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Re: Pedestrian Wind Study
87-95 Seagram Drive
Waterloo, Ontario
SLR Project #241.031930.00001



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1.0 Introduction

SLR Consulting (Canada) Ltd. (SLR) was retained by Masri O Inc. Architects to conduct a quantitative pedestrian wind study for the proposed development at 87-95 Seagram Drive in Waterloo, Ontario. This report is in support of the combined Official Plan Amendment (OPA) and Zoning Bylaw Amendment (ZBA) application for the development.

1.1 Existing Development

The proposed development is located on the south side of Seagram Drive, where Lester Street terminates. The site is currently occupied by five low-rise residential buildings. Figure 1 provides an aerial view of the immediate study area.

Immediately surrounding the site are low to mid-rise residential and commercial buildings from the north through the southeast. Laurier University Stadium is located to the south, with a low-rise commercial building to the southwest. To the west and northwest, there are mid to high-rise buildings. Beyond the immediate surroundings are a mix of high-rise, mid-rise and low-rise residential, commercial, and institutional buildings in all directions, with Waterloo Park to the southeast through the southwest.

Typically, developments with Site Plan Application (SPA) approval within a 500 m radius are included as existing surroundings. For this analysis, there were no developments identified that met the above criteria.



Figure 1: Aerial view of existing site & surroundings

*Credit: Esri, Maxar, Earthstar Geographics, and the GIS User Community
(Image Date April 28, 2022)*

1.2 Proposed Development

The proposed development consists of two 34-storey tall towers that are 108 m high, excluding the mechanical penthouse. The towers share a six-storey podium that is approximately 21 m tall.

Figure 2 shows a massing 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 entrances are located on the north facade, along Seagram Drive, with secondary entrances and exits on the north and south facades. There are six commercial entrances along the north side of the building. These areas of interest are shown in Figure 3a.

There is an outdoor amenity terrace at Level 7, as shown in Figure 3b.

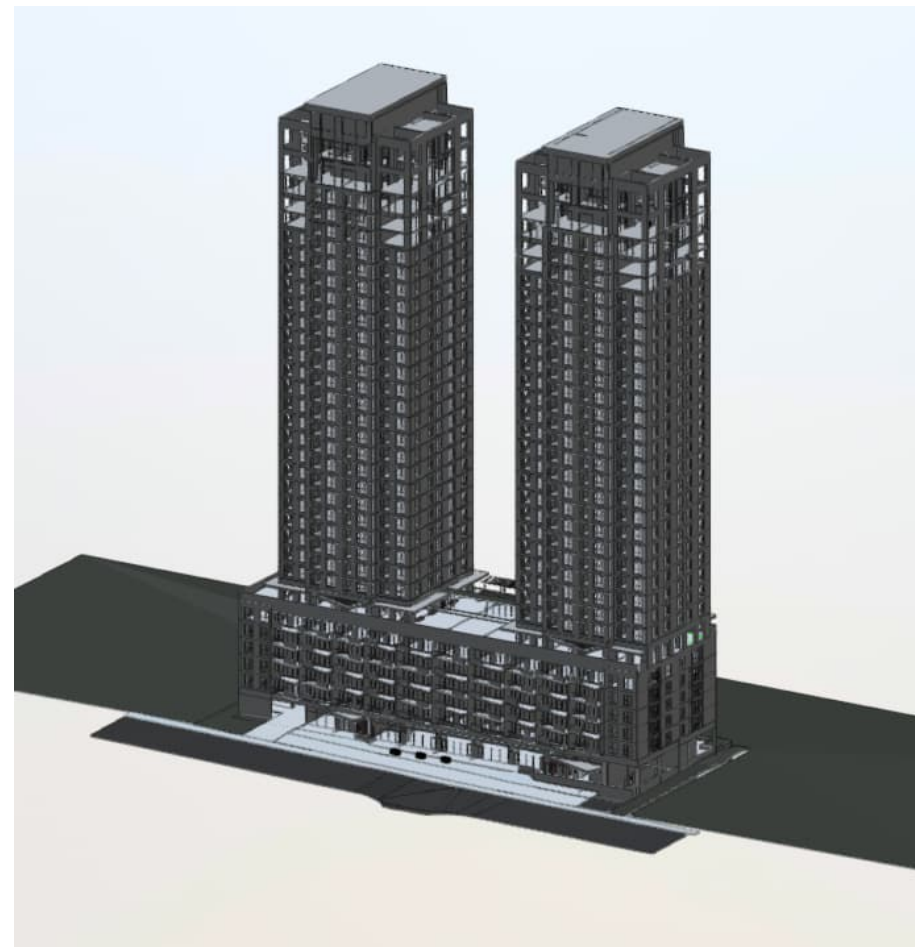


Figure 2: Massing of the proposed development

Credit: Masri O Inc. Architects

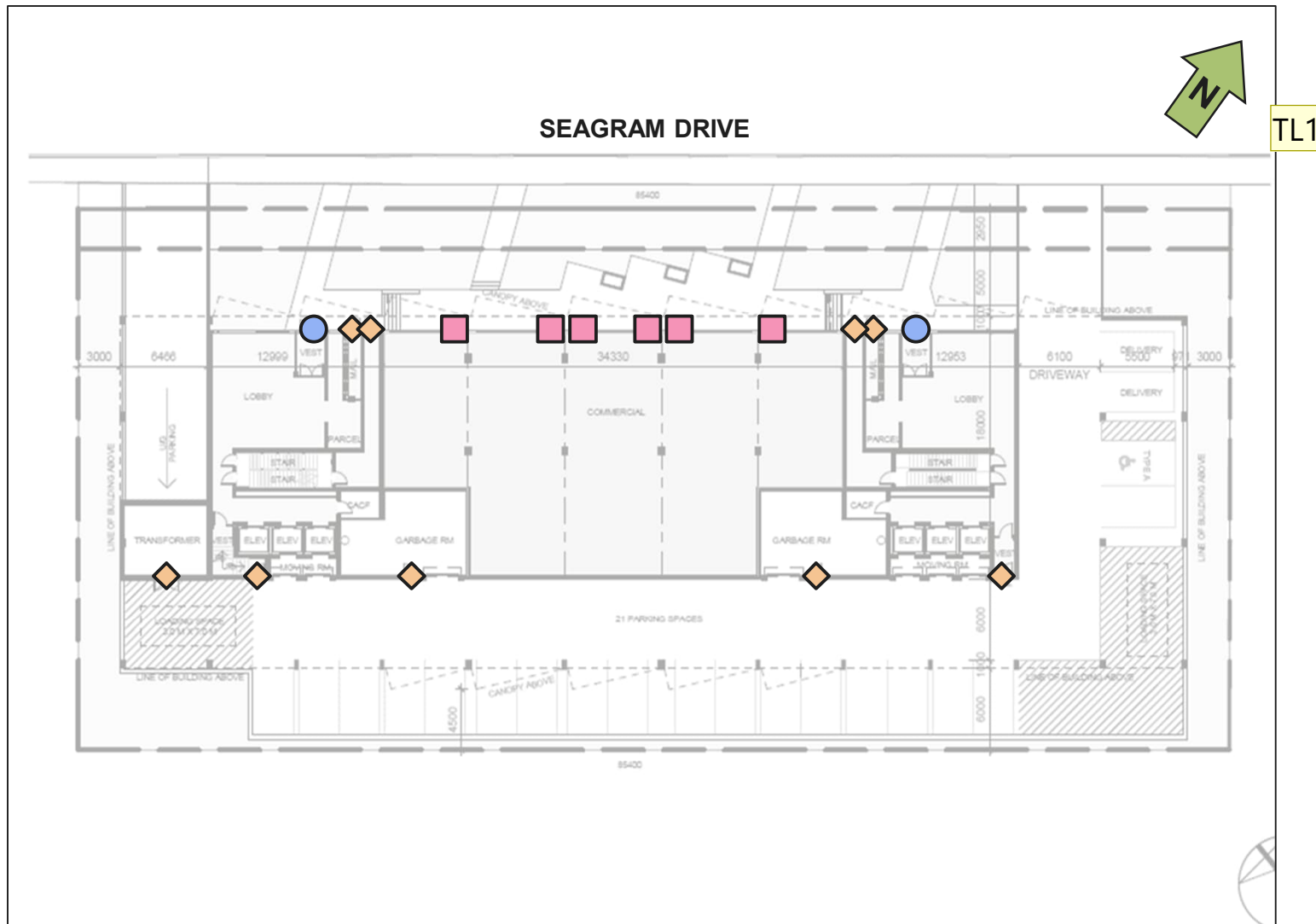


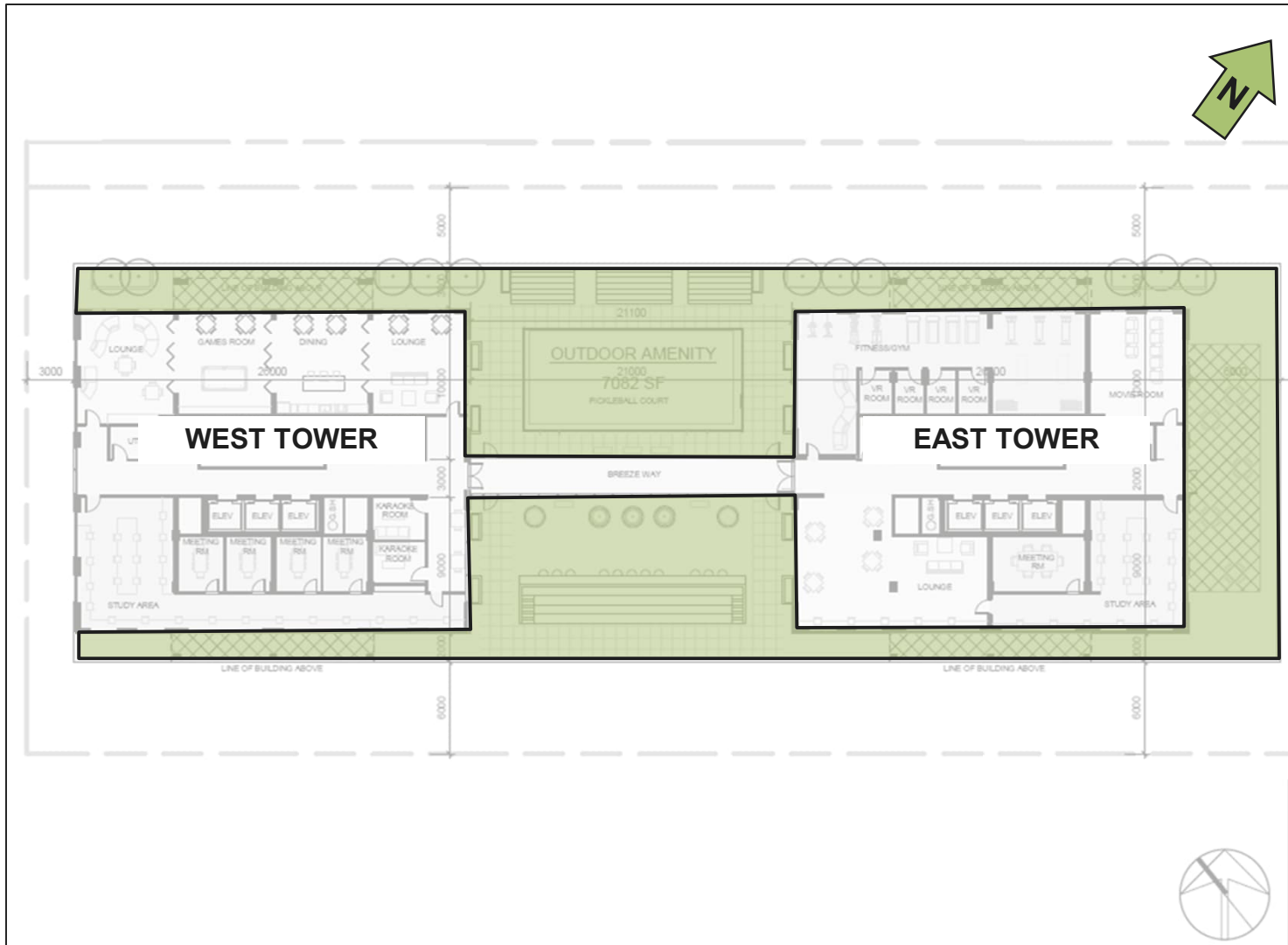
Figure 3a: Areas of interest – Grade
Credit: Masri O Inc. Architects

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Outdoor Amenity Terrace

Figure 3b: Areas of interest – Level 7
Credit: Masri O Inc. Architects

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 the latest 3D model and architectural set received by SLR on August 25 and August 26, 2025, from Masri O Inc. Architects.

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 were included in the model for both the Existing and Proposed Configurations.

SLR assessed two configurations, for comparison, as follows:

- **Existing Configuration:** Existing site with existing surroundings.
- **Proposed Configuration:** Proposed development with existing surroundings.

Photographs of the wind tunnel model showing both the Existing Configuration and the Proposed Configuration are included in Figures 4a and 4b. The wind tunnel testing was completed on September 22, 2025.

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 81 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.

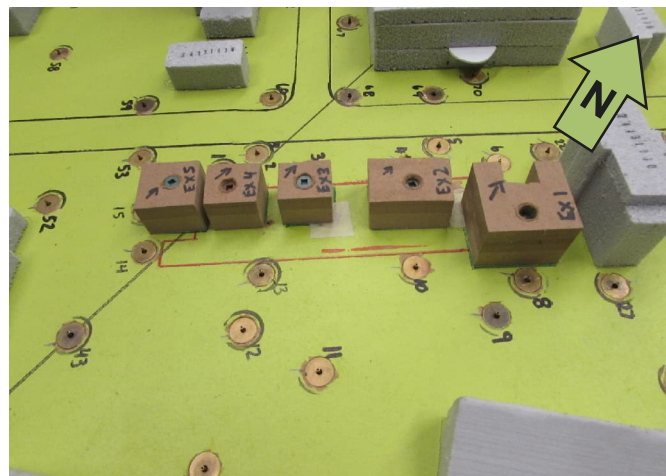
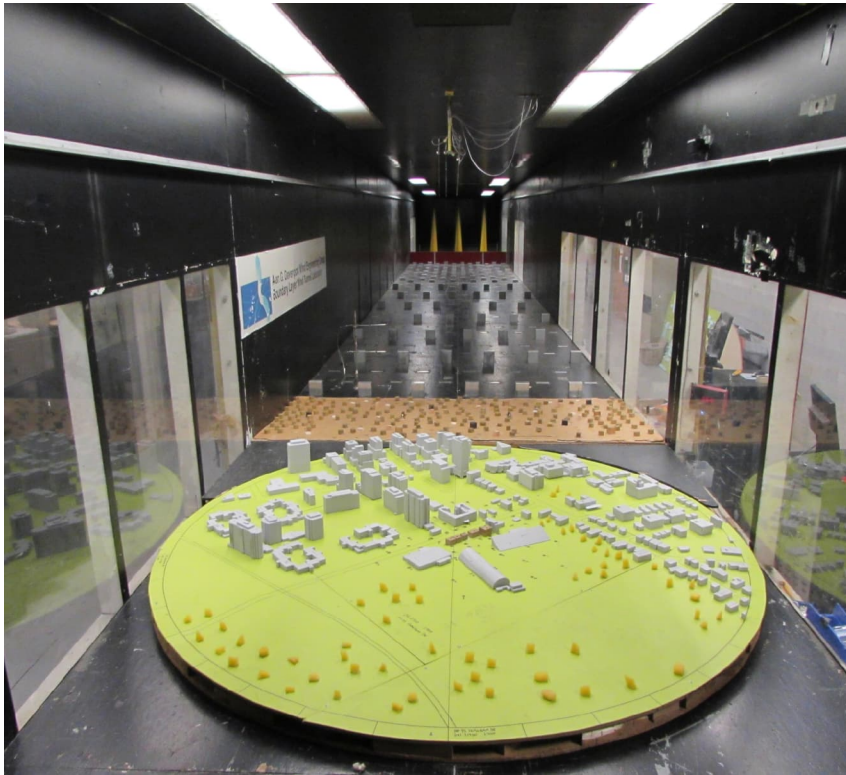


Figure 4a: Existing Configuration

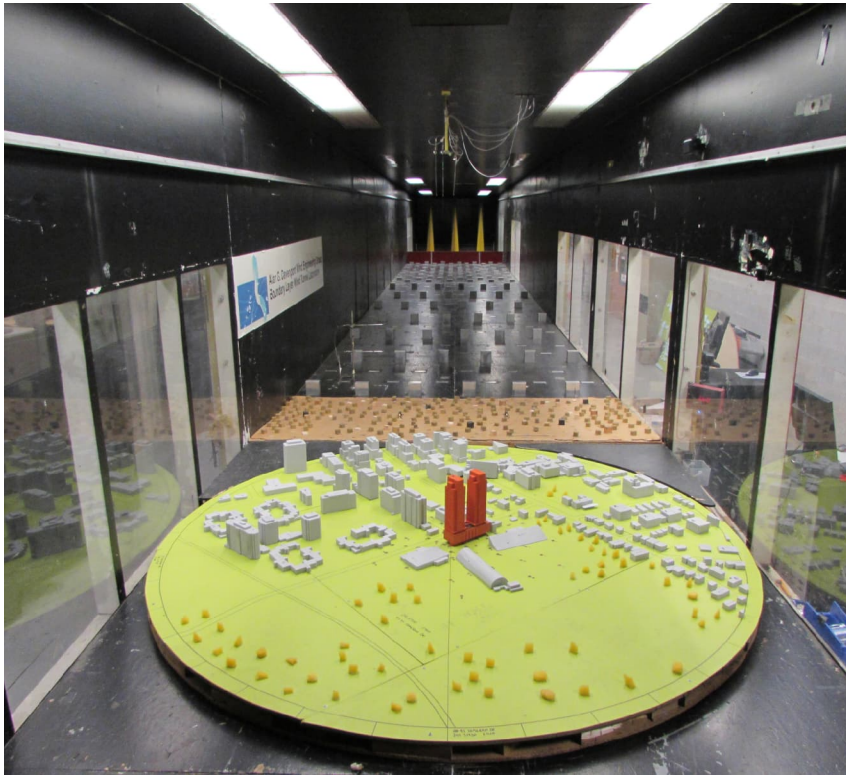


Figure 4b: Proposed Configuration

2.3 Wind Climate

Wind data recorded at the Region of Waterloo International Airport in Breslau for the period of 1993 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 5. 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 southwest through northwest and east 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 5 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 northwesterly and westerly sectors, as well as from the east. All wind speeds and directions were included in the wind climate model.

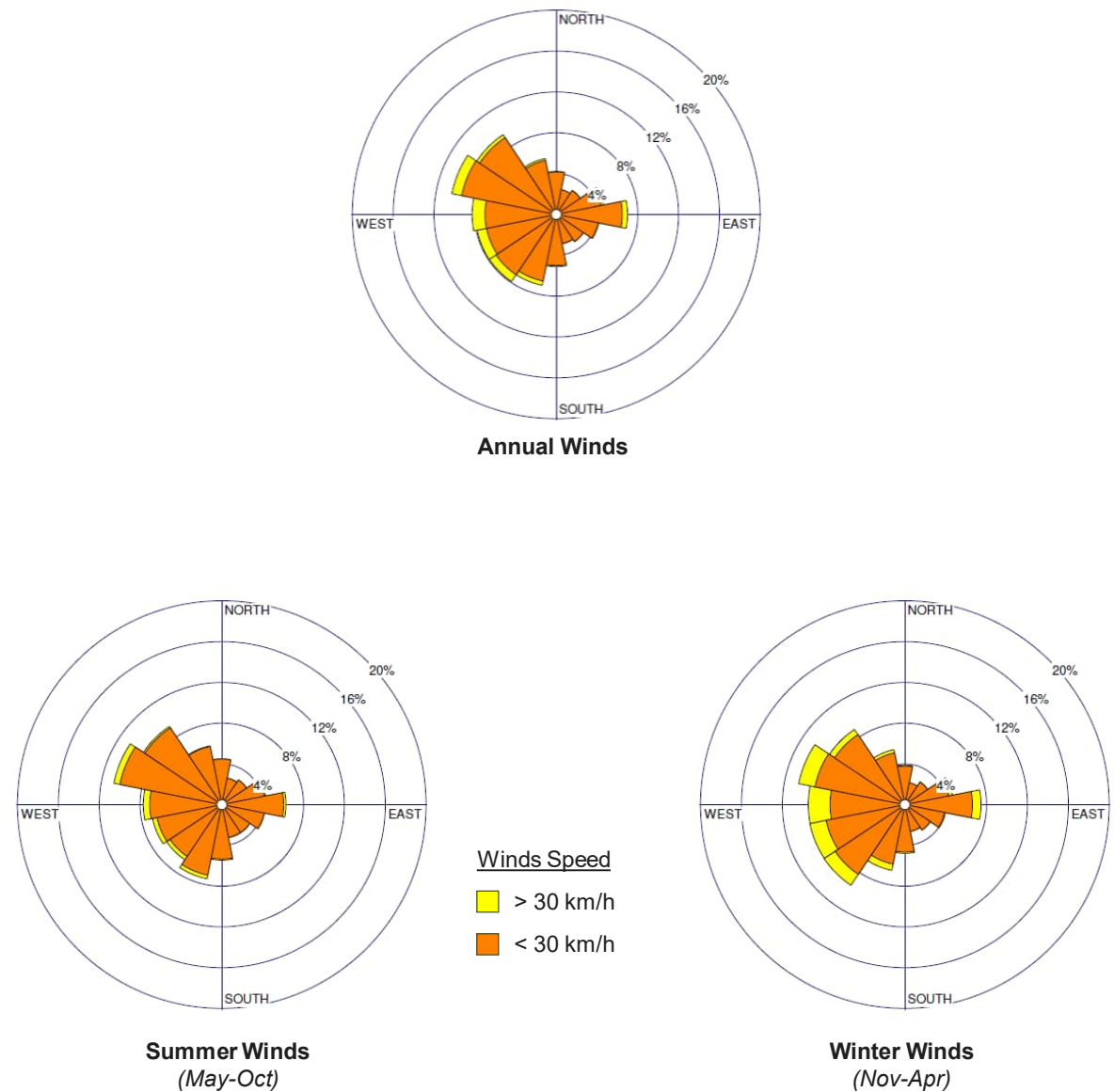


Figure 5: Wind roses for Region of Waterloo International Airport (1993-2020)

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 criteria utilized for this analysis is provided by the City of Waterloo, in the Terms of Reference for pedestrian wind studies. The comfort criteria, which is based on certain predicted hourly gust-equivalent mean (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 of either mean wind speed or 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 more than one event is predicted annually, wind mitigation measures are then advised. The wind safety criterion is shown in Table 2.

Table 1: Wind Comfort Criteria

Comfort Category	GEM Wind Speed Exceeded 20% of the time	Description of Wind Comfort
Sitting	≤ 10 km/h	Calm or light breezes desired for outdoor restaurants and seating areas where one can read a paper without having it blown away.
Standing	≤ 15 km/h	Gentle breezes suitable for main building entrances and bus stops.
Walking	≤ 20 km/h	Moderate breezes that can be tolerated if one's objective is to walk, run or cycle without lingering.
Uncomfortable	> 20 km/h	Strong winds of this magnitude are considered a nuisance for most activities, and wind mitigation is typically recommended.

Table 2: Wind Safety Criterion

Safety Criterion	Gust Wind Speed Exceeded Once Per Year (0.1%)	Description of Wind Effects
Exceeded	> 90 km/h	Excessive gust speeds that can adversely affect a pedestrian's balance and footing. Wind mitigation is typically required.

4.0 Results

Figures 6a through 7b present graphical images of the wind comfort conditions for the summer and winter months around the proposed development. 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. Appendix A presents wind comfort and safety conditions in tabular form.

There are generally accepted wind comfort levels that are desired for various pedestrian uses. However, in some climates, these may be difficult to achieve in the winter due to the overall climate. For sidewalks, walkways and pathways, wind conditions suitable for walking are desirable year-round but may not be feasible in the winter. For main entrances, transit stops, and public amenity spaces such as parks and playgrounds, wind conditions conducive to standing are preferred throughout the year. For on-site amenity areas, wind conditions suitable for sitting or standing are desirable during the summer, with stronger wind flows, conducive to walking, tolerated in the winter. The most stringent category of sitting is desirable during the summer for dedicated seating areas, such as patios, where calmer wind is expected for the comfort of patrons.

4.1 Building Entrances & Walkways (Locations 1-15)

In the Existing Configuration, wind conditions on-site are comfortable for walking or better throughout the year (Figures 6a and 6b).

In the Proposed Configuration, wind conditions on-site remain comfortable for walking or better throughout the year (Figures 7a and 7b). Wind conditions at the main residential entrance to the West Tower (Location 1) are suitable for standing in the summer (Figure 7a), and for walking in the winter (Figure 7b). At the main residential entrance to the East Tower (Location 4), wind conditions are suitable for standing throughout the year (Figures 7a and 7b). Wind conditions at the commercial entrances (Locations 3 and 4) are suitable for standing throughout the year (Figures 7a and 7b).

To improve wind conditions at the residential entrance to the West Tower, we recommend either recessing the entrance from the main facade or installing a vertical wind screen to the west of the door to provide local wind shelter.

At the secondary entrances and exits (Locations 3, 8, 10, 13, and 14), wind conditions are generally suitable for standing year-round, with the exception of the southwest corner of the building (Location 14), where wind conditions are conducive to walking in the winter (Figures 7a and 7b). These wind conditions are considered appropriate.

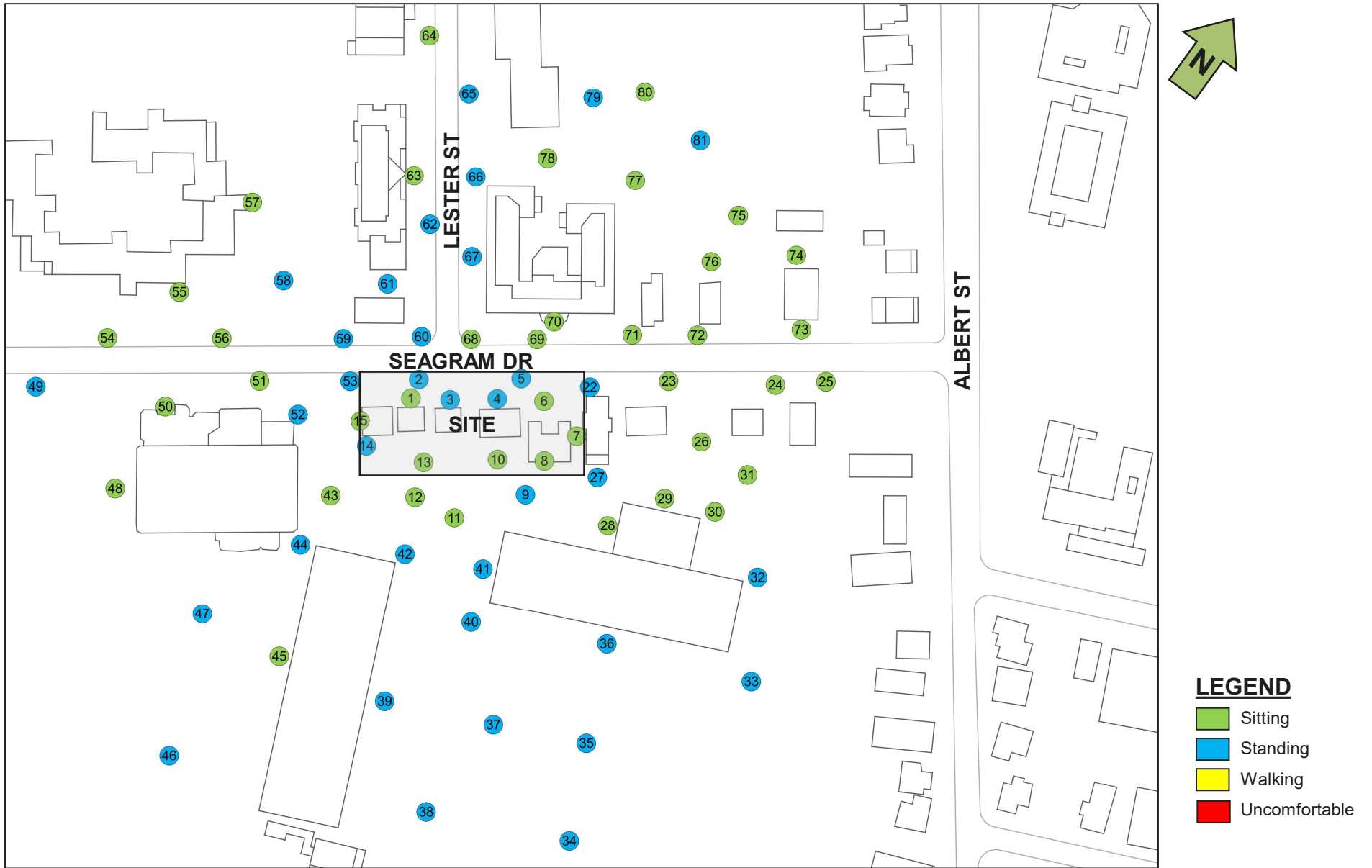


Figure 6a: Existing Configuration – Pedestrian Wind Comfort Conditions – Summer

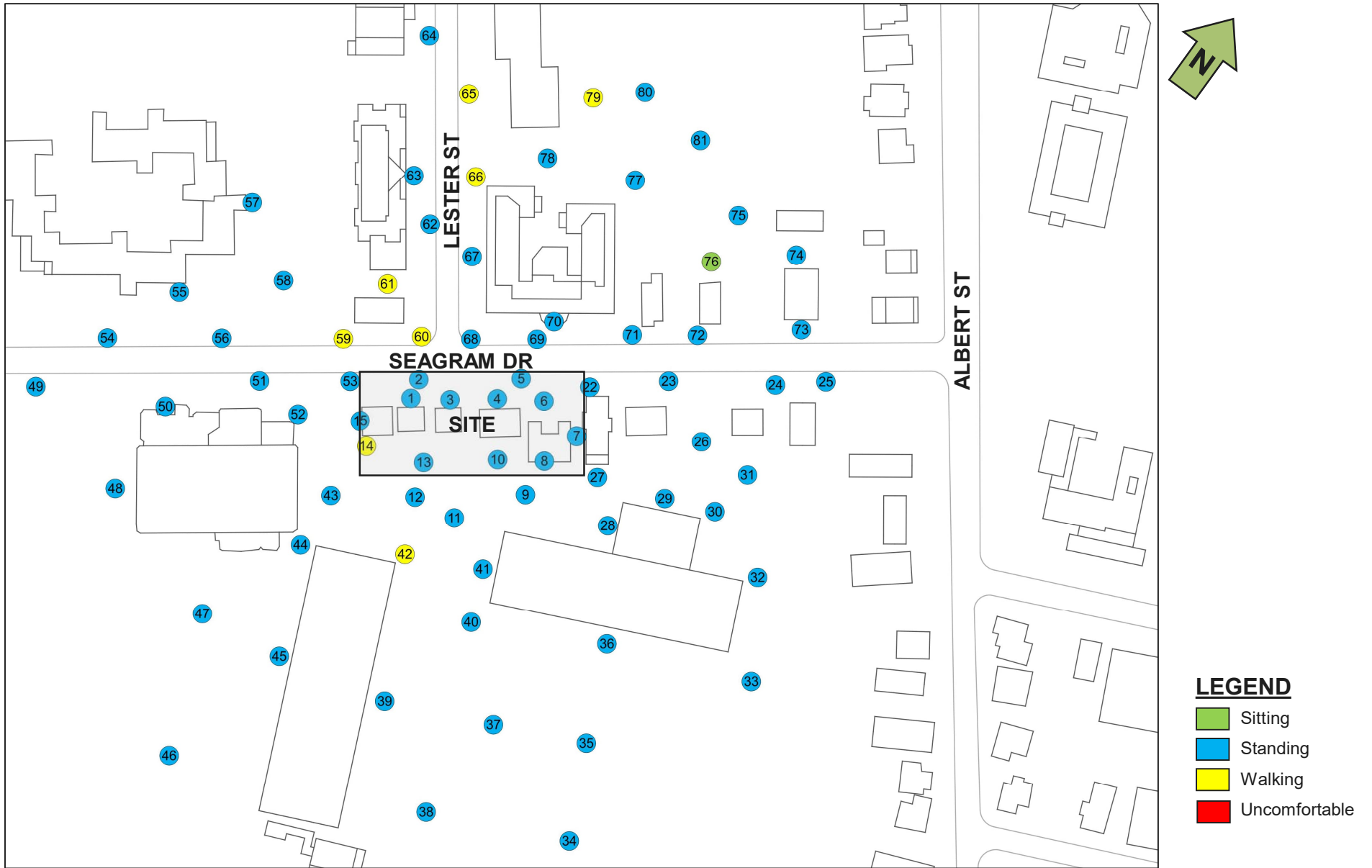


Figure 6b: Existing Configuration – Pedestrian Wind Comfort Conditions – Winter

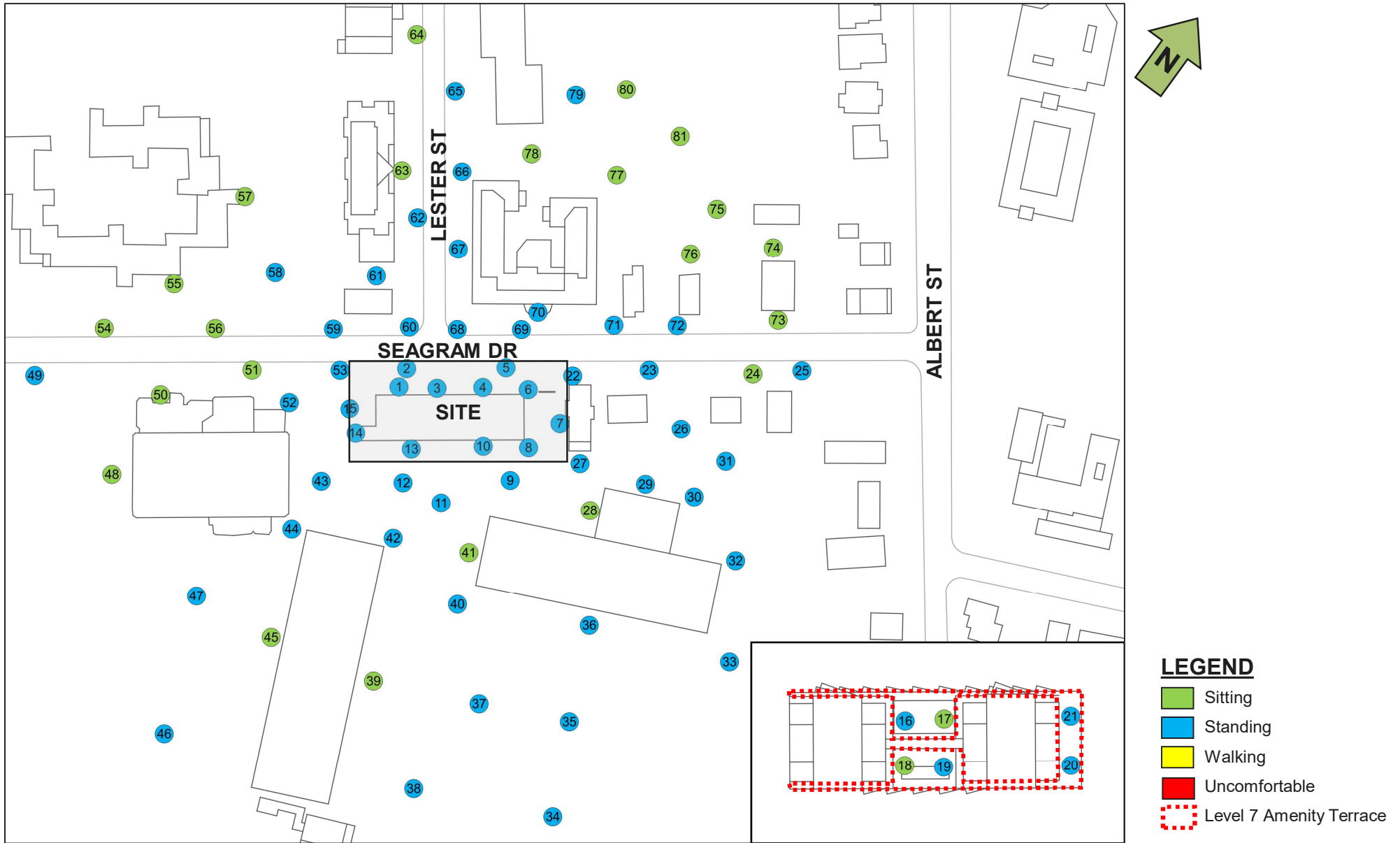


Figure 7a: Proposed Configuration – Pedestrian Wind Comfort Conditions – Summer

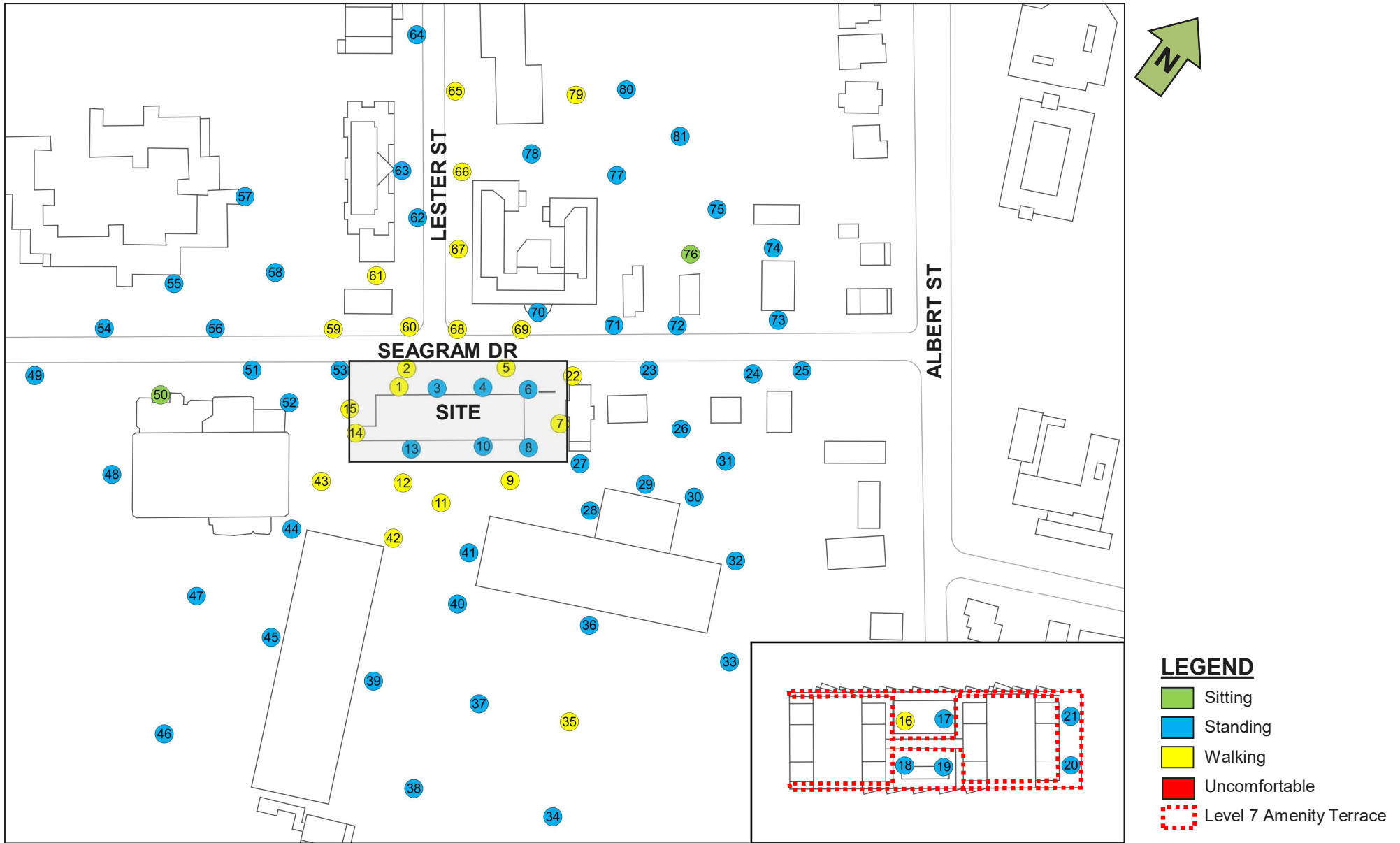


Figure 7b: Proposed Configuration – Pedestrian Wind Comfort Conditions – Winter

4.2 Level 7 Amenity Terrace (Locations 16-21)

In the Level 7 amenity terrace (Locations 16 through 21), wind conditions are suitable for sitting or standing in the summer (Figure 7a). During the winter, wind conditions are conducive to standing or walking (Figure 7b). These wind conditions are considered appropriate for the intended use, as winter use is anticipated to be infrequent.

4.3 Surrounding Sidewalks (Locations 22-81)

Existing wind conditions along the nearby sidewalks of Seagram Drive, Lester Street, and Albert Street are comfortable for walking or better year-round (Figures 6a and 6b).

With the proposed development in place, wind conditions on the surrounding sidewalks remain suitable for walking or better throughout the year (Figures 7a and 7b). These wind conditions are considered appropriate for the intended use.

4.4 Wind Safety

In the Existing Configuration, the wind safety criterion is met in all areas on-site and surrounding the site on an annual basis (Figure 8a).

In the Proposed Configuration, the wind safety criterion is generally met in all grade-level areas assessed on an annual basis (Figure 8b). However, the wind safety criterion is exceeded around the southwest corner of the development (Location 14). Additionally, the safety criterion is exceeded on the Level 7 terrace (Location 16).

To improve the safety conditions near the southwest building corner, we recommend installing a 2.2 m tall wind screen that is no more than 30% open between the bays along the west side of the loading space, to provide local wind shelter.

On the north part of the Level 7 amenity terrace, the design team is planning to include a pickleball court that is surrounded by chain link fencing. We recommend the fences that run east-west (per project north) to be at least 2.2 m tall, and no more than 30% open. This can be achieved through the addition of a mesh screen interwoven or attached the fence.

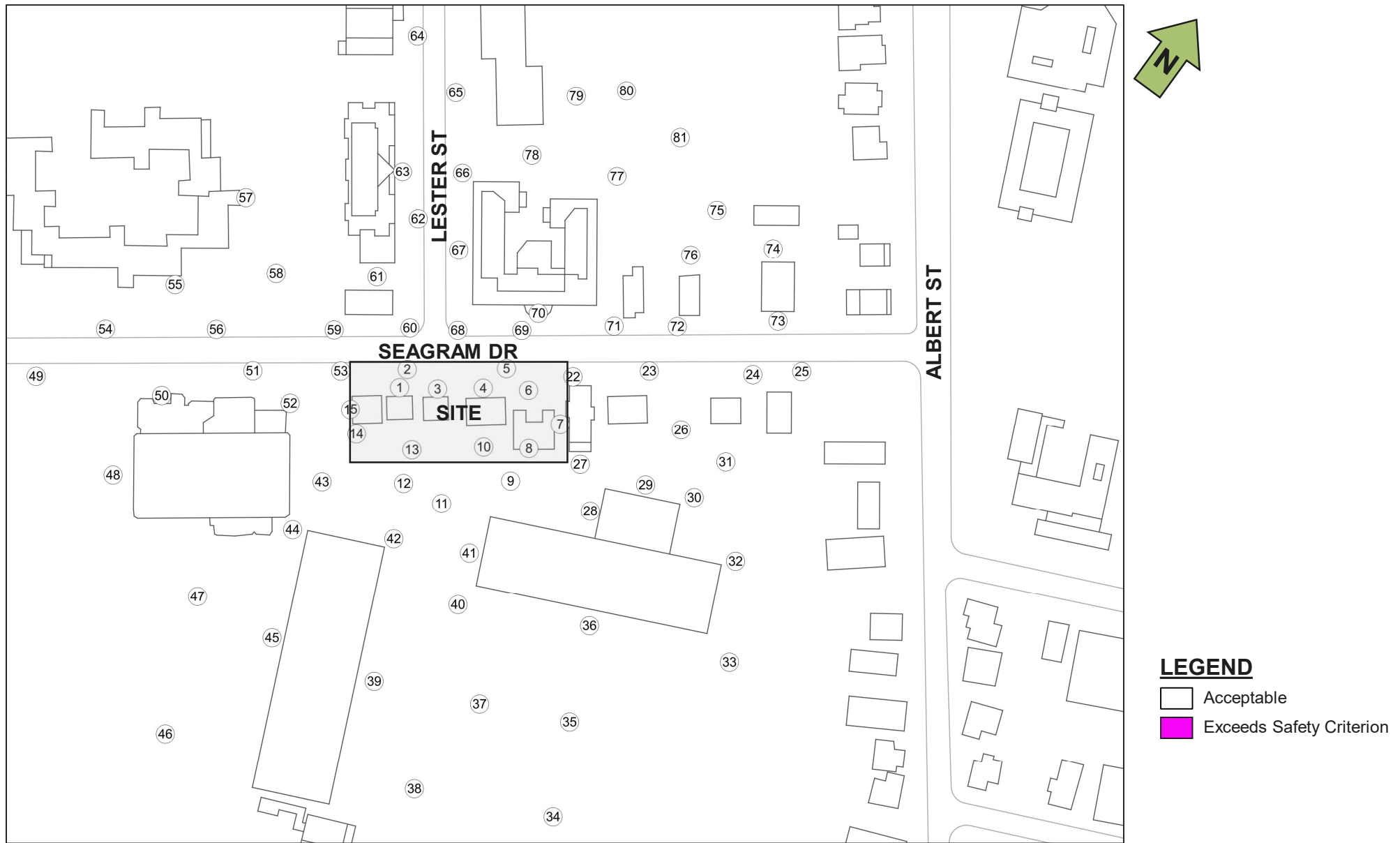


Figure 8a: Existing Configuration – Pedestrian Wind Safety Conditions – Annual

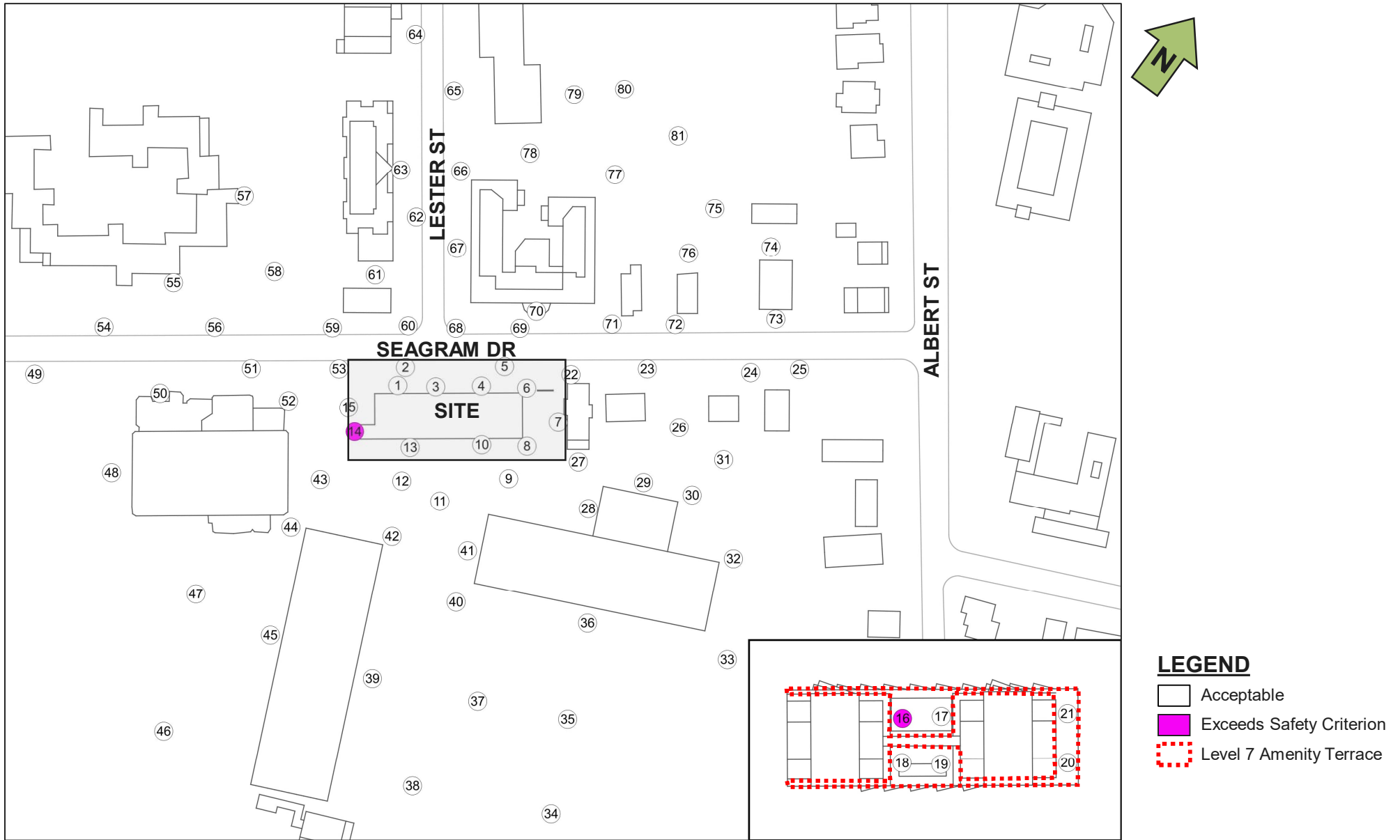


Figure 8b: Proposed Configuration – Pedestrian Wind Safety Conditions – Annual

5.0 Conclusion & Recommendations

The pedestrian wind conditions predicted for the proposed development at 87-95 Seagram Drive in Waterloo have been assessed through quantitative wind tunnel modelling. Based on the results of our study, the following conclusions have been reached:

- The wind safety criterion is generally met in all areas assessed in both the Existing Configuration and the Proposed Configuration on an annual basis. The two exceptions are at the southwest corner of the building at grade, and on the Level 7 amenity terrace. Recommendations are provided.
- Existing wind comfort conditions on-site and surroundings are comfortable for the intended use.
- With the proposed development in place, wind conditions on-site are generally suitable for the intended use, including the building entrances and exits. Recommendations are provided for the entrance to the West Tower.
- Wind comfort conditions on the Level 7 amenity terrace are suitable for the intended use.
- In both the Existing Configuration and Proposed Configuration wind comfort conditions on the surrounding sidewalks are comfortable for the intended use.
- SLR will work with the design team to develop practical and effective wind control measures as the design progresses for a few key areas.

6.0 Statement of Limitations

This report has been prepared by SLR Consulting (Canada) Ltd. (SLR) for Masri O Inc. Architects (Client) in accordance with the scope of work and all other terms and conditions of the agreement between such parties. SLR acknowledges and agrees that the Client may provide this report to government agencies, interest holders, and/or Indigenous communities as part of project planning or regulatory approval processes. Copying or distribution of this report, in whole or in part, for any other purpose other than as aforementioned is not permitted without the prior written consent of SLR.

Any findings, conclusions, recommendations, or designs provided in this report are based on conditions and criteria that existed at the time work was completed and the assumptions and qualifications set forth herein.

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Appendix A

Pedestrian Wind Comfort & Safety Tables

Interpretation Of Results

Example 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 two 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 season, while in the summer wind conditions are suitable for standing.

At Location 3, wind conditions are suitable for standing in the summer seasons for both Existing and Proposed Configurations. During the winter, the wind conditions are uncomfortable in both Configurations. In addition, the safety criteria is exceeded on an annual basis at Location 3 for both Configurations.

The categories are summarized in **Example Table 2**.

Example 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)
		Summer	Winter	
1	Existing			
1	Proposed	14.7	18.4	80.8
2	Existing	11.5	13.9	51.7
2	Proposed	8.3	9.8	40.2
3	Existing	13.0	22.3	90.5
3	Proposed	10.9	24.5	92.6

Example 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 A1-1: 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)
		Summer	Winter	
1	Existing	9.7	12.5	54.2
	Proposed	12.7	16.2	69.3
2	Existing	10.9	14.6	74.8
	Proposed	11.8	15.1	63.7
3	Existing	10.2	13.4	68.5
	Proposed	10.6	13.6	63.0
4	Existing	10.7	14.2	79.8
	Proposed	11.4	15.0	77.6
5	Existing	10.1	13.3	71.6
	Proposed	12.5	16.3	75.1
6	Existing	9.9	13.0	68.5
	Proposed	11.0	14.5	70.5
7	Existing	9.7	12.8	63.8
	Proposed	13.6	16.4	65.4
8	Existing	9.1	11.3	46.0
	Proposed	11.7	14.2	54.9
9	Existing	10.1	12.6	52.3
	Proposed	13.9	17.7	76.6
10	Existing	9.1	11.7	52.8
	Proposed	10.0	12.2	49.3

Table A1-2: 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)
		Summer	Winter	
11 Existing	11 Proposed	10.0	12.3	49.4
		13.9	17.9	77.4
12 Existing	12 Proposed	9.1	11.7	50.6
		13.4	17.9	87.0
13 Existing	13 Proposed	8.8	11.2	47.4
		10.3	12.7	50.4
14 Existing	14 Proposed	12.6	16.8	72.5
		14.0	18.0	91.7
15 Existing	15 Proposed	8.9	11.6	61.0
		12.5	15.6	64.6
16 Existing	16 Proposed			
		11.1	15.1	91.0
17 Existing	17 Proposed			
		9.7	12.6	54.2
18 Existing	18 Proposed			
		9.9	11.6	60.9
19 Existing	19 Proposed			
		10.7	13.2	69.6
20 Existing	20 Proposed			
		10.3	12.4	64.7

Table A1-3: 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)
		Summer	Winter	
21 Existing				
21 Proposed		12.2	14.8	69.2
22 Existing		11.5	14.8	71.4
22 Proposed		14.0	17.4	75.3
23 Existing		8.3	10.4	42.1
23 Proposed		10.1	12.9	62.0
24 Existing		8.9	11.3	47.2
24 Proposed		9.6	12.2	57.4
25 Existing		9.5	12.1	49.3
25 Proposed		10.1	12.9	61.5
26 Existing		8.9	10.7	45.2
26 Proposed		10.9	13.2	58.4
27 Existing		11.0	14.0	64.3
27 Proposed		12.3	15.0	61.2
28 Existing		8.5	10.8	50.5
28 Proposed		8.8	10.8	42.7
29 Existing		8.8	10.5	50.9
29 Proposed		10.9	13.2	59.4
30 Existing		9.3	11.6	45.9
30 Proposed		11.1	13.9	75.0

Table A1-4: 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)
		Summer	Winter	
31 Existing	31 Proposed	8.9	10.9	43.7
		10.7	13.3	66.1
32 Existing	32 Proposed	10.4	12.5	51.0
		11.4	14.0	73.0
33 Existing	33 Proposed	10.5	13.4	60.3
		10.4	13.1	55.4
34 Existing	34 Proposed	10.8	13.5	57.0
		10.3	12.8	53.3
35 Existing	35 Proposed	11.1	14.2	62.0
		11.7	15.1	70.0
36 Existing	36 Proposed	10.3	13.3	60.1
		10.7	13.9	70.3
37 Existing	37 Proposed	11.0	13.8	60.1
		11.4	14.7	68.7
38 Existing	38 Proposed	10.4	12.7	59.9
		10.5	13.0	65.4
39 Existing	39 Proposed	10.3	12.9	66.0
		9.5	12.1	67.6
40 Existing	40 Proposed	10.6	13.5	59.6
		10.7	13.9	72.4

Table A1-5: 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)
		Summer	Winter	
41 Existing		10.5	13.0	62.6
41 Proposed		9.8	12.5	53.9
42 Existing		11.8	15.1	68.6
42 Proposed		13.8	18.1	85.4
43 Existing		9.6	12.6	59.8
43 Proposed		14.0	17.7	72.5
44 Existing		10.6	13.4	55.7
44 Proposed		11.0	14.0	61.0
45 Existing		9.4	11.8	56.2
45 Proposed		9.3	11.9	62.9
46 Existing		10.5	12.9	50.6
46 Proposed		10.4	12.9	51.8
47 Existing		10.1	12.6	53.1
47 Proposed		10.1	12.8	54.4
48 Existing		9.2	11.6	55.9
48 Proposed		9.3	11.6	55.5
49 Existing		10.7	13.6	59.9
49 Proposed		10.3	13.1	56.7
50 Existing		8.0	10.6	47.1
50 Proposed		7.9	10.0	41.6

Table A1-6: 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)
		Summer	Winter	
51 Existing	51 Proposed	9.8	12.8	57.1
		9.4	12.0	49.7
52 Existing	52 Proposed	10.3	13.5	63.3
		11.3	14.2	64.2
53 Existing	53 Proposed	10.2	13.4	63.4
		11.5	14.3	57.3
54 Existing	54 Proposed	9.9	12.7	53.7
		9.6	12.2	49.8
55 Existing	55 Proposed	8.3	10.1	42.6
		8.6	10.5	51.2
56 Existing	56 Proposed	9.6	12.2	51.2
		9.6	12.0	49.7
57 Existing	57 Proposed	9.7	12.2	53.1
		9.5	12.0	58.5
58 Existing	58 Proposed	10.5	13.6	64.5
		10.7	13.7	62.0
59 Existing	59 Proposed	12.2	16.8	84.5
		11.6	15.2	74.1
60 Existing	60 Proposed	12.1	15.9	84.9
		14.9	18.9	88.8

Table A1-7: 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)
		Summer	Winter	
61 Existing	61 Proposed	13.8	18.6	84.8
		14.5	19.2	85.1
62 Existing	62 Proposed	11.3	13.7	57.8
		11.1	13.7	59.0
63 Existing	63 Proposed	9.6	11.9	52.5
		8.8	11.1	45.8
64 Existing	64 Proposed	9.1	11.1	53.0
		8.9	11.1	56.8
65 Existing	65 Proposed	13.9	18.5	82.3
		14.1	18.8	82.2
66 Existing	66 Proposed	12.7	16.0	68.1
		12.9	16.3	70.5
67 Existing	67 Proposed	10.4	13.6	61.3
		12.0	15.7	68.7
68 Existing	68 Proposed	9.9	12.8	61.7
		14.0	17.6	74.8
69 Existing	69 Proposed	9.6	12.3	55.9
		13.4	16.9	71.0
70 Existing	70 Proposed	9.0	10.9	46.8
		11.6	14.2	58.4

Table A1-8: 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)
		Summer	Winter	
71 Existing		9.5	11.8	47.5
71 Proposed		11.1	13.9	63.4
72 Existing		9.5	12.0	47.9
72 Proposed		10.1	12.7	57.4
73 Existing		8.6	10.8	43.2
73 Proposed		8.5	10.6	43.2
74 Existing		9.7	12.2	49.1
74 Proposed		8.6	10.8	45.6
75 Existing		9.8	12.2	53.7
75 Proposed		9.6	12.0	52.3
76 Existing		7.9	9.7	40.0
76 Proposed		7.9	9.7	38.7
77 Existing		8.9	11.1	47.5
77 Proposed		9.3	11.6	52.8
78 Existing		8.1	10.2	42.7
78 Proposed		8.2	10.3	42.8
79 Existing		13.0	16.5	68.6
79 Proposed		12.9	16.3	68.7
80 Existing		9.5	12.1	56.6
80 Proposed		9.3	11.8	51.1

Table A1-9: 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)
		Summer	Winter	
	81 Existing	10.0	12.6	58.4
	81 Proposed	9.7	12.2	54.0