

Appendix

Site Name

Beach Haven

Address

Beach Haven Road
Beach Haven, North Shore City

	Easting	Northing	Elevation (m)
NZMG	2662300	6489100	<20
NZTM	1751851	5927391	

General site characteristics

Urban

Topography

Hilly

Micro met characteristics

Site is near a tidal creek that flows SW into the upper Waitemata harbour and bordered by hills rising steeply to N, E, and S.

Site description and area characteristics

Monitor in self contained stainless steel housing located within grounds of private residence. Surrounding area mostly residential except some light industrial/ commercial premises along N side of Beach Haven Rd; houses date mostly from 1960s -1980s, (originally on med-large sized sections; now a lot of infill housing) approx 50% with chimneys

Air Quality Management Area

Urban

Predominant sources

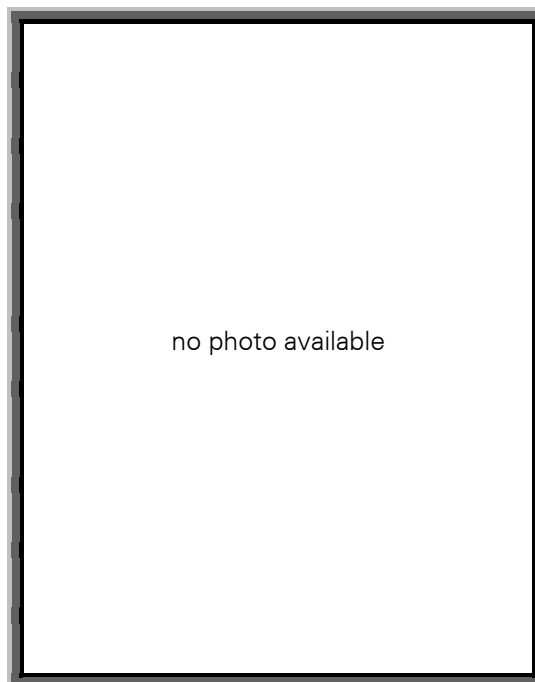
Vehicle and residential (in winter)

Distance from road and other major sources

Less than 3 metres to Beach Haven Road

Vehicle counts

N/a

Any nearby features that could affect measurements?**AS2922 compliant?**

Monitoring commenced

16.06.03

Monitoring ceased

17.09.03

Pollutants monitored

PM₁₀ MicroVol (non-regulatory method)

Inlet height (m)

Meteorological parameters measured on site

Nil

Mast height (m)

n/a

Data Owner

NSCC



Location map.

Map sourced from NZTopoOnline, extracted January 2006, Crown Copyright Reserved.

Site Name

Dominion Road I
(Metropolitan Rentals)

Address

Metropolitan Rentals
321 Dominion Road
Mt Eden, Auckland

	Easting	Northing	Elevation (m)
NZMG	2666395	6478851	60
NZTM	1755966	5917151	



Site - inlet attached to downpipe.

General site characteristics

Urban

Topography

Flat

Micro met characteristics**Site description and area characteristics**

Adjacent to 321 Dominion Road (Metropolitan Rentals) in narrow alley way between two buildings- about 3-3.5m from road side, 300m south of Valley Road intersection and 50m north of Burnley Terrace. Analysers housed in mobile trailer. Area mostly residential with the exception of commercial strip along Dominion Rd itself. Houses from 1920s onward. Med sized sites, with infill housing of newer vintage.

Air Quality Management Area

Urban

Predominant sources

Vehicle and some home heating in winter

Distance from road and other major sources

3m W to Dominion Road (arterial road, aligned N-S)

Vehicle counts

11400 - 7-day ADT (1993) Dominion Rd

Any nearby features that could affect measurements?

Small caravan parked between two buildings - inlet at building edge - effectively equivalent to a wall mounted inlet.

AS2922 compliant?

Monitoring commenced

01.01.94

Monitoring ceased

11.02.96

Pollutants monitored

CO: 01.01.94 – 11.02.96

NOx: 01.01.94 – 11.02.96

Inlet height (m)

2-2.5

Meteorological parameters measured on site

Nil

Mast height (m)

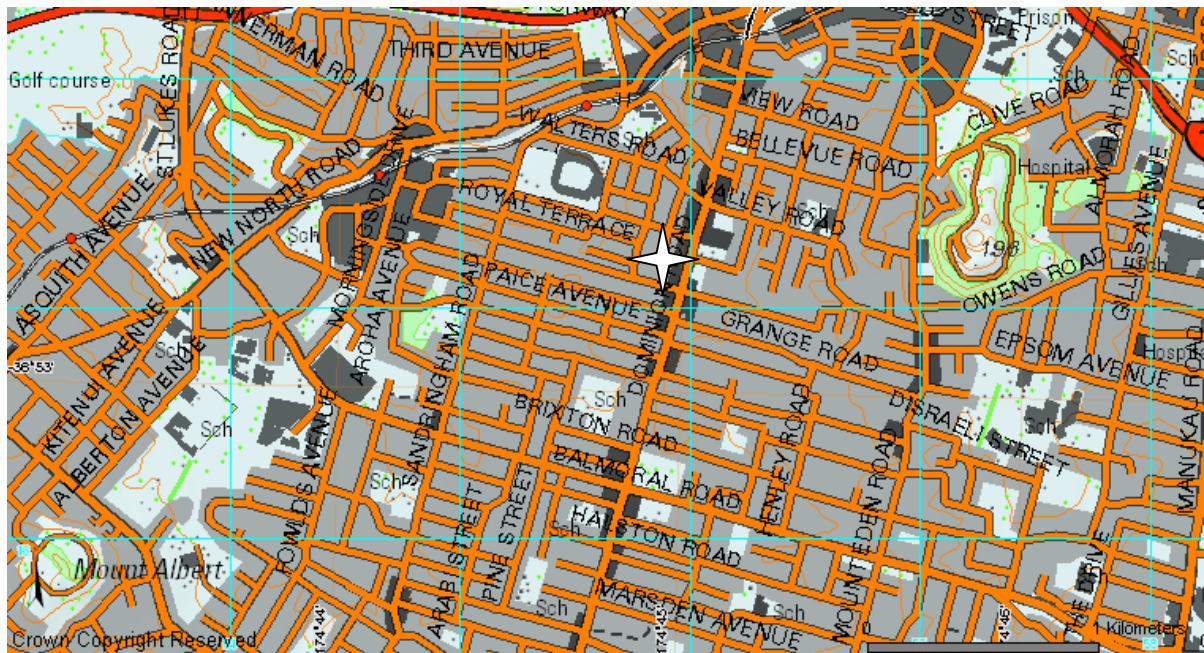
n/a

Data Owner

ARC



Inlet



Location map.

Map sourced from NZTopoOnline, extracted January 2006, Crown Copyright Reserved.

Site Name

Dominion Road II
(Veg Market)

Address

Growers Vegetable Market
270 Dominion Road
Mt Eden, Auckland

	Easting	Northing	Elevation (m)
NZMG	2666500	6479043	60
NZTM	1756071	5917343	

General site characteristics

Urban

Topography

Flat

Micro met characteristics**Site description and area characteristics**

In the carpark of Growers Vege Market. Area mostly residential with the exception of commercial strip along Dominion Rd itself. Houses from 1920s onward. Medium sized sites, with infill housing of newer vintage.

Air Quality Management Area

Urban

Predominant sources

Vehicle and some home heating

Distance from road and other major sources**Vehicle counts****Any nearby features that could affect measurements?**

Building adjacent to mobile trailer will affect wind flow

AS2922 compliant?

Yes



Mobile trailer in rear car-park off Dominion Road.

Monitoring commenced

06.12.01

Monitoring ceased

27.06.02

Pollutants monitored

CO: 06.12.01 – 27.06.02

NOx: 08.12.01 – 27.06.02

Inlet height (m)

Meteorological parameters measured on site

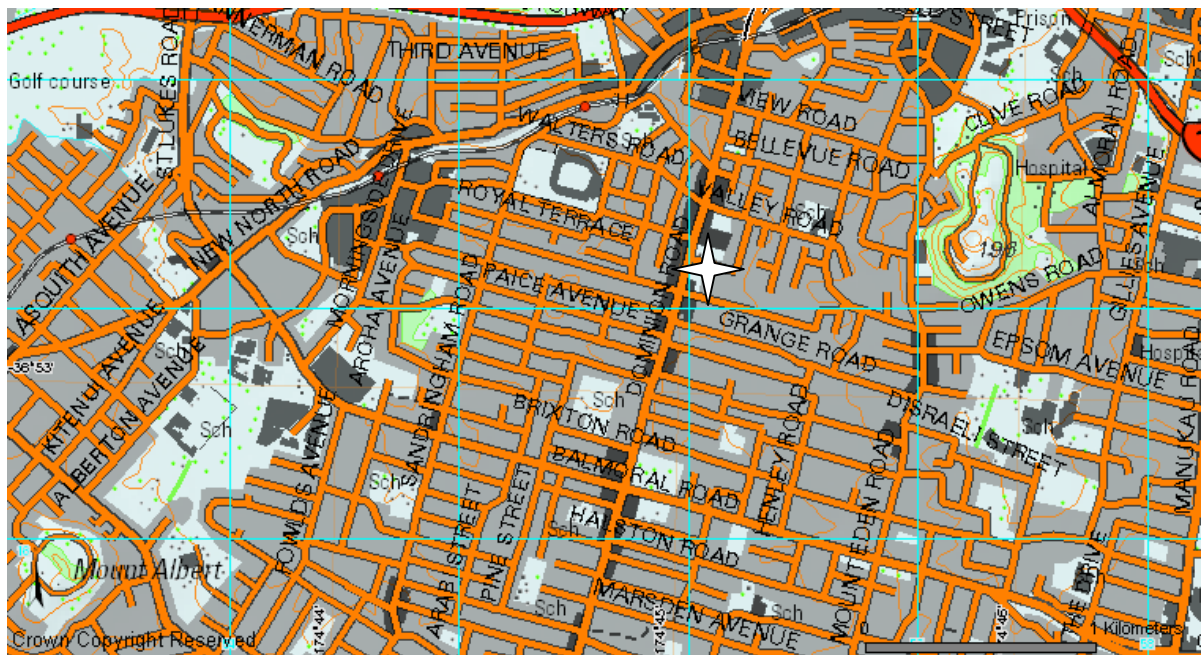
Nil

Mast height (m)

n/a

Data Owner

ARC



Location map.

Map sourced from NZTopoOnline, extracted January 2006, Crown Copyright Reserved.

Site Name

East Tamaki

Address

Manukau Institute of Technology
East Tamaki Rd
Otara, Manukau

	Easting	Northing	Elevation (m)
NZMG	2676893	6469328	10
NZTM	1766483	5907649	

General site characteristics

Urban

Topography

Flat

Micro met characteristics

The large building behind the monitor will shelter the inlet from northerly wind flows.

Site description and area characteristics

Monitors located within an air conditioned portable monitoring shed located within the Manukau Institute of Technology. Sampling inlet extends out of the roof.

Air Quality Management Area

Urban

Predominant sources

Vehicle

Distance from road and other major sources

10m S to East Tamaki Rd (arterial road, aligned W-E); 100 W to Otara Rd; 50m E to Newbury St

Vehicle counts

25,970 7-Day ADT (2003 estimate) East Tamaki Road between Otara Rd and Fulton Cres

Any nearby features that could affect measurements?

Directly behind the monitor are the large two storey buildings of the institute. On the south side of East Tamaki Road are residential houses.

AS2922 compliant?

Yes



Site viewed from the west.

Monitoring commenced

01.07.98

Monitoring ceased

13.08.02

Pollutants monitored

CO: 01.07.98 – 13.08.02

PM₁₀ (Grimm Particulate Sampler):

01.07.98 – 12.08.02

Inlet height (m)

3-3.5



Site viewed from the south.

Meteorological parameters measured on site

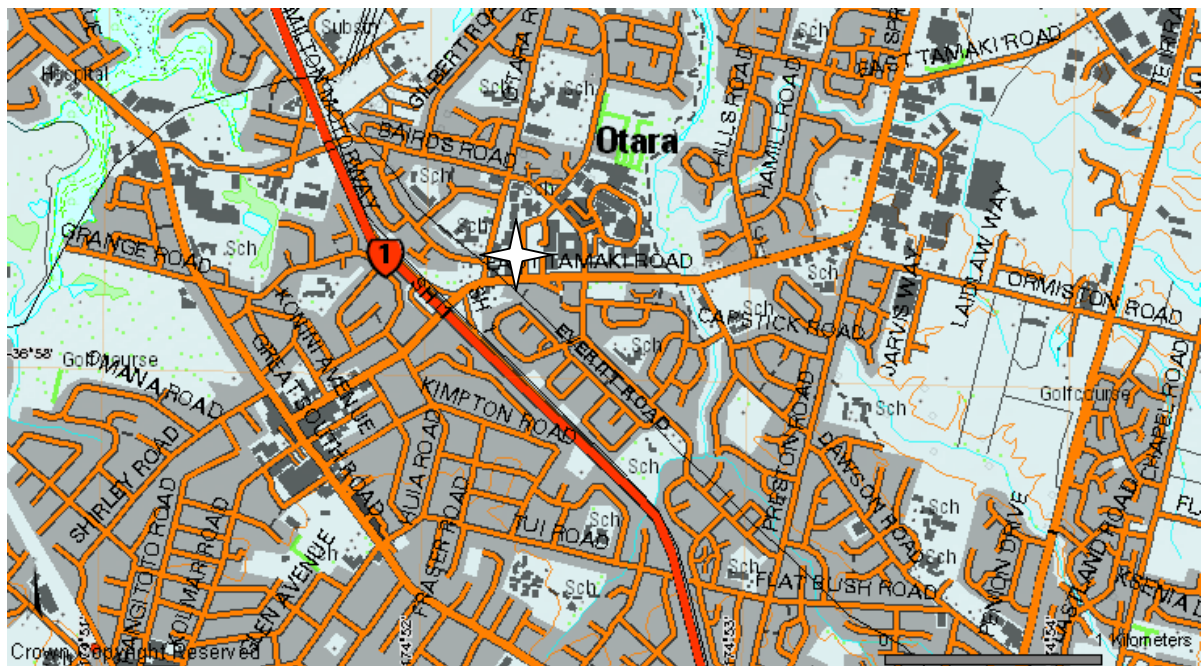
Wind speed, wind direction, ambient temperature, relative humidity.

Mast height (m)

8

Data Owner

MCC



Location map.

Map sourced from NZTopoOnline, extracted January 2006, Crown Copyright Reserved.

Site Name

Hobson Street

Address

240 Hobson St
City, Auckland

	Easting	Northing	Elevation (m)
NZMG	2667221	6481604	40
NZTM	1756787	5919905	



Site - looking south.

General site characteristics

Urban

Topography

Hilly

Micro met characteristics

Wide road - so no significant urban canyon effect.

Site description and area characteristics

Located on the second story of the five story ARC Rideline offices, Hobson St - 25m N of the traffic lighted intersection of Union St and Hobson St. CBD to N and E. Analysers situated in lunch room.

Air Quality Management Area

Urban

Predominant sources

Vehicle

Distance from road and other major sources

2m N to Hobson St (arterial road, aligned W-E); 25m S to Union St (arterial road, aligned N-S); 200m SW to Southern Motorway.

Vehicle counts

28,000 7-day ADT(1998) Hobson St

Any nearby features that could affect measurements?

On the adjacent side of Hobson St to the sampling tube intake tube is a 4 storey building. To the north of this building is a 2 storey building.

AS2922 compliant?

No: but site intended to monitor peak levels

Monitoring commenced

05.09.96

Monitoring ceased

31.03.00

Pollutants monitored

CO

Inlet height (m)

2.5

Meteorological parameters measured on site

Nil

Mast height (m)

n/a

Data Owner

ARC



Location map.

Map sourced from NZTopoOnline, extracted January 2006, Crown Copyright Reserved.

Site Name

Mangere

Address

Mangere Wastewater Treatment Plant
Mangere Bridge, Manukau

	Easting	Northing	Elevation (m)
NZMG	2668262	6469080	<10
NZTM	1757853	5907384	

General site characteristics

Urban

Topography

Undulating, Mt Mangere 1.5km to NE.

Micro met characteristics

Well exposed from all directions

Site description and area characteristics

Located within the grounds of the Wastewater treatment plant. Townships of Mangere and Favona 3km N-SE mostly older houses (1960s) on large sections, ~75% with chimneys. To W-SW is rolling pastureland, and Manukau Harbour. Auckland International Airport is 5km S.

Air Quality Management Area

Urban

Predominant sources**Distance from road and other major sources****Vehicle counts****Any nearby features that could affect measurements?****AS2922 compliant?**

Yes



Inlet attached to building roof.

Monitoring commenced

15.08.95

Monitoring ceased

15.05.96

Pollutants monitored

Ozone

Inlet height (m)

Meteorological parameters measured on site

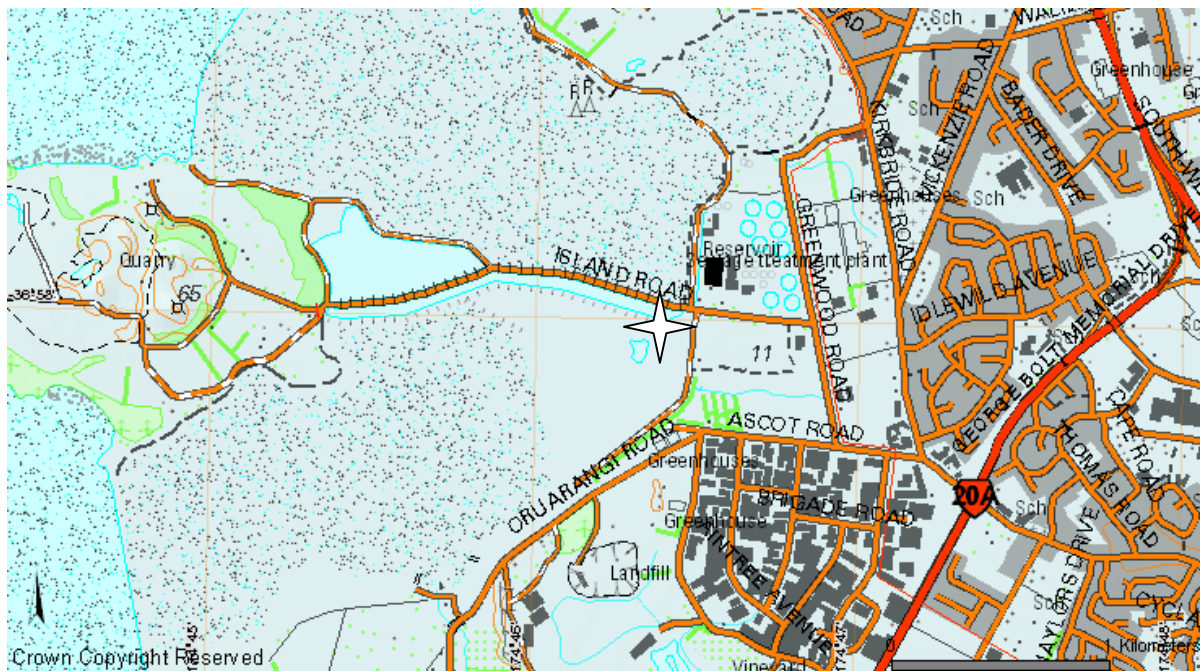
Vertical wind profile, mixing height (acoustic
sounder).

Mast height (m)

n/a

Data Owner

ARC



Crown Copyright Reserved

Location map.

Map sourced from NZTopoOnline, extracted January 2006, Crown Copyright Reserved.

Site Name

Manurewa I
(Post Office)

Address

181-183 Great South Road
Manurewa, Manukau

	Easting	Northing	Elevation (m)
NZMG	2679118	6462674	<20
NZTM	1768721	5901000	

General site characteristics

Urban

Topography**Micro met characteristics**

Site

Site description and area characteristics

Located on an awning over the footpath in shopping/business precinct.

Air Quality Management Area

Urban

Predominant sources

Vehicles

Distance from road and other major sources

<5 m

Vehicle counts

16,251 7-Day ADT (2004) Great South Road between Hill Road and Halver Road

Any nearby features that could affect measurements?

Buildings near inlet

AS2922 compliant?

Monitoring commenced

04.03.96

Monitoring ceased

21.03.97

Pollutants monitored

CO

Inlet height (m)

Meteorological parameters measured on site

Nil

Mast height (m)

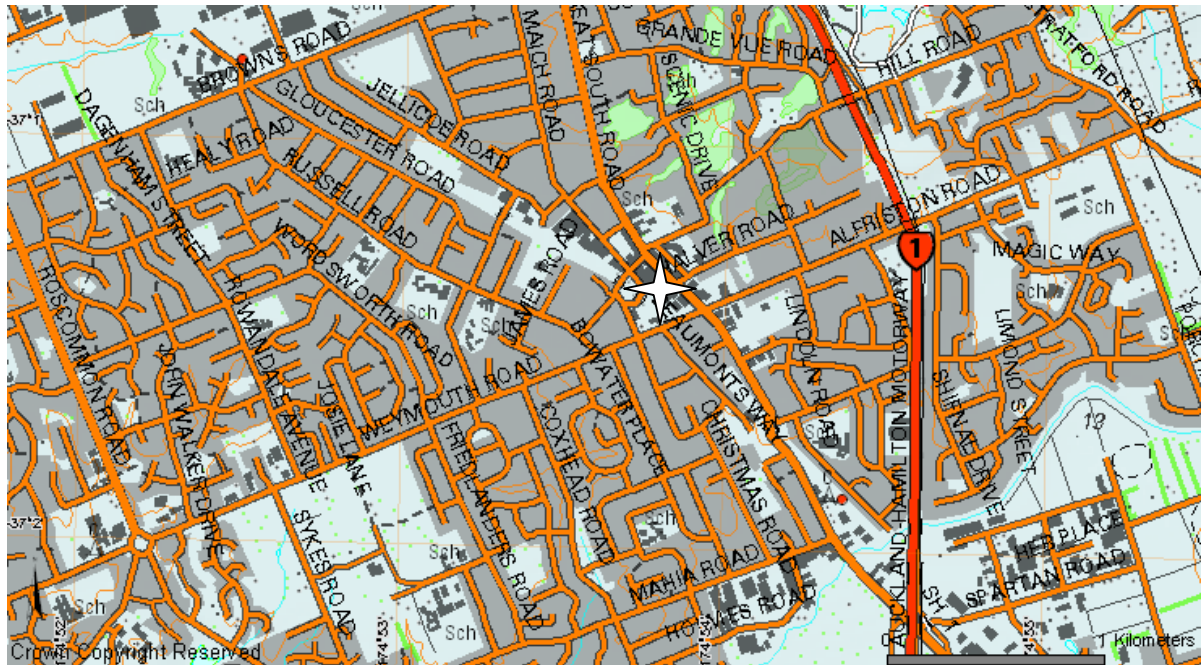
n/a

Data Owner

MCC



Inside the monitor housing



Location map.

Map sourced from NZTopoOnline, extracted January 2006, Crown Copyright Reserved.

Site Name

Mt Albert

Address

DSIR
Mt Albert Road
Mt Albert, Auckland



Aerial photo of site (photo 1959)

	Easting	Northing	Elevation (m)
NZMG	2664286	6477597	40
NZTM	1753860	5915893	

General site characteristics

Urban

Topography

Overall the surrounding area is undulating, with the steep volcanic cone of Mt Albert (summit 135m, approx 500m W) the exception. There is a small ridge slightly higher and just SW of the DSIR complex from where the land slopes down to the S and W. Immediately N of the DSIR site the land slopes down to the N.

Micro met characteristics

Prevailing wind from the SW; Mt Albert (135m) approx 500m W may have influence.

Site description and area characteristics

Inlet on the top of a pole mounted on a concrete pad, about 70m NE (downhill) of multi-storey science centre building. In the early 1990s the site relocated 20m NW; site characteristics remained similar. Surrounding area mostly residential, many large older houses (1920s-1960s) on large sites, with some newer, infill housing, approximately 75% with chimneys. Commercial/light industrial area 1km to S. Mt Albert Grammar School Farm (c. 14ha) <1km N.

Air Quality Management Area

Urban

Predominant sources

Vehicle and residential (during winter)

Distance from road and other major sources

Original site 190m WSW to Mt Albert Rd (arterial road, aligned NNW-SSE); Subsequent site 165m WSW to Mt Albert Rd.

Vehicle counts

10,000 vehicles per day Mt Albert Rd (1981).

Any nearby features that could affect measurements?**AS2922 compliant?**

Monitoring commenced

31.01.64

Monitoring ceased

17.01.96

Pollutants monitored

TSP (HD MedVol): 31.01.64 – 17.01.96

Lead (HD MedVol): 01.01.64 – 17.01.96

Inlet height (m)

2

Meteorological parameters measured on site

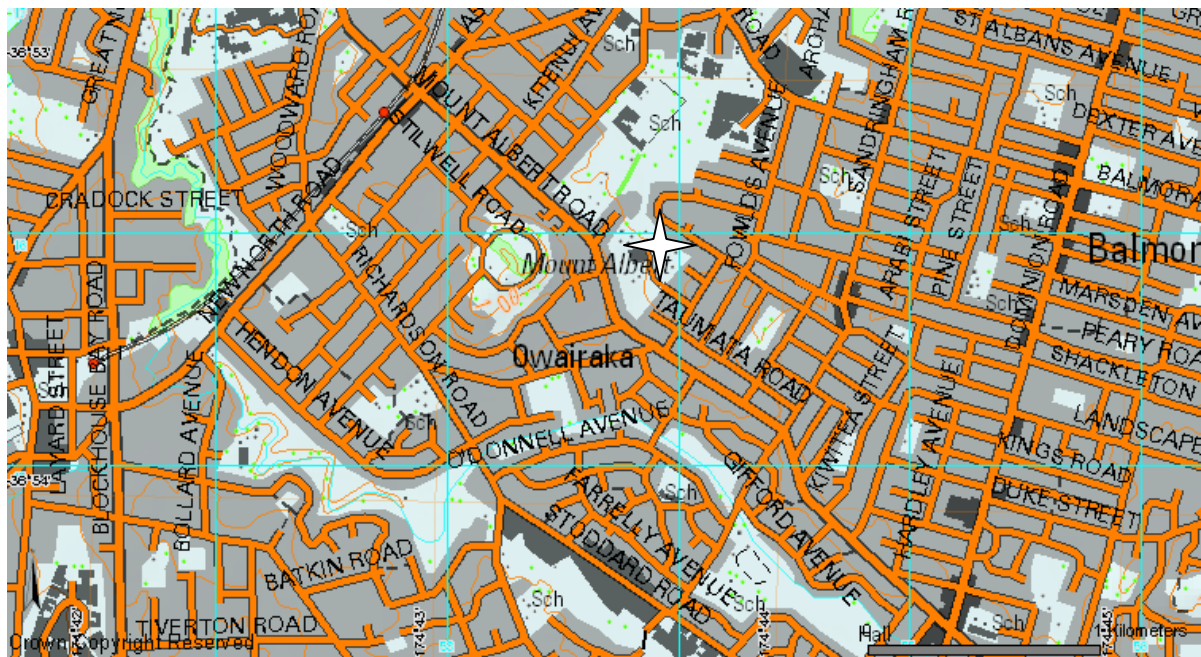
Nil

Mast height (m)

n/a

Data Owner

MoH/DoH



Location map.

Map sourced from NZTopoOnline, extracted January 2006, Crown Copyright Reserved.

Site Name

Mt Eden I
(Fenton St)

Address

3 Fenton St
Mt Eden, Auckland

	Easting	Northing	Elevation (m)
NZMG	2667009	6479963	70
NZTM	1756578	5918264	

General site characteristics

Urban

Topography

No photo available

Micro met characteristics

Building will affect air flows

Site description and area characteristics

On the roof of a three storey building.

Air Quality Management Area

Urban

Predominant sources**Distance from road and other major sources**

<30m N to Fenton St (aligned E-W); <30m W to Wynyard St (aligned E-W); 250m W to Dominion Rd (arterial, aligned N-S); 120m N to New North Rd (arterial, aligned SW-NE); 30m N to Railway, aligned E-W.

Vehicle counts

Dominion Rd 15,500 v/day; Wynyard Rd 3,000 v/day; New North Rd 19,000 v/day (1981)

Any nearby features that could affect measurements?

Train track immediately north of site.

AS2922 compliant?

Monitoring commenced

06.03.75

Monitoring ceased

31.12.83

Pollutants monitored

TSP (HD MedVol): 06.03.75 – 31.12.83

Lead (HD MedVol): 06.03.75 – 31.12.83

Inlet height (m)

Meteorological parameters measured on site

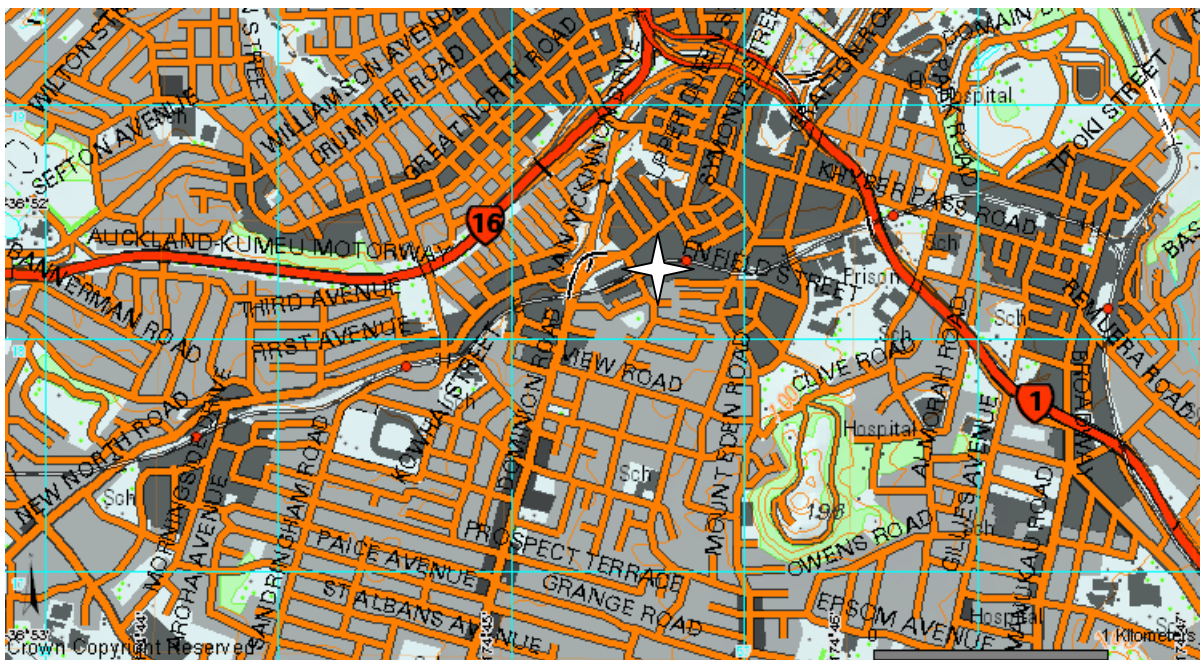
Wind speed and velocity

Mast height (m)

n/a

Data Owner

MoH



Location map.

Map sourced from NZTopo *Online*, extracted January 2006, Crown Copyright Reserved.

Site Name

Mt Eden II (A)
(Kelly St - ESR Building)

Address

17 Kelly St
Mt Eden, Auckland

	Easting	Northing	Elevation (m)
NZMG	2667273	6479731	86
NZTM	1756842	5918033	

General site characteristics

Urban



NO_x inlets and passive sampler on roof of ESR building.

Topography

Flat in immediate area, undulating to hilly beyond. Mt Eden (summit 196m) approx 0.8km to SSE.

Micro met characteristics

Residential house and the ESR centre will influence flow characteristics and may partly shield the intake tube and induce more turbulence into the flow. Wake effects from Mt Eden may also influence flow characteristics in the area.

Site description and area characteristics

Inlets on the roof of the ESR building, 40m SW of Mt Eden Rd. On the W side of Mt Eden Rd residential premises surround the ESR Science Centre. On the E side of Mt Eden Rd are commercial premises. Mt Eden summit (196m) is about 0.8km SSE. A railway track (aligned E-W) is about 200m to the north Residential to W (mostly larger older houses dating from 1920s with small sections, plus some later additions), commercial to E and N.

Air Quality Management Area

Urban

Predominant sources

Vehicle

Distance from road and other major sources

20m E to Mt Eden Rd (arterial road, aligned N-S); 200m (approx) N to railway track (aligned E-W).

Vehicle counts

15,000 7-day ADT (1999)

Any nearby features that could affect measurements?

Street parking for shops on both sides of Kelly St and Mt Eden Rd.

AS2922 compliant?

Monitoring commenced

29.12.82

Monitoring ceased

31.01.01

Pollutants monitored

NO_x: 01.01.91 – 31.01.01

PM₁₀ (Partisol): 16.02.97 – 21.01.01

PM_{2.5}: 30.08.97 – 23.01.01

TSP: 29.12.82 – 24.01.01

Lead: 01.01.83 – 30.09.00



Partisol units on roof.

Inlet height (m)

5.0 NO_x

6.5 Particulate

Meteorological parameters measured on site

Nil – mast for instantaneous readings only – no records kept.

Mast height (m)

N/a

Data Owner

MfE and ARC:

PM₁₀ and PM_{2.5} owned by ARC

NO_x, TSP and Lead owned by MfE.



Location map.

Map sourced from NZTopoOnline, extracted January 2006, Crown Copyright Reserved.

Site Name

Musick Point
(Gardeners' Shed)

Address

Howick Golf Course
Musick Pt
Bucklands Beach, Manukau

	Easting	Northing	Elevation (m)
NZMG	2679940	6481040	25
NZTM	1769506	5919367	

General site characteristics

Urban



Site - inlet protruding from roof of gardeners' shed.

Topography

The peninsula is undulating; bounded by steep cliffs that drop approximately 20m to harbour below.

Micro met characteristics

Wind flows from the N are likely to be influenced by the shed and nearby trees. The wakes from the roof edges will induce turbulence into the flow. However, the site is relatively well exposed to 'urban plume' emissions from central Auckland City (12km W).

Site description and area characteristics

Situated in groundskeepers' shed (22 x 7 x 3.5m) approximately 100m E of Tamaki River, and 1km S of the tip of Musick Point peninsula that protrudes N into the Hauraki Gulf. Sampling inlet extends from western end of the roof, about 1m above roofline. At base of peninsula is residential housing. Many mature trees <8m on the golf course that takes up the northern end of the peninsula. Houses at the southern end and in adjacent Blockhouse Bay range from 80 to <5 years old; low to medium density with a range of section sizes. About 30% of houses have chimneys.

Air Quality Management Area

Urban

Predominant sources

Urban plume (predominantly industrial and vehicle emissions) – some emissions associated with groundskeepers' vehicles.

Distance from road and other major sources

35m E of golf course access road; 0.5km N of Musick Point Rd (residential street); 12km E of Auckland CBD.

Vehicle counts

N/a

Any nearby features that could affect measurements?

Large trees near shed

AS2922 compliant?

Monitoring commenced

17.01.96

Monitoring ceased

07.01.99

Pollutants monitored

NO_x: 09.07.96 – 14.08.98

Ozone: 17.01.96 – 07.01.99

Inlet height (m)

4.5

Meteorological parameters measured on site

Wind speed and wind direction

Mast height (m)

6

Data Owner

ARC



Inlet extending from roof.



Analysing equipment inside shed.



Location map.

Map sourced from NZTopoOnline, extracted January 2006, Crown Copyright Reserved.

Site Name

Newton
(Canada St - Moblie)

Address

Top Kids Daycare Centre
Canada Street
Newton, Auckland

	Easting	Northing	Elevation (m)
NZMG	2667275	6480996	60
NZTM	1756842	5919298	

General site characteristics

Urban



Mobile trailer in car park of child-care centre.

Topography

Steep slope down (S) to motorway gully and up (N) to Karangahape Rd.

Micro met characteristics

Steep slope and multi storey buildings to N may shelter from this direction.

Site description and area characteristics

In carpark of childcare centre on corner of Canada St and Mercury Lane. Surrounding area is predominantly commercial /light industrial.

Air Quality Management Area

Urban

Predominant sources

Vehicle

Distance from road and other major sources

Mercury St, (E) and Canada St (S) <20m; Sthn motorway <70m S; Upper Queen St 100m E.

Vehicle counts

N/a

Any nearby features that could affect measurements?

Multi storey carpark adjacent to site to N; Southern Motoway with many off/on ramps to S.

AS2922 compliant?

No: but not deemed necessary as site purpose is to monitor peak pollutant levels and the effect on children at the childcare facility.

Monitoring commenced

03.07.02

Monitoring ceased

07.03.03

Pollutants monitored

CO: 03.07.02 – 03.03.03

NO_x: 10.07.02 – 06.03.03

PM₁₀ (Sequential Partisol): 16.07.02 – 31.12.02

Inlet height (m)

2.5

Meteorological parameters measured on site

Nil

Mast height (m)

N/a

Data Owner

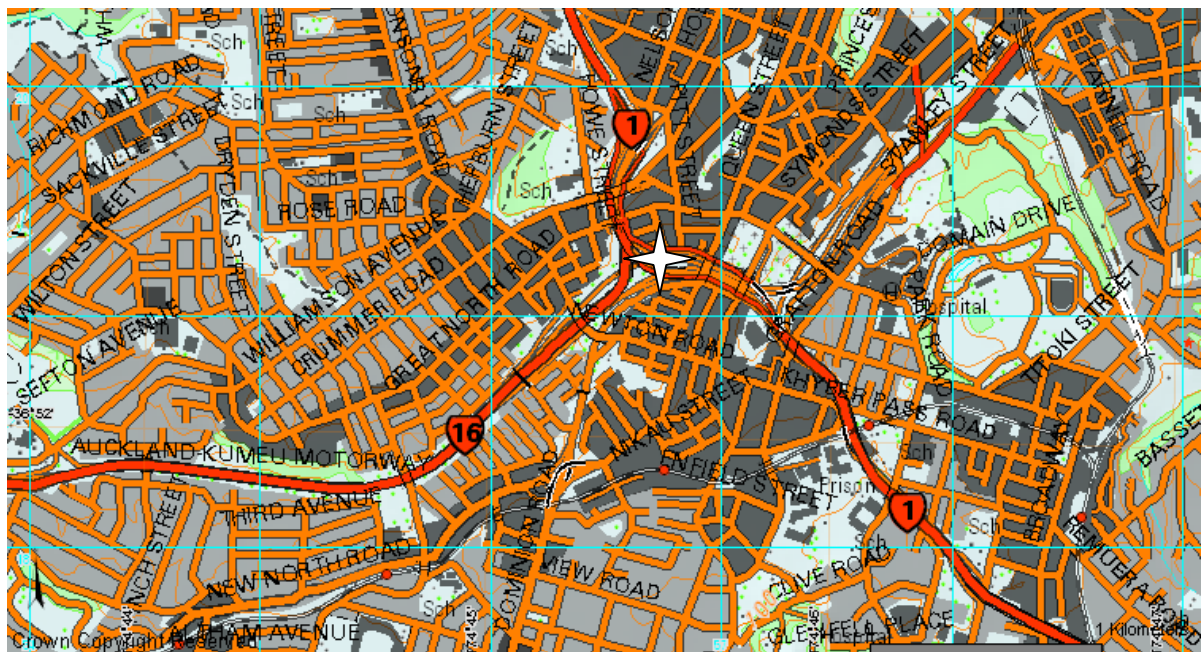
ARC



View south over Southern Motorway from adjacent multi-level car park. Trailer not yet installed.



Site viewed from the west. Mobile trailer to be parked where silver car is in image.



Location map.

Map sourced from NZTopoOnline, extracted January 2006, Crown Copyright Reserved.

Site Name

Northcote

Address

Corner of Northcote Road and Akoranga Drive
Northcote, North Shore City

	Easting	Northing	Elevation (m)
NZMG	2666960	6487970	20
NZTM	1756513	5926270	

General site characteristics

Urban

Topography

Flat

Micro met characteristics

Surrounding land reasonably flat and exposed. Buildings in vicinity will introduce turbulence.

Site description and area characteristics

Telecom substation on southern corner of intersection between Akoranga Drive and Northcote Rd. TSP inlet on side of building, Partisol on roof of shed. Surrounding area is residential from S-NW; houses of mixed age but mostly dating from 1960s through 1990s. Wairau commercial/industrial park extends from 1km NNW. Northcote Rd motorway junction (SH1) 0.5km NE; Lake Pupuke 1.5km NE. Sports grounds and golf course to E and N.

Air Quality Management Area

Urban

Predominant sources

Vehicle and domestic

Distance from road and other major sources

15m E to Akoranga Drive (aligned NW-SE); 15m N to Northcote Rd. (aligned NE-SW).

Vehicle counts

N/a

Any nearby features that could affect measurements?

Large tree close to intersection <10m N of site. Traffic queues for motorway often extend past site in morning rush hour. Service stations on W and N corners of intersection opposite site.

AS2922 compliant?

No; clear sky angle above HD MedVol inlet requirement not met.



HD Med Vol inlet attached to side of building;
Partisol inlet on roof of shed.

Monitoring commenced

24.08.83

Monitoring ceased

05.04.02

Pollutants monitored

TSP (HD MedVol): 24.08.83 – 03.04.02

TSP (Partisol): 25.02.98 – 05.04.02

Lead (HD MedVol): 31.10.93 – 30.06.99

Inlet height (m)

4 HD MedVol

3 Partisol

Meteorological parameters measured on site

Nil

Mast height (m)

N/a

Data Owner

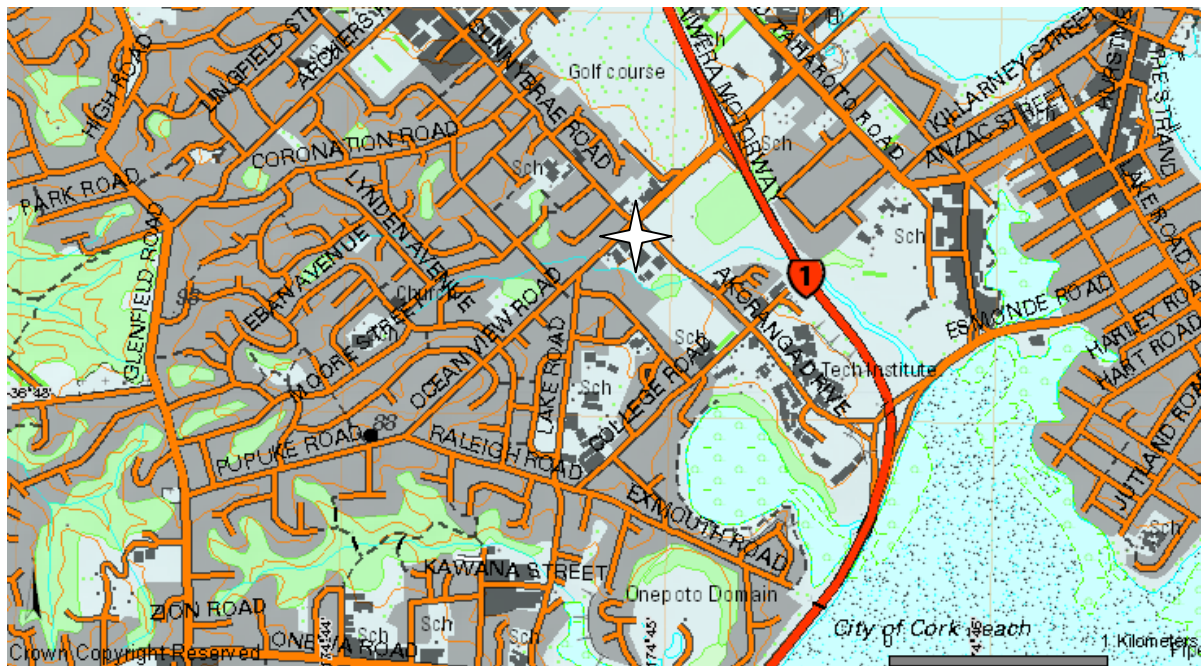
ARC (HD MedVol data prior to 1983 owned by Ministry of Health)



Site viewed from north



Site from northeast side of Akoranga Drive



Location map.

Map sourced from NZTopoOnline, extracted January 2006, Crown Copyright Reserved.

Site Name

One Tree Hill

Address

One Tree Hill Domain
Manukau Rd
One Tree Hill, Auckland

	Easting	Northing	Elevation (m)
NZMG	2668553	6475786	70
NZTM	1758130	5914091	

No photo available

General site characteristics

Urban

Topography

Mostly flat/undulating to N, W and S; One Tree Hill (summit 183m) 1km NE; Three Kings 1.5km W

Micro met characteristics**Site description and area characteristics**

Located in Watercare Services Ltd. shelter in western end of One Tree Hill Domain, within 20m of Manukau Rd, 80 m south of Lewin Rd. Residential to W and N, One Tree Hill Domain to NE (approx 48 ha).

Air Quality Management Area

Urban

Predominant sources

Vehicles on roads in park and main roads near park

Distance from road and other major sources**Vehicle counts****Any nearby features that could affect measurements?****AS2922 compliant?**

Monitoring commenced

12.02.96

Monitoring ceased

04.05.96

Pollutants monitored

NO_x

Inlet height (m)

Meteorological parameters measured on site

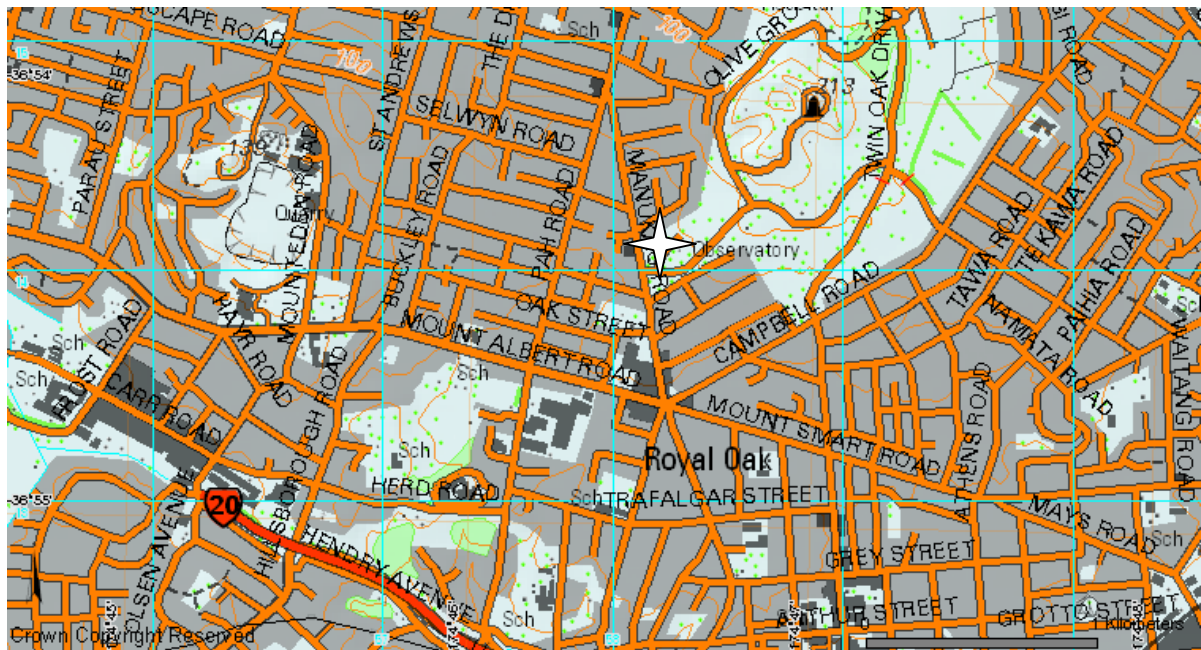
Nil

Mast height (m)

n/a

Data Owner

ARC



Location map.

Map sourced from NZTopoOnline, extracted January 2006, Crown Copyright Reserved.

Site Name

Penrose I
(Great Sth Rd - Clinic Roof)

Address

Penrose Occupational Health Clinic
766 Great South Road
Penrose, Auckland

	Easting	Northing	Elevation (m)
NZMG	2672294	6475235	20
NZTM	1761872	5913547	

General site characteristics

Industrial



Partisol inlets on roof; SO₂ attached to side of building (at right of image).

Topography

Flat

Micro met characteristics

Surrounding buildings to the NE, E and SE will shield the monitor and introduce turbulence.

Site description and area characteristics

On the eastern side of Great South Rd (a busy arterial road). On the opposite side of Great South Road are a train track and station. From NW-S and to the NE are industrial premises; residential to the N and SW. Houses date from 1930s onward; about 50% with chimneys.

Air Quality Management Area

Urban

Predominant sources

Vehicle and industry

Distance from road and other major sources

40m SW to Great South Road (arterial, aligned NW-SE; 330m NE to Southern Motorway (aligned NW-SE); 150m SE to Penrose Rd (aligned SW-NE). Railway line (aligned NNW-SSE) approx 90m SW of site.

Vehicle counts

Great South Road: 18,000; Southern Motorway: 99,000 (7-day ADT-1998); [1981:Great South Rd N of site: 22,000 v/day; Great South Rd S of site: 14,500 v/day; Southern Motorway: 55,000 v/day; Penrose Rd 16,000 v/day]

Any nearby features that could affect measurements?

13m to the NE is a large 3 storey building and the ACI industrial plant is to the south east

AS2922 compliant?

Monitoring commenced

31.01.64

Monitoring ceased

03.07.02

Pollutants monitored

PM₁₀ (HiVol): 28.04.94 – 09.10.01
PM₁₀ (Partisol): 12.10.01 – 12.04.02
PM_{2.5} (Partisol): 16.09.97 – 12.04.02
TSP (HD MedVol): 31.01.64 – 03.07.02
Lead (HD MedVol): 31.01.64 – 30.06.02
SO₂ (Wet Chem.): 20.07.75 – 27.12.00
Smoke: 20.07.75 – 27.12.00
NOx: 1987 - 1989

Inlet height (m)

5.6 Particulate /Lead
4.0 SO₂ and Smoke

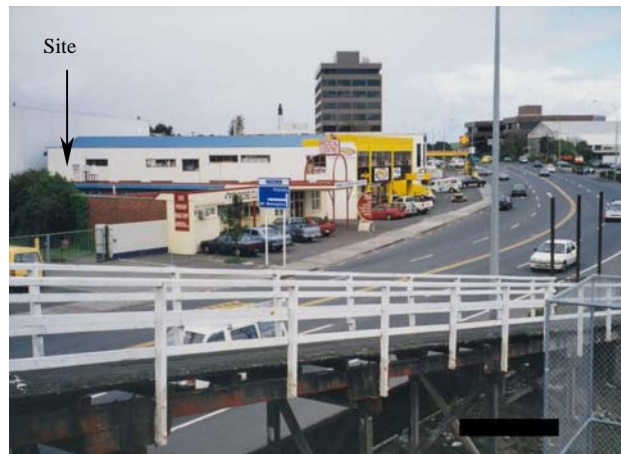
Meteorological parameters measured on site

Mast height (m)

6

Data Owner

MfE and ARC
PM₁₀ and PM_{2.5} data owned by ARC and
remainder owned by MfE/MOH



View south along Great South Road. Site on LHS of road on roof of clinic (photo taken in 1999).



Location map.

Map sourced from NZTopoOnline, extracted January 2006, Crown Copyright Reserved.

Site Name

Penrose II (A)
(Gavin St Substation - caravan)

Address

19 Gavin St
Penrose, Auckland

	Easting	Northing	Elevation (m)
NZMG	2672153	6475865	20
NZTM	1761730	5914177	

**General site characteristics**

Industrial

Topography

Flat

Micro met characteristics

Surrounding structures will both shield the monitor and introduce more turbulence into the flow.

Site description and area characteristics

Air conditioned caravan within the Gavin St substation, approximately 50m E of the Southern Motorway. The motorway is approximately 2m lower than the ground level at the monitoring site. To the NE-NW are industrial premises. To the north residential. Houses date from 1930s onward; about 50% with chimneys.

Predominant sources

Vehicle and industry

Distance from road and other major sources

50m W to Southern Motorway (aligned N-S)

Vehicle counts

99,000 (approx., 2001 information)

Any nearby features that could affect measurements?

Building adjacent to caravan - NE; Three stacks (300m S) at ACI Glass.

AS2922 compliant?

Monitoring commenced

1989

Monitoring ceased

October 2000

Pollutants monitored (past)

NO_x

Inlet height (m)

3.6

Meteorological parameters measured on site

None

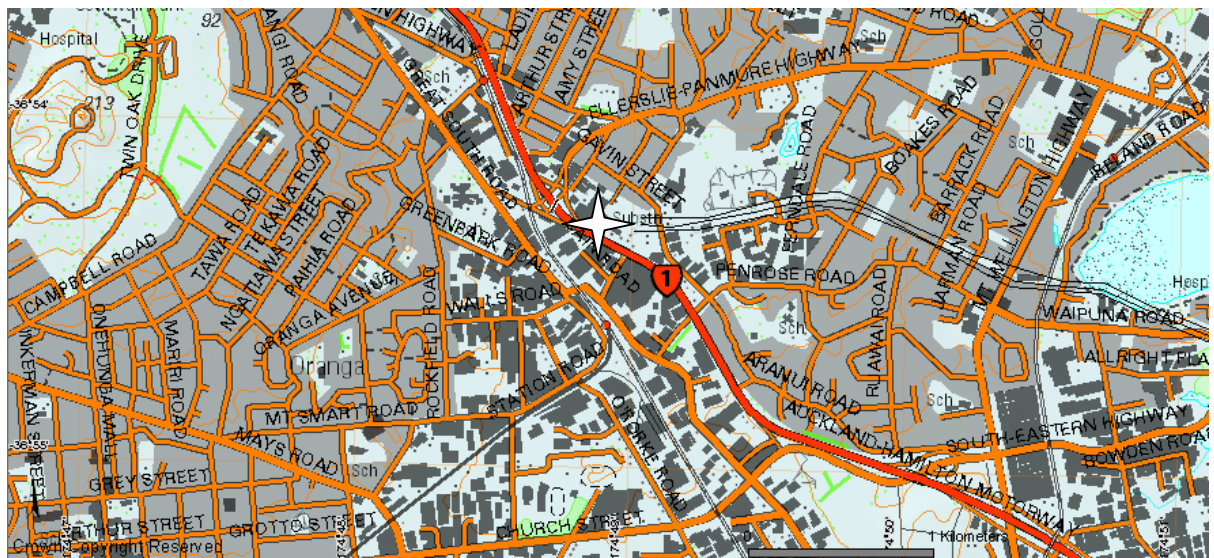
Mast height (m)

Data Owner

MfE



Analyser in caravan.



Location map.

Map sourced from NZTopoOnline, extracted January 2006, Crown Copyright Reserved.

Site Name

Penrose III (A)
(Great Sth Rd - ACI Trailer)

Address

ACI Glass
752 Great South Road
Penrose, Auckland

	Easting	Northing	Elevation (m)
NZMG	2672269	6475230	20
NZTM	1761847	5913542	

General site characteristics

Industrial

Topography

Flat

Micro met characteristics

Buildings may affect airflow.

Site description and area characteristics

Temporary location in air conditioned mobile trailer until shed installation at same site - eastern side of Great South Rd (a busy arterial road). On the opposite side of Great South Road are a train track and station. From NW-S and to the NE are industrial premises; residential to the N and SW. Houses date from 1930s onward; about 50% with chimneys.

Air Quality Management Area

Urban

Predominant sources

Vehicle and industry

Distance from road and other major sources

15m SW to Great South Road (arterial, aligned NW-SE; 350m NE to Southern Motorway (aligned NW-SE); 160m SE to Penrose Rd (aligned SW-NE). Railway line (aligned NNW-SSE) approx 70m SW of site.

Vehicle counts**Any nearby features that could affect measurements?**

Immediately to the NE is a large 3 storey building and the ACI industrial plant is to the south east.

AS2922 compliant?

Yes

No photo available

Monitoring commenced

17.11.00

Monitoring ceased

28.08.01

Pollutants monitored

NO_x: 18.11.00 – 28.08.01

SO₂: 23.01.01 – 28.08.01

Inlet height (m)

3

Meteorological parameters measured on site

Mast height (m)

Data Owner

MfE (SO₂) and ARC (NO_x)



Location map.

Map sourced from NZTopoOnline, extracted January 2006, Crown Copyright Reserved.

Site Name

Penrose III (B)
(Great Sth Rd - ACI Shed)

Address

ACI Glass
752 Great South Road
Penrose, Auckland

	Easting	Northing	Elevation (m)
NZMG	2672269	6475230	20
NZTM	1761847	5913452	

General site characteristics

Industrial



View of site from north.

Topography

Flat

Micro met characteristics

Buildings likely to affect localised airflows

Site description and area characteristics

Eastern side of Great South Rd (a busy arterial road). On the opposite side of Great South Road are a train track and train station. From NW-S and to the NE are industrial premises; residential to the N and SW. Houses date from 1930s onward; about 50% with chimneys.

Air Quality Management Area

Urban

Predominant sources

Vehicle and industry

Distance from road and other major sources

15m SW to Great South Road (arterial, aligned NW-SE; 350m NE to Southern Motorway (aligned NW-SE); 160m SE to Penrose Rd (aligned SW-NE). Railway line (aligned NNW-SSE) approx 70m SW of site.

Vehicle counts**Any nearby features that could affect measurements?**

ACI plant to N and NE and a single storey building immediately to SE.

AS2922 compliant?

Yes

Monitoring commenced

31.08.01

Monitoring ceased

17.05.05

Pollutants monitored

NO_x: 31.08.01 – 30.11.01

PM₁₀ (Partisol): 13.04.02 – 21.03.04

PM₁₀ (TEOM): 18.01.02 – 02.02.03

PM_{2.5} (Partisol): 12.04.02 – 21.03.04

TSP (HD MedVol): 25.09.02 – 17.05.04

Lead (HD MedVol): 01.06.03 – 17.05.04

SO₂ (Fluorescence): 31.08.01 – 30.01.04

Inlet height (m)

3.5 Particulate;

3.0 gas

Meteorological parameters measured on site

Wind speed, wind direction, ambient temperature, relative humidity, solar radiation.

Mast height (m)

6

Data Owner

MfE and ARC:

PM₁₀, PM_{2.5} and NO_x owned by ARC;

remainder owned by MfE



Shed and surrounds from north west.



Partisol hub and satellite inside shed.



Location map.

Map sourced from NZTopoOnline, extracted January 2006, Crown Copyright Reserved.

Site Name

Queen St I
(Cruickshank and Miller)

Address

Cruickshank and Miller
(approx) 296 Queen St
Auckland City

	Easting	Northing	Elevation (m)
NZMG	2667760	6481926	<20
NZTM	1757325	5920228	

No photo available

General site characteristics

Urban

Topography

Queen St slopes down to N, Wellesley Street rises to E and W from Queen Street.

Micro met characteristics

Pollutants are likely to be entrained within the urban canyon formed by the tall buildings on either side of the Queen St during calm conditions. Wind flows are also likely to be channeled along this corridor.

Site description and area characteristics

Eastern side of Queen St; just N of junction with Wellesly St. The surrounding area is the heart of the central business district. Albert Park (c. 8Ha) <150m to E.

Air Quality Management Area

Urban

Predominant sources

Vehicle

Distance from road and other major sources

10m SSW to Wellesley St.

Vehicle counts**Any nearby features that could affect measurements?**

Within 20m of traffic-signal controlled intersection of Queen St and Wellesley St.

AS2922 compliant?

No; but not deemed necessary as site purpose is to monitor peak pollutant levels.

Monitoring commenced

25.09.75

Monitoring ceased

22.12.82

Pollutants monitored

TSP (HD MedVol)

Inlet height (m)

Meteorological parameters measured on site

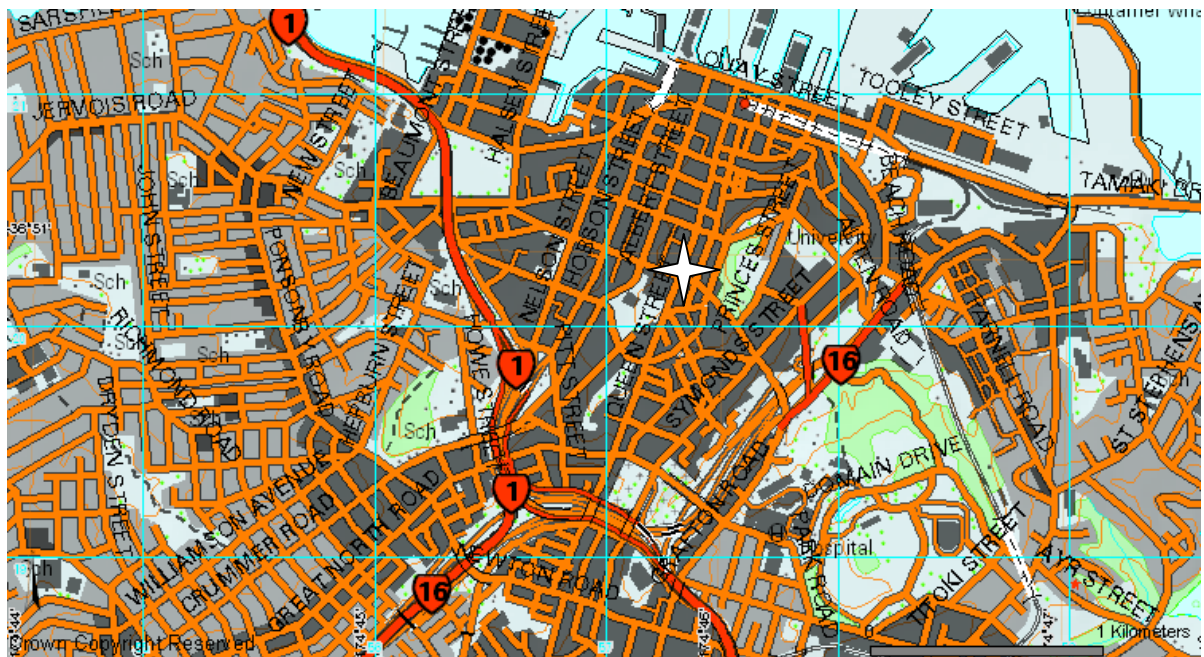
Nil

Mast height (m)

n/a

Data Owner

MoH



Location map.

Map sourced from NZTopoOnline, extracted January 2006, Crown Copyright Reserved.

Site Name

Queen St III
(Tisdalls)

Address

Tisdalls
176 Queen St
Auckland

	Easting	Northing	Elevation (m)
NZMG	2667865	6482213	15
NZTM	1757429	5920516	



Inlet attached to verandah roof to left side of lamp post.

General site characteristics

Urban

Topography

Queen St slopes gently down from N-S; Wyndham St and Victoria St both slope steeply towards Queen St.

Micro met characteristics

Pollutants are likely to be entrained within the urban canyon formed by the tall buildings on either side of the Queen St during calm conditions. Wind flows are also likely to be channeled along this corridor.

Site description and area characteristics

Eastern side of Queen St between Wyndham St and Victoria in Auckland's CBD. Both of these intersections are lighted. Queen St is located within a valley. The surrounding area is the heart of the central business district.

Air Quality Management Area

Urban

Predominant sources

Vehicle

Distance from road and other major sources

3m to Queen St

Vehicle counts**Any nearby features that could affect measurements?**

Within 2m of street parking.

AS2922 compliant?

No; but not deemed necessary as site purpose is to monitor peak pollutant levels.

Monitoring commenced

01.01.91

Monitoring ceased

30.06.00

Pollutants monitored

CO

Inlet height (m)

3.5

Meteorological parameters measured on site

Nil

Mast height (m)

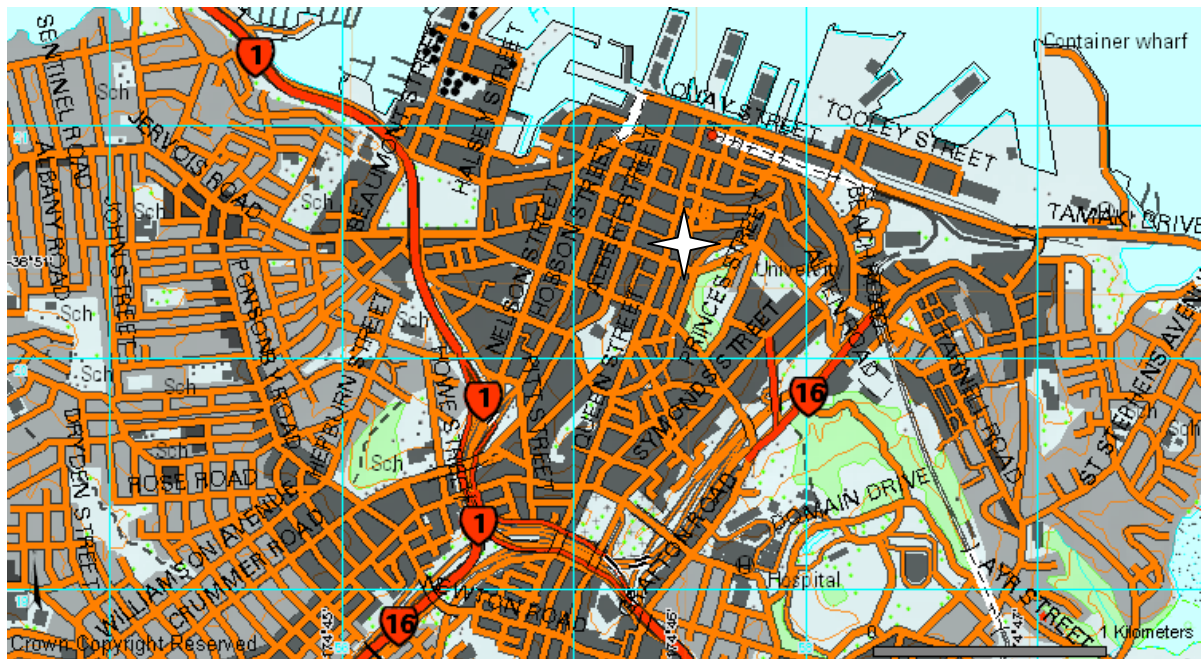
n/a

Data Owner

ARC



URAS 3G CO analyser.



Location map.

Map sourced from NZTopo *Online*, extracted January 2006, Crown Copyright Reserved.

Site Name

Sky Tower

Address

Sky City
Cnr Victoria & Federal Sts
Auckland

	Easting	Northing	Elevation (m)
NZMG	2667546	6482200	60
NZTM	1757110	5920502	

**General site characteristics**

Urban

Topography

The Sky Tower is on the crest of Victoria St (orientation WNW-ESE). Hobson and Federal Sts (orientation SSW-NNE) both slope down to N.

Micro met characteristics

Site is well exposed to winds from all directions.

Site description and area characteristics

The Sky Tower is located at the top of Victoria St West within Auckland's central business district. Numerous multi-story buildings are located near the site. However the sampling intake is located higher than the top of the surrounding structures. Inlet located in the top level of the 'pod' on sky tower.

Air Quality Management Area

Urban

Predominant sources

Urban Plume (predominantly industrial and vehicle emissions)

Distance from road and other major sources

100m S to Wellesley St (arterial, aligned NW-SE); 20m N to Victoria St (arterial, aligned NW-SE); 50m E to Hobson St (arterial, aligned SW-NE)

Vehicle counts

N/a

Any nearby features that could affect measurements?

The inlet is located above all surrounding structures

AS2922 compliant?

03.04.98

29.03.04

Ozone

250

Wind speed, wind direction, temperature

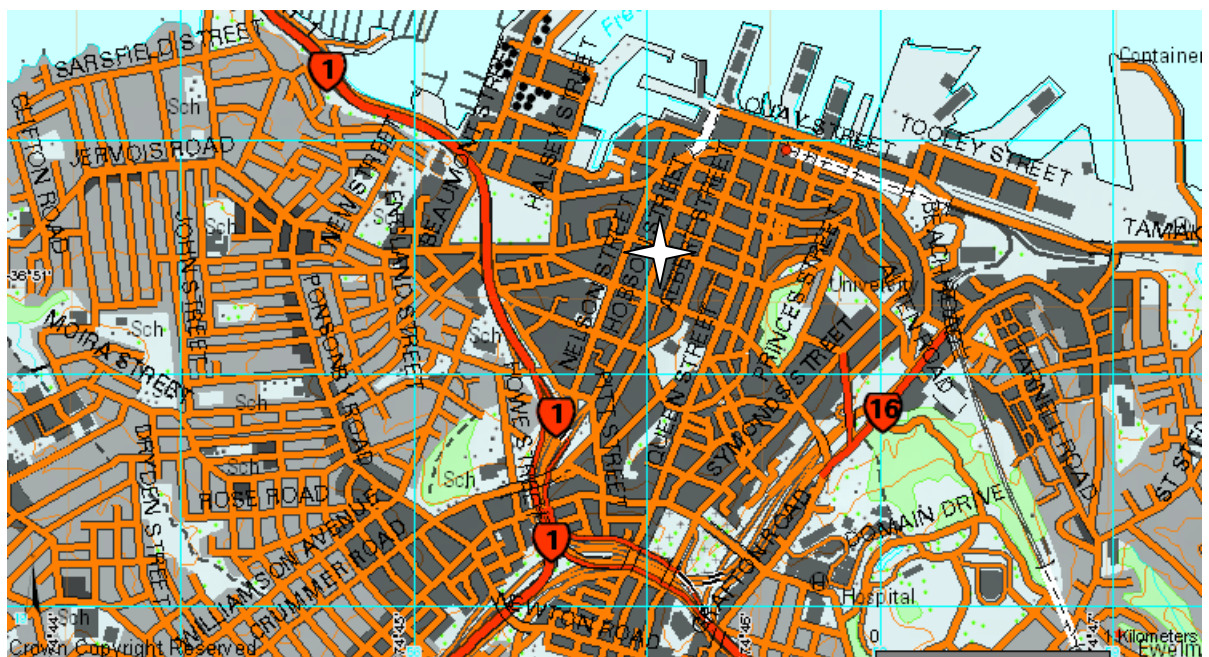
318 above MSL (sensors on second 'crows nest')

ARC

NIWA owns meteorological data from Sky Tower



Site



Location map.

Map sourced from NZTopoOnline, extracted January 2006, Crown Copyright Reserved.

Explanation of Terms and Sources of Metadata

Easting and Northing

NZ Map Grid coordinates (NZMG). Source: LINZ Digital Cadastral Database. Accuracy $\pm 20\text{m}$

NZ Transverse Mercator coordinates (NZTM). Source: LINZ

The NZTM projection, based on the New Zealand Geodetic Datum 2000 (NZGD2000), has superseded the NZMG. For each site in this report, the NZMG coordinates are given before the converted NZTM coordinates.

Elevation

For all current sites except Botany Downs, Glen Eden Ceramco Park, Queen St., Highbury Bank St and Takapuna Lake Rd elevation is estimated using a hand-held GPS.

For old sites and those listed above, the elevation is estimated to the nearest 20m contour from NZ TopoOnline (www.nztoponline.linz.govt.nz) accessed January 2006.

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General Site Characteristics

A general indication of the area the site is to represent.

Topography, Micro Met Characteristics, Site Description and Area Characteristics

Observations from field notes made by ARC or contractors visiting site.

Air Quality Management Area

These are the air quality management areas as specified in the Proposed Regional Plan: Air, Land and Water¹.

¹ Auckland Regional Council, Proposed Regional Plan: Air, Land and Water, October 2004

Vehicle Counts

Sourced from Opus, Transit New Zealand and local councils.

AS2922 –1987 Australian Standard for Ambient Air – Guide for the Siting of Sampling Units

This standard has slightly different recommendations depending on the pollutant being measured, and whether the station is peak, neighbourhood or background. Most common stipulations relate to the distance to nearest object above the height of the inlet or to the nearest traffic lane, the clear sky angle above the inlet, and the inlet height above the ground. This document classifies each site as compliant or not; if not, the reasons are identified. For many sites (Lincoln Rd, Khyber Pass, Mt Eden Kelly St., Musick Pt., Pakuranga, Penrose ACI (shed), Penrose Gavin St Substation, Pukekohe, Queen St., Takapuna (Westlake), Whangaparaoa and Canada St. (mobile)) site compliance assessments were made from site visits in August 2002². For the remainder of the current sites, an ARC Air Quality Team member made an assessment of compliance with the standard during site visits in 2005. A full description of site criteria can be found in Manuell, 2000³.

Start/Finish dates

These are for the site only and may vary for individual pollutant monitoring at each site.

Site Naming Convention

Different sites in the same area are denoted by roman numerals (e.g. I, II, III) following the site name.

Different locations of the same site are denoted by letters (e.g. A, B, C) following the site name.

² Iose, A. and Davy, P., (2003) '*Assessment of the Auckland ambient air quality monitoring network*' Technical Publication Greater Wellington Council

³ Manuell, D. (ed) (2000) *Air Pollution Measurement Manual Volume 3 Australian Standards Fifth Edition* The Clean Air Society of Australia and New Zealand.

Map Legend

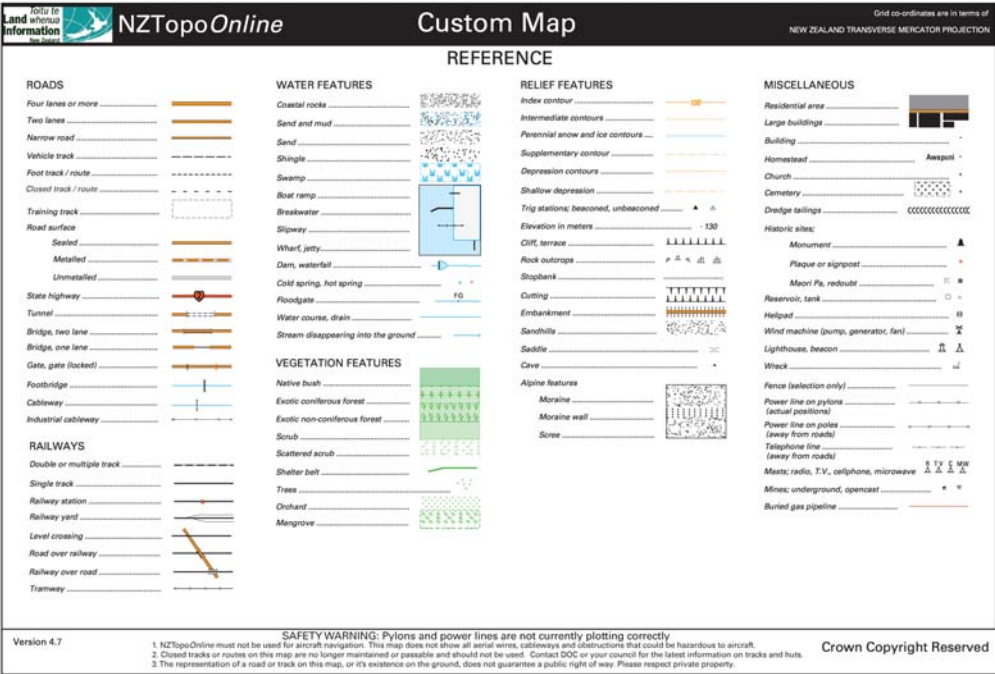


Figure A1: Legend for maps used in site inventory.