REPORT

1026 COOKE BOULEVARD

BURLINGTON, ON

PEDESTRIAN WIND STUDY
RWDI # 2305839
December 1, 2023

SUBMITTED TO

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EXECUTIVE SUMMARY

RWDI was retained to conduct a pedestrian wind assessment for the proposed project at 1026 Cooke Boulevard in Burlington, ON (Image 1). The assessment was based on the wind-tunnel testing conducted for the proposed development under the Existing, Proposed and Future configurations of the site and surroundings. The results were analysed using the regional wind climate records and evaluated against the Burlington Pedestrian Wind Criteria for pedestrian comfort (pertaining to common wind speeds conducive to different levels of human activity) and pedestrian safety (pertaining to infrequent but strong gusts that could affect a person's footing). The predicted wind conditions are presented in Figures 1A through 3C, and Table 1, and are summarized as follows:

- In the existing configuration, wind comfort conditions on and around the project site are considered suitable for pedestrian use throughout the year.

- With the addition of the proposed building, wind speeds are expected to remain appropriate at all test locations in the summer and at most locations in the winter. Uncomfortable wind speeds are anticipated during the winter between the proposed building and the existing building to the south, under the overhang close to the northeast building corner, at a parking lot area to the north of the site, and at one remote location on Plains Road East.

- After the construction of future developments, improved wind conditions are generally anticipated on and around the project site. Uncomfortable wind speeds are only anticipated in the winter at one test location around the northwest corner of the proposed building due to the presence of a high-rise tower to the west.

- Wind speeds at the main residential entrances are anticipated to be appropriate for the intended use throughout the year in both the Proposed and Future configurations.

- During the summer, wind speeds comfortable for outdoor uses are anticipated at the outdoor amenity around the southwest corner of the building (ground level) and on the Level 2 terrace. Higher wind speeds, suitable for more active uses, are anticipated at several locations on the Level 6 terraces. Elevated wind speeds are predicted on all outdoor amenities in the winter; however, this may not be a serious concern due to limited use of these areas in the colder months of the year.

- The wind Safety Criterion is expected to be met at the ground level for all configurations considered in this assessment. However, the criterion is predicted to be exceeded around the northeast corner of the Level 6 terrace in both the Proposed and Future configurations. These gusty conditions are expected to occur primarily during the winter months.

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1 INTRODUCTION

RWDI was retained to conduct a pedestrian wind assessment for the proposed project at 1026 Cooke Boulevard in Burlington, ON (Image 1). This report presents the project objectives, approach and the main results from RWDI's assessment and provides conceptual wind control measures, where necessary. Our Statement of Limitations as it pertains to this study can be found in Section 4 of this report.

1.1 Project Description

The proposed development site is located on the north side of Plains Road East, between Cooke Boulevard and Waterdown Road (Image 1). The development will consist of a 28-storey stower (excluding mechanical penthouse), with outdoor amenity terraces on Levels 2 and 6.

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 the Burlington Pedestrian Wind Criteria for gauging wind comfort and safety in pedestrian areas. The assessment focused on critical pedestrian areas, including, public sidewalks, main entrances, and outdoor amenities at and above grade.



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),

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

C - Future: Proposed project with existing and future surroundings (Image 2C).

The wind tunnel model included all relevant surrounding buildings and topography within an approximate 360 m radius around 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 72 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. The placement of wind measurement locations was based on our experience and understanding of the pedestrian usage for this site. Wind speeds were measured for 36 directions in 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.

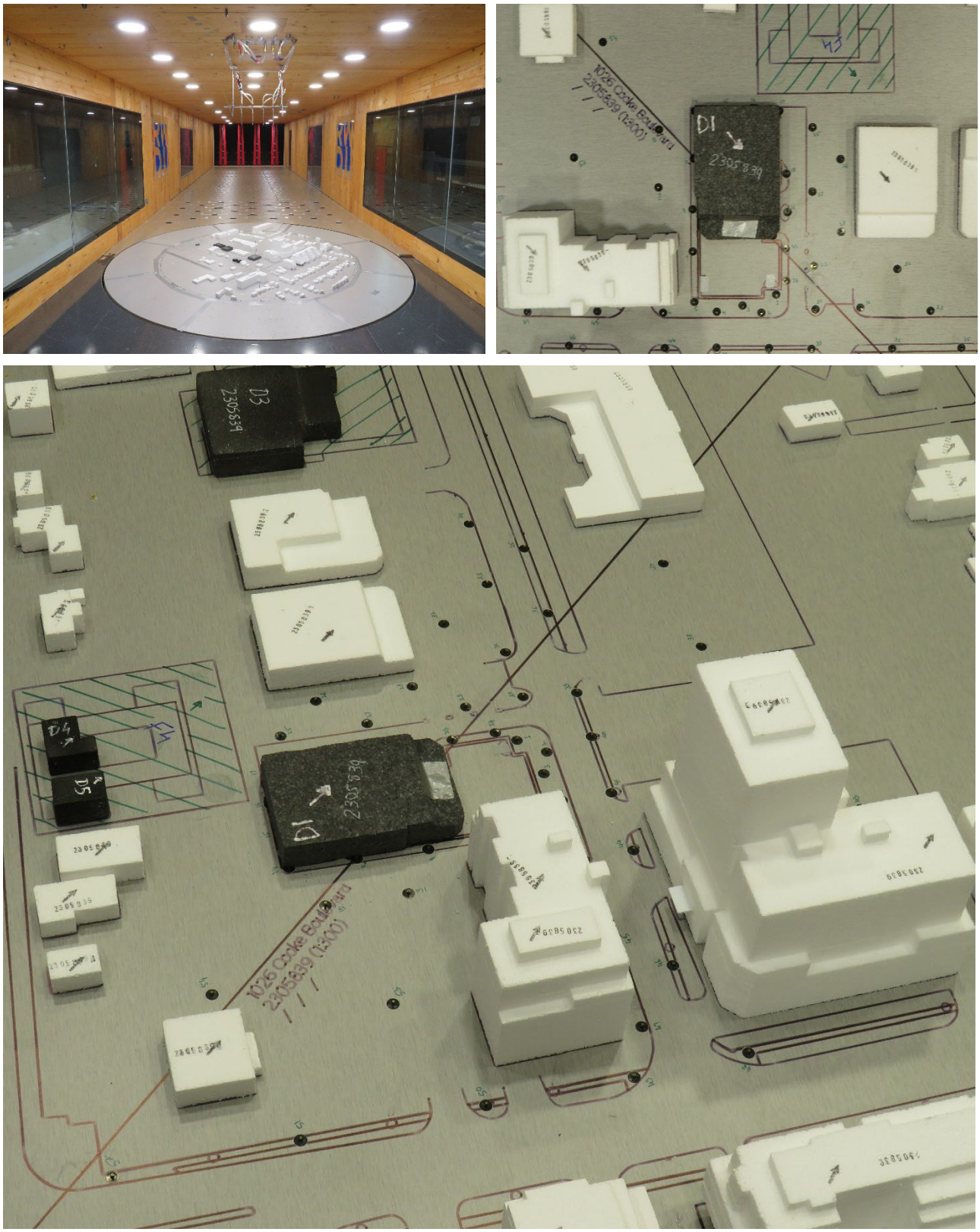


Image 2A: Wind Tunnel Study Model – Existing Configuration

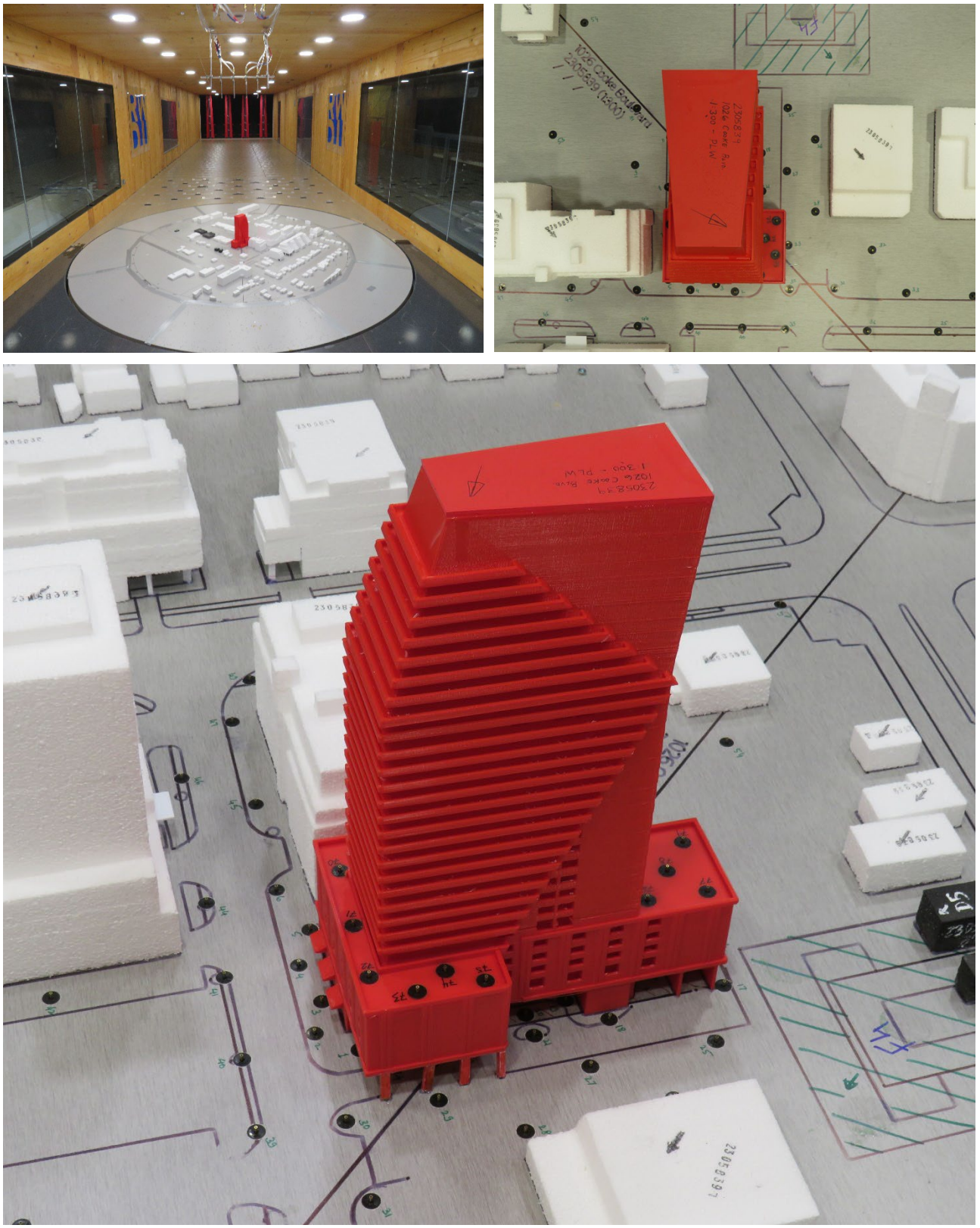
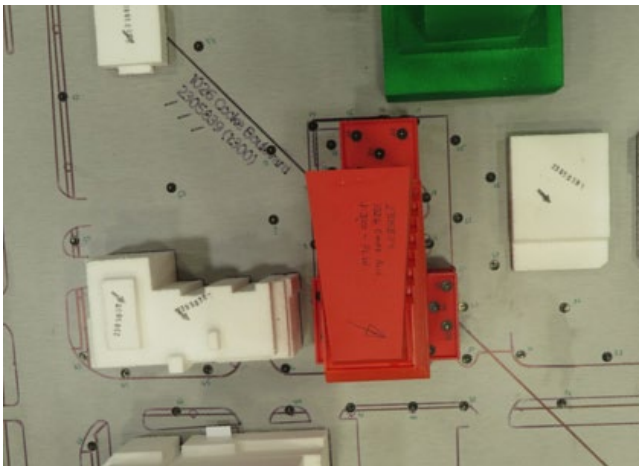


Image 2B: Wind Tunnel Study Model – Proposed Configuration





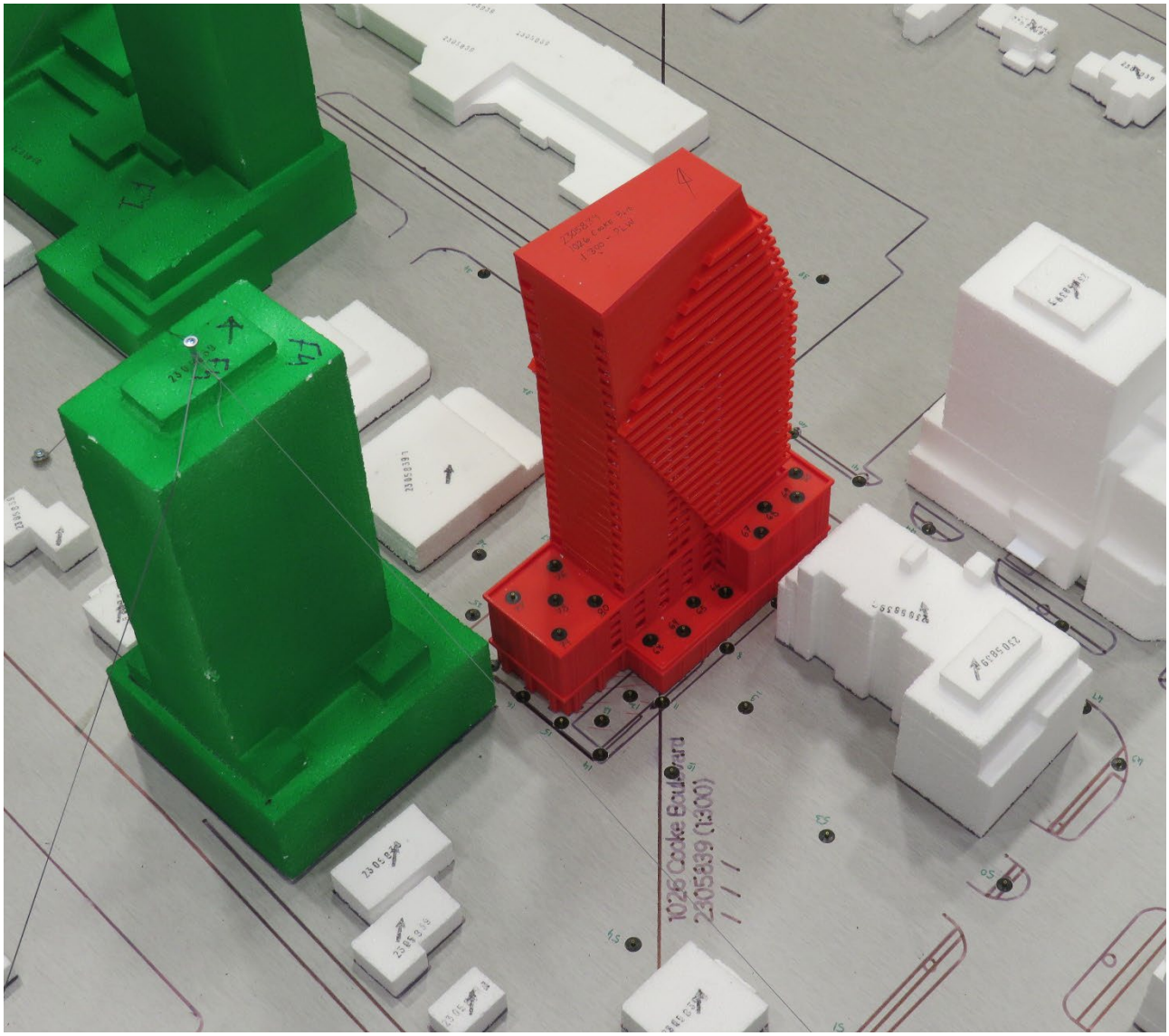
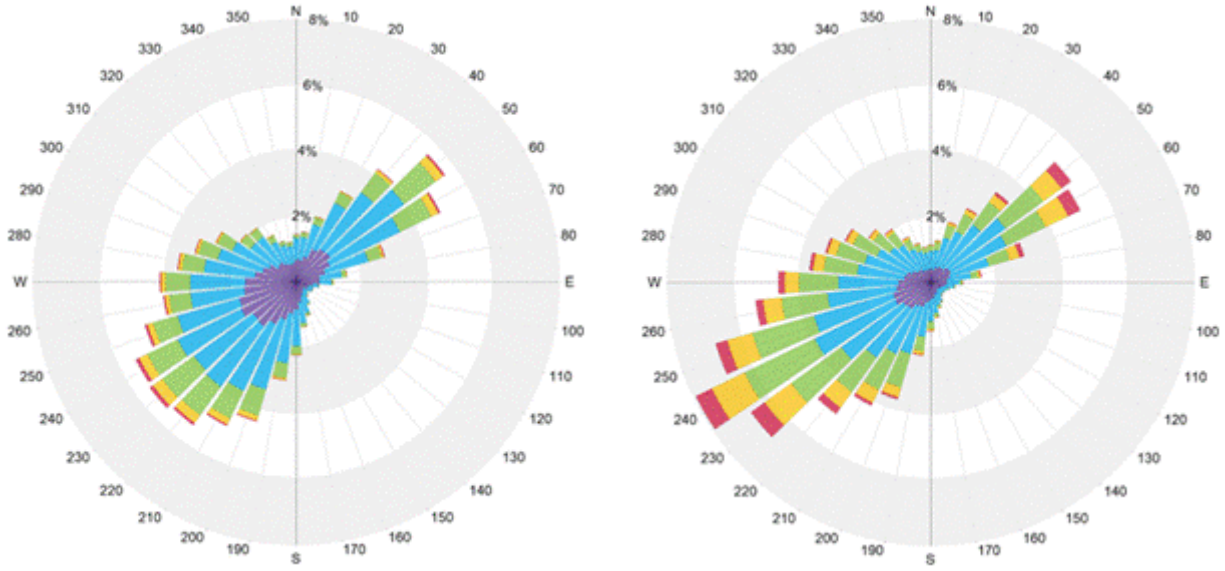


Image 2C: Wind Tunnel Study Model – Future Configuration

2.2 Wind Climate Data

Wind statistics recorded at Hamilton 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. Winds from the northeast and southwest directions are predominant in both summer and winter, as indicated by the wind roses. Strong winds of a mean speed greater than 30 km/h, measured at the airport (at an anemometer height of 10 m), occur for 3.8% and 12.6% of the time during the summer and winter seasons, respectively.

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.



Wind Speed (km/h)	Probability (%) Summer	Winter
Calm	3.9	2.3
1-10	33.7	21.7
11-20	43.1	39.5
21-30	15.5	23.9
31-40	3.0	9.0
>40	0.8	3.6

Image 3: Directional Distribution of Winds Approaching Hamilton International Airport between 1990 and 2020

2.3 Burlington Pedestrian Wind Criteria

The Burlington pedestrian wind criteria, developed in March 2020, are specified in the Guidelines and Terms of Reference, "Pedestrian Level Wind Study". The following defines the criterion in detail.

Comfort Category	GEM Speed (km/h)	Description
Sitting	≤ 10	**Calm or light breezes** • Appropriate for dedicated seating areas such as cafés, patios, and outdoor amenity areas
Standing	≤ 14	**Gentle breezes** • Appropriate for main building entrances, bus stops, and other places where pedestrians may linger
Leisurely Walking	≤ 17	**Moderate winds** • Appropriate for shopping and strolling along retail streets and parks
Fast Walking	≤ 20	**Relative higher speed winds** • Appropriate for areas where pedestrians are walking, running, or cycling without lingering
Uncomfortable	> 20	**Strong winds** • Inappropriate due to nuisance for all pedestrian activities • Wind mitigation measures required

Notes:

(1) GEM is defined as the maximum mean wind speed or gust speed divided by 1.85 (whichever is larger). Gust speed can be directly measured in a wind tunnel or represented by mean wind speed + 3*RMS (Root Mean Square) wind speed.

(2) GEM speeds listed above are based on a seasonal exceedance of 20% of the time between 06:00 and 23:00. The criterion has been met if the wind speeds occur at least four out of five days.

Safety Criterion	Gust Speed (km/h)	Description
Exceeded	> 90	• Excessive gust speeds • Adverse effect on pedestrian's balance and footing • Wind mitigation is required

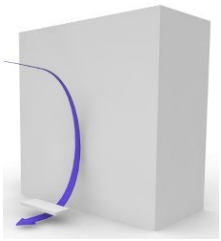
Notes:

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

(2) Gust speed can be directly measured in a wind tunnel or represented by mean wind speed + 3*RMS wind speed.

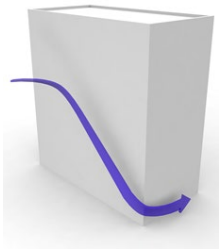
2.4 General Wind Flow Mechanisms

In the discussion of wind conditions, reference is made to the following wind flow mechanisms (Image 4):



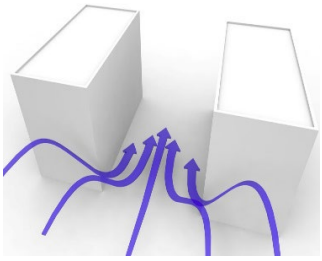
DOWNWASHING

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 wind moves around the buildings a localized increase in the wind activity or corner acceleration can be expected around the exposed building corners at pedestrian level. The effect is intensified when the wind approaches at an oblique angle to a tall façade and are deflected down and around the exposed corners.



CHANNELLING EFFECT

Wind flow tends to accelerate through the space between buildings, under bridges or in passages through buildings due to channelling effect caused by the narrow gap. The effect is intensified if the channel is aligned with the predominant wind direction.

Image 4: General Wind Flow Mechanisms

If these building/wind combinations occur for prevailing winds, there is a greater potential for increased wind activity. Design details such as setting back a tall tower from the edges of a podium, deep canopies close to ground level, wind screens, tall trees with dense landscaping, etc. (Image 5) can help reduce wind speeds. The choice and effectiveness of these measures would depend on the exposure and orientation of the site with respect to the prevailing wind directions and the size and massing of the proposed buildings.

Podium/tower setback, canopy, landscaping and wind screens (left to right)

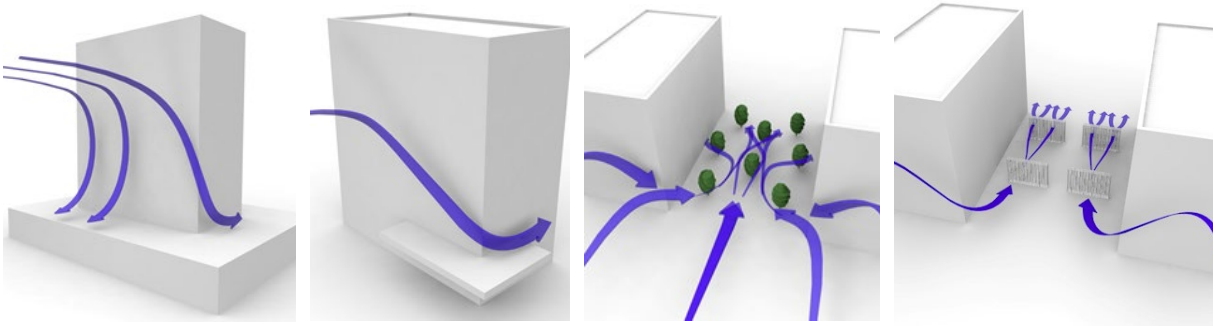


Image 5: Common Wind Control Measures

3 RESULTS AND DISCUSSION

The predicted wind conditions are shown on site plans in Figures 1A through 3C located in the "Figures" section of this report and the associated wind speeds are 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 Existing Configuration

The existing building onsite is low rise and does not redirect winds to create any notable impact. In the summer, wind conditions at the ground level are generally comfortable for Standing, with slightly higher wind speeds occurring around the mid-rise building to the south (Figure 1A). During the winter, higher wind speeds occur due to the seasonal wind climate in Burlington, and wind speeds around the site generally meet the criterion for Leisurely Walking or Fast Walking (Figure 2A). The Safety Criterion is met at all assessed locations in the Existing configuration (Figure 3A).

3.2 Proposed Configuration

The proposed building is taller than its immediate surroundings in the prevailing wind directions in Burlington (southwest and northeast). As a result, winds intercepted by the building at high elevations are expected to downwash to the ground level and accelerate around building corners.

3.2.1 Ground Level (Locations 1 through 54)

After the construction of the proposed building, wind conditions around the site are expected to be generally comfortable for Standing or Leisurely Walking in the summer, with lower wind speeds comfortable for Sitting or Standing occurring at the outdoor amenity near the southwest corner (Locations 12 and 13 in Figure 1B) and at both main entrances (Locations 1 and 22 in Figure 1B). In the winter, although higher, wind speeds at most assessed locations are still anticipated to be suitable for pedestrian use (Figure 2B). Appropriate wind speeds are still anticipated at both building entrances (Locations 1 and 22 in Figure 2B).

Uncomfortable wind conditions are predicted between the proposed building and the existing mid-rise building to the south, under the overhang close to the northeast building corner, at a parking lot area to the north of the site, and at one location on Plains Road East (Locations 5, 7, 23, 24, 28, and 50 in Figure 2B).The Safety Criterion is predicted to be met at all ground-level locations in the proposed configuration (Figure 3B).

3.2.2 Level 2 Terrace (Locations 55 through 58)

The Level 2 terrace is close to the ground and is not directly exposed to the prevailing winds. Wind conditions on this terrace are anticipated to be comfortable for Sitting or Standing in the summer, which is suitable for most outdoor uses (Figure 1B). Increased wind speeds occur in the winter (Figure 2B); however, this may not be a concern due to reduced use of outdoor spaces in the colder months of the year.

3.2.3 Level 6 Terraces (Locations 59 through 72)

The wind environment on the Level 6 terraces is expected to be comfortable for Standing in most areas during the summer, with higher wind speeds comfortable for Leisurely Walking or Fast Walking occurring in the central part of the west terrace and around the eastern corners of the east terrace (Figure 1B). Elevated wind speeds are anticipated in the winter (Figure 2B); however, as noted previously, windy terraces in the winter may not be of concern.

The Safety Criterion is predicted to be exceeded at a localized area on the Level 6 terrace close to the northeast tower corner (Location 65 in Figure 3B).

3.3 Future Configuration

3.3.1 Ground Level (Locations 1 through 54)

After the construction of future surroundings in the area, improved wind conditions are generally anticipated at the ground level relative to the Proposed configuration. Wind speeds around the proposed building are expected to generally meet the criterion for Leisurely Walking or Fast Walking, and uncomfortable wind conditions are only predicted to occur around the northwest corner of the building in the winter, due to the future tall building to the west (Location 17 in Figure 2C).

3.3.2 Level 2 Terrace (Locations 55 through 58)

Slightly improved conditions are also anticipated on the Level 2 terrace. Conditions suitable for Sitting are anticipated on the whole terrace in the summer (Figure 1C), with speeds comfortable for standing in the winter (Figure 2C)

3.3.3 Level 6 Terraces (Locations 59 through 72)

Similar or slightly higher wind speeds to the Proposed configuration are anticipated on the Level 6 terraces in the Future configuration (Figures 1C and 2C). The Safety Criterion is still predicted to be exceeded at Location 65 (Figure 3C).

3.4 Wind Control Features

3.4.1 Ground Level

Possible ways of improving wind conditions on site at grade include:

- Articulating the corners of the tower and podium, especially on the east side. These features can help break the wind downdrafts and reduce the extent of the high wind speed areas that tend to develop around corners.

- Installing a deep continuous canopy along the east façade, preferably wrapping around the northeast corner, to deflect downwashing winds away from pedestrian areas. In order to be effective as a wind control feature, the canopy should project at least 2m out from the building façade.

- Adding wind screens around the northeast corner of the building. wind screens should be tall (2m+) and ideally have a small fraction of open area (up to 30%).

- Planting large landscaping elements along the sidewalk of Cooke Boulevard and on the south side of the building where feasible. Please note that plants used for wind control should be large, have dense foliage, and be able to retain their leaves in the colder months of the year (coniferous or marcescent species)

  Conceptual examples of these wind control features are shown in Image 6.



Image 6: Examples of wind control features (Ground Level)

The borderline uncomfortable wind conditions off site at Locations 28 and 50 (Figure 2B and Table 1) are predicted to be appropriate for Fast Walking in the Future configuration (Figure 2C) and, therefore, no wind mitigation is necessary.

3.4.2 Level 6 Terraces

Wind conditions on the Level 6 terraces can be improved by:

- Installing large horizontal features (canopies/trellises) around the eastern corners of the tower.
- Adding planters/partitions/dividers to tower corners and in other frequently used areas to create sheltered zones for occupants.

Examples of these wind control features are shown in Image 7.



Image 7: Examples of wind control features (Level 6 Terraces)

4 STATEMENT OF LIMITATIONS

Limitations

This report was prepared by Rowan Williams Davies & Irwin, Inc. ("RWDI") for Real Capital Partners ("Client"). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein ("Project"). The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared.

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

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

Design Assumptions

RWDI confirms that the pedestrian wind assessment (the "**Assessment**") discussed herein was performed by RWDI in accordance with generally accepted professional standards at the time when the Assessment was performed and in the location of the Project. No other representations, warranties, or guarantees are made with respect to the accuracy or completeness of the information, findings, recommendations, or conclusions contained in this Report. This report is not a legal opinion regarding compliance with applicable laws.

The findings and recommendations set out in this report are based on the following information disclosed to RWDI. Drawings and information listed below were received from Real Capital Partners and used to construct the scale model of the proposed development **("Project Data**")

File Name	File Type	Date Received (dd/mm/yyyy)
22255P01-ARCH-TF-ZZ-WIP_2023-11-10	.PDF	10/11/2023
2023-11-01 - 1026 Cooke Blvd	.SKP	01/11/2023
2023-11-01 - 1026 Cooke Blvd	.DWG	01/11/2023

The recommendations and conclusions are based on the assumption that the Project Data and Climate Data are accurate and complete. RWDI assumes no responsibility for any inaccuracy or deficiency in information it has received from others. In addition, the recommendations and conclusions in this report are partially based on

historical data and can be affected by a number of external factors, including but not limited to Project design, quality of materials and construction, site conditions, meteorological events, and climate change. As such, the conclusions and recommendations contained in this report do not list every possible outcome.

The opinions in this report can only be relied upon to the extent that the Project Data and Project Specific Conditions have not changed. Any change in the Project Data or Project Specific Conditions not reflected in this report can impact and/or alter the recommendations and conclusions in this report. Therefore, it is incumbent upon the Client and/or any other third party reviewing the recommendations and conclusions in this report to contact RWDI in the event of any change in the Project Data and Project Specific Conditions in order to determine whether any such change(s) may impact the assumptions upon which the recommendations and conclusions were made.

5 REFERENCES

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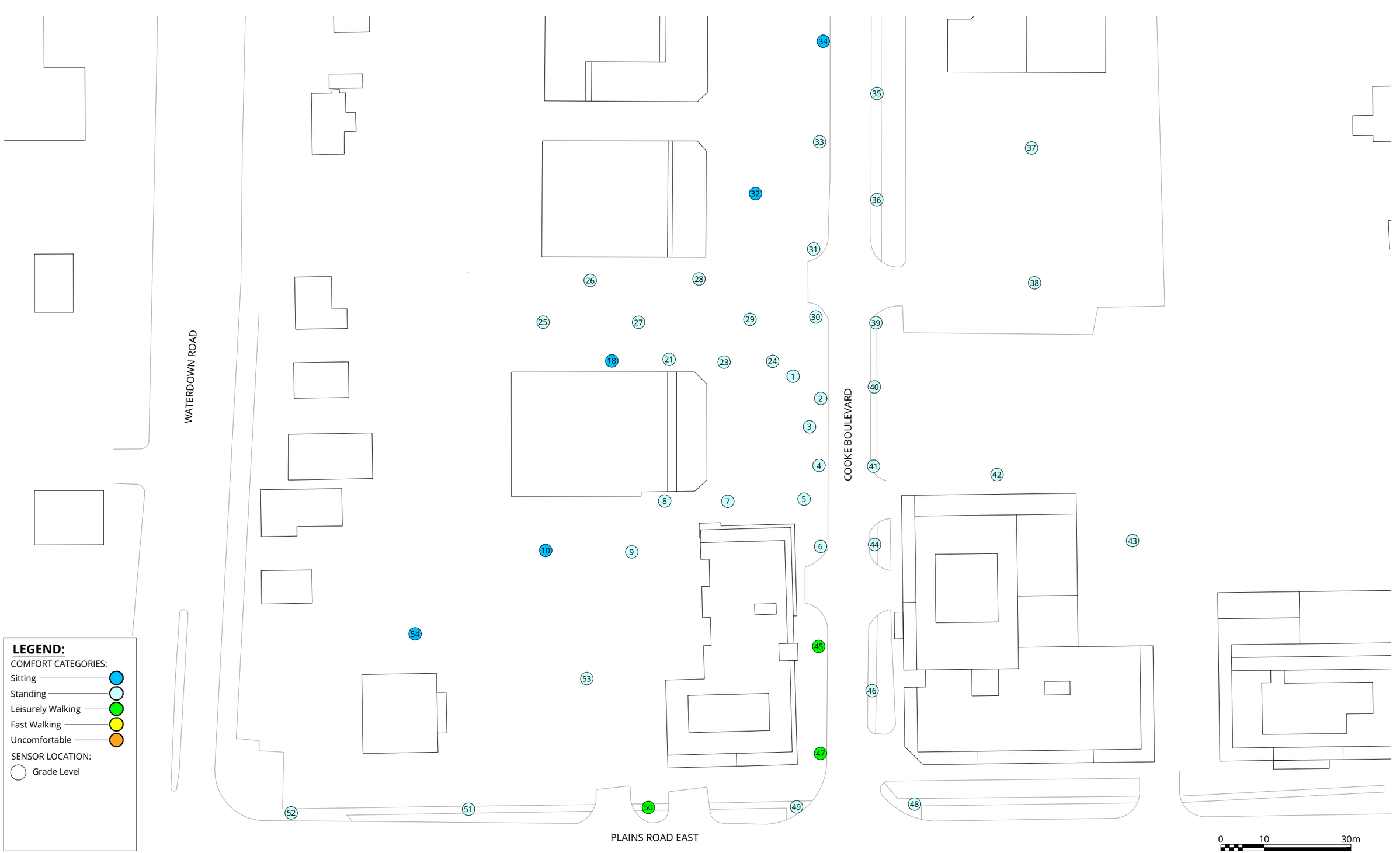
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FIGURES



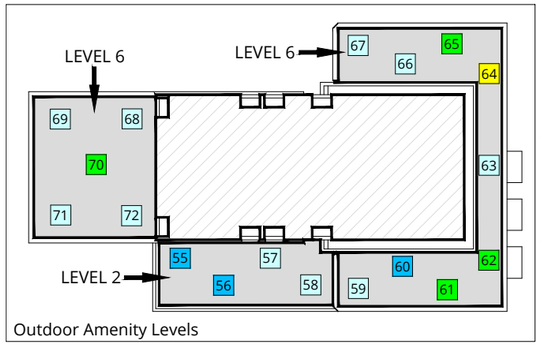
Pedestrian Wind Comfort Conditions
Existing Configuration
Summer (May to October, 6:00 to 23:00)

1026 Cooke Boulevard - Burlington, ON

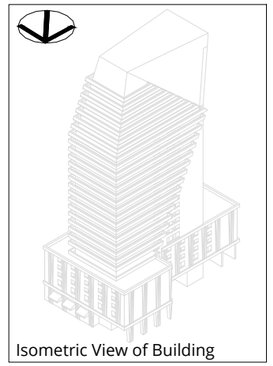
Project North True North

Project #2305839

Drawn by: ALJM	Figure: 1A
Approx. Scale:	1:800
Date Revised:	Nov. 24, 2023



Outdoor Amenity Levels


Isometric View of Building

WATERDOWN ROAD

COOKE BOULEVARD

PLAINS ROAD EAST

LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Leisurely Walking
- Fast Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level
- Outdoor Amenity Level
- Building Above Removed for Clarity
- Main Entrance Location

0 10 30m

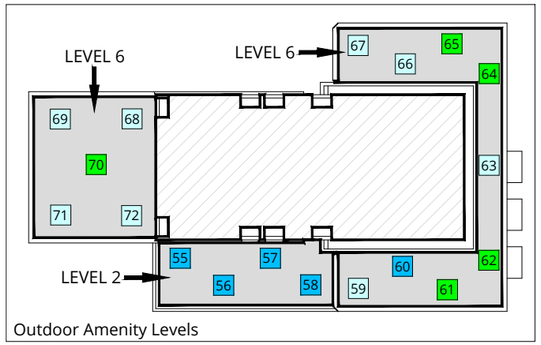
Pedestrian Wind Comfort Conditions
Proposed Configuration
Summer (May to October, 6:00 to 23:00)

1026 Cooke Boulevard - Burlington, ON

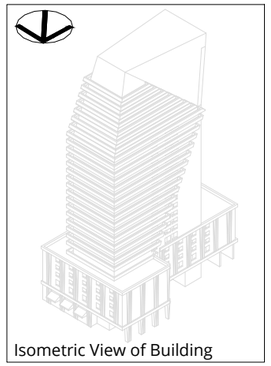
Project North True North

Project #2305839

Drawn by: ALJM	Figure: 1B
Approx. Scale:	1:800
Date Revised:	Nov. 24, 2023



Outdoor Amenity Levels


Isometric View of Building

FUTURE BUILDING

WATERDOWN ROAD

COOKE BOULEVARD

PLAINS ROAD EAST

LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Leisurely Walking
- Fast Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level
- Outdoor Amenity Level
- Building Above Removed for Clarity
- Main Entrance Location

0 10 30m

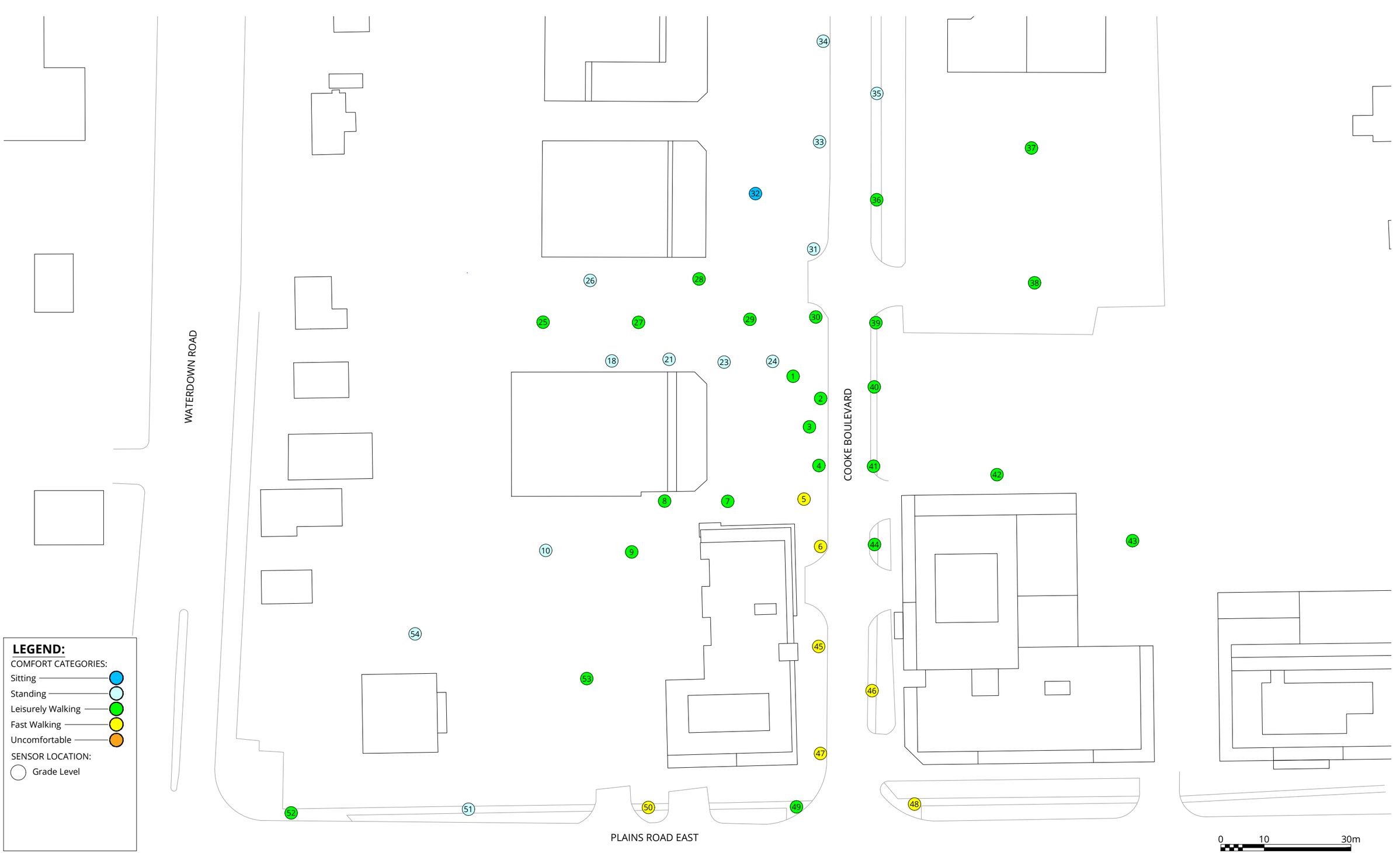
Pedestrian Wind Comfort Conditions
Future Configuration
Summer (May to October, 6:00 to 23:00)

1026 Cooke Boulevard - Burlington, ON

Project North True North

Project #2305839

Drawn by: ALJM	Figure: 1C
Approx. Scale:	1:800
Date Revised:	Nov. 24, 2023



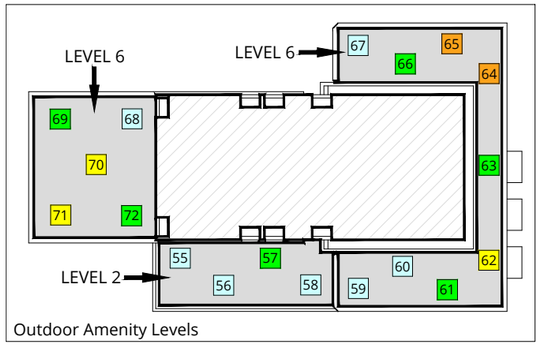
Pedestrian Wind Comfort Conditions
Existing Configuration
Winter (November to April, 6:00 to 23:00)

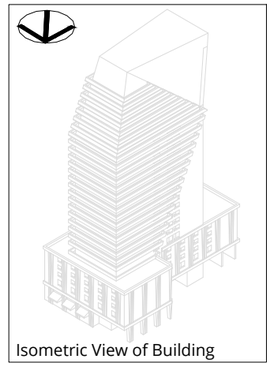
1026 Cooke Boulevard - Burlington, ON

Project North True North

Project #2305839

Drawn by: ALJM	Figure: 2A
Approx. Scale:	1:800
Date Revised:	Nov. 24, 2023





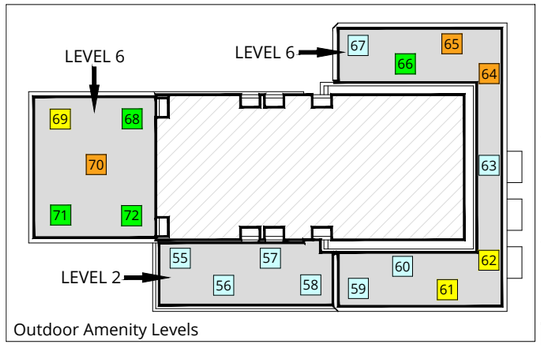
Pedestrian Wind Comfort Conditions
Proposed Configuration
Winter (November to April, 6:00 to 23:00)

1026 Cooke Boulevard - Burlington, ON

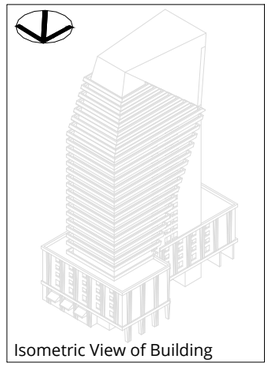
Project North True North

Project #2305839

Drawn by: ALJM	Figure: 2B
Approx. Scale:	1:800
Date Revised:	Nov. 24, 2023



Outdoor Amenity Levels


Isometric View of Building

FUTURE BUILDING

WATERDOWN ROAD

COOKE BOULEVARD

PLAINS ROAD EAST

LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Leisurely Walking
- Fast Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level
- Outdoor Amenity Level
- Building Above Removed for Clarity
- Main Entrance Location

0 10 30m

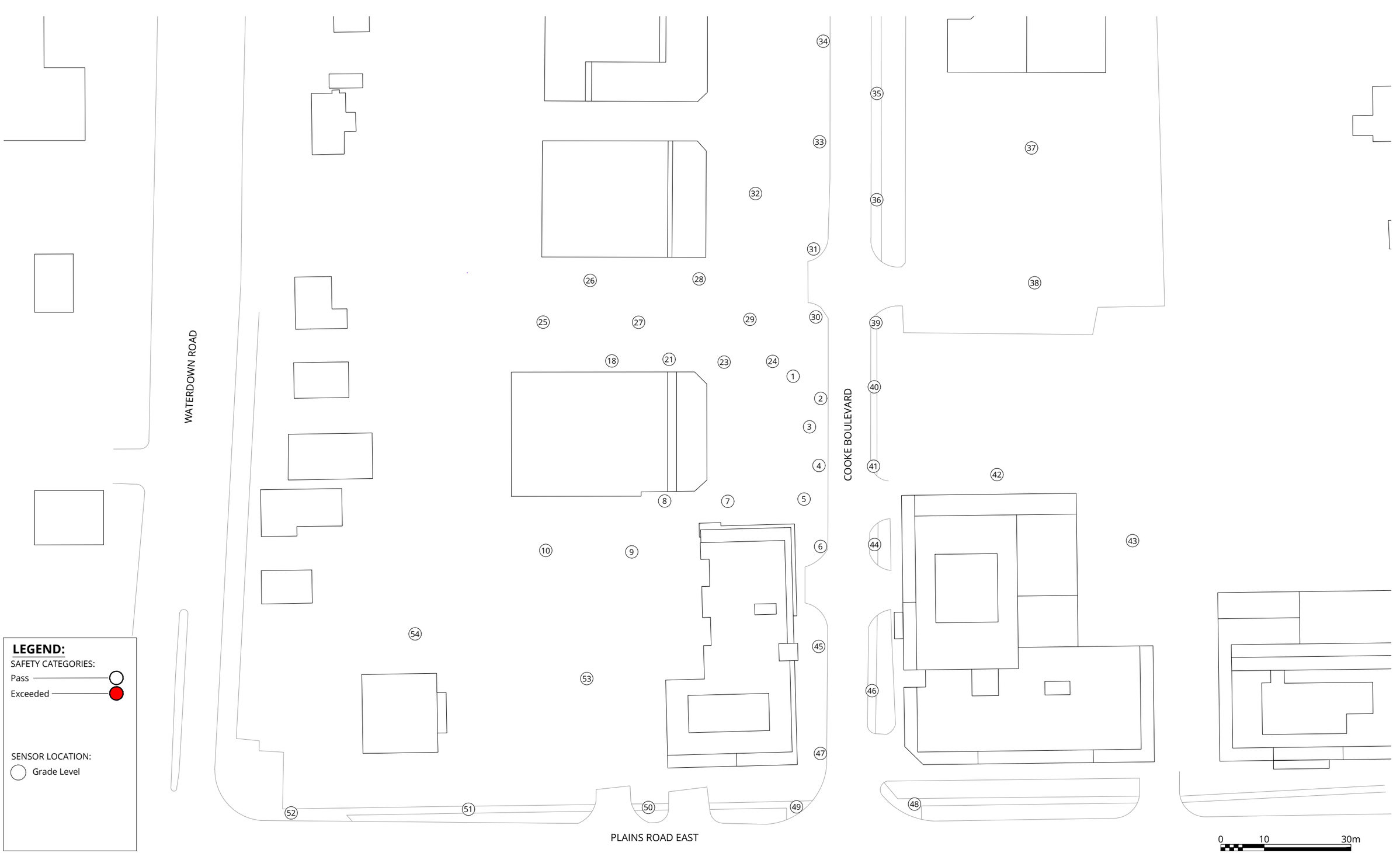
Pedestrian Wind Comfort Conditions
Future Configuration
Winter (November to April, 6:00 to 23:00)

1026 Cooke Boulevard - Burlington, ON

Project North True North

Project #2305839

Drawn by: ALJM	Figure: 2C
Approx. Scale:	1:800
Date Revised:	Nov. 24, 2023



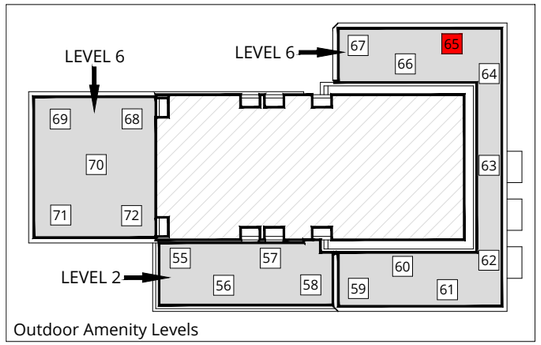
Pedestrian Wind Safety Conditions
Existing Configuration
Annual (January to December, 0:00 to 23:00)

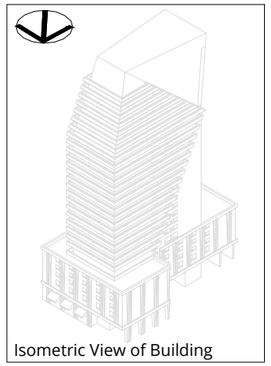
1026 Cooke Boulevard - Burlington, ON

Project North True North

Project #2305839

Drawn by: ALJM	Figure: 3A
Approx. Scale:	1:800
Date Revised:	Nov. 24, 2023





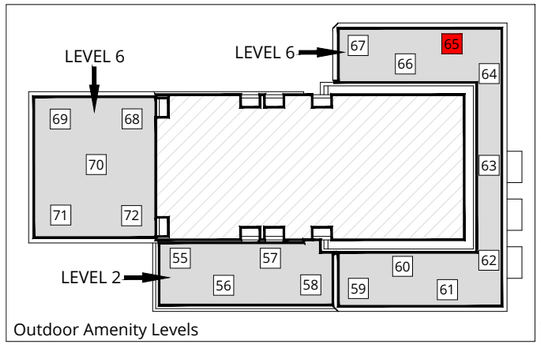
Pedestrian Wind Safety Conditions
Proposed Configuration
Annual (January to December, 0:00 to 23:00)

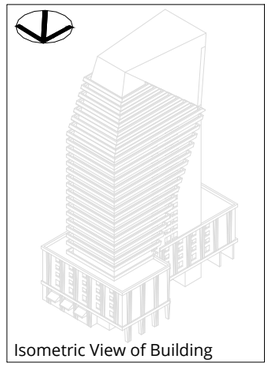
1026 Cooke Boulevard - Burlington, ON

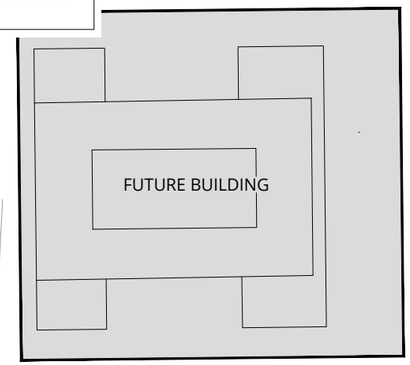
Project North True North

Project #2305839

Drawn by: ALJM	Figure: 3B
Approx. Scale:	1:800
Date Revised:	Nov. 24, 2023







WATERDOWN ROAD

COOKE BOULEVARD

PLAINS ROAD EAST

LEGEND:

SAFETY CATEGORIES:
- Pass
- Exceeded

SENSOR LOCATION:
- Grade Level
- Outdoor Amenity Level
- Building Above Removed for Clarity
- Main Entrance Location

0 10 30m

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

1026 Cooke Boulevard - Burlington, ON

Project North True North

Project #2305839

Drawn by: ALJM	Figure: 3C
Approx. Scale:	1:800
Date Revised:	Nov. 24, 2023

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	12	Standing	15	Leisurely Walking	67	Pass
	Proposed	10	Sitting	12	Standing	57	Pass
	Future	9	Sitting	11	Standing	54	Pass
2	Existing	13	Standing	15	Leisurely Walking	67	Pass
	Proposed	13	Standing	15	Leisurely Walking	64	Pass
	Future	11	Standing	14	Standing	54	Pass
3	Existing	13	Standing	16	Leisurely Walking	68	Pass
	Proposed	13	Standing	15	Leisurely Walking	61	Pass
	Future	12	Standing	15	Leisurely Walking	59	Pass
4	Existing	14	Standing	17	Leisurely Walking	75	Pass
	Proposed	15	Leisurely Walking	18	Fast Walking	66	Pass
	Future	14	Standing	16	Leisurely Walking	63	Pass
5	Existing	14	Standing	18	Fast Walking	73	Pass
	Proposed	17	Leisurely Walking	21	Uncomfortable	87	Pass
	Future	17	Leisurely Walking	20	Fast Walking	87	Pass
6	Existing	14	Standing	18	Fast Walking	67	Pass
	Proposed	14	Standing	17	Leisurely Walking	64	Pass
	Future	13	Standing	16	Leisurely Walking	62	Pass
7	Existing	13	Standing	16	Leisurely Walking	63	Pass
	Proposed	16	Leisurely Walking	21	Uncomfortable	83	Pass
	Future	15	Leisurely Walking	20	Fast Walking	85	Pass
8	Existing	12	Standing	15	Leisurely Walking	63	Pass
	Proposed	11	Standing	14	Standing	65	Pass
	Future	11	Standing	14	Standing	69	Pass
9	Existing	12	Standing	16	Leisurely Walking	67	Pass
	Proposed	10	Sitting	13	Standing	55	Pass
	Future	10	Sitting	13	Standing	61	Pass
10	Existing	9	Sitting	11	Standing	52	Pass
	Proposed	12	Standing	15	Leisurely Walking	62	Pass
	Future	11	Standing	14	Standing	62	Pass
11	Existing	-	-	-	-	-	-
	Proposed	12	Standing	16	Leisurely Walking	65	Pass
	Future	12	Standing	16	Leisurely Walking	74	Pass
12	Existing	-	-	-	-	-	-
	Proposed	10	Sitting	13	Standing	71	Pass
	Future	7	Sitting	9	Sitting	44	Pass
13	Existing	-	-	-	-	-	-
	Proposed	12	Standing	17	Leisurely Walking	77	Pass
	Future	8	Sitting	11	Standing	52	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
14	Existing	-	-	-	-	-	-
	Proposed	14	Standing	19	Fast Walking	73	Pass
	Future	12	Standing	15	Leisurely Walking	64	Pass
15	Existing	-	-	-	-	-	-
	Proposed	14	Standing	18	Fast Walking	76	Pass
	Future	13	Standing	16	Leisurely Walking	67	Pass
16	Existing	-	-	-	-	-	-
	Proposed	10	Sitting	12	Standing	56	Pass
	Future	15	Leisurely Walking	18	Fast Walking	76	Pass
17	Existing	-	-	-	-	-	-
	Proposed	15	Leisurely Walking	18	Fast Walking	82	Pass
	Future	20	Fast Walking	24	Uncomfortable	81	Pass
18	Existing	10	Sitting	13	Standing	50	Pass
	Proposed	10	Sitting	12	Standing	48	Pass
	Future	10	Sitting	14	Standing	65	Pass
19	Existing	-	-	-	-	-	-
	Proposed	6	Sitting	7	Sitting	29	Pass
	Future	6	Sitting	8	Sitting	35	Pass
20	Existing	-	-	-	-	-	-
	Proposed	9	Sitting	11	Standing	41	Pass
	Future	10	Sitting	13	Standing	54	Pass
21	Existing	12	Standing	14	Standing	64	Pass
	Proposed	10	Sitting	13	Standing	50	Pass
	Future	9	Sitting	11	Standing	50	Pass
22	Existing	-	-	-	-	-	-
	Proposed	7	Sitting	10	Sitting	40	Pass
	Future	8	Sitting	11	Standing	61	Pass
23	Existing	11	Standing	13	Standing	62	Pass
	Proposed	16	Leisurely Walking	22	Uncomfortable	86	Pass
	Future	12	Standing	17	Leisurely Walking	79	Pass
24	Existing	11	Standing	14	Standing	64	Pass
	Proposed	18	Fast Walking	23	Uncomfortable	84	Pass
	Future	15	Leisurely Walking	19	Fast Walking	81	Pass
25	Existing	12	Standing	16	Leisurely Walking	61	Pass
	Proposed	17	Leisurely Walking	20	Fast Walking	73	Pass
	Future	16	Leisurely Walking	20	Fast Walking	79	Pass
26	Existing	11	Standing	14	Standing	61	Pass
	Proposed	15	Leisurely Walking	19	Fast Walking	72	Pass
	Future	12	Standing	15	Leisurely Walking	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
27	Existing	12	Standing	15	Leisurely Walking	62	Pass
	Proposed	14	Standing	18	Fast Walking	69	Pass
	Future	13	Standing	17	Leisurely Walking	73	Pass
28	Existing	12	Standing	15	Leisurely Walking	62	Pass
	Proposed	18	Fast Walking	22	Uncomfortable	77	Pass
	Future	16	Leisurely Walking	20	Fast Walking	73	Pass
29	Existing	12	Standing	15	Leisurely Walking	62	Pass
	Proposed	15	Leisurely Walking	18	Fast Walking	81	Pass
	Future	12	Standing	15	Leisurely Walking	76	Pass
30	Existing	12	Standing	15	Leisurely Walking	64	Pass
	Proposed	15	Leisurely Walking	19	Fast Walking	72	Pass
	Future	14	Standing	17	Leisurely Walking	67	Pass
31	Existing	11	Standing	14	Standing	57	Pass
	Proposed	13	Standing	17	Leisurely Walking	64	Pass
	Future	13	Standing	16	Leisurely Walking	63	Pass
32	Existing	9	Sitting	10	Sitting	46	Pass
	Proposed	11	Standing	13	Standing	54	Pass
	Future	11	Standing	13	Standing	53	Pass
33	Existing	11	Standing	13	Standing	55	Pass
	Proposed	12	Standing	14	Standing	59	Pass
	Future	13	Standing	17	Leisurely Walking	60	Pass
34	Existing	10	Sitting	12	Standing	50	Pass
	Proposed	10	Sitting	12	Standing	51	Pass
	Future	15	Leisurely Walking	19	Fast Walking	72	Pass
35	Existing	11	Standing	13	Standing	53	Pass
	Proposed	12	Standing	15	Leisurely Walking	55	Pass
	Future	14	Standing	19	Fast Walking	75	Pass
36	Existing	12	Standing	15	Leisurely Walking	57	Pass
	Proposed	14	Standing	18	Fast Walking	63	Pass
	Future	13	Standing	17	Leisurely Walking	62	Pass
37	Existing	12	Standing	16	Leisurely Walking	58	Pass
	Proposed	13	Standing	17	Leisurely Walking	60	Pass
	Future	13	Standing	18	Fast Walking	74	Pass
38	Existing	13	Standing	16	Leisurely Walking	61	Pass
	Proposed	13	Standing	18	Fast Walking	63	Pass
	Future	12	Standing	16	Leisurely Walking	64	Pass
39	Existing	12	Standing	16	Leisurely Walking	62	Pass
	Proposed	15	Leisurely Walking	19	Fast Walking	70	Pass
	Future	13	Standing	17	Leisurely 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
40	Existing	13	Standing	16	Leisurely Walking	68	Pass
	Proposed	15	Leisurely Walking	18	Fast Walking	76	Pass
	Future	14	Standing	19	Fast Walking	75	Pass
41	Existing	14	Standing	17	Leisurely Walking	69	Pass
	Proposed	16	Leisurely Walking	19	Fast Walking	71	Pass
	Future	15	Leisurely Walking	18	Fast Walking	68	Pass
42	Existing	12	Standing	16	Leisurely Walking	67	Pass
	Proposed	11	Standing	13	Standing	62	Pass
	Future	10	Sitting	13	Standing	59	Pass
43	Existing	14	Standing	17	Leisurely Walking	74	Pass
	Proposed	14	Standing	17	Leisurely Walking	71	Pass
	Future	12	Standing	15	Leisurely Walking	70	Pass
44	Existing	12	Standing	16	Leisurely Walking	63	Pass
	Proposed	15	Leisurely Walking	18	Fast Walking	78	Pass
	Future	14	Standing	17	Leisurely Walking	76	Pass
45	Existing	16	Leisurely Walking	20	Fast Walking	81	Pass
	Proposed	16	Leisurely Walking	20	Fast Walking	85	Pass
	Future	16	Leisurely Walking	19	Fast Walking	87	Pass
46	Existing	14	Standing	19	Fast Walking	71	Pass
	Proposed	12	Standing	15	Leisurely Walking	63	Pass
	Future	12	Standing	15	Leisurely Walking	62	Pass
47	Existing	15	Leisurely Walking	19	Fast Walking	74	Pass
	Proposed	15	Leisurely Walking	18	Fast Walking	74	Pass
	Future	14	Standing	18	Fast Walking	77	Pass
48	Existing	14	Standing	18	Fast Walking	73	Pass
	Proposed	12	Standing	15	Leisurely Walking	62	Pass
	Future	11	Standing	14	Standing	59	Pass
49	Existing	13	Standing	16	Leisurely Walking	68	Pass
	Proposed	13	Standing	17	Leisurely Walking	69	Pass
	Future	14	Standing	17	Leisurely Walking	70	Pass
50	Existing	15	Leisurely Walking	19	Fast Walking	72	Pass
	Proposed	16	Leisurely Walking	21	Uncomfortable	76	Pass
	Future	15	Leisurely Walking	19	Fast Walking	75	Pass
51	Existing	11	Standing	14	Standing	60	Pass
	Proposed	11	Standing	14	Standing	58	Pass
	Future	11	Standing	13	Standing	58	Pass
52	Existing	12	Standing	15	Leisurely Walking	54	Pass
	Proposed	12	Standing	16	Leisurely Walking	55	Pass
	Future	13	Standing	17	Leisurely Walking	59	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
53	Existing	12	Standing	16	Leisurely Walking	68	Pass
	Proposed	12	Standing	16	Leisurely Walking	67	Pass
	Future	11	Standing	14	Standing	62	Pass
54	Existing	9	Sitting	12	Standing	47	Pass
	Proposed	10	Sitting	13	Standing	51	Pass
	Future	12	Standing	16	Leisurely Walking	66	Pass
55	Existing	-	-	-	-	-	-
	Proposed	10	Sitting	13	Standing	61	Pass
	Future	9	Sitting	11	Standing	54	Pass
56	Existing	-	-	-	-	-	-
	Proposed	10	Sitting	14	Standing	58	Pass
	Future	10	Sitting	13	Standing	59	Pass
57	Existing	-	-	-	-	-	-
	Proposed	12	Standing	16	Leisurely Walking	76	Pass
	Future	10	Sitting	13	Standing	61	Pass
58	Existing	-	-	-	-	-	-
	Proposed	11	Standing	14	Standing	61	Pass
	Future	10	Sitting	13	Standing	63	Pass
59	Existing	-	-	-	-	-	-
	Proposed	12	Standing	14	Standing	82	Pass
	Future	11	Standing	14	Standing	81	Pass
60	Existing	-	-	-	-	-	-
	Proposed	10	Sitting	12	Standing	55	Pass
	Future	10	Sitting	12	Standing	55	Pass
61	Existing	-	-	-	-	-	-
	Proposed	15	Leisurely Walking	17	Leisurely Walking	87	Pass
	Future	15	Leisurely Walking	18	Fast Walking	89	Pass
62	Existing	-	-	-	-	-	-
	Proposed	15	Leisurely Walking	18	Fast Walking	78	Pass
	Future	15	Leisurely Walking	18	Fast Walking	81	Pass
63	Existing	-	-	-	-	-	-
	Proposed	12	Standing	15	Leisurely Walking	66	Pass
	Future	11	Standing	14	Standing	61	Pass
64	Existing	-	-	-	-	-	-
	Proposed	18	Fast Walking	24	Uncomfortable	87	Pass
	Future	17	Leisurely Walking	22	Uncomfortable	87	Pass
65	Existing	-	-	-	-	-	-
	Proposed	17	Leisurely Walking	22	Uncomfortable	99	Exceeded
	Future	17	Leisurely Walking	21	Uncomfortable	101	Exceeded

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
66	Existing	-	-	-	-	-	-
	Proposed	12	Standing	16	Leisurely Walking	68	Pass
	Future	13	Standing	17	Leisurely Walking	70	Pass
67	Existing	-	-	-	-	-	-
	Proposed	11	Standing	14	Standing	79	Pass
	Future	11	Standing	13	Standing	75	Pass
68	Existing	-	-	-	-	-	-
	Proposed	12	Standing	14	Standing	60	Pass
	Future	13	Standing	17	Leisurely Walking	75	Pass
69	Existing	-	-	-	-	-	-
	Proposed	13	Standing	16	Leisurely Walking	68	Pass
	Future	14	Standing	18	Fast Walking	74	Pass
70	Existing	-	-	-	-	-	-
	Proposed	16	Leisurely Walking	20	Fast Walking	87	Pass
	Future	16	Leisurely Walking	21	Uncomfortable	86	Pass
71	Existing	-	-	-	-	-	-
	Proposed	14	Standing	19	Fast Walking	74	Pass
	Future	13	Standing	17	Leisurely Walking	67	Pass
72	Existing	-	-	-	-	-	-
	Proposed	13	Standing	17	Leisurely Walking	67	Pass
	Future	12	Standing	15	Leisurely Walking	68	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
Future	Project with future surroundings

Comfort Speed (km/h) (20% Seasonal Exceedance)	
≤ 10	Sitting
11 - 14	Standing
15 - 17	Leisurely Walking
18 - 20	Fast Walking
> 20	Uncomfortable

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