REPORT

1000 AND 1024 DUNDAS STREET EAST

MISSISSAUGA, ON

PEDESTRIAN WIND STUDY
RWDI # 2200461
April 29, 2022

SUBMITTED TO

Mr. John Lohmus
Plan Logic Consulting Inc.
316 Willa Road
Mississauga, Ontario, L5G 2G8
Johnlohmus@outlook.com

Mr. Moe Ahmed
President and CEO
Ahmed Group of Companies
1024 Dundas Street East
Mississauga, Ontario, L4Y 2B8
m@ahmed.com
T: 905.949.9489 x 111

SUBMITTED BY

Shivani Jariwala, M.E.Sc.
Technical Coordinator
Shivani.Jariwala@rwdi.com

Neetha Vasan, M.A.Sc., LEED A.P.
Senior Technical Coordinator
Neetha.Vasan@rwdi.com

Ahmed El Gammal, LEED AP® BD+C
Project Manager
Ahmed.ElGammal@rwdi.com
T: 647.475.1048 x 2423
M: 289.952.2427

RWDI – Toronto Office
625 Queen Street West
Toronto, Ontario, Canada, M5V 2B7

EXECUTIVE SUMMARY

RWDI was retained to conduct a pedestrian wind assessment for the proposed 1000 & 1024 Dundas Street East development in Mississauga, ON (Image 1). Based on our wind-tunnel testing for the proposed development under the Existing and Proposed configurations (Images 2A and 2B, respectively) and the local wind records (Image 3), the potential wind conditions are predicted as shown on site plans in Figures 1A through 3B, while the associated wind speeds are listed in Table 1. These results are evaluated against the pedestrian comfort and safety criteria adopted by the City of Mississauga, and can be summarized as follows:

- Wind speeds on and around the existing site are comfortable for the intended pedestrian use throughout the year. The pedestrian wind safety criterion is met at all the assessed areas on and around the existing site.
- Wind conditions are predicted to be appropriate for pedestrian use at most areas assessed. Higher wind speeds than desired for the intended use are expected in the patios and amenity areas at grade level in the summer, at Level 5 amenity areas, at the entrance to Building B, and at an isolated sidewalk location on Dundas Street East near the north building corner.
- The pedestrian wind safety criterion is expected to be met at most of the grade level and above-grade level locations. The exceptions are localized areas at grade near the south corner of the proposed building and on the northern podium near the western corner of Building A where the gust speeds are predicted to exceed the safety criterion.
- Recommendations for wind control have been described for all areas where wind speeds are expected to be higher than desired for the intended use seasonally.

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1 INTRODUCTION

RWDI was retained to conduct a pedestrian wind assessment for the proposed 1000 & 1024 Dundas Street East development in Mississauga, ON (Image 1). This report presents the project objective, approach and the main results from RWDI's assessment and provides conceptual wind control measures, where necessary.

1.1 Project Description

The project (site shown in Image 1) is located on the east side of the intersection of Dundas Street East and Tomken Road. The mixed-use development consists of two towers, Building A and Building B, atop a shared large four-storey podium. Buildings A and B consist of 16 and 20 storeys, with approximate building heights of 59 m and 69 m, respectively.

1.2 Objectives

The objective of the study was to assess the effect of the proposed development on local conditions in pedestrian areas on and around the study site and provide recommendations for minimizing adverse effects, if needed. This quantitative assessment was based on wind speed measurements on a scale model of the project and its surroundings in one of RWDI's boundary-layer wind tunnels. These measurements were combined with the local wind records and compared to appropriate criteria for gauging wind comfort and safety in pedestrian areas. The assessment focused on critical pedestrian areas, including the building entrances, public sidewalks, grade level outdoor amenity and patio areas, Level-5 outdoor amenity and green roof spaces.

Image 1: Aerial View of Site and Surroundings (Photo Courtesy of Google™ Earth)

2 BACKGROUND AND APPROACH

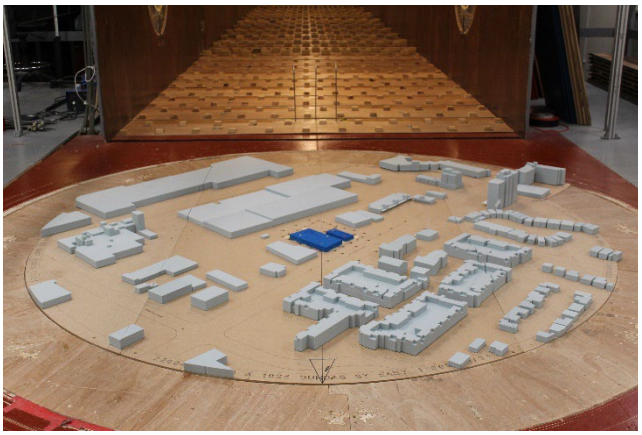
2.1 Wind Tunnel Study Model

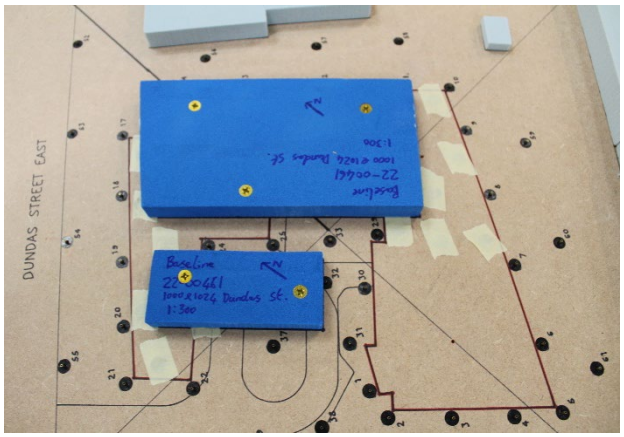
To assess the wind environment around the proposed project, a 1:300 scale model of the project site and surroundings was constructed for the wind tunnel tests of the following configurations:

A - Existing: Existing site with existing surroundings (Image 2A), and

B - Proposed: Proposed project with existing surroundings (Image 2B).

The wind tunnel model included all relevant surrounding buildings and topography within an approximately 360 m radius of the study site. The wind and turbulence profiles in the atmospheric boundary layer beyond the modelled area were also simulated in RWDI's wind tunnel. The wind tunnel model was instrumented with 80 specially designed wind speed sensors to measure mean and gust speeds at a full-scale height of approximately 1.5 m above local grade in pedestrian areas throughout the study site. Wind speeds were measured for 36 directions in a 10-degree increments. The measurements at each sensor location were recorded in the form of ratios of local mean and gust speeds to the mean wind speed at a reference height above the model. The placement of wind measurement locations was based on our experience and understanding of the pedestrian usage for this site and reviewed by the design team.





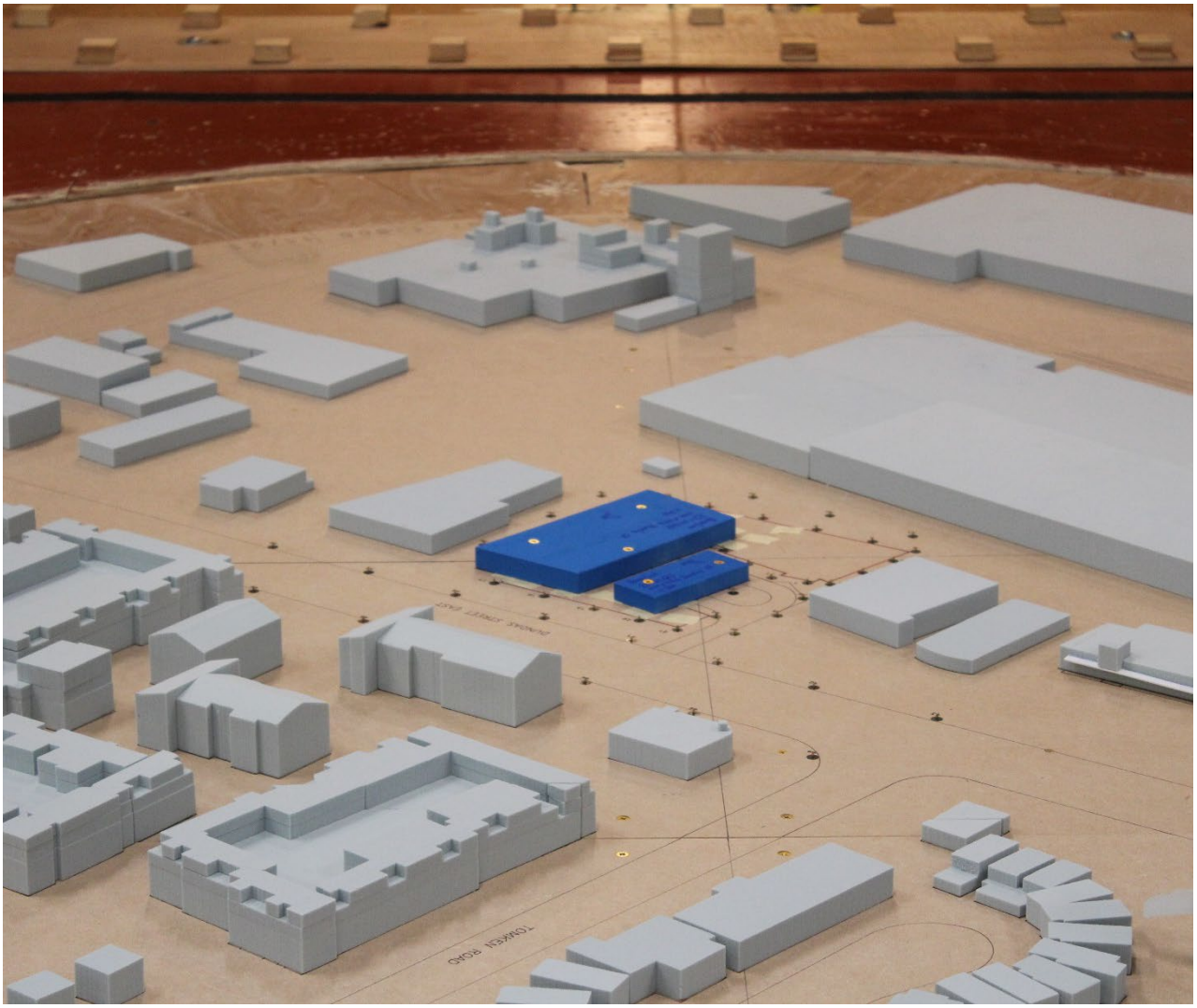


Image 2A: Wind Tunnel Study Model – Existing Configuration

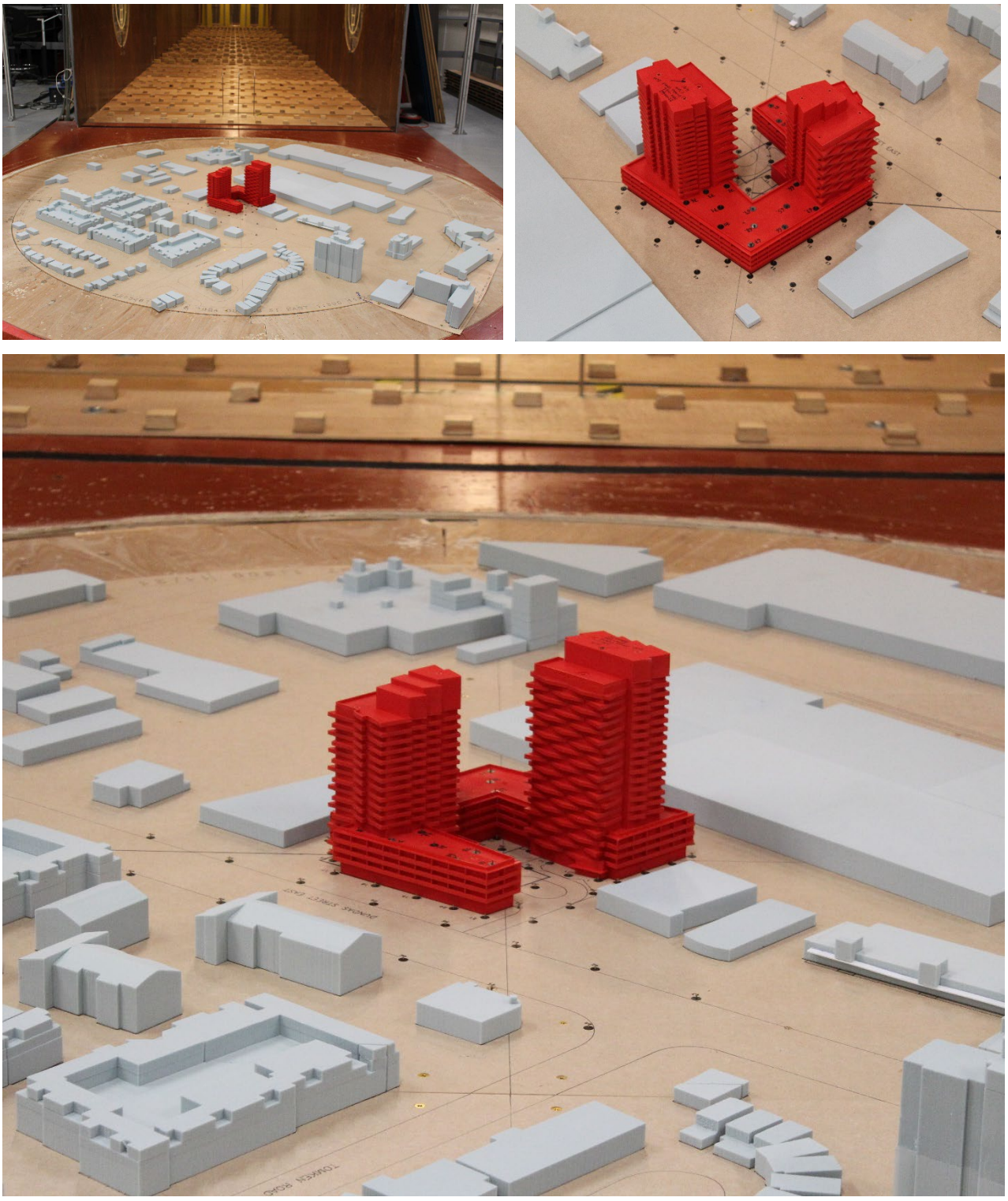
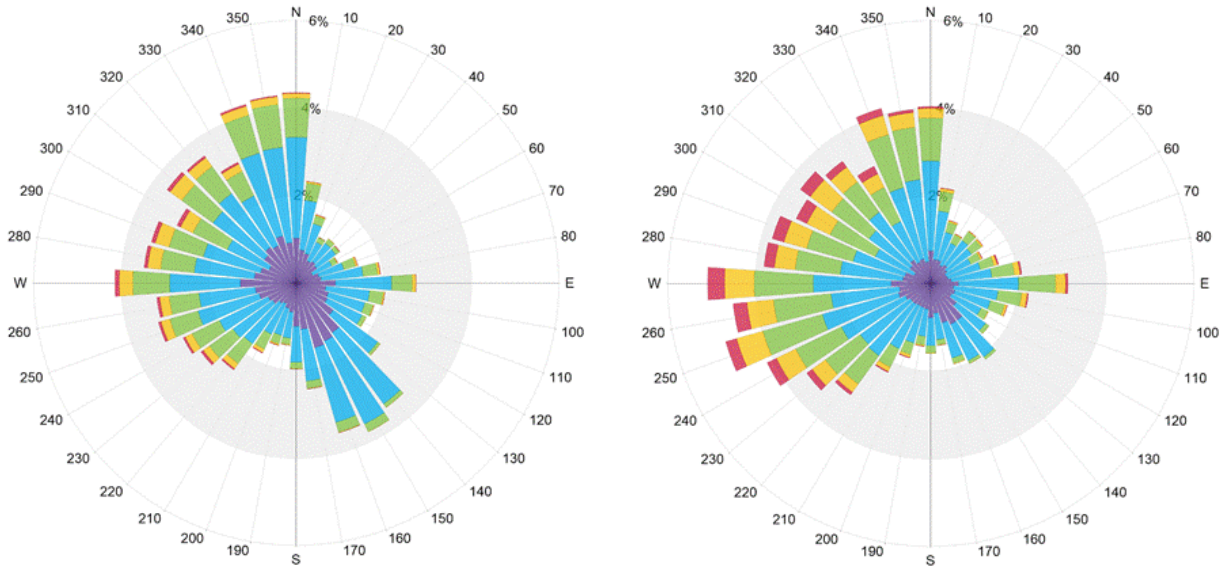


Image 2B: Wind Tunnel Study Model – Proposed Configuration

2.2 Meteorological Data

Wind statistics recorded at Toronto Pearson International Airport between 1990 and 2020, inclusive, were analyzed for the Summer (May through October) and Winter (November through April) seasons. Image 3 graphically depicts the directional distributions of wind frequencies and speeds for these two seasons. As indicated by the wind roses, winds from the east and southwest through north directions are predominant throughout the year, with winds from the southeast also frequent during the summer. Strong winds of a mean speed greater than 30 km/h measured at the airport (at an anemometer height of 10 m) occur for 4.8% and 11.4% of the time during the summer and winter seasons, respectively, and they are primarily from the southwest through north-northwest directions.

Wind statistics were combined with the wind tunnel data to predict the frequency of occurrence of full-scale wind speeds. The full-scale wind predictions were then compared with the wind criteria for pedestrian comfort and safety.



Summer (May – October) **Winter (November – April)**

Wind Speed (km/h)	Probability (%) Summer	Winter
Calm	5.4	3.7
1-10	30.8	22.5
11-20	42.9	39.9
21-30	16.0	22.5
31-40	3.9	8.1
>40	0.9	3.3

Image 3: Directional Distribution of Winds Approaching Toronto Pearson International Airport between 1990 and 2020.

2.3 Mississauga Pedestrian Wind Criteria

The Mississauga pedestrian wind criteria, developed in June 2014, are specified in the Urban Design Terms of Reference, "Pedestrian Wind Comfort and Safety Studies". The following defines the criteria in detail.

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

Notes:
(1) GEM Speed = max (Mean Speed, Gust Speed/1.85) and Gust Speed = Mean Speed + 3*RMS Speed;
(2) GEM speeds listed above are based on a seasonal exceedance of 20% of the time between 6:00 and 23:00.

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

Notes:
(1) Based on an annual exceedance of 9 hours or 0.1% of the time for 24 hours a day.

3 RESULTS AND DISCUSSION

The predicted wind conditions are shown on site plans in Figures 1A through 3B located in the "Figures" section of this report. These conditions and the associated wind speeds are also presented in Table 1, located in the "Tables" section of this report. The following is a detailed discussion of the suitability of the predicted wind conditions for the anticipated pedestrian use of each area of interest.

3.1 Grade Level (Locations 1 through 61)

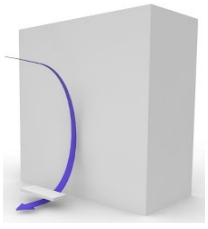
Wind conditions comfortable for walking or strolling are appropriate for sidewalks and walkways as pedestrians will be active and less likely to remain in one area for prolonged periods of time. Lower wind speeds conducive to standing are preferred at main entrances where pedestrians are apt to linger. Wind speeds comfortable for sitting are preferred for areas intended for prolonged passive activities or relaxed uses like seating and dining such as the grade level patio areas.

3.1.1 Existing Configuration

Wind speeds on and around the existing site are comfortable for sitting or standing during the summer (see Figure 1A). Seasonally stronger winds during the winter months are expected to result in slightly increased wind speeds, with conditions comfortable for standing around the site and on the nearby sidewalks. The pedestrian wind safety criterion is met at all areas assessed (see Figure 3A). These conditions are appropriate for the intended use of various pedestrian areas.

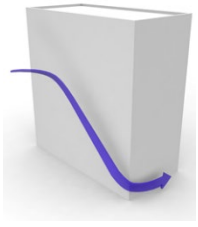
3.1.2 Proposed Configuration

With the addition of the proposed building, wind speeds are expected to increase around the building. The highest wind speeds are expected at the corners of the proposed development due to the prevailing winds from the north, east and west and directions downwashing off the tower and accelerating around the corners (Image 4).



DOWNWASHING

Tall buildings tend to intercept the stronger winds at higher elevations and redirect them to the ground level. This is often the main cause for wind accelerations around large buildings at the pedestrian level.



CORNER ACCELERATION

When winds approach at an oblique angle to a tall façade and are deflected down, a localized increase in the wind activity or corner acceleration can be expected around the exposed building corners at pedestrian level.

Image 4: Common Wind Flow Mechanisms

In the summer (Figure 1B), wind conditions are generally predicted to be comfortable for standing in most areas, with wind speeds comfortable for walking near the northern, eastern, and southern building corners. These conditions are suitable for sidewalks and walkways adjacent to the project. Wind conditions comfortable for sitting or standing are predicted at the main entrances (Locations 1, 15 and 16) and in the outdoor amenity (Locations 27 through 33) and most patio spaces along the building perimeter during the summer. While the conditions expected at the entrances are suitable for the anticipated usage, the patio and amenity areas could benefit from wind control measures to prolong wind comfort for the intended relaxed use.

During the winter season, due to seasonally stronger ambient winds, wind conditions are predicted to be comfortable for walking or standing in most areas. Conditions predicted on most sidewalk areas and the entrances to Building A continue to be appropriate for the intended uses, while higher wind speeds than desired are expected at the entrance to Building B (Location 1 in Figure 2B). Wind speeds predicted in the amenity and patio spaces are higher than desirable for passive use but can be considered acceptable as these areas would not be used frequently in the winter. Wind conditions near the southern building corner and at an isolated location on the sidewalk near the northern building corner are predicted to exceed the walking criterion marginally (up to 2 km/hr) and therefore rated uncomfortable (Locations 5 and 53, Figure 2B). Wind speeds at the southern building corner are also predicted to exceed the safety criterion marginally by 1 km/hr (Location 5 in Figure 3B).

3.1.3 Recommendations for Wind Control

Although the proposed development includes towers that are significantly taller than the surrounding buildings, the wind impact expected is low at most areas and high wind speeds are localized to a few locations mainly due to the large podium and tower setback on the podium. RWDI recommends that these setbacks be retained in the final design.

Higher wind speeds than desired for an entrance use are predicted at the Building B entrance in the winter. This entrance is designed with an overhead canopy that will shelter the area from winds downwashing off the façade, and a closed vestibule that will serve as a protected, conditioned waiting/transition area for patrons in the winter, and these design features are recommended to be retained. The wind speeds closer to the projected façade at the entrance of Building B will be likely lower and suitable for the intended usage. It is anticipated that patrons will not linger outdoors for long periods of time in the winter, in which case the higher wind speeds may be acceptable. However, if patrons are expected to wait outside near the entrance area, lower wind speeds can be achieved by installing vertical barriers on the either sides of the projected façade near Locations 1 and 31. The vertical barriers can be extended vertically from the grade to the canopy or at least 2m high from grade with the same width as the canopy projection from the facade.

During the summer, wind conditions in most patio areas and the amenity area are predicted to be appropriate for short-duration passive use, but not ideal for seating, dining, lounging etc. Any partition or privacy screens that are at least 2m tall and wide will disrupt wind flow parallel to the facades at the patio areas. Screens or landscaping features are recommended in the amenity area to reduce wind exposure and thereby improve wind conditions to be suitable for prolonged passive use.

High wind speeds at the southern corner (Location 5) are attributed to winds from the easterly and westerly directions that would be downwashed by the tower and subsequently accelerate around the corner. The approach

to reduce wind activity would be to curb the corner acceleration by adding either screens or coniferous landscaping features at this corner. This would both disrupt wind activity and restrict pedestrian access to the corner. Examples are shown in Image 5a.

The marginal exceedance of the walking criterion on the sidewalk location near Building A (Location 53) in the winter is a result of seasonally strong westerly winds being downwashed and redirected towards the location. Any coniferous landscaping on the proposed property in the area between this location and Building A will reduce wind speeds at this location. The design team may also consider a single large or a cluster of free-standing trellises/canopies, or a cluster of screens or large sculptures of the order of 2m height and 1-2m width in the area between the sidewalk and Building A to achieve a similar impact. Some examples are shown in Image 5b.

RWDI can provide further guidance as to the type and placement of wind control measures to achieve the desired wind conditions on the proposed development.

5a. Screens and Coniferous Landscaping at Building Corners

5b. Coniferous Landscaping and Overhead Trellises near the Sidewalk Areas

Image 5: Examples of Wind Control Measures Applicable to the Grade Level Areas

3.2 Level 5 Terraces (Locations 62 through 80)

It is generally desirable for wind conditions on terraces intended for passive activities to be comfortable for sitting more than 80% of the time.

Wind conditions at most areas on the Level 5 amenity terraces are predicted to be comfortable for sitting or standing in the summer and for standing or walking in the winter (Figures 1B & 2B). Wind speeds that meet the wind safety criterion are anticipated at all areas assessed except for a localized area near the west corner of Building A (Location 75 in Figure 3B).

RWDI received an updated planning package for the Level-5 amenity areas on 21st April. 2022. The following discussion regarding the applicability of the predicted wind conditions and the required wind control measures pertain to the Preliminary Concept – Option 3, as shown in Image 6.

It is our understanding that the Level-5 amenity areas are intended for year-round pedestrian usage. Since the predicted wind conditions are suitable for walking or lower throughout the year, they are appropriate for active pedestrian usage (e.g., along the running track).

Wind speeds at amenity areas near Locations 64, 67, 70, 77, and 80 are predicted to be higher than desired for long periods of passive usage (see Image 6). The proposed landscaping elements around these areas will help reduce wind speeds when they are in full foliage. To extend the wind benefits of landscaping to the colder months of the year, coniferous/marcescent species should be used. To achieve conditions conducive to sitting at these areas, additional wind control measures in the form of trellises, screens and landscaping should be considered around the designated seating areas to create sheltered zones for patrons. Examples are shown in Image 7.

To reduce the wind speeds near the west corner of Building A (Location 75) and resolve the safety issues, we recommend a wide canopy/trellis feature along the north façade wrapped around the corner to deflect the downwashing northwest winds from reaching the amenity level. Alternatively, screens/landscaping features should be locally placed at this corner to diffuse the energy of accelerated winds and alleviate the safety issues. Note that for screens and landscaping features to be effective for wind control a minimum height of 2 m and porosity of 20-30% is required.

a) SUMMER

b) WINTER

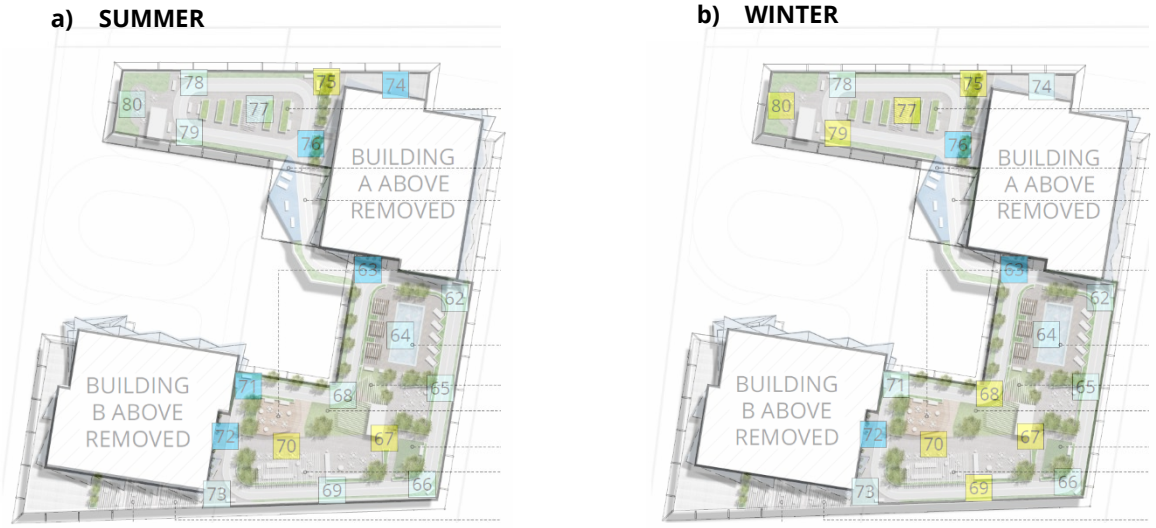


Image 6: Predicted Wind Conditions on the Level-5 Amenity Areas

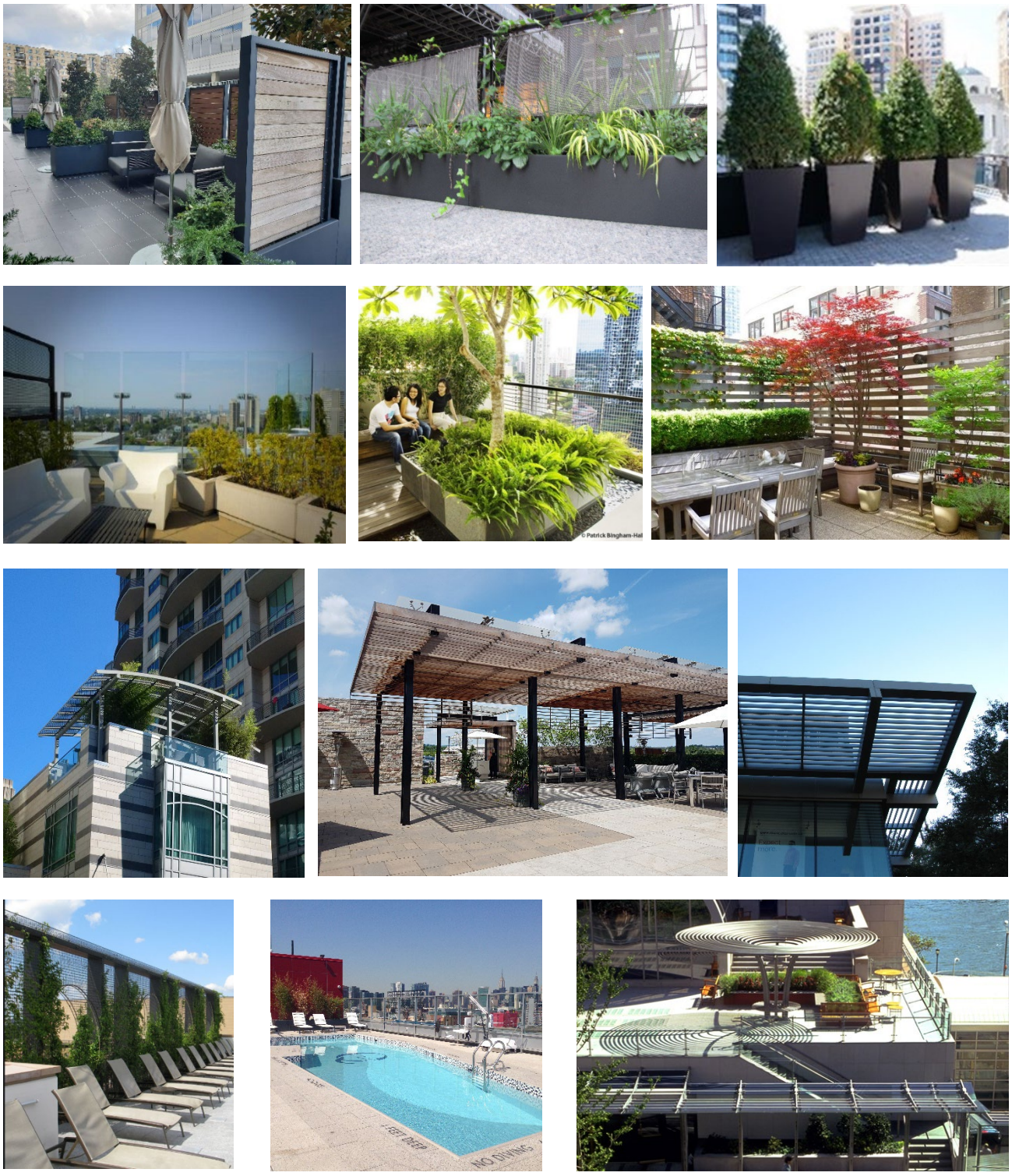


Image 7: Examples of Wind Control Measures Applicable to the Level 5 Amenity Areas

4 APPLICABILITY OF RESULTS

The wind conditions presented in this report pertain to the model of the 1000 & 1024 Dundas Street East development constructed using the drawings and information listed below. Should there be any design changes that deviate from this list of drawings, the wind condition predictions presented may change. Therefore, if changes in the design are made, it is recommended that RWDI be contacted and requested to review their potential effects on wind conditions.

File Name	File Type	Date Received (dd/mm/yyyy)
1000 Dundas_2021.11.03	Sketch Up	03/11/2021
2022-02-04-1024Dundas-PrelimConcept_clientcoordination (1)	PDF	21/04/2022

5 REFERENCES

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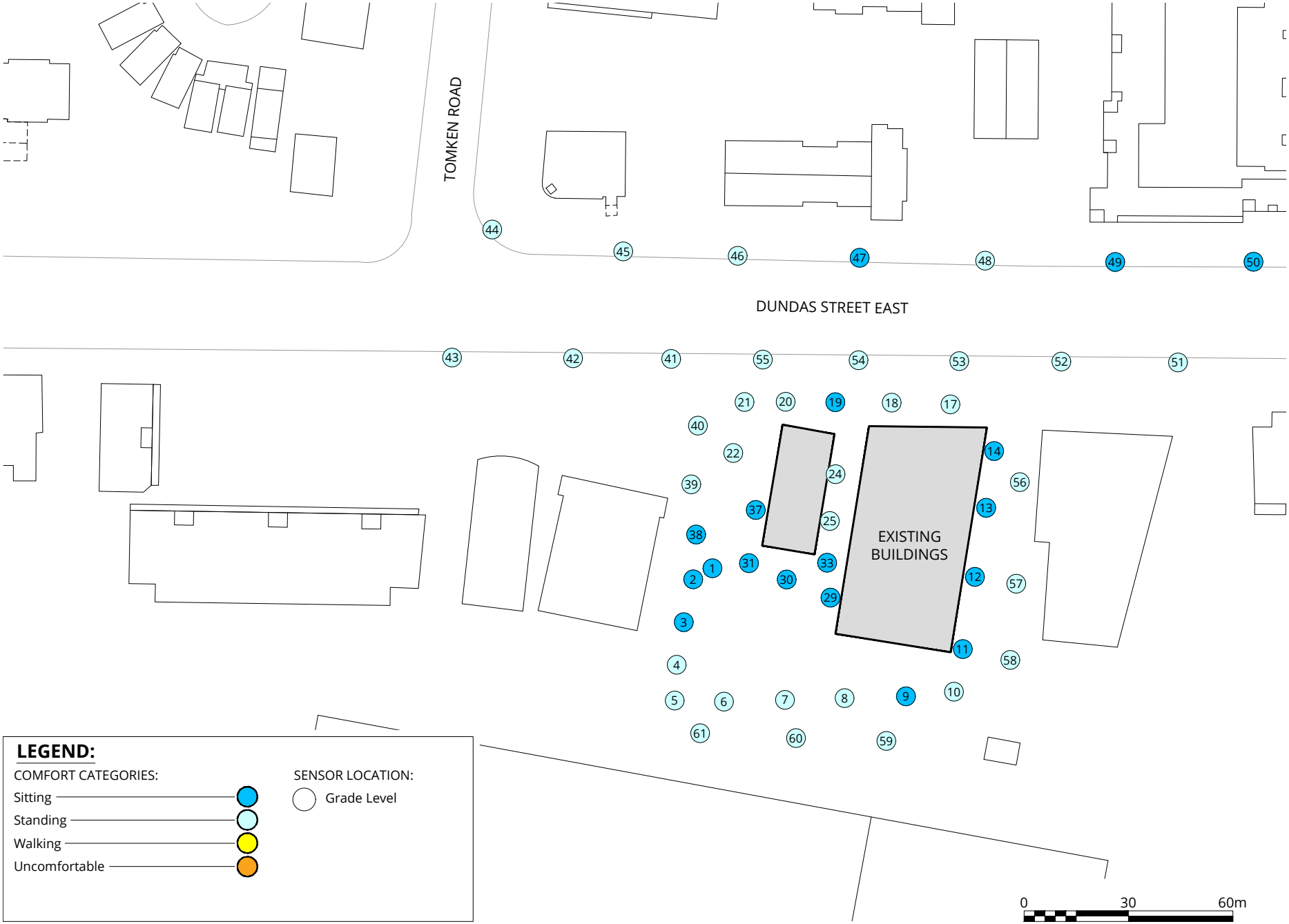
FIGURES



Pedestrian Wind Comfort Conditions
Existing Configuration
Summer (May to October, 6:00 to 23:00)

1000 & 1024 Dundas Street East - Mississauga, ON

True North

Project #2200461

Drawn by: DBB	Figure: 1A
Approx. Scale:	1:1500
Date Revised:	Dec. 10, 2021

Pedestrian Wind Comfort Conditions
Proposed Configuration
Summer (May to October, 6:00 to 23:00)

1000 & 1024 Dundas Street East - Mississauga, ON

True North

Project #2200461

Drawn by: DBB	Figure: 1B
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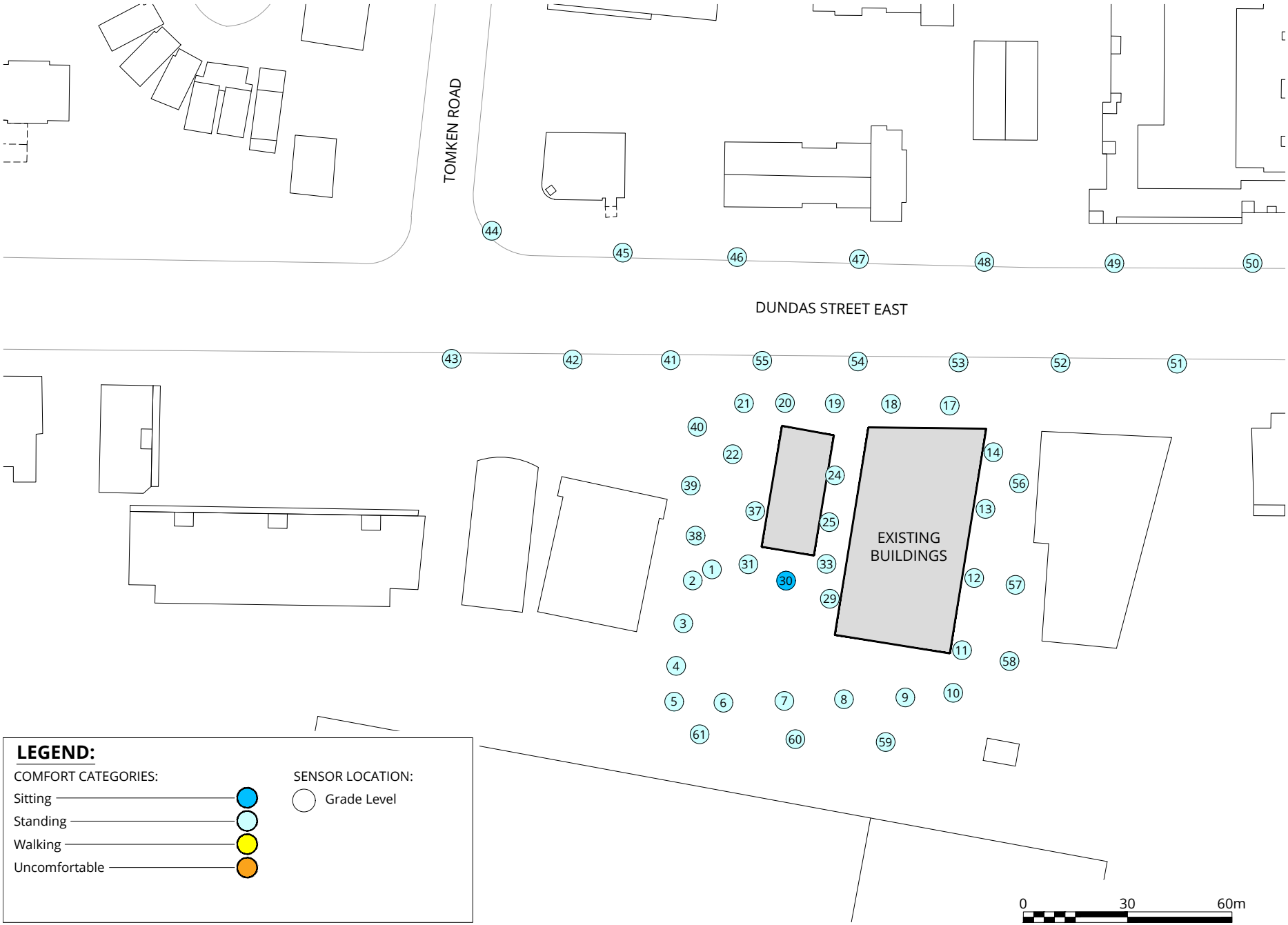
Date Revised:	Dec. 10, 2021



Pedestrian Wind Comfort Conditions
Existing Configuration
Winter (November to April, 6:00 to 23:00)

1000 & 1024 Dundas Street East - Mississauga, ON

True North

Project #2200461

Drawn by: DBB	Figure: 2A
Approx. Scale:	1:1500
Date Revised:	Dec. 10, 2021

Pedestrian Wind Comfort Conditions

Proposed Configuration

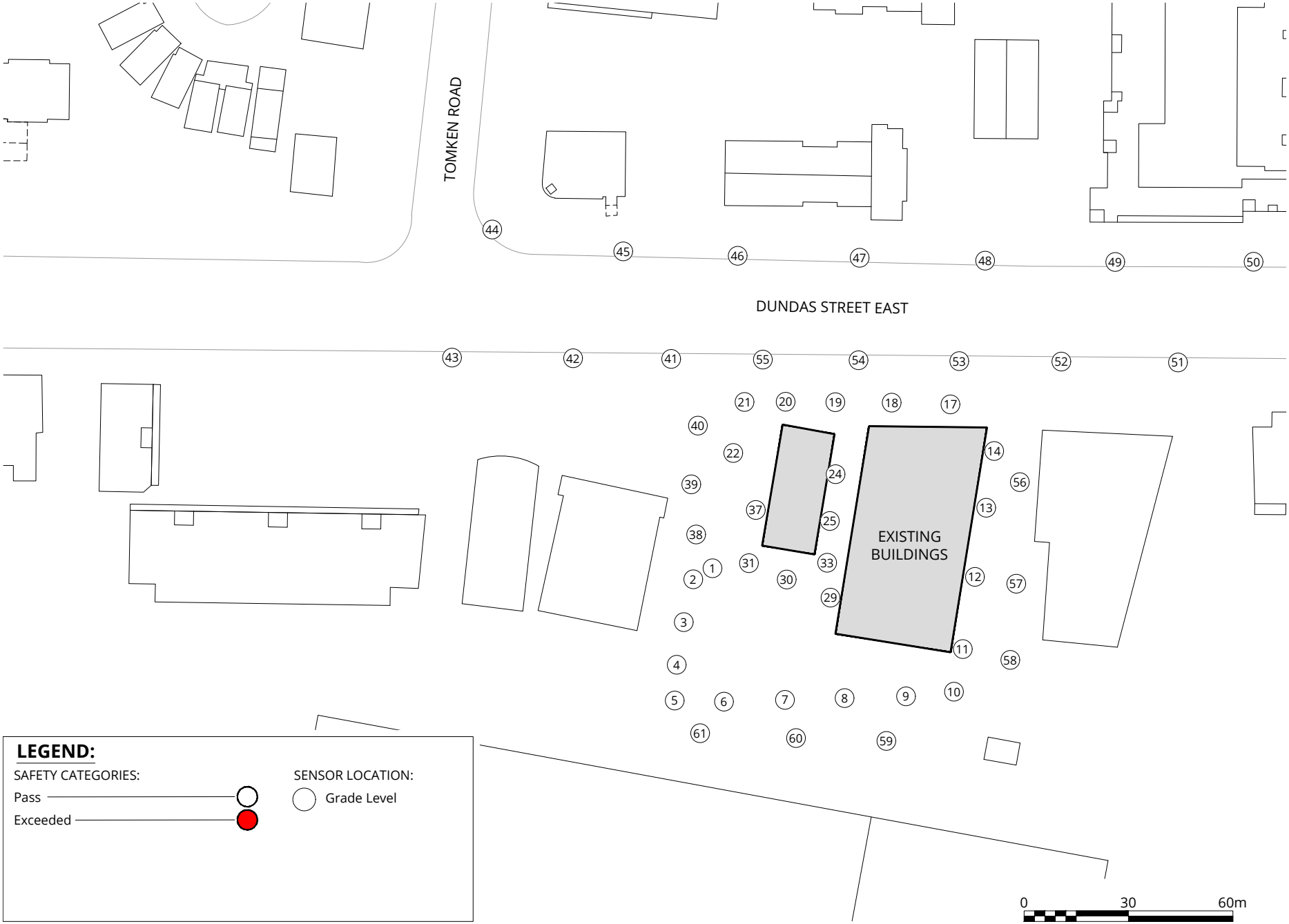
Winter (November to April, 6:00 to 23:00)

1000 & 1024 Dundas Street East - Mississauga, ON

True North

Project #2200461

Drawn by: DBB	Figure: 2B
Approx. Scale:	1:1500
Date Revised:	Dec. 10, 2021



Pedestrian Wind Safety Conditions
Existing Configuration
Annual (January to December, 0:00 to 23:00)

1000 & 1024 Dundas Street East - Mississauga, ON

True North

Project #2200461

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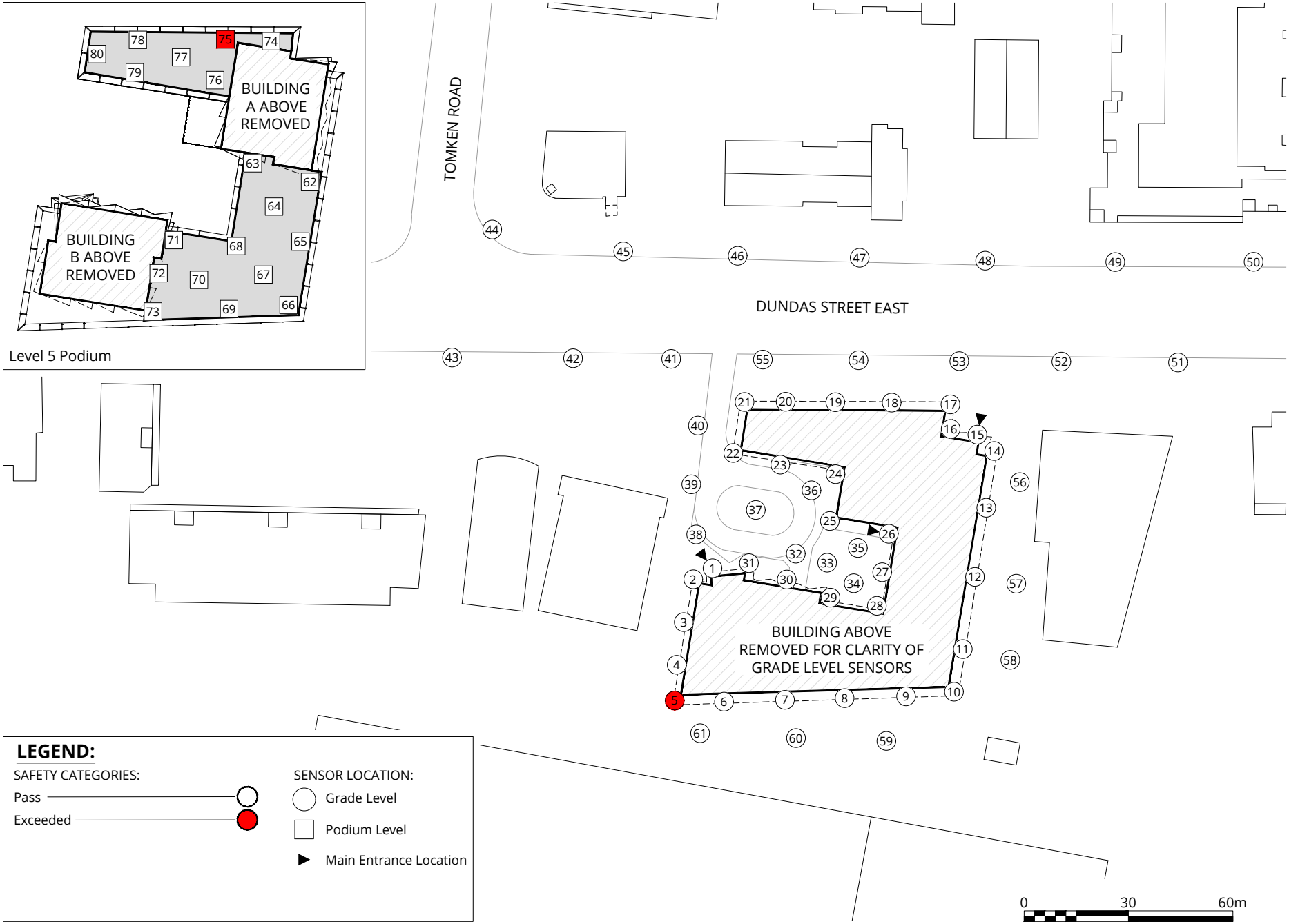
Approx. Scale:	1:1500
Date Revised:	Dec. 10, 2021



Pedestrian Wind Safety Conditions
Proposed Configuration
Annual (January to December, 0:00 to 23:00)

1000 & 1024 Dundas Street East - Mississauga, ON

True North

Project #2200461

Drawn by: DBB	Figure: 3B
Approx. Scale:	1:1500
Date Revised:	Dec. 10, 2021

TABLES

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (km/h)	Rating	Speed (km/h)	Rating	Speed (km/h)	Rating
1	Existing	10	Sitting	12	Standing	49	Pass
	Proposed	13	Standing	16	Walking	73	Pass
2	Existing	10	Sitting	12	Standing	50	Pass
	Proposed	16	Walking	18	Walking	86	Pass
3	Existing	10	Sitting	11	Standing	48	Pass
	Proposed	11	Standing	13	Standing	53	Pass
4	Existing	12	Standing	13	Standing	56	Pass
	Proposed	11	Standing	14	Standing	63	Pass
5	Existing	11	Standing	14	Standing	56	Pass
	Proposed	17	Walking	22	Uncomfortable	91	Exceeded
6	Existing	12	Standing	14	Standing	59	Pass
	Proposed	11	Standing	13	Standing	57	Pass
7	Existing	12	Standing	14	Standing	58	Pass
	Proposed	11	Standing	13	Standing	53	Pass
8	Existing	11	Standing	14	Standing	57	Pass
	Proposed	11	Standing	12	Standing	51	Pass
9	Existing	10	Sitting	12	Standing	52	Pass
	Proposed	11	Standing	12	Standing	47	Pass
10	Existing	11	Standing	13	Standing	53	Pass
	Proposed	16	Walking	18	Walking	68	Pass
11	Existing	9	Sitting	11	Standing	51	Pass
	Proposed	11	Standing	12	Standing	55	Pass
12	Existing	10	Sitting	11	Standing	50	Pass
	Proposed	11	Standing	12	Standing	54	Pass
13	Existing	10	Sitting	12	Standing	51	Pass
	Proposed	12	Standing	14	Standing	64	Pass
14	Existing	9	Sitting	11	Standing	50	Pass
	Proposed	16	Walking	19	Walking	86	Pass
15	Existing	-	-	-	-	-	-
	Proposed	12	Standing	14	Standing	73	Pass
16	Existing	-	-	-	-	-	-
	Proposed	7	Sitting	8	Sitting	42	Pass
17	Existing	11	Standing	13	Standing	53	Pass
	Proposed	16	Walking	20	Walking	87	Pass
18	Existing	11	Standing	13	Standing	52	Pass
	Proposed	11	Standing	14	Standing	61	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (km/h)	Rating	Speed (km/h)	Rating	Speed (km/h)	Rating
19	Existing	10	Sitting	12	Standing	51	Pass
	Proposed	11	Standing	13	Standing	57	Pass
20	Existing	11	Standing	13	Standing	57	Pass
	Proposed	11	Standing	13	Standing	63	Pass
21	Existing	11	Standing	14	Standing	55	Pass
	Proposed	15	Standing	17	Walking	77	Pass
22	Existing	11	Standing	13	Standing	51	Pass
	Proposed	13	Standing	14	Standing	67	Pass
23	Existing	-	-	-	-	-	-
	Proposed	11	Standing	11	Standing	63	Pass
24	Existing	11	Standing	13	Standing	52	Pass
	Proposed	7	Sitting	8	Sitting	42	Pass
25	Existing	11	Standing	13	Standing	57	Pass
	Proposed	13	Standing	15	Standing	69	Pass
26	Existing	-	-	-	-	-	-
	Proposed	8	Sitting	9	Sitting	42	Pass
27	Existing	-	-	-	-	-	-
	Proposed	10	Sitting	11	Standing	50	Pass
28	Existing	-	-	-	-	-	-
	Proposed	6	Sitting	7	Sitting	33	Pass
29	Existing	9	Sitting	11	Standing	52	Pass
	Proposed	7	Sitting	8	Sitting	39	Pass
30	Existing	9	Sitting	10	Sitting	45	Pass
	Proposed	11	Standing	13	Standing	59	Pass
31	Existing	10	Sitting	12	Standing	51	Pass
	Proposed	11	Standing	14	Standing	65	Pass
32	Existing	-	-	-	-	-	-
	Proposed	15	Standing	17	Walking	73	Pass
33	Existing	10	Sitting	13	Standing	56	Pass
	Proposed	15	Standing	17	Walking	75	Pass
34	Existing	-	-	-	-	-	-
	Proposed	11	Standing	13	Standing	57	Pass
35	Existing	-	-	-	-	-	-
	Proposed	11	Standing	13	Standing	65	Pass
36	Existing	-	-	-	-	-	-
	Proposed	12	Standing	13	Standing	65	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (km/h)	Rating	Speed (km/h)	Rating	Speed (km/h)	Rating
37	Existing	10	Sitting	12	Standing	54	Pass
	Proposed	15	Standing	17	Walking	75	Pass
38	Existing	10	Sitting	12	Standing	51	Pass
	Proposed	15	Standing	17	Walking	69	Pass
39	Existing	12	Standing	14	Standing	58	Pass
	Proposed	13	Standing	15	Standing	69	Pass
40	Existing	12	Standing	14	Standing	58	Pass
	Proposed	12	Standing	13	Standing	62	Pass
41	Existing	12	Standing	14	Standing	58	Pass
	Proposed	13	Standing	15	Standing	67	Pass
42	Existing	12	Standing	14	Standing	60	Pass
	Proposed	12	Standing	14	Standing	60	Pass
43	Existing	13	Standing	15	Standing	62	Pass
	Proposed	12	Standing	15	Standing	60	Pass
44	Existing	12	Standing	15	Standing	61	Pass
	Proposed	11	Standing	14	Standing	57	Pass
45	Existing	11	Standing	13	Standing	52	Pass
	Proposed	11	Standing	13	Standing	53	Pass
46	Existing	12	Standing	15	Standing	63	Pass
	Proposed	13	Standing	15	Standing	63	Pass
47	Existing	10	Sitting	12	Standing	48	Pass
	Proposed	13	Standing	16	Walking	65	Pass
48	Existing	11	Standing	13	Standing	54	Pass
	Proposed	13	Standing	15	Standing	59	Pass
49	Existing	10	Sitting	12	Standing	51	Pass
	Proposed	11	Standing	14	Standing	60	Pass
50	Existing	10	Sitting	12	Standing	55	Pass
	Proposed	10	Sitting	12	Standing	55	Pass
51	Existing	11	Standing	13	Standing	54	Pass
	Proposed	12	Standing	15	Standing	67	Pass
52	Existing	12	Standing	14	Standing	59	Pass
	Proposed	14	Standing	17	Walking	78	Pass
53	Existing	11	Standing	13	Standing	57	Pass
	Proposed	17	Walking	21	Uncomfortable	81	Pass
54	Existing	11	Standing	13	Standing	56	Pass
	Proposed	14	Standing	16	Walking	69	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (km/h)	Rating	Speed (km/h)	Rating	Speed (km/h)	Rating
55	Existing	12	Standing	14	Standing	56	Pass
	Proposed	15	Standing	17	Walking	72	Pass
56	Existing	12	Standing	14	Standing	56	Pass
	Proposed	16	Walking	19	Walking	83	Pass
57	Existing	11	Standing	13	Standing	53	Pass
	Proposed	15	Standing	18	Walking	82	Pass
58	Existing	11	Standing	13	Standing	51	Pass
	Proposed	15	Standing	16	Walking	66	Pass
59	Existing	11	Standing	14	Standing	57	Pass
	Proposed	15	Standing	17	Walking	71	Pass
60	Existing	11	Standing	14	Standing	57	Pass
	Proposed	15	Standing	18	Walking	82	Pass
61	Existing	11	Standing	14	Standing	60	Pass
	Proposed	16	Walking	20	Walking	89	Pass
62	Existing	-	-	-	-	-	-
	Proposed	14	Standing	15	Standing	70	Pass
63	Existing	-	-	-	-	-	-
	Proposed	8	Sitting	9	Sitting	45	Pass
64	Existing	-	-	-	-	-	-
	Proposed	12	Standing	14	Standing	63	Pass
65	Existing	-	-	-	-	-	-
	Proposed	13	Standing	15	Standing	70	Pass
66	Existing	-	-	-	-	-	-
	Proposed	12	Standing	14	Standing	62	Pass
67	Existing	-	-	-	-	-	-
	Proposed	16	Walking	17	Walking	73	Pass
68	Existing	-	-	-	-	-	-
	Proposed	14	Standing	16	Walking	63	Pass
69	Existing	-	-	-	-	-	-
	Proposed	14	Standing	16	Walking	66	Pass
70	Existing	-	-	-	-	-	-
	Proposed	16	Walking	17	Walking	77	Pass
71	Existing	-	-	-	-	-	-
	Proposed	10	Sitting	11	Standing	49	Pass
72	Existing	-	-	-	-	-	-
	Proposed	8	Sitting	9	Sitting	41	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (km/h)	Rating	Speed (km/h)	Rating	Speed (km/h)	Rating
73	Existing	-	-	-	-	-	-
	Proposed	15	Standing	15	Standing	63	Pass
74	Existing	-	-	-	-	-	-
	Proposed	10	Sitting	12	Standing	60	Pass
75	Existing	-	-	-	-	-	-
	Proposed	17	Walking	20	Walking	94	Exceeded
76	Existing	-	-	-	-	-	-
	Proposed	8	Sitting	10	Sitting	45	Pass
77	Existing	-	-	-	-	-	-
	Proposed	13	Standing	16	Walking	84	Pass
78	Existing	-	-	-	-	-	-
	Proposed	13	Standing	14	Standing	63	Pass
79	Existing	-	-	-	-	-	-
	Proposed	15	Standing	17	Walking	80	Pass
80	Existing	-	-	-	-	-	-
	Proposed	15	Standing	17	Walking	79	Pass

Season	Months	Hours
Summer	May - October	6:00 - 23:00 for comfort
Winter	November - April	6:00 - 23:00 for comfort
Annual	January - December	0:00 - 23:00 for safety

Configurations	
Existing	Existing site and surroundings
Proposed	Project with existing surroundings

Comfort Speed (km/h)	
(20% Seasonal Exceedance)	
≤ 10	Sitting
11 - 15	Standing
16 - 20	Walking
> 20	Uncomfortable

Safety Speed (km/h)	
(0.1% Annual Exceedance)	
≤ 90	Pass
> 90	Exceeded