

**69 CARRINGTON ROAD
BOX HILL**

ENVIRONMENTAL WIND ASSESSMENT

By

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and

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Report 23139-DE-EWA06

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1. INTRODUCTION

The proposed development at 69 Carrington Road will be a 15-level (~58m) mixed use building on a site between Carrington Road and Cambridge Street, in Box Hill. The location is highlighted in Figure 1.



Figure 1: Location of the proposed 69 Carrington Road Development, Box Hill (highlighted in red circle) [Google]

This assessment was commissioned by Golden Age Group and is based on a review of drawings prepared by Gray Puksand as listed in Appendix A and only considers current existing surrounds and under construction buildings. No future proposed buildings have been considered in this assessment. 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.

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2. THE DEVELOPMENT

The 69 Carrington Road Development will be a 15-level building (~58m) mixed use building consisting of:

- Two levels of retail tenancies (Ground Floor and Level 1)
- Thirteen levels of office tenancies (Levels 2 – 14)

The design will provide a link 'Laneway' from Carrington Road to Cambridge Street on the east side of the site. At Level 4 on the north, east, south and a portion of the west facades, the building sets back from the site boundary. The office tenancies at Levels 9 – 14 are each further set back progressively (terraced setback) from the site boundary on the south side. These setbacks have been utilised as outdoor terraces as shown in Figures 5 and 8 – 13.

The ground level retail tenancies will have main entrances along Carrington Road (an inset entrance) and the covered laneway (covered by above levels), and secondary back of house entrance along Cambridge Street. The ground level will also have a lobby with a recessed entrance and two lift entrances in the covered laneway on the east side of the site. There will be a staircase along the laneway linking the retail levels of the development. The basement carpark levels will be accessible via the car lift access along Cambridge Street. These entrances have been highlighted in Figure 2.

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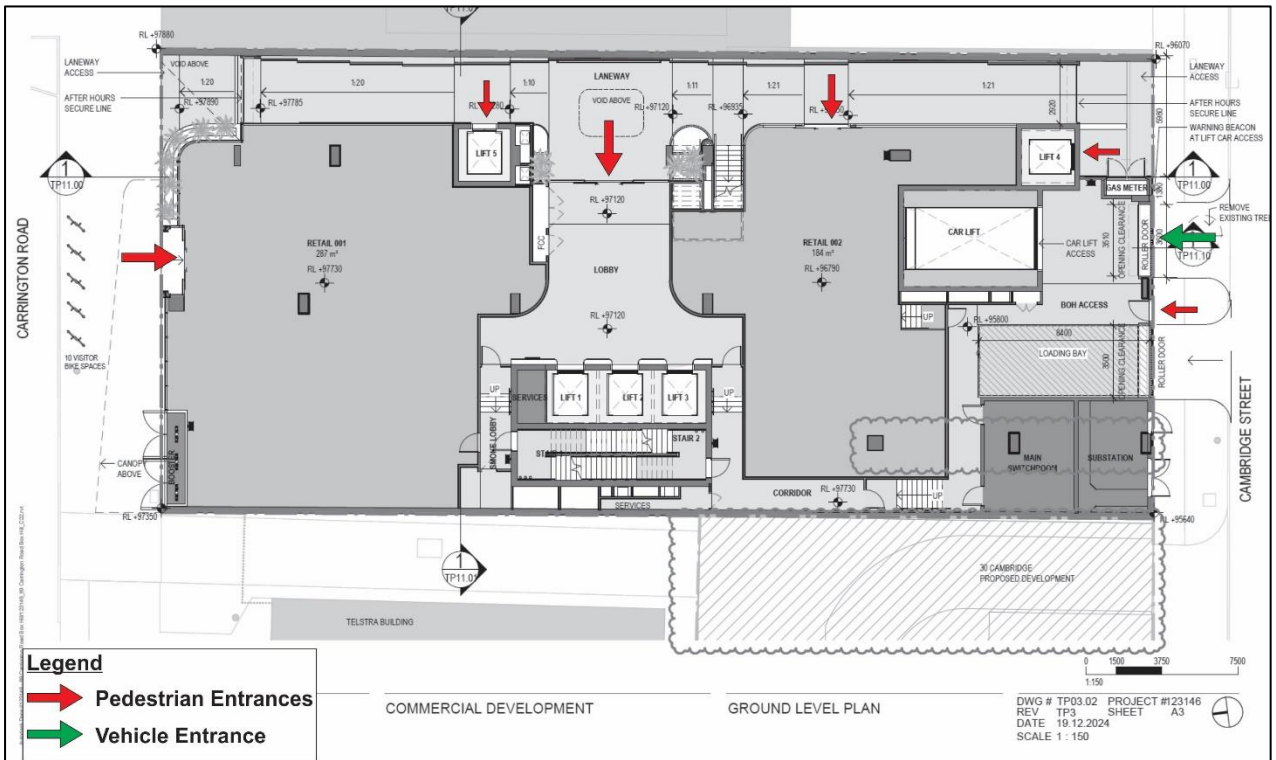


Figure 2: Ground level plan (with markup of entrances)

At Level 1, the architectural design creates a canopy shroud that project over Carrington Road as shown in Figure 3.

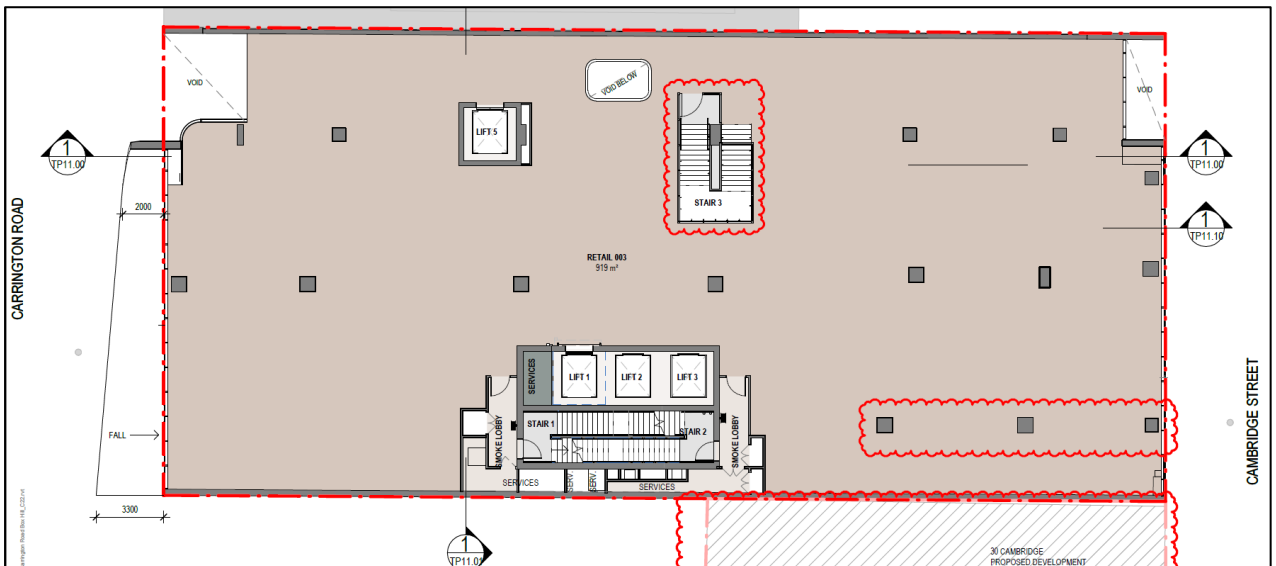


Figure 3: Level 1 plan

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The office tenancies at Levels 2 – 14 are presented in Figures 4 to 13 and some have private outdoor terraces on the north, east, south and west sides as follows:

- Levels 2 – 3: Partly recessed terraces at the northeast corner covered by upper levels floor plates
- Level 4: Open roof terraces with planter boxes on the north, east, south and west sides
- Levels 9 – 14: Open roof terraces with planter boxes on the south side

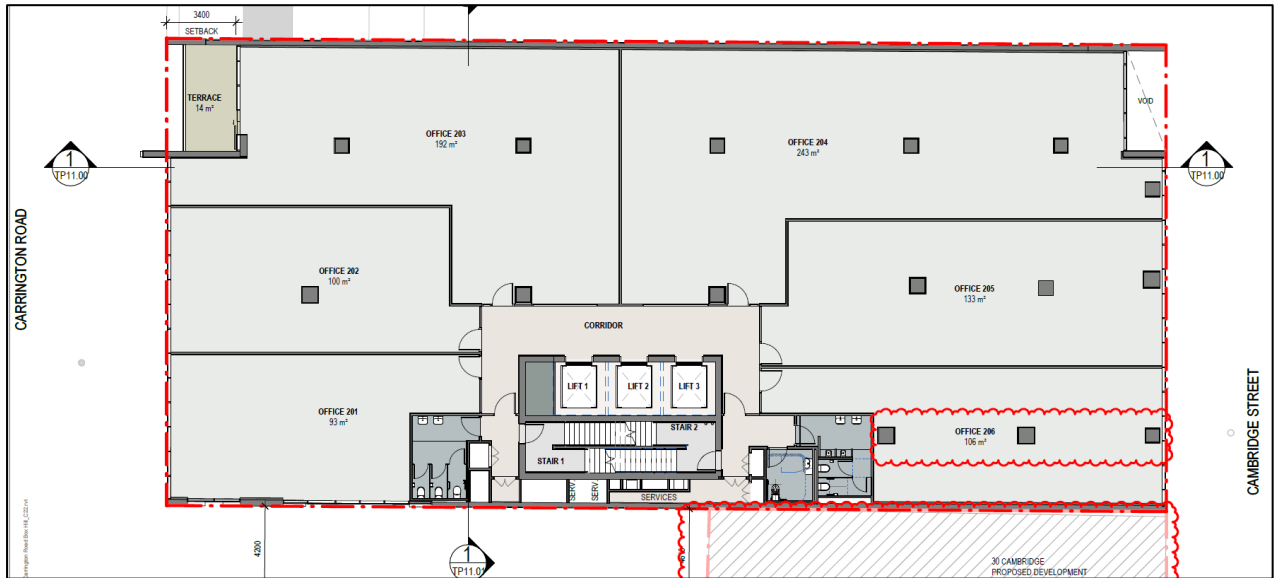


Figure 4: Levels 2-3 plan

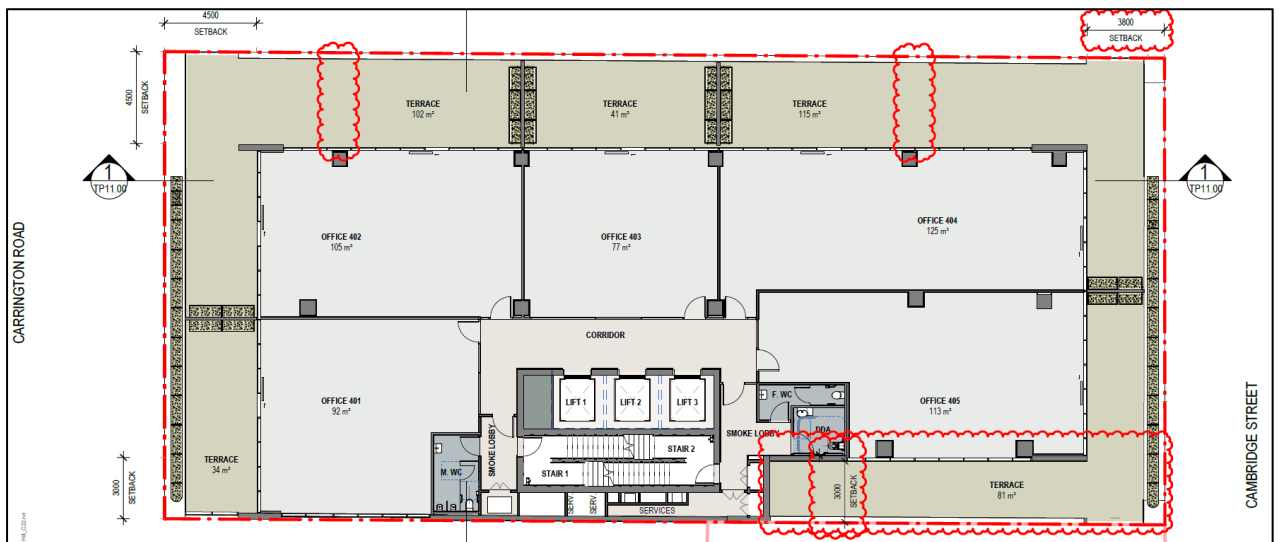


Figure 5: Level 4 plan

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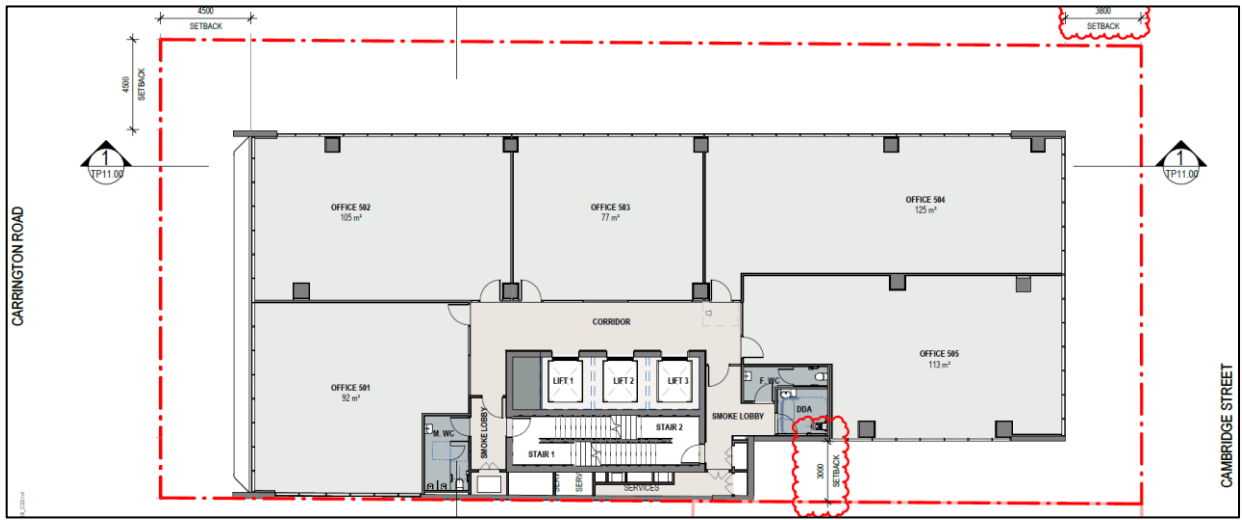


Figure 6: Levels 5-7 plan

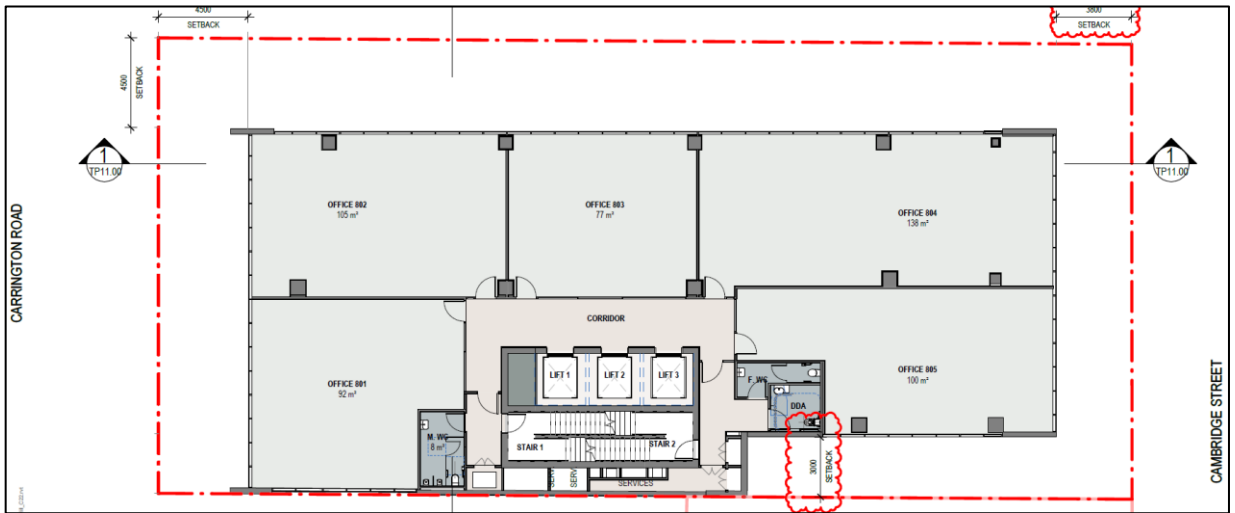


Figure 7: Level 8 plan

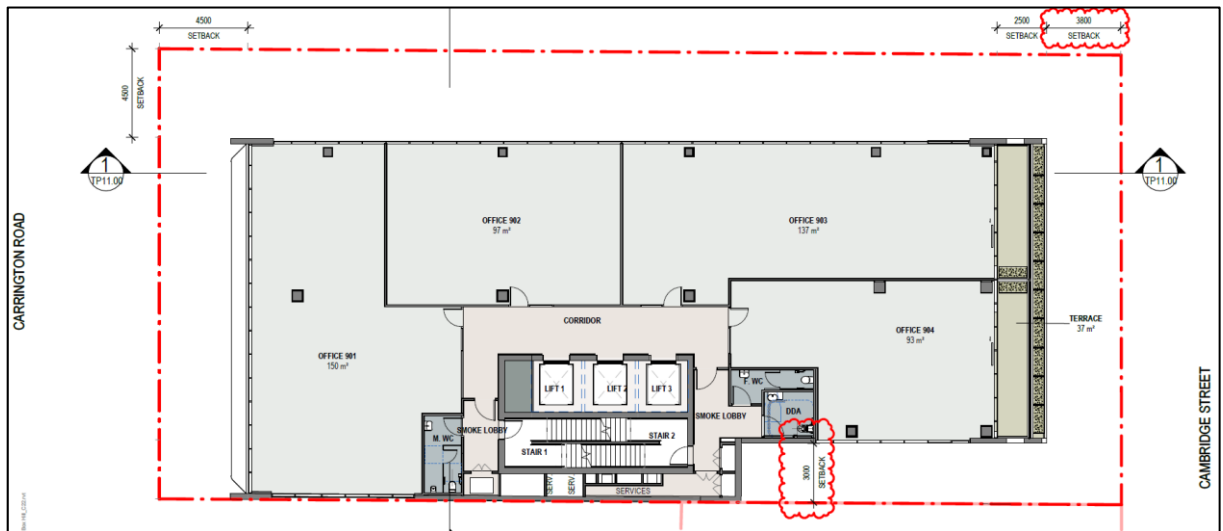


Figure 8: Level 9 plan

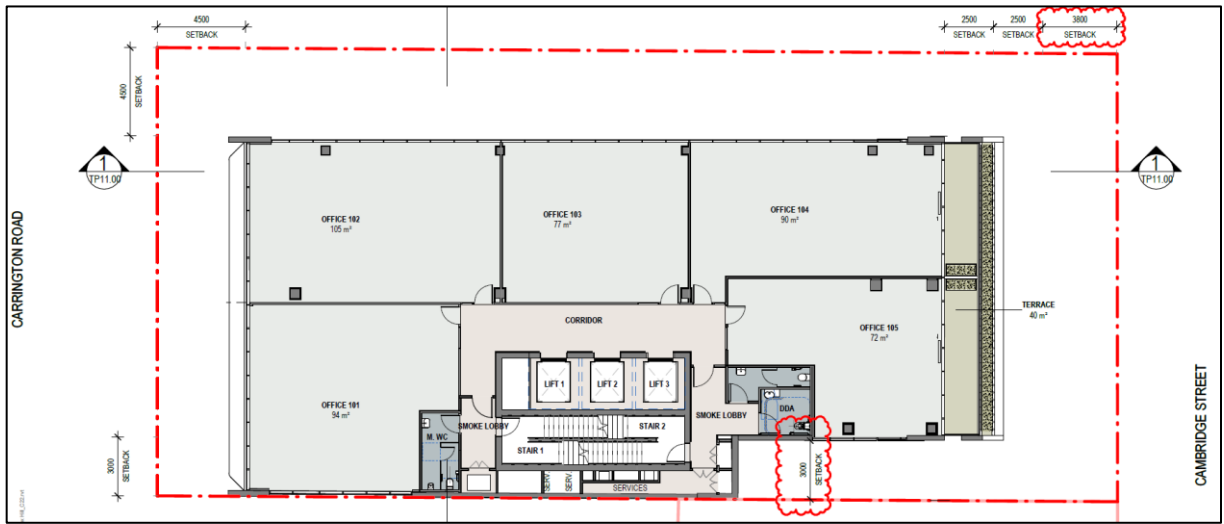


Figure 9: Level 10 plan

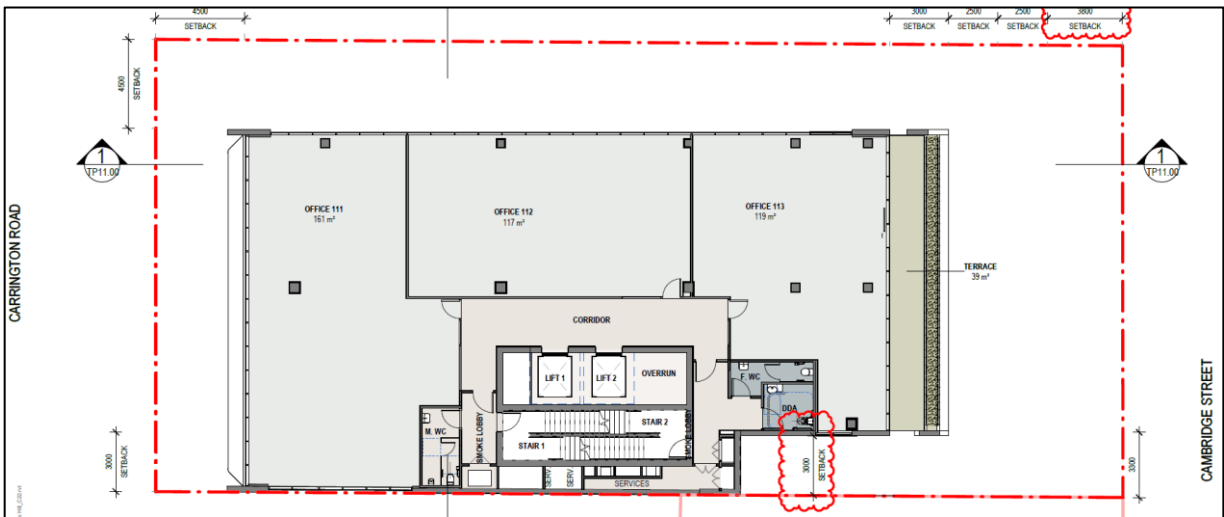


Figure 10: Level 11 plan

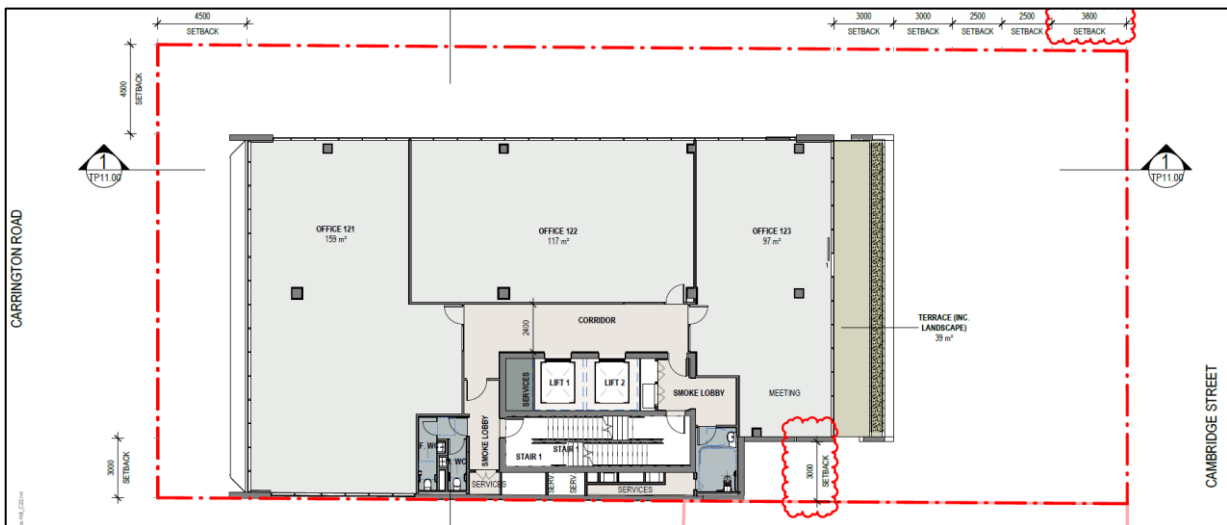


Figure 11: Level 12 plan

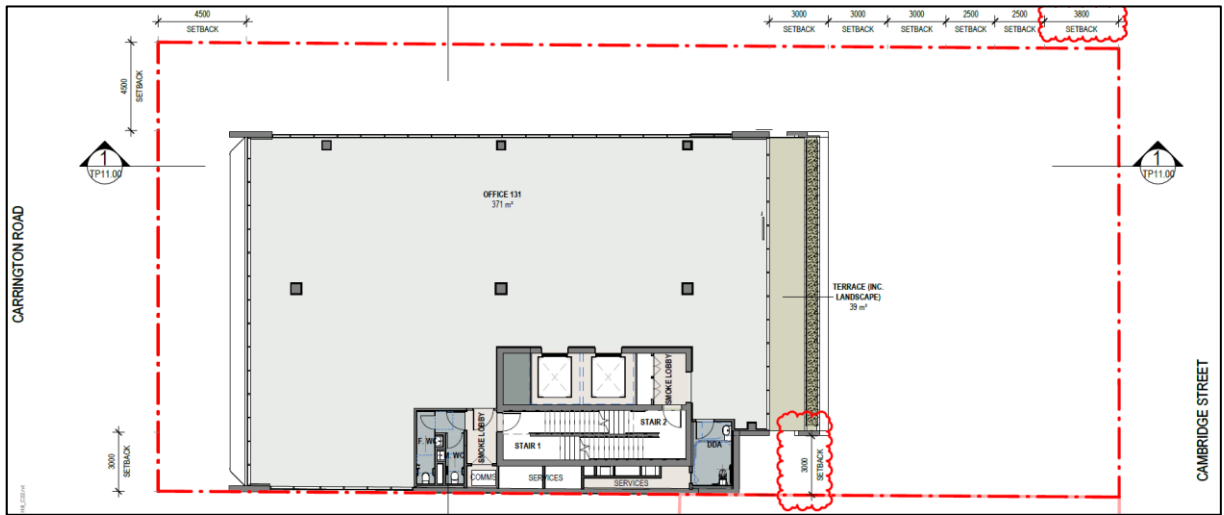


Figure 12: Level 13 plan

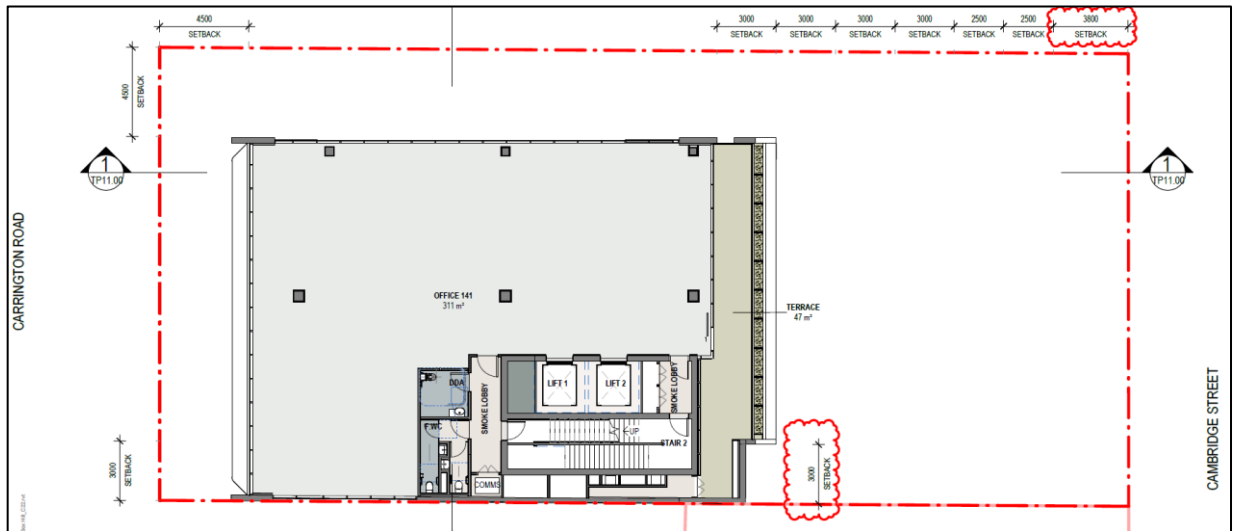


Figure 13: Level 14 plan

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3. WIND ENVIRONMENT AND EXPOSURE

The strongest and most frequent winds in the Box Hill 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 proposed Development will be immediately surrounded by mainly commercial buildings of 1 to 3 levels high. In the far field, there are several high-rise buildings along Whitehorse Road and Prospect Street which will provide shielding from the northwest sector winds. A few other high-rise buildings in Box Hill namely ATO, Tempo and Sky One Developments will also provide shielding from the northeast sector wind directions.

The change in local topography of the site from Cambridge Street to Carrington Road is approximately 2m drop over a length of approximate 50m (~2.3° change). However, in the far field the topography of the land to the north drops considerably which effectively reduces the relative heights of buildings to the north as well as causing higher approach wind speeds. This will be considered in this assessment.

Based on the above, the upper levels of the development would have exposure to the wind flow for the north and east through south to west-northwest wind directions.

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4. ASSESSMENT CRITERIA

To assess whether the predicted wind conditions are likely to be acceptable or not, some forms of criteria are required. For the purposes of the wind assessment of the development the wind criteria, safety and comfort, from the City of Whitehorse Planning Scheme Clause 58.04-4 (Standard D17) will be used. The definition of the criteria is summarised as follows:

Unsafe wind conditions mean 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)

Trees and landscaping should not be used to mitigate wind impacts. This does not apply to sitting areas, where trees and landscaping may be used to supplement fixed wind mitigation elements.

Wind mitigation elements, such as awnings and screens should be located within the site boundary, unless consistent with existing urban context or preferred future development of the area.

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.

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5. RECOMMENDED WIND COMFORT CRITERIA

The following wind comfort criteria are recommended:

Streetscapes	Walking
Building Entrances	Standing
External Lift Entrances (Lifts 4 & 5)	Standing
Office Levels Outdoor Terraces*	Walking

*The wind conditions on the office levels 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.

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6. WIND ASSESSMENT

6.1 Carrington Road

The wind conditions along Carrington Road would be influenced by wind flow from the north sector winds incident upon the north face, causing some downwash effects into Carrington Road. Furthermore, wind flow directed towards Carrington Road by the east and west sector winds deflecting off the northeast and northwest corners of the development, respectively.

The set back of the building from above Level 4 from the north site boundary and the canopy shroud projection at Level 1 would be expected to reduce the amount of downwash into Carrington Road. With appropriate landscaping (e.g. 1.2m high trees with ~50% solidity), the curved landscaped planter box near the northeast corner of the site would be expected to also reduce the speed up effects around the laneway entrance along Carrington Road.

Based on the above scenario, the wind conditions along Carrington Road away from the northeast and northwest corners would be expected to satisfy the walking comfort criterion. It would be expected that the wind conditions may be above the walking comfort criterion at the northeast and northwest corners. The wind conditions outside the ~1m inset retail entrance along Carrington Road would be expected to satisfy the recommended standing comfort criterion. It would be recommended that the wind conditions along Carrington Road be quantified by wind tunnel model testing.

The wind conditions along Carrington Road would be expected to be within the safety criterion.

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6.2 Cambridge Street

The wind conditions along Cambridge Street would be influenced by winds incident normal to the south face, resulting in downwash effects. Some additional wind flow would also be deflected into Cambridge Street from the southeast and southwest corners of the development due to east and west sector winds, respectively. The south façade will benefit from the set back from the southern boundary at Levels 4 to 8 and the terraced setbacks of the building from Levels 9 to 14.

Based on the above scenario, the wind conditions along Cambridge Street would be expected to satisfy the walking comfort and be above the standing comfort criterion at the back of house entrance along Cambridge Road. As such, it is recommended that the wind conditions along Cambridge Street be quantified by wind tunnel model testing.

The wind conditions along Cambridge Street would be expected to be within the safety criterion.

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6.3 Laneway

The wind induced pressure difference across the building would drive the wind flow through the covered laneway on the east side of the development, predominantly influenced by the strong and frequent north sector winds of Melbourne. The additional induced wind flow from the north sector winds, as discussed in Section 6.1, would be expected to be funnelled and accelerate through the laneway. Similarly, for southerly winds, the pressure difference would draw the additional induced wind flow from the south sector winds, discussed in Section 6.2, through the laneway.

Based on the above scenario the wind conditions in the laneway would be expected to satisfy the walking comfort criterion. The lobby entrance is recessed and would be expected to satisfy the standing comfort criterion, but at the retail and external lifts (Lifts 4 & 5) entrances, the wind conditions would be expected to be above the standing comfort criterion. As such, it is recommended that the wind conditions along the laneway be quantified by wind tunnel model testing.

The wind conditions along the Laneway would be expected to be within the safety criterion.

6.4 Office Levels Outdoor Terraces

The outdoor terraces at the northeast corners of Levels 2 and 3 are partly recessed (partly open on the east façade) into the site and covered by upper levels floors and wind conditions at these terraces would be expected to satisfy the standing comfort criterion at a minimum, and the safety criterion.

The north, east, south and west facing terrace at Level 4 is partly covered by the architectural design features on the north and south sides, which would provide some shielding from the downwash from the upper levels (discussed in Sections 6.1 and 6.2). Additionally, with appropriate landscaping as discussed in Section 6.1, the planter boxes on the Level 4 terrace would also provide some shielding from wind flow along the terrace. The wind conditions in the centre of these terraces (i.e., away from the building corners) would be expected to satisfy the walking comfort criterion at a minimum. However, the areas of the terraces near the building corners, particularly the northeast and southwest corners, would be expected to have wind conditions that are above the walking comfort criterion. To improve these wind conditions to satisfy the walking comfort criterion, higher balustrades on the west ends and local wind break screens near these corners would likely be required. Therefore, it is recommended that the wind conditions at these terraces be quantified by wind tunnel model testing.

The south facing outdoor terraces on Levels 9 – 14 would have greater exposure to direct wind flow. However, these terraces are set back into the building progressively at each level which would reduce the impact of downwash effects. Additionally, the east and west building facades extend to the southern edge of the terraces which would assist with deflecting flow from the southeast and southwest corners of the building away from the terraces. Based on the above scenario, the wind conditions at these terraces would be expected to satisfy the walking comfort criterion at a minimum, and the safety criterion.

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7. CONCLUSIONS

We have assessed the likely environmental wind conditions in the streetscapes surrounding the proposed development at 69 Carrington Road Development, Box Hill, detailed in drawings by Gray Puksand as listed in Appendix A.

It has been assessed that the wind conditions in the surrounding streetscapes would be expected to satisfy the walking comfort criterion except at the northeast and northwest corners of the site where wind conditions may be above the walking comfort criterion. These wind conditions would be increased compared to the existing wind conditions.

The wind conditions at the inset retail entrance along Carrington Road and at the recessed lobby entrance would be expected to satisfy the recommended standing comfort criterion. The wind conditions at the other pedestrian entrances around the Development (retail tenancy entrance in laneway, back of house entrance and outdoor lifts entrances) have been assessed to be likely above the standing comfort criterion. The wind conditions outside the retail entrance in the laneway would be improved to the standing comfort criterion by recessing the doors by 1.5m.

The partly covered podium level terrace at Level 4 has been assessed as potentially experiencing wind conditions that are above the walking comfort criterion near the building corners, especially near the northeast and southwest corners. Higher balustrades on the west ends and local wind break screens near corners of the Level 4 terrace would be expected to improve wind conditions to satisfy the walking comfort criterion. The wind conditions on the south facing terraces at Levels 9 – 14 would be expected to satisfy the walking comfort criterion at a minimum.

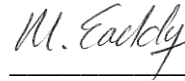
The wind conditions in the surrounding streetscapes would satisfy the pedestrian safety criterion.

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Wind tunnel studies have been recommended to quantify the wind conditions around the proposed 69 Carrington Road Development.



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19 Dec 2024



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APPENDIX A – DRAWING REGISTER

Drawing #	Revision	Date	Title
TP00.00	TP3	19.12.2024	Cover Sheet
TP01.00	TP3	19.12.2024	Existing and Demolition Plan
TP01.01	TP3	19.12.2024	Proposed Site Plan
TP01.10	TP3	19.12.2024	Development Summary
TP03.00	TP3	19.12.2024	Basement 2 Plan
TP03.01	TP3	19.12.2024	Basement 1 Plan
TP03.02	TP3	19.12.2024	Ground Level Plan
TP03.03	TP3	19.12.2024	Level 1 Plan
TP03.04	TP3	19.12.2024	Level 2-3 (Typical) Plan
TP03.06	TP3	19.12.2024	Level 4 Plan
TP03.07	TP3	19.12.2024	Level 5-7 (Typical) Plan
TP03.08	TP3	19.12.2024	Level 8 Plan
TP03.09	TP3	19.12.2024	Level 9 Plan
TP03.10	TP3	19.12.2024	Level 10 Plan
TP03.11	TP3	19.12.2024	Level 11 Plan
TP03.12	TP3	19.12.2024	Level 12 Plan
TP03.13	TP3	19.12.2024	Level 13 Plan
TP03.14	TP3	19.12.2024	Level 14 Plan
TP03.15	TP3	19.12.2024	Roof Plan
TP10.00	TP3	19.12.2024	North & South Elevations
TP10.01	TP3	19.12.2024	East Elevation
TP10.02	TP3	19.12.2024	West Elevation
TP11.00	TP3	19.12.2024	Section A
TP11.01	TP3	19.12.2024	Section B
TP11.10	TP3	19.12.2024	Facade Sections
TP20.00	TP3	19.12.2024	Materials Schedule
TP30.00	TP3	19.12.2024	Shadow Study - 22nd Sept
TP30.01	TP3	19.12-2024	Shadow Study - 22nd Sept

Notes:

- Drawing filename: 'Files_241219_Updated TP Submission_2024-12-19_12-27-09pm.ZIP'

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