

WestConnex M4-M5 Link Ambient air quality monitoring results

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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 4.5**.

4.1 Ramsay Street, Haberfield

The site was decommissioned in November 2017, and no data was collected from this time onwards.

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 1**.

Table 1 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
<i>Standard</i>	9	120	50	25
Average value	0.4	18.5	23.6	11.9
Maximum value	0.9	46.3	42.1	32.7
Minimum value	0.1	2.9	11.8	3.7

Note: All monitoring instruments have an uncertainty associated with each measurement. This is normally described as \pm a specific value. Due to this, negative values could be reported at very low ambient concentrations.

Reporting

Data availability across all air quality parameters at site 02 Rozelle was 94%.

Minor data loss for PM instruments was due to a number of readings for PM_{2.5} greater than PM₁₀ across the reporting period, which under our procedures requires the data be invalidated. A Pacific Environment Technician inspected both instruments during monthly maintenance; a 72-hour background check was performed on the PM₁₀ instrument between 16th and 18th May to determine the cause of minor noisy data readings from this instrument; whilst no obvious issues were noted, further investigation of this instrument performance is underway.

Reduced data capture for CO was due to a data flatline between 8th and 10th May due to a power cable issue. The cable was replaced on 10th May and readings returned with no ongoing issues identified.

Reduced data capture for NO, NO_x and NO₂ was due to a number of readings for NO higher than NO_x between 4th and 7th May, which under our procedures requires the data be invalidated. The instruments were inspected by a PE Technician during monthly maintenance, whilst no obvious issues were noted, further investigation of this instrument performance is underway.

Exceedances in 24-hour rolling average values for PM_{2.5} in NSW EPA criteria were recorded on 27th and 29th May at Site 02: Rozelle (see **Figure 5**). Elevated and exceedance levels of PM_{2.5} were recorded at nearby OEH stations at these times, suggesting a regional Particulate Matter event likely due to hazard reduction burning and bushfire activity in the Greater Sydney regional area at this time.

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 2**.

Table 2 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	0.4	17.5	29.7	13.5
Maximum value	1.3	43.9	56.7	39.5
Minimum value	0.1	1.7	15.8	4.0

Note: All monitoring instruments have an uncertainty associated with each measurement. This is normally described as \pm a specific value. Due to this, negative values could be reported at very low ambient concentrations.

Reporting

Data availability was 100% across all air quality parameters.

Exceedances in 24-hour rolling average values for PM_{2.5} in NSW EPA criteria were recorded on 8th, 27th and 29th May at Site 03: St Peters (see **Figure 5**); an exceedance in 24-hour rolling average values for PM₁₀ was recorded on 27th May (see **Figure 4**). Elevated and exceedance levels of PM_{2.5} and PM₁₀ were recorded at nearby OEH stations at these times, suggesting a regional Particulate Matter event likely due to hazard reduction burning and / or bushfire activity in the Greater Sydney regional area at this time.

4.4 Time series

The time series for the various pollutants during the reporting period are provided below. Pollutant concentrations are also averaged over the periods stated for short-term air quality criteria in the NSW Approved Methods. Where appropriate, the corresponding criterion is shown as a solid red line.

Figure 2 CO concentrations at M4-M5 Link sites (eight hour rolling average)

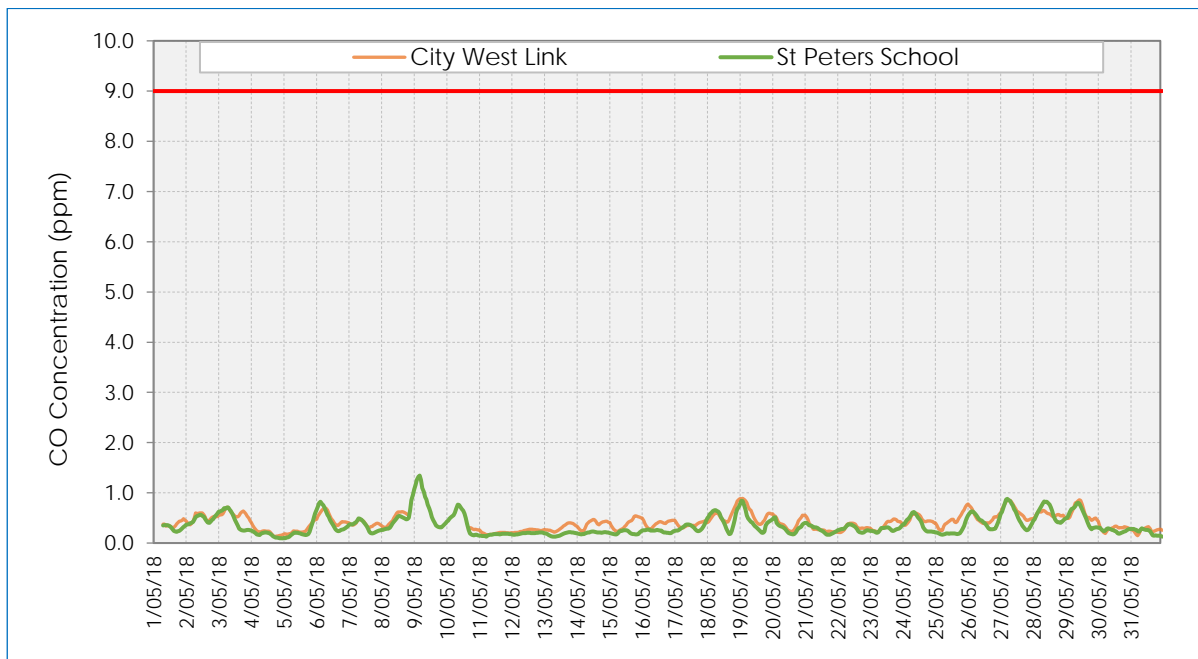


Figure 3 NO₂ concentrations at M4-M5 Link sites (one hour average)

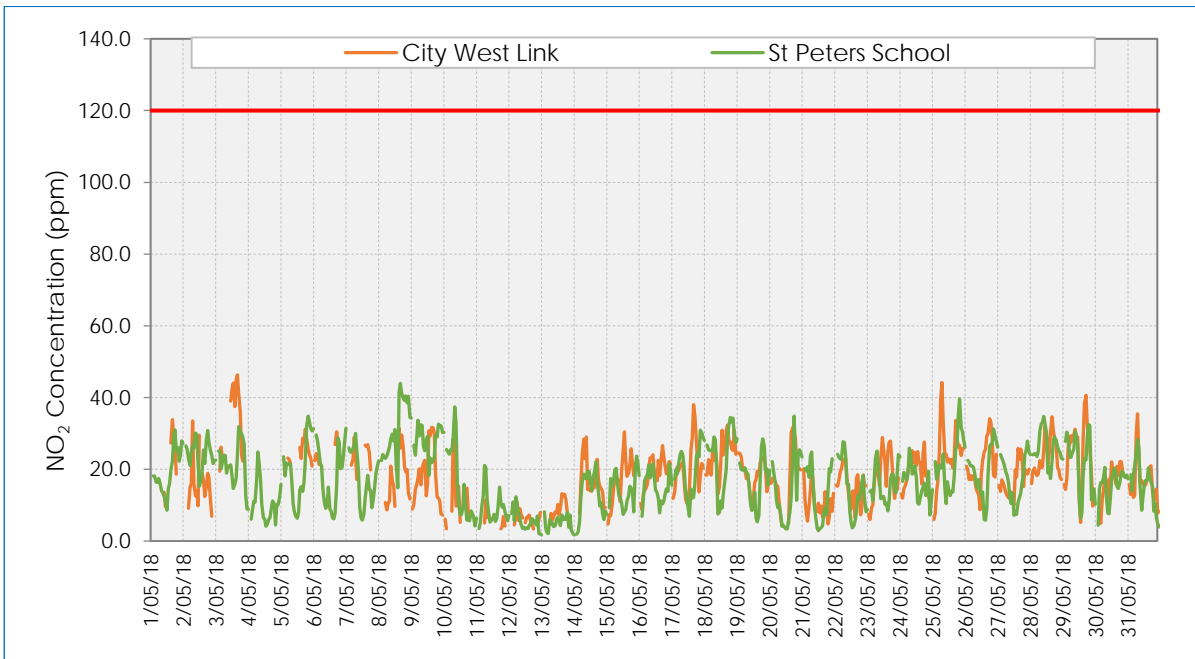
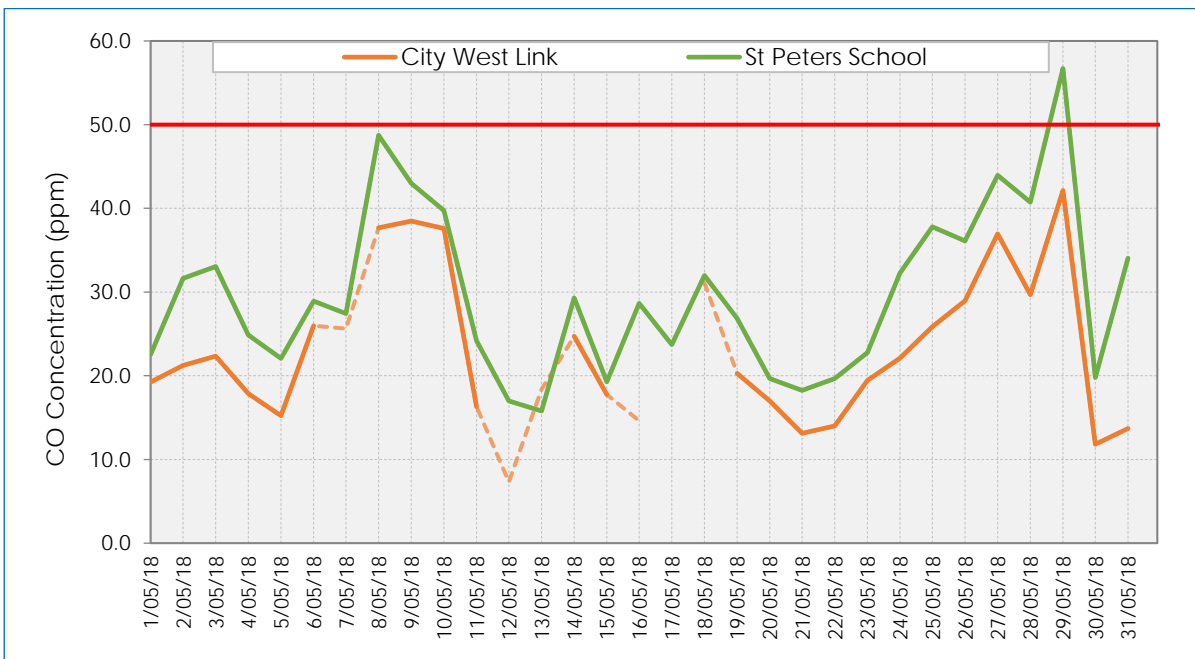
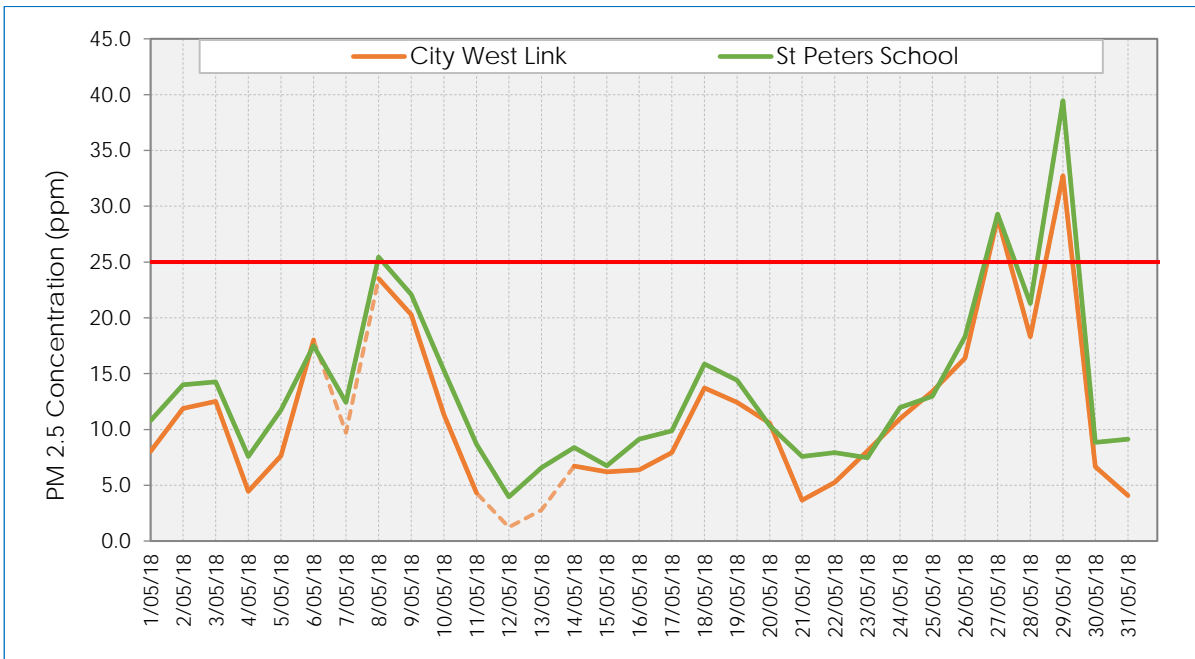


Figure 4 PM₁₀ concentrations at M4-M5 Link sites (24 hour average)



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

Figure 5 PM_{2.5} concentrations at M4-M5 Link sites (24 hour average)



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

4.5 Comparison with data from OEH monitoring sites

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). CO data was obtained for Macquarie Park as no CO data from Chullora, Rozelle or Earlwood was available during this reporting period. It should be noted that concentrations will vary between the WestConnex sites and OEH due to the differing nature of the sites (e.g. roadside vs background).

Figure 6 CO concentrations at M4-M5 Link sites and OEH sites (24-hour average)

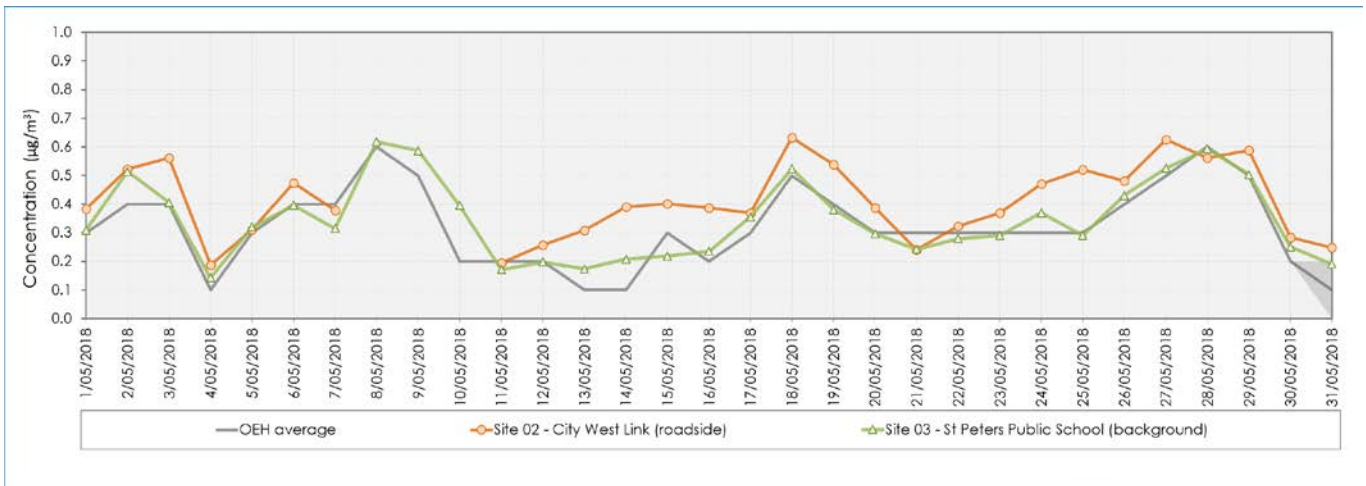


Figure 7 NO₂ concentrations at M4-M5 Link sites and OEH sites (24-hour average)

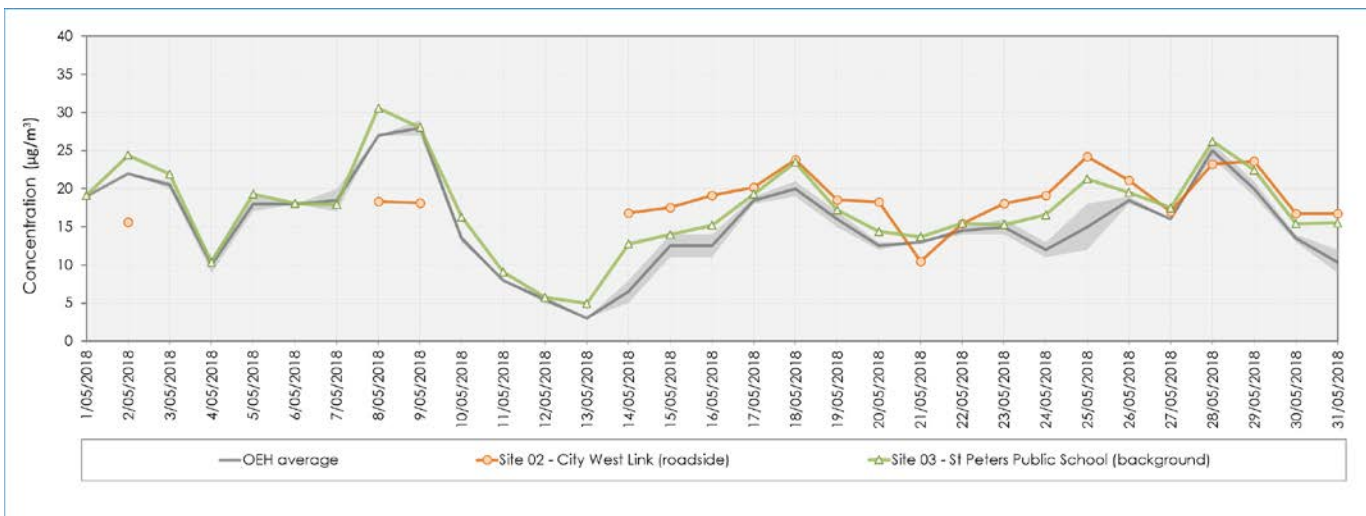
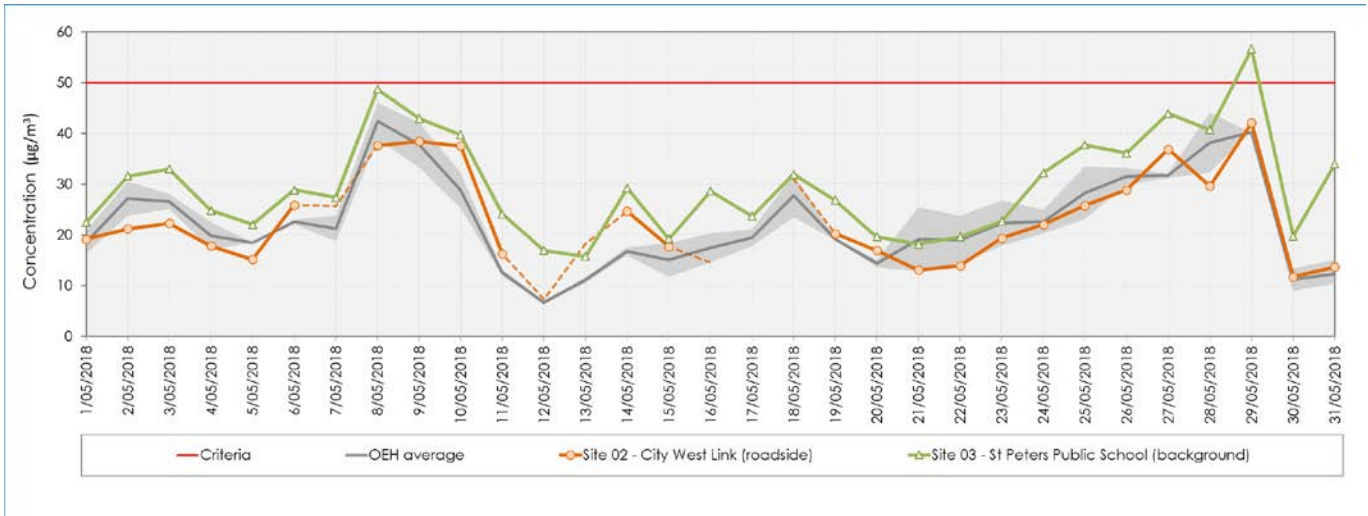
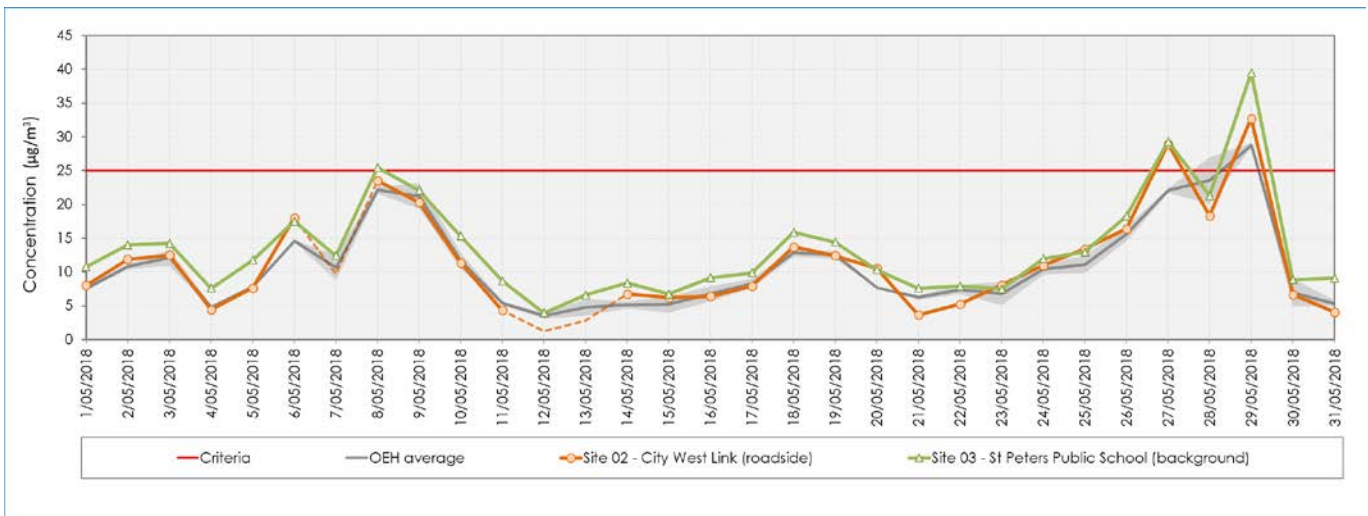


Figure 8 PM₁₀ concentrations at M4-M5 Link sites and OEH sites (24-hour average)



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

Figure 9 PM_{2.5} concentrations at M4-M5 Link sites and OEH sites (24-hour average)



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