WINDTECH

Wind Environment Statement

for the

North Eveleigh Concept Plan

Prepared for
Redfern-Waterloo Authority

March 26, 2008

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1.0 Introduction

This is an assessment of the current wind environment and wind impacts for the North Eveleigh Concept Plan, prepared for Redfern-Waterloo Authority.

The effect of wind activity within and around the site of the proposal is examined for the three predominant wind directions for Sydney, i.e. north-east, south and west. The analysis of the wind effects relating to the proposal was carried out in the context of the local wind climate, building morphology and land topography.

The conclusions of this report are drawn from our extensive experience in this field and are based on an examination of the Concept Plan proposal, prepared by Bates Smart, dated March 2008. No wind tunnel tests have been undertaken for the subject development. As such, this report addresses only the general wind effects and any localised effects that are identifiable by visual inspection. Any recommendations in this report are made only in-principle and are based on our extensive experience in the study of wind environment effects.

It is recommended that further analysis of the site should be undertaken at the Project Application phase. This should include a wind tunnel study on the area surrounding the eastern 16-storey residential tower.

2.0 Local Wind Climate

Three principal wind directions potentially affect the development. These winds prevail from the north-east, south and west, Table 1 is a summary of the principal time of occurrence of these winds. This summary is based on data obtained by the Bureau of Meteorology from Sydney Airport, between 1939 and 1992. Table 1 presents a summary of the principal time of occurrence of these winds. Wind roses for Sydney Airport 1939-2000 are presented in the appendix.

Table 1: Principal Time of Occurrence of Winds – Sydney Region

Month	Wind Direction		
	North-Easterly	Southerly	Westerly
January	X	X	
February	X	X	
March	X	X	
April		X	X
May			X
June			X
July			X
August			X
September		X	X
October	X	X	
November	X	X	
December	X	X	

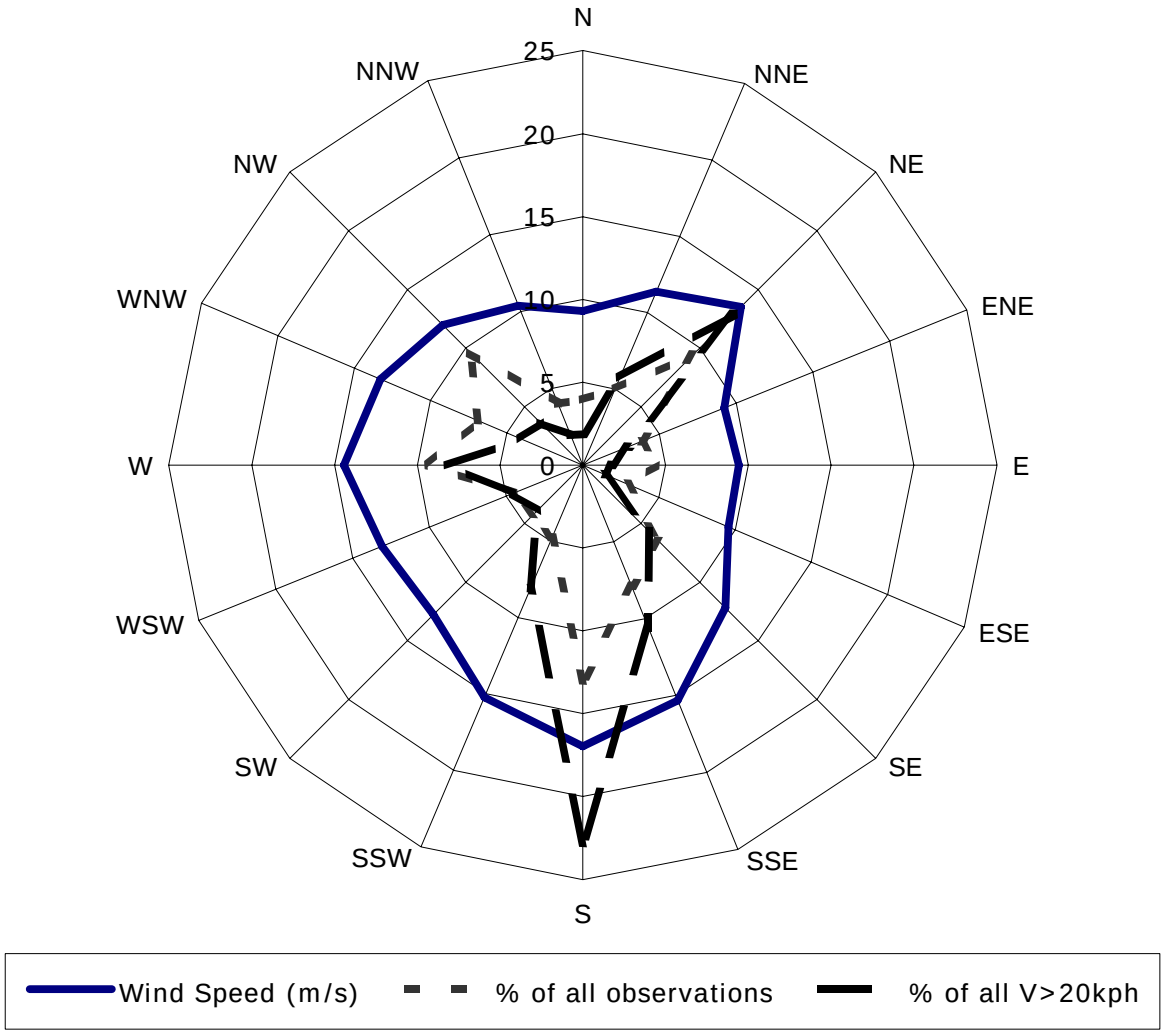


Figure 1: Basic Mean Wind Speed Data for Sydney, 1932-1992 (in metres per second, based on 3 hourly mean wind speeds, at 10m height at Kingsford Smith Airport)

3.0 Wind Effects on People

The acceptability of wind in any area is dependent upon its use. For example, people walking or window-shopping will tolerate higher wind speeds than those seated at an outdoor restaurant.

The following table, developed by Penwarden (1975), is a modified version of the Beaufort Scale, and describes the effects of various wind intensities on people. Note that the applicability column related to wind conditions occurring frequently (exceeded approximately once per week on average). Higher ranges of wind speeds can be tolerated for rarer events.

Table 2: Summary of Wind Effects on People (after Penwarden, 1975)

Type of Winds	Beaufort Number	Gust Speed (m/s)	Effects	Applicability
Calm, light air	1	0 - 1.5	Calm, no noticeable wind	Generally acceptable for Stationary, long exposure activities such as in outdoor restaurants, landscaped gardens and open air theatres.
Light breeze	2	1.6 - 3.3	Wind felt on face	
Gentle breeze	3	3.4 - 5.4	Hair is disturbed, Clothing flaps	
Moderate breeze	4	5.5 - 7.9	Raises dust, dry soil and loose paper - Hair disarranged	Generally acceptable for walking & stationary, short exposure activities such as window shopping, standing or sitting in plazas.
Fresh breeze	5	8.0 - 10.7	Force of wind felt on body	Acceptable as a main pedestrian thoroughfare
Strong breeze	6	10.8 - 13.8	Umbrellas used with difficulty, Hair blown straight, Difficult to walk steadily, Wind noise on ears unpleasant.	Acceptable for areas where there is little pedestrian activity or for fast walking.
Near Gale	7	13.9 - 17.1	Inconvenience felt when walking.	
Gale	8	17.2 -20.7	Generally impedes progress, Great difficulty with balance.	Unacceptable as a public accessway.
Strong gale	9	20.8 - 24.4	People blown over by gusts.	Completely unacceptable.

4.0 Description of the Proposal

The development plan indicates, as shown in Figures 2 & 3, that several mid-rise and high-rise buildings are to be erected within the site. An elliptical shaped 16-storey residnetial tower within the north-east corner of the site is the tallest. seven office blocks with heights of 8 storeys border the railway corridor along the eastern half of the site. Six new residential 4 and 5 storey buildings will be located in the eastern section in the vicinity of Wilson Street and 4 storey residential components will be constructed above the existing Paint Shop building. The existing heritage buildings on Wilson St east of Shepherd St and the Telecommunications equipment centre in the eastern corner of the site will be retained. The Carriage Workshop and Blacksmith Workshop in the centre of the site will be retained. At the western end of the site, 2 residential complexes are proposed, having a staggered height of 12, 8 and 5 storeys. At the centre of these blocks are pocket parks. Another 5 new residential blocks are located at the western end of the site and the existing Clothing Store is retained for residential use.

Figure 2: Proposed Aerial View of the eastern section of the site.

Figure 3: Proposed Aerial View of the western section of the site.

5.0 Site Analysis

The site is located to the north of the rail corridor immediately west of Redfern train station. The site is surrounded by two-storey townhouses to the west and north, warehouse complexes on the other side of the 100m wide railway corridor to the south, and which extends to the east. The local land topography gradually slopes up towards the north.

For each of the three predominant wind directions, the interaction between the wind and the building morphology in the area was considered. Important features taken into account include the distances between the proposed building forms, their overall heights and bulk as well as the landform. Only the potentially critical wind effects are discussed in this report.

Figure 4: Aerial Photograph of the Proposed Development Site

5.1 North-Easterly Winds

North Easterly winds are generally not critical for the majority of the site, but could potentially cause adverse conditions on the ground level of the north-western and south-eastern corner of the 16 storey building. North-easterly winds are expected to accelerate around these corners. This wind effect can be ameliorated by incorporating a strategic planting

scheme in the area, with 5m tall trees. Other treatments such as awnings and podiums could also be considered.

The orientation of the buildings, generally north-west/south-east for the buildings along the rail-corridor, and north-east/south-west for the buildings along Wilson Street, will serve to provide calm conditions to the majority of the site west of the 16 storey tower.

5.2 Southerly Winds

The north-west/south-east orientation of the buildings along the rail corridor, although beneficial when considering north-easterly winds, will potentially cause winds to accelerate through the open areas between adjacent buildings due to the effect of the south-easterly winds. These areas are expected to be used as pedestrian thoroughfares. The south-easterly winds tend to prevail during the afternoons of summer and spring, with possible benefits in terms of natural ventilation.

However, the open stretch of the railway corridor and the long line of building blocks along the southern boundary can result in funnelling effects between some of the taller components of the development, particularly at the east and west sides of the U-shaped blocks at the western end (12, 8 and 5 level buildings). The proposed 5-level linkages in these U-shaped buildings are important in protecting the pocket parks areas such that wind condition are expected to be suitable for stationary activities.

Dense tree planting should be provided at the southern boundary between the two 8-level components and adjacent to the 12-level components at the western part of the site.

The interaction of the southerly winds with the 16-level component at the eastern end of the site can potentially result in adverse wind effects around the eastern and western sides of that building. This wind effect can be ameliorated by incorporating a strategic planting scheme in the area, with 5m tall trees. Other treatments such as awnings and podiums could also be considered.

5.3 Westerly Winds

It is not expected that westerly winds will cause adverse winds within the site. Downwash and sidestream effects are likely to be significant from the westernmost 12 storey building and possibly the 16 storey building (depending on the final form of that building).
The use of strategic tree planting will help to mitigate these likely adverse wind effects at these locations.

6.0 Conclusions

An analysis of the wind environment impact with respect to the principal wind directions for Sydney has been completed for the North Eveleigh Concept Plan.

The conclusions of this report are drawn from our extensive experience in this field and are based on an examination of the North Eveleigh Concept Plan, dated March 2008. No wind tunnel tests have been undertaken for the subject development. As such, this report addresses only the general wind effects and any localised effects that are identifiable by visual inspection. Any recommendations in this report are made only in-principle and are based on our extensive experience in the study of wind environment effects.

The results of this study indicate that the site is generally exposed to southerly winds. It is recommended that 5m tall trees be planted within two southern thoroughfare corridors at the west end of the site, as well as around the base of the proposed 16-storey development. Awnings and podiums could also be considered.

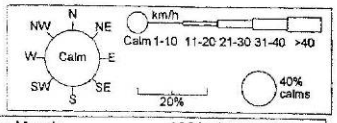
It is recommended that an updated/possibly more detailed analysis be carried at the project application phase, once the detailed design and building form of the development has been finalised. This should include a wind tunnel study on the area surrounding the eastern 16-storey residential tower.

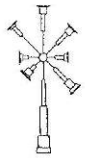
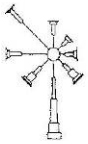
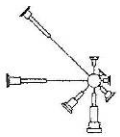
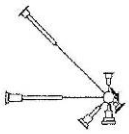
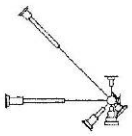
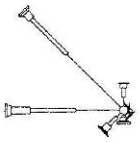
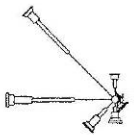
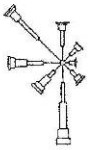
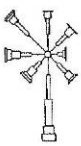
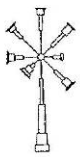
Appendix

Wind Roses for Sydney Airport
1939-2000

Wind Roses using available data between 1939 and 2000 for SYDNEY AIRPORT AMO

Site Number 066037 • Locality: SYDNEY AIRPORT • Opened Jan 1929 • Still Open
Latitude 33°56'28"S • Longitude 151°10'21"E • Elevation 6m



9 am January 1933 observations	9 am February 1755 observations	9 am March 1922 observations
		
9 am April 1834 observations	**9 am May 1866 observations**	**9 am June 1806 observations**
		
9 am July 1873 observations	**9 am August 1876 observations**	**9 am September 1814 observations**
		
9 am October 1901 observations	**9 am November 1835 observations**	**9 am December 1906 observations**
		

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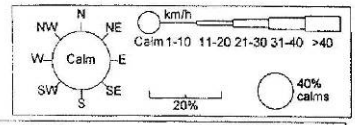

3 pm January 1939 observations	3 pm February 1771 observations	3 pm March 1925 observations
3 pm April 1832 observations	3 pm May 1877 observations	3 pm June 1821 observations
3 pm July 1882 observations	3 pm August 1882 observations	3 pm September 1811 observations
3 pm October 1904 observations	3 pm November 1839 observations	3 pm December 1906 observations