

51 – 52 Tottenham Court Road
London W1T 2EH

Basement Impact Assessment
Audit

For
London Borough of Camden

Project Number: 12336-87
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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 51 – 52 Tottenham Court Road, London W1T 2EH (planning reference 2016/2027/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. A revised BIA has been prepared by Sinclair Johnston & Partners Limited and the checker has CEng MICE MStrcutE qualification. It has been demonstrated that the BIA has been reviewed and approved by a Chartered Geologist (CGeol) in respect groundwater and land stability issues.
- 1.5. Revised BIA documents have been received to address the queries of the initial BIA Audits by CampbellReith.
- 1.6. The proposal is to lower the existing basement, extend the buildings' footprint horizontally to the rear and vertically by an additional storey to both Nos. 51 and 52 Tottenham Court Road.
- 1.7. It is indicated in the proposed structural drawings and reports that the preferred construction method for the basement works would be to underpin the existing Party Walls and create a new, reinforced concrete basement box for the proposed subterranean structure founded on piles. In the revised documents, the structural methodology, ground movement assessment and structural monitoring strategy have been updated. However, the feasibility of the underpinning has not been demonstrated to meet LBC's requirements in regards to damage impacts to neighbouring properties.
- 1.8. Ground conditions at No.52 are identified as 6m of Made Ground overlying 2.5m of River Terrace Deposits over London Clay. A groundwater seepage was encountered within the Made Ground and standing water level monitored within the River Terrace Deposits. Further investigation across the remaining site footprint will be required in advance of construction.
- 1.9. Insufficient site investigation and geotechnical assessment is presented. Outline pile capacities are not based on site specific information. On-site investigation data indicates the Made Ground to be loose.

- 1.10. The Ground Movement Assessment (GMA) has been revised and indicates damage to the neighbouring properties will be a maximum of Category 1 (Very Slight) on the Burland Scale. The GMA is based on assumptions that are inconsistent with the proposed two stages of underpinning within loose Made Ground and is not considered to be reasonably conservative.
- 1.11. The revised BIA confirms that the proposed piled raft slab is to be below the groundwater level and resin grouting is proposed to control groundwater to stabilise soils during construction. A Basement Construction Plan (BCP) will be required to demonstrate that resin grouting will be appropriately controlled to avoid additional stability and hydrogeological impacts.
- 1.12. It is anticipated that the proposed development will not impact on the wider hydrological and hydrogeological environments, although the effects of any resin grouting should be confirmed within a BCP.
- 1.13. Structural monitoring and condition surveys are proposed. Whilst the monitoring strategy is designed to ensure damage impacts to neighbours are limited to a maximum of Category 1, there are inconsistencies between the recommendations within the GMA and structural method statement, and the GMA has not been accepted as providing a reasonably conservative basis for the strategy.
- 1.14. The BIA identifies that a detailed unexploded ordnance (UXO) desktop threat assessment is required.
- 1.15. The proposed development must be constructed with regard to London Underground assets in the vicinity of the site, in consultation with the relevant TFL asset protection engineer.
- 1.16. It is accepted that there are no slope stability issues and that the development is at low risk of flooding.
- 1.17. Queries are discussed in section 4 and summarised in Appendix 2. The revised BIA does not meet the criteria of CPG4.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) in July 2016 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 51 – 52 Tottenham Court Road, London W1T 2EH (planning reference 2016/2027/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
- The Local Plan (A5 Basements) 2017.

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 *"Demolition of existing rear extensions and erection of a 4 storey rear extension, basement extension, roof extensions comprising an additional storey with mansard level above to no. 51 and set back roof extension no. 52 and external alterations including new shopfronts all to provide a mixed use retail, office and residential development involving the refurbishment and amalgamation of the existing ground floor retail units, refurbishment/reconfiguration of existing uses on the upper floors*

including the provision of additional office space at first – third floor levels and a new 3 bed residential flat at fourth floor level".

Neither building is listed, although they are both designated as “positive contributors” to the Charlotte Street Conservation Area Appraisal and Management Plan (2008). The nearest listed building to the site is the Rising Sun Public House at 46 Tottenham Court Road.

2.6. CampbellReith accessed LBC’s Planning Portal on 27.07.16 and gained access to the following relevant documents for audit purposes:

- LBC Application for Planning Permission dated 08/04/2016
- LBC Basement Impact Assessment Audit Instruction
- Basement Impact Assessment (BIA) report (Ellis and Moore Consulting Engineers Ltd, report ref: 15606 – c20160712bia, report issues 1 & 2, February and July 2016)
- Site Investigation (SI) report (Ground Engineering Ltd, report ref: C13604, January 2016)
- Construction Management Plan (M.E.F. Construction Services Ltd, report status: Initial Draft, January 2016)
- Construction Traffic Management and Access Plan (M.E.F. Construction Services Ltd, report status: Initial draft, January 2016)
- Environmental Impact Assessment and Control (M.E.F. Construction Services Ltd, rev: 00, January 2016)
- Planning statement for 51–52 Tottenham Court Road (Savills, April 2016)
- Planning Application Drawings consisting of
 - Location Plan – (Squire & Partners drawing 13081-G100_P_00_001, rev: -)
 - Existing Plans –
 - Basement (Squire & Partners drawing 13081-JA12_P_B1_001, rev: -)
 - Ground floor (Squire & Partners drawing 13081-JA12_P_00_001, rev: -)
 - 1st floor (Squire & Partners drawing 13081-JA12_P_01_001, rev: -)
 - 2nd floor (Squire & Partners drawing 13081-JA12_P_02_001, rev: -)
 - 3rd floor (Squire & Partners drawing 13081-JA12_P_03_001, rev: -)
 - Roof (Squire & Partners drawing 13081-JA12_P_RF_001, rev: -)
 - Front Elevation (Squire & Partners drawing 13081-JA12_E_NE_001, rev: -)
 - Rear Elevation (Squire & Partners drawing 13081-JA12_E_SW_001, rev: -)
 - North West Elevation (Squire & Partners drawing 13081-JA12_E_NW_001, rev: -)

South East Elevation (Squire & Partners drawing 13081-JA12_E_SE_001, rev: -)

Section A-A (Squire & Partners drawing 13081-JA12_S_AA_001, rev: -)

Demolition Plans –

Basement (Squire & Partners drawing 13081-C645_P_B1_001, rev: -)

Ground floor (Squire & Partners drawing 13081-C645_P_00_002, rev: -)

1st floor (Squire & Partners drawing 13081-C645_P_01_002, rev: -)

2nd floor (Squire & Partners drawing 13081-C645_P_02_002, rev: -)

3rd floor (Squire & Partners drawing 13081-C645_P_03_002, rev: -)

Roof (Squire & Partners drawing 13081-C645_P_RF_001, rev: -)

Front Elevation (Squire & Partners drawing 13081-C645_E_NE_004, rev: -)

Rear Elevation (Squire & Partners drawing 13081-C645_E_SW_002, rev: -)

North West Elevation (Squire & Partners drawing 13081-C645_E_NW_002, rev: -)

South East Elevation (Squire & Partners drawing 13081-C645_E_SE_002, rev: -)

Proposed Plans –

Basement (Squire & Partners drawing 13081-C645_P_B1_001, rev: B)

Ground floor (Squire & Partners drawing 13081-C645_P_00_001, rev: C)

1st floor (Squire & Partners drawing 13081-C645_P_01_001, rev: D)

2nd floor (Squire & Partners drawing 13081-C645_P_02_001, rev: D)

3rd floor (Squire & Partners drawing 13081-C645_P_03_001, rev: D)

4th floor (Squire & Partners drawing 13081-C645_P_04_001, rev: D)

Roof (Squire & Partners drawing 13081-C645_P_RF_001, rev: B)

Front Elevation (Squire & Partners drawing 13081-C645_E_NE_001, rev: D)

Rear Elevation (Squire & Partners drawing 13081-C645_E_SW_001, rev: -)

North West Elevation (Squire & Partners drawing 13081-C645_E_NW_001, rev: -)

South East Elevation (Squire & Partners drawing 13081-C645_E_SE_001, rev: -)

Section AA (Squire & Partners drawing 13081-C645_S_AA_001, rev: B)

Area and accommodation schedules –

Existing and proposed schedule of areas

Existing use mix drawing (Squire & Partners drawing 13081-F0_P_AL_001,rev:B)

Proposed use mix drawing (Squire&Partners drawing 13081-F0_P_AL_005,rev:C)

- Design and Access Statement (Squire & Partners Ltd, report status: Planning Issue, March 2016)
- Heritage Assessment (Peter Stewart Consultancy, April 2016)
- Environmental Noise Survey and Plant Noise Criteria (Applied Acoustic Design, report ref: 15204/001/twt, May 2016)
- Energy & Sustainability Statement (Mecserve Sustainability, report ref: C6092; report status: Final report for planning, November 2015)
- Air Quality Assessment for the proposed development at 51–52 Tottenham Court Road, London (Aether Ltd, report ref: AQ_assessment/2016/51_Tottenham_Court_Rd; report status: Final, January 2016)
- Daylight and Sunlight Study (Right of Light Consulting, April 2016)
- Crossrail response to “2016/2027/P 51 Tottenham Court Road, London W1T 2EH” 18.05.16 email
- 02.06.16 planning Comment by Richenda Walford for BCAAC

2.7. Additional information was provided with regards to further information requested in October 2017, comprising:

- Revised BIA – Structural Engineer’s report and construction method statement for subterranean development at 51-52 Tottenham Court Road, London, W1T 2EH – dated March 2017 by Sinclair Johnston and Partners Limited – incorporating London Underground Ltd, Lost Rivers of London Record and Unexploded Ordnance (UXO) information as well as structural drawings and Ground Movement Assessment report.
- Architectural Addendum for 51-52 Tottenham Court Road, London–dated April 2017 by Squire and Partners
- Statement of case for 51-52 Tottenham Court Road, London – dated April 2017 by Savills.

2.8. Additional information was provided with regards to further information requested in November 2017, comprising:

- Revised BIA – Structural Engineer’s report and construction method statement for subterranean development at 51-52 Tottenham Court Road, London, W1T 2EH – dated November 2017 (ref 8781 R 171011 GS) by Sinclair Johnston and Partners Limited.

- Letter to CampbellReith from Sinclair Johnston and Partners Limited dated 14th November 2017 with responses to D2 Audit queries, including additional outline retaining wall calculations, resin grout data sheet and outline structural monitoring strategy.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	The revised BIA has been prepared by Sinclair Johnston & Partners Limited and the checker has CEng MICE MIStructE qualification. The ground movement assessment report (appended in Appendix H of the revised BIA) has been checked by a Chartered Geologist (CGeol).
Is data required by Cl.233 of the GSD presented?	No	Outline works programme not included.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	Lost Rivers of London Record information included in revised BIA.
Are suitable plan/maps included?	Yes	Refer to Ground Engineering Site Investigation Report.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	Refer to Squire and Partners drawings and Design and Access Statement.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Refer to Ellis + Moore BIA report; section 2.0.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Refer to Ellis + Moore BIA report; section 2.0.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Refer to Ellis + Moore BIA report; section 2.0.

Item	Yes/No/NA	Comment
Is a conceptual model presented?	Yes	Refer to Ground Engineering Site Investigation Report.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Refer to Ellis + Moore BIA report; section 3.0.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Refer to Ellis + Moore BIA report; section 3.0. Evidence has been provided to prove that the site will not be affected by the Lost Rivers of London.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Refer to Ellis + Moore BIA report; section 3.0.
Is factual ground investigation data provided?	Yes	Refer to Ground Engineering Site Investigation Report. However, insufficient for proposed depth of piled foundations.
Is monitoring data presented?	Yes	Refer to Ground Engineering Site Investigation Report.
Is the ground investigation informed by a desk study?	Yes	Unexploded Ordnance (UXO) information provided in revised BIA (Appendix F). Stage 2 desktop study and risk assessment required.
Has a site walkover been undertaken?	Yes	Updated in revised BIA.
Is the presence/absence of adjacent or nearby basements confirmed?	No	GMA assumptions on neighbouring properties' foundations to be confirmed.
Is a geotechnical interpretation presented?	Yes	Refer to Ground Engineering Site Investigation Report.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Refer to Ground Engineering Site Investigation Report.

Item	Yes/No/NA	Comment
Are reports on other investigations required by screening and scoping presented?	Yes	However, GMA assumptions on neighbouring properties' foundations to be confirmed. GMA should reflect actual construction proposals.
Are the baseline conditions described, based on the GSD?	Yes	Refer to Ellis + Moore BIA report.
Do the base line conditions consider adjacent or nearby basements?	Yes	Refer to Ground Engineering Site Investigation Report.
Is an Impact Assessment provided?	Yes	Updated in revised BIA.
Are estimates of ground movement and structural impact presented?	Yes	However, the GMA is not consistent with the construction proposals.
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?	No	The GMA is not reasonably conservative based on the construction proposals: two stages of underpinning in loose Made Ground.
Has the need for monitoring during construction been considered?	Yes	Structural monitoring proposed in SJP and GEA reports.
Have the residual (after mitigation) impacts been clearly identified?	No	The GMA is not reasonably conservative based on the construction proposals: two stages of underpinning in loose Made Ground.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	The GMA is not reasonably conservative based on the construction proposals: two stages of underpinning in loose Made Ground.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	Refer to Ellis + Moore BIA report.

Item	Yes/No/NA	Comment
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	The GMA is not reasonably conservative based on the construction proposals: two stages of underpinning in loose Made Ground. Effects of grouting to be confirmed.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	Updated in revised BIA. However, the GMA is not reasonably conservative based on the construction proposals: two stages of underpinning in loose Made Ground.
Are non-technical summaries provided?	No	None in revised BIA.

4.0 DISCUSSION

- 4.1. The initial Basement Impact Assessment (BIA) was carried out in 2016 by Ellis + Moore consulting engineers with a separate site investigation report by Ground Engineering Limited (GE).
- 4.2. Revised BIA documents have been received in September and November 2017 to address the queries of the initial BIA Audits performed by CampbellReith. The revisions include a BIA prepared by Sinclair Johnston & Partners Limited and a Ground Movement Assessment (GMA) by Geotechnical and Environmental Associates (GEA). The checker to the revised BIA has CEng MICE MStructE qualifications. The GMA (and subsequent revision) has been checked by a Chartered Geologist (CGeol).
- 4.3. The site is located within the Charlotte Street conservation area, is rectangular in shape and set over circa 230m² in plan area. No. 51 & 52 Tottenham Court Road are three-storey and four-storey high buildings, respectively, with basements. The LBC Instruction to proceed with the audit identified that the basement proposal did not involve, or was not in close proximity to, a listed building.
- 4.4. The proposed basement consists of a single storey construction formed by lowering the existing basement at the front of the development site by approximately 1.10 metres and excavating the rear of portion of the site to the same level by approximately 3.50 metres. The building's existing footprint will be extended horizontally, to the rear, and vertically by 1No. additional storey on both No.51 and No.52. An existing party/dividing wall between 51-52 Tottenham Road will be demolished.
- 4.5. Structural drawings submitted show proposals for a new, in-situ reinforced concrete piled raft slab and retaining walls to form the substructure. The proposed pile lengths are inconsistently presented but are indicated to extend up to 25m below ground level (bgl). Underpinning of existing foundations is proposed, to bear within the Lynch Hill Gravel, >6m bgl.
- 4.6. The site investigation undertaken in 2016 indicates that the proposed basement will be underlain by Made Ground. A window sample borehole with dynamic probing was carried out at the rear of the site. The borehole information confirmed the presence of Made Ground to 6.0m bgl, Lynch Hill Gravel to 8.3m bgl, with London Clay indicated to 10m bgl. Given that the proposed piles may extend to 25m bgl, further SI to confirm design parameters will be required. The Made Ground is noted to be loose, with 3no SPT tests indicating N = 4, and 1no result of N = 10. It is also noted that Made Ground can vary in thickness over short lateral distances, and further SI should be undertaken to confirm the depth of Made Ground across the site where underpinning is proposed.

- 4.7. Groundwater was encountered at 4.8m as a seepage during the SI, with a standing water level monitored at approximately 6.0m bgl. Whilst the proposed basement slab will be at 4.0m bgl, the underpinning of existing foundations is proposed to be founded within the Lynch Hill Gravel, below groundwater level. Consideration has been given to the prospect of the proposed underpinned walls creating an obstacle to groundwater flow, although this is unlikely assuming penetration of <0.5m. However, to control groundwater and stabilise soils during construction, resin grouting is proposed. It is recommended that grouting works are subject to a Basement Construction Plan (BCP) to ensure they are properly designed and controlled on site, to avoid further impacts to stability and subterranean groundwater flow. Notwithstanding this, hydrogeological impacts are not anticipated, given that flow should continue below the basement.
- 4.8. Construction sequence, temporary and permanent works drawings have been prepared by Sinclair Johnston & Partners Limited. Outline retaining wall calculations have been presented in the November 2017 submission. Underpinning is proposed to be undertaken in two stages. The revised construction sequence indicates that retaining walls will be stiffly propped in both the temporary and permanent state.
- 4.9. In support of the revised BIA report (September 2017), estimates of the likely ground movement in the short and long-term due to the proposed basement have been submitted. However, these were based on assumptions that were inconsistent with scale of the proposed works and actual methodology to be adopted. The Ground Movement Assessment (GMA) assumed underpins to a depth of 4m bgl, whereas the BIA indicated they will be to >6m bgl, constructed over 2 stages. The GMA also assumed high stiffness walls in both the temporary and permanent case, whereas the construction sequence indicated the walls are likely to be cantilevers and therefore of low stiffness. The GMA assumed retaining walls will be formed within stiff clay rather than the Made Ground and water bearing granular deposits that will be actually encountered.
- 4.10. In the November 2017 submissions, the construction proposals have been clarified and the GMA has been updated and is stated to reflect the actual construction proposals ie two stage underpinning to >6m bgl; stiffly propped walls. However, the assessment makes assumptions on underpinning within stiff London Clay, whereas the actual conditions are indicated to be loose Made Ground. The movements predicted in the revised (November 2017) GMA are lower than the previous assessment, but they are not considered to make reasonably conservative assumptions for two stages of underpinning (considering shrinkage of the dry pack) nor the settlement likely to be induced by the stage one underpins bearing within loose Made Ground.
- 4.11. As described in 4.9 and 4.10, the GMA is not considered to be a reasonably conservative assessment. The GMA originally predicted Category 2 (Slight) damage to neighbours that could

be mitigated to Category 1 (Very Slight) damage by close control of construction. The revised GMA predicts a maximum of Category 1 (Very Slight) damage to neighbours, but this has not been demonstrated as feasible.

- 4.12. Considering the ground conditions currently indicated from the single borehole on site, a construction methodology should be adopted that can be demonstrated to maintain damage impacts to neighbours to a maximum of Category 1 (Very Slight).
- 4.13. Foundation depths of adjacent structures has been assumed within the GMA. Although it is accepted that assuming a shallow foundation depth is reasonably conservative when assessing building damage impacts, foundations to neighbouring buildings should be confirmed and used within any future GMA to confirm the magnitude of the impacts.
- 4.14. In addition to considering impact to adjacent buildings, the GMA should consider impacts to underground structures, if applicable. The presence of a sewer is noted in the BIA, which may require further consideration. Proximity and effects on London Underground Assets should also be confirmed. It is noted that the proposed works should be clear of LUL's exclusion zone. Any potential impact relating from construction should be assessed and discussed with the TFL asset protection engineer.
- 4.15. Proposals for a movement monitoring strategy were provided in 2016 as part of the Ellis + Moore submission. In the November 2017 submissions structural monitoring strategies are presented by both SJM and GEA, which are inconsistent in some respects. Within the SJM proposal, trigger values appear reasonable to control damage impacts to neighbours within Category 1, noting that based on the current construction methodology the feasibility of controlling movements has not been demonstrated. It is also noted:
- the frequency of monitoring should be reviewed by the engineer / contractor, and should be increased or decreased to match the programme of works;
 - the proposed monitoring reference locations are likely to be within the zone of influence of the works (ie prone to movement themselves) and stable reference points remote from the works should be established;
 - the monitoring point locations are insufficient to observe the movements predicted, and any final strategy should include for monitoring to relevant structural walls within the zone of influence (e.g. further along front and rear facades of Nos 49 and 53, along party walls etc).
- 4.16. The GEA report provides a range of trigger values based on current movement predictions. The GMA is not accepted (as 4.9 to 4.11) as reasonably conservative. Further to this, the critical sections indicated in the GMA, A and F, have been assigned red trigger values of between 3mm to 4.5mm. Controlling movements to within these limits is considered difficult to practically

implement. Considering the indicated ground conditions, 3mm of movement is likely to occur during a single stage of underpinning.

- 4.17. Evidence is presented that demonstrates that the site is at high risk from unexploded ordnance from WWII. Possible post-war development of the site may have encountered and removed UXO, however the risk of deep buried UXO remains significant. As recommend by Dynasafe BACTEC, a stage 2 detailed desktop study and risk assessment is required and should be undertaken for this site.
- 4.18. It is understood that the below ground drainage design will be developed should planning consent be granted. As per Ellis + Moore BIA report, it is expected that the proposals will not increase the extent of the existing impermeable hard-standing. It is accepted that the total amount of water entering into the sewer system as a result of the development will not increase.
- 4.19. It is accepted that there are no slope stability concerns regarding the proposed development and it is not in an area prone to flooding.
- 4.20. It is accepted that the development will not impact on the wider hydrogeology of the area, subject to assessment of the effects of resin grouting to be presented in a BCP, and is not in an area subject to flooding.
- 4.21. No significant trees have been reported within 15m of the site boundary.

5.0 CONCLUSIONS

- 5.1. The BIA has been prepared by Sinclair Johnston & Partners Limited and the checker has CEng MICE MStructE qualification. The GMA has been checked by a Chartered Geologist (CGeol).
- 5.2. The proposal is to lower the existing basement and extend the basement to the rear.
- 5.3. The ground conditions at one location are indicated to be loose Made Ground to 6m bgl overlying Lynch Hill Gravel and London Clay. Further SI will be required to demonstrate conditions across the site and to provide site specific design parameters for piles and underpinning.
- 5.4. It is proposed to underpin exiting foundations into the Lynch Hill Gravel and form a piled foundation to support the basement slab at approximately 4m bgl.
- 5.5. It is proposed to use resin grouting to control groundwater and stabilise soils during construction. It is recommended that these works are subject to a BCP.
- 5.6. It is accepted that the proposed development should not impact the wider hydrological and hydrogeological environments, subject to the appropriate implementation of resin grouting as controlled via BCP.
- 5.7. The BIA has not demonstrated the stability of the proposed scheme. The proposed two stages of underpinning has not been demonstrated as feasible whilst maintaining damage to neighbouring properties within Category 1 (Very Slight).
- 5.8. The current GMA is not considered to represent the actual ground conditions on site or reflect the likely movements induced by two stages of underpinning. Consequently, the assessment is not considered to be reasonably conservative.
- 5.9. Structural monitoring is proposed but is inconsistently presented between documents. Trigger values, monitoring locations and overall strategy should be appropriate to any final construction method proposed to maintain damage to neighbouring properties within Category 1 (Very Slight).
- 5.10. Any future submissions should include sufficient proposals, including drawings and calculations, to demonstrate that ground movements and consequential damage impacts to neighbouring structures (including buildings, utilities and London Underground Assets) can be limited to within the accepted LBC policy requirements (Category 1) or to the asset owner's satisfaction, as applicable.
- 5.11. Queries are summarised in Appendix 2. The BIA does not meet the criteria of CPG4.

Appendix 1: Resident's Consultation Comments

None

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Stability	Ground movement and damage impact assessment	Open – to be revised to reflect actual construction methodology, ground conditions, neighbouring foundation depth, adjacent assets etc. Sufficient mitigation to be demonstrated as achievable, consistent with construction proposed.	
2	Stability	Construction methodology, temporary and permanent works information, retaining wall calculations, foundations assessment	Open – to be confirmed and consistently presented within all assessments	
3	Stability	Use of resin grouting	N/A – Subject to BCP to demonstrate works can be controlled so that impacts are maintained within LBC Policy requirements (and to the satisfaction of neighbouring asset owners).	
4	Stability	Structural monitoring	Open – sufficient to demonstrate works can be controlled within LBC Policy requirements, including trigger values and contingency actions.	

Appendix 3: Supplementary Supporting Documents

None

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