REPORT

AMS YONKERS DOWNTOWN DEVELOPMENT – TEUTONIA

YONKERS, NY

PEDESTRIAN WIND STUDY
RWDI # 2102437
August 12, 2021

SUBMITTED TO

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EXECUTIVE SUMMARY

RWDI was retained to conduct a pedestrian wind assessment for the proposed AMS Yonkers Downtown Development – Teutonia Site in Yonkers, NY (Image 1). Based on our wind-tunnel testing for the proposed development under the Existing and Proposed configurations (Images 2A and 2B, respectively), and the local wind records (Image 3), the potential wind comfort and safety conditions are predicted as shown on site plans in Figures 1A through 3B, while the associated wind speeds are listed in Table 1. These results can be summarized as follows:

- During the summer, existing wind speeds around the site, including at sidewalks and parking lots, are comfortable for the intended usage. During the winter, wind speeds are markedly higher around the site, with wind speeds rated uncomfortable at multiple locations to the west and south of the site.
- The addition of the proposed development leads to generally higher wind speeds around the site throughout the year, as is expected when a tall structure is proposed in a low-rise neighborhood, especially close to the waterfront where prevailing winds are generally strong. However, wind speeds continue to be suitable for the intended usage around the site during the summer. During the winter, the addition of the proposed development leads to higher-than-desired wind speeds at several locations around the site, especially to the north and south.
- Wind speeds comfortable for the intended usage are anticipated at the south residential entrance and the retail entrances, while higher-than-desired wind speeds are anticipated throughout the year at the north residential entrance. It is our understanding the design team is open to recessing the north residential entrance, in which case, comfortable wind speeds can be anticipated there.
- During the summer, wind speeds at the Level 7 and Level 41 terraces are generally calm and suitable for the intended usage. Higher-than-desired wind speeds are anticipated locally at the south area of the Level 7 terrace.
- Wind speeds that exceed the RWDI Wind Safety Criterion are anticipated at two locations along the sidewalks of Pierpointe Street to the west of the proposed development in the Existing configuration. The addition of the proposed development results in reduced wind speeds that meet the safety criterion at these two locations. However, wind speeds are found to exceed the safety criterion at multiple grade locations to the northeast, south and southeast of the site.
- Wind speeds that meet the safety criterion are predicted at all assessed locations on the Level 7 and Level 41 terraces.
- It should be noted that an as-of-right low or mid-rise development on the Teutonia site, as opposed to the proposed high-rise development, is also expected to result in multiple locations with uncomfortable and unsafe wind speeds around the site due to the proximity of the site to the waterfront and the consequent exposure to prevailing winds. This is in light of multiple locations with existing uncomfortable and unsafe conditions along Pierpointe Street, where the existing structures are all low-rise buildings.

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1 INTRODUCTION

RWDI was retained to conduct a pedestrian wind assessment for the proposed AMS Yonkers Downton Development – Teutonia site in Yonkers, NY. This report presents the project objectives, approach and the main results from RWDI's assessment and provides conceptual wind control measures, where necessary.

1.1 Project Description

The Teutonia site (Image 1) is proposed to have two 40-story/435' tall residential towers on top of a multi-level parking garage, with retail spaces on the ground floor.

1.2 Objectives

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

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

2 BACKGROUND AND APPROACH

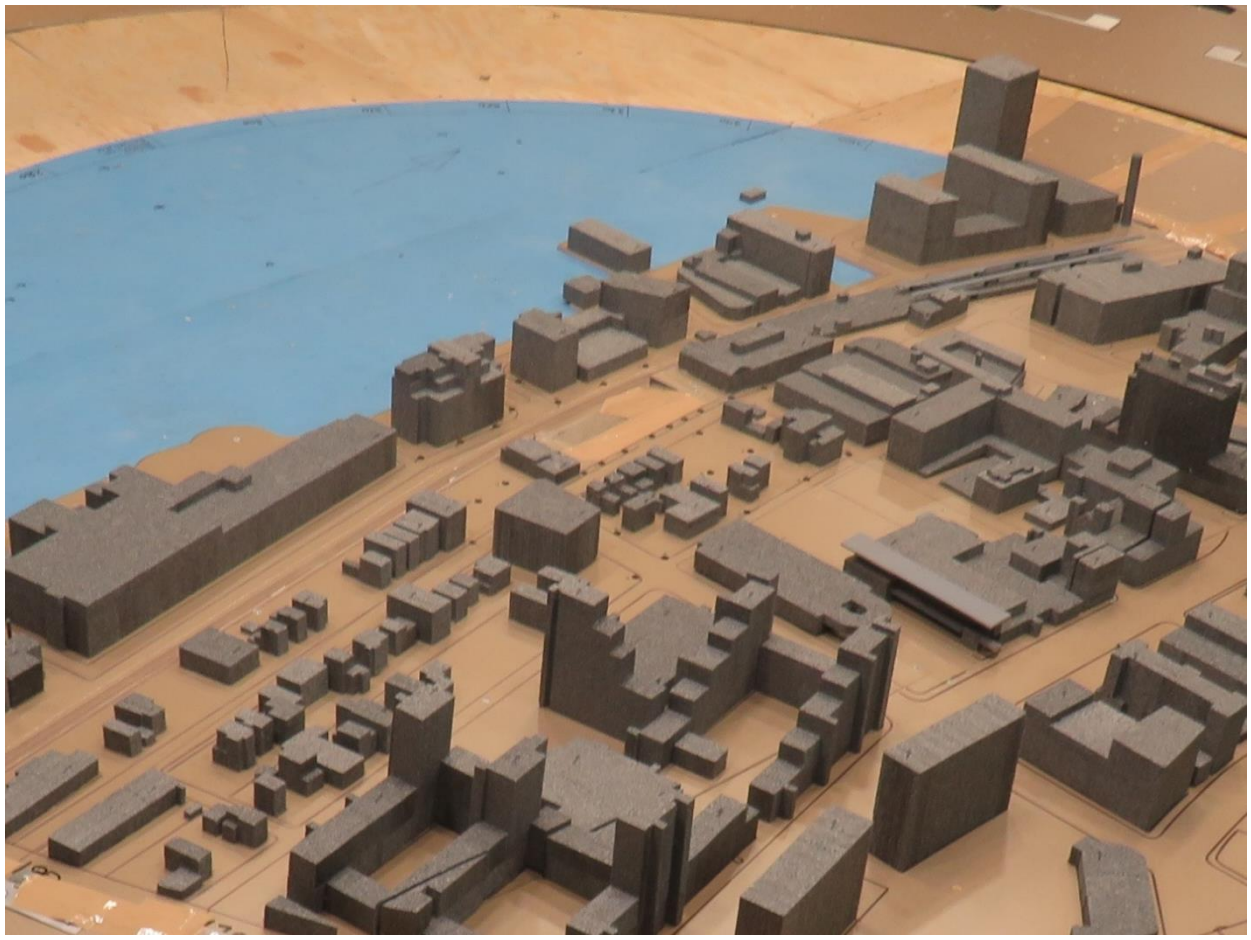
2.1 Wind Tunnel Study Model

To assess the wind environment around the proposed project, a 1:400 scale model of the project site and surroundings was constructed for the wind tunnel tests of the following configurations:

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

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

The wind tunnel model included all relevant surrounding buildings and topography within an approximately 1600 ft radius of the study site. The wind and turbulence profiles in the atmospheric boundary layer beyond the modeled area were also simulated in RWDI's wind tunnel. The wind tunnel model was instrumented with 72 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 10-degree increments. The measurements at each sensor location were recorded in the form of ratios of local mean and gust speeds to the mean wind speed at a reference height above the model. The placement of wind measurement locations was based on our experience and understanding of the pedestrian usage for this site and reviewed by the design team.



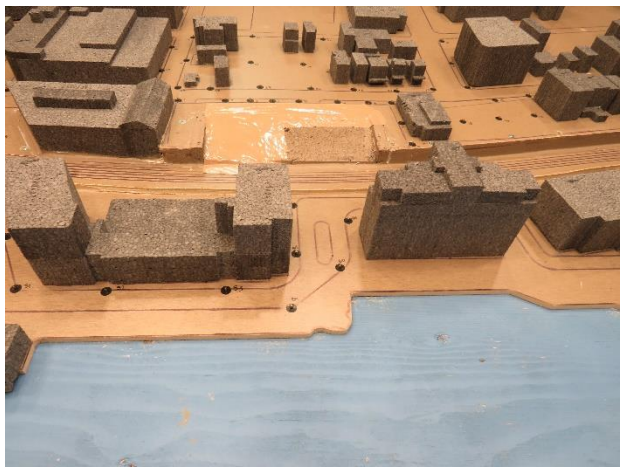
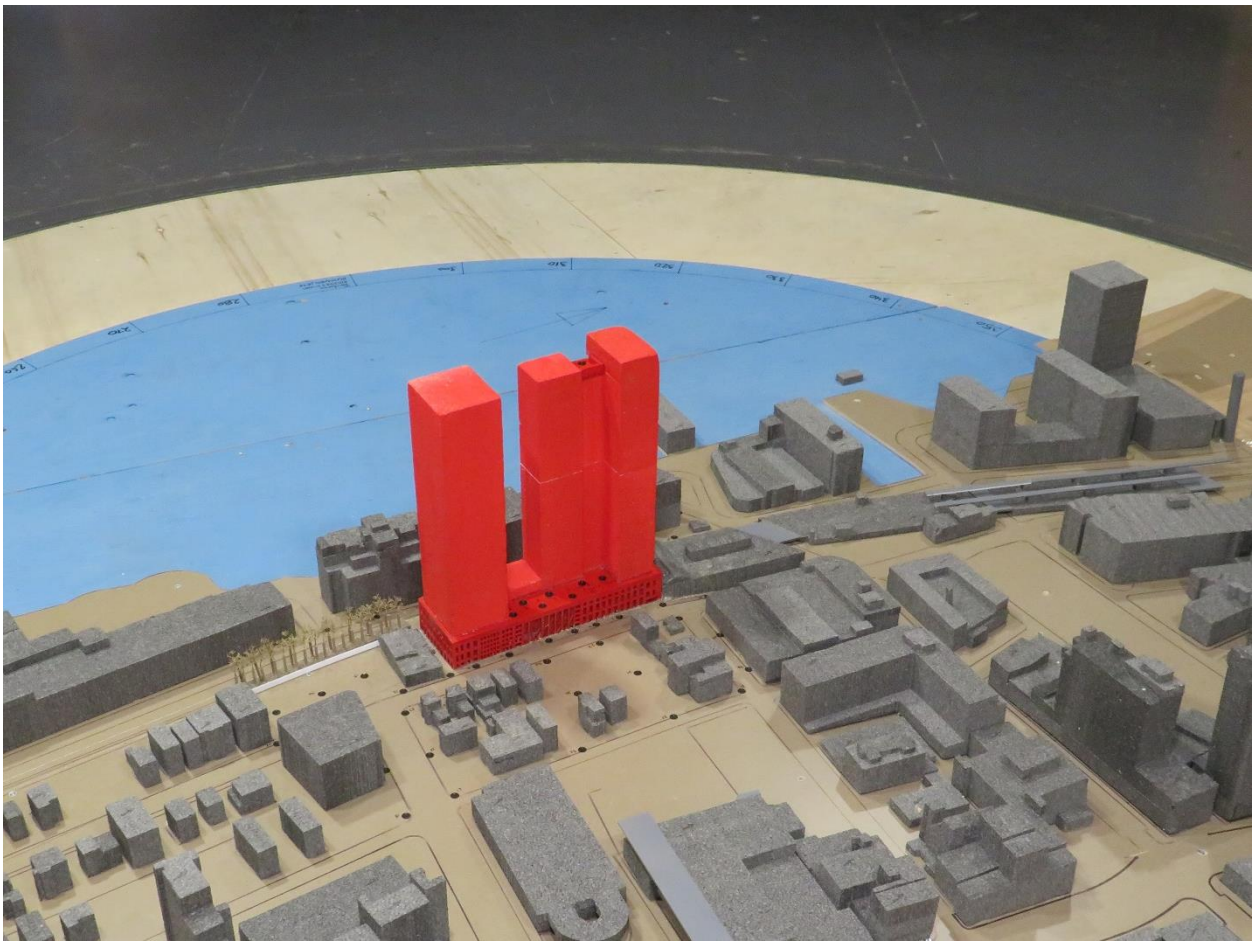


Image 2A: Wind Tunnel Study Model for the Existing Configuration



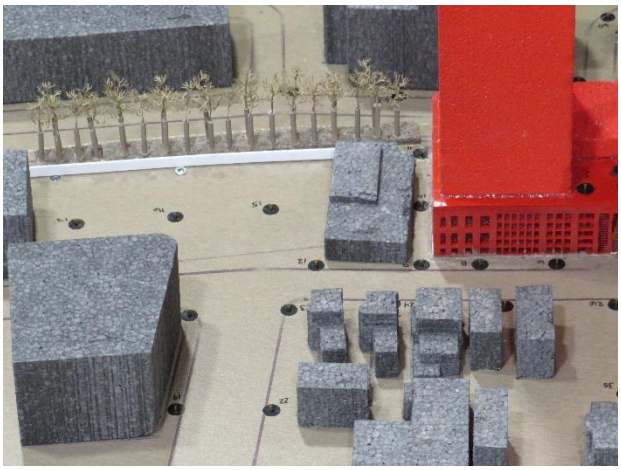


Image 2B: Wind Tunnel Study Model for the Proposed Configuration

2.2 Meteorological Data

Wind statistics recorded at LaGuardia International Airport between 1988 and 2018, inclusive, were analyzed for the Summer (May through October) and Winter (November through April) seasons. Image 3 graphically depicts the directional distributions of wind frequencies and speeds for these two seasons. Winds from the northeast, northwest and south directions are predominant throughout the year as indicated by the wind roses. Strong winds of a mean speed greater than 20 mph (red bands in Image 3) measured at the airport (at an anemometer height of 30 ft) occur for 3.7% and 11.4% of the time during the summer and winter seasons, respectively, and they are primarily from the aforesaid directions throughout the year, and additionally from the west during the winter.

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

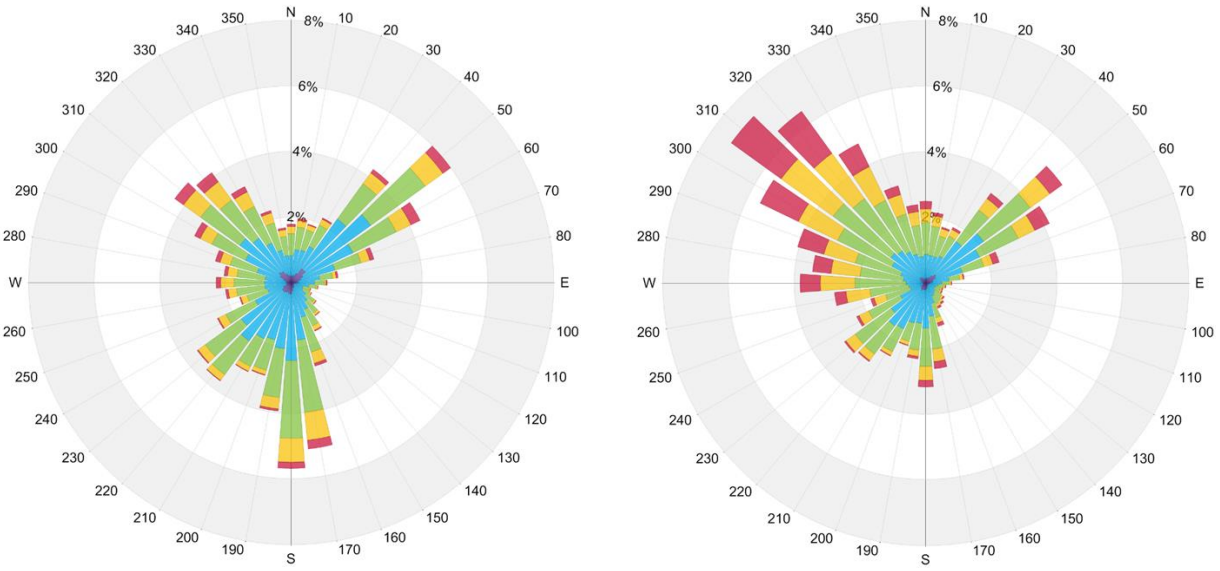


Image 3: Directional Distribution of Winds Approaching LaGuardia International Airport between 1988 and 2018

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

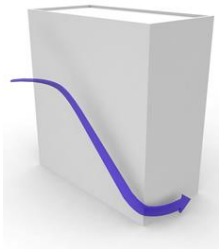
Notes:
(1) GEM Speed = max (Mean Speed, Gust Speed/1.85) and Gust Speed = Mean Speed + 3*RMS Speed;
(2) Wind conditions are considered to be comfortable if the predicted GEM speeds are within the respective thresholds for at least 80% of the time between 6:00 and 23:00. Nightly hours between 0:00 and 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 Yonkers, 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.

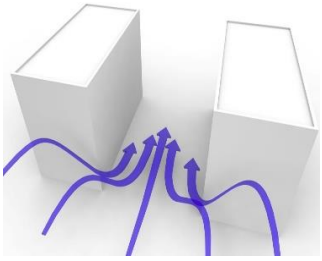
2.4 Generalized Wind Flows

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



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

3 RESULTS AND DISCUSSION

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

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 sitting or standing are preferred at main entrances where pedestrians are apt to linger. Wind speeds comfortable for sitting are preferred for areas intended for passive activities, such as terraces. During the winter, terraces would not be used frequently and increased wind activity at these areas would be considered acceptable.

3.1 Grade Level (Locations 1 through 63)

3.1.1 Existing Configuration

During the summer, existing wind speeds around the site, including at sidewalks and parking lots, are comfortable for the intended usage (Figure 1A). During the winter, wind speeds are markedly higher around the site, with wind speeds rated uncomfortable predicted at multiple locations to the west and south of the site, especially close to the waterfront (orange dots in Figure 2A).

Wind speeds that exceed the RWDI Wind Safety Criterion are anticipated at two locations along the sidewalks of Pierpointe Street to the west of the proposed development (Locations 49 and 60 in Figure 3A).

3.1.2 Proposed Configuration

Sidewalks

The addition of the proposed development leads to generally higher wind speeds around the site throughout the year, as is expected when a tall structure is proposed in a low-rise neighborhood, especially close to the waterfront where existing winds are already strong, as seen in the Existing configuration. However, wind speeds continue to be comfortable for walking or better at the sidewalks during the summer (Figure 1B), which is suitable for the intended usage. During the winter, wind speeds rated uncomfortable are predicted at several locations along the sidewalks around the site, especially to the north and south of the development.

Reduced wind speeds that meet the safety criterion are found at the two locations along Pierpointe Street where exceedances are observed in the Existing configuration (Locations 49 and 60 in Figure 3B). However, the addition of the proposed development results in wind speeds that exceed the safety criterion at multiple locations to the northeast, south and southeast of the site (Figure 3B).

The elevated wind speeds around the proposed development are primarily due to westerly winds accelerating around the corners of the tall massing and flowing down to the ground below, as shown in Image 4 above.

Entrances

The residential entrances of the proposed development are situated near Locations 2 and 7, while the retail entrances are near Locations 4 and 6. Calm wind conditions appropriate for standing, which is suitable for the intended usage, are anticipated throughout the year at the south residential entrance (Location 7 in Figures 1B and 2B). However, higher-than-desired wind speeds suitable for strolling during the summer and walking during the winter are anticipated at the north residential entrance (Location 2 in Figures 1B and 2B). These conditions are caused by the westerly winds accelerating around the northeast building corner and flowing past the north residential entrance. It is our understanding that the design team is open to recessing the north residential entrance into the façade. If the entrance is recessed by at least 5 ft into the façade, wind speeds comfortable for the intended usage can be anticipated there. An alternate approach is to add wind control measures such as wind screens or landscaping to the north of the entrance. Example images of these measures are shown in Image 5.

Wind speeds comfortable for standing during the summer and standing or strolling during the winter are anticipated at the retail entrances (Locations 4 and 6 in Figures 1B and 2B), which is acceptable for the intended usage.

Image 5: Example Images of Recessed Entrances and Wind Screens/Landscaping at Entrances

3.2 Above-Grade Levels (Locations 64 through 72)

3.2.1 Proposed Configuration

On the terraces, during the summer when they are anticipated to be used the most, wind speeds suitable for sitting are recommended for all designated seating areas while wind speeds suitable for standing are recommended for all other areas. During the summer, wind speeds suitable for standing are anticipated at all assessed locations on the

Level 7 and Level 41 terraces of the proposed development, except at the south side of the Level 7 terrace, where wind speeds suitable for strolling are anticipated (Figure 1B). The higher wind speeds at the south side of the Level 7 terrace are due to westerly winds accelerating in the narrow channel between the two towers, as explained in Image 4, and landing on the podium terrace. General strategies to achieve lower wind speeds at localized areas on terraces include the addition of trellises, wind screens or landscaping, example images of which are given in Image 6. As the building design and the programming of the terrace areas evolve, RWDI can provide specific recommendations to achieve comfortable wind conditions at all terrace areas.

Wind speeds that meet the RWDI wind safety criterion are anticipated at all tested locations on the terraces (Figure 3B).

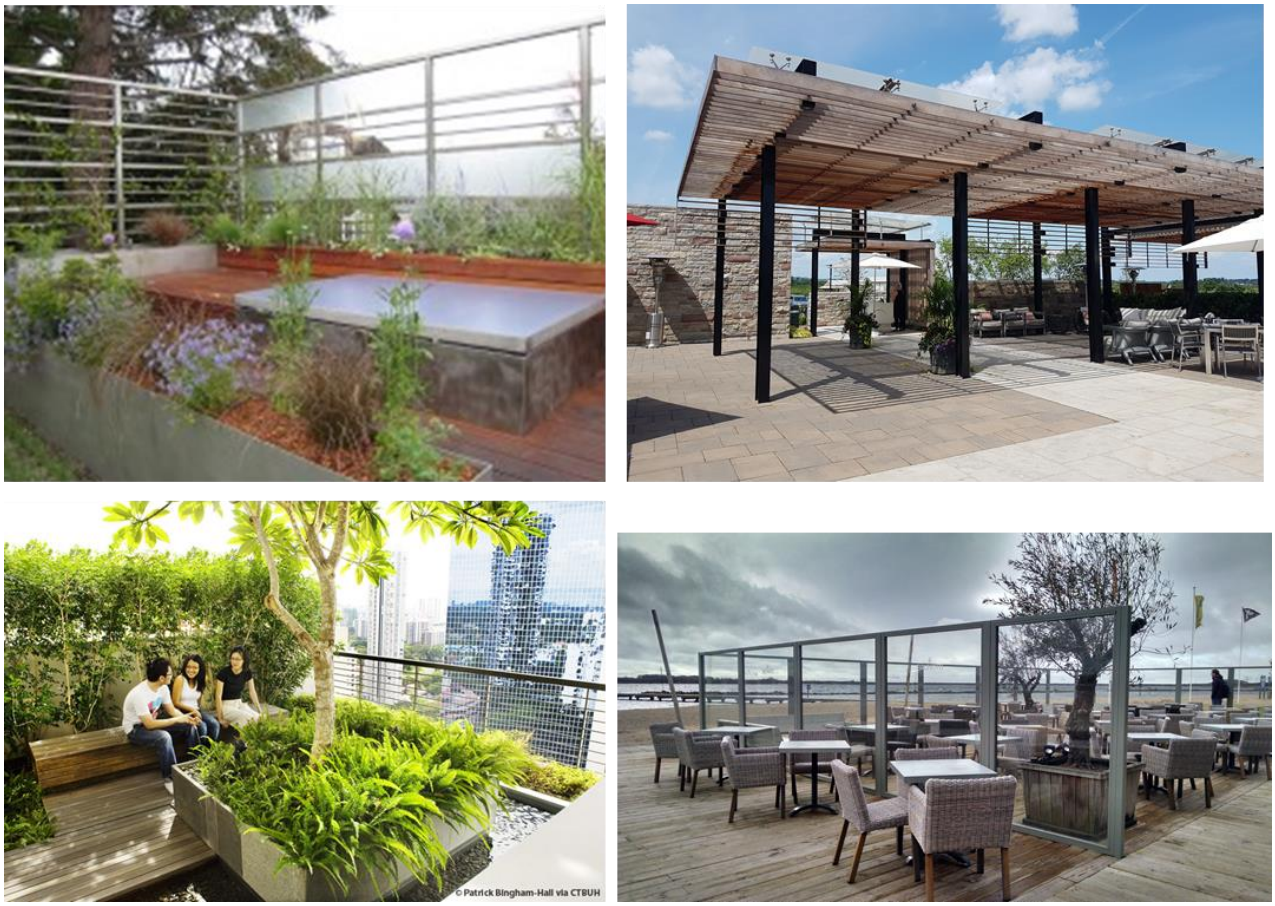


Image 6: Example Images of Wind Control Measures on Terraces such as Wind Screens, Trellises and Landscaping

4 APPLICABILITY OF RESULTS

The wind conditions presented in this report pertain to the model of the AMS Yonkers – Teutonia Site 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)
Yonkers Master Plan Massing model- Proposed B4_OPENINGS	Rhino (.3dm)	24/06/2021
Yonkers Master Plan Massing model- Proposed Alternate City Hall Site	Rhino (.3dm)	20/04/2021
Yonkers Master Plan Massing model- Proposed B4	Rhino (.3dm)	20/04/2021

5 REFERENCES

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FIGURES

LEGEND:

COMFORT CATEGORIES:

- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:

- Grade Level

NEPPERHAN STREET

VAN DER DONCK STREET

MAIN STREET

HUDSON RIVER

PIERPOINTE STREET

WATER GRANT STREET

BUENA VISTA AVENUE

HAWTHORNE AVENUE

HUDSON STREET

PROSPECT STREET

0 40 80ft

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

AMS Yonkers Downtown Development - Chicken Island, North Broadway, Teutonia - Yonkers, NY

Project #2102437

True North

Drawn by:	GRE	Figure:	1A
Approx. Scale:	1"=80'		
Date Revised:	May 7, 2021		

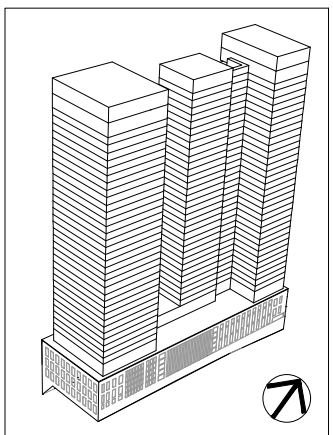
LEGEND:

COMFORT CATEGORIES:

- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:

- Grade Level
- Above Grade Levels
- Entrance Location



Isometric View of Building

NEPPERHAN STREET

VAN DER DONCK STREET

MAIN STREET

HUDSON RIVER

PIERPOINTE STREET

WATER GRANT STREET

BUENA VISTA AVENUE

HAWTHORNE AVENUE

HUDSON STREET

PROSPECT STREET

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

LEVEL 41

LEVEL 7

Above Grade Sensors - Teutonia

Approx. Scale: 1"=80'

0 40 80ft

Pedestrian Wind Comfort Conditions

Proposed Configuration

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

AMS Yonkers Downtown Development - Chicken Island, North Broadway, Teutonia - Yonkers, NY

Project #2102437

True North

Drawn by:	GRE	Figure:	1B
Approx. Scale:	1"=80'		
Date Revised:	Aug. 5, 2021		

LEGEND:

COMFORT CATEGORIES:

- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:

- Grade Level

NEPPERHAN STREET

VAN DER DONCK STREET

MAIN STREET

HUDSON RIVER

PIERPOINTE STREET

HAWTHORNE AVENUE

HUDSON STREET

BUENA VISTA AVENUE

WATER GRANT STREET

PROSPECT STREET

0 40 80ft

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

AMS Yonkers Downtown Development - Chicken Island, North Broadway, Teutonia - Yonkers, NY

Project #2102437

True North

Drawn by:	GRE	Figure:	2A
Approx. Scale:	1"=80'		
Date Revised:	May 7, 2021		

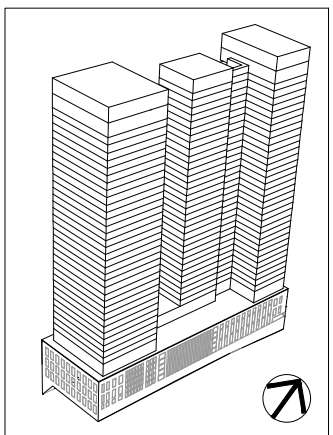
LEGEND:

COMFORT CATEGORIES:

- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:

- Grade Level
- Above Grade Levels
- Entrance Location



Isometric View of Building

NEPPERHAN STREET

VAN DER DONCK STREET

MAIN STREET

HUDSON RIVER

PIERPOINTE STREET

HAWTHORNE AVENUE

HUDSON STREET

BUENA VISTA AVENUE

WATER GRANT STREET

PROSPECT STREET

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

LEVEL 41

LEVEL 7

Above Grade Sensors - Teutonia

Approx. Scale: 1"=80'

0 40 80ft

Pedestrian Wind Comfort Conditions

Proposed Configuration

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

AMS Yonkers Downtown Development - Chicken Island, North Broadway, Teutonia - Yonkers, NY

Project #2102437

True North

Drawn by:	GRE	Figure:	2B
Approx. Scale:	1"=80'		
Date Revised:	Aug. 5, 2021		

LEGEND:

SAFETY CATEGORIES:

Pass

Exceeded

SENSOR LOCATION:

Grade Level

NEPPERHAN STREET

VAN DER DONCK STREET

MAIN STREET

HUDSON RIVER

PIERPOINTE STREET

WATER GRANT STREET

HAWTHORNE AVENUE

HUDSON STREET

BUENA VISTA AVENUE

PROSPECT STREET

0 40 80ft

Pedestrian Wind Safety Conditions

Existing Configuration

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

AMS Yonkers Downtown Development - Chicken Island, North Broadway, Teutonia - Yonkers, NY

Project #2102437

True North

Drawn by:	GRE	Figure:	3A
Approx. Scale:	1"=80'		
Date Revised:	May 7, 2021		

LEGEND:

SAFETY CATEGORIES:

Pass

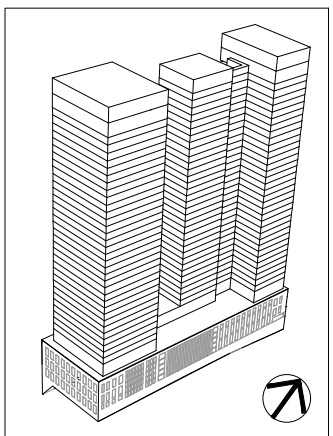
Exceeded

SENSOR LOCATION:

Grade Level

Above Grade Levels

Entrance Location



Isometric View of Building

NEPPERHAN STREET

VAN DER DONCK STREET

MAIN STREET

HUDSON RIVER

PIERPOINTE STREET

HAWTHORNE AVENUE

HUDSON STREET

BUENA VISTA AVENUE

WATER GRANT STREET

PROSPECT STREET

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS

LEVEL 41

LEVEL 7

Above Grade Sensors - Teutonia

Approx. Scale: 1"=80'

0 40 80ft

Pedestrian Wind Safety Conditions

Proposed Configuration

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

AMS Yonkers Downtown Development - Chicken Island, North Broadway, Teutonia - Yonkers, NY

Project #2102437

True North

Drawn by:	GRE	Figure:	3B
Approx. Scale:	1"=80'		
Date Revised:	Aug. 5, 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	37	Pass
	Proposed	10	Strolling	14	Uncomfortable	53	Pass
2	Existing	7	Standing	9	Strolling	42	Pass
	Proposed	9	Strolling	11	Walking	43	Pass
3	Existing	7	Standing	10	Strolling	50	Pass
	Proposed	8	Standing	11	Walking	41	Pass
4	Existing	7	Standing	10	Strolling	45	Pass
	Proposed	7	Standing	8	Standing	34	Pass
5	Existing	7	Standing	10	Strolling	42	Pass
	Proposed	7	Standing	7	Standing	34	Pass
6	Existing	7	Standing	9	Strolling	39	Pass
	Proposed	8	Standing	9	Strolling	36	Pass
7	Existing	6	Sitting	8	Standing	34	Pass
	Proposed	8	Standing	8	Standing	39	Pass
8	Existing	6	Sitting	9	Strolling	38	Pass
	Proposed	10	Strolling	12	Walking	45	Pass
9	Existing	6	Sitting	8	Standing	37	Pass
	Proposed	10	Strolling	12	Walking	53	Pass
10	Existing	8	Standing	10	Strolling	42	Pass
	Proposed	12	Walking	20	Uncomfortable	72	Exceeded
11	Existing	8	Standing	9	Strolling	34	Pass
	Proposed	12	Walking	17	Uncomfortable	68	Exceeded
12	Existing	8	Standing	10	Strolling	42	Pass
	Proposed	9	Strolling	13	Uncomfortable	52	Pass
13	Existing	9	Strolling	13	Uncomfortable	50	Pass
	Proposed	10	Strolling	16	Uncomfortable	62	Exceeded
14	Existing	7	Standing	8	Standing	30	Pass
	Proposed	9	Strolling	14	Uncomfortable	55	Pass
15	Existing	7	Standing	9	Strolling	36	Pass
	Proposed	10	Strolling	16	Uncomfortable	61	Exceeded
16	Existing	7	Standing	10	Strolling	41	Pass
	Proposed	8	Standing	11	Walking	50	Pass
17	Existing	8	Standing	10	Strolling	47	Pass
	Proposed	8	Standing	11	Walking	51	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	Existing	6	Sitting	10	Strolling	45	Pass
	Proposed	8	Standing	12	Walking	62	Exceeded
19	Existing	8	Standing	10	Strolling	39	Pass
	Proposed	11	Walking	16	Uncomfortable	65	Exceeded
20	Existing	7	Standing	9	Strolling	35	Pass
	Proposed	8	Standing	12	Walking	55	Pass
21	Existing	7	Standing	10	Strolling	37	Pass
	Proposed	10	Strolling	15	Uncomfortable	65	Exceeded
22	Existing	7	Standing	10	Strolling	40	Pass
	Proposed	10	Strolling	14	Uncomfortable	60	Exceeded
23	Existing	7	Standing	10	Strolling	41	Pass
	Proposed	9	Strolling	10	Strolling	53	Pass
24	Existing	6	Sitting	8	Standing	40	Pass
	Proposed	11	Walking	12	Walking	50	Pass
25	Existing	7	Standing	10	Strolling	41	Pass
	Proposed	10	Strolling	10	Strolling	43	Pass
26	Existing	7	Standing	10	Strolling	48	Pass
	Proposed	8	Standing	10	Strolling	38	Pass
27	Existing	7	Standing	10	Strolling	42	Pass
	Proposed	10	Strolling	12	Walking	52	Pass
28	Existing	7	Standing	9	Strolling	40	Pass
	Proposed	10	Strolling	16	Uncomfortable	67	Exceeded
29	Existing	7	Standing	10	Strolling	43	Pass
	Proposed	10	Strolling	14	Uncomfortable	53	Pass
30	Existing	7	Standing	10	Strolling	39	Pass
	Proposed	11	Walking	17	Uncomfortable	65	Exceeded
31	Existing	7	Standing	10	Strolling	41	Pass
	Proposed	8	Standing	10	Strolling	42	Pass
32	Existing	7	Standing	9	Strolling	40	Pass
	Proposed	9	Strolling	12	Walking	45	Pass
33	Existing	6	Sitting	8	Standing	34	Pass
	Proposed	9	Strolling	12	Walking	45	Pass
34	Existing	6	Sitting	8	Standing	40	Pass
	Proposed	8	Standing	11	Walking	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
35	Existing	6	Sitting	7	Standing	31	Pass
	Proposed	10	Strolling	13	Uncomfortable	53	Pass
36	Existing	4	Sitting	6	Sitting	22	Pass
	Proposed	8	Standing	12	Walking	51	Pass
37	Existing	6	Sitting	8	Standing	39	Pass
	Proposed	8	Standing	11	Walking	50	Pass
38	Existing	6	Sitting	8	Standing	38	Pass
	Proposed	7	Standing	9	Strolling	37	Pass
39	Existing	8	Standing	12	Walking	49	Pass
	Proposed	8	Standing	12	Walking	47	Pass
40	Existing	7	Standing	10	Strolling	43	Pass
	Proposed	8	Standing	11	Walking	45	Pass
41	Existing	8	Standing	10	Strolling	41	Pass
	Proposed	8	Standing	12	Walking	43	Pass
42	Existing	6	Sitting	7	Standing	28	Pass
	Proposed	7	Standing	9	Strolling	35	Pass
43	Existing	7	Standing	8	Standing	37	Pass
	Proposed	11	Walking	16	Uncomfortable	66	Exceeded
44	Existing	7	Standing	8	Standing	37	Pass
	Proposed	8	Standing	11	Walking	44	Pass
45	Existing	6	Sitting	8	Standing	32	Pass
	Proposed	8	Standing	10	Strolling	41	Pass
46	Existing	8	Standing	12	Walking	52	Pass
	Proposed	9	Strolling	12	Walking	49	Pass
47	Existing	7	Standing	10	Strolling	43	Pass
	Proposed	8	Standing	12	Walking	45	Pass
48	Existing	7	Standing	11	Walking	50	Pass
	Proposed	7	Standing	11	Walking	43	Pass
49	Existing	9	Strolling	16	Uncomfortable	60	Exceeded
	Proposed	9	Strolling	14	Uncomfortable	55	Pass
50	Existing	10	Strolling	14	Uncomfortable	50	Pass
	Proposed	11	Walking	14	Uncomfortable	48	Pass
51	Existing	7	Standing	10	Strolling	46	Pass
	Proposed	7	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
52	Existing	8	Standing	11	Walking	51	Pass
	Proposed	9	Strolling	11	Walking	46	Pass
53	Existing	8	Standing	10	Strolling	46	Pass
	Proposed	7	Standing	10	Strolling	38	Pass
54	Existing	8	Standing	11	Walking	45	Pass
	Proposed	10	Strolling	12	Walking	48	Pass
55	Existing	7	Standing	8	Standing	36	Pass
	Proposed	10	Strolling	12	Walking	47	Pass
56	Existing	6	Sitting	7	Standing	30	Pass
	Proposed	10	Strolling	15	Uncomfortable	55	Pass
57	Existing	7	Standing	8	Standing	38	Pass
	Proposed	10	Strolling	13	Uncomfortable	49	Pass
58	Existing	8	Standing	10	Strolling	44	Pass
	Proposed	9	Strolling	11	Walking	45	Pass
59	Existing	10	Strolling	15	Uncomfortable	51	Pass
	Proposed	9	Strolling	12	Walking	45	Pass
60	Existing	9	Strolling	16	Uncomfortable	61	Exceeded
	Proposed	8	Standing	12	Walking	48	Pass
61	Existing	7	Standing	8	Standing	34	Pass
	Proposed	10	Strolling	13	Uncomfortable	51	Pass
62	Existing	7	Standing	8	Standing	32	Pass
	Proposed	8	Standing	13	Uncomfortable	50	Pass
63	Existing	9	Strolling	13	Uncomfortable	52	Pass
	Proposed	10	Strolling	13	Uncomfortable	54	Pass
64	Existing	-	-	-	-	-	-
	Proposed	10	Strolling	10	Strolling	54	Pass
65	Existing	-	-	-	-	-	-
	Proposed	9	Strolling	9	Strolling	45	Pass
66	Existing	-	-	-	-	-	-
	Proposed	8	Standing	8	Standing	40	Pass
67	Existing	-	-	-	-	-	-
	Proposed	8	Standing	8	Standing	40	Pass
68	Existing	-	-	-	-	-	-
	Proposed	8	Standing	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
69	Existing	-	-	-	-	-	-
	Proposed	7	Standing	8	Standing	35	Pass
70	Existing	-	-	-	-	-	-
	Proposed	7	Standing	7	Standing	38	Pass
71	Existing	-	-	-	-	-	-
	Proposed	7	Standing	7	Standing	36	Pass
72	Existing	-	-	-	-	-	-
	Proposed	7	Standing	7	Standing	32	Pass

Season	Months	Hours
Summer	May - October	6:00 - 23:00 for comfort
Winter	November - April	6:00 - 23:00 for comfort
Annual	January - December	0:00 - 23:00 for safety
Configurations		
Existing	Existing site and surroundings	
Proposed	Project with existing surroundings	

Comfort Speed (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