

6 Nutley Terrace
London NW3 5BX

Basement Impact Assessment
Audit

For
London Borough of Camden

Project Number: 12336-15
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Campbell Reith Hill LLP
Friars Bridge Court
41-45 Blackfriars Road
London
SE1 8NZ

T: +44 (0)20 7340 1700
F: +44 (0)20 7340 1777
E: london@campbellreith.com
W: www.campbellreith.com

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Author	G D Harper, BEng (Hons)
Project Partner	E M Brown, BSc MSc CGeol FGS
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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 6 Nutley Terrace, London NW3 5BX (planning reference 2015/2229/P). The basement is considered to fall within Category C as defined by the Terms of Reference. CampbellReith was subsequently requested to review the audit based on revised information received (planning reference 2015/7025/P).
- 1.2. The Audit reviewed the Basement Impact Assessment (Revised April 2016) 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 review it against an agreed audit check list.
- 1.4. It has been confirmed that the development site does not involve a listed building, nor is it in the neighbourhood of listed buildings.
- 1.5. The BIA has confirmed that the proposed basement will be located within the Head Deposits underlain by London Clay, and that the surrounding slopes are stable.
- 1.6. It is proposed to adopt a top down construction with a secant pile wall. The SER states the RC liner wall will be cast in front of the piled wall and will be designed to act in the permanent condition to resist lateral loads from earth, water and surcharge loads from the adjacent ground. This is accepted.
- 1.7. It is accepted that the permeability in the London Clay and Head Deposits, is low and so the proposed basement should not impact on groundwater flows.
- 1.8. It is accepted that the risk of surface water flooding the buildings is low. The use of an attenuation tank is proposed to control the flow of surface water which should mitigate the impact of surface water flows on the drainage system and on neighbouring properties.
- 1.9. A construction survey and monitoring of adjacent properties should be provided. This may be agreed as part of the party wall act.
- 1.10. A revised ground movement assessment provided (April 2016) indicates that damage to the adjacent properties will not exceed Burland Category 1, with No 4 Nutley Terrace being the most affected. The GMA is based on the construction sequence described above which provides a high stiffness propping system, and other methods of construction could result in more

ground movement/damage. The GMA must be revisited once the final construction sequence is known.

- 1.11. The damage assessment also assumes that the affected buildings are in sound condition. A condition survey is required prior to construction to determine whether the damage assessment is appropriate or whether additional mitigation is required. This may be carried out as part of the party wall award
- 1.12. The piling 'exclusion zone' proposed for piles within 10m of the tunnel extrados, required to minimise any impact that the building may have on the Belsize Tunnel, is generally accepted.
- 1.13. It is accepted that the revised BIA (April 2016) together with the revised SER and GMA (both April 2016) adequately identifies the potential impacts from the intended basement and proposes adequate mitigation. Reference should be made to Section 5 for actions to be carried through to later stages.

2.0 INTRODUCTION

- 2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 6th August 2015 to carry out a Category C Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 6 Nutley Terrace, Camden Reference 2015/2229/P. A revision, request submitted 5th May 2016, was subsequently presented and an additional review requested under Camden planning reference 2015/7025/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. The original Audit Instruction described the planning proposal as the "Erection of a 4 storey building (including basement) comprising 6 flats (Class C3) (3 x 4 bed units and 3 x 2 bed units) following demolition of existing dwelling (C3) new vehicular crossover and provision of associated landscaping. This proposal was subsequently withdrawn.
- 2.6. According to the revised scope, it is now proposed to demolish the existing house and to construct two new three-storey houses with a single basement that will extend beneath both houses, with the current proposal being that the basement will be supported by secant piled

retaining walls. The basement will extend to a maximum depth of 4.0m below existing ground level, beneath the existing building footprint and into the existing rear garden.

2.7. The Audit Instruction also confirmed that the basement proposals do not involve a listed building, nor does the site neighbour listed buildings.

2.8. The following relevant documents were provided to CampbellReith on 5th May 2016 for audit purposes:

- Site Investigation and Basement Impact Assessment (Revised April 2016)
- Structural engineering report and subterranean construction method statement (SER) (Revised April 2016)
- Ground movement assessment report (GMA) (Revised April 2016)
- Construction Management Plan – pro forma v2.0, April 2016
- Drawings;
 - Existing site plan
 - Existing ground floor plan
 - Existing first floor plan
 - Existing roof plan
 - Existing front elevation
 - Existing side elevations
 - Existing rear elevation
 - Existing sections
 - Proposed lower ground floor plan
 - Proposed ground floor plan
 - Proposed first floor plan
 - Proposed second floor plan
 - Proposed roof plan
 - Proposed section A-A
 - Proposed front elevation
 - Proposed front elevation with boundary treatment
 - Proposed rear elevation

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	The authors of the BIA, the Structural Engineering report, the Groundwater Impact Assessment and the Ground Movement Assessment all have suitable credentials.
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	Structural Engineering report and BIA.
Are suitable plan/maps included?	Yes	BIA and drawings.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA Section 3.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Groundwater Impact Assessment Section 4 BIA Section 3.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Groundwater Impact Assessment Section 4.
Is a conceptual model presented?	Yes	Ground model in Site investigation report Section 7

Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA Section 4.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Groundwater Impact Assessment Section 5.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Groundwater Impact Assessment Section 5.
Is factual ground investigation data provided?	Yes	Site investigation report Section 4.
Is monitoring data presented?	Yes	Groundwater monitoring in the Site investigation report.
Is the ground investigation informed by a desk study?	Yes	Site investigation report Section 2.
Has a site walkover been undertaken?	Yes	Site investigation report Section 1.3.
Is the presence/absence of adjacent or nearby basements confirmed?	No	Assumptions made in GMA but no justification provided. Same as per BIA Section 2.1.1.
Is a geotechnical interpretation presented?	Yes	Site investigation report Section 7.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Site investigation report Section 8.1.1.
Are reports on other investigations required by screening and scoping presented?	Yes	Network Rail Belsize tunnel solution proposed.
Are baseline conditions described, based on the GSD?	Yes	Assumptions made in GMA but no justification provided.
Do the base line conditions consider adjacent or nearby basements?	Yes	No discussion on other basements being present or not.

Item	Yes/No/NA	Comment
Is an Impact Assessment provided?	Yes	Ground Movement Assessment.
Are estimates of ground movement and structural impact presented?	Yes	Ground Movement Assessment.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	Top down construction, secant piled wall with localised grouting or sealing if seepage occurs SUDS / attenuation tank Monitoring of nearby structures
Has the need for monitoring during construction been considered?	Yes	Structural Engineering report Sections 5 and 9.
Have the residual (after mitigation) impacts been clearly identified?	Yes	Degree of damage to neighbouring buildings is considered and indicated.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure been maintained?	Yes	Ground movement assessment indicates up to Burland Category 1 damage.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	With attenuation tank / SUDS.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	No	Predicted in revised GMA to be Burland Category 1 or less.
Are non-technical summaries provided?	Yes	BIA Section 9.1 Structural Engineering report.

4.0 DISCUSSION

- 4.1. The BIA has been carried out by an established firm of structural engineers, ElliottWood, who have employed the services of GEA and Chord to supplement the work needed to form the BIA. The authors and reviewers from all of these organisations have suitable qualifications.
- 4.2. The revised proposal maintains the top down construction although with the sides supported by a secant pile wall. It is stated that localised grouting or sealing will be employed if seepage occurs. This is an acceptable methodology using established techniques.
- 4.3. The BIA does not confirm the presence of other nearby basements, although it is assumed none are present based on a search on the Camden Planning Portal. The design case modelled in the Ground Movement Assessment Report is specific to the adjacent garage / pool extension to No. 4 Nutley Terrace. An investigation of the presence of other nearby basements is required to ascertain that the above scenario is the most critical.
- 4.4. It is acknowledged that the basement is founded within the Head Deposits underlain by London Clay. It is accepted that groundwater flows should be low and so not significantly affected by the proposed basement.
- 4.5. The groundwater is shown to be at shallow depth and so the basement will be significantly below the groundwater level. The proposal to allow for localised grouting or sealing should be adopted.
- 4.6. The BIA has shown that the surrounding slopes to the development are stable.
- 4.7. The BIA indicates that the new foundations will be deeper than any neighbouring foundations, although the presence of neighbouring basements is largely unknown.
- 4.8. There will be an increase in the area of surface water run-off unless the proposed mitigation measures such as an attenuation tank or similar are adopted. On the basis that suitable mitigation is provided it is accepted that this will not significantly alter the existing surface water drainage conditions.
- 4.9. The risk of surface water flooding is accepted as being low.
- 4.10. The GMA must be revisited once the final construction sequence is known. The Ground Movement Assessment indicates that damage to the adjacent properties will not exceed Burland Category 1. This is accepted, although it should be reviewed against the finally agreed construction sequence when a contractor is appointed.

- 4.11. A movement monitoring regime on the adjacent properties during construction is proposed and this should be provided. Surrounding residents mention a history of subsidence and condition surveys of potentially affected properties should also be undertaken prior to construction commencement and after completion. This may be undertaken as part of the agreement of the party wall award.

- 4.12. To minimise any impact that the proposed building may have on the Belsize Tunnel, an exclusion zone of 10m from the tunnel extrados will be formed whereby vertically-loaded piles will not encroach. Piles outside of the exclusion zone will take vertical and lateral loads. Piles that lie within the exclusion zone will only take lateral loads to reduce the required depth of pile and minimise any impact this may have on the tunnel.

5.0 CONCLUSIONS

- 5.1. The revised BIA has been carried out by established organisations. The authors and reviewers from all of these organisations have suitable qualifications.
- 5.2. The revised proposal maintains the top down construction although with the sides supported by a secant pile wall. The SER refers to grouting or otherwise sealing the piles to prevent the ingress of perched water into the excavation during construction. In light of the limited volumes of water, this is an acceptable methodology using established techniques. Similarly, due to the limited volumes of water, it is accepted there will be no adverse impact on the wider hydrogeology.
- 5.3. The BIA has confirmed that the proposed basement will be located within the Head Deposits underlain by London Clay, and that the surrounding slopes are stable.
- 5.4. The proposed basement will be excavated and constructed utilising established techniques.
- 5.5. It is accepted that the risk of surface water flooding the buildings is low. The use of an attenuation tank is proposed to control the flow of surface water which should mitigate the impact of surface water flows on the drainage system and on neighbouring properties.
- 5.6. A construction survey and monitoring of adjacent properties should be provided.
- 5.7. The revised ground movement assessment indicates that damage to the adjacent properties will not exceed Burland Category 1, with No 4 Nutley Terrace being the most affected. The GMA is based on the construction sequence described above which provides a high stiffness propping system, and other methods of construction could result in more ground movement/damage. The GMA must be revisited once the final construction sequence is known.
- 5.8. The damage assessment also assumes that the affected buildings are in sound condition. A condition survey is required prior to construction to determine whether the damage assessment is appropriate or whether additional mitigation is required. This may be carried out as part of the party wall award
- 5.9. The piling 'exclusion zone' proposed for piles within 10m of the tunnel extrados, required to minimise any impact that the building may have on the Belsize Tunnel, is generally accepted, although approval is required from the asset owners.

Appendix 1: Residents' Consultation Comments

None

Appendix 2: Audit Query Tracker

None

Appendix 3: Supplementary Supporting Documents

None

London

Friars Bridge Court
41- 45 Blackfriars Road
London, SE1 8NZ

T: +44 (0)20 7340 1700
E: london@campbellreith.com

Birmingham

Chantry House
High Street, Coleshill
Birmingham B46 3BP

T: +44 (0)1675 467 484
E: birmingham@campbellreith.com

Surrey

Raven House
29 Linkfield Lane, Redhill
Surrey RH1 1SS

T: +44 (0)1737 784 500
E: surrey@campbellreith.com

Manchester

No. 1 Marsden Street
Manchester
M2 1HW

T: +44 (0)161 819 3060
E: manchester@campbellreith.com

Bristol

Wessex House
Pixash Lane, Keynsham
Bristol BS31 1TP

T: +44 (0)117 916 1066
E: bristol@campbellreith.com

UAE

Office 705, Warsan Building
Hessa Street (East)
PO Box 28064, Dubai, UAE

T: +971 4 453 4735
E: uae@campbellreith.com

Campbell Reith Hill LLP. Registered in England & Wales. Limited Liability Partnership No OC300082
A list of Members is available at our Registered Office at: Friars Bridge Court, 41- 45 Blackfriars Road, London SE1 8NZ
VAT No 974 8892 43