Ref : 16016/AR

MultiLateral

72 Maresfield Gardens, NW3

Basement Impact Assessment for Planning

January 2018

Rev A

Content

1.0 INTRODUCTION

Multilateral were appointed by the building owners, Mr Mads Jensen and Ms Yasmin Meyohas, to act as the consulting Structural Engineers for the proposed development at 72 Maresfield Gardens, London, NW3, with Ackroyd Lowrie Architects. Multilateral have worked closely with the Architects to develop a viable structural strategy for the proposed scheme.

This report has been prepared to support the Planning Application for the proposed development. The purpose is to summarise the structural engineering impact assessment and suggested construction sequence of the proposed works, in particular lowering of the existing basement slab level. This report has been prepared in accordance with the guidance given in the Camden Planning Guidance on Basements and Lightwells CPG4, and development Policy DP27.3.

The report focuses on the proposed subterranean works whilst bearing in mind the superstructure works and should be read in conjunction with all relevant supporting documents from the Architects and other specialists, some of which are included in the Appendices of this document.

A desk study, intrusive geotechnical investigation, and basement impact assessment (BIA) were carried out by Jomas late 2017 and its findings have been incorporated in the subterranean construction methodology part of this report. Refer to Appendix A for the full report (ref: P1170J1222, revision Final v2.0).

A basement wall stability assessment (ref: 0537-TN-02-00) and a ground movement assessment (GMA, ref: 0537-TN-01-00) were completed by A-Square Studio in January 2018. Refer to Appendix B for details.

The appointed Contractor will be required to provide a detailed method statement, including all temporary works and movement monitoring proposals, to Multilateral for review prior to commencing any works on site. The Contractor is to accept full responsibility for the stability and structural integrity of the works during the contract and provide adequate temporary supports as necessary. The Contractor shall also prevent overloading of any completed or partially completed structural elements.

2.0 NON-TECHNICAL SUMMARY

The report and all enclosed supporting document confirm that the excavation and construction works associated with the proposed lowering of basement slab at 72 Maresfield Gardens can be achieved without significant impact to the structural stability of the existing structure and the neighbouring properties or its surrounding grounds.

The BIA prepared by Jomas has concluded that the proposed basement will not cause a notable change to the groundwater flow regime in the vicinity of the site.

The GMA completed by A-Square Studio has confirmed that the proposed works and construction sequence could be constructed without imposing damage to the surrounding properties. The analysis confirms that all of the affected facades would fall within 'Category 0' representative of a Negligible damage classification, in accordance with the Burland (1997) criteria, providing a good standard of workmanship carried out by a competent contractor.

3.0 EXISTING STRUCTURE, SITE AND GROUND CONDITIONS

The site is situated on the eastern side of Maresfield Gardens. From the historical maps, the property appears to have been built between 1953-1955 and have not undergone any significant changes ever since. The existing structure is a three-storey detached house, including a basement. The basement is approximately 1.2m below the external ground level with a garage which can be accessed via a ramp leading from the front garden/main entrance. The building is currently unoccupied. The house is constructed in load-bearing masonry walls with concrete floor slabs at basement and ground floors. The upper floors and the roof are of traditional timber joists and rafters, respectively.

To the north, the property is adjacent to No. 42 Netherhall Gardens which is a detached house. The nearest façade of No. 42 Netherhall Gardens is approximately 5m away from the northern elevation of No. 72 house. No. 70 Maresfield Gardens is a building situated along the southern boundary of the site, it is understood to belong to Camden Council comprising of eight flats. The southern façade of No. 72 is approximately 5.6m away from No. 70 northern elevation. There are boundary/garden walls between each property, approximately 1.2m away from the main house.

The British Geological Survey (BGS) map indicates the site to be directly underlain by deposits of London Clay Formation known as Claygate Member. This was confirmed by the intrusive site investigation (Appendix A). The thickness of Made Ground was encountered in the boreholes ranging between 0.9m and 2.65m. The lowered basement slab will be found within the Claygate formation, the thickness of which was not identified during the site investigation. Refer to Appendix A for further details of the geotechnical investigation.

4.0 PROPOSED STRUCTURAL WORKS

The current proposal consists of replacement of existing roof and second floor timber construction to accommodate new room layouts and improve headroom at both levels, renovation of the first and ground floors, and lowering of the existing basement slab level by 400mm.

The existing basement slab will be removed carefully and replaced with a new reinforced concrete slab. Following an extensive trial pits covering the whole building footprint, the 400mm drop of slab level was carefully considered to ensure minimal underpinning works to the existing foundation would be required.

Multilateral has appointed A-Square to carry out an initial basement stability assessment as well as a GMA to ensure the stability of the retaining basement wall will not be compromised by the removal of the existing slab. It was confirmed that temporary horizontal works will be necessary during construction. Refer to Section 8.0 for the proposed subterranean Construction Method Statement (CMS) and Appendix D for more information on the proposed structural works.

5.0 PROPOSED BELOW GROUND DRAINAGE

The existing onsite surface and foul water connections are served by a single combined connection to the public sewer within Maresfield Gardens. The existing systems are to be reused as much as possible with some manholes slightly relocated and/or associated pipes to suit the required invert levels and proposed architectural floor layouts. It is proposed that all above ground drainage above the basement level, including surface water drainage from the roof, will

be drained via gravity to the existing manholes along both sides of the property. All basement level drainage will be pumped via submersible packaged pumping stations. All new connections will be made to the existing manholes within the site and there will be no new connection required to the public sewer.

The proposed refurbishment works are all within the existing building footprint and the proposed landscape design of the front and rear garden is understood to have no significant change in impermeable surfaces from the existing condition. Thus, there is no potential increase in surface water discharge rate.

6.0 HYDROLOGY AND HYDRO-GEOLOGICAL STATEMENT SUMMARY

A basement impact assessment has been prepared by Jomas to demonstrate that the proposed works should not have an adverse effect on the adjoining properties or the groundwater.

Groundwater was encountered at 2.7m below ground level in one of the window sample. No groundwater was reported in the remaining exploratory holes during drilling or in any trial pits excavated.

Piezometers were installed within 3 no. boreholes and were monitored over 3 return visits in Oct/Nov 2017, and again in January 2018, to ensure the seasonal changes do not vary significantly. During the post-drilling monitoring, groundwater was encountered at depths between 3.02m and 3.83m below basement level within the Claygate Member. Given the recorded geology and the lack of groundwater reported during drilling, it is likely that the recorded water represents water that has percolated through the surface materials and then been unable to drain out of the well. The groundwater is not expected to be encountered within the required excavation depth. In any case, it would be prudent for the appointed contractor to have a contingency plan in place to deal with any perched water inflows as a precautionary measure.

Refer to Appendix A for full detail of the hydrology and hydrogeology impact assessment, which is summarised as follows;

- *Based on all the information available, the risk of flooding from groundwater is considered to be low. The proposed basement is unlikely to have a detectable impact on the local groundwater regime.*
- *The proposed dwelling will lie outside of flood risk zones and is therefore assessed as being at a very low probability of fluvial flooding.*
- *There are no surface water features on or in the immediate vicinity of the site. It is therefore not anticipated that the site will make any impact upon the hydrology of the area.*
- *The information available suggests that the site lies in an area that is not at risk of surface water flooding. Flooding via this source is therefore considered to be low.*
- *The proposed basement construction is considered unlikely to create a reduction of impermeable area in the post development scenario.*
- *No risk of flooding to the site from artificial sources has been identified.*

7.0 MOVEMENT MONITORING

A project specific movement monitoring regime will be proposed to monitor the verticality and lateral movements of the key facades of the existing and surrounding buildings to ensure the works does not cause any significant adverse impact on the structures. A condition survey to the neighbouring facades will be completed and recorded prior to demolition works.

A tri-axial monitoring will be provided to all structures adjacent to the basement excavation at the time of excavation and construction. The monitoring locations are to be free from all obstructions to allow readings to be taken. The key areas of monitoring on each façade will include the following locations as a minimum;

i. Vertical movement – at the mid-point of the façade, near ground level.
ii. Lateral movement – at the top of the façade midway between principal restraints, i.e. return walls.

Measurements will be carried out twice (one week apart) prior to commencing any construction works to establish a base reading, and then at a weekly basis during excavation and subterranean construction works until all major structural works are completed and temporary works removed. It is proposed that further readings are taken monthly thereafter for a 3-month period following the completion of the notifiable works. All readings will be recorded in a weekly report to show full tri-axial movements data for each monitoring point, with comparisons made against base

reading and previous readings. Refer to Appendix B for recommended trigger values analysed as part of the GMA.

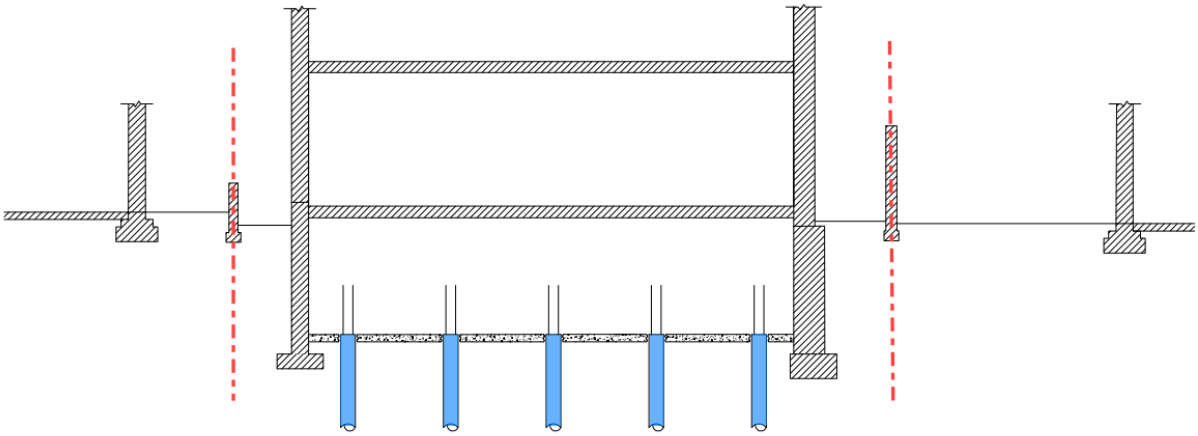
8.0 SUBTERRANEAN CONSTRUCTION METHOD STATEMENT (CMS)

The following sequence describes the proposed approach to be taken in the execution of the substructure works that would be suitable to safeguard the surrounding ground and structures.

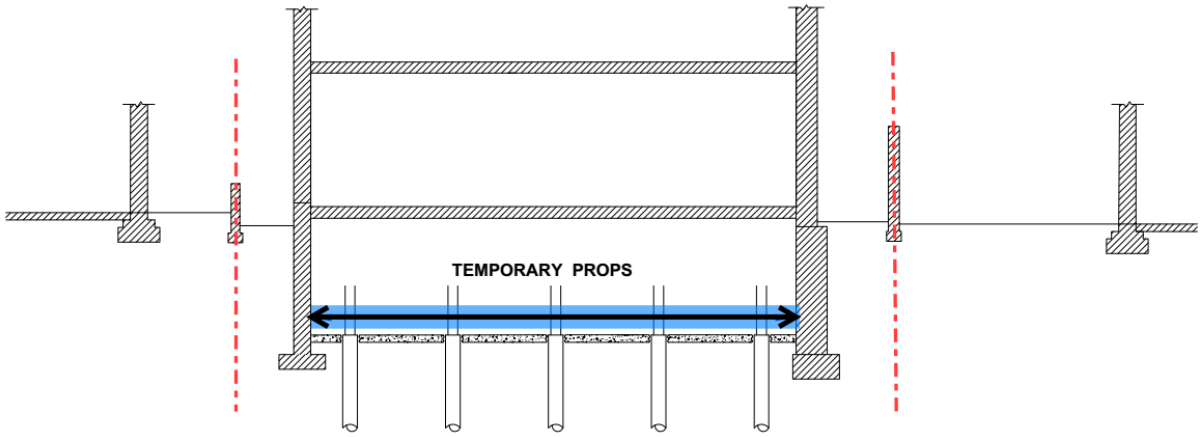
Detailed method statements and calculations for the enabling and temporary works will need to be prepared by the Contractor for comment by Multilateral and all relevant parties, including Party Wall Surveyors and their engineers.

1. Clear site. Locally break existing basement slab to allow for piling installation. A suitable piling rig, such as a sectional flight auger (SFA) rig, can be positioned in the basement via the existing garage door from the main site entrance.

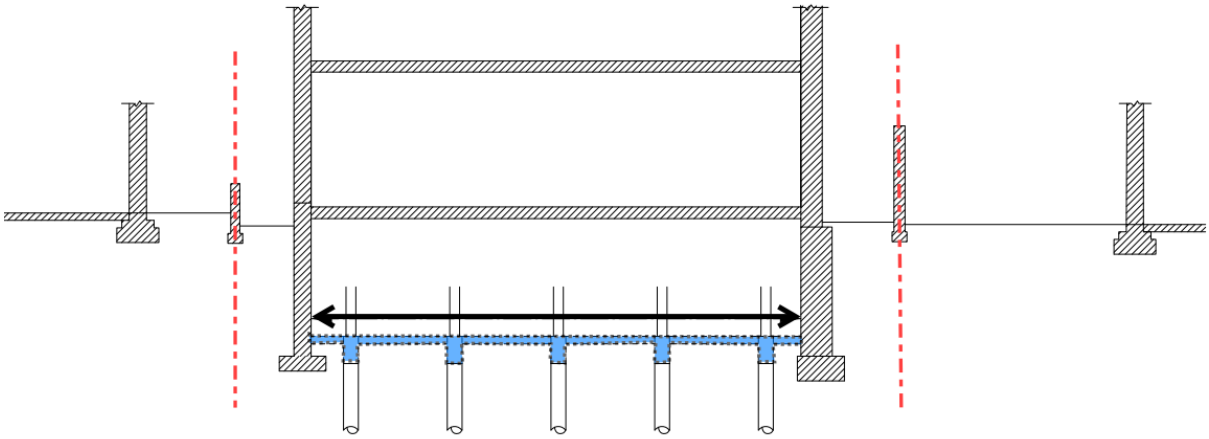
2. Install tension piles with extended-length reinforcement.



3. Install temporary lateral props to the base of all retaining walls above the existing basement slab level.



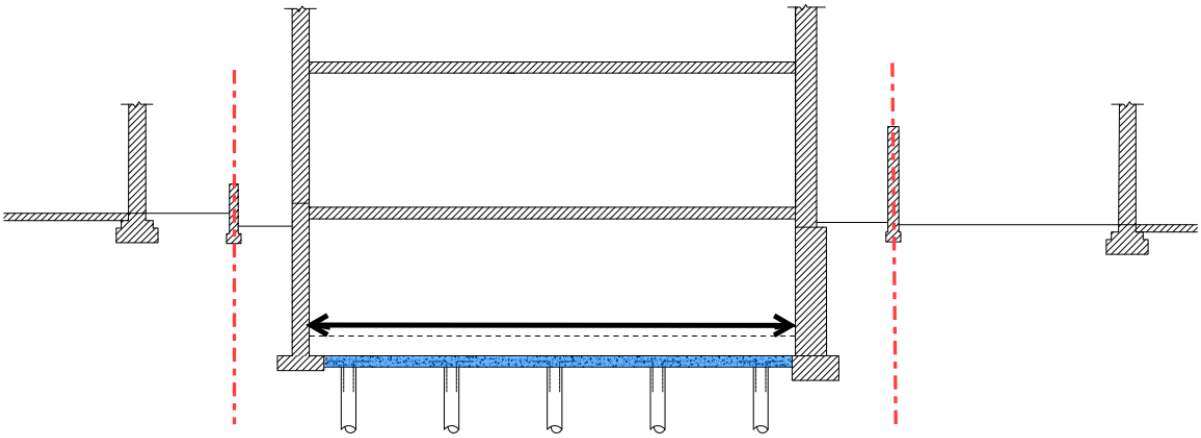
4. Once the temporary props are in place, carefully remove the existing basement slab. Locally excavate ground around the installed piles and carefully break down the top of piles to the required cut-off level using hand-held pneumatic breakers, leaving top of reinforcement to form an anchorage into the new slab.



5. Excavate the soil to the required level (approximately 650mm below the existing slab level). Install resin anchored dowelled bars in the existing basement wall/foundation at regular spacing to tie the wall and the new RC slab, with hydrophilic strip.

6. Level the ground and cast a layer of blinding across the basement footprint. Install waterproofing membrane and slab reinforcement bending the pile reinforcement to lap.

7. Cast new concrete slab. Once the concrete is cured, the temporary lateral props can be removed.

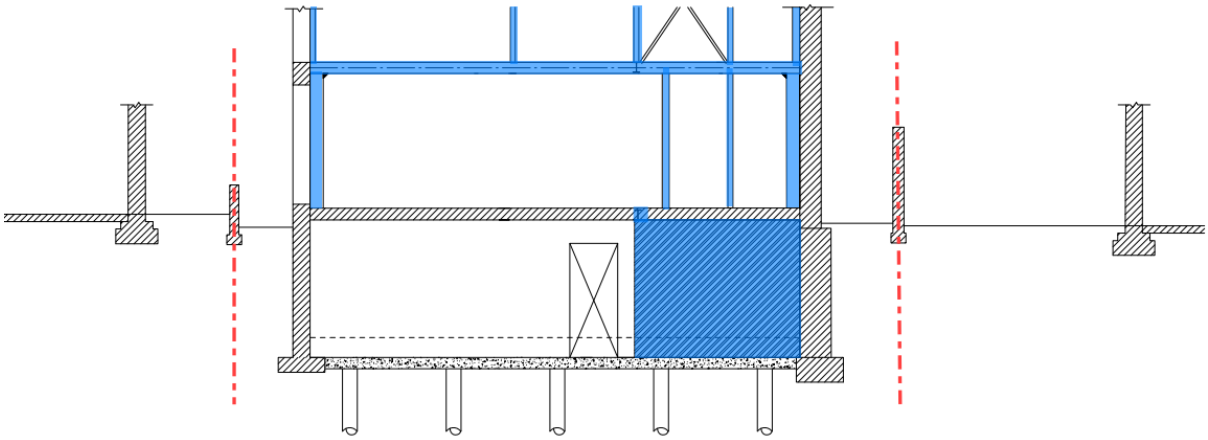


8. Install temporary supports to the existing walls above which are to be removed using needling or stooling techniques, as appropriate. Provide adequate spreaders at bases of all the temporary supports to ensure loads are distributed on the new basement slab and/or piles. Remove sections of existing masonry walls as required.

9. Construct new load bearing masonry walls at basement level, dry-packing between the underside of existing structures and the top of the new walls.

10. Install new steel columns and beams from bottom up with dry-pack between all existing and new structural elements.

11. Once new superstructure is completed, temporary supports can then be removed.



9.0 CONCLUSION

It is intended that the above measures and sequence of works are considered for the eventual detailed design and construction of the proposed works.

It is concluded that it is feasible to carry out the proposed works without impacting on any of the neighbouring structures. A competent and experienced contractor will be able to safely execute the works described above. Adequate temporary propping will need to be provided. A feasible CMS (outlined in Section 8.0) where no special construction methods are required, demonstrating that the construction of the subterranean works can be safely implemented.

The BIA prepared by Jomas (Appendix A) has concluded that the proposed basement will not cause a significant change to the groundwater flow regime in the vicinity of the site and there is a very low risk of flooding and it is is not anticipated that the site will make any impact upon the hydrology of the area. It is also concluded that the proposed basement construction is considered unlikely to create a reduction of impermeable area in the post development scenario.

The GMA completed by A-Square Studio (Appendix B) has confirmed that the proposed works and construction sequence could be constructed without imposing damage to the surrounding properties. The analysis confirms that all of the affected facades would fall within 'Category 0' representative of a Negligible damage classification, in accordance with the Burland (1997) criteria.

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10.0 CAMDEN BIA AUDIT CHECKLIST

Item provided		**Name of BIA document/appendix in which information is contained.**
1	Description of proposed development.	Refer to Section 4.0 of this report.
2	Plan showing boundary of development including any land required temporarily during construction.	Refer to Appendix C for architectural site plan and Appendix D for structural plans with site boundary.
3	Plans, maps and or photographs to show location of basement relative to surrounding structures.	Refer to; - Appendix A for Desk Study and Ground Investigation and Basement Impact Assessment Report (Appendix 1). - Appendix C for architectural drawings. - Appendix D for structural plans with site boundary.
4	Plans, maps and or photographs to show topography of surrounding area with any nearby watercourses/waterbodies including consideration of the relevant maps in the Strategic FRA by URS (2014)	Refer to Appendix A for Desk Study and Ground Investigation and Basement Impact Assessment Report (Appendix 3).
5	Plans and sections to show foundation details of adjacent structures.	The site is a detached property and no access was available to excavate inspection pits on third party properties outside the site boundary. Refer to Appendix D for structural plan and sections showing (conservatively) assumed foundation details of neighbouring structures considered in design.
6	Plans and sections to show layout and dimensions of proposed basement.	Refer to Appendix C for relevant architectural drawings.
7	Programme for enabling works, construction and restoration.	To be provided by others as a separate document.
8	Identification of potential risks to land stability (including surrounding structures and	Refer to Appendix A for Desk Study and Ground Investigation and Basement Impact Assessment Report.

	infrastructure), and surface and groundwater flooding.	
9	Assessment of impact of potential risks on neighbouring properties and surface and groundwater.	Refer to; - Appendix A for Desk Study and Ground Investigation and Basement Impact Assessment Report. - Appendix B for Ground Movement Analysis.
10	Identification of significant adverse impacts.	Refer to; - Appendix A for Desk Study and Ground Investigation and Basement Impact Assessment Report. - Appendix B for Basement Wall Stability Assessment and Ground Movement Assessment.
11	Evidence of consultation with neighbours.	To be provided separately by others.
12	Ground Investigation Report and Conceptual Site Model including - Desktop study - exploratory hole records - results from monitoring the local groundwater regime - confirmation of baseline conditions - factual site investigation report	Refer to Appendix A for Desk Study and Ground Investigation and Basement Impact Assessment Report.
13	Ground Movement Assessment (GMA).	Refer to Appendix B for Ground Movement Analysis.
14	Plans, drawings, reports to show extent of affected area.	Refer to Appendix B for Ground Movement Analysis.
15	Specific mitigation measures to reduce, avoid or offset significant adverse impacts.	Refer to Appendix B for Basement Wall Stability Assessment.
16	Construction Sequence Methodology (CSM) referring to site investigation and containing basement, floor and roof plans, sections (all	Refer to Section 8.0 of this report, and Appendix D for structural drawings

	views), sequence of construction and temporary works.	
17	Proposals for monitoring during construction.	Refer to Section 7.0 of this report
18	Confirmatory and reasoned statement identifying likely damage to nearby properties according to Burland Scale	Refer to Appendix B for Ground Movement Analysis.
19	Confirmatory and reasoned statement with supporting evidence that the structural stability of the building and neighbouring properties will be maintained (by reference to BIA, Ground Movement Assessment and Construction Sequence Methodology), including consideration of cumulative effects.	Refer to; - Section 8.0 of this report. - Appendix A for Desk Study and Ground Investigation and Basement Impact Assessment Report. - Appendix B for Ground Movement Analysis.
20	Confirmatory and reasoned statement with supporting evidence that there will be no adverse effects on drainage or run-off and no damage to the water environment (by reference to ground investigation, BIA and CSM), including consideration of cumulative effects.	Refer to; - Section 5.0 of this report. - Appendix A for Desk Study and Ground Investigation and Basement Impact Assessment Report.
21	Identification of areas that require further investigation.	Refer to; - Sections 1, 7, 8 and 9 of this report. - Appendix A for Desk Study and Ground Investigation and Basement Impact Assessment Report. - Appendix B for Ground Movement Analysis.
22	Non-technical summary for each stage of BIA.	Refer to Section 2.0 in this report.