



Victoria Quarter

Wind Microclimate

June 2021

Prepared For:

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Contents

Executive Summary.....	1
1. Introduction	2
2. Methodology and Criteria.....	4
2.1. Policy and Guidelines	4
2.2. Assessment Criteria.....	6
2.3. Assessment Methodology	6
3. Assessment	9
3.1. Existing Site Conditions	9
3.2. Impact of Proposed Development	10
3.3. Mitigation Measures	13
3.4. Residual Effects	13
4. Conclusions	14
Appendix A – Wind Climate at Site	15

Executive Summary

An experience-based desk study has been carried out to assess the likely impact of the proposed Victoria Quarter 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 review of the likely suitability of wind conditions based on the industry standard Lawson criteria for pedestrian comfort and safety.

The proposed development comprises buildings of relatively modest heights in terms of potential wind effects and is partially sheltered, at lower levels, from prevailing south-westerly and westerly winds by the railway embankment (with tree and undergrowth covering). There remains potential for channelling of prevailing south-westerly winds along the western elevations and through the gaps between the blocks, into the site, but the proposed development also benefits from significant landscaping proposals, expected to be beneficial in alleviating these winds and providing localised shelter to amenity spaces.

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 through or past, the proposed development.

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

Communal and public recreational spaces are generally expected to enjoy suitable conditions for planned activities though a few small areas such as the play space between Blocks F3 and F4 and the potential café spill-out area on the north side of Block A would potentially benefit from enhancement through further development of the soft landscaping proposals during detailed design stages.

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

1. Introduction

Urban Microclimate Ltd. has been commissioned by Fairview New Homes Ltd. to assess the likely impact of the proposed Victoria Quarter development, in London Borough of Barnet, 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 June 2021.

The proposed development consists of 13 buildings, with a series of communal and public, landscaped, amenity spaces distributed across the site. The tallest building, Block A, is up to 8 storeys and situated in the centre of the site. Blocks B to G, occupy the northern and western parts of the site and comprise nominally rectangular buildings of between 5 and 7 storeys. Blocks J and H sit in the south of the site and comprise nominally 'C'-shaped buildings, of between 2 and 5 storeys, around private courtyards.

The scheme considered is illustrated in Figures 1.1, below.

Figure 1.1a: Proposed Development (viewed, in isolation, from southwest)

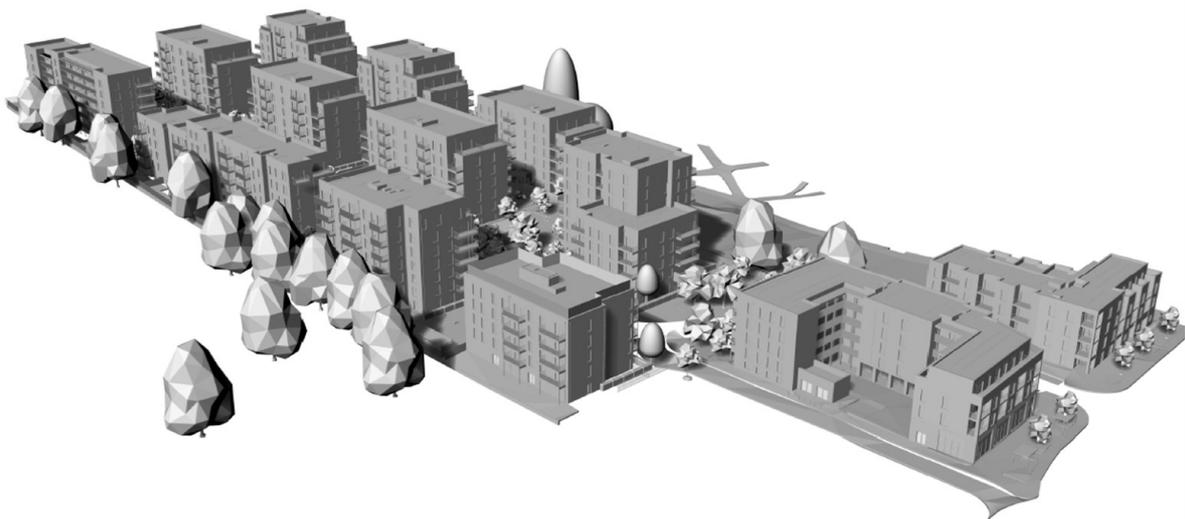


Figure 1.1b: Proposed Development (viewed, in isolation, from northeast)

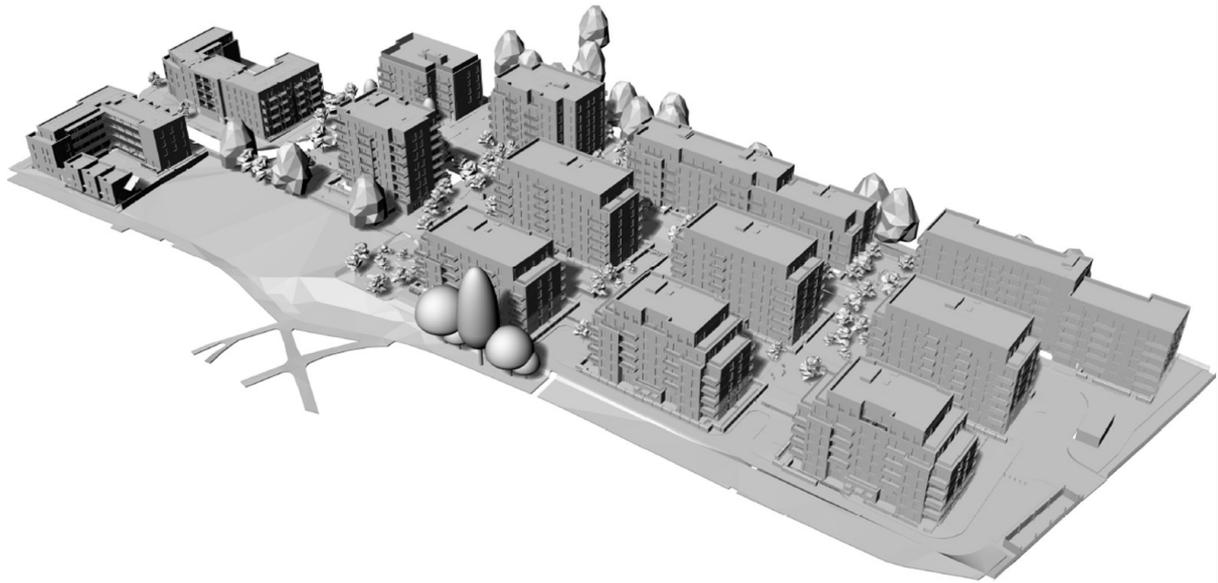


Figure 1.1c: Proposed Siteplan and Landscaping Scheme



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 June 2019) 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 Barnet’s draft Local Plan (Reg. 18, Jan. 2020) includes policies requiring new development to avoid adverse impacts on wind conditions but does not define any specific requirements. It does however include references to the Sustainable Design and Construction SPD (Oct. 2016) which includes more specific detail on requirements including, in particular:

“Developers should demonstrate that appropriate comfort levels can be achieved for all pedestrian public and communal outdoor spaces using the Lawson Criteria for Distress and Comfort as a guide to the appropriate level of amenity for the expected use of those areas.”

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 would not typically be required for the scale of development proposed and 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 / suburban 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 centre and the site based on the widely-accepted Deaves and Harris log law wind model of the atmospheric boundary layer 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

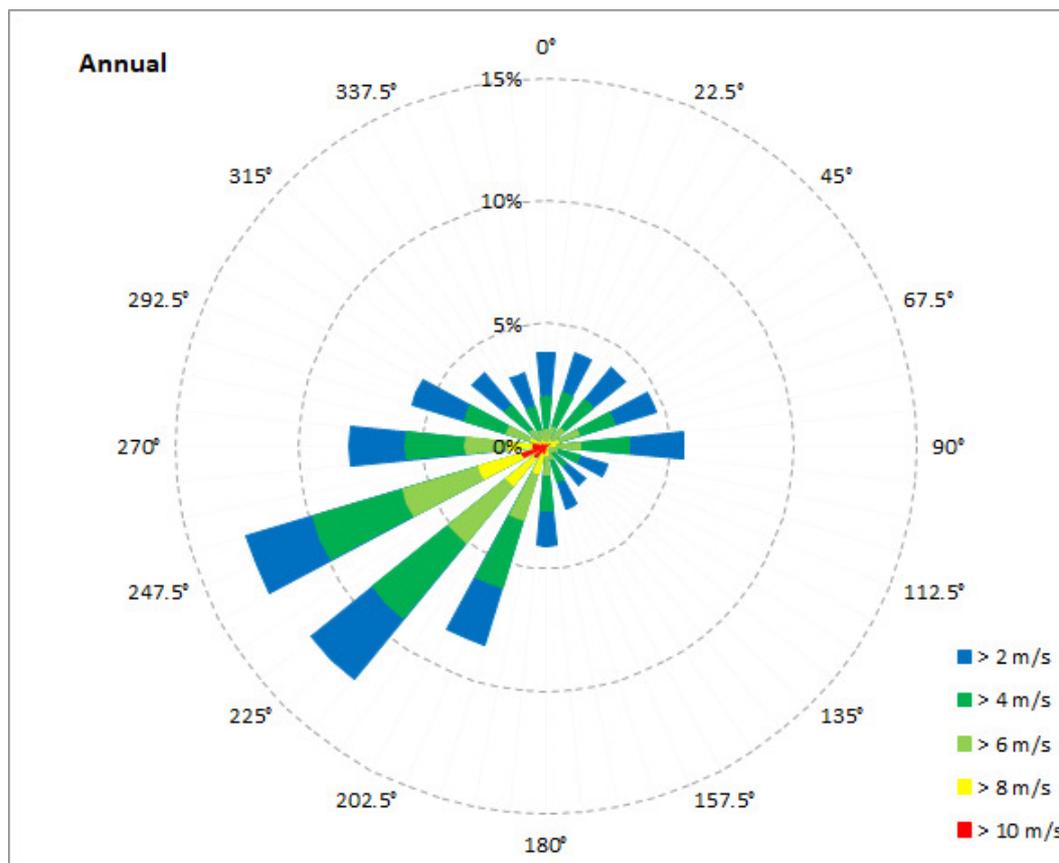
Suitability		Target Lawson comfort and safety criteria for specified seasons
Outdoor seating	For long periods of sitting, such as for an outdoor café or picnic area.	'Long-term sitting' (C4) in at least summer.
Entrances, waiting areas	For pedestrian ingress / egress at entrances, or short periods of 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 28 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 28 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' throughout the year. More exposed areas, such as the open areas of

Victoria Recreation Ground (away from trees), may be comfortable only for 'walking / strolling' in winter.

The existing site is largely cleared, with a capped basement car park (dug out in accordance with a previous planning consent) and a small number of low-rise buildings in the south of the site. The site is relatively sheltered from prevailing south-westerly and westerly winds by the railway embankment, which has significant tree and undergrowth covering, running along the west side of the site. The site is more exposed to north-easterly winds, which are common in spring, approaching across the relatively open Victoria Recreation Ground. However, these winds are generally significantly lighter than prevailing south-westerly winds.

In the absence of any dominant structures, 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 in and around the site.

Entrances to the existing and surrounding buildings are expected to generally enjoy suitable conditions for pedestrian ingress / egress.

Although relatively open and exposed, Victoria Recreation Ground is expected to have suitable conditions for general recreational activities, including children's play and sporting activities.

The Railway Bell and Builders Arms public houses both have beer gardens which are sheltered by a combination of the buildings, fences, the railway embankment and existing trees and undergrowth. Resulting conditions are expected to be suitable for long periods of outdoor sitting, during at least summer, across the gardens.

Main private gardens to dwellings on Victoria Road are sheltered by tall boundary fences, whilst the communal spaces for the flats on Glyn Avenue are substantially sheltered by both the buildings and dense mature trees along the south side of Victoria Recreation Ground (and presumably also a boundary fence). These spaces are expected to enjoy suitable conditions for associated recreational activities, including outdoor seating during at least summer.

3.2. Impact of Proposed Development

The proposed development comprises buildings of relatively modest heights in terms of potential wind effects and is partially sheltered, at lower levels, from prevailing south-westerly and westerly winds by the railway embankment, with tree and undergrowth covering. The western blocks do however protrude above this and are orientated to present wide obstructions to the prevailing winds, particularly the most frequent winds from the west-south-west. Whilst the modest heights limit the potential for any significant

downdraughts, there is potential for channelling of prevailing south-westerly and westerly winds along the western elevations and through the gaps between the blocks, into the site.

The development is more exposed, and presents a similarly wide obstruction, to north-easterly winds which are common in spring. However, these winds, although often cold, are generally significantly lighter than prevailing south-westerly winds.

The proposed development also benefits from significant landscaping proposals. The current assessment assumes that the trees will be planted semi-mature and be of a deciduous species with substantial canopies and retained solidity in winter (i.e. numerous branches) such that the landscaping proposals are expected to be beneficial in helping alleviate wind flows across the site.

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 of modest scale, is partially sheltered from prevailing south-westerly and westerly winds and includes proposals for substantial soft landscaping. As a result, pedestrian level wind conditions in and around the site are expected to remain rated as safe for all users.

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

Pedestrian Comfort

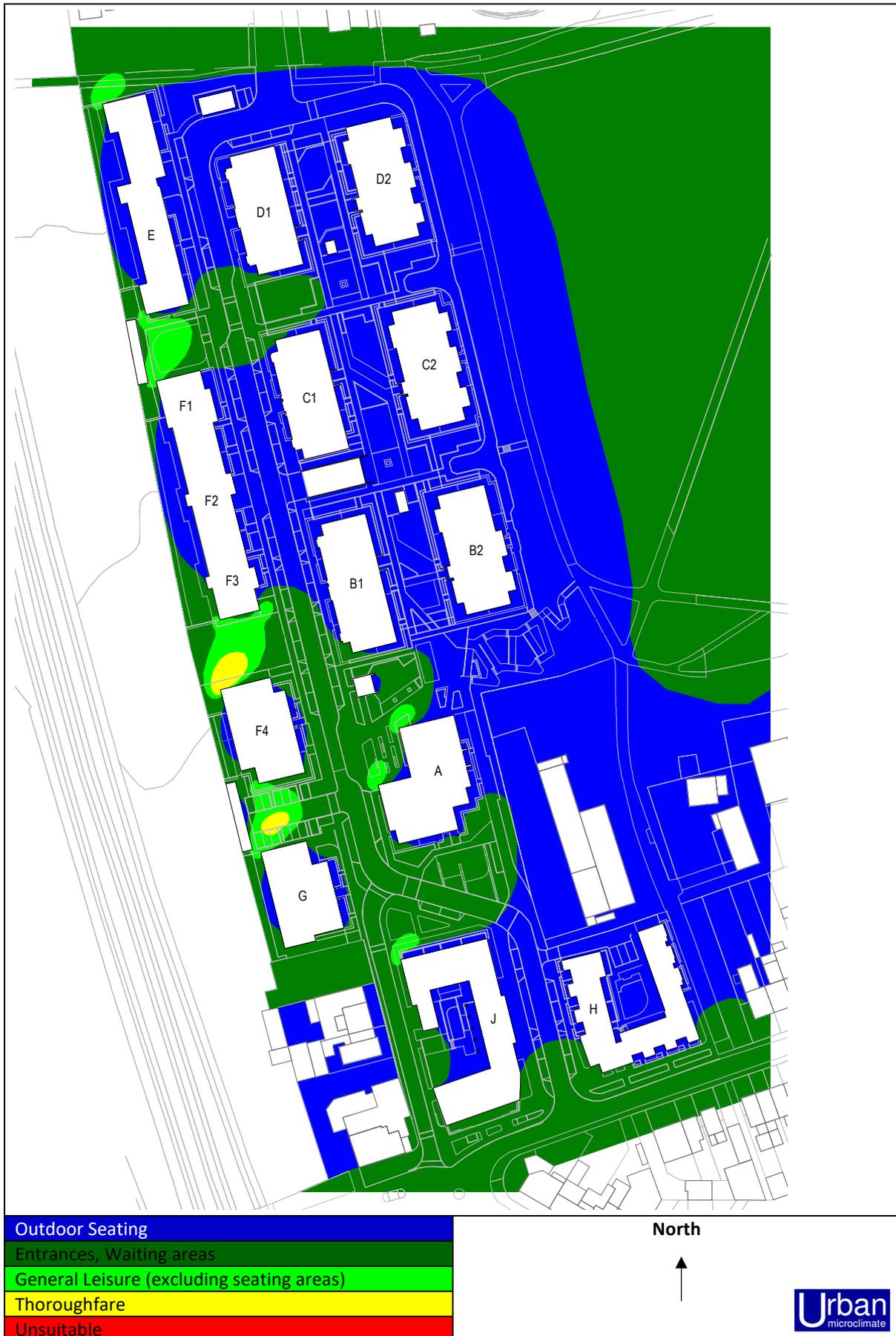
In terms of pedestrian comfort, with respect to wind force, conditions within and alongside the site are expected to be suitable for at least leisurely strolling and are thus expected to be suitable for pedestrian access to, and passage through or past, the development.

The main entrances to the proposed development are located away from exposed corners and are expected to enjoy suitable conditions for pedestrian ingress / egress.

Communal and public amenity spaces, including the play spaces, are generally expected to enjoy suitable conditions for recreational activities including at least short periods of sitting or standing from spring through to autumn. These conditions are considered appropriate for uses such as children's play, for example. The play space between Blocks F3 and F4 may be marginal for such uses closer to the corner of Block F4 but overall is expected to be considered at least tolerable. Conditions are also likely to improve as the proposed tall shrub planting matures and enhances the shelter.

The Gateway Garden is expected to have suitable conditions for at least short periods of sitting or standing throughout the year and is thus expected to be suitable for a meeting point.

Figure 3.2: Suitability Assessment



Much of the site is expected to be further suitable for long periods of outdoor sitting, such as for picnics for example, during at least summer, particularly in central and eastern parts of the site and set back within the enclosed courtyards of Blocks J and H.

This also includes much of Park Plaza, where conditions are expected to be suitable for recreational activities including a mix of short to long periods of outdoor sitting. This mix of conditions is generally considered appropriate for large amenity spaces. The north side of Block A may be slightly windy for any café spill-out seating towards the northwest corner but is expected to have a significant area of frontage, towards the northeast corner, with amenable conditions for such uses. Conditions also have potential to improve as areas of tall shrub planting mature and enhances the shelter.

Private amenity spaces at ground level are protected by boundary hedges and are generally expected to enjoy amenable conditions for recreational uses including outdoor seating during at least summer. A few of the corner terraces may be windier than ideal. However, private spaces are generally considered less sensitive than communal spaces (due to their less frequent usage) and these terraces would still be expected to enjoy amenable conditions for outdoor seating for a majority of the time.

The proposed development is not expected to have any significant effect on the suitability of wind conditions within the surrounding area. Surrounding thoroughfares are expected to remain suitable for at least leisurely strolling. Entrances to surrounding buildings are expected to generally remain suitable for pedestrian ingress / egress and both the pub beer gardens and private gardens are expected to retain suitable conditions for associated recreational activities. The western part of Victoria Recreation Ground is expected to benefit from additional shelter from prevailing south-westerly winds, provided by the proposed development. However, as existing conditions are expected to be suitable for existing recreational uses, this potential enhancement is not considered significant.

3.3. Mitigation Measures

Conditions are expected to be generally suitable, and at least tolerable, for planned pedestrian activities and no mitigation measures are considered to be required.

The play space between Blocks F3 and F4 and the potential café spill-out area on the north side of Block A would potentially benefit from additional trees or hedges or tall shrub planting around the building corners. However, this would represent an enhancement rather than a mitigation requirement.

3.4. 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.

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 through or past, the proposed development.

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

Communal and public recreational spaces are generally expected to enjoy suitable conditions for planned activities though a few small areas would potentially benefit from enhancement through further development of the soft landscaping proposals during detailed design stages.

The proposed development is not expected to have any significant impact on the pedestrian level wind conditions within the surrounding area.

Appendix A – Wind Climate at Site

Figure A.1: Autumn Wind Speed and Direction Distribution (at ref height of 28 m)

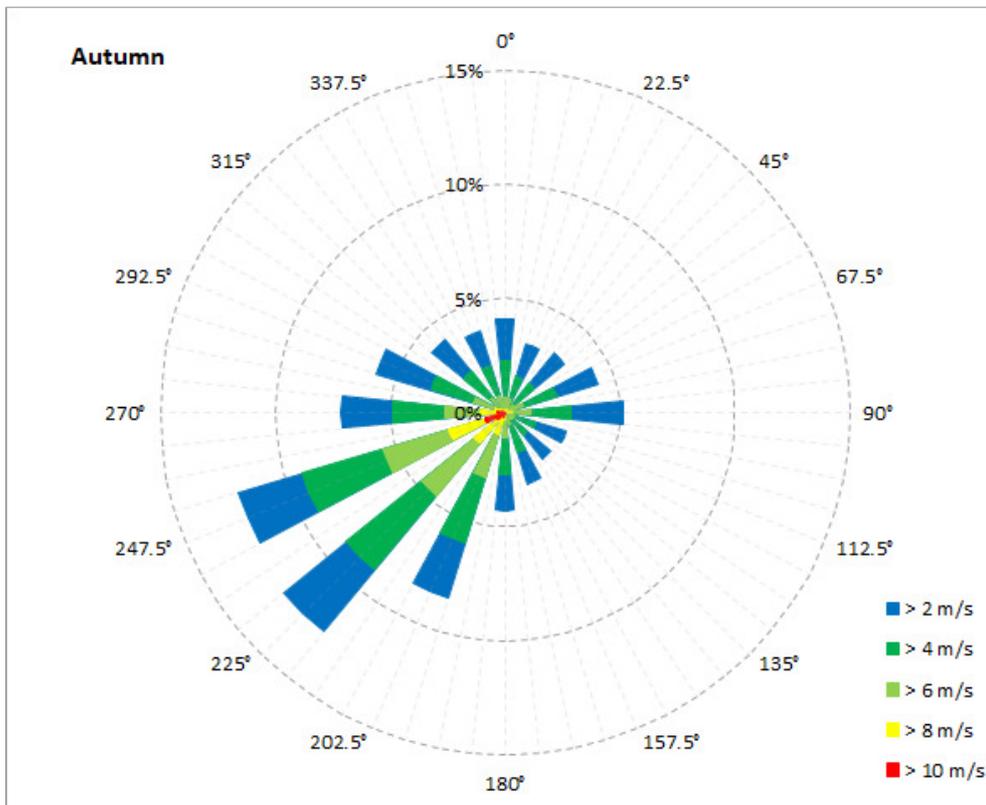


Figure A.2: Winter Wind Speed and Direction Distribution (at ref height of 28 m)

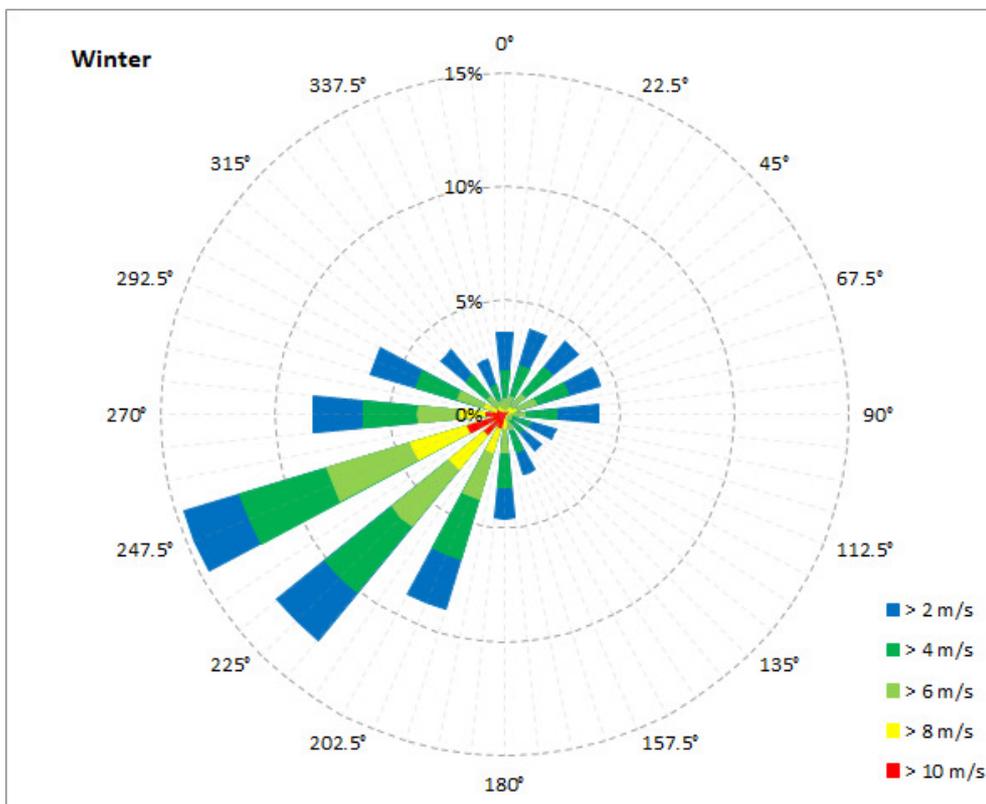


Figure A.3: Spring Wind Speed and Direction Distribution (at ref height of 28 m)

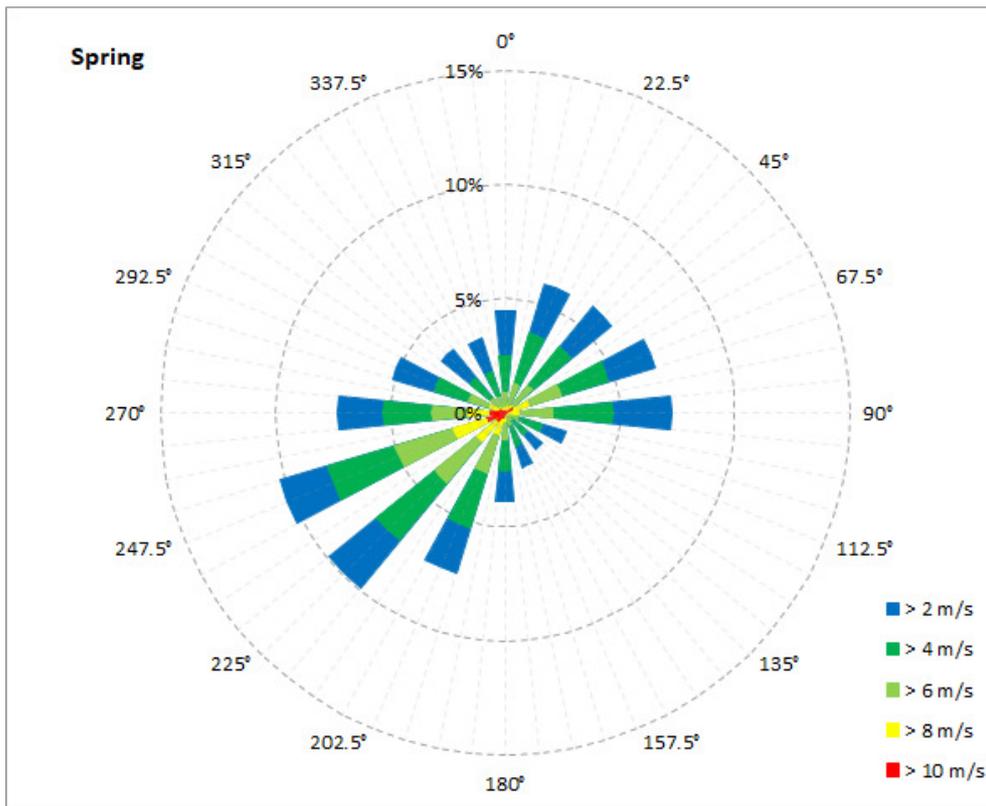
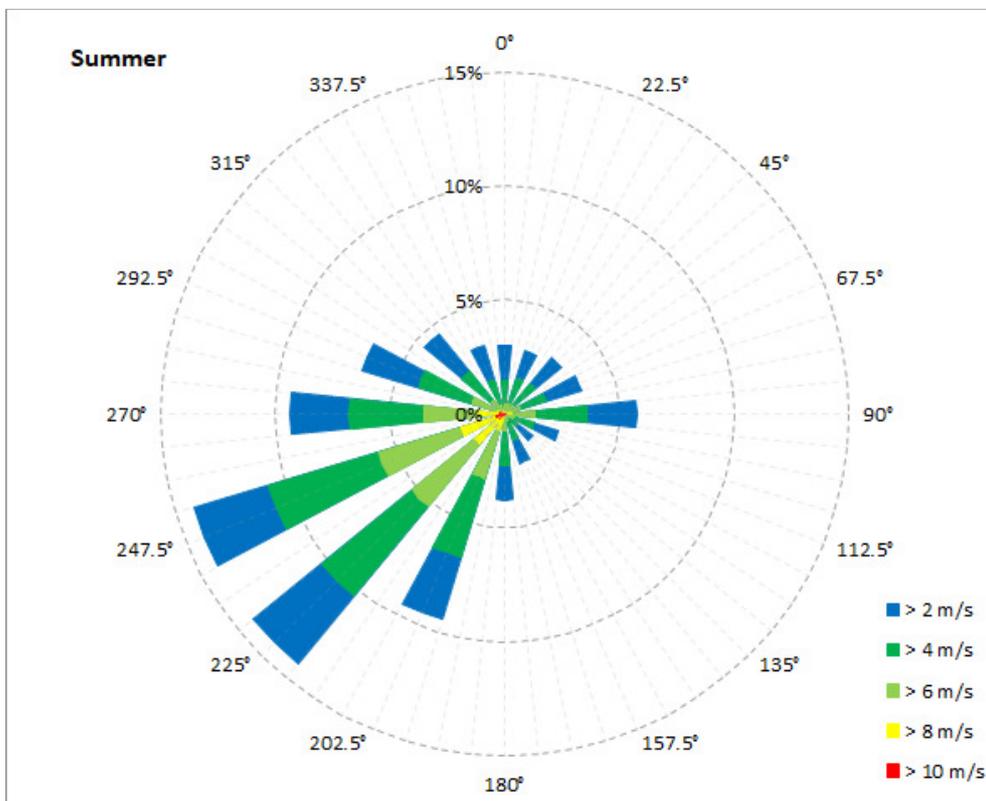


Figure A.4: Summer Wind Speed and Direction Distribution (at ref height of 28 m)



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