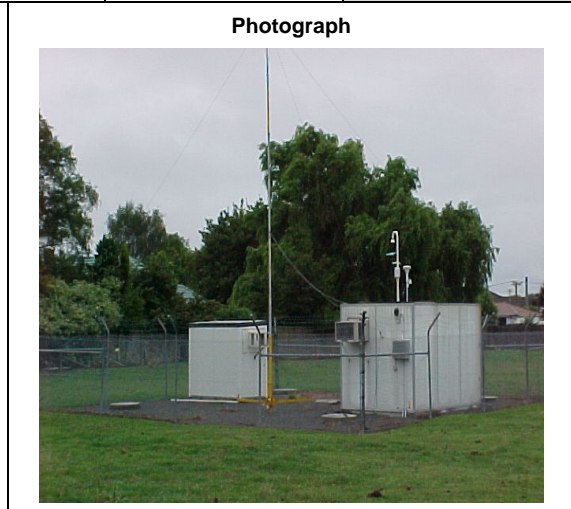
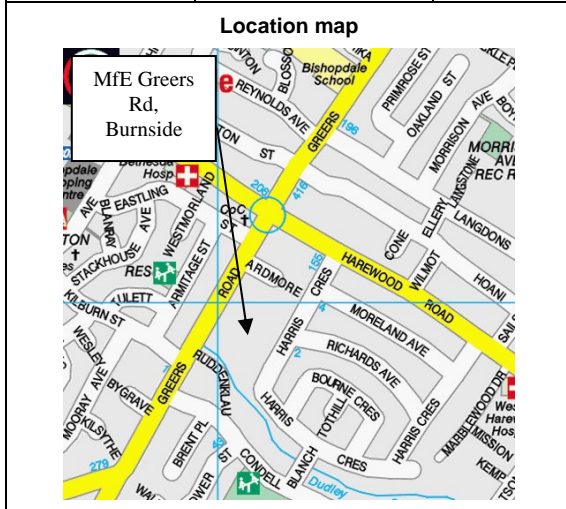
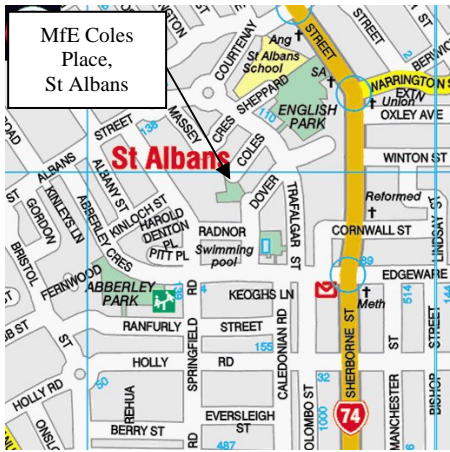



5.1.3 MfE Greers Road, Burnside, Christchurch – Site CAN002

Site name	MfE Greers Road, Burnside		Site ID	CAN002
Address	Transpower, Greers Road, Burnside, Christchurch		Site class	Residential – neighbourhood
Description				
This site is located in a paddock to the rear of the Transpower New Zealand Ltd electrical substation on Greers Road and is surrounded by residential properties on four sides. It is representative of emissions arising from domestic properties in the newer suburban areas of Burnside and Bishopdale which lie to the northwest of Christchurch city centre.				
Pollutants monitored	CO	NO₂	SO₂	VOCs
	Y	Y	Y	Y
Meteorological parameters monitored	PM₁₀	TSP	Lead	
	Y	N	N	
Meteorological parameters monitored	Wind speed	Wind direction	RH	
	Y	Y	Y	
	Temperature (6 m)	Temperature (10 m)	Temperature (2 m)	
	N	Y	Y	



5.1.4 MfE Coles Place, St Albans, Christchurch – Site CAN003

Site name	MfE Coles Place, St Albans		Site ID	CAN003
Address	Coles Place, St Albans, Christchurch		Site class	Residential – neighbourhood
Description				
This site is operated by Environment Canterbury and is located on an area of public open space at the end of Coles Place. It is surrounded by residential properties on four sides. It is representative of emissions arising from domestic properties in the older suburban area of St Albans which lies to the north of Christchurch city centre.				
Pollutants monitored	CO	NO₂	SO₂	VOCs
	N	N	N	Y
Meteorological parameters monitored	PM₁₀	TSP	Lead	
	N	Y	Y	
	Wind speed	Wind direction	RH	
	N	N	N	
	Temperature (5 m)	Temperature (10 m)	Temperature (2 m)	
	N	N	N	
Location map		Photograph		
				

5.2 Air pollutants monitored at GEMS/AMIS sites

An overview of the air pollutants monitored at each site as part of the GEMS/AMIS programme is given in Table 2 below.

Table 2: Air pollutants monitored at GEMS/AMIS sites

Site	CO	NO ₂	SO ₂	VOC	PM ₁₀	TSP	Lead*
Kowhai Intermediate, Kingsland AKL073N		✓		✓	✓	✓	✓
Transpower, Gavin Street, Penrose, Auckland AKL009		✓	✓	✓	✓	✓	✓
Greers Road, Burnside, Christchurch CAN002	✓	✓	✓	✓	✓		
Coles Place, St Albans, Christchurch CAN003				✓		✓	✓

Note:

* Lead is monitored in the months of June, July and August only.

6 Methods

6.1 Quality assurance

All monitoring services are undertaken by Watercare Services Ltd in accordance with the Ministry for the Environment's *Good Practice Guide for Air Quality Monitoring and Data Management* and, wherever applicable, the appropriate Australian/New Zealand and US EPA monitoring methods.

Watercare Laboratory Services is accredited by IANZ (International Accreditation New Zealand) and, since October 2003, has held accreditation for the following methods:

- Australian Standard AS 3580.7.1 – 1992 'Method 7.1: Determination of carbon monoxide – direct reading instrumental method'.
- Australian Standard AS 3580.5.1 – 1993 'Method 5.1: Determination of oxides of nitrogen – chemiluminescence method'.
- Australian Standard AS 3580.4.1 – 1990 'Method 4.1: Determination of sulphur dioxide – direct reading instrumental method'.
- US EPA Method 40, Part 50, Appendix J 'Reference Method for the Determination of Particulate Matter as PM₁₀ in the Atmosphere'.

As part of the GEMS/AMIS programme, Watercare Laboratory Services provides the following monitoring services:

- instrument operation, calibration and maintenance: this includes the use of automatic daily calibration systems for all continuous ambient gas monitors and ensures that the requirements of the relevant Australian Standards for weekly calibration of continuous analysers
- site maintenance as well as, when necessary, the commissioning of new sites and decommissioning of old sites
- data logging, polling, checking, rescaling, validation, ratification and reporting: this encompasses the entire data quality assurance process and ensures that the final dataset reported is fit for the purpose of the GEMS/AMIS programme.

6.2 Analytical methods

6.2.1 Carbon monoxide

Measurements are made in accordance with AS 3580.7.1 – 1992 ‘Determination of carbon monoxide – direct reading instrumental method’. The performance of the instruments is checked using an automatic calibration system. This ensures compliance with the method which requires instrumentation to be calibrated on a weekly basis.

The instruments themselves are IR-absorption gas analysers which continuously measure carbon monoxide. This allows data to be analysed and reported over a variety of average periods, including 10 minutes, 24 hours and one year.

6.2.2 Nitrogen oxides

Measurements are made in accordance with AS 3580.5.1 – 1993 ‘Determination of oxides of nitrogen –chemiluminescence method’. The performance of the instruments is checked using an automatic calibration system. This ensures compliance with the method which requires instrumentation to be calibrated on a weekly basis.

The instruments themselves are chemiluminescence gas analysers which continuously measure nitrogen oxides. This allows data to be analysed and reported over a variety of average periods, including 10 minutes, 24 hours and one year.

6.2.3 Sulphur dioxide

Measurements are made in accordance with AS 3580.4.1 – 1990 ‘Determination of sulphur dioxide – direct reading instrumental method’. The performance of the instruments is checked using an automatic calibration system. This ensures compliance with the method which requires instrumentation to be calibrated on a weekly basis.

The instruments themselves are UV-fluorescence gas analysers which continuously measure sulphur dioxide. This allows data to be analysed and reported over a variety of average periods, including 10 minutes, 24 hours and one year.

6.2.4 Volatile organic compounds

VOCs are measured each quarter (January – March, April – June, July – September and October – December) in accordance with Watercare’s Air Quality Group Test Method T114 (ref – NIOSH Methods 1500 and 1501).

VOC samples are taken using passive (3M) sampling badges which are exposed for a three-month period. The VOCs diffuse on to the badges which are coated with activated carbon. Following exposure, the samples are forwarded to AgriQuality who extract the VOCs using carbon disulphide and analyse them using GC-MS.

Note: Determination of 1,3-butadiene over a three-month exposure period is not reliable. Investigations have determined that samples are unstable when held above -4°C (OSHA Method 54, NIOSH Method 1024), with significant desorption occurring. Technical information supplied with 3M badges reports a 10 percent loss of 1,3-butadiene over three weeks' storage at room temperature. Due to the potential for error over a three-month exposure period, 1,3-butadiene has not been analysed and reported.

6.2.5 Particulate matter (PM₁₀)

Measurements are made in accordance with the US EPA equivalent method for measuring PM₁₀ EQPM-1102-150 'Thermo Andersen Series FH62-C14 Continuous PM₁₀ Ambient Particulate Monitor'. This method was designated as an equivalent method by the US EPA in accordance with 40 CFR Part 53 on 11 December 2002.

The Thermo Andersen FH62-C14 is fitted with a size-selective PM₁₀ head and measures particle mass as it accumulates during sampling. As a result, the instrument is able to record and output real-time measurements of PM₁₀ data which allows measurements to be reported over a variety of average periods, including 10 minutes, 24 hours and one year. The inlet temperature of all beta-gauges operated by the Ministry for the Environment is 40°C.

6.2.6 Particulate matter (TSP)

Measurements of TSP are made in accordance with Watercare's Air Quality Group Test Method T101. It is a gravimetric method of measuring particulates and is modelled upon the high-volume sampler method. The technique has been used to provide TSP data at existing GEM/AMIS sites since 1982.

The equipment used to measure TSP is quite basic and involves ambient air being pulled through a glass fibre filter by a pump with a gas metre being used to measure the air volume drawn through the filter. The filter is weighed before and after sampling. The TSP concentration is determined from the weight of particulates collected and the air volume sampled.

6.2.7 Lead

Lead is sampled during the winter months (June – August) with the same instrumentation used to measure TSP according to Watercare's Air Quality Group Test Method T101. This is a gravimetric technique used to measure particulates and is modelled upon the high volume sampler method. The technique has been used to provide TSP data at existing GEMS sites since 1987.

Analysis of lead is performed by Watercare Laboratory Services according to US EPA methods 3051 and 2007. This involves analysing each individual TSP filter exposed during the winter period using mixed acid digestion. This sample is then analysed for lead using the technique of ICP-OES. The concentration of lead is then determined from the amount of lead detected and the total volume of air sampled during that sample period. Concentrations are then averaged for the three-month monitoring period.