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Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12466-07
Revision: F1

January 2017

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Document History and Status

Revision	Date	Purpose/Status	File Ref	Author	Check	Review
D1	October 2016	Comment	IMim-12466-07-271016-50 Rochester Place-D1.doc	I MacDonald	E Brown	E Brown
F1	January 2017	For Planning	IMim-12466-07-160117-50 Rochester Place-F1.doc	G Kite	A Marlow	A Marlow

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Document Details

Last saved	17/01/2017 14:20
Path	IMim-12466-07-160117-50 Rochester Place-F1.doc
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Project Number	12466-07
Project Name	50 Rochester Place
Planning Reference	2016/3719/P

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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 50 Rochester Place, London, NW1 9JX (planning reference 2016/3719/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 comprises two reports, one by Croft Structural Engineers which includes a summary of the scheme, ground movement assessment and impact assessment and refers to a second report by Soils Limited which includes the screening, scoping and partial impact assessment. In the original submission, there was no evidence of the geological experience of the author of the GMA as required by CPG4. In the revised submission the authors' qualifications are acceptable.

1.5. The proposal includes the construction of a new single story basement beneath the footprint of the existing building. An underpinning sequence and sketches to illustrate construction sequence have been included in Appendix C and D of the Croft BIA along with the appropriate structural calculations.

1.6. The BIA has confirmed that the proposed basement will be founded on London Clay with Head Deposits and Made Ground overlying. It is noted that ground conditions are based on a single window sample hole to a depth of 6m. The interpretation of geotechnical parameters appears to be based on typical, published values rather than site specific data. However, these are accepted on the basis that insitu testing of the London Clay will be undertaken during construction to confirm minimum design shear strengths.

1.7. In the original BIA audit, it was requested that the relevant map extracts from the Arup GSD are included to support the answers in the screening process. These have been presented in the revised submissions.

1.8. In the original BIA audit, it was requested that a conceptual model detailing strata level, geotechnical soil parameters and groundwater levels to be used in design is provided. In the revised submissions, this has been presented.

1.9. In the revised submissions, the ground movement assessment (GMA) and damage impact assessment have been updated and are accepted, and a Damage Category 1 (Very Slight) is predicted in accordance with the Burland Scale. The proposed temporary works methodology is accepted as providing appropriately stiff propping to limit ground movements. The proposed structural monitoring should adopt trigger values based on the GMA and be agreed under the Party Wall Act.

1.10. It is accepted that there are no slope stability concerns regarding the proposed development.

1.11. It is accepted that the development will not impact on the wider hydrogeology of the area and is not in an area subject to flooding.

1.12. Queries and matters requiring further information or clarification are summarised in Appendix 2. Based on the revised submissions, the criteria contained in CPG4 and DP27 have been met. This assumes that recommendations in relation to confirming soil parameters and structural monitoring trigger values are adopted.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 20 September 2016 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 50 Rochester Place, London, NW1 9JX (Camden Planning reference 2016/3719/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 a single storey roof extension and a basement extension under the footprint of the host building."*

The Audit Instruction also confirmed 50 Rochester Place is not listed, nor is it a neighbour to a listed building.

2.6. CampbellReith accessed LBC's Planning Portal on 26 September 2016 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment Report (rev 2) dated 28 June 2016 issued by Croft Structural Engineers.
- Basement Impact Assessment Report (Ref 15051/BIA) dated August 2015 issued by Soils Limited.
- Design Access Statement issued by AWDM.
- Planning Application Drawings issued by AWDM consisting of:

  Location Plan;

  Existing Plans;

  Existing sections and Elevations;

  Proposed Plans;

  Proposed Sections and Elevations.
- Ground Investigation Report (Ref GWPR1315, Rev V1) dated 01 August 2015 issued by Ground & Water Ltd.
- Planning Comments and Responses.

2.7. CampbellReith were provided with following relevant documents for audit purposes in December 2016:

- Basement Impact Assessment Report (rev 3) dated 9 December 2016 issued by Croft Structural Engineers.
- Basement Impact Assessment Report (Ref 15051/BIA/Rev 1.01) dated August 2015 issued by Soils Limited.
- Ground Investigation Report (Ref GWPR1315, Rev V2.01) dated November 2016 issued by Ground & Water Ltd.
- Revised Submission Cover Letter dated 9 December 2016 by Croft Structural Engineers.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	Provided in updated submissions.
Is data required by Cl.233 of the GSD presented?	Yes	
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	See Soils BIA for screening and scoping and Croft BIA for details of impacts and mitigation measures.
Are suitable plan/maps included?	Yes	Provided in updated submissions.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	Provided in updated submissions.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Provided in updated submissions.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Provided in updated submissions.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	See Soils Limited BIA Section 3.2.
Is a conceptual model presented?	Yes	Provided in updated submissions.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	See Soils BIA Section 4.

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	See Soils BIA Section 4.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	NA	No requirement for scoping identified within Hydrology screening.
Is factual ground investigation data provided?	Yes	Included within Ground and Water GIR and Soils BIA.
Is monitoring data presented?	Yes	See Audit paragraph 4.3 and 4.8.
Is the ground investigation informed by a desk study?	No	See Audit paragraph 4.4.
Has a site walkover been undertaken?	Yes	See Croft BIA Section 3.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	See Croft BIA Section 3.
Is a geotechnical interpretation presented?	Yes	See Audit paragraph 4.7 and 4.8.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Provided in updated submissions. However, this appears to be presentation of parameters rather than site specific interpretation.
Are reports on other investigations required by screening and scoping presented?	Yes	Ground investigation identified and included as separate report, Ground and Water Ground Investigation Report.
Are the baseline conditions described, based on the GSD?	Yes	Provided in updated submissions.
Do the base line conditions consider adjacent or nearby basements?	Yes	Croft BIA states adjacent building do not have basements.
Is an Impact Assessment provided?	Yes	Impact Assessment given in Soils Limited BIA Section 6 Ground Movement Assessment (GMA) and Damage Category provided in Croft BIA Appendix A. Updated in revised submissions.

Item	Yes/No/NA	Comment
Are estimates of ground movement and structural impact presented?	Yes	See Croft BIA Appendix A.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	See Soils Limited BIA Section 6.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	Construction method statement consider mitigation / contingency measures.
Has the need for monitoring during construction been considered?	Yes	Se Croft BIA Section 4. This should be updated to reflect movements predicted.
Have the residual (after mitigation) impacts been clearly identified?	Yes	Potential for structural movement requiring contingency actions.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Provided in updated submissions.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	See Croft BIA Section 4.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	Provided in updated submissions.
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	See Croft BIA Section 4 and Appendix A
Are non-technical summaries provided?	No	Although an executive summary has been included at the start of the Croft BIA.

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) comprises two reports; one report by Croft Structural Engineers which includes structural calculations, construction programme and methodology and makes reference to a second report by Soils Limited which includes the screening and scoping. In the original submission, the Croft report, which includes a ground movement assessment, has been authored by a chartered structural engineer but there is no evidence of the author's geological expertise as required. In the revised submission, the authors' qualifications are acceptable. The Soils Limited report has been authored and checked by individuals with appropriate qualifications.

4.2. The site comprises a single storey garage. The proposed development is the construction of a new basement beneath the existing footprint of the building. The basement is to be formed using reinforced concrete cantilevered walls, constructed using underpinning techniques. A construction method statement, programme and sequencing have been included in the BIA appendices.

4.3. A single window sample borehole has been undertaken for the scheme and the BIA reports that ground conditions comprise Made Ground over Head Deposits and London Clay. It does not appear that any other borehole records have been consulted in the production of the BIA. Groundwater was not encountered during the site investigation, but the subsequent monitoring visit recorded groundwater at 1.05m below ground level (bgl).

4.4. The Croft BIA makes reference to a Desk Study and Walkover Survey in Section 3. This section has a very limited desk study discussion with no discussion of site history, topography, hydrogeology or hydrology, and makes reference to the Soils BIA for geology discussion.

4.5. The relevant maps extracts from the Arup GSD, Camden SFRA and the Environment Agency (EA) identifying the site location on each map are not referenced or included in the original submissions. These have been provided in the revised submissions.

4.6. There was no evidence to suggest that the Arup GSD had been consulted in the responses to Questions 1-4 of the Land Stability screening of the original submission. However, it is noted that the appropriate responses to the screening have been given. As item 4.5, the relevant extracts have now been provided.

4.7. The BIA does not make reference to the Arup GSD figures in response to the Hydrogeology screening questions. Particular reference is made to the responses to questions 2 and 6 of the screening in which Soils Limited have responded stating that the nearest surface water feature is the Grand Union Canal 375m to the south of the site. It is noted that the closest water

feature is the River Fleet, most of which has now been culverted, which lies approximately 200m to the west of the site.

4.8. The BIA does not make reference to the Arup GSD figures in response to the Hydrology screening, but it is noted that appropriate answers have been given. It is noted that the road in front of the property is at low risk of flooding from surface water flooding. It is stated in the BIA that there will be no increase in impermeable area, therefore the surface water flow regime and volume will remain unchanged by the proposed development.

4.9. The original Soils Limited BIA reports on the ground and groundwater conditions encountered during the site investigation and subsequent monitoring visit, however it did not present a conceptual site model. In the revised submissions, this has now been presented.

4.10. Geotechnical parameters are discussed in the Ground and Water, Ground Investigation Report (GIR) with drained design parameters being presented in 6.4. Undrained shear strengths have been discussed based on conversion of Dynamic Probe results, though there is no discussion on methodology behind the conversion. These values have then been used to determine bearing capacities which are inconsistent for the ground conditions encountered. Further justification for the parameters and bearing capacities presented is required. Stiffness parameters for the retaining wall design are also not presented.

4.11. In the revised submissions, typical London Clay design parameters are presented but these do not appear to be based on site specific data. It is accepted that the parameters and bearing capacities presented are reasonable for typical London Clay conditions. To ensure these are consistent with actual site conditions, insitu shear strength values should be obtained during construction by an appropriately experienced geotechnical engineer.

4.12. In the original submission, neither BIA nor the GIR present the groundwater profile to be used in design. Both the GIR and Soils Limited BIA discuss the results of the monitoring visit, with the BIA noting that the level was recorded at a time when groundwater was likely to be at its lowest. However, neither make recommendations as to an appropriate design groundwater condition to be used in detailed design. In the revised submissions, the conceptual site model indicates a design groundwater level and the structural calculations adopt a groundwater level from ground surface.

4.13. The need for mitigation is identified within the Impact Assessment section (Section 6) in the Soils Limited BIA but generally states that appropriate measures will be proposed during detailed design phase. The Croft BIA further discusses mitigation measures relating to flooding and drainage providing outline solutions to reduce risks of impact. In the revised submissions, residual risks relating to groundwater and structural stability are discussed. The construction method statement is considered acceptable, which adopts contingency propping measures in

response to structural movements. The adoption of a design groundwater level from ground surface is considered a conservative approach to waterproofing and structural design.

4.14. In the original Croft BIA, further discussion on mitigation measures for ground movement were presented, stating that the maximum level of cracking is 'Hairline' cracking, referencing the Party Wall Act as the mitigating measure along with the use of suitably experienced designers and contractors. However, the ground movement assessment, undertaken for No.52 which is deemed most critical, presents a Burland Damage Category 1 for the proposed development suggesting cracking up to 1mm. The approach used in the GMA was considered acceptable, however a review was proposed following the soil parameter review discussed in paragraph 4.10, particularly with reference to the design curves used in the assessment.

4.15. Following review of the revised submission, it is considered that the ground conditions include potentially loose Made Ground and soft to firm London Clay. It is accepted that the construction method statement proposes suitable propping / temporary works arrangements, although particular care should be undertaken if groundwater is encountered. The BIA states that a groundwater control specialist contractor should be engaged and the method statement should be updated to include details of the proposed control measures. The proposed structural monitoring trigger levels should be adjusted to reflect the movements predicted in the GMA (e.g. the amber and red trigger values should be less than the predicted maximum movement values) to keep damage to within predicted limits. It is accepted that these limits will be agreed under the Party Wall process.

4.16. It is noted that one of the consultation comments states that piles were added to middle and back flank walls of No. 48 and that the wall between No. 48 and No. 50 is not a party wall as shown in the drawings. In the revised submissions the locations of these structures have been included in the drawings. It is accepted that a full investigation of these structures will be undertaken under the Party Wall Act with additional mitigation and monitoring adopted, as required.

4.17. It is accepted there are no slope stability concerns or any other surface water considerations regarding the proposed development. It is also accepted that the proposal will not impact the wider hydrogeology.

5.0 CONCLUSIONS

5.1. The BIA comprises two reports, one by Croft Structural Engineers which refers to a second report by Soils Limited. In the revised submission the author's qualifications are accepted.

5.2. The proposal includes the construction of a new single story basement beneath the footprint of the existing building. An underpinning sequence and sketches to illustrate construction sequence have been included with the appropriate structural calculations.

5.3. The BIA has confirmed that the proposed basement will be founded in London Clay with Head Deposits and Made Ground overlying. The interpretation of geotechnical parameters appear to be based on typical, published values rather than site specific data. However, these are accepted on the basis that insitu testing of the London Clay will be undertaken during construction to confirm minimum design shear strengths.

5.4. In the revised submissions, reference information and a conceptual site model have been provided, as requested in the original BIA audit.

5.5. In the revised submissions, the ground movement assessment (GMA) and damage impact assessment have been updated and are accepted, and a Damage Category 1 (Very Slight) is predicted in accordance with the Burland Scale. The proposed temporary works methodology is accepted as providing appropriately stiff propping to limit ground movements. The proposed structural monitoring should adopt trigger values based on the GMA and be agreed under the Party Wall Act

5.6. Further clarification is required as to the presence of piles under the flank walls of No. 48 along with confirmation whether there is a party wall between No. 48 and No. 50. It is accepted that these will be investigated under the Party Wall Act, with appropriate design amendments and mitigation proposed to maintain structural impacts within the limits defined in the BIA.

5.7. It is accepted that there are no slope stability concerns regarding the proposed development.

5.8. It is accepted that the development will not impact on the wider hydrogeology of the area and is not in an area subject to flooding.

5.9. Queries and matters requiring further information or clarification are summarised in Appendix 2. Based on the revised submissions, the criteria contained in CPG4 and DP27 have been met. This assumes that recommendations in relation to confirming soil parameters and structural monitoring trigger values are adopted.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Not Given	Not Given	15/08/2016 (from Planning website)	The site is within the groundwater flow of the River Fleet and a hillside spring line is present along Rochester Place, with water flows southwest to the river.	4.7, 4.8, 4.17
Saffer (on behalf of Ostrich Arts Limited)	Forsters LLP, 31 Hill Street, London, W1J 5LS	30/08/2016	BIA does not demonstrate that the proposed development will avoid adversely affecting drainage and run-off or causing other damage to the water environment.	4.7, 4.8, 4.17
Holmes	48a Rochester Place	19/09/2016 (from Planning website)	The proposed development doesn't take into account the piles installed to the middle and back flank wall in the 1980's Wall between No. 50 and No. 48 shown as party wall which it is not. Concerned that the mitigation measures are not adequate given the above concerns and that some cracking is anticipated.	4.15, 4.16

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA	No evidence of GMA author's geological experience	Closed	December 2016
2	BIA	No evidence that Arup GSD has been consulted in the preparation of the BIA.	Closed	December 2016
3	BIA	Geotechnical parameters and bearing capacities presented in Ground and Water Report are inconsistent with the results of the investigation	Open - review the undrained shear strengths and bearing capacities presented in the Ground and Water Report; justify methodology / calculations for deriving parameters presented.	Ongoing – as 4.11, insitu shear strength values should be obtained during construction by an appropriately experienced geotechnical engineer.
4	Stability	No Conceptual model presented	Closed	December 2016
5	Stability	Consultation response states the middle and back flank walls to No. 48 are piled, which are not identified by the BIA. The same response states that there is not a party wall between No.48 and No.50 as shown in some drawings.	Open - Clarification of the foundations to flank walls of No. 48 along with clarification if party wall present with No. 50 is required. BIA and drawings to be updated accordingly.	Ongoing – as 4.16, it is accepted that these will be investigated under the Party Wall Act, with appropriate design amendments and mitigation proposed to maintain structural impacts within the limits defined in the BIA.
6	Stability	Croft BIA states damage restricted to 'hairline' cracking only which would indicate a Damage Category 0. However, the GMA identifies a Damage Category 1 for the adjacent buildings. Basis of GMA does not reference site specific geotechnical parameters.	Open – the basis of the GMA to be justified using site specific geotechnical parameters; BIA to be updated to reflect the assessed damage category and mitigation measures to be revised accordingly.	Ongoing – as 4.15, the proposed structural monitoring trigger levels should be adjusted to reflect the movements predicted in the GMA to keep damage to within predicted limits. It is accepted that these limits will be agreed under the Party Wall process.

Appendix 3: Supplementary Supporting Documents

Basement Impact Assessment Report (rev 3) dated 9 December 2016 issued by Croft Structural Engineers.
Basement Impact Assessment Report (Ref 15051/BIA/Rev 1.01) dated August 2015 issued by Soils Limited.
Ground Investigation Report (Ref GWPR1315, Rev V2.01) dated November 2016 issued by Ground & Water Ltd.
Revised Submission Cover Letter dated 9 December 2016 by Croft Structural Engineers.

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