Unlocking potential for a better built environment

DESKTOP WIND MICROCLIMATE ASSESSMENT REPORT

Moxy Hotel, Spinningfields

January 2025

GIA No: **21958**

PROJECT DATA:

Client	**KE Hotels (Manchester) Ltd, T/A Moxy Manchester City**
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1 INTRODUCTION

This report outlines the results of a desktop wind microclimate assessment of the Moxy Hotel, Spinningfields

1.1 SUMMARY

Potential wind effects were assessed for Moxy Hotel, Spinningfields.

Consideration was given to the potential impact of the proposed development on local thoroughfares, proposed amenity spaces and building entrances.

Various potential risk factors for raised wind speeds were considered.

Given the relatively small amoung of the facade that is exposed to either the primary or secondary dominant winds in Manchester, due to the shelter provided by neighbouring buildings, there is a low risk of raised winds on the ground.

Therefore the wind conditions at the ground level are considered to be suitable for use.

1.2 GUIDANCE

The Planning Practice Guidance (2021) identifies the potential for tall and large buildings to affect wind microclimate. The National Design Guide (2021) states in Paragraph 71 that:

"Proposals for tall buildings (and other buildings with a significantly larger scale or bulk than their surroundings) require special consideration. This includes their [...] environmental impacts, such as [...] wind. These need to be resolved satisfactorily"

Greater Manchester Combined Authority Joint Development Plan "Places for Everyone" (2021)

Policy JP-P-1 "Sustainable Places" states that "all development [...] should be consistent with: [...] comfortable and inviting, with indoor and outdoor environments: [...] addressing microclimate issues such as sunlight, indoor air quality, overheating, shade, wind and shelter".

Manchester Core Strategy (2012 – 2027)

Policy EN2 – Tall Buildings – States that, by their very size, 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.

2 METHOD

To assess the terrace pedestrian comfort, safety and uplift pressures a 3D CFD model of the development and surrounding site was created. This section describes the methodology for the creation of this model and the inputs used.

2.1 ASSESSMENT METHODOLOGY

The assessment was performed as a desktop study, combining analysis of wind data from a local weather station with qualified assessment of any likely effects that the development may have on local wind conditions.

The assessment was performed by an experienced wind engineer with 10 years specific experience of performing wind microclimate studies.

The most common effects that a development could have on local wind conditions are as follows:

- Downwash:
  - High speed airflow from higher in the earth boundary layer being directed down to ground level by a building face.
- Corner flows:
  - Acceleration of the airflow due to the large pressure gradients around sharp corners.
- Channelling:
  - Acceleration of the airflow due to the flow paths being constrained between multiple buildings.

In general wind conditions at ground level are typically influenced by the phenomenon known as downwash. This mechanism increases with building height and exposure to winds (or reduced shelter from surrounding buildings). Therefore the results discussion will predominantly be around the associated risk of downwash.

2.2 SITE GEOMETRY

A 3D CAD model of the proposed development was used for the analysis, which is shown in Figure 4.

The site is located within a suburban setting of low to medium rise commercial and residential units. The surrounding area is shown in Figure 5.

2.3 WIND DATA ANALYSIS

30 years of wind data were obtained for Manchester Airport. The location of the site relative to the airport is shown in Figure 6.

Seasonal wind roses were created for the weather station. These are shown in Figure 7.

The dominant wind direction is westerly in winter, autumn, summer and spring.

The secondary wind direction observed in winter is westerly.

The dominant wind directions for high wind speeds (hourly wind speeds >8m/s at 10m height at the airport) are 290°, stronger winds are most likely to occur in summer.

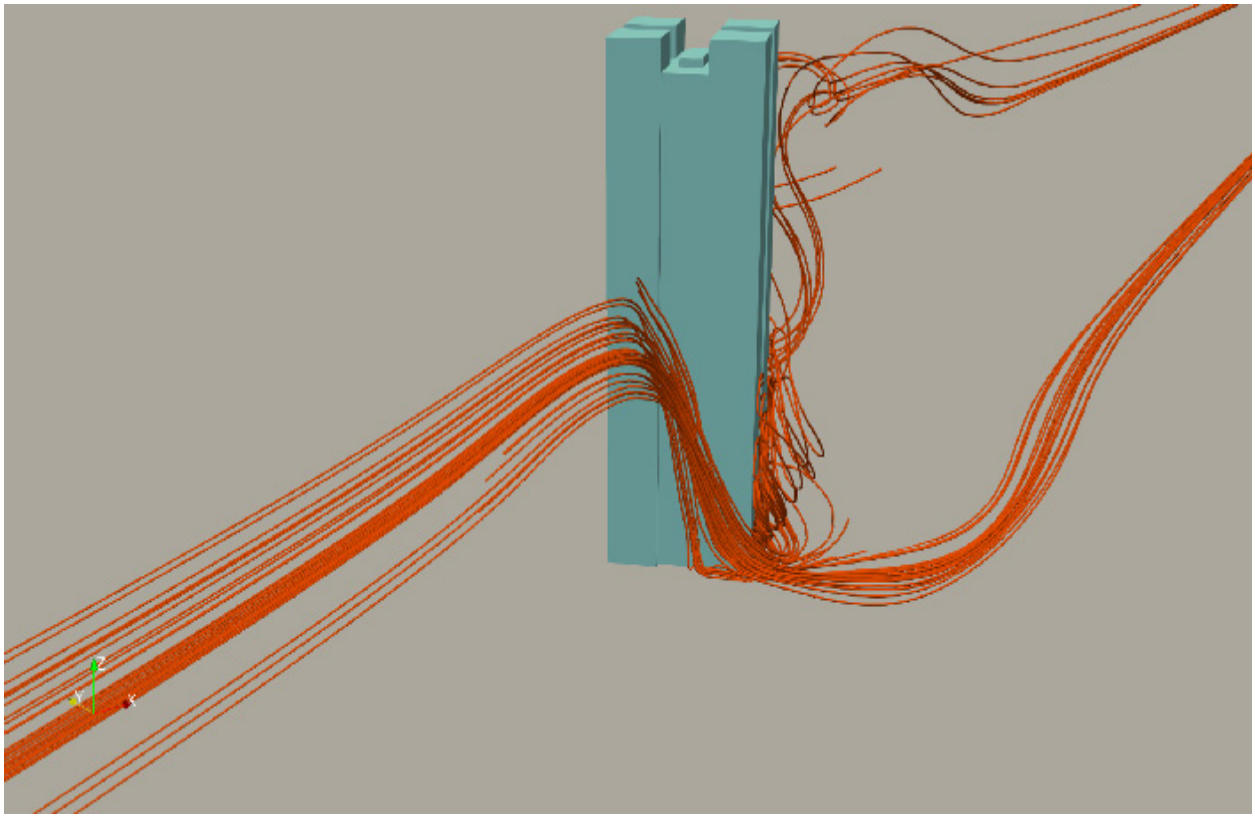


Fig. 01: Downwash

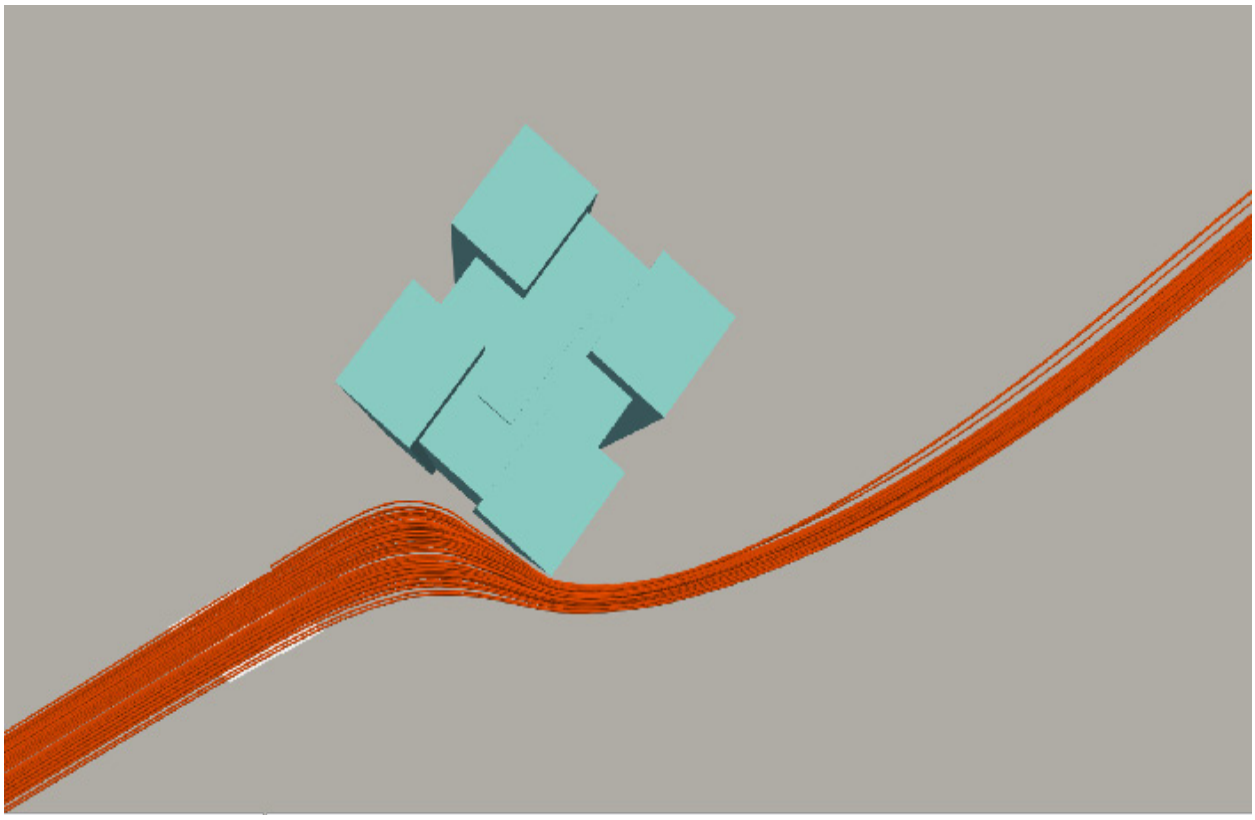


Fig. 02: Corner Flows

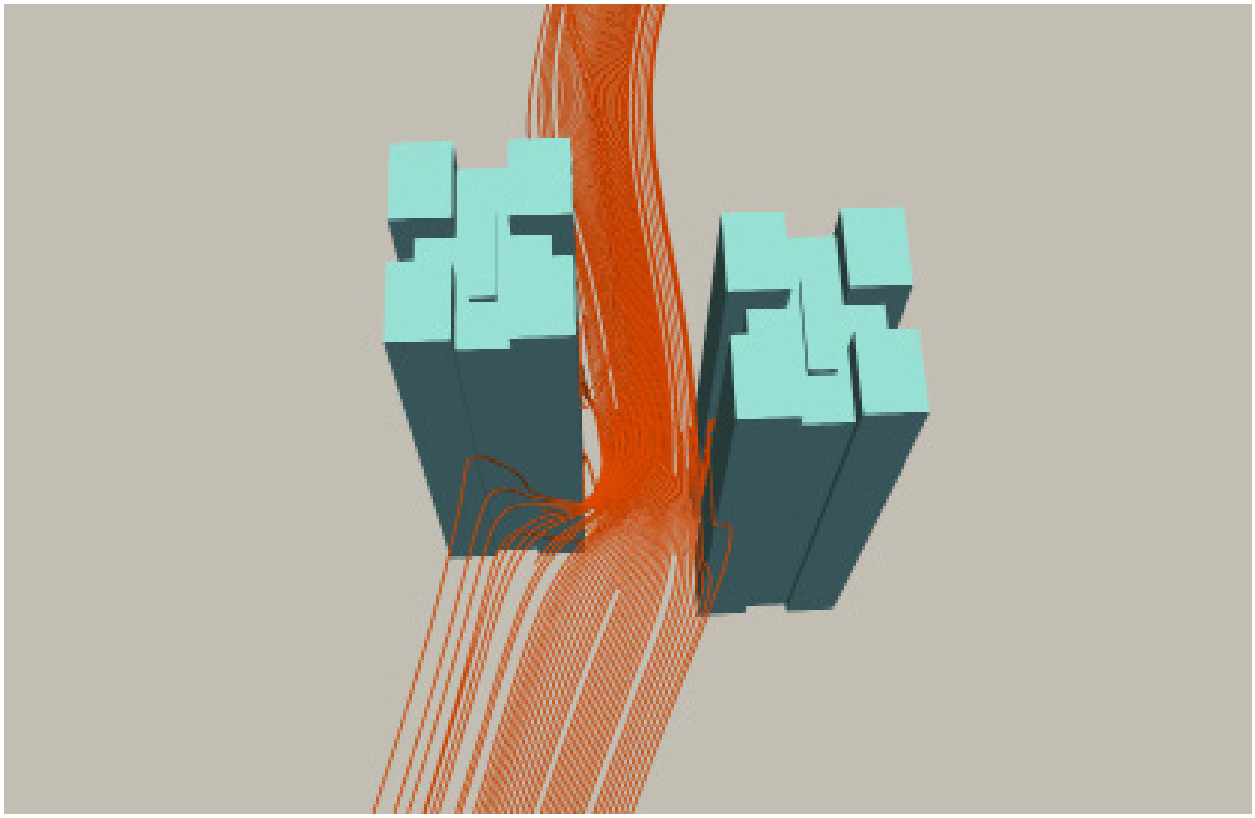


Fig. 03: Channelling



Fig. 04: The Proposed Development

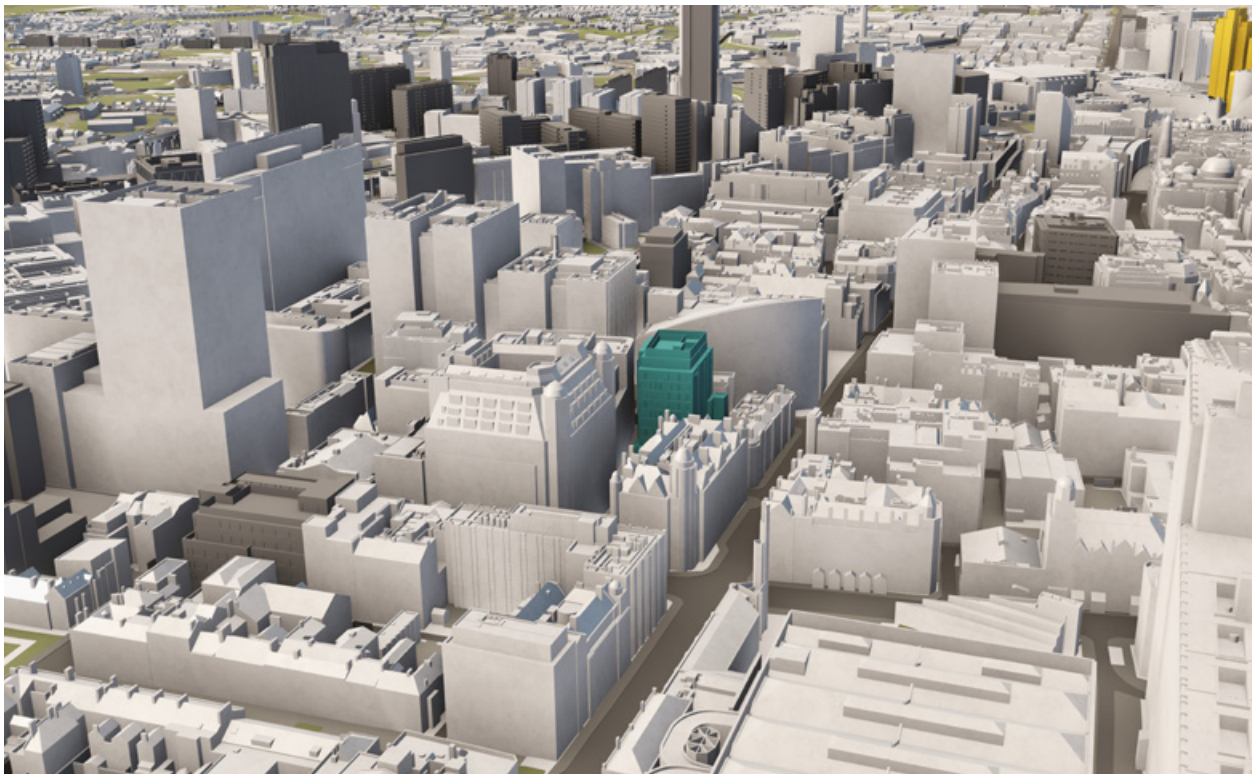


Fig. 05: Surrounding Area, with the site shown shaded.



Fig. 06: Relative Locations of Site and Weather Station Manchester Airport

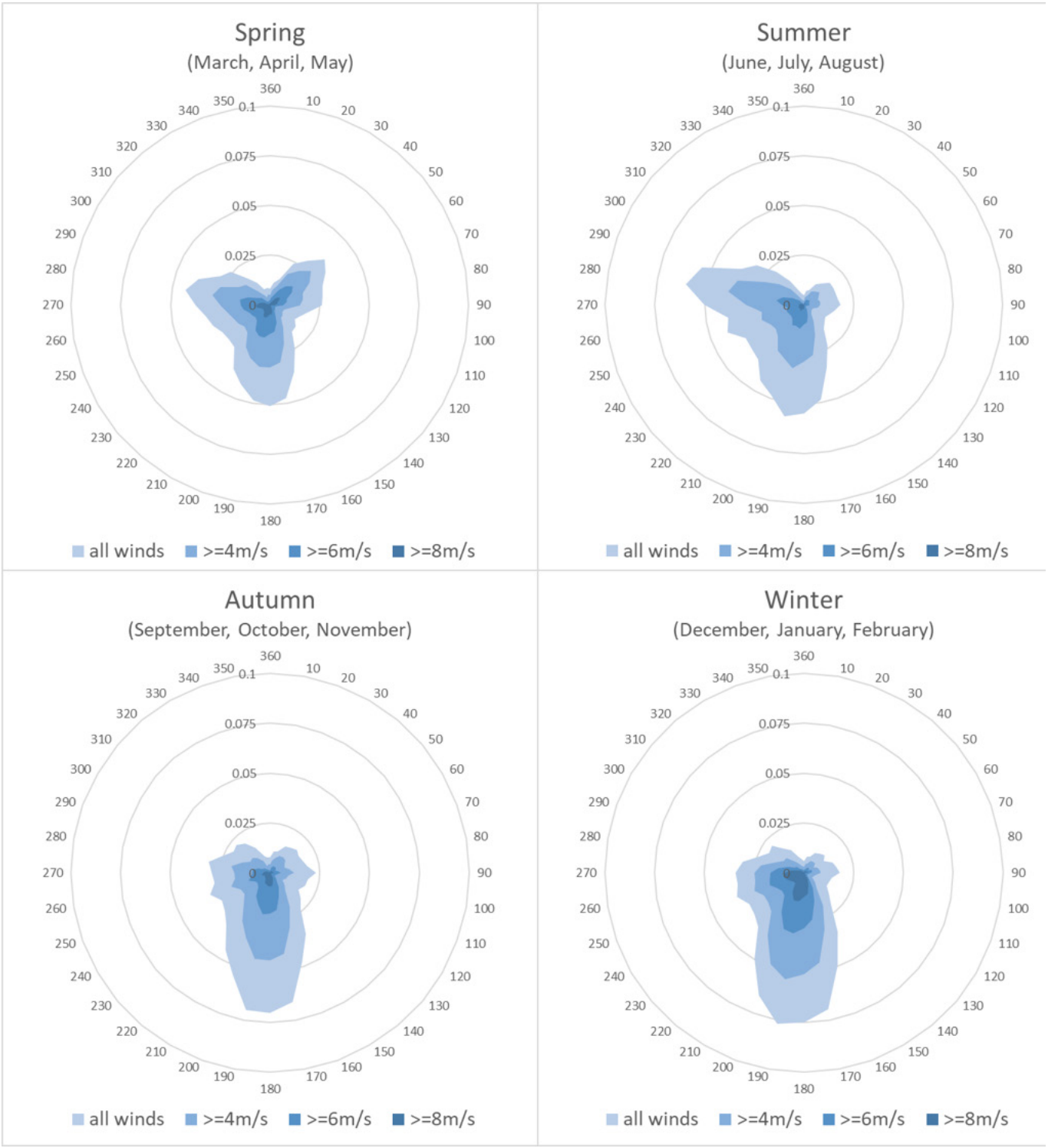


Fig. 07: Seasonal Wind Roses for Manchester Airport (1990-2020)

2.4 TARGET CONDITIONS

The desired wind microclimate would typically need areas acceptable for sitting, standing (including at entrances of buildings) and walking use. A description of the comfort categories to classify wind conditions in accordance with is given below.

Any areas which are predicted to be unsafe (annually) or uncomfortable (for winter) will require mitigation, unless they are in locations where pedestrian access can be controlled in the event of strong winds. This applies to all thoroughfares (for pedestrians) and roads (for cyclists) around the Development.

The areas immediately outside any building entrances should be suitable for standing use during winter to provide a "buffer" between the still conditions in interior spaces and the general thoroughfare.

Any amenity spaces should be suitable for leisure walking in the winter, and for a mixture of sitting and standing in the summer.

2.5 LIMITATIONS & ASSUMPTIONS

This study is a desktop study. This means it does not include any modelling of the actual airflow around the site. Hence any atypical local microclimatic features will not be captured.

The nature of a desktop study means that all results and conclusions are qualitative, and it is not possible to draw quantitative conclusions.

Table 01: Lawson Comfort Criteria (LDDC variant)

KEY	COMFORT CATEGORY	MEAN WIND SPEED (5% EXCEEDANCE)	DESCRIPTION
	Sitting	4 m/s	Acceptable for outdoor sitting use (e.g. cafés, benches, balconies and terraces)
	Standing	6 m/s	Acceptable for main building entrances, pick-up / drop-off points and bus stops
	Walking (leisure)	8 m/s	Acceptable for strolling
	Walking (business)	10 m/s	Acceptable for external pavements,
	Uncomfortable	>10 m/s	Not comfortable for regular pedestrian access

Table 02: Lawson Safety Criteria (LDDC variant)

KEY	SAFETY CATEGORY	MEAN WIND SPEED (0.025% EXCEEDANCE)	DESCRIPTION
	No Safety Exceedance	<15 m/s	
	S15 (Distress)	>15 m/s	Unsafe for frail individuals, or cyclists
	S20 (Safety)	>20m/s	Wind conditions considered unsafe for all users

3 RESULTS

Figure 8 shows a plan view of the development site, with the dominant (west north-west) and secondary dominant (south south-east) wind angles highlighted.

Figure 09 shows the view from the dominant wind angle.

Figure 10 and 11 shows views from the secondary dominant wind angle.

From the diminant west south-westerly winds directly the proposed development slightly protrudes above the neighbouring properties. The extent of the protrusion is minimal and is unlikely to generate raised winds at ground level.

From the secondary dominant, southerly wind direction, the proposed development is slightly more exposed to these winds. The podium level circled in Figure 11 should provide additional protection from winds that are encouraged downward, due to the downwash effect.

Therefore the wind conditions at the ground level should be suitable for use.

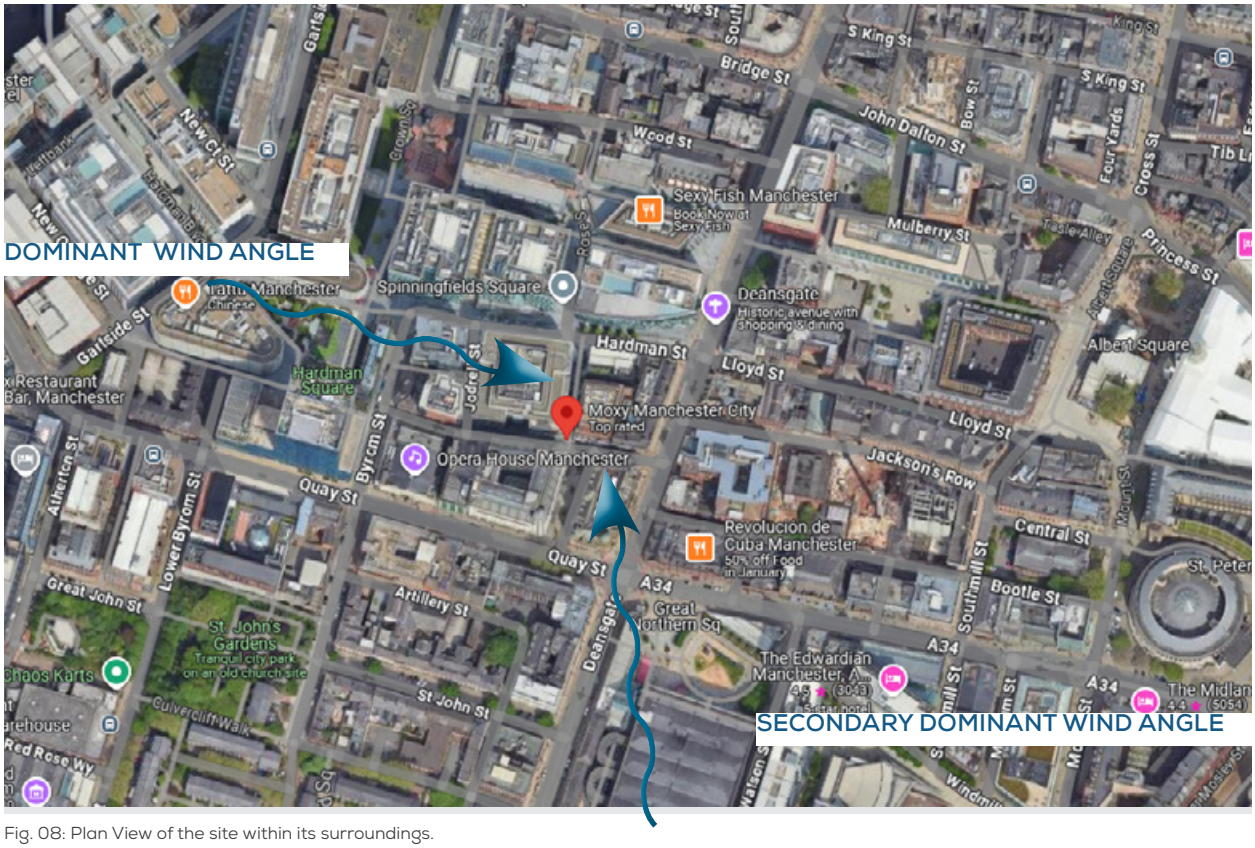


Fig. 08: Plan View of the site within its surroundings.

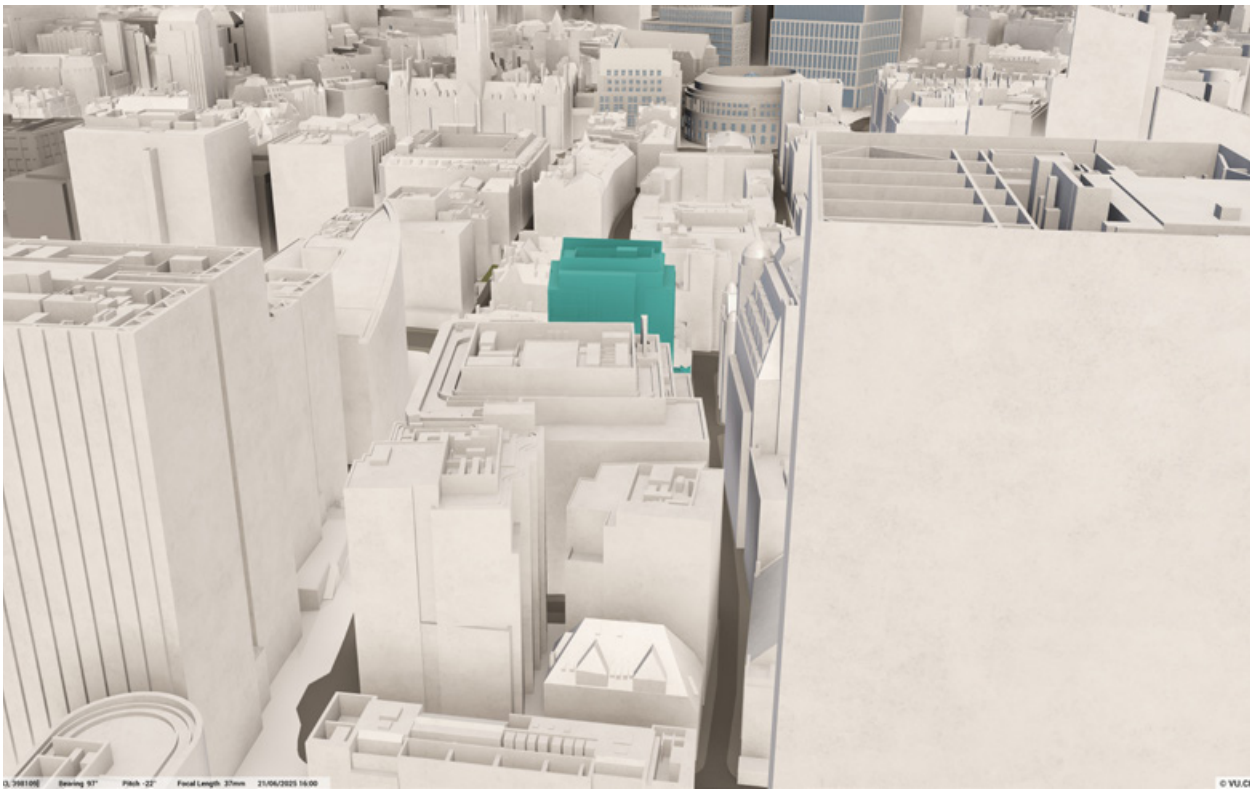


Fig. 09: The Proposed Development, as Viewed from the dominant wind angle (West North-West)

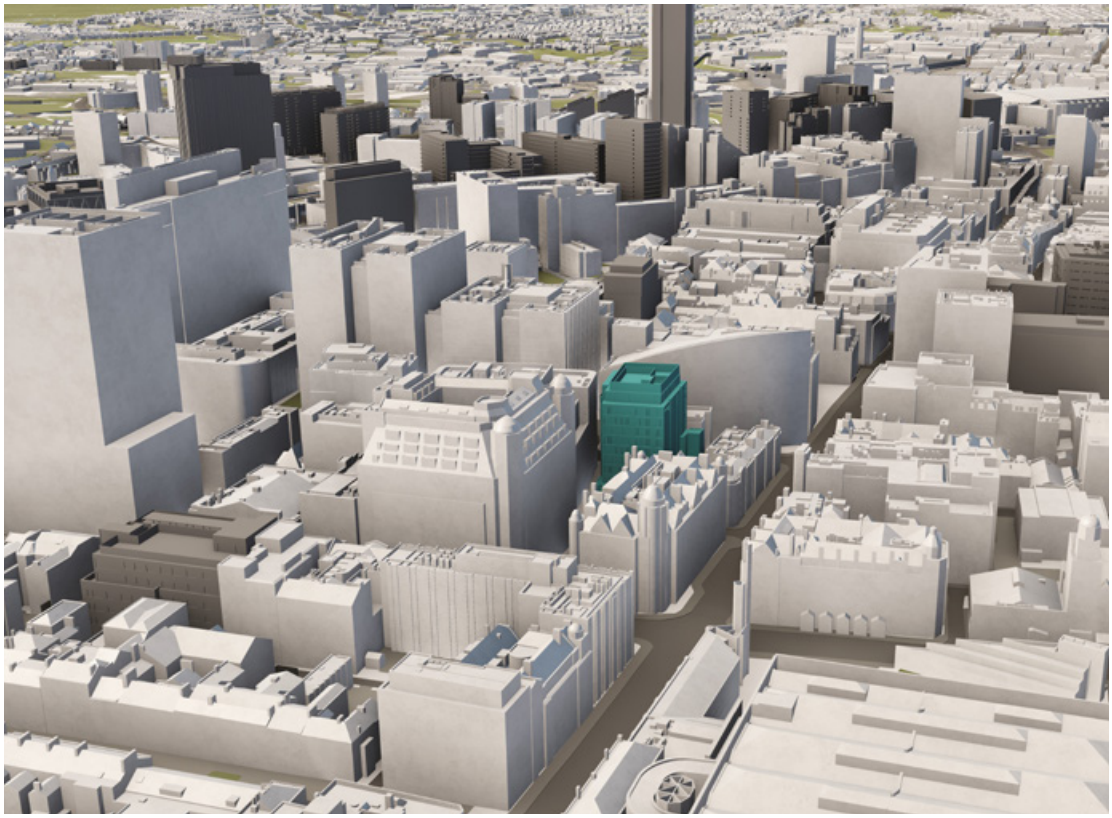


Fig. 10: The Proposed Development, as Viewed the secondary dominant wind angle, close up.



Fig. 11: The Proposed Development, as Viewed from Fountain Street (from the South South-East)

4 CONCLUSIONS

Potential wind effects were assessed for Moxy Hotel, Spinningfields.

Consideration was given to the potential impact of the proposed development on local thoroughfares, proposed amenity spaces and building entrances.

Various potential risk factors for raised wind speeds were considered.

Given the relatively small amoung of the facade that is exposed to either the primary or secondary dominant winds in Manchester, due to the shelter provided by neighbouring buildings, there is a low risk of raised winds on the ground.

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