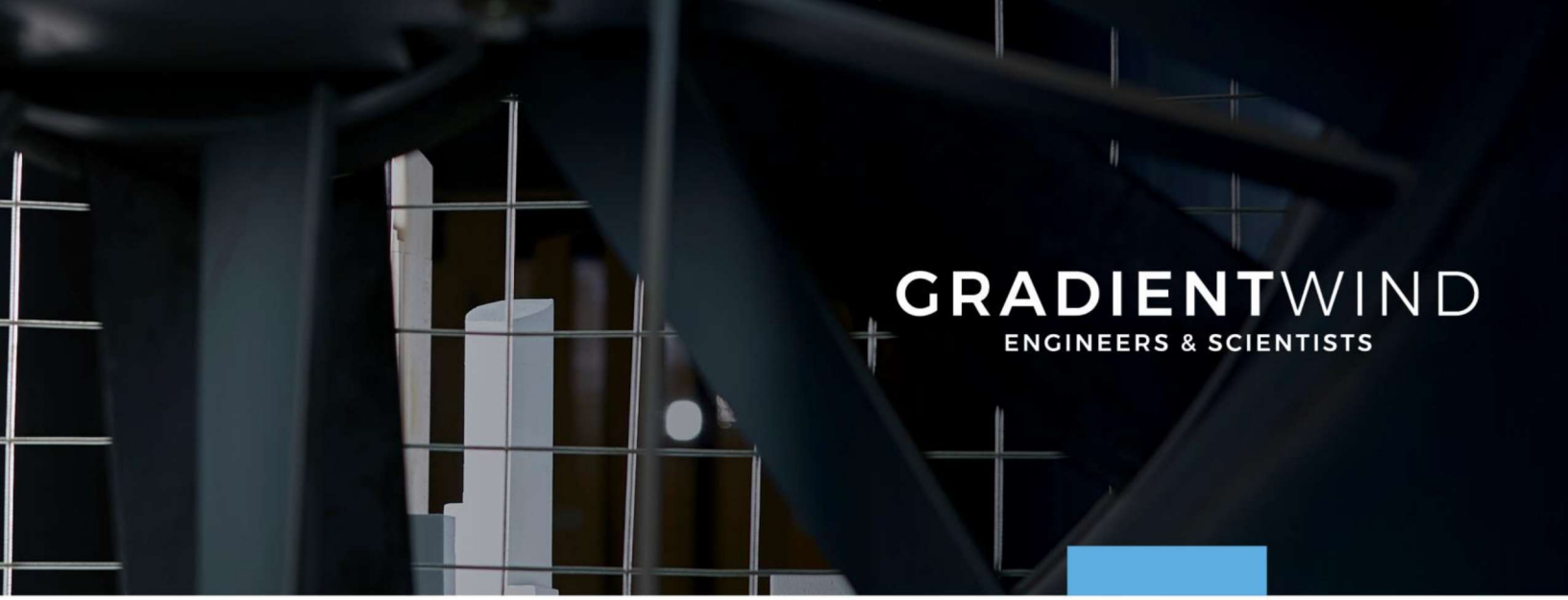
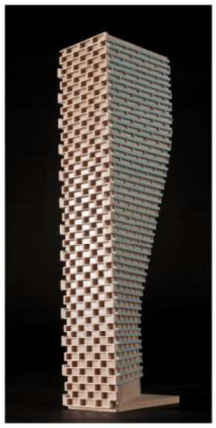


GRADIENTWIND
ENGINEERS & SCIENTISTS

# PEDESTRIAN LEVEL WIND STUDY

Guildwood TOC Site
4105 Kingston Road
Toronto, Ontario

Report: 24-232-PLW



October 31, 2025

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# EXECUTIVE SUMMARY

This report describes a pedestrian level wind (PLW) study to secure zoning certainty for redevelopment at Guildwood GO through the Province's TOC Program for the proposed multi-building development, referred to as Guildwood GO, located at 4105 Kingston Road in Toronto, Ontario (hereinafter referred to as the "Guildwood TOC Site"). Our mandate within this study is to investigate pedestrian wind conditions within and surrounding the Guildwood TOC Site, and to identify areas where wind conditions may interfere with certain pedestrian activities so that mitigation measures may be considered, where required.

The PLW study involves the simulation of wind speeds for sixteen (16) wind directions in a three-dimensional (3D) computer model using the computational fluid dynamics (CFD) technique, combined with meteorological data integration, to assess pedestrian wind conditions within and surrounding the Guildwood TOC Site according to City of Toronto wind comfort and safety criteria.

A complete summary of the predicted wind conditions is provided in Section 5 and illustrated in Figures 3A-9, and is summarized as follows:

1) The Guildwood TOC Site is located in a mostly suburban context, and the existing wind conditions on the site are suitable for mostly walking, or better, with uncomfortable wind conditions extending from the south tower of the neighbouring development at 4121 Kingston Road during the spring and winter months. While the introduction of the Guildwood TOC Site is predicted to produce modestly windier conditions at grade, most grade-level areas within and surrounding the Guildwood TOC Site are predicted to experience conditions that are considered acceptable for the intended pedestrian uses throughout the year, including conditions over the nearby transit stop, the neighbouring existing surface parking lot to the east-southeast, Greenvale Park, the park serving 4121 Kingston Road, most of the surrounding public sidewalks, the proposed Station Plaza, and in the vicinity of most building access points.

a. Regions of conditions that may be considered occasionally uncomfortable for walking are predicted during the spring and winter near the west corner of Tower C2, over the private ROW between Towers B1 and C2, between Towers A1/A2 and B2, and to the north of Tower A1.

b. Conditions considered occasionally uncomfortable for walking are also predicted to the east of Tower B2 during the summer and autumn months and over parking lots to the south and the POPS and multiuse path during the winter season.

c. Most of the windier conditions are situated over pedestrian inaccessible areas, affecting limited portions of pedestrian sidewalks, surface parking, and the public realm, as well as the POPS during the winter months when pedestrian usage is expected to be limited.

2) It is recommended that primary residential and retail entrances along the north and west elevations of Towers A1 and A2, the east elevation of Tower B2, the northwest elevation of the shared podium serving Towers B1 and B2, and the southeast elevation of the shared podium serving Towers C1 and C2 be recessed into their respective façades by at least 2 m, or include a combination of flanking vertical wind barriers and overhead canopies of similar depth.

a. Comfort levels within the POPS, as well as within the proposed park if required by its programming, may be improved by implementing targeted landscaping measures adjacent to designated seating and along the southern perimeter of the park, as described in Section 5.1.

b. To improve wind conditions throughout the Guildwood TOC Site, wind mitigation elements may include canopies, setbacks, façade projections, corner treatments, and landscaping elements, as described in Section 5.1.; these elements would also be expected to be beneficial for wind conditions within the POPS and over the multiuse path. As the design of the Guildwood TOC Site progresses, mitigation strategies may be explored and considered in collaboration with the building and landscape architects, including through post-zoning approvals (e.g. Site Plan Control).

3) Regarding the common amenity terraces serving the Guildwood TOC Site at Level 8, conditions are predicted to be suitable for mostly standing, or better, during the typical use period, with isolated regions suitable for walking. The terraces were modelled with 1.8-m-tall wind screens along their perimeters. These screens are recommended to provide shielding against direct winds.

    a. The extent of mitigation is dependent on programming, and an appropriate mitigation strategy may be developed as the design of the Guildwood TOC Site progresses. Potential mitigation elements may include mitigation inboard of the perimeter, such as targeted wind screens, raised planters with dense plantings, and canopies/pergolas above sensitive areas, and canopies extending from select tower elevations to diffuse downwashing winds off the tower façades.

4) The foregoing statements and conclusions apply to common weather systems, during which one area at grade within the immediate vicinity of the Guildwood TOC Site may receive conditions that approach the wind safety threshold, as defined in Section 4.4. Specifically, the wind safety threshold may be exceeded on an annual basis over an isolated area between Tower B2 and the shared podium serving Towers A1 and A2. It is expected that mitigation measures implemented to improve wind comfort conditions over the sidewalks along the sidewalks along the Public ROW C extension as noted above would be beneficial in eliminating this potential safety exceedance.

**Addendum:** The PLW study was completed with the architectural drawings prepared by Zeidler Architecture in August 2025. Updated drawings were distributed to the consultant team in September 2025, of which the heights of each tower have increased due to the addition of an MPH Level atop each tower and the modest revision of floor-to-floor heights, particularly at the podium and grade level. Nonetheless, the updated built form remains consistent with the building massing assessed herein. It is expected that most areas at grade and over the common amenity terraces will experience conditions that are similar to those detailed herein, and the results, recommendations, and conclusions of the current study remain applicable to the September 2025 massing.

# TABLE OF CONTENTS

## 1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Fotenn Planning + Design to undertake a pedestrian level wind (PLW) study to secure zoning certainty for redevelopment at Guildwood GO through the Province's TOC Program for the proposed multi-building development located at 4105 Kingston Road in Toronto, Ontario (hereinafter referred to as the "Guildwood TOC Site"). Our mandate within the current study is to investigate pedestrian wind conditions within and surrounding the Guildwood TOC Site for the current architectural design, and to identify areas where wind conditions may interfere with certain pedestrian activities so that mitigation measures may be considered, where required.

The PLW study is based on industry standard computer simulations using the computational fluid dynamics (CFD) technique and data analysis procedures, City of Toronto wind comfort and safety criteria, architectural drawings provided by Zeidler Architecture in August 2025, surrounding street layouts and existing and approved future building massing information obtained from the City of Toronto, and recent site imagery.

## 2. TERMS OF REFERENCE

The Guildwood TOC Site is located at 4105 Kingston Road in Toronto, situated approximately 130 metres (m) to the south of the intersection of Kingston Road and Celeste Drive on a trapezoidal parcel of land bordered by Kingston Road to the northwest, a low-rise commercial building to the north at 4095 Kingston Road, a high-rise multi-building development to the northeast at 4121 Kingston Road, an existing commuter (GO) surface parking lot to the east-southeast, and the Guildwood GO Station and the GO Transit – Metrolinx railway to the south. Proposed future public rights of way (ROW), referred to as Public ROW A, Public ROW D, and Public ROW C are proposed to be located along the east, south, and west sides of the noted redevelopment proposal at 4121 Kingston Road, respectively, and a park is proposed at the southeast corner of the 4121 Kingston Road site. Throughout this report, Public ROW D is referred to as project north.

The Guildwood TOC Site is proposed to comprise six towers: Tower A1 (40 storeys) and Tower A2 (35 storeys), situated to the east in Block A; Towers B1 and B2 (60 storeys) central to the Guildwood TOC Site in Block B; and Towers C1 and C2 (30 storeys) to the west in Block C. A park is proposed to the east, a

station plaza is proposed to the south along the existing GO station, and a privately-owned publicly accessible space (POPS) is proposed at the southwest corner of the Guildwood TOC Site. Within the Guildwood TOC Site, a public Right-of-Way (ROW), referred to as Public ROW E, is proposed to extend from and connect extensions of Public ROW A and Public ROW C and a private ROW is proposed to extend westwards from the intersection of Public ROW C and Public ROW D to provide vehicular access to the western tower massing. A multiuse path is also proposed through the POPS to the southwest, extending to the west beneath the Kingston Road overpass and connecting to Livingston Road North.

Towers A1 and A2 rise to the north and south of TOC Block A, respectively, above a common 7-storey 'C'-shaped podium. Above three underground parking levels, the ground floor of this podium comprises a central lobby with main entrances to the east and west, retail spaces at the northwest, northeast, and southwest corners, a loading space at the southeast corner, and shared building support spaces throughout the remainder of the level. Access to the underground parking is provided by a ramp to the north from Public ROW D. Towers B1 and B2 rise at the southwest corner and to the east of TOC Block B, respectively, and Towers C1 and C2 rise to the north and south of TOC Block C, respectively, above common 7-storey podia. The noted towers share three underground parking levels. The ground floor of the podium shared by Towers B1 and B2 includes a central lobby with main entrances to the north and south, indoor amenities to the north, retail spaces to the east and south, a loading space near the southwest corner, and shared building support spaces throughout the remainder of the level. Access to the shared underground parking is provided by ramps at the southeast and southwest corners from Public ROW E and the private ROW, respectively. The ground floor of the podium shared by Towers C1 and C2 includes a central lobby with a main entrance to the southeast, indoor amenities along the Private ROW, a loading space at the west corner, and shared building support spaces throughout the remainder of the level. All levels above the ground floor are reserved for residential occupancy, with common amenity terraces located atop the podia at Level 8 and indoor amenities at Level 8.

Regarding wind exposures and considering true north, the near-field surroundings of the Guildwood TOC Site (defined as an area falling within a 200-m-radius of the Guildwood TOC Site) are characterized by Greenvale Park to the northwest, low-rise residential dwellings farther from the west clockwise to the north, to the northeast, and from the southeast clockwise to the south, surface parking lots from the east-southeast clockwise to the southwest across the Metrolinx tracks, and the Guildwood GO Station to the

south. The GO Transit – Metrolinx railway extends from the east-southeast to the west-southwest and continues into the far-field. Notably, a high-rise multi-building development comprising three towers (13, 29, and 38 storeys) is approved at 4121 Kingston Road to the immediate northeast of the Guildwood TOC Site. The far-field surroundings (defined as the area beyond the near field and within a two-kilometre (km) radius) comprise a mix of low-rise suburban massing and green spaces in all directions with isolated clusters of mid- and high-rise buildings to the south and to southwest and north-northeast along Kingston Road, with additional mid- and high-rise developments proposed along Kingston Road. The Scarboro Golf and Country Club is located approximately 225 m to the west. Various parks and dense forested areas are located along Highland Creek which flows from the west clockwise to the north as well as adjacent to Lake Ontario, which is located approximately 1.2 km to the southeast of the Guildwood TOC Site.

A site plan for the proposed massing scenario is illustrated in Figure 1A, while the existing scenario is illustrated in Figure 1B. Figures 2A-2H illustrate the computational models used to conduct the study.

## 3. OBJECTIVES

The principal objectives of this study are to (i) determine pedestrian level wind conditions at key areas within and surrounding the Guildwood TOC Site; (ii) identify areas where wind conditions may interfere with the intended uses of outdoor spaces; and (iii) recommend suitable mitigation measures, where required.

## 4. METHODOLOGY

The approach followed to quantify wind conditions over the site is based on CFD simulations of wind speeds across the Guildwood TOC Site within a virtual environment, meteorological analysis of the Toronto area wind climate, and synthesis of computational data with City of Toronto wind criteria[1]. The following sections describe the analysis procedures, including a discussion of the noted pedestrian wind criteria.

[1] Toronto, *Pedestrian Level Wind Study Terms of Reference Guide*, 2022
https://www.toronto.ca/wp-content/uploads/2022/03/8f9c-CityPlanning-ToR-Wind-Guide.pdf

## 4.1 Computer-Based Context Modelling

A computer based PLW study was performed to determine the influence of the wind environment on pedestrian comfort over the Guildwood TOC Site. Pedestrian comfort predictions, based on the mechanical effects of wind, were determined by combining measured wind speed data from CFD simulations with statistical weather data obtained from Billy Bishop Toronto City Airport in Toronto, Ontario.

The general concept and approach to CFD modelling is to represent building and topographic details in the immediate vicinity of the Guildwood TOC Site on the surrounding model, and to create suitable atmospheric wind profiles at the model boundary. The wind profiles are designed to have similar mean and turbulent wind properties consistent with actual site exposures. An industry standard practice is to omit trees, vegetation, and other existing and proposed landscape elements from the model due to the difficulty of providing accurate seasonal representation of vegetation. The omission of trees and other landscaping elements produces stronger wind speed values.

## 4.2 Wind Speed Measurements

The PLW analysis was performed by simulating wind flows and gathering velocity data over a CFD model of the Guildwood TOC Site for 16 wind directions. The CFD simulation model was centered on the Guildwood TOC Site, complete with surrounding massing within a radius of approximately 550 m. The process was performed for two context massing scenarios, as noted in Section 2.

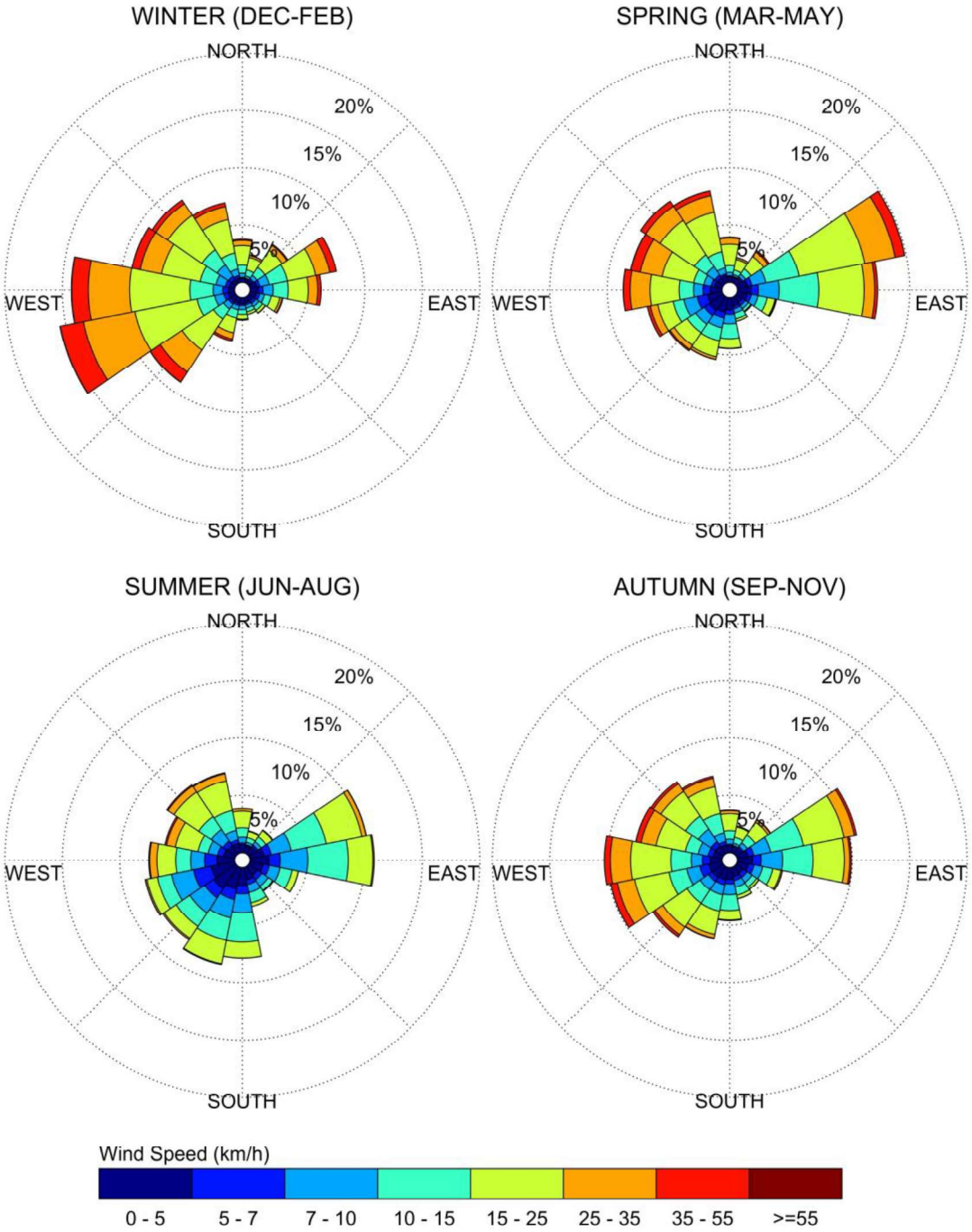
Mean and peak wind speed data obtained over the Guildwood TOC Site for each wind direction were interpolated to 36 wind directions at 10° intervals, representing the full compass azimuth. Measured wind speeds approximately 1.5 m above local grade, the Level 8 common amenity terraces serving the Guildwood TOC Site, and the common amenity terrace serving the neighbouring development at 4121 Kingston Road were referenced to the wind speed at gradient height to generate mean and peak velocity ratios, which were used to calculate full-scale values. Gradient height represents the theoretical depth of the boundary layer of the earth's atmosphere, above which the mean wind speed remains constant. Further details of the wind flow simulation technique are presented in Appendix A.

## 4.3 Historical Wind Speed and Direction Data

A statistical model for winds in Toronto was developed from approximately 50 years of hourly meteorological wind data recorded at Billy Bishop Toronto City Airport and obtained from Environment and Climate Change Canada. Wind speed and direction data were analyzed during the appropriate hours of pedestrian usage (that is, between 06:00 and 23:00) and divided into four distinct seasons, as stipulated in the wind criteria. Specifically, the spring season is defined as March through May, the summer season is defined as June through August, the autumn season is defined as September through November, and the winter season is defined as December through February, inclusive.

The statistical model of the Toronto area wind climate, which indicates the directional character of local winds on a seasonal basis, is illustrated on the following page. The plots illustrate seasonal distribution of measured wind speeds and directions in kilometers per hour (km/h). Probabilities of occurrence of different wind speeds are represented as stacked polar bars in sixteen azimuth divisions. The radial direction represents the percentage of time for various wind speed ranges per wind direction during the measurement period. The preferred wind speeds and directions can be identified by the longer length of the bars. For Toronto, the most common winds occur for westerly wind directions, followed by those from the east, while the most common wind speeds are below 36 km/h. The directional preference and relative magnitude of wind speed changes somewhat from season to season.

## SEASONAL DISTRIBUTION OF WIND
## BILLY BISHOP TORONTO CITY AIRPORT, TORONTO, ONTARIO




**Notes:**

1. Radial distances indicate percentage of time of wind events.
2. Wind speeds are mean hourly in km/h, measured at 10 m above the ground.

## 4.4 Pedestrian Wind Comfort and Safety Criteria – City of Toronto

Pedestrian wind comfort and safety criteria are based on the mechanical effects of wind without consideration of other meteorological conditions (that is, temperature and relative humidity). The comfort criteria assume that pedestrians are appropriately dressed for a specified outdoor activity during any given season. Since both mean and gust wind speeds affect pedestrian comfort, their combined effect is defined in the City of Toronto Pedestrian Level Wind Study Terms of Reference Guide. Specifically, the criteria are defined as a Gust Equivalent Mean (GEM) wind speed, which is the greater of the mean wind speed or the gust wind speed divided by 1.85.

The wind speed ranges are based on the Beaufort scale, which describes the effects of forces produced by varying wind speed levels on objects. Four pedestrian comfort classes and corresponding gust wind speed ranges are used to assess pedestrian comfort: (1) Sitting; (2) Standing; (3) Walking; and (4) Uncomfortable. Wind conditions suitable for sitting are represented by the colour blue, standing by green, and walking by yellow; uncomfortable conditions are represented by the colour orange, consistent with the City of Toronto Terms of Reference. Specifically, the comfort classes, associated wind speed ranges, and limiting criteria are summarized as follows:

**PEDESTRIAN WIND COMFORT CLASS DEFINITIONS**

| Wind Comfort Class | GEM Speed (km/h) | Description |
|---|---|---|
| SITTING | ≤ 10 | GEM wind speeds no greater than 10 km/h occurring at least 80% of the time are considered acceptable for sedentary activities, including sitting. |
| STANDING | ≤ 15 | GEM wind speeds no greater than 15 km/h occurring at least 80% of the time are considered acceptable for activities such as standing, strolling, or more vigorous activities. |
| WALKING | ≤ 20 | GEM wind speeds no greater than 20 km/h occurring at least 80% of the time are considered acceptable for walking or more vigorous activities. |
| UNCOMFORTABLE | > 20 | Uncomfortable conditions are characterized by predicted values that fall below the 80% target for walking. Brisk walking and exercise, such as jogging, are considered acceptable for moderate excesses of this criterion. |

Regarding wind safety, gust wind speeds greater than 90 km/h, occurring more than 0.1% of the time on an annual basis (based on wind events recorded for 24 hours a day), are classified as dangerous. From calculations of stability, it can be shown that gust wind speeds of 90 km/h would be the approximate threshold wind speed that would cause an average elderly person in good health to fall.

Experience and research on people's perception of mechanical wind effects has shown that if the wind speed levels are exceeded for more than 20% of the time, the activity level would be judged to be uncomfortable by most people. For instance, if GEM wind speeds of 10 km/h were exceeded for more than 20% of the time most pedestrians would judge that location to be too windy for sitting. Similarly, if GEM wind speeds of 20 km/h at a location were exceeded for more than 20% of the time, walking or less vigorous activities would be considered uncomfortable. As these criteria are based on subjective reactions of a population to wind forces, their application is partly based on experience and judgment.

Once the pedestrian wind speed predictions have been established throughout the Guildwood TOC Site, the assessment of pedestrian comfort involves determining the suitability of the predicted wind conditions for discrete regions within and surrounding the Guildwood TOC Site. This step involves comparing the predicted comfort classes to the target comfort classes, which are dictated by the location type for each region (that is, a sidewalk, building entrance, amenity space, or other). An overview of common pedestrian location types and their typical windiest target comfort classes are summarized below. Depending on the programming of a space, the desired comfort class may differ from this table.

**TARGET PEDESTRIAN WIND COMFORT CLASSES FOR VARIOUS LOCATION TYPES**

| Location Types | Target Comfort Classes |
|---|---|
| Primary Building Entrance | Standing |
| Secondary Building Access Point | Walking |
| Public Sidewalk / Bicycle Path | Walking |
| Café / Patio / Bench / Garden | Sitting / Standing |
| Transit/Bus Stop (Without Shelter) | Standing |
| Transit/Bus Stop (With Shelter) | Walking |
| Public Park / Plaza / Amenity Space | Sitting / Standing |
| Garage / Service Entrance / Parking Lot | Walking |

# 5. RESULTS AND DISCUSSION

The following discussion of the predicted pedestrian wind conditions for the Guildwood TOC Site is accompanied by Figures 3A-6B, which illustrate wind conditions at grade level for the proposed and existing massing scenarios, and by Figures 8A-D, which illustrate wind conditions over the common amenity terraces serving the Guildwood TOC Site at Level 8. Conditions are presented as continuous contours of wind comfort within and surrounding the Guildwood TOC Site and correspond to the various comfort classes noted in Section 4.4.

Wind comfort conditions are also reported for the typical use period, which is defined as May to October, inclusive. Figures 7A-B illustrate wind comfort conditions at grade level for the proposed and existing massing scenarios, and Figure 9 illustrates wind comfort conditions over the noted common amenity terraces serving the Guildwood TOC Site during this period, consistent with the comfort classes in Section 4.4.

The details of these conditions are summarized in the following pages for each area of interest.

## 5.1 Wind Comfort Conditions – Grade Level

Notably, the development at 4121 Kingston Road which has been approved but not yet constructed has been included in the context of both proposed and existing massing scenarios in alignment with the City of Toronto PLW Terms of Reference requirements.

The mostly suburban environs of the Guildwood TOC Site and the limited built-up massing in the vicinity of the Guildwood TOC Site exposes the Guildwood TOC Site to prevailing winds from multiple directions and windier conditions are predicted over the site under the existing massing scenario, prior to the introduction of the Guildwood TOC Site. While conditions at most areas near and within the Guildwood TOC Site are predicted to be suitable for the intended pedestrian uses throughout the year, the exposure of the area to the prevailing winds and their interaction with the overpass over the rail corridor as well as the neighbouring approved development at 4121 Kingston Road produces areas of wind conditions that are considered uncomfortable for walking the spring, autumn, and winter and that extend over the Guildwood TOC Site. In particular, winds are predicted to downwash over the western and southern elevations of the southern

tower at 4121 Kingston Road, accelerate around its southwestern corner, and be channelled between the podia serving this neighbouring development.

Following the introduction of the Guildwood TOC Site, conditions over downwind areas, predominantly those to the east, are predicted to modestly improve, while the noted regions of uncomfortable wind conditions remain. During the spring and winter, conditions that may be considered uncomfortable for walking are situated near the west corner of Tower C2, over the private ROW between Towers B1 and C2, between Towers A1/A2 and B2, and to the north of Tower A1. During the summer and autumn, these conditions are also predicted to the east of Tower B2, while uncomfortable conditions are predicted over parking lots to the south, the POPS, and the multiuse path during the winter. Prominent winds, particularly those from the southwest clockwise to the northwest are predicted to downwash over the western façades towards grade-level and accelerate around the west corner of Tower B1 and at the west corner of Tower C2. In addition, these winds are predicted to channel between Towers A1 and A2 and Tower B2. Winds from the northeast, predominant during the spring, summer, and autumn, are predicted to downwash over the east façades of Towers A1 and B2 and accelerate around the northeast corners of these towers.

Of note, the noted windier conditions are situated over isolated areas affecting surface parking, pedestrian sidewalks within the Guildwood TOC Site, and a limited area of sidewalks along Kingston Road, as well as over the POPS and multiuse path to the southwest during the winter season when pedestrian uses are limited and pedestrians are not expected to linger.

As the design of the Guildwood TOC Site progresses, mitigation strategies for wind control and mitigation may be explored and considered in collaboration with the building and landscape architects. Elements that may be considered include the addition of building setbacks, particularly from the west and east elevations, canopies that extend from select podia elevations to diffuse downwashing winds, the introduction of façade protrusions such as staggered protruding balconies, large vertical fins, and canopy projections to diffuse downwashing winds over the tower façades, corner treatments such as chamfering of tower corners to reduce corner acceleration, and elements at grade such as overhead canopies that span pedestrian areas between podia and targeted placement and installation of vertical wind barriers.

Of note, if the approved development at 4121 Kingston Road does not advance to construction, the mitigation measures outlined herein would continue to apply and an additional review and analysis of wind conditions in that scenario may be required.

On account of these conditions, it is recommended that primary residential and retail entrances along the north and west elevations of Towers A1 and A2, the east elevation of Tower B2, the northwest elevation of the shared podium serving Towers B1 and B2, and the southeast elevation of the shared podium serving Towers C1 and C2 be recessed into their respective façades by at least 2 m, or include a combination of flanking vertical wind barriers and overhead canopies of similar depth.

**Sidewalks along Kingston Road:** Wind comfort conditions along Kingston Road under the existing massing scenario are predicted to be suitable for mostly walking, or better, throughout the year, with the exception of the noted windier conditions along the rail corridor overpass during the winter months, as noted above. Following the introduction of the Guildwood TOC Site, wind conditions over most of the nearby public sidewalks along Kingston Road are predicted to be suitable for standing, or better, during the summer, with an isolated region suitable for walking, becoming suitable for a mix of mostly standing and walking throughout the remainder of the year.

**Existing Transit Stop along Kingston Road:** Prior to and following the introduction of the Guildwood TOC Site, wind comfort conditions in the vicinity of the nearby existing transit stop along Kingston Road are predicted to be suitable for sitting during the summer, becoming suitable for standing throughout the remainder of the year. The noted conditions are considered acceptable for transit stops.

**Public ROW A:** Following the introduction of the Guildwood TOC Site, wind conditions over the sidewalks along Public ROW A are predicted to be suitable for mostly sitting during the summer, becoming suitable for standing, or better, throughout the remainder of the year. The noted conditions are considered acceptable.

Under the existing massing scenario, conditions over these sidewalks are predicted to be suitable for standing, or better, during the summer and autumn, becoming suitable for walking, or better, during the winter and spring. Notably, the introduction of the Guildwood TOC Site is predicted to improve comfort levels along Public ROW A, in comparison to existing conditions, and wind conditions with the Guildwood TOC Site are considered acceptable for the noted public sidewalks along Public ROW A.

**Existing Public ROW C:** With the exception of the above-noted windier areas near the 4121 Kingston Road southern tower, wind conditions prior to and following the introduction of the Guildwood TOC Site over the nearby sidewalks along the existing Public Row C along the west elevation of 4121 Kingston Road are predicted to be suitable for mostly standing, or better, during the summer, becoming suitable for mostly walking, or better, during the spring, autumn, and winter. Notably, the introduction of the Guildwood TOC Site is predicted to improve comfort levels along the existing Public ROW C in comparison to existing conditions.

**Greenvale Park and the Park Northeast of the Guildwood TOC Site:** Prior to and following the introduction of the Guildwood TOC Site, wind comfort conditions over nearby areas of Greenvale Park are predicted to be suitable for standing during the typical use period. The noted conditions are considered acceptable.

Under the existing massing scenario, conditions over the park serving 4121 Kingston Road (located to the immediate northeast of the Guildwood TOC Site) are predicted to be suitable for mostly standing during the typical use period. Following the introduction of the Guildwood TOC Site, wind conditions over the noted park are predicted to be suitable for mostly sitting during the same period, with an isolated region suitable for standing at the northwest corner of the park. Notably, the introduction of the Guildwood TOC Site is predicted to improve comfort levels over the park serving 4121 Kingston Road, in comparison to existing conditions.

**Neighbouring Existing Surface Parking Lots East-Southeast and South of Guildwood TOC Site:** Following the introduction of the Guildwood TOC Site, wind conditions over the neighbouring surface parking lot to the immediate east-southeast of the Guildwood TOC Site are predicted to be suitable for standing, or better, throughout the year, which is considered acceptable. Conditions over the noted area under the existing massing scenario are predicted to be suitable for sitting during the summer, becoming suitable for mostly standing during the spring and autumn, and suitable for a mix of standing and walking during the winter. While the introduction of the Guildwood TOC Site produces slightly windier conditions over the noted surface parking lot during the summer, conditions are predicted to improve in comparison to existing conditions during the winter season, and wind conditions with the Guildwood TOC Site are considered acceptable.

Under the existing massing scenario, wind conditions over the nearby surface parking lot to the south of the Guildwood TOC Site across the Metrolinx rail tracks are predicted to be suitable for standing, or better, during the summer, becoming suitable for standing during the autumn, suitable for a mix of standing and walking during the spring, and suitable for walking during the winter. With the exception of the above-noted windier area to the south of the Guildwood TOC Site, wind conditions following the introduction of the Guildwood TOC Site over the noted area are predicted to be suitable for standing, or better, during the summer, becoming suitable for a mix of standing and walking during the spring and autumn, and suitable for walking during the winter.

**Station Plaza:** During the typical use period, wind conditions over the proposed station plaza are predicted to be suitable for mostly sitting, which is considered acceptable.

**Proposed Park:** During the typical use period, conditions over the proposed park located to the east of Towers A1 and A2 are predicted to be suitable for sitting over a majority of the area. Specifically, standing conditions are predicted at the southeast corner of the park. If the southeast corner of the park will not accommodate designated seating areas or more sedentary activities, the noted conditions may be considered acceptable. If required by programming, calmer wind conditions may be extended by implementing targeted wind barriers and landscaping along the southern perimeter of the park, predominantly orientated east-west, to buffer against winds from the southwest.

**POPS:** Conditions over the POPS at the southwest corner of the Guildwood TOC Site are predicted to be suitable for mostly standing during the typical use period, with a region suitable for sitting to the east.

Comfort levels at designated seating areas within the POPS may be improved by implementing targeted landscaping elements adjacent to sensitive-use areas such as tall wind barriers, in combination with strategically placed seating with high-back benches or other local wind mitigation. The extent of the mitigation measures is dependent on the programming of the noted spaces. An appropriate mitigation strategy may be developed in collaboration with the building and landscape architects as the design of the Guildwood TOC Site progresses and programming of public spaces is defined. Notably, mitigation elements implemented elsewhere on the Guildwood TOC Site regarding the windier conditions over other pedestrian spaces, such as the canopies, setbacks, and landscaping elements described above, would also be expected to be beneficial for wind conditions within the POPS.

**Multiuse Path:** With the exception of the above noted conditions that may occasionally be considered uncomfortable for walking during the winter season over the multiuse path near the POPS, wind comfort conditions over the proposed multiuse path are predicted to be suitable for a mix of standing and walking during the winter, spring, and autumn seasons, being suitable for standing, or better, during the summer.

Wind conditions over of the multiuse path are expected to improve following the above noted mitigation strategy pertaining to windier conditions around the west corner of Tower C2; specifically, mitigation elements are recommended that target the downwashing of prevailing westerly winds over Towers C1 and C2 in Block C during the winter season. Of particular importance are elements located at the southwest corner of Tower C2, including canopies and wind screens. Additional elements that may be considered include wind barriers strategically placed along the path, such as a hedge row or a row of coniferous trees, particularly to the north.

**Proposed Public ROW E, Public ROW C Extension, and the Private ROW:** With the exception of the above-noted windier areas within the Guildwood TOC Site, conditions over the sidewalks along Public ROW E, the proposed extension of Public ROW C, and the private ROW are predicted to be suitable for walking, or better, throughout the year. Particularly to the south and east of Towers A1 and A2, conditions over the sidewalks serving the Guildwood TOC Site are predicted to be suitable for mostly standing, or better, throughout the year.

**Building Access Points:** As noted above, it is recommended that primary entrances along the north and west elevations of Towers A1 and A2, the east elevation of Tower B2, the northwest elevation of the shared podium serving Towers B1 and B2, and the southeast elevation of the shared podium serving Towers C1 and C2 be recessed into their respective façades by at least 2 m, or include a combination of flanking vertical wind barriers and overhead canopies of similar depth.

Conditions in the vicinity of the remaining primary building entrances serving the Guildwood TOC Site are predicted to be suitable for standing, or better, throughout the year.

## 5.2 Wind Comfort Conditions – Common Amenity Terraces

**Level 8 Common Amenity Terraces**: Wind comfort conditions over the common amenity terraces serving the Guildwood TOC Site atop the podia are predicted to be suitable for mostly standing, or better, during the typical use period, with isolated regions suitable for walking. Of note, these terraces were modelled with 1.8-m-tall wind screens along their perimeters, which are recommended to provide shieling against direct winds.

The extent of mitigation within the terraces is dependent on programming and an appropriate mitigation strategy may be developed as the design of the Guildwood TOC Site progresses and the programming of these spaces is further defined and allocated, as a successful mitigation strategy responds to the programming of the space. Elements that may be implemented, in addition to the perimeter wind screens, include mitigation inboard of the perimeter, which could take the form of targeted wind screens, raised planters with dense plantings, and canopies/pergolas above sensitive areas, and canopies extending from select tower elevations to diffuse downwashing winds.

## 5.3 Wind Safety

Within the immediate vicinity of the Guildwood TOC Site and in context of typical weather patterns, which exclude anomalous localized storm events such as tornadoes and downbursts, one area at grade is expected to receive conditions that may approach the wind safety threshold, as defined in Section 4.4. Specifically, the wind safety threshold may be exceeded on an annual basis over an isolated area between Tower B2 and the shared podium serving Towers A1 and A2. This exceedance is expected to be mostly isolated over the roadway surface owing to the higher-level winds from the tall massing of Tower B2 being redirected to grade and then channelled and accelerated between the podia massing. It is expected that mitigation measures implemented to improve wind comfort conditions over the sidewalks along the extension of Public ROW C as noted above would be similarly beneficial in eliminating this potential safety exceedance.

### 5.4 Applicability of Results

Pedestrian wind comfort and safety have been quantified for the specific configuration of existing and foreseeable construction around the Guildwood TOC Site. Future changes (that is, construction or demolition) of these surroundings may cause changes to the wind effects in two ways, namely: (i) changes beyond the immediate vicinity of the Guildwood TOC Site would alter the wind profile approaching the site; and (ii) development in proximity to the Guildwood TOC Site would cause changes to local flow patterns.

## 6. SUMMARY AND RECOMMENDATIONS

A complete summary of the predicted wind conditions is provided in Section 5 of this report and illustrated in Figures 3A-9. Based on computer simulations using the CFD technique, meteorological data analysis, and experience with numerous similar developments, the study concludes the following:

1) The Guildwood TOC Site is located in a mostly suburban context, and the existing wind conditions on the site are suitable for mostly walking, or better, with uncomfortable wind conditions extending from the south tower of the neighbouring development at 4121 Kingston Road during the spring and winter months. While the introduction of the Guildwood TOC Site is predicted to produce modestly windier conditions at grade, most grade-level areas within and surrounding the Guildwood TOC Site are predicted to experience conditions that are considered acceptable for the intended pedestrian uses throughout the year, including conditions over the nearby transit stop, the neighbouring existing surface parking lot to the east-southeast, Greenvale Park, the park serving 4121 Kingston Road, most of the surrounding public sidewalks, the proposed Station Plaza, and in the vicinity of most building access points.

    a. Regions of conditions that may be considered occasionally uncomfortable for walking are predicted during the spring and winter near the west corner of Tower C2, over the private ROW between Towers B1 and C2, between Towers A1/A2 and B2, and to the north of Tower A1. Conditions considered occasionally uncomfortable for walking are also predicted to the east of Tower B2 during the summer and autumn months and over parking lots to the south and the POPS during the winter season.

b. Most of the windier conditions are situated over pedestrian inaccessible areas, affecting limited portions of pedestrian sidewalks, surface parking, and the public realm, as well as the POPS and multiuse path during the winter months when pedestrian usage is expected to be limited.

2) It is recommended that primary residential and retail entrances along the north and west elevations of Towers A1 and A2, the east elevation of Tower B2, the northwest elevation of the shared podium serving Towers B1 and B2, and the southeast elevation of the shared podium serving Towers C1 and C2 be recessed into their respective façades by at least 2 m, or include a combination of flanking vertical wind barriers and overhead canopies of similar depth.

   a. Comfort levels within the POPS, as well as within the proposed park if required by its programming, may be improved by implementing targeted landscaping measures adjacent to designated seating and along the southern perimeter of the park, as described in Section 5.1.

   b. To improve wind conditions throughout the Guildwood TOC Site, wind mitigation elements may include canopies, setbacks, façade projections, corner treatments, and landscaping elements, as described in Section 5.1.; these elements would also be expected to be beneficial for wind conditions within the POPS and over the multiuse path. As the design of the Guildwood TOC Site progresses, mitigation strategies may be explored and considered in collaboration with the building and landscape architects, including through post-zoning approvals (e.g. Site Plan Control).

3) Regarding the common amenity terraces serving the Guildwood TOC Site at Level 8, conditions are predicted to be suitable for mostly standing, or better, during the typical use period, with isolated regions suitable for walking. The terraces were modelled with 1.8-m-tall wind screens along their perimeters. These screens are recommended to provide shielding against direct winds.

a. The extent of mitigation is dependent on programming, and an appropriate mitigation strategy may be developed as the design of the Guildwood TOC Site progresses. Potential mitigation elements may include mitigation inboard of the perimeter, such as targeted wind screens, raised planters with dense plantings, and canopies/pergolas above sensitive areas, and canopies extending from select tower elevations to diffuse downwashing winds off the tower façades.

4) The foregoing statements and conclusions apply to common weather systems, during which one area at grade within the immediate vicinity of the Guildwood TOC Site may receive conditions that approach the wind safety threshold, as defined in Section 4.4. Specifically, the wind safety threshold may be exceeded on an annual basis over an isolated area between Tower B2 and the shared podium serving Towers A1 and A2. It is expected that mitigation measures implemented to improve wind comfort conditions over the sidewalks along the Public ROW C extension as noted above would be beneficial in eliminating this potential safety exceedance.

Sincerely,

***Gradient Wind Engineering Inc.***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Junior Wind Scientist

David Huitema, M.Eng., P.Eng.
CFD Lead Engineer

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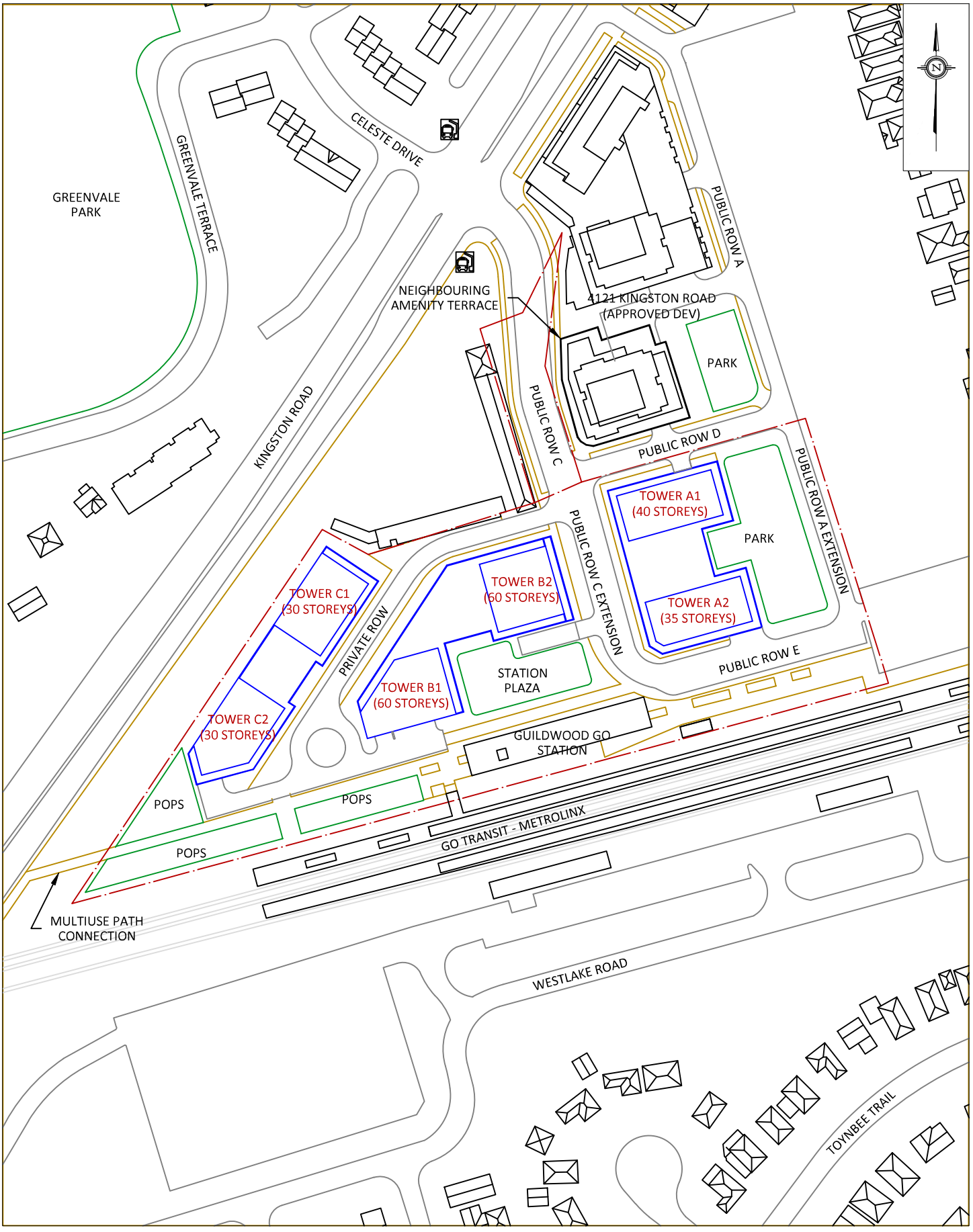
Project Coordinator

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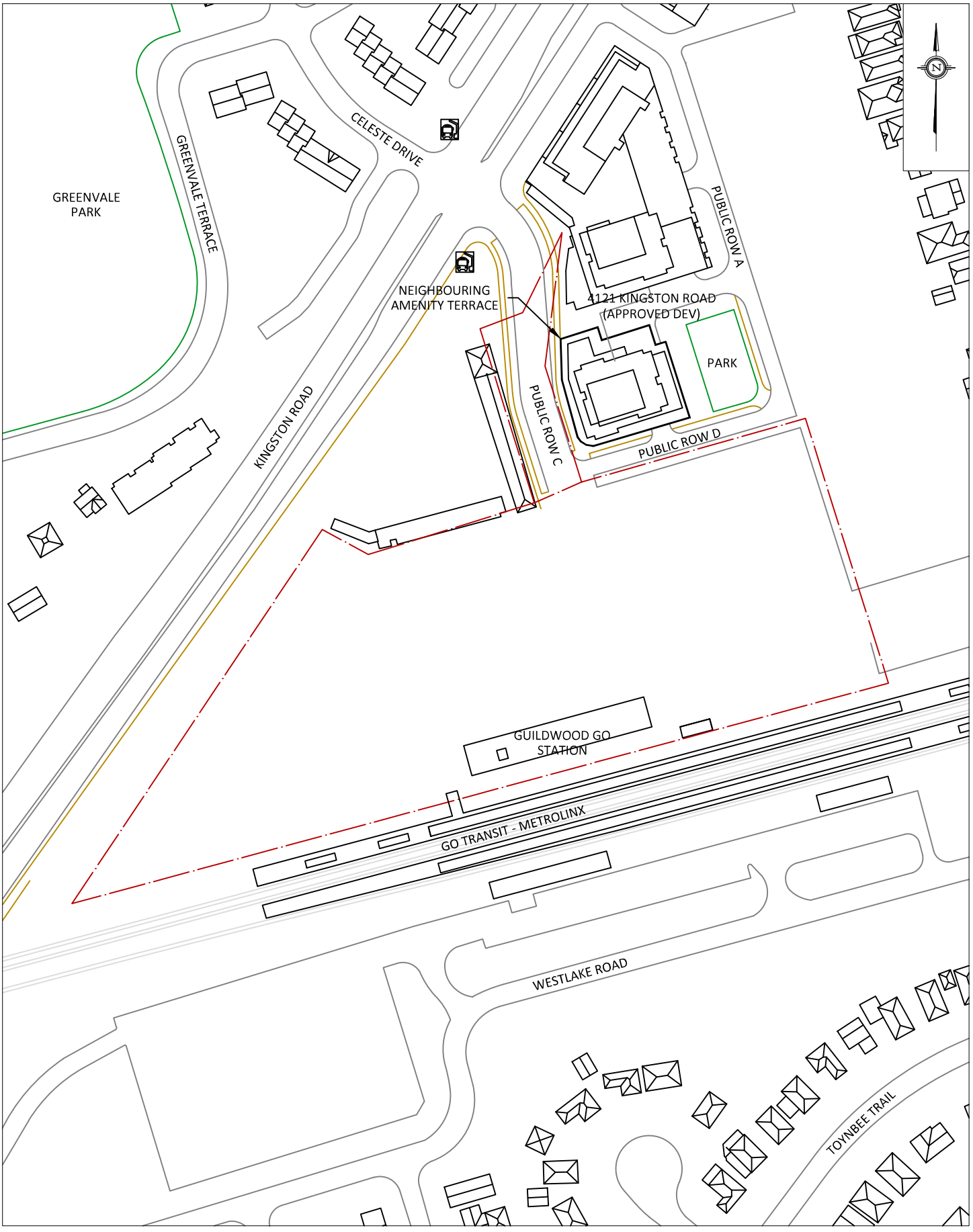
| | |
|---|---|
| PROJECT | GUILDWOOD TOC SITE - 4125 KINGSTON ROAD, TORONTO<br>PEDESTRIAN LEVEL WIND STUDY |
| SCALE | 1:2000 |
| DRAWING NO. | 24-232-PLW-1A |
| DATE | OCTOBER 31, 2025 |
| DRAWN BY | S.K. |

DESCRIPTION

FIGURE 1A:
PROPOSED SITE PLAN AND SURROUNDING CONTEXT

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| | |
|---|---|
| PROJECT | GUILDWOOD TOC SITE - 4125 KINGSTON ROAD, TORONTO<br>PEDESTRIAN LEVEL WIND STUDY |
| SCALE | 1:2000 |
| DRAWING NO. | 24-232-PLW-1B |
| DATE | OCTOBER 31, 2025 |
| DRAWN BY | S.K. |

DESCRIPTION

FIGURE 1B:
EXISTING SITE PLAN AND SURROUNDING CONTEXT

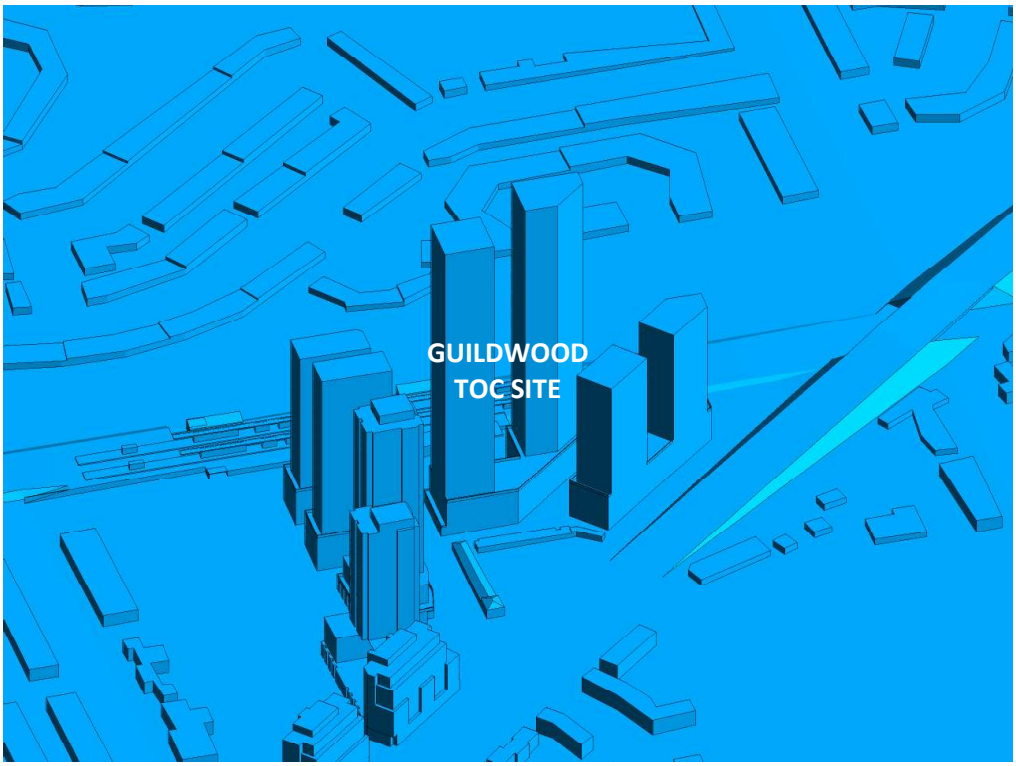



**FIGURE 2A: COMPUTATIONAL MODEL, PROPOSED MASSING, NORTH PERSPECTIVE**

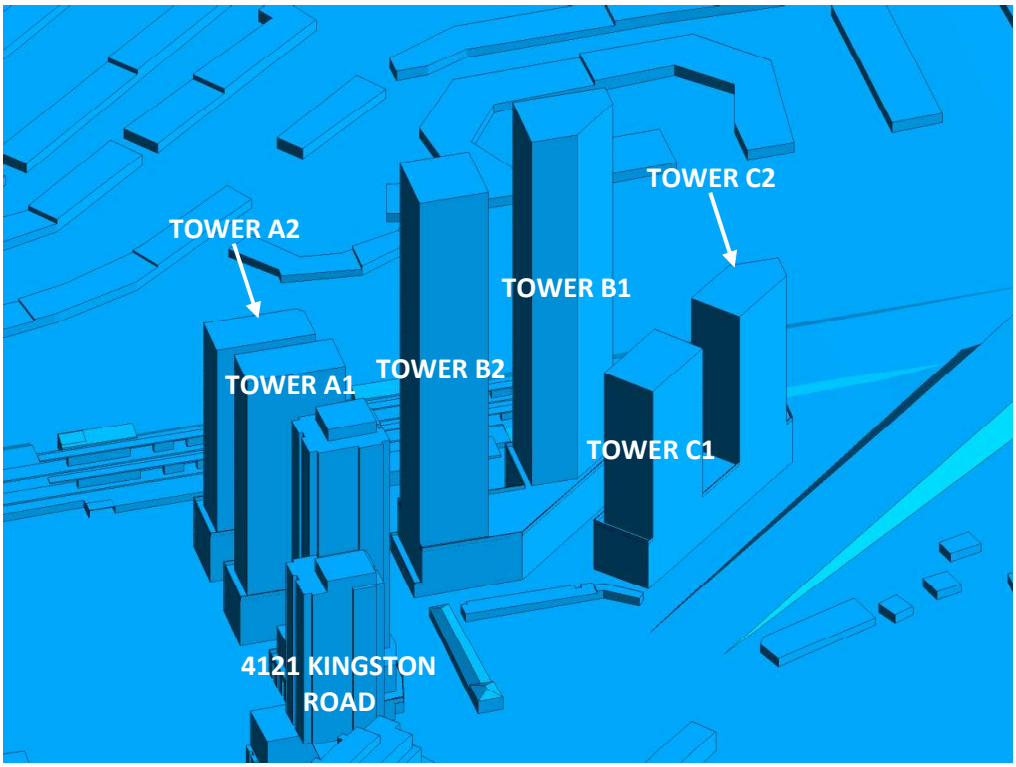



**FIGURE 2B: CLOSE-UP VIEW OF FIGURE 2A**

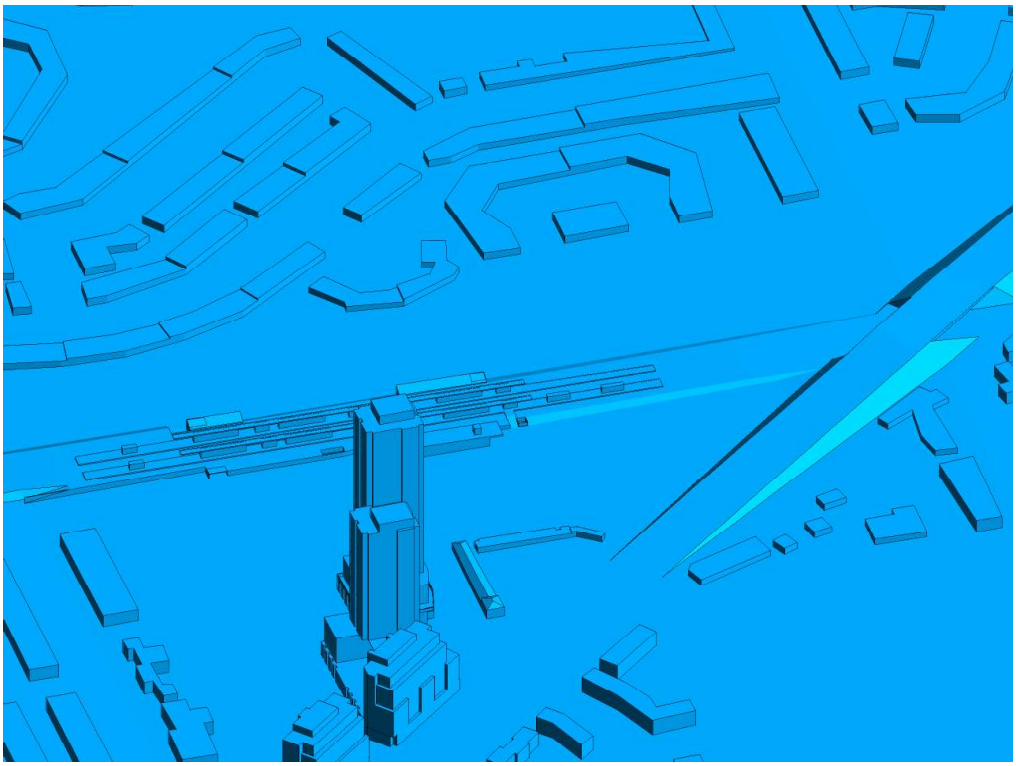


FIGURE 2C: COMPUTATIONAL MODEL, EXISTING MASSING, NORTH PERSPECTIVE

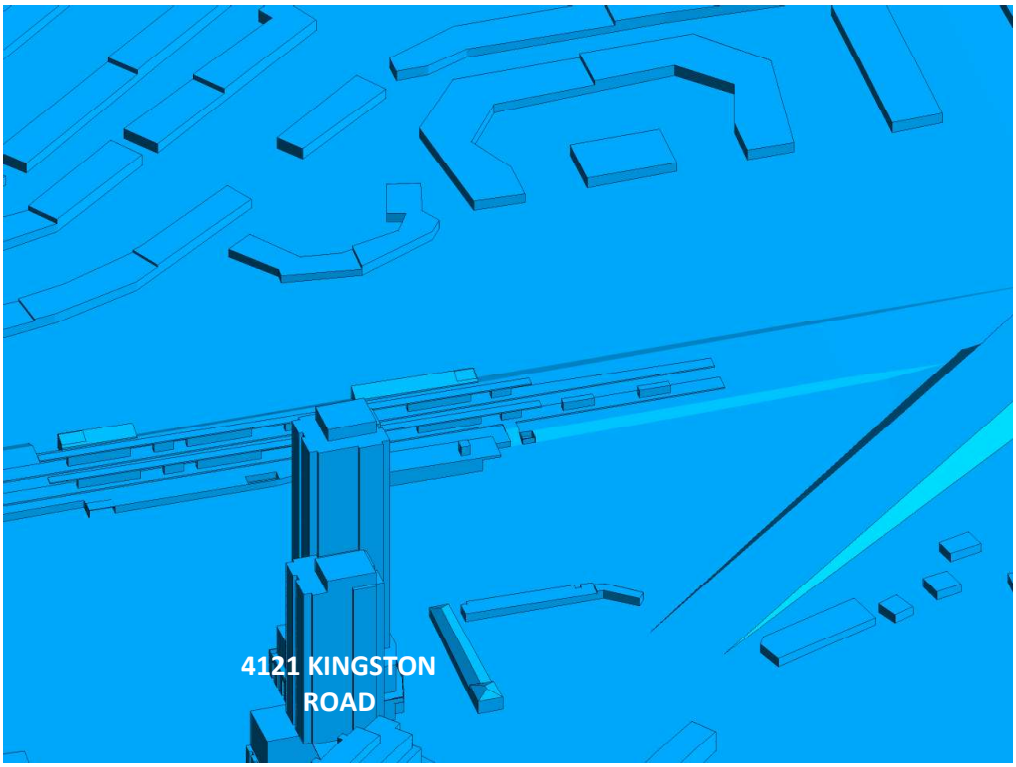



FIGURE 2D: CLOSE-UP VIEW OF FIGURE 2C

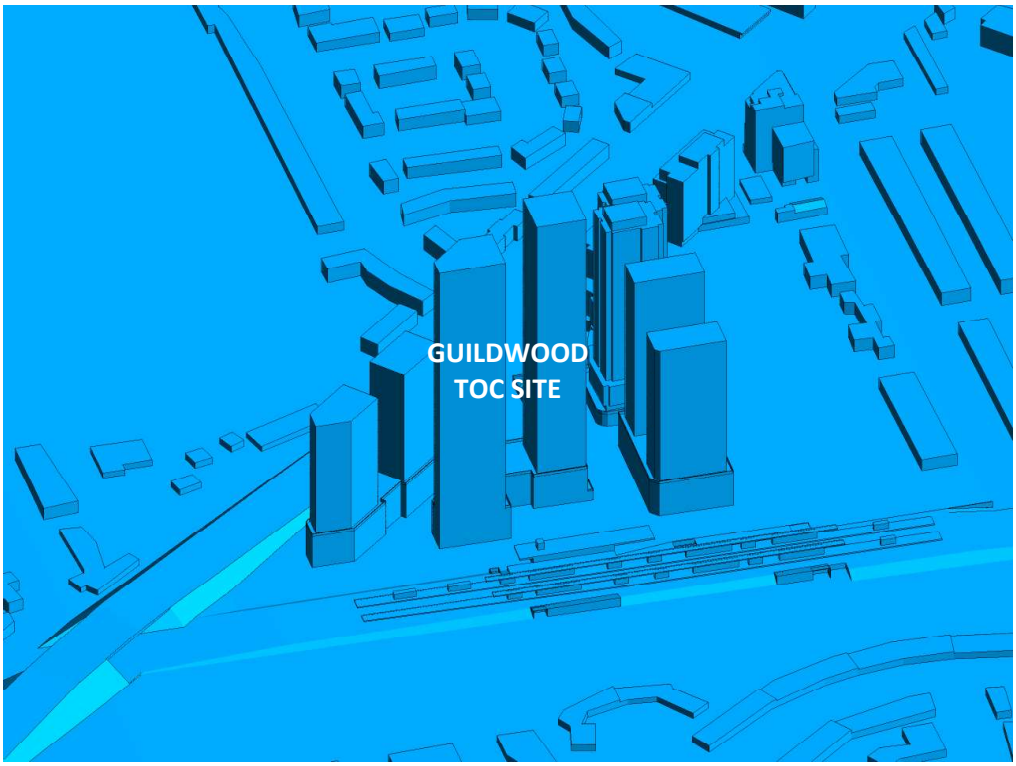



**FIGURE 2E: COMPUTATIONAL MODEL, PROPOSED MASSING, SOUTH PERSPECTIVE**

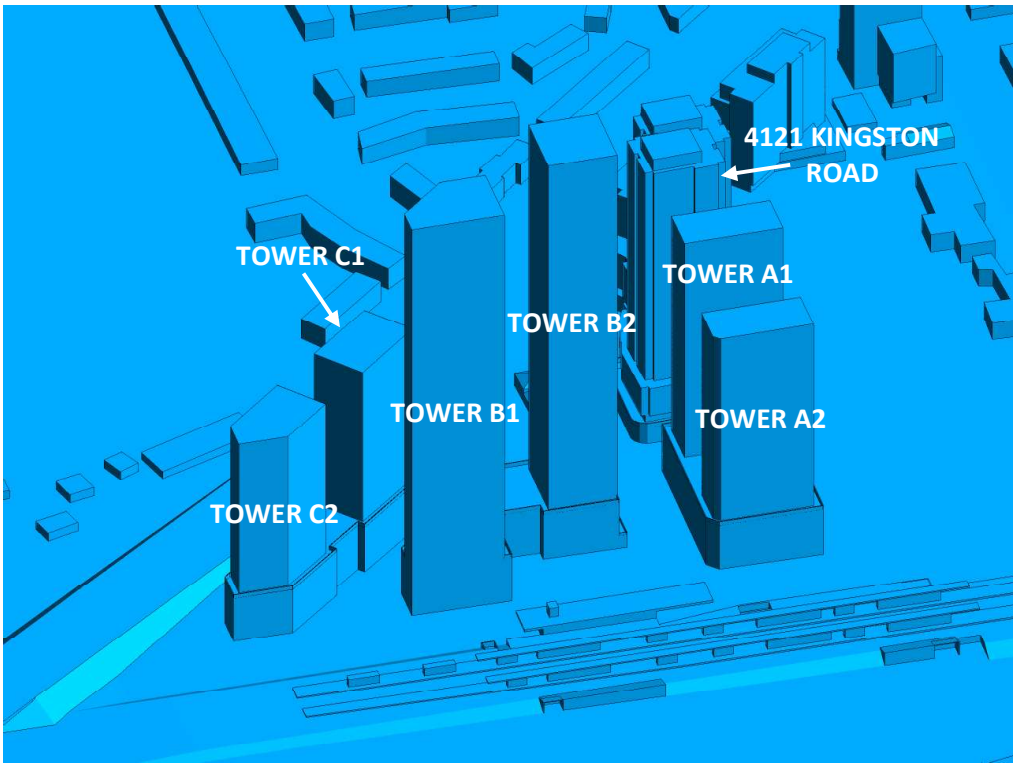



**FIGURE 2F: CLOSE-UP VIEW OF FIGURE 2E**

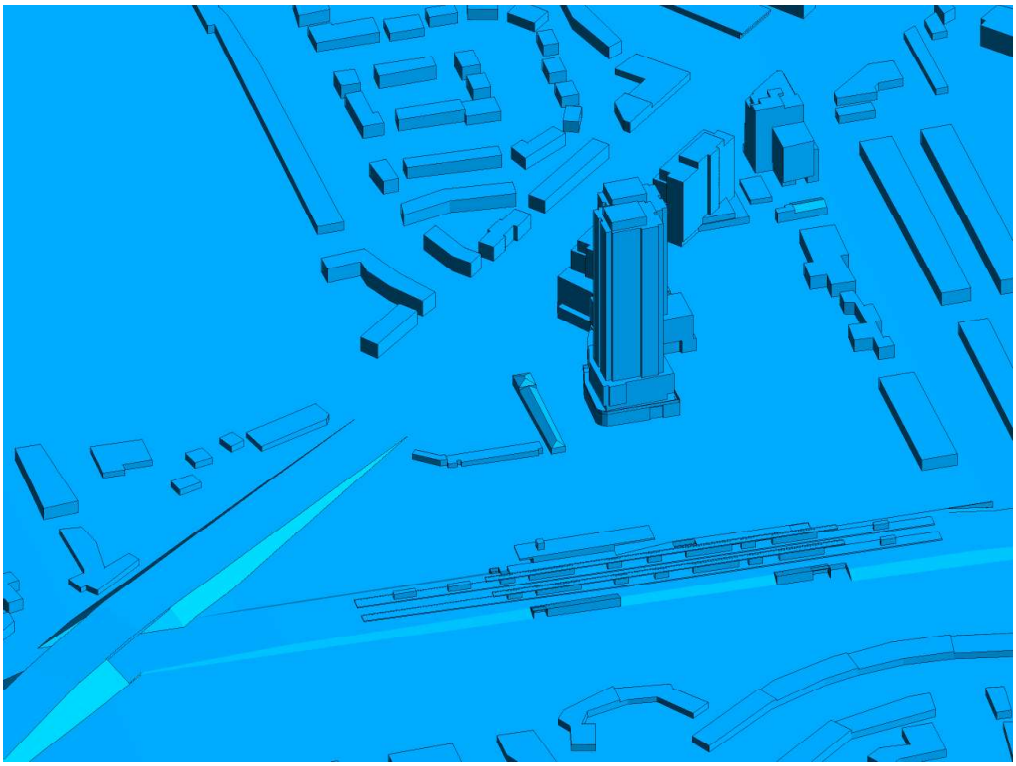


**FIGURE 2G: COMPUTATIONAL MODEL, EXISTING MASSING, SOUTH PERSPECTIVE**

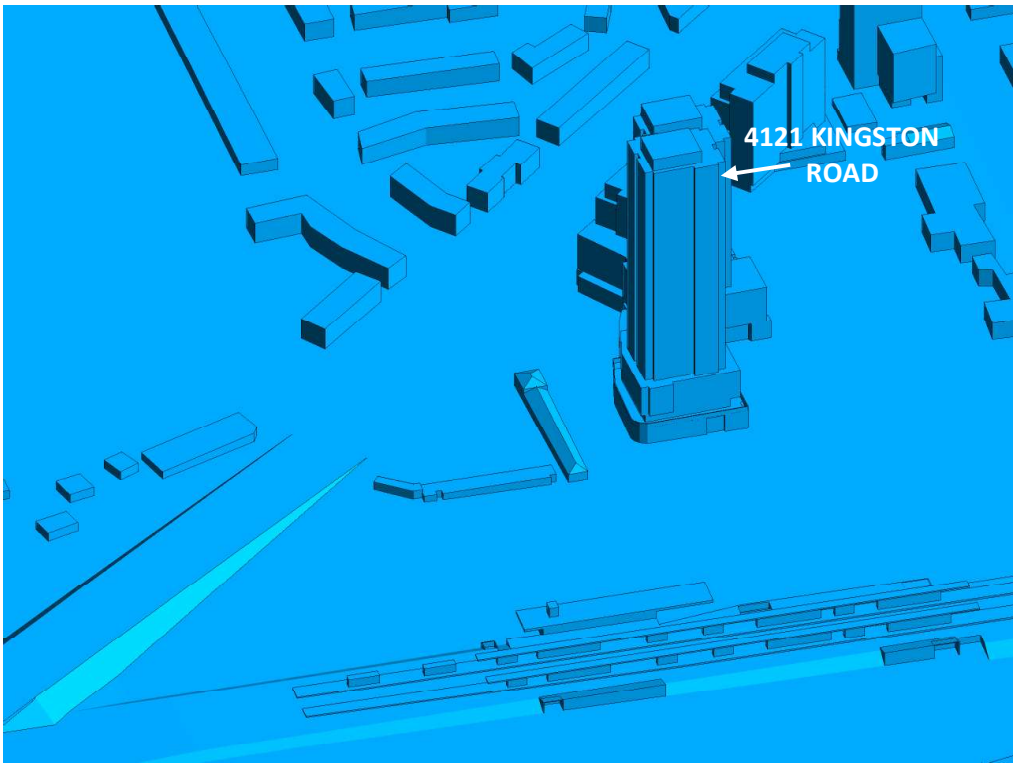



**FIGURE 2H: CLOSE-UP VIEW OF FIGURE 2G**

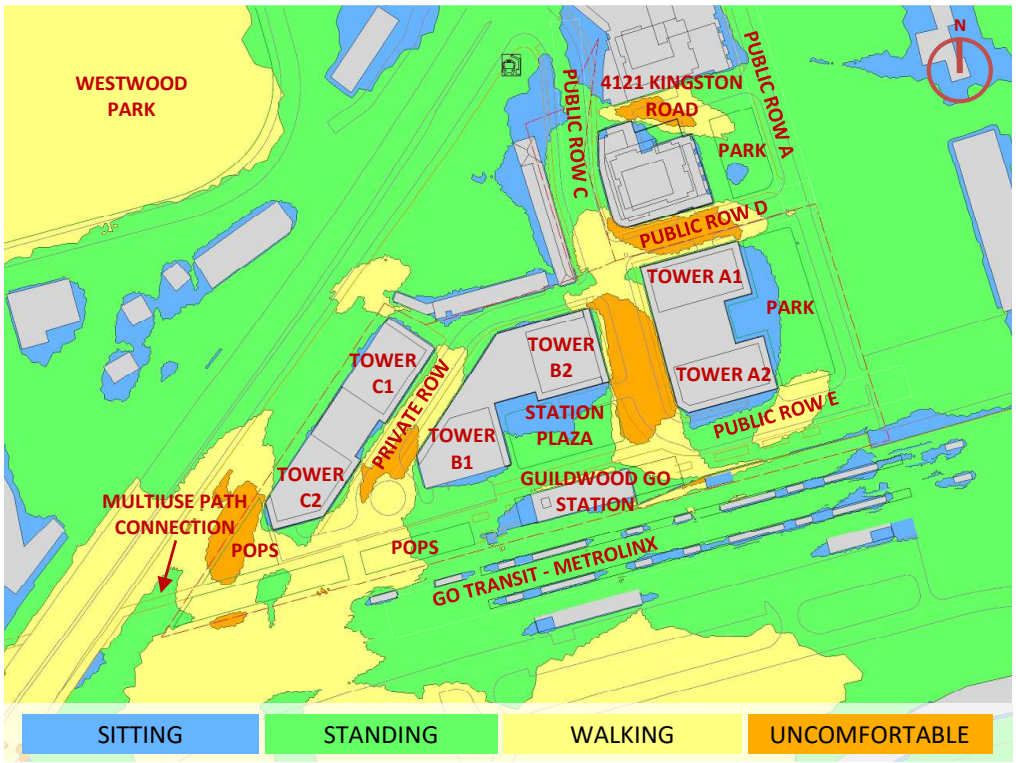



**FIGURE 3A: SPRING – PROPOSED MASSING – WIND COMFORT, GRADE LEVEL**

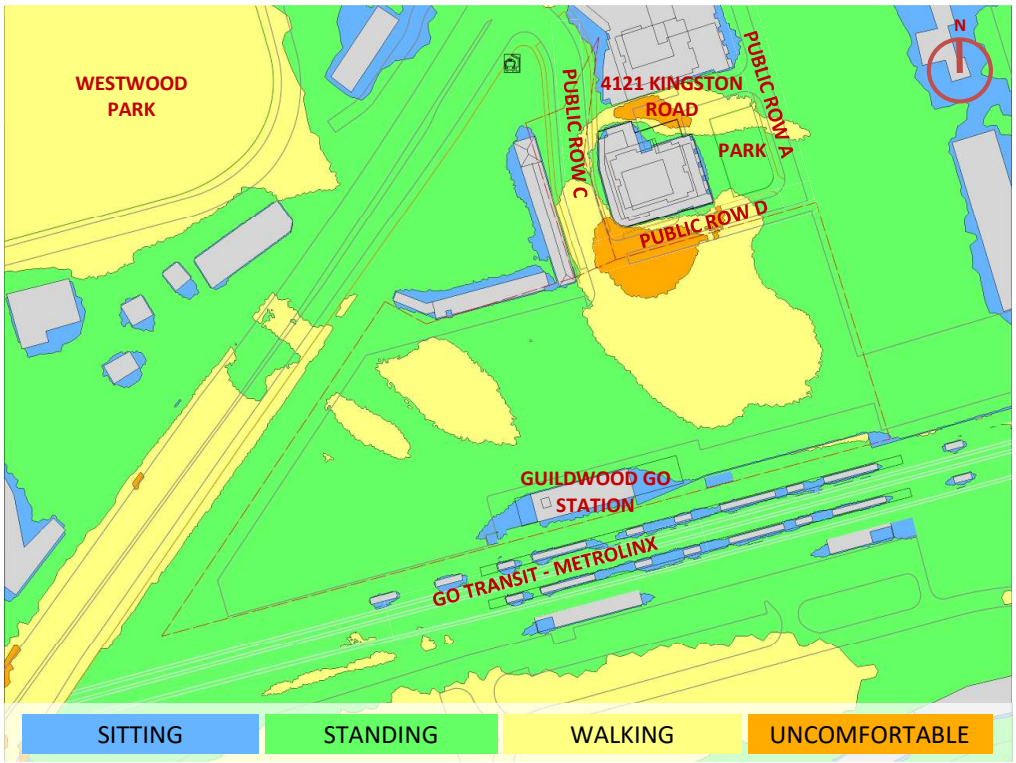



**FIGURE 3B: SPRING – EXISTING MASSING – WIND COMFORT, GRADE LEVEL**


**FIGURE 4A: SUMMER – PROPOSED MASSING – WIND COMFORT, GRADE LEVEL**

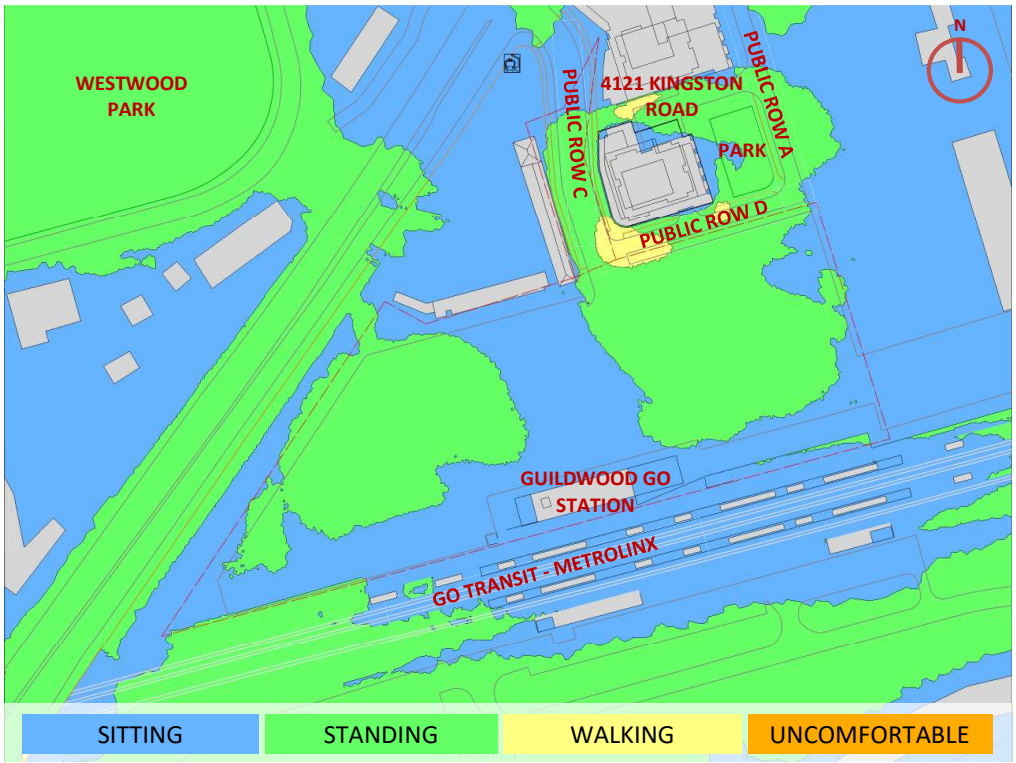



**FIGURE 4B: SUMMER – EXISTING MASSING – WIND COMFORT, GRADE LEVEL**

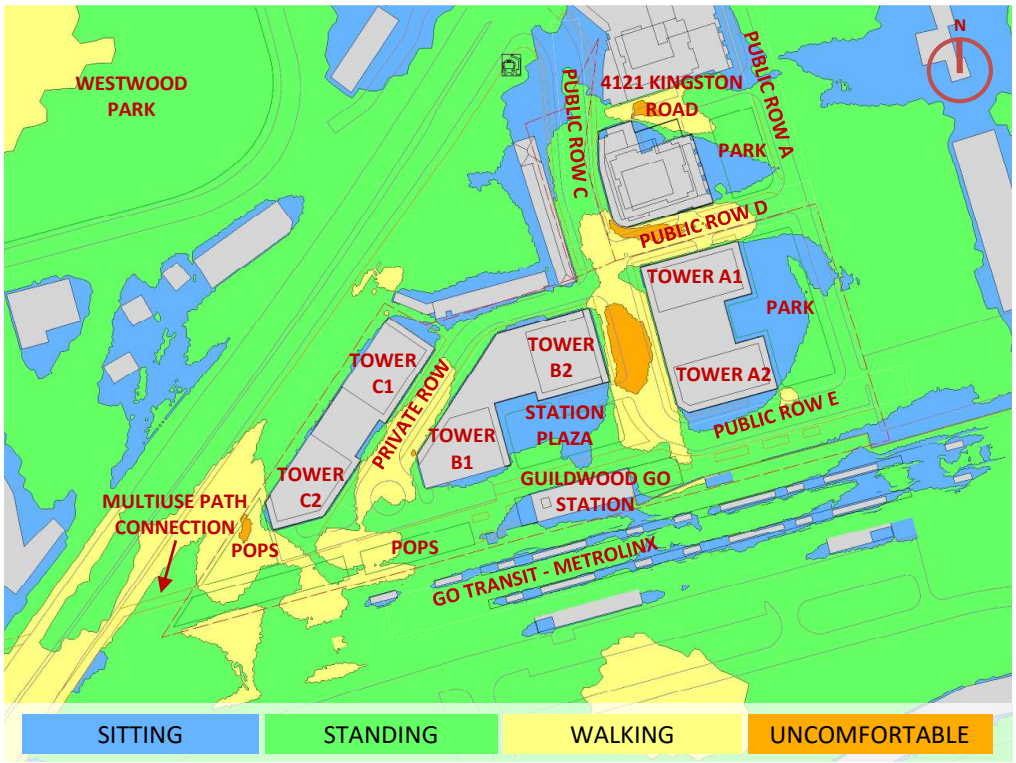



**FIGURE 5A: AUTUMN – PROPOSED MASSING – WIND COMFORT, GRADE LEVEL**

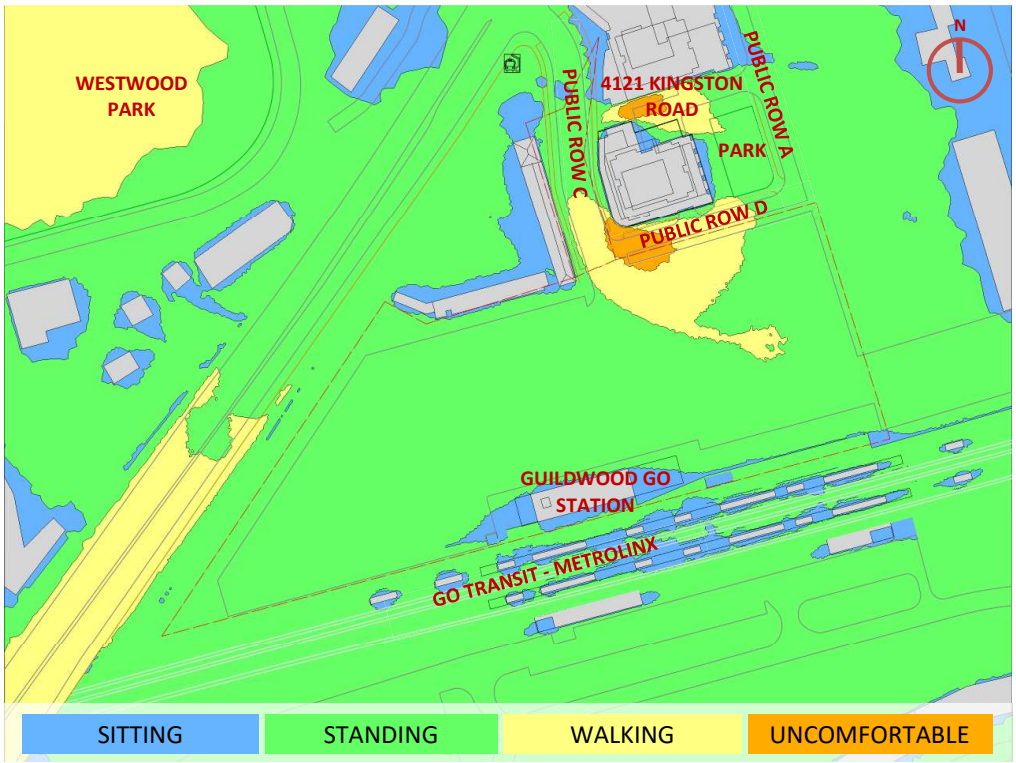



**FIGURE 5B: AUTUMN – EXISTING MASSING – WIND COMFORT, GRADE LEVEL**

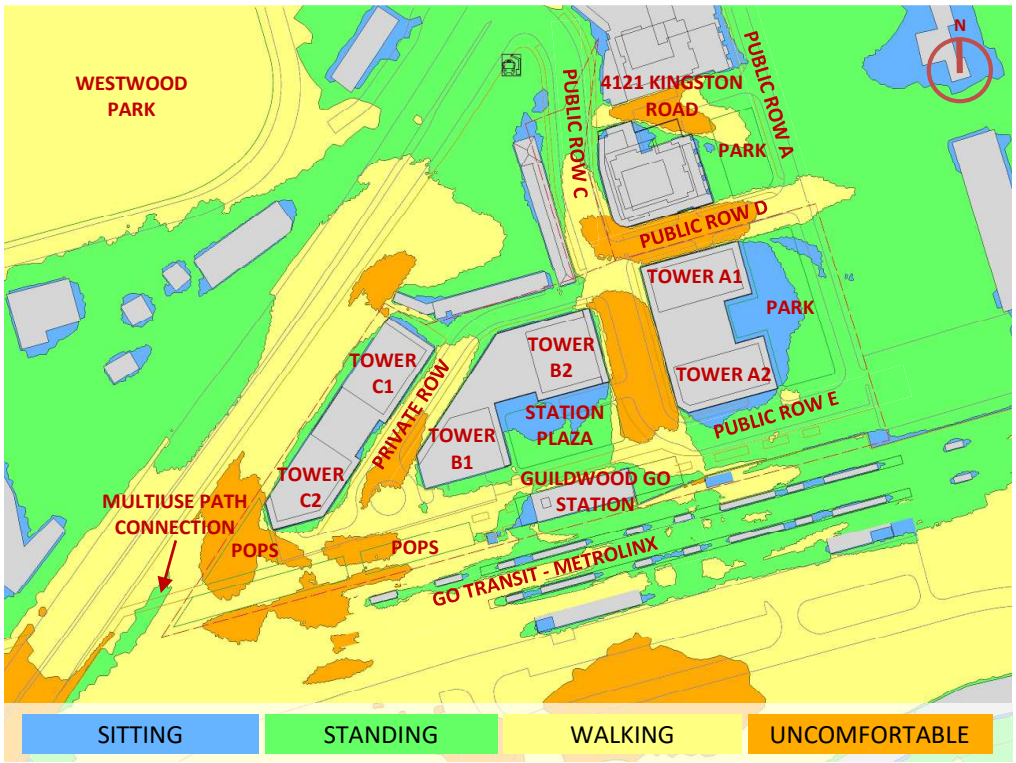



**FIGURE 6A: WINTER – PROPOSED MASSING – WIND COMFORT, GRADE LEVEL**

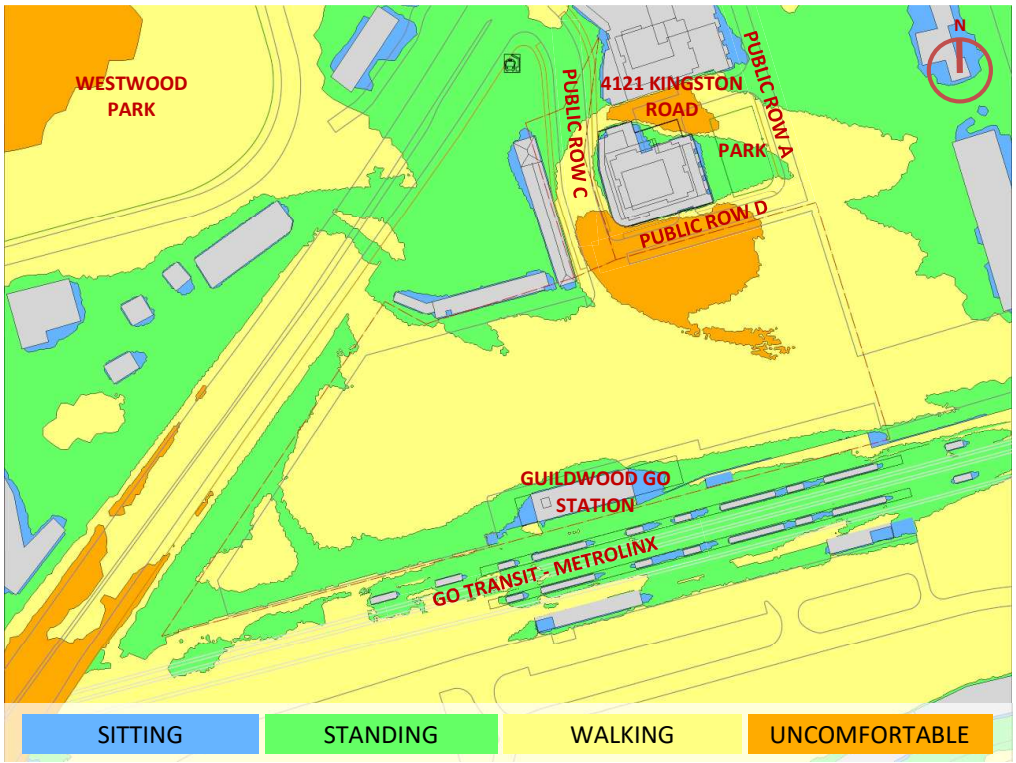



**FIGURE 6B: WINTER – EXISTING MASSING – WIND COMFORT, GRADE LEVEL**

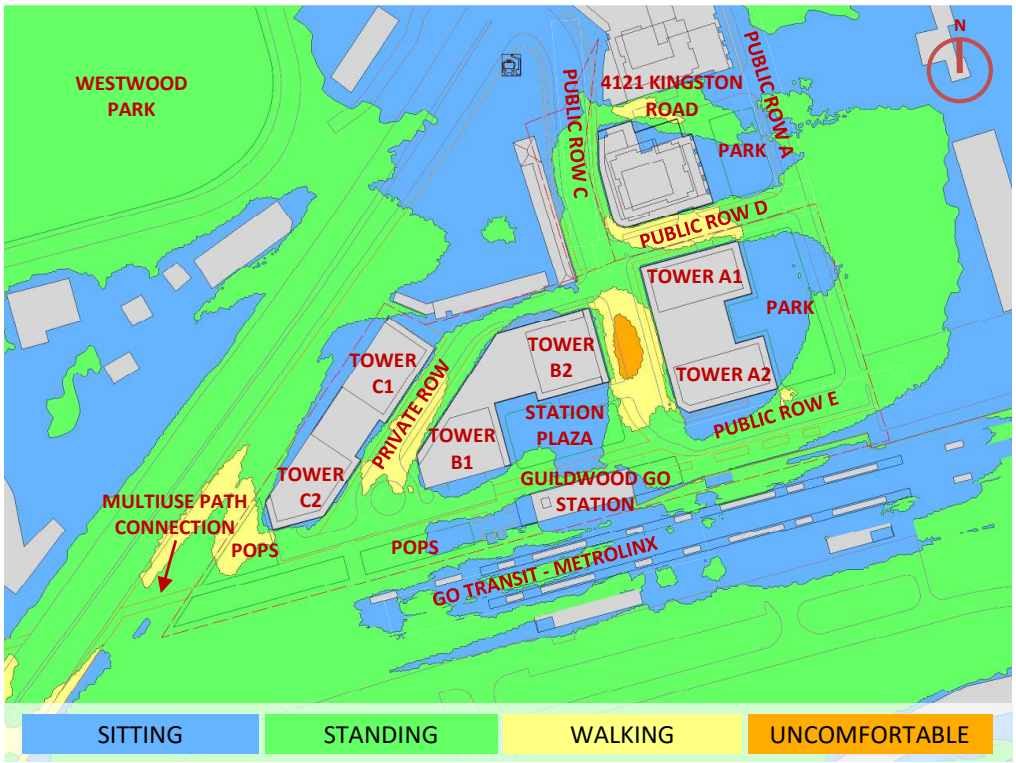



**FIGURE 7A: TYPICAL USE PERIOD – PROPOSED MASSING – WIND COMFORT, GRADE LEVEL**

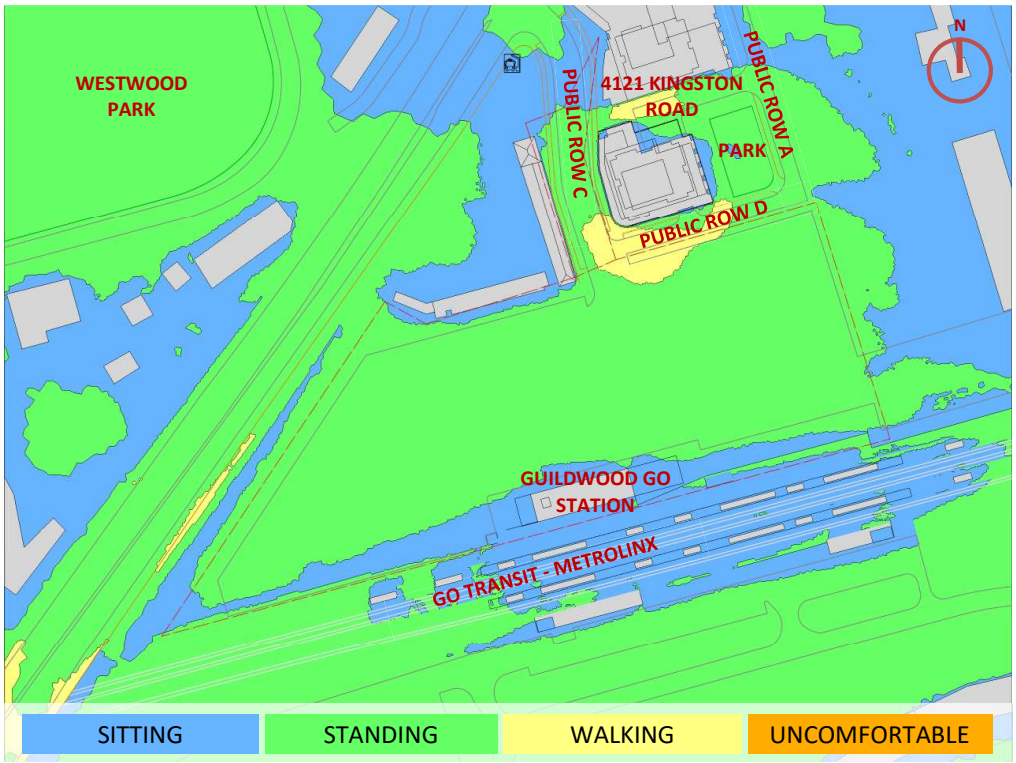



**FIGURE 7B: TYPICAL USE PERIOD – EXISTING MASSING – WIND COMFORT, GRADE LEVEL**

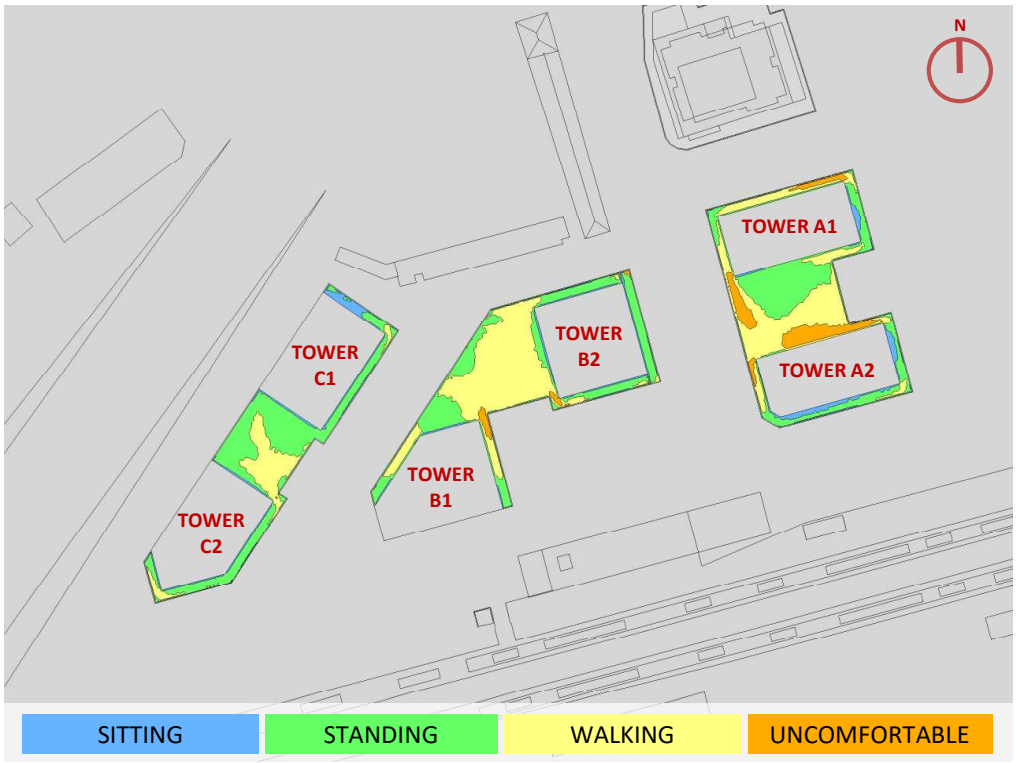



**FIGURE 8A: SPRING – WIND COMFORT, LEVEL 8 COMMON AMENITY TERRACES**

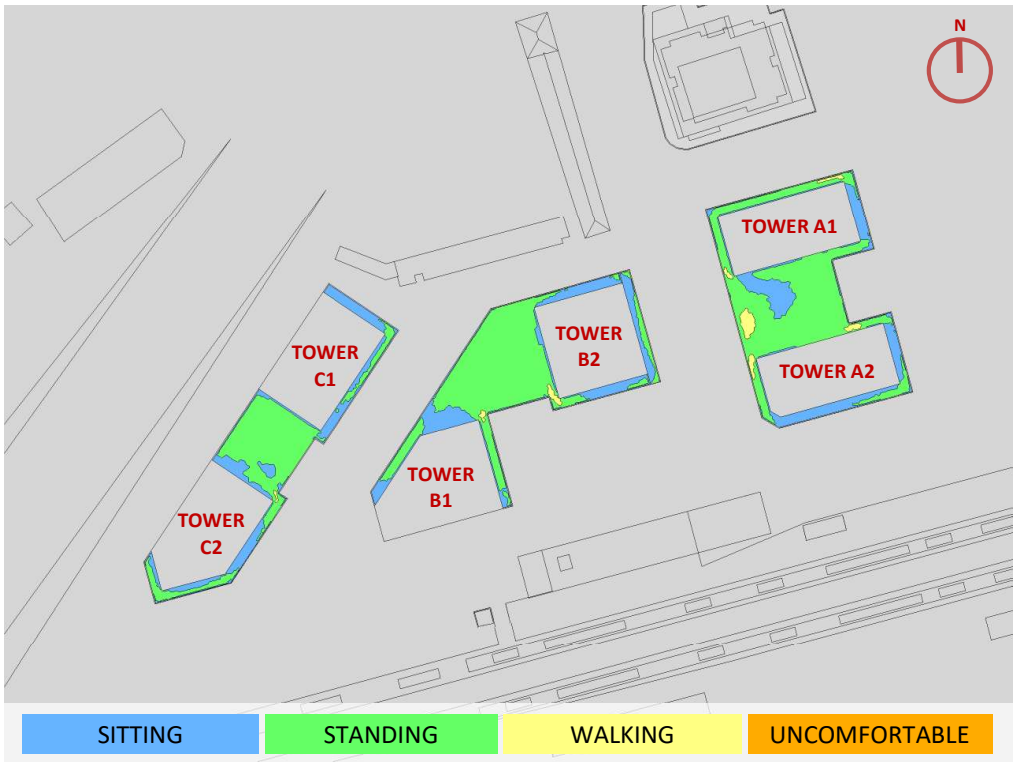



**FIGURE 8B: SUMMER – WIND COMFORT, LEVEL 8 COMMON AMENITY TERRACES**

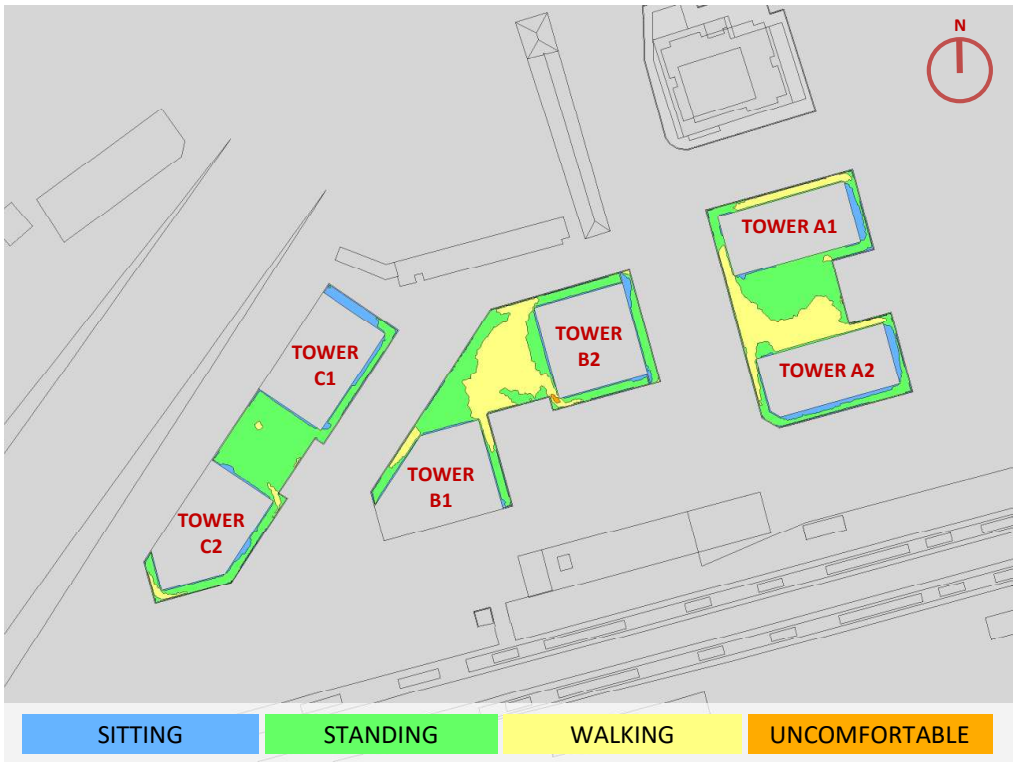



**FIGURE 8C: AUTUMN – WIND COMFORT, LEVEL 8 COMMON AMENITY TERRACES**

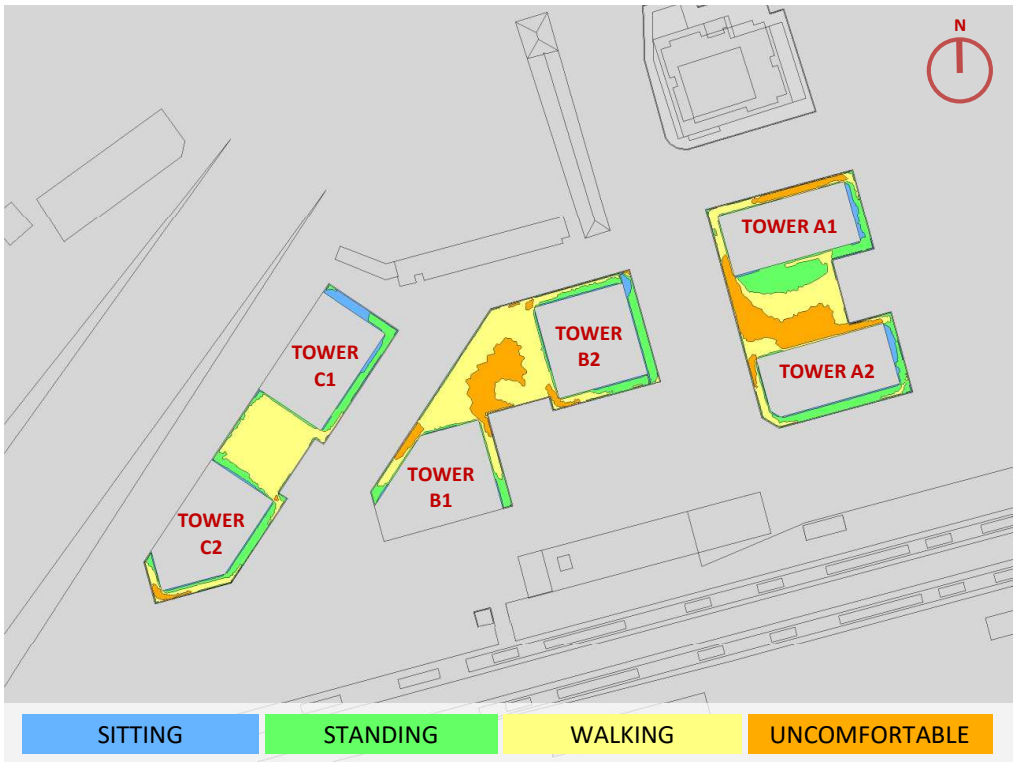



**FIGURE 8D: WINTER – WIND COMFORT, LEVEL 8 COMMON AMENITY TERRACES**

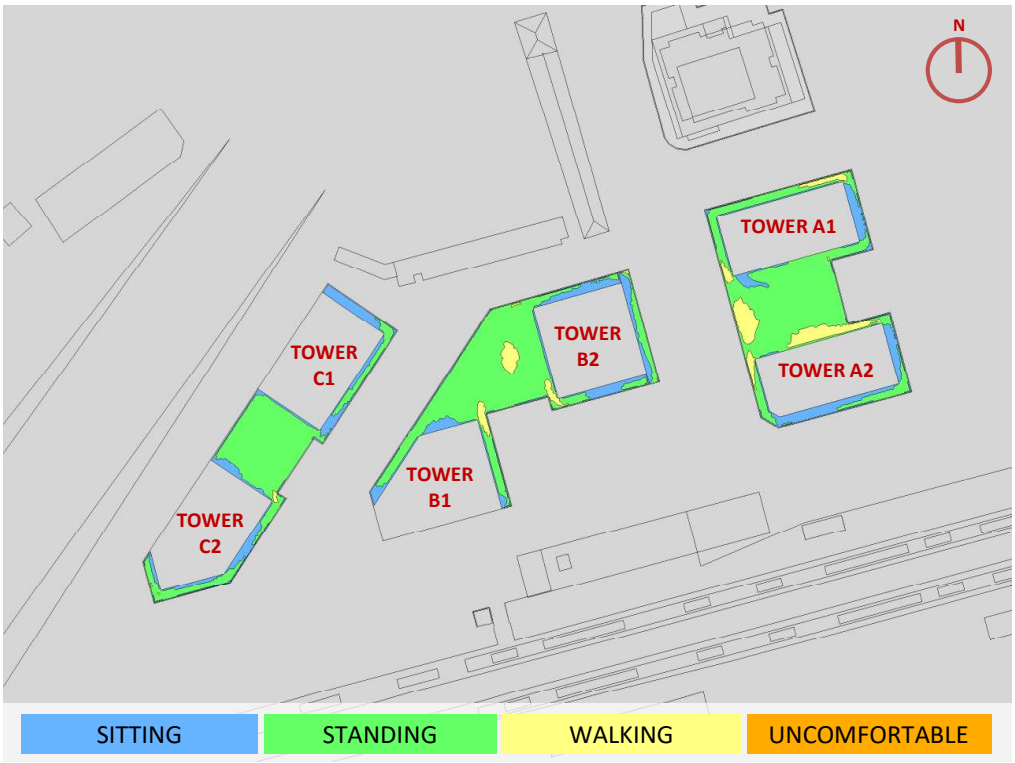
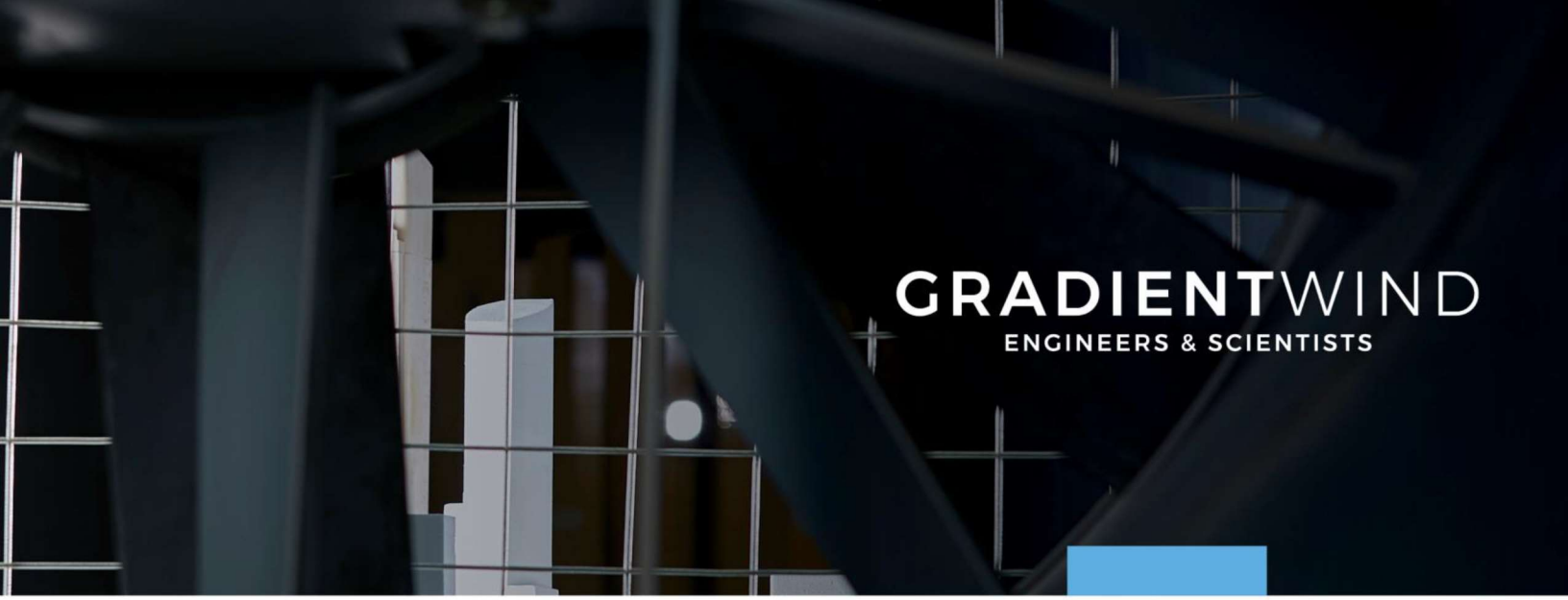
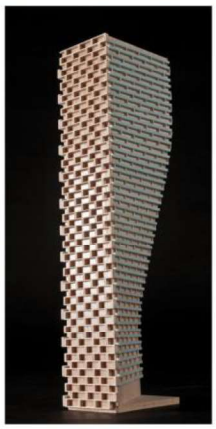



**FIGURE 9: TYPICAL USE PERIOD – WIND COMFORT, LEVEL 8 COMMON AMENITY TERRACES**



## APPENDIX A

## SIMULATION OF THE ATMOSPHERIC BOUNDARY LAYER

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## SIMULATION OF THE ATMOSPHERIC BOUNDARY LAYER

The atmospheric boundary layer (ABL) is defined by the velocity and turbulence profiles according to industry standard practices. The mean wind profile can be represented, to a good approximation, by a power law relation, Equation (1), giving height above ground versus wind speed [1], [2].

$$U = U_g \left(\frac{Z}{Z_g}\right)^{\alpha} \qquad \text{Equation (1)}$$

where $\boldsymbol{U}$ = mean wind speed, $\boldsymbol{U_g}$ = gradient wind speed, $\boldsymbol{Z}$ = height above ground, $\boldsymbol{Z_g}$ = depth of the boundary layer (gradient height), and $\alpha$ is the power law exponent.

For the model, $U_g$ is set to 6.5 metres per second (m/s), which approximately corresponds to the 50% mean wind speed for Toronto based on historical climate data and statistical analyses. When the results are normalized by this velocity, they are relatively insensitive to the selection of gradient wind speed.

$Z_g$ is set to 540 m. The selection of gradient height is relatively unimportant, so long as it exceeds the building heights surrounding the Guildwood TOC Site. The value has been selected to correspond to our physical wind tunnel reference value.

$\alpha$ is determined based on the upstream exposure of the far-field surroundings (that is, the area that is not captured within the simulation model).

Table 1 presents the values of α used in this study, while Table 2 presents several reference values of α. When the upstream exposure of the far-field surroundings is a mixture of multiple types of terrain, the α values are a weighted average with terrain that is closer to the Guildwood TOC Site given greater weight.

**TABLE 1: UPSTREAM EXPOSURE (ALPHA VALUE) VS TRUE WIND DIRECTION**

| Wind Direction (Degrees True) | Alpha Value (α) |
|---|---|
| 0 | 0.24 |
| 22.5 | 0.25 |
| 45 | 0.24 |
| 67.5 | 0.25 |
| 90 | 0.22 |
| 112.5 | 0.20 |
| 135 | 0.18 |
| 157.5 | 0.19 |
| 180 | 0.21 |
| 202.5 | 0.24 |
| 225 | 0.26 |
| 247.5 | 0.22 |
| 270 | 0.22 |
| 292.5 | 0.24 |
| 315 | 0.24 |
| 337.5 | 0.23 |

**TABLE 2: DEFINITION OF UPSTREAM EXPOSURE (ALPHA VALUE)**

| Upstream Exposure Type | Alpha Value (α) |
|---|---|
| Open Water | 0.14-0.15 |
| Open Field | 0.16-0.19 |
| Light Suburban | 0.21-0.24 |
| Heavy Suburban | 0.24-0.27 |
| Light Urban | 0.28-0.30 |
| Heavy Urban | 0.31-0.33 |

The turbulence model in the computational fluid dynamics (CFD) simulations is a two-equation shear-stress transport (SST) model, and thus the ABL turbulence profile requires that two parameters be defined at the inlet of the domain. The turbulence profile is defined following the recommendations of the Architectural Institute of Japan for flat terrain [3].

$$I(Z) = \begin{cases} 0.1\left(\frac{Z}{Z_g}\right)^{-\alpha-0.05}, & Z > 10\ \text{m} \\ 0.1\left(\frac{10}{Z_g}\right)^{-\alpha-0.05}, & Z \leq 10\ \text{m} \end{cases} \qquad \text{Equation (2)}$$

$$L_t(Z) = \begin{cases} 100\ \text{m}\sqrt{\frac{Z}{30}}, & Z > 30\ \text{m} \\ 100\ \text{m}, & Z \leq 30\ \text{m} \end{cases} \qquad \text{Equation (3)}$$

where $I$ = turbulence intensity, $L_t$ = turbulence length scale, $Z$ = height above ground, and $\alpha$ is the power law exponent used for the velocity profile in Equation (1).

Boundary conditions on all other domain boundaries are defined as follows: the ground is a no-slip surface; the side walls of the domain have a symmetry boundary condition; the top of the domain has a specified shear, which maintains a constant wind speed at gradient height; and the outlet has a static pressure boundary condition.

## REFERENCES

[1] P. Arya, "Chapter 10: Near-neutral Boundary Layers," in *Introduction to Micrometeorology*, San Diego, California, Academic Press, 2001.

[2] S. A. Hsu, E. A. Meindl and D. B. Gilhousen, "Determining the Power-Law Wind Profile Exponent under Near-neutral Stability Conditions at Sea," vol. 33, no. 6, 1994.

[3] Y. Tamura, H. Kawai, Y. Uematsu, K. Kondo, and T. Okhuma, "Revision of AIJ Recommendations for Wind Loads on Buildings," in *The International Wind Engineering Symposium, IWES 2003*, Taiwan, 2003.