

Appendix H Pedestrian-Level Wind Study



DRAFT REPORT

PEDESTRIAN WIND STUDY

GOLDEN SHORES MASTER PLAN LONG BEACH, CALIFORNIA

CONSULTING ENGINEERS & SCIENTISTS

Project Number: #0940879

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SUBMITTED TO:

David A. Crook, AICP, LEED AP PCR Services Corporation 55 South Lake Avenue, Suite 215 Pasadena, CA 91101 T: (626)204-6170 F: (626)204-6171 d.crook@pcrnet.com

SUBMITTED BY:

Rowan Williams Davies & Irwin Inc.

Consulting Engineers & Scientists 650 Woodlawn Road West Guelph, Ontario N1K 1B8 P: (519) 823-1311 F: (519) 823-1316

Technical Coordinator:Simon Levine, M.S.Senior Engineer:Hanqing Wu, Ph.D., P.Eng.Project Manager:Mark P. Chatten, P.E.Project Director:Frank Kriksic, B.E.S., C.E.T.



1 INTRODUCTION

Rowan Williams Davies & Irwin Inc. (RWDI) was retained by PCR Services Corporation, to conduct a Pedestrian Wind Study for the proposed Golden Shores development, in Long Beach, California. The purpose of the study was to assess the wind environment around the development in terms of pedestrian comfort and safety. This objective was achieved through wind tunnel testing of a 1:300 scale model of the proposed phases of the development and existing surrounding buildings.

The photographs in Figures 1a through 1d show the test model in RWDI's boundary-layer wind tunnel for the existing configuration and proposed phasing configurations. The wind tunnel data were combined with local wind climate data (Figure 2) to predict the frequencies of occurrence of full scale wind speeds, which were then assessed using RWDI's criteria for pedestrian wind comfort and safety.

Background information is provided in Appendix A, including a description of wind tunnel testing and analysis methodology, a discussion of the local wind climate for the Long Beach area, an explanation of RWDI's wind criteria and other reference materials. The wind tunnel model was constructed using the architectural information listed in Appendix B.

The placement of wind measurement locations was based on our experience and understanding of the pedestrian usage for this site, and reviewed by PCR Services Corporation.



2 SUMMARY OF RESULTS

The RWDI criteria for wind conditions are explained in detail in Appendix A. Generally, wind conditions suitable for walking are appropriate for sidewalks; lower wind speeds comfortable for standing are preferred for building entrances where pedestrians are more apt to linger. For amenity and pool areas, low wind speeds conducive to sitting are recommended. However, for a warmer climate such as that in Long Beach, a breeze is often considered pleasant, and, therefore, slightly higher wind speeds suitable for standing should be deemed appropriate.

Table 1 presents the predicted wind conditions for the summer (May through October) and winter seasons (November through April) for each test configuration. These results are also graphically presented on site plans for each test configuration in Figures 3a through 4d and can be summarized as follows:

2.1 EXISTING CONFIGURATION

Existing pedestrian wind comfort conditions on and around the development site were suitable for walking or better during the summer season, and for standing or sitting during the winter (see Figures 3a and 4a). These conditions are considered appropriate for these areas.

2.2 PROPOSED CONFIGURATIONS

In general, the proposed development had a minimal effect on pedestrian wind comfort conditions on off-site areas surrounding the development site. These off-site conditions are considered appropriate.



2.2.1 Phase 1 Tower

2.2.1.1 Surrounding Walkways and Building Entrances (Locations 1 through 25)

Wind conditions were suitable for walking or better year-round along pedestrian walkways and plazas surrounding the Phase 1 tower, and generally suitable for standing or better around the base of the tower (see Figures 3b to 3d and 4b to 4d). The increased wind speeds measured in the plaza area at the southwest corner of West Ocean Blvd. and Golden Shore St. (Locations 22 through 25) were primarily due to the acceleration of southeasterly and northwesterly winds

around the northeast side of the Phase 1 tower. Increased wind speeds were also measured in the plaza on the southwest side of the Phase 1 tower (Locations 6 through 10). The safety criterion was exceeded on the western edge of this plaza at Location 9 in the winter season with the Phase 2 development in place (see Figures 4c and 4d). In general, the higher wind speeds in this area were more prevalent with the Phase 2 development in place, and were primarily due to the

channeling of southerly and southwesterly winds between the two Phase 2 towers (see Image 1) and over the Phase 2 podium. Landscaping oriented primarily in an east-west direction in this plaza could help alleviate these stronger winds and improve wind comfort in the area. If seating is planned in this area, localized measures such as trellises and wind screens may be utilized around seating areas (see Image 2).



Image 1: Channeling Flow



Image 2: Wind Screens



2.2.2 Phase 2 Buildings

2.2.2.1 Surrounding Walkways (Locations 26 through 37)

Wind conditions along the pedestrian walkways surrounding the Phase 2 Towers and Podium were suitable for walking or better in both the summer and winter seasons. These wind conditions are considered appropriate for these areas.



Image 3: Downwashing Flow

The safety criterion was marginally exceeded along the walkway near the northeast corner of the Phase 2 podium in the winter season (see Location 33 in Figure 4c) without the Phase 3 development in place. This was primarily due to downwashing easterly and westerly winds channelling along the north side of the Phase 2 tower (see Image 3). If desired, the addition of canopy trees along the walkway between Locations 32 to 34 could improve pedestrian wind comfort conditions in this area. With the proposed Phase 3 tower and podium in place, wind conditions at Location 33 were improved to be comfortable for standing and meet the safety criterion throughout the year (Figures 3d and 4d).

2.2.2.2 Podium (Locations 42 through 56)

Wind conditions on the Phase 2 podium were suitable for standing or better, with the exception of Locations 44, 46 and 52 in summer, and Location 46 in winter, where conditions were suitable for walking (Figures 3c, 3d, 4c and 4d). The higher wind speeds at Locations 44 and 46 were due to downwashing southerly and westerly winds accelerating around the southern base of the Phase 2 tower. It is recommended that entrances to the tower be located away from the building corners. A wrap-around canopy and/or recessed entrances can be considered to improve wind comfort conditions for pedestrians entering and exiting the tower. The criterion for standing was only marginally exceeded at Location 52 (see Table 1).



2.2.3 Phase 3 Tower

2.2.3.1 Surrounding Walkways (Locations 57 through 80)

Pedestrian wind comfort conditions were suitable for walking or better along sidewalks and walkways surrounding the Phase 3 development in both the summer and winter seasons (see Figures 3d and 4d). These wind conditions are considered appropriate.

2.2.3.2 Podium (Locations 82 to 96)

Wind conditions on the Phase 3 podium were suitable for walking or better in both the summer and winter seasons (see Figures 3d and 4d). The safety criterion was exceeded along the west edge of the podium at Location 85 during the winter season (see Figure 4d and Table 1). This was due to downwashing northwesterly and southeasterly winds accelerating around the south edge of the Phase 3 tower. The addition of



Image 4: Trellis

partitions or privacy fences for the townhouse units along the west edge of the podium in this area will help improve wind conditions. Trellises above these patios could also help to mitigate these stronger winds (see Image 4). Conditions on the pool deck were suitable for standing or better year round (see Locations 87 through 93 in Figures 3d and 4d), which is considered appropriate for this climate.

3. APPLICABILITY OF RESULTS

The results presented in this report pertain to the following items: 1) the scale model of the proposed Golden Shores development, constructed using the architectural information listed in Appendix B; and, 2) the phasing of the proposed development, as reflected in the test configurations. Should there be any design changes that deviate substantially from this list of drawings, the results 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.

TABLES

| GEM V | COMFORT CATEGORY GEM Wind Speed (mph) Category Limit | | | Standing 0 - 9 ≥80% | 9 0 - 12 | Uncomfo >12 >20% | ortable | Gust Spe | Y CATEGORY eed ≥55 (mph) its Seasonally |
|-------|---|------------------|--------|---------------------------|----------|------------------------|----------|----------|---|
| Loc. | Config. | Season | % | % | % | % | RATING | Events | RATING |
| 1 | А | Summer | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | В | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 60 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 70 | 80 | 90 | 10 | Standing | 0 | PASS |
| | D | Summer | 60 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 70 | 80 | 90 | 10 | Standing | 0 | PASS |
| 2 | А | Summer | 80 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | В | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 50 | 65 | 80 | 20 | Walking | 0 | PASS |
| | | Winter | 60 | 75 | 85 | 15 | Walking | 1 | PASS |
| | D | Summer | 55 | 65 | 85 | 15 | Walking | 0 | PASS |
| | | Winter | 60 | 75 | 85 | 15 | Walking | 1 | PASS |
| 3 | А | Summer Winter | | OT AVAII OT AVAII | | | | | |
| | В | Summer | 55 | 70 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 70 | 80 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 65 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 1 | PASS |
| | D | Summer | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 1 | PASS |
| 4 | А | Summer Winter | | OT AVAII OT AVAII | | | | | |
| | В | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 80 | 90 | 95 | 5 | Sitting | 0 | PASS |
| | D | Summer | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 85 | 95 | 95 | 5 | Sitting | 0 | PASS |
| 5 | А | Summer Winter | DATA N | OT AVAII OT AVAII | LABLE | | | | |
| | В | Summer | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 75 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 80 | 90 | 95 | 5 | Sitting | 0 | PASS |
| | D | Summer | 80 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |

Configuration A - Existing Configuration B - Phase 1 Configuration C - Phases 1 & 2 Configuration D - Phases 1, 2 & 3 Summer: May - October Winter: November - April

| COMFORT CATEGORY GEM Wind Speed (mph) Category Limit | | | SittingStandin $0 - 6$ $0 - 9$ $\geq 80\%$ $\geq 80\%$ | | g Walking 0 - 12 ≥80% | Uncomfo >12 >20% | ortable | Gust Spe | Y CATEGORY eed \geq 55 (mph) its Seasonally |
|--|---------|--------|--|----|-----------------------------|------------------------|----------|----------|--|
| Loc. | Config. | Season | % | % | % | % | RATING | Events | RATING |
| 6 | А | Summer | 80 | 90 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 80 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | В | Summer | 55 | 75 | 95 | 5 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 0 | PASS |
| | С | Summer | 55 | 70 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 1 | PASS |
| | D | Summer | 60 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 1 | PASS |
| 7 | А | Summer | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | В | Summer | 50 | 70 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 60 | 75 | 90 | 10 | Walking | 0 | PASS |
| | С | Summer | 50 | 70 | 85 | 15 | Walking | 0 | PASS |
| | | Winter | 60 | 75 | 90 | 10 | Walking | 2 | PASS |
| | D | Summer | 55 | 70 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 60 | 80 | 90 | 10 | Standing | 2 | PASS |
| 8 | А | Summer | 60 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 50 | 70 | 80 | 20 | Walking | 0 | PASS |
| | | Winter | 60 | 75 | 85 | 15 | Walking | 2 | PASS |
| | D | Summer | 55 | 70 | 85 | 15 | Walking | 0 | PASS |
| | | Winter | 65 | 75 | 85 | 15 | Walking | 2 | PASS |
| 9 | А | Summer | 60 | 75 | 95 | 5 | Walking | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 55 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 0 | PASS |
| | С | Summer | 45 | 60 | 80 | 20 | Walking | 1 | PASS |
| | | Winter | 55 | 70 | 80 | 20 | Walking | 4 | FAIL |
| | D | Summer | 50 | 65 | 80 | 20 | Walking | 1 | PASS |
| | | Winter | 60 | 70 | 85 | 15 | Walking | 4 | FAIL |
| 10 | А | Summer | 70 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 80 | 90 | 100 | 0 | Sitting | 0 | PASS |
| | В | Summer | 60 | 75 | 85 | 15 | Walking | 0 | PASS |
| | | Winter | 70 | 80 | 90 | 10 | Standing | 0 | PASS |
| | С | Summer | 55 | 65 | 80 | 20 | Walking | 0 | PASS |
| | | Winter | 60 | 75 | 85 | 15 | Walking | 2 | PASS |
| | D | Summer | 55 | 70 | 80 | 20 | Walking | 0 | PASS |
| | | Winter | 65 | 75 | 85 | 15 | Walking | 1 | PASS |

Configuration A - Existing Configuration B - Phase 1 Configuration C - Phases 1 & 2 Configuration D - Phases 1, 2 & 3



| COMFORT CATEGORY GEM Wind Speed (mph) Category Limit | | | Sitting 0 - 6 ≥80% | Standing 0 - 9 ≥80% | Walking 0 - 12 ≥80% | Uncomfe >12 >20% | ortable | Gust Spe | Y CATEGOR eed ≥55 (mph) nts Seasonally |
|--|---------|--------|--------------------------|---------------------------|---------------------------|------------------------|----------|----------|--|
| Loc. | Config. | Season | % | % | % | % | RATING | Events | RATING |
| 11 | А | Summer | 85 | 100 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | В | Summer | 85 | 100 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | С | Summer | 55 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 0 | PASS |
| | D | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| 12 | А | Summer | 85 | 100 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | В | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| C D | С | Summer | 50 | 70 | 85 | 15 | Walking | 0 | PASS |
| | | Winter | 65 | 75 | 85 | 15 | Walking | 1 | PASS |
| | D | Summer | 55 | 70 | 85 | 15 | Walking | 0 | PASS |
| | | Winter | 65 | 75 | 85 | 15 | Walking | 1 | PASS |
| 13 A | А | Summer | 60 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 70 | 85 | 90 | 10 | Standing | 1 | PASS |
| | В | Summer | 60 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 1 | PASS |
| | С | Summer | 55 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 1 | PASS |
| | D | Summer | 50 | 70 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 60 | 75 | 90 | 10 | Walking | 1 | PASS |
| 14 | А | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 80 | 90 | 95 | 5 | Sitting | 0 | PASS |
| | | Winter | 85 | 90 | 100 | 0 | Sitting | 0 | PASS |
| | D | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 65 | 80 | 95 | 5 | Standing | 0 | PASS |
| 15 | А | Summer | 55 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 1 | PASS |
| | В | Summer | 60 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 0 | PASS |
| | С | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 50 | 70 | 85 | 15 | Walking | 0 | PASS |
| | | Winter | 60 | 75 | 85 | 15 | Walking | 1 | PASS |

Configuration A - Existing Configuration B - Phase 1 Configuration C - Phases 1 & 2 Configuration D - Phases 1, 2 & 3



| GEM Wind Speed (mph) Category Limit | | 0 - 6 ≥80% | 0 - 9 ≥80% | 0 - 12 ≥80% | >12 >20% | | Gust Spe | eed ≥ 55 (mph) the seasonally | |
|--|---------|---------------|---------------|----------------|-------------|----|----------|---------------------------------------|--------|
| Loc. | Config. | Season | % | % | % | % | RATING | Events | RATING |
| 16 | А | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 65 | 80 | 90 | 10 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 90 | 10 | Standing | 0 | PASS |
| | С | Summer | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 80 | 90 | 95 | 5 | Sitting | 0 | PASS |
| | D | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| 17 | А | Summer | 80 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 80 | 90 | 95 | 5 | Sitting | 0 | PASS |
| | В | Summer | 55 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 65 | 85 | 95 | 5 | Standing | 1 | PASS |
| | С | Summer | 60 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 70 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| 18 | А | Summer | DATA N | NOT AVAII | LABLE | | | | |
| | | Winter | DATA N | NOT AVAII | LABLE | | | | |
| | В | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 80 | 90 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 80 | 95 | 100 | 0 | Sitting | 0 | PASS |
| 19 | А | Summer | DATA N | NOT AVAII | LABLE | | | | |
| | | Winter | DATA N | NOT AVAII | ABLE | | | | |
| | В | Summer | 50 | 70 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 60 | 80 | 90 | 10 | Standing | 1 | PASS |
| | С | Summer | 55 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 1 | PASS |
| | D | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| 20 | А | Summer | DATA N | NOT AVAII | LABLE | | | | |
| | | Winter | DATA N | NOT AVAII | LABLE | | | | |
| | _ | - | | | | | | | |

Standing Walking Uncomfortable

Sitting

COMFORT CATEGORY

Configuration A - Existing Configuration B - Phase 1 Configuration C - Phases 1 & 2 Configuration D - Phases 1, 2 & 3

В

С

D

Summer 60

Summer 65

Summer 70

65

75

75

Winter

Winter

Winter

80

80

85

85

85

90

Summer: May - October Winter: November - April

90

90

95

95

95

95

10

10

5

5

5

5

Standing

Standing

Standing

Standing

Standing

Standing

0

1

0

0

0

0

PASS

PASS

PASS

PASS

PASS

PASS

SAFETY CATEGORY



| GEM V | COMFORT CATEGORY GEM Wind Speed (mph) Category Limit | | Sitting 0 - 6 ≥80% | Standing 0 - 9 ≥80% | Walking 0 - 12 ≥80% | Uncomfo >12 >20% | ortable | Gust Spe | Y CATEGORY eed ≥55 (mph) nts Seasonally |
|-------|--|--------|--------------------------|---------------------------|---------------------------|------------------------|----------|----------|---|
| Loc. | Config. | Season | % | % | % | % | RATING | Events | RATING |
| 21 | А | Summer | DATA N | NOT AVAII | LABLE | | | | |
| | | Winter | DATA N | NOT AVAII | LABLE | | | | |
| | В | Summer | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 1 | PASS |
| | С | Summer | 75 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 80 | 90 | 95 | 5 | Sitting | 0 | PASS |
| | D | Summer | 75 | 95 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 80 | 90 | 95 | 5 | Sitting | 0 | PASS |
| 22 | А | Summer | 90 | 100 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 90 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | В | Summer | 50 | 70 | 85 | 15 | Walking | 0 | PASS |
| | | Winter | 60 | 75 | 90 | 10 | Walking | 1 | PASS |
| | С | Summer | 55 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 0 | PASS |
| | D | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| 23 | А | Summer | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 50 | 70 | 85 | 15 | Walking | 0 | PASS |
| | | Winter | 60 | 75 | 90 | 10 | Walking | 1 | PASS |
| | С | Summer | 55 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 0 | PASS |
| | D | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| 24 | А | Summer | 60 | 75 | 95 | 5 | Walking | 0 | PASS |
| | | Winter | 70 | 85 | 90 | 10 | Standing | 1 | PASS |
| | В | Summer | 50 | 65 | 85 | 15 | Walking | 0 | PASS |
| | | Winter | 60 | 75 | 90 | 10 | Walking | 1 | PASS |
| | С | Summer | 55 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 0 | PASS |
| | D | Summer | 55 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 0 | PASS |
| 25 | А | Summer | 75 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 80 | 90 | 100 | 0 | Sitting | 0 | PASS |
| | В | Summer | 50 | 65 | 85 | 15 | Walking | 0 | PASS |
| | | Winter | 60 | 75 | 90 | 10 | Walking | 1 | PASS |
| | С | Summer | 55 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 0 | PASS |
| | D | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | | | | | | | | |

Configuration A - Existing Configuration B - Phase 1 Configuration C - Phases 1 & 2 Configuration D - Phases 1, 2 & 3



| COMFORT CATEGORY GEM Wind Speed (mph) Category Limit | | | Sitting 0 - 6 ≥80% | Standing 0 - 9 ≥80% | Walking 0 - 12 ≥80% | Uncomf >12 >20% | ortable | Gust Spe | Y CATEGOF eed ≥55 (mph) nts Seasonally |
|--|---------|------------------|--------------------------|---------------------------|---------------------------|-----------------------|----------|----------|--|
| Loc. | Config. | Season | % | % | % | % | RATING | Events | RATING |
| 26 | А | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 70 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 70 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 0 | PASS |
| 27 | А | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | | 80 | 90 | 10 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| C D | Summer | 55 | 70 | 80 | 20 | Walking | 0 | PASS | |
| | Winter | 65 | 75 | 85 | 15 | Walking | 1 | PASS | |
| | Summer | 55 | 70 | 85 | 15 | Walking | 0 | PASS | |
| | | Winter | 65 | 75 | 85 | 15 | Walking | 1 | PASS |
| 28 A | А | Summer | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 65 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 65 | 85 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| 29 | А | Summer Winter | | NOT AVAII NOT AVAII | | | | | |
| | В | Summer | 60 | 85 | 95 | 5 | Standing | 0 | PASS |
| | - | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 60 | 80 | 95 95 | 5 | Standing | 0 | PASS |
| | e | Winter | 65 | 80 | 90 | 10 | Standing | 0 | PASS |
| | D | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | D | Winter | 70 | 80 | 90 | 10 | Standing | 0 | PASS |
| 30 | А | Summer | DATA I | NOT AVAII | LABLE | | | | |
| | | Winter | DATA I | NOT AVAII | LABLE | | | | |
| | В | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 60 | 80 | 90 | 10 | Standing | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 2 | PASS |
| | D | Summer | 65 | 80 | 90 | 10 | Standing | 0 | PASS |
| | | Winter | 70 | 80 | 90 | 10 | Standing | 1 | PASS |

Configuration A - Existing Configuration B - Phase 1 Configuration C - Phases 1 & 2 Configuration D - Phases 1, 2 & 3 Summer: May - October Winter: November - April



| GEM V | F ORT CATI Wind Speed (ry Limit | | Sitting 0 - 6 ≥80% | Standing 0 - 9 ≥80% | Walking 0 - 12 ≥80% | Uncomfo >12 >20% | ortable | Gust Spe | Y CATEGORY eed ≥55 (mph) ats Seasonally |
|-------|---|--------|--------------------------|---------------------------|---------------------------|------------------------|----------|----------|---|
| Loc. | Config. | Season | % | % | % | % | RATING | Events | RATING |
| 31 | А | Summer | DATA N | NOT AVAII | LABLE | | | | |
| | | Winter | DATA N | NOT AVAII | LABLE | | | | |
| | В | Summer | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 65 | 80 | 90 | 10 | Standing | 0 | PASS |
| | | Winter | 70 | 80 | 90 | 10 | Standing | 2 | PASS |
| | D | Summer | 65 | 80 | 90 | 10 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 90 | 10 | Standing | 1 | PASS |
| 32 | А | Summer | 80 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 80 | 90 | 95 | 5 | Sitting | 0 | PASS |
| | В | Summer | 60 | 80 | 90 | 10 | Standing | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 1 | PASS |
| | С | Summer | 50 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 60 | 80 | 90 | 10 | Standing | 0 | PASS |
| | D | Summer | 60 | 75 | 95 | 5 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 95 | 5 | Standing | 0 | PASS |
| 33 | А | Summer | 70 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 65 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 90 | 10 | Standing | 1 | PASS |
| | С | Summer | 55 | 70 | 85 | 15 | Walking | 0 | PASS |
| | | Winter | 60 | 75 | 85 | 15 | Walking | 3 | FAIL |
| | D | Summer | 65 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 90 | 10 | Standing | 1 | PASS |
| 34 | А | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 1 | PASS |
| | В | Summer | 65 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 90 | 10 | Standing | 1 | PASS |
| | С | Summer | 50 | 65 | 85 | 15 | Walking | 0 | PASS |
| | | Winter | 60 | 75 | 85 | 15 | Walking | 2 | PASS |
| | D | Summer | 55 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 1 | PASS |
| 35 | А | Summer | 65 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 1 | PASS |
| | С | Summer | 75 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 80 | 90 | 95 | 5 | Sitting | 0 | PASS |
| | D | Summer | 55 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 1 | PASS |
| | | | | | | | | | |

Configuration A - Existing Configuration B - Phase 1 Configuration C - Phases 1 & 2 Configuration D - Phases 1, 2 & 3



| GEM V | COMFORT CATEGORY GEM Wind Speed (mph) Category Limit | | Sitting 0 - 6 | Standing 0 - 9 | 0 - 12 | >12 | fortable | Gust Spe | Y CATE eed ≥ 55 (n |
|---------|--|------------------|------------------|------------------------|----------------------|----------------------|---------------------|----------|-----------------------------------|
| Catego | ry Limit | | $\geq 80\%$ | $\geq 80\%$ | ≥80% | >20% | | > 2 Ever | nts Season |
| Loc. | Config. | Season | % | % | % | % | RATING | Events | RATIN |
| 36 | А | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | C | Winter | 70 | 85 | 95 100 | 5 | Standing | 0 | PASS |
| | С | Summer | 80 | 95 05 | 100 | 0 | Sitting | 0 | PASS |
| | D | Winter Summer | 80 65 | 95 85 | 100 95 | 0 5 | Sitting Standing | 0 0 | PASS PASS |
| | D | Winter | 03 75 | 85 85 | 93 95 | 5 | Standing | 0 | PASS |
| 37 | А | Summer | 70 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 80 | 90 | 95 | 5 | Sitting | 0 | PASS |
| | В | Summer | 70 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 80 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 80 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | D | Summer | 80 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 80 | 95 | 100 | 0 | Sitting | 0 | PASS |
| 38 | А | Summer Winter | | NOT AVAII NOT AVAII | | | | | |
| | В | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | D | Winter | 03 70 | 85 | 95 95 | 5 | Standing | 0 | PASS |
| | С | Summer | | NOT AVAII | | 5 | Standing | 0 | 17100 |
| | - | Winter | | NOT AVAII | | | | | |
| | D | Summer | DATA I | NOT AVAII | LABLE | | | | |
| | | Winter | DATA | NOT AVAII | LABLE | | | | |
| 39 | А | Summer | | NOT AVAII | | | | | |
| | | Winter | | NOT AVAII | | | ~ | | |
| | В | Summer | 65 70 | 85 85 | 100 | 0 | Standing | 0 | PASS |
| | С | Winter Summer | 70 Data 1 | 85 NOT AVAII | 95 ABLE | 5 | Standing | 0 | PASS |
| | C | Winter | | NOT AVAII NOT AVAII | | | | | |
| | D | Summer | | NOT AVAI | | | | | |
| | _ | Winter | | NOT AVAII | | | | | |
| 40 | А | Summer | 55 | 75 | 85 | 15 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 0 | PASS |
| | В | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | G | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | | NOT AVAI | | | | | |
| | D | Winter Summer | | NOT AVAII NOT AVAII | | | | | |
| | U | Summer Winter | | NOT AVAII NOT AVAII | | | | | |
| | Enterior | | | C | | | | | |
| | - Existing - Phase 1 | | | Summe Winter: | r: May - C Noveml | October ber - Apr | il | | |
| | - Phase 1 - Phases 1 & | × 2 | | winter: | noveini | sei - Apr | 11 | | |
| manon C | - Phases 1 a | | | | | | | | |



| COMFORT CATEGORY GEM Wind Speed (mph) Category Limit | | Sitting 0 - 6 ≥80% | Standing 0 - 9 ≥80% | Walking 0 - 12 ≥80% | Uncomfo >12 >20% | ortable | Gust Spe | Y CATEGO eed \geq 55 (mph) its Seasonally | |
|--|---------|--------------------------|---------------------------|---------------------------|------------------------|----------|----------------------|--|--------------|
| Loc. | Config. | Season | % | % | % | % | RATING | Events | RATING |
| 41 | А | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | | NOT AVAII | | | | | |
| | | Winter | | NOT AVAII | | | | | |
| | D | Summer | | NOT AVAII | | | | | |
| | | Winter | DATA N | NOT AVAII | LABLE | | | | |
| 42 | А | Summer | | NOT AVAII | | | | | |
| | P | Winter | | NOT AVAII | | | | | |
| | В | Summer | | NOT AVAII | | | | | |
| | C | Winter | | NOT AVAII | | F | Ctore I'm | 0 | DAGG |
| | С | Summer | 70 75 | 90 85 | 95 05 | 5 | Standing Standing | 0 | PASS |
| | р | Winter Summer | 75 70 | 85 | 95 05 | 5 | Standing Standing | 0 | PASS |
| | D | Winter | 70 75 | 90 90 | 95 95 | 5 5 | Standing Standing | 0 0 | PASS PASS |
| 43 | А | Summer | DATA Ν | NOT AVAII | ABLE | | | | |
| | | Winter | | NOT AVAII | | | | | |
| | В | Summer | | NOT AVAII | | | | | |
| | | Winter | | NOT AVAII | | | | | |
| | С | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| 44 | А | Summer | | NOT AVAII | | | | | |
| | | Winter | | NOT AVAII | | | | | |
| | В | Summer | | NOT AVAII | | | | | |
| | a | Winter | | NOT AVAII | | 1.7 | XX7 11 · | 0 | DAGG |
| | С | Summer | 55 | 70 80 | 85 | 15 | Walking | 0 | PASS |
| | D | Winter | 65 | 80 | 90 90 | 10 | Standing | 1 | PASS |
| | D | Summer Winter | 55 65 | 75 80 | 90 90 | 10 10 | Walking Standing | 0 1 | PASS PASS |
| 45 | А | Summer | DATA N | NOT AVAII | LABLE | | | | |
| | | Winter | | NOT AVAII | | | | | |
| | В | Summer | DATA N | NOT AVAII | LABLE | | | | |
| | | Winter | DATA N | NOT AVAII | LABLE | | | | |
| | С | Summer | 70 | 90 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 1 | PASS |
| | D | Summer | 70 | 90 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 1 | PASS |

Configuration A - Existing Configuration B - Phase 1 Configuration C - Phases 1 & 2 Configuration D - Phases 1, 2 & 3



| Table 1: Pedestrian Wind Comfort and | Safety Categories - Multiple Seasons |
|--------------------------------------|--------------------------------------|
|--------------------------------------|--------------------------------------|

| GEM W | ORT CATH Vind Speed (ry Limit | | Sitting 0 - 6 ≥80% | Standing 0 - 9 ≥80% | Walking 0 - 12 ≥80% | Uncomfe >12 >20% | ortable | Gust Spe | Y CATEGOR eed \geq 55 (mph) its Seasonally | | | |
|-------|--------------------------------------|------------------|--------------------------|---------------------------|---------------------------|------------------------|----------|----------|--|--|--|--|
| Loc. | Config. | Season | % | % | % | % | RATING | Events | RATING | | | |
| 16 | А | Summer | DATA N | IOT AVAII | LABLE | | | | | | | |
| | | Winter | DATA N | OT AVAII | LABLE | | | | | | | |
| | В | Summer | DATA N | DATA NOT AVAILABLE | | | | | | | | |
| | | Winter | DATA N | OT AVAII | LABLE | | | | | | | |
| | С | Summer | 50 | 65 | 80 | 20 | Walking | 0 | PASS | | | |
| | | Winter | 60 | 75 | 85 | 15 | Walking | 2 | PASS | | | |
| | D | Summer | 50 | 65 | 80 | 20 | Walking | 0 | PASS | | | |
| | | Winter | 60 | 75 | 85 | 15 | Walking | 2 | PASS | | | |
| 47 | А | Summer | | DATA NOT AVAILABLE | | | | | | | | |
| | _ | Winter | | OT AVAII | | | | | | | | |
| | В | Summer | | OT AVAII | | | | | | | | |
| | a | Winter | | IOT AVAII | | _ | a | 0 | D + 66 | | | |
| | С | Summer | 65 | 80 | 95 95 | 5 | Standing | 0 | PASS | | | |
| | D. | Winter | 70 | 85 | 95 95 | 5 | Standing | 1 | PASS | | | |
| | D | Summer | 60 70 | 80 85 | 95 95 | 5 | Standing | 0 | PASS | | | |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 1 | PASS | | | |
| 48 | А | Summer | | IOT AVAII | | | | | | | | |
| | D | Winter | | OT AVAII | | | | | | | | |
| | В | Summer Winter | | IOT AVAII IOT AVAII | | | | | | | | |
| | С | Summer | 60 | 80 | 90 | 10 | Standing | 0 | PASS | | | |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 1 | PASS | | | |
| | D | Summer | 60 | 80 | 90 | 10 | Standing | 0 | PASS | | | |
| | | Winter | 70 | 85 | 90 | 10 | Standing | 1 | PASS | | | |
| 19 | А | Summer | DATA N | IOT AVAII | LABLE | | | | | | | |
| | | Winter | DATA NOT AVAILABLE | | | | | | | | | |
| | В | Summer | DATA N | DATA NOT AVAILABLE | | | | | | | | |
| | | Winter | DATA N | OT AVAII | LABLE | | | | | | | |
| | С | Summer | 65 | 80 | 95 | 5 | Standing | 0 | PASS | | | |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS | | | |
| | D | Summer | 65 | 80 | 95 | 5 | Standing | 0 | PASS | | | |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS | | | |
| 50 | А | Summer | DATA N | IOT AVAII | LABLE | | | | | | | |
| | | Winter | | OT AVAII | | | | 1 | | | | |
| | В | Summer | | OT AVAII | | | | 1 | | | | |
| | | Winter | | IOT AVAII | | | | 1 | | | | |
| | С | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS | | | |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS | | | |
| | D | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS | | | |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS | | | |

Configuration A - Existing Configuration B - Phase 1 Configuration C - Phases 1 & 2 Configuration D - Phases 1, 2 & 3

| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$ | COMFOI GEM Win | nd Speed (| | Sitting 0 - 6 | Standing 0 - 9 | 0 - 12 | Uncomf >12 | ortable | Gust Spe | Y CATEGOI ed $\geq 55 \text{ (mph)}$ |
|---|----------------------------|------------|--------|------------------|-------------------|--------|---------------|---------------------|----------|---|
| 51 A Summer DATA NOT AVAILABLE B Summer DATA NOT AVAILABLE B Summer DATA NOT AVAILABLE C Summer DATA NOT AVAILABLE C Summer 65 90 95 5 Standing 0 PASS D Summer 65 95 5 Standing 0 PASS D Summer 65 95 5 Standing 0 PASS Summer DATA NOT AVAILABLE Winter 0 PASS D Summer DATA NOT AVAILABLE 0 PASS S Standing 0 PASS DATA NOT AVAILABLE B Summer DATA N | Category | Limit | | ≥80% | ≥80% | ≥80% | >20% | | >2 Even | its Seasonally |
| | Loc. | Config. | Season | % | % | % | % | RATING | Events | RATING |
| B Summer DATA NOT AVAILABLE 0 PASS C Summer 65 90 95 5 Standing 0 PASS D Summer 65 85 95 5 Standing 0 PASS D Summer 65 85 95 5 Standing 0 PASS D Summer DATA NOT AVAILABLE 0 PASS 0 PASS Summer DATA NOT AVAILABLE DATA NOT AVAILABLE 0 PASS B Summer DATA NOT AVAILABLE 0 PASS Winter DATA NOT AVAILABLE 0 PASS D Summer DATA NOT AVAILABLE 0 PASS D Summer DATA NOT AVAILABLE 0 PASS D Summer DATA NOT AVAILABLE 0 PASS Winter 70 85 95 5 Standing 0 PASS Summer DATA NOT AVAILABLE Vinter 75 85 95 Standing 1 PASS | 51 | А | Summer | DATA N | NOT AVAII | LABLE | | | | |
| Winter DATA NOT AVAILABLE PASS C Summer 65 90 95 5 Standing 0 PASS D Summer 65 85 95 5 Standing 0 PASS D Summer 65 85 95 5 Standing 0 PASS 52 A Summer DATA NOT AVAILABLE Standing 0 PASS B Summer DATA NOT AVAILABLE VallABLE VallABLE PASS C Summer DATA NOT AVAILABLE VallABLE PASS Winter 70 80 95 Standing 0 PASS D Summer 60 75 95 Standing 0 PASS D Summer DATA NOT AVAILABLE VallAING PASS PAS D Summer DATA NOT AVAILABLE VallAING PASS Summer DATA NOT AVAILABLE VallAING PASS PASS | | | Winter | DATA N | NOT AVAII | | | | | |
| C Summer 65 90 95 5 Standing 0 PASS D Summer 65 85 95 5 Standing 0 PASS D Summer 65 85 95 5 Standing 0 PASS 52 A Summer DATA NOT AVAILABLE Valtable | | В | Summer | DATA N | NOT AVAII | | | | | |
| Winter 70 85 95 5 Standing 0 PASS D Summer 65 85 95 5 Standing 0 PASS 52 A Summer DATA NOT AVAILABLE - - - - - - PASS 52 A Summer DATA NOT AVAILABLE - - - - - PASS B Summer DATA NOT AVAILABLE - | | | Winter | DATA N | NOT AVAII | LABLE | | | | |
| DSummer6585955Standing0PASS52ASummerDATA NOT AVAILABLE WinterDATA NOT AVAILABLE Winter0PASS52ASummerDATA NOT AVAILABLE WinterDATA NOT AVAILABLE DATA NOT AVAILABLE0PASSCSummer6075955Walking Winter0PASSDSummer6075955Standing0PASSDSummer075955Standing0PASSSSummer075955Standing0PASSDSummer075955Standing0PASSSiSummerDATA NOT AVAILABLE WinterDATA NOT AVAILABLE DATA NOT AVAILABLEPASSPASSDSummer7085955Standing1PASSDSummer7085955Standing1PASSDSummer7085955Standing1PASSDSummerDATA NOT AVAILABLE DATA NOT AVAILABLEPASS1PASSS951000Sitting0PASSDSummerDATA NOT AVAILABLEPASS1PASSDSummerDATA NOT AVAILABLEPASS0PASSDSummerDATA NOT AVAILABLEVAILABLE0PASSDSumme | | С | Summer | 65 | 90 | 95 | 5 | Standing | 0 | PASS |
| Winter7585955Standing0PASS52ASummerDATA NOT AVAILABLE DATA NOT AVAILABLEDATA NOT AVAILABLE DATA NOT AVAILABLEPASSBSummerDATA NOT AVAILABLE DATA NOT AVAILABLEValking0PASSCSummer6075955Walking0PASSDSummer6075955Walking0PASSDSummer6075955Standing0PASSS3ASummerDATA NOT AVAILABLE WinterDATA NOT AVAILABLE DATA NOT AVAILABLEPASSBSummerDATA NOT AVAILABLE WinterDATA NOT AVAILABLE DATA NOT AVAILABLEPASSDSummer7085955Standing0PASSDSummer7085955Standing1PASSDSummerDATA NOT AVAILABLE DATA NOT AVAILABLEPASS1PASSS4ASummerDATA NOT AVAILABLE DATA NOT AVAILABLEPASPASSS54ASummerDATA NOT AVAILABLE DATA NOT AVAILABLE0PASSDSummerB51000Sitting0PASSDSummerB51000Sitting0PASSDSummerB4NOT AVAILABLE DATA NOT AVAILABLEVinterPASSDSummerDATA NOT AVAILABLE DATA NOT AVAILABLEVinter <td< td=""><td></td><td></td><td>Winter</td><td>70</td><td>85</td><td>95</td><td>5</td><td>Standing</td><td>0</td><td>PASS</td></td<> | | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | D | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | | Winter | 75 | 85 | 95 | 5 | Standing | 0 | PASS |
| BSummer WinterDATA NOT AVAILABLE VINTERValuableCSummer6075955Walking0PASSDSummer6075955Standing0PASSDSummer7085955Standing0PASS53ASummerDATA NOT AVAILABLE WinterValuableValuableValuableBSummerDATA NOT AVAILABLE WinterDATA NOT AVAILABLEValuableValuableCSummerDATA NOT AVAILABLE WinterValuableValuableValuableCSummer7085955Standing0PASSDSummer7085955Standing1PASSDSummer7085955Standing1PASSDSummer7085955Standing1PASSDSummer7585955Standing1PASSS4ASummerDATA NOT AVAILABLE WinterValuableValuableValuableBSummerBATA NOT AVAILABLEValuable0PASSS5ASummerBATA NOT AVAILABLEValuableValuableBSummerDATA NOT AVAILABLEValuableValuableValuableS5ASummerDATA NOT AVAILABLEValuableValuableBSummerDATA NOT AVAILABLE </td <td>52</td> <td>А</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> | 52 | А | | | | | | | | |
| | | | | | | | | | | |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | | В | | | | | | | | |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$ | | | | | | | | | | |
| DSummer6075955Walking0PASS53ASummerDATA NOT AVAILABLEStanding0PASS53ASummerDATA NOT AVAILABLEValueValueValueBSummerDATA NOT AVAILABLEValueValueValueBSummerDATA NOT AVAILABLEValueValuePASSCSummer7085955Standing0DSummer7085955Standing0DSummer7085955Standing1PASSWinter7585955Standing1PASSWinter7585955Standing1PASSWinterDATA NOT AVAILABLEValuePASSS4ASummerDATA NOT AVAILABLEValuePASSWinterDATA NOT AVAILABLEValue0PASSDSummerB5951000Sitting0DSummer85951000Sitting0PASSDSummerBATA NOT AVAILABLEValue0PASSSitting0951000Sitting0PASSDSummerDATA NOT AVAILABLEValueValue0PASSDSummerDATA NOT AVAILABLEValueValue0PASSSitting095< | | С | | | | | | U | | |
| Winter7085955Standing0PASS53ASummerDATA NOT AVAILABLE $VAILABLE$ $VAILABLE$ $VAILABLE$ $VAILABLE$ BSummerDATA NOT AVAILABLE $VAILABLE$ V $VAILABLE$ V CSummer7085955Standing1DSummer7085955Standing0PASSDSummer7085955Standing1PASSDSummer7085955Standing1PASS54ASummerDATA NOT AVAILABLE $VAILABLE$ V V V BSummerDATA NOT AVAILABLE V V V V VinterDATA NOT AVAILABLE V V V V V BSummerDATA NOT AVAILABLE V V V V V Minter85951000Sitting0PASSDSummerS1001000Sitting0PASS55ASummerDATA NOT AVAILABLE V V V V 55ASummerDATA NOT AVAILABLE V V V V 55ASummerDATA NOT AVAILABLE V V V V 55ASummerDATA NOT AVAILABLE V V V V V 55A | | | | | | | | 0 | | |
| 53 A Summer DATA NOT AVAILABLE B Summer DATA NOT AVAILABLE B Summer DATA NOT AVAILABLE B Summer DATA NOT AVAILABLE C Summer DATA NOT AVAILABLE C Summer 70 85 95 5 D Summer 70 85 95 5 Standing 1 PASS D Summer 70 85 95 5 Standing 1 PASS D Summer 70 85 95 5 Standing 1 PASS SWinter 75 85 95 5 Standing 1 PASS SWinter DATA NOT AVAILABLE S4 A Summer DATA NOT AVAILABLE B Summer DATA NOT AVAILABLE | | D | | | | | | | | |
| WinterDATA NOT AVAILABLEBSummerDATA NOT AVAILABLEWinterDATA NOT AVAILABLECSummer7085955Standing0PASSDSummer7085955Standing1PASSDSummer7085955Standing1PASSDSummer7085955Standing1PASSSummer7085955Standing1PASSDSummerDATA NOT AVAILABLEValicable7PASSSummerDATA NOT AVAILABLEValicable7PASSSummerDATA NOT AVAILABLE7PASSPASSOSummerS951000Sitting0PASSDSummerS951000Sitting0PASSDSummerBATA NOT AVAILABLEValicable0PASSDSummerDATA NOT AVAILABLEValicable0PASSS5ASummerDATA NOT AVAILABLEValicable0PASSS5ASummerDATA NOT AVAILABLEValicableVinterPASSS5ASummerDATA NOT AVAILABLEValicableVinterPASSS5ASummerDATA NOT AVAILABLEValicableVinterPASSS5ASummerDATA NOT AVAILABLEValicableValicableVinter <td></td> <td></td> <td>Winter</td> <td>70</td> <td>85</td> <td>95</td> <td>5</td> <td>Standing</td> <td>0</td> <td>PASS</td> | | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| B Summer DATA NOT AVAILABLE Winter DATA NOT AVAILABLE Winter 75 85 95 5 Standing 0 PASS Winter 75 85 95 5 Standing 1 PASS D Summer 70 85 95 5 Standing 0 PASS Winter 75 85 95 5 Standing 1 PASS D Summer DATA NOT AVAILABLE Winter DATA NOT AVAILABLE B Summer DATA NOT AVAILABLE C Summer 85 95 100 0 Sitting 0 PASS Winter 85 95 100 0 Sitting 0 PASS D Summer 85 95 100 0 Sitting 0 PASS Winter 90 95 100 0 Sitting 0 PASS Winter 90 95 100 0 Sitting 0 PASS Standing 0 PASS D Summer 85 95 100 0 Sitting 0 PASS Winter 90 95 100 0 Sitting 0 PASS Winter 0ATA NOT AVAILABLE C Summer 0ATA NOT AVAILABLE C Summer 60 80 90 10 Standing 0 PASS D Summer 60 80 90 10 Standing 2 PASS D Summer 60 80 90 10 Standing 0 PASS | 53 | А | | | | | | | | |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$ | | | | | | | | | | |
| CSummer7085955Standing0PASSWinter7585955Standing0PASSDSummer7085955Standing0PASSWinter7585955Standing1PASS54ASummerDATA NOT AVAILABLEValueValueValueValue54ASummerDATA NOT AVAILABLEValueValueValue64SummerDATA NOT AVAILABLEValueValueValueValue55ASummerBATA NOT AVAILABLEValue0PASS55ASummerDATA NOT AVAILABLEValue0PASS55ASummerDATA NOT AVAILABLEValue0PASS55ASummerDATA NOT AVAILABLEValue0PASS55ASummerDATA NOT AVAILABLEValueValue0PASS55ASummerDATA NOT AVAILABLEValueValueValueValue55ASummerDATA NOT AVAILABLEValueValueValueValue55ASummerDATA NOT AVAILABLEValueValueValueValue55ASummerDATA NOT AVAILABLEValueValueValueValueValue55ASummerDATA NOT AVAILABLEValueValueValueValueValueValu | | В | | | | | | | | |
| Winter7585955Standing1PASSDSummer7085955Standing0PASSWinter7585955Standing1PASS54ASummerDATA NOT AVAILABLE WinterVinterDATA NOT AVAILABLE WinterVinterPATA NOT AVAILABLE WinterVinterPASS64SummerDATA NOT AVAILABLE WinterVinterDATA NOT AVAILABLE WinterVinterPASSCSummerS951000Sitting0PASSDSummer85951000Sitting0PASSDSummer851001000Sitting0PASS55ASummerDATA NOT AVAILABLE WinterVinter0PASS55ASummerDATA NOT AVAILABLE WinterVinter0PASS55ASummerDATA NOT AVAILABLE WinterVinterVinterPASS55ASummerDATA NOT AVAILABLE WinterVinterVinterPASS55ASummerO809010Standing055ASummerG809010Standing255DSummer60809010Standing0PASS | | _ | | | | | _ | | | |
| DSummer7085955Standing0PASS54ASummerDATA NOT AVAILABLE WinterDATA NOT AVAILABLE DATA NOT AVAILABLEPASSBSummerDATA NOT AVAILABLE WinterDATA NOT AVAILABLEPASSCSummer85951000Sitting0DSummer85951000Sitting0PASSDSummer85951000Sitting0PASSDSummer851001000Sitting0PASSDSummerBATA NOT AVAILABLE WinterDATA NOT AVAILABLE Winter0PASS55ASummerDATA NOT AVAILABLE Winter0PASS55ASummerDATA NOT AVAILABLE Winter0PASSCSummerDATA NOT AVAILABLE Winter0PASSCSummer60809010Standing0DSummer60809010Standing0DSummer60809010Standing0DSummer60809010Standing0DSummer60809010Standing0 | | С | | | | | | - | | |
| Winter7585955Standing1PASS54ASummerDATA NOT AVAILABLE WinterDATA NOT AVAILABLE WinterValiableValiableValiableBSummerDATA NOT AVAILABLE WinterDATA NOT AVAILABLEValiableValiableValiableCSummerS5951000Sitting0PASSDSummer85951000Sitting0PASSDSummer851001000Sitting0PASS55ASummerDATA NOT AVAILABLE WinterValiableValiable PASSValiable55ASummerDATA NOT AVAILABLE WinterValiable PATA NOT AVAILABLE WinterValiable PASSValiable PASS55ASummerDATA NOT AVAILABLE ValiableValiable PASSValiable | | _ | | | | | | 0 | | |
| 54ASummerDATA NOT AVAILABLE WinterDATA NOT AVAILABLE DATA NOT AVAILABLEBSummerDATA NOT AVAILABLECSummer85951000Sitting0PASSWinter85951000Sitting0PASSDSummer851001000Sitting0PASSDSummer851001000Sitting0PASS55ASummerDATA NOT AVAILABLE WinterValiableValiableValiable55ASummerDATA NOT AVAILABLE WinterValiableValiableValiableBSummerDATA NOT AVAILABLE WinterValiableValiableValiableCSummer60809010Standing0PASSDSummer60809010Standing0PASSDSummer60809010Standing0PASS | | D | | | | | | - | | |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$ | | | Winter | 75 | 85 | 95 | 5 | Standing | 1 | PASS |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$ | 54 | А | | | | | | | | |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$ | | D | | | | | | | | |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | | В | | | | | | | | |
| Winter 85 95 100 0 Sitting 0 PASS D Summer 85 100 100 0 Sitting 0 PASS Winter 90 95 100 0 Sitting 0 PASS 55 A Summer DATA NOT AVAILABLE - - - Winter DATA NOT AVAILABLE - - - - B Summer DATA NOT AVAILABLE - - - Winter DATA NOT AVAILABLE - - - - Winter DATA NOT AVAILABLE - - - - Winter DATA NOT AVAILABLE - - - - - C Summer 60 80 90 10 Standing 0 PASS D Summer 60 80 90 10 Standing 0 PASS | | C | | | | | 0 | G | 0 | DAGG |
| DSummer851001000Sitting0PASSWinter90951000Sitting0PASS55ASummerDATA NOT AVAILABLE WinterVariableVariableVariableBSummerDATA NOT AVAILABLE WinterVariableVariableVariableCSummer60809010Standing0DSummer60809010Standing2DSummer60809010Standing0DSummer60809010Standing0DSummer60809010Standing0PASS9010Standing0PASS | | C | | | | | | | | |
| Winter90951000Sitting0PASS55ASummerDATA NOT AVAILABLE WinterVAILABLE DATA NOT AVAILABLEBSummerDATA NOT AVAILABLE WinterDATA NOT AVAILABLECSummer60809010Standing0PASSWinter65809010Standing2PASSDSummer60809010Standing0PASS | | 5 | | | | | | | | |
| 55 A Summer DATA NOT AVAILABLE Vailable b DATA NOT AVAILABLE DATA NOT AVAILABLE B Summer DATA NOT AVAILABLE Winter DATA NOT AVAILABLE Winter DATA NOT AVAILABLE C Summer 60 80 90 10 Standing 0 PASS Winter 65 80 90 10 Standing 0 PASS D Summer 60 80 90 10 Standing 0 PASS | | D | | | | | | | | |
| WinterDATA NOT AVAILABLEBSummerDATA NOT AVAILABLEWinterDATA NOT AVAILABLECSummer6080Winter65809010Summer60809010StandingDSummer60809010Summer60809010StandingDSummer60809010 | | | Winter | 90 | 95 | 100 | 0 | Sitting | 0 | PASS |
| BSummerDATA NOT AVAILABLE WinterPATA NOT AVAILABLECSummer60809010Standing0PASSWinter65809010Standing2PASSDSummer60809010Standing0PASS | 55 | А | | | | | | | | |
| Winter DATA NOT AVAILABLECSummer60809010Standing0PASSWinter65809010Standing2PASSDSummer60809010Standing0PASS | | D | | | | | | | | |
| C Summer 60 80 90 10 Standing 0 PASS Winter 65 80 90 10 Standing 2 PASS D Summer 60 80 90 10 Standing 0 PASS | | В | | | | | | | | |
| Winter65809010Standing2PASSDSummer60809010Standing0PASS | | a | | | | | 10 | a . r | | D. 67 |
| D Summer 60 80 90 10 Standing 0 PASS | | С | | | | | | - | | |
| | | - | | | | | | | | |
| Winter 70 80 90 10 Standing 2 PASS | | D | | | | | | - | | |
| | | | Winter | 70 | 80 | 90 | 10 | Standing | 2 | PASS |
| ation A - Existing Summer: May - October | ation A - H ation B - F | | | | | Novemł | | | 1 | |

Config Configuration B - Phase 1 Configuration C - Phases 1 & 2 Configuration D - Phases 1, 2 & 3

Winter: November - April

| GEM V | COMFORT CATEGORY GEM Wind Speed (mph) Category Limit | | Sitting 0 - 6 ≥80% | Standing 0 - 9 ≥80% | Walking 0 - 12 ≥80% | Uncomfo >12 >20% | ortable | Gust Spe | Y CATEGORY eed ≥55 (mph) its Seasonally |
|-------|---|--------|--------------------------|---------------------------|---------------------------|------------------------|----------|----------|---|
| Loc. | Config. | Season | % | % | % | % | RATING | Events | RATING |
| 56 | А | Summer | DATA N | OT AVAII | LABLE | | | | |
| | | Winter | DATA N | OT AVAII | LABLE | | | | |
| | В | Summer | | OT AVAII | | | | | |
| | | Winter | | OT AVAII | | | | | |
| | С | Summer | 75 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 80 | 90 | 95 | 5 | Sitting | 0 | PASS |
| | D | Summer | 75 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 80 | 90 | 95 | 5 | Sitting | 0 | PASS |
| 57 | А | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 60 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 70 | 80 | 90 | 10 | Standing | 1 | PASS |
| | D | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| 58 | А | Summer | 60 | 80 | 90 | 10 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 90 | 10 | Standing | 1 | PASS |
| | В | Summer | 60 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 60 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 1 | PASS |
| 59 | А | Summer | 70 | 80 | 90 | 10 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 1 | PASS |
| | В | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 1 | PASS |
| | С | Summer | 55 | 70 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 1 | PASS |
| | D | Summer | 45 | 65 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 60 | 75 | 90 | 10 | Walking | 1 | PASS |
| 60 | А | Summer | 55 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 55 | 70 | 85 | 15 | Walking | 0 | PASS |
| | | Winter | 65 | 75 | 90 | 10 | Walking | 1 | PASS |
| | С | Summer | 55 | 70 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 0 | PASS |
| | D | Summer | 50 | 65 | 85 | 15 | Walking | 0 | PASS |
| | | Winter | 60 | 75 | 90 | 10 | Walking | 1 | PASS |

Configuration A - Existing Configuration B - Phase 1 Configuration C - Phases 1 & 2 Configuration D - Phases 1, 2 & 3



| GEM W | ORT CATI Vind Speed (ry Limit | | Sitting 0 - 6 ≥80% | Standing 0 - 9 ≥80% | Walking 0 - 12 ≥80% | Uncom >12 >20% | fortable | Gust Spe | Y CATEGOR eed \geq 55 (mph) its Seasonally |
|-------|---|--------|--------------------------|---------------------------|---------------------------|----------------------|----------|----------|--|
| Loc. | Config. | Season | % | % | % | % | RATING | Events | RATING |
| 61 | А | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 50 | 70 | 85 | 15 | Walking | 0 | PASS |
| | | Winter | 60 | 75 | 90 | 10 | Walking | 0 | PASS |
| | С | Summer | 55 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 55 | 70 | 85 | 15 | Walking | 0 | PASS |
| | | Winter | 65 | 75 | 85 | 15 | Walking | 2 | PASS |
| 62 | А | Summer | 70 | 90 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 55 | 70 | 85 | 15 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 0 | PASS |
| | С | Summer | 55 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 70 | 90 | 100 | 0 | Standing | 0 | PASS |
| | _ | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| 63 | А | Summer | | NOT AVAII | | | | | |
| | D | Winter | | NOT AVAII | | 10 | XX7 11 · | 0 | DAGG |
| | В | Summer | 55 | 75 | 90 90 | 10 | Walking | 0 | PASS |
| | G | Winter | 65 | 80 | 90 95 | 10 | Standing | 0 | PASS |
| | С | Summer | 60 70 | 80 | 95 95 | 5 | Standing | 0 | PASS |
| | D | Winter | 70 | 85 | 95 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 65 | 85 | 95 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| 64 | А | Summer | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | ~ | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 60 | 80 | 90 | 10 | Standing | 0 | PASS |
| | | Winter | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| 65 | А | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 70 | 90 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | D | C | 07 | 07 | 100 | 0 | a | 0 | DAGG |

Configuration A - Existing Configuration B - Phase 1 Configuration C - Phases 1 & 2 Configuration D - Phases 1, 2 & 3

D

Summer: May - October Winter: November - April

0

5

100

95

Sitting

Sitting

Summer 85

Winter 85

95

95

RWDI

PASS

PASS

0

0

| GEM W | Yind Speed (ry Limit | | Sitting 0 - 6 ≥80% | Standing 0 - 9 ≥80% | Walking 0 - 12 ≥80% | Uncomf >12 >20% | ortable | Gust Spe | Y CATEGOR eed ≥55 (mph) its Seasonally |
|-------|--------------------------|--------|--------------------------|---------------------------|---------------------------|-----------------------|----------|----------|--|
| Loc. | Config. | Season | % | % | % | % | RATING | Events | RATING |
| 66 | А | Summer | 60 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 1 | PASS |
| | В | Summer | 55 | 70 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 0 | PASS |
| | С | Summer | 55 | 75 | 95 | 5 | Walking | 0 | PASS |
| | | Winter | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 1 | PASS |
| 67 | А | Summer | 55 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 2 | PASS |
| | В | Summer | | 75 | 95 | 5 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 0 | PASS |
| | С | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 55 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 60 | 80 | 90 | 10 | Standing | 1 | PASS |
| 68 A | Summer | 60 | 80 | 90 | 10 | Standing | 0 | PASS | |
| | | Winter | 70 | 80 | 90 | 10 | Standing | 1 | PASS |
| | В | Summer | 70 | 90 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 70 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 50 | 70 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 60 | 75 | 90 | 10 | Walking | 1 | PASS |
| 69 | А | Summer | 80 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 85 | 95 | 95 | 5 | Sitting | 0 | PASS |
| | В | Summer | 85 | 100 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 90 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | С | Summer | 85 | 100 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | D | Summer | 70 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| 70 | А | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| В | Summer | 70 | 90 | 100 | 0 | Standing | 0 | PASS | |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 75 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 80 | 90 | 95 | 5 | Sitting | 0 | PASS |
| | D | Summer | | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |

Configuration A - Existing Configuration B - Phase 1 Configuration C - Phases 1 & 2 Configuration D - Phases 1, 2 & 3 Summer: May - October Winter: November - April



| COMFORT CATEGORY GEM Wind Speed (mph) Category Limit | | Sitting 0 - 6 ≥80% | Standing 0 - 9 ≥80% | Walking 0 - 12 ≥80% | Uncomfo >12 >20% | ortable | SAFETY CATEGO Gust Speed ≥55 (mph > 2 Events Seasonally | | |
|--|---------|--------------------------|---------------------------|---------------------------|------------------------|---------|---|--------|--------|
| Loc. | Config. | Season | % | % | % | % | RATING | Events | RATING |
| 71 | А | Summer | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | В | Summer | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | С | Summer | 90 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | D | Summer | 90 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| 72 | А | Summer | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 70 | 90 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 70 | 90 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 1 | PASS |
| 73 | А | Summer | 70 | 85 | 90 | 10 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 90 | 10 | Standing | 0 | PASS |
| | В | Summer | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 95 | 100 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 95 | 100 | 100 | 0 | Sitting | 0 | PASS |
| 74 | А | Summer | 90 | 100 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 90 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | В | Summer | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 90 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | С | Summer | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | D | Summer | 85 | 100 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| 75 | А | Summer | 80 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | В | Summer | 55 | 75 | 95 | 5 | Walking | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 55 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 75 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 80 | 90 | 100 | 0 | Sitting | 0 | PASS |

Configuration A - Existing Configuration B - Phase 1 Configuration C - Phases 1 & 2 Configuration D - Phases 1, 2 & 3



| COMFORT CATEGORY GEM Wind Speed (mph) Category Limit | | Sitting 0 - 6 ≥80% | Standing 0 - 9 ≥80% | Walking 0 - 12 ≥80% | Uncomfo >12 >20% | ortable | Gust Spe | Y CATEGORY eed ≥55 (mph) ats Seasonally | |
|--|---------|--------------------------|---------------------------|---------------------------|------------------------|----------|----------|---|--------|
| Loc. | Config. | Season | % | % | % | % | RATING | Events | RATING |
| 76 | А | Summer | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 90 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | В | Summer | 80 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | С | Summer | 85 | 100 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | D | Summer | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| 77 | А | Summer | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 65 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 70 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 75 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 80 | 90 | 100 | 0 | Sitting | 0 | PASS |
| 78 | А | Summer | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 80 | 90 | 95 | 5 | Sitting | 0 | PASS |
| | В | Summer | 65 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 65 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 80 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| 79 | А | Summer | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 80 | 90 | 95 | 5 | Sitting | 0 | PASS |
| | В | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 65 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 85 | 95 | 100 | 0 | Sitting | 0 | PASS |
| 80 | А | Summer | 75 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 80 | 90 | 95 | 5 | Sitting | 0 | PASS |
| | В | Summer | 60 | 85 | 95 | 5 | Standing | 0 | PASS |
| D | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS | |
| | С | Summer | 65 | 80 | 95 | 5 | Standing | 0 | PASS |
| | - | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 80 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 85 | 90 | 95 | 5 | Sitting | 0 | PASS |

Configuration A - Existing Configuration B - Phase 1 Configuration C - Phases 1 & 2 Configuration D - Phases 1, 2 & 3



| Limit Config. A B C D A B C D D | Season Summer Winter Summer Winter Summer Winter Summer Winter Summer Winter Summer | DATA N 65 75 60 70 DATA N DATA N DATA N | ≥80% % NOT AVAII 85 85 80 85 NOT AVAII NOT AVAII | ABLE 95 95 95 95 ABLE | >20% % 5 5 5 5 5 | RATING Standing Standing | Events 0 0 0 | RATING PASS PASS PASS PASS |
|---|--|--|---|--|--|--|--|--|
| A B C D A B C | Summer Winter Summer Winter Summer Winter Summer Winter Summer Winter | DATA N 65 75 60 70 DATA N DATA N DATA N | NOT AVAII 85 85 80 85 NOT AVAII NOT AVAII | ABLE ABLE 95 95 95 95 ABLE | 5 5 5 | Standing Standing Standing | 0 0 0 | PASS PASS |
| B C D A B C | Winter Summer Winter Summer Winter Summer Winter Summer Winter Winter | DATA N 65 75 60 70 DATA N DATA N DATA N | NOT AVAII 85 85 80 85 NOT AVAII NOT AVAII | ABLE 95 95 95 95 ABLE | 5 5 | Standing Standing | 0 0 | PASS |
| C D A B C | Summer Winter Summer Winter Summer Winter Summer Winter Winter | 65 75 60 70 DATA N DATA N DATA N | 85 85 80 85 NOT AVAII NOT AVAII | 95 95 95 95 ABLE | 5 5 | Standing Standing | 0 0 | PASS |
| D A B C | Summer Winter Winter Summer Winter Summer Winter | 60 70 DATA M DATA M DATA M | 80 85 NOT AVAII NOT AVAII | 95 95 ABLE | 5 | Standing | 0 | |
| A B C | Summer Winter Summer Summer Winter | DATA N DATA N DATA N DATA N | NOT AVAII NOT AVAII NOT AVAII | ABLE | 5 | | | |
| B C | Winter Summer Winter | DATA N | | | | Standing | 0 | PASS |
| С | Summer Winter | | | LABLE | | | | |
| | | | NOT AVAII NOT AVAII | | | | | |
| | | | NOT AVAII NOT AVAII | | | | | |
| | Winter | DATA N | NOT AVAII | ABLE | 5 | Standing | 0 | PASS |
| - | Winter | 70 | 85 | 95 95 | 5 | Standing | 1 | PASS |
| А | Summer | | | | | | | |
| В | Summer | DATA N | NOT AVAII | ABLE | | | | |
| С | Summer | DATA N | NOT AVAII | ABLE | | | | |
| D | Summer | 50 | 70 | 85 | 15 | Walking | 0 | PASS |
| | Winter | 60 | 75 | 90 | 10 | Walking | 1 | PASS |
| А | Summer Winter | | | | | | | |
| В | Summer Winter | | | | | | | |
| С | Summer Winter | | | | | | | |
| D | Summer Winter | 60 70 | 80 85 | 95 95 | 5 5 | Standing Standing | 0 0 | PASS PASS |
| А | Summer | | | | | | | |
| В | Summer | DATA N | NOT AVAII | ABLE | | | | |
| С | Summer | DATA N | NOT AVAII | ABLE | | | | |
| D | Summer | 45 | 70 | 85 | 15 | Walking | 1 | PASS |
| | Winter | 55 | 75 | 85 | 15 | Walking | 4 | FAIL |
| Existing Phase 1 Phases 1 & | : 2 | | | • | | l | | |
| F F | B C D A B C D A B C D A B C D Existing Phase 1 Phases 1 & | D Summer Winter A Summer Winter B Summer Winter D Summer Winter D Summer Winter C Summer Winter D Summer Winter D Summer Winter D Summer Winter D Summer Winter D Summer Winter D Summer Winter D Summer Winter | DSummer65 WinterASummerDATA N WinterBSummerDATA N WinterBSummerDATA N WinterCSummerDATA N WinterDSummer50 WinterDSummer50 WinterASummerDATA N WinterBSummerDATA N WinterBSummerDATA N WinterBSummerDATA N WinterCSummerDATA N WinterDSummer60 WinterDSummer60 WinterASummerDATA N WinterBSummerDATA N WinterBSummerDATA N WinterDSummerAA N WinterDSummerAA N WinterDSummerDATA N VinterDSummerAA N N MinterDSummer45 WinterExisting Phase 1 Phases 1 & 22 | DSummer6580ASummerDATA NOT AVAIIWinterDATA NOT AVAIIBSummerDATA NOT AVAIIWinterDATA NOT AVAIIWinterDATA NOT AVAIIWinterDATA NOT AVAIIWinterDATA NOT AVAIIWinterDATA NOT AVAIIDSummer5070WinterBATA NOT AVAIIDSummer5070WinterDATA NOT AVAIIBSummerDATA NOT AVAIIWinterDATA NOT 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AVAILABLEValuable0OSummerDATA NOT AVAILABLEValuable0OSummerDATA NOT AVAILABLEValuable0MinterDATA NOT AVAILABLEValuableValuableDSummerDATA NOT AVAILABLEValuableDSummerDATA NOT AVAILABLEValuableDSummerDATA NOT AVAILABLEValuableBSummerDATA NOT AVAILABLEValuableDSummerDATA NOT AVAILABLEValuableDSummerDATA NOT AVAILABLE< |



| Table 1: Pedestrian Wind Comfort and | Safety Categories - Multiple Seasons |
|--------------------------------------|--------------------------------------|
|--------------------------------------|--------------------------------------|

| GEM V | ORT CATI Vind Speed (ry Limit | | Sitting 0 - 6 ≥80% | 0 - 9 ≥80% | Walking 0 - 12 ≥80% | Uncomt >12 >20% | lonuole | Gust Spe | Y CATEG eed ≥55 (m its Seasona |
|-----------|---|------------------|--------------------------|------------------------|---------------------------|-----------------------|----------------------|----------|--------------------------------------|
| Loc. | Config. | Season | % | % | % | % | RATING | Events | RATIN |
| | 8 | | | | | | | | |
| 86 | А | Summer | | NOT AVAII | | | | | |
| | В | Winter Summer | | NOT AVAII NOT AVAII | | | | | |
| | С | Winter Summer | | NOT AVAII NOT AVAII | | | | | |
| | | Winter | DATA N | NOT AVAII | LABLE | | | | |
| | D | Summer | 50 | 70 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 60 | 75 | 90 | 10 | Walking | 1 | PASS |
| 87 | А | Summer | | NOT AVAII | | | | | |
| | D | Winter | | NOT AVAII | | | | | |
| | В | Summer Winter | | NOT AVAII | | | | | |
| | С | Winter Summer | | NOT AVAII | | | | | |
| | U | Winter | | NOT AVAII NOT AVAII | | | | | |
| | D | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | D | Winter | 03 70 | 85 | 95 95 | 5 | Standing | 0 | PASS |
| | | winter | 70 | 05 |)5 | 5 | Standing | 0 | 1 455 |
| 88 | А | Summer | DATA N | NOT AVAII | LABLE | | | | |
| | | Winter | DATA N | NOT AVAII | LABLE | | | | |
| | В | Summer | DATA N | NOT AVAII | LABLE | | | | |
| | | Winter | | NOT AVAII | | | | | |
| | С | Summer | | NOT AVAII | | | | | |
| | P | Winter | | NOT AVAII | | - | a . r | 0 | D 4 G G |
| | D | Summer | 65 75 | 85 85 | 95 05 | 5 | Standing Standing | 0 | PASS |
| | | Winter | 15 | 85 | 95 | 5 | Standing | 0 | PASS |
| 89 | А | Summer | DATA N | NOT AVAII | LABLE | | | | |
| | | Winter | DATA N | NOT AVAII | LABLE | | | | |
| | В | Summer | DATA N | NOT AVAII | LABLE | | | | |
| | | Winter | | NOT AVAII | | | | | |
| | С | Summer | | NOT AVAII | | | | | |
| | 5 | Winter | | NOT AVAII | | - | a . 1 | C. | D |
| | D | Summer | 70 75 | 85 85 | 95 05 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 0 | PASS |
| 90 | А | Summer | DATA N | NOT AVAII | LABLE | | | | |
| | | Winter | | NOT AVAII | | | | | |
| | В | Summer | | NOT AVAII | | | | | |
| | | Winter | | NOT AVAII | | | | | |
| | С | Summer | | NOT AVAII | | | | | |
| | D | Winter | | NOT AVAII | | ~ | G. 1 | 0 | DAGG |
| | D | Summer | 65 75 | 85 85 | 95 05 | 5 | Standing | 0 | PASS |
| | | Winter | 15 | 85 | 95 | 5 | Standing | 0 | PASS |
| | - Existing | | | | r: May - C | | _ | | |
| | - Phase 1 | | | Winter: | Novemb | per - Apri | 1 | | |
| | - Phases 1 & | | | | | | | | |
| iration D | - Phases 1, 2 | 2 & 3 | | | | | | | |



| Table 1: Pedestrian Wind Comfort and | Safety Categories - Multiple Seasons |
|--------------------------------------|--------------------------------------|
|--------------------------------------|--------------------------------------|

| | ind Speed (| E GORY mph) | Sitting 0 - 6 ≥80% | 0 - 9 ≥80% | Walking 0 - 12 ≥80% | Uncomf >12 >20% | onable | - | ed ≥55 (m its Seasona |
|-----------------------------|-----------------------|-----------------------|--------------------------|------------------------|---------------------------|------------------------|----------------------|--------|--------------------------|
| Loc. | Config. | Season | % | % | % | % | RATING | Events | RATIN |
| Loc. | Coning. | Season | 70 | 70 | 70 | 70 | KAIINO | Events | KATIN |
| 91 | А | Summer | | NOT AVAII | | | | | |
| | В | Winter Summer | | NOT AVAII NOT AVAII | | | | | |
| | | Winter | | NOT AVAII | | | | | |
| | С | Summer | | NOT AVAII | | | | | |
| | | Winter | | NOT AVAII | | | | | |
| | D | Summer | 80 | 90 | 95 | 5 | Sitting | 0 | PASS |
| | | Winter | 80 | 90 | 95 | 5 | Sitting | 0 | PASS |
| 92 | А | Summer | | NOT AVAII | | | | | |
| | r. | Winter | | NOT AVAII | | | | | |
| | В | Summer | | NOT AVAII | | | | | |
| | C | Winter | | NOT AVAII | | | | | |
| | С | Summer | | NOT AVAII | | | | | |
| | D | Winter Summer | | NOT AVAII | | 5 | Standing | 0 | DAGO |
| | D | Summer Winter | 75 80 | 85 90 | 95 95 | 5 5 | Standing Sitting | 0 0 | PASS PASS |
| | | w mier | 00 | 50 | 73 | J | Sitting | 0 | газэ |
| 93 | А | Summer | DATA N | NOT AVAII | LABLE | | | | |
| | | Winter | DATA N | NOT AVAII | LABLE | | | | |
| | В | Summer | DATA N | NOT AVAII | LABLE | | | | |
| | | Winter | | NOT AVAII | | | | | |
| | С | Summer | DATA N | NOT AVAII | LABLE | | | | |
| | | Winter | DATA N | NOT AVAII | | | | | |
| | D | Summer | 75 | 95 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| 94 | А | Summer | DATA N | NOT AVAII | LABLE | | | | |
| | | Winter | DATA N | NOT AVAII | LABLE | | | | |
| | В | Summer | DATA N | NOT AVAII | LABLE | | | | |
| | | Winter | | NOT AVAII | | | | | |
| | С | Summer | | NOT AVAII | | | | | |
| | ~ | Winter | | NOT AVAII | | | ~ ~ ~ | - | |
| | D | Summer | 70 | 90 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 80 | 90 | 95 | 5 | Sitting | 0 | PASS |
| 95 | А | Summer | | NOT AVAII | | | | | |
| | л | Winter | | NOT AVAII | | | | | |
| | В | Summer | | NOT AVAII | | | | | |
| | C | Winter | | NOT AVAII | | | | | |
| | С | Summer Winter | | NOT AVAII | | | | | |
| | D | Winter Summer | 65 | NOT AVAII 85 | 95 | 5 | Standing | 0 | PASS |
| | U | Summer Winter | 65 75 | 85 90 | 95 95 | 5 5 | Standing Standing | 0 | PASS |
| | | | | | | | | | |
| uration A - uration B - | - | | | Summe Winter: | r: May - C | October ber - April | 1 | | |
| | Phase 1 Phases 1 & | - 2 | | winter: | noveint | er - April | L | | |
| | - Phases 1 & | | | | | | | | |
| | 1 mases 1, 1 | - 0. 5 | | | | | | 1 | |

| COMFORT CATEGORY GEM Wind Speed (mph) Category Limit | | 0-6 0-9 0-12 | | Walking 0 - 12 ≥80% | g Uncomfortable >12 >20% | | Gust Spe | EXACTEGORY eed \geq 55 (mph) its Seasonally | |
|--|---------|--------------|--------|---------------------------|--------------------------------|----|----------|--|--------|
| Loc. | Config. | Season | % | % | % | % | RATING | Events | RATING |
| 96 | А | Summer | DATA N | JOT AVAII | LABLE | | | | |
| | | Winter | DATA N | JOT AVAII | LABLE | | | | |
| | В | Summer | | NOT AVAII | | | | | |
| | | Winter | | NOT AVAII | | | | | |
| | С | Summer | | JOT AVAII | | | | | |
| | | Winter | | NOT AVAII | | | | | |
| | D | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 0 | PASS |
| 97 | А | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | _ | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 60 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 55 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 1 | PASS |
| | D | Summer | 60 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 70 | 80 | 90 | 10 | Standing | 1 | PASS |
| 98 | А | Summer | 60 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 55 | 75 | 95 | 5 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 0 | PASS |
| | D | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 1 | PASS |
| 99 | А | Summer | 70 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 55 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 0 | PASS |
| | С | Summer | 55 | 75 | 95 | 5 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 1 | PASS |
| | D | Summer | 65 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| 100 | А | Summer | 70 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 100 | 0 | Standing | 0 | PASS |
| | В | Summer | 65 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 60 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 65 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |

Configuration A - Existing Configuration B - Phase 1 Configuration C - Phases 1 & 2 Configuration D - Phases 1, 2 & 3 Summer: May - October Winter: November - April

| COMFORT CATEGORY GEM Wind Speed (mph) Category Limit | | | SittingStanding $0 - 6$ $0 - 9$ $\geq 80\%$ $\geq 80\%$ | | Walking 0 - 12 ≥80% | Uncomfe >12 >20% | ortable | Gust Spe | Y CATEGORY eed ≥55 (mph) nts Seasonally |
|--|---------|--------|---|----|---------------------------|------------------------|----------|----------|---|
| Loc. | Config. | Season | % | % | % | % | RATING | Events | RATING |
| 101 | А | Summer | 75 | 95 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 80 | 90 | 100 | 0 | Sitting | 0 | PASS |
| | В | Summer | 55 | 75 | 95 | 5 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 95 | 5 | Standing | 1 | PASS |
| | С | Summer | 55 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 60 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| 102 | А | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 65 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| 103 | А | Summer | 75 | 95 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 80 | 90 | 95 | 5 | Sitting | 0 | PASS |
| | В | Summer | 75 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 80 | 90 | 95 | 5 | Sitting | 0 | PASS |
| | С | Summer | 75 | 95 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 80 | 90 | 100 | 0 | Sitting | 0 | PASS |
| | D | Summer | 80 | 95 | 100 | 0 | Sitting | 0 | PASS |
| | | Winter | 80 | 95 | 100 | 0 | Sitting | 0 | PASS |
| 104 | А | Summer | 65 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 70 | 90 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 55 | 75 | 95 | 5 | Walking | 0 | PASS |
| | | Winter | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 55 | 75 | 95 | 5 | Walking | 0 | PASS |
| | | Winter | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| 105 | А | Summer | 75 | 95 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 80 | 90 | 95 | 5 | Sitting | 0 | PASS |
| | В | Summer | 70 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 70 | 90 | 100 | 0 | Standing | 0 | PASS |
| | - | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 70 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |

Configuration A - Existing Configuration B - Phase 1 Configuration C - Phases 1 & 2 Configuration D - Phases 1, 2 & 3



| COMFORT CATEGORY GEM Wind Speed (mph) Category Limit | | | SittingStanding $0 - 6$ $0 - 9$ $\geq 80\%$ $\geq 80\%$ | | Walking 0 - 12 ≥80% | Uncomfortable >12 >20% | | Gust Spe | Y CATEGOI eed $\geq 55 \text{ (mph)}$ its Seasonally |
|--|---------|--------|---|----|---------------------------|------------------------------|----------|----------|--|
| Loc. | Config. | Season | % | % | % | % | RATING | Events | RATING |
| 106 | А | Summer | 55 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 55 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 70 | 80 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 55 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 60 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| 107 | А | Summer | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 70 | 80 | 90 | 10 | Standing | 0 | PASS |
| | С | Summer | 60 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 70 | 80 | 90 | 10 | Standing | 1 | PASS |
| | D | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| 108 | А | Summer | 60 | 75 | 85 | 15 | Walking | 0 | PASS |
| | | Winter | 65 | 80 | 90 | 10 | Standing | 1 | PASS |
| | В | Summer | 60 | 80 | 90 | 10 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 90 | 10 | Standing | 1 | PASS |
| | С | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 60 | 75 | 90 | 10 | Walking | 0 | PASS |
| | | Winter | 70 | 80 | 90 | 10 | Standing | 0 | PASS |
| 109 | А | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 85 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 70 | 90 | 100 | 0 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 65 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 75 | 90 | 95 | 5 | Standing | 0 | PASS |
| 110 | А | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | В | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | С | Summer | 60 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |
| | D | Summer | 60 | 85 | 95 | 5 | Standing | 0 | PASS |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS |

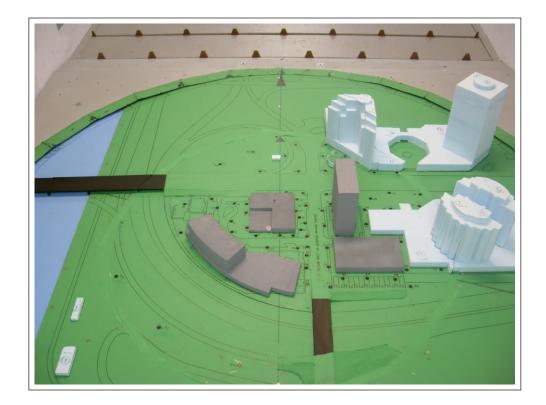
Configuration A - Existing Configuration B - Phase 1 Configuration C - Phases 1 & 2 Configuration D - Phases 1, 2 & 3 Summer: May - October Winter: November - April

| COMFORT CATEGORY GEM Wind Speed (mph) Category Limit | | Sitting Standing 0 - 6 0 - 9 ≥80% ≥80% | | Walking 0 - 12 ≥80% | Uncomfor >12 >20% | | | SAFETY CATEGORY Gust Speed ≥55 (mph) > 2 Events Seasonally | | |
|---|---------|--|----|---------------------------|-------------------------|---|----------|--|--------|--|
| Loc. | Config. | Season | % | % | % | % | RATING | Events | RATING | |
| 111 | А | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS | |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS | |
| | В | Summer | 55 | 80 | 95 | 5 | Standing | 0 | PASS | |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS | |
| | С | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS | |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS | |
| | D | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS | |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS | |
| 112 | А | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS | |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS | |
| | В | Summer | 60 | 80 | 95 | 5 | Standing | 0 | PASS | |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS | |
| | С | Summer | 60 | 85 | 100 | 0 | Standing | 0 | PASS | |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS | |
| | D | Summer | 60 | 85 | 95 | 5 | Standing | 0 | PASS | |
| | | Winter | 70 | 85 | 95 | 5 | Standing | 0 | PASS | |
| | | | | | | | - | | | |



FIGURES





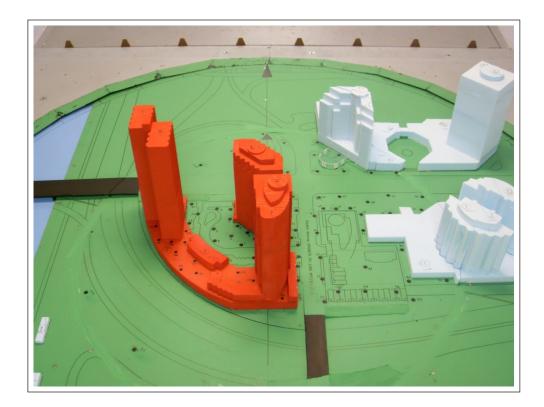
| Wind Tunnel Study Model Configuration - Existing | Figure: 1 | | RWDI | |
|---|------------------|-------|-----------------|--|
| Golden Shores Master Plan - Long Beach, California | Project #0940879 | Date: | August 19, 2009 | |





| Wind Tunnel Study Model Configuration - Phase 1 | Figure: | 1b | RWD | |
|--|------------------|-------|-----------------|--|
| Golden Shores Master Plan - Long Beach, California | Project #0940879 | Date: | August 19, 2009 | |



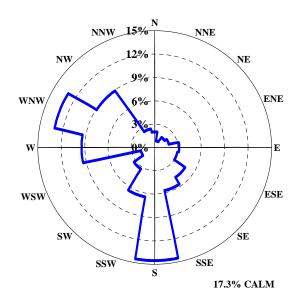


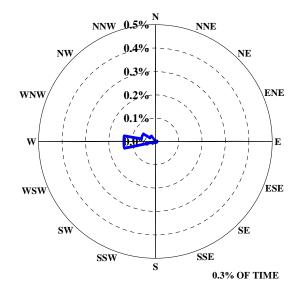
| Wind Tunnel Study Model Configuration - Phases 1 & 2 | Figure: | 1c | RWDI | |
|---|------------------|-------|-----------------|--|
| Golden Shores Master Plan - Long Beach, California | Project #0940879 | Date: | August 19, 2009 | |





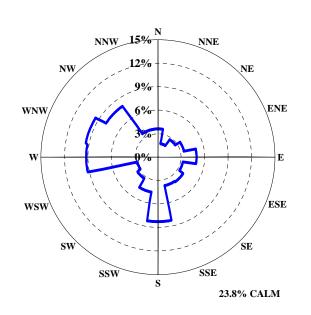
| Wind Tunnel Study Model Configuration - Phases 1, 2 & 3 | Figure: | 1d | RWDI | |
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| Golden Shores Master Plan - Long Beach, California | Project #0940879 | Date: | August 19, 2009 | |



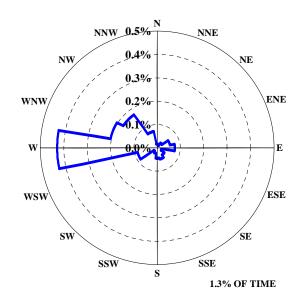


ALL SUMMER WINDS



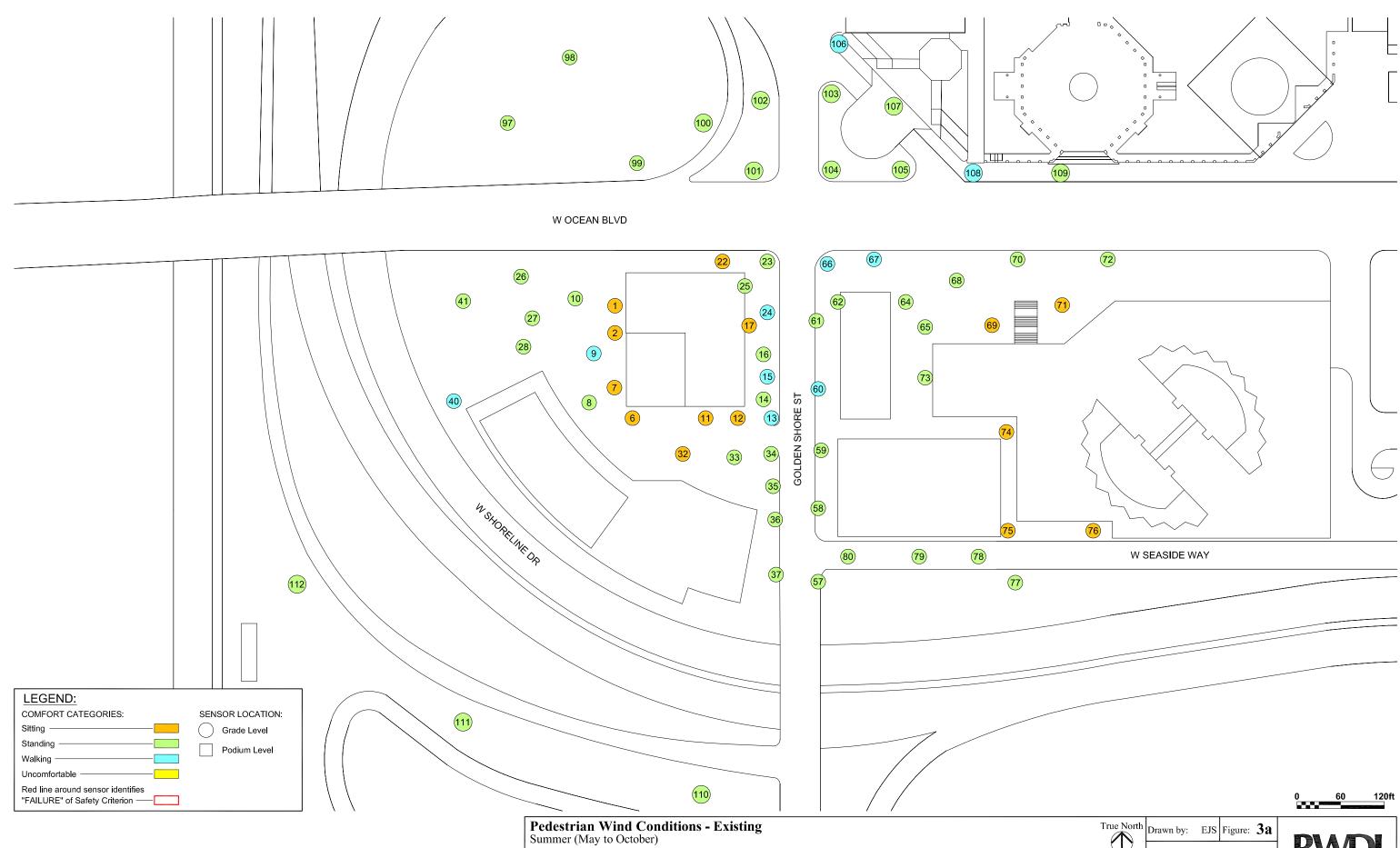


ALL WINTER WINDS

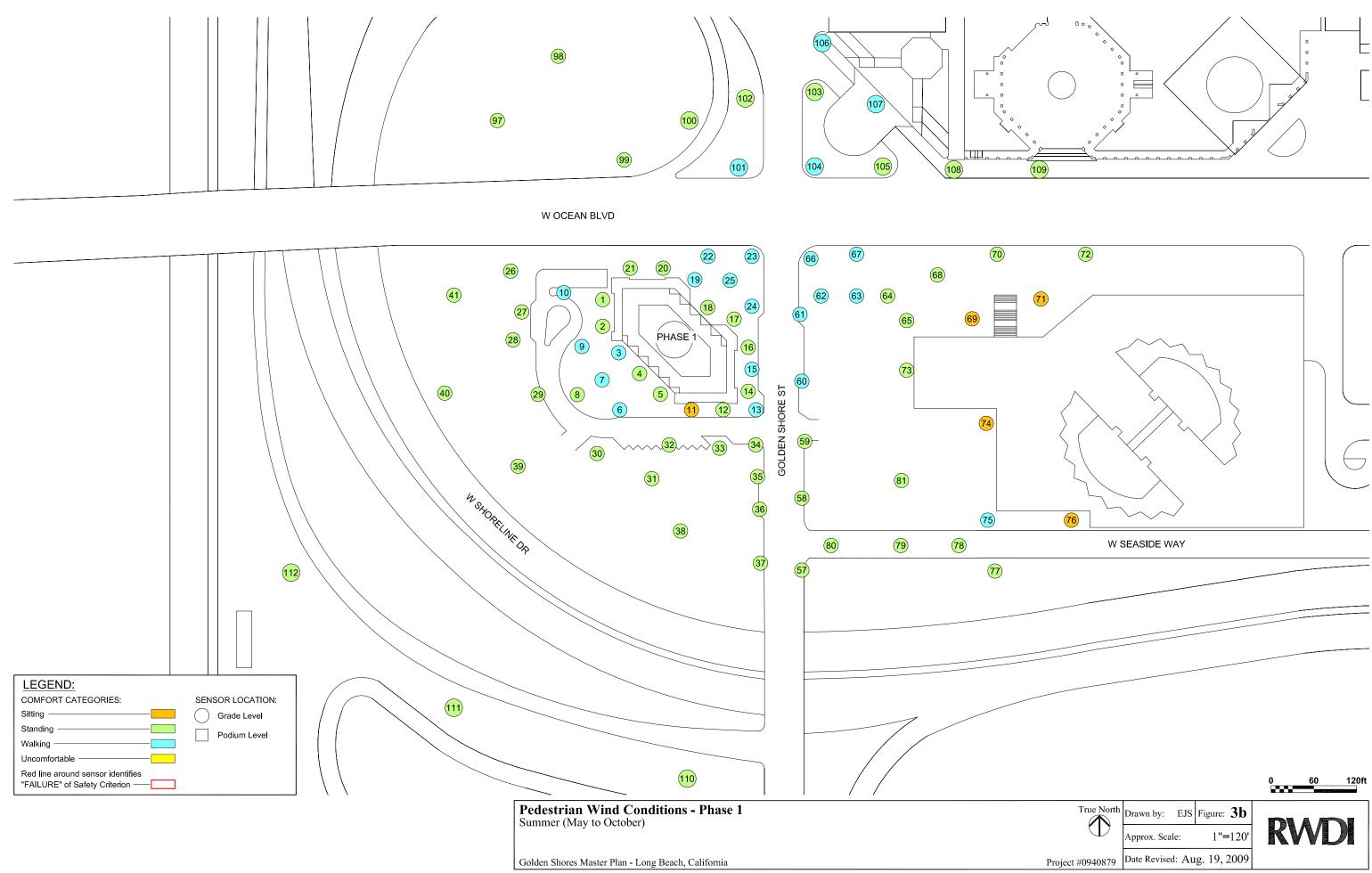


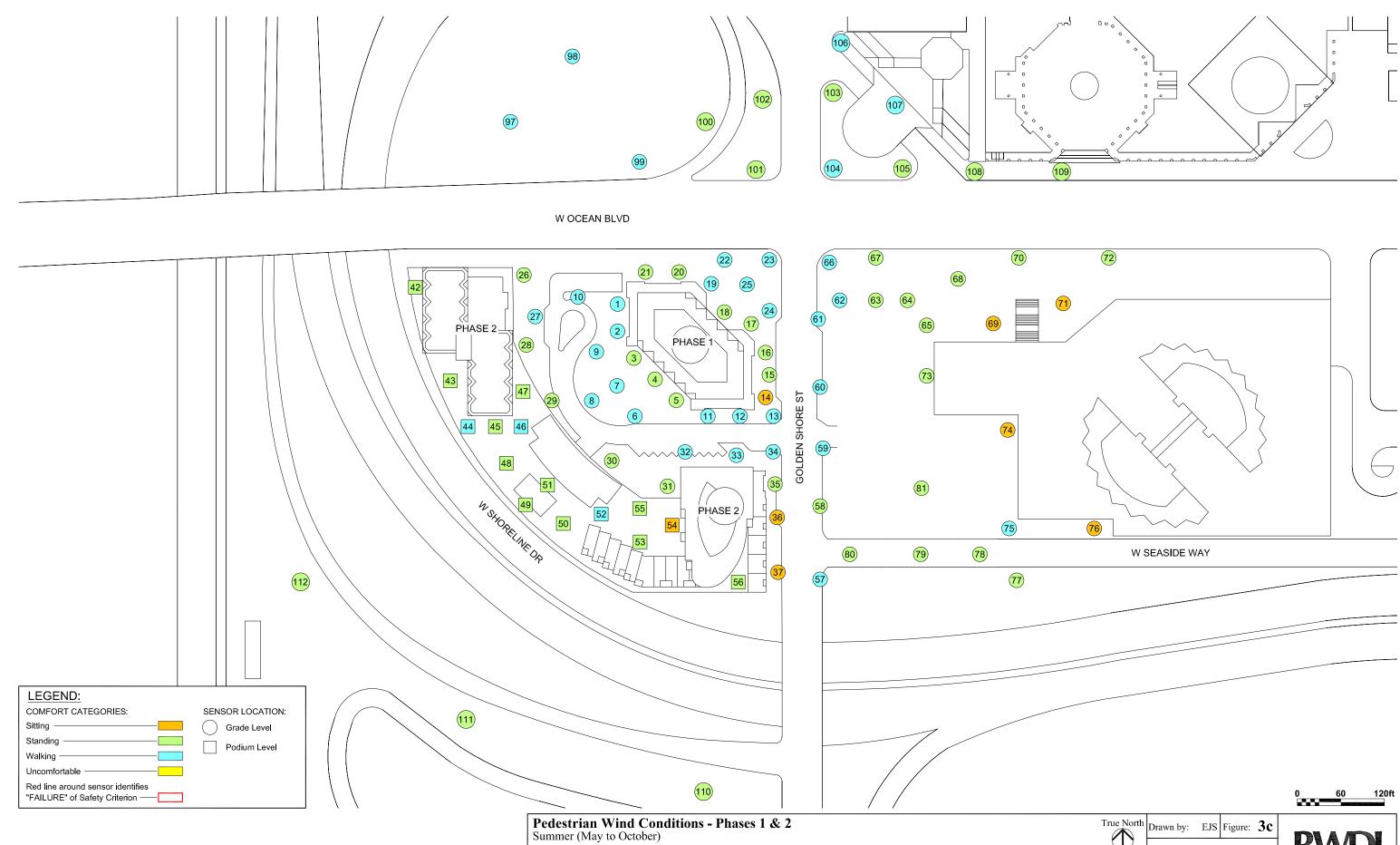
WINTER WINDS EXCEEDING 20 MPH

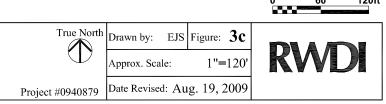
| Directional Distribution (%) of Winds (Blowing Fro Station: Long Beach Airport, CA (1943 - 2008) | Figure: | 2 | RWDI | | |
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| Golden Shores Master Plan - Long Beach, California | Project #: | 0940879 | Date: August 19 | | |

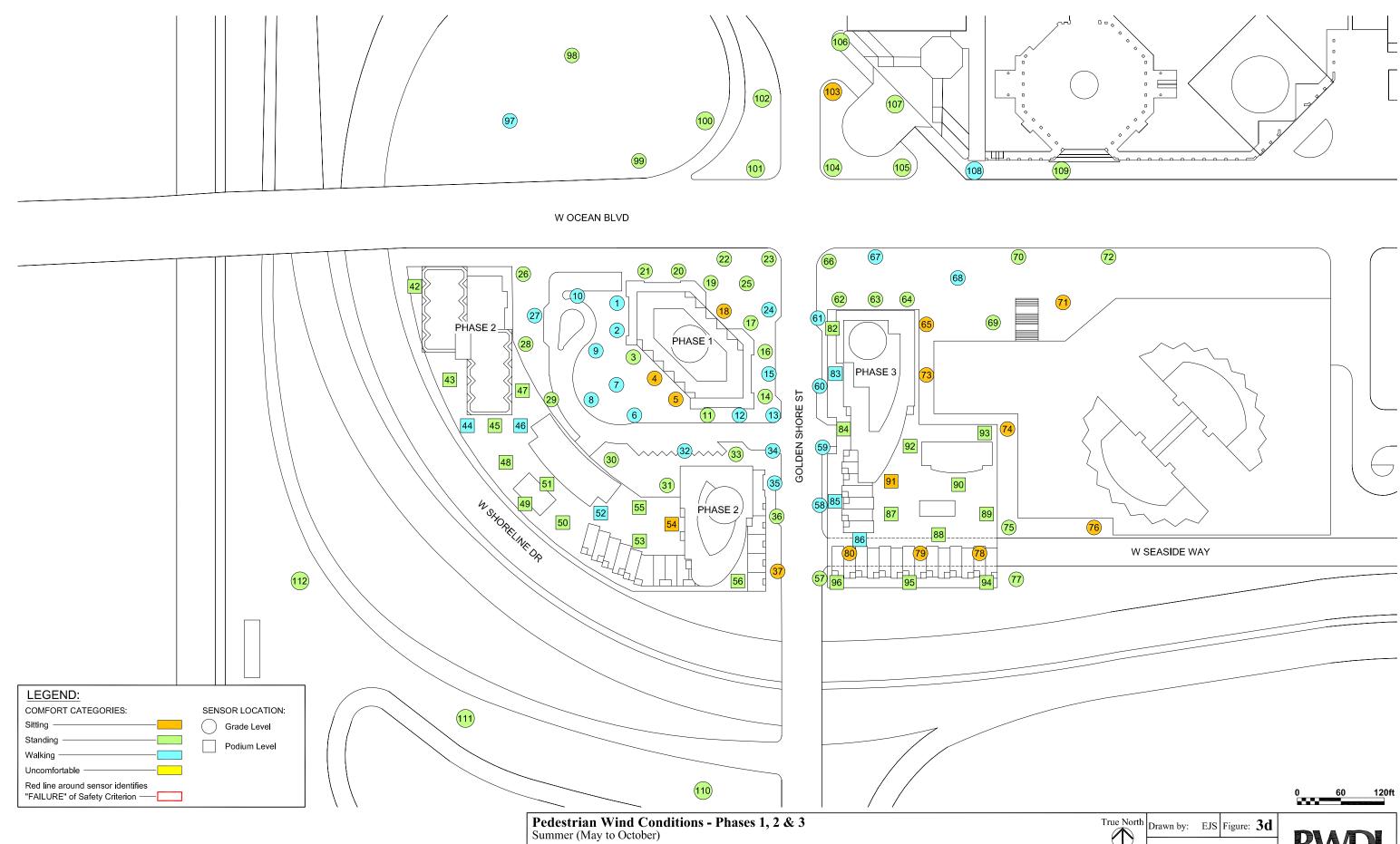


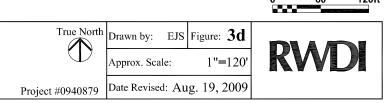
| True North | Drawn by: EJS | Figure: 3a | |
|------------------|------------------|-------------------|--|
| \oplus | Approx. Scale: | 1"=120' | |
| Project #0940879 | Date Revised: Au | g. 19, 2009 | |

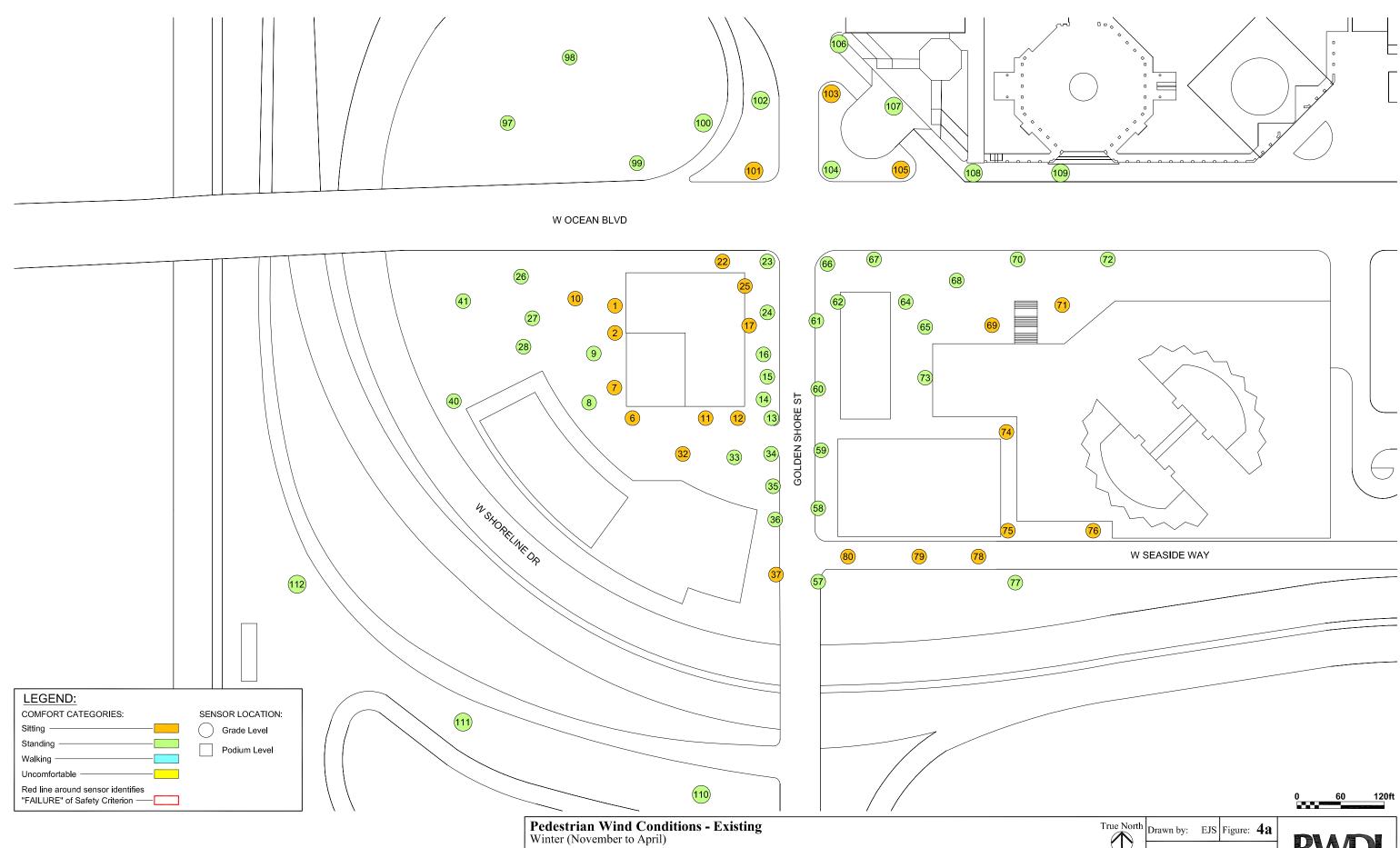


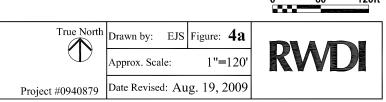


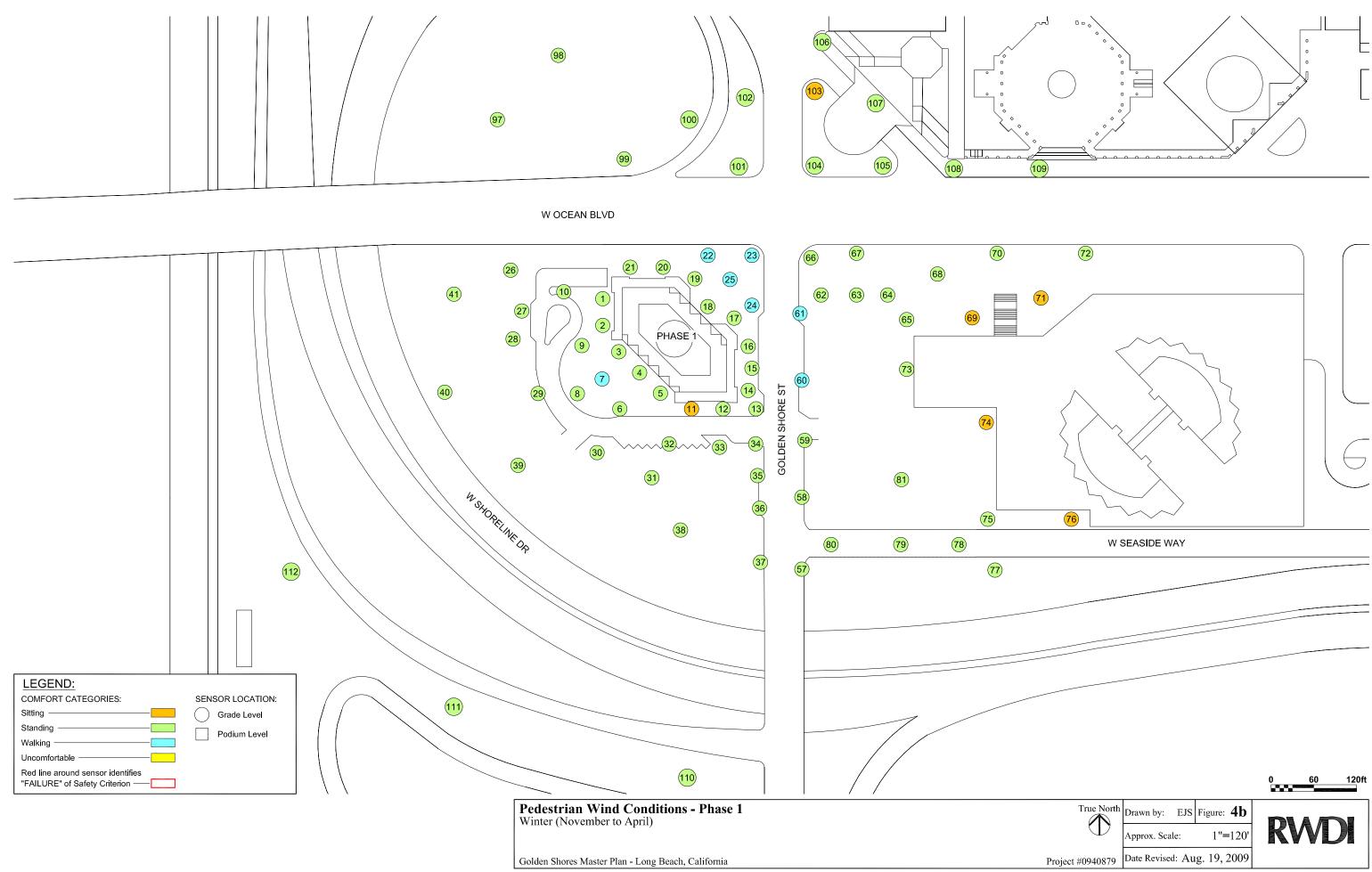


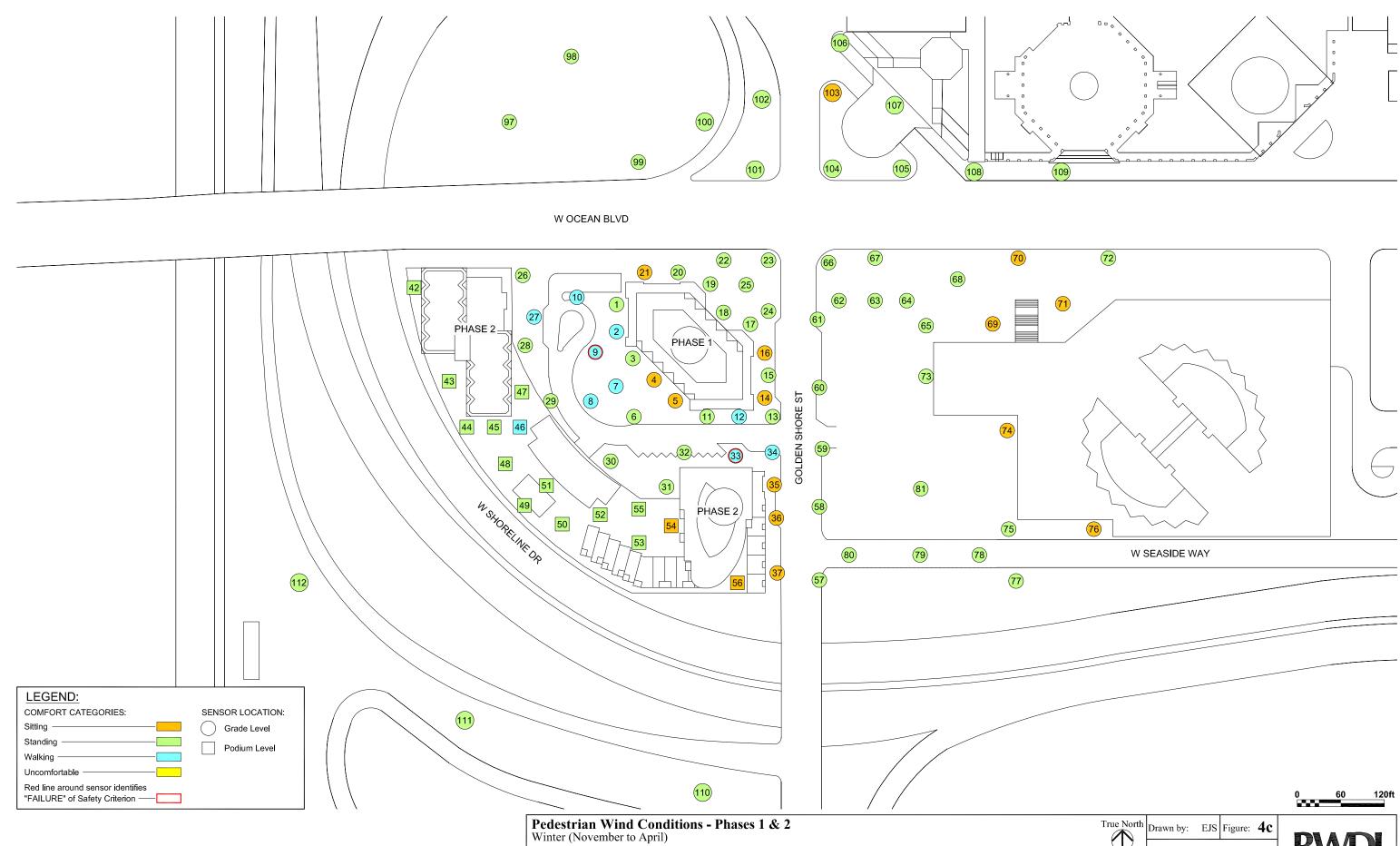




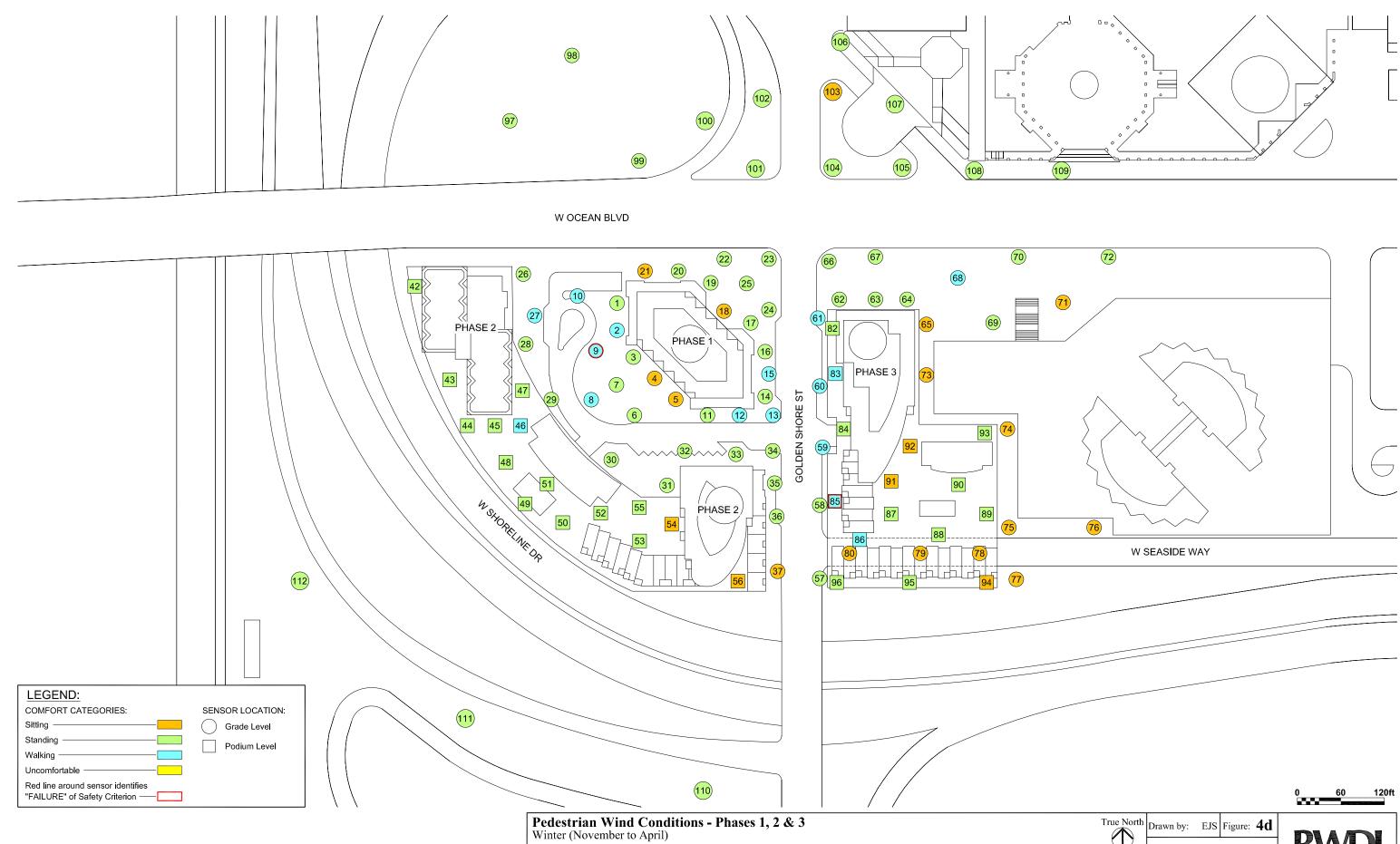


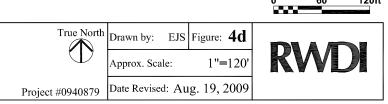






| True North | Drawn by: EJS | Figure: 4c | |
|------------------|------------------|-------------|--|
| \oplus | Approx. Scale: | 1"=120' | |
| Project #0940879 | Date Revised: Au | g. 19, 2009 | |





APPENDICES



APPENDIX A – BACKGROUND INFORMATION

A.1 METHODOLOGY

Wind tunnel testing of a 1:300 scale model was conducted for the proposed Golden Shores development in Long Beach, California for the following test configurations:

- **Configuration A** Existing on-site and surrounding buildings.
- Configuration B Phase 1 of the proposed development with existing surrounding buildings.
- **Configuration** C– Phases 1 and 2 of the proposed development with existing surrounding buildings.
- Configuration D Phases 1, 2 and 3 of the proposed development with existing surrounding buildings.

Photographs of the scale models in the boundary layer wind tunnel are shown in Figures 1a through 1d, corresponding to test Configurations A, B, C and D, respectively. The models included the proposed development and all relevant surrounding buildings and topography within a 1200 ft radius of the study site. The mean speed profile and turbulence of the natural wind approaching the modeled area were also simulated in RWDI's boundary layer wind tunnel. The model was instrumented with 112 wind speed sensors to measure mean and gust wind speeds at a full scale height of approximately 5 ft. These measurements were recorded for 36 equally incremented wind directions.

Long-term wind data are analyzed to determine the local wind climate. These wind statistics are combined with the wind tunnel data in order to predict the frequency of occurrence of full-scale wind speeds. The full-scale wind predictions are then compared with the RWDI criteria for pedestrian comfort and safety.

A.2 LOCAL METEOROLOGICAL DATA

Wind statistics recorded at the Long Beach International Airport between 1943 and 2008 were analyzed for the summer (May through October) and winter (November through April) seasons. Figure 2 graphically shows the distribution of wind frequency and directionality for the two seasons. When all wind data is considered, winds from the south and west-northwest directions



are dominant in the summer, with secondary winds from the west and northwest directions, as indicated by the upper-left wind rose (labeled All Summer Winds in Figure 2). The wind rose labeled All Winter Winds in Figure 2 illustrates the winter data. This wind rose indicates the dominance of winds from the south and west through northwest directions during the winter season. Calm winds occur for 17.3% and 23.8% of the time in summer and winter, respectively.

Strong winds of a mean speed great than 20 mph measured at the airport (at an anemometer height of 30 ft) occur for 1.3% of the time during the winter season, and are negligible during the summer. Strong winds tend to be westerly throughout the year, as demonstrated by the two right-hand wind roses in Figure 2. However, the analysis methods have accounted for these and all wind directions.

A.3 EXPLANATION OF RWDI WIND CRITERIA

The RWDI wind criteria, developed by RWDI through research and consulting practice since 1974, have been published in numerous academic journals and conference proceedings (References 1 through 6). They have also been widely accepted by municipal authorities as well as by the building design and city planning community. RWDI's criteria have been used in thousands of pedestrian wind projects and adopted as part of environmental planning guidelines by several major cities around the world.

The RWDI wind criteria deal with both pedestrian safety and comfort, as they relate to the force of the wind. Thermal effects (e.g., temperature, humidity, sun/shade, etc.) are not considered in these comfort criteria. Gust speeds over a short period are critical in some circumstances, particularly where winds are very strong and pedestrians' footing and balance are involved. The mean wind speed can also affect pedestrian comfort in areas such as an outdoor café. The combined effect of mean and gust speeds can be quantified by a Gust Equivalent Mean (GEM) speed. GEM is the greater of either the mean speed, or the gust speed divided by 1.85, which is a gust factor typically used for wind comfort (References 1, 5, 7 and 8).

The GEM wind speed predicted for each test location on the model is compared to the RWDI wind criteria to determine pedestrian comfort, while the gust speed is used for the wind safety evaluation. The following table is an example of how these predicted results are presented in this report.



| COMFORT C GEM Wind Sp Category Limit | eed (mph) | Sitting 0 - 6 80% | Standing 0 - 9 80% | Walking 0 - 12 80% | Uncomf > 12 > 20% | òrtable | Gust Spee | CATEGORY ed. 55mph s Seasonally |
|---|--------------------------------------|-------------------------|--------------------------|--------------------------|-------------------------|--|------------------|--|
| Loc. Config. | Season | % | % | % | % | RATING | Events | RATING |
| 999 A B | Summer Winter Summer Winter | 75 50 65 45 | 85 70 80 65 | 95 85 90 75 | 5 15 10 25 | Standing Walking Standing Uncomfortable | 0 1 2 4 | PASS PASS PASS FAIL |

Example Table: Pedestrian Wind Comfort and Safety Categories

Across the top of the Example Table there are four comfort categories:

- Sitting: Wind speeds up to 6 mph Low wind speeds during which one can read a newspaper without having it blown away. Recommended for outdoor cafes and other amenity spaces that promote sitting.
- Standing: Wind speeds up to 9 mph Slightly higher wind speeds that are strong enough to rustle leaves. These wind speeds are appropriate at major building entrances, bus stops or other areas, such as a bench along a sidewalk, where people may want to linger but not necessarily sit for extended periods of time.
- Walking: Wind speeds up to 12 mph Winds that would lift leaves, move litter, hair and loose clothing. Appropriate for sidewalks, intersections, plazas, parks or playing fields where people are more likely to be active and receptive to some wind activity.
- Uncomfortable: Wind speeds greater than 12 mph The effects of wind speeds at this level range from small trees swaying and wind force being felt on the body to whole trees being in motion and inconvenience being felt when walking. Winds of this magnitude are considered a nuisance for most activities, but can be acceptable depending upon the season and use of an area.

Along the left side of the Example Table, the sensor location, test configuration and season are listed. The subsequent four columns show the percentage of time that the winds are predicted to fall within the wind speed ranges for each comfort category. The percentage has been rounded to the closest 5% to reflect the general public's insensitivity to a small change in wind speed.



Wind conditions are considered acceptable for sitting, standing or walking if the wind speeds are within their specified ranges at least 80% of the time. Using this criterion, each location has been given a comfort RATING on the right side of the "COMFORT CATEGORY" section of the table. Pedestrian activities other than the wind comfort category rating can still take place in the area; however, the percentages of time that the wind will be comfortable for other activities may be less than the desired 80% criterion.

For example, at Location 999 in the Example Table, the summer wind conditions are identified as comfortable for sitting 75% of the time and suitable for standing 85% of the time for Configuration A. While these percentages become lower in Configuration B (65% and 80%, respectively), the summer wind conditions for both configurations are considered to be in the same category, i.e., comfortable for standing. The winter wind conditions for Configuration B are rated uncomfortable, since the 80% criterion is not satisfied for walking. Wind speed reduction may be needed if the comfort designation is uncomfortable or if the wind conditions are not consistent with the intended use of an area.

Safety is also considered by the criteria. Gust speeds in excess of 55 mph can adversely affect a pedestrian's balance and footing. If winds of this magnitude occur more than two times per season, a "FAIL" RATING is indicated in the "SAFETY CATEGORY" section. Location 999 for Configuration B in the Example Table fails the safety criterion in the winter. Wind control measures are typically required at locations that receive the "FAIL" RATING.

These guidelines represent average wind tolerance. Regional differences in wind climate and variations in age, health, clothing, etc. can affect people's perception of the wind climate. For example, on very hot days, higher winds can be tolerated because the cooling effect of the wind would be considered pleasant. On colder days, people's tolerance of wind would be reduced, especially if they are unprepared or without appropriate clothing.



A.4 REFERENCES

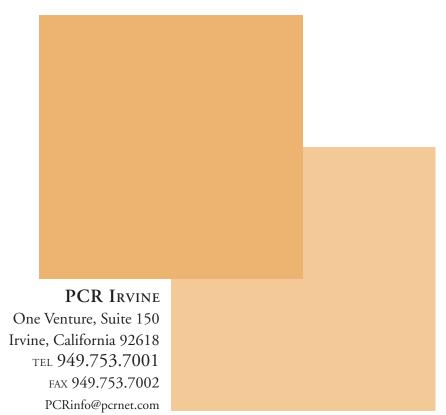
- ASCE Task Committee on Outdoor Human Comfort (2004). Outdoor Human Comfort and Its Assessment, 68 pages, American Society of Civil Engineers, Reston, Virginia, USA.
- 2) Williams, C.J., Hunter, M.A. and Waechter, W.F. (1990). "Criteria for Assessing the Pedestrian Wind Environment," *Journal of Wind Engineering and Industrial Aerodynamics*, Vol.36, pp.811-815.
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- 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.



APPENDIX B – DRAWINGS AND INFORMATION FOR MODEL CONSTRUCTION

The drawings and information listed below were received from PCR Services Corporation and were used to construct the scale model of the proposed Golden Shores Master Plan development.

| Description | File Name | File type | Date Received |
|-------------------|---------------------------------------|-----------|---------------|
| Site Plan | Golden Shore Hotel Option B Plans.pdf | PDF | July 8, 2009 |
| Building Sections | Hotel Option B Cross Sections.pdf | PDF | July 8, 2009 |



PCR SANTA MONICA

233 Wilshire Boulevard, Suite 130 Santa Monica, California 90401 TEL **310.451.4488** FAX **310.451.5279** PCRinfo@pcrnet.com

PCR PASADENA

55 South Lake Avenue, Suite 215 Pasadena, California 91101 TEL 626.204.6170 FAX 626.204.6171 PCRinfo@pcrnet.com