

158 Iverson Road,
London NW6 2HH

Basement Impact Assessment
Audit

For
London Borough of Camden

Project Number: 12336-86

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Contents

1.0 Non-technical summary 1

2.0 introduction..... 3

3.0 Basement Impact Assessment Audit Check List..... 5

4.0 Discussion 9

5.0 Conclusions 12

Appendix

- Appendix 1: Residents' Consultation Comments
- Appendix 2: Audit Query Tracker
- Appendix 3: Supplementary Supporting Documents

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 158 Iverson Road (planning reference 2016/3632/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 carried out by Croft Structural Engineers with input from third party organisations and the report authors for the relevant element have appropriate qualifications.
- 1.5. The BIA has confirmed that the proposed basement will be founded within the London Clay stratum.
- 1.6. The BIA has undertaken screening in accordance with the Camden guidelines and a number of issues were identified to be carried through to the scoping stage.
- 1.7. Acceptable justification for the soil parameters adopted in the underpinning design has been provided within the updated October 2016 Ground Investigation Report.
- 1.8. The Basement Method Statement which has been presented requires further clarification to enable the proposed construction sequence to be verified, as there appears to be inconsistencies between the BMS and the structural drawings in relation to the propping of the basement walls in the permanent condition.
- 1.9. Calculations for the ground movement/building damage assessment have been provided and within the October 2016 Ground Investigation Report which predict generally Category 0 Damage.
- 1.10. The basement is considered to lie within the water table and the impact assessment notes that the drainage design should provide measures to reduce the backing up of groundwater around the structure, Table 5.1 of the groundwater report. Details on how this is to be achieved are shown on the engineering drawings comprising pipes to reroute any flows from the rear to the front of the property.

- 1.11. Issues which were identified in the screening and scoping assessments have been adequately responded to apart from the land stability issues associated with the soil parameters and the retaining wall design.
- 1.12. Queries and requests for further information are discussed in Section 4 and summarised in Appendix 2.
- 1.13. It is noted that the basement was constructed prior to the satisfactory conclusion of the initial audit report queries.
- 1.14. Subsequent party wall award information suggests that only minor, cosmetic damage has occurred to the neighbouring properties.
- 1.15. It is considered that the audit is now complete.

2.0 INTRODUCTION

- 2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 11th July 2016 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 158 Iverson Road, London NW6 2HH, planning reference 2016/3632/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 *"Creation of basement level, including rear lightwell"*. The Audit Instruction also confirmed there were no listed buildings on or adjacent to the site.
- 2.6. CampbellReith accessed LBC's Planning Portal on 4th August 2016 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment (BIA) incorporating Basement Method Statement (BMS) and Structural Monitoring statement (SMS)
- Basement Impact assessment – Land stability (LS)
- Basement Impact assessment – Groundwater (GW)
- Non-technical Summary – Ground Investigation Report (NTS)
- Planning Application Drawings consisting of
 - Location Plan
 - Existing Plans, elevations and sections
 - Proposed Plans, elevations and sections

2.7. Subsequent to the issue of the initial Audit report, CampbellReith was provided with the following documentation in response to the queries raised

- Basement Impact Assessment (BIA) incorporating Basement Method Statement (BMS) and Structural Monitoring Statement (SMS), Revision 2, by Croft Structural Engineers
- Ground Investigation Report, Report Reference GWPR1605/GIR/October 2016, by Ground and Water Ltd, status FINAL
- Structural Calculations, May 2016 by LIM Engineering
- E mails, 6 October 2016 and 31st October 2016 from the applicant, Tom Schneider

2.8. CampbellReith was advised by Camden in November 2016 that the basement has been constructed. At this stage the queries raised in the initial audit report had not been fully resolved. As a consequence the following party wall awards were received, No 156 on 13th January 2017 and No 160 on 8th February 2017. Completion letters were received on 8th February 2017 for No 160, and 2nd March 2017 for Flats 156A and 156B.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	The qualifications of the BIA author and the authors of the separate Groundwater and Land Stability reports are acceptable.
Is data required by Cl.233 of the GSD presented?	Yes	In general the information has been provided. An outline programme for the works has been provided in Appendix E of the updated BIA.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	In general the majority of the elements of the development are outlined.
Are suitable plan/maps included?	No	Limited maps have been include in the BIA to illustrate the location of the site in relation to the various screening items.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	No	Refer to the response above.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	Some maps have been included in the responses although not necessarily maps from the Camden documents. However the responses are accepted.
Hydrogeology Screening Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	Limited justification for the responses has been provided. However the responses are accepted.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	The responses are accepted.
Is a conceptual model presented?	Yes	Ground conditions are described in section 6 of the Land Stability assessment.

Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Scoping has been carried although it has been referred to as the Impact assessment. The BIA recommends that the location of a nearby lost river and the Jubilee line are confirmed.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Scoping has been carried out. Refer to comment above.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Potential for flooding from artificial sources has been noted.
Is factual ground investigation data provided?	Yes	A ground investigation has been referenced in the LS report and borehole, trial pit or window sampling information has been provided.
Is monitoring data presented?	Yes	Monitoring results have been referenced in the LS report and noted in Section 4.4 of the Ground Investigation Report.
Is the ground investigation informed by a desk study?	Yes	A desk study and walk over have been undertaken - section 3 of the BIA.
Has a site walkover been undertaken?	Yes	See above.
Is the presence/absence of adjacent or nearby basements confirmed?	No	No investigation of the existing foundations to the neighbouring properties has been carried out. Neighbouring basements confirmed via planning portal.
Is a geotechnical interpretation presented?	Yes	Values for various soil parameters have been presented in the Ground Investigation report based on the site works.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Parameters for the retaining wall design have been tabulated in section 6.4 of the LS report.

Item	Yes/No/NA	Comment
Are reports on other investigations required by screening and scoping presented?	No	None required.
Are the baseline conditions described, based on the GSD?	Yes	Section 3 of the BIA describes the site setting.
Do the base line conditions consider adjacent or nearby basements?	Yes	No information on neighbouring buildings foundations has been presented.
Is an Impact Assessment provided?	Yes	
Are estimates of ground movement and structural impact presented?	Yes	Section 6.5 of the updated Ground Investigation Report, October 2016 provides calculations for ground movements.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	The Impact Assessments relate to the issues identified in the Scoping stage.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	The primary method of controlling ground movement is by monitoring before, during and after the underpinning works.
Has the need for monitoring during construction been considered?	Yes	Details of the monitoring and action required are contained in the BIA Appendix C – Structural Monitoring Statement.
Have the residual (after mitigation) impacts been clearly identified?	Yes	The BIA considers there to be no unacceptable impacts resulting from the basement development, however this has not been demonstrated.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	The GMA provided has assessed that the predicted movements will be Burland Category 0 and that provided suitable temporary works and monitoring are carried out, the stability of the building and neighbouring properties will be maintained.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	Essentially the status quo has been maintained with a small reduction in the site's impermeable area

Item	Yes/No/NA	Comment
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	Further information is require to demonstrate this eg. a coherent geotechnical interpretation and ground movement assessment.
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	Burland category 0 is predicted.
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

- 4.1. The Basement Impact Assessment (BIA) has been carried out by Croft Structural Engineers with separate reports for land stability and groundwater being prepared by third parties. The report authors have suitable qualifications.
- 4.2. The LBC Instruction to proceed with the audit identified that the basement proposal neither involved a listed building nor was adjacent to listed buildings.
- 4.3. The proposed development comprises an existing 3 storey terraced building with a basement level under the front half of the building footprint. The proposed development involves the construction of a new basement to the rear half of the building and extending it to the front and rear to form lightwells. The basement will extend approximately 2800mm in depth below the ground floor.
- 4.4. The basement is to be formed by the underpinning of the existing foundations around the perimeter which will act as the retaining structure in both the temporary and permanent situations.
- 4.5. The BIA has identified that the site is underlain by Made Ground to a depth of up to 1.8 metres below which lies the London Clay Formation.
- 4.6. The ground investigation comprised 2 window sampler boreholes to a maximum depth of 5m, 1 dynamic probe to a maximum depth of 10m and 2 hand dug trial pits to expose the existing foundations. Details of the investigation points were provided in the form of plans and logs.
- 4.7. A standpipe is noted as having been installed in one of the window sampler boreholes. The borehole was reported as being dry at the time of the investigation with a water level 2m bgl noted on a return visit 3 weeks later.
- 4.8. Geotechnical testing has been carried out on a number of soil samples recovered during the ground investigation and the results have been presented within the report Sections 5 and 6 of the GI report providing indicative soil parameters for the London Clay and the Made Ground.
- 4.9. Screening has been undertaken in accordance with the requirements of the GSD. Although no maps have been included in the BIA to illustrate some of the responses, and the justification is limited on some of the items, in general the responses are accepted. There are issues arising from the screening for groundwater, land stability and surface flow and a number of items have been carried forward to scoping. The LS recommends that the location of a nearby lost river is confirmed. Additionally, the NTS advised that the location of the Jubilee line in relation to the site is confirmed.

- 4.10. The stability screening identified the following as the main items to be carried to scoping/ impact – London Clay is the shallowest strata at the site, the site is within 5m of a highway and the proposed basement will increase the differential depth of foundations with neighbouring properties.
- 4.11. The surface water and flooding screening identified the proposed development site will change the impermeable area and could be affected by infrastructure failure.
- 4.12. The groundwater screening identified that the basement may extend below the water table, the development may change the impermeable area, and there may be more run off discharged to the ground.
- 4.13. Ground Movement and building damage are discussed in the BIA and the October 2016 Ground Investigation Report with Croft noting that damage will be limited to Category 2 or less (elsewhere Category 0 is predicted). The NTS also states that damage is likely to fall within Category 0 and calculations are included in section 6.5 of the October 2016 Ground Investigation Report.
- 4.14. For the land stability issues, the LS report noted these can be dealt with by ensuring: that the basement construction is undertaken by competent contractors; monitoring of the existing structures is carried out during the works with a system of actions in place should the monitoring readings warrant it; and groundwater is controlled during the construction operations. The monitoring of the structures and actions are detailed in the BMS in Appendix C, Structural Monitoring Statement.
- 4.15. For the surface water the impermeable area of the site has been calculated as decreasing so there is no issue in that respect. The infrastructure failure is deemed to be a low risk due to the low probability of its occurrence. The surface water and flooding impacts are accepted as being negligible.
- 4.16. The impermeable area change noted in the groundwater screening is beneficial and no impact is anticipated from this source. The basement is considered to lie within the water table and the impact assessment notes that the drainage design should provide measures to reduce the backing up of groundwater around the structure, Table 5.1 of the groundwater report. The structural drawings indicate drainage pipes adjacent to the retaining walls and below the basement slab to assist in groundwater flow.
- 4.17. It is noted that the underpinning wall design is based on propping at high and low level in both the temporary and permanent cases. Whilst the low level propping can be readily achieved by use of the basement slab, the high level propping does not appear to be practical. Further

information is required on how this high level propping is to be installed for the permanent condition.

- 4.18. It is noted that the BIA recommends the use of pumping and non-return valves for the basement drainage to minimise the potential for flooding.
- 4.19. A non-technical summary has been provided.
- 4.20. Notwithstanding the comments noted above, it is understood that the basement has been constructed during the late summer of 2016.
- 4.21. In order to assess the impact of the basement construction on neighbouring properties, details of the monitoring which was detailed in Appendix C, Structural Monitoring Statement of the Basement Method Statement were requested from the applicant.
- 4.22. The response from the applicant was that the monitoring had not been undertaken and therefore no information was available.
- 4.23. Given the situation, the Party Wall awards for 156 and 160 Iverson Road were requested so that:
- Camden have evidence that suitable awards are in place
 - Details of any damage noted in the post construction survey are identified and suitable repairs undertaken
- 4.24. The awards were received from the applicant as noted in section 2.8 with the initial awards being entered into in July 2016, and condition surveys undertaken.
- 4.25. The award for No. 160 has been signed off as complete and to the satisfaction of the Adjoining Owner on 8th February 2017, and it is accepted that this is a suitable indication that extensive damage has not occurred as a result of the basement construction.
- 4.26. The awards for No. 156 Flats A and B have been signed off as complete and to the satisfaction of the Adjoining Owner on 1st March 2017, and it is accepted that this is a suitable indication that extensive damage has not occurred as a result of the basement construction.

5.0 CONCLUSIONS

- 5.1. The Basement Impact Assessment (BIA) has been carried out by Croft Structural Engineers with separate reports for groundwater and land stability being prepared by third parties. The report authors have suitable qualifications.
- 5.2. The BIA has confirmed that the proposed basement will be founded within the London Clay stratum.
- 5.3. The BIA has undertaken screening in accordance with the Camden guidelines and a number of issues were identified to be carried through to the scoping stage. The various documents advise that the location of a nearby lost river and the Jubilee line should be confirmed in relation to the site. The updated documents researched this issue further and stated that the lost river does not impact the site.
- 5.4. Soil parameters for use in the structural and stability design have been presented Borehole and trial pit logs and test results have been included with the overall BIA documentation in the Ground Investigation Report of October 2016.
- 5.5. The basement is considered to lie within the water table and the impact assessment notes that the drainage design should provide measures to reduce the backing up of groundwater around the structure, Table 5.1 of the groundwater report. Indicative details of these measures are shown on the engineering drawings.
- 5.6. It is accepted that the development will not impact on the wider hydrology of the area and is not in an area subject to flooding.
- 5.7. Calculations have been provided to assess the likely magnitude of ground movements during the basement excavation and their impact on the surrounding buildings. It was noted in the BIA and accompanying documentation that the control of the ground movement is dependant on a monitoring regime.
- 5.8. As noted in 4.20, the basement has been constructed prior to the completion of the audit, and before all queries have been closed out. Therefore, details of the monitoring records were requested. No records are available as the monitoring was not undertaken.
- 5.9. In order to obtain evidence that no adverse impacts had occurred on neighbouring properties, the party wall awards for Nos 156 and 160 were requested. These were provided by the applicant with completion letters detailing any defects and repairs.
- 5.10. The completion letters noted minor cracking to the adjacent properties which are subject cosmetic repairs.
- 5.11. Although unsatisfactory in terms of the approval process, it is considered that the basement construction has not significantly impacted the adjacent properties.

Appendix 1: Residents' Consultation Comments

None

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA	No outline / indicative programme provided. Refer to section 3.	Closed – indicative programme in Appendix E of Croft BIA v 2.	07/10/2016
2	BIA	Location of lost river and Jubilee line to be confirmed.	Closed – Hydrogeology Screening advises that the lost river does not impact the site.	07/10/2016
3	Stability	No details of the boreholes, trial pits, window sampling provided. Logs and location plan required. Refer to section 4.6.	Closed – Ground Investigation Report has been provided.	07/10/2016
4	Stability	No geotechnical testing results included. To be provided with a reliable, consistent geotechnical interpretation. Refer to section 4.8.	Closed – Ground Investigation Report has been provided.	07/10/2016
5	Stability	Wall design based on propping at high level. How is this achieved? Detail required. Refer to section 4.17.	Open – wall design still unclear. Confirmation statement on stiff clay required.	
6	Stability	Ground Movement and building damage assessment to be reviewed and justification provided.	Closed – calculations received.	07/10/2016
7	Groundwater	Details of drainage measures to reduce groundwater back-up to be provided. Refer to section 4.16.	Closed – drainage detail indicated on drawings.	04/10/2016

Appendix 3: Supplementary Supporting Documents

- Basement Impact Assessment (BIA) incorporating Basement Method Statement (BMS) and Structural Monitoring Statement (SMS), Revision 2 by Croft Structural Engineers.
- Ground Investigation Report, Report Reference GWPR 1606/GIR/October 2016, by Ground and Water Ltd, Status Final
 - Structural Calculations, May 2016 by LIM Engineering
- Emails 6th October 2016, 31st October 2016, 13th January 2017, 2nd March which contained party wall awards