

Land to the rear of 1 Elsworthy  
Terrace  
London, NW3 3DR

Basement Impact Assessment  
Audit

For

London Borough of Camden

Project Number: 12336-91  
Revision: D1

August 2016

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### Document Details

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## 1.0 NON-TECHNICAL SUMMARY

- 1.1. CampbellReith was instructed by London Borough of Camden, (LBC) to carry out an audit on the Basement Impact Assessment submitted as part of the Planning Submission documentation for Land to the rear of 1 Elsworthy Terrace, NW3 3DR (Camden planning reference 2016/3495/P). The basement was considered to fall within Category A by the Planning Officer as defined by the Terms of Reference, however, a review of the proposals indicates potential impacts on stability and hydrology. On this basis, the basement is considered to fall within Category B.
- 1.2. The Audit reviewed the Basement Impact Assessment for potential impact on land stability and local ground and surface water conditions arising from basement development in accordance with LBC's policies and technical procedures.
- 1.3. CampbellReith was able to access LBC's Planning Portal and gain access to the latest revision of submitted documentation and reviewed it against an agreed audit check list.
- 1.4. The BIA was undertaken by Geo-environmental Services Limited (GES) together with The Budgen Partnership, however the input of an individual with a C.WEM or CEng MICE qualification is required with respect to hydrology.
- 1.5. It is proposed to construct a residential building over a double basement formed by a contiguous piled retaining wall in an unused area of garden. Structural details and sketches to illustrate the construction sequence are requested.
- 1.6. Question 4 of the hydrogeology screening should be addressed further.
- 1.7. The information required is provided in a fragmented format and is contradictory in some areas. It is requested the hydrology screening be made consistent with the Flood Risk Assessment (FRA) and the impact assessment be undertaken on the basis of the information from the ground investigation rather than the desk study as indicated.
- 1.8. Definitive proposals for surface water management are requested.
- 1.9. The presence or absence of basements beneath the neighbouring properties should be confirmed. With regards to the foundation depths, unless further information is forthcoming, the greatest differential depth should be assumed.
- 1.10. The factual data from the site specific ground investigation is not presented and this is requested. Further information is requested with respect to assumed soil parameters.

- 1.11. Oasys Xdisp has been used to predict vertical and horizontal settlement due to excavation and pile installation. The full tabular input and output are requested to verify the conclusions. The assumed pile length should also be indicated. Heave movements as a result of excavation are not provided and this is requested.
- 1.12. Category 0 damage is indicated for all of the walls considered with the exception of the '*side wall*' to No 1 Elsworthy Terrace and the front elevation of the garage to No 23 Elsworthy Road where Category 1 damage is predicted. CPG4 requires mitigation for damage of Category 1 or higher.
- 1.13. Outline monitoring proposals are not provided and this is requested.
- 1.14. An outline works duration is requested with a detailed programme to be provided at a later date by the appointed Contractor.
- 1.15. A draft Construction Management Plan (CMP) is provided. Details are to be agreed with the Council.
- 1.16. Queries and requests for further information are discussed in Section 4 and summarised in Appendix 2.

## 2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 1 August 2016 to carry out a Category A Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for Land to the rear of 1 Elsworthy Terrace, NW3 3DR (Camden planning reference 2016/3495/P).

2.2. The Audit was carried out in accordance with the Terms of Reference set by LBC. It reviewed the Basement Impact Assessment for potential impact on land stability and local ground and surface water conditions arising from basement development.

2.3. A BIA is required for all planning applications with basements in Camden in general accordance with policies and technical procedures contained within

- Guidance for Subterranean Development (GSD). Issue 01. November 2010. Ove Arup & Partners.
- Camden Planning Guidance (CPG) 4: Basements and Lightwells.
- Camden Development Policy (DP) 27: Basements and Lightwells.
- Camden Development Policy (DP) 23: Water.

2.4. The BIA should demonstrate that schemes:

- a) maintain the structural stability of the building and neighbouring properties;
- b) avoid adversely affecting drainage and run off or causing other damage to the water environment;
- c) avoid cumulative impacts upon structural stability or the water environment in the local area, and;

evaluate the impacts of the proposed basement considering the issues of hydrology, hydrogeology and land stability via the process described by the GSD and to make recommendations for the detailed design.

2.5. LBC's Audit Instruction described the planning proposal as "Erection of two storey *building with two basement levels and front lightwell for use as a single-family dwelling house (Class C3) and alteration to the front boundary wall to allow pedestrian access on site*".

2.6. The Audit Instruction also confirmed the site is not a neighbour to listed buildings.

2.7. CampbellReith accessed LBC's Planning Portal on 4 August 2016 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment (BIA): Geo-environmental Services Limited (GES) together with The Budgen Partnership, dated June 2016
- Building Damage Assessment report: Geo-environmental Services Limited (GES), dated June 2016
- Arboriculture Report: Simon Pryce, dated October 2015
- Construction Management Plan
- Design and Access statement
- Flood Risk Assessment: Herrington Consulting Limited, June 2016
- Site location plan
- Ko and Partners and Malcolm Hollis Planning Application Drawings consisting of
  - Proposed Plans
  - Existing Sections
  - Proposed Sections
  - Proposed Elevations
  - Topographical Survey
- 2 No consultation responses

### 3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	No	See Audit paragraph 4.1.
Is data required by Cl.233 of the GSD presented?	No	Some of the information provided in a fragmented format in the various BIA documents and no programme of works included.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	No	As above.
Are suitable plan/maps included?	No	Arup GSD, EA and Camden SFRA map extracts with site location indicated not provided (see Audit paragraph 4.3).
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	No	As above.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	Relevant map extracts not referenced or provided with site location indicated. Justification not given for all of the 'No' answers (see Audit paragraph 4.3).
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	Relevant map extracts not referenced or provided with site location indicated. Response to Q2 incomplete (see Audit paragraphs 4.3 and 4.5).
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	Relevant map extracts not referenced or provided with site location indicated. Screening largely considered incorrect and inconsistent with FRA (see Audit paragraphs 4.6 to 4.8).
Is a conceptual model presented?	Yes	Building Damage Assessment (BDA) report Section 2.1



Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA Section 4.1.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	No	Not provided although one issue should have been carried forward from the screening (see Audit paragraph 4.5).
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	No	Not provided although two issues should have been carried forward from the screening (see Audit paragraph 4.5).
Is factual ground investigation data provided?	No	Stated in the BDA report that a ground investigation was undertaken, however, the exploratory hole records are not included (see Audit paragraph 4.11).
Is monitoring data presented?	Yes	Water level from a single monitoring visit in Section 2.2 of the BDA report.
Is the ground investigation informed by a desk study?	Yes	Assumed the investigation was informed by the desk study.
Has a site walkover been undertaken?	Yes	BIA Section 2.2.
Is the presence/absence of adjacent or nearby basements confirmed?	No	States in Section 5 of the BIA that several of the properties including No 1 Elsworthy Terrace ' <i>contain a lower ground floor however the presence of basements should not be discounted.</i> '
Is a geotechnical interpretation presented?	No	Not presented.
Does the geotechnical interpretation include information on retaining wall design?	No	Some parameters provided in Section 7.1 of the BIA , however, this is incomplete as stiffness parameters are not included and it does not appear to be informed by the ground investigation.
Are reports on other investigations required by screening and scoping presented?	No	Some information from the ground investigation included but incomplete (see Audit paragraph 4.11).

Item	Yes/No/NA	Comment
Are the baseline conditions described, based on the GSD?	No	Proposal not sufficiently detailed and presence or absence of basements not confirmed. Also information is presented in a fragmented format.
Do the base line conditions consider adjacent or nearby basements?	Yes	Considered but not confirmed.
Is an Impact Assessment provided?	Yes	However, not undertaken in accordance with the Arup GSD and not all issues identified by screening and scoping considered.
Are estimates of ground movement and structural impact presented?	Yes	Provided but incomplete (see Audit paragraph 4.12).
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	No	Not all the issues identified.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	Not explicitly stated and not all of the potential impacts of the basement considered.
Has the need for monitoring during construction been considered?	Yes	Considered but outline proposals not presented.
Have the residual (after mitigation) impacts been clearly identified?	No	Not identified.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	Supporting analysis not provided to be able to verify this.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	No	Not demonstrated (see Audit paragraphs 4.6 to 4.9).
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	As above.

Item	Yes/No/NA	Comment
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	Category 0 (Negligible) to Category 1 (Vey Slight) damage predicted. Further mitigation measures are required (see Audit paragraph 4.12 to 4.14).
Are non-technical summaries provided?	Yes	Summary of screening and scoping outcome presented.

## 4.0 DISCUSSION

- 4.1. The Basement Impact Assessment (BIA) has been carried out by Geo-environmental Services Limited (GES) together with The Budgen Partnership and the individuals involved have CGeol FGS and CEng MIStructE qualifications. The preparation of a BIA also requires the input of a Hydrologist with a C.WEM qualification or a Civil Engineer specialising in flood risk management and surface water drainage with a CEng qualification with respect to hydrology. It is stated in Section 3.1.3 of the BIA that the hydrology screening is only provided for guidance and should be confirmed by a suitably qualified individual.
- 4.2. The site is an unused grassed and wooded area of garden located within a conservation area. It is proposed to construct a residential building over a double basement which requires an excavation of c.7m formed by a contiguous piled retaining wall. The proposal is not sufficiently detailed, however, the drawings indicate the building will be detached. No structural details are included. Although a construction sequence is provided in the text, sketches to illustrate this are not provided.
- 4.3. Justification or reference to the Arup GSD data was not given for several of the 'No' responses to the screening questions although it is considered the impacts have largely been correctly assessed with the exception of the hydrology screening. It would be beneficial if the requirements of CPG4 were followed accurately by the inclusion of map extracts from the Arup GSD, Environment Agency and the LBC Flood Risk Management Strategy identifying the site location on each map. These would help support statements made in the BIA screening process.
- 4.4. Although most of the information required is provided, it is in a fragmented format. It is clear the site specific ground investigation was not considered in the impact assessment as this is presented in a separate document with no reference made to it in the impact assessment.
- 4.5. The justification to Question 2 of the hydrogeology screening is considered incomplete. A 'Yes' response is given to Question 4 of the hydrogeology screening and Questions 3 and 6 of the hydrology screening, however, these were not addressed any further.
- 4.6. A 'No' response is given to Question 2 of the hydrology screening, however, this is considered incorrect. The proposed development will increase the impermeable area at the site from the existing as it is an undeveloped greenfield site. The proposed surface water runoff will therefore be changed from the existing route. Even with the inclusion of SUDS options, the volume of peak run-off will be changed.
- 4.7. The responses to Questions 4 and 5 are also considered incorrect. The Flood Risk Assessment (FRA) states that the proposed surface water runoff will be discharged into the public sewer

network. This will alter the quantity and profile of surface water inflows being received by adjacent properties.

- 4.8. A 'Yes' response is given to Question 6 of the hydrology screening which relates to whether or not the site is in an area at risk from flooding. It is stated the northeast corner of the site is at risk from surface water flooding, however, the mitigation proposed is not considered appropriate. Additionally, it is stated in the FRA that the site is at a 'very low' risk of surface water flooding. Figure 5a of the Camden SFRA indicates the site is in an area at risk from internal sewer flooding. Although this issue is not considered in the BIA, it is stated in the (FRA) provided under a separate cover that consultation with Thames Water indicates there has been no flood incident from sewers at the site.
- 4.9. The proposed drainage strategy considers the use of a green roof, permeable paving and a cellular storage system to minimise the volume and flow rate of surface water runoff from the site, however, no definitive details are provided.
- 4.10. It is stated in Section 5 of the BIA that several of the properties including No 1 Elsworthy Terrace '*contain a lower ground floor however the presence of basements should not be discounted.*'
- 4.11. A building damage assessment report is provided and this comprises ground conditions indicated to be from a site specific investigation. The factual data from this investigation is not presented. No geotechnical interpretation is provided and although some retaining wall parameters are provided in the BIA, stiffness parameters (E) are not included.
- 4.12. It is stated in Section 3 of the building damage assessment report that heave movements as a result of the excavation have not been calculated separately as it is considered this is accounted for in the movements calculated by the Oasys programme Xdisp. This is incorrect as Xdisp is based on CIRIA C580 which does not consider heave movements.
- 4.13. Movements due to pile installation and excavation calculated using Xdisp are presented. The assumed pile length is not indicated and although contour and displacement plots are included, the full tabular input and output from the programme are not provided.
- 4.14. Damage assessments have been undertaken for Nos 1, 2 and 3 Elsworthy Terrace and No 23 Elsworthy Road and Category 0 (Negligible) is indicated for all of the walls with the exception of the '*side wall*' to No 1 Elsworthy Terrace and the '*front elevation*' of the garage to No 23 Elsworthy Road where Category 1 (Very Slight) damage is predicted. CPG4 requires mitigation for damage of Category 1 or higher.
- 4.15. Section 4.2 of the building damage assessment proposes movement monitoring for the neighbouring structures however outline proposals are not provided.

- 4.16. A works programme is not included as required by Cl. 233 of the Arup GSD.
- 4.17. A draft Construction Management Plan (CMP) is provided.

## 5.0 CONCLUSIONS

- 5.1. The BIA was undertaken by Geo-environmental Services Limited (GES) together with The Budgen Partnership, however the input of an individual with a C.WEM or CEng MICE qualification is required with respect to hydrology.
- 5.2. It is proposed to construct a residential building over a double basement which requires an excavation of c.7m formed by a contiguous piled retaining wall in an unused area of a garden. Structural details and sketches to illustrate the construction sequence are requested.
- 5.3. Question 4 of the hydrogeology screening should be addressed further.
- 5.4. Definitive proposals for the surface water management are requested.
- 5.5. The information required is provided in a fragmented format and is contradictory in some areas. It is requested the hydrology screening be made consistent with the Flood Risk Assessment (FRA) and the impact assessment be undertaken on the basis of the information from the ground investigation rather than the desk study as indicated.
- 5.6. The presence or absence of basements beneath the neighbouring properties should be confirmed. With regards to the foundation depths, unless further information is forthcoming, the greatest differential depth should be assumed.
- 5.7. The factual data from the site specific ground investigation is not presented and this is requested.
- 5.8. Stiffness values (E) are not included in the retaining wall parameters provided in the BIA and this is requested.
- 5.9. Heave movements as a result of excavation are not provided and these are requested.
- 5.10. Oasys Xdisp has been used to predict vertical and horizontal settlement due to excavation and pile installation. The full tabular input and output are requested to verify the conclusions. The assumed pile length should also be indicated.
- 5.11. Category 0 damage is indicated for all of the walls considered with the exception of the '*side wall*' to No 1 Elsworthy Terrace and the '*front elevation*' of the garage to No 23 Elsworthy Road where Category 1 damage is predicted. CPG4 requires mitigation for damage of Category 1 or higher.
- 5.12. Outline monitoring proposals are not provided and these are requested.

- 5.13. An outline works duration is requested with a detailed programme to be provided at a later date by the appointed Contractor.
- 5.14. A draft Construction Management Plan (CMP) is provided. Details are to be agreed with the Council.



## Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Kedar	23 Elsworthy Road NW3 3DS	28/07/16	Impact on existing trees	Arboriculture report states minimal impact on trees if suitable protective measures are implemented.
Usiskin	Not provided	Undated	Impact on existing trees	As above.

## Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA format	BIA author qualifications.	Open – Input of an individual with C.WEM or CEng MICE required with respect to hydrology	
2	BIA format	Information provided in fragmented format and inconsistent in some of the documents.	Open – see Audit paragraph 5.5.	
3	BIA format	Works programme not included.	Open – outline duration to be provided with detailed programme submitted at a later date by appointed Contractor.	
4	BIA format	Factual site investigation data not provided.	Open – to be provided.	
5	Hydrogeology	Question 4 of the screening not carried forward despite a 'Yes' response.	Open – to be addressed and made consistent with the FRA.	
6	Hydrology	Incorrect responses to a number of questions and inconsistent with FRA.	Open – to be appraised by suitably qualified individual and made consistent with FRA.	
7	Hydrology	No definitive proposals on surface water management plan.	Open – to be provided.	
8	Stability	Presence or absence of basement beneath neighbouring properties not confirmed in BIA and foundations depths not determined.	Open – Presence or absence of basements to be beneath adjacent properties to be confirmed. Foundation depths of neighbouring properties to be determined or maximum differential depth assumed.	
9	Stability	No structural details or construction sequence sketches provided.	Open – to be provided.	
10	Stability	Stiffness parameters not included in retaining wall parameters	Open – to be provided.	

11	Stability	Full input and output from Oasys Xdisp not provided.	Open – to be provided.	
12	Stability	Further mitigation measures required for walls indicated to fall within Category 1 damage.	Open – to be provided.	
13	Stability	Heave movements not calculated.	Open – to be provided.	
14	Stability	Movement monitoring proposal not provided.	Open – Outline proposal to be provided. Details and trigger levels to be agreed as part of Party Wall award.	

## Appendix 3: Supplementary Supporting Documents

None

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