



OUR REF: 803400.140429
YOUR REF: Email 191212/JH-RP

20 December 2019

Justin Hazelbrook
Community and Conditions Coordinator
PO Box 6008
Silverwater, NSW 2128

RE: Report on Ambient Air Quality Above-Limit Reading

Dear Justin,

SNC-Lavalin Australia have been appointed by Fulton Hogan EGIS OM (FHEOM) Joint Venture to perform the Independent Air quality specialist roles and were approved by the NSW Department of Environment and Planning (DPE) on 14 May 2019.

The SNC-L Environment team have prepared and reviewed the report on the Ambient Air Quality Above-Goal Reading Notifications dated 10 December 2019 to address the requirements under the Minister's Condition of Approval (MCoA) E12.

Condition E12 states:

"Within 20 working days of any Notification of Above-Goal Reading, the Proponent must prepare and submit to the Secretary a Report on Above-Goal Reading that details the cause and major contributor of the exceedance and the options available to prevent recurrence.

Where the operation of the tunnel is identified to be a significant contributor to the recorded above-goal reading, the Report on Above-Goal Reading must include consideration of improvements to the tunnel air quality management system so as to achieve compliance with the ambient air quality goals, including but not limited to installation of the additional ventilation management facilities allowed for under condition B5, and discussion of whether those improvements are feasible and reasonable..."

The Ambient Air Quality Above-Goal Reading Report has been prepared following the notification provided by the Proponent of the Above-Goal Readings that were recorded at all six monitoring stations for both PM_{10} and $PM_{2.5}$.

The SNC-L Environment team have prepared the report based on the information provided by FHEOM who confirmed that during the period when the exceedances occurred, the tunnel was operating normally. Publicly available information and monitoring data was also reviewed when determining the likely cause and major contributor of the Above-Goal Readings which included long and short term monitoring trends for ambient, in-tunnel and ventilation outlet air quality for the M4 East tunnel, air quality data from the NSW Government Environment, Energy and Science Group monitoring stations as well as alerts issued by the NSW Rural Fire Service and weather data from



the Bureau of Meteorology. The review noted that all in tunnel and ventilation outlet monitoring data complied with the relevant criteria during the period.

The review concluded that multiple exceptional events including fires occurring in the Wollemi , Blue Mountains, Tallaganda and Yengo National Parks most likely impacted air quality causing nearly all monitoring stations across Sydney to record 24hr average PM_{10} and $PM_{2.5}$ values above goal levels. It is therefore highly unlikely that the operation of the tunnel was the cause or major contributor to the Above-Goal Readings and no actions are recommended. The cause and major contributor of the exceedances are the exceptional events as noted above.

Should you have any queries regarding our comment, please do not hesitate to contact me by telephone on 0429 227 775 or email at Richard.Peterson@snclavalin.com.

Yours sincerely,

SNC-LAVALIN AUSTRALIA PTY LTD



Richard Peterson

Director

Environment & Geoscience
Infrastructure



Ambient Monitoring Reporting

Report on Above-Goal Reading WestConnex M4 East To be submitted to DPIE within 20 days of the Report of Above-Goal Reading	
Details of the Above-Goal Reading Attach relevant Notification of Above-Goal Reading	<p>This report has been prepared to address the requirements under MCoA E12: “Within 20 working days of any Notification of Above-Goal Reading, the Proponent must prepare and submit to the Secretary a Report on Above-Goal Reading that details the cause and major contributor of the exceedance and the options available to prevent recurrence.</p> <p>Where the operation of the tunnel is identified to be a significant contributor to the recorded above-goal reading, the Report on Above-Goal Reading must include consideration of improvements to the tunnel air quality management system so as to achieve compliance with the ambient air quality goals, including but not limited to installation of the additional ventilation management facilities allowed for under condition B5, and discussion of whether those improvements are feasible and reasonable.</p> <p>The Proponent must comply with any requirements arising from the Secretary’s review of the Report on Above-Goal Reading.”</p> <p>The following parameters, PM₁₀ – 24 hour average reading with a goal limit of 50 µg/m³ and PM_{2.5} – 24 hour average reading with a goal limit of 25 µg/m³, were reported with Above-Goal Readings on 10 December at the following monitoring stations:</p> <ul style="list-style-type: none"> • Allen Street • St Lukes Park • Haberfield Public School • Powells Creek • Concord Oval • Ramsay Street <p>The immediate notification of the ambient air quality above-goal reading has been issued to Secretary, EPA and NSW Health. (refer to Section 1 of this report)</p>
Was the data valid? If invalid, include any details or justifications for the invalidity	<p>The data has not yet been validated.</p>
Comparison with long term monitoring trends and background air quality data This is not required to be completed, however if available and	<p>Long term trends for PM₁₀ show that levels are consistently between 10-35 µg/m³ at all six stations since monitoring began in December 2018. Similarly, PM_{2.5} levels are consistently between 5-20 µg/m³. No increase in PM₁₀ or PM_{2.5} is evident once operation of the tunnel began in July 2019 with pre-operational levels (based on recorded data).</p> <p>The diagrams in Section 2 demonstrates that the Above-Goal Readings for 10 December 2019 were significantly greater than the average daily readings since operation of the tunnel began to October 2019.</p>
Cause or major contributor of the Above-Goal Reading If the cause or major contributor are not able to be determined, then known facts of what was occurring at the time should be included (eg traffic information, ventilation outlet monitoring records etc)	<p>It may be concluded that the Above-Goal Readings recorded at the six monitoring stations were likely to be attributed to multiple exceptional events including the Gospers Mountain Fire in the Wollemi National that was burning on the days of the recorded Above-Goal Readings. Multiple additional fires were also occurring in the Blue Mountains, Tallaganda and Yengo National Parks. These fires were the most likely cause of the poor air quality in Sydney on 10 December 2019, causing almost all monitoring stations across Sydney to record 24hr average PM₁₀ and PM_{2.5} values above goal levels. The wind direction moving smoke in an easterly direction during this period is also likely to be a major contributor of the poor air quality in Sydney.</p> <p>In addition, the diagrams in Section 2.4 demonstrate that all ventilation outlet and in-tunnel monitoring results for the same period were below the specified goals. Therefore, it is unlikely that events or emissions associated with the operation of the M4 East Tunnel were a cause or major contributor of the recorded exceedances.</p> <p>Additional data collected from the NSW Government Environment, Energy and Science (EES) Group air quality monitoring stations located around the Sydney Basin and alerts issued by NSW Rural Fire Service confirm that the fire events were exceptional and likely to be the cause or major contributor of the Above-Goal Readings.</p>
Options to prevent recurrence This is to include consideration of improvements to the tunnel air quality management system so as to achieve compliance with the	

ambient air quality goals, including but not limited to installation of the additional ventilation management facilities allowed for under condition B5, and discussion of whether those improvements are feasible and reasonable

It has been identified that the most likely cause of the Above-Goal Readings were the fires occurring in the Blue Mountains, Wollemi, Tallaganda and Yengo National Parks. Therefore, the operation of the tunnel has not been identified as a significant contributor of the exceedances and as such, no further action is required as specified in the Minister's Condition of Approval E12.

Person responsible for report	Name	Name: Peter Redwin
	Position	Position: Head of Operations and Maintenance
	Organisation	Organisation: WestConnex Transurban
	Date	

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1. Ambient above-limit Reading Notifications

1.1 10 December 2019

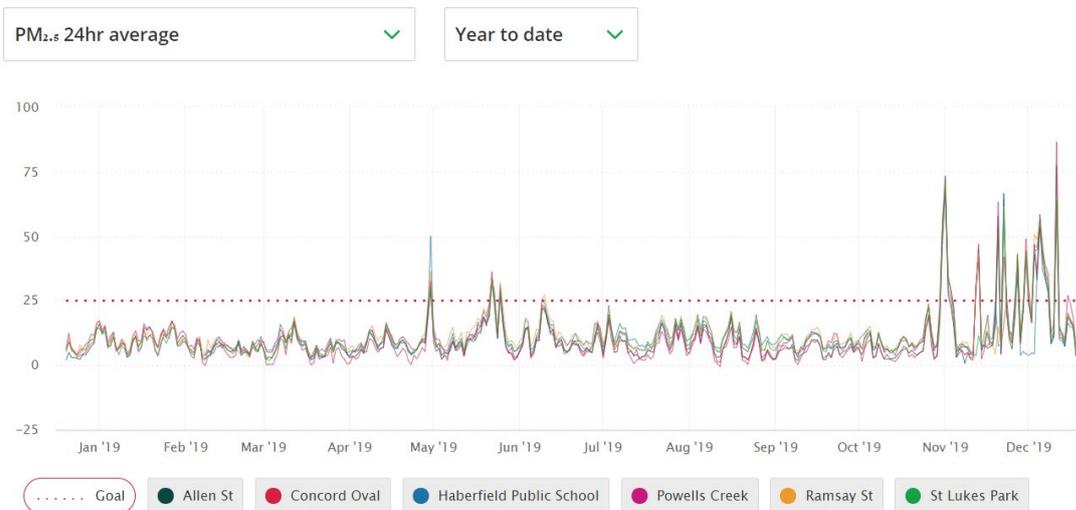
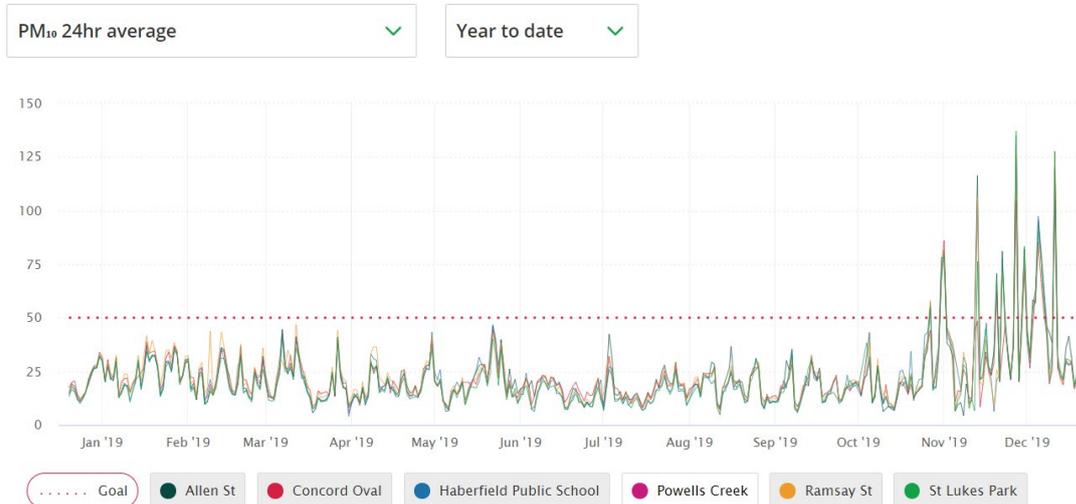
Notification of Ambient above-goal reading WestConnex M4 East			
To be notified immediately to Project Company and RMS. Project Company is to notify DPE, EPA and NSW Health within 24 hours.			
Date	10 December 2019		
Time (start and finish)	0000hrs to 0000hrs		
Relevant location	<input checked="" type="checkbox"/> Allen Street <input checked="" type="checkbox"/> Powells Creek		
	<input checked="" type="checkbox"/> St Lukes Park <input checked="" type="checkbox"/> Concord Oval		
	<input checked="" type="checkbox"/> Haberfield Public School <input checked="" type="checkbox"/> Ramsay Street		
Relevant goal	<input type="checkbox"/> CO – 8 hour rolling average of 9.0 ppm		
	<input type="checkbox"/> NO ₂ – One hour average of 0.12 ppm (245 µg/m ³)		
	<input checked="" type="checkbox"/> PM ₁₀ – 24 hour average of 50 µg/m ³		
	<input checked="" type="checkbox"/> PM _{2.5} – 24 hour average of 25 µg/m ³		
	<input type="checkbox"/> PM ₁₀ – Annual average of 25 µg/m ³		
	<input type="checkbox"/> PM _{2.5} – Annual average of 8 µg/m ³		
Above-goal reading Detail the above-goal reading that was received	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> PM₁₀ Allen Street: 105.4 µg/m³ Concord Oval: 118.9 µg/m³ Haberfield Public School: 120.2 µg/m³ Ramsay Street: 127.4 µg/m³ St Lukes Park: 127.6 µg/m³ </td> <td style="width: 50%; vertical-align: top;"> PM_{2.5} Allen Street: 77.2 µg/m³ Concord Oval: 86.5 µg/m³ Haberfield Public School: 59.2 µg/m³ Powells Creek: 63.5 µg/m³ Ramsay Street: 64.8 µg/m³ St Lukes Park: 64.2 µg/m³ </td> </tr> </table>	PM₁₀ Allen Street: 105.4 µg/m ³ Concord Oval: 118.9 µg/m ³ Haberfield Public School: 120.2 µg/m ³ Ramsay Street: 127.4 µg/m ³ St Lukes Park: 127.6 µg/m ³	PM_{2.5} Allen Street: 77.2 µg/m ³ Concord Oval: 86.5 µg/m ³ Haberfield Public School: 59.2 µg/m ³ Powells Creek: 63.5 µg/m ³ Ramsay Street: 64.8 µg/m ³ St Lukes Park: 64.2 µg/m ³
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Duration Detail the duration of the above-goal reading or event	24hrs		
Nature of event Detail nature of the event that contributed to the above-goal reading	NSW RFS have indicated that fires burning in the Blue Mountains National Park, Wollemi National Park and Tallaganda National Park are being controlled, affecting greater Sydney's air quality. DPIE, Sydney-east air quality has exceeded the rolling 24-hour goal for PM ₁₀ - 50 µg/m ³ and PM _{2.5} - 25 µg/m ³ at all sites, air quality was classed as hazardous. NSW Health has issued a bushfire smoke health alert.		
Was the data valid? If unknown at this stage, please indicate. Refer section 5.2.1 of this Protocol.	Data is yet to be validated		
Was there an emergency? Refer section 3.1 of this Protocol. If this is unknown at this stage, please indicate.	No		
Measures employed Detail measures employed to minimise the concentration levels	All ventilation outlet monitoring results for the 10/12/19 were below the limits and goals specified.		
Commitment to prepare and submit a Report on Above-Goal Reading A Report on Above-Goal Reading will be prepared for this notification. Please note that a Report is not required in the event of an emergency.			
Person responsible for notification	Name: Peter Redwin		
	Position: Head of Operations and Maintenance		
	Organisation: WestConnex Transurban		

2. Air Quality Monitoring Results

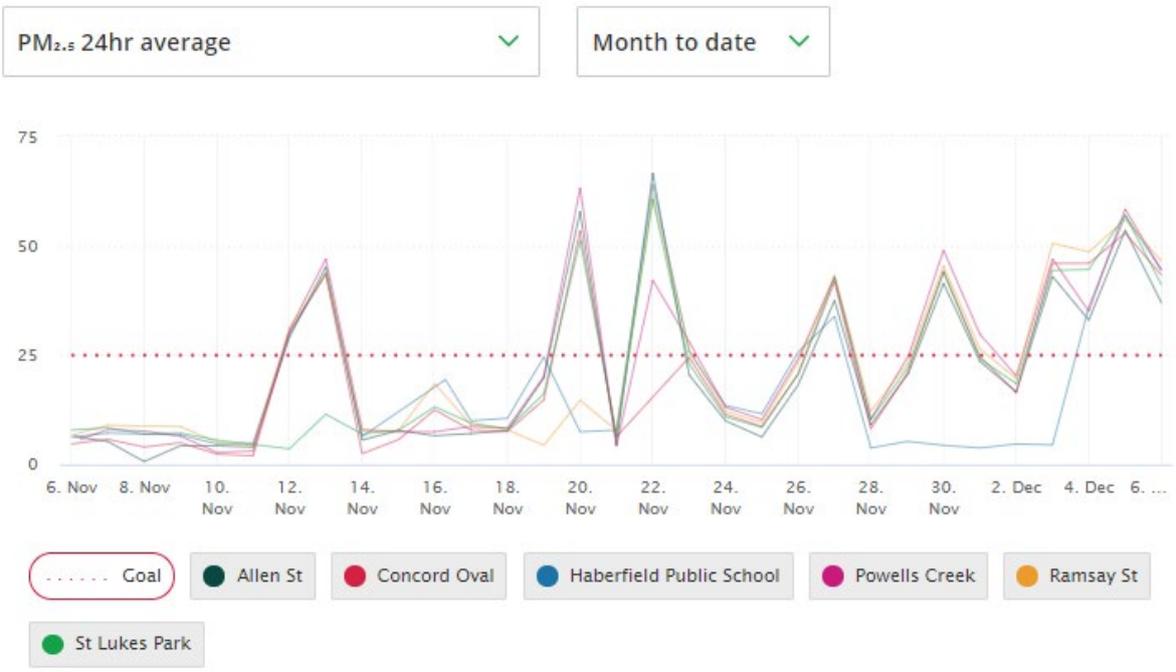
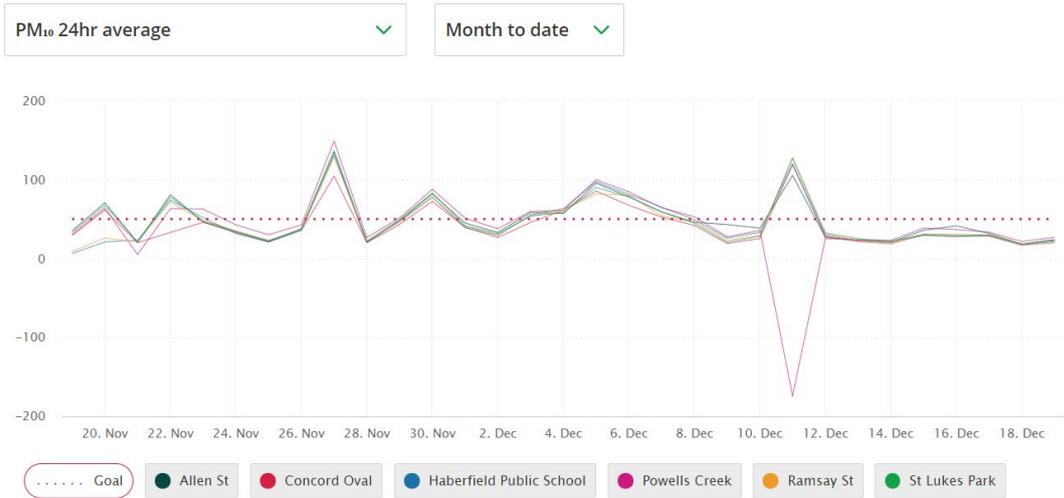
The following diagrams were captured from the official website for the Air Monitoring on M4E.

(<https://www.linkt.com.au/sydney/using-toll-roads/about-sydney-toll-roads/westconnex-m4/tunnel-air-quality>)

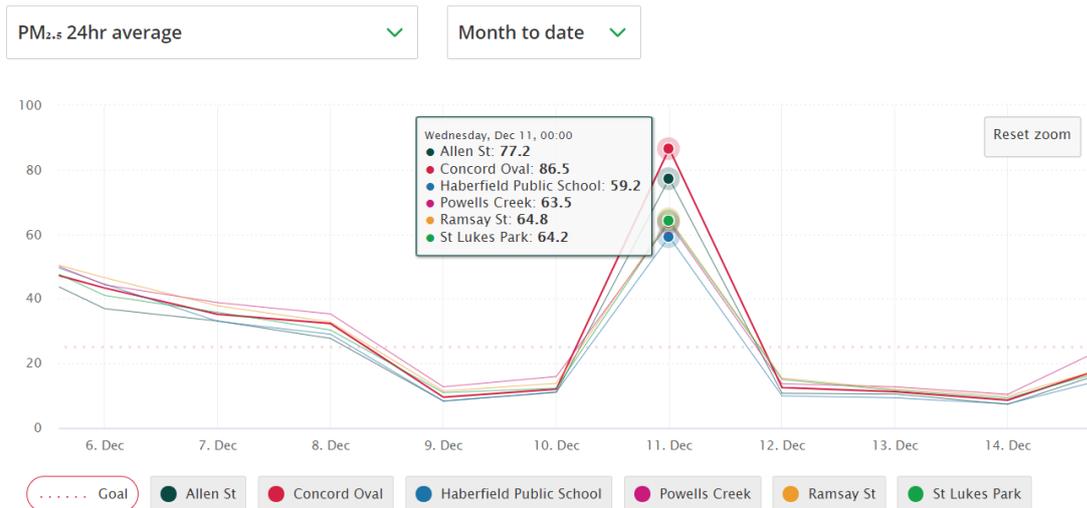
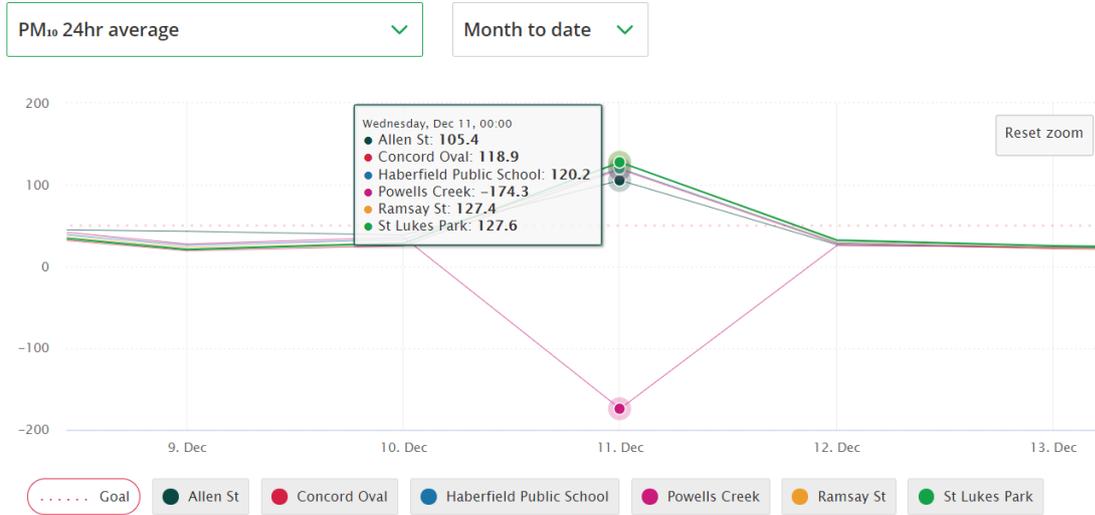
2.1 Ambient Air Quality Data from Dec 2018 – Dec 2019



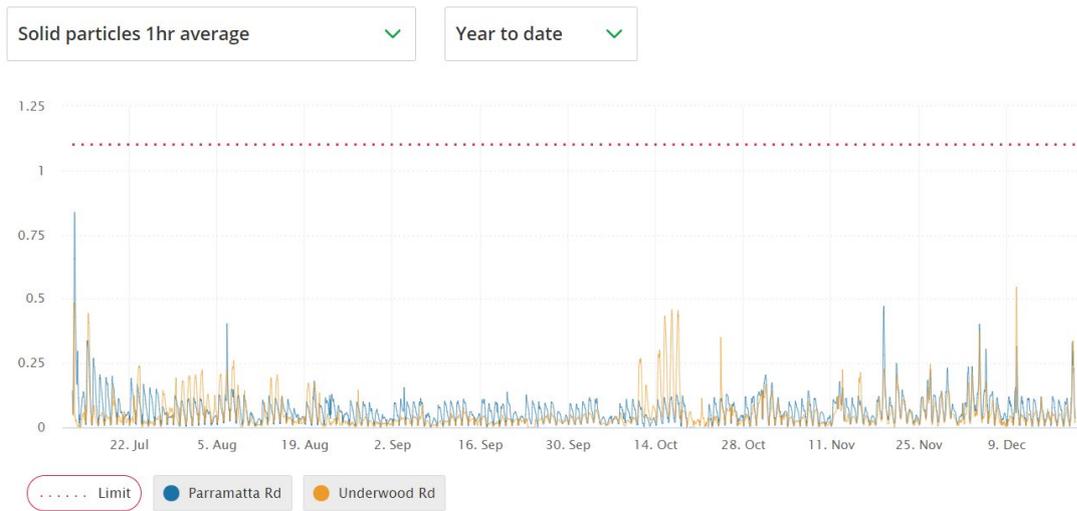
2.2 Ambient Air Quality Data for Previous Month



2.3 10 December PM10 and PM2.5 - 24 Hour Average Data at All Monitoring Stations



2.4 Solid Particles – 1 Hour Average Data Values from Ventilation Outlet Monitoring Equipment



3. Background

3.1 Monitoring Stations

The Westconnex - M4 East Project features various ventilation plant and equipment and air quality monitors to ensure pollutants do not exceed the targets and limits set by the Minister's Conditions of Approval. M4 East air quality is monitored by hundreds of sensors and measures various pollutants across three main areas, one of which includes ambient air quality stations in the areas around the M4 tunnels.

These stations include six external ambient air quality monitoring stations located at Allen Street, Powells Creek, St Lukes Park, Concord Oval, Ramsay Street and Haberfield Public School. The locations of these monitoring stations are outlined in Figure 1 below.

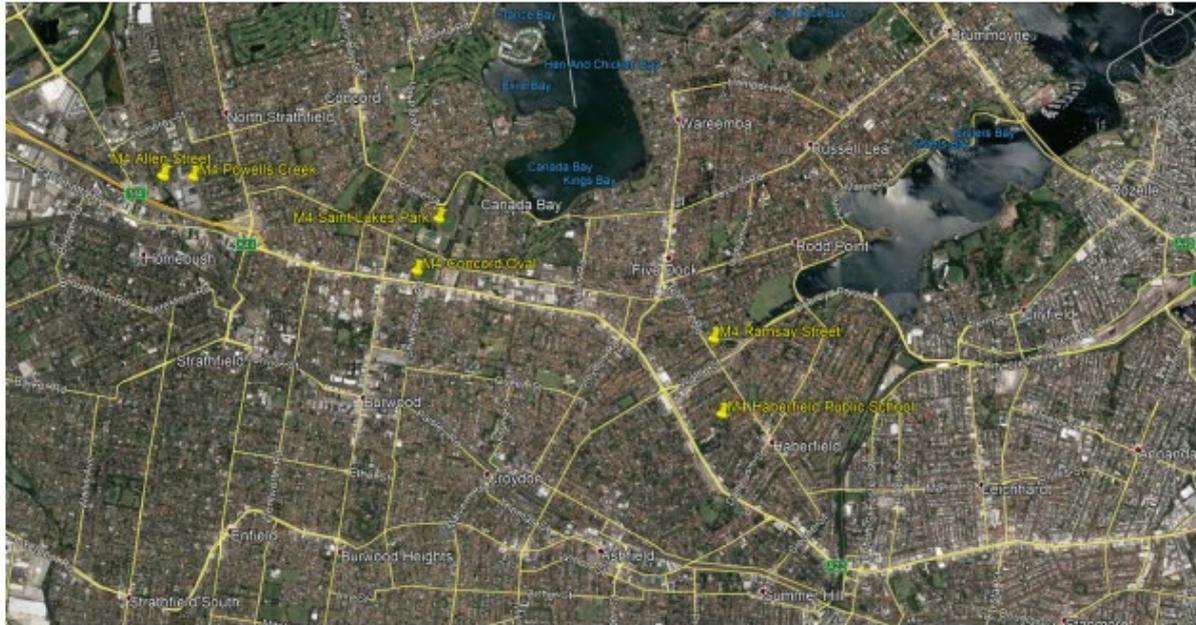


Figure 1 Location of Ambient Air Quality Monitoring Stations

3.2 Ambient Air Quality Goals

Figure 2 below outlines the ambient air quality goals for each recorded parameter.

Parameter	Time Period	Goal Level	Units
CO	8 hours (rolling, based on 1-hour averages)	9.0	ppm
NO ₂	1 hour	0.12	ppm
PM ₁₀	1 day	50	µg/m ³
	1 year	25	µg/m ³
PM _{2.5}	1 day	25	µg/m ³
	1 year	8	µg/m ³

Figure 2 Ambient Air Quality Goals

3.3 Validation of Data

The Ecotech ERS department performs daily data checks to ensure maximum data capture rates are maintained. Any equipment failures are communicated to the responsible field engineers for urgent rectification.

The validated database is created by duplicating the non-validated database and then flagging data affected by instrument faults, calibrations and other maintenance activities. The data validation software requires the analyst to supply a valid reason (e.g. backed by maintenance notes, calibration sheets etc.) in the database for flagging any data as invalid.

3.4 Exceptional Events

Exceptional events such as a fire or dust occurrence that adversely affects air quality at a particular location and causes an exceedance of 1-day average standards in excess of normal historical fluctuations and background levels are excluded from this standard, as per the Ambient Air Quality National Environmental Protection Measure (NEPM).

4. Events Report

4.1 Investigation of Event

In order to determine the cause of the Above-Goal Readings and whether these can be attributed to external phenomena or events or emissions from the M4 East Motorway tunnel outlets, an investigation has been undertaken in line with the WestConnex Ambient Air Quality Goal Protocol that was prepared under Condition E10.

The Above-Limit Reading Notification indicates that the data has not been quality validated. The diagrams in Section 2 outline that Powell's Creek did not record an exceedance on 10 December for PM_{10} . The publicly available information demonstrates that the Powell's Creek monitoring station recorded a reading of $-174.3 \mu\text{g}/\text{m}^3$, however all other monitoring stations recorded readings above goal limits on the day in question. The Ecotech Service Report for 9 – 15 December (Appendix A) has been reviewed which outlines that maintenance was conducted on the Powell's Street monitoring on 10 and 11 December after an error alarm was reported. It is likely that data from the Powell's Creek monitoring station has been misrepresented on 10 December and therefore the review has proceeded for the remaining monitoring stations by reviewing supporting information from other air quality monitors across Sydney.

As the Notification in Section 1 outlines, no emergencies occurred at the time of the Above-Goal Reading as advised by the Proponent.

Data has been obtained from other ambient air quality monitoring stations in the Sydney Basin to confirm whether the Above-Goal Readings received at the monitoring stations near the WestConnex M4 East Tunnel were similar to other results for concurrent monitoring periods.

The NSW Government Environment, Energy and Science (EES) Group operates air quality monitoring networks that continuously measure particles (PM_{10} , $PM_{2.5}$), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2) and visibility. In addition to these, the stations also monitor wind speed and direction, air temperature and humidity.

The monitoring plan prepared for the NEPM for Ambient Air Quality outlines that these stations, along with permanent upper bound stations, ensure that all major pollutant events are captured and reported.

4.2 Additional Data

4.2.1 Environment, Energy and Science Group

The following data has been obtained from the EES monitoring database for the period concurrent with the Above-Goal Readings obtained from the M4 East monitoring stations on 10 December 2019.

Tuesday
10 December 2019
11 pm - 12 am (AEST)
[Previous](#) | [Next](#) | [Select](#)
[Show index values](#)

Scale: 0 to 250

		VERY GOOD SC	GOOD SC	FAIR SC	POOR SC	VERY POOR SC	HAZARDOUS SC
--	--	-----------------	------------	------------	------------	-----------------	-----------------

Pollutants		Ozone O3	Ozone O3	Nitrogen dioxide NO2	Visibility NEPH	Carbon monoxide CO	Sulfur dioxide SO2	Particles PM10	Particles PM2.5
Averaging Periods		1-hour average	rolling 4-hour average	1-hour average	1-hour average	rolling 8-hour average	1-hour average	rolling 24-hour average	rolling 24-hour average
Bushfire Emergency - Port Macquarie	Port Macquarie	2.4	2.2	0.2	1.65	0.1	0.0	59.6	35.7
Bushfire Emergency - Coffs Harbour	Coffs Harbour	4.2	3.0	0.3	1.52	0.4		52.8	34.6
Bushfire Emergency - Lismore	Lismore							41.9	20.6
Sydney East	Cook And Phillip	1.8	1.7	0.2	0.27	0.1	0.0		
	Randwick	2.5	2.5	-0.1	0.36		0.0		95.2
	Rozelle	2.5	2.5	0.0	0.43	0.2	0.0	142.7	101.8
	Chullora	2.2	2.1	0.1	0.34	0.0		140.4	97.6
	Earlwood	2.3	2.3	0.0	0.34			105.6	70.7
Sydney North-west	Macquarie Park	2.3	2.4	-0.1	0.43	0.3	0.0	187.3	152.0
	Parramatta North	2.7	2.6	-0.1	0.38	0.2	0.0	195.3	130.1
	Richmond	2.1	2.4	0.3	0.38		0.0	171.6	108.1
	St Marys	1.9	2.2	0.1	0.38			159.8	84.2
	Prospect	2.4	2.5	0.0	0.40	0.0	0.0	168.5	104.8
Sydney South-west	Rouse Hill	2.4	2.5	0.0	0.39	0.3	0.0	216.2	129.8
	Bargo	2.2	2.3	0.3	0.31		0.0	129.3	100.7
	Bringelly	2.0	2.1	0.3	0.29		0.1	111.0	65.7
	Camden	1.7	2.0	0.4	0.37	0.2		95.1	63.7
	Campbelltown West	2.3	2.3	0.1	0.39	0.3	0.0	96.7	63.7
Illawarra	Liverpool	2.1	2.2	0.3	0.36	0.2	0.0	124.9	81.6
	Oakdale				0.91				250.2
	Wollongong	1.8	1.7	0.5	0.29	0.5		93.1	61.3
	Kembla Grange	2.3	2.4	0.1	0.29			67.3	38.8
	Albion Park Sth	2.5	2.5	-0.1	0.29		-0.1	72.8	39.4
Lower Hunter	Wallsend	2.8	2.9	-0.1	0.63		0.1	90.9	65.2
	Newcastle	2.5	2.8	0.0	0.59	0.5	0.0	106.2	72.7
	Beresfield	2.3	2.7	0.3	0.68		0.1	86.3	54.2
Central Coast	Wyong	2.6	2.9	-0.2	0.48	0.3	0.0	110.0	74.3
Central Tablelands	Bathurst							77.3	31.5
	Orange				0.23			50.3	27.6
Northern Tablelands	Armidale				8.39			116.7	99.9
North-west Slopes	Gunnedah	2.7	3.3	0.2				52.9	31.5
	Narrabri							37.6	19.1
	Tamworth							143.3	92.9
Southern Tablelands	Goulburn	2.4	2.5	0.0	0.78			64.3	37.9
	Albury							56.2	29.3
South-west Slopes	Wagga Wagga Nth							79.1	25.0
	Muswellbrook			0.2			0.1	109.4	54.5
Upper Hunter - Singleton	Singleton			-0.1			0.0	104.6	63.6

Figure 3 EES Air Quality Monitoring Data for 10 December 2019 (Data Readings)

4.2.2 NSW Rural Fire Service

The following data has been obtained from the New South Wales Rural Fire Service (NSW RFS) who are the lead agency for the coordination of bush firefighting and prevention throughout the state. The NSW RFS have launched an application that shows every fire in NSW along with its size, severity and warnings. On 10 December 2019, NSW RFS provided notifications through this database that multiple bush fires were occurring in the areas surrounding Sydney specifically including the Gaspers Mountain Fire in the Wollemi National that was burning on the days of the recorded Above-Goal Reading. Multiple additional fires were also occurring in the Blue Mountains and Yengo National Parks. NSW RFS confirmed that on 10 December 2019, 89 fires were burning in NSW.



Figure 4 NSW RFS tweet issuing an emergency warning for the Little L Complex Fire on 10 December



NSW RFS @NSWRFS · Dec 10

At 5.30am there are 89 fires burning across NSW with 40 yet to be contained. Today firefighters will advantage of easing conditions. Are you? What will you do if fire threatens? Take 5 minutes to find out how Fireproof your plan is at myfireplan.com.au
 #NSWRFS #NSWFires

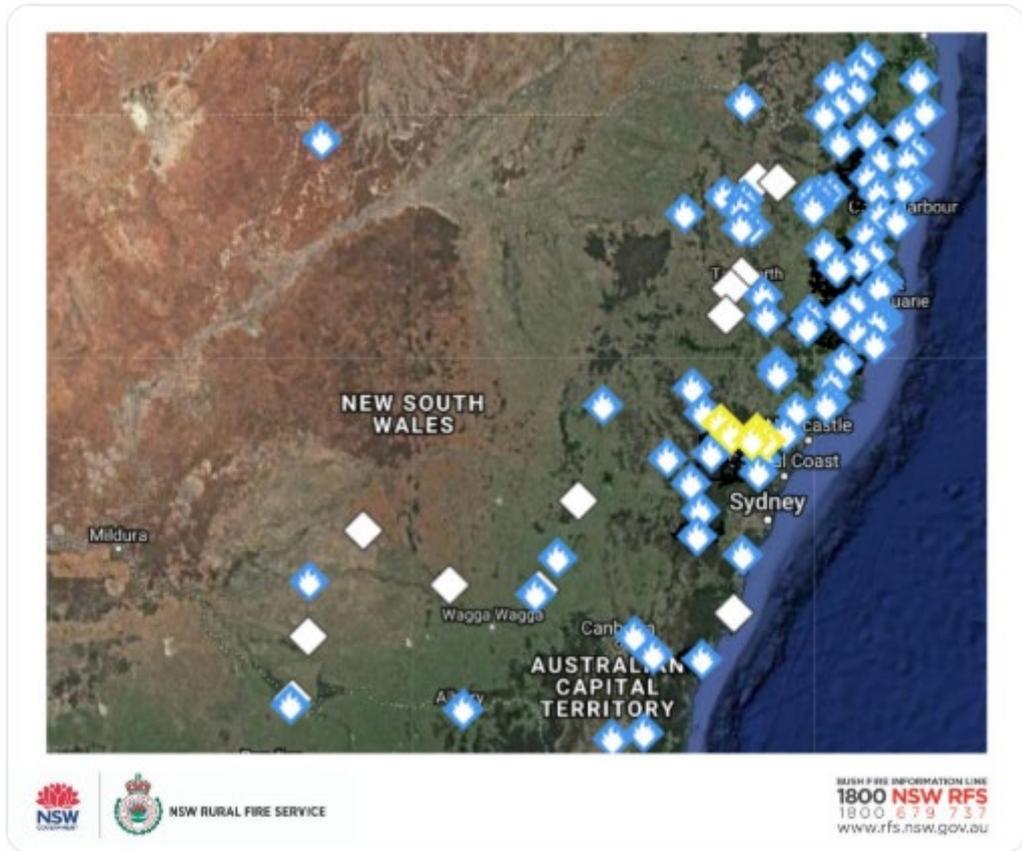


Figure 5 NSW RFS 'Fire Near Me' data of fires Occurring on 10 December 2019 NB: Red = out of control Yellow = being controlled Blue = under control

4.2.3 The Bureau of Meteorology

The Bureau of Metrology (BoM) is an executive agency of the Australian Government that is responsible for providing weather services to Australia. It is the main provider of weather forecasts warnings and observations to the Australian public. The following images have been taken from BoM's Water and Land website that integrates information from diverse BoM services into groups of weather elements including wind forecasts as seen below for 10 December 2019.

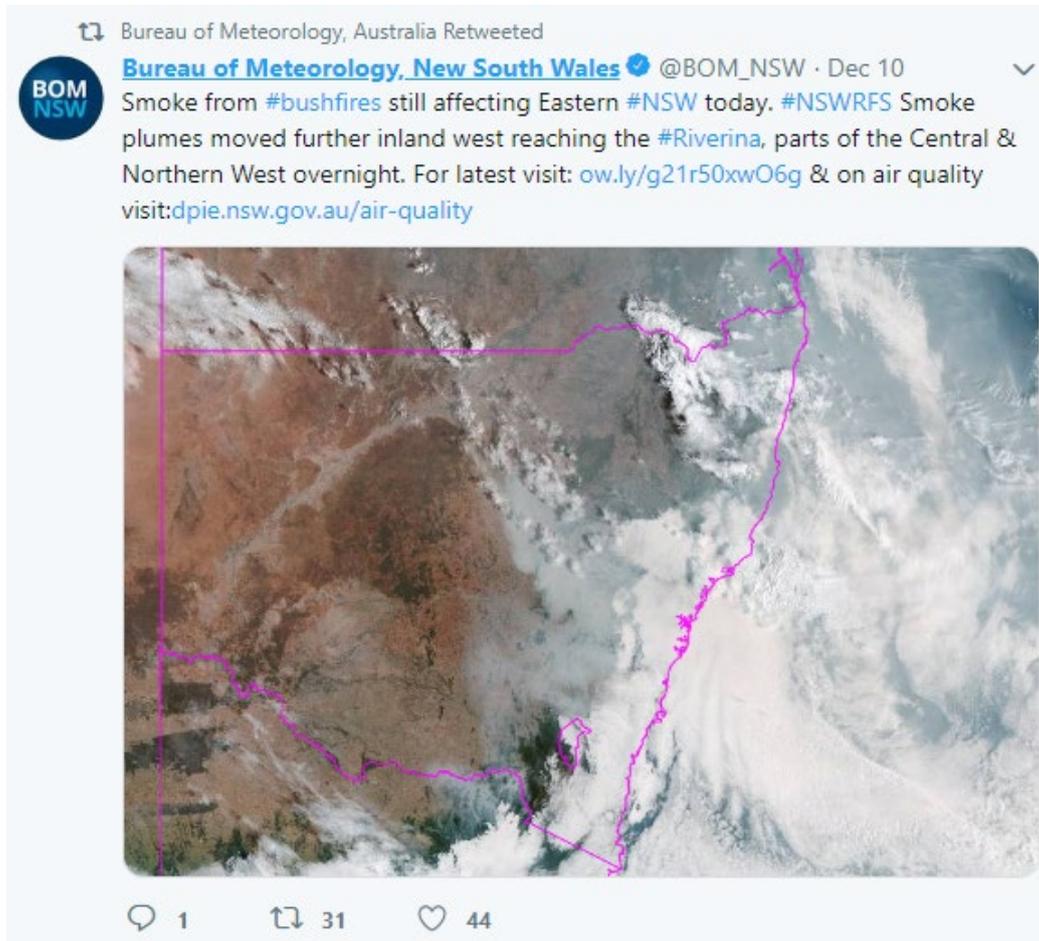
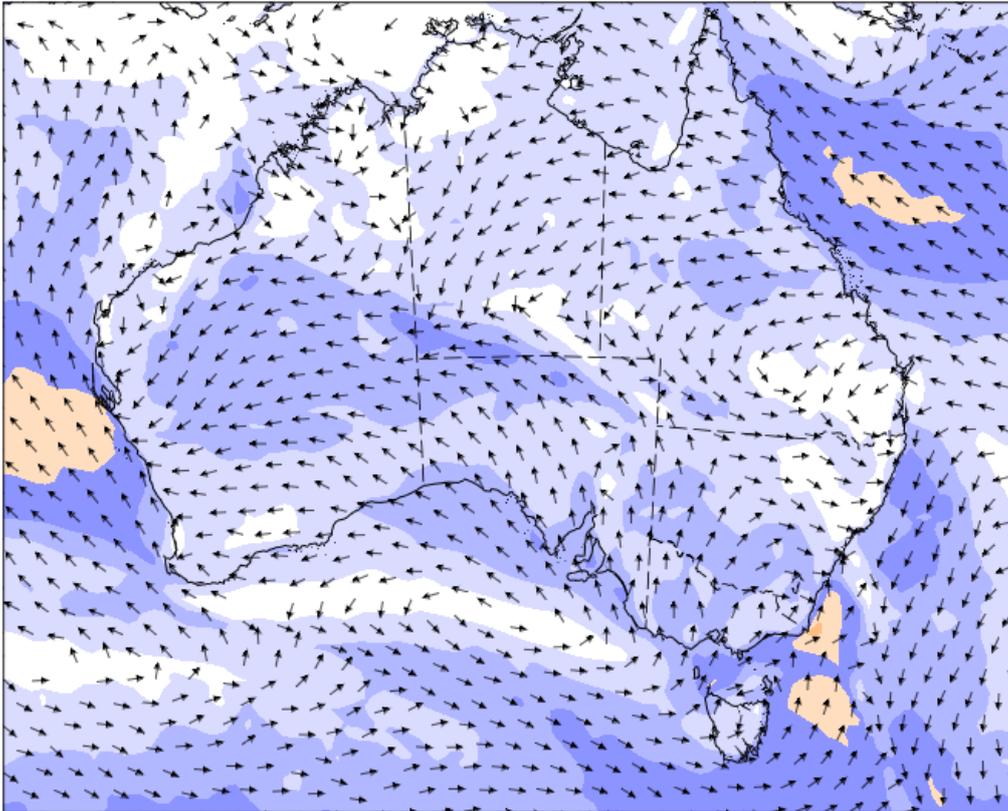


Figure 6 BoM satellite image of smoke in NSW on 10 December 2019

Forecast for 14:00 AEDT on Tuesday 10 December 2019



Wind Forecast for: 02:00 pm AEDT 10/12/2019

Issued 09/12/2019

Copyright © Commonwealth of Australia 2019, Australian Bureau of Meteorology

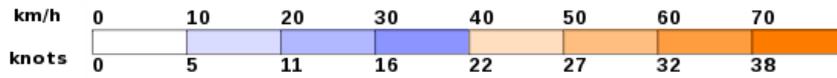


Figure 7 BoM wind forecast 10 December 2019

5. Findings

The EES data in Section 4.2.1 outlines that air quality was reduced across the Sydney Basin on the day concurrent with that of the notification on 10 December. All monitoring stations except two in Sydney's east, north-west and south-west recorded readings substantially above the goal limits for both $PM_{2.5}$ and PM_{10} with air quality rated as either very poor or hazardous at all stations.

On the same day, an emergency warning was issued by NSW RFS for the Little L Complex fire and satellite images from BoM show smoke affecting eastern NSW as exhibited in Figure 6. Additionally, the wind forecast issued by BoM at 2pm on 10 December (Figure 7) show that winds were predicted to push smoke in an easterly direction.

The data indicates that there was an ongoing external event that most likely affected air quality and caused PM_{10} and $PM_{2.5}$ to exceed goal levels. In addition to the data, the alerts and warnings from NSW RFS outlines that multiple fires were occurring on 10 December specifically including the Gospers Mountain Fire in the Wollemi National. Multiple additional fires were also occurring in the Blue Mountains, Tallaganda and Yengo National Parks. These fires along with a range of other fires, are the most probable cause of the event in Sydney, making it unlikely that the tunnel was a significant contributor to the Above-Goal Readings.

The diagrams in Section 2 of this report correlate with the findings of the EES, BoM and NSW RFS that a significant external event was occurring in areas surrounding Sydney on the date of recorded exceedances, that most likely caused the majority of monitoring stations across the Sydney Basin to record Above-Goal Readings. In addition, the diagrams in Section 2.1 indicate that apart from the recent bushfires in October, November and December that caused exceedances in ambient air quality, almost all readings at all monitoring stations for the past year have remained under the specified limits and no changes in air quality are evident since operation of the tunnel began. In addition, all ventilation outlet monitoring results for the same period were below the limits and goals specified as exhibited in the diagram in Section 2.4

6. Conclusion

The investigation into the cause of the exceedances has identified that the Above-Goal Readings recorded at the monitoring stations on 10 December were most likely the result of a Sydney-wide event that caused almost all monitoring stations across Sydney to record 24hr average PM_{10} and $PM_{2.5}$ values above $50 \mu\text{g}/\text{m}^3$ and $25 \mu\text{g}/\text{m}^3$, respectively.

The additional data collected from the EES air quality monitoring stations across Sydney is consistent with the readings from the ambient air quality monitoring stations located near the tunnel. Furthermore, the fire updates from NSW RFS for the concurrent period of the notification date confirm that multiple fires were occurring in areas surrounding Sydney. The fires specifically included the Gospers Mountain Fire in the Wollemi National and the Little L Complex Fire in the Yengo National Park that were burning on the days of the recorded Above-Goal Readings. The wind direction forecast as well as the satellite images of the smoke above eastern NSW demonstrates that the wind is also likely to be a significant contributor to the smoke from these fires affecting the air quality in Sydney.

Therefore, it has been concluded that as no emergencies were occurring within the tunnel at the time, as reported by the Proponent, this external natural occurrence was most likely the cause or major contributor of the exceedances and it is unlikely to be attributable to events of emissions from the M4 East motorway tunnel outlets.

As the notifications of the Ambient Above-Goal Readings have been provided to the relevant agencies, an external event is most likely the cause of the Above-Goal Readings and the operation of the tunnel has not been identified as a significant contributor of the exceedance, no further action is required as specified in the Minister's Condition of Approval E12.

Appendix A – Ecotech Service Report 9 – 15 Dec 2019

Fulton Hogan Egis Ecotech Service and Maintenance Reports



Company Details

Company Name	Fulton Hogan Egis	Service Report No.:	
Company Address	Level 7, Suite 701. 50 Clarence St Sydney, NSW 2000	Site	Ecotech Service and Maintenance Reports
Company Contact	Christina Kim	Contract No:	
Position	ICMS/QSE Manager	Service Requested By	
Email	christina.kim@fheom.com.au	Order or Ref Number	

Additional Work performed? Yes/No

Details as applicable

NSW - WCX M4 East Allen St

Visit Date / Time Start	9/12/2019 10:00:54 AM	Visit Date / Time End	9/12/2019 12:21:12 PM
Service Type	3	Service Engineers:	Aotasi Patea

Job Details

DESCRIPTION OF WORK COMPLETED
<p>Monthly maintenance.</p> <p>Completed all due maintenance per monthly tasks list for:</p> <ul style="list-style-type: none"> PM2.5 BAM 1020 dust monitor PM10 TEOM 1400 dust monitor NOx S40 Analyser CO S30 Analyser Gas Diluter SC2000 calibrator Zero Air 8301LC Generator Met Sensors - DTs & WS/WD Logger WinAQMS Calibration Gas bottle. Enclosure Generic Shelter

Fulton Hogan Egis
Ecotech Service and Maintenance Reports



OUTSTANDING ITEMS

Empty box for outstanding items.

NSW - WCX M4 East Allen St

Visit Date / Time Start	10/12/2019 9:31:29 AM	Visit Date / Time End	10/12/2019 11:10:35 AM
Service Type	0	Service Engineers:	Aotasi Patea

Job Details

DESCRIPTION OF WORK COMPLETED

ERS reported TEOM data chart looking strangely smoother than normal.

Looked to be this way since SM bypassed aux flow water trap filter on 08/12. Latter was restricting aux flow causing it to drop just above 13 lpm. Bypassing water filter allowed aux flow to get back to normal 16.6 lpm.

Currently no replacement water trap filter in stock. Manually cleaned clogged up water trap filter (carefully removed ingrained dust as best as possible). Reinstated water trap filter inline the aux flow line - observed aux flow remained unchanged at 16.63 lpm

Performed leak check
Performed flow check

Notes:

- 1) need replacement set of TEOM filters.
- 2) need replacement aux flow water trap filter

OUTSTANDING ITEMS

Empty box for outstanding items.

NSW - WCX M4 East Allen St

Visit Date / Time Start	12/12/2019 7:30:59 AM	Visit Date / Time End	12/12/2019 7:58:13 AM
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Fulton Hogan Egis
Ecotech Service and Maintenance Reports



Service Type	0	Service Engineers:	Aotasi Patea
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Job Details

DESCRIPTION OF WORK COMPLETED

Changed Multiplier and Offset for Wind Direction and Wind Speed today 12/12/2019 at 6:45 AM AEST. New factors need to be applied to data since 11/11/2019 14:35 hrs.

Wind Direction
Old multiplier: 71.942 | New multiplier: 71.895
Old Offset: 0.64674 | New Offset: 0.71015

Wind Speed
Old multiplier: 6.0872 | New multiplier: 6.1283
Old Offset: 0.039836 | New Offset: 0.062625

Uploaded images of calibration forms for 18-0883 to AMS under general visit.

OUTSTANDING ITEMS

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NSW - WCX M4 East Concord Oval

Visit Date / Time Start	10/12/2019 7:00:46 AM	Visit Date / Time End	10/12/2019 9:10:24 AM
Service Type	3	Service Engineers:	Aotasi Patea

Job Details

DESCRIPTION OF WORK COMPLETED

PM10 TEOM 1400
+completed all due monthly tasks per tasks lists

Note: need new box of filters to bring next visit

PM2.5 BAM 1020
+completed all due monthly tasks per tasks list

Fulton Hogan Egis
Ecotech Service and Maintenance Reports



NOx Serinus 40
+completed all due monrhtly tasks per tasks list

CO Serinus 30
+completed all due monrhtly tasks per tasks list

Note: FCW motor making a low level bit of noise

ZAG 8301LC
+completed all due monrhtly tasks per tasks list

CONOx Calibration gases
+completed all due monrhtly tasks per tasks list

10m+2m Differential Temperature sensors
+completed all due monrhtly tasks per tasks list

Windsonic Gill WSWD sensor
+completed all due monrhtly tasks per tasks list

WinAQMS datalogger
+completed all due monrhtly tasks per tasks list

Enclosure Generic Shelter
+completed all due monrhtly tasks per tasks list

OUTSTANDING ITEMS

NSW - WCX M4 East Haberfield School

Visit Date / Time Start	10/12/2019 8:00:00 AM	Visit Date / Time End	10/12/2019 12:00:00 PM
Service Type	3	Service Engineers:	Scott Xie

Job Details

DESCRIPTION OF WORK COMPLETED

Fulton Hogan Egis
Ecotech Service and Maintenance Reports



Monthly maintenance carried out onsite.
CO and NOX analyser filters changed.
CO and NOX span/zero calibration done.
BAM checked OK, self test pass.
Teom filter loading is 30 % no filter changed.

OUTSTANDING ITEMS

NSW - WCX M4 East Haberfield School

Visit Date / Time Start	14/12/2019 9:00:00 AM	Visit Date / Time End	14/12/2019 1:00:00 PM
Service Type	0	Service Engineers:	Scott Xie

Job Details

DESCRIPTION OF WORK COMPLETED

CO analyser restarted remotely, span/zero cal done and form added to AMS

OUTSTANDING ITEMS

NSW - WCX M4 East Haberfield School

Visit Date / Time Start	15/12/2019 10:00:00 AM	Visit Date / Time End	15/12/2019 10:30:00 AM
Service Type	0	Service Engineers:	Scott Xie

Job Details

Fulton Hogan Egis
Ecotech Service and Maintenance Reports



DESCRIPTION OF WORK COMPLETED

CO reading drift up, manually restarted analyser, it seems problem fixed but it may happen again, need a site visit next week for a further investigation.

OUTSTANDING ITEMS

NSW - WCX M4 East Powells Creek

Visit Date / Time Start	10/12/2019 11:20:13 AM	Visit Date / Time End	10/12/2019 12:18:08 PM
Service Type	0	Service Engineers:	Aotasi Patea

Job Details

DESCRIPTION OF WORK COMPLETED

ERS reported TEOM aux flow error alarm.

Arrived to find TEOM filter load over 80% - changed filter.

Also aux flow error due to aux flow water trap filter clogging up. Readings were only just above 11 lpm. Cleaned and reinstalled water trap filter inline. Aux flow back to 13.7 lpm.

Cleaned inlet head.

PM10 noise yaking some time to settle.

Reassembled filter but still not much better - keeping an eye on it overnight.

Notes

- 1) need replacement set of TEOM filters - last 2 conditioning in sensor unit.
- 2) need replacement aux flow water trap filter
- 3) haze increasingly getting worse than earlier this morning

OUTSTANDING ITEMS

Fulton Hogan Egis
Ecotech Service and Maintenance Reports



NSW - WCX M4 East Powells Creek

Visit Date / Time Start	11/12/2019 8:06:21 AM	Visit Date / Time End	11/12/2019 9:05:16 AM
Service Type	0	Service Engineers:	Aotasi Patea

Job Details

DESCRIPTION OF WORK COMPLETED

ERS reported TEOM instrument sending rubbish PM10 data to website since changing filter and fixing aux flow alarm yesterday.

Onsite today investigate.
Data today looks normal but there was dust elevation yesterday for both PM10 and PM2.5 during the visit - also noted haze conditions worsening at the time of the visit.

Also revisited TEOM filter noise levels since yesterday. Noise levels did not improve overnight. Changed TEOM filter accordingly - this time noise levels once the filter settled dropped below 0.100 and as low as 0.03 at times which is the desired outcome.

OUTSTANDING ITEMS

NSW - WCX M4 East Ramsay St

Visit Date / Time Start	10/12/2019 12:00:00 PM	Visit Date / Time End	10/12/2019 4:00:00 PM
Service Type	3	Service Engineers:	Scott Xie

Job Details

Fulton Hogan Egis Ecotech Service and Maintenance Reports



DESCRIPTION OF WORK COMPLETED

Monthly maintenance done onsite, including:

- Gas cylinder certificate and pressure checked OK.
- CO and NOX gas analyser filters changed, leak check pass.
- CO and NOX gas analyser span/zero calibration done.
- Diff Temp Sensor fan checked OK.
- Shelter temperature checked OK; site cleaned.
- Gas diluter checked OK.
- Logger checked OK.
- Bam tape checked OK, inlet, capstan shaft cleaned, self-test pass.
- BAM AT calibrated.
- 1405 Teom sample filter changed.
- Zero air supply checked OK.
- PM10 and PM2.5 inlet cleaned.

OUTSTANDING ITEMS

NSW - WCX M4 East St Lukes

Visit Date / Time Start	10/12/2019 12:38:26 PM	Visit Date / Time End	10/12/2019 2:59:05 PM
Service Type	3	Service Engineers:	Aotasi Patea

Job Details

DESCRIPTION OF WORK COMPLETED

PM10 TEOM 1400
+completed all due monthly tasks per tasks lists

Note: need new box of filters to bring next visit

PM2.5 BAM 1020
+completed all due monthly tasks per tasks list

NOx Serinus 40
+completed all due monthly tasks per tasks list

Fulton Hogan Egis Ecotech Service and Maintenance Reports



CO Serinus 30

+completed all due monthly tasks per tasks list

Note: FCW motor making a low level bit of noise

ZAG 8301LC

+completed all due monthly tasks per tasks list

CONOx Calibration gases

+completed all due monthly tasks per tasks list

10m+2m Differential Temperature sensors

+completed all due monthly tasks per tasks list

Windsonic Gill WSWD sensor

+completed all due monthly tasks per tasks list

WinAQMS datalogger

+completed all due monthly tasks per tasks list

Enclosure Generic Shelter

+completed all due monthly tasks per tasks list

Note:

Haze is getting pretty bad now - literally worsened over the last half hour.

OUTSTANDING ITEMS