

**BILLS STREET DEVELOPMENT  
HAWTHORN  
ENVIRONMENTAL WIND ASSESSMENT**

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**Report 68-21-DE-EWA-01**



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## 1. INTRODUCTION

The proposed Bills Street Development will consist of six buildings for Social and Affordable Housing in Hawthorn. The location is highlighted in Figure 1.

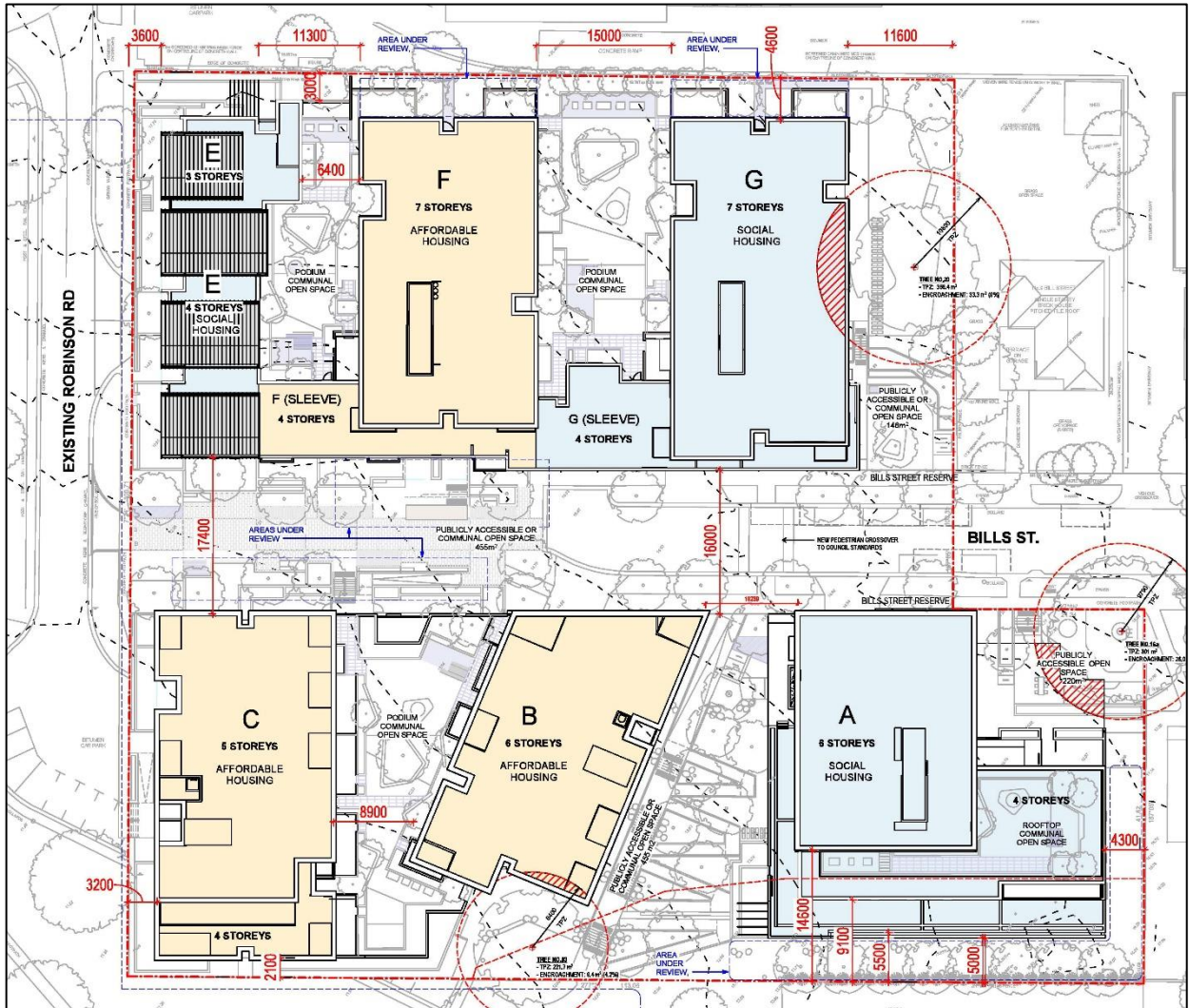


**Figure 1: Location of the proposed Bills Street Development, Hawthorn  
(highlighted in red) [Google]**

This assessment was commissioned by Hayball and is based on a review of drawings prepared by Hayball dated 11 June 2021 (Rev 6), and only considers current existing surrounds and under construction buildings (i.e. no proposed future buildings). This desktop environmental wind assessment is based on MEL Consultants knowledge of wind flow around buildings and structures from undertaking numerous wind tunnel model studies, no wind tunnel study has been undertaken for this study.

## 2. THE DEVELOPMENT

The Bills Street development will consist of six buildings labelled A to G and heights ranging from 4 to 7 storeys as shown in Figure 2.



**Figure 2: Bills Street Development Site Plan**

The topography of the development site falls from the highest elevation at the northeast corner to the lowest elevation at the south west corner. The change of elevation across the site is evident in Figures 3 to 5 that show the Lower Ground Level 2, Lower Ground Level 1, and Ground plans. The common podium of Buildings B and C has pedestrian access at the southwest corner at Lower Ground Level 2 and the common podiums of Buildings A, and E to G have pedestrian access at Lower Ground Level 1, with the remaining areas of the buildings having access at Ground Level.



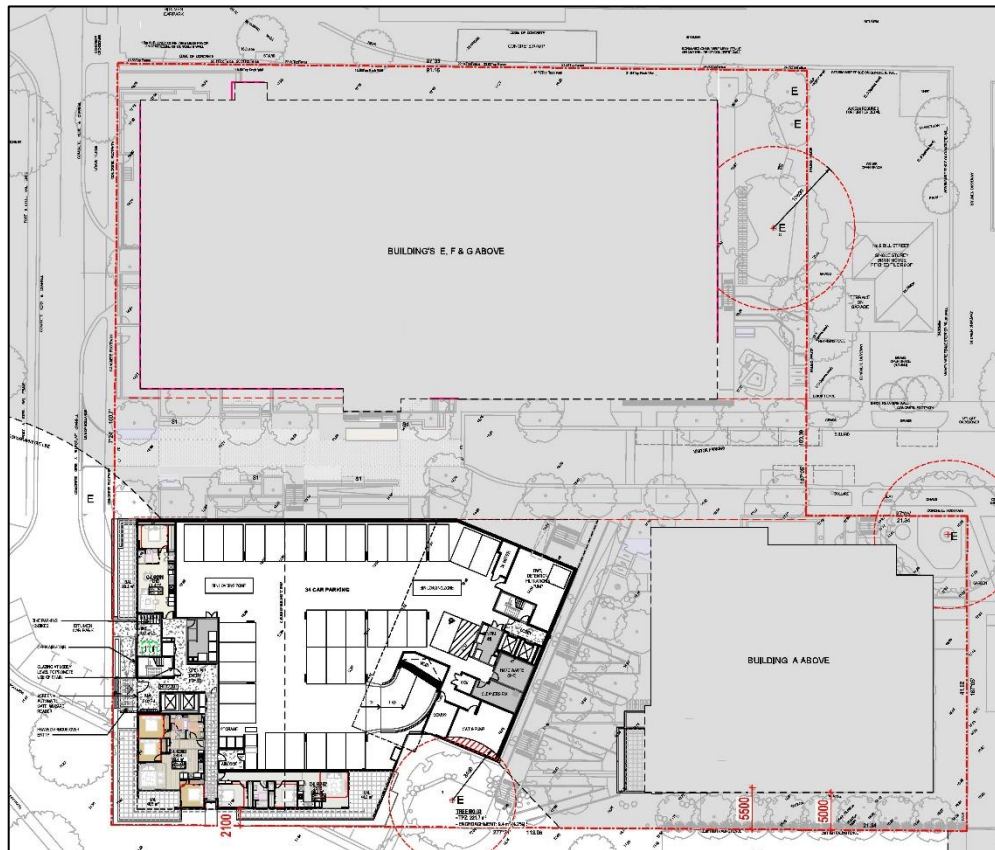


Figure 3: Lower Ground Level 2 Plan

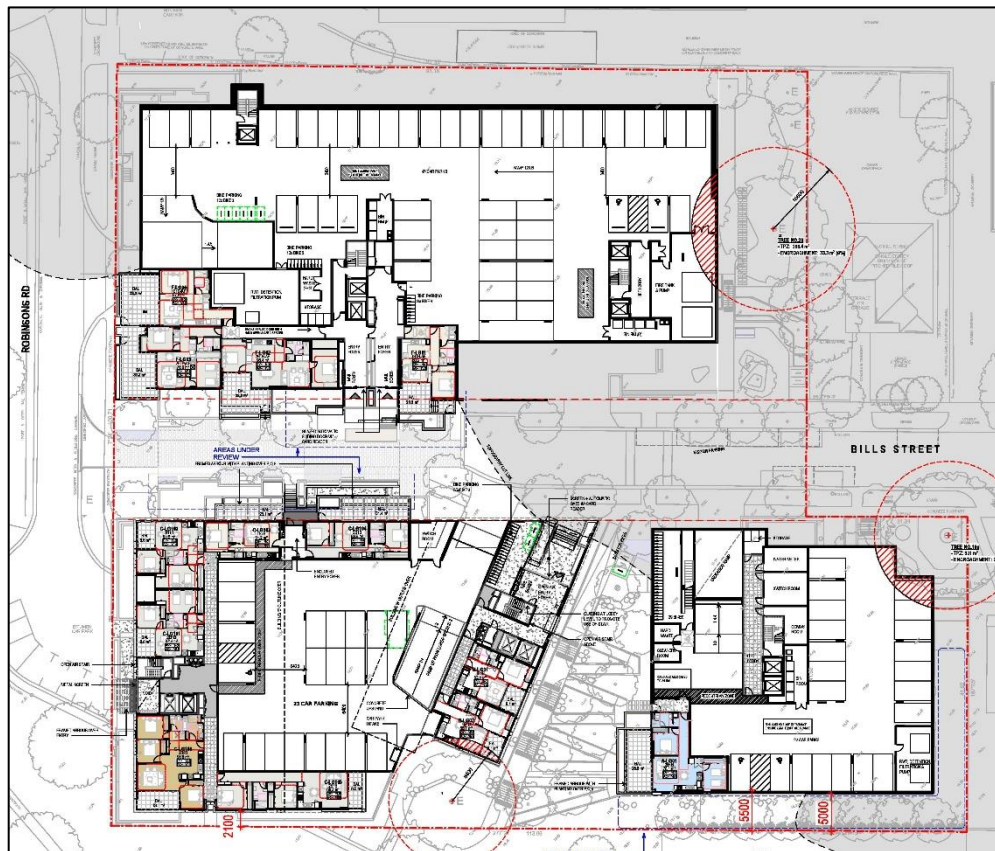
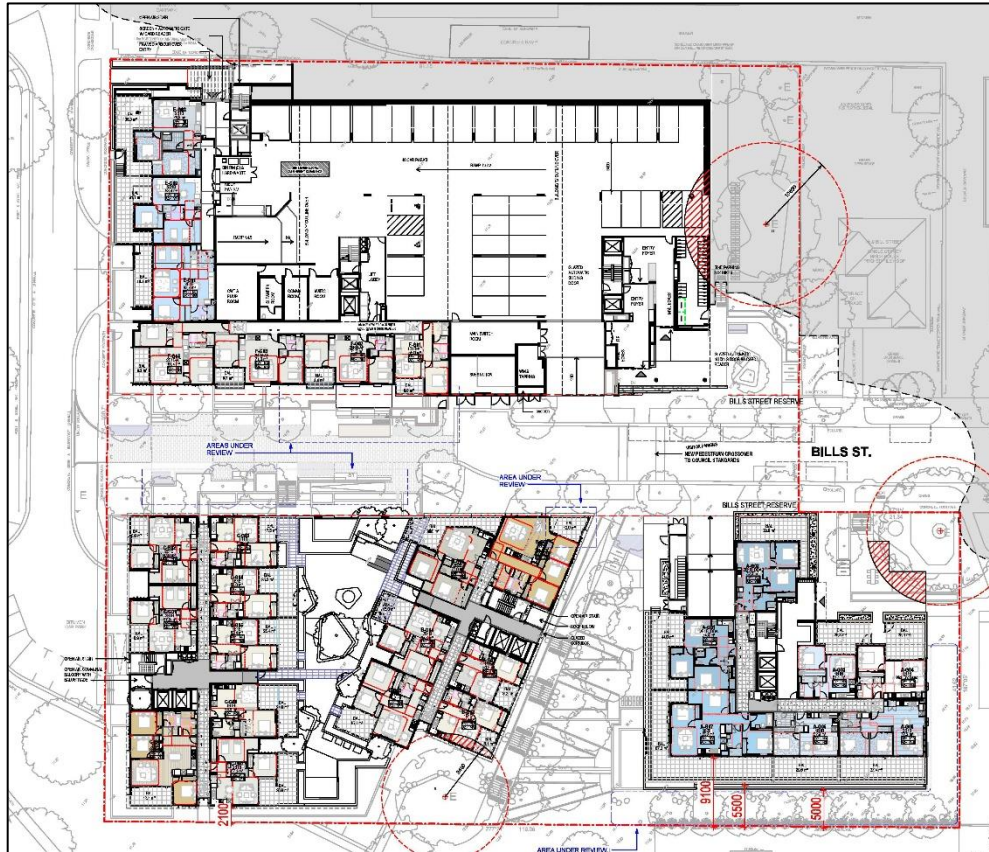


Figure 4: Lower Ground Level 1 Plan



**Figure 5: Ground Level Plan**

Above Ground Level Buildings A and B increase with the same planform up to the height of buildings. Building C is an 'L' shape up to 4 storeys after which the east section of the building steps back and the rectangular shape continues up to the height of the building. Building E will be a 4 storey building at the northwest corner of the site and links to the 4 storey connections between Buildings F and G.

At ground level and on the podiums between the buildings there are areas of public and private open space.

### **3. WIND ENVIRONMENT AND EXPOSURE**

The strongest and most frequent winds in the Melbourne Region come from the north and west sectors with secondary strong winds coming from the south sector; east sector winds are relatively light and infrequent.

The location of the proposed development would be expected to benefit from the topography of the area, which makes the 3 to 4 level buildings to the immediate north effectively taller and provide increased shielding for the prevailing north sector wind directions. For the east, south, and west sector wind directions the approach is over typical suburban housing with open fields to the southwest on either side of the M1 tollway.

Based on the above, all the buildings would be expected to have exposure to the east, south and west sector wind directions and the upper levels of the Buildings F and G would have exposure to north sector wind directions.

#### 4. ASSESSMENT CRITERIA

To assess whether the predicted wind conditions are likely to be acceptable or not, some form of criteria are required so for the purposes of the wind assessment of the development the wind criteria, safety and comfort, from the Better Apartment Design Standards (BADs) produced by the Department of Environment, Land, Water and Planning (DELWP) will be applied or used. While the proposed development is an office building the wind safety and comfort criteria outlined in the BADs are commonly applied by responsible authorities (Melbourne City Council, City of Port Phillip, City of Whitehorse) for all types of developments. The definition of the criteria is as follows:

**Unsafe wind conditions** means the hourly maximum 3 second gust which exceeds 20 metres/second from any wind direction considering at least 16 wind directions with the corresponding probability of exceedance percentage.

**Comfortable wind conditions** A 'mean wind speed' from all wind directions combined with a probability of exceedance less than 20% of the time, equal to or less than:

- 3 metres/second for sitting areas
- 4 metres/second for standing areas
- 5 metres/second for walking areas

**Mean wind speed** means the maximum of:

- Hourly mean wind speed, or
- Gust equivalent mean wind speed (3 second gust wind speed divided by 1.85)

The above criteria are pass/fail criteria as they only assess the summation of probabilities of exceedance across all wind directions to determine whether a location passes or fails the threshold criterion i.e. the criteria assess the average wind conditions.



## 5. RECOMMENDED WIND COMFORT CRITERIA

The following wind comfort criteria are recommended:

Streetscapes	Walking
Building Entrances	Standing (short term exposure)
Outdoor Terraces/Balconies	Walking

The wind conditions on private outdoor terraces have been recommended to satisfy the walking criterion as these spaces could be considered elective when external conditions would be perceived as acceptable for the desired activity. Users of these terraces will need to be educated on the wind effects and loose objects should not be left on an unattended terrace.

## **6. WIND ASSESSMENT**

### **6.1 Robinson Road**

The wind conditions along Robinson Road would be affected by the exposure of Buildings C and E to the west sector wind directions and Buildings A to C to the south sector wind directions. The exposure to the west sector wind directions would be expected to result in increased wind conditions along Robinson Road, in particular at the southwest corner of Building C, due to the downwash of wind flow by the buildings. However, wind conditions for the west sector wind directions along Robinson Road would be expected to satisfy the walking comfort criterion.

The south sector wind direction would have the main effect on Robinson Road on the west side of Building C. Buildings A to C create a wall of buildings along the south of the site with relatively narrow gaps between the buildings. While wind flow would pass between the buildings, wind flow would also be deflected around the east and west side of Buildings A and C respectively. This would increase wind conditions around the southwest corner of Building C and into Robinson Road, assuming the road is extended to the west side of Building C, and wind conditions around this corner and in Robinson Road would be expected to satisfy the walking criterion.

### **6.2 South Side**

As discussed in Section 6.1, Buildings A to C create a wall of building along the south side of the site. The buildings have some positive design features, such as setbacks and a podium between Buildings B and C, but the buildings will create downwash wind flow along the south side of the development which will flow towards the corner of the building, increasing the local wind conditions in this area. However, the wind conditions along the south side of the development would still satisfy the walking criterion.

### **6.3 Bills Street**

Bills Street will be an east-west pedestrian and vehicle connection through the middle of the development. The wind conditions along the street will be affected by the funnelling of

the west and east sector wind directions along the street by the buildings of the development, and also by the south sector wind directions that would flow between Buildings A to C.

The west sector wind directions would be funnelled into Bills Street by Buildings C and E. The funnelling of the wind flow would result in the highest wind conditions between Buildings C and E with wind conditions improving with distance east from the intersection with Robinson Road. The east sector wind directions are relatively light and infrequent but there would still be some funnelling of wind flow along Bills Street by Buildings A and G.

The south sector wind directions would flow between Buildings A to C and create jets of wind flow across Bills Street. The jet of wind flow between Buildings B and C would be mitigated to a degree by the podium connecting these two buildings but the downstream influence of Building F would act to deflect this wind flow down into Bills Street. The gap between Buildings A and B is defined as a ground level pedestrian connection between the south side of the development and Bills Street, so this wind flow would accelerate as the gap between Buildings A and B narrows, creating a localised jet of wind flow across Bills Street.

Based on the above scenario, the wind conditions along Bills Street would be highest at the corners but be expected to satisfy the walking comfort criterion.

## **6.4 Public and Private Open Space**

The development has private open space on the podiums between Buildings E to G and B and C as well as private terraces for each residence. The private open spaces between Buildings E to G would be shielded from direct wind flow by the link buildings between Buildings E to G and the existing buildings to the north on elevated ground. However, the area between Buildings E and F would be expected to be impacted by downwash from Building F for the west sector wind directions. Therefore, the wind conditions in the private open spaces between Buildings E and F would be expected to satisfy the walking criterion and between Buildings F and G would be expected to satisfy the standing and sitting criteria.

The private open space between Buildings B and C would be expected to be impacted by wind flow accelerating between the buildings and any downward associated effects. The reducing gap between Buildings B and C would cause increasing wind speeds with the highest wind conditions where the buildings have the smallest separation. Therefore, the wind conditions in the private open space would be expected to satisfy the walking criterion.

The space between Buildings A and B is defined as a public open space that links the south side of the development to Bills Street. The discussion of the wind conditions in this area is the same as the discussion for the podium space between Buildings B and C, where the wind flow would accelerate due to the narrowing separation between the buildings. Therefore, the wind conditions in this area would be expected to satisfy the walking criterion.

The wind conditions on the private terraces would be expected to satisfy the walking criterion, but the wind conditions on them would be expected to increase and be gustier (turbulent) for balconies near, or at, corners of the tower, particularly those facing the north and west wind directions. Corner balconies are known to experience higher wind conditions compared to balconies located centrally on a façade due to the tendency of wind flowing towards, and accelerating around, building corners. This means that the amenity of corner balconies can be considerably reduced compared to more centrally located balconies. Increasing the heights of the balcony balustrades and the returns would be expected to improve the wind conditions on the balconies.

It would be recommended that users be educated on the wind impacts on balconies and that any objects to be left permanently on the balconies would be tethered/ fixed securely to the balconies and the fixing/ tethers inspected regularly for damage/ corrosion. Any loose items should not be left on the balconies when unattended.

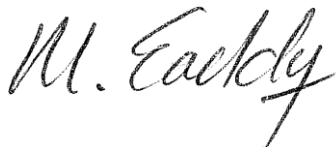


## 7. CONCLUSIONS

We have assessed the likely environmental wind conditions in the streetscapes surrounding the proposed Bills Street, Hawthorn, development, detailed in drawings by Hayball dated 11 June, 2021, (Rev 6).

It has been assessed that the wind conditions in the surrounding streetscapes and public open spaces around the development would satisfy the walking criterion for all wind directions. The wind conditions in the private open spaces would be expected to satisfy the walking criterion with the area between Buildings F and G satisfy the standing and sitting criteria. No modifications to the design have been recommended.

The wind conditions would satisfy the pedestrian safety criterion.



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