REPORT

3115 HURONTARIO STREET

MISSISSAUGA, ON

PEDESTRIAN WIND STUDY
RWDI # 2406897
July 31, 2024

SUBMITTED TO

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EXECUTIVE SUMMARY

RWDI was retained to conduct a pedestrian wind assessment for the proposed development at 3115 Hurontario Street in Mississauga, ON. The assessment was based on the wind tunnel testing conducted for the proposed development site with existing and future – as of right surroundings. The location, footprint, and height of the future buildings – as of right were determined from the context plan received from the design team by RWDI on July 10th, 2024. The height of other future buildings that are in the approval process has been reduced to the maximum height approved by the City.

The wind tunnel tests included proposed landscaping on-site, such as leafless trees, in order to provide more conservative wind conditions. The results were analyzed using the regional wind climate records and evaluated against the Mississauga 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 1 and 2, and Table 1. Note that references to the orientation of built features are based on Project North which is approximately aligned with Kirwin Avenue as shown in the figures.

Key Findings:

- The proposed project will be a 142 m tall (42-storey) mixed-use development, with an outdoor charity terrace on Level 2 and outdoor residential amenity terraces on Levels 3 and 7.
- The proposed project in the context of the existing and future – as of right surroundings will be significantly sheltered from the prevailing winds; hence, wind speeds that meet the pedestrian safety criterion are predicted at all locations assessed at and above grade level.
- Throughout the year, appropriate wind comfort conditions are expected at all areas assessed on the ground level, including sidewalks and walkways, as well as the residential, charity, and retail entrances.
- In the summer, when the outdoor areas are anticipated to be used most often, calm wind speeds are expected on the above-grade terraces, which is generally appropriate. If desired, lower wind speeds for prolonged seated uses like dining, lounging, etc. may be achieved on the north part of the Level 3 west terrace, the southwest and central parts of the Level 7 east terrace, and throughout the Level 7 west terrace by local wind control measures, as discussed in the report.
- In the winter, elevated wind speeds are expected at most areas on the upper-level terraces, but this may not be of concern as the areas would not be used frequently during the colder months.

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1 INTRODUCTION

RWDI was retained to conduct a pedestrian wind assessment for the proposed development at 3115 Hurontario Street in Mississauga, ON. This report presents the project objectives, background and approach, and discusses of the 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 project (site shown in Image 1) is located north of Hurontario Street and east of Kirwin Ave. It is a mixed-use development, consisting of 42 storeys and 4 levels of underground parking. The proposed building will have an outdoor charity terrace on Level 2 and outdoor residential amenity terraces on Levels 3 and 7.

1.2 Objectives

The objective of the study was to assess the wind 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 with existing and future – as of right surroundings in one of RWDI's boundary-layer wind tunnels. These measurements were combined with the local wind records and compared to the Mississauga criteria for gauging wind comfort and safety in pedestrian areas. The assessment focused on critical pedestrian areas, including building entrances, public sidewalks/walkways, and the above-grade outdoor amenity areas.

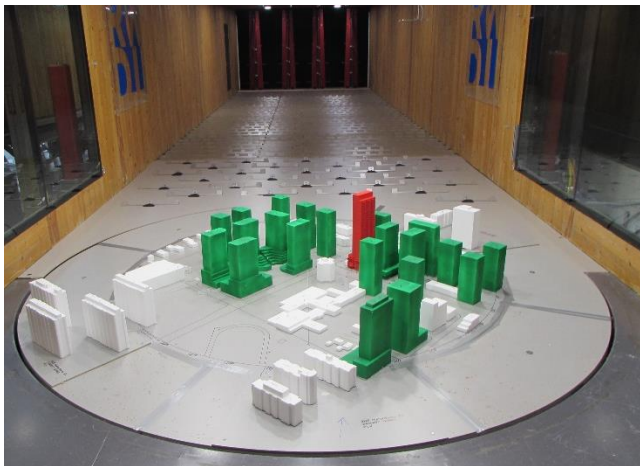
Image 1: Aerial View of the Existing Site and Surroundings (Photo Courtesy of Google™ Earth)

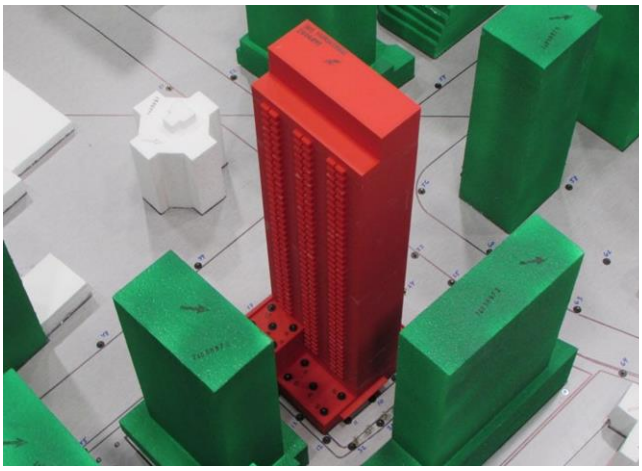
2 BACKGROUND AND APPROACH

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 proposed project with existing and future – as of right surroundings (Image 2). The location, footprint, and height of the future buildings – as of right were determined from the context plan received from the design team by RWDI on July 10th, 2024. The height of other future buildings that are in the approval process has been reduced to the maximum height approved by the City.

The wind tunnel model included all relevant surrounding buildings and topography within an approximately 360 m radius of the study site. The wind tunnel test included proposed landscaping on-site, such as leafless trees, in order to provide more conservative wind conditions. 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 88 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 increment. 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.





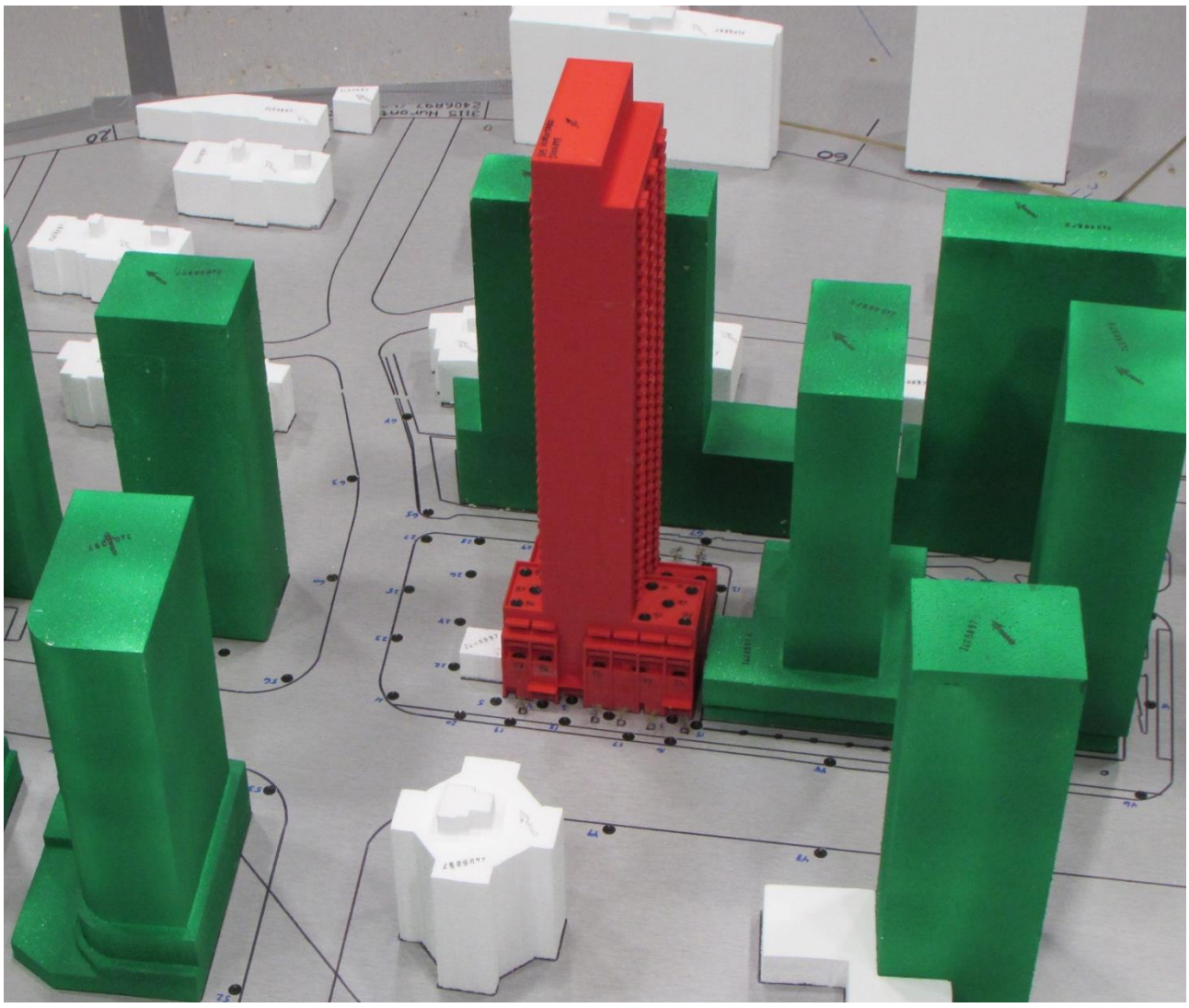
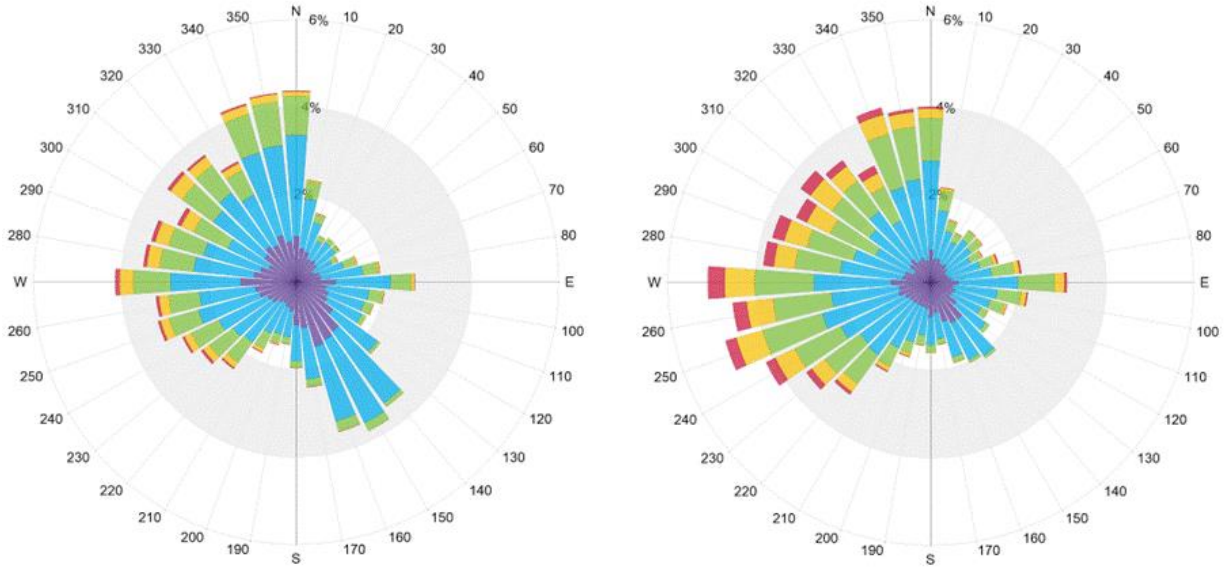


Image 2: Wind Tunnel Study Model – Proposed + Future Buildings – As of Right

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. Winds from the southwest, west and northwest directions are predominant during both summer and winter. During the winter season, the prevailing winds from the east direction are also frequent, as indicated by the wind roses. The southeast winds are frequent in the summer, but typically of low wind speeds. Strong winds of a mean speed greater than 30 km/h measured at the airport (at an anemometer height of 10 m) occur 4.8% and 11.4% 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.



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

Wind Speed (km/h)	Probability (%) Summer	Winter
Calm	5.3	3.7
1-10	30.7	22.5
11-20	42.9	39.9
21-30	16.2	22.6
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 criterion 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; and,
(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 a site plan in Figures 1 and 2 located in the "Figures" section of this report. These conditions and the associated wind speeds are also represented 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.

Note that references to the orientation of built features are based on Project North which is approximately aligned with Kirwin Avenue as shown in the figures.

Wind conditions that meet the safety criterion are predicted at all assessed locations for the proposed + future – as of right configuration.

3.1 Grade Level (Locations 1 through 67)

The proposed project in the context of the existing and future – as of right surroundings will be significantly sheltered from the prevailing winds; as such, moderate wind conditions are expected on and around the site.

The charity, residential and retail entrances are situated along the south façade, near Locations 1, 3 and 4, respectively. Wind speeds near the entrances are predicted to be comfortable for sitting or standing throughout the year, which is suitable for an entrance where pedestrians may linger (Figures 1 and 2).

In the summer, wind conditions at most areas on and around the project site are predicted to be comfortable for sitting or standing, with higher wind speeds conducive to walking mostly on the north side of the project site (Figure 1). In the winter, higher wind speeds occur in most of the areas assessed due to seasonally stronger winds, but conditions remain appropriate for walking or better in all areas (Figure 2). These conditions are appropriate for the intended use of sidewalks and walkways.

3.2 Above-Grade Levels (Locations 68 through 88)

It is generally desirable for wind conditions on terraces intended for passive activities to be comfortable for sitting more than 80% of the time in the summer. During the winter, the area would not be used frequently, and increased wind activity would be considered appropriate.

In the summer, when the above-grade outdoor spaces are anticipated to be used most frequently, wind conditions appropriate for sitting are expected at most areas on the terraces, which is appropriate (Figure 1). Slightly higher wind speeds comfortable for standing are expected to occur on the north part of the Level 3 west terrace (Location 80 in Figure 1), the southwest and central parts of the Level 7 east terrace (Locations 83 and 85 in Figure 1), and throughout the Level 7 west terrace (Locations 86 – 88 in Figure 1).

In the winter, slightly higher wind speeds are expected, but this may not be of concern as the areas would not be used frequently during the colder months (Figure 2).

While conditions comfortable for standing are generally appropriate for a terrace, the wind speeds may be slightly higher than desired if prolonged passive activities are planned such as seating, dining, etc. To achieve lower wind speeds in the outdoor amenity terraces, the design team is encouraged to consider taller guardrails along the perimeters of the Level 3 west terrace and Level 7 terraces. Landscaping/hardscaping features in the form of planters, screens and trellises that may be placed strategically around designated seating areas are also recommended to create localized low-wind zones. Examples are shown in Image 4 for reference.

Image 4: Examples of Wind Control Options Applicable to the Outdoor Amenity Spaces

4 STATEMENT OF LIMITATIONS

Limitations

This report was prepared by Rowan Williams Davies & Irwin, Inc. ("RWDI") for Sweeny & Co. Architects Inc. ("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 "**Assessmen**t") 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 by for Sweeny & Co. Architects Inc. **("Project Data**").

File Name	File Type	Date Received (dd/mm/yyyy)
240628_3115 Hurontario_Draft ZBA	PDF	03/07/2024
240628_3115 Hurontario_Draft ZBA-Sheet - AZ204 - Ground Floor.dwg	DWG	03/07/2024
240628_3115 Hurontario_Draft ZBA-Sheet - AZ205 - Level 02.dwg	DWG	03/07/2024
240628_3115 Hurontario_Draft ZBA-Sheet - AZ206 - Level 03 - Amenity.dwg	DWG	03/07/2024
240628_3115 Hurontario_Draft ZBA-Sheet - AZ207 - Level 04-06 Typical Podium.dwg	DWG	03/07/2024

File Name	File Type	Date Received (dd/mm/yyyy)
240628_3115 Hurontario_Draft ZBA-Sheet - AZ208 - Level 07 - Amenity.dwg	DWG	03/07/2024
240628_3115 Hurontario_Draft ZBA-Sheet - AZ209 - Level 08-42 Typical Tower.dwg	DWG	03/07/2024
240628_3115 Hurontario_Draft ZBA-Sheet - AZ210 - Roof Level - MPH & Amenity.dwg	DWG	03/07/2024
240628_3115 Hurontario_Draft ZBA-Sheet - AZ501 - Building Sections - North & East.dwg	DWG	03/07/2024

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

1. ASCE Task Committee on Outdoor Human Comfort (2004). *Outdoor Human Comfort and Its Assessment*, 68 pages, American Society of Civil Engineers, Reston, Virginia, USA.

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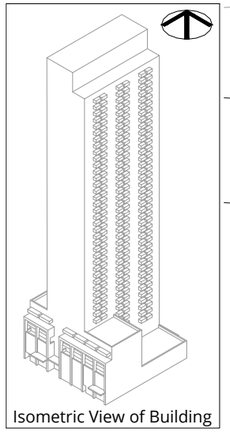
FIGURES



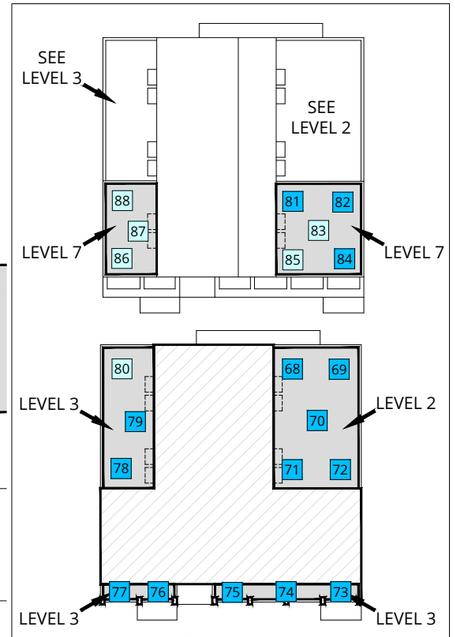
Isometric View of Building

KIRWIN AVENUE

FUTURE BUILDINGS

HURONTARIO STREET

HILLCREST AVENUE



LEGEND:

COMFORT CATEGORIES:

- Sitting
- Standing
- Walking
- Uncomfortable

- Grade Level Sensor
- Amenity Terrace Sensor
- Future Buildings - As of Right
- Building Above Removed for Clarity
- Main Entrance Location

0 20 40m

Pedestrian Wind Comfort Conditions

Proposed + Future - As of Right

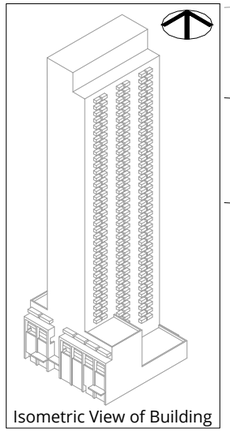
Summer (May to October, 6:00 to 23:00)

3115 Hurontario Street - Mississauga, ON

Project North True North

Project #2406897

Drawn by: ALJM	Figure: 1
Approx. Scale:	1:1000
Date Revised:	Jul. 24, 2024

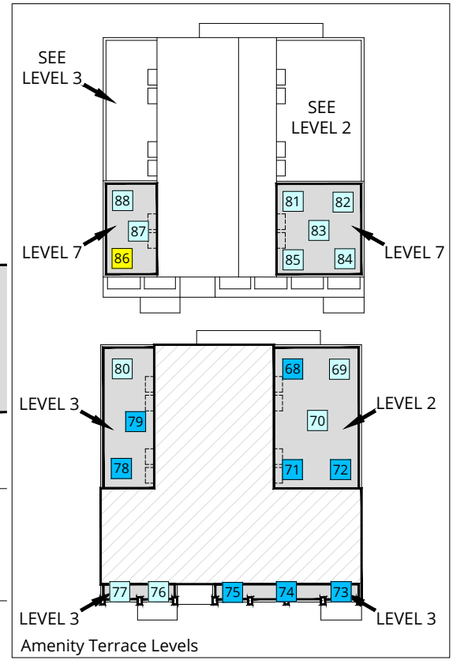

Isometric View of Building

KIRWIN AVENUE

FUTURE BUILDINGS

HURONTARIO STREET

HILLCREST AVENUE



Amenity Terrace Levels

LEGEND:

COMFORT CATEGORIES:

- Sitting
- Standing
- Walking
- Uncomfortable

- Grade Level Sensor
- Amenity Terrace Sensor
- Future Buildings - As of Right
- Building Above Removed for Clarity
- Main Entrance Location

0 20 40m

Pedestrian Wind Comfort Conditions

Proposed + Future - As of Right

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

3115 Hurontario Street - Mississauga, ON

Project North True North

Project #2406897

Drawn by: ALJM	Figure: 2
Approx. Scale:	1:1000
Date Revised:	Jul. 24, 2024

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	Proposed + Future	8	Sitting	10	Sitting	42	Pass
2	Proposed + Future	10	Sitting	11	Standing	50	Pass
3	Proposed + Future	7	Sitting	8	Sitting	38	Pass
4	Proposed + Future	11	Standing	13	Standing	56	Pass
5	Proposed + Future	15	Standing	18	Walking	80	Pass
6	Proposed + Future	8	Sitting	9	Sitting	54	Pass
7	Proposed + Future	10	Sitting	12	Standing	52	Pass
8	Proposed + Future	17	Walking	20	Walking	80	Pass
9	Proposed + Future	11	Standing	13	Standing	63	Pass
10	Proposed + Future	13	Standing	15	Standing	65	Pass
11	Proposed + Future	12	Standing	15	Standing	62	Pass
12	Proposed + Future	15	Standing	17	Walking	68	Pass
13	Proposed + Future	12	Standing	14	Standing	56	Pass
14	Proposed + Future	12	Standing	15	Standing	61	Pass
15	Proposed + Future	9	Sitting	11	Standing	48	Pass
16	Proposed + Future	12	Standing	14	Standing	63	Pass
17	Proposed + Future	12	Standing	14	Standing	69	Pass
18	Proposed + Future	13	Standing	15	Standing	73	Pass
19	Proposed + Future	15	Standing	18	Walking	75	Pass
20	Proposed + Future	15	Standing	18	Walking	69	Pass
21	Proposed + Future	15	Standing	18	Walking	70	Pass
22	Proposed + Future	12	Standing	14	Standing	61	Pass
23	Proposed + Future	15	Standing	18	Walking	70	Pass
24	Proposed + Future	13	Standing	15	Standing	63	Pass
25	Proposed + Future	15	Standing	18	Walking	69	Pass
26	Proposed + Future	14	Standing	17	Walking	74	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	Proposed + Future	17	Walking	20	Walking	81	Pass
28	Proposed + Future	17	Walking	20	Walking	79	Pass
29	Proposed + Future	18	Walking	20	Walking	77	Pass
30	Proposed + Future	17	Walking	20	Walking	79	Pass
31	Proposed + Future	16	Walking	19	Walking	73	Pass
32	Proposed + Future	15	Standing	18	Walking	73	Pass
33	Proposed + Future	17	Walking	20	Walking	82	Pass
34	Proposed + Future	15	Standing	18	Walking	77	Pass
35	Proposed + Future	15	Standing	18	Walking	74	Pass
36	Proposed + Future	14	Standing	18	Walking	80	Pass
37	Proposed + Future	11	Standing	13	Standing	58	Pass
38	Proposed + Future	15	Standing	18	Walking	69	Pass
39	Proposed + Future	16	Walking	19	Walking	76	Pass
40	Proposed + Future	15	Standing	17	Walking	71	Pass
41	Proposed + Future	12	Standing	14	Standing	67	Pass
42	Proposed + Future	14	Standing	17	Walking	73	Pass
43	Proposed + Future	15	Standing	17	Walking	75	Pass
44	Proposed + Future	12	Standing	14	Standing	63	Pass
45	Proposed + Future	15	Standing	17	Walking	72	Pass
46	Proposed + Future	14	Standing	16	Walking	69	Pass
47	Proposed + Future	15	Standing	18	Walking	76	Pass
48	Proposed + Future	13	Standing	16	Walking	67	Pass
49	Proposed + Future	14	Standing	16	Walking	68	Pass
50	Proposed + Future	13	Standing	16	Walking	70	Pass
51	Proposed + Future	13	Standing	16	Walking	67	Pass
52	Proposed + Future	12	Standing	14	Standing	78	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	Proposed + Future	16	Walking	17	Walking	70	Pass
54	Proposed + Future	13	Standing	16	Walking	63	Pass
55	Proposed + Future	16	Walking	18	Walking	70	Pass
56	Proposed + Future	13	Standing	16	Walking	66	Pass
57	Proposed + Future	13	Standing	15	Standing	69	Pass
58	Proposed + Future	15	Standing	18	Walking	86	Pass
59	Proposed + Future	12	Standing	14	Standing	61	Pass
60	Proposed + Future	17	Walking	19	Walking	74	Pass
61	Proposed + Future	14	Standing	16	Walking	67	Pass
62	Proposed + Future	14	Standing	16	Walking	67	Pass
63	Proposed + Future	14	Standing	17	Walking	74	Pass
64	Proposed + Future	13	Standing	16	Walking	73	Pass
65	Proposed + Future	16	Walking	20	Walking	81	Pass
66	Proposed + Future	13	Standing	15	Standing	64	Pass
67	Proposed + Future	14	Standing	17	Walking	68	Pass
68	Proposed + Future	9	Sitting	10	Sitting	47	Pass
69	Proposed + Future	10	Sitting	11	Standing	66	Pass
70	Proposed + Future	10	Sitting	12	Standing	56	Pass
71	Proposed + Future	9	Sitting	10	Sitting	49	Pass
72	Proposed + Future	8	Sitting	9	Sitting	42	Pass
73	Proposed + Future	7	Sitting	9	Sitting	45	Pass
74	Proposed + Future	8	Sitting	10	Sitting	43	Pass
75	Proposed + Future	7	Sitting	9	Sitting	40	Pass
76	Proposed + Future	10	Sitting	13	Standing	60	Pass
77	Proposed + Future	10	Sitting	12	Standing	57	Pass
78	Proposed + Future	8	Sitting	9	Sitting	38	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
79	Proposed + Future	9	Sitting	10	Sitting	41	Pass
80	Proposed + Future	12	Standing	14	Standing	64	Pass
81	Proposed + Future	10	Sitting	12	Standing	51	Pass
82	Proposed + Future	10	Sitting	11	Standing	46	Pass
83	Proposed + Future	12	Standing	14	Standing	61	Pass
84	Proposed + Future	10	Sitting	11	Standing	53	Pass
85	Proposed + Future	11	Standing	14	Standing	65	Pass
86	Proposed + Future	14	Standing	17	Walking	70	Pass
87	Proposed + Future	13	Standing	15	Standing	73	Pass
88	Proposed + Future	12	Standing	15	Standing	72	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		
Proposed + Future	Project with Existing and Future Buildings – As of Right	

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