



Bendix Street, Manchester

Wind Microclimate

November 2019

Prepared For:

Mulbury Homes (Central) Limited
Great Oak Farm
Mag Lane
Lymm
Cheshire, WA13 0TF

Urban Microclimate Limited

16 Torrington Gardens, Perivale, Middlesex UB6 7EN

Tel 0799 097 2510

Registered in England and Wales No. 9286534

Contents

Executive Summary.....	1
1. Introduction	2
2. Methodology and Criteria.....	5
2.1. Policy and Guidelines	5
2.2. Assessment Criteria.....	6
2.3. Assessment Methodology	7
3. Assessment	9
3.1. Baseline Conditions	9
3.2. Impact of Proposed Development	10
3.3. Cumulative Effects.....	13
3.4. Mitigation Measures	13
3.5. Residual Effects	14
4. Conclusions	15
Appendix A – Wind Climate at Site	16

Executive Summary

An experience-based desk study has been carried out to assess the potential impact of the Proposed Development at Bendix Street 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 is of modest scale and is partially sheltered, at lower levels, from prevailing winds.

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 immediately around the Site are expected to be suitable for pedestrian access to, and passage past, the Proposed Development.

Residential entrances to the Proposed Development are expected to enjoy suitable conditions for pedestrian ingress / egress. The commercial entrances may be slightly windy but are expected to be tolerable for pedestrian ingress / egress.

The communal roof-top terrace is expected to enjoy suitable conditions for planned recreational activities, but may benefit from the introduction of landscaping features to further enhance conditions.

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

On the basis of the above, the Proposed Development is considered compliant with Local Authority policies with regards to wind microclimate.

1. Introduction

Urban Microclimate Ltd. has been commissioned by Mulbury Homes (Central) Ltd. to assess the potential impact of the Proposed Development at Bendix Street, in Manchester, on the pedestrian level wind environment in and around the Site.

This report relates to Bendix Street. Reports in relation to Oldham Road are submitted separately in support of the relevant planning application.

The assessment comprises an experience-based desk study and is based on details of the Proposed Development issued by Tim Groom Architects, the architects for the Development, in November 2019.

The Proposed Development comprises a nominally trapezoidal, 13-storey, building. The building also includes a communal roof-top terrace at the southeast end.

The scheme considered is illustrated in Figures 1.1, below.

Figure 1.1a: Proposed Massing (In Isolation, Viewed from South)

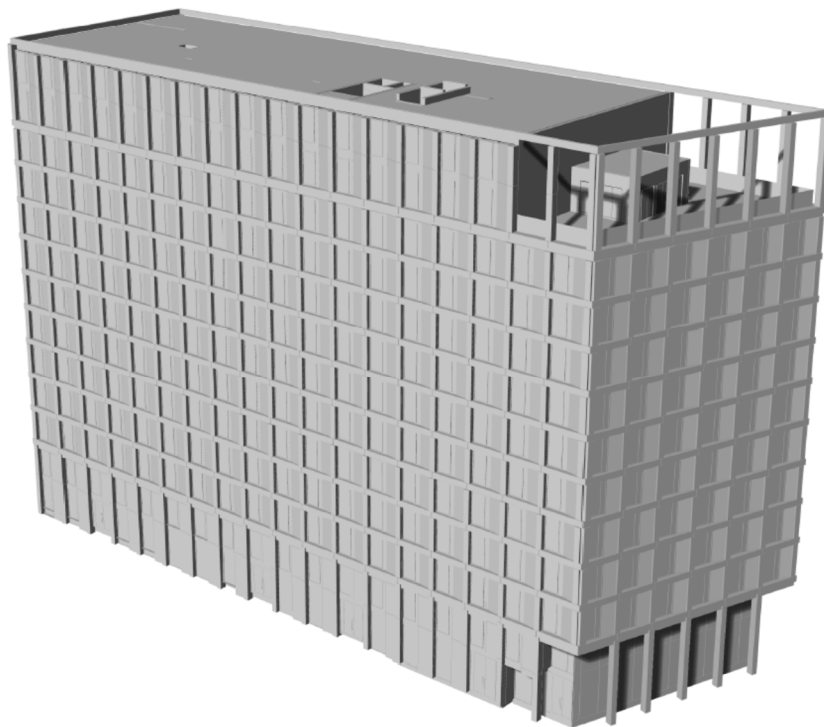
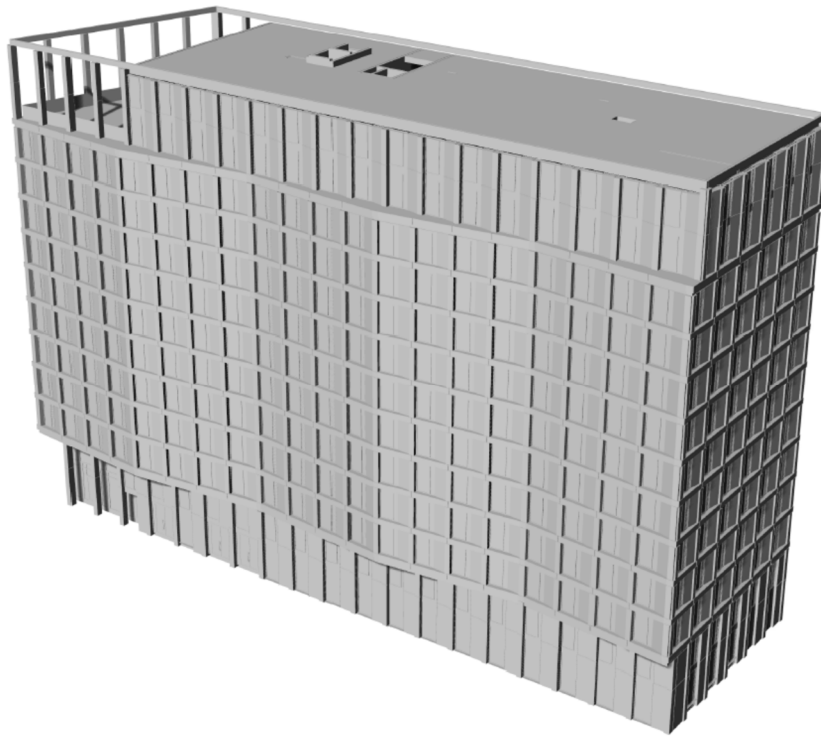
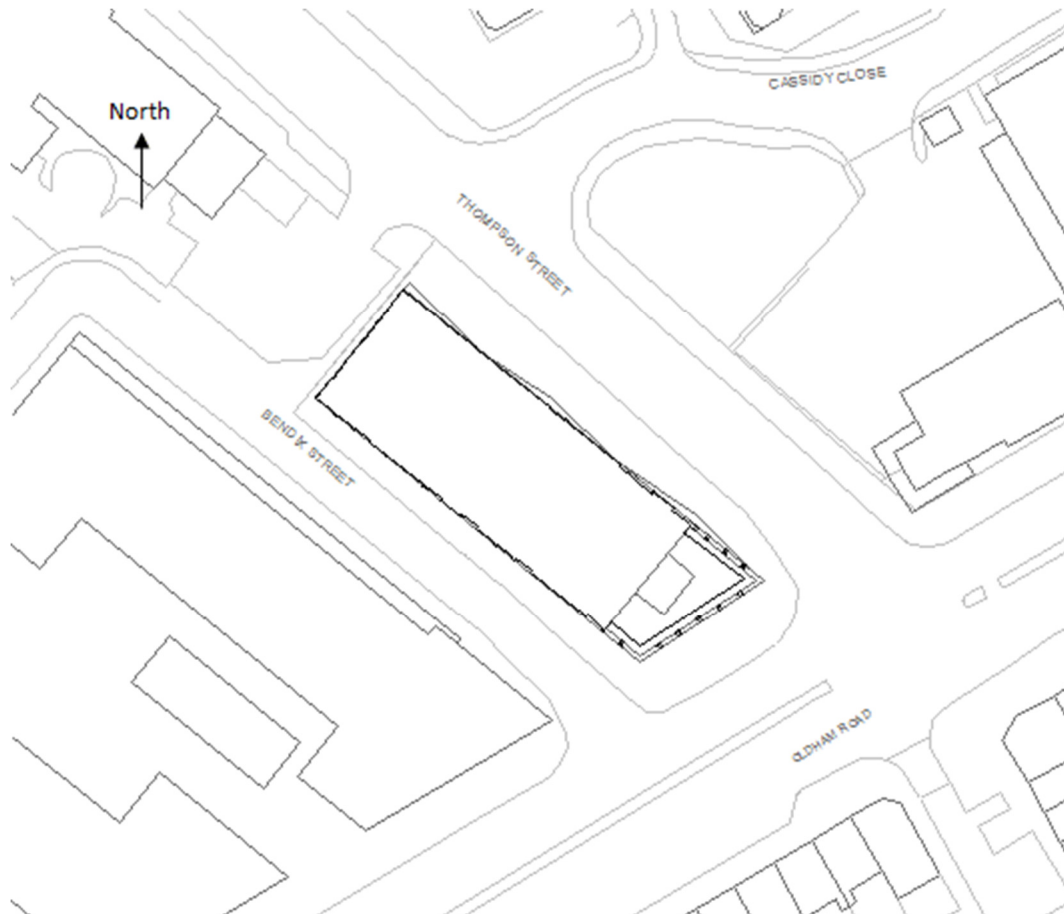


Figure 1.1b: Proposed Massing (In Isolation, Viewed from North)**Figure 1.1c: Proposed Siteplan**

The surrounding context considered for the baseline and impact assessments includes surrounding developments currently under construction, in their completed state. Of particular note, this includes the neighbouring development at Oldham Road / Marshall Street (planning ref 112015/FO/2016/N1).

Cumulative effects with the associated applications at Oldham Road and Goulden Street and consented surrounding developments in the immediate vicinity are also considered.

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 NPPF (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 NPPG identifies the potential for a building’s size and shape (particularly in the case of tall and large buildings) to affect the wind microclimate. Under the section addressing ‘Design: How should buildings and the spaces between them be considered?’, the NPPG states under ‘Consider form’ that:

“Some forms pose specific design challenges, for example how taller buildings meet the ground and how they affect local wind and sunlight patterns should be carefully considered.”

The NPPG goes on to state under ‘Consider scale’ that:

“Account should be taken of local climatic condition, including [...] wind”.

Local Planning Policy

Manchester City Council’s Local Development Framework Core Strategy Development Plan Document (adopted July 2012) includes Policy EN2 Tall Buildings, for which tall buildings are defined as buildings which are substantially taller than their neighbourhoods and/or which significantly change the skyline. Policy EN2 states:

“...tall buildings can have a significant impact on the local environment and its micro- climate. It is therefore expected that this impact be modelled and that submissions for tall buildings also include appropriate measures to create an attractive, pedestrian friendly local environment.”

The Guide to Development in Manchester, Supplementary Planning Document and Planning Guidance (adopted April 2007), includes:

Section 2. Design, Paragraph 2.40 (Hard landscaped areas within the public realm should be attractive):

“Where the public realm includes hard landscaped areas, its design should reflect the level and nature of their use, and should consider issues such as overshadowing, prevailing winds...”

Section 12. The City Centre, Paragraph 12.8 (Development Quality):

“...Key questions will be ... the microclimate, including overshadowing and air turbulence effects, created by the relationship of the building to those adjacent; and the quality and usability of the spaces surrounding the building.”

With regards to the abovementioned definition of a tall building, it should be noted the surrounding area includes existing and proposed future buildings of a similar height as the Proposed Development, as outlined in the New Cross development framework.

Additional Standards and Guidance

The assessment of environmental wind flows also 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 is not typically required for developments of the scale of the Proposed Development and lies outside the scope of the current study.

The 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.

Long-term wind frequency statistics from Manchester Airport weather centre, approximately 15 km to the south of the Site, were 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 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

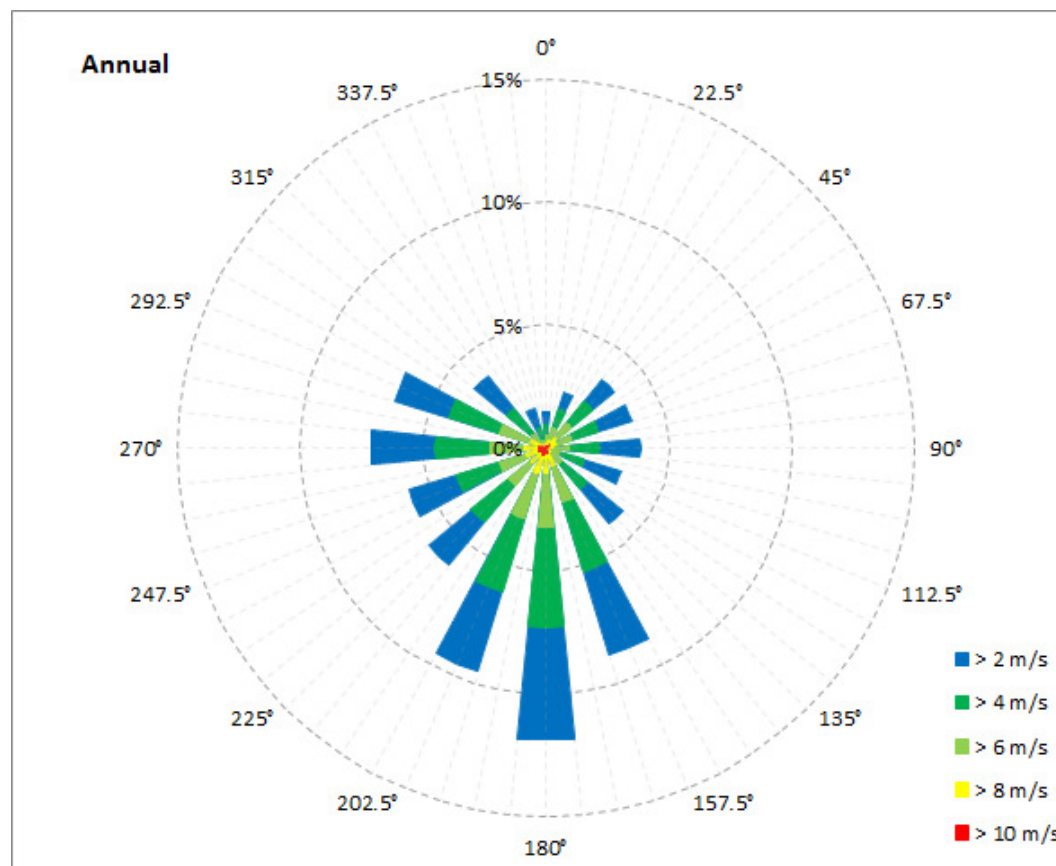
Suitability		Target Lawson comfort and safety criteria for specified seasons
Outdoor seating	For long periods of sitting, such as for an outdoor café or picnic area.	'Long term sitting' (C4) in at least summer.
Entrances, waiting areas	For pedestrian ingress/egress at entrances, or short periods of sitting 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.
Unsuitable	Unsuitable for all activities.	Exceeds comfort criterion for 'Business walking' (C1) or safety criteria (S1/S2).

3. Assessment

3.1. Baseline 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 40 m, corresponding to the approximate maximum 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 40 m)



Based on the wind climate statistics, winds from the southerly quadrant are prevalent. Light to moderate winds from the south and south-south-east are most common, whilst stronger winds more frequently blow from the south-south-west. Winds from the west-south-west and west also occur frequently, and extreme wind speeds (relevant to pedestrian safety) are most likely to blow from these directions. Northerly winds are generally light and rare, though cold north-easterly winds are common during spring. Wind speeds are generally higher during winter and lower during summer.

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 autumn to spring and for 'long term sitting' in summer.

The Site currently comprises a small commercial building and an open car park. Surrounding buildings, including the new development at Oldham Road / Marshall Street, partially shelter the Site from prevailing southerly winds and substantially shelter the Site from the stronger west-south-westerly winds.

As a result, conditions in and immediately 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 in and around the Site are expected to be suitable for at least leisurely strolling along the thoroughfares and for pedestrian ingress / egress at entrances to the existing and immediately surrounding buildings, including the new development at Oldham Road / Marshall Street. The bus stop on Oldham Road, to the south of the Site, is expected to be suitable for short periods of standing, such as for awaiting a bus.

The private garden to rear of the Turning Point rehabilitation centre on Thompson Street, to the northwest of the Site, is sheltered by a substantial boundary wall and is expected to enjoy suitable conditions for associated recreational uses, including outdoor seating.

Existing conditions are therefore expected to be suitable for current pedestrian activities.

3.2. Impact of Proposed Development

Demolition and Construction

Within the Site, pedestrian activities will be different during demolition and construction, comprising mainly work activities.

The removal of the existing low-rise building is not expected to significantly increase the exposure of any sensitive surrounding uses to prevailing southerly or stronger west-south-westerly winds.

During construction, there is some potential for the partially completed structure to slightly exacerbate downdraughts from northeast elevation of the Oldham Road / Marshall Street development, for north-easterly winds. However, this potential short-term effect would not be expected to materially affect the suitability of wind conditions.

Pedestrian perception of conditions both within the Site and in the surrounding area is also likely to be affected by expectations of conditions around a building site, with pedestrians more likely to tolerate adverse conditions as they can appreciate it as a temporary situation.

Overall, conditions are likely to be suitable for interim pedestrian activities and the Proposed Development is not expected to have any significant effect on wind conditions within the Site or surrounding area during construction.

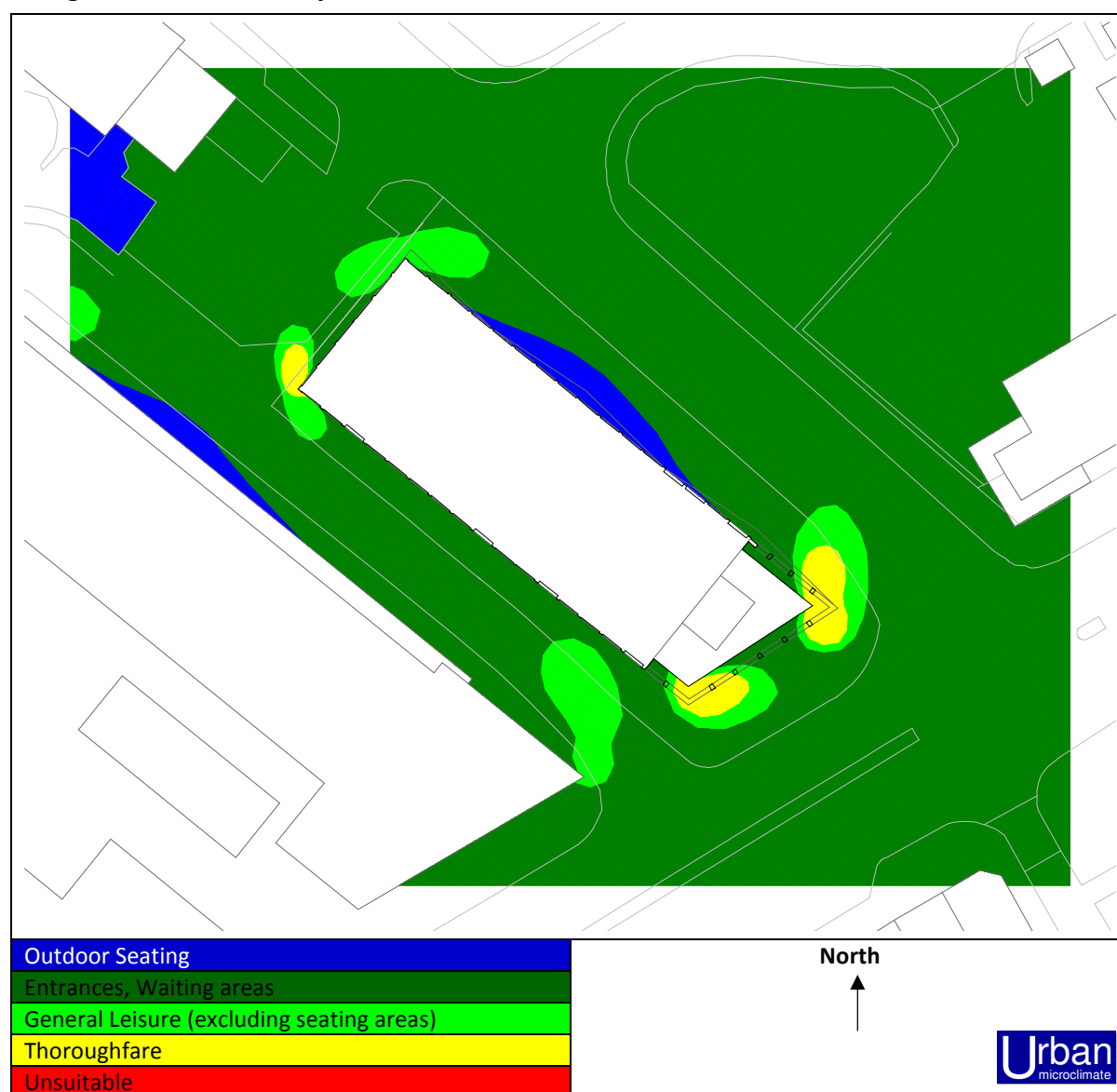
Operation

Upon completion, the Proposed Development will be partially sheltered at lower levels from prevailing southerly winds and substantially sheltered from stronger west-south-westerly winds by surrounding buildings.

In addition, the orientation of the Proposed Development relative to these winds and the modest height of the proposal is expected to limit the potential for downdraughts. The main wind effects are therefore expected to comprise channelling of prevailing winds along the building frontages and around the corners.

The 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).

Figure 3.2: Suitability Assessment



Pedestrian Safety

As discussed above, the Proposed Development is of modest scale and is partially sheltered from prevailing winds. 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 considered to have no significant impact with respect to pedestrian safety.

Pedestrian Comfort

In terms of pedestrian comfort, with respect to wind force, wind conditions are expected to be suitable for at least leisurely strolling and are thus considered suitable for pedestrian access to and passage past the Development.

The main residential entrance to the Proposed Development is located in a relatively sheltered part of the southwest elevation, away from the building corners, and is expected to enjoy suitable conditions for pedestrian ingress / egress. Secondary entrances on the southwest and northeast elevations are also expected to enjoy suitable conditions for pedestrian ingress / egress.

The commercial frontage on Oldham Road is potentially susceptible to prevailing south-south-westerly and west-south-westerly / westerly winds accelerating around the south corner, as well as southerly and north-easterly winds, common in spring, accelerating around the east corner. The entrances may be too close to the corners to enjoy comfortable conditions for pedestrian ingress / egress, but conditions are expected to be tolerable for a commercial entrance.

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 and entrances to surrounding buildings, including the new development at Oldham Road / Marshall Street, are expected to remain suitable for pedestrian ingress / egress. The bus stop on Oldham Road, to the south of the Site, is expected to retain suitable conditions for awaiting a bus. The private garden to rear of the Turning Point rehabilitation centre is also expected to remain suitable for associated recreational uses, including outdoor seating.

Communal Roof-Top Terrace

The roof-top terrace is generally exposed to prevailing southerly and south-south-westerly winds, as well as the stronger winds from the west-south-west. However, the potential for these winds to be channelled across the terrace is limited by the height of the building extending above the terrace (two storeys) and by the relatively narrow southeast façade. In addition, the terrace has a solid perimeter parapet, though the taller frame structure is too open to have significant benefit with respect to wind conditions. Overall, the terrace is expected to be suitable for recreational activities including long periods of outdoor sitting

(such as for a picnic, for example) during summer. The terrace may however benefit from the introduction of landscaping features, such as planters or hedging, around any seating areas to further enhance conditions and maximise the potential for amenable conditions for outdoor sitting.

3.3. Cumulative Effects

As discussed in Section 1, the above assessment considers surrounding developments currently under construction.

In addition, the surrounding area includes a number of consented future developments. The closest of these are at 32-38 Oldham Road (planning ref. 119731/FO/2018), approximately 90 m from the Site, and at 25 Addington Street (planning ref. 115746/FO/2017), approximately 135 m from the Site. These future developments are not considered close enough to be significantly affected by the Proposed Development.

The associated developments at Oldham Road and Goulden Street are similarly considered to lie sufficiently far, to the southwest and west respectively, to experience no significant wind effects emanating from the Proposed Development.

The surrounding redevelopment as a whole may enhance the shelter provided to the Site, but this is not expected to materially affect the suitability of conditions discussed above, with existing surrounds.

On this basis, the suitability of pedestrian and roof-terrace level wind conditions in and around the Site are not expected to significantly change from those discussed above for the existing surrounding context.

Similarly, the Proposed Development is not expected to significantly affect conditions within the future surrounding developments.

Potential cumulative effects are therefore considered insignificant.

3.4. 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 commercial entrances may benefit from relocating further along the façades, away from the corners, to create more amenable conditions for pedestrian ingress / egress but this would be considered an enhancement rather than a mitigation requirement. Similarly, the communal roof-top terrace may benefit from the introduction of landscaping features to provide additional shelter to any seating areas.

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 immediately around the existing Site are expected to rate as safe for all users and are expected to be comfortable for current pedestrian activities.

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 around the Site are expected to be suitable for pedestrian access to, and passage past, the Proposed Development.

Residential entrances to the Proposed Development are expected to enjoy suitable conditions for pedestrian ingress / egress. The commercial entrances may be slightly windy but are expected to be tolerable for pedestrian ingress / egress.

The communal roof-top terrace is expected to enjoy suitable conditions for planned recreational activities, but may benefit from the introduction of landscaping features to further enhance conditions.

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

On the basis of the above, the Proposed Development is considered compliant with Local Authority policies with regards to wind microclimate.

Appendix A – Wind Climate at Site

Figure A.1: Autumn Wind Speed and Direction Distribution (at ref height of 40 m)

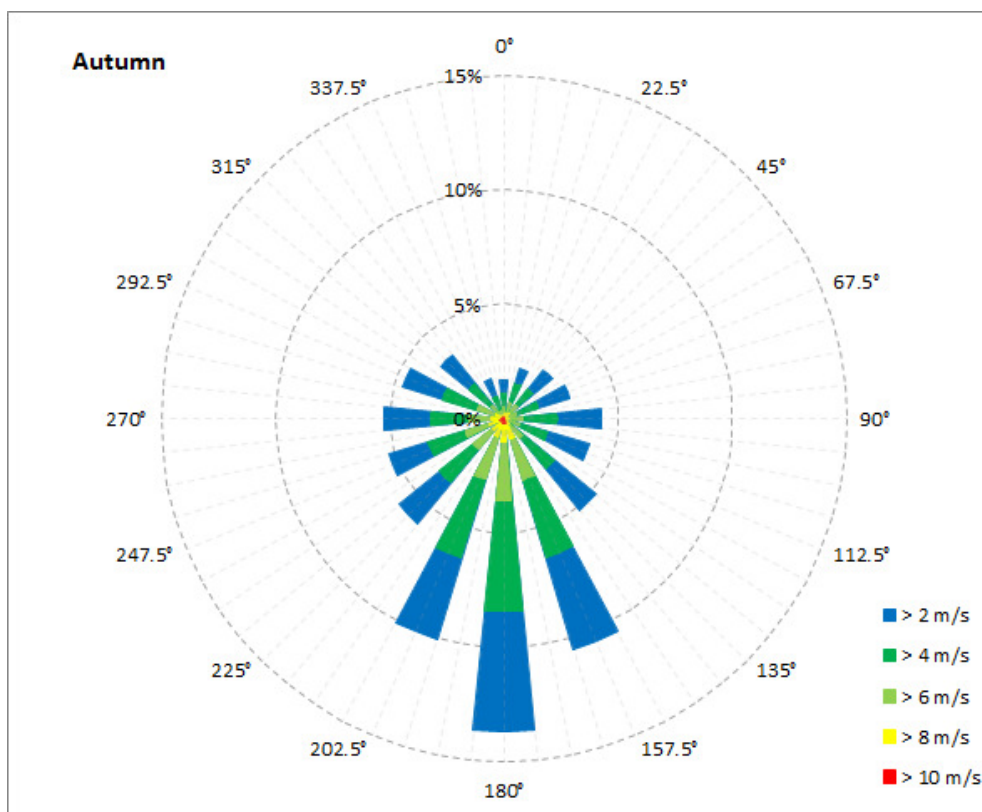


Figure A.2: Winter Wind Speed and Direction Distribution (at ref height of 40 m)

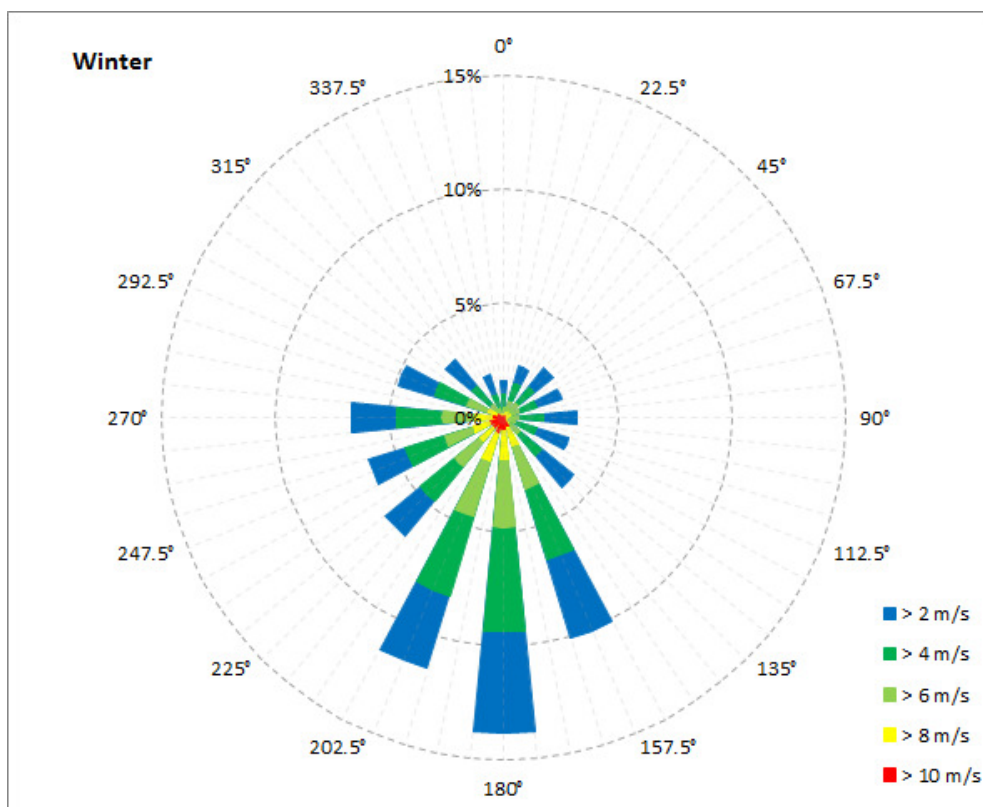
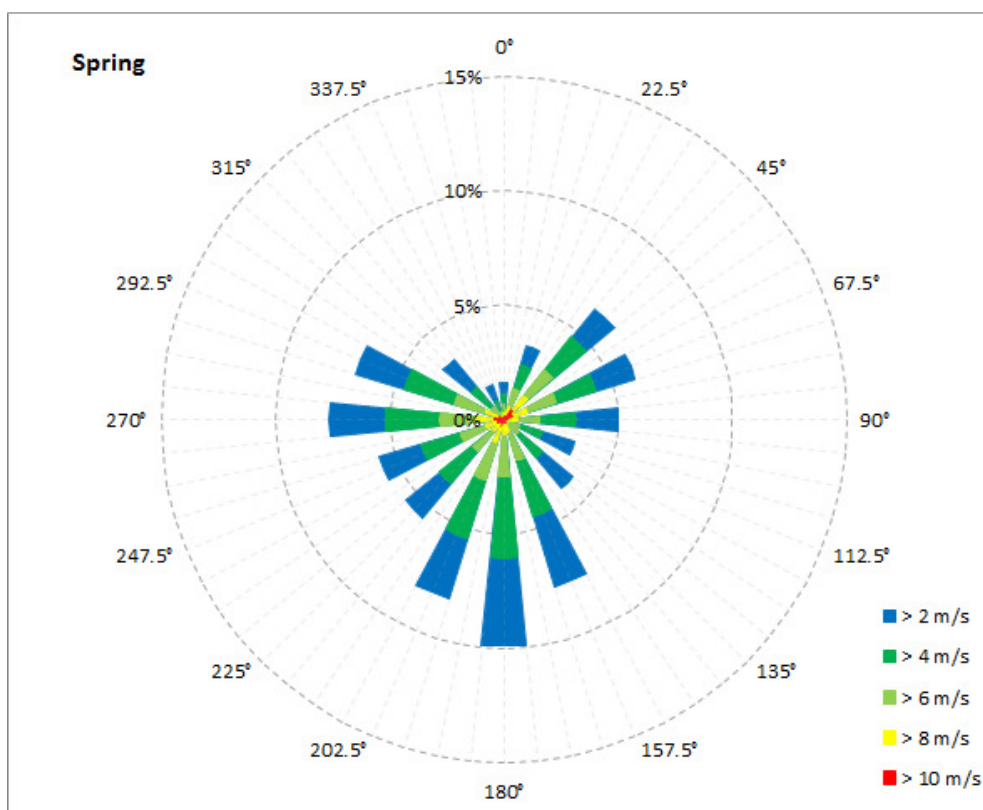


Figure A.3: Spring Wind Speed and Direction Distribution (at ref height of 40 m)**Figure A.4: Summer Wind Speed and Direction Distribution (at ref height of 40 m)**