FINAL REPORT

IDCP V3

CAMBRIDGE, MA

PEDESTRIAN WIND STUDY
RWDI # 2101718
June 4, 2021

SUBMITTED TO

Michael Tilford
VP, Development
mtilford@bxp.com

Ian Hatch
Project Manager
ihatch@bxp.com

BXP – Boston Properties
800 Boylston Street, Suite 1900
Boston, MA 02199-8103
(617) 236-3329

SUBMITTED BY

Sreeyuth Lal, Ph.D.
Technical Coordinator
sreeyuth.lal@rwdi.com

Sonia Beaulieu, M.Sc., PMP, P.Eng.
Senior Project Manager / Principal
sonia.beaulieu@rwdi.com

RWDI
600 Southgate Drive
Guelph, Ontario, Canada N1G 4P6
T: 519.823.1311

EXECUTIVE SUMMARY

RWDI was retained to conduct a pedestrian wind assessment for the proposed IDCP V3 development in Cambridge, MA (Image 1).

The following document summarizes the findings and results from our wind tunnel testing of the project for the Existing, Proposed and Future configurations. Potential wind comfort and safety conditions resulting from the study are shown on site plans in Figures 1A through 2C. The associated wind speeds are listed in Table 1.

These results can be summarized as follows:

Wind Safety:

- Winds at all tested locations meet the RWDI wind safety criterion in all the assessed configurations.

Wind Comfort:

- Existing wind conditions are mainly calm and generally suitable for passive activities in most areas. Elevated wind speeds comfortable for active pedestrian use are currently occurring in some open space and sidewalks along Binney Street and Broadway throughout the year. During the winter, uncomfortable wind conditions exist at a sidewalk location along Loughrey Walkway, to the east of project site.
- The addition of the proposed buildings, which are significantly taller than the existing massing on site, is expected to cause generally higher wind activity. Wind speeds during the summer are anticipated to remain suitable for the intended usage. However, during the winter, higher-than-desired wind conditions are anticipated at a few localized areas. On the terraces, during the summer, calm winds suitable for passive usage are anticipated at most locations except for a few terrace corners.
- The addition of the future buildings generally leads to lower wind speeds at the areas around the proposed development.
- Wind control measures that can be used to achieve the desired wind speeds at all grade and above-grade areas are described within the report.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1 INTRODUCTION

RWDI was retained to conduct a pedestrian wind assessment for the proposed IDCP V3 development in Cambridge, MA. The project (site shown in Image 1) involves the construction of two 400,000 SF/289 ft tall commercial buildings and one 400,000 SF/430 ft tall residential tower on a new land parcel located at the intersection of Binney Street and Galileo Way. The existing site features a multi-level parking garage and a two-story office building.

The objective of the study was to assess the effect of the proposed development on local pedestrian wind conditions and to 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. The assessment focused on critical pedestrian areas, including public sidewalks and building terraces.

This report presents the project objectives, approach and the main results from RWDI's assessment and provides conceptual wind control measures, where necessary.

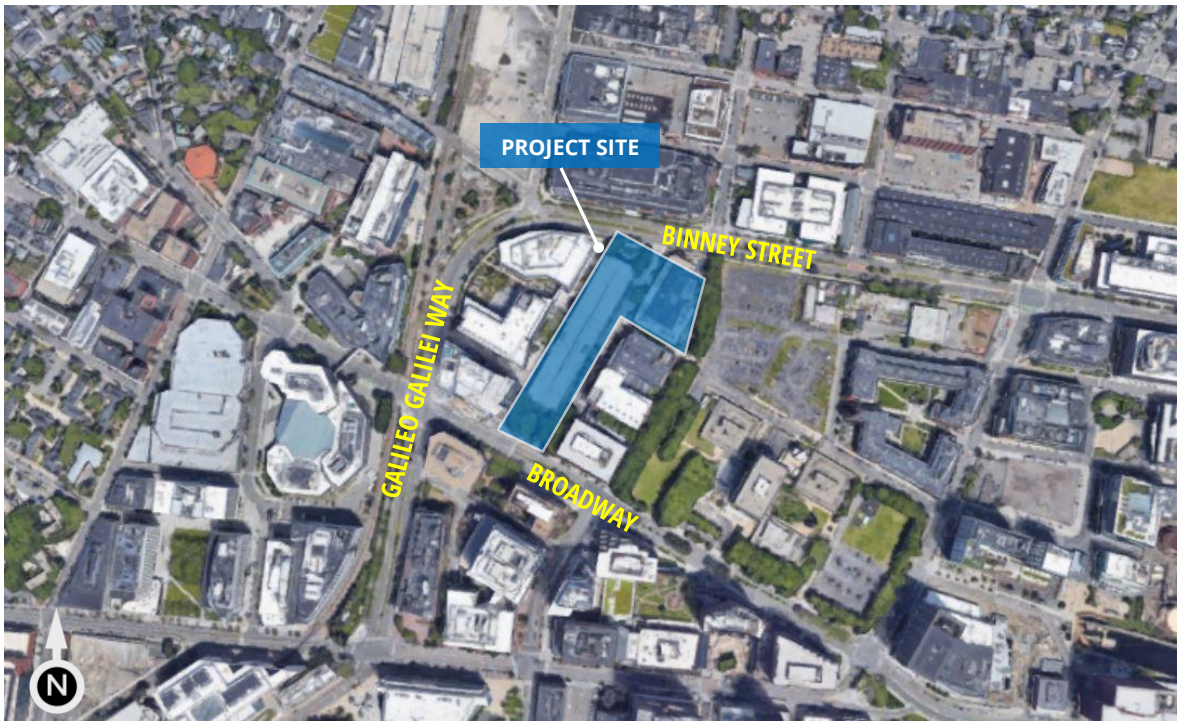


Image 1: Aerial View of Site and Surroundings (Photo Courtesy of Google™ Earth)

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 approximately 1200 ft radius of the study site. The wind and turbulence profiles in the atmospheric boundary layer beyond the modelled area were also simulated in RWDI's wind tunnel. The wind tunnel model was instrumented with 143 specially designed wind speed sensors to measure mean and gust speeds at a full-scale height of approximately 5 ft above local grade in pedestrian areas throughout the study site. Wind speeds were measured for 36 directions in a 10-degree increments. The measurements at each sensor location were recorded in the form of ratios of local mean and gust speeds to the mean wind speed at a reference height above the model. The placement of wind measurement locations was based on our experience and understanding of the pedestrian usage for this site.

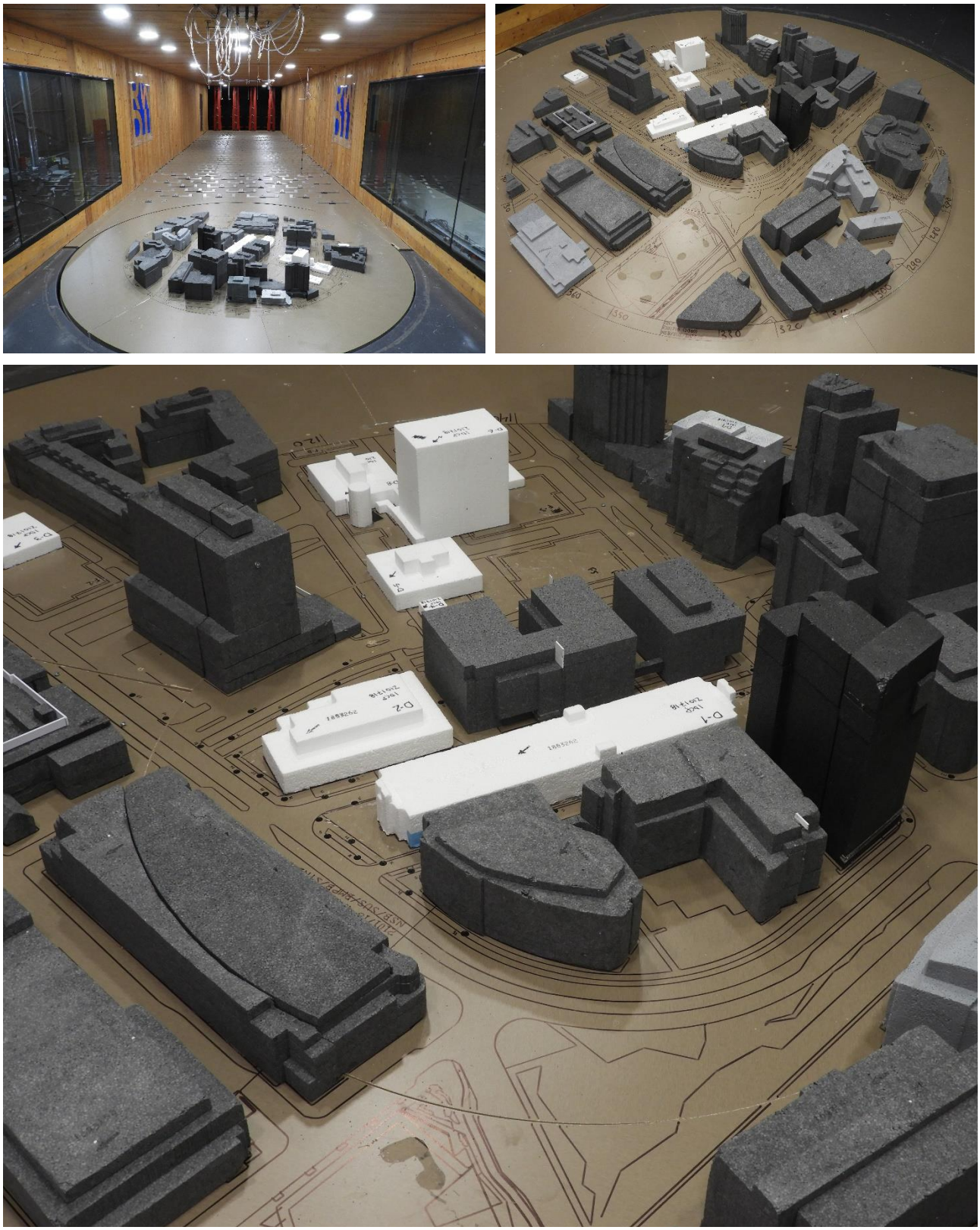
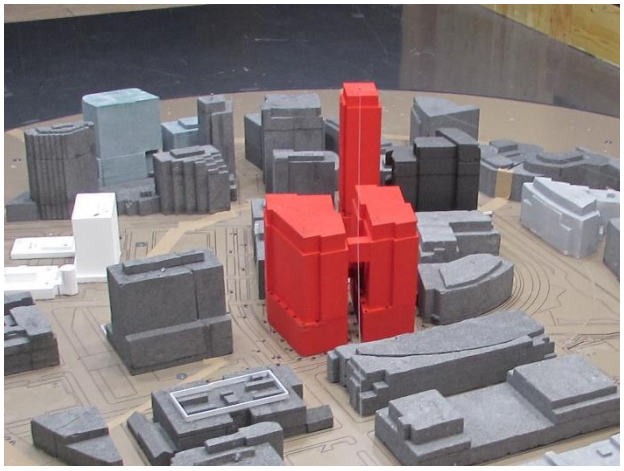


Image 2A: Wind Tunnel Study Model – Existing Configuration



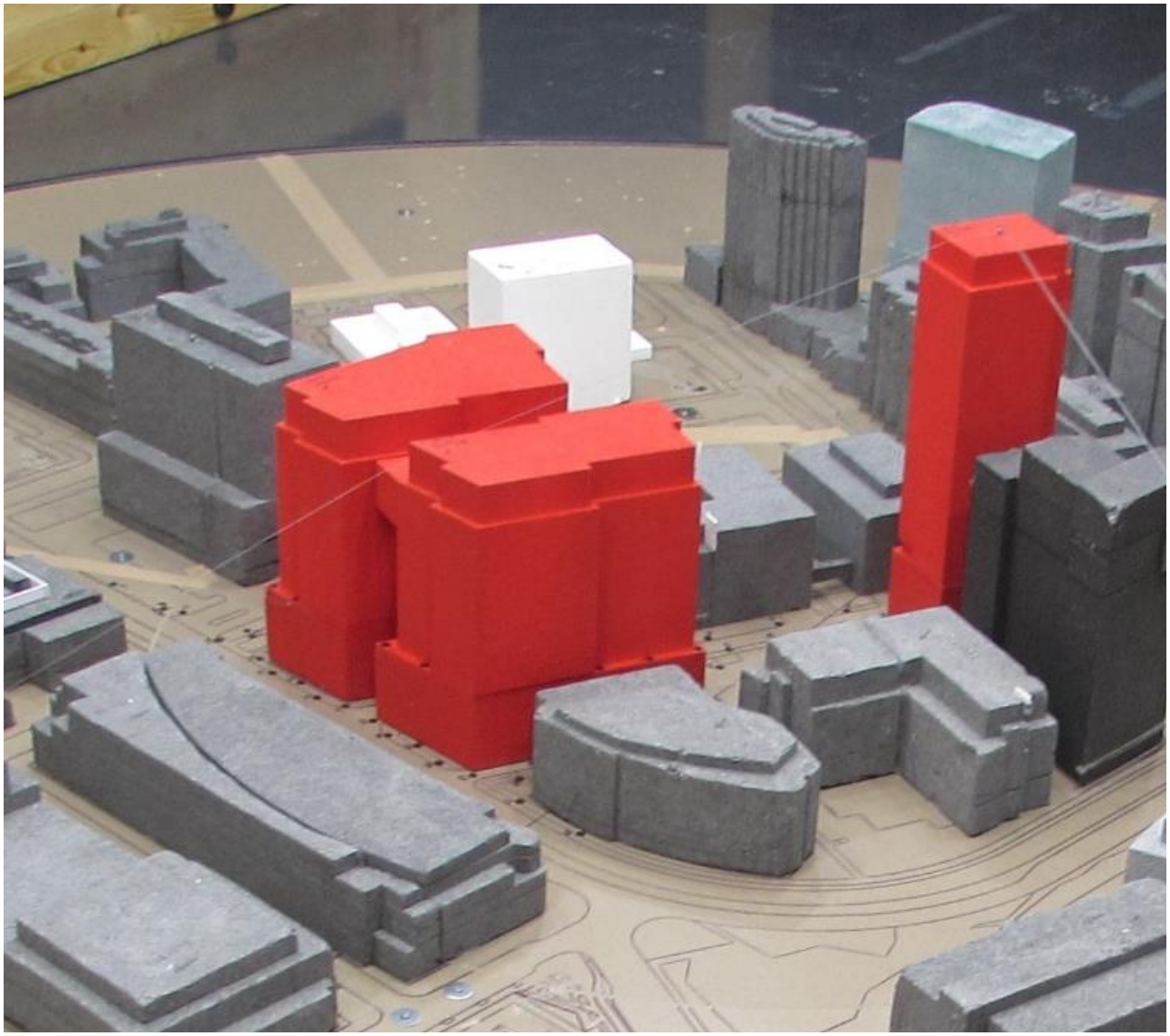


Image 2B: Wind Tunnel Study Model – Proposed Configuration

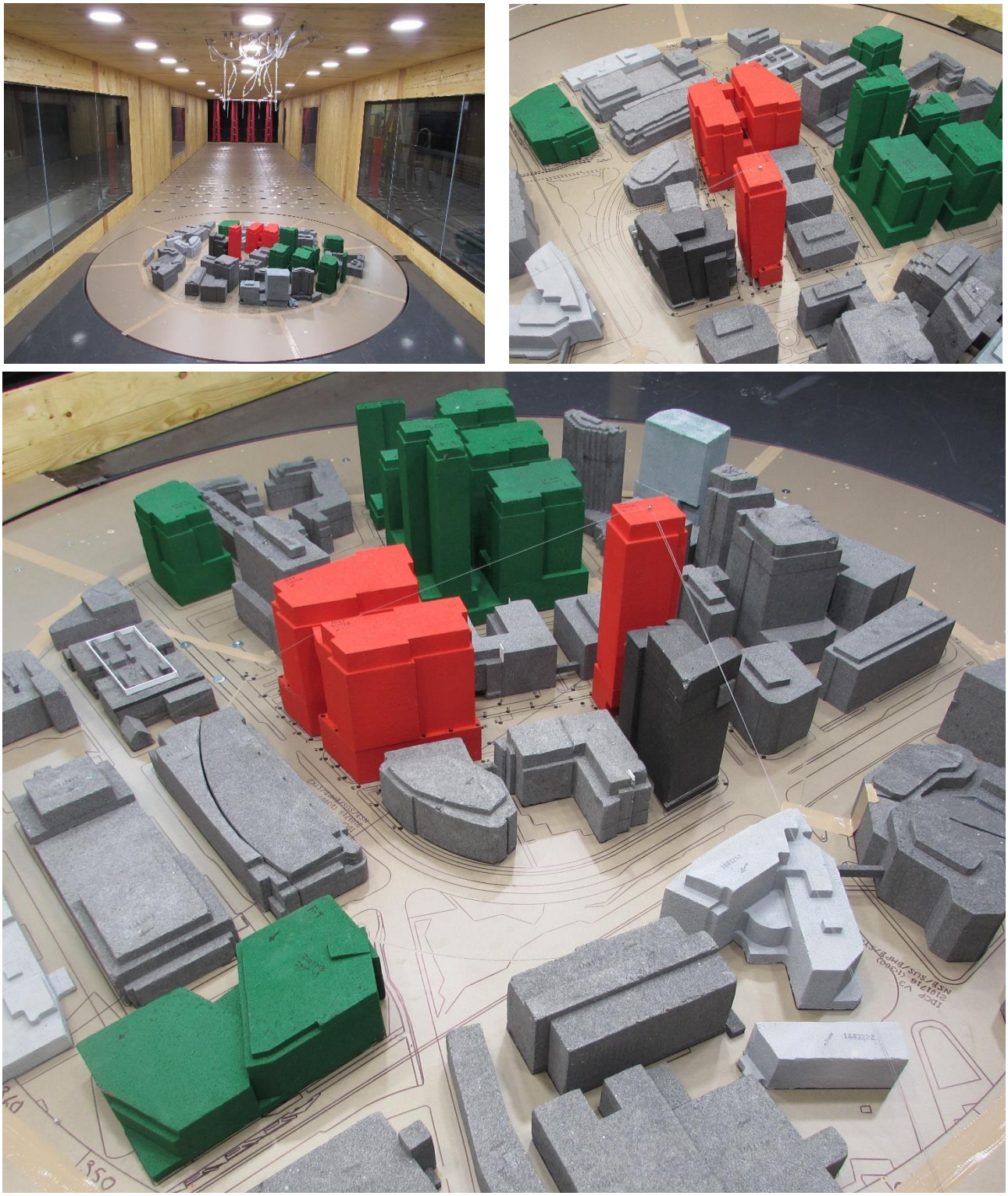
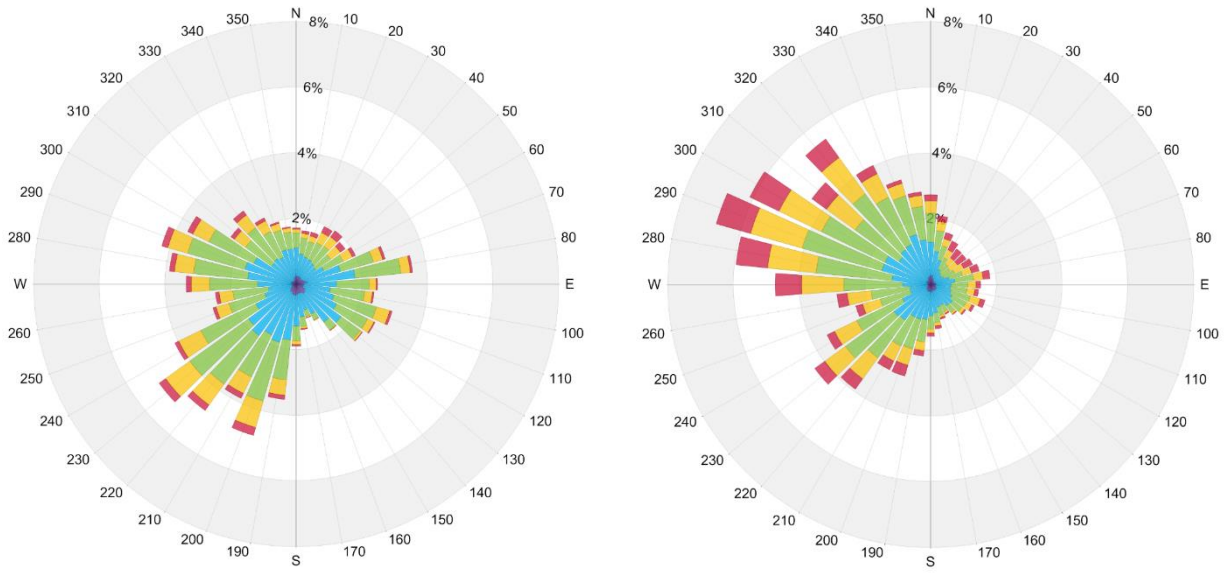


Image 2C: Wind Tunnel Study Model – Future Configuration

2.2 Meteorological Data

Wind statistics recorded at Boston Logan International Airport between 1990 and 2019, inclusively, 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. The most common wind directions are those between south-southwest and north-northwest. Winds from the east-northeast to the east-southeast are also strong but less frequent. In the case of strong winds, west-northwest, northwest, west and northeast are the dominant wind directions. Strong winds of a mean speed greater than 20 mph measured at the airport (at an anemometer height of 30 ft) occur for 3.9% and 11% of the time during the summer and winter seasons, respectively, and they are primarily from the southwest through northeast directions.

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



Wind Speed (mph)	Probability (%) Summer	Winter
Calm	2.7	2.3
1-5	8.3	6.1
6-10	36.1	27.7
11-15	36.2	34.2
16-20	12.8	18.7
>20	3.9	11.0

Image 3: Directional Distribution of Winds Approaching Boston Logan International Airport between 1990 and 2019

2.3 RWDI Pedestrian Wind Criteria

The RWDI pedestrian wind criteria, which have been developed by RWDI through research and consulting practice since 1974, are used in the current study. These criteria have been widely accepted by municipal authorities as well as by the building design and city planning community. Regional differences in wind climate and thermal conditions as well as variations in age, health, clothing, etc. can affect a person's perception of the wind climate. Therefore, comparisons of wind speeds for the existing and proposed building configurations are the most objective way in assessing local pedestrian wind conditions. In general, the combined effect of mean and gust speeds on pedestrian comfort can be quantified by a Gust Equivalent Mean (GEM).

Comfort Category	GEM Speed (mph)	Description
Sitting	≤ 6	Calm or light breezes desired for outdoor restaurants and seating areas where one can read a paper without having it blown away
Standing	≤ 8	Gentle breezes suitable for main building entrances, bus stops, and other places where pedestrians may linger
Strolling	≤ 10	Moderate winds that would be appropriate for window shopping and strolling along a downtown street, plaza or park
Walking	≤ 12	Relatively high speeds that can be tolerated if one's objective is to walk, run or cycle without lingering
Uncomfortable	> 12	Strong winds of this magnitude are considered a nuisance for all pedestrian activities, and wind mitigation is typically recommended

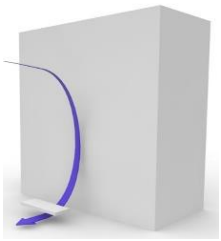
Notes:
(1) GEM Speed = max (Mean Speed, Gust Speed/1.85) and Gust Speed = Mean Speed + 3*RMS Speed;
(2) Wind conditions are considered to be comfortable if the predicted GEM speeds are within the respective thresholds for at least 80% of the time between 6:00 and 23:00. Nightly hours between 0:00 and 5:00 are excluded from the wind analysis for comfort since limited usage of outdoor spaces is anticipated; and,
(3) Instead of standard four seasons, two periods of summer (May to October) and winter (November to April) are adopted in the wind analysis, because in a cold climate such as that found in Cambridge, there are distinct differences in pedestrian outdoor behaviors between these two-time periods.

Safety Criterion	Gust Speed (mph)	Description
Exceeded	> 56	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; and,
(2) Only gust speeds need to be considered in the wind safety criterion. These are usually rare events, but deserve special attention in city planning and building design due to their potential safety impact on pedestrians.

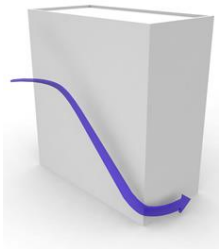
2.4 Generalized Wind Flows

In our discussion of wind conditions, reference may be made to the following generalized wind flows (Image 4):



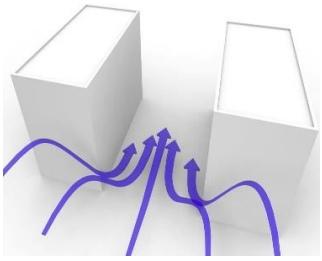
DOWNWASHING

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



CORNER ACCELERATION

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



CHANNELING EFFECT

When two buildings are situated side by side, wind flow tends to accelerate through the space between the buildings due to channeling effect caused by the narrow gap.

Image 4: Generalized Wind Flows

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)

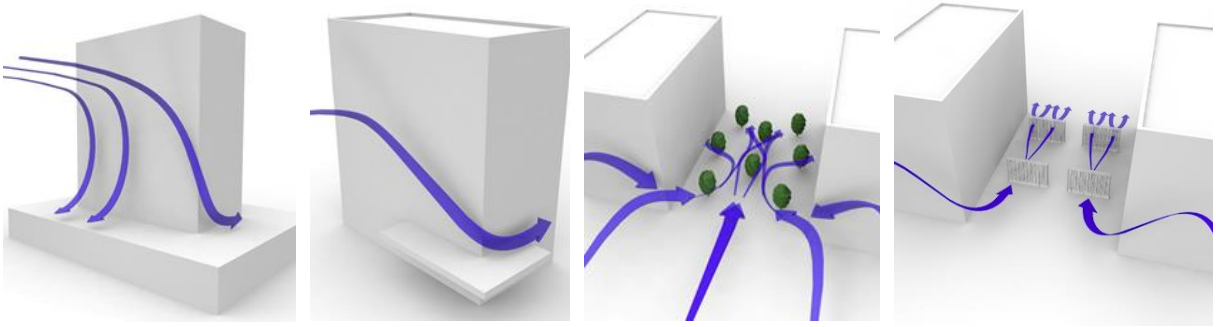


Image 5: Common Wind Control Measures

3 RESULTS AND DISCUSSION

The predicted wind conditions are shown on site plans in Figures 1A through 2C 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. The following is a detailed discussion of the suitability of the predicted wind conditions for the anticipated pedestrian use of each area of interest.

Wind conditions comfortable for walking or strolling are appropriate for sidewalks and walkways as pedestrians will be active and less likely to remain in one area for prolonged periods of time. Lower wind speeds conducive to standing are preferred at main entrances where pedestrians are apt to linger. It is generally desirable for wind conditions on areas intended for passive activities, such as terraces and plaza, to be comfortable for sitting or standing for 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.

3.1 Pedestrian Safety

Wind conditions that meet the RWDI wind safety criterion are predicted at all locations for all configurations assessed. No changes are required to the proposed development to address potential safety issues.

3.2 Pedestrian Comfort

3.2.1 Grade Level (Locations 1 through 117)

3.2.1.1 Existing Configuration

Existing wind conditions are currently mainly calm and suitable for passive activities in most areas (Figures 1A and 2A). Elevated wind speeds comfortable for active pedestrian use are currently occurring in some open space and sidewalks along Binney Street and Broadway throughout the year. However, during the winter, uncomfortable wind conditions exist on the sidewalk of Loughrey Walkway, to the east of project site (Location 61 in Figure 2A).

3.2.1.2 Proposed Configuration

The addition of the proposed buildings, which are significantly taller than the existing massing that they will replace, will generally lead to higher wind activity in the vicinity of the buildings due to a combination of the wind flow patterns described in Image 4. As such, higher wind speeds on and around the buildings, especially around building corners, are predicted throughout the year (Figures 1B and 2B). Wind speeds at all tested locations are anticipated to remain comfortable for the intended usage during the summer (Figure 1B). We however note that winds rated as uncomfortable are predicted during the winter around the western corners of the northwest building, the southwest corner of the northeast building, and at several areas around the south building (Locations 4, 35, 36, 49, 53, 90, 92 and 102 in Figure 2B). These conditions are due to a combination of downwashing and corner acceleration (Image 4) of the prevailing westerly and northwesterly winds that are intercepted by the proposed buildings.

The recommended wind control measures are identified in Image 6. Coniferous/marcescent landscaping or wind screens, signage or architectural features should be added in the areas highlighted in purple where uncomfortable conditions are predicted in the winter. These vertical features should be at least 6 ft tall, and 20-40% porous to maintain good wind control efficacy. These features could help to diffuse the energy of winds accelerating around the building corners where they are installed. In addition, deep canopies that wrap around the building corners could also be added at the locations highlighted in blue in Image 6, which could help redirecting winds downwashing off the facades away from the ground. Example images of these features are shown in Image 7.

As the project design evolves, RWDI can provide more specific recommendations for the different areas. The effect of the recommended mitigation measures, either in isolation or as a combination, can be quantified using wind tunnel tests.

Wind speeds appropriate for sitting or standing throughout the year are desired at main entrances of the buildings. Therefore, as the building design evolves, it is recommended to plan entrances at areas where lower wind speeds are predicted throughout the year.

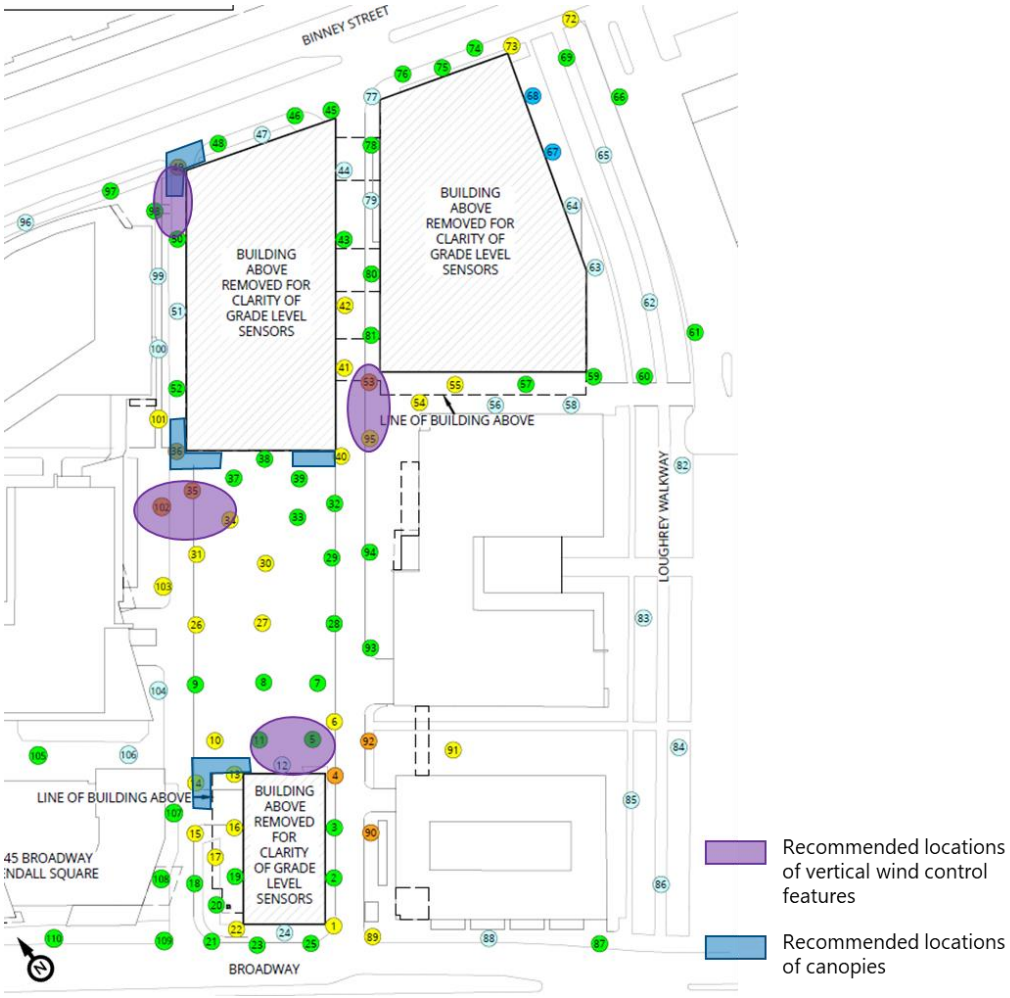


Image 6: Recommended Wind Control Measures at the Grade Level

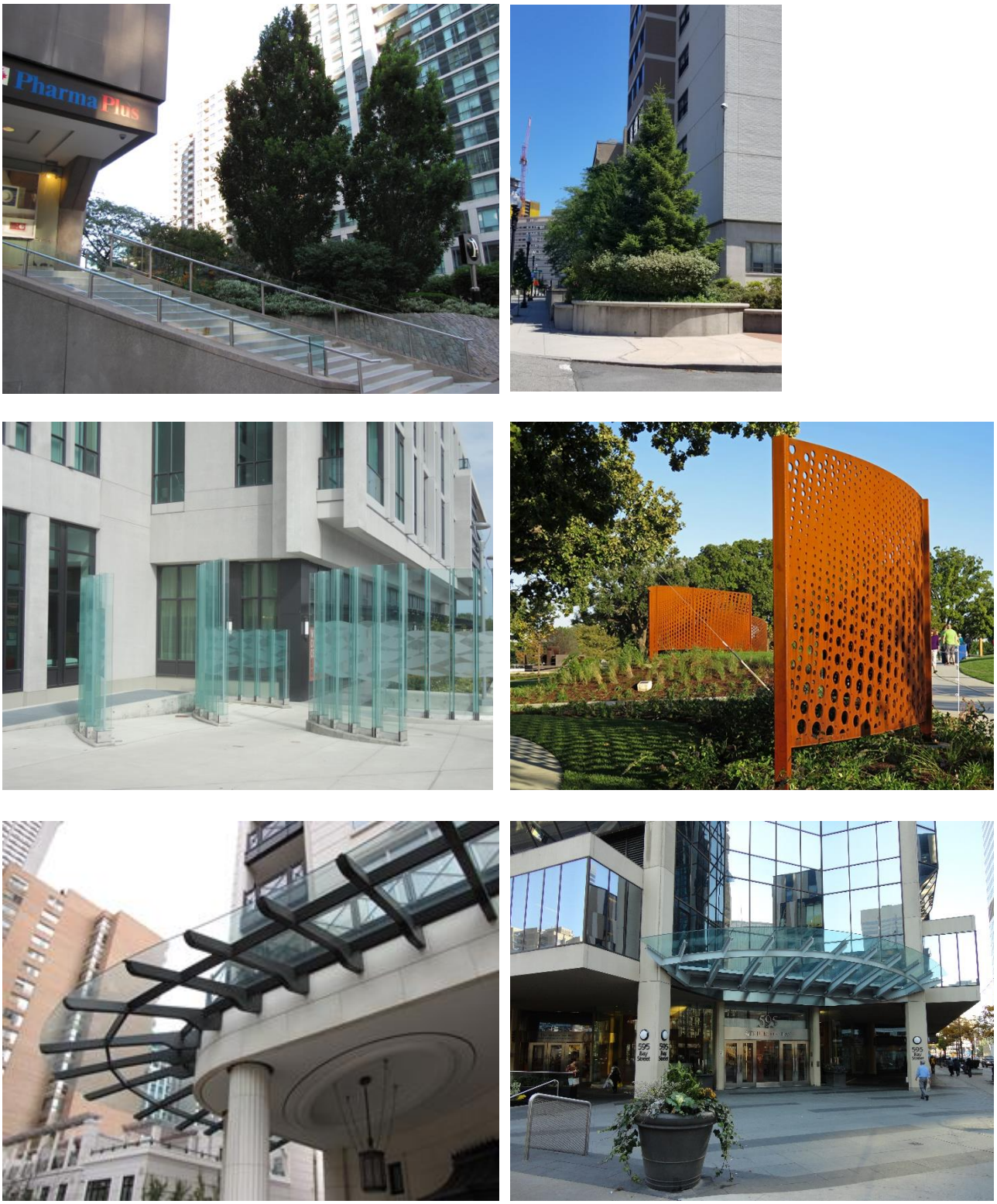


Image 7: Example Images of Recommended Wind Control Measures at the Grade Level such as Landscaping, Wind Screens and Canopies

3.2.1.3 Future Configuration

The addition of the future buildings leads to lower wind speeds at several locations throughout the year. For example, wintertime wind conditions (from uncomfortable to walking conditions) were improved at three locations (Locations 35, 36 and 92 in Figure 2C). Locally higher wind speeds are anticipated along Loughrey Walkway throughout the year (Figures 1C and 2C); however, conditions remain suitable for walking throughout the year.

3.2.2 Level 5 Terraces (Locations 118 through 143)

3.2.2.1 Proposed Configuration

During the summer, generally calm conditions suitable for sitting or standing are anticipated at most areas on the Level 5 terraces of the buildings (Figure 1B), which is suitable for the intended usage. Locally higher wind speeds comfortable for strolling or walking are anticipated at the southwest and northeast corners of the north building terraces (Locations 124 and 139, respectively, in Figure 1B), and the southeast corner of the south building terrace (Location 119 in Figure 1B). Wind control measures such as tall guardrails that are at least 6 ft tall and/or wrap-around canopies can be used to achieve lower wind speeds at the impacted terrace corners.

During the winter, generally higher wind speeds are anticipated on the terraces, including wind speeds rated uncomfortable at the aforesaid terrace corners (Figure 2B); however, this is acceptable is limited usage of the terraces is anticipated during the colder months.

3.2.2.2 Future Configuration

The addition of the future buildings reduces wind speeds at the northeast corner of the northeast building and the southeast corner of the south building (Locations 139 and 119, respectively, in Figure 1C) compared to the conditions measured under the proposed configuration. As a result, during the summer, wind speeds suitable for standing are anticipated at Location 139. Conditions however remain higher than desired at Location 119. Wind speeds at all other assessed areas on the terraces are not significantly impacted by the addition of the future buildings.

4 APPLICABILITY OF RESULTS

The wind conditions presented in this report pertain to the model of the IDCP V3 development constructed using the drawings and information listed below. Should there be any design changes that deviate from this list of drawings, the wind condition predictions presented may change. Therefore, if changes in the design are made, it is recommended that RWDI be contacted and requested to review their potential effects on wind conditions.

File Name	File Type	Date Received (dd/mm/yyyy)
2021-0319-IDCP-SASAKI-COORDINATION BASE-RWDI	Sketchup	19/03/2021

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.

2. Williams, C.J., Hunter, M.A. and Waechter, W.F. (1990). "Criteria for Assessing the Pedestrian Wind Environment," *Journal of Wind Engineering and Industrial Aerodynamics*, Vol.36, pp.811-815.

3. Williams, C.J., Soligo M.J. and Cote, J. (1992). "A Discussion of the Components for a Comprehensive Pedestrian Level Comfort Criteria," *Journal of Wind Engineering and Industrial Aerodynamics*, Vol.41-44, pp.2389-2390.

4. Soligo, M.J., Irwin, P.A., and Williams, C.J. (1993). "Pedestrian Comfort Including Wind and Thermal Effects," *Third Asia-Pacific Symposium on Wind Engineering*, Hong Kong.

5. Soligo, M.J., Irwin, P.A., Williams, C.J. and Schuyler, G.D. (1998). "A Comprehensive Assessment of Pedestrian Comfort Including Thermal Effects," *Journal of Wind Engineering and Industrial Aerodynamics*, Vol.77&78, pp.753-766.

6. Williams, C.J., Wu, H., Waechter, W.F. and Baker, H.A. (1999). "Experiences with Remedial Solutions to Control Pedestrian Wind Problems," *Tenth International Conference on Wind Engineering*, Copenhagen, Denmark.

7. Lawson, T.V. (1973). "Wind Environment of Buildings: A Logical Approach to the Establishment of Criteria", *Report No. TVL 7321*, Department of Aeronautic Engineering, University of Bristol, Bristol, England.

8. Durgin, F. H. (1997). "Pedestrian Level Wind Criteria Using the Equivalent average", *Journal of Wind Engineering and Industrial Aerodynamics*, Vol. 66, pp.215-226.

9. Wu, H. and Kriksic, F. (2012). "Designing for Pedestrian Comfort in Response to Local Climate", *Journal of Wind Engineering and Industrial Aerodynamics*, Vol.104-106, pp.397-407.

10. Wu, H., Williams, C.J., Baker, H.A. and Waechter, W.F. (2004), "Knowledge-based Desk-Top Analysis of Pedestrian Wind Conditions", *ASCE Structure Congress 2004,* Nashville, Tennessee.

FIGURES

BENT STREET
ROGERS STREET
SIXTH STREET
FULKERSON STREET
BINNEY STREET
USDOT VOLPE EXCHANGE
EXISTING BUILDING
EXISTING BUILDING
EXISTING BUILDING
POTTER STREET
LOUGHREY WALKWAY
GALILEO GALILEI WAY
145 BROADWAY
KENDALL SQUARE
BROADWAY
AMES PLACE
75 AMES STREET
AMES STREET
AMES STREET RESIDENTIAL
0 50 100ft

LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level

Pedestrian Wind Comfort Conditions

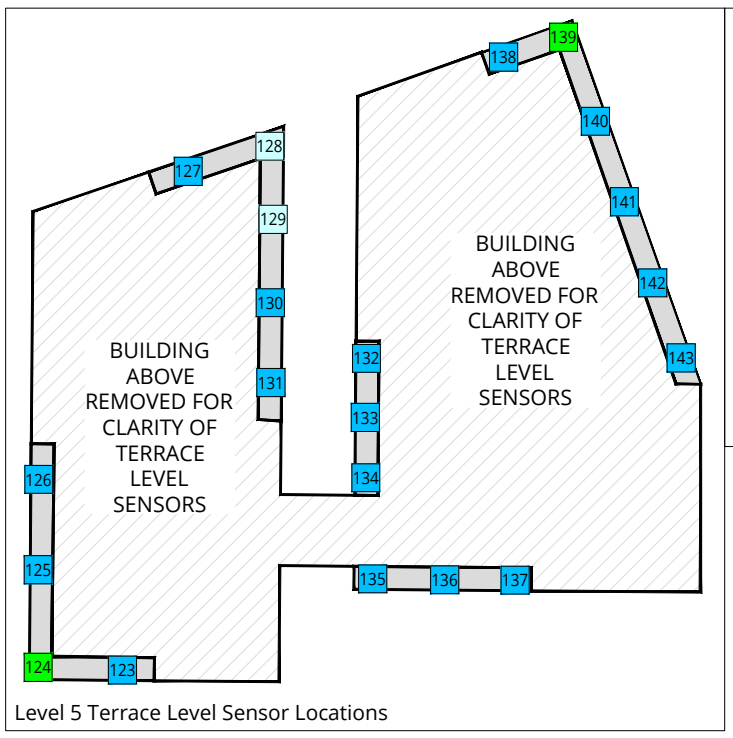
Existing Configuration
Summer (May to October, 6:00 to 23:00)

IDCP V3 - Cambridge, MA

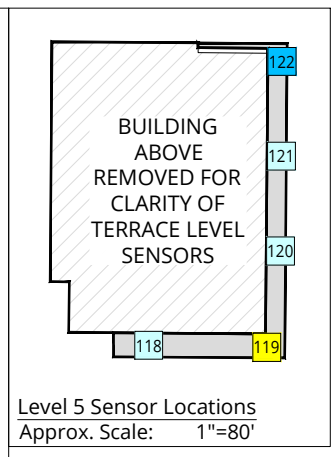
True North

Project #2101718

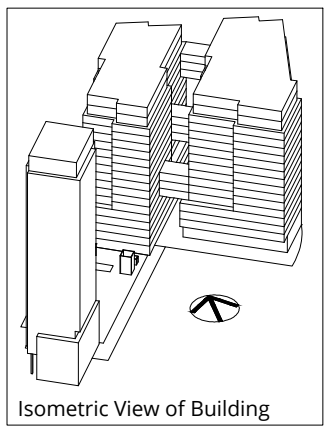
Drawn by:	DF	Figure:	1A
Approx. Scale:	1"=100'		
Date Revised:	May 31, 2021		



Level 5 Terrace Level Sensor Locations



Level 5 Sensor Locations
Approx. Scale: 1"=80'


Isometric View of Building

ROGERS STREET

SIXTH STREET

BINNEY STREET

FULKERSON STREET

USDOT VOLPE EXCHANGE

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

LINE OF BUILDING ABOVE

POTTER STREET

LOUGHREY WALKWAY

EXISTING BUILDING

GALILEO GALILEI WAY

145 BROADWAY
KENDALL SQUARE

LINE OF BUILDING ABOVE

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

BROADWAY

AMES PLACE

75 AMES STREET

AMES STREET

AMES STREET RESIDENTIAL

0 50 100ft

LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level
- Level 5 Terrace

Pedestrian Wind Comfort Conditions

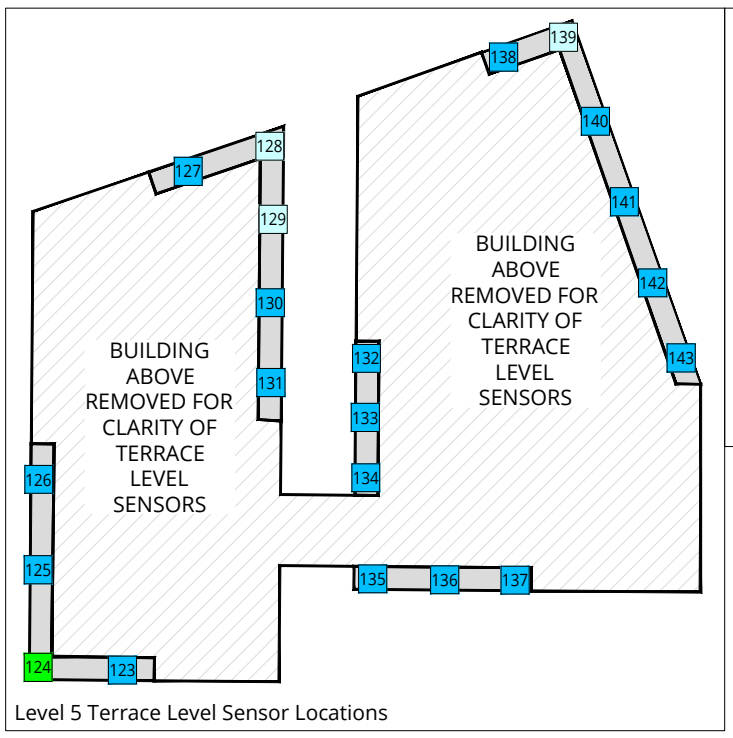
Proposed Configuration
Summer (May to October, 6:00 to 23:00)

IDCP V3 - Cambridge, MA

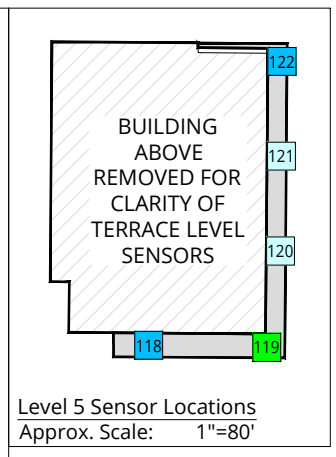
True North

Project #2101718

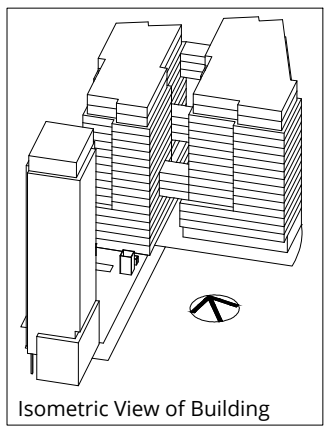
Drawn by: DF	Figure: 1B
Approx. Scale:	1"=100'
Date Revised:	May 31, 2021



Level 5 Terrace Level Sensor Locations



Level 5 Sensor Locations
Approx. Scale: 1"=80'


Isometric View of Building

LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level
- Level 5 Terrace

Pedestrian Wind Comfort Conditions

Future Configuration

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

IDCP V3 - Cambridge, MA

True North

Project #2101718

Drawn by: DF	Figure: 1C
Approx. Scale:	1"=100'
Date Revised:	May 31, 2021

BENT STREET
ROGERS STREET
SIXTH STREET
FULKERSON STREET
BINNEY STREET
USDOT VOLPE EXCHANGE
EXISTING BUILDING
EXISTING BUILDING
EXISTING BUILDING
POTTER STREET
LOUGHREY WALKWAY
GALILEO GALILEI WAY
145 BROADWAY
KENDALL SQUARE
BROADWAY
AMES PLACE
75 AMES STREET
AMES STREET
AMES STREET RESIDENTIAL
0 50 100ft

LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level

Pedestrian Wind Comfort Conditions

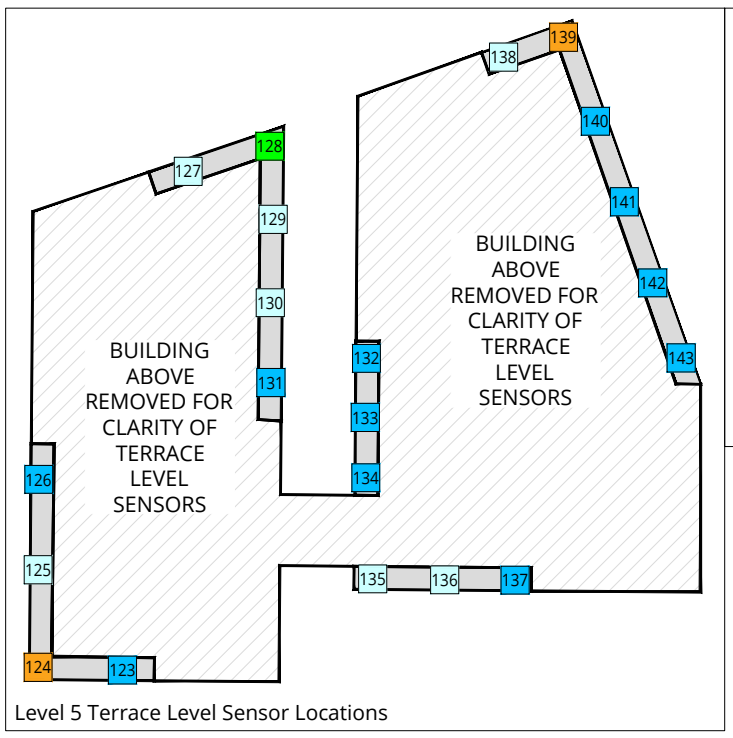
Existing Configuration
Winter (November to April, 6:00 to 23:00)

IDCP V3 - Cambridge, MA

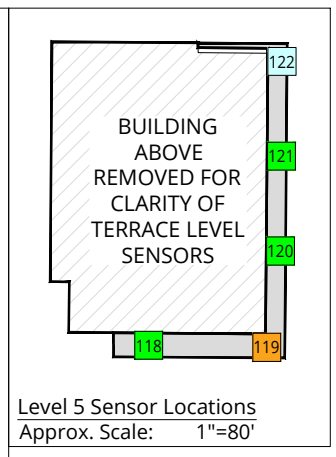
True North

Project #2101718

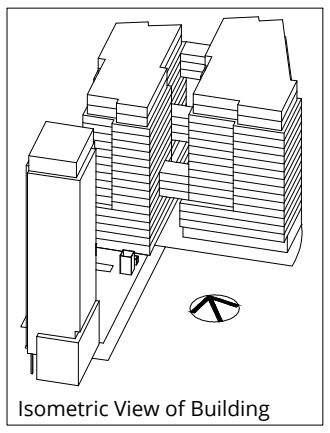
Drawn by:	DF	Figure:	2A
Approx. Scale:	1"=100'		
Date Revised:	May 31, 2021		



Level 5 Terrace Level Sensor Locations



Level 5 Sensor Locations
Approx. Scale: 1"=80'


Isometric View of Building

ROGERS STREET

SIXTH STREET

BINNEY STREET

FULKERSON STREET

USDOT VOLPE EXCHANGE

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

LINE OF BUILDING ABOVE

POTTER STREET

LOUGHREY WALKWAY

EXISTING BUILDING

GALILEO GALILEI WAY

145 BROADWAY
KENDALL SQUARE

LINE OF BUILDING ABOVE

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

BROADWAY

AMES PLACE

75 AMES STREET

AMES STREET

AMES STREET RESIDENTIAL

0 50 100ft

LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level
- Level 5 Terrace

Pedestrian Wind Comfort Conditions

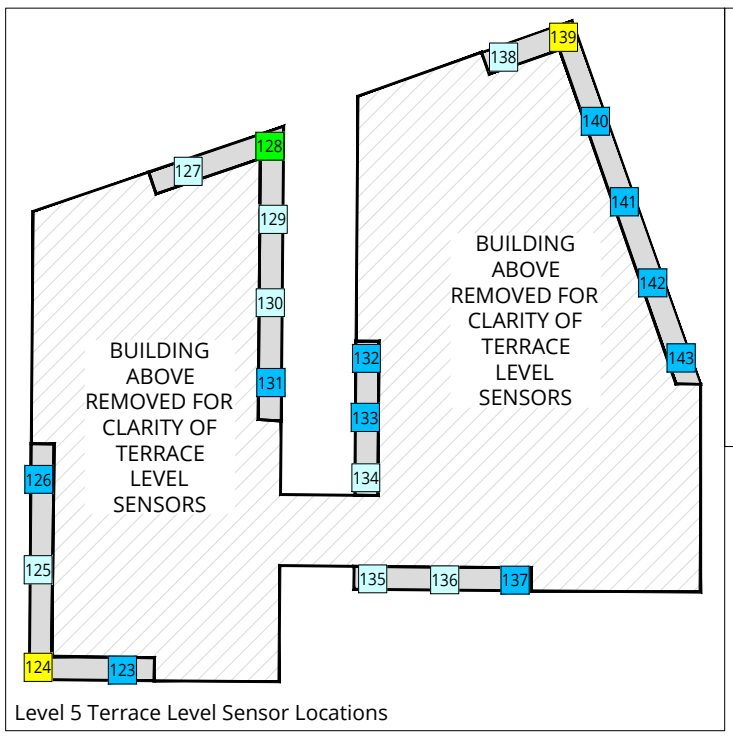
Proposed Configuration
Winter (November to April, 6:00 to 23:00)

IDCP V3 - Cambridge, MA

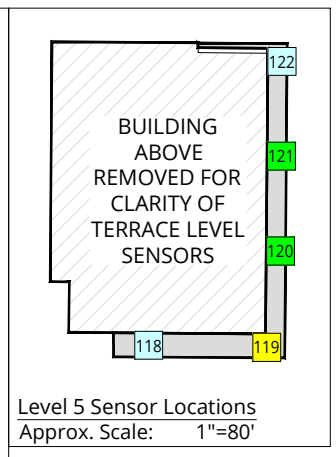
True North

Project #2101718

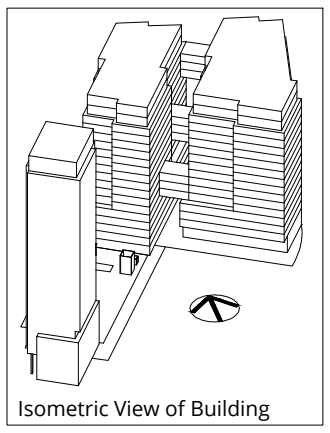
Drawn by: DF	Figure: 2B
Approx. Scale:	1"=100'
Date Revised:	May 31, 2021



Level 5 Terrace Level Sensor Locations



Level 5 Sensor Locations
Approx. Scale: 1"=80'



Isometric View of Building

LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level
- Level 5 Terrace

Pedestrian Wind Comfort Conditions

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

IDCP V3 - Cambridge, MA

True North

Project #2101718

Drawn by: DF	Figure: 2C
Approx. Scale:	1"=100'
Date Revised:	May 31, 2021

TABLES

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
1	Existing	8	Standing	10	Strolling	41	Pass
	Proposed	9	Strolling	11	Walking	43	Pass
	Future	8	Standing	10	Strolling	41	Pass
2	Existing	8	Standing	10	Strolling	39	Pass
	Proposed	7	Standing	9	Strolling	37	Pass
	Future	7	Standing	8	Standing	34	Pass
3	Existing	8	Standing	10	Strolling	37	Pass
	Proposed	8	Standing	10	Strolling	38	Pass
	Future	7	Standing	8	Standing	34	Pass
4	Existing	-	-	-	-	-	-
	Proposed	11	Walking	14	Uncomfortable	50	Pass
	Future	10	Strolling	13	Uncomfortable	48	Pass
5	Existing	-	-	-	-	-	-
	Proposed	8	Standing	10	Strolling	40	Pass
	Future	8	Standing	10	Strolling	39	Pass
6	Existing	-	-	-	-	-	-
	Proposed	9	Strolling	12	Walking	44	Pass
	Future	8	Standing	10	Strolling	40	Pass
7	Existing	-	-	-	-	-	-
	Proposed	8	Standing	10	Strolling	42	Pass
	Future	7	Standing	9	Strolling	39	Pass
8	Existing	-	-	-	-	-	-
	Proposed	8	Standing	10	Strolling	42	Pass
	Future	8	Standing	10	Strolling	40	Pass
9	Existing	6	Sitting	7	Standing	30	Pass
	Proposed	8	Standing	10	Strolling	43	Pass
	Future	8	Standing	10	Strolling	40	Pass
10	Existing	-	-	-	-	-	-
	Proposed	10	Strolling	11	Walking	43	Pass
	Future	9	Strolling	10	Strolling	41	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
11	Existing	-	-	-	-	-	-
	Proposed	8	Standing	10	Strolling	42	Pass
	Future	7	Standing	10	Strolling	39	Pass
12	Existing	-	-	-	-	-	-
	Proposed	7	Standing	8	Standing	37	Pass
	Future	7	Standing	8	Standing	35	Pass
13	Existing	-	-	-	-	-	-
	Proposed	10	Strolling	12	Walking	45	Pass
	Future	9	Strolling	11	Walking	41	Pass
14	Existing	-	-	-	-	-	-
	Proposed	10	Strolling	12	Walking	46	Pass
	Future	9	Strolling	10	Strolling	44	Pass
15	Existing	-	-	-	-	-	-
	Proposed	10	Strolling	11	Walking	43	Pass
	Future	9	Strolling	10	Strolling	40	Pass
16	Existing	9	Strolling	10	Strolling	42	Pass
	Proposed	10	Strolling	12	Walking	42	Pass
	Future	9	Strolling	11	Walking	40	Pass
17	Existing	10	Strolling	12	Walking	47	Pass
	Proposed	10	Strolling	12	Walking	43	Pass
	Future	9	Strolling	11	Walking	41	Pass
18	Existing	-	-	-	-	-	-
	Proposed	8	Standing	10	Strolling	40	Pass
	Future	8	Standing	10	Strolling	39	Pass
19	Existing	10	Strolling	11	Walking	45	Pass
	Proposed	8	Standing	10	Strolling	40	Pass
	Future	8	Standing	10	Strolling	38	Pass
20	Existing	10	Strolling	11	Walking	45	Pass
	Proposed	8	Standing	10	Strolling	41	Pass
	Future	8	Standing	10	Strolling	39	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
21	Existing	-	-	-	-	-	-
	Proposed	8	Standing	10	Strolling	42	Pass
	Future	8	Standing	10	Strolling	42	Pass
22	Existing	10	Strolling	11	Walking	45	Pass
	Proposed	8	Standing	11	Walking	41	Pass
	Future	8	Standing	10	Strolling	40	Pass
23	Existing	10	Strolling	12	Walking	48	Pass
	Proposed	8	Standing	10	Strolling	39	Pass
	Future	7	Standing	10	Strolling	37	Pass
24	Existing	9	Strolling	11	Walking	45	Pass
	Proposed	7	Standing	8	Standing	35	Pass
	Future	6	Sitting	8	Standing	34	Pass
25	Existing	-	-	-	-	-	-
	Proposed	8	Standing	10	Strolling	40	Pass
	Future	7	Standing	9	Strolling	38	Pass
26	Existing	-	-	-	-	-	-
	Proposed	9	Strolling	12	Walking	43	Pass
	Future	8	Standing	11	Walking	42	Pass
27	Existing	-	-	-	-	-	-
	Proposed	8	Standing	11	Walking	42	Pass
	Future	8	Standing	10	Strolling	40	Pass
28	Existing	-	-	-	-	-	-
	Proposed	8	Standing	10	Strolling	39	Pass
	Future	7	Standing	9	Strolling	35	Pass
29	Existing	5	Sitting	6	Sitting	29	Pass
	Proposed	8	Standing	10	Strolling	37	Pass
	Future	7	Standing	10	Strolling	37	Pass
30	Existing	-	-	-	-	-	-
	Proposed	8	Standing	11	Walking	42	Pass
	Future	8	Standing	11	Walking	41	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
31	Existing	5	Sitting	6	Sitting	26	Pass
	Proposed	9	Strolling	12	Walking	45	Pass
	Future	8	Standing	12	Walking	44	Pass
32	Existing	-	-	-	-	-	-
	Proposed	7	Standing	10	Strolling	38	Pass
	Future	7	Standing	9	Strolling	35	Pass
33	Existing	-	-	-	-	-	-
	Proposed	8	Standing	10	Strolling	40	Pass
	Future	8	Standing	10	Strolling	37	Pass
34	Existing	-	-	-	-	-	-
	Proposed	8	Standing	12	Walking	46	Pass
	Future	8	Standing	11	Walking	43	Pass
35	Existing	-	-	-	-	-	-
	Proposed	8	Standing	13	Uncomfortable	46	Pass
	Future	8	Standing	12	Walking	45	Pass
36	Existing	4	Sitting	6	Sitting	25	Pass
	Proposed	10	Strolling	14	Uncomfortable	46	Pass
	Future	9	Strolling	12	Walking	44	Pass
37	Existing	-	-	-	-	-	-
	Proposed	7	Standing	10	Strolling	44	Pass
	Future	6	Sitting	9	Strolling	43	Pass
38	Existing	-	-	-	-	-	-
	Proposed	7	Standing	10	Strolling	48	Pass
	Future	6	Sitting	8	Standing	42	Pass
39	Existing	-	-	-	-	-	-
	Proposed	7	Standing	10	Strolling	40	Pass
	Future	7	Standing	9	Strolling	37	Pass
40	Existing	5	Sitting	6	Sitting	32	Pass
	Proposed	8	Standing	11	Walking	43	Pass
	Future	8	Standing	11	Walking	43	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
41	Existing	4	Sitting	6	Sitting	24	Pass
	Proposed	8	Standing	11	Walking	42	Pass
	Future	8	Standing	11	Walking	41	Pass
42	Existing	5	Sitting	6	Sitting	29	Pass
	Proposed	8	Standing	12	Walking	42	Pass
	Future	8	Standing	12	Walking	41	Pass
43	Existing	5	Sitting	7	Standing	30	Pass
	Proposed	7	Standing	9	Strolling	36	Pass
	Future	8	Standing	9	Strolling	36	Pass
44	Existing	6	Sitting	7	Standing	29	Pass
	Proposed	7	Standing	7	Standing	37	Pass
	Future	7	Standing	7	Standing	38	Pass
45	Existing	6	Sitting	8	Standing	32	Pass
	Proposed	7	Standing	10	Strolling	37	Pass
	Future	7	Standing	10	Strolling	37	Pass
46	Existing	7	Standing	9	Strolling	36	Pass
	Proposed	7	Standing	9	Strolling	38	Pass
	Future	7	Standing	9	Strolling	40	Pass
47	Existing	7	Standing	8	Standing	35	Pass
	Proposed	7	Standing	8	Standing	34	Pass
	Future	7	Standing	8	Standing	34	Pass
48	Existing	7	Standing	9	Strolling	38	Pass
	Proposed	8	Standing	10	Strolling	40	Pass
	Future	8	Standing	10	Strolling	43	Pass
49	Existing	7	Standing	9	Strolling	38	Pass
	Proposed	10	Strolling	14	Uncomfortable	52	Pass
	Future	10	Strolling	14	Uncomfortable	52	Pass
50	Existing	6	Sitting	7	Standing	32	Pass
	Proposed	7	Standing	10	Strolling	43	Pass
	Future	7	Standing	10	Strolling	44	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
51	Existing	5	Sitting	6	Sitting	31	Pass
	Proposed	6	Sitting	8	Standing	40	Pass
	Future	6	Sitting	8	Standing	40	Pass
52	Existing	5	Sitting	6	Sitting	27	Pass
	Proposed	8	Standing	10	Strolling	41	Pass
	Future	8	Standing	10	Strolling	41	Pass
53	Existing	6	Sitting	8	Standing	37	Pass
	Proposed	9	Strolling	13	Uncomfortable	47	Pass
	Future	9	Strolling	13	Uncomfortable	45	Pass
54	Existing	-	-	-	-	-	-
	Proposed	8	Standing	11	Walking	41	Pass
	Future	8	Standing	10	Strolling	39	Pass
55	Existing	-	-	-	-	-	-
	Proposed	8	Standing	12	Walking	48	Pass
	Future	7	Standing	10	Strolling	44	Pass
56	Existing	6	Sitting	7	Standing	30	Pass
	Proposed	7	Standing	7	Standing	42	Pass
	Future	7	Standing	7	Standing	44	Pass
57	Existing	-	-	-	-	-	-
	Proposed	7	Standing	9	Strolling	37	Pass
	Future	7	Standing	9	Strolling	36	Pass
58	Existing	-	-	-	-	-	-
	Proposed	8	Standing	8	Standing	45	Pass
	Future	8	Standing	8	Standing	43	Pass
59	Existing	-	-	-	-	-	-
	Proposed	8	Standing	10	Strolling	42	Pass
	Future	9	Strolling	11	Walking	41	Pass
60	Existing	8	Standing	12	Walking	48	Pass
	Proposed	8	Standing	9	Strolling	41	Pass
	Future	8	Standing	10	Strolling	40	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
61	Existing	9	Strolling	13	Uncomfortable	52	Pass
	Proposed	8	Standing	10	Strolling	43	Pass
	Future	8	Standing	12	Walking	43	Pass
62	Existing	9	Strolling	12	Walking	51	Pass
	Proposed	8	Standing	8	Standing	45	Pass
	Future	9	Strolling	11	Walking	42	Pass
63	Existing	8	Standing	9	Strolling	42	Pass
	Proposed	7	Standing	7	Standing	47	Pass
	Future	7	Standing	8	Standing	43	Pass
64	Existing	7	Standing	8	Standing	33	Pass
	Proposed	6	Sitting	7	Standing	36	Pass
	Future	6	Sitting	7	Standing	33	Pass
65	Existing	9	Strolling	12	Walking	47	Pass
	Proposed	8	Standing	8	Standing	44	Pass
	Future	7	Standing	8	Standing	40	Pass
66	Existing	9	Strolling	12	Walking	47	Pass
	Proposed	7	Standing	9	Strolling	46	Pass
	Future	7	Standing	9	Strolling	42	Pass
67	Existing	-	-	-	-	-	-
	Proposed	5	Sitting	6	Sitting	33	Pass
	Future	6	Sitting	6	Sitting	31	Pass
68	Existing	6	Sitting	8	Standing	35	Pass
	Proposed	5	Sitting	5	Sitting	31	Pass
	Future	5	Sitting	5	Sitting	29	Pass
69	Existing	7	Standing	9	Strolling	46	Pass
	Proposed	8	Standing	10	Strolling	45	Pass
	Future	7	Standing	9	Strolling	42	Pass
70	Existing	8	Standing	11	Walking	43	Pass
	Proposed	7	Standing	9	Strolling	40	Pass
	Future	7	Standing	9	Strolling	37	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
71	Existing	8	Standing	10	Strolling	48	Pass
	Proposed	8	Standing	10	Strolling	45	Pass
	Future	7	Standing	10	Strolling	41	Pass
72	Existing	7	Standing	9	Strolling	47	Pass
	Proposed	8	Standing	12	Walking	42	Pass
	Future	7	Standing	10	Strolling	40	Pass
73	Existing	7	Standing	8	Standing	43	Pass
	Proposed	8	Standing	12	Walking	43	Pass
	Future	8	Standing	11	Walking	42	Pass
74	Existing	7	Standing	8	Standing	39	Pass
	Proposed	8	Standing	10	Strolling	40	Pass
	Future	7	Standing	10	Strolling	38	Pass
75	Existing	6	Sitting	7	Standing	36	Pass
	Proposed	7	Standing	9	Strolling	34	Pass
	Future	6	Sitting	8	Standing	34	Pass
76	Existing	7	Standing	8	Standing	37	Pass
	Proposed	7	Standing	10	Strolling	37	Pass
	Future	7	Standing	10	Strolling	38	Pass
77	Existing	6	Sitting	7	Standing	29	Pass
	Proposed	7	Standing	8	Standing	34	Pass
	Future	7	Standing	9	Strolling	35	Pass
78	Existing	4	Sitting	6	Sitting	25	Pass
	Proposed	7	Standing	10	Strolling	42	Pass
	Future	7	Standing	8	Standing	39	Pass
79	Existing	5	Sitting	6	Sitting	25	Pass
	Proposed	7	Standing	8	Standing	38	Pass
	Future	6	Sitting	8	Standing	36	Pass
80	Existing	6	Sitting	7	Standing	30	Pass
	Proposed	7	Standing	10	Strolling	41	Pass
	Future	7	Standing	9	Strolling	40	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
81	Existing	6	Sitting	8	Standing	34	Pass
	Proposed	7	Standing	10	Strolling	42	Pass
	Future	7	Standing	9	Strolling	40	Pass
82	Existing	7	Standing	10	Strolling	44	Pass
	Proposed	7	Standing	8	Standing	40	Pass
	Future	9	Strolling	12	Walking	45	Pass
83	Existing	6	Sitting	7	Standing	30	Pass
	Proposed	7	Standing	7	Standing	37	Pass
	Future	8	Standing	10	Strolling	43	Pass
84	Existing	6	Sitting	7	Standing	29	Pass
	Proposed	7	Standing	7	Standing	34	Pass
	Future	8	Standing	10	Strolling	43	Pass
85	Existing	6	Sitting	7	Standing	29	Pass
	Proposed	7	Standing	7	Standing	34	Pass
	Future	8	Standing	10	Strolling	39	Pass
86	Existing	7	Standing	7	Standing	32	Pass
	Proposed	6	Sitting	7	Standing	30	Pass
	Future	8	Standing	10	Strolling	42	Pass
87	Existing	7	Standing	7	Standing	34	Pass
	Proposed	8	Standing	9	Strolling	38	Pass
	Future	7	Standing	8	Standing	34	Pass
88	Existing	6	Sitting	7	Standing	32	Pass
	Proposed	7	Standing	8	Standing	39	Pass
	Future	7	Standing	8	Standing	36	Pass
89	Existing	8	Standing	9	Strolling	37	Pass
	Proposed	9	Strolling	11	Walking	41	Pass
	Future	8	Standing	10	Strolling	40	Pass
90	Existing	6	Sitting	8	Standing	36	Pass
	Proposed	12	Walking	15	Uncomfortable	51	Pass
	Future	10	Strolling	13	Uncomfortable	50	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
91	Existing	6	Sitting	7	Standing	30	Pass
	Proposed	8	Standing	12	Walking	47	Pass
	Future	7	Standing	9	Strolling	43	Pass
92	Existing	8	Standing	10	Strolling	41	Pass
	Proposed	10	Strolling	13	Uncomfortable	50	Pass
	Future	8	Standing	11	Walking	43	Pass
93	Existing	6	Sitting	8	Standing	36	Pass
	Proposed	7	Standing	10	Strolling	38	Pass
	Future	7	Standing	8	Standing	34	Pass
94	Existing	6	Sitting	7	Standing	31	Pass
	Proposed	8	Standing	10	Strolling	40	Pass
	Future	7	Standing	9	Strolling	39	Pass
95	Existing	6	Sitting	8	Standing	36	Pass
	Proposed	9	Strolling	12	Walking	45	Pass
	Future	8	Standing	12	Walking	43	Pass
96	Existing	7	Standing	9	Strolling	36	Pass
	Proposed	7	Standing	8	Standing	43	Pass
	Future	7	Standing	7	Standing	45	Pass
97	Existing	8	Standing	11	Walking	42	Pass
	Proposed	7	Standing	9	Strolling	39	Pass
	Future	8	Standing	10	Strolling	43	Pass
98	Existing	6	Sitting	8	Standing	38	Pass
	Proposed	7	Standing	10	Strolling	44	Pass
	Future	8	Standing	11	Walking	45	Pass
99	Existing	4	Sitting	5	Sitting	25	Pass
	Proposed	6	Sitting	7	Standing	39	Pass
	Future	6	Sitting	7	Standing	40	Pass
100	Existing	4	Sitting	5	Sitting	27	Pass
	Proposed	6	Sitting	8	Standing	36	Pass
	Future	6	Sitting	8	Standing	37	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
101	Existing	-	-	-	-	-	-
	Proposed	8	Standing	11	Walking	40	Pass
	Future	8	Standing	11	Walking	40	Pass
102	Existing	5	Sitting	6	Sitting	28	Pass
	Proposed	10	Strolling	14	Uncomfortable	48	Pass
	Future	9	Strolling	13	Uncomfortable	47	Pass
103	Existing	6	Sitting	6	Sitting	28	Pass
	Proposed	8	Standing	12	Walking	44	Pass
	Future	8	Standing	11	Walking	42	Pass
104	Existing	6	Sitting	6	Sitting	38	Pass
	Proposed	7	Standing	8	Standing	40	Pass
	Future	7	Standing	8	Standing	37	Pass
105	Existing	7	Standing	10	Strolling	47	Pass
	Proposed	7	Standing	10	Strolling	48	Pass
	Future	7	Standing	10	Strolling	46	Pass
106	Existing	8	Standing	10	Strolling	47	Pass
	Proposed	6	Sitting	8	Standing	39	Pass
	Future	6	Sitting	8	Standing	37	Pass
107	Existing	7	Standing	8	Standing	37	Pass
	Proposed	8	Standing	10	Strolling	40	Pass
	Future	8	Standing	8	Standing	37	Pass
108	Existing	8	Standing	8	Standing	44	Pass
	Proposed	8	Standing	10	Strolling	42	Pass
	Future	8	Standing	9	Strolling	39	Pass
109	Existing	10	Strolling	12	Walking	43	Pass
	Proposed	8	Standing	10	Strolling	41	Pass
	Future	8	Standing	10	Strolling	40	Pass
110	Existing	7	Standing	9	Strolling	35	Pass
	Proposed	7	Standing	9	Strolling	34	Pass
	Future	7	Standing	9	Strolling	34	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
111	Existing	8	Standing	10	Strolling	39	Pass
	Proposed	7	Standing	8	Standing	35	Pass
	Future	7	Standing	8	Standing	34	Pass
112	Existing	8	Standing	9	Strolling	40	Pass
	Proposed	8	Standing	9	Strolling	40	Pass
	Future	8	Standing	9	Strolling	38	Pass
113	Existing	8	Standing	9	Strolling	40	Pass
	Proposed	7	Standing	9	Strolling	39	Pass
	Future	6	Sitting	8	Standing	35	Pass
114	Existing	10	Strolling	11	Walking	48	Pass
	Proposed	10	Strolling	11	Walking	44	Pass
	Future	8	Standing	10	Strolling	42	Pass
115	Existing	8	Standing	10	Strolling	40	Pass
	Proposed	8	Standing	11	Walking	38	Pass
	Future	7	Standing	10	Strolling	35	Pass
116	Existing	6	Sitting	7	Standing	28	Pass
	Proposed	6	Sitting	7	Standing	27	Pass
	Future	6	Sitting	7	Standing	25	Pass
117	Existing	7	Standing	7	Standing	35	Pass
	Proposed	6	Sitting	8	Standing	30	Pass
	Future	7	Standing	8	Standing	30	Pass
118	Existing	-	-	-	-	-	-
	Proposed	7	Standing	9	Strolling	40	Pass
	Future	6	Sitting	8	Standing	37	Pass
119	Existing	-	-	-	-	-	-
	Proposed	12	Walking	14	Uncomfortable	52	Pass
	Future	9	Strolling	12	Walking	47	Pass
120	Existing	-	-	-	-	-	-
	Proposed	8	Standing	10	Strolling	40	Pass
	Future	7	Standing	9	Strolling	39	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
121	Existing	-	-	-	-	-	-
	Proposed	8	Standing	10	Strolling	37	Pass
	Future	8	Standing	10	Strolling	40	Pass
122	Existing	-	-	-	-	-	-
	Proposed	6	Sitting	7	Standing	31	Pass
	Future	6	Sitting	7	Standing	32	Pass
123	Existing	-	-	-	-	-	-
	Proposed	4	Sitting	6	Sitting	24	Pass
	Future	4	Sitting	6	Sitting	25	Pass
124	Existing	-	-	-	-	-	-
	Proposed	9	Strolling	14	Uncomfortable	52	Pass
	Future	9	Strolling	12	Walking	48	Pass
125	Existing	-	-	-	-	-	-
	Proposed	5	Sitting	7	Standing	31	Pass
	Future	5	Sitting	7	Standing	31	Pass
126	Existing	-	-	-	-	-	-
	Proposed	4	Sitting	5	Sitting	20	Pass
	Future	4	Sitting	5	Sitting	20	Pass
127	Existing	-	-	-	-	-	-
	Proposed	5	Sitting	7	Standing	29	Pass
	Future	5	Sitting	7	Standing	29	Pass
128	Existing	-	-	-	-	-	-
	Proposed	7	Standing	10	Strolling	45	Pass
	Future	7	Standing	10	Strolling	43	Pass
129	Existing	-	-	-	-	-	-
	Proposed	7	Standing	8	Standing	48	Pass
	Future	7	Standing	7	Standing	49	Pass
130	Existing	-	-	-	-	-	-
	Proposed	6	Sitting	8	Standing	41	Pass
	Future	6	Sitting	7	Standing	42	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
131	Existing	-	-	-	-	-	-
	Proposed	4	Sitting	6	Sitting	29	Pass
	Future	4	Sitting	5	Sitting	29	Pass
132	Existing	-	-	-	-	-	-
	Proposed	4	Sitting	4	Sitting	19	Pass
	Future	4	Sitting	4	Sitting	19	Pass
133	Existing	-	-	-	-	-	-
	Proposed	4	Sitting	6	Sitting	27	Pass
	Future	4	Sitting	6	Sitting	26	Pass
134	Existing	-	-	-	-	-	-
	Proposed	5	Sitting	6	Sitting	24	Pass
	Future	6	Sitting	7	Standing	25	Pass
135	Existing	-	-	-	-	-	-
	Proposed	6	Sitting	8	Standing	39	Pass
	Future	6	Sitting	8	Standing	40	Pass
136	Existing	-	-	-	-	-	-
	Proposed	6	Sitting	8	Standing	35	Pass
	Future	6	Sitting	7	Standing	34	Pass
137	Existing	-	-	-	-	-	-
	Proposed	4	Sitting	6	Sitting	34	Pass
	Future	4	Sitting	6	Sitting	32	Pass
138	Existing	-	-	-	-	-	-
	Proposed	6	Sitting	7	Standing	30	Pass
	Future	5	Sitting	7	Standing	30	Pass
139	Existing	-	-	-	-	-	-
	Proposed	10	Strolling	13	Uncomfortable	52	Pass
	Future	8	Standing	12	Walking	49	Pass
140	Existing	-	-	-	-	-	-
	Proposed	5	Sitting	5	Sitting	34	Pass
	Future	6	Sitting	6	Sitting	32	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

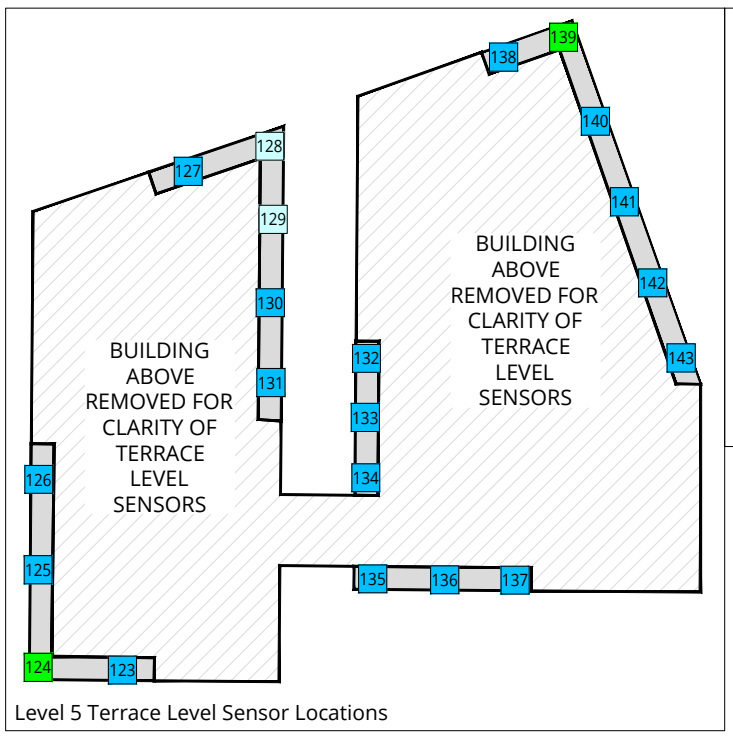
Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
141	Existing	-	-	-	-	-	-
	Proposed	6	Sitting	6	Sitting	35	Pass
	Future	6	Sitting	6	Sitting	34	Pass
142	Existing	-	-	-	-	-	-
	Proposed	6	Sitting	6	Sitting	37	Pass
	Future	6	Sitting	6	Sitting	36	Pass
143	Existing	-	-	-	-	-	-
	Proposed	6	Sitting	6	Sitting	31	Pass
	Future	6	Sitting	6	Sitting	30	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	

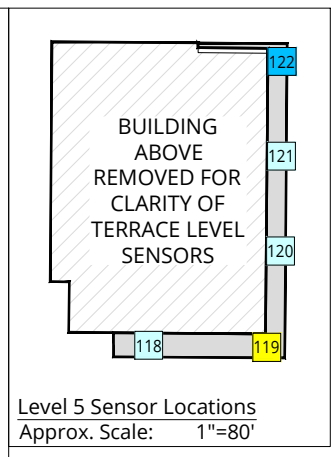
Comfort Speed (mph)	
(20% Seasonal Exceedance)	
≤ 6	Sitting
7 - 8	Standing
9 - 10	Strolling
11 - 12	Walking
> 12	Uncomfortable

Safety Speed (mph)	
(0.1% Annual Exceedance)	
≤ 56	Pass
> 56	Exceeded

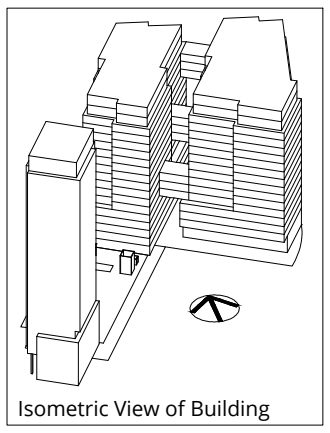
FIGURES



Level 5 Terrace Level Sensor Locations



Level 5 Sensor Locations
Approx. Scale: 1"=80'



Isometric View of Building

ROGERS STREET

SIXTH STREET

BINNEY STREET

FULKERSON STREET

GALILEO GALILEI WAY

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

LINE OF BUILDING ABOVE

LINE OF BUILDING ABOVE

145 BROADWAY
KENDALL SQUARE

USDOT VOLPE EXCHANGE

POTTER STREET

LOUGHREY WALKWAY

EXISTING BUILDING

BROADWAY

AMES STREET

AMES PLACE

75 AMES STREET

AMES STREET RESIDENTIAL

LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level
- Level 5 Terrace

0 50 100ft

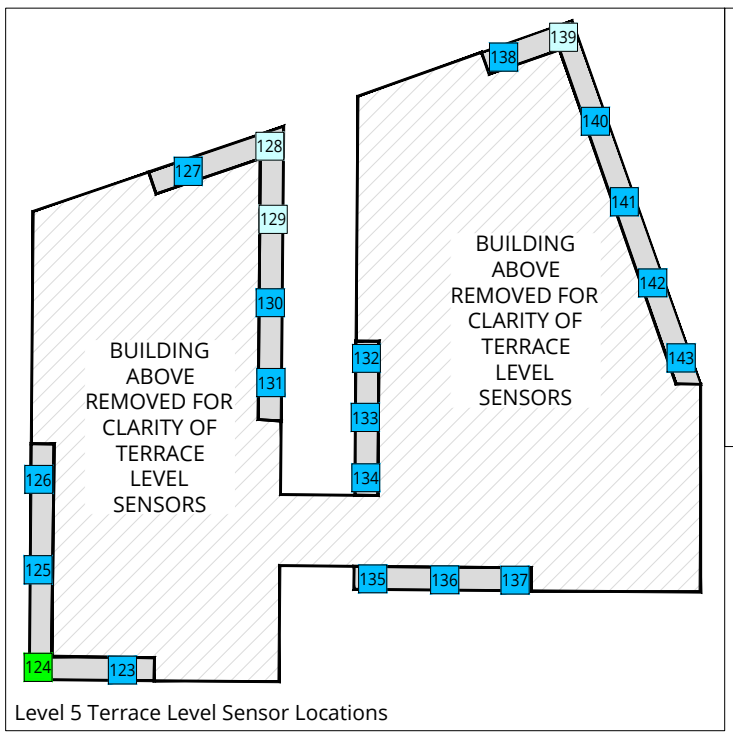
Pedestrian Wind Comfort Conditions
Proposed Configuration
Summer (May to October, 6:00 to 23:00)

IDCP V3 - Cambridge, MA

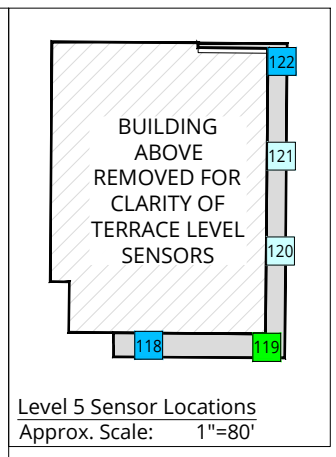
True North

Project #2101718

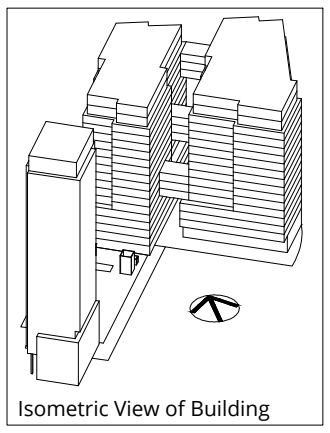
Drawn by: DF	Figure: 1A
Approx. Scale:	1"=100'
Date Revised:	Apr. 13, 2021



Level 5 Terrace Level Sensor Locations



Level 5 Sensor Locations
Approx. Scale: 1"=80'


Isometric View of Building

ROGERS STREET

SIXTH STREET

BINNEY STREET

FULKERSON STREET

USDOT VOLPE EXCHANGE

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

LINE OF BUILDING ABOVE

POTTER STREET

LOUGHREY WALKWAY

VOLPE-MODEL 9 FUTURE BUILDING

VOLPE-MODEL 8 FUTURE BUILDING

LINE OF BUILDING ABOVE

GALILEO GALILEI WAY

145 BROADWAY KENDALL SQUARE

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

BROADWAY

AMES STREET

AMES PLACE

75 AMES STREET

AMES STREET RESIDENTIAL

0 50 100ft

LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level
- Level 5 Terrace

Pedestrian Wind Comfort Conditions

Future Configuration

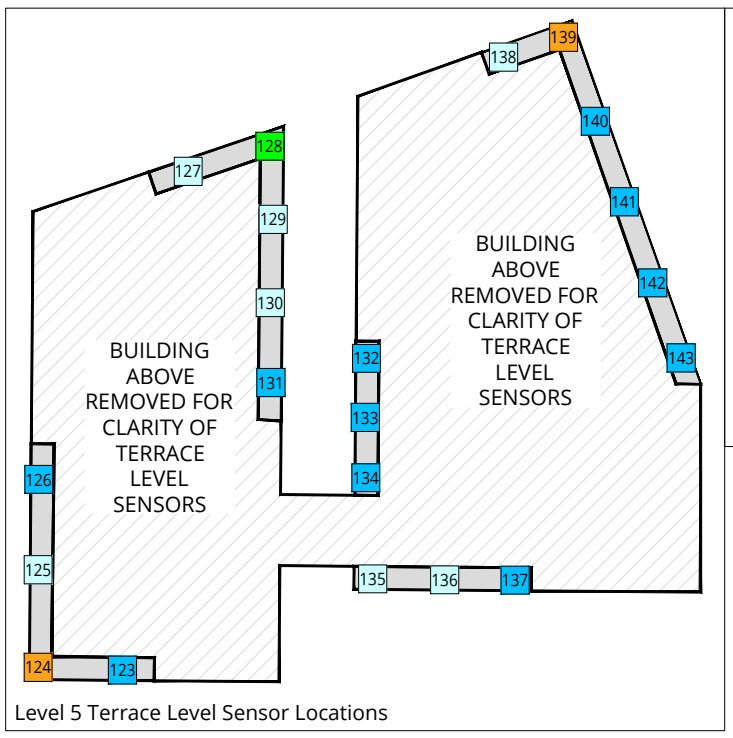
Summer (May to October, 6:00 to 23:00)

IDCP V3 - Cambridge, MA

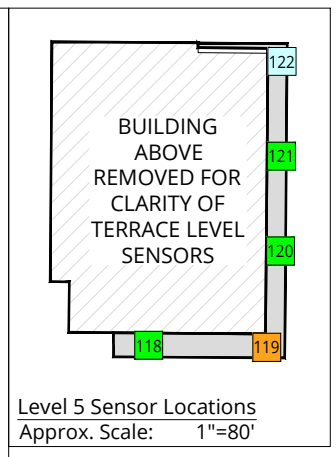
True North

Project #2101718

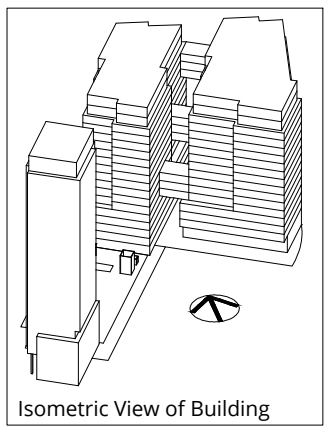
Drawn by: DF	Figure: 1B
Approx. Scale:	1"=100'
Date Revised:	Apr. 13, 2021



Level 5 Terrace Level Sensor Locations



Level 5 Sensor Locations
Approx. Scale: 1"=80'


Isometric View of Building

ROGERS STREET

SIXTH STREET

BINNEY STREET

FULKERSON STREET

USDOT VOLPE EXCHANGE

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

LINE OF BUILDING ABOVE

POTTER STREET

LOUGHREY WALKWAY

EXISTING BUILDING

GALILEO GALILEI WAY

145 BROADWAY
KENDALL SQUARE

LINE OF BUILDING ABOVE

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

BROADWAY

AMES STREET

AMES PLACE

75 AMES STREET

AMES STREET RESIDENTIAL

0 50 100ft

LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level
- Level 5 Terrace

Pedestrian Wind Comfort Conditions

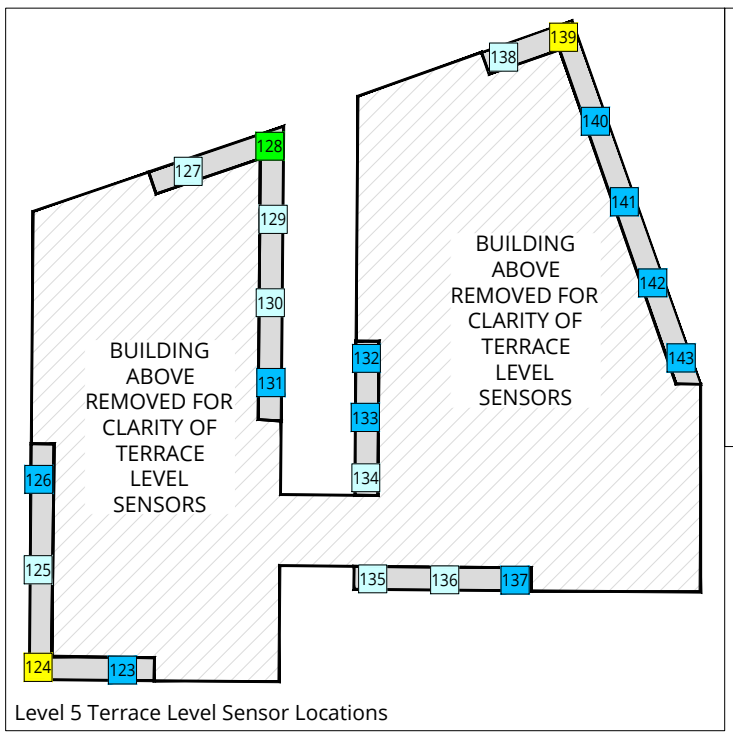
Proposed Configuration
Winter (November to April, 6:00 to 23:00)

IDCP V3 - Cambridge, MA

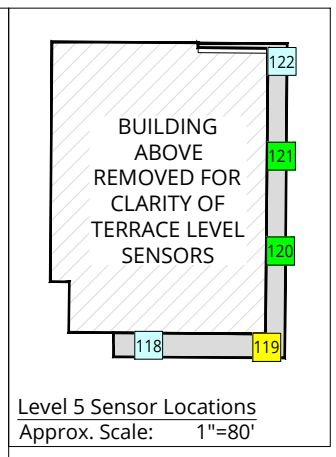
True North

Project #2101718

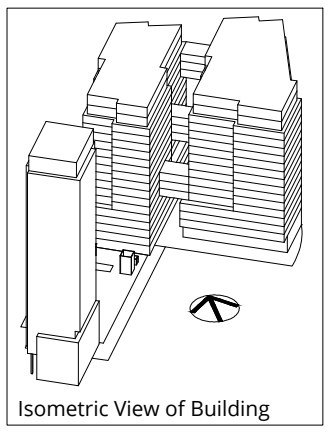
Drawn by: DF	Figure: 2A
Approx. Scale:	1"=100'
Date Revised:	Apr. 13, 2021



Level 5 Terrace Level Sensor Locations



Level 5 Sensor Locations
Approx. Scale: 1"=80'



Isometric View of Building

LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level
- Level 5 Terrace

Pedestrian Wind Comfort Conditions

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

IDCP V3 - Cambridge, MA

True North

Project #2101718

Drawn by: DF	Figure: 2B
Approx. Scale:	1"=100'
Date Revised:	Apr. 13, 2021

TABLES

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
1	Proposed	9	Strolling	11	Walking	43	Pass
	Future	8	Standing	10	Strolling	41	Pass
2	Proposed	7	Standing	9	Strolling	37	Pass
	Future	7	Standing	8	Standing	34	Pass
3	Proposed	8	Standing	10	Strolling	38	Pass
	Future	7	Standing	8	Standing	34	Pass
4	Proposed	11	Walking	14	Uncomfortable	50	Pass
	Future	10	Strolling	13	Uncomfortable	48	Pass
5	Proposed	8	Standing	10	Strolling	40	Pass
	Future	8	Standing	10	Strolling	39	Pass
6	Proposed	9	Strolling	12	Walking	44	Pass
	Future	8	Standing	10	Strolling	40	Pass
7	Proposed	8	Standing	10	Strolling	42	Pass
	Future	7	Standing	9	Strolling	39	Pass
8	Proposed	8	Standing	10	Strolling	42	Pass
	Future	8	Standing	10	Strolling	40	Pass
9	Proposed	8	Standing	10	Strolling	43	Pass
	Future	8	Standing	10	Strolling	40	Pass
10	Proposed	10	Strolling	11	Walking	43	Pass
	Future	9	Strolling	10	Strolling	41	Pass
11	Proposed	8	Standing	10	Strolling	42	Pass
	Future	7	Standing	10	Strolling	39	Pass
12	Proposed	7	Standing	8	Standing	37	Pass
	Future	7	Standing	8	Standing	35	Pass
13	Proposed	10	Strolling	12	Walking	45	Pass
	Future	9	Strolling	11	Walking	41	Pass
14	Proposed	10	Strolling	12	Walking	46	Pass
	Future	9	Strolling	10	Strolling	44	Pass
15	Proposed	10	Strolling	11	Walking	43	Pass
	Future	9	Strolling	10	Strolling	40	Pass
16	Proposed	10	Strolling	12	Walking	42	Pass
	Future	9	Strolling	11	Walking	40	Pass
17	Proposed	10	Strolling	12	Walking	43	Pass
	Future	9	Strolling	11	Walking	41	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
18	Proposed	8	Standing	10	Strolling	40	Pass
	Future	8	Standing	10	Strolling	39	Pass
19	Proposed	8	Standing	10	Strolling	40	Pass
	Future	8	Standing	10	Strolling	38	Pass
20	Proposed	8	Standing	10	Strolling	41	Pass
	Future	8	Standing	10	Strolling	39	Pass
21	Proposed	8	Standing	10	Strolling	42	Pass
	Future	8	Standing	10	Strolling	42	Pass
22	Proposed	8	Standing	11	Walking	41	Pass
	Future	8	Standing	10	Strolling	40	Pass
23	Proposed	8	Standing	10	Strolling	39	Pass
	Future	7	Standing	10	Strolling	37	Pass
24	Proposed	7	Standing	8	Standing	35	Pass
	Future	6	Sitting	8	Standing	34	Pass
25	Proposed	8	Standing	10	Strolling	40	Pass
	Future	7	Standing	9	Strolling	38	Pass
26	Proposed	9	Strolling	12	Walking	43	Pass
	Future	8	Standing	11	Walking	42	Pass
27	Proposed	8	Standing	11	Walking	42	Pass
	Future	8	Standing	10	Strolling	40	Pass
28	Proposed	8	Standing	10	Strolling	39	Pass
	Future	7	Standing	9	Strolling	35	Pass
29	Proposed	8	Standing	10	Strolling	37	Pass
	Future	7	Standing	10	Strolling	37	Pass
30	Proposed	8	Standing	11	Walking	42	Pass
	Future	8	Standing	11	Walking	41	Pass
31	Proposed	9	Strolling	12	Walking	45	Pass
	Future	8	Standing	12	Walking	44	Pass
32	Proposed	7	Standing	10	Strolling	38	Pass
	Future	7	Standing	9	Strolling	35	Pass
33	Proposed	8	Standing	10	Strolling	40	Pass
	Future	8	Standing	10	Strolling	37	Pass
34	Proposed	8	Standing	12	Walking	46	Pass
	Future	8	Standing	11	Walking	43	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
35	Proposed	8	Standing	13	Uncomfortable	46	Pass
	Future	8	Standing	12	Walking	45	Pass
36	Proposed	10	Strolling	14	Uncomfortable	46	Pass
	Future	9	Strolling	12	Walking	44	Pass
37	Proposed	7	Standing	10	Strolling	44	Pass
	Future	6	Sitting	9	Strolling	43	Pass
38	Proposed	7	Standing	10	Strolling	48	Pass
	Future	6	Sitting	8	Standing	42	Pass
39	Proposed	7	Standing	10	Strolling	40	Pass
	Future	7	Standing	9	Strolling	37	Pass
40	Proposed	8	Standing	11	Walking	43	Pass
	Future	8	Standing	11	Walking	43	Pass
41	Proposed	8	Standing	11	Walking	42	Pass
	Future	8	Standing	11	Walking	41	Pass
42	Proposed	8	Standing	12	Walking	42	Pass
	Future	8	Standing	12	Walking	41	Pass
43	Proposed	7	Standing	9	Strolling	36	Pass
	Future	8	Standing	9	Strolling	36	Pass
44	Proposed	7	Standing	7	Standing	37	Pass
	Future	7	Standing	7	Standing	38	Pass
45	Proposed	7	Standing	10	Strolling	37	Pass
	Future	7	Standing	10	Strolling	37	Pass
46	Proposed	7	Standing	9	Strolling	38	Pass
	Future	7	Standing	9	Strolling	40	Pass
47	Proposed	7	Standing	8	Standing	34	Pass
	Future	7	Standing	8	Standing	34	Pass
48	Proposed	8	Standing	10	Strolling	40	Pass
	Future	8	Standing	10	Strolling	43	Pass
49	Proposed	10	Strolling	14	Uncomfortable	52	Pass
	Future	10	Strolling	14	Uncomfortable	52	Pass
50	Proposed	7	Standing	10	Strolling	43	Pass
	Future	7	Standing	10	Strolling	44	Pass
51	Proposed	6	Sitting	8	Standing	40	Pass
	Future	6	Sitting	8	Standing	40	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
52	Proposed	8	Standing	10	Strolling	41	Pass
	Future	8	Standing	10	Strolling	41	Pass
53	Proposed	9	Strolling	13	Uncomfortable	47	Pass
	Future	9	Strolling	13	Uncomfortable	45	Pass
54	Proposed	8	Standing	11	Walking	41	Pass
	Future	8	Standing	10	Strolling	39	Pass
55	Proposed	8	Standing	12	Walking	48	Pass
	Future	7	Standing	10	Strolling	44	Pass
56	Proposed	7	Standing	7	Standing	42	Pass
	Future	7	Standing	7	Standing	44	Pass
57	Proposed	7	Standing	9	Strolling	37	Pass
	Future	7	Standing	9	Strolling	36	Pass
58	Proposed	8	Standing	8	Standing	45	Pass
	Future	8	Standing	8	Standing	43	Pass
59	Proposed	8	Standing	10	Strolling	42	Pass
	Future	9	Strolling	11	Walking	41	Pass
60	Proposed	8	Standing	9	Strolling	41	Pass
	Future	8	Standing	10	Strolling	40	Pass
61	Proposed	8	Standing	10	Strolling	43	Pass
	Future	8	Standing	12	Walking	43	Pass
62	Proposed	8	Standing	8	Standing	45	Pass
	Future	9	Strolling	11	Walking	42	Pass
63	Proposed	7	Standing	7	Standing	47	Pass
	Future	7	Standing	8	Standing	43	Pass
64	Proposed	6	Sitting	7	Standing	36	Pass
	Future	6	Sitting	7	Standing	33	Pass
65	Proposed	8	Standing	8	Standing	44	Pass
	Future	7	Standing	8	Standing	40	Pass
66	Proposed	7	Standing	9	Strolling	46	Pass
	Future	7	Standing	9	Strolling	42	Pass
67	Proposed	5	Sitting	6	Sitting	33	Pass
	Future	6	Sitting	6	Sitting	31	Pass
68	Proposed	5	Sitting	5	Sitting	31	Pass
	Future	5	Sitting	5	Sitting	29	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
69	Proposed	8	Standing	10	Strolling	45	Pass
	Future	7	Standing	9	Strolling	42	Pass
70	Proposed	7	Standing	9	Strolling	40	Pass
	Future	7	Standing	9	Strolling	37	Pass
71	Proposed	8	Standing	10	Strolling	45	Pass
	Future	7	Standing	10	Strolling	41	Pass
72	Proposed	8	Standing	12	Walking	42	Pass
	Future	7	Standing	10	Strolling	40	Pass
73	Proposed	8	Standing	12	Walking	43	Pass
	Future	8	Standing	11	Walking	42	Pass
74	Proposed	8	Standing	10	Strolling	40	Pass
	Future	7	Standing	10	Strolling	38	Pass
75	Proposed	7	Standing	9	Strolling	34	Pass
	Future	6	Sitting	8	Standing	34	Pass
76	Proposed	7	Standing	10	Strolling	37	Pass
	Future	7	Standing	10	Strolling	38	Pass
77	Proposed	7	Standing	8	Standing	34	Pass
	Future	7	Standing	9	Strolling	35	Pass
78	Proposed	7	Standing	10	Strolling	42	Pass
	Future	7	Standing	8	Standing	39	Pass
79	Proposed	7	Standing	8	Standing	38	Pass
	Future	6	Sitting	8	Standing	36	Pass
80	Proposed	7	Standing	10	Strolling	41	Pass
	Future	7	Standing	9	Strolling	40	Pass
81	Proposed	7	Standing	10	Strolling	42	Pass
	Future	7	Standing	9	Strolling	40	Pass
82	Proposed	7	Standing	8	Standing	40	Pass
	Future	9	Strolling	12	Walking	45	Pass
83	Proposed	7	Standing	7	Standing	37	Pass
	Future	8	Standing	10	Strolling	43	Pass
84	Proposed	7	Standing	7	Standing	34	Pass
	Future	8	Standing	10	Strolling	43	Pass
85	Proposed	7	Standing	7	Standing	34	Pass
	Future	8	Standing	10	Strolling	39	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
86	Proposed	6	Sitting	7	Standing	30	Pass
	Future	8	Standing	10	Strolling	42	Pass
87	Proposed	8	Standing	9	Strolling	38	Pass
	Future	7	Standing	8	Standing	34	Pass
88	Proposed	7	Standing	8	Standing	39	Pass
	Future	7	Standing	8	Standing	36	Pass
89	Proposed	9	Strolling	11	Walking	41	Pass
	Future	8	Standing	10	Strolling	40	Pass
90	Proposed	12	Walking	15	Uncomfortable	51	Pass
	Future	10	Strolling	13	Uncomfortable	50	Pass
91	Proposed	8	Standing	12	Walking	47	Pass
	Future	7	Standing	9	Strolling	43	Pass
92	Proposed	10	Strolling	13	Uncomfortable	50	Pass
	Future	8	Standing	11	Walking	43	Pass
93	Proposed	7	Standing	10	Strolling	38	Pass
	Future	7	Standing	8	Standing	34	Pass
94	Proposed	8	Standing	10	Strolling	40	Pass
	Future	7	Standing	9	Strolling	39	Pass
95	Proposed	9	Strolling	12	Walking	45	Pass
	Future	8	Standing	12	Walking	43	Pass
96	Proposed	7	Standing	8	Standing	43	Pass
	Future	7	Standing	7	Standing	45	Pass
97	Proposed	7	Standing	9	Strolling	39	Pass
	Future	8	Standing	10	Strolling	43	Pass
98	Proposed	7	Standing	10	Strolling	44	Pass
	Future	8	Standing	11	Walking	45	Pass
99	Proposed	6	Sitting	7	Standing	39	Pass
	Future	6	Sitting	7	Standing	40	Pass
100	Proposed	6	Sitting	8	Standing	36	Pass
	Future	6	Sitting	8	Standing	37	Pass
101	Proposed	8	Standing	11	Walking	40	Pass
	Future	8	Standing	11	Walking	40	Pass
102	Proposed	10	Strolling	14	Uncomfortable	48	Pass
	Future	9	Strolling	13	Uncomfortable	47	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
103	Proposed	8	Standing	12	Walking	44	Pass
	Future	8	Standing	11	Walking	42	Pass
104	Proposed	7	Standing	8	Standing	40	Pass
	Future	7	Standing	8	Standing	37	Pass
105	Proposed	7	Standing	10	Strolling	48	Pass
	Future	7	Standing	10	Strolling	46	Pass
106	Proposed	6	Sitting	8	Standing	39	Pass
	Future	6	Sitting	8	Standing	37	Pass
107	Proposed	8	Standing	10	Strolling	40	Pass
	Future	8	Standing	8	Standing	37	Pass
108	Proposed	8	Standing	10	Strolling	42	Pass
	Future	8	Standing	9	Strolling	39	Pass
109	Proposed	8	Standing	10	Strolling	41	Pass
	Future	8	Standing	10	Strolling	40	Pass
110	Proposed	7	Standing	9	Strolling	34	Pass
	Future	7	Standing	9	Strolling	34	Pass
111	Proposed	7	Standing	8	Standing	35	Pass
	Future	7	Standing	8	Standing	34	Pass
112	Proposed	8	Standing	9	Strolling	40	Pass
	Future	8	Standing	9	Strolling	38	Pass
113	Proposed	7	Standing	9	Strolling	39	Pass
	Future	6	Sitting	8	Standing	35	Pass
114	Proposed	10	Strolling	11	Walking	44	Pass
	Future	8	Standing	10	Strolling	42	Pass
115	Proposed	8	Standing	11	Walking	38	Pass
	Future	7	Standing	10	Strolling	35	Pass
116	Proposed	6	Sitting	7	Standing	27	Pass
	Future	6	Sitting	7	Standing	25	Pass
117	Proposed	6	Sitting	8	Standing	30	Pass
	Future	7	Standing	8	Standing	30	Pass
118	Proposed	7	Standing	9	Strolling	40	Pass
	Future	6	Sitting	8	Standing	37	Pass
119	Proposed	12	Walking	14	Uncomfortable	52	Pass
	Future	9	Strolling	12	Walking	47	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
120	Proposed	8	Standing	10	Strolling	40	Pass
	Future	7	Standing	9	Strolling	39	Pass
121	Proposed	8	Standing	10	Strolling	37	Pass
	Future	8	Standing	10	Strolling	40	Pass
122	Proposed	6	Sitting	7	Standing	31	Pass
	Future	6	Sitting	7	Standing	32	Pass
123	Proposed	4	Sitting	6	Sitting	24	Pass
	Future	4	Sitting	6	Sitting	25	Pass
124	Proposed	9	Strolling	14	Uncomfortable	52	Pass
	Future	9	Strolling	12	Walking	48	Pass
125	Proposed	5	Sitting	7	Standing	31	Pass
	Future	5	Sitting	7	Standing	31	Pass
126	Proposed	4	Sitting	5	Sitting	20	Pass
	Future	4	Sitting	5	Sitting	20	Pass
127	Proposed	5	Sitting	7	Standing	29	Pass
	Future	5	Sitting	7	Standing	29	Pass
128	Proposed	7	Standing	10	Strolling	45	Pass
	Future	7	Standing	10	Strolling	43	Pass
129	Proposed	7	Standing	8	Standing	48	Pass
	Future	7	Standing	7	Standing	49	Pass
130	Proposed	6	Sitting	8	Standing	41	Pass
	Future	6	Sitting	7	Standing	42	Pass
131	Proposed	4	Sitting	6	Sitting	29	Pass
	Future	4	Sitting	5	Sitting	29	Pass
132	Proposed	4	Sitting	4	Sitting	19	Pass
	Future	4	Sitting	4	Sitting	19	Pass
133	Proposed	4	Sitting	6	Sitting	27	Pass
	Future	4	Sitting	6	Sitting	26	Pass
134	Proposed	5	Sitting	6	Sitting	24	Pass
	Future	6	Sitting	7	Standing	25	Pass
135	Proposed	6	Sitting	8	Standing	39	Pass
	Future	6	Sitting	8	Standing	40	Pass
136	Proposed	6	Sitting	8	Standing	35	Pass
	Future	6	Sitting	7	Standing	34	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
137	Proposed	4	Sitting	6	Sitting	34	Pass
	Future	4	Sitting	6	Sitting	32	Pass
138	Proposed	6	Sitting	7	Standing	30	Pass
	Future	5	Sitting	7	Standing	30	Pass
139	Proposed	10	Strolling	13	Uncomfortable	52	Pass
	Future	8	Standing	12	Walking	49	Pass
140	Proposed	5	Sitting	5	Sitting	34	Pass
	Future	6	Sitting	6	Sitting	32	Pass
141	Proposed	6	Sitting	6	Sitting	35	Pass
	Future	6	Sitting	6	Sitting	34	Pass
142	Proposed	6	Sitting	6	Sitting	37	Pass
	Future	6	Sitting	6	Sitting	36	Pass
143	Proposed	6	Sitting	6	Sitting	31	Pass
	Future	6	Sitting	6	Sitting	30	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	Project with existing surroundings	
Future	Project with future surroundings	

Comfort Speed (mph)		Safety Speed (mph)	
(20% Seasonal Exceedance)		(0.1% Annual Exceedance)	
≤ 6	Sitting	≤ 56	Pass
7 - 8	Standing	> 56	Exceeded
9 - 10	Strolling		
11 - 12	Walking		
> 12	Uncomfortable		

IDCP V3

CAMBRIDGE, MA

PEDESTRIAN WIND ASSESSMENT

PROJECT #2101718
JANUARY 29, 2021

SUBMITTED TO

Michael Tilford
VP, Development
mtilford@bxp.com

BXP – Boston Properties
800 Boylston Street, Suite 1900
Boston, MA 02199-8103
(617) 236-3329

SUBMITTED BY

Nishat Nourin, M.Eng., P.Eng.
Project Engineer
Nishat.Nourin@rwdi.com

Sonia Beaulieu, M.Sc., P.Eng., ing.
Senior Project Manager / Principal
sonia.beaulieu@rwdi.com

RWDI
600 Southgate Drive
Guelph, ON, Canada N1G 4P6
T: 519.823.1311

1. INTRODUCTION

The following presentation outlines recommended wind control measures for the purposes of improving wind conditions on and around the proposed IDCP V3 project. All wind control measures are conceptual in nature and will have to be refined based on the specific usage of each area.

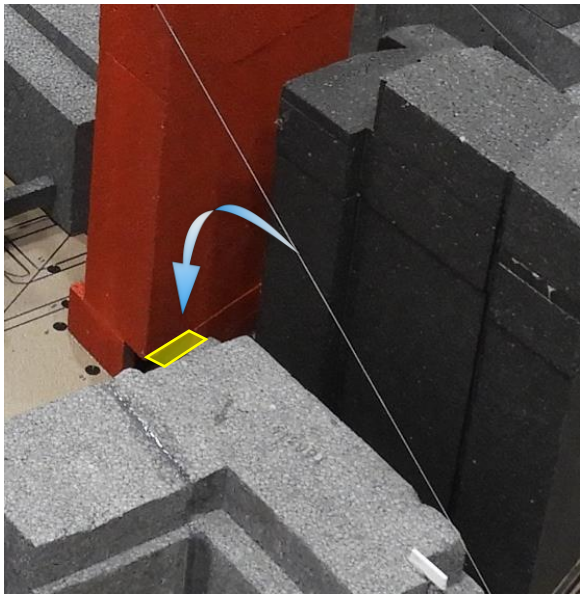
1. GRADE LEVEL – PASSAGEWAY

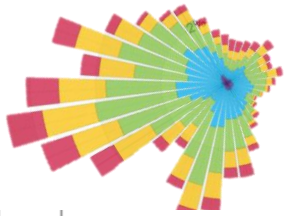
Higher than desired wind speeds are expected in the passageway of the proposed south building, particularly during the winter. This is due to acceleration of the westerly winds down the west tower façade channeling through this area.

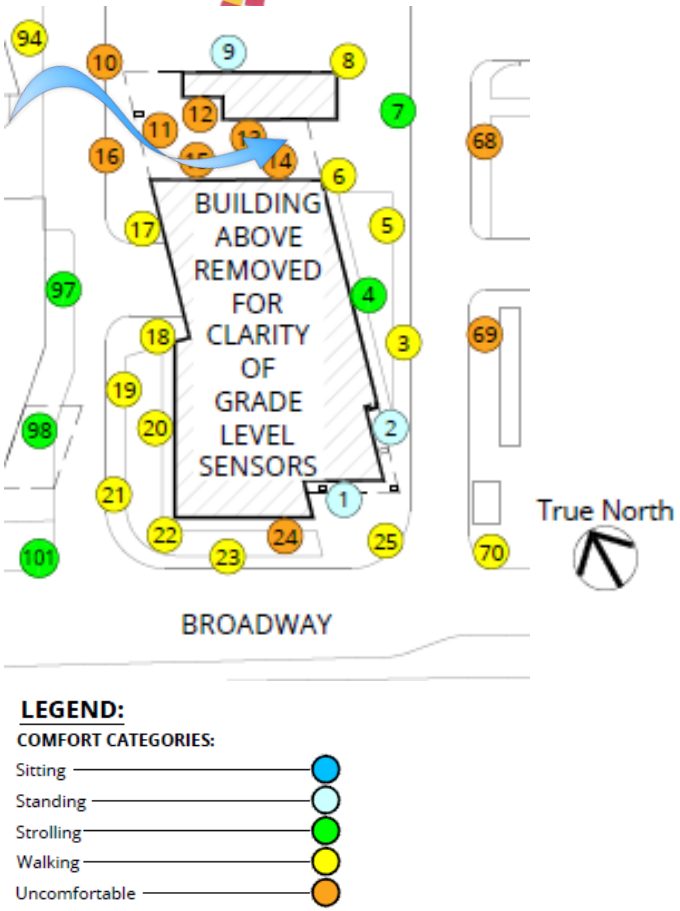
A deep canopy along the west façade, above the passageway would be beneficial to reduce the impact of downwashing winds in the passageway.

Vertical features, such as porous wind screens, coniferous/ marcescent landscaping on both sides of the passageway would be beneficial to achieve reduced wind speeds at Locations 10 – 16. If feasible, they should be placed in a staggered arrangement in the passageway as well.

Vertical features should be at least 6 ft tall, and 20-40% porous to maintain good wind control efficacy.







LEGEND:

COMFORT CATEGORIES:

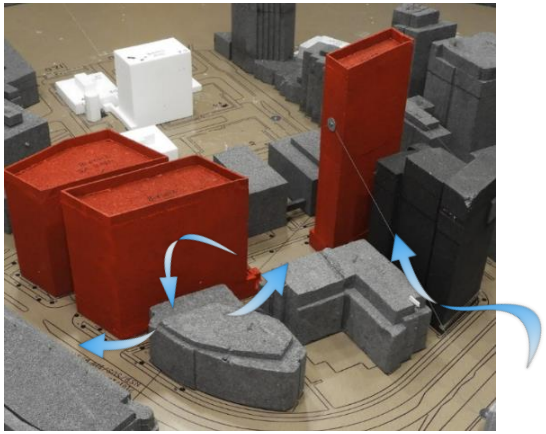
- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

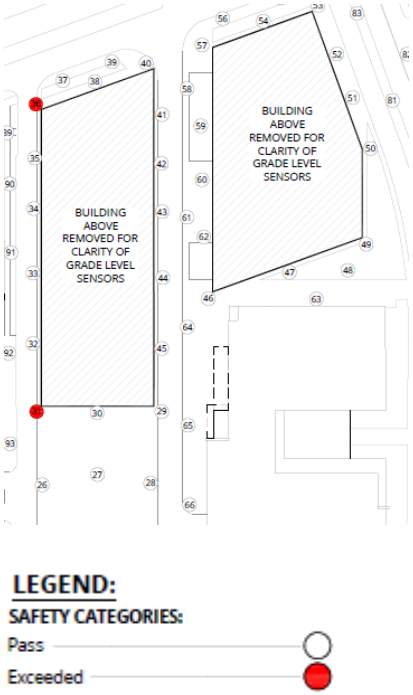
1. GRADE LEVEL – PROJECT PERIMETER & SIDEWALKS

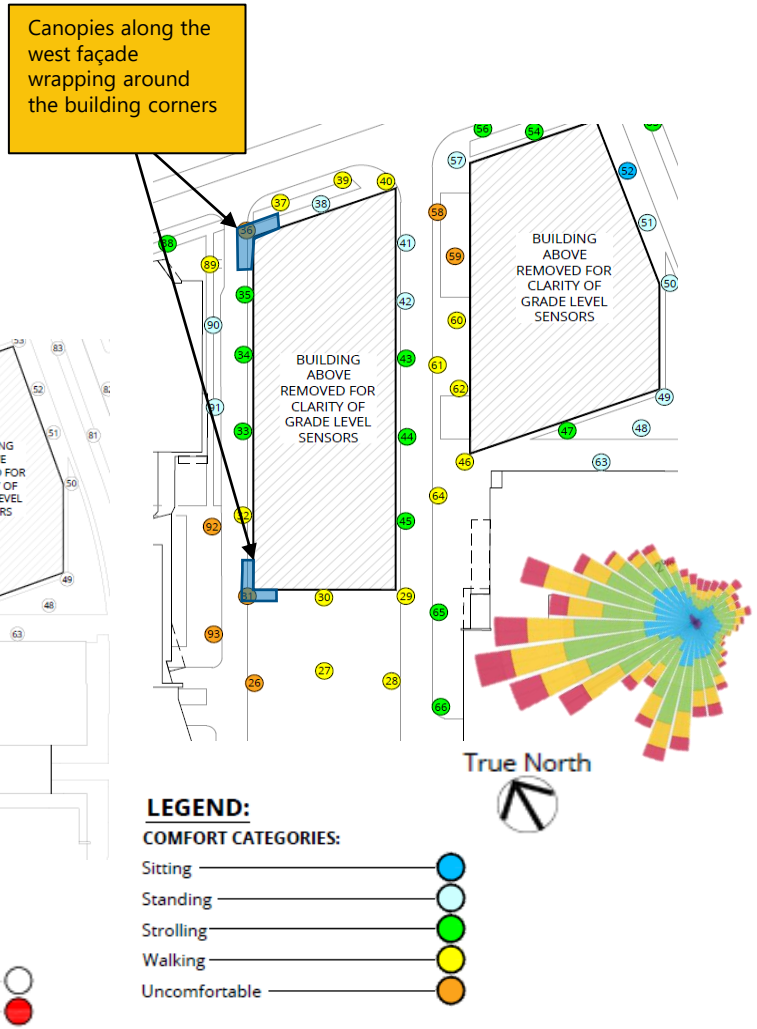
Higher than desired wind speeds in the winter around the north building perimeter/ sidewalks are mainly caused by the westerly, northwesterly winds.

Coniferous/ marcescent landscaping or wind screens, signage, architectural features along the sidewalks or open spaces should be considered to reduce high wind speeds.

In addition, deep canopies that wrap around the building corners could be added at the northwest and southwest corner (highlighted in blue in the image on the right side).

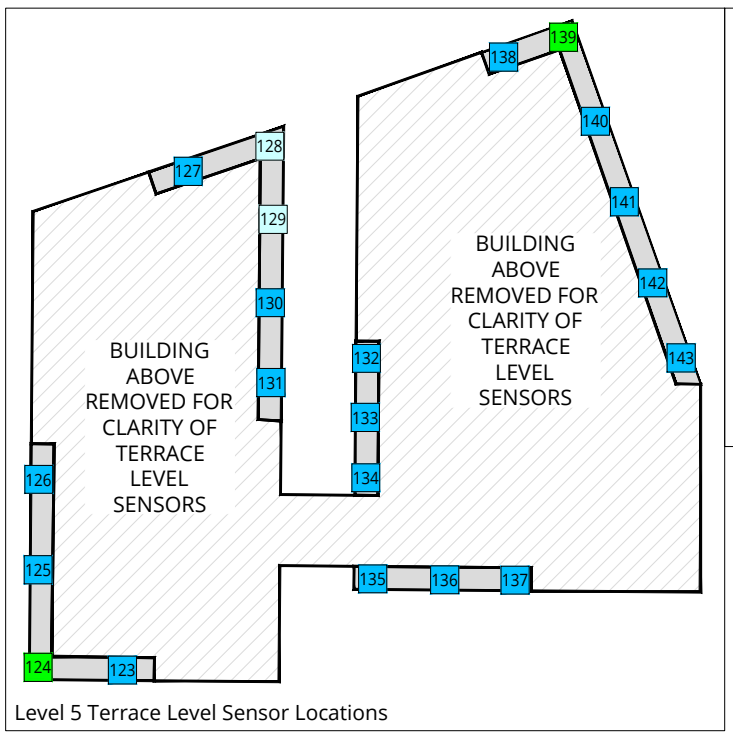




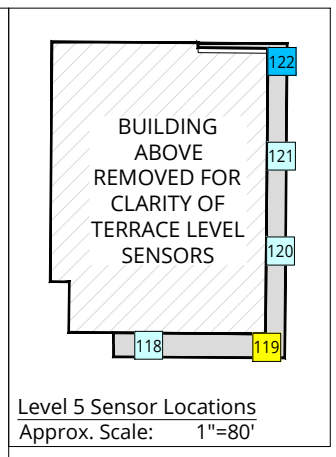


EXAMPLES OF WIND CONTROL AT GRADE LEVEL

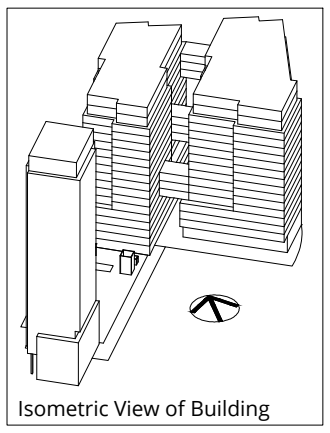
FIGURES



Level 5 Terrace Level Sensor Locations



Level 5 Sensor Locations
Approx. Scale: 1"=80'



Isometric View of Building

ROGERS STREET

SIXTH STREET

BINNEY STREET

FULKERSON STREET

GALILEO GALILEI WAY

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

LINE OF BUILDING ABOVE

LINE OF BUILDING ABOVE

145 BROADWAY
KENDALL SQUARE

USDOT VOLPE EXCHANGE

POTTER STREET

LOUGHREY WALKWAY

EXISTING BUILDING

BROADWAY

AMES STREET

AMES PLACE

75 AMES STREET

AMES STREET RESIDENTIAL

LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level
- Level 5 Terrace

0 50 100ft

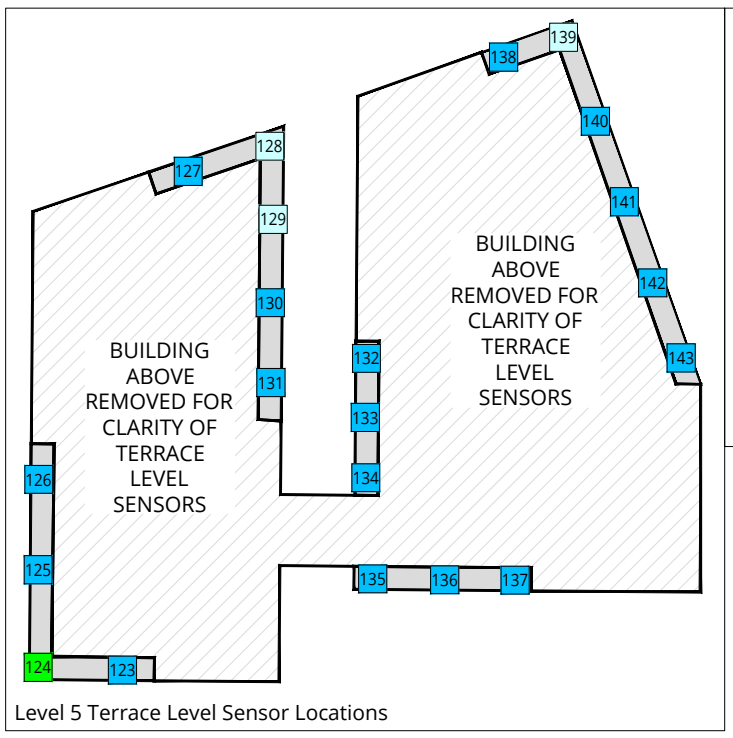
Pedestrian Wind Comfort Conditions
Proposed Configuration
Summer (May to October, 6:00 to 23:00)

IDCP V3 - Cambridge, MA

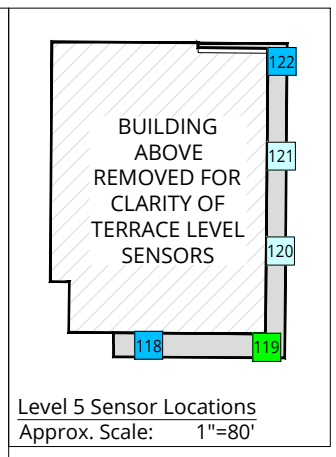
True North

Project #2101718

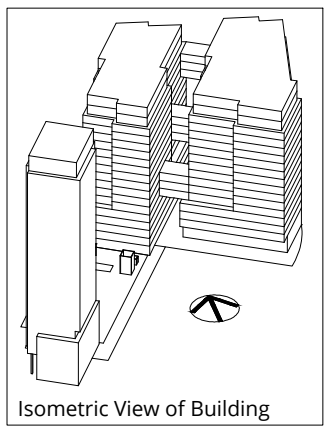
Drawn by: DF	Figure: 1A
Approx. Scale:	1"=100'
Date Revised:	Apr. 13, 2021



Level 5 Terrace Level Sensor Locations



Level 5 Sensor Locations
Approx. Scale: 1"=80'


Isometric View of Building

ROGERS STREET

SIXTH STREET

BINNEY STREET

FULKERSON STREET

USDOT VOLPE EXCHANGE

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

LINE OF BUILDING ABOVE

POTTER STREET

LOUGHREY WALKWAY

VOLPE-MODEL 9 FUTURE BUILDING

VOLPE-MODEL 8 FUTURE BUILDING

LINE OF BUILDING ABOVE

GALILEO GALILEI WAY

145 BROADWAY KENDALL SQUARE

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

BROADWAY

AMES STREET

AMES PLACE

75 AMES STREET

AMES STREET RESIDENTIAL

0 50 100ft

LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level
- Level 5 Terrace

Pedestrian Wind Comfort Conditions

Future Configuration

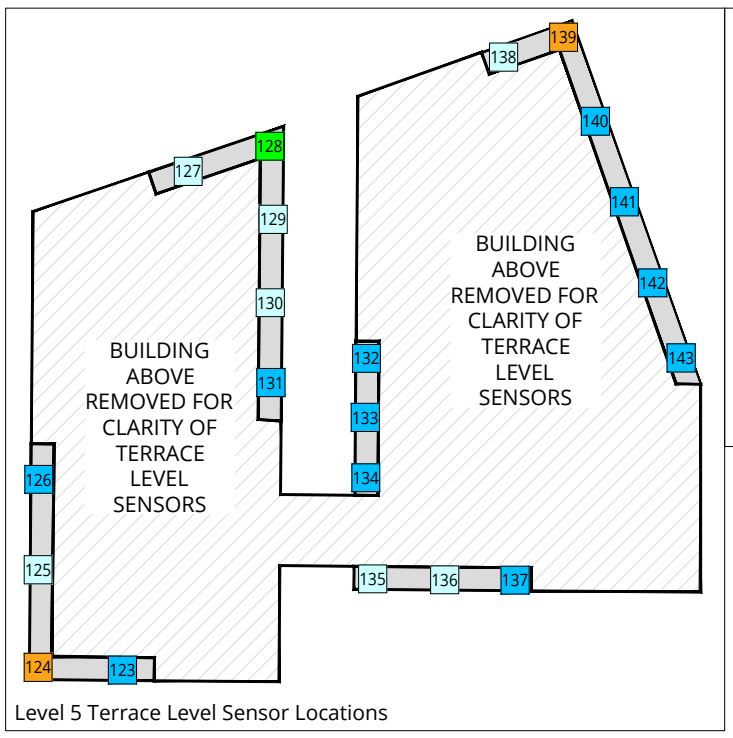
Summer (May to October, 6:00 to 23:00)

IDCP V3 - Cambridge, MA

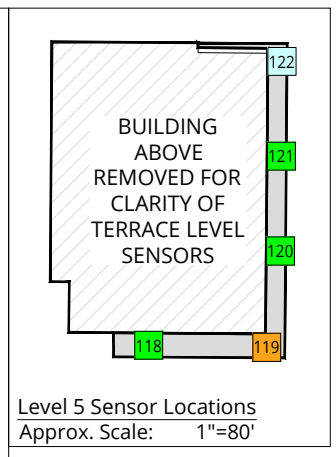
True North

Project #2101718

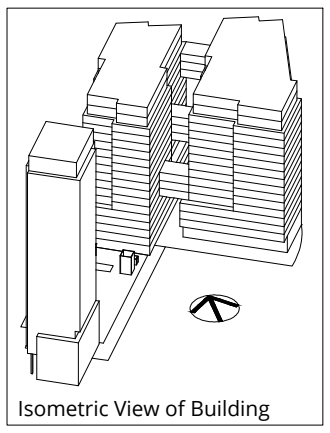
Drawn by: DF	Figure: 1B
Approx. Scale:	1"=100'
Date Revised:	Apr. 13, 2021



Level 5 Terrace Level Sensor Locations



Level 5 Sensor Locations
Approx. Scale: 1"=80'


Isometric View of Building

ROGERS STREET

SIXTH STREET

BINNEY STREET

FULKERSON STREET

USDOT VOLPE EXCHANGE

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

LINE OF BUILDING ABOVE

POTTER STREET

LOUGHREY WALKWAY

EXISTING BUILDING

GALILEO GALILEI WAY

145 BROADWAY
KENDALL SQUARE

LINE OF BUILDING ABOVE

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

BROADWAY

AMES STREET

AMES PLACE

75 AMES STREET

AMES STREET RESIDENTIAL

0 50 100ft

LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level
- Level 5 Terrace

Pedestrian Wind Comfort Conditions

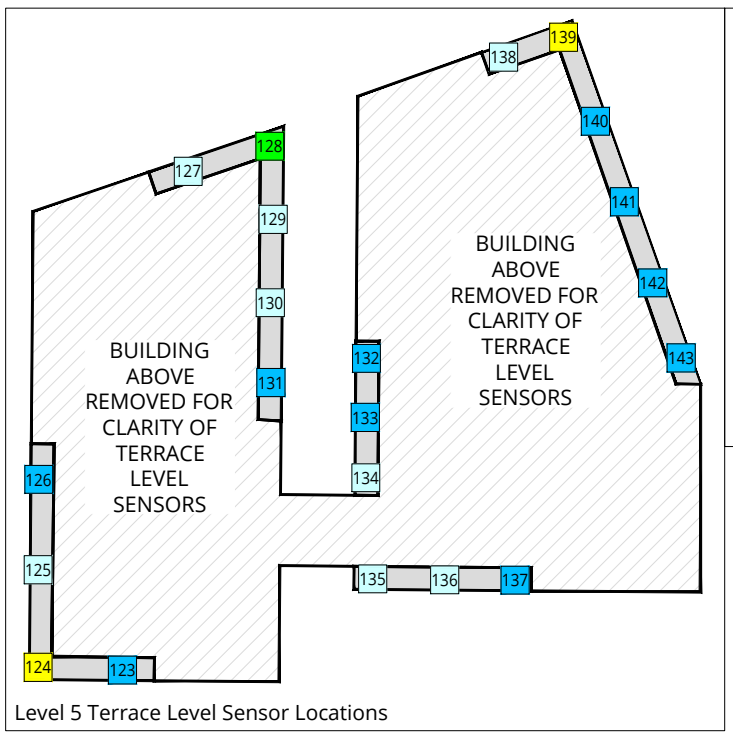
Proposed Configuration
Winter (November to April, 6:00 to 23:00)

IDCP V3 - Cambridge, MA

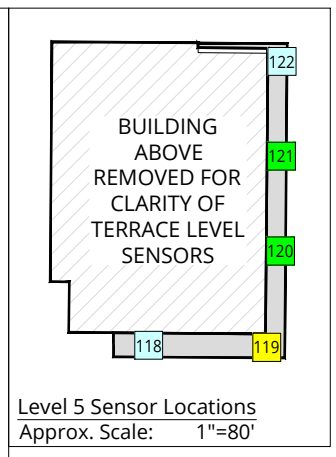
True North

Project #2101718

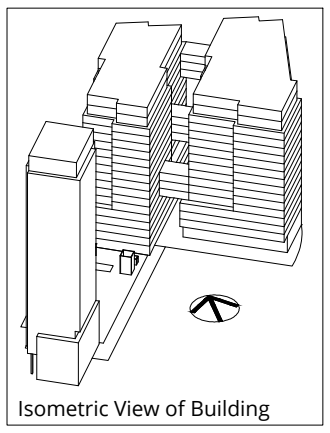
Drawn by: DF	Figure: 2A
Approx. Scale:	1"=100'
Date Revised:	Apr. 13, 2021



Level 5 Terrace Level Sensor Locations



Level 5 Sensor Locations
Approx. Scale: 1"=80'



Isometric View of Building

LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level
- Level 5 Terrace

Pedestrian Wind Comfort Conditions

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

IDCP V3 - Cambridge, MA

True North

Project #2101718

Drawn by: DF	Figure: 2B
Approx. Scale:	1"=100'
Date Revised:	Apr. 13, 2021

TABLES

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
1	Proposed	9	Strolling	11	Walking	43	Pass
	Future	8	Standing	10	Strolling	41	Pass
2	Proposed	7	Standing	9	Strolling	37	Pass
	Future	7	Standing	8	Standing	34	Pass
3	Proposed	8	Standing	10	Strolling	38	Pass
	Future	7	Standing	8	Standing	34	Pass
4	Proposed	11	Walking	14	Uncomfortable	50	Pass
	Future	10	Strolling	13	Uncomfortable	48	Pass
5	Proposed	8	Standing	10	Strolling	40	Pass
	Future	8	Standing	10	Strolling	39	Pass
6	Proposed	9	Strolling	12	Walking	44	Pass
	Future	8	Standing	10	Strolling	40	Pass
7	Proposed	8	Standing	10	Strolling	42	Pass
	Future	7	Standing	9	Strolling	39	Pass
8	Proposed	8	Standing	10	Strolling	42	Pass
	Future	8	Standing	10	Strolling	40	Pass
9	Proposed	8	Standing	10	Strolling	43	Pass
	Future	8	Standing	10	Strolling	40	Pass
10	Proposed	10	Strolling	11	Walking	43	Pass
	Future	9	Strolling	10	Strolling	41	Pass
11	Proposed	8	Standing	10	Strolling	42	Pass
	Future	7	Standing	10	Strolling	39	Pass
12	Proposed	7	Standing	8	Standing	37	Pass
	Future	7	Standing	8	Standing	35	Pass
13	Proposed	10	Strolling	12	Walking	45	Pass
	Future	9	Strolling	11	Walking	41	Pass
14	Proposed	10	Strolling	12	Walking	46	Pass
	Future	9	Strolling	10	Strolling	44	Pass
15	Proposed	10	Strolling	11	Walking	43	Pass
	Future	9	Strolling	10	Strolling	40	Pass
16	Proposed	10	Strolling	12	Walking	42	Pass
	Future	9	Strolling	11	Walking	40	Pass
17	Proposed	10	Strolling	12	Walking	43	Pass
	Future	9	Strolling	11	Walking	41	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
18	Proposed	8	Standing	10	Strolling	40	Pass
	Future	8	Standing	10	Strolling	39	Pass
19	Proposed	8	Standing	10	Strolling	40	Pass
	Future	8	Standing	10	Strolling	38	Pass
20	Proposed	8	Standing	10	Strolling	41	Pass
	Future	8	Standing	10	Strolling	39	Pass
21	Proposed	8	Standing	10	Strolling	42	Pass
	Future	8	Standing	10	Strolling	42	Pass
22	Proposed	8	Standing	11	Walking	41	Pass
	Future	8	Standing	10	Strolling	40	Pass
23	Proposed	8	Standing	10	Strolling	39	Pass
	Future	7	Standing	10	Strolling	37	Pass
24	Proposed	7	Standing	8	Standing	35	Pass
	Future	6	Sitting	8	Standing	34	Pass
25	Proposed	8	Standing	10	Strolling	40	Pass
	Future	7	Standing	9	Strolling	38	Pass
26	Proposed	9	Strolling	12	Walking	43	Pass
	Future	8	Standing	11	Walking	42	Pass
27	Proposed	8	Standing	11	Walking	42	Pass
	Future	8	Standing	10	Strolling	40	Pass
28	Proposed	8	Standing	10	Strolling	39	Pass
	Future	7	Standing	9	Strolling	35	Pass
29	Proposed	8	Standing	10	Strolling	37	Pass
	Future	7	Standing	10	Strolling	37	Pass
30	Proposed	8	Standing	11	Walking	42	Pass
	Future	8	Standing	11	Walking	41	Pass
31	Proposed	9	Strolling	12	Walking	45	Pass
	Future	8	Standing	12	Walking	44	Pass
32	Proposed	7	Standing	10	Strolling	38	Pass
	Future	7	Standing	9	Strolling	35	Pass
33	Proposed	8	Standing	10	Strolling	40	Pass
	Future	8	Standing	10	Strolling	37	Pass
34	Proposed	8	Standing	12	Walking	46	Pass
	Future	8	Standing	11	Walking	43	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
35	Proposed	8	Standing	13	Uncomfortable	46	Pass
	Future	8	Standing	12	Walking	45	Pass
36	Proposed	10	Strolling	14	Uncomfortable	46	Pass
	Future	9	Strolling	12	Walking	44	Pass
37	Proposed	7	Standing	10	Strolling	44	Pass
	Future	6	Sitting	9	Strolling	43	Pass
38	Proposed	7	Standing	10	Strolling	48	Pass
	Future	6	Sitting	8	Standing	42	Pass
39	Proposed	7	Standing	10	Strolling	40	Pass
	Future	7	Standing	9	Strolling	37	Pass
40	Proposed	8	Standing	11	Walking	43	Pass
	Future	8	Standing	11	Walking	43	Pass
41	Proposed	8	Standing	11	Walking	42	Pass
	Future	8	Standing	11	Walking	41	Pass
42	Proposed	8	Standing	12	Walking	42	Pass
	Future	8	Standing	12	Walking	41	Pass
43	Proposed	7	Standing	9	Strolling	36	Pass
	Future	8	Standing	9	Strolling	36	Pass
44	Proposed	7	Standing	7	Standing	37	Pass
	Future	7	Standing	7	Standing	38	Pass
45	Proposed	7	Standing	10	Strolling	37	Pass
	Future	7	Standing	10	Strolling	37	Pass
46	Proposed	7	Standing	9	Strolling	38	Pass
	Future	7	Standing	9	Strolling	40	Pass
47	Proposed	7	Standing	8	Standing	34	Pass
	Future	7	Standing	8	Standing	34	Pass
48	Proposed	8	Standing	10	Strolling	40	Pass
	Future	8	Standing	10	Strolling	43	Pass
49	Proposed	10	Strolling	14	Uncomfortable	52	Pass
	Future	10	Strolling	14	Uncomfortable	52	Pass
50	Proposed	7	Standing	10	Strolling	43	Pass
	Future	7	Standing	10	Strolling	44	Pass
51	Proposed	6	Sitting	8	Standing	40	Pass
	Future	6	Sitting	8	Standing	40	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
52	Proposed	8	Standing	10	Strolling	41	Pass
	Future	8	Standing	10	Strolling	41	Pass
53	Proposed	9	Strolling	13	Uncomfortable	47	Pass
	Future	9	Strolling	13	Uncomfortable	45	Pass
54	Proposed	8	Standing	11	Walking	41	Pass
	Future	8	Standing	10	Strolling	39	Pass
55	Proposed	8	Standing	12	Walking	48	Pass
	Future	7	Standing	10	Strolling	44	Pass
56	Proposed	7	Standing	7	Standing	42	Pass
	Future	7	Standing	7	Standing	44	Pass
57	Proposed	7	Standing	9	Strolling	37	Pass
	Future	7	Standing	9	Strolling	36	Pass
58	Proposed	8	Standing	8	Standing	45	Pass
	Future	8	Standing	8	Standing	43	Pass
59	Proposed	8	Standing	10	Strolling	42	Pass
	Future	9	Strolling	11	Walking	41	Pass
60	Proposed	8	Standing	9	Strolling	41	Pass
	Future	8	Standing	10	Strolling	40	Pass
61	Proposed	8	Standing	10	Strolling	43	Pass
	Future	8	Standing	12	Walking	43	Pass
62	Proposed	8	Standing	8	Standing	45	Pass
	Future	9	Strolling	11	Walking	42	Pass
63	Proposed	7	Standing	7	Standing	47	Pass
	Future	7	Standing	8	Standing	43	Pass
64	Proposed	6	Sitting	7	Standing	36	Pass
	Future	6	Sitting	7	Standing	33	Pass
65	Proposed	8	Standing	8	Standing	44	Pass
	Future	7	Standing	8	Standing	40	Pass
66	Proposed	7	Standing	9	Strolling	46	Pass
	Future	7	Standing	9	Strolling	42	Pass
67	Proposed	5	Sitting	6	Sitting	33	Pass
	Future	6	Sitting	6	Sitting	31	Pass
68	Proposed	5	Sitting	5	Sitting	31	Pass
	Future	5	Sitting	5	Sitting	29	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
69	Proposed	8	Standing	10	Strolling	45	Pass
	Future	7	Standing	9	Strolling	42	Pass
70	Proposed	7	Standing	9	Strolling	40	Pass
	Future	7	Standing	9	Strolling	37	Pass
71	Proposed	8	Standing	10	Strolling	45	Pass
	Future	7	Standing	10	Strolling	41	Pass
72	Proposed	8	Standing	12	Walking	42	Pass
	Future	7	Standing	10	Strolling	40	Pass
73	Proposed	8	Standing	12	Walking	43	Pass
	Future	8	Standing	11	Walking	42	Pass
74	Proposed	8	Standing	10	Strolling	40	Pass
	Future	7	Standing	10	Strolling	38	Pass
75	Proposed	7	Standing	9	Strolling	34	Pass
	Future	6	Sitting	8	Standing	34	Pass
76	Proposed	7	Standing	10	Strolling	37	Pass
	Future	7	Standing	10	Strolling	38	Pass
77	Proposed	7	Standing	8	Standing	34	Pass
	Future	7	Standing	9	Strolling	35	Pass
78	Proposed	7	Standing	10	Strolling	42	Pass
	Future	7	Standing	8	Standing	39	Pass
79	Proposed	7	Standing	8	Standing	38	Pass
	Future	6	Sitting	8	Standing	36	Pass
80	Proposed	7	Standing	10	Strolling	41	Pass
	Future	7	Standing	9	Strolling	40	Pass
81	Proposed	7	Standing	10	Strolling	42	Pass
	Future	7	Standing	9	Strolling	40	Pass
82	Proposed	7	Standing	8	Standing	40	Pass
	Future	9	Strolling	12	Walking	45	Pass
83	Proposed	7	Standing	7	Standing	37	Pass
	Future	8	Standing	10	Strolling	43	Pass
84	Proposed	7	Standing	7	Standing	34	Pass
	Future	8	Standing	10	Strolling	43	Pass
85	Proposed	7	Standing	7	Standing	34	Pass
	Future	8	Standing	10	Strolling	39	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
86	Proposed	6	Sitting	7	Standing	30	Pass
	Future	8	Standing	10	Strolling	42	Pass
87	Proposed	8	Standing	9	Strolling	38	Pass
	Future	7	Standing	8	Standing	34	Pass
88	Proposed	7	Standing	8	Standing	39	Pass
	Future	7	Standing	8	Standing	36	Pass
89	Proposed	9	Strolling	11	Walking	41	Pass
	Future	8	Standing	10	Strolling	40	Pass
90	Proposed	12	Walking	15	Uncomfortable	51	Pass
	Future	10	Strolling	13	Uncomfortable	50	Pass
91	Proposed	8	Standing	12	Walking	47	Pass
	Future	7	Standing	9	Strolling	43	Pass
92	Proposed	10	Strolling	13	Uncomfortable	50	Pass
	Future	8	Standing	11	Walking	43	Pass
93	Proposed	7	Standing	10	Strolling	38	Pass
	Future	7	Standing	8	Standing	34	Pass
94	Proposed	8	Standing	10	Strolling	40	Pass
	Future	7	Standing	9	Strolling	39	Pass
95	Proposed	9	Strolling	12	Walking	45	Pass
	Future	8	Standing	12	Walking	43	Pass
96	Proposed	7	Standing	8	Standing	43	Pass
	Future	7	Standing	7	Standing	45	Pass
97	Proposed	7	Standing	9	Strolling	39	Pass
	Future	8	Standing	10	Strolling	43	Pass
98	Proposed	7	Standing	10	Strolling	44	Pass
	Future	8	Standing	11	Walking	45	Pass
99	Proposed	6	Sitting	7	Standing	39	Pass
	Future	6	Sitting	7	Standing	40	Pass
100	Proposed	6	Sitting	8	Standing	36	Pass
	Future	6	Sitting	8	Standing	37	Pass
101	Proposed	8	Standing	11	Walking	40	Pass
	Future	8	Standing	11	Walking	40	Pass
102	Proposed	10	Strolling	14	Uncomfortable	48	Pass
	Future	9	Strolling	13	Uncomfortable	47	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
103	Proposed	8	Standing	12	Walking	44	Pass
	Future	8	Standing	11	Walking	42	Pass
104	Proposed	7	Standing	8	Standing	40	Pass
	Future	7	Standing	8	Standing	37	Pass
105	Proposed	7	Standing	10	Strolling	48	Pass
	Future	7	Standing	10	Strolling	46	Pass
106	Proposed	6	Sitting	8	Standing	39	Pass
	Future	6	Sitting	8	Standing	37	Pass
107	Proposed	8	Standing	10	Strolling	40	Pass
	Future	8	Standing	8	Standing	37	Pass
108	Proposed	8	Standing	10	Strolling	42	Pass
	Future	8	Standing	9	Strolling	39	Pass
109	Proposed	8	Standing	10	Strolling	41	Pass
	Future	8	Standing	10	Strolling	40	Pass
110	Proposed	7	Standing	9	Strolling	34	Pass
	Future	7	Standing	9	Strolling	34	Pass
111	Proposed	7	Standing	8	Standing	35	Pass
	Future	7	Standing	8	Standing	34	Pass
112	Proposed	8	Standing	9	Strolling	40	Pass
	Future	8	Standing	9	Strolling	38	Pass
113	Proposed	7	Standing	9	Strolling	39	Pass
	Future	6	Sitting	8	Standing	35	Pass
114	Proposed	10	Strolling	11	Walking	44	Pass
	Future	8	Standing	10	Strolling	42	Pass
115	Proposed	8	Standing	11	Walking	38	Pass
	Future	7	Standing	10	Strolling	35	Pass
116	Proposed	6	Sitting	7	Standing	27	Pass
	Future	6	Sitting	7	Standing	25	Pass
117	Proposed	6	Sitting	8	Standing	30	Pass
	Future	7	Standing	8	Standing	30	Pass
118	Proposed	7	Standing	9	Strolling	40	Pass
	Future	6	Sitting	8	Standing	37	Pass
119	Proposed	12	Walking	14	Uncomfortable	52	Pass
	Future	9	Strolling	12	Walking	47	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
120	Proposed	8	Standing	10	Strolling	40	Pass
	Future	7	Standing	9	Strolling	39	Pass
121	Proposed	8	Standing	10	Strolling	37	Pass
	Future	8	Standing	10	Strolling	40	Pass
122	Proposed	6	Sitting	7	Standing	31	Pass
	Future	6	Sitting	7	Standing	32	Pass
123	Proposed	4	Sitting	6	Sitting	24	Pass
	Future	4	Sitting	6	Sitting	25	Pass
124	Proposed	9	Strolling	14	Uncomfortable	52	Pass
	Future	9	Strolling	12	Walking	48	Pass
125	Proposed	5	Sitting	7	Standing	31	Pass
	Future	5	Sitting	7	Standing	31	Pass
126	Proposed	4	Sitting	5	Sitting	20	Pass
	Future	4	Sitting	5	Sitting	20	Pass
127	Proposed	5	Sitting	7	Standing	29	Pass
	Future	5	Sitting	7	Standing	29	Pass
128	Proposed	7	Standing	10	Strolling	45	Pass
	Future	7	Standing	10	Strolling	43	Pass
129	Proposed	7	Standing	8	Standing	48	Pass
	Future	7	Standing	7	Standing	49	Pass
130	Proposed	6	Sitting	8	Standing	41	Pass
	Future	6	Sitting	7	Standing	42	Pass
131	Proposed	4	Sitting	6	Sitting	29	Pass
	Future	4	Sitting	5	Sitting	29	Pass
132	Proposed	4	Sitting	4	Sitting	19	Pass
	Future	4	Sitting	4	Sitting	19	Pass
133	Proposed	4	Sitting	6	Sitting	27	Pass
	Future	4	Sitting	6	Sitting	26	Pass
134	Proposed	5	Sitting	6	Sitting	24	Pass
	Future	6	Sitting	7	Standing	25	Pass
135	Proposed	6	Sitting	8	Standing	39	Pass
	Future	6	Sitting	8	Standing	40	Pass
136	Proposed	6	Sitting	8	Standing	35	Pass
	Future	6	Sitting	7	Standing	34	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
137	Proposed	4	Sitting	6	Sitting	34	Pass
	Future	4	Sitting	6	Sitting	32	Pass
138	Proposed	6	Sitting	7	Standing	30	Pass
	Future	5	Sitting	7	Standing	30	Pass
139	Proposed	10	Strolling	13	Uncomfortable	52	Pass
	Future	8	Standing	12	Walking	49	Pass
140	Proposed	5	Sitting	5	Sitting	34	Pass
	Future	6	Sitting	6	Sitting	32	Pass
141	Proposed	6	Sitting	6	Sitting	35	Pass
	Future	6	Sitting	6	Sitting	34	Pass
142	Proposed	6	Sitting	6	Sitting	37	Pass
	Future	6	Sitting	6	Sitting	36	Pass
143	Proposed	6	Sitting	6	Sitting	31	Pass
	Future	6	Sitting	6	Sitting	30	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	Project with existing surroundings	
Future	Project with future surroundings	

Comfort Speed (mph)		Safety Speed (mph)	
(20% Seasonal Exceedance)		(0.1% Annual Exceedance)	
≤ 6	Sitting	≤ 56	Pass
7 - 8	Standing	> 56	Exceeded
9 - 10	Strolling		
11 - 12	Walking		
> 12	Uncomfortable		

PRELIMINARY RESULTS

IDCP V3

CAMBRIDGE, MA

PEDESTRIAN WIND STUDY
RWDI # 2101718
January 18, 2021

SUBMITTED TO

Michael Tilford
VP, Development
mtilford@bxp.com

BXP – Boston Properties
800 Boylston Street, Suite 1900
Boston, MA 02199-8103
(617) 236-3329

SUBMITTED BY

Nishat Nourin, M.Eng., P.Eng..
Project Engineer
Nishat.Nourin@rwdi.com

Sonia Beaulieu, M.Sc., P.Eng., ing.
Senior Project Manager / Principal
sonia.beaulieu@rwdi.com

RWDI
600 Southgate Drive
Guelph, Ontario, Canada N1G 4P6
T: 519.823.1311

EXECUTIVE SUMMARY

RWDI was retained to conduct a pedestrian wind assessment for the proposed IDCP V3 development in Cambridge, MA (Image 1).

The following document summarizes the findings and results from our wind tunnel testing of the proposed development under the Existing, Proposed and Future configurations (Images 2A through 2C). Wind tunnel data was combined with the local wind records (Image 3) to yield the potential wind comfort and safety conditions shown on site plans in Figures 1A through 3C. The associated wind speeds are listed in Table 1.

These results can be summarized as follows:

Wind Safety:

- Winds at all tested locations meet the safety criterion in the existing configuration.
- With the addition to the proposed project, winds at two sidewalk locations at proposed building corners are predicted to exceed the safety criterion.
- In the Future configuration, wind speeds at all tested location are expected to meet the safety criterion.

Wind Comfort:

- Existing wind conditions are mainly calm and suitable for passive activities in most areas. Elevated wind speeds comfortable for active pedestrian use are likely currently occurring in some open space and sidewalks along Binney Street and Broadway throughout the year. During the winter, uncomfortable wind conditions exist at a sidewalk location along Loughrey Walkway, to the east of project site.
- With the addition of the proposed project, wind speeds are expected to increase throughout the year. During the winter, wind speeds at a few sidewalk locations around the proposed development and the area underneath the proposed building undercut are predicted to be uncomfortable.
- With the addition of the future development, improved wind conditions with fewer uncomfortable locations are predicted throughout the year.
- Wind speeds at above-grade level areas are generally predicted to be comfortable for passive pedestrian use during the summer, when these areas will be frequently used, if these areas are planned for outdoor amenity.

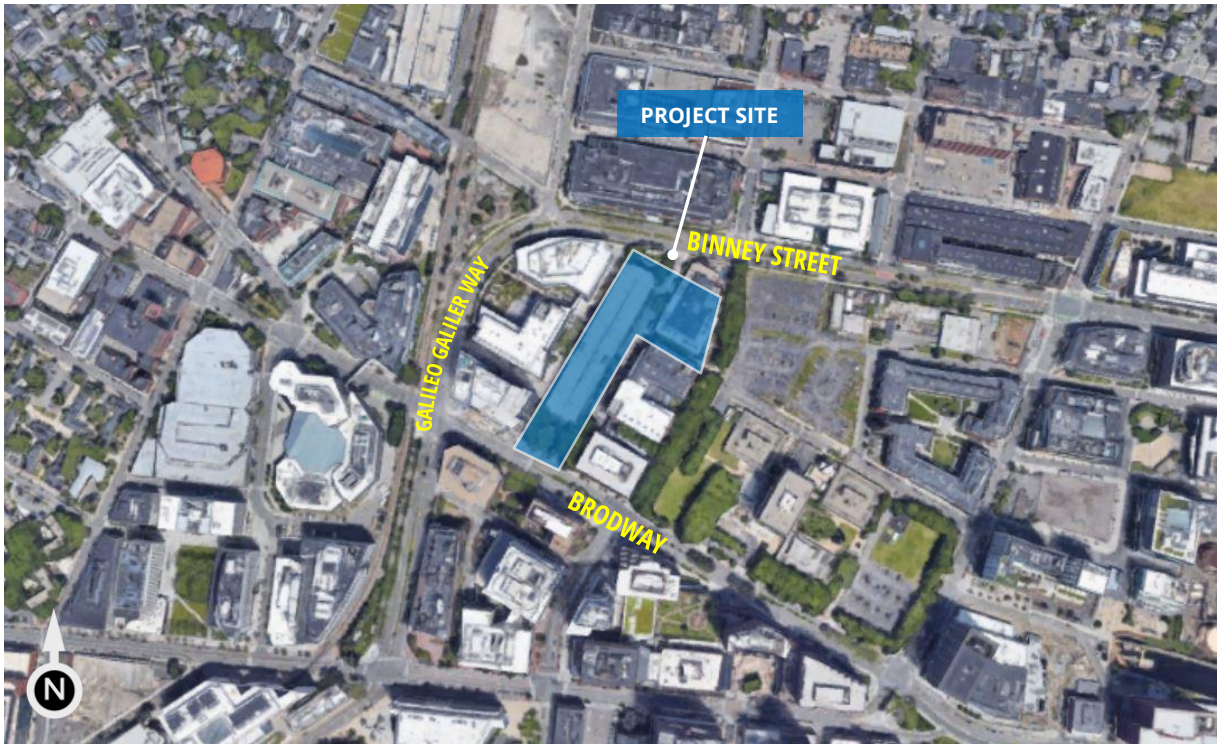


Image 1: Aerial View of Site and Surroundings (Photo Courtesy of Google™ Earth)

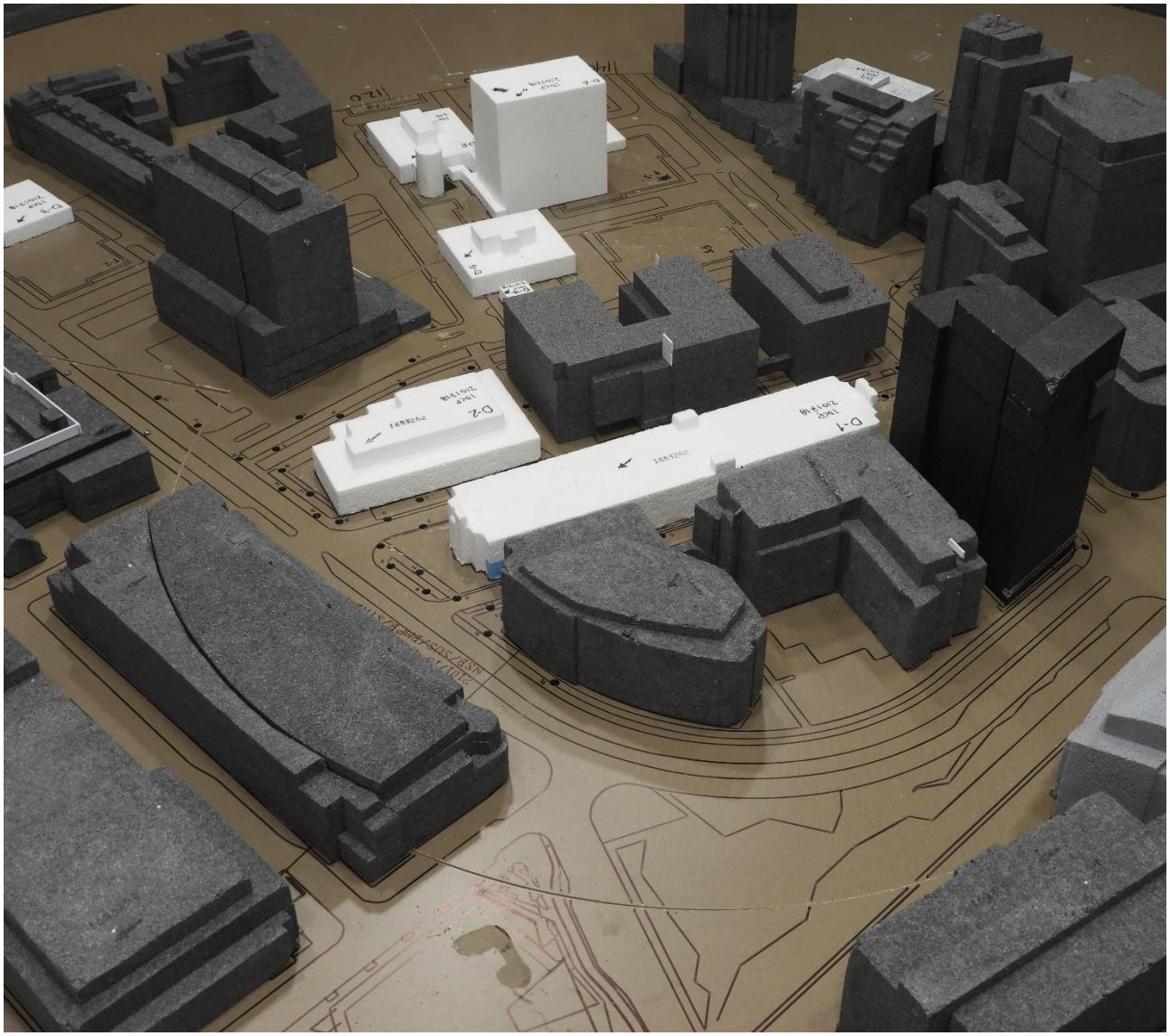
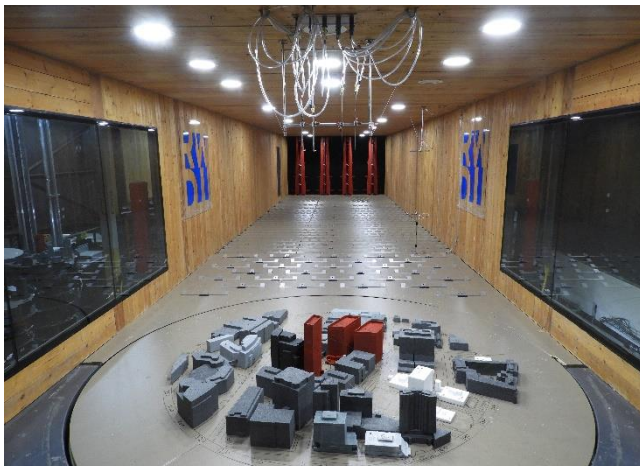
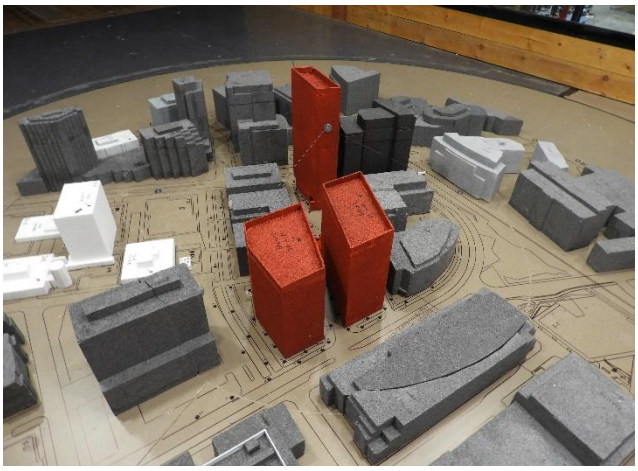


Image 2A: Wind Tunnel Study Model – Existing Configuration





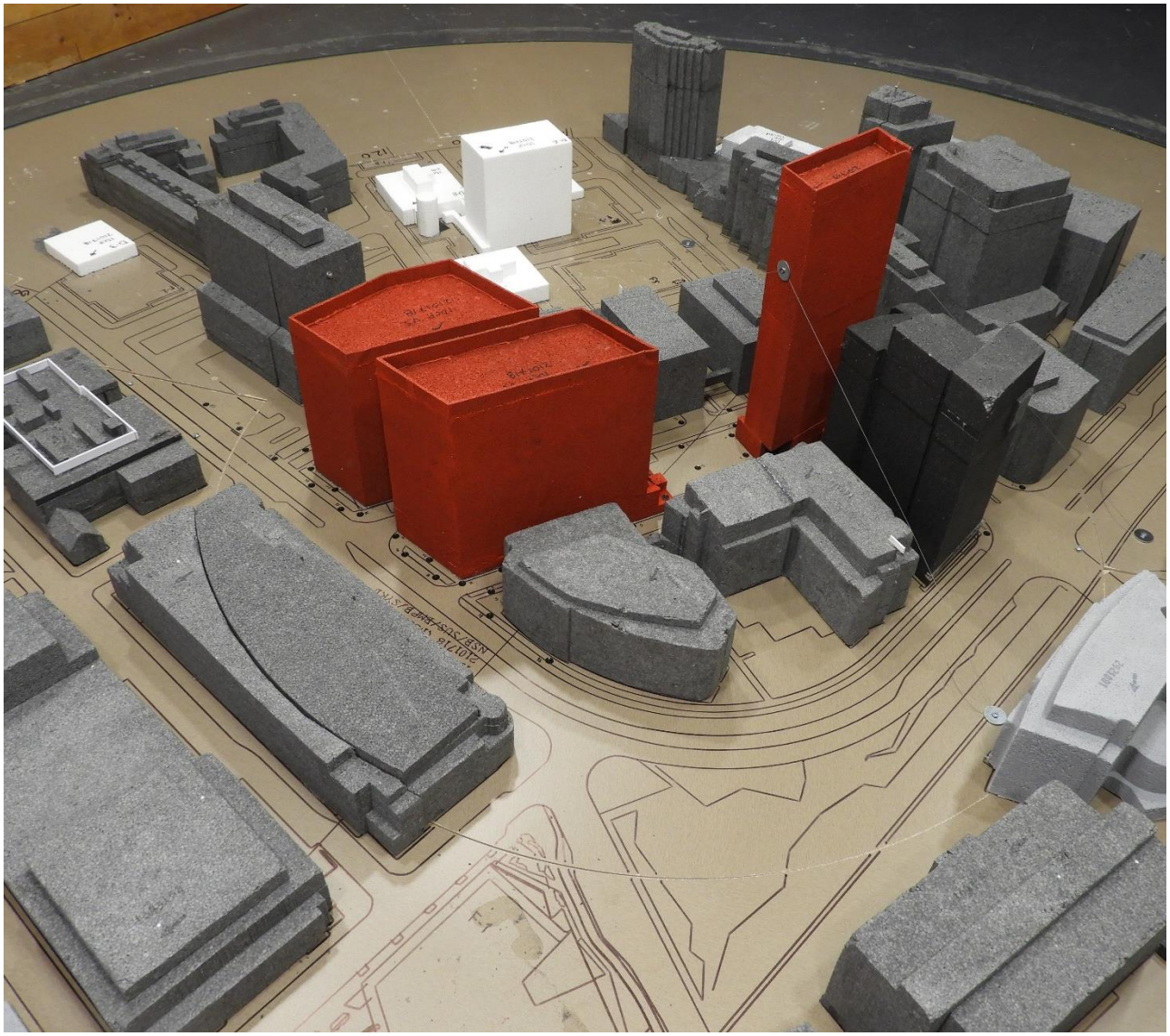
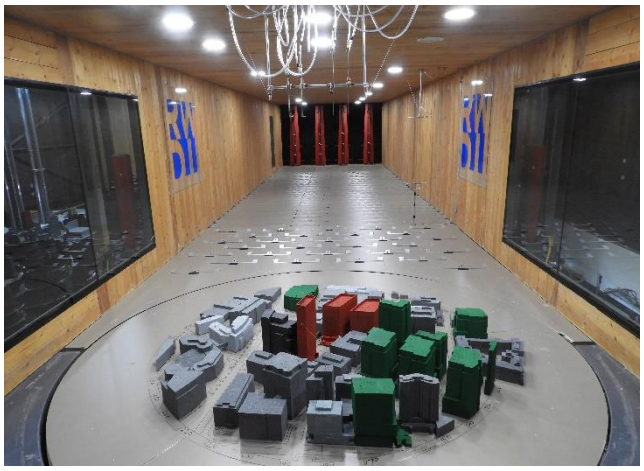


Image 2B: Wind Tunnel Study Model – Proposed Configuration



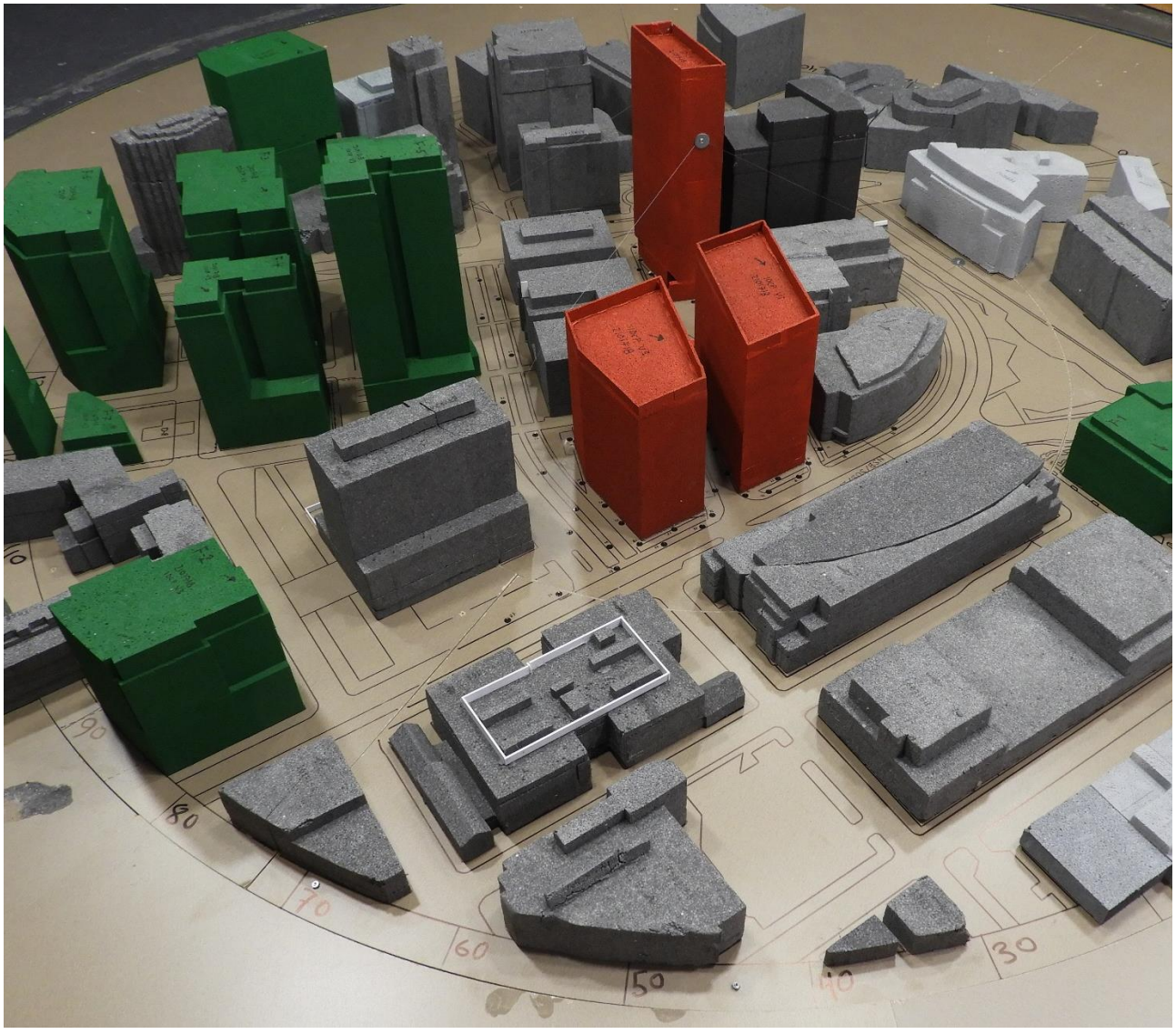
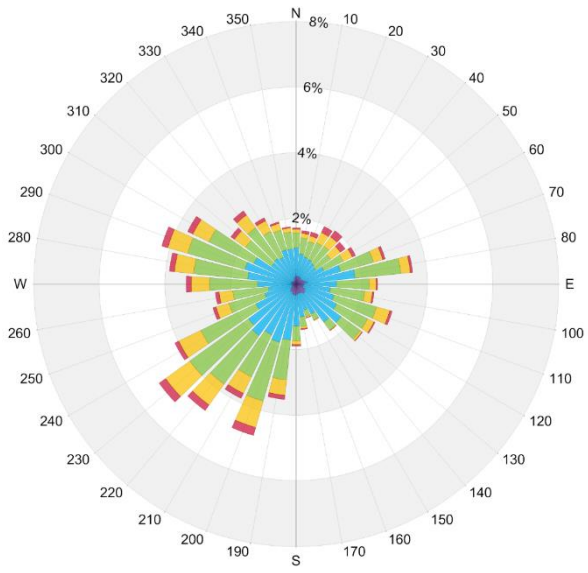
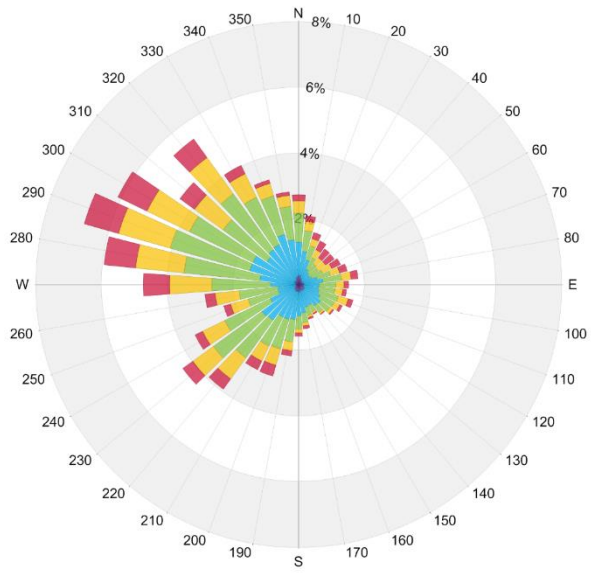


Image 2B: Wind Tunnel Study Model – Future Configuration



Summer (May – October)



Winter (November – April)

Wind Speed (mph)	Probability (%) Summer	Winter
Calm	2.7	2.3
1-5	8.3	6.1
6-10	36.1	27.7
11-15	36.2	34.2
16-20	12.8	18.7
>20	3.9	11.0

Image 3: Directional Distribution of Winds Approaching Boston Logan International Airport between 1990 and 2019

RWDI Pedestrian Wind Criteria

The RWDI pedestrian wind criteria, which have been developed by RWDI through research and consulting practice since 1974, are used in the current study. These criteria have been widely accepted by municipal authorities as well as by the building design and city planning community. Regional differences in wind climate and thermal conditions as well as variations in age, health, clothing, etc. can affect a person's perception of the wind climate. Therefore, comparisons of wind speeds for the existing and proposed building configurations are the most objective way in assessing local pedestrian wind conditions. In general, the combined effect of mean and gust speeds on pedestrian comfort can be quantified by a Gust Equivalent Mean (GEM).

Comfort Category	GEM Speed (mph)	Description
Sitting	≤ 6	Calm or light breezes desired for outdoor restaurants and seating areas where one can read a paper without having it blown away
Standing	≤ 8	Gentle breezes suitable for main building entrances, bus stops, and other places where pedestrians may linger
Strolling	≤ 10	Moderate winds that would be appropriate for window shopping and strolling along a downtown street, plaza or park
Walking	≤ 12	Relatively high speeds that can be tolerated if one's objective is to walk, run or cycle without lingering
Uncomfortable	> 12	Strong winds of this magnitude are considered a nuisance for all pedestrian activities, and wind mitigation is typically recommended

Notes:
(1) *GEM Speed = max (Mean Speed, Gust Speed/1.85)* and *Gust Speed = Mean Speed + 3*RMS Speed*;
(2) Wind conditions are considered to be comfortable if the predicted GEM speeds are within the respective thresholds for at least 80% of the time between 6:00 and 23:00. Nightly hours between 0:00 and 5:00 are excluded from the wind analysis for comfort since limited usage of outdoor spaces is anticipated; and,
(3) Instead of standard four seasons, two periods of summer (May to October) and winter (November to April) are adopted in the wind analysis, because in a cold climate such as that found in **Cambridge**, there are distinct differences in pedestrian outdoor behaviors between these two-time periods.

Safety Criterion	Gust Speed (mph)	Description
Exceeded	> 56	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; and,
(2) Only gust speeds need to be considered in the wind safety criterion. These are usually rare events but deserve special attention in city planning and building design due to their potential safety impact on pedestrians.

FIGURES

BENT STREET
ROGERS STREET
SIXTH STREET
FULKERSON STREET
BINNEY STREET
USDOT VOLPE EXCHANGE
EXISTING BUILDING
EXISTING BUILDING
EXISTING BUILDING
POTTER STREET
LOUGHREY WALKWAY
GALILEO GALILEI WAY
145 BROADWAY KENDALL SQUARE
BROADWAY
AMES PLACE
75 AMES STREET
AMES STREET
AMES STREET RESIDENTIAL
0 50 100ft

LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level

Pedestrian Wind Comfort Conditions

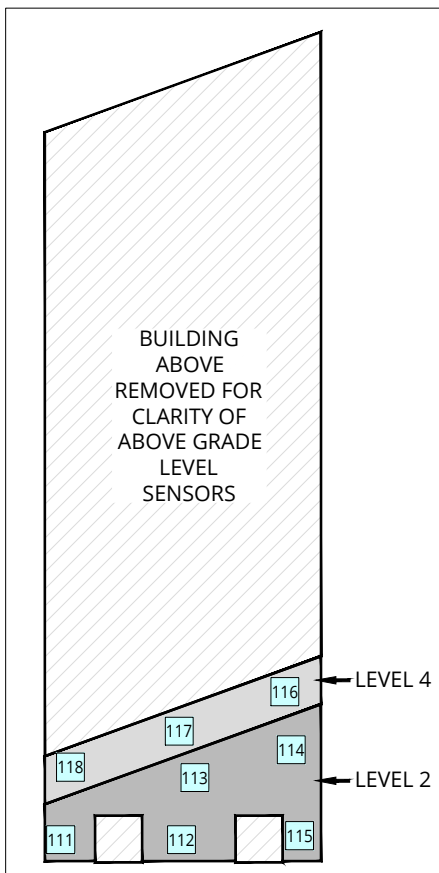
Existing Configuration
Summer (May to October, 6:00 to 23:00)

IDCP V3 - Cambridge, MA

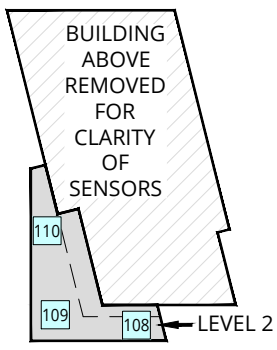
True North

Project #2101718

Drawn by: DF	Figure: 1A
Approx. Scale:	1"=100'
Date Revised:	Jan. 14, 2021



Above Grade Sensor Locations
Approx. Scale: 1"=80'



Above Grade Sensor Locations
Approx. Scale: 1"=80'

ROGERS STREET
SIXTH STREET
BINNEY STREET
USDOT VOLPE EXCHANGE
POTTER STREET
LOUGHREY WALKWAY
EXISTING BUILDING
BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS
BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS
BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS
145 BROADWAY KENDALL SQUARE
GALILEO GALILEI WAY
BROADWAY
AMES PLACE
75 AMES STREET
AMES STREET
AMES STREET RESIDENTIAL

LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level
- Above Grade Level

0 50 100ft

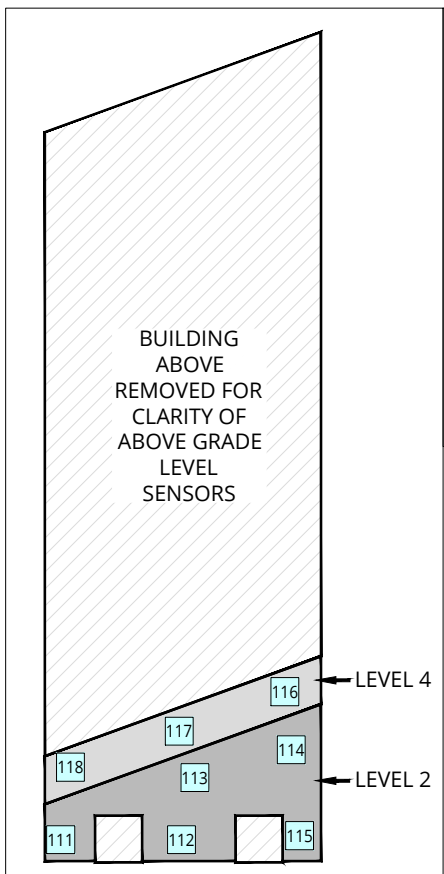
Pedestrian Wind Comfort Conditions
Proposed Configuration
Summer (May to October, 6:00 to 23:00)

IDCP V3 - Cambridge, MA

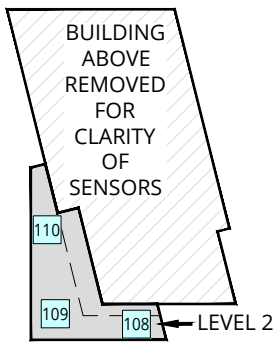
True North

Project #2101718

Drawn by: DF	Figure: 1B
Approx. Scale:	1"=100'
Date Revised:	Jan. 14, 2021



Above Grade Sensor Locations
Approx. Scale: 1"=80'



Above Grade Sensor Locations
Approx. Scale: 1"=80'

ROGERS STREET
SIXTH STREET
BINNEY STREET
USDOT VOLPE EXCHANGE
BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS
BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS
POTTER STREET
LOUGHREY WALKWAY
VOLPE-MODEL 9 FUTURE BUILDING
VOLPE-MODEL 8 FUTURE BUILDING
GALILEO GALILEI WAY
145 BROADWAY KENDALL SQUARE
BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS
BROADWAY
AMES STREET
AMES PLACE
75 AMES STREET
AMES STREET RESIDENTIAL
0 50 100ft

LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level
- Above Grade Level

Pedestrian Wind Comfort Conditions

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

IDCP V3 - Cambridge, MA

True North

Project #2101718

Drawn by:	DF	Figure:	1C
Approx. Scale:	1"=100'		
Date Revised:	Jan. 14, 2021		

BENT STREET
ROGERS STREET
SIXTH STREET
FULKERSON STREET
BINNEY STREET
EXISTING BUILDING
EXISTING BUILDING
EXISTING BUILDING
USDOT VOLPE EXCHANGE
POTTER STREET
LOUGHREY WALKWAY
GALILEO GALILEI WAY
145 BROADWAY KENDALL SQUARE
BROADWAY
AMES PLACE
75 AMES STREET
AMES STREET
AMES STREET RESIDENTIAL
0 50 100ft

LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level

Pedestrian Wind Comfort Conditions

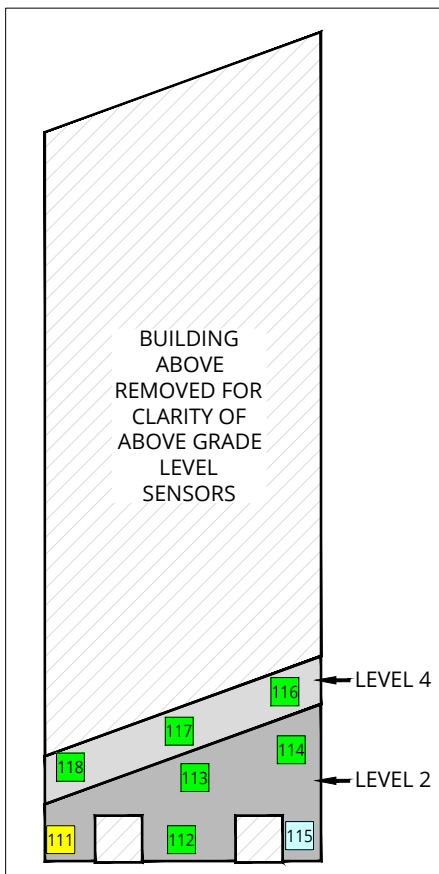
Existing Configuration
Winter (November to April, 6:00 to 23:00)

IDCP V3 - Cambridge, MA

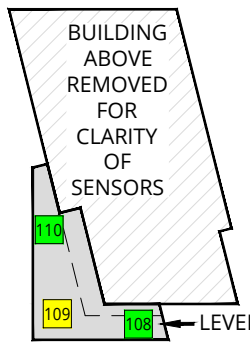
True North

Project #2101718

Drawn by: DF	Figure: 2A
Approx. Scale:	1"=100'
Date Revised:	Jan. 14, 2021



Above Grade Sensor Locations
Approx. Scale: 1"=80'



Above Grade Sensor Locations
Approx. Scale: 1"=80'

ROGERS STREET
SIXTH STREET
BINNEY STREET
USDOT VOLPE EXCHANGE
POTTER STREET
LOUGHREY WALKWAY
EXISTING BUILDING
GALILEO GALILEI WAY
145 BROADWAY KENDALL SQUARE
BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS
BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS
BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS
BROADWAY
AMES PLACE
75 AMES STREET
AMES STREET
AMES STREET RESIDENTIAL
0 50 100ft

LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level
- Above Grade Level

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

IDCP V3 - Cambridge, MA

True North

Project #2101718

Drawn by: DF	Figure: 2B
Approx. Scale:	1"=100'
Date Revised:	Jan. 14, 2021

BUILDING ABOVE REMOVED FOR CLARITY OF ABOVE GRADE LEVEL SENSORS

LEVEL 4

LEVEL 2

Above Grade Sensor Locations
Approx. Scale: 1"=80'

BUILDING ABOVE REMOVED FOR CLARITY OF SENSORS

LEVEL 2

Above Grade Sensor Locations
Approx. Scale: 1"=80'

ROGERS STREET

SIXTH STREET

BINNEY STREET

USDOT VOLPE EXCHANGE

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

POTTER STREET

LOUGHREY WALKWAY

VOLPE-MODEL 9 FUTURE BUILDING

VOLPE-MODEL 8 FUTURE BUILDING

GALILEO GALILEI WAY

145 BROADWAY KENDALL SQUARE

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

BROADWAY

AMES STREET

AMES PLACE

75 AMES STREET

AMES STREET RESIDENTIAL

0 50 100ft

LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level
- Above Grade Level

Pedestrian Wind Comfort Conditions

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

IDCP V3 - Cambridge, MA

True North

Project #2101718

Drawn by: DF	Figure: 2C
Approx. Scale:	1"=100'
Date Revised:	Jan. 14, 2021

BENT STREET
ROGERS STREET
SIXTH STREET
FULKERSON STREET
BINNEY STREET
GALILEO GALILEI WAY
145 BROADWAY
KENDALL SQUARE
EXISTING BUILDING
EXISTING BUILDING
EXISTING BUILDING
USDOT VOLPE EXCHANGE
POTTER STREET
LOUGHREY WALKWAY
BROADWAY
AMES PLACE
75 AMES STREET
AMES STREET
AMES STREET RESIDENTIAL
0 50 100ft

LEGEND:

SAFETY CATEGORIES:
Pass
Exceeded

SENSOR LOCATION:
Grade Level

Pedestrian Wind Safety Conditions

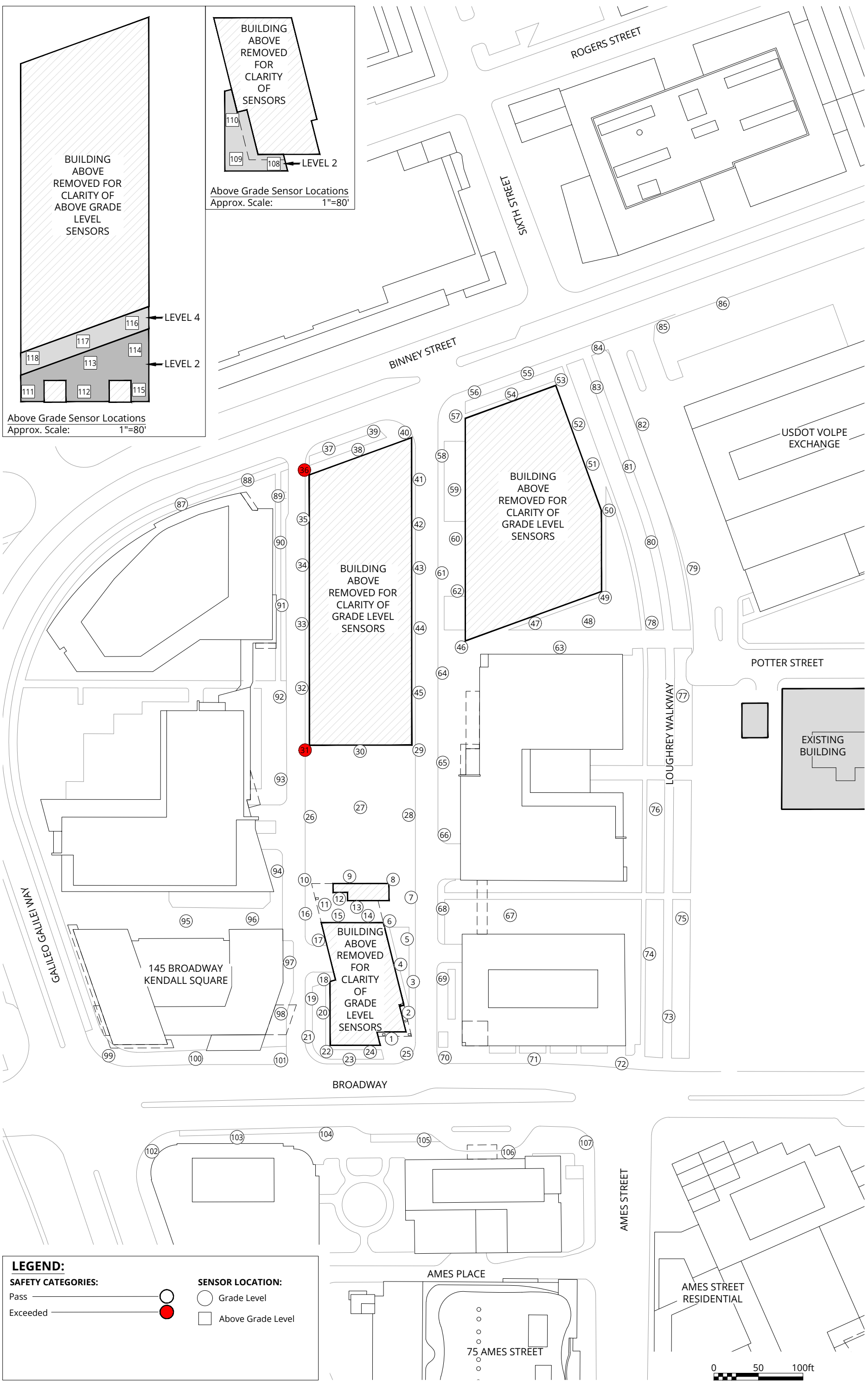
Existing Configuration
Annual (January to December, 0:00 to 23:00)

IDCP V3 - Cambridge, MA

True North

Project #2101718

Drawn by: DF	Figure: 3A
Approx. Scale:	1"=100'
Date Revised:	Jan. 14, 2021



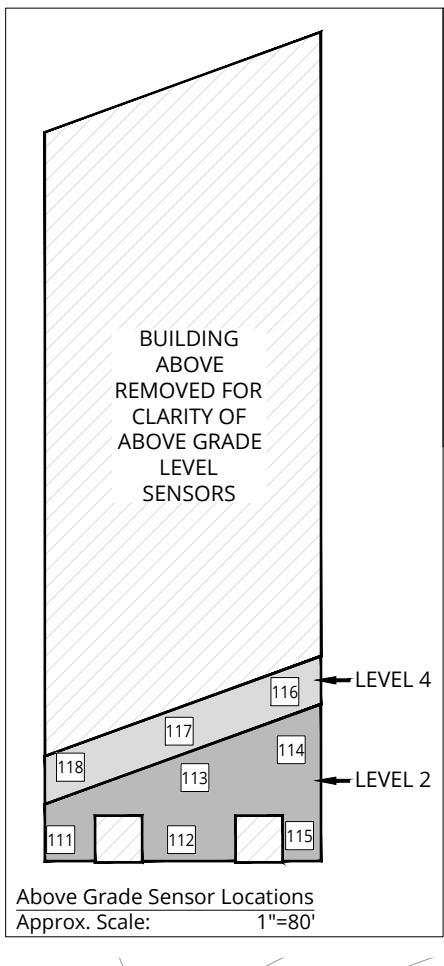
Pedestrian Wind Safety Conditions
Proposed Configuration
Annual (January to December, 0:00 to 23:00)

IDCP V3 - Cambridge, MA

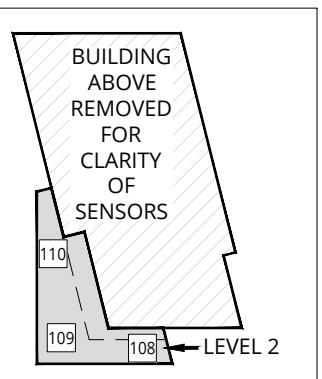
True North

Project #2101718

Drawn by: DF	Figure: 3B
Approx. Scale:	1"=100'
Date Revised:	Jan. 14, 2021



Above Grade Sensor Locations
Approx. Scale: 1"=80'



Above Grade Sensor Locations
Approx. Scale: 1"=80'

LEGEND:

SAFETY CATEGORIES:
- Pass
- Exceeded

SENSOR LOCATION:
- Grade Level
- Above Grade Level

Pedestrian Wind Safety Conditions

Future Configuration
Annual (January to December, 0:00 to 23:00)

IDCP V3 - Cambridge, MA

True North

Project #2101718

Drawn by: DF	Figure: 3C
Approx. Scale:	1"=100'
Date Revised:	Jan. 14, 2021

TABLES

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
1	Existing	8	Standing	10	Strolling	42	Pass
	Proposed	6	Sitting	7	Standing	31	Pass
	Future	5	Sitting	7	Standing	26	Pass
2	Existing	8	Standing	10	Strolling	39	Pass
	Proposed	7	Standing	8	Standing	33	Pass
	Future	7	Standing	8	Standing	32	Pass
3	Existing	8	Standing	10	Strolling	37	Pass
	Proposed	8	Standing	11	Walking	50	Pass
	Future	8	Standing	10	Strolling	47	Pass
4	Existing	8	Standing	10	Strolling	40	Pass
	Proposed	8	Standing	10	Strolling	44	Pass
	Future	7	Standing	10	Strolling	42	Pass
5	Existing	-	-	-	-	-	-
	Proposed	8	Standing	11	Walking	45	Pass
	Future	8	Standing	10	Strolling	42	Pass
6	Existing	-	-	-	-	-	-
	Proposed	8	Standing	11	Walking	42	Pass
	Future	7	Standing	10	Strolling	37	Pass
7	Existing	-	-	-	-	-	-
	Proposed	8	Standing	10	Strolling	43	Pass
	Future	7	Standing	9	Strolling	40	Pass
8	Existing	-	-	-	-	-	-
	Proposed	9	Strolling	12	Walking	45	Pass
	Future	8	Standing	12	Walking	43	Pass
9	Existing	-	-	-	-	-	-
	Proposed	7	Standing	8	Standing	39	Pass
	Future	6	Sitting	8	Standing	40	Pass
10	Existing	6	Sitting	7	Standing	30	Pass
	Proposed	10	Strolling	13	Uncomfortable	48	Pass
	Future	10	Strolling	12	Walking	47	Pass
11	Existing	-	-	-	-	-	-
	Proposed	11	Walking	14	Uncomfortable	48	Pass
	Future	9	Strolling	12	Walking	47	Pass
12	Existing	-	-	-	-	-	-
	Proposed	10	Strolling	13	Uncomfortable	50	Pass
	Future	8	Standing	12	Walking	48	Pass
13	Existing	-	-	-	-	-	-
	Proposed	11	Walking	15	Uncomfortable	53	Pass
	Future	9	Strolling	13	Uncomfortable	50	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
14	Existing	-	-	-	-	-	-
	Proposed	11	Walking	15	Uncomfortable	52	Pass
	Future	8	Standing	13	Uncomfortable	47	Pass
15	Existing	-	-	-	-	-	-
	Proposed	11	Walking	14	Uncomfortable	52	Pass
	Future	9	Strolling	12	Walking	48	Pass
16	Existing	8	Standing	10	Strolling	44	Pass
	Proposed	11	Walking	13	Uncomfortable	47	Pass
	Future	10	Strolling	12	Walking	45	Pass
17	Existing	-	-	-	-	-	-
	Proposed	10	Strolling	12	Walking	43	Pass
	Future	9	Strolling	11	Walking	43	Pass
18	Existing	9	Strolling	10	Strolling	42	Pass
	Proposed	9	Strolling	11	Walking	43	Pass
	Future	8	Standing	10	Strolling	43	Pass
19	Existing	10	Strolling	12	Walking	47	Pass
	Proposed	9	Strolling	11	Walking	45	Pass
	Future	8	Standing	10	Strolling	43	Pass
20	Existing	10	Strolling	11	Walking	45	Pass
	Proposed	8	Standing	11	Walking	42	Pass
	Future	8	Standing	10	Strolling	40	Pass
21	Existing	10	Strolling	11	Walking	45	Pass
	Proposed	8	Standing	11	Walking	43	Pass
	Future	8	Standing	10	Strolling	42	Pass
22	Existing	10	Strolling	11	Walking	45	Pass
	Proposed	10	Strolling	12	Walking	48	Pass
	Future	9	Strolling	11	Walking	45	Pass
23	Existing	10	Strolling	12	Walking	48	Pass
	Proposed	10	Strolling	12	Walking	47	Pass
	Future	8	Standing	11	Walking	42	Pass
24	Existing	9	Strolling	11	Walking	45	Pass
	Proposed	10	Strolling	13	Uncomfortable	50	Pass
	Future	8	Standing	12	Walking	43	Pass
25	Existing	8	Standing	10	Strolling	41	Pass
	Proposed	10	Strolling	12	Walking	44	Pass
	Future	9	Strolling	12	Walking	43	Pass
26	Existing	-	-	-	-	-	-
	Proposed	10	Strolling	14	Uncomfortable	50	Pass
	Future	10	Strolling	13	Uncomfortable	50	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
27	Existing	-	-	-	-	-	-
	Proposed	9	Strolling	12	Walking	47	Pass
	Future	8	Standing	12	Walking	47	Pass
28	Existing	5	Sitting	7	Standing	25	Pass
	Proposed	9	Strolling	12	Walking	44	Pass
	Future	8	Standing	11	Walking	43	Pass
29	Existing	5	Sitting	6	Sitting	29	Pass
	Proposed	8	Standing	12	Walking	47	Pass
	Future	8	Standing	12	Walking	46	Pass
30	Existing	-	-	-	-	-	-
	Proposed	9	Strolling	12	Walking	47	Pass
	Future	8	Standing	11	Walking	43	Pass
31	Existing	5	Sitting	6	Sitting	26	Pass
	Proposed	11	Walking	16	Uncomfortable	60	Exceeded
	Future	10	Strolling	14	Uncomfortable	55	Pass
32	Existing	4	Sitting	6	Sitting	25	Pass
	Proposed	8	Standing	11	Walking	41	Pass
	Future	8	Standing	10	Strolling	39	Pass
33	Existing	5	Sitting	6	Sitting	27	Pass
	Proposed	8	Standing	10	Strolling	39	Pass
	Future	8	Standing	10	Strolling	37	Pass
34	Existing	5	Sitting	6	Sitting	31	Pass
	Proposed	8	Standing	9	Strolling	40	Pass
	Future	7	Standing	9	Strolling	39	Pass
35	Existing	6	Sitting	7	Standing	32	Pass
	Proposed	7	Standing	10	Strolling	41	Pass
	Future	7	Standing	10	Strolling	40	Pass
36	Existing	7	Standing	9	Strolling	38	Pass
	Proposed	11	Walking	16	Uncomfortable	58	Exceeded
	Future	11	Walking	15	Uncomfortable	56	Pass
37	Existing	7	Standing	9	Strolling	38	Pass
	Proposed	9	Strolling	12	Walking	52	Pass
	Future	9	Strolling	12	Walking	50	Pass
38	Existing	7	Standing	8	Standing	35	Pass
	Proposed	7	Standing	8	Standing	35	Pass
	Future	7	Standing	8	Standing	35	Pass
39	Existing	7	Standing	9	Strolling	36	Pass
	Proposed	8	Standing	11	Walking	43	Pass
	Future	8	Standing	10	Strolling	43	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
40	Existing	6	Sitting	8	Standing	32	Pass
	Proposed	8	Standing	12	Walking	47	Pass
	Future	7	Standing	10	Strolling	42	Pass
41	Existing	6	Sitting	7	Standing	29	Pass
	Proposed	7	Standing	8	Standing	40	Pass
	Future	7	Standing	8	Standing	39	Pass
42	Existing	5	Sitting	7	Standing	30	Pass
	Proposed	7	Standing	8	Standing	39	Pass
	Future	7	Standing	8	Standing	36	Pass
43	Existing	5	Sitting	6	Sitting	29	Pass
	Proposed	7	Standing	9	Strolling	35	Pass
	Future	7	Standing	8	Standing	33	Pass
44	Existing	4	Sitting	6	Sitting	24	Pass
	Proposed	7	Standing	9	Strolling	35	Pass
	Future	7	Standing	9	Strolling	34	Pass
45	Existing	5	Sitting	6	Sitting	32	Pass
	Proposed	8	Standing	10	Strolling	41	Pass
	Future	8	Standing	10	Strolling	43	Pass
46	Existing	6	Sitting	8	Standing	37	Pass
	Proposed	10	Strolling	12	Walking	47	Pass
	Future	8	Standing	12	Walking	44	Pass
47	Existing	-	-	-	-	-	-
	Proposed	7	Standing	9	Strolling	39	Pass
	Future	7	Standing	10	Strolling	40	Pass
48	Existing	-	-	-	-	-	-
	Proposed	7	Standing	7	Standing	40	Pass
	Future	7	Standing	8	Standing	40	Pass
49	Existing	-	-	-	-	-	-
	Proposed	7	Standing	8	Standing	42	Pass
	Future	8	Standing	9	Strolling	40	Pass
50	Existing	8	Standing	9	Strolling	42	Pass
	Proposed	8	Standing	8	Standing	48	Pass
	Future	7	Standing	9	Strolling	41	Pass
51	Existing	7	Standing	8	Standing	33	Pass
	Proposed	6	Sitting	7	Standing	35	Pass
	Future	6	Sitting	7	Standing	32	Pass
52	Existing	6	Sitting	8	Standing	35	Pass
	Proposed	5	Sitting	6	Sitting	33	Pass
	Future	4	Sitting	6	Sitting	30	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
53	Existing	7	Standing	8	Standing	43	Pass
	Proposed	8	Standing	12	Walking	46	Pass
	Future	7	Standing	10	Strolling	41	Pass
54	Existing	6	Sitting	7	Standing	36	Pass
	Proposed	7	Standing	9	Strolling	38	Pass
	Future	6	Sitting	8	Standing	34	Pass
55	Existing	7	Standing	8	Standing	39	Pass
	Proposed	8	Standing	12	Walking	42	Pass
	Future	7	Standing	10	Strolling	37	Pass
56	Existing	7	Standing	8	Standing	37	Pass
	Proposed	8	Standing	10	Strolling	40	Pass
	Future	8	Standing	10	Strolling	40	Pass
57	Existing	6	Sitting	7	Standing	29	Pass
	Proposed	6	Sitting	8	Standing	34	Pass
	Future	6	Sitting	8	Standing	32	Pass
58	Existing	4	Sitting	6	Sitting	25	Pass
	Proposed	9	Strolling	13	Uncomfortable	52	Pass
	Future	8	Standing	11	Walking	45	Pass
59	Existing	5	Sitting	6	Sitting	25	Pass
	Proposed	8	Standing	13	Uncomfortable	54	Pass
	Future	8	Standing	11	Walking	46	Pass
60	Existing	6	Sitting	7	Standing	30	Pass
	Proposed	8	Standing	12	Walking	53	Pass
	Future	8	Standing	11	Walking	44	Pass
61	Existing	6	Sitting	8	Standing	34	Pass
	Proposed	8	Standing	12	Walking	49	Pass
	Future	8	Standing	12	Walking	44	Pass
62	Existing	-	-	-	-	-	-
	Proposed	8	Standing	12	Walking	50	Pass
	Future	7	Standing	10	Strolling	42	Pass
63	Existing	6	Sitting	7	Standing	30	Pass
	Proposed	7	Standing	7	Standing	45	Pass
	Future	6	Sitting	7	Standing	41	Pass
64	Existing	6	Sitting	8	Standing	36	Pass
	Proposed	9	Strolling	12	Walking	47	Pass
	Future	9	Strolling	12	Walking	47	Pass
65	Existing	6	Sitting	7	Standing	31	Pass
	Proposed	7	Standing	9	Strolling	39	Pass
	Future	7	Standing	8	Standing	34	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
66	Existing	6	Sitting	8	Standing	36	Pass
	Proposed	7	Standing	10	Strolling	40	Pass
	Future	7	Standing	9	Strolling	39	Pass
67	Existing	6	Sitting	7	Standing	30	Pass
	Proposed	7	Standing	11	Walking	50	Pass
	Future	7	Standing	9	Strolling	39	Pass
68	Existing	8	Standing	10	Strolling	41	Pass
	Proposed	11	Walking	14	Uncomfortable	49	Pass
	Future	9	Strolling	12	Walking	46	Pass
69	Existing	6	Sitting	8	Standing	36	Pass
	Proposed	12	Walking	15	Uncomfortable	53	Pass
	Future	10	Strolling	14	Uncomfortable	54	Pass
70	Existing	8	Standing	9	Strolling	37	Pass
	Proposed	10	Strolling	12	Walking	44	Pass
	Future	9	Strolling	11	Walking	41	Pass
71	Existing	6	Sitting	7	Standing	32	Pass
	Proposed	7	Standing	8	Standing	33	Pass
	Future	7	Standing	8	Standing	34	Pass
72	Existing	7	Standing	7	Standing	34	Pass
	Proposed	7	Standing	9	Strolling	35	Pass
	Future	7	Standing	8	Standing	32	Pass
73	Existing	7	Standing	7	Standing	32	Pass
	Proposed	7	Standing	7	Standing	30	Pass
	Future	8	Standing	11	Walking	47	Pass
74	Existing	6	Sitting	7	Standing	29	Pass
	Proposed	6	Sitting	7	Standing	29	Pass
	Future	8	Standing	10	Strolling	42	Pass
75	Existing	6	Sitting	7	Standing	29	Pass
	Proposed	7	Standing	8	Standing	32	Pass
	Future	8	Standing	10	Strolling	43	Pass
76	Existing	6	Sitting	7	Standing	30	Pass
	Proposed	6	Sitting	7	Standing	31	Pass
	Future	8	Standing	10	Strolling	43	Pass
77	Existing	7	Standing	10	Strolling	44	Pass
	Proposed	7	Standing	7	Standing	40	Pass
	Future	9	Strolling	12	Walking	46	Pass
78	Existing	8	Standing	12	Walking	48	Pass
	Proposed	8	Standing	8	Standing	43	Pass
	Future	8	Standing	11	Walking	42	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
79	Existing	9	Strolling	13	Uncomfortable	52	Pass
	Proposed	8	Standing	9	Strolling	51	Pass
	Future	8	Standing	10	Strolling	42	Pass
80	Existing	9	Strolling	12	Walking	51	Pass
	Proposed	8	Standing	8	Standing	48	Pass
	Future	8	Standing	10	Strolling	42	Pass
81	Existing	9	Strolling	12	Walking	47	Pass
	Proposed	8	Standing	9	Strolling	49	Pass
	Future	7	Standing	9	Strolling	42	Pass
82	Existing	9	Strolling	12	Walking	47	Pass
	Proposed	8	Standing	10	Strolling	50	Pass
	Future	7	Standing	10	Strolling	42	Pass
83	Existing	7	Standing	9	Strolling	46	Pass
	Proposed	8	Standing	10	Strolling	49	Pass
	Future	7	Standing	9	Strolling	43	Pass
84	Existing	7	Standing	9	Strolling	47	Pass
	Proposed	8	Standing	12	Walking	45	Pass
	Future	7	Standing	10	Strolling	39	Pass
85	Existing	8	Standing	10	Strolling	48	Pass
	Proposed	8	Standing	11	Walking	47	Pass
	Future	7	Standing	10	Strolling	40	Pass
86	Existing	8	Standing	11	Walking	43	Pass
	Proposed	7	Standing	10	Strolling	42	Pass
	Future	7	Standing	9	Strolling	36	Pass
87	Existing	7	Standing	9	Strolling	36	Pass
	Proposed	7	Standing	8	Standing	40	Pass
	Future	6	Sitting	7	Standing	40	Pass
88	Existing	8	Standing	11	Walking	42	Pass
	Proposed	7	Standing	10	Strolling	39	Pass
	Future	7	Standing	10	Strolling	40	Pass
89	Existing	6	Sitting	8	Standing	38	Pass
	Proposed	8	Standing	11	Walking	43	Pass
	Future	8	Standing	11	Walking	42	Pass
90	Existing	4	Sitting	5	Sitting	25	Pass
	Proposed	6	Sitting	7	Standing	42	Pass
	Future	7	Standing	8	Standing	42	Pass
91	Existing	4	Sitting	5	Sitting	27	Pass
	Proposed	6	Sitting	7	Standing	36	Pass
	Future	6	Sitting	7	Standing	36	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
92	Existing	5	Sitting	6	Sitting	28	Pass
	Proposed	10	Strolling	14	Uncomfortable	48	Pass
	Future	9	Strolling	12	Walking	46	Pass
93	Existing	6	Sitting	6	Sitting	28	Pass
	Proposed	10	Strolling	14	Uncomfortable	52	Pass
	Future	10	Strolling	13	Uncomfortable	48	Pass
94	Existing	6	Sitting	6	Sitting	38	Pass
	Proposed	8	Standing	11	Walking	45	Pass
	Future	8	Standing	10	Strolling	45	Pass
95	Existing	7	Standing	10	Strolling	47	Pass
	Proposed	7	Standing	8	Standing	43	Pass
	Future	6	Sitting	8	Standing	43	Pass
96	Existing	8	Standing	10	Strolling	47	Pass
	Proposed	7	Standing	9	Strolling	40	Pass
	Future	7	Standing	8	Standing	39	Pass
97	Existing	7	Standing	8	Standing	37	Pass
	Proposed	8	Standing	9	Strolling	40	Pass
	Future	7	Standing	8	Standing	35	Pass
98	Existing	8	Standing	8	Standing	44	Pass
	Proposed	8	Standing	10	Strolling	42	Pass
	Future	8	Standing	9	Strolling	41	Pass
99	Existing	8	Standing	10	Strolling	39	Pass
	Proposed	8	Standing	10	Strolling	39	Pass
	Future	8	Standing	10	Strolling	38	Pass
100	Existing	7	Standing	9	Strolling	35	Pass
	Proposed	7	Standing	8	Standing	34	Pass
	Future	6	Sitting	8	Standing	32	Pass
101	Existing	10	Strolling	12	Walking	43	Pass
	Proposed	8	Standing	10	Strolling	43	Pass
	Future	8	Standing	10	Strolling	42	Pass
102	Existing	8	Standing	9	Strolling	40	Pass
	Proposed	8	Standing	9	Strolling	40	Pass
	Future	8	Standing	9	Strolling	40	Pass
103	Existing	8	Standing	9	Strolling	40	Pass
	Proposed	7	Standing	9	Strolling	39	Pass
	Future	7	Standing	8	Standing	33	Pass
104	Existing	10	Strolling	11	Walking	48	Pass
	Proposed	10	Strolling	12	Walking	46	Pass
	Future	10	Strolling	12	Walking	45	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
105	Existing	8	Standing	10	Strolling	40	Pass
	Proposed	9	Strolling	12	Walking	42	Pass
	Future	8	Standing	11	Walking	40	Pass
106	Existing	6	Sitting	7	Standing	28	Pass
	Proposed	7	Standing	9	Strolling	37	Pass
	Future	7	Standing	9	Strolling	35	Pass
107	Existing	7	Standing	7	Standing	35	Pass
	Proposed	7	Standing	8	Standing	34	Pass
	Future	7	Standing	9	Strolling	34	Pass
108	Existing	-	-	-	-	-	-
	Proposed	8	Standing	10	Strolling	39	Pass
	Future	7	Standing	9	Strolling	37	Pass
109	Existing	-	-	-	-	-	-
	Proposed	8	Standing	11	Walking	43	Pass
	Future	7	Standing	10	Strolling	39	Pass
110	Existing	-	-	-	-	-	-
	Proposed	7	Standing	10	Strolling	44	Pass
	Future	7	Standing	10	Strolling	40	Pass
111	Existing	-	-	-	-	-	-
	Proposed	8	Standing	12	Walking	48	Pass
	Future	7	Standing	10	Strolling	44	Pass
112	Existing	-	-	-	-	-	-
	Proposed	7	Standing	9	Strolling	38	Pass
	Future	7	Standing	9	Strolling	38	Pass
113	Existing	-	-	-	-	-	-
	Proposed	8	Standing	10	Strolling	40	Pass
	Future	8	Standing	10	Strolling	40	Pass
114	Existing	-	-	-	-	-	-
	Proposed	8	Standing	10	Strolling	39	Pass
	Future	7	Standing	10	Strolling	40	Pass
115	Existing	-	-	-	-	-	-
	Proposed	7	Standing	8	Standing	34	Pass
	Future	7	Standing	8	Standing	35	Pass
116	Existing	-	-	-	-	-	-
	Proposed	7	Standing	10	Strolling	43	Pass
	Future	8	Standing	10	Strolling	45	Pass
117	Existing	-	-	-	-	-	-
	Proposed	8	Standing	10	Strolling	41	Pass
	Future	8	Standing	10	Strolling	41	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
118	Existing	-	-	-	-	-	-
	Proposed	8	Standing	10	Strolling	53	Pass
	Future	8	Standing	12	Walking	52	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 (mph)		Safety Speed (mph)	
(20% Seasonal Exceedance)		(0.1% Annual Exceedance)	
≤ 6	Sitting	≤ 56	Pass
7 - 8	Standing	> 56	Exceeded
9 - 10	Strolling		
11 - 12	Walking		
> 12	Uncomfortable		