

Flat 1, 44 Goldhurst Terrace  
NW6 3HT

Basement Impact Assessment  
Audit

For  
London Borough of Camden

Project Number: 12727-78  
Revision: F1

November 2018

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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 Flat 1, 44 Goldhurst Terrace, Swiss Cottage NW6 3HT (planning reference 2017/6906/P). The basement is considered to fall within Category B as defined by the Terms of Reference.
- 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 has been prepared by Solid Geometry Structural Engineers with input from Soiltechnics, Cooper Associate and Chord Environmental Limited. The authors' qualifications are in accordance with LBC requirements.
- 1.5. The proposed basement consists of a single storey construction beneath an existing lower ground floor covering the entire building footprint and extending into the rear garden area, including lightwells to the front and rear.
- 1.6. The proposed basement will be founded within the London Clay formation. A borehole drilled at the site encountered Made Ground underlain by London Clay. No groundwater was found either during drilling or a subsequent monitoring visit.
- 1.7. The construction methodology includes suitable outline temporary works sequencing and propping arrangements. Geotechnical parameters for retaining wall design are provided. An outline construction programme has been also provided as requested in the previous audit.
- 1.8. The Ground Movement Assessment (GMA) has been revised to address the previous audit comments. A new model has been produced to demonstrate that damage to the applicant's property and neighbouring buildings will be within the limits required by CPG Basements 2018.
- 1.9. No trees are to be removed as part of the proposal. The proposed foundations are to be constructed at the appropriate depths to mitigate against shrink / swell movements.
- 1.10. The BIA states that the tree protection measures proposed in the accompanying arboricultural report will be carried out during construction.

- 1.11. The change in the proportion of hardstanding areas has been calculated, as requested in the previous audit. The change in impermeable area is considered to have a negligible impact on the hydrological environment.
- 1.12. The drainage proposal will be developed at the detailed stage of design in accordance with Camden's Planning Policy and the National Planning Policy Framework. The FRA also proposes appropriate flood risk mitigation which should be adopted.
- 1.13. Non-technical summaries are now provided in the BIA as requested in the previous audit.
- 1.14. It is accepted that there are no slope stability impacts as a result of the proposed development.
- 1.15. It is accepted that the development will not impact on the wider hydrogeology of the area.
- 1.16. Considering the supplementary information provided, the BIA meets the requirements of CPG Basements.

## 2.0 INTRODUCTION

- 2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 14<sup>th</sup> May 2018 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for Flat 1, 44 Goldhurst Terrace, Swiss Cottage NW6 3HT reference 2017/6906/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): Basements 2018.
  - Camden Development Policy (DP) 27: Basements and Lightwells.
  - Camden Development Policy (DP) 23: Water.
  - Local Plan Policy A5 Basements.
- 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 *"Construction of basement extension including lightwells to front and rear and single storey extension at rear lower ground floor level."*
- 2.6. The Audit Instruction also confirmed that 44 Goldhurst Terrace is not involved in, or was a neighbour to, listed buildings.

2.7. CampbellReith accessed LBC's Planning Portal on 29 May 2018 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment Report (BIA) issue 02 Part 1 by Solid Geometry Structural Engineers, dated 31 May 2018.
- Basement Impact Assessment Report (BIA) issue 02 Part 2 by Soiltechnics Environmental and Geotechnical Consultants, dated May 2018.
- BIA Appendix A to F and G1 to G6 by Soiltechnics dated April and November 2017.
- BIA Appendix H, Arboricultural Survey and Planning Integration Statement, reference AR/3684/rg, by Quaife Woodlands, dated 29 May 2017.
- Planning Application Drawings consisting of  
Location Plan - Proposed Site Plan reference AP00 00 by Kokorelia Architects dated November 2017  
  
Existing Plans AP100 R01 and AP120, by Kokorelia Architects dated March 2018.  
  
Existing Drawings AP100 00, AP110 00, AP111 00, AP112 00, AP113 00, AP120 by Kokorelia Architects dated November 2017.  
  
Proposed Drawings AP200 00, AP201 00, AP202 00, AP210 00, AP211 00, AP212 00, AP213 00, AP220 00 by Kokorelia Architects dated November 2017.  
  
Proposed Plans AP200 R01, AP210 R01, AP202 R01, AP210 R01, AP211 R01, AP220 R01 by Kokorelia Architects dated March 2018.
- Design & Access Statement by Kokorelia Architects dated November 2017.
- Flood Risk Assessment reference CA4735.02, by Cooper Associates, dated April 2018.
- Planning Advice Letter reference 2015/1118/PRE by Camden Council dated 08 April 2015.
- Planning Comments and Responses.

2.8. The following documents were updated in response to the queries raised and comments on the initial audit. These were received in November 2018 and are available on the planning portal:

- Preliminary Calcs for BIA by Solid Geometry Structural Engineers, dated October 2018.
- Basement Impact Assessment Report (BIA) Issue 03 Part 1 by Solid Geometry Structural Engineers, Soiltechnics Environmental and Geotechnical Consultants dated October 2018.
- Change in Impermeable Area by Kokorelia Architects, no date available.
- Programme of works, no authors and date provided.
- Ground Investigation Report by Soiltechnics, dated October 2018.

### 3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	
Is data required by Cl.233 of the GSD presented?	Yes	Outline construction programme has been provided.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	Change in impermeable area has been quantified.
Are suitable plan/maps included?	Yes	
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	Q13 The proposal will significantly increase the differential depth of foundations.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Change in impermeable areas has now been quantified and assessed in the BIA.
Is a conceptual model presented?	Yes	Described within the text.



Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	GMA provided which considers differential depth of foundations (assessment methodology not accepted).
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Is factual ground investigation data provided?	Yes	Although no laboratory testing results are included.
Is monitoring data presented?	Yes	One groundwater monitoring visit was undertaken and results provided.
Is the ground investigation informed by a desk study?	Yes	
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	
Is a geotechnical interpretation presented?	Yes	
Does the geotechnical interpretation include information on retaining wall design?	Yes	However, bearing pressure and settlement calculations not provided for consideration within GMA.
Are reports on other investigations required by screening and scoping presented?	Yes	
Are the baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	

Item	Yes/No/NA	Comment
Is an Impact Assessment provided?	Yes	
Are estimates of ground movement and structural impact presented?	Yes	However, methodology not agreed.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	The GMA has been reviewed; hydrological impacts have been reviewed.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	Temporary works proposed appear robust; flood mitigation proposed.
Has the need for monitoring during construction been considered?	Yes	Although not specified.
Have the residual (after mitigation) impacts been clearly identified?	Yes	
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	The GMA has been reviewed.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	However, drainage proposal will be developed at the detailed stage of design in accordance with Camden's Planning Policy and the National Planning Policy Framework.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	As above.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	The GMA has been revised.
Are non-technical summaries provided?	Yes	

## 4.0 DISCUSSION

- 4.1. The BIA has been prepared by Solid Geometry Structural Engineers with input from Soiltechnics, Cooper Associate and Chord Environmental Limited. The authors' qualifications are in accordance with LBC requirements.
- 4.2. The LBC Instruction to proceed with the audit identified that the basement proposal does not involve a listed building or is adjacent to listed buildings. The site is located within the South Hampstead Conservation Area.
- 4.3. The proposed basement consists of a single storey construction beneath an existing lower ground floor covering the entire building footprint and extending into the rear garden area, including lightwells to the front and rear.
- 4.4. The BIA has identified that the existing brick foundations bear on the London Clay formation. Intrusive ground investigation indicates the underlying soils to comprise Made Ground to 1.1m below ground level (bgl), underlain by London Clay to 5.75m bgl, which was the full depth of exploration. No groundwater strikes were noted during the investigation and one subsequent monitoring visit recorded the standpipe to be dry.
- 4.5. The Desk Study within the BIA shows the site to lie in close proximity to a branch of the historic Westbourne, although no watercourses are shown on historic mapping. The BIA concludes that river is likely to have been culverted. The BIA highlights the site as being continuously residential from 1896, prior to which it comprised open fields.
- 4.6. The proposed basement will utilise traditional underpinning of the perimeter walls. The lightwell retaining walls will be formed in an underpinned style sequence. The construction methodology includes suitable outline temporary works sequencing and propping arrangements. The works will be stiffly propped in the temporary condition. In the permanent condition, the retaining walls will cantilever.
- 4.7. Geotechnical parameters for retaining wall design and a bearing capacity for foundations is presented. Structural calculations are also presented; proposed bearing pressures and resultant settlements are clearly stated.
- 4.8. Due to the age and style of the terraced housing, and the inspection pits undertaken, the BIA concludes that foundations at the adjacent properties will be similar or identical to those found at 44 Goldhurst Terrace. Nearby basements are identified although none are within the immediate vicinity of the site.

- 4.9. A revision of the GMA was requested in the previous audit. The original GMA did not consider ground movements due to the installation of the underpins and the damage calculations presented were not in accordance with the methodology described in CIRIA C760.
- 4.10. The GMA has been revised to address the previous audit comments and a new model has been produced to assess damage to the applicant's property and neighbouring buildings. Ground movements due to excavation have been estimated using a settlement profile derived from figure 6.11a of C760. Immediate settlement of the underpinning bays has been estimated to be 2.5mm due to the new load setting. In addition different values (from 2 to 12mm) construction related settlement effects have been considered and damage categories have been estimated for each case. Additionally a bearing capacity for the London Clay at founding level is assessed.
- 4.11. The GMA results indicate damage to the applicant's building and neighbouring properties to be within Category 1 of the Burland Scale. However it is noted that ground movements due to underpinning largely depend on the quality of the workmanship and a careful selection of the contractor is recommended. It is noted that Thames Water waste and mains water assets are identified within close proximity of the site. Consultation with assets owners may be required as part of the planning process.
- 4.12. The need for ground movement monitoring is mentioned in the BIA and a movement monitoring strategy during excavation and construction is provided. An outline construction programme is now presented in the BIA as requested in the previous audit.
- 4.13. The underlying, impermeable London Clay is classified as unproductive strata. The proposed basement will have no adverse effect on the local hydrogeology.
- 4.14. The BIA refers to the GSD Figure 15 and highlights that the site lies on a street known to have flooded in 2002, although states that it is not located within an area considered to be at risk from surface water flooding. The BIA section 3.4.4 also refers to known incidents of ruptured Thames Water pipes in the vicinity of the site leading to localised surface water flooding. The accompanying Flood Risk Assessment (FRA) identifies that the site lies in Environment Agency Flood Zone 1, which has a low probability of flooding. Contrary to the BIA, the FRA also identifies that Goldhurst Terrace experienced flooding in 1975 and 2002, according to the LBC surface water flooding records.
- 4.15. The change in the proportion of hardstanding has been calculated as requested in the previous audit. There will be an increase of 3.36m<sup>2</sup> or about 13.5% of the total area. Although a drainage strategy has not been presented in the BIA, the change in impermeable area is considered to make a negligible impact to the hydrological environment and the FRA confirms the new drainage system will provide betterment. It states that the drainage proposal will be developed at the detailed stage of design in accordance with Camden's Planning Policy and the

National Planning Policy Framework. The FRA also proposes appropriate flood risk mitigation which should be adopted, such as fitting non-return valves to the existing foul and rainwater drainage system and waterproofing throughout.

- 4.16. The scoping stage of the BIA outlines that no evidence of tree-related subsidence has been noted on the property itself or at adjacent properties. Consultation Responses received indicate that some local ground movements may have occurred. No trees are to be removed as part of the proposal. Reference to NHBC Chapter 4.2 is made in the BIA, and an assessment made of recommended foundations depths according to the governing trees in the proximity at both the front and back of the property. It is concluded that the depth of the proposed development is in excess of the foundation depths recommended in the guidance, and as such any new foundations will be beyond the zone of influence of the tree roots.
- 4.17. Non-technical summaries are now provided in the BIA as requested in the previous audit.
- 4.18. The BIA states that tree protection measures identified in the accompanying arboricultural report will be carried out during construction.
- 4.19. It is accepted that there are no slope stability impacts as a result of the proposed development.

## 5.0 CONCLUSIONS

- 5.1. The BIA has been prepared by authors who possess suitable qualifications.
- 5.2. The proposed basement consists of a single storey construction beneath an existing lower ground floor covering the entire building footprint and extending into the rear garden area, including lightwells to the front and rear.
- 5.3. The proposed basement will be founded within the London Clay formation.
- 5.4. The construction methodology includes suitable outline temporary works sequencing and propping arrangements. Geotechnical parameters for retaining wall design are provided. An outline construction programme has been also provided as requested in the previous audit.
- 5.5. The GMA confirms that damage to the applicant's property and neighbouring buildings will be within the limits required by the CPG Basements 2018.
- 5.6. No trees are to be removed as part of the proposal. The proposed foundations are to be constructed at the appropriate depths to mitigate against shrink / swell movements.
- 5.7. The BIA states that the tree protection measures proposed in the accompanying arboricultural report will be carried out during construction.
- 5.8. The change in the proportion of hardstanding areas has been calculated as requested in the previous audit. The impact is considered to be negligible providing the proposed drainage is installed.
- 5.9. The drainage proposal will be developed at the detailed stage of design in accordance with Camden's Planning Policy and the National Planning Policy Framework. The FRA also proposes appropriate flood risk mitigation which should be adopted.
- 5.10. It is accepted that there are no slope stability impacts as a result of the proposed development.
- 5.11. It is accepted that the development will not impact on the wider hydrogeology of the area.
- 5.12. Considering the supplementary information provided, the BIA meets the requirements of CPG Basements.

## Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Fladmark	Flat 3, 44 Goldhurst Terrace NW6 3NT	06 April 2018	Concerned that signs of existing subsidence haven't been considered in BIA.	Discussed in Section 4
Willans	Flat 3, 44 Goldhurst Terrace NW6 3HT	26 March 2018	Concerned about the proposed excavation methodology, impact on existing subsidence, flooding reported within the last 5 years, effects on existing arboriculture and services (gas) in common areas.	Discussed in Section 4
Gaskin	46 Goldhurst Terrace NW6 3HT	13 March 2018	Concerned that the development will affect the structural integrity of the building and surrounding properties, with particular reference to subsidence. Concerned that the area for water runoff and soakaway will be reduced. Concerned for loss of amenity, that the garden above the proposed basement will no longer be able to support trees and other vegetation. Concerned that the proposals do not consider protected trees within the Conservation Area.	Discussed in Section 4
Campbell	unknown	05 March 2018	Concerned about Party Wall issues with no. 46.	Discussed in Section 4



Fletcher	Leaseholder in building	09 April 2018	Concerned about slope stability; describes the property as being on a slight hill. Concerned about proximity to London Underground infrastructure – states that since conversions at No.s 58 and 66, can hear the trains. Concerned about the depth of the proposal, states that Flat 1 is already below ground level.	Discussed in Section 4
Quinn	42c Goldhurst Terrace	13 March 2018	Concerned about structural implications for adjoining properties and lack of notification to occupiers, owners and Freeholders. Concerned at lack of a Method Statement. Concerned that area is already known to be unstable and property situated on sloping ground. Concerned about implications of excavating a sub-basement beneath an existing semi-basement. Concerned about party walls.	Discussed in Section 4
Prooth	15 Fairfax Place, NW6 4EJ	20 February 2018	Concerned about subsidence and longer-term 'sinking' of neighbouring properties.	Discussed in Section 4
Hirsch	50 Goldhurst Terrace, NW6 3HT	21 February 2018	Concerned that exploratory works in advance of planning permission being granted may form large excavations.	Discussed in Section 4
Macleod	52 Goldhurst Terrace	10 March 2018	Concerned that the proposal excavation will be excessively deep due to Flat 1 already being below ground, and lightwell ineffectual.	Discussed in Section 4
Gabriel	50 Goldhurst Terrace	13 March 2018	Agrees with all points made by other residents.	Discussed in Section 4

Fuller	Flat 2, 44 Goldhurst Terrace NW6 3HT	13 March 2018	Concerned about subsidence of the building as a result of the proposal affecting the structural integrity of his flat, which lies above Flat 1. Concerned about land stability and mentions a historic flooding problem from the front garden into Flat 1 hallway. Concerned that proposed lightwell is not situated on land fully owned by the applicant.	Discussed in Section 4
Quinn & Israel	42c Goldhurst Terrace	13 March 2018	Highlights that adjacent property (No. 42) suffered subsidence previously, and concerned that proposal will cause the same again. States that site is built on sloping historic landfill with known instability. States that buildings in this area show signs of distress. Lime trees removed. States that foundations at alternate party walls are inadequate. Existing lower floor flat floor levels 1.2 – 1.6m below street level. Concerned about movement to already unstable buildings. Concerned about the size of the proposed lightwell.	Discussed in Section 4
Ryan	42a Goldhurst Terrace	10 March 2018	Concerned that development will impact on the adjacent garden fence and garden space.	Not within scope of BIA Audit
Campbell, J	46a Goldhurst Terrace	13 March 2018	Mentions a historic water leak at Flat 1, 44 Goldhurst Terrace.	Discussed in Section 4

## Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA	Outline Construction Programme to be provided	Closed – See section 4.12.	23/11/2018
2	Hydrology	Drainage proposals to be provided considering site location (LFRZ / CDA) and TW and LBC requirements	Closed – See sections 4.14 and 4.15.	23/11/2018
3	Stability	Non-technical summaries to be provided, in accordance with LBC requirements	Closed – See section 4.17.	23/11/2018
4	BIA	Confirm drainage proposal	Closed – See sections 4.14 and 4.15.	23/11/2018

## Appendix 3: Supplementary Supporting Documents

None

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