M5 East Motorway

Report 6: In-Tunnel Air Quality Monitoring

October 2017
### Document Control

#### Revision History

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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 10th May at 12:30pm for CO, and fell out of service on 23rd May at midnight. Work order #900234 was raised for its inspection during the August closure period, however the instrument is reading correctly at its control panel. The work order is now in progress, and the replacement work could not be completed during the October closure period. The unit will be replaced during the November closure period.

- AQS 406 visibility and CO readings spiked on 11th October around 11.30 am due to truck diesel spill incident at Cross Passage 02.

- AQS 303, AQS304 and AQS402 visibility readings spiked within the closure period during deluge testing activities (resulting in water vapour) as the instrument’s snouts were not covered to avoid erroneous readings. Staff have been reminded of the importance of installing snout caps during wall-washing and deluge testing.
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: Air flow in the western end of tunnels
- Black: Air flow in the eastern end of tunnels
- Red: Fresh air in through western tunnel portals
- Grey: Fresh air in through eastern tunnel portals

AQS303
AQS304
AQS604
AQS402

BEXLEY ROAD TUNNEL PORTALS

EASTBOUND TUNNEL

FRESH AIR ENTERS THE TUNNELS THROUGH THE INTAKE POINT

PRINCESS HIGHWAY EXIT RAMP

AIR EXITS THE TUNNEL THROUGH THE VENTILATION STACK

MARCH STREET EXIT RAMP

MARSH STREET ON RAMP

MARSH STREET TUNNEL PORTALS
Figure 1: Main tunnel westbound, CO results for October 2017 (15min time-weighted average)

AQS404 out of service
Figure 2: Main tunnel eastbound, CO results for October 2017 (15min time-weighted average)
Figure 3: Cooks River tunnel, CO results for October 2017 (15min time-weighted average)
Figure 4: Main tunnel westbound, visibility results for October 2017

AQS404 out of service
Figure 5: Main tunnel eastbound, visibility results for October 2017
Figure 6: Cooks River tunnel, visibility results for October 2017