APPENDIX 17.1
PEDESTRIAN LEVEL WIND MICROCLIMATE ASSESSMENT

DRAFT REPORT

MORTLAKE STAG BREWERY

LONDON, UK

PEDESTRIAN LEVEL WIND MICROCLIMATE ASSESSMENT

RWDI #1603134 PLW REV-C

26TH JANUARY 2018

SUBMITTED TO

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VERSION HISTORY

RWDI Project #1603134	Mortlake Stag Brewery London, UK	
Report	**Releases**	**Dated**
Reports	Rev A	31st October 2017
	Rev B	13th November 2017
	Rev C	26th January 2018
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	Stefan Astley	Project Manager

1. EXECUTIVE SUMMARY

The objective of this study was to determine the ground, terrace and balcony level wind environment within and around the proposed Mortlake Stag Brewery development in London, UK.

This report presents a description of the methodology used and the results of two configurations tested in the wind tunnel, namely:

- Configuration 1: The Existing Site with existing surrounding buildings; and
- Configuration 2: The Development with existing surrounding buildings.

The meteorological data for the Site indicate strong prevailing winds from the southwest quadrant throughout the year with secondary winds from the northeast direction which are more frequent during the spring months.

Wind conditions at ground level in and around the Development within the context of existing surrounds are generally suitable for their intended usage. A single exception to this occurs, at the main southern entrance on the west facing façade of Plot 16, where wind conditions exceed the recommended criteria for the intended use. This area requires wind mitigation measures.

Wind conditions at elevated levels amenity spaces are suitable for a mixed sitting / standing use during summer. Areas where conditions are suitable for standing, should there be any sitting use intended, wind mitigation measures would be required.

There is no occurrence of strong winds exceeding the pedestrian safety criteria.

Wind mitigation measures have been recommended to alleviate the winds at aforementioned area where the pedestrian comfort criteria are exceeded.

2. INTRODUCTION

RWDI was retained by Waterman Infrastructure & Environment to conduct a pedestrian level wind microclimate assessment for the Stag Brewery component of the Development, in London, UK. This report presents the background, objectives, results and discussion from RWDI's assessment. A discussion of the overall results from the study is presented in the "Discussion" section of this report.

3. BACKGROUND AND APPROACH

Wind tunnel tests were conducted on a 1:300 scale model of the Mortlake Stage Brewery development (referred to as the "Development" hereafter in this report), in London. The investigation quantifies the wind conditions within and around the Site, by comparing the measured wind speed and frequency of occurrence with the Criteria. Meteorological data for London has been analysed and adjusted to the Site conditions by modelling the effect of terrain roughness on the wind speeds approaching the Site.

Measurements were taken at up to 367 locations for 36 wind directions, in 10° increments. The measurements covered ground level locations along the building facades and at corners, near main entrances, on pedestrian routes within and around the Site, balconies and roof top terraces. Analysis was conducted on a seasonal basis but the report focuses on the windiest season results (i.e. winter) and those for the summer season, when pedestrian activity generally requires calmer conditions.

Two configurations of the wind tunnel model were tested, as follows:

- Configuration 1: The Existing Site with existing surrounding buildings; and
- Configuration 2: The Development with existing surrounding buildings.

3.1 Site Description and Surroundings

The Site is located in Mortlake, in the London Borough of Richmond upon Thames. The OS Landranger grid reference is TQ205759. The Ste is bounded by the River Thames to the north, Bull Alley to the east, Mortlake High Street to the south-east, Lower Richmond Road to the south-west and Ship Lane to the west.

The surrounding buildings consist of typical sub-urban low-rise residential buildings. The wider surrounding comprises Richmond Park to the south and the City of London to the north-east. As such, the Site is relatively exposed to oncoming prevailing south westerly winds above ~12m in height, which can proceed unimpeded towards the Site.

3.2 The Development

The Development consists of mixed residential and commercial buildings, with a number of existing buildings being retained. The proposed buildings range from 2 to 9 storeys tall. This design is expected to generally introduce favourable wind conditions across the Site. Moreover, wind conditions along the towpath on the bank of the River Thames, to the north-east of the Site, are expected to remain suitable for their intended uses.

Figure 1: Site Location with the approximate Site highlighted in yellow.

4. METHODOLOGY AND ASSESSMENT CRITERIA

Wind tunnel testing is the most well-established and robust means of assessing the pedestrian wind microclimate with the Development in place. It enables the wind conditions at the Site to be quantified and classified in accordance with the Criteria. To produce the results within the tunnel, a 1:300 scale model of the existing buildings at the Site and the surrounding area within a 360 metre (m) radius of the centre of the Site was constructed.

The basic methodology for quantifying the pedestrian level wind environment is outlined below:

1. Measure the wind speeds at pedestrian level in the wind tunnel relative to a reference wind speed;
2. Adjust standard meteorological data to account for conditions at the Site;
3. Combine these to obtain the expected frequency and magnitude of wind speeds at pedestrian level; and
4. Compare the results with the Criteria to 'grade' conditions around the Site.

4.1 Simulation of Atmospheric Winds

The wind is turbulent, or gusty, and this turbulence varies depending upon the Site. It is necessary to reflect these differences in the wind tunnel test. In addition, the atmospheric boundary layer is a shear flow which means that the mean wind speed increases with height. Modelling these effects is achieved by a combination of spires and floor roughness elements to create a naturally-grown boundary layer that is representative of urban or open country conditions, as appropriate. The detailed contoured proximity model around the Site is used to fine-tune the flow and create conditions similar to those expected at full scale (as shown in Figure 2).

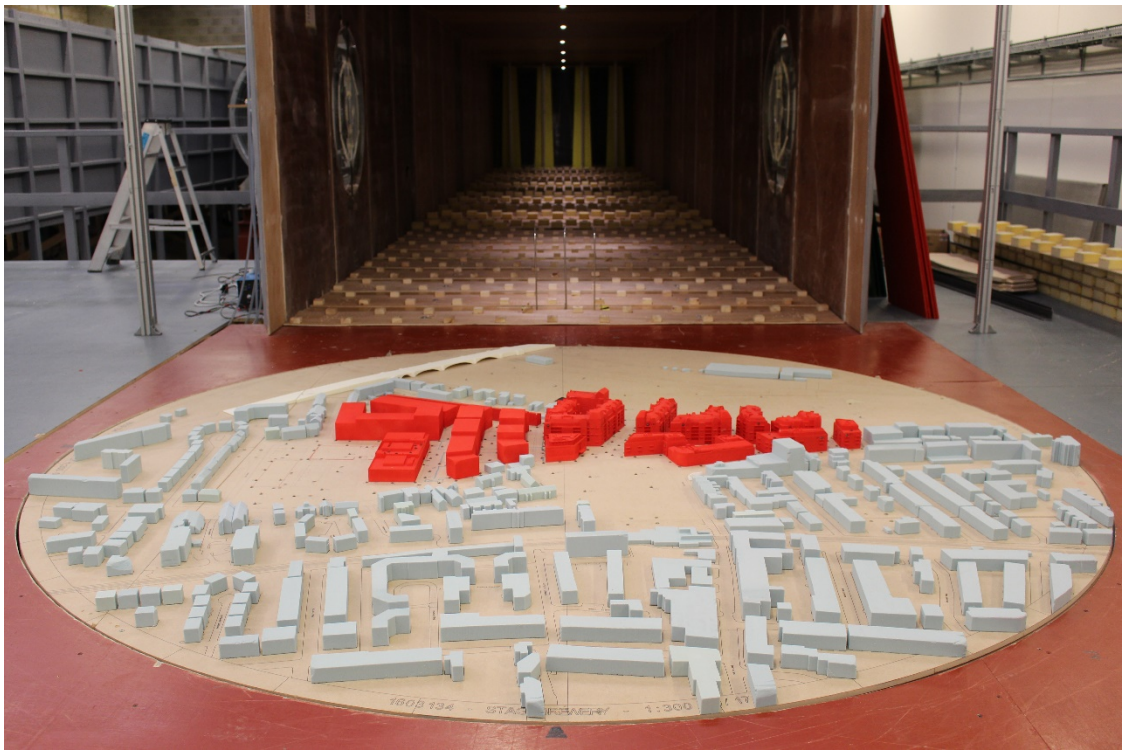


Figure 2: Image of the Development with exiting surrounding buildings. (View in the wind tunnel from south)

4.2 Measurement Technique

Wind speed measurements were made using Irwin probes. For pedestrian comfort studies, both the mean wind speed and the peak wind speed are measured at selected locations at the Site and surrounding area to represent sensitive receptors, such as entrances, amenity areas and thoroughfares, at a scaled height of 1.5m above ground level. The typical equivalent full-scale time period for measuring the mean wind speed is around 90 minutes, whereas the peak wind speed is taken as the wind speed exceeded for 1% of the time.

Wind speed at each location was measured for 36 wind directions in 10° increments, with 0° representing wind blowing from the north and 90° wind blowing from the east.

4.3 Scaling

The length scale of the model was 1:300 and the velocity scale was approximately 1:2 for strong winds. Consequently, the time scale for the tests was 1:150, or in other words 1 second in the wind tunnel is equivalent to 150 seconds at full scale.

4.4 Meteorological Data

Combined meteorological data derived from the meteorological stations at three major London airports (Heathrow, Gatwick and Stansted) has been corrected to standard conditions of 10m above open flat level country terrain. The meteorological station data is then adjusted to the Site conditions using the methodology implemented in the BREVe3 software package. Approximately 30 years of meteorological data for London was used in this assessment and is presented in Appendix B as wind roses by season (refer to Figure 15, Appendix B) with the wind speed divided into Beaufort Force ranges. The radial axis indicates the cumulative number of hours per season that the wind speed exceeds the particular Beaufort Force. The seasons are defined as spring (March, April and May), summer (June, July and August), autumn (September, October and November) and winter (December, January and February).

The meteorological data indicate that the prevailing wind direction throughout the year is from the south-west. This is typical for many areas of southern England. There is a secondary peak from north-easterly winds, especially during the spring, which tend to be cold winds. The combination of meteorological data, site altitude and velocity ratios permits the percentage of time that wind speeds are exceeded at ground level on the site to be evaluated. The locations can then be assessed using the Lawson Comfort Criteria, as described below.

4.5 Pedestrian Comfort

The assessment of the wind conditions requires a standard against which the measurements can be compared. This report uses the Lawson Comfort Criteria, which have been established for over thirty years. The Criteria, which seek to define the reaction of an average pedestrian to the wind, are described in Table 1. If the measured wind conditions exceed the threshold wind speed for more than 5% of the time, then they are unacceptable for the stated pedestrian activity and the expectation is that there may be complaints of nuisance or people will not use the area for its intended purpose.

The Criteria sets out four pedestrian activities and reflect the fact that less active pursuits require more benign wind conditions. The four categories are sitting, standing, strolling and walking, in ascending order of activity level, with a fifth category for conditions that are uncomfortable for all uses. In other words, the wind conditions in an area for sitting need to be calmer than a location that people merely walk past.

The distinction between strolling and walking is that in the strolling scenario pedestrians are more likely to take on a leisurely pace, with the intention of taking time to move through the area, whereas in the walking scenario pedestrians are intending to move through the area quickly and are therefore expected to be more tolerant of stronger winds.

The Criteria are derived for open air conditions and assume that pedestrians will be suitably dressed for the season. Thermal comfort is discussed with reference to acceptable wind environments but not evaluated as part of the assessment.

The coloured key in Table 1 corresponds to the presentation of wind tunnel test results described in the results section of this report.

Table 1: Lawson Comfort Criteria

Key	Comfort Category	Threshold	Description
	Sitting	0-4 m/s	Light breezes desired for outdoor restaurants and seating areas where one can read a paper or comfortably sit for long periods
	Standing	4-6 m/s	Gentle breezes acceptable for main building entrances, pick-up/drop-off points and bus stops
	Strolling	6-8 m/s	Moderate breezes that would be appropriate for strolling along a city/town street, plaza or park
	Walking	8-10 m/s	Relatively high speeds that can be tolerated if one's objective is to walk, run or cycle without lingering
	Uncomfortable	>10 m/s	Winds of this magnitude are considered a nuisance for most activities, and wind mitigation is typically recommended

4.6 Strong Winds

The assessments undertaken also provide a notification of stronger winds, which are defined as wind speeds in excess of 15m/s for more than two hours of the year which would require wind mitigation.

Strong winds are generally associated with areas which would be classified as acceptable for walking or as uncomfortable. In a mixed-use urban development scheme, walking and uncomfortable conditions would not usually form a part of the 'target' wind environment and would usually require mitigation to improve wind conditions.

5. RESULTS

5.1 Details of Analysis

To account for the difference in height and terrain roughness between meteorological conditions at the airports and the Site, it is necessary to apply adjustment factors to the wind tunnel velocity ratios. Adjustment factors (mean factors) were computed for wind directions from 0° through to 360°. The reference height in the wind tunnel was at the equivalent full-scale height of 120 metres. Table 2 presents the mean factors for the Site.

Table 2: BREVe3 mean factors at 120m above ground level

Wind Direction	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°
Mean Factor at 120 m	1.39	1.41	1.42	1.43	1.38	1.40	1.45	1.44	1.40	1.38	1.39	1.36

5.2 Desired Pedestrian Activity around the Development

Generally, for a mixed-use development, the target wind conditions are:

1. Strolling use during the windiest season on pedestrian thoroughfares;
2. Standing / entrance use wind conditions at main entrances, drop off areas or taxi ranks, and bus stops throughout the year; and
3. Sitting use wind conditions at outdoor seating and amenity areas during the summer season when these areas are more likely to be frequently used by pedestrians.

The business walking and carpark / roadway use classifications are usually avoided because of their association with occasional strong winds, unless they are on a minor pedestrian route or a route where pedestrian access could be controlled in the event of strong winds.

Achieving a sitting classification in the summer usually means that the same receptor would be acceptable for standing / entrance use in the windiest season because winds are stronger at this time. This is considered an acceptable occurrence for the majority of external amenity spaces because other factors such as air temperature and precipitation influence people's perceptions about the 'need' to use seating in the middle of winter.

For a large terrace space, a mix of sitting and standing / entrance use wind conditions is acceptable provided that any desired seating areas are situated in areas having sitting use wind conditions.

5.3 Performance against the Lawson Comfort Criteria

The wind microclimate within and around the Site has been assessed and classified using the Lawson Comfort Criteria defined in Table 1. The results of the assessment for each configuration are described below and presented graphically in Figures 3 to 10.

5.3.2 Configuration 1 – The Existing Site with existing surrounding buildings

The wind microclimate results for Configuration 1 are shown in the following figures:

- Figure 3: Windiest season (Ground Level)
- Figure 4: Summer season (Ground Level)

5.3.3 Configuration 2 – The Development with existing surrounding buildings

The wind microclimate results for Configuration 2 are shown in the following figures:

- Figure 5: Windiest season (Ground Level)
- Figure 6: Windiest season (Terraces and balconies)
- Figure 7: Windiest season (School rooftop)
- Figure 8: Summer season (Ground Level)
- Figure 9: Summer season (Terraces and balconies)
- Figure 10: Summer season (School rooftop)

5.4 Occurrence of Strong Winds

There is no occurrence of strong winds above 15m/s occurring for more than 2.2 hours per annum.

6. DISCUSSION

This discussion compares the measured wind conditions (shown in the dot plots) to the anticipated usage of the Site, to provide an assessment of whether the wind conditions are suitable or too 'windy' for the intended use.

Any receptors not specifically mentioned are considered suitable for or 'calmer' than required for the desired pedestrian usage. Locations that are 'windier' than desired would require mitigation to provide a wind environment that is acceptable for the intended use.

6.1 Configuration 1: The Existing Site with existing surrounding buildings

The discussion of the wind microclimate in Configuration 1 is based on the results shown in Figure 3 for the windiest season, and Figure 4 for the summer season at ground level.

6.1.1 Pedestrian Comfort

Wind conditions across the existing Site range from suitable for sitting to suitable for strolling during the windiest season. Conditions are generally one category calmer during summer, and are suitable for mixed sitting / standing use. These conditions are acceptable for their current usage.

6.1.2 Strong Winds

There were no strong wind exceeding the 15m/s threshold for more than 2.2 hours per year recorded in this configuration.

6.2 Configuration 2: Development with existing surrounding buildings

Discussion of the wind microclimate in Configuration 2 is based on the results shown Figure 5, 7 and 8 for the windiest season, and Figure 7, 8 and 9 for the summer season at ground level, elevated levels and across the school rooftop respectively.

6.2.1 Pedestrian Comfort

As the buildings to the southwest of the Development are predominantly low-rise residential, prevailing south westerly winds can proceed relatively unimpeded towards the Site. As such, areas directly exposed to south-westerly winds and within narrow gaps between buildings are expected to be "windier" than the rest of the Site. However, as a result of carefully designed elements of the Development, wind conditions in and around the Development are generally expected to be suitable for their intended usage.

Thoroughfares (Figure 5)

Wind conditions during the windiest season in and around the Development within the context of existing surrounding buildings range from suitable for sitting to strolling use. These wind conditions are acceptable for the intended thoroughfare use (classified as acceptable for strolling use or 'calmer', during the windiest season). As such, these areas do not require wind mitigation measures.

Entrances (Figure 5)

Entrances to the Development are represented by receptor locations (it should be noted that entrance locations are only defined for the detailed component of the Development):

- Building 1: 118
- Building 2: 129, 150, 151, 153, 155, 321
- Building 3: 132, 133, 134, 148
- Building 4: 144,146
- Building 5: 185
- Building 6: 194
- Building 7: 175, 177, 178, 179
- Building 8: 204, 205, 211
- Building 9: 243
- Building 10: 232
- Building 11: 217, 220
- Building 12: 238, 299
- School: 73 and 92

Wind conditions at these locations are considered suitable for the intended use (classified as acceptable for standing / entrance use or calmer, during the windiest season). In relation to the outline component of the Development (Buildings 13 to 22 inclusive), the location of building entrances is not currently known. This is because the outline element of the hybrid planning application does not seek approval for building appearance, articulation and so forth. This detail would be sought via future reserved matters applications. However, it is reasonable to assume that building entrances would be located at various ground floor locations around the buildings. Figure 5 shows that immediately surrounding Building 13 to 22 inclusive, the wind conditions would be suitable for standing use or calmer during the windiest season. However, should a building entrance be located on the west façade at Building 16 (Location 40) the wind conditions during the windiest season would be suitable for strolling use. This would be one category windier that the required standing / entrance use wind environment. This location would require wind mitigation measures to ensure its comfortable use.

Amenity Spaces – Ground Level (Figure 8)

During summer, wind conditions across the Site, within the context of existing surrounding buildings, are suitable for a mixture of sitting and standing / entrance use. Furthermore, wind conditions across Mortlake Green to the south of the Stag Brewery component of the Site and the tow path to the north of the Stag Brewery component of the Site are suitable for sitting during summer. These conditions are acceptable, in terms of pedestrian comfort, for their intended use should seating be restricted to the calmer areas; and therefore, wind mitigation measures are not required. With the Development in place, these locations (as well as within the River Thames) were generally found to be the same as existing conditions during the summer. However, provided seating areas cannot be located at areas where wind conditions are suitable for standing use.

Amenity Spaces – Elevated Levels (Figures 9 and 10)

Wind conditions at balconies and elevated terraces across the Site are suitable, in terms of pedestrian comfort, for a mix of standing / sitting uses. These conditions are generally suitable for their intended use. Furthermore, wind conditions at across the school rooftop are suitable for sitting use throughout summer. Balconies where standing conditions occur (probes 259, 264, 265 and 268) would require wind mitigation measures such that they become suitable for sitting use. These wind mitigation measures would include raised parapets and / or soft landscaping.

6.2.2 Strong Winds

No strong winds in exceedance of the pedestrian safety criteria were recorded in this configuration.

7. WIND MITIGATION RECOMMENDATIONS

The inclusion of planting and other landscape enhancements would generally be expected to increase shelter within the Development compared to the wind conditions described above, particularly when the trees and plants are established and in full leaf. Wind mitigation measures that would improve the wind conditions are described in this section and represent the type of mitigation that is likely to be beneficial (based on our experience). However, the details of these measures are recommended to be developed through further wind tunnel testing during mitigation workshops.

The areas in and around the Development with 'windier' than desired wind conditions are as follows:

- The west facing façade of Building 16 (Location 40) should a building entrance be located there;
- Balconies associated with Buildings 6, 9 and 12 (Locations 259, 264, 265 and 268).

Wind mitigation measures that are expected to provide shelter in these areas consists of a combination of soft and hard landscaping, as illustrated in Image 1, being:

- a building entrance is not located at Location 40;
- a building entrance at Location 40 is recessed by 1.5m; and
- 3m to 5m tall trees or screens of at least 2m high are planted / erected on both sides of any entrance at Location 40.

Furthermore, localised elements such as trees 1.5m to 2m high or shrubs in planters are recommended, staggered at ground level to break down wind flows and provide shelter to seating areas, as shown in Image 2.

Image 1 - Mitigation measures for the entrance

Image 2 – Mitigation measures for the balconies

8. CONCLUSIONS

In conclusion:

1. The meteorological data for the Site indicate prevailing winds from the southwest quadrant throughout the year with secondary winds from the northeast direction which are more prevalent during the spring months.

2. Wind conditions in and around the Development within the context of existing surrounding buildings are suitable for the intended usage. However, should a building entrance be located on the west façade at Building 16 (Location 40) wind conditions during the windiest season would exceed the recommended criteria for the intended use. This area would require wind mitigation measures.

3. Wind conditions at elevated levels amenity spaces are suitable for a mixed sitting / standing use during summer. Areas where conditions are suitable for standing, should there be any sitting use intended, wind mitigation measures would be required.

4. There is no occurrence of strong winds exceeding the pedestrian safety criteria within the context of the existing surrounding buildings.

5. Wind mitigation measures have been recommended to provide shelter to the aforementioned areas where the pedestrian comfort criteria are exceeded.

6. **Overall, the vast majority of the site is suitable for its intended use but areas where wind conditions are 'windier' than desired, from a comfort point of view, require wind mitigation. Wind mitigation measures have been recommended and we would welcome the opportunity to discuss these further. It is recommended that mitigation measures are developed through further testing.**

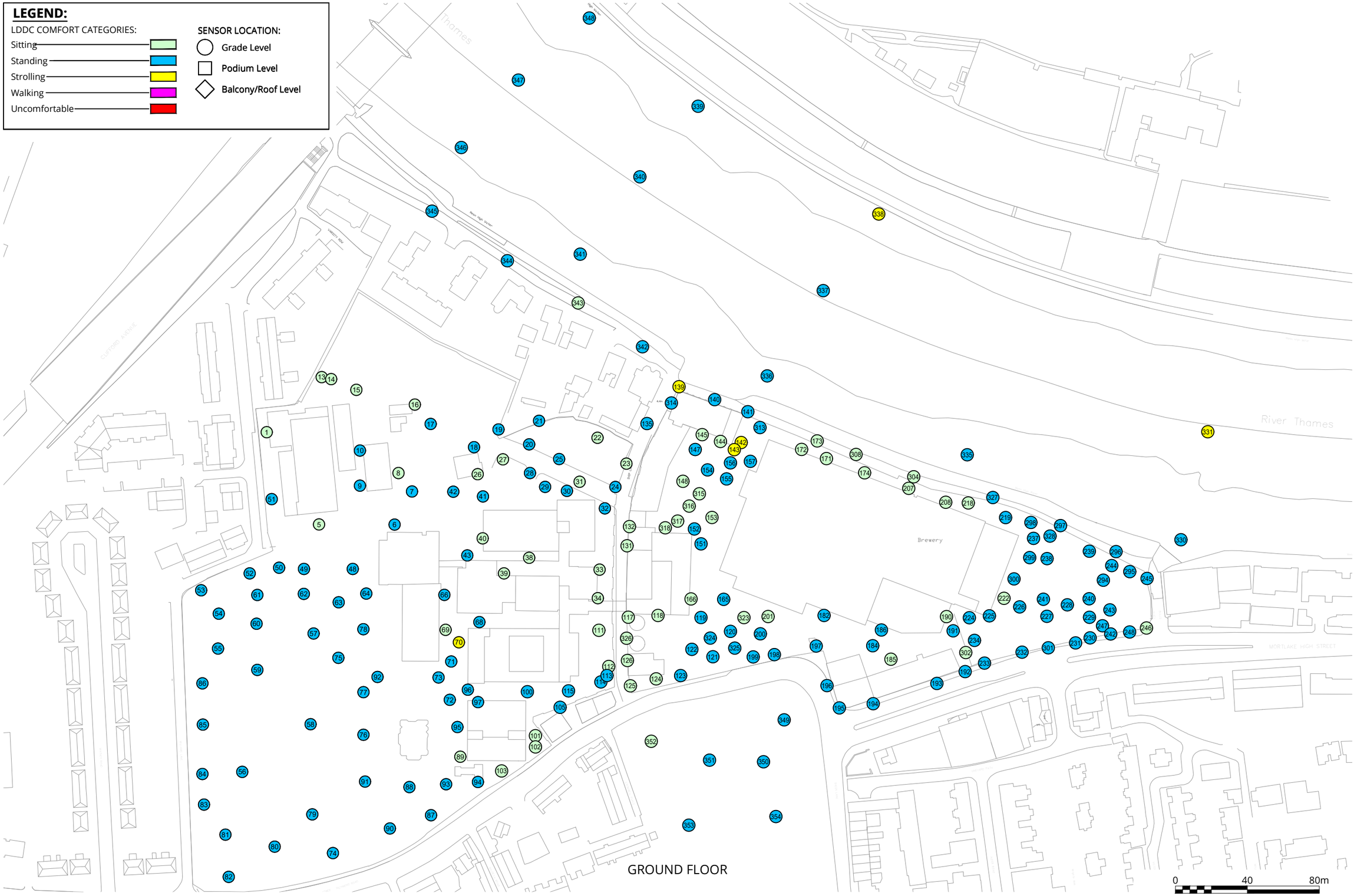
LEGEND:

LDDC COMFORT CATEGORIES:

- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:

- Grade Level
- Podium Level
- Balcony/Roof Level



Pedestrian Wind Comfort Conditions - Ground Floor

Configuration 1: Existing site with existing surrounding buildings

Windiest Season

Mortlake Stag Brewery - London, UK

True North

Project #1603134

Drawn by: MRW	Figure: 3
Approx. Scale @A3:	1:2000
Date Revised:	Sep. 7, 2017

LEGEND:

LDDC COMFORT CATEGORIES:

- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:

- Grade Level
- Podium Level
- Balcony/Roof Level

River Thames

GROUND FLOOR

0 40 80m

Pedestrian Wind Comfort Conditions - Ground Floor

Configuration 1: Existing site with existing surrounding buildings

Summer Season

Mortlake Stag Brewery - London, UK

True North

Project #1603134

Drawn by: MRW	Figure: 4
Approx. Scale @A3:	1:2000
Date Revised:	Sep. 7, 2017

LEGEND:

LDDC COMFORT CATEGORIES:

- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:

- Grade Level
- Podium Level
- Balcony/Roof Level

GROUND FLOOR

0 40 80m

Pedestrian Wind Comfort Conditions - Ground Floor

Configuration 2: Proposed development with existing surrounding buildings

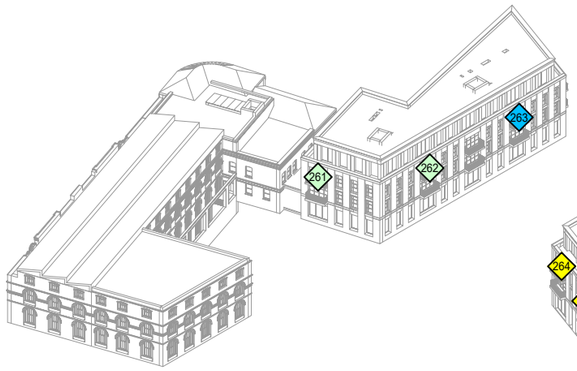
Windiest Season

Mortlake Stag Brewery - London, UK

True North

Project #1603134

Drawn by: MRW	Figure: 5
Approx. Scale @A3:	1:2000
Date Revised:	Sep. 7, 2017



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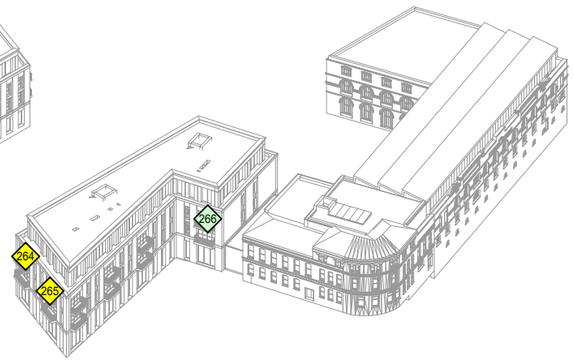

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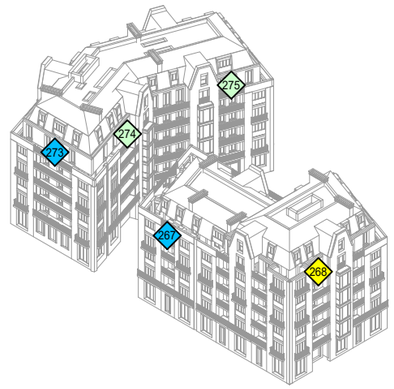

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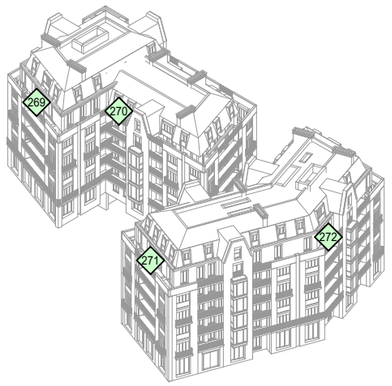
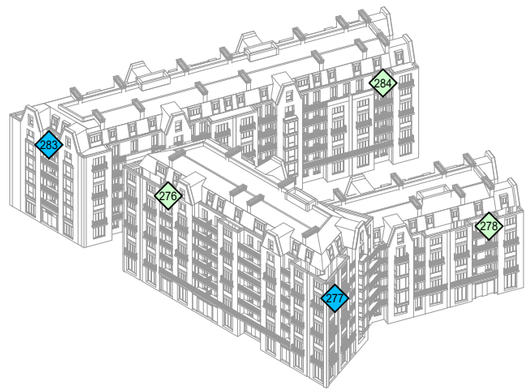


BLOCK 11/12 NORTH WEST

BLOCK 02/03 SOUTH EAST

BLOCK 02/03 NORTH WEST



BLOCK 07/08 SOUTH EAST

BLOCK 07/08 NORTH WEST

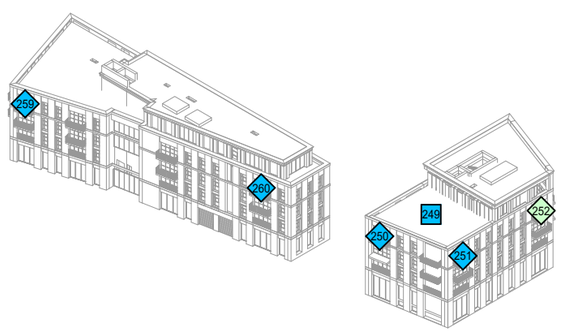
LEGEND:

LDDC COMFORT CATEGORIES:

- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

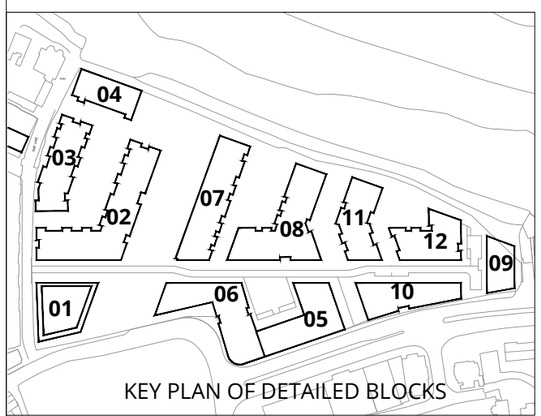
SENSOR LOCATION:

- Grade Level
- Podium Level
- Balcony/Roof Level



BLOCK 09/10 SOUTH EAST

BLOCK 09/10 NORTH WEST



KEY PLAN OF DETAILED BLOCKS

0 40 80m

Pedestrian Wind Comfort Conditions - Balconies and Roof View

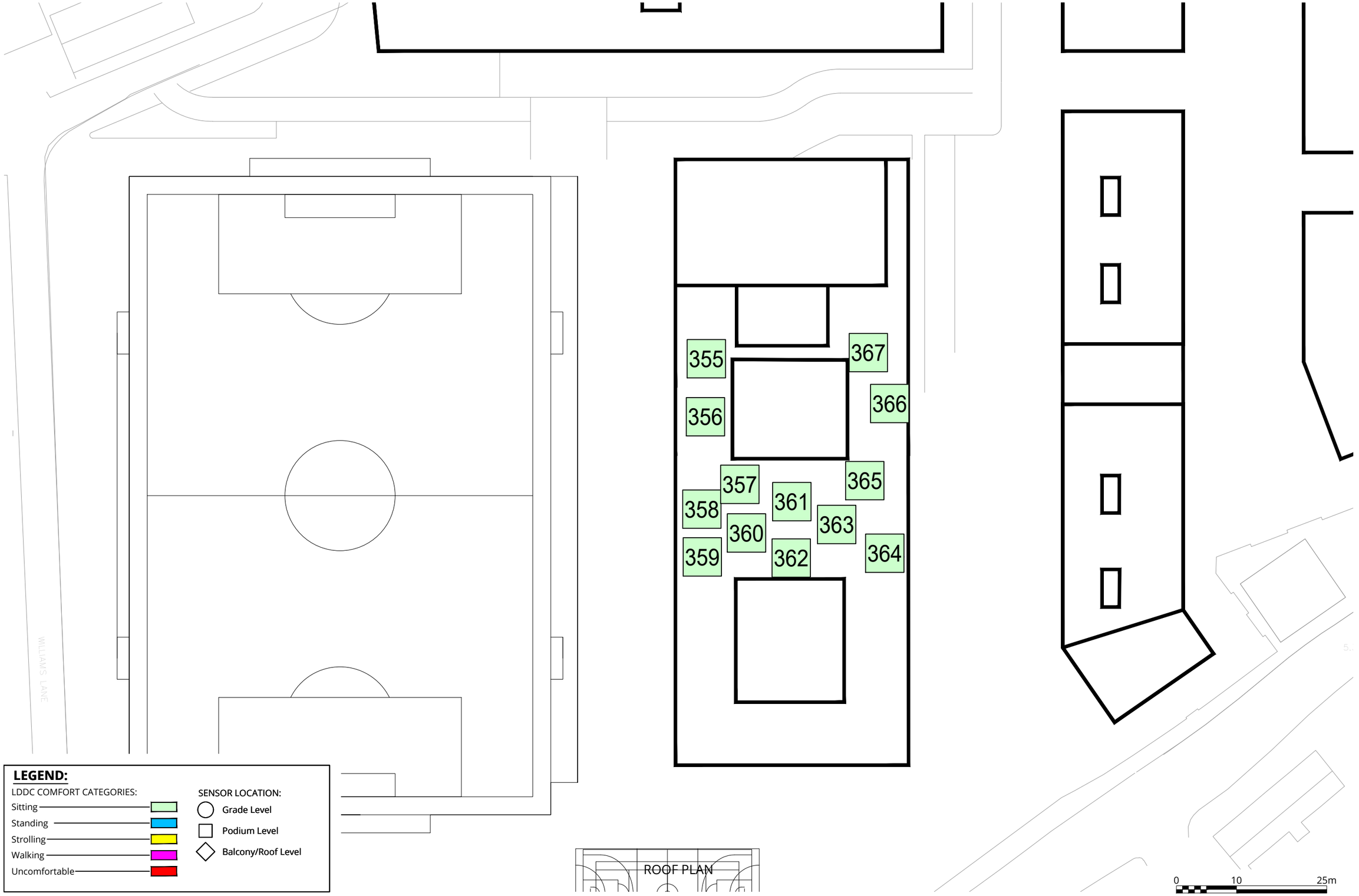
Configuration 2: Proposed development with existing surrounding buildings

Windiest Season

Mortlake Stag Brewery - London, UK

Project #1603134

Drawn by: MRW	Figure: 6
Approx. Scale @A3:	1:2000
Date Revised:	Sep. 7, 2017



Pedestrian Wind Comfort Conditions - Roof Plan
Configuration 2: Proposed development with existing surrounding buildings
Windiest Season

Mortlake Stag Brewery - London, UK

True North

Project #1603134

Drawn by: MRW	Figure: 7
Approx. Scale @A3:	1:600
Date Revised:	Sep. 7, 2017

LEGEND:

LDDC COMFORT CATEGORIES:

- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:

- Grade Level
- Podium Level
- Balcony/Roof Level

GROUND FLOOR

0 40 80m

Pedestrian Wind Comfort Conditions - Ground Floor

Configuration 2: Proposed development with existing surrounding buildings

Summer Season

Mortlake Stag Brewery - London, UK

True North

Project #1603134

Drawn by: MRW	Figure: 8
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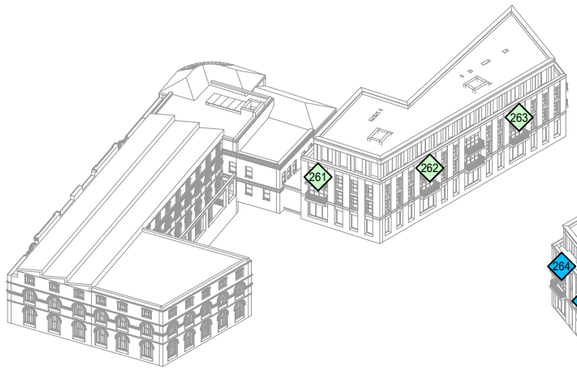

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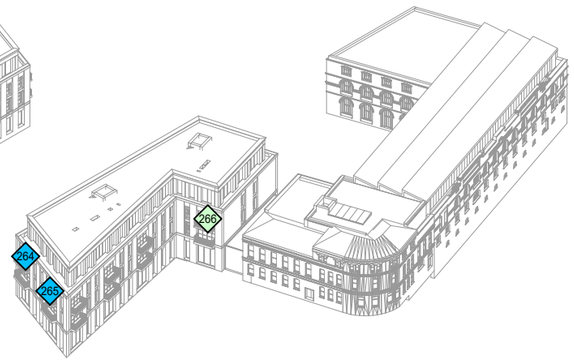
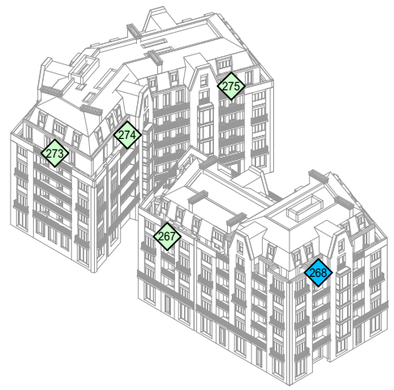
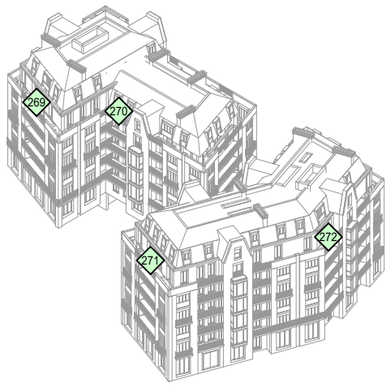


BLOCK 05/06 SOUTH WEST



BLOCK 11/12 SOUTH EAST



BLOCK 11/12 NORTH WEST

BLOCK 02/03 SOUTH EAST

BLOCK 02/03 NORTH WEST

BLOCK 07/08 SOUTH EAST

BLOCK 07/08 NORTH WEST

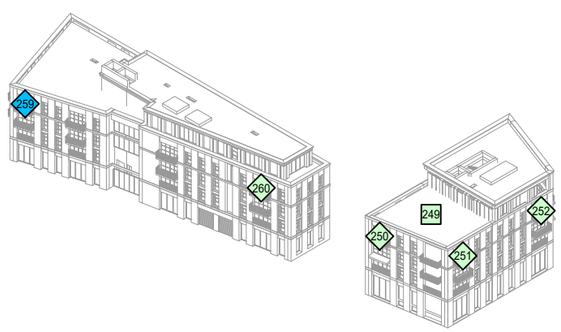
LEGEND:

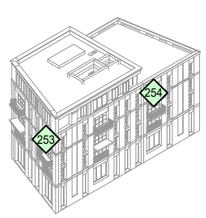
LDDC COMFORT CATEGORIES:

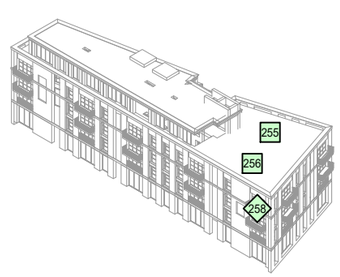
- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:

- Grade Level
- Podium Level
- Balcony/Roof Level

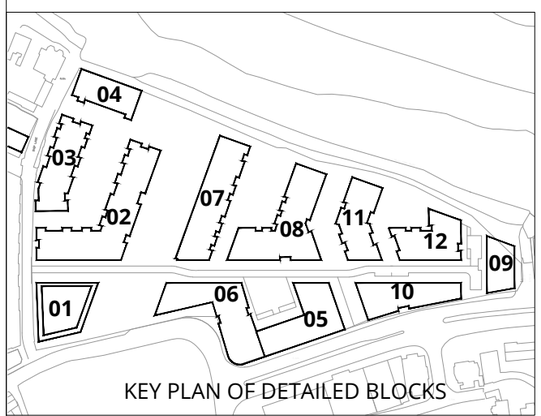






BLOCK 09/10 SOUTH EAST

BLOCK 09/10 NORTH WEST



KEY PLAN OF DETAILED BLOCKS

0 40 80m

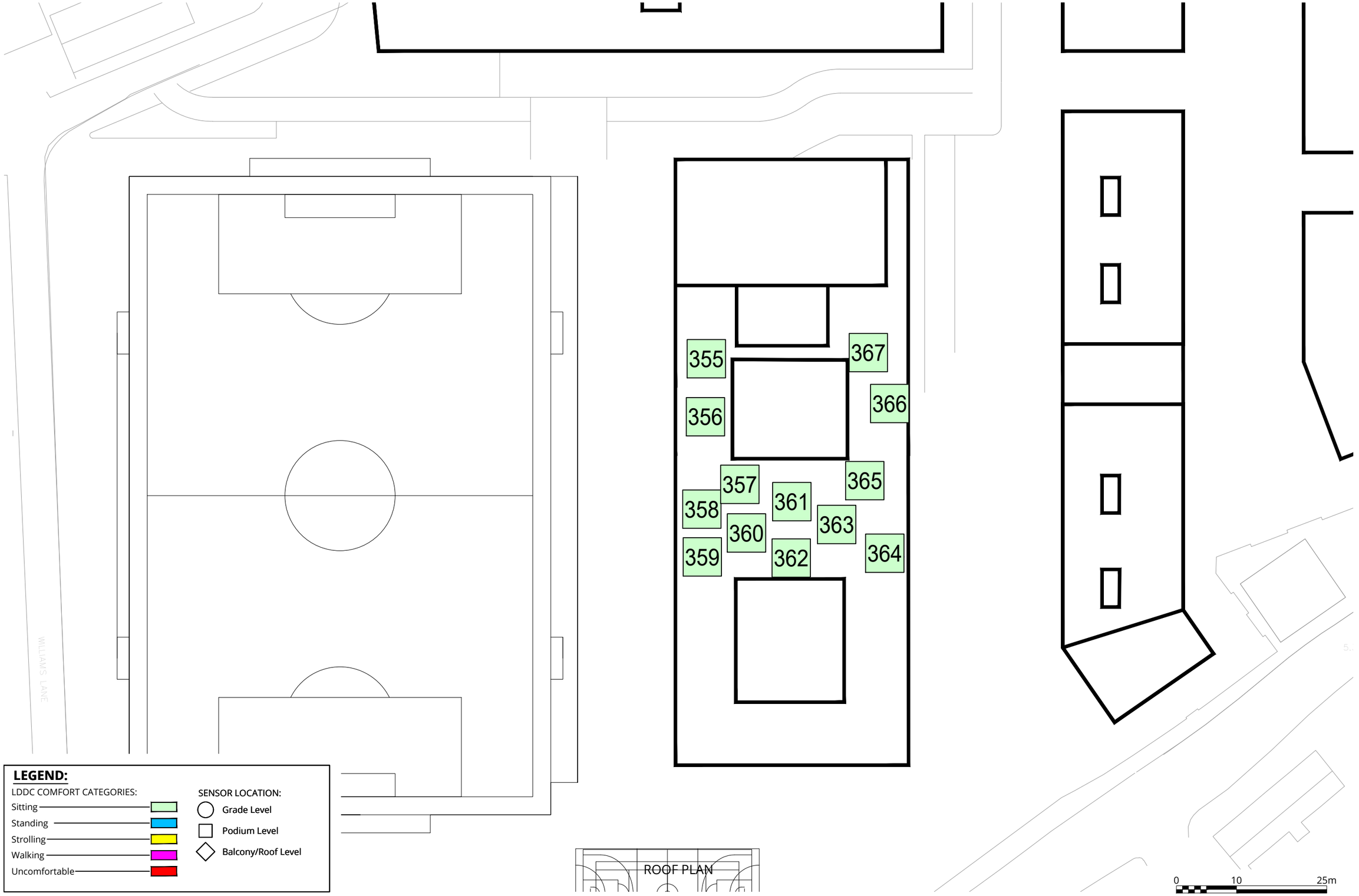
Pedestrian Wind Comfort Conditions - Balconies and Roof View

Configuration 2: Proposed development with existing surrounding buildings
Summer Season

Mortlake Stag Brewery - London, UK

Project #1603134

Drawn by: MRW	Figure: 9
Approx. Scale @A3:	1:2000
Date Revised:	Sep. 7, 2017



Pedestrian Wind Comfort Conditions - Roof Plan
Configuration 2: Proposed development with existing surrounding buildings
Summer Season

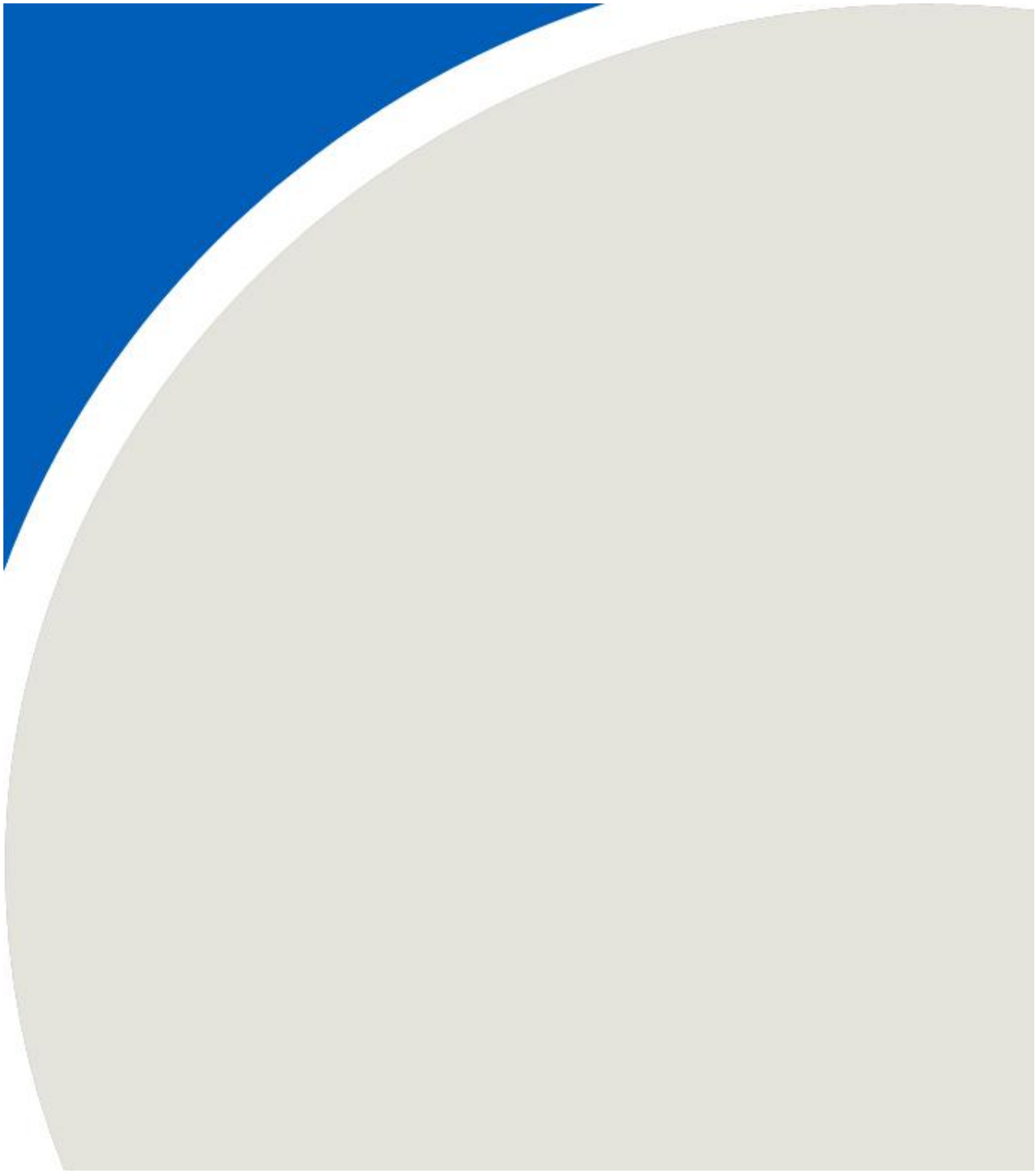
Mortlake Stag Brewery - London, UK

True North

Project #1603134

Drawn by: MRW	Figure: 10
Approx. Scale @A3:	1:600
Date Revised:	Sep. 7, 2017

APPENDICES



APPENDIX A: WIND TUNNEL PHOTOS

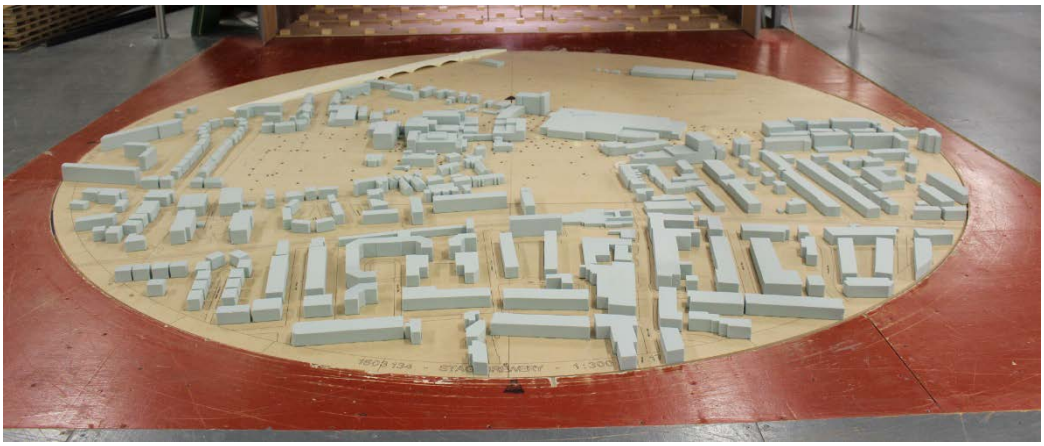


Figure 11: The Existing Site with existing surrounding buildings (Configuration 1) – View in the Wind Tunnel (from the south)

Figure 12: The Existing Site with existing surrounding buildings (Configuration 1) – View in the Wind Tunnel (from the south)

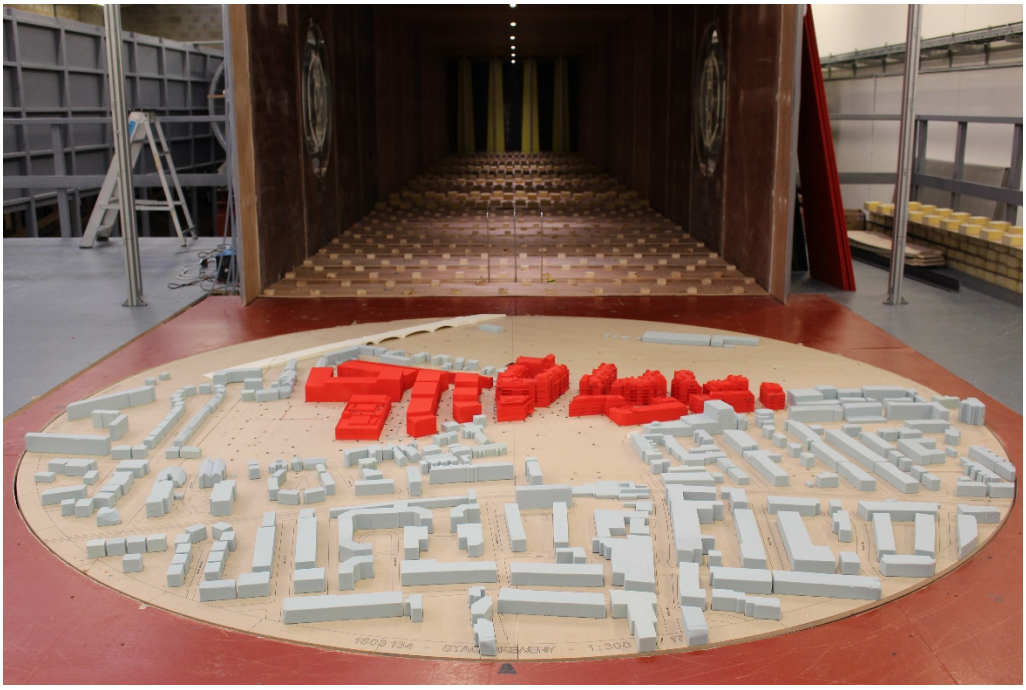


Figure 13: The Development with existing surrounding buildings (Configuration 2) – View in the Wind Tunnel (from the south)

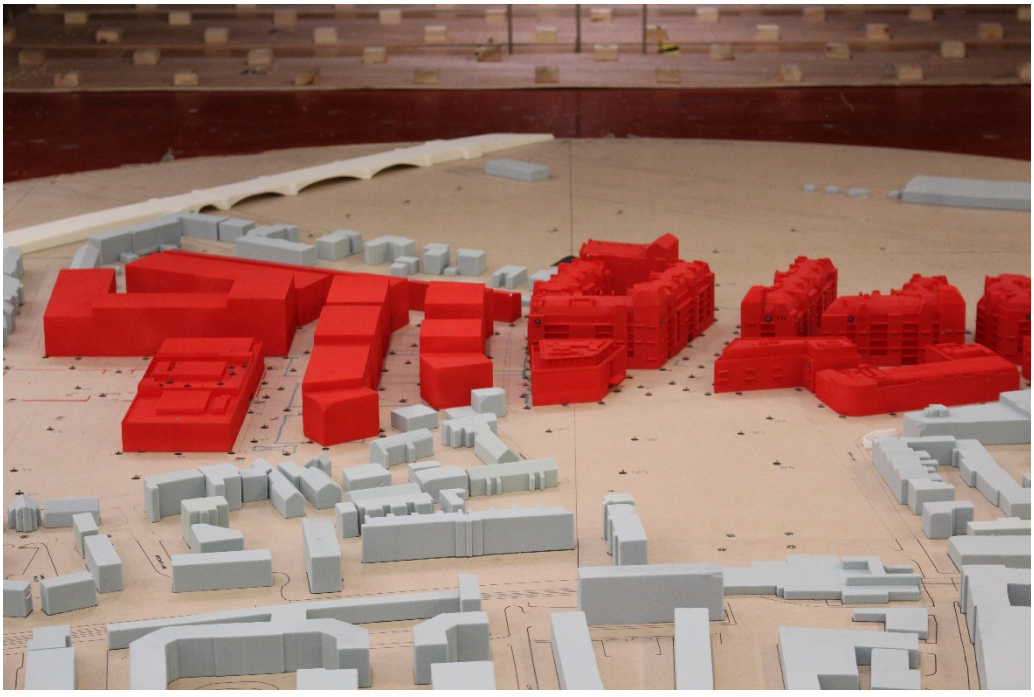


Figure 14: The Development with existing surrounding buildings (Configuration 2) – View in the Wind Tunnel (from the south)

APPENDIX B: METEOROLOGICAL DATA

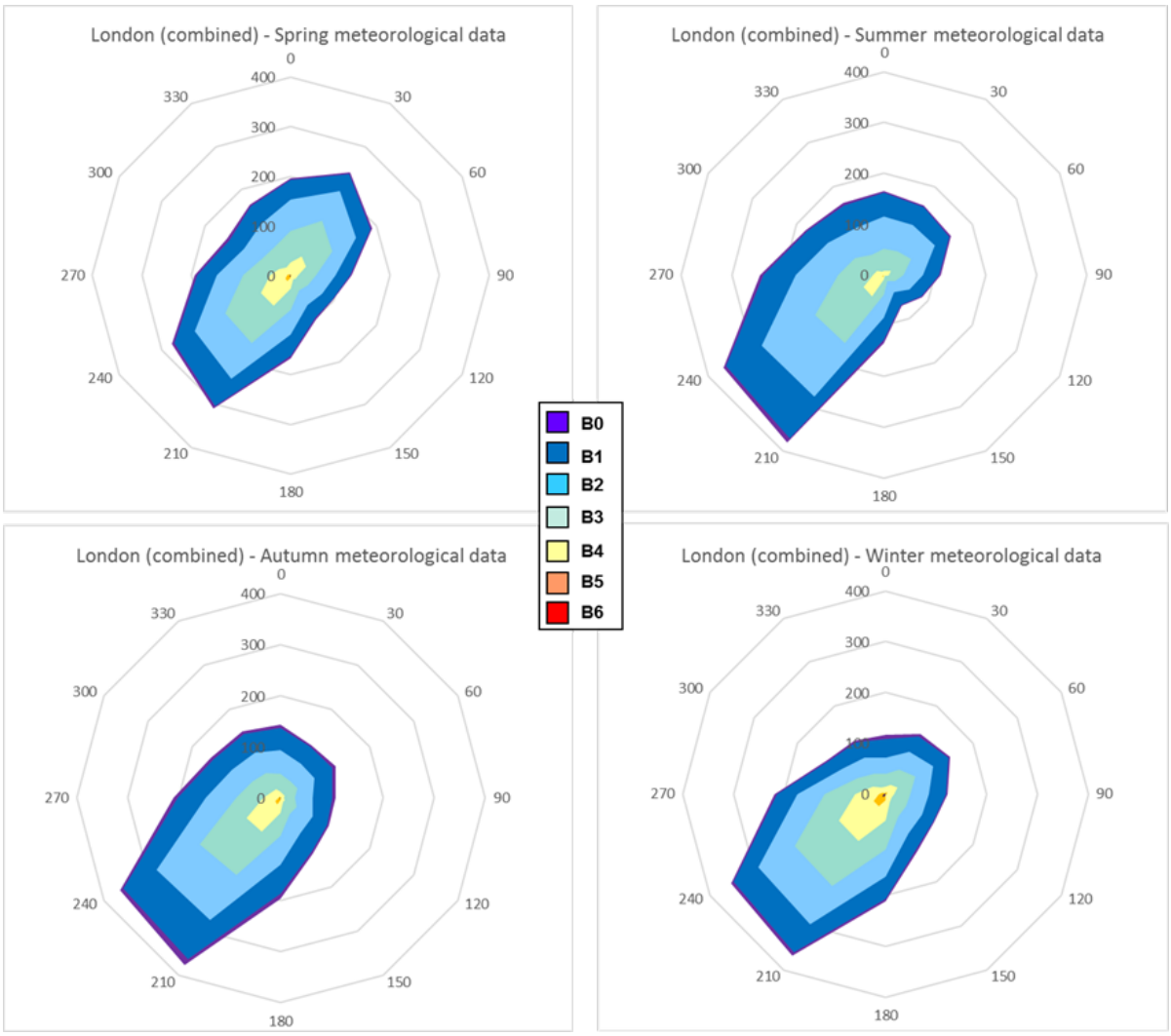


Figure 15: Seasonal wind roses for London Combined (in Beaufort Force)

(Radial axis indicates the hours for which the stated Beaufort Range is exceeded)