



ONE BATTERSEA BRIDGE

WIND MICROCLIMATE ASSESSMENT REPORT

April 2024

The background of the cover is a teal-tinted aerial photograph of a city model. A prominent feature is a tall, cylindrical skyscraper with a flat top, surrounded by various other rectangular buildings of different heights and shapes. A curved, white structure is visible in the middle ground. The overall scene is viewed from an elevated perspective, looking down at the model.

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WIND MICROCLIMATE ASSESSMENT REPORT

One Battersea Bridge

April 2024

GIA No: 18043



PROJECT DATA:

Client **Promontoria Battersea Limited**
Project Title **One Battersea Bridge**
Project Number **18043**

REPORT DATA:

Report Title **Wind Microclimate Assessment**
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1 INTRODUCTION

This report outlines the results of a wind microclimate analysis for the Proposed Development known as One Battersea Bridge, at 1 Battersea Bridge Road, London, SW11 3BZ, in London Borough of Wandsworth.

1.1 SUMMARY

Wind microclimate conditions for the Proposed Development known as One Battersea Bridge were assessed using wind tunnel testing.

There are no wind safety risks associated with the Proposed Development at ground level.

Even in the absence of landscaping and mitigation measures, conditions would be suitable for the intended use for all off-site entrances, existing amenity, bus stops, the Thames Path and “In Town” statue public realm areas, the proposed entrances to the restaurant and residential lobbies and the proposed seating outside of the residential lobby.

Wind mitigation measures were developed, consisting of:

- 3x free-standing 50% porous screens, 1500mm wide by 3000mm tall, at the northern end of the site;
- 2x free-standing 50% porous screens, 1500mm wide by 3000mm tall, at the southern end of the site;
- 1x 30% porous baffle (1200mm wide by 9000mm tall) at the south east corner of the development;
- 1x 50% porous screen within the planter between the community hub and residential entrances (1200mm wide by 3000mm tall); and
- A 50% porous screen was added around the western edge of the level 3 balcony at the north of the development

When these are included, along with existing and proposed landscaping, there are no wind safety risks around the site or surrounding area, and all wind conditions are suitable for the intended use (including thoroughfares, proposed amenity at ground floor, the community hub entrance, balconies and the level 10 terrace) in addition to those locations which were already suitable without mitigation.

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 3D CFD 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 assessment has been informed by supplementary testing in Computational Fluid Dynamics (CFD). The CFD testing has been used both to minimise the risk of the Proposed Development causing adverse wind impacts, and also to ensure that the wind tunnel probe locations were set up to capture the critical locations for wind conditions across the site and surrounding area.

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 Proposed 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 taken from the City of London Wind Microclimate Guidelines (based on 30 years of data recorded at London Heathrow and City airports) and corrected for variations in terrain between the City 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.

The mean correction factors between the site and the city are shown in Table 1.

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.

2.3 LIMITATIONS AND ASSUMPTIONS

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

The assessment herein is valid to the design as supplied to GIA at the time of the assessment, and does not cover future variations in the design.

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	1.01	0.91	0.97	0.98	1.02	1.01	1.00	1.00	1.02	1.01	0.98	0.98



Fig. 01: 3D View of Existing Site

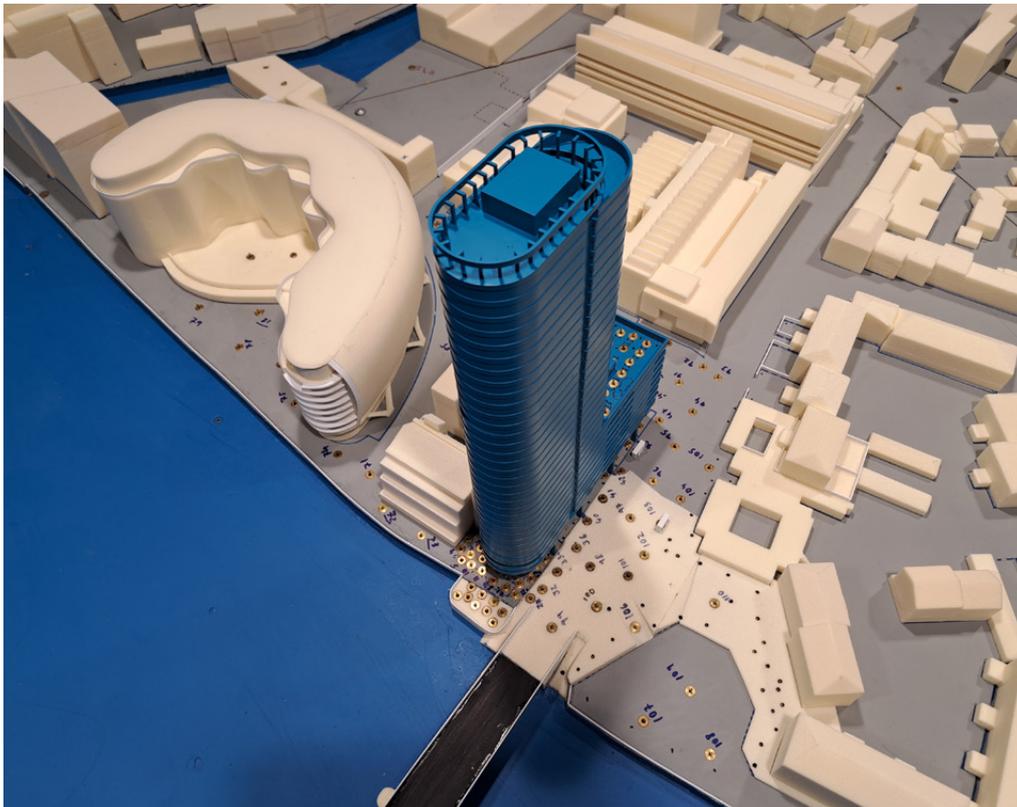


Fig. 02: 3D View of Proposed Development

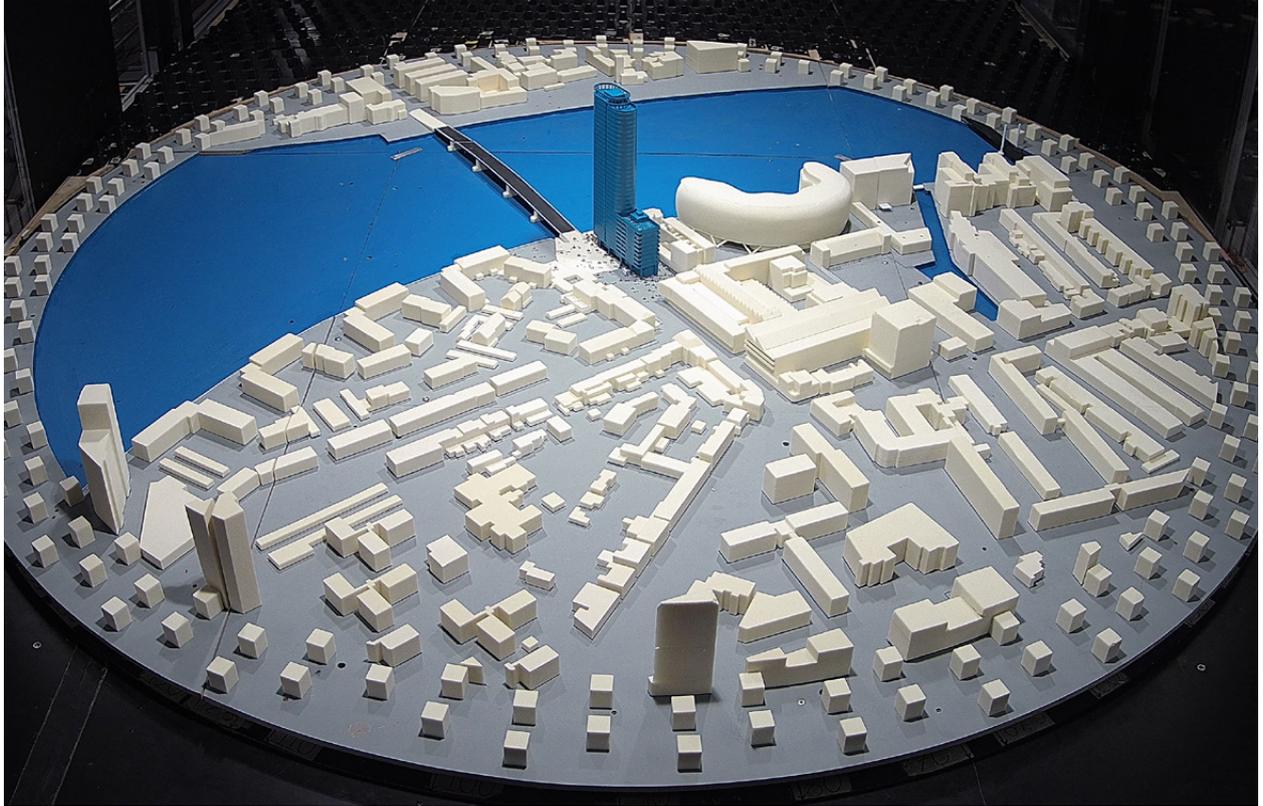


Fig. 03: Proposed Development with Existing Surrounds

2.4 LAWSON COMFORT AND SAFETY CRITERIA

The assessment was graded against the Lawson Comfort and Safety Criteria.

Table 2 and Table 3 show the banding of the various categories within the Lawson Comfort and Safety criteria.

The City of London variant of the Lawson Comfort Criteria has been used for this assessment, as it is the most conservative version of the Lawson Criteria used in the UK.

Comfort categories are based on the level of wind speed exceedance for 5% of each season, and safety categories are based on the level of wind speed exceedance for 1.9 hours per year.

Table 02: Lawson Comfort Criteria (City of London variant)

KEY	COMFORT CATEGORY	MEAN WIND SPEED (5% EXCEEDANCE)	DESCRIPTION
	Frequent Sitting	2.5 m/s	Acceptable for frequent outdoor sitting use, e.g. restaurant, café.
	Occasional Sitting	4 m/s	Acceptable for occasional outdoor seating, e.g. general public outdoor spaces, balconies/terraces intended for occasional use, etc.
	Standing	6 m/s	Acceptable for entrances, bus stops, covered walkways or passageways beneath buildings.
	Walking	8 m/s	Acceptable for external pavements, walkways.
	Uncomfortable	>8 m/s	Not comfortable for regular pedestrian access

Table 03: Lawson Safety Criteria (City of London 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

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.

Strong Winds

Any areas which show up as exceeding the safety criteria 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.

Thoroughfares

General thoroughfares should be suitable for walking in the windiest season.

Thoroughfare conditions are measured at probes 27 to 33, 35, 36, 40, 41, 42, 45, 48 to 53, 56, 58, 60, 62, 64, 65, 67 to 71, 83 to 88, 90 to 92, 100 to 102, 104 and 105.

Car Parks & Roadways

Due to their less frequent usage by pedestrians, car parks and roadways can handle uncomfortable wind conditions, but should not be subject to any wind safety exceedances.

There are car parks located at probes 54, 55, 57, 59, 61 and 62.

Roadway conditions were measured at probes 93 to 99.

Building Entrances

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 1, 8, 34, 38, 43 and 46, and the principal off-site entrances are probes 66, 89 and 111.

Bus Stops

Bus stops are targeted to be suitable for standing in the Windiest Season. There are bus stops located at probes 47 and 103.

Public Realm

General public realm should be suitable for walking in the windiest season and standing in summer.

There is public realm around the site in the form of the Thames Path (probes 22 to 26, 72 to 75, 78 and 79) and also the area around the "In Town" sculpture (probes 106 to 11).

Amenity Spaces - Seating

The target conditions for amenity spaces are based on the summer months, as factors such as temperature or rainfall will be the limiting factor for these spaces during other seasons.

There are specific seating areas located outside the main entrance at probes 37 and 39. These are targeted to be suitable for occasional sitting in summer.

Amenity Spaces - Mixed

The target condition for a mixed amenity space to be suitable for a mixture of occasional sitting and standing during the summer, to allow users to choose their location according to their level of activity.

There is an existing mixed amenity space at probes 76, 77, 80 and 81, and proposed mixed amenity to the north of the site in the form of the restaurant spill out, outdoor terrace and amphitheatre, at probes 2 to 7 and 9 to 21.

Amenity Spaces - Terraces

There is a proposed terrace at level 10, which is treated as a mixed amenity space and targeted to be suitable for a mixture of occasional sitting and standing during the summer.

Conditions for the terrace are recorded at probes 204 to 207, 209 and 211 to 219.

Amenity Spaces - Balconies

Balconies are private spaces, the use of which can be controlled according to the individual user's preference, so can stand higher wind speeds than communal amenity spaces but are still required to be suitable for sitting or standing in summer conditions.

Proposed balcony conditions have been measured at probe locations 251 to 260.

Receptor Maps

The locations of ground level sensitive receptors are shown in Figure 4, the level 10 terrace are shown in Figure 5 and proposed balconies are shown in Figure 6.

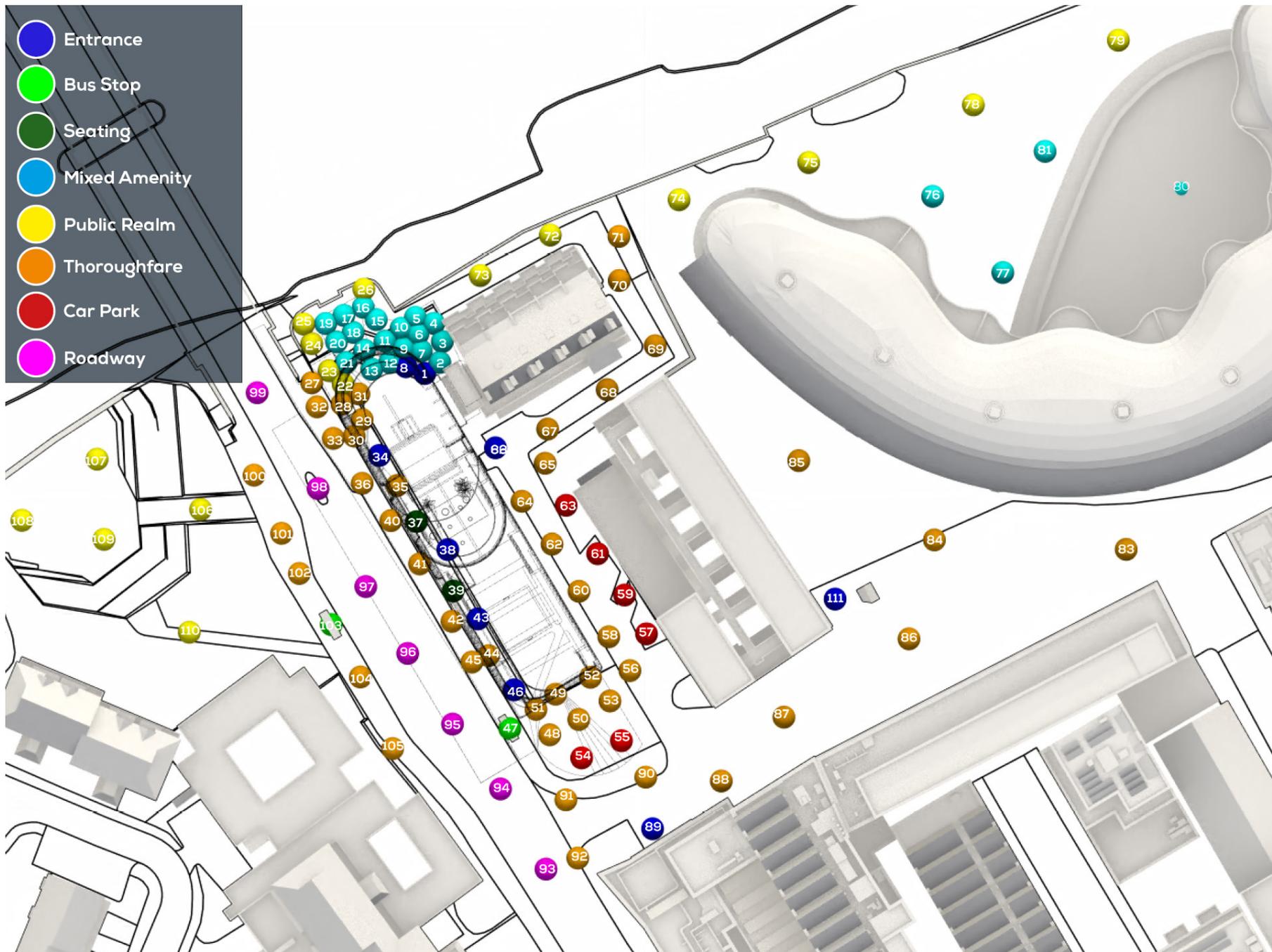


Fig. 04: Ground Level Wind Receptors

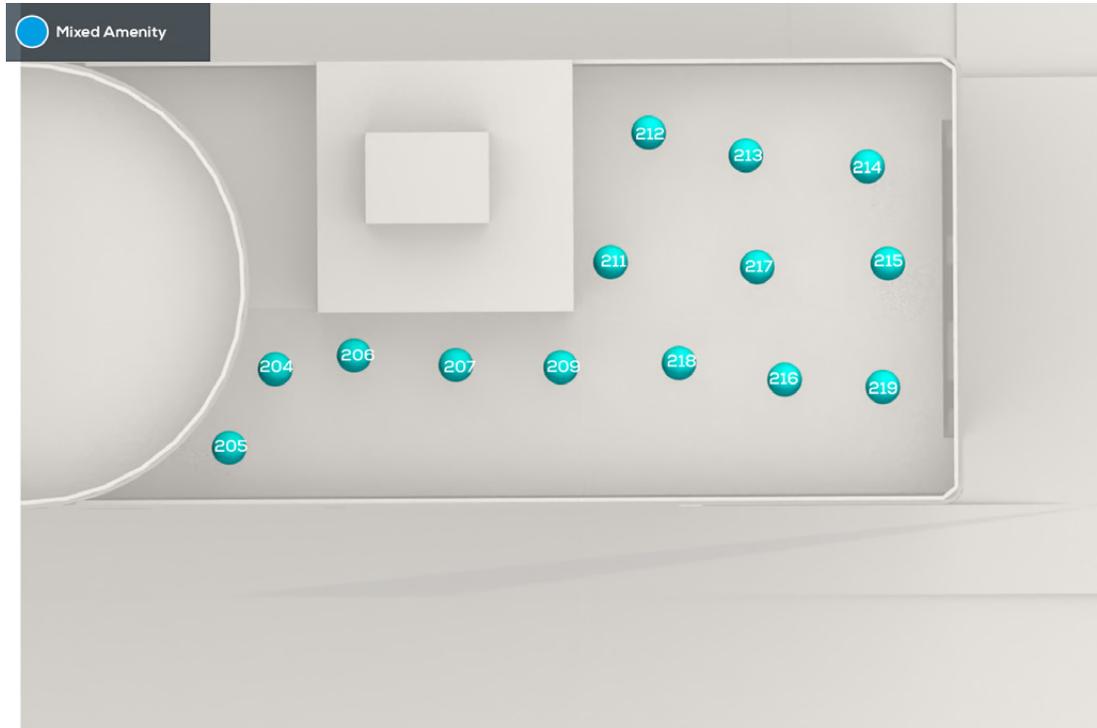


Fig. 06: Proposed Terrace Level Wind Receptors

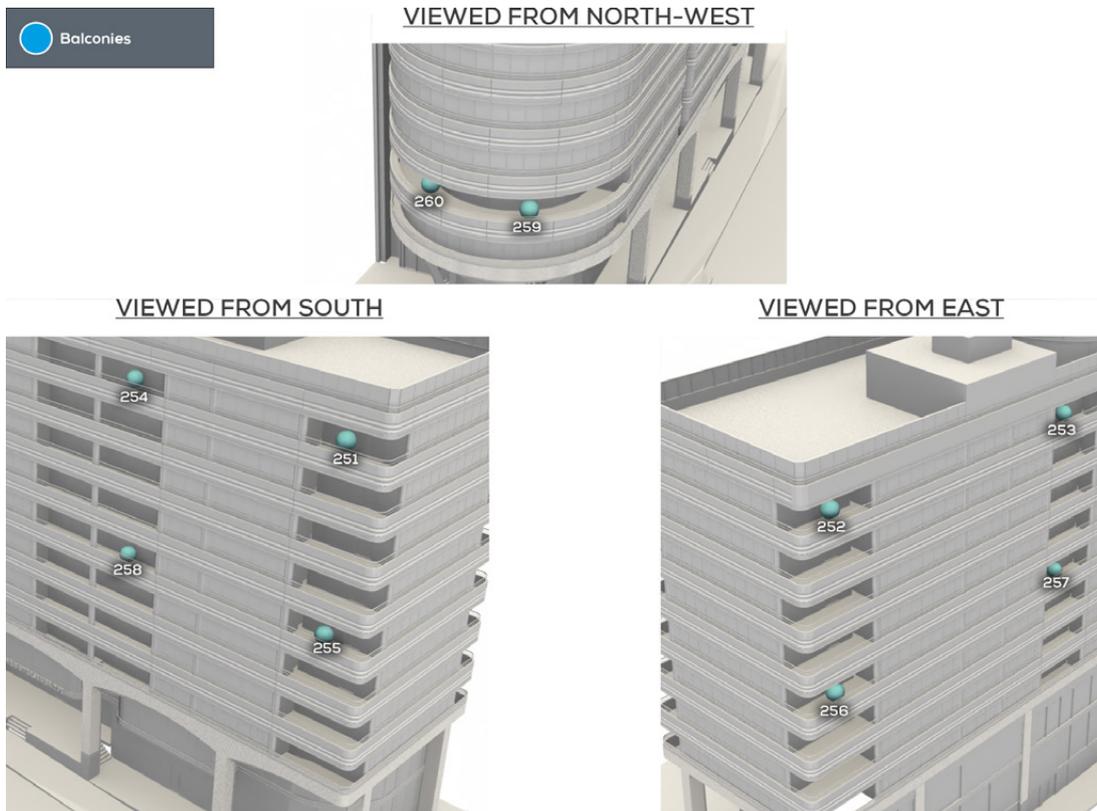


Fig. 05: Balcony Wind Receptors

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 (including any planning consented schemes which are under construction at the time of writing); and
- Proposed Development with Existing Surrounds: The completed and operational development with the existing surrounds; and
- Proposed Development with Landscaping, Mitigation and Existing Surrounds: The completed and operational development with the existing surrounds, plus the existing and proposed landscaping, and additional mitigation measures.

A cumulative scheme review (undertaken by Temple as part of EIA screening) found that there are no significant consented schemes within a 400m radius of the Proposed Development which are not sufficiently advanced to be included in the baseline, so a separate cumulative assessment has not been undertaken at the current juncture.

Trees or soft landscaping were not initially included in the assessment, to ensure conservative results demonstrating a worst-case scenario.

For Scenario 3, existing and proposed trees were included in the model. These are shown in Figure 7 (at ground level) and Figure 8 (at terrace level).

The proposed trees consisted off a mix of 5m high deciduous trees, and 7.5m high evergreen trees. The tree types are highlighted in the legend for Figures 7 and 8.

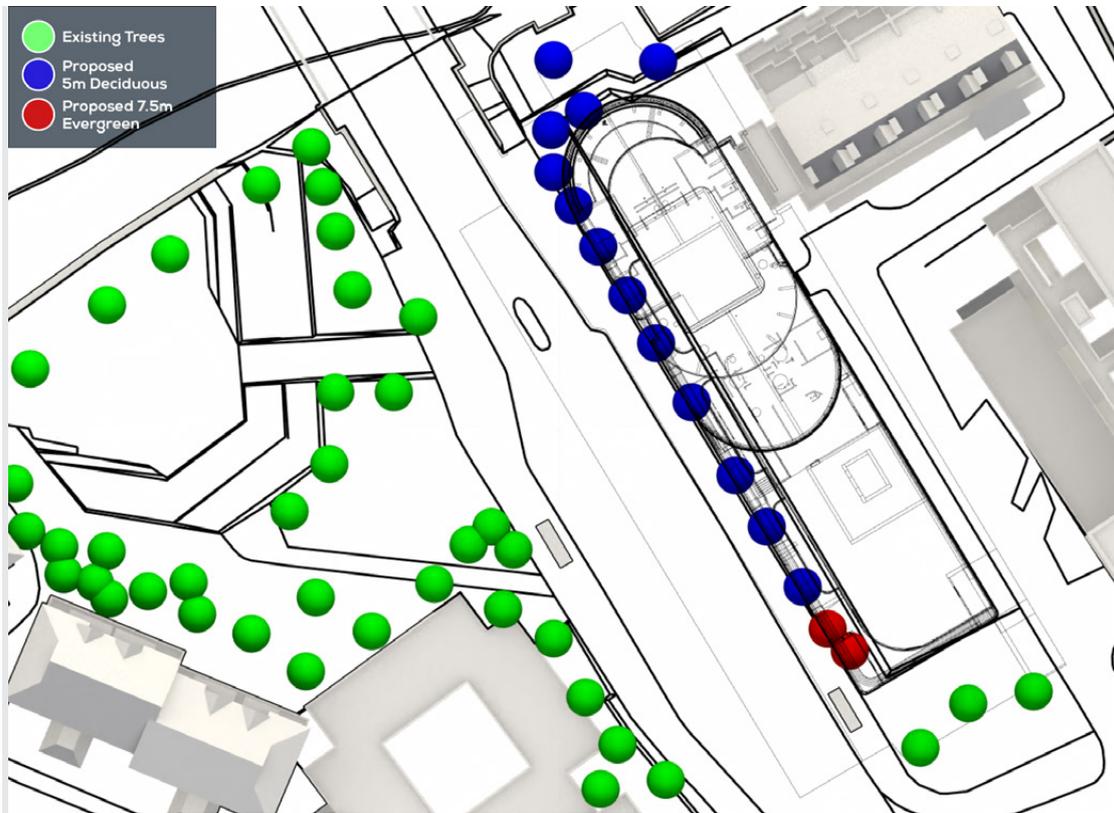


Fig. 07: Proposed and Existing Landscaping at Ground Level

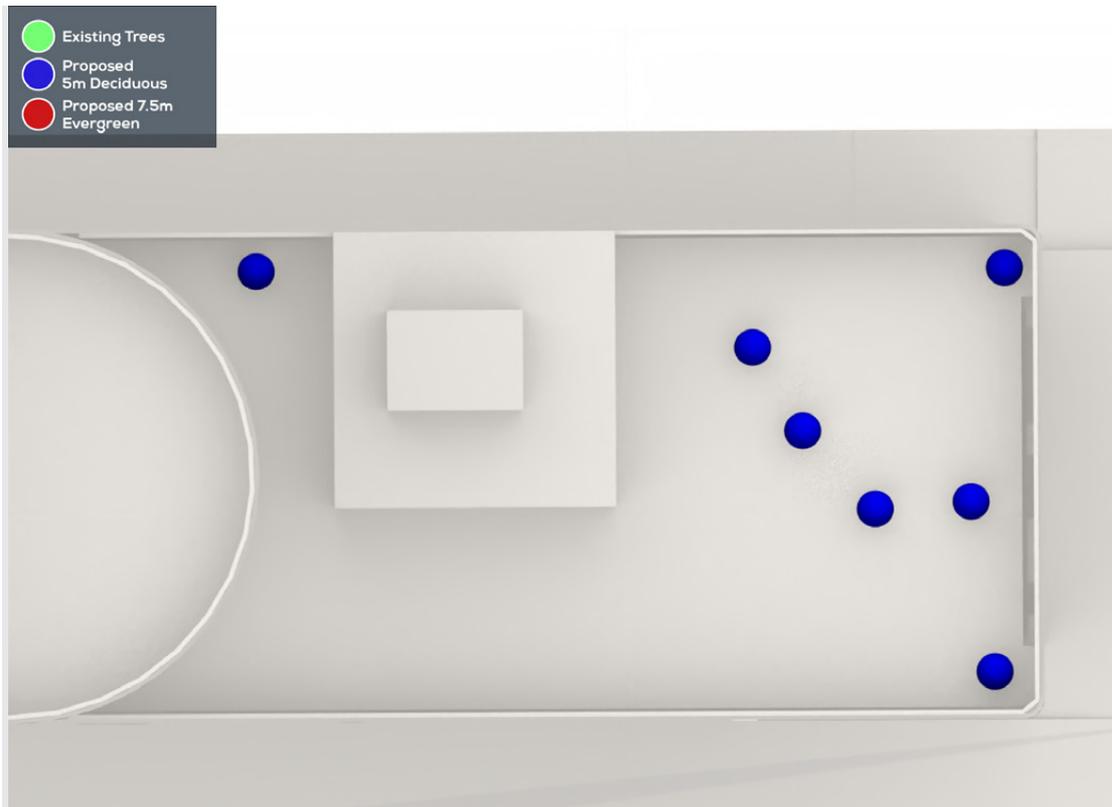


Fig. 08: Proposed Landscaping at Terrace Level

3 RESULTS

3.1 BASELINE CONDITIONS

Annual safety at ground level for the baseline scenario is shown in Figure 9. Winter comfort at ground level for the baseline scenario is shown in Figure 10. Summer comfort at ground level for the baseline scenario is shown in Figure 11.

Strong Winds

There are no locations which show a risk to pedestrian safety due to strong winds in the baseline scenario.

Thoroughfares

Conditions for general thoroughfares (probes 27 to 33, 35, 36, 40, 41, 42, 45, 48 to 53, 56, 58, 60, 62, 64, 65, 67 to 71, 83 to 88, 90 to 92, 100 to 102, 104 and 105) range between suitable for occasional sitting, standing and walking in the windiest season. This is suitable for the intended use.

Car Parks & Roadways

Conditions for the car parks (probes 54, 55, 57, 59, 61 and 62) are suitable for standing in the windiest season. This is suitable for the intended use.

Roadway conditions (probes 93 to 99) are suitable for either standing or walking in the windiest season. This is suitable for the intended use.

Building Entrances

Conditions for the principal off-site entrances (probes 66, 89 and 111) are suitable for occasional sitting or standing in the windiest season. This is suitable for the intended use.

Bus Stops

Conditions for the bus stops (probes 47 and 103) are suitable for occasional sitting in the windiest season. This is suitable for the intended use.

Public Realm

Conditions for the Thames Path (probes 22 to 26, 72 to 75, 78 and 79) are suitable for a mix of occasional sitting and standing in either the windiest season or summer. This is suitable for

the intended use.

Conditions for the area around the "In Town" sculpture (probes 106 to 11) are suitable for a mix of occasional sitting and standing in either the windiest season or summer. This is suitable for the intended use.

Amenity Spaces - Mixed

Conditions for the existing mixed amenity space (probes 76, 77, 80 and 81) are suitable for a mix of occasional sitting and standing in summer. This is suitable for the intended use.



Fig. 09: Ground Level Safety for Existing Site with Existing Surrounds



Fig. 10: Ground Level Windiest Season Comfort for Existing Site with Existing Surrounds

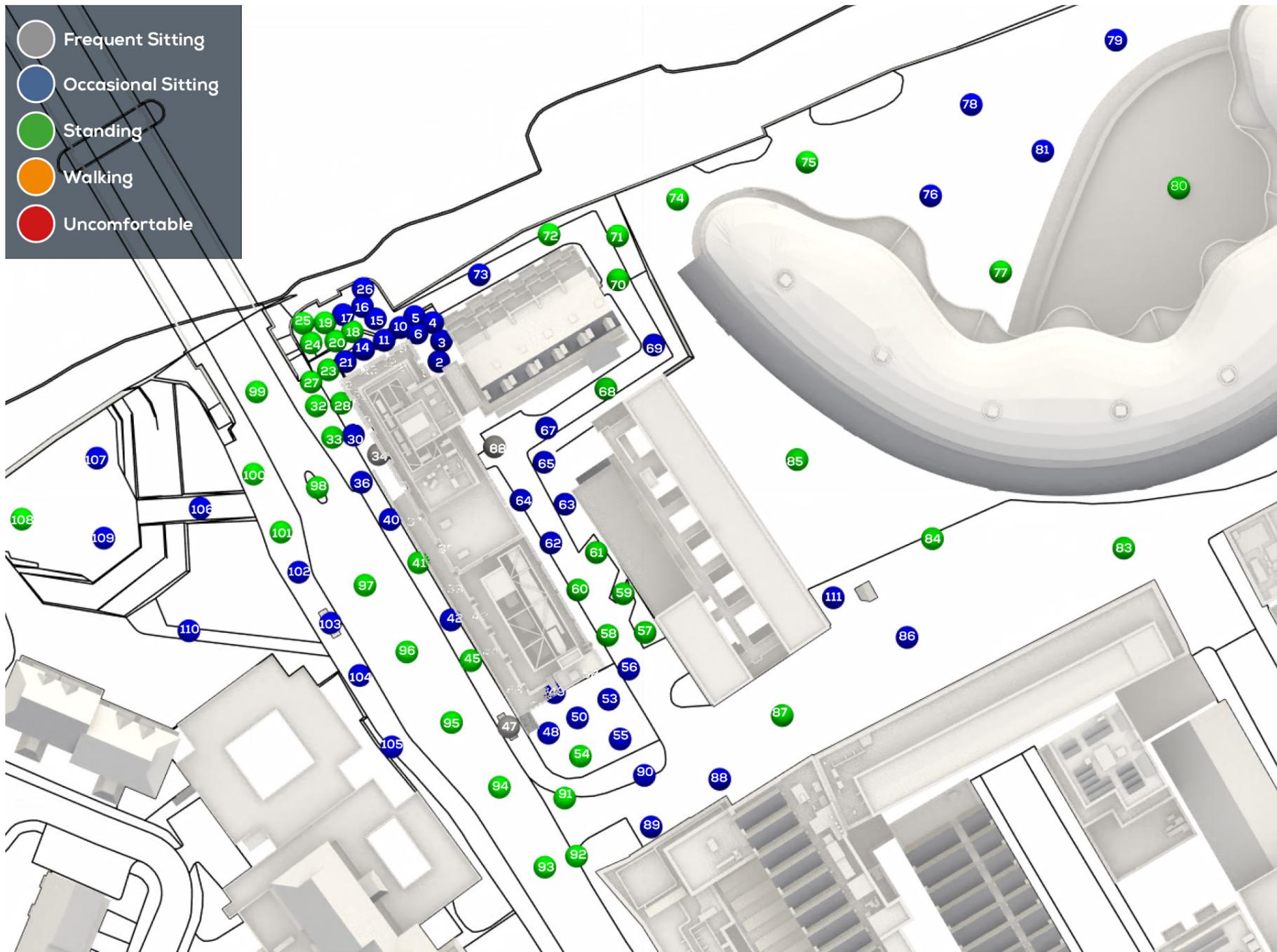


Fig. 11: Ground Level Summer Comfort for Existing Site with Existing Surrounds

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 12. Winter comfort at ground level for the Proposed Development with existing surrounds is shown in Figure 13. Summer comfort at ground level for the Proposed Development with existing surrounds is shown in Figure 14.

Annual safety at proposed terrace levels for the Proposed Development with existing surrounds is shown in Figure 15. Winter comfort at proposed terrace levels for the Proposed Development with existing surrounds is shown in Figure 16. Summer comfort at proposed terrace levels for the Proposed Development with existing surrounds is shown in Figure 17.

Annual safety at proposed balcony levels for the Proposed Development with existing surrounds is shown in Figure 18. Winter comfort at proposed balcony levels for the Proposed Development with existing surrounds is shown in Figure 19. Summer comfort at proposed balcony levels for the Proposed Development with existing surrounds is shown in Figure 20.

Strong Winds

There are 12 ground floor locations which show a risk to pedestrian safety due to strong winds when tested without mitigation measures.

These consist of two on-site locations at the north of the site (probes 14 and 18), three on-site locations at the south of the site (probes 46, 49 and 51), one off-site thoroughfare at the north of the site (probe 27), four off-site thoroughfares to the south of the site (probes 48, 50, 58 and 88) and four car-park locations (probes 54, 55, 59 and 61).

There is also a balcony location at the north of the development (probe 259) which shows a risk to user safety due to strong winds.

Proposed mitigation measures for these issues are set out in Section 3.3 and tested in Section 3.4.

Thoroughfares

There are four thoroughfare locations (probes 27, 48, 50, 58) which are uncomfortable in the windiest season. This is a category windier than the target condition. Proposed mitigation measures for this issue are set out in Section 3.3 and tested in Section 3.4.

Conditions for all other general thoroughfares (probes 28 to 33, 35, 36, 40, 41, 42, 45, 49, 51 to 53, 56, 60, 62, 64, 65, 67 to 71, 83 to 88, 90 to 92, 100 to 102, 104 and 105) range between suitable for standing and walking in the windiest season. This is suitable for the intended use.

Car Parks & Roadways

Conditions for the car parks (probes 54, 55, 57, 59, 61 and 62) are suitable for walking or record uncomfortable conditions in the windiest season. This is acceptable due to the nature of these receptors as not locations where pedestrians would be expected to dwell for significant periods of time.

Roadway conditions (probes 93 to 99) are suitable for walking in the windiest season. This is suitable for the intended use.

Building Entrances

Conditions for the entrances to the restaurant (probes 1, 8, 34) are suitable for occasional sitting or standing in the windiest season. This is suitable for the intended use.

Conditions for the main entrance lobby (probe 38) are suitable for occasional sitting in the windiest season. This is suitable for the intended use.

Conditions for the secondary entrance lobby (probe 43) are suitable for standing in the windiest season. This is suitable for the intended use.

Conditions for the community hub entrance (probe 46) are uncomfortable in the windiest season. This is two categories windier than the target condition. Proposed mitigation measures for this issue are set out in Section 3.3 and tested in Section 3.4.

Conditions for the principal off-site entrances (probes 66, 89 and 111) are suitable for occasional sitting or standing in the windiest season. This is suitable for the intended use.

Bus Stops

Conditions for the bus stops (probes 47 and 103) are suitable for standing in the windiest season. This is suitable for the intended use.

Public Realm

Conditions for the Thames Path (probes 22 to 26, 72 to 75, 78 and 79) are suitable for a mix of standing and walking in the windiest season and for a mix of occasional sitting and standing in summer. This is suitable for the intended use.

Conditions for the area around the "In Town" sculpture (probes 106 to 11) are suitable for a mix of standing and walking in the windiest season and for standing in summer. This is suitable for the intended use.

Amenity Spaces - Seating

There are seating areas located outside the main entrance (probes 37 and 39) are suitable for occasional sitting in summer. This is suitable for the intended use.

Amenity Spaces - Mixed

Conditions for the proposed mixed amenity space at the north of the site (probes 2 to 7 and 9 to 21) are suitable for a mix of occasional sitting, standing and walking in summer. This is up to one category windier than the target condition. Proposed mitigation measures for this issue are set out in Section 3.3 and tested in Section 3.4.

Conditions for the existing mixed amenity space (probes 76, 77, 80 and 81) are suitable for a mix of occasional sitting and standing in summer. This is suitable for the intended use.

Amenity Spaces - Terraces

Conditions for the level 10 terrace (probes 204 to 207, 209 and 211 to 219) are suitable for a mix of occasional sitting, standing and walking in summer. This is up to one category windier than the target condition. Proposed mitigation

measures for this issue are set out in Section 3.3 and tested in Section 3.4.

Amenity Spaces - Balconies

There is one balcony location (probe 259) at the northern end of the development, which is uncomfortable in summer. This is two categories windier than the target condition. Proposed mitigation measures for this issue are set out in Section 3.3 and tested in Section 3.4.

All other balcony locations (probes 251 to 258 and 260) range between suitable for frequent sitting, occasional sitting and standing in summer. This is suitable for the intended use.



Fig. 12: Ground Level Safety for Proposed Development with Existing Surrounds



Fig. 13: Ground Level Windiest Season Comfort for Proposed Development with Existing Surrounds



Fig. 14: Ground Level Summer Comfort for Proposed Development with Existing Surrounds



Fig. 15: Terrace Level Annual Safety, Proposed Development with Existing Surrounds

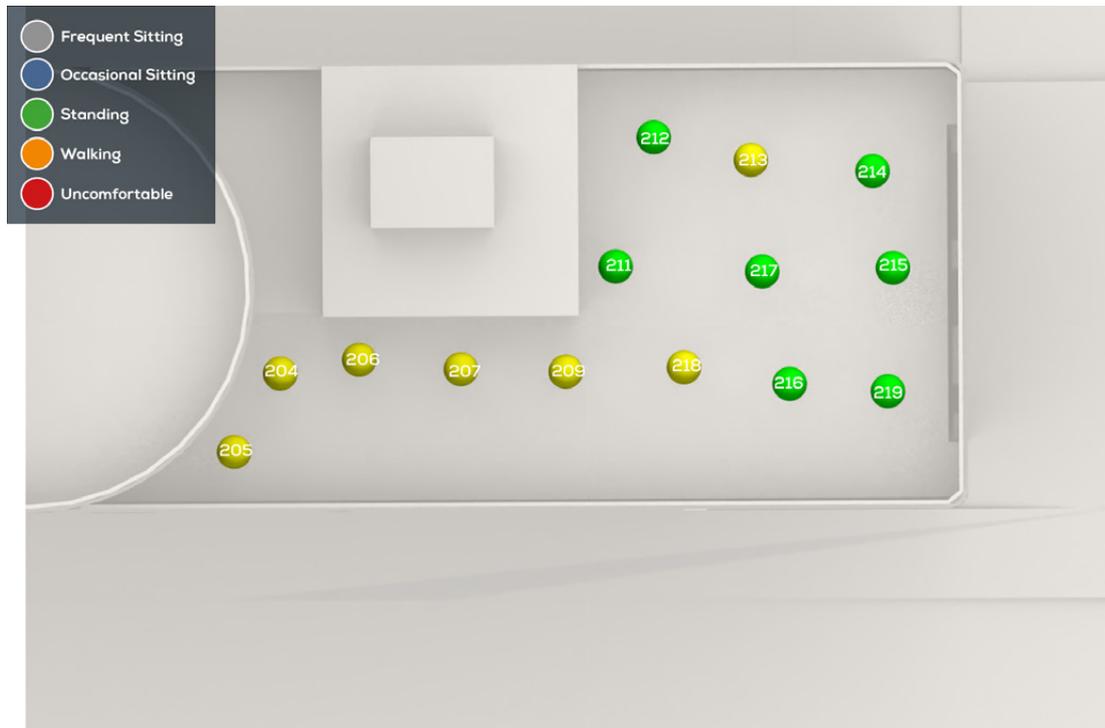


Fig. 16: Terrace Level Windiest Season Comfort, Proposed Development with Existing Surrounds

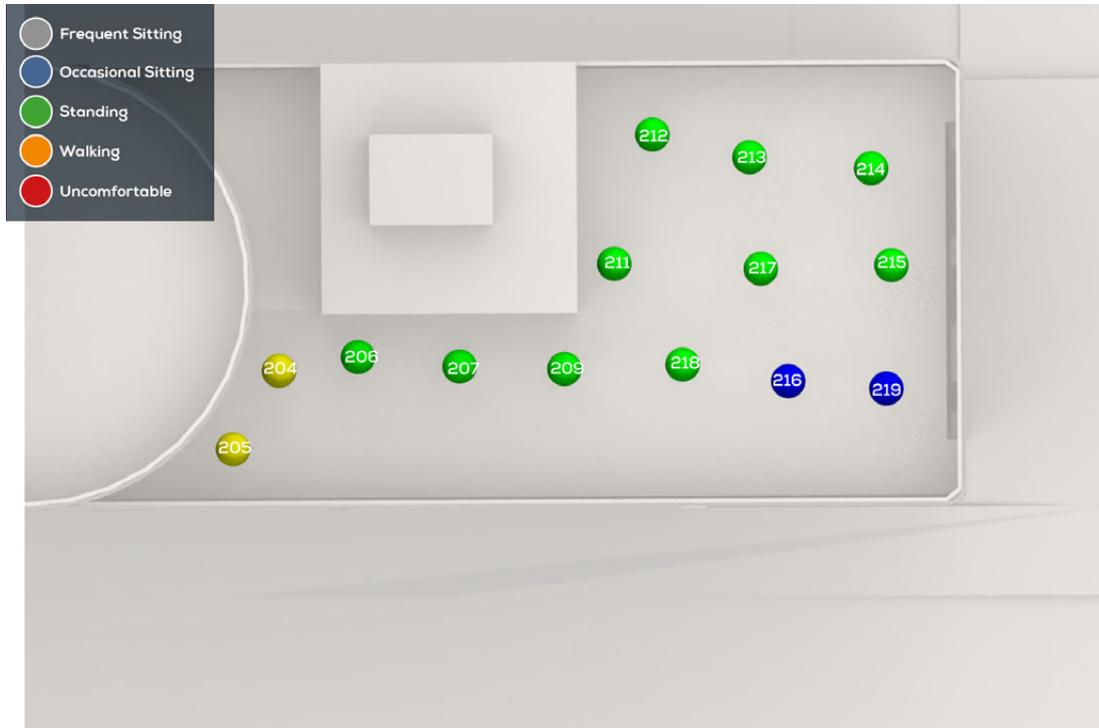


Fig. 17: Terrace Level Summer Comfort, Proposed Development with Existing Surrounds

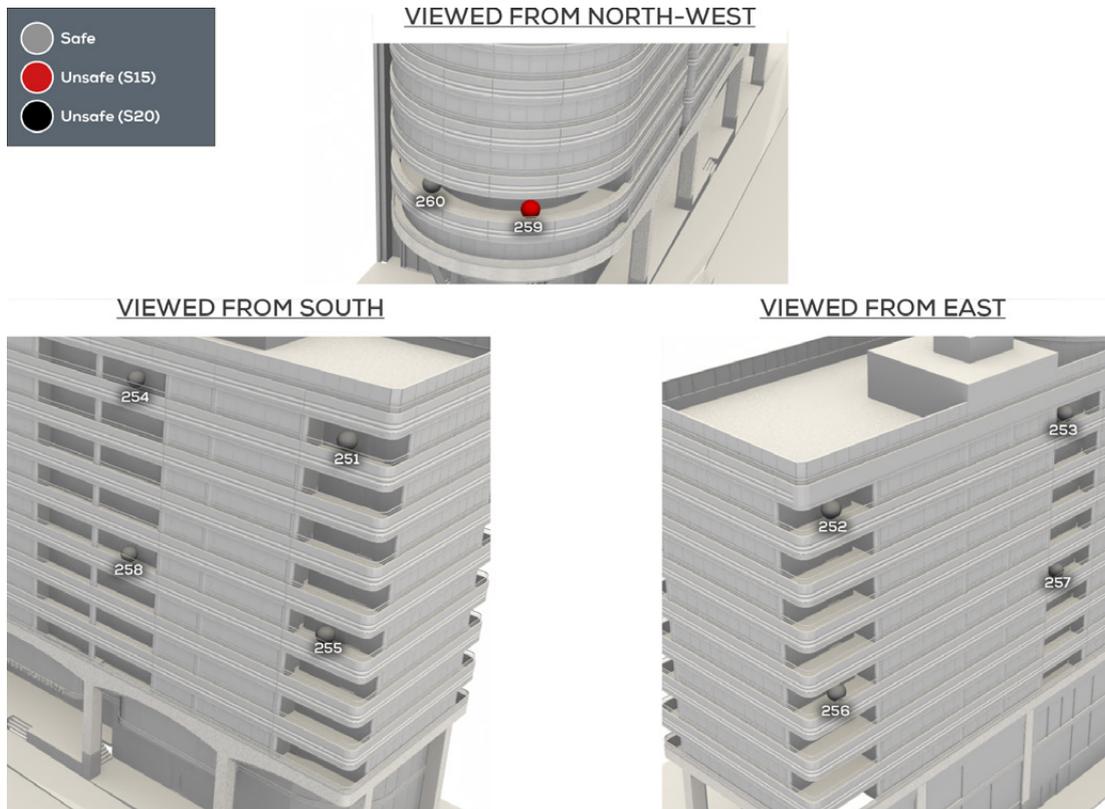
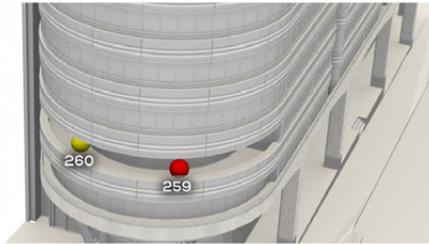


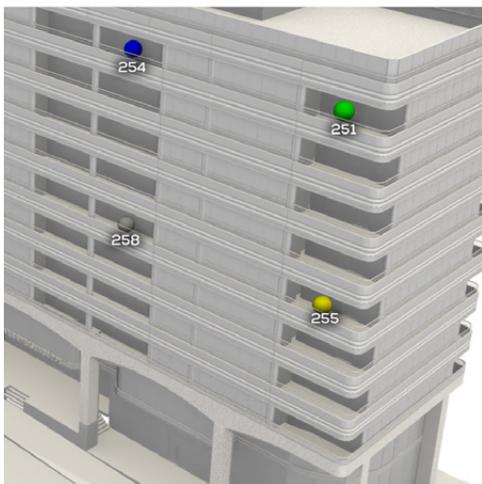
Fig. 18: Balcony Level Annual Safety, Proposed Development with Existing Surrounds

- Frequent Sitting
- Occasional Sitting
- Standing
- Walking
- Uncomfortable

VIEWED FROM NORTH-WEST



VIEWED FROM SOUTH



VIEWED FROM EAST

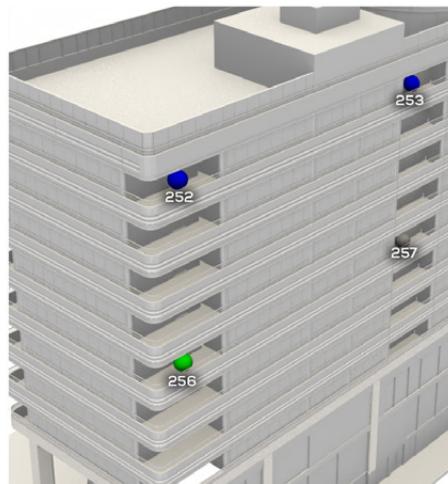
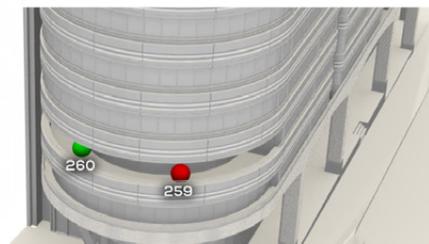


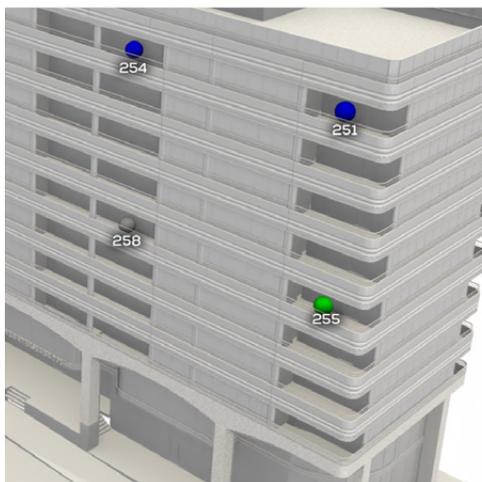
Fig. 19: Balcony Level Windiest Season Comfort, Proposed Development with Existing Surrounds

- Frequent Sitting
- Occasional Sitting
- Standing
- Walking
- Uncomfortable

VIEWED FROM NORTH-WEST



VIEWED FROM SOUTH



VIEWED FROM EAST

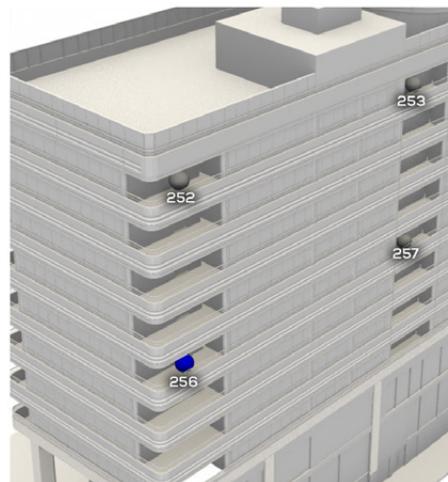


Fig. 20: Balcony Level Summer Comfort, Proposed Development with Existing Surrounds

3.3 WIND MITIGATION MEASURES

Mitigation measures were developed as part of a wind tunnel workshop.

The ground level mitigation measures as tested were set out as shown in Figure 21, and the models as used in the wind tunnel are shown in Figure 22. They can be summarised as follows:

- 3x free-standing 50% porous screens, 1500mm wide by 3000mm tall, at the northern end of the site;
- 2x free-standing 50% porous screens, 1500mm wide by 3000mm tall, at the southern end of the site;
- 1x 30% porous baffle (1200mm wide by 9000mm tall) at the south east corner of the development; and
- 1x 50% porous screen within the planter between the community hub and residential entrances (1200mm wide by 3000mm tall).

In addition to the above, a 50% porous screen was added around the western edge of the level 3 balcony at the north of the development (shown in Figure 21).

With regards to the level 10 terrace, the following key hard landscaping features were included within the model (shown in Figure 23):

- 3m high porous screening at north west of the terrace; and
- The proposed "Mill" play structure.

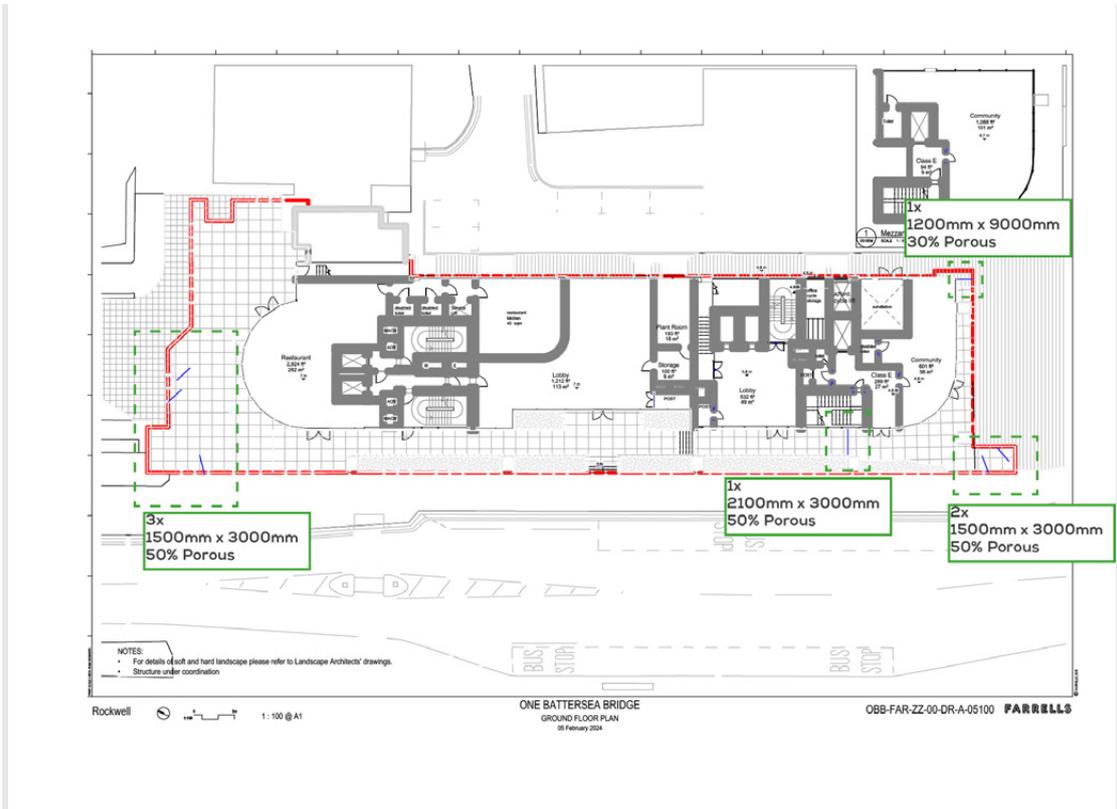


Fig. 21: Ground Level Wind Mitigation Locations



Fig. 22: Wind Mitigation as Tested in Wind Tunnel

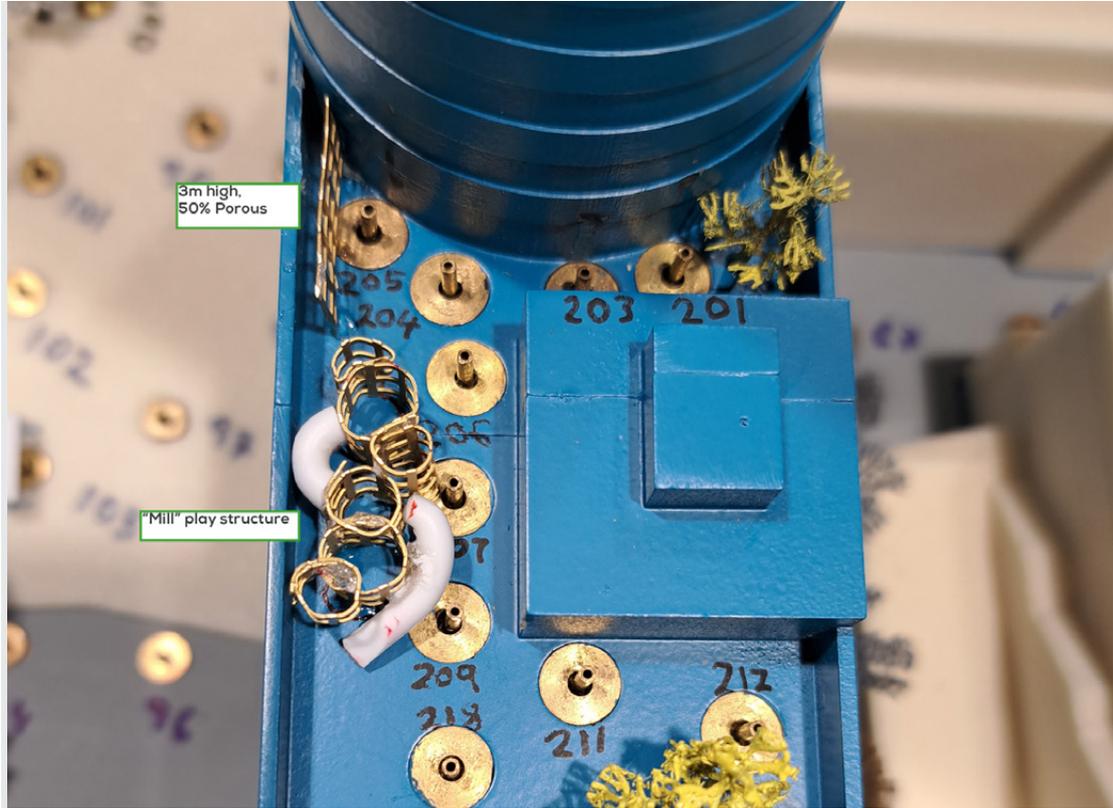


Fig. 23: Terrace Level Key Hard Landscaping Features

3.4 CONDITIONS FOR PROPOSED DEVELOPMENT WITH LANDSCAPING, MITIGATION AND EXISTING SURROUNDS

An additional scenario was tested, with the existing and proposed landscaping (as set out in Section 2.6) and the proposed mitigation measures (as set out in Section 3.3) included in the model.

Conditions for those locations which exceeded the target condition in the absence of mitigation are set out below.

Annual safety at ground level for the Proposed Development with landscaping, mitigation and existing surrounds is shown in Figure 24. Winter comfort at ground level for the Proposed Development with landscaping, mitigation and existing surrounds is shown in Figure 25. Summer comfort at ground level for the Proposed Development with landscaping, mitigation and existing surrounds is shown in Figure 26.

Annual safety at proposed terrace levels for the Proposed Development with landscaping, mitigation and existing surrounds is shown in Figure 27. Winter comfort at proposed terrace levels for the Proposed Development with landscaping, mitigation and existing surrounds is shown in Figure 28. Summer comfort at proposed terrace levels for the Proposed Development with landscaping, mitigation and existing surrounds is shown in Figure 29.

Annual safety at proposed balcony levels for the Proposed Development with landscaping, mitigation and existing surrounds is shown in Figure 30. Winter comfort at proposed balcony levels for the Proposed Development with landscaping, mitigation and existing surrounds is shown in Figure 31. Summer comfort at proposed balcony levels for the Proposed Development with landscaping, mitigation and existing surrounds is shown in Figure 32.

Strong Winds

The 12 ground floor locations, and one balcony location which showed a risk to pedestrian safety when tested without mitigation

measures no longer show any safety risk. No new wind safety risks have been introduced and the risk to pedestrian safety is now negligible.

Thoroughfares

Conditions for the thoroughfare location at probe 27 are still above the uncomfortable threshold in the windiest season. This location is, however, suitable for walking in all seasons bar winter, and the 5% wind speed in winter is only 8.2m/s (so marginal to the 8m/s threshold between walking and uncomfortable conditions). This, coupled with the highly localised and relatively low expected foot-flow for this location, means that this location is now considered suitable for the intended use.

Conditions for the other previously uncomfortable locations (probes 48, 50, 58) are suitable for walking in the windiest season. This is now suitable for the intended use.

Building Entrances

Conditions for the community hub entrance (probe 46) are suitable for standing in the windiest season. This is now suitable for the intended use.

Amenity Spaces - Mixed

Conditions for the proposed mixed amenity space at the north of the site (probes 2 to 7 and 9 to 21) are suitable for a mix of occasional sitting and standing in summer. This is now suitable for the intended use.

Amenity Spaces - Terraces

Conditions for the level 10 terrace (probes 204 to 207, 209 and 211 to 219) are suitable for a mix of occasional sitting and standing in summer. This is now suitable for the intended use.

Amenity Spaces - Balconies

The balcony location (probe 259) at the northern end of the development, which was uncomfortable in summer without mitigation, is now suitable for standing. This is suitable for the intended use.

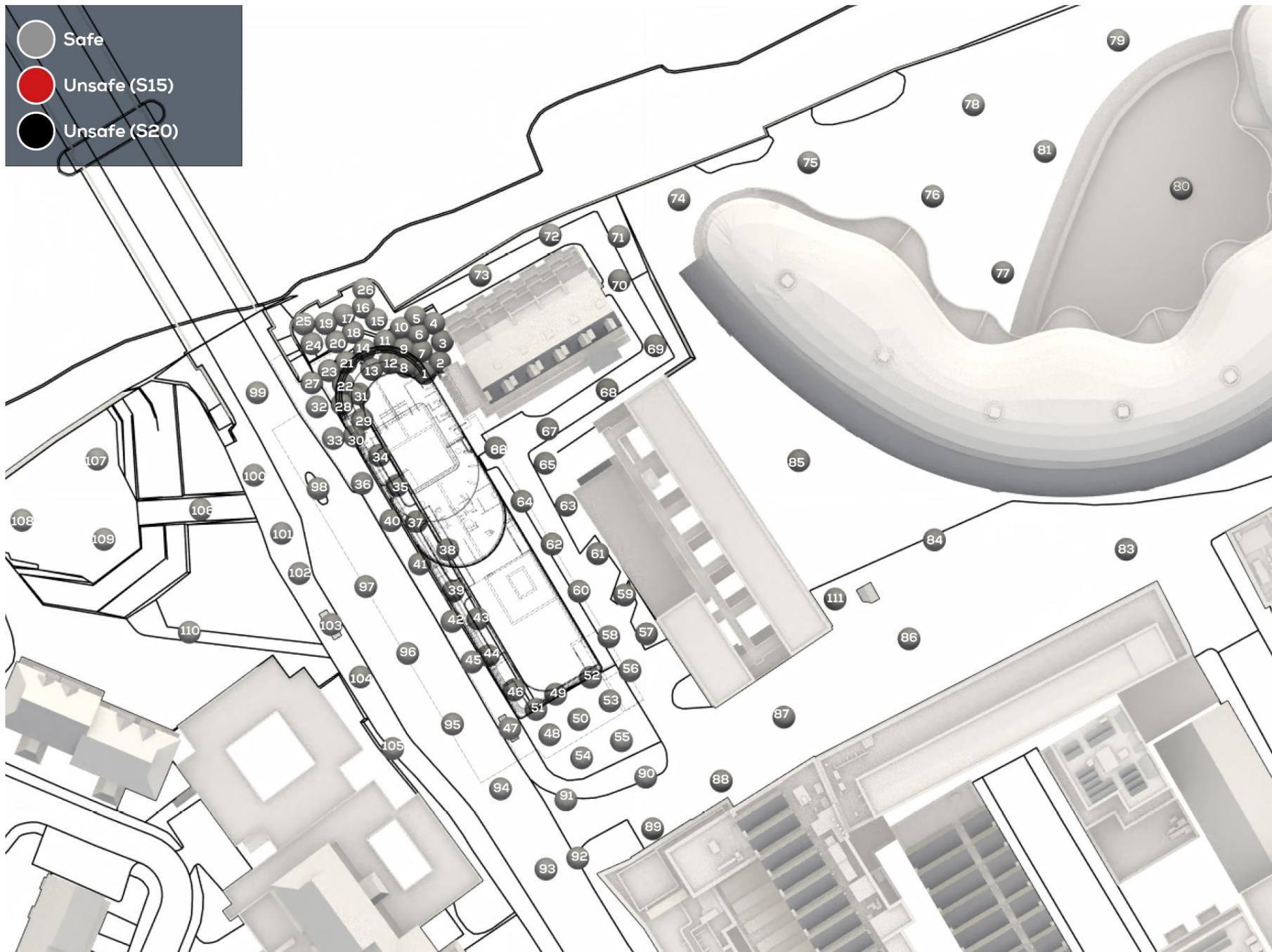


Fig. 24: Ground Level Safety for Proposed Development with Landscaping, Mitigation and Existing Surrounds



Fig. 25: Ground Level Windiest Season Comfort for Proposed Development with Landscaping, Mitigation and Existing Surrounds



Fig. 26: Ground Level Summer Comfort for Proposed Development with Landscaping, Mitigation and Existing Surrounds



Fig. 27: Terrace Level Annual Safety, Proposed Development with Landscaping, Mitigation and Existing Surrounds

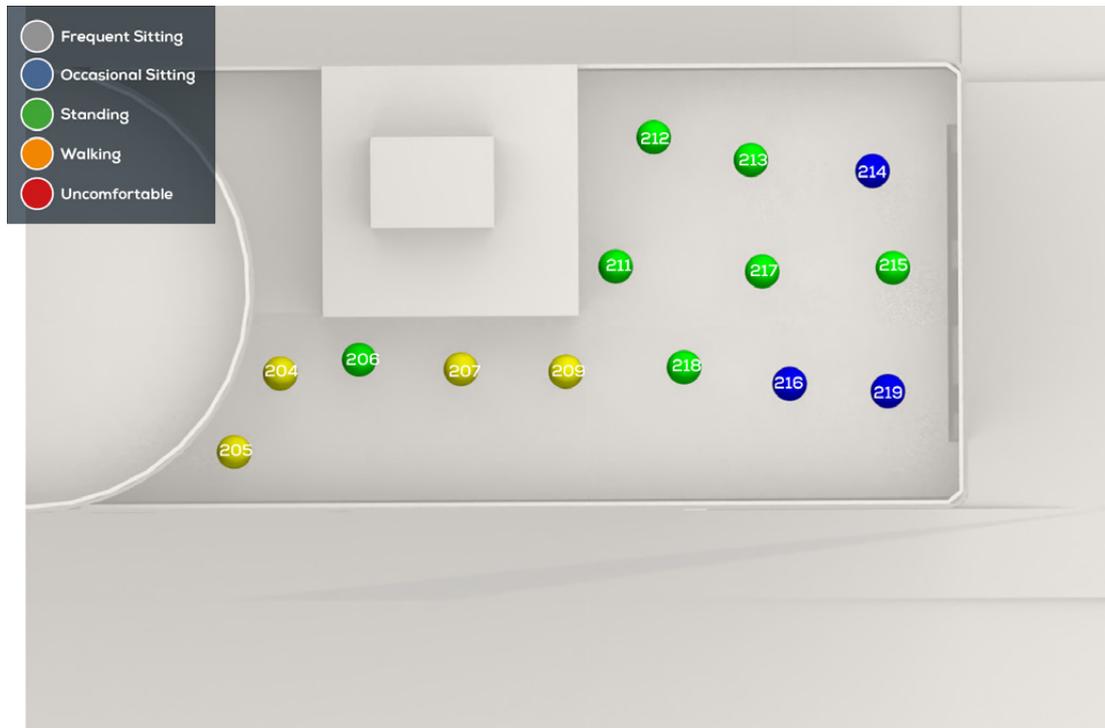


Fig. 28: Terrace Level Windiest Season Comfort, Proposed Development with Landscaping, Mitigation and Existing Surrounds

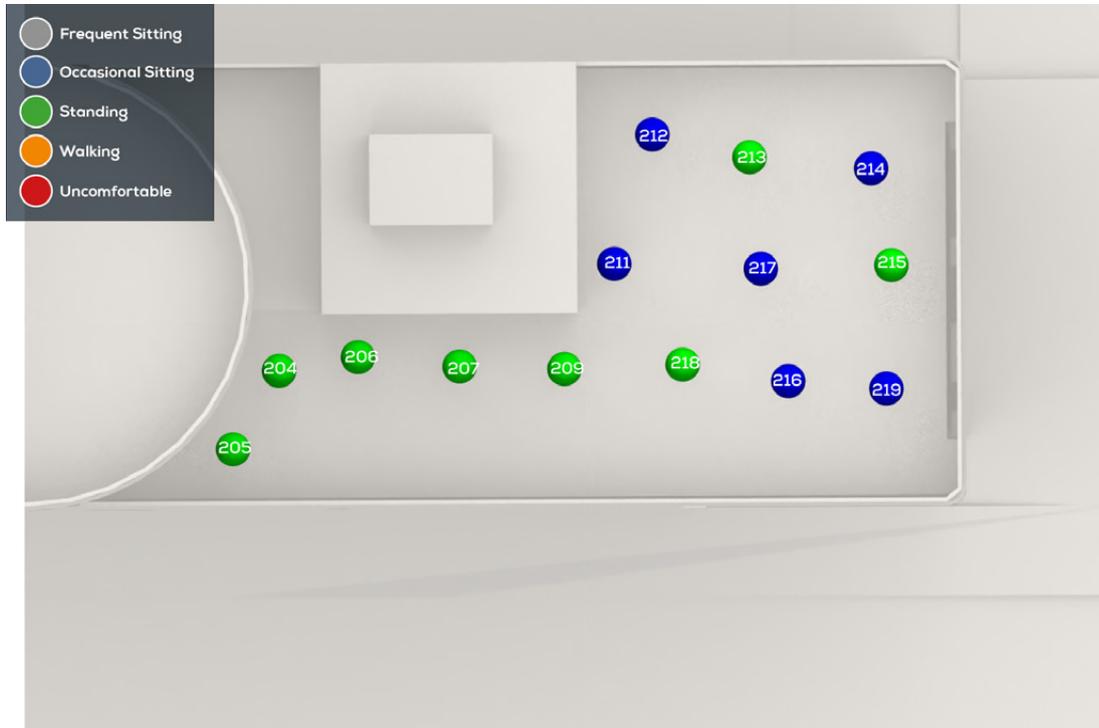


Fig. 29: Terrace Level Summer Comfort, Proposed Development with Landscaping, Mitigation and Existing Surrounds

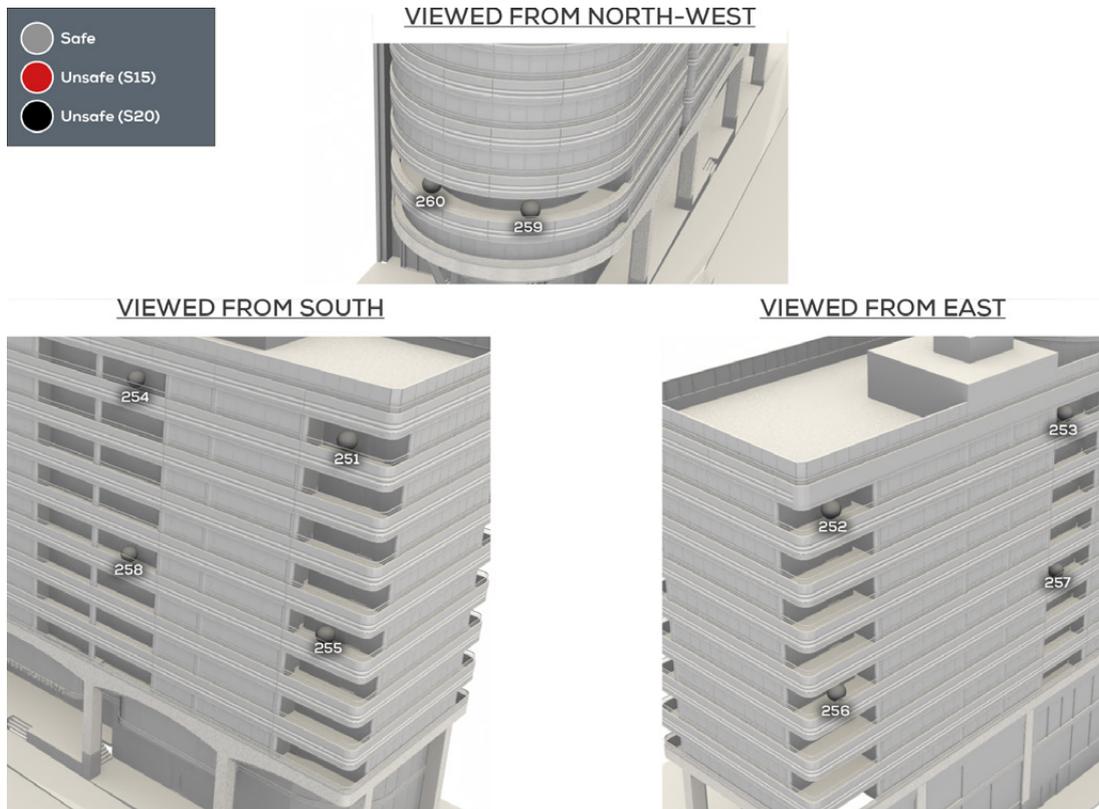
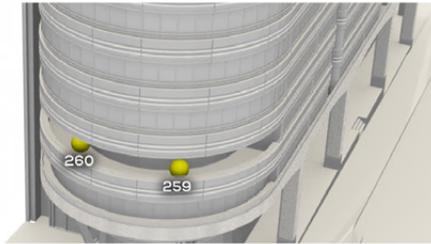


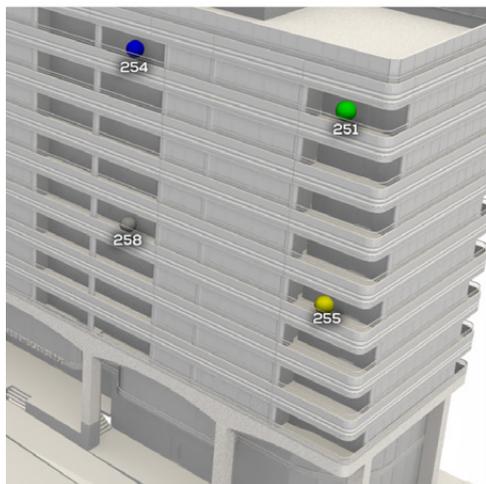
Fig. 30: Balcony Level Annual Safety, Proposed Development with Landscaping, Mitigation and Existing Surrounds

- Frequent Sitting
- Occasional Sitting
- Standing
- Walking
- Uncomfortable

VIEWED FROM NORTH-WEST



VIEWED FROM SOUTH



VIEWED FROM EAST

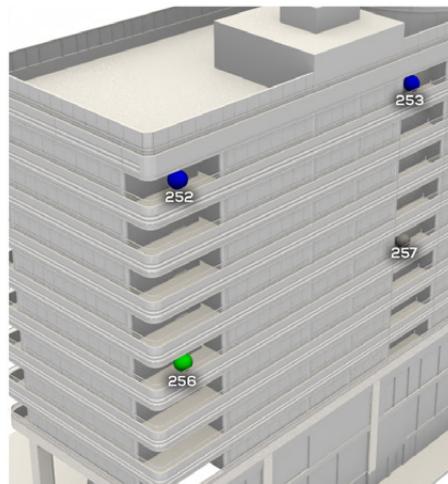


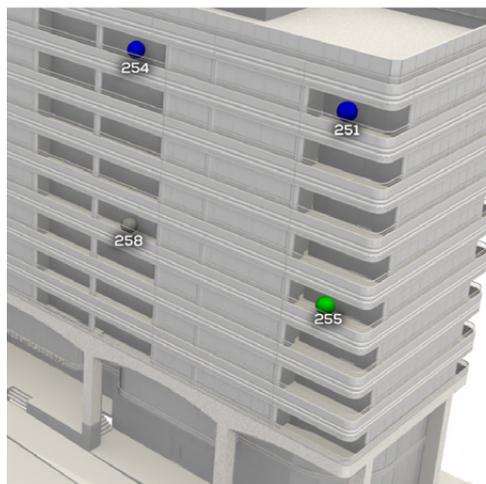
Fig. 31: Balcony Level Windiest Season Comfort, Proposed Development with Landscaping, Mitigation and Existing Surrounds

- Frequent Sitting
- Occasional Sitting
- Standing
- Walking
- Uncomfortable

VIEWED FROM NORTH-WEST



VIEWED FROM SOUTH



VIEWED FROM EAST



Fig. 32: Balcony Level Summer Comfort, Proposed Development with Landscaping, Mitigation and Existing Surrounds

4 CONCLUSIONS

Wind microclimate conditions for the Proposed Development known as One Battersea Bridge were assessed using wind tunnel testing.

There are no wind safety risks associated with the Proposed Development at ground level.

Even in the absence of landscaping and mitigation measures, conditions would be suitable for the intended use for all off-site entrances, existing amenity, bus stops, the Thames Path and "In Town" statue public realm areas, the proposed entrances to the restaurant and residential lobbies and the proposed seating outside of the residential lobby.

Wind mitigation measures were developed, consisting of:

- 3x free-standing 50% porous screens, 1500mm wide by 3000mm tall, at the northern end of the site;
- 2x free-standing 50% porous screens, 1500mm wide by 3000mm tall, at the southern end of the site;
- 1x 30% porous baffle (1200mm wide by 9000mm tall) at the south east corner of the development;
- 1x 50% porous screen within the planter between the community hub and residential entrances (1200mm wide by 3000mm tall); and
- A 50% porous screen was added around the western edge of the level 3 balcony at the north of the development

When these are included, along with existing and proposed landscaping, there are no wind safety risks around the site or surrounding area, and all wind conditions are suitable for the intended use (including thoroughfares, proposed amenity at ground floor, the community hub entrance, balconies and the level 10 terrace), in addition to those locations which were already suitable without mitigation.

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 Heathrow and City airports combined are shown in Figure 33.

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 and turbulence intensities measured from the wind tunnel are shown in Figure 34 and Figure 35.



Fig. 33: Seasonal Wind Roses for London Combined (1990-2020)

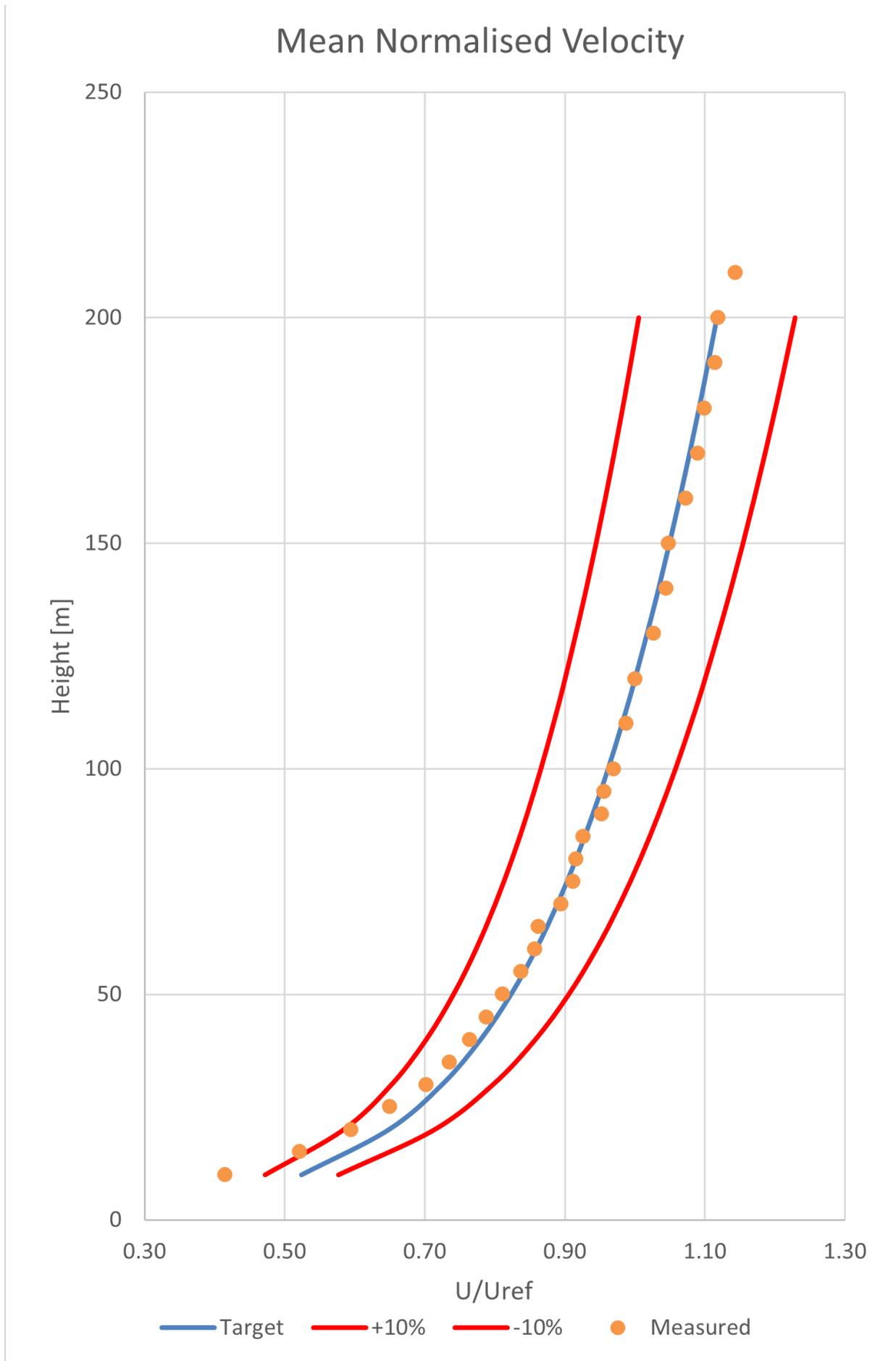


Fig. 34: Wind Velocity Profile for Battersea Bridge Road

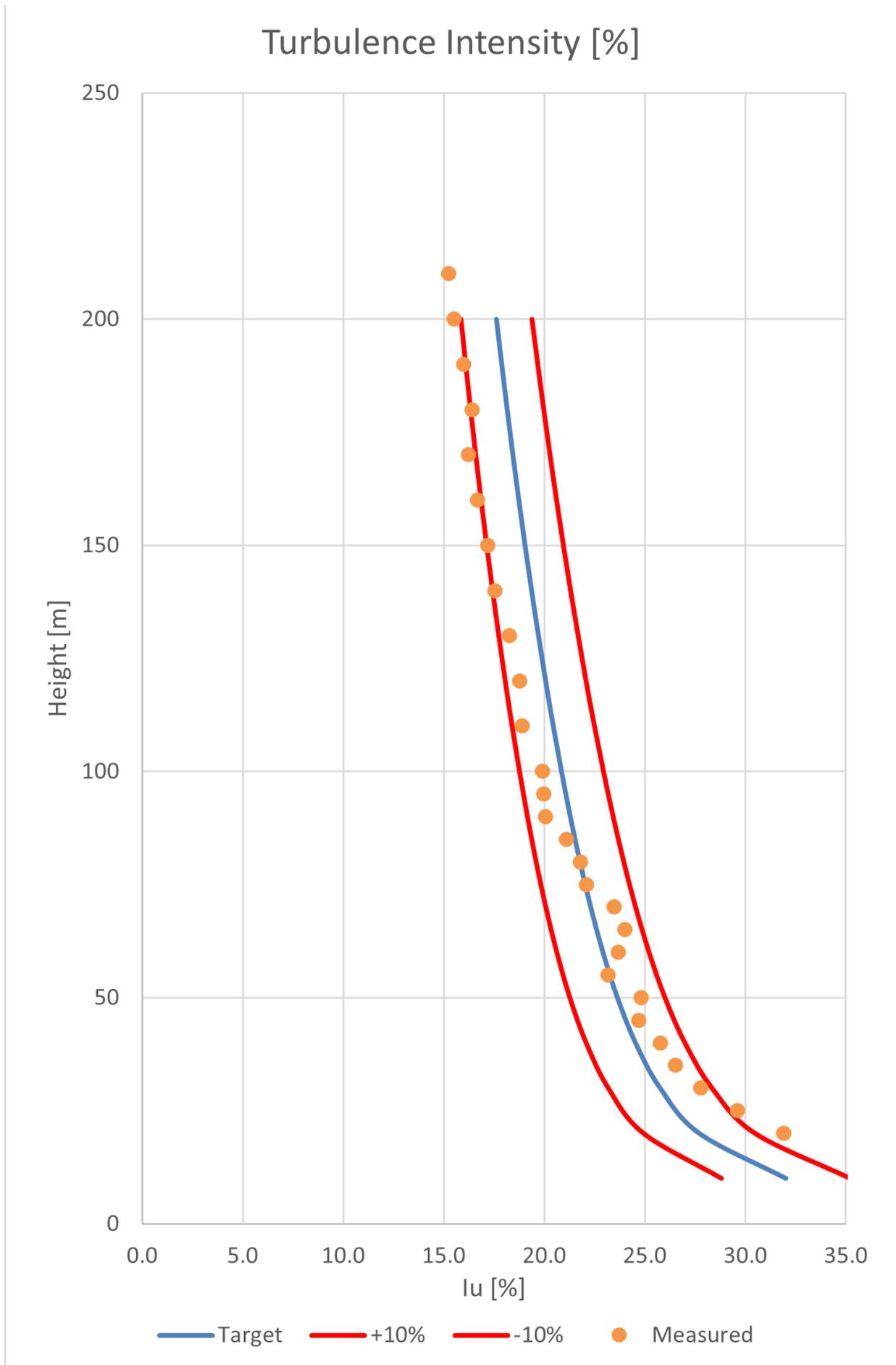


Fig. 35: Wind Turbulence Profile for Battersea Bridge Road



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