Basement Update
Consultants brief

14 May 2012

Purpose of the study

Need to retest the hypotheses put to Arup in 2008 and to answer the following questions.

- Is the construction of a basement under a house in a terrace likely to cause damage to the structure of an adjoining, or nearby properties, though subsidence, heave or similar?

- Will the construction of a basement interrupt the water table, displace groundwater and cause the flooding of gardens, lower ground floors or basements of neighbouring properties?

- What measures are necessary to mitigate the impact of basement extensions beneath gardens upon trees, gardens and greenery, both within the application property and adjoining?

In addition any assessment must specifically consider the possible cumulative impact of multiple basement extensions that have been constructed in close proximity. Consideration should be to nearby properties, not just those which immediately adjoin the basement extension. It should incorporate existing experience and best practice gleaned since the publication of the original Arup report in 2008. The final report must form a firm and timely foundation for the forthcoming Core Strategy/SPD review and integration with NPPF, proving a robust basis on which to answer any planning appeals.

The study will include the following elements:

Contents

An examination of the hydrological and geophysical character of the Borough

This study will include an examination of the varied hydrological and geophysical character of the Borough. This will include consideration of:

- Topography
- Geological conditions (clay, gravel, old river channels etc)
- Hydrological and hydro-geological conditions (surface water, shallow and deep aquifers)

The study will consider whether the differing characteristics within the Borough will require a differing approach to basement development, and if so, clearly set out what these differing approaches may be.

- Will different types of basement development be appropriate in different areas?
- Are different mitigation and adaption measures appropriate?
- Is there is a case for not allowing basements in specific areas, such as areas susceptible to flooding, where there is inadequate sewer capacity or where there problems of cumulative effects?

An assessment of the impact that recent subterranean development has had upon structural stability, ground water and surface water.

The Council envisages that this will consist of survey/ sample considering case studies from within this Borough and elsewhere. Three particular elements will be considered:

- Impact of construction upon structural stability. If structural damage is caused has this been effectively resolved, and if so how?
- Impact of basements beneath gardens upon the state of the gardens.
- Impact on adjoining properties including water penetration/flooding.

The Council would be interested in consultants views as to how this survey might be best carried out/ sample chosen.

An assessment as to whether basement extensions can be constructed without significant structural implications for neighbouring/ nearby properties. This should include consideration of the following specific questions/ concerns:

- Whether a basement extension at one end of a terrace 'anchors' the terrace which otherwise would have 'floated' as a single unity, thereby contributing to structural damage;

- Whether there are different risks associated with the construction of basement extensions for different types of property, i.e. detached and terraced properties;

- What is the impact between subterranean development and properties which do not directly abut the basement development/ share a party wall?

- Does the building of larger extensions have greater risks in terms of structural stability and all types of flooding. In principle, can double (or greater) extensions be created without having a detrimental impact upon ground water and structural stability? Do multi-storey basements have particular implications with structural stability and ground water? Where appropriate the report should refer to the actual depth of the extension and associated engineering works rather than 'storeys';

- Is there a direct relationship between the depth of the work, proximity of neighbouring properties and risk of structural instability? Could an approach be justified which resists basement extensions where the depth of the deepest engineering works lies within a given distance and angle from an adjoining property.

- Does the mass of a building that is subject to underground extension have an impact upon possible structural damage to adjoining buildings? Might, for instance, a four storey buildings settle more than one which is two storeys?

- Are there circumstances where a basement beneath an existing building (under pinning) may be more appropriate than that beneath a garden (cut and cover)?

- Does the method of construction have implications on risk, be this concerning structural stability or upon noise and vibration?

- What is the long term risk of structural stability, following years of settlement?

- Are there particular risks associated to listed buildings, many of which are properties which have shallow foundations? If there is greater risk to such buildings should this be mitigated by “exclusion zones” of basement development from listed structures?

- Will these conclusions be dependent on the particular characteristics of the part of the borough in which the property lies?

- Are the requirements of what the Council expect within a Construction Management Statement adequate (as set out in the Subterranean SPD). This should include considering:

    - How does one pick up localised springs which could cause flooding? Will the drilling of a single bore hole be adequate?
    - The Council currently requires self certification by a Charted Civil Engineer or Structural Engineer. Are there qualifications that should be demanded of the constructor, or expertise that the constructor should bring in, or some form of monitoring that should be done, to ensure good construction methods are followed?

An assessment of the potential impact that basement development may have upon flooding and upon the Borough’s hydrological regime

This element should consider

- The potential impact of basement development upon ground water flows and upon the aquifer, including at times of storm events.

- The potential impact that basement development beneath a garden may have upon rainwater runoff and surface water flooding.

- The measures necessary to mitigate the possible impact of basement construction. In particular:
    - how much permeable soil above a garden basement extension is necessary to provide an effective Sustainable Urban Drainage system and to allow trees and vegetation to flourish. In particular is the 1 m of permeable top soil currently required adequate?

    - how much of the area underneath a garden should be left undeveloped to allow for both the free flow of ground water and the retention of an effective soakaway to reduce rain water run off, thereby reducing the risk of flooding.
        - Is the 15% currently required adequate
        - Is the 15% an adequate SUD for the entire property (including the roof and forecourts and will as the garden beneath which the basement is built?
        - Is the position of the 15% ‘buffer’ significant? Does it have to be at the lowest part of the garden?

- The measures necessary to mitigate the risk of surface water flooding of the basement (for example pumps) and of neighbouring properties.

- The long term energy costs of continual pumping to stop water ingress, and the implications on both the basement property and its neighbours were this pumping to cease. Is there variation with differing soil types and to the problems that could be caused to neighbouring buildings?

Consideration of the risk to basement development from surface water, sewer and fluvial flooding

This should consider the potential impact of all types of flooding on new basement development. Include consideration of tidal flood risk zones and the Borough's Critical Drainage Areas as set out within the Boroughs Surface Water Management Plan such as the area adjoining Counters Creek Sewer.

Consideration of the impact of subterranean developments in terms of the sustainability of the development

The Council currently has adopted a proxy approach to off-setting the adverse environmental effects of basements. Is this approach suitable and the current EcoHomes assessments appropriate/fit for purpose?

In particular the report should consider the sustainability implications of:

- The excavation of large quantities of soil and demolition material
- The use of large quantities of building materials, especially cement and its carbon impact
- The energy requirements for operating some of the facilities (e.g. swimming pools, saunas, etc) and for the heating, cooling and ventilation of the building and the water requirements.

The Party Wall Act

The Council recognises that the Party Wall Act is a principal tool by which structural stability is 'managed'. The consultants should confirm whether they have the appropriate experience in this matter to give a view as to whether the whether the Acts, as currently in place, give adequate protection against the kind of damage, short and long term, that may result from subterranean development?

Noise and nuisance

For your experience are there any particular construction methods and techniques that have the potential to reduce the nuisance from noise and vibration caused by the construction of basement extensions.

Timetable

The Council requires this report to be completed so it can inform the development of preferred options as part of the Core Strategy review later this summer. Consultants are invited to comment on the feasibility of the study being completed by the end of June 2012.

Final Output

All reports that are produced must :

- be clear and concise
- be written in “plain English” without the use of unexplained technical terms or abbreviations
- include a short non-technical summary
- be provided in electronic format, compatible with Microsoft Word which is wordsearchable
- The Council must be consulted on the format and content of the report before they are finalised
- All data collected and produced during the study will be the property of the Council

Costs and Payments

The consultant should provide a total cost, including a breakdown of each key element of the study. An hourly rate for any extra ad hoc work that may be required should also be provided.

Any costs should be inclusive of all staff and sub-contractor costs. The consultant will be responsible for any public indemnity or public liability costs.

The relationship will be governed by the Council’s standard ‘Terms of Appointment for Consultancy Services.’

Additional Requirements

As the Council is depending on the expertise of the appointed consultant it may require assistance defending any positions recommended by the consultant at the

EIP of the partial review of the Core Strategy on this subject likely in the Spring of 2013.

The consultant should indicate whether they would be able to appear as an expert witness for the Council should this be required, and the cost for such appearance.