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30 January 2018

Convertia Pty Ltd
c/o Christopher Curtis
Senior Urbanist Planning
Ethos Urban
Via email: sydney@ethosurban.com

RE: Air Quality Assessment – Albert Road, Strathfield

Dear Christopher,
Todoroski Air Sciences has assessed the potential for air quality impacts at the proposed residential apartment complex at 11-13 Albert Road and 2-6 Pilgrim Avenue, Strathfield New South Wales (NSW) (hereafter referred to as the Project).

Project background
The proposed Project would see the development of a multi-storey apartment complex to replace the existing residential apartment buildings at the site. The adjacent land use to the Project site includes an existing service station, which has the potential to emit air emissions associated with petrol refuelling and storage.

Figure 1 presents the location of the Project and adjacent service station.

The assessment focuses on the air impacts associated with the operation of the existing service station on the Project site. The assessment applies air dispersion modelling with published air emission rates for the identified sources to predict the likely impacts on the Project site.

Site Investigation
A site investigation was conducted on 8 December 2017. The existing adjacent service station is a Coles Express service station with six pump stations suppling standard fuels including 98 RON, 95 RON, E10 and diesel fuels.

The service station has Vapour Recovery (VR), (VR1 and VR2) controls in place. The storage tank ventilation stacks are fitted with VR1 controls and are located to the southern end of the site between the entry points on Albert Road and Raw Square (refer to **Figure 2**). When filling a car, the VR2 vacuums fumes from the point where the nozzle fits the car, preventing most vapours from escaping.

Figure 3 presents the pump station layout at the service station. It was noted that many other multi-storey apartment complexes are located to the west and south of the site.

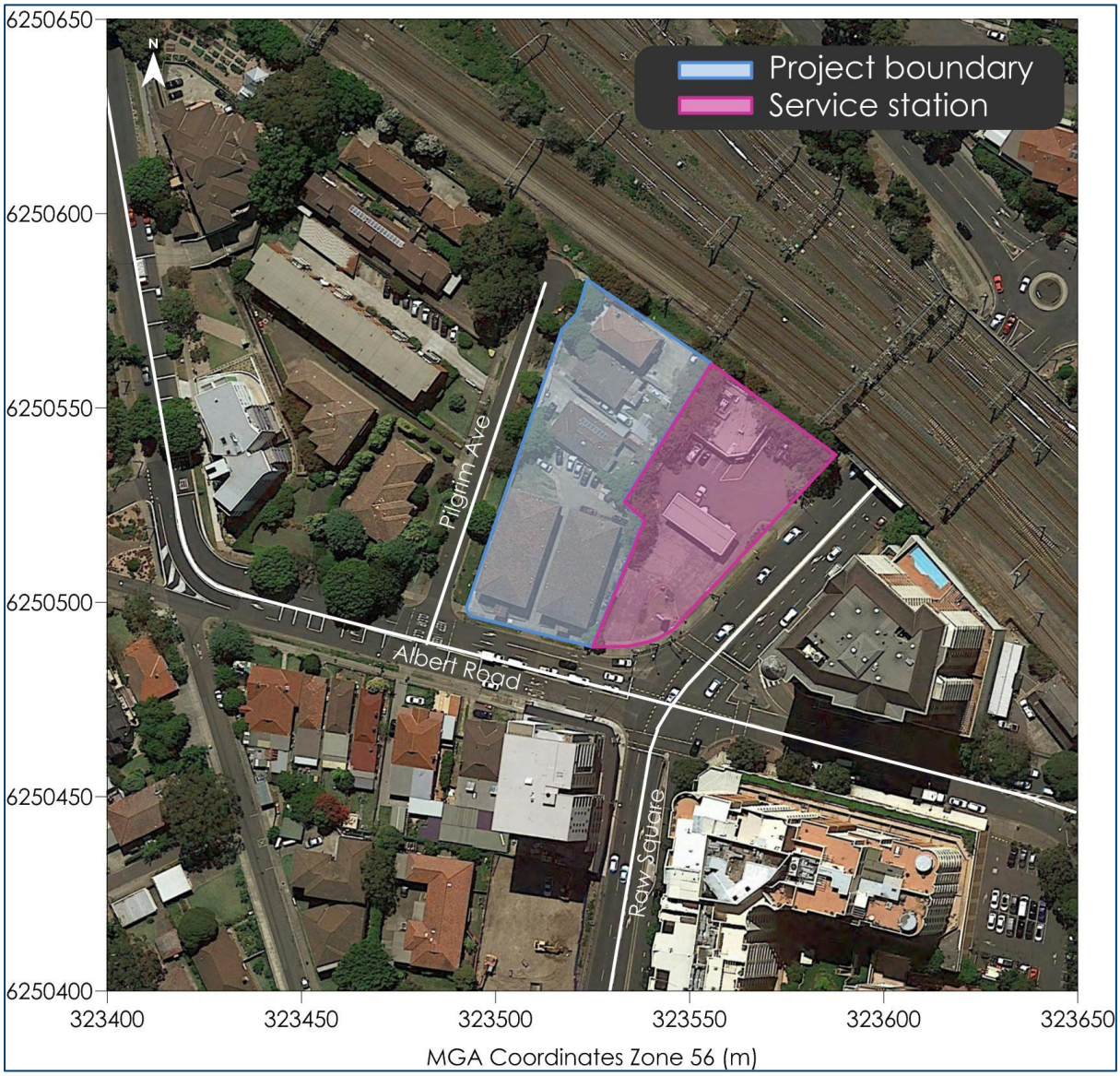

Figure 1: Project location

Figure 2: Service station – facing south toward Albert Road

Figure 3: Service station - pump station layout

Approach to assessment

To assess the potential air quality impacts associated with the existing service station, air dispersion modelling was undertaken using a combination of the CALPUFF Modelling System and The Air Pollution Model (TAPM).

The model was setup in general accord with the methods provided in the NSW EPA document *Generic Guidance and Optimum Model Setting for the CALPUFF Modeling System for Inclusion into the 'Approved Methods for the Modeling and Assessments of Air Pollutants in NSW, Australia'* (**TRC**, **2011**).

The TAPM model was applied to generate meteorological data for use in CALMET and was supplemented with data from the Bureau of Meteorology (BoM) weather station at Canterbury Racecourse (Site No. 066194). The 2012 calendar year is selected as the period for modelling based on an analysis of long-term data trends in the available recorded meteorological data**.**

Modelling of the key air emission sources from the service station was conducted using CALPUFF with applied emissions rates outlined in the following section.

Emission estimation

Petrol stations release pollutants (i.e. fuel vapour) to air as a result of the following activities:

- Loading storage tanks with petrol - controlled through Vapour Recovery Stage 1 (VR1);
- Petrol vehicle refuelling - controlled through Vapour Recovery Stage 2 (VR2);
- Spillage of petrol;

- Petrol storage tank breathing losses; and,
- Emissions from diesel transfer and storage operations.

VR1 controls the emissions from underground storage tanks as they are filled by road tankers and reduces the emissions from this activity by approximately 90% (**NSW EPA, 2012a**).

VR2 controls the emissions from refuelling vehicle tanks at the petrol pump and is designed to recover at least 85% of the emissions (**NSW EPA, 2009**).

The site inspection confirmed that the station has VR1 and VR2 installed.

Potential emissions from the petrol station were calculated using the methodology presented in the NSW EPA document *Air Emissions Inventory for the Greater Metropolitan Region in New South Wales 2008 Calendar Year Commercial Emissions* (2008 inventory) (**NSW EPA, 2012b**).

Emission rates were adjusted using the temporal factors provided in the *Air Emissions Inventory for the Greater Metropolitan Region* emissions inventory to account for the expected variations in emissions which result from changes to temperature and activity. For example, the emissions for the refuelling of vehicle tanks are highest during peak traffic hours when there would most likely be the largest number of cars refuelling. It was conservatively assumed that all of the throughput at the service station is petroleum, noting that Volatile Organic Compound (VOC) emissions from diesel are significantly lower than emissions from petrol.

The service station has six fuelling bays/ bowsers. To calculate the typical daily fuel throughput, it was assumed that each of the six bowsers can fill ten vehicles per hour with an average tank capacity of 44 litres (i.e. one car every 6 minutes at each bowser). On this basis, a throughput of approximately 10 million litres per annum was calculated.

The key pollutants from the fuel vapours with scope for any impact are benzene and toluene, hence their potential air quality impacts were assessed. The emissions for benzene and toluene were calculated as 0.78% and 1.9% of the total VOC emissions respectively, using the vapour phase speciation profiles for organic emissions (**NSW EPA, 2012b**).

Modelling results

The spatial distribution of the dispersion modelling predictions for the modelled scenarios is presented as isopleth diagrams showing ground level concentrations in **Figure 4** and **Figure 5** for benzene and toluene, respectively.

The modelling results indicate the predicted levels of benzene and toluene would be below the respective air quality criterions at the Project site.

The most limiting pollutant is benzene, which is predicted to be at approximately one fifth of the acceptable level. This indicates that up to approximately five times more fuel throughput would be acceptable.

Figure 4: Predicted 1-hour average benzene concentrations (µg/m³)

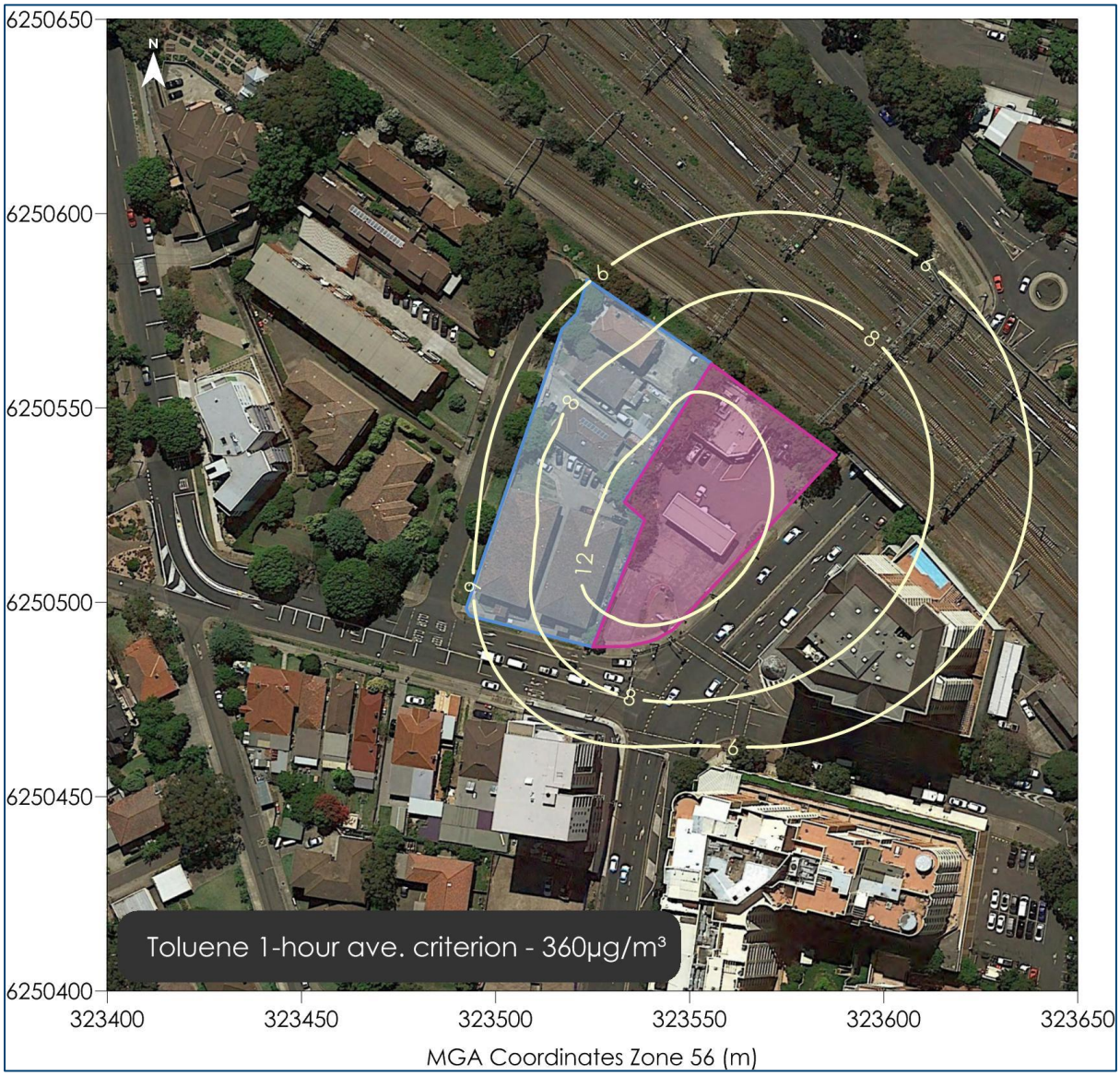

Figure 5: Predicted 1-hour average toluene concentrations (µg/m³)

Summary and conclusions

This report has assessed the potential for air quality impacts associated with the operation of the existing service station at 9 Albert Road on the proposed Project site at 11-13 Albert Road and 2-6 Pilgrim Avenue.

The air dispersion modelling applied in this assessment was carried out using air emission factors provided in the *Air Emissions Inventory for the Greater Metropolitan Region* emissions inventory (**NSW EPA, 2012b**) and detailed air dispersion modelling to predict the likely levels of benzene and toluene which may occur at the Project site.

The dispersion modelling results indicate that the vapour emissions from the service station would not lead to unacceptable impacts at the Project site. The assessment also indicates that the fuel throughput of the service station could increase significantly without resulting in any impact above air quality criteria.

Please feel free to contact us if you need to discuss (or require clarification on) any aspect of this report.

Yours faithfully,

Todoroski Air Sciences

Aleks Todoroski

Philip Henschke

References

NSW EPA (2009)

"Standards and best practice guidelines for vapour recovery at petrol service stations" New South Wales Department of Environment, Climate Change and Water, November 2009

NSW EPA (2012a)

"Air Emissions Inventory for the Greater Metropolitan Region in New South Wales – On-Road Mobile Emissions: Results" New South Wales Environmental Protection Authority, August 2012

NSW EPA (2012b)

"Air Emissions Inventory for the Greater Metropolitan Region in New South Wales – Commercial Emissions: Results" New South Wales Environmental Protection Authority, August 2012

NSW EPA (2014)

"Reducing service station emissions" New South Wales Environmental Protection Authority, Website location: http://www.epa.nsw.gov.au/air/petrolvapour.htm

TRC (2011)

"Generic Guidance and Optimum Model Settings for the CALPUFF Modeling System for Inclusion into the Approved Methods for the Modeling and Assessments of Air Pollutants in NSW, Australia", Prepared for the NSW Office of Environment and Heritage by TRC Environmental Corporation.