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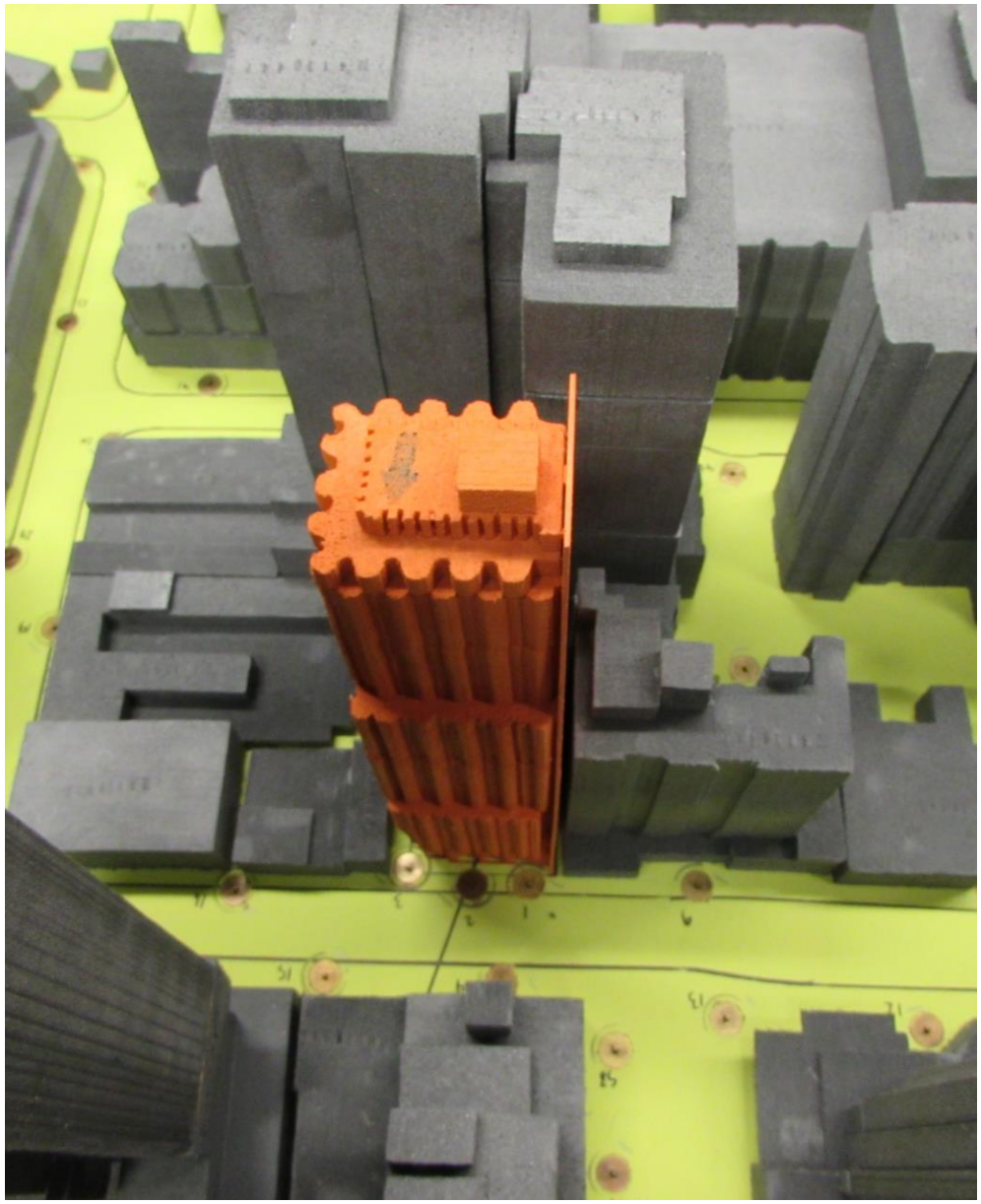
Date: August 31, 2022

Re: **Pedestrian Wind Study 15-17 Elm Street**
Toronto, ON
SLR Project #241.30447.00000



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For

17 Elm GP Inc.
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Version	Date
Draft 1.0	August 29, 2022
Final 1.0	August 31, 2022

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1.0 INTRODUCTION

SLR Consulting (Canada) Ltd. (SLR) was retained by 17 Elm GP Inc. to conduct a pedestrian wind study for the proposed development at 15-17 Elm Street in Toronto, Ontario. This report is in support of the combined Zoning Bylaw Amendment (ZBA) and Site Plan Approval (SPA) application for the development.

1.1 Existing Site

The proposed development is located at 15-17 Elm Street, between Yonge Street and Bay Street. The site is currently occupied by two low-rise commercial developments. Figure 1 provides an aerial view of the immediate study area. A virtual site visit was conducted by SLR using Google Earth images dated June and September 2021; some of these images are included in Figures 2a through 2d.

Immediately surrounding the site are low to mid-rise residential/ commercial developments to the north through east, and high-rise commercial developments in all other directions. Beyond the immediate surroundings are also mid to high-rise developments in all directions.

Typically, developments with Zoning Bylaw approval and/or those currently under construction within the context extents are included as existing surroundings. For this assessment, the following approved developments were included: 244 Church Street, 2 & 8 Elm Street, 348-356 Yonge Street, 56 and 66 Bond Street, 22 Elm Street & 33 Gerrard Street West, 335 Yonge Street, 20 Edward Street, 11 & 33 Centre Avenue, 80 & 94 Chestnut Street, 365-391 Yonge Street & 3 Gerrard Street East, 215-229 Church Street & 117 Dundas Street.

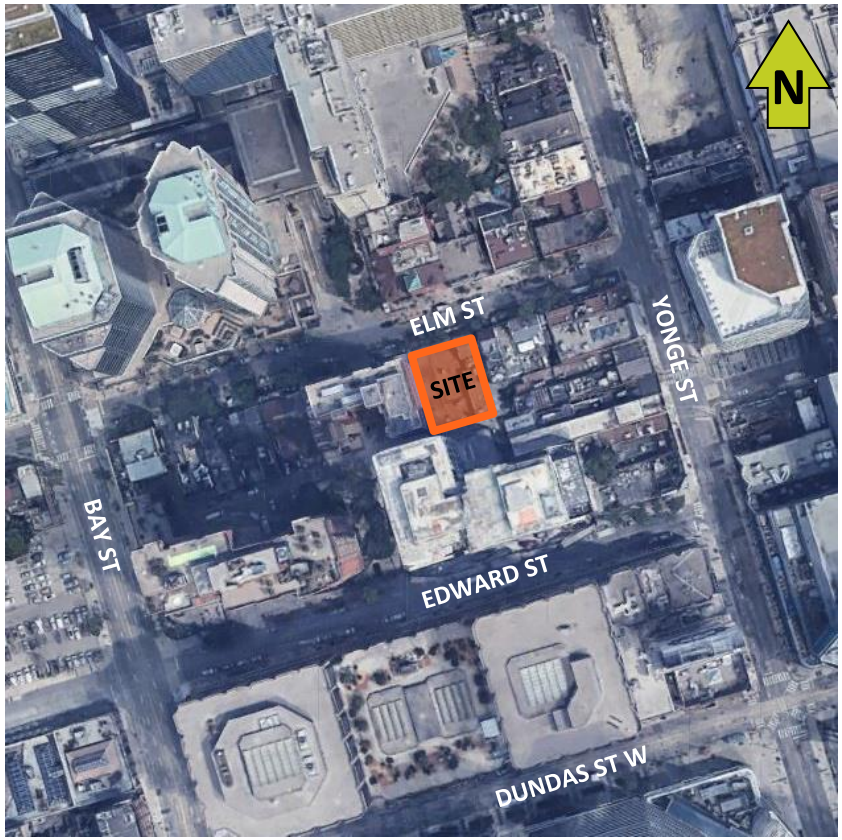


Figure 1: Aerial view of existing site & surroundings
Credit: Google Earth Pro, dated 6/15/2021

Figure 2a: Looking east along Elm Street (Site to the right)

Figure 2b: Looking north along Yonge Street

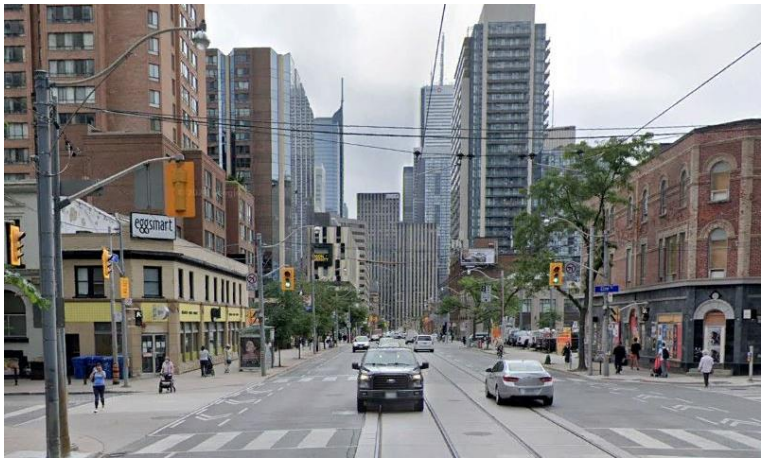


Figure 2c: Looking southeast along Bay Street

Figure 2d: Looking west along Edward Street

1.2 Proposed Development

The proposed development is a 32-storey tower with a total height of approximately 100 m including the mechanical penthouse and the elevator overrun. Figure 3 provides the building section of the proposed development.

1.3 Areas of Interest

Areas of interest for pedestrian wind conditions include those areas which pedestrians are expected to use on a frequent basis. Typically these include sidewalks, main entrances, transit stops, plazas and parks.

The main residential entrance and the retail entrance to the proposed development are located on the north facade along Elm Street. Secondary entrances are located along the north, east and south facades. An outdoor amenity space is located on the north side of the proposed development, at grade level. On-site areas of interest are shown in Figure 4.

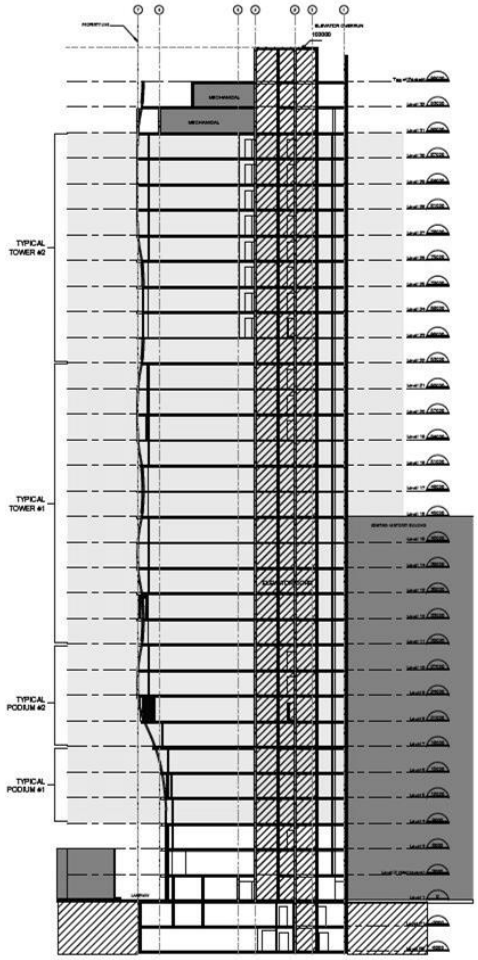


Figure 3: Building Section of of proposed development
Credit: Parisians

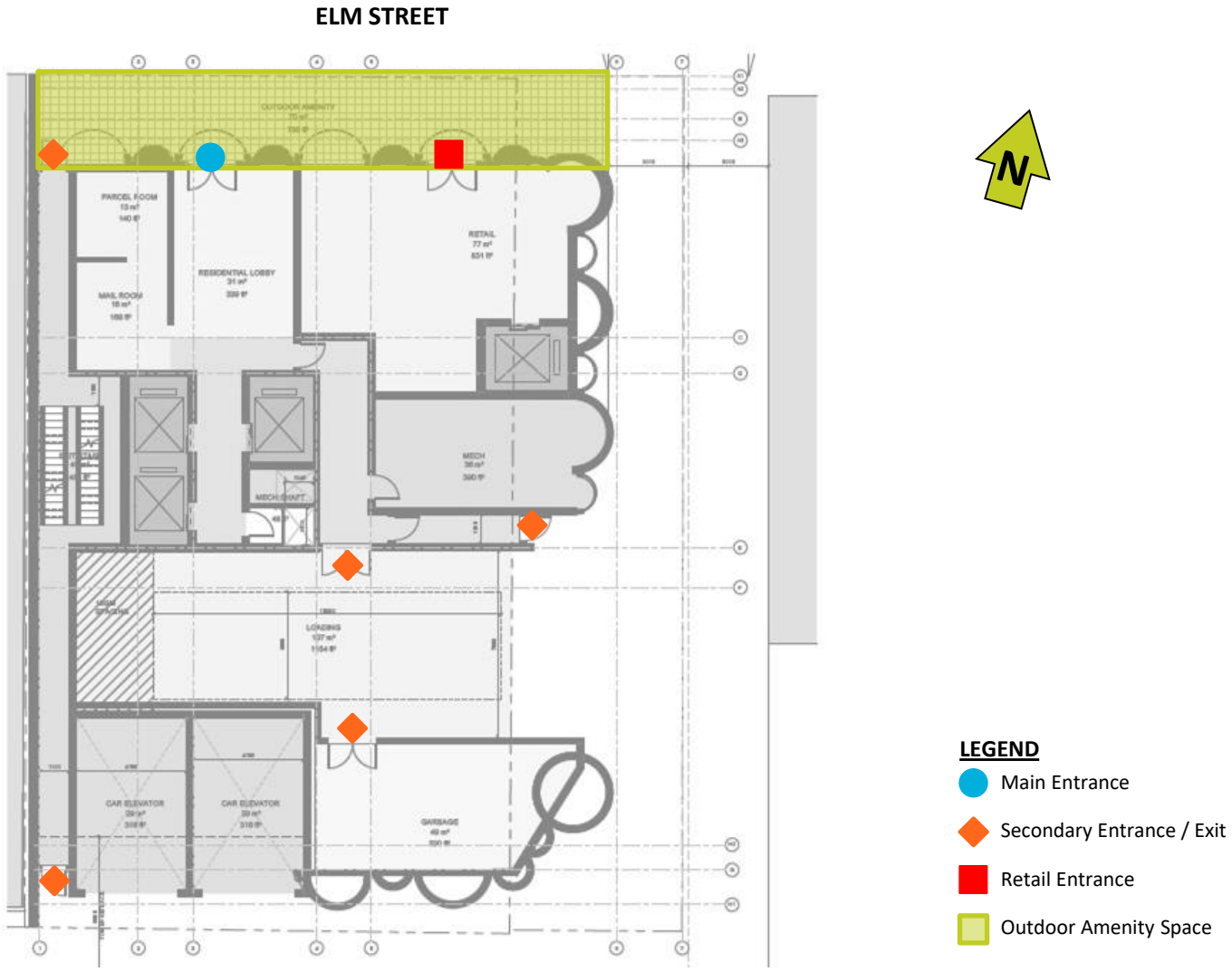


Figure 4: Areas of Interest

2.0 APPROACH

The objective of the wind tunnel study is to assist the design team and City Planning officials in making informed decisions about the building form considered and its influence on pedestrian comfort. This quantitative analysis involves the construction of a physical model of the development and surrounding features that influence wind flow. The physical model is instrumented with probes and tested in a wind tunnel. Afterwards, the wind tunnel data are combined with regional meteorological data; this analysis is then compared to the relevant wind criteria and standards in order to determine how appropriate the wind conditions are for the intended pedestrian usage.

2.1 Scale Model Construction

A 1:400 scale model of the proposed Development was constructed based on up-to-date drawing information received by SLR on June 27, 2022.

The proximity model of the surrounding area was built in block form for a radius of approximately 480 m from the site centre. As existing buildings surrounding the site will influence wind characteristics, existing buildings, those under construction and those buildings with Zoning Bylaw Amendment (ZBA) were included in the model for both the Existing and Proposed Configurations. Information regarding which approved developments to include within the existing surrounds was determined using the City of Toronto website, as well as discussion with the design team. A list of the approved surrounding development applications was provided to the City Planner for review and comment. Grade differences within the limits of the model were found to be minor, thus the site was modeled as flat.

SLR tested two configurations in the wind tunnel. The descriptions are below:

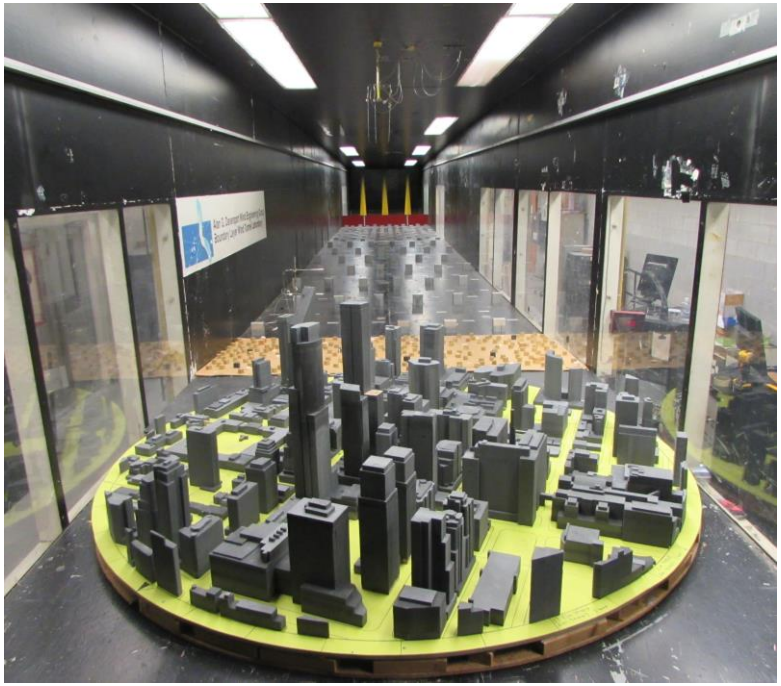
- Existing Configuration: Existing site with existing and approved surroundings
- Proposed Configuration: Proposed development with existing and approved surroundings

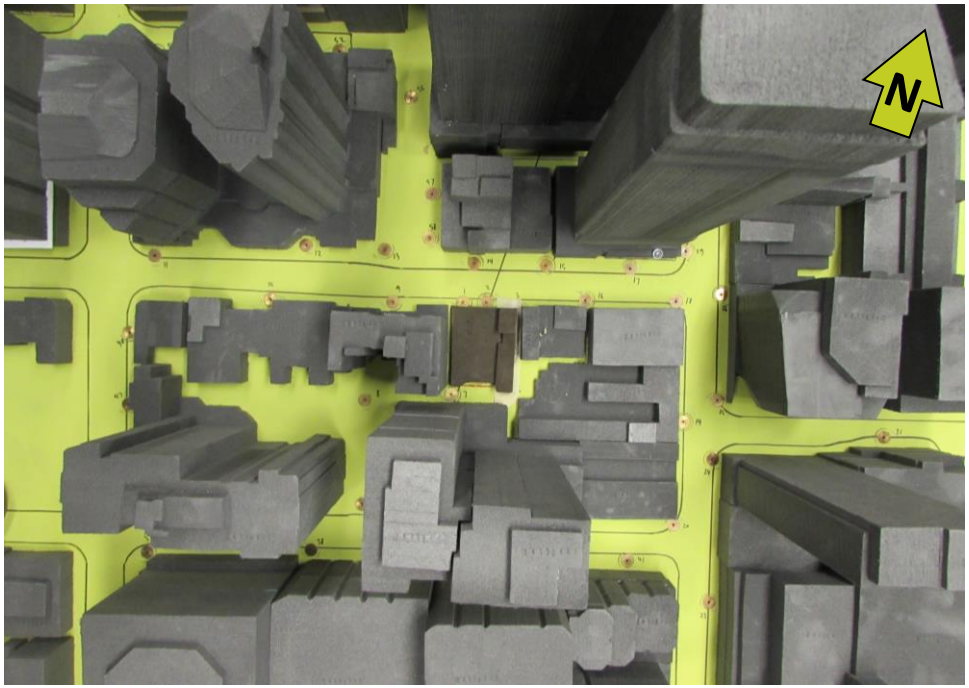
Photographs of the wind tunnel model showing both the Existing and Proposed Configurations are included in Figures 5a and 5b.

2.2 Wind Tunnel

Wind tunnel tests were conducted in the Alan G. Davenport Wind Engineering Group Boundary-Layer Wind Tunnel Laboratory at the University of Western Ontario. The upstream test section of the wind tunnel included generic roughness blocks and turbulence-generating spires to modify the wind flow approaching the model. These features develop characteristics of the wind flow that are similar to the actual site. The test model is rotated on a turn-table to simulate different wind directions with the upstream terrain being changed as appropriate to reflect the various upwind conditions encountered around the site.

The test model was equipped with 58 omni-directional probes to record wind speed at the pedestrian-level (approximately 1.5 m above grade). The orientation of the model was rotated in 10° intervals on the turn-table to permit measurement of wind speed at each probe location for 36 wind directions. The wind tunnel data were then combined with the wind climate model for this region to predict the occurrence of wind speeds in the pedestrian realm and compare against wind criteria for comfort and safety.





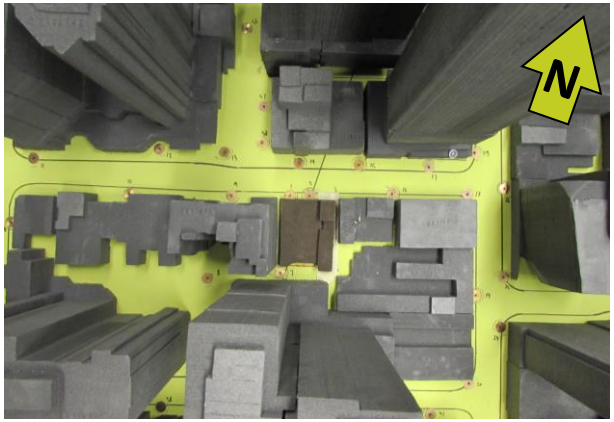
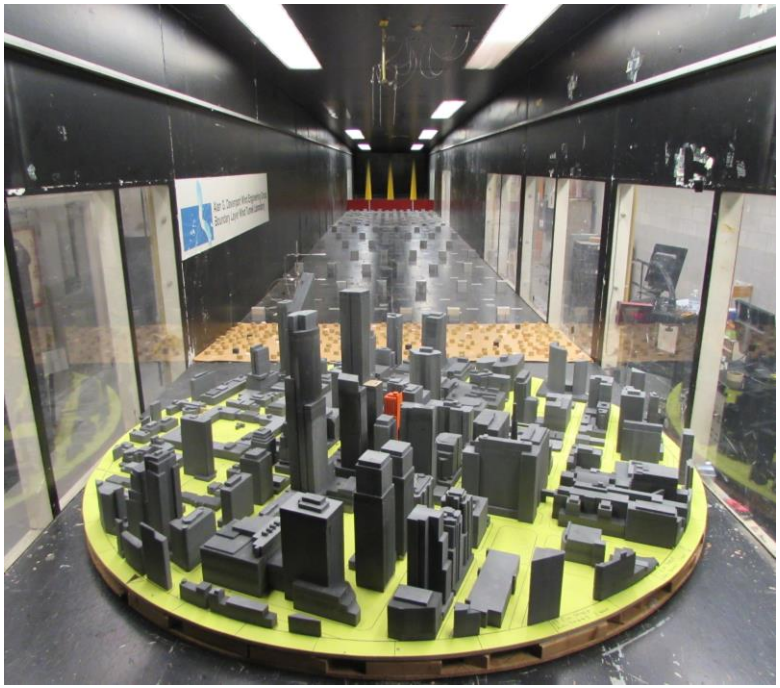
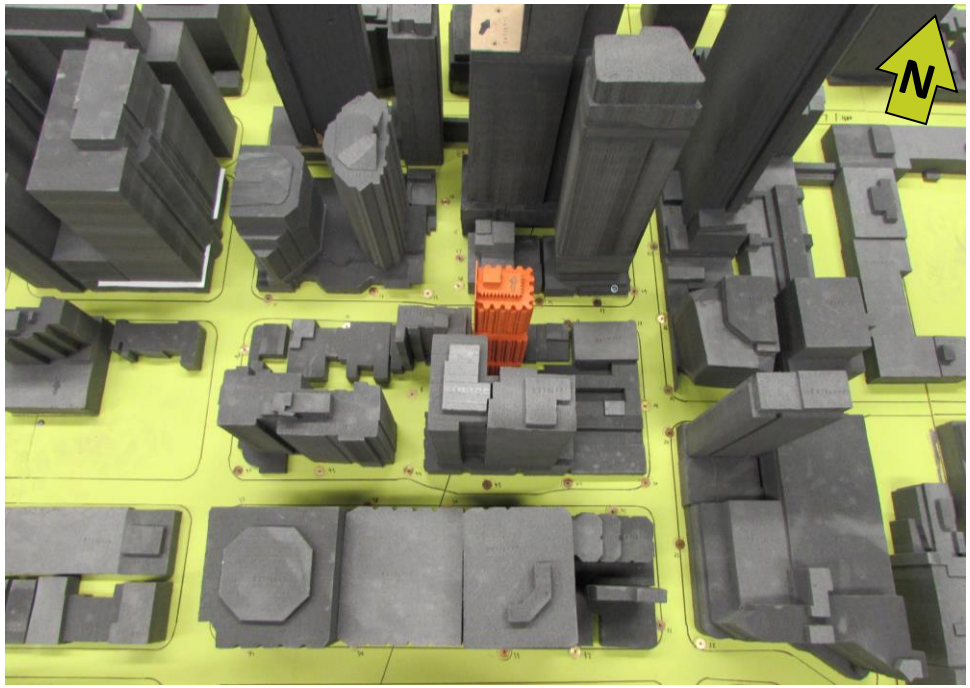


Figure 5a: Existing Configuration





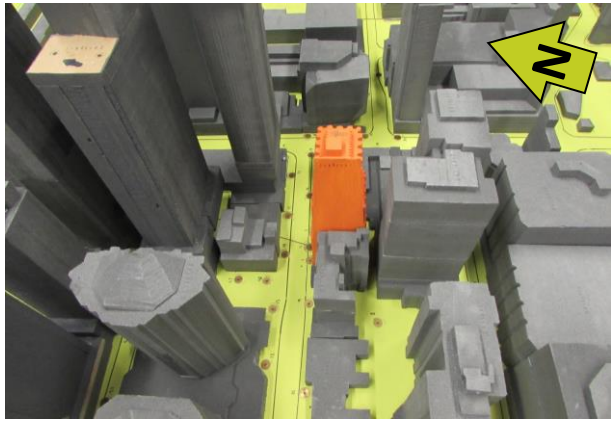


Figure 5b: Proposed Configuration

2.3 Wind Climate

Wind data recorded at the Toronto Island Billy Bishop Airport for the period of 1991 to 2020 were obtained and analysed to create a wind climate model for the region. Annual and seasonal wind distribution diagrams ("wind roses") are shown in Figure 6. These diagrams illustrate 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 northeast and southwest through westerly directions are most prevalent. The seasonal wind roses readily show how the prevalent winds shift throughout the year.

The directions from which stronger winds (e.g., > 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 configurations. The wind roses in Figure 6 also identify the directional frequency of these stronger winds, as indicated in the figure's legend colour key. On an annual basis, strong winds occur from the northeast and west through southwest directions. All wind speeds and directions were included in the wind climate model.

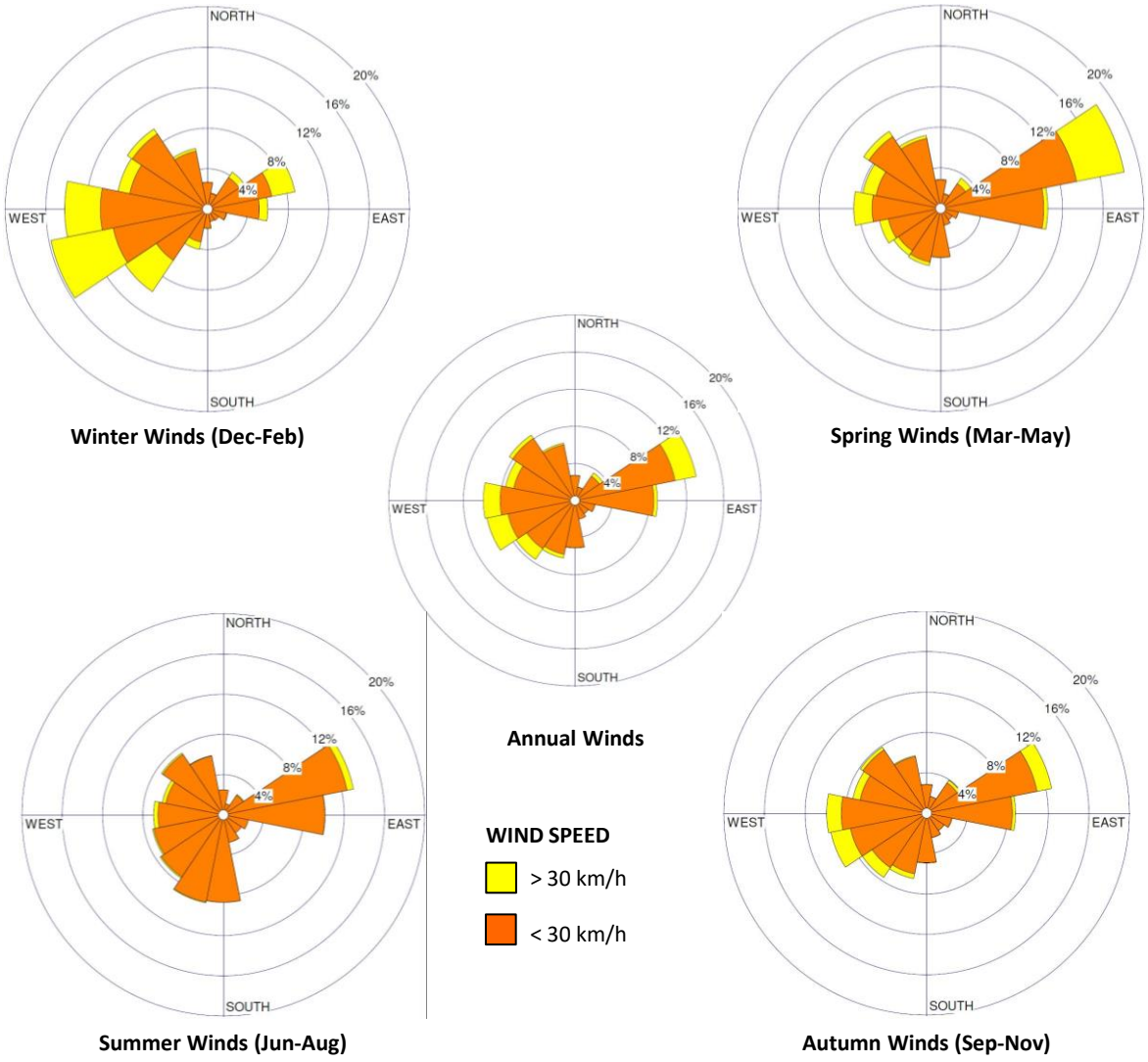


Figure 6: Wind Roses for Toronto Island Billy Bishop Airport (1991-2020)

3.0 PEDESTRIAN WIND CRITERIA

Wind comfort conditions are discussed in terms of being acceptable for certain pedestrian activities and are based on predicted wind force and the expected frequency of occurrence. Wind chill, clothing, humidity and exposure to direct sun, for example, all affect a person's thermal comfort; however, these influences are not considered in the wind comfort criteria.

The comfort criteria, which are based on certain predicted hourly GEM wind speeds being exceeded 20% of the time, are summarized in Table 1. By allowing for a 20% exceedance, it assumes wind speeds will be comfortable for the corresponding activity at least four out of five days. The comfort criteria consider only daytime hours, between 6:00am and 11:00pm. GEM is defined as the maximum mean wind speed or the gust wind speed divided by 1.85.

The criterion for wind safety in the table is based on hourly gust wind speeds that are exceeded nine hours per year (approximately 0.1% of the time). When the criterion is exceeded, wind mitigation measures are advised. The wind safety criterion is shown in Table 2.

These criteria are based on the *Pedestrian Level Wind Study Terms of Reference Guide* of the City of Toronto, which came into effect in June 2022.

Table 1: Wind Comfort Criteria

Comfort Category	Comfort Ranges for GEM Wind Speed Exceeded 20% of the Time	Description of Wind Comfort
Sitting	≤ 10 km/h	Light breezes desired for outdoor seating areas where one can read a paper without having it blown away.
Standing	≤ 15 km/h	Gentle breezes suitable for passive pedestrian activities where a breeze may be tolerated.
Walking	≤ 20 km/h	Relatively high speeds that can be tolerated during intentional walking, running and other active movements.
Uncomfortable	> 20 km/h	Strong winds, considered a nuisance for most activities.

Table 2: Wind Safety Criterion

Activity	Safety Criterion Gust Wind Speed Exceeded 0.1% of the Time	Description of Wind Effects
Any	> 90 km/h	Excessive gust speeds that can adversely affect safety and a pedestrian's balance and footing. Wind mitigation is typically required.

4.0 RESULTS

Figures 7a through 9b present graphical images of the wind comfort conditions for the summer and winter months around the proposed development. These represent the seasonal extremes of best and worst case. Conditions for spring and autumn are shown in Appendix A. The "comfort zones" shown are based on an integration of wind speed and frequency for all 36 wind directions tested with the seasonal wind climate model. The presence of mature trees can lead to wind comfort levels that are marginally more comfortable than shown, during seasons when foliage is present. The annual wind safety conditions are shown in Figures 10a and 10b. Table 2 in Appendix B provides the detailed wind comfort and safety conditions for all seasons.

There are generally accepted wind comfort levels that are desired for various pedestrian uses. However, in some regions these may be difficult to achieve in the winter due to the overall climate. For sidewalks, walkways loading areas and laneways, wind comfort suitable for walking is desirable year-round. For main entrances, transit stops, and outdoor amenity spaces intended for pets, wind conditions conducive to standing are preferred throughout the year. For areas such as park benches, seating for restaurants and cafes, and outdoor amenity spaces, including play areas for children, wind conditions suitable for sitting are desired throughout the year, as calmer winds are expected for the comfort of patrons and the public.

4.1 Building Entrances, Amenity Space & Walkways (Locations 1-7)

Existing wind conditions on-site are comfortable standing in the summer (Figure 7a). During the winter, wind conditions are comfortable for walking Figures 7b).

In the Proposed Configuration, wind conditions on the site are generally comfortable for walking or better throughout the year(Figures 8a and 8b). However, wind conditions are uncomfortable on the north side of the site (Location 2) and at a few building corners (Locations 4 and 7) in the winter months (Figure 8b).

At the main residential entrance (Location 1), wind conditions are comfortable for standing in the summer and walking in the winter (Figures 8a and 8b). At the retail entrance (near Location 2), wind conditions are comfortable for walking in the summer (Figure 8a). However, in the winter, wind conditions at this entrance are uncomfortable (Figure 8b). The outdoor amenity space is also located along the north side, near Locations 1 and 2, where wind conditions are generally comfortable for walking or better throughout the year, except during the winter on the east side of the space (Location 2). At the secondary entrances (Locations 4, 5 and 7), wind conditions are conducive to sitting or standing, with uncomfortable wind conditions (Locations 4 and 7) in the winter months.

Strong wind flows on-site are caused by the predominant northeasterly and southwesterly winds that are channeled through the gaps between buildings and accelerating at the proposed building corners. In addition, winds from the northeasterly directions are downwashed off the tower facade and redirected towards grade level. To improve wind conditions on the north side of the development (main and retail entrances and the outdoor amenity space), we recommend building modification such as tower step-back or a stepped facade on the north-east portion, close to the grade level. In addition, a large canopy minimum 3m wide along the north and east facade would be beneficial, to deflect the downwashing wind flows at grade.

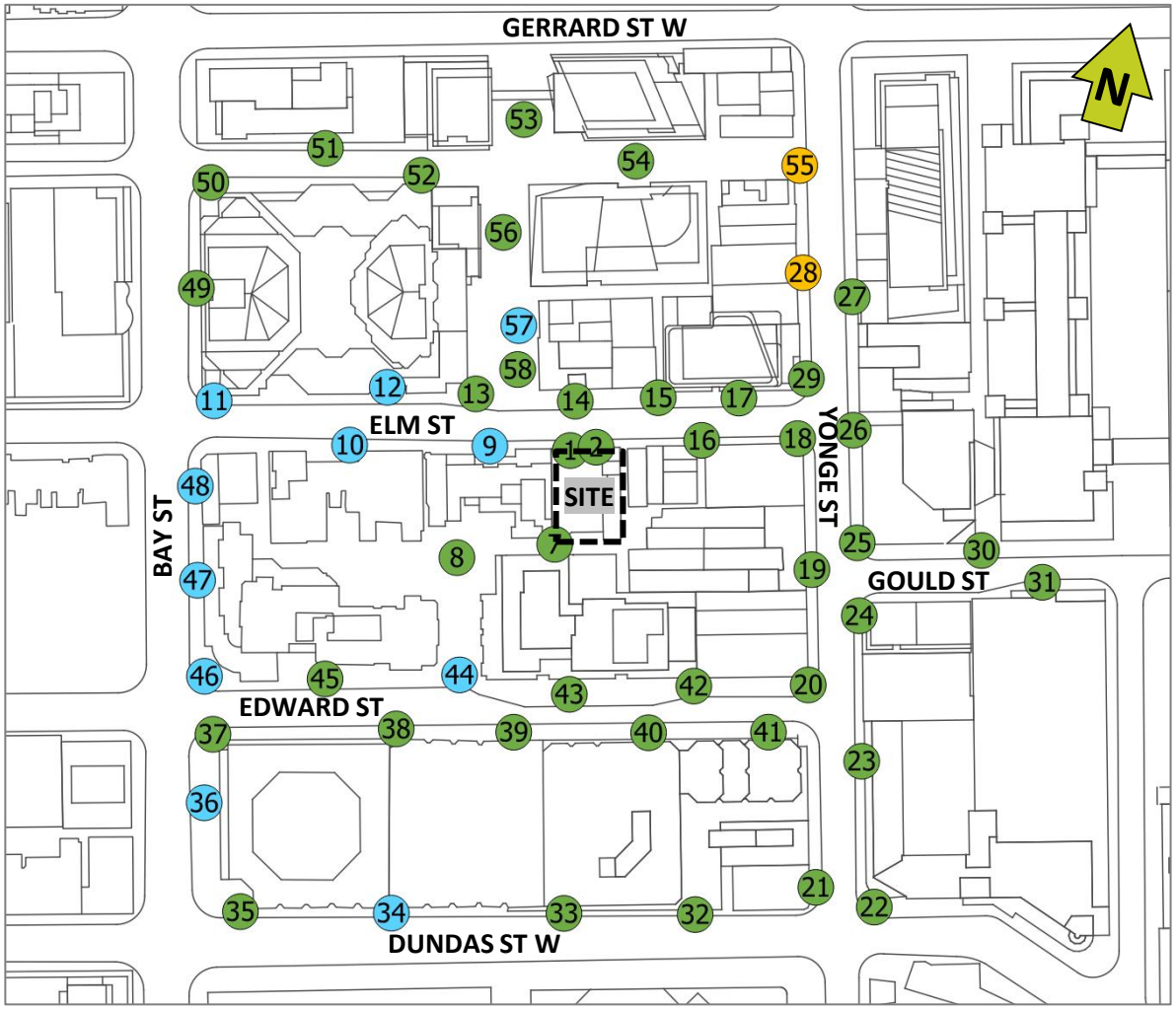


Figure 7a: Existing Configuration – Pedestrian Wind Comfort – Summer – On-site & Surrounding Sidewalks

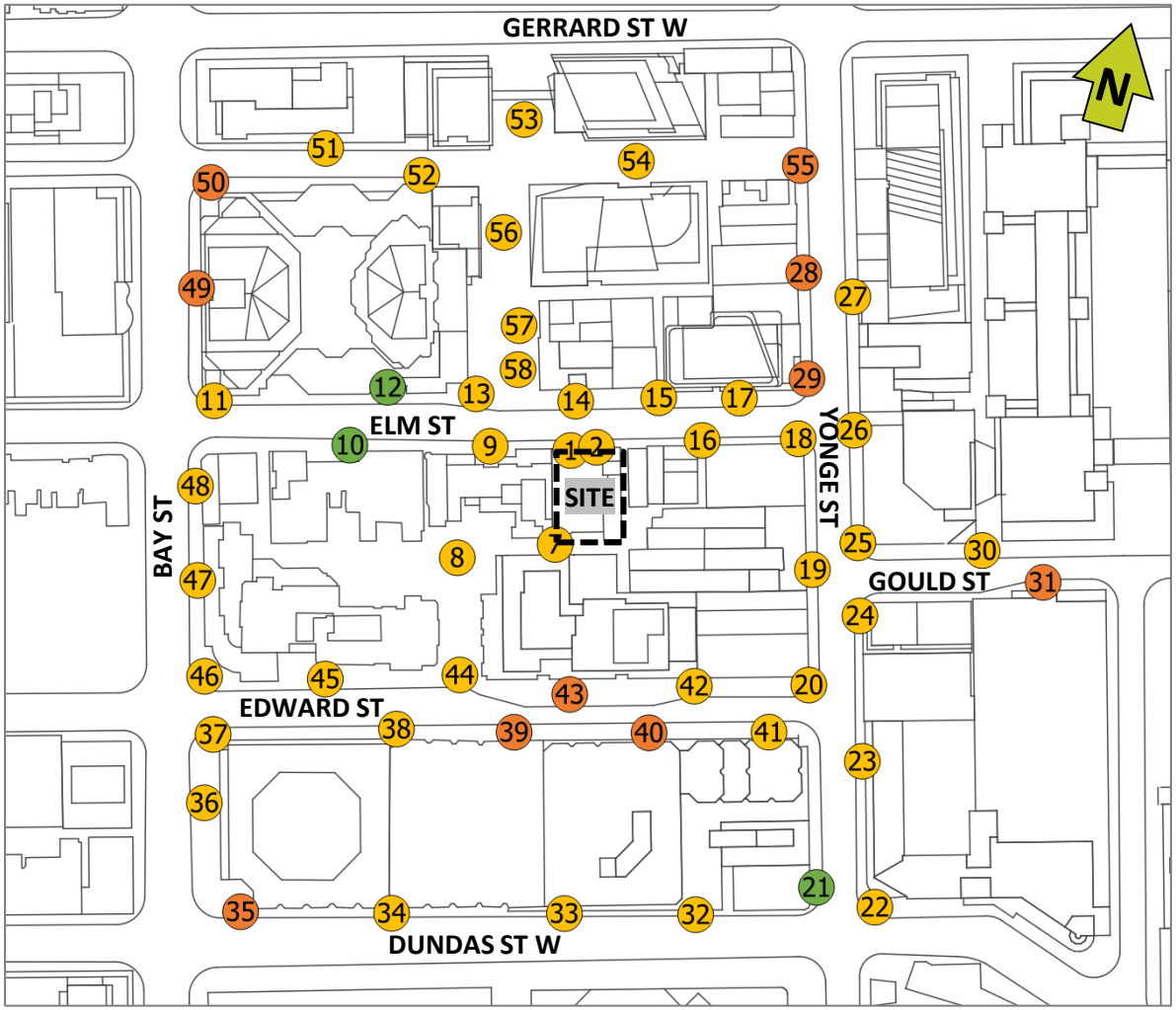


Figure 7b: Existing Configuration – Pedestrian Wind Comfort – Winter – On-site & Surrounding Sidewalks

Figure 8a: Proposed Configuration – Pedestrian Wind Comfort – Summer Building Entrances & Amenity Spaces

Figure 8b: Proposed Configuration – Pedestrian Wind Comfort – Winter Building Entrances & Amenity Spaces

Vertical wind screens or partitions should be used on both sides of the entrances (Locations 1, 2 and 4) and surrounding seating areas. Alternatively, the entrances can be recessed into the building facade for wind protection.

To improve wind conditions at the southwest corner of the development (Location 7), we recommend a fence or vertical screen, minimum 2.2m tall and approximately 70% solid along the west and south edges of the site, to disrupt wind flows from the southwest.

4.2 Surrounding Sidewalks (Locations 8-58)

Existing wind conditions along the sidewalks of Elm Street, Bay Street, Yonge Street, Edward Street, Gould Street, Gerrard Street West and Dundas Street West are generally comfortable for walking or better year-round (**Figures 7a and 7b**). However, wind conditions are uncomfortable at a few sidewalk locations along Yonge Street (Locations 28 and 55), Gould Street (Location 31), Edward Street (Locations 39, 40 and 43) and Bay Street (Locations 49 and 50) during the winter. Wind conditions at the nearby transit stops (Locations 21, 22, 26, 29, 35 and 48) are generally comfortable for walking or better throughout the year. The exceptions are two transit stops along Yonge Street (Location 29) and Dundas Street West (Location 35), where wind conditions are uncomfortable in the winter months (**Figure 7b**).

In the Proposed Configuration, wind conditions along the surrounding sidewalks are generally comfortable for walking or better throughout the year (**Figures 9a and 9b**). The exceptions include uncomfortable wind conditions along the sidewalks of Elm Street (Locations 14 and 16), Yonge Street (Locations 25, 27, 28 and 55), Edward Street (Location 39, 40, 42 and 43), and Bay Street (Locations 49 and 50) during the winter season (**Figure 9b**). At the nearby transit stops, wind conditions remain comfortable for walking or better (Locations 21, 22, 26 and 48) and uncomfortable (Locations 29 35 and 35) in the winter months (**Figure 9b**).

4.3 Wind Safety

In the Existing Configuration, the wind safety criterion was met in all areas on-site on an annual basis. Off-site, the wind safety criterion is exceeded at a few sidewalk locations along Yonge Street (Location 28), Edward Street (Locations 40 and 42), Bay Street (Location 50) and at the transit stop along Dundas Street West (Location 35) on an annual basis (**Figure 10a**).

In the Proposed Configuration, the wind safety criterion was met in all onsite areas but one area to the north of the proposed development (Location 2) on an annual basis. Wind control measures described in **Section 4.1** would be beneficial to eliminate the safety concern on-site. Off-site, the wind safety conditions remain similar to the existing conditions, with safety exceedances at a few sidewalk locations (Locations 28, 35, 40, 42, and 50) on an annual basis (**Figure 10b**).

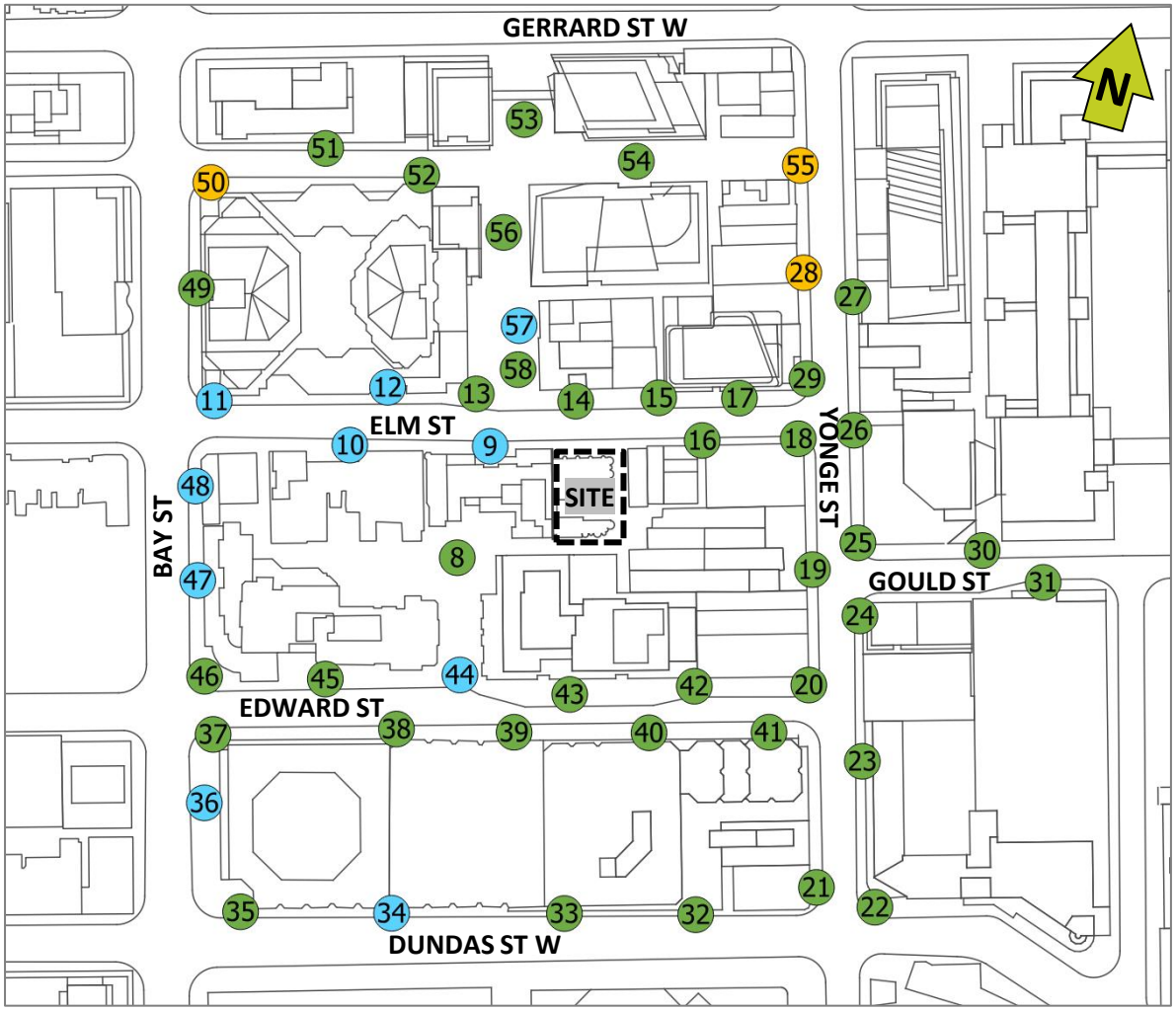


Figure 9a: Proposed Configuration – Pedestrian Wind Comfort – Summer – Surrounding Sidewalks

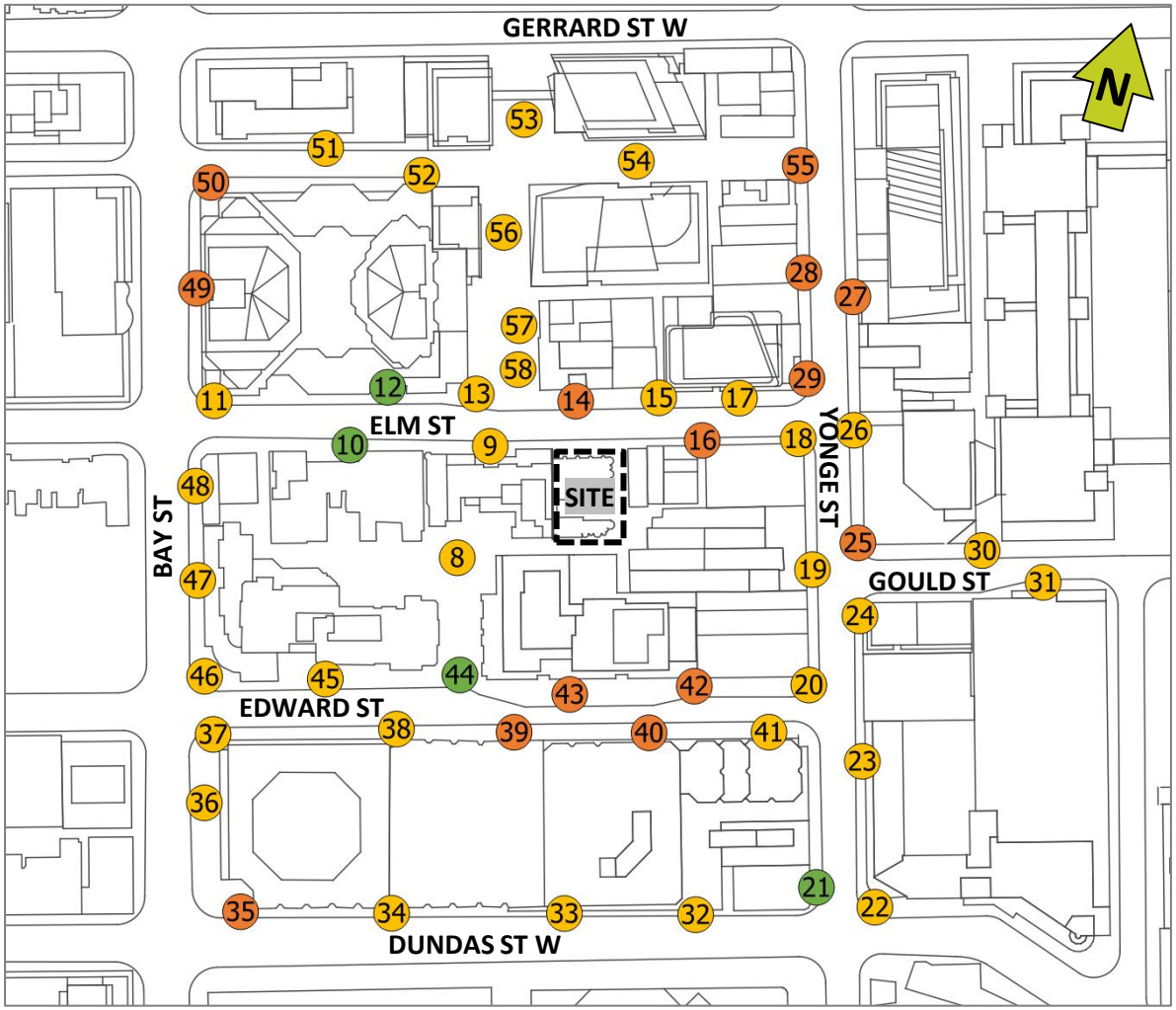
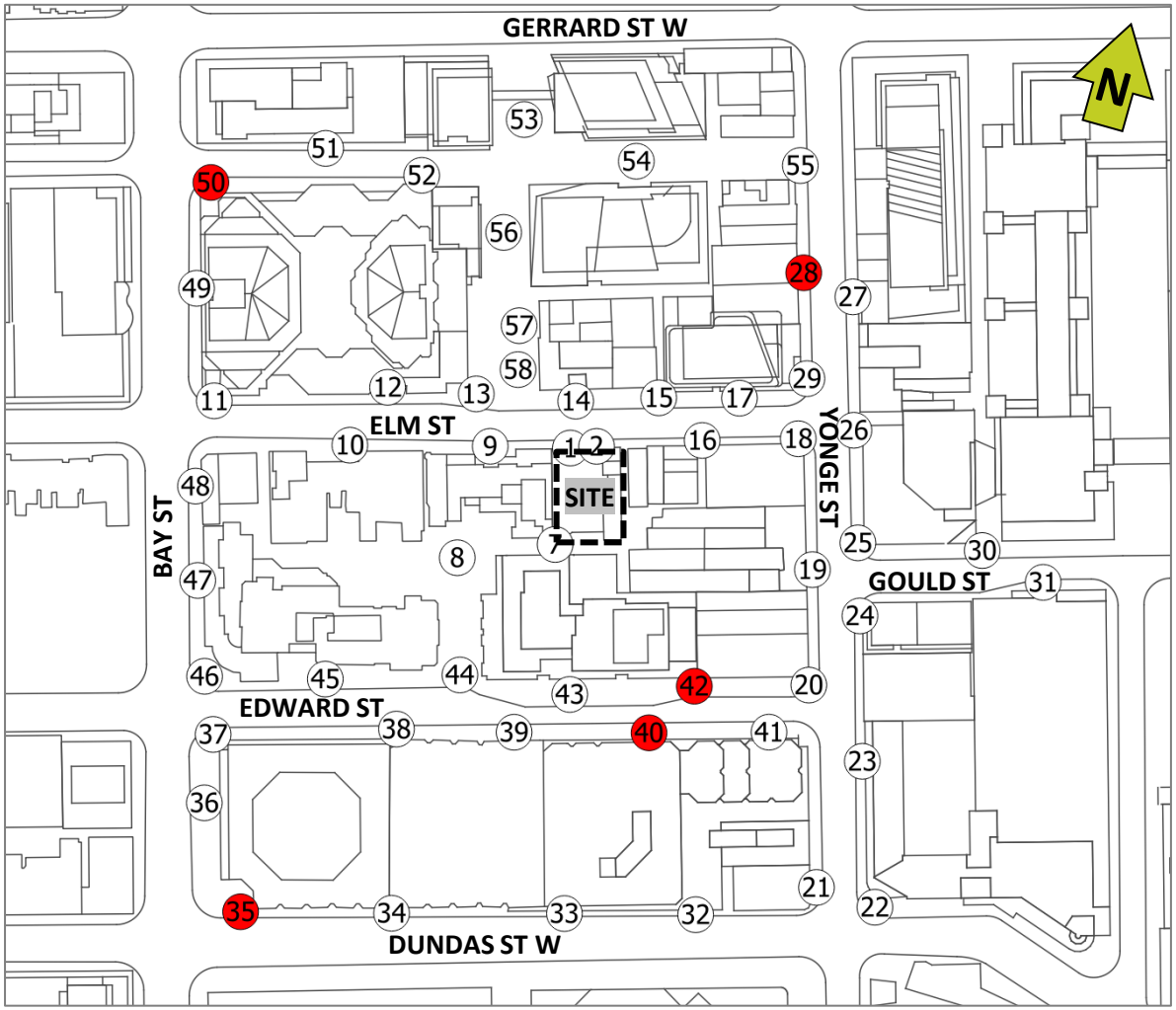
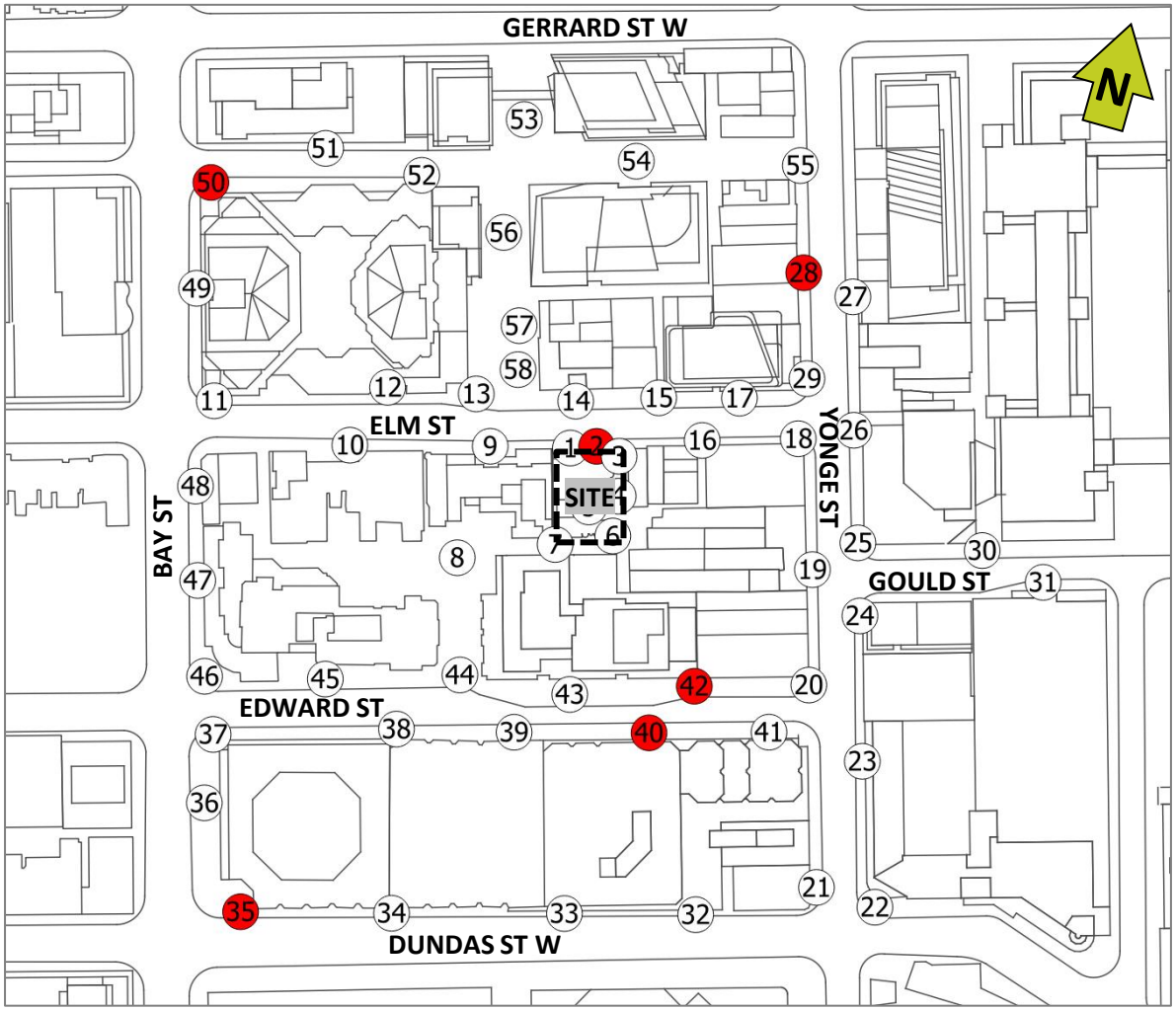


Figure 9b: Proposed Configuration – Pedestrian Wind Comfort – Winter – Surrounding Sidewalks



○ Acceptable ● Exceeded

Figure 10a: Existing Configuration – Pedestrian Wind Safety – Annual – On-site & Surrounding Sidewalks



○ Acceptable ● Exceeded

Figure 10b: Proposed Configuration – Pedestrian Wind Safety – Annual – On-site & Surrounding Sidewalks

5.0 UPDATED ARCHITECTURAL INFORMATION

SLR received updated drawings of the proposed development on August 30, 2022. Based on the latest drawings, there is an outdoor amenity space on Level 21, as shown in **Figure 11**.

The terrace on Level 21 will be exposed to the predominant northeasterly, westerly and southwesterly winds. Therefore, this terrace will be windier than desired for passive activities throughout the year. Wind control measures in the form of tall vertical screens should be considered along the terrace edges and near seating areas. SLR will work with the design team to conduct wind tunnel testing of the terrace and refine wind control measures prior to the next submission.

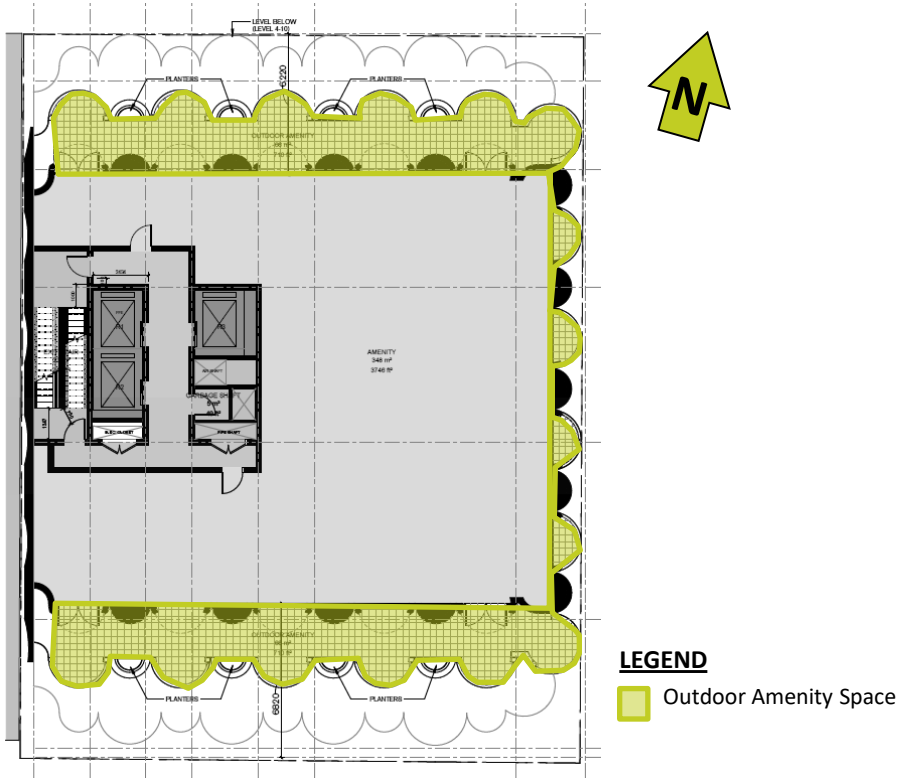


Figure 11: Proposed Terrace on Level 21
Credit: Parisians

6.0 CONCLUSIONS & RECOMMENDATIONS

The pedestrian wind conditions predicted for the proposed development at 15-17 Elm Street in Toronto have been assessed through wind tunnel modeling techniques. Based on the results of our study, the following conclusions have been reached:

- In the Existing Configuration, the wind safety criterion is met at all but a few sidewalk locations on an annual basis. In the Proposed Configuration, the wind safety criterion is exceeded at one on-site location. Wind control measures are recommended on-site. Wind safety conditions off-site remain similar to the Existing Configuration.
- Wind conditions on the site, including most entrances and amenity spaces, are generally windier than desired for the intended use. Wind control measures are recommended.
- On the sidewalks surrounding the proposed development, wind conditions are generally similar between the Existing and Proposed Configurations.

7.0 LIMITATIONS OF LIABILITY

This report has been prepared and the work referred to in this report has been undertaken by SLR Consulting (Canada) Ltd. (SLR) for 15-17 Elm Limited Partnership, hereafter referred to as the "Client". It is intended for the sole and exclusive use of the Client. The report has been prepared in accordance with the Scope of Work and agreement between SLR and the Client. Other than by the Client and by the City of Toronto in their role as land use planning approval authorities, copying or distribution of this report or use of or reliance on the information contained herein, in whole or in part, is not permitted unless payment for the work has been made in full and express written permission has been obtained from SLR.

This report has been prepared in a manner generally accepted by professional consulting principles and practices for the same locality and under similar conditions. No other representations or warranties, expressed or implied, are made.

Opinions and recommendations contained in this report are based on conditions that existed at the time the services were performed and are intended only for the client, purposes, locations, time frames and project parameters as outlined in the Scope or Work and agreement between SLR and the Client. The data reported, findings, observations and conclusions expressed are limited by the Scope of Work. SLR is not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. SLR does not warranty the accuracy of information provided by third party sources.

8.0 REFERENCES

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Appendix A

Pedestrian Wind Comfort Conditions

Spring (March - May) and Autumn (September - November)

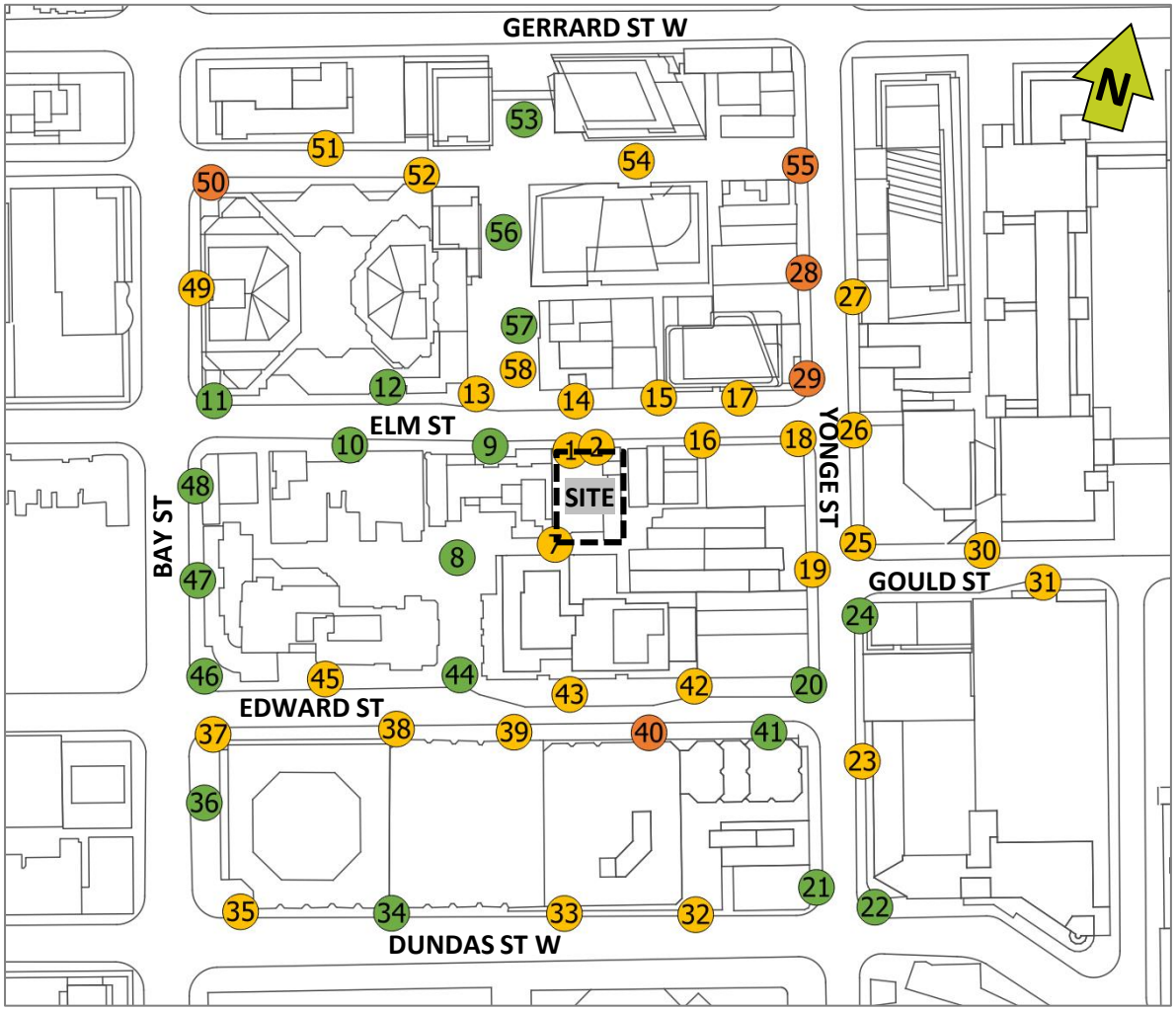

Figure A1a: Existing Configuration – Pedestrian Wind Comfort – Spring – On-site & Surrounding Sidewalks

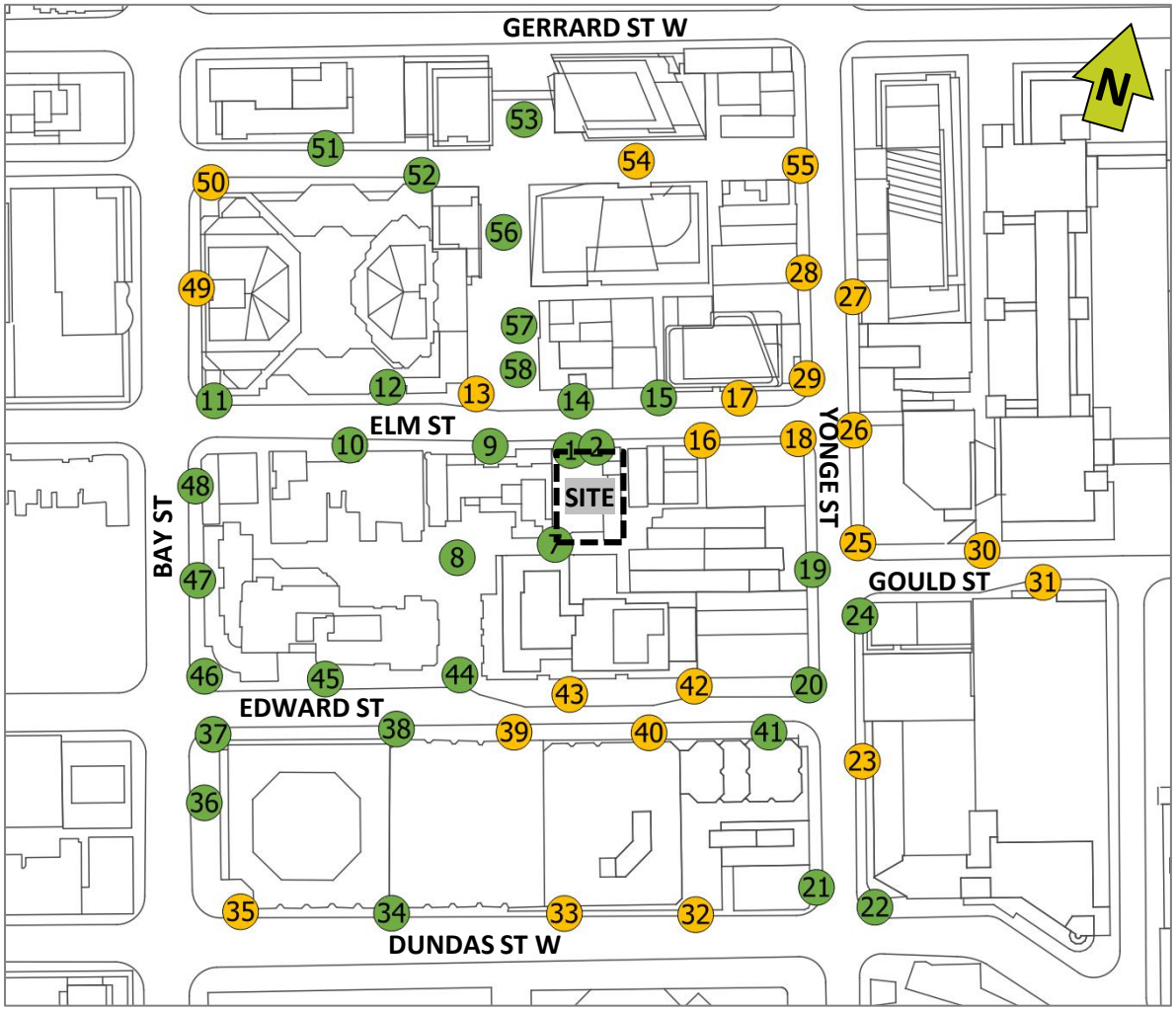

Figure A1b: Existing Configuration – Pedestrian Wind Comfort – Autumn – On-site & Surrounding Sidewalks

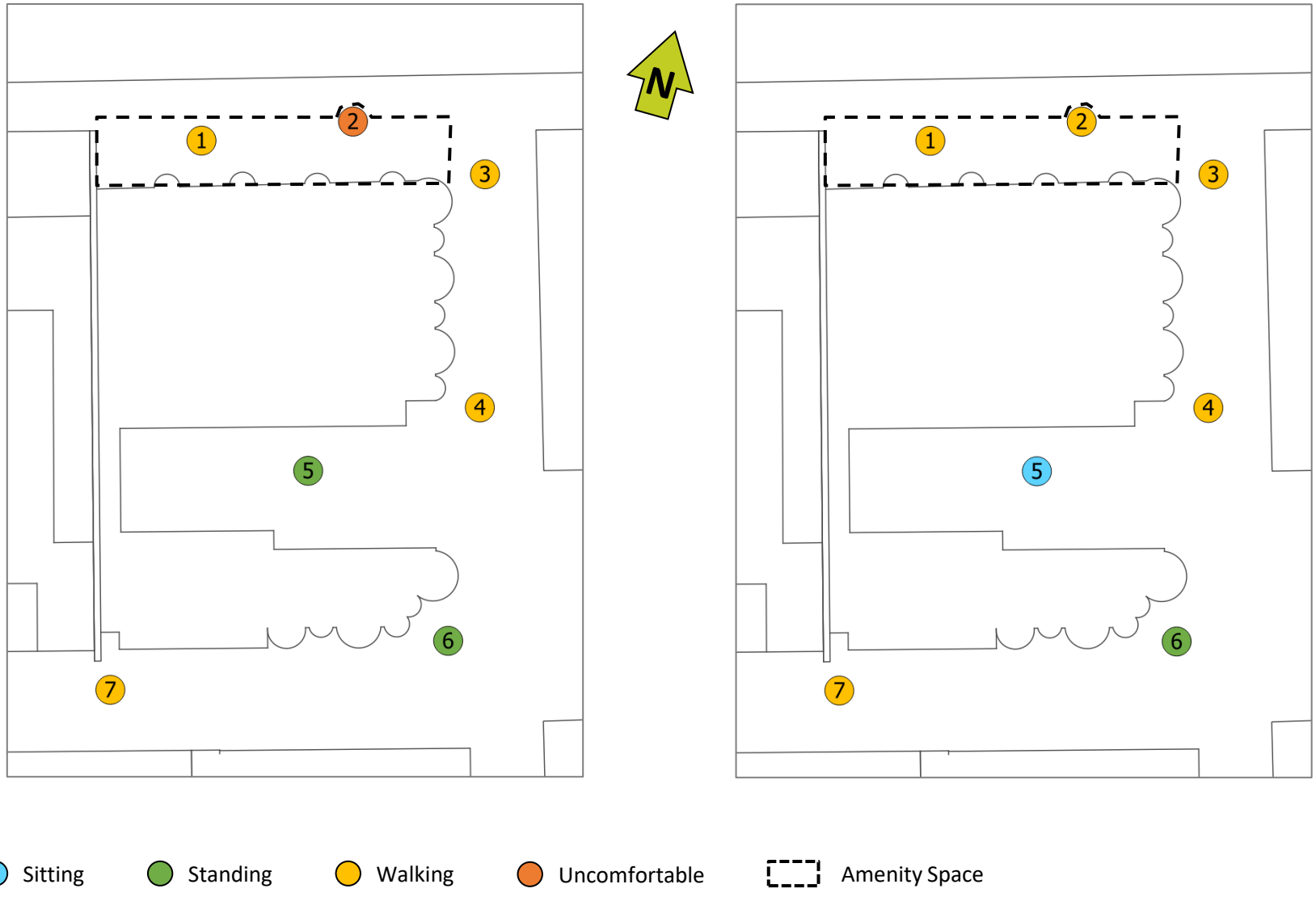

Figure A2a: Proposed Configuration – Pedestrian Wind Comfort – Spring Building Entrances & Amenity Spaces

Figure A2b: Proposed Configuration – Pedestrian Wind Comfort – Autumn Building Entrances & Amenity Spaces

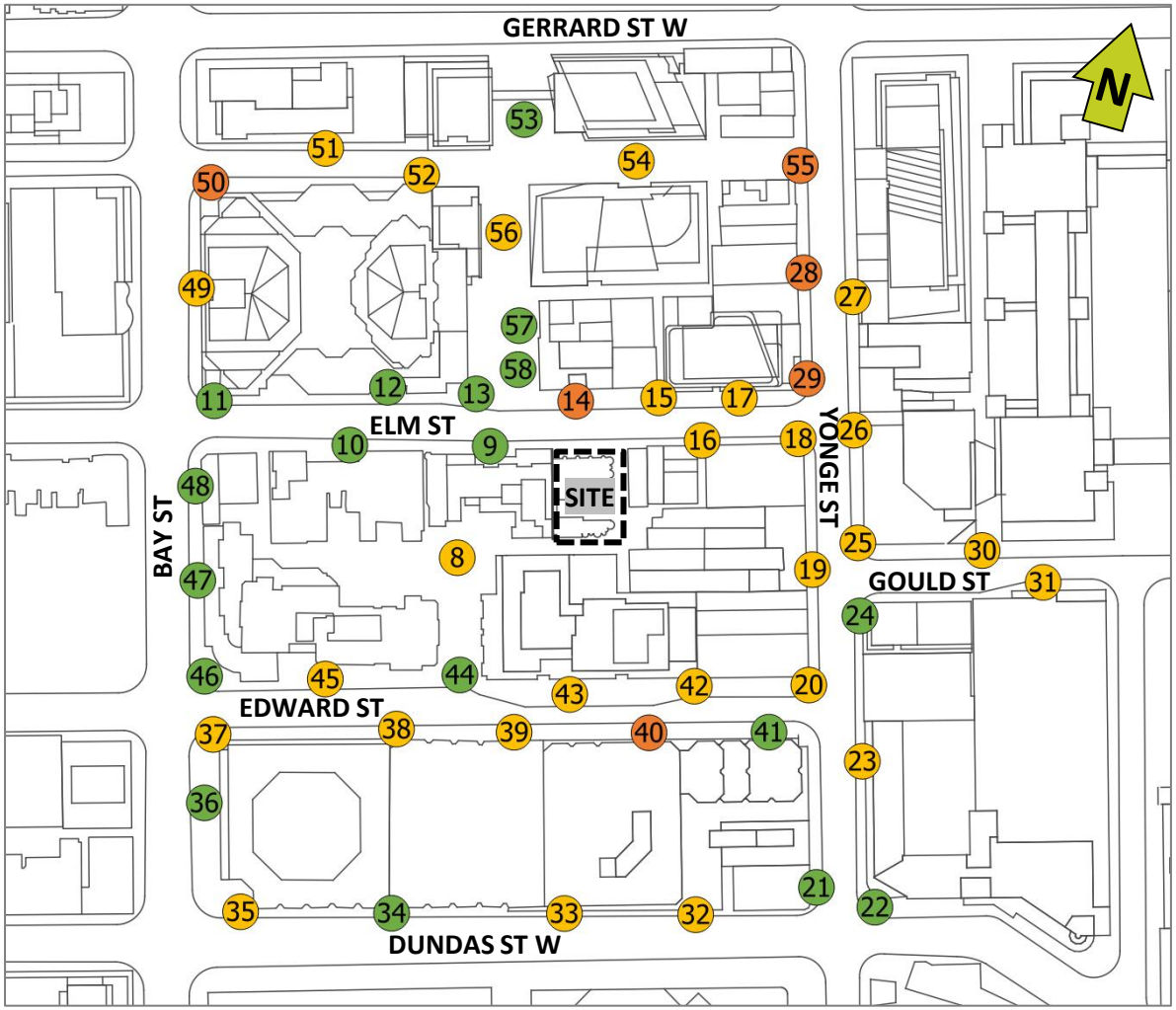

Figure A3a: Proposed Configuration – Pedestrian Wind Comfort – Spring – Surrounding Sidewalks

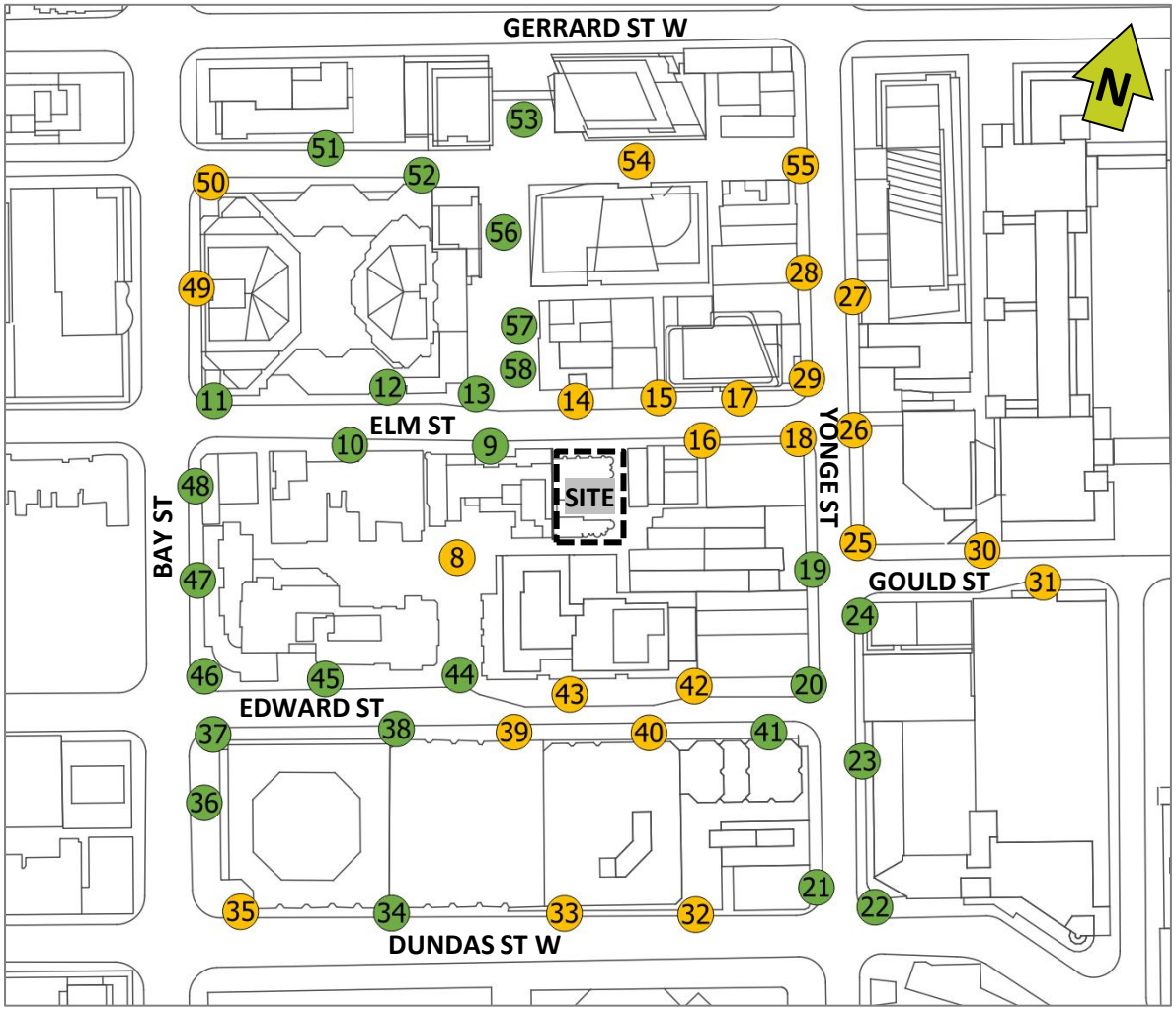

Figure A3b: Proposed Configuration – Pedestrian Wind Comfort – Autumn – Surrounding Sidewalks

Appendix B

Pedestrian Wind Comfort & Safety Tables

INTERPRETATION OF RESULTS

Table 1 below illustrates the wind comfort and safety criteria. The table provides the GEM (Gust Equivalent Mean) wind speed (in km/h) exceeded 20% of the time for comfort for each of the four seasons for each configuration. It also categorizes the wind speeds as either sitting, standing, walking or uncomfortable. In addition, the table provides the gust wind speed exceeded 0.1% of the time annually.

For instance, at Location 1 there is not data in the Existing Configuration, while in the Proposed Configuration, wind conditions are suitable for walking in the winter, spring and autumn seasons, while in the summer wind conditions are suitable for standing.

At Location 3, wind conditions are suitable for walking in the winter, spring and autumn seasons in the Existing Configuration, while in the summer wind conditions are conducive to sitting. In the Proposed Configuration, wind conditions are suitable for walking in the spring and autumn, standing in the summer, and uncomfortable in the winter. In addition, the safety criteria is exceeded on an annual basis at Location 3 in the Proposed Configuration.

Table 1: Pedestrian Wind Conditions

Location	Configuration	Wind Comfort				Wind Safety
		GEM Speed Exceeded 20% of the Time (km/h)				Gust Speed Exceeded 0.1% of the Time (km/h)
		Winter	Spring	Summer	Autumn	
1	Existing					
1	Proposed	19.3	18.3	15.0	16.1	71.7
2	Existing	12.5	11.3	6.8	11.7	71.4
2	Proposed	16.6	18.1	14.7	15.8	80.0
3	Existing	17.6	14.2	9.8	15.8	79.5
3	Proposed	20.9	15.7	10.3	18.6	95.6

Table 2: Categories

Criteria	Speed
Sitting	≤ 10 km/h
Standing	≤ 15 km/h
Walking	≤ 20 km/h
Uncomfortable	> 20 km/h
Safety	> 90 km/h

Table B1-1: Pedestrian Wind Conditions

Location	Configuration	Wind Comfort				Wind Safety
		GEM Speed Exceeded 20% of the Time (km/h)				Gust Speed Exceeded 0.1% of the Time (km/h)
		Winter	Spring	Summer	Autumn	
1	Existing	17.4	16.6	11.3	14.5	71.3
1	Proposed	19.1	18.0	12.6	15.8	73.4
2	Existing	17.3	15.6	11.6	14.2	65.3
2	Proposed	21.1	23.9	15.5	18.9	109.1
3	Existing					
3	Proposed	19.3	18.5	12.9	16.1	75.9
4	Existing					
4	Proposed	20.9	18.0	12.7	16.6	82.6
5	Existing					
5	Proposed	11.7	10.0	7.3	9.3	44.1
6	Existing					
6	Proposed	15.4	13.2	9.2	12.1	60.4
7	Existing	18.5	15.7	11.1	14.5	77.7
7	Proposed	20.0	18.2	12.5	16.1	82.5
8	Existing	16.3	14.7	11.4	13.6	62.2
8	Proposed	18.0	17.4	12.8	15.3	77.1
9	Existing	16.0	14.7	9.9	13.0	62.3
9	Proposed	15.0	13.7	9.5	12.2	58.3
10	Existing	13.5	13.1	9.0	11.4	50.9
10	Proposed	14.2	13.9	9.5	12.1	52.3

Table B1-2: Pedestrian Wind Conditions

Location	Configuration	Wind Comfort				Wind Safety
		GEM Speed Exceeded 20% of the Time (km/h)				Gust Speed Exceeded 0.1% of the Time (km/h)
		Winter	Spring	Summer	Autumn	
11	Existing	15.4	12.2	9.2	11.7	64.0
11	Proposed	15.2	11.5	8.8	11.2	64.3
12	Existing	13.6	13.0	9.1	11.3	51.4
12	Proposed	13.4	11.2	8.2	10.5	51.7
13	Existing	17.3	18.1	11.9	15.0	84.4
13	Proposed	15.8	15.0	10.5	13.2	59.7
14	Existing	17.4	16.5	11.8	14.5	65.6
14	Proposed	20.5	20.2	13.7	17.3	86.5
15	Existing	16.4	17.1	12.5	14.6	68.7
15	Proposed	18.0	18.0	12.8	15.5	75.0
16	Existing	19.4	18.2	12.6	16.2	81.6
16	Proposed	20.0	17.6	12.2	16.2	81.1
17	Existing	17.5	17.9	12.1	15.2	83.9
17	Proposed	18.3	17.4	11.9	15.4	79.8
18	Existing	18.3	17.4	12.6	15.5	72.1
18	Proposed	18.7	17.2	12.6	15.6	71.7
19	Existing	17.6	16.3	11.4	14.6	69.0
19	Proposed	18.0	16.7	11.6	14.9	70.3
20	Existing	16.1	14.9	11.0	13.6	78.1
20	Proposed	16.8	15.8	11.5	14.2	79.2

Table B1-3: Pedestrian Wind Conditions

Location	Configuration	Wind Comfort				Wind Safety
		GEM Speed Exceeded 20% of the Time (km/h)				Gust Speed Exceeded 0.1% of the Time (km/h)
		Winter	Spring	Summer	Autumn	
21	Existing	14.1	13.1	10.1	12.0	53.1
21	Proposed	14.2	13.0	10.1	12.0	52.5
22	Existing	17.4	14.8	11.8	14.2	68.3
22	Proposed	16.8	14.4	11.6	13.9	65.1
23	Existing	19.4	15.5	11.7	15.0	79.0
23	Proposed	19.5	15.1	11.4	14.8	81.4
24	Existing	16.5	13.8	10.8	13.6	83.6
24	Proposed	17.2	14.8	11.4	14.2	86.1
25	Existing	20.0	17.1	12.8	16.4	83.7
25	Proposed	20.8	17.3	13.1	16.9	84.9
26	Existing	19.2	16.9	11.8	15.6	79.2
26	Proposed	18.9	16.4	11.6	15.3	77.0
27	Existing	19.5	18.7	13.6	16.4	71.8
27	Proposed	20.1	19.5	13.9	17.0	76.1
28	Existing	21.3	22.4	15.2	18.5	91.4
28	Proposed	21.9	23.4	15.6	19.1	100.2
29	Existing	22.2	20.5	14.6	18.3	83.8
29	Proposed	21.9	20.3	14.5	18.1	82.6
30	Existing	19.1	17.1	12.1	15.5	74.0
30	Proposed	18.7	17.0	12.0	15.3	71.1

Table B1-4: Pedestrian Wind Conditions

Location	Configuration	Wind Comfort				Wind Safety
		GEM Speed Exceeded 20% of the Time (km/h)				Gust Speed Exceeded 0.1% of the Time (km/h)
		Winter	Spring	Summer	Autumn	
31	Existing	20.4	18.8	12.8	16.8	81.3
31	Proposed	19.8	18.8	12.7	16.5	78.3
32	Existing	19.2	16.6	12.3	15.3	72.8
32	Proposed	19.3	16.6	12.4	15.4	73.9
33	Existing	18.4	17.0	12.1	15.2	73.1
33	Proposed	18.4	16.9	12.0	15.1	71.8
34	Existing	15.4	14.1	9.8	12.6	61.8
34	Proposed	15.5	14.1	9.8	12.6	59.8
35	Existing	22.7	17.8	12.0	16.8	97.3
35	Proposed	22.9	17.8	12.0	16.9	99.3
36	Existing	16.1	12.9	9.3	12.3	65.4
36	Proposed	16.5	13.2	9.4	12.6	67.4
37	Existing	18.0	15.0	11.1	14.1	72.4
37	Proposed	18.5	15.5	11.4	14.5	73.9
38	Existing	18.2	16.2	11.2	14.6	76.1
38	Proposed	18.4	16.7	11.4	14.9	76.0
39	Existing	20.7	18.2	12.3	16.5	89.6
39	Proposed	21.3	18.8	12.6	17.0	89.3
40	Existing	23.0	20.6	14.1	18.6	90.9
40	Proposed	23.6	21.0	14.4	19.0	93.0

Table B1-5: Pedestrian Wind Conditions

Location	Configuration	Wind Comfort				Wind Safety
		GEM Speed Exceeded 20% of the Time (km/h)				Gust Speed Exceeded 0.1% of the Time (km/h)
		Winter	Spring	Summer	Autumn	
41	Existing	16.9	14.5	10.9	13.7	75.1
41	Proposed	17.3	14.9	11.0	13.9	73.1
42	Existing	19.9	18.6	12.7	16.4	92.1
42	Proposed	20.8	19.8	13.3	17.2	92.7
43	Existing	20.2	18.4	12.5	16.4	83.9
43	Proposed	20.8	18.7	12.6	16.8	84.2
44	Existing	15.0	14.7	10.0	12.6	69.2
44	Proposed	14.9	14.7	9.9	12.5	69.2
45	Existing	16.3	15.6	10.6	13.6	70.5
45	Proposed	16.6	15.9	10.7	13.8	71.1
46	Existing	15.8	13.6	9.9	12.5	62.8
46	Proposed	16.1	13.9	10.0	12.6	62.9
47	Existing	16.2	13.2	9.3	12.4	65.8
47	Proposed	16.3	13.2	9.3	12.4	65.7
48	Existing	16.3	12.9	9.3	12.3	68.9
48	Proposed	16.0	12.5	9.1	12.1	67.7
49	Existing	22.0	17.3	12.9	16.8	86.1
49	Proposed	22.1	17.2	12.8	16.9	86.9
50	Existing	24.5	20.5	14.9	19.1	97.1
50	Proposed	24.8	21.0	15.1	19.3	98.5

Table B1-6: Pedestrian Wind Conditions

Location	Configuration	Wind Comfort				Wind Safety
		GEM Speed Exceeded 20% of the Time (km/h)				Gust Speed Exceeded 0.1% of the Time (km/h)
		Winter	Spring	Summer	Autumn	
51	Existing	18.0	15.1	11.3	14.1	72.3
51	Proposed	18.1	15.3	11.5	14.2	73.5
52	Existing	17.6	16.1	11.6	14.5	67.1
52	Proposed	17.2	15.8	11.4	14.3	66.4
53	Existing	15.8	14.4	11.3	13.4	58.6
53	Proposed	16.3	14.6	11.4	13.6	60.5
54	Existing	18.0	17.2	12.3	15.1	69.8
54	Proposed	18.6	18.1	12.6	15.7	73.9
55	Existing	23.1	21.5	15.1	19.0	87.5
55	Proposed	23.2	21.6	15.1	19.0	87.9
56	Existing	16.2	14.8	10.7	13.4	64.4
56	Proposed	16.8	15.7	11.0	14.0	67.5
57	Existing	15.3	13.8	9.9	12.5	56.8
57	Proposed	15.6	13.7	9.7	12.6	59.3
58	Existing	18.0	16.6	11.5	14.8	71.2
58	Proposed	16.3	14.0	10.1	12.9	64.1