

25 June 2014

CPP Project 7530

Central Park JV No.2
Level 12, 101 Bathurst Street
Sydney
NSW 2000

Attn: Mr. Michael Goldrick

Subject: Reflectivity and Wind Engineering – Frasers Blocks 1 and 4N

- Ref: (1) CPP report 4946 entitled 'Wind Tunnel Tests for Frasers Broadway Blocks 1, 4, and 8' Dated May 2009.
(2) CPP report 4946 entitled 'Solar Reflectivity Assessment for Frasers Broadway Blocks 1, 4, and 8' dated May 2009.

Dear Mr. Goldrick,

The purpose of this report is to outline the changes to the wind environment around the site and reflectivity, due to the proposed revised massing and geometry of Frasers Blocks 1 and 4N. This report covers both the S75W Amendment to Blocks 1+4N, and State Significant Development Application for Block 1. The global wind conditions around the site are governed by more than the geometry of a single building, hence why the changes to these large adjacent buildings have been grouped together in a single report for the approvals process.

ENVIRONMENTAL WIND CONDITIONS

Wind-tunnel testing has not been conducted on the proposed building layout as the building layout is considered similar enough to allow a qualitative assessment of the wind conditions in the public domain to be extrapolated from the existing results. The relevant wind tunnel testing was conducted on the original Frasers Broadway design layout and reported in CPP report 4946 entitled '*Frasers Broadway Blocks 1, 4, and 8*' dated May 2009. The results from the previous testing are presented herein to frame the qualitative discussion on the wind conditions in and around the public domain for the proposed changes, Figure 1. A photograph of the wind tunnel model from is presented in Figure 1. The primary results reproduced in Figure 2 show that the pedestrian areas around the Blocks of interest are generally acceptable for use as public standing from a comfort perspective, such as window shopping, and pass the distress criterion.

The drawings prepared for these applications have been reviewed and compared with the geometry used to create the massing geometry for previous wind-tunnel testing conducted around the site and for the reflectivity analysis from the building façades. From a wind engineering perspective, the important changes between the proposed building geometry and massing designs compared with that modelled and tested in the wind tunnel are that the link bridge connecting Blocks 1 and 4N has been deleted, and a slight reduction in massing of the buildings allowing for the development of a new wider pedestrian link from Central Park to Broadway. The proposed development, with the existing outline shown with a blue dotted line, is shown in Figure 3 and Figure 4.

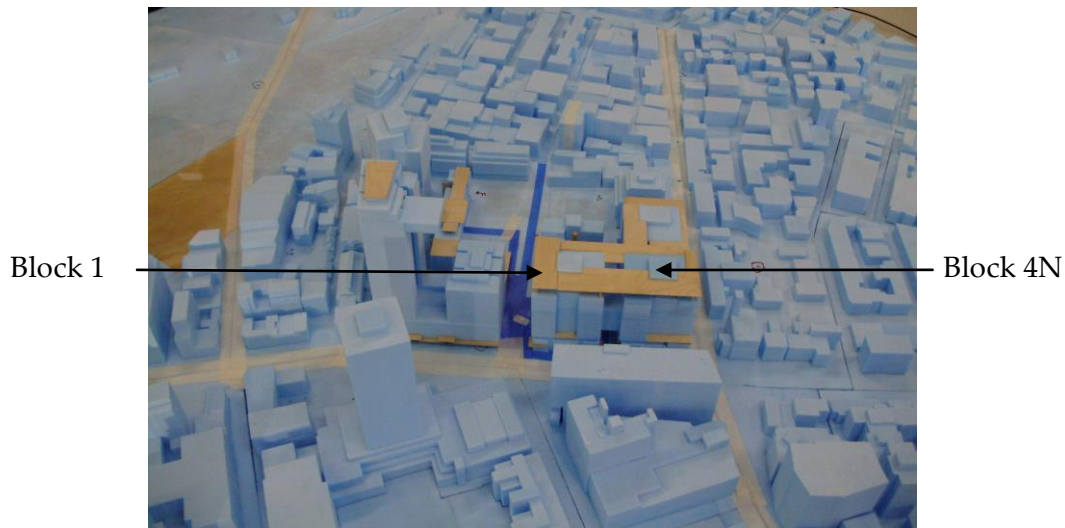


Figure 1: Photograph of the wind tunnel model viewed from the north

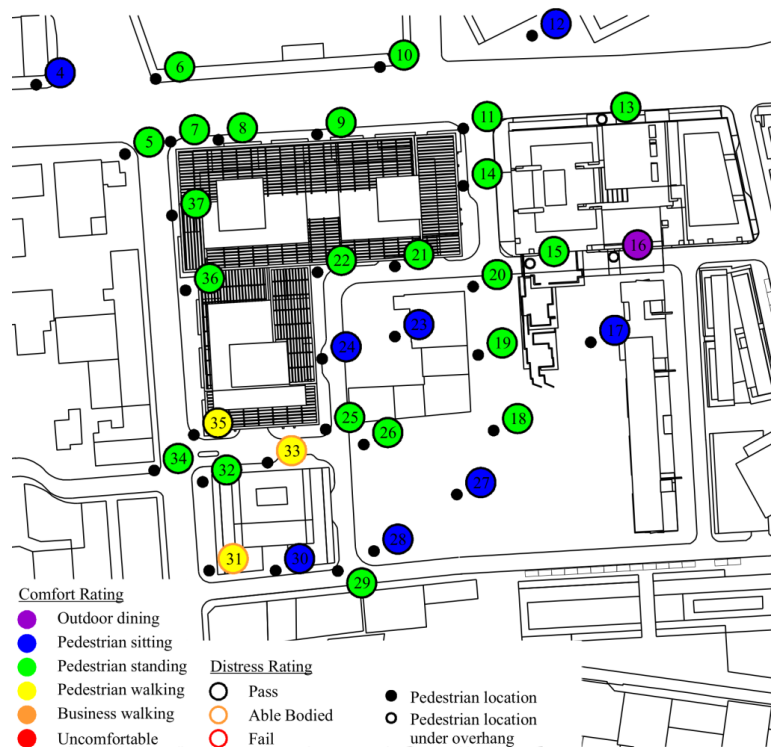


Figure 2: Results from previous wind tunnel testing

For winds from the south quadrant, the removal of the link bridge and the widening of the laneway enlarges the area of the pedestrian link. This increase in area is expected to slightly reduce the wind speed through the link and onto Broadway, and increase the overall volume of flow, which is beneficial from an air quality perspective.



Figure 3: North elevation of the proposed development



Figure 4: Ground floor plan (T) and Level 5 plan of the proposed development

The wind conditions on the building corners and in the new passageway are expected to be similar to those in the parallel link between Blocks 1 and 2, hence would be suitable for pedestrian standing activities. These conditions would meet the City of Sydney DCP 2012 requirements for a non-active frontage. The main entrances to the buildings are well located remote from the building corners.

The proposed geometric changes to the façade articulation are expected to have minimal impact on the wind conditions at ground level throughout the site.

REFLECTIVITY

The previous analysis described two solar reflectivity issues from the north façade of Blocks 1 and 4N onto Broadway. These events occurred from 7 am to 9 am during March and October when the rising sun strikes all levels of the north facades reflecting to the west along Broadway, and around 5 pm during April and September when the setting sun strikes all levels of the north facades reflecting to the east-north-east along Broadway. As the orientation of the building has not changed, these issues will remain with the proposed buildings. The deletion of some façade articulation and solar tubes with supporting vertically aligned framework along the north façade of Block 4N, will increase the likelihood of reflections along Broadway during these events.

Vertical fin elements to the northern facades will be required in lieu, and CPP have been in discussions with the designing architects regarding their configuration. In essence, it is recommended vertical fin be included to block high incident angle reflections whereby a fin depth ratio of 1:8 is adopted over much of the northern facades. This means the fin needs to be 1 unit for every 8 units of glazing width being protected, for example a framed glazing unit utilising a 200 mm deep fins placed at 1600 mm centres. Alternatively where the glazing is recessed behind an adjacent opaque wall of sufficient depth, fins will not be needed.

From the previous studies the additional relevant recommendation was for all areas of the northern façade of Block 1 and 4N and along the north half of the east façade of Block 4N to install cladding or glazing with a reflectivity coefficient of less than 10%. The creation of the passage between the two buildings does not create any reflectivity concerns.

CONCLUSIONS

The Frasers Blocks 1 and 4N site geometry is similar to that used in the wind tunnel testing conducted on the initial Frasers Broadway design, except for the deletion of the bridge link between Blocks 1 and 4N, the reduction in building massing, and the change of the façade line.

It is considered that the environmental wind conditions around the site will not change significantly with the proposed amendments. The wind conditions in the majority of the areas surrounding these buildings, including the new pedestrian link, would be considered suitable for pedestrian standing activities and pass the distress criterion. The conditions would be expected to meet the City of Sydney DCP for non-active frontages.

Solar reflections from the north façade in particular, have the potential to impact upon roadway locations on Broadway during certain periods of the year. The design of appropriate measures to mitigate these issues is being developed with the design team incorporating vertical fin elements projecting from the north façade.

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



Matt Glanville
Director