15 September 2014 CPP Project 6923

Lend Lease Building Pty. Ltd.
Level 4, 30 The Bond
30 Hickson Road
Millers Point
NSW 2000

Attn: Mr. Andrew Davis

Subject: Wind Engineering - Barangaroo South Commercial Building C2 and C6 Kiosk

Ref: (1) CPP report, Barangaroo Masterplan, dated December 2013

Dear Mr. Davis,

Please find herein comments regarding the impact of Barangaroo South Commercial Building C2 and the small 4 m high kiosk to the south on the pedestrian level wind conditions are considered. The architectural drawings prepared for this application, Figure 1, have been reviewed and assessed from an environmental wind perspective at ground level. Compared with the massing model used for the wind tunnel testing of the Barangaroo South precinct, Figure 2, the architectural form of the building has been developed, but the general massing of the building has remained similar. The details of the wind-tunnel testing and analysis are contained in Reference (1).

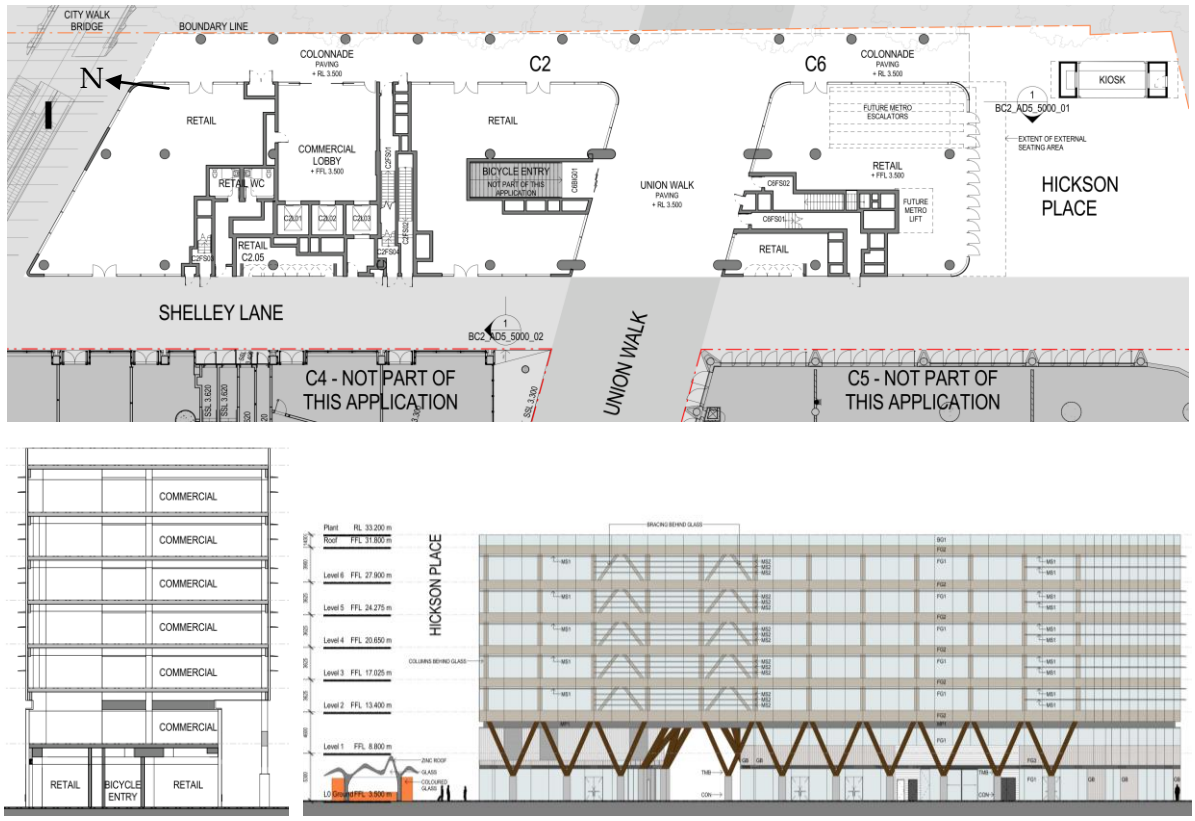

Figure 1: Typical floor plan (T), section looking north (BL), east elevation (BR) of the proposed Barangaroo South C2 development

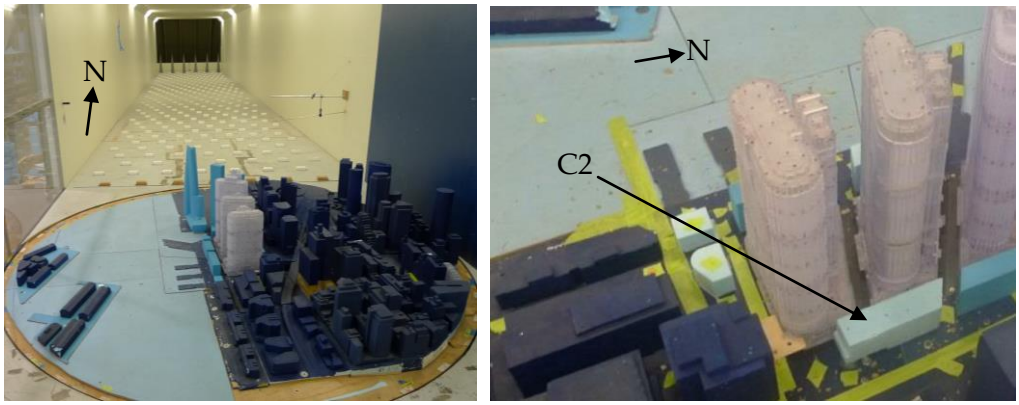

Figure 2: Photograph of the wind tunnel model

The directional wind flow pattern around the site is complex. The classification of wind conditions at various locations around the site is summarised in Figure 3, with directional results presented in Figure 4 and Figure 5; the contours relate to the wind climate at the site, and the distance of the symbol from the centre of the plot represents the local mean wind speed for winds from that direction. Classification of the comfort and distress criteria is determined by the integration of the measured wind speed with the local wind climate as discussed fully in Reference (1).

The wind flow in this section of the Barangaroo South precinct is dictated by the neighbouring taller structures particularly C4 and C5. From a pedestrian comfort perspective the wind conditions around the site all met the pedestrian walking criterion, with the majority of locations being classified as acceptable for pedestrian standing activities, Figure 3. All locations passed the distress criterion. The wind conditions around the slightly amended geometry to that tested would be expected to be similar to those measured as they are governed by the taller buildings.

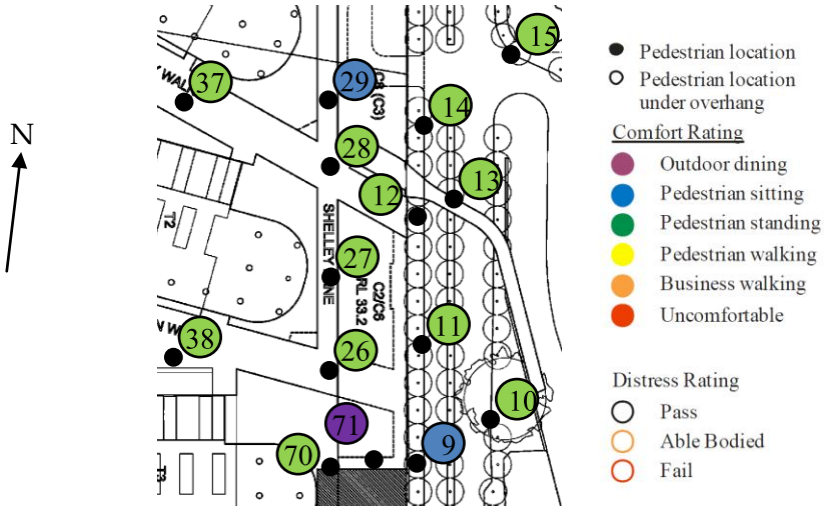

Figure 3: Wind climate results from December 2013 report

It is evident from Figure 4 and Figure 5 that strong wind events tend to occur for winds from the north and south quadrants and are caused by the proximity of C2 to Buildings C4 and C5. Winds from the south are accelerated around Building C5 with a large amount of

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downwash before being channelled along Shelley Lane and Hickson Road. Winds from the north-east are channelled by the taller building along Shelley Lane and Hickson Road.

Wind conditions along Shelly Lane, Locations 26 to 28 and 70 in Figure 3, would be suitable for café style activities for over 90% of the time, and for outdoor dining for about 65% of the time. Local wind conditions would be expected to improve with the inclusion of additional structures along Shelley Lane. Similar wind conditions exist along Hickson Road, with slightly calmer conditions to the south of C2. The wind conditions in the Union Walk through-site link will be similar to location 26 at the west end of the link. The wind speed in the link is expected to be more constant rather than turbulent, but the overall conditions would remain similar to slightly improved as it is more shielded for winds from the north and south. As the wind conditions in this area are governed by the taller building massing, to improve the wind conditions around the building local amelioration techniques such as vertical screening would be required.

In summary, it is expected that the amended design of Barangaroo South Building C2 will not change the local wind conditions from those measured with the massing model used in the wind-tunnel testing. All ground level locations are expected to meet the 'pedestrian walking' comfort criterion and pass the distress criterion.

I hope this is of assistance, please do not hesitate to contact me on 9551 2000 if you would like to discuss any aspect of this report.

Yours sincerely,

Graeme Wood
Director
cc M. Glanville

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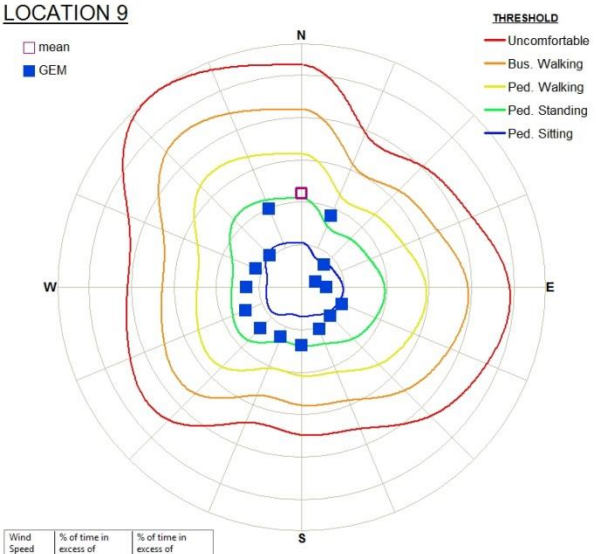
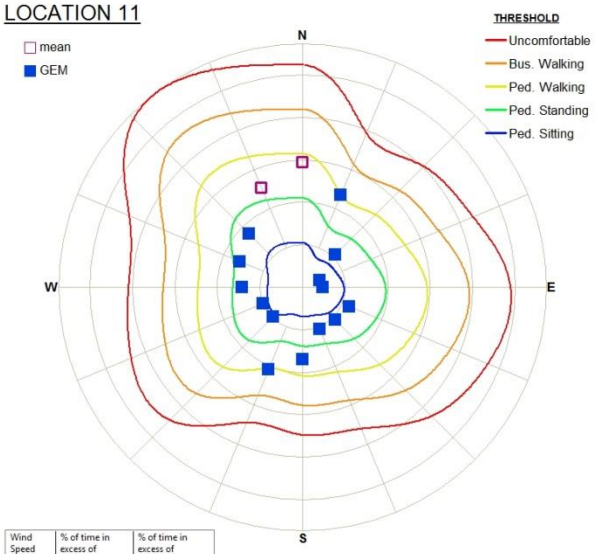
LOCATION 9



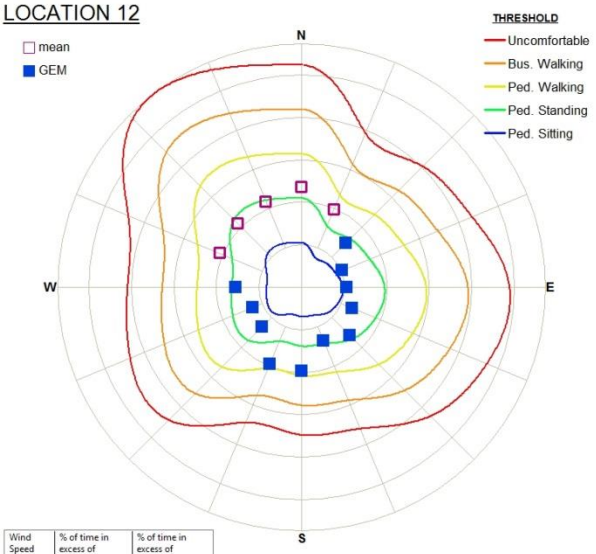
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	19.1	24.6
4.0	1.3	2.3
6.0	0.0	0.1
8.0	0.0	0.0
10.0	0.0	0.0
3.1	**5.0**	Ped Sitting
6.2	**0.022**	Pass
3.4	Ped Sitting	**5.0**
6.6	Pass	**0.022**

LOCATION 11



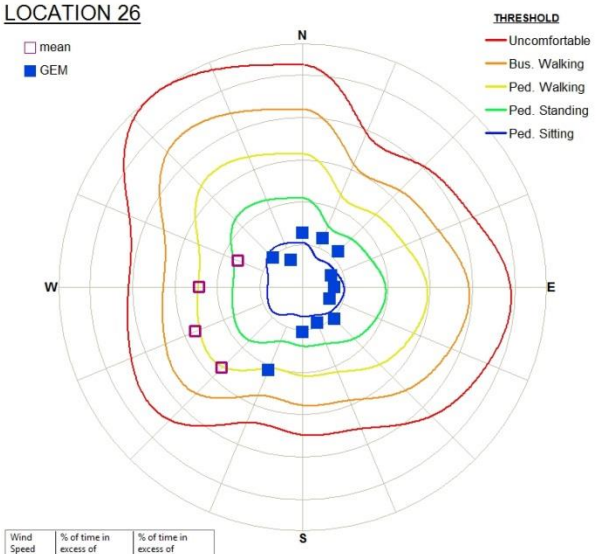
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	21.1	32.0
4.0	3.6	7.1
6.0	0.5	0.9
8.0	0.0	0.1
10.0	0.0	0.0
3.5	**5.0**	Ped Sitting
8.4	**0.022**	Pass
4.4	Ped Standing	**5.0**
8.8	Pass	**0.022**

LOCATION 12



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	31.5	36.3
4.0	4.2	7.2
6.0	0.4	0.7
8.0	0.0	0.0
10.0	0.0	0.0
3.8	**5.0**	Ped Sitting
8.1	**0.022**	Pass
4.3	Ped Standing	**5.0**
8.7	Pass	**0.022**

LOCATION 26



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	18.5	23.8
4.0	5.5	3.7
6.0	1.1	0.5
8.0	0.2	0.1
10.0	0.0	0.0
4.1	**5.0**	Ped Standing
9.6	**0.022**	Pass
3.6	Ped Sitting	**5.0**
8.7	Pass	**0.022**

Figure 4: Directional results

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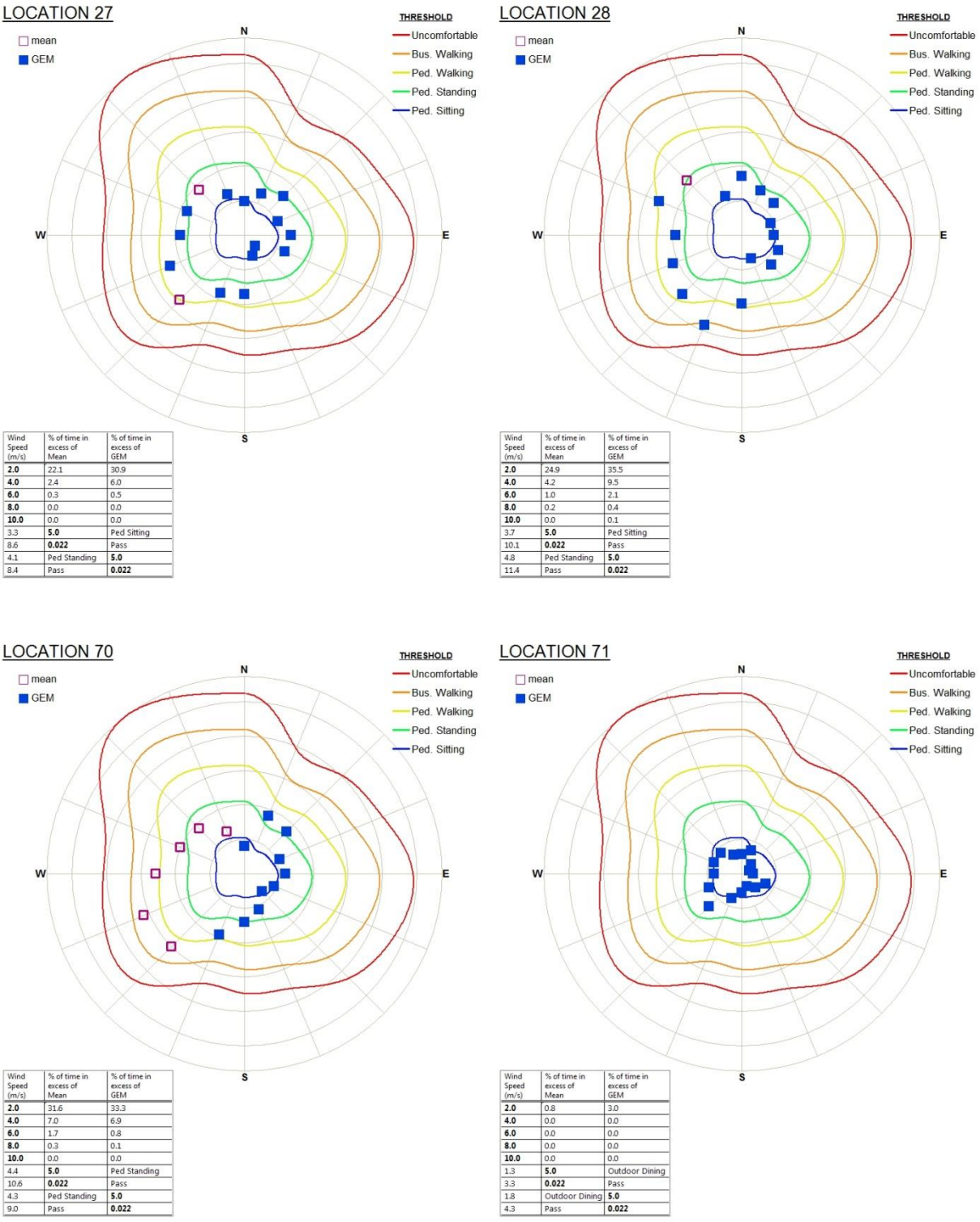

Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	22.1	30.9
4.0	2.4	6.0
6.0	0.3	0.5
8.0	0.0	0.0
10.0	0.0	0.0
3.3	**5.0**	Ped Sitting
8.6	**0.022**	Pass
4.1	Ped Standing	**5.0**
8.4	Pass	**0.022**

Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	24.9	35.5
4.0	4.2	9.5
6.0	1.0	2.1
8.0	0.2	0.4
10.0	0.0	0.1
3.7	**5.0**	Ped Sitting
10.1	**0.022**	Pass
4.8	Ped Standing	**5.0**
11.4	Pass	**0.022**

Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	31.6	33.3
4.0	7.0	6.9
6.0	1.7	0.8
8.0	0.3	0.1
10.0	0.0	0.0
4.4	**5.0**	Ped Standing
10.6	**0.022**	Pass
4.3	Ped Standing	**5.0**
9.0	Pass	**0.022**

Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	0.8	3.0
4.0	0.0	0.0
6.0	0.0	0.0
8.0	0.0	0.0
10.0	0.0	0.0
1.3	**5.0**	Outdoor Dining
3.3	**0.022**	Pass
1.8	Outdoor Dining	**5.0**
4.3	Pass	**0.022**

Figure 5: Directional results

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