PEDESTRIAN WIND ENVIRONMENT STATEMENT

2B-6 HASSALL STREET, PARRAMATTA

WE531-01F02(REV3)- WS REPORT

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Prepared for:

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DOCUMENT CONTROL

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EXECUTIVE SUMMARY

This report is in relation to the proposed redevelopment of 2B-6 Hassall Street, Parramatta and presents an opinion on the likely impact of the proposed design on the local wind environment on 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 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. 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 although the subject development is relatively exposed to the three main prevailing wind directions it is anticipated that suitable wind conditions will exist in the publicly accessible areas surrounding and through-out the subject development for non-sedentary activities.

However, to improve the pedestrian wind comfort in the Plaza and Level 12 terraces and increase usability of these areas, it is suggested that the following features be included in the design:

- Inclusion of horizontal screening, such as a canopy or art work, elevated above ground level through the plaza.
- Inclusion of planting or localised screening, such as an art work, signage or baffle screens, throughout the plaza.
- Inclusion of 1.5m impermeable balustrades surrounding the Level 12 terraces.

It is recommended to verify the outcomes of this assessment with a wind tunnel study at a later design stage to confirm and optimise the usage of the treatments suggested.

CONTENTS

1 RESPONSE TO SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS

This report has been prepared having regard to the Secretary's Environmental Assessment Requirements (SEAR) for the project by DPE, ref no SEAR 9670 issued on 9 November 2018. It details the wind impact criteria as outlined in Table 1 below.

Table 1: Secretary's Environmental Assessment Criteria

SEARS – Environmental Amenity	Item Discussed in:
Assess amenity impacts on the surrounding locality including wind impacts	Section 8

2 INTRODUCTION AND BACKGROUND

This report supports a State Significant Development Application (SSDA) submitted to the Department of Planning and Environment (DPE) pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for a mixed-use tertiary educational and commercial development at 2b-6 Hassall Street, Parramatta, also known as the Western Sydney University (WSU) Innovation Hub.

This report has been prepared having regard to the Secretary's Environmental Assessment Requirements (SEAR) for the project by DPE, ref no SEAR 9670 issued on 9 November 2018.

The proposal seeks to expand WSU's Parramatta CBD campus network to include a state-of the-art facility for engineering innovation and will offer programs across engineering, architecture and entrepreneurship. WSU is reshaping its campus network, to combine existing campuses with CBD vertical campuses and is committed to developing a campus precinct that connects with and embeds business, industry and community partners.

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 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.

3 THE SITE AND SURROUNDS

The site is located at 2b-6 Hassall Street, Parramatta within the City of Parramatta Local Government Area (LGA). The site comprises three allotments of land with a combined area of 2,647m^2 and is legally described as Lot 22 in DP608861, Lot 62 in DP1006215 and Lot 7 in DP128820. Figure 1 provides an aerial map of the site and its immediate surrounds and Figure 2 provides a photograph of the site from Hassall Street.

The site has a single road frontage to Hassall Street, with all existing built form being demolished at the time of writing in accordance with the first early works DA/714/2018. The site will subsequently be excavated in accordance with a second early works DA.

The surrounding development is characterised by a mix of uses and is currently undergoing significant urban regeneration. To the north is the State and Commonwealth heritage listed Lancer Barracks. To the east is the basement driveway to the Curtis Cheng Centre (NSW Police Headquarters) and the PCYC site which is currently subject to a Planning Proposal for a new mixed-use development up to 192m in height. To the south, on the opposite side of Hassall Street is the Eclipse commercial tower (1-3 Hassall Street), a low rise a residential flat building (5 Hassall) and a low rise commercial building (7 Hassall Street). The site adjoins the Commercial Hotel to the west which is a local heritage item.

The site is located at the eastern end of the Parramatta CBD and is in close proximity to the Parramatta Rail Station and Transport Interchange (100m to the west) and the Parramatta Square urban renewal precinct (250m to the north west).

Figure 1: Site Location Context Plan
Source: Ethos Urban

Figure 2: Photograph of the site from Hassall Street
Source: Ethos Urban

4 OVERVIEW OF PROPOSED DEVELOPMENT

This SSDA will seek consent for the redevelopment of the site as a mixed-use development comprising a tertiary institution, commercial and retail uses. Specifically, the proposal will seek approval for:

- Construction and use of a 19 storey building comprising:
- Basement / Lower Ground level including car parking, a loading dock, back-of-house storage and plant and tertiary institution floorspace;
- Ground level including retail tenancies, end-of-trip facilities, tertiary institution lobby floorspace, a commercial office lobby, plant equipment and driveway ramp;
- Above Ground levels comprising tertiary institution and commercial floorspace;
- Mid-rise and rooftop terraces and plant equipment;
- Landscaping and public domain works including the provision of a possible future Ground level through-site link; and
- Extension and augmentation of services and infrastructure as required.

Note, in accordance with separate early works DAs to the City of Parramatta Council, the site will be cleared, remediated and excavated in preparation for the subject SSDA.

5 PLANNING CONTEXT

This application is SSD by way of clause 8 and schedule 1 under State Environmental Planning Policy (State and Regional Development) 2011 on the basis that the development is for the purpose of a tertiary institution and has a capital investment value of more than $30 million.

Clause 226(1) of the Environmental Planning and Assessment Regulation 2000 provides that a development carried out by an Australian University (under the meaning of the Higher Education Act 2001) is a Crown development. WSU is listed as an Australian University under Schedule 1 of the Higher Education Act 2001 and as the development will occur on University land, it is a Crown development for the purposes of Division 4 of the EP&A Act.

6 REGIONAL WIND

The Bankstown 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. These wind directions were determined from an 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 Bankstown region is also determined. The frequency of occurrence of these winds is also shown in Figure 3.

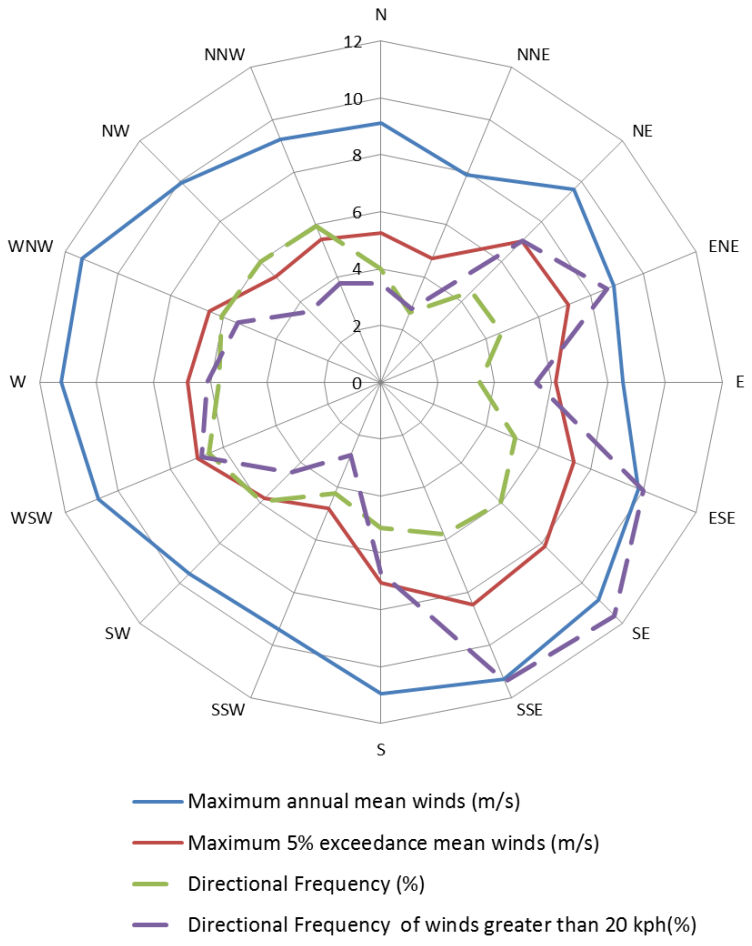

Figure 3: Annual and Weekly Recurrence Mean Wind Speeds, and Frequencies of Occurrence, for the Bankstown Region (Observations from Bankstown Airport from 1993 to 2016, corrected to open terrain at 10m)

7 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 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 (rather than referencing specific wind speeds). Any recommendations in this report are made only in-principle and are based on our extensive experience in the study of wind environment effects.

8 RESULTS AND DISCUSSION

The expected wind conditions are discussed in 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.

8.1 Pedestrian Footpaths and Plaza

At ground floor level the development is relatively shielded from the direct effects of the three prevailing wind directions by the surrounding buildings to the south, west and north east. However, the surrounding footpaths and plaza will still be affected by downwash from the tower, which is exposed to the westerly and south to south easterly winds. The south to south easterly winds will impact the tower and downwash onto the pedestrian footpath at Hassall Street and into the plaza area. As the winds downwash from the tower they will accelerate into the plaza. The westerly winds are also expected to downwash off the western face of the tower onto the top of the retail premises and combine with the direct westerly winds coming over the Commercial Hotel directly to the west to flow into the plaza. Additionally, the prevailing westerly winds are anticipated to side stream along the northern and southern sides of the Commercial Hotel to the west and accelerate around the corners of the retail premises into the plaza, further impacting the wind conditions described above in the plaza.

It is anticipated that the wind conditions at the footpath along Hassle Street and ground level through the plaza generated by the above effects are expected to be acceptable for walking, however it is not anticipated that they will be suitable for short term sedentary activities unless treatments are included.

It is therefore recommended that horizontal screening, e.g. in the form of artwork or a canopy, be retained in the design above the plaza. These treatments are recommended to keep the down washed winds from the tower elevated and prevent them from reaching ground level in pedestrian areas along Hassall Street and through the Plaza where they may impact pedestrian comfort. To mitigate the impact of any side-streaming winds, it is recommended that additional planting or localised wind screening, which can be in the form of signage, art work or baffle screens, be included throughout the plaza. These treatments will have the effect of impeding and slowing the wind flowing through the plaza at ground level.

The extent and positioning of the above treatments can be determined by wind tunnel testing at a later stage of the development.

8.2 Level 12 Terraces

Due to the height of the development relative to the Commercial Hotel to the west and Curtis Cheng Centre to the north-east, the Level 12 terraces are exposed to the north easterly and westerly wind directions. As well as the impact of the direct westerly wind, the western terrace will be subject to upwash from the tower below and downwash from the floors above due to the westerly winds. Likewise, the northern terrace will be subject to downwash from the levels above due to the north easterly winds. As such, although the Level 12 terraces may occasionally experience wind conditions that would require mitigation measures to make them suitable for short-term sedentary activities such as outdoor dining, the conditions experienced on the terraces are likely to be similar to conditions experienced on comparable terraces in the Parramatta CBD. It should be noted that conditions are not expected to exceed safety criteria and will be suitable for general usage.

The Level 12 terraces are optional, private areas and the exact requirements for their intended usage by potential tenants is not yet known. Therefore, it is generally recommended that a 1.5m high impermeable balustrade be included in the design. Once the nature of the intended use of these areas is known, additional treatments, such as the use of planting or screens, may be required to further improve the wind conditions on the terraces to meet the needs of the occupant. Any such requirements can be determined at a later stage of the development with wind tunnel testing.

8.3 Conclusion

It is anticipated that the majority of wind conditions at ground level surrounding the development and through the plaza will be acceptable for their intended use and the wind comfort in these areas will be enhanced with the inclusion of the treatments recommended in this report.

The wind conditions on the Level 12 terraces are not expected to exceed safety levels and, as they are private terraces generally associated with the proposed commercial and university uses, are expected to be acceptable for their intended uses. Further treatments may be required should the future tenant wish to use the terraces for alternative purposes, such as short or long term sedentary activities.

9 REFERENCES

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