Lend Lease (Millers Point) Pty Limited

Barangaroo South - Concept Plan Amendment

Wind Impact Assessment

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1 Introduction

This report has been prepared by Cermak Peterka Petersen and Arup for submission to the Department of Planning in support of the Concept Plan Amendment Preferred Project Report for Barangaroo South.

Pedestrian acceptability of footpaths, entrances, plazas, and terraces is often an important design parameter of interest to the building owner and architect. Assessment of the acceptability of the pedestrian level wind environment is desirable during the project design phase so that modifications can be made, if necessary, to create wind conditions suitable for the intended use of the space.

Analytical methods such as computational fluid dynamics (CFD) are not capable, except in very simple geometries, to estimate wind pressures, frame loads, or windiness in pedestrian areas.

Techniques have been developed which permit boundary layer wind tunnel modelling of buildings to determine wind velocities in pedestrian areas. This report includes wind tunnel test procedures, test results, and a discussion of test results obtained. Table 1 summarises the model configurations, test methods, and data acquisition parameters used. All the data collection was performed in accordance with Australasian Wind Engineering Society (2001), and American Society of Civil Engineers (1999, 2006).

Table 1: Configurations for data acquisition

Configuration A	
Geometry:	Proposed Barangaroo South Concept Plan Amendment with surrounding buildings and landscape, as shown in Figure 4.
Pedestrian Velocities:	Pedestrian winds measured at 51 locations for 16 wind directions in 22.5° increments from 0° (north).
Configuration B.1	
Geometry:	Existing configuration.
Pedestrian Velocities:	Pedestrian winds measured at 6 locations for 16 wind directions in 22.5° increments from 0° (north).

2 The Wind Tunnel Test

Modelling of the aerodynamic loading on a structure requires special consideration of flow conditions to obtain similitude between the model and the prototype. A detailed discussion of the similarity requirements and their wind tunnel implementation can be found in Cermak (1971, 1975, 1976). In general, the requirements are that the model and prototype be geometrically similar, that the approach mean velocity and turbulence characteristics at the model building site have a vertical profile shape similar to the full-scale flow, and that the Reynolds number for the model and prototype be equal. Due to modelling constraints the Reynolds number cannot be made equal and Australasian Wind Engineering Society Quality Assurance Manual (2001) suggests a minimum Reynolds number of 50,000, based on minimum model width and wind velocity at the top of the model; in this study the modelled Reynolds number was over 50,000.

The wind tunnel test was performed in the boundary layer wind tunnel shown in Figure 1. The wind tunnel test section is 3.0 m wide, by 2.4 m high with a porous slatted roof for passive blockage correction. This wind tunnel has a 21 m long test section, the floor of which is covered with roughness elements, preceded by a vorticity generating fence and spires The spires, barrier, and roughness elements were designed to provide a modelled atmospheric boundary layer approximately 1.2 m thick with a mean velocity and turbulence intensity profile similar to that expected to occur in the region approaching the modelled area. The approach wind characteristics used for the model test are shown in Figure 2 and are explained more fully in Section 4.1.

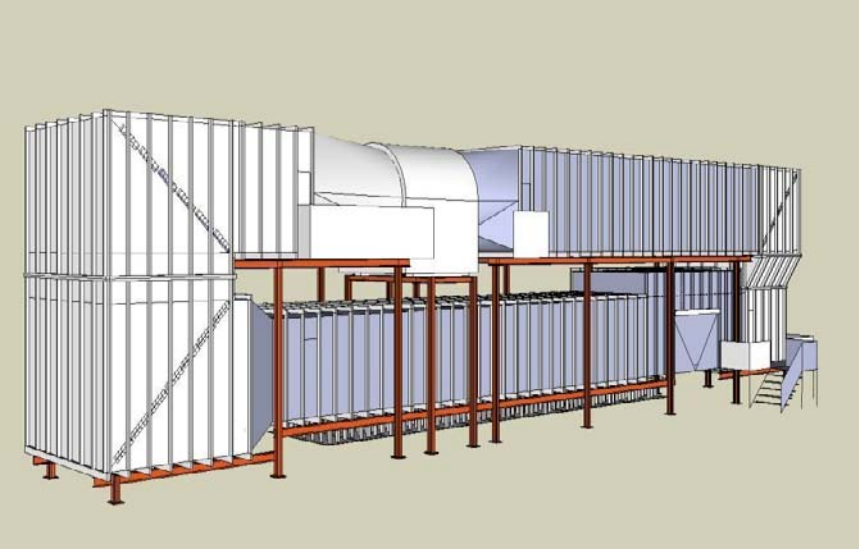

Figure 1: Schematic of the closed circuit wind tunnel

A model of the proposed development and surrounds to a radius of 570 m was constructed at a scale of 1:400, which was consistent with the modelled atmospheric flow, permitted a reasonable test model size with an adequate portion of the adjoining environment to be included in a proximity model, and was within wind tunnel blockage limitations. Significant variations in the building surface were formed into the model. The models were mounted on the turntable located near the downstream end of the wind tunnel test section as shown in Figure 3. The turntable permitted rotation of the modelled area for examination of velocities

from any approach wind direction. Additional photos of the testing are shown in Appendix B.

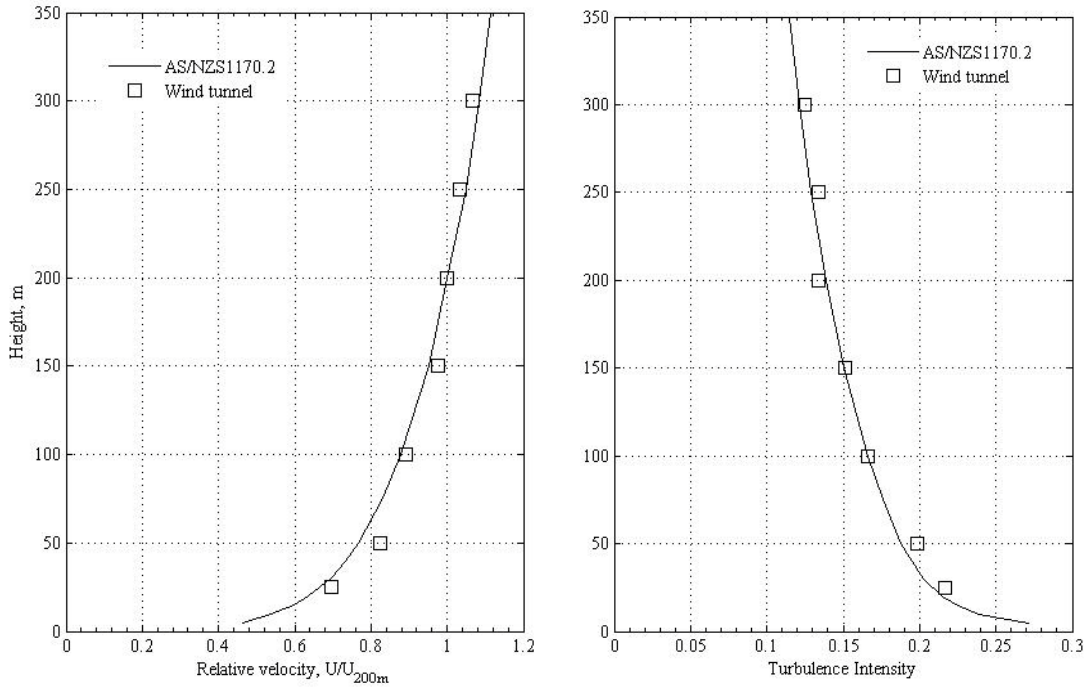

Figure 2: Mean velocity and turbulences profiles approaching the model

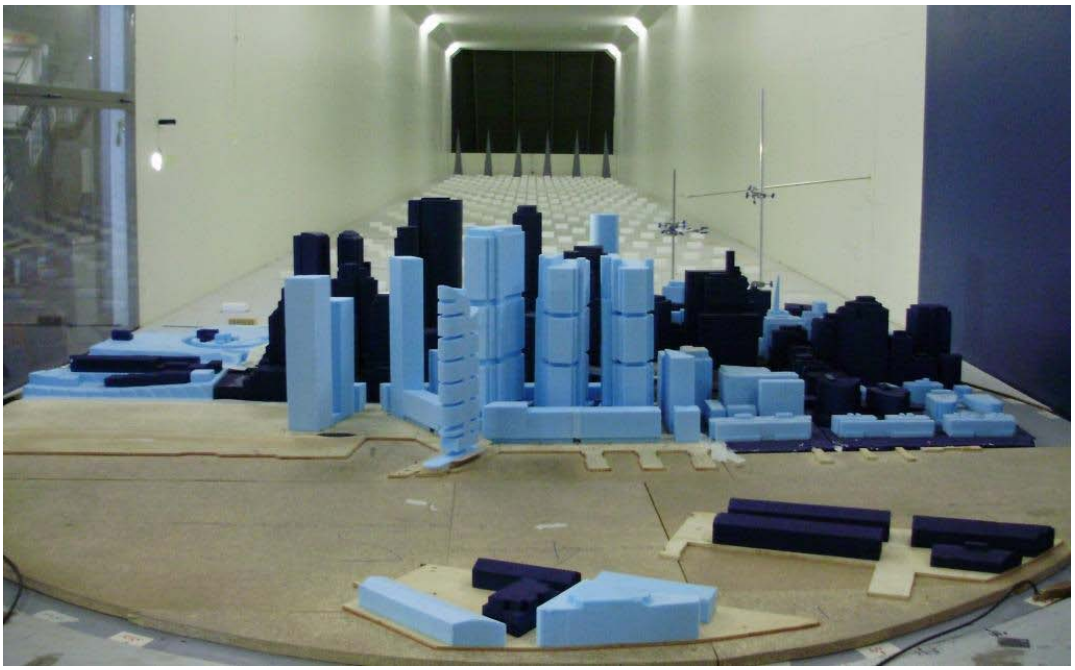

Figure 3: Photograph of the Barangaroo South model in the CPP wind tunnel

3 Environmental Wind Criteria

Over the years, a number of researchers have added to the knowledge of wind effects on pedestrians by suggesting criteria for comfort and safety. Because pedestrians will tolerate higher wind speeds for a smaller period of time than for lower wind speeds, these criteria provide a means of evaluating the overall acceptability of a pedestrian location. Also, a location can be evaluated for its intended use, such as for an outdoor café or a footpath. One of the most widely accepted set of criteria was developed by Lawson (1990), which is described in Table 2 and Table 3.

Lawson's criteria have categories for discomfort, based on wind speeds exceeded five percent of the time, allowing planners to judge the usability of locations for various intended purposes ranging from 'Business Walking' to 'Pedestrian sitting'. The level and severity of these comfort categories can vary based on individual preference, so calibration to the local wind environment is recommended when evaluating the Lawson ratings. The criteria also include a distress rating, for safety assessment, which is based on occasional (once or twice per year) wind speeds[1]. In both cases, the wind speed used the larger of a mean or gust equivalent-mean (GEM) wind speed. The GEM is defined as the peak gust wind speed divided by 1.85; this is intended to account for locations where the gustiness is the dominant characteristic of the wind. Assessment using the Lawson criteria provides a similar classification as using once per annum gust criteria, which are the basis of the City of Sydney (2004) DCP, however provides significantly more information regarding the serviceability wind climate.

Table 2: Summary of Lawson Criteria for Comfort

Comfort (Maximum of mean or gust equivalent mean (GEM†) wind speed exceeded 5% of the time)	
< 4 m/s	Pedestrian Sitting (considered to be of long duration)
4 - 6 m/s	Pedestrian Standing (or sitting for a short time or exposure)
6 - 8 m/s	Pedestrian Walking
8 - 10 m/s	Business Walking (objective walking from A to B or for cycling)
> 10 m/s	Uncomfortable

†. The gust equivalent mean (GEM) is the peak 3s gust wind speed divided by 1.85.

The rating of 'uncomfortable' in Table 2 is the wording of the acceptance criteria author and may not apply directly to any particular project. High wind areas are certainly not uncomfortable all the time, just on windier days. The word uncomfortable, in our understanding, refers to acceptability of the site by pedestrians for typical pedestrian use (i.e. on the windiest days, pedestrians will not find the areas 'acceptable' for walking and will tend to avoid such areas if possible).

[1] The distress rating fail indicates some unspecified potential for causing injury to a less stable individual who might be blown over. The likelihood of such events is not well described in the literature and is likely to be strongly affected by individual differences, presence of water, blowing dust or particulates, and other variables in addition to the wind speed.

Table 3: Summary of Lawson Criteria for Distress

Distress (Maximum of mean or GEM† wind speed exceeded 0.022% of the time)	
<15 m/s	Not to be exceeded more than two times per year (or one time per season) for general access area.
<20 m/s	Not to be exceeded more than two times per year (or one time per season) where only able bodied people would be expected (frail people or cyclists would not be expected).

†. The gust equivalent mean (GEM) is the peak 3s gust wind speed divided by 1.85.

4 Data Acquisition and Results

4.1 Velocities

Velocity profile measurements were taken to verify that appropriate boundary layer flow approaching the site was established and to determine the likely pedestrian level wind climate around the test site. Pedestrian wind measurements and analysis are described in Section 4.1.2. All velocity measurements were made with hot-film anemometers, which were calibrated against a Pitot-static tube in the wind tunnel. The calibration data were described by a King's Law relationship (King, 1914)

4.1.1 Velocity Profiles

Mean velocity and turbulence intensity profiles for the boundary layer flow approaching the model are shown in Figure 2. Turbulence intensities are related to the local mean wind speed. These profiles have the form as defined in Standards Australia (2002) and are appropriate for the approach conditions.

4.1.2 Pedestrian Winds

Barangaroo is located to the east of Darling Harbour and directly to the north of the King Street Wharf precinct. The topography rises steeply to the east of the site toward Kent Street and the Western Distributor road deck as shown in Figure 4. The Barangaroo South development consists of twenty buildings of varying height and plan form, based on the architectural plans dated 04 November 2010. For this report wind speed measurements were recorded at 51 locations to evaluate pedestrian comfort in and around the project site as shown in Figure 4 and Figure 5. The central colour of each location dot indicates the comfort rating for the location, and the colour of the outer ring indicates whether the location passes the distress criterion. The points tested close to the site were tested for the configuration described in Table 1. Velocity measurements were made at the model scale equivalent of 1.5m to 2.1m above the ground surface for 16 wind directions at 22.5° intervals. Locations were chosen to determine the degree of pedestrian comfort at the building corners where relatively severe conditions are typically found, near building entrances, on adjacent pavements with heavy pedestrian traffic, and in open plaza areas. Seven comparative pedestrian positions, three located in a familiar or relatively undisturbed area near the project site, were tested for reference purposes.

The hot-film signal was sampled by for a period corresponding to one hour in prototype. All velocity data was digitally filtered to obtain the two to three second running mean wind speed at each point; this is the minimum size of a gust affecting a pedestrian. These local wind speeds (*U)* were normalised by the tunnel reference velocity (U_{ref}). Mean and turbulence statistics were calculated and used to calculate the normalised effective peak gust using:

$$\frac{U_{pk}}{U_{ref}} = \frac{U + 3U_{rms}}{U_{ref}}$$

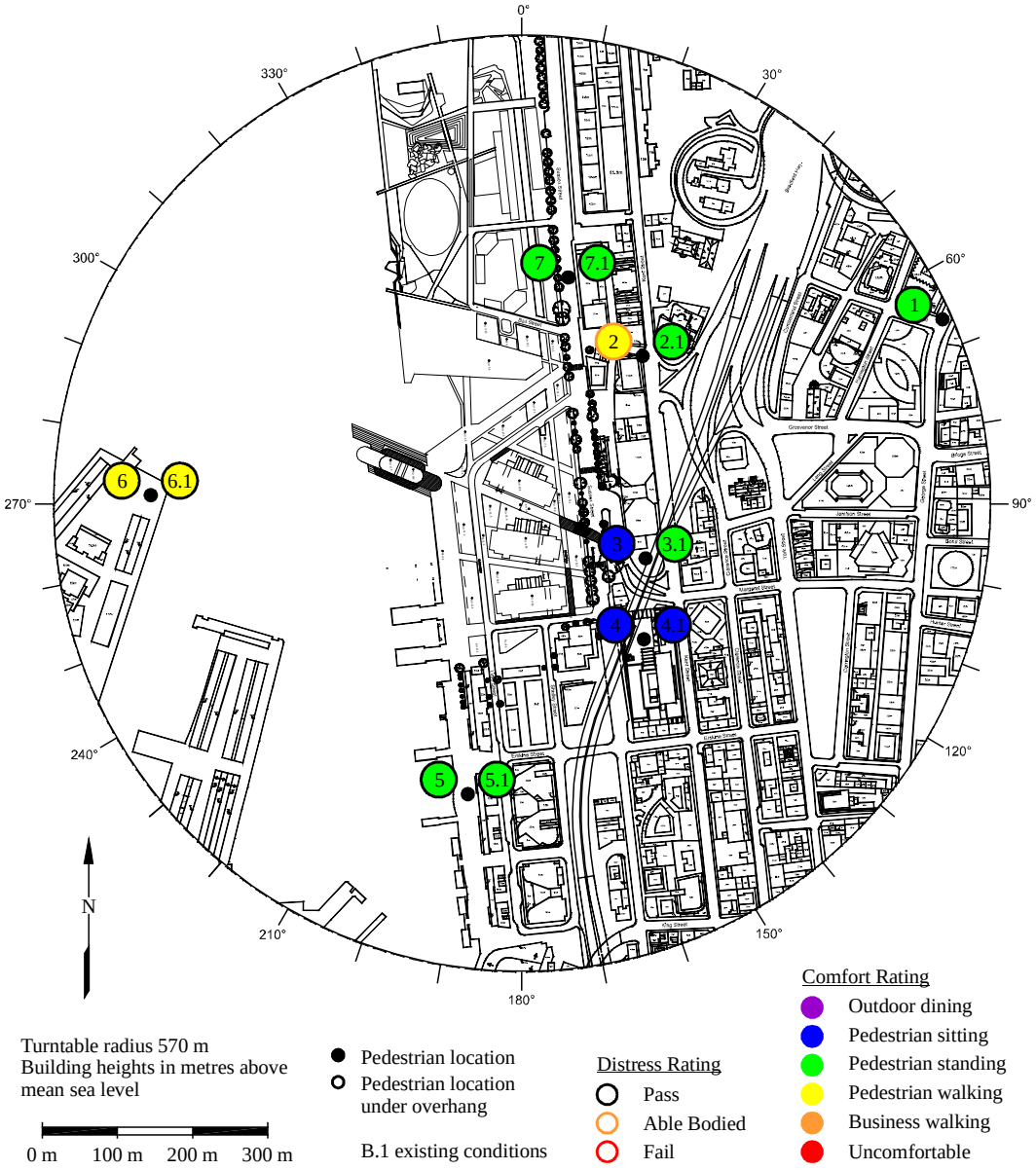

Figure 4: Remote pedestrian wind speed measurement locations with comfort/distress ratings

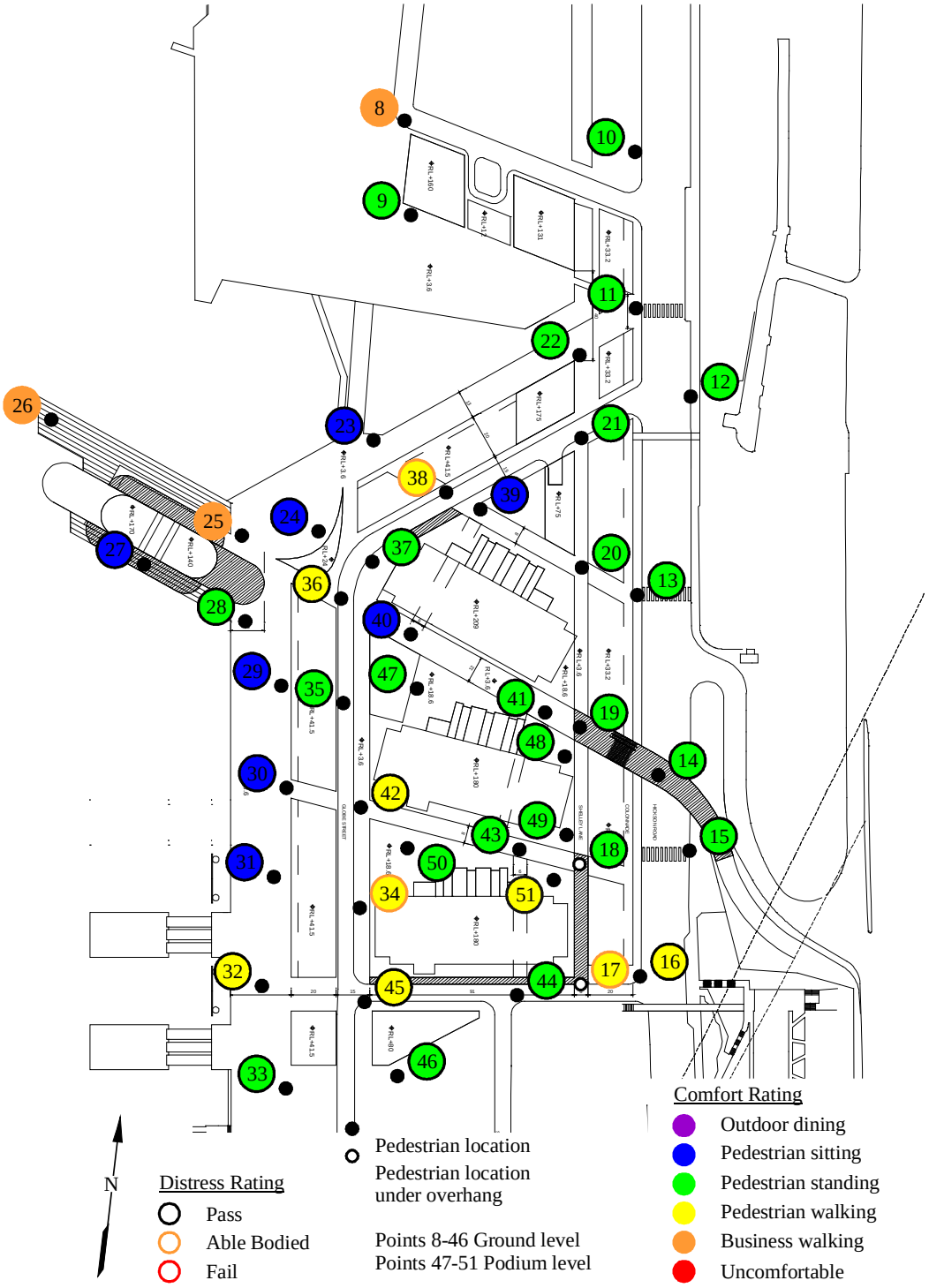

Figure 5: Pedestrian wind speed measurement locations with comfort/distress ratings

Figure 5 shows a number of awnings which were included in the Concept Plan Amendment model that was tested in the wind tunnel. These are shown as hatched areas and can be found to the south and east of Building C5, to the north, south and east of the hotel, and to the north-west of Building C3. The bridge over Hickson Rd between Buildings C3 and C4 was also tested with a canopy over its full length.

The mean and gust equivalent mean velocities relative to the free stream wind tunnel reference velocity at a full-scale elevation of 200m are plotted in polar form in Appendix C. The graphs show velocity magnitude and the approach wind direction for which that velocity was measured. The polar plots aid in visualisation of the effects of the nearby structures or topography, the relative significance of various wind azimuths, and whether the mean or gust is of greater importance.

To enable a quantitative assessment of the wind environment, the wind tunnel data was combined with wind frequency and direction information measured by the Bureau of Meteorology at a standard height of 10m at Sydney Airport from 1974 to 2008 as shown in Figure 6. From this data, directional criterion lines for the Lawson rating wind speeds have been calculated and included on the polar plots in Appendix C; this gives additional information regarding directional sensitivity at each location.

The criteria of Lawson consider the integration of the velocity measurements with local wind climate statistical data summarized in Figure 6 to rate each location. From the cumulative wind speed distributions for each location, the percentage of time each of the Lawson comfort rating wind speeds are exceeded are presented in tabular form under the polar plots in Appendix C. In addition to the rating wind speeds, the percentage of time that 2m/s is exceeded is also reported. This has been provided as it has found that the limiting wind speed for long-term stationary activities such as fine outdoor dining should be about 2m/s to 2.5m/s rather than 4m/s. Interpretation of these wind levels can be aided by the description of the effects of wind of various magnitudes on people. The earliest quantitative description of wind effects was established by Sir Francis Beaufort in 1806, for use at sea; the Beaufort scale is reproduced in Table 4 including qualitative descriptions of wind effects.

The tables in Appendix C also give the wind speed exceeded 5% and 0.022% for direct comparison with the Lawson criteria and the associated Lawson ratings for both mean and GEM wind speeds. A colour coded summary assessment of pedestrian comfort and safety with respect to the Lawson criteria is presented in Figure 4 and Figure 5 for each test location. Because some pedestrian wind measurement positions are purposely chosen at sites where large velocities of small spatial extent may exist, the general wind environment about the structure may be less severe than one might infer from an analysis only of Figure 4 and Figure 5. The implications of the results are discussed in Section 5.

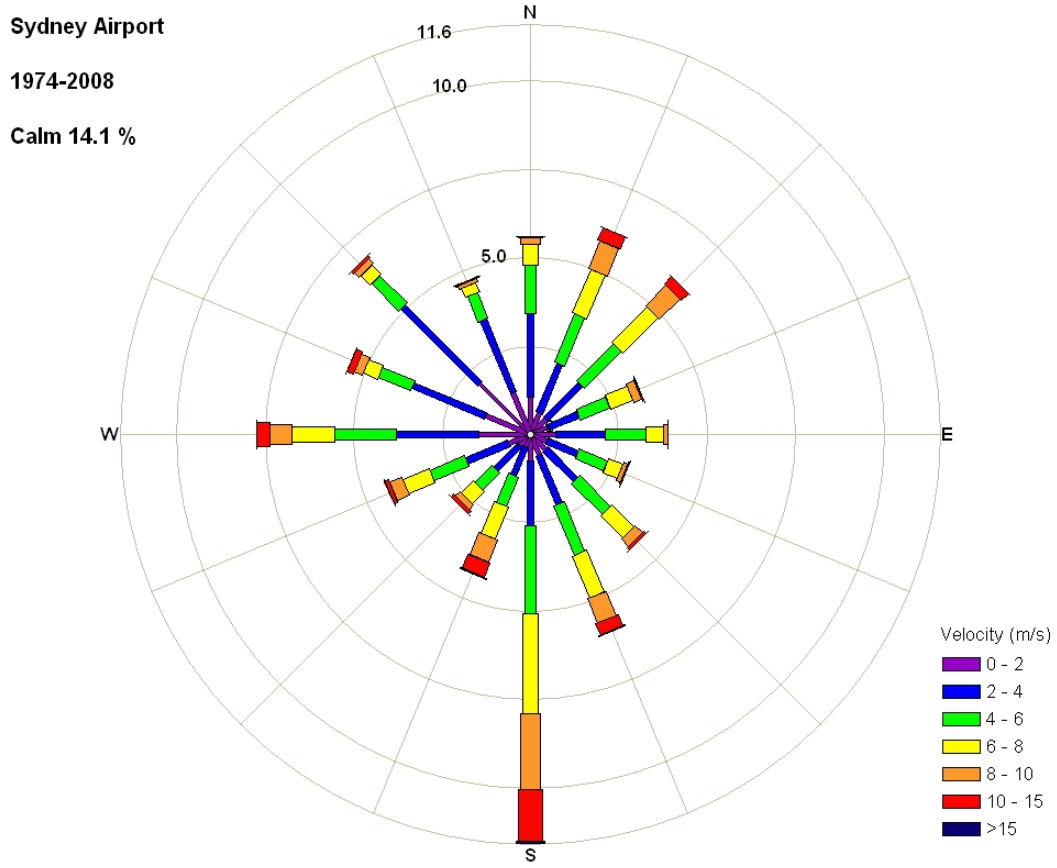

Figure 6: Wind rose of direction and speed for Sydney Airport

Table 4: Summary of wind effects on people, Penwarden (1973)

Description	Beaufort Number	Speed (m/s)	Effects
Calm, light air	0, 1	0–2	Calm, no noticeable wind.
Light breeze	2	2–3	Wind felt on face.
Gentle breeze	3	3–5	Wind extends light flag. Hair is disturbed. Clothing flaps
Moderate breeze	4	5–8	Raises dust, dry soil, and loose paper. Hair disarranged.
Fresh breeze	5	8–11	Force of wind felt on body. Drifting snow becomes airborne. Limit of agreeable wind on land.
Strong breeze	6	11–14	Umbrellas used with difficulty. Hair blown straight. Difficult to walk steadily. Wind noise on ears unpleasant. Windborne snow above head height (blizzard).
Near gale	7	14–17	Inconvenience felt when walking.
Gale	8	17–21	Generally impedes progress. Great difficulty with balance in gusts.
Strong gale	9	21–24	People blown over by gusts.

5 Discussion

The wind climatology chart shown in Figure 6 indicates that the most frequent strong winds are from the south, and to a lesser extent, the west and north-east. The locations tested around the development site are susceptible to winds from different directions, depending on the relative location of the point tested to the geometry of development. However, in general terms the winds from the south and west quadrants had the most pronounced effect on the site as higher level winds were brought to street level as downwash and channelled between the large buildings. The influence of wind direction on the suitability of a location for an intended purpose can be ascertained from the graphs in Appendix C.

The primary conclusions of the pedestrian study can be understood by reviewing the colour coded images of Figure 4 and Figure 5, which depict the locations selected for investigation of pedestrian wind comfort around the site, along with the Lawson criteria rating for both comfort and distress. The testing did include some awnings/canopies as shown in Figure 5, however testing was performed without planned trees, or other plantings to provide a worst case assessment; heavy streetscape planting typically reduces the wind speeds by less than 10%. The central colour indicates the comfort rating for the location, and the colour of the outer ring indicates whether the location passes the distress criterion. No locations were classified as ‘uncomfortable’ for the comfort rating or failing the distress rating however mitigation measures may still be appropriate for some locations depending on the intended use of the space. Although conditions may be classified acceptable there may be certain wind directions that cause regular peak wind conditions and therefore require further consideration. These can be determined by an inspection of the plots in Appendix C.

It is evident from Figure 4 and Figure 5 that the wind environment around the proposed development is generally satisfactory for pedestrian standing or walking.

The general wind amenity of the site is similar to wind conditions measured at locations 1 to 7 (refer Figure 4), which are located in well known areas remote from the site. These remote locations give a general indication of the surrounding wind climate and can be used for comparison with the wind environment in and around the development. Figure 4 includes a comparison with existing wind conditions at these locations and shows that Barangaroo South has only a minor influence on the remote wind conditions. For Location 2, on the junction of Gas Lane and Kent Street, the winds from the north-east quadrant are the most affected and change the comfort rating from ‘pedestrian standing’ to ‘pedestrian walking’, and the distress rating classification changes to ‘able bodied’, however this location is highly sensitive to the measurement probe placement due to the proximity to Observatory Tower. Locations 3 and 4 are influenced by the scale of the Barangaroo South development and are indicating slightly improved conditions due to additional shielding.

Locations 8 to 11 (refer Figure 5) are located around residential buildings R4, R5, R6, and R10 at the north of the Barangaroo South site. All locations are suitable for pedestrian standing except for location 8 on the north-west corner of the tall tower (R4). This location is rated ‘business walking’ for comfort, and ‘able bodied’ for distress. Location 8 is exposed to winds from the south-west quadrant with downwash being accelerated around the north-west corner and over the small central building (R6). These conditions are expected to be of relatively small

spatial extent and provision of local amelioration measures will improve ground level wind conditions.

Locations 12 to 15 are located along Hickson Road. The wind conditions at these locations are suitable for ‘pedestrian standing’. Wind conditions on the pedestrian walkway over Hickson Road (location 14) are suitable for ‘pedestrian standing’ hence the full enclosure of the bridge in response to wind conditions is not considered necessary.

The wind conditions at locations 16 and 17, to the south-east of the development, are classified as suitable for ‘pedestrian walking’. Location 17 marginally exceeds the distress criterion and is classified as suitable for ‘able bodied’ pedestrians. Both these locations experience windy conditions for winds from the south caused by downwash from building C5. Amelioration measures such as an extension to the southern awning will improve the wind conditions in this area.

Locations 18 to 22 are located along Shelley Lane and are all suitable for ‘pedestrian standing’. The winds are channelled along Shelley Lane and the laneways between the large towers.

Locations 23 and 24 on the south side of Southern Cove are classified as suitable for ‘pedestrian sitting’.

Wind conditions at locations 25 and 26 to the north-east and north-west of the hotel are rated as suitable for ‘business walking’ and ‘able bodied’ pedestrians given their exposure to winds from certain directions. Winds from the south-west quadrant will create downwash around the hotel tower, accelerating wind flow around the corners of the hotel, resulting in windy conditions at these locations. The upper level flow reaching the hotel tower is accelerated by the massing of the city to the east. Walking in these areas will be ‘uncomfortable’ during strong winds from the south. Additional shelter from these wind directions could be provided for pedestrians through the consideration of a combination of an extension to the awnings, combined with public domain planting and ground plane wind breaks and screens, and developed further as part of the detailed design of the hotel.

Wind conditions at locations 27 to 33 on the west side of the development are typically suitable for ‘pedestrian sitting’ or ‘pedestrian standing’ activities with the exception of location 32, which is acceptable for ‘pedestrian walking’. Generally the long large massing of buildings R8 and R9 creates a calm area for winds normal to the face (i.e. from the west), with skewed flows being accelerated along the length of the buildings. Location 32 to the west of the gap between the low-rise residential buildings experiences funnelling flow for wind from the west, and downwash outflow from building C5 for winds from the south.

Locations 34 to 38 are positioned on Globe Street. Locations 35 and 37 are classified for ‘pedestrian standing’. Locations 34, 36, and 38 are classified as acceptable for ‘pedestrian walking’. Windy conditions at these locations are caused by downwash from the nearest tall tower during winds perpendicular to the wide face of that tower. The height of the upstream residential buildings (R8 and R9) induces a higher proportion of the downwash from the large commercial towers to reach ground level. Locations 34 and 38 are rated for ‘able bodied’ pedestrians.

Locations 39 to 41 are located in the laneways to the north and south of Building C3. All points are suitable for ‘pedestrian walking’ or ‘pedestrian sitting’.

Locations 42 to 45 are located in the laneways to the north and south of Building C5. Wind conditions on Globe Street to the west of the tower are classified as acceptable for ‘pedestrian walking’, and to the east of the laneways are acceptable for ‘pedestrian standing’. The wind conditions to the west of the tower are again caused by downwash from tower C5.

Wind conditions at location 46 to the south of the site are classified as suitable for ‘pedestrian standing’.

Wind conditions at locations 47 to 49 on the podium of building C4 are classified as suitable for ‘pedestrian standing’. These points are influenced by different wind directions accelerating around the relative corners of the building.

Wind conditions at locations 50 and 51 on the north-west and north-east podium of building C5 are classified as ‘pedestrian standing’ and ‘pedestrian walking’ respectively. Location 50 is influenced by winds from the south-west accelerating around the western corner. Location 51 is affected by westerly winds being channelled between buildings C4 and C5, as well as winds from the south circulating on the podium in the lee of the building.

6 Conclusion

A wind tunnel study of the proposed Barangaroo South Concept Plan Amendment indicative design was conducted to assess pedestrian wind comfort. A model of the project was fabricated to a 1:400 scale and centred on a turntable in the wind tunnel. Replicas of surrounding buildings within a 570 m radius were constructed and placed on the turntable.

The wind tunnel testing was performed in the natural boundary layer wind tunnel of Cermak Peterka Petersen Pty. Ltd., St Peters. Approach boundary layers representative of the environment surrounding the proposed development were established in the test section of the wind tunnel. The approach wind flow had appropriate turbulence characteristics corresponding to Terrain Category 3 as defined in Standards Australia (2002).

Measurements of winds likely to be experienced by pedestrians were made with a hot-film anemometer at 51 locations for 16 wind directions each. These points were tested in the proposed Barangaroo South Concept Plan Amendment configuration. The measurements were combined with wind statistics to produce results of wind speed versus the percentage of time that wind speed is exceeded for each location.

For the majority of locations, the wind environment at ground level around the Barangaroo South site was generally found to be suitable for ‘pedestrian sitting’ and ‘pedestrian standing’.

Based on the configuration modelled, some locations such as near the corners of the large north and south commercial towers and the large northern residential tower were suitable for ‘pedestrian walking’ and specific locations near the corners of the hotel were suitable for ‘business walking’. The majority of the strong wind scenarios are caused by relatively uninterrupted downwash. No locations experienced dangerous conditions, but several were classified for ‘able bodied’ pedestrians.

Further amelioration measures to improve the windy conditions experienced for certain wind directions will be considered and investigated as part of the detailed design for each of the buildings and may include a combination of appropriately designed and positioned awnings, public domain planting and ground plane wind breaks and screens.

7 References

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A1

D	Characteristic dimension (building height, width, etc.)
n	Mean velocity profile power law exponent
T_u	Turbulence intensity, U_{rms}/U
U	Local mean velocity
U_{ref}	Reference velocity at reference height z_{ref}
U_{pk}	Peak wind speed in pedestrian studies
U_{rms}	Root-mean-square of fluctuating velocity
z	Height above surface
ν	Kinematic viscosity of approach flow
$\sigma( )$	Standard deviation of $( ),= ( )'_{rms}$
ρ	Density of approach flow
$( )_{max}$	Maximum value during data record
$( )_{min}$	Minimum value during data record
$( )_{mean}$	Mean value during data record
$( )_{rms}$	Root mean square about the mean

Appendix B

Additional Photos of the Wind Tunnel

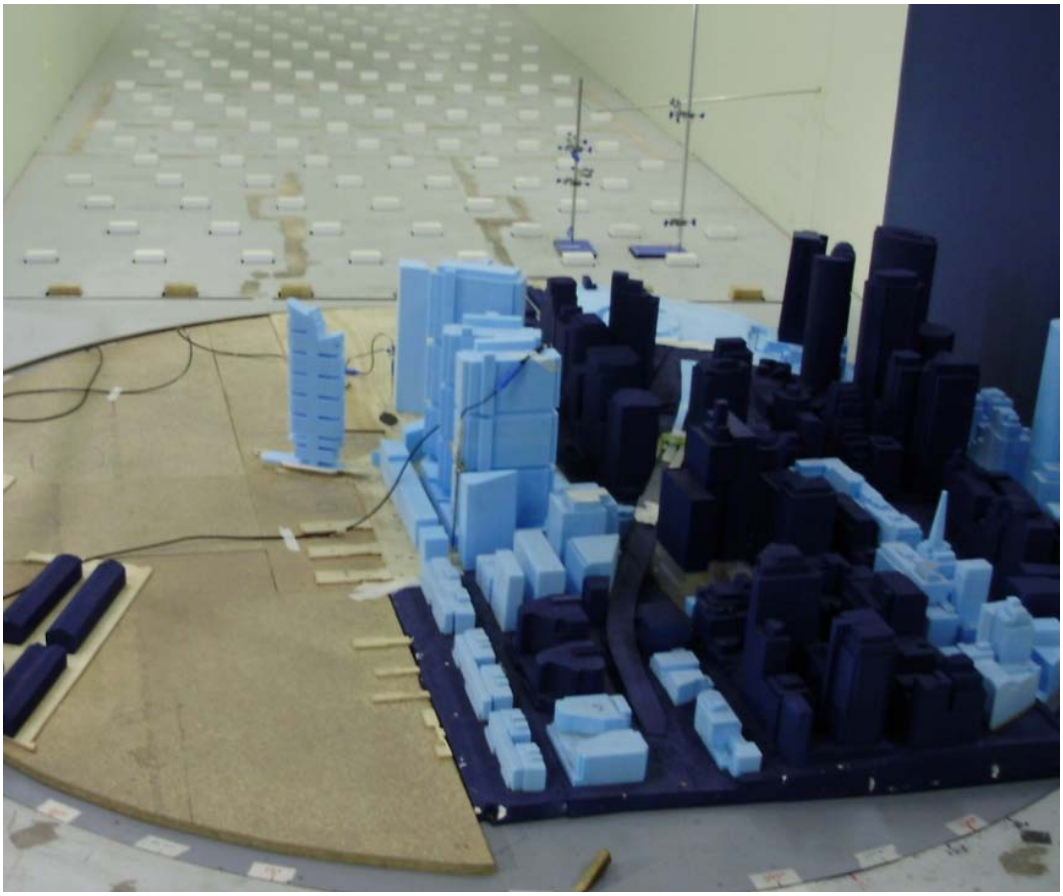


Figure 7: View of the Barangaroo South site from the south

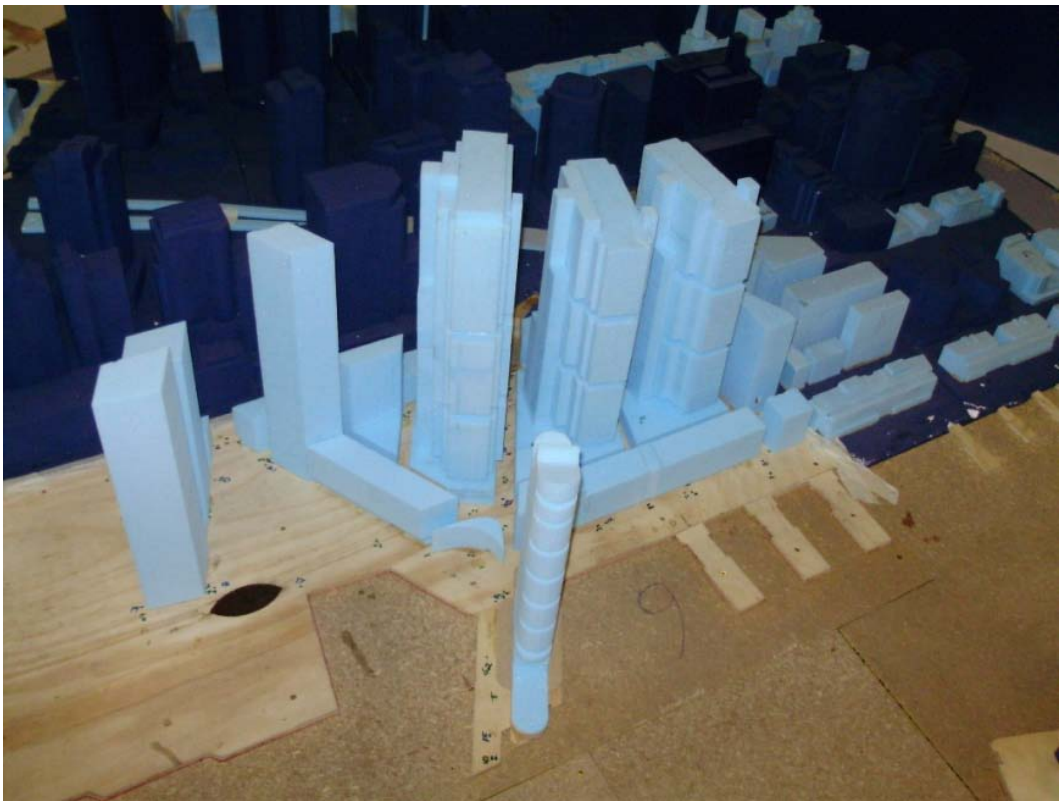


Figure 8: View of the Barangaroo South site from the north-west

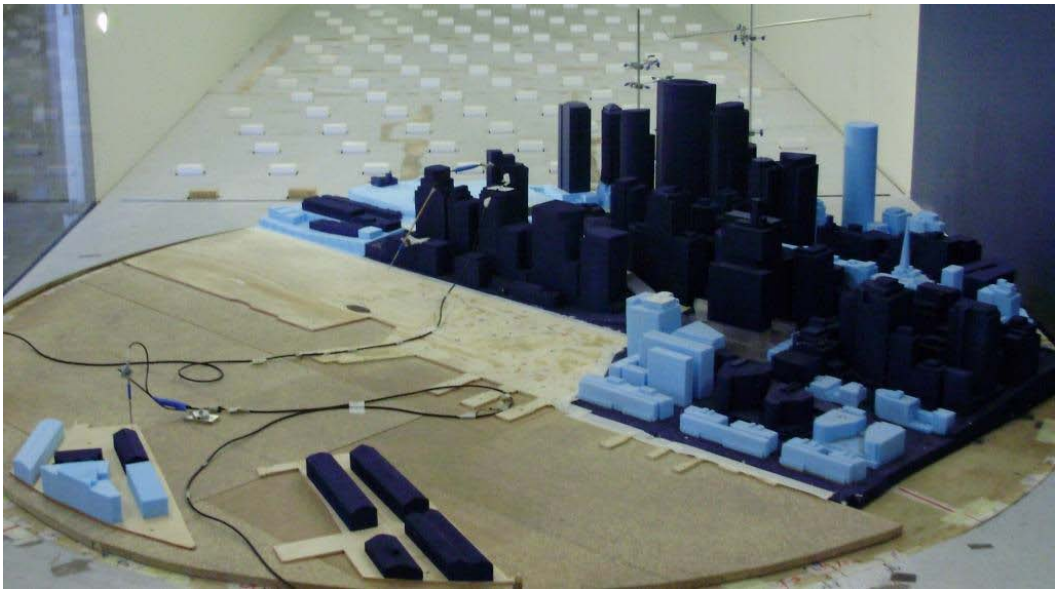


Figure 9: View of the existing configuration from the south-west

Appendix C

Directional Wind Results

C1 Explanation of Results

The mean and gust equivalent mean velocities relative to the free stream wind tunnel reference velocity at a full-scale elevation of 200m are plotted in polar form below. The graphs show velocity magnitude and the approach wind direction for which that velocity was measured. The polar plots aid in visualisation of the effects of the nearby structures or topography, the relative significance of various wind azimuths, and whether the mean or gust is of greater importance.

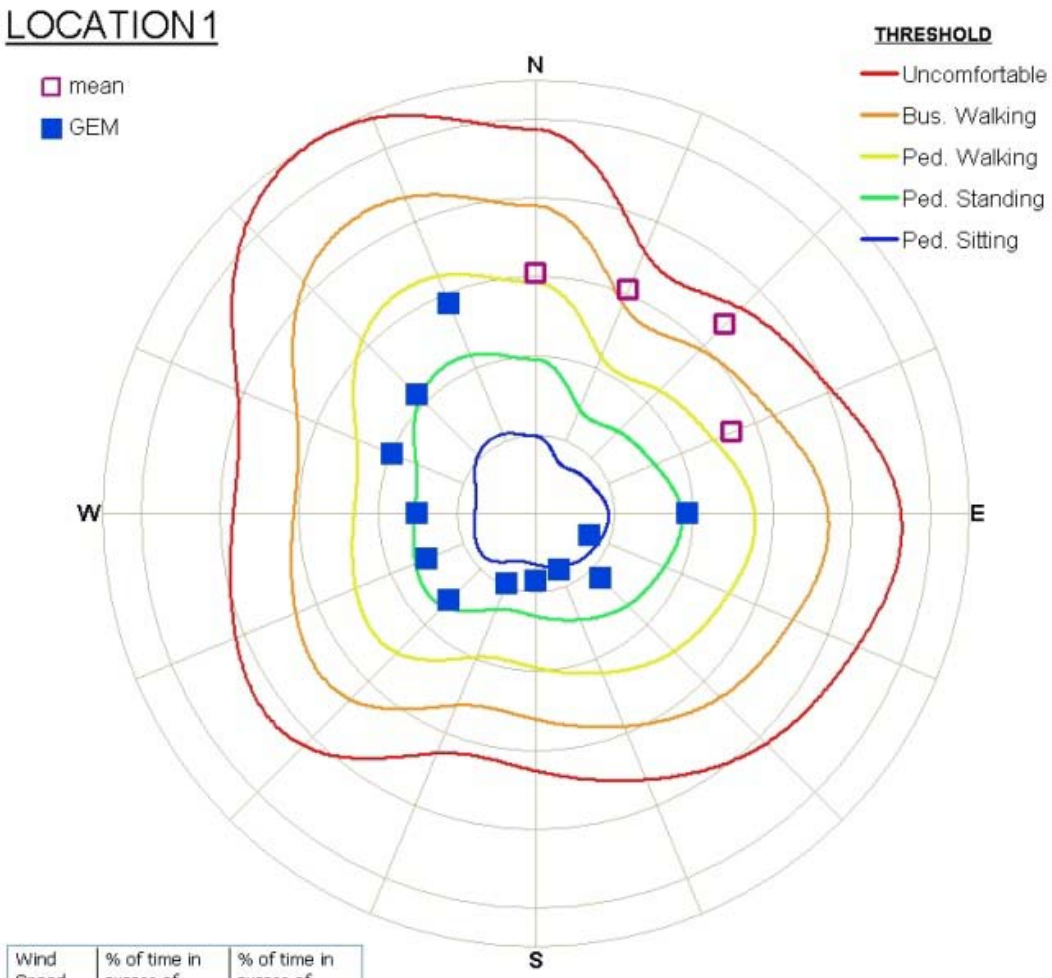
To enable a quantitative assessment of the wind environment, the wind tunnel data was combined with wind frequency and direction information measured by the Bureau of Meteorology at a standard height of 10m at Sydney Airport from 1974 to 2008 as shown in Figure 6. From this data, directional criterion lines for the Lawson rating wind speeds have been calculated and included on the polar plots. This gives additional information regarding directional sensitivity at each location.

The criteria of Lawson consider the integration of the velocity measurements with local wind climate statistical data summarized in Figure 6 to rate each location. From the cumulative wind speed distributions for each location, the percentage of time each of the Lawson comfort rating wind speeds are exceeded are presented in tabular form under the polar plots. In addition to the rating wind speeds, the percentage of time that 2m/s is exceeded is also reported. This has been provided as it has found that the limiting wind speed for long-term stationary activities such as fine outdoor dining should be about 2m/s to 2.5m/s rather than 4m/s. Interpretation of these wind levels can be aided by the description of the effects of wind of various magnitudes on people.

The tables below also give the wind speed exceeded 5% and 0.022% for direct comparison with the Lawson criteria and the associated Lawson ratings for both mean and GEM wind speeds.

C2 Location 1

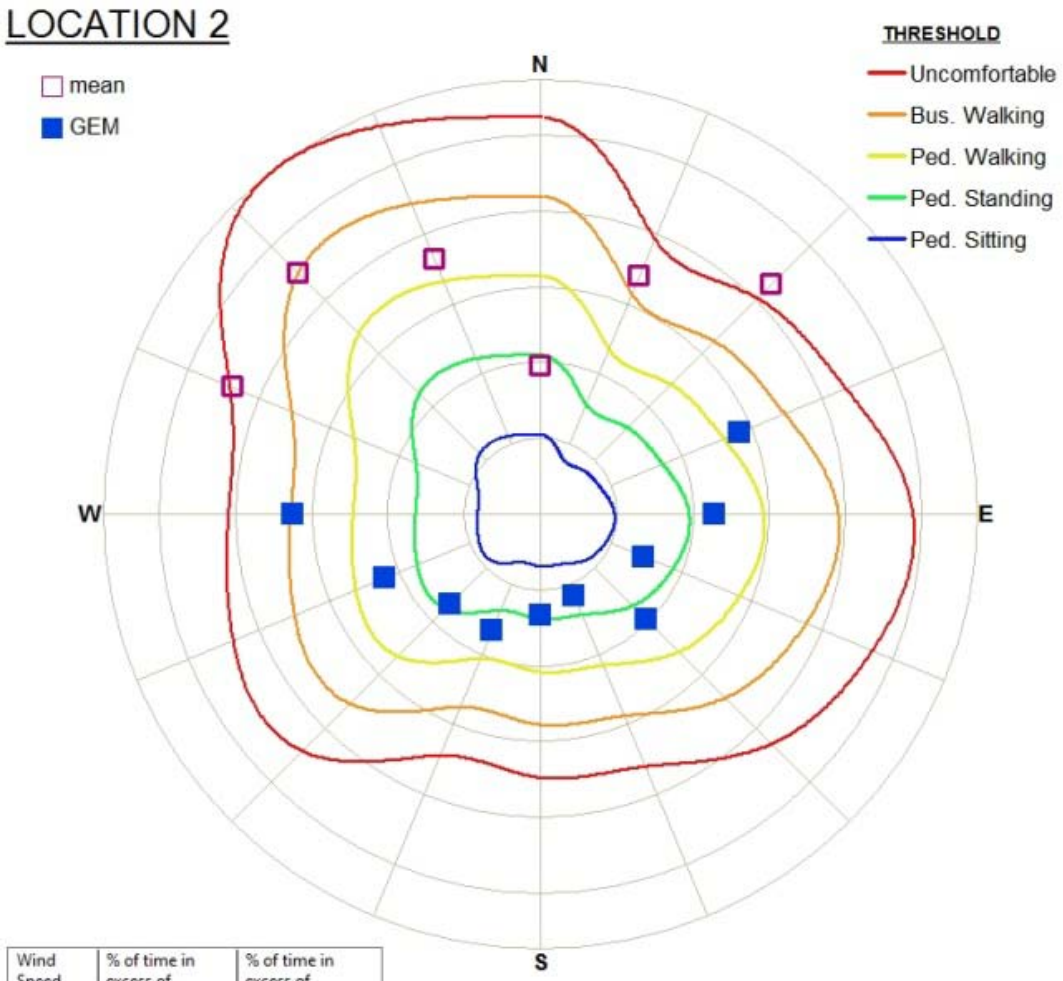
C2.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	29.4	37.3
4.0	11.5	10.9
6.0	4.9	3.2
8.0	1.5	0.5
10.0	0.3	0.1
5.9	**5.0**	Ped Standing
12.1	**0.022**	Pass
5.3	Ped Standing	**5.0**
10.5	Pass	**0.022**

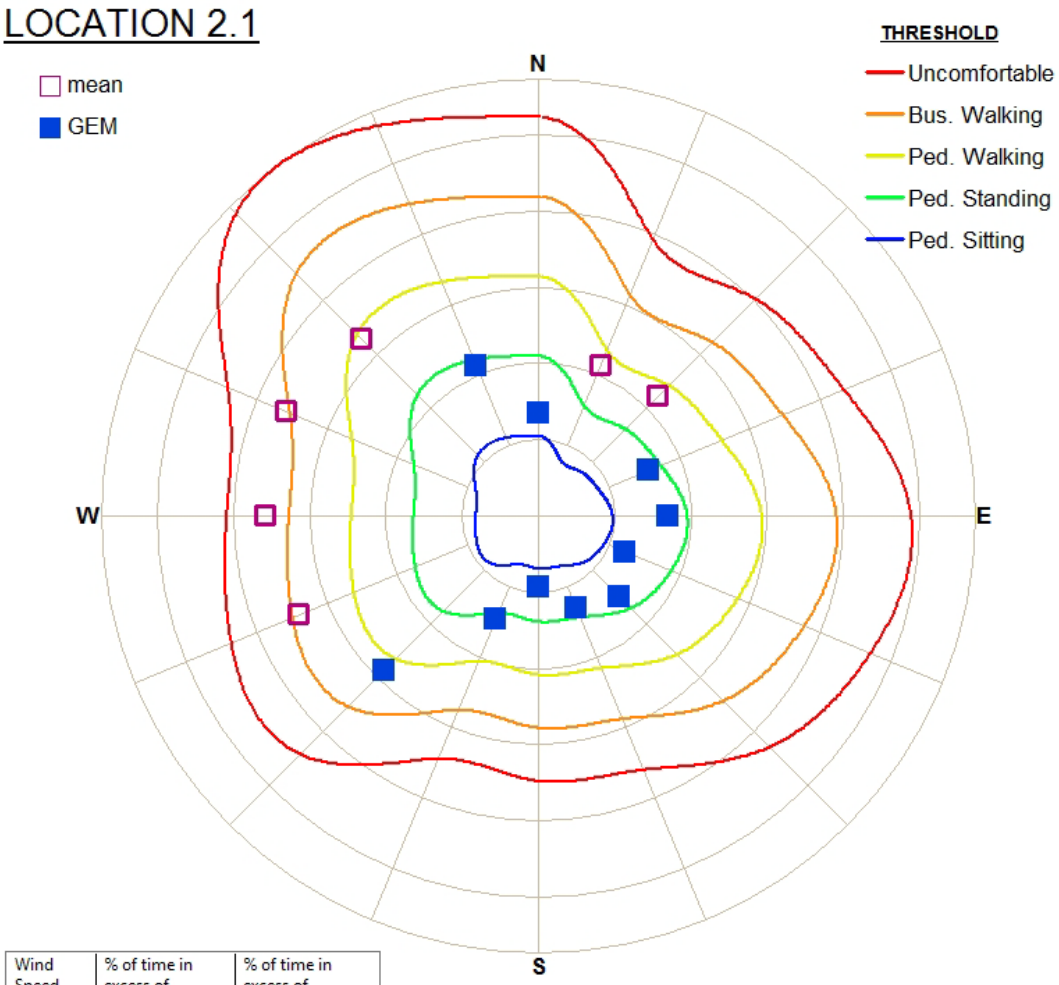
C3 Location 2

C3.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	48.7	53.6
4.0	19.4	19.3
6.0	8.7	7.7
8.0	3.8	2.7
10.0	1.3	0.7
7.3	**5.0**	Ped Walking
16.9	**0.022**	Able Body
6.8	Ped Walking	**5.0**
14.8	Pass	**0.022**

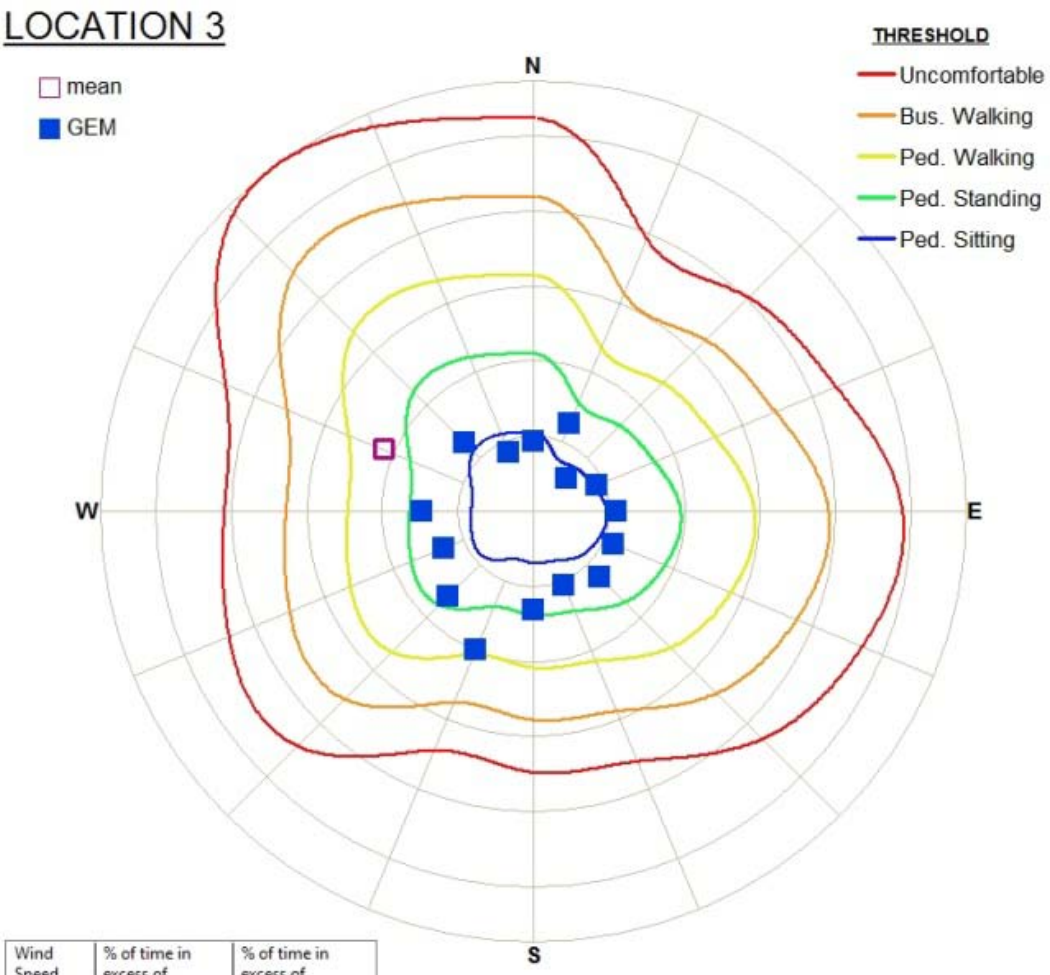
C3.2 Configuration B.1 (Existing)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	39.0	41.9
4.0	12.8	10.8
6.0	4.4	2.7
8.0	1.5	0.6
10.0	0.4	0.1
5.7	**5.0**	Ped Standing
14.2	**0.022**	Pass
5.1	Ped Standing	**5.0**
11.7	Pass	**0.022**

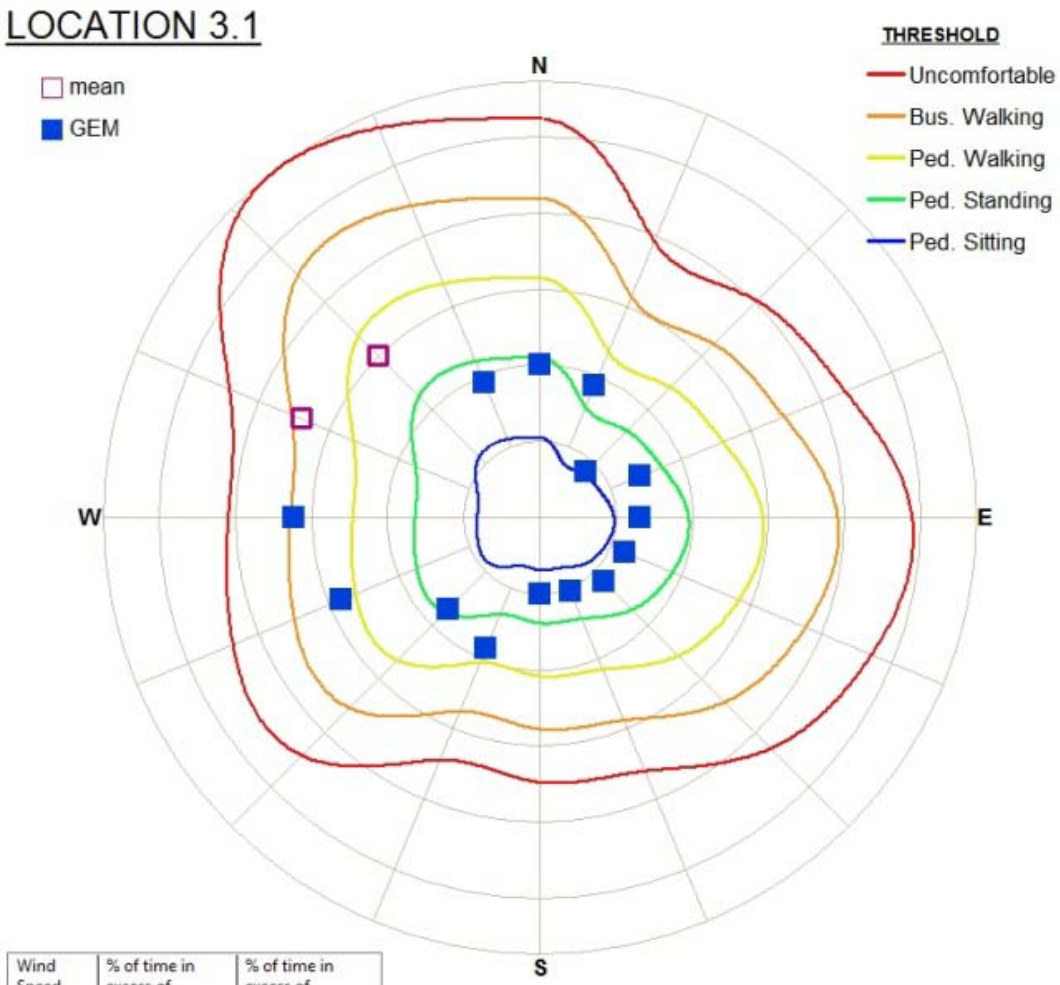
C4 Location 3

C4.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	16.4	23.7
4.0	1.8	2.6
6.0	0.3	0.3
8.0	0.0	0.0
10.0	0.0	0.0
3.0	**5.0**	Ped Sitting
8.3	**0.022**	Pass
3.4	Ped Sitting	**5.0**
8.1	Pass	**0.022**

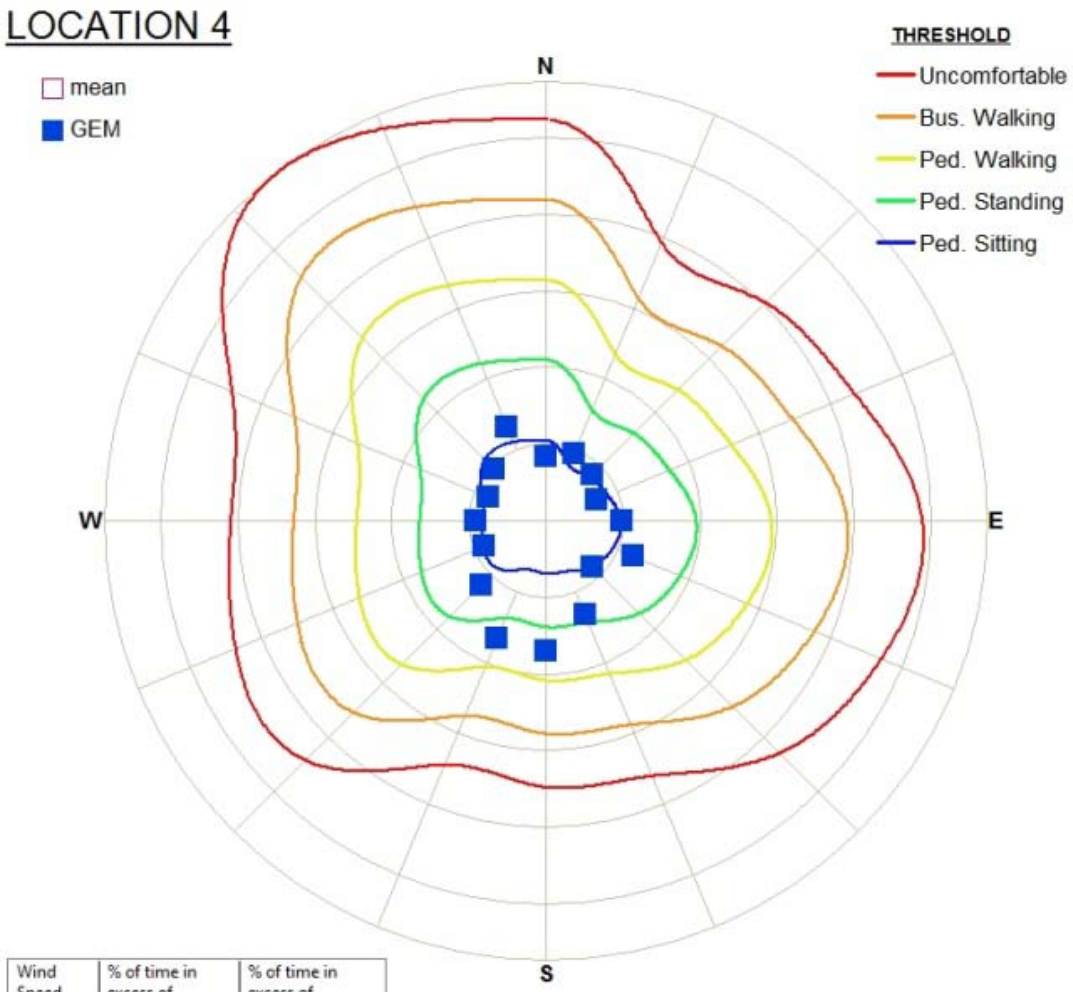
C4.2 Configuration B.1 (Existing)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	30.8	37.1
4.0	7.8	9.2
6.0	2.4	2.7
8.0	0.8	0.8
10.0	0.2	0.2
4.6	**5.0**	Ped Standing
12.8	**0.022**	Pass
4.9	Ped Standing	**5.0**
12.6	Pass	**0.022**

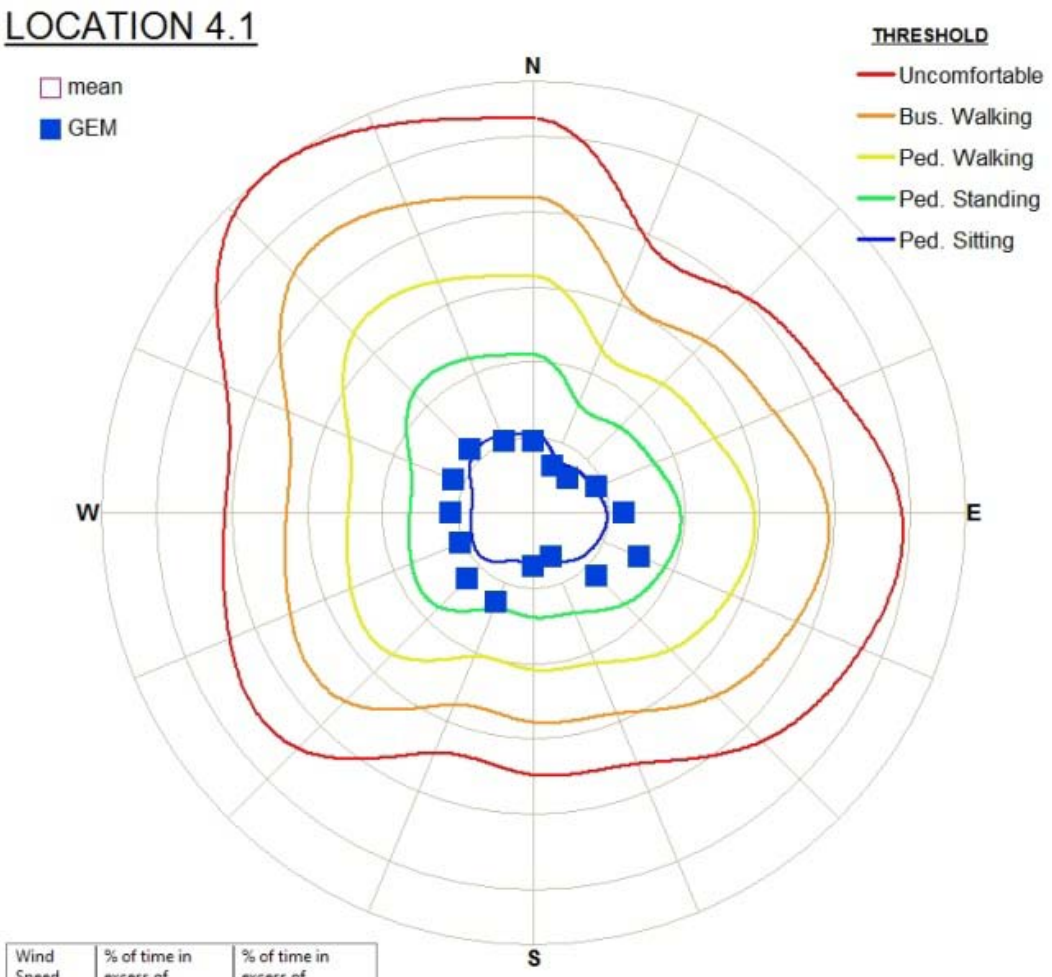
C5 Location 4

C5.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	11.7	18.7
4.0	0.8	2.7
6.0	0.0	0.1
8.0	0.0	0.0
10.0	0.0	0.0
2.8	**5.0**	Ped Sitting
6.0	**0.022**	Pass
3.4	Ped Sitting	**5.0**
7.3	Pass	**0.022**

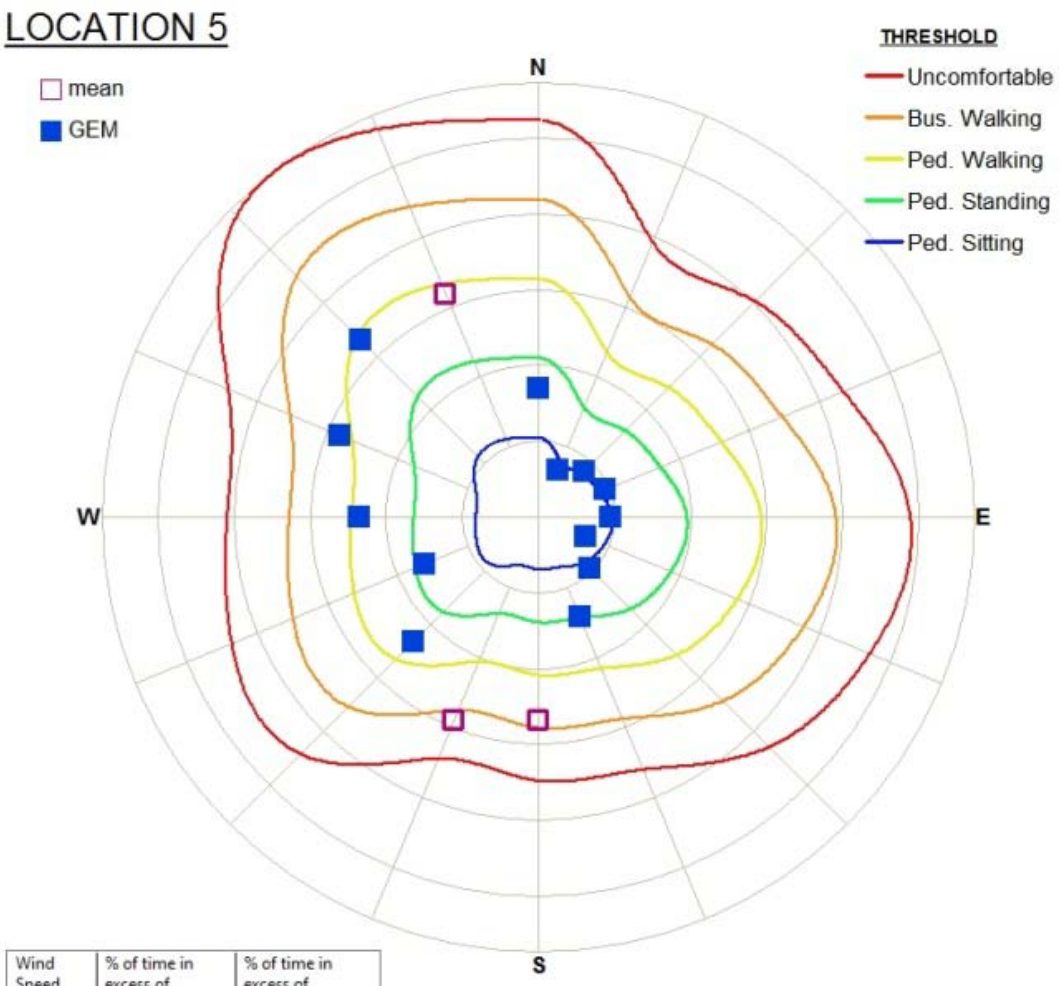
C5.2 Configuration B.1 (Existing)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	4.7	10.5
4.0	0.1	0.3
6.0	0.0	0.0
8.0	0.0	0.0
10.0	0.0	0.0
2.0	**5.0**	Outdoor Dining
4.4	**0.022**	Pass
2.4	Ped Sitting	**5.0**
5.4	Pass	**0.022**

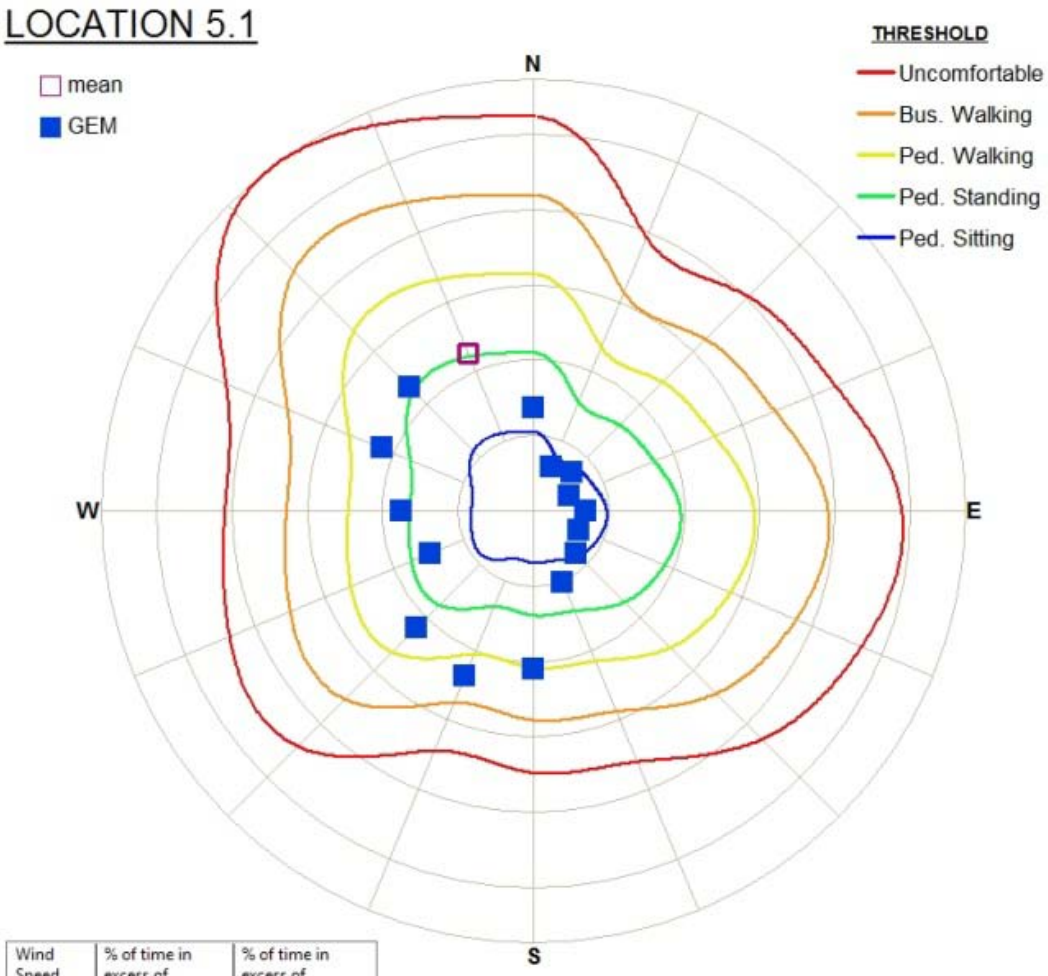
C6 Location 5

C6.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	32.2	38.2
4.0	12.6	13.8
6.0	4.5	4.1
8.0	1.1	0.8
10.0	0.2	0.1
5.8	**5.0**	Ped Standing
12.7	**0.022**	Pass
5.6	Ped Standing	**5.0**
12.1	Pass	**0.022**

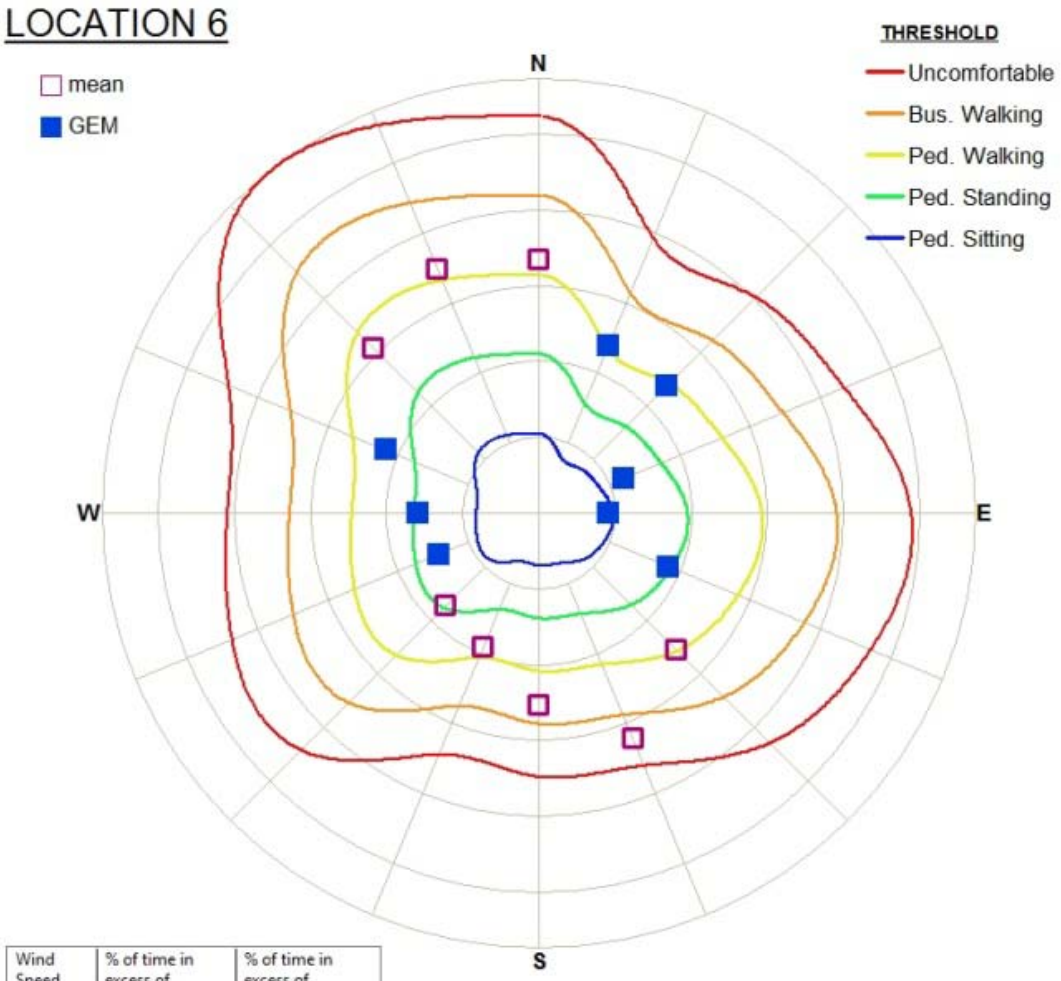
C6.2 Configuration B.1 (Existing)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	21.2	28.9
4.0	4.8	8.4
6.0	0.7	1.5
8.0	0.1	0.2
10.0	0.0	0.0
3.9	**5.0**	Ped Sitting
9.5	**0.022**	Pass
4.6	Ped Standing	**5.0**
10.0	Pass	**0.022**

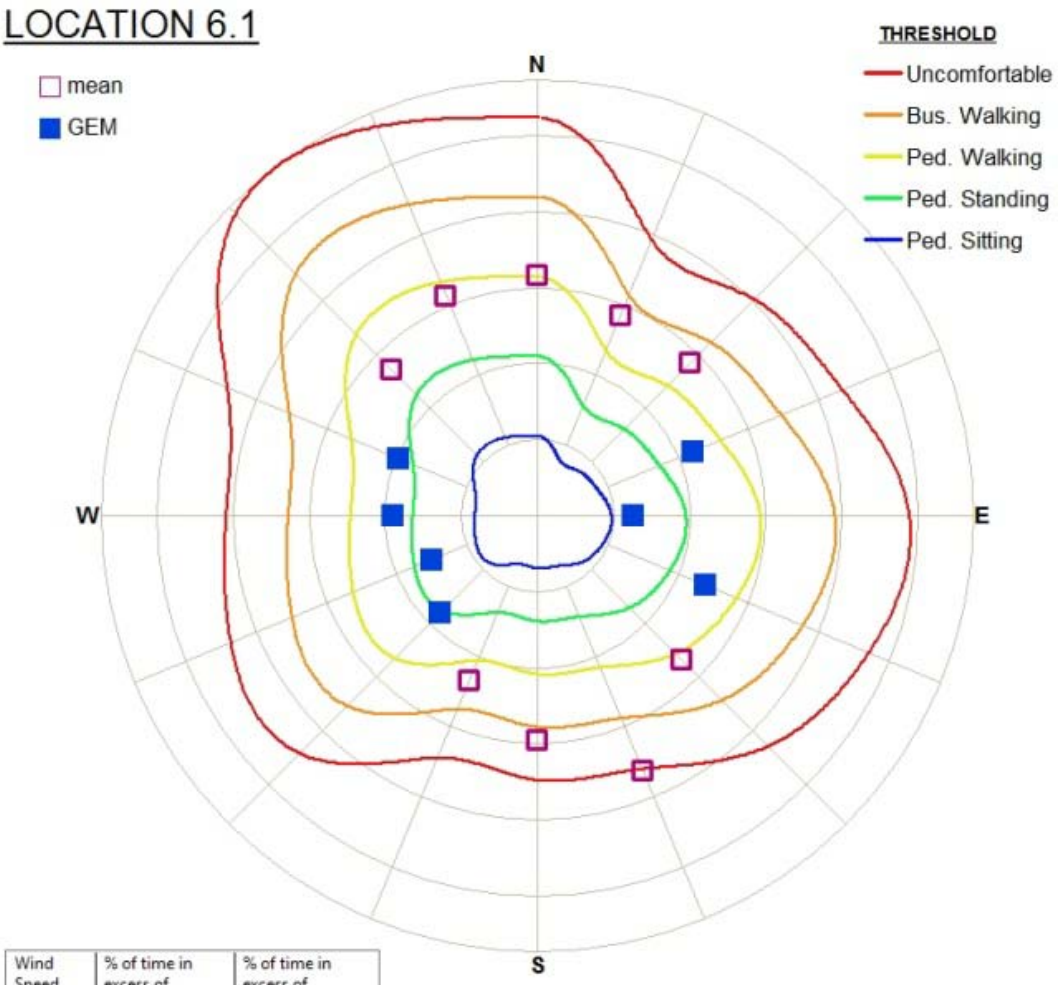
C7 Location 6

C7.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	48.1	49.1
4.0	19.6	16.7
6.0	5.7	3.2
8.0	1.2	0.4
10.0	0.2	0.0
6.1	**5.0**	Ped Walking
13.2	**0.022**	Pass
5.5	Ped Standing	**5.0**
10.8	Pass	**0.022**

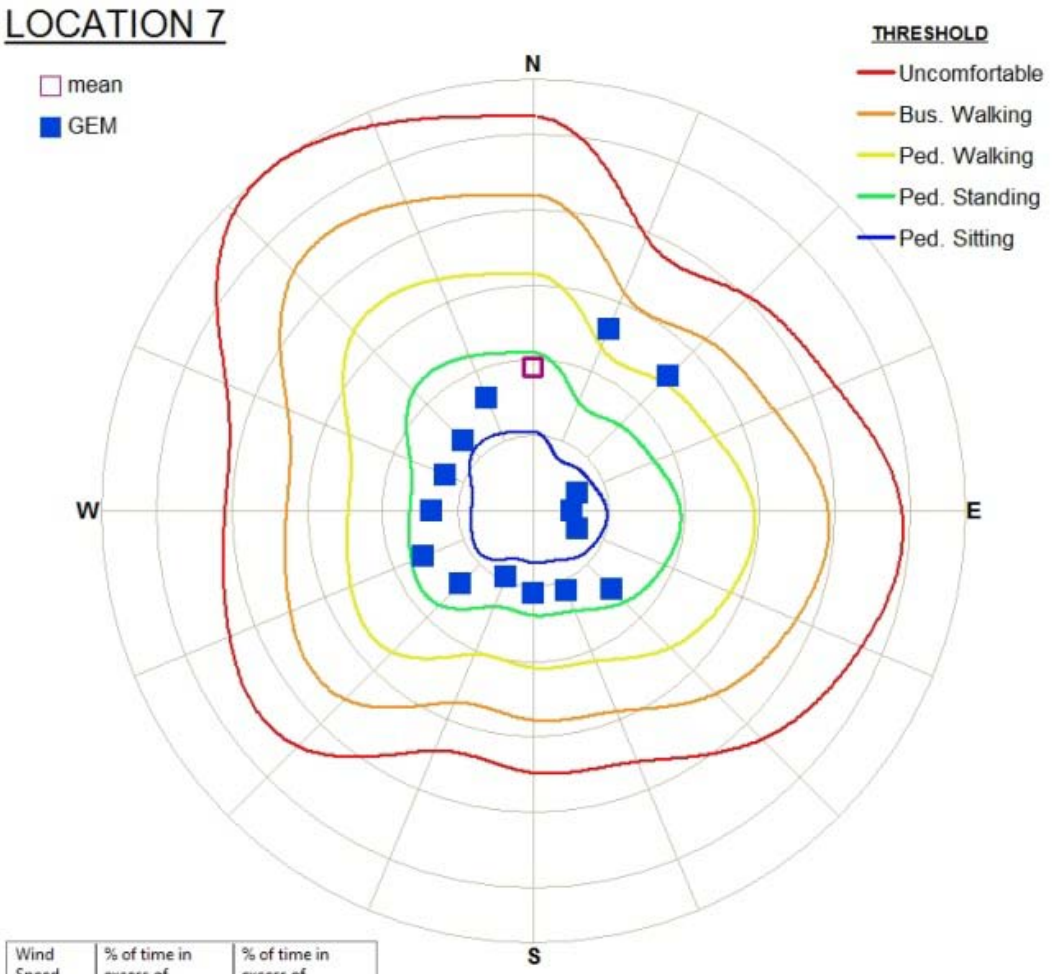
C7.2 Configuration B.1 (Existing)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	51.9	52.8
4.0	24.0	21.3
6.0	9.2	5.5
8.0	2.5	0.9
10.0	0.5	0.1
6.9	**5.0**	Ped Walking
14.6	**0.022**	Pass
6.1	Ped Walking	**5.0**
12.3	Pass	**0.022**

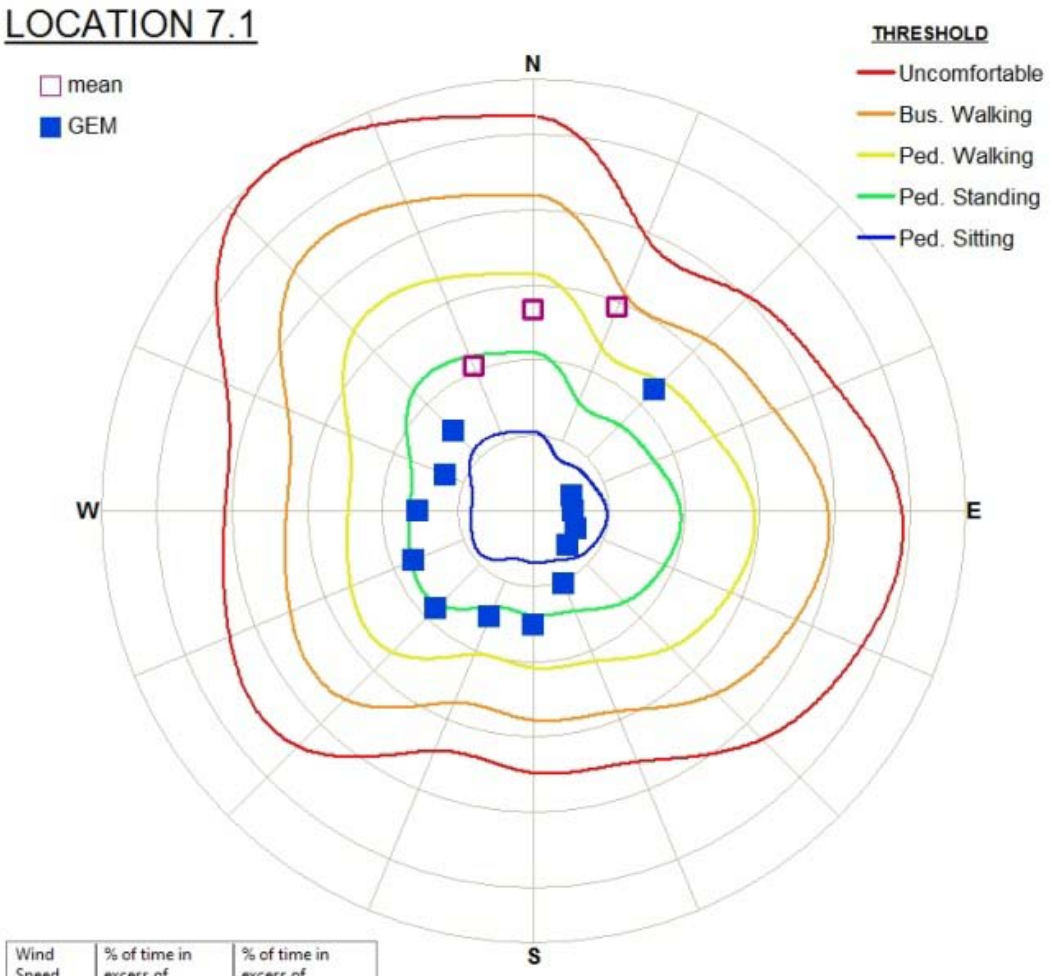
C8 Location 7

C8.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	17.0	28.2
4.0	3.8	5.7
6.0	0.5	1.1
8.0	0.0	0.1
10.0	0.0	0.0
3.5	**5.0**	Ped Sitting
7.8	**0.022**	Pass
4.1	Ped Standing	**5.0**
8.8	Pass	**0.022**

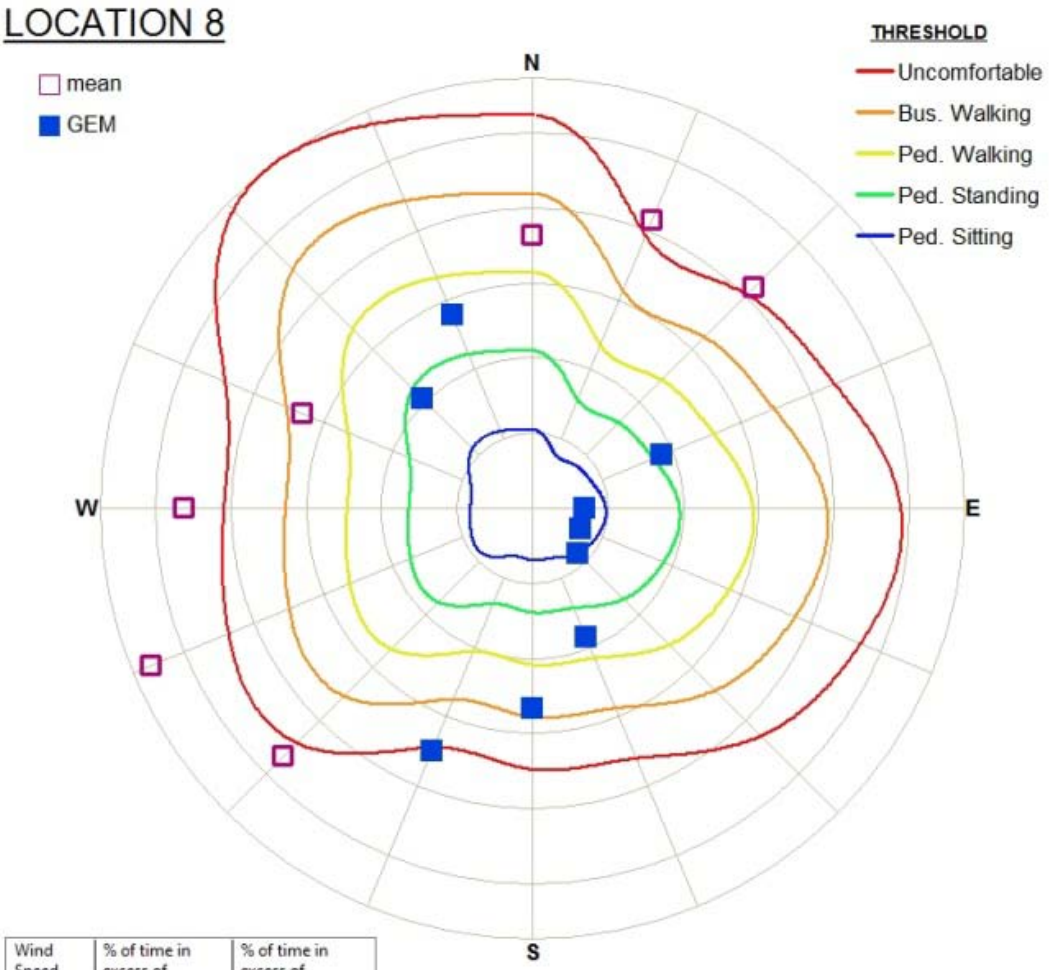
C8.2 Configuration B.1 (Existing)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	28.8	32.9
4.0	6.6	7.3
6.0	1.4	1.0
8.0	0.2	0.1
10.0	0.0	0.0
4.3	**5.0**	Ped Standing
9.6	**0.022**	Pass
4.4	Ped Standing	**5.0**
8.6	Pass	**0.022**

C9 Location 8

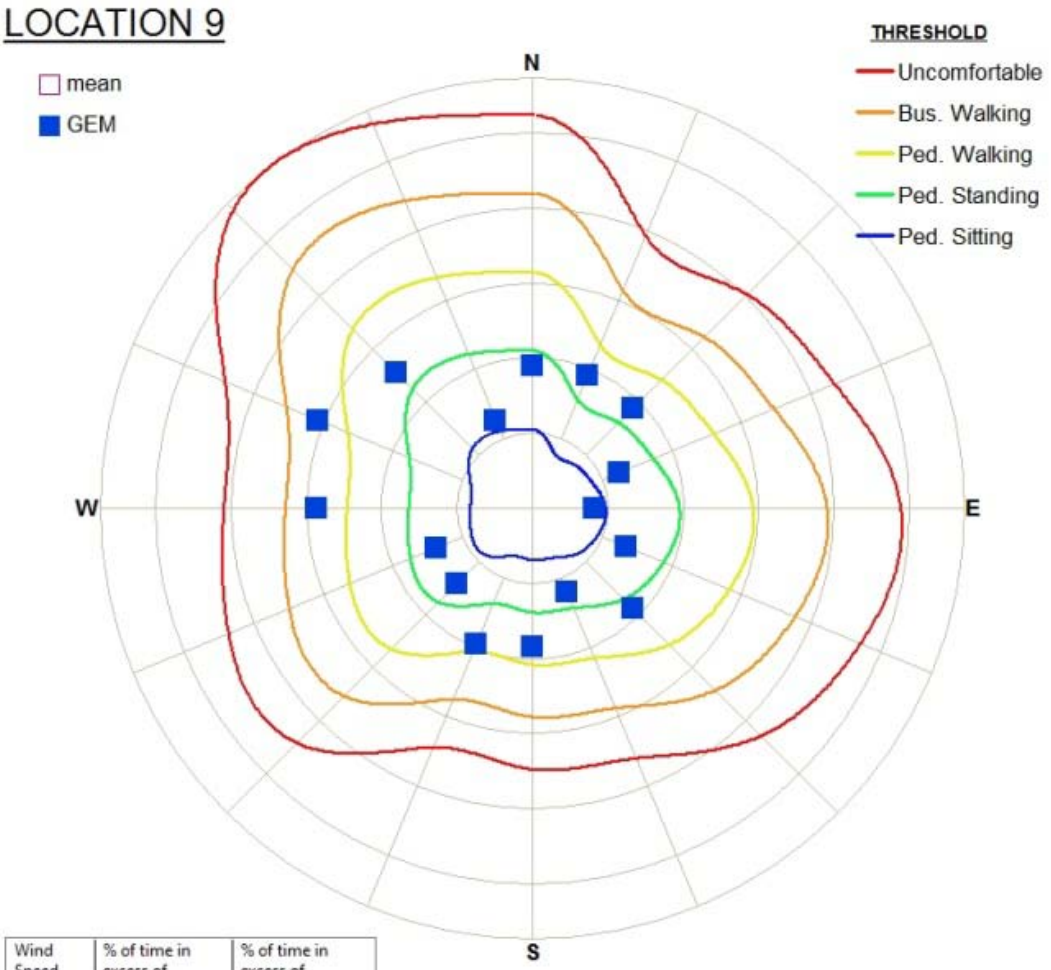
C9.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	52.0	55.1
4.0	27.7	29.5
6.0	14.9	13.8
8.0	7.5	5.0
10.0	3.0	1.4
8.9	**5.0**	Bus Walking
18.4	**0.022**	Able Body
7.9	Ped Walking	**5.0**
15.5	Able Body	**0.022**

C10 Location 9

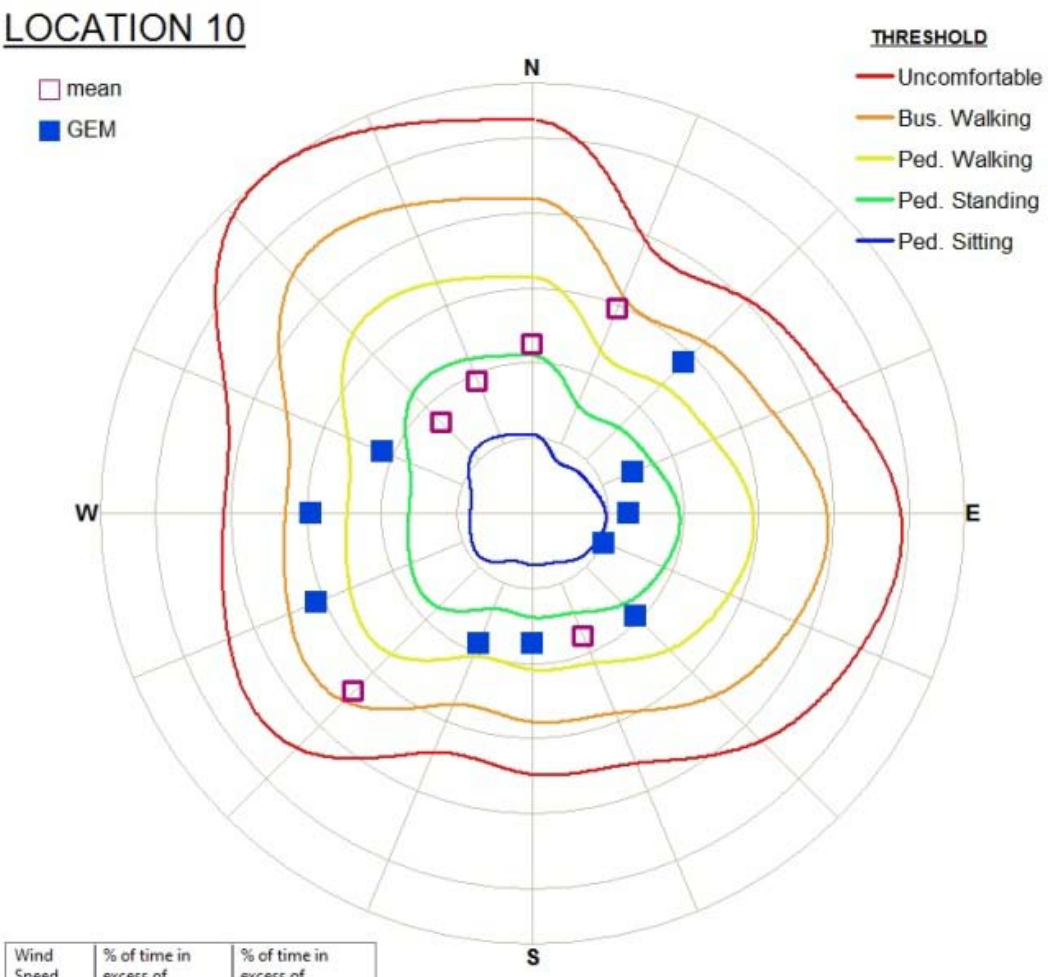
C10.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	29.2	42.9
4.0	5.0	10.9
6.0	0.7	2.1
8.0	0.1	0.5
10.0	0.0	0.1
4.0	**5.0**	Ped Sitting
9.9	**0.022**	Pass
4.9	Ped Standing	**5.0**
11.6	Pass	**0.022**

C11 Location 10

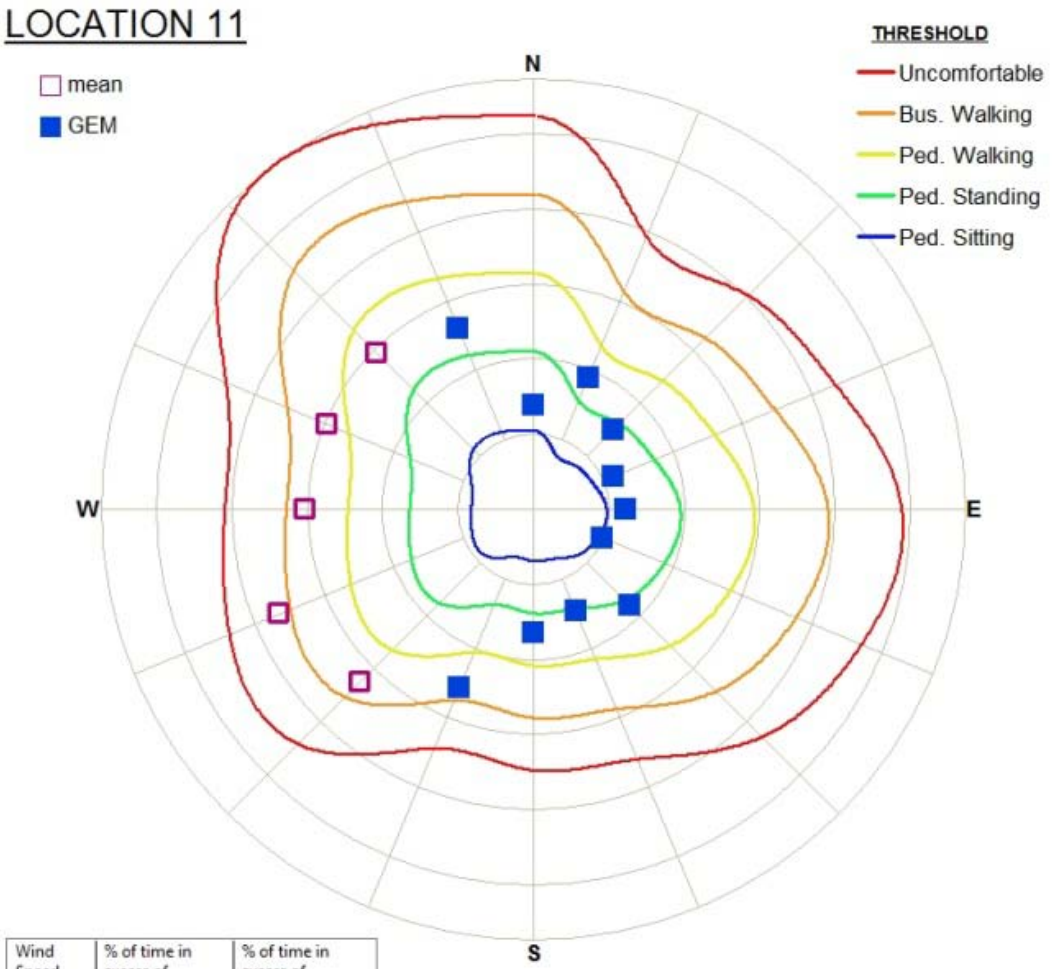
C11.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	42.3	47.6
4.0	12.8	16.8
6.0	3.2	4.4
8.0	0.5	0.8
10.0	0.1	0.1
5.4	**5.0**	Ped Standing
11.0	**0.022**	Pass
5.8	Ped Standing	**5.0**
11.4	Pass	**0.022**

C12 Location 11

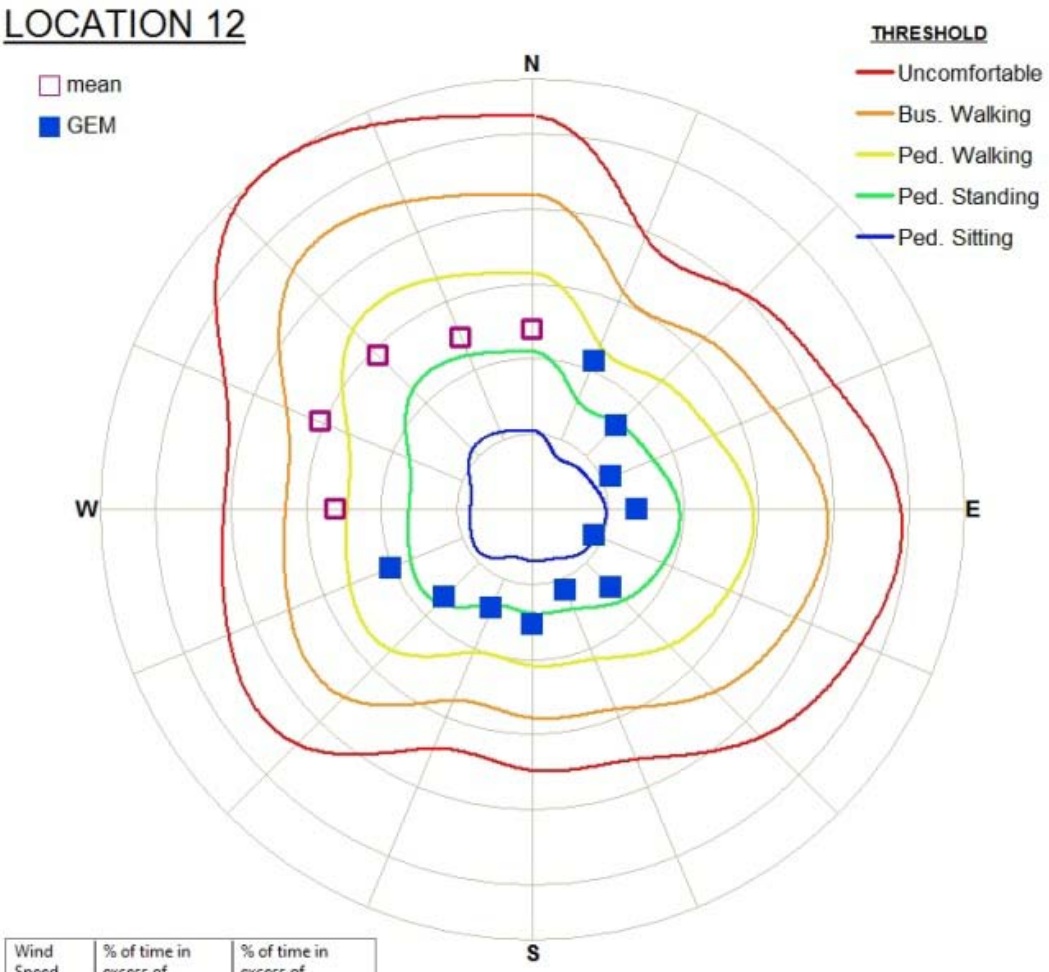
C12.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	40.7	45.2
4.0	11.3	11.9
6.0	3.9	2.6
8.0	1.1	0.5
10.0	0.2	0.1
5.5	**5.0**	Ped Standing
12.5	**0.022**	Pass
5.1	Ped Standing	**5.0**
11.2	Pass	**0.022**

C13 Location 12

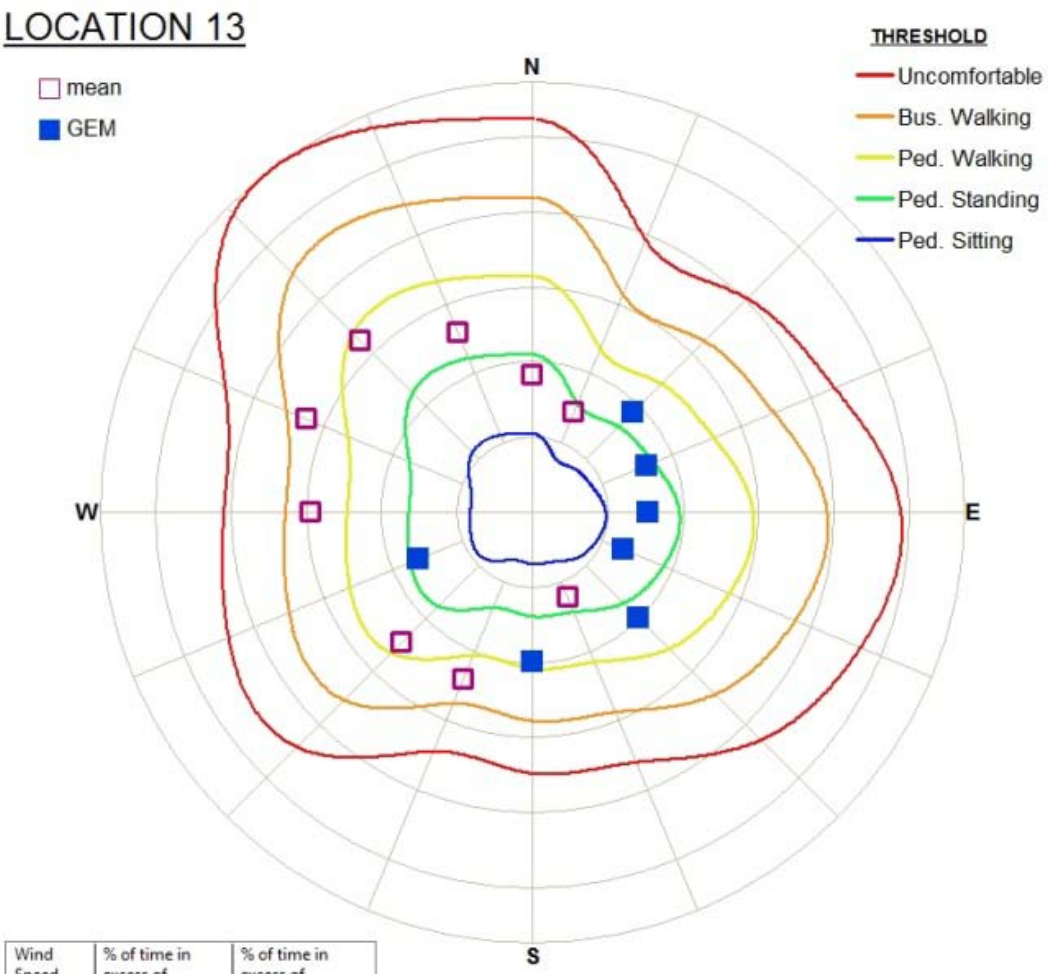
C13.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	38.2	42.6
4.0	7.3	8.4
6.0	1.6	1.3
8.0	0.4	0.2
10.0	0.1	0.0
4.4	**5.0**	Ped Standing
11.6	**0.022**	Pass
4.5	Ped Standing	**5.0**
10.2	Pass	**0.022**

C14 Location 13

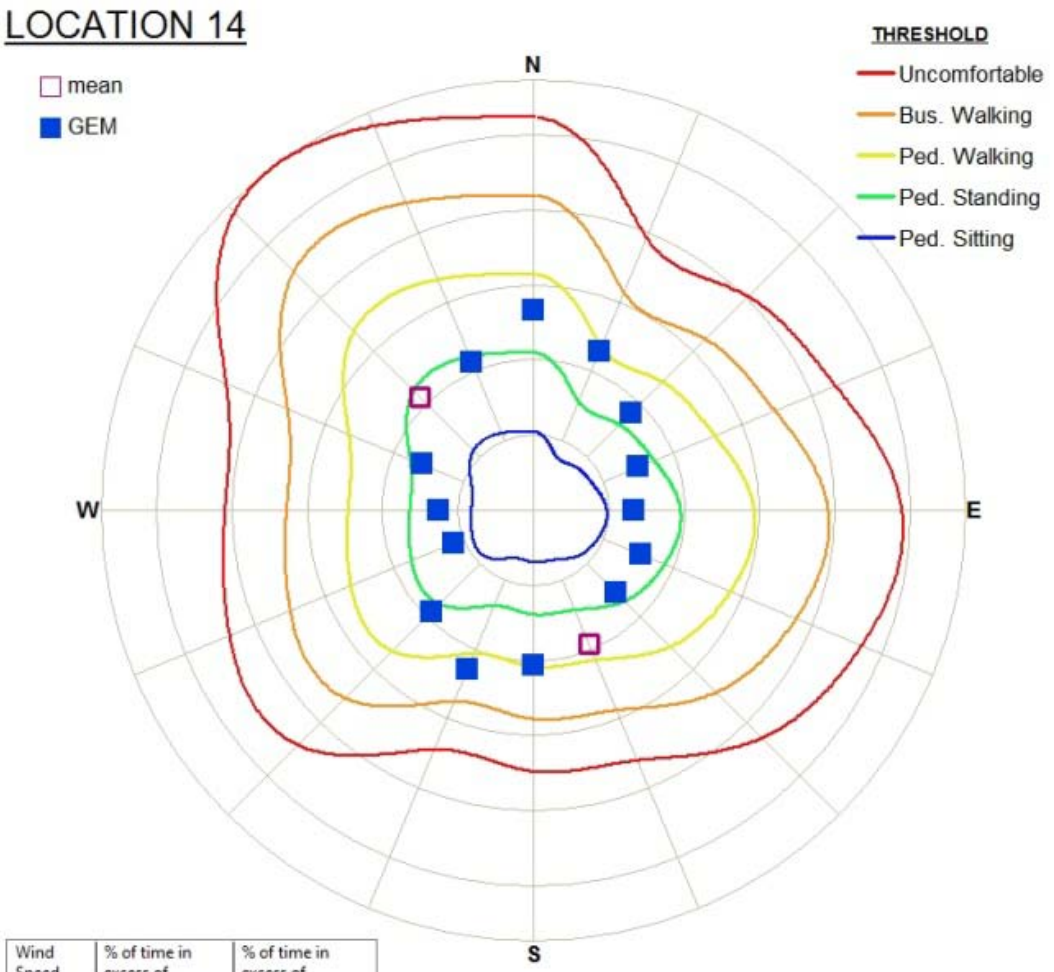
C14.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	46.9	46.5
4.0	12.7	11.8
6.0	3.1	2.3
8.0	0.8	0.4
10.0	0.2	0.1
5.3	**5.0**	Ped Standing
12.6	**0.022**	Pass
5.0	Ped Standing	**5.0**
11.1	Pass	**0.022**

C15 Location 14

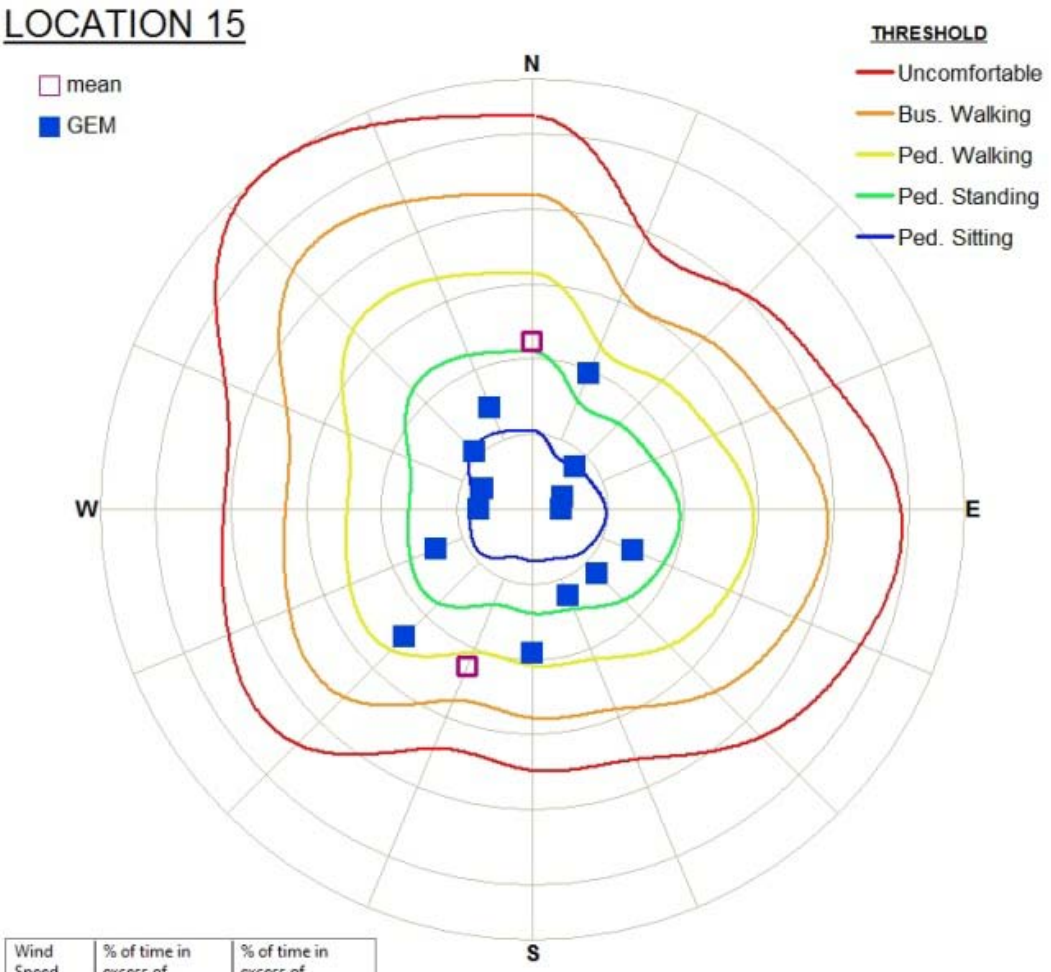
C15.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	38.0	42.4
4.0	9.2	11.7
6.0	1.0	1.7
8.0	0.1	0.1
10.0	0.0	0.0
4.6	**5.0**	Ped Standing
8.9	**0.022**	Pass
4.9	Ped Standing	**5.0**
9.6	Pass	**0.022**

C16 Location 15

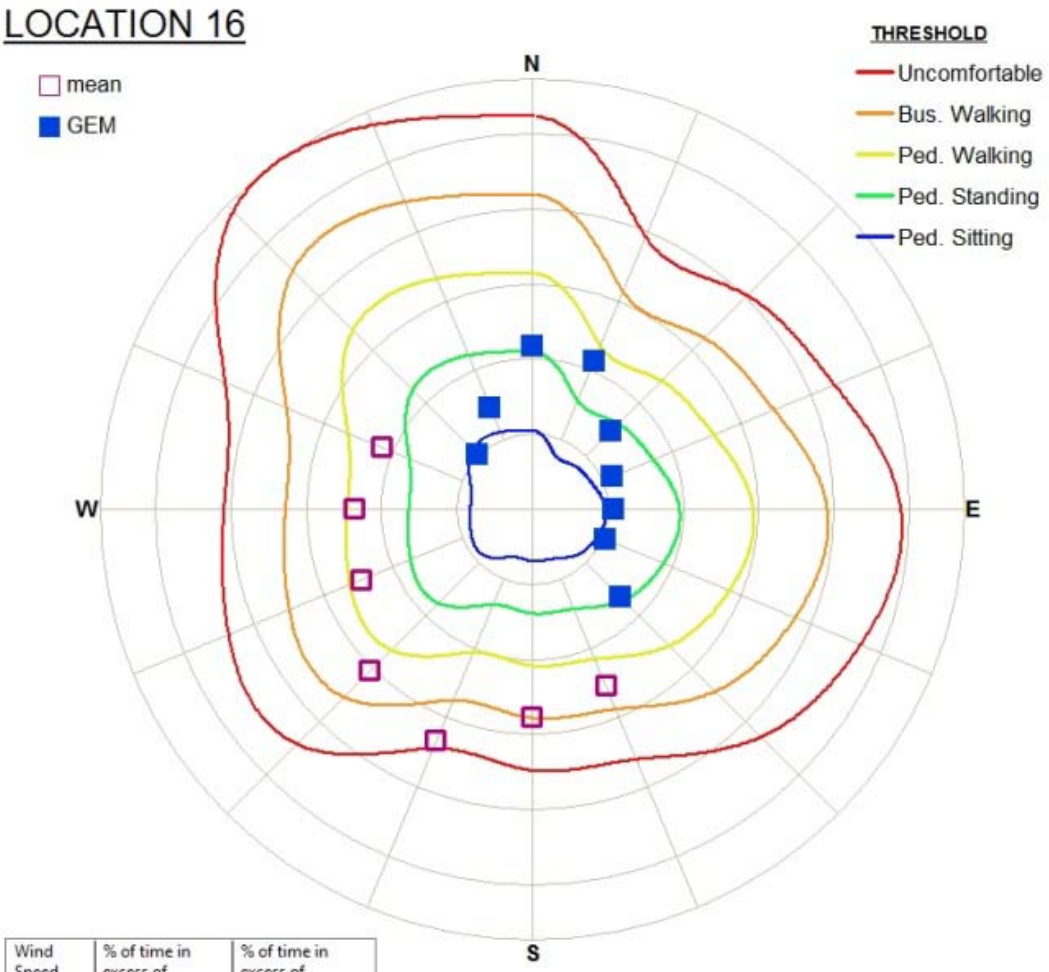
C16.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	23.5	27.9
4.0	6.1	6.9
6.0	0.7	0.8
8.0	0.1	0.1
10.0	0.0	0.0
4.2	**5.0**	Ped Standing
9.2	**0.022**	Pass
4.3	Ped Standing	**5.0**
9.2	Pass	**0.022**

C17 Location 16

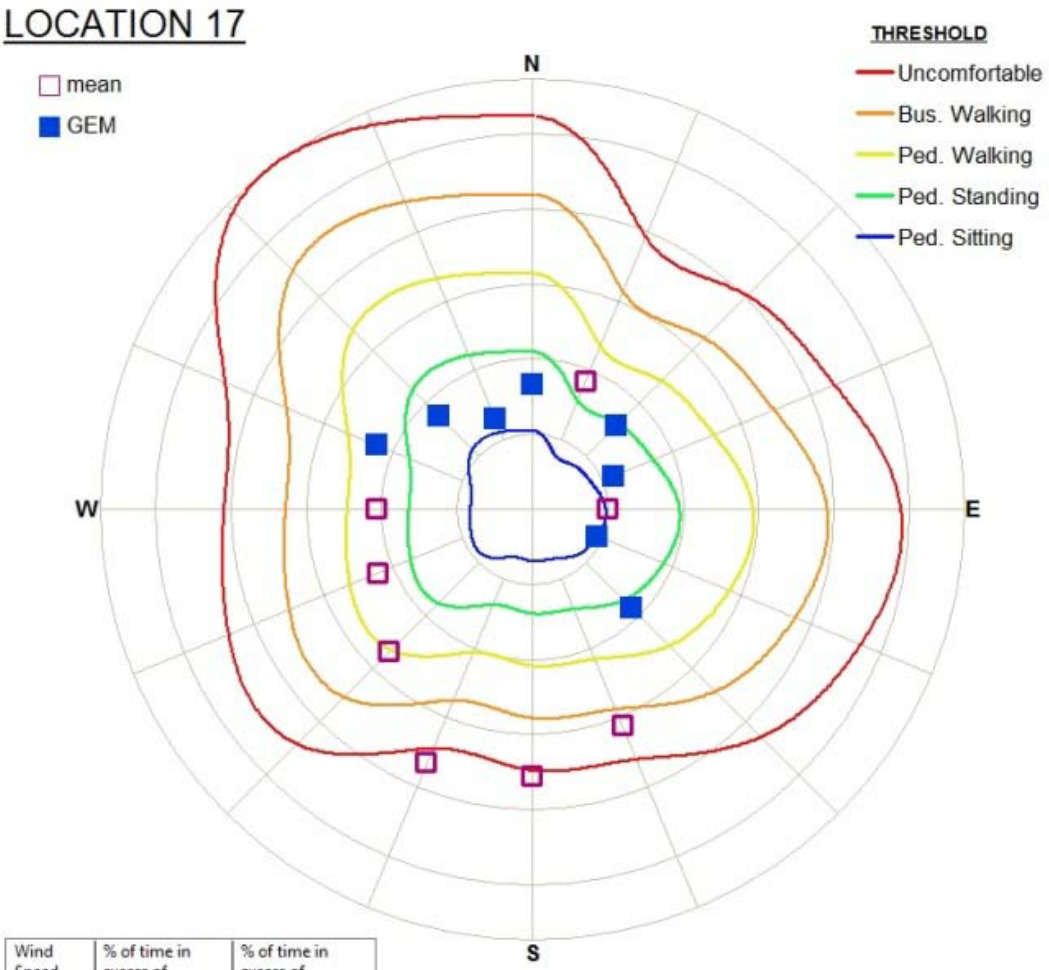
C17.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	39.7	43.4
4.0	17.3	16.0
6.0	6.1	4.0
8.0	1.5	0.7
10.0	0.3	0.1
6.2	**5.0**	Ped Walking
13.6	**0.022**	Pass
5.7	Ped Standing	**5.0**
11.6	Pass	**0.022**

C18 Location 17

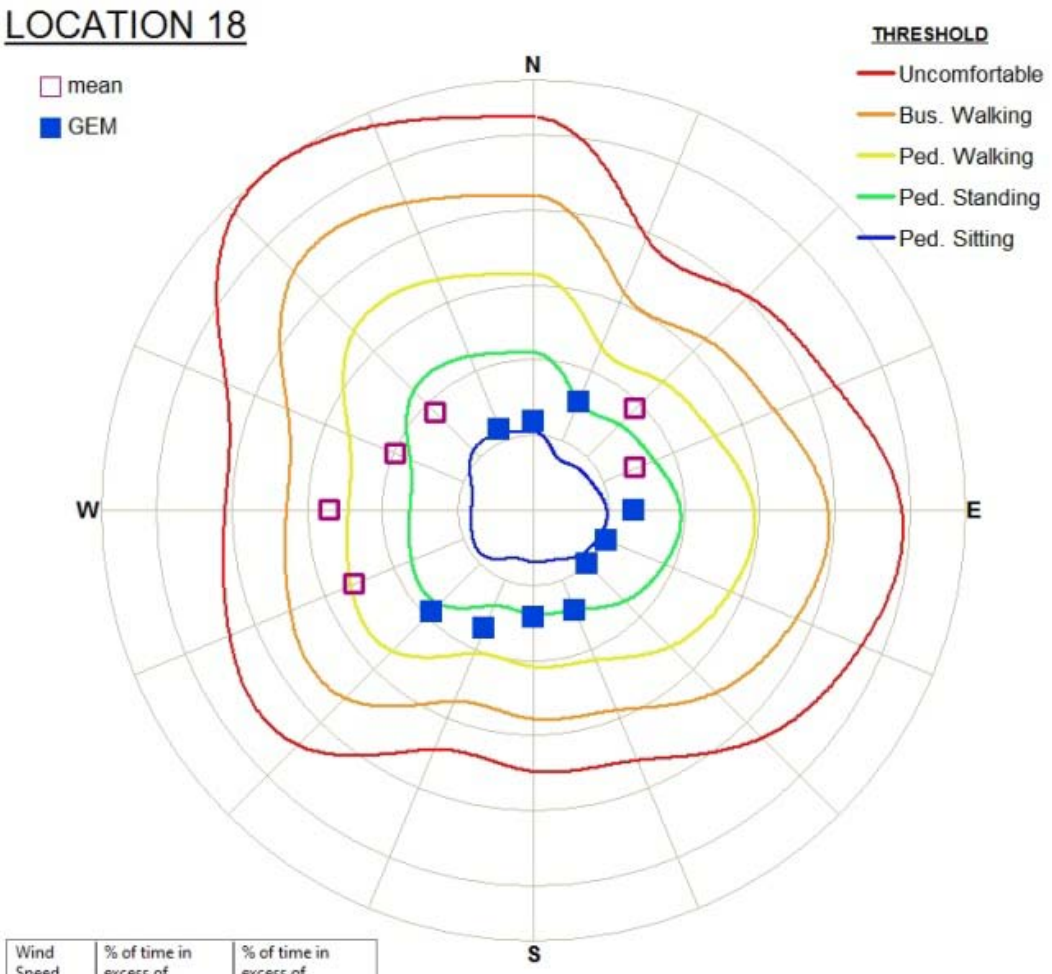
C18.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	41.5	43.8
4.0	19.2	17.7
6.0	9.6	7.1
8.0	3.8	2.1
10.0	1.2	0.4
7.4	**5.0**	Ped Walking
15.8	**0.022**	Able Body
6.5	Ped Walking	**5.0**
13.9	Pass	**0.022**

C19 Location 18

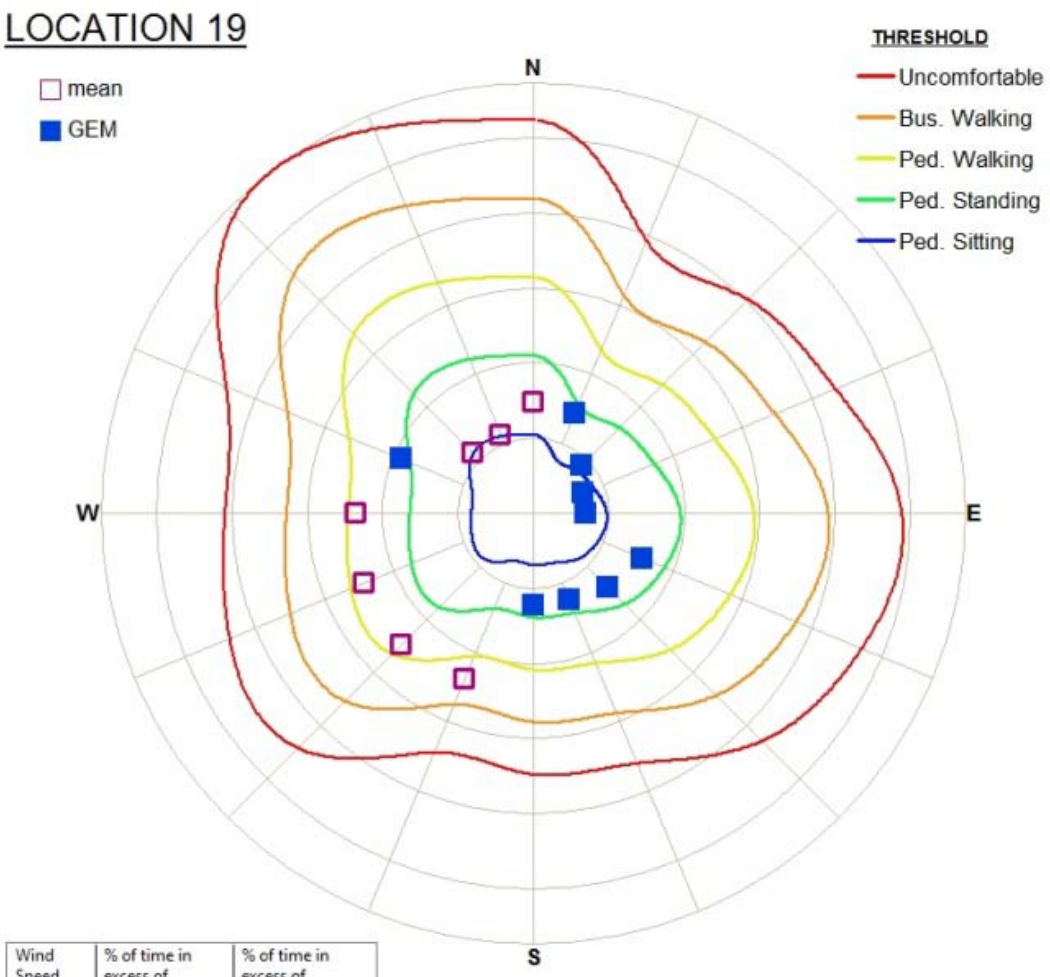
C19.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	29.3	35.6
4.0	5.6	6.6
6.0	1.1	0.8
8.0	0.2	0.1
10.0	0.0	0.0
4.1	**5.0**	Ped Standing
9.9	**0.022**	Pass
4.2	Ped Standing	**5.0**
9.0	Pass	**0.022**

C20 Location 19

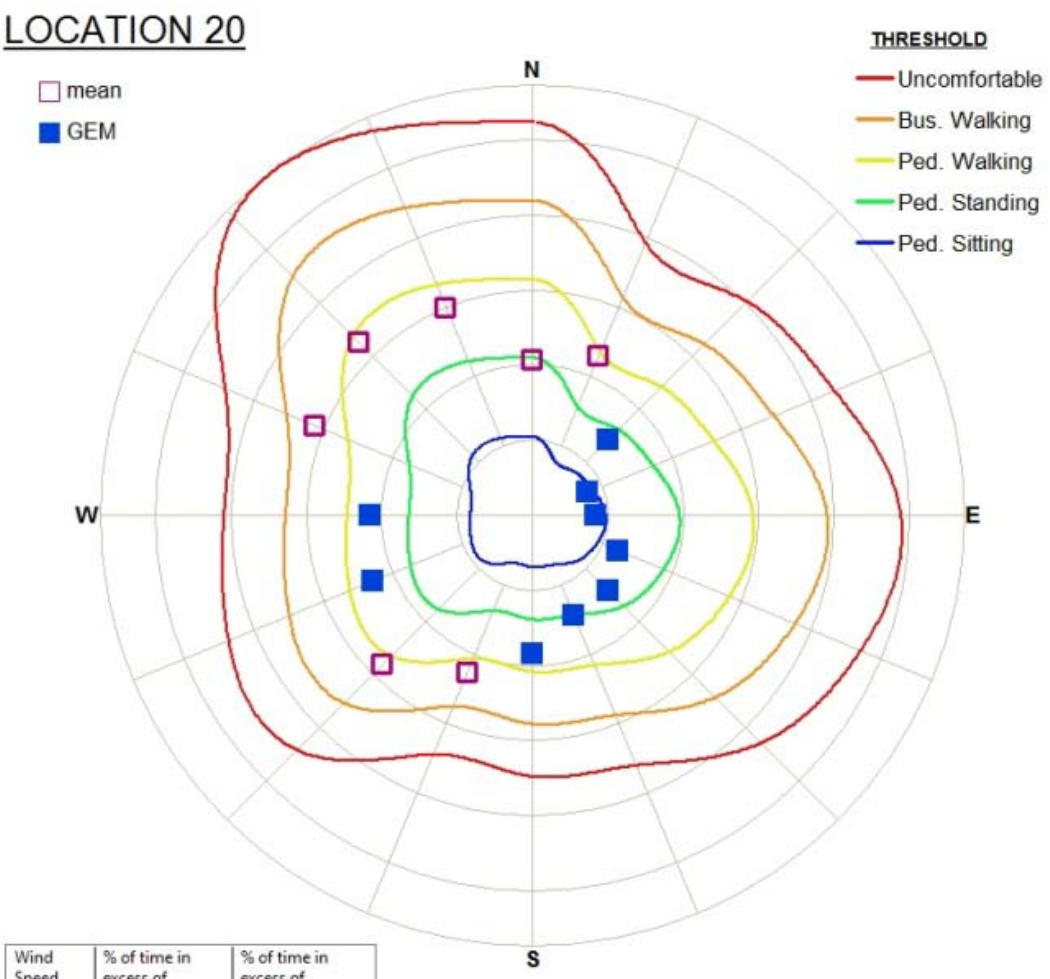
C20.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	25.0	29.9
4.0	5.8	5.5
6.0	1.2	0.9
8.0	0.2	0.1
10.0	0.0	0.0
4.2	**5.0**	Ped Standing
10.0	**0.022**	Pass
4.0	Ped Standing	**5.0**
9.4	Pass	**0.022**

C21 Location 20

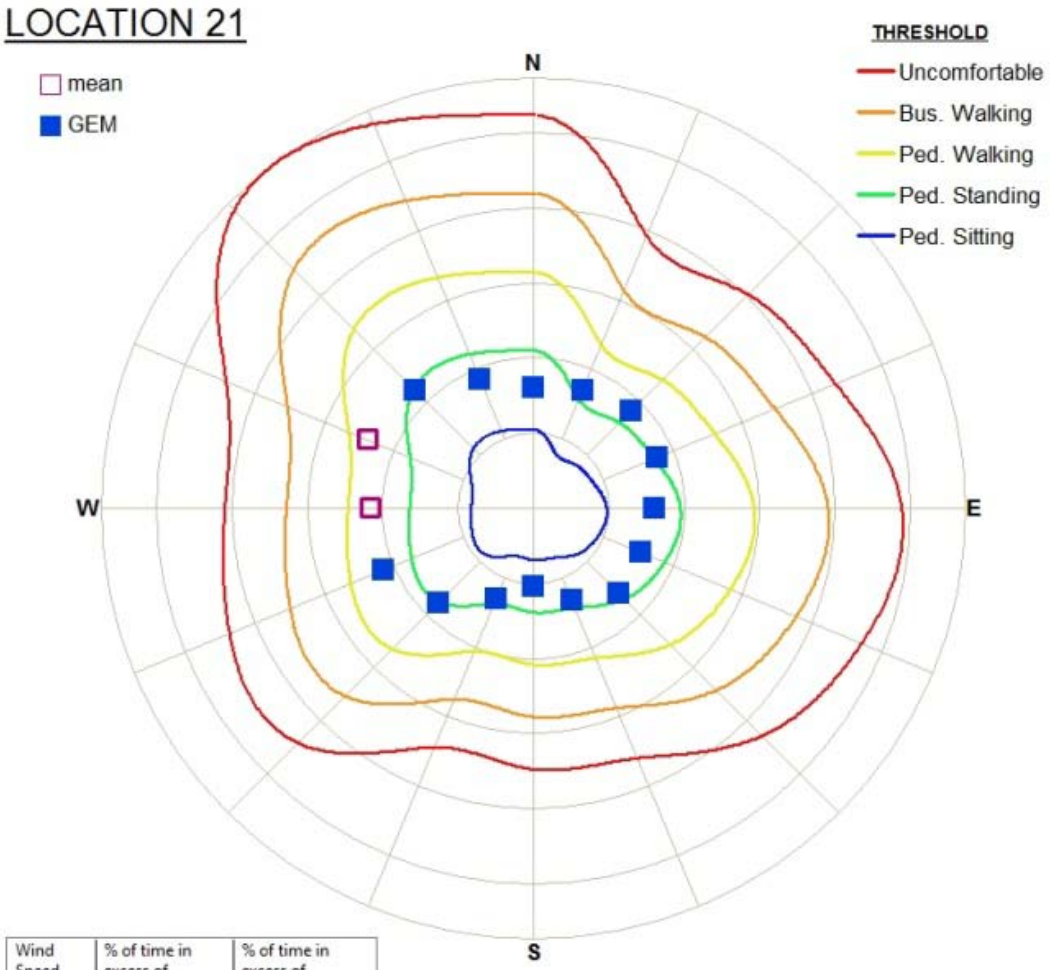
C21.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	43.3	43.4
4.0	11.0	11.2
6.0	2.3	1.7
8.0	0.5	0.2
10.0	0.1	0.0
4.9	**5.0**	Ped Standing
12.2	**0.022**	Pass
4.9	Ped Standing	**5.0**
10.2	Pass	**0.022**

C22 Location 21

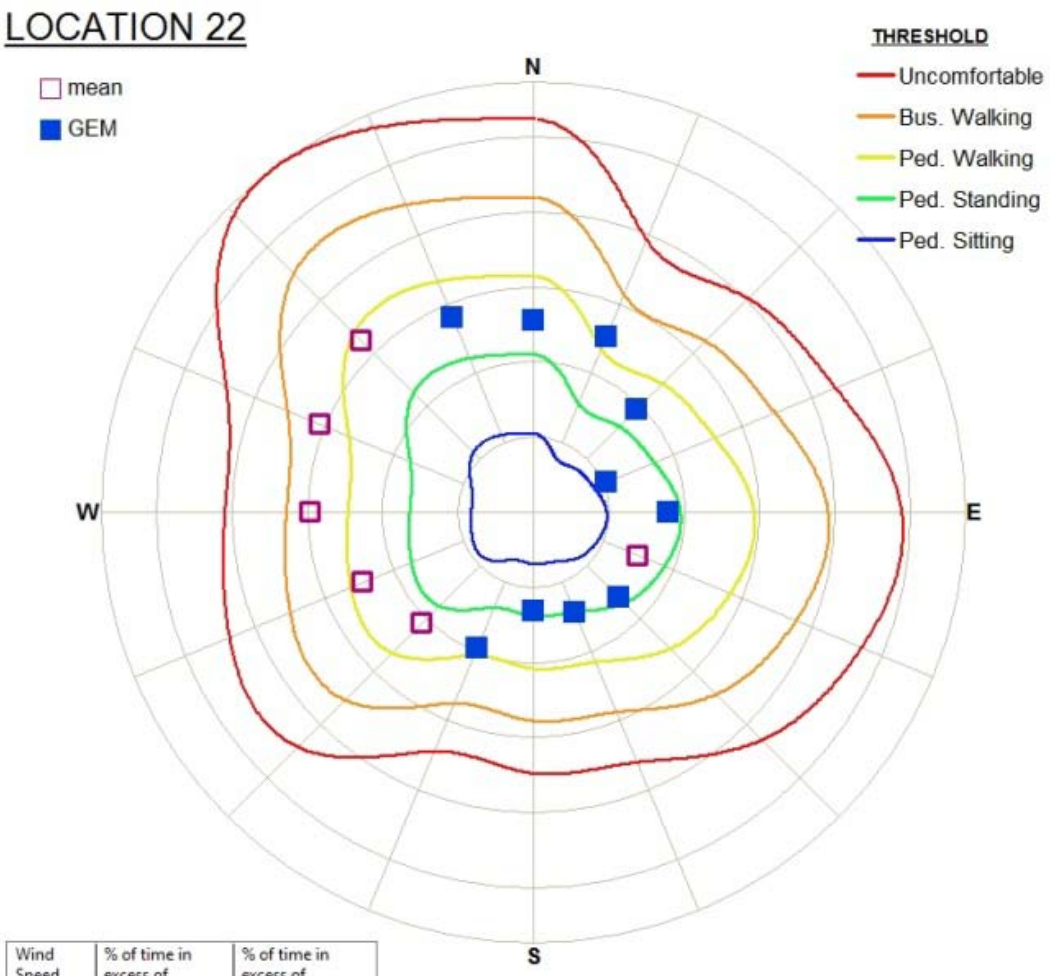
C22.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	29.9	38.0
4.0	3.8	5.7
6.0	0.6	0.6
8.0	0.1	0.1
10.0	0.0	0.0
3.7	**5.0**	Ped Sitting
9.1	**0.022**	Pass
4.1	Ped Standing	**5.0**
8.9	Pass	**0.022**

C23 Location 22

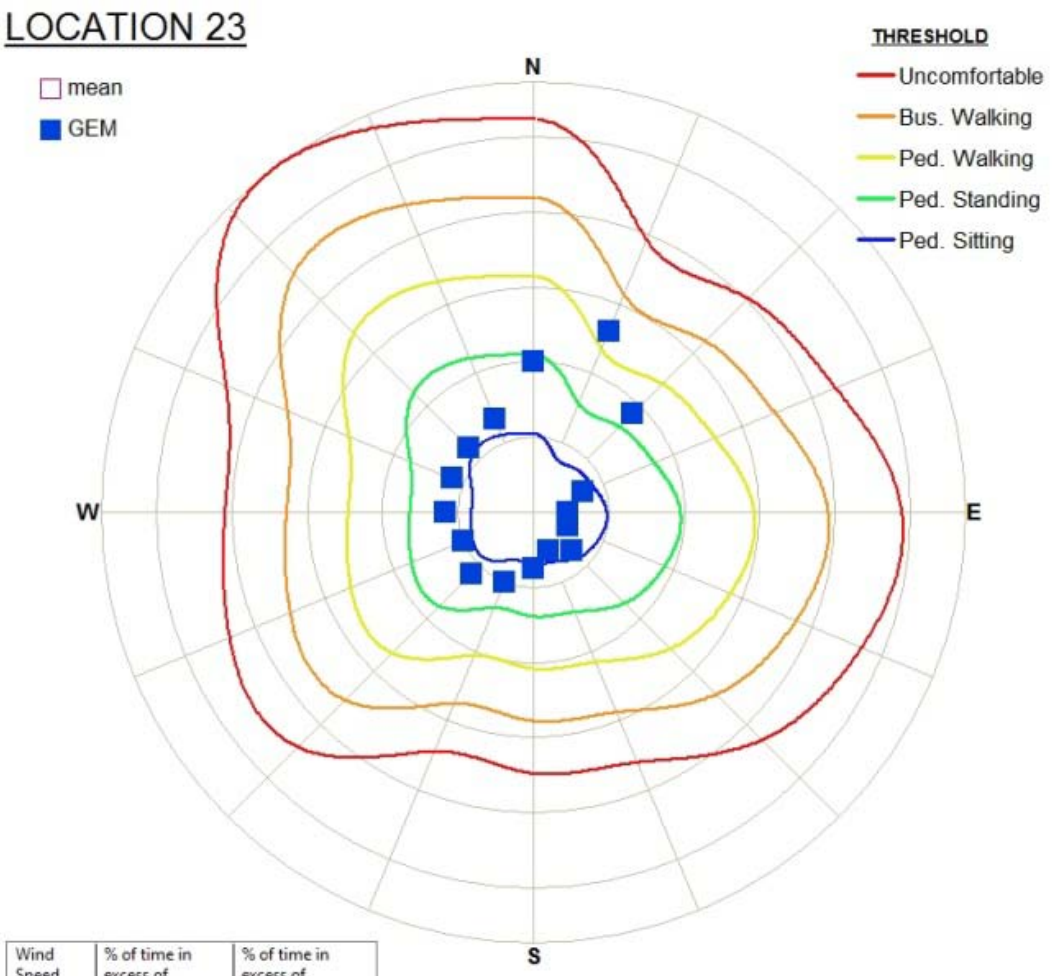
C23.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	42.4	46.9
4.0	10.5	10.8
6.0	2.6	1.9
8.0	0.7	0.2
10.0	0.1	0.0
5.0	**5.0**	Ped Standing
12.2	**0.022**	Pass
4.9	Ped Standing	**5.0**
9.9	Pass	**0.022**

C24 Location 23

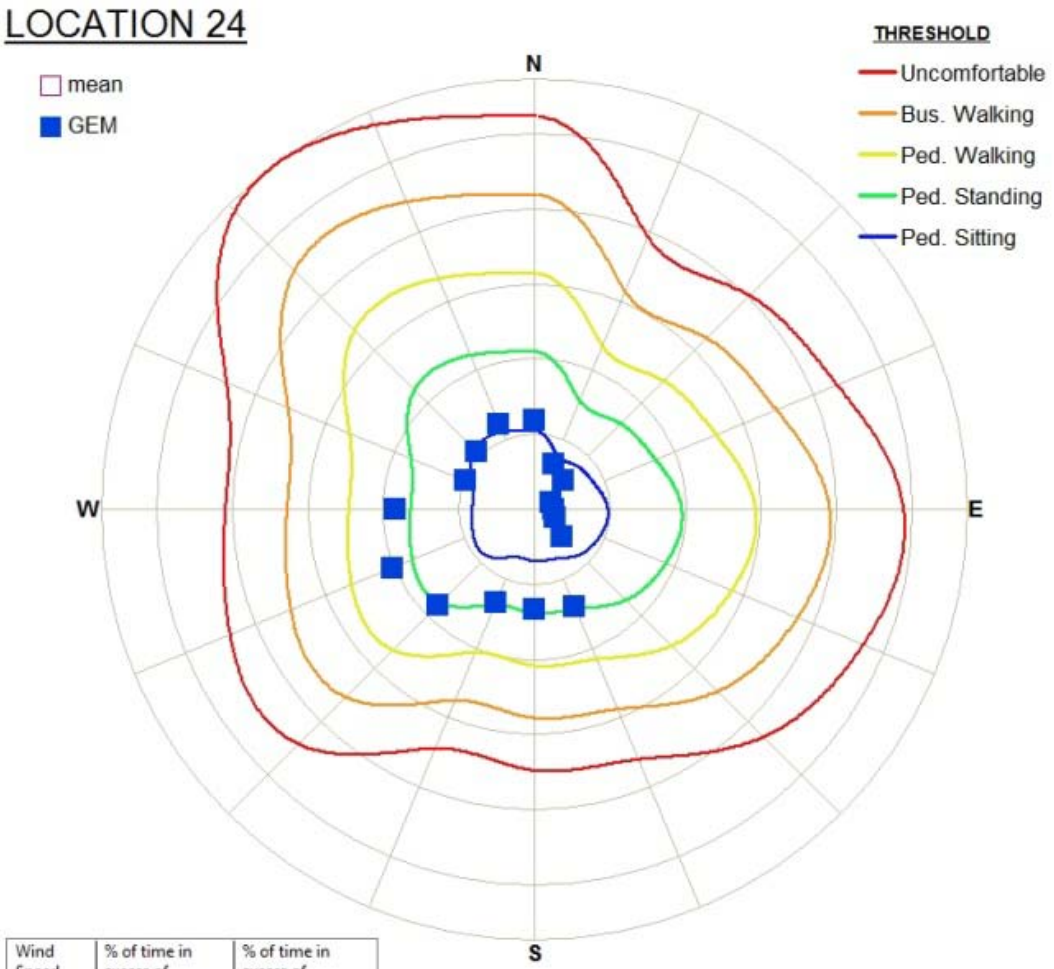
C24.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	11.7	17.9
4.0	2.5	3.7
6.0	0.5	0.7
8.0	0.0	0.1
10.0	0.0	0.0
2.9	**5.0**	Ped Sitting
8.2	**0.022**	Pass
3.6	Ped Sitting	**5.0**
8.5	Pass	**0.022**

C25 Location 24

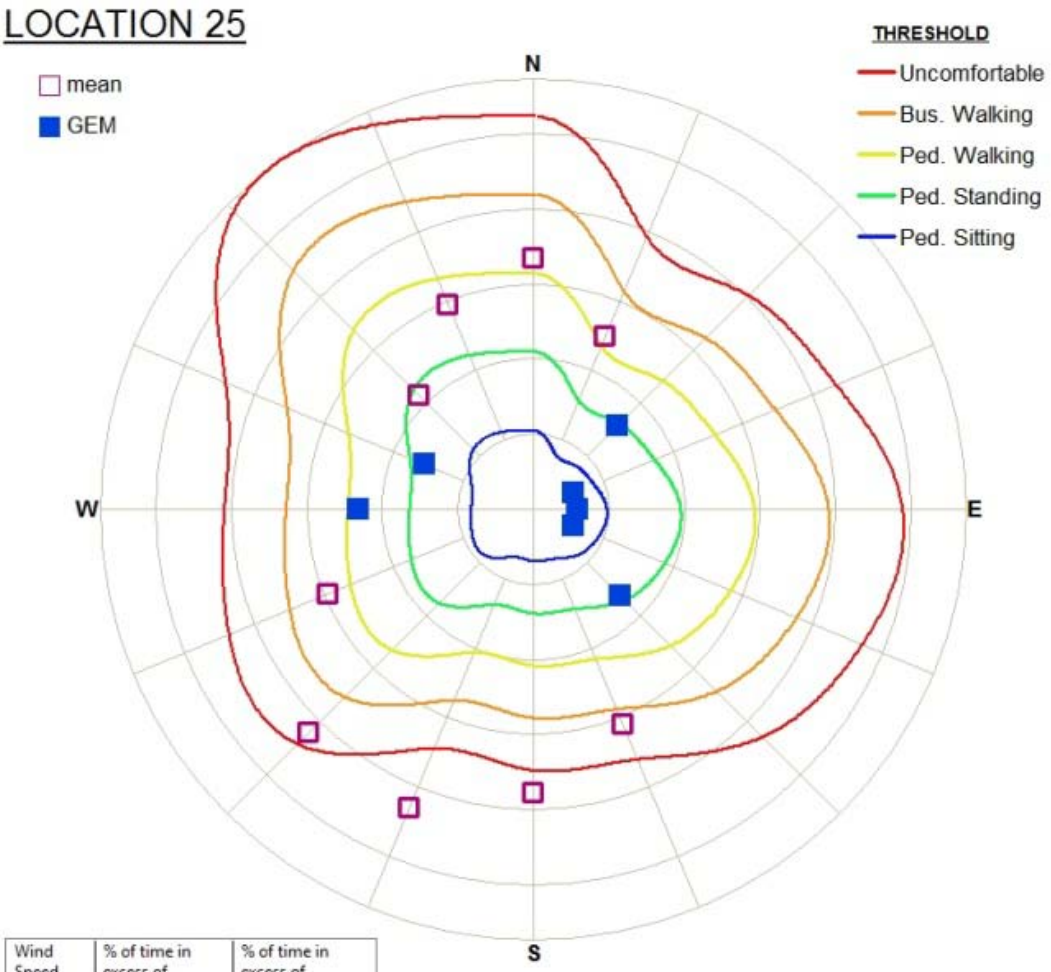
C25.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	8.3	20.8
4.0	0.1	2.5
6.0	0.0	0.1
8.0	0.0	0.0
10.0	0.0	0.0
2.3	**5.0**	Ped Sitting
4.6	**0.022**	Pass
3.4	Ped Sitting	**5.0**
7.2	Pass	**0.022**

C26 Location 25

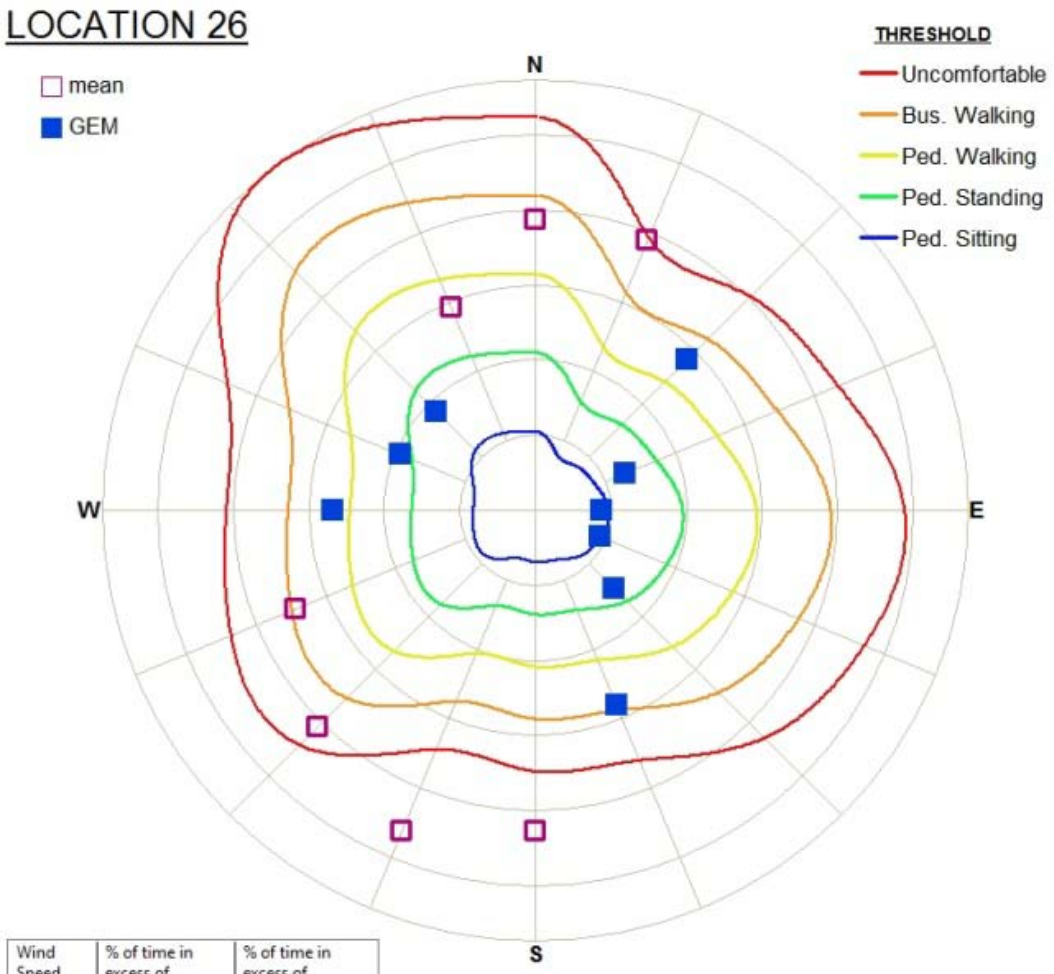
C26.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	47.6	47.6
4.0	24.3	21.1
6.0	12.6	7.4
8.0	5.5	1.7
10.0	2.0	0.3
8.1	**5.0**	Bus Walking
17.8	**0.022**	Able Body
6.5	Ped Walking	**5.0**
13.3	Pass	**0.022**

C27 Location 26

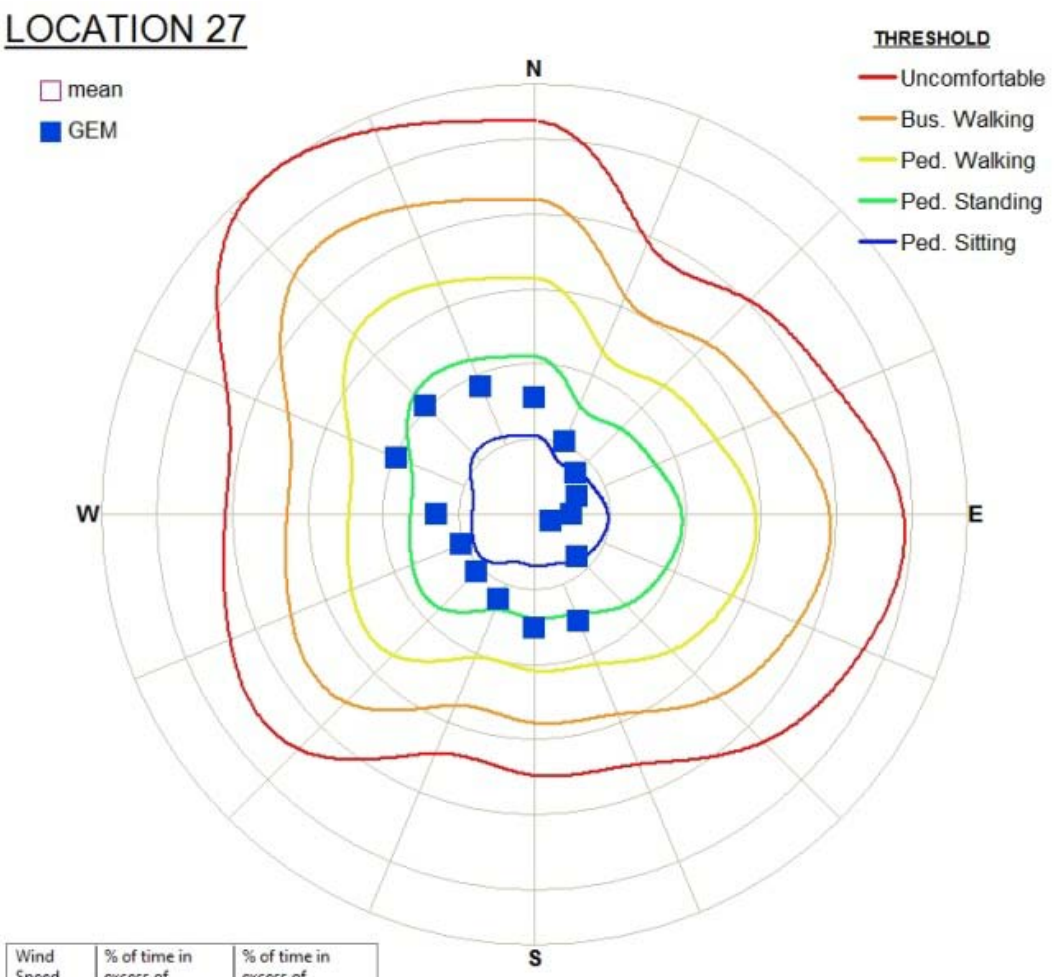
C27.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	51.2	53.2
4.0	29.5	28.5
6.0	15.9	13.9
8.0	8.0	4.9
10.0	3.4	1.4
9.0	**5.0**	Bus Walking
19.4	**0.022**	Able Body
7.9	Ped Walking	**5.0**
16.1	Able Body	**0.022**

C28 Location 27

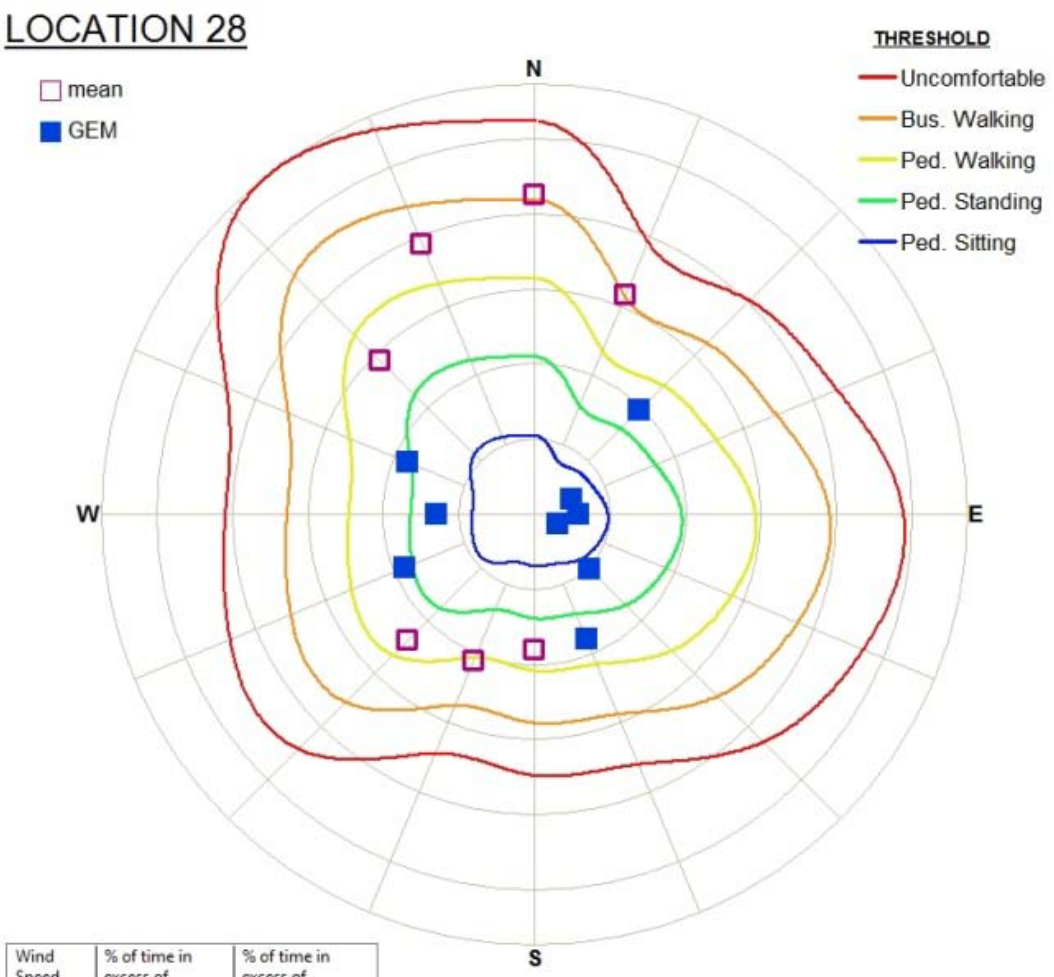
C28.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	16.0	24.1
4.0	1.3	2.8
6.0	0.1	0.2
8.0	0.0	0.0
10.0	0.0	0.0
3.0	**5.0**	Ped Sitting
6.8	**0.022**	Pass
3.5	Ped Sitting	**5.0**
7.7	Pass	**0.022**

C29 Location 28

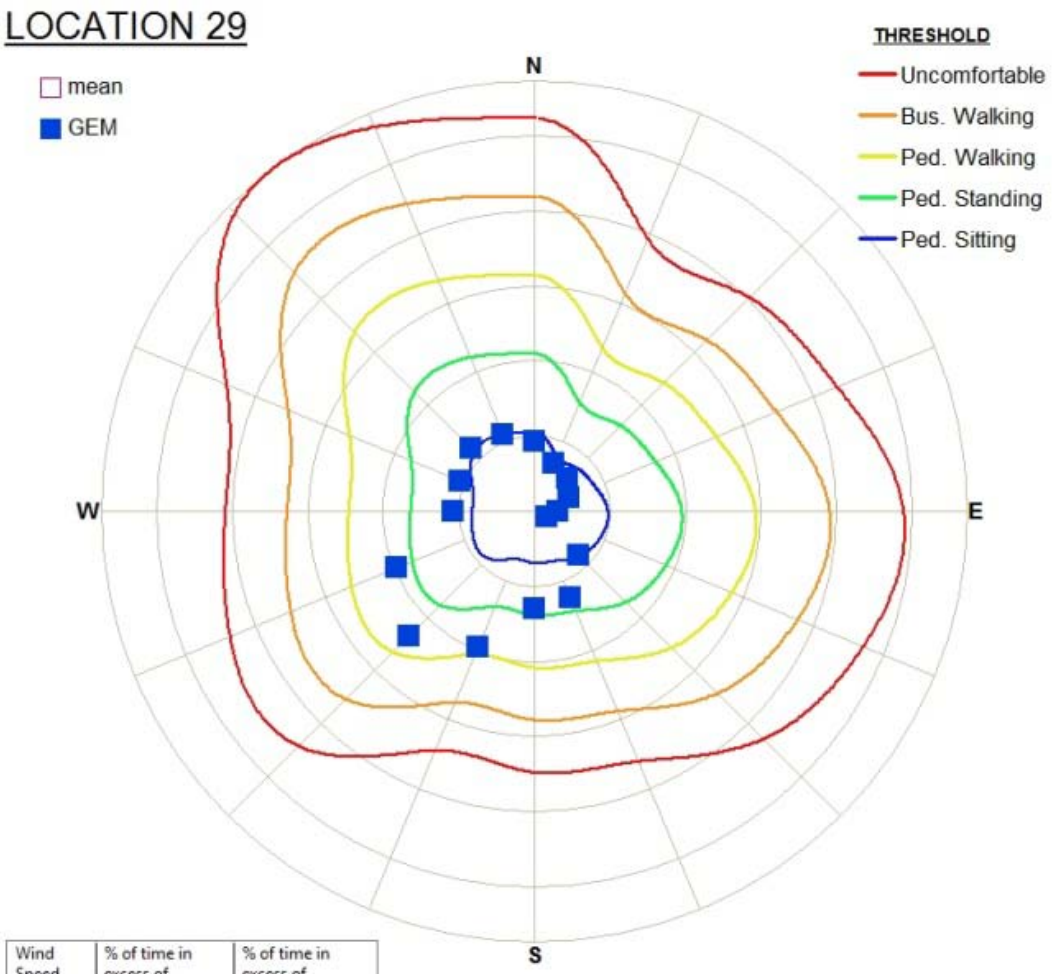
C29.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	40.9	42.7
4.0	13.8	12.0
6.0	3.9	2.2
8.0	1.0	0.3
10.0	0.2	0.0
5.5	**5.0**	Ped Standing
12.6	**0.022**	Pass
5.0	Ped Standing	**5.0**
10.4	Pass	**0.022**

C30 Location 29

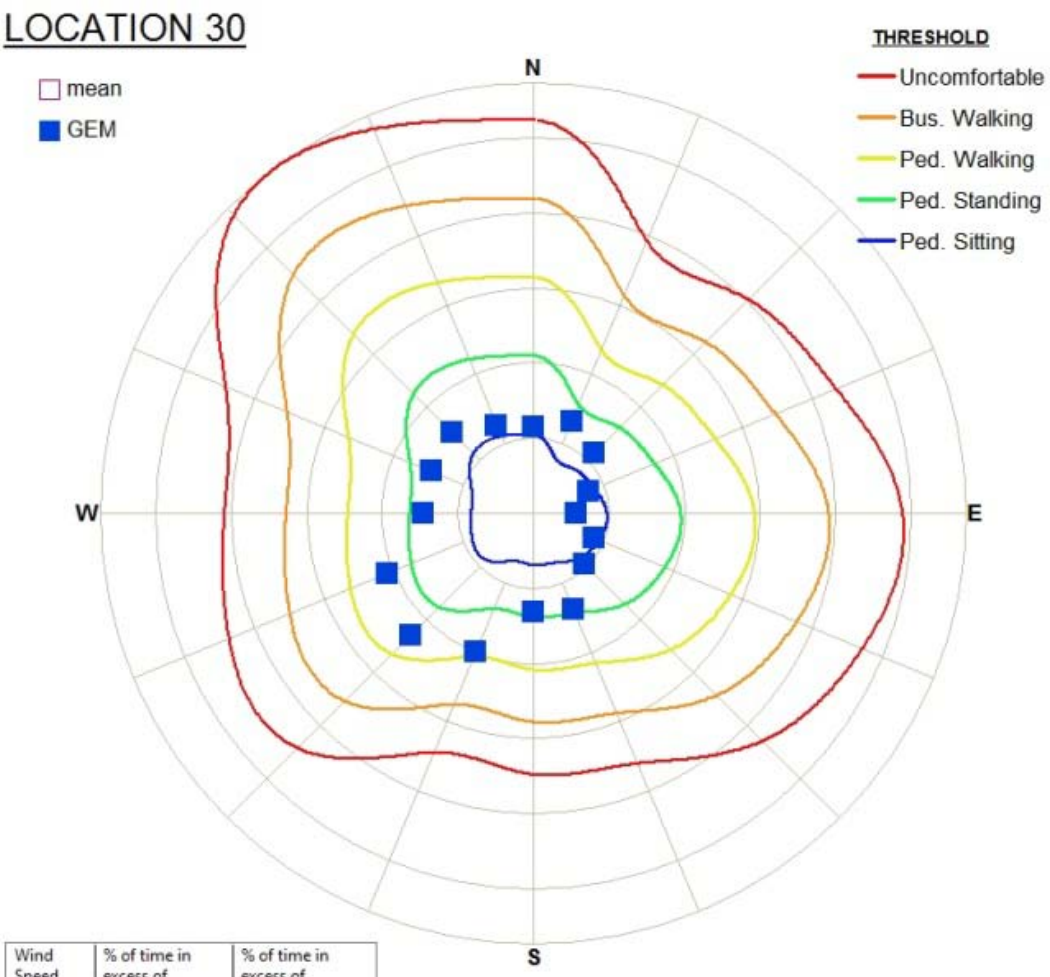
C30.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	11.0	19.0
4.0	1.5	2.7
6.0	0.2	0.3
8.0	0.0	0.0
10.0	0.0	0.0
2.7	**5.0**	Ped Sitting
7.9	**0.022**	Pass
3.4	Ped Sitting	**5.0**
8.2	Pass	**0.022**

C31 Location 30

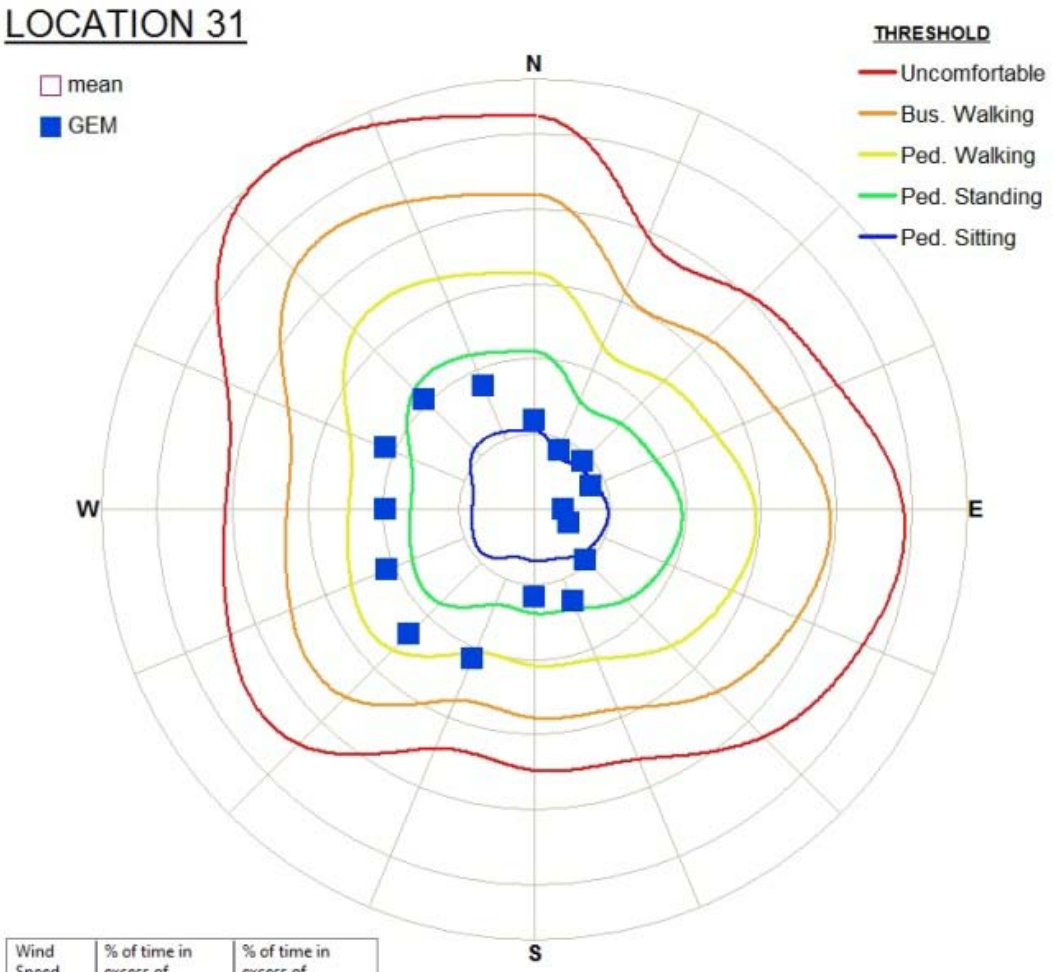
C31.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	17.1	27.1
4.0	1.5	3.6
6.0	0.1	0.3
8.0	0.0	0.0
10.0	0.0	0.0
2.9	**5.0**	Ped Sitting
7.6	**0.022**	Pass
3.7	Ped Sitting	**5.0**
8.3	Pass	**0.022**

C32 Location 31

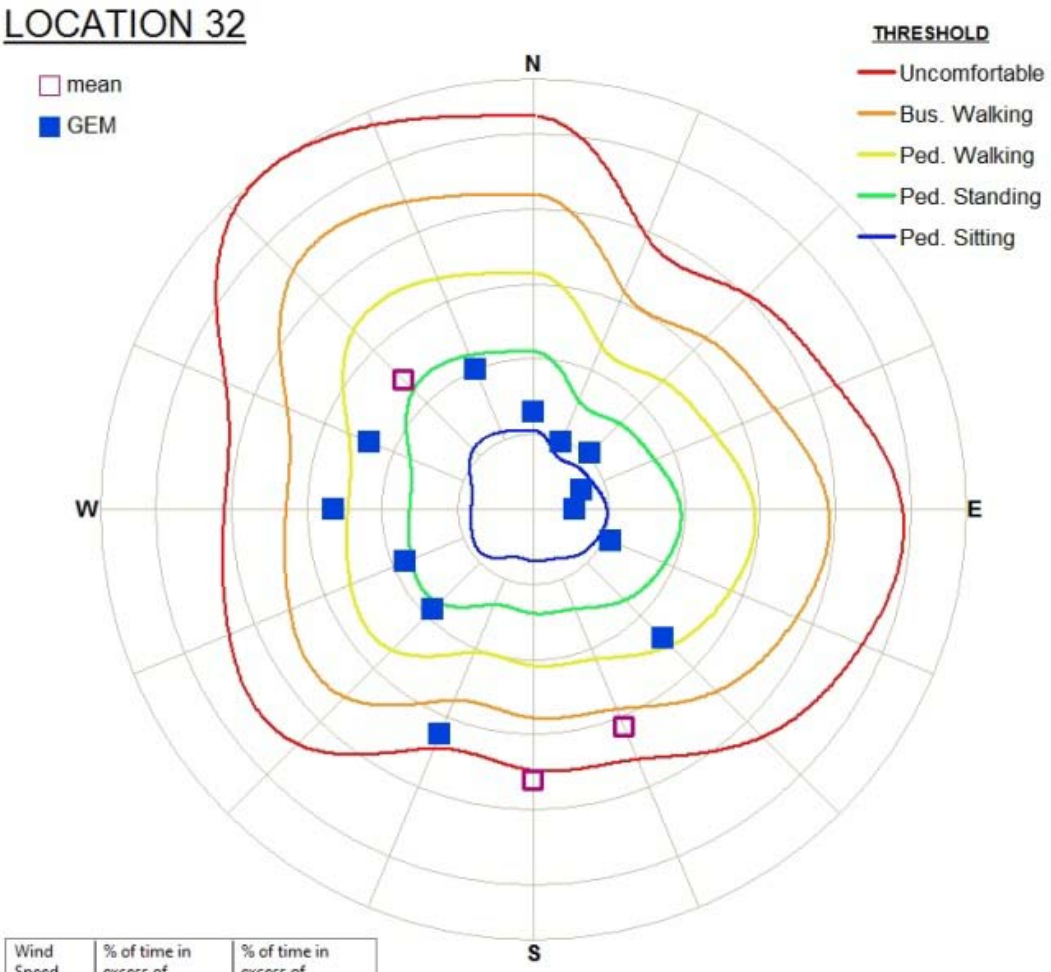
C32.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	15.9	27.1
4.0	1.9	5.1
6.0	0.2	0.7
8.0	0.0	0.1
10.0	0.0	0.0
3.0	**5.0**	Ped Sitting
7.5	**0.022**	Pass
4.0	Ped Sitting	**5.0**
9.1	Pass	**0.022**

C33 Location 32

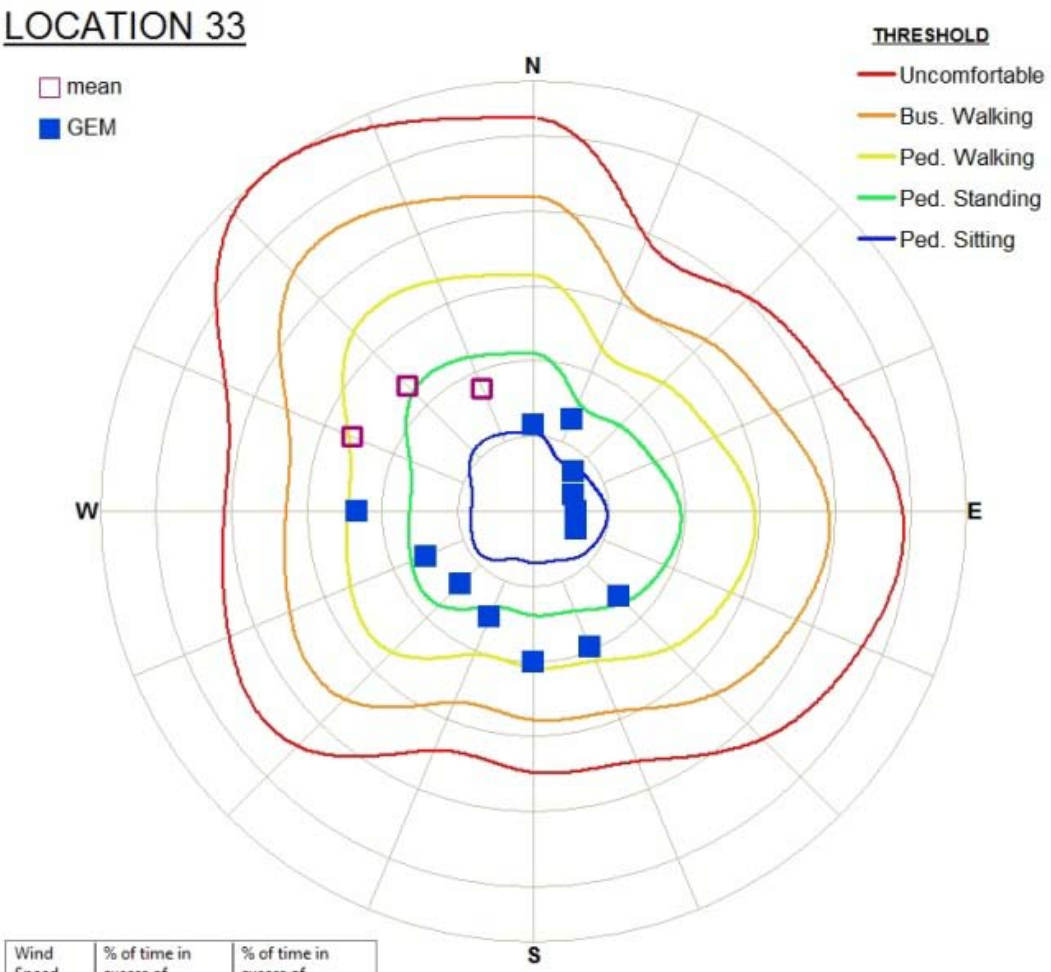
C33.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	36.2	41.5
4.0	17.7	19.2
6.0	8.7	8.9
8.0	3.2	3.0
10.0	1.0	0.8
7.1	**5.0**	Ped Walking
14.8	**0.022**	Pass
7.0	Ped Walking	**5.0**
14.7	Pass	**0.022**

C34 Location 33

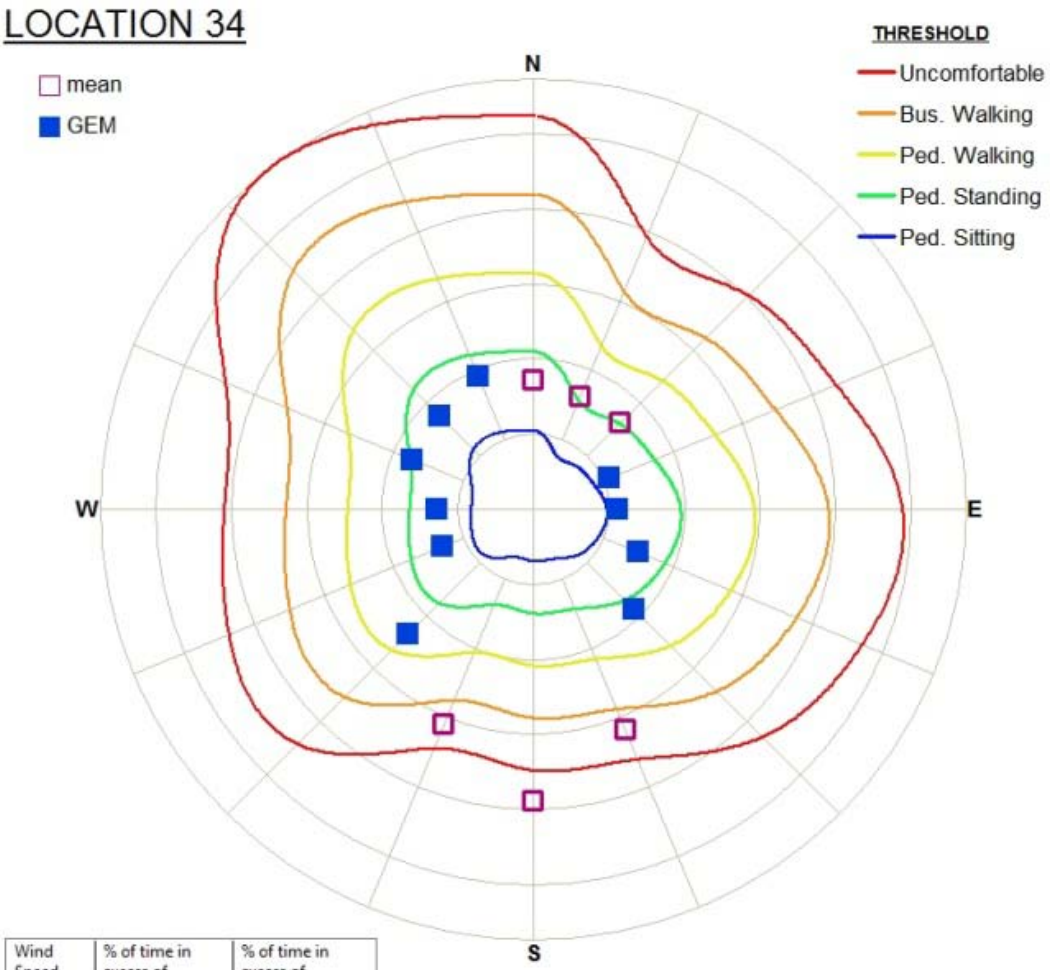
C34.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	29.4	33.5
4.0	6.1	8.5
6.0	1.0	1.3
8.0	0.1	0.1
10.0	0.0	0.0
4.2	**5.0**	Ped Standing
9.8	**0.022**	Pass
4.6	Ped Standing	**5.0**
9.4	Pass	**0.022**

C35 Location 34

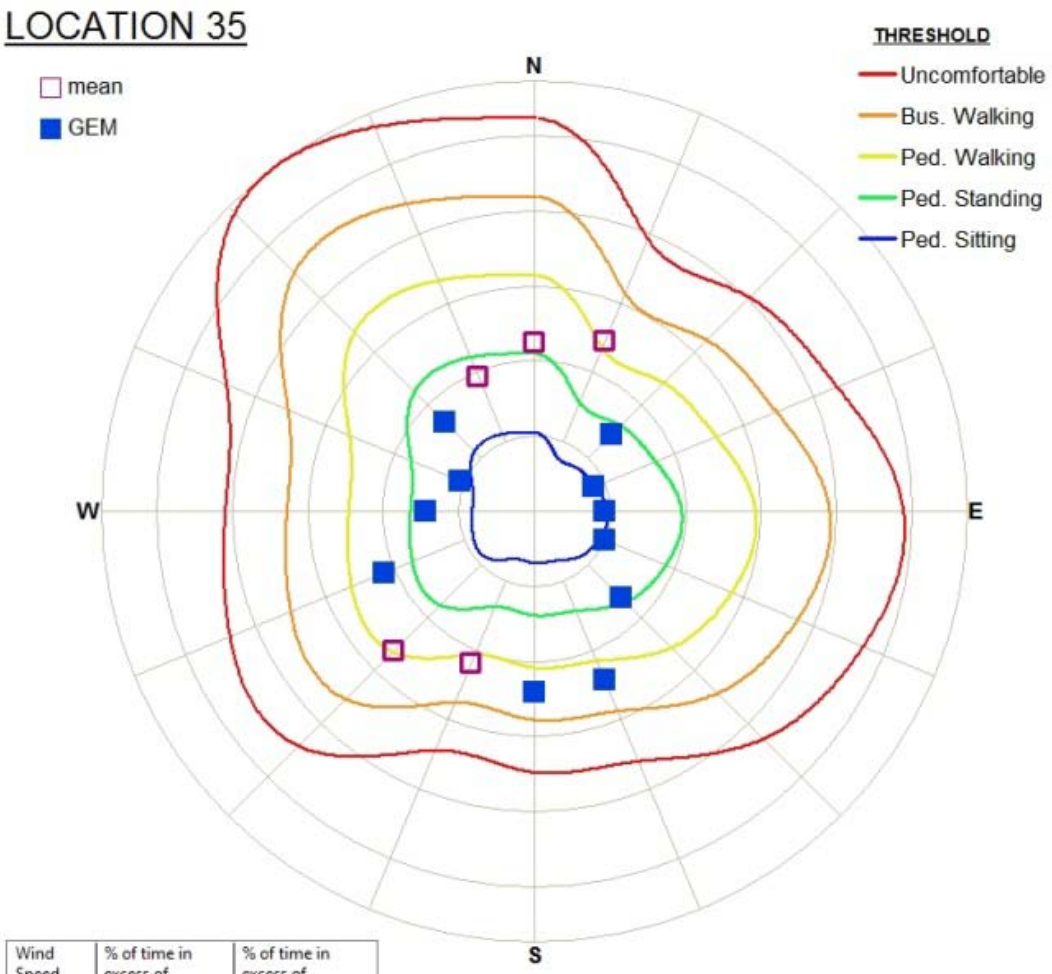
C35.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	38.8	40.7
4.0	16.9	15.7
6.0	9.4	7.1
8.0	4.2	2.3
10.0	1.5	0.6
7.5	**5.0**	Ped Walking
15.9	**0.022**	Able Body
6.6	Ped Walking	**5.0**
13.8	Pass	**0.022**

C36 Location 35

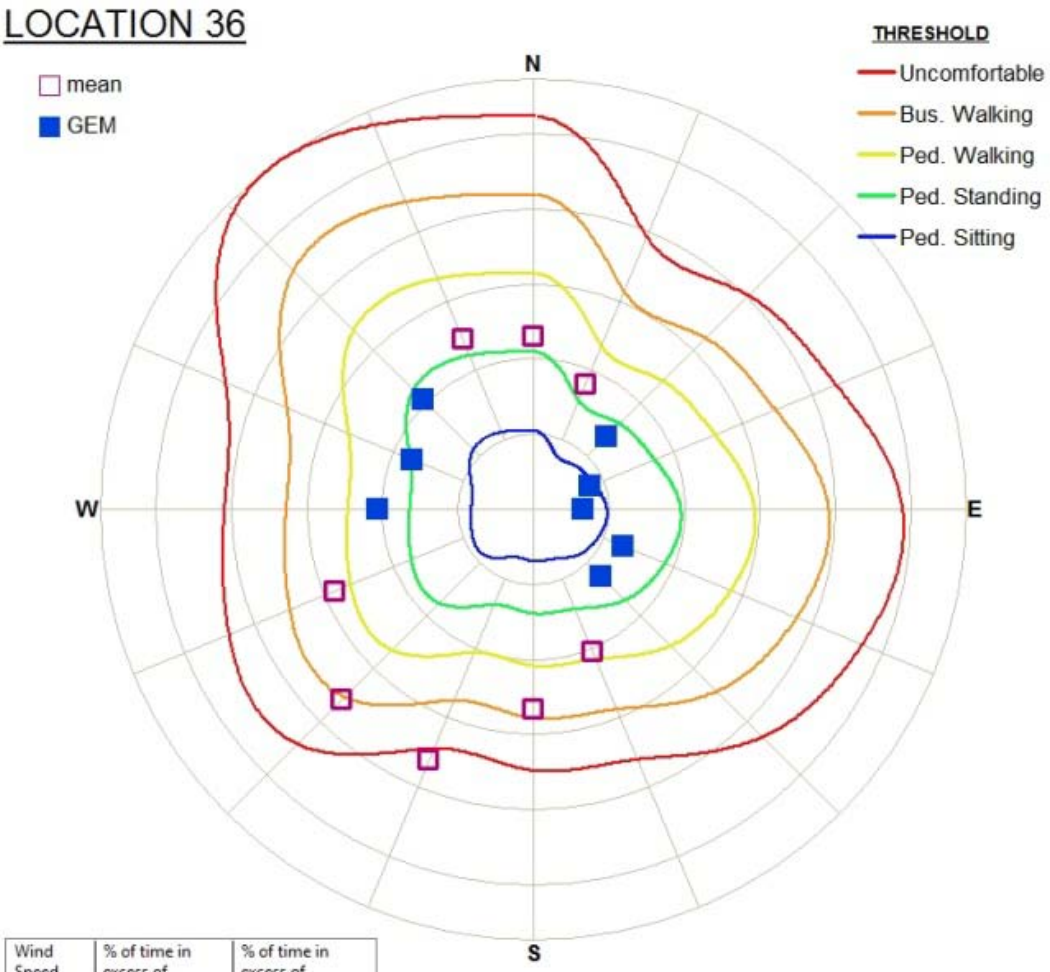
C36.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	35.9	39.4
4.0	11.9	12.8
6.0	2.1	2.6
8.0	0.2	0.3
10.0	0.0	0.0
5.0	**5.0**	Ped Standing
10.0	**0.022**	Pass
5.2	Ped Standing	**5.0**
10.5	Pass	**0.022**

C37 Location 36

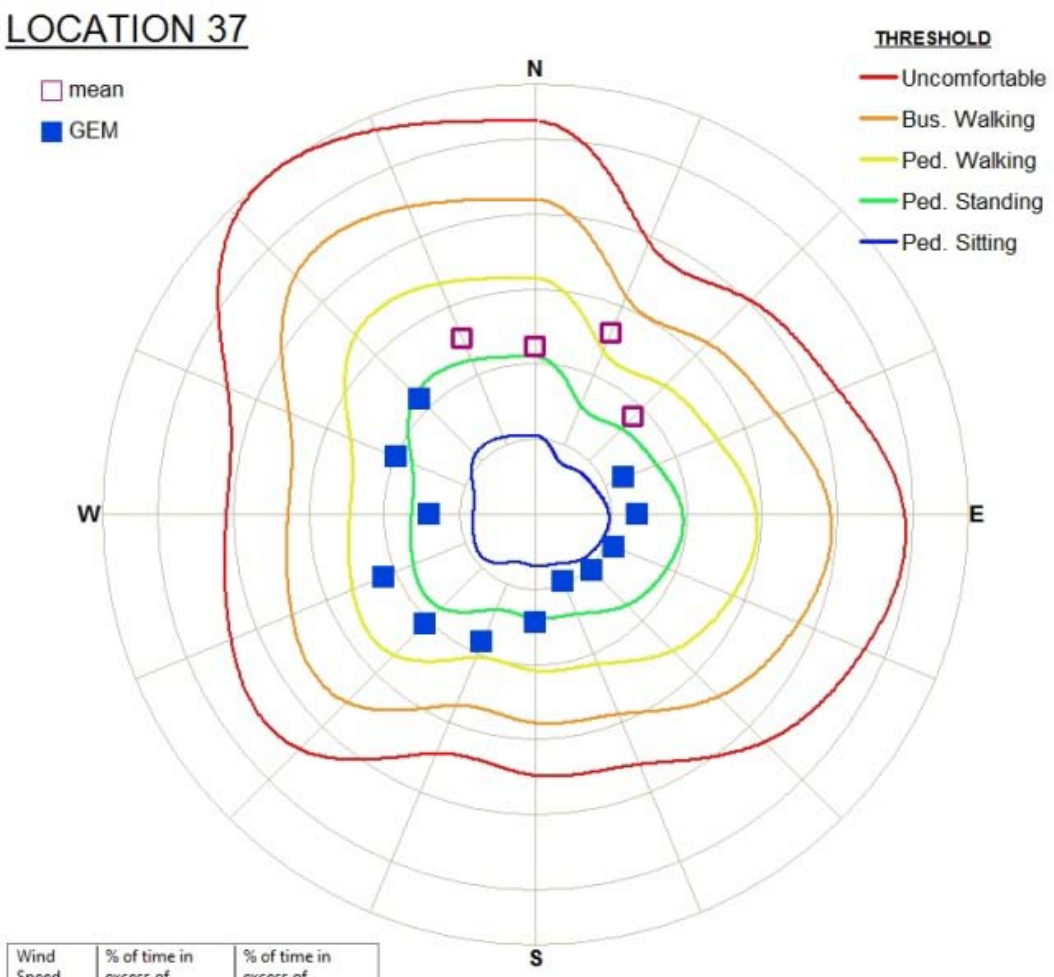
C37.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	41.7	41.9
4.0	16.2	13.6
6.0	5.5	3.3
8.0	1.6	0.6
10.0	0.4	0.1
6.1	**5.0**	Ped Walking
14.6	**0.022**	Pass
5.4	Ped Standing	**5.0**
12.3	Pass	**0.022**

C38 Location 37

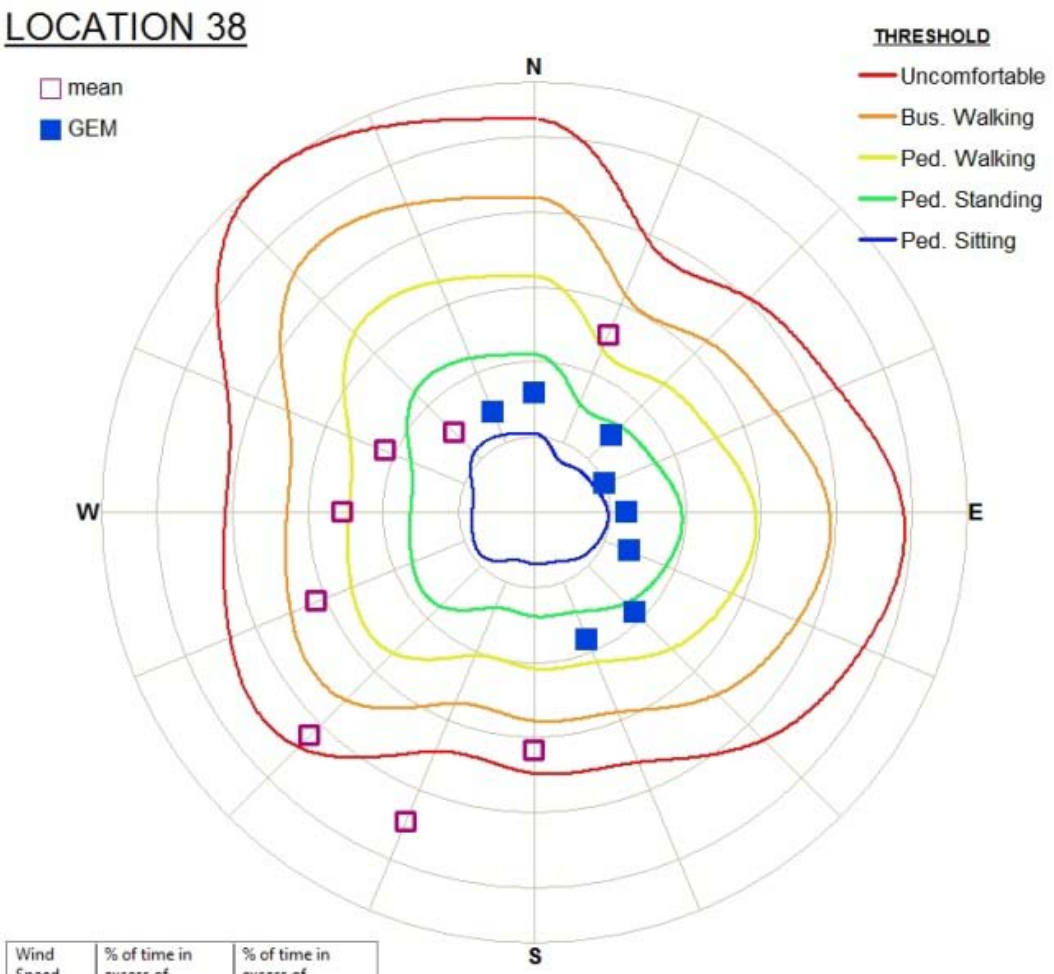
C38.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	31.2	37.8
4.0	6.1	7.2
6.0	0.9	0.8
8.0	0.1	0.1
10.0	0.0	0.0
4.2	**5.0**	Ped Standing
8.8	**0.022**	Pass
4.3	Ped Standing	**5.0**
8.6	Pass	**0.022**

C39 Location 38

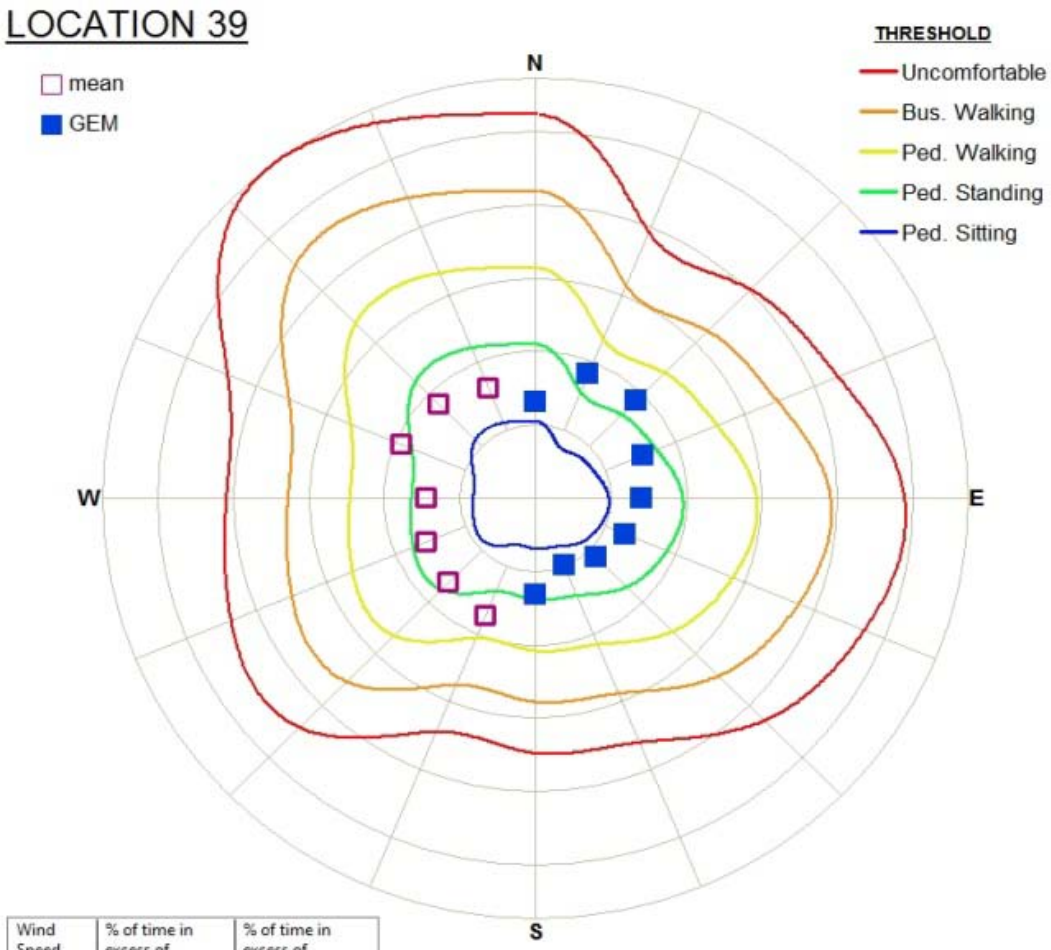
C39.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	42.6	44.6
4.0	19.9	18.7
6.0	9.3	7.1
8.0	3.6	2.0
10.0	1.3	0.5
7.2	**5.0**	Ped Walking
18.0	**0.022**	Able Body
6.5	Ped Walking	**5.0**
14.6	Pass	**0.022**

C40 Location 39

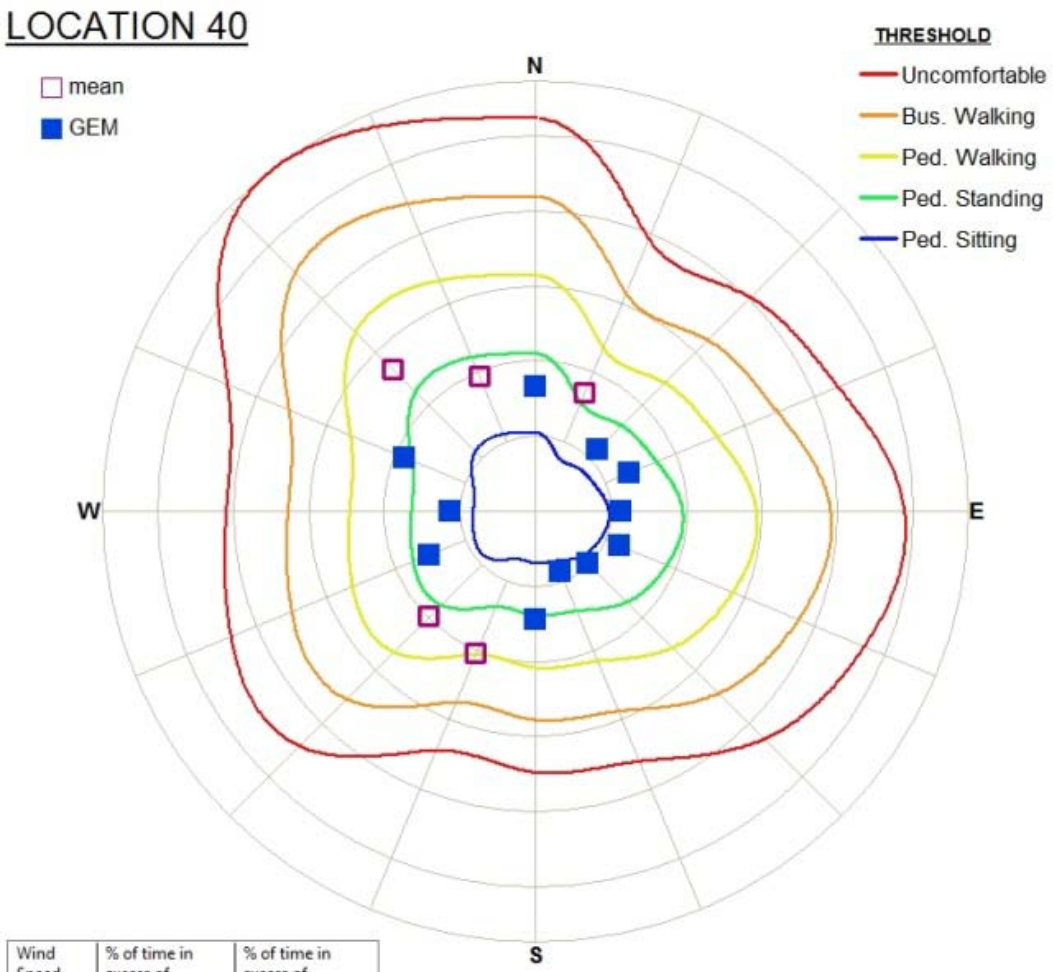
C40.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	27.3	31.7
4.0	2.7	3.6
6.0	0.2	0.2
8.0	0.0	0.0
10.0	0.0	0.0
3.5	**5.0**	Ped Sitting
7.6	**0.022**	Pass
3.7	Ped Sitting	**5.0**
7.2	Pass	**0.022**

C41 Location 40

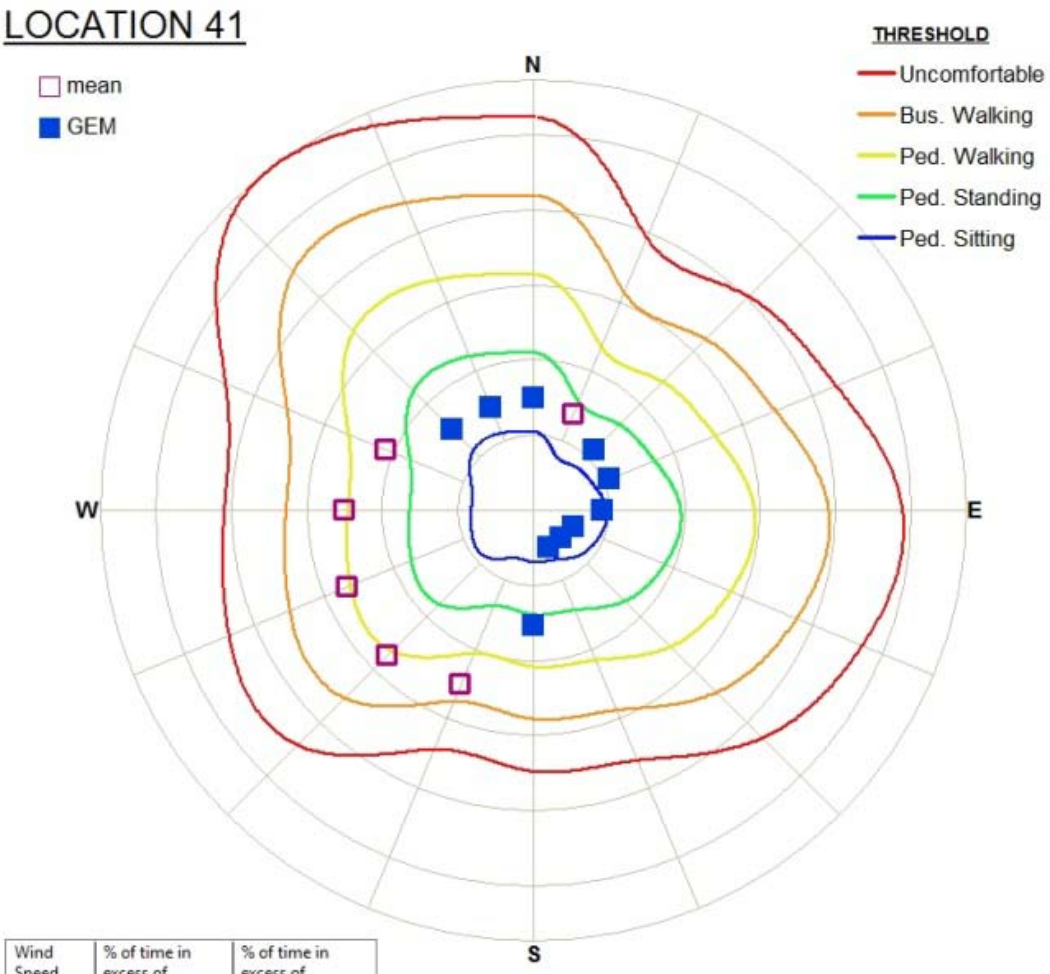
C41.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	28.4	30.4
4.0	4.2	3.4
6.0	0.5	0.3
8.0	0.1	0.0
10.0	0.0	0.0
3.8	**5.0**	Ped Sitting
9.4	**0.022**	Pass
3.7	Ped Sitting	**5.0**
8.2	Pass	**0.022**

C42 Location 41

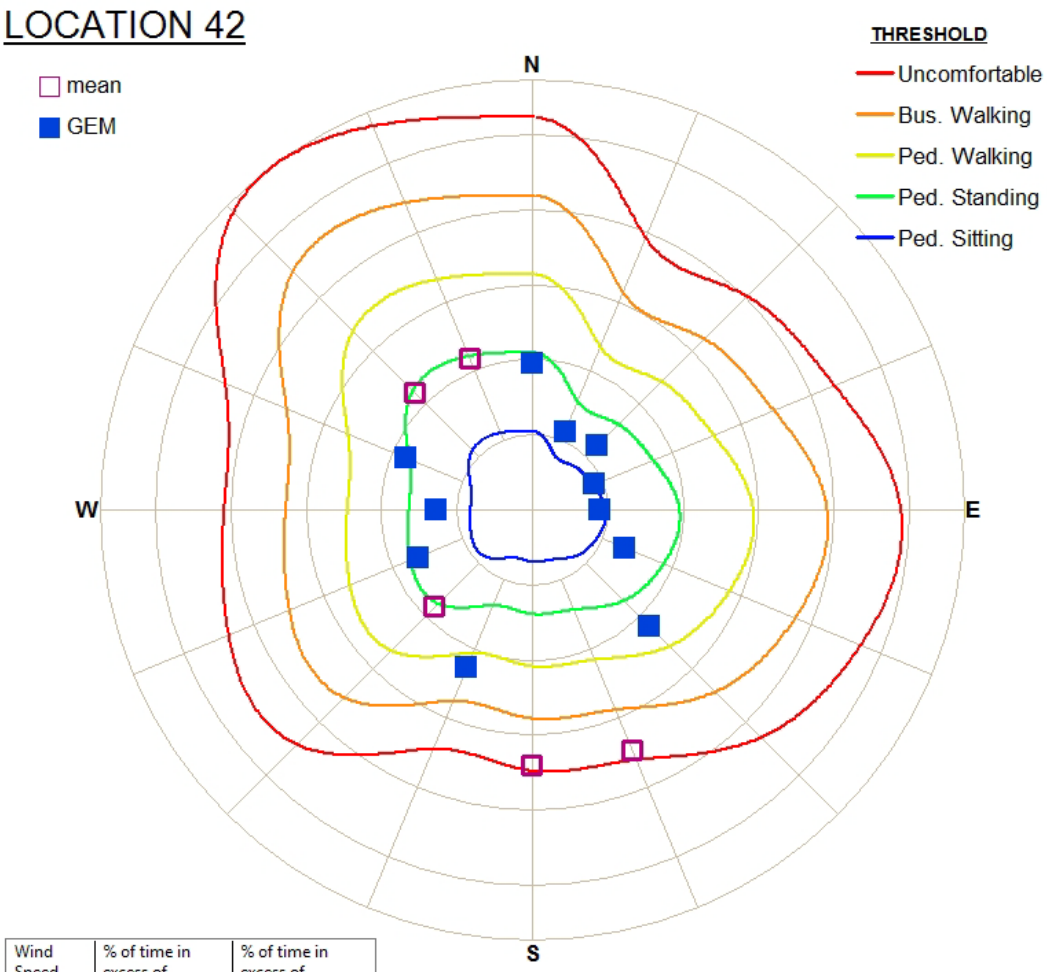
C42.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	26.2	29.2
4.0	7.0	6.0
6.0	1.8	0.8
8.0	0.3	0.1
10.0	0.0	0.0
4.5	**5.0**	Ped Standing
10.6	**0.022**	Pass
4.2	Ped Standing	**5.0**
9.1	Pass	**0.022**

C43 Location 42

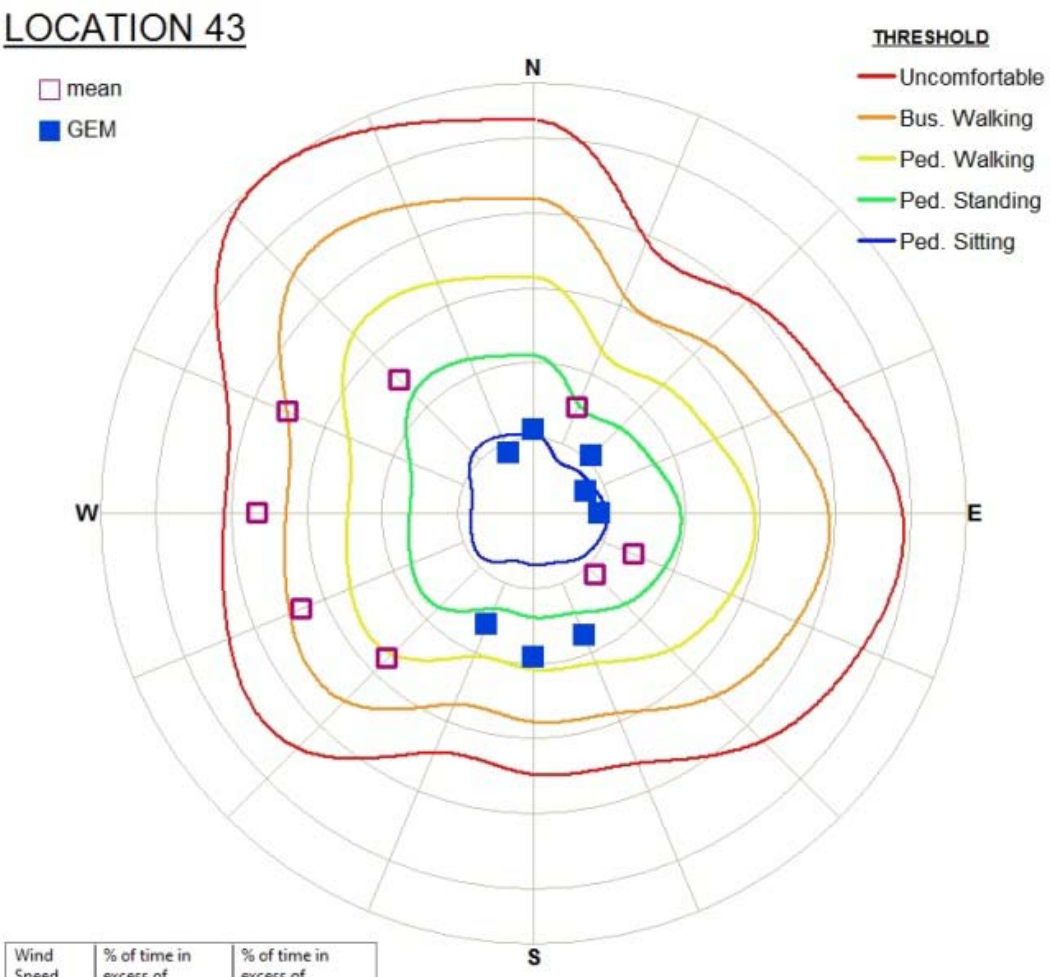
C43.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	35.0	39.1
4.0	15.3	14.8
6.0	7.7	5.8
8.0	2.9	1.6
10.0	0.8	0.3
6.9	**5.0**	Ped Walking
14.9	**0.022**	Pass
6.2	Ped Walking	**5.0**
13.1	Pass	**0.022**

C44 Location 43

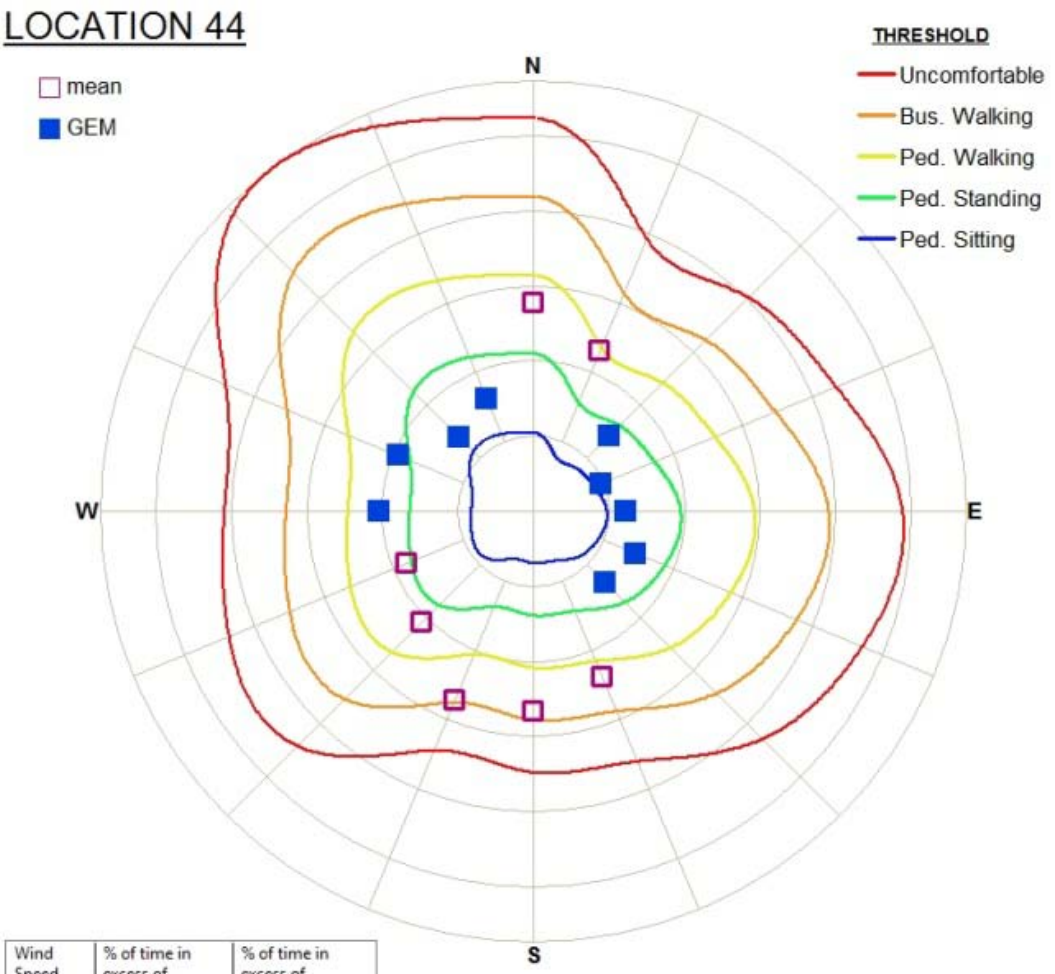
C44.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	40.1	38.2
4.0	13.0	11.3
6.0	4.1	2.6
8.0	1.4	0.6
10.0	0.4	0.1
5.6	**5.0**	Ped Standing
14.1	**0.022**	Pass
5.1	Ped Standing	**5.0**
11.4	Pass	**0.022**

C45 Location 44

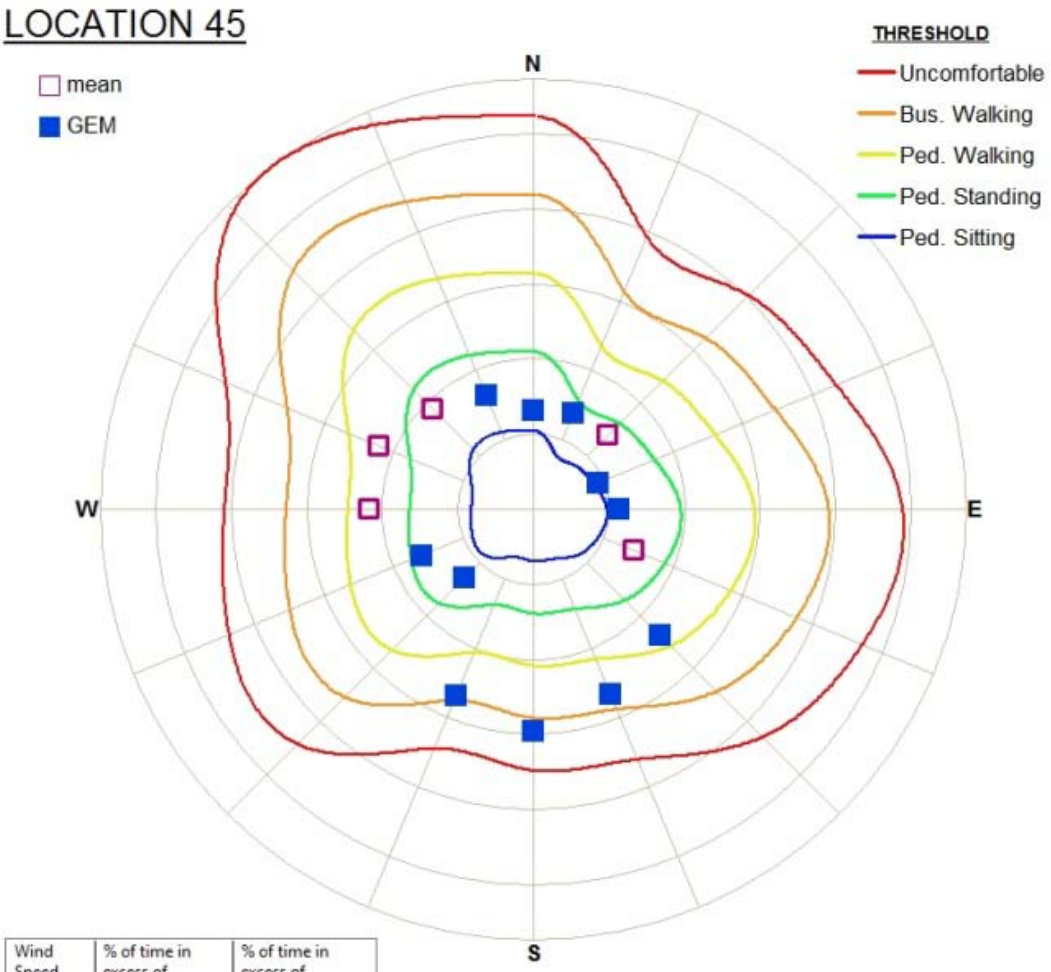
C45.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	40.1	42.3
4.0	15.9	13.9
6.0	4.4	2.9
8.0	0.8	0.3
10.0	0.1	0.0
5.8	**5.0**	Ped Standing
11.8	**0.022**	Pass
5.3	Ped Standing	**5.0**
10.7	Pass	**0.022**

C46 Location 45

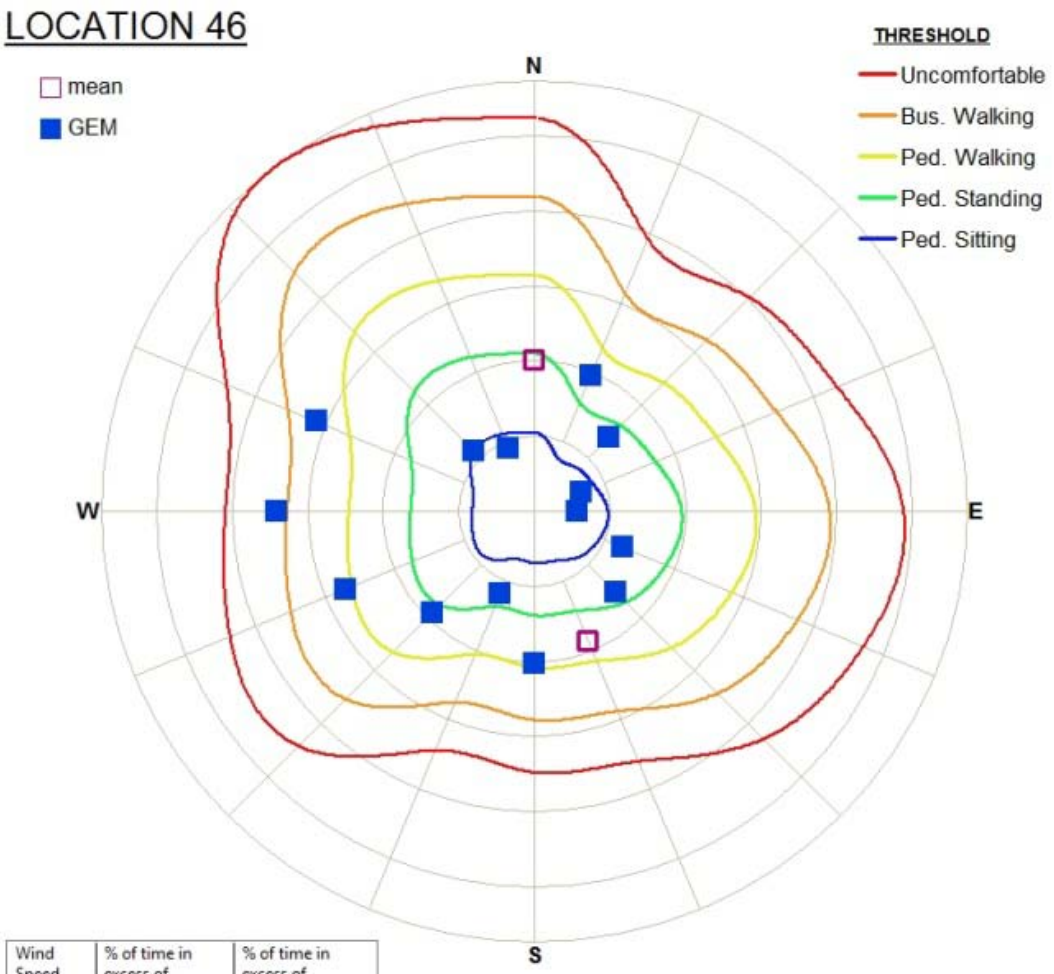
C46.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	38.8	39.8
4.0	13.3	15.0
6.0	3.7	5.4
8.0	0.7	1.3
10.0	0.1	0.2
5.6	**5.0**	Ped Standing
11.2	**0.022**	Pass
6.1	Ped Walking	**5.0**
12.6	Pass	**0.022**

C47 Location 46

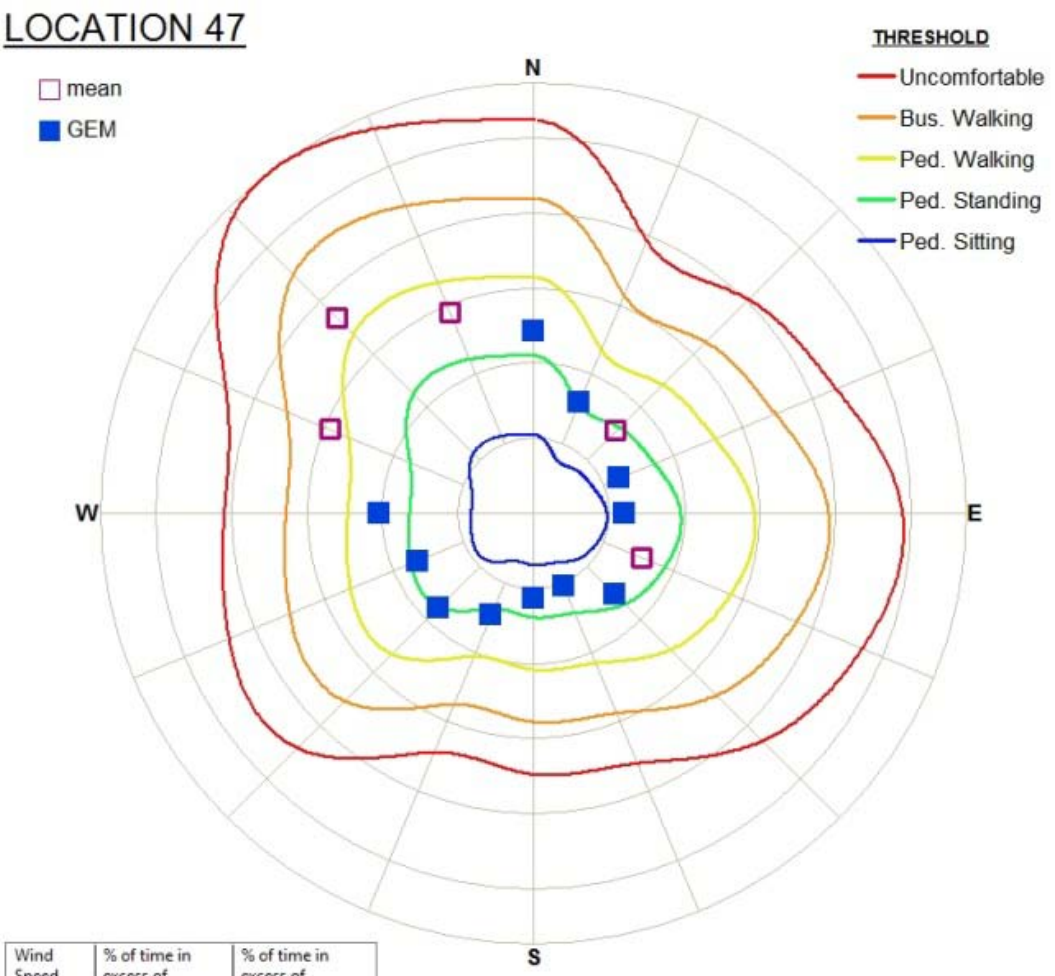
C47.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	34.1	40.8
4.0	9.3	12.6
6.0	1.8	3.1
8.0	0.4	0.9
10.0	0.1	0.2
4.7	**5.0**	Ped Standing
11.3	**0.022**	Pass
5.3	Ped Standing	**5.0**
12.7	Pass	**0.022**

C48 Location 47

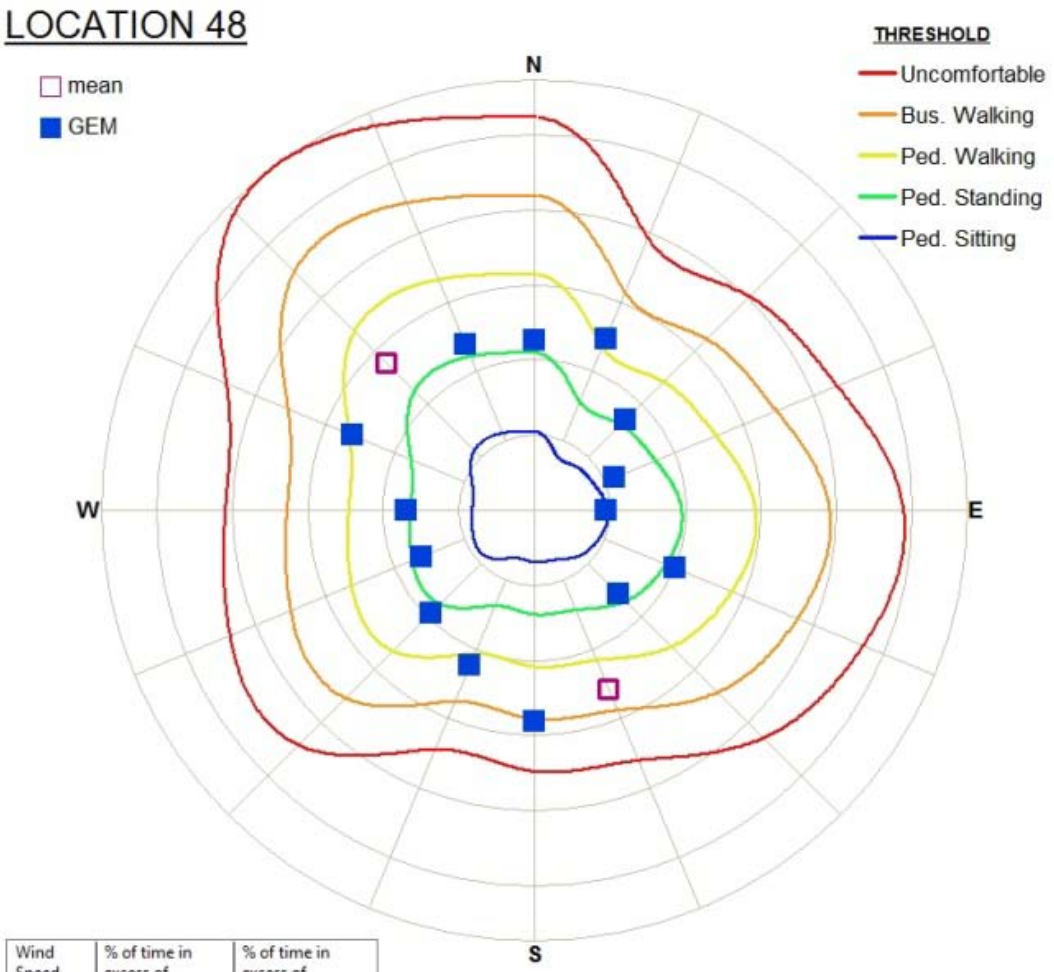
C48.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	32.4	40.4
4.0	4.8	6.1
6.0	1.3	1.2
8.0	0.4	0.3
10.0	0.1	0.1
3.9	**5.0**	Ped Sitting
12.3	**0.022**	Pass
4.2	Ped Standing	**5.0**
11.2	Pass	**0.022**

C49 Location 48

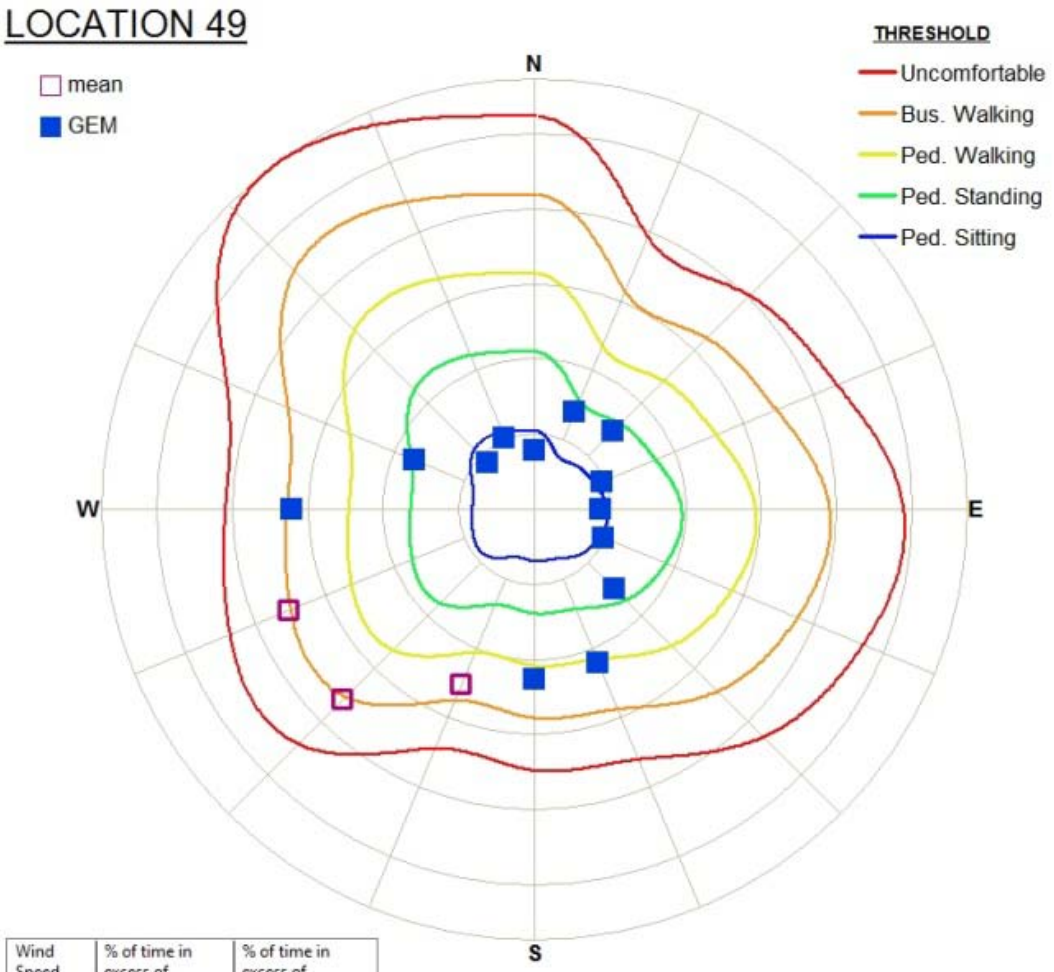
C49.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	43.5	48.5
4.0	13.5	17.3
6.0	3.1	5.0
8.0	0.4	1.0
10.0	0.1	0.1
5.4	**5.0**	Ped Standing
11.0	**0.022**	Pass
6.0	Ped Standing	**5.0**
11.7	Pass	**0.022**

C50 Location 49

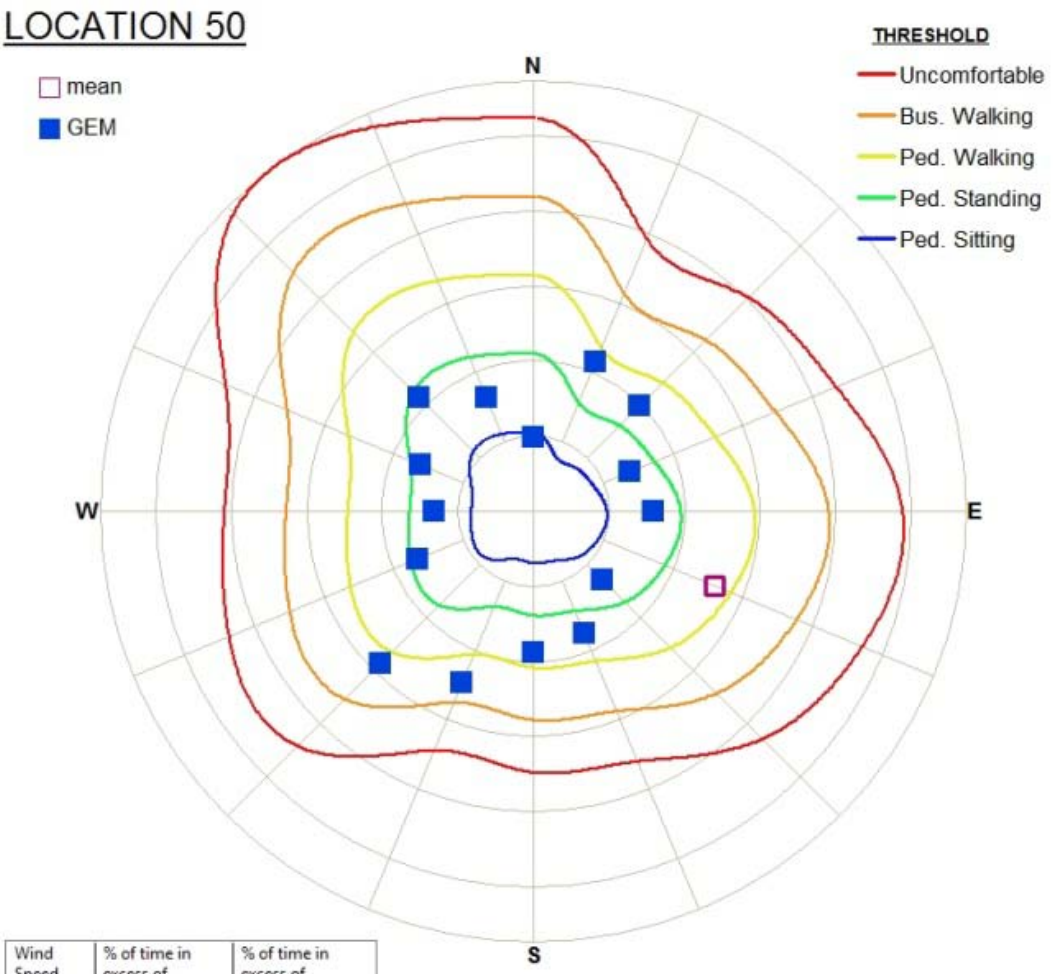
C50.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	33.4	39.0
4.0	12.7	15.4
6.0	3.8	4.4
8.0	1.0	0.9
10.0	0.2	0.2
5.5	**5.0**	Ped Standing
12.5	**0.022**	Pass
5.8	Ped Standing	**5.0**
12.2	Pass	**0.022**

C51 Location 50

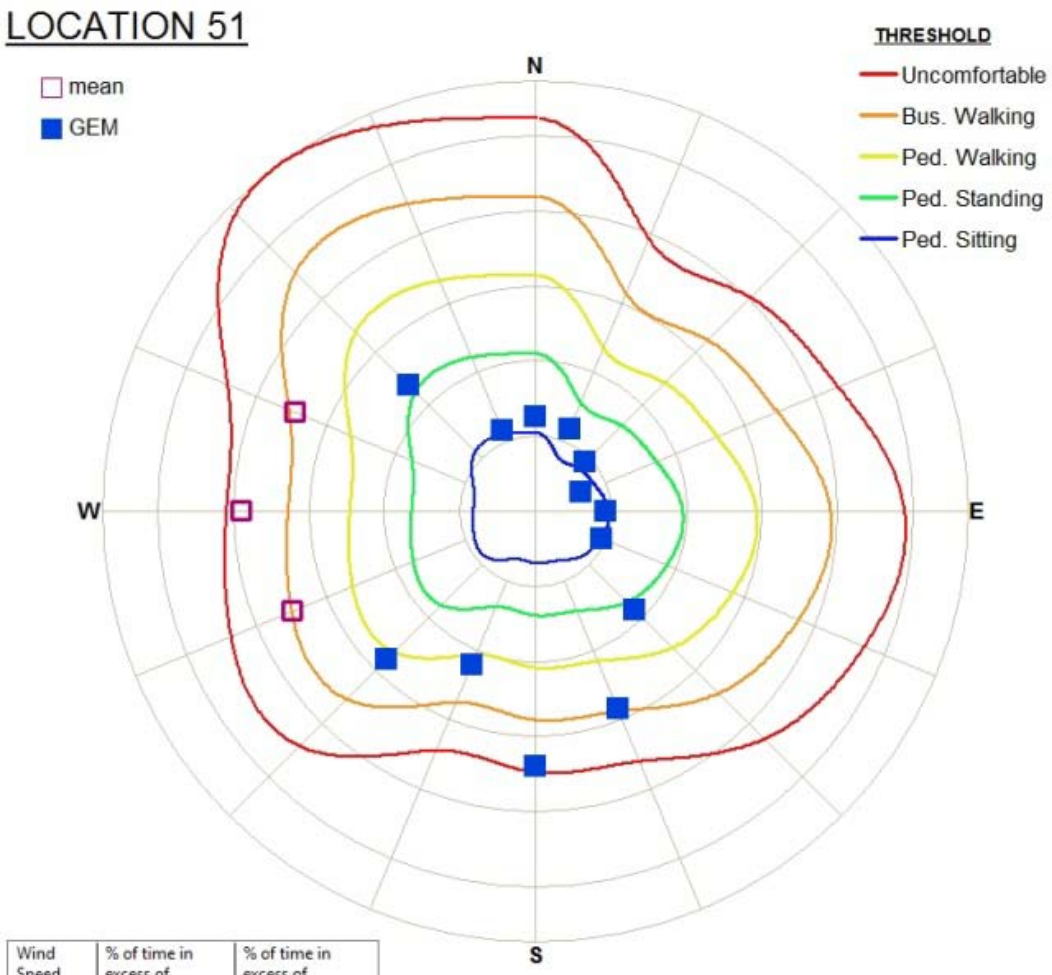
C51.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	33.6	41.1
4.0	7.3	11.0
6.0	1.0	1.5
8.0	0.1	0.2
10.0	0.0	0.0
4.4	**5.0**	Ped Standing
9.9	**0.022**	Pass
4.8	Ped Standing	**5.0**
10.3	Pass	**0.022**

C52 Location 51

C52.1 Configuration A (Concept Plan Amendment)



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	38.5	42.8
4.0	18.0	20.3
6.0	7.0	9.1
8.0	2.2	3.0
10.0	0.6	0.7
6.6	**5.0**	Ped Walking
14.4	**0.022**	Pass
7.0	Ped Walking	**5.0**
14.1	Pass	**0.022**