

August 8, 2018

Lakeshore (Burlington) Inc.
421 Brant Street
Burlington, Ontario L7R 2G3

Attn: Mr. Mark G. Bales

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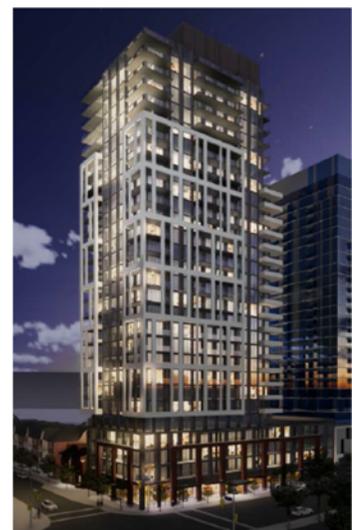
**Re: Pedestrian Wind Comfort – Letter of Opinion
2069 Lakeshore Road – Burlington, ON
Novus File No. 17-0107**

At the request of Lakeshore (Burlington) Inc., this letter of opinion by Novus Environmental Inc. (Novus) provides our estimation of the pedestrian wind conditions surrounding the proposed development at 2069 Lakeshore Road in Burlington, Ontario. This letter of opinion provides a summary of our engineering judgement and experience and is in support of the Zoning By-law Amendment (ZBA) submission.

Building Information and Surroundings

Novus has reviewed the current architectural and site plan set, dated July 24, 2018; this information forms the basis for this letter of opinion. The proposed site is located on the north side of Lakeshore Road in Burlington, between Pearl Street and Martha Street. The site is currently occupied by a low-rise commercial building and a low-rise residential building.

The proposed 29-storey (plus mechanical penthouse) development will have retail at grade, with residential space above. The total height of the development is approximately 99m. There is a one-storey podium, with a rectangular footprint of approximately 60m by 38m, while the tower atop is L-shaped. There is an outdoor amenity space on Level 2, at the northeast corner of the building. At Level 5 the tower footprint becomes rectangular, approximately 36m by 24m, and is located at the southwest corner of the site. An outdoor amenity space is located on the east side of Level 5. The main entrance to the residential tower is in the middle of the south facade, while the entrances to the individual



Rendering of Proposed Development

work/live units are located at the northwest corner of the development. There are retail entrances along the south and west facades, as well as exits.

Directly surrounding the proposed development there are low-rise commercial buildings to the northeast and east; a parking lot to the southeast, a high-rise building under construction to the south; a high-rise building to the southwest; and, low-rise buildings to the northwest and north. Beyond the immediate surroundings there is a combination of low to high-rise commercial and residential buildings to the southwest through northwest, as well as to the northeast, with low-rise residential developments to the north. To the east through south is Lake Ontario.

Wind Climate

Wind data recorded at the Burlington Piers station for the period of 1991-2015 were obtained and analysed to create a wind climate model for the region. The annual wind distribution diagram (“wind roses”) are shown in **Figure 1**. This diagram illustrates the percentage of time wind blows from the 16 main compass directions. Of main interest are the longest peaks that identify the most frequently occurring wind directions. The annual wind rose indicates that wind approaching from the westerly through southwesterly directions are most prevalent. The direction from which stronger winds (e.g., greater than 30 km/h) approach are also of interest as they have the highest potential of creating problematic wind conditions, depending upon site exposure and the building configuration. The wind rose in **Figure 1** also identifies the directional frequency of these stronger winds (in yellow). On an annual basis, strong winds occur from the northeasterly and easterly directions.

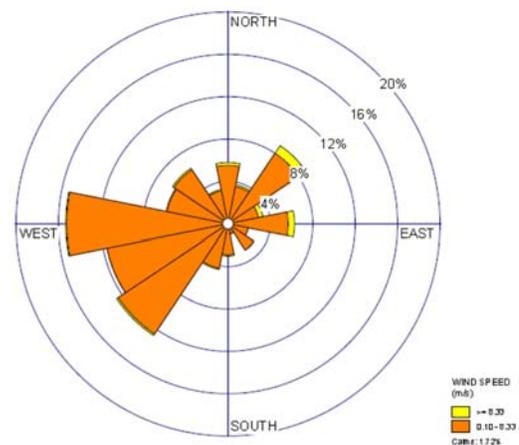


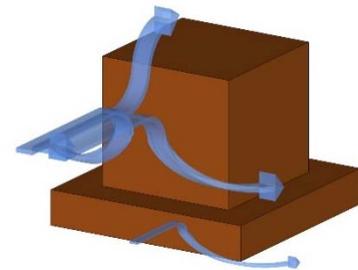
Figure 1: Annual Wind Rose for Burlington Piers Station (1991-2015)

Pedestrian Wind Conditions

There are generally accepted wind comfort levels that are desired for various pedestrian uses. For example, for public sidewalks, wind comfort suitable for **leisurely walking** would be desirable year-round; however, in the winter, windier conditions comfortable for **fast walking**, may occur in harsher wind climates. For main entrances and transit stops, wind conditions conducive to **standing** would be preferred throughout the year, but can be difficult to achieve in regions where winter winds are inherently harsh. For outdoor amenity spaces, wind conditions suitable for **sitting** and/or **standing** are generally desirable during the summer months. The most stringent category of **sitting** is considered

appropriate for cafes and dedicated seating areas, while for public parks **sitting** and/or **standing** would be appropriate in the summer.

The development is partially sheltered from the prevailing southwest through west winds by the downtown core, but it is exposed to the secondary easterly winds. And the proposed development is taller than the surrounding existing developments. Hence, the inclusion of a podium is a positive design feature, as the large horizontal element will disrupt downwashing wind flows before they reach grade (see image). Downwashing flows occur when a tower intercepts the stronger wind flows found at higher elevations and redirects these flows downwards to the corners of the building.



Downwashing flow intercepted by podium

Generally, we expect wind conditions on Lakeshore Road and Pearl Street to be comfortable for leisurely walking throughout the year. However, there is the potential, due to existing high-rise developments in the area, for wind conditions to be conducive to fast walking in the winter season at the intersection of Pearl Street and Lakeshore Road. At the main entrance on Lakeshore Road, wind conditions are predicted to be suitable for standing in the summer and leisurely walking in the winter; the inclusion of a vestibule at this entrance is a positive design feature that should be maintained, as should the recession of the entrance from the main facade. These features will provide additional shelter for pedestrians during the winter season. At the numerous retail entrances along the south and west sides of the building, wind conditions are expected to be suitable for standing in the summer and leisurely walking in the winter. The recession of the retail entrances from the main facade is a positive design feature, as it provides local protection from downwashing flows; this feature should be maintained.

Wind conditions on the two outdoor amenity spaces will vary depending on the exposure of the amenity space to the prevailing southwesterly winds. On the Level 2 outdoor amenity space, wind conditions are expected to be suitable for standing in both the summer and winter seasons. On the Level 5 outdoor amenity space, wind conditions are expected to be comfortable for leisurely walking or better in the summer, with the potential for gustier winds conducive to fast walking in the winter. These wind conditions are due to the downwashing of westerly wind flows off the tower. We suggest the design team consider including trellises and/or vertical wind screens to provide additional shelter for passive activities. On the roof top, wind conditions are expected to be suitable for leisurely walking throughout the year, due to the overall exposure of the area.

Conclusion

Wind conditions on and around the site are generally expected to be suitable for the intended usage. However, there is the potential for wind conditions to be conducive to fast walking in the winter at the intersection of Lakeshore Road and Pearl Street. Wind conditions in the outdoor amenity spaces may

also not be ideal, hence mitigation measures such as trellises and/or wind screen should be considered. Due to these determinations, we recommend conducting a quantitative analysis of the proposed development once the design progresses to the Site Plan Approval (SPA) application.

Should you have any questions or comments, please feel free to contact us.

Sincerely,

Novus Environmental Inc.



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