

WestConnex M4-M5 Link Ambient air quality monitoring results

May 2016

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GLOSSARY

Term	Description
CH ₄	Methane
CO	Carbon monoxide
NMHC	Non-methane hydrocarbons
NO	Nitric oxide
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
O ₃	Ozone
ppb	Parts per billion
ppm	Parts per million
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of less than 10 µm
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of less than 2.5 µm
THC	Total hydrocarbons
µg/m ³	Micrograms per cubic metre

1 Introduction: Understanding local air quality

WestConnex is undertaking air quality monitoring within local areas in close proximity to the proposed M4-M5 Link motorway. Monitoring stations have been established to measure the existing air quality conditions. The data collected through our monitoring program provides a baseline for the current air quality conditions along the project corridor. The data is being collected as part of the environmental assessment process for the M4-M5 Link project.

2 Monitoring air quality

To support the development and assessment of the M4-M5 Link, three ambient air quality monitoring stations have been established along the project corridor. Data from these three stations supplements the multiple long-term monitoring stations operated by NSW Office of Environment and Heritage and Roads and Maritime Services. Air quality specialists have been commissioned to operate and maintain the monitoring network during the planning phase of the project. A map of the monitoring station locations across the M4-M5 Link project area is provided below in **Figure 1**.

Figure 1 M4-M5 Link air quality monitoring station locations



3 Monitoring methodology

Air quality monitoring is undertaken in accordance with Australian standards and guidelines. Specific pollutants are monitored and reported against the relevant air quality goals in the National Environment Protection Measure (Ambient Air Quality). Meteorological conditions are also monitored locally to give a greater understanding of the conditions that may influence air quality outcomes. For more information on the pollutants measured and monitoring methodology visit www.westconnex.com.au

A data verification process is carried out to ensure high quality data capture. The data verification process includes:

- Removal of clearly incorrect data
- Corrections for instrument drift
- Corrections for offsets
- Removal of data acquired during calibration periods
- Removal of data during servicing, maintenance and equipment breakdown periods.

The above process can cause data gaps, and may be one reason why there is some data missing in the graphs provided.

The instruments measuring pollutants are subject to some variability and the results should be read within this context.

4 Results

A summary of air quality results from the M4-M5 Link monitoring network is provided below. Results of CO, NO₂, PM₁₀ and PM_{2.5} concentrations are provided and results are also represented graphically. The solid red line in each of the figures corresponds to the respective criteria or advisory reporting standard for that pollutant as stated in the NSW *Approved Methods* (NSW DEC, 2005).

Data from the M4-M5 Link air quality monitoring sites were compared to the free, 24 hour average data available from the NSW Office of Environment and Heritage (OEH) web site. Data were obtained for the OEH sites Chullora, Rozelle and Earlwood and the results are shown in **Section 4.4**.

4.1 Ramsay Street, Haberfield

A summary of the air quality results from the Ramsay Street monitoring station in Haberfield is provided in **Table 1** and **Figure 2**, **Figure 3**, **Figure 4** and **Figure 5**.

Table 1 Ramsay Street summary statistics for air pollutants

Statistics	CO (ppm) 8 hour rolling average values	NO ₂ (ppb) 1 hour average values	PM ₁₀ (µg/m ³) 24 hour average values	PM _{2.5} (µg/m ³) 24 hour average values
<i>Standard</i>	9	120	50	25
Average value	0.5	18.6	20.7	12.9
Maximum value	1.5	39.5	38.1	40.4
Minimum value	0.1	5.0	12.4	3.3

Note: Maximum PM_{2.5} readings occurred on days when PM₁₀ readings have not been recorded (refer **Figure 4** and **Figure 5**)

Figure 2 Ramsay Street CO concentrations (eight hour rolling average)

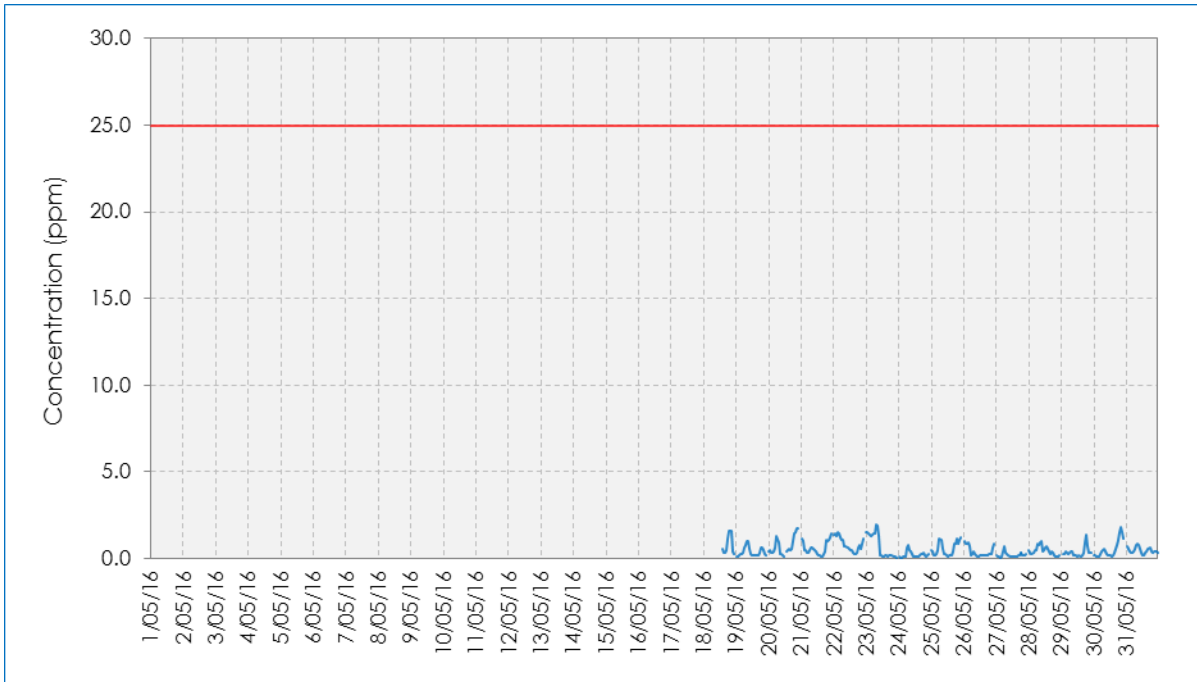


Figure 3 Ramsay Street NO₂ concentrations (one hour average)

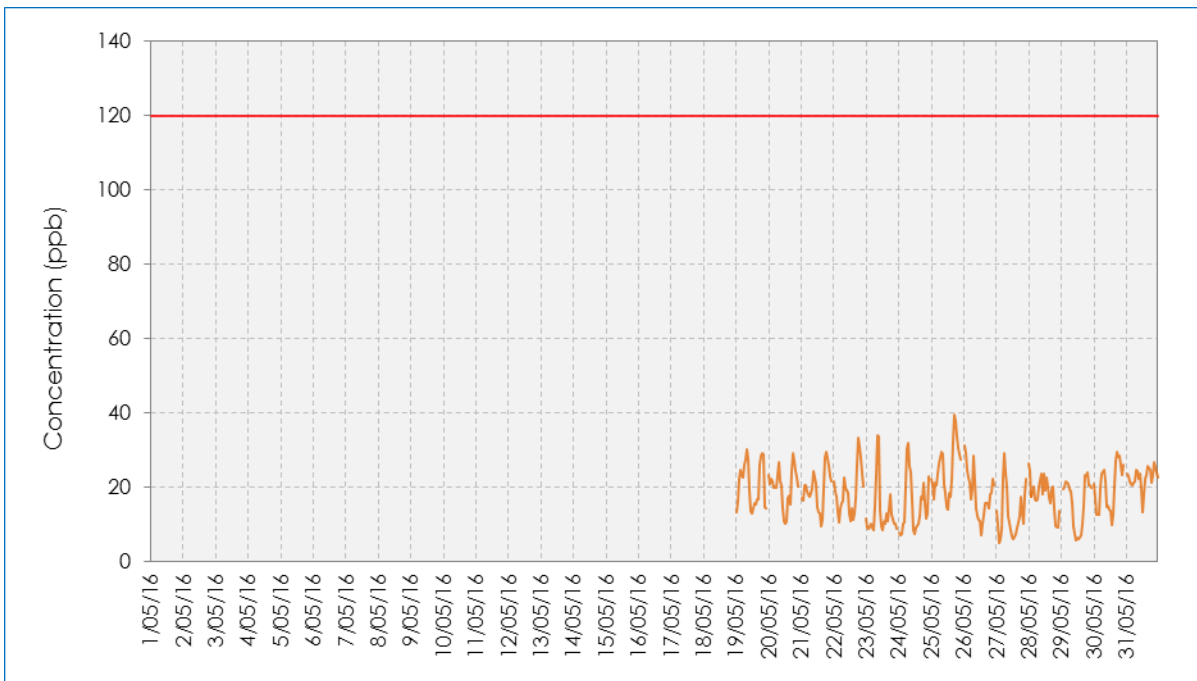
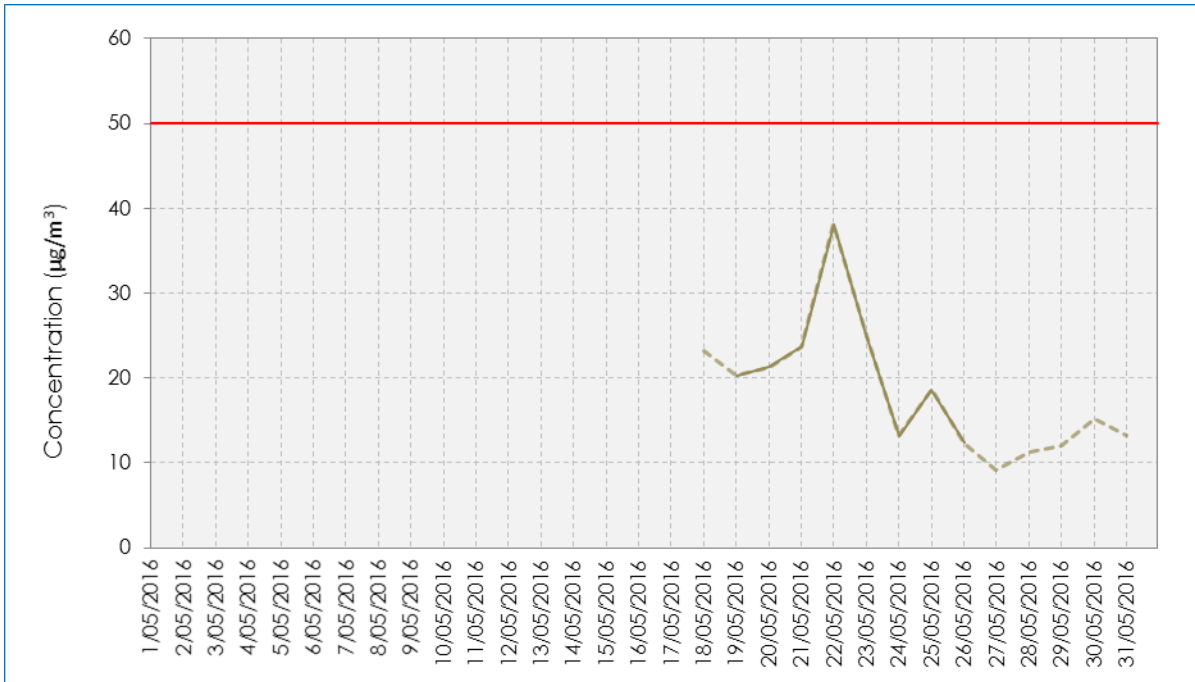
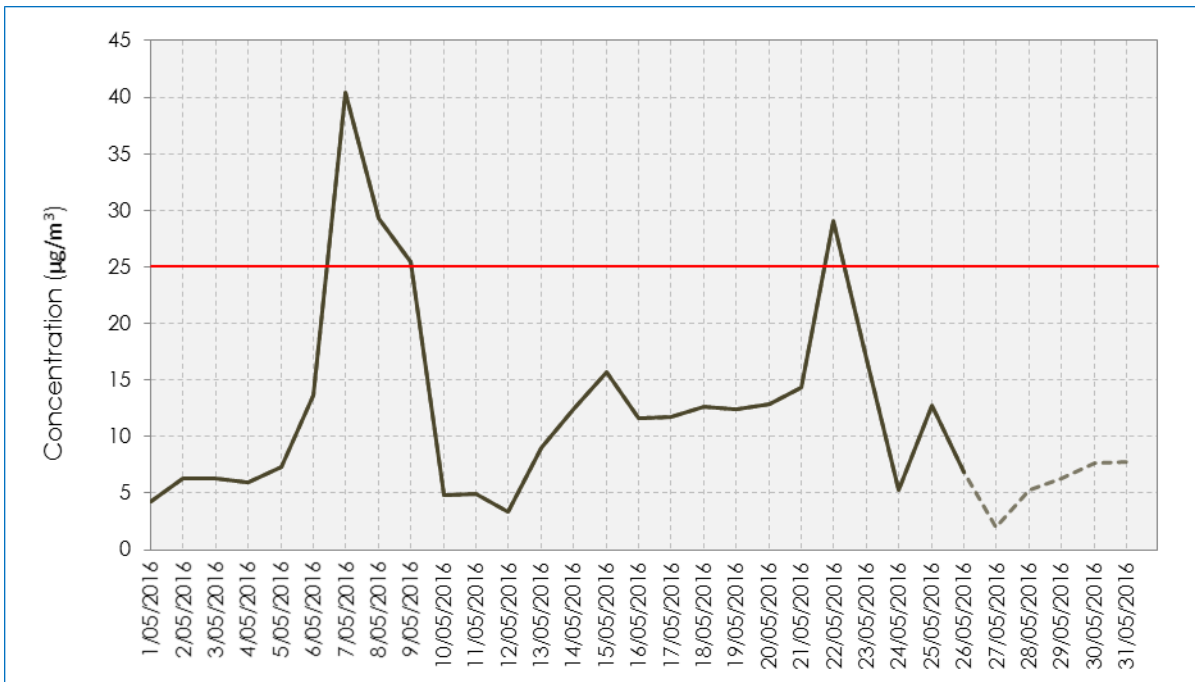


Figure 4 Ramsay Street PM₁₀ concentrations (24 hour average)



Note: Dashed line denotes results where less than 75% of the expected samples in the averaging period are available.

Figure 5 Ramsay Street PM_{2.5} concentrations (24 hour average)



Note: Dashed line denotes results where less than 75% of the expected samples in the averaging period are available.

Reporting

A circuit breaker trip occurred on 28th April at the Ramsay Street monitoring station, resulting in CO, NO₂ and PM₁₀ data loss. This issue was resolved on 18th May by a Pacific Environmental technician.

It should be noted that ambient PM_{2.5} readings will always be less than or equal to PM₁₀ readings for the same period. From 26th May data availability for PM_{2.5} and PM₁₀ was lower than 75% of the expected samples for the 24 hour averaging period. This reduced data capture was a result of excluding PM_{2.5} data exceeding PM₁₀ 1 hour average values, in accordance with the data validation and ratification procedure.

In May 2016, a number of back burning activities occurred throughout the Sydney region on multiple days; this led to an overall deterioration in air quality including elevated particulates, which may have been responsible for the above exceedances of the air quality criteria in the *NSW Approved Methods* (NSW DEC, 2005) Elevated particulate matter concentrations were also registered at other M4-M5 Link and OEH sites on these days (**Figure 14** and **Figure 15, Section 4.4**)

4.2 City West Link, Rozelle

A summary of the air quality results from the City West Link monitoring station in Rozelle is provided in **Table 2** and **Figure 6**, **Figure 7**, **Figure 8** and **Figure 9**.

Table 2 City West Link summary statistics for air pollutants

Statistics	CO (ppm) 8 hour rolling average values	NO ₂ (ppb) 1 hour average values	PM ₁₀ (µg/m ³) 24 hour average values	PM _{2.5} (µg/m ³) 24 hour average values
Standard	9	120	50	25
Average value	0.6	21.2	23.4	10.9
Maximum value	1.3	71.0	70.9	37.6
Minimum value	0.2	2.0	8.3	2.0

Figure 6 City West Link CO concentrations (eight hour rolling average)

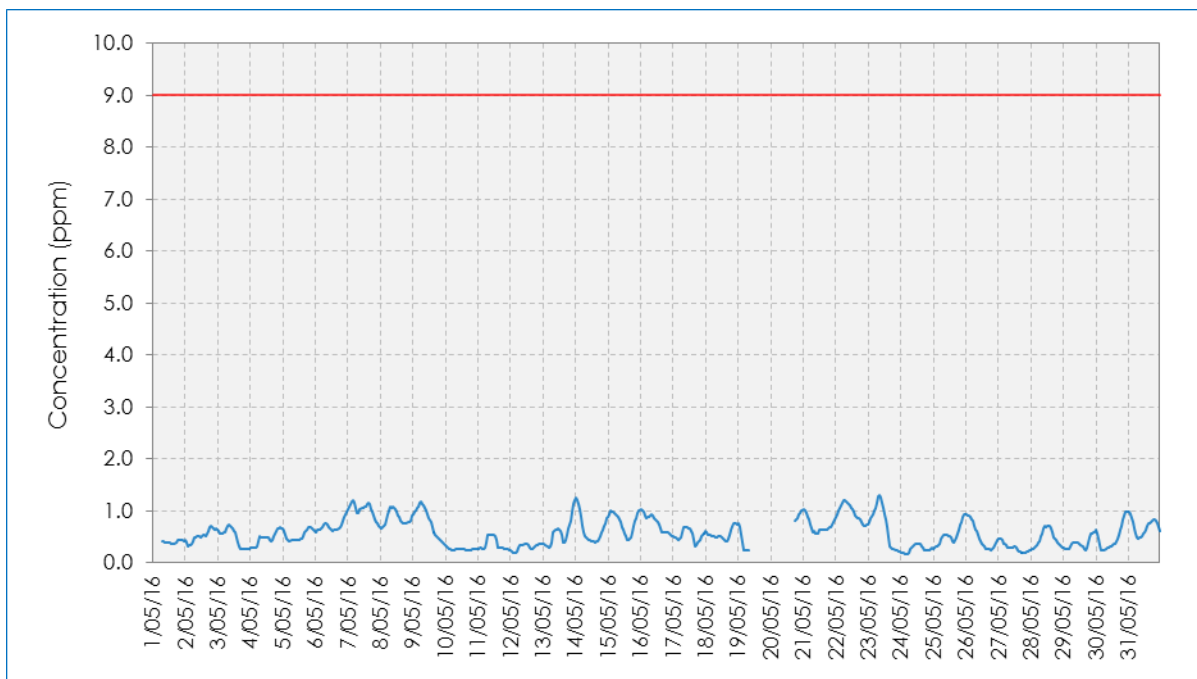


Figure 7 City West Link NO₂ concentrations (one hour average)

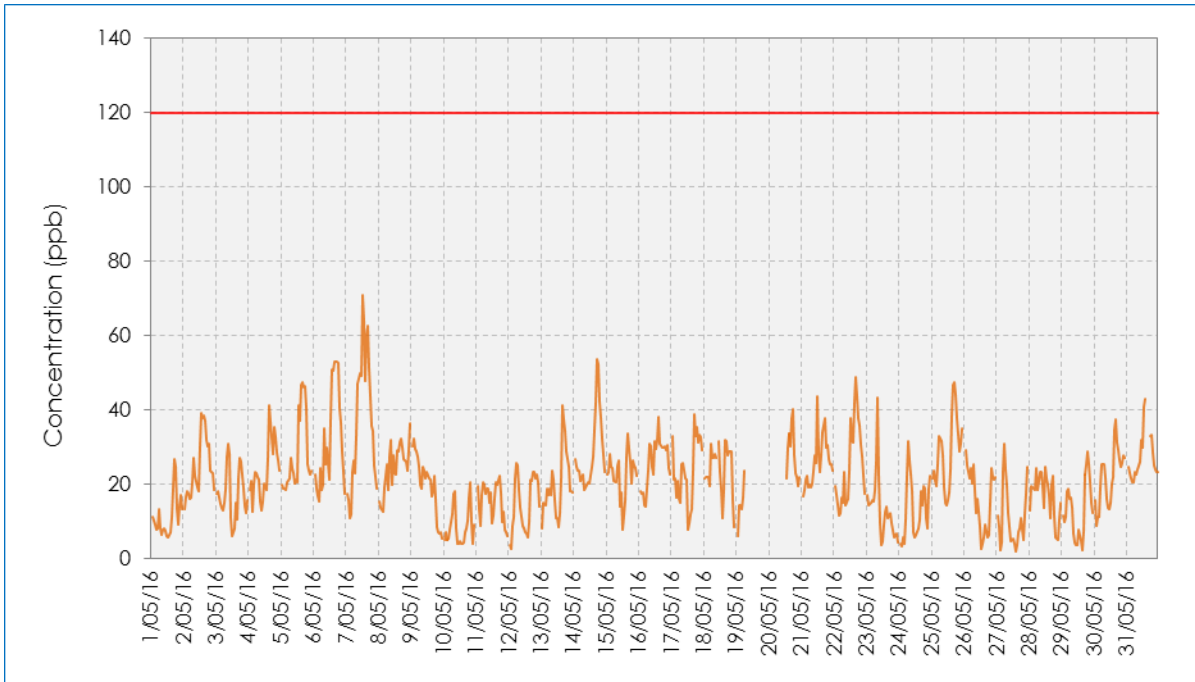
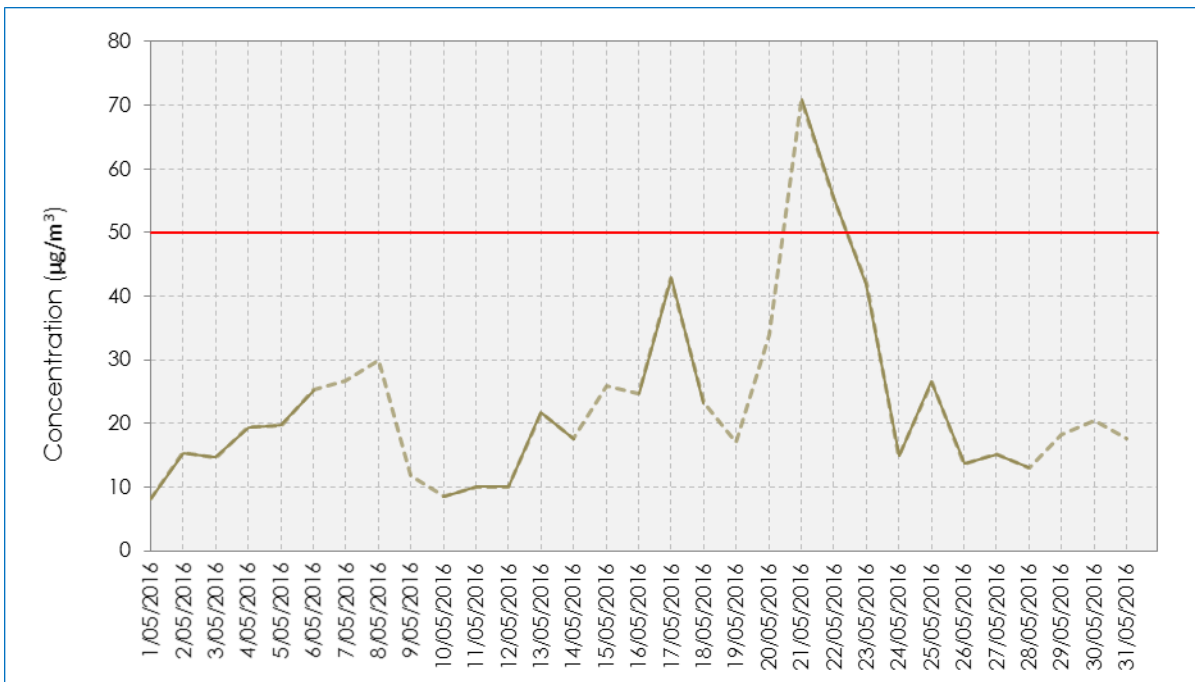
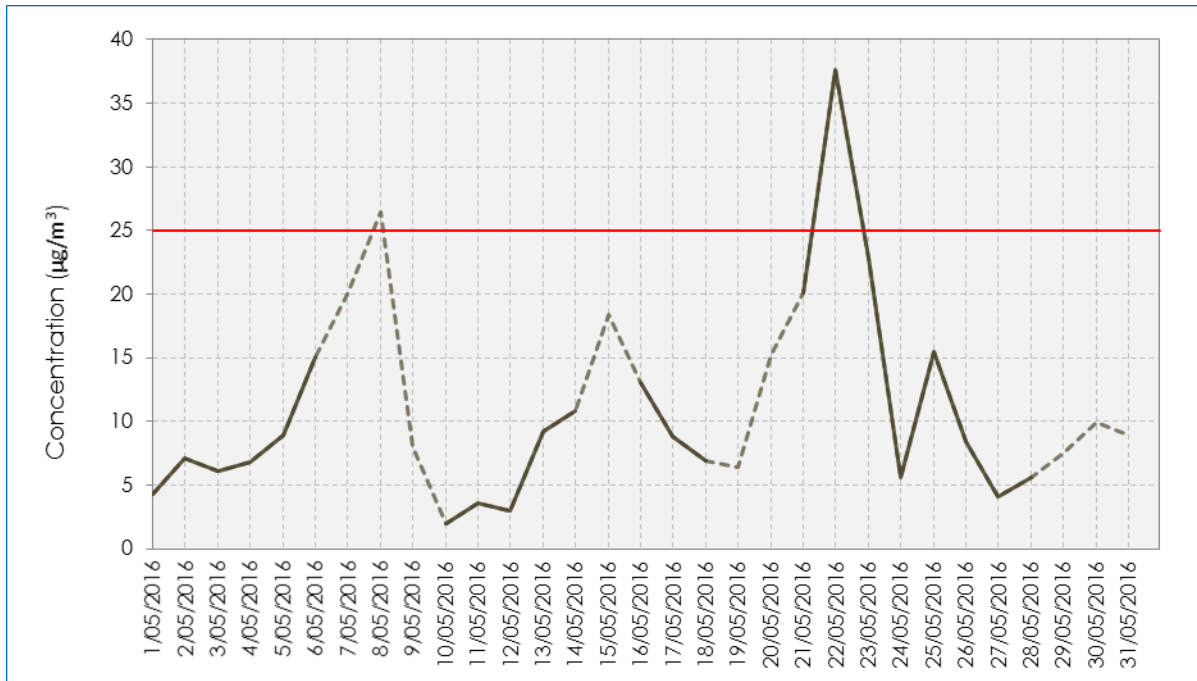


Figure 8 City West Link PM₁₀ concentrations (24 hour average)



Note: Dashed line denotes results where less than 75% of the expected samples in the averaging period are available

Figure 9 City West Link PM_{2.5} concentrations (24 hour average)



Note: Dashed line denotes results where less than 75% of the expected samples in the averaging period are available.

Reporting

It should be noted that ambient PM_{2.5} readings will always be less than or equal to PM₁₀ readings for the same period. Note that in some instances data availability for PM_{2.5} and PM₁₀ were lower than 75% of the expected samples for the 24 hour averaging period. Reduced data capture was a result of excluding both PM_{2.5} exceeding PM₁₀ 1 hour average values, in accordance with the data validation and ratification procedure

Reduced data capture between 19th and 20th May was due to a communication issue with the logger.

In May 2016, a number of back burning activities occurred throughout the Sydney region on multiple days; this led to an overall deterioration in air quality including elevated particulates, which may have been responsible for the above exceedances of the air quality criteria in the *NSW Approved Methods* (NSW DEC, 2005). Elevated particulate matter concentrations were also registered at other M4-M5 Link and OEH sites on these days (**Figure 14** and **Figure 15, Section 4.4**).

4.3 St Peters Public School, St Peters

A summary of the air quality results from the St Peter Public School monitoring station in St Peters is provided in **Table 3** and **Figure 10**, **Figure 11**, **Figure 12** and **Figure 13**.

Table 3 St Peters summary statistics for air pollutants

Statistics	CO (ppm) 8 hour rolling average values	NO ₂ (ppb) 1 hour average values	PM ₁₀ (µg/m ³) 24 hour average values	PM _{2.5} (µg/m ³) 24 hour average values
Standard	9	120	50	25
Average value	0.6	16.5	23.4	12.8
Maximum value	1.6	33.4	56.4	40.9
Minimum value	0.2	4.4	9.8	3.1

Figure 10 St Peters CO concentrations (eight hour rolling average)

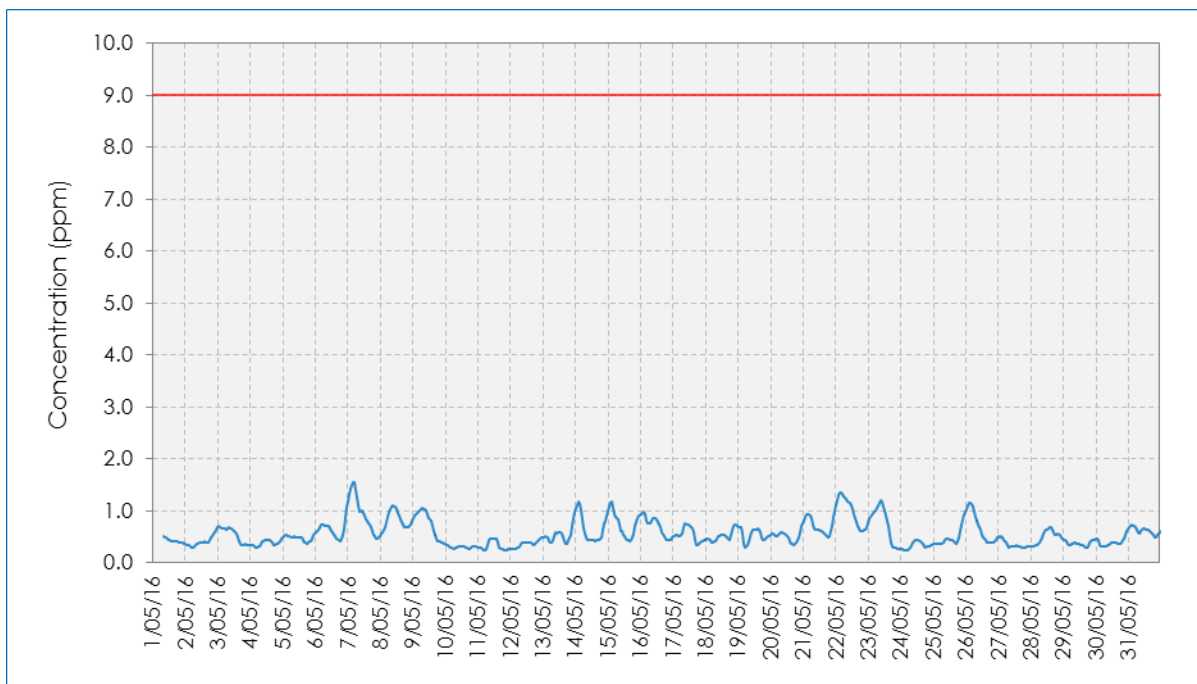


Figure 11 St Peters NO₂ concentrations (one hour average)

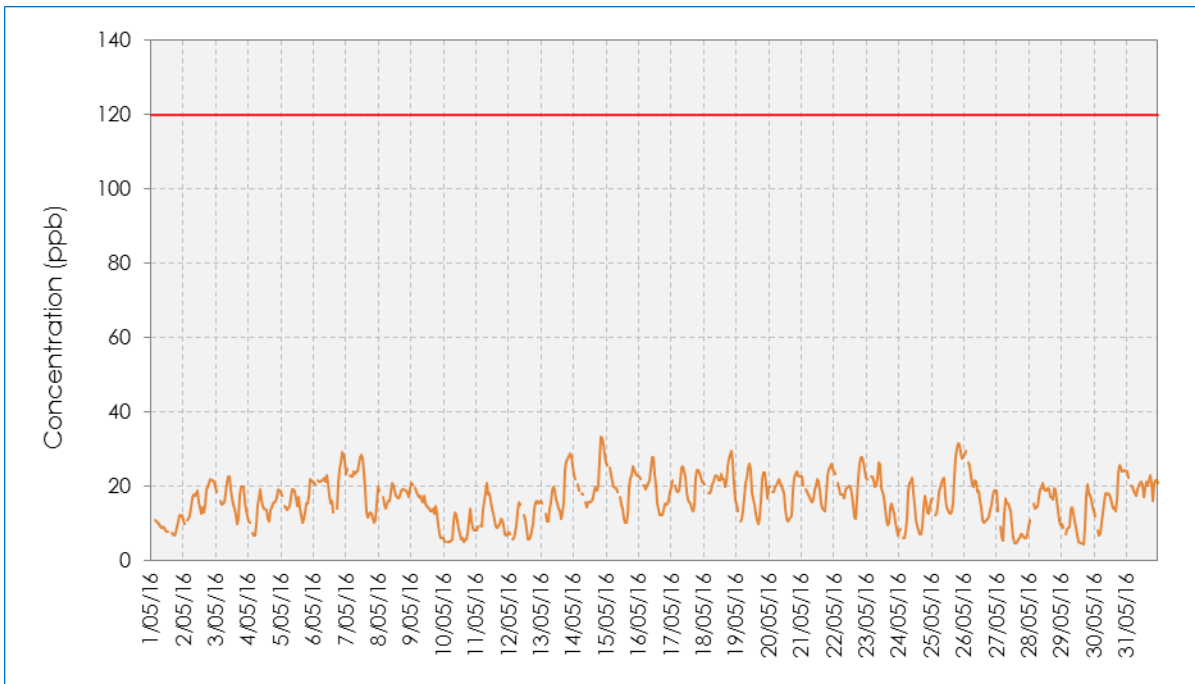
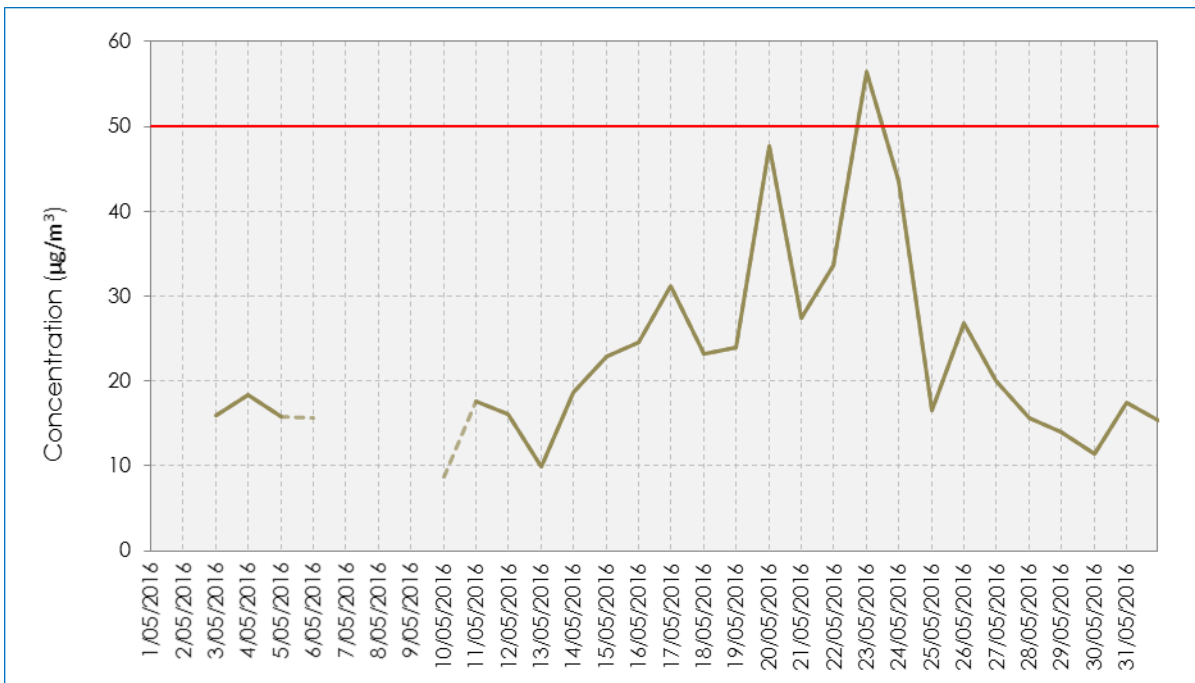
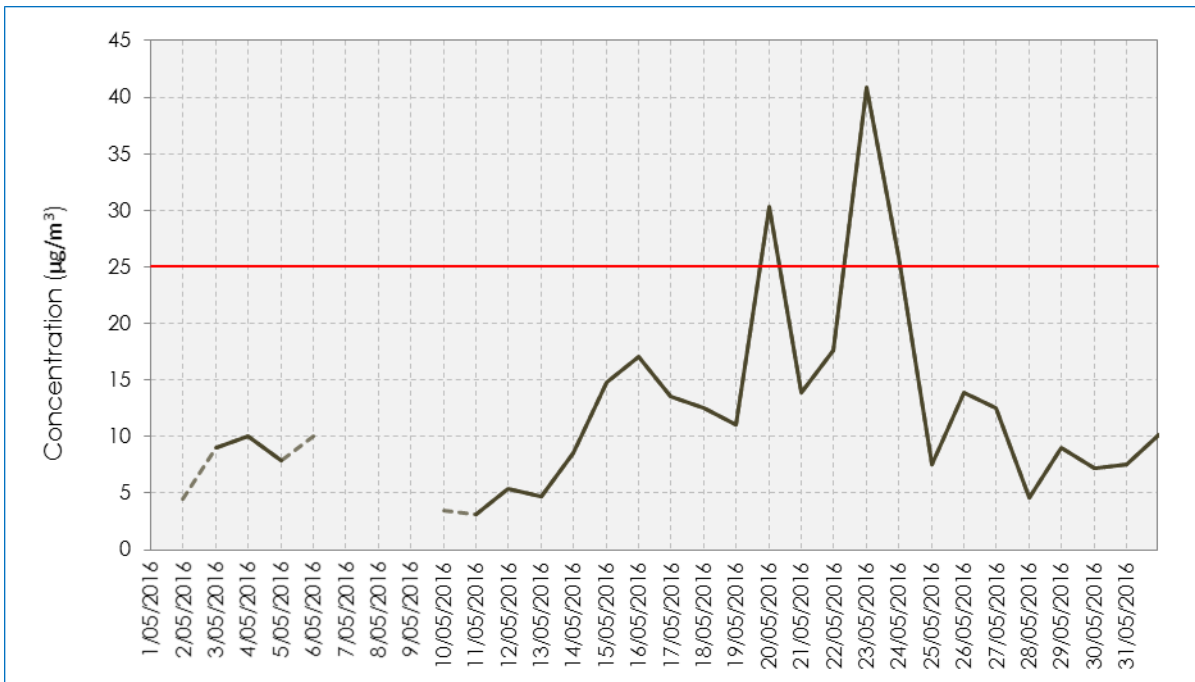


Figure 12 St Peters PM₁₀ concentrations (24 hour average)



Note: Dashed line denotes results where less than 75% of the expected samples in the averaging period are available.

Figure 13 St Peters PM_{2.5} concentrations (24 hour average)



Note: Dashed line denotes results where less than 75% of the expected samples in the averaging period are available.

Reporting

Due to a mechanical issue with the PM_{2.5} and PM₁₀ analyser, the particulate analysers had to undergo instrument zero calibration tests, leading to data gaps earlier in the month.

In May 2016, a number of back burning activities occurred throughout the Sydney region on multiple days; this led to an overall deterioration in air quality including elevated particulates, which may have been responsible for the above exceedances of the air quality criteria in the NSW Approved Methods (NSW DEC, 2005). Elevated particular matter concentrations were also registered at other M4-M5 Link and OEH sites (**Figure 14** and **Figure 15, Section 4.4**).

4.4 Comparison with data from OEH monitoring data during back burning events

The following graphs show the comparison – as time series of 24-hour averages - between the particulate concentrations at the M4-M5 Link sites and those at the OEH sites. The OEH data are shown as average values for the Chullora, Rozelle and Earlwood sites, with the grey shaded area giving the range of values across the three sites (i.e. the graphs show the maximum, average and minimum values for the three OEH sites). As can be seen, the elevated levels of particulate matter correspond well with the OEH sites, suggesting that the elevated levels were regional and likely due to the numerous back burning activities during the month.

Figure 14 PM₁₀ concentrations at M4-M5 Link sites and OEH sites (24-hour average)

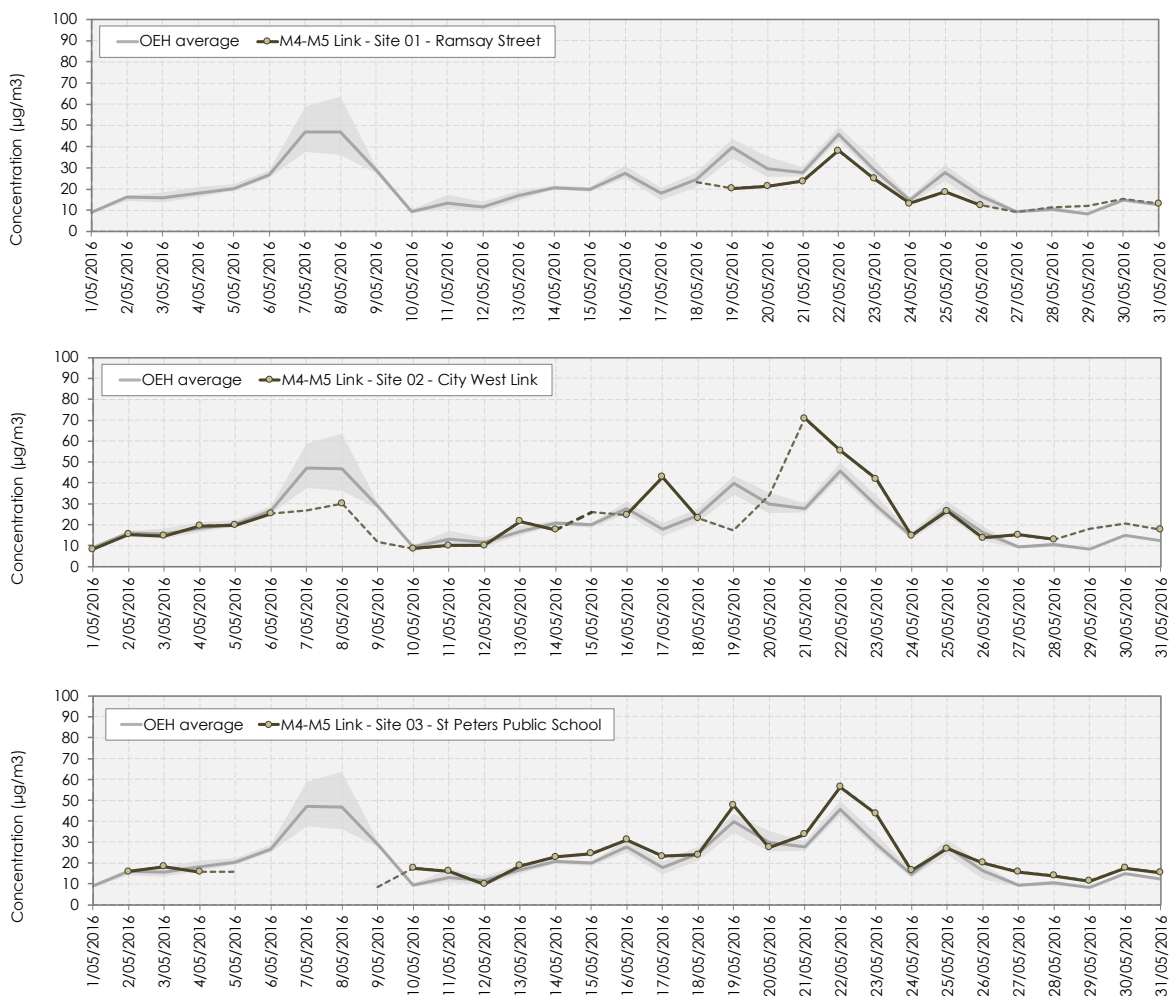


Figure 15 PM_{2.5} concentrations at M4-M5 Link sites and OEH sites (24-hour average)

