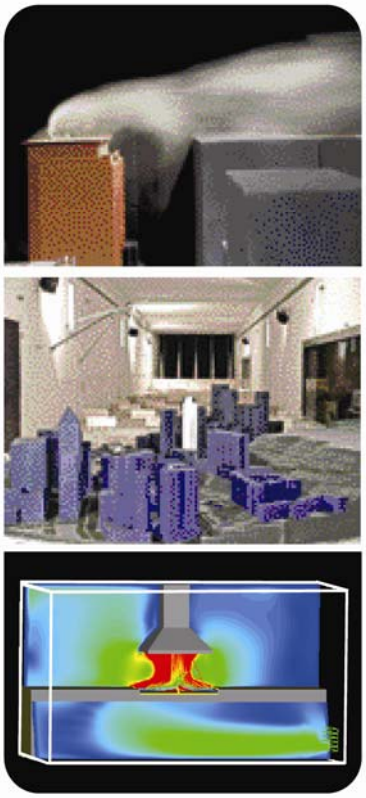
CERMAK
PETERKA
PETERSEN

WIND ENGINEERING AND AIR QUALITY CONSULTANTS

FINAL REPORT



Wind Assessment for:

MARRICKVILLE METRO

Sydney, Australia

AMPCI c/-

Bovis Lend Lease

30 The Bond,

30 Hickson Road

Millers Point, NSW 2000

Australia

October 2010

CPP Project: 5627

CPP
Unit 2, 500 Princes Highway
St. Peters, NSW 2044, Australia
info-syd@cppwind.com
www.cppwind.com

TABLE OF CONTENTS

TABLE OF FIGURES

TABLE OF TABLES

Introduction

Cermak Peterka Petersen Pty. (CPP) has been engaged by AMPCI to prepare a wind impact report to accompany a Preferred Project Report in respect to the Concept Plan Application under Part 3A of the NSW *Environmental Planning and Assessment Act 1979* for the proposed redevelopment of the Marrickville Metro Shopping Centre and addressing section 8 of the Director Generals Requirements (Application Number MP 09_0191 3rd March 2010) and to the letter from the Department of Planning (DOP) dated 14 October 2010. This report provides an opinion based assessment of the impact of the proposed Marrickville Metro Shopping Centre on the pedestrian level local wind environment in and around the development.

Marrickville Metro Shopping Centre is located at 34 Victoria Road, Marrickville. The existing shopping centre fronts Victoria Road to the north, Murray Street to the east, Smidmore Street to the south, and is adjoined by single storey residential dwellings to the west, Figure 1. The existing shopping centre is predominantly a single level retail building and comprises major tenants being Kmart, Woolworths, and Aldi as well as a range of speciality stores. Car parking is located at roof top level with existing vehicle ramp access via Smidmore Street and Murray Street.

The land at 13-55 Edinburgh Road is located to the south of Smidmore Street and is bounded by Edinburgh Road and Murray Street. This site is currently used as a warehouse with associated ground level car parking.

Figure 1 Location of the proposed development

The shopping centre is located within an established residential and industrial precinct surrounded by small lot residential housing to the north and west, and predominantly industrial land comprising larger allotments and larger building scales to the south and east.

AMPCI proposes to upgrade and expand Marrickville Metro Shopping Centre to accommodate additional retail floor space. The proposal has two key elements:

- An extension of retail floor area at first floor level above the existing shopping centre building with further additional roof top parking above;
- Redevelopment of the existing industrial land south of Smidmore Street (13-55 Edinburgh Road) to create a two level retail addition to the shopping centre with car parking above.

Sydney Wind Climate & Environmental Wind Speed Criteria

The proposed development lies approximately 4 km to the north of the Sydney Airport Bureau of Meteorology anemometer (BoM Station 947670). In the absence of any surrounding development it is considered the wind climate at the Marrickville site would be similar to Sydney Airport given a similar proximity to the eastern seaboard. At the site there is significant surrounding industrial and residential surrounding development which will perturb the local wind environment as discussed later in this report. Analysis based on Bureau of Meteorology mean wind speed data from 1986 through to 2007 was used to produce the local wind characteristics, Figure 2.

Prevailing strong winds tend to come from the north-east, south, and west directions. North-east winds tend to be summer sea breezes bringing relief on warm days, south winds are associated with frontal systems, tend to be cold and are often associated with rain, and west winds are associated with virtually all weather patterns, but are particularly strong during late winter and spring during synoptic gale events.

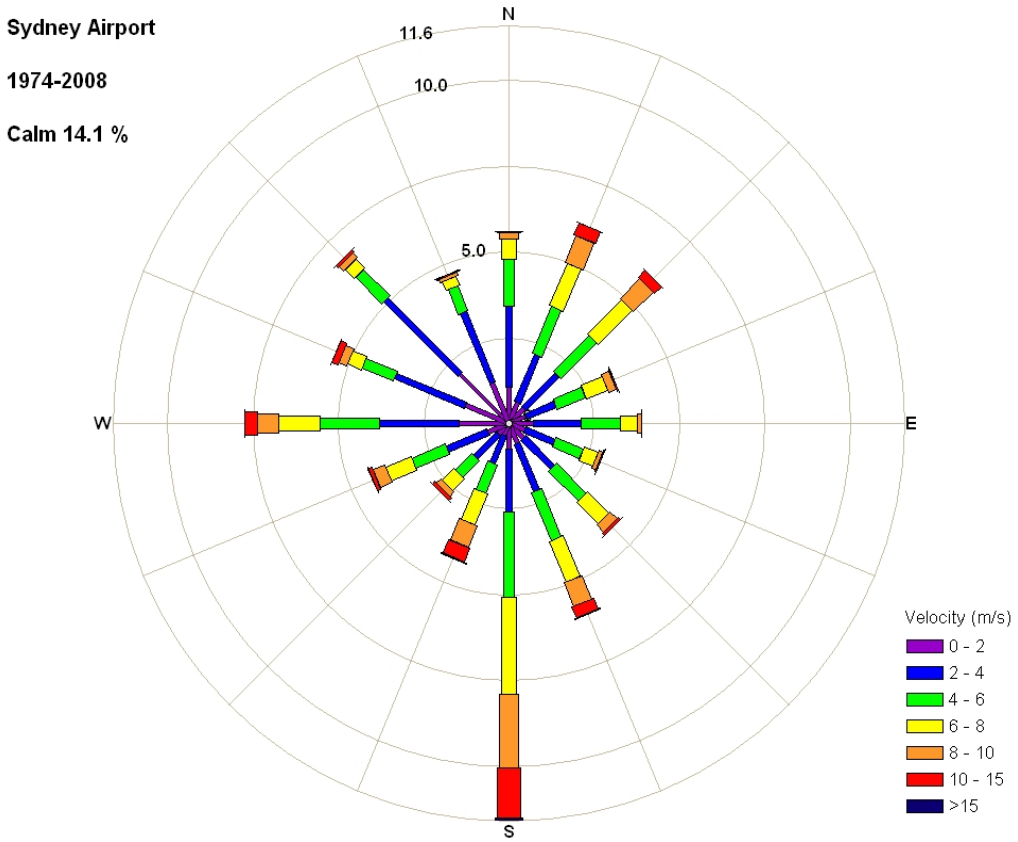


Figure 2 Wind rose for Sydney Airport

Sydney Airport is relatively windy, with an average wind speed at 10 m reference height of approximately 4 m/s (8 kt, 14 kph), and five percent of the time the mean wind speed is in excess of 9.5 m/s (18 kt, 34 kph). Converting the five percent of the time wind speed to typical pedestrian level at the site would result in about 6.0 m/s (12 kt, 22 kph). Comparing this with the comfort criteria of Lawson in Table 1 indicates that the locale would be acceptable for pedestrian standing/walking; hence any recreational outdoor activity may require some shielding from prevailing wind directions.

Comfort (maximum wind speed exceeded 5% of the time)	
<2 m/s	Outdoor fine Dining
2 - 4 m/s	Pedestrian Sitting (considered to be of long duration)
4 - 6 m/s	Pedestrian Standing (or sitting for a short time or exposure)
6 - 8 m/s	Pedestrian Walking
8 - 10 m/s	Business Walking (objective walking from A to B or for cycling)
> 10 m/s	Uncomfortable
Distress (maximum wind speed exceeded 0.022% of the time, twice per annum)	
<15 m/s	General access area
15 - 20 m/s	Acceptable only where able bodied people would be expected; no frail people or cyclists expected
>20 m/s	Unacceptable

The wind speed is either a mean wind speed or a gust equivalent mean (GEM) wind speed. The GEM wind speed is equal to the 3 s gust wind speed divided by 1.85.

Table 1: Lawson pedestrian comfort criteria for various activities

Environmental Wind Assessment

The proposed Marrickville Metro Shopping Centre will have similar height and massing to the existing shopping centre on the site, and therefore the wind conditions around the site are expected to be generally similar to existing except in some localised areas. Existing wind conditions around the shopping centre and Civic Place are known to be acceptable for use as a public area.

Both the existing and proposed Marrickville Metro Shopping Centre development is surrounded by small lot residential housing and medium rise buildings. Topography immediately surrounding the site is relatively flat but gently dropping in elevation toward the south. Shielding provided by these surrounding developments will generally maintain winds within the development at or below the 4-6 m/s Lawson Pedestrian Standing criterion at most locations.

With the redevelopment of the existing industrial land south of Smidmore Street there will be new two level retail fronting Edinburgh Road. The increase in height is expected to marginally increase the ground level wind speeds for winds from the south quadrant. The new southern entrance near the centre of the Edinburgh Road façade will have marginally increased exposure to prevailing southerly winds compared with the existing southern entrance fronting Smidmore Street, Figure 3, which is afforded some shielding by the existing warehouse development. Despite the marginally increased height and exposure, it is considered winds are unlikely to exceed the 6 m/s Pedestrian Standing criterion and the entrance will be suitable for public domain access to the shopping centre.

Figure 3: Ground floor plan of the proposed development

Synoptic winds from the south quadrant will lead to occasional stronger winds channelled through the new southern entrance and into the centre. This will have some impact on the wind speed comfort of air flows penetrating the centre, rain ingress, as well as air-conditioning loads particularly heating loads during late winter months. Attention will be paid to entrance door configurations during detailed design to mitigate these potential internal impacts.

In the existing centre, pedestrian access is largely via the rooftop car park and this will continue with the redevelopment of the site. The Level 1 and especially Level 2 car park deck is currently exposed to Sydney's prevailing wind directions given its elevation. Winds at the existing and proposed roof car park levels may therefore be approaching the pedestrian walking criterion particularly near the edges, but this will be acceptable for the intended use. Some relaxation of the Lawson criterion should be permitted on the car park roof as there will be an expectation by users of slightly higher winds in the elevated and exposed location which will be used only for short term vehicle access type activities. Door sealing at rooftop entrance locations will be particularly important for air conditioning loads and close attention will be paid to door configurations during detailed design.

Conclusions

Cermak Peterka Petersen Pty. Ltd. has provided an opinion based assessment of the impact of the proposed Marrickville Metro Shopping Centre on the pedestrian level local wind environment in and around the development. Wind conditions around the site are expected to be similar to existing conditions except in some localised areas.

The main southern entrance to the development fronting Edinburgh Road will be suitable as a public domain access to the shopping centre and attention will be paid to entrance door configurations during detailed design.

As required under Section 8 of the Director Generals Requirements for the Marrickville Metro Shopping Centre, the development will achieve a suitably high level of environmental and residential amenity in terms of wind impacts.

References

Lawson, T.V., (1990), The Determination of the wind environment of a building complex before construction, *Department of Aerospace Engineering, University of Bristol*, Report Number TVL 9025.

Architectural Drawings

Assessment of wind effects in this report has been based upon the Part 3A drawings provided by Bovis Lend Lease 28 October.