Rozelle Interchange

Air Quality Community Consultative Committee

Meeting 2

16 November 2021

Agenda

Agenda Items		Responsibility
1.0	Welcome and actions from previous meeting	Abigail Goldberg
2.0	Community items, including response to questions raised by community representatives	Community representatives, Inner West Council
3.0	Project construction update	Charles Scarf (JHCPB : construction contractor)
4.0	Project presentation on ventilation matters	TfNSW, JHCPB, WCX and Ian Longley
5.0	Administrative items: - Meeting dates for 2022	Nick Francesconi
6.0	Thanks and close	Abigail Goldberg

Welcome & actions from previous meeting

Community items, including response to questions raised by community representatives

Project construction update

Rozelle Interchange
WestConnex
JOHN HOLLAND
CPB CONTRACTORS

Rozelle Interchange
WestConnex
JOHN HOLLAND
CPB CONTRACTORS

Victoria Rd / The Crescent intersection

Rozelle Interchange
WestConnex
JOHN HOLLAND
CPB CONTRACTORS

Rozelle ventilation outlets

Rozelle Interchange
WestConnex
JOHN HOLLAND
CPB CONTRACTORS

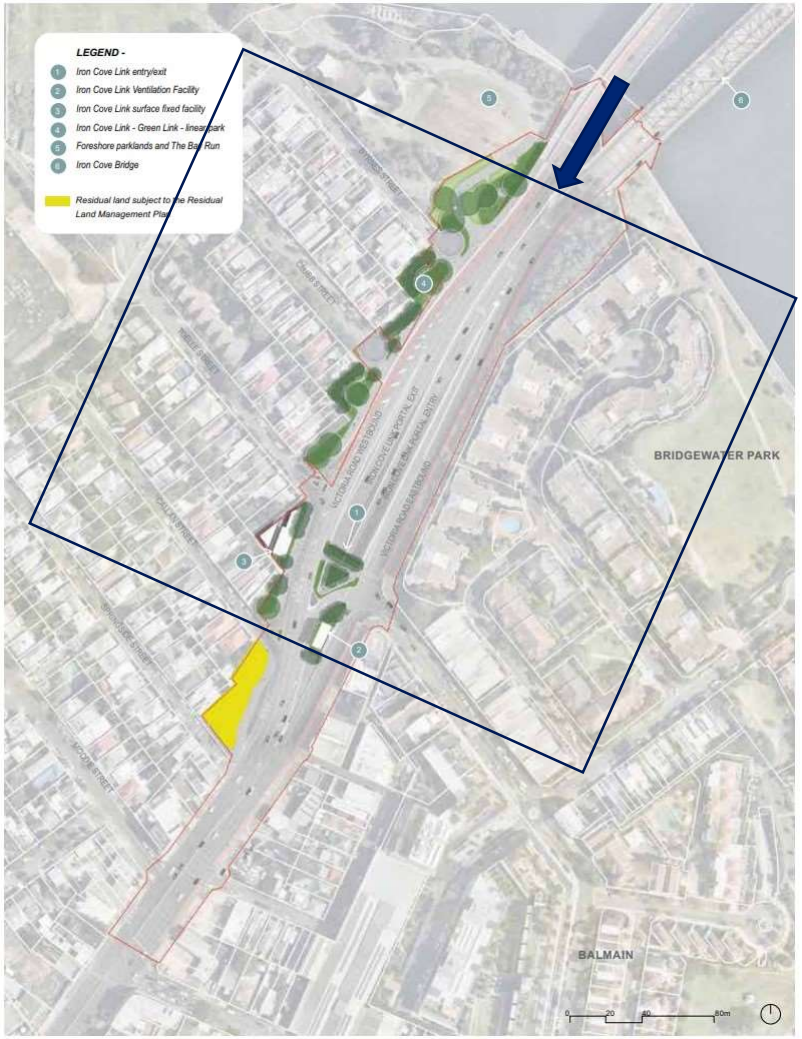
Rozelle Interchange
WestConnex
JOHN HOLLAND
CPB CONTRACTORS

Green link bridge Connecting Rozelle Bay Light Rail Station with the future parkland

Rozelle Interchange
WestConnex
JOHN HOLLAND
CPB CONTRACTORS

Rozelle Interchange
WestConnex
JOHN HOLLAND
CPB CONTRACTORS

Brennan St Bridge Connecting Whites Creek Cycle Path with the future parklands



Rozelle Interchange
WestConnex
JOHN HOLLAND
CPB CONTRACTORS

Rozelle Interchange
WestConnex
JOHN HOLLAND
CPB CONTRACTORS

Victoria Rd Iron Cove

Rozelle Interchange
WestConnex
JOHN HOLLAND
CPB CONTRACTORS

Tunnelling

80% complete

Completion target: early Q2 2022

Project presentation on ventilation matters

Approach to the questions

All questions collated and issues identified.

Issues arranged into similar themes.

Responses to themes presented below.

- **Air quality modelling factors**
- **Ventilation facility siting and design**
- **Air quality outputs**
- **Air quality monitoring**
- **Traffic considerations**

Air quality modelling factors

How does air quality modelling consider and account of landscape features and terrain differences?

The GRAMM/GRAL model used in the EIS modelled pollution dispersion in complex, local terrain and topography, including the presence of buildings, in urban areas.

The model has been validated in a wide range of studies featuring both complex and flat terrain, and with different meteorological conditions such as high and low wind velocities, and stable or unstable atmospheric conditions and is not inherently conservative.

The topography of the land in an area plays an important role in the dispersion of air pollutants. It steers winds, generates turbulence and large scale eddies, and generates drainage flows at night and upslope flows during the day.

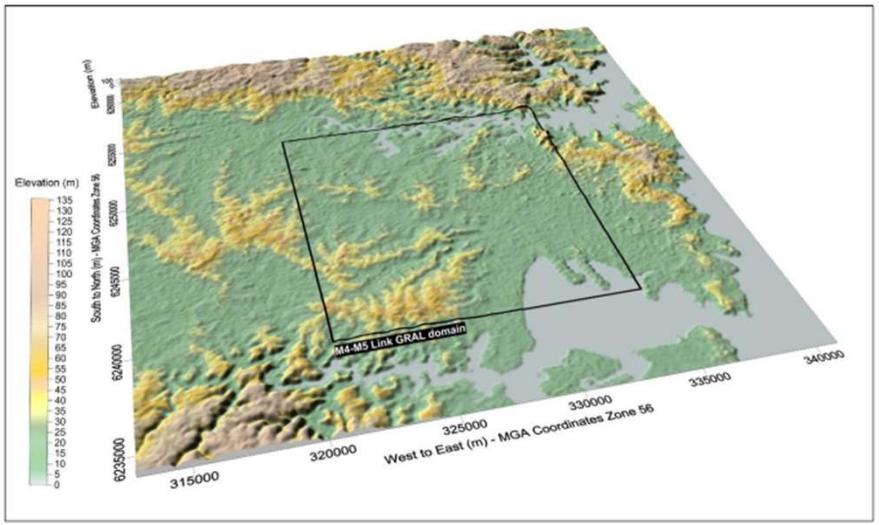


Figure 6-1. Terrain in the GRAMM domain (grid system MGA94).

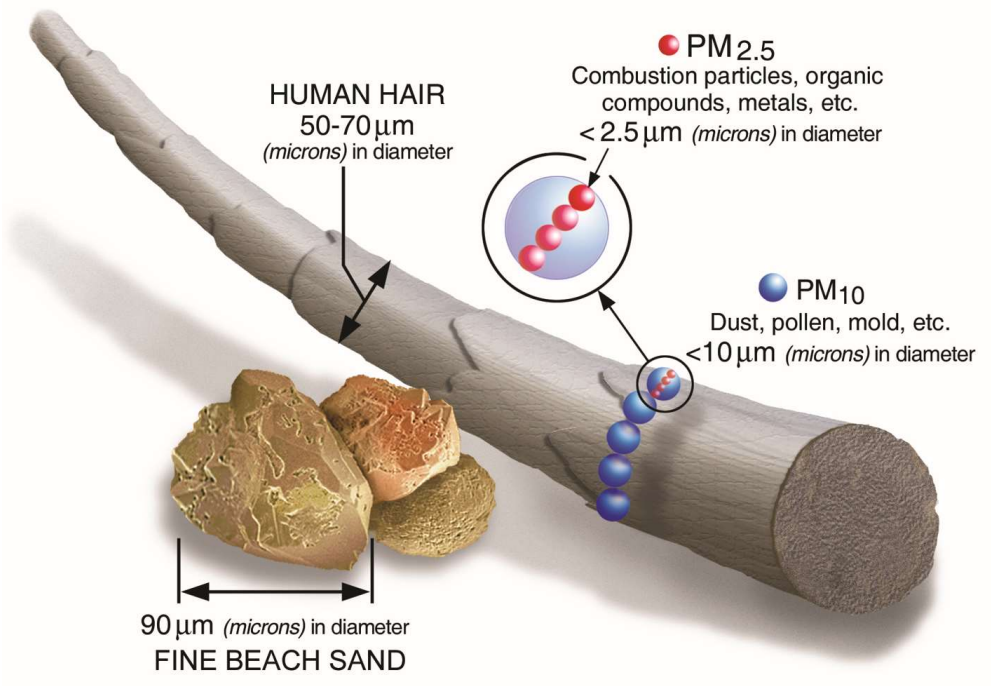
Source: WestConnex – M4-M5 Link Technical Working Paper : Air quality. Appendix I. Volume 2C Part A

Terrain data for Sydney were obtained from the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) website.

Data were processed within the GEOM (Geographical/Geometrical grid processor) component of GRAMM. The terrain data used in GRAMM had a resolution of 30 metres. Although the terrain in the dispersion model domain was not especially complex, a spatially-varying terrain file was used to provide an accurate reflection of the situation.

The resultant GRAMM wind fields (incorporating both terrain and land use information) were then used as input into the GRAL dispersion model.

How does the dispersion of particulate matter from ventilation outlets compare with dispersion of gaseous components?



Over the distances and timeframes that are relevant here the dispersion is the same for particulate matter and gases.

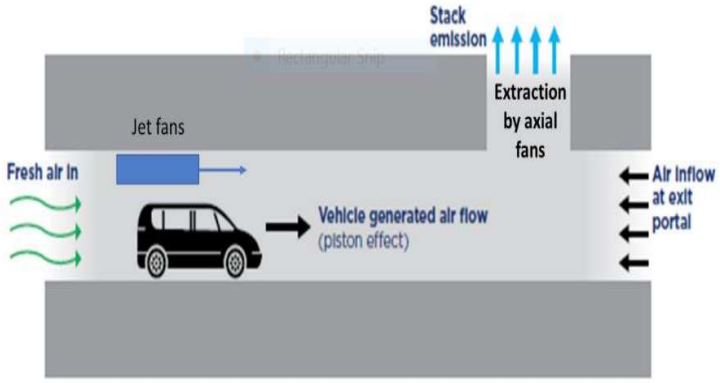
Particulates smaller than 10 microns (i.e. PM10) generally stay suspended in the atmosphere for hours to days or weeks.

Larger dusts will deposit to surfaces much faster but these are not considered relevant for health effects (we have good natural defences) and are only likely to be emitted from the tunnel outlets at very low levels.

Ventilation facility siting and design

What is the engineering/science reasoning to locate larger ventilation outlets at the end of the tunnels as opposed to smaller and/or shorter, more frequent ventilation outlets?

The project incorporates a longitudinal ventilation system that relies on single directional traffic flow with ventilation outlets at the end of each tunnel tube.



TP04_Road-Tunnel-Ventilation-Systems.pdf (nsw.gov.au)

The ventilation outlets are ideally located close to the end of the tunnels before the exit portals.

This allows some air to be drawn into the portals against the traffic flow. This forced reverse flow is achieved by jet fans within the exit ramp and tunnel.

Minimising the use of these fans increases the performance of the tunnels and reduces operational power consumption and cost, while providing environmental benefits, such as reducing greenhouse gas emissions associated with energy generation.

What is the engineering/science reasoning to locate larger ventilation outlets at the end of the tunnels as opposed to smaller and/or shorter, more frequent ventilation outlets? (continued)

Smaller, more frequent outlets – often referred to as ’slots‘ are a design option used on some tunnels internationally, where a single large outlet would be unacceptable for urban planning or reduced effectiveness due to sheltering by buildings or terrain.

Slots can reduce the capital cost of a single large structure but can increase operational cost if more ventilation machinery is required.

Either approach can be designed to meet both in-tunnel and ambient air quality requirements.

Notwithstanding, scientific evidence supports the fact that tall outlets with powerful fans will result in better dilution of emissions that short outlets.

On what basis were the locations for the Rozelle and Iron Cove ventilation outlets chosen?

The Rozelle and Iron Cove ventilation outlets were chosen for their proximity to the end of the tunnels.

The exact locations were determined for a number of engineering reasons, primarily by proximity to interchanges and tunnel exits.

Wherever the outlets are located, they can be designed to achieve little, if any, change in ambient air quality.

Further discussion on the final design of the ventilation system is provided in the EIS, specifically section 4.6.1.

Location of project ventilation outlets relative to other areas

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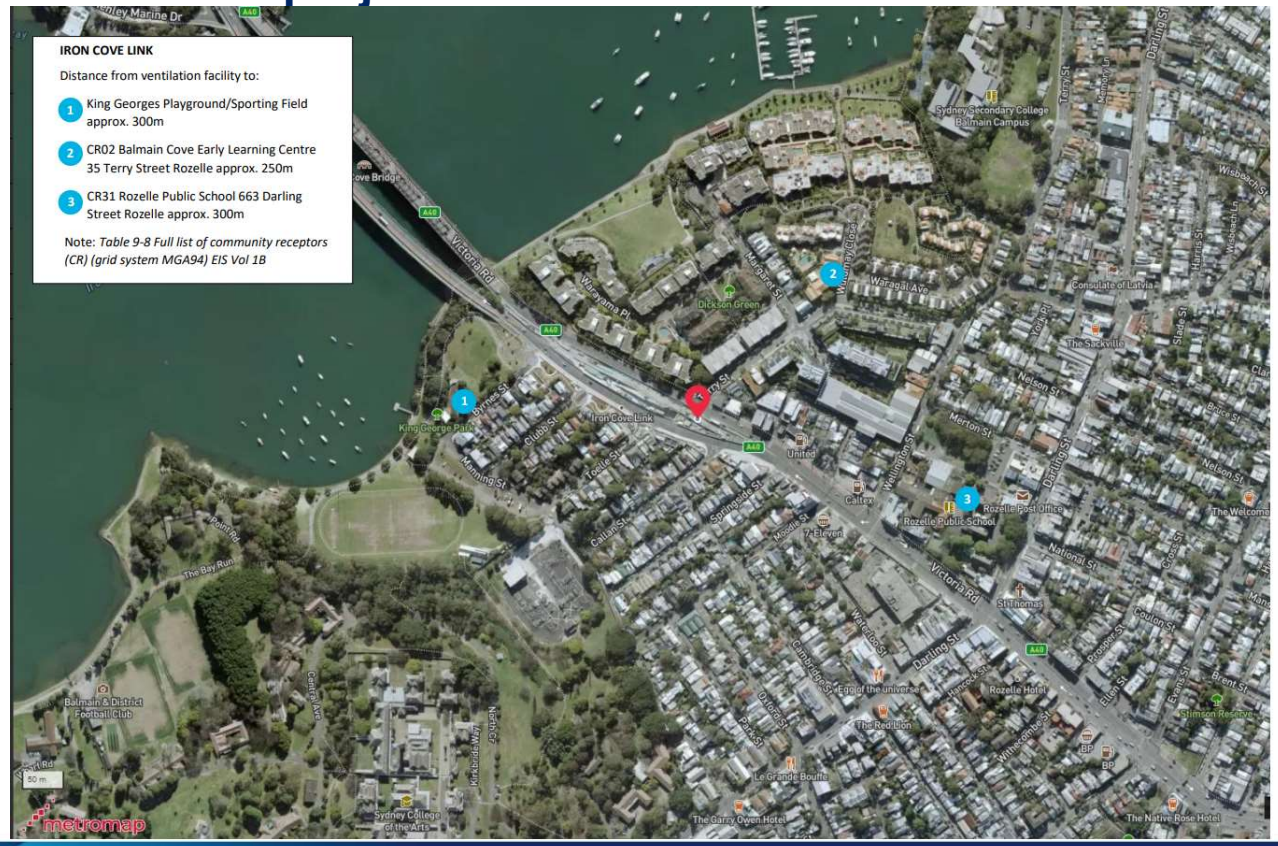


Air quality outputs

What would the air quality impacts be on Rozelle Public School?

Rozelle Public School is identified as a community receptor (CR31).
Many of the figures in the EIS show the impact of the project at Rozelle public schools explicitly.

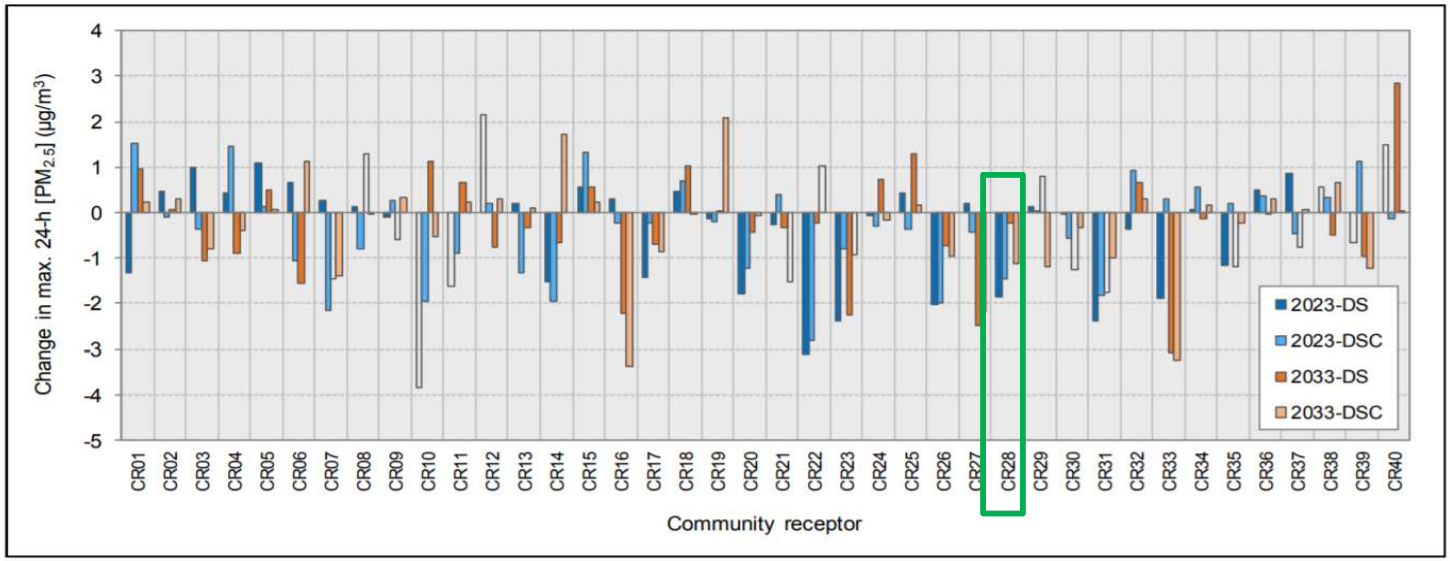


Figure 9-57 Change in maximum 24 hour $PM_{2.5}$ concentration at community receptors (DS and DSC scenarios), relative to corresponding DM scenarios

From Figure 9-57 of the EIS, it can be seen that levels improve due to the reduction in traffic on Victoria Rd.

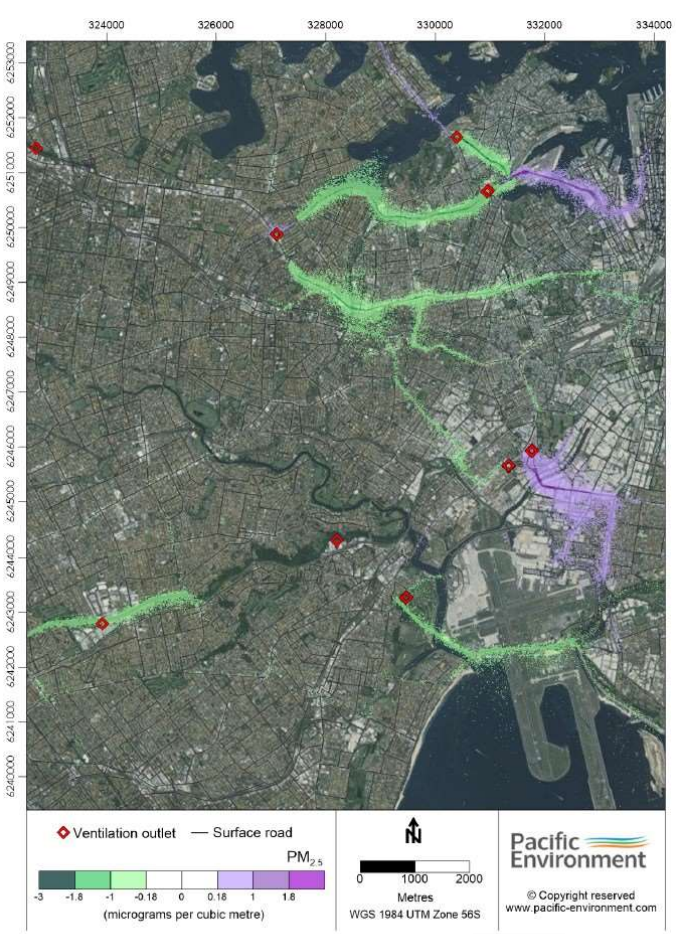


Figure 9-54 Contour plot of change in annual mean $PM_{2.5}$ concentration (2023-DS)

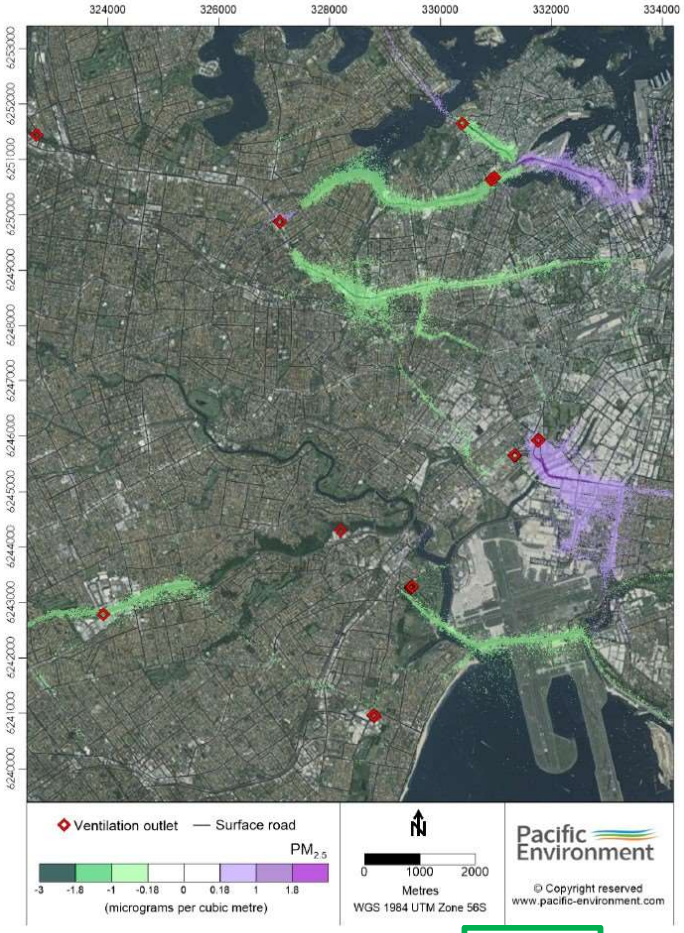


Figure 9-55 Contour plot of change in annual mean $PM_{2.5}$ concentration (2033-DS scenario)

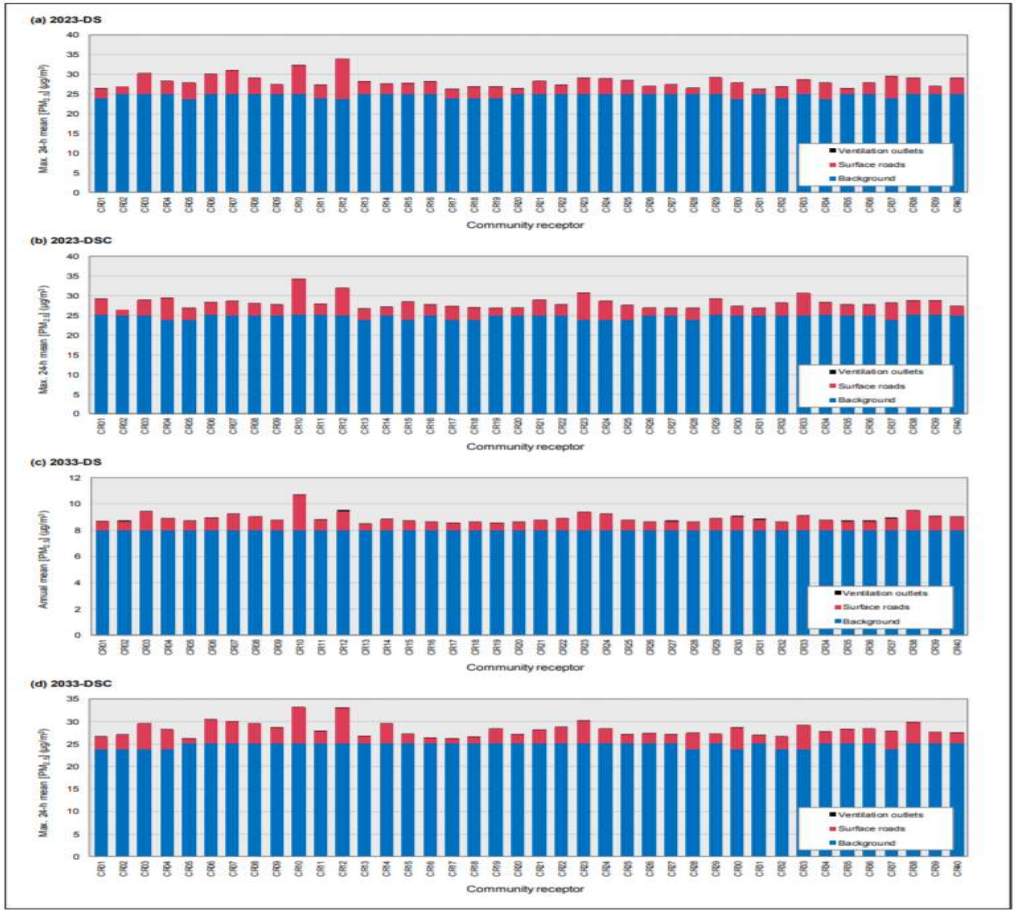


Figure 9-58 Source contributions to maximum 24 hour mean $PM_{2.5}$ -concentration at community receptors (with-project (DS) and cumulative (DSC) scenarios)

Figure 9-58 shows the contribution of background, nearby roads and all ventilation outlets to maximum 24-hour PM2.5 concentrations.

It can be seen that the contribution of the outlets is small at all receptors.

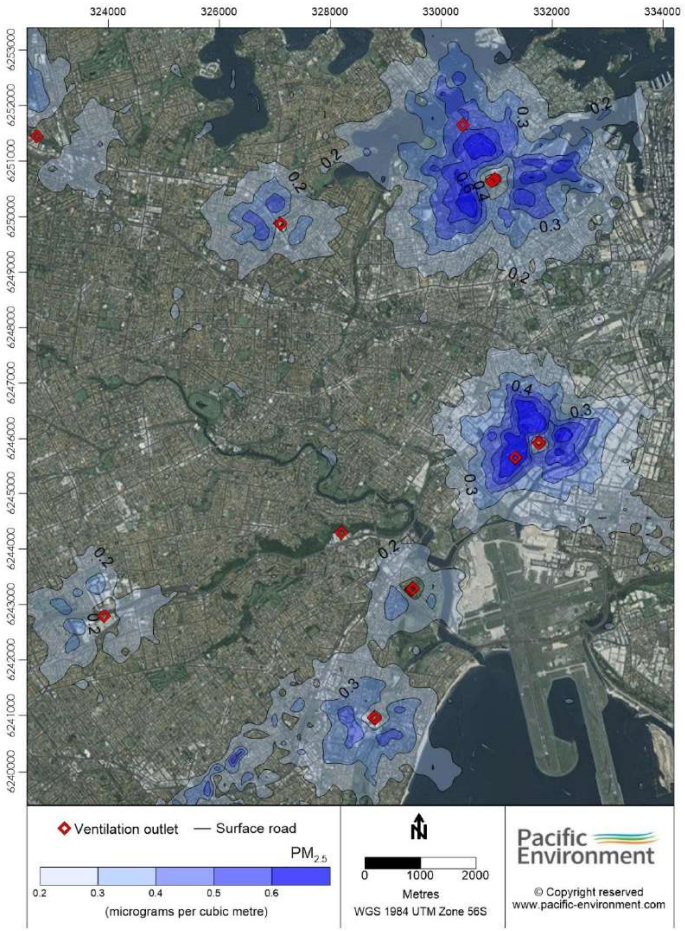


Figure 8-88 Contour plot of maximum 24 hour $PM_{2.5}$ concentration for ventilation outlets only (2033-DSC)

Figure 8-88 of the air quality technical paper shows the contribution of the outlets in 2033.

Note the air quality criterion is 25 µg/m3.

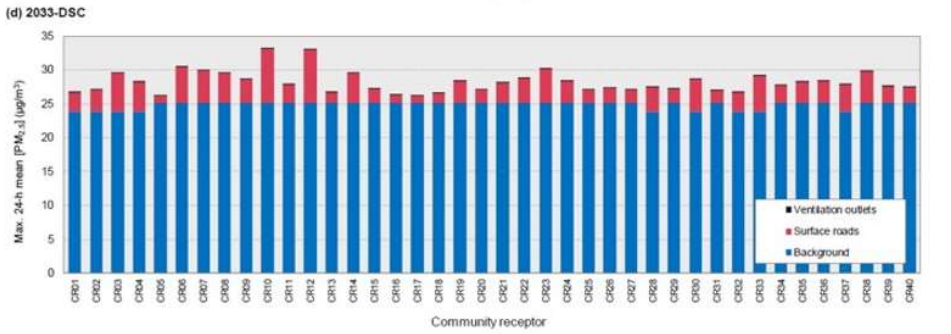


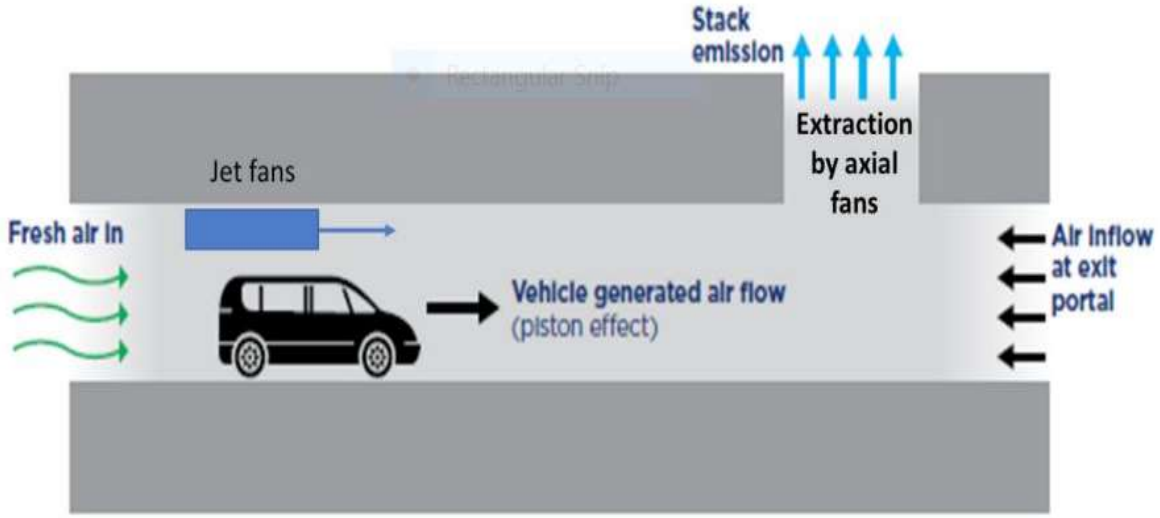
Figure K-106 Source contributions to maximum 24-hour mean $PM_{2.5}$ concentration at community receptors (with-project and cumulative scenarios)

Air quality monitoring

How do you prove that there will be zero emissions from tunnel portals?

Portal emission control is via air velocity meters located throughout the tunnel and in the outlets.

The air flow is controlled continuously and in real time, throughout the tunnels such that the air is always flowing in through the portals.



TP04_Road-Tunnel-Ventilation-Systems.pdf (nsw.gov.au)

Is it possible to have more than two monitoring stations at each site?

Analysis of the winds at the DPIE air quality monitoring station in Rozelle showed there were three predominant wind directions: the south, the north-west and the north-east. This means that the best locations for monitoring are likely to be to north, south-east and south-west of the outlets, and outlet emissions are unlikely to be detected at other locations.

This information, in combination with other information – such as land ownership, accessibility and factors that could influence measurements – is used to identify sites for ambient air quality monitoring that maximise the likelihood of measuring the outlet emissions.

However, in practical terms there are few suitable monitoring sites in the desired directions. For example, in the case of the Victoria Road outlet, the north-westerly winds in spring and summer are essentially along the road axis, and therefore any pollution signal from the ventilation outlet would be mixed with a stronger signal from the traffic on Victoria Road.

How will the project engage with the community and make air quality monitoring data (including historical datasets) available in real time?

Engagement is partly addressed through this AQCCC that will operate for two years after project operation.

The agreed AQCCC Terms of Reference identify the purpose of the AQCCC as:

1.2 Purpose of the AQCCC

Infrastructure Approval SSI 7485 for the M4-M5 Link project was approved by the then Minister for Planning on 17 April 2018. Condition of Approval (CoA) E2 requires the establishment of an Air Quality Community Consultative Committee (AQCCC) prior to finalising the detailed design of the project. Attachment A provides an extract of the relevant CoAs.

The AQCCC's role is to provide advice prior to and during operation of the Rozelle Interchange project, specifically:

- Review, provide advice on and agree on the location of the air quality monitoring stations
- Review and/or provide advice on the operational environmental management plans and operation stage documents, compliance tracking reporting, audit reports and complaints as they relate to air quality.

Conditions of Approval require continuous monitoring and real-time publication of data.

E23 - Air quality monitoring data is to be made available in as close to real time as possible, under the website reporting requirements of Condition E28.

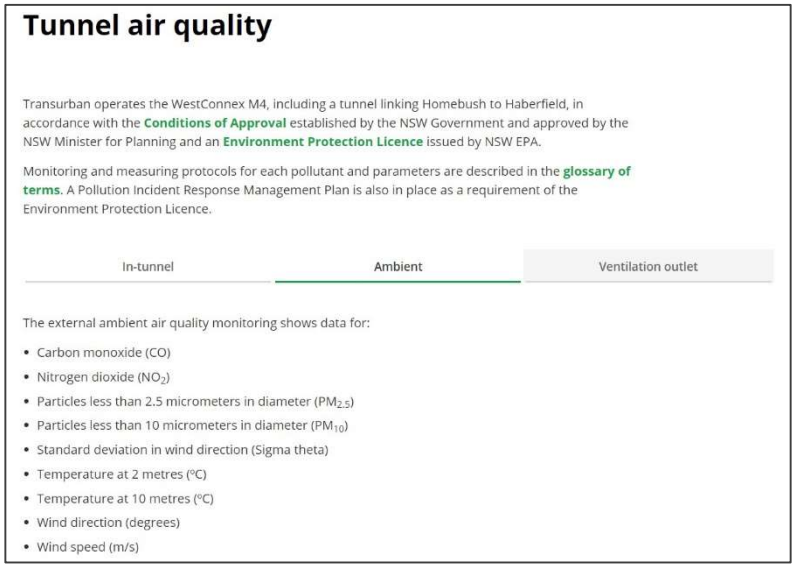
- E28 - Results of hourly updated real-time monitoring and relevant meteorological data must be provided on a website in an easy to interpret format. This data must be preliminary until a quality assurance check has been undertaken by a person or organisation, who is accredited by NATA for this purpose.

- E29 has provisions for making this website known to the community, as follows:
  - The availability of monitoring data must be conveyed to the local community by way of newsletter (including translation into common community languages in the area) and newspaper advertisement at least one month prior to the commencement of operation.

The TfNSW air quality portal centralises this data, as does Transurban's Linkt website (refer links below), which will include Rozelle Interchange once it is operational.

https://caportal.com.au/rms/air-quality/road-tunnels#id=772&ct=10&pj=35

https://www.linkt.com.au/using-toll-roads/about-sydney-toll-roads/sydney.html



Tunnel air quality

Transurban operates the WestConnex M4, including a tunnel linking Homebush to Haberfield, in accordance with the **Conditions of Approval** established by the NSW Government and approved by the NSW Minister for Planning and an **Environment Protection Licence** issued by NSW EPA.

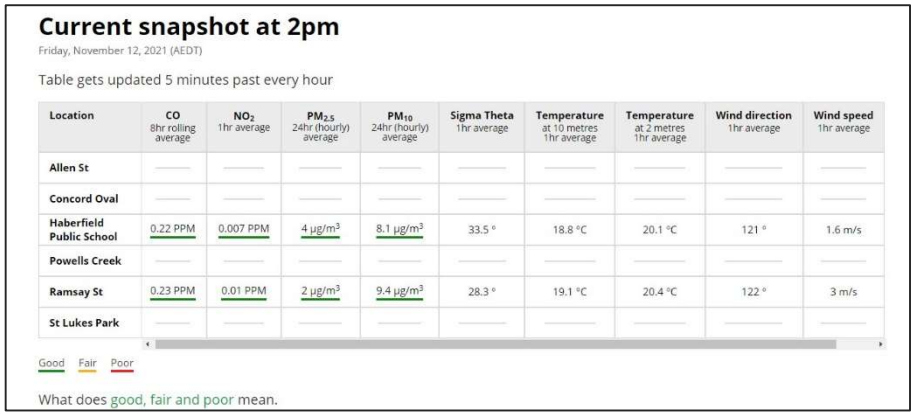
Monitoring and measuring protocols for each pollutant and parameters are described in the **glossary of terms**. A Pollution Incident Response Management Plan is also in place as a requirement of the Environment Protection Licence.

In-tunnel | Ambient | Ventilation outlet

The external ambient air quality monitoring shows data for:

- Carbon monoxide (CO)
- Nitrogen dioxide (NO_2)
- Particles less than 2.5 micrometers in diameter ($PM_{2.5}$)
- Particles less than 10 micrometers in diameter (PM_{10})
- Standard deviation in wind direction (Sigma theta)
- Temperature at 2 metres (°C)
- Temperature at 10 metres (°C)
- Wind direction (degrees)
- Wind speed (m/s)

M4 East ambient air quality extract Friday 12/11/21



Current snapshot at 2pm

Friday, November 12, 2021 (AEDT)

Table gets updated 5 minutes past every hour

Location	CO 8hr rolling average	NO_2 1hr average	$PM_{2.5}$ 24hr (hourly) average	PM_{10} 24hr (hourly) average	Sigma Theta 1hr average	Temperature at 10 metres 1hr average	Temperature at 2 metres 1hr average	Wind direction 1hr average	Wind speed 1hr average
Allen St									
Concord Oval									
Haberfield Public School	0.22 PPM	0.007 PPM	4 µg/m³	8.1 µg/m³	33.5 °	18.8 °C	20.1 °C	121 °	1.6 m/s
Powells Creek									
Ramsay St	0.23 PPM	0.01 PPM	2 µg/m³	9.4 µg/m³	28.3 °	19.1 °C	20.4 °C	122 °	3 m/s
St Lukes Park									

Good Fair Poor

What does good, fair and poor mean.

Traffic considerations

What data will be collected to monitor heavy vehicle use of the tunnels, both above ground and in-tunnel, to assist with understanding the changes in traffic and thus, the changes in ambient air pollution?

TfNSW will have traffic data (including heavy vehicles) for Victoria Road, Anzac Bridge and City West Link, as well as traffic data for the tunnels, which will facilitate a clear picture of traffic distribution.

In general terms, the only change that is expected is a shift of traffic into the new tunnels. Traffic on the surface will reduce regardless as a new tunnel option is being provided.

There will be two routes between Victoria Road and Anzac Bridge, the surface route and tunnel route, both of which will be free and the travel time savings if you are heading south from Victoria Road will be significant.

What are the traffic volume models for the 3 major roads; Victoria Rd Drummoyne to White Bay, Anzac Bridge and City Westlink?

- **Current scenario;**
- **2022-2040 (or similar) with no changes to road network; and**
- **2022-2040 (or similar) with Westconnex tunnel network**

All of the traffic data for current, do nothing and do something scenarios is provided in the EIS, with the key figures provided in the tables below.

Table 8-8 Total traffic emissions in the WestConnex GRAL domain

Scenario code	Scenario description	Total daily VKT[a] (million vehicle-km)	Total emissions (tonnes/year)				
			CO	NOx	PM_{10}	$PM_{2.5}$	THC
2015-BY	2015 – Base Year (existing conditions)	11.5	9,633	4,775	242	173	1,052
2023-DM	2023 – Do Minimum (no M4-M5 Link)	13.2	5,561	3,037	221	143	599
2023-DS	2023 – Do Something (with M4-M5 Link)	13.8	5,648	3,108	227	147	590
2023-DSC	2023 – Do Something Cumulative (with M4-M5 Link and some other projects)	14.3	5,737	3,164	232	150	589
2033-DM	2033 – Do Minimum (no M4-M5 Link)	14.5	3,719	2,434	227	140	380
2033-DS	2033 – Do Something (with M4-M5 Link)	15.2	3,837	2,506	234	145	376
2033-DSC	2033 – Do Something Cumulative (with M4-M5 Link and all other projects)	16.1	4,005	2,609	245	152	380

(a) VKT = vehicle kilometres travelled

Table 8-9 Absolute changes in total traffic emissions in the WestConnex GRAL domain

Scenario comparison	Change in total emissions (tonnes/year)				
	CO	NOx	PM_{10}	$PM_{2.5}$	THC
Underlying changes in emissions with time[a]					
2023-DM vs 2015-BY	-4,072	-1,738	-21	-30	-453
2033-DM vs 2015-BY	-5,914	-2,341	-15	-32	-672
Changes due to the project in a given year					
2023-DS vs 2023-DM	+87	+71	+6	+4	-9
2023-DSC vs 2023-DM	+176	+127	+11	+7	-10
2033-DS vs 2033-DM	+118	+72	+7	+4	-4
2033-DSC vs 2033-DM	+286	+174	+18	+11	-1

(a) NB: The 2023-DM and 2033-DM scenarios include the M4-East and New M5 projects. The 2015-BY scenario does not.

http://mpweb.planningportal.nsw.gov.au/major-projects/project/3611

Table 8-10 Percentage changes in total traffic emissions in the WestConnex GRAL domain

Scenario comparison	Change in total emissions (%)				
	CO	NOx	PM_{10}	$PM_{2.5}$	THC
Underlying changes in emissions with time[a]					
2023-DM vs 2015-BY	-42.3%	-36.4%	-8.7%	-17.1%	-43.1%
2033-DM vs 2015-BY	-61.4%	-49.0%	-6.3%	-18.7%	-63.9%
Changes due to the project in a given year					
2023-DS vs 2023-DM	+1.6%	+2.3%	+2.7%	+2.9%	-1.6%
2023-DSC vs 2023-DM	+3.2%	+4.2%	+4.9%	+5.1%	-1.6%
2033-DS vs 2033-DM	+3.2%	+2.9%	+3.0%	+3.2%	+1.1%
2033-DSC vs 2033-DM	+7.7%	+7.2%	+8.0%	+8.2%	-0.2%

(a) The 2023-DM and 2033-DM scenarios include the M4-East and New M5 projects. The 2015-BY scenario does not.

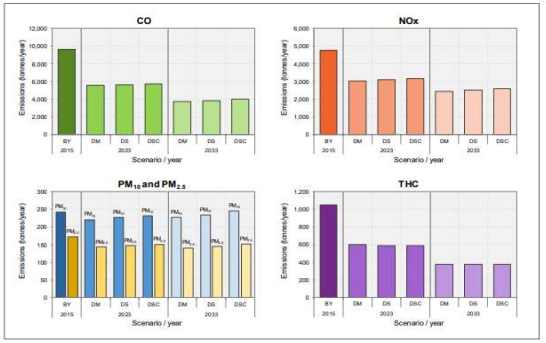


Figure 8-7 Total traffic emissions in the WestConnex GRAL domain

Administrative items

CoA E2 – requires that the AQCCC review and provide advice on the following documents as they relate to air quality:

- Location of AQMS
- Operational Environmental Management Plan and other operation stage documents
- Operation Compliance Tracking Reporting
- Operation Audit reports
- Operation Air Quality Complaints

CoA E25 – requires consulting with the AQCCC regarding the proposed organisation to operate the air quality monitoring stations

CoA 32 – requires the preparation of the Ambient Air Quality Goal Protocol in consultation with the AQCCC

CoA E37/38 – requires consultation with the AQCC re the engagement of independent person to audit operational air quality monitoring

Suggested date for meeting 3 of the Rozelle Interchange:

- **Tuesday 15th February 2022 :** Location of AQMS to be presented by TfNSW


NSW
GOVERNMENT
Transport
for NSW