REPORT
TRAFALGAR AND BURNHAMTHORPE

OAKVILLE, ONTARIO

PEDESTRIAN WIND ASSESSMENT

PROJECT # 2511774
APRIL 6, 2026

SUBMITTED TO

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1. INTRODUCTION

Rowan Williams Davies & Irwin Inc. (RWDI) was retained by 1816986 Ontario Inc. ("Westerkirk") to assess the potential wind conditions at pedestrian levels on and around the proposed development in support of applications for an Official Plan Amendment, Zoning By-law Amendment, and Draft Plan of Subdivision for the lands municipally known as 340 Burnhamthorpe Road East and 3437 Trafalgar Road (the "Site" or "Subject Site").

We understand the project to be a mixed-use community over 12 development blocks and proposing 27 buildings of varying heights, ranging from low- to high-rise. The development is designed around a unique open space system, including 0.5 hectares of public parks, an urban square, walking trails, a new public street network with bike lanes and 14,475 square metres of commercial space, including restaurants, banks and a food store. The site location is shown in Image 1.

A rendering of the proposed development massing design is shown in Image 2, and the proposed preliminary landscaping plan is presented in Image 3.

We understand that the design will propose amenity areas on all building sites, and multiple parks and other outdoor use areas within the masterplan. Amenity use may also be planned on the podium roofs of the proposed towers.

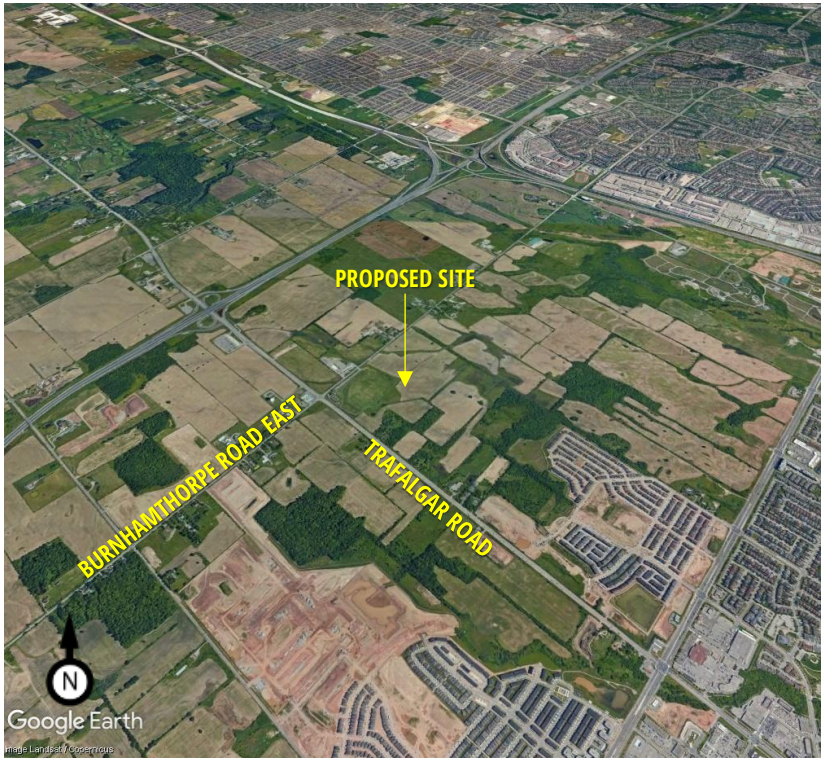


Image 1: Aerial view of the existing site and surroundings (Source: Google Earth)

1. INTRODUCTION

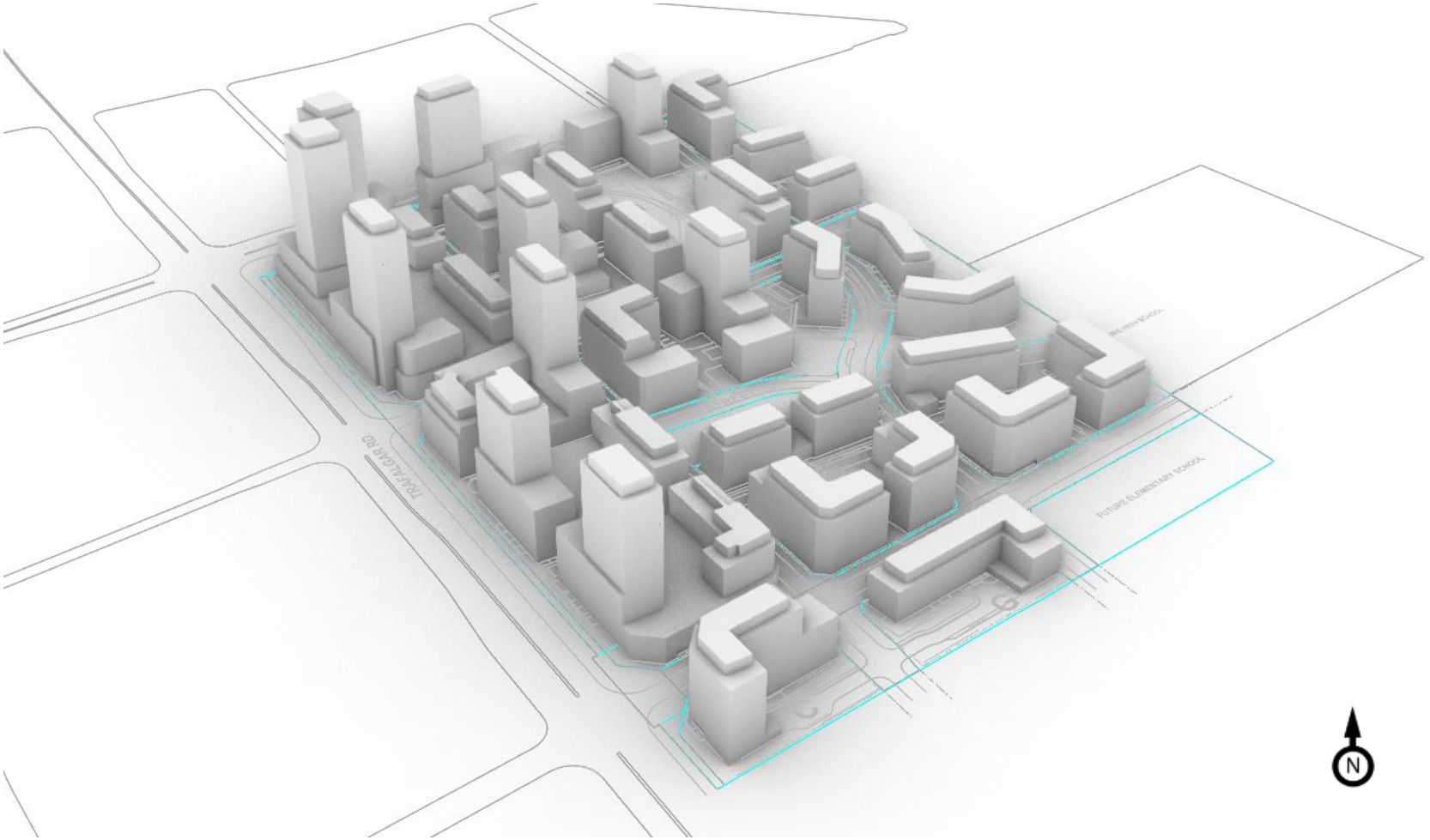


Image 2: Rendering of the Proposed Development Massing Design

1. INTRODUCTION

Image 3: Proposed Site and Landscaping Layout

2. METHODOLOGY

2.1 Objective

The objective of this assessment is to provide an evaluation of the potential impact of the proposed development on wind conditions in pedestrian areas on and around it based on Computational Fluid Dynamics (CFD) modelling. The assessment is based on the following:

- A review of the regional long-term meteorological data;
- The use of *Orbital Stack*, an in-house CFD tool;
- E-model of the proposed project received on November 21, 2025, that was used for the CFD modelling;
- A review of the landscape progress plans received on December 10, 2025, and block numbers received on December 18, 2025;
- RWDI's engineering judgment, experience, and expert knowledge of wind flows around buildings[1-3]; and,
- The RWDI wind comfort and safety criteria.

Note that other microclimate issues, such as those relating to cladding and structural wind loads, door operability, air quality, snow impact, etc., are not part of the scope of this assessment

2.2 CFD for Wind Simulation

CFD is a numerical technique that can be used for simulating wind flows in complex environments. For this analysis, CFD techniques were used to generate a virtual wind tunnel where flows around the site and its surroundings were simulated in full scale. The computational domain that covered the site and its surroundings was divided into millions of small cells where calculations were performed, yielding a prediction of wind conditions across the entire study domain. CFD excels as a tool for wind modelling, presenting early design advice, comparing different design and site scenarios, resolving complex flow physics, and helping diagnose problematic wind conditions.

The computational modelling method used in the current assessment does not explicitly simulate the transient behaviour of turbulent wind. The effects of infrequent but strong wind gusts were estimated based on other calculated quantities. RWDI has found this approach to be appropriate for the assessment of typical wind comfort conditions. Wind safety issues, which relate to transient, higher-speed gusts, are discussed qualitatively, based on the CFD predictions and our extensive wind-tunnel experience for similar projects.

In order to quantify the transient behaviour of wind and refine any conceptual mitigation measures, a more detailed assessment would be required using either a boundary-layer wind tunnel or transient computational modelling.

2. METHODOLOGY

2.3 Simulation Model

CFD simulations were completed for two scenarios:

A – Existing: Existing site and surroundings

B – Proposed: The proposed development in the context of the existing surroundings.

The computer model of the proposed development is shown in Image 4, and the extended model of the two configurations are shown in Images 5a and 5b. The 3D models were simplified to include only the necessary building and terrain details that would affect the local wind flows in the area and around the site**. Landscaping and smaller architectural and accessory features were not included in the computer model in order to provide more conservative wind conditions (as is the norm for this level of assessment).**

The wind approaching the modelled area was simulated for 16 directions (starting at 0°, at 22.5° increments around the compass), accounting for the effects of the atmospheric boundary layer and terrain impacts. Wind data were obtained in the form of ratios of wind speeds at approximately 1.5 m above the concerned levels, to the mean wind speed at a reference height. The data was then combined with regional meteorological records to determine the wind speeds and frequencies in the simulated areas.

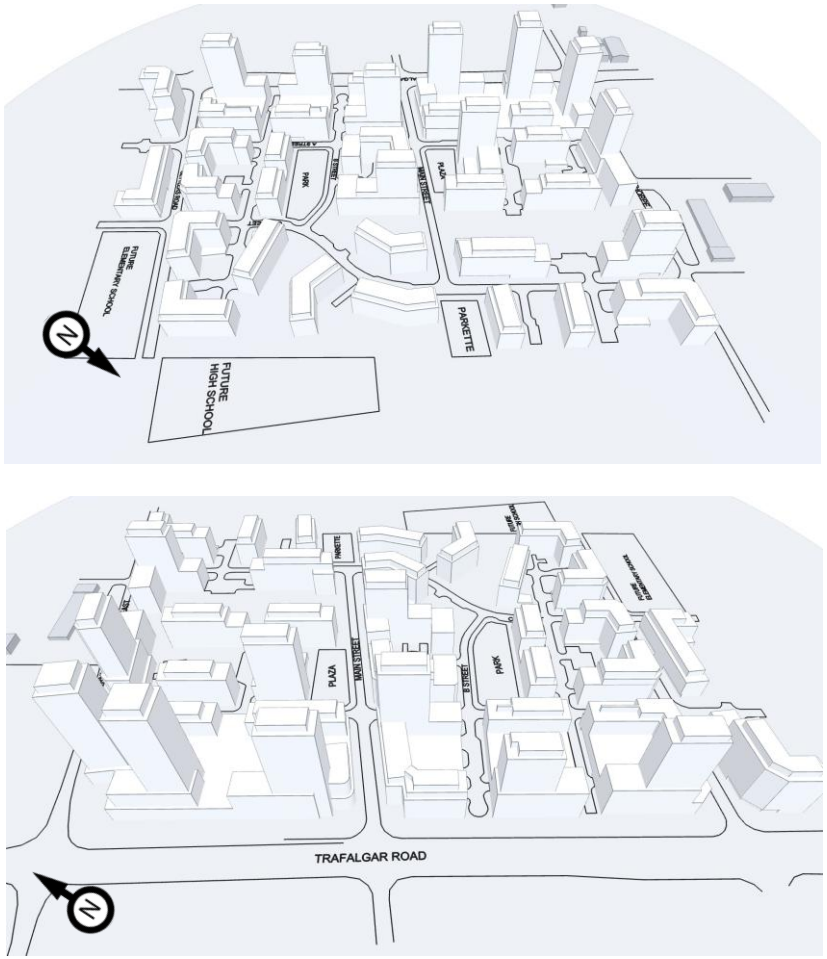


Image 4: Computer model of the proposed project

2. METHODOLOGY

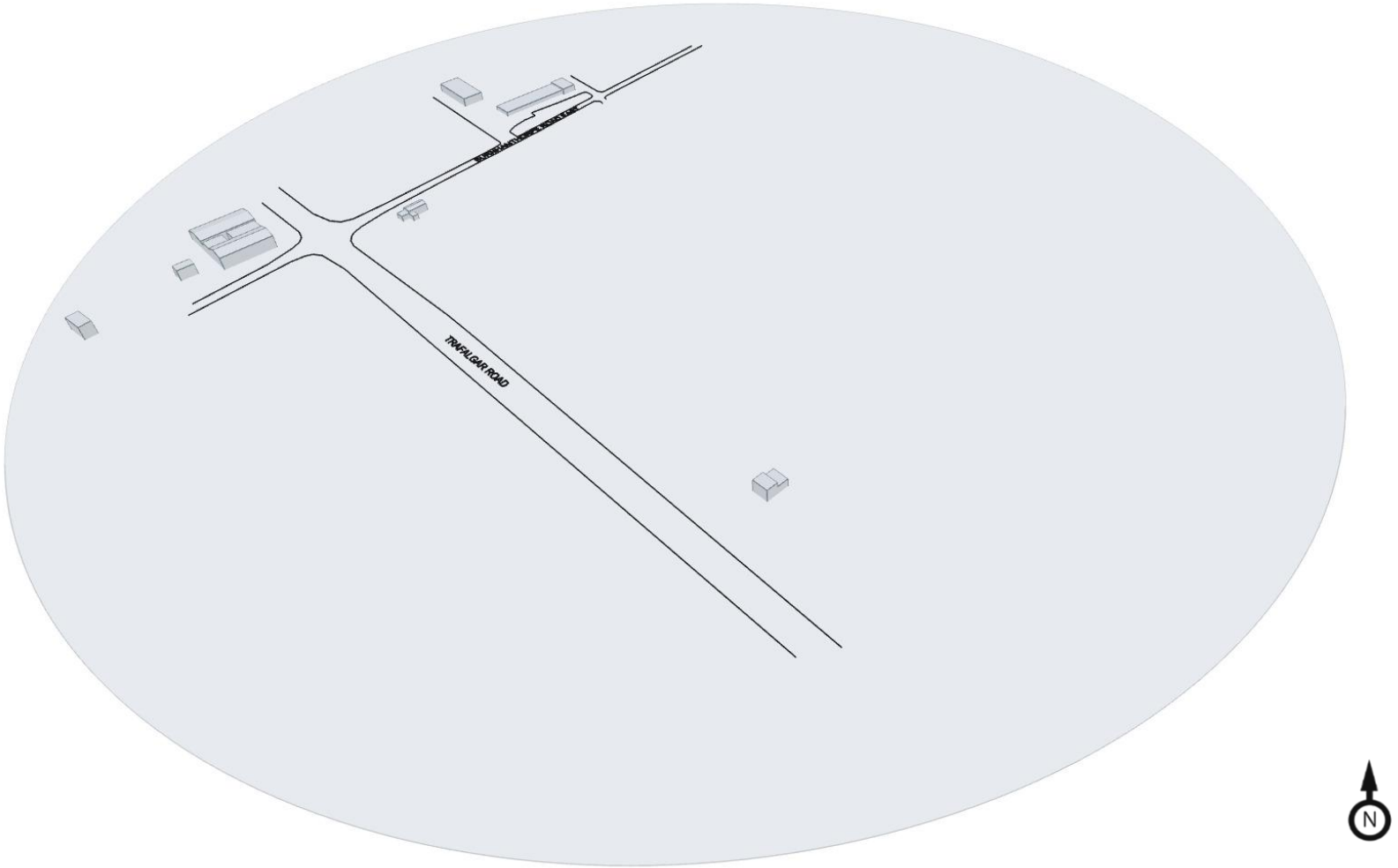


Image 5a: Computer model of the existing site and extended surroundings

2. METHODOLOGY

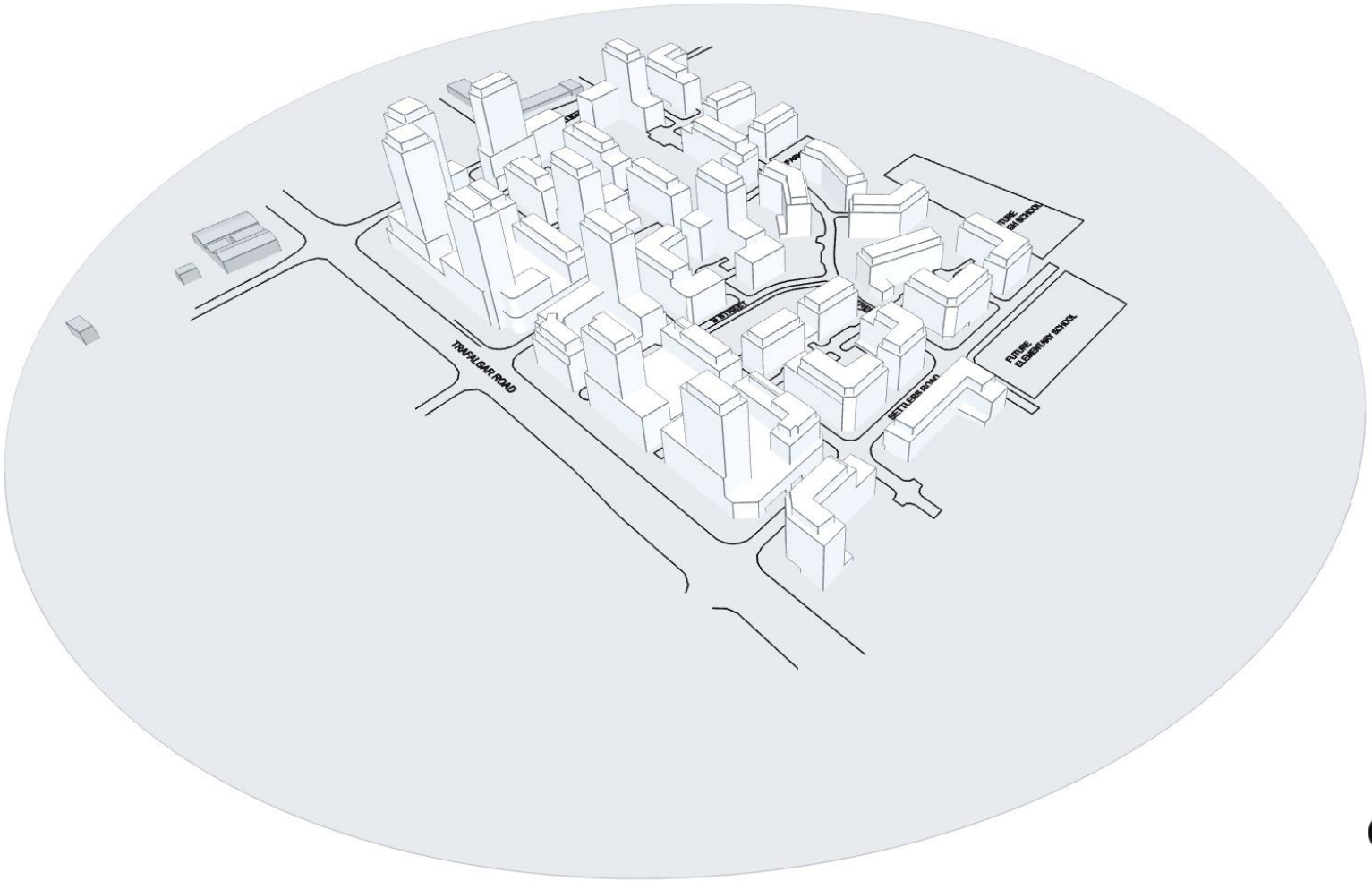


Image 5b: Computer model of the proposed development and extended surroundings

3. METEOROLOGICAL DATA

Meteorological data from Toronto Pearson International Airport for the period from 1994 to 2024 were used as a reference for wind conditions in the area, as this is the nearest station to the site with long-term, hourly wind data. The distributions of wind frequency and directionality for the summer (May through October) and winter (November through April) seasons are shown in the wind roses in Image 6.

When all winds are considered, winds from the southwest through north are predominant throughout the year, with secondary winds from south-southeast in the summer, and from east in the winter.

Strong winds of a speed greater than 30 km/h measured at the airport (red and yellow bands) occur more often in the winter than in the summer season. Winds from the west-southwest through north-northwest and east potentially could be the source of uncomfortable or severe wind conditions, depending upon the site exposure and development design.

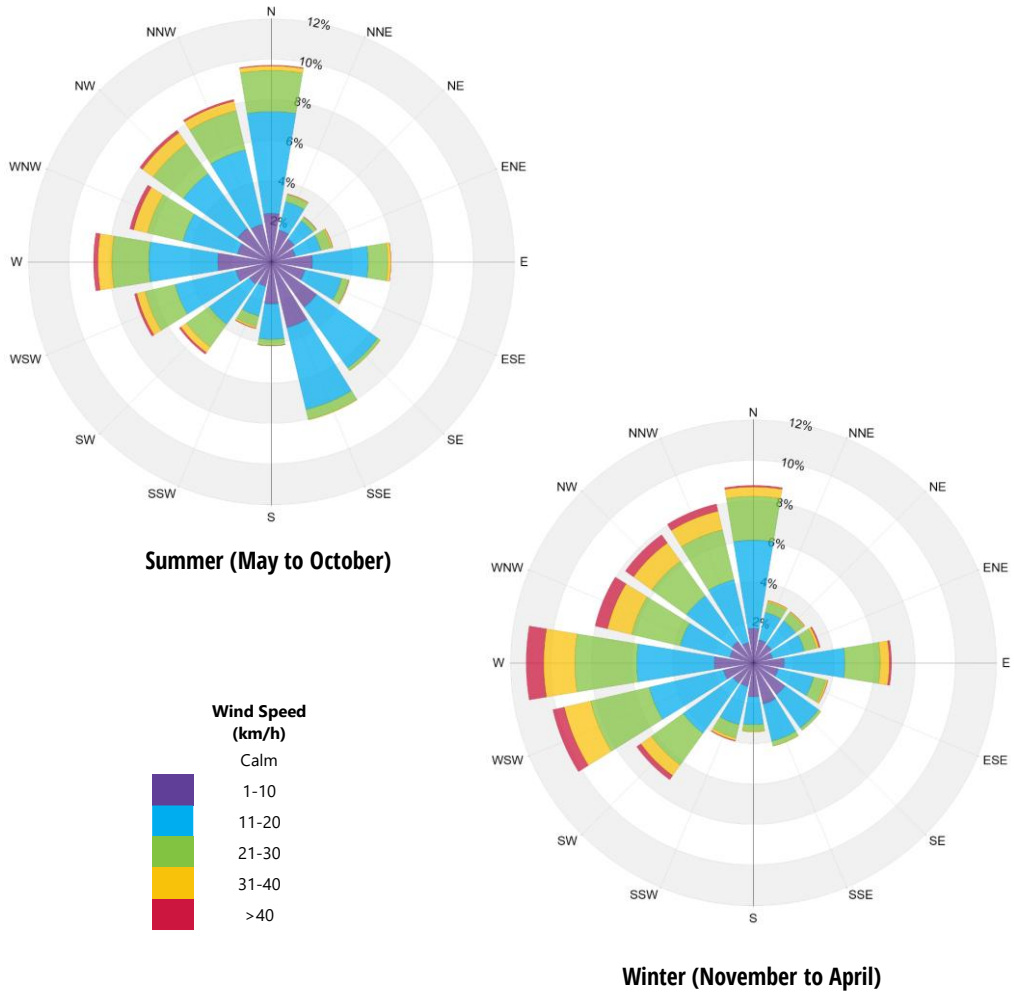


Image 6: Directional distribution of winds approaching Toronto Pearson International Airport (1994-2024)

3. WIND CRITERIA

The RWDI pedestrian wind criteria are used in the current study; the criteria presented in the table below address pedestrian safety and comfort. These criteria have been developed by RWDI through research and consulting practice since 1974. They have also been widely accepted by municipal authorities, building designers, and the city planning community.

3.1 Pedestrian Comfort

Pedestrian comfort is associated with common wind speeds conducive to different levels of human activity. Wind conditions are considered suitable for sitting, standing, strolling, or walking if the associated mean wind speeds (see table) are expected for at least four out of five days (80% of the time). The assessment considers winds occurring between 6 AM and midnight. Limited usage of outdoor spaces is anticipated in the excluded period. Speeds that exceed the criterion for Walking are categorized as Uncomfortable. These criteria for wind forces represent average wind tolerance. They are sometimes subjective, and regional differences in wind climate and thermal conditions, as well as variations in age, health, clothing, etc., can also affect people's perception of the wind climate.

Comfort Category	GEM Speed (km/h)	Description (Based on seasonal compliance of 80%)
Sitting	≤ 10	Calm or light breezes desired for outdoor seating areas where one can read a paper without having it blown away
Standing	≤ 14	Gentle breezes suitable for main building entrances, bus stops, and other places where pedestrians may linger
Strolling	≤ 17	Moderate winds appropriate for window shopping and strolling along a downtown street, plaza or park
Walking	≤ 20	Relatively high speeds that can be tolerated if one's objective is to walk, run or cycle without lingering
Uncomfortable	> 20	Strong winds considered a nuisance for all pedestrian activities. Wind mitigation is typically recommended

3.2 Pedestrian Safety

Pedestrian safety is associated with excessive Gust Speeds that can adversely affect a person's balance and footing. These are usually infrequent events but deserve special attention due to the potential impact on pedestrian safety.

Safety Criterion	Gust Speed (km/h)	Description (Based on annual exceedance of 9 hrs or 0.1% of time)
Exceeded	> 90	Excessive gusts that can adversely affect one's balance and footing. Wind mitigation is typically required

5. RESULTS AND DISCUSSION

5.1 Wind Flow Around the Project

Wind tends to accelerate significantly over generally open lands. The addition of a large group of buildings can create an overall slowdown of the bulk wind flows, and the accelerated flows tend to be localized around the buildings. Buildings that are taller than their surroundings tend to intercept and redirect stronger winds around them. The mechanism by which winds are directed down the height of a building is called Downwashing. These flows subsequently move around exposed building corners, causing a localized increase in wind speeds due to Corner Acceleration. Wind accelerations through the space between buildings are called Channeling. Stepped massing, articulated corner massing (chamfered/fileted/reentrant), low roofs, canopies, wind screens and trees disrupt wind accelerations and reduce the potential wind impact on the ground level. These flow patterns are illustrated in Image 7.

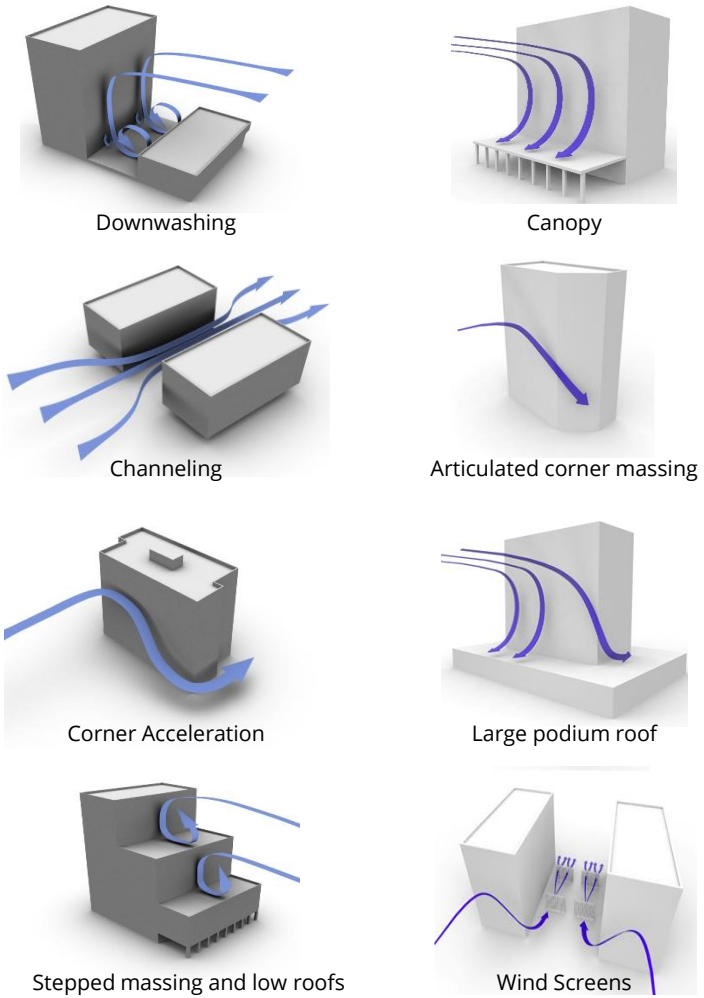


Image 7: General wind flow patterns

5.2 Presentation of Results

The predicted seasonal wind comfort conditions for the Existing and Proposed configurations are presented as colour contours of wind speeds calculated based on the wind criteria (Section 4). The contours represent wind speeds at a horizontal plane approximately 1.5 m above the concerned level. The assessment against the safety criterion (Section 4) was conducted qualitatively based on the predicted wind conditions and our extensive experience with wind tunnel assessments. A detailed discussion of the expected wind conditions with respect to the prescribed criteria and applicability of the results follows in Sections 5.3. and 5.4. The discussion includes recommendations for wind control to reduce the potential of high wind speeds for the design team's consideration (Section 5.5).

Target Conditions:

For the current development, wind speeds comfortable for walking are appropriate for sidewalks and walkways where pedestrians are likely to be active and moving intentionally. Lower wind speeds comfortable for standing are required where building entrances or waiting areas are planned. Calm wind speeds suitable for sitting are desired in areas where prolonged periods of passive activities are anticipated, such as the parks and any outdoor amenity areas, seating areas, etc., especially during the summer and shoulder months when these areas would be used the most.

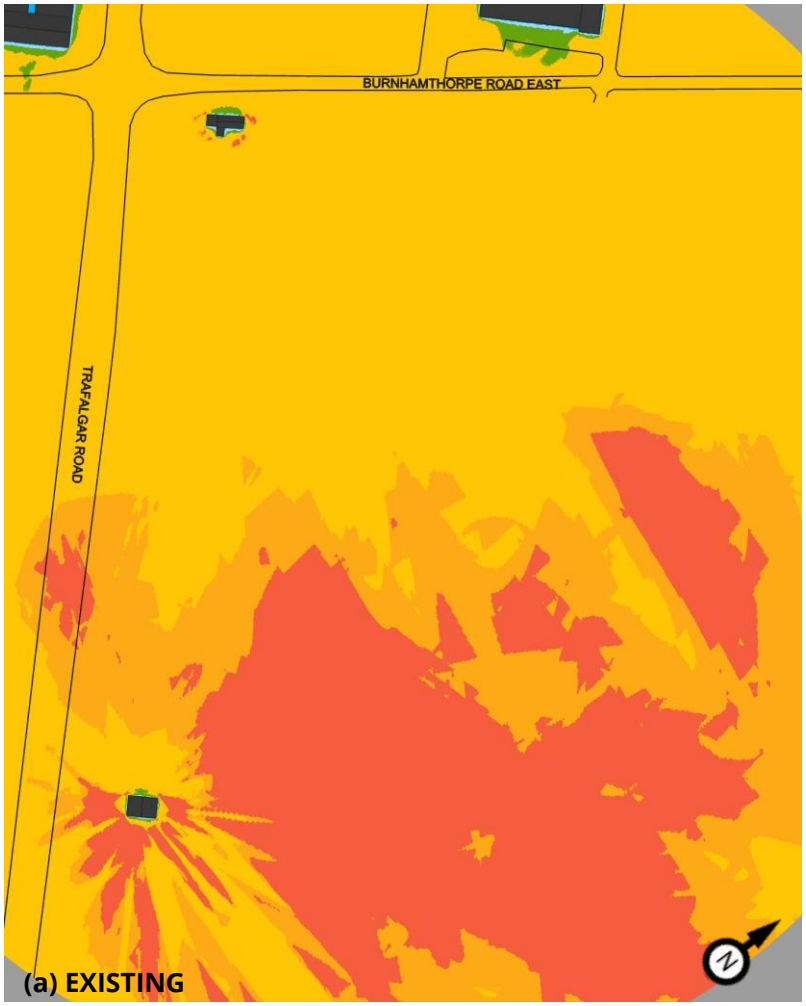
5.3 Existing Scenario

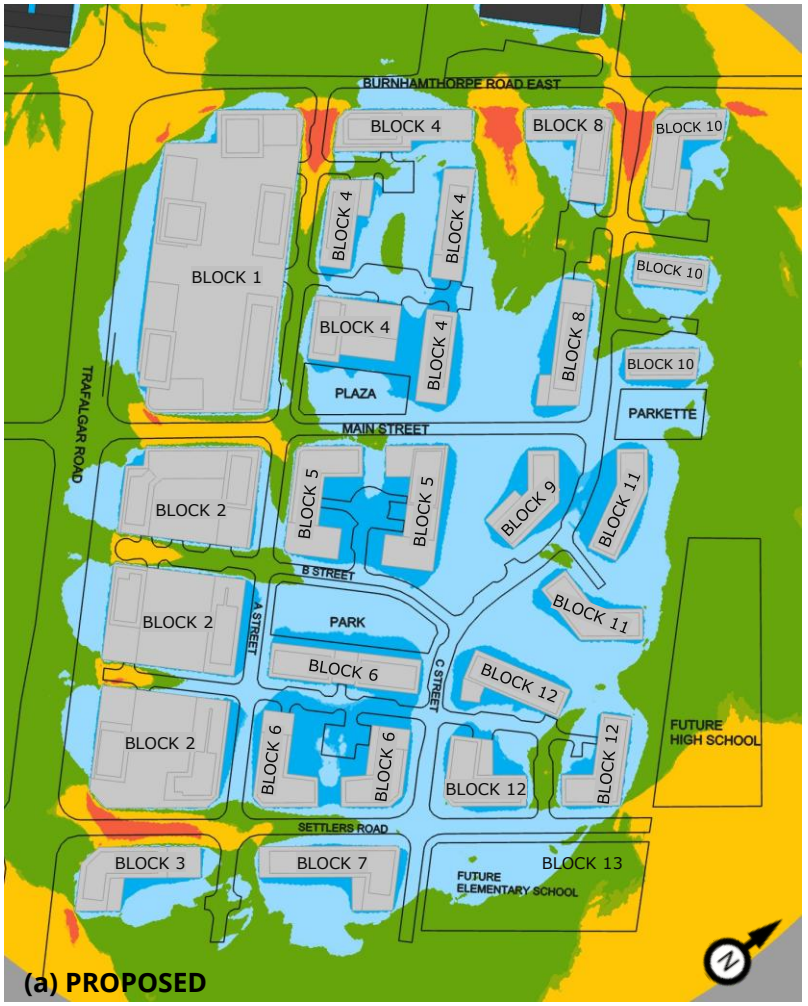
The existing site is open, unbuilt land, surrounded by similar open fields and/or low-rise residential neighbourhoods in all directions. Wind flowing through the site is uninterrupted and therefore tends to accelerate through the open space. Wind conditions on and around the existing site are shown in Image 8. Conditions are considered comfortable for walking or uncomfortable in the summer and uncomfortable in the winter. Wind conditions on the project site may exceed the safety criterion.

5.4 Proposed Scenario: Grade Level

As discussed in Section 5.1, the addition of the proposed masterplan development is expected to reduce wind activity on the site by disrupting and rearranging wind flows through the site. The stepped elevations or tower setbacks on the tall buildings, articulated tower and podium corners, and the orientation of the masterplan with major streets aligned against the predominant wind direction, all help reduce the potential wind impacts. At the outer boundaries, the interaction of the approaching strong winds with tall buildings that are most exposed to the wind will result in wind acceleration zones locally around them. The predicted wind conditions are shown in Images 9a and 9b for the summer and winter seasons, respectively, and a detailed discussion of the results follows.

5. RESULTS AND DISCUSSION

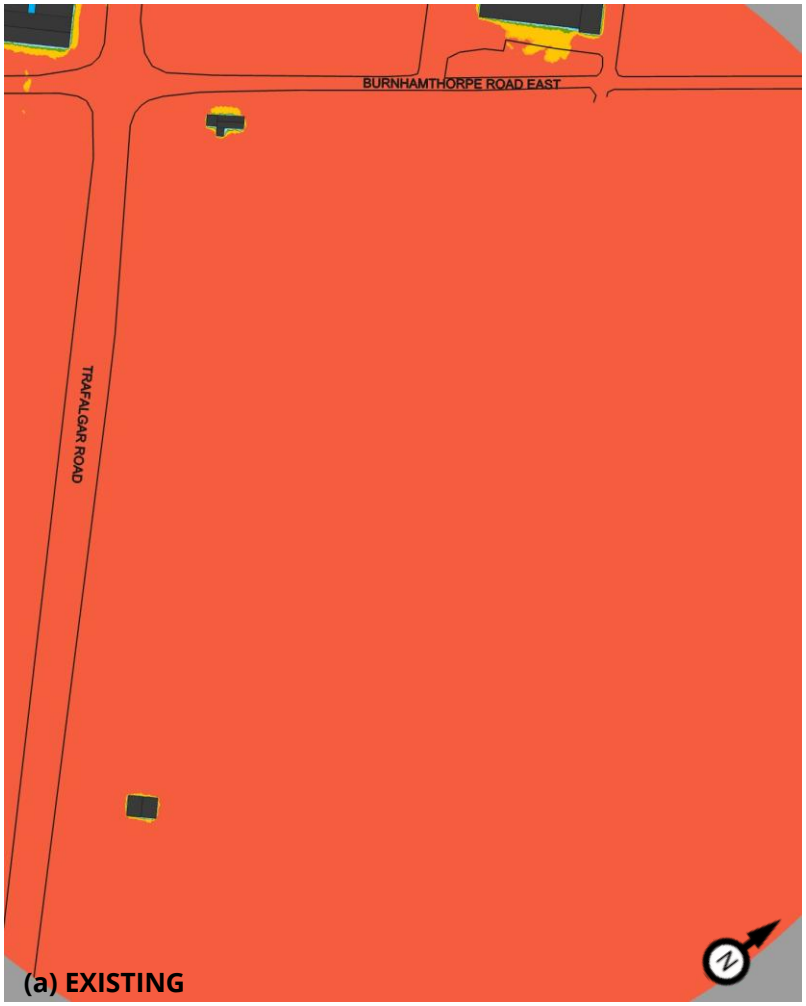


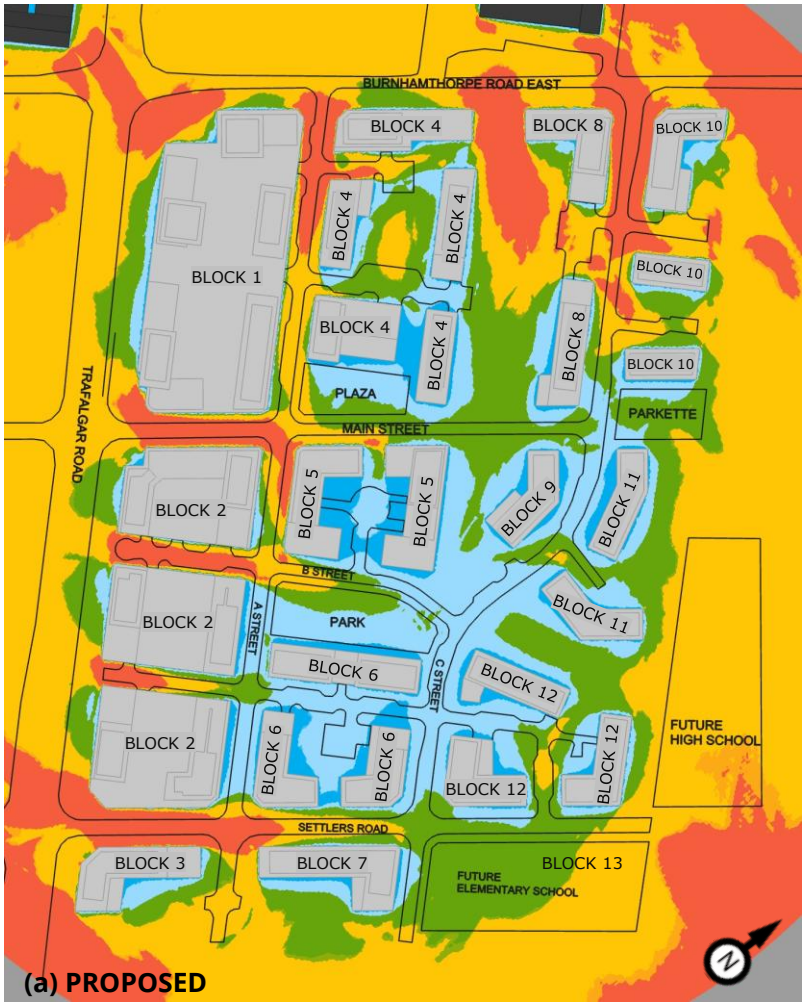


COMFORT: SITTING | STANDING | STROLLING | WALKING | UNCOMFORTABLE

Image 8: Predicted wind conditions – GROUND LEVEL – SUMMER

5. RESULTS AND DISCUSSION





COMFORT: SITTING | STANDING | STROLLING | WALKING | UNCOMFORTABLE

Image 9: Predicted wind conditions – GROUND LEVEL – WINTER

5.4.1 Sidewalks and Walkways

During the summer months, wind speeds along the sidewalks surrounding the project are expected to be comfortable for standing, strolling, or walking. Potentially uncomfortable conditions are expected in the areas between the buildings on Burnhamthorpe Road and Trafalgar Road.

In the winter, wind conditions on most sidewalks and walkways are expected to be comfortable for walking or strolling. Large areas of uncomfortable wind conditions, relative to summer, are expected on the north and west sides of the development due to the seasonally stronger winds. Areas where uncomfortable conditions are predicted may also be subject to strong gusts that exceed the annual safety criterion.

The high wind speeds discussed above are attributed to the windward location of the buildings and direct exposure to the predominant winds, as there are no wind buffers upwind of the site. As can be noted, the high wind activity is limited to the north and west ends of the on-site streets and the interior is mostly sheltered.

Architectural modifications that can be considered to assist with wind mitigation include deeper tower stepbacks and deep canopies on the mid-to-upper levels of the podiums on the north and west sides of the buildings. We understand that an extensive landscaping plan with street trees and clustered tree plantings is being proposed. Trees with large crowns combined with dense and tall underplanting are favourable for reducing wind activity around them. Wind-tolerant and evergreen vegetation should be considered in the potentially windy areas discussed above to extend the wind mitigation benefits into the cold months when winds are stronger. We strongly encourage the consideration of architectural sculptures, screens, and other built features at building corners and along the windy streets for disrupting channelling flows and corner acceleration flows. Some examples of these features are shown in Image 10.

5.4.2 Parks, Plazas, and Gardens

The proposed parks, plaza, and courtyard/garden areas are positively located in areas that would be sheltered from wind by the proposed buildings, mostly toward the southern half of the development site or the south side of the buildings. The gardens between Blocks 4 and 8 would be more exposed to the predominant winds and channelling flows between buildings due to the size of the area and opening at the north end on Burnhamthorpe Road. Conditions in this garden are predicted to be comfortable for standing or strolling in the summer and for strolling or walking in the winter, with uncomfortable conditions in the northern half in both seasons. Note that these predictions are made in the absence of the proposed treescape. We understand this garden, like all the other proposed gardens, parks, and plazas, will be extensively landscaped with trees. Strategic landscaping can reduce wind activity substantially; we recommend the incorporation of tall, large evergreen trees in the north half of the garden between Blocks 4 and 8 to achieve low wind conditions in the winter months as well.

5.4.3 Entrances and Amenity Areas at Grade

The main lobby entrances to most of the buildings, as we understand, are proposed in areas where the wind conditions are expected to be comfortable for standing or sitting, which is positive. We understand that some of the main entrances may be located along Street A (for Blocks 1 and 4) and Street C (Block 8) – wind speeds at the north ends of these streets are predicted to be comfortable for strolling, walking, or uncomfortable in the summer and winter, which represents higher than ideal speeds for entrances. We suggest considering the relocation of entrances to less windy areas, or the addition of wind screens or recessed entrances to protect the doorways from wind. Some examples are shown in Image 10.

Amenity areas for each building are proposed in favourable locations for low wind speeds. Wind speeds at all outdoor amenity areas adjacent to the proposed buildings are predicted to be comfortable for sitting or standing in the summer and for standing or strolling in the winter. These conditions are appropriate for outdoor amenity use, and the speeds in the summer will be reduced with the incorporation of the proposed trees around the areas.

5.4.4 Recommendations

RWDI understands that the design team is continuously working on details, including architectural features (canopies, screens, etc.), entrance locations, landscaping, etc. Based on the proposed concept for the rezoning stage, we see that most main entrances are located away from the corners of the building massings, which is positive. We recommend that, as much as feasible, the design team consider evergreen trees or screens on both sides of the main entrances facing the north, so as to create a localized protected zone for patrons using the entrances. Alternatively, consider recessing the entrances 2 m into the façade for a similar effect.

The proposed landscaping plan includes planting beds in strategically favourable areas for wind control. The proposed landscaping beds can be used to incorporate several wind-blocking measures (such as decorative screens and evergreen layered planting to a height of more than 2 m) to reduce the overall wind activity and, as a result, reduce the predicted uncomfortable wind zones on the site. They can also encourage pedestrians to walk closer to the building façades, where calmer wind speeds are expected. Some examples of features to be considered are presented in Image 10. RWDI can advise the design team to aid in this effort as the design progresses. RWDI recommends that wind tunnel testing be conducted to validate and refine mitigation strategies during the Site Plan Approval stage.

5. RESULTS AND DISCUSSION

Image 10: Examples of features for wind control at the grade level

5.5 Proposed Scenario: Above-Grade Outdoor Areas

Conditions comfortable for sitting are desirable for prolonged periods of relaxed use, while slightly higher speeds comfortable for standing may be acceptable in areas that are less frequently used, or in areas that aren't intended for seating.

The predicted wind conditions for the potential above-grade outdoor areas are shown in Image 11. Wind conditions in the amenity areas vary depending on their location relative to the taller massing around them. Areas located downwind (east or south) of the towers relative to the predominant westerly and northwesterly winds are expected to be sheltered, and therefore, wind conditions would be comfortable for sitting or standing in the summer. Conditions in the other, more exposed areas are predicted to be comfortable for strolling or walking in the summer. Uncomfortable wind conditions are predicted near the northern towers of Blocks 1, 4, and 8 and the southern towers of Blocks 2 and 3. Higher wind speeds are predicted in the winter, which may be acceptable due to the limited use expected in the colder months. Due to the greater exposure to both directly approaching winds as well as building-induced flows, wind gusts exceeding the annual safety criterion may be expected at the base of the taller towers along the north and west of the development.

Note: No guardrails were included in the current model based on the information received at the time of the assessment. Taller guardrails are recommended around amenity areas intended for frequent use. Solid perimeter screens of a minimum height of 1.8 m are recommended. Additionally, the design team is advised to consider porous screens (approximately 30%-50% open), dense vegetation of mixed heights, and other upright or floor-mounted elements across the amenity areas to further diffuse and disrupt wind flows through the area. These features could be placed strategically to create smaller zones of calm wind activity for designated patron uses. Such upright features should be at least 1.8 m tall. Overhead trellises and canopies may also be considered close to the base of the towers to break downwashing flows. Examples are provided in Image 12. RWDI recommends that wind tunnel testing be conducted at the Site Plan Approval stage to refine and validate the predicted wind speeds and mitigation strategies presented herein.

5. RESULTS AND DISCUSSION

COMFORT: SITTING | STANDING | STROLLING | WALKING | UNCOMFORTABLE

Image 11: Predicted wind conditions – ABOVE-GRADE

RWDI Project #2511774
April 6, 2026

5. RESULTS AND DISCUSSION

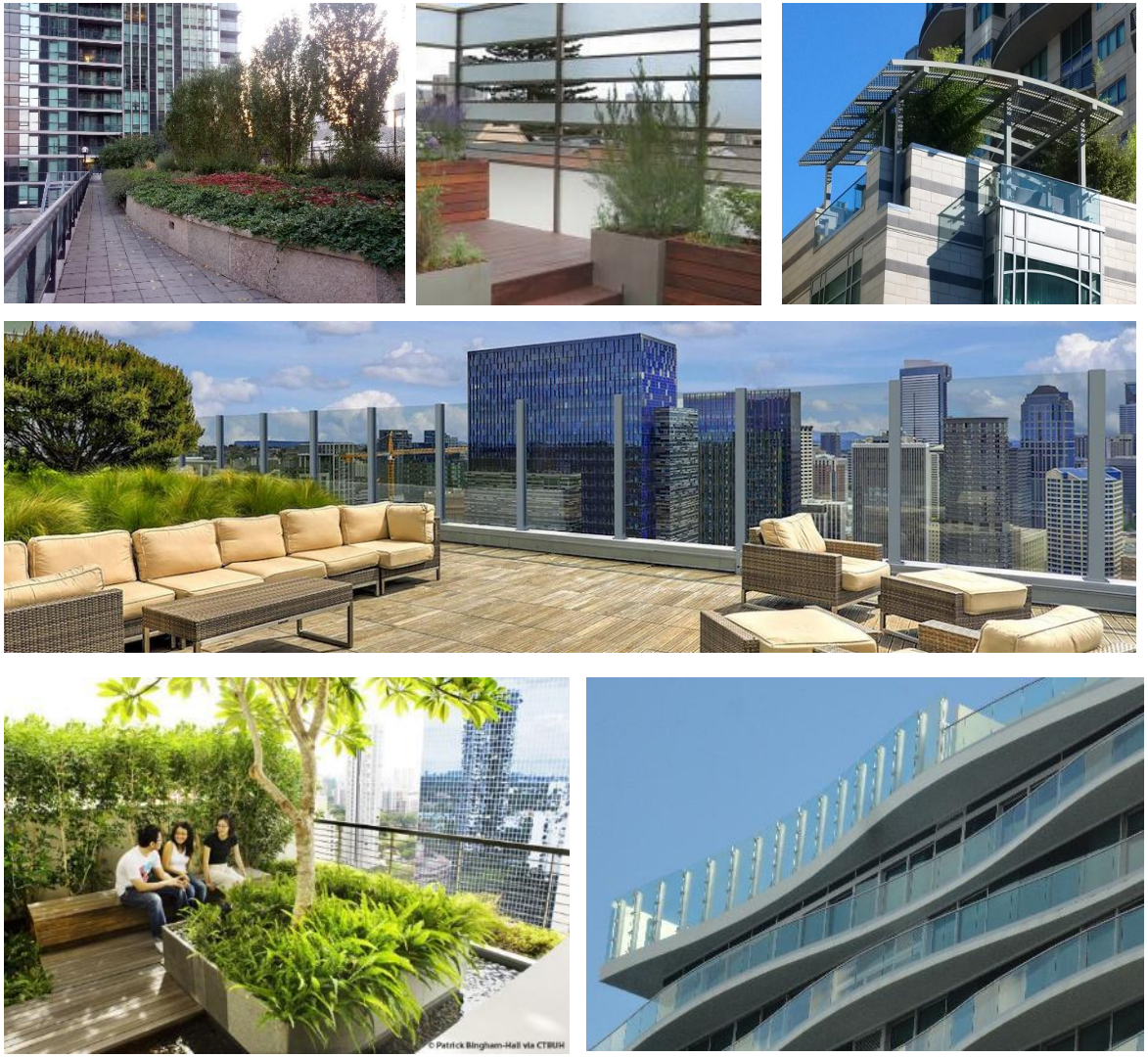


Image 12: Design strategies for wind control on outdoor amenities

5.6 Updated Architectural Drawings

RWDI received updated architectural drawings on April 6, 2026 (Image 13). The revised submission maintains the original development layout, consisting of 27 buildings distributed across 12 blocks, with building heights ranging from 4 to 30 storeys. The only modification pertains to the taller tower located at Block 1, for which the overall height has been reduced from 32 to 30 storeys.

RWDI has reviewed this revision and confirms that the Computational Fluid Dynamics (CFD) Pedestrian Wind Study previously completed for the site remains applicable. The two-storey reduction in the height of the Block 1 tower is not anticipated to result in any material changes to the local wind flow patterns or pedestrian-level wind conditions. As such, the outcomes and conclusions of the original CFD pedestrian wind simulation remain valid, and no updates to the analysis or associated figures are required at this time.

Image 13: Updated Site Plan, April 6, 2026.

6. SUMMARY

RWDI was retained to provide an assessment of the potential pedestrian-level wind impact of the proposed Trafalgar and Burnhamthorpe masterplan project in Oakville, Ontario. Our assessment was based on a computational modelling and simulation of wind flows in combination with information on the local wind climate, the current design of the proposed development and the existing surroundings. Our findings are summarized as follows:

- Wind speeds at the existing site, which is an open and undeveloped lot, are high; conditions are comfortable for walking during the summer and uncomfortable in the winter.
- Positively, the addition of the large development will disrupt the wind flow through the site, and as a result, preexisting uncomfortable conditions over large areas within and adjacent to the bounding streets around the site are expected to be improved to be comfortable for strolling or walking.
- The proposed built form articulations, like the stepped massing, articulated corners, low podiums, etc., are expected to have a positive impact on reducing wind effects at the pedestrian level.
- Relatively higher wind activity and uncomfortable conditions are expected around the corners and channels between the buildings proposed along Burnhamthorpe Road and Trafalgar Road due to the direct exposure to the predominant wind approaching over open terrain.
- Wind conditions in the proposed parks, plazas, gardens, and amenity areas at the ground level are predicted to be appropriate for the expected seasonal use. The exception is the garden area between Blocks 4 and 8, where higher speeds are expected in the summer and winter.
- The proposed landscaping plan includes the extensive use of trees and planting beds in strategically favourable areas for wind control. The landscaping beds can be used to incorporate several wind-blocking measures to reduce the overall wind activity and encourage pedestrians to walk closer to the building façades, where calmer wind conditions are expected.
- The podium-roof level amenity areas would highly benefit from wind control features to achieve conditions suitable for seating, dining, or lounging.
- Wind control features such as winter plantings, screens, sculptures, etc., are recommended around the windy zones and designated leisure zones. RWDI can help select the wind control features as the design develops.
- RWDI recommends that wind tunnel testing be conducted at the Site Plan Approval stage to refine and validate the predicted wind speeds and mitigation strategies presented herein.
- The updated architectural drawings received on April 6, 2026, are not anticipated to result in any changes to the predicted conditions presented in this report.

7. DESIGN ASSUMPTIONS

The findings/recommendations in this report are based on the building geometry and architectural drawings communicated to RWDI, listed below. Should the details of the proposed design and/or geometry of the building change significantly, results may vary.

File Name	File Type	Date Received (mm/dd/yyyy)
2025-11-20 - 3D Massing.3dm	E-model	11/20/2025
2025-12-05_24-028_WT_Zoning_For Internal Review 1.pdf	Landscaping Plans	12/10/2025
24-30-276-02 DRAFT PLAN DEC 18 2025.pdf	Block Numbers	12/18/2025
2026-04-06 - Trafalgar and Burnhamthorpe - Architectural Set.pdf	Updated Arch Set	04/06/2026

It should be noted that wind comfort is subjective and can be sensitive to changes in building design and operation that are possible during the life of a building. In the event of changes to the design, construction, or operation of the building in the future, RWDI could provide an assessment of their impact on the discussions included in this report. It is the responsibility of Others to contact RWDI to initiate this process.

8. STATEMENT OF LIMITATIONS

This report was prepared by Rowan Williams Davies & Irwin Inc. for 1816986 Ontario Inc. ("Client"). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein and the authorized scope. The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared. Because the contents of this report may not reflect the final design of the Project or subsequent changes made after the date of this report, RWDI recommends that it be retained by Client to verify that the results and recommendations provided in this report have been correctly interpreted in the final design of the Project.

The conclusions and recommendations contained in this report have also been made for the specific purpose(s) set out herein. Should the Client or any other third party utilize the report and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this report carefully review the stated assumptions contained herein and to understand the different factors which may impact the conclusions and recommendations provided.

9. REFERENCES

1. H. Wu, C.J. Williams, H.A. Baker and W.F. Waechter (2004), "Knowledge-based Desk-Top Analysis of Pedestrian Wind Conditions", *ASCE Structure Congress 2004,* Nashville, Tennessee.

2. H. Wu and F. Kriksic (2012). "Designing for Pedestrian Comfort in Response to Local Climate", *Journal of Wind Engineering and Industrial Aerodynamics*, vol.104-106, pp.397-407.

3. C.J. Williams, H. Wu, W.F. Waechter and H.A. Baker (1999), "Experience with Remedial Solutions to Control Pedestrian Wind Problems", *10th International Conference on Wind Engineering*, Copenhagen, Denmark.