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Shaftesbury Theatre: Live Loads to Proposed Basement Extension Roof Slab

The proposed basement to Shaftesbury Theatre will wrap around the external elevations of the building, one storey level below Bloomsbury Street and High Holborn. The Bloomsbury Street elevation of the proposed basement will extend below the existing highway. It is understood that this section of Bloomsbury Street is to be pedestrianized as part of the West End Project being carried out in partnership with the London Borough of Camden. The proposed work to Shaftesbury Theatre will be carried out concurrently to the West End Project. Although the area above the new basement will be pedestrianized, the roof slab to the new basement will be design to allow for highway loading should Bloomsbury Street ever be reinstated as a highway in future.

As such we have based the design loadings for the basement roof slab on *BS 5400-2:1978 Steel, concrete and composite bridges- Part 2: Specification for loads*. This document sets out the loads and load combinations for highway bridge live loads in Great Britain. These are summarised as follows:

HA Loading: consists of a uniformly distributed load (30kN/m to each lane of the notional carriageway) and knife edge load (120kN across each lane of the carriage way) or a single wheel load of 100kN.

HB Loading: abnormal vehicle loading. One unit consists of 10kN per notional axle. This is distributed between four wheel per axle and four axles in total. The minimum number of units of type HB loading that shall be considered is 25, but this number may be increased up to 45 if so directed by the appropriate authority. 25 units of HB loading will be allowed for in the proposed design.

Various combinations and arrangements of these two loads are required to be applied to the structure by the code. Areas of the structure which are not considered to be subject to highway loading, now or in the future, will be designed for an imposed load of 10kN/m².

The geometry of the proposed structure and load combinations and arrangements set out in BS5400-2, dictates that the HA load case alone is the most onerous when applied to the whole structure.

In the absence of any more specific design load combination in relation to basements, it is felt that the use of this code of practice adequately satisfies the design requirements for the proposed structure.