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Date: November 17, 2021

To: Mr. Sam Badawi
ADI Development Group
1100 Burloak Drive
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Re: **Pedestrian Wind Study**
1120 Cooke Boulevard
Burlington, ON
SLR Project #241.30122.00000

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PROVINCE OF ONTARIO



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1.0 INTRODUCTION

SLR Consulting (SLR) was retained by ADI Development Group to conduct a pedestrian wind study for the 1120 Cooke Boulevard in Burlington, Ontario. This report is in support of the Official Plan Amendment (OPA) and Zoning Bylaw Amendment (ZBA) applications for the development.

1.1 Existing Development

The proposed development is located at 1120 Cooke Boulevard, at the northeast corner of the intersection of Waterdown Road and Masonry Court in Burlington. The site is currently unoccupied. Figure 1 provides an aerial view of the immediate study area. A virtual site visit was conducted by SLR using Google Earth images dated October 2020 and images are included in Figures 2a through 2d.

Immediately surrounding the site is an aggregate business to the south through west, a water reservoir to the northwest, low and mid-rise residential buildings to the northeast, with low-rise commercial buildings and their parking lots to the east and southeast. Beyond the immediate surroundings there are low-rise residential buildings to the northeast through south to southwest, with farmland to the west through north. Lake Ontario is located approximately 1 km to the southeast.

Typically, developments under construction and those with Site Plan Approval (SPA) are included as existing surroundings for the analysis. For this study developments included: 101 Masonry Court, 1085 Clearview Avenue, 35 Plains Road East, and 1025 Cooke Boulevard.



Figure 1: Aerial view of existing site & surroundings
Credit: Google Earth Pro, dated 7/8/2018



Figure 2a: Waterdown Boulevard Looking North (Site to the right)



Figure 2b: Waterdown Road Looking South (Site to the left)



Figure 2c: Masonry Court Looking East (Site to the left)



Figure 2d: Cooke Boulevard Looking North (Site tot eh left)

1.2 Proposed Development

The proposed development includes three buildings:

- Building A is 37-storeys tall, approximately 118 m in height including the mechanical penthouse, and located on top of an 'L' shaped five-storey podium at the northwest corner of the site.
- Building B is 27-storeys tall (approximately 104 m) and is located on the east edge of the site. Buildings B and C are located on top of a four-storey common podium.
- Building C is also 37-storeys tall (approximately 118 m) and located on the south edge of the site.

Figure 3 shows the rendering of the proposed development.

1.3 Areas of Interest

Areas of interest for pedestrian wind conditions include those areas which pedestrians are expected to use on a frequent basis. Typically these include sidewalks, main entrances, transit stops, plazas and parks. There are two transit stops along Waterdown Road, south of the proposed development. The main residential entrance to Building A is located along the south facade, while the main entrance to Building B and C are located along the north and west facades, respectively. The on-site areas are shown in Figure 4a.

Amenity spaces associated with the new development are located on Level 5 of Building A and on roof (Level 4) of the podium connecting Buildings B and C. At grade level, there is a patio and lawn to the east of Building A, a dog run area to the north of Building C, and a patio near the retail entrance to the south of Building B, as shown in Figures 4a and 4b.

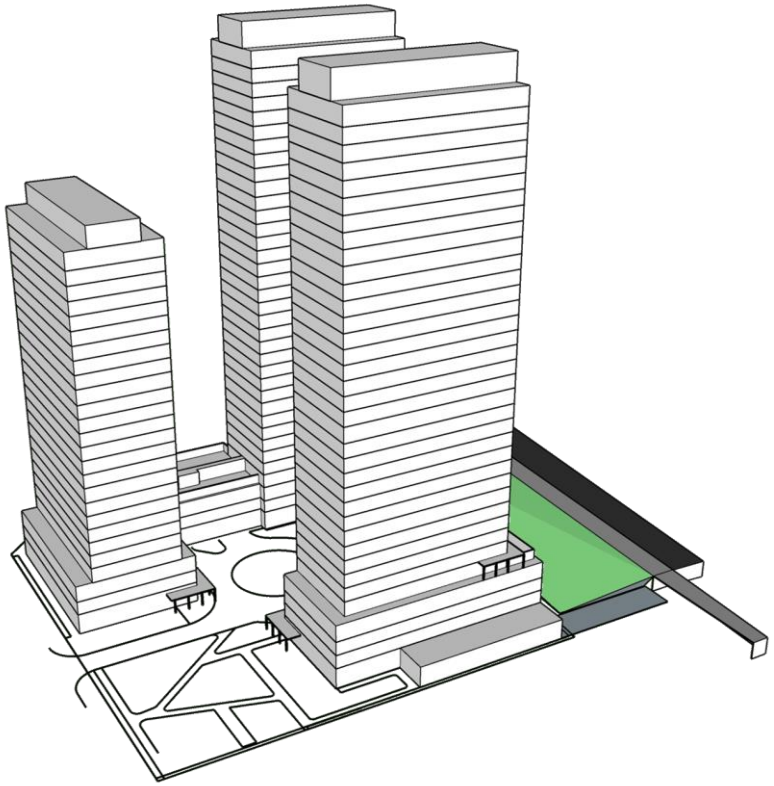


Figure 3: Rendering of Final Proposed Development
Credit: Core Architects (received May 21, 2021)

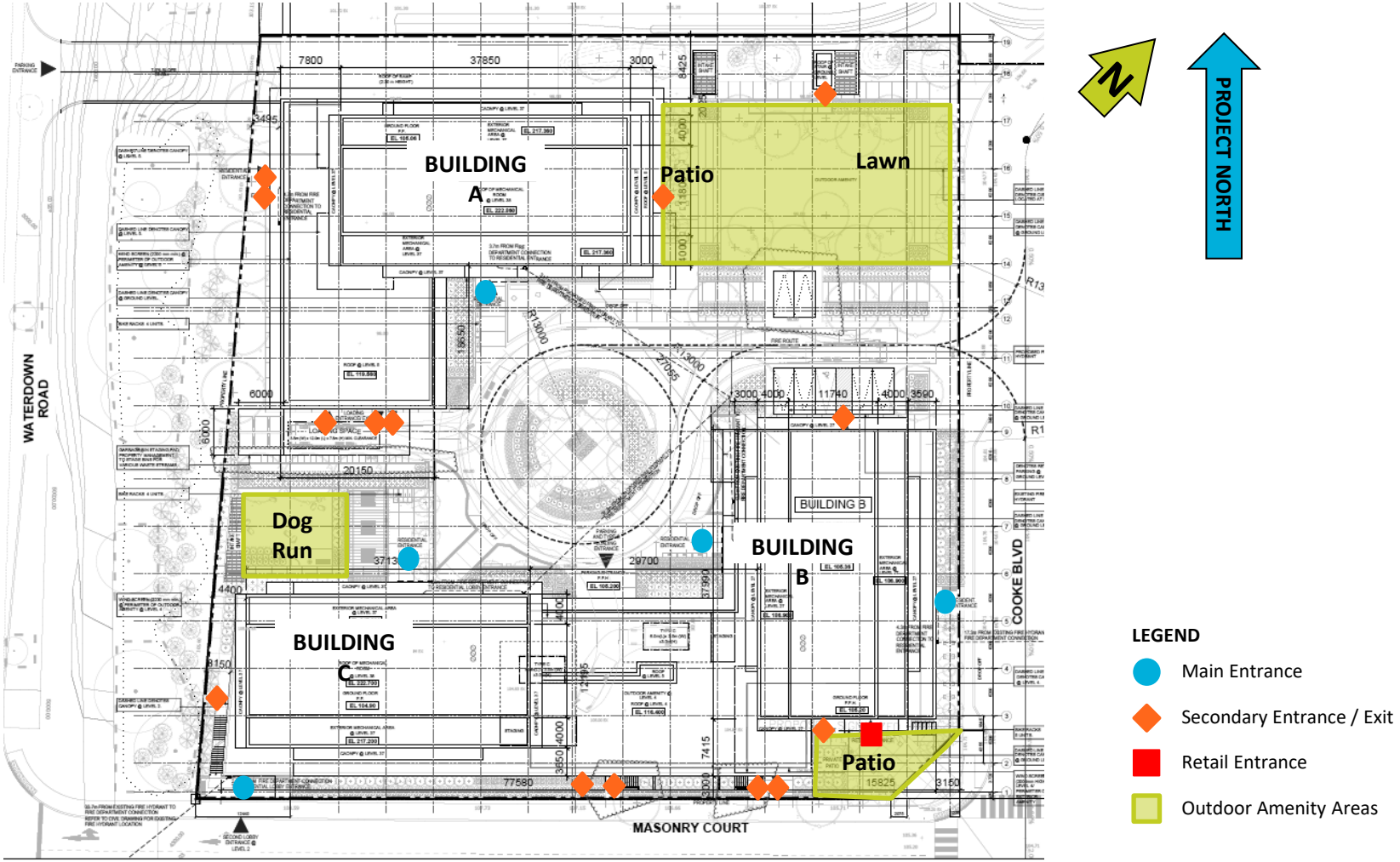


Figure 4a: Areas of Interest – Grade Level

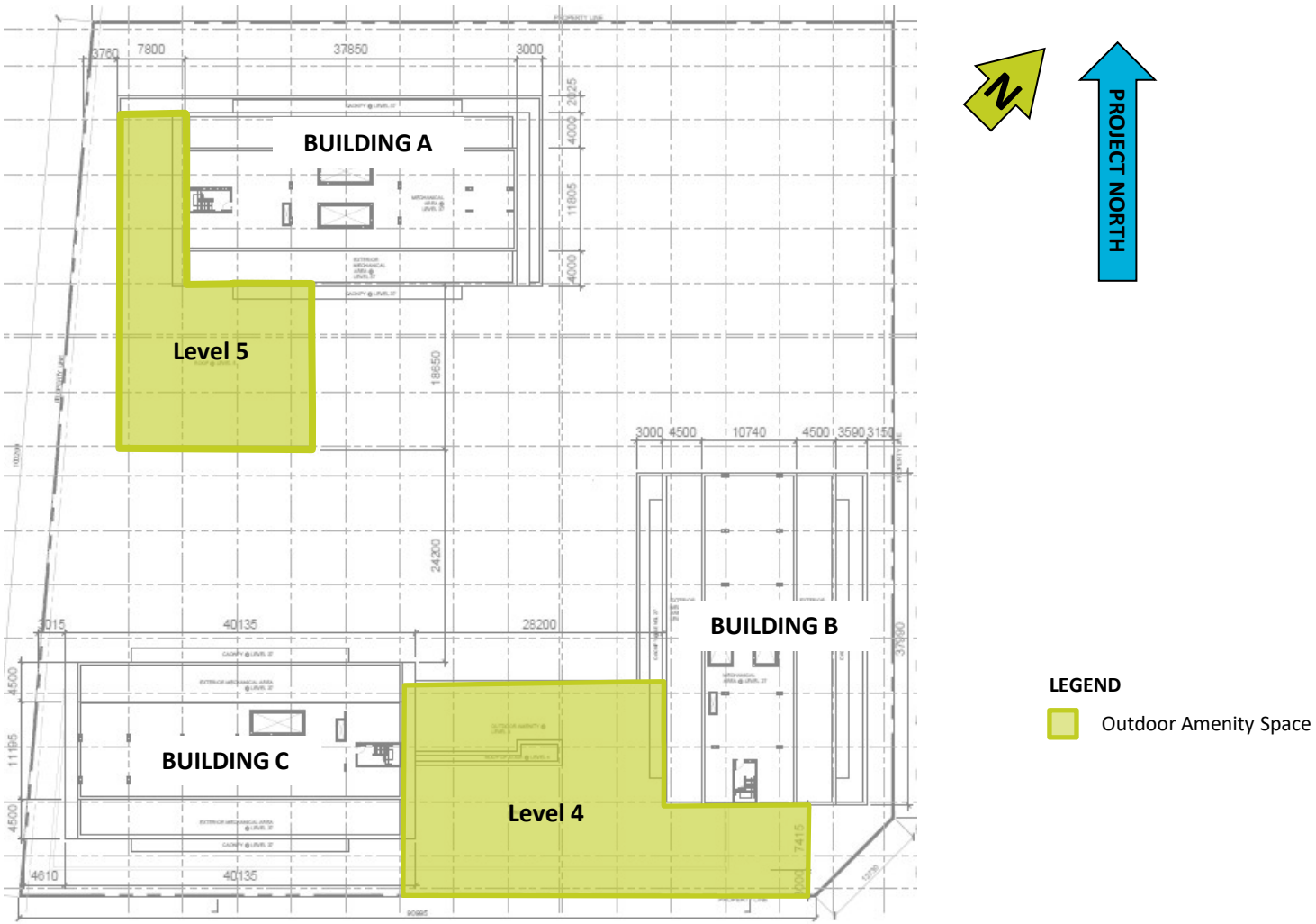


Figure 4b: Areas of Interest – Above-grade Level

2.0 APPROACH

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

2.1 Scale Model Construction

A 1:400 scale model of the 1120 Cooke Boulevard Development was constructed based on up-to-date drawing information received by SLR on April 16, 2021 and May 21, 2021.

The proximity model of the surrounding area was built in block form for a radius of approximately 480 m from the site centre. As existing buildings surrounding the site will influence wind characteristics, existing buildings, those under construction and those buildings with Site Plan Approval (SPA) were included in the model for all configurations. Information regarding which approved developments to include within the existing surrounds was determined using the City of Burlington website, as well as discussion with the design team; see Section 11.

Grade differences within the limits of the model were found to be minor, thus the site was modeled as flat.

SLR conducted the first wind tunnel test of the Existing and Original Proposed Configurations on April 2021. This analysis highlighted several areas of concern on site. Discussions with the design team led to the development of two massing options, which included the rotation of Building A by 90 degrees. In an effort to understand the efficacy of this massing change a qualitative CFD assessment was conducted in May 2021 (**Appendix A**). The results of the CFD assessment showed promising improvement of the wind conditions at grade within the site. Therefore the massing was revised and in addition, several mitigation measures were included on the site, such as:

- Canopies, all protruding 3 m from the facade, were included at the southeast corner of Building A, the northwest corner of Building B, and at the southwest corner of Building C at grade.
- Parapets (2.2 m tall) along the edges of Level 5 terrace of Building A and Level 4 terrace of Building B and C.
- Canopies, all protruding 3 m from the facade, at the northwest and southwest corners of the Building A terrace and the southwest corner of Building B terrace.

A wind tunnel test was then conducted for the revised development. Photographs of the wind tunnel model showing the Existing, Original Proposed and Final Proposed Configurations are included in **Figures 5a** through **5c**.

2.2 Wind Tunnel

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

The test model was equipped with 83 omni-directional probes to record wind speed at the pedestrian-level (approximately 1.5m above grade). The orientation of the model was rotated in 10° intervals on the turn-table to permit measurement of wind speed at each probe location for 36 wind directions. The wind tunnel data were then combined with the wind climate model for this region to predict the occurrence of wind speeds in the pedestrian realm and compare against wind criteria for comfort and safety.







Figure 5a: Existing Configuration





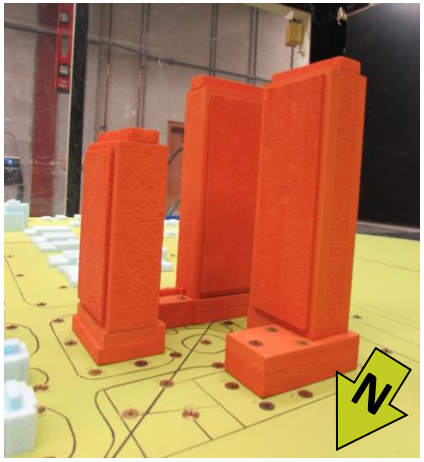


Figure 5b: Original Proposed Configuration



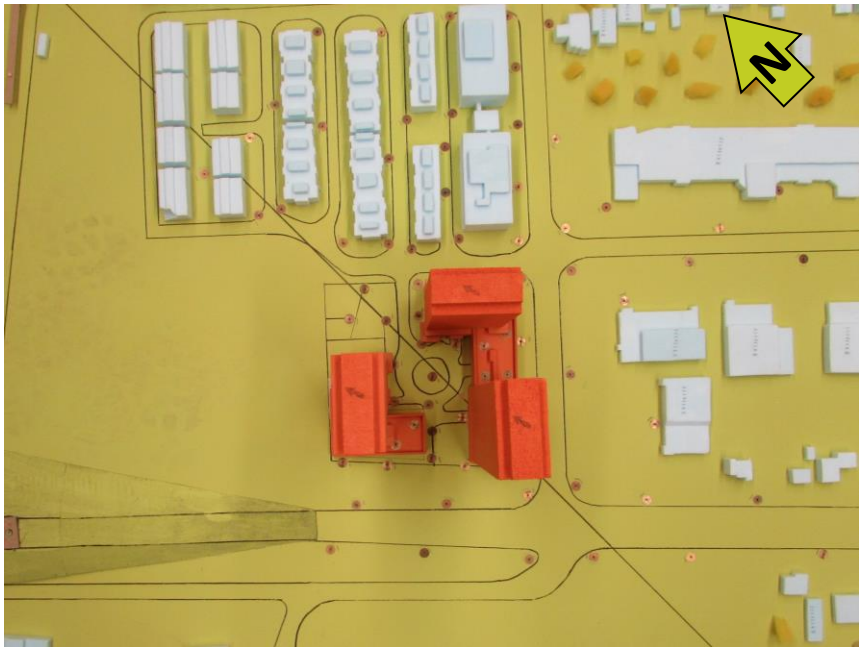


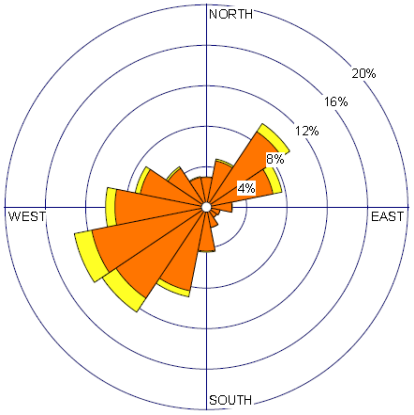


Figure 5c: Final Proposed Configuration

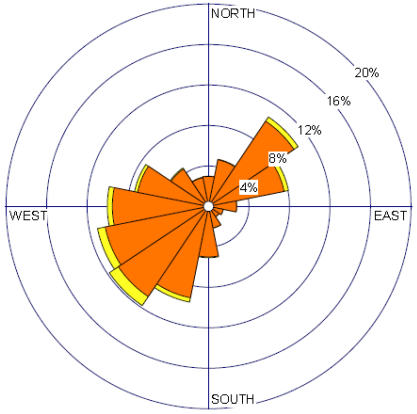
WIND CLIMATE

Wind data recorded at John C. Munro International Airport in Hamilton for the period of 1993 to 2019 were obtained and analysed to create a wind climate model for the region. Annual and seasonal wind distribution diagrams ("wind roses") are shown in Figure 6. These diagrams illustrate the percentage of time wind blows from the 16 main compass directions. Of main interest are the longest peaks that identify the most frequently occurring wind directions. The annual wind rose indicates that wind approaching from the southwest and northeast quadrants are most prevalent. The seasonal wind roses readily show how the prevalent winds shift throughout the year. The seasonal wind roses show daytime winds, from 6:00 – 23:00, while the annual wind rose shows all hours.

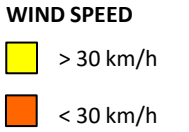
The directions from which stronger winds (e.g., > 30 km/h) approach are also of interest as they have the highest potential of creating problematic wind conditions, depending upon site exposure and the building configurations. The wind roses in Figure 6 also identify the directional frequency of these stronger winds, as indicated in the figure's legend colour key. On an annual basis, strong winds occur from the southwest and northeast quadrants. All wind speeds and directions were included in the wind climate model.

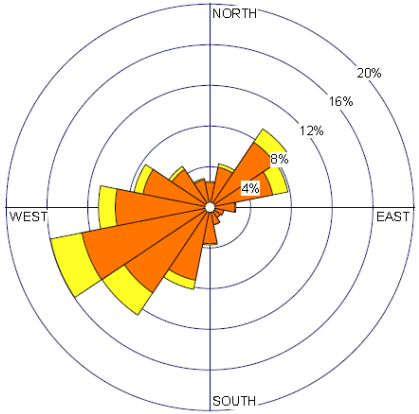


Annual Winds



Summer Winds (May - Oct)





Autumn Winds (Nov - Apr)

Figure 6: Wind Roses for John C. Munro International Airport (1993-2019, 6am–11pm)

3.0 PEDESTRIAN WIND CRITERIA

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

The criteria utilized for this analysis is provided by the City of Burlington, in the document *Pedestrian Level Wind Study Guidelines and Terms of Reference (June 2020).* The comfort criteria, which is based on certain predicted hourly gust-equivalent mean (GEM) wind speeds being exceeded 20% of the time, are summarized in Table 1. By allowing for a 20% exceedance, it assumes wind speeds will be comfortable for the corresponding activity at least four out of five days. The comfort criteria consider only daytime hours, between 6:00am and 11:00pm. GEM is defined as the maximum mean wind speed or the gust wind speed divided by 1.85.

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

Table 1: Wind Comfort Criteria

Activity	Comfort Ranges for GEM Wind Speed Exceeded 20% of the Time		Description of Wind Comfort
Sitting	0 to 10 km/h	0 to 2.8 m/s	Calm or light breezes desired for outdoor restaurants and seating areas where one can read a paper comfortably.
Standing	0 to 14 km/h	0 to 3.9 m/s	Gentle breezes suitable for main building entrances and transit stops.
Leisurely Walking	0 to 17 km/h	0 to 4.7 m/s	Moderate breezes suitable for walking along pedestrian thorough fares.
Fast Walking	0 to 20 km/h	0 to 5.6 m/s	Strong breezes that can be tolerated if one's objective is to walk, run or cycle without lingering.
Uncomfortable	> 20 km/h	> 5.6 m/s	Strong winds of this magnitude are considered a nuisance for most activities, and wind mitigation is typically recommended.

Table 2: Wind Safety Criterion

Activity	Safety Criterion Gust Wind Speed Exceeded Once Per Year (0.1%)		Description of Wind Effects
Any	90 km/h	25 m/s	Excessive gust speeds that can adversely affect a pedestrian's balance and footing. Wind mitigation is typically required.

4.0 RESULTS

Figures 7a through 12b present graphical images of the wind comfort conditions for the summer and winter months around the proposed development. These represent the seasonal extremes of best and worst case. The "comfort zones" shown are based on an integration of wind speed and frequency for all 36 wind directions tested with the seasonal wind climate model. The assessment does not account for the presence of mature trees, thus wind comfort conditions for months when foliage is present could be better than those predicted. Full detailed results for the summer and winter can be found in Appendix B. Annual wind safety is provided in Appendix A.

There are generally accepted wind comfort levels that are desired for various pedestrian uses. For example, for public sidewalks, wind comfort suitable for **fast walking** would be desirable year-round. For main entrances and transit stops, wind conditions conducive to **standing** would be preferred throughout the year but can be difficult to achieve in regions where winter winds are inherently harsh. For amenity spaces, wind conditions suitable for **sitting** and/or **standing** are generally desirable during the summer months. The most stringent category of **sitting** is considered appropriate for cafes and dedicated seating areas, while for parks **sitting** and/or **standing** would be appropriate in the summer.

Note, Project North is approximately 42° counter-clockwise from True North. When referring to the building, Project North is used; when referring to wind directions, True North is used.

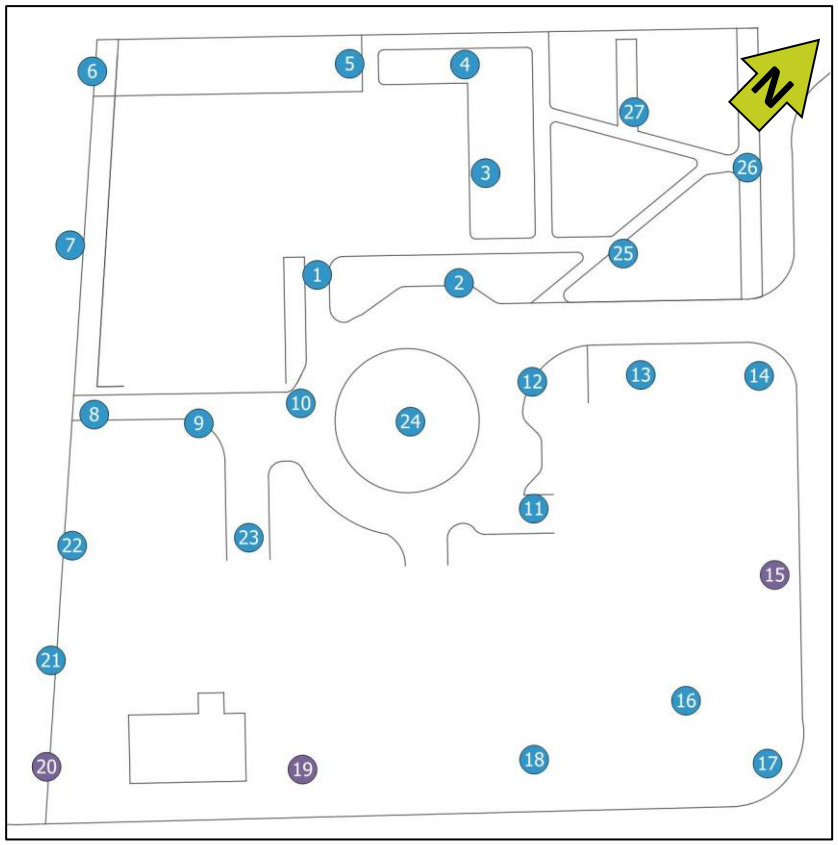
4.1 Building Entrances & Walkways (Locations 1-27)

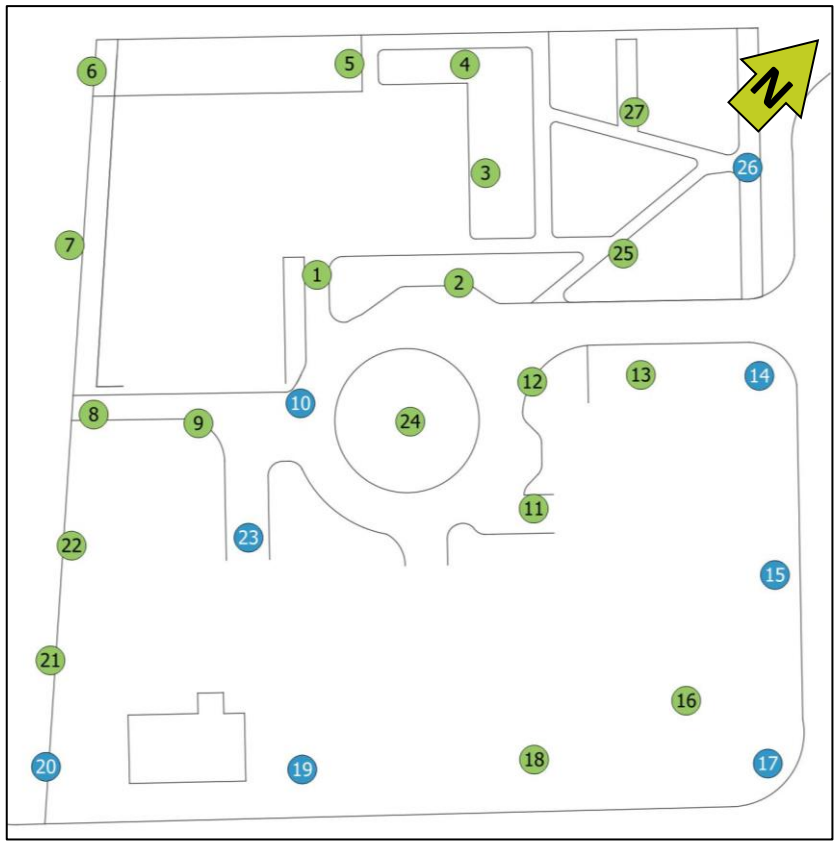
Existing wind conditions on-site are suitable for sitting or standing in the summer and for leisurely walking or better during the winter (Figures 7a and 7b).

In the Original Proposed Configuration, wind conditions on-site are generally comfortable for fast walking or better in the summer (Figure 8a). The exceptions are the northwest and southeast corners of Building A, where wind conditions are uncomfortable in the summer (Locations 6 and 10). During the winter, wind conditions are generally suitable for fast walking or better in most areas on-site (Figure 8b). However, wind conditions are uncomfortable near building corners and in the central area between Buildings A and C (Locations 4,6,8-10, 12, 17, 20, 22 and 24).

With the final proposed development in place, wind conditions are generally improved compared to the Original Proposed Configuration. Wind conditions are mainly comfortable for leisurely walking or fast walking throughout the year (Figures 9a and 9b). Uncomfortable wind conditions occur on the lawn in the summer season (Location 27), while in the winter uncomfortable wind conditions occur in the central space (Locations 10, 12 and 24), as well as at the northeast corner of Building B (Location 14), the southeast corner of Building B (Location 17), and at the southwest corner of Building C (Location 20).

At the main entrance to Building A (Location 1) wind conditions are conducive to leisure walking in the summer and fast walking in the winter. At the main entrances to Building B (Locations 11 and 15) wind conditions are suitable for standing in the summer and leisurely walking in the winter. At the retail entrance (Location 16) wind conditions are comfortable for standing year-round (Figures 9a and 9b). At the main entrance to Building C





Predicted Comfort Classes

(#) Sitting (#) Leisurely Walking (#) Uncomfortable

(#) Standing (#) Fast Walking

Notes:

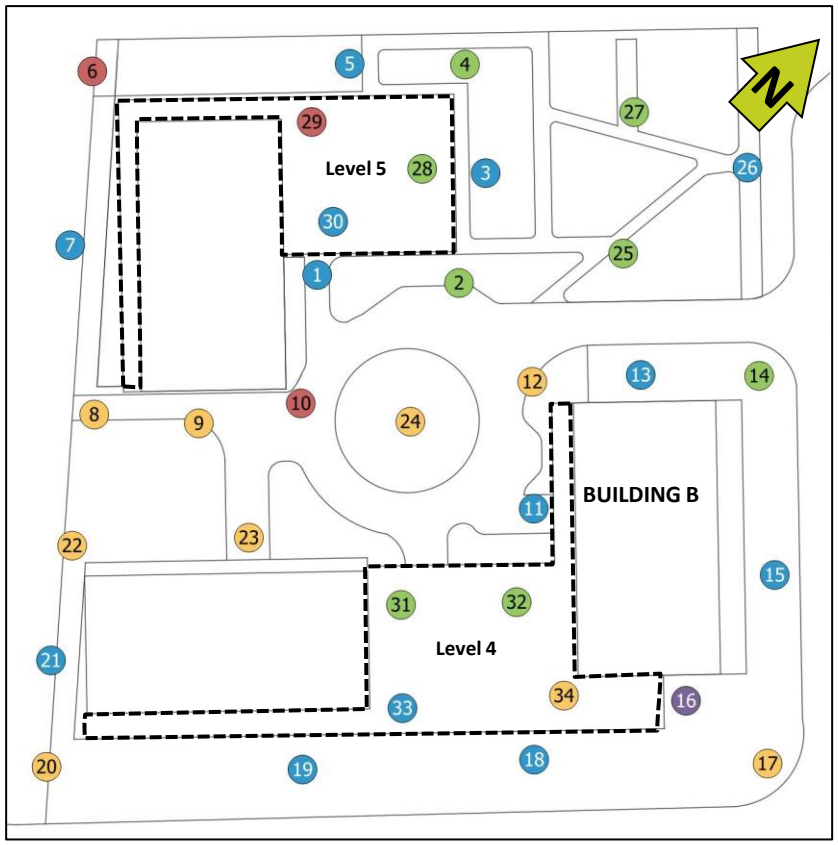
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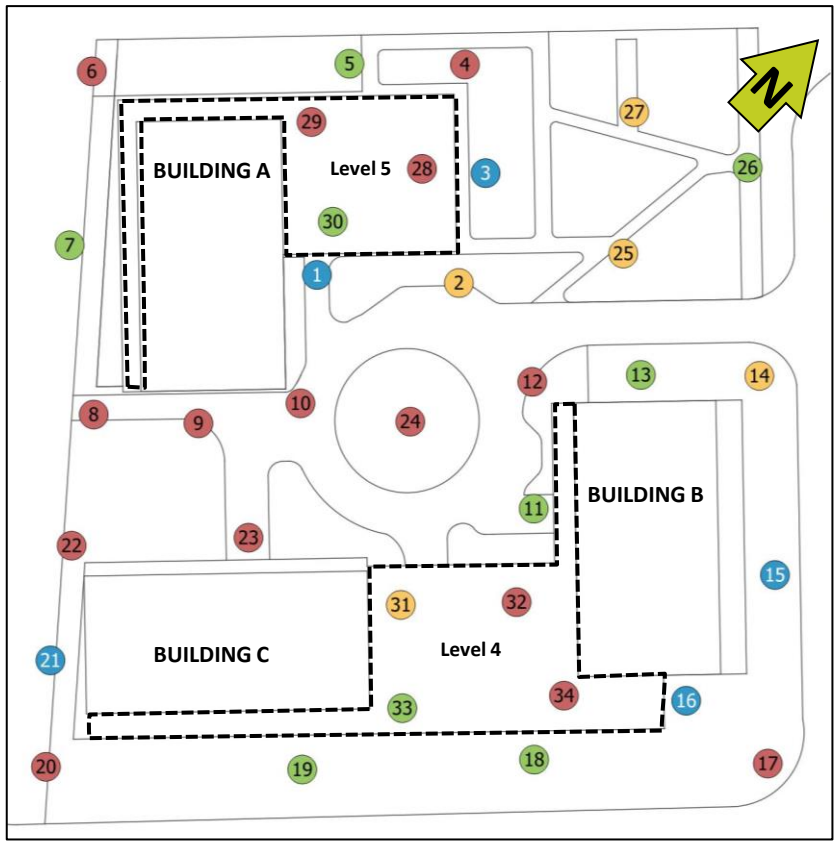
2) Pedestrian level wind sensor location (#)

3) Diagram may be divided by levels (e.g., Grade, Amenity Floors, etc.).

Figure 7a: Existing Configuration – Pedestrian Wind Conditions – On-site Summer

Figure 7b: Existing Configuration – Pedestrian Wind Conditions – On-site Winter





Predicted Comfort Classes

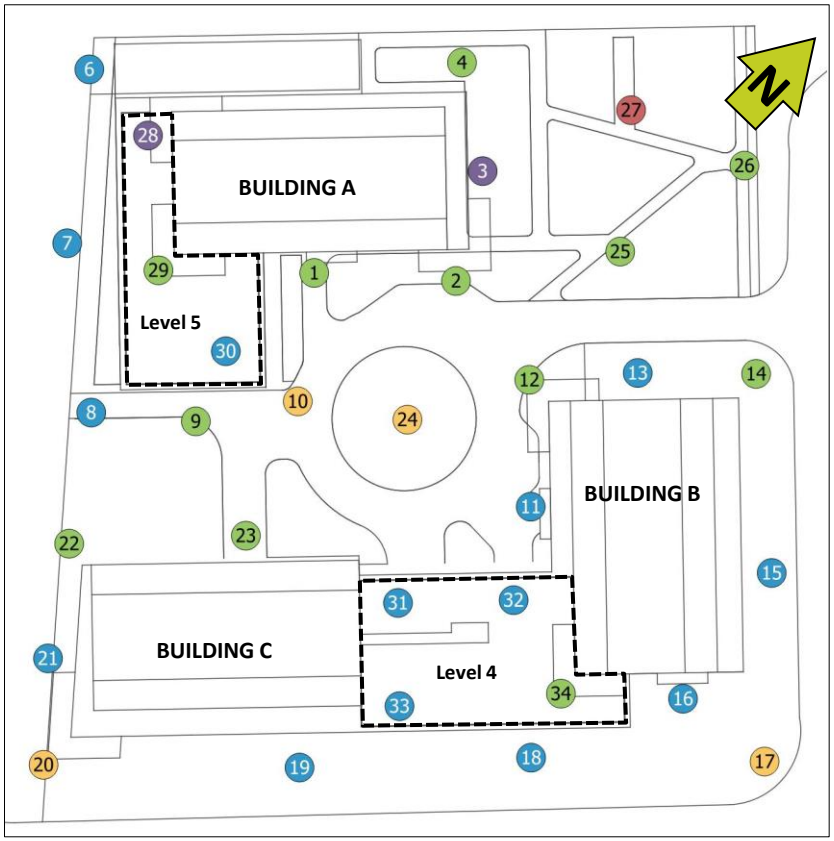
(#) Sitting
(#) Leisurely Walking
(#) Uncomfortable
(#) Standing
(#) Fast Walking

Notes:

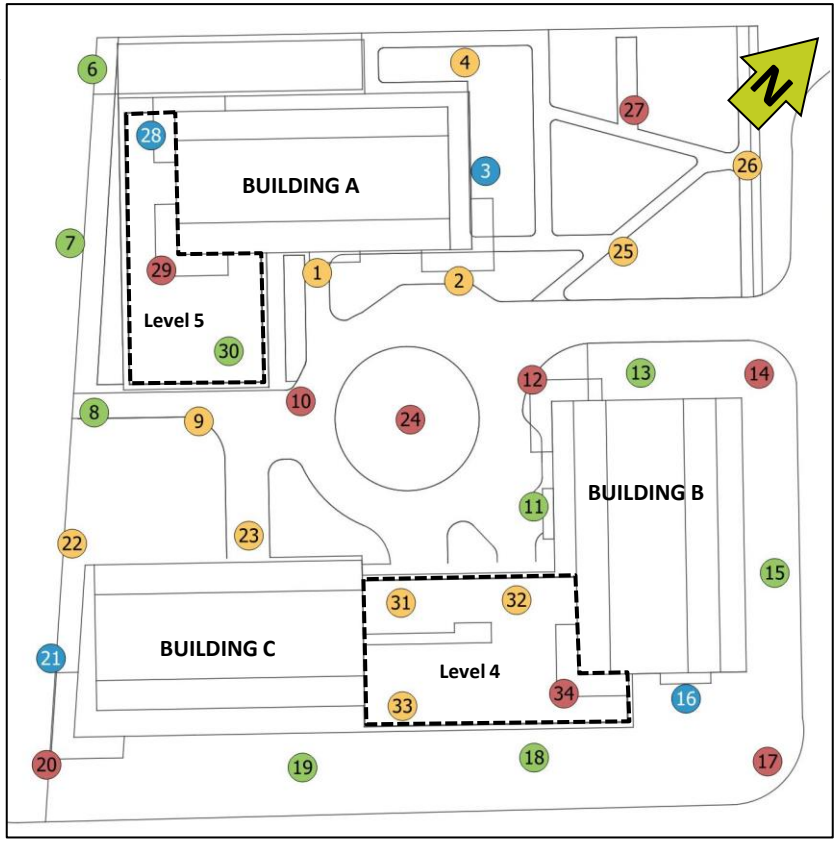
1) Not to scale.
2) Pedestrian level wind sensor location (#)
3) Diagram may be divided by levels (e.g., Grade, Amenity Floors, etc.).

Figure 8a: Original Proposed Configuration – Pedestrian Wind Conditions – On-site Summer

Figure 8b: Original Proposed Configuration – Pedestrian Wind Conditions – On-site Winter



PROJECT NORTH



Predicted Comfort Classes

(#) Sitting
(#) Leisurely Walking
(#) Uncomfortable
(#) Standing
(#) Fast Walking

Notes:

1) Not to scale.
2) Pedestrian level wind sensor location (#)
3) Diagram may be divided by levels (e.g., Grade, Amenity Floors, etc.).

Figure 9a: Final Proposed Configuration – Pedestrian Wind Conditions – On-site Summer

Figure 9b: Final Proposed Configuration – Pedestrian Wind Conditions – On-site – Winter

(Location 23) wind conditions are conducive to leisurely walking in the summer and fast walking in the winter. Wind conditions at the southeast entrance to Building C (Location 20) are comfortable for fast walking in the summer and are uncomfortable in the winter in the Final Proposed Configuration.

At the various secondary entrances are generally comfortable for leisurely walking or better year-round (Figures 9a and 9b) in the Final Proposed Configuration.

Additional commentary on localized wind mitigation measures for windy areas are provided in Section 5.0.

4.2 Amenity Terraces (Locations 28-34)

In the Original Proposed Configuration, wind conditions at the Level 5 terrace of Building A are suitable for leisurely walking or better in the summer. However, winds at the northeast corner of the terrace are uncomfortable in the summer (Location 29 in Figure 8a). During the winter, the south end of the terrace is comfortable for standing whereas the rest of the areas are uncomfortable (Figure 8b). Wind conditions at Level 4 terrace are comfortable for fast walking or better throughout the year (Figures 8a and 8b). However, uncomfortable wind conditions occur to the west of Building B in the winter(Locations 32 and 34 in Figure 8b).

In the Final Proposed Configuration, wind conditions on both terraces are generally comfortable for sitting or standing in the summer, with the exception of the southwest corners of both terraces, where wind speeds are conducive to leisurely walking (Locations 29 and 34 in Figure 9a).

During the winter, on the Level 5 terrace, wind conditions are generally comfortable for sitting or standing. However, wind conditions near the southwest corner of the terrace are uncomfortable in the winter (Location 29 in Figure 9b). On the Level 4 terrace, wind conditions are generally suitable for fast walking in the winter, except for the southwest corner where wind conditions are uncomfortable (Location 34 in Figure 9b).

Additional commentary on localized wind mitigation measures are provided in Section 5.0.

4.3 Surrounding Sidewalks

Existing wind conditions on the sidewalks of Masonry Court, Cooke Boulevard, and Waterdown Road are comfortable for fast walking or better throughout the year (Figures 10a and 10b). At the transit stops, wind conditions are suitable for fast walking or better throughout the year (Locations 70 and 73 in Figures 10a and 10b).

In the Original Proposed Configuration, wind conditions on the surrounding sidewalks are generally similar to the existing wind conditions (Figures 11a and 11b). However, wind conditions are uncomfortable to the south, southwest and northeast of the Original proposed development during the winter season (Locations 36, 62, 68, 69 and 70 in Figure 11b).

In the Final Proposed Configuration, wind conditions are generally similar or slightly better compared to the Original Proposed configuration. Wind conditions are generally comfortable for fast walking or better throughout the year (Figures 12a and12b), with fewer locations with uncomfortable wind conditions in the winter (Locations 62, 68 and 69 in Figure 12b).

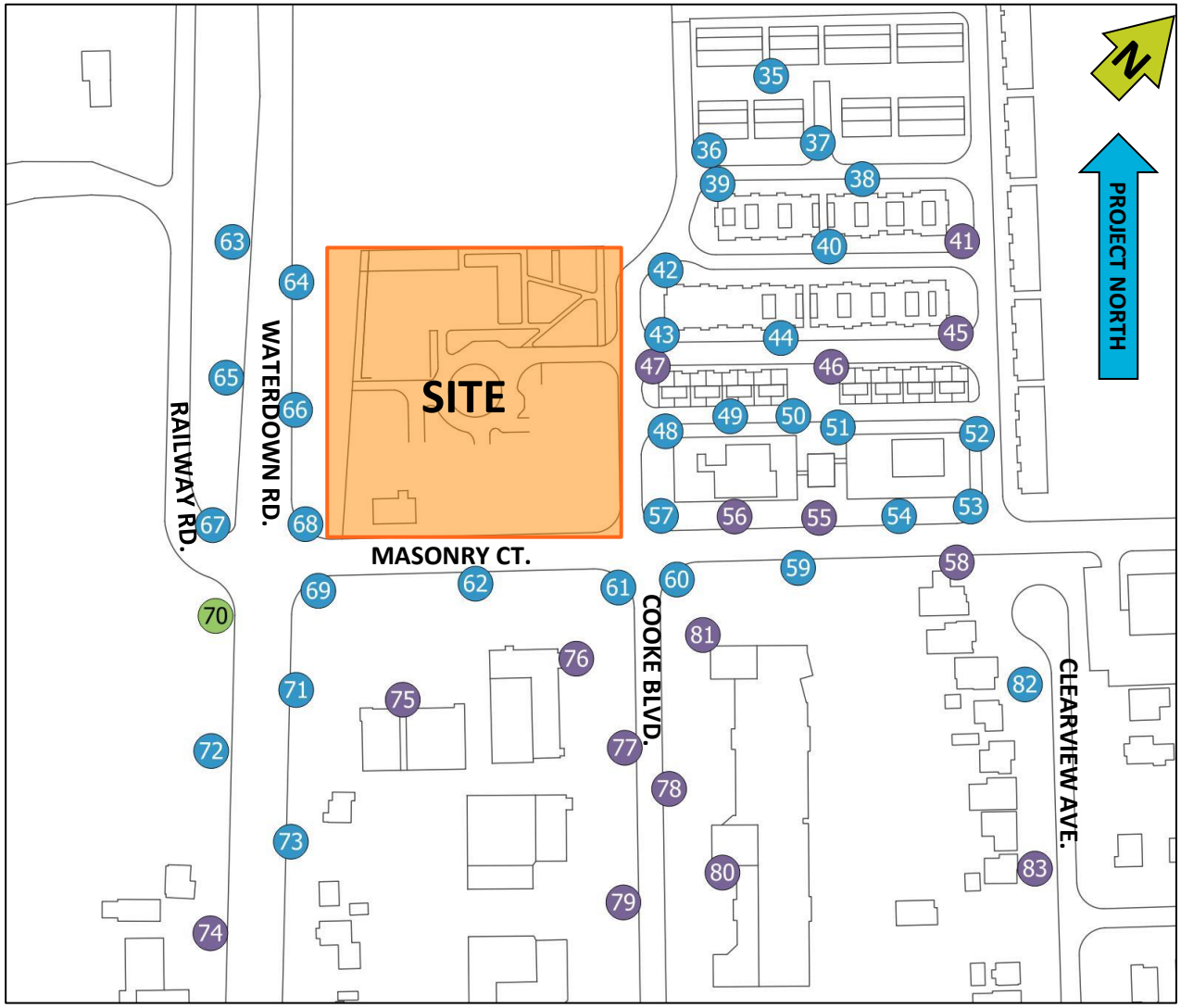


Figure 10a: Existing Configuration – Pedestrian Wind Conditions – Surrounding Sidewalks – Summer



Figure 10b: Existing Configuration – Pedestrian Wind Conditions – Surrounding Sidewalks – Winter

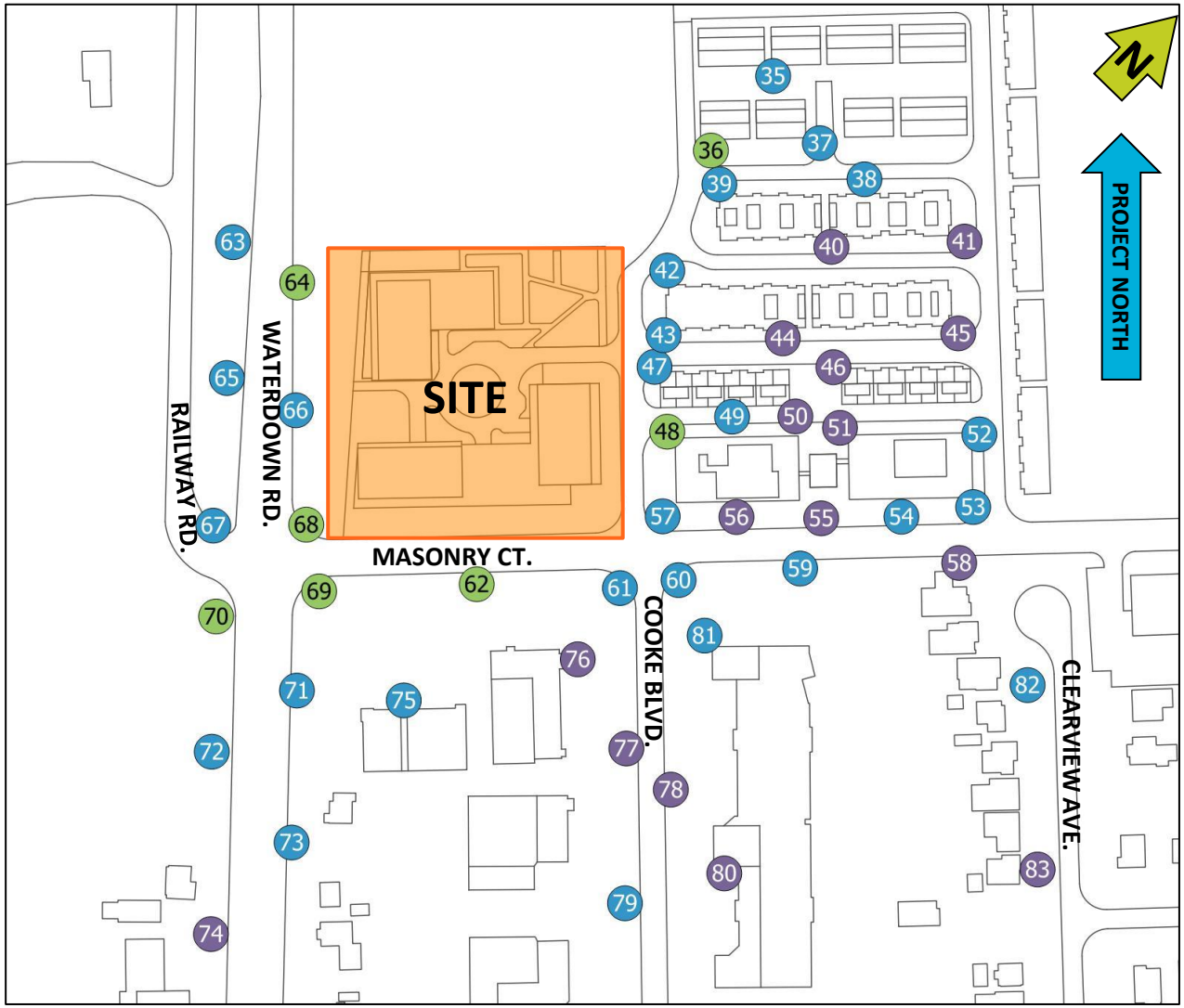


Figure 11a: Original Proposed Configuration – Pedestrian Wind Conditions – Surrounding Sidewalks – Summer

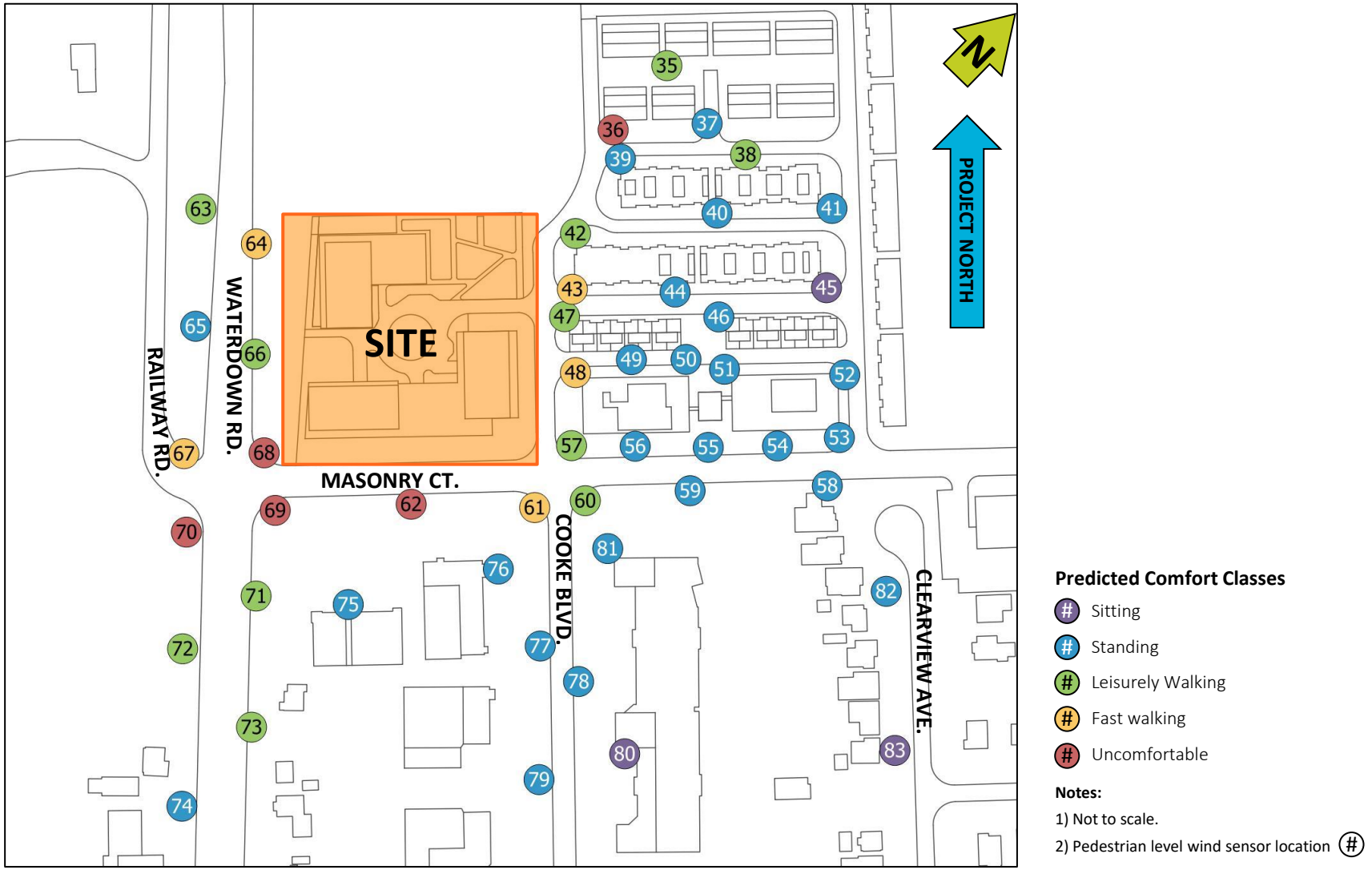


Figure 11b: Original Proposed Configuration – Pedestrian Wind Conditions – Surrounding Sidewalks – Winter

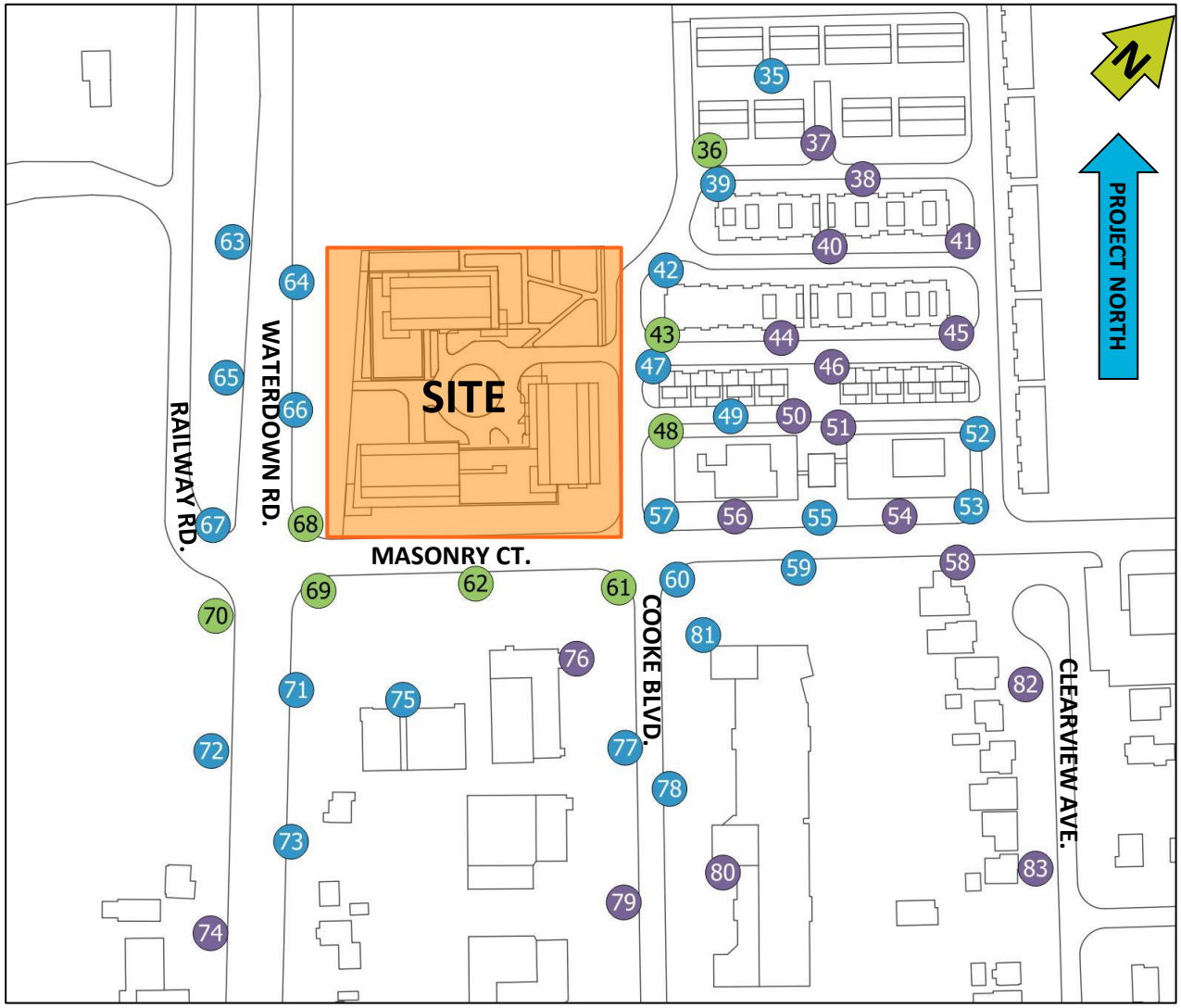


Figure 12a: Final Proposed Configuration – Pedestrian Wind Conditions – Surrounding Sidewalks – Summer

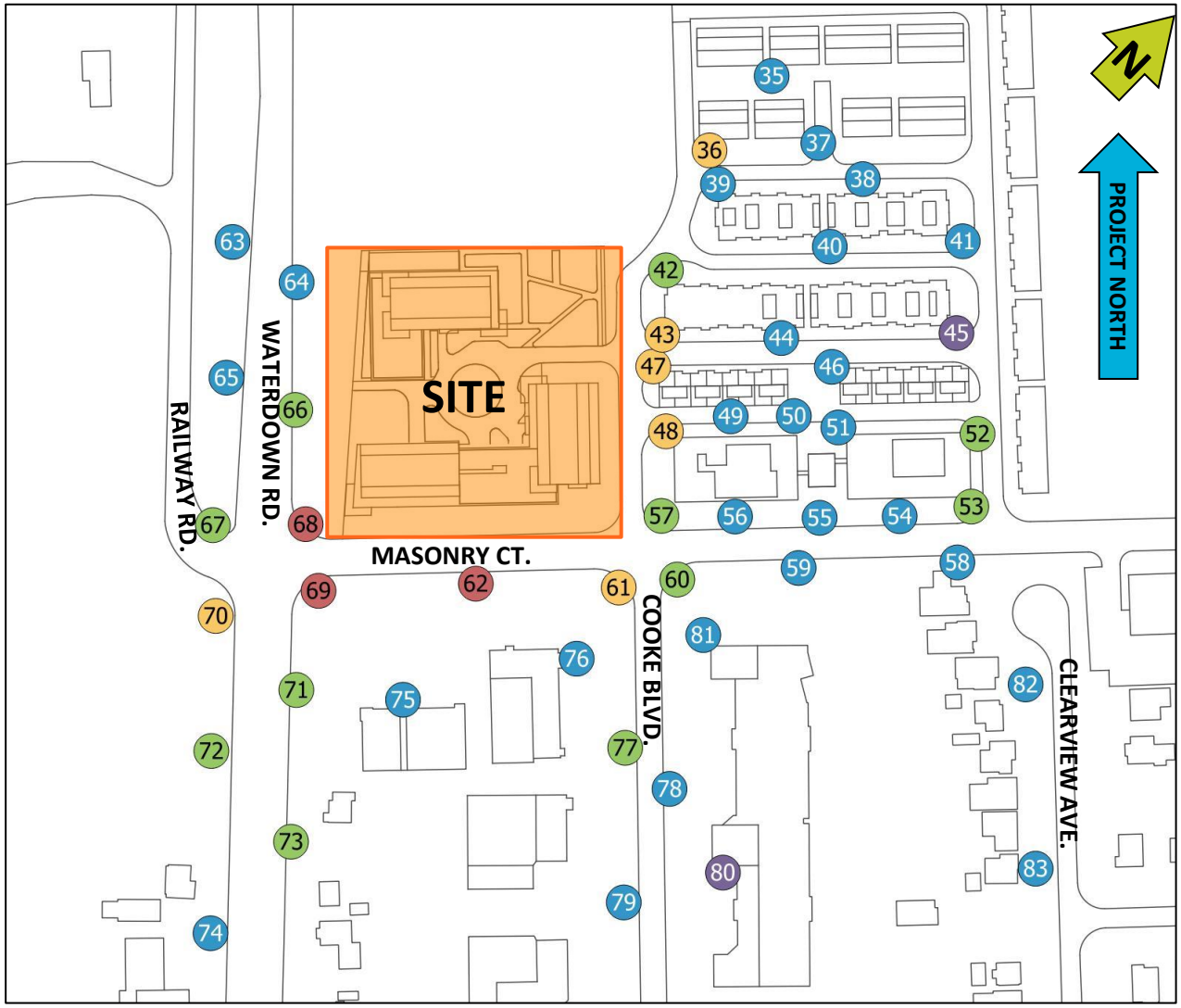
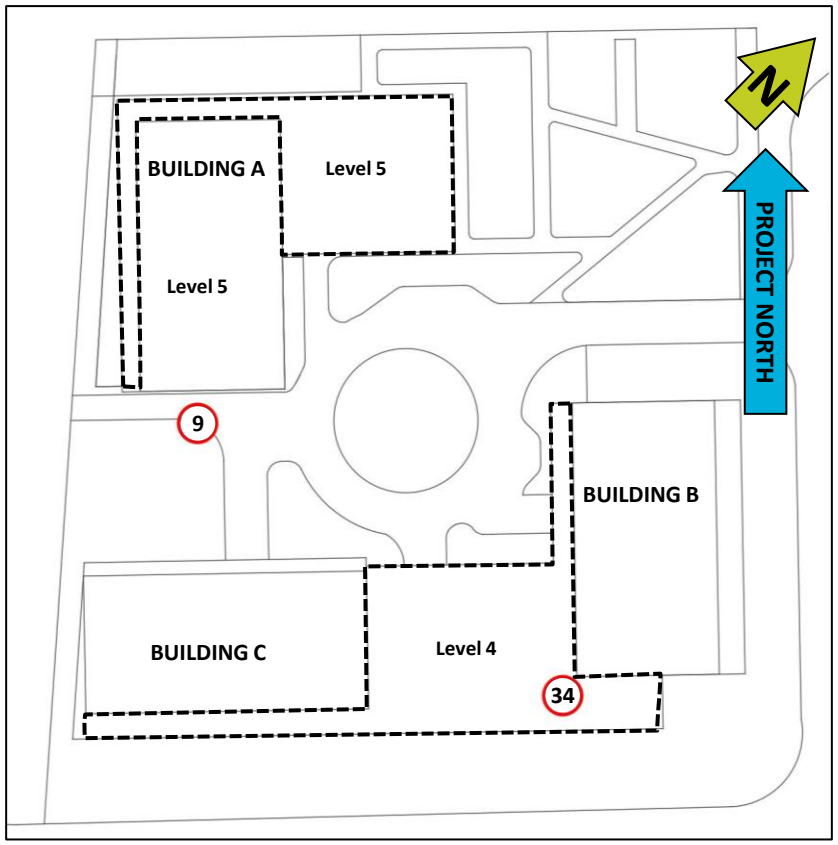


Figure 12b: Final Proposed Configuration – Pedestrian Wind Conditions – Surrounding Sidewalks – Winter



Safety:

Fail

Notes:

1) Not to scale.

2) Pedestrian level wind sensor location (#)

Figure 13: Original Proposed Configuration – Pedestrian Wind Safety Conditions On-site – Annual

4.4 Wind Safety

In the Existing Configuration, the wind safety criterion is met in all areas on and surrounding the existing site.

In the Original Proposed Configuration, the wind safety criterion is met in all areas on and surrounding the site at grade with the exception of the loading area (Location 9 in Figure 13). These gusting winds is due to the northwest and westerly winds channeling between Buildings A and C, creating local accelerations at grade level. On the amenity terraces the safety criterion is met at all areas except the southwest corner of the Level 4 terrace (Location 34 in Figure 13). Here, the gusty conditions are due to the downwashing of northwesterly winds around the corner of Building B.

In the Final Proposed Configuration, the wind safety criterion is met in all areas both on-site and on the surrounding sidewalks (Appendix C).

5.0 RECOMMENDATIONS FOR MITIGATION

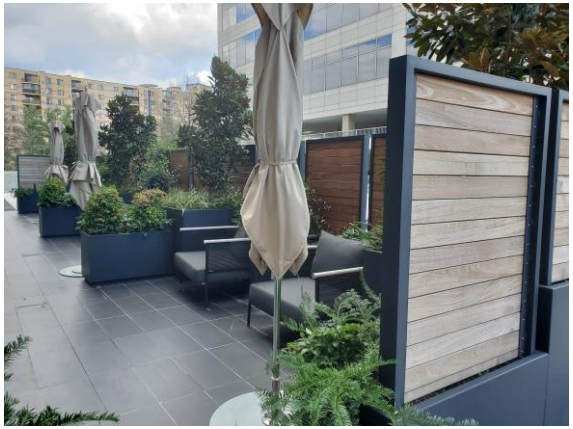
After the analysis was completed, SLR received updated landscaping information (Appendix D). According to the landscape plan, multiple rows of coniferous trees are planned along the west edge of the project site. These trees will be beneficial, as they will disrupt the prevailing west and northwesterly winds. Therefore, we expect wind conditions on the west edge of the site, between Buildings A and B to be calmer than those presented in Figures 9a and 9b, around Locations 9, 20, 22, and 23). The landscape plan also includes vertical wind screens in the lawn area to the east of Building A (Figure D1 in Appendix D). This feature will be positive to improve uncomfortable wind conditions near Location 27.

To improve wind conditions at the entrances, we recommend the design team include vertical wind screens on the both sides of the entrance to Building C. Alternatively, if feasible, the entrances can be recessed into the building facade for wind protection. Larger canopies (minimum 3 m wide) above entrances to Building A and B will be beneficial to reduce the impact of downwashing wind flows.

To improve wind conditions near the northeast and northwest corner of Building C, we recommend adding vertical wind screens and/or marcescent landscaping. The wind conditions near the southeast corner of Building C (Location 17) can be improved by including horizontal features such as trellises and/or umbrellas in the patio area to reduce the impact of wind flows downwashing from the Level 4 terrace.

At the terraces, we recommend planning passive activities away from the southwest corners of both terraces (Locations 29 and 34). If calmer wind conditions are desired in the winter, additional wind mitigation measures, in the form of wind screens to the west of Location 30 and 32 can be considered. Horizontal features, such as overhead canopies or trellises can be considered along the east facade of Building C.

Examples of wind mitigation measures are shown in Figure 14.







Examples of wind screens near entrances, open space and seating areas







Examples of horizontal features (canopy, umbrellas) near entrance and seating areas

Figure 14: Examples of Wind Mitigation Measures

6.0 CONCLUSIONS & RECOMMENDATIONS

The pedestrian wind conditions predicted for the proposed development at 1120 Cooke Boulevard have been assessed through wind tunnel modeling techniques. Based on the results of our assessment, the following conclusions have been reached:

- In the Existing Configuration wind conditions at grade were generally suitable for the intended usage. The wind safety criterion was met in all areas.
- In the Original Proposed Configuration, there were 20 locations with uncomfortable wind conditions in the winter. The wind safety criterion was met in almost all areas except on the south side of Building A, and on the terrace of between Buildings B and C.
- In the Final Proposed Configuration, wind conditions are calmer compared to the Original Proposed Configuration as there were 12 locations with uncomfortable wind conditions in the winter. The wind safety criterion was met in all areas both on and surrounding the proposed development.
- The areas near the main entrance to Buildings A, B and C are windier than desired in the Final Proposed Configuration. Wind mitigation measures, additional to what is shown on the landscaping plans, are recommended for these areas.
- Wind conditions at Level 4 and Level 5 terraces are suitable for the intended use in the summer in the Final Proposed configuration, with the exception of the southwest corners of both terrace, where wind speeds are windier than desired for passive activities. Wind mitigation measures are recommended for these areas.
- SLR will work with the design team prior to the next planning submission to confirm the practicality and efficacy of the additional mitigation measures.

7.0 ASSESSMENT APPLICABILITY

This assessment is based on wind tunnel techniques and provides a quantitative analysis of the pedestrian wind comfort conditions on and surrounding the proposed development site. Any subsequent alterations to the design may influence these findings, possibly requiring further review by SLR. Should you have any questions or concerns, please do not hesitate to contact the undersigned.

Sincerely,

SLR Consulting (Canada) Ltd.



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Microclimate Engineer



Tahrana Lovlin, MAES, P.Eng.
Specialist – Microclimate

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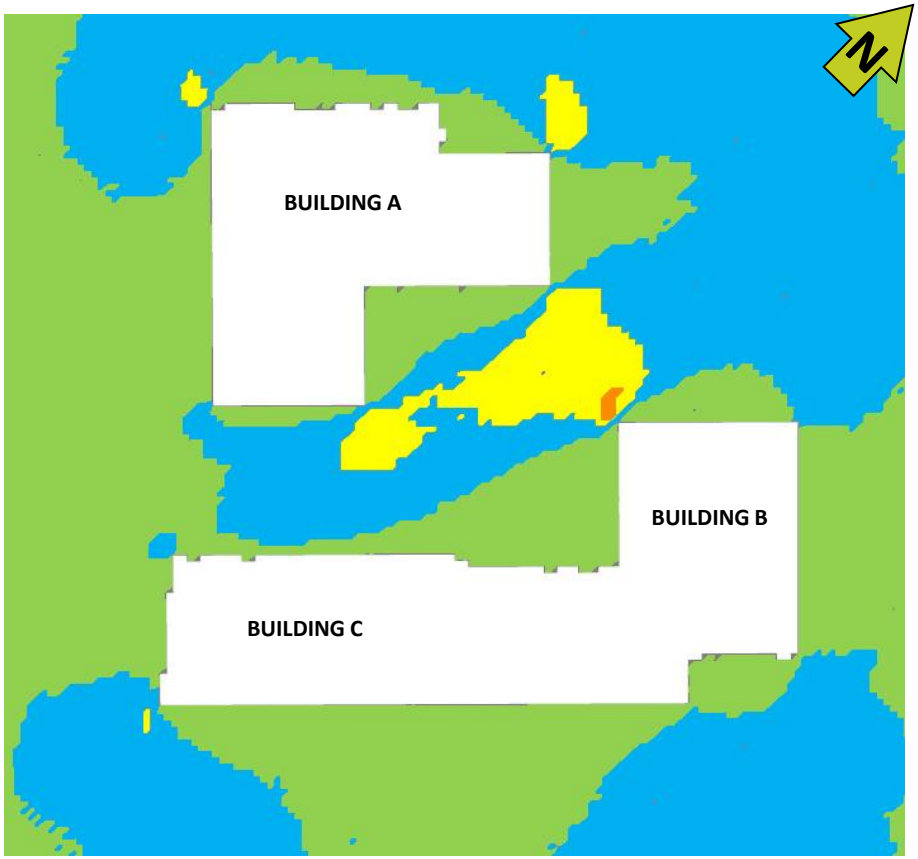
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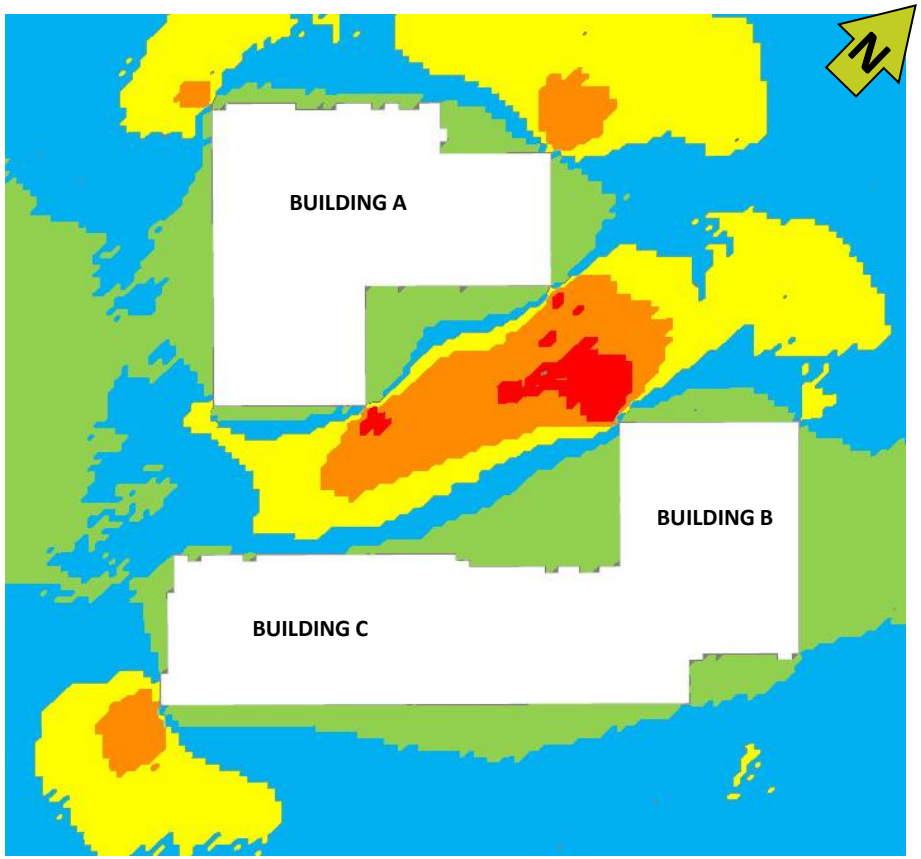
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Appendix A

CFD Results – Massing Options





Sitting
Standing
Leisurely Walking
Fast Walking
Uncomfortable

Figure A1a: Option 1 - Pedestrian Wind Comfort – Summer – Grade Level

Figure C1b: Option 1 - Pedestrian Wind Comfort – Winter – Grade Level

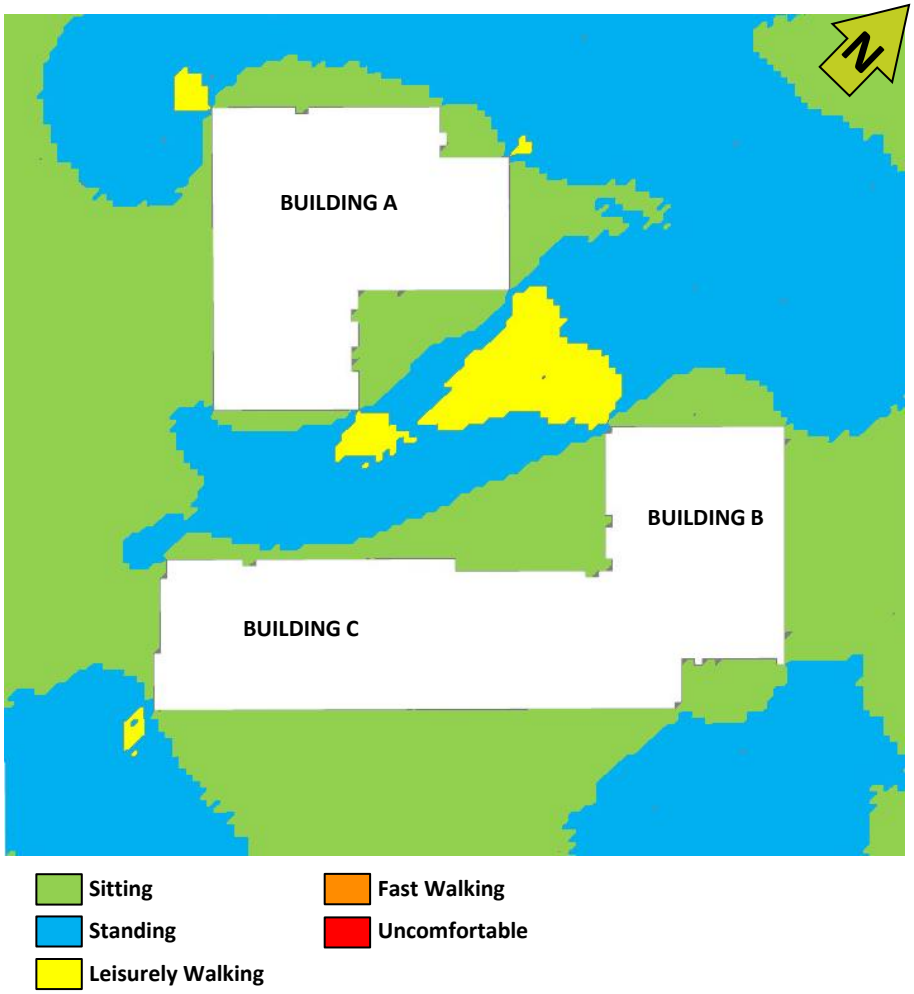


Figure C1c: Option 2 - Pedestrian Wind Comfort – Summer – Grade Level



Figure C1d: Option 2 - Pedestrian Wind Comfort – Winter – Grade Level

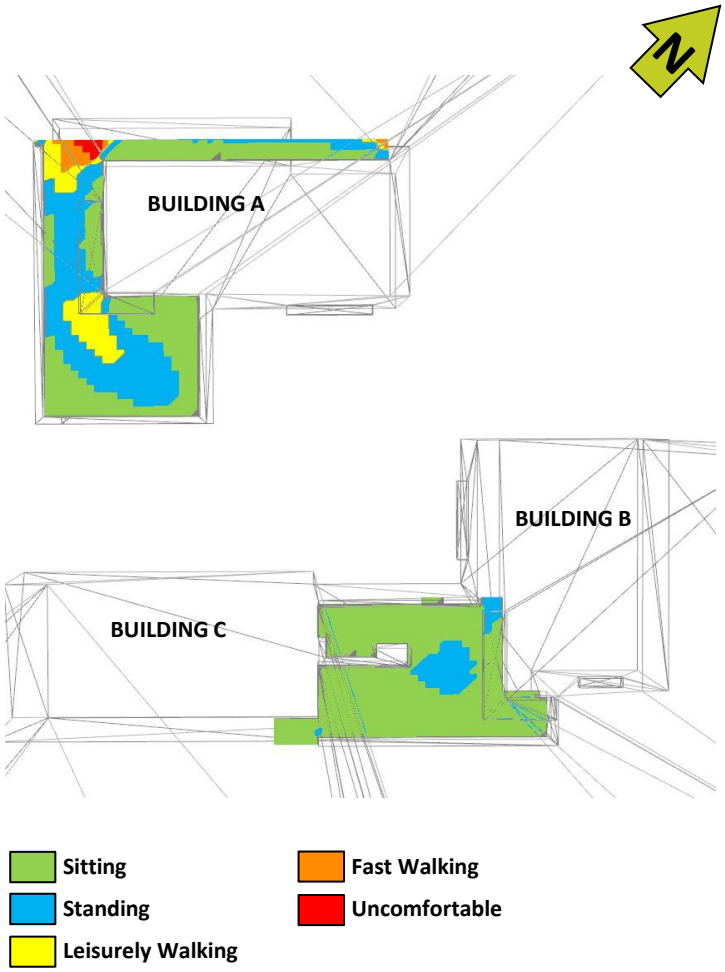


Figure C1e: Option 1 - Pedestrian Wind Comfort – Summer – Terraces

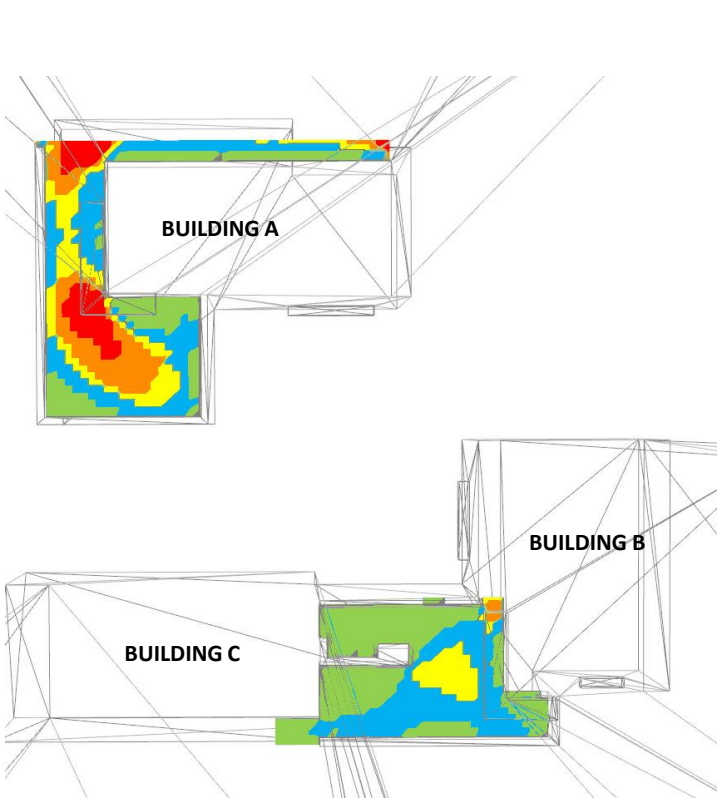


Figure C1f: Option 1 - Pedestrian Wind Comfort – Winter – Terraces

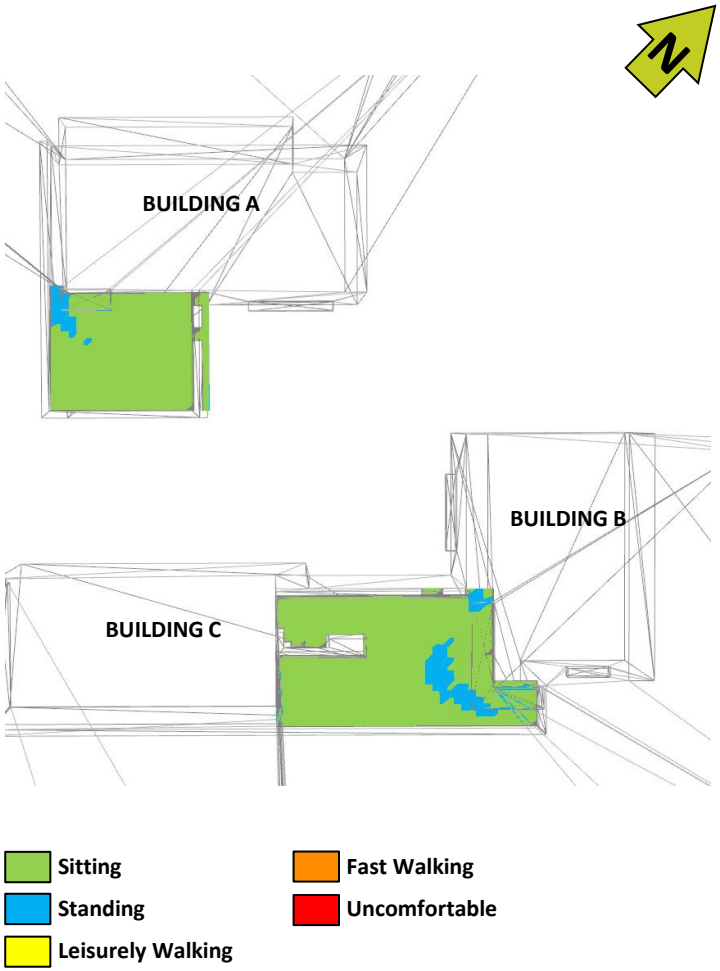


Figure C1g: Option 2 - Pedestrian Wind Comfort – Summer – Terraces

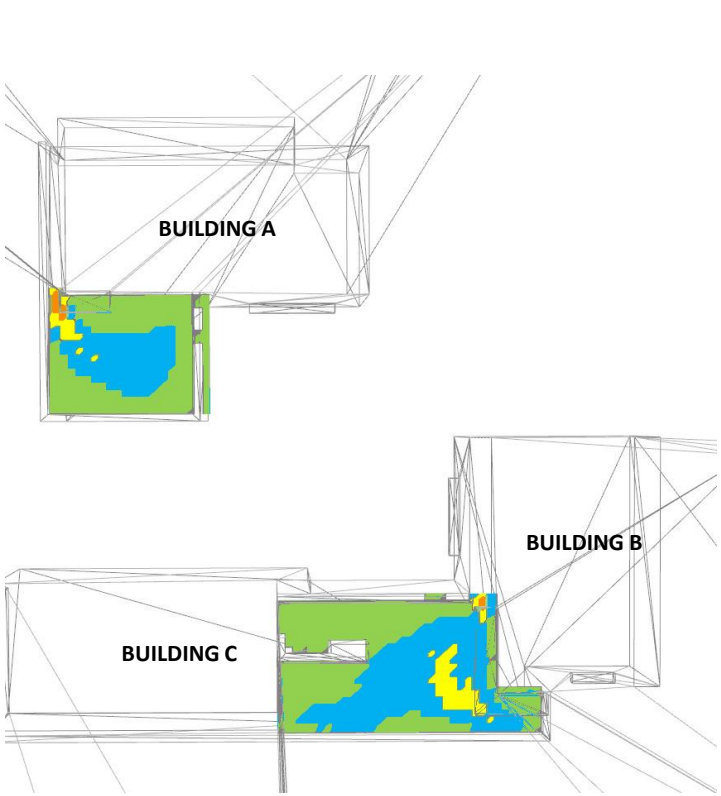


Figure C1h: Option 2 - Pedestrian Wind Comfort – Winter – Terraces

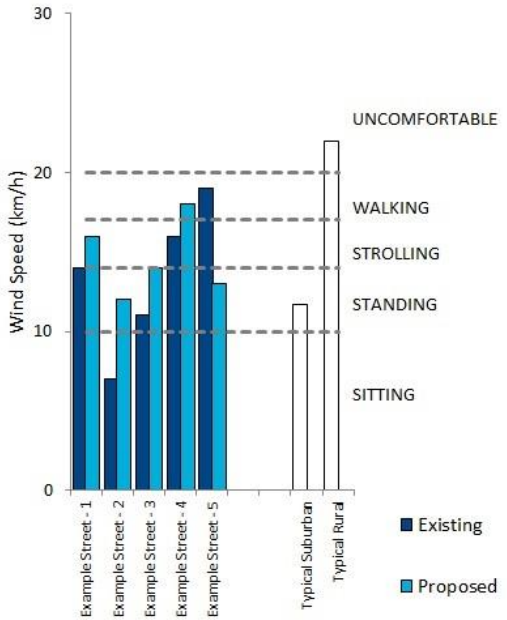
Appendix B

Pedestrian Wind Comfort Graphs

Summer (July – September) & Winter (January – March)

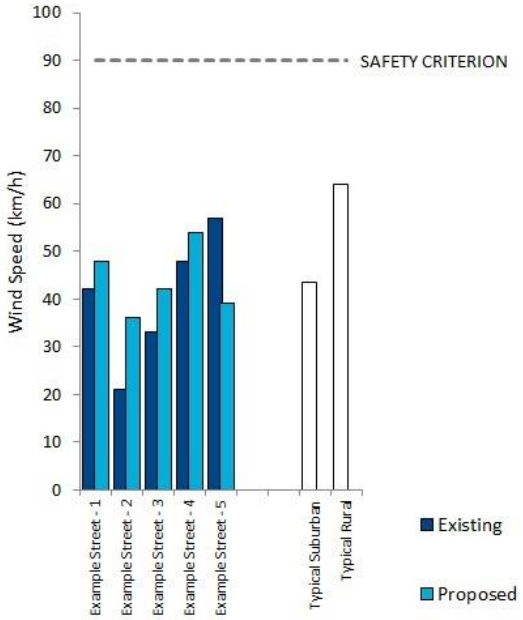
INTERPRETATION OF RESULTS

The figure below illustrates comfort criteria. The vertical bars represent the GEM wind speed (in km/h) exceeded 20% of the time for the test configurations at each location. The dashed horizontal lines represent wind speed thresholds for the wind comfort criteria. At the right side of each graph are white bars that represent ambient wind conditions for typical suburban and rural areas of this region.



Example Results – Comfort Criteria (20% GEM Wind Speeds)

The dark blue bars represent wind conditions in the Existing Configuration, while the light blue bars represent the Proposed Configuration. For example, wind conditions at Sensor #2 were suitable for sitting in the Existing Configuration and standing in the Proposed Configuration. The figure below illustrates the safety criteria, which should not exceed 90 km/h more than 0.1% of the time. For example, all sensors passed the wind safety criterion in both configurations.



Example Results – Safety Criteria (Annual 0.1% Gust Wind Speeds)

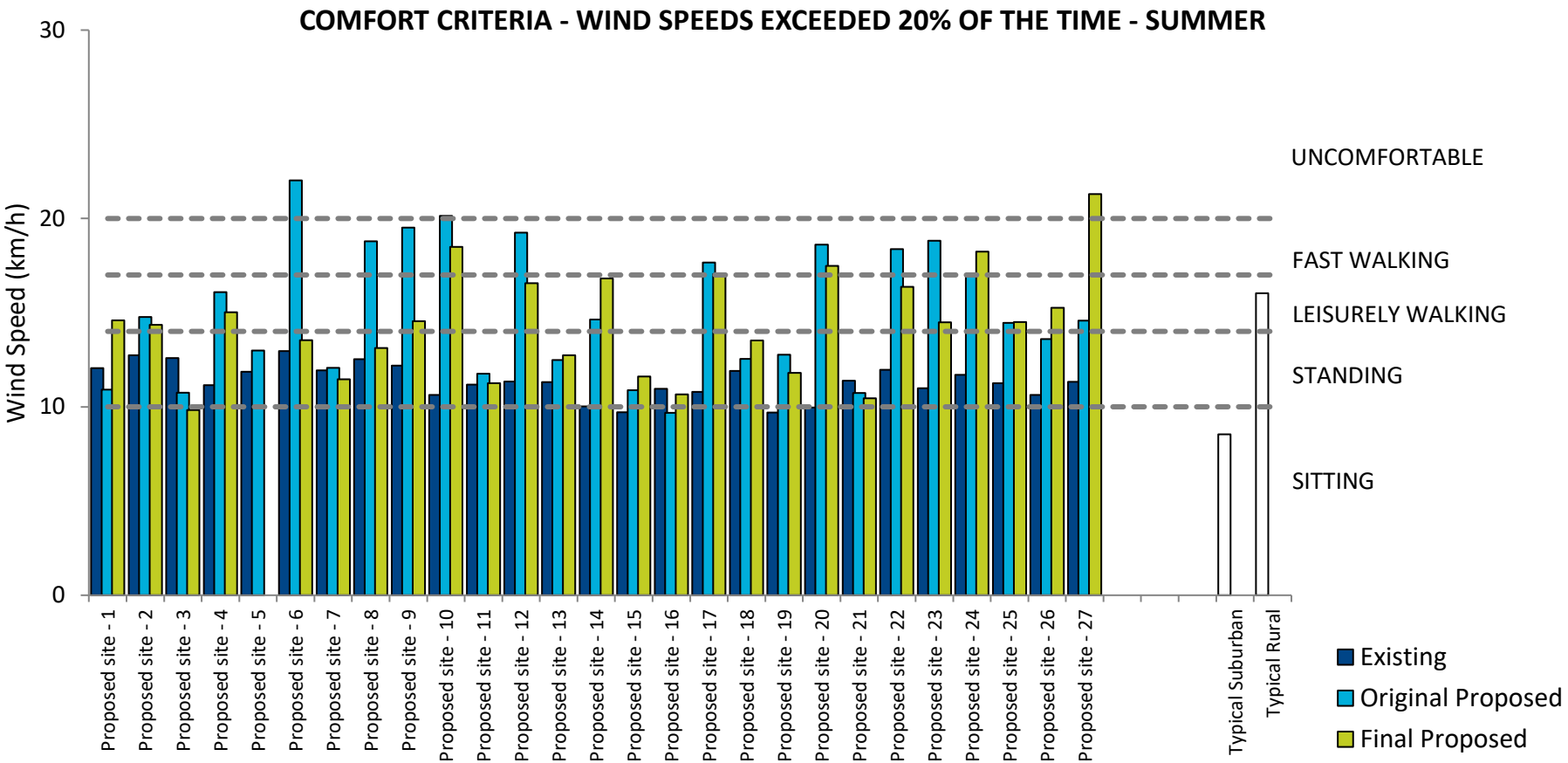


Figure A1a: Wind Conditions – Summer - Proposed Site

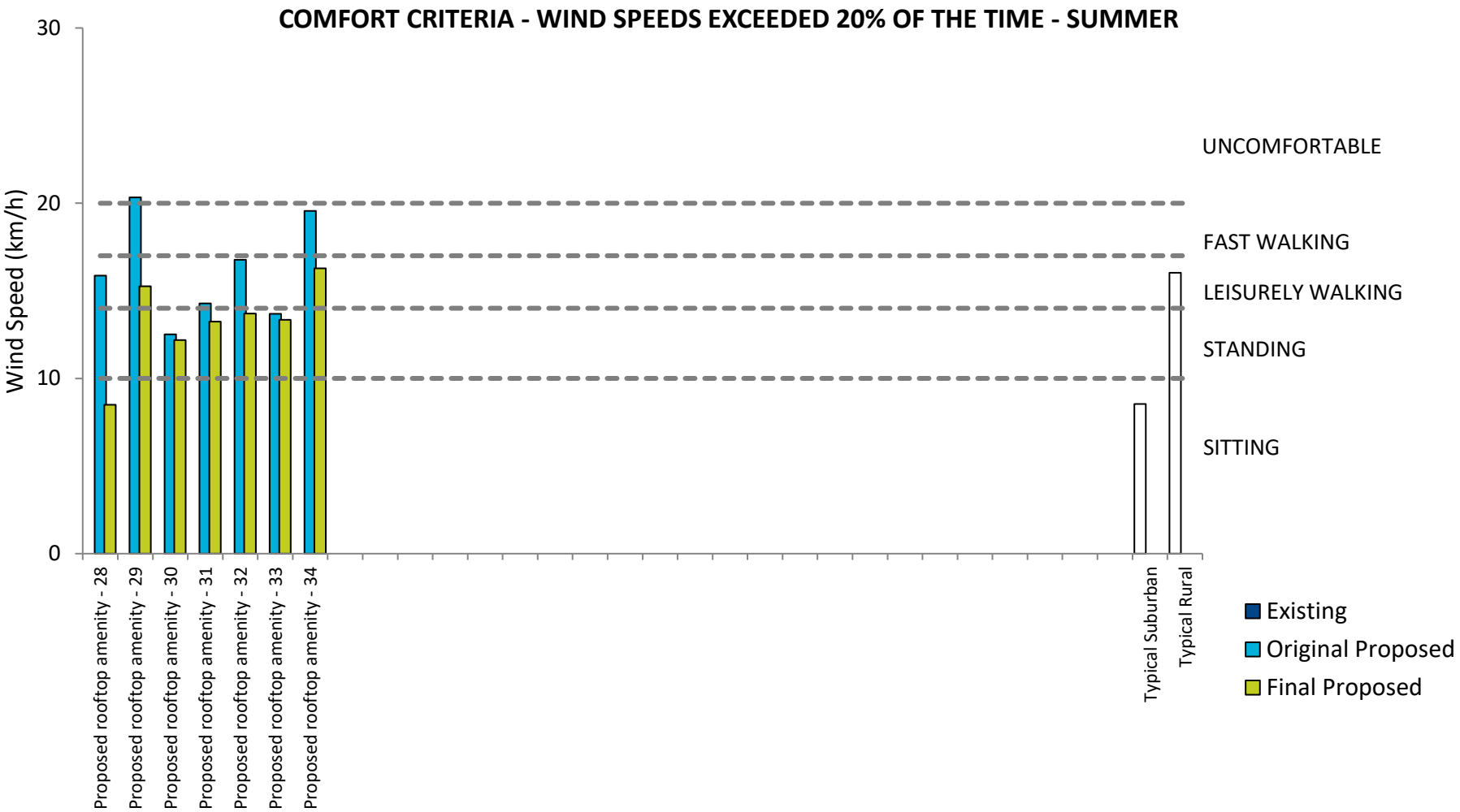


Figure A1b: Wind Conditions – Summer – Proposed Rooftop Amenity

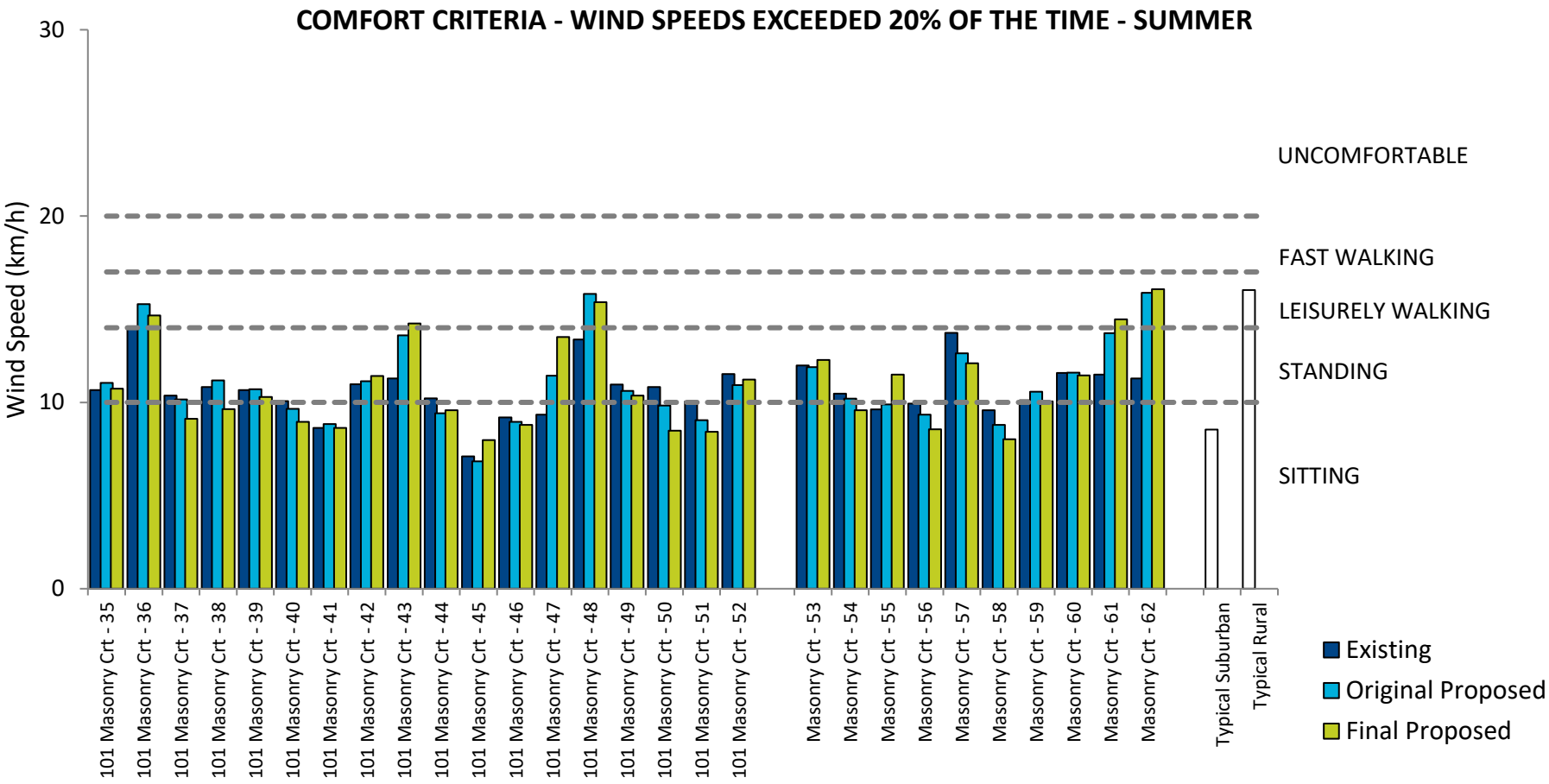


Figure A1c: Wind Conditions – Summer - Masonry Court

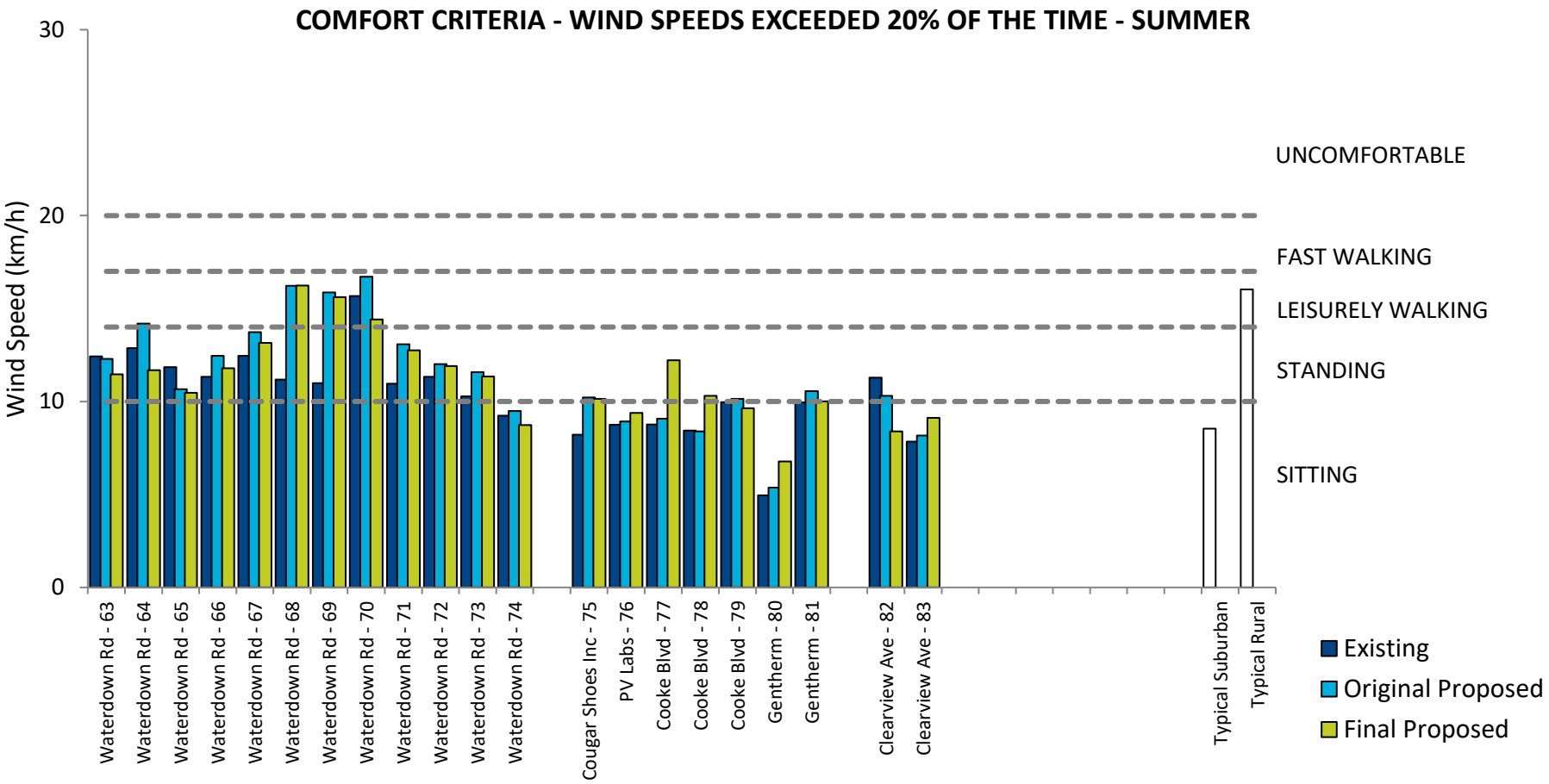


Figure A1d: Wind Conditions – Summer - Waterdown Road

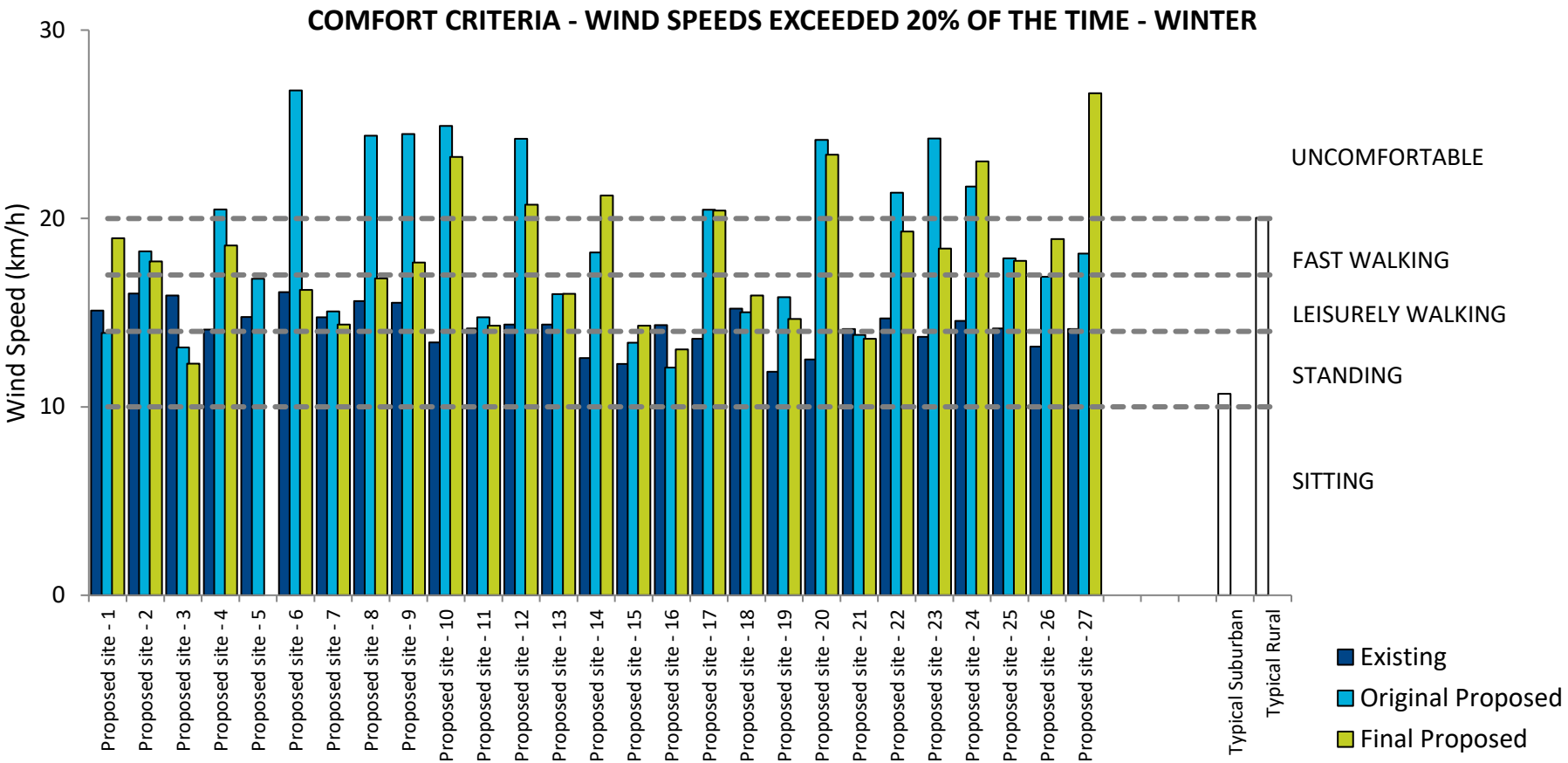


Figure A2a: Pedestrian Wind Conditions – Winter Season – Proposed Site

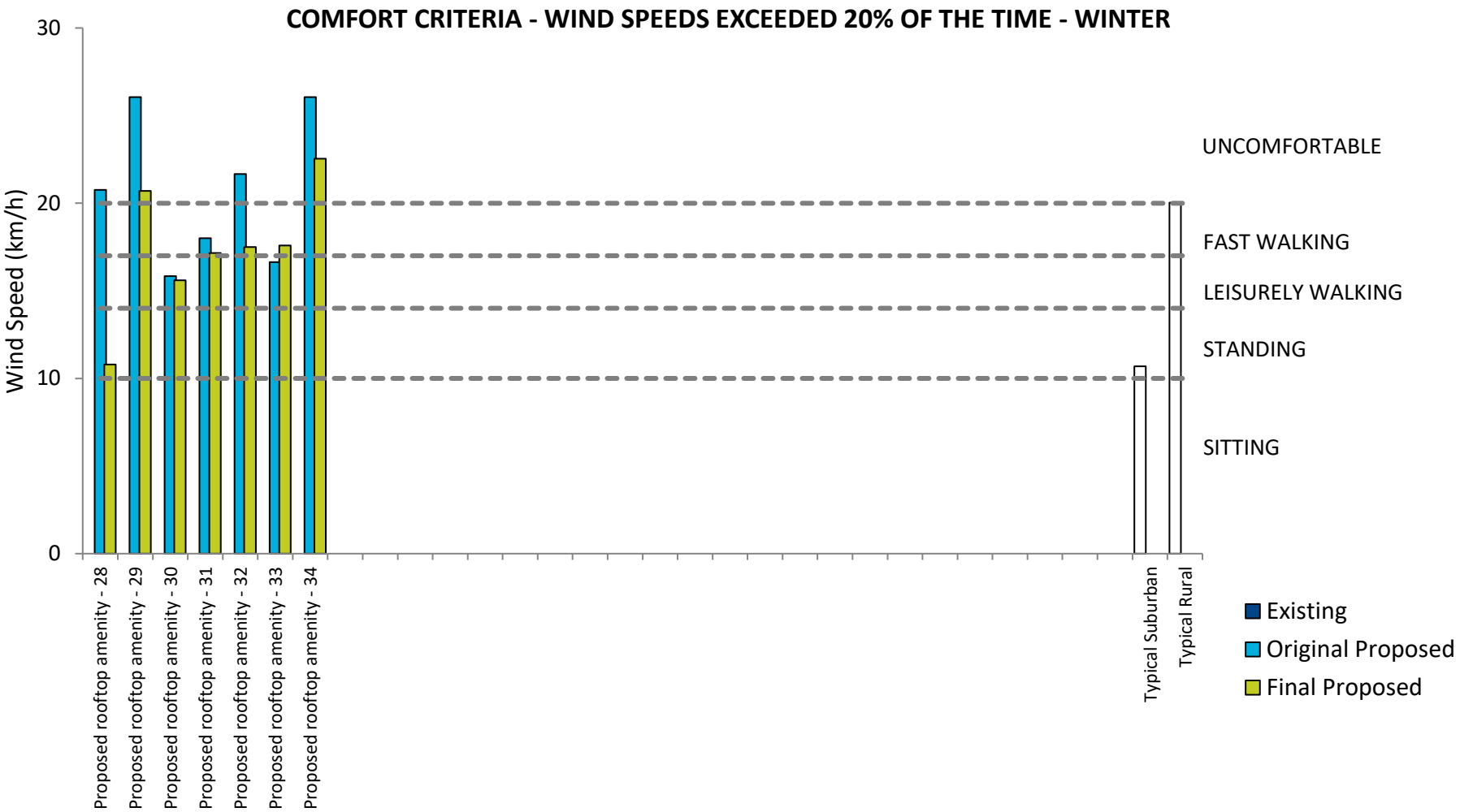


Figure A2b: Pedestrian Wind Conditions – Winter Season – Proposed Rooftop Amenity

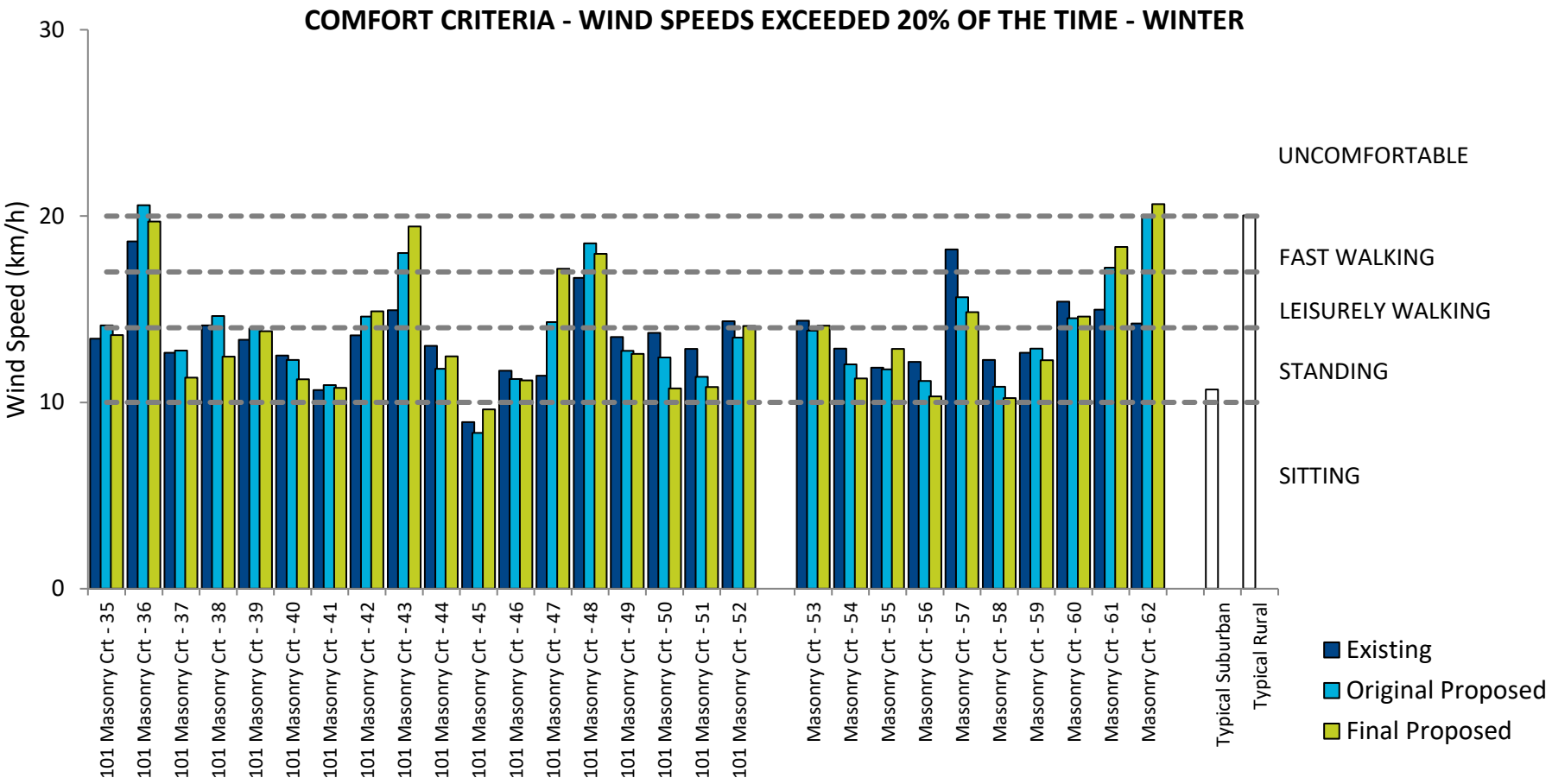


Figure A2c: Pedestrian Wind Conditions – Winter Season – Masonry Court

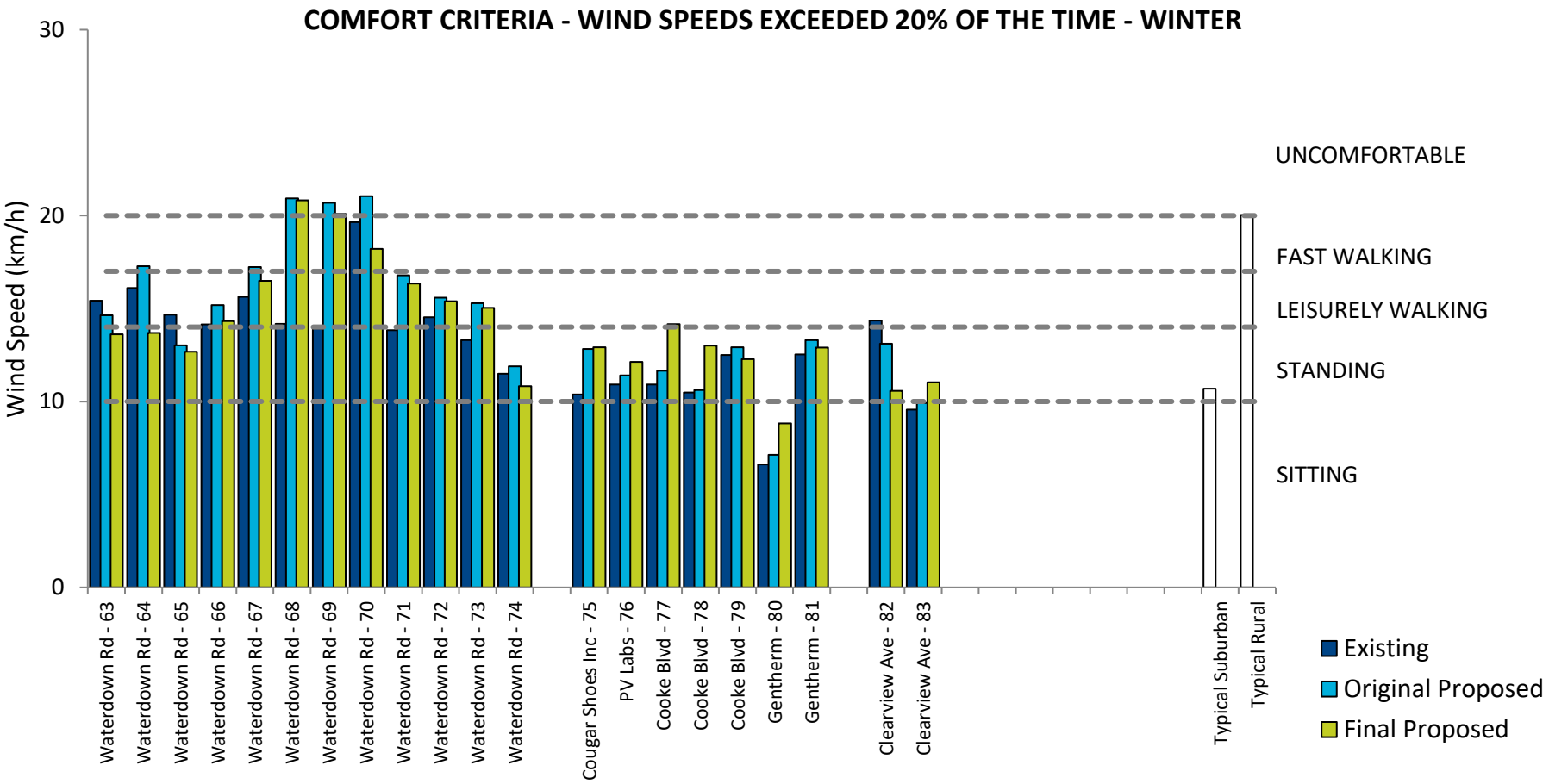


Figure A2d: Pedestrian Wind Conditions – Winter Season – Waterdown Road

Appendix C

Pedestrian Wind Safety Analysis

Annual

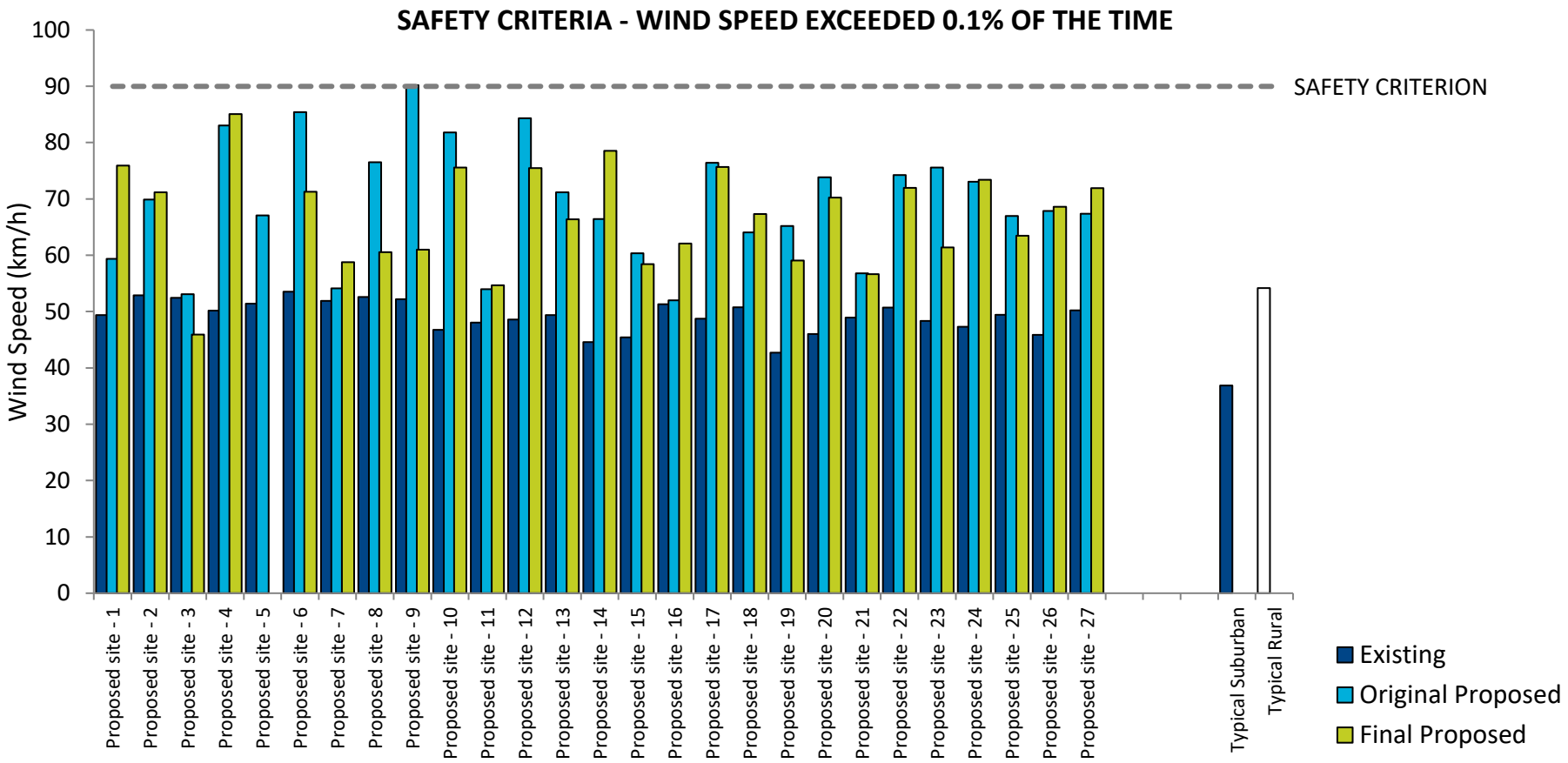


Figure B1a: Pedestrian Wind Safety – Annual – Proposed Site

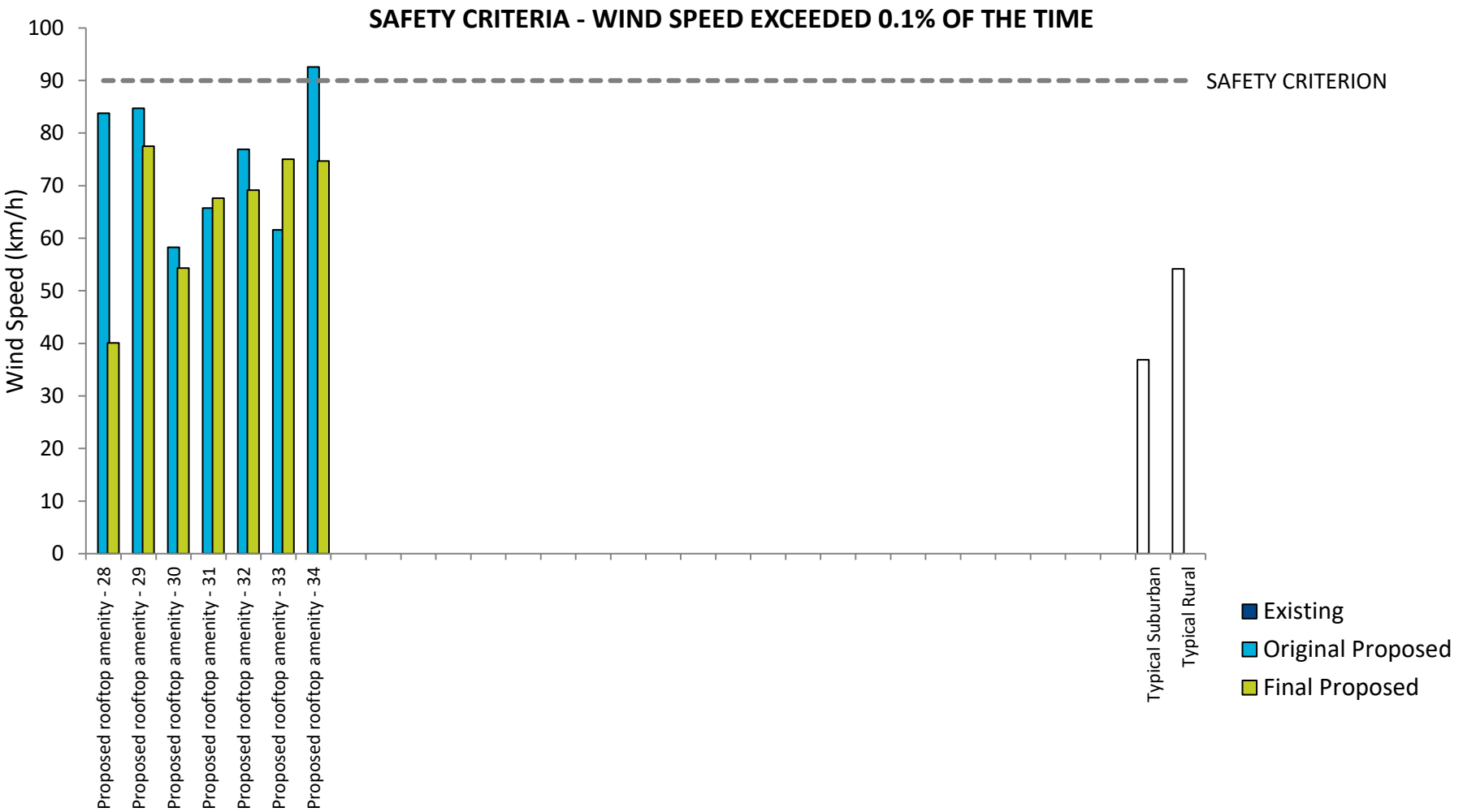


Figure B1b: Pedestrian Wind Safety – Annual – Proposed Rooftop Amenity

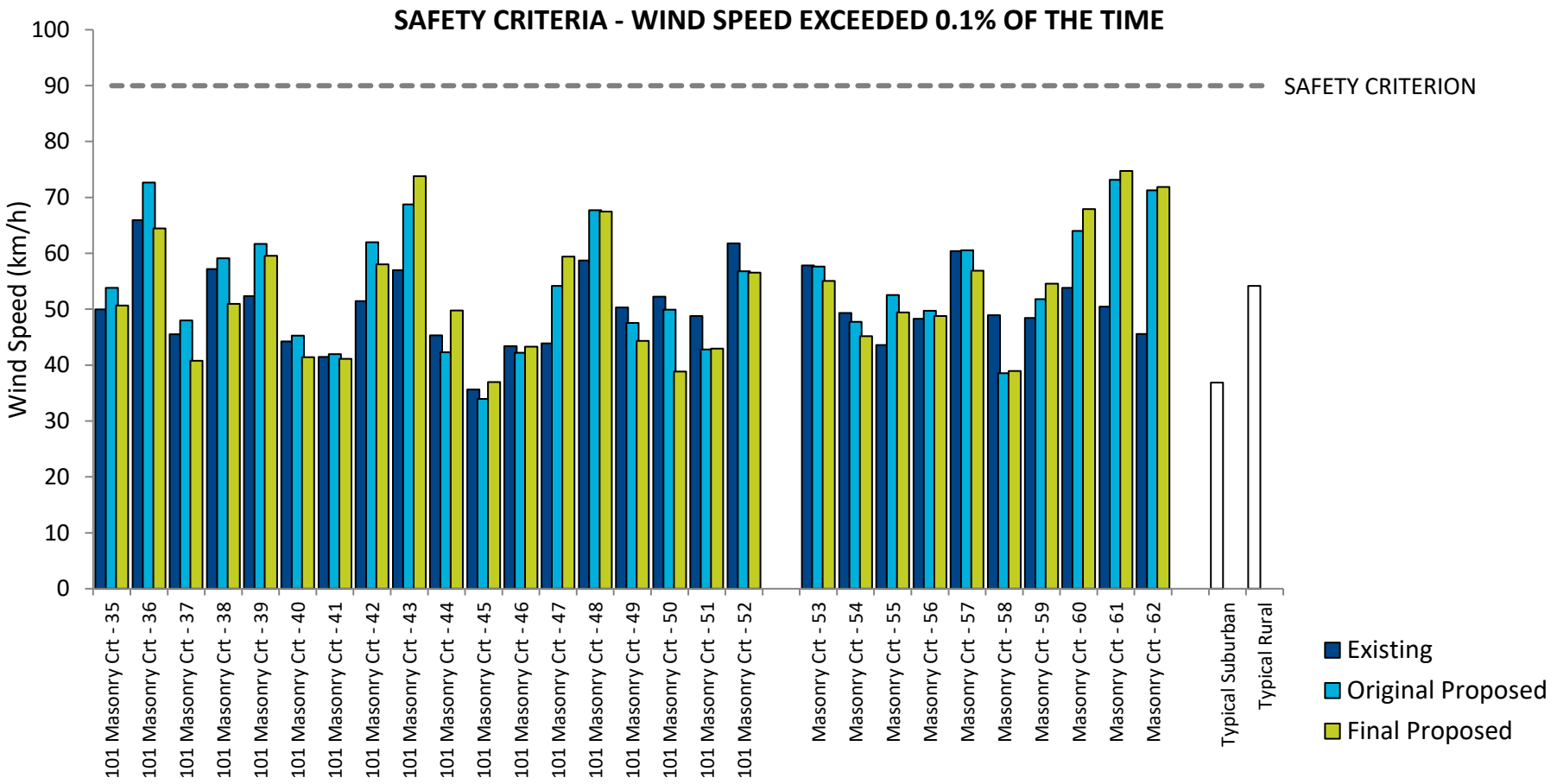


Figure B1c Pedestrian Wind Safety – Annual – Masonry Court

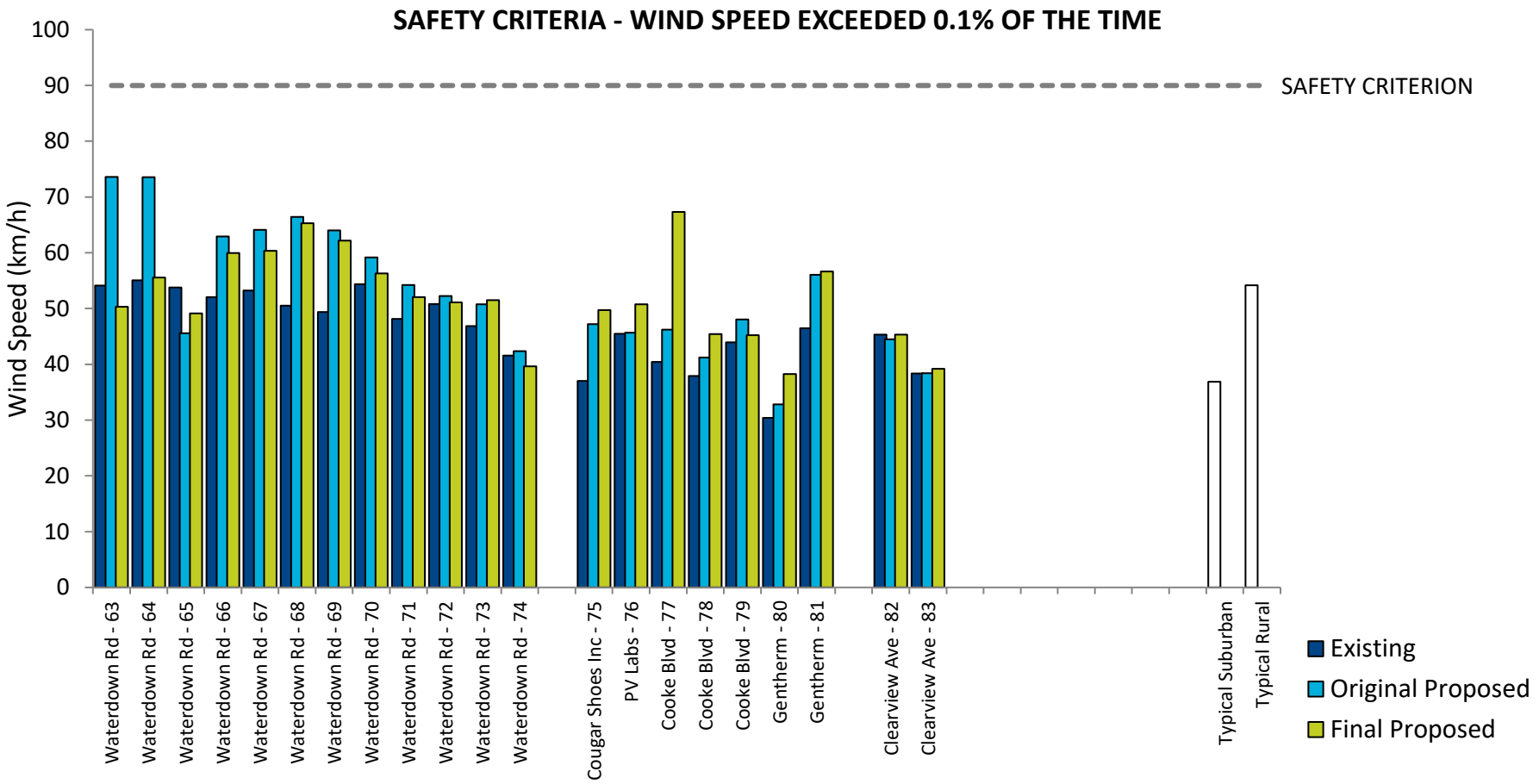


Figure B1d: Pedestrian Wind Safety – Annual – Waterdown Road

Appendix D

Updated Drawings

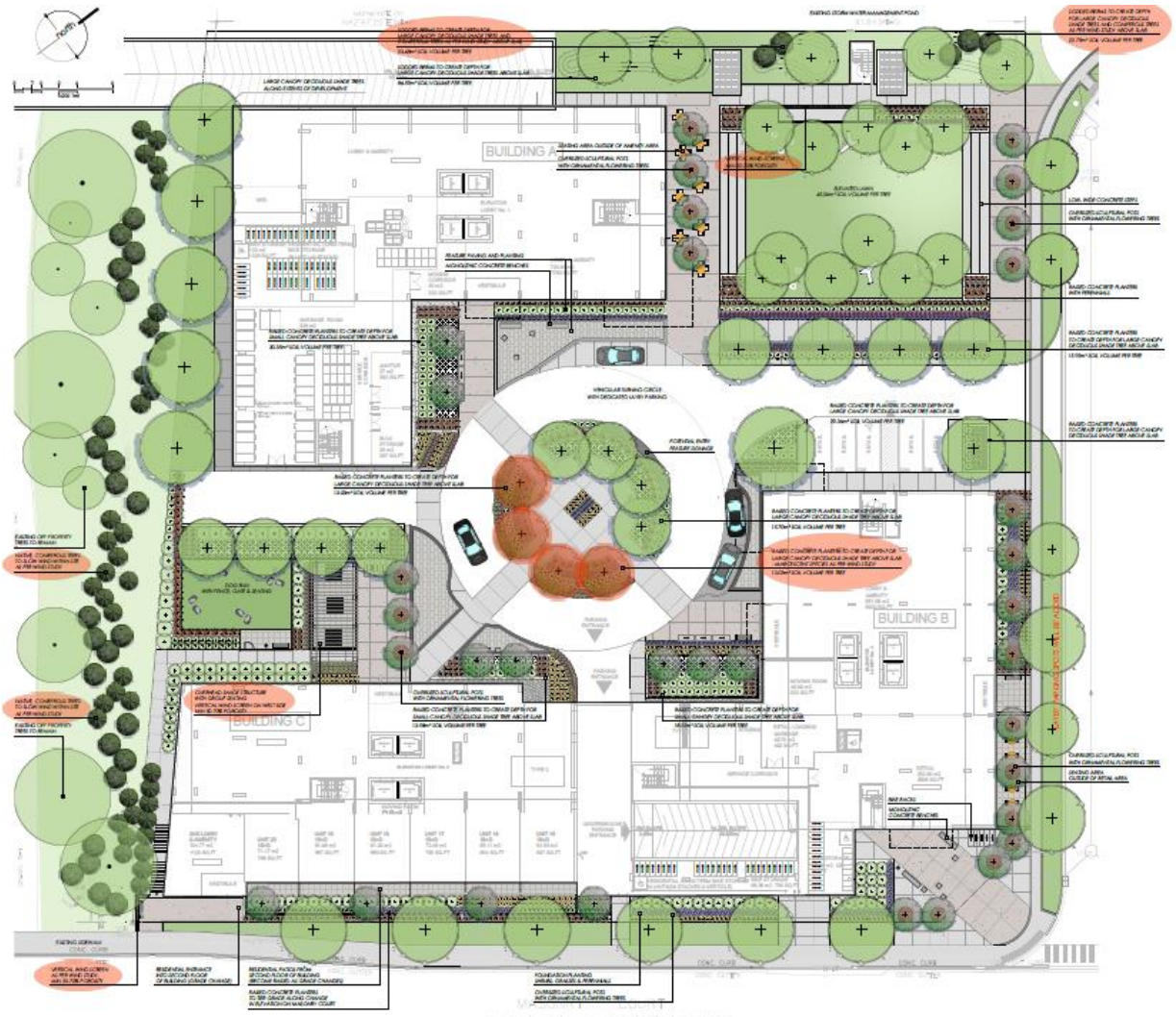


Figure D1: Landscape plan
Credit: adesso design inc.