Waterview Operational Air Quality Monitoring Report March 2018

Document No: [Subject]

Waterview Tunnel Joint Operation
1399 Great North Road, Waterview, Auckland 1026

nzta.govt.nz/waterviewconnection
/twitter.com/wcnow

DOCUMENT CONTENTS

1 INTRODUCTION

1.1 OVERVIEW

The Waterview Tunnel opened on 02 July 2017. This report includes analysis of validated air quality monitoring data for Waterview Tunnel Joint Operations (WTJO) for the period March 2018. This air quality monitoring report has been prepared in accordance with Waterview Connection BOI Operational Air Quality Condition OA.4.

1.2 WATERVIEW OPERATIONAL AIR QUALITY REQUIREMENTS

Waterview Connection BOI Operational Air Quality Conditions OA.2 – OA.8 (refer Appendix A) set out the requirements for monitoring of ambient air quality in the vicinity of the tunnel portals and of emissions from one of the tunnel portals.

Two ambient air quality stations (one near the northern end and one near the southern end of the Waterview Tunnel) and one portal analyser are required to be operated for a minimum period of 2 years. The two ambient stations measure concentrations of particulates ($PM_{2.5}$ & PM_{10}) and nitrogen dioxide (NO_2) as well as wind speed and wind direction. The portal analyser measures concentrations of NO_2.

Condition OA.2 stipulates that the results of ambient monitoring are to be compared with the National Environmental Standards for air quality and Auckland Regional air quality targets, which are shown in Table 1.

Table 1. WTJO ambient air quality criteria

Pollutant	Threshold concentration	Averaging period
Fine particles (PM_{10})	50 µg/m^3 20 µg/m^3	24-hour Annual
Fine particles ($PM_{2.5}$)	25 µg/m^3 10 µg/m^3	24-hour Annual
Nitrogen dioxide	200 µg/m^3 100 µg/m^3 40 µg/m^3	1-hour 24-hour Annual

This monitoring is required to continue until the Air Quality Peer Review Panel (required under condition OA.7) recommend that it is no longer necessary. Results are required to be reported monthly for the first 12 months and quarterly thereafter (OA.4).

1.3 MONITORED PARAMETERS AND LOCATIONS

Monitoring locations are shown in Appendix B. Locations and types of instrumentation have been agreed with Auckland Council and the Air Quality Peer Review Panel.

A portal monitoring station with Cavity Attenuated Phase Shift Spectroscopy (CAPS) NO_2 analyser has been installed at the rear of 93 Hendon Avenue near the Southern portal, to monitor NO_2 in accordance with the requirements of consent condition OA.2 and to demonstrate compliance with consent condition OA.8. The portal station is located approximately 80 m from the southern tunnel portal on the residential boundary (40 m from SH20). SH20 is screened from the nearest receptors within the southern approach trench.

Two ambient air quality monitoring stations have been installed to monitor particulates (BAM-1020 analysers, PM_{10} and $PM_{2.5}$), nitrogen dioxide (Chemiluminescence NO_x analyser), wind speed and wind direction in accordance with conditions OA.2 and OA.3.

The southern ambient air quality station is located in the approximate location of the original pre-construction baseline monitoring for the WTJO, near 5 Barrymore Road. The southern station is also located adjacent to the residential area at Hendon Avenue, approximately 470 m from the southern tunnel portal (25 m from SH20) where SH20 achieves grade.

Under condition OA.2, the northern ambient air quality station is required to be located at Waterview School subject to agreement by the School; this agreement was not secured. The northern station is therefore located in the approximate location of the original pre-construction baseline monitoring for the WTJO, near the operation maintenance building. This station is located approximately 100 m from the northern tunnel portal downwind in the prevailing wind direction (25 m from SH20, 330 m SH16 and 20 m from Great North Road), with no obstruction between the adjacent traffic sources and air quality station. This location is likely to experience higher levels than the proposed location at the School and is therefore considered conservative.

1.4 DATA MANAGEMENT

Data are downloaded and checked daily by suppliers Ecotech and monthly validated reports provided to the WTJO. A daily summary of results (non-validated data) is provided to the WTJO and, in the event that WTJO air quality criteria are exceeded, email/text alerts are sent, so investigation can be initiated.

Ecotech calibrate the air quality stations on a monthly basis, and attend the site if a fault is detected during the daily checks. Calibration and equipment fault reports are forwarded to the WTJO.

The valid data exception report for March 2018 is attached as Appendix C.

2 MONITORING RESULTS AND ANALYSIS

2.1 SUMMARY STATISTICS

A comparison of the monitored levels of NO_2, $PM_{2.5}$ and PM_{10} against the WTJO air quality criteria is shown in Table 2 for March 2018. This shows that measured air quality concentrations were below the WTJO ambient air quality criteria.

Monitoring sites used for compliance monitoring should achieve at least 75% valid data for averaging or 95% data capture[1]. All stations achieved at least 75% valid data for averaging and at least 95% data capture during March 2018 with the exception of the portal air quality monitoring station, which did not achieve 95% data capture. This is due to a loss of power between 09 March and 14 March 2018 from the storm event..

Data measured in previous months is summarised in Appendix D and original baseline data in Appendix F.

Table 2. Air quality monitoring results for March 2018

AQ Station	Description	% valid data for averaging	% data capture	Concentration in µg/m^3	WTJO air quality criteria in µg/m^3
Northern ambient air quality station	Maximum 1-hour average NO_2	96.9	100	62.1	200
	Maximum 24-hour average NO_2	95.8	100	34.3	100
	Maximum daily average $PM_{2.5}$	100	100	11.3	25
	Maximum daily average PM_{10}	99.9	99.9	31.0	50
Southern ambient air quality station	Maximum 1-hour average NO_2	97.6	100	41.1	200
	Maximum 24-hour average NO_2	95.8	100	22.8	100
	Maximum daily average $PM_{2.5}$	100	100	11.0	25
	Maximum daily average PM_{10}	99.9	99.9	23.9	50
Portal air quality station	Maximum rolling 1-hour average NO_2	79.0	**82.5**	51.0	200

2.2 EXCEEDENCES OF AIR QUALITY CRITERIA

The Waterview Connection BOI Operational Air Quality Condition OA.5 requires that when an exceedance of the WTJO air quality criteria occur, an investigation shall be undertaken into the cause of the exceedance and that this be reported to the Air Quality Peer Review Panel and Auckland Council.

There were no exceedances of the WTJO air quality criteria in March 2018.

Measured concentrations at all air quality stations were well below the air quality criteria and less than 50% of the air quality criteria for NO_2 and $PM_{2.5}$.

[1] Ministry for the Environment. 2009. Good Practice Guide for Air Quality Monitoring and Data Management 2009. Wellington: Ministry for the Environment.

2.3 POLLUTION ROSES

Pollution roses illustrate the relationship between wind direction and air pollutant concentrations. They are a useful tool to visualise the directions from which air pollution is received in order to identify potential air pollution sources. The wind directions in which the highest contaminant concentrations are measured would indicate the presence of upwind sources of that contaminant.

Pollution roses based on the hourly monitoring data are provided in Appendix E for March 2018.

In summary, the pollution roses show that:

- The highest NO_2 concentrations at the northern station were measured in wind directions ranging from north-west to south (from the direction of the adjacent SH20 alignment) and in wind directions ranging from east-northeast to southeast (from the direction of Great North Road).
- The highest concentrations of PM_{10} at the northern station were measured in winds from the west (from the direction of the SH20 alignment) and in winds from a range of directions from the east-northeast to southeast (from the direction of Great North Road). The pollution rose for $PM_{2.5}$ shows a similar trend (highest concentrations measured from west-northwest or west and from the east-southeast).
- The highest NO_2 concentrations at the portal station in March 2018 were measured in winds from a range of directions from the east-southeast to south. The SH20 alignment was upwind of the monitor in these conditions.
- The highest concentration of NO_2 measured southern station was from the east, in the direction of the SH20 alignment. The highest PM_{10} concentrations measured at the southern station were from the north-northeast and northeast in the direction of Hendon Avenue and to the south-southwest from the direction of the SH20 alignment. The wind directions in which the highest $PM_{2.5}$ concentrations were measured in March 2018 varied.
- The NO_2 pollution roses indicate that the main source of NO_2 at the monitoring sites is likely to be traffic emissions. The PM_{10} and $PM_{2.5}$ pollution roses for March similarly indicate that traffic emissions are likely to be a significant source, with the exception of $PM_{2.5}$ at the southern station which did not indicate any dominant source.

2.4 TRAFFIC DATA AND POLLUTANT TRENDS

The daily traffic flow through the Waterview tunnel during March 2018 is shown in Figure 1 below with daily average nitrogen dioxide concentrations. The traffic flow shows a distinct weekly pattern, with traffic flows generally increasing from Monday to Friday and dropping off at the weekend, with the lowest traffic flow on Sundays.

The northern air quality station shows the highest measured levels of NO_2. The northern station is located closer to major traffic sources than the other two stations and has no obstruction between the adjacent traffic sources and the air quality station. The portal and southern stations show similar NO_2 trends.

The weekly pattern of $PM_{2.5}$ and PM_{10} concentrations show a weak correspondence with daily traffic flows, as shown in Figure 2. The PM_{10} and $PM_{2.5}$ concentrations show similar trends at the northern and southern stations, however the northern station shows some peaks in the 24-hour average PM_{10} concentration which are not shared at the southern station. On days where the highest PM_{10} concentrations were measured at the northern station, there was a low ratio of $PM_{2.5}$ to PM_{10}, which is

not generally consistent with vehicle combustion impacts. This may indicate a local PM_{10} source affecting the northern station on these days (e.g. marine aerosols or dust).

Trends in the monthly average NO_2 concentration measured each month since May 2017 are shown in Figure 3. These show the pollutant level changes after tunnel opening in July 2017 and the seasonality of in NO_2 concentrations. Monthly average NO_2 concentrations in March were higher than those measured in January and February 2018, and were lower than in the three months after opening.

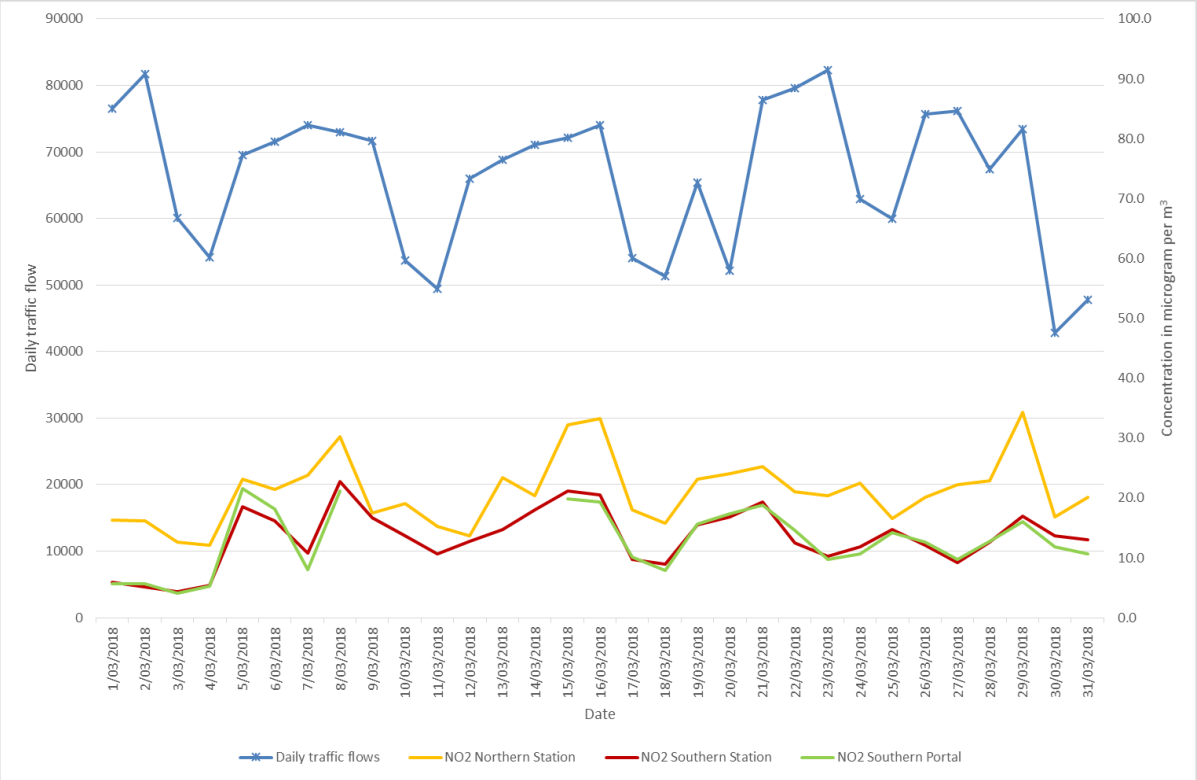

Figure 1: Waterview tunnel traffic flows and NO_2 March 2018

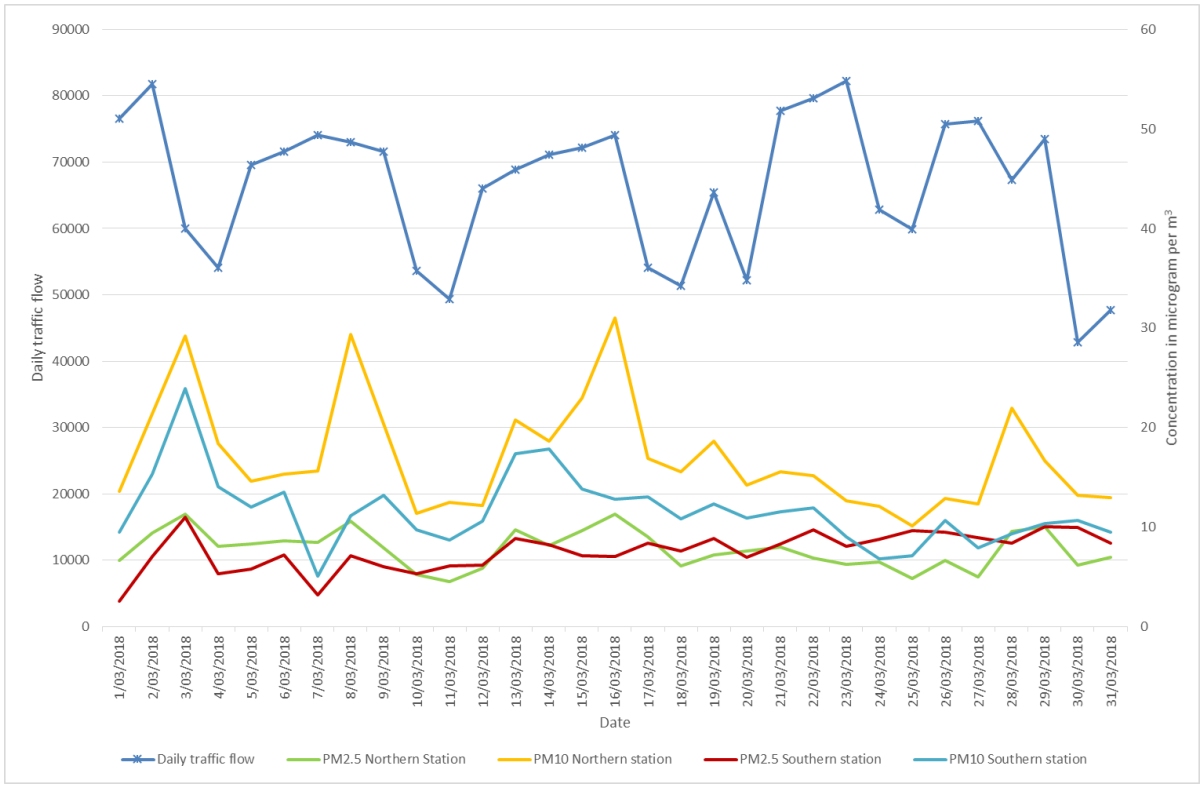

Figure 2: Waterview tunnel traffic flows and daily average $PM_{2.5,}$ and $PM_{10,}$ March 2018

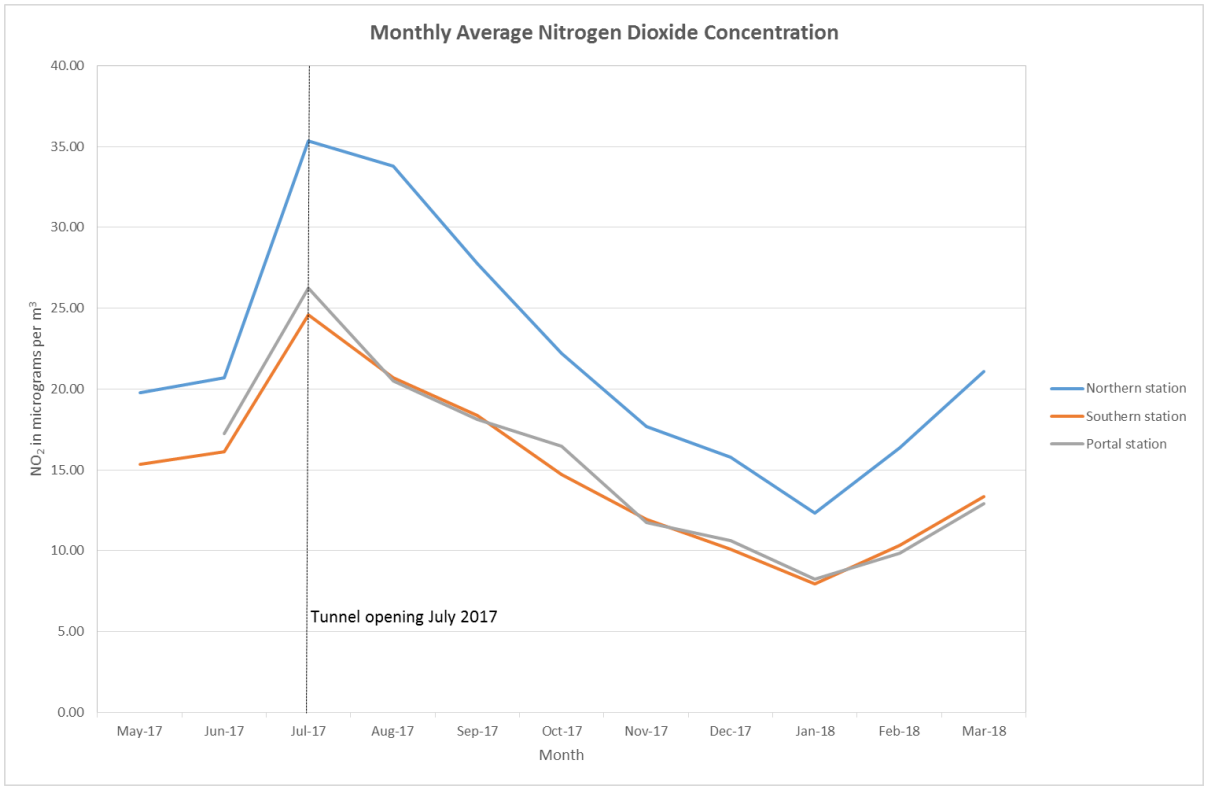

Figure 3: Monthly average nitrogen dioxide concentrations

3 CONCLUSION

This air quality monitoring report has been prepared in accordance with Waterview Connection BOI Operational Air Quality Condition OA.4, and includes analysis of validated air quality monitoring data for March 2018.

The analysis of NO_2, $PM_{2.5}$ and PM_{10} data for the two ambient air quality stations and NO_2 data for the portal air quality station has shown that measured air quality concentrations were below the WTJO ambient air quality criteria during March 2018.

The recommended data capture of 75% valid data for averaging and recommended 95% data capture was achieved at all locations during March 2018 with the exception of the portal air quality monitoring station, which did not achieve 95% data capture. This is due to a loss of power between 09 March and 14 March 2018.

Monthly average NO_2 concentrations in March were higher than those measured in January and February 2018, and were lower than in the three months after opening. The highest measured concentrations of NO_2 were recorded at the northern station. This station is located closer to major traffic sources than the other two stations and has no obstruction between the adjacent sources and air quality station. The concentrations of PM_{10} (and $PM_{2.5}$) were also slightly higher at the northern station than the southern station. On days where the highest PM_{10} concentrations were measured at the northern station, there was a low ratio of $PM_{2.5}$ to PM_{10}, which is not generally consistent with vehicle combustion impacts. This may indicate a local PM_{10} source affecting the northern station on these days (e.g. marine aerosols or dust).

Analysis of NO_2 pollution roses indicates that the main source of pollutant concentrations is traffic emissions. Traffic emissions are also a significant contributor to PM_{10} and $PM_{2.5}$ concentrations. The highest concentrations of PM_{10} at the northern station appear to be partly due to an additional non-vehicle combustion source, which is evident on days where the highest concentrations were measured.

APPENDIX A: AIR QUALITY CONDITIONS

OA.1 The vents used to discharge emissions in the tunnels shall discharge vertically into air at a height of 15m, as follows: (a) The northern ventilation stack will be at a height of 15m. This height shall be calculated from the lowest existing ground level along the Great North Road boundary, adjacent to the ventilation stack; and (b) The southern ventilation stack will be at a height of 15m calculated from the post-construction ground level of the Alan Wood Reserve averaged at a distance of 10m from the exterior walls the ventilation stack location and shall not be impeded by any obstruction that may in the opinion of the Peer Review Panel (Condition OA. 7) decrease the vertical efflux velocity (in other words, the average velocity of material emitted into the atmosphere).

OA.2 Prior to the tunnels becoming operational, the NZTA shall establish two ambient air quality monitoring stations and one portal air quality monitoring station. The location and types of these monitoring stations shall be selected by the NZTA in consultation with the Auckland Council and Peer Review Panel (Condition OA.7), providing that one ambient monitoring station will be located within the Waterview Primary School (subject to agreement by the School).

Ambient air quality shall be monitored continuously in real time, to monitor potential effects associated with the operation of the ventilation system from the tunnels. Ambient monitoring shall include fine particulates (PM_{10} and $PM_{2.5}$) and nitrogen dioxide. Portal monitoring shall include nitrogen dioxide. Results shall be compared with the relevant National Environmental Standards for air quality and Auckland Regional air quality targets (as identified in Chapter 4 of the Auckland Regional Plan: Air, Land and Water, 2010). Monitoring shall be undertaken at each site until the Peer Review Panel recommends that monitoring is no longer necessary. The locations, operation and maintenance schedules of the continuous monitors shall, as far as practicable, comply with the requirements of AS/NZ 3580.1.1: 2007 Method for Sampling and Analysis of Ambient Air – Guide to Siting Air Monitoring Equipment, and with methods specified in the National Environment Standards.

OA.3 Continuous monitoring of wind speed and direction shall be undertaken at each ambient air quality monitoring location as required by Condition OA.2. The locations of wind speed and direction monitors shall, as far as practicable, comply with the requirements of AS 2923:1987 Ambient Air – Guide for the Measurement of Horizontal Wind for Air Quality Applications.

OA.4 For the first 12 months of tunnel operation, the results of the ambient air quality monitoring shall be reported via validated reports and issued for information via the Project website (monthly). Following this period, and for a period of at least 12 months, reporting shall take place quarterly as follows: Quarter 1 (December to February) by 31 March, Quarter 2 (March to May) by 30 June, Quarter 3 (June to August) by 30 September and Quarter 4 (September to December) by 31 December.

OA.5. If the monitoring required by Condition OA.2 shows that concentrations of contaminants in ambient air at the monitoring locations exceeds the relevant National Environmental Standards for air quality, or Regional Air Quality Targets (as identified in Chapter 4 of the Auckland Regional Plan: Air, Land and Water), the NZTA shall undertake an investigation into the cause of the exceedance and report this to the Peer Review Panel (Condition OA.7) and the Major Infrastructure Team Manager, Auckland Council.

OA.6. The air quality monitoring shall be undertaken in general accordance with the Operational Air Quality Management Procedure (Appendix O of Technical Report G.1 Assessment of Air Quality Effects) submitted with this application.

OA.7. A Peer Review Panel shall be appointed by NZTA with the agreement of Major Infrastructure Team Manager, Auckland Council for the purpose of reviewing the ambient air quality monitoring programme and results. The Peer Review Panel shall consist of two independent experts in air quality with experience in ambient air quality monitoring and emissions from motor vehicles. The Peer Review Panel shall review all ambient monitoring, relevant traffic data and tunnel emissions and provide a summary report including any interpretation and recommendations to NZTA, Auckland Council and the Community Liaison Group(s) within 6 months of the tunnels becoming operational and annually thereafter.

O.A.8 The tunnel ventilation system shall be designed and operated to ensure that any air emitted from the tunnel portals does not cause the concentration of nitrogen dioxide (NO_2) in ambient air to exceed 200 micrograms per cubic metre, expressed as a rolling 1 hour average, at any point beyond the designation boundary that borders an air pollution sensitive land use.

Advice Note: The above standard reflects the National Environmental Standard for Nitrogen Dioxide (NO_2) concentration in ambient air.

APPENDIX B: MONITORING LOCATIONS

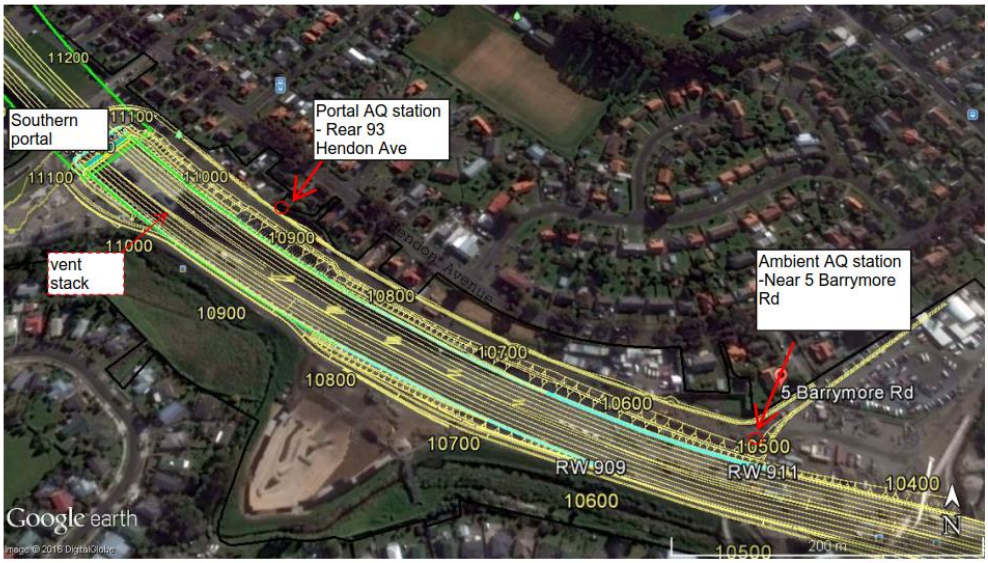

Figure B 1: Southern area stations

Figure B 2: Northern area station

APPENDIX C: VALID DATA EXCEPTION REPORT

North ambient air quality station

Start Date	End Date	Reason	Change Details	User Name	Change Date
01/03/2018 1:00	31/03/2018 1:40	Automatic overnight span calibration check from approximately 1:00 - 1:40	NO, NO_2, NO_x	AE	12/04/2018
31/03/2018 21:00	31/03/2018 21:00	Data outside calibrated range of instrument	PM_{10}	AE	12/04/2018

South ambient air quality station

Start Date	End Date	Reason	Change Details	User Name	Change Date
01/03/2018 1:00	31/03/2018 1:30	Automatic overnight span calibration check from approximately 1:00 - 1:30	NO, NO_2, NO_x	AE	12/04/2018
02/03/2018 11:00	02/03/2018 11:00	Instrument fault - tape fault	PM_{10}	AE	12/04/2018

Portal air quality station

Start Date	End Date	Reason	Change Details	User Name	Change Date
01/03/2018 0:45	31/03/2018 0:45	Automatic background check, nightly for 5 minutes	NO_2	AE	12/04/2018
01/03/2018 2:00	31/03/2018 2:30	Automatic overnight span calibration check from approximately 2:00 - 2:30	NO_2	AE	12/04/2018
09/03/2018 10:35	14/03/2018 19:15	Power interruption - no data available	NO_2	AE	12/04/2018
14/03/2018 19:20	14/03/2018 20:05	Instrument stabilisation after power restored to site	NO_2	AE	12/04/2018

APPENDIX D: PREVIOUS MONTHLY DATA

AQ Station	Description	Pre Tunnel Opening Concentration in µg/m^3		Post Tunnel Opening Concentration in µg/m^3									Project air quality criteria in µg/m^3
		May 2017	June 2017	July 2017	Aug 2017	Sept 2017	Oct 2017	Nov 2017	Dec 2017	Jan 2018	Feb 2018	Mar 2018	
Northern ambient air quality station	Maximum rolling 1-hour average NO_2	65.5	72.2	97.5	93.8	97.5	80.8	57.5	61.9	63.7	64.9	62.1	200
	Maximum 24-hour average NO_2	30.2	36.9	46.4	54.1	44.8	39.4	26.5	31.7	24.7	30.2	34.3	100
	Maximum daily average $PM_{2.5}$	**32.7**	24.9	24.8	16.9	14.0	10.5	11.3	10.8	16.0	13.1	11.3	25
	Maximum daily average PM_{10}	35.7	33.3	31.0	26.4	26.9	31.3	35.1	24.4	36.0	27.6	31	50
Southern ambient air quality station	Maximum rolling 1-hour average NO_2	64.2	79.3	75.0	67.1	75.1	65.0	56.0	44.9	34.3	54.1	41.9	200
	Maximum 24-hour average NO_2	30.0	30.8	38.2	34.7	27.4	25.5	20.7	16.9	18.5	17.9	22.8	100
	Maximum daily average $PM_{2.5}$	23.2	19.1	**26.5**	12.6	12.1	13.3	9.8	8.1	14.0	9.8	11	25
	Maximum daily average PM_{10}	35.8	31.8	31.8	28.8	31.6	37.9	22.0	20.1	34.0	26.7	23.9	50
Portal air quality station	Maximum rolling 1-hour average NO_2	70.8	80.6	86.9	73.8	84.9	62.6	63.5	51.2	46.7	46	51	200
	Maximum 24-hour average NO_2	32.1	33.1	46.0	35.3	31.6	26.9	22.2	21.1	20.4	20.4	21.6	100

It should be noted that construction activities on site in the vicinity of the stations, including vehicle movements on haul roads, will have contributed to measured particulate levels pre tunnel opening. Baseline measurements of $PM_{2.5}$ were also elevated in May 2017 during the night time due to domestic smoke from adjacent residential properties.

APPENDIX E: POLLUTION ROSES FOR MARCH 2018

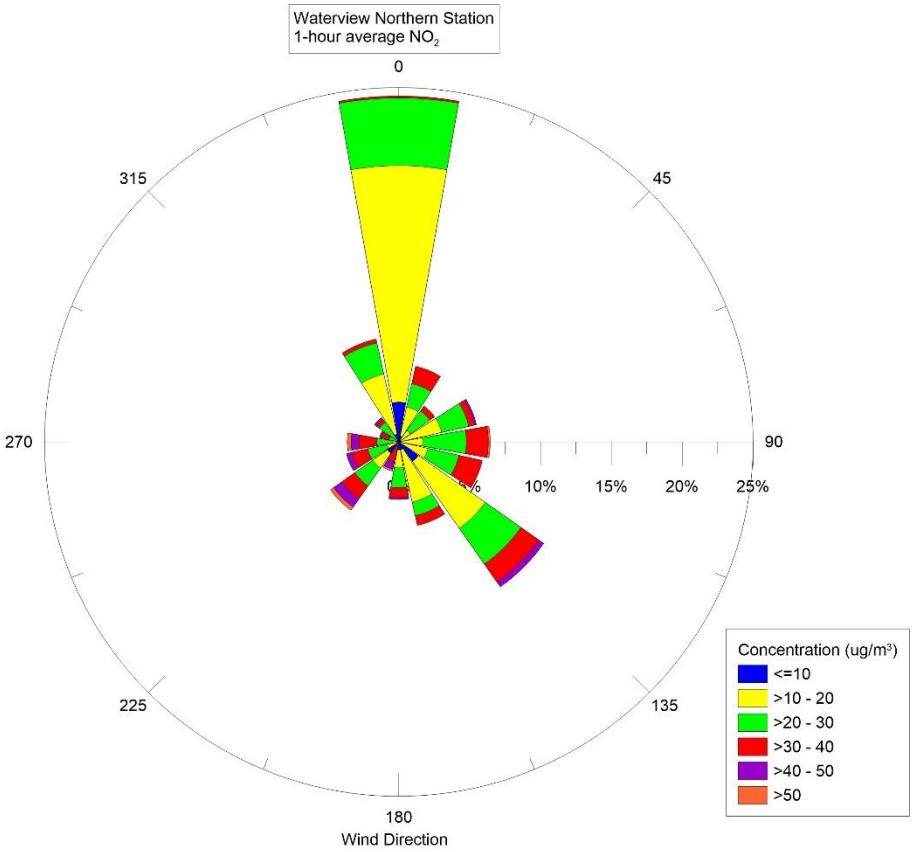

Figure D 1: Northern station 1-hour average NO_2

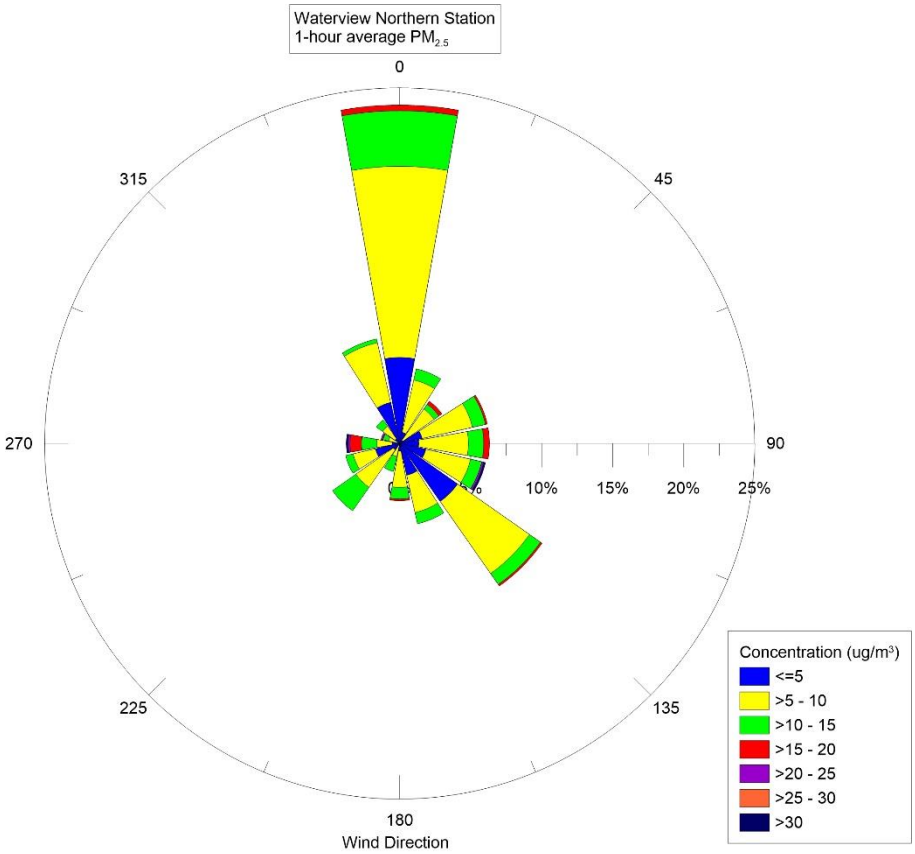

Figure D 2: Northern station 1-hour average $PM_{2.5}$

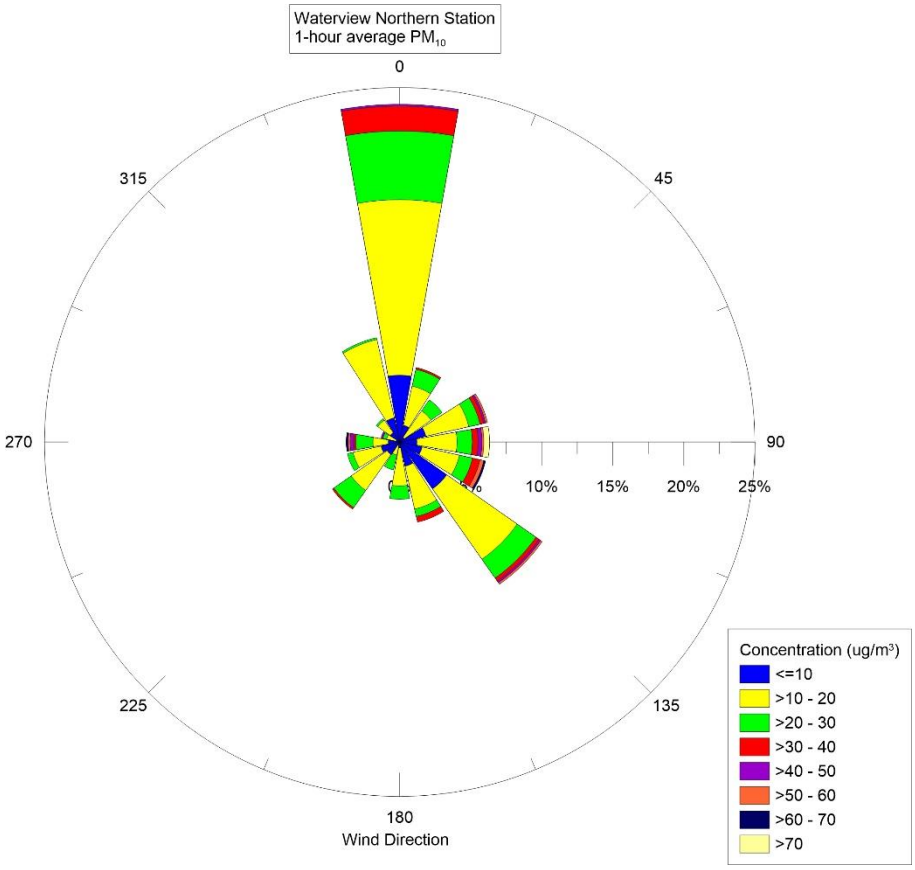

Figure D 3: Northern station 1-hour average PM_{10}

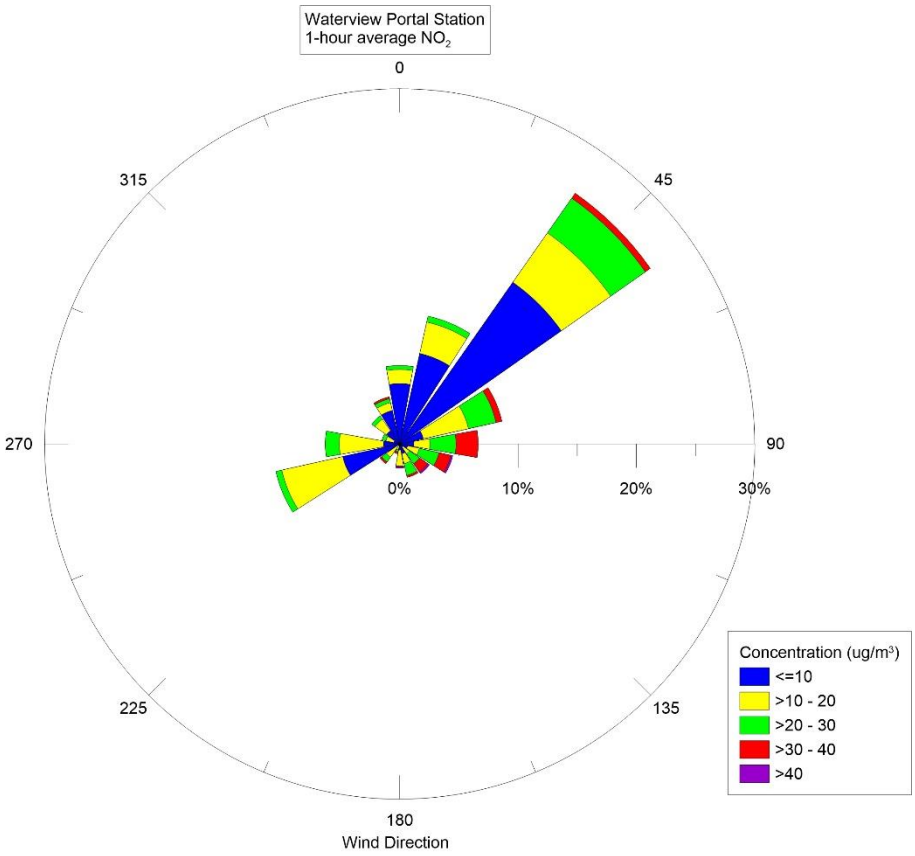

Figure D 4: Portal station 1-hour average NO_2

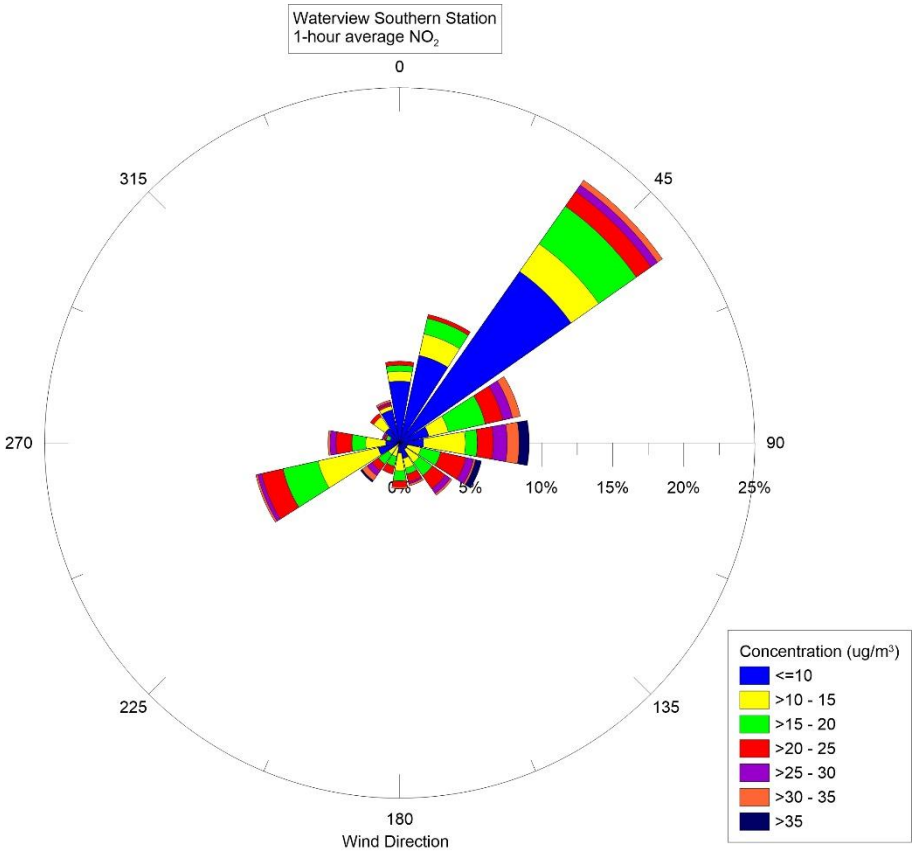

Figure D 5: Southern station 1-hour average NO_2

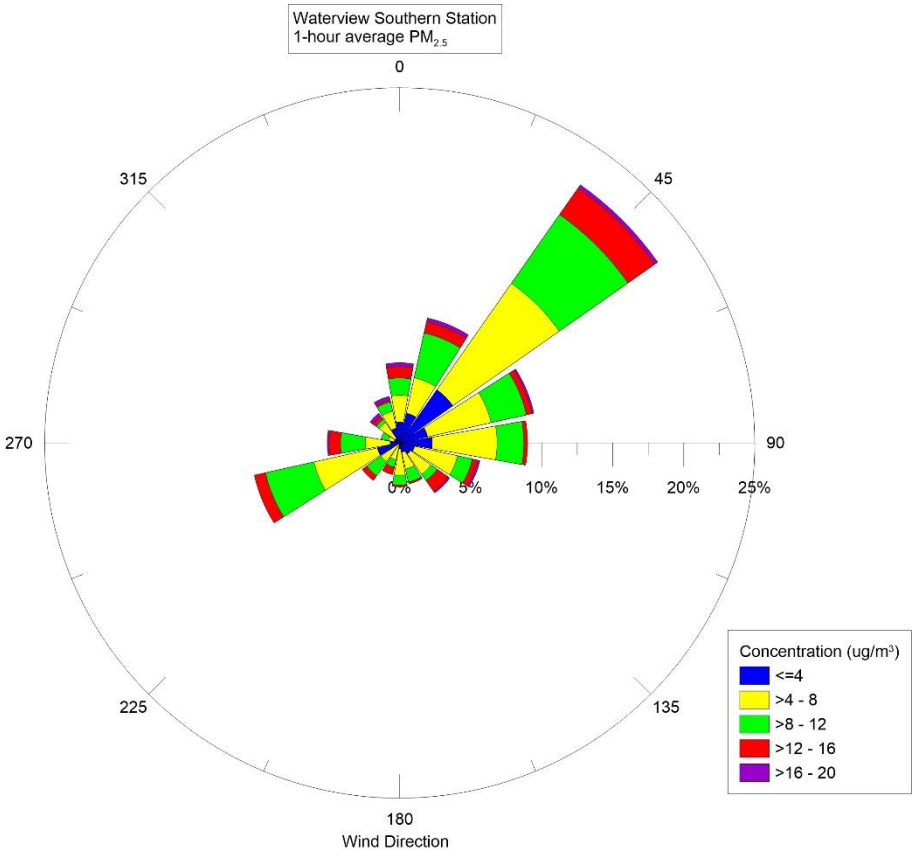

Figure D 6: Southern station 1-hour average $PM_{2.5}$

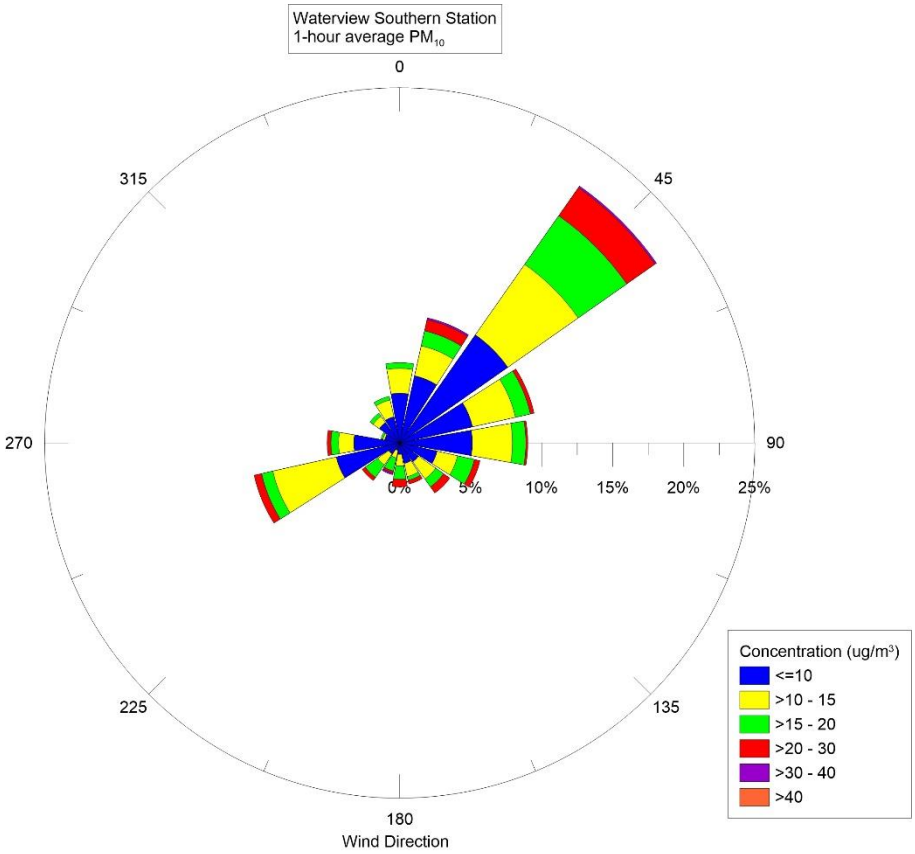

Figure D 7: Southern station 1-hour average PM_{10}

APPENDIX F: ORIGINAL BASELINE MONITORING DATA

Air Quality Station	Description	Jun-06	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06
Northern Area - Cowley St air quality station	Maximum rolling 1-hour average NO_2							
	Maximum 24-hour average NO_2							
	Maximum daily average $PM_{2.5}$							
	Maximum daily average PM_{10}							
Southern Area - Alan Wood air quality station	Maximum rolling 1-hour average NO_2	55	59	59	53	112	39	57
	Maximum 24-hour average NO_2	25	34	31	26	86	17	19
	Maximum daily average $PM_{2.5}$							
	Maximum daily average PM_{10}	32	44	23	22	19	63	22

Air Quality Station	Description	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Jul-07	Aug-07	Sep-07	Oct-07	Nov-07	Dec-07
Northern Area - Cowley St air quality station	Maximum rolling 1-hour average NO_2								55	66	61	50	44
	Maximum 24-hour average NO_2								29	36	28	30	23
	Maximum daily average $PM_{2.5}$												
	Maximum daily average PM_{10}								25	32	28	28	24
Southern Area - Alan Wood air quality station	Maximum rolling 1-hour average NO_2	28	35	37	53	56	56	61	51	61	44	42	38
	Maximum 24-hour average NO_2	10	13	15	27	34	32	28	20	25	18	17	13
	Maximum daily average $PM_{2.5}$												
	Maximum daily average PM_{10}	21	19	19	19	32	35	22	31	17	24	24	14

Air Quality Station	Description	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08
Northern Area - Cowley St air quality station	Maximum rolling 1-hour average NO_2	38	43	46	57	71	71	81	71	62	66	119	62
	Maximum 24-hour average NO_2	20	23	27	27	39	42	41	38	34	35	35	30
	Maximum daily average $PM_{2.5}$												
	Maximum daily average PM_{10}	29	21	22	24	37	31	33	16	18	20	27	18
Southern Area - Alan Wood air quality station	Maximum rolling 1-hour average NO_2	26	38	42	54	59	67	58	52	45	43	34	36
	Maximum 24-hour average NO_2		20	19	25	30	38	32	21	21	16	13	14
	Maximum daily average $PM_{2.5}$												
	Maximum daily average PM_{10}	24	18	21	19	37	27	30	17	15	19	22	15

Air Quality Station	Description	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09
Northern Area - Cowley St air quality station	Maximum rolling 1-hour average NO_2	74	265				55	103	99	77	93	83	80
	Maximum 24-hour average NO_2	37	48				26	56	48	44	45	30	39
	Maximum daily average $PM_{2.5}$												
	Maximum daily average PM_{10}	20	29	26	29	27	50	43	32	135	31	33	25
Southern Area - Alan Wood air quality station	Maximum rolling 1-hour average NO_2	29	32	38	40	51	62	44	51	37			
	Maximum 24-hour average NO_2	9	15	18	20	24	30	22	20	18			
	Maximum daily average $PM_{2.5}$												
	Maximum daily average PM_{10}	17	26	20	21	25	38	30	28	117			
Air Quality Station	**Description**	**Jan-10**	**Feb-10**	**Mar-10**	**Apr-10**	**May-10**	**Jun-10**	**Jul-10**	**Aug-10**	**Sep-10**	**Oct-10**	**Nov-10**	**Dec-10**
Northern Area - Cowley St air quality station	Maximum rolling 1-hour average NO_2	52	57	58	56	55	23	265	70	41	93	101	85
	Maximum 24-hour average NO_2	29	30	33	33	28	11	46	22	22	30	34	27
	Maximum daily average $PM_{2.5}$						16	29	34	10	10	13	8
	Maximum daily average PM_{10}	21	27	23	20	28	20	35	39	26	27	22	30
Southern Area - Alan Wood air quality station	Maximum rolling 1-hour average NO_2												
	Maximum 24-hour average NO_2												
	Maximum daily average $PM_{2.5}$												
	Maximum daily average PM_{10}						44	40	37	24	26	22	30

Results taken from: *Ambient Air Quality Monitoring Summary Report, Beca 09 May 2011*.