M5 East Motorway
Report 6: In-Tunnel Air Quality Monitoring
June 2017
# Document Control

## Revision History

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<tr>
<td>001</td>
<td>06/07/2017</td>
<td>Joanna Trube</td>
<td>Final</td>
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## References

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Summary

• This report is provided consistent with Exhibit 1 of the O&M Contract (SSR, Appendix 24, Item 21).

• CCTV cameras are used to monitor conditions within the tunnels and jet fans are used to increase tunnel ventilation, in response to in-tunnel conditions, to ensure that tunnel air quality remains within specified limits.

• AQS404 commenced exhibiting erroneous readings 10\textsuperscript{th} May at 12:30pm for CO, and fell out of service on 23\textsuperscript{rd} May at midnight. Work order #900234 has been raised for its inspection during the July closure period.

• All units experienced loss of data between 20\textsuperscript{th} and 23\textsuperscript{rd} June due to the main server crashing during a software update, which shut down all instruments across the M5 East. All instruments were functioning once the server was reinstated.

• AQS406 commenced exhibiting erroneous data for visibility on 28\textsuperscript{th} May. Work order #900235 has been raised for its inspection during the July closure period.
Preamble

Air Quality Report: In-Tunnel Air Quality Monitoring

This report shows the carbon monoxide (CO) and visibility levels in the M5 East Tunnel (Main Tunnel) and the Cooks River Tunnel (CRX).

Carbon Monoxide

Carbon monoxide (CO) is monitored in the tunnel because exposure to high levels can be harmful to people’s health. The limits in the tunnel are based on World Health Organisation guidelines for short term exposure to CO. The limit for CO in the tunnel is 87 parts per million (ppm) for 15 minutes and maintaining levels below this limit is a requirement under the Ministerial Conditions of Approval for the M5 East Motorway. The level of CO in the tunnel is continually measured and the ventilation system is adjusted to ensure that the concentration of CO within the tunnel remains below the required levels.

Visibility

Visibility is measured in the tunnel because poor visibility can make driving conditions dangerous. The major cause of reduced visibility or haze in the tunnel is from smoky vehicles, mainly for diesel trucks. Visibility limits used in the tunnel are taken from the World Road Association guidelines which recommend the tunnel is closed if the visibility reaches 0.012/m.

15-minute time-weighted average

This refers to the CO or visibility readings averaged over a 15 minute period with this reading being updated every 15 minutes.
M5 East Tunnel Ventilation System

The arrows show the direction of air flow:
- Red arrow: Air flow in the western end of tunnels
- Black arrow: Air flow in the eastern end of tunnels
- Red arrow with black tip: Fresh air in through western tunnel portals
- Gray arrow with black tip: Fresh air in through eastern tunnel portals

AQS303
AQS304
AQS604
AQS402
M5 East Tunnel Ventilation System
Figure 1: Main tunnel westbound, CO results for June 2017 (15min time-weighted average)
Figure 2: Main tunnel westbound, instrument AQS404, CO results for June 2017 (15min time-weighted average)
Figure 3: Main tunnel westbound, instruments AQS403 and AQS403, CO results for June 2017 (15min time-weighted average)
Figure 4: Main tunnel westbound, instrument AQS604, CO results for June 2017 (15min time-weighted average)
Figure 5: Main tunnel eastbound, CO results for June 2017 (15min time-weighted average)
Figure 6: Main tunnel eastbound, instrument AQS301, CO results for June 2017 (15min time-weighted average)
Figure 7: Main tunnel eastbound, AQS302-AQS303-AQS304, CO results for June 2017 (15min time-weighted average)
Figure 8: Cooks River tunnel, CO results for June 2017 (15min time-weighted average)
Figure 9: Main tunnel westbound, visibility results for June 2017
Figure 10: Main tunnel westbound, instrument AQS404, visibility results for June 2017
Figure 11: Main tunnel westbound, instruments AQS402 and AQS403, visibility results for June 2017
Figure 12: Main tunnel westbound, instrument AQS604, visibility results for June 2017
Figure 13: Main tunnel eastbound, visibility results for June 2017
Figure 14: Main tunnel eastbound, instrument AQS301, visibility results for June 2017
Figure 15: Main tunnel eastbound, AQS302-AQS303-AQS304, visibility results for June 2017
Figure 16: Cooks River tunnel, visibility results for June 2017