



WIND MICROCLIMATE ASSESSMENT REPORT

41-49 (Bookers) and 49-59 (BMW)
Battersea Park Road

17 January 2024

GIA No: 1790

PROJECT DATA:

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1 INTRODUCTION

This report outlines the results of a wind microclimate analysis to support the Application for Phased Full Planning Permission for: Demolition of all existing buildings and construction of three new buildings, together comprising Residential (Use Class C3) and Student Accommodation (Sui Generis) along with Commercial, Business and Service (Use Class E) and/or Local Community and Learning (Class F1) floorspace, located at 41-49 (Bookers) and 49-59 (BMW) Battersea Park Road and known as Battersea Park Road.

1.1 SUMMARY

Wind microclimate conditions for the proposed development at Battersea Park Road were assessed using wind tunnel testing.

There are no regions of potentially unsuitable or unsafe conditions at ground level.

Conditions for the proposed balconies and private terraces on Building 1 are suitable for the intended use and not subject to any potential wind safety risks.

Conditions for the proposed podium level terrace on Building 3 are suitable for the intended use and not subject to any potential wind safety risks.

Conditions for the proposed level 7 terrace on Building 1 are not subject to any potential wind safety risks, and will be suitable for the intended use provided the proposed wind mitigation screens (3 screen 30% porous, 2m tall, 2-3m wide) are installed.

Conditions for the proposed level 7 terrace on Building 2 are not subject to any potential wind safety risks, and will be suitable for the intended use provided the proposed wind mitigation screens (3 screen 30% porous, 2m tall, 2-3m wide) are installed.

All cumulative wind impacts will be negligible.

All conditions will be suitable and the proposed development will have an acceptable impact on the local wind microclimate.

1.2 BACKGROUND

This document is a substitution for the wind tunnel based assessment as reported in the document "1790-jw-22-0615(Battersea Park Road)_Wind Tunnel Assessment", which was submitted to support the original planning application (2022/1835).

The assessment herein is based off an updated scheme design.

1.3 GUIDANCE

Planning Practice Guidance

The Planning Practice Guidance (2021) identifies the potential for tall and large buildings to affect wind microclimate. The National Design Guide (2021) states in Paragraph 71 that:

“Proposals for tall buildings (and other buildings with a significantly larger scale or bulk than their surroundings) require special consideration. This includes their [...] environmental impacts, such as [...] wind. These need to be resolved satisfactorily”

The London Plan (2021)

The Greater London Authority (GLA) London Plan (2021) sets out the overall strategy for developments in London over the next 20-25 years. The relevant policies to wind microclimate are as follows:

Policy D8 (Public Realm) of the London Plan states that developments should “ensure that appropriate shade, shelter, seating and, where possible, areas of direct sunlight are provided, with other microclimatic considerations, including temperature and wind, taken into account in order to encourage people to spend time in a place.”

Policy D9 (Tall Buildings) of the London Plan states that “wind, daylight, sunlight penetration and temperature conditions around the building(s) and neighbourhood must be carefully considered and not compromise comfort and the enjoyment of open spaces, including water spaces, around the building.

The Wandsworth Local Plan 2023-2038 (2023).

The Wandsworth Local Plan was adopted in July 2023, and sets out policies and guidance for the development of the borough over the plan period of 2023 to 2038.

There is no specific guidance with regards to wind microclimate within the adopted local plan.

2 METHOD

To identify the likely effect of the proposed development on the pedestrian level wind environment, a wind tunnel model of the development and surrounding site was created. This section describes the methodology for the creation of this model and the inputs used.

2.1 ASSESSMENT METHODOLOGY

The wind tunnel assessment was performed at a 10x5 boundary layer wind tunnel in London, UK.

A full description of the test methodology is included in Appendix 01.

The wind microclimate effects are assessed annually, for the Windiest Season and for the summer months (June, July, August). Windiest Season conditions are reported as this is a reasonable worst case scenario, summer conditions are reported as this is the season when pedestrian usage of outdoor spaces is expected to be highest.

2.2 ESTABLISHING MICROCLIMATE CONDITIONS

Microclimate conditions were established using a 1/300 scale wind tunnel model, extending 400m radius from the Site.

A model of the development was included within the wind tunnel model and tested to determine the conditions at and around the Site. The model used is shown in Figure 1, Figure 2 and Figure 3.

The model was run at full scale from 18 wind angles, spaced using 10° or 30° increments such that no sector contributes more than 10% of the annual wind. The wind angles which were run are indicated in Appendix 01.

Wind speeds were measured at 1.5m above any surfaces expected to be used for pedestrian activity.

On-site and local wind speeds were combined with wind statistics from 30 years of data recorded at a superstation of Heathrow, Gatwick and Stansted Airports corrected for variations in terrain between the airport and the site, to obtain annual and seasonal frequency and magnitude of wind speeds across the model. This allows the 'grading' of the pedestrian level winds according to the Lawson Comfort Criteria, which are explained later in this report.

2.3 LIMITATIONS AND ASSUMPTIONS

The accuracy of the results is dependent upon the accuracy of the CAD used to construct the model.

There is an inherent assumption that on-site wind speeds will scale linearly with the measured wind speeds at the airport.

There is an inherent assumption that the wind speed statistics for the past 30 years will remain applicable for the foreseeable future.

Table 01: Site Wind Correction Factors

DIRECTION (°N)	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°
Corr. Factor	1.26	1.24	1.30	1.30	1.32	1.41	1.33	1.31	1.35	1.29	1.29	1.23



Fig. 01: 3D View of Proposed Development (blue)



Fig. 02: Surrounding Context with Existing Surrounds

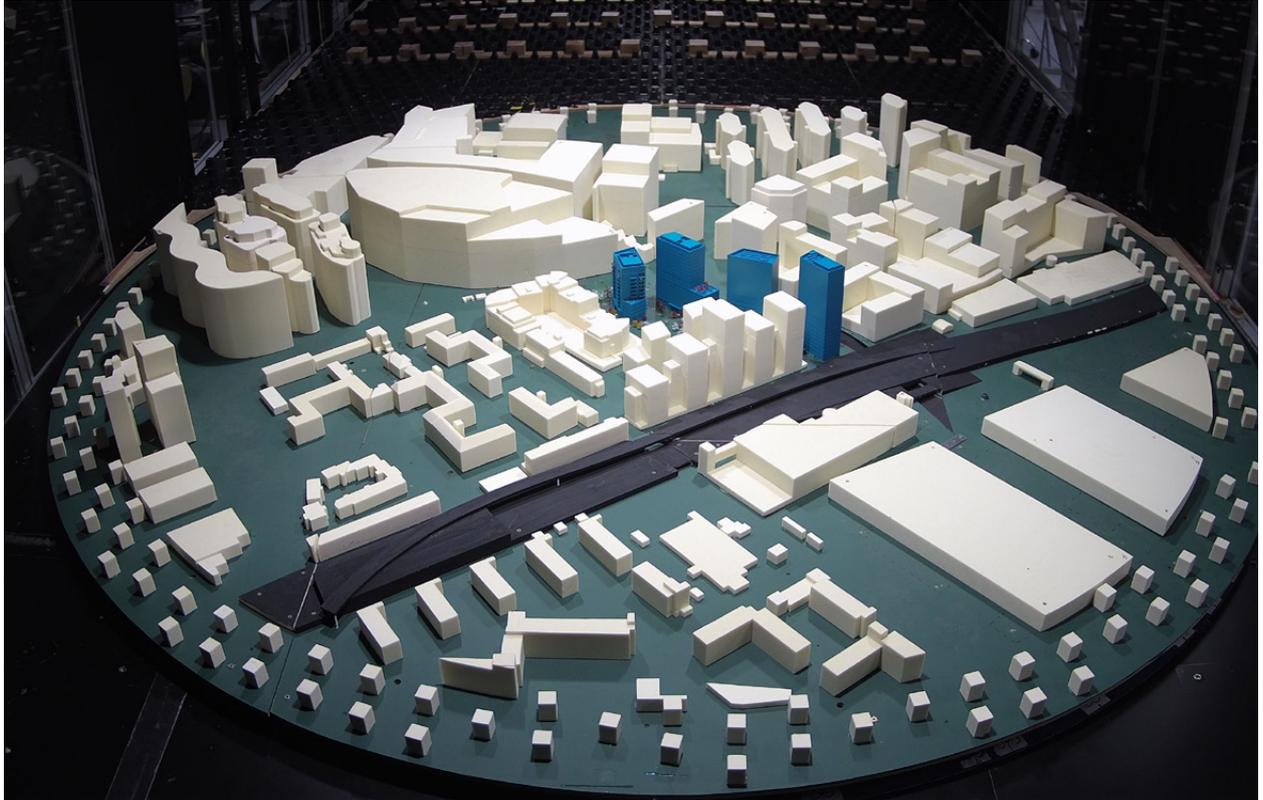


Fig. 03: Surrounding Context with Cumulative Surrounds

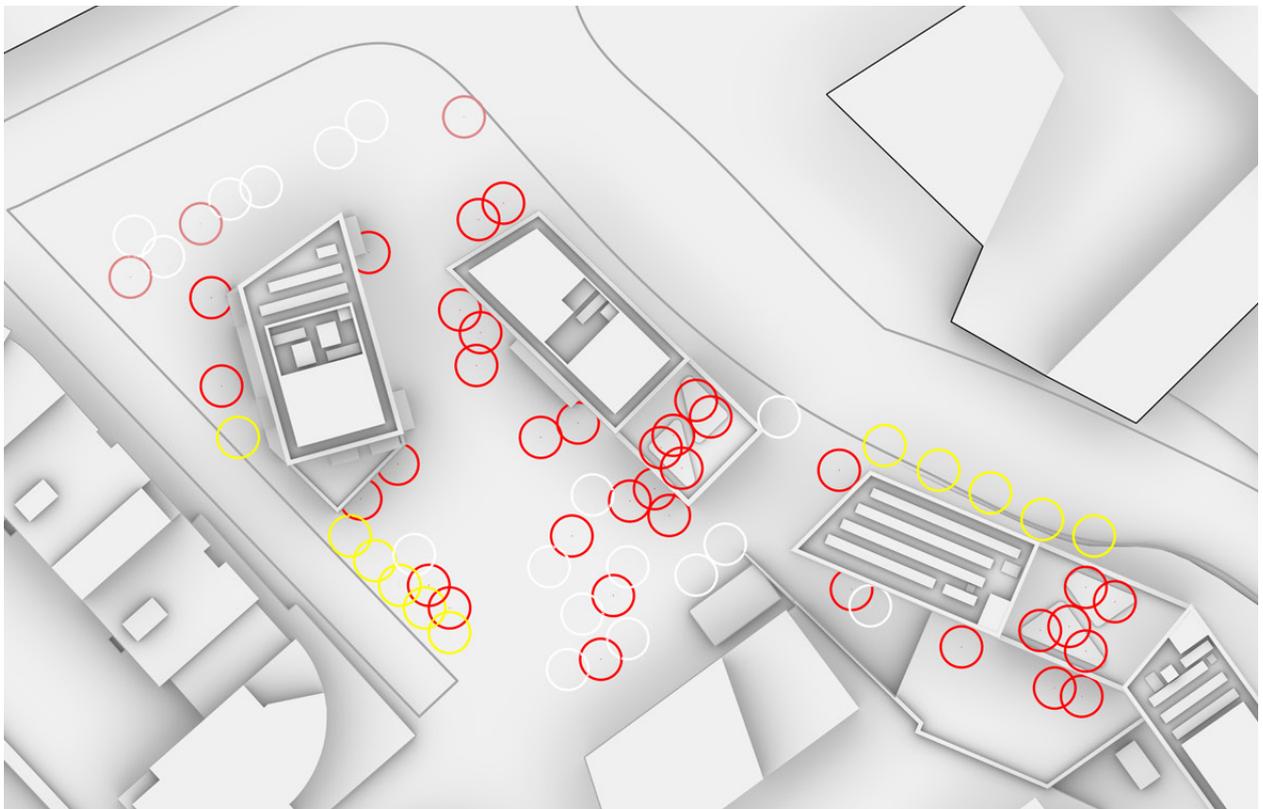


Fig. 04: Tree Locations as Tested

2.4 LAWSON COMFORT CRITERIA

The assessment was performed using the LDDC variant of the Lawson Comfort Criteria. The Lawson Criteria are well-established in the UK for quantifying wind conditions in relation to build developments and, although not a UK 'standard', the criteria are recognised by local authorities as a suitable benchmark for wind assessments. The Lawson Criteria have been adopted for this assessment.

Table 02: Lawson Comfort Criteria (LDDC variant)

KEY	COMFORT CATEGORY	MEAN WIND SPEED (5% EXCEEDANCE)	DESCRIPTION
	Sitting	4 m/s	Acceptable for outdoor sitting use (e.g. cafés, benches, balconies and terraces)
	Standing	6 m/s	Acceptable for main building entrances, pick-up / drop-off points and bus stops
	Walking (leisure)	8 m/s	Acceptable for strolling
	Walking (business)	10 m/s	Acceptable for external pavements, walking purposefully without lingering
	Uncomfortable	>10 m/s	Not comfortable for regular pedestrian access

Table 03: Lawson Safety Criteria (LDDC variant)

KEY	SAFETY CATEGORY	MEAN WIND SPEED (0.022% EXCEEDANCE)	DESCRIPTION
	No Safety Exceedance	<15 m/s	
	S15 (Distress)	>15 m/s	Unsafe for frail individuals, or cyclists
	S20 (Safety)	>20m/s	Wind conditions considered unsafe for all users

2.5 TARGET CONDITIONS

For a mixed-use urban area within which the Site is located, the desired wind microclimate would typically need to have areas acceptable for sitting, standing (including at entrances of buildings) and walking use. A description of the comfort categories to classify wind conditions in accordance with is given below.

Any areas which show up as either unsafe (annually) or uncomfortable (for Windiest Season) will require mitigation, unless they are in locations where pedestrian access can be controlled in the event of strong winds. This applies to all thoroughfares (for pedestrians) and roads (for cyclists) around the Development.

Probes 19 to 30, 32, 39 to 59, 64 to 66, 68, 69 and 316 to 318 are general thoroughfares. These are targeted to be suitable for leisure walking.

The areas immediately outside any building entrances should be suitable for standing use during Windiest Season to provide a "buffer" between the still conditions in interior spaces and the general thoroughfare. The principal entrances to the proposed development are probes 16 and 301 to 308, and the principal off-site entrances are probes 3 to 11.

Bus stops are targeted to be suitable for standing. There are two bus stops on Battersea Park Road, which are probes 1 and 2.

The proposed public realm within the site (probes 31, 33 to 38, 60 to 63, 67 and 309 to 315) is targeted to be suitable for leisure walking in Windiest Season and for a mixture of sitting and standing in summer.

There is proposed amenity in the form of a podium terrace on Building 3 (probes 214 to 216), and level 7 terraces on Building 2 (probes 208-210) and Building 3 (probes 211 to 213). Conditions for these spaces are targeted to be suitable for a mixture of standing and sitting in summer conditions.

There are also balconies and private

terraces on Building 1 (probes 201 to 207). These are private spaces, the use of which can be controlled by the user depending on the conditions on a specific day, so whether conditions are comfortable can be effectively managed by the individual. These are targeted to be suitable for either sitting or standing in summer.

2.6 TEST SCENARIOS

The purpose of these tests was to compare conditions with and without the proposed development.

The following scenarios were tested:

- Baseline: The existing building on site, with the existing surrounds (results taken from previous wind tunnel assessment);
- Proposed Site, Existing Surrounds: The completed and operational development with the existing surrounds;
- Proposed Site with Mitigation Measures, Existing Surrounds: The completed and operational development with the existing surrounds and proposed wind mitigation screens on the level 7 terraces; and
- Proposed Site, Cumulative Surrounds: The completed and operational development with the existing surrounds, plus local future schemes (either consented or awaiting determination).

The above scenarios were tested including the trees from the proposed soft landscaping scheme, which were located as shown in Figure 4.

The trees were modelled in winter leaf and sized according to installation height, to ensure conservative results.

3 RESULTS

3.1 BASELINE CONDITIONS

Annual safety at ground level for the baseline scenario is shown in Figure 4. Windiest Season comfort at ground level for the baseline scenario is shown in Figure 5. Summer comfort at ground level for the baseline scenario is shown in Figure 6.

There are no regions of wind safety concern at any probe location.

Conditions for general thoroughfares (probes 19 to 30, 32, 39 to 59, 64 to 66, 68, 69, 307 and 318) are suitable for a mixture of sitting and standing in all seasons. This is suitable for the intended use.

The principal off site entrances (probes 3 to 11) are suitable for sitting or standing in the windiest season and for sitting in summer. This is suitable for the intended use.

The Battersea Park Road bus stops (probes 1 and 2) are suitable for standing in the windiest

season and sitting or standing in summer. This is suitable for the intended use.



Fig. 05: Safety at Ground Level, Baseline

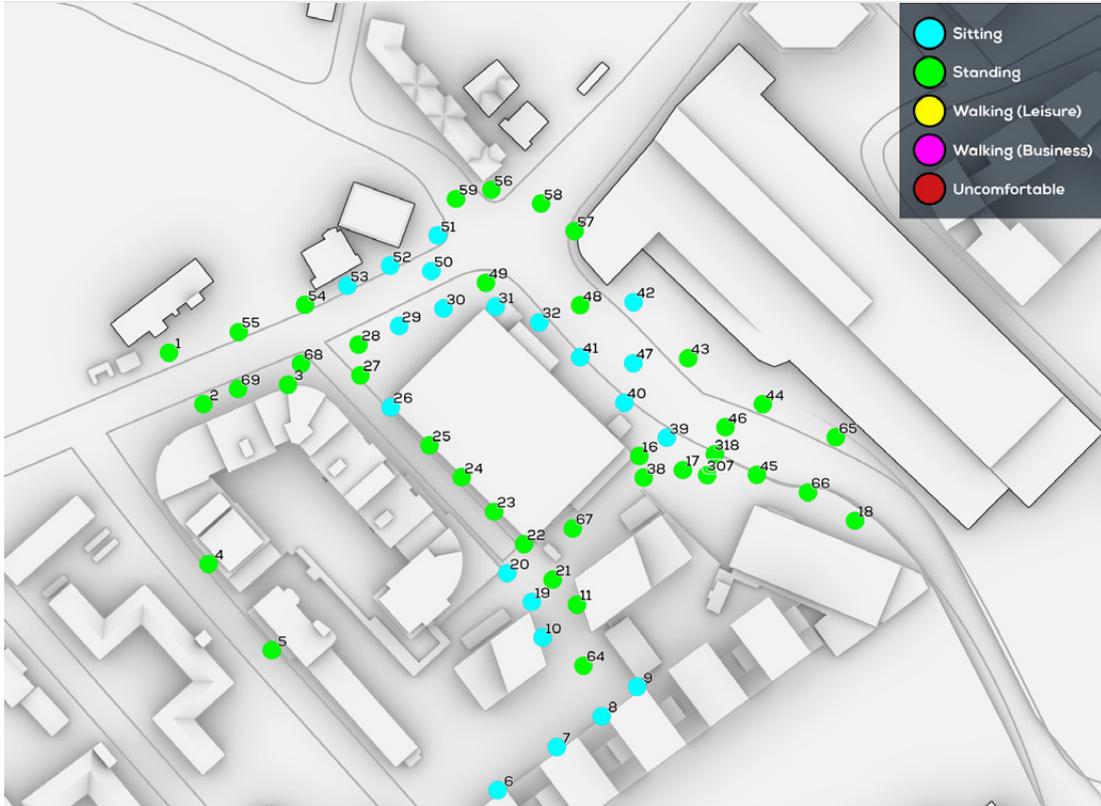


Fig. 06: Windiest Season Comfort at Ground Level, Baseline

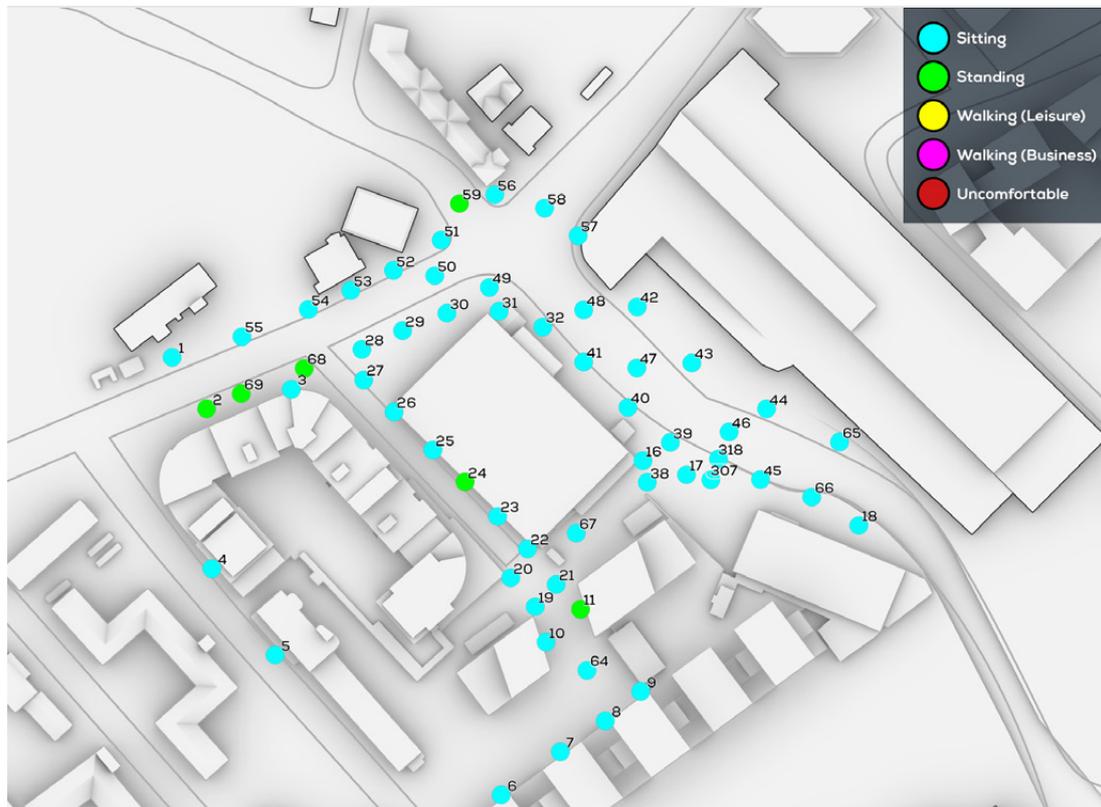


Fig. 07: Summer Comfort at Ground Level, Baseline

3.2 CONDITIONS FOR PROPOSED DEVELOPMENT WITH EXISTING SURROUNDS

Annual safety at ground level for the proposed development with existing surrounds is shown in Figure 8. Windiest Season comfort at ground level for the proposed development with existing surrounds is shown in Figure 9. Summer comfort at ground level for the proposed development with existing surrounds is shown in Figure 10

There are no regions of wind safety concern at any probe location.

Conditions for general thoroughfares (probes 19 to 30, 32, 39 to 59, 64 to 66, 68, 69 and 316 to 318) range between sitting, standing and leisure walking in the windiest season, and between sitting and standing in summer. This is suitable for the intended use.

The principal off site entrances (probes 3 to 11) are suitable for sitting or standing in the windiest season and for sitting in summer. This is suitable for the intended use..

The Battersea Park Road bus stops (probes 1 and 2) are suitable for standing in the windiest season and sitting or standing in summer. This is suitable for the intended use.

All principal on-site entrances (16 and 301 to 308) are suitable for sitting or standing in both the windiest season and summer. This is suitable for the intended use.

The proposed public realm (probes 31, 33 to 38, 60 to 63, 67 and 309 to 315) is suitable for a mixture of sitting, standing and leisure walking in the windiest season and for a mixture of sitting and standing in summer. This is suitable for the intended use.

Annual safety at elevated levels for the proposed development with existing surrounds is shown in Figure 11 Windiest Season comfort at elevated levels for the proposed development with existing surrounds is shown in Figure 12. Summer comfort at elevated levels for the proposed development with existing

surrounds is shown in Figure 13

There are no safety exceedances on any of the Building 1 balconies (probes 201 to 208) and conditions are suitable for a mixture of sitting and standing in either the windiest season or in summer. This is suitable for the intended use.

There are no safety exceedances on the Building 3 podium level terrace (probes 214 to 218) and conditions are suitable for a mixture of sitting and standing in either the windiest season or in summer. This is suitable for the intended use.

There are no safety exceedances on the Building 2 level 7 terrace (probes 208 to 210) and conditions are suitable for a mixture of standing and business walking in winter and am mixture of standing and leisure walking in summer. This is a category windier than required for the intended use and will require mitigation.

There are no safety exceedances on the Building 3 level 7 terrace (probes 211 to 213) and conditions are suitable for standing in either the windiest season or summer. The target is for this terrace to include locations which are suitable for sitting in summer, so mitigation is proposed for this terrace also.



Fig. 08: Safety at Ground Level, Proposed Development with Existing Surrounds

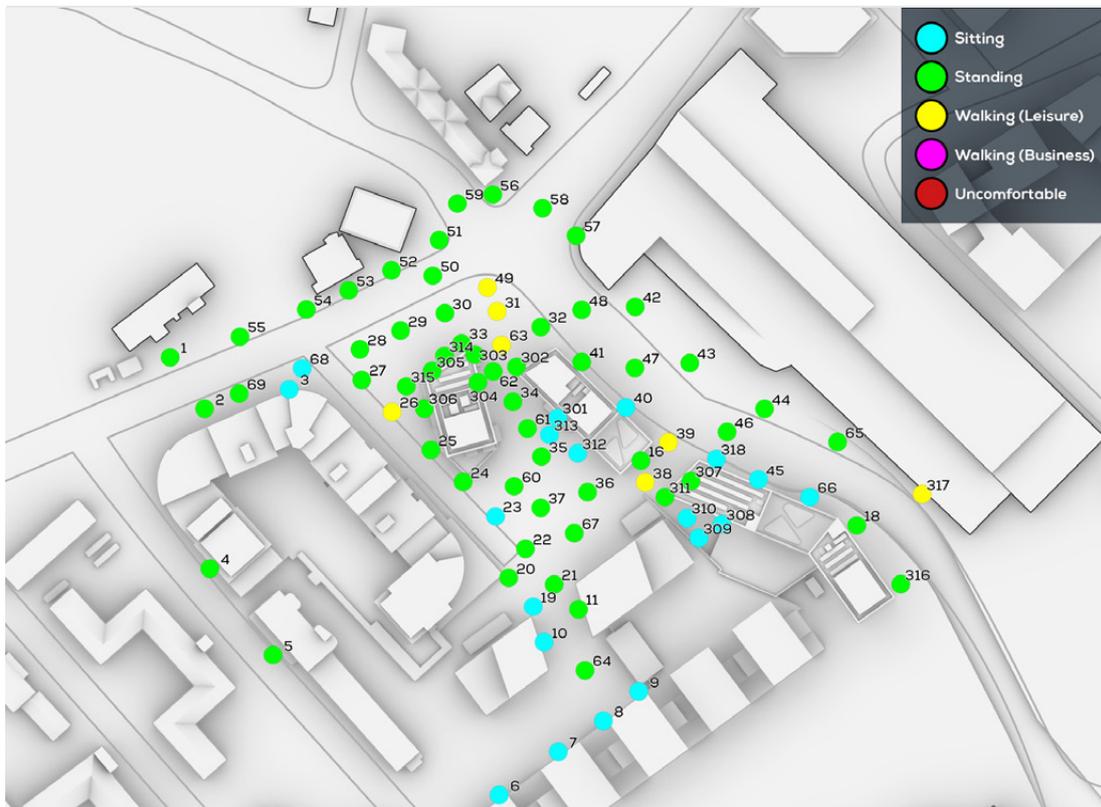


Fig. 09: Windiest Season Comfort at Ground Level, Proposed Development with Existing Surrounds

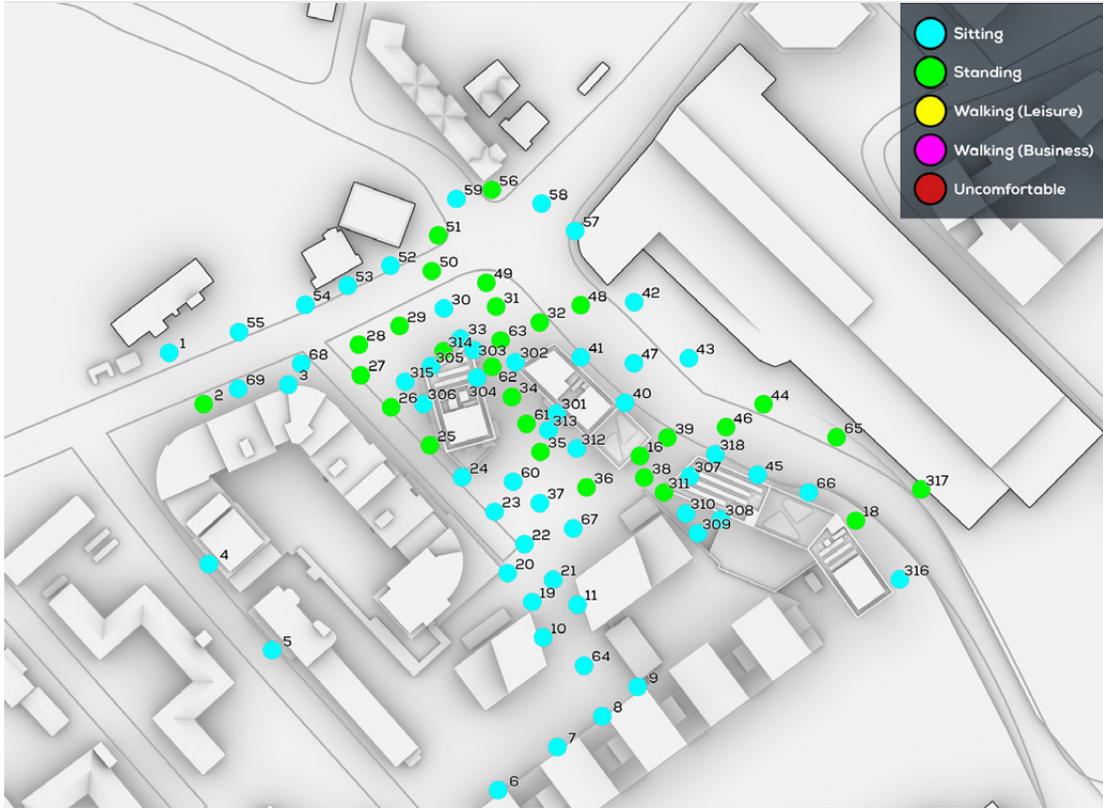


Fig. 10: Summer Comfort at Ground Level, Proposed Development with Existing Surrounds



Fig. 11: Safety at Elevated Levels, Proposed Development with Existing Surrounds

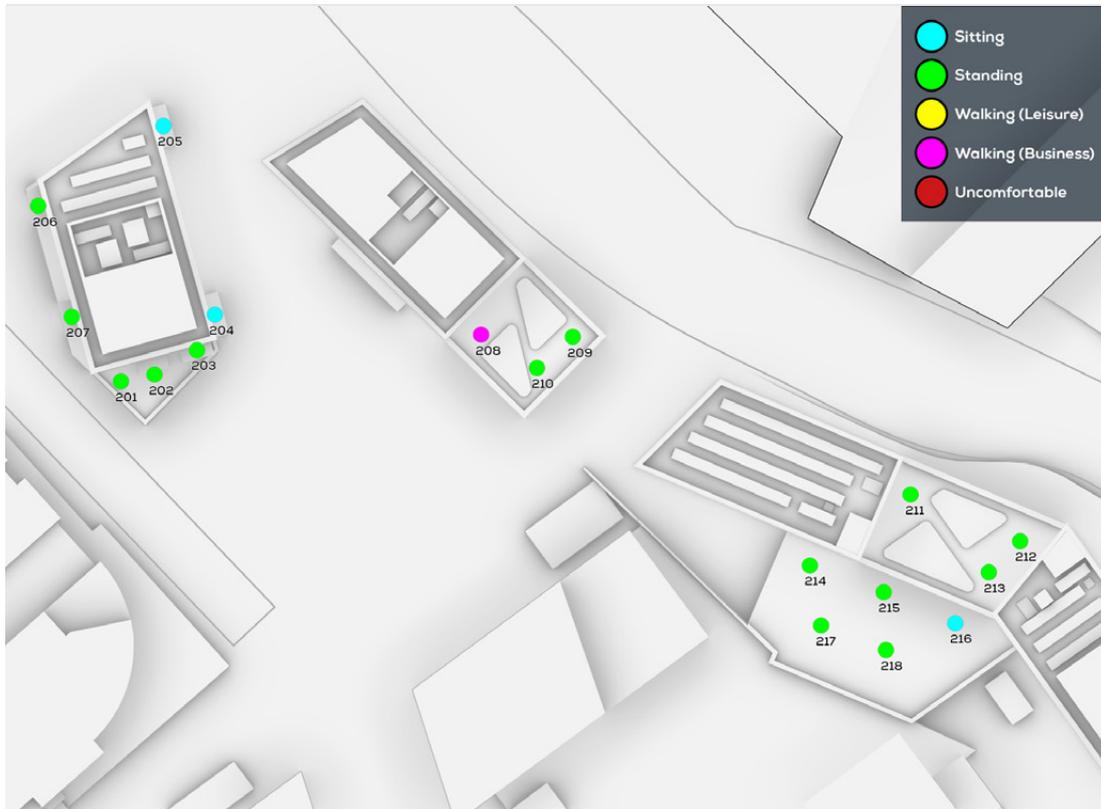


Fig. 12: Windiest Season Comfort at Elevated Levels, Proposed Development with Existing Surrounds

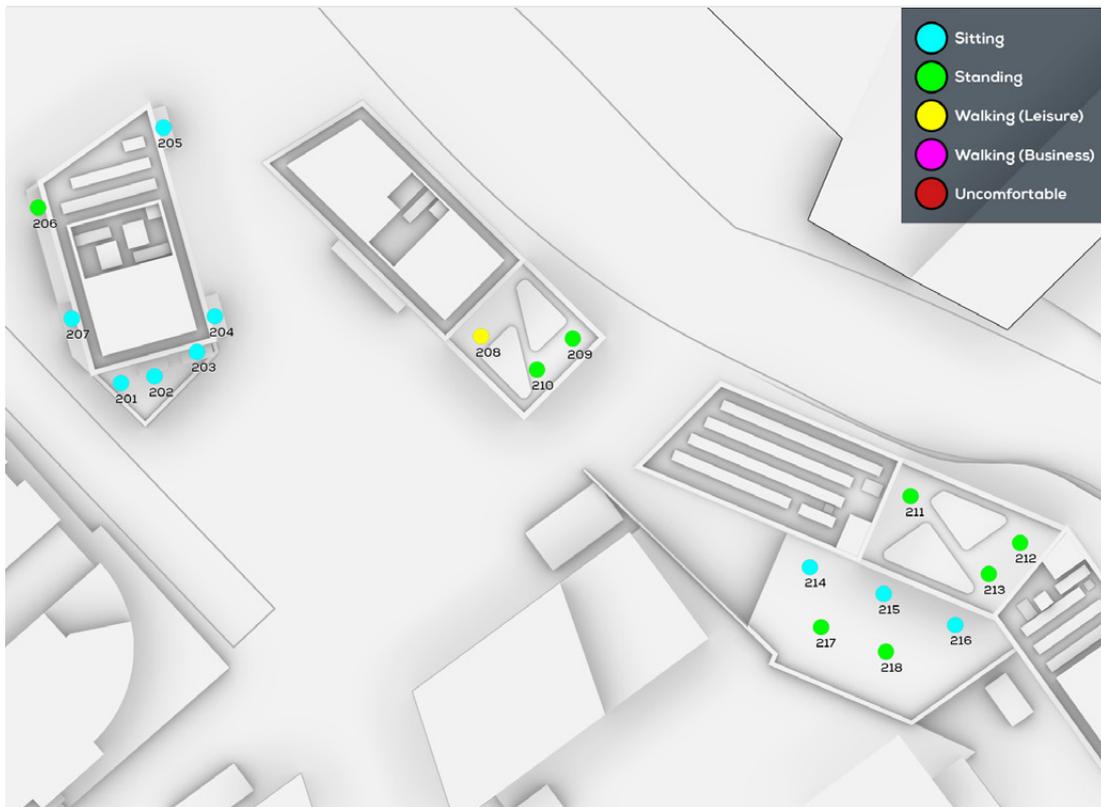


Fig. 13: Summer Comfort at Elevated Levels, Proposed Development with Existing Surrounds

3.3 CONDITIONS FOR PROPOSED DEVELOPMENT WITH MITIGATION MEASURES AND EXISTING SURROUNDS

Wind mitigation screens were added to the level 7 terraces on Building 2 and Building 3.

For each terrace, one 3m wide by 2m high screen and two 2m wide by 2m high screens were added.

The screens were all 30% porous (70% solid), and were included in the locations shown in Figure 14 and Figure 15.

Annual safety at ground level for the proposed development with mitigation and existing surrounds is shown in Figure 16. Windiest Season comfort at ground level for the proposed development with mitigation and existing surrounds is shown in Figure 17. Summer comfort at ground level for the proposed development with mitigation and existing surrounds is shown in Figure 18

Ground level conditions are not materially altered from the conditions without the terrace level screens

Annual safety at elevated levels for the proposed development with mitigation and existing surrounds is shown in Figure 19. Windiest Season comfort at elevated levels for the proposed development with mitigation and existing surrounds is shown in Figure 20. Summer comfort at elevated levels for the proposed development with mitigation and existing surrounds is shown in Figure 21

Conditions for the Building 1 balconies or the Building 3 podium level terrace are not materially altered from the conditions without the terrace level screens

There are no safety exceedances on the Building 2 level 7 terrace (probes 208 to 210) and conditions are now suitable for standing in the windiest season and sitting in summer. This is suitable for the intended use.

There are no safety exceedances on the

Building 3 level 7 terrace (probes 211 to 213) and conditions are suitable for standing in the windiest season and a mixture of sitting and standing in summer. This is suitable for the intended use.

The inclusion of the screens is sufficient to ensure suitable conditions at all elevated levels.

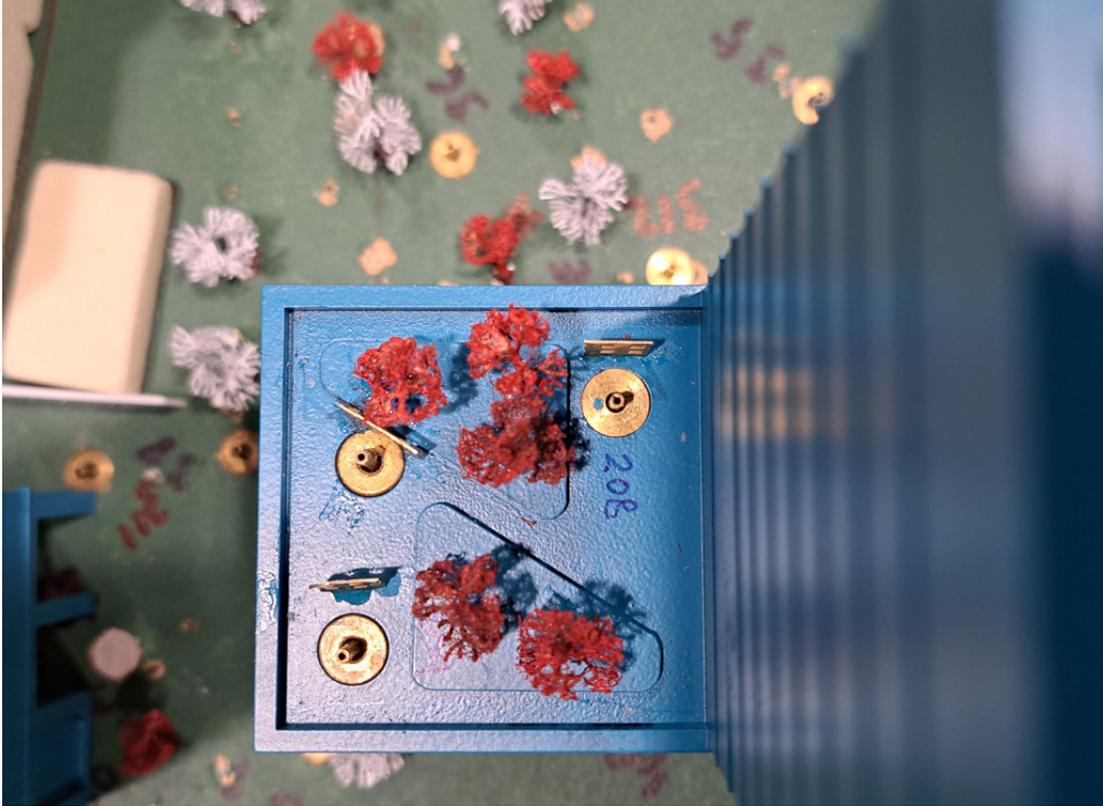


Fig. 14: Wind Mitigation Screens on Building 2 Level 7 Terrace (viewed from north)

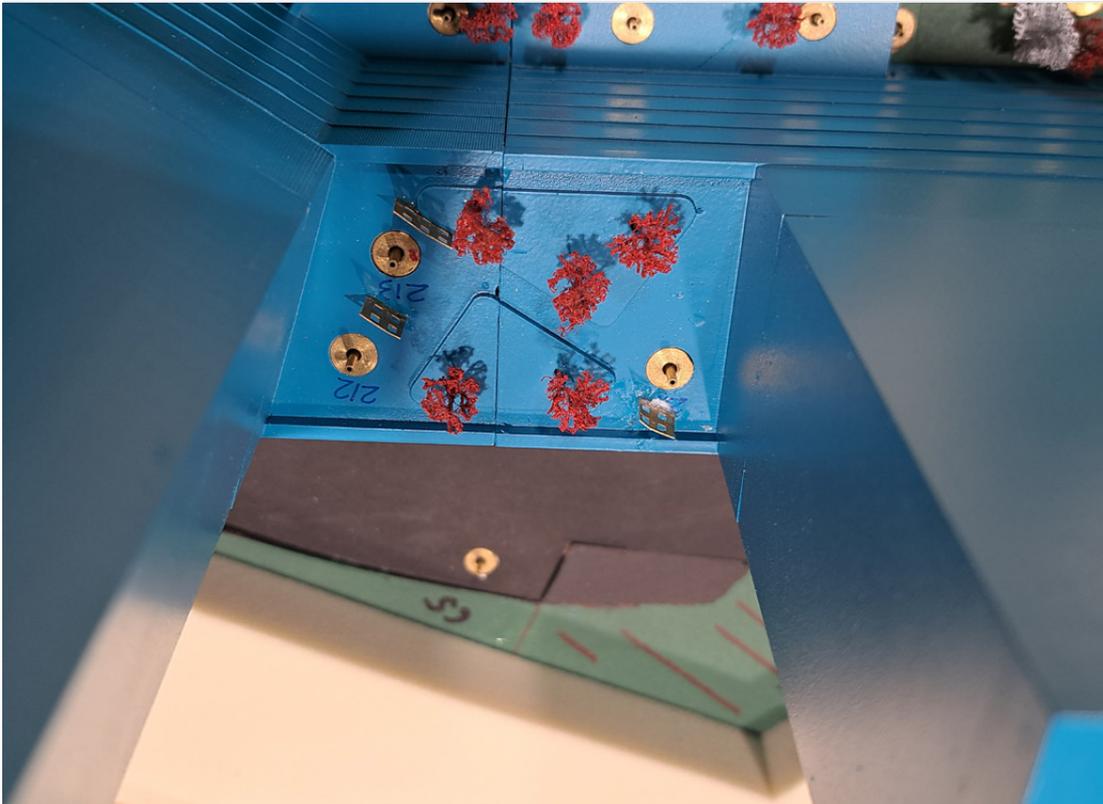


Fig. 15: Wind Mitigation Screens on Building 3 Level 7 Terrace (viewed from north)



Fig. 16: Safety at Ground Level, Proposed Development with Mitigation and Existing Surrounds

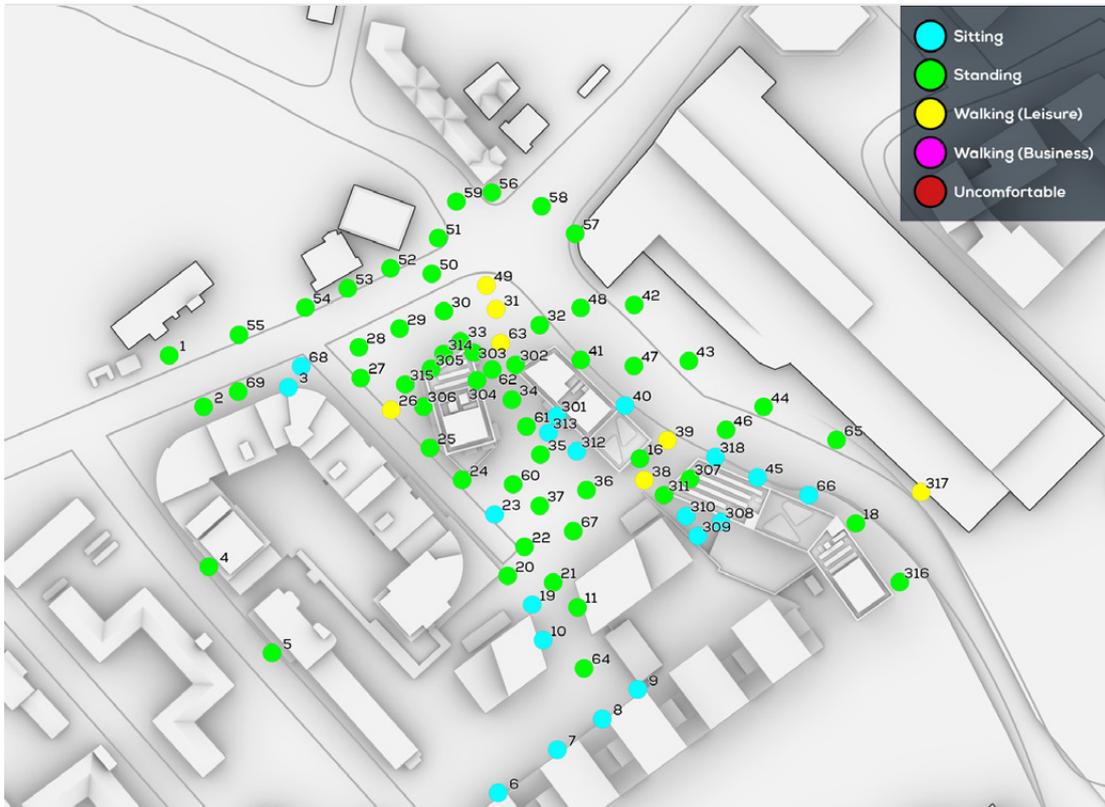


Fig. 17: Windiest Season Comfort at Ground Level., Proposed Development with Mitigation and Existing Surrounds

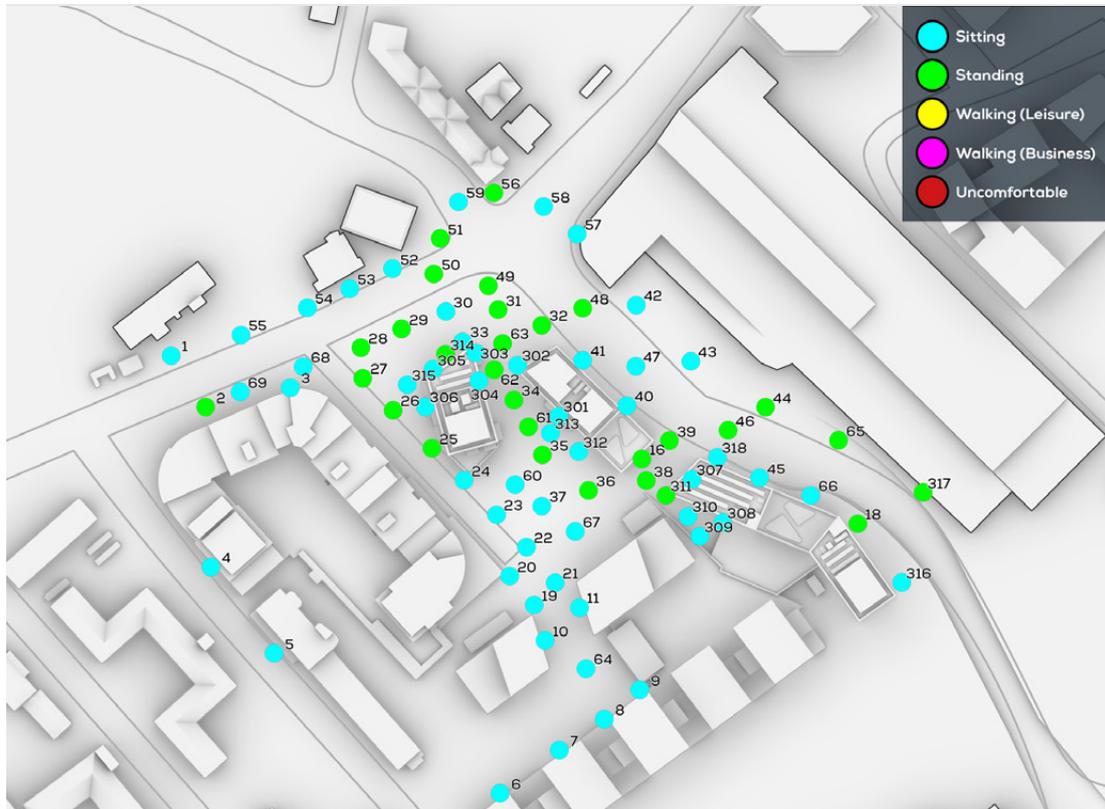


Fig. 18: Summer Comfort at Ground Level, Proposed Development with Mitigation and Existing Surrounds



Fig. 19: Safety at Elevated Levels, Proposed Development with Mitigation and Existing Surrounds

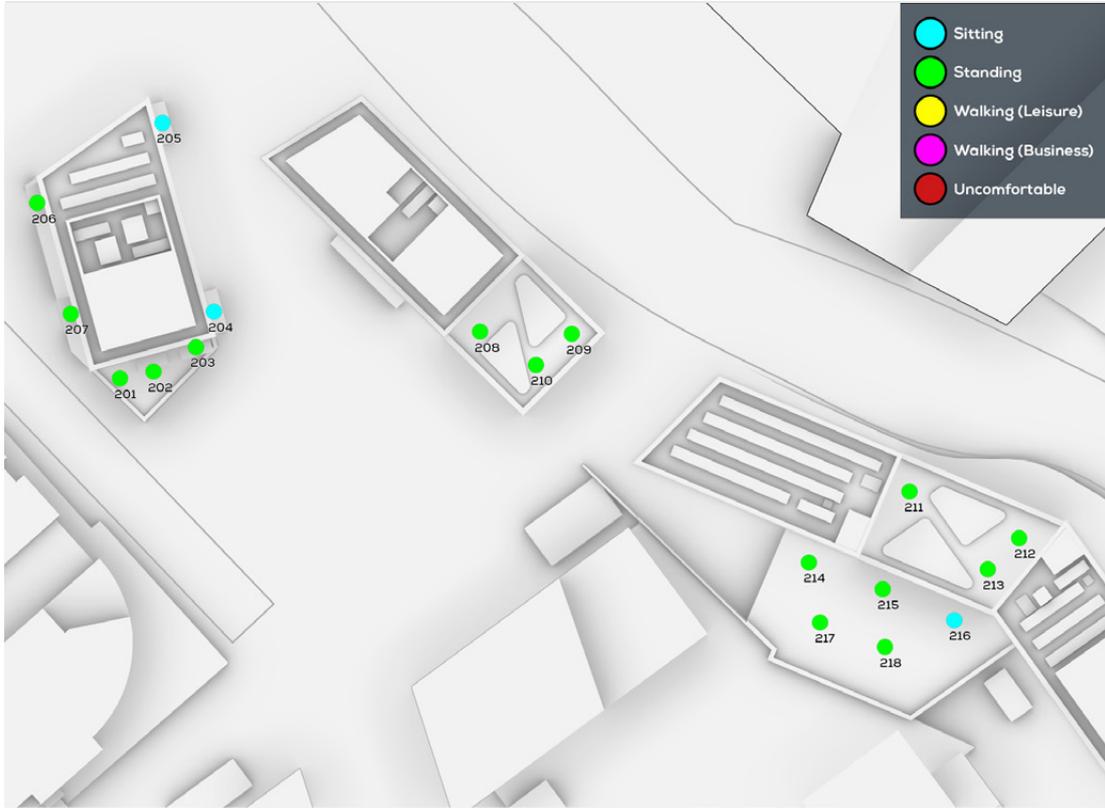


Fig. 20: Windiest Season Comfort at Elevated Levels, Proposed Development with Mitigation and Existing Surrounds

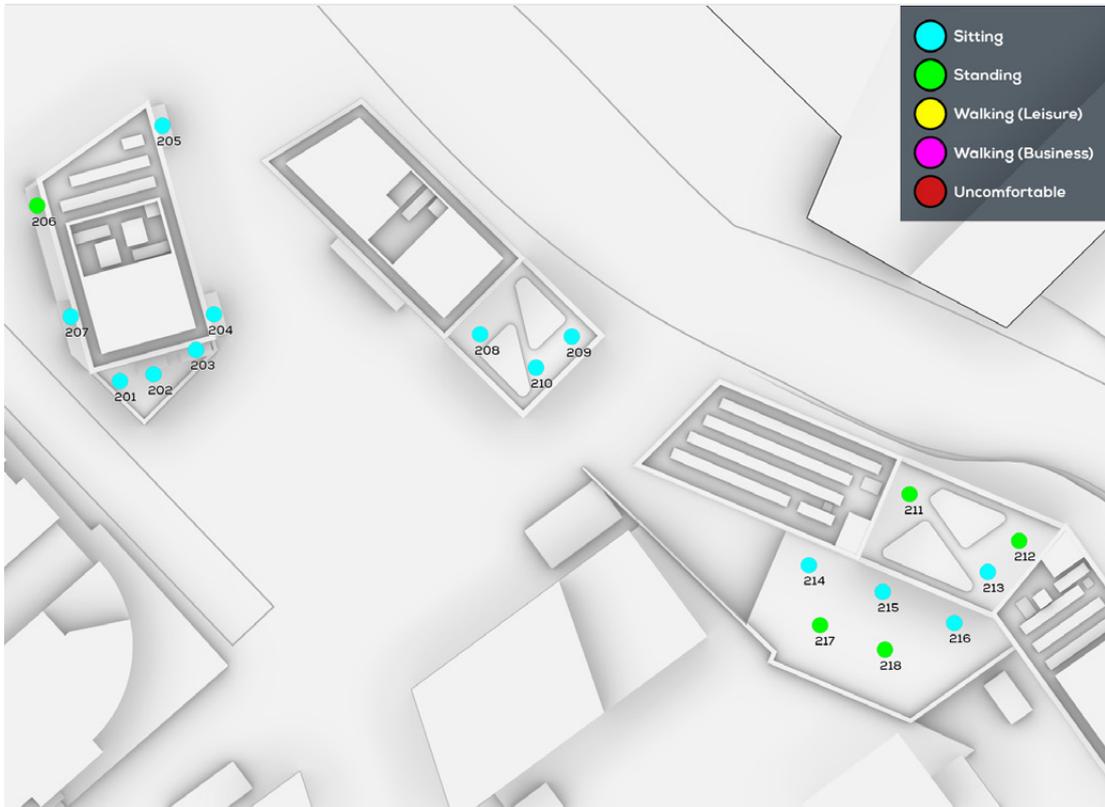


Fig. 21: Summer Comfort at Elevated Levels, Proposed Development with Mitigation and Existing Surrounds

3.4 CONDITIONS FOR PROPOSED DEVELOPMENT WITH CUMULATIVE SURROUNDS

Annual safety at ground level for the proposed development with cumulative surrounds is shown in Figure 22. Windiest Season comfort at ground level for the proposed development with cumulative surrounds is shown in Figure 23. Summer comfort at ground level for the proposed development with cumulative surrounds is shown in Figure 24

There are no regions of wind safety concern at any probe location.

Conditions for general thoroughfares (probes 19 to 30, 32, 39 to 59, 64 to 66, 68, 69 and 316 to 318) range between sitting, standing and leisure walking in the windiest season, and between sitting and standing in summer. This is suitable for the intended use.

The principal off site entrances (probes 3 to 11) are suitable for sitting or standing in the windiest season and for sitting in summer. This is suitable for the intended use..

The Battersea Park Road bus stops (probes 1 and 2) are suitable for standing in the windiest season and sitting or standing in summer. This is suitable for the intended use.

All principal on-site entrances (16 and 301 to 308) are suitable for for sitting or standing in both the windiest season and summer. This is suitable for the intended use.

The proposed public realm (probes 31, 33 to 38, 60 to 63, 67 and 309 to 315) is suitable for a mixture of sitting, standing and leisure walking in the windiest season and for a mixture of sitting and standing in summer. This is suitable for the intended use.

Annual safety at elevated levels for the proposed development with cumulative surrounds is shown in Figure 25 Windiest Season comfort at elevated levels for the proposed development with cumulative surrounds is shown in Figure 26. Summer comfort at elevated levels for the proposed

development with cumulative surrounds is shown in Figure 27.

There are no safety exceedances on any of the Building 1 balconies (probes 201 to 208) and conditions are suitable for a mixture of sitting and standing in either the windiest season or in summer. This is suitable for the intended use.

There are no safety exceedances on the Building 3 podium level terrace (probes 214 to 218) and conditions are suitable for a mixture of sitting and standing in either the windiest season or in summer. This is suitable for the intended use.

There are no safety exceedances on the Building 2 level 7 terrace (probes 208 to 210) and conditions are suitable for standing in the windiest season and sitting in summer. This is suitable for the intended use.

There are no safety exceedances on the Building 3 level 7 terrace (probes 211 to 213) and conditions are suitable for standing in the windiest season and a mixture of sitting and standing in summer. This is suitable for the intended use.

The cumulative scenario was tested with the terrace wind mitigation screens outlined in Section 3.4 included in the model.

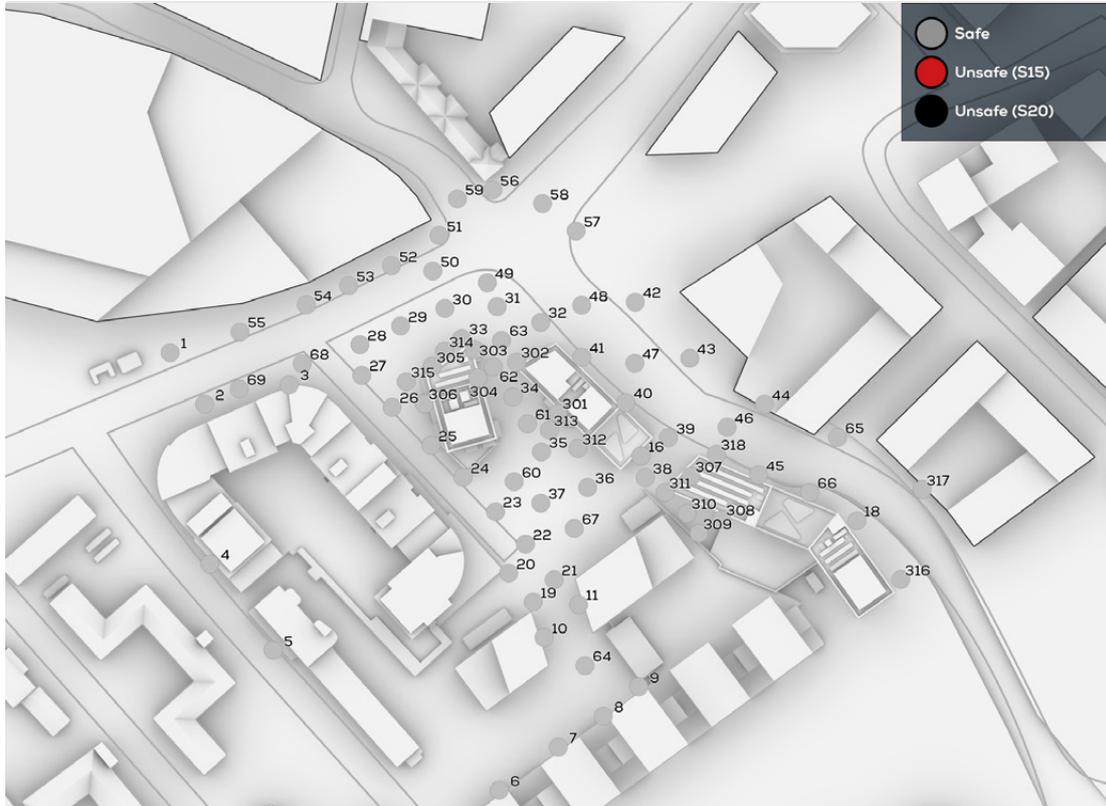


Fig. 22: Safety at Ground Level, Proposed Development with Cumulative Surrounds

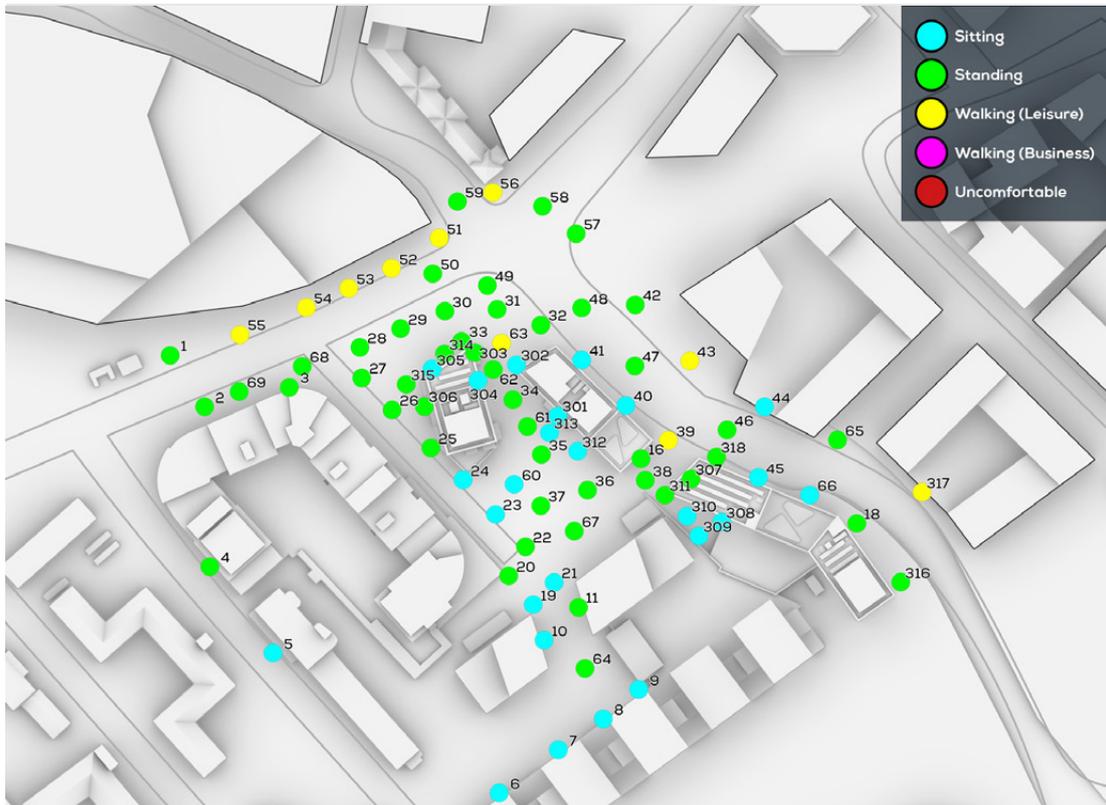


Fig. 23: Windiest Season Comfort at Ground Level, Proposed Development with Cumulative Surrounds



Fig. 24: Summer Comfort at Ground Level, Proposed Development with Cumulative Surrounds

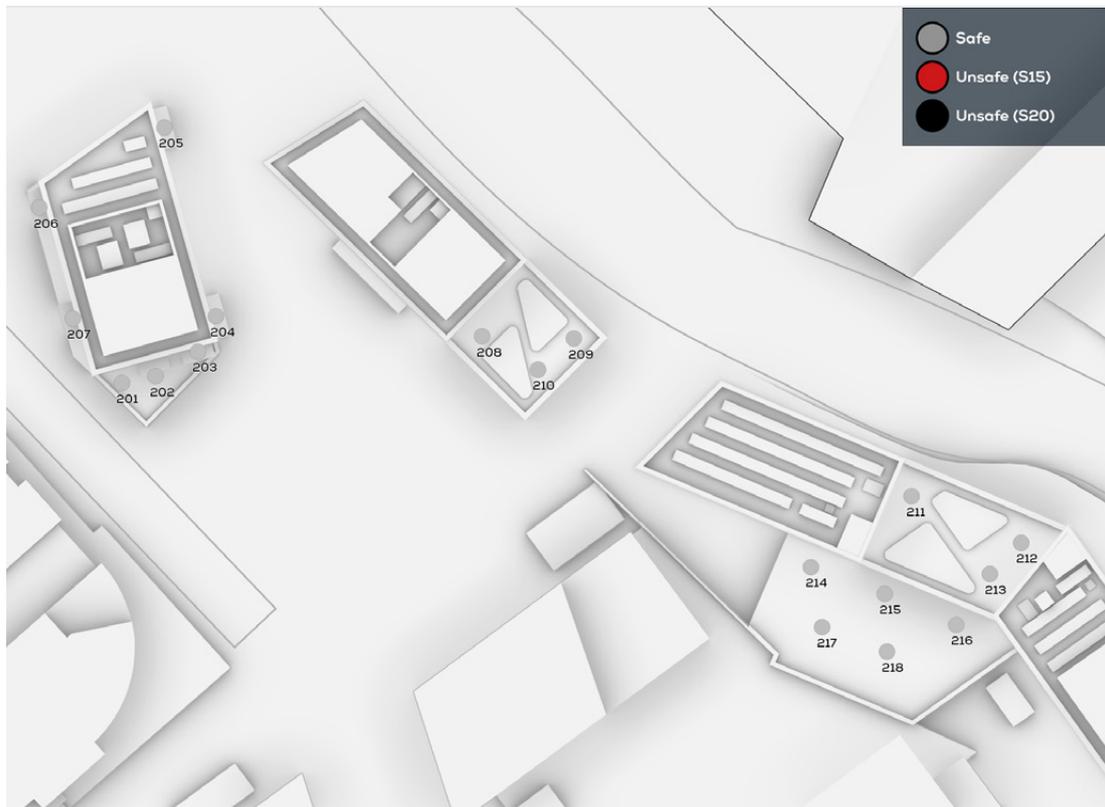


Fig. 25: Safety at Elevated Levels, Proposed Development with Cumulative Surrounds

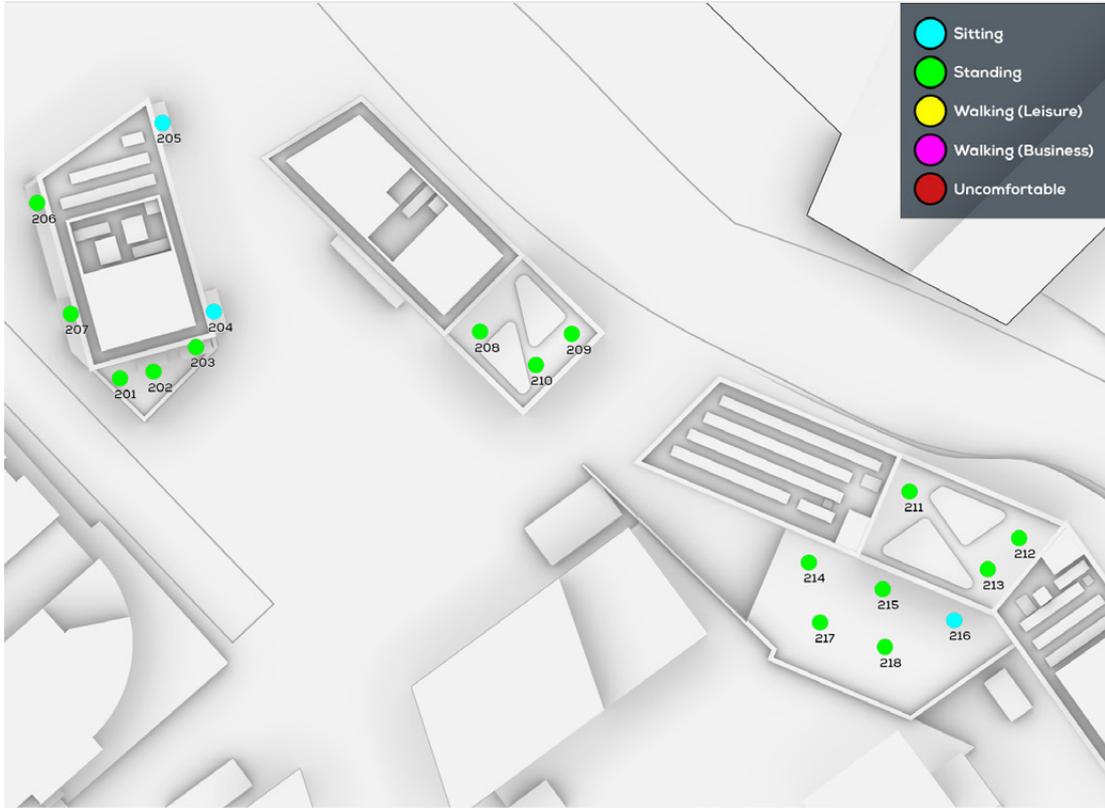


Fig. 26: Windiest Season Comfort at Elevated Levels, Proposed Development with Cumulative Surrounds

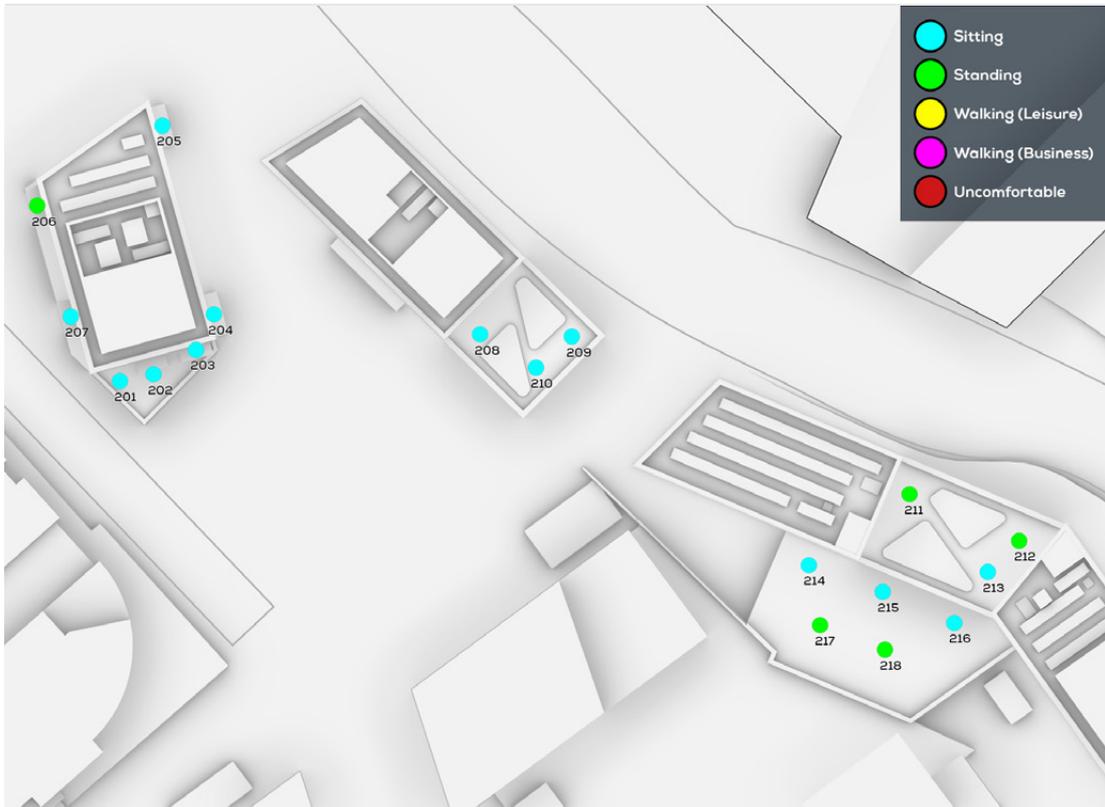


Fig. 27: Summer Comfort at Elevated Levels, Proposed Development with Cumulative Surrounds

4 CONCLUSIONS

Wind microclimate conditions for the proposed development at Battersea Park Road were assessed using wind tunnel testing.

There are no regions of potentially unsuitable or unsafe conditions at ground level.

Conditions for the proposed balconies and private terraces on Building 1 are suitable for the intended use and not subject to any potential wind safety risks.

Conditions for the proposed podium level terrace on Building 3 are suitable for the intended use and not subject to any potential wind safety risks.

Conditions for the proposed level 7 terrace on Building 1 are not subject to any potential wind safety risks, and will be suitable for the intended use provided the proposed wind mitigation screens (3 screen 30% porous, 2m tall, 2-3m wide) are installed.

Conditions for the proposed level 7 terrace on Building 2 are not subject to any potential wind safety risks, and will be suitable for the intended use provided the proposed wind mitigation screens (3 screen 30% porous, 2m tall, 2-3m wide) are installed.

All cumulative wind impacts will be negligible.

All conditions will be suitable and the proposed development will have an acceptable impact on the local wind microclimate.

APPENDIX 01
DETAILED METHODOLOGY

WIND TUNNEL METHODOLOGY

The present assessment is based on Boundary Layer Wind Tunnel Testing of the proposed development. The assessment is based on 1:300 scale boundary layer wind tunnel testing, carried out in the 10 X 5 wind tunnel in the Aeronautical Engineering Department of Imperial College.

Wind speed measurements were made using "Irwin" probes, which measure simultaneous fluctuating pressures at ground level and at 1.5m above ground level at full scale, to provide fluctuating omnidirectional wind speeds at 1.5m above ground level. Pressure measurement was done using an electronically scanned pressure system that allows up to 512 channels of pressures to be sampled simultaneously at high speeds in order to capture rapid fluctuation of the signals.

As the present assessment was conducted at 1:300 scale, the wind tunnel speed was set at circa at a wind speed equivalent to 15 m/s at full scale (over which safety impacts are noted) so that 48 seconds data acquisition time at 600 Hz would be equivalent to 160 minutes of full scale data acquisition at 2 Hz.

Fluctuating pressures measured through long tubes are subjected to distortion by what commonly known as "organ pipe" effect, which leads to certain frequencies getting amplified or attenuated depending on the geometry of the long tube.

The measured data of this study were digitally corrected by applying a recursive filter, which was calibrated to correct for the distortion caused by the tube length and characteristics used in the assessment.

The speed-up factor time histories were analysed using Extreme Value Analysis to derive statically stable gust wind speeds for each measurement location and wind direction

WIND CLIMATE METHODOLOGY

The simulations were performed from 18 wind directions, spaced such that no single direction contributed more than 10% of the annual winds.

The directions simulated were 0°, 30°, 60°, 90°, 120°, 150°, 180°, 200°, 210°, 220°, 230°, 240°, 250°, 260°, 270°, 280°, 300°, 330°.

Seasonal wind roses for London Superstation (Heathrow, Gatwick and Stansted) are shown in Figure 28.

Target wind profiles for the site, from each wind direction, were generated using sectoral analysis of the terrain surrounding the site and the local weather stations with ESDU 2010 Item 01008 'Computer program for wind speeds and turbulent properties: flat or hilly sites in terrain with roughness changes'. The target wind profiles, compared to the wind speeds measured from the wind tunnel are shown in Figure 29.

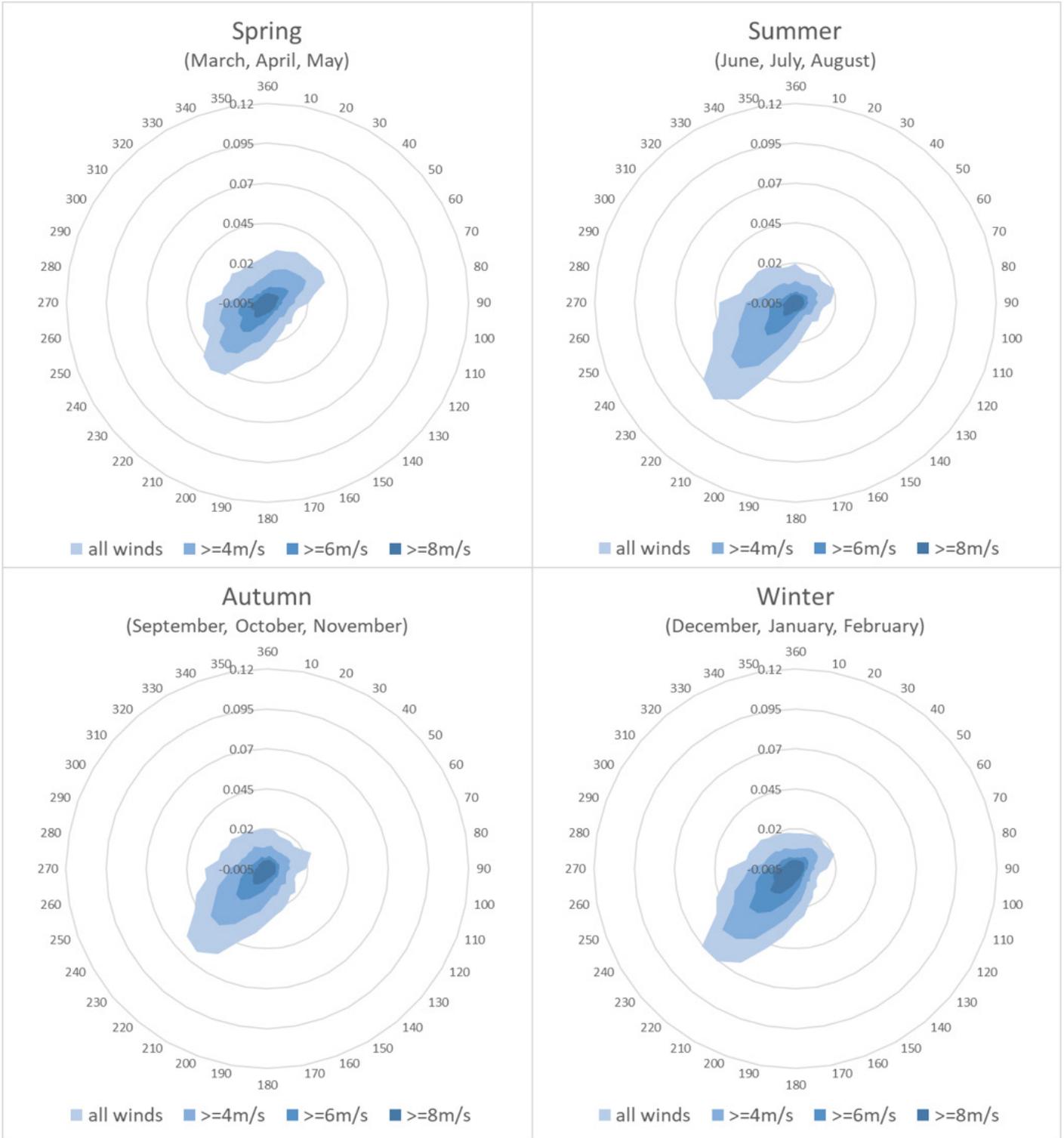


Fig. 28: Seasonal Wind Roses for London Superstation (1990-2020)

Comparison of ESDU TARGET Wind Speed Profiles (Blue Lines)
with Measured in Wind Tunnel (Red Circles)

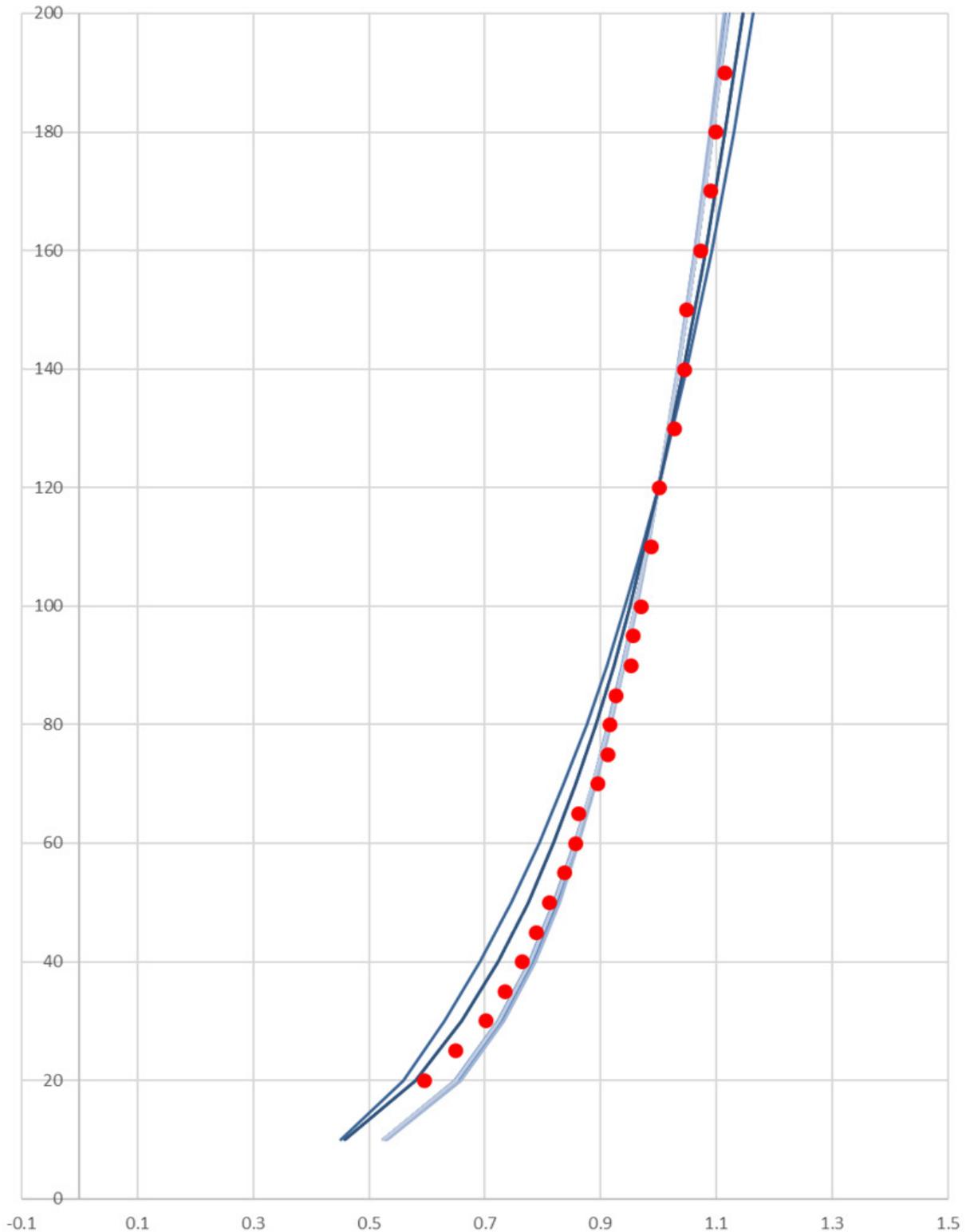


Fig. 29: Wind Profile for Battersea Park Road

For further details please contact us on:

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