

THE  STAR

# PEDESTRIAN WIND ENVIRONMENT ASSESSMENT— RESPONSE TO SUBMISSIONS

PREPARED BY



16 November 2018

CPP Project 8839

The Star Entertainment Group Limited

80 Pyrmont Street  
Pyrmont NSW 2009  
Australia

Attn: Raymond Yeo

Project: The Star, Sydney (Modification 13)

Dear Mr Yeo,

This letter includes CPP's responses to the various submissions from the Public Exhibition relating to the impacts of the proposed Star Mod13 project on the local wind environment.

## 1. Clarification

CPP letter dated 19 March 2018 (Appendix FF(1) of Modification 13 Public Exhibition documents) providing qualitative advice refers to a wind tunnel study that was ongoing at the time of writing of the letter. The results of that wind tunnel study are outlined in the CPP report titled Wind Tunnel Study of Pedestrian Wind Environment dated April 2018 (Appendix FF(2)). The test was based on the exhibited Mod13 development scheme which included the tower.

The letter was inadvertently included in the Public Exhibition document set and appears to have caused the impression that no wind tunnel study was conducted on the proposed Mod13 tower, whereas a wind tunnel study has in fact been conducted (Appendix FF(2)).

The CPP wind tunnel studies provided recommendations that aided building design and façade refinements to help improve wind conditions to levels suitable for the intended uses of the space. Elements of the recommendations were integrated into the exhibited plans wherever they were deemed necessary.

## 2. Department of Planning Feedback

### *Wind Impacts*

#### *16. Update the Wind Impact Assessment as follows:*

- a) *to allow for a comparison between the existing and proposed wind environments, confirm the 'as-existing' measurements for points 1 to 12*
- b) *assess the impact of the development at the following additional points:*
  - i) *the pedestrian outdoor seating on Jones Bay Road*
  - ii) *the entrance to 10 Jones Bay Road*
  - iii) *Pyrmont Bay foreshore, opposite the Pirrama Road entrance/frontage*
  - iv) *Pyrmont Bay Park and Metcalf Park.*
- c) *confirm whether the proposed mitigation measures at Level 59 Club Lounge Sky Terrace adequately address wind impact so that this space is functional for its intended purpose and does not pose a safety risk.*
- d) *consider providing additional wind mitigation measures to improve the wind environment comfort level at point 6 from 'pedestrian standing' to 'pedestrian sitting'.*

**CPP response:**

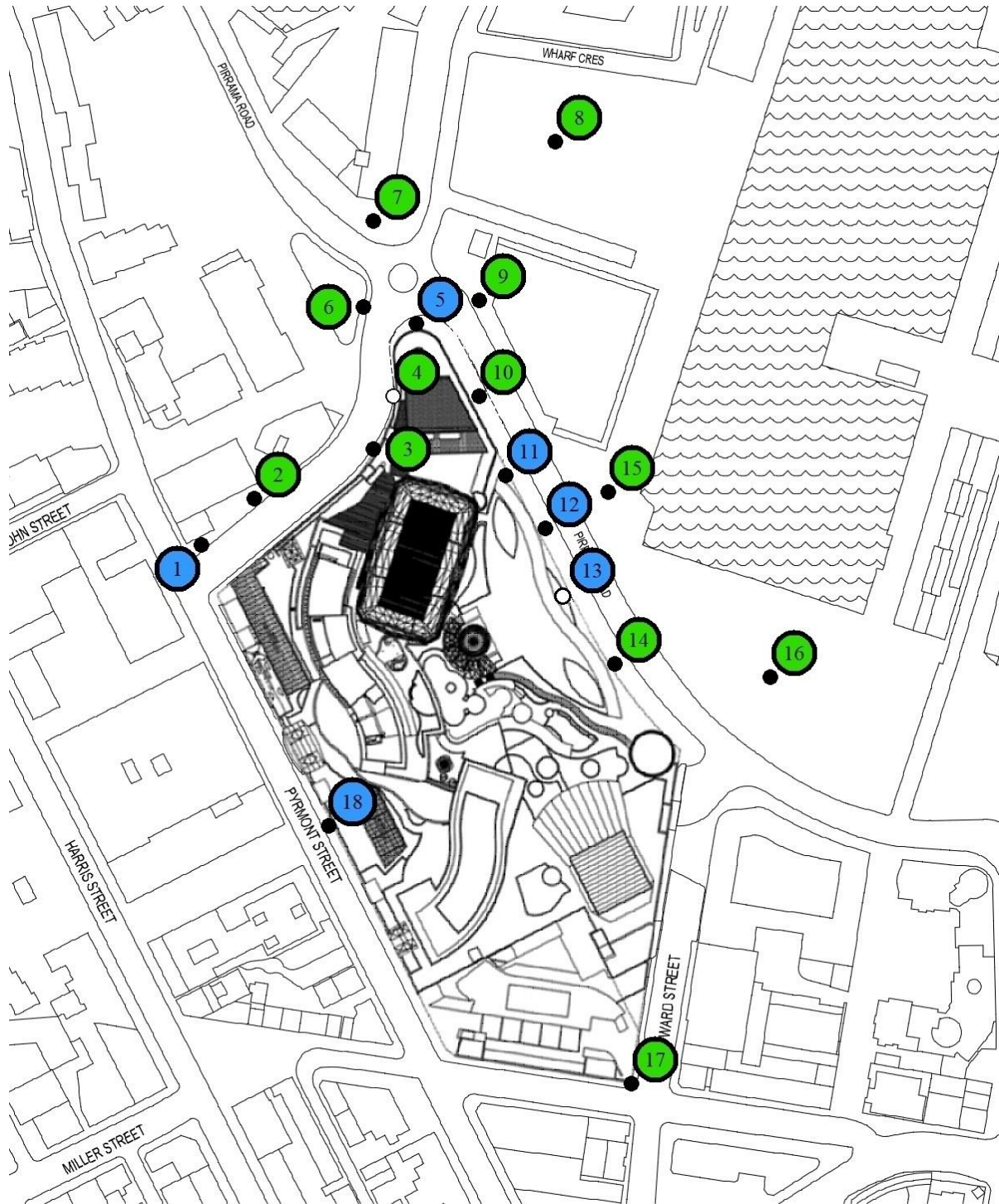
a) Multiple wind tunnel studies were conducted, including the test outlined in CPP report dated April 2018, to acquire ground level wind speeds surrounding both the existing site and the proposed Mod13 development site to allow comparisons of changes, if any, in the wind environment. The measurements are summarised in Table 1 and the measurement locations are presented in Figure 1 and Figure 2. Locations in close proximity of the tower experienced slightly windier conditions than in the existing configuration, however wind conditions remain suitable for the intended purposes of these areas. The remaining locations experienced similar wind conditions in both configurations.

Table 1: Comparison of wind speeds exceeded 5% of the time for existing and proposed configurations

Description / Location		Wind Tunnel Results			
		EXISTING		PROPOSED (X.1)	
		Lawson comfort rating	5% exceeded wind speed (m/s)	Lawson comfort rating	5% exceeded wind speed (m/s)
Ground	1	PSi	3.5	PSi	3.7
	2	PSt	5.1	PSi	3.7
	3	PSt	4.7	PSt	5.6
	4	PSt	4.1	PSi	3.6
	5	PSi	3.0	PW	7.3
	6	PSt	4.8	PW	6.4
	7	PSt	4.6	PW	6.2
	8	PSt	4.4	PSt	4.9
	9	PSt	4.9	PW	6.4
	10	PSt	5.6	PSt	5.5
	11	PSi	2.7	PSi	3.2
	12	PSi	3.5	PSi	3.9
	13	PSi	3.0	PSi	3.9
	14	PSt	4.6	PSt	4.6
	15	PSt	4.8	PSt	4.6
	16	PSt	5.6	PSt	5.1
	17	PSt	5.0	PSt	5.5
	18	PSi	3.8	PSi	2.7

**LEGEND**

Comfort Criteria			
OD	Outdoor Dining	PSt	Pedestrian Standing
PSi	Pedestrian Sitting	PW	Pedestrian Walking
BW	Business Walking	U	Uncomfortable
Distress/Safety Criteria			
Pass	Passes safety criteria	AB	Able bodied
Fail	Fails safety criteria		



**Comfort Rating**

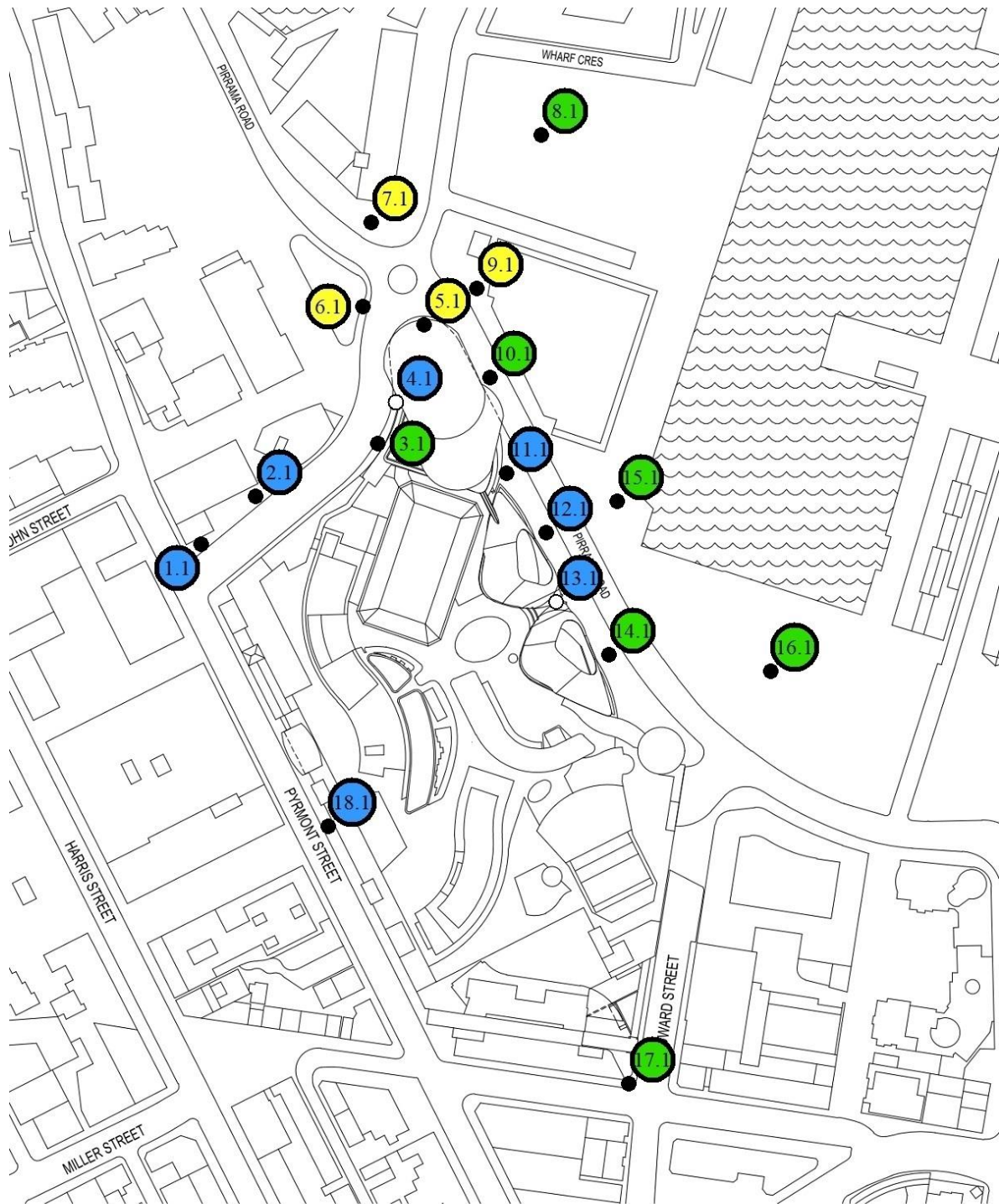
- Outdoor Dining
- Pedestrian Sitting
- Pedestrian Standing
- Pedestrian Walking
- Business Walking
- Uncomfortable

**Distress Rating**

- Pass
- Able Bodied
- Fail
- Pedestrian Location
- Pedestrian Location Under Overhang

Figure 1: Measurement locations in existing configuration





**Comfort Rating**

- Outdoor Dining
- Pedestrian Sitting
- Pedestrian Standing
- Pedestrian Walking
- Business Walking
- Uncomfortable

**Distress Rating**

- Pass
- Able Bodied
- Fail
- Pedestrian Location
- Pedestrian Location Under Overhang

Figure 2: Measurement locations in proposed configuration

b) Wind conditions at 10 Jones Bay Road (Location 6) were slightly windier with the addition of the Mod13 exhibited scheme and tower, however this level of wind is still suitable for the intended purposes of this area as a space for moving pedestrians.

Wind conditions within the pedestrian outdoor seating on Jones Bay Road (Location 3), Pyrmont Bay foreshore (Location 15), Pyrmont Bay Park (Location 16) and Metcalf Park (Location 8) experienced similar wind conditions in both existing and proposed configurations, and thus the Mod13 exhibited scheme had limited impacts on the wind environment in these areas.

c) The wind tunnel model used in the study conducted April 2018 included a balustrade equivalent to 6 m in height at full-scale around the perimeter of the Level 59 Club Lounge Terrace, however tested without proposed landscaping. Proposed local landscaping and vertical screening surrounding the seating areas, evident in the exhibited scheme landscaping plans, would help improve conditions to levels that will be suitable for its intended purposes and will pass the distress/safety criterion. During winds from the south the terrace will experience downwash from the tower facade, and thus overhead protection (temporary or fixed) such as an awning along the façade is suggested to further protect the area beneath. This element will be incorporated into the scheme during design development.

d) In the exhibited scheme, landscaping was proposed within the vicinity of the area at Location 14 on Pirrama road adjacent to the Lyric theatre office. This landscaping in combination with local vertical screening to the north-east of the seating area during windy days is expected to improve the wind environment from 'pedestrian standing' to 'pedestrian sitting'. Details of the proposed landscaping will be provided in the revised landscape packaging that will accompany the response to submissions report.

### 3. 284119 Submission

#### ***Proper Planning Pathway***

*8. The proposal results in [...] wind impacts and other environmental conditions not contemplated on the grant of approval for the original application.*

#### **CPP response:**

A comparison of the measured winds from extensive wind tunnel studies around the existing and proposed site configurations, Figure 1 and Figure 2 respectively, shows the proposed Mod13 exhibited scheme will not have significant impacts on the existing wind environment surrounding the development site on the ground plane. Some locations close to the tower (locations 5, 6, 7 and 9) have become slightly windier, however these levels of conditions remain suitable for moving pedestrians along the footpaths. Furthermore, wind conditions at some locations have slightly improved with the addition of the tower (locations 2 and 4).

#### ***Apartment Design Guide (ADG)***

*The design of roof top private open spaces must address [...] wind effects.*

#### ***Other Landscaping comments:***

*The Level 59 Club Lounge description does not match the plans. There is no wind study evidence to confirm that the landscaping proposed has been designed to withstand the western aspect and likely wind effects. Is the proposal achievable at upper levels of the tower?*

#### **CPP response:**

The wind tunnel model used in the study conducted April 2018 included a balustrade equivalent to 6 m in height at full-scale around the perimeter of the Level 59 Club Lounge Terrace, however tested without

proposed landscaping. Proposed local landscaping and vertical screening surrounding the seating areas, evident in the exhibited scheme landscaping plans, would help improve conditions to levels that will be suitable for its intended purposes and will pass the distress/safety criterion.

#### 4. 279884 Submission

##### *Wind*

*The Star Casino's decision to exclude a wind assessment as part of the development application because wind mitigation measures have been added to the proposal since it was first planned lacks transparency and is unacceptable. The height of the tower has increased since it was first proposed and higher buildings cause greater wind impacts.*

*The environmental impact statement's claim that "conditions on the ground plane were classified as suitable as public access ways" does not tell us whether it will be comfortable for people to set at Pyrmont Bay Park, or walk or stand along the footpaths on a windy day.*

*If the proposal is not refused, a comprehensive wind assessment must be carried out.*

##### **CPP response:**

As noted in the clarification in Section 1 above a detailed wind tunnel study of the proposed scheme was conducted.

CPP Wind Tunnel Study Report dated April 2018 concluded "The wind tunnel study showed the general wind environment at ground level around the proposed development site was found to be acceptable for use as a main public accessway...". This implies that from a wind perspective a pedestrian can comfortably stand or walk along the investigated locations on the footpaths along Jones Bay Road, Pirrama Road and Pyrmont Street.

The measured wind conditions from the wind tunnel study along Pirrama Road (Locations 10 to 14) would also be considered suitable for short-term stationary activities such as taxi ranks, bus stops and kiss and ride zones. Wind conditions suitable for long-term stationary activities such as café dining could be achieved with local wind mitigation measures such as temporary vertical screening and dense landscaping - this will be achieved by the proposed magnolia and angophora tree clusters at the two proposed F&B venues on Pirrama Road as evident in the landscape package, Figure 3. During windy days, temporary vertical screening could be used around seatings areas to provide additional protection.

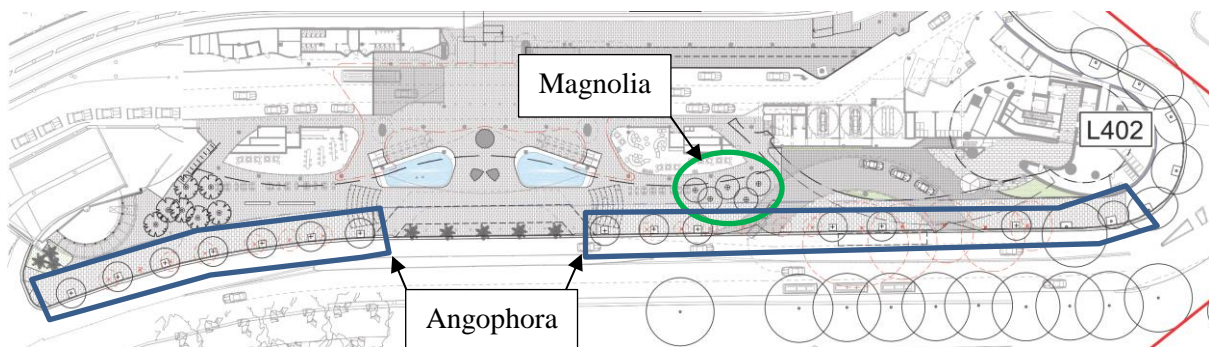


Figure 3: Proposed landscaping along Pirrama Road

Relatively calmer conditions were measured at the Star main entrance VIP drop-off (Location 7) and Ritz Carlton Porte Cochere (Location 9) closer to the building along Pirrama Road, which are suitable for the intended purposes of these areas.



The proposed tower had limited impacts on the Pyrmont Bay Park (Location 16) as it was found in the wind tunnel studies that the wind conditions are very similar in both the existing and proposed configuration of the development site. Thus, Pyrmont Bay Park can continue to be used comfortably by patrons for recreational activities.

## 5. 281102 Submission

The following extract is from the response to submission letter reference 281102:

**Wind Environment Assessment** – MOD13 modification to the development as approved under MP08-0098, up to and including MOD 14. Further consideration of wind impacts at 16 Pyrmont Street are required as the submission is not explicit in the Wind Environment Assessment report. As it reads if pedestrian wind assessments result in measured wind conditions at ground level (16 Pyrmont Street home is on ground / not an apartment) showing transient spaces for pedestrian activities will be continued at a comfortable level. However outdoor seating for dining – our kitchen and living room open to outdoor living / dining decking and backyard (therefore long term stationary activities) will be exposed to wind speeds for longer periods / frequencies of time and it is recommended local amelioration such as vertical screening and landscaping surrounding seated areas are utilized to help improve local comfort conditions. The assessments also states additional awnings would be slightly beneficial for wind conditions and they would provide some shielding from wind and wind-driven rain. Design recommendations for SEGL based on the finding of the Consultant for the purpose of this development application also apply to 16 Pyrmont Street, our home is a roads width away from The Star. Who is going to provide 16 Pyrmont Street with amelioration for living conditions and shielding from the wind tunnelling and wind driven rain with Mod 14&Mod13 approval to build? NSW Government? City of Sydney council? The Proponent?

### CPP response:

The wind tunnel studies conducted have shown that the outdoor area of the 16 Pyrmont Street building (Location 1) experienced similar wind conditions in both the existing and proposed development site configurations, where the wind conditions were classified as ‘pedestrian sitting’. Therefore, the impact of the proposed tower on this area will be limited.

Wind conditions measured within close proximity of the 16 Pyrmont Street building (Location 2) improved in the proposed configuration, classified as ‘pedestrian sitting’ under Lawson comfort criteria. This level of winds would be considered suitable for outdoor café style seating areas.

The awnings referenced in the above submission are design features of the proposed Mod13 and the approved Mod14 works and not mitigation measures recommended by CPP. Any comments in the CPP Report relating to these awnings are not related nor a result of the wind tunnel study, but general observations of the design elements of the proposal.

## 6. Other Submissions

The relevant extracts from response letters, as referenced, are below:

**Extract #1, reference PCU075629:** “The proposed tower would cause significant impacts for Pyrmont including [...] creating wind tunnels, interrupting private and harbour views, and creating a barrier to the harbour.”

**Extract #2, reference 281279:** “Wind Tunnel: I do not believe I saw an analysis of wind impacts of the Project in the documents submitted. A wind tunnel, coupled with the creating of a large shadow over Pyrmont, would make cooler months unbearable.”



**Extract #3, reference 278484:** *“The design of the proposed building will create [...] wind tunnel effects on pedestrian pathways to and from the Sydney CBD [...]. These impacts cannot be mitigated or compensated. Residents and pedestrian will suffer and so will, indirectly, local Pyrmont businesses.*

**Extract #4, reference 280640:** *“The height will cause issues with creating wind tunnel effect and reduce amount of sunlight reaching areas around the new tower.”*

**Extract #5, reference 280678:** *“(12) the proposed tower would cause significant impacts for Pyrmont including [...] creating wind tunnels, [...].”*

**Extract #6, reference 279776:** *“The design of the proposed building will create [...] wind tunnel effects on pedestrian pathways to and from the Sydney CBD, [...].”*

**Extract #7, reference 280686:** *“If the proposed tower is allowed to go ahead it will cause significant impacts for residents in Pyrmont including [...] the creation of wind tunnels [...].”*

**Extract #8, reference 280818:**

### **“3. Wind tunnel**

*I do not believe I saw an analysis of wind impacts of the Project in the documents submitted. A wind tunnel, coupled with the creating of a large shadow over Pyrmont, would make cooler months unbearable.”*

**Extract #9, reference 280954:** *“The result will be [...] creation of wind tunnels [...].”*

### **CPP response:**

Recent wind tunnel tests, and the CPP Report dated April 2018 which outlines the findings of the wind tunnel study on The Star Mod 13 development scheme, show that under the industry accepted Lawson comfort and safety criteria the measured wind comfort levels along the footpaths on Pirrama Road, Jones Bay Road, Pyrmont Street and Edward Street, presented in Figure 1 and Figure 2, are suitable for both non-stationary and stationary pedestrians, such as those waiting at bus stops or taxi ranks, after the addition of the proposed development. No wind safety issues were found at the investigated locations along the footpaths and roadways surrounding the development site at ground level at the investigated locations along Pirrama Road, Jones Bay Road, Pyrmont Street and Edward Street.

A comparison of the measured winds from the extensive wind tunnel studies around the existing and proposed site configurations, Figure 1 and Figure 2 respectively, shows the proposed Mod13 exhibited scheme will not have significant impacts on the existing wind environment surrounding the development site on the ground plane. Some locations close to the tower (locations 5, 6, 7 and 9) have become slightly windier, however these levels of conditions remain suitable for moving pedestrians along the footpaths. Furthermore, wind conditions at some locations have slightly improved with the addition of the tower (locations 2 and 4).



CERMAK  
PETERKA  
PETERSEN

WIND ENGINEERING AND AIR QUALITY CONSULTANTS

Please do not hesitate to contact me if you have any questions regarding any aspect of this letter.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'J. Paetzold', is written over a faint, larger signature.

Joe Paetzold,  
Engineering Manager

cc: Andrew Nguyen, Project Engineer

## REFERENCES

City of Sydney (2018), *Modification Request for The Star (MP08\_0098 MOD 13) – 20-80 Pyrmont Street, Pyrmont*, Reference ID 284119, 9 October 2018

CPP (2018), *Wind Tunnel Study of Pedestrian Wind Environment for The Star MOD13 DA Scheme*, CPP Project 8839, April 2018, Revision 08.

*MP08\_0098 MOD 13 – Construction of a New Hotel and Residential Tower (“Project”) – I OBJECT to the proposal*, Reference ID 281279, 17 September 2018.

*MP08\_0098 MOD 13 – Construction of a new hotel and residential tower and alterations to existing building*, Reference ID 278484

*MP08\_0098 MOD 13 – Construction of a new hotel and residential tower and alterations to existing building*, Reference ID 280640

*MP08\_0098 MOD 13 – Construction of a new hotel and residential tower and alterations to existing building*, Reference ID 280678, 16 September 2018

*MP08\_0098 MOD 13 – Construction of a new hotel and residential tower and alterations to existing building*, Reference ID 279776

*MP08\_0098 MOD 13 – Construction of a new hotel and residential tower and alterations to existing building*, Reference ID 280686

*MP08\_0098 MOD 13 – Construction of a new hotel and residential tower and alterations to existing building*, Reference ID 280818, 17 September 2018

*MP08\_0098 MOD 13 – Construction of a new hotel and residential tower and alterations to existing building*, Reference ID 280954

*Re: Modification Request for The Star Casino (MP08-0098 MOD 13)*, 3 September 2018, PCU075629.

*Submission of Objections with Grounds as follows: Noise impact, Air impact, Light impact, Security & Privacy impact*, Reference ID 281102, 18 September 2018.

