Technical Memorandum

To:	Amy Kiely	**From:**	Dr Farzin Ghanadi
Company:	Stockland Developments Pty Limited	**SLR Consulting Limited**	
cc:		**Date:**	24 July 2026
		Project No.	610.032969.00001

RE: Waterloo Estate (South)
Environmental Wind Tunnel Study – Response to Submissions

This document has been prepared by SLR Consulting Ltd (SLR) as an addendum to the previously issued quantitative wind assessment for the proposed development within the Waterloo Estate (South):

- SLR Report 610.032969.00001-R02-v1.2 (dated 30 March 2026), *"Waterloo Estate (South)"*.

The addendum has been developed in response to submissions received during the public exhibition of the Waterloo Estate (South) Concept SSDA (93222706) and concurrent rezoning.

Should you require any further clarification or additional information in relation to this addendum, please do not hesitate to contact SLR.

Kind Regards,

Dr Farzin Ghanadi
Associate Consultant

Reviewed by:

Dr Neihad Al-Khalidy
Technical Director

In the following sections, the matters raised in the Department's key issues letter as well as the City of Sydney's submission to the Concept SSDA and rezoning have been addressed.

1. **Supporting documentation relating to wind impacts does not allow a comprehensive understanding of the comparison of impacts between the existing approved envelopes and proposed envelopes.**

SLR Response

- The comparison has been undertaken on a point-by-point basis using consistent measurement locations and assessment criteria for the approved 2022 Design Guide and proposed Masterplan scenarios. As shown in Table 7 of the Environmental Wind Tunnel Study Report, only minor localised variations are observed due to changes in building geometry.
- Accordingly, the proposed Masterplan is considered capable of satisfying the required pedestrian wind comfort and safety criteria.

2. **Wind studies should provide 5% exceedance speed data for comfort and data for safety, so it is possible to do a proper comparative analysis with the current Design Guide.**

   Further, test locations in surrounding streets and parks need to be included in testing to understand the impact of the development.

SLR Response

- The wind assessment within the Environmental Wind Tunnel Study Report has been undertaken using the 5% exceedance wind speed criterion for pedestrian comfort. These assessment criteria have been applied consistently to the baseline, approved 2022 Design Guide, and proposed Masterplan scenarios.
- As outlined in the Environmental Wind Tunnel Study Report (page 44, refer extract below), the pedestrian safety assessment has been undertaken in accordance with the Sydney DCP 2012 using the local wind speed and wind direction probability distributions to calculate the peak annual gust. The results indicate that no assessment locations exceed the adopted pedestrian safety criterion.

Page 44

"Masterplan Design Guide" Scenario 1 to Scenario 3

- NO locations are predicted to experience winds which exceed the Safety Criterion,

- Additional test locations are discussed in the following items.

3. **Based on the submitted documentation, it is indicated that wind conditions have worsened on George Street with fewer locations suitable for sitting which is the anticipated use.**
   There were not enough test points within the location of the future park and suitable conclusions are not able to be made. Further, there is insufficient testing in Waterloo Park except for some results indicating worsening conditions to walking, and not enough test points have been considered within the new small park to provide sufficient data.

At a minimum, concept envelopes should be informed by comprehensive wind assessments and ensure the following:

- **That the wind environment on George Street is not made worse than the current Design Guide**
- **Comfort (walking - the 5% exceedance is not more than 8m/s) conditions are achieved at the base of all towers)**
- **At least 50% of each park is suitable for sitting**

SLR Response

- As shown in Table 7 of the Environmental Wind Tunnel Study Report (refer extracted results in Table 1 below), a point-by-point comparison along George Street has been undertaken between the approved 2022 Design Guide and the proposed Masterplan scenarios. The comparative assessment indicates that the number of locations achieving the Sitting comfort criterion decreases from 10 under the approved 2022 Design Guide to 6 under the proposed Masterplan. Under SLR's significance criteria, a change of one comfort category (e.g. Sitting to Standing) is classified as a minor unfavourable impact. The comparison without mitigation treatments shows only minor localised changes attributable to the redistribution of the proposed built form and do not represent a significant deterioration in the overall pedestrian wind environment
- The proposed Masterplan also delivers measurable improvements in the pedestrian wind environment at a number of assessment locations when compared with the approved 2022 Design Guide. As demonstrated in the table below, Location 48 improves from Standing to Sitting comfort under the proposed Masterplan. Similar favourable changes are evident at other locations within Block 8 (e.g. Location 15) and along the surrounding streets (e.g. Locations 27 and 49), reflecting the beneficial influence of the revised built form and landscape arrangement on local pedestrian wind conditions. These improvements demonstrate that the proposed Masterplan not only maintains the overall wind environment but also enhances pedestrian comfort at several key locations across the site.

Table 1 Assessment of Wind Impacts Along George Street

Location	"Design Guide"	"Masterplan"	Relative to Target Comfort Level
13	STANDING	STANDING	Negligible
37	WALKING	STANDING	Unfavourable Minor
38	STANDING	SITTING	Unfavourable Minor
39	STANDING	SITTING	Unfavourable Minor
40	STANDING	SITTING	Unfavourable Minor
41	STANDING	STANDING	Negligible
44	STANDING	STANDING	Negligible
45	STANDING	SITTING	Unfavourable Minor
46	STANDING	SITTING	Unfavourable Minor
47	SITTING	SITTING	Negligible
48	SITTING	STANDING	Favourable Minor
62	STANDING	STANDING	Negligible
64	WALKING	STANDING	Unfavourable Minor
65	STANDING	STANDING	Negligible
66	STANDING	STANDING	Negligible
67	SITTING	SITTING	Negligible
68	SITTING	SITTING	Negligible
69	WALKING	WALKING	Negligible

Location	"Design Guide"	"Masterplan"	Relative to Target Comfort Level
70	WALKING	WALKING	Negligible
71	STANDING	STANDING	Negligible
72	STANDING	STANDING	Negligible
73	SITTING	SITTING	Negligible
90	SITTING	SITTING	Negligible
138	STANDING	STANDING	Negligible

- SLR considers that the current wind environment provides a strong foundation for achieving the required comfort criterion. As the project progresses through the detailed SSDA phase and the architectural, landscape, and public domain designs are finalised, including the precise locations of designated seating areas, targeted site-specific wind mitigation measures can be integrated into the design. These measures may include mature evergreen trees with dense canopies, strategically positioned planter boxes, pergolas, overhead shade structures, and other architectural windbreak elements to reduce local pedestrian-level wind speeds within areas intended for prolonged occupancy. Based on SLR's engineering judgement and experience with developments of a comparable scale and urban context, these measures are expected to readily improve wind conditions to achieve the nominated Sitting comfort criterion. The effectiveness of the proposed mitigation measures will subsequently be quantitatively verified and, where necessary, further optimised through supplementary wind tunnel testing and/or Computational Fluid Dynamics (CFD) modelling during the detailed design stage.

- The assessment has been undertaken using the 5% exceedance criterion for pedestrian comfort criteria. The results indicate that walking comfort (5% exceedance wind speed less than 8 m/s) is achieved around the base of the proposed towers where required.
- Sensors 114–118, located along the western edge of Waterloo Park and Waterloo Oval (see Figure 1 in this letter), represent the most exposed locations and all satisfy the Standing comfort criterion. As the interior of the park is further sheltered by trees and landscaping, sitting comfort is expected. Two sensors were also installed within the proposed Future Park and demonstrated Standing comfort. Further quantitative assessment of the wind environment within these parks will be undertaken during the future detailed SSDA phase, following confirmation of the final park layout, landscaping, and areas intended for prolonged occupancy. This assessment will enable verification of the pedestrian wind environment against the nominated comfort criteria and, where necessary, inform the refinement of site-specific wind mitigation measures. This matter is addressed further in Section 5 of this letter.

4. Confirm whether the redistribution of built form does not materially worsen pedestrian wind conditions and identify where mitigation can improve outcomes.

SLR Response

- A point-by-point comparison between the approved 2022 Design Guide and the proposed Masterplan indicates that only a limited number of assessment locations along the surrounding streets experience a minor reduction in pedestrian wind comfort. It should be noted that this comparison is based on the proposed built form without the benefit of site-specific wind mitigation measures. During the detailed SSDA design stage, targeted mitigation measures—such as mature evergreen tree planting, deep awnings, and other architectural or landscape treatments—will be

incorporated where required to mitigate localised wind effects and restore or improve pedestrian wind comfort.

- Furthermore, the comparative assessment demonstrates that the proposed Masterplan provides tangible improvements to the pedestrian wind environment at numerous assessment locations relative to the approved 2022 Design Guide. As an example, an improved comfort classification from Standing to Sitting (e.g. Location 48), while similar favourable outcomes are observed within Block 8 (e.g. Location 15) and along the surrounding street network (e.g. Locations 27 and 49). These improvements are attributable to the revised building configuration, enhanced landscape integration, and redistribution of the built form, which collectively reduce adverse wind effects and improve pedestrian amenity.

5. **The Environmental Wind Tunnel Study has not provided predicted comfort levels for existing development surrounding the site. The Department requests that additional wind testing be undertaken to identify predicted comfort levels across surrounding streets and key public domain areas, including Waterloo Park and Waterloo Oval, and demonstrate how appropriate design responses and/or mitigation measures would achieve suitable wind comfort outcomes, including a 'sitting' comfort level where applicable.**

SLR Response:

- As shown in the following figure, the majority of wind measurement points are strategically located in the immediate vicinity of the proposed development, where the influence of the building mass is expected to be greatest. These locations directly capture development-induced wind effects, including façade downwash, corner acceleration, wind channelling, and shielding, providing a representative assessment of the pedestrian wind environment. In contrast, measurement points located near the outer boundary of the proxy (approximately 900 m from the site) are predominantly influenced by the surrounding urban environment rather than the proposed development and are therefore unlikely to experience any measurable or practically significant changes in wind conditions attributable to the development.

Figure 1 Existing Wind Measurement Points and Proxy Model Boundary

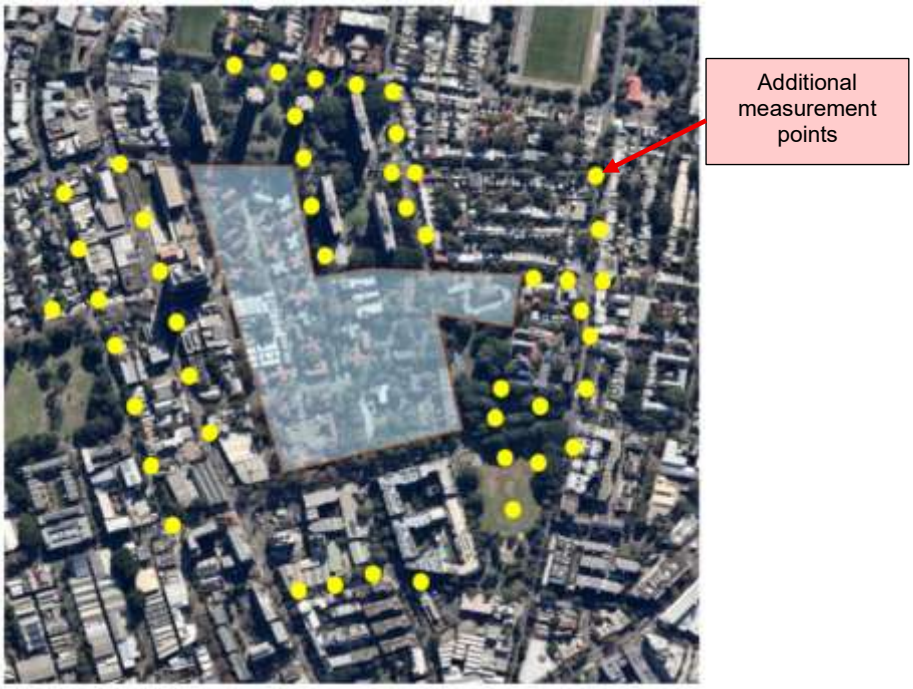
- The existing measurement points located along the edges of the Parks, including Waterloo Park and Waterloo Oval, are positioned at the locations closest to the proposed development and are therefore considered appropriate for assessing the potential influence of the development on public open spaces. As these edge locations are the first areas within the park to experience any development-induced changes in airflow, they provide a conservative and representative indication of potential wind impacts within the park.

  The current assessment demonstrates that the standing comfort criterion is achieved at these edge locations. Given that wind speeds would be expected to further reduce with increasing distance into the park due to the combined effects of separation from the development and the sheltering provided by the mature and dense tree canopy, it is likely that the sitting comfort criterion would also be achieved within much of the park.

  Waterloo Park and Waterloo Oval are recognised as a high-sensitivity recreational receptor accommodating activities such as walking, jogging, outdoor exercise, passive recreation, children's play and organised sporting activities. Notwithstanding this sensitivity, the assessment results indicate that the development does not result in adverse wind conditions at the park boundary, being the area most susceptible to development-related impacts.

  On this basis, and in our professional opinion, additional wind tunnel testing of the Master Plan is not warranted at this stage. For future SSDAs, once the detailed design of individual development blocks has been finalised, additional measurement points, as shown in Figure 2 below, may be incorporated into the accompanying environmental wind assessment to further verify this conclusion if required.

Figure 2 Proposed additional wind measurement points for future detailed SSDAs



11. The Environmental Wind Tunnel Study predicts comfort levels in proposed parks in Block 1 and Block 8 to be 'standing' and 'walking', respectively. The Department considers these outcomes to be unacceptable for public open space and requests design amendments to ensure wind comfort outcomes achieve a 'sitting' comfort level.

SLR Response:

- Block 1:
  - SLR confirms that the measured wind comfort outcomes from the current assessment are broadly comparable to those of the approved 2022 Design Guide scheme, with only minor localised variations observed and no material adverse impact on the overall pedestrian wind environment.
  - The current wind tunnel assessment demonstrates that the assessed locations within Block 1 satisfy the Standing comfort criterion under the current Masterplan configuration, indicating that the proposed development provides an acceptable wind environment for pedestrian standing activities within this future public open space.
  - As the detailed landscape design and the final arrangement of seating areas have NOT yet been established at this stage, no measurement points have been specifically located at the intended seating locations. During the subsequent SSDA stage, once the park layout and designated seating areas have been finalised, additional wind tunnel measurement points could be incorporated to directly assess wind conditions at these areas of prolonged occupancy and confirm compliance with the required comfort criterion.
  - SLR anticipates that the current wind environment provides a robust basis for achieving the required sitting comfort criterion. Given that the existing measurement locations within Block 1 already satisfy the standing comfort criterion, it is expected that once the final seating areas are identified during the subsequent SSDA stage, the implementation of targeted and site-specific wind mitigation measures—such as mature evergreen trees, or overhead shade structures—will readily reduce local wind speeds to achieve the sitting comfort criterion. The performance of these mitigation measures can subsequently be confirmed through supplementary wind tunnel testing and/or CFD analysis during the detailed design phase.
- Block 8:
  - The detailed design of the public open spaces, including the landscape layout and the final locations of seating areas, had not yet been finalised at the time of the assessment. Consequently, the wind tunnel assessment did not include measurement points specifically located at the intended seating areas. During the subsequent SSDA phase, once the detailed park layout and seating locations have been confirmed, additional quantitative analysis, can be undertaken to directly assess wind conditions at these areas of prolonged occupancy and verify compliance with the required sitting comfort criterion.
  - The current assessment indicates that the future public open spaces already achieve a favourable baseline wind environment. Accordingly, SLR considers there is a high likelihood that the required sitting comfort criterion can be achieved through the incorporation of targeted, site-specific wind mitigation measures during the detailed design phase. Such measures may include mature evergreen trees with dense canopies, pergolas, overhead shade structures, and other architectural or landscape windbreak elements.

Summary:

The comparison was undertaken using consistent measurement locations and assessment criteria for the approved 2022 Design Guide and proposed Masterplan scenarios, with only minor localised variations observed due to changes in building geometry.

SLR considers that the current wind environment provides a robust basis for achieving the required comfort criterion. During the subsequent SSDA stage, once designated activity areas have been finalised, additional wind tunnel measurement points can be strategically located to directly assess wind conditions within the intended areas of prolonged occupancy and confirm compliance with the relevant comfort criteria.