CampbellReith
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Gondar Gardens
London, NW6 1QF

Basement Impact Assessment
Audit

For

London Borough of Camden

Project Number: 12727-22

Revision: D1

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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 Gondar Gardens, London NW6 1QF (planning reference 2017/6045/P). The basement is considered to fall within Category C 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 includes the partial demolition of the existing reservoir, including the roof and most of the internal structure, and the erection of six 4-6 storey buildings and four 2-3 storey link buildings. There will be two levels of basement. The second, lower level of part basement will include the excavation of a further 1.4 m of soil over the eastern portion, remote from any neighbouring assets and below the existing reservoir floor slab level.

1.5. The existing reservoir retaining walls will be retained on three sides, (north, west and south), and partly incorporated into the scheme, with the basement and lower basement being constructed within the footprint of the existing reservoir. Localised underpinning of the existing masonry foundations will be required. Due to the limited area occupied by the lower basement level, there will be a significant upfilling across the western extent of the reservoir footprint to raise the existing level to the formation level of the first basement level. Slope re-profiling will be undertaken at the eastern end of the site to facilitate a landscaped /conservation area. The existing ground level will be lowered to be consistent with street level at the western end of the site.

1.6. The BIA has been prepared by Waterman Structures Ltd with supporting documents prepared by RSK Environmental Ltd and RSK Land & Development Engineering Ltd. The Waterman BIA summarises the specialist input from RSK. The RSK author's qualifications are in accordance with LBC guidance.

1.7. The BIA includes the majority of the information required from a desk study in line with LBC guidance.

1.8. A site investigation has confirmed the underlying ground conditions to comprise a significant depth of Made Ground (up to 10.50 mbgl) overlying London Clay. Groundwater was monitored

between 4.28m and 7.37m bgl. The data was presented in an interpretative report in accordance with LBC Guidance.

1.9. The proposed development will not impact the wider hydrogeological environment.

1.10. The site is within a Critical Drainage Area (Group 3-010) but not within a designated Flood Risk Zone. The Flood Risk Assessment confirms the site is at very low risk to medium risk of flooding from all sources. Appropriate mitigation is identified and should be implemented.

1.11. A SUDs strategy is presented which would reduce off-site drainage flow rates in accordance with current guidance and benefit the wider hydrological environment.

1.12. Indicative temporary and permanent works structural drawings, proposed slope stability measures and geotechnical parameters for retaining wall design are provided. An outline construction programme has been presented.

1.13. A ground movement assessment (GMA) predicts damage to neighbours to be confined to Category 0 (Negligible), in accordance with the Burland Scale. The assessment is considered appropriate. The proposed development is not considered to adversely impact land stability.

1.14. The BIA is considered to meet the requirements of the relevant LBC Policies.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 8 December 2017 to carry out a Category C Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for Gondar Gardens, London, NW6 1QF, Camden Reference 2017/6045/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.
- Local Plan 2017; 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; 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 Audit Instruction described the planning proposal as: "*Partial demolition of the existing reservoir, including the roof and most of the internal structure, and the erection of six 4-6 storey buildings and four 2-3 storey link buildings with common basement levels within the retaining walls of the existing reservoir to include 82 Self contained extra care apartments*

(class C2); a 15 bed nursing home (Class C2). Associated communal facilities including reception area, guest suite, lounge, restaurant, café, bar, library, exercise pool, gym, therapy rooms and cinema; Associated support facilities including staff offices, welfare and training spaces, storage, laundry, kitchen, cycle storage, car parking and plant areas and a site-wide biodiversity-led landscaping and planting scheme including external amenity space, drop off area, retention pond and slope stabilization and associated engineering works."

The proposal is not located within a Conservation Area and the proposal does not involve a listed building nor is it a neighbour of a listed building.

2.6. CampbellReith accessed LBC's Planning Portal on 18th December 2017 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment report (ref STR13472/BIA) dated July 2017 by Waterman Structures Ltd.
- Geo-environmental/Geo-technical Site Assessment (ref 371487-02(01)) dated May 2017 by RSK Environmental Ltd (including Geo-environmental Site Assessment dated December 2009 by RSK Group plc.)
- Hydrogeology and Hydrology Assessment (ref 371487-R04 (00)) dated June 2017 by RSK Environmental Ltd.
- Land Stability Assessment (ref 371487-R03 (00)) dated June 2017 by RSK Environmental Ltd.
- Flood Risk Assessment (ref 371487-R1 (03)) dated October 2017 by RSK Land & Development Engineering Ltd.
- SUDS report dated June 2017 by RSK Land & Development Engineering Ltd.
- Proposed demolition, site plan, floorplans, sections and elevations dated June 2017 by Robin Partington & Partners.
- Construction Management Plan (version 1) dated July 2017 by Life Care Residences and sub-contractors.
- Design and Access Statement dated October 2017 by Robin Partington & Partners.
- Arboricultural Report for planning (ref 170202-PD-11a) dated May 2017 by Tim Moya Associates.
- Tree Removal Plan dated July 2017 by Andy Sturgeon Design.

- Comments and objections to the proposed development from local residents.

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	
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 plans/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	Land Stability Assessment (RSK Environmental Ltd), Section 4, Table 2.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Hydrogeology and Hydrology Assessment (RSK Environmental Ltd), Section 4, Table 2).
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Hydrogeology and Hydrology Assessment (RSK Environmental Ltd), Section 4, Table 2).
Is a conceptual model presented?	Yes	

Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Land Stability Assessment (RSK Environmental Ltd), Section 5.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Hydrogeology and Hydrology Assessment (RSK Environmental Ltd), Section 5).
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Hydrogeology and Hydrology Assessment (RSK Environmental Ltd), Section 5). A Flood Risk Assessment and SUDS report have been provided.
Is factual ground investigation data provided?	Yes	Geo-environmental/Geo-technical Site Assessment (ref 371487-02(01)) dated May 2017 by RSK Environmental Ltd (including Geo-environmental Site Assessment dated December 2009 by RSK Group plc.)
Is monitoring data presented?	Yes	Geo-environmental/Geo-technical Site Assessment, section 4.2 and Appendix G.
Is the ground investigation informed by a desk study?	Yes	Geo-environmental Site Assessment (dated December 2009), section 3.
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	Based on LBC records. Land Stability Assessment report (section 5) states that access has not been gained to the adjacent properties to determine the foundations of these properties.
Is a geotechnical interpretation presented?	Yes	Geo-environmental/Geo-technical Site Assessment, Section 6 and Appendix H.

Item	Yes/No/NA	Comment
Does the geotechnical interpretation include information on retaining wall design?	Yes	Geo-environmental/Geo-technical Site Assessment, Section 6.5.
Are reports on other investigations required by screening and scoping presented?	Yes	Flood Risk Assessment, SUDS report, and Arboricultural Impact Assessment provided.
Are baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	
Is an Impact Assessment provided?	Yes	Waterman Structures Ltd BIA Report, Section 4 and supporting RSK documents.
Are estimates of ground movement and structural impact presented?	Yes	Land Stability Assessment (RSK Environmental Ltd), Section 7.
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	SUDS; flood risk mitigation measures; engineered slopes; propping and sequencing of construction works.
Has the need for monitoring during construction been considered?	Yes	
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	
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	

Item	Yes/No/NA	Comment
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?	Yes	Damage categories confined to Category 0 (Negligible).
Are non-technical summaries provided?	Yes	In supporting documents.

4.0 DISCUSSION

4.1. The BIA has been prepared by Waterman Structures Ltd with supporting documents prepared by RSK Environmental Ltd and RSK Land & Development Engineering Ltd. The Waterman BIA summarises the specialist input from RSK. The RSK author's qualifications are in accordance with LBC guidance.

4.2. The proposed development includes the partial demolition of the existing covered reservoir, including the roof and most of the internal structure, and the erection of six 4-6 storey buildings and four 2-3 storey link buildings. There will be two levels of basement. The second, lower level of part basement will include the excavation of a further 1.4 m of soil over the eastern portion, remote from any neighbouring assets and below the existing reservoir floor slab level.

4.3. The existing reservoir retaining walls will be retained on three sides, (north, west and south), and partly incorporated into the scheme, with the basement and lower basement being constructed within the footprint of the existing reservoir, albeit with the lower (2nd) part lowest basement FFL level being 0.5m below existing. Localised underpinning of the existing masonry foundations will be required to allow modification to the permanent site grade levels and construction of the ground floor structure. Because of the limited area occupied by the lower basement level, there will be a significant upfilling across the western extent of the reservoir footprint to raise the existing level to the formation level of the first basement level. The existing site surface level will be lowered to be consistent with street level in the western part of the site. Slope re-profiling will be undertaken at the eastern end of the site to facilitate a landscaped /conservation area.

4.4. The BIA includes the majority of the information required from a desk study in line with the GSD Appendix G1.

4.5. Site investigations were undertaken by RSK in December 2009 and March 2017. The investigation in December 2009 comprised seven window sample boreholes to a depth of 4.0m and a single cable percussion borehole advanced to a depth 20m bgl. The investigation in March 2017 comprised two cable percussive boreholes advanced to depths of 50.00m bgl, a further cable percussion borehole advanced to depth of 15.00m bgl and six drive-in sampler boreholes advanced to depths of up to 7.00m bgl across the site. The ground conditions comprise Made Ground to depths of between 3.20 and 10.50m bgl. The Made Ground generally comprised reworked London Clay, but with occasional layers of brick rubble particularly over the reservoir structure. The underlying London Clay was encountered beneath the Made Ground, and was proved to the terminal depth in each location of between 7.00m bgl (72.80m AOD) and 50.00mbgl.

4.6. The ground conditions data is presented in an interpretative report in accordance with the GSD Appendix G3.

4.7. Groundwater monitoring was undertaken within BH1 and BH2 in April and May 2017. It should be noted that the BIA makes repeated references to a measured groundwater depth range of between 6.62m and 7.37m bgl within BH1 and 2. However, a shallower depth to groundwater of 4.28m bgl was recorded in the May 2017 visit within BH3. As the lower ground floor level will be set into the clay layer, and therefore potentially below the saturated zone, the BIA recommends that this area is tanked using a suitable material and/or an exterior drainage solution to prevent ground water ingress. Continued groundwater monitoring is recommended within the BIA to confirm the design water level and to identify any seasonal fluctuations.

4.8. Based on the majority of the development being constructed within the footprint of the former reservoir, and the underlying non-aquifer, the proposed development will not impact the wider hydrogeological environment.

4.9. The site is within a Critical Drainage Area (Group 3-010) but not within a designated Flood Risk Zone. The Flood Risk Assessment confirms the site is at very low risk to medium risk of flooding from all sources. Appropriate mitigation is identified and should be implemented.

4.10. The development will increase the impermeable area and a SUDS assessment has been provided. Due to the poor drainage characteristics of the underlying London Clay discharge via soakaways and/or SUDS is not considered to be feasible, and therefore a combination of green roof technologies (to reduce the amount of impermeable area post development), and the attenuation of the surface run-off water in cellular storage tanks (which would then be discharged into the existing Thames Water drainage network at a permitted rate by Thames Water) is proposed. The SUDs strategy presented reduces off-site drainage flow rates in accordance with current guidance and will benefit the wider hydrological environment.

4.11. All structural basement modifications will be made within the existing profile of the reservoir retaining wall structure. Temporary propping will be installed prior to demolition to minimise ground movements. Within the profile of the retained existing scalloped retaining walls, the proposed foundation piles will be within the underlying London Clay strata, adopting continuous flight-auger techniques. Structural drawings are provided and the geotechnical parameters for retaining wall design are provided. Indicative temporary and permanent works structural drawings, proposed slope stability measures and geotechnical parameters for retaining wall design are provided. An outline construction programme has been presented.

4.12. A ground movement assessment (GMA) predicts damage to neighbours to be confined to Category 0 (Negligible), in accordance with the Burland Scale. The assessment is based on modified CIRIA guidance for embedded retaining walls. However, as existing retaining walls will

remain in place, and will be fully propped during demolition of the internal reservoir and roof structure, the GMA has been appropriately modified to reflect this. Additionally, the GMA has reasonably demonstrated that the majority of surrounding structures are outside of the zone of influence of the works, including the demolition phase, and movements to highways will be negligible. As such, although a structural monitoring regime has not been provided in detail, the It is accepted that a monitoring strategy will be adopted as required to control the works. The proposed development is not considered to adversely impact land stability.

5.0 CONCLUSIONS

5.1. The author's qualifications are in accordance with CPG4 guidelines.

5.2. The proposed development includes the partial demolition of the existing covered reservoir, including the roof and most of the internal structure, and the erection of six buildings and link buildings with two levels of basement.

5.3. The existing reservoir retaining walls will be retained on three sides, (north, west and south), and partly incorporated into the scheme, with the basement and lower basement being constructed within the footprint of the existing reservoir, with local shallow excavations below current reservoir floor level.

5.4. Slopes across the site have been assessed for stability and appropriate engineering / mitigation is proposed, where required.

5.5. A site investigation has confirmed the underlying ground conditions to comprise Made Ground overlying London Clay. Groundwater was monitored between 4.28m and 7.37m bgl.

5.6. The proposed development will not impact the wider hydrogeological environment.

5.7. A Flood Risk Assessment is presented. Appropriate mitigation is identified and should be implemented.

5.8. A SUDs strategy is presented which would reduce off-site drainage flow rates in accordance with current guidance and benefit the wider hydrological environment.

5.9. Indicative temporary and permanent works structural drawings, proposed slope stability measures and geotechnical parameters for retaining wall design are provided. An outline construction programme has been presented.

5.10. A ground movement assessment (GMA) predicts damage to neighbours to be confined to Category 0 (Negligible), in accordance with the Burland Scale. The assessment is considered appropriate. The proposed development is not considered to adversely impact land stability.

5.11. The BIA is considered to meet the requirements of the relevant LBC Policies.

Appendix 1: Consultation Comments

Consultation Comments

Surname	Address	Date	Issue raised	Response
Scoggins	20 Gondar Gardens	1st December 2017	The Sustainable Drainage report is based on an erroneous assumption about the impermeable proportion of the site and makes no attempt to size or locate the necessary storage.	Section 4
Newell	33 Agamemnon Road	1st December 2017	Object to the development due to the local area's flooding risk 'which make hillside basements problematic'. Thames Water is concerned about local water infrastructure's ability to cope with probable water demand on the site and is concerned about the effect on existing sewers.	Section 4
Neilson	4 Eden Mansions	2nd December 2017	Object to the development due to concern that development will cause damage to adjacent buildings and the effects on drainage of basement excavations are likely to be significant.	Section 4
Dyal	1 Chase Mansions, Gondar Gardens	7th December 2017	Object to the development because believe excavating the site would cause subsidence to their property.	Section 4
Gondar and Agamemnon Residents' Association		12th December 2017	The SUDS report erroneously considers that only 60% of the site is greenfield – from simple observation the total is around 90%, only the street frontage is impermeable. There is no attempt to estimate the attenuation provided by green and brown roofs and no attempt to calculate the size of attenuation tanks.	Section 4
Fordwych Residents' Association		13th December 2017	Objection to development, specifically the underground car park which may disrupt the water table and the course of underground rivers in the area, such as the River Westbourne.	Section 4

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Appendix 2: Audit Query Tracker

None

Appendix 3: Supplementary Supporting Documents

None

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