M5 East Motorway
Report 6: In-Tunnel Air Quality Monitoring
May 2017
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 10th May at 12:30pm for CO, and fell out of service on 23rd May at midnight. Work order #900234 has been raised for its inspection during the June closure period.

- All units experienced loss of data on 20th and 21st May due to failure of UPS082, which shut down servers at the Motorway Control Centre.

- All units experienced a partial loss of data on 26th May due to a power outage at Canterbury Substation.

- AQS406 commenced exhibiting erroneous data for visibility on 28th May. Work order #900235 has been raised for its inspection during the June 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.
- Air flow in the western end of tunnels
- Air flow in the eastern end of tunnels
- Fresh air in through western tunnel portals
- Fresh air in through eastern tunnel portals

AQS303
AQS304
AQS604
AQS402
BEXLEY ROAD TUNNEL PORTALS

FRESH AIR ENTERS THE TUNNELS THROUGH THE INTAKE POINT

AIR EXITS THE TUNNEL THROUGH THE VENTILATION STACK

PRINCESS HIGHWAY EXIT RAMP

MARSH STREET EXIT RAMP

MARSH STREET TUNNEL PORTALS

AQS403
AQS402
AQS303
AQS304
AQS302
AQS604
Figure 1: Main tunnel westbound, CO results for May 2017 (15 min time-weighted average)
Figure 2: Main tunnel westbound, instrument AQS404, CO results for May 2017 (15min time-weighted average)
Figure 3: Main tunnel westbound, instruments AQS403 and AQS403, CO results for May 2017 (15min time-weighted average)
Figure 4: Main tunnel westbound, instrument AQS604, CO results for May 2017 (15min time-weighted average)
Figure 5: Main tunnel eastbound, CO results for May 2017 (15min time-weighted average)
Figure 6: Main tunnel eastbound, instrument AQS301, CO results for May 2017 (15 min time-weighted average)
Figure 7: Main tunnel eastbound, AQS302-AQS503-AQS304, CO results for May 2017 (15min time-weighted average)
Figure 8: Cooks River tunnel, CO results for May 2017 (15min time-weighted average)
Figure 9: Main tunnel westbound, visibility results for May 2017.
Figure 10: Main tunnel westbound, instrument AQS404, visibility results for May 2017
Figure 11: Main tunnel westbound, instruments AQS402 and AQS403, visibility results for May 2017
Figure 12: Main tunnel westbound, instrument AQS604, visibility results for May 2017
Figure 13: Main tunnel eastbound, visibility results for May 2017
Figure 14: Main tunnel eastbound, instrument AQS301, visibility results for May 2017.
Figure 15: Main tunnel eastbound, AQS302-AQS303-AQS304, visibility results for May 2017
Figure 16: Cooks River tunnel, visibility results for May 2017