### Importance of microclimate assessment of tall buildings

A good microclimate is essential to make cities attractive and comfortable places for people to live, work and visit. Bad urban planning and building design can create poor microclimates, making city areas undesirable and, more seriously, can threaten the health and safety of the population. Densely built city centres are at most threat of extreme microclimate factors and are thus in most need of greater regulation. Microclimate factors that are most assessed in EIA include daylight, sunlight, overshadowing, solar glare and wind – all of which can have significant individual and combined effects.

There have been failings in urban planning and individual building designs that have contributed to unsatisfactory, and in some cases dangerous, microclimates around tall buildings. Such failings have led to powerful wind tunnel effects and gusts at street level (capable of tipping over large vehicles), extremely hot street surfaces from focused light rays, low natural light levels for neighbouring residencies and scenarios that have damaged adjacent properties. More seriously, there have been deaths associated with the unusual wind conditions at the base of new buildings.

**Tall Buildings in London**

Currently there are nearly 600 high-rise (>35m high) buildings within Greater London, and between 2014–2015 there were 263 additional towers (i.e. >20 storeys) in the planning process. This number would increase the total of tall buildings in London by 45% and would dramatically change the ground level environment. The need for microclimate assessment (and mitigation) in urban planning is ever more apparent.

**Legislation and Example Planning Policy**

National legislation: artificial lighting emitted from premises (including natural illumination by capturing daylight) can be a ‘statutory nuisance’ [under section 79 of the Environmental Protection Act 1990 (as amended by section 103 of the Clean Neighbourhoods and Environment Act 2005)].

Other microclimate impacts, such as wind, are not directly mentioned in national legislation.

National planning policy: National Planning Policy Framework (NPPF) (2015) requires good standard of amenity for all existing and future occupants [paragraph 17] and requires planning policies to use streetscapes and buildings to create comfortable places to live, work and visit [paragraph 58]. Planning Practice Guidance (2014) recognises that tall building forms pose specific design challenges related to how they affect local wind and sunlight patterns [paragraph 25] and that account should be taken of local climatic conditions [paragraph 26].

Regional policy: The London Plan states that tall buildings should not affect their surroundings adversely in terms of microclimate, wind turbulence, overshadowing and reflected glare [policy 7.7].

Local policy: City of London’s Local Plan states “the design and materials [of large buildings should] avoid unacceptable wind impacts at street level or intrusive solar glare impacts on the surrounding townscape and public realm” [Policy DM10.1].

**Sustainable Urban Design**

The EIA process can be a catalyst for sustainable urban design of tall buildings by bringing together clients, architects and planners at the initial design stage. EIA Practitioners can assist project teams in predicting likely microclimate effects at the scoping stage and by identifying the modelling and testing work required within the assessment (e.g. computational fluid dynamics [CFD] and wind tunnel testing). Some Local Planning Authorities (LPA) even provide specific criteria for such assessments; for example Tower Hamlets’ EIA scoping guidance requests tunnel modelling for buildings over 10 storeys high and CFD/desk-study for less than 10 storeys. An important aspect of this work is to fully incorporate cumulative schemes into the assessment to ensure that the interaction of the development with other proposals does not exacerbate microclimate impacts.
Being armed with examples of good and bad practice, as well as a good understanding of the relevant guidance and case law, is essential to help resistant clients understand how the EIA process can help. Additionally, IEMA’s Guide to Shaping Quality Development can be used as a blue print to shaping good microclimate design.

Initiating proactive communication with the design team and client over microclimate effects can minimise the need for redesign or retrofit mitigation, through optimising designs from the earliest stage and is likely to improve the chances of the LPAs granting planning consent.

EIA Practitioners and urban planners must work to bring together the sometimes conflicting aspirations of the client and architect, the prevailing planning policy compliance, and the needs of future users, visitors and public. As concluded in a recent research article, sustainable urban design incorporates a “holistic approach that goes beyond the architecture, structural or façade system to include the interface between the street environment and the building”; EIA is surely the best tool to understand and optimise this interface.

This article was written as a contribution to the EIA Quality Mark’s commitment to improving EIA practice. Sam Edwards is an Environmental Consultant at AECOM, April 2016.

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