderate** adverse to **low** adverse. Provided that the proposed mitigation measures are undertaken we expect that the adverse effects of the earthworks and bridge structure will be **low**.

Wetlands, Dry Ponds and features

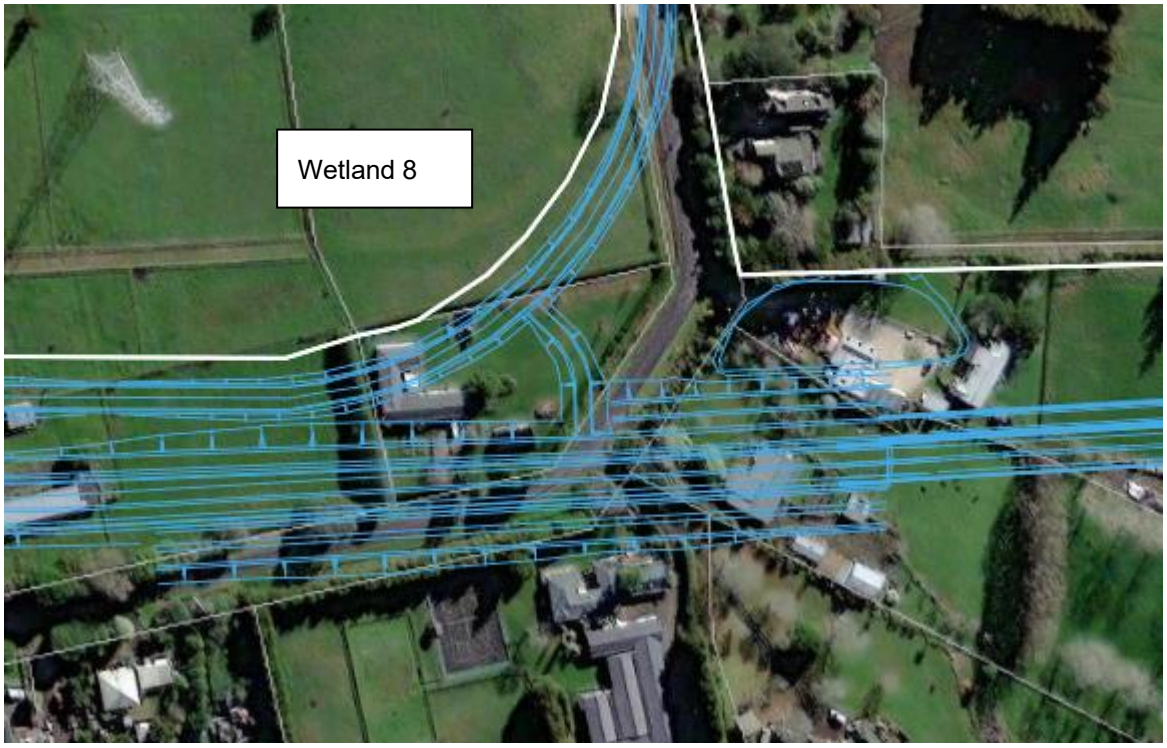
Across the Project corridor nine wetland ponds and three dry ponds are proposed within this Project area;

- Wetland 32 is located to the south of the project corridor at 125 and 143 Fred Taylor Drive in proximity to SH16;

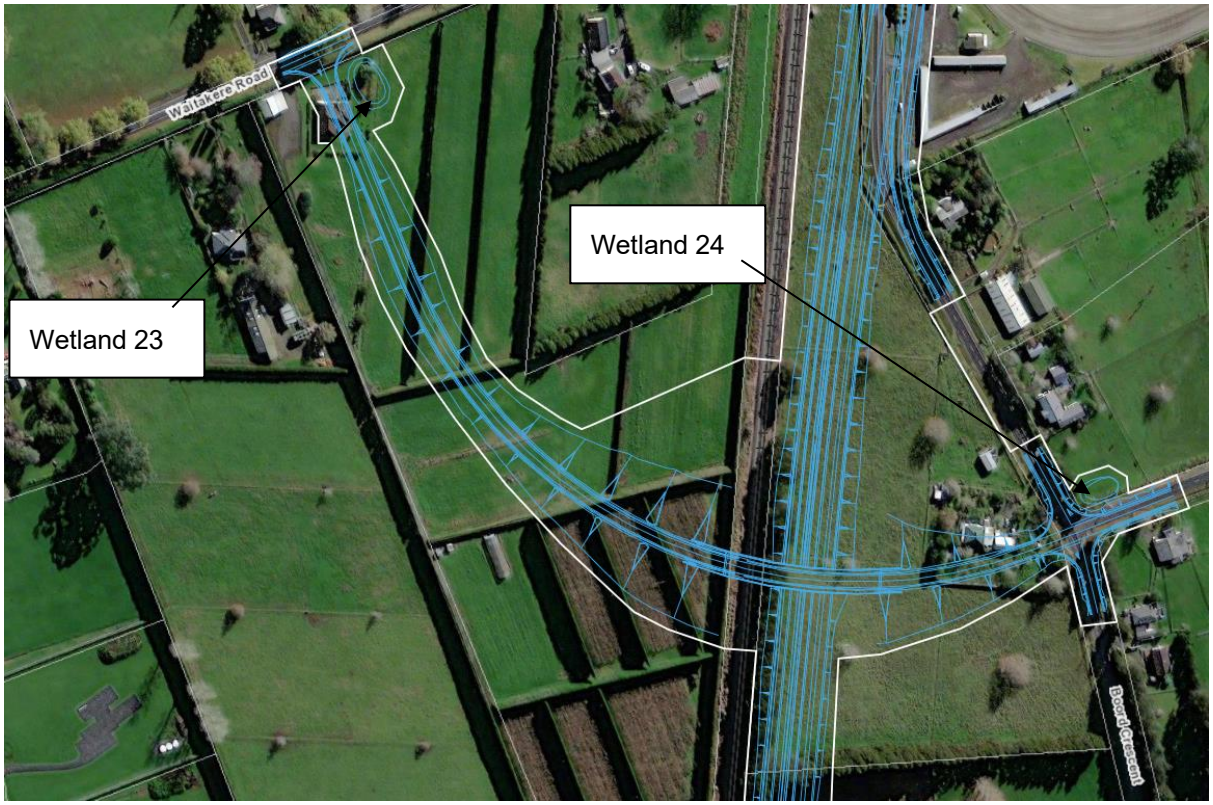


- Wetland 4 is located to the north of the Project corridor approximately 30m form the Kumeū River and set within the boundary of the property at 384 Taupaki Road;

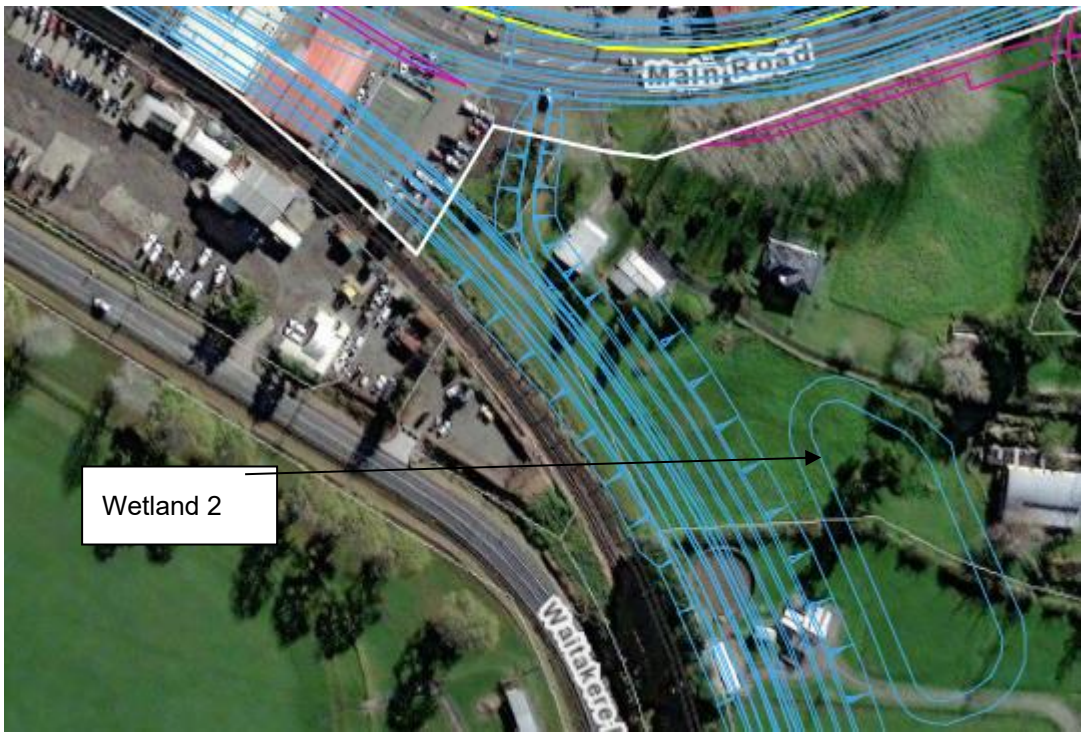
- Wetland 8 is located to the north of the Project corridor within the boundary of 178 Boord Crescent approximately 180m of the Kumeū River;



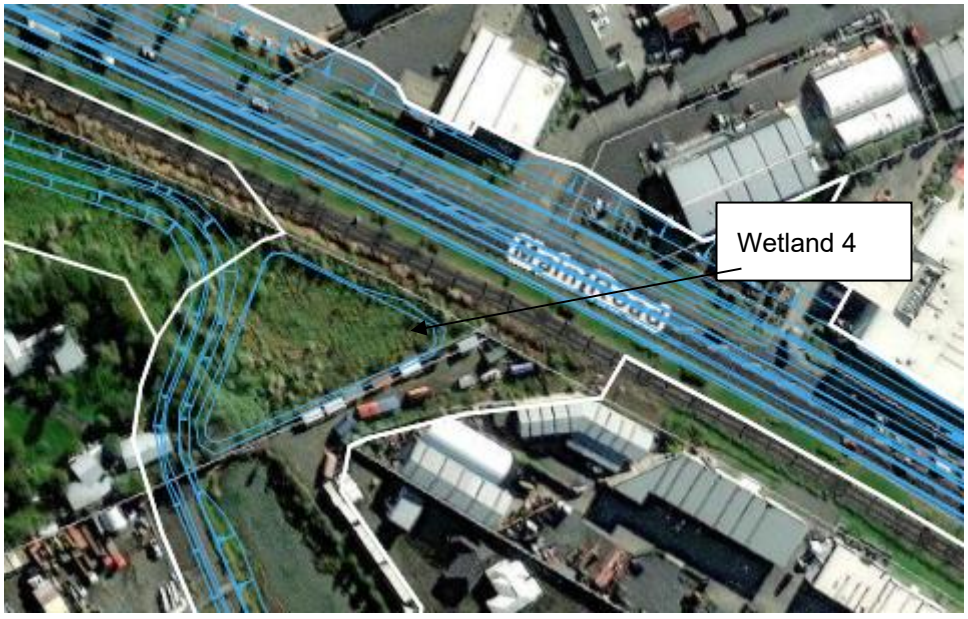
- Wetland 23 is located to the west of Waitakere road within the boundary of 903 Waitakere Road and Wetland 24 is located to the north of the project corridor within the boundary of 42 Boord;



- Wetland 2 is located to the north of the project corridor and south of the SH16 Main Road approximately 45m from the Kumeū River within the boundary of 7 Main Road;



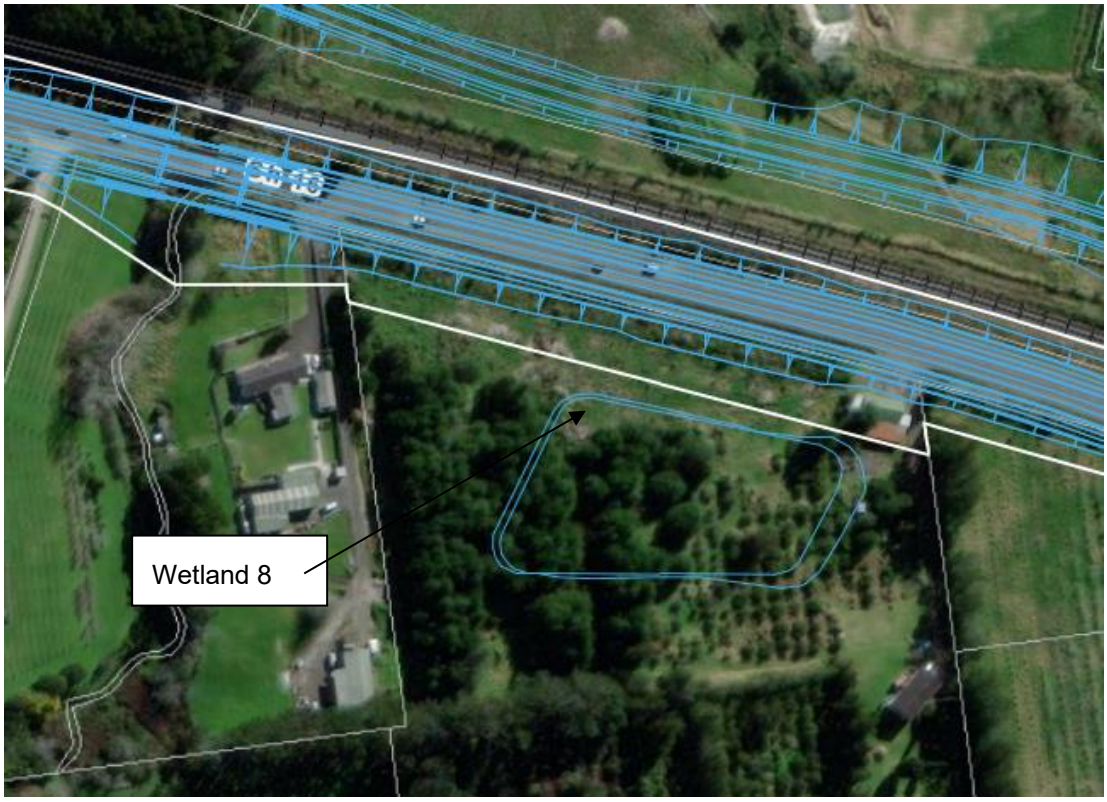
- Wetland 4 is located to the south of the project corridor and the NAL within the boundary of 223 Main Road;



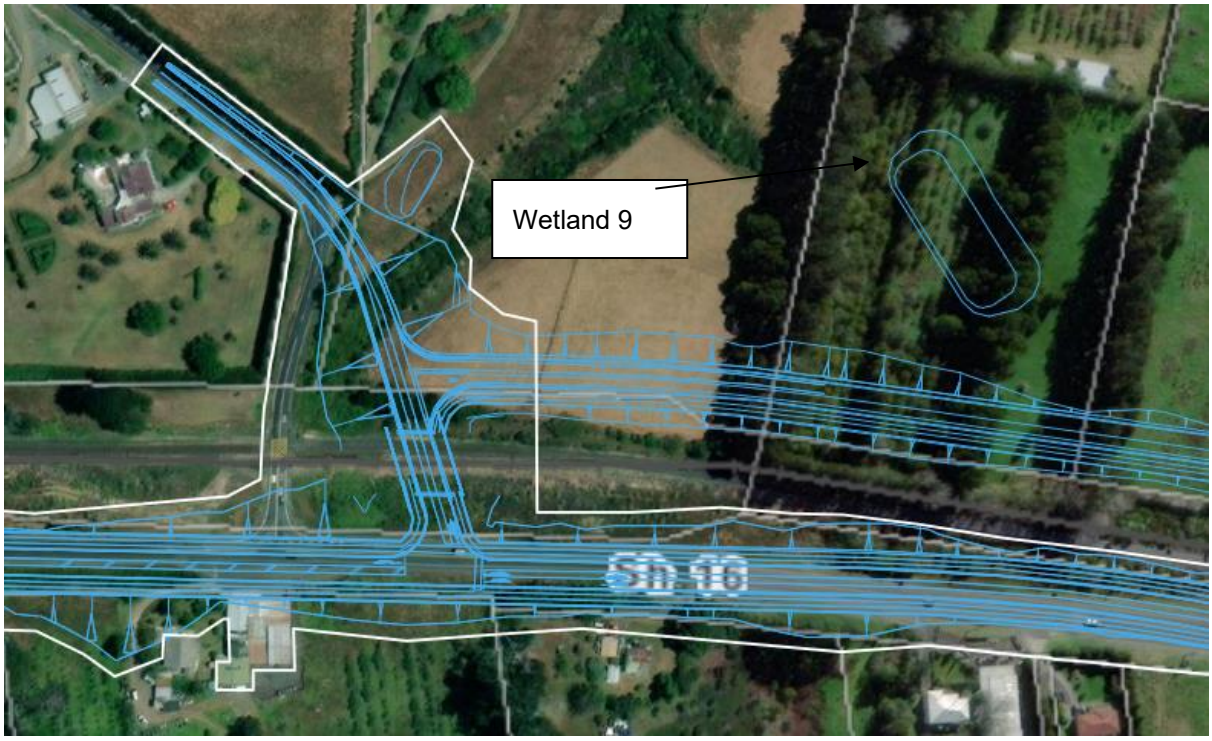
- Wetland 5A is located to the south of the Main Road corridor and the NAL is located within the boundary of 1 Winfield Road approximately 90m of the Kumeū River;

- Wetland 6 is located between the project corridor and SH16 Main Road from 351, 353, 355 Main Road;

- Wetland 8 is located to the south of the Project corridor within FUZ land at 551 SH16 Road within 50m of a Kumeū River branch watercourse;

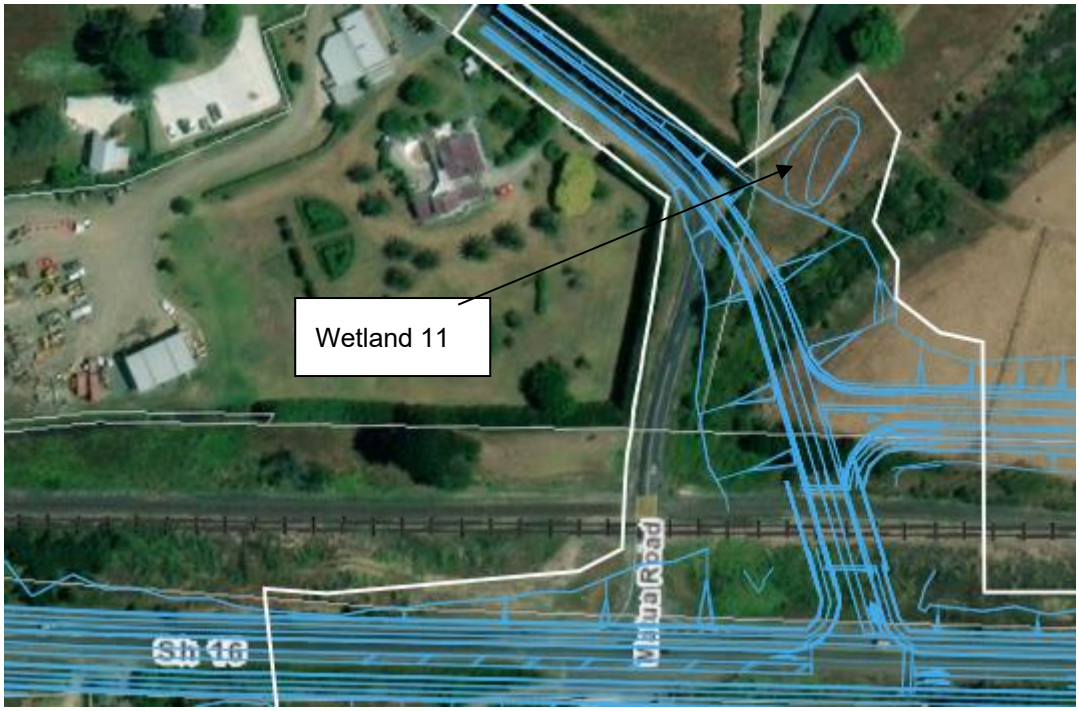


- Wetland 9 is located to the north of the Project corridor located within the boundary of 307 Matua Road within 25m of a Kumeū River branch watercourse;

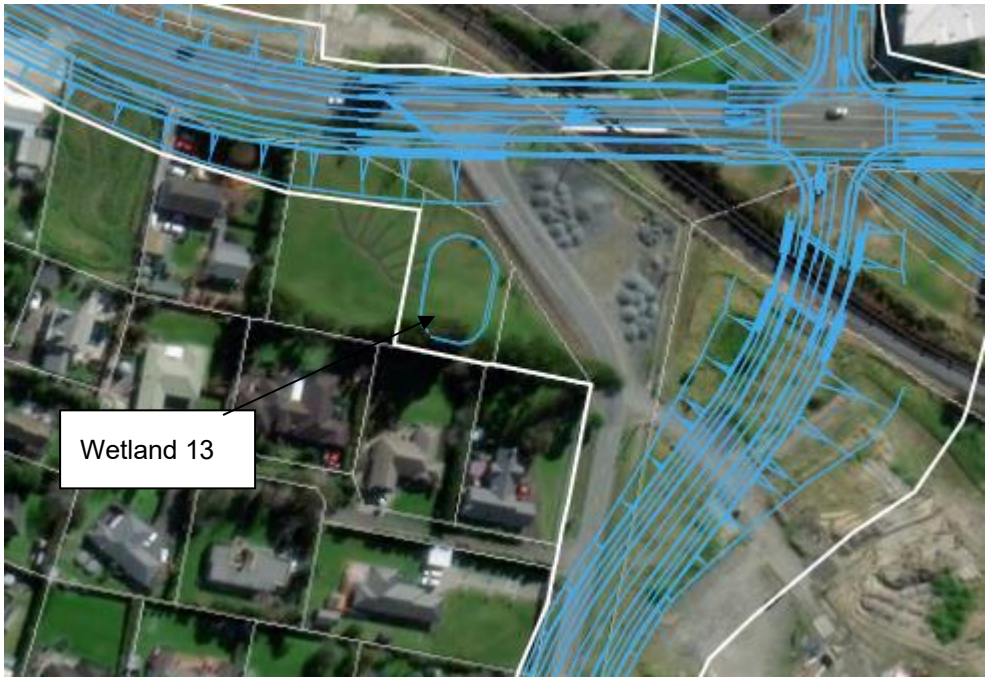


- Wetland 10 is located to the south of the Project corridor within the boundary of 695 SH16 the wetland is within 22m of the Ahukuramu Stream;

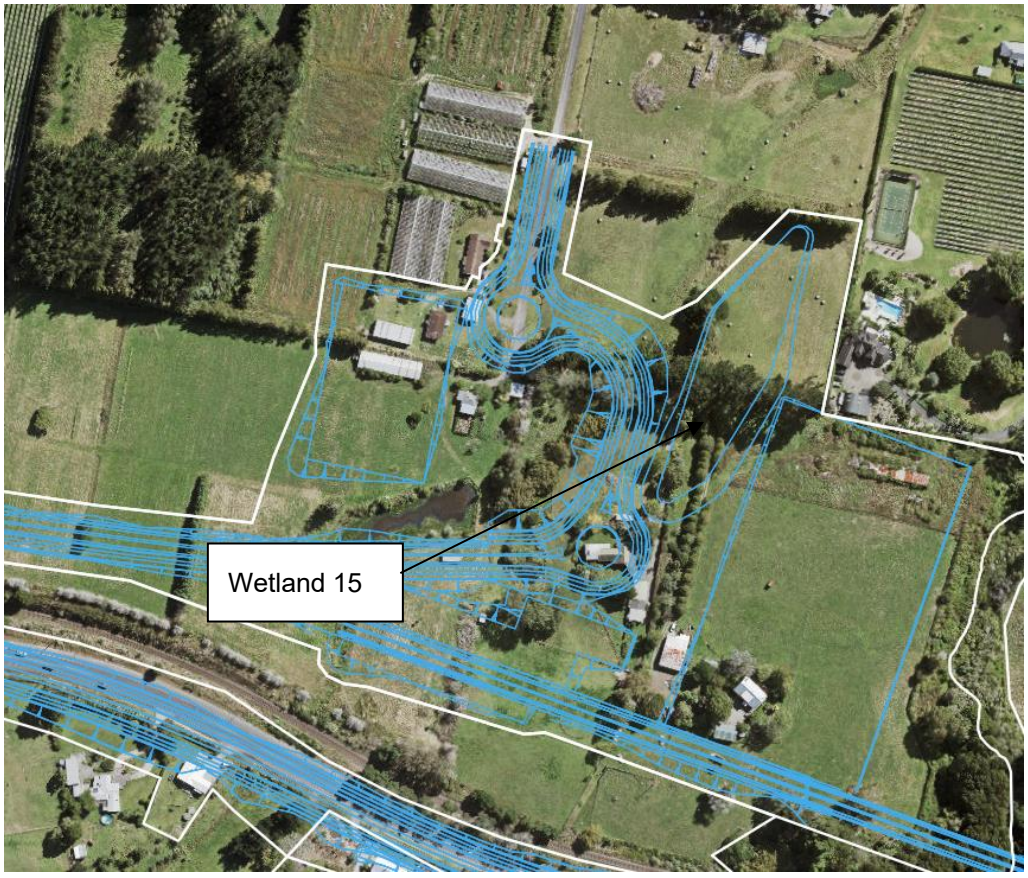
- Wetland 11 is located to the north of the proposed corridor located within the boundary of 411 Matua Road.



- Wetland 13 is located to the south of the Project corridor located within the boundary of 391 Main Road;



- Wetland 15 is located to the north of the Project corridor located within the boundary of 239 Matua Road;



The proposed wetlands will require earthworks to re-shape the land and achieve optimal depths and edge profiles, which will be determined as part of the resource consent phase. Wetlands will generally be constructed within greenfield sites in both rural and urban settings with the exception of Wetland 5A, Wetland 6 and Wetland 15 which are set in set within brownfield lots.

Without the implementation of mitigation measures we anticipate that adverse effect will be **low-moderate** to **low**. With mitigation, we consider adverse effects on the physical landscape to implement the proposed wetlands to be **low**.

Kumeū Rapid Transit Corridor Station

The Kumeū River pond to the east of the site is not expected to be directly impacted by the proposed station building and platforms. However, Wetland 5A associated with the development of the RTC will impact directly with the Kumeū River pond. Wetland 5A will require earthworks that cut into the existing sealed surface of the brownfield site.

This landscape has a lower level of sensitivity to change due to the amount of alteration to the landscape that has already taken place. On that basis, we consider adverse effects on the physical landscape to implement the proposed wetland to be **low** to **very low** with or without the inclusion of mitigation measures.

Huapai Rapid Transit Corridor Station

The Kumeū River branch to the east of the site is not expected to be directly impacted by the proposal, however the proposed design will require several crossing of a branch of the Kumeū River to the west. This watercourse has been modified over time by the adjoining rural land use and has an existing culvert from Meryl Avenue.

This landscape has a lower level of sensitivity to change due to the amount of alteration already undertaken for farming purposes. The FUZ classification also anticipates a fundamental change in the landscape from a rural to urban, which reduces the sensitivity of the landscape to change. On that basis with the inclusion of mitigation measures, we consider adverse effects on the physical landscape to implement the proposed wetland to be **low**. Without the implementation of mitigation measures it is anticipated that adverse effects will be **low-moderate** to **low**.

Private Properties

Residential properties within and adjacent to the Project area (either partially or fully designated) will be impacted by the Project in the following ways:

- Surface level changes between private property boundaries and the upgraded road corridor, requiring existing driveways and private accessways to be regraded;
- Encroachment into private yard areas and the removal of private garden plantings and trees, ancillary buildings and boundary fences;
- Potential impacts related to the construction of noise mitigation measures;
- Visual effects related to night works including light spill and sky glow; and;
- Demolition of existing dwellings and ancillary buildings (required properties within the proposed designation boundary)

Approximately 43 retained dwellings are proposed to be impacted by the project works. Landscape mitigation measures are proposed under 9.6.3 Recommended Measures to Avoid, Remedy or Mitigate Construction Effects below.

Overall, it is assessed that the adverse effects on the physical landscape on private properties will be predominantly **low-moderate** to **low** with the inclusion mitigation measures. Without the inclusion of mitigation measures is anticipated that landscape effects will range from **moderate** to **low-moderate.**

Kumeū Rapid Transit Corridor Station

Existing residential properties are set back from the Project approximately 190m to the north beyond intervening commercial and open space. These will not receive any direct impacts as a result of the project.

Residential zoned mixed housing suburban land is approximately 30m to the south of the proposed over bridge, if this land is developed by the time that the construction on the Project has started. It is expected that these projects will be affected in the following ways:

- Potential impacts related to the construction of noise mitigation measures;
- Visual effects related to night works including light spill and sky glow; and;

It is expected that these properties will not experience direct landscape effects as a result of the project and any changes to the design or layout of the development will have an appropriate setback from the designation.

Landscape mitigation measures are proposed under 9.6.3 Recommended Measures to Avoid, Remedy or Mitigate Construction Effects below.

Overall, it is assessed that with the implementation of mitigation measures the adverse effects on the physical landscape on private properties will be predominantly **low.** Without the implementation of mitigation measures it is anticipated that adverse effects will range from **low-moderate** to **low**.

Huapai Rapid Transit Corridor Station

Existing residential properties are set back from the Project approximately 200m to the north beyond existing shelterbelt vegetation around the lot. These will not receive any direct landscape character impacts as a result of the project. However, there may be visual impacts on these properties if they are retained.

The FUZ to the south of site on the opposite side of SH16 currently contains rural residential and rural production land and single house zone land beyond a branch of the Kumeu River to east is expected to be developed within the near future. The Spatial Land Use Strategy identifies that this area will be developed as a Local Centre and is expected to have a higher density of development of commercial and residential and uses. If this land is developed before construction starts on the project it is expected that there will be the following effects:

Potential impacts related to the construction of noise mitigation measures; and; visual effects related to night works including light spill and sky glow. It is expected that these properties will not experience direct landscape effects as a result of the project.

Landscape mitigation measures are proposed under 9.6.3 Recommended Measures to Avoid, Remedy or Mitigate Construction Effects below.

Overall, with the implementation of mitigation measures it is assessed that the adverse effects on the physical landscape on private properties will be predominantly **low.** Without the implementation of mitigation measures it is anticipated that adverse effects will range between **low-moderate** and **low** adverse.

9.6.2.1 Site Finishing Works

Finishing works are expected to include grassing of exposed earth, lighting, signage, line markings, footpath / cycleway details and reinstatement of private property fences and gardens. Streetscape elements and landscaping, including that required as mitigation will also be implemented. These activities are to be determined by detailed design and will occur within the already modified areas of the Project. Landscape effects are anticipated to be in the region of **low** adverse through this final phase of the construction process with or without the implementation of mitigation measures.

Kumeū Rapid Transit Corridor Station

Finishing works are expected to include grassing of exposed earth, lighting, signage, streetscape elements, car parking area and landscaping, including those required as mitigation will also be implemented. These activities are to be determined by detailed design and will occur within the already modified areas of the Project. Landscape effects are expected to be **very low** through this final phase of the construction process with or without the implementation of mitigation measures.

Huapai Rapid Transit Corridor Station

Finishing works are expected to include grassing of exposed earth, lighting, signage, streetscape elements, car parking area and landscaping, including those required as mitigation will also be implemented. These activities are to be determined by detailed design and will occur within the already modified areas of the Project. Landscape effects are expected to be **very low** through this final phase of the construction process with the implementation of mitigation measures. Without the implementation of mitigation measures it is anticipated that adverse effects have the potential to be **low** adverse.

9.6.2.2 Temporary Visual Effects

The construction of the Project is anticipated to be in stages along the proposed corridor over a period of approximately five years. Visual effects are anticipated to occur progressively through the Project area and transient viewing audiences may concurrently experience adverse visual effects from multiple stages through the construction period.

The consideration of visual effects through the construction phase acknowledges the full range of activities (and their resultant visual impact), required to implement the upgraded road corridor.

It is anticipated that construction activities required to implement the Project will introduce a concentrated area of construction activity into the existing busy transportation corridor in the urban and rural landscape. Within the FUZ the proposed construction phase will be consistent with the construction activities expected to be associated with the urbanisation of the FUZ. Another important consideration is that landscape change by way of vegetation removal and land modification (on private rural property), albeit at a lesser scale, forms part of the expected backdrop of the existing environment.

Notwithstanding the above, some vantage points within the Project area are likely to witness heightened adverse visual effects through the construction phase due to the magnitude of vegetation removal and / or earthworks proposed. These areas are outlined below:

- Private properties where physical landscape effects will occur within their lots.
- Effects on properties at 260 and 284 Sate Highway 16 due to the proximity to Wetland 3 and the main route corridor;

- Properties at 178 and 182 SH16 in proximity to the nearby site compound and Wetland 8;
- Properties at 37, 51 and 62 Boord Crescent in proximity to Wetland 24 and proposed nearby site compound.
- Effects on the private property 7 Main Road, in proximity to Wetland 2 and the nearby site compound,
- A private properties at 382 Main road in proximity to the nearby site compound;
- Private properties at 51 and 50 Gilbransen Road in proximity to Wetland 7 and Wetland 8;
- A private property at 30 Meryl Avenue in relation to the proposed nearby site compound;
- Private properties at 402 and 411 Matua Road in relation to the proposed nearby site compound.

The nature and significance of the potential adverse visual effects is considered to be moderated through the Project area by the following aspects:

- Road works and construction activities can generally be expected to occur where temporary roads, wetlands and construction compounds within the proximity of the existing road network;
- The existing SH16 is already an existing element within the visual composition of the Project area;
- The existing road corridor landscape has already been modified by previous works required to shape the existing road corridor.
- The Main Works are estimated to last approximately 5 years and is proposed to be implemented in six phases which are expected to allow efficient access to the construction zones while maintaining continued access for the intersecting roads and existing private and commercial driveways.

Without the implementation of mitigation adverse visual effects for the transient public viewing audience are anticipated to be **moderate** to **low-moderate** through the construction phase, taking into account those vantage points listed above where adverse effects are likely to be heightened during the temporary construction period. With the implementation of mitigation adverse visual effects for the transient public viewing audience are anticipated to be **low-moderate** to **low** through the construction phase.

Adverse visual effects during the construction phase are likely to be heightened for private viewing audiences directly adjacent to the Project area on the basis of more direct and prolonged engagement with the construction activities of the Project. This will include the presence of heavy machinery and the visible disturbance of both the road corridor and also individual private interfaces with the road.

Therefore, without the implementation of mitigation measures is it is anticipated that adverse effects will range between **moderate** to **low-moderate** during the construction phase for private viewing audiences, depending on their location, proximity to the works and outlook. With the implementation of mitigation it is anticipated that adverse effect will range between **low-moderate** to **low** during the construction phase for private viewing audiences.

Kumeū Rapid Transit Corridor Station

Audiences to the north of the NAL within proximity to the site will be removed during the construction of the station and over bridge. Enduring audiences will be limited to those to the north of SH16 Main Road and will comprise audiences within commercial properties, users of the Kumeū River Park open space and transient audiences in the form of road users and pedestrians. These audiences to the north have a lower level of sensitivity with the exception of users with the Open Space, which have a higher level of sensitivity. Audiences to the south of the NAL are anticipated to be residential and will have a higher level of sensitivity.

The consideration of visual effects through the construction phase acknowledges the full range of activities (and their resultant visual impact), required to implement the station building, platform and over bridge.

It is anticipated that construction activities required to implement the Project will introduce a concentrated area of construction activity within the context of the NAL and SH16 Main Road. Audiences to the north of the project have a lower level of sensitivity compared to the residential audiences that are anticipated to the south which are likely to experience a higher adverse level of effects through the construction phase of works.

The nature and significance of the potential adverse visual effects is considered to be moderated through the Project area by the following aspects:

- Construction activities can generally be expected to occur where temporary roads, wetlands and construction compounds within the proximity of the existing transportation corridor;
- The existing SH16 and NAL are already an existing element within the visual composition of the Project area.

Overall, adverse visual effects for the transient public viewing audience are anticipated to be low through the construction phase, taking into account that the project will appear for a short interval along the transportation corridor.

Adverse visual effects during the construction phase are likely to be heightened for private viewing audiences to the south of Project area on the basis of more direct and persistent engagement with the construction activities. This will include visible disturbance due to the presence of heavy machinery.

Therefore, adverse visual effects are anticipated to range between **low-moderate** to **low** during the construction phase for private viewing audiences, depending on their location, proximity to the works and outlook. These effects are likely to be within the same range with or without the inclusion of mitigation measures.

Huapai Rapid Transit Corridor Station

Audiences to the north and south of the project within proximity to the site may have removed during the construction of the station and over bridge. Potential residential audiences to the north are limited to properties at 239 Matua Road and 30 Meryl Avenue, however it is expected that these will likely be removed as part of the urbanisation of the lots and surrounding area. To the south audiences will be limited to transient audiences on SH16 Main Road and potentially retained residential audiences to the south. These audiences have a lower level of sensitivity to change due to their existing context of the transportation corridor and the expected urbanisation of the surrounding area.

To the east of the site residential properties within the SHZ will experience a mixed visual effect as a result of the construction activity. This residential audience have a higher level of sensitivity to change.

The consideration of visual effects through the construction phase acknowledges the full range of activities (and their resultant visual impact), required to implement the station building, platform, Park ‘n’ Ride, bus layover and over bridge.

It is anticipated that construction activities required to implement the Project will introduce a concentrated area of construction activity within the context of a landscape transitioning from rural to urban. Audiences within the FUZ have a lower level of sensitivity compared to the existing single

house zone residential audiences to the east of the site, which are likely to experience a higher adverse level of effects through the construction phase of works.

The nature and significance of the potential adverse visual effects is considered to be moderated through the Project area by the following aspects:

- Construction activities can generally be expected to occur where temporary roads and construction compounds within the proximity of the existing transportation corridor;
- The existing SH16 and NAL are already an existing element within the visual composition of the Project area;
- The area immediately surrounding the site is expected to be within a transitioning landscape from rural to urban.

Overall, adverse visual effects for the transient public viewing audience are anticipated to be **low** through the construction phase, taking into account that the project will appear for a short interval along the transportation corridor.

Adverse visual effects during the construction phase are likely to be heightened for private viewing audiences to the east of Project area on the basis of more direct and persistent engagement with the construction activities. This will include visible disturbance due to the presence of heavy machinery.

Therefore, adverse visual effects are anticipated to range between **low-moderate** to **low** during the construction phase for private viewing audiences, depending on their location, proximity to the works and outlook. These effects are likely to be within the same range with or without the inclusion of mitigation measures.

9.6.3 Recommended Measures to Avoid, Remedy or Mitigate Construction Effects

Recommendations are in line with the general recommendations in Section 6.1.2.

In addition to these measures the following project specific interventions are suggested:

- Provide hoarding or other screening along the works boundaries of site compounds, wetlands and dry ponds in proximity to residences to reduce visual effects on users of outdoor spaces that overlook the works; and;
  Ensure that measures are taken to prevent contamination and pollution of groundwater and wetlands within proximity to site compounds.

9.6.4 Assessment of Operational Effects

9.6.4.1 Natural Character Effects

Natural character forming elements, features and processes within the Project area are more prevalent within the rural sections of the project however, there are elements that are apparent within the urban landscape. These are typically wetlands, rivers and perennial watercourses that traverse the existing modified rural and urban landscapes. Indigenous riparian vegetation within wetlands and waterways are varied and intermittent. Kumeū River (and its branches), Ngongetepara Creek, Karure Stream, Pakinui Stream and Totara Creek) within the Project corridor designation contain the most concentrated and contiguous native riparian habitats that have undergone some modification at bridge crossings and within the urban context. We consider that the natural character value of these

element, features and processes are moderate, however at the bridge approaches and crosses the existing modification reduces the character value.

Clearance of indigenous riparian vegetation and habitat will be required to facilitate the crossing of the wetlands and watercourse environments in particular at the crossing of Kumeū River (and its branches), Ngongetepara Creek, Karure Stream, Pakinui Stream and Totara Creek. The design proposes bridges across the Ngongetepara Creek, Kumeū River and Kumeū River Branch watercourses to minimise the impact on the natural flow of water and to enable the riparian habitat to continue underneath the bridge. Although the primary watercourse streams are bridged in the design subsequent branches of the stream are proposed to be culverted. All other watercourses will be culverted. Adverse effects on natural character will be heightened where culverts are utilised as a result of the change to the natural watercourse, removal of vegetation and the disconnection of contiguous native riparian vegetation. Alterations to watercourses, water bodies, wetlands, riparian vegetation all are the subject of a separate regional consent process, this will also consider the natural character effects.

It is recommended that during detailed design process of the Project corridor the extent of impacts on watercourses are limited to reduce the size of the area impacted. A planting plan and vegetation protection plan is recommended as part of the ULDMP which will be developed as part of the detailed design of the Project. It is recommended that any planting proposed as mitigation through the regional consents process is integrated with the planting plan as recommended through this assessment under the ULDMP. This will ensure that natural character values of the watercourses and wetlands are enhanced or protected where possible as an outcome of the Project.

On the basis of the above (allowing for future landscape mitigation), adverse natural character effects are likely to be **low,** where bridges are used to cross water courses and retain natural character value. Without landscape mitigation measures it is anticipated that adverse effects have the potential to be **low-moderate** adverse.

Where culverts are required we consider natural character effects to be **low-moderate** adverse, these effects will be considered further as part of a future regional resource consent. Without landscape mitigation measures it is anticipated that adverse effects have the potential to be **moderate** adverse.

Kumeū Rapid Transit Corridor Station

Natural character forming elements, features and processes within the Project area are limited to those associated with the Kumeū River branch and pond. We consider that the natural character value of this element are overall moderate, however at the bridge approaches and crosses the existing modification reduces the character value. These are not within the footprint of the Project but will be impacted by Wetland 5A as part of the RTC and SH16 works.

On the basis of the above it is anticipated that there will not be any adverse natural character effects on the Kumeū River and pond.

Huapai Rapid Transit Corridor Station

Natural character forming elements, features and processes within the Project area are limited to those associated with the Kumeū River branches to the east and west. We consider that the natural character value of this element are overall moderate in the branch to the east and low-moderate within the branch to the west, which has already undergone some modification including a culvert. It is expected that the flow of the western branch of the Kumeū River would be maintained. The river branch to the east is not within the footprint of the Project and is not expected to be directly impacted.

However the river branch to the west is expected to require a culvert and modification to the river path.

On the basis of the above, with the implementation of mitigation measures it is expected that there will **low** adverse natural character effects on the Kumeū River branch to the west and pond. Without mitigation measures it is anticipated that effects may be as high as **low-moderate** adverse.

9.6.4.2 Visual Amenity Effects

Overall, there are likely to be a range of visual amenity effects on public and private viewing audiences relative to proximity to the corridor in the urban and rural landscapes. Rural properties set back from the Project area will experience a reduced incremental increase in effects in the context of the existing transportation corridor. Urban properties that set back from the Project area experience interrupted views of works, reducing the level of effects experienced.

There are no retained urban private properties that interface directly with the Project corridor, properties north of Main Road will retain existing vegetation which provides amenity and filters views towards the road. Retained private properties within the rural landscape will generally experience a heightened change in the view as a result of the RTC being introduced into the view. However, this will be reduced for properties which already experience the NAL and rail traffic within their views. Retained private rural properties which have filtered, screened or distant views towards the works are expected to experience a reduced level of change as a result of the works.

It is recommended that boundary fences and garden plantings (removed through the Project works) be reinstated on completion of the works affecting properties that will be retained. These mitigation measures should be considered within the ULDMP under the lens of neighbourhood character and as such are discussed further in the following section.

FUZ land within the Project corridor is expected to be developed over time as visual effects are anticipated to be reduced for the public viewing audience, based on improved visual amenity for users associated with streetscape improvements, maturing street trees, berm planting and accessibility to active modes of transport.

Public viewing audiences within proximity to the Project are primarily pedestrians active mode users along SH16 Main Road and users in the Fred Taylor Park and Huapai Domain open spaces.

Views will also be available from Fred Taylor Drive, Taupaki Road, Boord Crescent, Waitakere Road, Trotting Cross Drive, SH16 Main Road, Access Road and Matua Road, these audiences will have an oblique view towards the project.

Overall, some visual effects are anticipated to be mitigated by measures implemented during the finishing phase of the construction period (within the road corridor and private property boundaries), that will mature through the operational phase of the Project. These will reduce some of the long-term residual visual effects of the Project. In an urban setting the rapid transit corridor will be seen in proximity to the existing SH16 and / or NAL. The presence of these existing transportation corridors within the locality of the Project will result in the proposal appearing less at odds with the surrounding landscape. The proposed project corridor will be a noticeable new feature within the landscape particularly within rural zoned land where there is currently no visible transportation corridor. The road corridor will be less apparent in the FUZ where existing screening vegetation is present and where proposed UDLMP planting has matured.

Without the inclusion of mitigation measures it is anticipated that effects will be **low** adverse for transient viewers within the FUZ and urban landscape and **low-moderate** adverse for static audiences through the operational phase of the Project. For private viewing audiences, visual effects are likely to range from **moderate** adverse to **low-moderate** adverse for rural audiences and **low-moderate** adverse to **low** adverse for residential audiences within FUZ. Audiences within the existing urban core of Kumeū and Huapai are expected to experience **low** adverse effects during operation.

On that basis, with the inclusion of mitigation measures, adverse visual effects within the Project area are likely to be **very low** for transient viewers within the FUZ and urban landscape and **low** for static audiences through the operational phase of the Project. For private viewing audiences, visual effects are likely to range from **low-moderate** to **low** for rural audiences and **low** to **very low** for residential audiences within FUZ. Audiences within the existing urban core of Kumeū and Huapai are expected to experience **very low** adverse effects during operation. In all instances these would reduce over an extended period of time.

Kumeū Rapid Transit Corridor Station

Audiences to the north of the project are expected to be transient in nature and along SH16 and within the Kumeū River open space and within commercial and industrial properties. These will experience views of the proposed station within the context SH16 Main Road and built form that are expected to be built adjacent to the station.

Audiences to the south of the NAL are expected to view the finished Project within the context of amenity planting long pathway to over bridge and the active NAL. This will filter views towards the Project.

There are no retained urban private properties that interface directly with the station. However, it is anticipated that at the time of implementation the surrounding area will be developed for residential purposes.

Overall, some visual effects are anticipated to be mitigated by measures implemented during the finishing phase of the construction period, including the implementation of the soft landscape planting that will mature through the operational phase of the Project. This will reduce some of the long-term residual visual effects of the Project. In an urban setting the proposed station and overpasses will be seen in proximity to the existing SH16 and or NAL. The presence of these existing transportation corridors within the locality of the Project will result in the proposal appearing less at odds with the surrounding landscape. The proposed station will be a noticeable feature within the landscape, however this is within the context of other built development that will surround the proposal.

On that basis, adverse visual effects within the Project area are likely to be **very low** for transient viewers in urban landscape and **low** for static audiences within the FUZ through the operational phase of the Project. For private viewing audiences, adverse visual effects are likely to range from **low** to **very low** for residential audiences within existing urban zones. These would reduce over an extended period of time as the surrounding area is developed and landscape planting matures. It is anticipated that these effects will be within the same range with or without the implementation of mitigation.

Huapai Rapid Transit Corridor Station

There are no retained urban private properties that interface directly with the Project corridor, properties north of Main Road SH16 will retain existing vegetation which provides amenity and filters views towards the road. Retained private properties within the rural landscape will generally

experience a heightened change in the view as a result of the Park ‘n’ Ride, station building and but lay over being introduced into the view. However, this will be reduced for properties to the south which already experience the NAL and rail traffic within the view. Retained private rural properties which have filtered, screened or distant views towards the works are expected to experience a reduced level of change as a result of the works.

Public viewing audiences within proximity to the Project are primarily transient users along SH16 Main Road.

Overall, some visual effects are anticipated to be mitigated by measures implemented during the finishing phase of the construction period (within the road corridor and private property boundaries), that will mature through the operational phase of the Project. These will reduce some of the long-term residual visual effects of the Project. In an urban setting the proposed station and overpasses will be seen in proximity to the existing SH16 and NAL and the proposed RTC. The presence of these existing transportation corridors within the locality of the Project will result in the proposal appearing less at odds with the surrounding landscape. The proposed station will be a noticeable feature within the landscape however this is expected to be within the context of established commercial and retail buildings to the south in the proposed local centre and residential development to the north and west.

Without the implementation of mitigation measures it is considered that adverse visual effects within the Project area are likely to be **low** to **very low** for transient viewers within the FUZ and existing urban landscape and **low** adverse for static audiences through the operational phase of the Project. For private viewing audience, visual effects are likely to range from **low** adverse for residential audiences within existing urban zones. Any retained rural residential audiences would be expected to experience **low -moderate** to **low** adverse visual effects.

On that basis, with the implementation of mitigation measures, adverse visual effects within the Project area are likely to be **very low** for transient viewers within the FUZ and existing urban landscape and **low** adverse for static audiences through the operational phase of the Project. For private viewing audience, visual effects are likely to range from **low** adverse to **very low** adverse for residential audiences within existing urban zones. Any retained rural residential audiences would be expected to experience **low** adverse visual effects.

In all instances these would reduce over an extended period of time as the surrounding area is developed and landscape planting matures.

9.6.4.3 Landscape Character Effects

The principal elements of the Project will permanently alter the character of the rural sections of the project corridor. The FUZ sections of the Project area will experience the proposal within the context of a wider landscape undergoing urbanisation. The rural zoned sections of the Project area are characterised by the lack of streetscape features, informal intermittent vegetation, managed and unmanaged watercourses, shelterbelt and hedgerows along field boundaries and existing rural land uses. The existing rural roadways generally lack urban characteristics such as a kerb and channel roadway, footpaths and street lighting. These features will be introduced into the landscape by the Project including active mode transport lanes, street lighting and a kerb and channel roadway. At the completion of the Project, the upgraded corridor will resemble that of an urban arterial road on account of the pedestrianisation, active modes of transport, structured street tree planting, integrated stormwater management and engineered roading elements that have an inherently urban aesthetic.

The Project is anticipated to enter the operational phase within the context of increased urbanisation where FUZ land is progressively live-zoned and urbanised. Although it is not possible to anticipate the

exact future urban land use pattern, it is expected that residential development will primarily populate the surrounding FUZ.

Through the existing urban centres of Kumeū and Huapai the urban character of the landscape will endure, the proposed project is expected to improve the structure and amenity of the road corridor by providing a more structured road layout and consistent landscape pattern. The FUZ is not structure planned, however the Spatial Land Use Strategy - Kumeū-Huapai, Riverhead, and Redhills North provides a high level direction of future urbanisation. Neighbourhood Centres are proposed along Motu Road and to the south of Fred Taylor Park, which are proximate to the Project area. It is reasonable to expect that these centres will be surrounded by a predominantly residential land use. Based on the above the magnitude and nature of landscape change proposed by the Project we consider to be in alignment with the changes that will likely occur throughout the localised landscape as it is urbanised over time.

The typical cross sections above (Figure 9-1) illustrates the proposed upgrade to the road and the expected future use. Although there will not be space along the entire road corridor for green infrastructure elements such as street trees and berm, it is expected that there will be some retained green existing infrastructure to contribute to the overall amenity of the corridor. A structured planting design will be provided through wider rural and FUZ designation including on slopes and embankments as part of the ULDMP, to provide integration of the project into the landscape. It is also recommended that the ULDMP advises on design strategies to design slopes and embankments to have a more naturalised appearance and integrate with the surrounding rural landscape. These features and design details are expected to improve landscape and urban amenity of the Project corridor.

It is assessed that planting and design interventions within the ULDMP, in conjunction with stormwater management and reinstatement planting, will reduce effects on landscape character associated with broad vegetation clearance Project area within the rural environment.

On the basis of the above without mitigation effects may be as high as **moderate high** adverse**,** allowing for future landscape mitigation, adverse landscape character effects are anticipated to be **low-moderate** adverse to **low** adverse once mitigation planting has established.

Kumeū Rapid Transit Corridor Station

The Project is anticipated to enter the operational phase within the context of increased urbanisation where FUZ land is progressively live-zoned and urbanised. Although it is not possible to anticipate the exact future urban land use pattern, it is expected that residential development will primarily populate around the proposed station.

It is expected that a structured planting design and concourse area will be provided around the proposed station and forecourt area will be provided within a ULDMP. These features and design details are expected to improve landscape and urban amenity of the proposed urban landscape. It is anticipated that the natural qualities of the Kumeū River branch to the east will not be materially changed by the proposed works.

It is assessed that planting and design interventions provided in a ULDMP, will reduce effects on landscape character and likely result in a positive overall **very low** positive landscape character effects. Without the implementation of mitigation measures it is anticipated that landscape effects will be **low** adverse.

Huapai Rapid Transit Corridor Station

The character of the Kumeū River branch to the east is expected to endure, and the proposed project is expected to improve the relationship with that watercourse. Elements such as urban trees, amenity planting areas and urban amenity around the proposed station will help to settle the proposal into the landscape. A structured planting design and concourse area will be provided around the proposed station and forecourt area will be included within a ULDMP. The removal of existing mature trees will be partially mitigated by the proposed urban landscape design, however it is acknowledged that this loss of landscape features is in line with the expected development of the landscape from rural to urban.

It is assessed that in the context of the FUZ and with planting and design interventions provided in a ULDMP, effects on landscape character and likely result in a **very low** adverse landscape character effects. Without the implementation of mitigation measures it is anticipated that landscape effects will be **low** adverse.

9.6.5 Recommended Measures to Avoid, Remedy or Mitigate Operational Effects

Recommendations are in line with the general recommendations in Section 6.1.3.

In addition to these measures the following project specific interventions are suggested:

- The existing Huapai Domain and Fred Taylor Park and the project corridor are designed to integrate with and / or re-establish boundaries to the open spaces.
- Protect the natural character and processes of the Kumeū River, and its branches, particularly where the river branch crosses SH16 Main Road and the project corridor crosses the existing pond. This will be covered within the regional consent process.

9.7 Conclusions

It is anticipated that without the inclusion of mitigation measures adverse landscape and visual effects (with mitigation) range from **low** to **moderate** for the construction phase (**moderate** to **low** in rural areas and **moderate** to **low** in urban areas) and **very low** to **low-moderate** for the operational phase (in both rural and urban areas). Within the existing urban cores of Kumeū and Huapai it is anticipated that landscape and visual effects experienced during construction resulting in a **low-moderate** to **low** level of effects, after the project corridor is completed the effects will be **low** adverse.

Provided that mitigation measures are adverse landscape and visual effects (with mitigation) range from **very low** to **moderate** for the construction phase (**moderate** to **low** in rural areas and **low-moderate** to **very low** in urban areas) and **very low** to **low-moderate** for the operational phase (in both rural and urban areas). Overall, the adverse effects can be mitigated and reduced over time in relation to the FUZ areas which will experience urbanisation of the surrounding landscape. The FUZ landscape context has a lower level of sensitivity to change due to the anticipated developing urban form of the landscape associated with future urbanisation. Natural character effects are expected to range from low-moderate to low, providing the higher sensitivity natural character areas with bridges.

The existing urban core of Kumeū and Huapai also have a reduced sensitivity to change and are anticipated to experience landscape and visual effects during construction resulting in a **low** level of effects. However, after the project corridor is completed the effects will be **very low** adverse. The rural areas of the project are more sensitive to the introduction of the road corridor however,

integration works proposed by the ULDMP will assist with the integration of the slopes and embankments into the landscape through earth shaping and mitigation planting

Kumeū Rapid Transit Corridor Station

It is anticipated that without the inclusion of mitigation measures adverse landscape and visual effects landscape and visual effects range from **low-moderate** to **low** adverse for the construction phase and **low** adverse for the operational phase

Overall landscape and visual effects (with mitigation) range from **low** to **very low** adverse for the construction phase and **low** adverse to **very low** positive for the operational phase. Overall, the adverse effects can be mitigated and reduced over time in relation to the regeneration in the existing urban surrounds and the changes to the landscape character are expected to have a positive effect. The existing urban landscape context has a lower level of sensitivity to change due to the existing already disturbed site and anticipated further development of the landscape associated with regeneration. Natural character effects on the Kumeū River are expected to be **low**, provided that the direct impacts on the existing pond minimised.

The existing urban core of Kumeū also has a reduced sensitivity to change will be experience landscape and visual effects during construction resulting in a **low-moderate** to **low** level of effects. However, after the project corridor is completed the effects will be **low** positive. The proposed integration with the surrounding landscape and streetscape advised in the ULDMP will assist with the establishing the station within the developing urban landscape. Within the urban core the level of effects are anticipated to be the same with or without mitigation.

Huapai Rapid Transit Corridor Station

It is anticipated that without the inclusion of mitigation measures adverse landscape and visual effects landscape and visual effects will range from **moderate** to **low** adverse for the construction phase and **low-moderate** to **very low** adverse for the operational phase

Overall adverse landscape and visual effects (with mitigation) range from **low-moderate** to **very low** for the construction phase of works and **low** adverse to **very low** adverse during the operational phase. Overall, the adverse effects can be mitigated and reduced over time in relation to the urbanisation of the existing rural landscape. The existing urban landscape context has a lower level of sensitivity to change due to the anticipated urbanisation of the landscape. Natural character effects on the Kumeū River branches are expected to be **low** adverse. Provided that the direct impacts on the existing Kumeū River to the east are avoided and the effects on the river branch to the west maintain the flow of the watercourse. The proposed integration with the surrounding landscape and streetscape advised in the ULDMP will assist with the establishing the station within the developing urban landscape.

10 NoR S4: Access Road Upgrade

10.1 Project Corridor Features

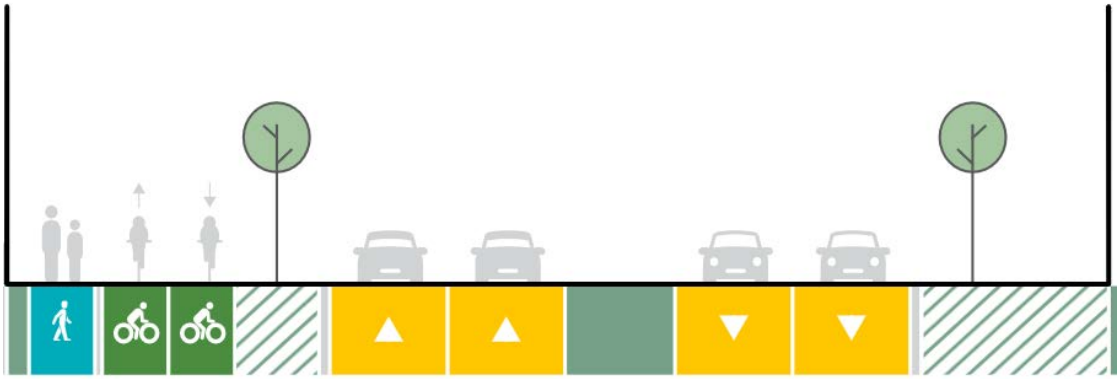
The proposed Access Road Upgrade is set between SH16 Main Road and Motu Road to the south west of the Kumeū Road. The project road corridor acts as a boundary between existing and future urban land to the north and rural land to the south.

Key features of the proposed upgrade include the following:

The nature and extent of impacts on the landscape as a physical resource during the construction period of the Project. A specific focus on the location of the construction compound, extent of vegetation clearance, impacts on water courses, the scale and location of proposed cut and fill slopes and the likely impacts of bridge construction.

- The addition of the active mode transport corridor adjacent to the rural road.
- The introduction of an active mode corridor into, rural 'greenfield' lots and how this will interface with the enduring rural environment to the south of the corridor.
- Consideration of landscape character effects and urban amenity issues in relation to the permanent landscape change, including specific assessment of how this corridor will integrate into the future urban environment to the north of the corridor;
- Potential removal of mature trees, consideration of future opportunities to integrate existing trees.
- The construction of a new bridge over the existing stream.

Figure 10-1: Access Road Typical Cross Sections



10.2 Existing and Likely Future Environment

10.2.1 Planning context

Access Road / Tawa Road is an existing arterial corridor that runs along the eastern RUB of Kumeū-Huapai.

- The northern side of Access Road is zoned under the AUP:OP as FUZ, with Business – Light Industry Zoning at the north-eastern section of Access Road.
- The southern side of Access Road is predominantly zoned under the AUP:OP as Rural – Countryside Living, with exception to the Kumeū Showgrounds which are zoned as Rural – Mixed Rural Zone are identified as a precinct (I517 Kumeū Showgrounds Precinct) in the AUP:OP.

Table 10-1 below provides a summary of the existing and likely future environment as it relates to Access Road.

Table 10-1: Access Road Upgrade Existing and Likely Future Environment

Environment today	Zoning	Likelihood of Change for the environment[21]	Likely Future Environment[22]
Business	Business (Light Industrial) Zone	Low	Business (Light Industrial)
Rural	Rural – Countryside Living Zone Rural – Mixed Rural Zone	Low	Rural
Undeveloped greenfield areas (Future Urban Zone)	Future Urban	High	Urban

10.2.2 Existing / Baseline Landscape

10.2.2.1 Baseline Landscape

The proposed project area along Access Road / Tawa Road from SH16 Main Road south west to Motu Road. The road is predominantly surrounded on either side by rural land use for the majority of the route, however land to the north of the of the site is FUZ . The north eastern end of the route borders existing urban business and light industrial development.

The local landscape character within the Project corridor is summarised below:

- Vegetation cover comprising non-native stand-alone street trees, linear belts of mixed indigenous and non-native vegetation along riparian corridors, shelterbelts along the road corridor, exotic vegetation in around private residential and commercial property boundaries.
- The urban industrial and commercial development within Kumeū at the north eastern end of the road.

[21] Based on AUP:OP zoning/policy direction
[22] Based on AUP:OP zoning/policy direction

- .
- The rural sections of the project are characterised by rural residential lifestyle blocks with elements of rural production, shelterbelts and pastoral fields.

Landform and Hydrology

The Project corridor traverses a gently sloping topography that gently slopes up towards the southern end of the corridor. High points are located adjacent to the existing commercial and industrial land to the north and close to 49 Tawa Road to the south. The lower lying land areas of the Project area are located within proximity of Kumeū River branches, flood plains and wetlands.

Landcover

The landscape across the Project corridor is characterised as a distinctly modified urban landscape within the commercial area at the north of the corridor. This commercial area feature large lot commercial and industrial development to the north of Access Road. The balance of the area to the north of the Project corridor rural is predominantly FUZ, containing areas of open pasture with rural residential properties also present.

The south of the project area is predominantly zoned as rural and contains rural residential lifestyle blocks with small pockets of agricultural production, non-residential landcover is characterised by geometric pastoral fields. These field patterns are bound in parts by structured hedgerows, shelter belts and small areas of native vegetation. Fields predominantly contain exotic grassland with small pockets of agricultural crops, rural industry and amenity planting in proximity to dwellings.

Areas of mature native vegetation are limited within this landscape and is primarily located in proximity to stretches of riparian vegetation along the Kumeū River branch. However, this is a very small element within the context of the wider Project area.

There are no scheduled notable trees within the designation.

Land Use

The Project corridor traverses four AUP:OP zones listed in table 13-1 Access Road Upgrade Existing and Likely Future Environment.

Pastoral fields comprise the majority of the area between residential properties with some smaller rural production land use amongst residential lifestyle blocks and shelterbelts. Although currently rural the land to the north of the road is zoned as FUZ and anticipated to be urbanised in the future. Land at the eastern of route surrounds the Kumeū Showgrounds (refer Figure 10-2 below) and contains the Kumeū Community Centre.

At the eastern end of the route urban commercial lands use is present to the north of the project corridor at the approach to SH16 and the southern existing urban area of Kumeū.

Figure 10-2: View north west into the Kumeū Showgrounds from Waitakere Road.

Scheduled Landscape and Ecological Features

There are no scheduled landscape or ecological features within or proximate to the Project area.

Historical and Cultural Associations

There are no scheduled historical and cultural features within or proximate to the Project area.

10.2.2.2 Likely Future Environment

Overview

The FUZ land to the north of the Project corridor will witness a significant change from rural to urban land use character over the next 10-15 years. It is anticipated that the abiotic features of the landscape, principally the topography, will be altered over time as the surrounding landscape is urbanised. It is anticipated that some of the defining biotic (land cover) features of the landscape will undergo substantial change alongside future development, with the removal of large areas of vegetation to accommodate the Project. This will likely involve the implementation of street tree plantings, public open space areas and general landscaping within the private yards of future housing development for public amenity. The balance the western end of the Project Area will continue to have an urban function by the completion of the project.

Rural land to the south of the project corridor is expected to remain, the land is expected to retain a rural aesthetic and land use and is not anticipated to experience a change in the overall character of the landscape. It is anticipated that the abiotic and biotic features of the landscape outside of the designation will remain.

10.2.2.3Kumeū-Huapai / Riverhead area

This area has not undergone a structure planned it is identified by council that this process will be undertaken before the land is released to be urbanised. This processed is indicatively programmed to be undertaken in 2025 in order for the land to be released between 2028 and 2032 as indicated in the Future Urban Land Supply Strategy (FULSS).

The Spatial Land Use Strategy for Kumeū-Huapai, Riverhead, and Redhills North has been developed with collaboration between Auckland Council and the project team. This provides a high level framework that outlines the distribution of future land use (see Figure 10-3 below).

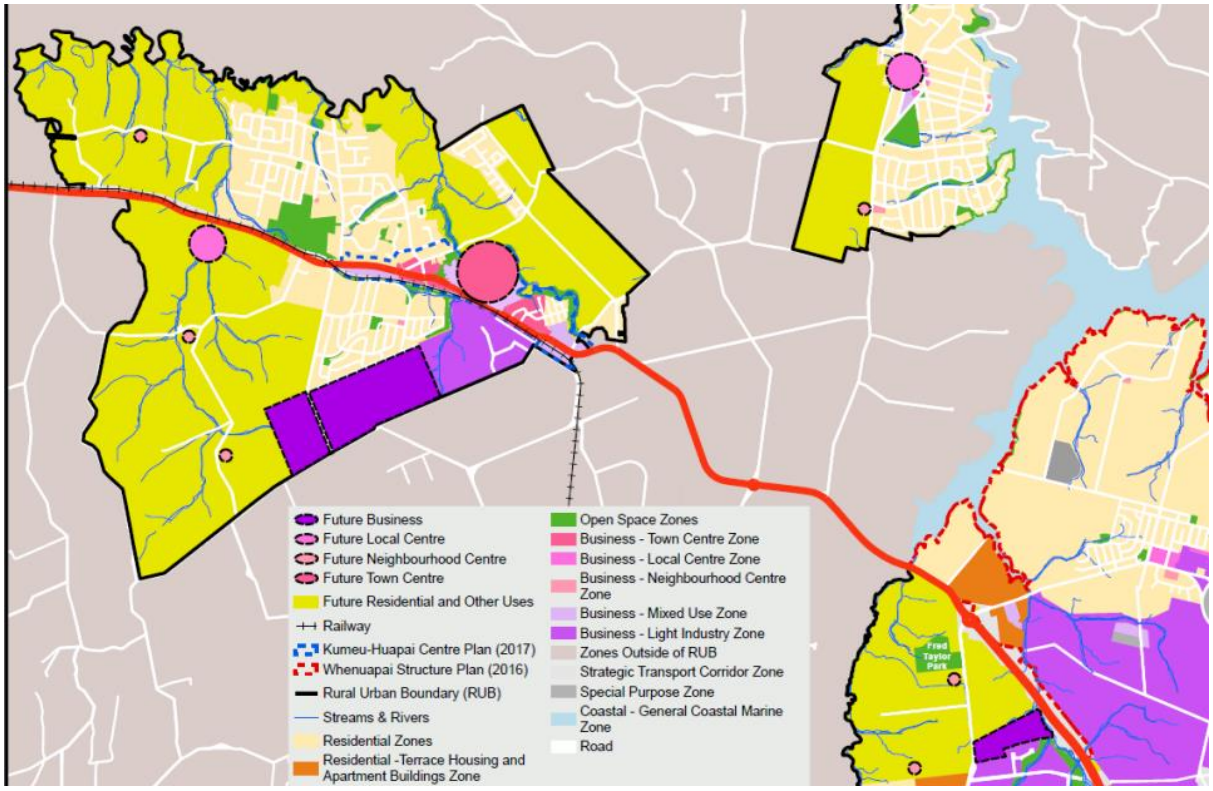


Figure 10-3: Spatial Land Use Strategy - Kumeū-Huapai, Riverhead, and Redhills North.

10.3 Extent of Visibility and Viewing Audience

The extent of visibility of the proposed widening of the road corridor is contained by the surrounding vegetation and the changes in topography. Notwithstanding the above, some vantage points within the Project area are likely to witness heightened adverse visual effects. In summary the viewing audience for the Project includes:

- *Public Views:* Transient public audience (vehicle users). Key roads where views can be obtained from include: Access Road, Tawa Road;
  - Travelers (cars, pedestrians and cyclists) along Access Road, Tawa Road, Waitakere Road and Station Road which bisects the site (Refer Appendix 2 Site Photo SP32, SP33, SP34, SP35, SP36, SP31);

- *Private Views:* The viewing context also includes a relatively small private viewing audience, comprising views from rural residential and lifestyle dwellings as well as from the commercial and agricultural businesses located to the south of the Project Corridor. Specifically:
  - Views from the residential properties within the designation that immediately front on to Project corridor along Access Road and Tawa Road (Refer Appendix 2 Site Photo SP39, SP32)
  - Occupants of nearby commercial buildings adjacent the proposed corridor. (Refer Appendix 2 Site Photo SP38 and SP37).

Views are well contained within the immediate surrounding area of the Project corridor by existing urban development to the north east of the site and existing rural vegetation within the FUZ and rural zoned land.

Within the FUZ to the north of the Project Corridor audiences likely to grow to include residents of future urban developments, over time. Rural zoned areas within the Project corridor are expected to continue to be characterised as they are currently.

10.4 Landscape Values

There are no regionally or nationally significant landscapes (ONLs, ONFs or ONCs) within or proximate to the proposed designation boundary.

The gently sloping topography and the mature stands of vegetation and braided stream and wetland network contribute to the visual amenity of the landscape. The largely modified landscape has limited natural features, which are restricted to individual stands of native vegetation and riparian vegetation within watercourses.

10.5 Landscape Sensitivity

This corridor is situated within a broader landscape that is both rural and contains areas that have been assessed within the AUP:OP as being suitable for urbanisation. The proposed FUZ area to the north is indicated by the Spatial Land Use Strategy as primarily being developed for business and commercial uses. Rural zoned land which will maintain rural has medium to low sensitivity to the type of change proposed by the project. The Project area within the FUZ is assessed as having a low sensitivity to landscape change.

10.6 Assessment of Landscape Effects

10.6.1 Positive Effects

Generalised positive effects related to the Project are covered in Section 5 of this report. Additional positive effects related specifically to this Project include:

- The opportunity to improve the stream and riparian environment of a branch of the Kumeū River within proximity to the upgraded Access Road bridge.
- There is the potential to provide a legible and integrated RUB through the design of the road corridor. By creating a threshold and a sense of transition between the two sides of the road corridor the design can maintain amenity for audiences and integrate with the existing landscape character.

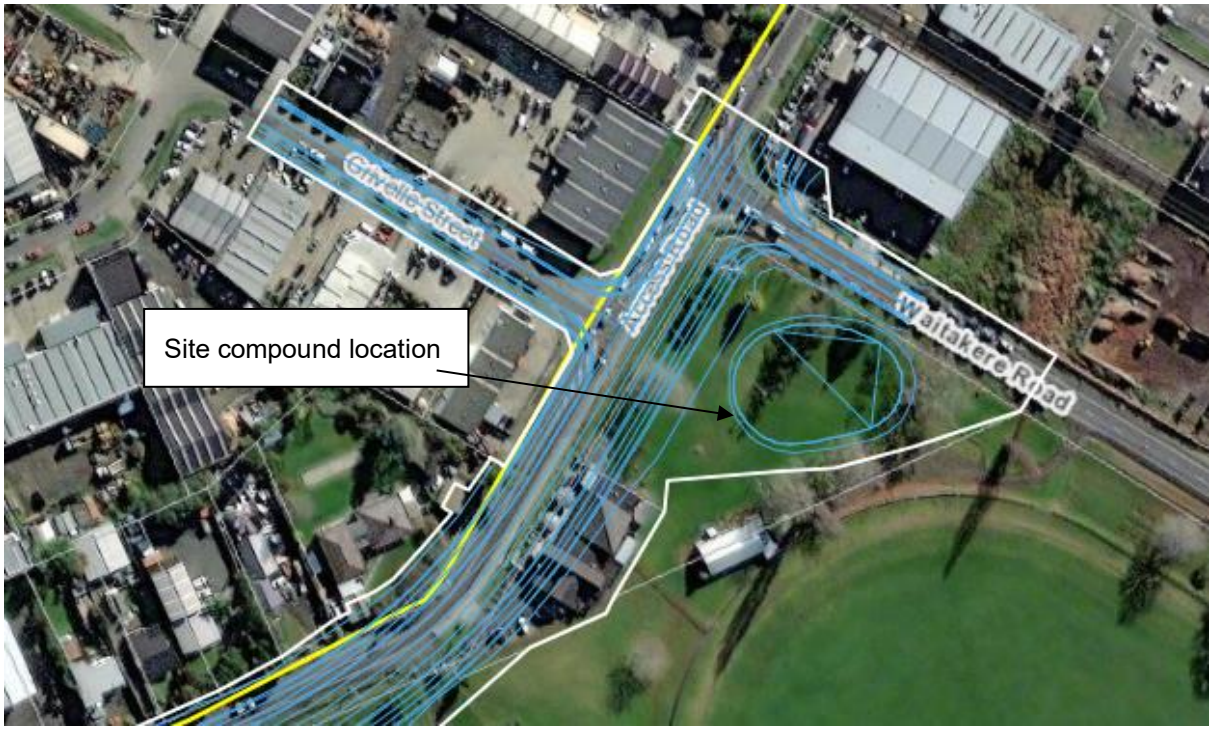
10.6.2 Assessment of Construction Effects

Construction Areas

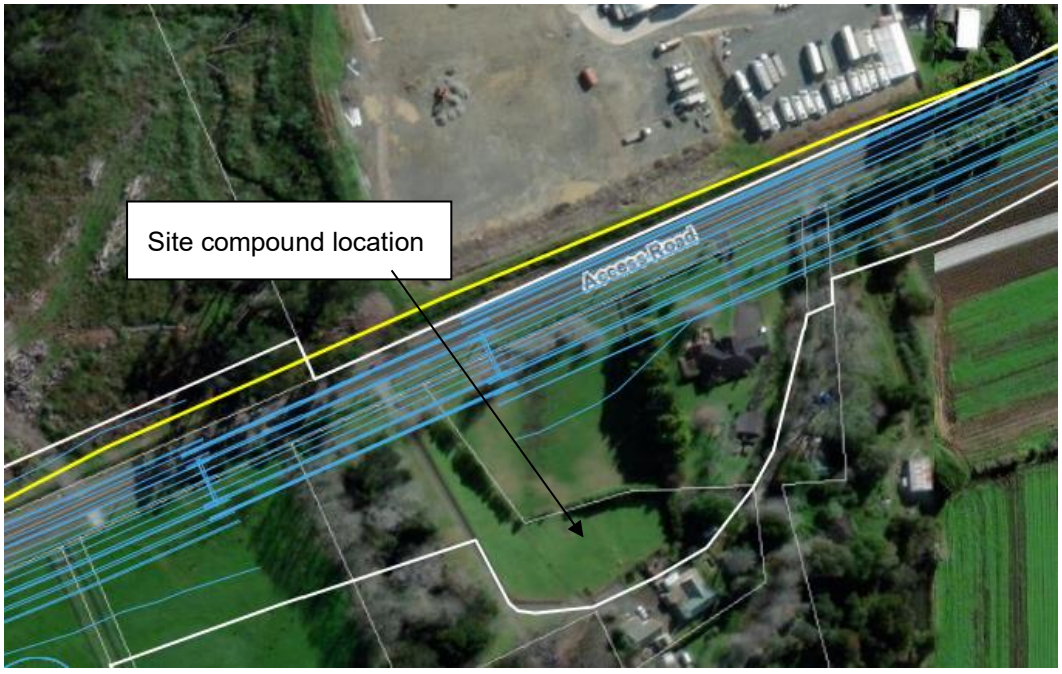
Site compound and construction areas are to be established at three locations within the Project area. Construction traffic will be heightened at these locations through the construction period of the Project.

Site compound, stockpile, sediment retention pond are located at:

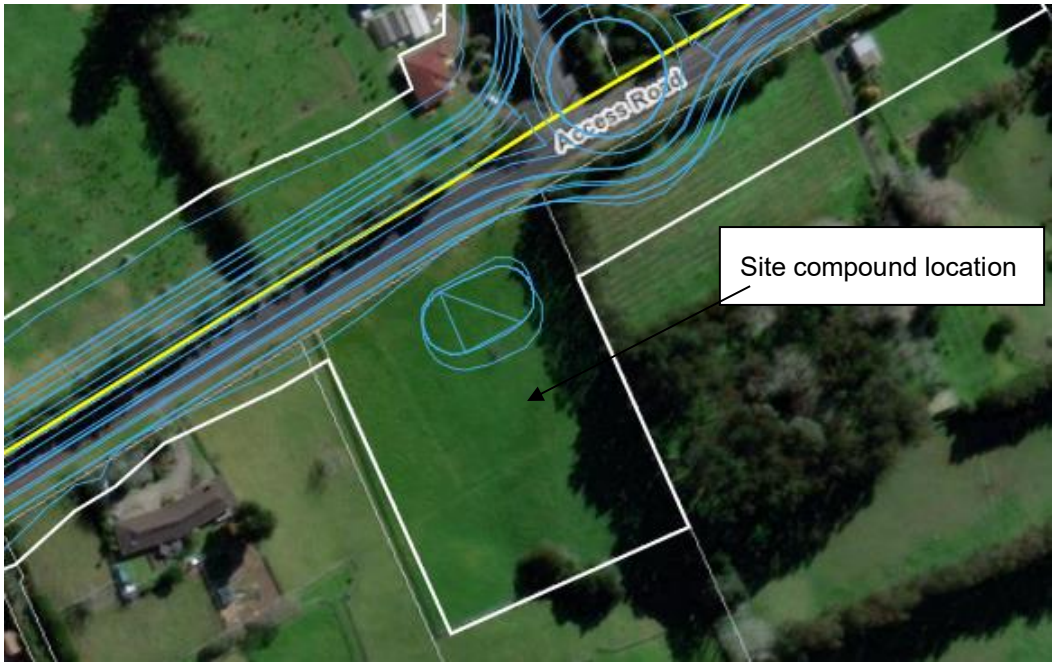
- Plot 10 adjacent to 21 Access Road



- 123 Access Road



- 7 Tawa Road



Overall, the adverse physical landscape effects resulting from establishment and use of the indicative site compound and construction work areas within the Project area is assessed to be **low** adverse in rural areas and **very low** adverse in proximity to existing urban areas. These are anticipated to have relatively similar levels or effects with or without mitigation.

Vegetation Clearance

Although vegetation clearance is a permitted activity under the AUP, this does not diminish that there will be a material change that will result in landscape effects.

Linear stretches of vegetation that border the existing road corridor, within private residential properties, streetscape amenity around commercial and industrial properties and vegetation that delineate field boundaries will be removed to accommodate the construction and operation of the Project corridor. This vegetation consists of a mixture of indigenous and non-native vegetation including shelterbelts that are archetypal within the wider modified rural landscape. Exotic pasture, trees, shelterbelt plantings, private gardens and exotic stands of trees make up the majority of vegetation to be removed. Riparian vegetation within watercourses and wetlands will be removed to accommodate the replacement bridge. The riparian vegetation is a mixture of native and non-native vegetation within Kumeū River branch (Refer Figure 10-4 below). These works are subject to a separate regional consent process, however their potential effects on the landscape and natural character have been included within this assessment and the selection of the designation.

Figure 10-4: Existing vegetation to the south of the existing Access Road bridge.

Vegetation proposed to be removed in the urban context of the Project corridor will typically comprise exotic streets trees, amenity vegetation and amenity vegetation surrounding commercial and industrial development.

Without the implementation of mitigation measures the adverse physical landscape effects likely to arise from vegetation clearance within the rural Project area is assessed as between **low-moderate** to **low**. Vegetation removal in the urban Project area is assessed as being **low** adverse in urban and FUZ areas and **low** adverse in rural areas.

Overall, with the inclusion of mitigation measures the adverse physical landscape effects likely to arise from vegetation clearance within the rural Project area is assessed as **low**. Vegetation removal in the urban Project area is assessed as being **very low** adverse in urban and FUZ areas and **low** adverse in rural areas.

Structures and Earthworks

The Project corridor design requires a new bridge to replace the existing bridge that crosses a branch of the Kumeū River. This will result in a wider larger structure within the landscape, however this will be in the context of urbanised land to the north. A temporary overbridge road diversion is proposed to the south of existing road and will extend into the rural landscape.

The project anticipates that there is the potential for retaining walls at approximately six locations, these are proposed to prevent or reduce earthworks from incurring into land adjacent to the project corridor. The height of these retaining walls will be a maximum of 15m in height and are placed in proximity to retained rural residences and urban commercial buildings.

The proposed Project corridor will require fill material to be imported to fulfil a deficit in the earthworks balance across the entirety of the scheme. Overall, the proposed design requires additional fill in order to widen the project corridor and to ramp up the landform at the bridge crossing approach. Although bridges and earthworks are largely matters for regional consents, these will be addressed in future regional consenting process.`

The impacts and potential landscape effects of the proposed earthworks include the modification of and permanent changes to the underlying landform to widen the existing transportation corridor into a greenfield landscape to the south, provide a new bridge; surface level changes in close proximity to private properties; and earthworks in proximity to a watercourse. The proposed cut and fill slopes range in scale from 1m to 23m wide and will alter the form of the existing rural and urban land forms.

It is recommended that a condition on the designation is included that promotes the re-use of topsoil from pastoral land impacted by the proposed earthworks[23] and the integration of proposed slopes into the surrounding landscape.

Overall, the earthworks are considered to be of a quantity that is reasonably anticipated with a project of this scope and scale and all cut and fill slopes are expected to be integrated within the existing modified environment.

Without the inclusion of proposed mitigation it is anticipated that landscape effects will be **low-moderate** adverse to **low** adverse. Provided that the proposed mitigation measures are undertaken we expect that the adverse effects of the earthworks and bridge structure will be **low**.

Wetlands, Dry Ponds and features

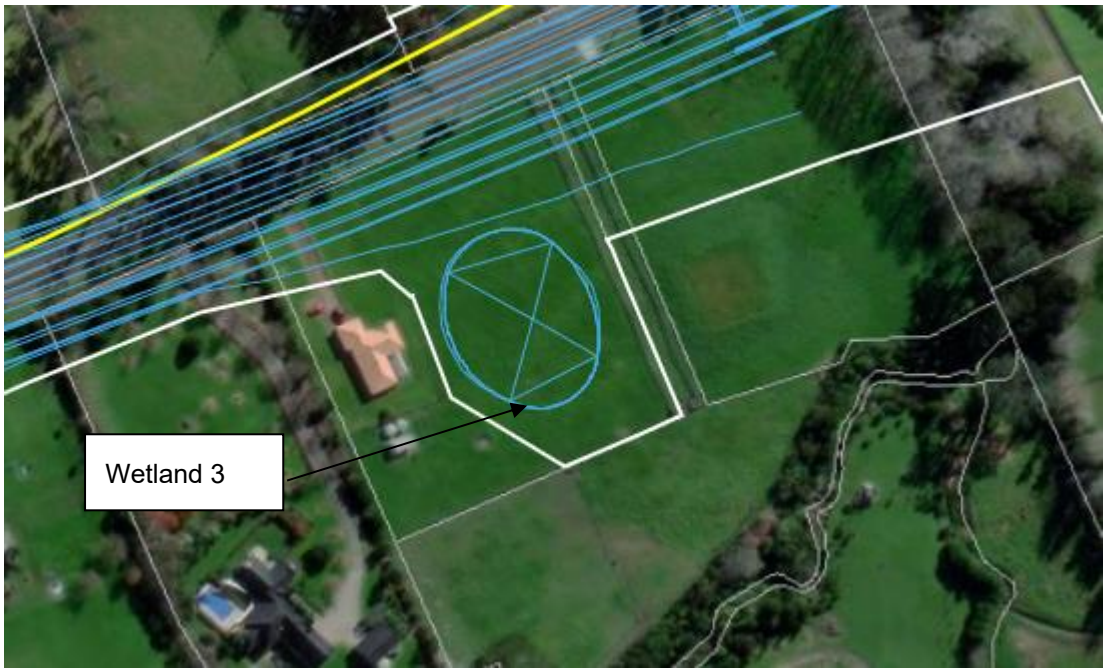
Across the Project corridor four wetland ponds are proposed;

- Wetland 1 is located to the south of the project corridor within the boundary of 83 Tawa Road;

[23] Refer to NZTA Landscape Guidelines (September 2014), Section 4.12 Topsoil for additional information regarding best practice guidelines for topsoil management and soil stripping.

- Wetland 2 is located to the south of the project corridor within the boundary of 7 Tawa Road;

- Wetland 3 is located to the south of the Project corridor at approximately 120m form a branch of the Kumeū River and set within the boundary of 161 Access Road;



- Wetland 4 is located to the north of the Project corridor within the boundary of Plot 10 adjacent to 21 Access Road

The proposed wetlands will require earthworks to re-shape the land and achieve optimal depths and edge profiles, which will be determined as part of the resource consent phase. Wetlands will all be constructed within greenfield sites in rural zoned land.

On that basis, we consider adverse effects on the physical landscape to implement the proposed wetlands to be **low**, it is anticipated that the effects level will be approximately the same at the with or without mitigation.

Private Properties

Residential properties within and adjacent to the Project area (either partially or fully designated) will be impacted by the Project in the following ways:

- Surface level changes between private property boundaries and the upgraded road corridor, requiring existing driveways and private accessways to be regraded;
- Construction of retaining walls;
- Encroachment into private yard areas and the removal of private garden plantings and trees, ancillary buildings and boundary fences;
- Potential impacts related to the construction of noise mitigation measures;
- Visual effects related to night works including light spill and sky glow; and
- Demolition of existing dwellings and ancillary buildings (required properties)

Approximately 18 retained dwellings are proposed to be impacted by the project works. Landscape mitigation measures are proposed under 10.6.3 Recommended Measures to Avoid, Remedy or Mitigate Construction Effects below.

Without the mitigation measures it is anticipated that effects on the physical landscape on retained private properties will be predominantly **low-moderate** adverse through the construction phase of works.

With the implementation of mitigation measures, it is assessed that the adverse effects on the physical landscape on retained private properties will be between **low-moderate** and **low** adverse through the construction phase of works.

10.6.2.1 Site Finishing Works

Finishing works are expected to include grassing of exposed earth, lighting, signage, line markings, footpath / cycleway details and reinstatement of private property fences and gardens. Streetscape elements and landscaping, including that required as mitigation will also be implemented. These activities are to be determined by detailed design and will occur within the already modified areas of the Project. Landscape effects are expected to be **low** through this final phase of the construction process with or without the implementation of mitigation measures.

10.6.2.2 Temporary Visual Effects

The construction of the Project is anticipated to be in two stages along the proposed corridor over an estimated period of two to three years. Visual effects are anticipated to occur progressively through the Project area and transient viewing audiences may concurrently experience adverse visual effects from multiple stages through the construction period.

The consideration of visual effects through the construction phase acknowledges the full range of activities (and their resultant visual impact), required to implement the widened road corridor.

It is anticipated that construction activities required to implement the Project will introduce a concentrated area of construction activity into the existing road corridor in the urban and rural landscape. Within the FUZ the proposed construction phase will be consistent with the construction activities expected to be associated with the urbanisation of the rural landscape. Another important consideration is that landscape change by way of vegetation removal and land modification (on private rural property), albeit at a lesser scale, forms part of the expected backdrop of the existing environment.

Notwithstanding the above, some vantage points within the Project area are likely to witness heightened adverse visual effects through the construction phase due to the magnitude of vegetation removal and / or earthworks proposed. These areas are outlined below:

- Private properties where physical landscape effects will occur within their lots.
- Effects on properties at 83 and 79 Tawa Road due to the proximity to Wetland 3, site compound at CH000 and the main route corridor;
- Properties at 21 and 17 in proximity to the nearby site compound and Wetland 2;
- A property at 233 Access Road in proximity to the relocated access driveway.
- Private properties at 165, 161, 127A, 127B Access Road and 32 Farrand Road in proximity to Wetland 3, the nearby site compound and the proposed replacement bridge.

The nature and significance of the potential adverse visual effects is considered to be moderated through the Project area by the following aspects:

- Road works and construction activities can generally be expected to occur where temporary roads, wetlands and construction compounds within the proximity of the existing road network;

- Access Road already being an existing element within the visual composition of the Project area;
- The existing road corridor landscape has already been modified by previous works required to shape the existing road corridor.
- The construction works are estimated to last approximately 2-3 years and is anticipated to be staged/managed in two phases which are expected to allow efficient access to the construction zones while maintaining continued access for the intersecting roads and existing private and commercial driveways.

It is anticipated that without the implementation of mitigation measures adverse visual effects for the transient public viewing audience are anticipated to be **low-moderate** to **low** through the construction phase

Overall, with the implementation of mitigation measures, adverse visual effects for the transient public viewing audience are anticipated to be **low-moderate** to **very low** through the construction phase, taking into account those vantage points listed above where adverse effects are likely to be heightened during the temporary construction period.

Adverse visual effects during the construction phase are likely to be heightened for private viewing audiences directly adjacent to the Project area on the basis of more direct and prolonged engagement with the construction activities of the Project. This will include the presence of heavy machinery and the visible disturbance of both the road corridor and also individual private interfaces with the road.

It is anticipated that without the implementation of mitigation measures adverse visual effects will be between **low-moderate** to **low**, during the construction phase.

With the implementation of mitigation measure adverse visual effects are anticipated to range between **low-moderate** to **very low** during the construction phase for private viewing audiences, depending on their location, proximity to the works and outlook.

10.6.3 Recommended Measures to Avoid, Remedy or Mitigate Construction Effects

Recommendations are in line with the general recommendations in Section 6.1.2.

10.6.4 Assessment of Operational Effects

10.6.4.1 Natural Character Effects

Natural character forming elements are typically wetlands, rivers and perennial watercourses that traverse the existing modified rural and urban landscapes. Indigenous riparian vegetation within wetlands and waterways are limited to the existing bridge Kumeū River branch. This contains a mixture of native and non-native vegetation, however around the vicinity of the proposed bridge crossing the vegetation is predominantly non-native and invasive species. As a result of the low value vegetation and the modification that has already been undertaken at the bridge crossings. We consider that the natural character value of these element, features and processes are low.

Clearance of some indigenous riparian vegetation and habitat will be required to facilitate the widening of the bridge crossing of the Kumeū River branch. The use of a bridge will minimise the impact on the natural flow of water and to enable the riparian habitat to continue underneath the bridge after completion. It is recommended that during detailed design process a planting plan and vegetation protection plan is recommended as part of the ULDMP, which will be developed as part of

the detailed design of the Project. This will ensure that natural character values of the watercourses and wetlands are enhanced as an outcome of the Project.

On the basis of the above (allowing for future landscape mitigation), natural character effects are likely result in a **very low** positive**,** where the river flow is retained and the existing low quality vegetation is replaced by native riparian vegetation. Without the implementation of mitigation measures it is anticipated that natural character effects will be **low** adverse.

10.6.4.2Visual Amenity Effects

Overall, there are likely to be a range of visual amenity effects on public and private viewing audiences relative to proximity to the corridor in the urban and rural landscapes. Rural properties set back from the Project area to the south will experience a reduced incremental increase in effects in the context of the existing transportation corridor. Urban properties that set back from the Project area experience interrupted views of works, reducing the level of effects experienced.

There are no residential urban private properties that interface directly with the Project corridor, properties to the northern end of the project corridor are all commercial and light industrial properties. These audiences have a lower level of sensitivity than residential audiences. Retained private residential properties within the rural landscape will generally experience a heightened change in the view as a result of the widening of the road resulting in the corridor moving closer to the audiences. The impacts perceived will be reduced for properties which are set further back from the existing road corridors or have rural properties which have views that are filtered or screened.

It is recommended that boundary fences and garden plantings (removed through the Project works) be reinstated on completion of the works affecting the property. These mitigation measures should be considered within the ULDMP under the lens of neighbourhood character and as such are discussed further in the following section.

FUZ land to the north of the Project corridor will be urbanised with the Spatial Land Use Strategy indicating that the northside will be developed for business -light industrial and residential. Visual effects are anticipated to be reduced for this viewing audience, based on improved visual amenity for users associated with streetscape improvements, maturing street trees, berm planting and accessibility to active modes of transport.

Public viewing audiences within proximity to the Project are primarily transient road users along Access Road, Tawa Road and Station Road, have a reduced level of sensitivity to change. Station Road users will have views that are perpendicular to the project corridor. It is recognised that there is the potential for new roads to adjoint the site from the FUZ, however it is not expected that effects on these audiences will be more pronounced than the identified roads.

Overall, some visual effects are anticipated to be mitigated by measures implemented during the finishing phase of the construction period (within the road corridor and private property boundaries), that will mature through the operational phase of the Project.

These will reduce some of the long-term residual visual effects of the Project. In an urban setting the approximately 30m four road lane and active mode corridor will be seen within the context of the existing Access Road and Tawa Road. The presence of the existing transportation corridors within the locality of the Project will result in the proposal appearing less at odds with the surrounding landscape. The proposed project corridor will be a noticeably altered feature within the landscape particularly the introduction of highway lighting. The road corridor will be less apparent from the FUZ

where built form urbanised road networks are street lighting and vegetation will be present in the context.

It is anticipated that without the inclusion of mitigation measures visual effects within the Project area are likely to be **low to very low** adverse for transient viewers within the FUZ landscape and **low** for static audiences through the operational phase of the Project. For private viewing audiences, adverse visual effects are likely to range from **low-moderate** for rural audiences and **low** for audiences within the FUZ. Commercial and industrial audiences within the existing urban area of Kumeū are expected to experience **very low** adverse effects during operation.

With the implementation of mitigation measures, adverse visual effects within the Project area are likely to be **very low** for transient viewers within the FUZ landscape and **low** for static audiences through the operational phase of the Project. For private viewing audiences, adverse visual effects are likely to range from **low-moderate** to **low** for rural audiences and **low** to **very low** for audiences within the FUZ. Commercial and industrial audiences within the existing urban area of Kumeū are expected to experience **very low** adverse effects during operation. In all instances these would reduce over an extended period of time.

10.6.4.3 Landscape Character Effects

The principal elements of the Project will permanently alter the character of the road corridor interface with the rural southern side of the project corridor. The FUZ section to the north of the Project area will experience the proposal within the context of a wider landscape undergoing urbanisation. The rural zoned sections of the Project area are characterised by the lack of streetscape features, informal intermittent vegetation, managed and unmanaged watercourses, shelterbelt and hedgerows along field boundaries and existing rural land uses. The existing rural roadways generally lack urban characteristics such as a kerb and channel roadway, footpaths and street lighting. These features will be introduced into the landscape by the Project including active mode transport lanes, street lighting and a kerb and channel roadway. At the completion of the Project, the upgraded corridor will resemble that of an urban arterial road as a result of the pedestrianisation, active modes of transport, structured street tree planting, integrated stormwater management and engineered roading elements that have an inherently urban aesthetic.

The Project is anticipated to enter the operational phase within the context of increased urbanisation where FUZ land is progressively live-zoned and urbanised. Although it is not possible to anticipate the exact future urban land use pattern, it is expected that business and commercial land uses will primarily populate the FUZ.

Through the existing commercial and industrial urban area the existing character of the landscape will endure. The proposed project is expected to improve the structure and amenity of the road corridor by providing a more structured road layout and consistent landscape pattern. The development of FUZ within the SLUS is less structured and is intended to be at a high level. However, it is identified that the area to the north of the project corridor will be primarily developed for business and commercial use and residential at the southern end of the Project corridor. Based on the above the magnitude and nature of landscape change proposed by the Project we consider to be in alignment with the changes that will likely occur throughout the landscape as it is urbanised over time.

The typical cross sections at Figure 10-1 illustrates the proposed upgrade to the road and the expected future use. Although there will not be space along the entire road corridor for green infrastructure elements such as street trees and berm, there is some existing retained green existing infrastructure to contribute to the overall amenity of the corridor on the southern aspect. A structured planting design will be provided along the Project corridor including on slopes and embankments as

part of the ULDMP, to provide integration of the project into the landscape. It is also recommended that the ULDMP seeks to optimise the design of slopes and embankments to have a more naturalised appearance and integrate with the surrounding rural landscape. These features and design details are expected to improve landscape and urban amenity of the Project corridor.

It is assessed that planting and design interventions within the ULDMP, in conjunction with stormwater management and reinstatement planting, will reduce effects on landscape character associated with broad vegetation clearance Project area within the rural environment.

It is assessed that in the context of the FUZ and with planting and design interventions provided in a ULDMP, effects on landscape character and likely result in a **very low** adverse landscape character effects. Within the context of the rural landscape to the south the effects on the landscape character are expected to be in line with the proposed urban interface. We consider that effects on the landscape character are likely to be **low** adverse. Without the implementation of mitigation, it is anticipated that landscape character effects have the potential to be **low-moderate** adverse.

10.6.5 Recommended Measures to Avoid, Remedy or Mitigate Operational Effects

Recommendations are in line with the general recommendations in Section 6.1.3.

In addition to these measures the following project specific interventions are suggested:

- Protect the natural character and processes of the Kumeū River, and its branches, particularly where the river branch crosses SH16 Main Road and the project corridor crosses the existing pond. This will be covered within the regional consent process.

10.7 Conclusions

Without the implementation of mitigation measures it is anticipated that landscape and visual effects could range from **low-moderate** adverse to **low** adverse for the construction phase and **low-moderate** adverse to **low** adverse for the operational phase (low-moderate to low in retained rural areas and low in urban areas).

Overall adverse landscape and visual effects (with mitigation) range from **low-moderate** to **very low** for the construction phase (moderate to low in retained rural areas and low to very low in urban areas) and **low-moderate** to **very low** for the operational phase (low-moderate to very low in retained rural areas and low to very low in urban areas). The adverse effects can be mitigated and reduced over time in relation to the FUZ areas which will experience urbanisation of the surrounding landscape.

The FUZ landscape context has a lower level of sensitivity to change due to the anticipated developing urban form of the landscape associated with future urbanisation. Natural character effects are expected to be **very low** positive, however without the implementation of mitigation measures there is the potential for **low** adverse effects.

Provided that the existing flow of the watercourse is retained and the surrounding non-native and invasive species are removed and replaced with native riparian vegetation. Although, the rural areas of the landscape are more sensitive to the widening of the road corridor, integration works proposed by the ULDMP will assist with the integration of the slopes and embankments into the landscape through earth shaping and mitigation planting.

11 Overall Conclusions

NoR S1 Alternative State Highway (ASH), including Brigham Creek Interchange (BCI)

Overall landscape and visual effects without mitigation range from **high** adverse to **low** adverse for the construction phase and **high moderate** adverse to **low** adverse for the operational phase. With the anticipation of mitigation measures being implement landscape and visual effects are anticipated to range from **moderate-high to very** for the construction phase and **low-moderate** to **very low** for the operational phase.

Overall, the adverse effects can be mitigated and reduced over time in relation to the FUZ areas which will experience urbanisation of the surrounding landscape. The FUZ landscape context has a lower level of sensitivity to change due to the anticipated developing urban form of the landscape associated with future urbanisation. The rural areas of the landscape are more sensitive to the introduction of the road corridor, however optimizing landscape integration, through the ULDMP, which will assist with the integration of the slopes and embankments into the landscape through earth shaping and mitigation planting. Heightened adverse visual effects on retained rural properties can be reduced during the construction phase, however adverse effects will be unavoidable in some instances.

NoR S2 SH16 Main Road Upgrade

Without the implementation of mitigation measures, overall landscape and visual effects are anticipated to range from **moderate** adverse to **low** adverse for the construction phase and **moderate** adverse to **low** adverse for the operational phase.

With the implementation of a mitigation measures landscape and visual effects are anticipated to range from **moderate** to **low** adverse for the construction phase and **low-moderate** to **very low** adverse for the operational phase. Overall, the adverse effects can be mitigated and reduced over time in relation to the FUZ areas which will experience urbanisation of the surrounding landscape. The FUZ landscape context has a lower level of sensitivity to change due to the anticipated developing urban form of the landscape associated with future urbanisation.

The existing urban core of Kumeū and Huapai also have a reduced sensitivity to change will be experience landscape and visual effects during construction resulting in a **low-moderate** level of effects. However, after the project corridor is completed, the effects will be **very low**. The rural areas of the landscape are more sensitive to the widening of the road corridor however, integration works proposed by the ULDMP will assist with the integration of the slopes and embankments into the landscape through earth shaping and mitigation planting.

NoR S3 Rapid Transit Corridor (RTC), including the Regional Active Mode Corridor (RAMC)

It is anticipated that without the inclusion of mitigation measures adverse landscape and visual effects (with mitigation) range from **low** to **moderate** for the construction phase (**moderate** to **low** in rural areas and **moderate** to **low** in urban areas) and **very low** to **low-moderate** for the operational phase (in both rural and urban areas). Within the existing urban cores of Kumeū and Huapai it is anticipated that landscape and visual effects experienced during construction resulting in a **low-moderate** to **low** level of effects, after the project corridor is completed the effects will be **low** adverse.

Provided that mitigation measures are adverse landscape and visual effects (with mitigation) range from **very low** to **moderate** for the construction phase (**moderate** to **low** in rural areas and **low-moderate** to **very low** in urban areas) and **very low** to **low-moderate** for the operational phase (in

both rural and urban areas). Overall, the adverse effects can be mitigated and reduced over time in relation to the FUZ areas which will experience urbanisation of the surrounding landscape. The FUZ landscape context has a lower level of sensitivity to change due to the anticipated developing urban form of the landscape associated with future urbanisation. Natural character effects are expected to range from low-moderate to low, providing the higher sensitivity natural character areas with bridges.

The existing urban core of Kumeū and Huapai also have a reduced sensitivity to change and are anticipated to experience landscape and visual effects during construction resulting in a **low** level of effects. However, after the project corridor is completed the effects will be **very low** adverse. The rural areas of the landscape are more sensitive to the introduction of the road corridor however, integration works proposed by the ULDMP will assist with the integration of the slopes and embankments into the landscape through earth shaping and mitigation planting

NoR KS Kumeu Rapid Transit Station

It is anticipated that without the inclusion of mitigation measures adverse landscape and visual effects landscape and visual effects range from **low-moderate** to **low** adverse for the construction phase and **low** adverse for the operational phase

Overall landscape and visual effects (with mitigation) range from **low** to **very low** adverse for the construction phase and **low** adverse to **very low** positive for the operational phase. Overall, the adverse effects can be mitigated and reduced over time in relation to the regeneration in the existing urban surrounds and the changes to the landscape character are expected to have a positive effect. The existing urban landscape context has a lower level of sensitivity to change due to the existing already disturbed area and anticipated further development of the landscape associated with regeneration. Natural character effects on the Kumeū River are expected to be **low**, provided that the direct impacts on the existing pond minimised.

The existing urban core of Kumeū also has a reduced sensitivity to change will be experience landscape and visual effects during construction resulting in a **low-moderate** to **low** level of effects. However, after the project corridor is completed the effects will be **low** positive. The proposed integration with the surrounding landscape and streetscape advised in the ULDMP will assist with the establishing the station within the developing urban landscape. Within the urban core the level of effects are anticipated to be the same with or without mitigation.

NoR HS Huapai Rapid Transit Station

It is anticipated that without the inclusion of mitigation measures adverse landscape and visual effects landscape and visual effects will range from **moderate** to **low** adverse for the construction phase and **low-moderate** to **very low** adverse for the operational phase

Overall adverse landscape and visual effects (with mitigation) range from **low-moderate** to **very low** for the construction phase of works and **low** to **very low** during the operational phase. Overall, the adverse effects can be mitigated and reduced over time in relation to the urbanisation of the existing rural landscape. The existing urban landscape context has a lower level of sensitivity to change due to the anticipated urbanisation of the landscape. Natural character effects on the Kumeū River branches are expected to be **low** adverse. Provided that the direct impacts on the existing Kumeū River to the east are avoided and the effects on the river branch to the west maintain the flow of the watercourse. The proposed integration with the surrounding landscape and streetscape advised in the ULDMP will assist with the establishing the station within the developing urban landscape.

NoR S4 Access Road Upgrade

Without the implementation of mitigation measures it is anticipated that landscape and visual effects could range from **low-moderate** to **low** for the construction phase and **low-moderate** to **low** for the operational phase (low-moderate to low in retained rural areas and low in urban areas).

Overall adverse landscape and visual effects (with mitigation) range from **low-moderate** to **very low** for the construction phase (moderate to low in retained rural areas and low to very low in urban areas) and **low-moderate** to **very low** for the operational phase (low-moderate to very low in retained rural areas and low to very low in urban areas). The adverse effects can be mitigated and reduced over time in relation to the FUZ areas which will experience urbanisation of the surrounding landscape.

The FUZ landscape context has a lower level of sensitivity to change due to the anticipated developing urban form of the landscape associated with future urbanisation. Natural character effects are expected to be **very low** positive, however without the implementation of mitigation measures there is the potential for **low** adverse effects.

Provided that the existing flow of the watercourse is retained and the surrounding non-native and invasive species are removed and replaced with native riparian vegetation. Although, the rural areas of the landscape are more sensitive to the widening of the road corridor, integration works proposed by the ULDMP will assist with the integration of the slopes and embankments into the landscape through earth shaping and mitigation planting.

Summary of Construction and Operational Effects with Mitigation

NoR #	Temporary Construction Effects		Operation (Permanent Effects)		
	Landscape Effects	**Visual Effects**	**Natural Character Effects**	**Visual Amenity Effects**	**Landscape Character Effects**
NoR S1 Alternative State Highway (ASH)	Moderate to Moderate-High Adverse	Low to Moderate Adverse	Low to Moderate Adverse	Very Low to Low-Moderate Adverse	Low to Low-Moderate Adverse
NoR S2 SH16 Main Road Upgrade	Low-Moderate Adverse	Low to Moderate Adverse	Low to Low-Moderate Adverse	Very Low to Low-Moderate Adverse	Very Low to Low Adverse
NoR S3 Rapid Transit Corridor and Regional Active Mode Corridor	Very Low to Low-Moderate Adverse	Low to Low-Moderate Adverse	Low to Low-Moderate Adverse	Very Low to Low-Moderate Adverse	Low to Low-Moderate Adverse

NoR KS Kumeu Rapid Transit Station	Very Low to Low Adverse	Low to Low-Moderate Adverse	Neutral	Very Low to Low Adverse	Very Low Positive to Low Adverse
NoR HS Huapai Rapid Transit Station	Very Low to Low Adverse	Low to Low-Moderate Adverse	Low	Very Low to Low	Very Low
NoR S4 Access Road Upgrade	Very Low to Low-Moderate Adverse	Ver Low to Low-Moderate Adverse	Very Low	Very Low to Low-Moderate	Very Low to Low Adverse

1 Appendix 1: Landscape Effects Methodology

1.1 Overview

This Landscape Effects Assessment (LEA) has been undertaken with reference to Te Tangi a te Manu, Aotearoa New Zealand Landscape Assessment Guidelines[24]. The same methodology applies to the construction and operational stages of the works and for NoRs (S1, S2, S3, KS, HS and S4). These guidelines have been developed to relate to the Aotearoa New Zealand environmental planning context and align with te ao Māori and te ao Pākehā concepts of landscape.

Landscape impacts result from natural or induced change in the components, character or quality of the landscape. Usually these are the result of landform or vegetation modification or the introduction of new structures, facilities or activities into the landscape.

Natural character impacts are in relation to natural or induced change to any streams, wetlands and their margins as outlined in the NZCPS[25]. These are usually the result of landform, vegetation or hydrological modification or the introduction of structures into the landscape.

Effects arise from change in the values associated with the landscape, not as simply as a result of the change itself. Visual impacts are the result of change to the landscape and are a consequence of that change.

The process of change itself, that is the construction process and / or activities associated with the development, also carry with them their own visual impacts, however, these are distinct from those generated by a completed development.

The landscape and visual effects generated by any particular proposal can, therefore, be perceived as:

- positive (beneficial), contributing to the visual character and quality of the environment.
- negative (adverse), detracting from existing character and quality of environment; or
- neutral (benign), with essentially no effect on existing character or quality of environment.

The degree to which landscape and visual effects are generated by a development depends on a number of factors, these include:

- The degree to which the proposal contrasts, or is consistent, with the qualities of the surrounding landscape.
- The proportion of the proposal that is visible, determined by the observer's position relative to the objects viewed.
- The distance and foreground context within which the proposal is viewed.
- The area or extent of visual catchment from which the proposal is visible.
- The number of viewers, their location and situation (static, or moving) in relation to the view.
- The backdrop and context within which the proposal is viewed.
- The predictable and likely known future character of the locality.
- The quality of the resultant landscape, its aesthetic values and contribution to the wider landscape character to the area.

[24] 'Te Tangi a te Manu: Aotearoa New Zealand Landscape Assessment Guidelines', [Final Draft subject to final editing, graphic design, illustrations, approved by Tuia Pito Ora/NZILA 5 May 2021]

[25] 'New Zealand Coastal Policy Statement' [issued 4 November 2010]. Accessed online 24.11.2021 (https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/coastal-management/nz-coastal-policy-statement-2010.pdf)

Change in a landscape and 'visibility' of a proposal does not of itself, constitute an adverse landscape or visual effect. It is the effect on the values of the landscape, positive, adverse or benign that need to be understood and evaluated.

1.2 Scale of Effects

In determining the magnitude of potential and actual landscape and visual effects of the Project, a consistent 7-point rating scale has been used that is based on the recommendations in the Te Tangi a te Manu, Aotearoa New Zealand Landscape Assessment Guidelines. The effects ratings referred to in this assessment are based upon a seven-point scale which ranges from 'very low' to 'very high' and are described in the table below.

7-point rating scale

Effect Rating	*Use and Definition*
Very High:	Total loss of key elements / features / characteristics, i.e. amounts to a complete change of landscape character and in views.
High:	Major modification or loss of most key elements / features / characteristics, i.e. little of the pre-development landscape character remains and a major change in views. Concise Oxford English Dictionary Definition High: adjective- Great in amount, value, size, or intensity.
Moderate- High:	Modifications of several key elements / features / characteristics of the baseline, i.e. the pre-development landscape character remains evident but materially changed and prominent in views.
Moderate:	Partial loss of or modification to key elements / features / characteristics of the baseline, i.e. new elements may be prominent in views but not necessarily uncharacteristic within the receiving landscape. Concise Oxford English Dictionary Definition Moderate: adjective- average in amount, intensity, quality or degree
Low-Moderate:	Minor loss of or modification to one or more key elements / features / characteristics, i.e. new elements are not prominent within views or uncharacteristic within the receiving landscape.
Low:	Little material loss of or modification to key elements / features / characteristics. i.e. modification or change is not uncharacteristic or prominent in views and absorbed within the receiving landscape. Concise Oxford English Dictionary Definition Low: adjective- 1. Below average in amount, extent, or intensity.

Effect Rating	*Use and Definition*
Very Low:	Negligible loss of or modification to key elements/ features/ characteristics of the baseline, i.e. approximating a 'no change' situation and a negligible change in views.

Mitigation

For effects that are very low or low, mitigation is generally not required. Mitigation may be required for landscape effects of a low-moderate to moderate rating and area likely to be required for effects of a moderate-high to high rating to reduce effects to a lower degree. For effects that are very high, mitigation is unlikely to reduce the level of effect to any discernible degree.

1.3 Methodology Breakdown

The methodology that forms the basis for the assessment is set out below:

- Identification of relevant statutory provisions and non-statutory guidance relating to landscape;
- Analysis and description of existing landscape elements, features and character of the existing 'Baseline Landscape' within the NoRs and surrounding areas;
- Analysis and description of landscape elements, features and character of the likely future environment within the NoRs and surrounding areas;
- Analysis and description of perceptual, sensory and associative qualities within the Project areas, and the identification of the viewing audience and visual catchment;
- Summary of landscape values within the Project areas, including inputs from other specialists such as ecology, stormwater and historic heritage;
- Evaluation of the sensitivity of the landscape within the Project areas to landscape change arising from transport infrastructure upgrades;
- Analysis and description of the development proposal including construction methodology, timeline and discussion of avoidance and mitigation measures already integrated through the design;
- Identification of the principal elements of the Project (effects generators) likely to result in landscape, natural character and visual effects;
- Identification of construction (temporary) vs operational (permanent) effects of the Projects;
- Identification of general and targeted mitigation measures to reduce the magnitude of likely effects;
- Assessment of effects (adverse, neutral and / or positive) on the bio-physical aspects of the landscape resource, landscape character, natural character and visual amenity, taking account of the proposed mitigation measures; and
- Summary of the overall landscape and visual effects of the Projects and an overall determination of the significance of landscape and visual effects.

1.4 Landscape Values

Considering the absence of any scheduled high value landscape areas (ONLs, ONFs. HNCs or ONCs) at a national, regional or district level within or directly adjacent to the Project areas, a

summary is provided of local landscape values within each Project Group. Local values generally considered three broad categories including: biophysical, perceptual and associative values.[26]

1.5 Landscape Sensitivity

The level of sensitivity of the sites and wider rural areas to land use change is influenced by the latest planning direction (AUP:OP and also the Whenuapai Structure Plan) that has placed the sites, local landscape and NoRs into the Future Urban Zone (FUZ) and some live mixed housing urban zoning around Whenuapai local centre.

Notwithstanding the above, the interface between the land and water (riparian margins) is particularly sensitive to landscape change and under Part 2 of the RMA (section 6(a)) and relevant policies of the National Policy Statement for Freshwater 2020 (NPS-FM), the values within these areas of the landscape should generally be protected from inappropriate subdivision, use and development.

Other landscape attributes may also be sensitive to the effects of landscape change such as topographical and landform features, vegetation (scheduled notable trees or patterns of contiguous land cover), existing sensitivity associated with the built environment and views afforded to landmarks and / or landscape features within the contextual landscape. A scheduled notable tree is a tree or group of trees that a community or nation regards as being of special importance. These are listed in the Schedule 10: notable trees schedule in the AUPOIP[27].

1.6 Landscape Effects

Landscape effects derive from changes in the physical landscape, which may give rise to changes in its character and how this is experienced over time. This may in turn affect the perceived value ascribed to the landscape.

Potential landscape effects in this assessment relate to the following landscape attributes:

- Biophysical - Abiotic: Geophysical processes (landform) and drainage patterns.
- Biophysical – Biotic: Vegetation cover, quality and pattern (native and exotic).
- Human attributes: Land uses, active and passive recreation, amenity and built form.

Landscape and visual effects are assessed in two parts as outlined below; firstly, through the construction period of the Projects where the bio-physical and human attributes within the Project area are required to be modified to implement the Project. Landscape and visual effects during the construction phase are generally considered to be temporary and dynamic in nature and may temporarily be heightened by the intervention of heavy machinery, areas of exposed ground and the use of construction service areas. In the second part (the operational phase of the Projects), the overall significance and value of landscape and visual change is explored and ultimately the Project's impact on landscape character, natural character and visual amenity is assessed.

The two categories of effects are outlined as follows:

- **Temporary Effects** (Construction Effects): Describes the anticipated impacts on the bio-physical elements and features of the landscape resource (landform, vegetation and hydrology) resulting

[26] Landscape Guideline: Appendix 1: NZTA Landscape and Visual Assessment Guidelines

[27] AUPOIP Schedule 10: Notable Trees, https://unitaryplan.aucklandcouncil.govt.nz/Images/Auckland%20Unitary%20Plan%20Operative/Chapter%20L%20Schedules/Schedule%2010%20Notable%20Trees%20Schedule.pdf [accessed 5 July 2022]

from the construction of the Project. It also includes visual amenity effects for both public and private viewing audiences from construction works. The construction activities required to implement the Project are categorised under the following broad headings:

  - **Site enabling works** - site establishment, demolition and vegetation clearance;
  - **Project formation works** - bulk earthworks, retaining walls, overhead structures, culvert upgrades, stormwater wetlands construction.

- **Permanent Effects** (Operational Effects): Describes the effects on the landscape of completed works (including integrated landscape mitigation measures), the significance of physical landscape change and ultimately the resulting effects of the Projects on landscape character, natural character and visual amenity for both public and private viewing audiences.
  - **Finishing works** - lighting, signage, road, footpath / cycleway details and line markings, streetscape elements and landscaping (including trees, mitigation planting and riparian / stormwater device / wetland planting).

1.7 Natural Character Effects

Section 6(a) of the RMA identifies as a matter of national importance to recognise / provide for the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers[28] and their margins, and the protection of them from inappropriate subdivision, use, and development.

Assessing existing natural character is primarily concerned with the degree to which natural processes, natural patterns and natural elements have undergone human modification. Hydrological and ecological survey and assessment for the Project area generally underpin the landscape evaluation of existing natural character values.

The natural character assessment for this Project applies to the existing water bodies and wetlands associated with the Totara Creek, Totara Inlet, Ngongetepara Creek, Karure Stream, Kumeū River (and its branches), Pakinui Stream and the Ahukurama Stream.

1.8 Visual Effects

Visual effects relate to the changes that arise in the composition of available views as a result of changes to the landscape, to people's responses to the changes, and to the overall effects with respect to visual amenity. Visual effects are considered for both temporary (construction effects) and permanent (operational effects) of the Projects.

Potential effects considered in this assessment relate to the following visual amenity attributes:

- Visual quality and composition (legibility, coherence, setting, scenic quality)
- Visibility (extent of visibility to the Project area)
- Views (viewing audience and views afforded to, from and within the Project area).

The nature and magnitude of the visual effect can be influenced by a number of factors such as:

- The extent to which the Project areas are visible;

[28] A 'river' is defined in the RMA as a continually or intermittently flowing body of fresh water; and includes a stream and modified watercourse.

- Legibility and whether there are intervening elements in the landscape that restrict views towards the Project area;
- Whether or not aspects of the Project appear 'at odds or integrated' with existing landscape character and composition;
- Distance between the viewer and the Project area;
- The nature of the viewing audience, numbers and extent of the visual catchment.

The proposed Projects are located within an evolving future urban landscape, which in itself will bring about substantial landscape and visual change. Therefore, the visual composition that exists today is likely to change considerably over the course of the next decade.

Based on the above, the visual assessment for the Projects focuses on the potential visual effects arising (through the construction and operation of the Projects) within the proposed NoR areas, and localised landscape. The focus of the assessment is on the nature and significance of effects within the Project areas and how that translates to effects for immediately adjacent land uses (existing and future but acknowledging that the existing land uses will change in the future).

Assessment photography was obtained during the project site visit in July 2020 and September 2022. The outlook from viewpoints that were captured onsite were photographed and assessed in variable weather conditions and at standing eye level. The photographs were taken with a digital SLR camera.

1.9 Limitations

This landscape assessment does not specifically address and respond to Mana whenua values from a design planning perspective. However, Mana whenua knowledge and associative values of the project landscape has been shared through the separate and parallel engagement between the Project team and Mana whenua who have expressed interest in the Projects. There are several crossovers with related specialties including urban design, ecology, arboriculture and historic heritage. This report references the latest data available in respect of these matters at the time of issue.

All site assessments have been undertaken from public land and supported through detailed desktop GIS mapping and aerial photograph information.

1.10 Project Assumptions

The findings of this landscape effects assessment are underpinned by the following assumptions:

- For the FUZ areas, it is likely that construction of the road corridors will occur ahead of, or in parallel to, the urbanisation of these areas. Therefore, the starting assumption is that the roads will be constructed in the existing village and semi-rural environment and operate in an urban environment.
- For those areas that are already urbanised or are planned to be (as per precinct plans in the AUP:OP), construction and operation of the transport corridors will be within an urban environment.
- The Whenuapai Structure Plan can be used to reasonably anticipate the likely future context of the eastern extent of NoR S1.
- The likely future land uses for NoR S2, NoR S3, NoR S4, NoR KS and NoR HS are referenced from the Spatial Land Use Strategy - Kumeū-Huapai, Riverhead, and Redhills North.

- The proposed designation footprint has sufficient space to enable design changes to occur through the detailed design phase of the Project, in order to integrate the road corridor from a visual and urban design perspective with adjoining land uses.

1.11 Statutory Guidance

1.11.1 Notice of Requirement

This assessment has been prepared to support the NoRs for the projects. The process for consideration of a NOR is set out in section 168 of the RMA. This includes consideration of the actual or potential effects (including positive effects) on the environment of allowing the requirement under the Resource Management Act (RMA).

Part 2, Schedule 6, Clause 33(7)(b) in Part 8 of the RMA, in particular ss 168, 171 and 176 of the RMA. The designation once confirmed authorises the activities relating to the Project or work enabled by the designation that would otherwise require a resource consent for land use activities pursuant to section 9(3) of the RMA. This assessment therefore focuses on the landscape and visual effects of the land use activities that will be authorised by the proposed designations for the Project. Landscape and visual effects arising from activities that require future regional consents will be assessed as part of a future consent process.

1.11.2 Precincts and Subdivisions

A number of Precinct overlays exist that are relevant to the Strategic Package, largely within the Kumeū-Huapai area. These are outlined below and shown in Figure 1-1 below:

- **I516 Kumeū Precinct**: the purpose of the Precinct is to enable the establishment of a town centre to serve the Kumeū and Huapai area with a strong commercial core and associated residential and recreational areas.
- **I517 Kumeū Showgrounds Precinct:** Provides specifically for the activities undertaken by the Kumeū District Agricultural and Horticultural Society at the showgrounds.
- **Special Housing Area - Huapai:2 Precinct:** Provides for the comprehensive and integrated development for residential purposes.
- **Special Housing Area - Huapai Triangle Precinct:** which allows for urban expansion to support Huapai and Kumeū's role as a compact centre.

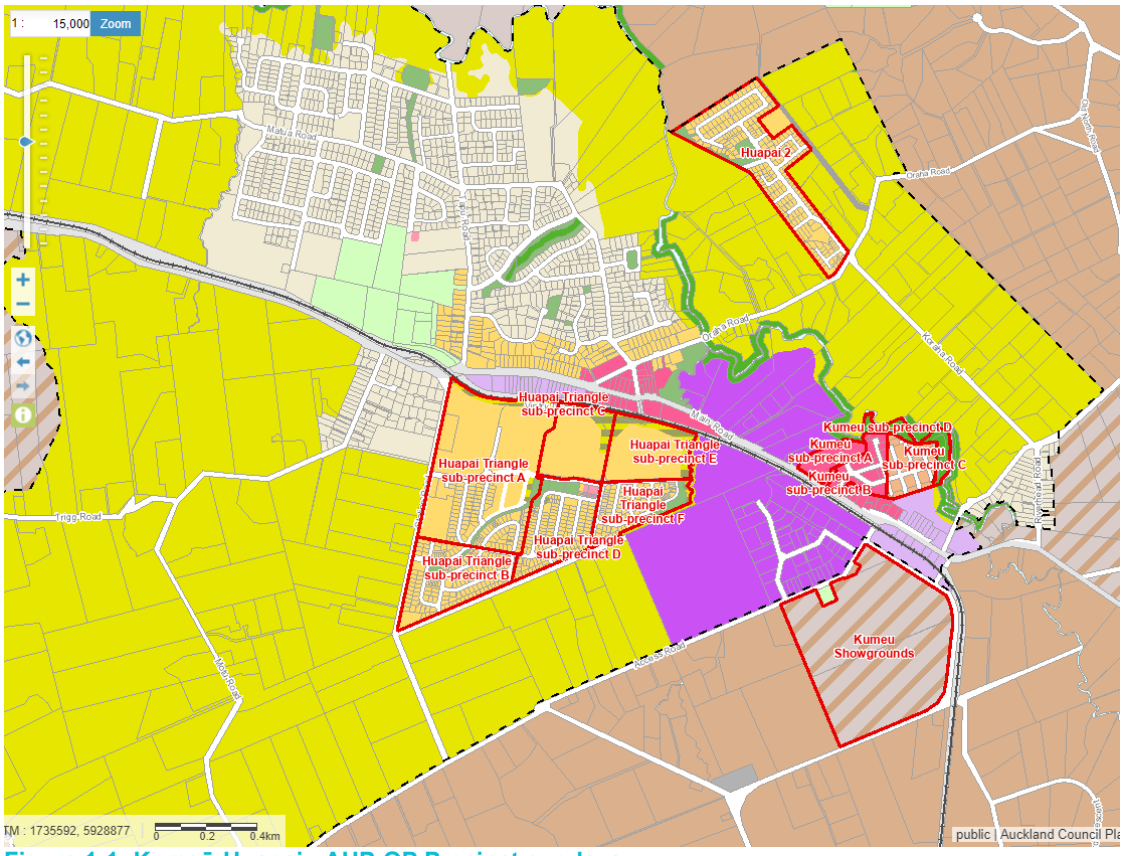


Figure 1-1: Kumeū-Huapai - AUP:OP Precinct overlays

1.12 Non-Statutory Guidance

The Kumeū-Huapai / Riverhead area has not been structure planned. Land release for the Kumeū-Huapai / Riverhead area is identified in the FULSS to occur between 2028 and 2032. Council's current view is that structure planning must occur prior to the release of land currently zoned FUZ. This is indicatively programmed for Kumeū-Huapai / Riverhead in 2025.

The project team has working closely with Auckland Council to support land use integration for the Kumeū-Huapai / Riverhead area.

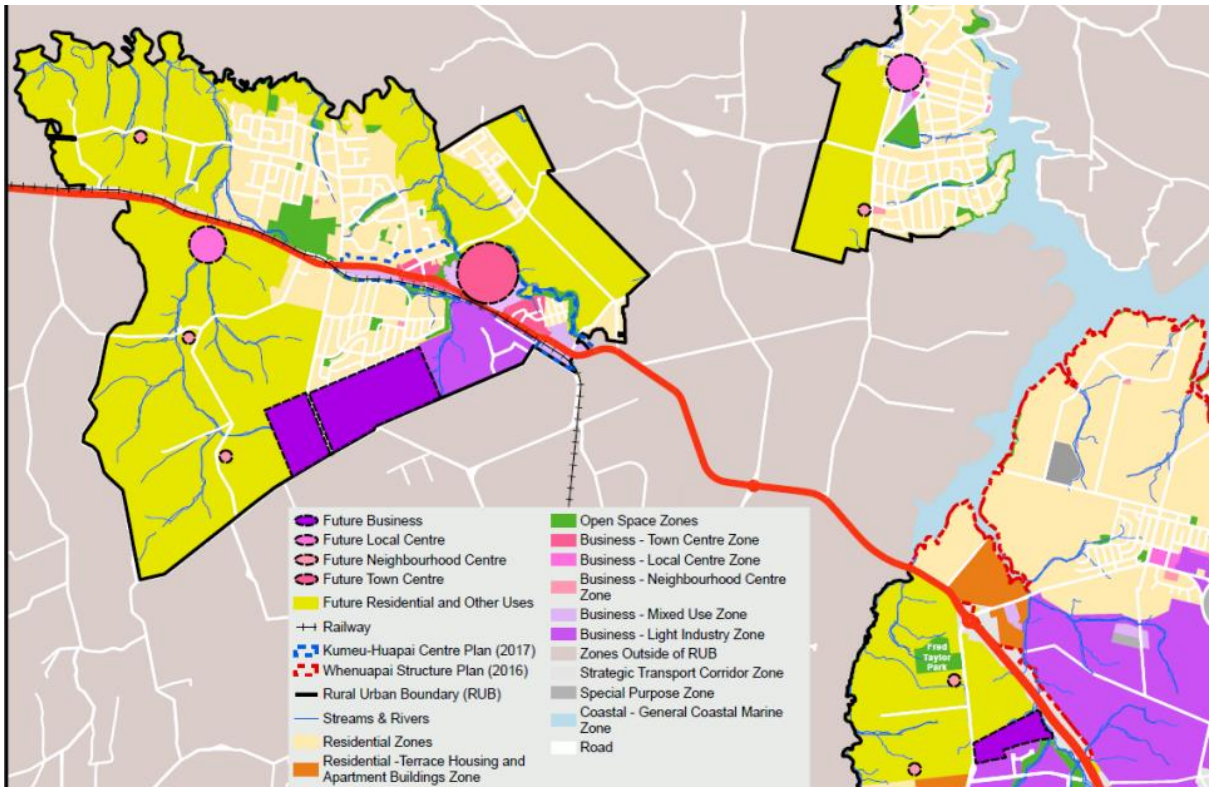


Figure 1-2: Spatial Land Use Strategy - Kumeū-Huapai, Riverhead, and Redhills North.

Note: The Spatial Land Use Strategy is not a detailed structure plan and is only intended to be a high-level outline of the future land uses in the Future Urban zone.

1.12.1 Whenuapai Structure Plan September 2016

Only the eastern extents of the NoR S1 Alternative State Highway (**ASH**), including Brigham Creek Interchange (**BCI**) Project will be within the Whenuapai Structure Plan area. The project area is anticipated to impact High Density residential and Mixed Use zoned areas in the Whenuapai Structure Plan, either side of Brigham Creek Road.

The stated vision for Whenuapai:

> *"Whenuapai is a liveable, compact and accessible place with a mix of high quality residential and employment opportunities. It makes the most of its extensive coastline, is well connected to the wider Auckland Region, and respects the cultural and heritage values integral to its distinctive character."*

Seven key objectives are identified, the sixth and seventh relate broadly to landscape as follows:

#6. Enhance the natural environment and protect natural heritage

- freshwater quality throughout the catchment is enhanced over time
- scheduled natural heritage is protected
- the overall biodiversity of the area is improved over time

- environmental constraints, such as coastal erosion and contaminated land, are adequately managed
- sedimentation of the Upper Waitematā Harbour is carefully managed through subdivision and development processes.

#7. The provision of quality open spaces

- a network of high-quality open spaces and recreation areas meet the needs of the growing Whenuapai community
- there are ample opportunities for cycling, sport, passive recreation and social interaction
- stream networks are utilised as recreational routes and connections between open spaces and the coast where practicable
- public access to, and along, the coast is enhanced where practicable.

And two further key outcome that broadly relate to landscape:

- "*2. Quality- built environment*" - the street network enhances Whenuapai's sense of place by favouring pedestrians, cyclists and public transport modes.
- "*3. A well connected Whenuapai*" - dedicated cycle and pedestrian footpaths provide safe, connected and high amenity linkages between areas of activity at a local scale.

Landscape does not feature strongly in the vision and / or the key outcomes for the Whenuapai Structure Plan with 8.2.4 Open Space and Recreation, providing the greatest specific direction. The "indicative esplanade" connections and provisions of Neighbourhood Parks, Sports Parks and Suburb Parks throughout the structure plan area are however referenced.

Land Use

Future development of land within the structure plan area will have a significant shift from rural land use to urban land use. Within the western portion of plan area within the footprint of NoR S1 includes high density residential; Mixed Use – business zones. This is expected to result in a significant shift from rural to urban land use which means that the existing landscape character and visual amenity surrounding the proposed designations is likely to experience substantial change over the next 10-30 years.

Whenuapai Structure Plan Natural Character, Landscape and Visual Assessment

A Natural Character, Landscape and Visual Assessment[29] was undertaken during the production of the structure plan to identify any potential landscape effects that may result from future land use activities. The landscape assessment identifies that while there are no areas of high natural character or landscape, the structure plan area retains relatively high levels of amenity because of its largely open rural nature, mature trees, and proximity to the Upper Waitematā Harbour.

The assessment acknowledges that there will be a level of adverse effects on the landscape as a result of changing land uses, but that this also presents opportunities to enhance some landscape outcomes. The assessment makes the following recommendations to mitigate likely adverse effects:

- maintain and enhance areas of high visual amenity, especially around the northern part of the structure plan area with appropriate built form, open space and plantings
- restore and enhance biodiversity through planting, and weed and pest control
- connect habitats along coastal and stream networks

[29] 7.9 Natural character, landscape and visual of the Whenuapai Structure Plan.

- improve the quality of stormwater entering the Upper Waitematā Harbour
- create integrated networks of public open space
- introduce appropriate plantings in new development
- provide landscape variety to build on existing characteristics of different parts of the structure plan area.

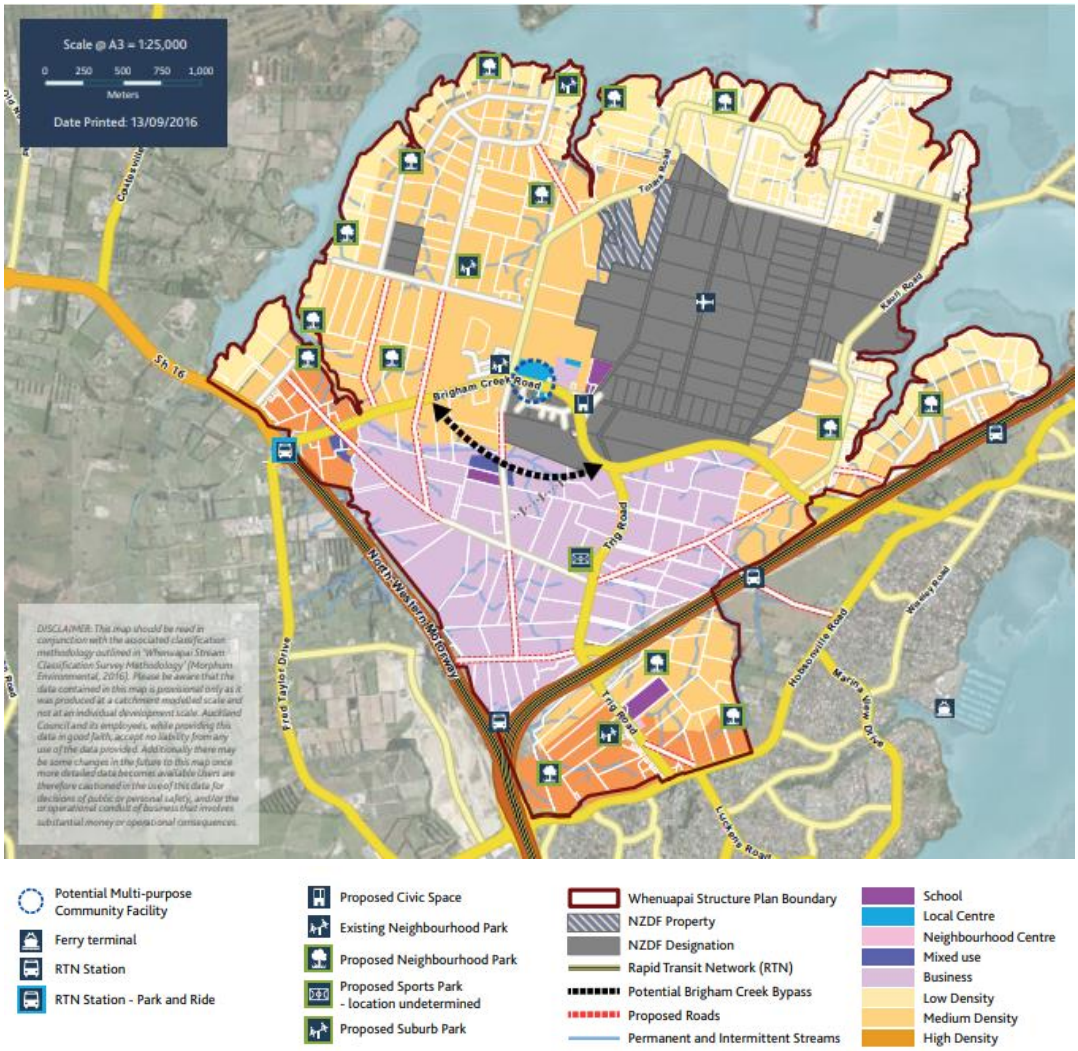


Figure 1-3: Whenuapai Structure Plan Map

1.12.2 National Policy Statement on Urban Development – NPS UD

The National Policy Statement-Urban Development (NPS-UD) came into effect on 20 August 2020 and sets out a list of things that local authorities must do to give effect to the objectives and policies defined within the policy statement. The NPS-UD does not explicitly address or refer to urban design but sets out the characteristics and rationale for "*well-functioning urban environments*" that enable all communities to provide for their social, economic, and cultural well-being and for their health and safety, now and into the future. This includes, amongst other requirements, the enabling of density and development capacity through "up-zoning" and more enabling planning provisions:

- around local centre zones
- in areas with employment opportunities

- in areas that are well serviced by existing or planned public transport or where there is high demand for housing or business
- along rapid transit stops

In the context of this Project, the NPS-UD Policy 1 defines what constitutes a well-functioning urban environment as one that provides “good accessibility for all people between housing, jobs, community services, natural spaces, and open spaces, including by way of public or active transport”. The implications of NPS-UD Policy 3 are that development of six storeys or more building heights are more likely within the context of an expanded road corridor.

2 Appendix 2: Graphic Supplement

ATTACHMENT 52

NORTH-WEST STRATEGIC ASSESSMENT OF LANDSCAPE EFFECTS PART 2 OF 4

DRAFT

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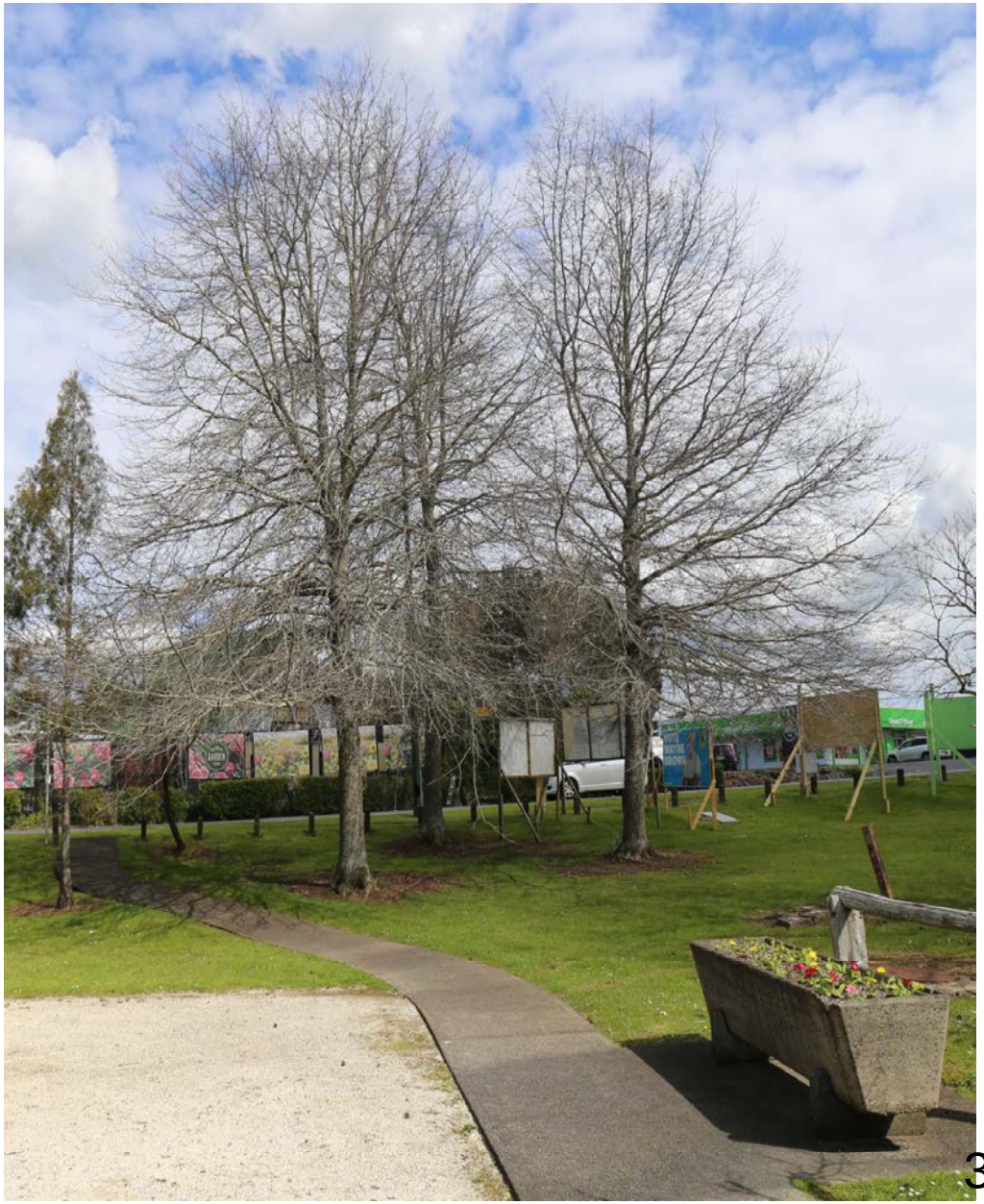
SUPPORTING GROWTH ALLIANCE

STRATEGIC NORTH WEST - NOTICE OF REQUIREMENTS

LANDSCAPE AND VISUAL EFFECTS ASSESSMENT APPENDIX 2 GRAPHIC SUPPLEMENT

SEPTEMBER 2022

Redhills and Riverhead - Notice of Requirements



Contents

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Data Sources: Photography - BML

NORTH WEST STRATEGIC NORS

View North towatds the Project Corridor from Fred Taylor Park

Date: 15 September 2022 Revision: 0

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Project Manager: john.goodwin@boffamiskell.co.nz | Drawn: OMa | Checked: JGo

SP 1

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NORTH WEST STRATEGIC NORS

View north along Fred Taylor Drive from opposite 151 Fred Taylor Drive

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NORTH WEST STRATEGIC NORS

View north west from Joseph Dunstan Drive

SP 3

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NORTH WEST STRATEGIC NORS

View north along Taupaki Road

SP 4

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NORTH WEST STRATEGIC NORS

View west from Taupaki Drive from outside 380 Taupaki Drive

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NORTH WEST STRATEGIC NORS

View north west from Foster Road

SP 6

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NORTH WEST STRATEGIC NORS

View south west from Puke Road from opposite 22 Puke Road

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NORTH WEST STRATEGIC NORS

View north east from Awa Road from outside 35 Awa Road

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NORTH WEST STRATEGIC NORS

View east from Foster Road from outside 142 Foster Road

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NORTH WEST STRATEGIC NORS

View north from Pomona Road along the access for 103 Pomona Road

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NORTH WEST STRATEGIC NORS

View south west along Waitakere Road

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NORTH WEST STRATEGIC NORS

View north west along Waitakere Road from outside 580 Waitakere Road

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NORTH WEST STRATEGIC NORS

View south east along Main Road SH16 from opposite 7 Main Road SH16

SP 13

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NORTH WEST STRATEGIC NORS

View south west along Main Road SH16 from outside 88 Main Road SH16

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Existing View

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NORTH WEST STRATEGIC NORS

View west along Main Road SH16 from outside 325 Main Road SH16

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NORTH WEST STRATEGIC NORS

View west along Main Road SH16 from outside 347 Main Road SH16

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ATTACHMENT 53

NORTH-WEST STRATEGIC ASSESSMENT OF LANDSCAPE EFFECTS PART 3 OF 4

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NORTH WEST STRATEGIC NORS

View north along Station Road

SP 17

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NORTH WEST STRATEGIC NORS

View north west along Station Road from outside 2 Station Road

SP 18

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NORTH WEST STRATEGIC NORS

View south along Tapu Road from opposite 3 Tapu Road

SP 19

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NORTH WEST STRATEGIC NORS

View south west towards SH16 from Gilbransen Road from outside 50 Gilbransen Road

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NORTH WEST STRATEGIC NORS

View south along Matua Road from outside 411 Matua Road

SP 21

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NORTH WEST STRATEGIC NORS

View north along Puke Road from outside 104 Puke Road

SP 22

Date: 15 September 2022 Revision: 0

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Viewpoint Details

401

Data Sources: Photography - BML

NORTH WEST STRATEGIC NORS

View north east from Joseph Dunstan Drive

SP 23

Date: 15 September 2022 Revision: 0

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Data Sources: Photography - BML

NORTH WEST STRATEGIC NORS

View north west from Boord Crescent from outside 42 Boord Crescent

SP 24

Date: 15 September 2022 Revision: 0

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NORTH WEST STRATEGIC NORS

View west from Boord Crescent from outside 108 Boord Crescent

SP 25

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Data Sources: Photography - BML

NORTH WEST STRATEGIC NORS

View north east from Waitakere Road towards Main Road SH16

SP 26

Date: 15 September 2022 Revision: 0

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Existing View

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Data Sources: Photography - BML

NORTH WEST STRATEGIC NORS

View south from Main Road SH16 from opposite Access Road

SP 27

Date: 15 September 2022 Revision: 0

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Data Sources: Photography - BML

NORTH WEST STRATEGIC NORS

View south from Kumeu River Park towards the Main Road SH16

SP 28

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Data Sources: Photography - BML

NORTH WEST STRATEGIC NORS

View south west from the south east corner of Huapai Domain

SP 29

Date: 15 September 2022 Revision: 0

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Data Sources: Photography - BML

NORTH WEST STRATEGIC NORS

View south west towards SH16 from Huapai Domain

SP 30

Date: 15 September 2022 Revision: 0

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Project Manager: john.goodwin@boffamiskell.co.nz | Drawn: OMa | Checked: JGo

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Data Sources: Photography - BML

NORTH WEST STRATEGIC NORS

View north west from Waitakere Road from outside 927 Waitakere Road

Date: 15 September 2022 Revision: 0

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NORTH WEST STRATEGIC NORS

View north east along Tawa Road from outside 66 Tawa Road

SP 32

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Data Sources: Photography - BML

NORTH WEST STRATEGIC NORS

View north east along Access Road from outside 236 Access Road

SP 33

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Data Sources: Photography - BML

NORTH WEST STRATEGIC NORS

View north east along Access Road from outside 184 Access Road

SP 34

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Data Sources: Photography - BML

NORTH WEST STRATEGIC NORS

View east along Access Road outside 162 Access Road

SP 35

Date: 15 September 2022 Revision: 0

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ATTACHMENT 54

NORTH-WEST STRATEGIC ASSESSMENT OF LANDSCAPE EFFECTS PART 4 OF 4

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Data Sources: Photography - BML

NORTH WEST STRATEGIC NORS

View north east towards Access Road from Grivelle Street

SP 36

Date: 15 September 2022 Revision: 0

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Data Sources: Photography - BML

418

NORTH WEST STRATEGIC NORS

View north along Access Road outside 10 Grivelle Street

SP 37

Date: 15 September 2022 Revision: 0

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Data Sources: Photography - BML

419

NORTH WEST STRATEGIC NORS

View south west along Access Road outside 63 Access Road

SP 38

Date: 15 September 2022 Revision: 0

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420

Data Sources: Photography - BML

NORTH WEST STRATEGIC NORS

View north along Access Road outside 127A Access Road

SP 39

Date: 15 September 2022 Revision: 0

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3 Appendix 3: Auckland Unitary Plan Activities

Auckland Unitary Plan – E26 Infrastructure

Table E26.4.3.1 below is relevant for considering effects and recommending mitigation in relation to tree removal. Note that, except for Trees in Roads, in Open Space Zones and Notable Trees, trees are not protected under the AUP.

Table E26.4.3.1 Activity table - Network utilities and electricity generation – Trees in roads and open space zones and the Notable Trees Overlay

Activity	Activity Status			Permitted Standards or Matters of Discretion / Control
	Trees in roads [dp]	Open space zones [dp]	Notable trees [dp]	
(A89) Tree removal of Notable Trees	N/A	N/A	Discretionary	N/A
(A90) Tree trimming, alteration or removal on roads adjoining rural zones and on roads adjoining the Future Urban Zone	Permitted	N/A	N/A	N/A
(A91) Tree alteration or removal of any tree less than 4m in height and/or less than 400mm in girth	Permitted	Permitted	Restricted Discretionary	N/A
(A92) Tree alteration or removal of any tree greater than 4m in height and/or greater than 400mm in girth	Restricted Discretionary	Restricted Discretionary	N/A	N/A
(A93) Tree trimming, alteration and removal not otherwise provided for	D	D	D	N/A

Auckland Unitary Plan – E26 Infrastructure

The table below is relevant for considering effects and recommending mitigation in relation to vegetation clearance. Also refer to Table E15.4.1.

Table E26.3.3.1 Activity table – Network utilities and electricity generation and vegetation management

Activity	Activity Status						Permitted Standards
	Rural zones, coastal areas and riparian areas [rp]	SEA [rp]	ONF [dp]	HNC [dp]	ONL [dp]	ONC [dp]	
(A76) Vegetation alteration or removal	P	P	P	P	P	P	Refer to E26.3.5.4. Vegetation alteration or removal for Permitted Activity Standards
(A77) Vegetation alteration or removal that does not comply with Standards E26.3.5.1 to E26.3.5.4	RD	RD	RD	RD	RD	RD	
(A78) Vegetation alteration or removal not otherwise provided for	D	D	D	D	D	D	

Auckland Unitary Plan – E15 Vegetation management and biodiversity

Table E15.4.1 below is relevant for considering effects of activities over and above those that are permitted and recommending mitigation in relation to vegetation clearance in urban and FUZ zones, and adjacent to riparian areas.

Table E15.4.1 Activity table - Auckland-wide vegetation and biodiversity management rules

Activity	Activity Status	Permitted Standards
Riparian areas (as described below)		
(A16) Vegetation alteration or removal within 20m of rural streams, other than those in Rural – Rural Production Zone and Rural – Mixed Rural Zone	RD	N/A
(A17) Vegetation alteration or removal within 10m of rural streams in the Rural – Rural Production Zone and Rural – Mixed Rural Zone	RD	N/A

Activity	Activity Status	Permitted Standards
(A18) Vegetation alteration or removal within 20m of a natural wetland, in the bed of a river or stream (permanent or intermittent), or lake	RD	N/A
(A19) Vegetation alteration or removal within 10m of urban streams	RD	N/A
All other zones and areas not covered above (i.e. Urban Zones and FUZ)		
(A22A) Vegetation alteration or removal	P	Refer to E15.6. Vegetation alteration or removal for Permitted Activity Standards
All areas		
(A23) Permitted activities in Table E15.4.1 that do not comply with one or more of the standards in E15.6	RD	N/A

Auckland Unitary Plan – E26 Infrastructure - Earthworks

The table below is relevant for considering effects of activities over and above those that are permitted and recommending mitigation in relation to earthworks.

Table E26.5.3.1 Activity table - Earthworks all zones and roads [dp]

Activity	Activity Status	Permitted Standards
(A95) Earthworks up to 2500m2 other than for maintenance, repair, renewal, minor infrastructure upgrading	P	Refer to E26.5.5.2. General standards (District)
(A96) Earthworks up to 2500m3 other than for maintenance, repair, renewal, minor infrastructure upgrading	P	Refer to E26.5.5.2. General standards (District)
(A97) Earthworks greater than 2500m2 other than for maintenance, repair, renewal, minor infrastructure upgrading	RD	N/A
(A97A) Earthworks greater than 2500m3 other than for maintenance, repair, renewal, minor infrastructure upgrading	RD	N/A

4 Appendix 4: Regional and District Plan Matters

Table 4-1 Landscape impacts of road infrastructure construction broken down into AUP:OP Regional and District Plan matters

Landscape Feature	Activity	Impact	AUP:OP District Plan provisions	AUP:OP Regional Plan provisions
Operation				
Terrestrial habitat	Vegetation removal (including trees) outside of roads and public spaces in: a) a rural zone b) riparian margins c) coastal areas d) SEAs This also includes other terrestrial habitat of value identified in the EcIA.	Permanent loss of habitat fragmentation and edge effects.		✓
	Vegetation removal (including trees) in: a) Roads b) Public spaces c) ONFs d) ONLs e) HNCs f) ONCs	Permanent loss of habitat / ecosystem, fragmentation and edge effects.	✓	
	Earthworks – leading to invasion of bare earth surfaces with weeds and transfer of weeds (seeds and fragments) between earthworks areas.	Weed dispersal to previously unaffected areas of indigenous vegetation, reduction in terrestrial biodiversity.		✓
Natural Character Areas – (Freshwater habitat, wetland or stream, including riparian margins)	Vegetation removal.	Permanent loss of habitat / ecosystem, fragmentation and edge effects.		✓
	Construction activities – earthworks (leading to sediment discharge), machinery use and chemical storage (leading to leaks / spills).	Uncontrolled discharge leading to habitat and water quality degradation.		✓

Landscape Feature	Activity	Impact	AUP:OP District Plan provisions	AUP:OP Regional Plan provisions
	Diversion, abstraction or bunding of watercourses and water level / flow / periodicity changes.	Detrimental effects on habitats including plant composition and fauna.		✓
Construction				
Vegetation	Presence of the road - use of road edges as dispersal corridors by invasive plant species.	Weed dispersal to previously unaffected areas of indigenous vegetation, reduction in terrestrial biodiversity.		✓
	Road maintenance - increased use of herbicides.	Increased weed incursion, unintentional spray of indigenous vegetation.		✓
Natural Character Areas – (Freshwater habitat, wetland or stream, including riparian margins)	Vehicle (cartage) movement - risk of spills of potential toxins (oil, milk, chemicals).	Temporary degradation of instream / wetland habitat and water quality.		✓
	Presence of bridge.	Shading leading to change in ecosystem structure.		✓
	Gradual change in hydrology from presence of the road / stormwater, including reclamations.	Effect on downstream habitat (including erosion / sediment discharge) due to change in hydrology (increase or decrease).		✓
	Stormwater discharges - pollutants (such as heavy metals and herbicides).	Permanent degradation of wetland or instream habitat and water quality.		✓

ATTACHMENT 55

NORTH-WEST STRATEGIC ASSESSMENT OF HISTORIC (BUILT) HERITAGE / EFFECTS

TE TUPU NGĀTAHI
SUPPORTING GROWTH

North West Strategic Assessment of Historic (Built) Heritage / Effects

December 2022

Version 1

Document Status

Responsibility	Name
Author	John Brown
Reviewer	Tracey Grant
Approver	John Daly

Revision Status

Version	Date	Reason for Issue
1	16/12/2022	Notice of Requirement Lodgement

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Abbreviations

Acronym/Term	Description
AEE	Assessment of Effects on the Environment
ASH	Alternative State Highway
AT	Auckland Transport
AUP:OP	Auckland Unitary Plan Operative in Part
BCI	Brigham Creek Interchange
CC2W	City Centre to Westgate
FTN	Frequent Transit Network
FULSS	Future Urban Land Supply Strategy
FUZ	Future Urban Zone
NAL	North Auckland Line
NoR	Notice of Requirement (under the Resource Management Act 1991)
RMA	Resource Management Act 1991
RTC	Rapid Transit Corridor
RAMC	Regional Active Mode Corridor
RUB	Rural Urban Boundary
SG	Te Tupu Ngātahi Supporting Growth
SH16	State Highway 16
The Council	Auckland Council
Waka Kotahi	Waka Kotahi NZ Transport Agency

Glossary of Acronyms / Terms

Acronym/Term	Description
Auckland Council	Means the unitary authority that replaced eight councils in the Auckland Region as of 1 November 2010.
Strategic Assessment Package	Four Notices of Requirement (for ASH, RTC, Station Road and SH16) and one alteration to an existing designation (SH16 Main Road) for the Whenuapai Arterial Transport Network for Auckland Transport.

1 Executive Summary

Assessment undertaken

1. The assessment is based on review of:

    a. the heritage databases at Auckland Council, New Zealand Archaeological Association Site Recording Scheme and Heritage New Zealand Pouhere Taonga;

    b. a review of historic maps
    published and unpublished publications on the history of the study area
    previously undertaken archaeological assessment for the project

2. Assessment criteria used are from:

    - International and National guidance and practice for Environmental Impact Assessment (EIA), calibrated to historic heritage values assessment criteria and values from the Auckland Unitary Plan (AUP:OP)

3. This Historic Built Heritage Assessment focuses on two scheduled Historic (Built) Heritage sites at Huapai and Kumeū. For assessment of archaeological sites and other identified sites of potential heritage interest, please refer to the archaeological assessment.

NoR S2 *State Highway 16* ***NoR S3*** *Rapid Transit Corridor (**RTC**), including the Regional Active Mode Corridor (**RAMC**),* ***NoR KS*** *Kumeū RTC Station and* ***NoR HS*** *Huapai RTC Station*

Results of assessment and recommended measures

4. There are two Scheduled Historic heritage buildings and a non-scheduled built heritage feature – railways carriages, previously recorded within the boundary of these NoRs:

    - The Huapai Tavern, is scheduled as a historic place in the Auckland Unitary Plan (AUP:OP Schedule 14.1 #00482). It is currently present within the footprint of several proposed NoR designations;

    - The Kumeū Railway Station Goods Shed (AUP:OP Schedule 14.1 ID #00483). It is currently present within the footprint of several proposed NoR designations;

    - The non-scheduled historical railway carriages (CHI ref #18493) were previously recorded within the footprint of several proposed designations. However, as of August 2022 they are no longer present on the site. The café has apparently permanently closed following flooding in September 2021, although the main building remains. It is not known if the carriages will return to the site; and,

    - A recorded pre-1940 homestead is located at 42 Boord Crescent (CHI ref 16381). This has been identified in the archaeological assessment as being potentially of pre-1900 date. It may also be impacted by NoR S3.

5. There are potentially significant (large) adverse and permanent effects on historic heritage values of the Huapai Tavern during the construction phase only. These effects are certain to occur as a

result of any construction activities associated with NoR S3, NoR KS and NoR HS and cannot be avoided without significant route variation. Some demolition of modern extensions may be essential, but total demolition of the structure needs to be avoided if significant adverse effects are to be reduced. Therefore, I recommend mitigation through the following methods:

a. As a minimum:

i. Historic building recording to document removal of modern extensions which are not the core 19th century component of the Tavern;

ii. Relocation of the core 19th century component of the Tavern, and preferably all structures from the pre 1940 footprint;

b. If practicable – integration of the remaining Tavern structure into the new station complex, to maintain its historical relationship to the site, and any context and community values associated with this historic heritage place.

6. If the minimum proposed measures (ai; aii) are adopted, the level of adverse effect will reduce from critical (permanent) adverse, to moderate (permanent) adverse.

7. If recommendations (ai, aii) and (b) are adopted, the level of adverse effect will reduce from critical (permanent) adverse, to moderate (permanent) adverse, but additionally there may be positive benefits for long-term viability and maintenance and/or enhancement of community and context values associated with the place.

8. There are potentially significant and critically adverse effects on historic heritage values of the Kumeū Railway Station Goods Shed during the construction phase only. These effects are certain to occur as a result of any construction activities associated with NoR S3 and cannot be avoided without significant route variation. However, unlike the Huapai Tavern, the goods shed has a relatively small building footprint and may be easily relocated in its entirety, with no loss of significant physical fabric.

9. Similar to the Huapai Tavern, relocation and integration of the railway goods shed into the future Kumeū train station would be a good option. This would avoid or largely reduce significant any adverse effects on historic heritage context values. Additionally, this integration would ensure long-term viable use, and maintain and enhance heritage values, which will benefit historic heritage values for both sites.

10. Any relocation or modification of existing scheduled sites outside of the heritage overlays is likely to necessitate a future Plan Change, to modify their respective extents of place. This a future piece of work and is not sought as part of the current NoR proposals.

Conclusion

11. There is a potential adverse effect on historic built heritage during the construction phase, arising from future construction activities within the spatial extents of NoR S3 in particular. Without appropriate intervention or mitigation, demolition of two scheduled historic heritage places may occur, which would generate permanent and critically adverse effects on historic heritage values.

12. If the proposed mitigation measures are adopted, critical adverse effects will be reduced to moderate adverse effects for the Huapai Tavern only, and likely little or neutral adverse effects for the Railway Goods Shed.

13. Additionally, during the operational phase, there is potential for positive and permanent effects will occur, if the two structures are effectively integrated into the future Kumeū Station design.

14. In relation to the Huapai Tavern and the Railway Goods Shed, I largely agree with the conclusion presented in the archaeological report:

    'Overall, the most severe impact onto the cultural heritage by the strategic projects is onto the few remaining historic buildings and structures of early Kumeū from the time when it was a service centre for a rural community. These buildings form a strong tie to the past and the local identity. Demolition of these structures would sever this tie. The construction of a Kumeū transport station can be seen as a unique opportunity to bring these buildings together and strengthen the local identity'

15. However, I consider that relocation of buildings to a separate 'heritage precinct', away from the context of the railway line and Huapai village core, is not the best opportunity to mitigate effects on heritage values. Rather, the scheduled structures should be integrated into the operational function and associated commercial activities of the station complex itself.

16. The opportunity to reuse these structures in this manner will maintain and enhance their contextual and community associations, particularly with the history of the railway and with the Tavern remaining at the transport node which is the historical centre of the village.

2 Introduction

This Historic (Built) Heritage assessment has been prepared for the North West Strategic Projects and Kumeū Huapai Local Arterials Notices of Requirement (**NoRs**) for Waka Kotahi NZ Transport Agency (**Waka Kotahi**) and Auckland Transport (**AT**) (the "**Strategic Assessment Package**").

The NoRs are to designate land for future strategic and local arterial transport corridors as part of Te Tupu Ngātahi Supporting Growth Programme (**Te Tupu Ngātahi**) to enable the construction, operation and maintenance of transport infrastructure in the North West area of Auckland.

The Strategic Assessment Package will provide route protection for the strategic projects, which include:

- Alternative State Highway (**ASH**), including Brigham Creek Interchange (**BCI**)
- the Rapid Transit Corridor (**RTC**), including the Regional Active Mode Corridor (**RAMC**)
- Kumeū Rapid Transit Station
- Huapai Rapid Transit Station State Highway 16 (**SH16**) Main Road Upgrade

It also includes the upgrade of Access Road, an existing local arterial corridor within Kumeū-Huapai.

This report assesses the transport effects of the North West Strategic Assessment Package identified in Table 2-1 below. Refer to the AEE for a more detailed project description.

Table 2-1: North West Strategic Assessment Package – Notices of Requirement and Projects

Notice	Project
NoR S1	Alternative State Highway (**ASH**), including Brigham Creek Interchange (**BCI**)
NoR S2	SH16 Main Road Upgrade
NoR S3	Rapid Transit Corridor (**RTC**), including the Regional Active Mode Corridor (**RAMC**)
NoR KS	Kumeū Rapid Transit Station
NoR HS	Huapai Rapid Transit Station
NoR S4	Access Road Upgrade

2.1 Purpose and Scope of this Report

This assessment forms part of a suite of technical reports prepared to support the assessment of effects within the Strategic Assessment Package. Its purpose is to inform the AEE that accompanies the Strategic Assessment Package sought by Waka Kotahi and AT.

This report considers the actual and potential effects associated with the construction, operation and maintenance of the Strategic Assessment Package on the existing and likely future environment as it relates to effects onto heritage and archaeology and recommends measures that may be implemented to avoid, remedy and/or mitigate these effects.

The key matters addressed in this report are as follows:

a) Identify and describe the actual and potential effects to historic (built) heritage of each relevant Project corridor within the Strategic Assessment Package;
b) Recommend measures as appropriate to avoid, remedy or mitigate actual and potential effects to historic (built) heritage (including any conditions/management plan required) for each relevant Project corridor within the Strategic Assessment Package; and
c) Present an overall conclusion of the level of actual and potential effects to Historic (Built) Heritage for each relevant Project corridor within the Strategic Assessment Package after recommended measures are implemented.

2.2 Report Structure

The report is structured as follows:

a) Overview of the methodology used to undertake the assessment and identification of the assessment criteria and any relevant standards or guidelines;
b) Description of historic heritage places assessed;
c) Description of the actual and potential positive effects on historic heritage of each Project corridor;
d) Description of the actual and potential adverse effects on heritage and archaeology of construction of each Project corridor;
e) Description of the actual and potential adverse effects on heritage and archaeology of operation of each Project corridor;
f) Recommended measures to avoid or mitigate potential adverse effects on heritage and archaeology; and
g) Overall conclusion of the level of potential adverse effects on heritage and archaeology of each Project corridor after recommended measures are implemented.

This report should be read alongside the AEE, which contains further details on the history and context of the Strategic Assessment Package. The AEE also contains a detailed description of works to be authorised for each NoR, likely staging and the typical construction methodologies that will be used to implement this work. These have been reviewed by the author of this report and have been considered as part of this assessment of effects on historic heritage and archaeology. As such, they are not repeated here, unless a description of an activity is necessary to understand the potential effects, then it has been included in this report for clarity.

3 Assessment Methodology

This assessment of effects of built heritage is based on standard international practices for environmental impact assessment (EIA) such as those described in:

- Waka Kotahi 2014: Guide to assessing historic heritage effects for state highway projects (Draft Version2.4).

3.1 Preparation for this Report

Preparation for this report has included:

- Review of online heritage databases and other readily available sources of information; listed in Section 3.2 below
- Route planning project team discussions for each of the NoRs; and
- Site visits where relevant to specific locations of interest along the NOR routes.

3.2 Methodology

The assessment methods set out in the Waka Kotahi guidance documentation has been aligned to regional values assessment criteria for Auckland set out in the AUP: OP RPS Statement B5.2.2.1. Identification and evaluation of historic heritage places (see below). The methodology for assessment of effects on built heritage is set out in Appendix 1 to this report. The following information sources were reviewed as part of the desk-top assessment:

- Draft Archaeological Assessment
- Auckland Council Cultural Heritage Inventory (CHI);
- The New Zealand Heritage List/Rārangi Kōrero;
- Historical aerial photography from Auckland Council Geomaps and Retrolens;
- Digital Archives New Zealand and other online digital databases;
- Google Streetview and Google Maps, including historical Streetview imagery; and
- Briefing pack and route information provided by Supporting Growth.

The route alignment for the NoRs was initially assessed through review of aerial photography and Google Streetview, to identify places of interest along the route. Sites are experienced from the public realm only.

Defining what is affected

Environmental effects may be adverse, neutral, or beneficial, direct or indirect, and temporary or permanent in nature. Understanding what values are affected is critical to assessment of effects. Because the proposed works lie entirely within the region covered by the AUP: OP, the Built Heritage values against which effects are measured are adopted from AUP:OP Section B5.2.2.1 as follows:

(a) historical: the place reflects important or representative aspects of national, regional or local history, or is associated with an important event, person, group of people, or with an idea or early period of settlement within New Zealand, the region or locality;

(b) social: the place has a strong or special association with, or is held in high esteem by, a particular community or cultural group for its symbolic, spiritual, commemorative, traditional or other cultural value;

(c) Mana Whenua: the place has a strong or special association with, or is held in high esteem by, Mana Whenua for its symbolic, spiritual, commemorative, traditional or other cultural value;

(d) knowledge: the place has potential to provide knowledge through archaeological or other scientific or scholarly study, or to contribute to an understanding of the cultural or natural history of New Zealand, the region, or locality;

(e) technology: the place demonstrates technical accomplishment, innovation or achievement in its structure, construction, components or use of materials;

(f) physical attributes: the place is a notable or representative example of:

(i) a type, design or style;

(ii) a method of construction, craftsmanship or use of materials; or

(iii) the work of a notable architect, designer, engineer or builder;

(g) aesthetic: the place is notable or distinctive for its aesthetic, visual, or landmark qualities;

(h) context: the place contributes to or is associated with a wider historical or cultural context, streetscape, townscape, landscape or setting.

Under the AUP: OP Assessment methodology, Historic Heritage values are effectively rated using the following scale:

Value Level Under AUP OP	**Local**	**Regional**	**National**
Exceptional	Merits Scheduling	Merits Scheduling	Merits Scheduling
Considerable	Merits Scheduling	Merits Scheduling	Merits Scheduling
Moderate	Does not merit scheduling in itself, but may support Scheduling under other criteria	Does not merit scheduling in itself, but may support Scheduling under other criteria	Does not merit scheduling in itself, but may support Scheduling under other criteria
Little	Does not merit Scheduling, and only weakly supports scheduling under other criteria	Does not merit Scheduling, and only weakly supports scheduling under other criteria	Does not merit Scheduling, and only weakly supports scheduling under other criteria
None	No heritage values identified	No heritage values identified	No heritage values identified

This scale of Historic Heritage Values is adopted in the Environmental Impact Assessment Method described in Appendix 1.

Two key aspects of scheduled places are their identified primary features, and their extent of place. These are described as follows (AUP:OP D17.1):

Primary Features (Primary features and non-primary features of Category A, A and B places)*

The primary features of Category A, A* and B places form the fundamental basis for scheduling a historic heritage place. The primary features of historic heritage places are identified in Schedule 14.1 Schedule of Historic Heritage, and for some places in Schedule 14.3 Historic Heritage Place maps.

Not all primary features of Category B places have been identified. Until such time as the primary features of Category B places are identified, all features within the extent of place of a Category B place will be considered a primary feature for the purposes of implementing the rules in chapter D17 of the AUP:OP.

Extent of place of scheduled historic heritage places

Most scheduled historic heritage places include an identified area around a heritage feature; referred to as the ‘extent of place’. The extent of place comprises the area that is integral to the function, meaning and relationships of the place and illustrates the historic heritage values identified for the place. The provisions relating to a historic heritage place apply within the area mapped as the extent of place on the Plan maps, including the airspace.

Primary features are generally more sensitive to changes than other features of an historic heritage place. 'Exclusions' are specifically identified features which can detract from a historic place, and their removal is generally considered as a positive aspect of change. An exception to this is that many interiors are defined as 'exclusions' due to legacy planning structures.

A third aspect to consider in assessment is the setting of a historic heritage place. This is defined in the AUP:OP as follows (AUP:OP D17.1).

Setting of a historic heritage place

The setting of a historic heritage place includes elements of the surrounding context beyond the identified extent of place within which a historic heritage place is experienced. The setting of a historic heritage place includes the sea, sky, land, structures, features, backdrop, skyline and views to and from the place. It can also include landscapes, townscapes, streetscapes and relationships with other historic heritage places which contribute to the value of the place.

Changes to the setting of an historic heritage place do not directly affect physical attributes, but they may potentially detract from landscape-related values, in particular, where a historic heritage place is recognised for its 'Aesthetic values' (such as a designed park or garden, or a serendipitous relationship between a ruined structure and a natural landscape). Context values may also be affected by changes to setting, especially where the historic heritage place has a group relationship with other, nearby places (for example a grouping of contemporary places where the intervisibility between them is affected by changes to setting).

3.3 Limitations

- This assessment focuses on those NoR's where there are potential effects to recorded built heritage places. NoR's without identified built heritage places are not assessed.
- This assessment is based on readily available information and is not an exhaustive study of each location along the NOR routes; and
- Sites are experienced from the public realm only.

This assessment relates to Historic (Built) Heritage only. A separate assessment of archaeological values also is provided in the AEE.

4 Background

Please refer to the Archaeological assessment for a discussion of the physical environment and wider historical background. This assessment focuses on effects to the scheduled built heritage sites within Huapai and Kumeū.

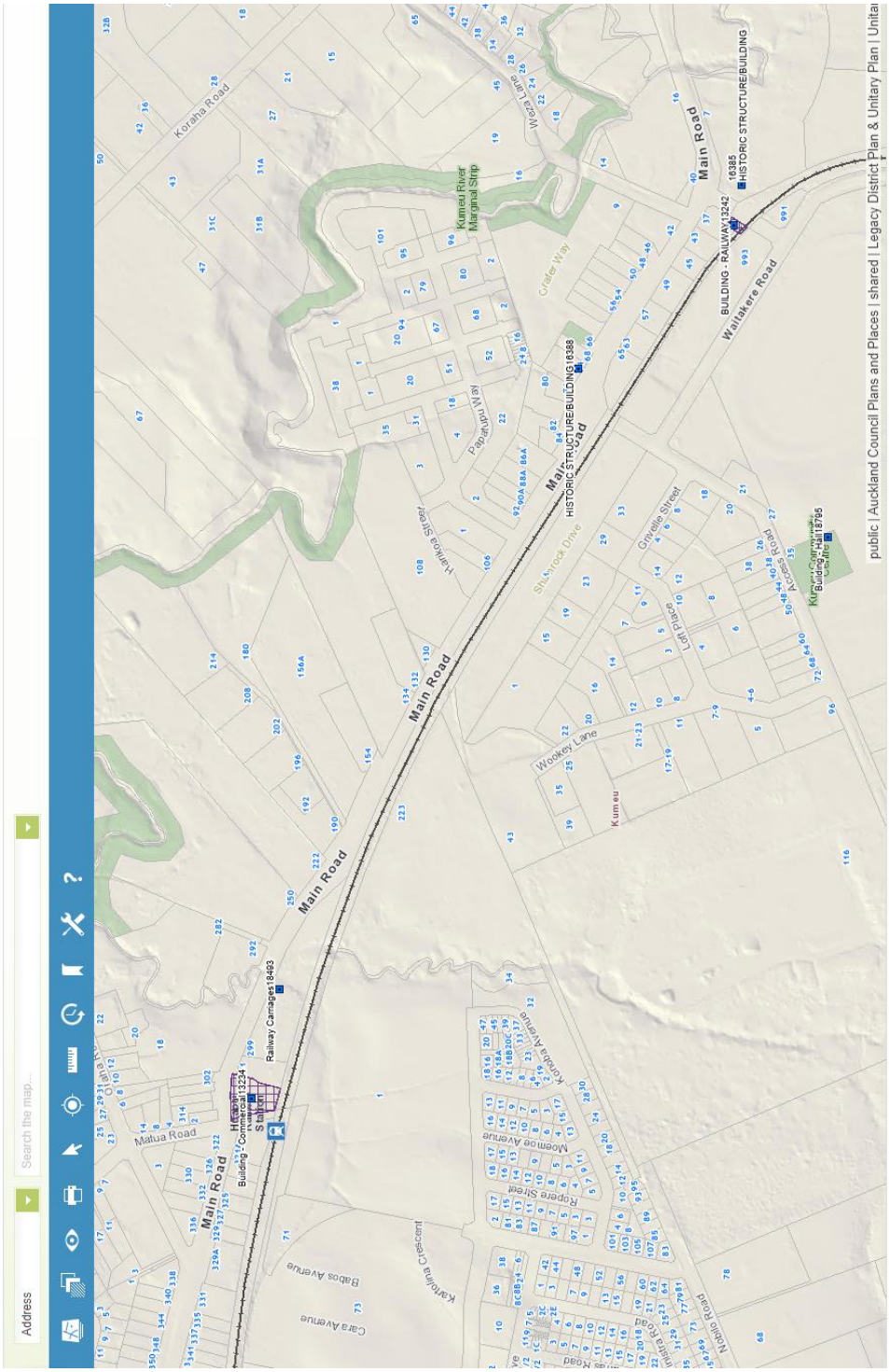


Figure 4-1: General site location with historic (built) heritage sites identified (Auckland Council GIS).

The following historic built heritage places may be affected by NoR S2 (SH16) and S3 (RTC & RAC, HS and KS):

Huapai

Huapai Tavern (AUP:OP Schedule 14.1 # 00482; Figure 4-2*; Figure* 4-3*; Figure* 4-4*)*

The Huapai Tavern is a Category B scheduled place under the AUP:OP:

ID	Place Name and/or Description	Verified Location	Verified Legal Description	Category	Primary Feature	Heritage Values	Extent of Place	Exclusions	Additional Rules for Archaeological Sites or Features	Place of Maori Interest or Significance
00482	Huapai Tavern	301 Main Road, Huapai	LOT 1 DP 147550; LOT 2DP 458781; road reserve	B		A,B,D,F,H	Refer to planning maps	Interior of building(s)		
00483	Kumeu Railway Station goods shed	37 Main Road, Kumeu	LOT 6 DP 159039; rail corridor	B		A,B,D,F,H	Refer to planning maps	Interior of building(s)		

It is recognised for the following criteria, which will all be of a least considerable heritage value:

A – Historical: the place reflects important or representative aspects of national, regional or local history, or is associated with an important event, person, group of people, or with an idea or early period of settlement within New Zealand, the region or locality

(Assumption - The building is a key surviving early building associated with the development of Huapai in the late 1800s)

B – Social: the place has a strong or special association with, or is held in high esteem by, a particular community or cultural group for its symbolic, spiritual, commemorative, traditional or other cultural value

(Assumption - the building has strong community associations as a gathering place and centre of Huapai)

D – Knowledge: the place has potential to provide knowledge through archaeological or other scientific or scholarly study, or to contribute to an understanding of the cultural or natural history of New Zealand, the region, or locality

(Assumption - The building has archaeological value as a pre-1900 place)

F – Physical Attributes: the place is a notable or representative example of:

(i) a type, design or style;

(ii) a method of construction, craftsmanship or use of materials; or

(iii) the work of a notable architect, designer, engineer or builder

(Assumption – the building is a surviving example of a 19th century public house, modified over time showing continual use and development)

H – Context: the place contributes to or is associated with a wider historical or cultural context, streetscape, townscape, landscape or setting

(Assumption – the building is associated with other, contemporary locations around Huapai and Kumeū, and thematically with early public houses in the region)

The primary feature is not defined. Under the provisions of the AUP:OP, the primary feature then defaults to the entire extent of Place (AUP:OP Section D17.1).

Interiors are defined as 'exclusions'. This does not necessarily mean they have no heritage value, but for planning purposes, any internal changes (including the removal of internal fabric and structures) are permitted under the AUP(OP).

There are no additional archaeological controls. However, the core of the building is recorded as an 1870s structure, and the site meets the definition of an archaeological site under the HNZPTA 2014, and the provisions of this Act also apply. The effects on archaeological values are discussed in the separate archaeological assessment.

The extent of place of the Huapai Tavern extends into the current road reserve and may be impacted by the extent and construction of NoR S2 (SH16). This site is further discussed in S3 (NoR RTC / RAC, NoR HS and NoR KS).

Railway Carriages (CHI #18493; Figure 4-5*)*

The non-scheduled railway carriages previously formed part of the Carriages Café. The carriages have been removed from the site recently and are not present as of August 2022. While the recorded location is potentially impacted by NoR S2 and S3 it is not known whether the carriages will be returned to the site in the future, or what their current condition is.

The site has been identified previously, but the railway carriages are not included on the AUP:OP Schedule. There is little indication of their assessed heritage value. It is assumed for the purposes of this report that they would not meet the 'considerable' value criteria required for scheduling under the Auckland Unitary Plan. They are assumed to have 'moderate' historic heritage values for assessment purposes.

Kumeū

Kumeū Railway Goods Shed (AUP:OP Schedule 14.1 # 00483; Figure 4-6*)*

The Kumeū Railway Goods Shed is a Category B scheduled place under the AUP:OP:

ID	Place Name and/or Description	Verified Location	Verified Legal Description	Category	Primary Feature	Heritage Values	Extent of Place	Exclusions	Additional Rules for Archaeological Sites or Features	Place of Maori Interest or Significance
00482	Huapai Tavern	301 Main Road, Huapai	LOT 1 DP 147550; LOT 2DP 458781; road reserve	B		A,B,D,F,H	Refer to planning maps	Interior of building(s)		
00483	Kumeu Railway Station goods shed	37 Main Road, Kumeu	LOT 6 DP 159039; rail corridor	B		A,B,D,F,H	Refer to planning maps	Interior of building(s)		

It is recognised for the following criteria, which will all be of a least considerable heritage value:

A – Historical: the place reflects important or representative aspects of national, regional or local history, or is associated with an important event, person, group of people, or with an idea or early period of settlement within New Zealand, the region or locality;

(Assumption - The building is a key surviving early building associated with the development of Kumeū in the late 1800s)

B – Social: the place has a strong or special association with, or is held in high esteem by, a particular community or cultural group for its symbolic, spiritual, commemorative, traditional or other cultural value

(Assumption - the building has strong community associations)

D – Knowledge: the place has potential to provide knowledge through archaeological or other scientific or scholarly study, or to contribute to an understanding of the cultural or natural history of New Zealand, the region, or locality

(Assumption - The building has archaeological value as a potential pre-1900 place)

F – Physical Attributes: the place is a notable or representative example of:

(i) a type, design or style;

(ii) a method of construction, craftsmanship or use of materials; or

(iii) the work of a notable architect, designer, engineer or builder.

(Assumption – the building is a surviving example of a 19th century transport infrastructure building)

H – Context: the place contributes to or is associated with a wider historical or cultural context, streetscape, townscape, landscape or setting

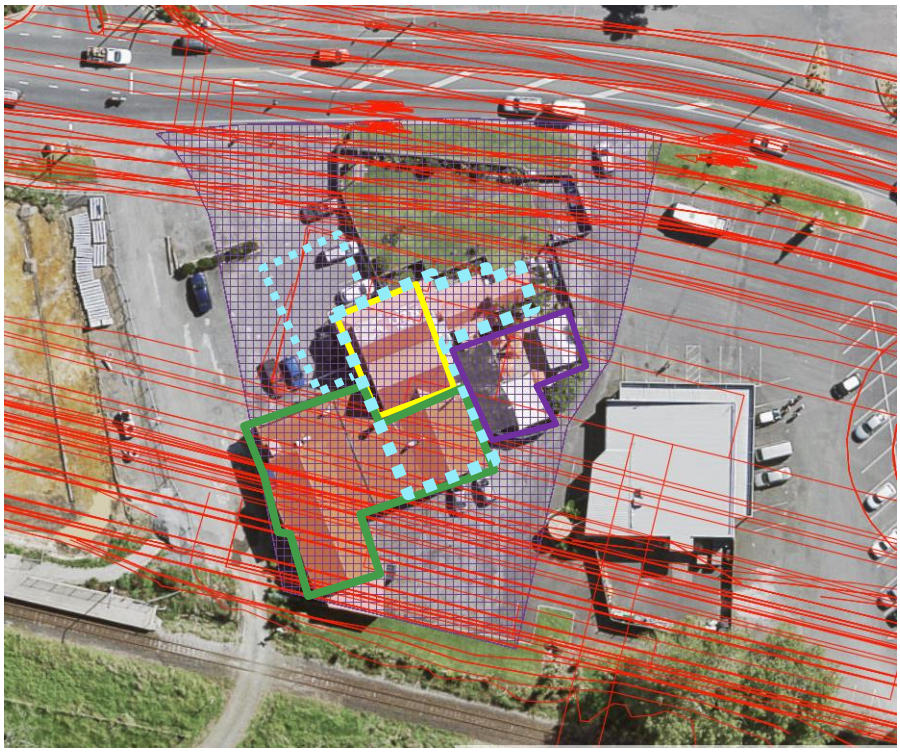
(Assumption – the building is associated with other, contemporary locations around Huapai and Kumeū, and thematically with the arrival of the railway in the region)

The primary feature is not defined. Under the provisions of the AUP:OP, the primary feature then defaults to the entire extent of Place (AUP:OP Section D17.1). this also includes the later 20th century extensions to the Tavern.

Interiors are defined as ‘exclusions’. This does not necessarily mean they have no heritage value, but for planning purposes, any internal changes (including the removal of internal fabric and structures) are permitted under the AUP:OP.

There are no additional archaeological controls. However, the building is understood to be recorded as pre-1900 structure, and the building itself meets the definition of an archaeological site under the HNZPTA 2014. In this case, the provisions of this Act also apply, with respect to total demolition of the building only[1]. The effects on archaeological values are discussed in the separate archaeological assessment.

[1] HNZPTA 2014 Section 42(3)



Yellow outline – surviving Pre-1900 Core; Blue outline – Pre-1940 footprint (approximate); Green outline– Pre1979; Purple - Pre-2006

Figure 4-2: Extent of Place for Huapai Tavern extends spatially into the road reserve and may be impacted by construction activities of NoR S2

Figure 4-3: Older (pre-1940) sections of the Huapai Tavern. Facing towards the high street (After Bader et al 2021)

Figure 4-4: Main (pre-1900 core) buildings of the Huapai Tavern. Pre-1979 20th century single-storey extensions to the right with 'Lion Red' sign (After Bader et al 2021)

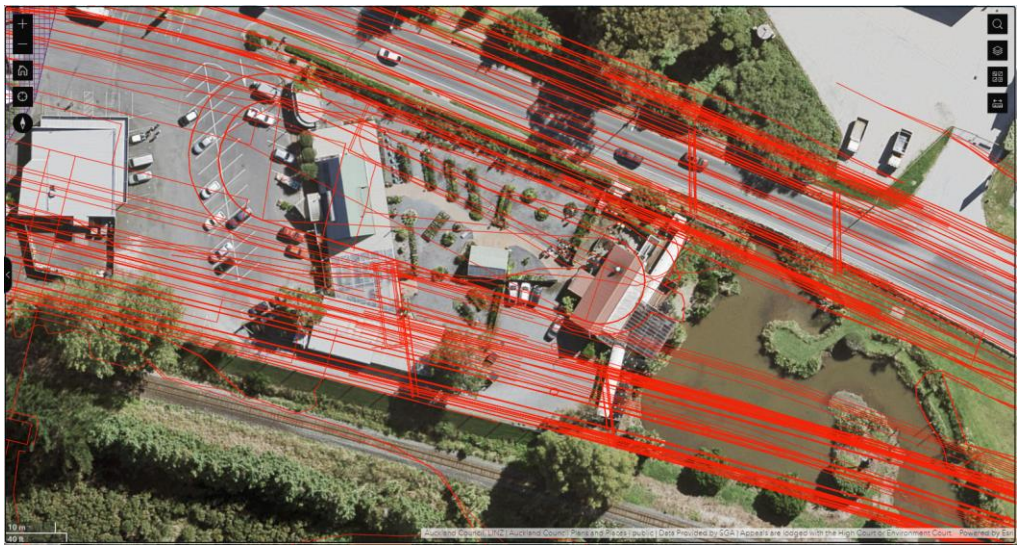


Figure 4-5. Railway carriages (CHI 18493) scheduled in the AUP, next to the railway line (Middle – 2021; bottom August 2022 – railway carriages no longer present)

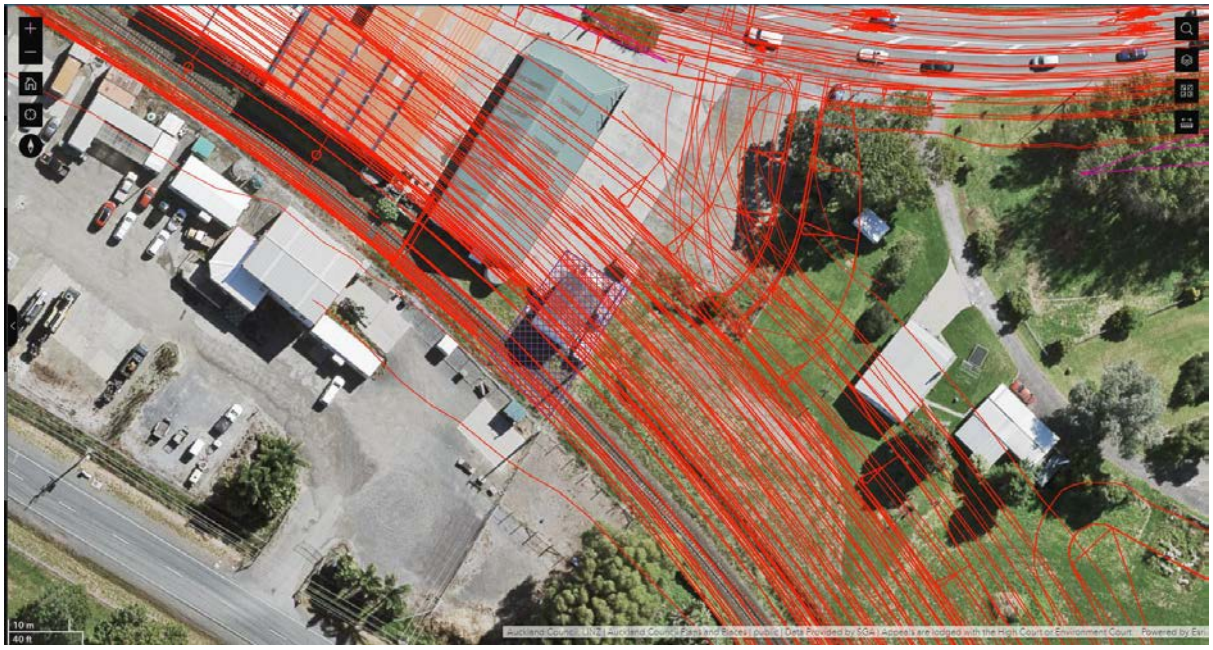


Figure 4-6. Goods Shed AUP:OP # 000483 (After Bader et al 2021)

*Other sites (*Figure 4-7*)*

Two historic houses are recorded within the 200 m buffer zone (CHI #16379 and CHI #16380), but none will be impacted by the development. Both seem to be built post 1940 or have been moved to their current location post 1940 (Figure 4-7).

The archaeological assessment notes that a historic house (CHI # 16381) at 42 Boord Crescent is within the extent of S3 and will be impacted by the proposed NoR. The building has been extended, but the original structure is potentially originally a pre-1900 homestead (Figure 4-8). If so, archaeological authority will be required for the building to be totally demolished.

Potential effects are discussed generally at the strategic level, where they are common to all NoRs, and then specifically with respect to each NoR (see below).

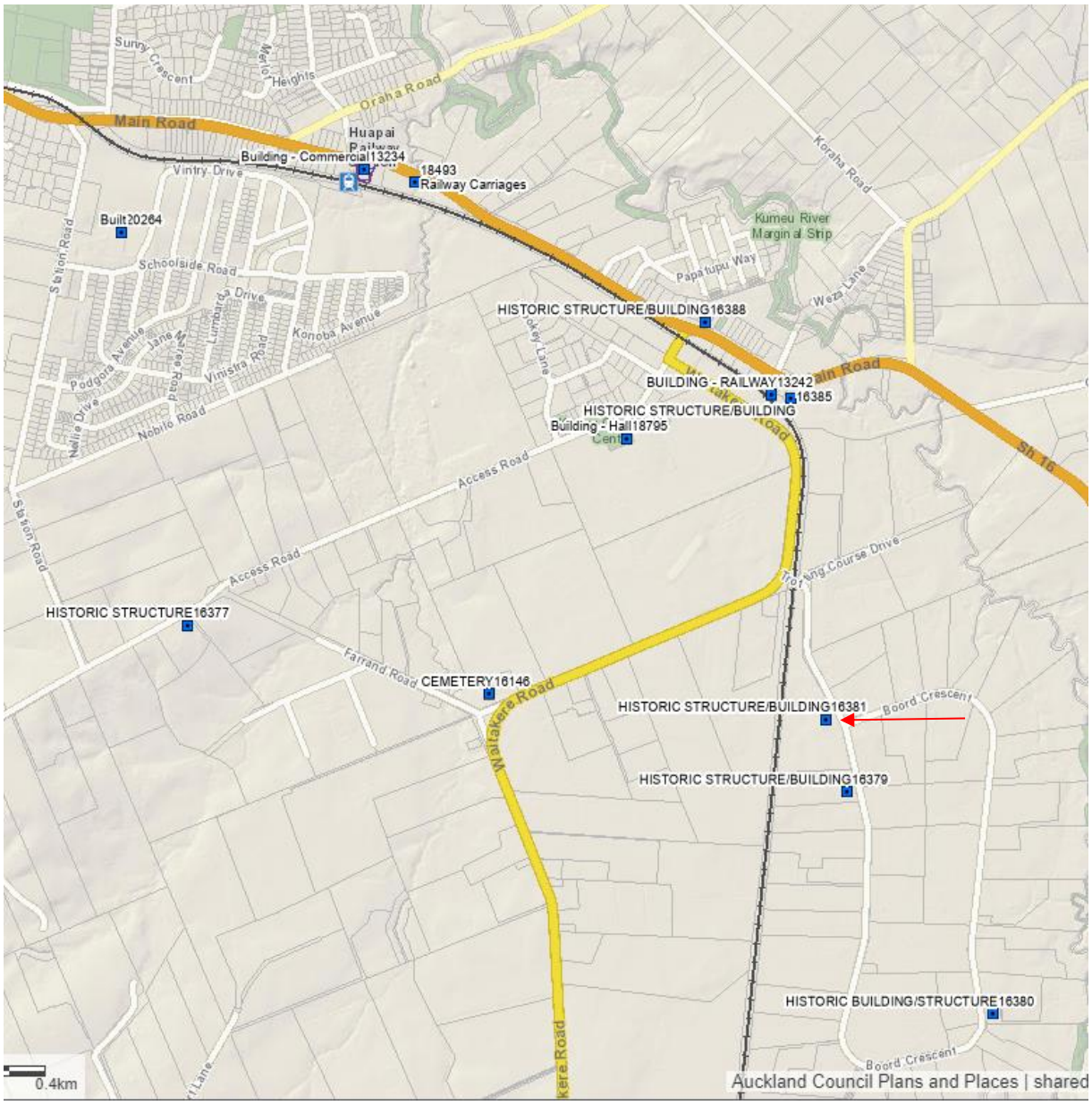


Figure 4-7. CHI sites in the vicinity of the study area. Historical building CHI 16381 is arrowed)

Figure 4-8. Possible early homestead (CHI 13681) at Boord Crescent (after Bader et al 2021)

5 Strategic Assessment Package Overview

An overview of the Strategic Assessment Package is provided in

Figure 5-1 below, with a brief summary of the Strategic Assessment Package projects provided in Table 5-1 below.

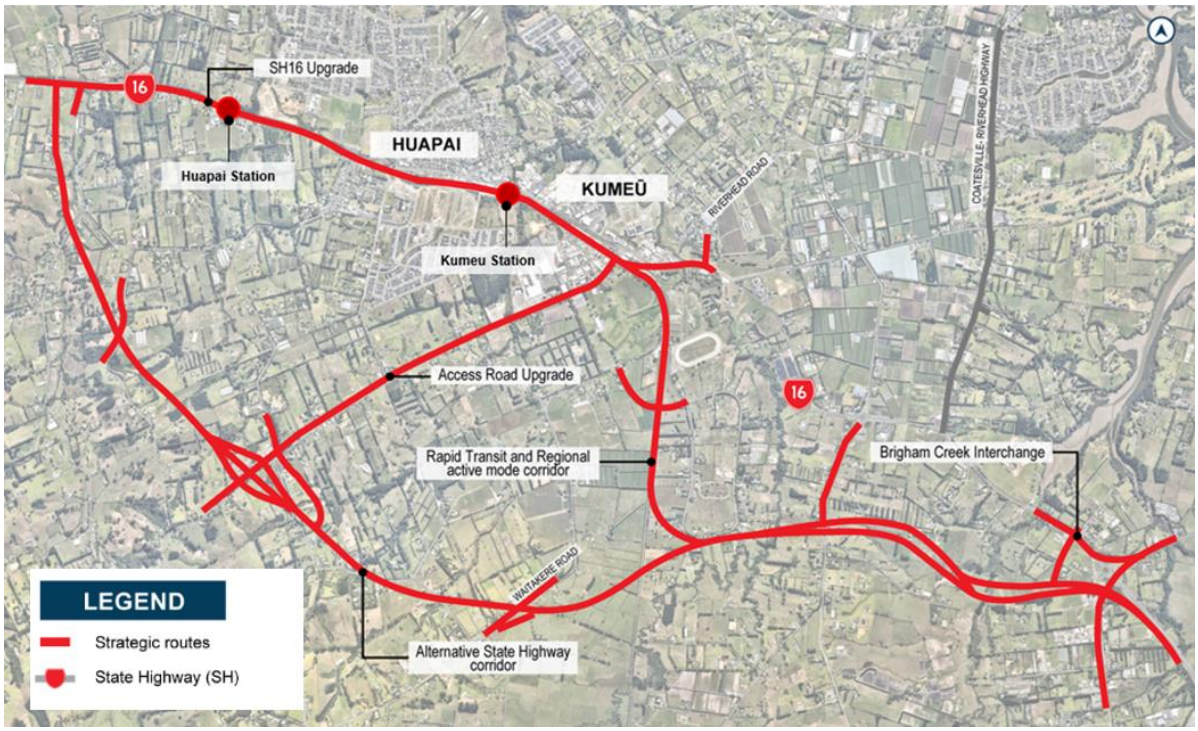


Figure 5-1. North West Strategic Assessment Package – Overview of NoRs for Assessment

Table 5-1.: Strategic Assessment Package Project Summary

Corridor	NOR	Description	Requiring Authority
Alternative State Highway	S1	A new four-laned dual carriageway motorway and the upgrade of Brigham Creek Interchange.	Waka Kotahi
State Highway 16 Main Road Upgrade (alteration to existing designation 6766)	S2	Upgrade to urban corridor including active modes and realignment of Station Road intersection with SH16.	Waka Kotahi
Rapid Transit Corridor, including Regional Active Mode Corridor	S3	New Rapid Transit Corridor and active mode corridor in one co-located corridor.	Waka Kotahi
Kumeū RTC Station	KS	New rapid transit station, including transport interchange facilities and accessway.	Waka Kotahi
Huapai RTC Station	HS	New rapid transit station, including transport interchange facilities, park and ride and accessway.	Waka Kotahi
Access Road Upgrade	S4	Upgrade of Access Road to a four-lane cross-section with separated cycle lanes and footpaths on both sides of the corridor.	Auckland Transport

Please refer to the AEE for further information on these projects, including a project description, key project features and the planning context.

This section assesses common or general Built Heritage matters across the entire North West Strategic Network. This section also recommends measures to avoid, remedy, or mitigate actual or potential adverse effects that may be common to all sections.

5.1 Positive Effects

Positive effects for built heritage generally along the full route are largely limited to indirect effects arising from any improvements to pedestrian and low-speed modes of transport (e.g. cycling). Where there is improvement to pedestrian environment, there is usually an indirect opportunity for people to observe the environment at a more leisurely pace. The resultant opportunity afforded is the greater appreciation of the amenity and aesthetic values that may be derived from built heritage places, as well as opportunities to gain insight, for example through provision of interpretive signage at opportune public locations. Similarly, reduction in traffic speeds and volumes might indirectly improve the long-term maintenance of building fabric, where less emissions are generated.

Positive effects of this nature are not easy to quantify, but I assess them generally as being of a negligible and permanent beneficial nature along the route, where provision is made for pedestrian and low-speed transport modes.

5.2 Assessment of construction effects

Temporary Effects

Construction effects include temporary effects, such as dust, noise and visual nuisance. Adverse effects from such works include:

- Loss of amenity or aesthetic experience, which may reduce associated historic heritage values (such as Aesthetic, Historical Context);
- Other values may be also indirectly affected, for example through a drop in visitor rates or ability to appreciate historical associations due to presence of works (e.g. social values, historical associations); and
- Risk of accidental physical damage (through vehicle or plant movement, dust clogging downpipes etc.).

Once construction is completed there will be little potential for residual adverse effects on built heritage arising from these temporary works.

Permanent Effects

Machine or plant that generates vibration also has potential to cause cosmetic damage to sensitive receptors such as heritage buildings with ornate decorative elements, plasterwork and so on. Sensitive receivers might include:

- Churches;
- Public buildings with ornate decoration (e.g. public library);
- Commercial buildings with elaborate parapets/fenestration; and
- Vulnerable sites (for example, damaged or poorly maintained buildings where fabric is at risk of further deterioration).

Where any such sensitive historic heritage receivers are identified as present along the route, these are described in the relevant section of each NoR.

In a construction environment, there is potential for accidental damage to occur to built heritage places. The nature of such damage cannot be readily quantified. It may range from negligible impacts which are easily rectified (for example construction vehicle scraping paintwork on a gate) to significant or even catastrophic impacts (e.g. fire resulting from poorly controlled construction activity burns down a wooden building).

5.3 Recommended measures to avoid, remedy or mitigate construction effects

The intensity of temporary construction effects on built heritage can be mitigated through standard construction practice. This includes site control measures such as wetting of spoil to prevent dust, temporary noise barriers, and monitoring effects of construction vibration if this is necessary. Where

such works occur close to the location of any sensitive built heritage receivers (typically within 5m), it is recommended that a specific risk assessment for damage from construction vibration is undertaken by an appropriately qualified person, if not already included as part of the noise and vibration assessments for the NoRs.

Separation of work compounds and flow of machine/plant/materials from built heritage places through use of temporary fencing or hoarding will also help prevent accidental damage. Construction management plans can also control workflows to minimise risk to built heritage places, and Management Plan clauses or NoR conditions requiring remediation of any accidental damage can effectively mitigate such impacts when they are of a low or moderate impact.

In rare instances a more significant accident (such as a heavy vehicle strike, the dropping of a crane load, or fire), may damage a building to an extent that will results in significant loss of fabric from a built heritage place. This may be partially mitigated through historic building recording to create an archive record of the place, using the levels of recording set out in:

- Heritage New Zealand Pouhere Taonga 2018: Archaeological Guidelines No.1 Investigation and recording of buildings and standing structures.

The level to which recording is undertaken will need to be determined based on the historic heritage value of the place (its importance), and the level of impact that has occurred.

Previously unidentified places of Historic Heritage value

Common to all NoRs, there is the possibility of works impacting on previously unidentified built heritage places of potential historic heritage value and significance. The adverse effects would not be quantifiable unless a values assessment was undertaken for such places first.

I note that, outside of the scope of this assessment, the archaeological assessment has identified several historical buildings or places with potential historical historic heritage values that may be impacted upon by construction or operational activities within the NoRs. It is unknown whether historic heritage evaluation of these places to determine the significance of their heritage values has been undertaken by Auckland Council using the RPS criteria and Auckland Council methodology. However, for the purposes of this assessment it is assumed that they have not merited inclusion on the Historic Heritage Schedule and would therefore have no more than a moderate level of historic heritage significance based on current information.

5.4 Assessment of operational effects

Once operational, there are no identified direct adverse effects on Built Heritage values along the NoR routes that would be ongoing.

Indirect effects might occur to built heritage places along the route. For example if traffic noise levels increased, then the reduction in amenity may indirectly affect the experiential historic heritage values of a place, primarily in the Aesthetics (G) value category. Typically, a response might be to establish permanent noise barriers to attenuate this. However, this may in itself result in adverse effects if the barrier is visually detracting. In such cases, the adverse effects would need to be balanced against each other.

Services operating out of historic buildings might be affected adversely by changes in traffic intensity. For example, if visiting habits reduced as a result of increase in traffic, or loss of on-street parking, loss of revenue might mean an owner is then not able to financially support long-term maintenance of

a place. Another example is the effect of increased emissions on building fabric (e.g. 'acid rain' degrading stonework, or long-term staining of building fabric from exhaust emissions). The intensity of such indirect effects are not readily quantifiable, however. I therefore assess the potential for such indirect effects along the route generally to be of a negligible to low adverse nature.

5.5 Recommended measures to avoid, remedy or mitigate operational effects

There are no recommendations to avoid, remedy or mitigate operational effects.

5.6 Summary and Conclusions

In summary, overall along the alignment of the NoRs there is generically a potential for temporary or permanent adverse effects on Built heritage, associated with the following construction activities:

- Temporary nuisance effects from construction activities
- Accidental damage arising from construction activities
- Loss of previously unidentified built heritage with significant historic heritage value as a result of construction activities

The potential intensity of adverse effects can range from negligible adverse to significant adverse, depending on the nature of an event, but in most cases significant adverse effects may be avoided, remedied or mitigated through:

- standard construction management practices, to minimise risk of adverse effects or to reduce their intensity/duration
- use of construction management plans, monitoring and recording of works to minimise risk of adverse effects, and
- recording or remediation of accidental damage if this was to occur

Overall, there is low potential for adverse effects to occur on Built heritage features as a result of operational activities, primarily relating to

- Any adverse increase in noise or emissions from traffic that may degrade the experiential (Aesthetic values) associated with built heritage places
- Possible indirect effects resulting from reduction in visitation opportunity where services are operating from a Built Heritage Place.

Overall, there is low potential for permanent, beneficial effects on historic heritage values for built heritage, where:

- the operation of public transport and improvement of pedestrian environment indirectly enhances use opportunities for built heritage places (potentially enhancing Social values), and

- opportunities for site interpretation which can enhance Historical Association and Context values

Table 5-2. Summary of Effects for general activities

Effect	Likelihood	Impact	Recommendation
Construction			
Nuisance Effects (Dust, noise etc.)	High potential to occur, typically resulting in indirect adverse effects on built heritage places effects to setting, and AUP:OP Aesthetic (G) values category.	Typically low to moderate adverse temporary	Mitigation through standard construction management techniques
Loss of Landscaping	Certain to occur. Affects the setting and potentially aesthetic and context values of historic heritage (e.g. loss of mature hedgerow defining a historical boundary or property curtilage)	Typically a low permanent adverse effect	Remediation through replanting and new landscaping
Accidental damage	High potential to occur.	Typically low to moderate impact, and unlikely to significantly affect scheduled / non-scheduled historic built heritage	Avoid through construction management plan design on construction sites, use of temporary hoarding etc. Remediate to at least current standard of condition if accidental damage occurs
Loss of unidentified heritage	High potential to occur Based on several identified places of historical interest or heritage potential referred to in Archaeological assessment	If occurs, impact will be high and potentially permanent adverse	Recommend additional recording for identified buildings of potential historic heritage interest within NoR footprints prior to demolition or relocation

Effect	Likelihood	Impact	Recommendation
	Operational		
Increase in noise / emissions etc. as a result of additional traffic capacity	Potential to occur, typically resulting in indirect adverse effects on built heritage places. Typically low and permanent adverse effects to setting, Aesthetic values category.		None recommended – purpose of NoR is to provide opportunity for modal shift, in order to reduce traffic.
Opportunity for use	operation of public transport and improvement of pedestrian environment indirectly enhances use opportunities for built heritage places		Opportunity to integrate historic heritage places into station complex

6 NoR S2: SH16 Main Road Upgrade

It is proposed to submit a Notice of Requirement (NoR S2) to designate the land required to implement the upgrade of the existing State Highway 16 (**SH16**) to a two-lane corridor with walking and cycling facilities.

6.1 Project Corridor Features

The SH16 Main Road Upgrade extends approximately 4.5km between Old Railway Road, east of Kumeū to Foster Road, west of Huapai. The SH16 Main Road is currently a 20m wide two-lane urban arterial with no active mode facilities on either side of the corridor.

SH16 Main Road is proposed to be upgraded to a 24m urban corridor traversing through well-established retail, commercial and residential environs. The corridor generally follows the existing SH16 Main Road alignment and also includes a 600m section of active mode only upgrade between Oraha Road and Tapu Road. As part of this project, Station Road will be realigned to form a new signalised intersection with SH16 and Tapu Road.

An overview of the proposed designation is provided in Table 6-1 below.

Figure 6-1. Overview of the SH16 Main Road Upgrade

6.2 Existing and Likely Future Environment

6.2.1 Planning context

SH16 Main Road is proposed to be upgraded to a 24m urban corridor along the urban extent of SH16 traversing through well-established retail, commercial and residential environs through Kumeū Huapai. This corridor contains a range of business, residential and open space and rural land uses under the AUP:OP between the eastern extent of the Kumeū-Huapai township and the western extent of the upgraded corridor (the intersection with the proposed ASH).

Table 6-1 below provides a summary of the existing and likely future environment as it relates to the SH16 Main Road Upgrade.

Table 6-1: SH16 Main Road Upgrade Existing and Likely Future Environment

Environment today	Zoning	Likelihood of Change for the environment[2]	Likely Future Environment[3]
Rural	Rural Mixed Rural Zone, Rural Countryside Living Zone	Low	Rural
Business	Business (Industrial)	Low	Urban
	Business (Local Centre)	Low	Urban
	Business (Mixed Use)	Low	Urban
Residential	Residential	Low	Urban
Open Space	Open Space – Sport and Active Recreation	Low	Open Space
Undeveloped greenfield areas	Future Urban	High	Urban

Please refer to the AEE for further information on the planning context.

6.2.2 Heritage Environment

The following historic (built) heritage places may be affected by NoR S3:

Huapai Tavern (AUP: OP Schedule 14.1 # 00482; Figure 4-2*; Figure* 4-3*; Figure* 4-4*)*

The extent of place of the Huapai Tavern extends into the current road reserve and may be impacted by the extent and construction of NoR S2 (SH16). The main building itself is not physically affected, but there will be changes to the setting of the place. This site is further discussed in S3 (NoR RTC / RAC, NoR HS and NoR KS).

[2] Based on AUP:OP zoning/policy direction
[3] Based on AUP:OP zoning/policy direction

Railway Carriages (CHI #18493; Figure 4-5*)*

A non-scheduled historic built site - Railway carriages are also potentially impacted by NoR S2. They were used as part of the carriage café but are currently not on the site (as of August 2022). The northern portion of the site extends into the proposed footprint of SH16 and any construction associated with upgrade of the road.

Kumeū Railway Goods Shed (AUP:OP Schedule 14.1 # 00483; Figure 4-6*)*

The Kumeū Railway Goods Shed is a Category B scheduled place under the AUP:OP. While the structure itself is not physically affected by SH16, there will be changes to the setting arising from work associated with SH16.

6.3 Assessment of Effects on Historic (Built) Heritage and Measures to Avoid, Remedy or Mitigate Actual or Potential Adverse Effects

6.3.1 Positive Effects

Please Refer to Section 5 for general effects common to all NoRs.

6.3.2 Assessment of Construction Effects

Construction activities will result in temporary adverse effects as described in Section 5 above to all sites.

Huapai Tavern

Construction activities will affect the setting of Huapai Tavern and its extent of place. While the Huapai Tavern is identified as having considerable aesthetic value as a landmark, this is more to do with its presence at the junction of road and rail infrastructure, rather than current landscaping arrangements.

There is also some potential for unidentified archaeological deposits to be affected, which may affect the knowledge value criterion. This is described in the archaeological assessment.

Overall, the effects of NoR S2 are assessed as being of low impact, and they are likely to result only in little adverse permanent effect

Railway Carriages

If the carriages were to be returned to the site, construction activities will potentially affect them and they would require relocation to avoid adverse effects.

Kumeū Goods Shed

Construction activities will affect the setting of the Kumeū Goods Shed and it may also require relocation to avoid adverse effects of construction.

6.3.3 Recommended Measures to Avoid, Remedy or Mitigate Construction Effects

Temporary adverse effects from construction may be managed as described above in Section 5.

Moving the railway carriages again will not result in adverse effects, and it will avoid adverse effects associated with demolition.

6.3.4 Assessment of Operational Effects

Huapai Tavern

There are no specific adverse effects identified relating the physical fabric of the Tavern during the operational phase, as these will all have occurred during the construction process.

Presuming the Huapai Tavern remains on the existing land parcel (NoR S2 would not require its removal), the environment surrounding the Tavern will be improved and enhanced, especially with new landscaping and improvements for pedestrians. This streetscape upgrade will generate potential moderate or high permanent beneficial effects that support the Tavern's aesthetic, and possibly also social and context heritage values.

Kumeū Railway Goods Shed

From a planning perspective, relocation of the Kumeū Goods shed (AUP:OP Schedule 14.1 #000483) is allowed for as a non-complying activity. Once relocated, a Plan Change would be necessary to modify its current extent of place and to update Schedule 14.1. Potentially this process may be simplified if the Goods Shed is relocated within the Extent of Place for the Huapai Tavern, as it may be able to be combined with this overlay. The options for relocation (See Section 7 below) suggest that this could be achievable if the Goods Shed is integrated into the overall station design.

There is a however a risk that the historic heritage structure is relocated outside of its current extent of place and away from its contextual relationship with the railway. In this case, while the physical attributes may be retained, there will be a reduction in the context value of the place. This could be mitigated in part through the use of interpretation and/or signage to demonstrate the origins of the building, and its original site.

6.3.5 Recommended Measures to Avoid, Remedy or Mitigate Operational Effects

It would be redundant to apply for a Plan Change at the same time as the notification of the NoR because the buildings still occupy their current sites and would do for some time. In this scenario, interim historic heritage controls equivalent to those applied through the historic heritage overlay D17 might be established through Designation conditions. This would ensure that once the buildings are relocated, and until such time the AUP:OP is updated, it remains clear that the relevant Historic Heritage rules still apply to the structure.

6.4 Conclusions

In conclusion there are some potential adverse effects on historic heritage arising from activities associated with NoR S2.

Adverse effects may occur to Huapai Tavern, but these may be mitigated and will likely result in little permanent adverse effects.

Relocation of the historic railway carriages is a preferable option to demolition.

7 NoR S3: Rapid Transit Corridor and Regional Active Mode Corridor; NoR KS: Kumeū Rapid Transit Station and NoR HS: Huapai Rapid Transit Station

7.1 Project Corridor Features

7.2 Existing and Likely Future Environment

7.2.1 Planning context

The Rapid Transit Corridor (**RTC**) and Regional Active Mode Corridor (**RAMC**) form a single, integrated corridor (Note the RAMC only extends to the eastern entrance to Kumeū). This corridor predominately traverses rural land outside of the Future Urban Zone (**FUZ**) and the Rural Urban Boundary (**RUB**), however for assessment purposes it can be split into two sections:

- The **rural section** of the RTC runs from the Brigham Creek Interchange to the entry to Kumeū-Huapai township and is co-located with the RAMC along this section. This rural section traverses land zoned under the AUP:OP as Rural – Countryside Living Zone, with an area zoned as FUZ in Redhills North.
- The **urban section** of the RTC runs from northern end of Waitakere Road to Foster Road and is co-located with the proposed SH16 Main Road upgrade[4] along this section. This urban section contains a range of land uses zoned under the AUP:OP as a mix of business zonings between the eastern extent of the Kumeū-Huapai township and Station Road

Table 7-1 below provides a summary of the North West existing and likely future environment as it relates to the RTC and the RAMC.

Table 7-1: RTC and RAMC Existing and Likely Future Environment

Environment today	Zoning	Likelihood of Change for the environment[5]	Likely Future Environment[6]
Rural	Rural	Low	Rural
Undeveloped greenfield areas	Future Urban	High	Urban
Business	Business (Industrial)	Low	Urban
	Business (Local Centre)	Low	Urban
	Business (Town Centre)	Low	Urban
Residential	Residential	Low	Urban

[4] Another North West Strategic project – refer to Section **Error! Reference source not found.** of this report
[5] Based on AUP:OP zoning/policy direction
[6] Based on AUP:OP zoning/policy direction

Environment today	Zoning	Likelihood of Change for the environment[5]	Likely Future Environment[6]
Open Space	Open Space – Informal Recreation Open Space – Sport and Active Recreation	Low	Open Space
Future Urban Zone / Undeveloped greenfield areas	Future Urban	**High**	Urban

The RTC stations - Kumeū Rapid Transit Station and Huapai Rapid Transit Station - are located in the urban section of the RTC corridors.

Kumeū Station is proposed to be located on land at 299 and 301 Main Road on the western side of a Kumeū River tributary. The land is zoned under the AUP:OP as Business - Town Centre Zone. An active modes overbridge is proposed across the NAL with active mode connections to:

- the Huapai Triangle crossing land zoned in the AUP:OP as Green Infrastructure Corridor and Residential - Mixed Housing Suburban Zone; and
- Wookey Lane crossing land zoned in the AUP:OP as Green Infrastructure Corridor and Residential - Mixed Housing Suburban Zone; and Business - Light Industry Zone.

Table 7-2: Kumeū Rapid Transit Station Existing and Likely Future Environment

Environment today	Zoning	Likelihood of Change for the environment[7]	Likely Future Environment[8]
Business	Business (Industrial)	Low	Urban
	Business (Town Centre)	Low	Urban
Residential	Residential - Mixed Housing Suburban Zone	Low	Urban
Open Space (located to the north of the proposed station location)	Open Space – Informal Recreation Open Space – Sport and Active Recreation	Low	Open Space

Huapai Station is proposed to be located on land at 29 and 31 Meryl Avenue on the western side of the Ahukuramu. The land is zoned under the AUP:OP as Business - Town Centre Zone. An active modes overbridge is proposed across the NAL and SH16 to FUZ land. Future connections will be determined as part of structure plan process.

[7] Based on AUP:OP zoning/policy direction
[8] Based on AUP:OP zoning/policy direction

Table 7-3: Huapai Rapid Transit Station Existing and Likely Future Environment

Environment today	Zoning	Likelihood of Change for the environment[9]	Likely Future Environment[10]
Residential (located to the east of the proposed station location)	Residential – Single House Zone	Low	Urban
Future Urban Zone / Undeveloped greenfield areas	Future Urban	High	Urban

7.2.2 Heritage Environment

Huapai

The development of the Huapai Tavern can be traced back to the 1870s[11] Overlaying historic maps and historic aerials shows the gradual development of the small cluster of Tavern buildings that exist currently. Analysis of changes to the built form and historical aerial photography demonstrates that the pre-1900 buildings still form the central core of the modern Huapai Tavern. The extent of NoR S3 covers much of the extent of place, and overlays the southern portion of the Tavern.

The railway carriages currently used for a café (CHI #18493) are also affected by S3, in particular the RTC corridor.

Kumeū

The Goods Railway Shed (AUP:OP Schedule 14.1 #00483) is also affected by the RTC corridor.

As noted in the archaeological assessment both the Goods Shed and the Railway Carriages have been moved to their existing locations from original locations.

One possible pre 1900 heritage building identified in the archaeological assessment (023) is within S3 and its demolition or removal will require an authority.

[9] Based on AUP:OP zoning/policy direction
[10] Based on AUP:OP zoning/policy direction
[11] https://www.huapaiTavern.co.nz/history-of-the-huapai-Tavern/

7.3 Assessment of Effects on Historic Heritage and Archaeology and Measures to Avoid, Remedy or Mitigate Actual or Potential Adverse Effects

Huapai Tavern

Without relocation, the Huapai Tavern will require substantial demolition, if not total demolition, to provide for construction activities. Relocation options have therefore been discussed, both within the extent of place, and relocation outside of the extent of place. In all instances, demolition of more modern extensions is anticipated.

Two options have been considered to relocate and retain the 19th century core of the Huapai Tavern within the station complex. These options are shown in Figure 7-1 and Figure 7-2 below.

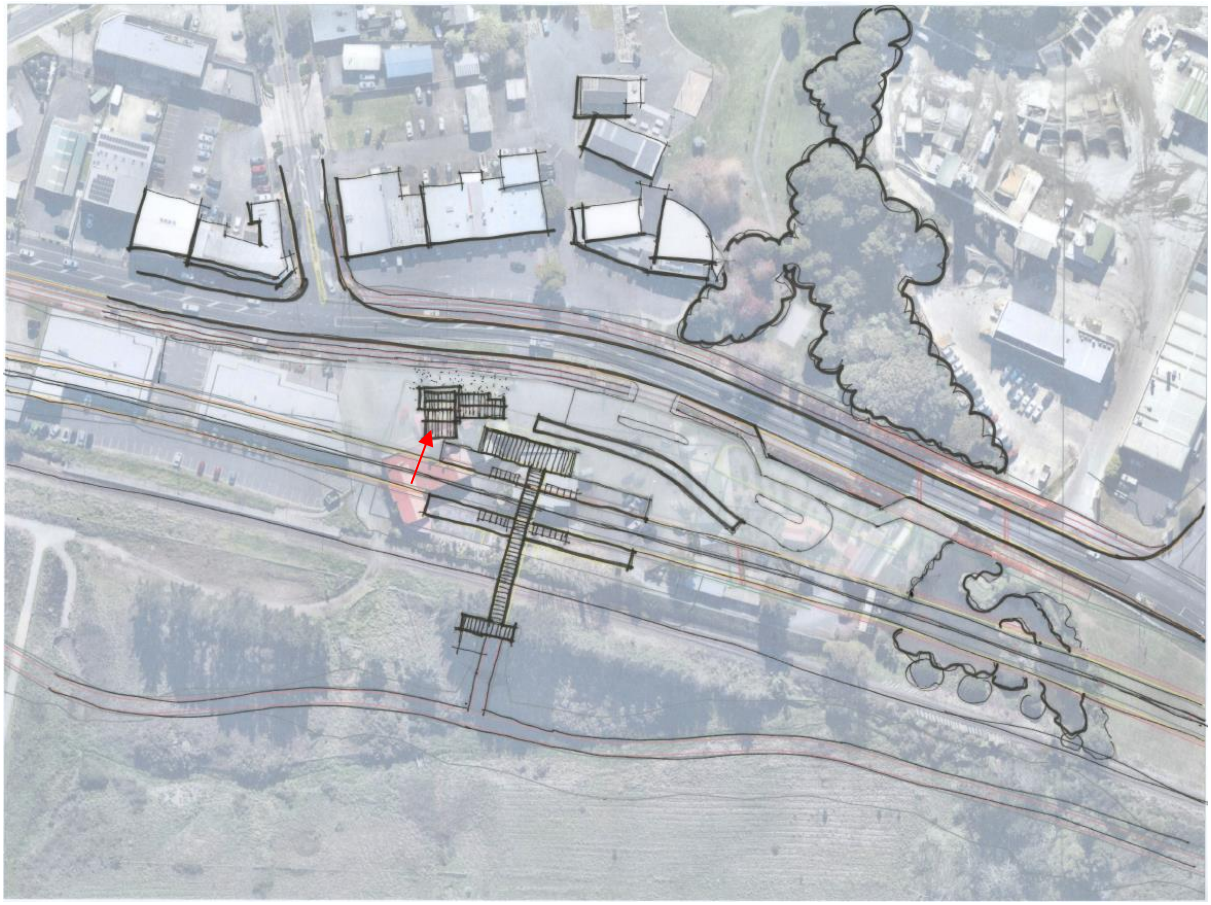


Figure 7-1. Huapai Tavern relocation option 1; within extent of place

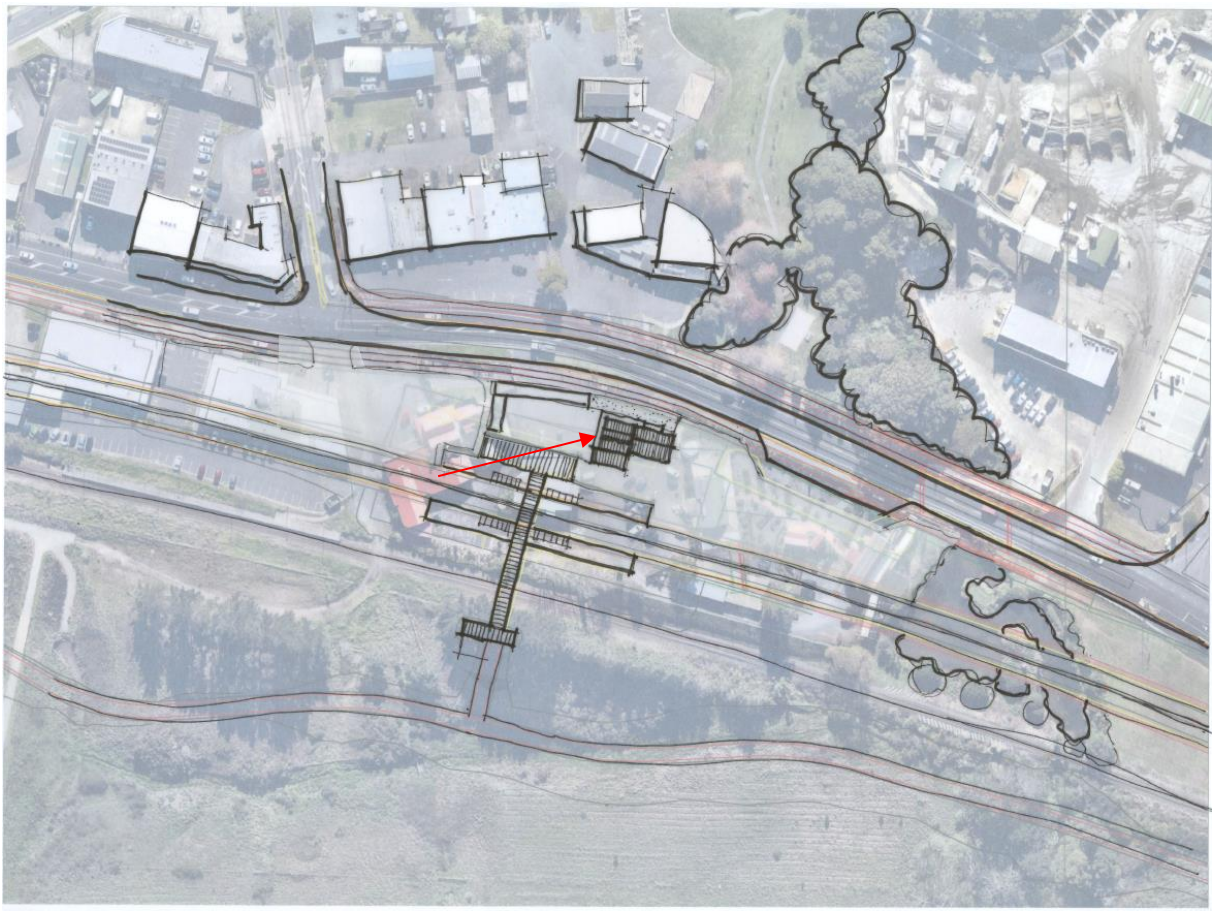


Figure 7-2. Huapai Tavern relocation option 2 – outside of extent of place

7.3.1 Positive Effects

Generally, there are no positive effects generated by construction activities required for the construction of the station and route corridor, because they will essentially modify the entire extent of place, altering its context and physical attributes. All effects on historic heritage values are either temporary adverse (such as construction nuisances) or permanent adverse (demolition or partial demolition of a scheduled historic heritage place). These adverse effects will range in severity, depending on what development options are taken.

Following completion of construction, there is potential for positive benefits to occur operationally, where historic heritage places are integrated into the station structure, or otherwise relocated within the site and maintained for future long-term use. In this environment, the context values, historical associations, social values, physical attributes and aesthetic (landmark values) might all be potentially maintained or enhanced. There is the potential for these positive effects to offset adverse effects over the longer term life of the two scheduled buildings, but this is not readily quantifiable at this stage, and will rely on detailed design.

7.3.2 Assessment of Construction Effects

Huapai Tavern – total demolition

Total demolition of the Tavern would result in large and permanent adverse effects to all historic heritage values associated with the Huapai Tavern, which cannot be fully mitigated through building recording or other methods. Total demolition also would require an archaeological authority under the HNZPTA 2014, as part of the core structure is pre-1900 in date. Total demolition of the Huapai Tavern should therefore be avoided.

Huapai Tavern – partial or substantial demolition

It is possible that the overall size of the Tavern may be reduced through demolition of more recent elements post-1970 extensions, which may not have as much heritage significance as the pre-1940 footprint (see Figure 4-2). This will still result in substantial demolition of the primary feature, as the various extensions are still part of the building and reflect its change and development over 120 plus years. In order to determine the relative significance of each building element, both external and internal building survey is required, and it would be best practice to develop a conservation plan for the building to inform further decision-making.

However, even if the building is reduced, retention in its current location seems unlikely given the required operational footprint of the new station.

Huapai Tavern – relocation

Alternatively to total or partial demolition, the Tavern may be relocated, either within the extent of place, or outside it. In either case, some demolition of the existing structure will still be required, though this will largely be the more recent extensions, or foundations which might in any case require upgrading given the building age.

It is unlikely that the full footprint of the Tavern currently could be easily relocated, but the pre-1940 core is likely to be relocatable, based on the Author's experience of monitoring similar work. This would probably need to be done in three or four sections, with each element then re-connected on the new site.

In order to retain existing context values and aesthetic values (as a local landmark), the Tavern should be relocated within the current site. Relocation 'offsite' will result in a loss of context and aesthetic values, as the building will be divorced from its historical context at the crossroads of rail and road routes. It will no longer be a central landmark to the village core.

7.3.3 Recommended Measures to Avoid, Remedy or Mitigate Construction Effects

Huapai Tavern

Relocation within the extent of place (Relocation Option 1) provides the best overall outcome for the Tavern for the following reasons:

- It retains significant building aspects which form the primary feature of the place;
- Although re-orientated within the site, it remains associated with the extent of place, which is the area *integral* to the understanding of the place;
- In particular it retains the historic spatial relationship with the Tavern located at the junction of Main Road and Matua Road;
- It also maintains a contextual relationship with the railway, and broader regional themes relating to representation of retail/hospitality in the historic environment.

In this case, the effective mitigation of construction activities means that adverse effects are likely to be reduced to a low adverse level for social, context and aesthetic values, and to a medium (moderate) adverse level for physical attributes. Overall, the place would still merit scheduling on this basis.

As noted above, relocation of the Tavern outside of the overlay can also help reduce adverse effects, but it does not fully mitigate them. There will be stronger impacts on context values and possibly aesthetic values, as the place is no longer on its original title, and the spatial relationship with the road and train junction is somewhat diluted, so that the building may have less landmark presence.

Railway Carriages

The Railway carriages (CHI 18493) are not fixed structures. As noted above, they have recently been removed from the site. Without an understanding of their condition and future outcome, recommendations for avoidance or mitigation of adverse effects cannot be made. However, Demolition (as a result of this project) is extremely unlikely due to the mobile nature of the feature.

Kumeū Railway Goods Shed

Moving the Goods Shed into an appropriate area (preferably as part of the station complex) will avoid any adverse effects on physical attributes and knowledge values that would be otherwise lost through demolition.

Retention of the Goods Shed in the vicinity of the railway will also help to maintain its context values, as it will remain as a physical reminder of the arrival of the railways in this region.

7.3.4 Assessment of Operational Effects

There is a risk that at least one scheduled historic heritage structure is relocated outside of its current extent of place.

From a planning perspective, relocation of the Huapai Tavern (AUP: OP Schedule 14.1 # 00482) or the Kumeū Goods shed (AUP: OP Schedule 14.1 #000483) is allowed for as a discretionary activity. Once relocated, a future Plan Change will be necessary to modify the current extent of place for wither site, and to update Schedule 14.1 as required.

There is the potential for any future plan change process associated with the relocation of the Goods Shed to be simplified if it is relocated within the Extent of Place for the Huapai Tavern, as it may be able to be combined with this overlay. This a future piece of work and is not sought as part of the current NoR proposals.

7.3.5 Recommended Measures to Avoid, Remedy or Mitigate Operational Effects

Huapai Tavern

If the Huapai Tavern is subject to full demolition, there will be no operational effects to manage. This is not a recommended outcome, however, because the effects of total or substantial demolition on historic heritage values cannot be fully mitigated.

If the Huapai Tavern is to be incorporated into the station design, than it is recommended that a conservation plan and maintenance plan are prepared to manage the long-term maintenance of the structure.

If the Huapai Tavern is relocated on the same title, then a plan change may not be necessary to ensure the historic heritage overlay remains active.

If the Tavern is relocated outside of the overlay, a Plan Change would be required in the future to update the schedule. As the notification of the NoR occurs well before any such relocation might occur, interim Historic Heritage controls equivalent to those applied through the overlay might be established through Designation conditions. This would ensure that until such time the AUP:OP is updated, it remains clear that the relevant Historic Heritage rules still apply to the structure.

Railway Carriages

It is assumed, on the basis of current information, that the Railway carriages will not be returned to the site prior to the operational phase. In which case, they would not be affected by the project. If possible, a record of their new location should be made, and the CHI record updated accordingly.

Railway Goods Shed

It is assumed that the Goods Shed will have been relocated to the station area as part of the operational phase. Because a Plan Change cannot applied for at the same time as the notification of the NoR, interim Historic Heritage controls equivalent to those applied through the overlay might be established through Designation conditions. This would ensure that until such time the AUP:OP is updated, it remains clear that the relevant Historic Heritage rules still apply to the structure.

7.4 Conclusions

The Huapai Tavern, an 1870s building (AUP: OP Schedule 14.1 #00482), is significantly impacted by S3 and it will require mitigation of adverse effects from construction and operation. The extent of place around the building is affected and modern extensions will need to be demolished to accommodate the proposed rapid transit corridor and station platforms. The original 19th century core will most likely need to be relocated within the site.

Additionally, the Railway Goods Shed (AUP: OP Schedule 14.1 #00483) is also impacted and requires relocation. In this case, relocation should be achievable without demolition of any part of the structure (other than its foundations). Significant adverse effects can therefore be avoided.

Operationally, if these structures form part of the future station, there is potential long-term to benefit and enhance their recognised historic heritage values, especially:

- Retention of physical attributes
- Historical associations with those context values relating to the history of the railway and establishment of Huapai and Kumeū.

8 Conclusion

The following recommendations relate to NoR S2 (SH16), NoR S3 (NoR RTC, NoR HS and NoR KS).

All Sites

Construction activities will result in temporary adverse effects from noise, dust and other construction nuisances, which can be mitigated through standard construction management processes.

There is a risk of accidental damage during construction activities, which can be remediated through repair of any damage that may occur.

Generally, there is a potential for previously unrecorded built heritage to be affected by construction. Several early buildings have been identified in the archaeological report, and it is recommended these are further assessed for heritage values.

Operationally, there is potential benefit to be accrued to all sites, through improved landscaping of the environment, and potential use opportunity within an integrated station complex.

NoR 2 -SH16 Road upgrade

The Huapai Tavern, an 1870s building (AUP: OP Schedule 14.1 #00482), is impacted by S2 and the extent of place around the building will be modified.

Potential permanent adverse effects of a minor nature may arise in relation to knowledge values (primarily the potential for archaeological features to be affected). Permanent adverse effects may be mitigated and this is described in more detail in the archaeological assessment.

The railway carriages (CHI 18493) are non-scheduled heritage items and they have been recently moved from their recorded location and their current condition is unknown. Although there is a contextual connection with the railway and the rolling stock, they are not fixed structures. Relocating these carriages permanently from the site would avoid any significant adverse effects.

The setting of a scheduled heritage building, the Railways Goods shed (AUP: OP Schedule14.1 #00483), is impacted by NoR S2. It seems likely that the building has been moved to its current location historically, based on assessment of aerial photography and maps.

In conclusion there are some adverse effects on historic heritage by the NoR of S2 and associated construction activities. However, impacts are likely to be low adverse and possibly negligible following any mitigation.

NoR S3:

Huapai

There are potentially significant (Large) and permanent adverse effects on historic heritage values of the Huapai Tavern arising from construction activities associated with NoR S3, including demolition. Relocation of any historic building is a preferable option to demolition, and for the Tavern, relocation within the extent of place (Relocation Option 1) is the preferred option overall.

Additionally, the loss of any part of the recorded heritage structures can be further mitigated by historic building recording. Changes to the curtilage and loss of more recent 20th century extensions from the Huapai Tavern can be mitigated through historic building recording, based on guidance levels established by HNZPT (2018). The level of recording will be relative to with the identified heritage values of the elements requiring demolition or alteration.

The railway carriages (CHI 18493) are non-scheduled heritage items and are not currently present on the site. It is not known whether they will return, or even if they are still extant.

Kumeū

The scheduled Railways Goods Shed (AUP: OP Schedule 14.1 #00483) is physically impacted by NoR S3. It has been likely moved to its current location. Appropriate mitigation would involve relocating the Good Shed to an alternative location, preferably in proximity to the proposed Kumeū rapid transit station (NoR KS), so that it continues to have a contextual and historical relationship with the railway line.

Relocation outside of the current extent of place will necessitate a future plan change requirement to modify the historic heritage overlay extent of place associated with the Goods Shed.

To a lesser extent, the setting of the Railways Goods Shed will be affected by NoR 2.

Temporary nuisances associated with Construction activities (noise, dust etc.) may be managed through standard construction practices, such as control of operating hours, dust control and noise attenuation barriers.

The incorporation of the Tavern within the new rapid transit station area, would be an opportunity to maintain it as a viable commercial space for the long-term, as well as a key community location at the centre of Kumeū town.

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1 APPENDIX 1 – ASSESSMENT METHOD FOR DETERMINING SCALE OF EFFECT

The effects that must be addressed in an AEE are set out in clause 7 of Schedule 4 and as follows:

- effects on those in the neighbourhood and, where relevant, the wider community including any social, economic and cultural effects
- physical effects on the locality including landscape and visual effects
- effects on ecosystems including effects on plants or animals and the physical disturbance of habitats in the vicinity
- effects on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual or cultural, or other special value for present or future generations
- any discharge of contaminants into the environment, including any unreasonable emission of noise and options for the treatment and disposal of contaminants
- any risk to the neighbourhood, wider community or the environment through natural hazards or the use of hazardous substances or hazardous installations.

The requirement to address a matter in the assessment of environmental effects is subject to the provision of any relevant policy statement which may direct and/or restrict the assessment to certain matters.

The terms 'effect' and 'environment' under the RMA are broadly defined. It is the role of the AEE to identify and address actual and potential effects of a proposal on a particular environment. The term effect includes:

- **Positive and adverse effects** - both of these effects should be considered regardless of their scale and duration. It is also important to remember that the assessment is not about achieving a balance between the two but ensuring adverse effects are avoided, remedied or mitigated.
- **Temporary and permanent effects** -there are many effects associated with proposals that are often temporary, such as those relating to a temporary event. It is important to make the distinction in the assessment between effects that are temporary versus those that are permanent. If there is only a temporary non-compliance with rules in a plan or regulations, and the adverse effects of that aspect are not discernible from those of permitted activities, the council has the discretion to treat the activity as a permitted activity and issue a written notice to that effect, and return the application. See s87BB RMA. For further information on this process, refer to the MfE technical guidance on deemed permitted activities.
- **Past, present and future effects** - in addition to past and present effects it is also important to consider forecast effects as some effects may take time to show and consideration should be given as to whether these effects are of high or low probability at any time in the future.
- Any **cumulative effects** regardless of degree or element of risk - an adverse cumulative effect is an effect, when combined with other effects, is significant only when it breaches a threshold. It should not be confused with matters relating to precedent.
- Any **reverse sensitivity effects** - situations where a potentially incompatible land use is proposed to be sited next to an existing land use.

Subject to the provisions of any policy statement or plan, all of these effects must be considered in the AEE regardless of their scale, intensity, duration, or frequency. It should also be considered whether potential effects are of high and/or low probability and could have a high potential impact.

Table for Determining Scale of Effects

VALUE					
Outstanding (very high) 5	Nil (0)	Little/ Minor (10)	Moderate / More Minor (15)	Large / Significant (20)	Critical / Significant (25)
Considerable (high) 4	Nil (0)	Little/ Minor (8)	Moderate / More Minor (12)	Moderate / Significant (16)	Large / Significant (20)
Moderate (medium) 3	Nil (0)	Negligible / Less Minor (6)	Little / Minor (9)	Moderate / More Minor (12)	Moderate / More Minor (15)
Little (low) 2	Nil (0)	Negligible / Less Minor (4)	Negligible / Less Minor (6)	Little / Minor (9)	Little/ Minor (10)
Negligible 1	Nil (0)	Negligible / Less Minor (2)	Negligible / Less Minor (3)	Negligible / Less Minor (4)	Negligible / Less Minor (5)
None 0	Nil (0)	Nil (0)	Nil (0)	Nil (0)	Nil (0)
	No Change 0	Low 2	Moderate 3	High 4	Very High 5
IMPACT					

This scale is adapted from EIA Good Practice examples (e.g. UK Design Manual Roads and Bridges / NZILA / ICOMOS NZ, Waka Kotahi Guidance on Assessment of Historic Heritage Effects for Highway Projects) to incorporate common terminology used in the New Zealand RMA Planning Context, and the recommended scaling of effects described in MfE and Quality Planning Website documents. Numerical values are provided to demonstrate relative weighting of effects.

Effects to historic heritage values are considered using the following scale and may be classed as Temporary, Permanent; Adverse or Beneficial.

Magnitude of Effect		Adverse Effects
Critical / Significant		Significant unacceptable adverse effects that cannot be avoided or mitigated. Most, or key, statutory objectives are not met.
Large / Significant		Significant adverse effects that is noticeable and will have a serious adverse impact on the environment but may be avoided or mitigated. Some key statutory objectives are not met
Moderate / More minor		Adverse effects that are noticeable that may cause an adverse impact but could be potentially mitigated or remedied and may be acceptable. Key statutory objectives are met, but not all
Little / Minor		Adverse effects that are noticeable but will not cause any significant adverse impacts, and may also be further avoided or mitigated. Most or all statutory objectives are met
Negligible / Less Minor		Adverse effects that are acceptable, and may not require further mitigation. They are discernible day-to-day effects, but too small to adversely affect other persons. Statutory objectives are met
None		No effect/Neutral
Intrusive*		Removal of an intrusive feature is always beneficial effect as intrusive aspects by nature are detrimental

Magnitude of Effect		Beneficial Effects
Critical		Beneficial effects which strongly enhance historic heritage values and support statutory objectives
Large / Significant		Beneficial effects which positively enhance historic heritage values and support most statutory objectives
Moderate / More minor		Beneficial effects which maintain or slightly enhance historic heritage values and support some statutory objectives
Little / Minor		Beneficial effects which slightly maintain or slightly enhance historic heritage values
Negligible / Less Minor		Beneficial effects which maintain historic heritage values to a limited degree
None		No effect/Neutral
Intrusive*		Removal of an intrusive feature is always beneficial effect as intrusive aspects by nature are detrimental

*(Where a particular feature is identified as intrusive in a conservation plan / heritage assessment)

ATTACHMENT 56

NORTH-WEST STRATEGIC ASSESSMENT OF HERITAGE / ARCHAEOLOGY EFFECTS

TE TUPU NGĀTAHI
SUPPORTING GROWTH

North West Strategic Assessment of Heritage / Archaeology Effects

December 2021

Version 1

Document Status

Responsibility	Name
Author	Dr. Hans-Dieter Bader
Reviewer	Dr. Janice Adamson
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Revision Status

Version	Date	Reason for Issue
1	16/12/2022	Notice of Requirement Lodgement

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Abbreviations

Acronym/Term	Description
AEE	Assessment of Effects on the Environment
ASH	Alternative State Highway
AT	Auckland Transport
AUP:OP	Auckland Unitary Plan Operative in Part
BCI	Brigham Creek Interchange
CC2W	City Centre to Westgate
FTN	Frequent Transit Network
FULSS	Future Urban Land Supply Strategy
FUZ	Future Urban Zone
NAL	North Auckland Line
NoR	Notice of Requirement (under the Resource Management Act 1991)
RMA	Resource Management Act 1991
RTC	Rapid Transit Corridor
RAMC	Regional Active Mode Corridor
RUB	Rural Urban Boundary
SG	Te Tupu Ngātahi Supporting Growth
SH16	State Highway 16
The Council	Auckland Council
Waka Kotahi	Waka Kotahi NZ Transport Agency

Glossary of Acronyms / Terms

Acronym/Term	Description
Auckland Council	Means the unitary authority that replaced eight councils in the Auckland Region as of 1 November 2010.
Strategic Assessment Package	Four Notices of Requirement (for ASH, RTC, Station Road and SH16) and one alteration to an existing designation (SH16 Main Road) for the Whenuapai Arterial Transport Network for Auckland Transport.
CHI	Cultural Heritage Inventory – a legacy database of historic and archaeological sites of the Auckland Council
NZAA	New Zealand Archaeological Association which runs the Site Recording Scheme. For a long time the Scheme was paper based but has recently been lifted onto a GIS application, the so called ArchSite
ArchSite	The online database of the Site Recording Scheme of the NZAA. It is the de facto national database of archaeological sites.

1 Executive Summary

Assessment undertaken

1. The assessment is based on

    - a review of the heritage databases at Auckland Council, New Zealand Archaeological Association Site Recording Scheme and Heritage New Zealand Pouhere Taonga
    - a review of historic maps
    - published and unpublished publications on the history of the study area
    - previously undertaken archaeological investigations and research
    - landscape and environment
    - oral traditions where available

2. Assessment criteria used are from

    - Heritage New Zealand Pouhere Taonga Act
    - Resource Management Act and
    - Auckland Unitary Plan (OP)

3. All cultural heritage sites, archaeological sites, risk areas (including unrecorded sites) and sub-surface archaeological features within 200 metres of the extent of each NoR route have been considered as part of this assessment. Heritage buildings are mentioned as heritage sites but are discussed in the separate Built Heritage Assessment. Heritage buildings are often surrounded by curtilage (services, cess pits and the like) which are considered archaeological sites. The curtilages of historic buildings as likely archaeological sites are considered in this report.
All heritage and archaeological sites as well as risk areas have a number specific to this report and the graphics in this report (e.g.: #022). In addition each item that is recorded in the Cultural Heritage Inventory (CHI), a legacy database, has a CHI number, each heritage item scheduled under the AUP:OP has a number and each archaeological site has a New Zealand Archaeological Association (NZAA) Site Recording Scheme (Archsite) number (e.g.: R11/98). The same site may or may not be present in several of these lists and databases.

NoR S1 Alternative State Highway (ASH), including Brigham Creek Interchange (BCI)

Results of assessment and recommended measures

4. There are no recorded archaeological sites within the extent of the proposed route. In terms of actual and potential features within the route and within 200m of the route, these are:

    - One historic building is recorded (#026) in the CHI within the proposed route and one possible archaeological site (#027). The possible archaeological site is the reported location of an early church which is within the route. Both would be impacted partially by the proposed route.

- Five historic buildings (four recorded in the CHI only, one is also scheduled in the AUP;OP), two archaeological sites, one scheduled notable tree and one scheduled historic heritage place is within the 200m buffer. One of the historic buildings is so close to the extent of the proposed route that the curtilage might be affected by the earthworks.

- Four significant streams (#010_12, #035, #036 and #037), three which were likely navigable by waka in pre-Contact times, are within the proposed earthworks footprint. These are areas of high risk to encounter archaeological features that have not been recorded previously as archaeological sites.

There are potential adverse effects on historic heritage and the archaeology by the proposed works.

5. Positive effects may arise as a result of construction around wetlands and streams, as these works will allow environmental archaeological research to be undertaken that could clarify the dates, sequence and details of the anthropogenic vegetation change from forest to open fern lands as it is recoded in 1853.

   All earthworks that include topsoil stripping (not just within the extent of the NoR but also haul roads, laydown areas etc.) must be considered for potential unrecorded archaeological deposits and features.

   Documentation of a suitable level of the historic building (fruit packing shed, #026) before demolition and investigation of the sub-floor assemblage and curtilage would allow preservation through documentation.

   There are no operational effects on archaeological or heritage sites.

6. There is a reasonable risk of potential adverse effects through encountering unrecorded archaeological sites. One historic building (fruit packing shed #026) within the works footprint is discussed in the Built Heritage Report.

7. A precautionary archaeological authority would mitigate the risk of encountering unrecorded archaeological sites. The historic building (#026) is post 1900 and therefore does not fall under the HNZPT Act.

8. Any processes regarding tikanga, especially around koiwi, should be discussed with manawhenua before the start of the project.

Conclusion

9. In conclusion there is an adverse effect on historic heritage by the proposed development of S1.

NoR S2 SH16 Main Road Upgrade

Results of assessment and recommended measures

10. There are no recorded archaeological sites within the extent of the proposed route. In terms of actual and potential features within the route and within 200m of the route, these are:

- One historic building is recorded close to the proposed route, a historic railway shed (AUP:OP reference #00483), and the curtilage of three more is within the route (#016, #017, #018, #019, they will be impacted by the RTC and discussed in detail there). They are within the 200 m buffer zone, but right next to the planned route extent. Two of the buildings are scheduled as historic places in the Auckland Unitary Plan (AUP:OP references #00482 and #00483).

- There are three significant streams (#038, #039, and #040), two of which were likely navigable by waka in pre-Contact times are within the proposed earthworks footprint. These are areas of high risk to encounter archaeological features that have not been recorded previously as archaeological sites.

There are adverse effects on historic heritage and potential adverse effects on archaeology by the proposed development.

11. Positive effects may arise as a result of the construction around wetlands and streams in that these works will allow environmental archaeological research to be undertaken that could clarify the dates, sequence, and details of the anthropogenic vegetation change from forest to open fern lands as it is recoded in 1853.

    All earthworks that include topsoil stripping (not just within the extent of the NoR area but also haul roads, laydown areas etc.) have to be taken into account for potential unrecorded archaeological deposits and features.

    Documentation of any historic building before demolition and investigation of the sub floor assemblage and curtilage would allow preservation through documentation.

    The railway shed (AUP#00483) has been shifted to its current location and does not contain any potential archaeological curtilage. The alignment does extend into the heritage overlay of the Huapai Tavern (AUP#00482) and might encounter some of the curtilage of the building.

    There are no operational adverse effect on archaeology or heritage.

12. There is a reasonable risk of potential adverse effects by encountering unrecorded archaeological sites. One historic building area scheduled in the AUP:OP (#00482) is affected by the earthworks but the historic building itself seems to be just outside of the proposed earthworks. These are major cultural heritage adverse effects.

13. An archaeological authority would mitigate the risk to encounter features that has not been recorded as archaeological sites. An archaeological authority is required to move or demolish the scheduled historic place/building or undertake earthworks within the potential curtilage of heritage buildings.

14. Any processes regarding tikanga, especially around koiwi, should be discussed with manawhenua before the start of the project.

Conclusion

15. In conclusion there is an adverse effect on historic heritage by the proposed development of S2.

NoR S3 Rapid Transit Corridor (**RTC**), including the Regional Active Mode Corridor (**RAMC**), ***NoR KS*** Kumeū RTC Station and ***NoR HS*** Huapai RTC Station

Results of assessment and recommended measures

16. There are no recorded archaeological sites within the extent of the proposed route. In terms of actual and potential features within the route and within 200m of the route, these are:

    - Two historic buildings are recorded (Huapai Tavern #016, historic house #023 report specific numbers displayed on the graphics) within the proposed route and one possible archaeological site which is the location of the original Kumeū train station building (#041), is within the route. One of the historic buildings, the Huapai Tavern, is scheduled as a historic place in the AUP:OP (reference #00482).

    - The curtilage of three further historic buildings or structures (#017, #019, #020) might be impacted by the proposed route extent. These three buildings/structures are right next to the proposed route extent and there is one further heritage building (#024) within the 200 m buffer zone.
    - There is a small risk of potential adverse effects by encountering unrecorded archaeological sites on the footprint of the Kumeū RTC Station, as heritage buildings are recorded on historic maps but have likely been destroyed by the developments of the 19th and 20th century.

    - There are three significant streams (#038, #039, and #040), two of which were likely navigable by waka in pre-Contact times are within the footprint of the planned earthworks. These are areas of high risk to encounter archaeological features that have not been recorded previously as archaeological sites.

    There are adverse effects on historic heritage and potential effects on archaeology as a result of the proposed development.

17. Positive effects may arise as a result of the construction around wetlands and streams in that these works will allow environmental archaeological research to be undertaken that could clarify the dates, sequence, and details of the anthropogenic vegetation change from forest to open fern lands as it is recoded in 1853.

    All earthworks that include topsoil stripping (not just within the extent of the NoR area but also haul roads, laydown areas etc.) have to be taken into account for potential unrecorded archaeological deposits and features.

    Documentation of the historic buildings before demolition and investigation of the sub floor assemblage and curtilage would allow preservation through documentation.

    A preferable mitigation process to documentation only would be to keep the Huapai Tavern (scheduled in AUP:OP as #00482, displayed in the graphics of this report as #016) on its original location and incorporate it into the function of the proposed train station. As a second best option is the development of a heritage precinct next to the Kumeū Rapid Transport Station. This is an opportunity to enhance the social wellbeing of the community. This could include the shifting of three of the structures (the Huapai Tavern - AUP #00482 (#16), the railway shed - AUP #00483 (#19) and the train carts of the railway café (#17)) into a dedicated heritage precinct on the area or close to the future Kumeū train station. Both these latter buildings have previously moved onto

their current location and therefore contain no heritage curtilage. The final mitigation measures will be confirmed as part of the Historic Heritage Management Plan which is a condition of the proposed designation.

There are no operational adverse effects on archaeology or heritage.

18. There is a reasonable risk of potential adverse effects by encountering archaeological features that have not been recorded as archaeological sites along the RTC and within the footprint of the Kumeū Station as well as close to the 19th railway corridor at the Kumeū and Huapai RTC stations. Two historic buildings, one of them scheduled must be either moved or demolished for the planned corridor (a railway shed, scheduled as AUP:OP #00483, and railway carriages). These are major cultural heritage adverse effects.

19. An archaeological authority would mitigate the risk to encounter archaeological features that have not been recorded as archaeological sites. An archaeological authority is necessary to move or demolish any historic places/buildings.

20. Any processes regarding tikanga, especially around koiwi, should be discussed with manawhenua before the start of the project.

Conclusion

21. In conclusion there are adverse effects on historic heritage by the proposed development of S3. The demolition of heritage buildings is a major adverse effect, even mitigated by a detailed documentation before the demolition. Incorporating them into new developments is a better option. As a second best option the buildings can be moved instead of demolished though there are still negative effects, but which could be mitigated, even more so if the new location of the buildings serves the purpose to educate the public about the heritage of the area.

NoR S4 Access Road Upgrade

Results of assessment and recommended measures

22. There are no recorded archaeological sites within the extent of the proposed route. In terms of actual and potential features within the route and within 200m of the route, these are:

    - One historic building is recorded within the 200 m buffer zone.

    There are no adverse effects on historic heritage and only a small risk to encounter archaeological features that have not been recorded as archaeological sites by the proposed development.

23. All earthworks that include topsoil stripping (not just within the extent of the NoR area but also construction areas) have to be taken into account for potential unrecorded archaeological deposits and features.

    There are no operational adverse effects on archaeology or heritage.

24. There is a very small risk of potential adverse effects by encountering archaeological features that have not been recorded as archaeological sites.

25. An Accidental Discovery Protocol would mitigate the very small risk to encounter archaeological features that have not been recorded as archaeological sites. It is recommended to align it with any Cultural Monitoring Protocol that might be developed by manawhenua in the future.

26. Any processes regarding tikanga, especially around koiwi, should be discussed with manawhenua before the start of the project.

Conclusion

27. In conclusion there is no adverse effect on historic heritage by the proposed development of S4.

Wider Conclusion

28. Overall, the most severe impact onto the cultural heritage by the RTC corridor and Kumeū Station projects is onto the few remaining historic buildings and structures of early Kumeū from the time when it was a service centre for a rural community. These buildings form a strong tie to the past and the local identity. Demolition of these structures would severe this tie.
The construction of a Kumeū transport station can be seen as a unique opportunity to bring these buildings together and strengthen the local identity with a dedicated heritage centre. The final mitigation measures will be determined during detailed design stage and form part of the Historic Heritage Management Plan (which is a condition of the proposed designation).

29. Nothing is visible of the pre-Contact history of the region and the crossing of several navigable streams by the strategic projects open the risk of encountering sub-surface archaeological features that have not been recorded as archaeological sites. We know from historical sources and oral traditions that Kumeū has been occupied by manawhenua. The works are also an opportunity to retell those histories and bring back some of the footprints of this pre-Contact occupation.

30. The adverse effects can be mitigated within the legal framework by archaeological authorities which would involve preservation by documentation of existing and newly discovered sites and places of significance. This includes the Huapai Tavern and the Railway shed (AUP:OP #00482 and 00483) from the perspective of the Heritage New Zealand Pouhere Taonga Act (2014), but the schedule in the AUP:OP needs to be considered for these two sites. The Huapai Tavern should not be moved but integrated into the station as a best outcome. Moving it is the second-best option and demolition and preservation through documentation is the last resort.

2 Introduction

This heritage landscape assessment has been prepared for the North West Strategic Projects Notices of Requirement (**NoRs**) for Waka Kotahi NZ Transport Agency (**Waka Kotahi**) and Auckland Transport (**AT**) (the "**Strategic Assessment Package**").

The NoRs are to designate land for future strategic and local arterial transport corridors as part of Te Tupu Ngātahi Supporting Growth Programme (**Te Tupu Ngātahi**) to enable the construction, operation and maintenance of transport infrastructure in the North West area of Auckland.

This report assesses the transport effects of the North West Strategic Assessment Package identified in Figure 5-1 and Table 2-1 below. Refer to the AEE for a more detailed project description.

Table 2-1: North West Strategic Assessment Package – Notices of Requirement and Projects

Notice	Project
NoR S1	Alternative State Highway (ASH), including Brigham Creek Interchange (BCI)
NoR S2	SH16 Main Road Upgrade
NoR S3	Rapid Transit Corridor (**RTC**), including the Regional Active Mode Corridor (RAMC)
NoR KS	Kumeū RTC Station
NoR HS	Huapai RTC Station
NoR S4	Access Road Upgrade

2.1 Purpose and Scope of this Report

This assessment forms part of a suite of technical reports prepared to support the assessment of effects within the Strategic Assessment Package. Its purpose is to inform the AEE that accompanies the Strategic Assessment Package sought by Waka Kotahi and AT.

This report considers the actual and potential effects associated with the construction, operation and maintenance of the Strategic Assessment Package on the existing and likely future environment as it relates to effects onto heritage and archaeology and recommends measures that may be implemented to avoid, remedy and/or mitigate these effects.

The key matters addressed in this report are as follows:

a) Identify and describe the heritage and archaeological context of the Strategic Assessment Package area.
b) Identify and describe the actual and potential effects onto heritage and archaeology of each Project corridor within the Strategic Assessment Package.

c) Recommend measures as appropriate to avoid, remedy or mitigate actual and potential effects onto heritage and archaeology (including any conditions/management plan required) for each Project corridor within the Strategic Assessment Package; and
d) Present an overall conclusion of the level of actual and potential effects onto heritage and archaeology for each Project corridor within the Strategic Assessment Package after recommended measures are implemented.

2.2 Report Structure

The report is structured as follows:

a) Overview of the methodology used to undertake the assessment and identification of the assessment criteria and any relevant standards or guidelines.
b) Description of each Project corridor and project features within the Whenuapai Assessment Package as it relates to historic heritage and archaeology.
c) Identification and description of the existing and likely future heritage landscape, separated into physical environment, Māori settlement history, European settlement history and previous archaeological projects as far as it is relevant to describe positive and adverse effects.
d) Description of the actual and potential positive effects on heritage and archaeology of each Project corridor.
e) Description of the actual and potential adverse effects on heritage and archaeology of construction of each Project corridor.
f) Description of the actual and potential adverse effects on heritage and archaeology of operation of each Project corridor.
g) Recommended measures to avoid or mitigate potential adverse effects on heritage and archaeology; and
h) Overall conclusion of the level of potential adverse effects on heritage and archaeology of each Project corridor after recommended measures are implemented.

This report should be read alongside the AEE which contains further details on the history and context of the Strategic Assessment Package. The AEE also contains a detailed description of works to be authorised for each NoR, likely staging and the typical construction methodologies that will be used to implement this work. These have been reviewed by the author of this report and have been considered as part of this assessment of effects on historic heritage and archaeology. As such, they are not repeated here, unless a description of an activity is necessary to understand the potential effects, then it has been included in this report for clarity.

2.3 Preparation for this Report

Preparation for this report included desktop investigations and drive by visits from public land.

Sources for desktop research include:

- NZ Archaeological Association (NZAA) online site recording database Archsite
- LINZ database of historic maps and survey plans via Quickmaps
- Heritage New Zealand Heritage List/ Rārangi Kōrero
- Heritage New Zealand online reports database
- Auckland Council Geomaps GIS viewer

- Auckland Council Cultural Heritage Inventory (CHI)
- Auckland Council Archives (online resources)
- Archives New Zealand (online resources)
- Local histories – published and unpublished
- Archaeological reports
- Aerial photographs
- National Library cartographic collection
- Alexander Turnbull Tiaki online collection
- Auckland Museum pictorial collections

The following archaeological reports were of particular interest:

Foster, R., Felgate, M., 2011, *Archaeological Investigation of Field Cottage and Ocklestone House,* Unpublished report to NZ Transport Agency, Auckland.

MacReady, S., 2019, *SH16 IMPROVEMENTS, BRIGHAM CREEK TO WAIMAUKU: PRELIMINARY ARCHAEOLOGICAL ASSESSMENT*, Unpublished report to NZ Transport Agency Safe Roads Alliance, Auckland.

Shackles, R. et.al., 2019, *COASTAL WALKWAY SUNDERLAND-HUDSON PRECINCT, HOBSONVILLE POINT: ARCHAEOLOGICAL MONITORING AND INVESTIGATION REPORT*, Unpublished report to Hobsonville Land Company, Auckland.

The drive by used only public roads and public land to get close to areas of interest pinpointed by the desktop research. The drive by were sufficient for the purpose of the report but did not require landowner consent and time-consuming surface and sub-surface investigations.

3 Assessment Methodology

3.1 Statutory Requirements

There are two main pieces of legislation in New Zealand that control work affecting archaeological sites. These are the *Heritage New Zealand Pouhere Taonga* Act 2014 (HNZPTA) and the *Resource Management* Act 1991 (RMA)

This assessment considers heritage places and archaeological sites as defined in the HNZPT Act, scheduled sites in the AUP OP, and also heritage sites that are recognised in the Auckland Council's Cultural Heritage Inventory (CHI).

3.1.1 Heritage New Zealand Pouhere Taonga Act 2014

Heritage New Zealand Pouhere Taonga (HNZ) administers the HNZPTA. The HNZPTA contains a consent (authority) process for any work affecting archaeological sites, where an archaeological site is defined as:

> *"6(a) any place in New Zealand, including any building or structure (or part of a building or structure), that—*
>
> (i) *was associated with human activity that occurred before 1900 or is the site of the wreck of any vessel where the wreck occurred before 1900; and*
>
> *(ii) provides or may provide, through investigation by archaeological methods, evidence relating to the history of New Zealand; and*
>
> *6(b) includes a site for which a declaration is made under section 43(1)"*

Any person, who intends carrying out work that may damage, modify or destroy an archaeological site, or to investigate a site using invasive archaeological techniques, must first obtain an authority from HNZ. The process applies to sites on land of all tenure including public, private and designated land. The HNZPTA contains penalties for unauthorized site damage or destruction.

The archaeological authority process applies to all sites that fit the HPA definition, regardless of whether:

- The site is recorded in the NZ Archaeological Association Site Recording Scheme or registered by HNZ;
- The site only becomes known about as a result of ground disturbance, and/ or
- The activity is permitted under a district or regional plan, or a resource or building consent has been granted.

Heritage New Zealand Pouhere Taonga also maintains The New Zealand Heritage List Rārangi Kōrero of Historic Places, Historic Areas, Wāhi Tupuna/Tipuna, Wāhi Tapu and Wāhi Tapu Areas. The List Rārangi Kōrero includes some significant archaeological sites. The purpose of The List Rārangi Kōrero is to inform members of the public about such places and to assist with their protection under the Resource Management Act (1991).

3.1.2 Resource Management Act 1991

The RMA promotes the sustainable management of natural and physical resources (RMA Section 2, 5(1)).

RMA Section 2, 5(2):
In this Act, **sustainable management** means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while—

(a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations

The protection of historic heritage from inappropriate subdivision, use, and development is identified as a matter of national importance (section 6(f)).

Historic heritage is defined as those natural and physical resources that contribute to an understanding and appreciation of New Zealand's history and cultures, derived from archaeological, architectural, cultural, historic, scientific, or technological qualities.

Historic heritage includes:

• historic sites, structures, places, and areas;

• archaeological sites;

• sites of significance to Maori, including wāhi tapu;

• surroundings associated with the natural and physical resources

(section 1 Interpretations).

These categories are not mutually exclusive and some archaeological sites may include above ground structures or may also be places that are of significance to Māori.

In Auckland the AUP:OP, there are specific provisions for historic heritage and places of significance to manawhenua. Those places of significance to manawhenua have the potential of containing archaeological value too. Note that scheduled historic heritage places have a stronger protection than archaeological sites, as these are not scheduled in the Plan.

3.1.3 Assessment Criteria

The basis for the used assessment criteria is defined by the Heritage New Zealand Pouhere Taonga (HNZPT) as follows:

> *"Archaeological values relate to the potential of a place to provide evidence of the history of New Zealand. This potential is framed within the existing body of archaeological knowledge, and current research questions and hypotheses about New Zealand's past. An understanding of the overall archaeological resource is therefore required"*(Heritage New Zealand Pouhere Taonga 2019:9).

The assessment criteria are split into two sections, Main Archaeological values and Additional values.

The first archaeological values look at an ***intra*** *(within the)* ***site*** *context.*

- **Condition**:
  How complete is the site? Are parts of it already damaged or destroyed?
  Condition varies from undisturbed to destroyed and every variation in between. It is also possible that the condition of various parts of the site varies.

- **Rarity/Uniqueness:**
  Rarity can be described in a local, regional and national context. Rarity can be rare as a site, or rarely examined or today a rare occurrence in the records.

- **Information Potential:**
  How diverse are the features to be expected during an archaeological excavation on the site?
  How complete is the set of features for the type of site?
  Can the site inform about a specific period or specific function?

The second set of archaeological values are ***inter site*** *(between sites) context* criteria:

- **Archaeological landscape / contextual value:**
  What is the context of the site within the surrounding archaeological sites?
  The question here is the part the site plays within the surrounding known archaeological sites. A site might sit amongst similar surrounding sites without any specific features. Or a site might occupy a central position within the surrounding sites. Though a site can be part of a complete or near complete landscape, whereby the value of each individual site is governed by the value of the completeness of the archaeological landscape.

- **Amenity value**:
  What is the context of the site within the physical landscape?
  This question is linked to the one above, but focuses onto the position of the site in the landscape. Is it a dominant site with many features still visible or is the position in the landscape ephemeral with little or no features visible? This question is also concerned with the amenity value of a site today and its potential for onsite education.

- **Cultural Association:**
  What is the context of the site within known historic events or to people?
  This is the question of known cultural association either by manawhenua or other descendant groups. This question is also concerned with possible commemorative values of the site.

Other values could include (Heritage New Zealand Pouhere Taonga 2019:9):

1 Architectural

2 Historic

3 Scientific

4 Technological

5 Cultural

The last value, cultural, acknowledges if there is an impact onto Māori cultural values. This assessment will not evaluate these, but rather state their relevance in relation to the other values. The HNZPT Act requires an assessment of Maori values as part of archaeological authority applications. Generally, HNZPT prefers that such an assessment be provided by manawhenua (Heritage New Zealand Pouhere Taonga 2019:10).

In addition, the Auckland Unitary Plan (Part 1, Chapter B: 5.2.2) outlines a place as having historic heritage value if it has one or more of the following values.

Identify and evaluate a place with historic heritage value considering the following factors:

(a) historical: the place reflects important or representative aspects of national, regional or local history, or is associated with an important event, person, group of people, or with an idea or early period of settlement within New Zealand, the region or locality;

(b) social: the place has a strong or special association with, or is held in high esteem by, a particular community or cultural group for its symbolic, spiritual, commemorative, traditional or other cultural value;

(c) Mana Whenua: the place has a strong or special association with, or is held in high esteem by, Mana Whenua for its symbolic, spiritual, commemorative, traditional or other cultural value;

(d) knowledge: the place has potential to provide knowledge through archaeological or other scientific or scholarly study, or to contribute to an understanding of the cultural or natural history of New Zealand, the region, or locality;

(e) technology: the place demonstrates technical accomplishment, innovation or achievement in its structure, construction, components or use of materials;

(f) physical attributes: the place is a notable or representative example of:

(i) a type, design or style;

(ii) a method of construction, craftsmanship or use of materials; or

(iii) the work of a notable architect, designer, engineer or builder;

(g) aesthetic: the place is notable or distinctive for its aesthetic, visual, or landmark qualities;

(h) context: the place contributes to or is associated with a wider historical or cultural context, streetscape, townscape, landscape or setting.

The methodology applies to all NoRs (NoRs S1, S2, S3, KS, HS, S4) and to both construction and operation stages.

4 Background

4.1 Physical Environment

The physical environment is low lying undulating. The study area (for all NoRs) is framed by the Ngongetepara Stream (off Brigham Creek) with the Totara Creek as a side stream and the Waiarohia Creek and Stream. The latter forms a natural boundary to the Hobsonville peninsula, called Onekiritea in pre-Contact times.

Brigham Creek and the Kumeū Stream that runs to the north of the study area forming a pathway between the Waitemata and the Kaipara harbours. The upper reaches of the Kumeū stream turn south and the study area is crossing the alluvium flats of the River on these upper reaches.

The soils of the area are allophanic soils impeded (LI) (https://soils-maps.landcareresearch.co.nz/). These soils are made from volcanic materials and this is reflected by the area made from East Coast Bays formation (Mwe: sand and mudstone with mixed volcanic content), Puketoka formation (Pup: pumiceous mud, sand and gravel including alluvial deposits) and Taupo Pumice alluvium (Q1a: estuarine and swamp deposits) (Figure 4-1).

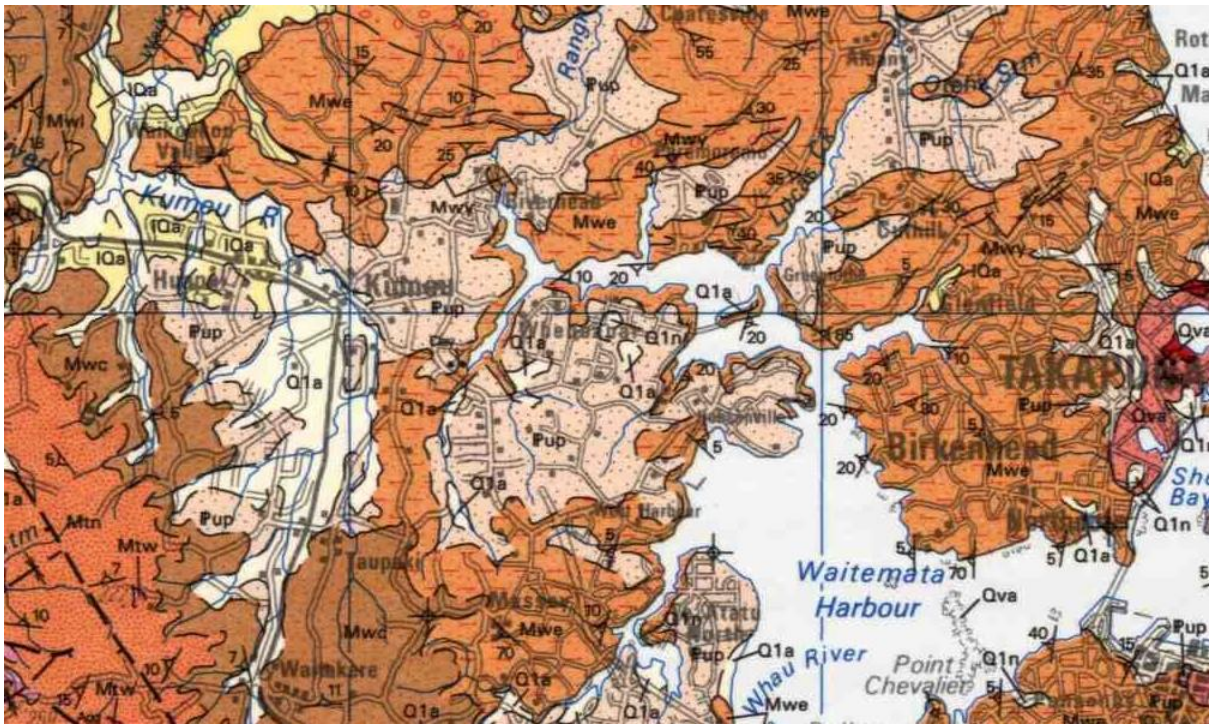

Figure 4-1: Detail of geological map, Auckland (Copyright Crown).

Historically the area was covered in Kauri forest like the rest of West Auckland, but with contact since European settlement this forest has given way to ‘undulating fern lands’ (Figure 4-2).

The modern use for farming and grazing shows that the volcanic content of the soils adds fertility to the general silty clay soils. The question is therefore how the area was used in pre-Contact times. The fertility of the soil would have supported growing of taro and other crops and swamps were seen as ‘food baskets’ for the availability of birds, eels and other resources like raupo. Is the observed

deforestation during pre-Contact times simply a matter of burning the forest or is it a sign of horticulture that left little archaeological signatures?

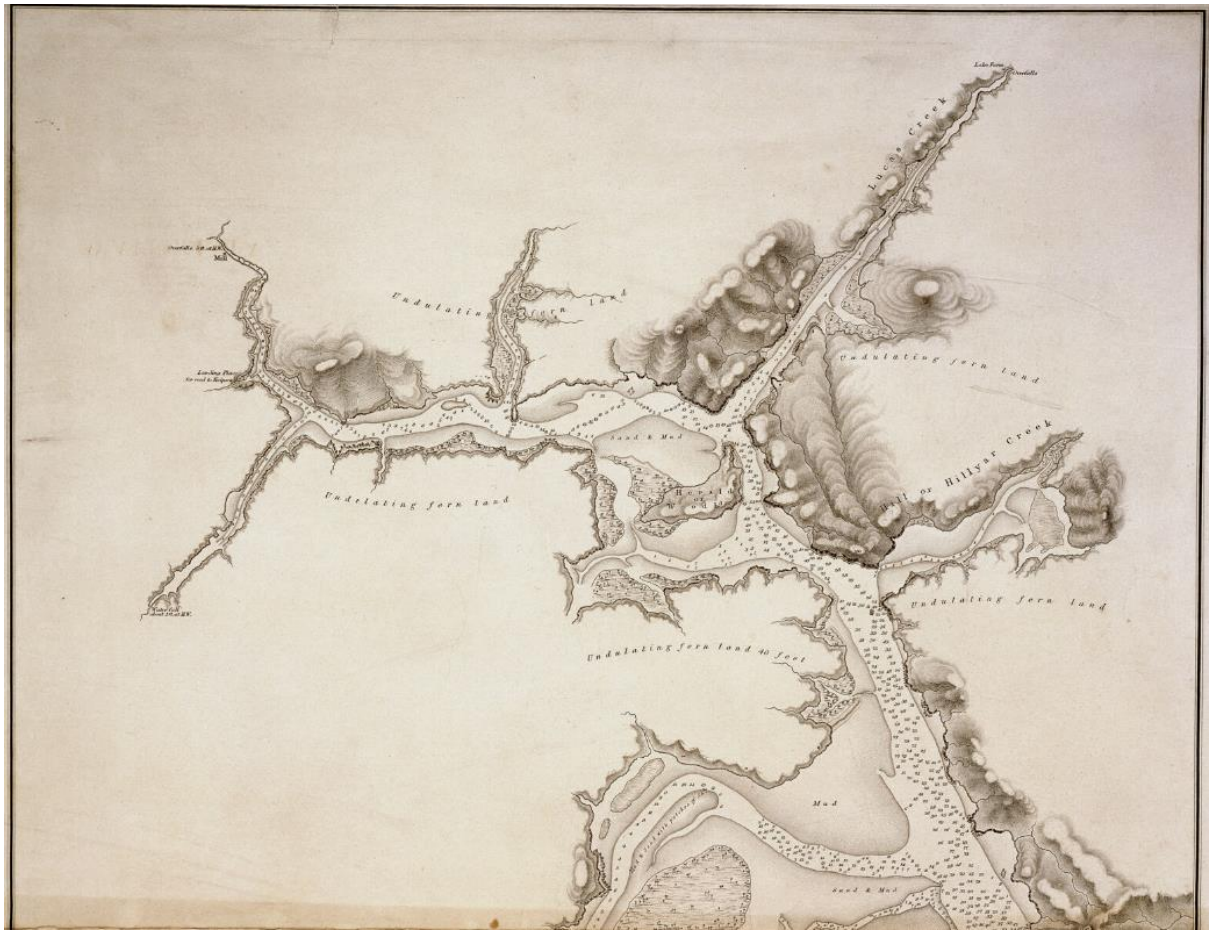

Figure 4-2: Detail of: 'Waitemata River from Kauri Point Auckland Harbour to its sources, surveyed by Comr. B. Drury and the officers of H.M.S. Pandora 1854'-(Auckland Libraries Heritage Collections Map 3909).

4.2 Pre-Contact Settlement

Whenuapai is on the cross roads for several portages between Kaipara and Waitemata Harbour and close to one of the portages between Waitemata and Manukau harbours, Ngongitepata and Te Whau (Hooker 1997). The meaning of the 'Whenua pai' might be 'fertile' or 'good' land (Simmons 1980) which contradicts the view of the early European settlers of the land being of poor quality as it is low lying, often flooded and clay soils (Rutherford 1940). An alternative, possibly older Māori name of the area is Waimarie which could be translated as 'calm water' (Simmons 1980). Most recorded archaeological sites are along the harbour or creek edges indicating that exploitation of kai moana was an important food source.

Like most places in Tāmaki Makaurau many different iwi have a relationship with the place. Te Kawerau, Wai o Hua and Ngāti Whātua and their many hāpu had a particular influence in the study area. The most recent of these inter tribals conflicts was attacks by Ngāpuhi under Hongi Heke.

Armed with muskets they inflicted a defeat on Ngāti Whātua as utu for being defeated in the previous century. For some years few people lived in the district as Ngāpuhi did not establish settlements[1] .

One of the first visits by a European to the area was by Samuel Marsden in 1820 who reported that plenty of food was around the Kaipara. Ngāti Whātua settlements near Kumeū are reported for this period (Dunsford 2002; Stone 2001). A land claim map from 1867 might indicate one of the areas of settlement (see figure below).

Figure 4-3: Detail of ML533, 1867, shows an area of a Maori claim along the stream called Turakiawatea. The red line indicates the area taken for the railway. This includes the area of Kumeū. It seems possible that one of the pre-Contact settlements was located within the area.

[1] (https://www.kaiparamoana.com/k-rero-o-mua-our-history).

4.3 Post Contact Settlement

For a short moment in time Governor Hobson considered Hobsonville as an area to start the Auckland settlement (Foster and Felgate 2011).

Between 1844 and 1865 pre-emptive waiver transactions, Crown purchases and Native Land Court sales reduced Māori customary land occupation in the Kaipara area to about a third[2].

The Waiparera Block is part of the study area. It was sold to the Crown in 1853 (Turton 1877). It is one example how the land changed hands. Brigham's land claim and later Crown Grant in 1857 is another example. Brigham's Creek is named after this land speculator.

Dense Kauri forest within the Kumeū area and throughout the Waitakere Ranges drew European commerce into the area. Within a few decades all timber able to be milled was cut down (Morris 1996). Gum diggers followed the timber mills but little is known of this activity through historic sources.

Towards the end of the 19th century the clay on the Hobsonville peninsula and surrounding areas was used for brick and pipe works which supplied the growing Auckland with this valuable building resource.

4.4 Archaeological Background

The NZAA (New Zealand Archaeological Association) Site Record Scheme has several site records close to the study area. It is mainly coastal shell midden and a few early historic structures. Historic structures including historic houses are recorded in the Cultural Heritage Inventory. Several sites from both these databases are scheduled in the Auckland Unitary Plan.

Each NoR has been buffered by 200 metres and all recorded historic sites as well as archaeological site potential are discussed individually in relation to these individual buffer zones. The following figures show the previously recorded archaeological sites on ArchSite (the NZAA Site Recording Scheme online), on CHI (Cultural Heritage Inventory of the Auckland Council online) and the relevant sites only in relationship to the 200m buffers of all NoRs discussed in this report (the study area).

[2] https://www.kaiparamoana.com/wai312-claim-to-settlement

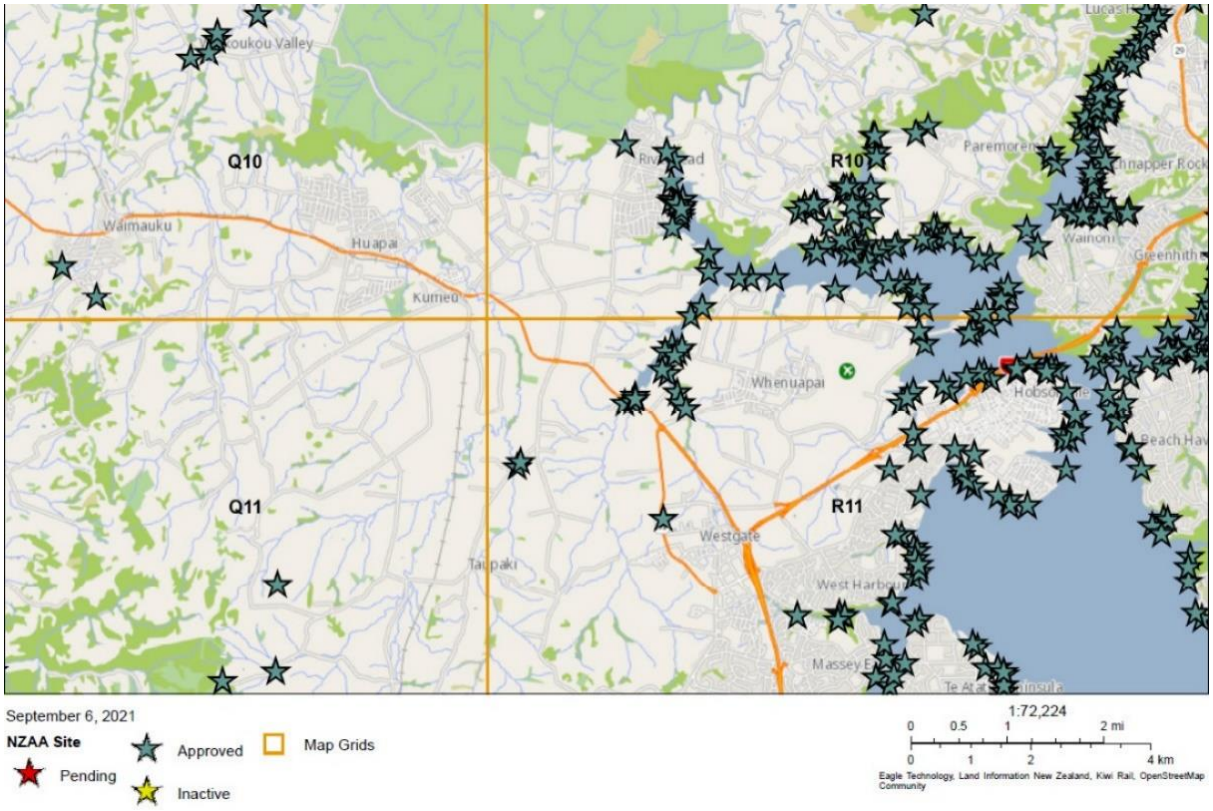

Figure 4-4: Archsite site distribution in the vicinity of the study area.

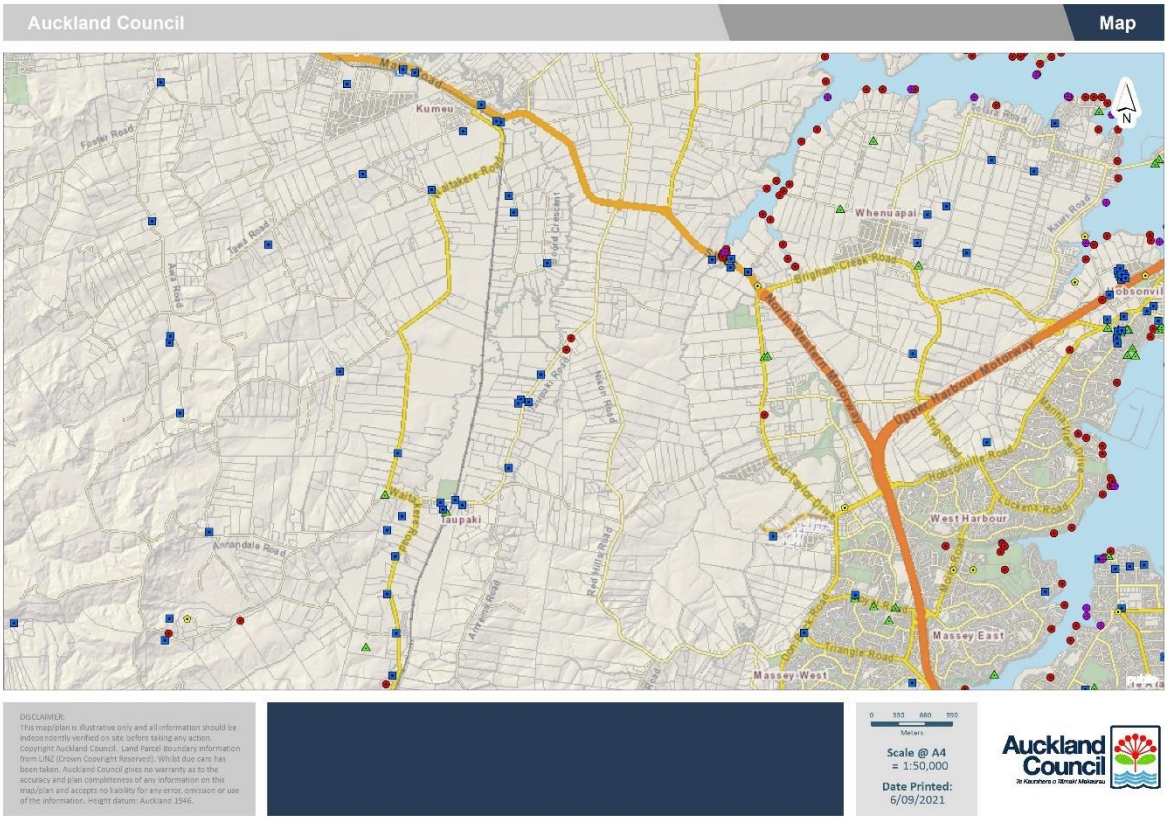

Figure 4-5: CHI sites in the vicinity of the study area.

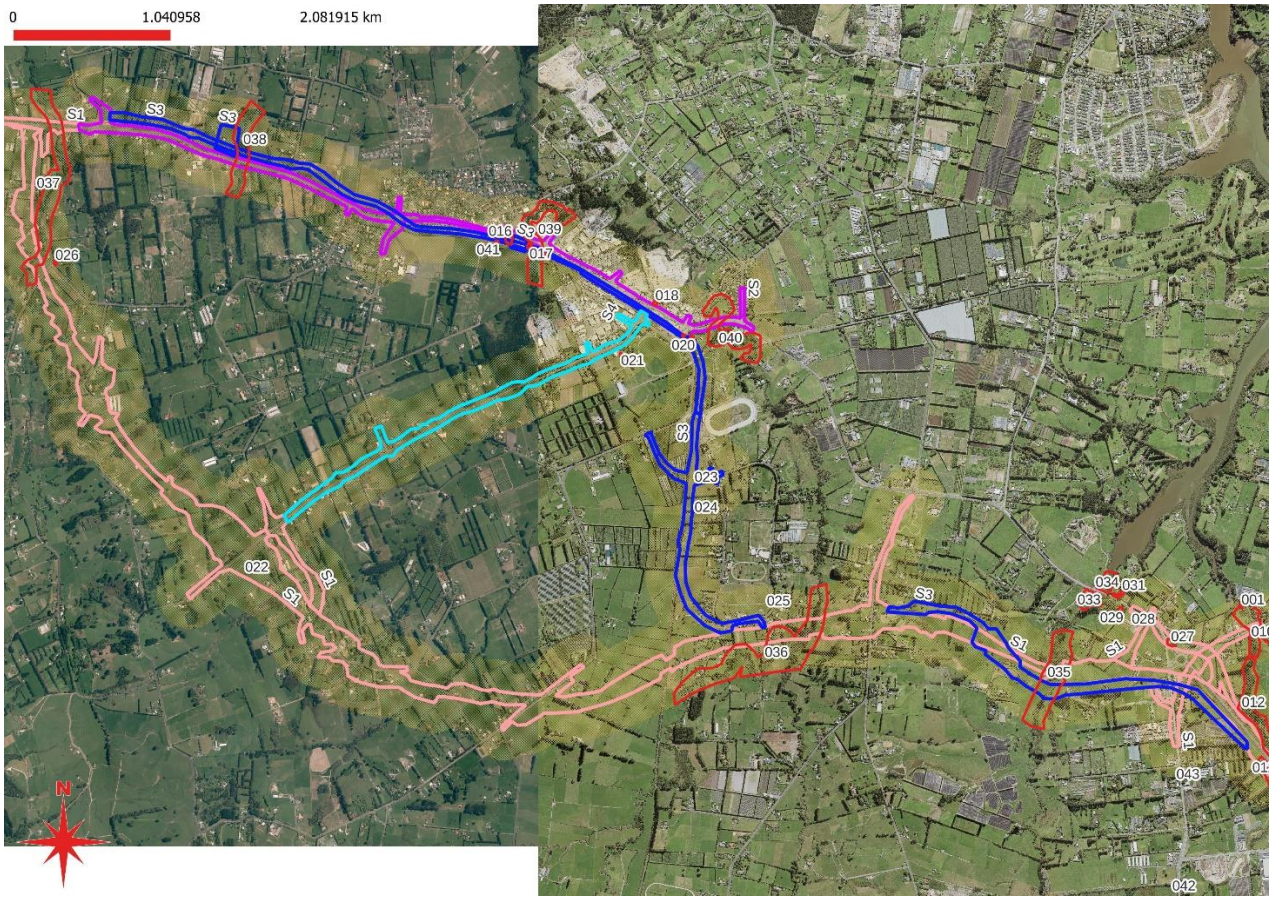

Figure 4-6: NoRs corridors (S1 – S4 in various colours) with 200m buffer zones (hatched areas surrounding NoR corridors), all heritage sites (numbered 027 - 034) and high risk areas (numbered 035 - 040) within these buffer zones.

Details of the sites and the risk areas are discussed within each NoR (see below).

4.5 Previous Archaeological Investigations

A number of assessments and monitoring exercises have taken place in the area between Hobsonville and Kumeū (see bibliography (Macready 2019)). Only a handful of these projects added anything significant to our knowledge of the study area (Foster and Felgate 2011; Hawkins and Campbell 2020; Shackles 2019).

Investigations of site damages to a few shell midden along the northern coastline along Hobsonville showed a long occupation history using continuous kai moana exploitation (Shackles 2019).

Another investigation focused on the homestead and its development of one of the early settlers in the area, the Ocklestones (Foster and Felgate 2011). It paints a vivid picture of the changes and continuations of the rural life on the edge of Auckland, which is today replaced by suburbia.The 1940 aerial shows the study area dominated by orchards and grazing (Figure 4-7).

A similar case study was undertaken during moving a heritage house from its original position (Hawkins and Campbell 2020).

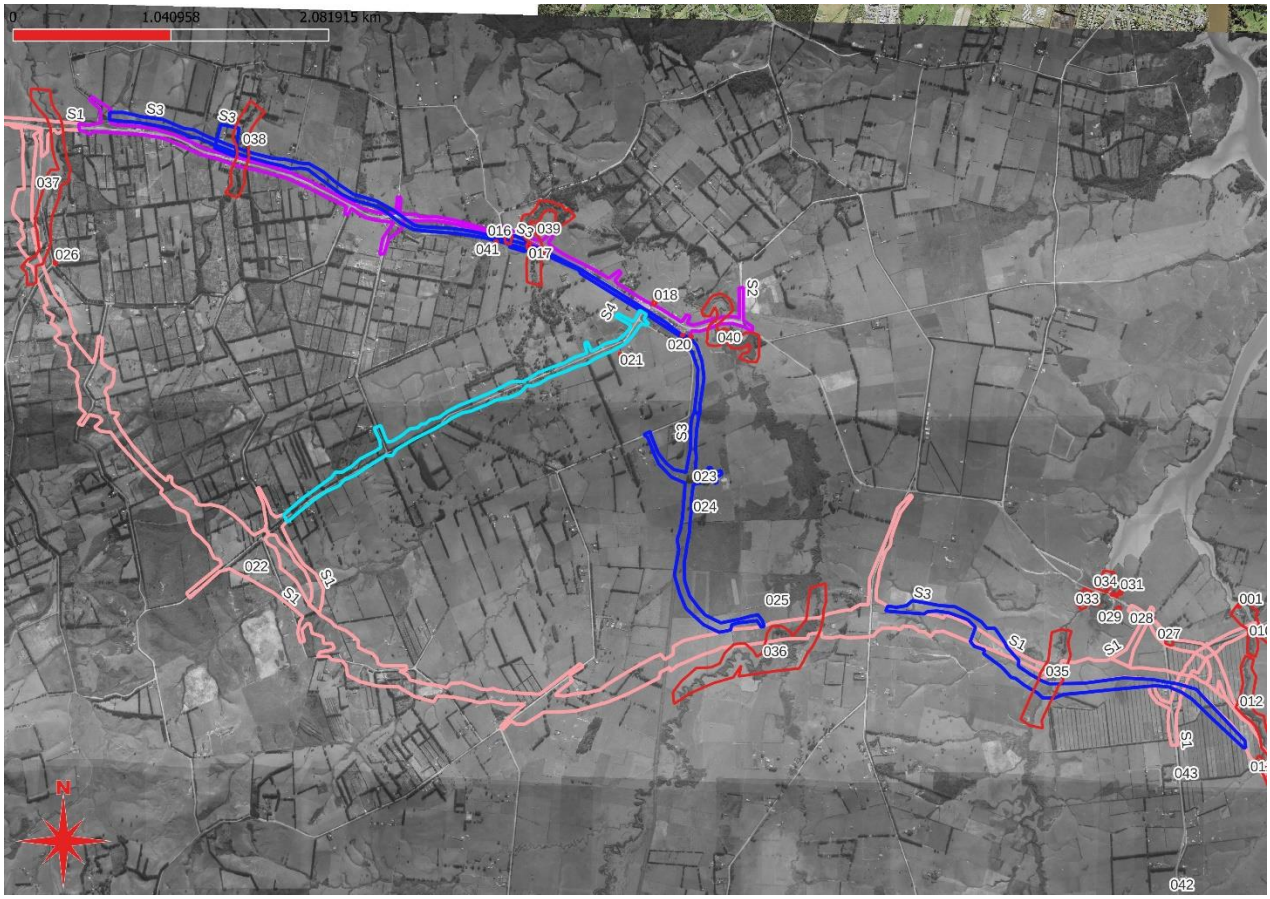

Figure 4-7: Rural character of the study area in 1940. Many shelterbelts of orchards can be seen.

5 Strategic Assessment Package Overview

An overview of the Strategic Assessment Package is provided in Figure 5-1 below, with a brief summary of the Strategic Assessment Package projects provided below.

Figure 5-1: North West Strategic Assessment Package – Overview of NoRs for Assessment

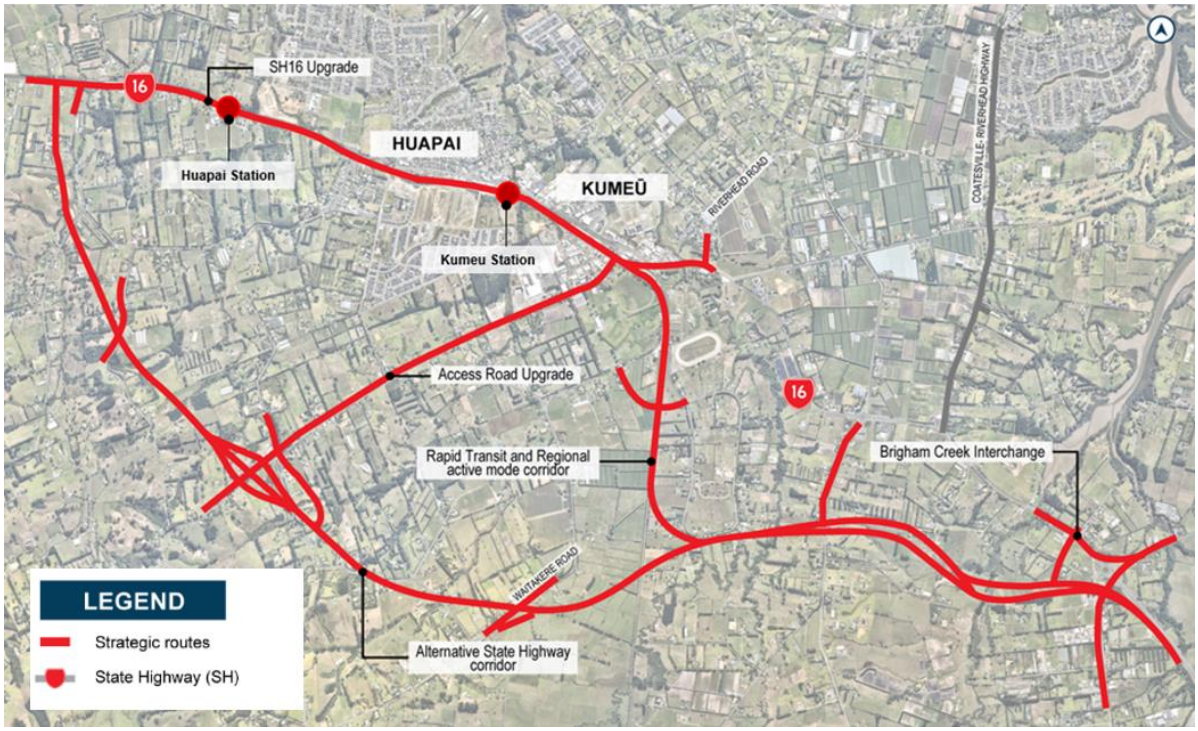

Table 5-1: Strategic Assessment Package Project Summary

Corridor	NOR	Description	Requiring Authority
Alternative State Highway	S1	A new four-laned dual carriageway motorway and the upgrade of Brigham Creek Interchange.	Waka Kotahi
State Highway 16 Main Road Upgrade (alteration to existing designation 6766)	S2	Upgrade to urban corridor including active modes and realignment of Station Road intersection with SH16.	Waka Kotahi
Rapid Transit Corridor	S3	New Rapid Transit Corridor and active mode corridor in one co-located corridor.	Waka Kotahi
Kumeū RTC Station	KS	New rapid transit station, including transport interchange facilities and accessway.	Waka Kotahi
Huapai RTC Station	HS	New rapid transit station, including transport interchange facilities, park and ride and accessway.	Waka Kotahi
Access Road Upgrade	S4	Upgrade of Access Road to a four-lane cross-section with separated cycle lanes	Auckland Transport

Corridor	NOR	Description	Requiring Authority
		and footpaths on both sides of the corridor.	

Please refer to the AEE for further information on these projects, including a project description, key project features and the planning context.

6 Positive Effects

The nature of historic heritage, especially archaeological features, recorded and unrecorded, is that all disturbances including construction have a negative effect that cannot be remediated only mitigated.

Nonetheless construction around wetlands and streams will allow environmental archaeological research to be undertaken that could clarify the dates, sequence and details of the anthropogenic vegetation change from forest to open fern lands. This is relevant for NoR S1, S2 and S3.

Any pre-Contact horticulture like frequent harvesting of fern root rhizomes or taro fields have not been observed in the study area. Large linear developments like the ones proposed here are a perfect opportunity to close this gap in the current archaeological knowledge of the study area. This is relevant for all NoRs.

The construction of a Kumeū transport station can be seen as a unique opportunity to bring heritage buildings together and strengthen the local identity with a dedicated heritage centre close to the transport station. The Huapai Tavern, a railway shed, railway carts setup as a café are all impacted by NoR 2 and 3, but there is also a packing shed, and early residential houses that are impacted (NoR 1) as well as heritage buildings like the Ponoma Hall that could potentially contribute to a heritage centre. None of the latter buildings are protected however have heritage value and could be considered to form part of a heritage centre. The final mitigation measures will be confirmed through the Historic Heritage and Management Plan, which is a condition of the proposed designations.

7 NoR S1: Alternative State Highway, including Brigham Creek Interchange

It is proposed to submit a Notice of Requirement (NoR S1) to designate the land required to implement the new four-laned dual carriageway motorway referred to as the Alternative State Highway (**ASH**) and the upgraded Brigham Creek Interchange (**BCI**).

7.1 Project Corridor Features

The ASH extends from the future State Highway 16 (SH16) / Brigham Creek Interchange (north of Massey) to a proposed new intersection with SH16 near/at Foster Road on the western edge of the FUZ, west of Huapai. This proposed state highway corridor will be approximately 11km long, travelling westward across rural farmlands to the southwestern side of Kumeū and Huapai, with an additional interchange proposed at Tawa Road.

An overview of the proposed design is provided in Figure 7-1 below.

Figure 7-1: Overview of the Alternative State Highway, including Brigham Creek Interchange

7.2 Existing and Likely Future Environment

7.2.1 Planning context

The Alternative State Highway (**ASH**) corridor, including the Brigham Creek Interchange (**BCI**), is largely rural and is proposed to traverse land zoned under the AUP:OP as Rural – Countryside Living Zone, Rural – Mixed Rural Zone and Rural – Rural Production Zones.

The ASH corridor will also traverse two separate areas of FUZ in Redhills North and Kumeū-Huapai with the BCI also currently sitting within FUZ land.

Table 7-1 below provides a summary of the existing and likely future environment as it relates to the ASH and BCI.

Table 7-1: Alternative State Highway and Brigham Creek Interchange Existing and Likely Future Environment

Environment today	Zoning	Likelihood of Change for the environment[3]	Likely Future Environment[4]
Rural	Rural - Mixed Rural Zone, Rural - Countryside Living Zone Rural - Production Zone	Low	Rural
Undeveloped greenfield areas	Future Urban	**High**	Urban

[3] Based on AUP:OP zoning/policy direction
[4] Based on AUP:OP zoning/policy direction

7.2.2 Heritage Environment

This section describes in detail the heritage features within a 200 m buffer of the NoR area.

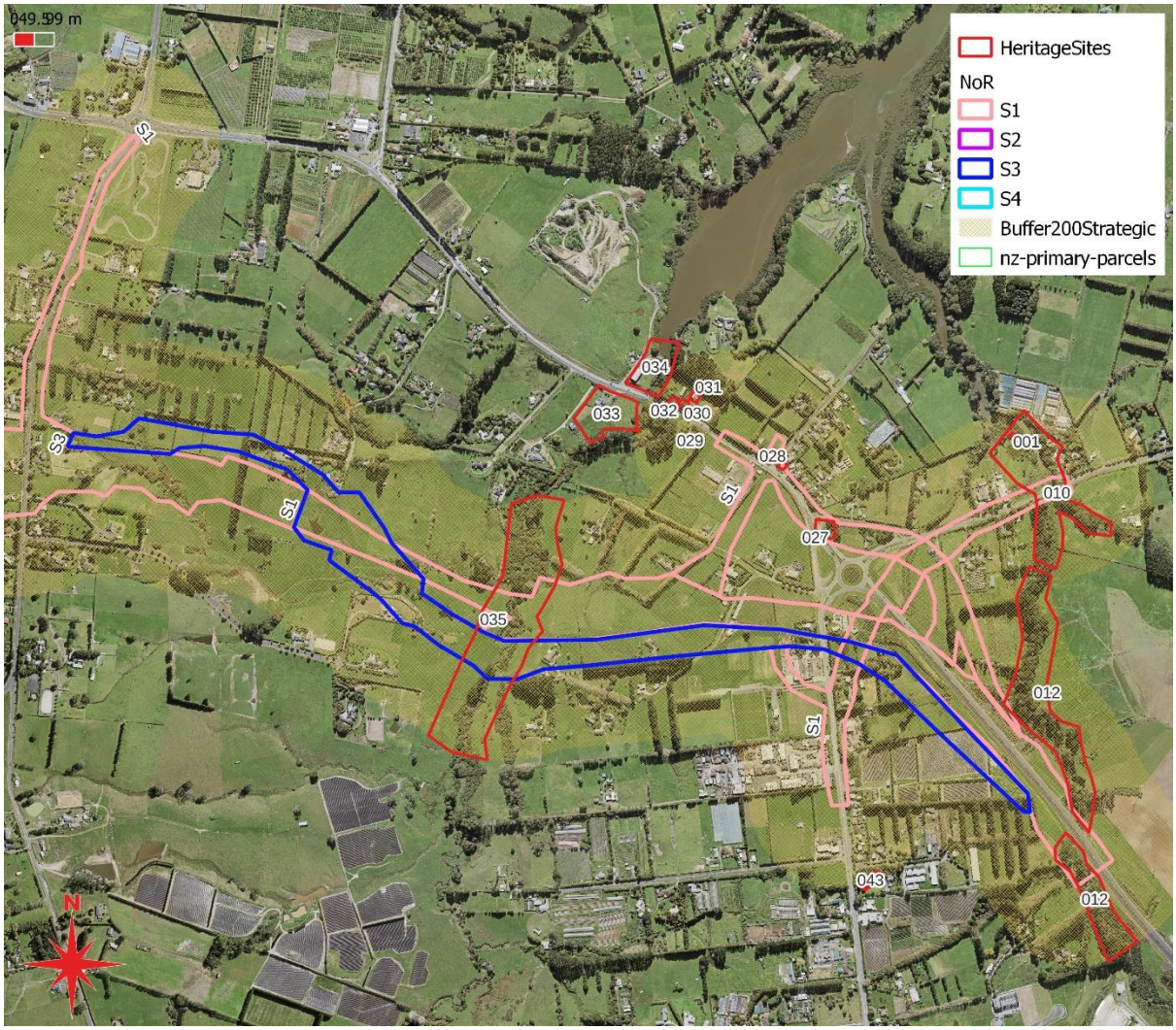

Figure 7-2: Eastern section of NoR S1. Site 027 (location of demolished church) is within the extent of NoR S1. Sites 001 (shell midden), 028 to 034 (historic structures mostly related to the Sinton family) are within the 200 m buffer zone around NoR S1. High Probability areas around streams 010, 012 (Totara Creek) and 040 (Ngongetepara Stream) are indicated.

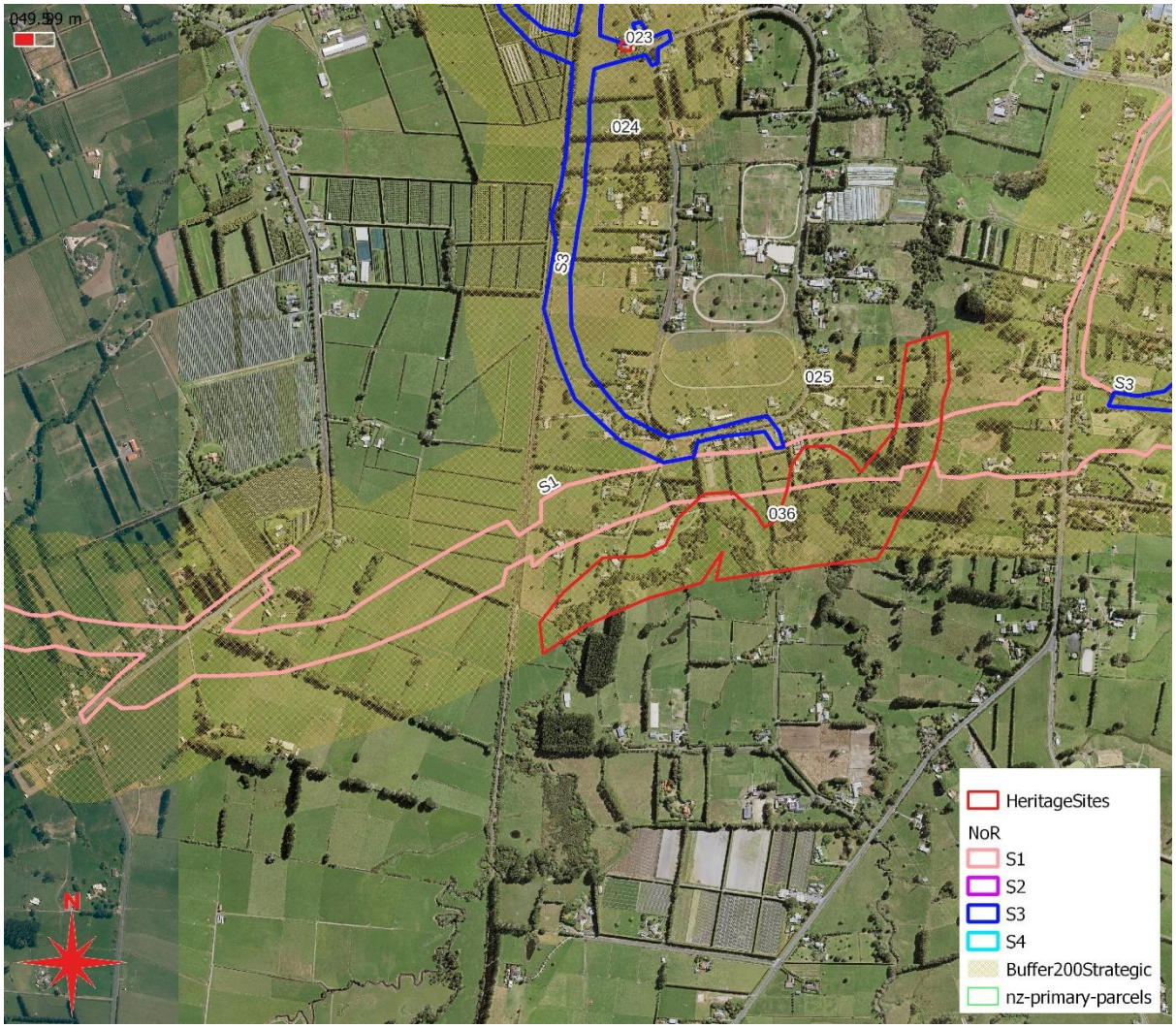

Figure 7-3: Eastern middle section of NoR S1. High probability area of the Kumeū stream (036) crossing the extent of NoR S1. Site 025 (a post 1940 heritage house) is within the 200 m buffer of NoR S1.

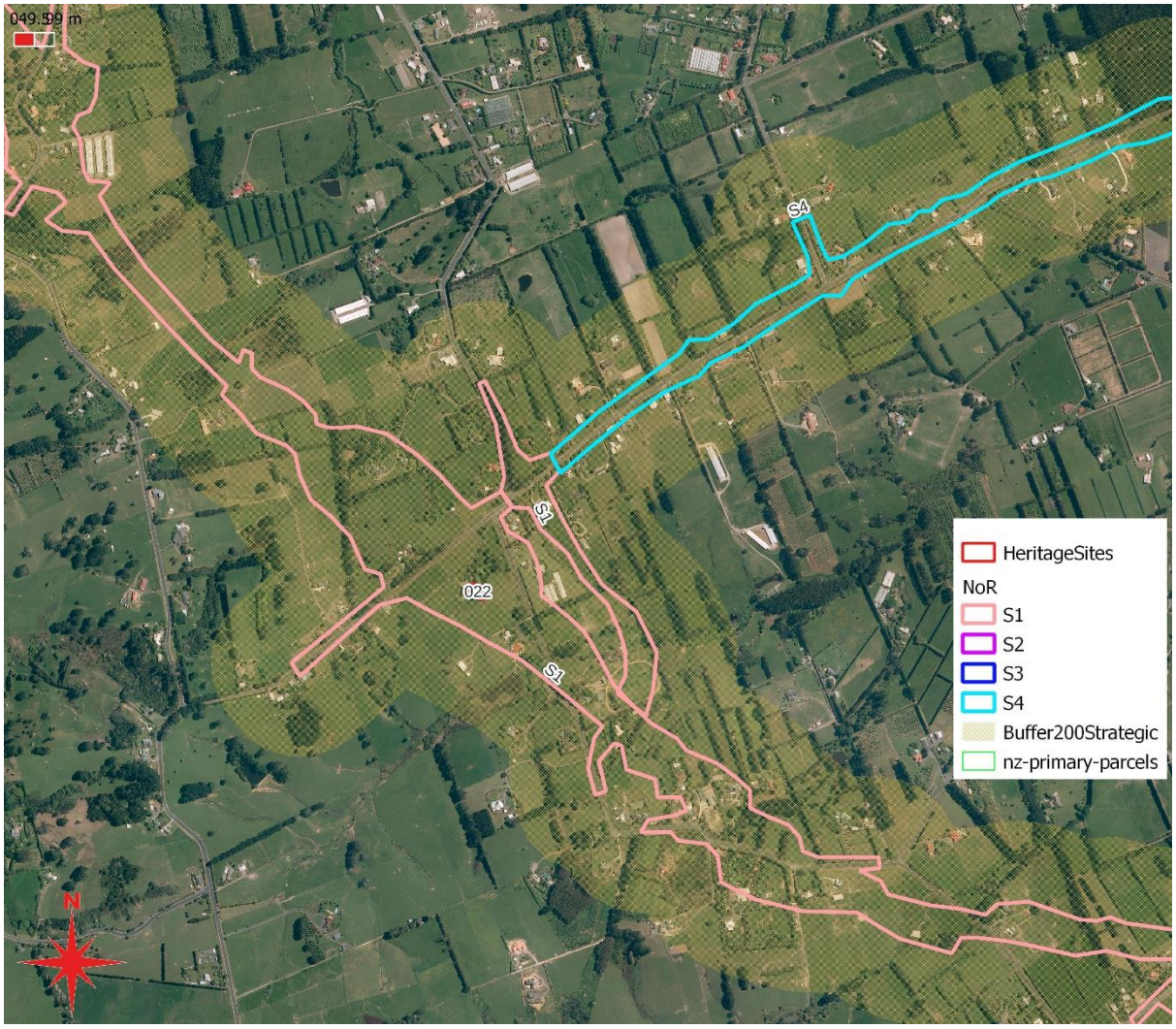

Figure 7-4: Western middle section of NoR S1. Red rectangle is 022, a historic house. It is within the extent of NoR S1.

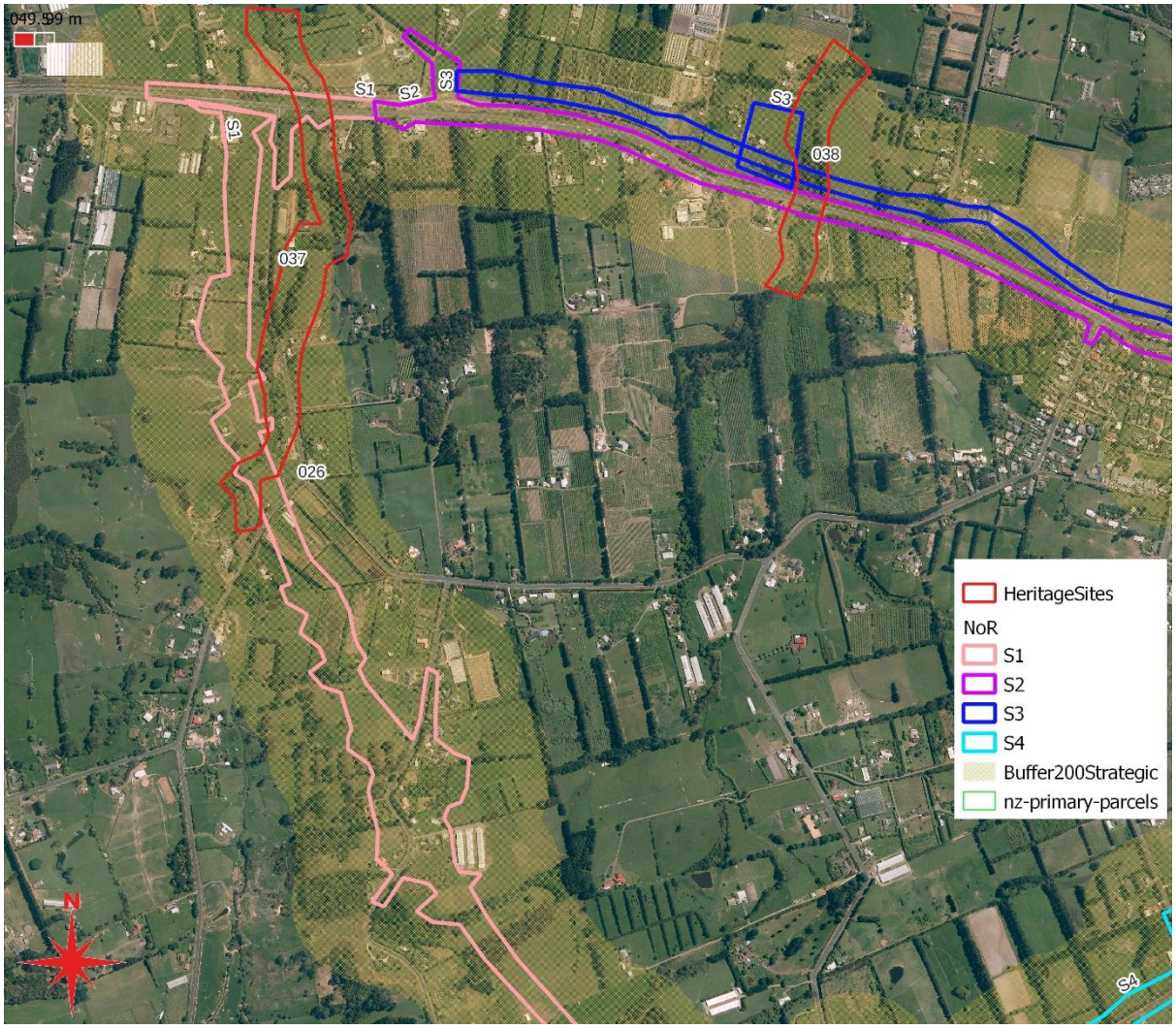

Figure 7-5: Western section of NoR S1. The Ahukuramu stream will be crossed twice by S1 (037). An early fruit packing shed is outside the extent but within the 200 m buffer zone (026).

Remains of a Presbyterian church are recorded in the CHI as #3711 (Figure 7-2). The church can still be seen on the 1940 aerials and it seems that about half of it has been disturbed/destroyed by recent road works for SH16 (Figure 7-6, Figure 7-7). It seems that no records of the early history have survived[5]. There is some probability that some few features of the church might have survived sub-surface (Figure 7-9).

A post 1940 commercial building (Sun Kwong Takeways) is recorded as a historic structure in the CHI #3713 and the extent of NoR S1 runs through the middle of the building (Figure 7-7 and Figure 7-8). This building seems to have replaced the original Sinton shop (032) that has been demolished. Despite the late date of the commercial building it might have been a late part of the historic complex in this area related to the Sinton family. The curtilage of earlier buildings, gone now, might still be sub-surface.

[5] https://www.presbyterian.org.nz/archives/AucklandPresbytery.htm

Figure 7-6: Presbyterian church clearly visible in 1940 aerial (027). Recorded shop to the north of it is still a paddock in 1940.

Figure 7-7: Location of demolished church shown. Historic structure (CHI#3713) 'Sun Kwong Takeways' shown. Both are within the extent of NoR S1. The historic structure is post 1940.

Figure 7-8: Former Sun Kwon Takeway.

Figure 7-9: Approximate location of Church. SH16 in the background.

Several historic buildings, some of them still standing and some of them demolished, as well as the remains of an early bridge / river crossing to the north of the current one, are within the 200 m buffer zone. One of the sites is scheduled in the AUP, but has been shown to be post 1940 (Druskovich 2016). None of them are impacted by NoR S1.

Figure 7-10: Heritage structures within the 200 m buffer zone along SH16. 033 is scheduled in the AUP. None of them will be impacted by the NoR S1.

Figure 7-11: Historic house (029).

Figure 7-12: Significant tree (030). Not impacted by NoR S1.

Further to the west NoR S1 crosses the Kumeū stream/river (#036, Figure 11) twice. It is unclear how far the river was navigable by waka before European style farming and draining of the wetlands had started. It is possible that both crossings are still within that navigable range and therefore have to be considered high probability areas to encounter archaeological features that have not been recorded as archaeological sites. The same is true for the Ngongetepara stream (#035, Figure 7-3).

A historic house has been recorded within the 200 m buffer zone in this mid-eastern area of the NoR S1, but it is post 1940 and not visible from the road (#025, Figure 7-13).

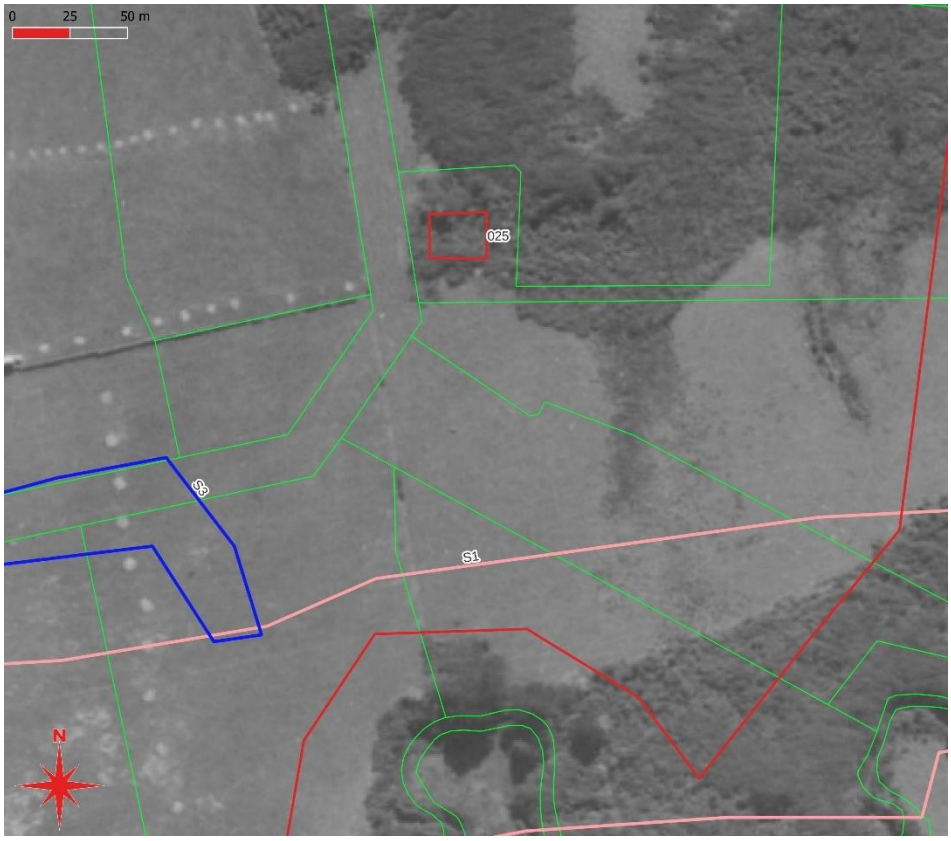

Figure 7-13: Location of historic house on the 1940 aerial showing paddocks and scrubs (025).

In the western section of NoR S1 (Figure 7-4 and Figure 7-5) one historic house is within the extent of the NoR (022). It is visible in the 1940 aerial, and it seems likely that it originates from the 19th century (Figure 7-14, Figure 7-15, Figure 7-16). We have to consider it a probable archaeological site too if the building date is pre 1900.

The Ahukuramu stream will be crossed twice (Figure 7-5). It is unclear how far the river was navigable by waka before European style farming and draining of the wetlands had started. It is possible that both crossings are still within that navigable range and therefore have to be considered high probability areas to encounter archaeological features that have not been recorded as archaeological sites.

A fruit packing shed, probably of early 20th century date and visible in the 1940 aerial is within the 200 m buffer zone but will not be impacted (Figure 7-17, Figure 7-18).

Figure 7-14: Historic house 022 on modern aerial.

Figure 7-15: Historic house on the 1940 aerial.

Figure 7-16: Historic house as seen from the road (022).

Figure 7-17: Early fruit packing shed with later extension in the 200 m buffer zone (026).

Figure 7-18: Fruit packing shed in the middle of orchards on the 1940 aerial (026).

7.2.3 Heritage Environment Overview

One possible archaeological site and two heritage sites with varying historic values are within the boundaries of the proposed development. One of the historic sites is likely pre 1900 and its curtilage has potential archaeological values.

A shell midden site is close by and indicates that the stream crossings (Totara Creek, Waiarohia / Ngongepetara Stream and Ahukuramu Stream) are high risk areas for the discovery of sub-surface, unrecorded archaeological features.

A group of buildings and one notable tree relate to the Sinton family are close by. They are outside the boundary of the proposed development.

GIS ID	AUP #	CHI #	NZAA #	Type	Description
001		13579	R11/2084	Shell midden	Not impacted
010-012				High probability area	Totara Creek – 2 crossings
027		3711		Archaeological site?	Location of Presbyterian church – full impact.
028		3713		Historic house	Sun Kwong Takeaways (post 1940) - impact
029		3486		Historic house	No impact (Sinton homestead)
030		12896		Significant tree	No impact
031		3379		Historic house	No impact (Sinton homestead)
032		20452		Archaeological site	No impact (Sinton Store)
033		13241	R11/2828	Historic house	No impact (Sinton house, post 1940)
034		20450, 13589, 185, 13588	R11/2081, R11/2079, R11/2080	Several features, old stream crossing	No impact
025		16380		Historic house, post 1940	No impact
022		16387		Historic house, archaeological site	Removal or demolition
026		16400		Historic structure	Fruit packing shed, no impact
037				High probability area	Ahukuramu Stream, two crossings
036				High probability area	Kumeū River, two crossings
035				High probability area	Ngongetepara stream, one crossing

7.3 Assessment of Effects on Historic Heritage and Archaeology and Measures to Avoid, Remedy or Mitigate Actual or Potential Adverse Effects

Potential adverse effects are unrecorded archaeological features close to the Totara Creek, Waiarohia / Ngongepetara Stream and Ahukuramu Stream crossings. Any archaeological features are likely from seasonal camps to exploit local resources like the shell midden close to the development along the various streams. They would not have been rare but are rarely investigated comprehensively and their information potential is high considering that only coastal pre-Contact sites have been recorded or documented. As any sites would be sub-surface, they have no amenity value and their cultural association would be the known relationship of iwi and hapū to the area. No additional assessment criteria are applicable.

It is unlikely but possible that archaeological remains are still in situ at the location of a Presbyterian Church (#027).

One historic house (#022), possibly of late 19th century origin is within the extent of the NoR. Both the house and the curtilage will likely have good information potential to the living conditions of the early settlers in the district. These sites are rarely investigated. The amenity value of the historic building could be preserved by moving it rather than demolish it. This is as a preferable mitigation process.

Several heritage structures and features are within a 200 m buffer zone, and some might be impacted by construction works (#029 to #032).

The documentation conditioned by an archaeological authority would mitigate the loss of heritage structures through preservation by documentation and the risk of construction delays by encountering yet unrecorded archaeological features.

In conclusion there are some adverse effects on archaeology by NoR S1. The risk of encountering unrecorded archaeological features and the loss of a possible heritage structure (#022) can be mitigated by the conditions of an archaeological authority applied for with Heritage NZ Pouhere Taonga under the Heritage NZ Pouhere Taonga Act.

7.3.1 Positive Effects

Potential positive effects are mentioned in Section 5.

7.3.2 Assessment of Construction Effects

There are no additional adverse effects during construction.

7.3.3 Recommended Measures to Avoid, Remedy or Mitigate Construction Effects

It is recommended to include all areas of earthworks or topsoil stripping during construction into any precautionary archaeological authority. Laydown areas, haul roads and other ancillary construction areas should avoid heritage structures that are close to the proposed development.

7.3.4 Assessment of Operational Effects

There are no additional adverse effects during operation.

7.3.5 Recommended Measures to Avoid, Remedy or Mitigate Operational Effects

There are no recommended measures to avoid operational effects as there are no adverse effects.

7.4 Conclusions

In conclusion there are small residual negative effects with the recommended mitigation in place as the loss of the original location of one heritage structure cannot remediated, only mitigated.

In conclusion there are some adverse effects on archaeology by NoR S1. The risk of encountering unrecorded archaeological features and the loss of a possible heritage structure (022) can be mitigated by the conditions of an archaeological authority applied for with Heritage NZ Pouhere Taonga under the Heritage NZ Pouhere Taonga Act. The amenity value of the historic building could be preserved by moving it rather than demolish it. This is as the preferable mitigation process.

Any processes regarding tikanga, especially around koiwi, should be discussed with manawhenua before the start of the project.

8 NoR S2: SH16 Main Road Upgrade

It is proposed to submit a Notice of Requirement (NoR S2) to designate the land required to implement the upgrade of the existing State Highway 16 (**SH16**) to a two-lane corridor with walking and cycling facilities.

8.1 Project Corridor Features

The SH16 Main Road Upgrade extends approximately 4.5km between Old Railway Road, east of Kumeū to Foster Road, west of Huapai. The SH16 Main Road is currently a 20m wide two-lane urban arterial with no active mode facilities on either side of the corridor.

SH16 Main Road is proposed to be upgraded to a 24m urban corridor traversing through well-established retail, commercial and residential environs. The corridor generally follows the existing SH16 Main Road alignment and includes a 600m section of active mode only upgrade between Oraha Road and Tapu Road. As part of this project, Station Road will be realigned to form a new signalised intersection with SH16 and Tapu Road.

An overview of the proposed design is provided in Figure 8-1 below.

Figure 8-1: Overview of the SH16 Main Road Upgrade

8.2 Existing and Likely Future Environment

8.2.1 Planning context

SH16 Main Road is proposed to be upgraded to a 24m urban corridor along the urban extent of SH16 traversing through well-established retail, commercial and residential environs through Kumeū Huapai. This corridor contains a range of business, residential and open space and rural land uses under the AUP:OP between the eastern extent of the Kumeū-Huapai township and the western extent of the upgraded corridor (the intersection with the proposed ASH).

Table 8-1 below provides a summary of the existing and likely future environment as it relates to the SH16 Main Road Upgrade.

Table 8-1: SH16 Main Road Upgrade Existing and Likely Future Environment

Environment today	Zoning	Likelihood of Change for the environment[6]	Likely Future Environment[7]
Rural	Rural Mixed Rural Zone, Rural Countryside Living Zone	Low	Rural
Business	Business (Industrial)	Low	Business (Industrial)
	Business (Local Centre)	Low	Business (Local Centre)
	Business (Mixed Use)	Low	Business (Mixed Use)
Residential	Residential	Low	Residential
Open Space	Open Space – Sport and Active Recreation	Low	Open Space
Undeveloped greenfield areas	Future Urban	High	Urban

[6] Based on AUP:OP zoning/policy direction
[7] Based on AUP:OP zoning/policy direction

8.2.2 Heritage Environment

The following chapter shows NoR S2 in relation to all Heritage structures and risks within a 200 m buffer zone. It includes a discussion of each of the Heritage items.

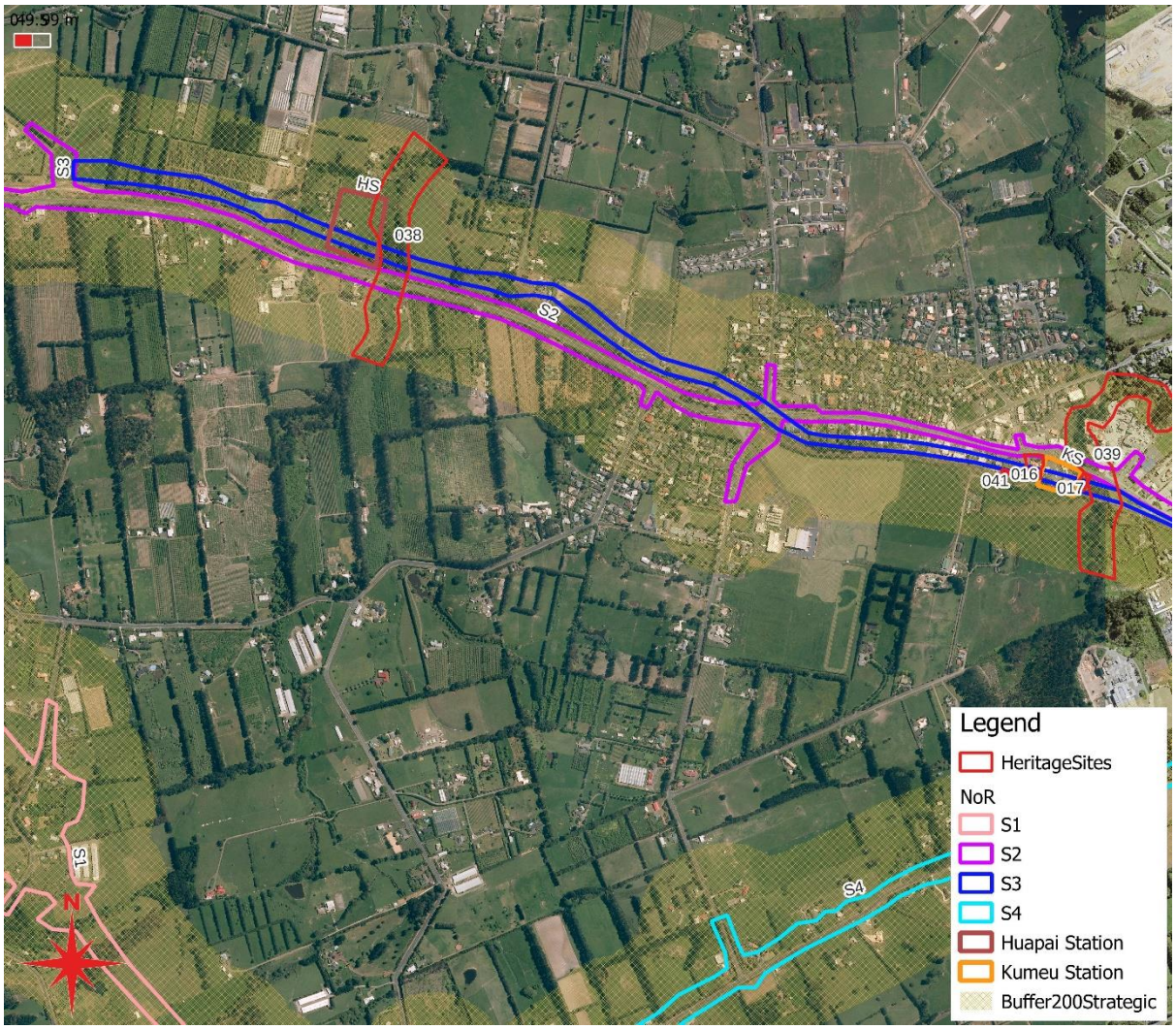

Figure 8-2: Extent of western part of NoR S2 in magenta with 200 m buffer zone. One potential heritage site (017) is impacted partially by NoR S2. One other (016), scheduled with the AUP is very close to the development and the curtilage of the site might be impacted. Two stream crossings (038 and 039) are high probability areas to encounter yet unknown archaeological sites.

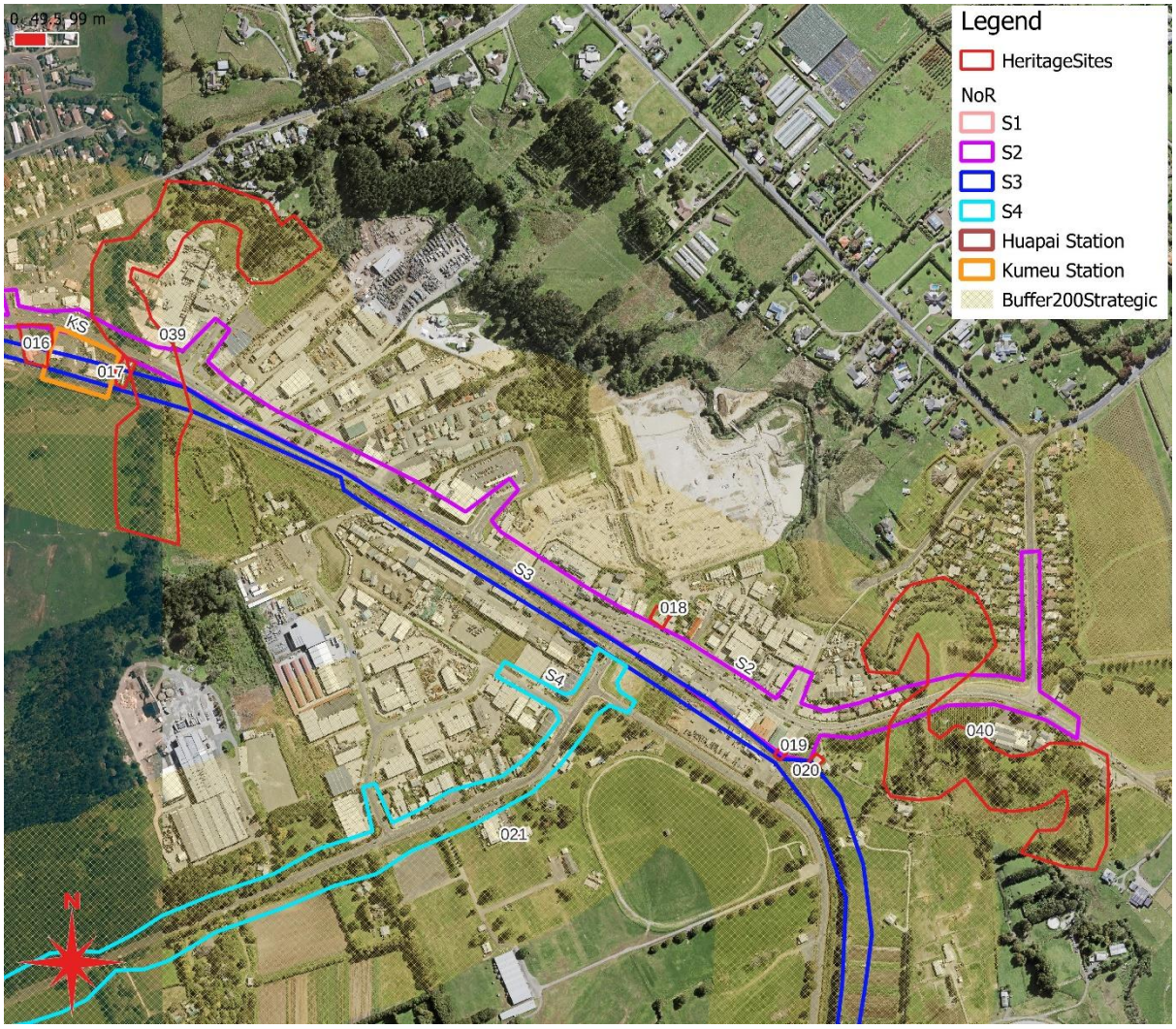

Figure 8-3: Extent of eastern part of NoR S2 in magenta with 200 m buffer zone. Historic site (019) scheduled in the AUP is partially impacted. Two further historic site (018 and 020) are very close to NoR S2 and them or their curtilage might be impacted by the construction. The Kumeū river crossing (040) is a high probability area to encounter yet unknown archaeological sites.

Several historic sites are either partially impacted by NoR S2 or are very close to the extent and could be impacted during construction or their curtilage sub-surface might be impacted upon.

The one historic site impacted by NoR S2, is the railway carriages (#017 in Figure 3) used for a café, with the CHI #18493. The railway shed (#019 in Figure 3), which is scheduled as #00483 in the AUP:OP is close to the proposed development. Both these structures seemed to have been moved to their current locations, therefore there exist no historic curtilage to be aware of.

Figure 8-4: Location of scheduled railway Goods Shed (019), scheduled in the AUP and two historic buildings next to NoR S2 (018 and 020), the Masonic Lodge building and a residential house.

Some sub-surface features of the curtilage of the Huapai Tavern (scheduled with AUP;OP referenced as #00482) could be impacted by the extent and construction of NoR S2. The building itself is not impacted but the heritage overlay (AUP;OP 00482) is impacted which contains the possible curtilage of the building – archaeological features sub-surface that relate to the building. This site is further discussed as the impacts from the RTCs in the discussion of NoR S3 and NoR KS.

The Masonic Lodge and a residential house are recorded in the CHI as #16388 and #16385. Both are outside the proposed development but very close to the extent of the NoR S2. Construction could impact on those structures, or any existing sub-surface curtilage could be clipped by NoR S2.

Figure 8-5: Railway carriages (017) next to SH16.

Figure 8-6: Railway shed (019) scheduled in the AUP;OP, next to the railway line.

Figure 8-7: Masonic Lodge (018), next to the extent of NoR S2.

Figure 8-8: Residential historic house (020), right next to the extent of NoR S2 and NoR S3.

Three stream crossings (identified as #038, #039 and #040 in Figure 2 and 3) are high risk areas to encounter archaeological features that are not recorded as archaeological sites. Of these three streams one is unnamed, and the remaining two are the Turakiawatea and the Kumeū river. The areas along the Turakiawatea and the Kumeū River have a high potential for pre–Contact or early Contact occupation. A Māori Land plan from 1868 shows this area claimed by Tautari.

Figure 8-9: Detail of ML 533 (1868) showing the Turakiawatea stream, and the land block named after the stream. This is a high-risk area to encounter somewhere along the rivers or streams early occupation.

Figure 8-10: Turakiawatea stream crossing. It seems that very little earthworks have been done along its banks previously.

8.2.3 Heritage Environment Overview

One heritage site, railway carts (#017), is partially within the boundaries of the proposed development. The railway carts have been moved to their current location and therefore do not have any archaeological, sub-surface values.

The stream crossings (Kumeū river, Turakiawareta stream and an unnamed stream) are high risk areas for the discovery of sub-surface archaeological features not recorded as archaeological sites, especially along the named rivers and streams, as both could have been navigable by waka.

Four heritage places and buildings (#016, #018, #019 and #020) are outside the boundary of the proposed development, but closely adjacent to it. The heritage overlay as per AUP;OP #00482 (Huapai Tavern) is impacted by NoR S2 but not the buildings themselves.

8.3 Assessment of Effects on Historic Heritage and Archaeology and Measures to Avoid, Remedy or Mitigate Actual or Potential Adverse Effects

There is the potential to uncover archaeological material close to the stream crossings. Any archaeological features are likely from seasonal camps to exploit local resources along the various streams. They would not have been rare but are rarely investigated comprehensively and their information potential is high considering that only coastal pre-Contact sites have been recorded or documented. As any sites would be sub-surface, they have no amenity values and their cultural association would be the known relationship of iwi and hapū to the area. No additional assessment criteria are applicable.

The railway carriages are recorded as heritage items and are partially impacted by the NoR S2. They have been moved to their current location. They are of local significance as one of the few remains of a regional important context, the railway line. The have served the community as a landmark and café for many years.

Two heritage buildings and a scheduled heritage area are within a 200 m buffer zone very close to the NoR and might be impacted by construction works. Subsurface archaeological features could be part of the curtilage of historic structures, which might be impacted by the NoR area.

An archaeological authority would mitigate the risk of encountering archaeological features that have not been recorded as archaeological sites.

In conclusion there are some adverse effects on historic heritage by NoR S2. The risk of encountering archaeological features that has not been recorded as archaeological sites can be mitigated by the conditions of an archaeological authority applied for with Heritage NZ Pouhere Taonga under the Heritage NZ Pouhere Taonga Act. Relocation of the historic railway carriages is a preferable option to demolition.

8.3.1 Positive Effects

Potential positive effects are mentioned in Section 5.

8.3.2 Assessment of Construction Effects

There are no additional adverse effects during construction.

8.3.3 Recommended Measures to Avoid, Remedy or Mitigate Construction Effects

It is recommended to include all areas of earthworks or topsoil stripping during construction into the precautionary archaeological authority.

8.3.4 Assessment of Operational Effects

There are no additional adverse effects during operation.

8.3.5 Recommended Measures to Avoid, Remedy or Mitigate Operational Effects

There are no recommended measures to avoid operational effects as there are no adverse effects.

8.4 Conclusions

In conclusion there are possibly small residual negative effects with the recommended mitigation in place as the loss of potential archaeological sites cannot remediated, only mitigated. The risk of encountering unrecorded archaeological features and the possible loss or damage of heritage structures (019 and 017) can be mitigated by the conditions of an archaeological authority applied for with Heritage NZ Pouhere Taonga under the Heritage NZ Pouhere Taonga Act.

Any processes regarding tikanga, especially around koiwi, should be discussed with manawhenua before the start of the project.

9 NoR S3: Rapid Transit Corridor and Regional Active Mode Corridor; NoR KS: Kumeū Rapid Transit Station and NoR HS: Huapai Rapid Transit Station

9.1 9.1 Project Corridor Features

A Notice of Requirement (NoR S3) is proposed to designate the land required to implement the new Rapid Transit Corridor (**RTC**) and Regional Active Mode Corridor (**RAMC**) in one co-located and integrated corridor.

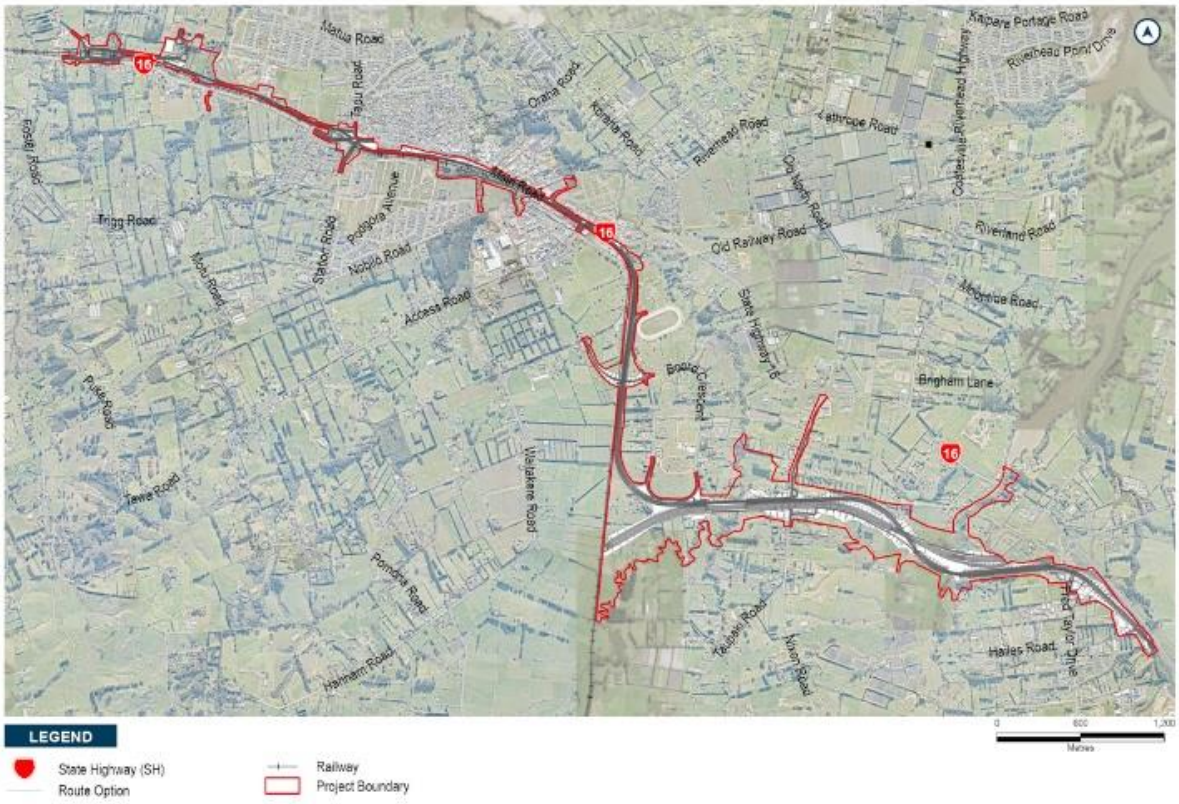

Figure 9-1: Rapid Transit Corridor and Regional Active Mode Corridor Overview

Two RTC stations are proposed. The future Kumeū Station is located between Harikoa Street and John MacDonalds Lane and the future Huapai Station is located opposite Meryl Avenue.

The Regional Active Mode Corridor (**RAMC**) is a segregated walking and cycling corridor that is located adjacent to the RTC alignment from the Brigham Creek Interchange to the western edge of Kumeū- Huapai, terminating at the signalised intersection of SH16 Main Road and Weza Lane. The corridor is co-located and integrated with the RTC and is proposed to be route-protected as a single NoR. The segregated corridor provides the opportunity for long-term amenity as a key cycling corridor, while connecting to the wider North western Cycleway and ultimately to the Auckland city centre network.

9.2 Existing and Likely Future Environment

9.2.1 Planning context

The Rapid Transit Corridor (**RTC**) and Regional Active Mode Corridor (**RAMC**) form a single, integrated transport corridor between Brigham Creek Interchange and the eastern entrance to Kumeū. The RTC only then continues through Kumeū Huapai and terminates at Matua Road. Two Stations are proposed Kumeū Station and Huapai Station.

The RTC corridor traverses both rural and urban land, as set out below:

- The **rural section** of the RTC runs from the Brigham Creek Interchange to the entry to Kumeū-Huapai township and is co-located with the RAMC along this section. This rural section traverses land zoned under the AUP:OP as Rural – Countryside Living Zone, with an area zoned as FUZ in Redhills North.
- The **urban section** of the RTC runs from northern end of Waitakere Road to Foster Road and is co-located with the proposed SH16 Main Road upgrade along this section. This urban section contains a range of land uses zoned under the AUP:OP as a mix of business zonings between the eastern extent of the Kumeū-Huapai township and Station Road

Table 9-1 below provides a summary of the North West existing and likely future environment as it relates to the RTC and the RAMC.

Table 9-1: RTC and RAMC Existing and Likely Future Environment

Environment today	Zoning	Likelihood of Change for the environment[8]	Likely Future Environment[9]
Rural	Rural	Low	Rural
Undeveloped greenfield areas	Future Urban	High	Urban
Business	Business (Industrial)	Low	Business (Industrial)
	Business (Local Centre)	Low	Business (Local Centre)
	Business (Town Centre)	Low	Business (Town Centre)
Residential	Residential	Low	Residential
Open Space	Open Space – Informal Recreation Open Space – Sport and Active Recreation	Low	Open Space
Future Urban Zone / Undeveloped greenfield areas	Future Urban	**High**	Urban

[8] Based on AUP:OP zoning/policy direction
[9] Based on AUP:OP zoning/policy direction

The RTC stations - Kumeū Rapid Transit Station and Huapai Rapid Transit Station - are located in the urban section of the RTC corridors.

Kumeū Station is proposed to be located on land at 299 and 301 Main Road on the western side of a Kumeū River tributary. The land is zoned under the AUP:OP as Business - Town Centre Zone. An active modes overbridge is proposed across the NAL with active mode connections to:

- the Huapai Triangle crossing land zoned in the AUP:OP as Green Infrastructure Corridor and Residential - Mixed Housing Suburban Zone; and
- Wookey Lane crossing land zoned in the AUP:OP as Green Infrastructure Corridor and Residential - Mixed Housing Suburban Zone; and Business - Light Industry Zone.

Table 9-2: Kumeū Rapid Transit Station Existing and Likely Future Environment

Environment today	Zoning	Likelihood of Change for the environment[10]	Likely Future Environment[11]
Business	Business (Industrial)	Low	Urban
	Business (Town Centre)	Low	Urban
Residential	Residential - Mixed Housing Suburban Zone	Low	Urban
Open Space (located to the north of the proposed station location)	Open Space – Informal Recreation Open Space – Sport and Active Recreation	Low	Open Space

Huapai Station is proposed to be located on land at 29 and 31 Meryl Avenue on the western side of the Ahukuramu. The land is zoned under the AUP:OP as Business - Town Centre Zone. An active modes overbridge is proposed across the NAL and SH16 to FUZ land. Future connections will be determined as part of structure plan process.

Table 9-3: Huapai Rapid Transit Station Existing and Likely Future Environment

Environment today	Zoning	Likelihood of Change for the environment[12]	Likely Future Environment[13]
Residential (located to the east of the proposed station location)	Residential – Single House Zone	Low	Urban
Future Urban Zone / Undeveloped greenfield areas	Future Urban	High	Urban

[10] Based on AUP:OP zoning/policy direction
[11] Based on AUP:OP zoning/policy direction
[12] Based on AUP:OP zoning/policy direction
[13] Based on AUP:OP zoning/policy direction

9.2.2 Heritage Environment

The northern part of NoR S3 is shown on the overview maps of S2 as areas with a blue boundary (Figure 8-2 and Figure 8-3). It should be noted that the scheduled historic area of the Whenuapai Tavern and the scheduled area of the Railway Goods Shed (AUP:OP reference #00482 and #00483) are within the NoR area extent. The location of the original Kumeū train station is also within the area (#041) and there is potential for archaeological features still being sub-surface.

The railway Goods Shed has been discussed in NoR S2 (#019, Figure 8-6) as it is in close vicinity to NoR S2 it. NoR S3 does impact onto it.

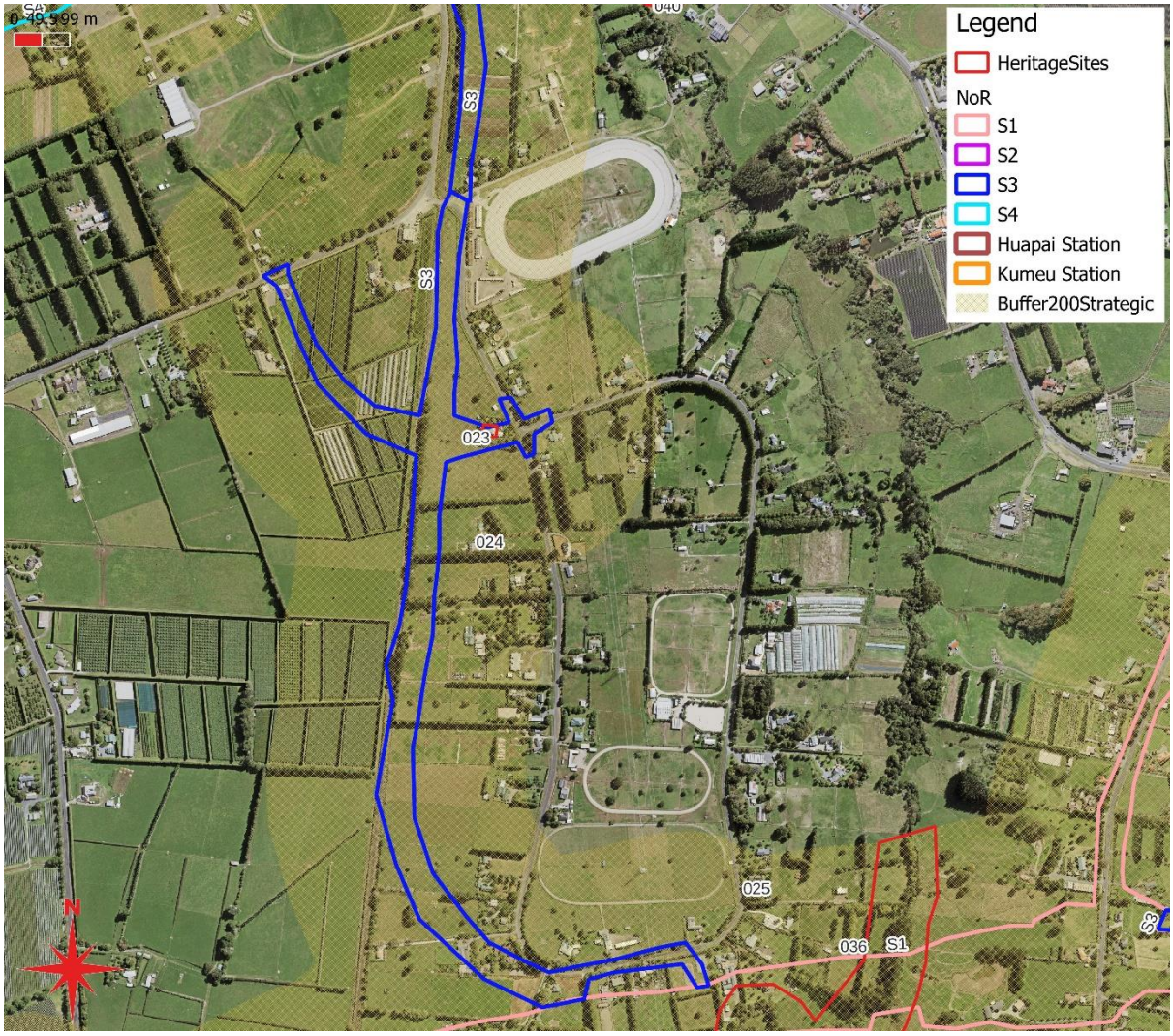

Figure 9-2: Southern extent of NoR S3 with 200 m buffer zone. One historic building is within the area of S3 (023) and two are within the 200 m buffer zone (024, 025). The buildings within 200 m will not be impacted by the proposed development.

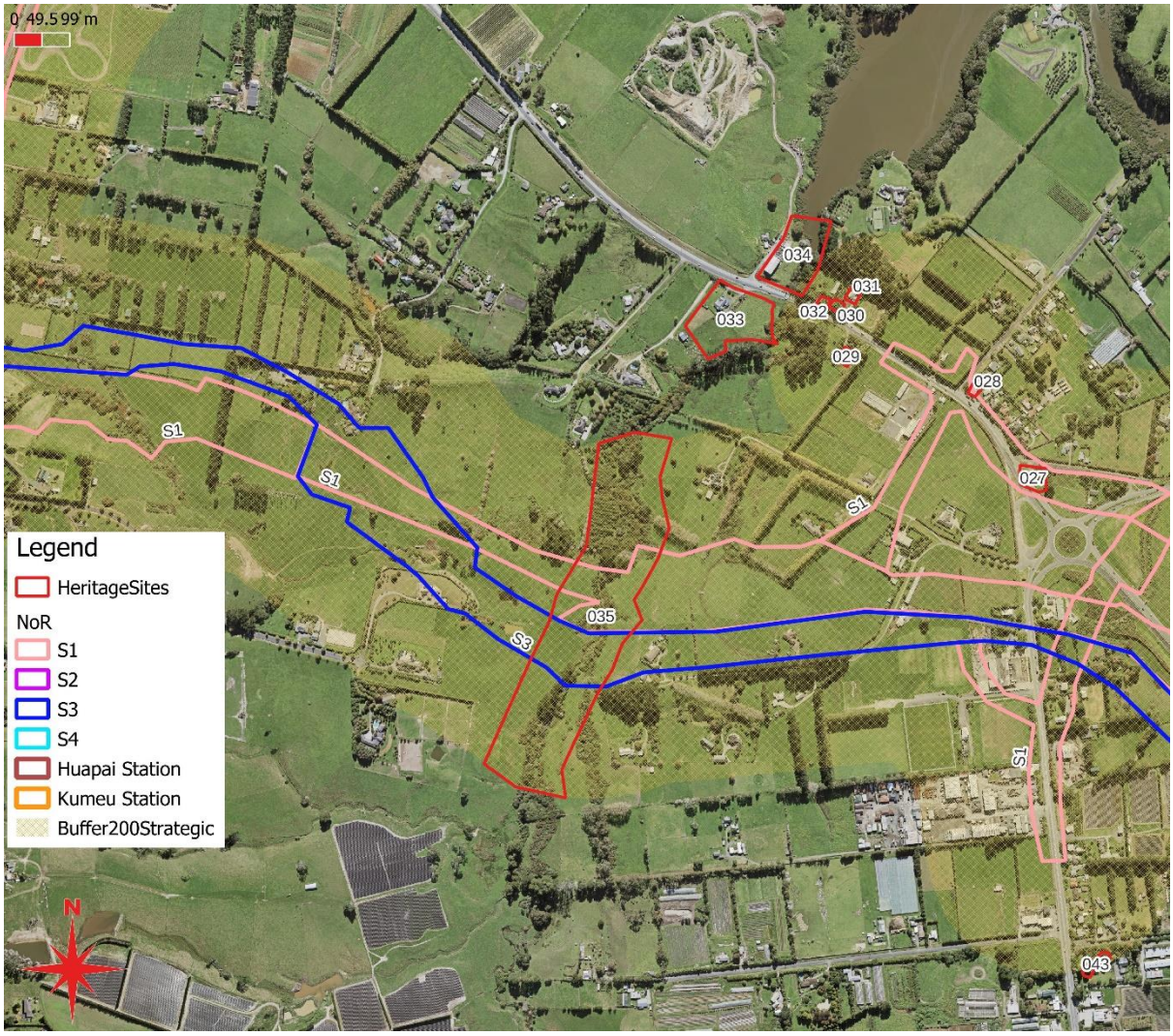

Figure 9-3: The south-eastern extent of NoR S3 with a 200 m buffer zone. One stream crossing (035) is shown as a high-risk area to encounter archaeological features that are not recorded as archaeological sites. The stream was likely still navigable by waka around the crossing.

The development of the Huapai Tavern can be traced back to the 1870s[14] (Dunsford 2002). Overlaying historic maps and historic aerials shows the development of the small cluster of buildings in the vicinity (Figure 9-4 to 43). Part of this grouping of buildings are pre 1900 buildings and these are still forming part of the modern Huapai Tavern. The extent of NoR S3 cuts through parts of the scheduled Historic Heritage Extent of Place (AUP:OP reference #00482). The scheduled area is larger than the buildings footprint and takes into account the curtilage of the heritage buildings. (Figure 9-8).

The following sequence of overlays seems to indicate that mainly the modern part of the scheduled heritage place, built post 1940, is impacted by NoR S3 (Figure 9-5, Figure 9-6, Figure 9-7, Figure 9-8), however a detailed investigation of the building and its curtilage is required to confirm this. If this assumption is correct, there is a chance to re design the current building complex and keeping its main heritage elements in place.

[14] https://www.huapaitavern.co.nz/history-of-the-huapai-tavern

The historic railway carriages (CHI #18493) are impacted by NoR S3.

The footprint of the Kumeū Station sits right between the scheduled Historic Heritage Extent of Place (#00482) and the railway carriages. The new station and upgraded roads and railway will transform this area into a busy hub, which opens the opportunity to create a new heritage precinct that keeps the function of the tavern, re-uses the railway carriages as a café and could incorporate other heritage buildings from the area.

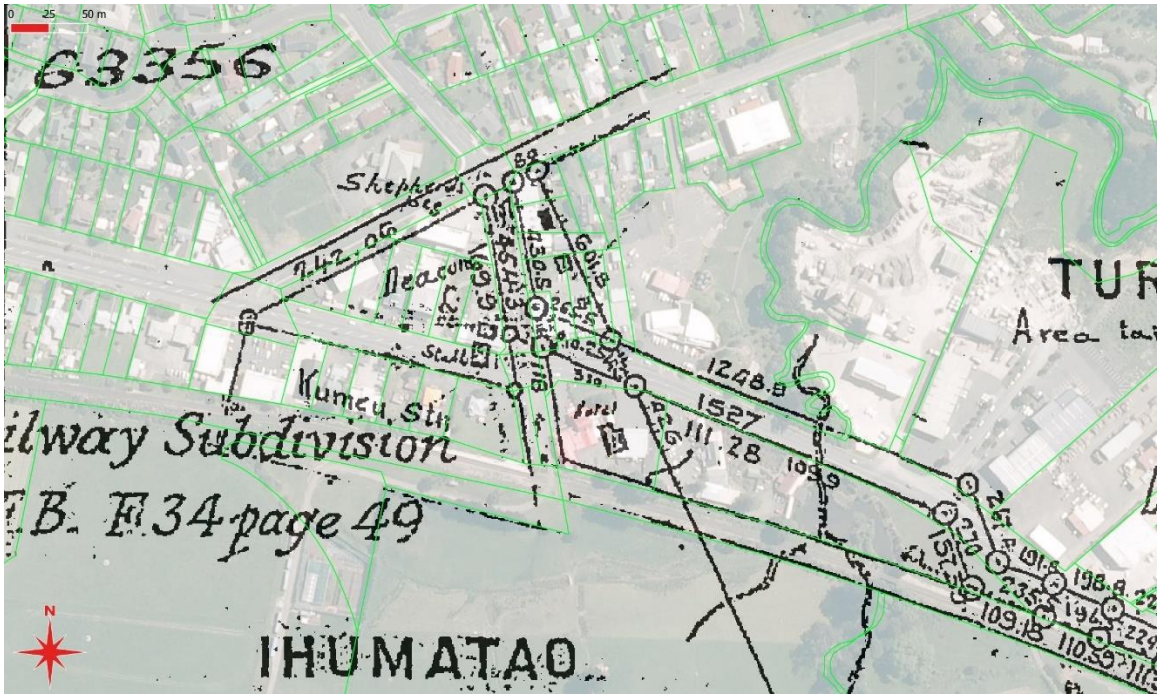

Figure 9-4: Hotel 1885 (SO 3938 - Road taken from Block Turakiawatea). The map shows the Hotel (owned by Deacon) shed and stables and the extent of the Kumeū Station property at the time.

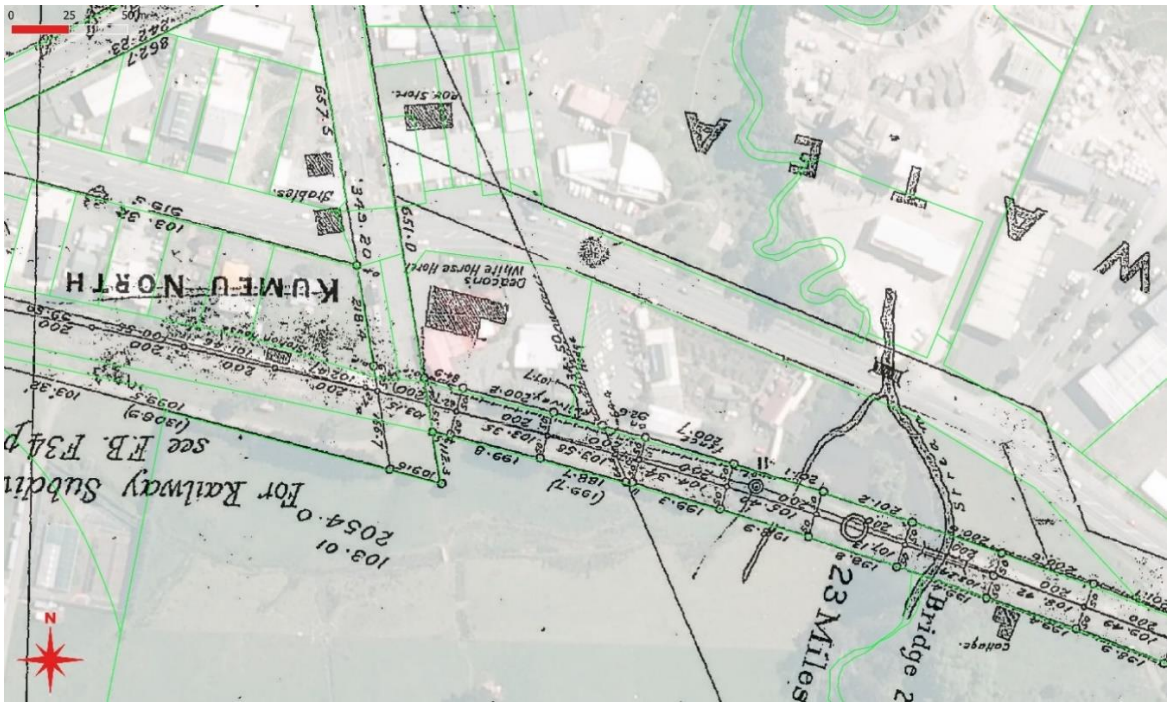

Figure 9-5: Hotel 1893 (Railway maps – Deacon's White Horse Hotel, Orientation of building is likely drawn incorrectly, probably due to the map being drawn with south to the top rather the traditional north to the top). Showing the same buildings as in 1885 with the addition of a Store. This map also shows the

location of the small Station building (shown in the overview maps as 041). Road and railway bridges over the stream are also shown.

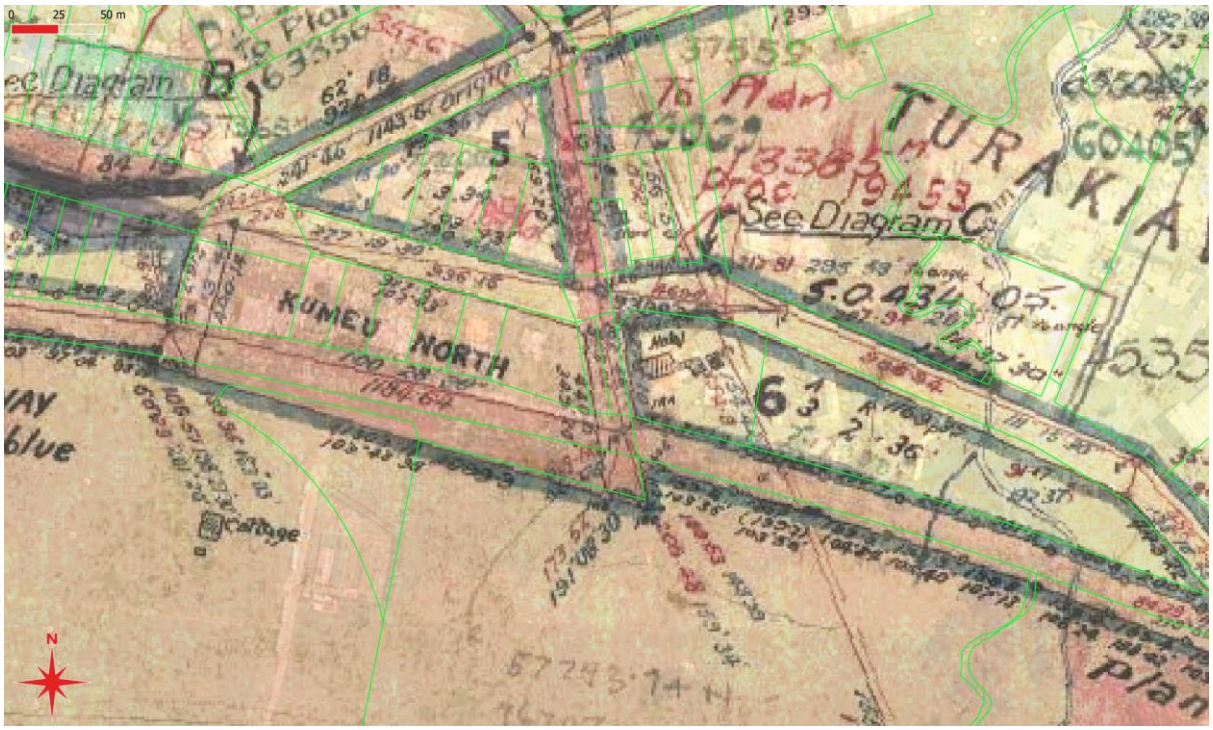

Figure 9-6: Detail of DP 8948, 1913, showing the Hotel with additional buildings attached. Shed and stables seem to have gone but the store is still there.

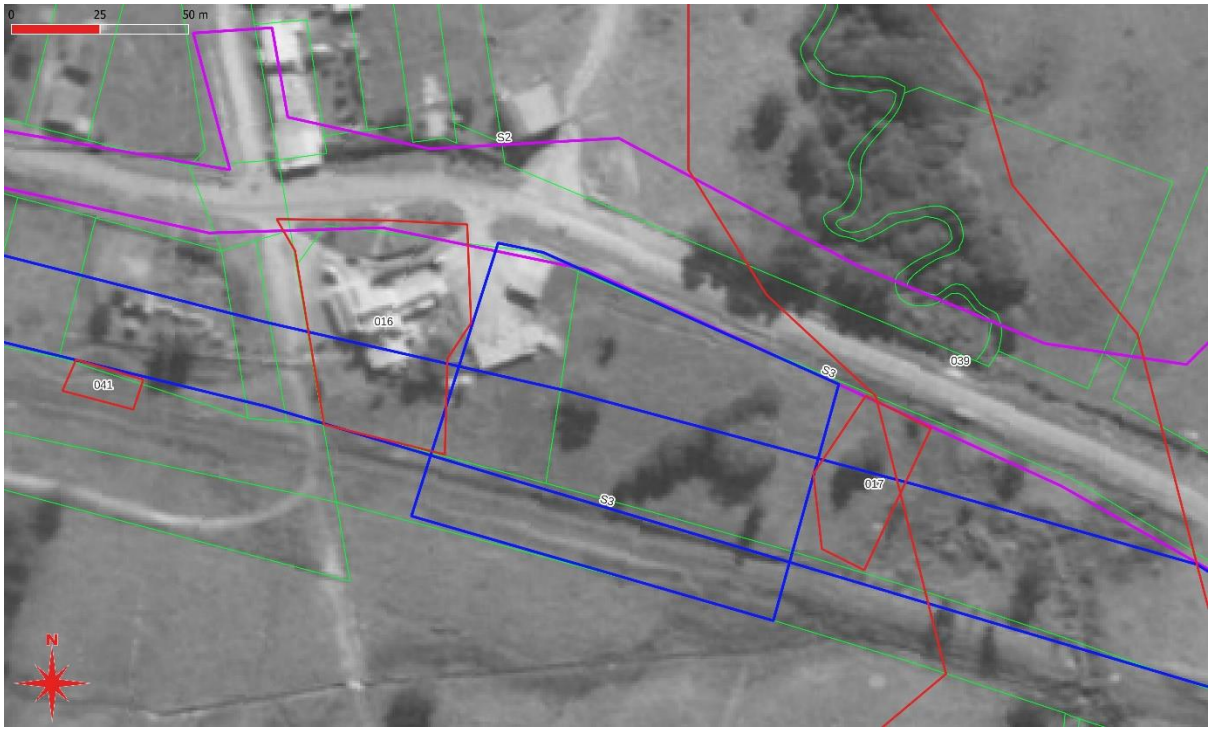

Figure 9-7: The Huapai Tavern in 1940 with further additions (scheduled area shown as 016). The store also shows further building additions but the train station building (041) seems to have gone.

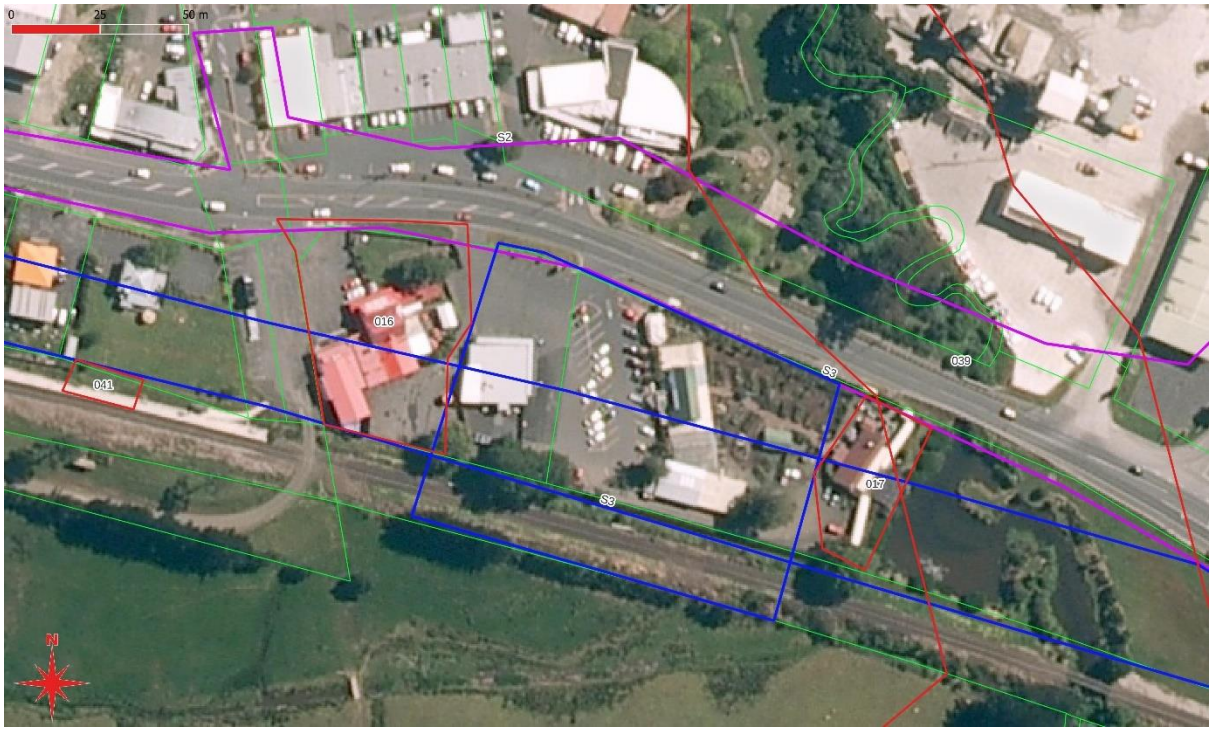

Figure 9-8: Current cluster of Hotel buildings - all encompassed by scheduled extent of place (016) in comparison to S3 and one option of the Kumeū station.

Figure 9-9: Old sections of the Huapai Tavern.

Figure 9-10: Main buildings of the Huapai tavern. Modern extensions to the right.

Figure 9-11: Railway carriages (017) overlooking the Turakiawatea stream.

Figure 9-12: Railway bridge over the Turakiawatea stream.

A historic house (CHI # 16381) is within the extent of S3 and will be impacted by the proposed development (#023 on Figure 2). This structure is likely pre1900 and therefore will require an archaeological authority to be moved or demolished. The curtilage and sub-surface floor assemblage will require an archaeological authority too.

Two further historic houses are recorded within the 200 m buffer zone (CHI #16379 and 16380) but neither will be impacted by the development and both seem to be built post 1940 or have been moved to their current location post 1940 (#024 and #025, Figure 3).

One further historic house is right next to the extent of the proposed development (CHI #16385) and the curtilage could be impacted by NoR S3 (#020, Figure 8-8)

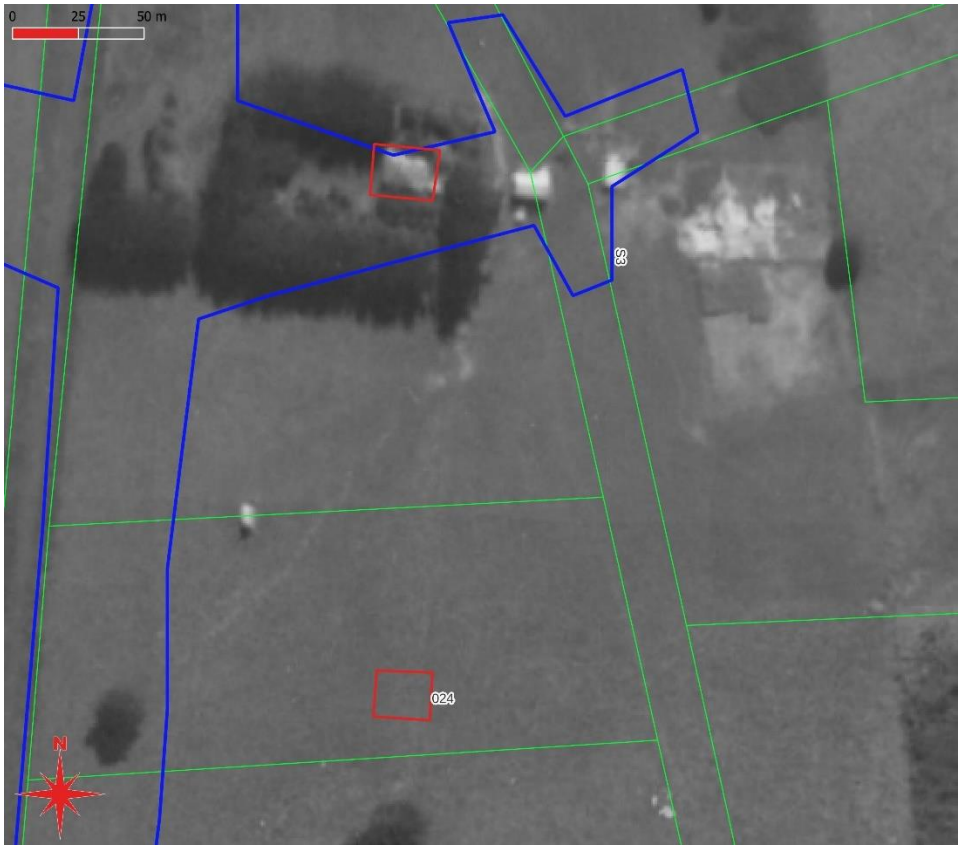

Figure 9-13: 023 and 024 on the 1940 aerial. S3 shown in blue.

Figure 9-14: View onto historic house (023) from the road. It looks like a pre 1900 villa but it will require detailed documentation of the house structure.

Another stream crossing (#035) is a high-risk area to encounter archaeological features that have not been recorded as archaeological sites, as it seems likely that the stream was still navigable by waka in pre and early Contact times before the stream silted up (Figure 9-3).

Figure 9-15: Approximate area of the Huapai Transit Station. It is next to a high risk area along the unnamed stream to encounter as yet unknown archaeological sites (038).

Regarding the development of the station, the area is considered high-risk to encounter archaeological features that have not been recorded as archaeological sites along the banks of an unnamed tributary of the Kumeū River (#038, Figure 48).

Figure 9-16: Stream banks (038) seems to be undisturbed and could still contain archaeological deposits.

Potential adverse effects are unrecorded archaeological features close to the stream. Any archaeological features are likely from seasonal camps to exploit local resources along the various

streams. They would not have been rare but are rarely investigated comprehensively and their information potential is high considering that only coastal pre-Contact sites along the creeks have been recorded or documented. As any sites would be sub-surface, they have no amenity values and their cultural association would be the known relationship of iwi and hapū to the area.

Figure 9-17: One of the options for the Kumeū Station. This option is closest to important heritage areas and structures. But no heritage site is within the extent of the station.

There are no heritage structures within the extent of the Kumeū Station. NoR KS is close to heritage spaces, structures and buildings. The details of the Huapai Tavern (#016) and the Railway carriages (#017) are discussed above.

The oldest part of the Huapai Tavern is outside the footprint of NoR S3 and KS. One possible option is to leave this part of the Tavern in its original location. It could form the nucleus of a heritage centre. This should be left in its original location. The modification of the currently scheduled heritage area around the Huapai Tavern would allow to create a heritage precinct for additional heritage buildings, for example, the Railway carriages and the Railway Goods Shed to be moved close to the Tavern. The carriages are moveable and the Railway Goods Shed has most likely been moved to its current location as it is not shown on the 1940s aerial. Both these heritage elements have already lost their original setting and moving them again will not impact onto their heritage values. One of the criteria for heritage values is their context and connection to place, which in this case has already been lost. The situation now where several heritage structures are dispersed over a large area is not ideal. Bringing them together is a better option than demolition in situ.

9.2.3 Heritage Environment Overview

Four heritage sites with varying historic values (Huapai Tavern extent of heritage place AUP:OP #00482, Railway Shed AUP;OP# 00483, railway carts CHI #18493 and a historic house CHI #16381) are within the boundaries of the proposed development. Two were likely moved to their current location and therefore these two places don't have any archaeological, sub-surface values. The historic house and the Huapai Tavern both have likely sub-surface archaeological deposits in situ.

One possible archaeological site is the location of the original Kumeū train station (#041).

The three stream crossings are high risk areas to encounter archaeological features that have not been recorded as archaeological sites, especially along the named rivers and streams, as these could have been navigable by waka.

Four heritage buildings are outside the boundary of the proposed development, but one is closely adjacent to it. The curtilage of this building could be impacted by the development (#020).

None of the railway stations impacts onto historic heritage, but there is a risk that some subsurface historic features – part of the curtilage of the Huapai Tavern, but outside the scheduled area – are present within the footprint of the planned Kumeū Station (NoR KS). NoR HS is close to a stream crossing, a high-risk area to encounter archaeological features that are not recorded as archaeological sites. There is an impact on the amenity values of the Huapai Tavern in its current location if it will be overlooked by high bridging structures.

GIS ID	AUP #	CHI #	NZAA #	Type	Description
016	00482	13234		Huapai Tavern	Heritage Extent of Place is impacted, including some of the buildings
017		18493		Railway carriages	Impacted, have been moved to this location
019	00483	13243		Railway Goods Shed	Impacted, has been moved to this location.
020		16385		Historic house	No impact – close vicinity
023		16381		Historic house	Impacted – requires demolition or must be moved
024		16379		Historic house	No impact
025		16380		Historic house	No impact
035				Stream crossing	High-risk area
038				Stream crossing	High-risk area

GIS ID	AUP #	CHI #	NZAA #	Type	Description
039				Stream crossing	High-risk area
041				Possible archaeological site	High-risk area

9.3 Assessment of Effects on Historic Heritage and Archaeology and Measures to Avoid, Remedy or Mitigate Actual or Potential Adverse Effects

There is the potential to uncover archaeological material close to the stream crossings. Any archaeological features are likely from seasonal camps to exploit local resources along the various streams. They would not have been rare but are rarely investigated comprehensively and their information potential is high considering that only coastal pre-Contact sites along the creeks have been recorded or documented. As any sites would be sub-surface they have no amenity values and their cultural association would be the known relationship of iwi and hapū to the area. No additional assessment criteria are applicable.

One scheduled heritage building, the railway Goods Shed, is partially impacted by NoR. It has been likely moved to its current location. Moving the Goods Shed into a safe area will mitigate the adverse effects better, as it is a better heritage outcome, compared to the mitigation of preservation through documentation only, if the building is demolished.

The extent of a scheduled heritage space around the Huapai Tavern, which goes back to the 1870s, is impacted by NoR S3 and it will require an authority with conditions of the authority to mitigate any adverse effects. It seems likely that conditions of an authority will include systematic archaeological excavation and analysis.

One possible pre 1900 heritage building (#023) is within S3 and its demolition or relocation will require an authority, its curtilage and sub floor assemblage are archaeological deposits will also require an authority for any earthworks on them. An archaeological investigation under an exploratory archaeological authority could establish a more accurate date for the building.

Three heritage buildings are within a 200 m buffer zone. One of them is very close to the NoR S3 and might be impacted by construction works. These sites often have a curtilage of historic structures, which might be impacted by the NoR area.

An archaeological authority would mitigate the loss of heritage structures through preservation by documentation and/or moving the heritage structure and the risk of encountering archaeological features that are not recorded as archaeological sites.

In conclusion there are some adverse effects on historic heritage by the NoR of S3. The risk of encountering unrecorded archaeological features and the loss of heritage structures can be mitigated by an archaeological authority applied for with Heritage NZ Pouhere Taonga under the Heritage NZ Pouhere Taonga Act. Relocation of any historic building is a preferable option to demolition as the negative impact on heritage values is much less significant.

9.3.1 Positive Effects

Potential positive effects are mentioned in Section 5. Moving the Railway Goods Shed to a better location so it can be appreciated by the public and serve a public purpose is one of the opportunities for positive effects.

9.3.2 Assessment of Construction Effects

There are no additional adverse effects during construction.

9.3.3 Recommended Measures to Avoid, Remedy or Mitigate Construction Effects

It is recommended to include all areas of earthworks or topsoil stripping during construction into the archaeological authority. This is to mitigate the risk of construction delays by the discovery of any archaeological features that have not been recorded as archaeological sites.

9.3.4 Assessment of Operational Effects

There are no additional adverse effects during operation.

9.3.5 Recommended Measures to Avoid, Remedy or Mitigate Operational Effects

There are no recommended measures to avoid operational effects as there are no adverse effects.

9.4 Conclusions

In conclusion there are negative effects and impacts to historic heritage resource and potential negative impacts to the archaeology through the proposed development of NoR S3, KS and HS. Impacts are on scheduled heritage sites and areas, as well as unscheduled heritage sites (recorded in the CHI). There are also several areas with a high risk to encounter yet unrecorded subsurface archaeological features. These negative effects can be mitigated by either recording heritage structures in detail before demolition or can be better mitigated by relocation of these structures, especially if the relocation serves to improve the public understanding and appreciation of these heritage structures. The loss of yet unrecorded archaeological sites/features can be mitigated by preservation through documentation. All mitigation processes will require conditions set through an archaeological authority issued by Heritage New Zealand Pouhere Taonga through the relevant Act.

There are small residual negative effects with the recommended mitigation in place as the loss of potential archaeological sites cannot remediated, only mitigated through documentation and analysis.

Any processes regarding tikanga, especially around koiwi, should be discussed with manawhenua before the start of the project.

10 NoR S4: Access Road Upgrade

10.1 Project Corridor Features

Access Road/Tawa Road is an existing arterial corridor that runs along the eastern RUB of Kumeū-Huapai. The proposed upgrade extends from the intersection of Access Road with SH16 (and entry to the Kumeū-Huapai township) in the east and continues into Tawa Road to its intersection with Puke Road in the west.

It is proposed to widen the existing Access Road/Tawa Road corridor from its current width of 20m to accommodate a 30m wide four-lane cross-section. The cross-section of the corridor transitions from the rural edge cross-section to an urban cross-section west of the Wookey Lane intersection. Along the western section of Access Road, which is a low-speed rural section, the corridor has a rural southern edge (swales, typically 9m wide top width) with walking and cycling facilities along its northern urban edge. Through the business and industrial area, a 30m urban corridor is provided, including walking and cycling infrastructure along both sides of this eastern section.

An overview of the proposed design is provided in Figure 10-1 below.

Figure 10-1: Overview of Access Road Upgrade

10.2 Existing and Likely Future Environment

10.2.1 Planning context

Access Road/Tawa Road is an existing arterial corridor that runs along the eastern RUB of Kumeū-Huapai.

- The northern side of Access Road is zoned under the AUP:OP as FUZ, with Business – Light Industry Zoning at the north-eastern section of Access Road.
- The southern side of Access Road is predominantly zoned under the AUP:OP as Rural – Countryside Living, with exception to the Kumeū Showgrounds which are zoned as Rural – Mixed Rural Zone are identified as a precinct (I517 Kumeū Showgrounds Precinct) in the AUP:OP.

Table 10-1 below provides a summary of the existing and likely future environment as it relates to Access Road.

Table 10-1: Access Road Upgrade Existing and Likely Future Environment

Environment today	Zoning	Likelihood of Change for the environment[15]	Likely Future Environment[16]
Business	Business (Light Industrial) Zone	Low	Business (Light Industrial)
Rural	Rural – Countryside Living Zone Rural – Mixed Rural Zone	Low	Rural
Undeveloped greenfield areas (Future Urban Zone)	Future Urban	High	Urban

[15] Based on AUP:OP zoning/policy direction
[16] Based on AUP:OP zoning/policy direction

10.2.2 Heritage Environment

This chapter discusses historic and archaeological heritage structures/features/deposits within the 200 m buffer of NoR S4.

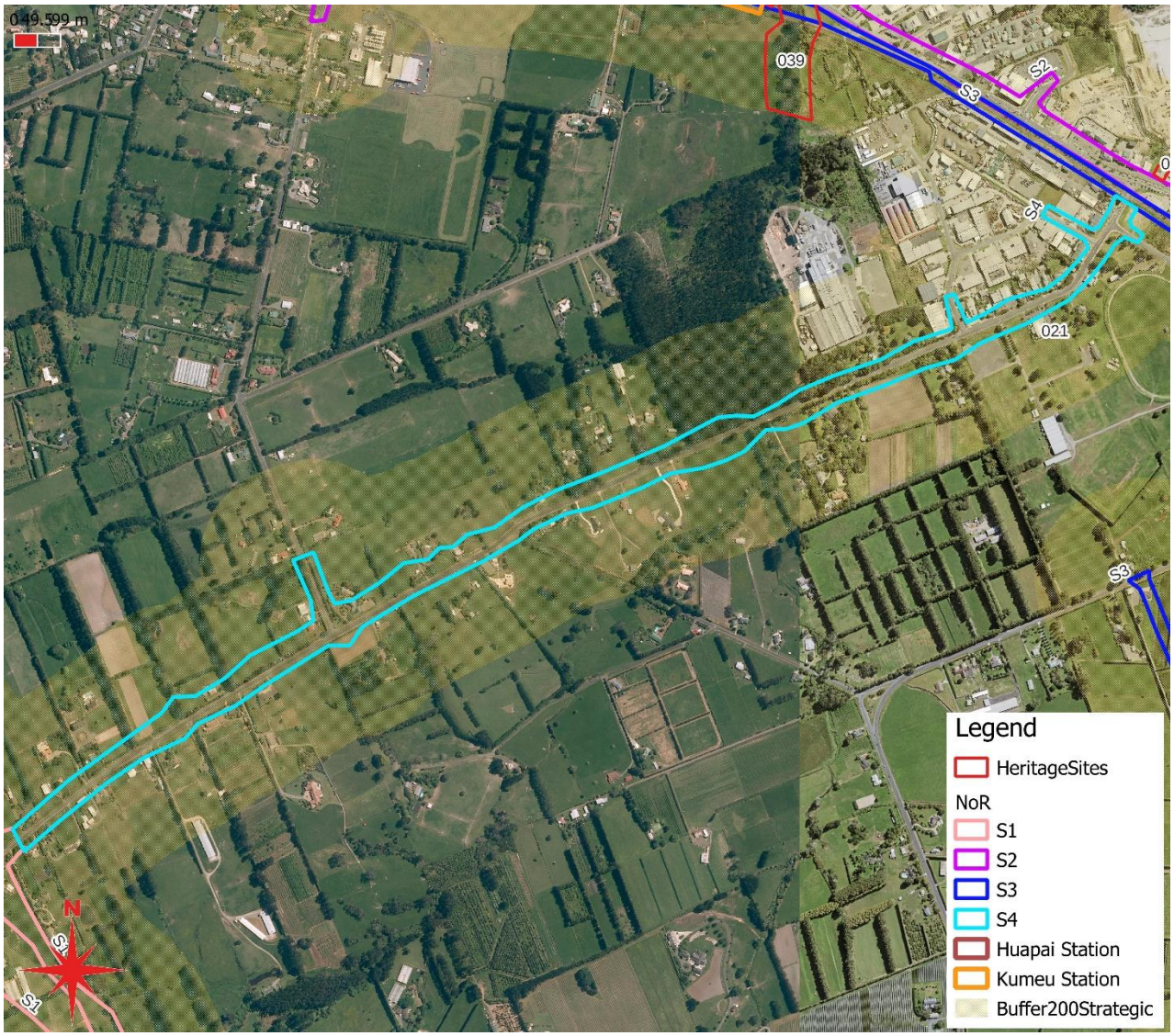

Figure 10-2: NoR S4 with 200 m buffer. One heritage site is within the buffer (021). It is the relocated Pomona Hall, restored and moved onto this location by the Council in 2010.

There is no archaeological or heritage site, place or building within the extent of NoR S4.

The only heritage building nearby has been moved in 2010 onto this location. The Pomona Hall (#021) is currently used as an antique shop. It is not impacted by the proposed NoR. A further heritage structure is recorded in the CHI (reference #16377, gates and shed) but could not be found on the ground or on recent aerials. It seems that it has been destroyed during recent building works on the property.

Figure 10-3: The Pomona Hall next to the Kumeū community Centre.

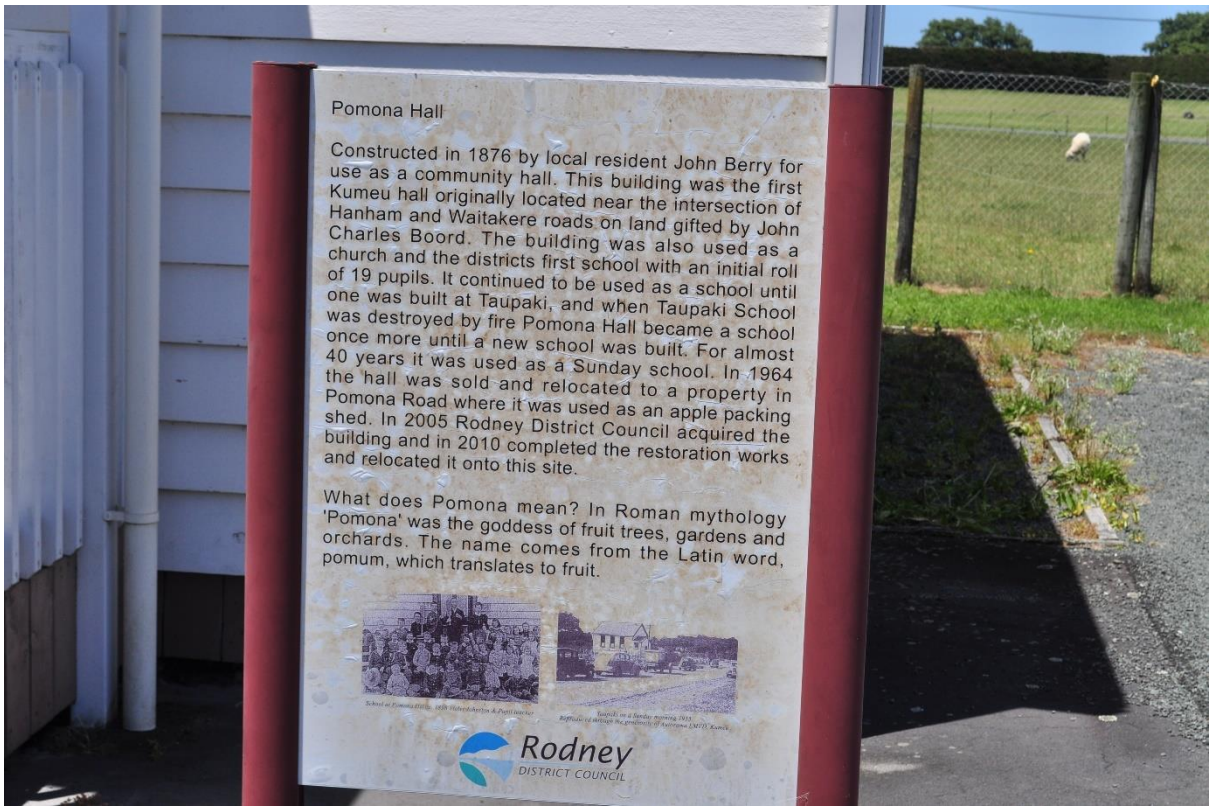

Figure 10-4: Information panel for the Pomona Hall.

10.3 Assessment of Effects on Historic Heritage and Archaeology and Measures to Avoid, Remedy or Mitigate Actual or Potential Adverse Effects

There are no adverse effects on Historic Heritage and Archaeology. The small residual risk to encounter archaeological features can be mitigated by an Accidental Discovery Protocol.

10.3.1 Positive Effects

Potential positive effects are mentioned in Section 5.

10.3.2 Assessment of Construction Effects

There are no additional adverse effects during construction.

10.3.3 Recommended Measures to Avoid, Remedy or Mitigate Construction Effects

It is recommended to include all areas of earthworks or topsoil stripping during construction into the accidental discovery protocol.

10.3.4 Assessment of Operational Effects

There are no additional adverse effects during operation.

10.3.5 Recommended Measures to Avoid, Remedy or Mitigate Operational Effects

There are no recommended measures to avoid operational effects as there are no adverse effects.

10.4 Conclusions

In conclusion there are no residual negative effects with the recommended mitigation in place.

Any processes regarding tikanga, especially around koiwi, should be discussed with manawhenua before the start of the project.

11 Conclusion

There are two recommendations that relate to several of the NoRs:

Regarding NoR S1, S2 and S3:

Precautionary Archaeology Authority

Any stream crossing or earthworks along the banks of a stream have a high risk to encounter as yet unknown archaeological sites. This risk increases where the streams can be navigable by waka in pre-Contact times before European style land use and drainage works reduced the water flow and increased the silt load of these streams. Any archaeological features are likely from seasonal camps to exploit local resources along the various streams. They would not have been rare but are rarely investigated comprehensively and their information potential is high considering that only coastal pre-Contact sites along the creeks have been recorded or documented. As any sites would be sub-surface, they have no amenity value, and their cultural association would be the known relationship of iwi and hapū to the area. No additional assessment criteria are applicable.

An archaeological authority would mitigate the risk of encountering yet unrecorded archaeological features and mitigate the loss of these potential archaeological sites through preservation by documentation.

In conclusion the risk of encountering unrecorded archaeological features can be mitigated by a precautionary archaeological authority applied for with Heritage NZ Pouhere Taonga under the Heritage NZ Pouhere Taonga Act.

Regarding NoR S2, S3 and KS:

Relocation of Heritage Buildings

The other recommendation that impacts several NoRs, - NoR S2, S3 and KS (possibly includes S1) - is a potentially positive effect. There is an opportunity to create a heritage precinct with the necessary re-design of the AUP scheduled places #00482 and #00483, the Huapai Tavern and the Railway Goods Shed, in close connection to the future Kumeū Rapid Transport Station. It seems that only the more modern part of the Huapai Tavern is impacted by NoR S3 (see discussion at NoR S3 chapter). We still require a detailed investigation of the building and its curtilage to have certainty. But if this assumption is correct, there is a chance to re design the current building complex and keeping its main heritage elements in place. There is an opportunity to create a heritage precinct, with the necessary move of the Railway Carriages and the Railway Goods Shed (AUP #00483). During construction of S1 and the southern part of S3 two more heritage buildings (022 and 023) are impacted. Rather than a demolition of these building, there is the opportunity to move them into this newly designed heritage precinct connected to the Kumeū Station. With several structures/buildings in place this would allow many opportunities to enhance the local sense of community and sense of place. Alternatively, these buildings could be integrated into the functions and commercial life of the train station. The final mitigation measures will be confirmed as part of the Historic Heritage Management Plan which is a condition of the proposed designation.

In addition to these heritage buildings there could be some space to develop an adjacent but separate area for manawhenua to tell their own stories. For a starter the name of the stream next to the Kumeū Station, Turakiawatea, is not visible today (Figure 8-9).

The following section addresses each NoR separately.

NoR S1:

One possible archaeological site (#027) and two heritage sites with varying historic values are within the boundaries of the proposed development. One of the historic sites is likely pre 1900 and its curtilage has likely archaeological values (#022). The other is post 1940 and seems to be part of the long development around the Sinton farmstead and local shop (#028).

A shell midden site is close by (#001) and indicates that the stream crossings (Totara Creek, Waiarohia / Ngongepetara Stream and Ahukuramu Stream) are high risk areas for the discovery of sub-surface, unrecorded archaeological features.

In conclusion there are some adverse effects on historic heritage by the NoR of S1. The risk of encountering unrecorded archaeological features and the loss of a possible heritage structure can be mitigated by an archaeological authority applied for with Heritage NZ Pouhere Taonga under the Heritage NZ Pouhere Taonga Act. Relocation of the historic house is a preferable option to a demolition.

NoR S2:

Two heritage sites with varying historic values are just touched by the boundaries of the proposed development (017 Railway carriages and 019 Railway Shed). Both were moved to their current location and therefore both places don't have any archaeological, sub-surface values, as they are missing archaeological features related to historic buildings like rubbish dumps, service trenches etc, which is called curtilage of the historic building.

The stream crossings (Kumeū river, Turakiawareta stream and an unnamed stream) are high risk areas for the discovery of sub-surface, unrecorded archaeological features, especially along the named rivers and streams, as both could have been navigable by waka.

Three heritage places and buildings are outside the boundary of the proposed development, but closely adjacent to it. They might be impacted by the construction zone. The scheduled heritage area around the Huapai Tavern (AUP;OP reference #00482) is clipped by the NoR S2 but no structure is impacted by the development. There is a small risk to encounter some of the historic curtilage of the Tavern.

An archaeological authority would mitigate the loss of heritage structures through preservation by documentation and/or moving the heritage structure and the risk of encountering archaeological features that have not been recorded as archaeological sites.

In conclusion there are some adverse effects on historic heritage by the NoR of S2. The risk of encountering unrecorded archaeological features and the loss of heritage structures can be mitigated by the conditions of an archaeological authority applied for with Heritage NZ Pouhere Taonga under the Heritage NZ Pouhere Taonga Act.

NoR S3:

Four heritage sites with varying historic values are within the boundaries of the proposed development (#015, #017, #019 and #023). Two were likely moved to their current location and therefore these two places don't have any archaeological, sub-surface values (#017 Railway Carriages and #019 Railway Goods Shed). The historic house (#023) and the Huapai Tavern (#015) both have likely sub-surface archaeological deposits around the structures and in the vicinity in situ.

One possible archaeological site is the location of the original Kumeū train station (#041).

The four stream crossings are high risk areas for the discovery of sub-surface, archaeological features, especially along the named rivers and streams, as these could have been navigable by waka.

Four heritage buildings are outside the boundary of the proposed development, but one is closely adjacent to it. The curtilage of this building could be impacted by the development (020).

One scheduled heritage building, a railways good shed, is impacted by NoR S3. It has been likely moved to its current location. Mitigation, if practicable, would involve relocating the Good Shed to an alternative location in proximity to the NAL to maintain the connection with the railway.

The extent of a scheduled heritage space around the Huapai Tavern, which goes back to the 1870s, is impacted by NoR S3 and it will require the conditions of an archaeological authority to mitigate any adverse effects.

One possible pre 1900 heritage building (#023) is within S3 and its demolition or move will require the conditions of an authority for mitigation. Its curtilage and sub floor assemblage are archaeological deposits and will also require the conditions of an authority for any earthworks on them to mitigate the impact.

Three heritage buildings are within a 200 m buffer zone. One of them is very close to the NoR and might be impacted by construction works (#020).

An archaeological authority would mitigate the loss of heritage structures through conditioning the preservation by documentation and/or moving the heritage structure, and the risk of encountering unrecorded archaeological features.

In conclusion there are some adverse effects on historic heritage by the NoR of S3. The risk of encountering unrecorded archaeological features and the loss of heritage structures can be mitigated by the conditions of an archaeological authority applied for with Heritage NZ Pouhere Taonga under the Heritage NZ Pouhere Taonga Act. Relocation of any historic building is a preferable option to demolition as the impact onto the heritage values is lesser.

NoR HS

The stream next to the station area is a high risk area (#038) for the discovery of sub-surface, unrecorded archaeological features.

In conclusion the risk of encountering unrecorded archaeological features can be mitigated by a precautionary archaeological authority applied for with Heritage NZ Pouhere Taonga under the Heritage NZ Pouhere Taonga Act.

NoR KS

There are no adverse effects on heritage or archaeological values, any small risk to encounter archaeological features or deposits from the curtilage of the Huapai Tavern can be mitigated through a precautionary archaeological authority. There is an impact on the amenity value of the Huapai Tavern in its current location by overlooking it with bridging structures.

In conclusion the risk of encountering unrecorded archaeological features can be mitigated by a precautionary archaeological authority applied for with Heritage NZ Pouhere Taonga under the Heritage NZ Pouhere Taonga Act.

NoR S4

There are no adverse effects on heritage or archaeological values, any small risk to encounter archaeological features or deposits can be mitigated through an Accidental Discovery Protocol.

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ATTACHMENT 57

NORTH-WEST STRATEGIC URBAN DESIGN FRAMEWORK EVALUATION

TE TUPU NGĀTAHI
SUPPORTING GROWTH

North West Strategic Urban Design Framework Evaluation

December 2022

Version 1

Document Status

Responsibility	Name
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Reviewer	Annette Jones
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Revision Status

Version	Date	Reason for Issue
1	16/12/2022	Notice of Requirement Lodgement

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Glossary of Acronyms / Terms

Acronym/Term	Description
ADT	Average Daily Traffic
AEE	Assessment of Effects on the Environment
ASH	Alternative State Highway
Auckland Council	Means the unitary authority in the Auckland Region
Auckland Plan	The Auckland Plan 2050: Development Strategy
AUP:OP	Auckland Unitary Plan: Operative in Part
BCI	Brigham Creek Interchange
CC2W	City Centre to Westgate (**CC2W**)
DBC	Detailed Business Case
Design Framework	Te Tupu Ngātahi Design Framework
Designation Boundary	The extent of the proposed designation.
FULSS	Future Urban Land Supply Strategy
FUZ	Future Urban Zone
Ha	Hectares
NAL	North Auckland Line
NoR	Notices of Requirement
North West Strategic Network	• Alternative State Highway, including Brigham Creek Interchange (NoR S1) • State Highway 16 Main Road Upgrade (NoR S2) • Rapid Transit Corridor, including Regional Active Mode Corridor (NoR S3), Kumeū Rapid Transit Station (NoR KS) and Huapai Rapid Transit Station (NoR HS) Access Road Upgrade (NoR S4)
North West Strategic Package	Four Notices of Requirement for the North West Strategic Network for Auckland Transport and Waka Kotahi NZ Transport Agency.
PBC	The Supporting Growth Programme Business Case (**PBC**)
Project area	Refers to the land being developed within the boundary of each NoR. Includes the carriageway, batter slopes, intersections, bridging, landscape mitigation planting, street trees, stormwater wetlands and construction laydown areas.
RAMC	Regional Active Mode Corridor
RMA	Resource Management Act 1991

Acronym/Term	Description
RNZAF	The Royal New Zealand Airforce
RTC	Rapid Transit Corridor
RTN	Rapid Transit Network
RUB	Rural Urban Boundary
SaAs	Safe and Appropriate Speed
SG	Te Tupu Ngātahi Supporting Growth
SH16	State Highway 16
The Council	Auckland Council

1 Executive Summary

This North West Strategic Urban Design Framework and Evaluation (UDFE) has been prepared for the North West Strategic Network Notices of Requirement (NoRs) for Auckland Transport (AT) and Waka Kotahi NZ Transport Agency (Waka Kotahi) (the "North West Strategic Package").

The six NoRs are described in Table 1-1 and illustrated in Figure 1-1. The NoRs are to designate land for future strategic transport corridors as part of the Supporting Growth Programme to enable the future construction, operation and maintenance of transport infrastructure in the North West (NW) of Auckland.

Table 1-1: North West Strategic Package: Notices of Requirement and Projects

Notice	Project
NoR S1	Alternative State Highway (ASH), including Brigham Creek Interchange
NoR S2	SH16 Main Road Upgrade
NoR S3	Rapid Transit Corridor (RTC), including Regional Active Mode Corridor (RAMC)
NoR KS	Kumeū Rapid Transit Station
NoR HS	Huapai Rapid Transit Station
NoR S4	Access Road Upgrade

This UDFE contains an evaluation section for each project within the North West Strategic Package which has been prepared based on the guidance and principles established in the programme wide document - Te Tupu Ngātahi Design Framework (Design Framework or Design Framework Principles).

The Design Framework defines a systems based approach to evaluating the environmental and cultural context of the North West Supporting Growth projects. Twenty design principles are evaluated under the headings Environment, Social, Built form, Movement and Land use.

The UDFE provides urban design focused commentary on the current design that has informed each of the proposed designations and recommends where any urban design opportunities should be considered in future design stages. An urban design designation condition requiring the preparation of an Urban and Landscape Design Management Plan (ULDMP) is proposed to ensure further consideration is given to urban design at the detailed design stage.

The recommendations are summarised as urban design outcomes sought and noted on Figures Figure 4-8, Figure 5-7, Figure 5-8, Figure 6-12 and Figure 7-7 as urban design outcomes and opportunities. Several opportunities have been identified during the evaluation for each NoR for consideration that are not mitigation for the projects. Rather the projects help enable these opportunities which could be realised either by the requiring authority, other stakeholders or parties, such as and owners and developers. These additional opportunities are not however required to mitigate the anticipated urban design effects of the Projects.

1.1 Summary of Urban Design Outcomes Sought

The following provides a summary of the Key outcomes and opportunities sought for each NoR project.

1.1.1 NoR S1 – Alternative State Highway (ASH), including Brigham Creek Interchange

The key outcomes and opportunities for NoR S1 are:

The ASH corridor will alter the existing identity and character of the area, particularly the rural areas outside of the FUZ land. The ULDMP will need to demonstrate how to minimise the impact on the built, natural and cultural values of the area. Optimise integration with adjacent zones by:

- recognising the transition from rural to urban land uses,
- resolve interface issues including access to properties,
- incorporation of acoustic barriers and screen planting where required,
- utilise the corridor and interchanges to respond to the future environment the ASH passes through to support placemaking and ensure the interchanges are legible for access to Kumeū and Huapai.

Minimise land disturbance, conserve resources and materials. The preferred alignment extends through moderate to severe undulating topography resulting in some large batter slopes. The detailed design will have to minimise impacts on streams, wetlands and adjacent dwellings.

Mana whenua shall continue to provide input into environmental and cultural landscape matters throughout the detailed design and construction phases including how desired outcomes reflect their identity and values.

Landscape plans that considers recommendations from the landscape and visual, flooding and ecological assessments including tree and stormwater wetland planting, construction compound and private property reinstatement and treatment of batter slopes. The landscape outcomes should reinforce the wider vegetation patterns of the local landscape and create connections to proposed greenways and the wider walking and cycling network.

Figure 1-1: Alternative State Highway, including Brigham Creek – Urban Design Outcomes and Opportunities

1.1.2 NoR S2 – SH16 Main Road Upgrade

Key outcomes sought for NoR S2:

An integration strategy and further design refinement should address interface issues with existing and future development, in particular around the development of the RT Stations and connections back into the future Town Centres and future communities to the south.

There is an opportunity to support partners in optimising adjacent and residual land along the corridor and to ensure the sense of identity and place is reinvigorated with the proposed upgrade of the corridor.

There is an opportunity for a gateway entrance and placemaking at the southern end of Kumeū and at the northern end at the junction with Station Road and thereby defining the extent of the Kumeū-Huapai town centre as envisioned in the Kumeū-Huapai Centre Plan.

Permeability of the corridor for active modes that addresses cross corridor connectivity (midblock crossings), modal priority and permeable access to destinations such as open spaces and community facilities and between areas of high density.

Mana whenua shall continue to provide input into environmental and cultural landscape matters throughout the detailed design and construction phases including how desired outcomes reflect their identity and values.

Landscape plans that respond to recommendations from the landscape & visual and ecological assessments including revegetation and stormwater wetland planting, adjacent construction

compound and private property reinstatement, treatment of batter slopes and structures. The landscape plans should enable a strong vegetated framework and identity for the SH16 (Kumeū and Huapai) Main Road.

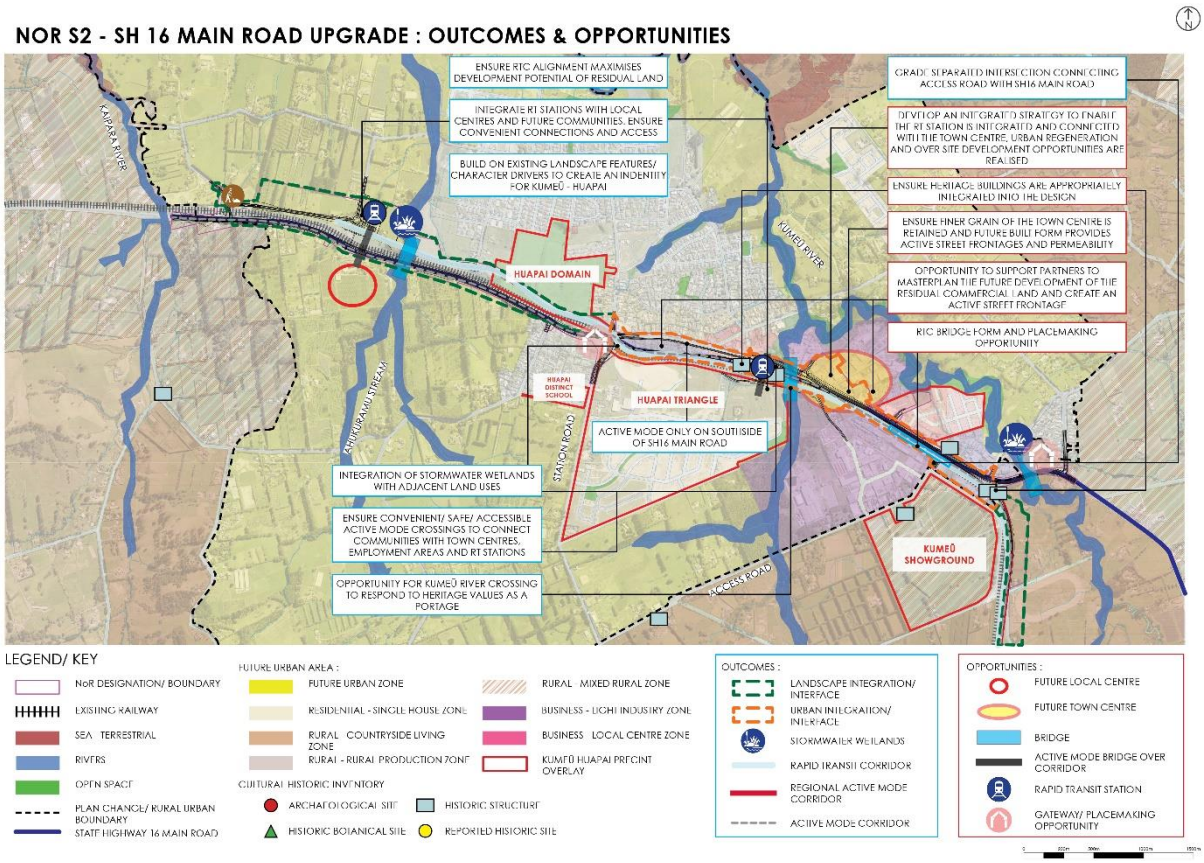


Figure 1-2: State Highway 16 Main Road Upgrade - Urban Design Outcomes and Opportunities

1.1.3 NoR S3 – Rapid Transit Corridor (RTC), including Regional Active Mode Corridor (RAMC), NoR KS – Kumeū Rapid Transit Station and NoR HS – Huapai Rapid Transit Station

Key outcomes sought for NoR S3:

A landscape interface approach within the corridor that recognises the transition from future urban to rural – countryside living. Through the urban section, future land integration should be considered in the detailed design phase and refinement of the alignment to maximise the spatial opportunity for adjacent / residual land redevelopment.

Details of the surrounding FUZ land use is currently unknown as Kumeū-Huapai is yet to be structure planned. Integration between land use and transport networks should be developed in a future stage to optimize connectivity with the RT Kumeū and Huapai Stations.

The urban section of the RTC impacts on two historic buildings and one CHI listed item. One of the buildings, Huapai Tavern is a scheduled historic place in AUP#00482 the other building, a rail shed is a scheduled historic place in AUP#00483. Rail carriages used as a cafe are identified as CHI item #18493.

An urban interface approach should respond to the changing built form interface, in particular providing legible and convenient pedestrian access between the corridor and adjacent development, between RTC Stations and local centres and adjacent future urban land uses.

The development of the RTC Stations will be a catalyst for intensification.

Design development of the Stations needs to consider connectivity with SH16 Main Road and adjacent commercial and residential areas, incorporating CPTED principles into the design.

Mana whenua shall continue to provide input into environmental and cultural landscape matters throughout the detailed design and construction phases including how desired outcomes reflect their identity and values.

Landscape plans that respond to recommendations from the landscape and visual and ecological assessments including revegetation and stormwater wetland planting, adjacent construction compound and private property reinstatement, treatment of batter slopes and structures.

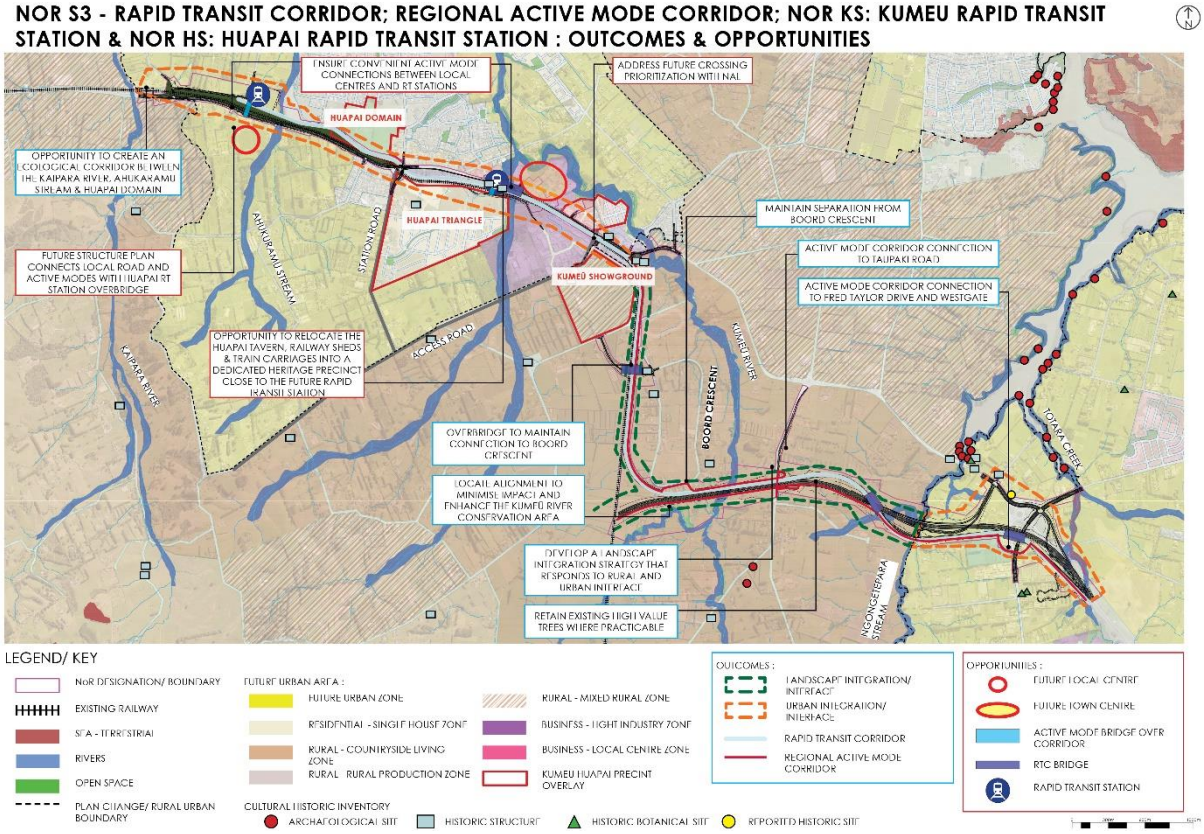


Figure 1-3: Rapid Transit Corridor; Kumeū Rapid Transit Station and NoR HS: Huapai Rapid Transit Station - Urban Design Outcomes and Opportunities

1.1.4 NoR S4 – Access Road Upgrade

Key outcomes sought for NoR S4:

The corridor aligns with the RUB, future detailed design should demonstrate an appropriate response and integration with the urban and rural character and reinforce an urban edge. The interim design includes green infrastructure, ie a swale on the rural side this will help ensure any built form is set back from the road where as the urban side of the road cross section allows for built form to address

the street. Further consideration should be given at the detailed design stage to ensure the rural character is retained with an appropriate interface.

Permeability of the corridor for active modes that addresses cross corridor connectivity (midblock crossings), modal priority and permeable access to destinations such as open spaces and community.

Mana whenua shall continue to provide input into environmental and cultural landscape matters throughout the detailed design and construction phases including how desired outcomes reflect their identity and values.

Landscape plans that considers recommendations from the landscape and visual, arboricultural heritage and ecological assessments including street tree and stormwater wetland planting, construction compound and private property reinstatement, treatment of batter slopes.

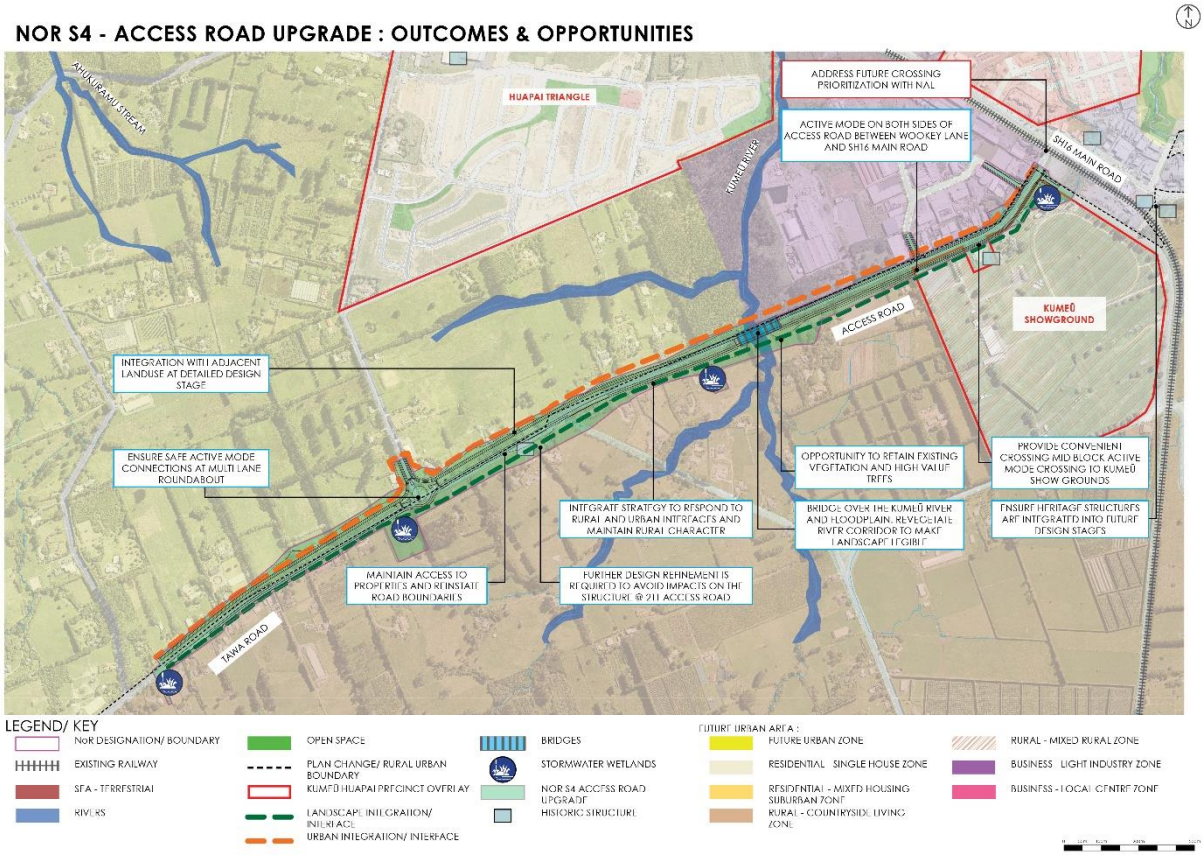


Figure 1-4: Access Road Upgrade – Urban Design Outcomes and Opportunities

2 Introduction

This Urban Design Framework and Evaluation has been prepared for the North West Strategic Projects and Kumeū Huapai Local Arterials Notices of Requirement (NoRs) for Waka Kotahi NZ Transport Agency (Waka Kotahi) and Auckland Transport (AT) (the "Strategic Assessment Package").

The NoRs are to designate land for future strategic and local arterial transport corridors as part of Te Tupu Ngātahi Supporting Growth Programme (Te Tupu Ngātahi) to enable the construction, operation and maintenance of transport infrastructure in the North West area of Auckland.

The Strategic Assessment Package will provide route protection for the strategic projects, which include:

- Alternative State Highway (ASH), including Brigham Creek Interchange (BCI)
- the Rapid Transit Corridor (RTC), including the Regional Active Mode Corridor (RAMC)
- Kumeū Rapid Transit Station
- Huapai Rapid Transit Station State Highway 16 (SH16) Main Road Upgrade

It also includes the upgrade of Access Road, an existing local arterial corridor within Kumeū-Huapai.

This report assesses the transport effects of the North West Strategic Assessment Package identified in Table 2-1 below and illustrated on Figure 2-1 below. Refer to the main AEE for a more detailed project description.

Table 2-1: North West Strategic Package: Notices of Requirement and Projects

Notice	Project
NoR S1	Alternative State Highway (ASH), including Brigham Creek Interchange
NoR S2	SH16 Main Road Upgrade
NoR S3	Rapid Transit Corridor (RTC), including Regional Active Mode Corridor (RAMC)
NoR KS	Kumeū Rapid Transit Station
NoR HS	Huapai Rapid Transit Station
NoR S4	Access Road Upgrade

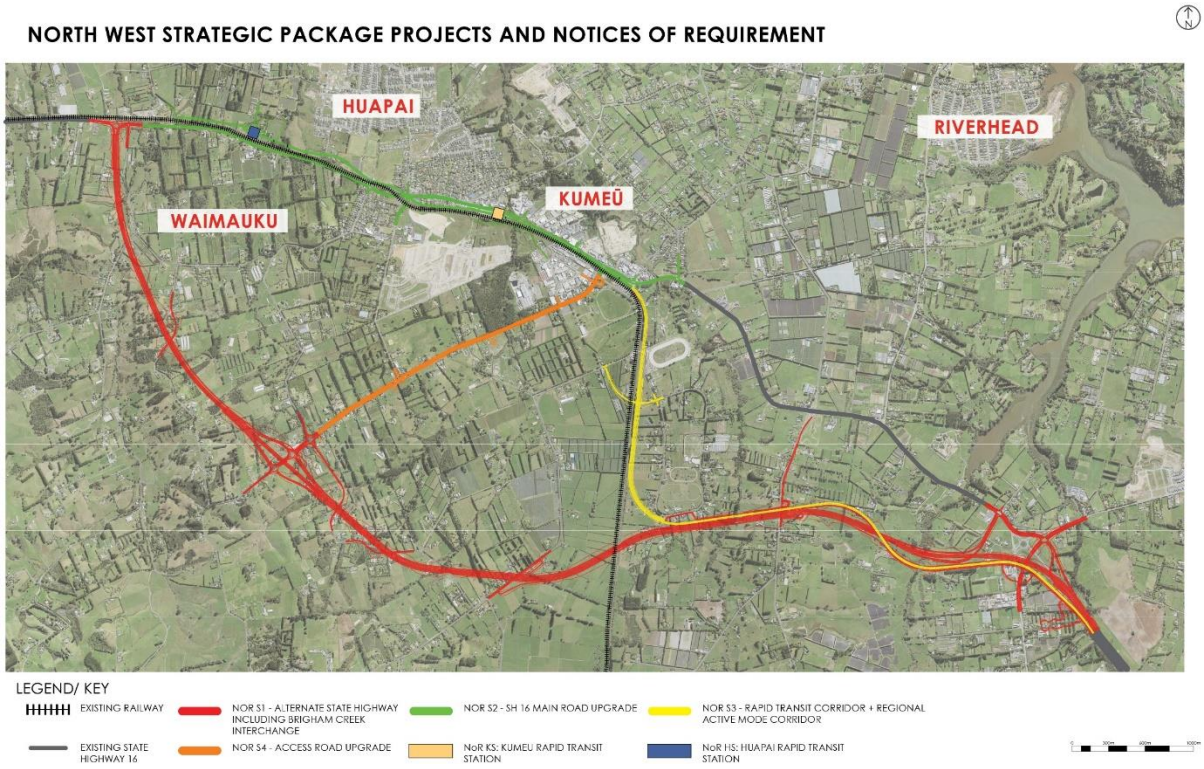


Figure 2-1: North West Strategic Package Projects and Notices of Requirement

2.1 Purpose and Scope of this Report

This urban design evaluation and framework provides an overview of the urban design considerations and inputs during option development and refinement as well as an evaluation and identification of future transport and land use integration opportunities for the North West Strategic Network.

The key sections addressed for each project are:

- Corridor Contextual Analysis
- Existing environment
- Likely future environment
- Urban design considerations - Form and Function
- Evaluation against the Te Tupu Ngātahi Design Framework principles
- Summary of urban design evaluation and recommendations
- Map of urban design outcomes and opportunities.

3 The Design Context

This urban design framework contains an evaluation which has been prepared for each of the projects based on the guidance and principles established in the programme wide document - Te Tupu Ngātahi Design Framework, Version 1.0 Final 25.03.19. The Design Framework provides the methodology that is used to evaluate each Te Tupu Ngātahi Supporting Growth Project and underpins the Urban Design Framework and Evaluation that is developed for each NoR.

The Te Tupu Ngātahi Design Framework takes a systems approach as the basis on which urban areas are organised and understood and pulls these apart as a series of layers; environment, social, built form, movement and land use, with cultural and sustainability values underpinning and spanning across these. In this way transport networks are not seen in isolation rather in terms of how they can contribute to the urban system as a whole.

There are twenty design principles that have been established within these layers to provide high level guidance on the attributes of responsive, resilient, sustainable, vibrant and high-quality urban environments. Each of the principles describe what 'good looks like' and what to aim for in the design of transport networks. The principles sit within an integrated system across the various layers, to be prioritised and applied according to desired outcomes articulated in the strategic policy direction and the unique needs of each context.

The Design Framework sits within the context of a range of established strategic plans, policies and design guidance that guide urban development outcomes at the:

- National level (e.g. NPS on Urban Development, GPS on Land Transport, Waka Kotahi NZ Transport Agency Urban Design Guidelines "Bridging the Gap" and "Landscape Guidelines", Regional Land Transport Plan); and
- Local level (e.g. Auckland Plan 2050, ATAP, Auckland Transport Roads and Streets Framework, Transport Design Manual, Auckland Unitary Plan, AT Sustainability Framework, Auckland Transport Code of Practice).

The established strategic plans and guidance outlined above informed the development of the Design Framework content and they are referenced in general terms as they relate to the attributes that will contribute to healthy, connected and sustainable communities. Where more recent design guidance was available that did not form part of these published reports, the Design Framework included more detail, e.g. the approach to the location of rail, rapid transit and the role of active modes.

National Policy Statement on Urban Development 2020 (NPS-UD)

The NPS-UD came into effect on 20 August 2020 and sets out a list of things that local authorities must do to give effect to the objectives and policies defined within the NPS-UD. The NPS-UD does not explicitly address or refer to urban design but sets out the characteristics and rationale for well-functioning urban environments that enable all communities to provide for their social, economic, and cultural well-being and for their health and safety, now and into the future. This includes, amongst other requirements, the enabling of:

- increased commercial and residential activity around centre zones;
- areas with employment opportunities; and
- areas that are well serviced by existing or planned public transport or where there is high demand for housing or business.

This aligns with the Design Framework principle of increasing density in and around centres to create vibrant walkable / cyclable communities that support public transport, the creation of a compact urban form and creating a community focal point and sense of place.

Auckland Council

At a local level, the key urban design considerations and provisions of the AUPOIP relevant to the North West Strategic Network include:

- Regional Policy Statement B2: Urban Growth and Form;
- Regional Policy Statement B3: Infrastructure Transport and Energy;
- Regional Policy Statement B4: Natural Heritage (E38: Urban Subdivision);
- Chapter E38: Subdivision;
- Chapter H: Zones (including structure planned zones).

The urban design specific commentary within the corridor evaluations in the sections below broadly address the objectives and policies of the relevant sections of the Regional Policy Statement and Chapters of the AUPOIP as listed above.

In addition, the Auckland Plan 2050 sets the vision and direction for Auckland and the Design Framework directly references this plan. It illustrates how the outcomes of the Auckland Plan are linked to the design principles set out for the Supporting Growth Programme in the Framework.

Kumeū-Huapai Centre Plan

The Kumeū-Huapai Centre Plan prepared by the Rodney Local Board in 2017 provides a planning framework to guide how the town centre area grows and develops in the short term and over the next 30 years. The Plan envisages a master planned town with a distinctive architectural identity, a town centre, good walking and cycling connectivity, trees and enhanced natural environment. These actions support the delivery of the vision of the future for Kumeū-Huapai as an attractive town centre that focuses on the river, has improved connections, and celebrates its heritage and rural remote areas.

Spatial Land Use Strategy - North West

The Spatial Land Use Strategy -North West (Kumeū-Huapai, Riverhead and Redhill) adopted by Auckland Council in May 2021 outlines how the future land use of the Kumeū- Huapai village including local centres and future urban expansion is supported by the North West Strategic Transport Network. The Future Urban Land Supply Strategy 2017 earmarks 80ha of Future Urban Zone in Kumeū-Huapai to be development ready by 2028-2032.

4 NoR S1: Alternative State Highway, Including Brigham Creek Interchange

4.1 Alternative State Highway, Including Brigham Creek Interchange Contextual Analysis

The ASH extends north west from the existing State Highway 16 (SH16), northern end of the north western motorway to join SH16 west of Huapai. The ASH corridor includes the Brigham Creek Interchange (north of Massey) and an interchange at Tawa / Access Road. The corridor joins with SH16 near / at Foster Road on the western edge of the FUZ, west of Huapai. This proposed state highway corridor will be approximately 11km long, travelling westward across rural farmland to the southwestern side of Kumeū and Huapai, with an additional interchange proposed at Tawa Road. An overview of the concept design is provided in Figure 4-1.

The ASH extends through an existing rural area. It starts at the Brigham Creek intersection in the south eastern end of the corridor where the zoning is FUZ and then extends to the west through Countryside Living zoned land uses until it crosses the southern portion of the Kumeū – Huapai FUZ, connecting with SH16 near / at Foster Road.

The indicative alignment has been prepared for assessment purposes, and to indicate what the final design of the Project may look like. The final alignment will be refined and confirmed at the detailed design stage.

Figure 4-1: Overview of the Alternative State Highway, including Brigham Creek Interchange

The proposed Brigham Creek Interchange (BCI) is located in Redhills North Future Urban area and to the west of Whenuapai. This interchange is anchored to the ASH, Rapid Transit Corridor and Regional Active Mode Corridor strategic projects whilst facilitating a connection to Fred Taylor Drive and Brigham Creek Road. The proposed BCI currently sits within rural land that has a Future Urban Zone (FUZ) overlay. The existing SH16 / Fred Taylor Drive / Brigham Creek Road Roundabout will be replaced by a fully grade separated interchange with on and off ramps in a 'Split-Fork" type arrangement.

Figure 4-2: Context of Alternative State Highway & Brigham Creek Interchange

4.1.1 Existing Environment

4.1.1.1 Urban / Built Features

The existing land use surrounding the ASH is largely rural (Countryside Living) consisting of low density rural residential dwellings with established gardens and rural based businesses including transportation and logistics, horticulture, plant nurseries and viticulture. Land use along and surrounding the ASH corridor and Brigham Creek Interchange consists of a patchwork of horticultural lots and lifestyle blocks containing residential dwellings with large gardens defined by shelterbelts.

The alignment crosses Totara Creek at its south-eastern, north-western motorway end. It then crosses the Ngongetepara Stream which forms the RUB to the west of the Brigham Creek Interchange. Further west the corridor crosses tributaries of the Kumeū River including conservation zoned land adjacent to the river by Boord Cresent. The corridor crosses the tributaries of the Ahukuramu Stream to the west of Tawa Road and the Kaipara River at the western end of the alignment where it joins SH16.

Westgate metropolitan centre is located to the south of the Brigham Creek interchange within the Red Hills North Future Urban area. The Kumeū and Huapai Villages are to the east of the ASH intersection with SH16.

Parks and open space include Fred Taylor Park, the Kumeū Show Grounds, Huapai Domain and open space and conservation zoning throughout Kumeū and Huapai. Schools and community amenities including halls, local shops and library located within the Kumeū and Huapai Villages.

The mid-section of the ASH extends through Rural – Countryside Living and Rural – Mixed Rural Zone with small areas of Open Space Conservation Zone to the east close to the Kumeū River. Residential properties are predominantly accessed from Boord Crescent, Waitakere Road, Hanham Road, Tawa Road, Pomona Road and Dysart Lane. The wider rural landscape is generally characterised by large lots and widely dispersed residential properties and farm buildings. Around Pomona Road and Dysart Lane, a tighter pattern of residential development and smaller lot sizes results in a denser grain of development.

4.1.1.2 Physical Features

The landscape is dominated by undulating topography and a network of riparian corridors and associated overland flow paths. Key watercourses in the Project area include the Ngongetepara Stream which is situated to the west of the Brigham Creek Interchange, the Kumeū River including conservation sections of the river by Boord Crescent, tributaries of the Ahukuramu Stream and the Kaipara River at the western end of the alignment where it joins SH16.

There are a number of existing flood prone areas alongside the ASH river crossings. The Kumeū River has the largest flood plain within the Project area.

The topography varies across the mid-section from flat and gently rising, around the Kumeū River to the east, to steeper undulating landform to the west around Pomona Road and Tawa Road. Topographical features are sensitive to changes in landform. The Kumeū River and its supportive network of tributaries and streams intermittent waterways and wetlands, are common features within low lying landform and the steeper river valleys.

Vegetation patterns comprise linear belts of exotic vegetation which delineate paddock boundaries, native and non-native planting on countryside living lots including vineyards and fruit crops and native and riparian vegetation along the stream corridors and valleys. Large and moderate sized areas of native bush are present amongst the steep sloping landform and valleys which follow the Kumeū River network.

There is currently no structure plan in place for the Kumeū - Huapai area and no green networks are proposed, however the Kumeū River and Ahukuramu Stream extend from the ASH alignment, north through FUZ land crossing SH16 Main Road, providing opportunities for the establishment of future blue green networks.

The Kumeū River and the Kaipara River provided Maori with an important transport corridor connecting the Waitematā and Kaipara Harbours. It was a waka portage known as Te Tōangaroa.

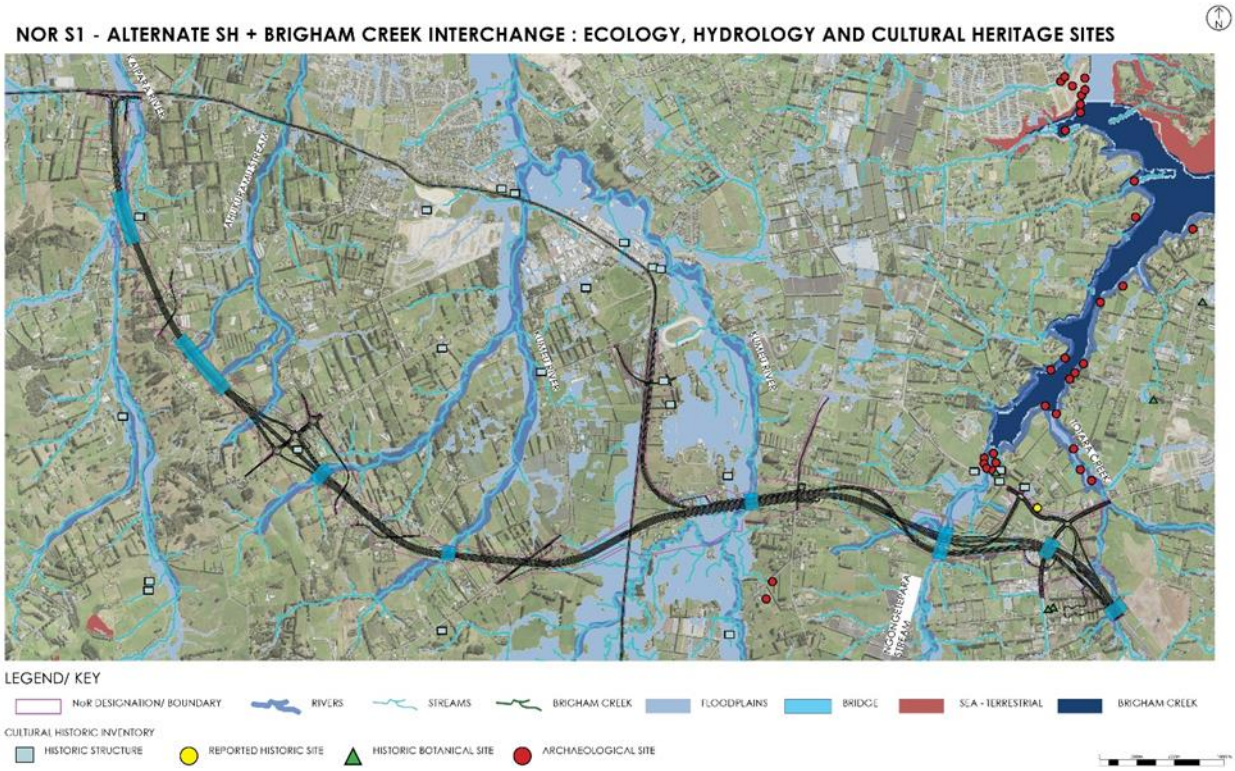


Figure 4-3: ASH Project Area Ecology, Hydrology & Cultural Heritage Sites

4.1.2 Likely Future Environment

The key land use features that will comprise the likely future environment include:

- The FUZ land around the Brigham Creek Interchange will become urbanised.
- The rural land between the FUZ zones will continue to be rural land uses.
- The FUZ land around Kumeū-Huapai will become urbanised.

The ASH will become a RUB/ FUZ edge definer and limit sprawl and thereby retaining the separate identity of Waimauku and Kumeū Huapai. Access Road will also define the edge of the FUZ.

Future transport projects within the North West Strategic area will provide for all modes including a Rapid Transit corridor and walking and cycling linking to the north western cycleway and proposed new RTN stations in Kumeū and Huapai.

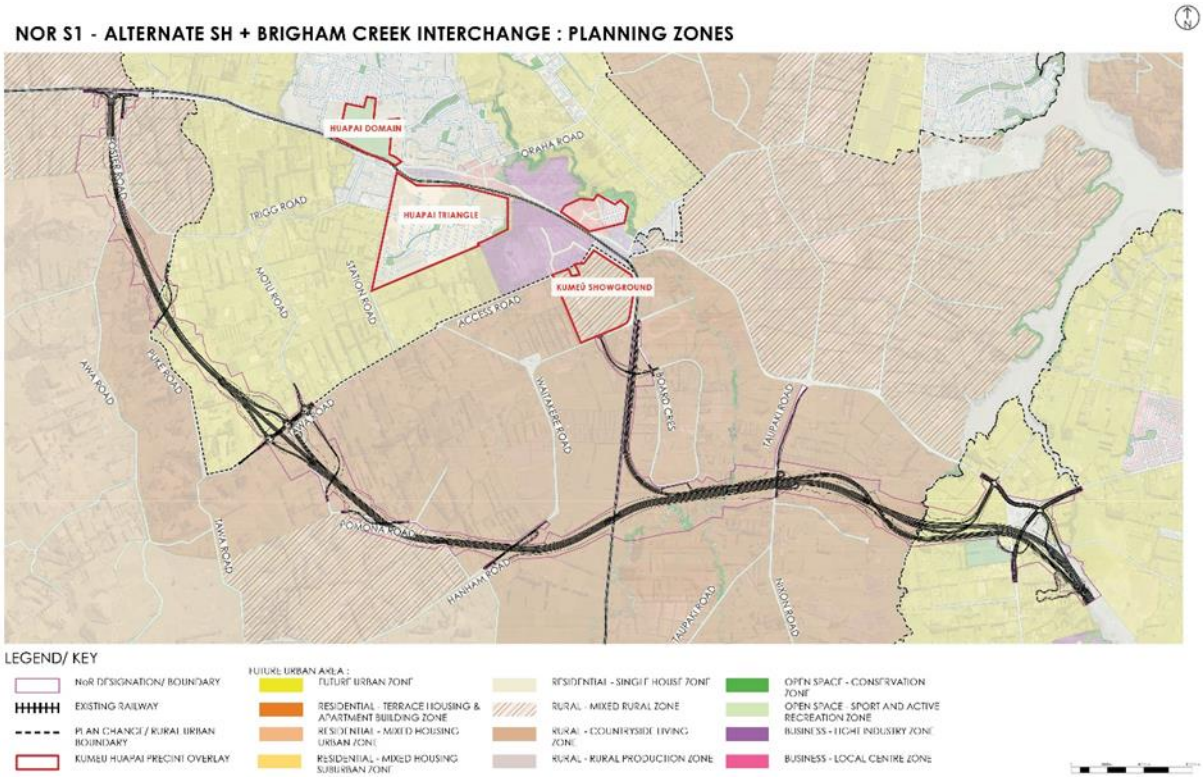


Figure 4-4: AUPOIP Zoning Alternative State Highway, including Brigham Creek interchange

4.2 ASH - Form and Function

This project consists of constructing a new four lane state highway as an extension of SH16 from the current end of the north western motorway at the Brigham Creek roundabout through mixed use rural/ countryside living land uses to join SH16 west of Foster Road in rural Huapai.

4.2.1 Alternative State Highway Design Features

Key features of the proposed new corridor include the following:

- The construction of a new four-lane motorway corridor with a cross-section of approximately 50m to accommodate a four-lane dual carriageway and separated cycle lanes and footpaths. The typical cross section includes an active mode corridor with central and side barriers (See Figure 4-5, Figure 4-6, and Figure 4-7 below).
- An underpass at Taupaki Road and bridges over the NAL with further grade separations at Waitakere Road, Pomona Road, Tawa Road, Puke Road and Foster Road. Tawa Road is designed to future proof for a full diamond interchange.
- The western end of the alignment ties-in at a proposed three-legged roundabout with SH16 Main Road, immediately west of Foster Road.

The re-alignment of the following local roads:

- Pomona Road, approximately 1.5km (two sections).
- Motu Road, approximately 200m.
- Puke Road, approximately 500m.
- Likely posted speed of 100km/h, design speed (of which effects will be assessed on) is 110 km/h.

- Stormwater dry ponds, wetlands and culverts.
- Batter slopes to enable the construction of the corridor, and associated cut and fill activities.
- Vegetation removal within the proposed corridor.
- Other construction related activities required outside the permanent corridor including the re-grade of driveways, construction traffic manoeuvring and construction laydown areas.

More detail of the proposed ASH features is provided in the AEE.

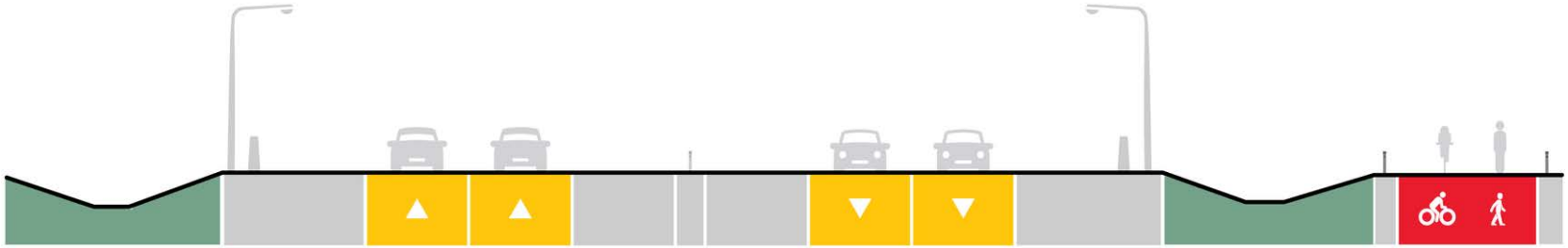


Figure 4-5: NOR S1 Alternative State Highway, typical 50m cross section

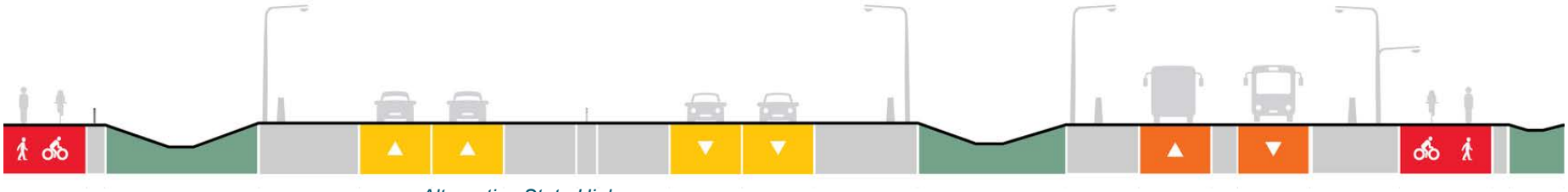
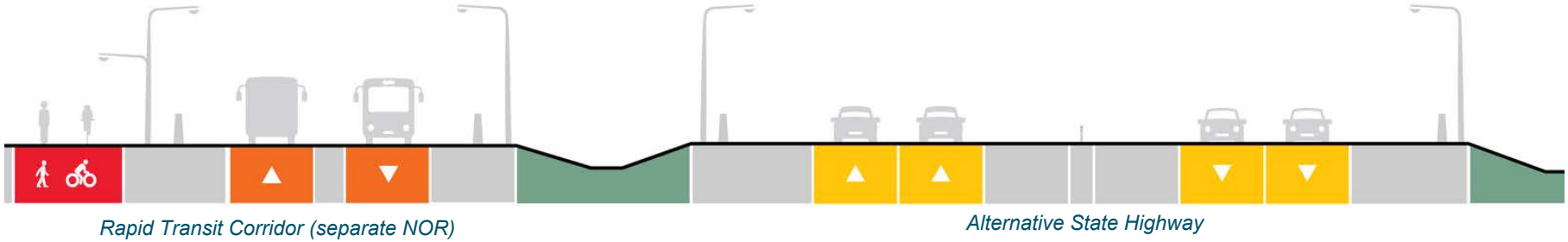


Figure 4-6: NOR S1 Alternative State Highway, typical cross section at Boord Crescent (showing RTC alongside)

Figure 4-7: NOR S1 Alternative State Highway typical cross section at Brigham Creek Interchange (showing RTC alongside)



4.3 NOR S1: Alternative State Highway, including Brigham Creek Interchange - Evaluation Against the Design Framework Principles

This evaluation considers the proposed Alternative State Highway, including Brigham Creek Interchange against the relevant - Te Tupu Ngātahi Design Framework Principles. The evaluation in Table 4-1 below provides urban design focused commentary on the current design detail and recommends how and where any urban design outcomes should be considered in future design stages.

These recommendations could form the basis of an urban design specific designation condition to prepare an Urban and Landscape Design Management Plan (ULDMP) in future delivery.

The evaluation Table 4-1 below lists each of the twenty principles identified in the Te Tupu Ngātahi Design Framework and provides an explanation which are highlighted in light blue. A recommendation of how the principle is applied to the NoR Project area is provided below each principle.

Table 4-1: Urban Design Evaluation for Alternative State Highway, including Brigham Creek Interchange

Principle	Explanation
ENVIRONMENT	
1.1 Support and enhance ecological corridors and biodiversity	Mitigate the effects on or enhance existing ecological corridors through the placement and design of movement corridors
The proposed ASH corridor designation provides spatial provisions that have the potential to support ecological connectivity and biodiversity in the local environment by providing contiguous space for diverse planting responses.	
The crossing of the Kumeū River, streams and flood plains incorporates bridge structures at key crossings, which will minimise stream interruptions and enables a connected natural system.	
1.2 Support water conservation and enhance water quality in a watershed	Take into account and work with the existing watershed as part of a whole system.
The proposed corridor cross section allows spatial provisions to provide natural drainage (swales) to stormwater wetlands as a way to address water quality and reduce hard engineering solutions. Water quality and detention / retention will be considered further in future regional consents.	
Further refinement of wetlands during the detailed design stage is recommended to define the wetland's final form and how the wetland will interface with the surrounding land uses. For example, wetlands should be configured in a naturally shaped manner and fully integrated with existing natural drainage features, swales and vegetation designed to integrate with the adjacent landform and incorporate vegetation.	
1.3 Minimise land disturbance, conserve resources and materials	Respect the existing topography, landforms and urban structure in the placement of strategic corridors. Minimise the quantity of hard engineering materials required. Minimise, mitigate any adverse effects of activities on the environment.
The ASH is likely to require a large volume of earthworks as the corridor extends through challenging terrain with moderate to severe undulating topography and elevation changes. The future construction management approach will need to address any opportunities to minimise impact on rural land use.	

Principle	Explanation
The proposed designation is wide enough to accommodate major interchanges at Brigham's Creek Road and Tawa Road. Land within the designation at Brigham Creek could be utilised for urban development or community infrastructure such as active recreation, once the highway is operational with landscaping opportunities within the designation at Tawa Road.	
1.4 Adapt to a changing climate and respond to the microclimatic factors of each area	Design for predicted future regional climatic impacts in the corridor location. Consider the positive contribution that the orientation of transport corridors can make to the local climatic environment of future places and streets.
The ASH corridor design crosses several streams and flood plains. The indicative design adopts a vertical geometry that accommodates stormwater events including the applied climate change factors as stated in Auckland Council Stormwater Code of Practice.	
The ASH corridor design has a reasonably wide designation which will provide opportunity for ecological and landscape mitigation and amenity which will contribute to reducing urban heat island effects associated with high concentrations of structures such as buildings roads and infrastructure in one area. The ASH will support the wider network in contributing to modal shift.	
SOCIAL	
2.1 Identity and place(s)	The identity or spirit of place is generally acknowledged as the unique amalgam of the inherent built, natural and cultural qualities of a place. Responding to identity in the location and type of new corridors can provide a sense of continuity and contribute to our collective memory.
The ASH corridor currently passes through a largely existing rural residential environment and is likely to impact on the identity and character of the area.	
Consideration of plant selection and placement provides the opportunity to reflect and enhance the unique local character inherent in the built, natural and cultural qualities of the location.	
In future design stages, mana whenua will be invited to provide input into relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.	
Sites of historic value • There are no heritage overlays along the corridor. Heritage structures identified on Auckland Council's Cultural Heritage Inventory are located within the corridor occur at the Brigham Creek Interchange, north of the indicative alignment by Boord Crescent, within the Tawa Road Interchange and on Foster Road near Trigg Road. These features provide opportunities for future development to explore and celebrate the inherent heritage character drivers for the area. • Where Cultural Heritage Inventory items cannot be practicably retained or relocated, they should be recorded and where appropriate recognised locally through signage. Further details of these are referenced in the Assessment of Historic Heritage Effects.	
2.2 Respect culturally significant sites and landscapes	Acknowledge significant sites and features in the layout of movement corridors including ridgelines or horizons.
Mana whenua have strong ties with the Kumeū River which was a portage between the Upper Harbour and the Kaipara Harbour. Mana whenua have provided feedback on the ASH corridor informing the alignment. There are a number of archaeological sites and a Māori Heritage Area within close proximity to the Brigham Creek Interchange area. Mana whenua should continue to be partnered with and input sought on the detailed design in relation to cultural values.	

Principle	Explanation
In future design stages, mana whenua will be invited to provide input into relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.	
2.3 Adaptive corridors	Corridors should demonstrate flexibility to respond to changes in their function and physical interfaces. Consider an adaptive approach in the way strategic corridors are designed to be able to respond to changes in land use, the way we move around or utilise technology over time.
The proposed ASH corridor cross section has the spatial provisions to be flexible, re-configurable and adapted at a detailed design stage for changing transport needs and to incorporate mitigation.	
2.4 Social cohesion	Provide clear, effective and legible connectivity between community and social functions.
The ASH corridor provides an inter-regional transport route that avoids the Kumeū Huapai villages enabling SH16 Main Road to be re-developed with a quality streetscape and to be less car dominated. It also enables the upgrade of SH16 to provide active modes by removing inter-regional traffic and freight from the existing SH16 Main Road. This will improve connectivity within Kumeū Huapai. Local roads will be re-aligned to maintain access under or over the Alternative State Highway.	
2.5 Safe corridors	Provide a safe and convenient network of routes accessible to people of all ages and abilities.
Active mode travel solutions (walking and cycling) are proposed as a Shared Use Path (SUP) facility as an extension of the North Western RAMC.	
BUILT FORM	
3.1 Align corridors with density	Locate stations/stops and corridors within walking distance of higher density development to facilitate modal shift, support commercial and mixed use centres and contribute to vibrant, active urban environments.
The proposed ASH corridor will enable the movement of inter-regional and freight trips out of Kumeū Huapai. This will support the upgrade of SH16 for active modes (as proposed by NoR S2) and help create a vibrant urban environment by moving the strategic trips out of Kumeū Huapai. Active mode facilities are proposed along the ASH which will tie into the proposed facilities on SH16 and the RAMC. The Brigham Creek Interchange results in a large area of residual land that could be utilised for open space/ active recreation given its close proximity the Fred Taylor Park or developed as a business zone. The Brigham Creek Interchange has been designed with the ASH and RTC on structures going over the local road connections thereby enabling direct at grade connectivity.	
3.2 Corridor scaled to the surrounding context and urban structure	Align the speed, type and scale of transport corridors and infrastructure with the environment that it moves through (appropriate scale to the context).
The function of ASH will be a dedicated high-speed rural state highway. Consideration has been given the corridor alignment to minimising environmental effects as far as is practicable. Opportunities to integrate the corridor and the details of mitigation will be determined at the detailed design stage. Opportunities / mitigation should include landscape and ecological mitigation planting to screen the corridor from adjacent properties.	
3.3 Facilitate an appropriate interface between place and movement	Facilitate the opportunity for place as well as movement in corridors (people-oriented streets)
The ASH designation is sufficiently wide to enable stream riparian margins to be planted and constructed stormwater wetlands integrated with streams and floodplains making the landscape legible. Opportunities to incorporate landscape and urban design elements into the corridor will assist with place making and identity, particularly at the Brigham Creek Road and Tawa Road interchanges.	

Principle	Explanation
MOVEMENT	
4.1 Connect nodes	Provide tangible connectivity between identified activity nodes.
The ASH corridor alignment provides direct connectivity between the Redhills North and the Huapai - Kumeū FUZ's, via the interchange at Tawa Road and the intersection on SH16 west of Kumeū Huapai.	
It also enables the upgrade of SH16 to provide active modes by removing inter-regional traffic and freight from the existing SH16 Main Road. This will improve connectivity within Kumeū Huapai.	
4.2 Connect modes	Provide for choice in travel and the ability to connect at interchanges between modes.
The ASH corridor provides complete connectivity for all modes (walking, cycling, public transport and private vehicle) however its primary function is for freight and interregional travel allowing for these to avoid SH16 Main Road. This supports the upgrade of SH16 main Road.	
4.3 Support access to employment and industry	Align the corridor location and typology to provide direct and efficient access to areas of employment and industry.
The corridor alignment provides direct access to the Kumeū Huapai and Whenuapai, and to Westgate and downtown Auckland employment areas, via SH16.	
4.4 Prioritise active modes and public transport	Provision of quality active mode corridors and dedicated public transport corridors to enable a modal shift away from private vehicle use.
The ASH corridor cross sections accommodate freight and interregional travel allowing for them to avoid SH16 Main Road. The corridor provides for a separated shared user path which connects with the North Western RAMC pathway in the east and SH16 in the west.	
The ASH designation accommodates an active mode corridor along its length from Brigham Creek to the intersection with SH16 (west of Huapai). The ASH also sits beside a RTC and AMC that links directly into the main street of the Huapai – Kumeū villages connecting with future RTC stations.	
Further development of modal priority at intersections and roundabouts at the detailed design stage will provide a higher level of service and enable modal shift.	
4.5 Support inter-regional connections and strategic infrastructure	Consider the location and alignment of significant movement corridors and placement of infrastructure (power, wastewater, water) to the network.
The ASH provides an alternative corridor for interregional and freight trips allowing them to avoid SH16 Main Road, this will improve the reliability of interregional movements in the north west. The ASH will be elevated over the North Auckland Line and has been located to avoid impacts in the National Grid overlay.	
4.6 Support legible corridor function	Consider how areas can be clearly navigated and understood by users moving from place to place.
Landscaping that responds to the finer grain of the landscape and environment, such as planting around streams and floodplains. The incorporation of wayfinding signage and design feature to act as markers for users of the active mode facilities as they move along the corridor.	
LAND USE	
5.1 Public transport directed and integrated into centres	Locate rapid transit interchanges within centres (local, town and metro) to support a mix of uses and provide modal choice to a larger number of users.

Principle	Explanation
The ASH corridor does not provide for dedicated public transport facilities; however, it will play an important role in removing inter-regional and freight traffic from SH16 Main Road. This allows SH16 to be upgraded with active mode facilities along SH16 Main Road and to the proposed RTC Stations.	
5.2 Strategic corridors as urban edges	Strategic corridors as potential definers of a land use edge.
The ASH has a strategic function to support the reliable movement of interregional trips and freight. This requires a new corridor which is predominantly located in a rural area. The ASH and Access Road will become urban edge definers. The design response to these corridors will limit sprawl, which will retain the separate identity of Waimauku and Kumeū Huapai, and prevent sprawl in rural areas.	

4.4 Summary of Urban Design Evaluation and Recommendations for Alternative State Highway, including Brigham Creek Interchange

Overall, the proposed ASH corridor design and configuration is generally supportive of the Design Framework principles. A number of urban design outcomes are shown in blue in Figure 4-8 below. These are recommended to form a part of the Urban and Landscape Design Master Plan (ULDMP) in future delivery stages. This is to ensure the detailed design of the corridor responds appropriately to the principles and the project specific urban design outcomes sought.

The ULDMP should include the following Project specific outcomes as illustrated in Figure 4-8:

The ULDMP should be based on Waka Kotahi Urban design guideline “Bridging The Gap” and Landscape Guidelines and P39 Landscape Specifications.

Develop a rural - urban interface approach within the corridor that:

- Supports and enhances ecological corridors and biodiversity. Develop a landscape ecological strategy for the corridor that avoids, or minimises impact on wildlife habitats, streams and water quality and identifies opportunities to enhance these features.
- Supports water conservation and enhance water quality throughout the corridor. Develop an integrated engineering, landscape, ecology and hydrological approach to stormwater that utilises swales (included in the ASH cross sections) and wetlands to provide enhanced water quality, ecological, cultural and amenity outcomes.
- The ASH corridor will alter the existing identity and character of the area, particularly the rural areas outside of the FUZ land. The ULDMP will need to develop techniques to minimise the impact on the built, natural and cultural character of the area, including minimising the impact on the established rural identity of rural zoned areas.
- Minimise land disturbance, conserve resources and materials. The preferred alignment extends through moderate to severe undulating topography resulting in some large batter slopes. The ULDMP will have to demonstrate how impacts on rural land use have been minimised and identify opportunities to utilise valuable land resources.
- Land within the designation at the Brigham Creek interchange, could be utilised for urban development or community infrastructure such as a recreation reserve.

- Social cohesion – As part of the wider works associated with the ASH local roads will be re-instated with access on local roads maintained. Steps to minimise localised severance issues should be considered in the ULDMP.
- Facilitate an appropriate interface between place and movement – At the detailed design stage further consideration will need to be given to the vertical alignment of the corridor and the relationship to the adjacent land use. This approach should consider the cut and fill balance along the corridor to create a desirable interface with the existing rural and future urban areas.
- Integrate the corridors with the surrounding environment and zoning, recognising that the corridor will pass through future urban and rural areas.
- Specific consideration for disconnected and residual pockets of land and how they can be used for landscape mitigation, or made ready for future development (if feasible)
- Recognises the transition from FUZ to rural land uses and provides a corridor interface that supports permeable pedestrian access and responds to the changing built form interface and spatial character of adjacent future development;
- Resolves interface issues including access to properties, incorporation of acoustic barriers and screen planting where required; and
- Utilises the corridor and interchanges to respond to the future environment it passes through FUZ to support placemaking and ensure the interchanges and access to Kumeū and Huapai, is legible.
- Mana whenua will be invited to provide input into the development of the ULDMP, in particular relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.
- A landscape plan that considers recommendations from the landscape and visual, arboricultural and ecological assessments including revegetation and stormwater wetland planting, construction compound and private property reinstatement and treatment of batter slopes. The landscape outcomes should reinforce the wider vegetation patterns of the local landscape and create connections to proposed greenways and the wider walking and cycling network.

Along with the above urban design outcomes further urban design opportunities in the Project area have also been identified in Figure 4-8 and shown in orange. These opportunities are not required to mitigate the Project's urban design effects but could be considered by the requiring authority or other parties at future stages of design and development.

4.5 Alternative State Highway, including Brigham Creek – Urban Design Outcomes and Opportunities

The urban design outcomes that have been identified are shown in blue and summarised in section 4.4 above. Opportunities that have been identified are shown in orange below.

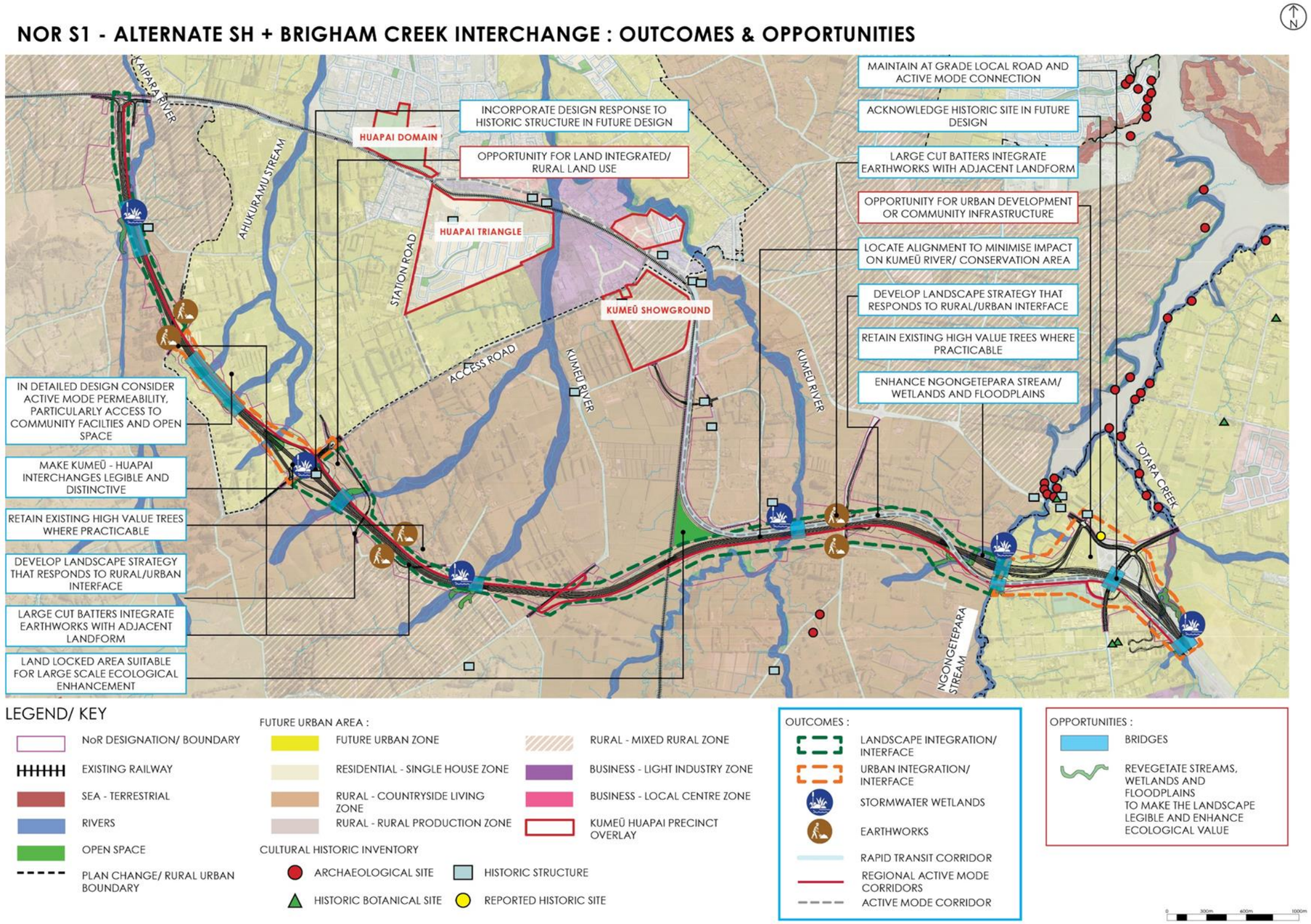


Figure 4-8: Alternative State Highway, including Brigham Creek interchange - urban design outcomes and opportunities

5 NoR S2: State Highway 16 Main Road Upgrade

5.1 State Highway 16 Main Road Upgrade Contextual Analysis

The State Highway 16 Main Road Upgrade Project (NoR S2) extends approximately 4.5km between Old Railway Road, east of Kumeū to Foster Road, west of Huapai. The SH16 Main Road is currently a 20m wide two-lane urban arterial with no active mode facilities on either side of the corridor.

SH16 Main Road is proposed to be upgraded to a 24m urban corridor traversing through well-established retail, commercial and residential environs. The corridor generally follows the existing SH16 Main Road alignment and also includes a 600m section of active mode only upgrade between Oraha Road and Tapu Road. As part of this project, Station Road will be realigned to form a new signalised intersection with SH16 and Tapu Road.

The indicative alignment has been prepared for assessment purposes, and to indicate what the final design of the Project may look like. The final alignment will be refined and confirmed at the detailed design stage.

An overview of the proposed design is provided in Figure 5-1 below;

Figure 5-1: Overview of the SH16 Main Road Upgrade

Figure 5-2: Contextual Overview of the SH16 Main Road Upgrade

The State Highway 16 Main Road Upgrade provides greater accessibility for all modes through the Kumeū-Huapai village and together with NoR S3 (RTC and RAMC), NoR KS (Kumeū Station) and NoR HS (Huapai Station) will enable the future planning and development of town centres that will support the significant growth that will occur through the FUZ.

The key features of the State Highway 16 Main Street Upgrade include:

A designation to incorporate active modes from River Head Road in the east to Matua Road in the west. The designation extends across a large part of the town centre properties that front onto SH16 and as such is a catalyst for redevelopment and revitalisation of the town centre.

SH16 main Street active modes connect to the RAMC corridor and ultimately connects with Westgate and the north western SUP to Auckland City Centre.

5.1.1 Existing Environment

5.1.1.1 Urban Features

The existing land use surrounding the State Highway 16 upgrade section extends through the Kumeū-Huapai villages, incorporating a range of light industrial, commercial businesses and community facilities as well as large areas of currently rural land zoned FUZ. The character of the SH16 Main Road is of a rural service town developed as ribbon development along a state highway. The commercial section of the Main Road extends for approximately 1.7km from Weza Lane in the east to Oraha Road in the west. The character of the SH16 Main Road consists of a predominance of shed like single storey buildings along the northern side of the Main Road and a section of small format shops near the Access Road which defines the Kumeū Village and small format shops and community facilities including library near the Matua Road intersection that defines the Huapai Village. West of Oraha Road the character of the Main Road changes to mostly residential dwellings on the northern side and mixed residential and business on the southern side. Larger commercial buildings define the western edge of Huapai Township at the Tapu Station Road intersection. A small (400m)

section of residential land adjoins the southern side of SH16 Main Road and open space on the northern side (Huapai Domain) west of Station Road. Further west rural land uses extend to the end of the SH16 Main Road Upgrade project which adjoins the ASH by Foster Road.

The presence of the NAL running parallel with the SH16 Main Road and carparking fronting onto the highway has created a wide transport corridor with a rustic character.

The existing transport function of the State Highway 16 Main Road section is characterised by:

- a variable width two- four lane high that extends through an urban area;
- mixed commercial ribbon development extends along SH16 from the south eastern end of Kumeū to the western end of Huapai;
- containing no formal walking or cycling facilities;
- having limited public transport services or facilities;
- limited north south access due to the NAL running parallel with SH16;
- containing private land access points / driveways;
- at grade NAL rail crossings; and
- a 50kph speed limit.

There are two schools in the general area. Matua Ngaru school off Gilbransen Road to the north of the designation and Huapai District School on Station Road and a preschool on the corner of Tapu Raod and Main Road.

The following outlines the key elements of the planning context for the SH16 Main Road Upgrade:

The existing SH16 corridor is generally a 20m wide and zoned ‘Strategic Transport corridor’ under the AUP:OP

The SH16 Main Road Upgrade extends along the urban extent of SH16 and contains a range of business land uses between within the Kumeū-Huapai township, extending from Weza Lane in the east to Station Road in the west.

These land uses are zoned under the AUP:OP as the following:

- Business – Local Centre Zone
- Business – Mixed Use Zone
- Business – Light Industry Zone
- Open Space - Sport and Active Recreation Zone
- Residential – Single House Zone
- Residential – Mixed Housing Suburban Zone
- Future Urban Zone
- Rural – Mixed Rural Zone

5.1.1.2 Physical Features

The existing physical features along and surrounding the SH16 Main Road Upgrade consist of urban development consisting of light industrial / mixed commercial buildings fronting both sides of SH16 Main Road from Weza Lane to Access Road at the eastern end. West of Access Road the NAL and associated grass berm bounds the southern side of SH16 Main Road and a mix of shed like retail buildings face onto the northern side of the Main Road until it crosses Kumeū River. Between John Mc Donald Lane and Oraha Road the SH16 Main Road contains a range of existing retail/ community facilities and a finer grain of built form. This includes the Railway Café and Huapai Tavern on the

southern side of SH16 and the Kumeū Library and a range of local shops on the northern side. West of Oraha Road the road is fronted by a mix of residential dwellings often utilised for commercial actives and interspersed with new commercial buildings.

There are several heritage structures located along SH16 Main Road, including the Huapai Tavern (AUP#00482) and a Rail Shed (AUP#00483) which are scheduled heritage structures and Railways Carriages which are CHI identified features (CHI item #18493).

The existing vegetation is highly modified and mostly exotic amenity planting. However, small areas of native or mixed exotic vegetation occur with areas of planted native vegetation associated with the Kumeū River.

Proposed Hydrology and Ecology

Key watercourses in the Project area shown in Figure 5-3 include Kumeū River, the Ahukuramu Stream and the Kaipara River to the west.

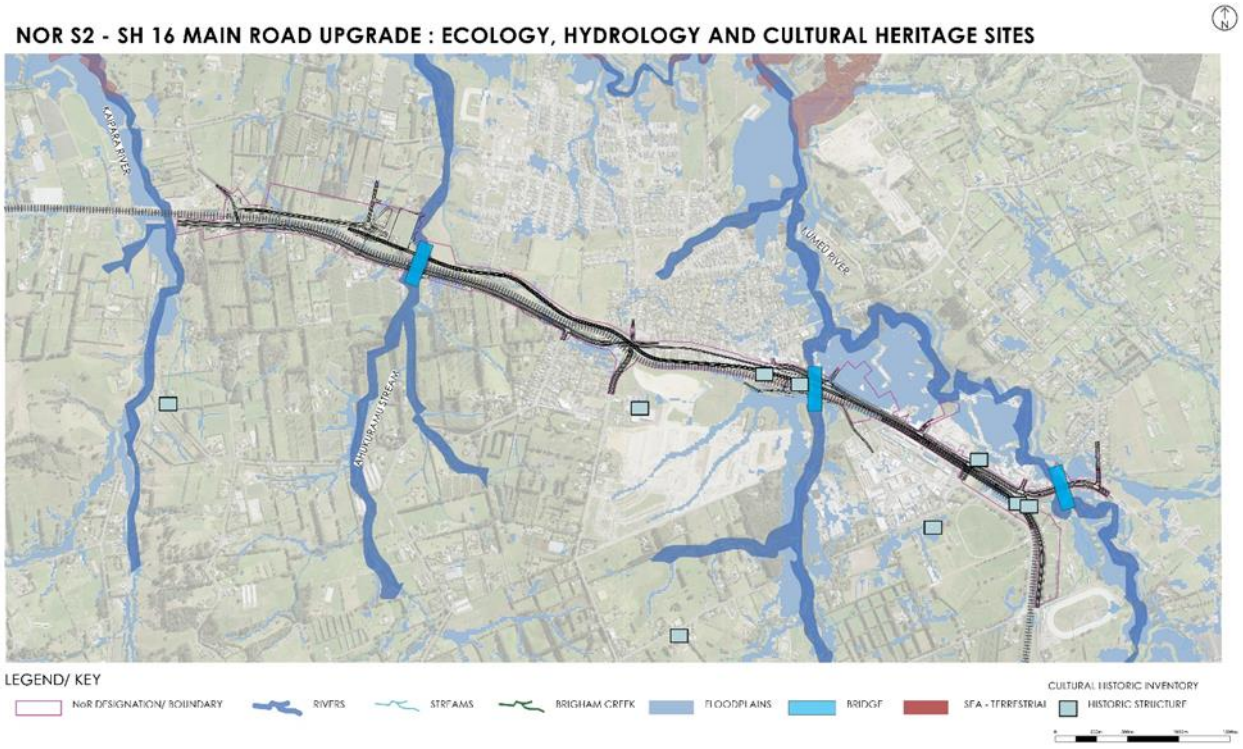


Figure 5-3: SH 16 Main Road Upgrade Ecology, Hydrology & Cultural Heritage Sites

5.1.2 Likely Future Environment

The key land use features that will comprise the future urban environment include:

Active modes extend along the SH16 Main Road throughout Kumeū-Huapai that connect to Westgate and the Central City, via the RAMC which is proposed as part of NOR S1.

Active modes that connect into FUZ communities providing convenient and safe access into the Kumeū-Huapai villages and connect to other facilities such as the Kumeū River greenway to be determined via a future structure plan and plan change process.

SH16 Main Road Upgrade active modes facilitates will provide connections to the RTC station located in the heart of a central Kumeū-Huapai Town Centre (NoR Kumeū Station) and a station with park and ride facilities at the western end of the FUZ development (NoR Huapai Station).

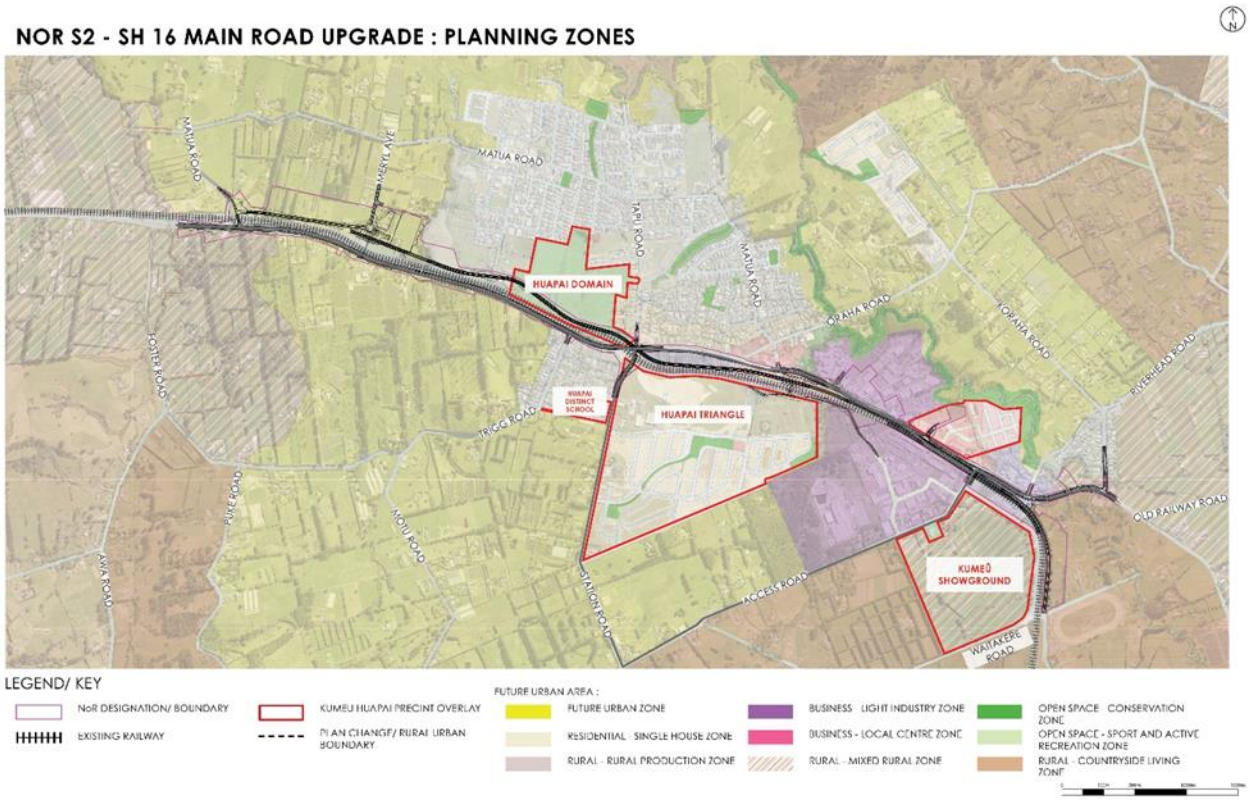


Figure 5-4: SH 16 Main Road Upgrade AUPOIP Zoning

5.2 State Highway 16 Main Road Upgrade - Form and Function

The functional intent of the SH16 Main Street Upgrade section of the Project is to provide all modes east- west connectivity through the centre of the Kumeū-Huapai village and future urban area. It enables a new Rapid Transit corridor to connect into the centre of the FUZ.

Table 5-1: SH16 Main Road Upgrade Form and Function

SH16 (Main Road) CFAF Summary
Purpose of Corridor: Main arterial running through the growth areas of Kumeū and Huapai and will support the FUZs. Additionally, the segment will provide an important function to connect people to Rapid Transit stations, the strategic cycle network and SH16 motorway interchanges
General Vehicle Volume: Average Daily Traffic (ADT) 9,000 in 2048
Priority Vehicle: 5 buses per hour under indicative 2048 AT bus network
Freight: Level 3 freight route
Vehicle Lanes Total (Priority Lanes / PT Priority at intersections): 2 (None / None)
Active Modes: Separated cycle lanes and footpaths on both sides

SH16 (Main Road) CFAF Summary
Speed Environment: 50kph
Parking and Access: Property access; no parking

5.2.1 State Highway 16 Main Road Upgrade Design Features

Key features of the proposed upgrade include the following:

- The widening of the existing 20m wide two-lane urban arterial to a 24m wide corridor with walking and cycling facilities on the northern side of the corridor where the main Road adjoins the RTC and on both the northern and southern sides where the Main Road is separated from the RTC. (See Figure 5-5 and Figure 5-6 below).
- The realignment of Station Road to form a new signalised intersection with SH16 and Tapu Road.
- Tie-ins with existing roads, stormwater dry ponds, wetlands and culverts.
- Likely posted speed of 50kph, design speed (of which effects will be assessed on) is 60 kph.
- Batter slopes to enable widening of the corridor, and associated cut and fill activities (earthworks).
- Vegetation removal along the existing road corridor.
- Other construction related activities required outside the permanent corridor including the re-grade of driveways, construction traffic manoeuvring and construction laydown areas.

More detail of the proposed Upgrade is provided in the AEE.

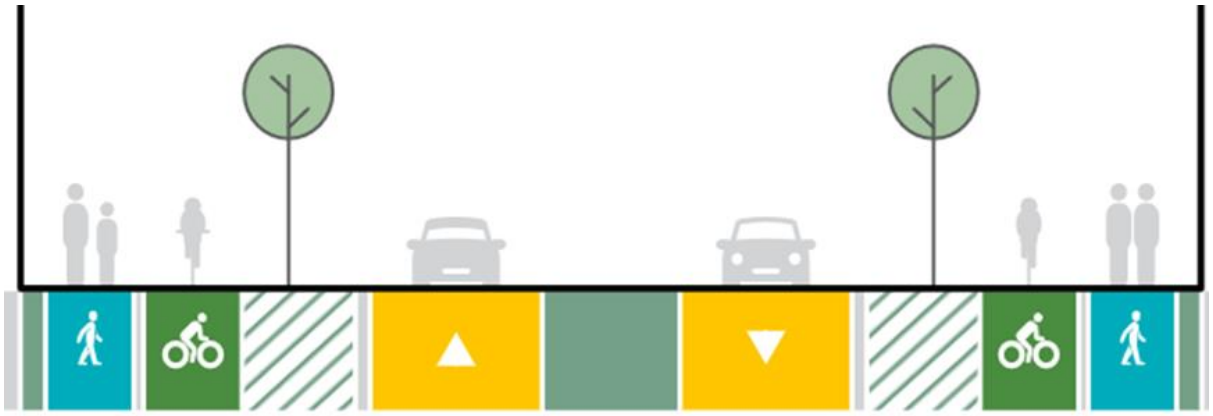


Figure 5-5: SH16 Main Road 24m urban arterial typical cross section

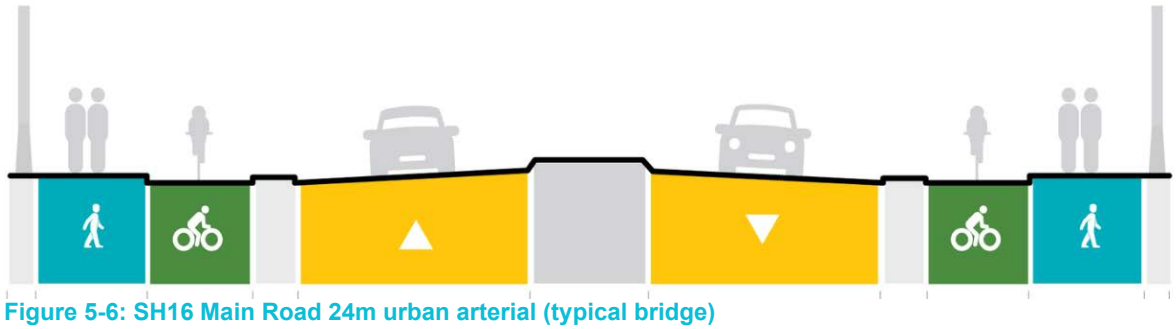


Figure 5-6: SH16 Main Road 24m urban arterial (typical bridge)

5.3 NOR S2: State Highway 16 Main Road Upgrade - Evaluation against the Design Framework Principles

This evaluation considers the application of the established Te Tupu Ngātahi Design Framework Principles against the proposed State Highway 16 Main Road Upgrade. It provides urban design focused commentary on the current design detail and recommends how and where any urban design outcomes should be considered in future design stages.

These recommendations can form the basis of an urban design specific designation condition to prepare an Urban and Landscape Design Management Plan (ULDMP) in future delivery.

The evaluation Table 5-2 below lists each of the twenty principles identified in the Te Tupu Ngātahi Design Framework and provides an explanation which are highlighted in light blue. A recommendation of how the principle is applied to the NoR Project area is provided below each principle.

Table 5-2: Urban Design Evaluation for State Highway 16 Main Road Upgrade

Principle	Explanation
ENVIRONMENT	
1.1 Support and enhance ecological corridors and biodiversity	Mitigate the effects on or enhance existing ecological corridors through the placement and design of movement corridors
SH16 Main Road is an existing urban highway. There is however the opportunity to enhance the ecology and biodiversity of the Kumeū River where SH16 Main Road crosses over the river.	
1.2 Support water conservation and enhance water quality in a watershed	Take into account and work with the existing watershed as part of a whole system.
The proposed typical corridor cross sections and designated area provide sufficient space to provide natural drainage to stormwater wetlands as a way to address water quality and reduce hard engineering solutions.	
Further refinement of stormwater wetlands along the SH16 Main Road during the detailed design stage is recommended to define the wetland's final form and how the wetlands will interface with the surrounding land uses as well as exploring opportunities to be a part of an integrated system. For example, wetlands should be configured in a naturally shaped manner and fully integrated with existing natural drainage features and vegetation.	
1.3 Minimise land disturbance, conserve resources and materials	Respect the existing topography, landforms and urban structure in the placement of strategic corridors. Minimise the quantity of hard engineering materials required. Minimise, mitigate any adverse effects of activities on the environment.
The upgrade has sought to minimise impacts on the urban structure where feasible, and the opportunity exists to integrate the corridor with existing and future development as part of the detailed design. Ensuring an attractive streetscape will help support the redevelopment of residual land impacted by both the upgrade of SH16 Main Road and also the RTC.	
1.4 Adapt to a changing climate and respond to the microclimatic factors of each area	Design for predicted future regional climatic impacts in the corridor location. Consider the positive contribution that the orientation of transport corridors can make to the local climatic environment of future places and streets.

Principle	Explanation
The corridor designs adopt vertical geometries that accommodate stormwater events including the applied climate change factors as stated in Auckland Council Stormwater Code of Practice.	
The corridor provides for active modes and prioritises public transport to support modal shift and reduce transport related climate change contributions.	
The corridor provides for street tree planting zones that, when delivered, will contribute to reducing urban heat island effects in the more intensively urbanised areas where 'islands' of higher temperatures can be caused by high concentrations of structures such as buildings, roads and infrastructure in one area.	
SOCIAL	
2.1 Identity and place(s)	The identity or spirit of place is generally acknowledged as the unique amalgam of the inherent built, natural and cultural qualities of a place. Responding to identity in the location and type of new corridors can provide a sense of continuity and contribute to our collective memory.
There is an opportunity with partners and developers to create gateways or arrival points at the eastern end of Kumeū where SH16 crosses a tributary of the Kumeū River and at the western end of the town at the Station Road SH16 Intersection. This would effectively "bookend" the town.	
There is an opportunity with partners and developers to enhance the character of land and development which fronts SH16 Main Road. This will be partly driven by the RTC Stations (NoRs KS and HS) and will respond to future structure plans and Council's Spatial Land Use Strategy.	
Consideration of street tree selection and placement provides the opportunity to reflect and enhance the unique local character inherent in the built, natural and cultural qualities of the location.	
In future design stages, mana whenua will be invited to provide input into relevant cultural landscape and environmental design matters including how desired outcomes reflect their identity and values.	
Sites of historic value include the Kumeū River as an historic Awa, the Huapai Tavern (scheduled historic place AUP00482) and other historic structures identified along the Main Road. The SH16 Upgrade impacts the frontage of the Huapai Tavern overlay; however the RTC and Kumeū RT Station impacts on the bulk of this and other heritage structures. The proposal is to relocate the Huapai Tavern within the footprint of the proposed designation for Kumeū Station (NoR KS). There is an opportunity for future development triggered by the SH16 Upgrade, RTC and the RT Station to celebrate the inherent heritage character drivers for the area.	
2.2 Respect culturally significant sites and landscapes	Acknowledge significant sites and features in the layout of movement corridors including ridgelines or horizons.
The Kumeū River is of significance to mana whenua as an historic Awa (portage) between the Upper Harbour and the Kaipara Harbour. Whilst it is unaffected by the Project, the redevelopment of the town centre with a new RTC station provides an opportunity for the SH16 Main Road Upgrade to provide active mode connections to the Kumeū River and associated greenway network to the north of the Town Centre as illustrated in the (Kumeū - Huapai Centre Plan.	
In future design stages, mana whenua will be invited to provide input into relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.	
2.3 Adaptive corridors	Corridors should demonstrate flexibility to respond to changes in their function and physical interfaces. Consider an adaptive approach in the way strategic corridors are designed to be able to respond to changes in land use, the way we move around or utilise technology over time.
The proposed SH16 Main Road Upgrade corridor cross section has the spatial provisions to be flexible, re-configurable and adapted at a detailed design stage for changing contextual needs. For example, town centre corridors with strong place functions can accommodate wider footpaths and wider berms for street tree planting.	

Principle	Explanation
In future design stages ensure horizonal and vertical geometric design maintains access for all modes to adjacent land use types from SH16 Main Road is maintained, especially to existing and future Town Centre areas.	
2.4 Social cohesion	Provide clear, effective and legible connectivity between community and social functions.
The proposed corridor provides fully separated active modes along SH16 Main Road improving connectivity to existing and future town centre areas and community infrastructure, including the Kumeū Library. The active modes will connect to the proposed active modes on Access Road (NoR S4), which will provide access to the Kumeū Showgrounds and Community Centre and also at Station / Tapu Road, providing access to the Huapai Domain.	
2.5 Safe corridors	Provide a safe and convenient network of routes accessible to people of all ages and abilities.
The proposed active mode facilities will deliver a greater level of access and movement to future local communities that will promote a sense of personal safety particularly for pedestrians and cyclists.	
The proposed active mode facilities provides enhanced multimodal access at Access Road and Tapu Road.	
The active travel solutions are proposed as fully segregated and prioritised with signalised intersections at: • SH16 Main Road • Access Road • Tapu Road • Matua Road	
Further development at a detailed design stage of the final crossing points across the intersections will reinforce the sense of personal safety. Future design needs to address prioritization and safe crossing over the NAL.	
BUILT FORM	
3.1 Align corridors with density	Locate stations/stops and corridors within walking distance of higher density development to facilitate modal shift, support commercial and mixed use centres and contribute to vibrant, active urban environments.
The corridor provides a safe, connected walking and cycling network, and improves connectivity within Kumeū Huapai and to the proposed RT stations where higher density development is likely to occur in the future.	
The corridor supports a range of mixed uses and densities and directly interfaces with the existing and future Main Centres and employment zones. The project provides for active modes connecting residential land to retail and a RT Station within the town centre. This will support intensification around the RT Station and provide a pedestrian (walking and cycling) frontage that supports businesses building up to the street.	
3.2 Corridor scaled to the surrounding context and urban structure	Align the speed, type and scale of transport corridors and infrastructure with the environment that it moves through (appropriate scale to the context).
The proposed configuration and scale of the corridor provides an appropriate response to the potential needs of the adjacent urban functions, for example the town centres connecting with RTC stations. Reduced traffic along SH16 Main Road due to the ASH providing for inter-regional transport and increased walking and cycling along the Main Road will establish the appropriate environment for the development of a Town Centre. There is an opportunity to support partners in optimising adjacent and residual land along the corridor and to ensure the sense of identity and place is reinvigorated with the proposed upgrade of the corridor. A place-led masterplan is recommended to maximise development of residual land.	
3.3 Facilitate an appropriate interface	Facilitate the opportunity for place as well as movement in corridors (people-oriented streets)

Principle	Explanation
between place and movement	
The proposed cross section of the corridor provides a flexible platform to address the opportunity for place as well as movement function, for example separated pedestrian and cycle facilities, potential road median spaces that provide safe waiting zones for pedestrians. In the absence of medians, signalized or legal crossings, spaced appropriately for the adjacent land-uses and pedestrian desire routes involved, should be considered.	
The proposed cross section also provides flexibility in supporting appropriate public private interfaces and connectivity at a fine grain (pedestrian) level. For example, direct pedestrian access to higher density living is accommodated and encouraged by placing pedestrian circulation closest to the corridor boundary.	
The corridor provides active mode connection to a RT Station and Park and Ride facility at the western edge of the FUZ.	
MOVEMENT	
4.1 Connect nodes	Provide tangible connectivity between identified activity nodes.
Active modes incorporated along the Main Road will link the Kumeū Town Centre and future western Huapai Local Centre, employment areas, Kumeū Showgrounds, Kumeū River open space network and the Huapai Recreation Reserve.	
4.2 Connect modes	Provide for choice in travel and the ability to connect at interchanges between modes.
The corridors provide connectivity for all modes (walking, cycling, public transport and private vehicle).	
The corridors provide a direct active mode and prioritised PT connection between the proposed centres and the RT stations.	
4.3 Support access to employment and industry	Align the corridor location and typology to provide direct and efficient access to areas of employment and industry.
The corridor provides for active modes with direct access to the FUZ, existing residential areas to the Town Centre and industrial employment zones.	
4.4 Prioritise active modes and public transport	Provision of quality active mode corridors and dedicated public transport corridors to enable a modal shift away from private vehicle use.
The cross section proposed for the corridor accommodates high-quality PT and active travel facilities, for example separated pedestrian, cycle pathways connecting to RT Stations.	
Further development of modal priority at intersections at the detailed design stage will provide a higher level of service and enable modal shift.	
4.5 Support inter-regional connections and strategic infrastructure	Consider the location and alignment of significant movement corridors and placement of infrastructure (power, wastewater, water) to the network.
The SH16 Main Road Upgrade is part of a strategic package of projects (ASH, RTC & RAMC) that will connect the future urban development of Kumeū and Huapai with the wider north west and the Auckland Region.	
The corridors also provide regional connectivity to communities via ASH, RTC and RAMC.	
4.6 Support legible corridor function	Consider how areas can be clearly navigated and understood by users moving from place to place.
The proposed cross section for the corridors accommodates a range of modes with clear allocation of street spaces, and inherently supports future community connectivity, mobility and travel choice.	

Principle	Explanation
Further development at the detailed design stage, of intersection crossings, midblock crossings and future bus stops along the corridor will provide clear and legible cross corridor access and connectivity between areas of high density and centres.	
LAND USE	
5.1 Public transport directed and integrated into centres	Locate rapid transit interchanges within centres (local, town and metro) to support a mix of uses and provide modal choice to a larger number of users.
The SH16 Main Road Upgrade provides active mode connections to future Kumeū and Huapai RT Stations adjacent to Town Centres.	
5.2 Strategic corridors as urban edges	Strategic corridors as potential definers of a land use edge.
This principle is not relevant to this corridor.	

5.4 Summary of Urban Design Evaluation and Recommendations for State Highway 16 Main Road West Upgrade

Overall, the proposed State Highway 16 Main Road Upgrade design and configuration is generally supportive of the Design Framework principles. A number of urban design outcomes are shown in blue in Figure 5-7 and Figure 5-8 below. These are recommended to form a part of the Urban and Landscape Design Management Plan (ULDMP) in future delivery stages. This is to ensure the detailed design of the corridor responds appropriately to the principles and the project specific urban design outcomes sought.

The ULDMP should include the following Project specific outcomes as illustrated in Figure 5-7 and Figure 5-8.

Develop an urban interface approach within the corridor that:

- Provides an appropriate interface to the existing and future town centre areas and enables buildings and spaces to positively address and integrate with the corridor.
- There is an opportunity to support partners in optimising adjacent and residual land along the corridor and to ensure the sense of identity and place is reinvigorated with the proposed upgrade of the corridor.
- Responds to the spatial character of the town centre environment by supporting quality public realm infrastructure, ample pedestrian footpath widths, parking, frequent pedestrian crossing points and providing street trees for shade and amenity.
- Permeability of the corridor for active modes that addresses cross corridor connectivity (midblock crossings), modal priority and permeable access to destinations such as open spaces and community facilities and between areas of high density.
- Enhances the identity for Kumeū and Huapai including consideration of landscape design drivers related to the Kumeū River, Huapai Recreation Reserve and the Kumeū Showgrounds and the creation of gateway elements at the eastern and western edges of the town.

- Responds to adjacent property interfaces including access into properties, parking and boundary reinstatement.
- Mana whenua will be invited to provide input into the development of the ULDMP, in particular relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.
- A landscape plan that addresses recommendations from the landscape and visual, and ecological assessments including street tree, stormwater wetland and ecological restoration planting, private property reinstatement and urban design aspects of the design of structures. The landscape plan should enable a strong vegetated framework and identity for the SH16 (Kumeū and Huapai) Main Road. The landscape outcomes should reinforce the wider vegetation patterns of the local landscape.
- Demonstrates that the project has adapted to the changing climate such as reducing urban heat island effects by incorporating street trees, supporting modal shift and accounting for flood hazard risks.

Further urban design opportunities in the Project area have also been identified in Figure 5-7 and Figure 5-8 shown in orange. These opportunities are not required to mitigate the Project's urban design effects but could be considered by the requiring authority or other parties at future stages of design and development.

5.5 State Highway 16 Main Road Upgrade - Urban Design Outcomes and Opportunities

The urban design outcomes that have been identified are shown in blue and summarised in section 5.4 above. Opportunities that have been identified are shown in orange on Figure 5-7 and Figure 5-8 below.

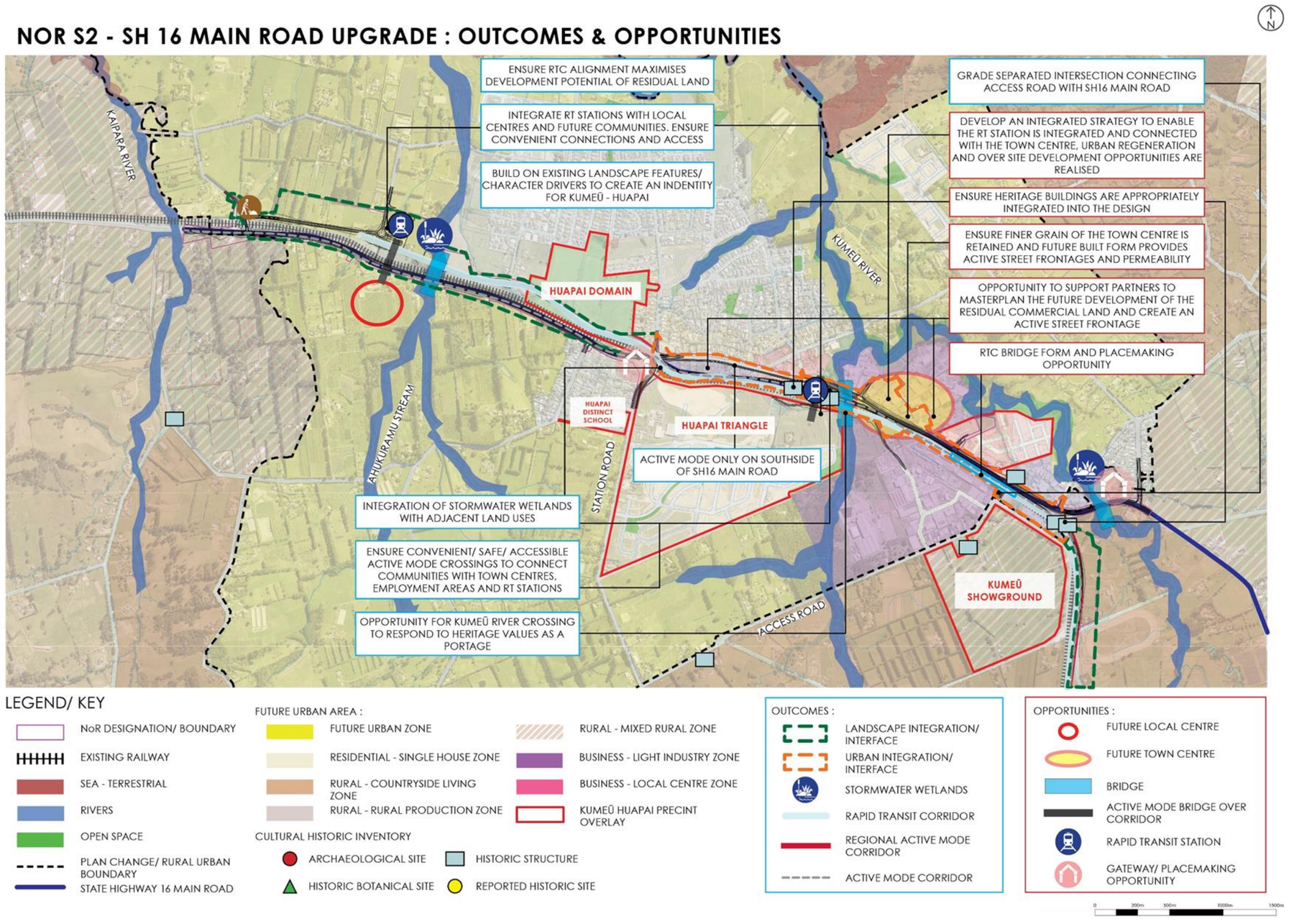


Figure 5-7: SH16 Main Road Upgrade urban design outcomes and opportunities

NOR S2 - SH 16 MAIN ROAD UPGRADE : TOWN CENTRE OUTCOMES & OPPORTUNITIES

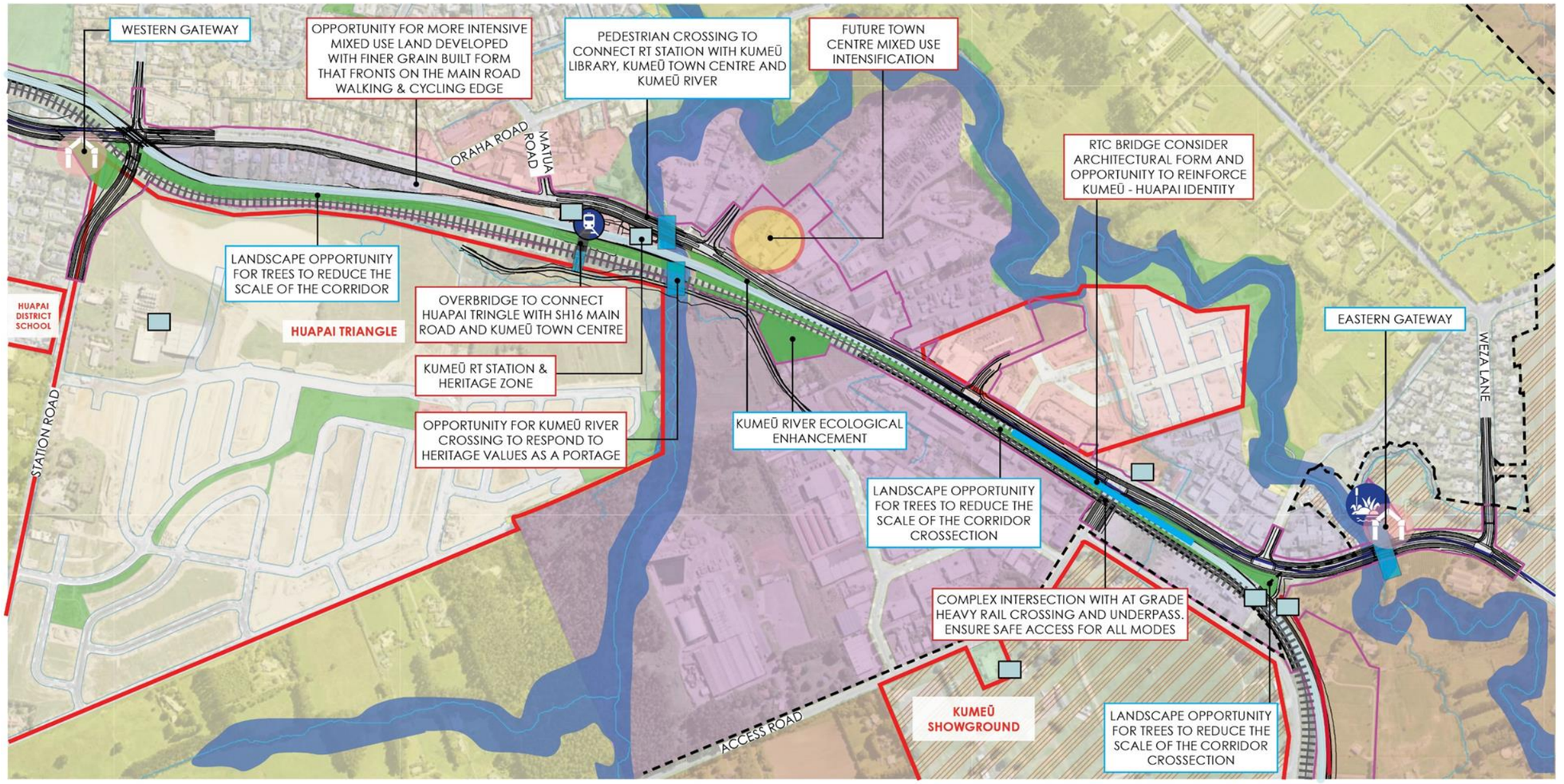


Figure 5-8: SH16 Main Road Upgrade: Town Centre Outcomes and Opportunities

6 NoR S3: Rapid Transit Corridor and Regional Active Mode Corridor; NoR KS: Kumeū Rapid Transit Station and NoR HS: Huapai Rapid Transit Station

6.1 Contextual Analysis

The Rapid Transit Corridor (RTC) will extend from the future SH16 / Brigham Creek Interchange to the west of Huapai. The RTC predominately traverses rural land outside of the FUZ at a total length of approximately 9.5km and is intended to operate in an uninterrupted free flowing manner with all road crossings grade separated. The RTC and RAMC are combined with the ASH corridor from Brigham Creek Interchange to Boord Crescent where the corridor separates from the ASH and runs parallel with the NAL until it merges with SH16 Main Road in Kumeū. The RAMC also connects with Taupaki Road.

The RTC is split into the following sections:

The rural section of the RTC runs from the Brigham Creek Interchange to the entry to Kumeū-Huapai township and is co-located with the RAMC along this section. Within the rural section, the RTC requires an extended width to accommodate both the RTC and RAMC.

The urbanised section of the RTC runs from northern end of Waitakere Road to Foster Road and is co-located with the proposed SH16 Main Road upgrade along this section. Within this section, the RTC requires approximately 38m width to locate two Frequent Transit Network lanes, separated active mode facilities and the SH16 Main Road Upgrade.

The RTC corridor will support bus rapid transport.

The RTC corridor will be at grade except at key sections to pass over local arterial roads or the Alternative State Highway, including Brigham Creek Road.

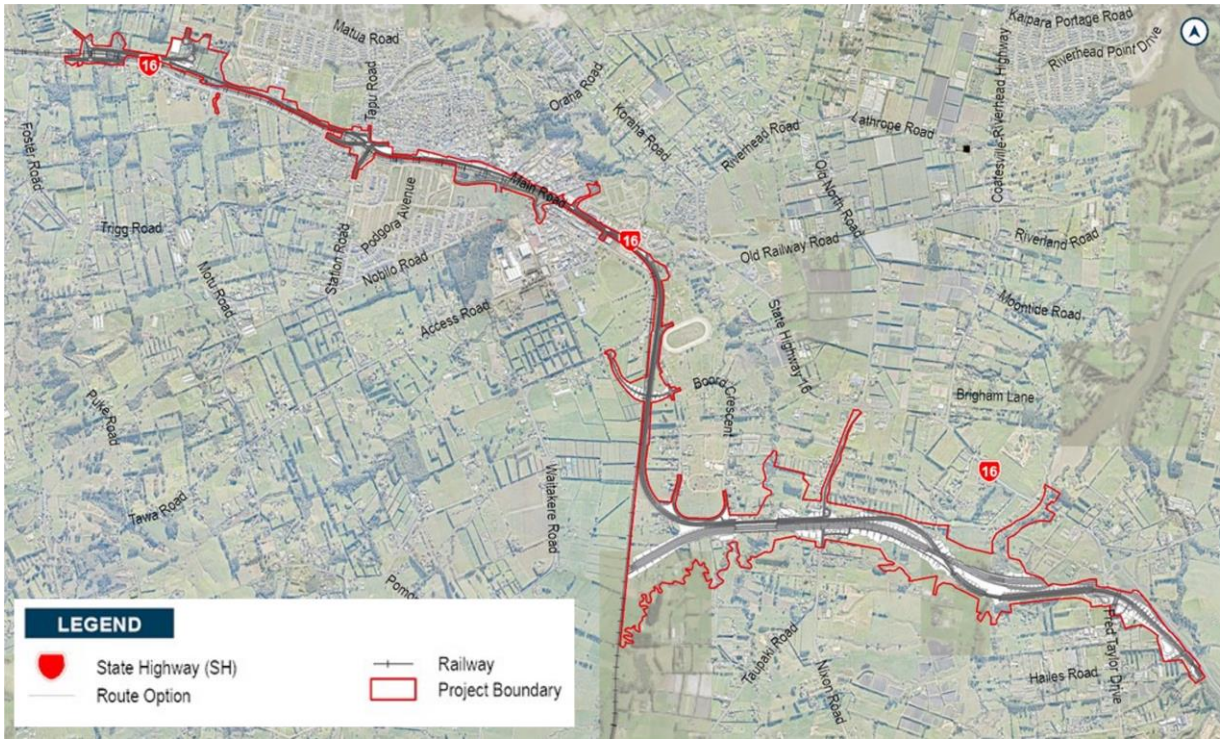


Figure 6-1: Rapid Transit Corridor and Regional Active Mode Corridor Overview

Figure 6-2: Contextual Overview of Rapid Transit Corridor; Regional Active Mode Corridor; NoR KS Kumeū Rapid Transit Station and NoR HS Huapai Rapid Transit Station

6.1.1.1 Urban Features

The RTC and AMC traverses two environments. A rural section between the Brigham Creek Interchange (west of Ngongetpara Stream) and an urban section that extends through Kumeū-Huapai township with RT stations located between the RTC and the SH16 Main Road Upgrade (on the site of the existing Huapai Tavern) to the west of the Kumeū River Tributary and a rural station located to the south of Meryl Avenue adjacent to the proposed Huapai Local Centre in the Spatial Land Use Strategy for the North West.

The RTC bridges over local roads (extension of Fred Taylor Drive) at the Brighams Creek Interchange at the eastern end of the route. West of the Brighams Creek Interchange, the rural section of the corridor is through undulating topography with several stream crossings and a variety of rural land uses including rural residential dwellings (countryside living), horticulture, transportation and logistics and a few commercial business operations. The RTC and RAMC are located on the southern side of the ASH. To the west of the Ngongetepara Stream the RTC and RAMC cross over the ASH and run along the side where the RAMC connects to Taupaki Road. The route passes to the south of Boord Crescent and provides a new connection, bridge over the RTC and RAMC, to Waitakere Road.

In the Kumeū-Huapai urban section the RTC corridor is located in between the NAL (to the south) and SH16 Main Road to the north. Between Weza Lane and John McDonald Lane the RTC is located on an existing berm between the NAL and SH16 Main Road. West of John McDonald Lane the RTC continues to run parallel (on the northern side) with the NAL. The RTC is located at the back, southern edge of mixed commercial and residential properties that follow SH16 Main Road until Station Road. Station Road defines the western extent of the commercial / urban part of the Kumeū – Huapai Village. The RTC corridor designation results in acquisition of all the properties between John McDonald Lane and Station Road, leaving an area between the RTC and SH16 Main Road that will be available for redevelopment.

Land to the west of the Kumeū River, between the RTC and SH16, contains a number of heritage buildings including the Huapai Tavern (scheduled historic place AUP00482), a Railway Shed (scheduled historic place AUP00483) and Railway Carriages (CHI item #18493) in close proximity to the proposed Kumeū RT Station.

At Station Road the existing NAL crosses under SH16 to be located on the northern side of the highway, were it runs parallel with SH16 to Waimauku and on to Hellensville. The RTC also crosses under SH16 at Station Road where it runs parallel, on the north side of the NAL, with SH16 to the south of the NAL. This section of the RTC clips the southern edge of the Huapai Domain and extends through rural properties that are zoned FUZ. The RTC ends at Matua Road at the western end of the FUZ and the RUB. At this location a future RTC interchange and park and ride facility are accommodated by a widened designation.

6.1.1.2 Physical Features

The Rapid Transit corridor crosses over the Ngongetepara Stream, Kumeū River and Ahukuramu Streams and their flood plains on bridges.

The existing vegetation is highly modified and is mostly dominated by agricultural land and exotic ecosystems such as exotic grassland and exotic amenity planting apart from along the Kumeū River which includes conservation areas near Boord Crescent.

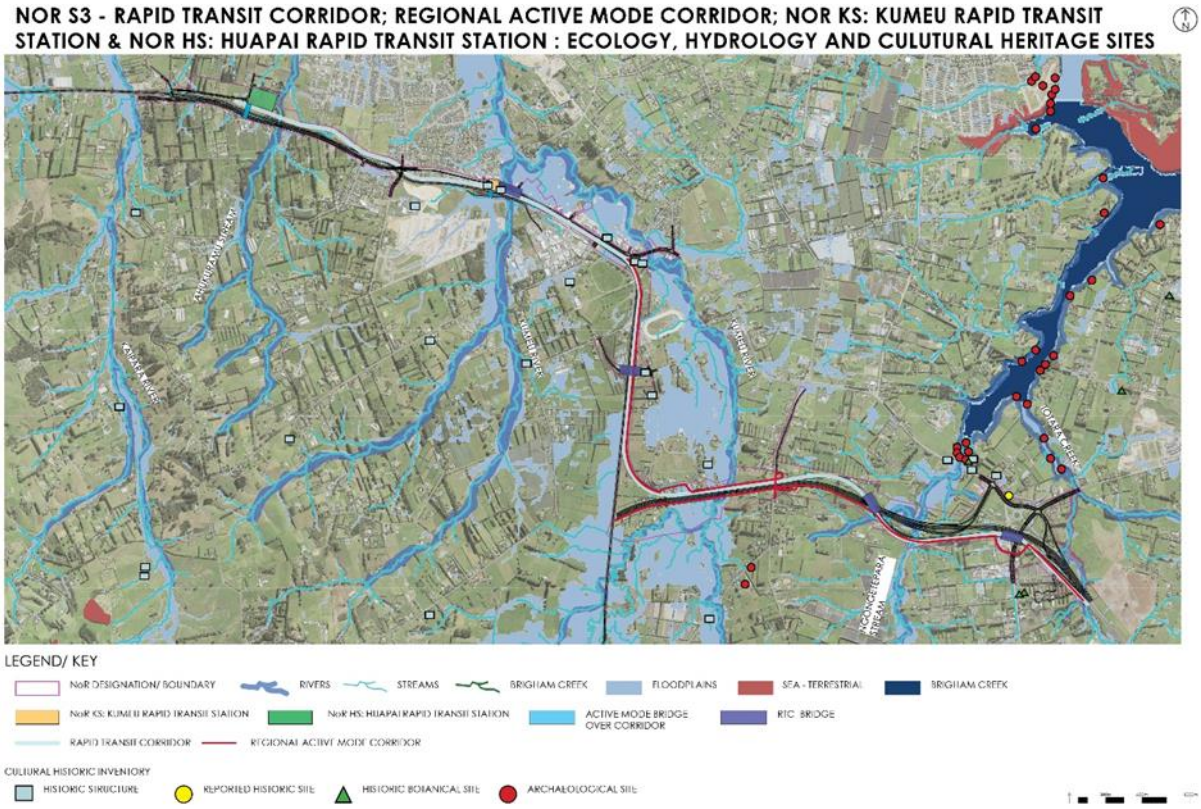


Figure 6-3: Rapid Transit Corridor; Regional Active Mode Corridor; NoR KS - Kumeu Station; NoR HS – Huapai Station: Ecology, Hydrology & Cultural Heritage Sites

6.1.2 Likely Future Environment

The rural section between the Brigham Creek Interchange and SH16 Main Road Kumeū-Huapai township is likely to remain rural in the future because of its zoning and its location outside of the RUB. The introduction of the ASH, RTC and RAMC will modify existing landscape and land use patterns.

The urban section that extends through the Kumeū-Huapai village to Matua Road will see significant change and the RTC and SH16 Main Road Upgrade together with the FUZ and RT Stations are catalysts for this change. The FUZ will result in a large increase in population with major expansion of the residential areas to the west and south of SH16. Refer Figure 6-4 below. The redevelopment of commercial land between Kumeū River (southern side of SH16 Main Road by John McDonald Lane) and Station Road presents an opportunity for a significant section of the Main Road to be redeveloped with a variety of businesses built up to and fronting onto the active mode (walking and cycling) edge of SH16 Main Road.

Having a RTC and stations conveniently located within walking and cycling distance of the urban area will be transformational. Under the NPS Urban Development, increased residential and commercial density is anticipated within a walking catchment of stations with height limits of at least 6 storeys considered appropriate.

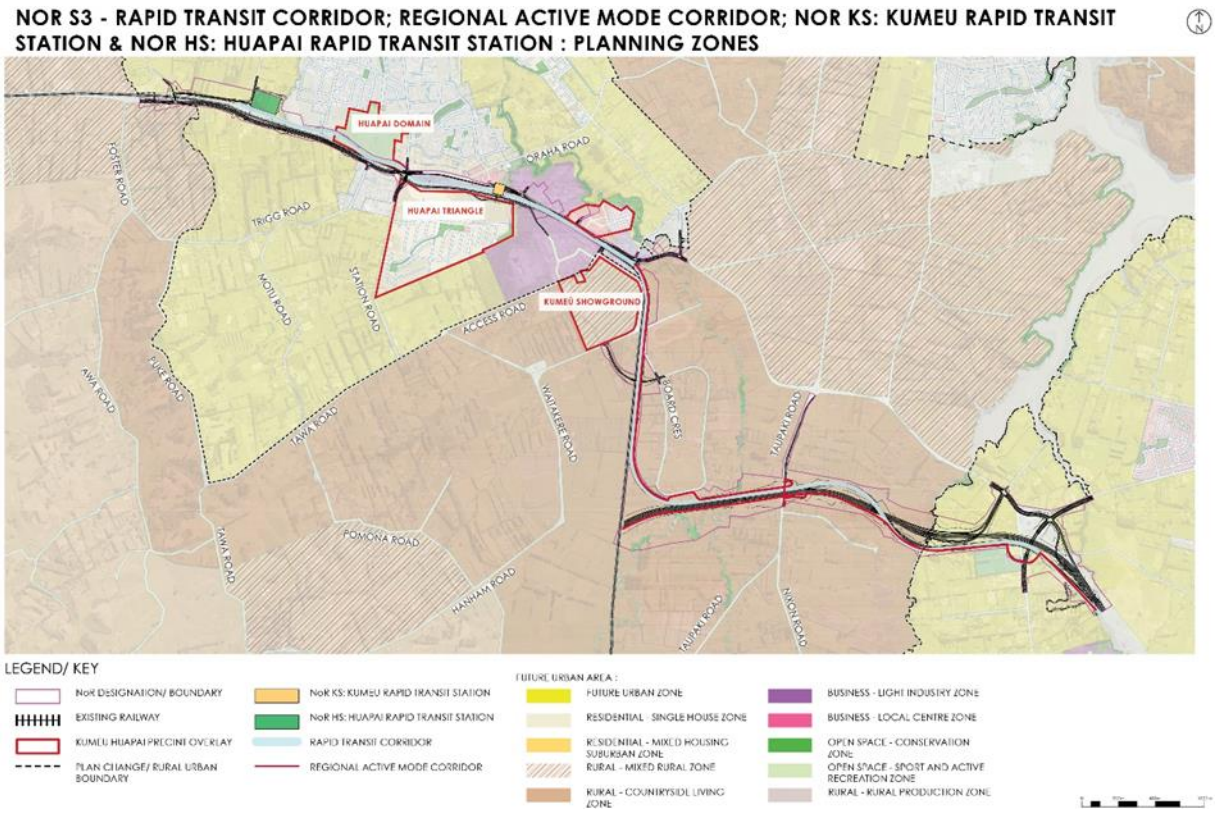


Figure 6-4: AUPOIP zoning for Rapid Transit Corridor; Regional Active Mode Corridor; NoR KS - Kumeu Station; NoR HS – Huapai Station

6.2 Form and Function

6.2.1 Regional Active Mode Corridor

The Regional Active Mode Corridor (RAMC) is a segregated walking and cycling corridor that is located adjacent to the RTC alignment from the Brigham Creek Interchange to the western edge of Kumeū- Huapai, terminating at the signalised intersection of SH16 Main Road and Weza Lane. The corridor is co-located and integrated with the RTC and is proposed to be route-protected as a single NoR. The segregated corridor provides the opportunity for long-term amenity as a key cycling corridor, while connecting to the wider North western Cycleway and ultimately to the Auckland city centre network.

6.2.1.1 Rapid Transit Corridor Design Features

Key features of the proposed Rapid Transit Corridor include the following:

- An approximately 9.5km long corridor intended to operate in an uninterrupted free flowing manner. The corridor has been designed to operate at 80km/h.
- The RTC will be at ground level except at key sections to pass over or under arterial roads (Fred Taylor Dr, Taupaki Rd, new Waitakere-Boord Cres Link Rd, Access Rd and Station Rd).
- The ASH goes over the RTC in the rural section.
- Grade separated road crossings at all intersections with adjoining roads.
- Within Kumeū-Huapai Township, upgrades of:

  - SH16 Main Road between Access Rd and John MacDonald Lane. At this section, the RTC abuts the KiwiRail boundary and the proposed SH16 upgrade which will need to be realigned north of its existing alignment.
  - Realignment of Station Road and Tapu Road to form a signalised cross-intersection. The RTC will pass under this proposed intersection to deviate to the north.
- The identification of two station locations along the route. The future Kumeū RT Station is located adjacent to the Kumeū Library between the SH16 Main Road Upgrade and the RTC to the west of the Kumeū River Tributary. The future Huapai RT Station is located to the south of Meryl Avenue.
- Batter slopes to enable the construction of the corridor, and associated cut and fill activities (earthworks).
- Vegetation removal within the proposed new corridor
- Stormwater dry ponds, wetlands and culverts.

The area to be route protected will include the transport corridor, FTN stations and additional land for tie-ins, stormwater infrastructure, batter slopes and retaining walls, and for other construction related activities including re-grade of private driveways, construction of area for traffic manoeuvring and laydown areas.

More detail of the proposed RTC features is provided in the AEE.

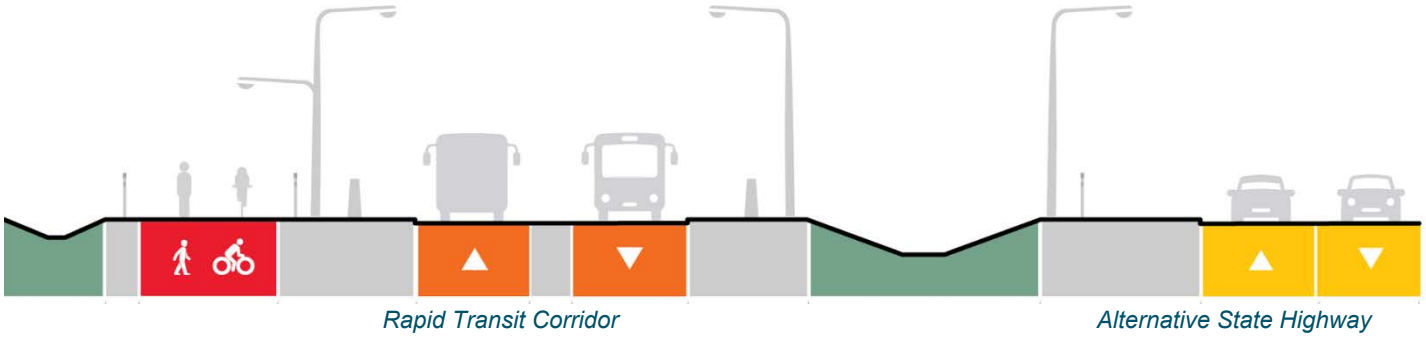


Figure 6-5: Typical Cross Section – RTC near Brigham Creek Interchange

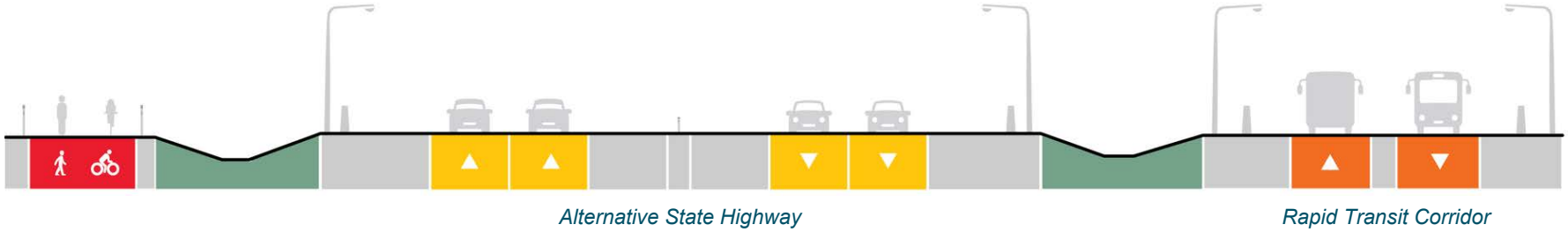


Figure 6-6: Typical Cross Section – Rapid Transit Corridor alongside ASH at Taupaki Road (shared path will re-join Rapid Transit Corridor at Boord Crescent)

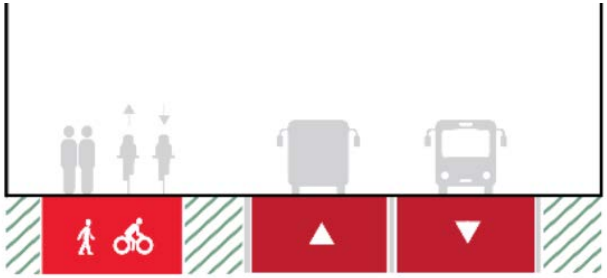


Figure 6-7: Typical Cross section – Rural Rapid Transit Corridor

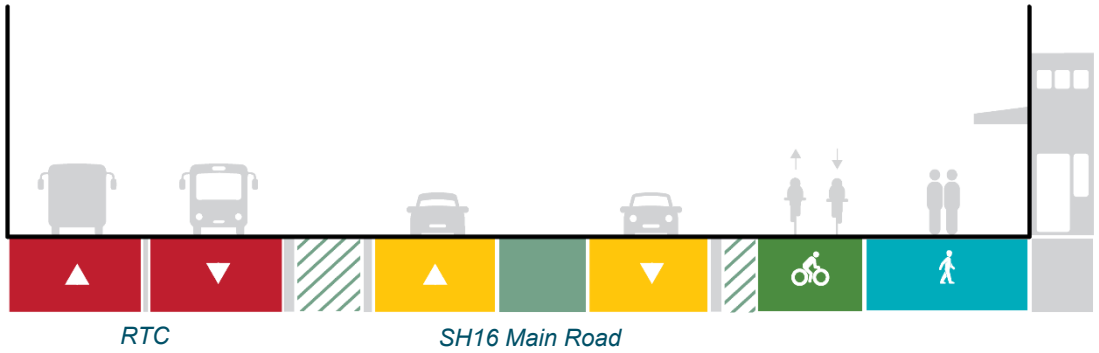


Figure 6-8: Typical Cross Section – Urban Rapid Transit Corridor at SH16 Main Road

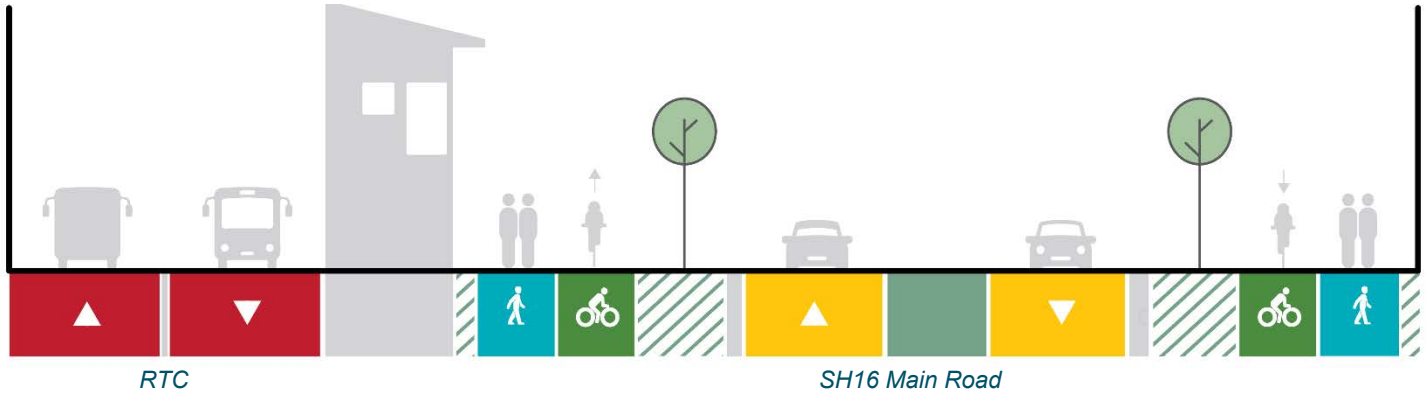


Figure 6-9: Typical Cross section – Rapid Transit Corridor at rear of urban block, SH16 Main Road on northern side and NAL on southern side (not shown)

6.2.1.2 Kumeū – Huapai Station Indicative Footprint

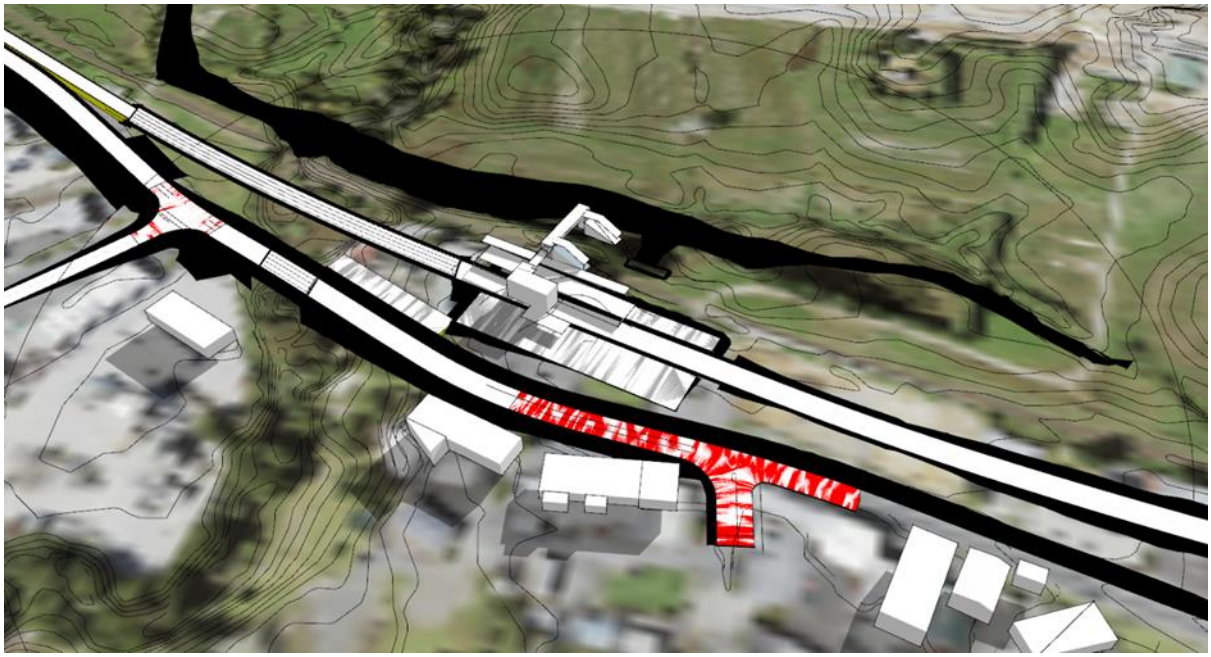


Figure 6-10: Kumeū RT Station indicative footprint

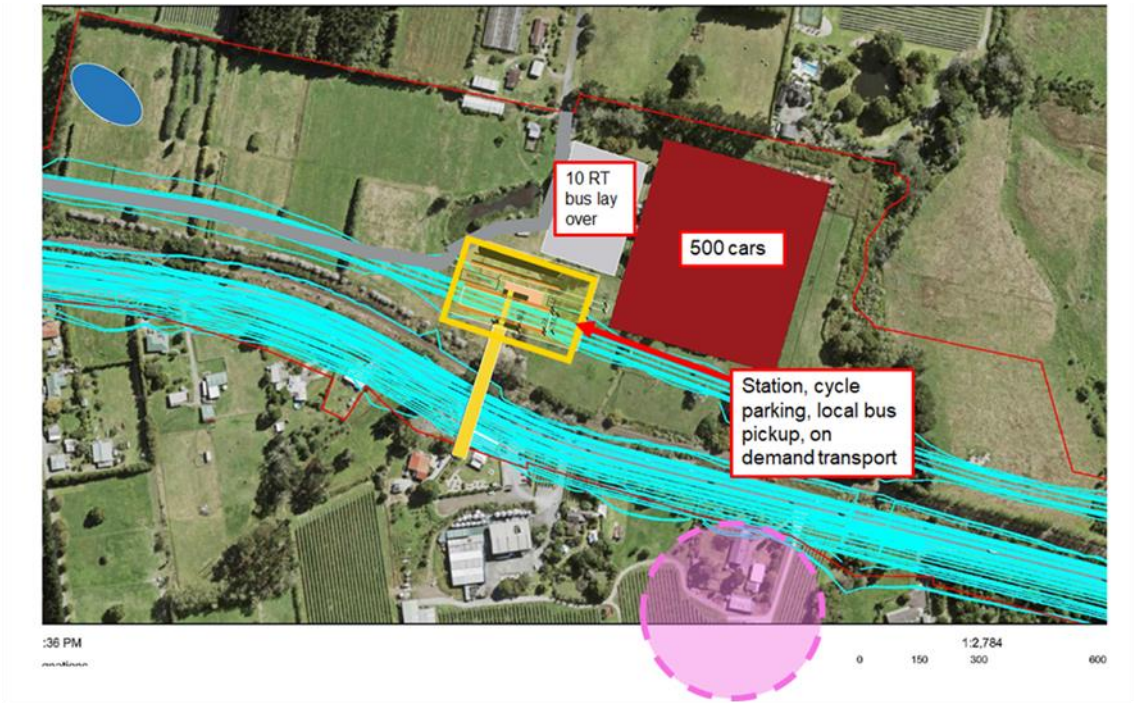


Figure 6-11: Huapai RT Station indicative footprint

6.3 NOR S3: Rapid Transit Corridor and Regional Active Mode Corridor; NoR KS: Kumeū Rapid Transit Station and NoR HS: Huapai Rapid Transit Station Kumeū Rapid Transit Station and NoR HS: Huapai Rapid Transist Station - Evaluation against the Design Framework Principles

This evaluation considers the application of the Te Tupu Ngātahi established Design Framework Principles against the proposed Rapid Transit Corridor including the Regional Active Mode Corridor; Kumeū Rapid Transit Station and Huapai Rapid Transit Station. It provides urban design focused commentary on the current design detail and recommends the framework for how and where any urban design outcomes should be considered in future design stages.

These recommendations can form the basis of an urban design specific designation condition to prepare an Urban and Landscape Design Management Plan (ULDMP) in future delivery.

The evaluation Table 6-1 below lists each of the twenty principles identified in the Te Tupu Ngātahi Design Framework and provides an explanation which are highlighted in light blue. A recommendation of how the principle is applied to the NoR Project area is provided below each principle.

Table 6-1: Urban Design Evaluation Rapid Transit Corridor and Regional Active Mode Corridor; NoR KS: Kumeū Rapid Transit Station and NoR HS: Huapai Rapid Transit Station

Principle	Explanation
ENVIRONMENT	
1.1 Support and enhance ecological corridors and biodiversity	Mitigate the effects on or enhance existing ecological corridors through the placement and design of movement corridors
Opportunity to enhance the ecology and biodiversity of the Kumeū River at the Boord Crescent Open Space - Conservation Zone and where the RTC crosses over the Kumeū River beside SH16 Main Road. Opportunity to create an ecological corridor between SH16 Main Road and the RTC from Kaipara River to the Ahukuramu Stream.	
1.2 Support water conservation and enhance water quality in a watershed	Take into account and work with the existing watershed as part of a whole system.
The proposed corridor cross section allows spatial provisions to provide natural drainage (swales) to direct stormwater to constructed wetlands (refer to preliminary construction drawings) as a way to address water quality and reduce hard engineering solutions. Water quality, detention / retention and discharge will be decided in future regional consents.	
1.3 Minimise land disturbance, conserve resources and materials	Respect the existing topography, landforms and urban structure in the placement of strategic corridors. Minimise the quantity of hard engineering materials required. Minimise, mitigate any adverse effects of activities on the environment.
The RTC and RAMC corridor is co-located with the ASH corridor in the rural section and located beside the existing NAL corridor through the urban section. This co-location of infrastructure will minimise land disturbance and limit effects to single corridors.	

Principle	Explanation
Opportunities to optimise land integration should be considered in the detailed design phase and refinement of the alignment through the urban section to maximise the spatial opportunity for adjacent land redevelopment.	
The alignment is likely to require a large volume of earthworks as the corridor extends through challenging terrain with undulating topography and elevation changes. The construction management approach will need to address any opportunities to minimise impact on rural land.	
1.4 Adapt to a changing climate and respond to the microclimatic factors of each area	Design for predicted future regional climatic impacts in the corridor location. Consider the positive contribution that the orientation of transport corridors can make to the local climatic environment of future places and streets.
The proposed corridor design adopts a vertical geometry that accommodates stormwater events including the applied climate change factors as stated in Auckland Council Stormwater Code of Practice.	
The proposed corridor design provides for street tree planting through the urban section that, when delivered, will contribute to the amenity of the area by providing shade and microclimatic cooling qualities.	
The detailed design phase should include a landscape and ecological strategy that incorporates the recommendations of the Landscape, Flooding and Visual and Ecological Assessments and a response to climate change factors.	
The proposed RAMC and the incorporation of cycling facilities at each of the RTC Stations will support modal shift and reduce transport related climate change contributions.	
SOCIAL	
2.1 Identity and place(s)	The identity or spirit of place is generally acknowledged as the unique amalgam of the inherent built, natural and cultural qualities of a place. Responding to identity in the location and type of new corridors can provide a sense of continuity and contribute to our collective memory.
Areas with extensive cut and fill batters along the ASH RTC and RAMC have the potential to impact on the local identity and character. Future design stages should integrate earthworks with the layout and character of the surrounding area, as far as practicable.	
Where the proposed corridor passes through a rural environment it should respond to adjacent land uses including; visual screening and separation, integration of fencing and any acoustic requirements, retention of existing high value trees and vegetation, the design of stormwater wetlands to integrate with natural flood plains and stream corridors and planting of existing stream corridors and flood plains to make the underlying landscape legible.	
Through the urban section, consideration of street tree selection and placement provides the opportunity to reflect and enhance the unique local character inherent in the built, natural and cultural qualities of the location.	
In future design stages, mana whenua will be invited to provide input into relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.	
There are two historic heritage sites recorded in close proximity to the proposed RTC, the Huapai Tavern and Rail Shed and historic items, Railway Carriages. The Heritage Assessment recommends the Huapai Tavern (AUP 00482), Rail Shed (AUP004283) and Railway Carriages (CHI item #18493) be located in a heritage zone near the future Kumeū RTC Station. “The modification of the currently scheduled heritage area around the Huapai Tavern would allow to create a heritage precinct for additional heritage buildings, e.g. the Railway carriages and the Railway Goods Shed to be moved close to the Tavern. Additional buildings like the Pomona Hall and two residential buildings (from S1 and S3) could probably join them. The functions as Tavern, café and antiques shop could be retained and extended with additional heritage buildings in a heritage precinct.”	
2.2 Respect culturally significant sites and landscapes	Acknowledge significant sites and features in the layout of movement corridors including ridgelines or horizons.
There are no sites of significance to mana whenua under the AUP:OP that have been identified along or in close proximity to the proposed corridor.	

Principle	Explanation
The Kumeū River was part of significant waka portage for tangata whenua connecting the upper harbour with Kaipara Harbour. Future design should work with mana whenua to ensure appropriate acknowledgment of this awa.	
In future design stages, mana whenua will be invited to provide input into cultural landscape and design matters including how desired outcomes reflect their history and values. Throughout the corridor there is opportunity for the incorporation of cultural narratives and response to the local context through mahi toi design responses.	
2.3 Adaptive corridors	Corridors should demonstrate flexibility to respond to changes in their function and physical interfaces. Consider an adaptive approach in the way strategic corridors are designed to be able to respond to changes in land use, the way we move around or utilise technology over time.
The proposed corridor incorporates a regional active mode corridor that connects into SH16 Main Road connecting with future RT Stations at Kumeū and Huapai. The stations include overbridges (over NAL and SH16 Main Road) connecting the stations with future Town Centres and FUZ land.	
Kumeū RT Station is located adjacent to existing zoned Town Centre land and will support Council's Spatial Land Use Strategy to expand Kumeū Town Centre. It will also connect the Huapai Triangle (high density housing area) directly into the SH16 Main Road and Kumeū Town Centre.	
Huapai Station overbridge will tie into the Future Local Centre, (identified in the Spatial Land Use Strategy – Kumeū-Huapai, Riverhead and Redhills North), located to the south of SH16 in the FUZ.	
2.4 Social cohesion	Provide clear, effective and legible connectivity between community and social functions.
The RTC has the potential to reinforce localised severance issues for the existing community created by the NAL and SH16 being located between residential communities and the Kumeū Town Centre. Further design stages should ensure issues of severance are addressed by providing overbridges (as indicated in the preliminary design) to connect FUZ land uses with the SH16 Main Road active mode corridor.	
2.5 Safe corridors	Provide a safe and convenient network of routes accessible to people of all ages and abilities.
With the provision of fully segregated active travel solutions, the corridor can deliver a greater level of safety, access and movement to future local communities that will promote a sense of personal safety particularly for pedestrians and cyclists.	
Further design detail of safe prioritised active modes including crossings across the SH16 Main Road will be developed at subsequent detail design stages. Safety in Design and CPTED reviews will ensure a safe corridor for all users.	
BUILT FORM	
3.1 Align corridors with density	Locate stations/stops and corridors within walking distance of higher density development to facilitate modal shift, support commercial and mixed use centres and contribute to vibrant, active urban environments.
The corridor locates the RT stations adjacent to the existing Kumeū Town Centre and the proposed Huapai Future Local Centre. The location of RT Stations adjacent to local centres will be a catalyst for mixed use higher density development that connects the RT Stations with the Town Centres, SH16 Main Road and FUZ residential and employment areas. The Kumeū RT Station should be designed with a frontage addressing the SH16 Main Road.	
3.2 Corridor scaled to the surrounding context and urban structure	Align the speed, type and scale of transport corridors and infrastructure with the environment that it moves through (appropriate scale to the context).
The proposed Kumeū RT Station aligns with higher density living e.g. the Huapai Triangle and Kumeū Town Centre future mixed use development. The proposed Huapai RT Station, bus interchange and park and ride facility located at the western edge of the FUZ will provide a connection via an overbridge to the future Huapai local centre and FUZ land to the south.	

Principle	Explanation
3.3 Facilitate an appropriate interface between place and movement	Facilitate the opportunity for place as well as movement in corridors (people-oriented streets)
The Kumeū RT Station presents an opportunity to reinforce place making given its location beside the Kumeū River and Huapai Tavern, potential historic precinct. It fronts onto SH16 Main Road and connects with active modes. The Huapai RT Station includes a Park and Ride facility connecting via an overbridge (over the NAL) to the SH16 Main Road pedestrian and cycle facilities. The Huapai RT Station is located at the western edge of FUZ and provides an opportunity to signal the rural edge and identity of Huapai.	
MOVEMENT	
4.1 Connect nodes	Provide tangible connectivity between identified activity nodes.
The RAMC connects active mode facilities to the Upgrade of SH16 Main Road (NoR S2), which provides direct active mode connectivity to the proposed RT Stations, Kumeū Show Grounds and Huapai Domain. The RTC Stations support this connectivity through the provision of active mode connections (over bridges) across the NAL to SH16 Main Road.	
The provision of overbridges over SH16 Main Road provides convenient future community (FUZ land to the south) connection into the stations. Future design phase to ensure direct and convenient active mode routes that align with desire lines.	
4.2 Connect modes	Provide for choice in travel and the ability to connect at interchanges between modes.
The proposed corridor provides a regional active mode corridor that connects Kumeū-Huapai with Westgate, the North Western Shared Use Path (SUP) and Auckland City Centre. The RAMC will also connect to the upgraded SH16 Main Road which will have active mode facilities to connect to the RTC stations.	
4.3 Support access to employment and industry	Align the corridor location and typology to provide direct and efficient access to areas of employment and industry.
The proposed Kumeū RT Station provides direct access to the industrial and business employment zones opportunities within Kumeū.	
The proposed Huapai station is located in FUZ / adjacent to the proposed Future Local Centre, identified in the Spatial Land Use Strategy – Kumeū-Huapai, Riverhead and Redhills North, and the associated employment opportunities. Both RTC stations will provide a reliable and rapid connection for existing and future residents to employment opportunities as Westgate and Auckland City Centre, via the proposed City Centre to Westgate RTC.	
4.4 Prioritise active modes and public transport	Provision of quality active mode corridors and dedicated public transport corridors to enable a modal shift away from private vehicle use.
The proposed RAMC corridor provides active mode access to SH16 Main Road. The SH16 Main Road Upgrade (NoR S2) provides active mode connections to the proposed Kumeū and Huapai RT Stations.	
The RTC provides for dedicated public transport (Rapid Transport) to connect with the future town centres at Kumeū and Huapai.	
4.5 Support inter-regional connections and strategic infrastructure	Consider the location and alignment of significant movement corridors and placement of infrastructure (power, wastewater, water) to the network.
The proposed RTC and RAMC corridor is a strategic corridor connecting Kumeū-Huapai with Westgate, the North Western SUP and Auckland City Centre.	

Principle	Explanation
At Boord Crescent the existing level crossing across the NAL will be replaced with the local road elevated over the NAL and RTC. This will improve safety on the RTC. Bridges are proposed at the Kumeu and Huapai RTC stations providing safe access over the NAL, RTC corridor and SH16 (Huapai Station only).	
4.6 Support legible corridor function	Consider how areas can be clearly navigated and understood by users moving from place to place.
The proposed typical corridor cross section accommodates a range of modes with clear allocation of street spaces, and inherently supports future community connectivity, mobility and travel choice.	
Further development of the intersection crossings at the detailed design stage will provide safe, clear and legible cross corridor access and connectivity between areas of higher density.	
LAND USE	
5.1 Public transport directed and integrated into centres	Locate rapid transit interchanges within centres (local, town and metro) to support a mix of uses and provide modal choice to a larger number of users.
The Kumeū and Huapai RT Stations will be located adjacent to the existing and future Kumeū town centre and the future Huapai local centre. The RT Stations have the potential to make a significant place making contribution to Kumeū and Huapai, as focal points within the centres and as catalysts for urban intensification.	
The provision of bridges over SH16 Main Road provides convenient future community (FUZ land to the south) connection into the stations.	
5.2 Strategic corridors as urban edges	Strategic corridors as potential definers of a land use edge.
This principle is not relevant to this corridor.	

6.4 Summary of Urban Design Evaluation and Recommendations for Rapid Transit Corridor and Regional Active Mode Corridor: NoR KS: Kumeū Rapid Transit Station and NoR HS: Huapai Rapid Transit Station

Overall, the proposed Rapid Transit Corridor, Regional Active Mode Corridor and Kumeū and Huapai Rapid Transit Stations configuration is generally supportive of the Design Framework principles. A number of urban design outcomes are shown in blue in Figure 6-12 below. These are recommended to form a part of the Urban and Landscape Design Master Plan (ULDMP) in future delivery stages. This is to ensure the detailed design of the corridor responds appropriately to the principles and the project specific urban design outcomes sought.

The ULDMP should include the following Project specific outcomes as illustrated in Figure 6-12:

The ULDMP should be based on Waka Kotahi Urban design guideline “Bridging the Gap”, NZTA Landscape Guidelines and P39 Landscape Specifications.

Develop an urban interface approach within the corridor that:

- Recognises the transition from rural village to an urban town centre, incorporating RT stations by providing a corridor interface that supports permeable pedestrian access and responds to the changing built form interface and spatial character of adjacent future development.
- Enhances the identity for Kumeū and Huapai including consideration of landscape design drivers related to the Kumeū River, Huapai Recreation Reserve and the Kumeū Showgrounds and the creation of gateway elements at the eastern and western edges of the town.
- Provide and integrated environment / ecological and landscape strategy for stormwater that addresses water quality and cultural landscape values and includes landscape plans to incorporate the recommendations of the landscape and visual assessment and ecological assessments.
- Demonstrates how batter slopes and land within the designation can be integrated with the adjacent landform and land uses whilst mitigating visual amenity and character effects.
- Mana whenua will be invited to provide input into the development of the ULDMP, in particular relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.
- Responds to land use and development opportunities associated with the location of the future RTC station between Harikoa Road and John McDonald Road.
- Integration of the proposed stormwater wetlands to ensure an appropriate interface with adjacent land uses.

Further urban design opportunities in the Project area have also been identified in Figure 6-12 and shown in orange. These opportunities are not required to mitigate the Project's urban design effects but could be considered by the requiring authority or other parties at future stages of design and development.

6.5 Rapid Transit Corridor; Regional Active Mode Corridor; Kumeū Rapid Transit Station and NoR HS: Huapai Rapid Transit Station - Urban Design Outcomes and Opportunities

The urban design outcomes that have been identified are shown in blue and summarised in section 6.4 above. Opportunities that have been identified are shown in orange below.

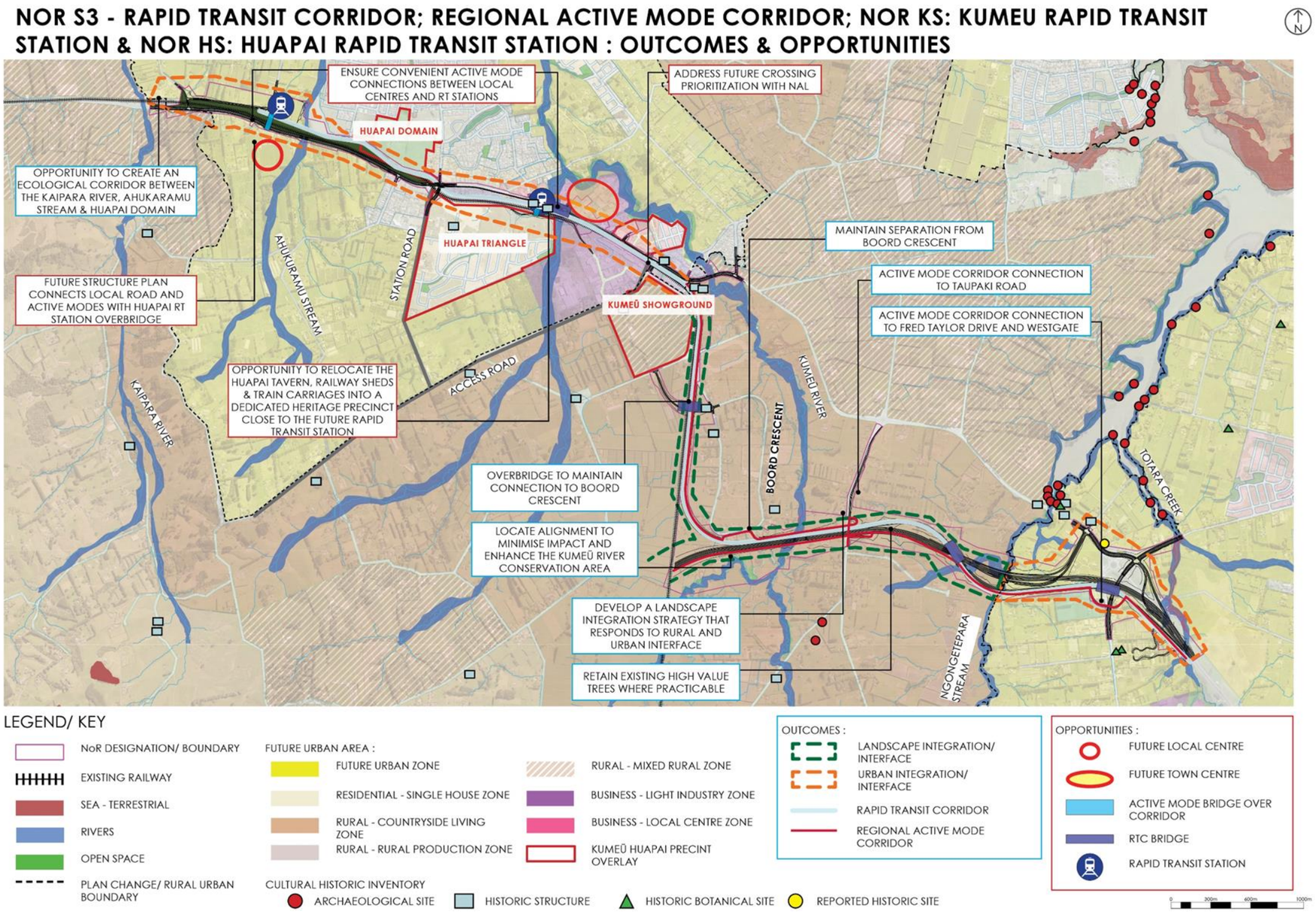


Figure 6-12: Rapid Transit Corridor; Regional Active Mode Corridor; NoR KS - Kumeu Station; and NoR HS – Huapai Station: urban design outcomes and opportunities

7 NoR S4 Access Road Upgrade

7.1 Access Road Upgrade Contextual Analysis

The Access Road / Tawa Road Upgrade is 2.8km in length linking Puke Road to SH16 Main Road at the entrance of Kumeū-Huapai township. It is currently a rural arterial corridor that runs along the eastern boundary of Kumeū- Huapai. The proposed upgrade extends from the intersection of Access Road with SH16 (and entry to the Kumeū-Huapai township) in the east and continues to Tawa Road to its intersection with Puke Road in the west.

Access Road is currently adjacent to Business and FUZ zoned areas and marks the RUB edge of Kumeū-Huapai township with countryside living zoning on the south-eastern side. The Access Road Upgrade plays a key role in connecting future residential communities to existing and likely future business zones and to both the RTC and ASH. It is aligned along the south-eastern boundary of the FUZ, providing an interface between rural and urban land uses.

It is proposed to widen the existing Access Road / Tawa Road corridor from its current width of 20m to accommodate a 30m wide four-lane cross-section. The cross-section of the corridor transitions from the rural edge cross-section to an urban cross-section at Wookey Lane intersection. Along the western section of Access Road, which is a low-speed rural section, the corridor has a rural southern edge (swales, typically 9m wide top width) with walking and cycling facilities along its northern urban edge. Through the business and industrial area, a generic 30m urban corridor is provided, including walking and cycling infrastructure along both sides of this eastern section.

An overview of the proposed design is provided in Figure 7-1 below:

Figure 7-1: Overview of Access Road Upgrade

The indicative alignment has been prepared for assessment purposes, and to indicate what the final design of the Project may look like. The final alignment will be refined and confirmed at the detailed design stage.

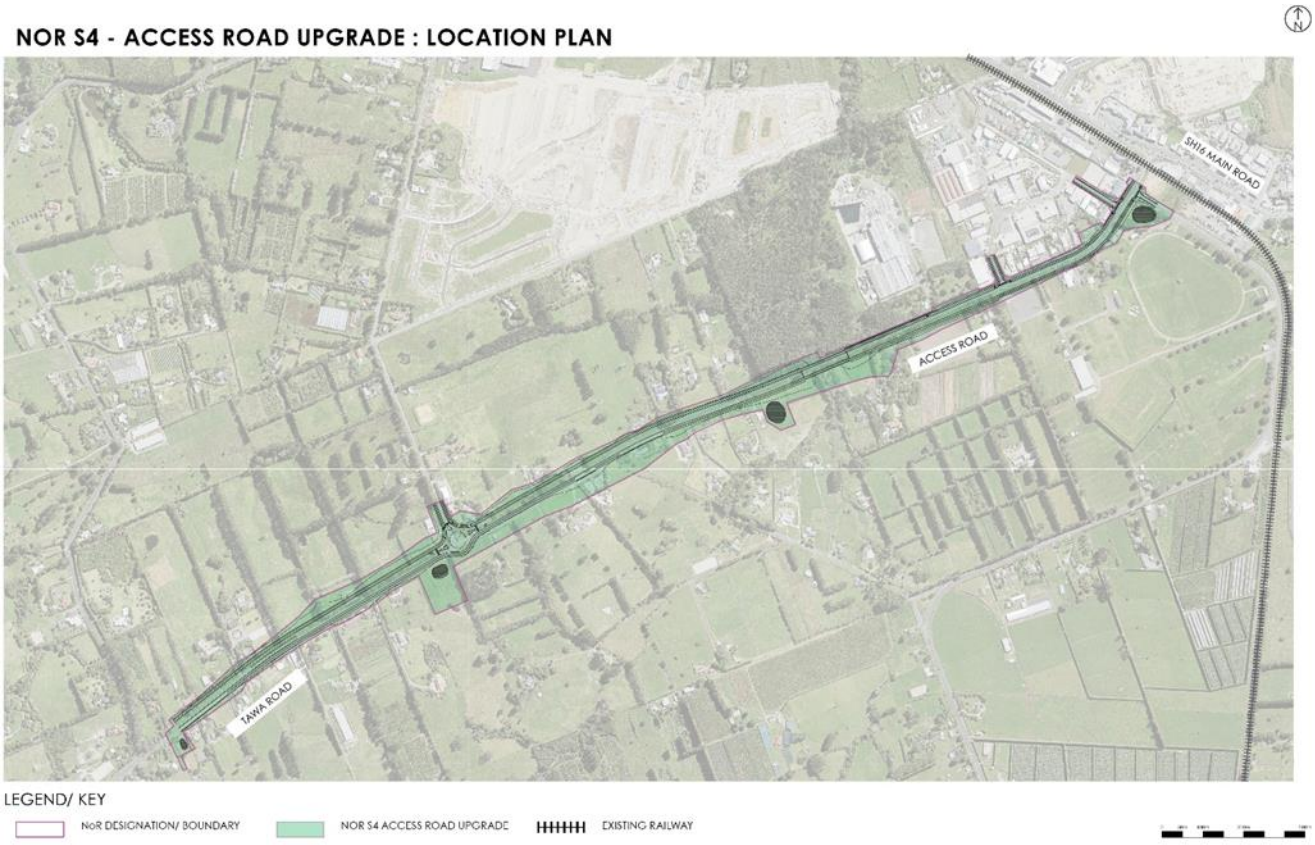


Figure 7-2: Overview Access Road Upgrade

7.1.1 Existing Environment Access Road Upgrade

7.1.1.1 Urban Features

Access Road is currently a local rural road extending from Puke Road in the south to join the SH16 Main Road in the north. It consists of a single lane in each direction with no provision for walking and cycling. The northern section between Wookey Lane and SH16 Main Road is more urban with residential dwellings and a mix or commercial properties fronting the western side of the road and the Kumeū Community Centre and Showgrounds defining the eastern edge of the road. Access Road crosses the NAL with an existing level crossing at the intersection with SH16.

7.1.1.2 Physical Features

Access Road extends through varied steep topography rising significantly from its southern end to join SH16 Main Road at its highest elevation. The southern section between Puke Road and Station Road follows a ridge before going through a valley formed by the Kumeū River and floodplain. North east of the gully the topography levels out as Access Road connects with the edge of Kumeū Village. Through the southern rural section, the road corridor is lined with trees and hedgerows that separate the adjacent property from the road corridor.

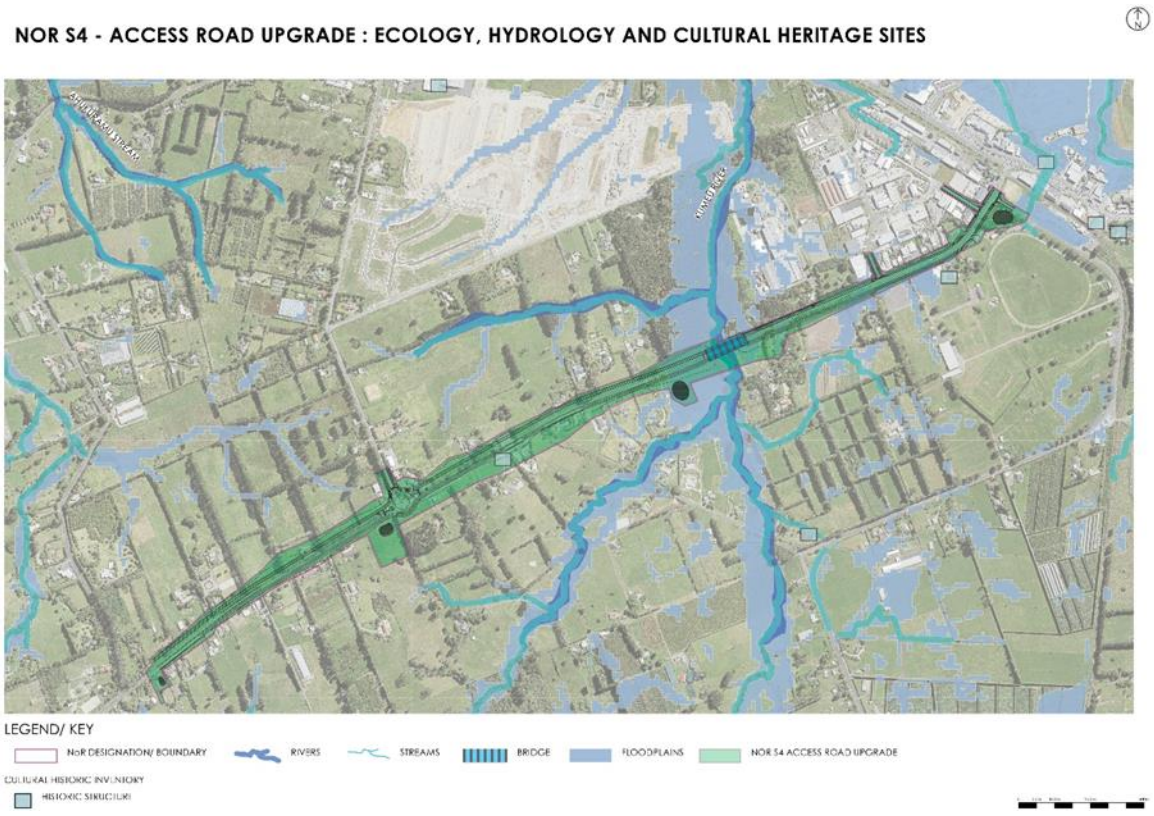


Figure 7-3: Access Road Upgrade, Ecology, Hydrology & Cultural Heritage Sites

7.1.2 Likely Future Environment Access Road Upgrade

Access Road will be an arterial road connecting the southern FUZ land to SH16 Main Road, Kumeū-Huapai township to the north and the ASH, Tawa Road interchange to the south.

Access Road includes Tawa Road at its southern end between Motu Road and Station Road where it merges with Access Road. Access Road aligns with the RUB, with the eastern side being zoned Rural and the western side FUZ and Business – Light industry at its northern end.

The existing industrial land use is anticipated to remain, expanding south to support the expanding urbanised area identified in the Spatial Land Use Strategy -North West (Kumeū-Huapai, Riverhead and Redhill) adopted by Auckland Council in May 2021. The FUZ land adjoins the Huapai Triangle high density residential precinct to the north and it likely that it will be developed for further residential and business uses.

The Upgrade of Access Road will provide separated active mode facilities to connect future residential areas with employment zones, the SH16 Main Road Upgrade, Kumeū Town Centre and RT Station.

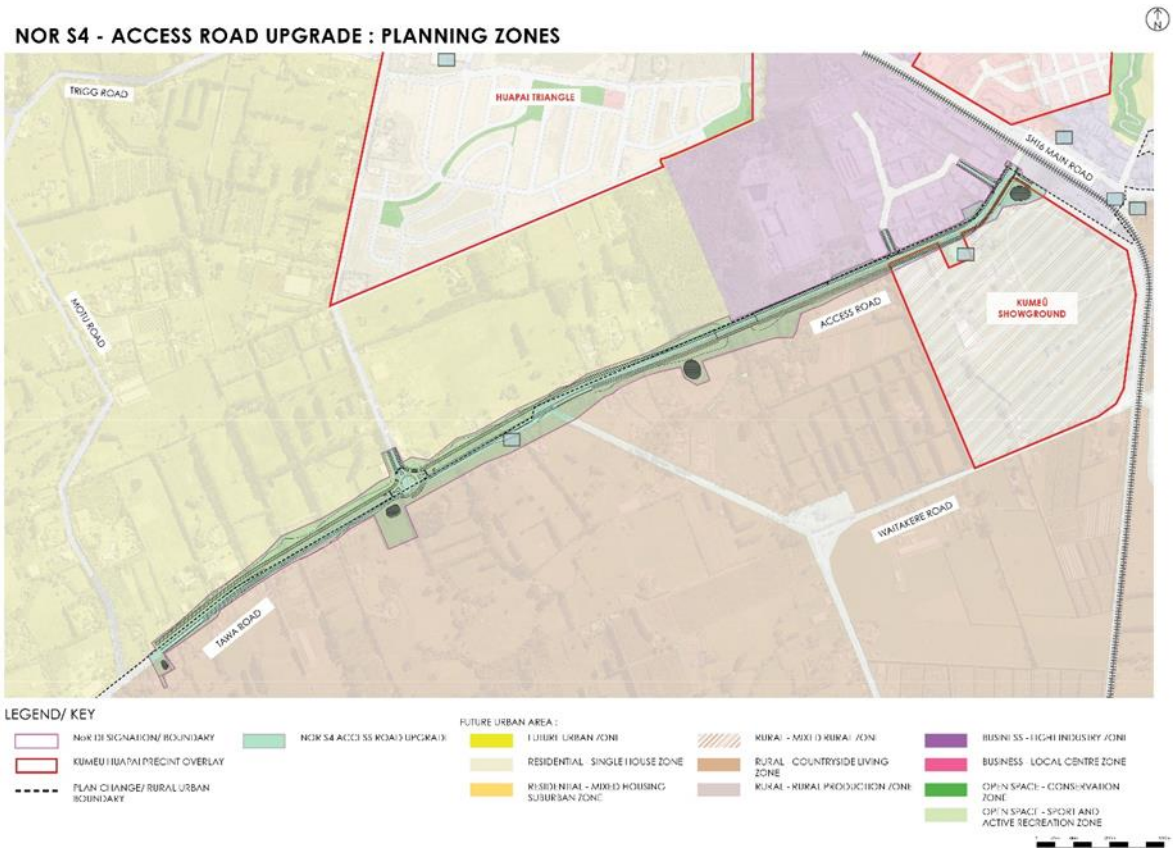


Figure 7-4: AUPOIP Zoning for Access Road Upgrade

7.2 Access Road Upgrade – Form and Function

Access Road marks the RUB edge and the eastern edge of FUZ and Business associated with Kumeū-Huapai township. Access Road will provide a local arterial road connecting the FUZ land and the SH16 Main Road / Town Centre with the ASH and associated active mode corridor. Once established the corridor will play a crucial role in balancing both movement and place priorities through the new growth area.

Key Features of the Access Road Upgrade include:

- Upgrading the existing Access Road corridor to a 30m wide four-lane arterial road with walking and cycling provisions (See Figure 7-5 and Figure 7-6)
- Swales typically with a 9m wide top width along the western section of Access Road on the southern edge.
- A posted speed limit of 60km/h through the urban FUZ-rural edge area and 50km/h through the business and industrial area.
- Tie-ins with existing roads, stormwater dry ponds, wetlands and culverts.
- Batter slopes to enable widening of the corridor, and associated cut and fill activities.
- Bridge over the Kumeū River and floodplain.
- Vegetation removal along the existing road corridor.
- Other construction related activities required outside the permanent corridor including the re-grade of driveways, construction traffic manoeuvring and construction laydown areas.

More detail of the proposed Upgrade is provided in the AEE.

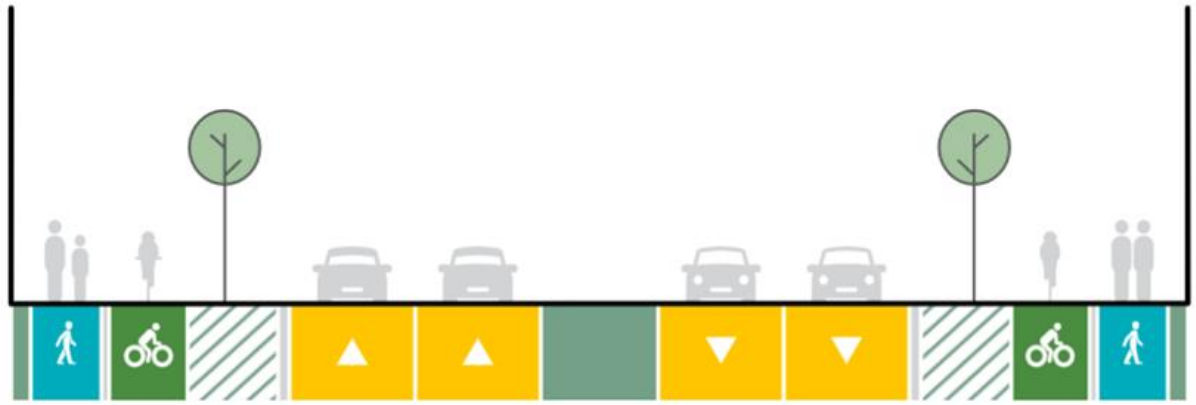


Figure 7-5: Typical urban cross section 30m – Access Road (north of Wookey Lane

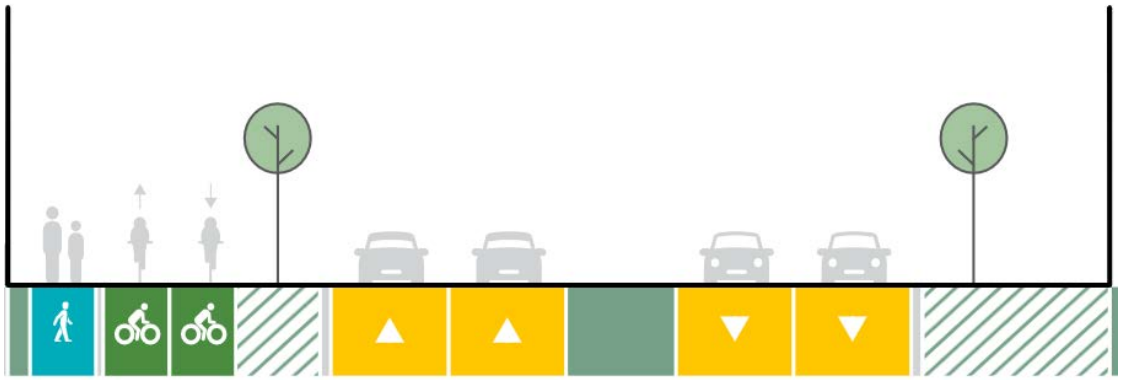


Figure 7-6: Typical rural cross section 35m – Access Road (south of Wookey Lane)

7.3 NOR S4: Access Road Upgrade - Evaluation against the Design Framework Principles

This evaluation considers the proposed Access Road Upgrade against the relevant Design Framework Principles. It provides urban design focused commentary on the current design detail and recommends the framework for how and where any urban design outcomes should be considered in future design stages. These recommendations can form the basis of an urban design specific designation condition to prepare an Urban and Landscape Design Master Plan (ULDMP) in future delivery stages, and where there is an overlap of urban design outcomes with other considerations (for example ecological, landscape, visual or water quality related recommendations) they can be integrated within the relevant specialist conditions.

The evaluation Table 7-1 below lists each of the twenty principles identified in the Te Tupu Ngātahi Design Framework and provides an explanation which are highlighted in light blue. A recommendation of how the principle is applied to the NoR Project area is provided below each principle.

Table 7-1: Urban Design Evaluation for the Access Road Upgrade

Principle	Explanation
ENVIRONMENT	
1.1 Support and enhance ecological corridors and biodiversity	Mitigate the effects on or enhance existing ecological corridors through the placement and design of movement corridors
A replacement and widened bridge crossing proposed on Access Road, over a tributary of the Kumeū River and flood plain provides an opportunity to enhance the ecological corridor of the river.	
Incorporate bridging structures to reinforce broader connectivity outcomes for ecology and water quality by minimising stream interruptions and ensuring a connected natural system.	
1.2 Support water conservation and enhance water quality in a watershed	Take into account and work with the existing watershed as part of a whole system.
The proposed typical corridor cross section allows spatial provisions to provide natural drainage to stormwater wetlands as a way to address water quality and reduce hard engineering solutions. Water quality and detention / retention will be decided in future regional consents.	
Further refinement of the wetlands during the detailed design stage is recommended to define the wetland's final form and how the wetland will interface with the surrounding land uses. For example, wetlands could be configured in a naturally shaped manner and fully integrated with existing natural drainage features and vegetation.	
1.3 Minimise land disturbance, conserve resources and materials	Respect the existing topography, landforms and urban structure in the placement of strategic corridors. Minimise the quantity of hard engineering materials required. Minimise, mitigate any adverse effects of activities on the environment.
The proposed corridor demonstrates a generally efficient alignment in relation to existing property boundaries along the corridor minimising land impacts and inefficient residual land portions.	
1.4 Adapt to a changing climate and respond to the microclimatic factors of each area	Design for predicted future regional climatic impacts in the corridor location. Consider the positive contribution that the orientation of transport corridors can make to the local climatic environment of future places and streets.
Adopt a vertical geometry that accommodates stormwater events including the applied climate change factors as stated in Auckland Council Stormwater Code of Practice.	
The proposed corridor design provides for street tree planting that, when delivered, will contribute to the amenity of the area by providing shade and microclimatic cooling qualities.	
The proposed corridor provides for active modes and prioritises public transport options to support modal shift and reduce transport related climate change contributions	
SOCIAL	
2.1 Identity and place(s)	The identity or spirit of place is generally acknowledged as the unique amalgam of the inherent built, natural and cultural qualities of a place. Responding to identity in the location and type of new corridors can provide a sense of continuity and contribute to our collective memory.
Access Road / Tawa Road is located on the edge of the RUB and FUZ. The typical cross sections illustrated in Figure 7-5 and Figure 7-6 above shows design integration with the rural character in the south utilising drainage swales adjoining the rural zone and a new urban form to the north will assist with developing the identity of the Kumeū-Huapai township.	

Principle	Explanation
Consideration of street tree selection and placement provides the opportunity to reflect and enhance the unique local character inherent in the built, natural and cultural qualities of the location.	
In future design stages, mana whenua will be invited to provide input into relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.	
2.2 Respect culturally significant sites and landscapes	Acknowledge significant sites and features in the layout of movement corridors including ridgelines or horizons.
In future design stages, mana whenua will be invited to provide input into other relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.	
2.3 Adaptive corridors	Corridors should demonstrate flexibility to respond to changes in their function and physical interfaces. Consider an adaptive approach in the way strategic corridors are designed to be able to respond to changes in land use, the way we move around or utilise technology over time.
The proposed typical corridor cross section has the spatial provisions to be flexible, re-configurable and adaptable for changing transport needs. For example, future bus priority measures at intersections, additional bus stops and future expansion of any walking and cycling networks can be accommodated within the corridor.	
The proposed cross section provides for all modes, with spatial provisions at the corridor edges that accommodate adjacent land use types and movement corridors adjoining urban and rural edge conditions.	
2.4 Social cohesion	Provide clear, effective and legible connectivity between community and social functions.
The proposed corridor should be designed to ensure severance issues are minimised and good access is maintained to community facilities.	
To enable local connectivity and cross corridor access further development at the detailed design stage should be undertaken to ensure safe crossing points at the roundabout at Station Road and across Access Road to the show grounds and community centre.	
2.5 Safe corridors	Provide a safe and convenient network of routes accessible to people of all ages and abilities.
The proposed corridor can deliver a greater level of access and movement to future local communities, with the provision of fully segregated active travel solutions.	
Further design detail of safe prioritised active modes crossings across multi-lane roundabouts should be addressed at subsequent detail design stages. Future design phases need to ensure safe crossing of the NAL.	
BUILT FORM	
3.1 Align corridors with density	Locate stations/stops and corridors within walking distance of higher density development to facilitate modal shift, support commercial and mixed use centres and contribute to vibrant, active urban environments.
The proposed cross sections for Access Road provides for active modes to access the SH16 Main Road active mode facilities which will connect to the proposed RAMC, proposed town centres and RTC Stations. Access Road will also connect to the active mode facilities on the proposed Alternative State Highway.	
3.2 Corridor scaled to the surrounding context and urban structure	Align the speed, type and scale of transport corridors and infrastructure with the environment that it moves through (appropriate scale to the context).
The corridor configuration and scale proposed provides an appropriate response to the potential needs of the adjacent area functions (access to and from adjacent built form and general spatial layout).	
The proposed Access Road Upgrade includes a speed reduction together with separated active modes. It includes a posted speed limit of 60km/h through the urban FUZ-rural edge area and 50km/h through the business and industrial area.	

Principle	Explanation
3.3 Facilitate an appropriate interface between place and movement	Facilitate the opportunity for place as well as movement in corridors (people-oriented streets)
The proposed corridor cross section provides a flexible platform to address the opportunity for place as well as movement function with clear allocation of street space, for example separated pedestrian and cycle facilities	
MOVEMENT	
4.1 Connect nodes	Provide tangible connectivity between identified activity nodes.
The proposed corridor alignment provides direct connectivity between the existing business / employment areas and community facilities located on the northern section of Access Road to the existing and expanded Kumeū Town Centre as proposed in Council's North West Spatial Land Use Strategy and the proposed Rapid Transit Station.	
4.2 Connect modes	Provide for choice in travel and the ability to connect at interchanges between modes.
The Access Road typical cross sections provide for separated active modes that connect to the proposed upgrade of SH16 Main Road, which in turn will connect to the Regional Active Modes Corridor. It is part of the North West Strategic package that provides future connectivity for all modes (walking, cycling, public transport and private vehicle).	
4.3 Support access to employment and industry	Align the corridor location and typology to provide direct and efficient access to areas of employment and industry.
The proposed corridor alignment provides direct and legible access to the business / employment areas in the Kumeū-Huapai township.	
4.4 Prioritise active modes and public transport	Provision of quality active mode corridors and dedicated public transport corridors to enable a modal shift away from private vehicle use.
The proposed corridor cross section accommodates active mode travel facilities to support a shift away from private vehicle use.	
4.5 Support inter-regional connections and strategic infrastructure	Consider the location and alignment of significant movement corridors and placement of infrastructure (power, wastewater, water) to the network.
Access Road is a key north south corridor in the eastern edge of the FUZ connecting the Town Centre with the ASH, Tawa Road Interchange.	
4.6 Support legible corridor function	Consider how areas can be clearly navigated and understood by users moving from place to place.
The proposed cross section for the corridor accommodates a range of modes with clear allocation of street spaces and inherently supports future community connectivity, mobility and travel choice.	
LAND USE	
5.1 Public transport directed and integrated into centres	Locate rapid transit interchanges within centres (local, town and metro) to support a mix of uses and provide modal choice to a larger number of users.
This principle is not relevant to the corridor.	
5.2 Strategic corridors as urban edges	Strategic corridors as potential definers of a land use edge.

Principle	Explanation
	Access Road is not a strategic corridor, but it will reinforce the urban edge of Kumeū Huapai. The typical cross sections illustrated in Figure 7-5 and Figure 7-6 above show the design integration with the rural character in the south east with drainage swales adjoining the rural zone and active modes adjoining the FUZ side. The urban section of Access Road has an urban form with active modes and street trees on both sides of the to the corridor.

7.4 Summary of Urban Design Evaluation and Recommendations for the Access Road Upgrade

Overall, the proposed Access Road Upgrade is generally supportive of the Design Framework principles. A number of urban design outcomes are shown in blue in Figure 7-7 below. These are recommended to form a part of the Urban and Landscape Design Master Plan (ULDMP) in future delivery stages. This is to ensure the detailed design of the corridor responds appropriately to the principles and the project specific urban design outcomes sought.

The ULDMP should include the following Project specific outcomes as illustrated in Figure 7-7:

Develop an urban interface approach within the corridor that:

- Addresses permeability of the corridor for active modes including cross corridor connectivity (midblock crossings), modal priority and permeable access to destinations such as open spaces and community facilities.
- Access Road / Tawa Road is located on the edge of the Rural Urban Boundary and adjoins the FUZ. At the detailed design stage further consideration should be given to minimising the impact on the established rural identity, form and layout of the southern side of the corridor.
- Responds to the changing built form interface, responds to the spatial character of adjacent development and access between the corridor and adjacent development.
- Further design details will need to be developed to demonstrate safe active mode crossings for a multi-lane roundabout and safe crossing of the NAL.
- Mana whenua will be invited to provide input into the development of the ULDMP, in particular, relevant cultural landscape and design matters including how desired outcomes reflect their identity and values.
- The earthworks batters for the proposed upgrade could potentially impact on heritage structure (CHI item16377) located at 211 Access Road which relates to sheds, railings and gates. Further design refinement is recommended at the next stage to reinstate the fence line.
- Landscape plans that considers recommendations from the landscape and visual, flooding and ecological assessments including street tree and stormwater wetland planting, construction compound and private property reinstatement, treatment of batter slopes. The landscape plans should also demonstrate integration with the Kumeū River. The landscape outcomes should reinforce the wider vegetation patterns of the local landscape and create connections to proposed Greenways and the wider walking and cycling network.

Further urban design opportunities in the Project area have also been identified in Figure 7-7 are shown in orange. These opportunities are not required to mitigate the Project's urban design effects but could be considered by the requiring authority or other parties at future stages of design and development.

7.5 Access Road Upgrade – Urban Design Outcomes and Opportunities

The urban design outcomes that have been identified are shown in blue and summarised in section 7.4 above.

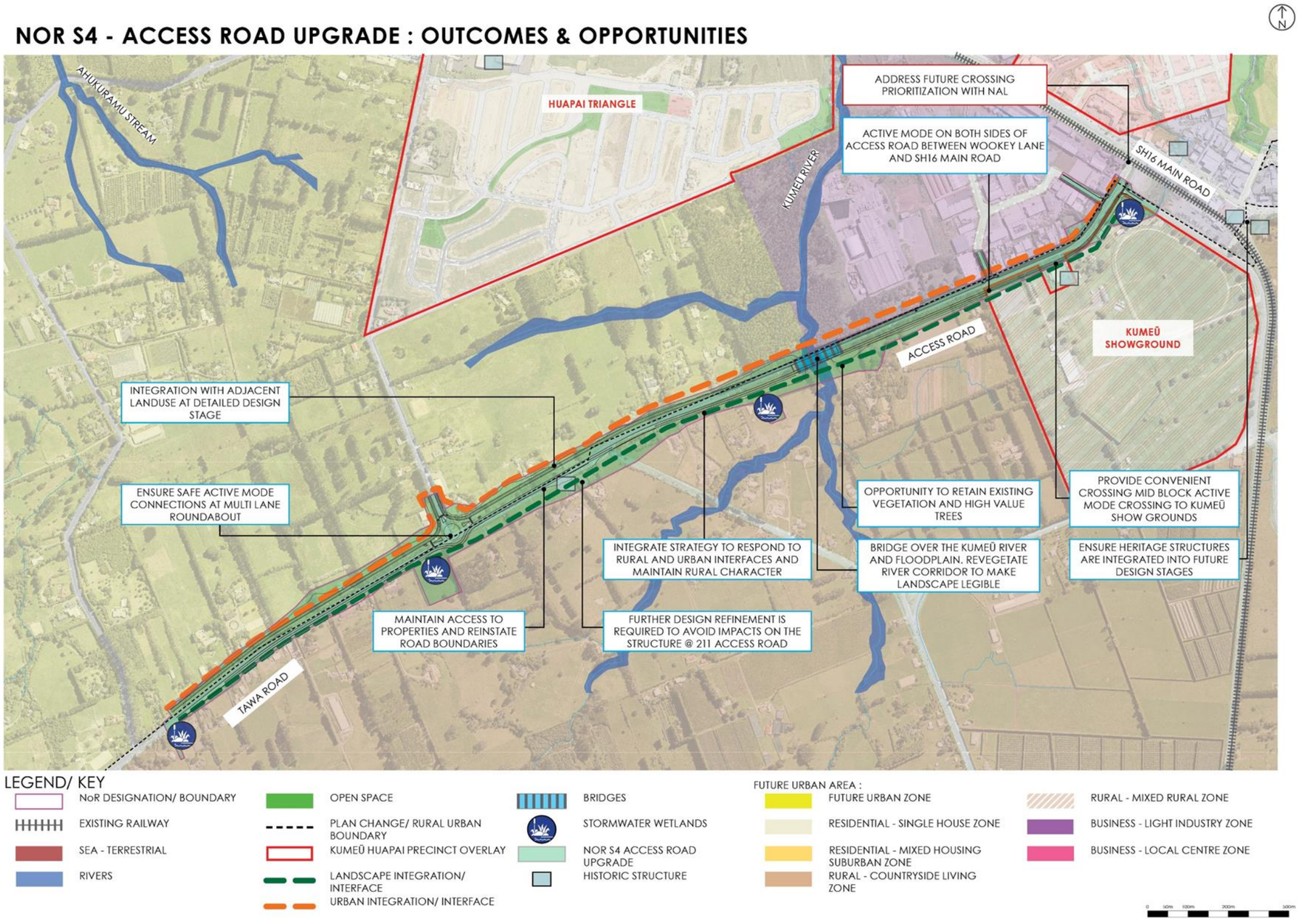


Figure 7-7: Access Road Upgrade urban design outcomes and opportunities

ATTACHMENT 58

CULTURAL IMPACT ASSESSMENT

CULTURAL IMPACT ASSESSMENT

FOR

TE TUPU NGĀTAHI NORTH WEST PROJECT (LOCAL AND STRATEGIC TRANSPORT NETWORK)

PREPARED FOR

TE TUPU NGĀTAHI

DECEMBER 2022

Ref. TKITT000054

Te Kawerau Iwi Tiaki Trust
PO Box 59-243 Mangere Bridge Auckland
www.tekawerau.iwi.nz

TE KAWERAU A MAKI

"Kawerau Iwi, Kawerau Mana, Kawerau Tangata"

Report No.	TKITT000054		
Prepared by:	Edward Ashby	Mana Taiao Manager	
Date of issue:	07 December 2022		
Revision:	Version 2		

EXECUTIVE SUMMARY

The North West Project proposes to upgrade and develop new sections of the local and strategic transport network extending from Whenuapai through Westgate and Brigham Creek to Waimauku. A significant element of the project is the Alternative State Highway (ASH) from Brigham Creek to western Huapai. The project sits within and across an important cultural landscape at the crossroads between the Hikurangi, Waitematā, and Kaipara Valley takiwa. It is the northern part of Te Kawerau ā Maki's heartland and contains a number of significant cultural sites and resources from our most ancient traditions through to our major Treaty settlement redress. A total of 51 cultural sites and resources were identified across the wider project area. The project was assessed against these sites and resources resulting in the documenting of eight significant adverse effects, 15 minor adverse effects, three negligible adverse effects, one potential significant beneficial effect*, one minor beneficial effect*, and 25 neutral effects. Where adverse effects were identified offsets (or further mitigation) were suggested. The significant adverse effects relate to the removal of productive topsoil, impacts to fresh water (including the taniwha), impacts to the Kumeū River (including the taniwha), impacts to fish species, setting impacts to Nga Rau Pou ā Maki, impacts to Pukewhakataratara, impacts to Wai paki i rape ō Ruarangi, and impacts to the cultural landscape. There is particular concern regarding a strategy of supporting urban growth in a flood prone catchment that holds the most regionally significant topsoil in northern Auckland. Due to these sensitivities the iwi cannot support the ASH component of the project. Advice is provided on suggested limits and offsets, and recommendations are provided for the project overall.

PEPEHA

Ko Hikurangi te maunga

Ko ngā Rau Pou ā Maki ngā tohu whakahī

Ko te Wao Nui ā Tiriwa te ngahere

Ko te Manukanuka ā Hoturoa me te Waitematā ngā moana

Ko Waitākere te awa

Ko Tainui te waka

Ko Tawhiakiterangi te tupuna

Ko Te Kawerau ā Maki te iwi

Hikurangi is the mountain

The many posts of Maki (Waitākere Ranges peaks) are the markers

Te Wao nui ā Tiriwa is the forest

Manukau and Waitematā are the harbours

Waitākere is the river

Tainui is the canoe

Tawhiakiterangi is the person

Te Kawerau ā Maki is the tribe

CONTENTS

INTRODUCTION

1.0 Project Background

Te Kawerau Iwi Tiaki Trust ('the Trust') have been commissioned by Te Tupu Ngātahi (an alliance involving Waka Kotahi, Auckland Transport, BECA, AECOM, Bell Gully and Buddle Finlay) (hereafter the Client) to prepare a Cultural Impact Assessment (CIA) for proposed upgrades and new sections of the local and strategic transport network extending from Hobsonville/Whenuapai through Westgate and Brigham Creek to Kumeū, Taupaki and Waimauku. The proposed transport network project is known as the 'North West Project'.

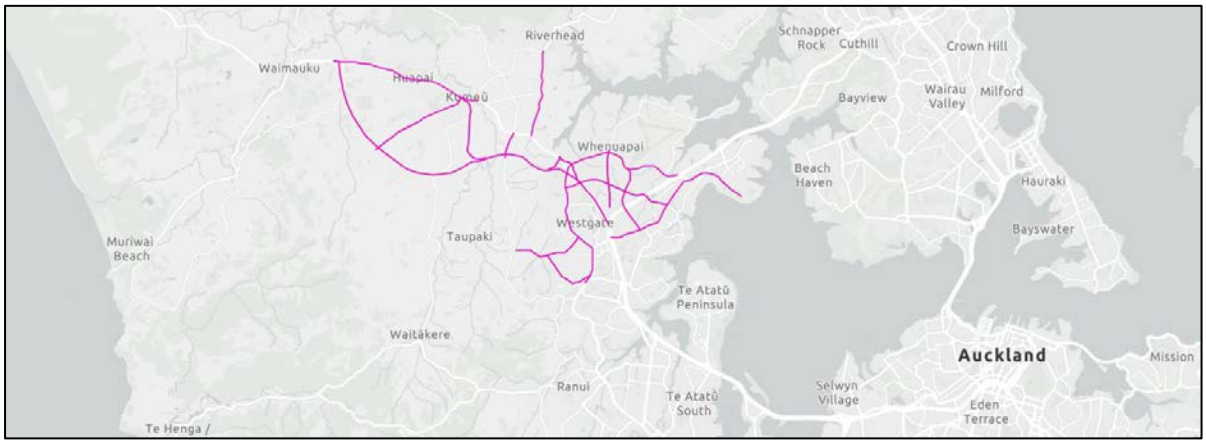


Figure 1: Plan showing Site regional context

The Client seeks to identify and protect the preferred transport network in Auckland's future growth areas. The wider strategy of Te Tupu Ngātahi is to support growth in housing and employment, to provide people with genuine travel choices, to address climate change by achieving transformative mode shift, and to address transport safety issues. For the North West Project the specific outcomes include an extensive walking and cycling network, 71km of bus lanes plus a rapid transit corridor to Kumeū-Huapai, safety upgrades, and state highway upgrades including an alternative route for State Highway 16. The network works will generally involve transport corridor widening/realignment, new corridors, bulk earthworks, bridge construction/stream crossings, stormwater management (e.g. ponds), vegetation removal/replanting, and installation of related infrastructure.

Specific to the 'strategic network' components of the North West Project are: the Alternative State Highway (ASH) route will include a new four-laned dual carriageway motorway and the upgrade of Brigham Creek Interchange; The SH16 main road (Main Rd) upgrade will include upgrading the existing corridor to a 24m wide urban corridor, including a 600m section of active mode only upgrade and realignment of Station Road to form a new signalised intersection with SH16; The development of a new rapid transit corridor (including the Regional Active Mode Corridor – RTC) and active mode corridor will be in one co-located corridor; The upgrade of Access Road (Access Rd) from a 20m width to a 30m four-lane cross-section with separated cycle lanes and footpaths on both sides of the corridor within the urban section and the north side within the rural section.

This CIA report has been prepared by the Trust as a legal entity of Te Kawerau ā Maki who are a mana whenua iwi of wider Tāmaki Makaurau (Auckland), but with particular lead interests in Hikurangi (West Auckland) and the Upper Waitematā Harbour. The purpose of this CIA report is to provide the Client and relevant statutory agencies with documentation of Te Kawerau ā Maki's cultural values, interests, and associations with the project area and its natural resources, and the potential impacts of the proposed project activities on these. This impact assessment also provides recommendations as to how to avoid, remedy or mitigate any potential cultural effects that arise from the project.

Te Kawerau ā Maki engagement in statutory processes including provision of technical advice for impact assessments is guided by our tikanga (customs and protocols) and mātauranga (tribal knowledge) and framed by Te Tiriti ō Waitangi, our Te Kawerau ā Maki Claims Settlement Act 2015, our Iwi Management Plan (IMP), and our organisational strategic values: Mana Motuhake (independence); Kaitiakitanga (guardianship and sustainable management); Whānaungatanga (people focused); Auahatanga (innovation); Mātauranga Māori (culture-driven).

2.0 Site Description

The project is situated in northern West Auckland/southwest Kaipara running from Hobsonville to Waimauku. It essentially runs along the low-lying alluvial plains between the Waitākere Ranges to the southwest, the Riverhead hill country to the north, and the Waitematā Harbour to the east. The project is situated primarily within the catchment of the Kumeū River. For the most part the project follows the alignment of SH16 and its various feeder roads, however the proposed Alternative State Highway crosses rural land to the west between the townships of Taupaki and Kumeū/Huapai.

The wider proposed project area (hereafter the Study Area) includes the entire alignment including the local and strategic network and a wider catchment of 4km radius from the project footprint. This wider area is appropriate for placing the project within its proper cultural landscape context and for capturing any potential setting impacts.

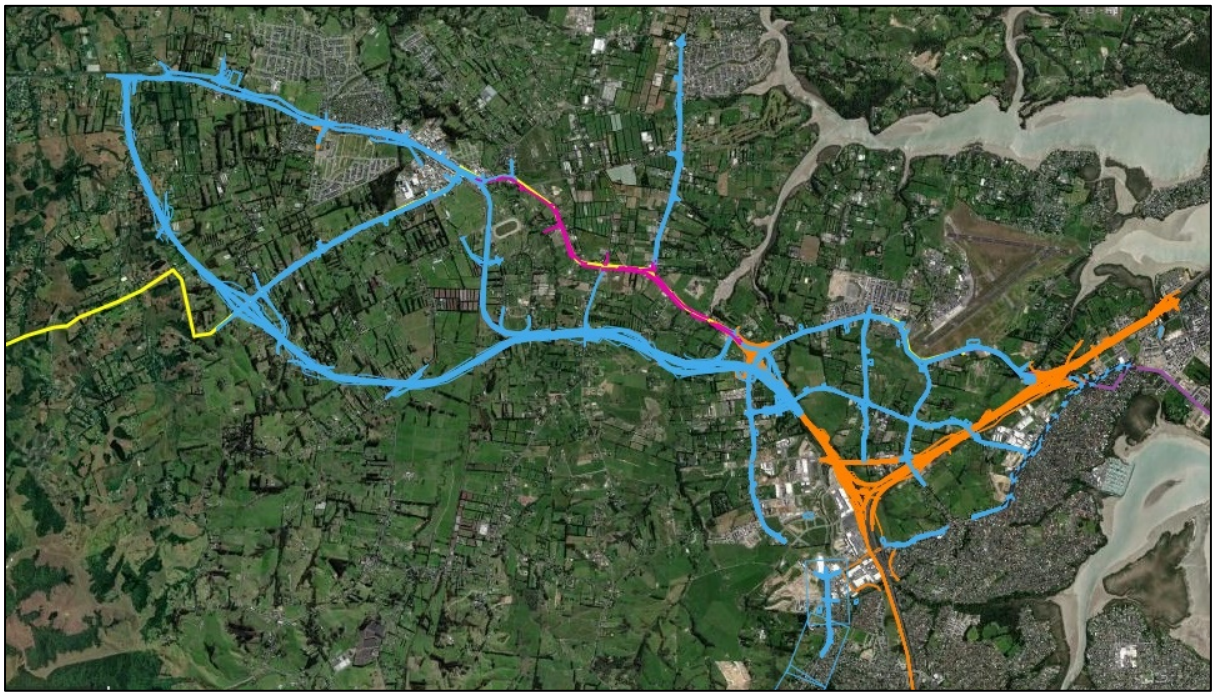


Figure 2: Plan showing Site (supplied by Client)

For the purposes of this report, the proposed project site (hereafter the Site) includes the local and strategic network footprint, including both its construction (including temporary compounds) and operational phases. Specifically this includes the Redhills, Riverhead, and Whenuapai 'arterials' as well as the strategic corridors known as ASH, Main Rd, RTC, and Access Rd.

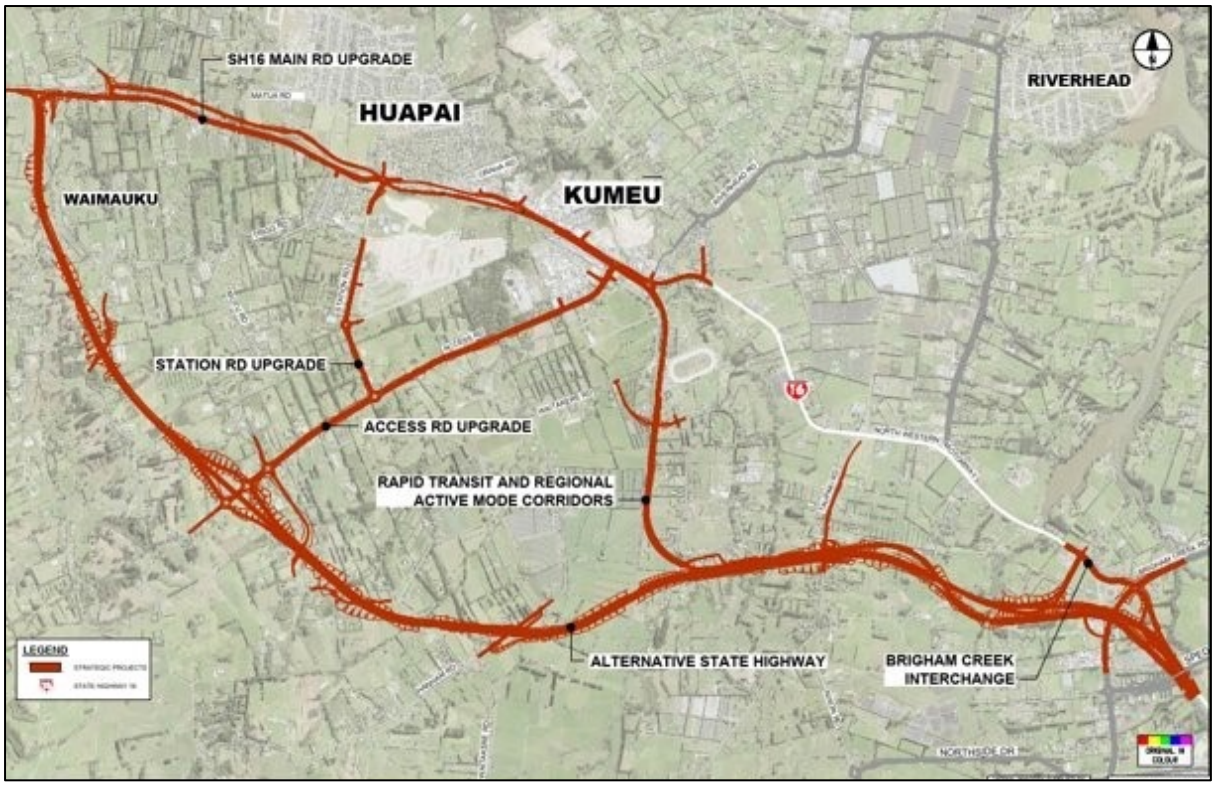


Figure 3: Plan showing Strategic Network (supplied by Client)

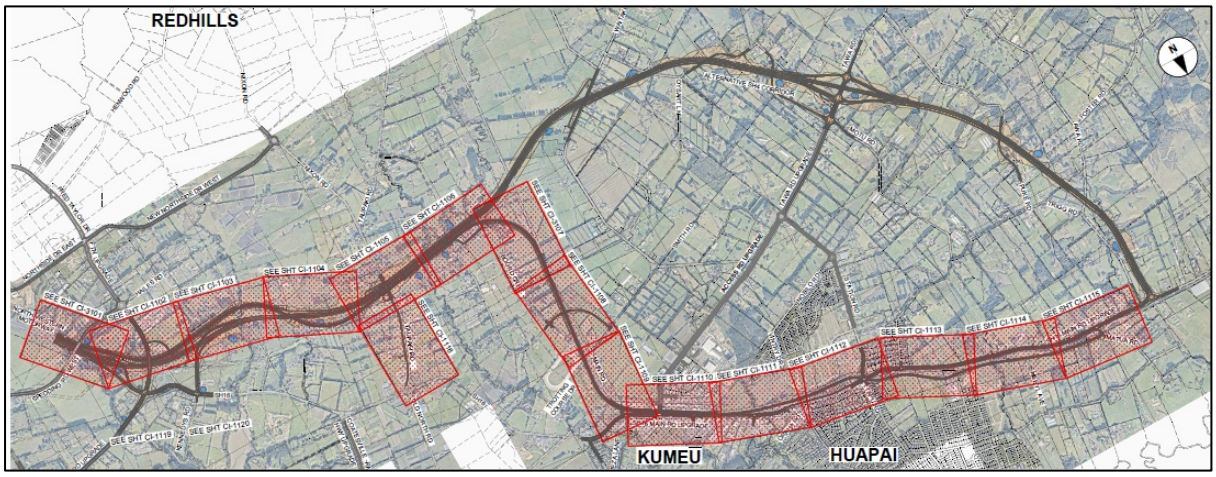


Figure 4: Plan of the Rapid Transit Corridor and Regional Active Mode (supplied by Client)

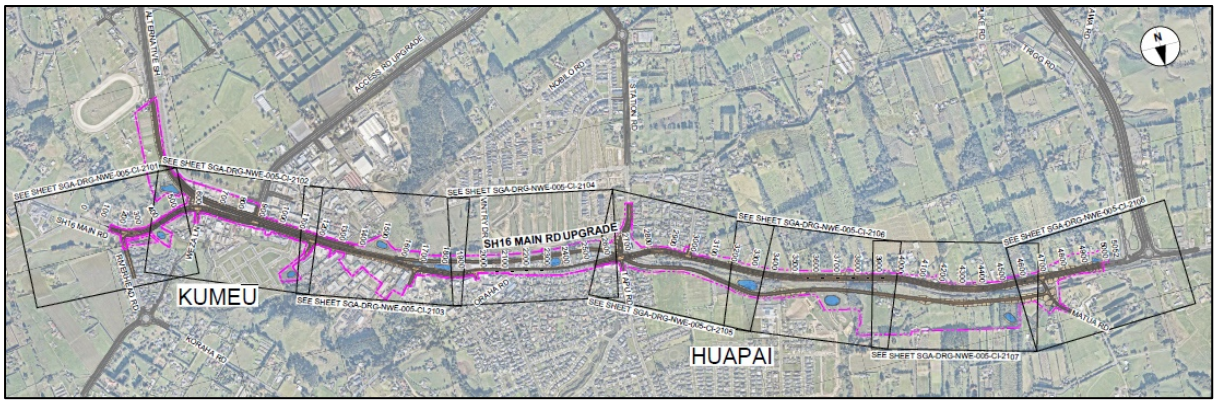


Figure 5: Plan of the SH16 Main Rd footprint (supplied by Client)

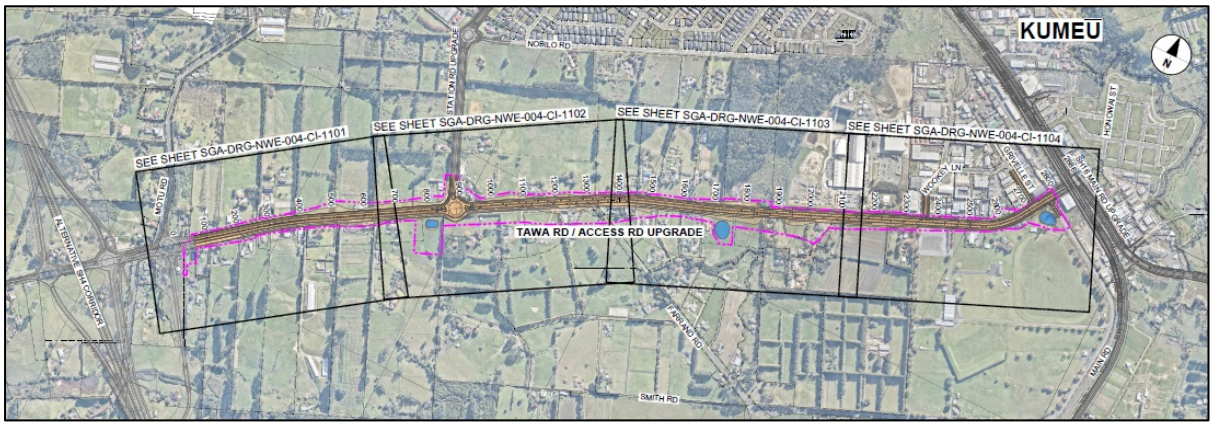


Figure 6: Plan of the Access Rd footprint (supplied by Client)

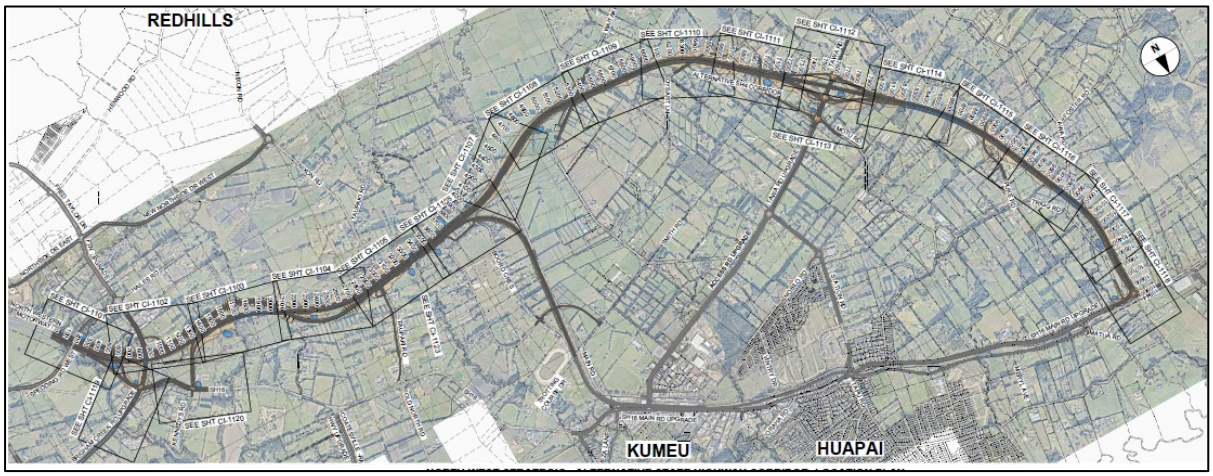


Figure 7: Plan of the Alternative State Highway footprint (supplied by Client)

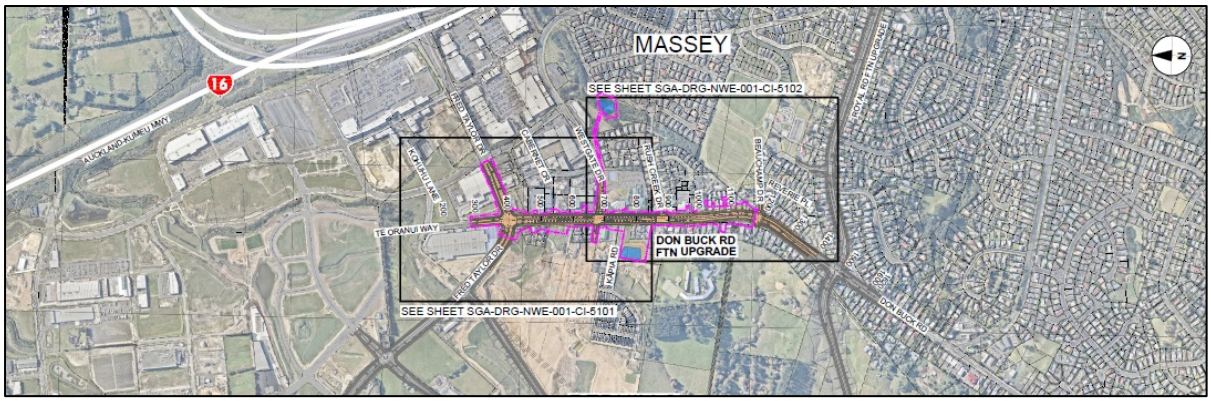


Figure 8: Plan of Don Buck Rd Local Network footprint (Supplied by Client)

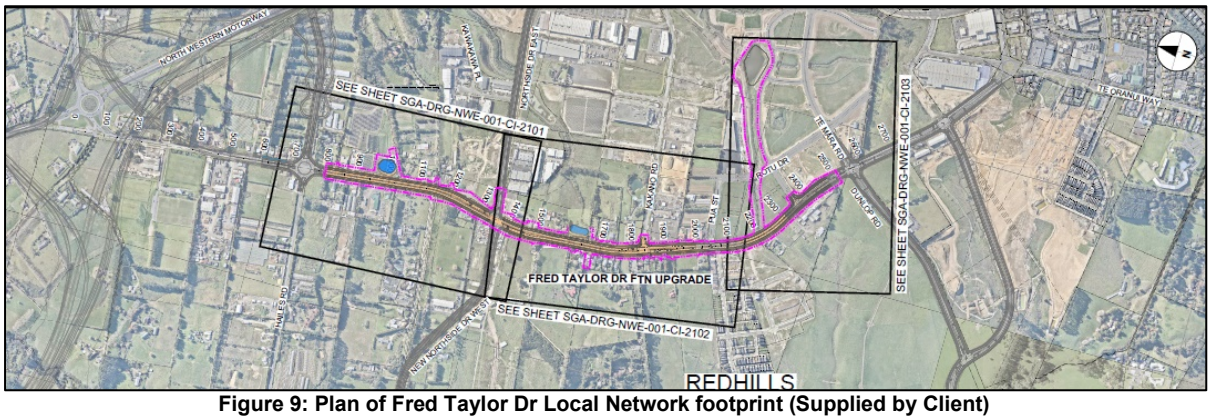


Figure 9: Plan of Fred Taylor Dr Local Network footprint (Supplied by Client)

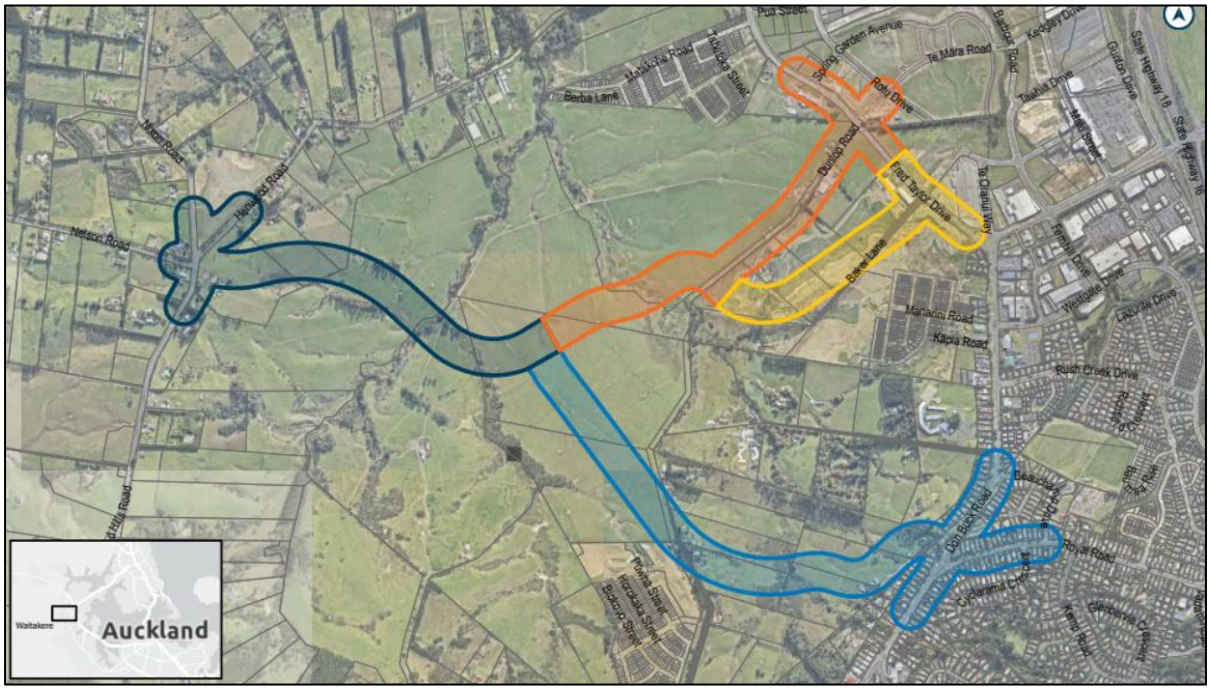


Figure 10: Plan of Red Hills Arterial footprint (Supplied by Client)

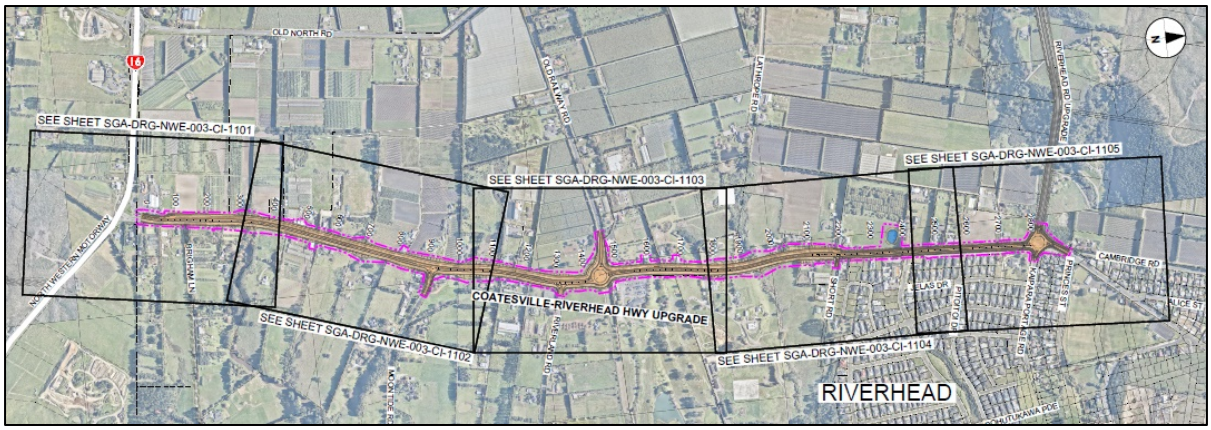


Figure 11: Plan of Coatesville-Riverhead HWY Local Network footprint (Supplied by Client)

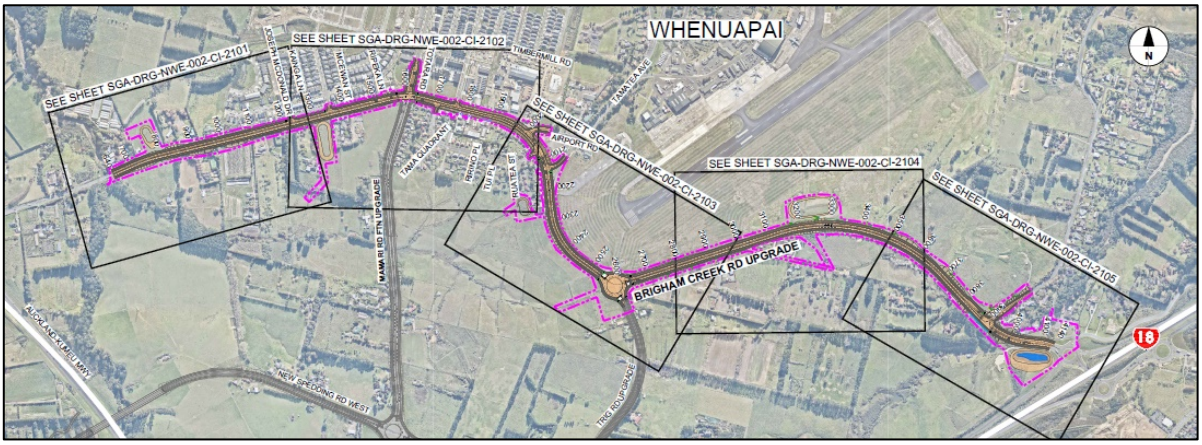


Figure 12: Plan of Brigham Creek Rd Local Network footprint (Supplied by Client)

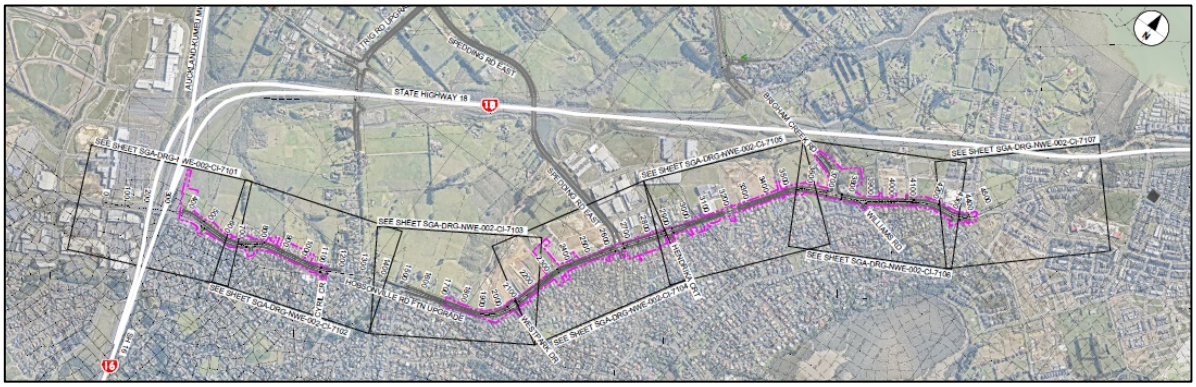


Figure 13: Plan of Hobsonville Rd Local Network footprint (Supplied by Client)

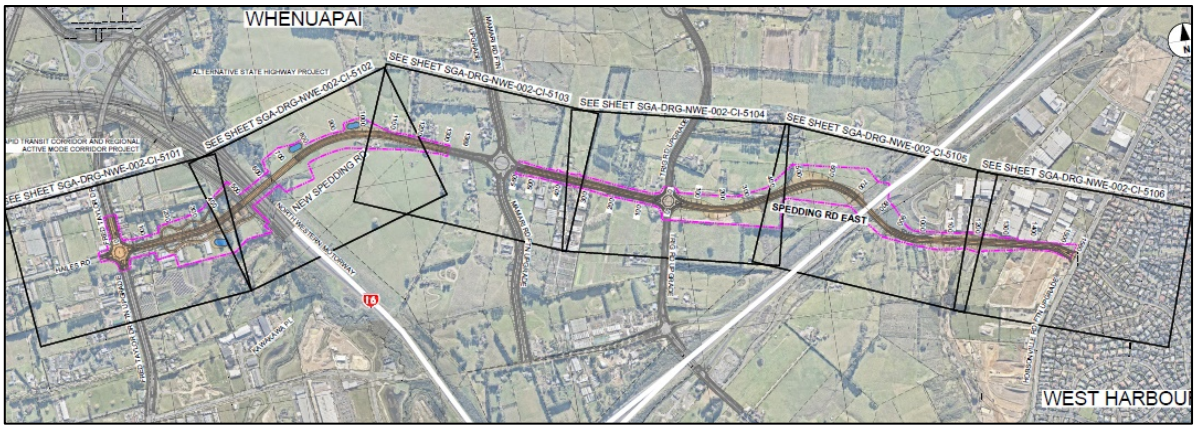


Figure 14: Plan of New Spedding Rd Local Network footprint (Supplied by Client)

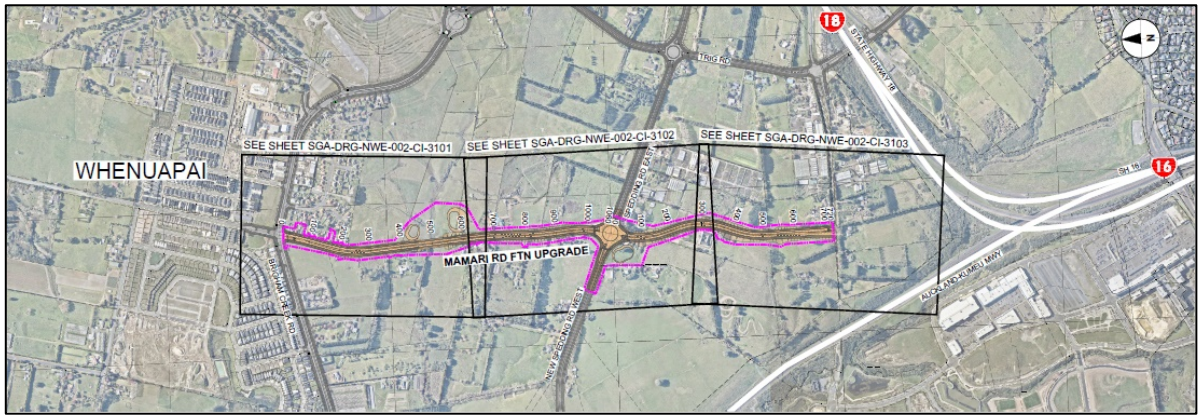


Figure 15: Plan of Mamari Rd Local Network footprint (Supplied by Client)

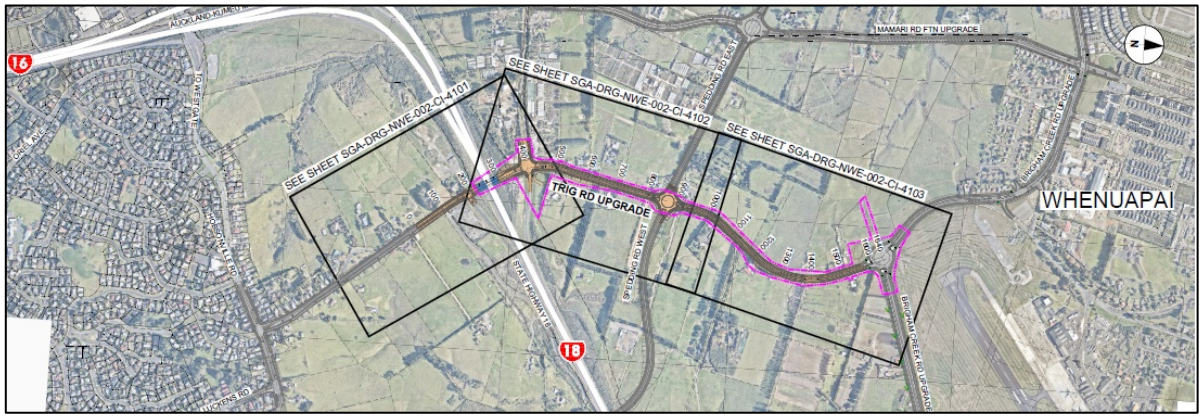


Figure 16: Plan of Trig Rd Local Network footprint (Supplied by Client)

Figure 17: Plan of Trig Rd Corridor footprint (Supplied by Client)

3.0 Aims and Objectives

The aim of this CIA report is to document Te Kawerau ā Maki's cultural values, interests, and associations with the Site; identify specific cultural sites and resources; assess the values of these sites and resources; identify the potential impacts that arise from project activities and assess the significance of effect; and provide recommendations as to how to avoid, remedy or mitigate the potential effects to Te Kawerau ā Maki.

This impact assessment will:

- provide a baseline of known environmental or natural features and resources that may hold cultural values;
- provide a statement of cultural association Te Kawerau ā Maki has with the Site and Study Area;
- identify any known cultural sites and resources within the Site or Study Area;
- describe the value or significance of such sites and resources;
- identify the potential for unrecorded cultural sites (i.e. buried Māori archaeology);
- identify the cultural constraints and risks associated with the Site and the potential significance of effects; and
- provide recommendations for further assessment where necessary and/or measures to avoid, remedy or mitigate adverse effects upon Te Kawerau ā Maki.

METHODOLOGY

4.0 Statutory Context

Te Tiriti o Waitangi

The key guiding document in any consideration of planning or practice that may impact upon the cultural values or wellbeing of Mana Whenua is Te Tiriti o Waitangi. The principles of the Treaty are recognised and provided for in the sustainable management of ancestral lands, water, air, coastal sites, wāhi tapu and other taonga, and natural and physical resources. The Treaty is articulated in law through an evolving set of principles. These include:

a. reciprocity
b. rangatiratanga
c. partnership
d. shared decision-making
e. active protection
f. mutual benefit
g. right of development
h. redress.

While Article 1 of the Treaty enables the Crown to govern and make laws, Article 2 guarantees Māori rangatiratanga over their people, lands and taonga (things of value). Māori values, associations and interests with their taonga applies regardless of property titles or other constructs, and the Treaty requires that the Crown actively protect these associations and interests (including through but not limited to statutes). Article 3 provides for equality and equity of citizenship and outcome.

Te Kawerau ā Maki Claims Settlement Act 2015

Te Kawerau ā Maki Claims Settlement Act (TKaMCSA) records the acknowledgements and apology given by the Crown to Te Kawerau ā Maki for historic grievances and breaches of Te Tiriti ō Waitangi and gives effect to provisions of the Deed of Settlement that settles the historical claims of Te Kawerau ā Maki. The Act binds the Crown to Te Kawerau ā Maki to work together in accordance with Te Tiriti. The Settlement as delivered through the Act provided both cultural and commercial redress to Te Kawerau ā Maki. This includes binding protocols between Government Ministries and Te Kawerau ā Maki (Part 2, s21 to s26), a recognised and agreed area of interest (Part 1, s12(2b), Part 1 of attachments to Act), and statutory acknowledgements and deeds of recognition (Part 2, s27 to s40, and Schedule 1).

Statutory acknowledgements require relevant consent authorities, the Environment Court, and Heritage New Zealand Pouhere Taonga to: (a) have regard to the statutory acknowledgement; (b) require relevant consent authorities to record the statutory acknowledgement on statutory plans and to provide summaries of resource consent applications or copies of notices of applications to the trustees; and (c) enable the trustees and any member of Te Kawerau ā Maki to cite the statutory acknowledgement as evidence of the association of Te Kawerau ā Maki with a statutory area. The statutory acknowledgement supports Te Kawerau ā Maki trustees being considered as affected persons in relation to an activity within the area under s95E and s274 of the Resource Management Act (1991), and s59(1) and 64(1) of the Heritage New Zealand Pouhere Taonga Act (2014).

Te Kawerau ā Maki Statutory Acknowledgement Areas are:

- Taumaihi (part of Te Henga Recreation Reserve)
- Motutara Settlement Scenic Reserve and Goldie Bush Scenic Reserve
- Swanson Conservation Area
- Henderson Valley Scenic Reserve

- Coastal statutory acknowledgement
- Waitākere River and tributaries
- Kumeū River and tributaries
- Rangitōpuni Stream and tributaries
- Te Wai-ō-Pareira / Henderson Creek and tributaries
- Motutara Domain (part of Muriwai Beach Domain Recreation Reserve)
- Whatipū Scientific Reserve

Heritage New Zealand Pouhere Taonga Act 2014

Statutory protection of Māori archaeology and wāhi tapu is provided for under the Heritage New Zealand Pouhere Taonga Act 2014 (HNZPTA), which is administered by Heritage New Zealand Pouhere Taonga (HNZPT), an autonomous Crown Entity. Under the Act all *in situ* materials, sites, and features older than 1900AD are considered archaeological sites whether previously recorded or not and are afforded automatic protection from damage, modification, or destruction without first obtaining an Archaeological Authority from HNZPT. Moveable objects and artefacts that are not *in situ* but that are from an archaeological context, or are of Māori origin, are controlled under the Protected Objects Act (1975). The HNZ Act S45(2)b stipulates that works on sites of interest to Māori can only occur if (a) the practitioners can demonstrate they have the requisite competencies for recognising and respecting Māori values, and (b) the practitioners undertaking the works have access to appropriate cultural support. Under the Act Mana Whenua are enabled to provide advice or assessment regarding the management or decision taking arising from impacts to their cultural sites, provided these meet the Act's criteria. It is noted that Te Kawerau ā Maki never ceded our sovereignty to govern our taonga to HNZPT and view the HNZPTA as overstepping its authority or role as the decision-maker over the taonga of Te Kawerau ā Maki, thus being in direct breach of Article II of Te Tiriti ō Waitangi.

Resource Management Act 1991

The Resource Management Act (RMA) 1991 provides statutory recognition of the Treaty of Waitangi and the principles derived from the Treaty. It introduces the Māori resource management system via the recognition of kaitiakitanga and tino rangatiratanga and accords Territorial Local Authorities with the power to delegate authority to iwi over relevant resource management decisions. The Act contains over 30 sections, which require Councils to consider matters of importance to tangata whenua. Some of the most important of these are:

- Take into account principles of the Treaty of Waitangi and their application to the management of resources (Section 8).
- Recognition and provision for, as a matter of national importance, the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, wāhi tapu and other taonga (Section 6(e)).
- Having particular regard to the exercise of kaitiakitanga or the iwi's exercise of guardianship over resources (Section 7(a)).
- Requiring the Minister for the Environment to consider input from an iwi/hapū authority when preparing a national policy statement (Section 46).
- The ability for local authorities to transfer their functions, powers or duties under the Act to iwi authorities (Section 33).
- Development of joint management agreements between councils and iwi/hapū authorities (Section 36B to 36E).
- Having regard to any relevant planning document recognised by an iwi/hapū authority (sections 35A(b), 61.2A(a), 66.2A(a), 74.2A).
- The obligation to consult with iwi/hapū over consents, policies and plans. (Combination of all the sections above and Clause 3(1)(d) of Part 1 of the first schedule of the Resource Management Act).

An assessment of impacts on cultural values and interests (CIA) can assist both applicants and the council in meeting statutory obligations in a number of ways, including:

- preparation of an Assessment of Environmental Effects (AEE) in accordance with s88(2)(b) and Schedule 4 of the Resource Management Act 1991 (RMA)
- requests for further information under s92 of the RMA in order to assess the application
- providing information to assist the council in determining notification status under ss95 to 95F of the RMA
- providing information to enable appropriate consideration of the relevant Part II matters when making a decision on an application for resource consent under s104 of the RMA, or when undertaking a plan change
- consideration of appropriate conditions of resource consent under s108 of the RMA.

It is noted that Te Kawerau ā Maki never ceded our sovereignty to govern our taonga to local authorities and view the RMA as enabling councils to overstep their authority or role as the decision-maker over the taonga of Te Kawerau ā Maki, thus being in direct breach of Article II of Te Tiriti ō Waitangi.

Reserves Act 1977 and Conservation Act 1987

Section 4 of the Conservation Act, which is invoked by the Reserves Act, states that the Act must be interpreted and administered as to give effect to the principles of the Treaty of Waitangi.

Public Works Act 1981

The PWA and its predecessor legislation have had a considerable negative impact upon Māori amounting to a breach of Te Tiriti Article II and international conventions. Te Kawerau ā Maki's last kāinga at Kōpironui was stolen by the Crown under the PWA in the 1950s leaving our people landless. While tacit protections for Māori land have been inserted into the PWA it remains a deeply problematic piece of legislation, both in terms of acquisition of land but also disposal of 'formerly' Māori land, that is not compliant with Te Tiriti o Waitangi or tikanga Māori.

5.0 Planning Policy Context

UN Declaration on the Rights of Indigenous Peoples

New Zealand supported the UN Declaration on the Rights of Indigenous Peoples (2007) in 2010. This support was an affirmation of fundamental rights and the aspirations of the Declaration. Article 11 states that indigenous peoples have the right to practise and revitalise their cultural traditions and customs, including the right to maintain, protect and develop the past, present and future manifestations of their cultures, such as archaeological and historical sites, artefacts, designs, ceremonies, technologies and visual and performing arts and literature (clause 1). States shall provide redress through effective instruments, which may include restitution, developed in conjunction with indigenous peoples, with respect to their cultural, intellectual, religious and spiritual property taken without their free, prior and informed consent or in violation of their laws, traditions and customs. (clause 2). Article 18 and 31 note that indigenous peoples have the right to participate in decision-making in matters which would affect their rights, through representatives chosen by themselves in accordance with their own procedures, as well as to maintain and develop their own indigenous decision-making institutions. Further that Indigenous peoples have the right to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions, as well as the manifestations of their sciences, technologies and cultures, including human and genetic resources, seeds, medicines, knowledge of the properties of fauna and flora, oral traditions, literatures, designs, sports and traditional games and visual and performing arts. They also have the right to maintain, control, protect and develop their intellectual property over such cultural heritage, traditional knowledge,
and traditional cultural expressions.

ICOMOS New Zealand Charter 2010

The International Council on Monuments and Sites (ICOMOS) is UNESCOs principal advisor in matters concerning the conservation and protection of historic monuments and sites and advises the World Heritage Committee on the administration of the World Heritage Convention (which includes provision of nationally significant heritage). The New Zealand National Committee (ICOMOS NZ) produced a New Zealand Charter in 2010 which has been adopted as a standard reference document by councils. The Charter sets out conservation purposes, principles, processes and practice. The scope covers tangible and intangible heritage, the settings of heritage, and cultural landscapes. Of particular relevance the Charter states that tangata whenua kaitiakitanga over their taonga extends beyond current legal ownership wherever such cultural heritage exists. The Charter also states that the conservation of Māori heritage requires incorporation of mātauranga and therefore is conditional on decisions made in association with tangata whenua and should procced only in this context.

National Policy Statement for Freshwater Management 2020

The NPS for freshwater management provides national policy settings that relevant statutory agencies including local authorities must comply with. Central to the NPS is the concept of Te Mana ō Te Wai set out in s1.3. This is an aspirational concept that means that the integrity (physical and spiritual) of all water is upheld to its highest possible quality or state. The Crown's interpretation of the concept is that the fundamental importance of water is recognised and that by protecting the health of freshwater we protect the health and well-being of the wider environment, including by protecting wai mauri, and the restoration of the balance between water, the environment, and communities. It provides six principles for the management of water (s1.3(4)). Relevant to tangata whenua are: (a) Mana whakahaere: the power, authority, and obligations of tangata whenua to make decisions that maintain, protect, and sustain the health and well-being of, and their relationship with, freshwater; (b) Kaitiakitanga: the obligation of tangata whenua to preserve, restore, enhance, and sustainably use freshwater for the benefit of present and future generations; (c) Manākitanga: the process by which tangata whenua show respect, generosity, and care for freshwater and for others. Policy 2.2(2) states that tangata whenua are actively involved in freshwater management (including decision-making processes), and Māori freshwater values are identified and provided for. Policy 2.2(3) requires that freshwater is managed in an integrated way that considers the effects of the use and development of land on a whole-of-catchment basis, including the effects on receiving environments. Section 3.4 sets out how councils must actively involve tangata whenua in the management of fresh water.

Auckland Unitary Plan

At a Local Government level, the Auckland Unitary Plan (AUP) provides for the protection and management of matters of importance to Mana Whenua including the environment and cultural heritage. These matters are set out in the Regional Policy Statement Chapter B6, but are also embedded in the lower-order policies and rules throughout the Plan.

Policy B6.2.2 provides for the recognition of Treaty of Waitangi/Te Tiriti ō Waitangi partnerships and participation. This includes Policy B6.2.2(1) that provides for Mana Whenua to actively participate in the sustainable management of natural and physical resources including ancestral lands, water, sites, wāhi tapu and other taonga.

Policy B6.3.2 deals with recognising Mana Whenua values and includes clause (1) that enables Mana Whenua to identify their values associated with ancestral lands, freshwater, biodiversity, and cultural heritage places and areas, and clause (2) that requires the integration of Mana Whenua values, mātauranga and tikanga in the management of natural and physical resources within the ancestral rohe. Clause (3) ensures that any assessment of environmental effects for an activity that may affect Mana Whenua values includes an appropriate assessment of adverse effects on those values. Clause (6) of the policy requires resource management decisions to have particular regard to potential impacts on: the holistic nature of the Mana Whenua world view; the exercise of kaitiakitanga; mauri; customary activities; sites and areas with significance spiritual or cultural heritage value; and any protected customary right under the Takutai Moana Act (2011).

Policy B6.5.2 provides for the active protection of Mana Whenua cultural heritage. Clause (2) sets out a framework for identifying and evaluating Mana Whenua cultural heritage using the assessment factors of: mauri; wāhi tapu; kōrero tūturu; rawa tūturu; hiahiatanga tūturu; and whakaaronui o te wā. Clause (4) requires the protection of places and areas listed in Schedule 12 Sites and Places of Signifiance to Mana Whenua from adverse effects. Clause (7) provides for the inclusion of a Māori cultural assessment in structure planning and plan change processes, and clause (9) encourages appropriate design, materials and techniques for infrastructure in areas of known historic settlement and occupation.

Iwi Management Plan

Te Kawerau ā Maki Resource Management Statement (1995) was lodged with Council explicitly as an iwi authority planning document under sections 66(c) and 74(b) of the RMA 1991 (since repealed). The IMP describes the continuing role of Te Kawerau ā Maki as kaitiaki (guardians) and provides policies to guide statutory authorities and applicants. Policy 2.2(2) promotes the integration of Te Kawerau ā Maki tikanga in resource management, while clause (3) requires engagement by all agencies within the rohe to help give effect to the kaitiaki role of the iwi. Policy 4.1.2(3) requires that cumulative effects upon Te Kawerau ā Maki are fully recognised and provided for. Policy 4.2.2 concerns Te Kawerau ā Maki cultural heritage and requires the protection of all heritage sites including access requirements (s4.2.2(1)); the involvement of Te Kawerau ā Maki in all instances where potential effects may arise (s4.2.2(2)); and the recognition of Te Kawerau ā Maki cultural and spiritual values (s4.2.2(3 and 4)). Policy 4.3.2 concerns the management of kōiwi, while s4.4.2 regards the management of water. Activities in the Coastal Marine Area are covered by s4.5.2. Waste management policies are described in s4.6.2 and land and landscape policies are set out in s4.7.2. Indigenous flora and fauna policy settings are described in s.4.8.2 including opposition to all destruction of native flora and fauna without Te Kawerau ā Maki written consent. Policy 4.9.2 concerns Te Kawerau ā Maki participation in design of the built environment and interpretation of heritage. The IMP also details formal support and adoption of the 1993 Matātua Declaration on cultural and intellectual property rights of indigenous peoples.

6.0 Te Ao Māori

Our worldview is the framework by which we understand and navigate our physical and metaphysical environment. A full account of the cosmological underpinnings of Te Ao Māori is not offered here but in brief it recognises both the spiritual and the physical, is guided by different domains governed by atua or distinct spiritual entities, and involves several core concepts including whakapapa, mana, wairua, mauri, tapu, and noa. Te Ao Māori places emphasis on the holistic link between people and the environment. Mātauranga is the knowledge or wisdom about the world developed over generations and passed down from tūpuna, while tikanga is the evolving set of principles and customary practices by which Māori give effect to this knowledge to navigate the world safely.

Papatūānuku

The primordial goddess embodying the whenua or land. She is the earthmother to all living things. This whakapapa is one of the reasons why whenua is the name for placenta as well as land, and why in Te Ao Māori tangata whenua belong to the whenua and not the other way around. Papatūānuku is a source of rejuvenation and life.

Ranginui

The primordial god embodying the sky or heavens. He is the skyfather to all living things. When he was separated from his wife Papatūānuku by their children, his tears became the rain which is considered tapu until it reaches the ground (wai Māori).

Tūmatauenga

The god of war and human activities and a progenitor of humanity.

Tāwhirimātea

The god of weather including thunder, lightning, wind, clouds and storms. He was opposed to the forced separation of his parents Papatūānuku and Ranginui and therefore he wars with his brothers and their descendants to this day.

Tāne

The god of forests and animals and an originator and protector of humans. Responsible for separating the embrace of his parents and ushering in Te Ao Marama (the age of light).

Tangaroa

The god of the sea, lakes, rivers and animals that live in them. There is a close and sometimes contentious relationship between Tangaroa and Tāne reflected in creatures such as reptiles and whales and in the dynamic between the sea and the coastline.

Rongo

The god of cultivated plants and agriculture also associated with peace.

Haumia-tiketike

The god of uncultivated plants and wild foraging.

Matā-oho

The local god of volcanic activity and earthquakes that formed the Tāmaki volcanic field.

Whakapapa

The sacred genealogy linking all things. Humans whakapapa not only to human tūpuna (ancestors), but also to the whenua, atua and their respective lineages. All indigenous animals and plants have an interconnected whakapapa. Whakapapa is a prerequisite of mana whenua, whānaungatanga, and kaitiakitanga.

Mana

A core metaphysical concept regarding the inherent authority or power of people, places or objects. Mana is derived or delegated from atua and, in the case of humans, is both inherited and earned through actions. Everything including people has an element or degree of mana. A person or tribe's mana can increase or decrease depending on the success, failure or nature of actions (or inactions) and is directly tied to their wellbeing. Undertaking the responsibilities of manakitanga and kaitiakitanga successfully are examples of maintaining or enhancing mana and contribute to cementing mana whenua.

Tapu

A core metaphysical concept regarding a state or degree of sacredness, prohibition, being set apart or forbidden. Tapu is a state where a person, place or thing is under the protection of or dedicated to an atua and is thus removed from profane or normal or common things and uses. Tapu is closely linked to mana and governs the behaviour of individuals and the wider society. Everything including people has an element or degree of tapu that must be preserved and respected. It is a priority of rangatira, tohunga and kaitiaki to maintain tapu and to ensure it is not diluted by common things. As with mana, the maintenance of tapu is directly linked to the wellbeing of both individuals and the tribe.

Noa

A core metaphysical concept regarding a normal or common (and sometimes profane) state that is in essence the opposite of tapu. Noa actions and things (whakanoa) can dilute tapu.

Wairua

A core metaphysical concept regarding the immortal spiritual or non-physical element of people, places or things.

Mauri

A core metaphysical concept regarding the essence that binds the physical and the spiritual together to enable life to exist and to thrive. Mauri is a sacred element and can be weakened or enhanced. When damaged or diluted the binding between the physical and the spiritual realms is weakened and life begins to falter and fail. It is the sacred obligation of mana whenua, through the act of kaitiakitanga, to maintain the balance of mauri within people, places, objects, ecosystems, and the hapū or iwi.

Mātauranga

The body of knowledge or customary wisdom and skill embedded within the tohunga, whānau, hapū and iwi. Mātauranga is passed down the generations from tūpuna but is also added onto through successive generations of uri, and culturally encodes hundreds of years of observations, measurements, theory, and custom regarding Te Ao Māori and the environment.

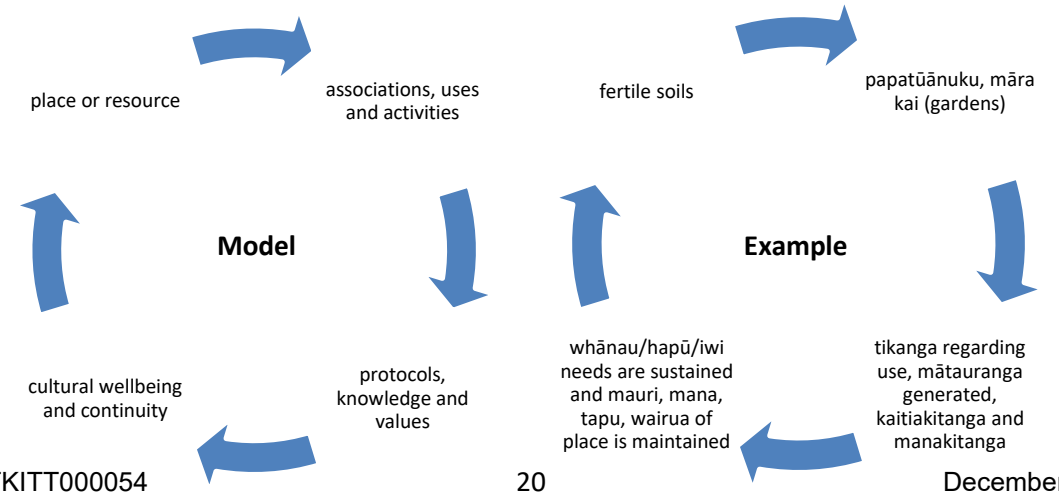
Tikanga

The lore, customs, practices, protocols, rules and methods that give effect to the application of mātauranga in navigating the natural and social world. There are different tikanga for different contexts and in different domains.

Cultural Values

Cultural values are the shared norms that govern the continuation of culture and provide the framework for social and individual actions. Key values include: rangatiratanga (chiefly authority or self-governorship), whānaungatanga (kinship and reciprocal connection through shared whakapapa), wairuatanga (spirituality), manakitanga (hospitality and showing care), and kaitiakitangata (guardianship or stewardship).

A model of how cultural values function is provided below.



7.0 Scoping and Consultation

The Study Area comprises a 4000m radius from the Site (from any point along its corridor). This radius is considered appropriate given the large scale of the Site and the presence of heritage sites within the catchment that could have setting or indirect impacts. Within this area all appropriate and known cultural sites, areas, landscapes and resources have been identified. Te Kawerau ā Maki however reserve the right to withhold certain information regarding wāhi tapu or sites that are culturally and spiritually sensitive to the iwi.

This report includes all known or appropriate-to-report elements of the natural and cultural environment within the Site and Study Area considered to hold cultural value for Te Kawerau ā Maki. This information forms the baseline of the assessment. This includes native biodiversity and ecology, geological and topographic features, natural resources including water bodies, built heritage such as marae, socio-cultural features such as papakāinga, cultural landscapes, historic or cultural sites, Māori archaeological sites, pou whenua and significant cultural public art.

Mātauranga/cultural knowledge of the Site and Study Area has been obtained, where appropriate, from Te Kawerau ā Maki kaumatua, kuia and other holders of knowledge within the iwi. Readily available published and unpublished written records, illustrations, maps, archaeological and geological records were reviewed during preparation of this cultural assessment. Spatially referenced heritage asset data was reviewed from the Auckland Council Cultural Heritage Inventory (CHI) and the New Zealand Archaeological Association (NZAA) recording scheme database (ArchSite). Other information, reports, and impact assessments available for the Site that have been provided by the Client have been reviewed including: engineering and design drawings of the route and a summary analysis of impacts identified from other disciplines. The opinions contained within this document may change and/or develop as new information is released.

This Cultural Impact Assessment involved a desktop study based on review of technical information, cultural knowledge of the area, and research, as well as site visits along the corridor to assess and confirm site conditions.

8.0 Assessment Approach

Following standard Environmental Impact Assessment (EIA) methodologies and planning terminology, but adapted for CIA purposes, this report will:

a. **Identify** the cultural sites, areas and resources (defined as both tangible and intangible cultural heritage, natural resources of cultural interest, and socio-cultural features) within a Study Area encompassing the proposed Site and a wider area that may be directly or indirectly impacted. The Study Area is defined as approximately 4000m radius of the Site to correspond with a likely area of setting impacts (e.g. noise, visual), indirect impacts, and a logical catchment of the cultural landscape.

b. Provide comment on the cultural **value** of the identified cultural sites, areas and resources. Māori cultural value is not derived from national or local policy but is defined and determined by tangata whenua and their particular world view and culture. Māori values are distinct from historic, archaeological or other value-systems, and are recognised by the courts and statute as their own legitimate knowledge-system with tangata whenua being the experts. Māori values are informed by whakapapa and guided by tikanga and kawa, with emphasis placed on the associative and living connection to places and resources which sustain cultural knowledge (mātauranga), practices, and spiritual and physical wellbeing. All cultural sites, areas and resources are of value to Te Kawerau ā Maki, who hold a holistic view of the environment and the unique relationship of the iwi to the whenua. It is difficult to apply a Western paradigm of value hierarchy or significance ranking (i.e. ‘low, medium, high’) when using a Te Ao Māori lens. Nevertheless, the methodology here attempts to distinguish the relative importance of matters as determined by a number of criteria, including the degree of mana, tapu or mauri, the degree to which a resource

has specific kōrero or mātauranga, its sensitivity to changes (ability to absorb impacts), and its relative scarcity. This approach recognises that a matters' value is intrinsic but relative to context. This approach is supported by RMA Part II matters noting the relationship of tangata whenua with their lands, waters, and taonga as nationally significant. The approach is set out below:

- high: cultural sites/areas/resources that retain their integrity overall, are either rare or are common but hold specific customary uses or mātauranga, are considered a wāhi tohu or landscape indicator, or have a high sensitivity to change.
- medium: cultural sites/areas/resources that retain the key elements of their integrity, are either uncommon or are common but hold specific customary uses or mātauranga, or have a moderate sensitivity to change.
- low: cultural sites/areas/resources that have been significantly degraded or damaged, are common and do not hold specific current customary uses or mātauranga, or have a low sensitivity to change.

Value is also assigned against the cultural values identified in the AUP Policy B6.5.2(2):

i. Mauri: the mauri (life force and life-supporting capacity) and mana (integrity) of the place or resource holds special significance to Mana Whenua;
ii. Wāhi Tapu: the place or resource is a wāhi tapu of special, cultural, historic, metaphysical and or spiritual importance to Mana Whenua;
iii. Kōrero Tūturu: The place has special historical and cultural significance to Mana Whenua;
iv. Rawa Tūturu: the place provides important customary resources for Mana Whenua
v. Hiahiatanga Tūturu: the place or resource is a repository for Mana Whenua cultural and spiritual values; and
vi. Whakaaronui o te Wa: the place has special amenity, architectural or educational significance to Mana Whenua.

c. Identify the potential **impacts** to cultural resources and elements. Only Mana Whenua can define the impact to their cultural values, but guidance is noted below. Cultural impacts can be:

- no change
- negligible: changes result in small impacts on integrity of the site/area/resource such that their function is reduced but not notably diminished, ability to understand/appreciate/use/access is impacted to a inconsequential degree, the ability to interpret the cultural landscape or setting is impacted but the change can easily be absorbed.
- minor: changes result in small impacts on integrity of the site/area/resource such that their function is reduced but not significantly diminished, ability to understand/appreciate/use/access is impacted to a small degree, the ability to interpret the cultural landscape or setting is impacted to a small degree or change can otherwise be largely absorbed.
- moderate: changes result in appreciable/significant impacts on the integrity of the site/area/resource such that their function is impeded, ability to understand/appreciate/use/access is impacted to a notable degree, the ability to interpret the cultural landscape or setting is impacted to a notable degree or change can otherwise not be absorbed.
- major: changes result in large scale/total impacts on the integrity of the site/area/resource such that their function is effectively destroyed, ability to understand/appreciate/use/access is impacted to a significant degree/is no longer possible, the ability to interpret the cultural landscape or setting is impacted to a significant degree or change can otherwise not be absorbed and the landscape or setting is no longer recognisable/able to function.

Impacts can be either adverse or beneficial. Impacts can also be temporary or permanent. They can occur during the construction or the operational phase of a development. Impacts can be:

i. direct (i.e. physical impacts resulting from a development, impacts to the settings of cultural sites or the character of cultural landscapes, visual, noise, odour, or culturally inappropriate land use activities).
ii. indirect (i.e. traffic congestion, erosion due to vegetation loss, or other secondary impacts that occur over time or in a secondary location to the original activity).
iii. cumulative (i.e. impacts which are caused by the combined result of past, current and future activities, or in-combination impacts).

d. Define the **significance of effect** resulting from combining the value of a cultural site, area or resource and the level of potential impact to that site, area or resource. Significance of effect is assessed pre-mitigation but can also be assessed again post-mitigation to ascertain the *residual effect* and effectiveness of any proposed mitigation. Significant effects (within a planning framework) are those with moderate or large effects (either adverse or beneficial). This method is outlined below in Table 1. Note that positive effects will be coloured green.

Table 1: Significance of effect

		LEVEL OF IMPACT				
		No Change	Negligible	Minor	Moderate	Major
CULTURAL VALUE	High	Neutral	Minor	Moderate	Large	Large
	Medium	Neutral	Negligible	Minor	Moderate	Large
	Low	Neutral	Negligible	Negligible	Minor	Moderate

9.0 Assumptions and Limitations

Te Kawerau ā Maki are the experts of our own culture and tikanga. This expertise and the equal weighting of mātauranga Māori evidence is accepted in the courts and by statute. Through a necessity to work within a Western planning framework we utilise planning language where possible to aid in mutual understanding, however there is difficulty in the translation and application of some core cultural concepts to such a framework. This is particularly an issue when segmenting or demarcating value spatially, when ascribing a type of significance hierarchy, and when limiting value to tangible elements, whereas Māori hold a holistic perspective that operates differently to typical Western paradigms. This means that where there is doubt or confusion over a term or point of discussion, readers should contact Te Kawerau ā Maki directly for clarification.

Due to the sensitive nature of certain cultural knowledge, areas and sites (e.g. burial grounds), Te Kawerau ā Maki reserves the right not to identify the exact spatial extents or provide full information of such areas to retain and protect this knowledge within the iwi. In other situations, while a general area may be known to be of cultural significance the exact spatial extent or location of the site may have been lost over successive generations. Where possible and appropriate, sites are described and defined to enable discussion of the impacts while acknowledging these limitations.

The environmental and archaeological data relied upon for elements of this report are derived from secondary sources and it is assumed the data and opinions within these and other secondary sources is reasonably accurate.

The CHI and ArchSite databases are a record of known archaeological and historic sites. They are not an exhaustive record of all surviving historic or cultural sites and resources and do not preclude the existence of further sites which are unknown at present. The databases also utilise a site location point co-ordinate system rather than detailing site extents or cultural landscapes.

ENVIRONMENTAL BASELINE

10.0 Topography and Geology

The Site is situated across the alluvial plains of the Kumeū River and Upper Waitematā Harbour, which crosses a number of underlying geological substrata. Near the mid-point of the network near Westgate this includes Waitematā Group East Coast Bays Formation being of "*Alternating sandstone and mudstone with variable volcanic content and interbedded volcaniclastic grits."* Near Whenuapai and Riverhead the underlying geology is of Late Pliocene to Middle Pleistocene pumiceous river deposits being of "*Pumiceous mud, sand and gravel with muddy peat and lignite: rhyolite pumice, including non-welded ignimbrite, tephra and alluvia*." Within the Kumeū basin the underlying geology is Holocene river deposits consisting of "*Sand, silt mud and clay with local gravel and peat beds.*" Near Waimauku and Huapai the underlying geology is Tauranga Group Middle Pleistocene - Late Pleistocene river and hill slope deposits being "*Predominantly pumiceous sand, silt, mud and clay, with interbedded gravel and peat.*"

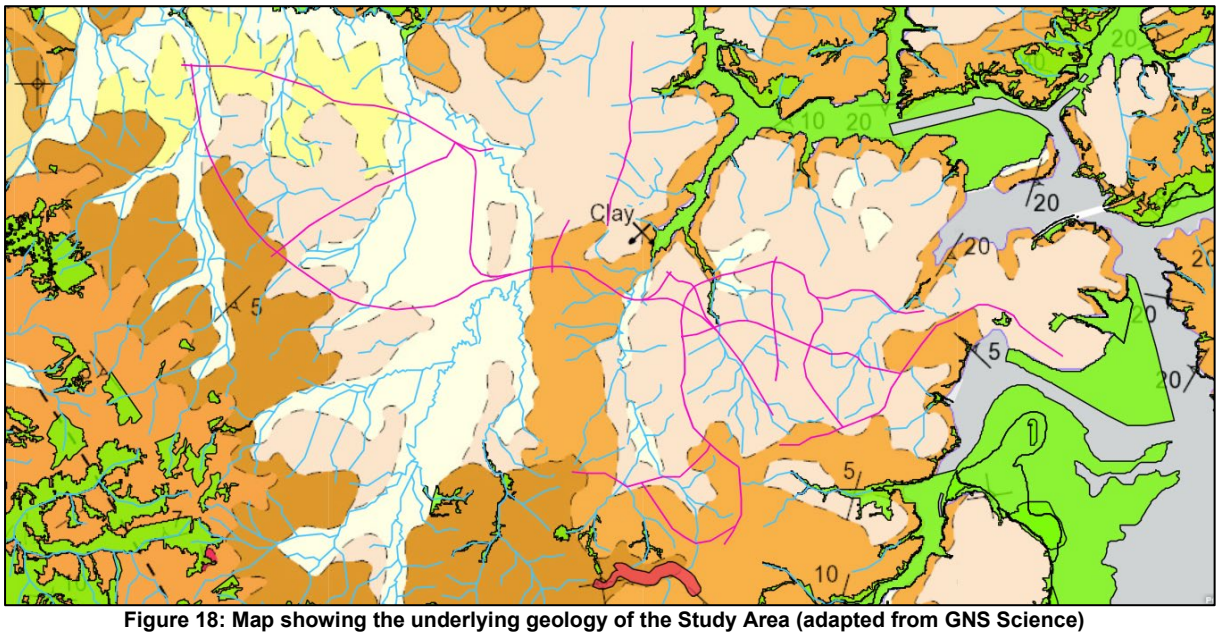


Figure 18: Map showing the underlying geology of the Study Area (adapted from GNS Science)

While all whenua is associated with Papatūānuku, alluvial soils are particularly valued due to their unique composition and higher organic content making them highly productive for horticulture, and thus containing a strong sense of mauri. The Land-Use Capability of these alluvial soils ranges from 1 (negligible limitations to horticulture) to 3 (moderate limitations to horticulture) meaning they are of very high productive quality, and in fact the largest area of high quality horticultural soils in northern Auckland.

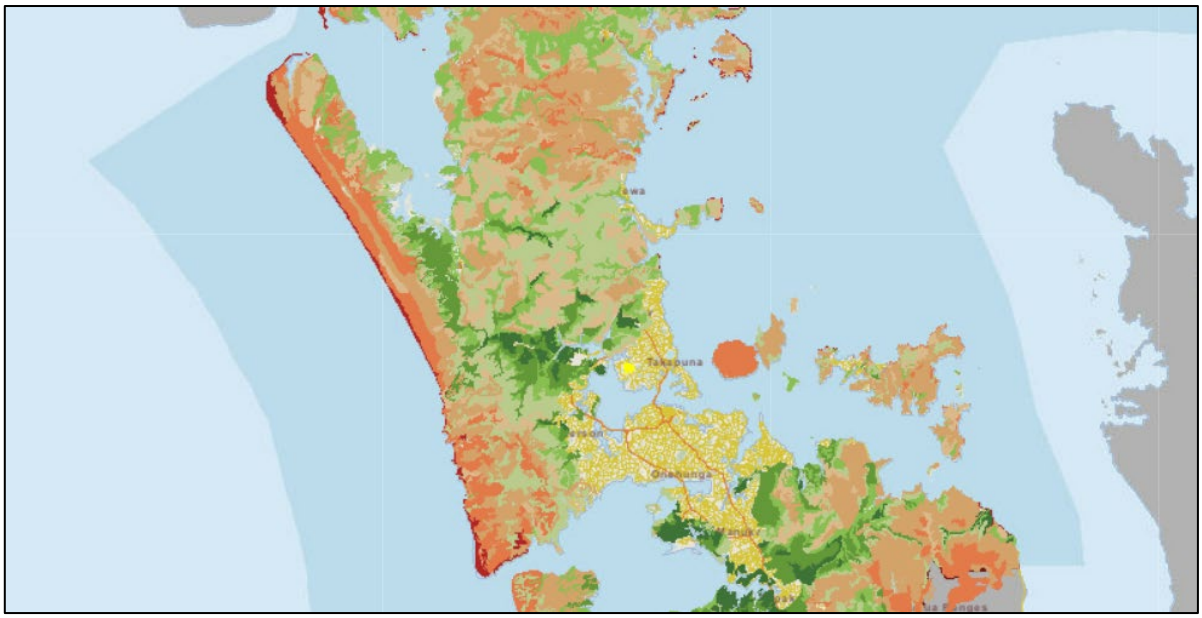


Figure 19: Land-use capability map showing high productivity within the Study Area (from Auckland Council)

The topography of the Site is low-lying alluvial plains for the most part, with steeper terrain to the south along the Waitakēre Ranges and to the north along the Riverhead hillcountry. The major drainage catchment is the Kumeū River but the Site also drains to Te Wai Roa ō Kahu (Upper Waitematā Harbour) and to Te Wai ō Pareira (Henderson Creek) via Manutewhau awa. The landscape is predominantly of an open rural (pasture) character but with areas of urban character at Whenuapai, Westgate, Kumeū and Huapai. There are no Outstanding Natural Features (ONFs) or Outstanding Natural Landscapes (ONLs) within or immediately adjoining the Site footprint, although ONLs are within the western part of the Study Area.

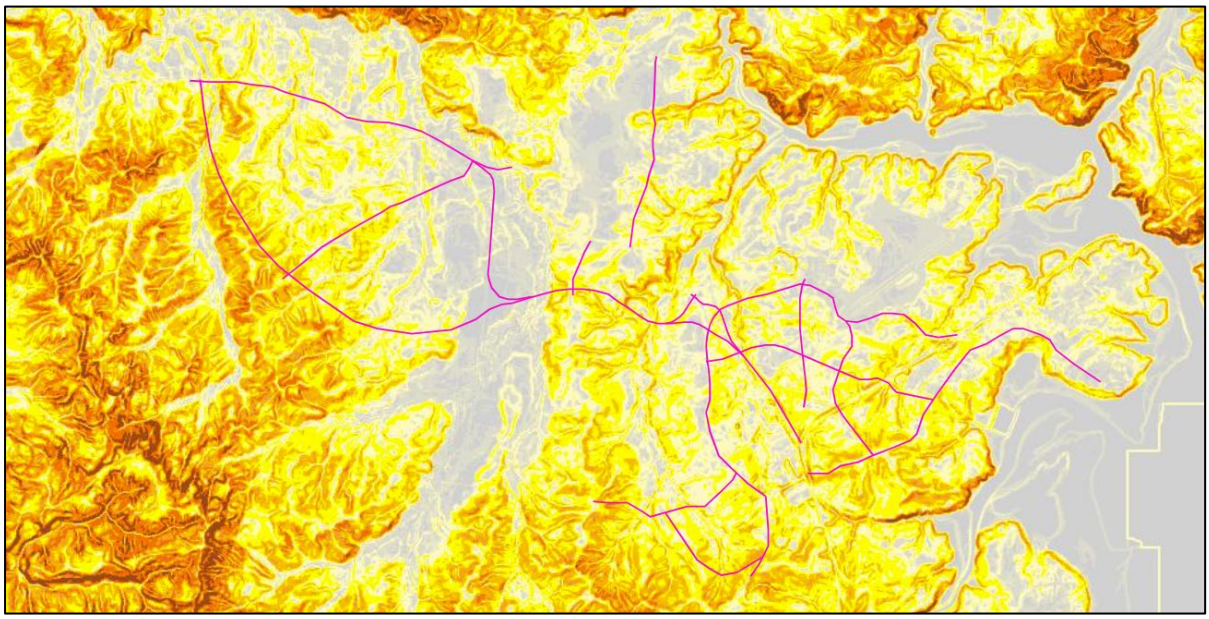


Figure 20: Map showing slope within the Study Area

11.0 Natural Resources and Ecology

Freshwater

The natural resources and ecology of the wider Study Area include significant freshwater ecosystems and habitat. This includes Te Waitematā, Te Wai ō Pareira (Henderson Creek), Wai Whauwhaupaku (Swanson Stream), Manutewhau awa (Massey-West Harbour), Wai huruhuru manawa (Massey), Wai Totora (Westgate), Wai Whakataratara (Westgate), Ngongetepara awa (Westgate-Whenuapai), Waiteputa (Westgate-Massey West), Taketakemanu awa (Westgate-Taupaki), Rawawaru (Whenuapai), Te Waiarohia ō Ngariki (Whenuapai), Pītoitoi awa (Brigham Creek), Te Wai Roa ō Kahu (Upper Waitematā Harbour), Rangitōpuni awa (Riverhead), Pakinui awa (Taupaki), Te Awa Kumeū, Ahukāramuramu awa (Waimauku), Waikoukou Awa (Waimauku), and the Te Awa Kaipara. In addition there are likely to be numerous wetland areas across the Study Area and Site. Freshwater and marine SEAs in the Study Area include SEA-M2-57b, SEA-M2-55a, and SEA-M2-56a.

The Site directly crosses a large number of (around 26 notable) rivers, streams or major tributaries most notably Te Waiarohia ō Ngariki, Wai Totora, Ngongetepara awa, Kumuū awa, and Ahukāramuramu awa.

The freshwater ecosystems within these waterways and waterbodies is not yet assessed (at the time of writing an ecological assessment was not available) but it is possible to include:

- indigenous fishes including tuna (eel), toitoi (bully), Īnanga, and kokopu
- indigenous freshwater invertebrates including mayflies, mud snails, dragonflies, freshwater mussels (kākahi), kōura (freshwater crayfish), and many others

Terrestrial

The natural resources and ecology of the wider Study Area include significant terrestrial ecosystems and habitat. This includes the Waitākere Ranges indigenous forest (Te Wao Nui ā Tiriwa) to the south and smaller pockets of vegetation Significant Ecological Area to the west and northwest. The Waitākere SEAs include old growth broadleaf and conifer forest of high biodiversity and habitat value across many endemic plant, fungi, invertebrate and vertebrate species. SEAs include: SEA_T_7036, SEA_T_2650, SEA_T_6381, SEA_T_6674, SEA_T_6743, SEA_T_2648, SEA_T_4866, and SEA_T_6540. There are also a number of scheduled trees within the Study Area and along the Site corridors including pohutakawa, kauri, rimu, tōtora, and karaka.

Generally, however the area is typified by exotic vegetation including large areas of ryegrass, kikuyu grass, and other pasture grasslands, as well as exotic trees including poplars, willow and other species but particularly pine at Riverhead.

The terrestrial ecosystems across the area are not yet assessed (at the time of writing an ecological assessment was not available) but it is possible to include:

- indigenous plants including tī kōuka, harakeke (flax), kauri, mānuka, kānuka, kahikatea, rārahu (braken fern), ponga, tōtora, rimu, pohutakawa, karaka, miro, tawa, mosses, liverworts and hornworts
- indigenous fungi including wood ear, sooty black mould, blue mushroom, and puffball
- indigenous herpetofauna including green gecko, forest gecko, copper skink, ornate skink, and although unlikely the Hochstetter's frog is found in the adjacent Waitākere Ranges

- indigenous invertebrates including earthworms (including giant North Auckland variety), wētā, grasshopper and many others

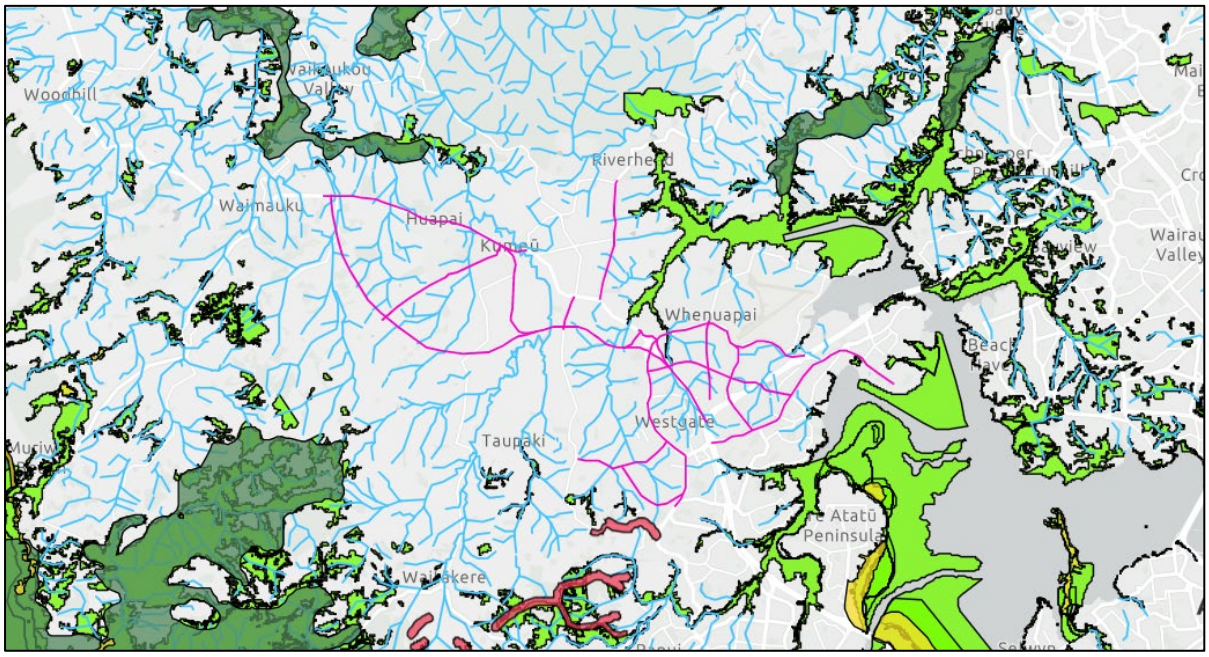


Figure 21: Map showing streams, significant ecological areas, and other natural features

Avifauna

As the Study Area covers marine, freshwater, forest, low-land plains, and hillcountry there are a wide variety of bird species as well as the native long-tailed bat (pekapeka) that interact with the area. The forested slopes of the Waitākere Ranges and Riverhead provide important roosting opportunity for bats as noted in the preliminary bat assessment carried out by the Client within a 10km radius of the Site. There are even several recordings of bats within the area we know as Ahipekapeka (west of Brigham Creek). The indigenous forest and SEAs to the south and west provide habitat for native birds such as tui, pīwakawaka, kereu, and ruru. The hillcountry and open plains provide habitat for kahu. The streams and coastal areas provide habitat for species such as tarāpuka (gull), takapu (gannet), kōtare (kingfisher), tōrea-pango (oystercatcher), poaka (stilts), pūtangitangi (paradise duck) and pūkeko. Importantly, several kawau (black shag or cormorant) have been spotted around Waimauku, Westgate, and the Upper Waitematā Harbour. The kawau is considered the kaitiaki of Te Kawerau's rohe.

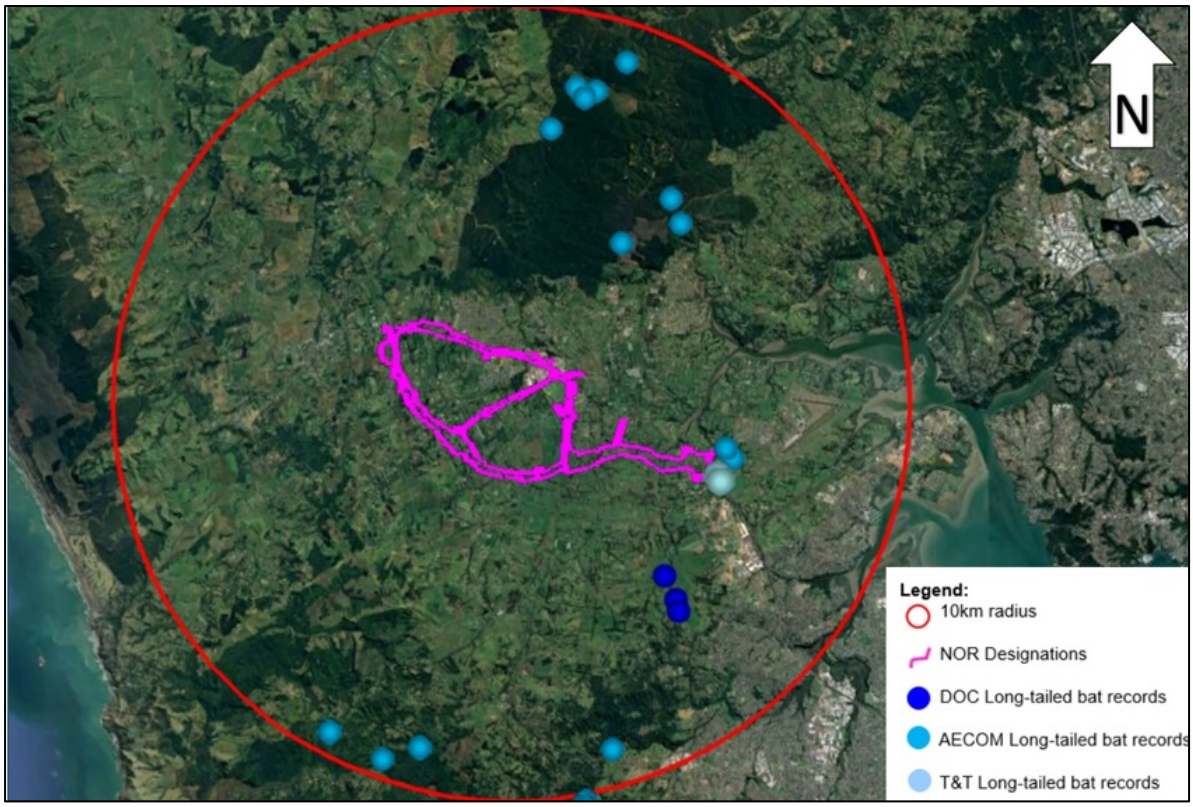


Figure 22: Map showing bat sightings within 10km of the Site (supplied by Client)

Figure 23: Image of a kawau (from NZ Birds Online)

15.0 Potential Direct Impacts

Direct impacts are likely to occur from bulk earthworks (permanent adverse), stream realignment (permanent adverse), works within a waterway (temporary and permanent adverse), construction and operational discharges to waterways (temporary and permanent adverse and beneficial), vegetation clearance (temporary and permanent adverse), noise pollution during construction of the Site network and operation of the ASH (temporary and permanent adverse), light pollution (permanent adverse), and changes to the setting of cultural sites (permanent adverse and beneficial),

16.0 Potential Indirect Impacts

Indirect impacts are likely to occur from vegetation clearance causing erosion (temporary adverse), severing habitat for terrestrial species during operation of ASH (permanent adverse), and subsequent large-scale urban intensification of the catchment enabled by the ASH (permanent adverse).

17.0 Potential Cumulative Impacts

Cumulative impacts are likely to occur from hydrological changes to the catchment (permanent adverse), net changes in stormwater contaminant discharges or quality (permanent adverse and beneficial), changes to the setting of and between wāhi tohu (permanent adverse), subsequent large-scale urban intensification of the catchment enabled by the ASH (permanent adverse), light pollution (permanent adverse), changes to the cultural landscape (permanent adverse and beneficial), and increased walking and cycling opportunities linked to human access and health and emissions (permanent beneficial).

18.0 Summary of Effects

Specific potential impacts identified as relating to the proposed project are included in Table 3 below:

Table 3: Summary of potential cultural impacts

Name	Summary of impact	Level of Impact	Significance of effect	Proposed mitigation	Residual effect	Offsetting
Waimauku-Whenuapai Cultural Landscape	Direct, indirect and cumulative permanent adverse construction and operation impacts arising from ASH including: Built form of ASH within rural setting Changes to the setting of and between wāhi tohu (visual, artificial lighting at night, audial, aural, spiritual)	Major Adverse	Large Adverse	Urban and Landscape Design Management Plan Cut and fill batters shaped to a natural profile. Boundary fences and planting to be reinstated for partially affected properties. A planting plan, including limiting removal of noteworthy trees	Moderate Adverse direct effects but Large Adverse indirect and cumulative effects	Cultural Design Plan including funding for implementation. Scheduling (schedule 12 AUP) all identified Māori Sites of Significance within Study Area through a Private

Name	Summary of impact	Level of Impact	Significance of effect	Proposed mitigation	Residual effect	Offsetting
	Changes to the rural character necessitated through subsequent large-scale urban intensification of the catchment enabled by the ASH …… Potential direct permanent beneficial operation impacts arising from Local Network (Don Buck Rd, Fred Taylor Dr, Coatesville-Riverhead HWY, Brigham Creek Rd, Hobsonville Rd, New Spedding Rd, Mamari Rd, Trig Rd) and existing corridor Strategic Network (Main Rd, RTC, Access Rd) upgrades that can contribute cultural design, place naming, and walking and cycling access opportunities	…… Potential Negligible Beneficial (Non-ASH)	…… Potential Minor Beneficial (Non-ASH)	and vegetation where practicable. Where practicable retaining stockpiles and reusing soil on site. Construction Noise and Vibration Management Plan. Site Specific Construction Management Schedule Pre and Post Building Condition Survey where vibration may exceed certain criteria. Road surface material, option that reduces noise at the source Best practise rail design and installation Installation of noise barriers Building modification mitigation should above mitigation not achieve desired outcome Ecological and landscape planting will help integrate the corridors with rural areas. Alongside the limited access points, the ecological and landscaping will		Plan Plan Change. Establishment of a Cultural Heritage and Offset fund and trust be established for the benefit of TKāM and NWōK with regard to the conservation, interpretation, and education regarding taonga within the Study Area. Permanent exclusion of urban intensification (Rural Zone) west of ASH and low density east of ASH (CSL Zone) RFR in favour of TKaM placed on any land within the Designation that may eventually be disposed of by NZTA

Name	Summary of impact	Level of Impact	Significance of effect	Proposed mitigation	Residual effect	Offsetting
				create a green buffer which will reinforce rural areas and will help avoid future development in rural areas.		
Whenua (productive soils)	Direct, indirect and cumulative permanent adverse construction impacts arising from: Bulk earthworks primarily from ASH but also from the wider Strategic and Local Network Removal of regionally significant high productivity soils (mauri) necessitated through subsequent large-scale urban intensification of the catchment enabled by the ASH	Major Adverse	Large Adverse	Where practicable retaining stockpiles and reusing soil on site. Cut and fill batters shaped to a natural profile.	Large Adverse	Topsoil Conservation Plan Permanent exclusion of urban intensification (Rural Zone) west of ASH and low density east of ASH (CSL Zone)
Wai Māori (fresh water)	Direct, indirect and cumulative temporary and permanent adverse construction and operation impacts arising from: Earthworks within proximity to watercourses (particularly ASH) Vegetation clearance along watercourse embankments Significantly increased impervious area within sensitive receiving water	Moderate Adverse	Large Adverse	Construction Environmental Management Plans. Operational impacts worked through and resolved during detailed design by optimising the design of culverts and bridges and new channels to minimise flood effects upstream and downstream of crossings. Vegetated swales Stormwater wetlands	Moderate Adverse	Permanent exclusion of urban intensification (Rural Zone) west of ASH and low density east of ASH (CSL Zone)

Name	Summary of impact	Level of Impact	Significance of effect	Proposed mitigation	Residual effect	Offsetting
	environment (primarily ASH) Changes to hydrology of the catchment resulting from new roads and culverts (primarily ASH) Increased risk of operational discharges of heavy metals and other contaminants from traffic enabled by the ASH Changes to the landuse and discharge type necessitated through subsequent large-scale urban intensification (and net impervious area) of the catchment enabled by the ASH …… Potential direct and cumulative permanent beneficial impacts relating to the Local Network (Don Buck Rd, Fred Taylor Dr, Coatesville-Riverhead HWY, Brigham Creek Rd, Hobsonville Rd, New Spedding Rd, Mamari Rd, Trig Rd) and existing corridor Strategic Network (Main Rd, RTC, Access Rd) upgrades arising from: Improved stormwater management upgrades including swales, wetlands,	…….. Minor Beneficial (Non-ASH)	…… Moderate Beneficial (Non-ASH)	Stormwater ponds Tree pits/rain gardens on routes with walking/cycling Use of bridges where possible (instead of culvert-reclamation systems)		

Name	Summary of impact	Level of Impact	Significance of effect	Proposed mitigation	Residual effect	Offsetting
	ponds, and tree pits/rain gardens					
Waitematā ō Kahumatamomoe	No change to low potential negligible net or cumulative adverse impact resulting from works within catchment. On balance likely neutral once up-stream mitigations in place.	Neutral	Neutral	Nil	Neutral	Nil
Te Wai Roa ō Kahu	No change to low potential negligible net or cumulative adverse impact resulting from works within catchment. On balance likely neutral once up-stream mitigations in place.	Neutral	Neutral	Nil	Neutral	Nil
Wai ō Pareira	No change to low potential negligible net or cumulative adverse impact resulting from works within catchment. On balance likely neutral once up-stream mitigations in place.	Neutral	Neutral	Nil	Neutral	Nil
Te Awa Mānutewhau	Direct temporary and permanent construction and operation adverse impact from: Upgrades to Don Buck Rd Wetland 2 occurring directly within awa Slight increase in net impervious surface	Minor Adverse	Moderate Adverse	Refer to 'Wai Māori' mitigations above	Minor Adverse	Riparian planting for 200m in both directions from impact Mauri health monitoring for 5 years
Te Waiarohia ō Ngariki	Direct and cumulative permanent construction and	Minor Adverse	Moderate Adverse	Refer to 'Wai Māori' mitigations above	Minor Adverse	Riparian planting for 200m in both

Name	Summary of impact	Level of Impact	Significance of effect	Proposed mitigation	Residual effect	Offsetting
	operation adverse impacts resulting from upgrades to southeast end of Brigham Creek Road and Trig Road upgrades from: Construction earthworks in proximity to the awa Works within the awa to install new culverts Permanent fill batter slopes adjacent to the awa Increase in impervious surface Construction of Hobsonville Rd Wetland 4					directions from impact Mauri health monitoring for 5 years
Wai Rawawaru	No change	Neutral	Neutral	Nil	Neutral	Nil
Wai Totara	Direct and cumulative permanent construction and operation adverse impacts resulting from upgrades to southeast end of Brigham Creek Road and RTC/RAMC from: Construction earthworks in proximity to the awa Permanent fill batter slopes adjacent to the awa New section of road (New Spedding Rd and RTC) and net	Minor Adverse	Moderate Adverse	Refer to 'Wai Māori' mitigations above New bridges over the span of the awa thus avoiding direct works in stream bed/banks	Minor Adverse	Cultural Design Riparian planting for 200m in both directions from impact Mauri health monitoring for 5 years

Name	Summary of impact	Level of Impact	Significance of effect	Proposed mitigation	Residual effect	Offsetting
	increase in impervious surface					
Te Awa Ngongetepara	Direct and cumulative temporary and permanent construction and operation adverse impacts resulting from upgrades to northwest end of Brigham Creek Road and from new RTC alignment from: Construction earthworks in proximity to the awa Site compound, stockpile, sediment pond, and lay-down area adjacent to awa Permanent fill batter slopes adjacent to the awa Increase in impervious surface from RTC	Minor Adverse	Moderate Adverse	Refer to 'Wai Māori' mitigations above Proposed new RTC overbridge to avoid works within stream	Minor Adverse	Cultural design Riparian planting for 200m in both directions from impact Mauri health monitoring for 5 years
Waiteputa	Direct permanent construction and operation adverse impacts resulting from the new Redhills Arterial from: Construction earthworks in proximity to the awa Permanent fill batter slopes adjacent to the awa New section of road and net increase in impervious surface	Minor Adverse	Moderate Adverse	Refer to 'Wai Māori' mitigations above Lighting design to reduce light spill, buffer planting,	Minor Adverse	Cultural Design Riparian planting for 200m in both directions from impact Mauri health monitoring for 5 years

Name	Summary of impact	Level of Impact	Significance of effect	Proposed mitigation	Residual effect	Offsetting
Te Awa Pītoitoi	Direct and cumulative temporary and permanent construction and operation adverse impacts resulting from upgrades to northwest end of Brigham Creek Road from: Construction earthworks in proximity to the awa Site compound, stockpile, sediment pond, and lay-down area adjacent to awa Increase in impervious surface	Negligible Adverse	Minor Adverse	Refer to 'Wai Māori' mitigations above	Negligible Adverse	Riparian planting for 200m in both directions from impact Mauri health monitoring for 5 years
Te Awa Rangitōpuni	No change	Neutral	Neutral	Nil	Neutral	Nil
Te Awa Pakinui	Direct permanent operation adverse impact to the setting of the awa and its context which will be changed with the introduction of the new RTC and bridge about 250m to the north.	Negligible Adverse	Minor Adverse	Urban and Landscape Design Management Plan	Minor Adverse	Cultural design
Te Awa Kumeū	Direct and cumulative construction and operation adverse impacts from: Works within the awa and its tributaries may impact the taniwha RTC and ASH new alignment significant earthworks in proximity to the	Major Adverse	Large Adverse	Refer to 'Wai Māori' mitigations above Proposed new RTC/ASH overbridge to avoid works within stream	Large Adverse	Avoid realignment of river Minimise earthworks in proximity Construction compounds set back 500m from river Cultural design

Name	Summary of impact	Level of Impact	Significance of effect	Proposed mitigation	Residual effect	Offsetting
	awa, particularly cut on east side RTC and ASH permanent fill batter slopes adjacent to the awa ASH stormwater wetland 4, 5 and 6, and Main Rd/RTC Wetland 2 in close proximity to awa RTC and ASH construction compounds in proximity to the awa Main Rd construction compound near east side of existing SH16 bridge RTC and ASH setting impacts from new bridge structures over the awa Works in awa for SH16 temporary road realignment, deconstruction of existing bridge, and construction of new bridge RTC and ASH new alignment net increase in impervious surface					Riparian planting for 500m in both directions from impact Mauri health monitoring for 5 years Establishment of a Cultural Heritage and Offset fund and trust be established for the benefit of TKāM and NWōK with regard to the conservation, interpretation, and education regarding taonga within the Study Area.
Te Awa Ahukāramuramu	Direct and cumulative permanent construction and operation adverse impacts resulting from upgrades to ASH/RTC/Main Rd from:	Minor Adverse	Moderate Adverse	Refer to 'Wai Māori' mitigations above Proposed new RTC/Main Rd bridge to avoid works within stream	Minor Adverse	Cultural Design Riparian planting for 200m in both directions from impact

Name	Summary of impact	Level of Impact	Significance of effect	Proposed mitigation	Residual effect	Offsetting
	Construction earthworks in proximity to the awa Permanent fill batter slopes adjacent to the awa Increase in impervious surface Construction of RTC/SH Wetland 10 and ASH Wetland 15					Mauri health monitoring for 5 years
Waikoukou	No change	Neutral	Neutral	Nil	Neutral	Nil
Te Awa Kaipara	Indirect and cumulative permanent adverse impacts from up-stream discharges and unlocking further urban intensification	Minor Adverse	Moderate Adverse	Refer to 'Wai Māori' mitigations above	Minor Adverse	Mauri health monitoring for 5 years
Native Ngahere and Rākau	No change	Neutral	Neutral	Nil	Neutral	Nil
SEA and Rakau within or adjacent to Site Footprint	Direct permanent construction adverse impacts relating to works near Brigham Creek SEA and other native vegetation along stream corridors	Minor Adverse	Minor Adverse	A planting plan, including limiting removal of noteworthy trees and vegetation where practicable.	Neutral	Nil
Native Fungi within or adjacent to Site Footprint	Direct permanent construction adverse impacts relating to earthworks, although scale of impact unknown as no assessments	Negligible Adverse	Negligible Adverse	Nil	Negligible Adverse	Include fungi identification in ecological assessments
Native Fishes within or adjacent to Site Footprint	Direct and cumulative temporary and permanent construction and operation adverse impacts from:	Moderate Adverse	Moderate Adverse	Nil	Moderate Adverse	Fresh water ecological management plan Use of fish passage design

Name	Summary of impact	Level of Impact	Significance of effect	Proposed mitigation	Residual effect	Offsetting
	Works within waterways that could cause injury, death or displacement Realignment of Kumeū river could cause injury, death or displacement Installation of culverts Sediment and other construction discharges Increase in impervious surface and related discharges					Mauri health monitoring for 5 years
Native Invertebrates within or adjacent to Site Footprint	Direct permanent construction and operation adverse impacts relating to: Earthworks Light pollution although scale of impact unknown as no assessments	Negligible Adverse	Negligible Adverse	Nil	Negligible Adverse	Include terrestrial invertebrate identification in ecological assessments
Native herpetofauna within or adjacent to Site Footprint	Direct permanent construction and operation adverse impacts relating to: Earthworks that could cause injury, death or displacement, Removal of vegetation including rank grasses that could cause displacement Segmentation of the landscape/habitats	Moderate Adverse	Minor Adverse	Nil	Minor Adverse	Lizard management plan

Name	Summary of impact	Level of Impact	Significance of effect	Proposed mitigation	Residual effect	Offsetting
	by the ASH, although scale of impact unknown as no assessments					
Native Avifauna within or adjacent to Site Footprint	Direct, indirect and cumulative temporary and permanent construction and operation adverse impacts from: Removal of trees and vegetation along Site corridor leading to displacement Bird strike from ASH in proximity to Waitākere Ranges Light pollution from ASH and subsequent urban intensification Loss of open habitat for Kahu (Hawks)	Minor Adverse	Minor Adverse	Impact management for TAR birds incl. North Island fernbird, banded rail and spotless crake to be incorporated into detailed design.	Minor Adverse	Bird Management Plan Permanent exclusion of urban intensification (Rural Zone) west of ASH and low density east of ASH (CSL Zone)
Native Bats	Direct, indirect and cumulative temporary and permanent construction and operation adverse impacts from: Removal of trees and vegetation along Site corridor leading to displacement Light pollution from ASH and subsequent urban intensification	Minor Adverse	Minor Adverse	Bat management plan to be developed and incorporated into detailed design. Significant ecological planting to mitigate impacts on bats has been incorporated into the designation footprint. This will lead to the enhancement of riparian areas and will green much of the corridor.	Minor Adverse	Bat management plan
Nga Rau Pou ā Maki (northern ridgeline)	Direct and cumulative permanent operation adverse impacts to the setting of the	Moderate Adverse	Large Adverse	Urban and Landscape Design Management Plan	Large Adverse	Establishment of a Cultural Heritage fund and trust be

Name	Summary of impact	Level of Impact	Significance of effect	Proposed mitigation	Residual effect	Offsetting
	northern ranges from ASH and the subsequent urban intensification of the lands below					established for the benefit of TKāM and NWōK with regard to the conservation, interpretation, and education regarding taonga within the Study Area. Permanent exclusion of urban intensification (Rural Zone) west of ASH and low density east of ASH (CSL Zone)
Te Ara Pukewhakataratara	Direct and cumulative permanent construction adverse impacts arising from Don Buck Rd further earthworks and modification of Pukewhakataratara Ridgeline	Negligible Adverse	Minor Adverse	Nil	Minor Adverse	Cultural design plan to recognise the site
Pukewhakataratara	Direct and cumulative permanent construction adverse impacts arising from Don Buck Rd further earthworks and modification of Pukewhakataratara	Minor Adverse	Moderate Adverse	Nil	Moderate Adverse	Minimise earthworks Cultural design plan to recognise the site Enter the site in Schedule 12 as a Māori Site of Significance

Name	Summary of impact	Level of Impact	Significance of effect	Proposed mitigation	Residual effect	Offsetting
Wai ō Pareira Kāinga	No change	Neutral	Neutral	Nil	Neutral	Nil
Te Mānutewhau Kāīnga	No change	Neutral	Neutral	Nil	Neutral	Nil
Te Rawawaru Kāīnga	No change	Neutral	Neutral	Nil	Neutral	Nil
Te Ngongetepara Kāīnga	No change to negligible adverse direct and cumulative effects from earthworks and unlocking further urban intensification	Negligible Adverse	Minor Adverse	Nil	Minor Adverse	Cultural design
Te Ahipekapeka	Direct and cumulative permanent construction and operation adverse impacts arising from Coatesville-Riverhead HWY further earthworks and impervious surface	Negligible Adverse	Minor Adverse	Nil	Minor Adverse	Cultural design plan to recognise the site
Turanga ō Kawau	No change	Neutral	Neutral	Nil	Neutral	Nil
Maraeroa	No change	Neutral	Neutral	Nil	Neutral	Nil
Pītoitoi Kāīnga	No change	Neutral	Neutral	Nil	Neutral	Nil
Taurangatira	No change	Neutral	Neutral	Nil	Neutral	Nil
Te Tōangaroa	No change	Neutral	Neutral	Nil	Neutral	Cultural design
Wai paki i rape ō Ruarangi	Direct temporary construction adverse impacts from: Main Rd construction compound near east side of existing SH16 bridge	Major Adverse	Large Adverse	Nil	Large Adverse	Cultural design

Name	Summary of impact	Level of Impact	Significance of effect	Proposed mitigation	Residual effect	Offsetting
	Main Rd/RTC Wetland 2 in close proximity to awa Works in awa for SH16 temporary road realignment, deconstruction of existing bridge, and construction of new bridge					
Tuuraki awatea	No change to negligible adverse setting and temporary down-stream impacts.	Negligible Adverse	Minor Adverse	Refer to 'Wai Māori' mitigations above	Neutral	Nil
Pukeharakeke	No change	Neutral	Neutral	Nil	Neutral	Nil
Te Ihumatāo	No change to negligible adverse cumulative effects from unlocking further urban intensification	Neutral	Neutral	Nil	Neutral	Nil
Te Patumāhoe Kāīnga	No change	Neutral	Neutral	Nil	Neutral	Nil
Kahutōpuni	No change	Neutral	Neutral	Nil	Neutral	Nil
Te Ara Rimu	No change	Neutral	Neutral	Nil	Neutral	Nil
Waimauku	No change to negligible adverse cumulative effects from unlocking further urban intensification within a flood-prone area	Negligible Adverse	Minor Adverse	Nil	Minor Adverse	Permanent exclusion of urban intensification (Rural Zone) west of ASH and low density east of ASH (CSL Zone)
Taumata	No change to negligible adverse setting impacts.	Neutral	Neutral	Nil	Neutral	Nil
Kāhukurī	No change	Neutral	Neutral	Nil	Neutral	Nil
Treaty Settlement Land	No change	Neutral	Neutral	Nil	Neutral	Nil

Table 4: Summary of Cultural Effects

Measures	Count
Significance of Effect ::	
Neutral	25
Negligible Beneficial	0
Minor Beneficial	1*
Moderate Beneficial	1*
Large Beneficial	0
Negligible Adverse	3
Minor Adverse	15
Moderate Adverse	3
Large Adverse	5

*Beneficial impacts were noted for the non-ASH elements in terms of landscape and water assuming all mitigations and offsets implemented, but overall (with ASH) the impact was adverse.

CONCLUSION

The North West Project proposes to upgrade and develop new sections of the local and strategic transport network extending from Hobsonville/Whenuapai through Westgate and Brigham Creek to Kumeū, Taupaki and Waimauku. A significant element of the project is the Alternative State Highway (ASH) from Brigham Creek to western Huapai. The project aims to support urban growth in the area and to provide people with genuine travel choices, to address climate change by achieving transformative mode shift, and to address transport safety issues. The project sits within and across an important cultural landscape at the crossroads between the Hikurangi, Waitematā, and Kaipara Valley takiwa. It is the northern part of Te Kawerau ā Maki's heartland and contains a number of significant cultural sites and resources from our most ancient traditions through to our major Treaty settlement redress. Sited between Nga Rau Pou ā Maki (the Waitākere Ranges) and Rangitōpuni (Riverhead Forest) on the alluvial plains of the Kumeū and Kaipara valleys, the project covers an area of numerous streams and the most productive soils in the northern half of the Auckland region. The valley is also protected by the taniwha Tangihua.

This CIA identified a total of 51 cultural sites and resources, ranging in relative value from low to predominantly high, and encompassing productive soil, rivers, landmarks, sacred sites, historical sites, traditional walking routes, and flora and fauna. The project was assessed against these sites and resources resulting in the documenting of eight significant adverse effects, 15 minor adverse effects, three negligible adverse effects, one potential significant beneficial effect*, one minor beneficial effect*, and 25 neutral effects. Where adverse effects were identified offsets (or further mitigation) were suggested. The significant adverse effects relate to the removal of productive topsoil, impacts to fresh water (including the taniwha), impacts to the Kumeū River (including the taniwha), impacts to fish species, setting impacts to Nga Rau Pou ā Maki, impacts to Pukewhakataratara, impacts to Wai paki i rape ō Ruarangi, and impacts to the cultural landscape.

While some of the cumulative impacts identified and measured, in particular future urban intensification, cannot be tied singularly to the project, it is reasonable to include them in this CIA given the strategic scope of the project and its aspirations to unlock urban development and support urban growth. Many harms can be mitigated to some degree or offset or compensated. However, at a strategic level, it is reasonable to question the wisdom of supporting urban growth in a flood prone catchment that holds the most regionally significant topsoils in northern Auckland, and that (through the ASH) places high risk of urbanising the fringes of the northern Waitākere Ranges. The destruction of a food bowl for the benefit of more concrete warehouses seems to be the opposite of sustainability or forward planning. The removal of highly organic topsoils at such a scale certainly is at odds with the project aim of addressing climate change. It is the role of iwi to be kaitiaki of the mauri of the resources in their rohe for the inter-generational benefit of all. The sensitivity of the receiving environment here is witnessed by the fact we hold there to be a taniwha protecting it. Te Kawerau ā Maki has maintained for half a decade now that the Crown (in all its varying forms including Council and NZTA) would be better off working with us to plan for growth at Riverhead where the soils are far less productive and flood prone and we have the scale of land to strategically plan for inter-generational wellbeing. It is frustrating to watch more of our taonga risk disappearing due to the acts of the Crown.

Due to the sensitivities of the landscape, we are not supportive of the ASH component of the project. We would prefer that the existing SH16 corridor be widened. This is a choice between existing homes and the environment. We choose to support te taiao. Should it (the ASH) proceed against our opposition and advice we have suggested limits and offsets to what that might look like. Our preference is for the Crown to work with Te Kawerau ā Maki on strategic and inter-generational growth in ways where we both benefit and where the environmental impacts are lower.

RECOMMENDATIONS

Table 5: Recommendations and outcome alignment

No.	Recommendation	TKaM Strategic Value alignment	IMP policy alignment	Legislative alignment	AUP policy alignment	Other policy alignment
1	Te Kawerau ā Maki do not oppose the proposal, with the exception of the ASH component which we do oppose (and prefer SH16 be widened instead), otherwise provided that the mitigations and offsets discussed are incorporated – we desire notice of the outcome of the application and the final designation conditions	Mana Motuhake				
2	Undertake further discussions and work to enable TKaM participation in design, construction and operation phases of the project e.g. through project board position and/or MOU and including procurement or training opportunities	Mana Motuhake, Kaitiakitanga, Whanaungatanga, Auaha	2.2 (integration of tikanga)	RMA 6(e), 7(a), 8	B6.2.2(1) (participation), B6.3.2(1) (identify values) B6.3.2(2) (integrate tikanga), B6.3.2(3) (AEE to include CIA), B6.3.2(6) (decisions to reflect cultural impacts), B6.5.2(7) (cultural landscapes in structure plans), B6.5.2(9) (cultural design of infrastructure)	UNDRIP, NPSFW, NZCPS, ICOMOS
3	Avoid realignment of the Kumeū River as a matter of spiritual integrity	Kaitiakitanga	2.2 (integration of tikanga), 4.2.2 (cultural heritage)	RMA 6(e), 7(a)	B6.3.2(2) (integrate tikanga), B6.3.2(6) (decisions to reflect cultural impacts)	UNDRIP, ICOMOS, NPSFW
4	Should the ASH proceed against our advice, permanent exclusion of urban intensification (Rural Zone to remain) west of ASH and low density east of ASH (CSL Zone) should be provided	Kaitiakitanga	2.2 (integration of tikanga), 4.1.2 (cumulative effects),	RMA 6(e), 7(a), 8	B6.3.2(1) (identify values) B6.3.2(2) (integrate tikanga),	UNDRIP

No.	Recommendation	TKaM Strategic Value alignment	IMP policy alignment	Legislative alignment	AUP policy alignment	Other policy alignment
			4.2.2 (cultural heritage), 4.7.2 (landscape)		B6.3.2(6) (decisions to reflect cultural impacts), B6.5.2(7) (cultural landscapes in structure plans)	
5	Avoid where possible significant earthworks on the areas of cultural value (sites) identified in this report, and where not possible, work with TKaM on design and construction monitoring that incorporates our tikanga	Kaitiakitanga	2.2 (integration of tikanga), 4.2.2 (cultural heritage), 4.3.2 (koiwi), 4.9.2 (cultural design)	RMA 6(e), 7(a), 8; HNZPTA s45	B6.2.2(1) (participation), B6.3.2(2) (integrate tikanga), B6.5.2(9) (cultural design of infrastructure), E11 and E12 rules (ADP)	UNDRIP, ICOMOS
6	Cultural Heritage and Offset fund and trust be established for the benefit of TKāM and NWōK with regard to the conservation, interpretation, and education regarding taonga within the Study Area. The budget for this fund will need to be negotiated but must be meaningful	Kaitiakitanga	2.2 (integration of tikanga), 4.2.2 (cultural heritage), 4.9.2 (cultural design)	RMA 6(e)	B6.2.2(1) (participation), B6.3.2(1) (identify values) B6.3.2(2) (integrate tikanga), B6.5.2(7) (cultural landscapes in structure plans), B6.5.2(9) (cultural design of infrastructure)	UNDRIP, ICOMOS
7	Work with TKaM on water sensitive design that incorporates our tikanga, noting the importance of not mixing waters and soil and plant filtration, and giving effect to Mana ō te Wai, and including elements such as riparian planning buffers and long-term mauri monitoring	Kaitiakitanga, Mātauranga	2.2 (integration of tikanga), 4.4.2 (management of water), 4.5.2 (coastal)	RMA 6(e), 7(a), 8	B6.2.2(1) (participation), B6.3.2(1) (identify values) B6.3.2(2) (integrate tikanga), B6.5.2(9) (cultural design of infrastructure)	UNDRIP, NPSFW, NZCPS

No.	Recommendation	TKaM Strategic Value alignment	IMP policy alignment	Legislative alignment	AUP policy alignment	Other policy alignment
8	Work with TKaM on ecologically sensitive design that incorporates our tikanga, including eco-sourced vegetation, a 100% native plant commitment, habitat enhancement, fish passages, and green corridors, and ensure and ecological offsetting framework is designed in partnership with TKaM	Kaitiakitanga, Mātauranga	2.2 (integration of tikanga), 4.7.2 (landscape), 4.8.2 (flora and fauna), 4.9.2 (cultural design)	RMA 6(e), 7(a), 8	B6.2.2(1) (participation), B6.3.2(1) (identify values) B6.3.2(2) (integrate tikanga)	UNDRIP
9	Develop in conjunction with TKaM an ecological restoration and management plan for the wetlands and streams that removes pests, monitors water, biodiversity and mauri quality including with cultural indicators, and includes enhancements such as native riparian planting	Kaitiakitanga	2.2 (integration of tikanga), 4.4.2 (management of water), 4.7.2 (landscape), 4.8.2 (flora and fauna), 4.9.2 (cultural design)	RMA 6(e), 7(a), 8	B6.2.2(1) (participation), B6.3.2(1) (identify values) B6.3.2(2) (integrate tikanga)	UNDRIP, NPSFW, NZCPS
10	Work with TKaM on a darkness sensitive design that incorporates our tikanga, and limits the degree of light pollution generated	Kaitiakitanga	2.2 (integration of tikanga), 4.1.2 (cumulative effects), 4.7.2 (landscape)	RMA 6(e), 7(a)	B6.2.2(1) (participation), B6.3.2(1) (identify values) B6.3.2(2) (integrate tikanga)	UNDRIP, NZCPS
11	Work with TKaM on cultural design incorporation and interventions, such as ensuring inter- and intra- cultural site visibility and settings is maintained, undertaking place naming and educational and physical (artistic) interpretation of cultural sites and history, and opportunity to input to the built form of elements of the project (e.g. bridges)	Kaitiakitanga, Auaha, Mātauranga	2.2 (integration of tikanga), 4.1.2 (cumulative effects), 4.2.2 (cultural heritage), 4.7.2 (landscape), 4.9.2 (cultural design)	RMA 6(e)	B6.2.2(1) (participation), B6.3.2(1) (identify values) B6.3.2(2) (integrate tikanga), B6.5.2(9) (cultural design of infrastructure)	ICOMOS
12	Actively support aspirations of TKaM to enter cultural sites within the Study Area onto the Auckland Council schedule of Sites of Significance to Mana Whenua, potentially through a private plan change	Kaitiakitanga	4.2.2 (cultural heritage), 4.7.2 (landscape)	RMA 6(e), 7(a), 8	B6.3.2(1) (identify values), B6.5.2(7) (cultural landscapes in structure plans/plan changes)	ICOMOS

No.	Recommendation	TKaM Strategic Value alignment	IMP policy alignment	Legislative alignment	AUP policy alignment	Other policy alignment
13	Develop and implement a Topsoil Conservation Plan	Kaitiakitanga	2.2 (integration of tikanga), 4.1.2 (cumulative effects)	RMA 6(e), 7(a), 8	B6.3.2(1) (identify values) B6.3.2(2) (integrate tikanga), B6.3.2(6) (decisions to reflect cultural impacts), B6.5.2(7) (cultural landscapes in structure plans), B6.5.2(9) (cultural design of infrastructure)	UNDRIP
14	In addition to the ecological management plan and topsoil management plan, TKāM should co-develop an urban/landscape design management plan and heritage management plan	Kaitiakitanga	4.2.2 (cultural heritage), 4.7.2 (landscape)	RMA 6(e), 7(a), 8	B6.2.2(1) (participation), B6.3.2(2) (integrate tikanga), B6.3.2(6) (decisions to reflect cultural impacts), B6.5.2(7) (cultural landscapes in structure plans)	UNDRIP, ICOMOS
15	Cultural monitoring, including pre-works cultural inductions, and the monitoring of cultural sites and resources for the construction period of the project, should be resourced at the cost of the Client	Kaitiakitanga, Whanau Mātauranga Māori	2.2 (integration of tikanga)	RMA 6(e), 7(a)	B6.2.2(1) (participation), B6.3.2(2) (integrate tikanga)	UNDRIP
16	Any lands within the designation that NZTA may wish to dispose of in the future should first be offered to TKaM to provide opportunity to re-acquire whenua alienated from TKaM	Mana Motuhake				

REFERENCES

Murdoch, G. (2011). *Te Kawerau ā Maki Claim Overview Report*. Unpublished Report.
Taua, T.W. (2009). *He kohikohinga korero mo Hikurangi.* In F. Macdonald and R. Kerr (ed). West – The History Of Waitakere. Random House.