M5 East Motorway

Report 6: In-Tunnel Air Quality Monitoring

December 2018
### Document Control

#### Revision History

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<td>001</td>
<td>08/1/2019</td>
<td>Diana Barnes</td>
<td>FINAL</td>
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#### References
Summary

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

Roads and Maritime Services has instructed Ventia to change ventilation within the M5 Tunnel settings from automatic to time of day settings as pre-set within the operating system as a trial starting from 1st February to reduce electricity costs. This change took effect at approximately 3pm on the 31st January and an increase in CO levels in the main tunnel has occurred.

In addition to time of day ventilation, 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. Any peaks of CO related to maintenance activities during closure, such as calibration, have been removed from graphs however have been retained in the raw data set provided to RMS.

Visibility peaked during maintenance closures.

Key maintenance updates:

AQS 404 had an electrical controller issue that was identified and repaired on the 21st November. Data prior to repair has been removed as it was deemed unreliable. Also removed from raw data set.

AQS 406 is out of service with an IR fault and parts are being sourced.

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 label: Fresh air in through western tunnel portals
- Grey arrow with label: Fresh air in through eastern tunnel portals

AQS303
AQS403
AQS402
AQS604
MARSH STREET ON RAMP
MARSH STREET TUNNEL PORTALS
PRINCESS HIGHWAY EXIT RAMP
MARSH STREET EXIT RAMP
AIR EXITS THE TUNNEL THROUGH THE VENTILATION STACK
FRESH AIR ENTERS THE TUNNELS THROUGH THE INTAKE POINT

BEXLEY ROAD TUNNEL PORTALS
Figure 1: Main tunnel westbound, CO results for December 2018 (15min time-weighted average)
Figure 2: Main tunnel eastbound, CO results for December 2018 (15min time-weighted average)
Figure 3: Cooks River tunnel, CO results for December 2018 (15min time-weighted average)
Figure 4: Main tunnel westbound, visibility results for December 2018
Figure 5: Main tunnel eastbound, visibility results for December 2018
Figure 6: Cooks River tunnel, visibility results for December 2018