WINDTECH

PEDESTRIAN WIND ENVIRONMENT STATEMENT

BLOCK 20A, EDMONDSON PARK

WK098-01F02(REV2)- WS REPORT

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Prepared for:

Landcom

Parramatta Riverbank Corporate Park Centre, Level 14, 60 Station Street, Parramatta

AT THE LEADING EDGE

WINDTECH CONSULTANTS
www.windtechconsult.com
reception@windtechglobal.com

Sydney | Singapore | London | Melbourne | Mumbai | New York | Hong Kong | Dubai | Miami | Toronto

DOCUMENT CONTROL

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EXECUTIVE SUMMARY

This report presents an opinion on the likely impact of the Block 20a development, located on Buchan Avenue and McDonald Road in Edmondson Park NSW, on the local wind environment at the critical outdoor areas within and around the subject site. The effect of wind activity has been examined for the three predominant wind directions for the region, namely the north-easterly, south-easterly and westerly winds. The analysis of the wind effects relating to the proposed development have been 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 has been 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 of the architectural drawings provided (received 3rd March 2026). 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 development has incorporated several design features and wind mitigating strategies and is expected to be suitable for the intended use for the majority of the outdoor trafficable areas. However, there are some areas that are likely to be exposed to stronger winds. It is expected that the wind effects identified in the report can be ameliorated with the consideration of the following treatment strategies into the design of the development:

- Ground level trafficable areas:
    - Inclusion of densely foliating vegetation such as trees or shrubs/hedge planting within the proposed landscape areas along the various street frontages of the site. In particular around the corner areas of the development and around areas intended for short duration stationary activities such as outdoor seating or main entranceways.
    - Note the densely foliating vegetation along the MacDonald Road and Buchan Avenue frontages of the site are to be of an evergreen species to ensure their effectiveness in wind mitigation throughout the year.
- Podium Rooftop Communal Open Space:
    - Inclusion of the proposed 1.5m high impermeable screen along the northern MacDonald Road frontage of the communal open space as indicated in the architectural drawings.
    - Inclusion of the proposed impermeable and lattice screens at least 1.8m high along the southern future laneway frontage of the communal open space as indicated in the architectural drawings.
    - Inclusion of densely foliating vegetation such as trees or shrubs/hedge planting within the proposed landscape areas of the communal open space. In particular around the corner areas of the development and around areas intended for short duration stationary activities such as outdoor seating.

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

- Private Balconies:

  - Inclusion of the proposed balustrades, full-height impermeable intertenancy screens, and full-height lattice end screens along the perimeter edge of the balconies as indicated in the architectural drawings. In particular the full-height lattice end screens along the south-western private balconies on Tower B.

  - Consider the inclusion of full-height impermeable or lattice end screens along one of the exposed perimeter edges of the northern and western corner private balconies facing MacDonald Road and Buchan Avenue on both Towers.

With the inclusion of the abovementioned recommendations in the final design, it is expected that wind conditions for the various trafficable outdoor areas within and around the development will be suitable for their intended uses, and that the wind speeds will satisfy the applicable criteria for pedestrian comfort and safety. Nonetheless, wind tunnel testing is recommended to be undertaken at a more detailed design to quantitatively assess the wind conditions and to optimise the size and extent of the treatments required.

CONTENTS

1 INTRODUCTION

This Pedestrian Wind Environment Statement Report accompanies an Environmental Impact Statement (EIS) pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), in support of a State Significant Development Application (SSDA) for the construction of the proposed mixed-use building, reference SSD-99909708.

This report addresses the Secretary's Environmental Assessment Requirements (SEARs) issued for the project, notably as indicated in Table 1:

Table 1: SEARs Requirement Section of Report where response is provided

SEARs Requirement Section of Report where response is provided.	
SEARs Section 7 – Environmental Amenity	Section 5

An opinion on the likely impact of the propsoed 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 has been 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 has been 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 DEVELOPMENT AND SURROUNDINGS

The site is located within a developing multi-residential precinct of Edmonson Park that is currently bounded by Buchan Avenue to the south-west, a proposed Future MacDonald Road extension to the north, a future laneway to the south-east and the future medium-rise development of Block 20b to the east. Surrounding the site are predominantly vacant lots that will be redeveloped into mixed use buildings varying up to 20 storeys in height. Furthermore, adjacent to the northern boundary of the site is the dense bushland of Maxwells Creek.

A survey of the land topography indicates a gradual rise in elevation towards the south. An aerial image of the subject site and the local surroundings is shown in Figure 1, with the frequency and magnitude of the prevailing winds is superimposed for each wind direction.

The existing site consists of a vacant lot, that will be redeveloped into a dual tower residential development sharing a common podium with varying overall height of nine to fifteen storeys above their local ground level.

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

- Ground Level areas and pedestrian footpath.
- Communal Open Space located on the podium rooftop.
- Private balconies.

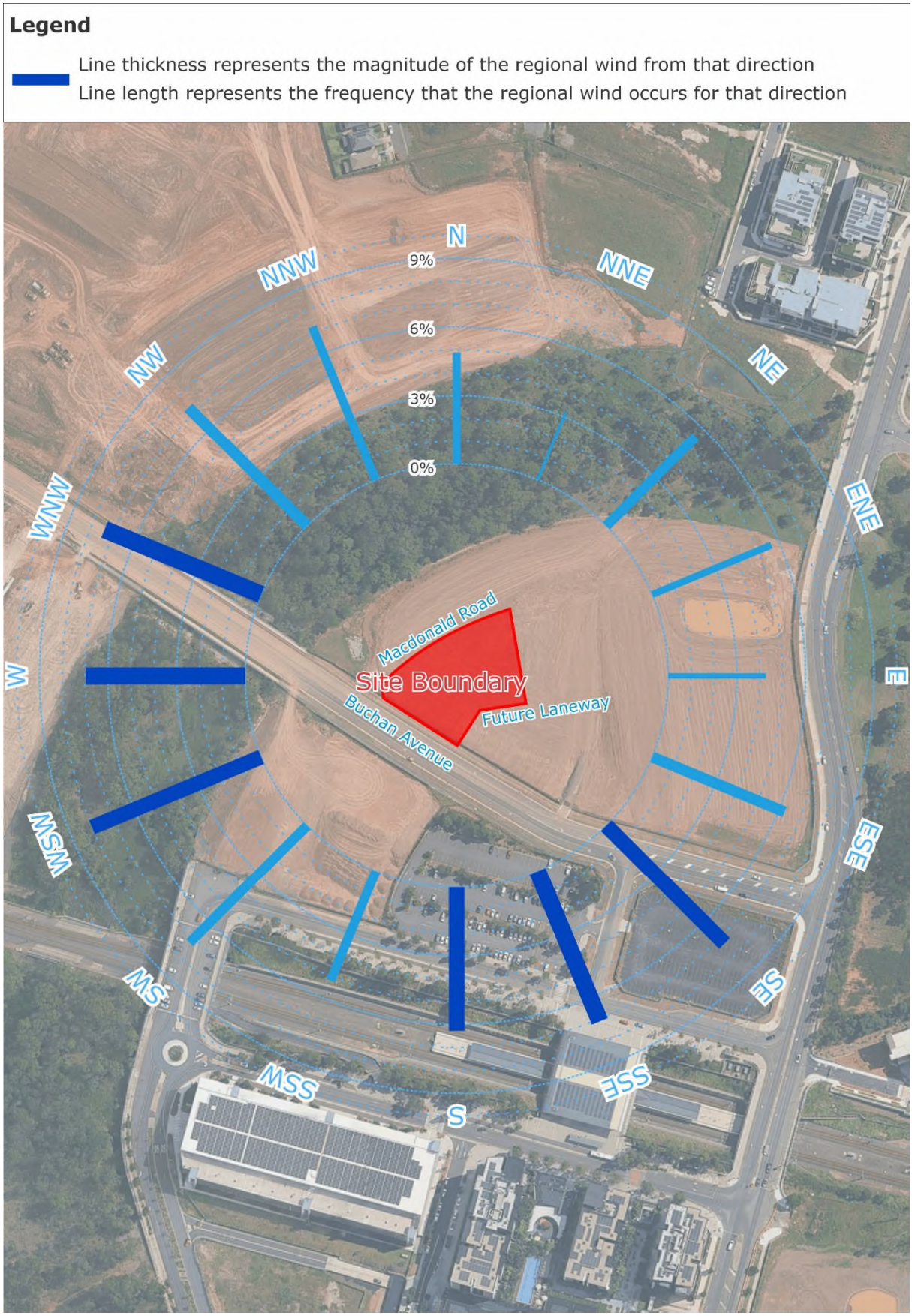

Figure 1: Aerial Image of the Site Location and Prevailing Wind Directions

3 REGIONAL WIND

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

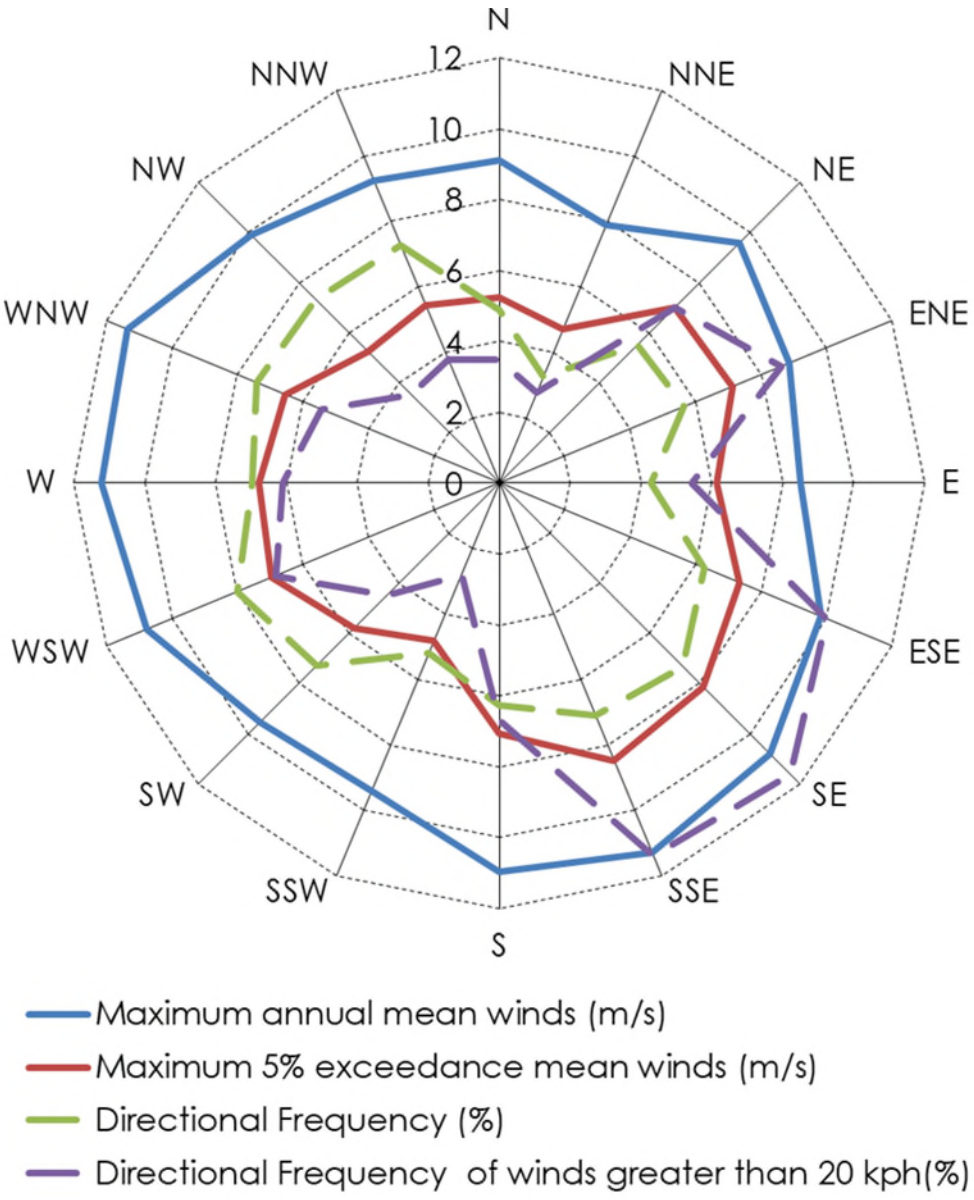

Figure 2: Directional Annual and 5% Exceedance Hourly Mean Wind Speeds (referenced to 10m height in standard open terrain), and Frequencies of Occurrence, for the Edmondson Park Region

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 2 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 2: 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 affecting this particular development 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 affecting the development 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. A glossary of the different wind effects described in this report is included in Appendix A.

For this assessment, the wind speed criteria for pedestrian comfort that are considered are listed as follows:

- Walking Criterion (8m/s with a 5% probability of exceedance)
  for general circulation and pedestrian thoroughfares, e.g. footpaths, private balconies/terraces, through-site links etc.

- Standing (Short Exposure) Criterion (6m/s with a 5% probability of exceedance)
  for stationary activities generally less than an hour, e.g. waiting areas, communal terraces, main entries, café seating etc.

- Sitting (Long Exposure) (4m/s with a 5% probability of exceedance)
  for stationary activities longer than an hour, e.g. outdoor cinemas, outdoor fine dining etc.

Note that the above wind comfort levels are derived from the Lawson (1975) criteria. Although this assessment is qualitative in nature, the above-mentioned criteria for pedestrian comfort are considered when assessing the wind environment impacts. However, all areas are also assessed with consideration to a pedestrian safety criterion of 23m/s for the annual maximum gust.

5.1 Ground Level Areas

The pedestrian footpaths surrounding the site benefits from the shielding provided by the building-form of the development. Down-washing wind effects onto the pedestrian footpaths off the tower facade are expected to be minimal due to relative setback of the tower from the footpaths and the towers' narrow projection to the prevailing winds for the region. Furthermore, the future buildings surrounding the site are also expected to be effective in providing further shielding once constructed. Similarly, the dense vegetation within Maxwell's Creek can provide some form of wind mitigation to the prevailing westerly and north-easterly winds, however the pedestrian footpath along MacDonald Road and Buchan Avenue frontages there may be susceptible to reattachment flows due to the relatively large distance between Maxwell's Creek and the footpaths. A review of the architectural drawings indicate that densely foliating trees are proposed along all these street frontages of the development site. These trees are expected to be effective in providing wind amelioration to the potential reattachment flows and enhancing the local wind conditions along the pedestrian footpaths. Hence, they are recommended to be included in the final design. Furthermore, the densely foliating vegetation along the Macdonald Road and Buchan Avenue frontages of the site are to be of an evergreen species to ensure their effectiveness in wind mitigation throughout the year.

Similarly, the inclusion of densely foliating vegetation in the form of trees or shrubs/hedge planting within the remaining frontages of the site are expected to be effective in wind mitigation and enhancing the local wind conditions, in particular those around the corner areas of the development and around areas intended for short duration stationary activities such as outdoor seating or main entranceways. Hence, they are recommended to be included in the final design.

5.2 Podium Rooftop Communal Open Space

The central Communal Open Space benefits from the shielding provided by the two tower components of the development to direct wind effects from the prevailing north-easterly and south-easterly winds. Furthermore, the future developments to the east and south of the site will provide additional shielding once constructed. The communal open space is however susceptible to winds travelling over the adjacent Maxwells Creek, in particular from the prevailing westerly direction. The communal open space may also be susceptible to accelerating flows around the corners of the tower and funnelling wind effects as the incident wind travels between the two towers. A review of the architectural drawings indicate 1.5m high impermeable screens are proposed along the Macdonald Road frontage of the communal open space. Similarly impermeable and lattice screens at least 1.8m high are proposed along the southern future laneway frontage of the site. These screens are expected to be effective in wind mitigation and enhancing the local wind conditions, in particular the outdoor trafficable areas along the perimeter of the communal open space. Hence, they are recommended to be included in the final design. Due to the relatively large area of the communal open space, the central areas may be exposed to reattachment flows as the wind travels over the proposed screens. It is expected the inclusion of densely foliating vegetation such as trees or shrubs/hedge planting within the proposed landscape areas of the communal open space to be effective in ameliorating these reattachment flows. In particular around the corner areas of the development and around areas intended for short duration stationary activities such as outdoor seating. Hence it is recommended to be considered within the final design of the development. Note the densely foliating vegetation is to be of an evergreen species to ensure their effectiveness in wind mitigation throughout the year.

5.3 Private Balconies

The majority of the balconies of the development are expected to be suitable for their intended use due to the inclusion of various wind mitigation features such as their overall recessed design, impermeable balustrades, full-height impermeable intertenancy screens, and full-height lattice end screens. These features should be included in the final design.

The northern and western corner private balconies facing Macdonald Road and Buchan Avenue on both towers however may be susceptible to stronger wind conditions due to their exposure to the direct prevailing westerly winds and accelerating flows around the corners of the towers. It is expected the wind conditions within these private balconies can be enhanced with the inclusion of full-height impermeable or lattice screens along one of the exposed perimeter edges of the balconies, similar to the screens proposed on the south-western private corner balcony on Tower B as indicated in the architectural drawings and to at least two-thirds of the exposed perimeter edge length.

5.4 Conclusion

The results of this assessment indicate that the development has incorporated several design features and wind mitigating strategies and is expected to be suitable for the intended use for the majority of the outdoor trafficable areas. However, there are some areas that are likely to be exposed to stronger winds. It is expected that the wind effects identified in the report can be ameliorated with the consideration of the following treatment strategies into the design of the development:

- Ground level trafficable areas:
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    - Inclusion of densely foliating vegetation such as trees or shrubs/hedge planting within the proposed landscape areas of the communal open space. In particular around the corner areas of the development and around areas intended for short duration stationary activities such as outdoor seating.
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    - Inclusion of the proposed balustrades, full-height impermeable intertenancy screens, and full-height lattice end screens along the perimeter edge of the balconies as indicated in the architectural drawings. In particular the full-height lattice end screens along the south-western private balconies on Tower B.
    - Consider the inclusion of full-height impermeable or lattice end screens along one of the exposed perimeter edges of the northern and western corner private balconies facing Macdonald Road and Buchan Avenue on both Towers.

With the inclusion of the abovementioned recommendations in the final design, it is expected that wind conditions for the various trafficable outdoor areas within and around the development will be suitable for their

intended uses, and that the wind speeds will satisfy the applicable criteria for pedestrian comfort and safety. Nonetheless, wind tunnel testing is recommended to be undertaken at a more detailed design to quantitatively assess the wind conditions and to optimise the size and extent of the treatments required.

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APPENDIX A WIND EFFECTS GLOSSARY

A.1 Downwash and Upwash Effects

The downwash wind effect occurs when wind is deflected down the windward face of a building, causing accelerated winds at pedestrian level. This can lead to other adverse effects as corner acceleration as the wind attempts to flow around the building, as seen in Figure A.1.

This can also lead to recirculating flow in the presence of a shorter upstream building, causing local ground level winds to move back into the prevailing wind.

The upwash effect occurs near upper level edge of a building form as the wind flows over the top of the building. This has the potential to cause acceleration of winds near the leading edge, as well as potentially reattaching onto the roof area. This effect causes wind issues particularly near the leading edges of tall building and on the rooftop areas if there is sufficient depth along the wind direction. Upwash is more apparent in taller towers and podia.

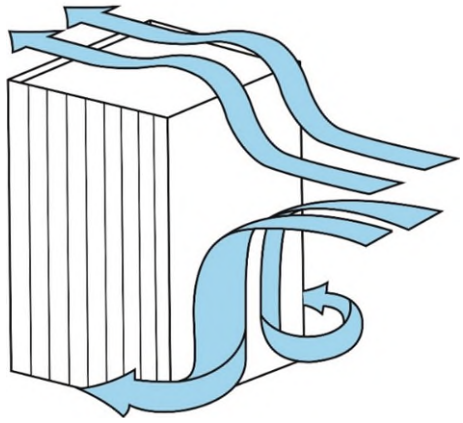

Figure A.1: Downwash Leading to Corner Wind Effect, and Upwash Effects

A.2 Funnelling/Venturi Effect

Funnelling occurs when the wind interacts with two or more buildings which are located adjacent to each other, which results in a bottleneck, as shown in Figure A.2. This causes the wind to be accelerated through the gap between the buildings, resulting in adverse wind conditions and pedestrian discomfort within the constricted space. Funnelling effects are common along pedestrian links and thoroughfares generally located between neighbouring buildings that have moderate gaps between them.

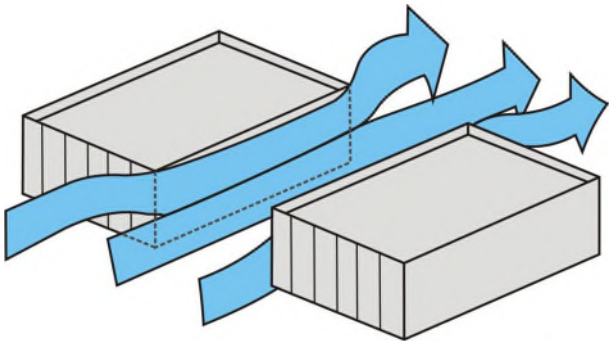

Figure A.2: Funnelling/Venturi Wind Effect

A.3 Gap Effect

The gap effect occurs in small openings in the façade that are open to wind on opposite faces, as seen in Figure A.3. This can involve a combination of funnelling and downwash effects. Presenting a small gap in the façade on the windward aspect as the easiest means through which the wind can flow through can result in wind acceleration through this gap. The pressure difference between the windward façade and the leeward façade also tends to exacerbate the wind flow through this gap.

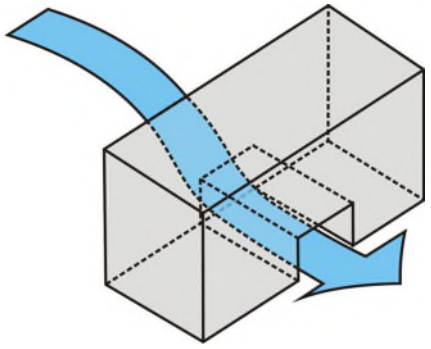

Figure A.3: Gap Wind Effect

A.4 Sidestream and Corner Effects

The sidestream effect is due to a gradual accumulation of wind shearing along the building façade that eventuates in an acceleration corner effect. The flow is parallel to the façade and can be exacerbated by downwash effects as well, or due to corner effect winds reattaching on the façade.

This is shown in Figure A.4. The corner refers to the acceleration of wind at the exterior vertical edge of a building, caused by the interaction of a large building massing with the incident wind, with the flow at the corner being accelerated due to high pressure differentials sets up between the windward façade and the orthogonal aspects. It can be further exacerbated by downwash effects that build up as the flow shears down the façade.

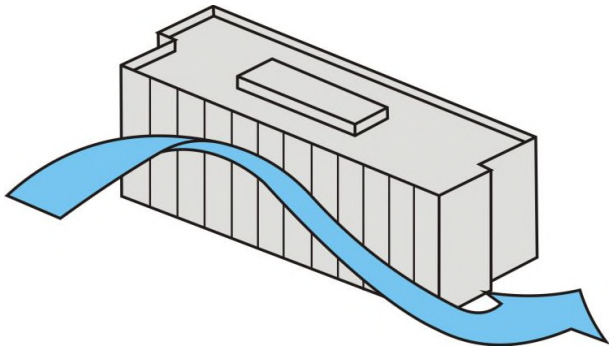

Figure A.4: Sidestream and Corner Wind Effect

A.5 Stagnation

Stagnation in a region refers to an area where the wind velocity is significantly reduced due to the effect of the flow being impeded by the bluff body. For a particular prevailing wind direction, this is typically located near the middle of the windward face of the building form or over a short distance in front of the windward face of a screen or fence. Concave building shapes tend to create an area of stagnation within the cavity, and wind speeds are generally low in these areas.