



Avonmouth House, London

Wind Microclimate

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Prepared For:

Tribe Avonmouth House Ltd.
35 Berkeley Square
Mayfair
London, W1J 5BF

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Executive Summary

An experience-based desk study has been carried out to assess the likely impact of the proposed Avonmouth House development on pedestrian level wind conditions in and around the site. The assessment considers the proposed development massing and exposure in conjunction with long-term wind climate statistics applicable to the site and provides an expert, qualitative, review of the likely suitability of wind conditions based on the industry standard Lawson criteria for pedestrian comfort and safety.

The proposed development comprises a significant structure with regards to potential wind effects but is substantially sheltered from prevailing south-westerly and westerly winds by the larger neighbouring development, at 87 Newington Causeway. The stepped massing of the proposed development, with the lower height in the southwest, is also expected to further limit the potential for downdraughts from the southwest elevation to reach pedestrian level. The communal roof-top terrace also benefits from a tall parapet and purposely developed landscaping features to shelter seating areas.

As a result, the proposed development is not expected to have any significant impact on pedestrian level wind conditions with regards to pedestrian safety, and conditions in and around the site are expected to rate as safe for all users.

In terms of pedestrian comfort, with respect to wind force, thoroughfares within and alongside the site are expected to be suitable for pedestrian access to, and passage past, the proposed development.

Main entrances to the proposed development are set back within recesses and are expected to enjoy suitable conditions for pedestrian ingress / egress.

Recreational spaces are expected to enjoy suitable conditions for planned activities, including outdoor seating in more sheltered parts of the pocket park (if delivered, with the associated indicative landscaping) and roof terrace.

The proposed development is not expected to have any significant impacts on the pedestrian level wind conditions within the surrounding area, which are expected to remain suitable for existing uses, including children's play at the play space in Newington Gardens.

No significant cumulative effects with consented future surrounding developments are expected.

1. Introduction

Urban Microclimate Ltd. has been commissioned by Tribe Avonmouth House Ltd. to assess the likely impact of the proposed redevelopment of Avonmouth House, on Avonmouth Street in London Borough of Southwark, on the pedestrian level wind environment in and around the site.

The assessment comprises an experience-based desk study and is based on details of the proposed development issued by the design team in September 2021.

The proposed development comprises demolition of existing building and structures and erection of a part 2, part 7, part 14, part 16 storey plus basement mixed-use development comprising 1733sqm (GIA) of space for Class E employment use and/or community health hub and/or Class F1(a) education use and 233 purpose-built student residential rooms with associated amenity space and public realm works, car and cycle parking, and ancillary infrastructure

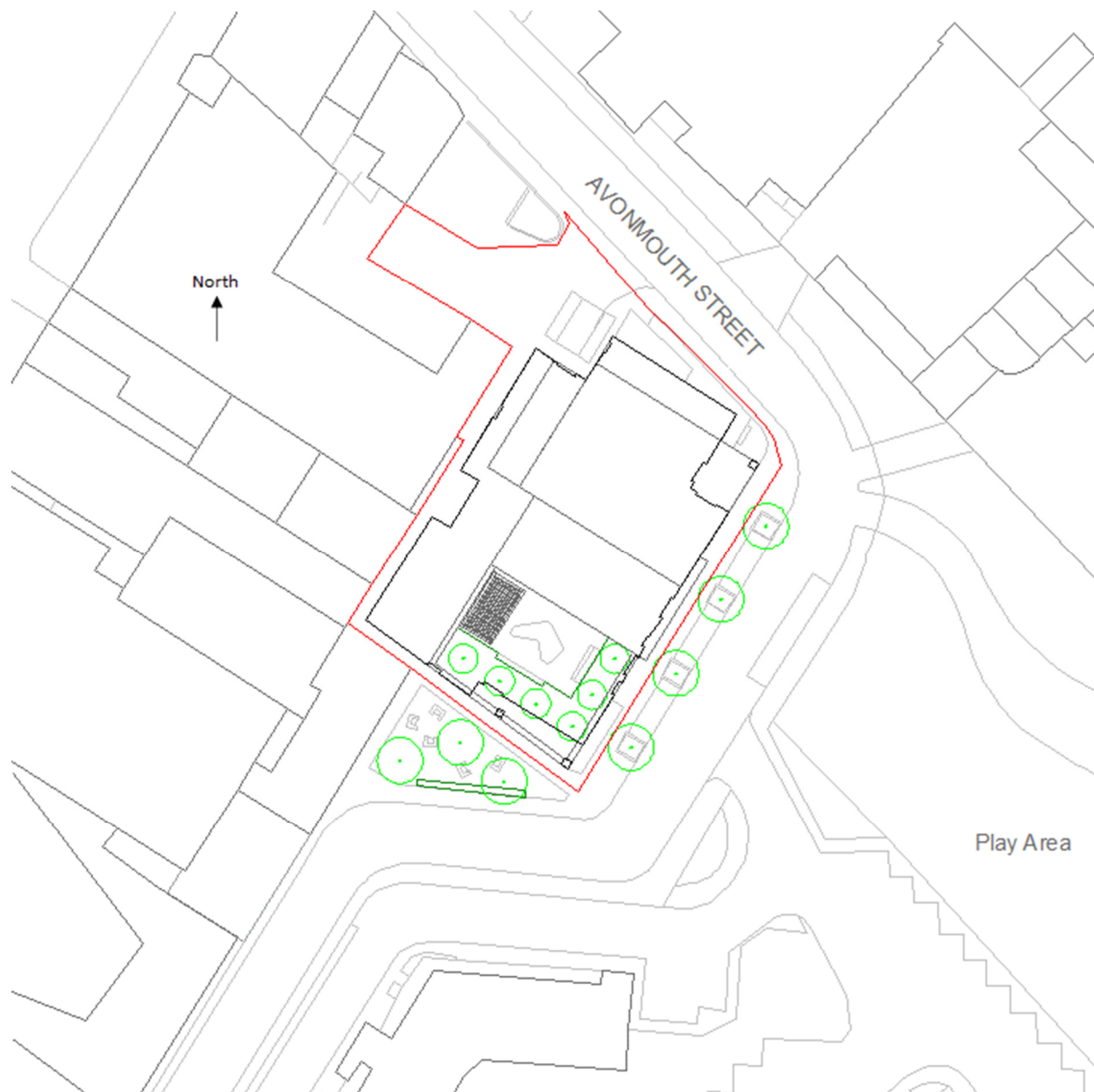
The scheme considered is illustrated in Figures 1.1, below.

Figure 1.1a: Proposed Massing (viewed from the south)



Figure 1.1b: Proposed Massing (viewed from the north)



Figure 1.1c: Proposed Siteplan and Landscaping

With reference to Figure 1.1c, above, the public realm landscaping illustrated lies beyond the site boundary and is indicative only.

2. Methodology and Criteria

2.1. Policy and Guidelines

National Planning Policy and Guidelines

There are no national planning policies directly relating to wind microclimate issues. However, the National Planning Policy Framework (updated in July 2021) emphasises the benefits of a high-quality built environment. An example of this is presented in Section 12, which states that developments should:

“establish or maintain a strong sense of place, using the arrangement of streets, spaces, building types and materials to create attractive, welcoming and distinctive places to live, work and visit”

The National Design Guide (October 2019) forms part of the associated planning practice guidance. Within this guide, the section Built Form B2 ‘Appropriate building types and forms’ states that:

“Proposals for tall buildings (and other buildings with a significantly larger scale or bulk than their surroundings) require special consideration. This includes their location and siting; relationship to context; impact on local character, views and sight lines; composition - how they meet the ground and the sky; and environmental impacts, such as sunlight, daylight, overshadowing and wind. These need to be resolved satisfactorily in relation to the context and local character.”

The section Context C1 ‘Understand and relate well to the site, its local and wider context’ goes on to state:

“Well-designed new development responds positively to the features of the site itself and the surrounding context beyond the site boundary. It enhances positive qualities and improves negative ones. Some features are physical, including:

- *environment – including landscape and visual impact, microclimate...”.*

Regional Planning Policy

The London Plan ‘The Spatial Development Strategy for Greater London’ (March 2021), includes several references to wind microclimate. These include Policy D3 Optimising Site Capacity Through the Design-led Approach, which states that:

“Buildings should be of high quality and enhance, activate and appropriately frame the public realm. Their massing, scale and layout should help make public spaces coherent and should complement the existing streetscape and surrounding area. Particular attention should be paid to the design of the parts of a building or public realm that people most frequently see or interact with in terms of its legibility, use, detailing, materials and location of

entrances. Creating a comfortable pedestrian environment with regard to levels of sunlight, shade, wind, and shelter from precipitation is important.”

Policy D8 Public Realm goes on to state that development plans and development proposals should:

“ensure buildings are of a design that activates and defines the public realm, and provides natural surveillance. Consideration should also be given to the local microclimate created by buildings, and the impact of service entrances and facades on the public realm”

and

“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”

Finally, Policy D9 Tall Buildings states that development proposals should address the following impacts (under environmental impact):

“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”

Local Planning Policy

London Borough of Southwark’s current local plan comprises the Saved Southwark Plan (2007) and the Core Strategy (2011). The former does not include any specific references to wind microclimate, though the Core Strategy includes Strategic Policy 12 – Design and Conservation which indicates that tall buildings (defined as greater than 30 m in height) should be well designed to avoid creating ‘wind tunnels’.

These documents will be replaced by the New Southwark Plan which has been submitted to the Secretary of State and is now undergoing consultation on the main modifications. The draft plan (August 2020) includes Policy P13 Design Quality, which states:

“Sustainable design must ... avoid creation of adverse local climatic conditions (e.g. wind shear).”

Policy P16 Tall Buildings also goes on to states that design of tall buildings will be required to

“Avoid harmful and uncomfortable environmental impacts including wind shear...”

In addition, the proposed modifications would also add, under Policy P55 Protection of Amenity:

“The amenity of those living, working in or visiting Southwark needs to be protected, to ensure a pleasant environment...Amenity considerations that will be taken into account include:

- *Daylight, sunlight, and impacts from wind and on microclimate.”*

Additional Standards and Guidance

The assessment of environmental wind flows lies outside the scope of BS EN 1991-1-4:2005, the current European Standard for wind actions on structures, which focuses on wind loading issues.

The impact of environmental wind on pedestrian spaces and the consequent suitability of these spaces for planned usage are described by and compared against the industry standard Lawson criteria, which are recognised by Local Authorities as a suitable benchmark for wind assessments.

2.2. Assessment Criteria

Details of the Lawson criteria for pedestrian comfort are presented in Table 2.1 and are based on the exceedance of threshold wind speeds, considering mean-hourly and gust-equivalent-mean values, occurring less than 5% of the time. The thresholds represent upper bounds of acceptability for a range of common activities. The value of 5% has been established as giving a reasonable allowance for extreme and relatively infrequent winds that are acceptable within each category.

Table 2.1: Lawson Criteria for Pedestrian Comfort

Threshold Mean-hourly Wind Speed Exceeded < 5% of the Time	Comfort Rating / Activity		Qualifying Comments
4 m/s	C4	Long-term Sitting	Reading a newspaper and eating and drinking.
6 m/s	C3	Standing or short-term Sitting	Appropriate for bus stops, window shopping and building entrances.
8 m/s	C2	Walking and Strolling	General areas of walking and sightseeing.
10 m/s	C1	Business walking	Local areas around tall buildings where people are not likely to linger.

Details of the Lawson criteria for pedestrian safety, or distress, are presented in Table 2.2 and are based on the exceedance of the threshold wind speeds, considering mean-hourly and gust-equivalent-mean values, occurring once per annum. These thresholds represent wind speeds with the potential to destabilise the less able or more susceptible members of the public (including elderly, cyclists and children) and able-bodied users.

Table 2.2: Lawson Criteria for Pedestrian Safety or Distress

Threshold mean-hourly wind speed exceeded once a year	Safety Rating		Qualifying Comments
15 m/s	S2	Unsuitable for general public	Less able and cyclists find conditions physically difficult.
20 m/s	S1	Unsuitable for able-bodied	Able-bodied persons find conditions difficult. Physically impossible to remain standing during gusts.

2.3. Assessment Methodology

An experience-based desk study has been carried out to provide a qualitative assessment of the likely effects of the proposed development on the pedestrian level wind environment. This assessment represents a professional opinion of likely effects. A detailed quantitative assessment, to confirm conditions in terms of pedestrian comfort and safety ratings, would require wind tunnel testing of a physical scale model. This lies outside the scope of the current study.

The current study considers the proposed development massing and exposure in conjunction with long-term wind climate statistics applicable to the site, and draws on extensive experience in the assessment of wind flows, gained from wind tunnel testing of similarly massed schemes within similar urban settings. These detailed studies were based on the aforementioned Lawson criteria for pedestrian comfort and safety.

A Weibull distribution was applied to long-term wind frequency statistics from Heathrow and London City Airports, with annual and seasonal data derived for 16 evenly spaced sectors. The Weibull parameters were corrected to open-country terrain at sea-level, combined and then corrected to apply directly at the site, taking account of differences in upwind terrain and altitude between the weather centres and the site based on the widely-accepted Deaves and Harris log law wind model of the atmospheric boundary layer (ESDU Item 01008 C) and BS EN 1991-1-4:2005. Historical data is used as standard practice due, in part, to lack of certainty in potential future changes in wind patterns, though any changes are expected to be minor.

The pedestrian level wind environment assessment is summarised in terms of suitability for various activities, based on expected seasonal comfort and annual safety ratings in accordance with the above criteria. The assessment takes full account of seasonal variations in wind conditions and pedestrian activities. Thus, conditions for recreational activities focus on summer, but also consider spring and autumn. Recreational activities do not consider winter comfort ratings as it is anticipated that users would not demand suitable conditions 95% of the time in winter but would instead be satisfied to use the amenity spaces on occasions when conditions, including precipitation and temperature, permit. Conditions for pedestrian thoroughfare, access or waiting (for example at bus stops) consider all seasons, with winter being predominantly the critical season due to generally higher wind speeds in the winter months.

The activities considered, and their relation to the comfort criteria detailed above, are shown in Table 2.3. The table is ordered in terms of decreasing sensitivity to wind speeds. Conditions considered suitable for the more sensitive activities would also be suitable for the subsequent, less sensitive, uses.

Table 2.3: Suitability Assessment

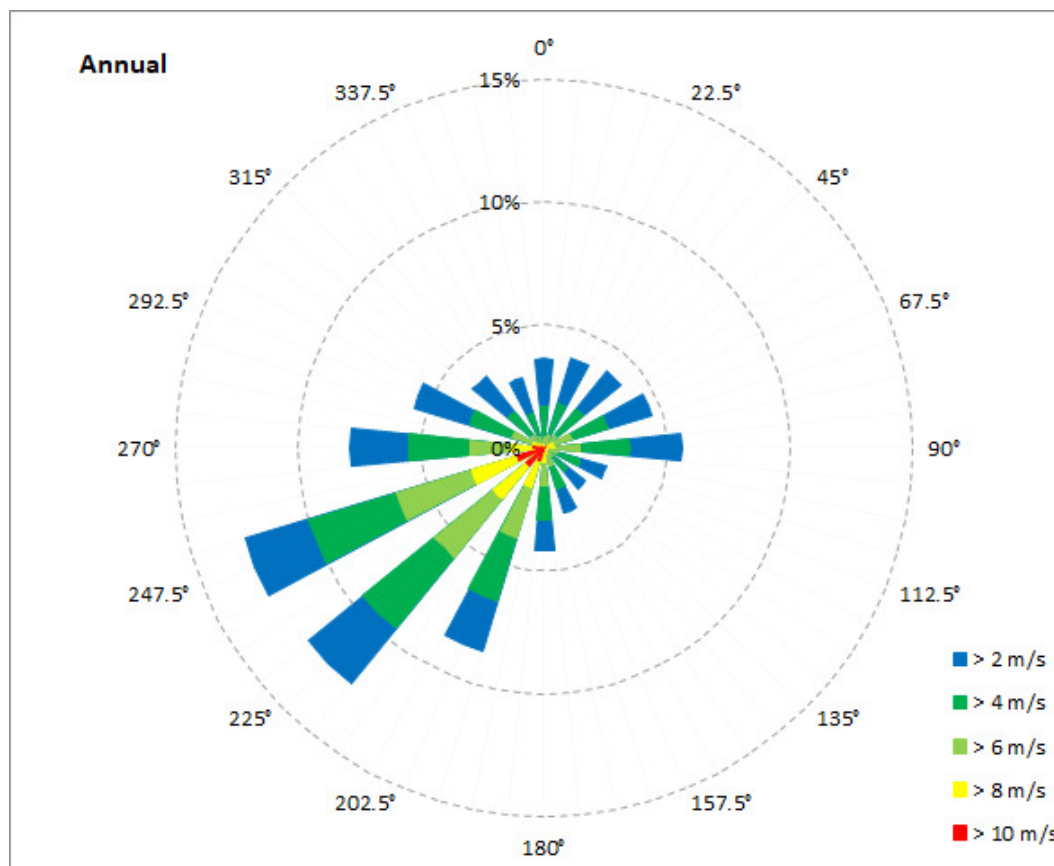
Suitability		Target Lawson comfort and safety criteria for specified seasons
Outdoor seating	For long periods of sitting, such as for an outdoor café or picnic area.	'Long-term sitting' (C4) in at least summer.
Entrances, waiting areas	For pedestrian ingress / egress at entrances, or short periods of sitting or standing such as at a bus stop, taxi rank, meeting point, window shopping, etc.	'Standing or short-term sitting' (C3) in all seasons.
General leisure (excluding seating areas)	For leisure uses excluding long periods of outdoor sitting, such as active leisure, general park spaces, children's play area, etc.	'Standing or short-term sitting' (C3) from spring to autumn.
Thoroughfare	For pedestrian access to, and passage through, the site and surrounding area.	'Business walking' / 'Walking or strolling' (C1/C2) in all seasons - 'Walking or strolling' (C2) desired but 'Business walking' (C1) may be acceptable in some areas.
Unsuitable	Unsuitable for all activities.	Exceeds comfort criterion for 'Business walking' (C1) or safety criteria (S1/S2).

3. Assessment

3.1. Existing Site Conditions

The wind climate expected at the site is summarised in Figure 3.1 in terms of the annual wind speed and direction probability distributions at a reference height of 55 m, corresponding to the approximate maximum roof height of the proposed development relative to local ground level. Seasonal wind speed and direction probability distributions are presented in Appendix A.

Figure 3.1: Wind Climate at Site (at reference height of 55 m)



From the wind climate statistics, the prevailing winds at the site blow from the south-westerly sector. Wind speeds are generally highest during winter, when the most frequent strong winds blow from the west-south-west. Wind speeds are generally lower during summer. North-easterly winds are common during spring but, although potentially cold, these winds are generally light. South-easterly winds are generally light, rarely occurring and usually do not cause adverse impacts on pedestrian level conditions.

Applying these wind statistics at the site, an area free from localised building effects (either sheltering or acceleration) would be expected to experience pedestrian level wind conditions rated (in accordance with the Lawson criteria) as comfortable for 'standing or short-term sitting' from spring through to autumn. Summer conditions would potentially be comfortable for long-term sitting.

The existing site comprises a two-storey commercial building and is substantially sheltered from winds approaching from most directions, particularly prevailing south-westerly and westerly winds, by the existing surrounding buildings.

The neighbouring high-rise development at 87 Newington Causeway represents the dominant structure in the immediate vicinity of the site. This development presents a wide obstruction to prevailing south-westerly winds but is partially sheltered from these winds by other tall buildings, further to the southwest. The 87 Newington Causeway development also benefits from a podium structure wrapping around much of the tower. No significant impacts on the surrounding wind conditions were identified in the wind microclimate report submitted to support the planning application (reference 16/AP/3144). The shelter and podium is therefore expected to limit the potential for downdraughts to impact on pedestrian level conditions, though it is expected that there remains some potential for accelerated winds along Tiverton Street, to the southwest of the Avonmouth House site.

As a result of the above limitations on wind effects, conditions in and around the existing site are expected to rate as safe for all users, in accordance with the Lawson criteria for pedestrian safety.

In terms of pedestrian comfort, conditions are expected to be suitable for at least leisurely strolling on thoroughfares, and entrances to the existing and immediate surrounding buildings are expected to generally enjoy suitable conditions for pedestrian ingress / egress.

Newington Gardens, to the southeast of the site, benefits from large, mature trees and tall shrub planting around the park's southwest corner. Resulting conditions are expected to be suitable for general recreational uses including at least short periods of sitting, such for a meeting point or play space for example, with more sheltered areas expected to be further suitable for long periods of outdoor sitting, such as for picnics, during at least summer. This mix of conditions is expected to be considered suitable for existing uses, including children's play within the play space.

3.2. Impact of Proposed Development

The proposed development comprises a significant structure with regards to potential wind effects. However, the development is substantially sheltered from the most frequent strong winds from the west-south-west and southwest by the larger neighbouring development, at 87 Newington Causeway. This scheme is also expected to partially shelter the proposed development from westerly and south-south-westerly winds though, whilst the mean speeds reaching the development are expected to be reduced, these winds may be more gusty.

The stepped massing of the proposed development, with the lower height in the southwest, is also expected to further limit the potential for downdraughts from the southwest elevation, for prevailing south-westerly winds, to reach pedestrian level. There does however remain potential for some downdraughts from the southwest and northwest

elevation (for more westerly winds) to reach pedestrian level before accelerating further around the south and north corners, respectively.

The development is more exposed, and is orientated to present a wider obstruction, to north-westerly and south-easterly winds. However, these winds are less frequent and generally lighter than prevailing south-westerly winds.

The development is similarly exposed, but presents a narrower obstruction, to north-easterly winds. Although common in spring, and are often cold, these winds are again less frequent and generally lighter than prevailing south-westerly winds.

The southwest and southeast sides of the development also have potential to benefit from the indicative landscaping proposals, which are likely to include large, semi-mature, trees, expected to have substantial canopies which retain significant solidity during winter (i.e. numerous branches), and hedging along the south side of the pocket park (if delivered).

The expected pedestrian level wind environment in and around the site, resulting from the above effects, is discussed below and indicatively presented in terms of suitability for pedestrian activities in Figure 3.2 (based on the categories described in Table 2.3).

Pedestrian Safety

As discussed above, the proposed development is substantially sheltered from the most frequent strong winds and the stepped massing is expected to further limit the potential for downdraughts, from the southwest elevation, reaching pedestrian level directly. As a result, pedestrian level wind conditions in and around the site are expected to remain rated as safe for all users, irrespective of the potential public realm landscaping.

The proposed development is thus expected to have no significant impact with respect to pedestrian safety.

Pedestrian Comfort

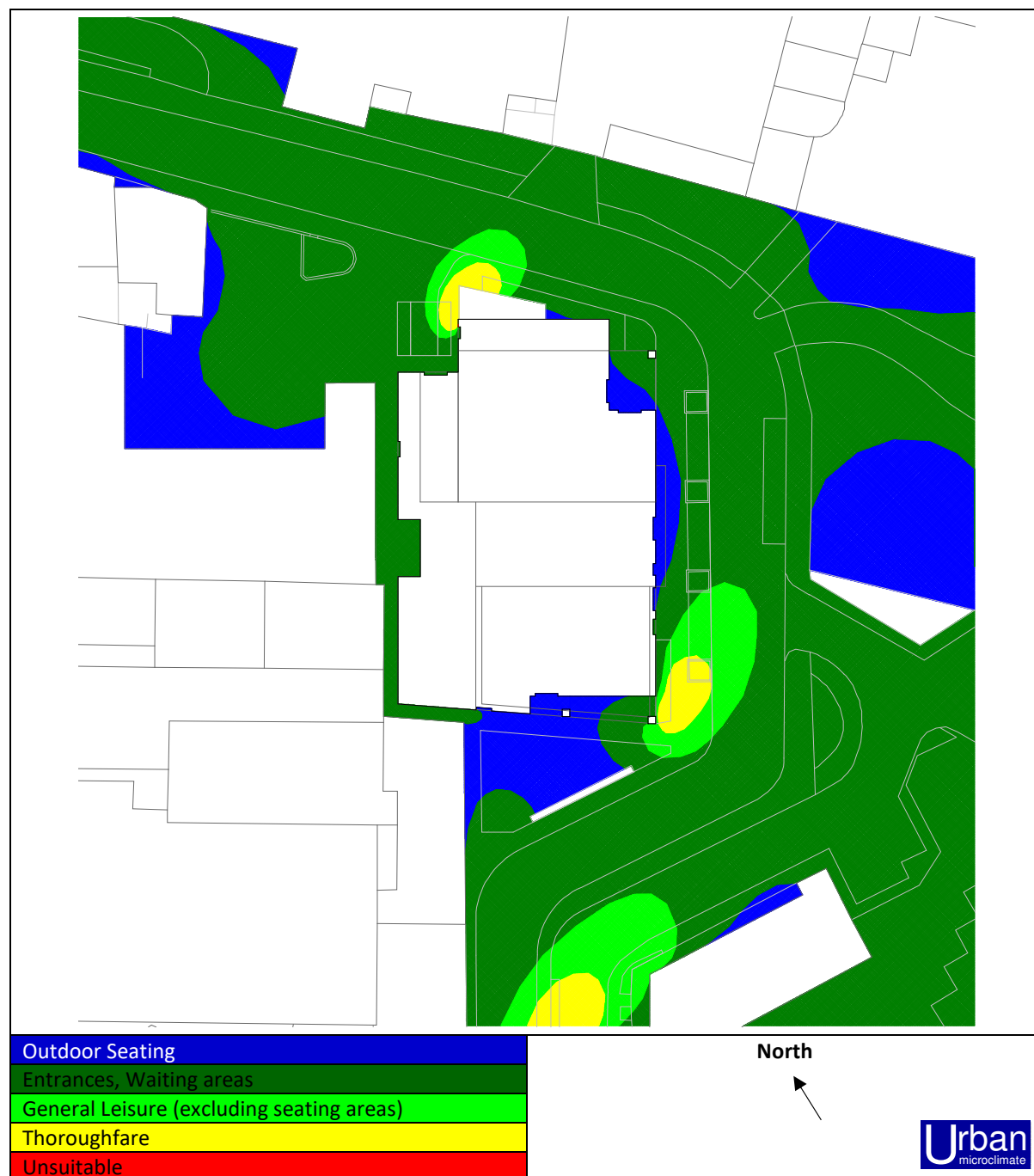
In terms of pedestrian comfort, with respect to wind force, conditions on thoroughfares within and alongside the site are expected to be suitable for at least leisurely strolling and are therefore expected to be suitable for pedestrian access to and passage past the development. Again, these expected conditions are not dependent on the potential public realm landscaping.

Whilst the east corner is potentially susceptible to north-easterly winds channelling around the corner, the main entrance is set back into a deep corner recess and is expected to have suitable conditions for pedestrian ingress / egress throughout the year. The entrance to the employment space, on the southwest elevation, is also expected to enjoy suitable conditions for pedestrian ingress / egress.

The pocket park, if delivered to the southwest of the site, would benefit from both the proposed trees and a hedge (of approximately 1.1 - 1.2 m height) along the south edge of

the space. Resulting conditions would be expected to be suitable for at least short periods of standing or sitting, such as for a meeting point, with much of the space further suitable for long periods of outdoor sitting, such as for picnics, during summer. This mix of conditions is expected to be considered acceptable for proposed uses of the potential amenity space.

Figure 3.2: Suitability Assessment (including indicative landscaping)



The proposed development is not expected to have any significant effect on the suitability of pedestrian level wind conditions within the surrounding area. Surrounding thoroughfares are expected to remain suitable for at least leisurely strolling and entrances to surrounding buildings are expected to generally remain suitable for pedestrian ingress / egress.

Newington Gardens is expected retain suitable conditions for recreational activities including a mix of short to long-term sitting, with the play space expected to retain suitable conditions for children's play.

Roof-Top Terrace

The communal roof-top terrace at Level 07 is partially sheltered by a 1.5 m high parapet but is potentially susceptible to some downdraughts from the taller element extending above the terrace and some gusting winds emanating from 87 Newington Causeway, for prevailing south-westerly and westerly winds. Substantial landscaping measures have therefore been introduced across the terrace. This includes a pergola and (northwest) side-wall structure, of approximately 30% to 50% solidity, above the communal table and benches, and significant tree planting with tall shrubs (up to around 1.1 m height) in planters, along the southwest and southeast sides of the terrace.

Resulting conditions are expected to be suitable for recreational activities including at least short periods of standing or sitting, such as for viewing for example, with summer conditions expected to be further suitable for long periods of outdoor sitting, at least within the seating areas beneath the pergola and set into the planters.

3.3. Cumulative Effects

The assessment of existing and proposed site conditions accounts for the new development at 87 Newington Causeway, in its completed state.

Within the surrounding area, the closest consented future developments comprise the following:

- Land At 19 21 And 23 Harper Road 325 Borough High Street And 1-5 And 7-11 Newington Causeway (application reference 18/AP/0657)
- Skipton House 80 London Road (application reference 18/AP/4194)
- London South Bank University 103 Borough Road (application reference 17/AP/4233)

These developments all lie a significant distance (at least 150 m) from the site, with substantial intervening buildings between each development and the site. On this basis, potential cumulative effects are considered insignificant.

3.4. Mitigation Measures

Key features, responding to potential wind effects, have been designed into the proposed development such that conditions are expected to be suitable for existing and proposed pedestrian activities and no further mitigation measures are considered to be required.

3.5. Residual Effects

As no mitigation measures are expected to be required, the residual effects are as discussed above for the proposed development.

4. Conclusions

Existing Site Conditions

Pedestrian level wind conditions in and around the existing site are expected to rate as safe for all users and are expected to be comfortable for existing uses, including children's play at the play space in Newington Gardens.

Impact of Proposed Development

The proposed development is not expected to have any significant impact on wind conditions with regards to pedestrian safety.

In terms of pedestrian comfort, thoroughfares within and alongside the site are expected to be suitable for pedestrian access to, and passage past, the proposed development.

Entrances to the proposed development are expected to enjoy suitable conditions for pedestrian ingress / egress.

Recreational spaces are expected to enjoy suitable conditions for planned activities, including outdoor seating in more sheltered parts of the pocket park and roof terrace.

The proposed development is not expected to have any significant impact on pedestrian level wind conditions within the immediate surrounding area, which are expected to remain suitable for existing uses.

No significant cumulative effects with consented future surrounding developments are expected.

Appendix A – Wind Climate at Site

Figure A.1: Autumn Wind Speed and Direction Distribution (at ref height of 55 m)

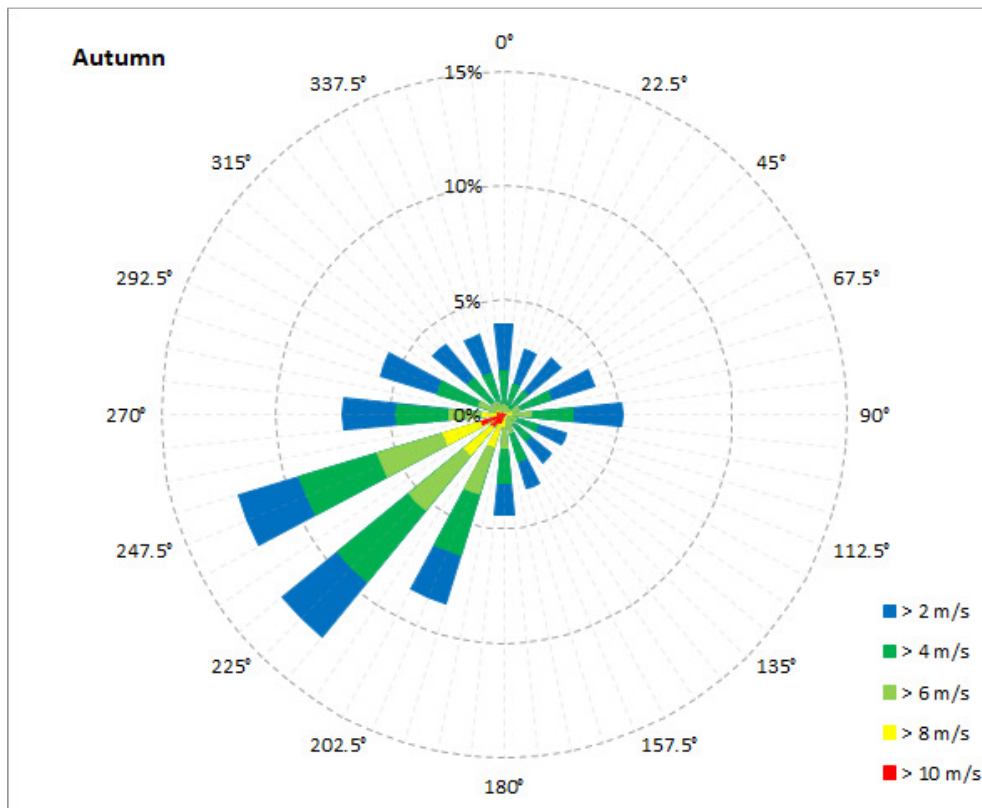


Figure A.2: Winter Wind Speed and Direction Distribution (at ref height of 55 m)

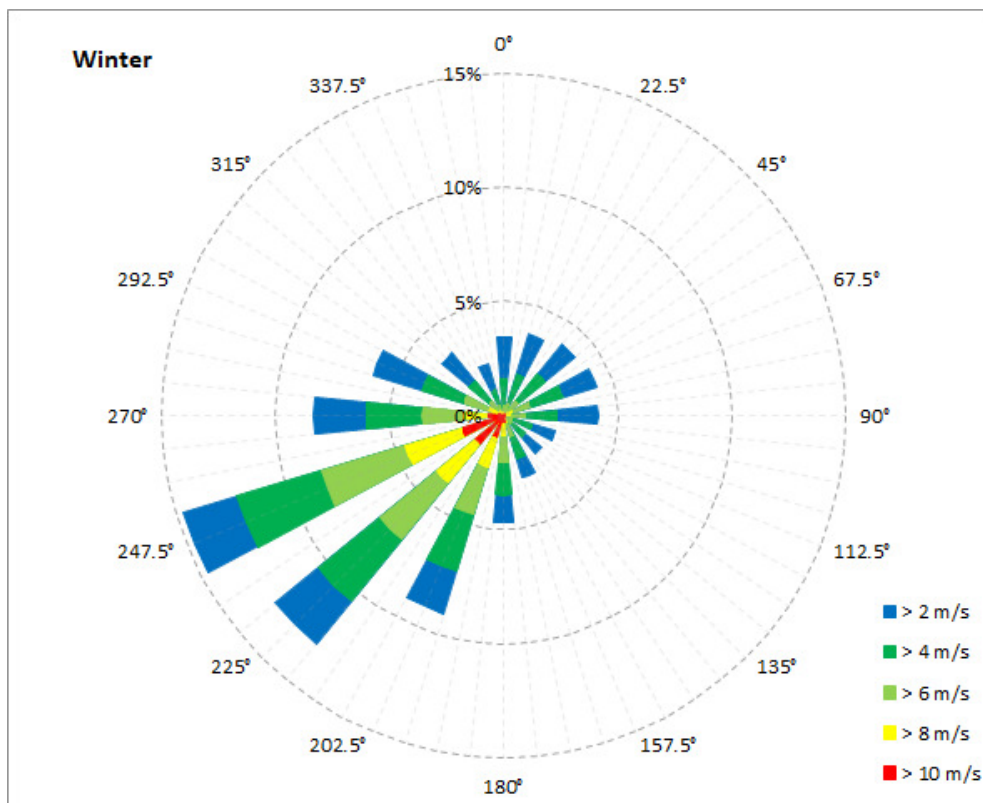
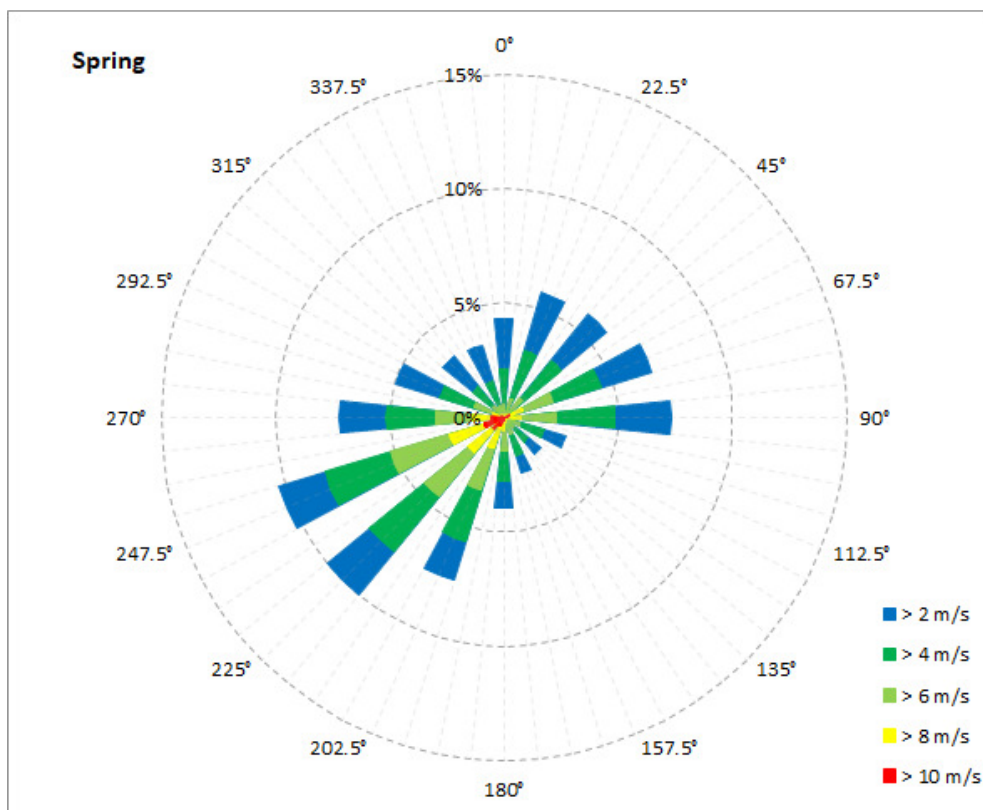
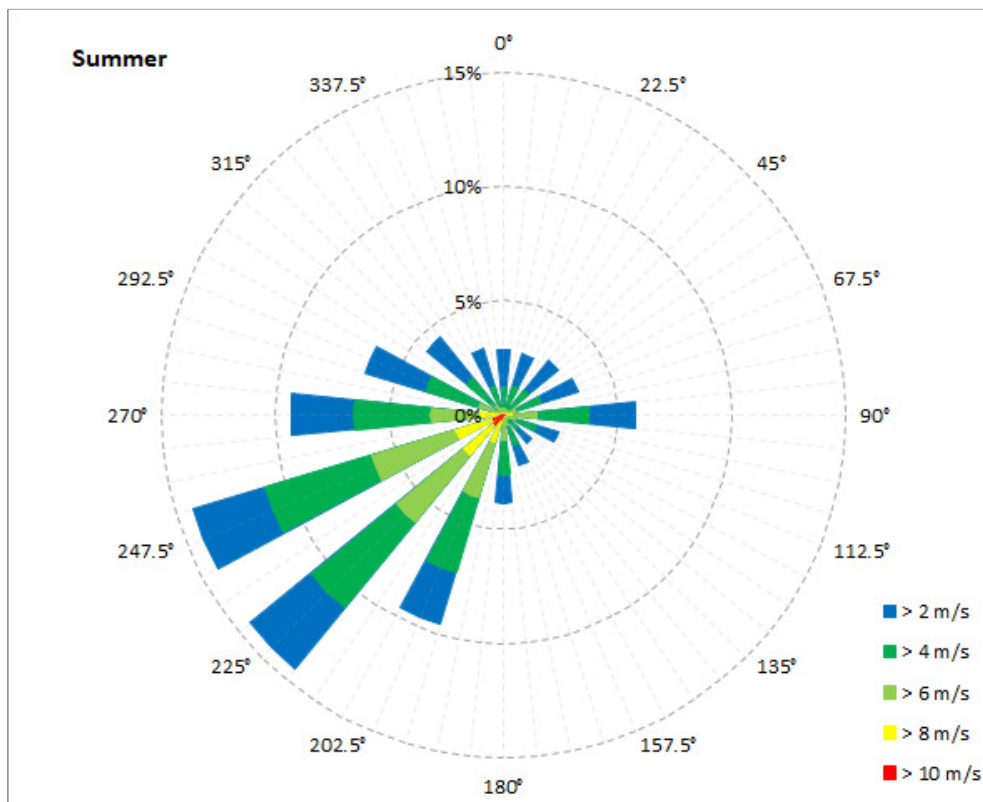


Figure A.3: Spring Wind Speed and Direction Distribution (at ref height of 55 m)**Figure A.4: Summer Wind Speed and Direction Distribution (at ref height of 55 m)**

Urban Microclimate Limited

16 Torrington Gardens, Perivale, Middlesex UB6 7EN

Tel 0799 097 2510

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