

17 August 2020

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Re: M8 MCoA_E17 - Report on above goal recording - 24 and 25 July 2020

Dear Justin,

1 Introduction

The Ministers Condition of Approval (MCoA) E17 for WestConnex M8 (New M5) includes a requirement for ambient monitoring notification and reporting, as follows:

Within 20 working days of any Notification of Above-Goal Recording, the Proponent must prepare and submit to the Secretary a Report on Above-Goal Recording 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 Recording 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 Proponent must comply with any requirements arising from the Secretary's review of the Report on Above-Goal Recording.

A *Notification of Ambient Above-Goal Recording* was sent to DPIE, EPA and NSW Health for exceedances which occurred on 24 and 25 July 2020, at the St Peters ambient monitoring sites. In accordance with MCoA E17, the purpose of this report is to follow up on the notification and provide a Report on Above-Goal Recording, identifying the cause and major contributor for the exceedances recorded on 24 and 25 July 2020.

2 Analysis of above-goal recordings

The above-goal recordings for 24-hour average PM_{2.5} concentrations on 24 and 25 July 2020 are summarised in Table 2.1. Data are presented for the reported concentrations in the notification (taken directly from the website) and as revised concentrations, re-calculated from raw hourly average data. It is noted that the averaging period for data reported on the website is hours 1 to 24. However, the data are logged by the instruments for hours 0 to 23. This results in a slightly different 24-hour concentration between the two datasets (ie the website uses the first hour of the next day for the previous day average).

Table 2.1 Summary of above-goal recording

Date	Site	Pollutant	Concentration ($\mu\text{g}/\text{m}^3$)	
			Originally reported in the notification	Revised following analysis of raw data
24/07/20	St Peters 1 (Campbell St)	PM _{2.5}	26.2	26.0
	St Peters 2(SPI)		26.6	25.5
25/07/20	St Peters 1 (Campbell St)	PM _{2.5}	28.2	29.1
	St Peters 2(SPI)		27.0	28.5
	St Peters 3 (St Peters St)		28.1	29.1

2.1 Timeseries analysis

A timeseries of the 24-hour average PM_{2.5} concentration from 15 July to 30 July for all sites is presented Figure 2.1. Also presented in the plot are the 24-hour average PM_{2.5} concentrations recorded at the closest ‘background’ monitoring station operated by DPIE at Earlwood. It is noted that Barton Park is located approximately 1km from the Arncliffe ventilation outlet and therefore also a ‘background’ site.

Figure 2.1 shows that, although above-goal concentrations were recorded at only two sites on the 24 July 2020 and three sites on the 25 July 2020, the ambient PM_{2.5} concentrations were trending upwards at all sites from 20 July 2020 with peak concentrations occurring at all sites on 25 July 2020. All sites increase at the same time and rate, despite being spatially distant from each other and located in different directions from the ventilation stacks. This is indicative of a regional influence on recorded concentrations, rather than any localised impact from ventilation outlets.

Figure 2.2 plots the hourly PM_{2.5} concentration on the 24 and 25 July 2020 only. On 24 July 2020 concentrations are elevated from midnight, begin to drop during the day from about 09:00, before increasing again from around 18:00 and peaking at around 21:00. On 25 July 2020 concentrations remain elevated overnight and do not begin to drop until after midday, before increasing again after 18:00.

The elevated concentrations that occur overnight on both days are most likely as a result of residential wood heating during cold evenings, and continued in the morning from AM peak traffic on surrounding surface roads (further discussion provided below on the source of peak concentrations). The extended period of elevated concentration on the morning of 25 July 2020 may have been exacerbated by thick fog across Sydney on this day¹.

¹ Water vapour can have an influence on measurements of PM_{2.5}

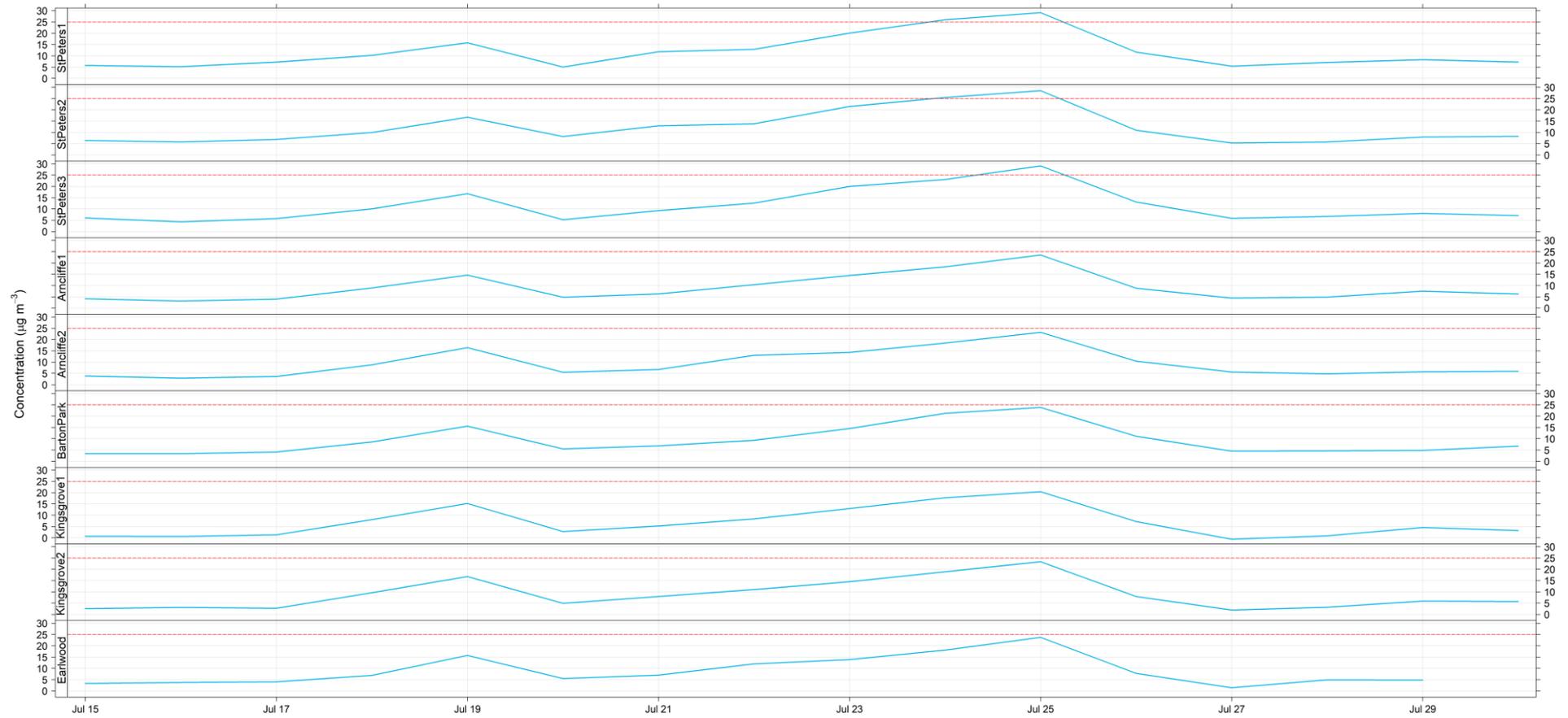


Figure 2.1 Time series plot of 24-hour average PM_{2.5} concentration (µg/m³) for all sites – 15/07/2020 to 30/07/2020

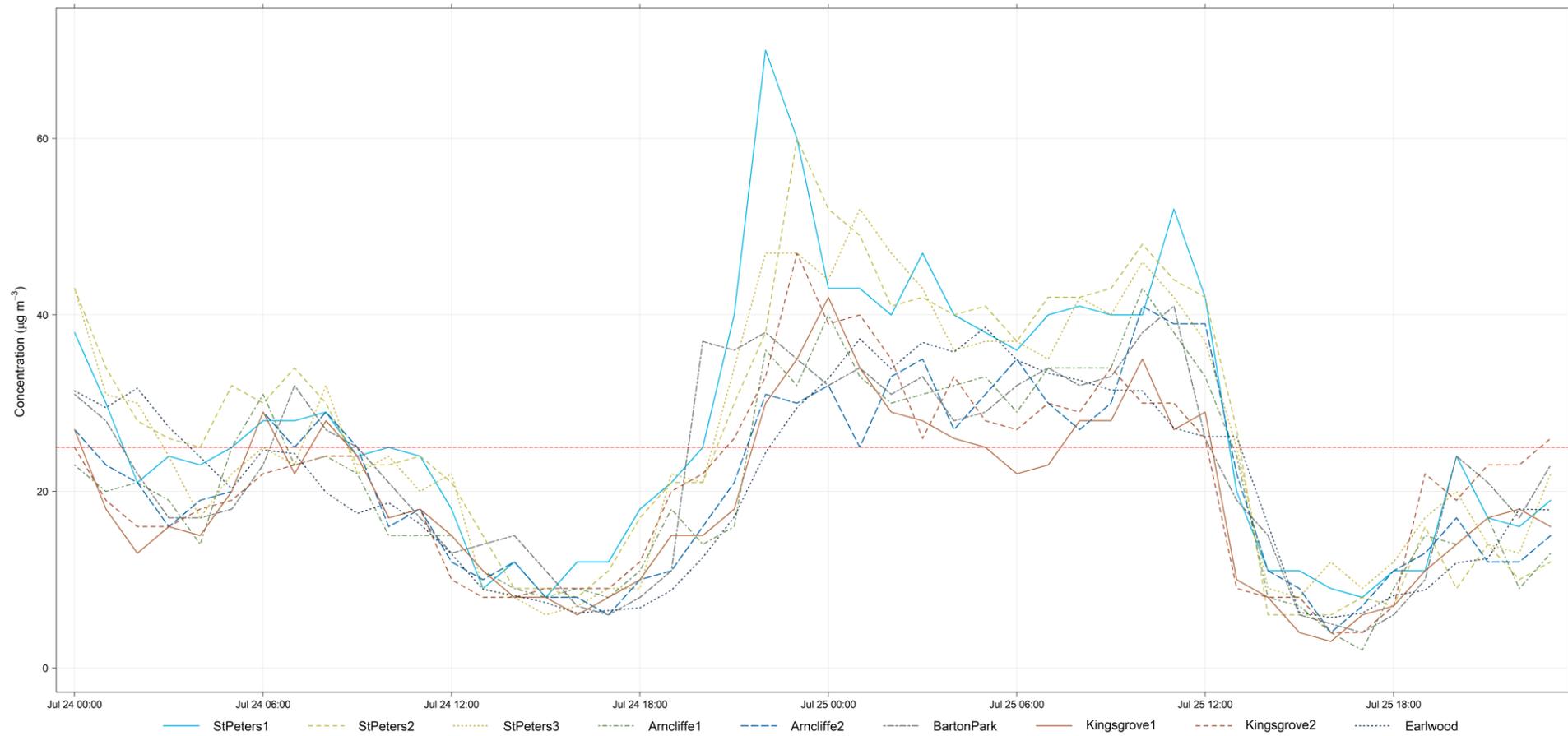


Figure 2.2 Time series plot of 1-hour average PM_{2.5} concentration (µg/m³) for all sites – 24/07/2020 to 25/07/2020

2.2 Source of peak concentrations

Polar plots of the maximum 1-hour $PM_{2.5}$ concentrations for the period 15 July 2020 to 30 July 2020 are presented in Figure 2.3 (St Peters sites) and Figure 2.4 (background sites). These plots show the wind speed and wind direction under which the highest concentrations occur and are useful to identify where pollution is originating from. In each plot, the highest concentrations (shown by the darker colour) occur when winds are blowing from the northwest. The consistency in pattern across each plot, and the associated low wind speeds under which they occur, is evidence of a regional influence on peak concentrations. It is also noted that none of the monitoring sites, except for St Peters (SPI) are located southeast of a ventilation outlet², indicating the ventilation outlets have not contributed to the highest peak concentrations.

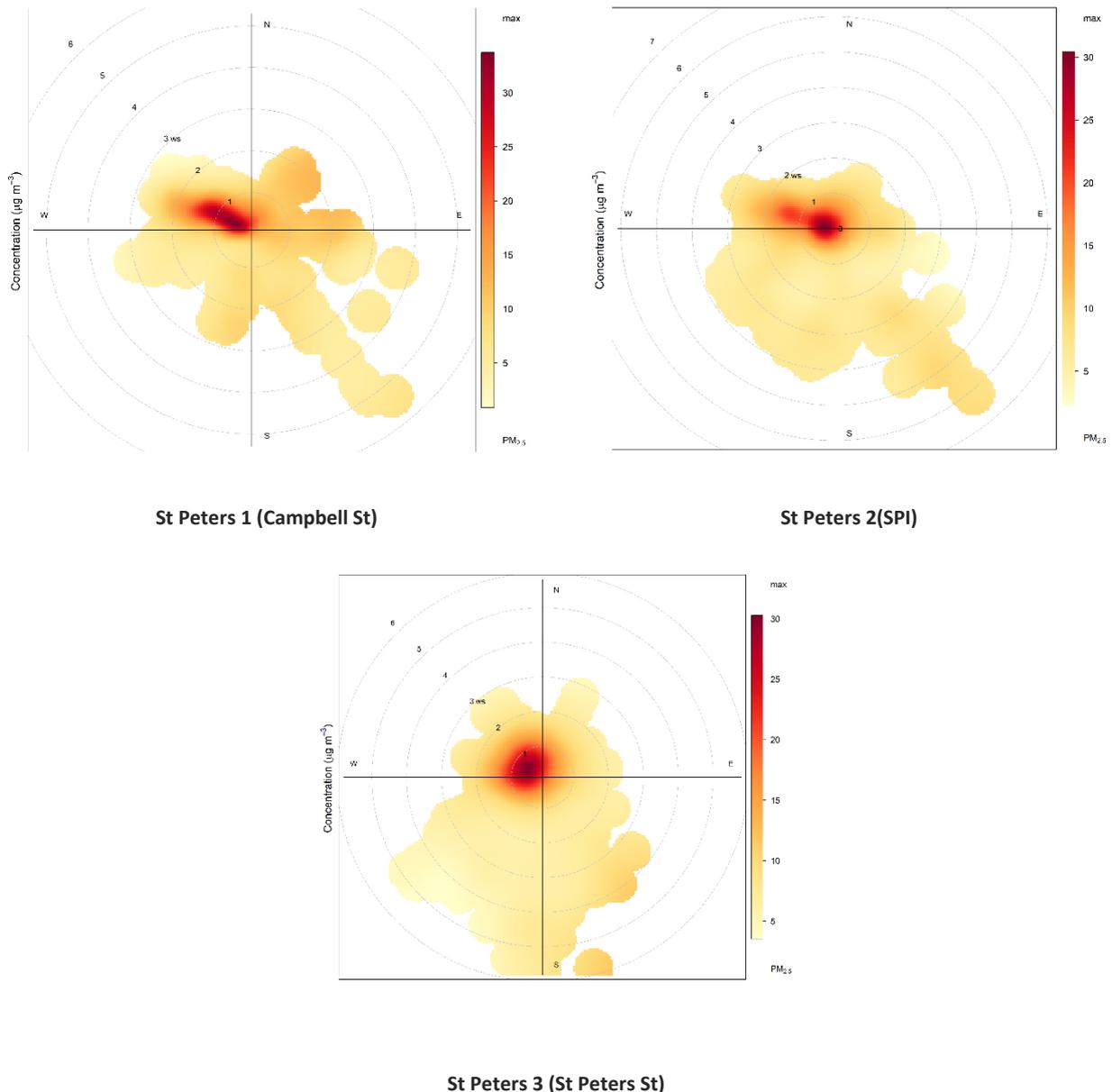


Figure 2.3 Polar plot of maximum hourly $PM_{2.5}$ concentration ($\mu g/m^3$) – St Peters

² The locations for each monitoring site, relative to the ventilation outlets is shown in Appendix A

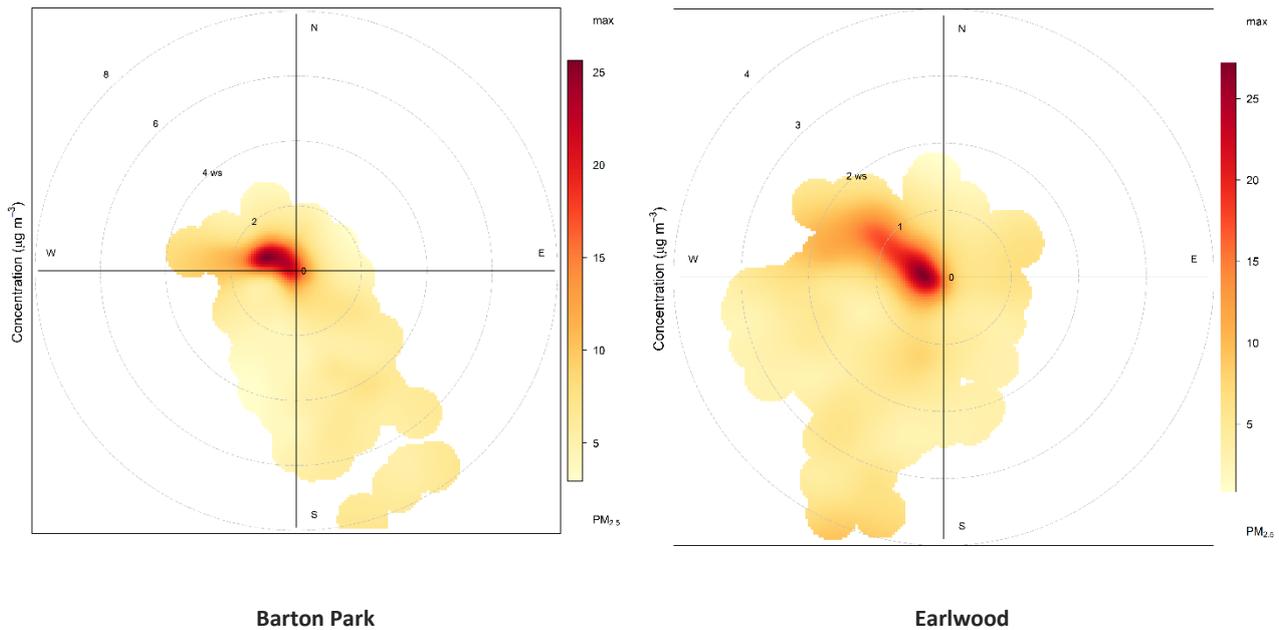


Figure 2.4 Polar plot of maximum hourly PM_{2.5} concentration (µg/m³) – background sites

3 Conclusion

Our review of ambient air quality data has found that the operation of the tunnel has not caused nor is a major contributor to the above-goal recording on 24 and 25 July 2020, for the following reasons:

- similar trends are observed across all monitoring sites, including background locations, trending upwards from 20 July 2020 and peaking on 25 July 2020 at all sites. This is indicative of a regional influence rather than a specific local source;
- the diurnal pattern of concentrations indicative that residential wood heating, followed by AM peak traffic and exacerbated by morning fog have contributed most to 24-hour average concentrations on 24 and 25 July 2020;
- plots of peak concentrations with wind speed and direction indicate that the ventilation outlets are not associated with peak concentrations and a regional influence is more likely; and
- none of the ventilation outlets recorded above-limit readings on the 24 and 25 July 2020.

Yours sincerely

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Associate - Air Quality

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Appendix A

Monitoring locations

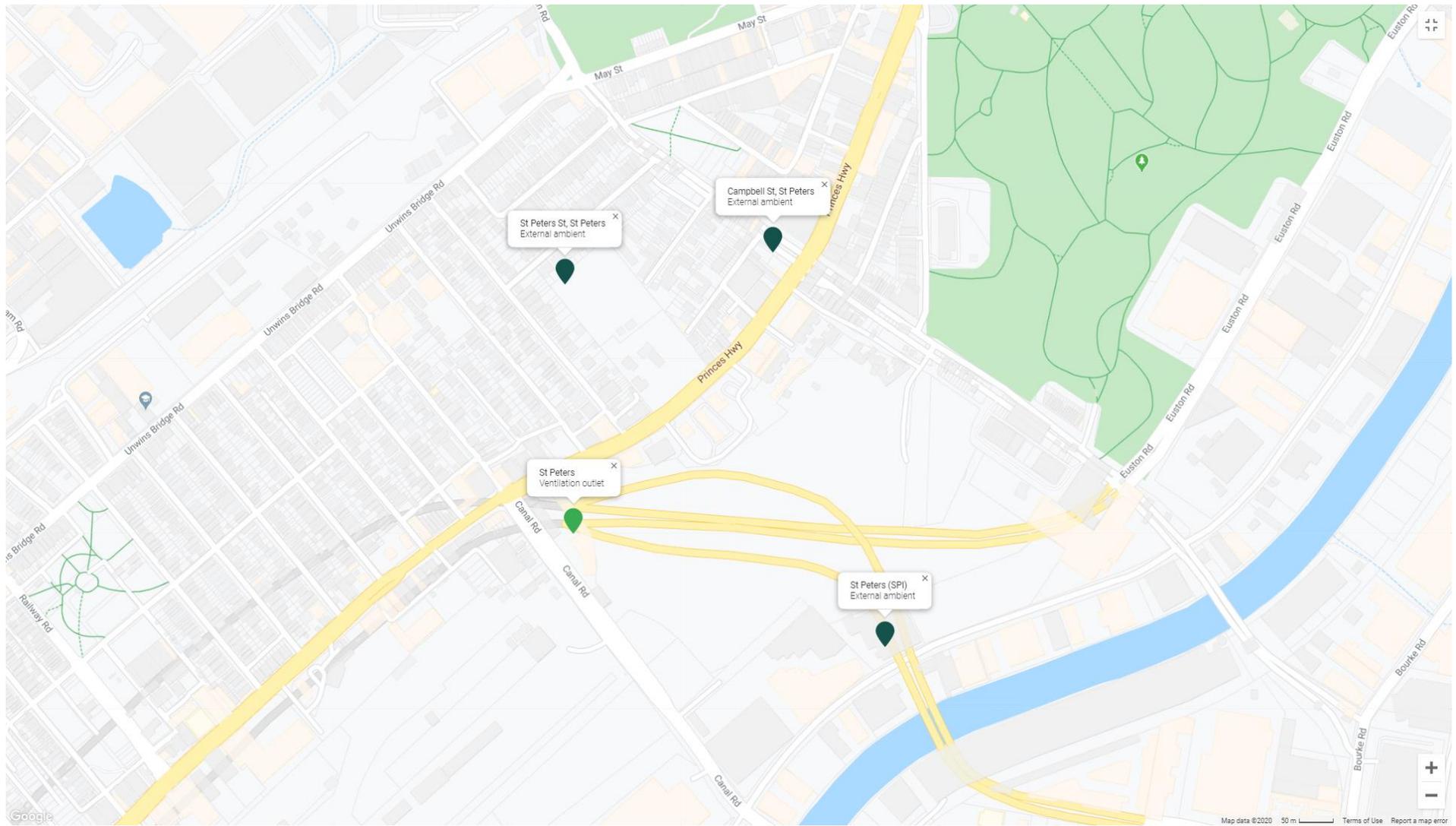


Figure A.1 St Peters monitoring locations

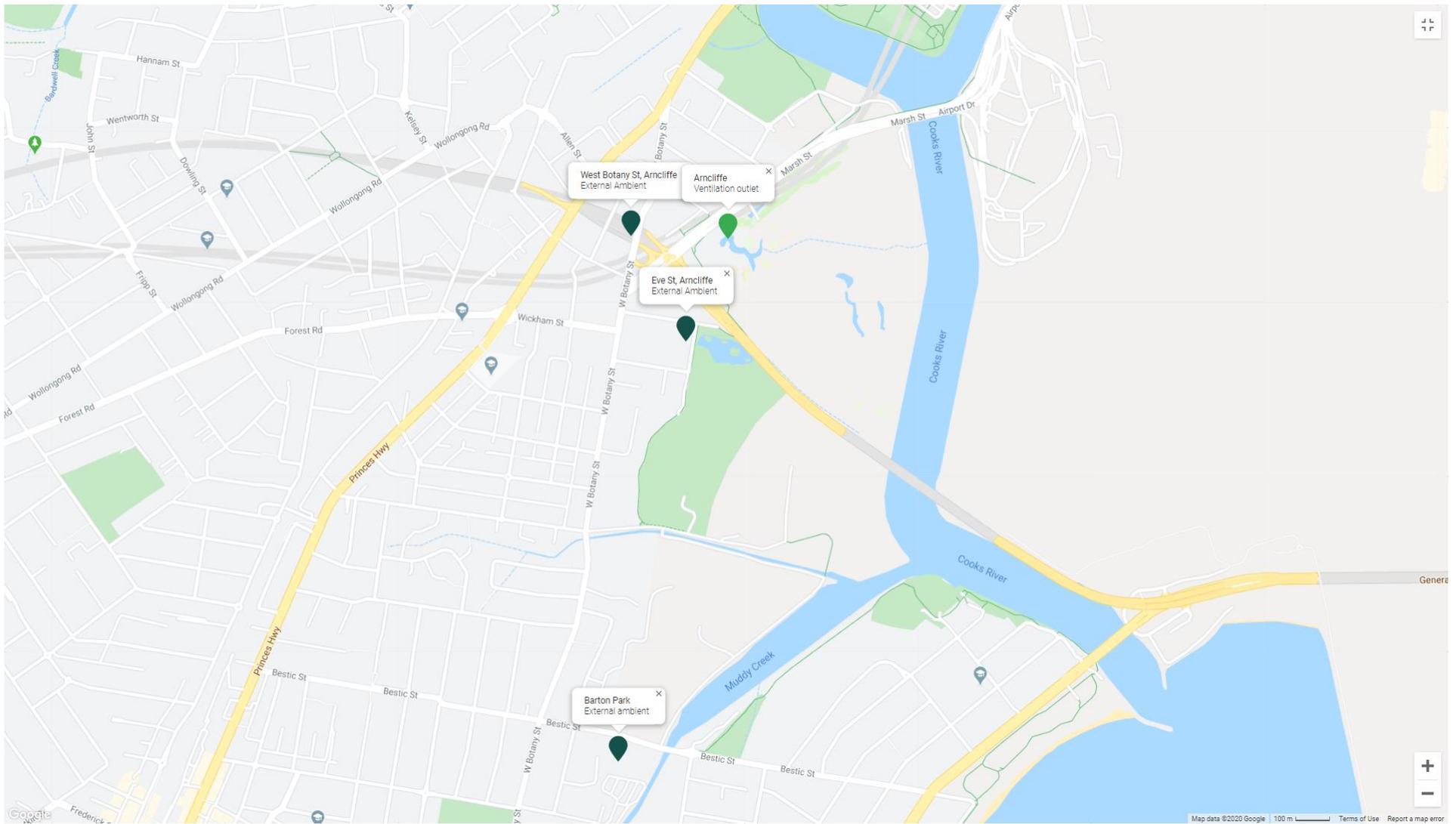


Figure A.2 Arcliffe monitoring locations