

# **Basement Impact Assessments: Defining the scope of Engineering input**

Guidance note 1v0

# Use of this document

This note is relevant to anyone who is considering making a planning application for basement development. It is intended to provide guidance to applicants on the scope of services that they will need from a Structural Engineer in the preparation of Basement Impact Assessments (BIAs), to support planning applications for development involving basements.

Sections 1 to 4 are informative, describing the background to Camden's planning policies and the key parties involved in the preparation of a BIA. Sections 5 to 7 describe the actions required by the various parties to ensure adequate structural engineering input into the BIA, and Sections 8 and 9 provide an explanation of the terms used and sources of further information.

The note is intended to inform all developers who are considering basement development, whether you are a householder or a commercial developer.

This document deals only with the structural engineering aspects of basement construction until planning permission is granted. It does not cover the subsequent detailed design services that will be required, once planning permission has been received, to satisfy Building Regulations and the Party Wall Act.

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## 1 Background

With a shortage of development land and high land values in the borough, the development of basements is a popular way of gaining additional space in homes.

Basement development can potentially lead to ground instability or flooding and Camden recognises the need to protect the environment and adjoining neighbouring buildings from these impacts.

All basement excavations in the borough will need planning permission and will be assessed against the Council's planning policies. The Council will only grant planning permission for basement development where the applicant has demonstrated, in a Basement Impact Assessment, that the proposal would not cause harm.

Applications for basements vary widely in scale and type: householders may wish to extend an existing cellar or add rooms in a new basement; commercial developers may wish to include a basement as part of large scale development. No matter what scale of basement work is proposed, the development will need to be planned with engineering input, and this must be evident in the Basement Impact Assessment.

## 2 Policy and process

The [Local Plan](#)<sup>1</sup> sets out Camden's planning policies. Policy A5 requires basement applications to follow the Basement Impact Assessment (BIA) process, which is set out in supporting documents ([Camden Planning Guidance](#)<sup>2</sup>). The process is highly technical and needs to be carried out by suitably qualified and experienced professionals.

It should be noted that a number of construction professionals may be required to complete a BIA, such as an architect, geotechnical engineer, structural and civil engineer, flood risk assessor and arboriculturalist. These specialist roles are described below. Where this is the case, it is recommended that a lead consultant is appointed who is responsible for ensuring that the various inputs are coordinated and consistent.

The BIA process is designed to ensure that basement development in Camden meets the requirements of the Policy with respect to the structural, ground or water conditions of the area. In almost all cases, compliance with the policy requires a detailed investigation of the ground conditions and adjacent structures by a qualified engineer at an early stage in the design process.

The applicant should be aware of their legal obligations under the [Construction \(Design and Management\) Regulations 2015](#)<sup>3</sup>. Typically, the architect will fulfil the role of Principal designer, although other members of the design team may do so.

Information about how to appoint an Engineer is provided in the final section of this note.

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<sup>1</sup> <https://www.camden.gov.uk/localplan>

<sup>2</sup> <https://www.camden.gov.uk/basements>

<sup>3</sup> <http://www.hse.gov.uk/construction/cdm/2015/index.htm>

### 3 Key roles

#### The key parties

**Client:** the person or organisation that is intending to make an application for planning permission.

**Principal designer:** appointed in accordance with the Construction (Design and Management) Regulations 2015. This note presumes that the architect fulfils this role.

**Engineer:** the chartered structural engineering consultant (a Member of the Institution of Structural Engineers or Institution of Civil Engineers).

**Lead consultant:** this is usually the architect, but may be the planning consultant, structural engineer or geotechnical engineer.

A **planning consultant** may be appointed to prepare the planning application and can assist in interpreting planning law and policy. Chartered planners are members of the Royal Town Planning Institute (RTPI).

Depending on the results of the BIA screening exercise, other consultants may be required. Some are described below:

- **Geotechnical engineer:** A geotechnical engineer will investigate the ground and groundwater conditions to provide baseline data for the BIA, assess risks posed by site conditions and provide design advice for foundations, retaining walls, floor slabs, external paving and slopes. Trained geotechnical engineers may be members of the Association of Geotechnical and Geoenvironmental Specialists (AGS) and/or members of the UK Register of Ground Engineering Professionals (RoGEP).
- **Flood risk assessor:** Flood risk assessors are typically civil engineering consultants who have membership of the Institution of Civil Engineers. A flood risk assessment (FRA) is an assessment of the risk of flooding from all flooding mechanisms, the identification of flood mitigation measures and should provide advice on actions to be taken before and during a flood.
- **Hydrogeologist:** Hydrogeologists specialise in the study of groundwater to analyse the movement, distribution and quality of water below the ground surface. Some basement projects will require the input of a hydrogeologist to determine the impact of the basement proposals on the groundwater. This may require computer modelling and a report. Experienced hydrogeologists will be chartered with the Institute of Water and Environmental Management (CIWEM) or with the Geological Society of London (CGeol).

- **Arboriculturalist:** An Arboriculturalist is an amenity tree specialist who can determine the relationship between trees and buildings and determine any impacts from the basement proposals to surrounding vegetation and vice versa. The Arboricultural Association has a list of registered consultants.

## 4 Before starting the BIA

The applicant (Client) and the Principal designer shall agree the brief for the Engineer's input to the planning application.

*Agreement with the Engineer* should be reached on the

- role of Engineer – including relationship with design team and other consultants and sub-contractors
- scope of the works,
- outputs,
- cost and programme.

## 5 Preparing the BIA

The following is a list of the tasks that the Engineer is likely to be required to carry out:

- Identify the limitations of the site topography on the proposals.
- Obtain evidence of public services (water, gas, sewerage etc.) and comment on any effect that these may have on the proposals - during construction and on completion.
- Comment on any physical site restrictions which may affect the engineering options for the proposals. Prepare a desk study of the site (unless prepared by others).
- Collaborate with the Lead consultant and any other consultants in seeking from the Client any further information needed so that they can perform their services under their various agreements with the Client.
- Collaborate with the Lead consultant and any other consultants in making initial recommendations to the Client on the technical viability of the Works.
- Visit the site and study data and information relating to the Project and relevant to the Works which are reasonably accessible to the Engineer, and consider reports relating to the Works which have either been prepared by the Engineer or have been prepared by others and made available to the Engineer by the Client.
- Arrange for a geotechnical investigation to be undertaken, by acting as the agent for the Client (when authorised by the Client). Certify the amount of any payments to be made by the Client to the persons or firms carrying out such investigations and advise the Client on the results of such investigations. Note that investigations should include inspection pits to show the existing foundations and the material they are founded on, for all walls which may be impacted by the proposals.
- Advise the Lead Consultant on surveys of the site. This will include defining and making arrangements for topographical and dimensional surveys of the site, surveys to obtain details of construction in existence on or adjacent to the site, special investigations or model tests. Arrange for the surveys to be carried out, by acting as agent for the Client (when authorised by the Client). Certify the amount of any payments to be made by the Client to the persons or firms carrying out such works, and advise the Client on the results of such works.
- Consult any local or other authorities about matters of principle in connection with the design of the Works.
- It may be necessary to discuss and agree with the Client any changes to the arrangements for payments to be made to the Engineer which may have become necessary as a result of changes to the Brief. Comment to the Lead Consultant on any restrictions the Brief may impose on any future use of the Works suggested by the Client.

- Provide sufficient preliminary information in relation to the Works in the form of advice, sketches, reports or outline specifications to enable the Lead Consultant to prepare their outline proposals.
- Coordinate the structural design of the Basement, using the Ground Movement Assessment as a key input to ensure compatibility of parameters and assumptions made, for example, excavation depths, propped or un-propped cantilever wall etc.
- Discuss and agree with the Client the terms of retaining the Engineer during the basement construction works. If planning permission is granted for basement works, the permission will require an Engineer to be retained for the duration of the works in order to inspect, approve, and monitor the critical elements of both permanent and temporary basement construction works. Engineering input will be required until completion, to ensure compliance with the design approved by the planning permission.

## 6 Engineer's Deliverables

The following is a list of the typical outputs (deliverables) that the Engineer will prepare for their client:

1. Written confirmation of the Client's Brief and instructions.
2. An initial design programme.
3. An assessment of significant risks from Health & Safety file prepared by Principal designer.
4. A Ground Investigation Report with a geotechnical interpretation prepared by suitably qualified geotechnical engineer.
5. A Structural Engineering Report containing:
  - a. An appraisal of the arrangement of the site and host structure (where present) including any previous alterations, obvious defects, its relationship (or that of the site if vacant) with adjoining buildings and their condition.
  - b. Relevant drawings to show the relationships to the basement of the ground conditions and groundwater, existing trees and infrastructure and how they are addressed in design.
  - c. Outline scheme sketches and layouts indicating basic proposals, general layout and preliminary sizing of primary structural elements.
  - d. Sketch layouts of structural solution in plan and section for critical elements of the building.
  - e. Foundation types and size estimates, including verification of an adequate bearing stratum and measures to deal with hydrostatic and/or heave pressures where relevant.
  - f. Requirements for retaining walls, including drawings of underpinning, piling etc. and supporting outline calculations with assumptions clearly stated.
  - g. Assessment of expected ground movements (short and long term) using analytical or empirical means, and how these will affect adjoining or adjacent properties. The design shall limit damage to all buildings to a maximum of Burland Category 1 as set out in CIRIA SP200 Tables 3.1 & 3.2.
  - h. Details of sequences of construction and temporary propping to demonstrate how movements and building damage will be restricted to those predicted.
  - i. An outline monitoring strategy to ensure movements are limited to those predicted.
  - j. Proposals to deal with groundwater during construction and in the permanent condition (where relevant).
  - k. External drainage layouts showing primary routes and proposals for Sustainable Urban Drainage Systems (SUDS).

- l. Details of risk from surface water, sewer and groundwater flooding and how this is addressed in the design (where basement is in flood risk/Critical Drainage area).
- m. Utilities plans and confirmation of consultation with relevant asset owners (where required).

In order to ensure that a BIA can be demonstrated to comply with the Camden Planning Guidance (CPG), it is recommended that the Structural Engineer's report (SER) is presented as part of a planning application. It may be a standalone document, or may form part of the BIA report. The SER should demonstrate that the engineering design has been advanced to concept design stage (RIBA Stage 2) as a minimum. Relevant drawings should be provided to show how the designers have addressed ground conditions and groundwater, existing trees and infrastructure, drainage, flooding, vertical and horizontal loading, structural engineering general arrangement and details, requirements for underpinning, piling and/or other below ground works.

It should be noted that the services and deliverables are site specific; hence the scope of services and deliverables presented in this document are not exhaustive. It should also be noted that the SER forms only part of the BIA, and other assessments and supporting evidence are likely to be required. Reference should be made to Camden's planning guidance to understand the full requirements of the BIA process.

## Glossary

A number of the terms referred to in the previous section are described below. Further information is provided in the Camden Planning Guidance.

**Desk study:** A desk study is the collation and review of information already available to inform and guide the geotechnical investigation. The desk study includes a visual inspection of the site and its surrounding area, and a review of maps and other records to assess the topography, geology, history and environmental setting of a site.

**Geotechnical investigation:** Geotechnical investigations are performed by a geotechnical engineer to obtain information on the physical properties of soil beneath a site to design foundations, retaining walls, slabs and external areas and allow slope assessment where required. A geotechnical investigation will include subsurface exploration, typically via boreholes, trial pits and water monitoring installation, with laboratory testing of the soil samples retrieved. A desk study and geotechnical investigation together comprise a 'site investigation'.

**Ground Movement Assessment and Building Damage Assessment:** Where identified as being necessary by the BIA screening and scoping exercise, the BIA shall include an assessment of likely ground movements associated the construction of the proposed basement and the potential impact on surrounding structures and infrastructure. Depending on the scheme, these assessments may be based on relevant case histories and/or ground modelling.

**Other reports:** Dependent on the findings of the screening and scoping stages of the BIA, other reports, documents and/or drawings may be required such as Flood Risk Assessments, details of sustainable drainage systems (SUDS), slope stability assessments, arboricultural assessments.

**Topographical and dimensional surveys:** Topographical surveys are used to identify and map the contours of the ground and existing features such as trees, buildings, manholes, utility poles and retaining walls to allow a new structure to be dimensioned and located accurately, and its impacts assessed.

**Works:** The Works means the construction of the proposed basement and any other enabling works or construction activities associated with it.

## References

### Planning Guidance

The architect and structural engineer (or other Lead consultant if appropriate) should read and be familiar with all the relevant planning guidance in Camden. The *Camden geological, hydrogeological and hydrological study – Guidance for Subterranean Development* outlines the process to be adopted for the BIA and provides check lists and guidance for desk study, site investigation, geotechnical interpretation and appropriate assessments.

This and other supporting documents that describe the process and information to be submitted with basement planning applications, including Camden Planning Guidance, may be found at <https://www.camden.gov.uk/basements>.

#### **Construction industry guidance**

Further useful information for applicants, including relevant legislation, how to obtain a reliable builder, design responsibilities, insurance and warranties, can be found in CIRIA publication C740 [Structural stability of buildings during refurbishment](#)<sup>4</sup>.

#### **Royal Institute of British Architects**

The Royal Institute of British Architects (RIBA) has prepared a Plan of Work which organises the process of briefing, designing and constructing building projects into key stages ([RIBA Stages 1 to 7](#)<sup>5</sup>). Reference to the plan indicates that planning applications are typically made at Stage 3, but may be made at Stage 2 in some cases. Stage 2 comprises the preparation of outline proposals for structural design and is the minimum that should be prepared for planning.

#### **Association for Consultancy and Engineering**

The Association for Consultancy and Engineering (ACE) has prepared a Form of Appointment based on the RIBA Stages which allows the client to set out the duties of a structural engineer ([the ACE Professional Services Agreement](#)<sup>6</sup>). The accompanying [ACE Schedule of Services](#)<sup>7</sup> defines the structural engineering services required at each RIBA stage. . It should be noted that the scope of services assumes that the architect will be the Lead consultant.

<sup>4</sup> [https://www.ciria.org/Resources/Free\\_publications/Structural\\_stability\\_on\\_site.aspx](https://www.ciria.org/Resources/Free_publications/Structural_stability_on_site.aspx)

<sup>5</sup> <https://www.ribaplanofwork.com/>

<sup>6</sup> <https://www.acenet.co.uk/ace-professional-services-agreement-2017/95/78/1/614/41>

<sup>7</sup> <https://www.acenet.co.uk/ace-schedule-of-services-civil-and-structural-engineering-single-consultant-or-non-lead-consultant/100/78/1/614/41>