

# Surface Noise Research

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## 2022 CPX Survey Summary

**Client:** Waka Kotahi  
**Date:** 2 Oct 2023  
**Ref:** 22-105-R04-B

Prepared for (the Client)  
**Waka Kotahi**

Prepared by the Consultant)  
**Altissimo Consulting Ltd**

**Project** Surface Noise Research  
**Report** 2022 CPX Survey Summary  
**Reference** 22-105-R04-B

### Prepared by

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Version history:

Version	Date	Comment
A	10 Aug 2023	For issue
B	2 Oct 2023	With updated project names

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## 1 Introduction

Altissimo has undertaken routine Close Proximity (CPX) testing of road surface noise levels across New Zealand in 2022/2023. This report presents the measurement details and resulting measured levels.

## 2 Measurement locations and dates

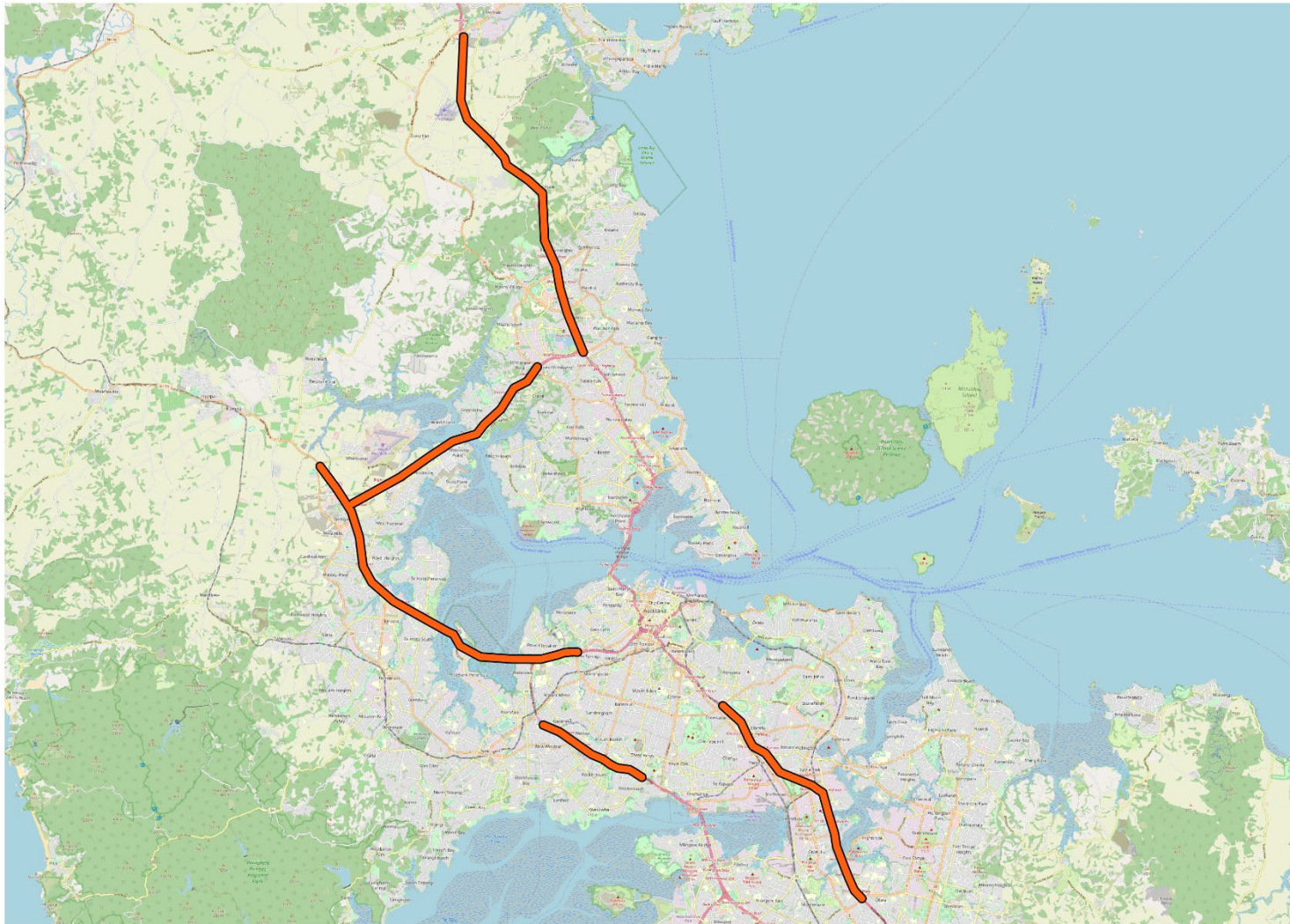
CPX measurements were performed at the following locations:

**Table 1 2022 CPX survey details**

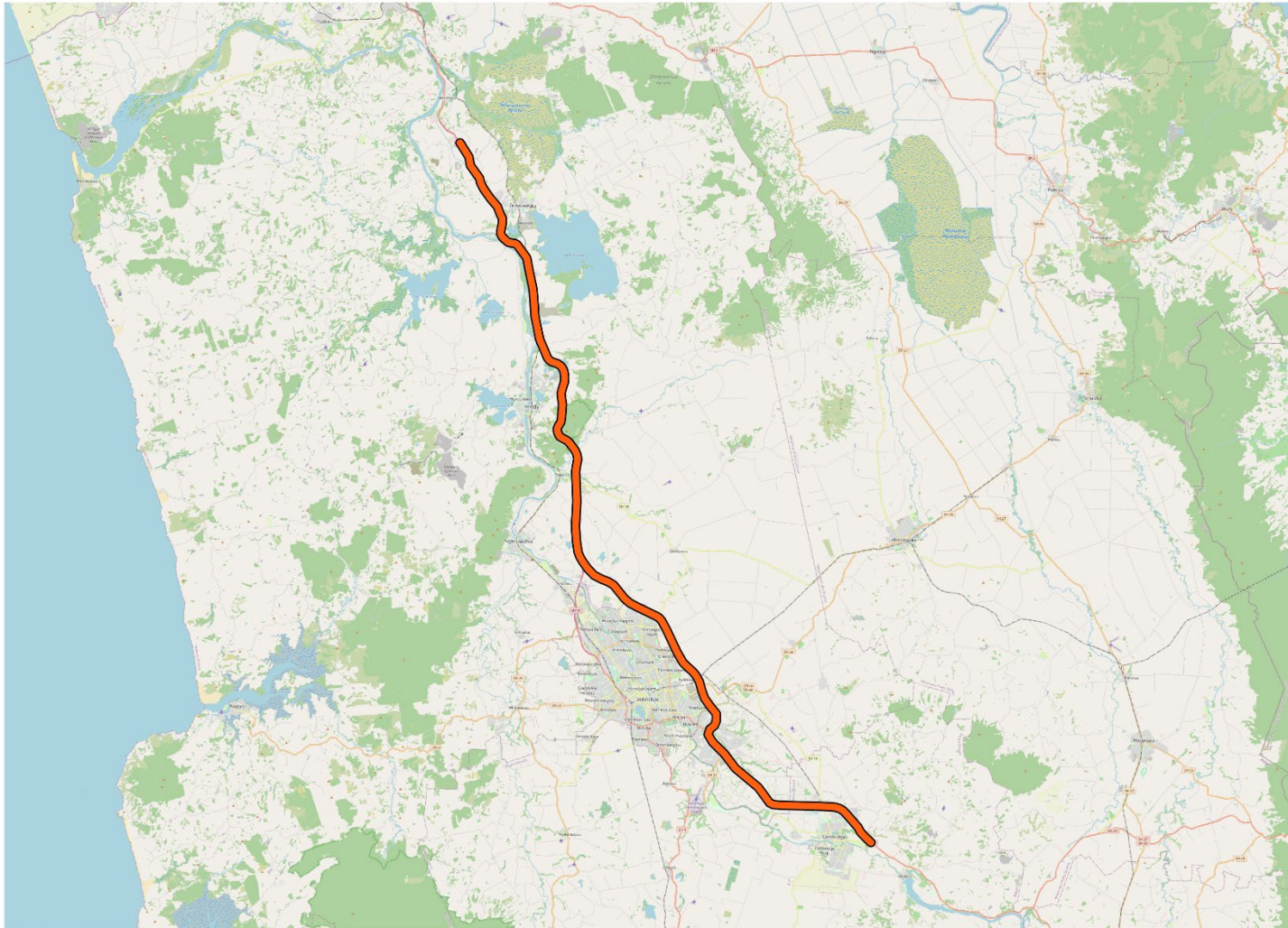
Site description	Northern extent	Southern extent
Auckland Northern Motorway (SH1)	Silverdale interchange	SH18 interchange
Upper Harbour Drive (SH18)	Albany Hwy interchange	Trig Rd
Northwestern Motorway (SH16)	Bringham Creek Rd	Great Nth Rd
Southwestern Motorway (SH20)	SH16 interchange	Hillsborough Rd
Auckland Southern Motorway (SH1)	Green Ln	East Tamaki Rd
Waikato Expressway (SH1)	Hampton Downs Rd	Tirau Rd
Junction Road (SH3)	Mangorei Rd	Inglewood
Mountain Road (SH3A)	Devon RD (SH3)	Inglewood
Mountain Road (SH3)	Inglewood	Hawera
SH1	Levin	Otaki
Kapiti Expressway (SH1)	Otaki	Transmission Gully northern extent (SH1)
Transmission Gully Motorway (SH1)	Kapiti Expressway southern extent (SH1)	Tawa (Takapu Rd)
SH59	Transmission Gully northern extent (SH1)	Plimmerton
Hutt Expressway (SH2)	Kaitoke	SH1 interchange
SH1	Waipara (SH7 intersection)	Tram Rd
Christchurch Northern Corridor (SH74)	Tram Rd	Cranford St
Western Belfast Bypass, Johns Road, Russley Road (SH1)	Tram Rd	Yaldhurst Rd
West Coast Road (SH73)	Springfield	Pound Road
Christchurch Southern Motorway (SH76 / SH1)	Barrington St	Rolleston
SH1	Rolleston	Rakaia
Christchurch Akaroa Road (SH75)	Halswell	Little River

The location of the 2023 CPX surveys are shown in Figures 1 – 5.

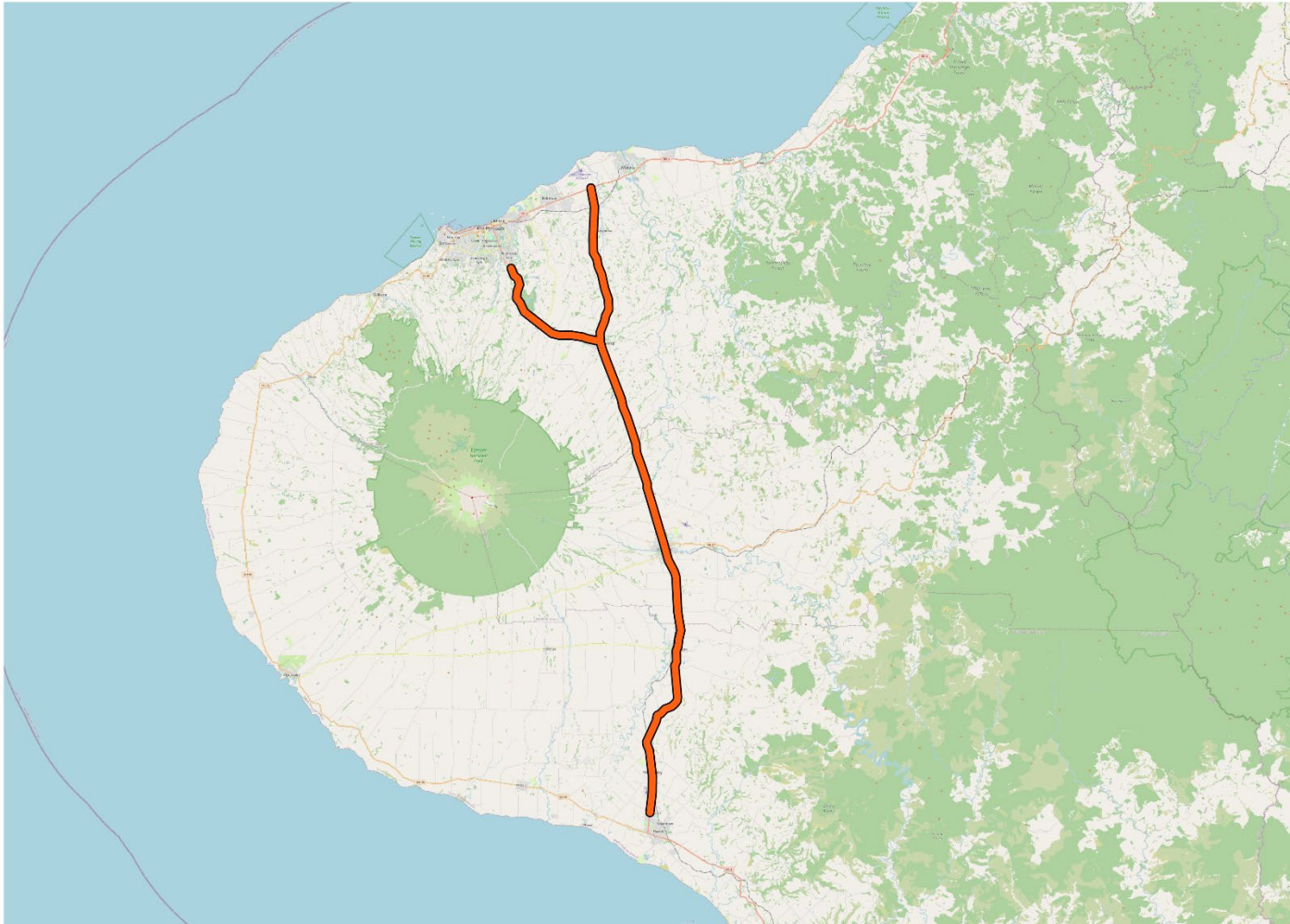




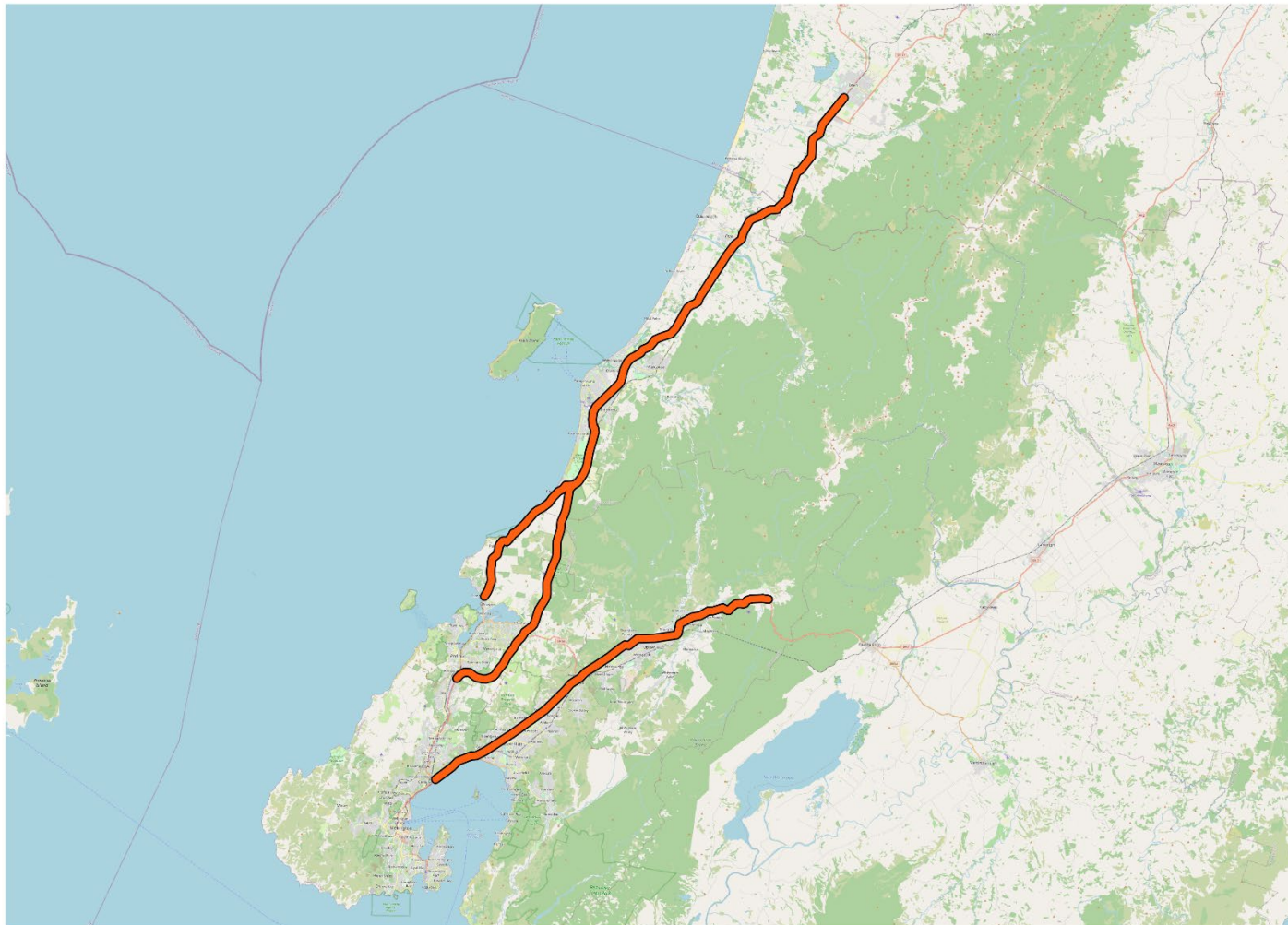
**Figure 1: Auckland survey summary**



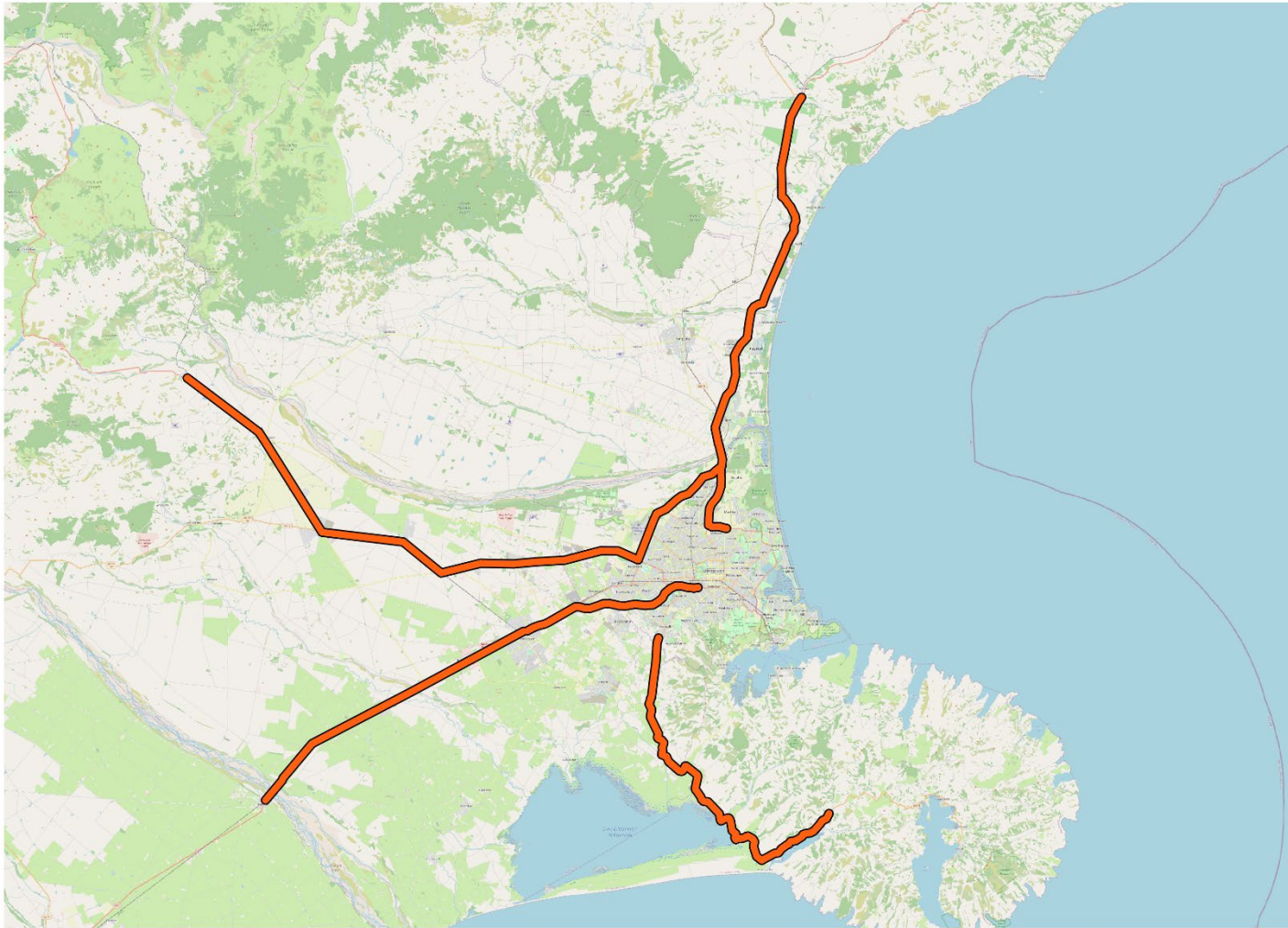
**Figure 2: Waikato survey summary**



**Figure 3: Taranaki survey summary**



**Figure 4: Wellington survey summary**



**Figure 5: Canterbury survey summary**



### 3 CPX measurement details

All measurements were performed by Robin Wareing (Altissimo Consulting) using Waka Kotahi's CPX trailer. The details of the towing vehicles are presented below:

**Table 2 2022 CPX survey - towing vehicle details**

Region	Vehicle details
Canterbury	Toyota Hiace
Taranaki	Toyota Camry
All others	Ford Ranger

Measurements prior to 2023/02/01 had both left and right wheel bays instrumented, measurements after this date were performed with only the left wheel bay instrumented.

All measurements were performed at least 48 hours after rain. The road surface was visually monitored and if dew began to form measurements were stopped.



## 4 Results

The average CPX noise level and associated standard deviation have been calculated for all measured projects. CPX levels are not presented for non-named projects but have been calculated for the extent of all the measurements. The levels are presented based on major projects, and the location of each project is shown in the associated figures.

### 4.1 Auckland

Site	Surface type	CPX Level dB L <sub>CPX</sub>	Standard Deviation dB	Length km
<b>SH16/18 Connections</b>	ENRAC	96.2	1.5	25.4
	EPA10 (30 mm)	96.7	0.6	0.2
	REJAC	98.0	0.5	3.9
<b>SH16 - Causeway Upgrade (2016)</b>	PA10 (30 mm)	97.2	1.0	8.5
	PA10 TWIN (70 mm)	95.0	0.6	3.7
<b>SH16 - Te Atatu Interchange (2016)</b>	EPA10 (30 mm)	97.6	0.9	0.9
	PA10 (30 mm)	97.8	1.1	1.4
<b>SH20 - Waterview Connection (2017)</b>	PA10 (30 mm)	97.9	1.0	3.0
	PA10 HS (30 mm)	97.4	0.4	0.4
<b>SH16 - Lincoln to Westgate (2019)</b>	EPA10 (30 mm)	97.5	0.8	5.56
	PA10 (30 mm)	97.3	1.0	2.24

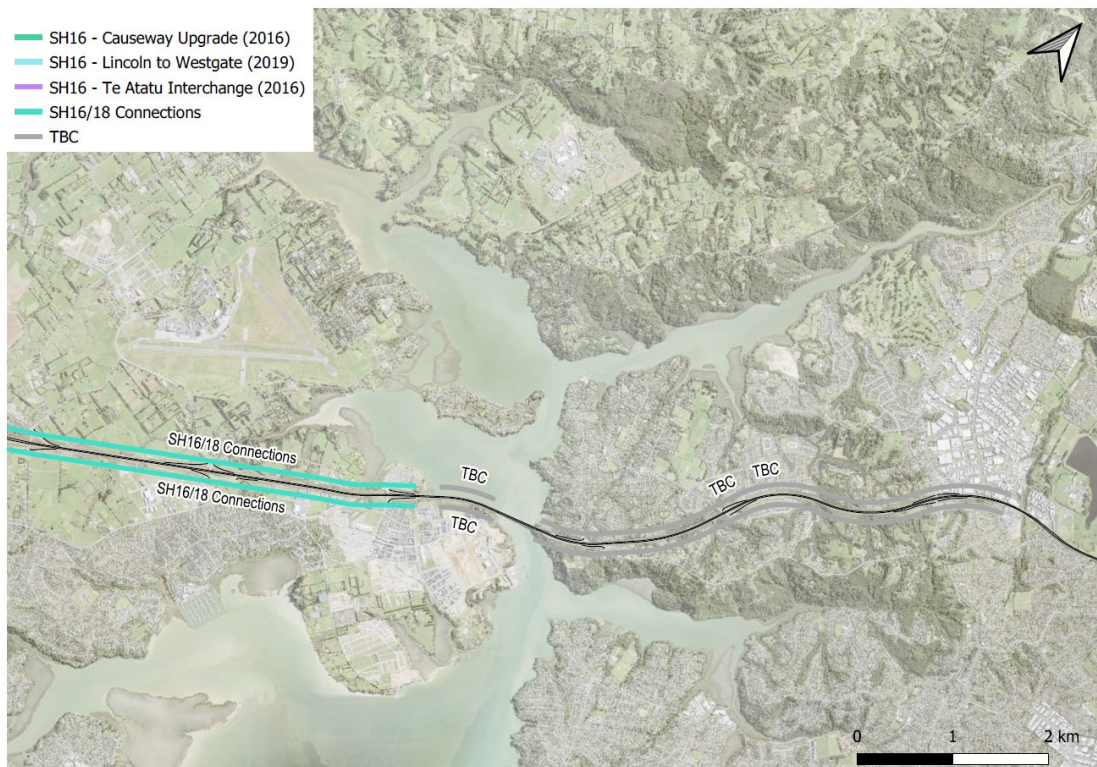
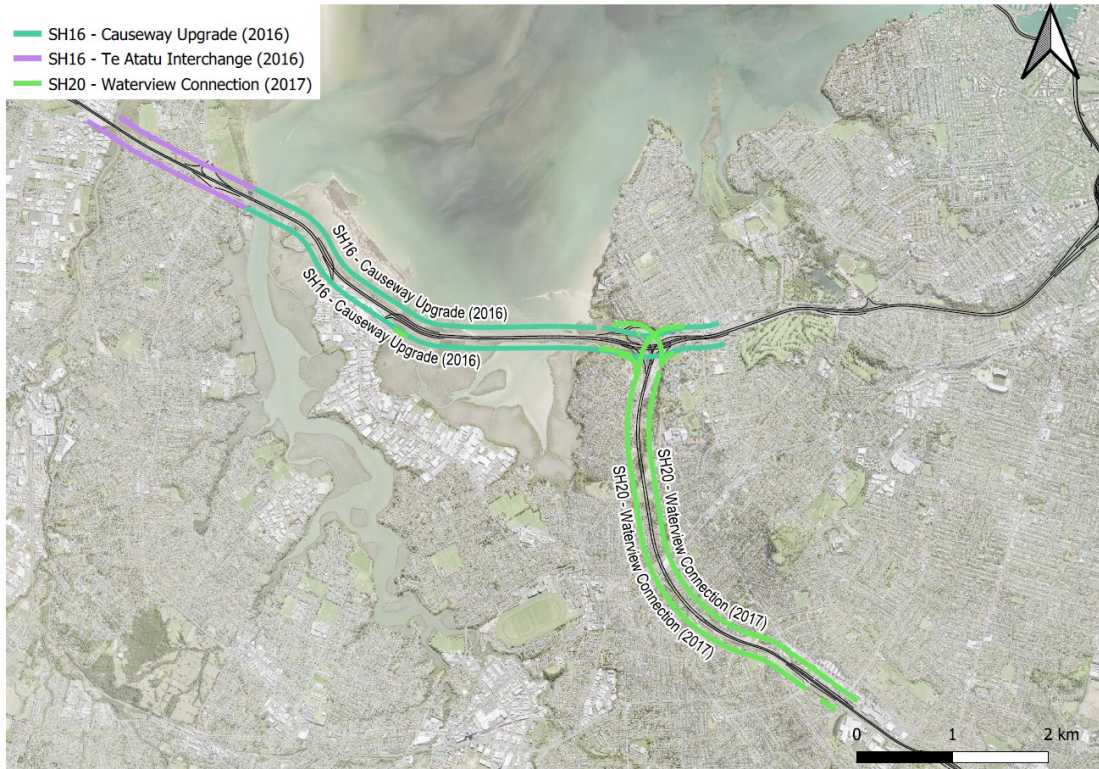


Figure 6: Auckland sites (1/2)





**Figure 7: Auckland sites (2/2)**



## 4.2 Waikato

Site	Surface type	CPX Level dB L <sub>CPX</sub>	Standard Deviation dB	Length km
<b>SH1 - WEX - Longswamp (2020)</b>	SMA10 (50 mm)	98.6	0.9	24.1
<b>SH1 - WEX - Rangiriri (2017)</b>	CHIP 4-6 Racked-In	100.6	1.2	12.6
	SMA11 (45 mm)	98.3	2.2	0.8
<b>SH1 - WEX - Tamahere and Cambridge (2015)</b>	EPA10 (30 mm)	96.7	1.3	54.1
	PA10 (30 mm)	96.8	1.5	1.2
	SMA10 (40 mm)	96.1	1.9	0.9
<b>SH1 - WEX - Huntly (2020)</b>	SMA10 (40 mm)	98.0	0.7	1.3
	SMA10 (50 mm)	97.9	0.8	59.2
<b>SH1 - WEX - Ngāruawāhia (2013)</b>	CHIP 3-5 Racked-In	100.7	1.6	20.5
<b>SH1 - WEX - Hamilton (2022)</b>	EPA7 (30 mm)	94.4	1.6	5.8
	EPA7 (50 mm)	92.9	2.2	9.6
	SMA14 (50 mm)	99.5	0.6	73.3

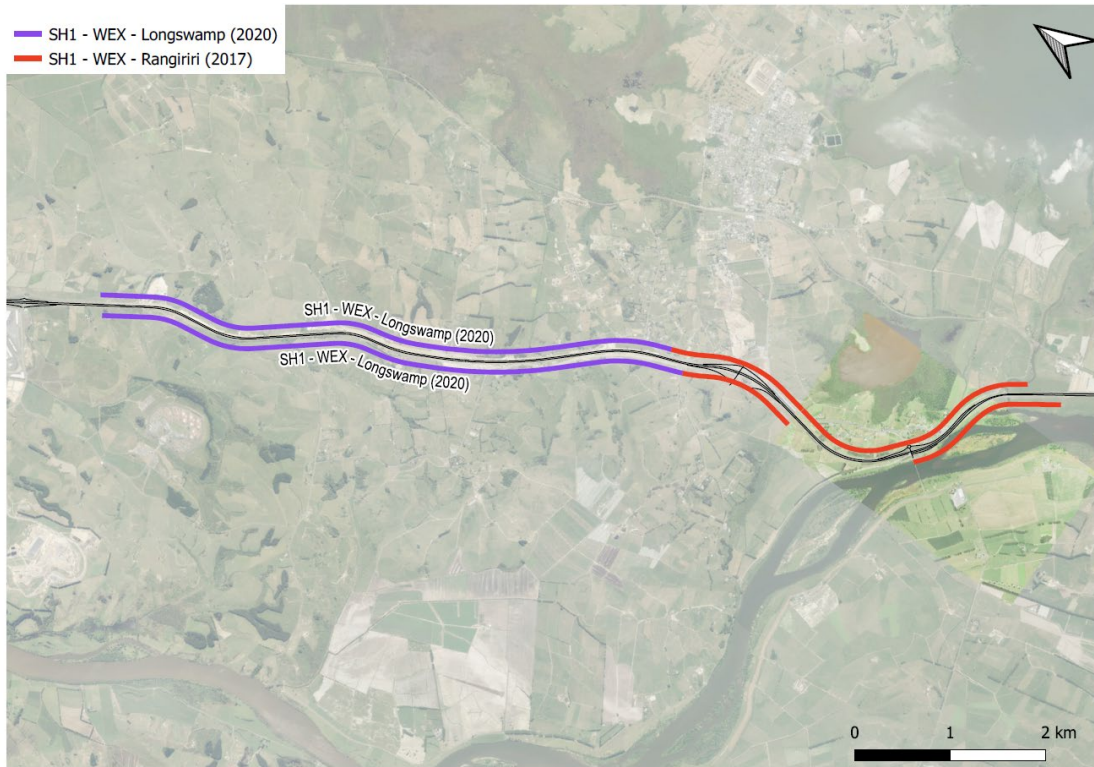


Figure 8: Waikato sites (1/6)





Figure 9: Waikato sites (2/6)

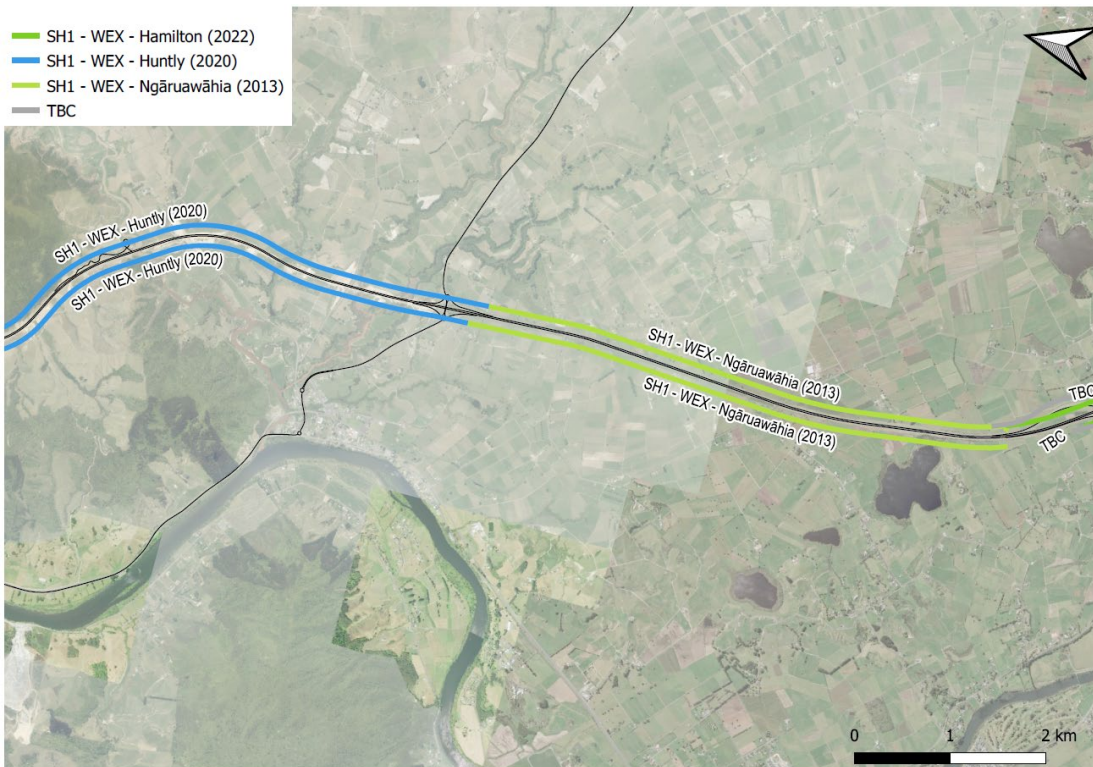
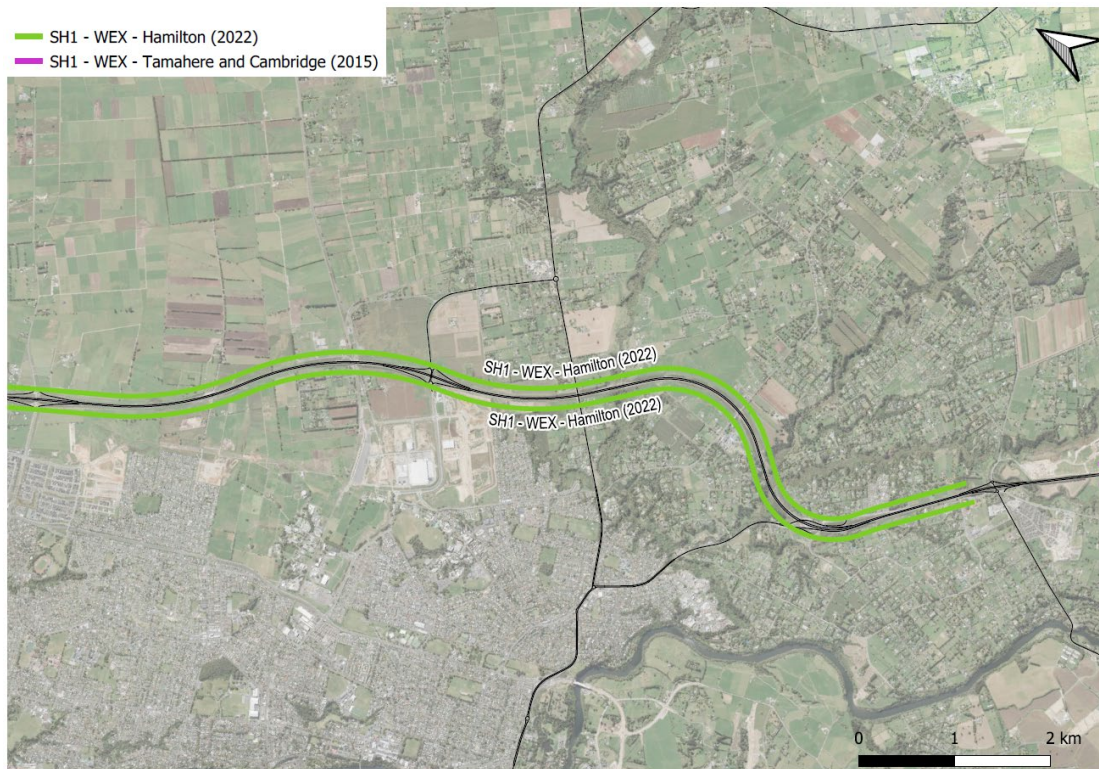


Figure 10: Waikato sites (3/6)





Figure 11: Waikato sites (4/6)



**Figure 12: Waikato sites (5/6)**



**Figure 13: Waikato sites (6/6)**



### 4.3 Taranaki

Site	Surface type	CPX Level dB L <sub>CPX</sub>	Standard Deviation dB	Measured Length km
<b>SH3A - Sentry Hill to Inglewood</b> <b>SH3 - New Plymouth to Hāwera</b>	AC14 (25 mm)	96.7	0.4	0.64
	AC14 (50 mm)	96.0	0.0	0.04
	ACM14 (40 mm)	96.2	0.3	0.12
	ACM14 (50 mm)	97.3	0.6	0.04
	B/S3-5	100.7	0.3	0.16
	CHIP 2	101.3	0.4	3.14
	CHIP 2-3	101.2	0.7	7.24
	CHIP 2-4	100.7	0.8	18.82
	CHIP 2-4 Racked-In	101.0	0.7	27.54
	CHIP 2-5	101.0	0.8	1.94
	CHIP 3	100.6	0.5	6.46
	CHIP 3-5	100.6	0.7	7.84
	CHIP 3-5 Racked-In	100.7	0.8	0.9
	CHIP 4	100.8	0.9	3.92
	CHIP 4-5	100.9	0.5	0.22
	CHIP 5	100.0	0.8	2.82
	CHIP 6	100.1	0.5	0.04
	COMB3-5	99.1	2.6	0.28
	TEXT5	101.0	0.6	0.08





## 4.4 Wellington

Site	Surface type	CPX Level dB L <sub>CPX</sub>	Standard Deviation dB	Length km
<b>SH1 - Mackays to Peka Peka (2017)</b>	CHIP 3-5 Racked-In	96.3	1.4	29.1
	PA10 (30 mm)	96.7	1.3	24.2
	PA5 (30 mm)	96.5	1.4	81.0
	SMA10 (40 mm)	94.7	1.0	0.6
<b>SH1 - Transmission Gully (2022)</b>	CHIP 2-4	98.8	0.9	53.5
	PA10 (30 mm)	96.4	1.0	2.9
	SMA10 (40 mm)	98.0	0.8	31.8
<b>SH1 - Peka Peka to Ōtaki (2022)</b>	EPA10 (25 mm)	97.0	1.1	63.7



Figure 14: Wellington sites (1/4)



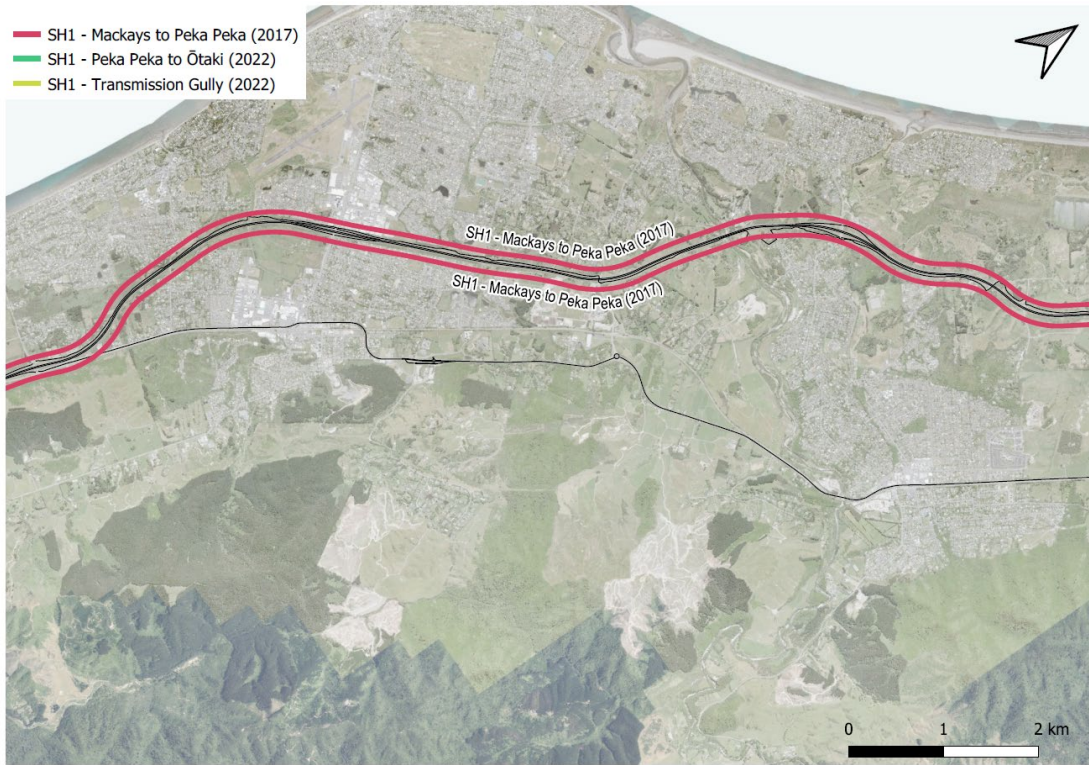


Figure 15: Wellington sites (2/4)

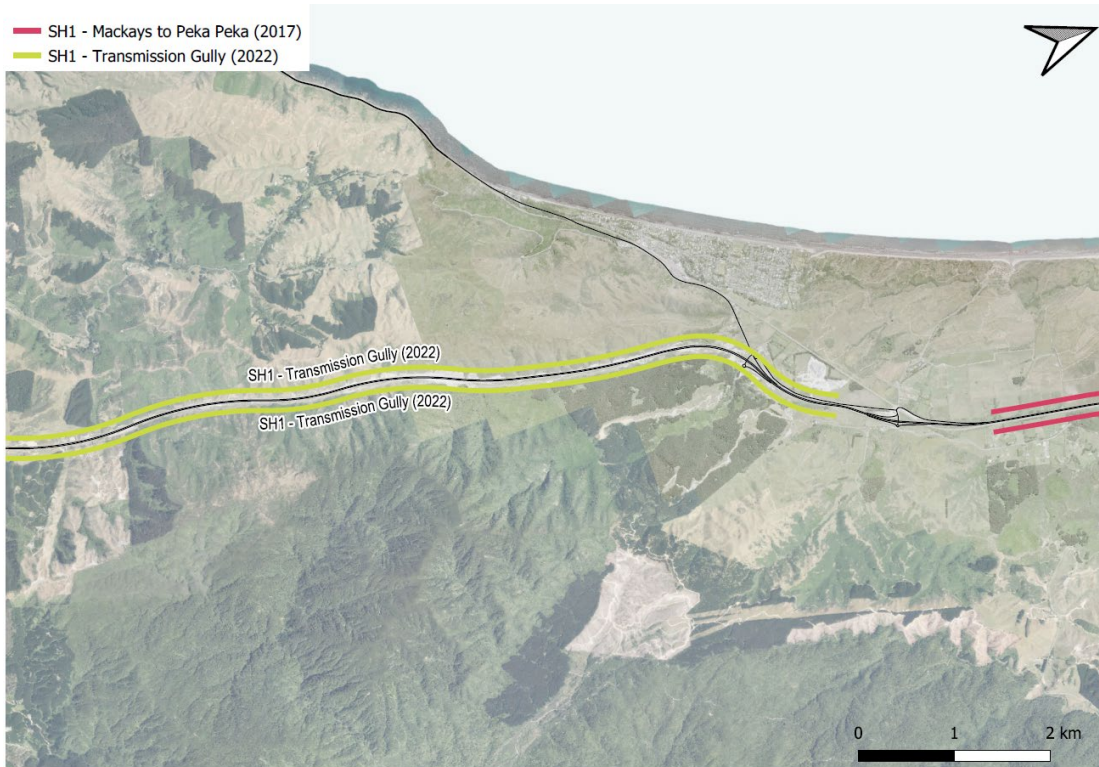
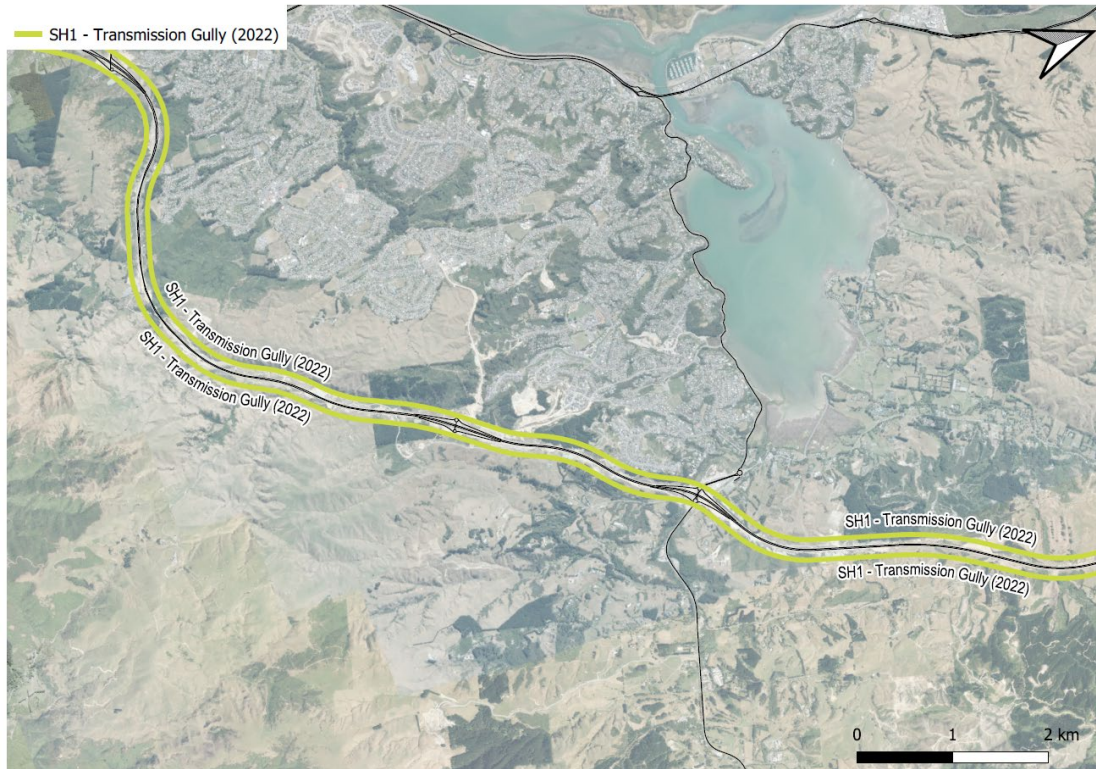


Figure 16: Wellington sites (3/4)





**Figure 17: Wellington sites (4/4)**



## 4.5 Canterbury

Site	Surface type	CPX Level dB L <sub>CPX</sub>	Standard Deviation dB	Length km
<b>SH74 Christchurch Northern Corridor (2021)</b>	EPA7 (30 mm)	94.1	0.9	10.0
	EPA7 (50 mm)	91.1	0.8	13.7
	PA10 (30 mm)	94.9	1.8	1.1
	PA7 (30 mm)	95.1	0.7	16.1
	PA7 HS (30 mm)	93.3	0.6	1.0
	PA7 LV (30 mm)	93.9	0.7	1.1
	SMA7 (30 mm)	95.1	0.5	1.4
<b>SH73 - Chipseal noise trial site (2022)</b>	CHIP 2 Single-Coat	101.0	0.3	0.5
	CHIP 2-4 Racked-In	101.0	0.2	0.5
	CHIP 2-4 Two-Coat	100.9	0.2	0.5
	CHIP 2-4-6 Multi-Coat	101.2	0.3	0.5
	CHIP 3 Single-Coat	100.7	0.2	1.1
	CHIP 3-5 Two-Coat	100.7	0.4	0.7
<b>SH76/SH1 - CSM Stage 2 (2021)</b>	EPA7 (40 mm)	92.7	1.3	38.3
	SMA10 (45 mm)	98.1	0.6	11.6
<b>SH1 - Russley Road (2018)</b>	EPA7 (30 mm)	93.8	0.9	1.36
	PA10 (30 mm)	97.0	1.8	9.7
	SMA10 (40 mm)	98.1	1.4	2.0
<b>SH1 - The Groynes to Sawyers (2017)</b>	EPA10 (30 mm)	97.1	1.9	0.6
	EPA10 HV (30 mm)	95.8	1.6	0.6
	EPA14 (30 mm)	98.4	2.1	0.5
	EPA7 (40 mm)	93.1	1.1	1.4
	PA10 (30 mm)	95.2	1.3	7.9
	SMA10 (40 mm)	98.2	0.6	1.1
<b>SH1 - Western Belfast Bypass (2017)</b>	EPA7 (30 mm)	94.6	1.8	0.5
	EPA7 (40 mm)	93.4	1.3	12.4
	EPA7 (50 mm)	91.7	1.0	0.5
	SMA10 (40 mm)	97.7	0.7	0.8
<b>SH76 - CSM Stage 1 (2012)</b>	EPA10 (40 mm)	100.5	0.6	1.7
	PA10 (40 mm)	100.5	1.1	7.1
	PA14 (40 mm)	98.4	1.8	15.1
<b>SH73 - Paparua Prison</b>	ECHIP 3-5 Dry-Lock	101.6	0.4	0.5
<b>SH73 - Aylesbury Corner</b>	ECHIP 3-5 Dry-Lock	101.6	0.3	0.56
<b>SH1 - Sawyers to Harewood</b>	PA10 (30 mm)	98.8	0.6	4.48
	SMA10 (30 mm)	98.8	0.7	0.1



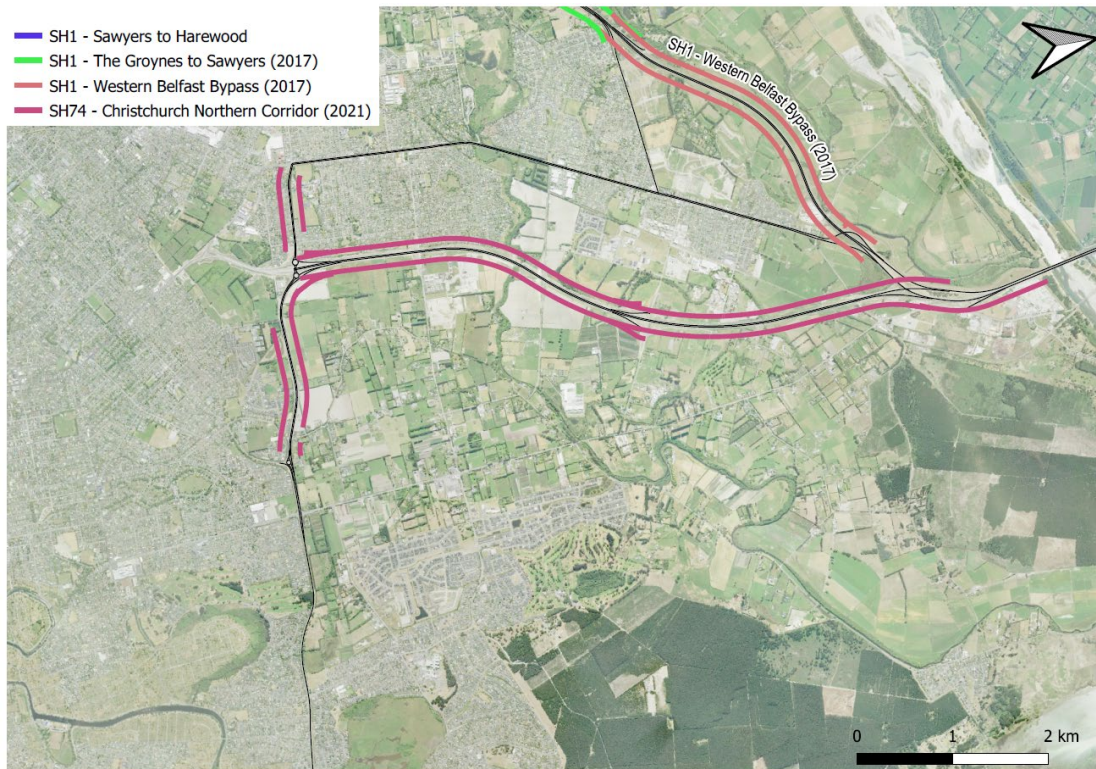


Figure 18: Christchurch sites (1/6)

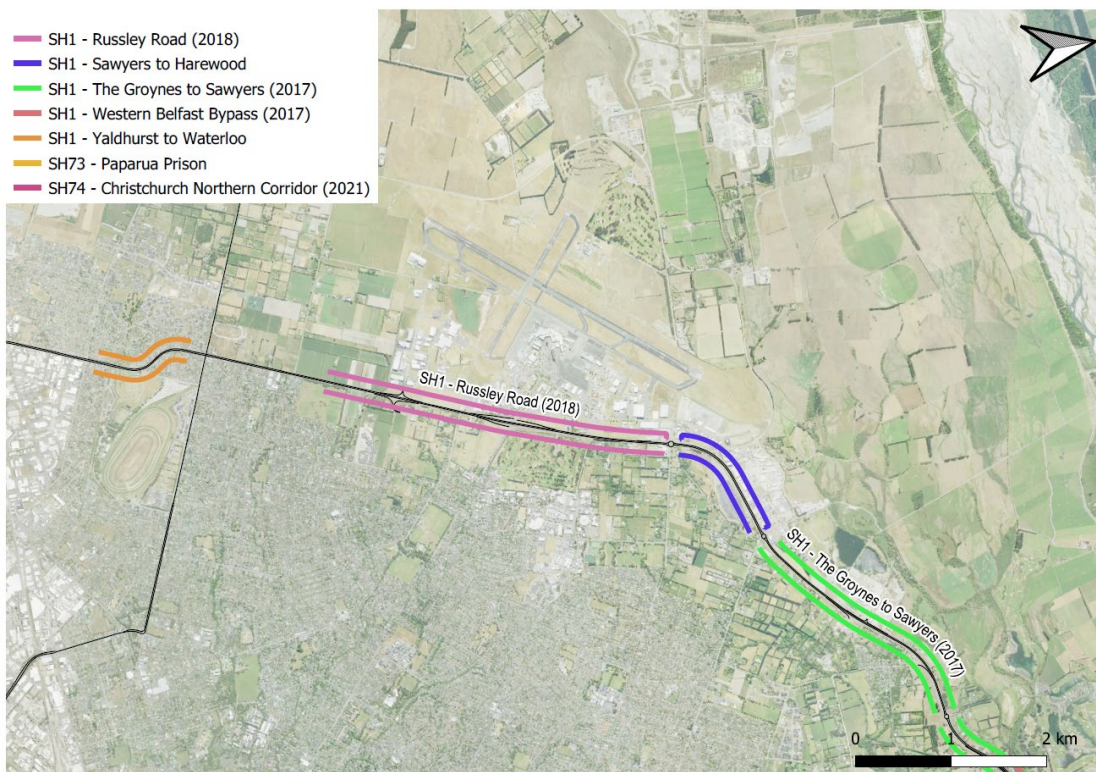


Figure 19: Christchurch sites (2/6)



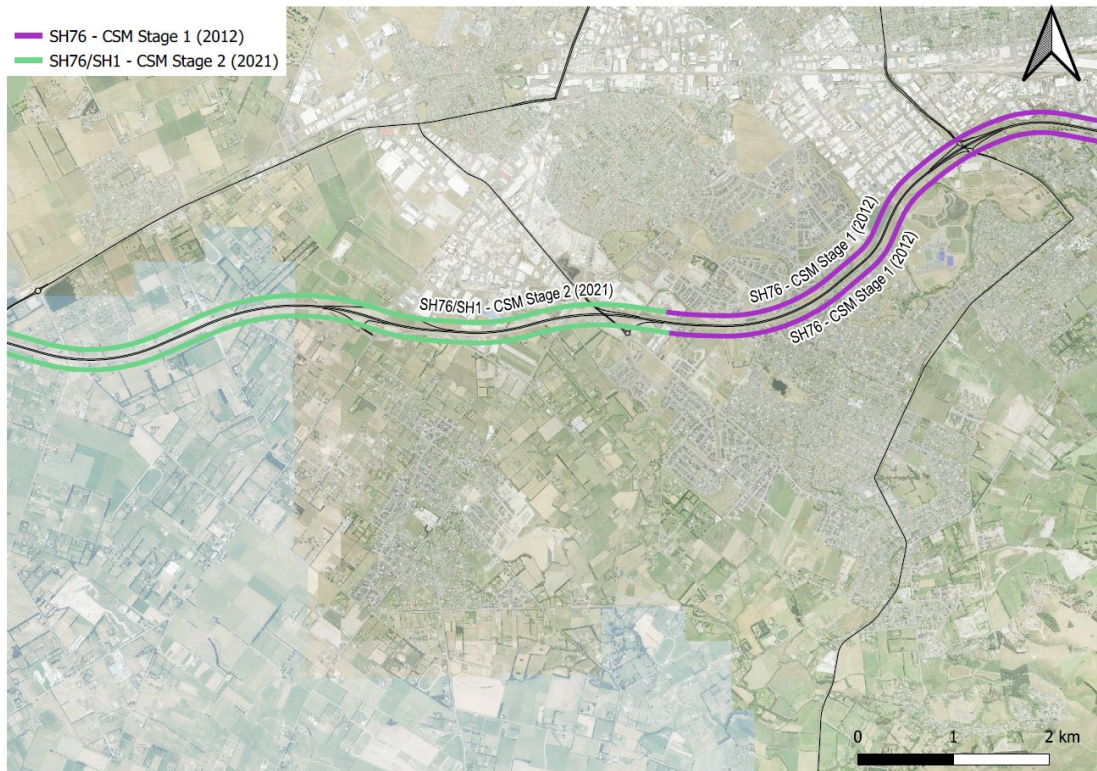


Figure 20: Christchurch sites (3/6)

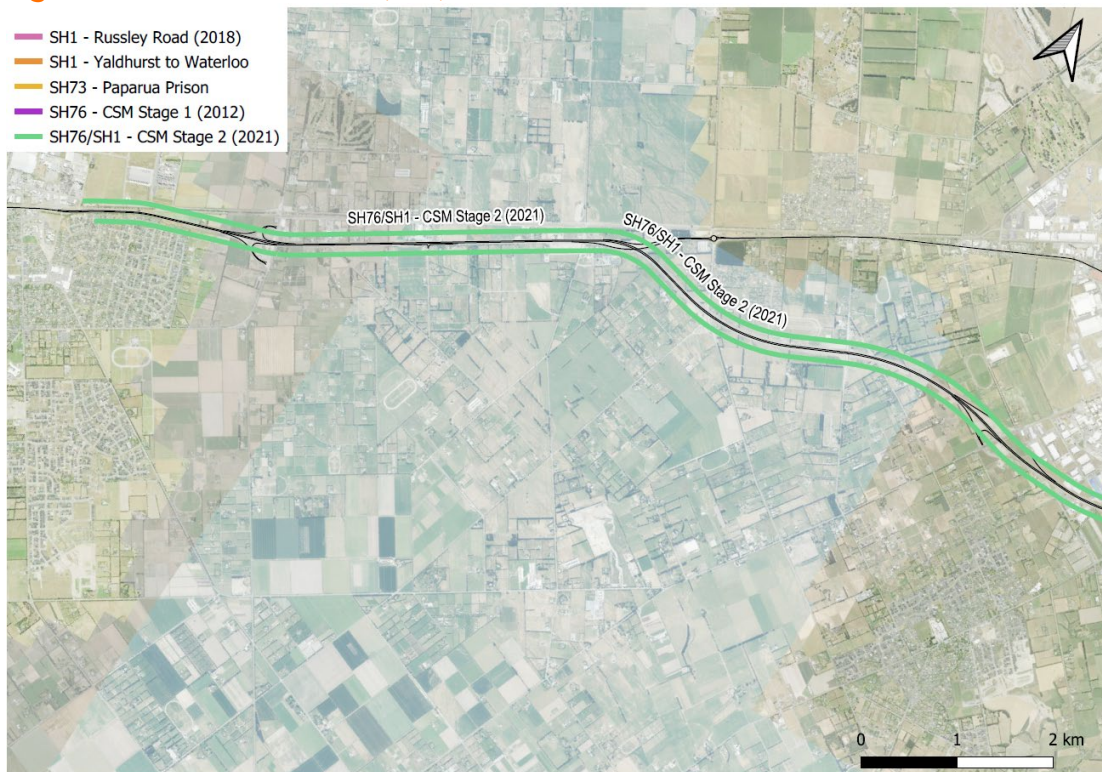


Figure 21: Christchurch sites (4/6)





**Figure 22: Christchurch sites (5/6)**



**Figure 23: Christchurch sites (6/6)**

