

Ornan Court, 2 Ornan Road  
London NW3 4PT

Basement Impact Assessment  
Audit

For  
London Borough of Camden

Project Number: 12466-51

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March 2017

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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 Ornan Court, 2 Ornan Road, London NW3 4PT (planning reference 2016/5652/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 proposed development comprises the construction of a basement to a level of approximately 3.2mbgl beneath the footprint of the existing building, with associated lightwells. The property shares a party wall with Rosslyn Court.
- 1.5. The BIA has been prepared by Site Analytical Services, with supporting documents by Applied Geotechnical Engineering and Martin Redson Associates. The qualifications of the Site Analytical Services Ltd authors are in accordance with LBC guidelines.
- 1.6. The BIA does not present any assessment of historical use of the site, reference mapping data, underground utility infrastructure within the proposed development's zone of influence, a conceptual site model or an outline construction programme. An impact assessment is not explicitly presented. Non-technical summaries have not been provided.
- 1.7. The site lies directly on designated unproductive strata, the London Clay. Historical groundwater monitoring undertaken in 2011 and 2014 encountered groundwater at between 1.64m bgl and 3.51m bgl. The proposed basement excavation is therefore likely to encounter groundwater. The BIA notes that consideration should be given to temporary dewatering and also recommends that further groundwater monitoring is undertaken prior to, during and after construction.
- 1.8. The proposed foundations will be formed in the London Clay. The BIA identifies the potential for shrink / swell movements, which requires further assessment.
- 1.9. The proposed basement is to be formed by underpinning. Retaining wall design, permanent works and temporary works information is presented. Temporary works plans should include dewatering arrangements.

- 1.10. Cross-sections across the existing site indicate a change in level across the site, managed by retaining structures. An assessment of whether the proposed development will affect stability of these retaining structures should be provided.
- 1.11. According to records from London Underground Limited (LUL) the site lies within 5m of the Northern Line which runs along Haverstock Hill. As the proposed basement will remain greater than 30m above the tunnels, it is accepted that it is unlikely impact upon them. However, this should be demonstrated and agreed with LUL, and their requirements may include additional survey and assessment. LUL should continue to be consulted, especially if proposals are changed (e.g. increases in depth, changes to proposed foundations).
- 1.12. It is accepted that the site is at very low risk of flooding.
- 1.13. The development results in an increase in impermeable site area. Outline drainage plans should be provided, including attenuation proposals, with sufficient assessment to demonstrate discharge flows will be in accordance with LBC's and Thames Water's requirements.
- 1.14. A Ground Movement Assessment (GMA) has been presented which indicates a Damage Impact of Category 1 (Very Slight) to surrounding structures, in accordance with the Burland Scale. The basis of the assessment is not accepted. The GMA and damage impact assessment should be revised once propping arrangements and geotechnical parameters are confirmed.
- 1.15. In line with LBC guidance, where Category 1 or a higher damage category is identified, the BIA should provide mitigation measures to address ground movement. It should also provide an outline methodology and guidance for monitoring structural movements during construction, which should include trigger values linked to predicted movements and contingency actions.
- 1.16. Non-technical summaries should be provided within any revisions to the BIA submitted.
- 1.17. Queries and matters requiring further information or clarification are discussed in Section 4 and summarised in Appendix 2. Until the additional information requested has been provided it is not possible to assess whether the requirements of CPG4 have been met.

## 2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 20 February 2017 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for Ornan Court, 2 Ornan Road, London NW3 4PT, Camden Reference 2016/5652/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; and,
- 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 planning portal describes the proposal as: "Excavation of basement to create 2 x 2 bedroom self-contained flats (Class C3) with associated front lightwells and cycle storage area and extension refuse storage area, to front elevation."

The planning portal also confirmed the site lies within the Fitzjohns Netherhall Conservation Area but the building is not a listed building.

2.6. CampbellReith accessed LBC's Planning Portal on 6<sup>th</sup> March 2017 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment (ref 14/22662-1) dated January 2015 by Site Analytical Services Ltd.
- Responses from London Underground Limited (30 October 2014 and 4 November 2014), London Streets (4 November 2014), Network Rail (30 October 2014) and Crossrail (28 October 2014).
- Report on a Ground Investigation (ref 11/17802) dated April 2015 by Site Analytical Services Ltd.
- Ground Movement Assessment report (ref P4085) dated December 2014 by Applied Geotechnical Engineering (document incomplete).
- Structural Drawings and Calculations (ref 16.280) dated April, May and August 2016 by Martin Redston Associates.
- Existing and proposed architectural drawings (ref 15/0159) dated April 2016 by Design Solutions.
- Temporary Works Sequence dated 28 April 2016 by Martin Redston Associates.
- Construction Management Plan dated 12 December 2016 by MP Brothers.
- Design and Access Statement dated 2 August 2016 by Design Solutions.
- Planning and Heritage Statement (ref CA/2609) dated September 2016 by Apcar Smith Planning.
- Tree Survey and Arboricultural Impact Assessment and Tree Protection Plan (ref E49) dated 22 April 2016 by Martin Dobson Associates.

### 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?	No	Outline construction programme required.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	BIA Report, Volume 1: Table 1, Section 4, 5, and 6; Volumes 6, 7 and 8 (Structural Calculations and Drawings) and Volume 9. Further temporary works information required to confirm sequence, propping and dewatering.
Are suitable plans/maps included?	No	A site location plan along with existing and proposed plans have been provided. However, no historical maps or GSD reference maps provided.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	No	Insufficient plans and maps included.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	BIA Report, Volume 1, Table 1. References to answers should be provided (e.g. GSD map extracts). Level change across retaining walls on site should be assessed.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA Report, Volume 1, Table 1. The proposed basement will extend beneath the water table surface. References to answers should be provided (e.g. GSD map extracts).
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	BIA Report, Volume 1, Table 1. References to answers should be provided (e.g. GSD map extracts). Screening indicates that surface water flows will be changed, impermeable site area will increase, changes will be made to the quality of surface water being received by adjacent properties, that Ornan Road flooded in 2002.



Item	Yes/No/NA	Comment
Is a conceptual model presented?	No	
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	No	BIA Report, Volume 1, Section 5. Historical land uses have not been discussed. Level changes across site not discussed. Accepted that there are no impacts to LUL assets.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA Report, Volume 1, Section 4. Report states that the screening process has identified an ancient watercourse within 100m of the site; recommends that further groundwater monitoring is required prior to, during and after the construction and that dewatering and waterproofing are required.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	No	BIA Report, Volume 1, Section 6. There is a change in permeable / impermeable site ratio. Attenuation drainage references need further detailing to assess.
Is factual ground investigation data provided?	Yes	Volume 1 of BIA, Section 3 (2014 investigation) and Volume 5 of BIA, Section 5.1 (2011 investigation).
Is monitoring data presented?	Yes	Groundwater monitoring undertaken of 2 boreholes on 6, 12 and 20 April 2011, 17 August 2011 and 25 September 2014. Groundwater monitoring undertaken of 5 boreholes on 11 and 27 November 2014 (Appendix B of Volume 1 of BIA).
Is the ground investigation informed by a desk study?	No	Not demonstrated.
Has a site walkover been undertaken?	Yes	Site Analytical Services visited the site in November 2014.
Is the presence/absence of adjacent or nearby basements confirmed?	No	GMA indicates that Rosslyn Court is assumed to be founded at 1m bgl and 239 Haverstock Hill has a full basement which is founded at 3m bgl. Land stability screening Question 13 indicates foundation depths of adjacent properties is unknown.

Item	Yes/No/NA	Comment
Is a geotechnical interpretation presented?	Yes	Volume 5 of BIA, Section 5.1 (2011 investigation) and Volume 1 of BIA, Section 5 (Slope stability). GMA stiffness values not accepted.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Volume 5 of BIA, Section 5.1 and sub-section 5.3.
Are reports on other investigations required by screening and scoping presented?	Yes	A Tree Survey and Arboricultural Impact Assessment and Tree Protection Plan report is presented which confirms that no trees will be felled as part of the development. Consultations with LUL, London Streets, Network Rail and Crossrail.
Are baseline conditions described, based on the GSD?	Yes	However, suitable reference material / mapping not provided in evidence.
Do the base line conditions consider adjacent or nearby basements?	Yes	Within GMA.
Is an Impact Assessment provided?	No	Some impact assessment covered within Scoping discussions.
Are estimates of ground movement and structural impact presented?	Yes	Ground Movement Assessment report (Volume 3 and 4 of the BIA) and Structural Calculations and Drawings (Volume 7 and 8 of the BIA). Assumptions of GMA not consistent with structural scheme. Stiffness parameters not accepted.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	No	Screening and scoping conclusions should be evidenced, with impact assessment presented as required. Drainage assessment, temporary works, GMA should be updated.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	Groundwater impacts on temporary works, drainage, mitigation of movements where Category 1 damage or greater are predicted have not been addressed.

Item	Yes/No/NA	Comment
Has the need for monitoring during construction been considered?	No	A plan showing the monitoring positions on the front and rear facades and on the party wall has been provided (Volume 9 of BIA). Trigger values and contingency plans linked to updated GMA to be provided.
Have the residual (after mitigation) impacts been clearly identified?	No	
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	Structural scheme, temporary works, GMA to be confirmed. Impacts to highway and utilities not assessed.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	No	Attenuation in line with CPG4 3.51 should be assessed.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	Hydrogeological impacts unlikely. Stability impacts to be assessed.
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	However, GMA not accepted. Assumptions not consistent with structural scheme. Stiffness parameters not accepted.
Are non-technical summaries provided?	No	

## 4.0 DISCUSSION

- 4.1. The BIA has been prepared by Site Analytical Services, with supporting documents by Applied Geotechnical Engineering and Martin Redson Associates. The qualifications of the Site Analytical Services Ltd authors are in accordance with LBC guidelines.
- 4.2. The proposed development comprises the excavation of a basement to a level of approximately 3.2m bgl beneath the footprint of the existing building in addition to a large open lightwell. The basement will create two 2-bedroom self-contained flats. The property shares a party wall with Rosslyn Court. The proposed lightwell is within 5m of Ornan Road.
- 4.3. The BIA does not present any assessment of historical use of the site, reference mapping as provided within the GSD, underground utility infrastructure within the proposed development's zone of influence, a conceptual site model or an outline construction programme. An impact assessment is not explicitly presented. Non-technical summaries have not been provided.
- 4.4. Cross-section across the existing site indicates a change in level across the site, managed by retaining structures. This has not been identified at Screening or Scoping and the BIA has not assessed whether the proposed development will affect stability of these retaining structures. This assessment should be provided.
- 4.5. The site lies directly on designated unproductive strata, the London Clay. It is accepted that the proposed development will not impact the wider hydrogeological environment.
- 4.6. Historical groundwater monitoring undertaken in 2011 and 2014 encountered groundwater at between 1.64m bgl and 3.51m bgl. The proposed basement excavation is therefore likely to encounter groundwater. The BIA notes that consideration should be given to temporary dewatering and also recommends that further groundwater monitoring is undertaken prior to, during and after construction.
- 4.7. The proposed basement is to be formed by underpinning. Retaining wall design and permanent works information is provided. The London Clay is accepted as being an appropriate bearing bearing stratum and geotechnical parameters presented for foundation and retaining wall design are considered reasonably conservative.
- 4.8. The site contains a number of mature trees. The BIA identifies the potential for shrink / swell movements due to water demand of the trees changing the moisture content of the soils. This should be further assessed.

- 4.9. Temporary works information has been presented to confirm sequencing and propping arrangements, which is accepted. Temporary works plans should include dewatering arrangements as underpinning through water bearing Made Ground presents a risk of instability.
- 4.10. According to records from London Underground Limited (dated 4 November 2014) the site lies within 5m of the Northern Line which runs along Haverstock Hill. Available drawings indicate tunnels' crown level at approximately 37mOD. The proposed basement will be greater than 30m above tunnels' crown level and assessment of potential impacts to the tunnels is presented. It is accepted the proposed development is unlikely to impact upon the tunnels. However, this should be demonstrated and agreed with LUL, and their requirements may include additional survey and assessment.
- 4.11. The BIA notes that Ornan Road was subject to surface water flooding in 2002 although the site is not located within a Local Flood Risk Zone, as defined by LBC. Within the BIA, the site itself is noted to be topographically higher than Ornan Road. The Environment Agency indicates the site to be at a 'Very Low' risk of surface water flooding, which is accepted. The development should incorporate appropriate mitigation measures to protect against potential sewer surcharge flood risk.
- 4.12. Assumptions have been made about the drainage design, including the attenuation of discharge flow. The development results in an increase in impermeable site area. In accordance with CPG4, section 3.51, outline drainage plans should be provided, including attenuation SUDS proposals, with sufficient assessment to demonstrate discharge flows will be in accordance with LBC's and Thames Water's requirements. If the implementation of attenuation SUDS is not practicable, this should be stated, providing substantiation.
- 4.13. A Ground Movement Assessment (GMA) has been presented which indicates a Damage Impact of Category 1 (Very Slight) to surrounding structures, in accordance with the Burland Scale. The GMA assumes high stiffness propping during construction and in the permanent case. The temporary works propping has been accepted, subject to review of dewatering proposals. The permanent works indicate the retaining walls will act as cantilevers, and should therefore be considered as low stiffness for the purpose of the GMA. The stiffness values adopted for the heave assessment are not considered to be reasonably conservative.
- 4.14. The GMA and damage impact assessment should be revised once propping arrangements and geotechnical parameters are confirmed, which should include a contour plan indicating a zone of influence of the development. All structures within the zone should be assessed for damage impact, including the highway, retaining structures and any utilities identified.
- 4.15. In line with LBC guidance, where Category 1 or a higher damage category is identified, the BIA should provide mitigation measures to address ground movement. It should also provide an

outline methodology and guidance for monitoring structural movements during construction, which should include trigger values linked to predicted movements and contingency actions.

- 4.16. Non-technical summaries should be provided within any revisions to the BIA submitted.
- 4.17. Queries and matters requiring further information or clarification are summarised in Appendix 2.

## 5.0 CONCLUSIONS

- 5.1. The qualifications of the BIA authors are in accordance with the requirements of CPG4.
- 5.2. The following items should be included in any further assessment presented:
- Assessment of any historical land uses and provision of reference GSD mapping;
  - Identification of underground utility assets within the zone of influence;
  - A conceptual site model;
  - An outline construction programme;
  - Impact assessments for issues taken beyond Scoping;
  - Non-technical summaries.
- 5.3. The London Clay is accepted as being an appropriate bearing stratum and geotechnical parameters presented for foundation and retaining wall design are considered reasonably conservative. However, the BIA identifies the potential for shrink / swell movements, which requires further assessment.
- 5.4. The London Clay is designated unproductive strata and it is accepted that the proposed development will not impact upon the wider hydrogeological environment.
- 5.5. Groundwater is likely to be encountered above formation level and the BIA recommends that further groundwater monitoring is undertaken prior to, during and after construction.
- 5.6. The proposed basement is to be formed by underpinning. Temporary works information should include dewatering requirements to confirm structural stability will be maintained.
- 5.7. An assessment of whether the proposed development will affect the stability of on-site retaining structures should be provided.
- 5.8. The GMA and damage impact assessment should be revised once propping arrangements and geotechnical parameters are confirmed, and include assessment of all structures, utilities and highways within the zone of influence. Where Category 1 or a higher damage category is identified, the BIA should provide mitigation measures to address ground movement. An outline methodology for monitoring structural movements during construction should be provided.
- 5.9. It is accepted that the development is unlikely impact the underlying LUL tunnels. However, this should be demonstrated and agreed with LUL. LUL should continue to be consulted, especially if proposals are changed (e.g. increases in depth, changes to proposed foundations).

- 5.10. It is accepted that the site is at very low risk of flooding.
- 5.11. Outline drainage plans should be provided, including attenuation SUDS proposals.
- 5.12. Queries and matters requiring further information or clarification are summarised in Appendix 2. Until the additional information requested has been provided it is not possible to assess whether the requirements of CPG4 have been met.



## Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Guttman	Flat 1a, Rosslyn Court	27 February 2017	Concerns regarding flooding and land stability.	5.4 – 5.8, 5.10, 5.11

## Appendix 2: Audit Query Tracker

Audit Query Tracker

1	Desk Study / BIA	Relevant information to be provided in accordance with CPG4 / GSD	Open – to be provided as 4.3 / 5.2	
2	Stability	BIA identifies potential for shrink / swell movements, to be assessed	Open – to be provided as 4.8 / 5.3	
3	Stability	Further consultations with LUL re impacts to tunnels	Open – accepted as unlikely but consultation should be continued and assessment progressed in accordance with LUL requirements.	N/A – ongoing with LUL
3	Stability	Further groundwater monitoring, as recommended by BIA, to inform temporary works	Open – to be provided as 4.6, 4.9 / 5.5	
4	Stability	Dewatering proposals to be provided, to ensure stability	Open - to be provided as 4.6 / 5.6	
5	Stability	Assessment of on-site retaining structures	Open – to be provided as 4.4 / 5.7	
6	Stability	Ground movement, damage impact and structural monitoring	Open – to be provided as 4.13, 4.14 / 5.8	
7	Hydrology	Drainage and SUDS proposals	Open – to be provided as 4.11 / 5.11	

## Appendix 3: Supplementary Supporting Documents

None