

24 November 2015

610.15353 AQ Letter 20151124.docx

AFS Capital Pty Ltd
L2, 210 Clarence Street
Sydney NSW 2000

Attention: Alex Sicari

Dear Alex

**Air Quality Assessment
326 Hume Highway, Bankstown**

SLR Consulting Australia Pty Ltd (SLR) has been commissioned by AFS Capital Pty Ltd to provide an Air Quality Assessment for a proposed mixed use development to be located at 326 Hume Highway, Bankstown (the Project Site).

A development application (DA) has been submitted to Bankstown City Council (Council) for the re-development of the Project Site. The DA details the proposed design of a mixed use development incorporating retail and 127 residential units. The setback distance from the Hume Highway to the nearest residential units is 15.5 metres (m).

Following review of the DA, Council has requested:

"An air quality assessment, undertaken by a suitably qualified consultant, is required to support the proposed encroachment within the minimum 20 m Hume Highway setback. This assessment must include a comparison of the air quality impacts of the proposed setback against those of a compliant development."

The aim of this assessment is to provide the information requested by Council. It provides examination of air quality data collected at a roadside location with similar traffic volumes, a comparison of the likely air quality impacts at the proposed and required setback distances and discusses the design measures which are proposed to be included at the Project Site to mitigate and minimise air quality impacts at the proposed setback distance of 15.5 m.

I trust this meets with your requirements, but please do not hesitate to contact me if I can provide clarification or further information.

Yours sincerely



DR MARTIN DOYLE | Principal - Air Quality

Checked/Authorised by: KL

1 Background

The Project Site is located within a mixed use commercial and residential area on a busy road approximately 16 kilometres (km) to the west south west of Sydney CBD. The local setting of the Project Site is shown in **Figure 1**. The Project Site is bounded to the south by Hume Highway, Rookwood Road to the west and Stacey Street is over 160 m to the east.

Figure 1 Location of the Proposed Development



Modified from "DA to Bankstown City Council, Mixed Use Development 18 August 2015"

A development application (DA) has been submitted to Council for the re-development of the Project Site. The DA details the proposed design of a mixed use development incorporating retail and 127 residential units. The setback distance from the Hume Highway to the nearest residential units is 15.5 metres (m).

Following review of the DA, Council has requested:

"An air quality assessment, undertaken by a suitably qualified consultant, is required to support the proposed encroachment within the minimum 20 m Hume Highway setback. This assessment must include a comparison of the air quality impacts of the proposed setback against those of a compliant development."

This assessment has been prepared with regard to:

- The Bankstown Development Control Plan 2015 (Bankstown City Council, March 2015, Amended May 2015);
- The NSW Department of Planning and Environment (DPE) "Development near Rail Corridors and Busy Roads" technical guideline (interim) (DoP, 2008); and

- Section 101 of the *State Environmental Planning Policy (SEPP) (Infrastructure) 2007*.

2 Legislation and Guidance

Under the Australian Environmental Law Framework, environmental laws are broadly classified into two categories:

- Environmental planning laws; and
- Environmental protection laws.

Environmental planning in NSW is largely governed by the Environmental Planning and Assessment Act 1999 (the EP & A Act) and Environmental Planning and Assessment Regulation 2000 (the EP & A Regulation) serving as the overarching structure for planning. The other statutory documents that support that structure are the NSW State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs) (P&E NSW, 2015).

2.1 Bankstown Development Control Plan

The Bankstown Development Control Plan (DCP) 2015 supplements the Bankstown LEP 2015. Part A2, Section 5.1 of the DCP provides specific provisions for development located at 326 Hume Highway. In relation to setback distances, the relevant requirement states:

“dwellings are setback a minimum 20 metres from the Hume Highway boundary of the allotment or a road related area (within the meaning of the Roads Act 1993) adjoining or associated with the Hume Highway”

2.2 State Environmental Planning Policy

The specific SEPP applicable to the Project Site is the NSW State Environmental Planning Policy (Infrastructure) 2007 (the ‘Infrastructure SEPP’). More specifically, the Infrastructure SEPP refers to guidelines which must be taken into account where development is proposed in, or adjacent to, specific roads and railway corridors under clause 101 – *Development with Frontage to Classified Road*¹. The objectives of clause 101 are to ensure that new development does not compromise the effective and ongoing operation and function of classified roads and to reduce the potential of traffic noise and vehicle emissions on development adjacent to classified roads.

2.3 Guidance Documents

Reference is also made to the NSW Department of Planning document “*Development Near Rail Corridors and Busy Roads – Interim Guideline*” (DoP, 2008) (the Guideline) which supports the specific rail and road provisions of the Infrastructure SEPP.

An aim of the Guideline is to assist in reducing the health impacts of adverse air quality from road traffic on sensitive adjacent development and assists in the planning, design and assessment of development in, or adjacent to busy roads (DoP 2008).

¹ The NSW State Roads Act 1986 No. 85 defines ‘classified road’ as a main road, a secondary road, a state highway, a tourist road, a state work, a freeway or a controlled access road.

3 Pollutant Emission Sources

The primary sources of emission in the area immediately surrounding the Project Site are considered to be products of combustion from vehicles travelling along the Hume Highway and to a lesser extent, Rookwood Road and Stacey Street. A review of the National Pollutant Inventory Emission Estimation Technique Manual (NPI EET) for Combustion Engines (DEWHA 2008) identifies the primary pollutants from combustion engines as:

- Total Volatile Organic Compounds (TVOCs).
- Carbon monoxide (CO).
- Oxides of nitrogen (NO_x).
- Particulate matter less than 2.5 µm in aerodynamic diameter (PM_{2.5}).
- Particulate matter less than 10 µm in aerodynamic diameter (PM₁₀).
- Sulfur dioxide (SO₂).

The rate of pollutant emission is a function of a number of factors including the type of vehicles in which fuel is combusted, the type of fuel combusted, the number and speed of vehicles and the grade of the road.

The impact upon nearby sensitive receivers is dependent on the prevailing meteorological conditions (primarily wind speed and direction) but also the distance from the source to the receiver and any mitigation between the source and receiver. Such mitigation might be in the form of barriers which may act as a physical obstacle or result in changes to airflow which may help in reducing air quality impacts.

Finally, the resulting impacts at any receiver should be considered in the context of the relevant air quality criteria for each pollutant of interest.

4 Road Traffic Volumes

Traffic volume information is collected by Roads and Maritime Services (RMS) in NSW via permanent and sample roadside traffic collection devices. There are approximately 600 permanent roadside collection device stations, which continuously collect traffic information 365 days per year.

Information collected from these devices includes traffic volume counts, speed and classification (vehicle type) depending on the technology available at each site.

Average road traffic volumes for a selection of permanent RMS roadside collection device stations across NSW are available for 2012.

The average traffic volume figures are provided as:

- All days - throughput of vehicles past a specific point on the road per day, where a 'day' refers to any full 24 hour period where data was collected.
- Weekdays - throughput of vehicles past a specific point on the road per weekday, where a 'weekday' refers to any full 24 hour period, Monday to Friday, where data was collected. This figure excludes public holidays and school holidays.
- Weekends - throughput of vehicles past a specific point on the road for weekends, where a 'weekend' refers to any full 24 hour period on a Saturday or Sunday, where data was collected.

The closest roadside collection device station to the Project Site is located on the Hume Highway, north of Stacey Street (approximately 400 m from the Project Site). Vehicles counted at this location could turn onto Stacey Street, or continue along Hume Highway past the Project Site if travelling westbound or have travelled past the Project Site or originated from Stacey Street if travelling eastbound. For the purposes of this assessment, the traffic volumes counted at this location are assumed to be indicative of those experienced at the Project Site. The average road traffic volumes along the Hume Highway at this location during 2012 are presented in **Table 1**.

Table 1 Average Road Traffic Volumes – Hume Highway, Greenacre²

Average Road Traffic Volumes – Hume Highway	2012
Northbound (towards Chullora)	
All Days (vehicles/day)	28,200
No of Days Collected	297
Weekdays (vehicles/day)	30,200
No of Days Collected	172
Weekends (vehicles/day)	24,500
No of Days Collected	86
Southbound (towards Yagoona)	
All Days (vehicles/day)	28,600
No of Days Collected	355
Weekdays (vehicles/day)	30,700
No of Days Collected	194
Weekends (vehicles/day)	25,500
No of Days Collected	103

The traffic volume along Hume Highway in both directions is over 60,000 vehicles / weekday and 50,000 vehicles per day on weekends. Information on the peak hourly flows is not available from RMS although 60,000 vehicles per day would represent a peak hourly flow of greater than 2,500 (refer **Section 5**).

5 Assessment of Proposed Project

The following outlines a qualitative assessment of the likely air quality impacts on the proposed development resulting from the operation of vehicles along the Hume Highway.

5.1 Air Quality Monitoring Data

A review of air quality monitoring performed close to roadside locations as part of the M4 East Project has been performed. Monitoring data for the M4E:04 peak (roadside) station, located approximately 10 m from Parramatta Road, Concord (approximately 57,000 vehicles per day (RMS, 2012)), indicates that maximum concentrations of pollutants between August 2014 and April 2015 were as presented in **Table 2**.

² <http://www.rms.nsw.gov.au/about/corporate-publications/statistics/traffic-volumes/map/index.html>

Table 2 Pollutant Concentrations measured for the M4 East Project

Pollutant ¹	Averaging Period	Maximum Concentration	Relevant Criterion
CO	Maximum 1 hour	1.94 mg/m ³	10 mg/m ³
NO ₂	Maximum 1 hour	153.8 µg/m ³	246 µg/m ³
PM ₁₀	Maximum 24 hour	45.1 µg/m ³	50 µg/m ³

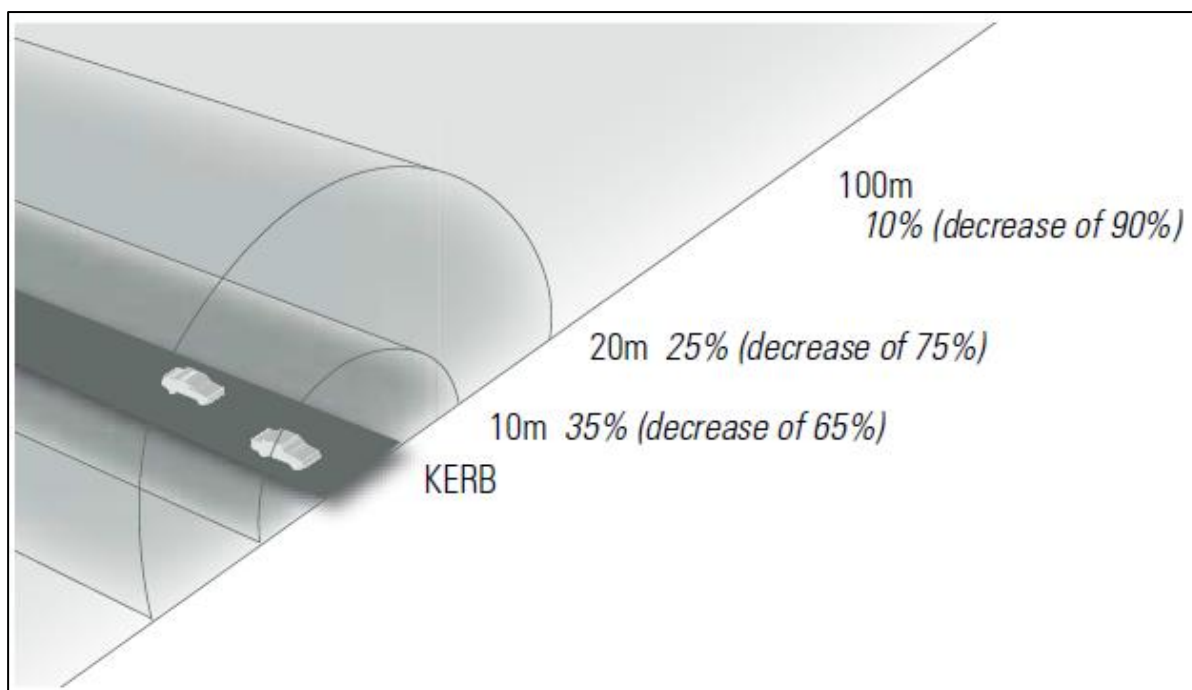
Note 1: no monitoring of SO₂, TVOC or PM_{2.5} performed

Taking into account the similar traffic volumes along Parramatta Road when compared to the Project Site (~57,000 vs. ~60,000 vehicles per day) it is considered that these data would be representative of pollutant concentrations measured at 10 m from the Hume Highway.

5.2 Reductions in Air Pollutant Concentrations from Kerbside

As outlined in the Guideline (DoP, 2008) air pollutant concentrations resulting from road traffic tend to decrease with increasing distance from the road. For example, under the unfavourable dispersion conditions of temperature inversion and light winds (<1 metre per second) where little mixing occurs in the atmosphere (termed F-class stability) pollutant concentrations can be expected to reduce by around 65 percent of roadside levels in the first ten metres from the road. Further reductions occur as the distance from the road increases. A relative decrease in the pollutant concentrations with respect to the distance from the road is shown in **Figure 2**.

Figure 2 Percentage of Pollutant Concentration relative to Kerbside Concentration



Source: DoP, 2008

Based on these data, air pollutant concentrations at ~15 m from kerbside are likely to be 30% of those experienced at kerbside (a decrease of 70%).

5.3 Assessment of Impacts

As discussed in **Section 1**, the Project Site is proposed to consist of residential units within 15.5 m of the Hume Highway, with units starting on the first floor. The proposed Level 1 plans showing the units affected by the setback distances are shown in **Figure 3**.

Figure 3 Site Plan for the Project Site – Level 1



The DCP requires that the setback to residential development at this location is 20 m. Air quality monitoring at 10 m from a road with a similar daily traffic volume (refer **Section 5.1**), and the generic pollutant reductions by distance from kerbside provided in the Guideline (refer **Section 5.2**) allow the derivation of pollutant concentrations at 15 m and 20 m from the kerbside. These derived data are presented in **Table 3**.

Table 3 Anticipated Pollutant Concentrations at Distances from Kerbside

Pollutant	Units	Criterion	Pollutant Concentrations at Distance from Kerbside			
			Extrapolated Kerbside	Measured 10 m	Extrapolated 15 m	Extrapolated 20 m
CO	mg/m ³	10	5.5	1.9	1.7	1.4
NO ₂	µg/m ³	246	439.4	153.8	131.8	109.9
PM ₁₀	µg/m ³	50	128.9	45.1	38.7	32.2

Based on the results presented in **Table 3**, it is shown that the relevant air quality criterion is achieved at both 15 m and 20 m from kerbside. The additional 5 m setback distance results in a further 5% reduction in pollutant concentrations when compared to concentrations measured at the kerbside.

5.4 Development Design Measures

As shown in **Figure 3**, the proposed development does not have any balconies or openable areas within the majority of the frontage to the Hume Highway. Where balcony areas do exist within the 20 m setback distance, these do not directly face the Hume Highway. Windows which face onto the Hume Highway within the 20 m setback distance are non-operable. The planting of large trees is proposed along the frontage of the Project Site with the Hume Highway. These trees will act to assist the dispersion of vehicle emissions prior to impacting on the development.

6 Conclusion

An assessment has been performed to identify the potential impact on air quality of a reduction in setback distance from the Hume Highway of a proposed development to be located at 326 Hume Highway, Bankstown. This assessment has considered air quality monitoring data relating to a road with a similar volume of traffic. These data and subsequent analysis and examination of the proposed development design indicate:

- Air quality criteria are likely to be achieved at either 20 m or 15.5 m setback distances at this location.
- The difference in air pollutant concentrations at either 20 m or 15.5 m is likely to be 5% when compared with concentrations measured at the kerbside.
- The absolute change in air quality experienced at either 20 m or 15.5 m setback distance is likely to be small and would not materially affect compliance or non-compliance of the development with air quality criteria.
- Design measures implemented as part of the development include non-operable windows on the frontage with the Hume Highway, restriction of balcony space within the required 20 m setback distance and planting of vegetation to assist in the dispersion of any air pollutants being emitted by road traffic.

Given the findings of the air quality assessment, it is not considered that air quality issues should restrict the relaxation of the required setback distance in this particular instance.

7 References

- Bankstown City Council – Development Control Plan 2015, March 2015 (Amended May 2015).
- DoP 2008, Development Near Rail Corridors and Busy Roads – Interim Guideline, NSW Department of Planning, 2008, DoP 08_048.
- DEWHA 2008, National Pollutant Inventory Emission Estimation Technique Manual for Combustion Engines version 3.0 published by the Department of Environment, Water, Heritage and Arts, June 2008.
- P&E NSW 2015, NSW Government - Planning and Environment, accessed online <http://hub.planning.nsw.gov.au/PlanningControls/Legislation.aspx>, dated 14 August 2015.