

138-140 Highgate Road  
London, NW5 1PB

Basement Impact Assessment  
Audit

For  
London Borough of Camden

Project Number: 12985-06  
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September 2018

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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 138-140 Highgate Road, NW5 1PB (planning reference 2018/1528/P). The basement is considered to fall within Category C 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 proposed development involves demolition of the fuel station and MOT centre and erection of a three-storey building to provide 6 x 4 bedroomed dwelling houses with gardens and associated landscaping. The proposal involves excavations ranging between 5m and 8m below ground level (bgl); the greater excavation depths will be located towards the east-northeast area of the site, adjacent to College Lane.
- 1.5. The Basement Impact Assessment (BIA) has been carried out by individuals who possess suitable qualifications ("CGeol") only for the assessment of subterranean (groundwater) flow. The assessment of the land stability and surface flow and flooding, should also be undertaken by individuals who possess suitable qualifications.
- 1.6. The BIA documents should refer to CPG Basements (March 2018), not to the outdated CPG4.
- 1.7. The latest available (revision A) planning application drawings dated 15 August 2018, should be consistently included and referenced across all BIA documents.
- 1.8. In the screening assessments, justification should be provided for all 'No' answers, and review and amendments are required as described in Section 4. The scoping section of the screening & scoping report should be revised accordingly.
- 1.9. Amendments are required in the ground investigation report (GI) report with respect to: (i) the excavation depth of the proposed basement, (ii) the proposed thickness of imported soil, (iii) a reference about "underpinning of walls", and (iv) additional geotechnical parameters required for retaining wall design.
- 1.10. Consistency of the proposed construction solution is required across all BIA documents.

- 1.11. A construction method statement and a structural engineering report should be provided and the ground movement assessment GMA report should be revised in accordance with the comments of this Audit.
- 1.12. The revised BIA documentation should contain a non-technical executive summary, a construction programme, a topographical survey and a structural monitoring strategy.
- 1.13. Based on the above comments, a number of queries has been raised as summarised in Appendix 2. It cannot, currently, be confirmed that the proposal adheres to the requirements of the CPG Basements.

## 2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 20 August 2018 to carry out a Category C Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 138-140 Highgate Road, NW5 1PB (Camden planning reference 2018/1528/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 Basements (March 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 *"Demolition of petrol station and MOT centre at 138-140 Highgate Road and erection of a three storey terrace building to provide 6 x 4 bedroomed dwelling houses with gardens at lower ground, ground and upper ground levels together with associated landscaping"*.

The Audit Instruction also confirmed that the basement proposal does not involve or is neighbour to, any listed buildings.

2.6. CampbellReith accessed LBC's Planning Portal on 10 September 2018 and gained access to the following relevant documents for Audit purposes:

- "Planning policy statement", dated March 2018, issued by Washington Young LLP Chartered Town Planners;
- "140 Highgate Road, design and access statement", dated March 2018, issued by D\*Haus Company Ltd;
- "Desk study basement impact assessment (screening & scoping) report", dated 19 February 2018, job ref.no. P1323J1303/SL, version final v1.0, issued by Jomas Associates Ltd;
- "Geo-environmental & geotechnical assessment (ground investigation) & basement impact assessment report", dated 8 August 2018, job ref.no. P1323J1303/SL, version final v2.0, issued by Jomas Associates Ltd;
- "Ground Movement Assessment", dated 15 August 2018, job ref.no. P1323J1303, version v1.0, issued by Jomas Associates Ltd;
- "Arboricultural impact assessment, arboricultural method statement, tree constraints plan and tree protection plan", dated February 2018, job ref.no. P1323J303, version final v1.0, issued by Jomas Associates Ltd;
- A planning application drawing titled "Site location plan and block plan", drawing no. 0067\_PL\_000, dated 12 March 2018, issued by D\*Haus Company Ltd.
- Planning application drawings dated 15 August 2018, issued by D\*Haus Company Ltd, consisting of:
  - "Existing roof plan", drawing no. 0067\_PL\_001, revision A;
  - "Existing ground floor plan", drawing no. 0067\_PL\_002, revision A;
  - "Existing elevations sheet 1 of 2", drawing no. 0067\_PL\_003, revision A;
  - "Existing elevations sheet 2 of 2", drawing no. 0067\_PL\_004, revision A;
  - "Existing sections", drawing no. 0067\_PL\_005, revision A;
  - "Proposed roof plan", drawing no. 0067\_PL\_006, revision A;
  - "Proposed upper ground floor plan", drawing no. 0067\_PL\_007, revision A;
  - "Proposed ground floor plan", drawing no. 0067\_PL\_008, revision A;
  - "Proposed lower ground floor plan", drawing no. 0067\_PL\_009, revision A;
  - "Proposed elevations sheet 1 of 2", drawing no. 0067\_PL\_010, revision A;

- “Proposed elevations sheet 2 of 2”, drawing no. 0067\_PL\_011, revision A;
  - “Proposed sections (cross sections)”, drawing no. 0067\_PL\_012, revision A;
  - “Proposed sections (longitudinal sections)”, drawing no. 0067\_PL\_013, revision A;
  - “Longitudinal elevations existing vs proposed”, drawing no. 0067\_PL\_014.
- Planning comments and responses.



### 3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	No	Refer to comments in Audit paragraph 4.1.
Is data required by Cl.233 of the GSD presented?	No	A works programme for construction should be provided.  Contradictory information on the proposed development and the construction solution is presented in the ground investigation report (GI), in the ground movement assessment report (GMA) and in the proposed development drawings.  Refer also to additional comments in Audit paragraphs 4.14 & 4.19.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	No	Preliminary drawings showing the intended construction solution and sequence of works should be provided.
Are suitable plan/maps included?	Yes	General site location and 3-D site-specific plans are included.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	As above.  Reference has been made to Camden Planning Guidance.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	Reference has been made to Camden Planning Guidance, a Groundsure report and OS Maps data have been included in the screening & scoping report.  Justification should be provided for all 'No' answers.  Refer also to comments in Audit paragraph 4.7.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	Reference has been made to Camden Planning Guidance and a Groundsure report and OS Maps data have been included in the screening & scoping report.  Reference should be made to a tributary of the 'lost' River Fleet shown outside the site boundary towards the east according to

Item	Yes/No/NA	Comment
		figure 11 of Arup GSD.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	A Groundsure report, OS Maps data, Environment Agency information and Camden SFRA data have been consulted and discussed in the screening & scoping and the GI report. Reference is also made to Camden Planning Guidance.  The Highgate Road, to the west of the site, was flooded in 1975 according to Figure 15 of Arup GSD.  Justification should be provided for all 'No' answers.
Is a conceptual model presented?	Yes	Ground conditions are presented in the GI report.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	No	Scoping is discussed in paragraphs 7.2.4 to 7.2.7 of the screening & scoping report.  However, the scoping outcome may need to be revised given the additions required into the screening process.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	No	Scoping is discussed in paragraph 7.2.3 of the screening & scoping report.  However, the scoping outcome may need to be revised given the additions required into the screening process.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	No	Scoping is discussed in paragraphs 7.2.8 & 7.2.9 of the screening & scoping report.  However, the scoping outcome may need to be revised given the additions required into the screening process.
Is factual ground investigation data provided?	Yes	Factual ground investigation information is presented in the GI report.
Is monitoring data presented?	Yes	Groundwater monitoring information is presented in section 4.2 of the GI report.
Is the ground investigation informed by a desk study?	Yes	A full desk study report has been provided including a Groundsure report and OS maps.

Item	Yes/No/NA	Comment
Has a site walkover been undertaken?	Yes	The site walkover information is presented in section 2.2 of the screening & scoping report.
Is the presence/absence of adjacent or nearby basements confirmed?	No	No information is provided about any nearby basements.
Is a geotechnical interpretation presented?	Yes	Some interpretation is presented in section 9 of the GI report.
Does the geotechnical interpretation include information on retaining wall design?	No	Some information is presented in section 9 of the GI report and some additional information is provided in section 3 "Ground Model" of the GMA report, however, this is incomplete as parameters such as the unit weight, the effective stress cohesion and angle of friction and Poisson ratio values are missing.
Are reports on other investigations required by screening and scoping presented?	Yes	A GI report and a GMA report are appended.  The BIA identified that the subject area is within a conservation area and a management plan for construction, traffic and demolition is required at the detailed design stage.  A proposed construction method statement should be appended to the BIA.
Are the baseline conditions described, based on the GSD?	No	Description of the neighbouring properties with regards to the existence of any nearby basements is not provided in the BIA.
Do the baseline conditions consider adjacent or nearby basements?	No	As above.
Is an Impact Assessment provided?	Yes	An impact assessment is discussed in both the GI report and the GMA report, however, this is considered incomplete as per the comments of this Audit.
Are estimates of ground movement and structural impact presented?	No	Estimates of ground movements and structural impact are discussed in the GMA report for the majority of the adjacent buildings and structures, however, these are based on "preliminary drawings" which were not available at the time of writing this Audit.  Refer also to comments in Audit paragraphs 4.16 & 4.17.  Based on the above, the GMA report cannot be fully assessed and

Item	Yes/No/NA	Comment
		should be revised accordingly.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	No	Further queries should be addressed and additional analysis needs to be undertaken as per the present Audit report.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	Mitigation methods should be considered, if required, in the light of the results of a revised GMA report.
Has the need for monitoring during construction been considered?	Yes	The need for monitoring is briefly discussed in sections 10.7.4 and 10.7.5 of the GI report, however, the monitoring strategy should be considered after the revision of the GMA report.
Have the residual (after mitigation) impacts been clearly identified?	No	Any residual impact should be considered in the light of a revised GMA report.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	As discussed above, additional information is required for the GMA report and any structural impact to be fully assessed.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	The scheme does not appear to adversely affect drainage or run-off.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	The impact upon structural stability should be further assessed in the light of a revised GMA, in accordance with the comments of this Audit.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	However, a revised GMA is required.
Are non-technical summaries provided?	No	A non-technical executive summary is presented at the front section of the screening & scoping report, however, this should be updated with information that the applicant has gathered during each stage of the BIA, according to the requirements of paragraph 4.6 of CPG Basements (March 2018).

## 4.0 DISCUSSION

- 4.1. The Basement Impact Assessment (BIA) has been carried out by engineering consultants Jomas Associates Ltd by individuals who possess suitable qualifications (“CGeol”) only for the assessment of subterranean (groundwater) flow. The assessment of the land stability and surface flow and flooding, should be undertaken by individuals who possess suitable qualifications such as “CEng”, “MICE”, “C.WEM”, in conjunction with a “CGeol” as required, according to section 4.7 of CPG Basements (March 2018). As such, the BIA should be re-issued.
- 4.2. The proposed development involves demolition of the fuel station and MOT centre and erection of a three-storey terrace building to provide 6 x 4 bedroomed dwelling houses with gardens at basement, lower and upper ground levels together with associated landscaping as shown on the latest available development plans. The proposal involves significant, in terms of volume and depth, excavations ranging between 5m and 8m below ground level (bgl); the greater excavation depths will be located towards the east-northeast of the site, adjacent to College Lane.
- 4.3. The BIA reports, consisting of a desk study/screening & scoping report, a ground investigation report (GI) and a ground movement assessment (GMA) report, refer to CPG4, however, this document is superseded by the Camden Planning Guidance (CPG) Basements (March 2018). Hence, the CPG Basements document should be referenced across all BIA documents as required.
- 4.4. The latest available (revision A) planning application drawings dated 15 August 2018, issued by D\*Haus Company Ltd, suggest that the proposal is about a three-storey terrace building with ‘basement’, ‘lower’ and ‘upper’ ground floors, as shown in the proposed cross sections. However, in the same set of drawings, in the floor plans, ‘lower’, ‘ground’ and ‘upper’ floor plans are noted; hence, there is some inconsistency, which needs correction. Further, it is assumed that the cross sections shown in drawing no. 0067\_PL\_005 are sections AA & BB, and not sections CC and DD. In the same context, the design and access statement and the planning policy statement drawings and text should be corrected in accordance with the latest development drawings.
- 4.5. The BIA reports (desk study/screening & scoping, GI and GMA) describe the proposed development as a new four-storey residential development, which contradicts the three-storey proposal according to the latest drawings. As such, amendments and consistency is required across all BIA documents including their appendices.
- 4.6. In the screening & scoping report it is noted that there are no watercourses within 250m of the site, however, a tributary of the ‘lost’ River Fleet is shown outside the site boundary towards

the east according to figure 11 of Arup GSD. As such, assessment and a relevant comment should be included within the screening & scoping report.

- 4.7. Concerning the land stability screening questions and answers, included in the screening & scoping report, the following are noted:
- 4.7.1. Justification should be provided for all 'No' answers in accordance with the CPG Basements requirements;
- 4.7.2. The answer to question no. 6 should be amended in accordance with the arboricultural report, which states that trees 'T10' and 'T11' will not be retained on-site post-development. Also, according to the same report, root protection areas of trees in the proximity of the site appear to be affected by the proposed works. The recommendations of the arboricultural report should be adhered to and this should be clearly stated in the BIA documents;
- 4.7.3. The answer to question no. 12 needs to be amended to include College Lane which appears to be within 5m from the eastern site boundary;
- 4.7.4. The answer to question no. 13 should be revised given that the proposed basement floor is expected to be between 6.50m and 8m bgl towards College Lane; hence the proposed foundations will be significantly lower compared to the foundations of the neighbouring properties across College Lane towards the east.
- 4.8. About the surface flow and flooding screening questions and answers, included in the screening & scoping report, justification should be provided for all 'No' answers in accordance with the CPG Basements requirements. The Highgate Road to the west of the site was flooded in 1975 according to Figure 15 of Arup GSD. Therefore, it is recommended that a Flood Risk Assessment is undertaken and included in the BIA.
- 4.9. The scoping section 7.2 of the screening & scoping report should be updated in accordance with the amendments and additions required for the screening section (refer to comments above).
- 4.10. In the GI report (page vi, and page 29) it is stated that due to the proposed basement "...soils will be removed down to approximately 3.5-4.0m bgl". However, based on the latest development drawings, it appears that the proposed basement floor will be constructed between 5m to 8m bgl. As such, an amendment is required accordingly.
- 4.11. In the GI report (page vi) it is stated that "Due to the presence of asbestos, any areas of proposed soft landscaping should comprise at least 6000mm of clean imported soil...". It is

assumed that this is a typo but a comment would be required if otherwise, as it will impact the basement construction.

- 4.12. In the GI report (section 9.11.5) and in the GMA report (section 2, page 10) “underpinning of walls” is discussed; however, it appears that underpinning of any walls will not be required given the existing structures on site will be demolished. A clarification is required.
- 4.13. A full set of geotechnical parameters for retaining wall design including unit weight, effective stress cohesion and angle of friction and Poisson ratio should be included in the GI report.
- 4.14. Contradictory information regarding the proposed construction solution (cantilever retaining wall vs contiguous pile wall) is presented in the GI report (paragraph 9.7.4) and the GMA report (section 2.2, page 4) respectively, for the basement section towards Highgate Road. In addition, “sacrificial bearing piles” are mentioned in paragraph 10.7.4. of the GI report. Clarification and consistency of the preferred construction solution is required across all BIA documents.
- 4.15. Given that the proposal involves significant, in terms of volume and depth, excavations ranging between 5m and 8m below ground level, preliminary drawings showing the preferred construction solution and sequence of works should be included in the BIA. For the same reason a detailed topographical survey of the site is recommended to be carried out, ideally including information about any adjacent basements and structures, in order to inform the BIA.
- 4.16. Estimates of ground movements and assessment of structural impact are both discussed in the GMA report for the majority of the adjacent buildings and structures, however, these are based on “preliminary drawings” which were not available to CampbellReith at the time of writing this Audit report. Also, it appears that many crucial assumptions and details of the GMA are not discussed or presented in a clear way. Such assumptions include the existence or not of accurate topographical survey data, both for the site and the adjacent impacted structures (roads, buildings, ground), values and distribution of the actual loads (‘indicative’ loads are only taken into account in the GMA) for both the existing and the proposed structures, maximum depth of excavation considered in the analysis, to name a few. Further, no impact assessment has been undertaken/discussed for College Lane, situated at the immediate northeast of the site, very close to greater excavation depths.
- 4.17. A construction method statement and a structural engineering report should be provided containing assumptions and outline calculations for basement elements, a proposed construction sequence and sketches showing the design intent for permanent and temporary works. The GMA report should take into account the intended construction solution and sequence in order to assess the structural impact on all adjacent structures and neighbouring buildings. In this context, the GMA report cannot be fully assessed and should be revised accordingly.

- 4.18. A structural monitoring strategy with proposed trigger levels during construction should be included in the BIA in the light of the results of the revised GMA report.
- 4.19. A works programme for construction should be provided in accordance with Arup GSD, paragraph 233.
- 4.20. A non-technical executive summary is presented at the front section of the screening & scoping report, however, this should be updated with the information that the applicant gathered during each stage of the BIA (including the site investigation and GMA stages), according to the requirements of paragraph 4.6 of CPG Basements (March 2018).



## 5.0 CONCLUSIONS

- 5.1. The Basement Impact Assessment (BIA) has been carried out by individuals who possess suitable qualifications ("CGeol") only for the assessment of subterranean (groundwater) flow. The assessment of the land stability and surface flow and flooding, should be undertaken by individuals who possess suitable qualifications such as "CEng", "MICE", "C.WEM", in conjunction with a "CGeol" as required.
- 5.2. The BIA documents should refer to Camden Planning Guidance Basements (March 2018), not to the outdated CPG4.
- 5.3. The latest available (revision A) planning application drawings dated 15 August 2018, should be consistently included and referenced across all BIA documents.
- 5.4. The screening & scoping report should include reference to figure 11 of Arup GSD.
- 5.5. In the land stability screening, justification should be provided for all 'No' answers, and review and amendments are required for answers provided to questions no. 6, 12 and 13.
- 5.6. In the surface flow and flooding screening, justification should be provided for all 'No' answers. It is recommended that a Flood Risk Assessment be undertaken given that Highgate Road, situated to the west of the site, was flooded in 1975 according to Arup GSD data.
- 5.7. The scoping section 7.2 of the screening & scoping report should be updated in accordance with the amendments and additions required for the screening section.
- 5.8. Amendments and additional information are required in the GI report with respect to: (i) the excavation depth of the proposed basement, (ii) the proposed thickness of imported soil, (iii) a reference about "underpinning of walls", and (iv) additional geotechnical parameters required for retaining wall design.
- 5.9. Consistency of the proposed construction solution is required across all BIA documents.
- 5.10. A detailed topographical survey is recommended to be carried out to inform the BIA.
- 5.11. The GMA report should be revised in accordance with the comments of this Audit.
- 5.12. A construction method statement and a structural engineering report should be provided containing assumptions and outline calculations for basement elements, the proposed construction sequence and sketches showing the design intent for permanent and temporary works.
- 5.13. A structural monitoring strategy should be included in the BIA in the light of the revised GMA.

- 5.14. A works programme for construction should be included in the BIA.
- 5.15. The non-technical executive summary should be updated with the information that the applicant has gathered during each stage of the BIA.
- 5.16. Based on the above comments, a number of queries has been raised as summarised in Appendix 2. It cannot, currently, be confirmed that the proposal adheres to the requirements of the CPG Basements.

## Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Willmott	Unknown	Unknown	<ul style="list-style-type: none"><li>• Adjacent trees and root protection areas</li></ul>	<ul style="list-style-type: none"><li>• A request has been made and additional comments shall be provided in the screening &amp; scoping report noting that the recommendations of the arboricultural report should be adhered to.</li></ul>

## Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA	The assessment of the land stability and surface flow and flooding, should be undertaken by individuals who possess suitable qualifications.	Open	
2	BIA	Reference to CPG Basements (March 2018) document is required.	Open	
3	BIA	The latest planning application drawings should be consistently referenced in the BIA.	Open	
4	BIA	Update of scoping section is required according to screening section comments.	Open	
5	BIA	Amendments of the GI report about excavation depth, proposed thickness of imported soil, "underpinning of walls", geotechnical parameters for retaining wall design.	Open	
6	BIA	Consistency of the proposed construction solution is required across all BIA documents.	Open	
7	BIA	A detailed topographical survey is recommended to inform the BIA.	Open	
8	BIA	A works programme for construction should be provided.	Open	
9	BIA	The non-technical executive summary should be updated.	Open	
10	Stability	In the land stability screening, justification should be provided for all 'No' answers, and review is required for answers no. 6, 12 and 13.	Open	
11	Stability	The GMA should be revised.	Open	
12	Stability	A construction method statement and a structural engineering report should be provided with outline calculations and sketches.	Open	
13	Stability	A structural monitoring strategy is required.	Open	
14	Hydrogeology	Reference to figure 11 of Arup GSD should be included.	Open	
15	Hydrology	In the surface flow and flooding screening, justification shall be provided for all 'No' answers.	Open	
16	Hydrology	A Flood Risk Assessment should be undertaken.	Open	

## Appendix 3: Supplementary Supporting Documents

None

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