TECHNICAL MEMORANDUM

DATE 22 August 2017 **PROJECT No.** 1521107-258-TM-Rev0

ASSESSMENT OF AIR QUALITY IMPACTS ON PLANNED MULTI-STOREY BUILDINGS IN THE VICINITY OF THE WEST GATE TUNNEL PROJECT

Introduction

An air quality impact assessment was prepared by Golder Associates Pty Ltd (Golder) as part of the West Gate Tunnel Project (WGTP) Environment Effects Statement (EES). The assessment informed the EES as to the potential impacts of tunnel ventilation structure emissions on air quality in the local area using the plume dispersion model AERMOD.

Impacts were assessed at gridded receptors within a 10 kilometre by 10 kilometre model domain centred on the project (half-way between the tunnel ventilation structures). Two uniform Cartesian receptor grids within the domain were included:

- an outer grid measuring 10 kilometres by 10 kilometres centred on the project with a 100 metre resolution
- an inner grid measuring 4.25 kilometres by 2.5 kilometres centred on the project with a 25 metre resolution.

Discrete receptors were used to represent selected sensitive receptors within the model domain. All gridded and discrete receptors were input at ground level.

Item 3 of the IAC Air Quality Expert Conclave Statement suggested that the modelling assessment should address the potential impacts on existing or planned tall buildings. The following summarises the outcomes of such an assessment conducted by Golder.

Existing and planned tall buildings

Areas which could potentially include tall buildings which may be impacted by the southern tunnel ventilation structure emissions to air are Precinct 15 to the south and the Bradmill Precinct to the north. Hobsons Bay City Planning Scheme Amendment C88 for Precinct 15 is currently under exhibition as of 6 July 2017. Maribyrnong Planning Scheme Amendment C63 for the Bradmill Precinct is currently under a development plan that was approved by the Minister for Planning on 5 May 2011.

- Amendment C88 for Precinct 15: *building heights of two to three storeys along Kyle Road and New Street, three to five storeys on Blackshaws Road and up to six storeys in the remainder of the precinct.*
- Amendment C63 for the Bradmill Precinct: *Low rise dwellings of 1-2 storeys fronting Francis Street to provide an appropriate interface to the existing residential development. Transition to medium density (2-4 storey) residential development internal to the site. Higher density housing (2-6 storeys) near the Neighbourhood Activity Centre.*

In addition, two storey residences (some with balconies) were identified to the west of the northern ventilation structure and the WGTP includes an elevated cycle path, or veloway, along Footscray Road.

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Supplementary modelling

To assess the potential impacts of the tunnel ventilation structure emissions to air at these existing and future sensitive receptors, flagpole receptors were added to an existing $PM_{2.5}$ model:

- Grids of *flagpole* receptors at 4 m, 7 m, 10 m, 13 m and 16 m, representing six storey buildings were included in the model, with a spacing of 25 m, covering Precinct 15 and the Bradmill Precinct.
- Two storey residences (some with balconies) were identified to the west of the northern ventilation structure for which a grid of flagpole receptors, conservatively representing six storey buildings was included.
- In addition to these residences, the veloway was represented as a line of 10 m flagpole receptors (estimated height of the veloway) spaced at 25 m along Footscray Road between Maribyrnong Street and Tullamarine Freeway.

A $PM_{2.5}$ model was selected because $PM_{2.5}$ is of primary interest and its assessment includes a constant background concentration, simplifying interpretation of the results. Air quality impact modelling for the WGTP EES reported that the 2011 meteorological year and 2031 traffic predicted the highest maximum (99.9th percentile) results for $PM_{2.5}$.

Flagpole receptors included in the model (in addition to the existing receptors) are illustrated in Figure 1.

Figure 1: Flagpole receptors

Results

The original and supplementary plume dispersion modelling results are provided in Table 1.

Table 1: $PM_{2.5}$ Modelling Results: Scenario B, 2011

Model	Receptor configuration	Maximum predicted GLC[1]	Design criteria[2]	Contribution to maximum predicted GLC		Project contribution relative to design criteria (%)	Compliance
				Project	Background		
Original model	27,472 receptors at 0 m	17	50	9.2	7.9	18	Yes
Original model plus flagpole receptors	27,472 receptors at 0 m 694 receptors at 4 m 694 receptors at 7 m 694 receptors at 10 m 694 receptors at 13 m 694 receptors at 16 m 75 receptors at 10 m	17	50	9.2	7.9	18	Yes

Notes:
Concentrations rounded to two significant figures.
1 99.9th percentile (9th highest value) as required for assessment against SEPP(AQM) design criteria.
2 SEPP(AQM) design criteria.

Conclusions

The predicted maximum $PM_{2.5}$ concentration (99.9th percentile) including the flagpole receptors was the same as that predicted without flagpole receptors. That is the predicted maximum concentration occurs at an existing ground level receptor. Examination of the rank output file for the supplementary modelling (which, in descending order, lists the highest concentration for each hour modelled) indicates that the first flagpole receptor does not feature until the 257th highest result (3.8 $\mu g/m^3$; 16 m receptor, 625 m north of the west stack).

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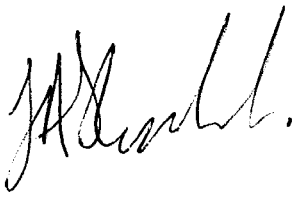

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