



April 8, 2024

Mirvac
Attn: Anne Ng
E: anne.ng@mirvac.com
M: +61 466 850 853

**Re: Harbourside Redevelopment
SSDA2 MOD2 - Wind Impact Assessment
RWDI Project #2105658**

Dear Anne,

This Wind Impact Assessment has been prepared by RWDI Australia Pty Ltd ("RWDI") on behalf of Mirvac Retail Sub SPV Pty Ltd (Mirvac) and is submitted in support of a Section 4.55(2) Modification Application submitted to the Department of Planning, Housing and Infrastructure (DPHI), to modify development consent SSD 49295711 relating to the detailed design, construction, and operation of the new Harbourside mixed-use podium and tower building.

The proposed Modification Application (SSD 49295711 MOD 2) relates to the following:

- Expansion of permissible uses on level 1 to include commercial/events & conference uses;
- Amendments to the design of the ground floor residential and southern commercial lobbies;
- Amendments to level 4 office layout;
- Amendments to level 5 internal pool, external amenities and communal open space;
- Amendments to the general layout of levels 6 – 8;
- Amendments to levels 46 – 49 penthouse and rooftop plant;
- Various amendments to building services, plant, podium rooftop and facades following further design development and coordination; and
- Inclusion of design changes to the Bunn Street through-site link as required by the consent.

For a detailed description of the proposed modifications, please refer to the Modification Report prepared by Ethos Urban. This report demonstrates that the above amendments will not give rise to unreasonable environmental impacts from a wind perspective.

RWDI have previously undertaken wind tunnel testing of the development as documented in the report submitted as part of SSDA2 dated 4 November 2022. Note that an updated wind tunnel test is proposed to be conducted to satisfy the conditions of consent. In this study, exceedances of the wind comfort and safety criteria were noted in a limited number of locations, including on the Level 5 terrace, ground level, and the proposed Bunn Street Bridge. This letter has been prepared to assess the change in wind



conditions associated with these locations as a result of further design development, specifically for the SSDA2 MOD2 design scheme.

1. Methodology

Modelling has been undertaken using Computational Fluid Dynamics (CFD) simulations to assess the expected impact to the overall wind conditions around the site. For this analysis, CFD techniques were used to generate a virtual wind tunnel where flows around the site and its surroundings were simulated in full scale. The computational domain that covered the site and its surroundings was divided into millions of small cells where calculations were performed, yielding a prediction of wind conditions across the entire study domain. CFD excels as a tool for wind modelling for comparing different designs and site scenarios, resolving complex flow physics, and helping diagnose problematic wind conditions.

CFD modelling has been undertaken for the SSDA2 (July 2023) and current SSDA2 MOD2 designs to facilitate comparison between the wind conditions for these two schemes.

It is important to understand that this assessment is based on a steady-state analysis of the site and, therefore, the wind speed predictions represent an average of the expected conditions within and around the development. While this provides valuable insight into the site conditions and governing wind effects, the overall gust response can only be evaluated through the use of wind tunnel testing.

2. Comparison of Wind Conditions

The following sections discuss the wind conditions in key locations.

2.1 Level 5 Terrace

Wind conditions on Level 5 are summarised in Image 1 below.

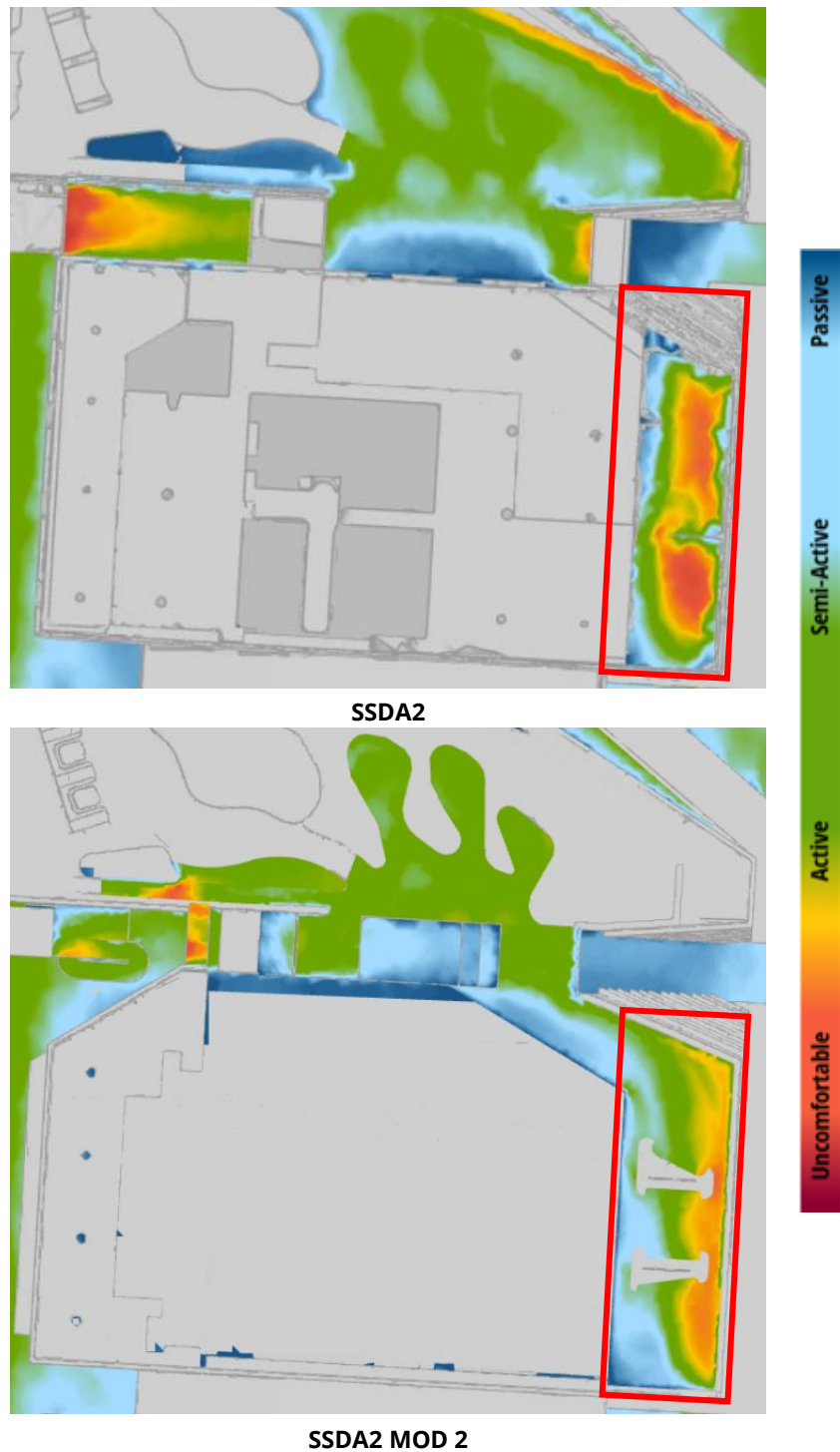


Image 1: Comparison of Wind Conditions on Levels 5 for SSDA2 and SSDA2 MOD 2 Designs

The comparison between the SSDA2 and SSDA2 MOD2 designs reveals a significant reduction in wind intensity on the eastern Level 5 terrace. This improvement can be attributed to several enhancements, including the expansion of the awning, taller balustrades, and the integration of screening within the terrace. These adjustments, informed by earlier studies aimed at minimizing wind infiltration, have led to a notable enhancement in terrace conditions. Specifically, areas marked in blue indicate a high likelihood of comfort for long-duration use. These are situated closer to the building and

underneath the extended awning. The incorporation of screening further contributes to the creation of zones suitable for semi-active or short-duration activities. However, it is worth noting that regions nearer to the terrace edges may still experience considerable wind exposure, especially during the summer months. During winters, wind conditions are anticipated to calmer due to low exposure to west winds.

The improvements indicate that the safety criterion is now likely met, and further amelioration of comfort conditions could be accomplished through localised landscaping measures.

2.2 Ground Level

Two areas where wind speeds were observed to exceed the safety criterion were noted at the intersection of Darling Drive & Murray Street, and near the south side of the Sofitel. It is important to highlight that both spaces were exceeding the criterion for the existing configuration of the site. Conditions at these locations are shown in Image 2A below.

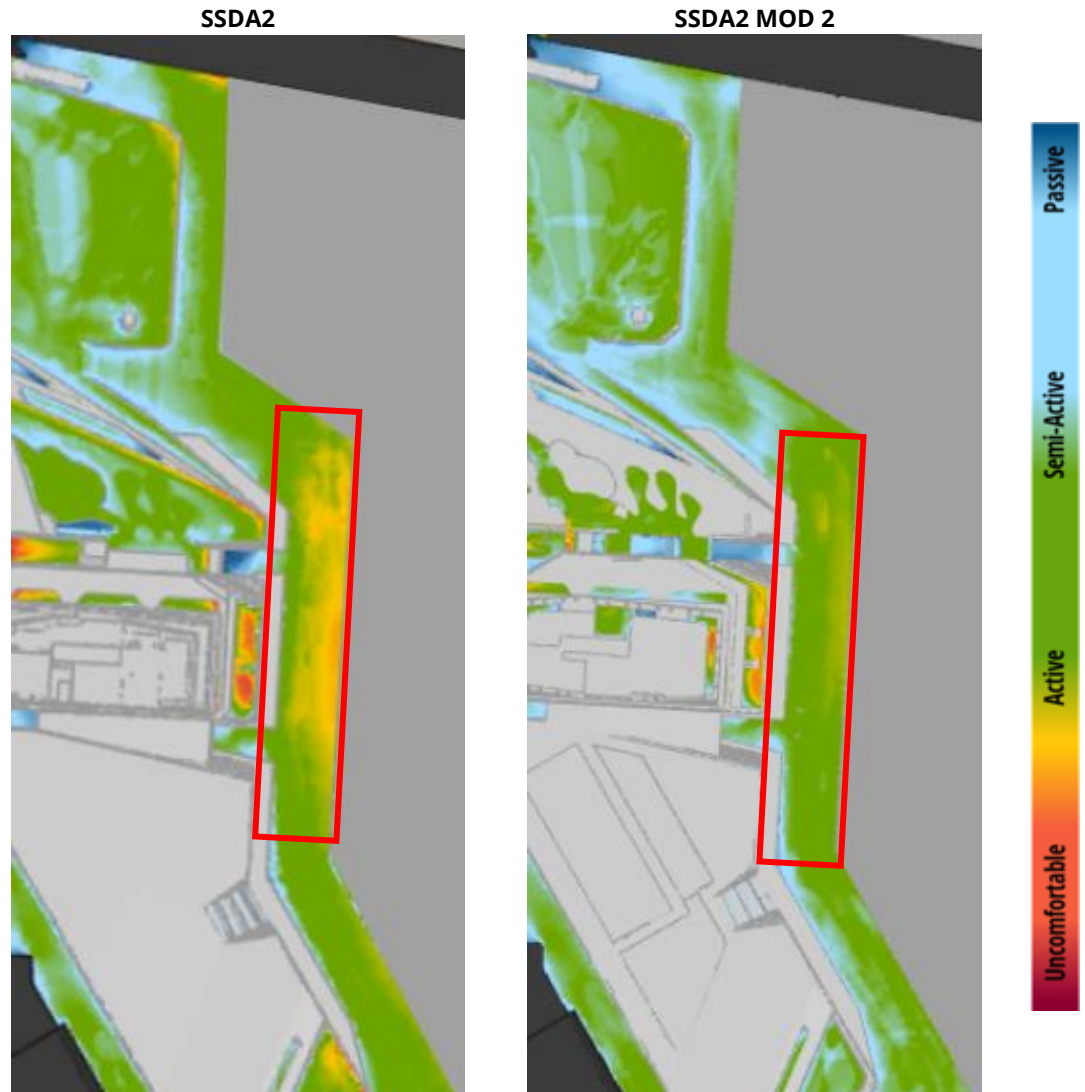


**Image 2A: Comparison of Wind Conditions on Ground Level
 for SSDA2 and SSDA2 MOD 2 Designs**

As shown, the extent of the strong winds has decreased in both locations on account of changes to the built form incorporated in the SSDA2 MOD2 design, which is positive for the overall wind environment.

Another location of interest is the Waterfront Promenade, where one minor exceedance of the safety criterion was noted in the wind tunnel study for the proposed SSDA 2

design, at a location in line with the south walk. A comparison of the expected wind conditions along the Promenade are indicated in Image 2B below.



Waterfront Promenade

**Image 2B: Comparison of Wind Conditions on Ground Level
for SSDA2 and SSDA2 MOD 2 Designs**

As shown, the wind speeds along the entire Waterfront Promenade have improved compared to the original SSDA2 design, which is positive for the overall wind environment. Landscaping will further improve wind amenity in this area.

Finally, another location of interest is the residential entrance lobby located on the western frontage. A comparison of the expected wind conditions is shown in Image 2C below. As shown, the wind speeds are consistent with the original SSDA2 design.



Residential Lobby

Image 2C: Comparison of Wind Conditions at Ground Level Residential Lobby Entrance for SSDA2 and SSDA2 MOD 2 Designs

It is important to note that while this CFD study has assessed mean wind conditions, the improvement indicates that the gust response is also likely to reduce.

2.3 Bunn Street Bridge

The Bunn Street Bridge has not been simulated in the current CFD analysis due to the level of detail being contemplated for wind mitigation. However, this area was assessed during wind tunnel testing of the development, as documented in the report submitted for SSDA2 on 4 November 2022. During testing, no balustrading or obstruction was implemented to establish a baseline understanding of the prevailing wind conditions and aid in informing subsequent design decisions. Advice was provided in the report based on the test data and RWDI's experience with wind amelioration, recommending:

"Impermeable balustrades with a minimum total height of 1.8 m to reduce exposure to the southerly winds. Other suitable measures can include a combination of impermeable and porous screening along the perimeter; however, the overall height from a wind perspective is recommended as 1.8 m."

RWDI understand that detailed design of the bridge is ongoing, and we are actively providing input on the screening to improve wind amenity and safety on the bridge. This will continue to be assessed as the design develops, and the overall performance will be assessed as part of a separate SSDA3 planning submission.



3. Summary and Conclusion

This letter addresses the changes in wind conditions on and around the Harbourside Redevelopment in Pyrmont, NSW, comparing the SSDA2 and SSDA2 MOD2 designs. Computational Fluid Dynamics (CFD) simulations were performed for these two designs to facilitate comparison of wind conditions and to demonstrate the level of improvement which has resulted through the ongoing design and consultation process.

Overall, the wind conditions are shown to improve at the key areas where higher wind speeds were noted in the original wind tunnel study (documented in RWDI's report dated 4 November 2022).

Please do not hesitate to contact us if you have any further questions.

RWDI

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Dr Aman Choudhry
Senior Microclimate Engineer

A handwritten signature in black ink, appearing to read 'Michael Pieterse'.

Michael Pieterse
Senior Project Manager | Associate Principal