PEDESTRIAN WIND ENVIRONMENT STATEMENT

INTERCONTINENTAL HOTEL REFURBISHMENT, SYDNEY

WD237-03F02(REV6)- WS REPORT

OCTOBER 21, 2020

Prepared for:

Mulpha Hotel Sydney Trust

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DOCUMENT CONTROL

Date	Revision History	Issued Revision	Prepared By (initials)	Instructed By (initials)	Reviewed & Authorised by (initials)
July 8, 2020	Update of previous report (WD237-01F02(rev3), dated August 15, 2017) for the latest design scheme.	0	JW	SWR	BU
July 9, 2020	Updated discussion.	1	JW	SWR	BU
July 13, 2020	Updated site description.	2	JW	SWR	BU
July 16, 2020	Updated discussion.	3	JW	SWR	JG
July 29, 2020	Revised GFA.	4	AB	SWR	AB
August 4, 2020	Revised GFA.	5	AB	SWR	AB
October 21, 2020	Updated discussion.	6	BU	SWR	BU

EXECUTIVE SUMMARY

This report presents an opinion on the likely impact of the proposed refurbishment of the Intercontinental Hotel, Sydney, 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, southerly and westerly winds. The analysis of the wind effects relating to the proposed refurbishment 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 refurbishment, 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 building is relatively exposed to the three prevailing wind directions of the Sydney region, and it is expected that wind affecting the refurbishment will be similar to the existing site conditions. Nonetheless, to provide suitable wind conditions to the Level 32 outdoor lounge area, it is recommended to include a 1.3m high impermeable balustrade around the perimeter. With the inclusion of this balustrade, it is expected that suitable wind conditions will be experienced at all outdoor trafficable areas within and around the proposed refurbishment.

CONTENTS

1 INTRODUCTION

An opinion on the likely impact of the proposed refurbishment on the local wind environment affecting pedestrians within the critical outdoor areas within and around the refurbishment is presented in this report. The analysis of wind effects relating to the refurbishment has been carried out in the context of the predominant wind directions for the region, building morphology of the refurbishment 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.

This study assesses compliance with the controls for wind impacts of the Planning Secretary's Environmental Assessment Requirements (SEAR) issued for the State Significant Development (SSD). Item 5 states:

Assess the environmental and residential amenity impacts associated with the proposal, including solar access, acoustic impacts, visual privacy, overshadowing, servicing requirements (including waste management, loading zones, mechanical plant), lighting impacts, air quality, odour and dust emissions, and wind impacts.

2 DESCRIPTION OF THE PROPOSAL AND SURROUNDINGS

2.1 Description of the Site

The site comprises two allotments containing the Intercontinental Hotel (incorporating the former NSW Treasury Building) at 115-119 Macquarie Street. The legal description of the site is:

- Lot 40 DP 41315; and
- Lot 4 DP 785393,

The site (115-119 Macquarie Street) contains two interconnected buildings that comprise:

- The 32-storey Intercontinental Hotel tower, which is located on the corner of Phillip and Bridge Streets set above a podium.
- The State Heritage listed former NSW Treasury Building, which is located on the corner of Macquarie and Bridge Streets.

Immediately to the north of the site (99-113 Macquarie Street) is a seven-storey commercial building known as Transport House, which is locally heritage listed. This site was part of the SSD 7693 Concept approval. Works relating to this portion of the Concept SSDA site will be progressed via a separate planning approval/application. The building is separated from the Treasury Buildings by a narrow laneway, known as Macquarie Lane.

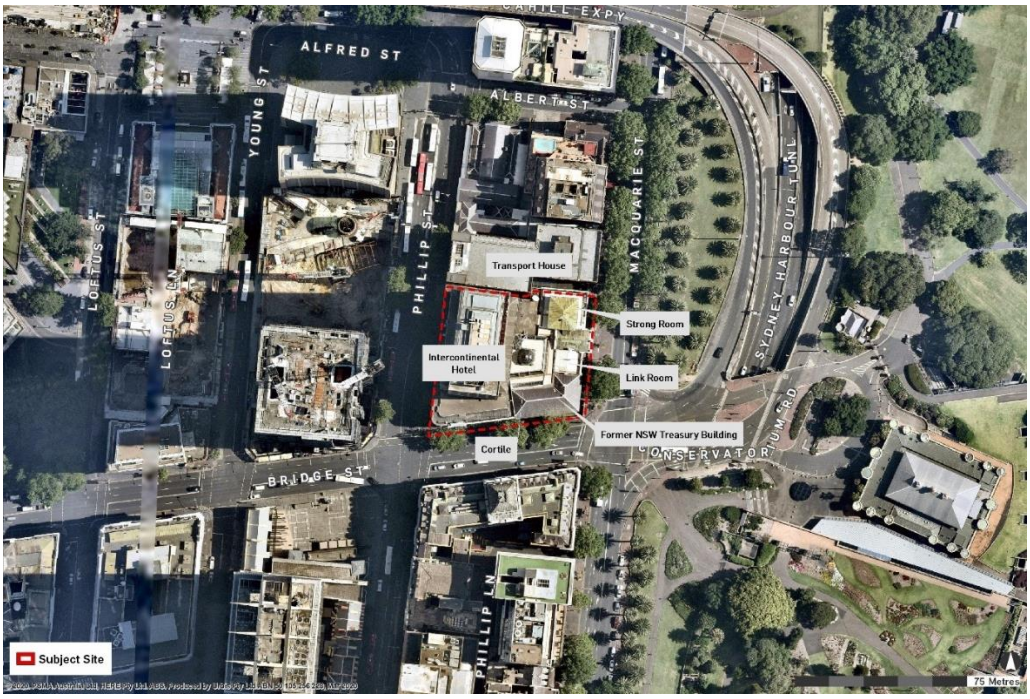


Figure 1: Aerial Image of the Site Location

2.2 Description of the Proposal

The proposal is a Stage 2 (Detailed) SSDA that seeks approval for:

- Various refurbishments to the Intercontinental Hotel tower.
- Alterations to the roof of the Intercontinental Hotel, including expansion of the club lounge and terrace – in compliance with the approved envelope under SSD 7693 (the Concept approval).

The proposed land use is 'tourist and visitor accommodation' (including ancillary uses), consistent with the existing use and what was considered/approved under the Concept approval.

From a staging perspective, no works will be undertaken to Transport House due to its sensitivity and requirement for more consideration, including a competitive design process.

The proposal would increase the GFA of the Intercontinental Hotel tower by 250sqm. The proposal also provides a maximum height of building of RL 114.55 (consistent with the envelope approved under the Concept approval).

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

- Ground Level trafficable areas.
- Level 32 Outdoor Lounge.

3 REGIONAL WIND

The Sydney region is governed by three principal wind directions, and these can potentially affect the subject refurbishment. These winds prevail from the north-east, south 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 Kingsford Smith Airport (Sydney Airport). The data has been collected from this station from 1995 to 2016 between 6am to 10pm and corrected so that it represents winds over standard open terrain at a height of 10m above ground level. Figure 2a 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 frequency of occurrence of these winds is also shown in Figure 2a. Figure 2b shows the 5% exceedance mean wind speeds for the region relative to the building form of the proposed refurbishment.

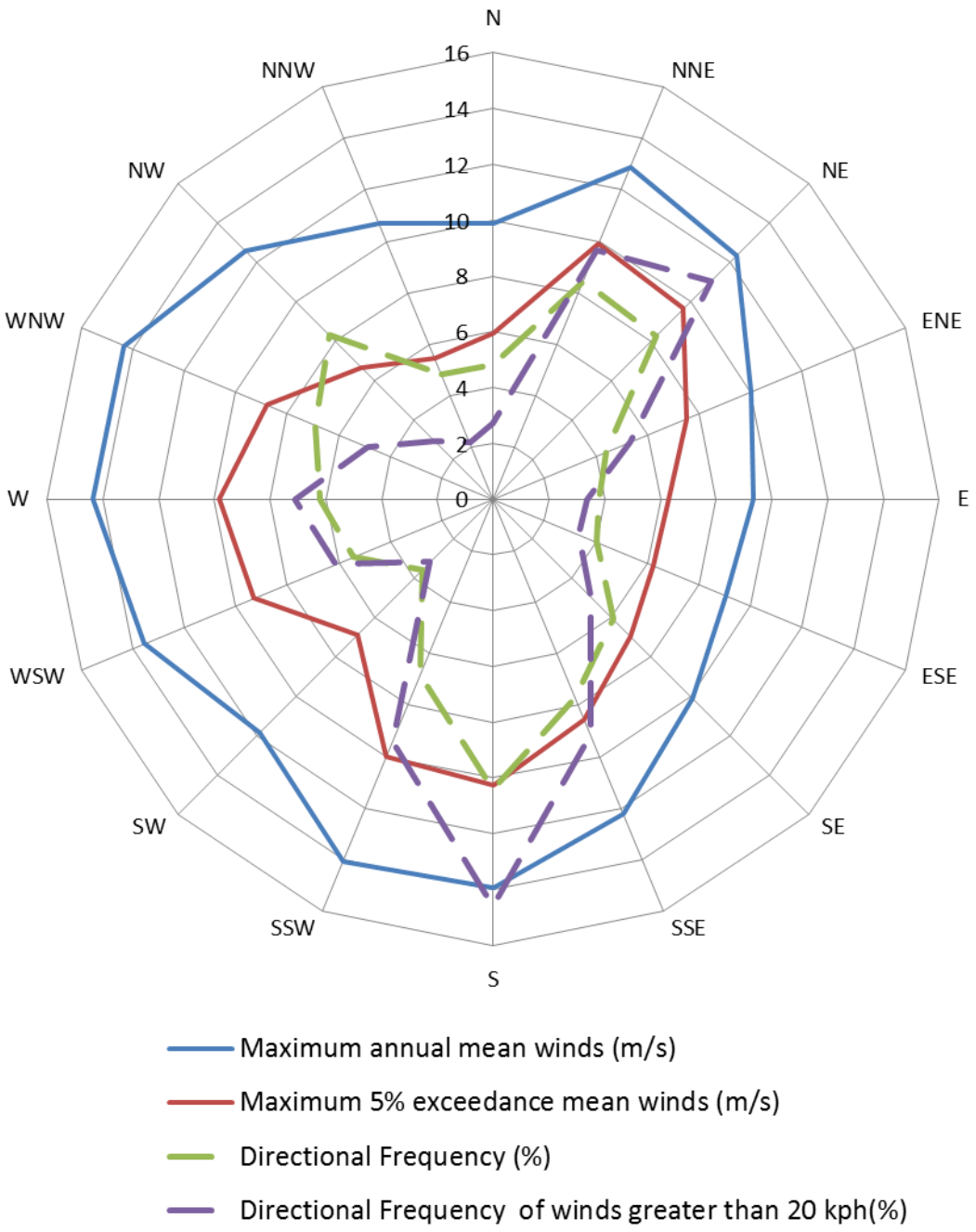


Figure 2a: Annual and Weekly Recurrence Mean Wind Speeds, and Frequencies of Occurrence, for the Region (based on observations from the Kingsford Smith Airport (Sydney Airport) meteorological station from 1995 to 2016, corrected to open terrain at 10m)

Legend

Line thickness represents the magnitude of the regional wind from that direction
Line length represents the frequency that the regional wind occurs from that direction

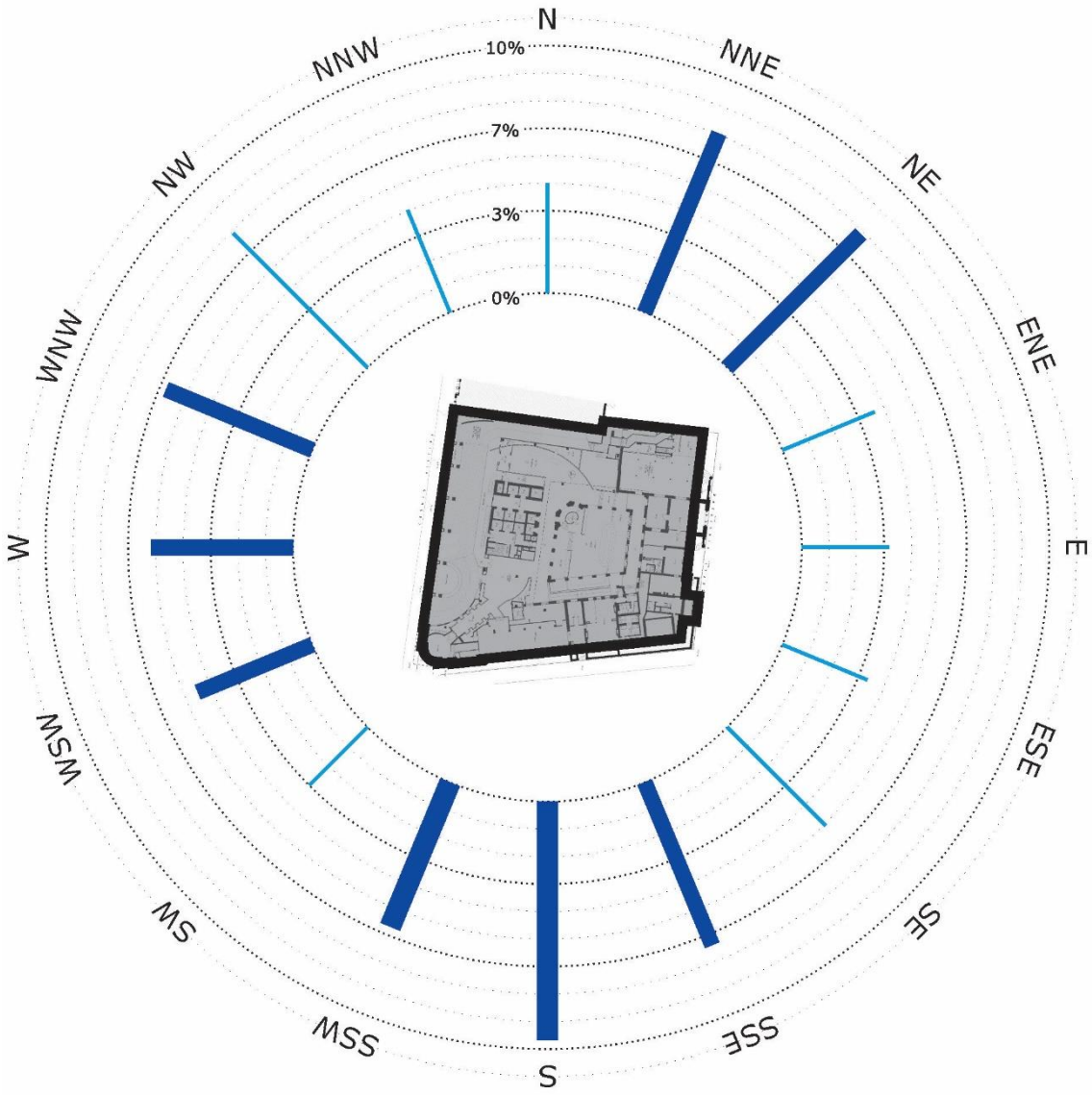


Figure 2b: Regional Wind Climate in relation to the Building Form

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 refurbishment. 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 ground plane will be used primarily for circulation. However, there are potential dining areas such as the outdoor Lounge/ Dining area on Level 32. The recommended criterion for wind conditions for the circulation area is 7.5m/s with a 5% probability of exceedance, whereas the proposed dining areas will need to satisfy a more stringent comfort criterion of 3.5m/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.

Flow-path diagrams which highlight the potentially critical wind effects around the various trafficable areas of the proposed refurbishment are shown in Figures 4.

5.1 Ground Level Trafficable Areas

The orientation of Phillip Street with the prevailing southerly winds has the potential to generate funnelling winds and sidestreaming winds along the corresponding pedestrian footpath area. This is expected to be a pre-existing wind condition which is not expected to be worsened with the addition of the proposed refurbishment. As such, the wind conditions along Phillip Street are expected to be comparable to the existing site conditions.

Furthermore, the westerly winds are expected to funnel along Bridge Street and potentially accelerate around the south-east corner of the refurbishment. Similarly, the north-easterly winds are expected to sidestream along Macquarie Street and accelerate around the south-eastern corner of the refurbishment and potentially funnel along Bridge Street. The effect of the prevailing north-easterly winds is expected to be dampened by the existing street trees along Macquarie Street. The wind conditions along Bridge Street and Macquarie Street are also expected to be similar to the existing site conditions.

5.2 Elevated Areas (Level 32 Outdoor Lounge)

The eastern aspect of the outdoor lounge on Level 32 benefits from shielding from the prevailing winds from the west due to the building form of the subject refurbishment. The northern aspect of the outdoor lounge on Level 32 benefits from shielding from the prevailing winds from the south due to the building form of the subject refurbishment. However, the Level 32 outdoor lounge is prone to the prevailing north-easterly winds upwashing off of the tower

form and onto the trafficable areas of the outdoor lounge. There is also the potential for the prevailing north-easterly winds to sidestream along the eastern and northern aspects of the proposed refurbishment along the outdoor lounge. Furthermore, the eastern aspect of the Level 32 outdoor lounge is also prone to the prevailing southerly winds sidestreaming along the eastern aspect of the proposed refurbishment along the outdoor lounge. The northern aspect of the Level 32 outdoor Lounge is prone to the prevailing westerly winds sidestreaming along the northern aspect of the proposed refurbishment along the outdoor lounge. With the inclusion of a 1.3m high impermeable balustrade around the perimeter of the Level 32 Outdoor Lounge, it is expected that the wind conditions at this area will be similar to the existing site conditions.

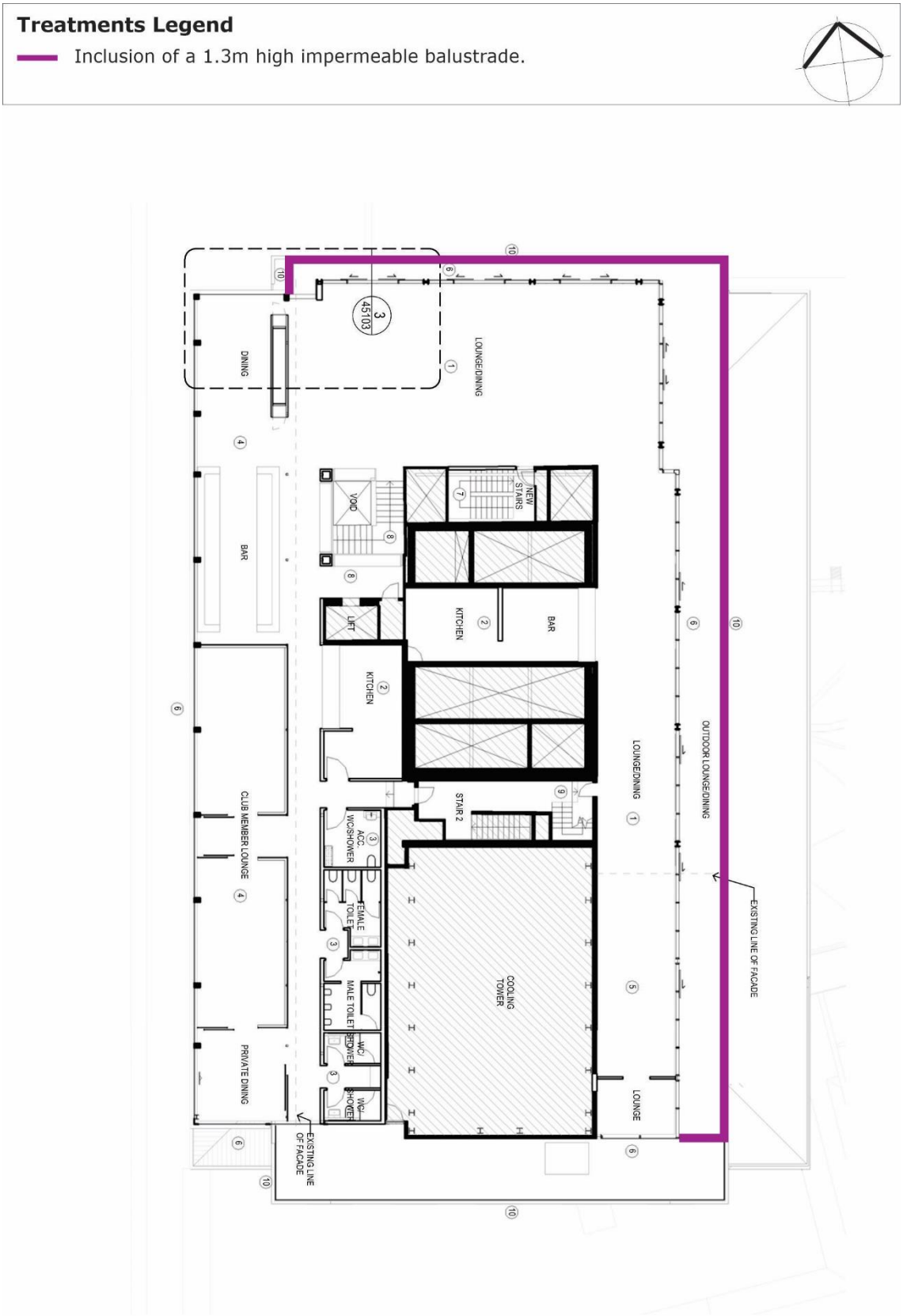
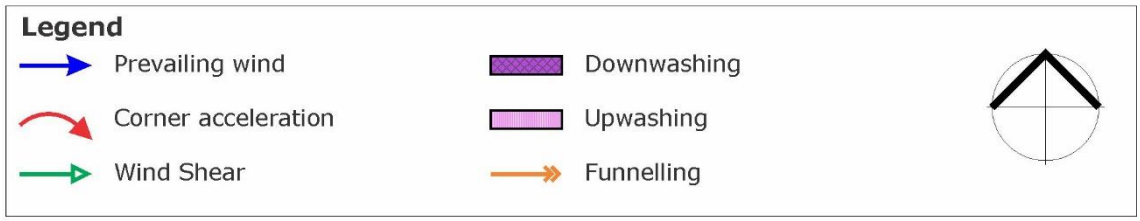
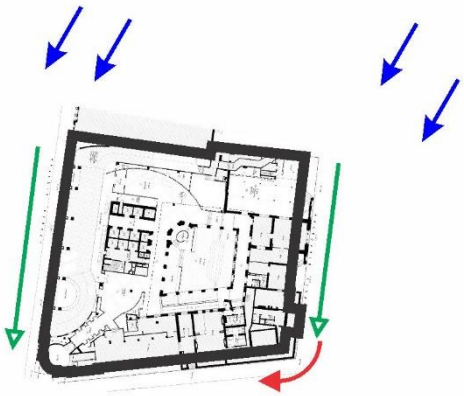
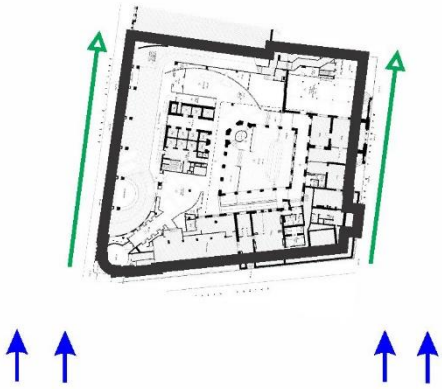


Figure 3: Suggested Treatment Strategy – Level 32 Plan

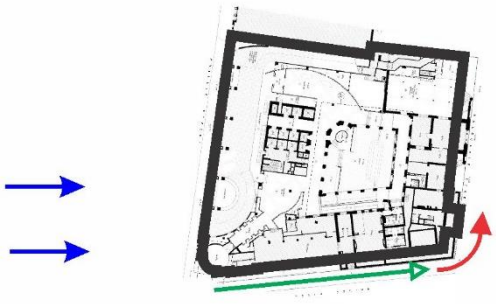




Prevailing Wind: North-East

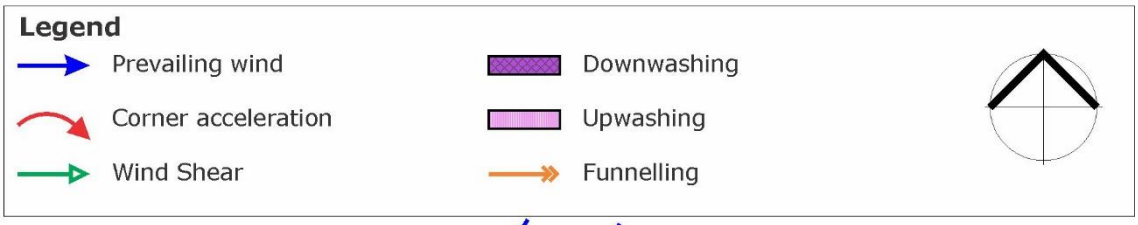


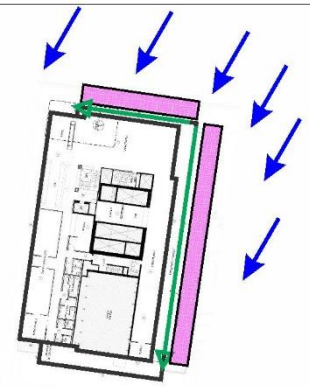
Prevailing Wind: South



Prevailing Wind: West

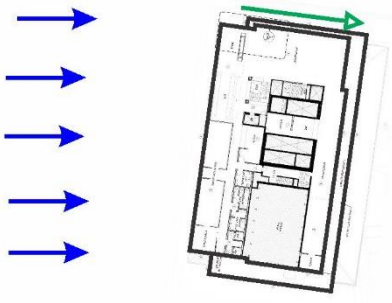
Figure 4a: Wind Flow-Path Diagrams – Ground Level Plan





Prevailing Wind: North-East

Prevailing Wind: South



Prevailing Wind: West

Figure 4b: Wind Flow-Path Diagrams – Level 32 Plan

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