



PEDESTRIAN WIND ENVIRONMENT STATEMENT
280-292 LAKEMBA STREET & 62-70 KING GEORGES ROAD,
WILEY PARK

WD673-04F02(REV0)- WS REPORT

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EXECUTIVE SUMMARY

This report presents an opinion on the likely impact of the proposed development located at 280-292 Lakemba Street & 62-70 King Georges Road, Wiley Park on the local wind environment at the critical outdoor areas within and around the subject development. The effect of wind activity is examined for the three predominant wind directions for the Bankstown region; namely the north-easterly, south to south-easterly and westerly winds. The analysis of the wind effects relating to the proposed development 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 latest architectural drawings. No wind tunnel testing was undertaken for the subject development, and hence 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 assessment indicate that the subject building benefits from shielding provided by the subject and neighbouring buildings, and the use of effective wind mitigating features in the building design such as the recessing balconies into the overall building footprint, full-height privacy screens, impermeable balustrades and blade walls. There are however potential impacts on the wind comfort within certain areas of the subject development due to wind effects generated from the interaction of the prevailing winds with the development built-form. It is expected that the wind effects; identified in the report, can be ameliorated and the local wind conditions further enhanced with the consideration of the following treatment strategies into the design of the development:

Ground Level Areas:

- The retention of the proposed awning along the Lakemba Street and King Georges Road frontages of the site as indicated in the architectural drawings.
- The inclusion of the proposed densely foliating street trees along the Lakemba Street and King Georges Road frontages of the site as indicated in the architectural drawings; in particular the street trees around the corners of Buildings 01 and 02.
- The inclusion of the proposed densely foliating trees north-eastern and south-eastern boundaries of the site as indicated in the architectural drawings.
- The inclusion of the proposed densely foliating trees and shrubs/hedge planting within the proposed planter areas along the through-site pedestrian footpath as indicated in the architectural drawings.
- The inclusion of densely foliating vegetation such as trees or shrubs/hedge planting along the entrance walkway from the King Georges Road frontage of the site.

- Restrict areas intended for short duration stationary activities such as outdoor seating, away from the corner areas of the building.

Private Balconies

- Retention of the proposed balustrades, blade walls and full-height privacy screens as indicated in the architectural drawings.
- Consideration of louver screens along of the expose perimeter edges of the upper corner balconies; in particular those along the Lakemba Street frontage and south-western aspects on Levels 5 and above.

Level 7 Communal Outdoor Terraces – Building 02

- Retention of the proposed full-height blade wall between the outdoor terraces and the adjacent private residential balconies.

Rooftop Communal Outdoor Spaces – Buildings 01 and 02

- The inclusion of densely foliating vegetation such as trees or shrubs/hedge planting within the proposed planter areas around the communal outdoor spaces as indicated in the architectural drawings; in particular those along the perimeter edge of the communal outdoor spaces.
- Restrict areas intended for short duration stationary activities such as outdoor seating, away from the corner areas of the building.

Note the densely foliating vegetation is to be of an evergreen species to ensure their effectiveness in wind mitigation throughout the year.

The inclusion of additional wind mitigation elements such as baffle screens, pergolas and densely foliating vegetation such as trees or shrubs/hedge planting within the various outdoor trafficable areas; particularly around areas intended for short duration stationary activities such as within the child play areas, outdoor seating along the pedestrian walkways and communal outdoor spaces etc., is expected to be effective in further enhancing the localised wind conditions. The north-eastern entrance of the through-site link between Building 02 and the King Georges Road entrance of the through-site link between Building 01 are susceptible to accelerating flows and funnelling wind effects, hence these entrances can also benefit from the inclusion of additional wind mitigation elements detailed above.

CONTENTS

1	Introduction	1
2	Description of the Development and Surroundings	2
3	Regional Wind	4
4	Wind Effects on People	5
5	Results and Discussion	6
5.1	Ground Level Areas	6
5.2	Various Private Balconies	7
5.3	Level 7 Communal Outdoor Terraces on Building 02	8
5.4	Rooftop Communal Outdoor Spaces on Buildings 01 and 02	8
6	References	9

1 INTRODUCTION

An opinion on the likely impact of the proposed design on the local wind environment affecting pedestrians within the critical outdoor areas within and around the subject development is presented in this report. The analysis of wind effects relating to the proposed development was carried out in the context of the predominant wind directions for the region, building morphology of the development and nearby buildings, and local land topography. The conclusions of this report are drawn from our extensive experience in the field of wind engineering and studies of wind environment effects.

No wind tunnel testing was undertaken for this assessment. Hence this report addresses only the general wind effects and any localised effects that are identifiable by visual inspection, and any recommendations in this report are made only in-principle.

2 DESCRIPTION OF THE DEVELOPMENT AND SURROUNDINGS

The development site is located at 280-292 Lakemba Street & 62- 70 King Georges Road in Wiley Park. It is bounded by Lakemba Street to the north and King Georges Road to the west, and apartment buildings varying up to four storeys high along the remaining boundaries. Surrounding the site is a six storey high apartment building across the site on Lakemba Street and low-rise residential and commercial buildings along King Georges Road. The development site is located within the residential district of Wiley Park and is predominantly comprised of low-rise residential housing. A survey of the local land topography indicates a general ascent towards the south of the site. An aerial image of the subject site and the local surroundings is shown in Figure 1.

The subject development consists of two mixed-use buildings; Building 01 and 02, with an overall height of eight-storeys above the local ground level. Building 01 is located along the King Georges Road frontage of the site and Building 02 located along the north-western boundary of the site. Retail tenancies and lobby areas are proposed on the ground floor with private residential tenancies on the remaining floors. Vehicular access into the development site is provided off Lakemba Street.

The critical trafficable outdoor areas associated with the proposed development, which are the focus of this assessment with regards to wind effects, are detailed as follows:

- The ground level pedestrian footpath and walkways within and around the development site.
- Residential private balconies throughout the development.
- Communal outdoor terraces on Level 7 of Building 02.
- The rooftop communal outdoor spaces on Buildings 01 and 02.



Figure 1: Aerial Image of the Site Location

3 REGIONAL WIND

The wind climate of the Auburn region has been determined from a detailed analysis undertaken by Windtech Consultants of recorded directional wind speeds obtained at the meteorological station located at Bankstown Airport by the Bureau of Meteorology. The data has been collected from this station from 1993 to 2016 and corrected so that it represents winds over standard open terrain at a height of 10m above ground level. Figure 2 shows a summary of this analysis in the form of, a directional plot of the annual and 5% exceedance mean winds for the region. The region is governed by three principal wind directions, and these can potentially affect the subject development. These winds prevail from the north-east, south to south-east and west. The frequency of occurrence of these winds is also shown in Figure 2.

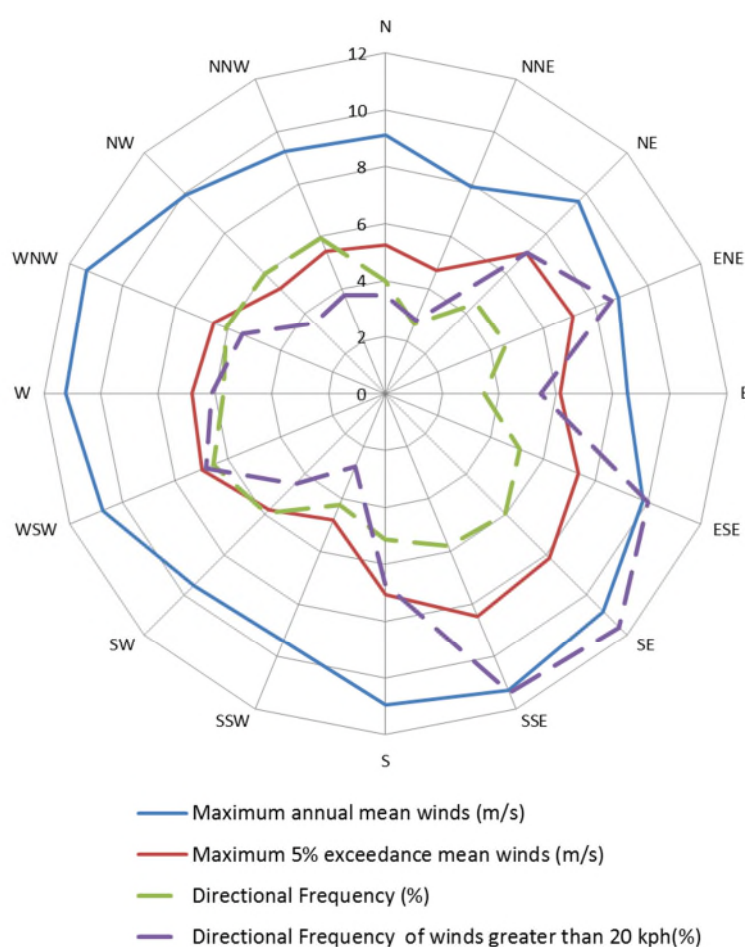


Figure 2: Annual and 5% Recurrence Mean Wind Speeds, and Frequencies of Occurrence, for the Bankstown Airport (Observations from Bankstown Airport from 1993 to 2016, corrected to open terrain at 10m)

4 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. Various other researchers, such as A.G. Davenport, T.V. Lawson, W.H. Melbourne, and A.D. Penwarden, have published criteria for pedestrian comfort for pedestrians in outdoor spaces for various types of activities. Some Councils and Local Government Authorities have adopted elements of some of these into their planning control requirements.

For example, A.D. Penwarden (1973) developed a modified version of the Beaufort scale which describes the effects of various wind intensities on people. Table 1 presents the modified Beaufort scale. Note that the effects listed in this table refers to wind conditions occurring frequently over the averaging time (a probability of occurrence exceeding 5%). Higher ranges of wind speeds can be tolerated for rarer events.

Table 1: Summary of Wind Effects on People (A.D. Penwarden, 1973)

Type of Winds	Beaufort Number	Mean Wind Speed (m/s)	Effects
Calm	0	Less than 0.3	Negligible.
Calm, light air	1	0.3 – 1.6	No noticeable wind.
Light breeze	2	1.6 – 3.4	Wind felt on face.
Gentle breeze	3	3.4 – 5.5	Hair is disturbed, clothing flaps, newspapers difficult to read.
Moderate breeze	4	5.5 – 8.0	Raises dust, dry soil and loose paper, hair disarranged.
Fresh breeze	5	8.0 – 10.8	Force of wind felt on body, danger of stumbling
Strong breeze	6	10.8 – 13.9	Umbrellas used with difficulty, hair blown straight, difficult to walk steadily, wind noise on ears unpleasant.
Near gale	7	13.9 – 17.2	Inconvenience felt when walking.
Gale	8	17.2 – 20.8	Generally impedes progress, difficulty balancing in gusts.
Strong gale	9	Greater than 20.8	People blown over.

It should be noted that wind speeds can only be accurately quantified with a wind tunnel study. This assessment addresses only the general wind effects and any localised effects that are identifiable by visual inspection and the acceptability of the conditions for outdoor areas are determined based on their intended use. Any recommendations in this report are made only in-principle and are based on our extensive experience in the study of wind environment effects.

5 RESULTS AND DISCUSSION

The expected wind conditions are discussed in the following sub-sections of this report for the various outdoor areas within and around the subject development. The interaction between the wind and the building morphology in the area is considered and important features taken into account including the distances between the surrounding buildings and the proposed building form, as well as the surrounding landform. Note that only the potentially critical wind effects are discussed in this report.

The desktop assessment of the local wind conditions is based on internationally recognised wind criteria for comfort; according to the intended use and typical activities of the trafficable area. The recommended criterion for wind conditions within pedestrian circulation; along the footpaths, and private balcony areas is 7.5m/s with a 5% probability of exceedance. The outdoor trafficable areas with short duration stationary activities; such as the communal open space and outdoor seating areas, are to satisfy a more stringent comfort criterion of 5.5m/s with a 5% probability of exceedance. Although this assessment is of a qualitative nature, the abovementioned criteria are considered when assessing the wind environment impacts.

5.1 Ground Level Areas

The various pedestrian footpaths and walkways within and around the site is expected to benefit from the shielding provided by the subject and neighbouring buildings, however it is potentially exposed to a number of wind effects due to the interaction of the prevailing winds with the development built-form. These are summarised as follows:

- Direct wind effects as it travels along King Georges Road due to the road's alignment with the prevailing southerly to south-easterly wind directions. It should be noted that this is an existing wind condition for the site.
- Side-stream wind effects along the building façade of the Building 01 as the prevailing southerly to south-easterly wind directions travel along King Georges Road.
- Accelerating flows around the corners of the buildings; in particular along the proposed entrance walkways between Buildings 01 and 02 from Lakemba Street and King Georges Road and those at the corner intersection of Lakemba Street and King Georges Road.
- Funnelling wind effects between Buildings 01 and 02 along the various pedestrian thoroughfares within the development site.

The following treatment strategies are expected to be effective in mitigating the abovementioned potential wind effects and enhance the local wind conditions along the various pedestrian footpaths within and around the site, hence they are recommended to be considered in the design of the development:

- The retention of the proposed awning along the Lakemba Street and King Georges Road frontages of the site as indicated in the architectural drawings.
- The inclusion of the proposed densely foliating street trees along the Lakemba Street and King Georges Road frontages of the site as indicated in the architectural drawings; in particular the street trees around the corners of Buildings 01 and 02.
- The inclusion of the proposed densely foliating trees north-eastern and south-eastern boundaries of the site as indicated in the architectural drawings.
- The inclusion of the proposed densely foliating trees and shrubs/hedge planting within the proposed planter areas along the through-site pedestrian footpath as indicated in the architectural drawings.
- The inclusion of densely foliating vegetation such as trees or shrubs/hedge planting along the entrance walkway from the King Georges Road frontage of the site.
- Restrict areas intended for short duration stationary activities such as outdoor seating, away from the corner areas of the building.
- The inclusion of localised screening, pergolas or densely foliating vegetation such as trees or shrubs/hedge planting within and around the pedestrian walkways; in particular areas intended for short duration stationary activities such as outdoor seating etc. The north-eastern entrance of the through-site link between Building 02 and the King Georges Road entrance of the through-site link between Building 01 are susceptible to accelerating flows and funnelling wind effects, hence these entrances can also benefit from the inclusion of additional wind mitigation elements detailed above.

Note the densely foliating vegetation is to be of an evergreen species to ensure their effectiveness in wind mitigation throughout the year.

5.2 Various Private Balconies

The wind conditions within the majority of the private/commercial balconies are expected to be acceptable for its intended uses due to the shielding provided by the neighbouring building to the west and the effective use of wind mitigating devices into the design of the development such as recessing the balcony areas into the building footprint and the inclusion of full-height privacy screens, impermeable blade walls and balustrades along the exposed perimeter edges of the balconies as indicated in the architectural drawings. The upper corner balconies on Levels 5 and above; in particular those along the Lakemba Street frontage and south-eastern aspects, are susceptible to stronger wind conditions due to their exposure to accelerating flow effects around the building from the prevailing westerly and southerly directions. The stronger wind conditions are expected to be within acceptable wind criterion and can be further enhanced with the consideration of additional effective wind mitigating devices; such as louver screens along one of the exposed perimeter edges, in the final design of the development.

5.3 Level 7 Communal Outdoor Terraces on Building 02

The wind conditions within the communal outdoor terrace located along the north-eastern boundary of Building 02 are expected to be acceptable for its intended uses due to the shielding provided by the subject building to the prevailing westerly and southerly winds. Furthermore, the proposed blade walls separating the outdoor terraces with the adjacent private balconies is expected to be effective in creating a stagnation zone within the outdoor terraces, thereby ameliorating the direct north-easterly winds. Hence, they are recommended to be retained in the final design of the development.

5.4 Rooftop Communal Outdoor Spaces on Buildings 01 and 02

The rooftop communal outdoor spaces on Buildings 01 and 02 benefits from some form of shielding by the proposed pergolas, staircore/liftcores and restricted plant areas, it is however exposed to direct wind effects from all prevailing wind directions due to the lack of shielding from the surrounding buildings at this elevated level. The following treatment strategies are expected to be effective in mitigating the abovementioned potential wind effects and enhance the local wind conditions within the communal outdoor spaces, hence they are recommended to be considered in the design of the development:

- The inclusion of densely foliating vegetation such as trees or shrubs/hedge planting within the proposed planter areas around the communal outdoor spaces as indicated in the architectural drawings; in particular those along the perimeter edge of the communal outdoor spaces.
- The inclusion of localised screening, pergolas or densely foliating vegetation such as trees or shrubs/hedge planting within and around the communal outdoor spaces; in particular areas intended for short duration stationary activities such as child play areas and outdoor seating etc.
- Restrict areas intended for short duration stationary activities such as outdoor seating, away from the corner areas of the building.

Note the densely foliating vegetation is to be of an evergreen species to ensure their effectiveness in wind mitigation throughout the year.

6 REFERENCES

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