SRE Briefing Note

Microclimate Studies

November 2020

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Building heights, form and massing all impact air flow through an urban area, and can create problematic conditions at ground level. As skylines in UK cities are being transformed from relatively low-lying skylines to more dense, high-rise streetscapes, microclimate studies are becoming more important.

Policy Background

The Greater London Authority and The City of London have introduced new guidance on the modelling and testing required to ensure that the Public Realm around proposed developments - pavements, parks, seating areas etc - are not adversely affected by the acceleration of air that can occur.

Planning Policy within the New London Plan (Policy D7 and D8) and the emerging City of London Local Plan (2036) outline the general requirements for consideration in relation to the impact of proposed developments on the local microclimate. Generally, these requirements apply to tall buildings (as defined by the relevant planning body) only.

In the first definitive guide of its type in the UK, the City of London Authority has also released 'Wind Microclimate Guidelines for Developments in The City of London'. Whilst written specifically for The City of London, there is no doubt that this document will inform policies throughout

London and in other urban centres in the UK: www.cityoflondon.gov.uk/assets/Services-Environment/wind-microclimate-guidelines.pdf

Measuring Comfort

Microclimate studies focus predominately on wind velocity. High wind velocities can make a public spaces unusable, resulting in reduced 'dwell time', a less vibrant public realm and reduced income for adjoining commercial premises.

Conditions can also be adversely affected in private spaces such as balconies, terraces and roof gardens. Ensuring these spaces remain viable, usable and vibrant are key to the success of any urban development.

The Comfort Level of a space is generally described within the Lawson Wind Comfort Criteria, where the probability of wind speed exceeding a specific velocity is expressed. The different wind speeds in addition to the probability values determine the level of comfort for pedestrians.

The criteria are defined within the table below:

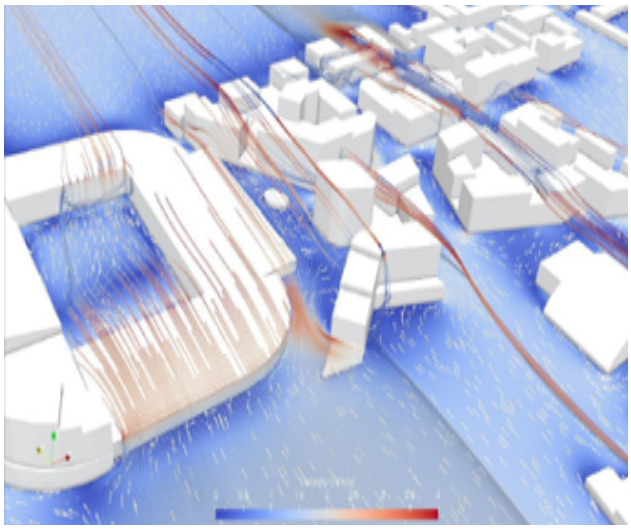
Category	Wind Velocity	Probability	Suitable Activity	
A	< 2.5m/s	< 5%	Frequent Sitting	Light breeze suitable for outside restaurants and seating areas where one read a paper or comfortably sit for long periods of time
B	< 4.0 m/s	< 5%	Occasional Sitting	Breeze suitable for shorter periods of sitting in parks and outdoor spaces
C	< 6.0 m/s	< 5%	Standing	Gentle breeze suitable for entrances, play areas and bus stop
D	< 8.0 m/s	< 5%	Walking	Moderate breeze suitable for slow paced walking with occasional stops
E	> 8.0 m/s	> 5%	Uncomfortable	Windy conditions that are uncomfortable for all pedestrian activities
S	> 15 m/s	> 0.022%	Unsafe	Dangerous strong winds

Recommended Approach for Wind Microclimate Studies

The 'Wind Microclimate Guidelines for Developments in The City London' outlines the following as the recommended approach to modelling the effects of Proposed Developments:

Building Height	Recommended Approach to Wind Microclimate Studies
Similar or lower than the average height of surrounding buildings. Up to 25m for City of London.	Wind studies are not required, unless sensitive pedestrian activities are intended (e.g. around hospitals, transport hubs, etc) or the project is located on an exposed location (e.g. edge of Thames, near a tall building).
Up to double the average height of surrounding buildings. 25m to 50m for City of London.	Computational (CFD) Simulations OR Wind Tunnel Testing.
Up to 4 times the average height of surrounding buildings. 50m to 100m for City of London.	Computational (CFD) Simulations AND Wind Tunnel Testing.
High Rise. Above 100m.	Early Stage Massing Optimization: Wind Tunnel Testing OR Computational (CFD) Simulations Detailed Design: Wind Tunnel Testing AND Computational (CFD) Simulations to demonstrate the performance of the final building design.

To avoid a conflict of interest and to ensure that results can be corroborated for a given area, where CFD and Wind Tunnel modelling are required, these should be undertaken by separate consultants.



3D output showing airflow streams

How can SRE help?

Using advanced 3D modelling software, SRE model a Proposed Development within the wider environment. The precise wind characteristics of an area, climatic conditions, topography, surrounding buildings and vegetation can all be simulated in the modelling.

For the purposes of developments within the City of London, 36 wind directions are considered to give additional levels of detail. However, depending on local policy and the complexity of the surrounding cityscape studies can consider as few as 16, or even 8, wind directions, whilst maintaining high levels of accuracy.

Air flows through the space can then be accurately modelled from numerous wind directions, and combined to inform the comfort level of the space in relation to the Lawson Criteria.

The results of the dynamic modelling are overlayed onto the proposed street plan, showing the levels of comfort throughout the proposed development site. Remedial work within the design can then be undertaken to mitigate any problematic areas.

Should you need assistance in this matter, please contact us on 01730 710044, email info@sre.co.uk, or visit www.sre.co.uk

Indicative street plan with LDDC Lawson Criteria highlighted

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