



Pedestrian Wind Environment Statement

for the Concept Plan(Preferred Project)
located at

60 Charlotte Street, Clemton Park

April 21, 2009

Report Reference

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1.0 Introduction

This report is in relation to the proposed Concept Plan of 60 Charlotte Street, Clemton Park. This report presents an opinion on the likely impact of proposed design on the wind environment within and around the various outdoor areas of the site.

The effect of wind activity within and around the proposal is examined for the three predominant wind directions for Sydney; 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.

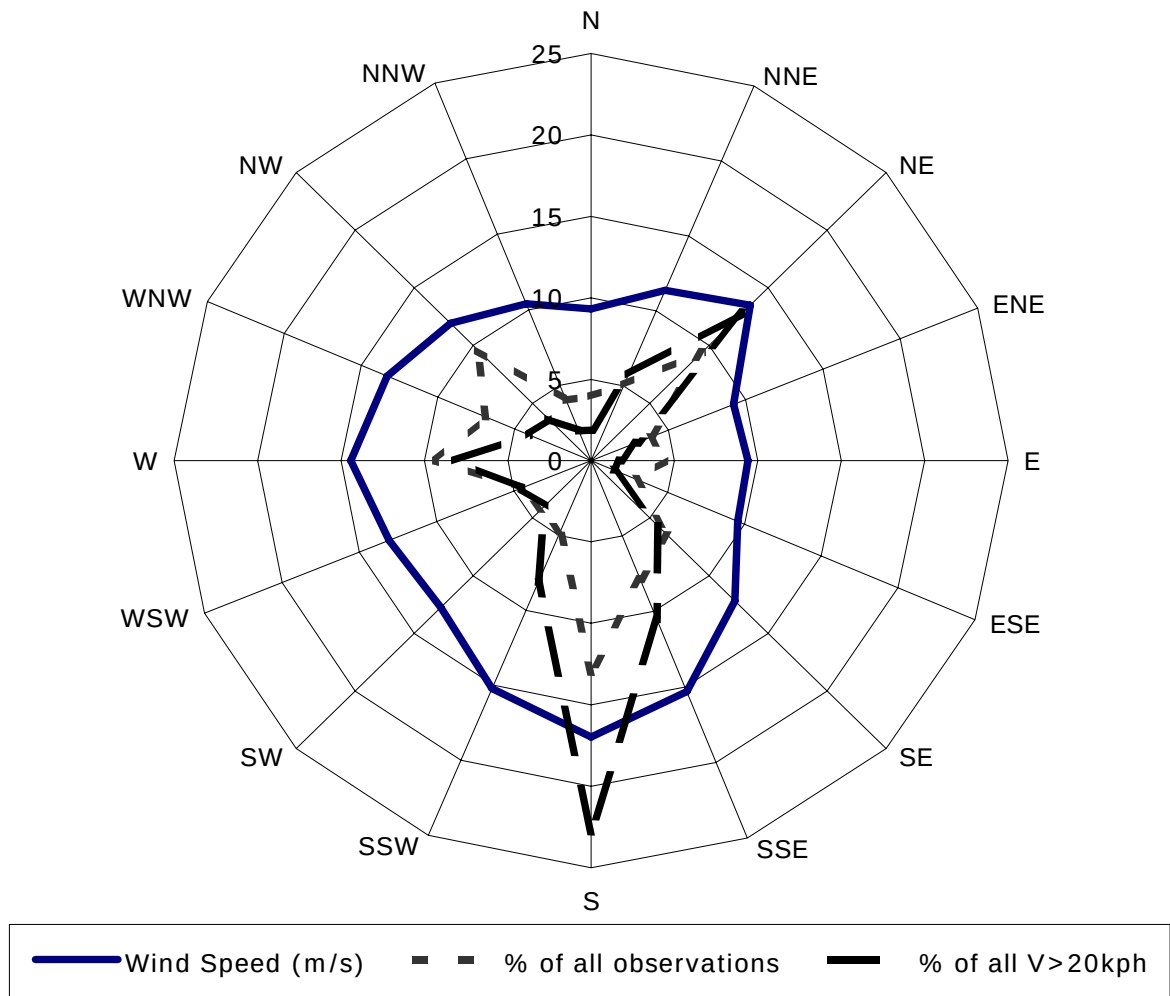
The conclusions of this report are drawn from our extensive experience in this field and are based on an examination of the architectural drawings prepared by Marchese and Partners International, dated August, 2008 and updated April 2009. No wind tunnel tests have been undertaken for the subject development. 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.

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.

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 Concept Plan consists of 5 development allotments which range in height from 3 to 8 levels. The development allotments have the following uses and approximate floor heights:

- Lot 1 – Bulk goods retail and commercial, 5 levels,
- Lot 3 – Residential units, 4 levels,
- Lot 2 – Residential units, retails shops and supermarket, 7-8 levels
- Lot 5 – Seniors living and care, 6 levels
- Lot 4 – Residential townhouses, 3 levels.

Several roads run through the site to provide vehicular access to all of the buildings. Foot paths run adjacent to the roads. Several grassed areas adjoin the buildings, notably in the centre of the development. Foot paths also run through these grassed areas. Vegetation is proposed in the grounds of the development. Figure 2 is a shows the site layout of the proposed Concept Plan.

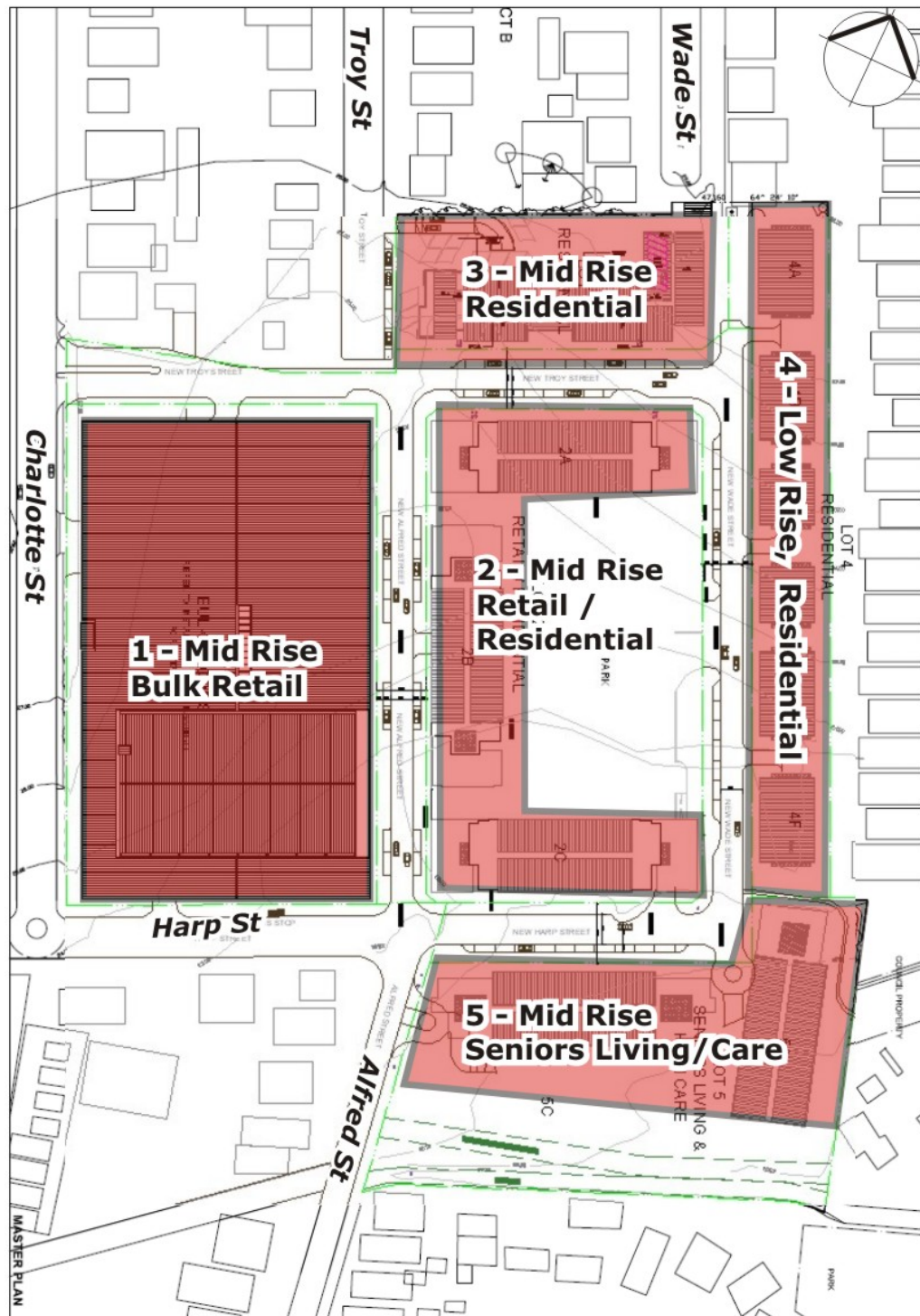


Figure 2: Site Plan showing Allotments 1 to 5

5.0 Site Analysis

The site is located on the eastern side of Charlotte Street, near the intersection of Charlotte Street and Harp Street, Clemton Park. An aerial photograph of the site is presented in Figure 3. The site is located near Canterbury Road and Kingsgrove Road.

Upstream buildings in all directions are in the form of low-rise buildings. Immediately surrounding the site from the west, through north, to the south are low-rise residential buildings. To the south-west are light industrial buildings. There is a park located to the east of the south-east corner of the site. Further away from the site to the west and south-west are many light industrial buildings.

The site slopes down from the north-west to south-east, this leaves the site relatively exposed to southerly winds.

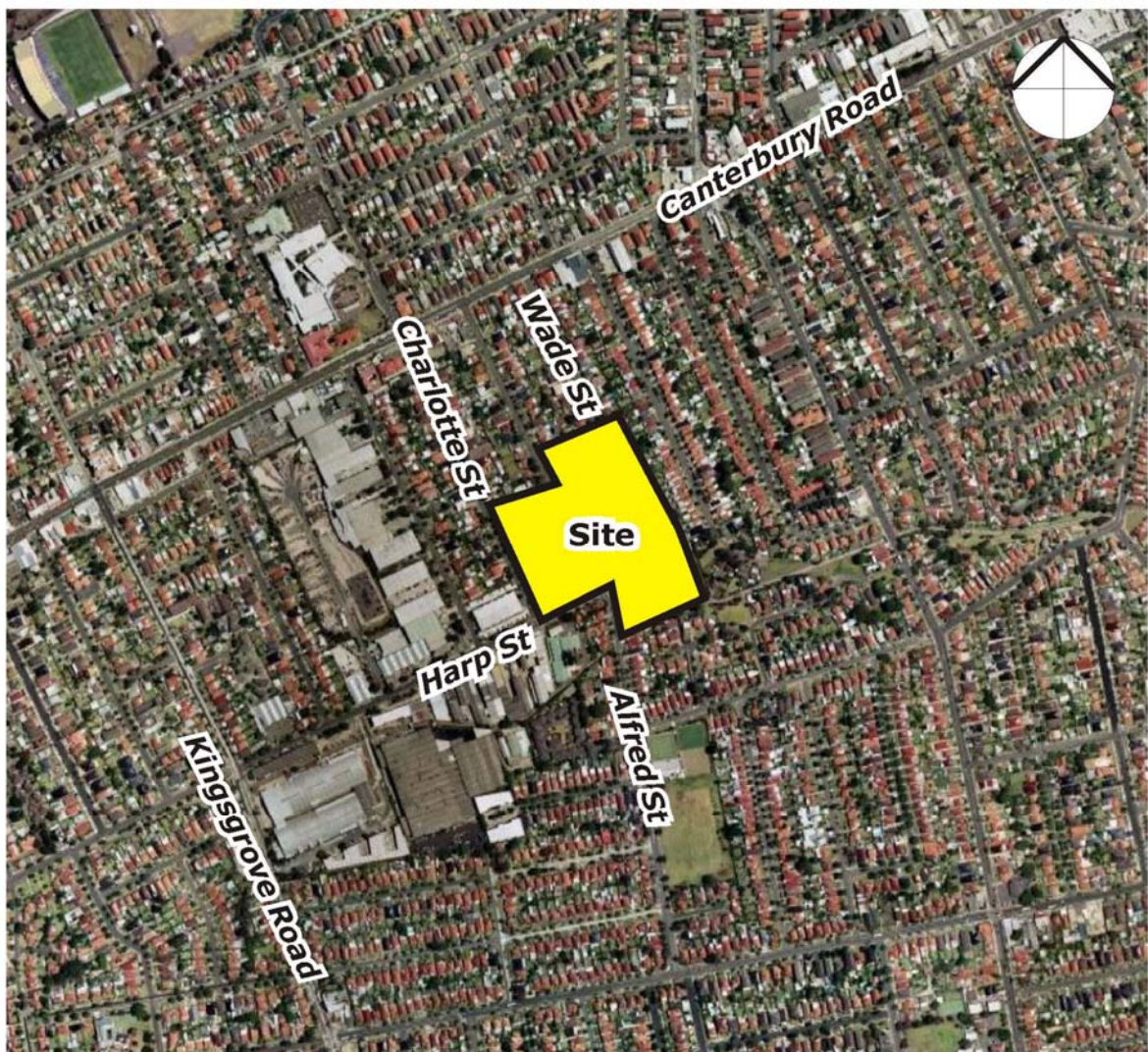


Figure 3: Aerial Image of the Proposed Development Site

6.0 Results

For each of the three predominant wind directions, the interaction between the wind and the building morphology in the area was considered. Wind conditions are assessed for the various outdoor spaces within and around the site, including the neighbouring properties. 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.

6.1 North-Easterly Winds

The ground level pedestrian access areas within the site are generally shielded from north-easterly winds by the proposed buildings that form Allotment 4 as well as the upstream buildings located north-east of the site.

The north-eastern corner of the Allotment 3 residential buildings may be subject to adverse wind conditions. With the inclusion of several densely foliating trees, as shown in Figure 4, it is expected that the wind conditions in this area will be suitable for its intended use. The ground level area along the eastern aspect of the eastern component of the Allotment 5 buildings may be subject to adverse wind conditions. With the inclusion of a row of densely foliating trees, as shown in Figure 4, it is expected that the wind conditions in this area will be suitable for its intended use.

The north-eastern corners of several of the buildings will be exposed to the north-easterly wind. If balconies are to be located on these corners, it is expected that they will be suitable for their intended use with the use of impermeable balustrades. If balconies are to be located on the easterly aspect of the easterly building of Allotment 5, then it is expected that they will be suitable for their intended use with the use of impermeable balustrades as shown in Figure 5.

It is not expected that the proposed Concept Plan will have any adverse effects to the wind conditions in the local surrounding streets and pedestrian footpaths.

6.2 Southerly Winds

The ground level pedestrian access areas within the site are generally shielded from southerly winds by the proposed buildings.

The south-western corner of the southerly Allotment 2 building, the south-western corner of the westerly Allotment 5 building and the south-western and south-eastern corner of the bulk goods building may be subject to adverse wind conditions. With the inclusion of several densely foliating trees, as shown in Figure 4, it is expected that the wind conditions in these areas will be suitable for their intended use. The open areas within Allotment 5 may be subjected to southerly winds, with the inclusion of several densely foliating trees to the south of the open areas, it is expected that the wind conditions in these areas will be suitable for their intended use.

The south-east and south-west corners of several of the buildings will be exposed to the southerly winds. If balconies are to be located on these corners, it is expected that they will be suitable for their intended use with the use of impermeable balustrades. If balconies are to be located on the southerly aspect of the westerly building of Allotment 5, or the southern or western aspect of the bulk goods building, then it is expected that they will be suitable for their intended use with the use of impermeable balustrades as shown in Figure 5.

With the effect of the recommended minimum planting, it is not expected that the proposed Concept Plan will have any adverse effects to the wind conditions in the local surrounding streets, pedestrian footpaths or neighbouring properties.

6.3 Westerly Winds

The ground level pedestrian access areas within the site are generally shielded from westerly winds by the proposed buildings and the adjacent buildings to the west of the site.

The north-western corner of the bulky goods building and the north-western corner of the northerly building within Allotment 2 may be subject to adverse wind conditions due to sidestream effects. With the inclusion of several densely foliating trees, as shown in Figure 4, it is expected that the wind conditions in these areas will be suitable for their intended use. The open area within Allotment 5 may be subjected to westerly winds, with the inclusion of several densely foliating trees to the west of this area, it is expected that the wind conditions in this area will be suitable for its intended use. Note that for trees to be effective in mitigating the westerly winds, which prevail during the winter months, they should be of an evergreen variety.

The south-west and north-west corners of several of the buildings will be exposed to the westerly wind. If balconies are to be located on these corners, it is expected that they will be suitable for their intended use with the use of impermeable balustrades. If balconies are to be located on the northern or western aspect of the bulk goods building, then it is expected that they will be suitable for their intended use with the use of impermeable balustrades as shown in Figure 5.

With the effect of the recommended minimum planting, it is not expected that the proposed Concept Plan will have any adverse effects to the wind conditions in the local surrounding streets, pedestrian footpaths or neighbouring properties.

 Densely foliating trees, capable of growing to atleast 4m tall with 3m wide canopy

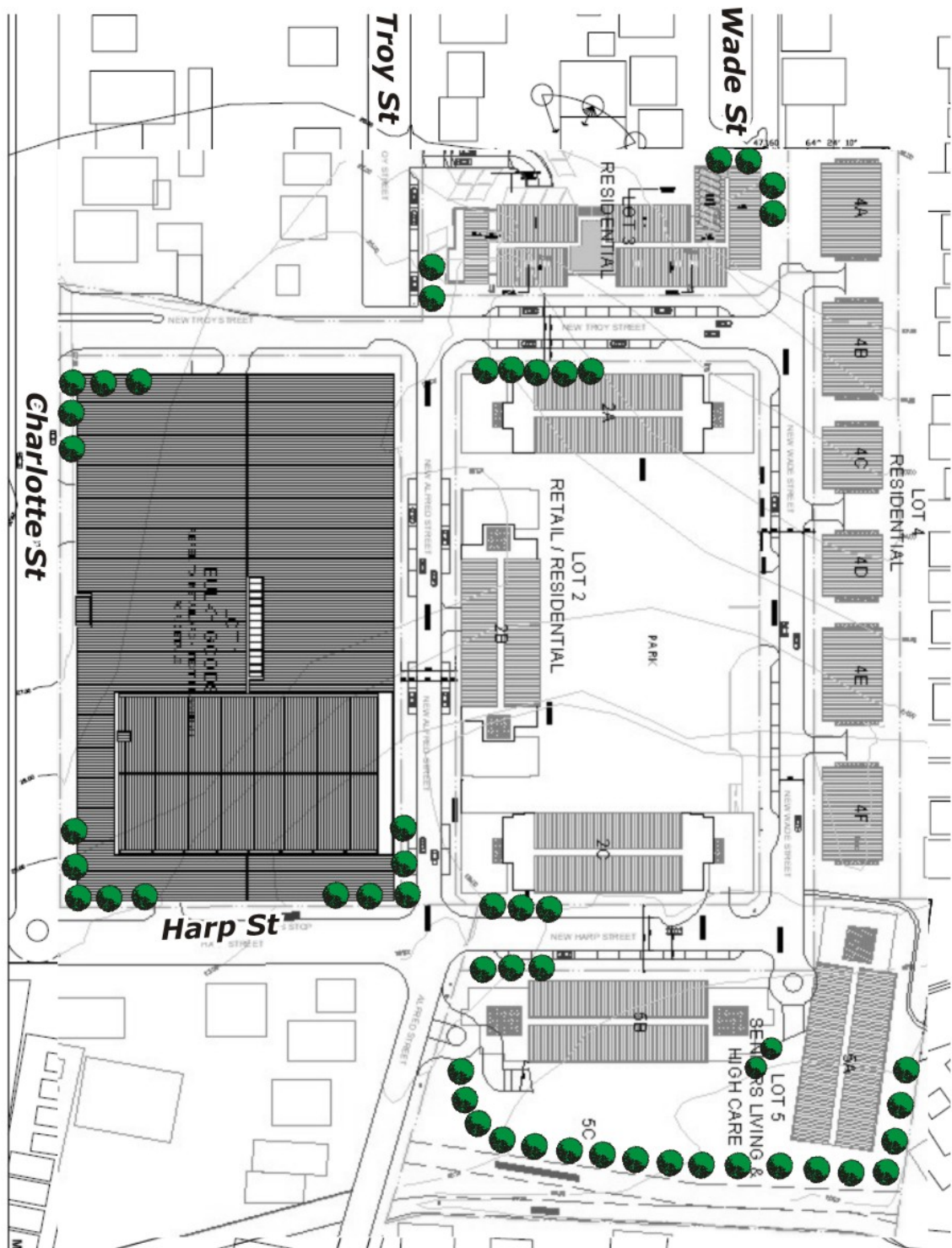


Figure 4: Treatments for Ground Level areas

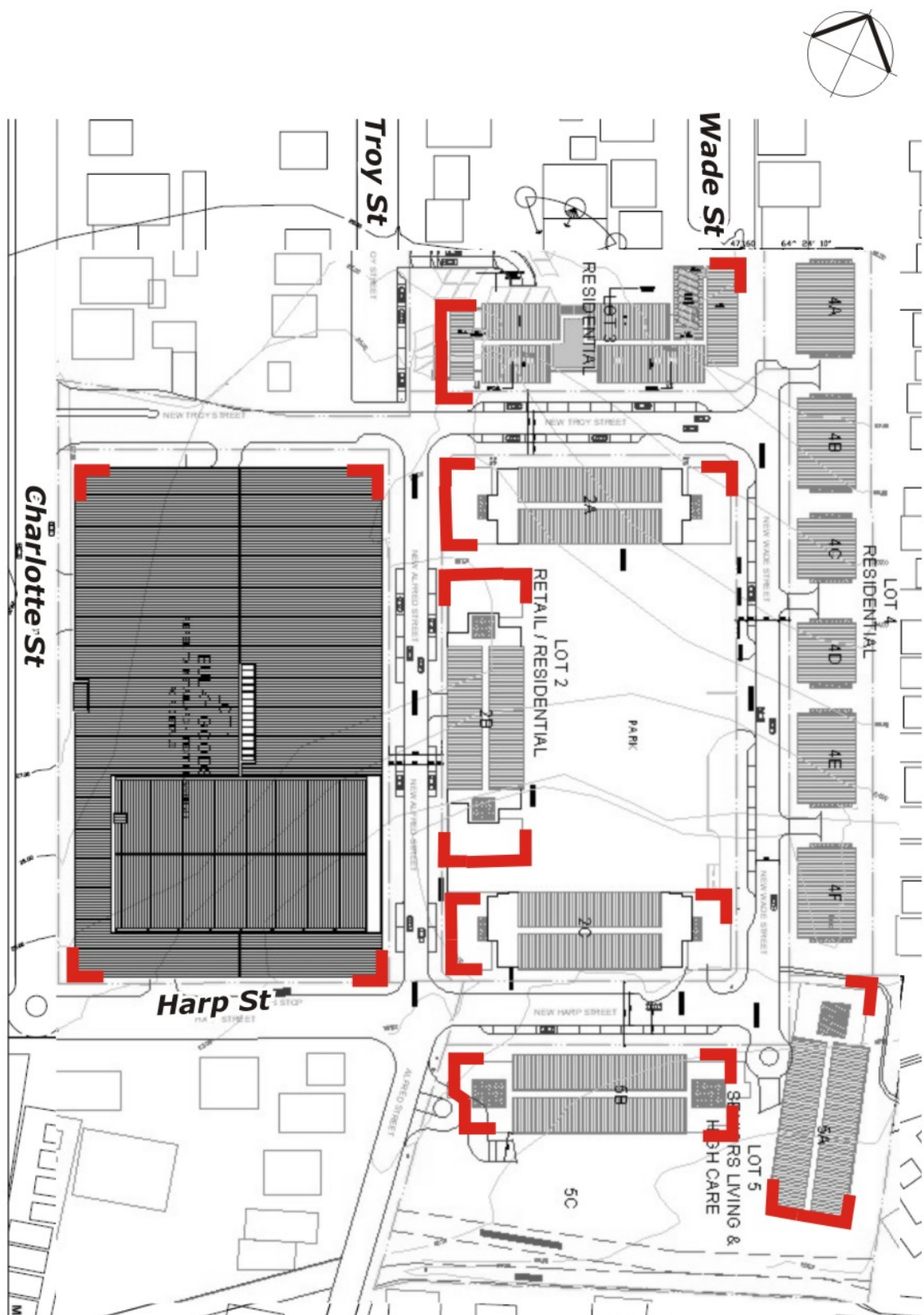


Figure 5: Recommended minimum extent of impermeable balustrades for the upper level balconies

7.0 Conclusions

An analysis of the wind environment impact with respect to the principal wind directions for Sydney has been completed for the proposed Concept Plan located at 60 Charlotte Street, Clemton Park.

The conclusions of this report are drawn from our extensive experience in this field and are based on an examination of the architectural drawings prepared by Marchese + Partners, dated August 2008 and updated April 2009. 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 well shielded from the prevailing winds by the surrounding buildings and the proposed tree layout. It is recommended that the final landscaping plan of the proposed Concept Plan include a tree planting scheme similar to that indicated in the current architectural drawings and highlighted in Figure 4. Note that for trees to be effective in enhancing adverse wind conditions, they should be of a densely foliating variety. If short duration activities (e.g. café seating) is proposed within the site, additional ameliorative treatments may be required.

If balconies are to be included at certain corners of the upper levels in the final development, then the use of impermeable balustrades at those locations is recommended to ensure that wind conditions at these areas will be acceptable for their intended use.

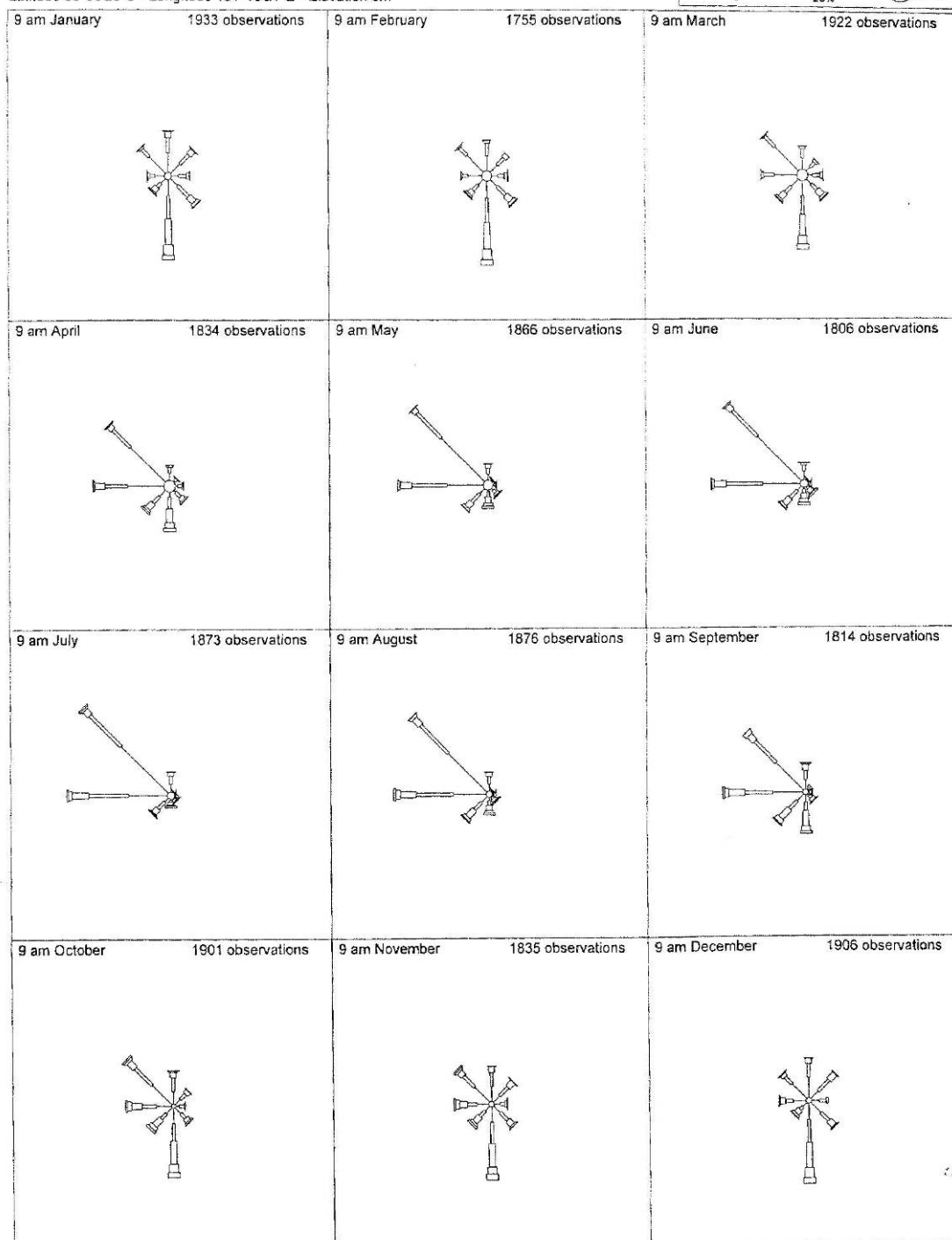
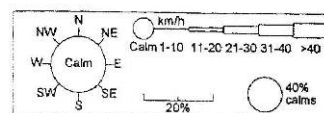
With the effect of the recommended minimum planting, it is not expected that the proposed Concept Plan will have any adverse effects to the wind conditions in the local surrounding streets, pedestrian footpaths or neighbouring properties.

Appendix

Wind Roses for Kingsford Smith (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

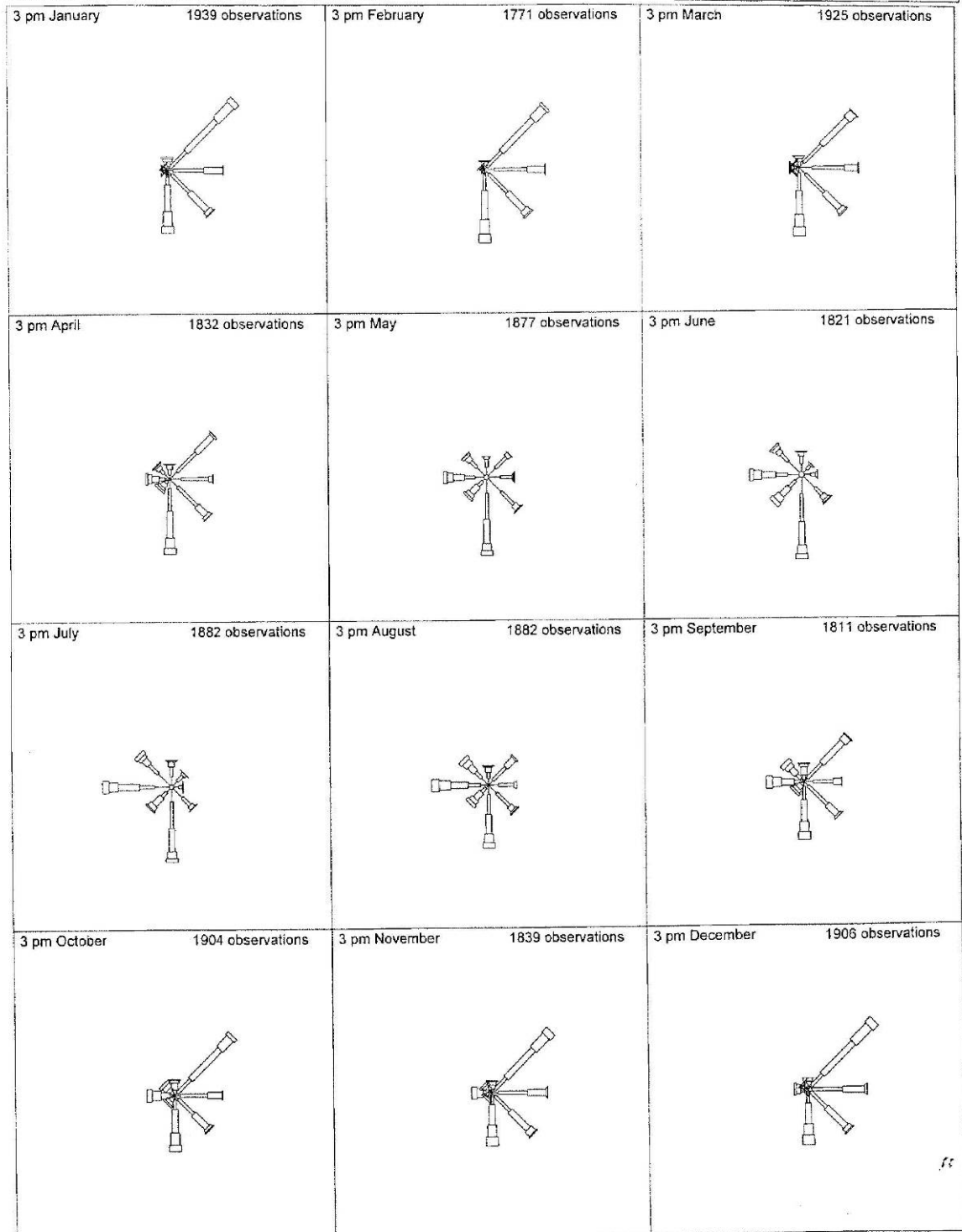
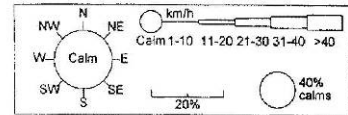


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