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London Irish Centre
50-52 Camden Square
NW1 9XB

Basement Impact Assessment
Audit

For

London Borough of Camden

Project Number: 13398-22
Revision: F1

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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 the London Irish Centre, 50-52 Camden Square, NW1 9XB (planning reference 2020/1481/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 prepared by Soiltechnics Limited using individuals who possess suitable qualifications. The screening questions, scoping and assessment stages of the BIA have been updated as requested.

1.5. The Structural Report and Subterranean Construction Method Statement, along with the Drainage Strategy and SuDS statement was prepared by Elliottwood Partnership Limited, using individuals who possess suitable qualifications.

1.6. The basement is to be formed inside a secant piled retaining wall with a raft foundation. The revised BIA confirms that the founding level for the basement is at 5.50m below ground level. Outline calculations to demonstrate the feasibility of the proposed substructure has been provided in the revised SER.

1.7. The BIA states that the proposed basement shall be founded in London Clay based on limited ground investigation data. However, the ground conditions at the site have not been fully characterised and further site investigation should be undertaken to permit detailed design, although is accepted that the information provided is sufficient for the BIA.

1.8. It is accepted that the proposed development will not impact the hydrogeology of the surrounding area.

1.9. Based on further information in the revised BIA and GMA, it is accepted that the impact of the proposed development on the surrounding properties will be limited to Burland Category 1 damage.

1.10. It is accepted that the scheme will not adversely affect hydrology, and adequate SuDS proposals have been incorporated into the scheme. However it is noted that potential changes

to SuDS may affect the ground movement assessment. This may be closed out as part of any party wall negotiations and other approvals processes.

1.11. Outline proposals are provided for a movement monitoring strategy during excavation and construction.

1.12. The revised BIA and associated documents meet the requirements of CPG: Basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 28 April 2020 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for the London Irish Centre, 50-52 Camden Square, London, NW1 9XB (Planning reference: 2020/1481/P).

2.2. The Audit was carried out in accordance with the Terms of Reference set by LBC. It reviewed the Basement Impact Assessment for potential impact on land stability and local ground and surface water conditions arising from basement development.

2.3. A BIA is required for all planning applications with basements in Camden in general accordance with policies and technical procedures contained within

- Guidance for Subterranean Development (GSD). Issue 01. November 2010. Ove Arup & Partners.
- Camden Planning Guidance Basements. March 2018.
- Camden Development Policy (DP) 27: Basements and Lightwells.
- Camden Development Policy (DP) 23: Water.
- Local Plan Policy A5 Basements.

2.4. The BIA should demonstrate that schemes:

a) maintain the structural stability of the building and neighbouring properties;

b) avoid adversely affecting drainage and run off or causing other damage to the water environment;

c) avoid cumulative impacts upon structural stability or the water environment in the local area;

and evaluate the impacts of the proposed basement considering the issues of hydrology, hydrogeology and land stability via the process described by the GSD and to make recommendations for the detailed design.

2.5. LBC's Audit Instruction described the planning proposal as *"Redevelopment of site to provide new and reconfigured community centre and ancillary residential accommodation (Class D2) involving alterations to retained buildings at No's 50, 51 and 53 Camden Square including replacement of two storey 'link' building; demolition of Murray Street and Murray Mews buildings and replacement with part-three/part-four storey building (plus basement level) with second and third floor terraces and new entrance; associated landscaping and cycle parking."*

2.6. CampbellReith accessed LBC's Planning Portal on 19 May 2020 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment Report (BIA) dated March 2020, prepared by Soiltechnics Limited;
- Structural Engineering Report and Subterranean Construction Method Statement dated February 2020, by Elliottwood Partnership Limited;
- Drainage Strategy and SuDS statement dated March 2020, by Elliottwood Partnership Limited;
- Arboricultural Impact Assessment and Method Statement dated February 2020, by ACD Environmental;
- Tree Survey dated October 2019, by ACD Environmental;
- Design and Access Statement dated March 2020, by Coffey Architects;
- Planning Application Drawings consisting of

  Location Plan: Drawing Reference 1120_A001_P1;

  Existing Plans: Drawing Reference: 1120_X101 to 1120_X105;

  Existing Elevation and Sections: Drawing Reference: 1120_X200 to X202, 1120_X250 to X251;

  Proposed Plans: Drawing Reference: 1120_A100 to 1120_A105;

  Proposed Elevations and Sections: Drawing Reference: 1120_A200 to 1120_A251;

  Demolition: Drawing Reference: 1120_D101 to D105, 1120_D200 to D202.

2.7. The following revised documents were forwarded to CampbellReith on 15 June 2020 for audit purposes:

- Structural Engineering Report and Subterranean Construction Method Statement dated June 2020, by Elliottwood Partnership Limited.
- Response to BIA audit query dated 15 June 2020, prepared by Soiltechnics Limited.

2.8. The following revised document was forwarded to CampbellReith on 16 July 2020 for audit purposes:

- Basement Impact Assessment Report (BIA) (Rev02) dated June 2020, prepared by Soiltechnics Limited.

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?	Yes	Justification provided in response to BIA query regarding the nominal impact that Made Ground will have on the movement assessment for the retaining wall.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	
Are suitable plan/maps included?	Yes	
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	
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Is a conceptual model presented?	Yes	Presented in Section 6.2 of the BIA and also in the Structural Report and Subterranean Construction Method Statement.
Land Stability Scoping Provided?	Yes	

Item	Yes/No/NA	Comment
Is scoping consistent with screening outcome?		
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Is factual ground investigation data provided?	Yes	Borehole data based on the limited Ground Investigation is presented in the BIA but does not extend to the full depth of the basement. It does not investigate potential backfill to cut and cover tunnel.
Is monitoring data presented?	Yes	It is stated that the single windowless sampling borehole location was monitored and found to be in a dry state.
Is the ground investigation informed by a desk study?	Yes	Section 3 of BIA.
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	No	
Is a geotechnical interpretation presented?	Yes	
Does the geotechnical interpretation include information on retaining wall design?	Yes	Provided for London Clay and Made Ground.

Are reports on other investigations required by screening and scoping presented?	Yes	Flood Risk Assessment and Arboricultural Assessment presented despite not being identified as required by scoping assessment.
Are the baseline conditions described, based on the GSD?	Yes	The BIA suggests the tunnel was constructed in cut and cover, which could have resulted in a significant thickness of Made Ground, in the vicinity of the tunnel This is considered in the revised BIA.
Do the base line conditions consider adjacent or nearby basements?	No	However, ground movement assessment assumes shallow foundations which is accepted as conservative.
Is an Impact Assessment provided?	Yes	
Are estimates of ground movement and structural impact presented?	Yes	
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	
Has the need for monitoring during construction been considered?	Yes	Refer Section 6 of the Structural Report and Subterranean Construction Method Statement. Trigger levels set by Third Party asset owners may also have to be incorporated following consultation.
Have the residual (after mitigation) impacts been clearly identified?	Yes	
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	The structural stability of third-party infrastructure is beyond the scope of this audit, and is to be considered during independent consultation with the asset owner.

Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	
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 1?	Yes	
Are non-technical summaries provided?	Yes	Section 4.5 of the BIA.

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by Soiltechnics Limited and the individuals concerned in its production have suitable qualifications as required by the CPG.

4.2. A Structural Engineering Report and Subterranean Construction Method Statement (SER), and a Drainage Strategy and SuDS statement have been prepared Elliottwood Partnership Limited. The individuals concerned in its production have suitable qualifications a required by CPG.

4.3. It is proposed to demolish part of the existing London Irish Centre, and construct a part three, part four-storey building with a basement beneath the southern corner at c. 5.50m bgl. The proposal involves the use of a secant piled retaining wall along the perimeter, which will provide the necessary support during excavation for the basement construction and deal with any perched water. The basement slab is to comprise a 500mm thick raft foundation. The SER and the BIA states it will be reinforced concrete, designed to resist heave and hydrostatic pressures.

4.4. A construction sequence is presented which indicates the 600mm dia secant piled wall will act as a propped high stiffness wall. Outline calculations are appended to the revised SER.

4.5. Locally, at the location of the proposed lift at the north-west corner of the new building, the basement will be formed using reinforced concrete underpins beneath the foundations of 50 – 52 Camden Square. As the foundations to be underpinned are in the ownership of the applicant, no impact assessment in required.

4.6. It is stated in the BIA that the site is partly situated above a rail tunnel. The tunnel passes beneath the existing McNamara Hall and is approximately 200m long. It is stated that the tunnel was constructed using a cut and fill method, with masonry retaining walls to its side and a series of masonry arches supporting the ground above. The crown level of the tunnel is not provided in the BIA. It is also stated that the foundation of the McNamara Hall consists of shallow ground bearing beams on a regular grid are constructed on top of the tunnel. It is stated that the Structural Engineers for the development are in discussion with Network Rail Asset protection to mitigate the risk of basement construction to the tunnel.

4.7. The depth of excavation and founding level of the basement have been consistently presented in the revised BIA to be c.5.50m bgl, as requested in the previous audit.

4.8. A ground investigation comprising a 4m borehole and three hand excavated trial pits has identified that the site is underlain by Made Ground and Head Deposits over London Clay. Although the exploratory holes does not extend to the full depth of the basement, it has confirmed the site to be underlain by London Clay. However, the BIA notes that the adjacent tunnel was constructed using cut and cover techniques which may have resulted in a significant thickness of Made Ground, in the eastern part of the basement. Due to the limited number and

depth of the exploratory holes, it is recommended that further ground investigation be undertaken to characterise the ground conditions in which the basement will be constructed, although it is accepted that there is sufficient information to allow the basement impacts on stability and the water environment to be assessed. Any additional site investigation should be sufficiently deep to delineate the properties of the soil strata below the basement. Further investigation will in any case be required to permit the design of the sub structure.

4.9. Outline geotechnical design parameters have been provided in Section 7.1 of the BIA. The BIA has been revised to include design parameters for Made Ground, and is accepted.

4.10. It is accepted that London Clay is an unproductive stratum and that the site is located away from the influence of the Hampstead Heath Ponds. It is stated that the ground investigations carried out at a nearby development indicated that the groundwater levels are typically around 3m below ground level. However, the limited monitoring on site did not reveal presence of groundwater. The presence of surrounding basements has not been confirmed, however, in the absence of an aquifer, it is accepted there would be no cumulative impacts to subterranean ground water flows from other basements.

4.11. It is accepted that the existing site does not include slopes, natural or man-made greater than 7 degrees.

4.12. Based on Section 3.3 of the Arboricultural Impact Assessment document it is understood that a tree will be removed as a part of the development. The response to Question 6 of the land stability screening has been revised accordingly. The BIA considers the impact of tree removal and concludes that the basement foundations will be below or outside the zone of influence of the trees to be removed.

4.13. A ground movement assessment has been undertaken. It is stated that temporary tension piles will be installed within the basement perimeter which will resist uplift forces from any residual overburden and hydrostatic pressures. The GMA ignores these tension piles and it is accepted that this approach is conservative.

4.14. Section 7.3.7 of the previous BIA states that the due to the presence of the railway tunnels to the east of the site, ground movements have been set to zero in this area. Response no. 5 to the audit query states that the tunnel represents a void, and therefore cannot transit ground movements. The tunnel is remote from the northeast corner of the proposed basement and this statement is not accepted. However, based on the previous audit comments, the revised GMA considers the presence of soil beyond the eastern basement perimeter.

4.15. The BIA states that ignoring corner stiffness and therefore adopting a full plane strain condition is considered conservative. Whilst this is not the case in all situations as it can smooth

out ground movements, it is accepted for the relationship between the basement and surrounding structures that exist here.

4.16. It is stated that the proposed development will cause structural damage limited to a Category 1 on Burland scale. IN the original BIA, this assessment did not however include the impact on the residential properties along Murray Mews. In response to the BIA audit, it is stated that the properties on Murray Mews cannot be affected due to the presence of the tunnel. This is not accepted as yielding of the ground to the south and east of the basement excavation will affect Murray Mews. Although not noted in the text, reference to the software output at the rear of the BIA confirms that Murray Mews has been assessed and that building damage is predicted not to exceed Burland Category 1.

4.17. The depth of foundations and presence of basements in the surounding properties along, has not been confirmed. The GMA assumes the properties to have a foundation at 0.50m bgl, which is accepted.

4.18. The Drainage Strategy and SuDS statement document states that above ground attenuation via blue roofs with gravity discharge located on top of the McNamara Hall is proposed to minimise surface water discharge. It is also stated that the additional loads imposed by the attenuation on the columns may cause ground movements that may further impact the Network Rail tunnels. If these movements do not meet the acceptance criteria set by Network Rail, the proposed strategy will have to be reviewed, and the attenuation tank may be included as a below ground structure. It is noted that depending on its depth and location, this could alter the ground movement and building damage assessment. However, no action is required for the current scheme.

4.19. An outline structural monitoring proposal with trigger values have been included with the Structural Report and Subterranean Construction Method Statement.

4.20. The screening assessment identifies that the site lies in a Critical Drainage Area. However, the current proposal will not lead to a change in the existing impermeable surface area and therefore will not impact the hydrology of the surrounding area.

5.0 CONCLUSIONS

5.1. The BIA and other relevant assessments have been carried out by individuals with suitable qualifications.

5.2. The BIA states that the basement will be founded on London Clay based on limited ground investigation data. Further ground investigation is recommended in the future, especially to confirm the presence of absence of extensive Made Ground in the vicinity of the tunnel and to provide information below the proposed basement depth to allow detailed design of gthe substructure. Adequate information and geotechnical interpretation has been included in the revised BIA for impact assessment purposes.

5.3. The basement is to be formed with secant pile retaining wall and raft foundation. The basement depth is consistently throughout the revised BIA. Outline structural calculations for the substructure are included in the SER.

5.4. The response to screening questions have been updated in the revised BIA and is accepted.

5.5. The BIA adequately demonstrates that the proposal will not impact the hydrogeology of the surrounding area.

5.6. The revised BIA and GMA adequately demonstrates that the proposal will not impact the structural stability of the neighbouring properties and that damage can be limited to Burland Category 1. Should the scheme be revised, the impacts should be confirmed during negotiations with party wall surveyors and statutory regulators as necessary.

5.7. The current proposal does not impact the hydrology of the surrounding area and has adequate SuDS incorporated into the scheme.

5.8. Proposals are provided for a movement monitoring strategy during excavation and construction.

5.9. Adequate response have been provided to the queries and requests for further information summarised in Appendix 2. The revised BIA meets the requirements of CPG: Basements.

Appendix 1: Residents' Consultation Comments

None

Appendix 2: Audit Query Tracker

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Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA	The depth of excavation and founding level of the basement to made consistent throughout the BIA.	Closed	16.07.2020
2	BIA	Further ground investigation providing sufficient site coverage required. Additional information on soil parameters required.	Closed	16.07.2020
3	BIA	Screening questions to be reviewed to ensure correct. Scoping and assessment to be updated as necessary.	Closed	16.07.2020
4	Stability	GMA should consider residential properties along Murray Mews and any other properties within the zone of influence of the basement.	Closed	16.07.2020
5	Stability	Assumptions in the assessment in relation to ground movements near tunnel and corner stiffness require justification.	Closed	16.07.2020
6	Stability	Outline structural calculations for substructure required.	Closed	15.06.2020

Appendix 3: Supplementary Supporting Documents

None

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