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December 12, 2017

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Burlington, Ontario L7R 1A3

Jacob Dosman
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**Re: Pedestrian Wind – Letter of Opinion
2421 and 2431 New Street
Burlington, Ontario
RWDI Project #1800708**

Dear John:

Rowan Williams Davies & Irwin Inc. (RWDI) has prepared this letter to present our opinion of pedestrian wind conditions on and around the proposed development at 2421 and 2431 New Street in Burlington, Ontario. This letter is in support of the Official Plan Amendment (OPA) and Zoning By-law Amendment (ZBA) applications for this project.

This qualitative assessment on pedestrian wind conditions is based on a review of the local wind climate and the design information received by RWDI on November 17, 2017, combined with our experience of wind-tunnel testing for similar projects. Wind-tunnel testing is typically required later in the design process to provide a quantitative evaluation of the wind flows around a development in support of the Site Plan Approval (SPA) application.

BUILDING AND SITE INFORMATION

The project site is located along New Street between Guelph Line and Beverly Drive in Burlington, Ontario (see Image 1). The project will be an 11-storey building that is approximately 33.5 m tall. Pedestrian areas on and around the development include building and retail entrances, two rooftop terraces on the 7th floor (see Image 2), sidewalks, and a parking lot. The surrounding area is primarily low-rise suburban single and multifamily residential dwellings with a few high-rise buildings to the north and south. Lake Ontario is approximately 1 km to the southeast of the project site.



Image 1: Aerial View of the Site and Surroundings (Courtesy of Google™ Earth)



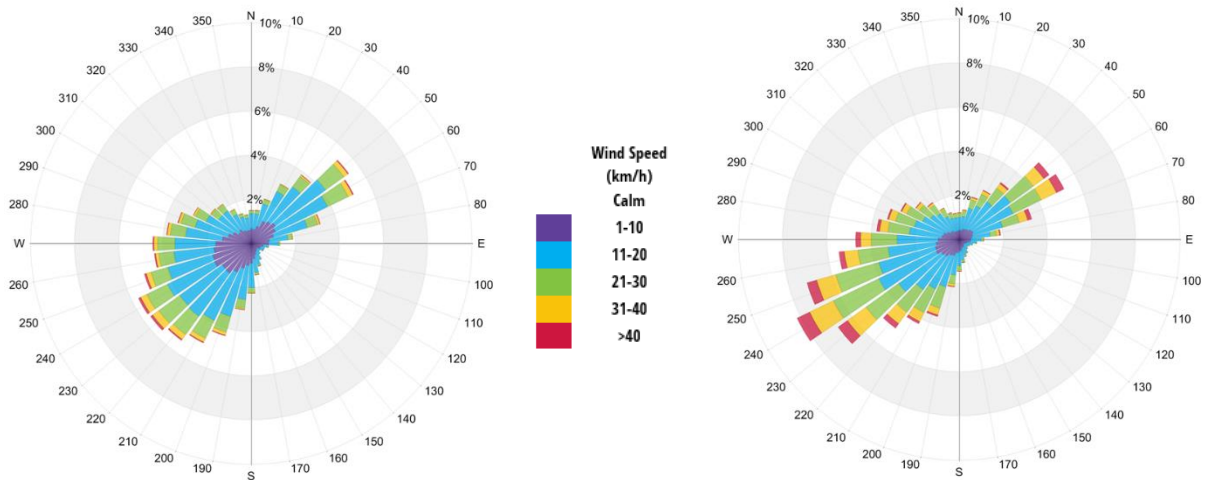
Image 2: New Street View of the Proposed Development

METEOROLOGICAL INFORMATION

Wind statistics recorded at Hamilton International Airport from 1985 to 2015, were analyzed for the summer (May through October) and winter (November through April) seasons, and were used as a reference for the project site. This is the nearest station to the site with long-term, reliable wind data.

The analyzed wind data are presented in the form of wind roses in Image 3, where the sectors show the frequency of wind speeds approaching from different directions. Winds in the area are predominantly from the southwest and northeast quadrants throughout the year. Strong winds of speeds greater than 30 km/h (yellow and red bands in Image 3) occur more often in the winter than in the summer and are primarily from the southwesterly and northwesterly directions.

Wind data from two nearby met stations (Burlington Piers and Royal Botanic Gardens) were also analyzed to confirm the local wind directionality from the Hamilton Airport.



Summer Winds (May to October)

Winter Winds (November to April)

Image 3: Direction Distribution of Winds Approaching Hamilton International Airport (1985 to 2015)

PEDESTRIAN WIND ASSESSMENT

To provide an opinion on the overall wind conditions expected on and around the proposed project, RWDI reviewed the long-term meteorological data for the area, drawings of the proposed project and information regarding the existing surroundings. These data, in conjunction with our experience in the area and our engineering judgment, allowed us to summarize the expected wind conditions at the project site. Our findings are summarized below.

Wind Flow Patterns

- Except for a few high-rise buildings to the north and south of the project site, the proposed building will be taller than its surroundings and will be exposed to winds from the prevailing directions.
- Buildings taller than their surroundings tend to intercept the stronger winds at higher elevations and redirect them to the ground. Such a *Downwashing Flow* (see Image 4a) is often the main cause for wind accelerations around taller buildings at pedestrian level. Furthermore, when winds approach a large façade at an oblique angle and are deflected down, a localized increase in the wind activity or *Corner Acceleration* can be expected around the downwind building corner at grade level (see Image 4b).

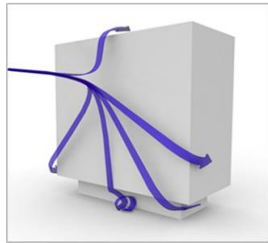


Image 4a: Downwashing Flow

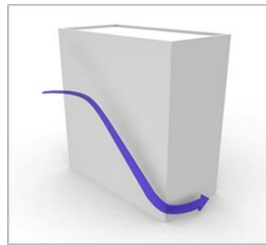


Image 4b: Corner Acceleration

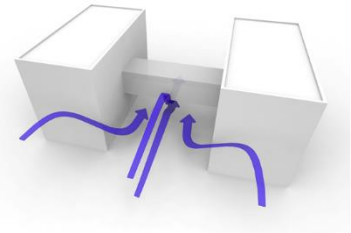


Image 4c: Passage Flow

- The proposed buildings have wide facades almost perpendicular to the prevailing winds from the northeast and southwest directions throughout the year (see Images 5a and 5b). Hence, they will be subject to downwashing and accelerated wind flows around the corners due to exposure to the prevailing winds.

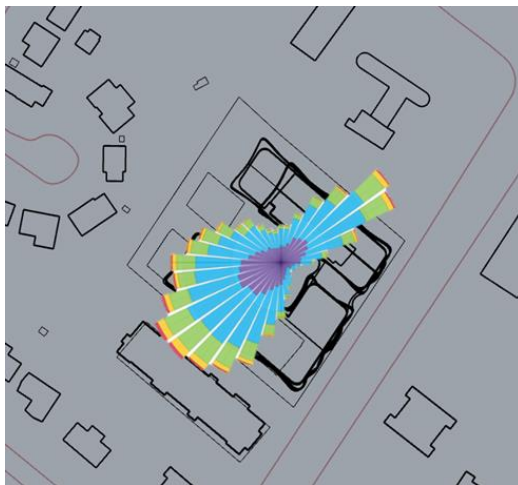


Image 5a: Directionality of Summer Winds

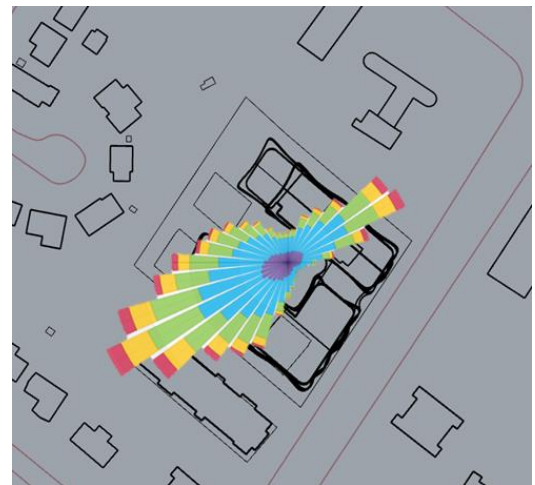


Image 5b: Directionality of Winter Winds

- The proposed buildings include stepped forms from 6 to 11 storeys on the northwest side, which is favourable from a wind control perspective. They will disrupt winds that would otherwise be directed downward by the towers and thereby reduce the potential to create large areas of undesirable wind activity, especially around the northwest areas at grade.
- The vehicle passage under the link between the proposed buildings (see Image 2 and Image 4c) is not aligned with the prevailing winds (see Images 5a and 5b) and, therefore, there should be no concern about the wind activity within the passage.

Predicted Wind Conditions

- Wind conditions comfortable for standing are preferred at entrances where pedestrians are more likely to linger, while higher wind speeds comfortable for strolling or walking are preferred at sidewalks and parking lots where more active pedestrian activities are expected.
- The primary entrances and retail entrances to the proposed buildings are located on the southeast façade of the project (see Images 5a, 5b and 6). These entrances are sheltered from the prevailing winds from the southwest directions, but exposed to the northeasterly winds. Wind speeds comfortable for standing are expected at the entrances during the summer, which is suitable for an entrance. However, accelerated wind speeds may occur occasionally during the winter due to the seasonally stronger prevailing winds from the northeast quadrants creating higher-than-desired wind conditions. It is recommended that the main entrances be recessed, or tall planters or wind screens be placed on both sides of the main and retail doorways.

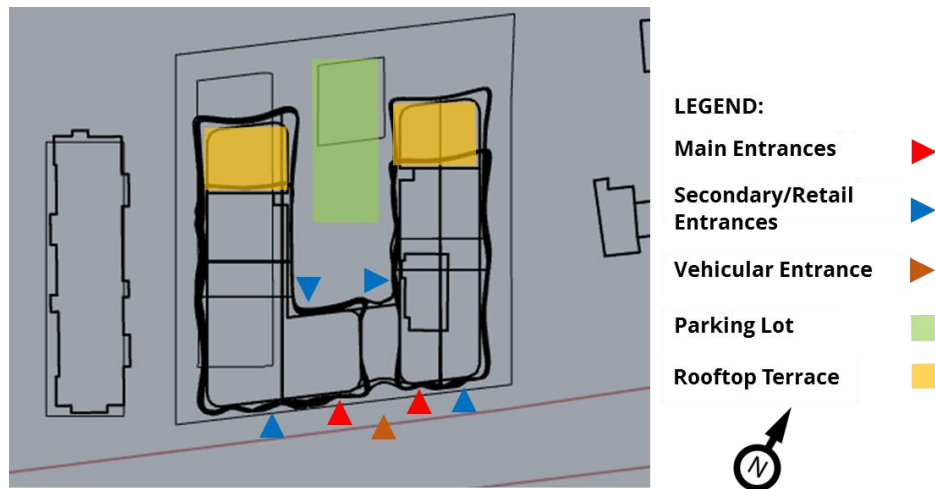


Image 6: – Site Plan Showing Pedestrian Areas

- Suitable wind conditions are expected at the two interior (secondary) entrances to the proposed buildings.



- Wind conditions at the sidewalks on and around the project, and the parking lot, are expected to be suitable for the intended use throughout the year.
- Given the height of the proposed buildings in comparison to its immediate surroundings and exposure to prevailing winds from the northeast and southwest quadrants, accelerated wind speeds and potentially uncomfortable conditions may occur around building corners along New Street during the winter. The proposed curved balconies and varied floor plans are positive features that will help reduce the corner accelerations but higher-than-desired winds are still predicted to occur. It is recommended that wind mitigation be placed at these building corners in the form of either year-round (coniferous) landscaping, windscreens or corner canopies.
- During the summer, wind speeds suitable for standing are expected on the rooftop terraces at the 7th floor. This will be slightly higher-than desired for any seating areas on the terraces. It is recommended that localized landscaping be placed to the west and north of any seating areas to create sitting conditions in the summer. During the winter, elevated wind speeds are anticipated on the rooftop terraces. However, these winds are not expected to be of concern as the use of the rooftop terraces would be limited during the colder winter months.

CONCLUSIONS

The proposed development includes several positive design features for wind control such as the orientation of the development with respect to the prevailing winds so that the main entrances are sheltered in the summer; the stepped massing; and the rounded building corners.

The addition of the proposed buildings to the site is expected to have minimal impact on the existing conditions of the surrounding sidewalks along New Street, Beverley Drive and Guelph Line. Wind conditions at the entrances, parking lot and sidewalks are generally expected to be suitable for the intended use during the summer and for much of the time during the winter.

Slightly higher-than desired wind conditions area expected at the main and retail entrances and the buildings corners along New Street in the winter, and at any seating areas on the 7th floor terraces during the summer. Wind mitigation has been recommended that will create acceptable conditions in these areas.

Wind tunnel tests can be conducted at a later design stage in support of the SPA submission to quantify these wind conditions and refine wind control solutions.



CLOSING

We trust this satisfies your requirements for the project. Should you have any questions or require additional information, please do not hesitate to contact us.

Yours very truly,

ROWAN WILLIAMS DAVIES & IRWIN Inc.

A handwritten signature in black ink, appearing to read 'Kelly Baah', is positioned above the printed name.

Kelly Baah, M.Eng., EIT
Technical Coordinator

A handwritten signature in black ink, appearing to read 'John Alberico', is positioned above the printed name.

John Alberico, M.Sc., CCEP, WELL AP
Senior Project Consultant / Principal

KB/bem