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BeauSight Investment Pty Ltd

254-260 Franklin Street, Adelaide

Desktop Wind Impact Study

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Executive Summary

BeauSight Investment Pty Ltd commissioned Vipac Engineers and Scientists Ltd to prepare a statement of wind effects for the ground level and elevated areas of the proposed development at **254-260 Franklin Street, Adelaide**. This appraisal is based on Vipac's experience as a wind-engineering consultancy.

Drawings of the proposed development were provided by **PACT architects** in **August 2025**.

The findings of this study can be summarized as follows:

With proposed design:

- Wind conditions on the ground level footpath areas would be expected to be within the **walking** comfort criterion.
- Wind conditions on the main building entrance would be expected to be within the **standing** comfort criterion.
- **With recommendations**, the communal balconies on level 3 would be expected to have wind conditions within the recommended **standing** comfort criterion.
- **With recommendations**, the balconies would be expected to be within the recommended **walking** comfort criterion.
- All areas are expected to fulfil the **Safety** criterion.

As a general statement, educating occupants about wind conditions at open terrace/balcony areas during high-wind events and fixing loose, lightweight furniture on the terrace are highly recommended.

The assessments provided in this report have been made based on experience of similar situations in Adelaide and around the world. As with any opinion, it is possible that an assessment of wind effects based on experience and without experimental validation may not account for all complex flow scenarios in the vicinity.

Vipac recommends a wind tunnel test or CFD simulation to quantify the wind conditions and determine the proper wind control measures wherever possible.

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1 Introduction

Vipac Engineers and Scientists has been commissioned by **BeauSight Investment Pty Ltd** to carry out an appraisal of the pedestrian wind effects at the ground level and elevated areas of the proposed development at **254-260 Franklin Street, Adelaide**.

Strong winds in pedestrian areas are frequently encountered in central business districts of cities around the world; including Adelaide, Sydney, Melbourne and Brisbane. Wind characteristics such as the mean speed, turbulence and ambient temperature determine the extent of disturbance to users of pedestrian areas. These disturbances can cause both comfort and safety problems and require careful consideration to mitigate successfully.

The proposed development is a 13-storey mixed-use building with a roof height of 43.1m from Franklin Street. The site is bounded by residential buildings to the north, Gray Street to the East, Franklin Street to the south and the Greek Orthodox Community building to the west. A satellite image of the proposed development site and the south elevation of the building are shown in Figure 1 and Figure 2, respectively.

This report details the opinion of Vipac as an experienced wind engineering consultancy regarding the wind effects in ground level and elevated areas of the proposed development. No wind tunnel testing has been carried out for this development at this stage. Vipac has carried out wind tunnel studies on a large number of developments of similar shape and having similar exposure to that of the proposed development. These serve as a valid reference for the prediction of wind effects. Empirical data for typical buildings in boundary layer flows has also been used to estimate the likely wind conditions on the ground level areas of the proposed development [2] & [3].

Drawings of the proposed development were supplied to Vipac by **PACT architects** in **August 2025**. A list of drawings supplied is provided in Appendix C of this report.



Figure 1: Aerial view of the proposed development site

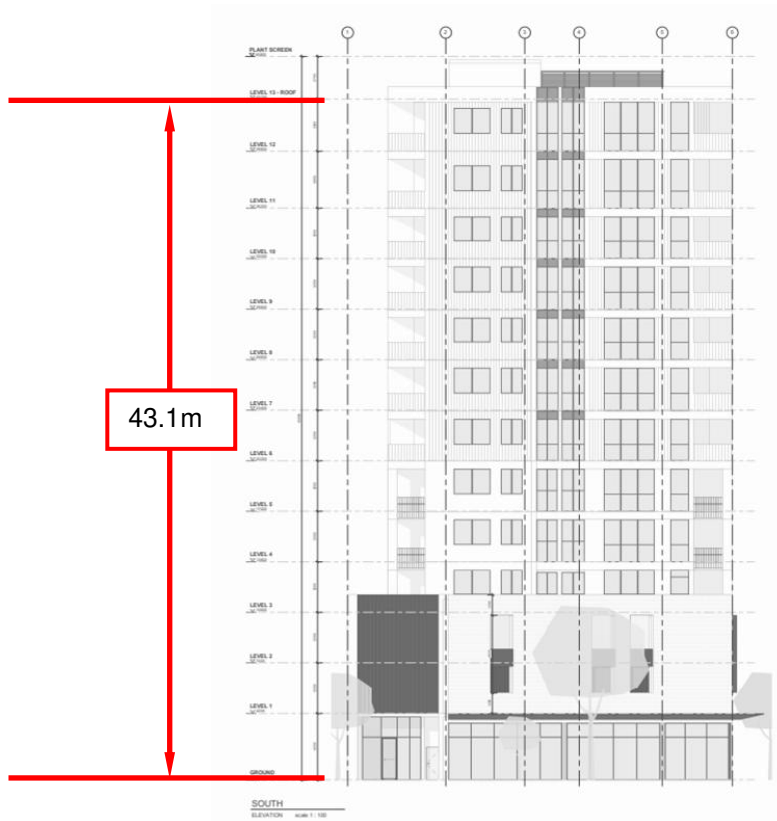


Figure 2: South Elevation of the proposed development.

2 Analysis Approach

In assessing whether a proposed development is likely to generate adverse wind conditions in ground level footpath areas, Vipac has considered the following five main points:

- The exposure of the proposed development to wind;
- The regional wind climate;
- The geometry and orientation of the proposed development;
- The interaction of flows with adjacent developments; and
- The assessment criteria determined by the intended use of the areas affected by wind flows generated or augmented by the proposed development.

The pedestrian wind comfort at specific locations of ground level footpath and elevated areas may be assessed by predicting the gust and mean wind speeds with a probability of once per year at that location. The location may be deemed generally acceptable for its intended use while gust and mean wind speeds are within the threshold values noted in Section 2.5. Where Vipac predicts that a location would not meet its appropriate comfort criterion, the use of wind control devices and/or local building geometry modifications to achieve the desired comfort rating may be recommended. For complex flow scenarios or where predicted flow conditions are well in excess of the recommended criteria, Vipac recommends scale model wind tunnel testing to determine the type and scope of the wind control measures required to achieve acceptable wind conditions.

2.1 Site Exposure

The proposed development is located on a relatively flat terrain. The site is surrounded within an approximately 2.6km radius predominately by parklands, residential buildings and low to mid-rise developments with some high-rise buildings to the east. A satellite image showing these site surroundings is shown in Figure 3.

Considering the immediate surroundings and terrain, for the purposes of this study, the site of the proposed development is assumed to be within Terrain Category 3 for all wind directions (Figure 3).

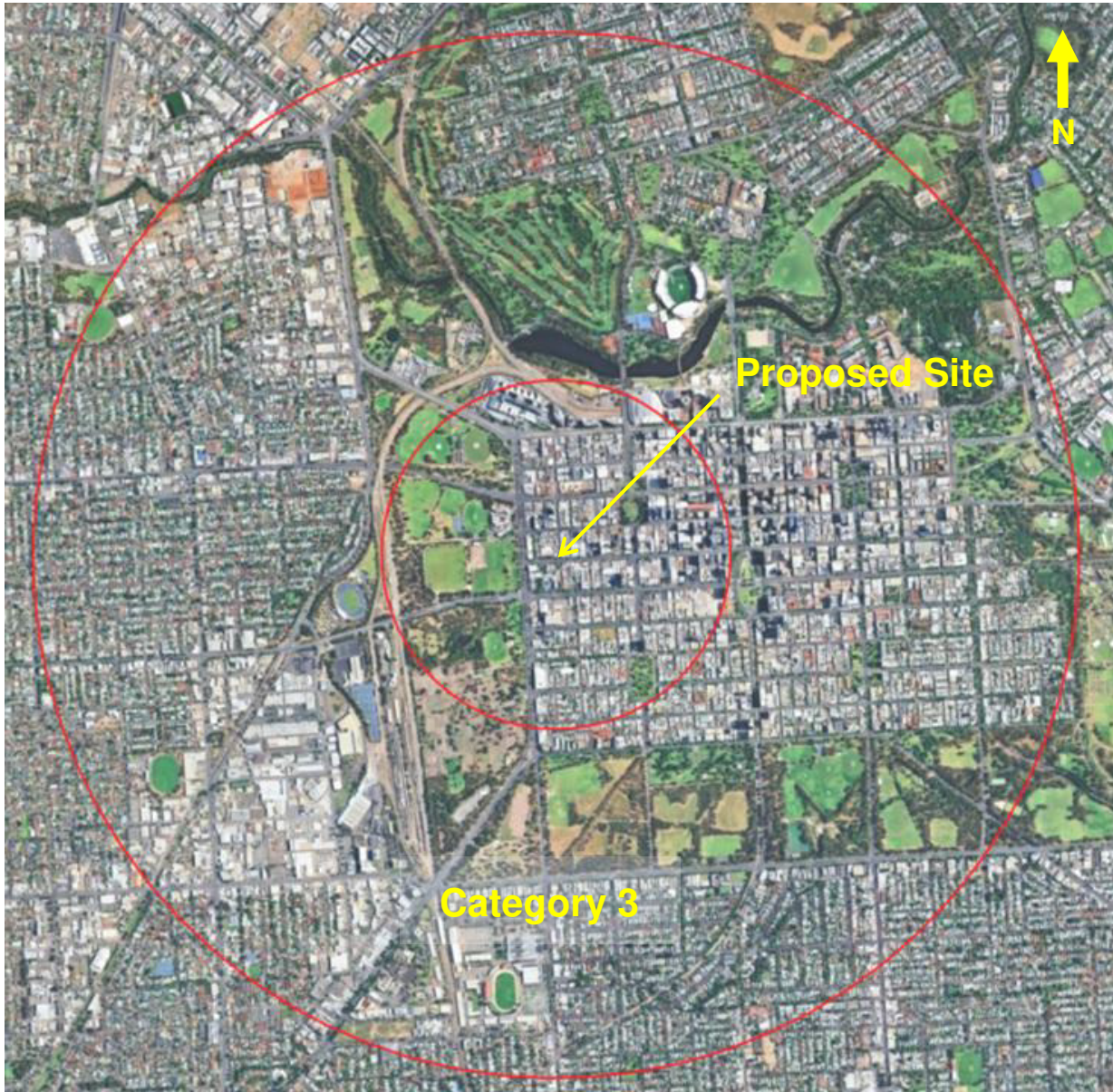


Figure 3: Assumed terrain categories for wind speed estimation.

2.2 Regional Wind Climate

The mean and gust wind speeds have been recorded in the Adelaide area for 30 years. These data have been analysed, and the directional probability distribution of wind speeds have been determined. The directional distribution of hourly mean wind speed at the gradient height ($\approx 500\text{m}$), with a probability of occurring once per year (i.e. 1 year return period) is shown in Figure 4. The wind data at this free stream height are common to all Adelaide city sites and may be used as a reference to assess ground level wind conditions at the site. Figure 4 indicates that the stronger winds can be expected from the south-westerly, north-westerly, and westerly directions.

Adelaide Annual Maximum Mean Hourly Wind Speeds (m/s) at 500m Height

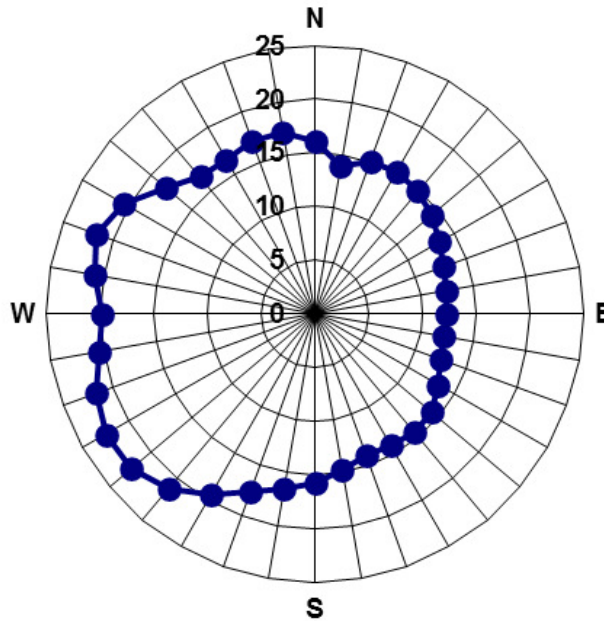


Figure 4: Directional Distribution of Annual Return Period Maximum Mean Hourly Wind Velocities (m/s) at gradient height of 500m in Adelaide.

2.3 Building Geometry and Orientation

The proposed development is a 13-storey mixed-use building. The overall plan-form dimensions are approximately 24.35m x 54.2m as shown in Figure 5. The main entrance is located on Franklin Street. The development incorporates a minor tower setback on level 3.

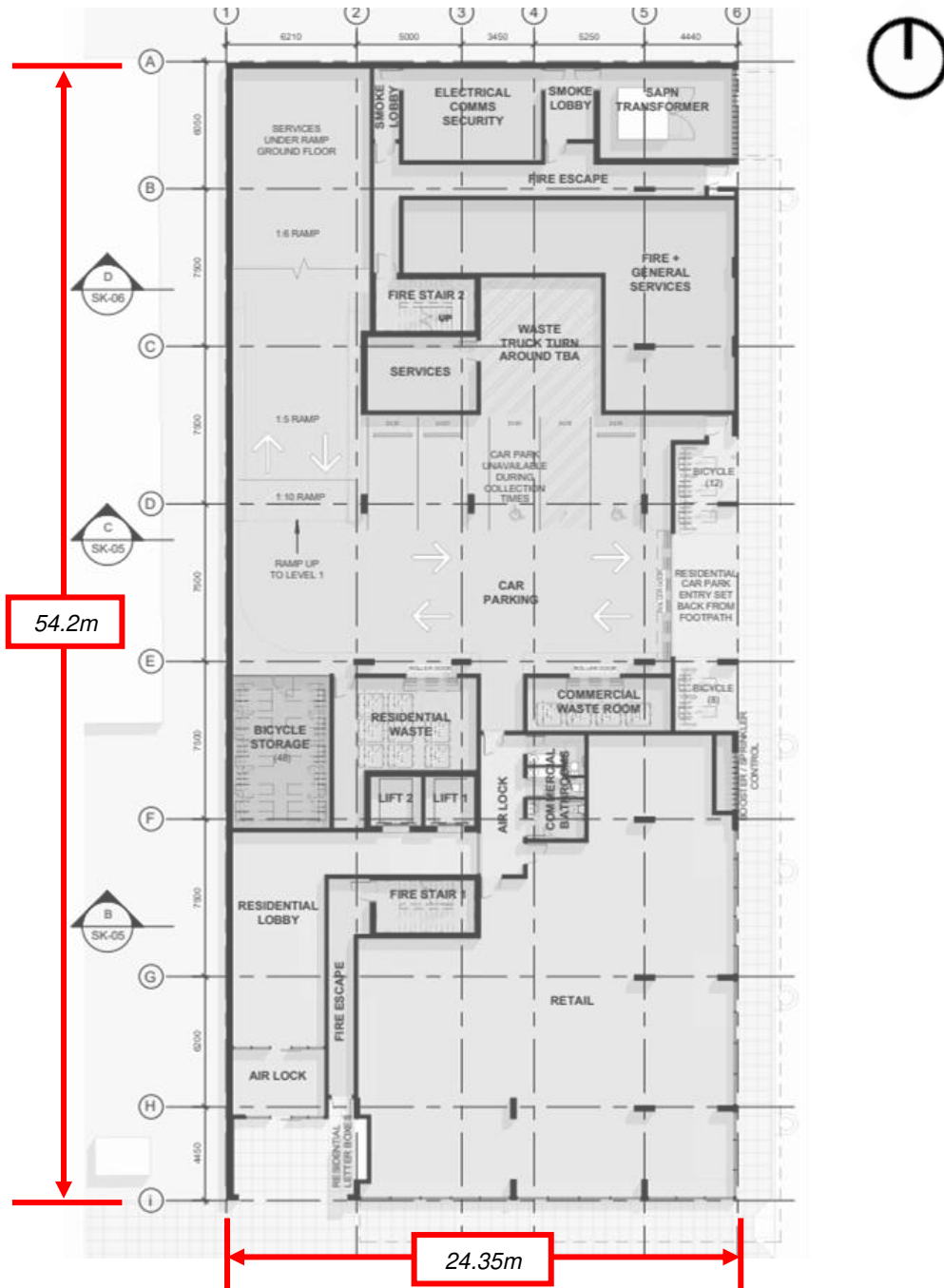


Figure 5: Ground floor plan with the overall dimensions overlaid.

2.4 Flow interactions with Adjacent Developments

The immediately adjacent developments are shown in Figure 6. At ground level, the site is exposed to direct winds from the westerly directions channelling along Franklin Street. The development is taller than the surrounding buildings and so is exposed to winds from all directions at the upper levels.



Figure 6: Immediately adjacent surroundings and their approximate number of floors (F)

2.5 Assessment Criteria

With some consensus of international opinion, pedestrian wind comfort is rated according to the suitability of certain activities at a site in relation to the expected annual peak 3-second gust velocity at that location for each wind direction. Each of the major areas around the site are characterized by the annual maximum gust wind speeds. Most patrons would consider a site generally unacceptable for its intended use if it were probable that during one annual wind event, a peak 3-second gust occurs which exceeds the established comfort threshold velocity (shown in Table 1). If that threshold is exceeded once per year then it is also likely that during moderate winds, noticeably unpleasant wind conditions would result, and the windiness of the location would be considered as unacceptable.

Table 1: Recommended Wind Comfort and Safety Gust Criteria.

Annual Maximum Gust Speed	Result on Perceived Pedestrian Comfort
>23m/s	Unsafe (frail pedestrians knocked over)
<16m/s	Acceptable for Walking (steady steps for most pedestrians)
<13m/s	Acceptable for Standing (vehicle drop off, queuing)
<10m/s	Acceptable for Sitting (outdoor cafés, pool areas, gardens)

In a similar manner, a set of hourly mean velocity criteria (see Table 2) with a 0.1% probability of occurrence are also applicable to ground level areas in and adjacent to the proposed development. An area should be within both the relevant mean and gust limits in order to satisfy the particular human comfort and safety criteria in question.

Table 2: Recommended Wind Comfort and Safety Mean Criteria.

Mean Speed in 0.1% of Time	Result on Perceived Pedestrian Comfort
>15m/s	Unsafe (frail pedestrians knocked over)
<10m/s	Acceptable for Walking (steady steps for most pedestrians)
<7m/s	Acceptable for Standing (vehicle drop off, queuing)
<5m/s	Acceptable for Sitting (outdoor cafés, pool areas, gardens)

The Beaufort Scale is an empirical measure that related the wind speed to observed conditions on the land and sea. Table 3 describes the categories of the Beaufort Scale. The comparison between these observed conditions and the comfort criteria described above can be found in Table 4.

Table 3: Beaufort Scale - empirical measure relating wind speed to observed conditions on land.

Beaufort Number	Descriptive Term	Wind Speed at 1.75 m height (m/s)	Specification for Estimating Speed
0	Calm	0-0.1	
1	Light Air	0.1-1.0	No noticeable wind
2	Light Breeze	1.1-2.3	Wind felt on face
3	Gentle Breeze	2.4-3.8	Hair disturbed, clothing flaps, newspapers difficult to read
4	Moderate Breeze	3.9-5.5	Raises dust and loose paper; hair disarranged
5	Fresh Breeze	5.6-7.5	Force of wind felt on body, danger of stumbling when entering a windy zone
6	Strong Breeze	7.6-9.7	Umbrellas used with difficulty, hair blown straight, difficult to walk steadily, sideways wind force about equal to forwards wind force, wind noise on ears unpleasant
7	Near Gale	9.8-12.0	Inconvenience felt when walking
8	Gale	12.1-14.5	Generally impedes progress, great difficulty with balance in gusts
9	Strong Gale	14.6-17.1	People blown over

Table 4: Comparison between Mean comfort criteria and the observed conditions.

Comfort Criteria	Beaufort Scale Equivalent
Safety	9 – Strong Gale
Walking	5 – Fresh Breeze
Standing	4-5 – Moderate to Fresh Breeze
Sitting	<4 – Moderate Breeze

2.5.1 Use of Adjacent Pedestrian Occupied Areas & Recommended Comfort Criteria

The consideration of the (intended) function of the environment heavily influences the appropriateness of the recommended wind comfort criteria. For example, people frequenting locations such as parks are will likely tolerate a windier environment when compared to people dining at an outdoor café.

This is partly due to the pedestrian’s judgement in clothing and predetermined expectation of the wind environment and partly due to the sensitivity of their activities to wind. For example, patrons at outdoor dining areas are highly sensitivity to wind due to the stationary nature of the activity; whereas pedestrians on the public footpaths may maintain a level of comfort under otherwise uncomfortable conditions by partaking in general activities performed on the footpath such as walking.

The following table lists the specific areas adjacent to the proposed development and the corresponding recommended criteria.

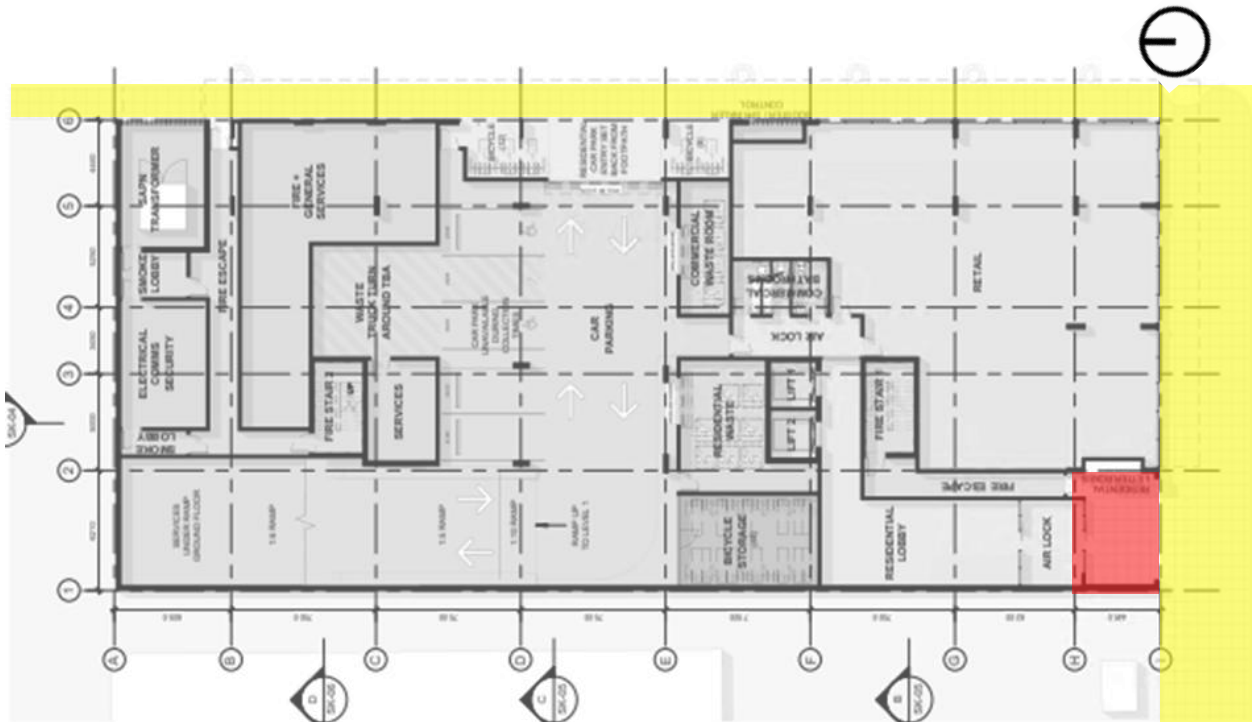
Table 5: Recommended application of criteria

Area	Specific location	Recommended Criteria
Public Footpaths	Along Franklin Street and Gray Street (Figure 7)	Walking
Building Entrances	Main building entrances along Franklin Street (Figure 7)	Standing
Communal balconies	Located on Level 3 (Figure 8)	Standing
Balcony/Terraces	Up the height of the building	Walking (See discussion below)

2.5.2 Terrace / Balcony Recommended Criterion Discussion

There are Private Balconies and Terraces located up the height of the development. Vipac recommends as a minimum that balcony/terrace areas meet the criterion for walking since:

- these areas are not public spaces;
- the use of these areas is optional, and only intended to be used on fair weather days with calm winds;
- residents at private open spaces can chose to retreat indoors during uncomfortable wind conditions, while a pedestrian or person using a public area may not have this option.
- many similar developments in Adelaide and other Australian capital cities experience wind conditions on balconies and elevated deck areas in the vicinity of the criterion for walking.



Recommended to fulfil Walking Recommended to fulfil Standing

Figure 7: Ground floor with recommended wind criteria overlaid



Recommended to fulfil Walking Recommended to fulfil Standing

Figure 8: Level 3 with recommended wind criteria overlaid

3 Pedestrian Level Wind Effects

3.1 Discussion & Recommendations

3.1.1 Ground Level areas

The ground level areas of the proposed development are exposed to the prevailing northerly and westerly winds. These winds are expected to channel along Gray Street and Franklin Street, respectively. Although these winds can seem to impact the proposed development ground level areas, the nearby landscaping along both Gray and Franklin Street are expected to reduce the intensity of these channelling flow. Therefore, the pedestrian footpath along Gray and Franklin Street are expected to be suitable for their intended use. The main building entrance is located on the south-western corner of the proposed development and positioned in an enclosed area. The positioning of the main building entrance in an enclosed area improves the overall wind conditions, especially from the channelling flow along Frankling street from the prevailing westerly winds. The main building entrance is expected to be suitable for its intended use.

3.1.2 Elevated areas

The elevated areas of the proposed development are exposed to the prevailing northerly and westerly winds. Minor shielding is provided from the neighbouring buildings due to their height. The prevailing northerly and westerly winds are expected to impact the northern and western façade and downwash onto the level 3 communal balconies. It is recommended to include an awning as shown in Figure 9 to mitigate this adverse wind effect. Additionally, the prevailing northerly and westerly winds are expected to impact the corners of the northern and western of the proposed development where the balconies are located, and corner acceleration is expected. To mitigate this adverse wind effect, it is recommended to include a standard height impermeable balustrade on the north-western, north-eastern and south-western balconies (refer Figure 10 for levels 4 and 5). Similarly, on the levels from 6 to 12, these balconies located on the north-western, north-eastern and south-western corners are expected to be suitable for their intended use with the proposed standard height impermeable balustrade.

With the proposed and recommended features mentioned above, the ground level and elevated areas are expected to fulfil the safety criterion.

Vipac recommends a wind tunnel test or a CFD simulation to quantify the wind conditions and determine the proper wind control measures wherever possible.

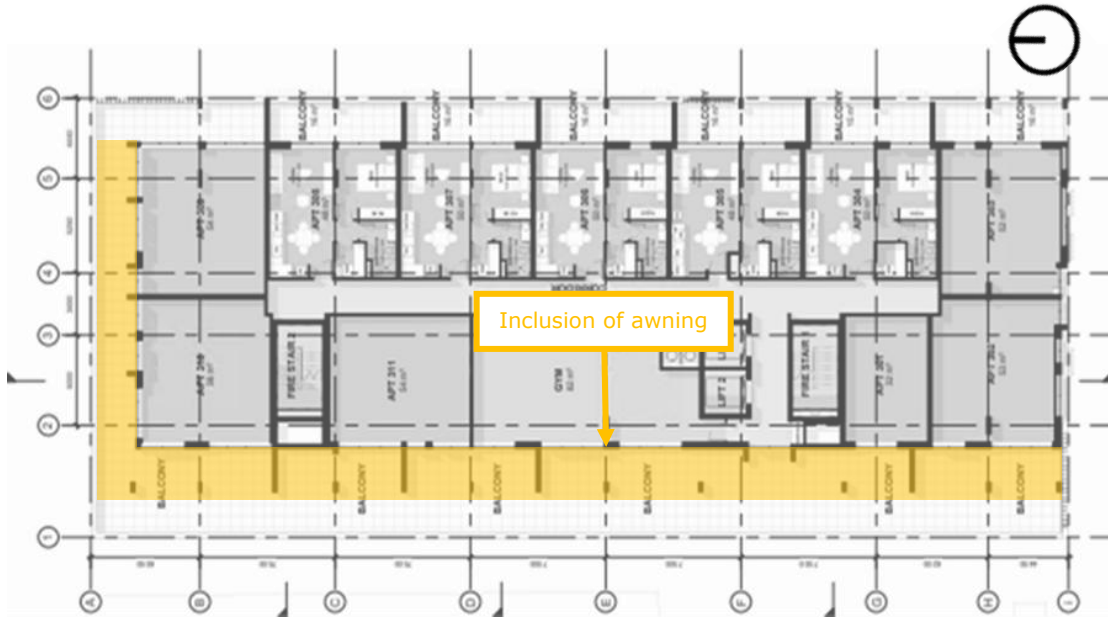


Figure 9: Level 3 plan with the recommended wind control measures overlaid

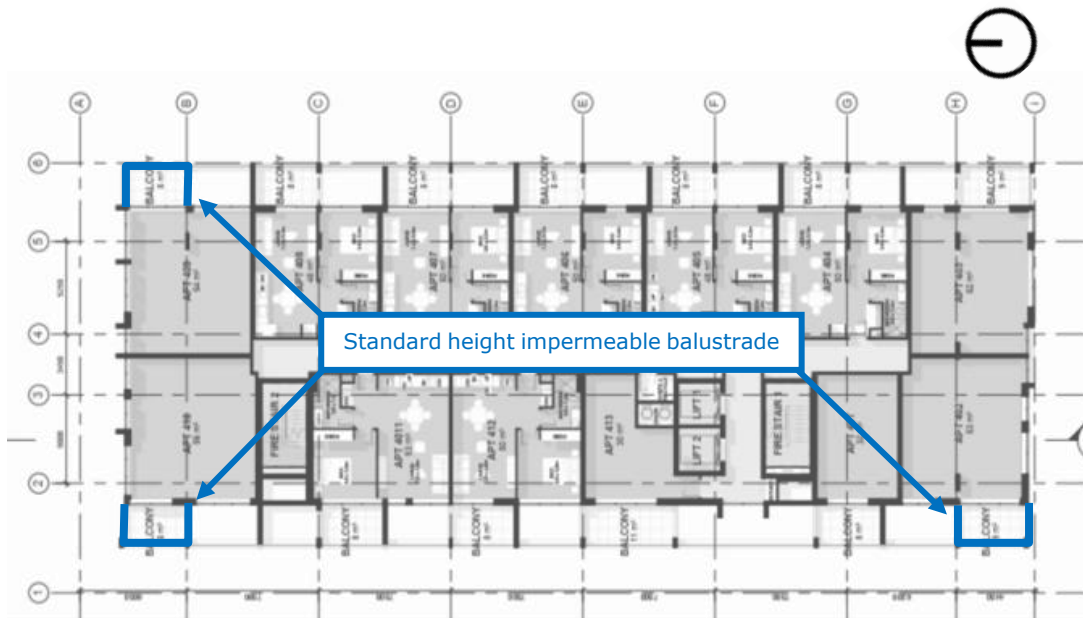


Figure 10: Level 4 -5 plan with the recommended wind control measures overlaid

4 Conclusions

An appraisal of the likely wind conditions at the pedestrian ground level and elevated areas of the proposed development at **254-260 Franklin Street, Adelaide** has been made.

Vipac has carefully considered the form and exposure of the proposed development, nominated criteria for various public areas according to their function and referred to past experience to produce our opinion of likely wind conditions.

The findings of this study can be summarised as follows:

With proposed design:

- Wind conditions on the ground level footpath areas would be expected to be within the **walking** comfort criterion.
- Wind conditions on the main building entrance would be expected to be within the **standing** comfort criterion.
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This Report has been Prepared

For

BeauSight Investment Pty Ltd

By

VIPAC ENGINEERS & SCIENTISTS PTY LTD.

Appendix A Environmental Wind Effects

Atmospheric Boundary Layer

As wind flows over the earth it encounters various roughness elements and terrain such as water, forests, houses and buildings. To varying degrees, these elements reduce the mean wind speed at low elevations and increase air turbulence. The wind above these obstructions travels with unattenuated velocity, driven by atmospheric pressure gradients. The resultant increase in wind speed with height above ground is known as a wind velocity profile. When this wind profile encounters a tall building, some of the fast-moving wind at upper elevations is diverted down to ground level resulting in local adverse wind effects.

The terminology used to describe the wind flow patterns around the proposed development is based on the aerodynamic mechanism, direction and nature of the wind flow.

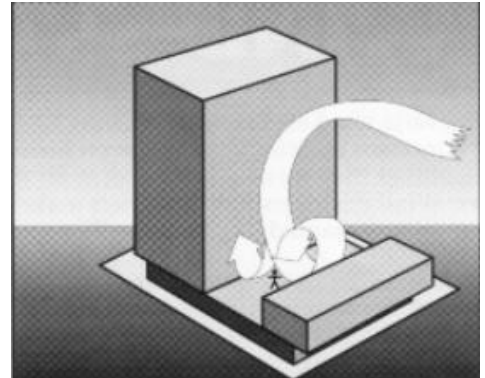
Downwash – refers to a flow of air down the exposed face of a tower. A tall tower can deflect a fast-moving wind at higher elevations downwards.

Corner Accelerations – when wind flows around the corner of a building it tends to accelerate in a similar manner to airflow over the top of an aeroplane wing.

Flow separation – when wind flowing along a surface suddenly detaches from that surface and the resultant energy dissipation produces increased turbulence in the flow. Flow separation at a building corner or at a solid screen can result in gusty conditions.

Flow channelling – the well-known “street canyon” effect occurs when a large volume of air is funnelled through a constricted pathway. To maintain flow continuity the wind must speed up as it passes through the constriction. Examples of this might occur between two towers, in a narrowing street or under a bridge.

Direct Exposure – a location with little upstream shielding for a wind direction of interest. The location will be exposed to the unabated mean wind and gust velocity. Piers and open water frontage may have such exposure.



Appendix B References

- [1] *Structural Design Actions, Part 2: Wind Actions*, Australian/New Zealand Standard 1170.2:2011
- [2] *Wind Effects on Structures* E. Simiu, R Scanlan, Publisher: Wiley-Interscience
- [3] *Architectural Aerodynamics* R. Aynsley, W. Melbourne, B. Vickery, Publisher: Applied Science Publishers
- [4] *The Aerodynamic Characteristics of Windbreaks, Resulting in Empirical Design Rules* J. Gandemer, Publisher: *Journal of Wind Engineering and Industrial Aerodynamics*
- [6] *Wind Protection by Model Fences in a simulated Atmospheric Boundary Layer* J.K. Rain, D.C. Stevenson, Publisher: *Journal of Industrial Aerodynamics, 2*
- [7] *Criteria for Environmental Wind Conditions* W.H Melbourne, Publisher: *Journal of Wind Engineering and Industrial Aerodynamics*
- [8] *Wind Design Guide* J. Bennett Publisher: *BBSC 433 – Architectural Aerodynamics*
- [9] *Central City Built Form Review: Wind Assessments*, Global Wind Technology Services
- [10] *Wind Guidelines for Planning Applicants* H. Fricke Publisher: *Moonee Valley City Council*



Appendix C Drawings List

Drawings Received: **August 2025**

2025.08.25 – 260 Franklin Street – PLP 01 – DRAFT.pdf