



SYMMETRYS
STRUCTURAL / CIVIL ENGINEERS

BASEMENT IMPACT ASSESSMENT

139 CRANLEY GARDENS
N10 3AH
LONDON

21066-SYM-XX-XX-RP-S-0001-Rev D

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REVISION HISTORY

Revision	Description	Date	By	Checked
A	First issue	21/02/2022	SB	DS/CA
B	Draft	06/04/2023	SB	CA
C	Draft updated	24/04/2023	SB	CA
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1.0 Introduction

1.1 Symmetrys Limited have been engaged by Crawford Partnership Architecture to produce a Basement Impact Assessment for the proposed single storey basement at 139 Cranley Gardens, London. The overall project consists of basement extension, relocating the existing outbuilding structure above the proposed basement footprint towards the rear (Figure 1 and Figure 2).

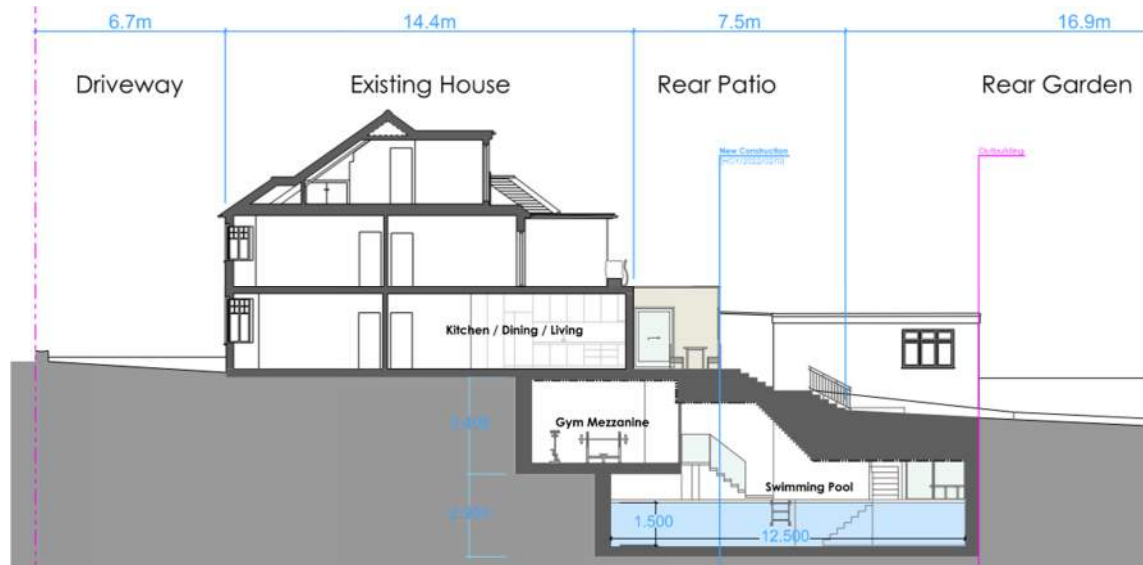


Figure 1. Proposed Section A-A.

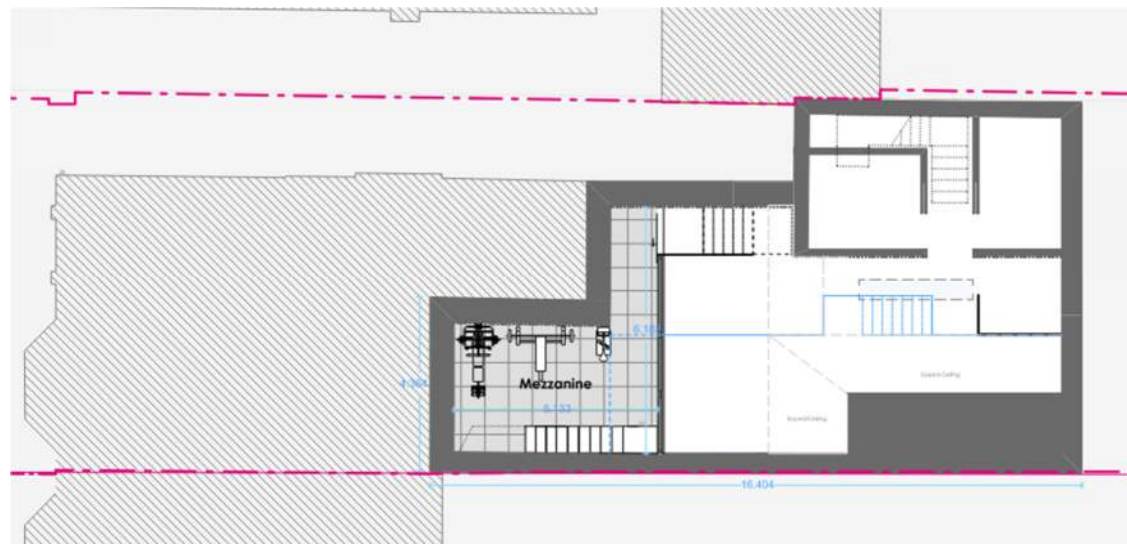


Figure 2. Proposed basement plan

1.2 Symmetrys drawings and this report form part of the architect's planning application. These documents are not intended for, and should not be relied upon, by any third party for any other purpose. Symmetrys drawings are based on the existing and proposed drawings provided by Crawford Partnership Architecture.

1.3 The client has appointed the specialist geotechnical engineers Site Analytical Services Ltd to drill one continuous flight auger borehole to a depth of 12.0m below ground level to accurately assess the site-specific soil conditions. This can be found in Appendix C. Site Analytical Services Ltd were also appointed to carry out a desk top study and specialist assessment of the ground conditions which is included within their report.

1.4 Symmetrys Limited have carried out a preliminary design of the proposed basement. The resulting structural drawings can be found in Appendix A.

1.5 The following reference documents have been used as guidance in compiling this report;

- Local requirements for information to be submitted with planning applications, Haringey, adopted July 2021.
- Development management DPD, including Policy DM18, Haringey, adopted July 2017.
- Haringey Council Strategic Floor Risk Assessment, issued on February 2015.
- Guidelines on safe and efficient basement construction below or near to existign structures (ASUC).

2.0 Existing site

2.1 The site is a residential property consisting of a 3-storey semi-detached house and a single-storey outbuilding located at the rear.

2.2 The semi-detached house was built at the beginning of 20th century, in a period between WW1 and WW2. The outbuilding was built over a period within the last decade.

2.3 The site is located on the south-eastern side of Cranley Gardens, in the London Borough of Haringey.

2.4 The site is surrounded by residential properties to the east and west, and a sport ground to the south (Figure 3).



Figure 3. Location plan.

3.0Desk Study

3.1Ground Condition

- 3.1.1The local geographical survey maps, accessible via the British Geological Society website, <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>, indicates London Clay Formation for bedrock geology.



Figure 4. British Geological Survey plan showing the bedrock geology data on the site.

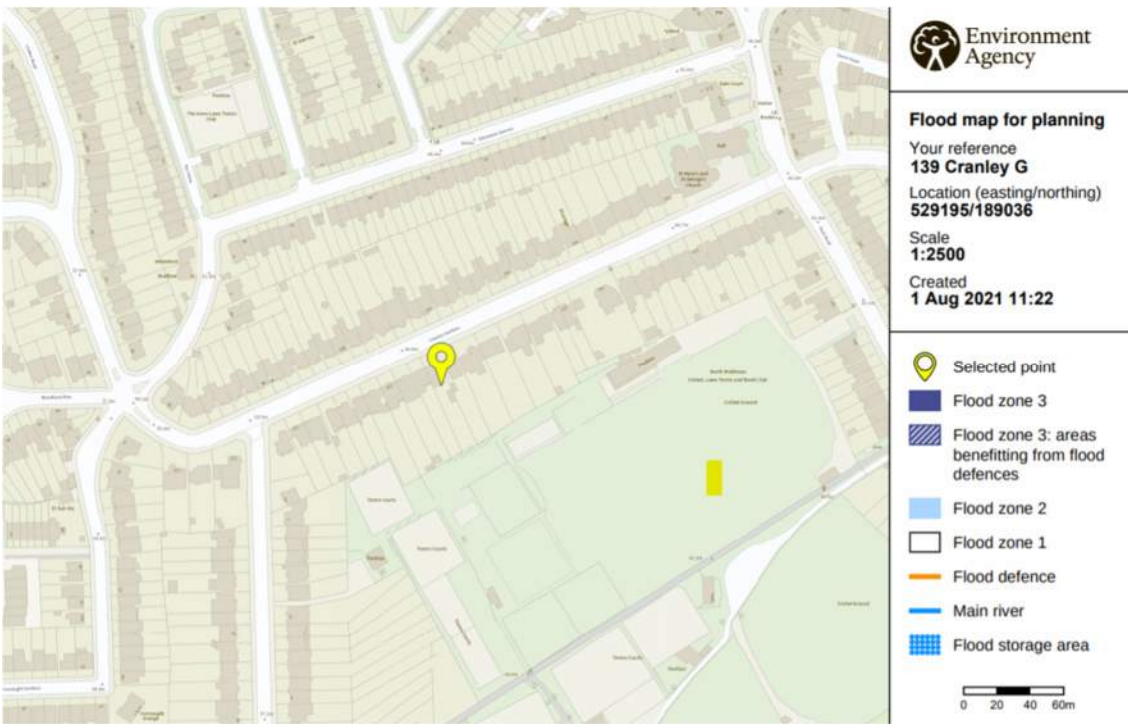


Figure 5. Environment Agency Flood Map for Planning

3.2Hydrology

- 3.2.1Figure 5 shows the indicative flood risk map taken from Environment Agency. It can be seen that the site falls within Flood zone 1, an area with a low probability of flooding.
- 3.2.2The risk of surface water flooding appears to be medium (Enviroingmental Agency). A site specific flood risk assessment has been carried out by Symmetrys to address the impact of the development on the hydrology and hydrogeology of the site.
- 3.2.3Haringey Council Strategic Flood Risk Assessment (Figure 6) shows that the site is in the vicinity of a watercourse, the Moselle Brook now culverted. Therefore, it is unlikely that the proposed development will have a detrimental impact on the local hydrology.
- 3.2.4Site Analytical Services Phase 1 report refers to streams located from 70m to the north and 192m to the south of the site, which have been infilled between the end of 19th century and beginning of 20th century.
- 3.2.5Potential Made Ground/Ground gas from the infilled pond and the infilled streams are highilted in the Geotechnical Phase 1 report having a potential impact on the site. A detailed Risk Assement is included within the aforementioned report.

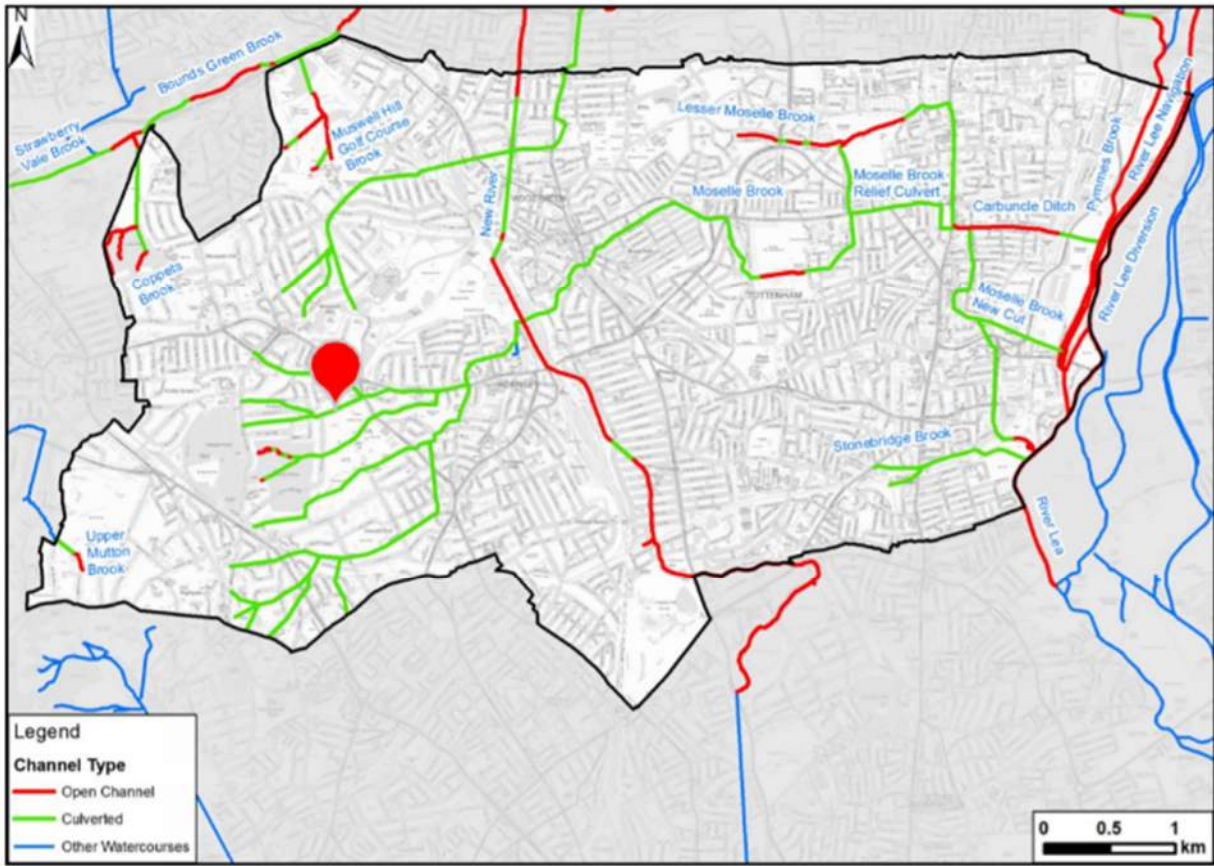


Figure 6. London Borough of Haringey- Channel Type

3.3Overground and Underground Railway Infrastructure

- 3.3.1Figure 7 shows the position of proposed basement in relation to the existing and historic railway routes (web site <http://www.railmaponline.com/UKIEMap.php>). The now abandoned Highgate to Alexandra Park railway line is located approximately 200m at north-west of the site.
- 3.3.2The proposed development is unlikely to have any impact to the existing over ground or underground network rail system.

3.3.3 CAT scan, safe digging practices (as contained in HSE publications) and other appropriate investigative techniques should always adopted.

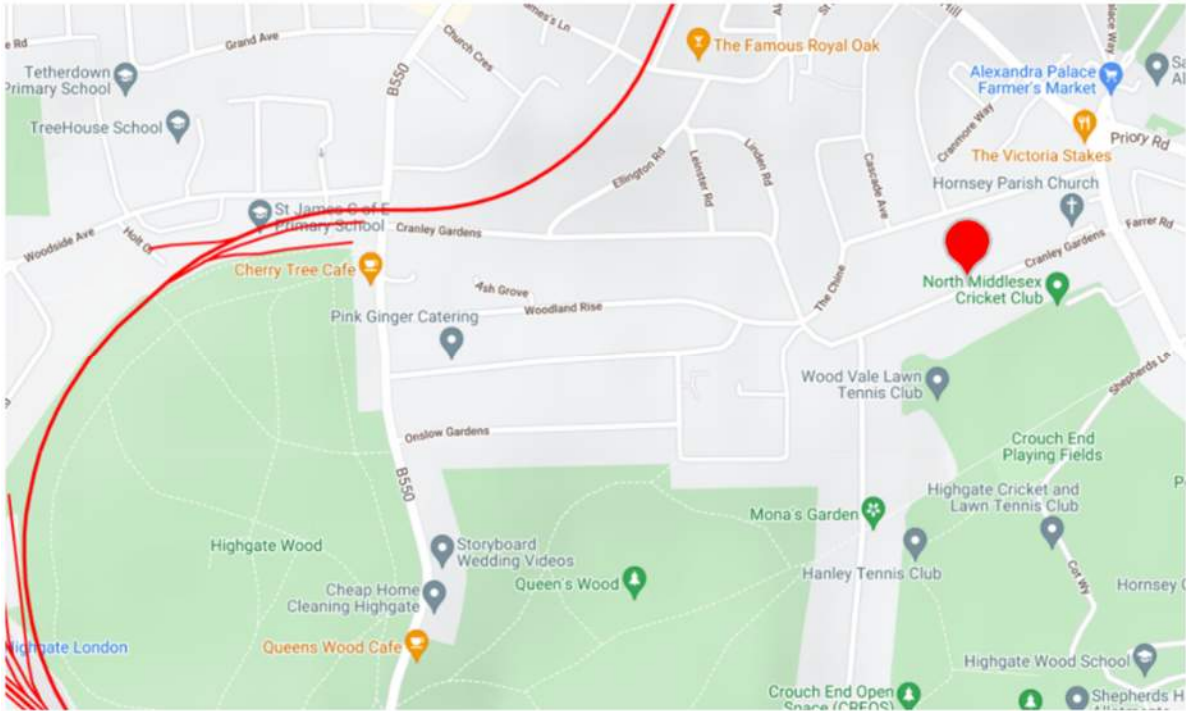


Figure 7. London Transport historic map. The red line is the now abandoned Highgate to Alexandra Park GNR's branch.

- 3.4 Bomb Damage
- 3.4.1 The 'Bomb Sight' archive has identified multiple areas within 250m from the site targeted by WW2 bombing.
- 3.4.2 The closest high explosive bomb is located 160m from the site. Therefore, caution must be exercised during the ground works.
- 4.0 Ground Investigation**
- 4.1 A ground investigation was carried out by specialist geotechnical engineers Site Analytical Services Ltd. Their geotechnical report is provided in Appendix C.
- 4.2 One borehole was excavated at the rear of the site to a maximum depth of 12m where stiff clay was encountered. See Appendix C for details.
- 4.3 The allowable bearing pressure was found to be 165 kN/m² at 1m depth, increasing to 250 kN/m² at 3m depth.
- 4.4 Groundwater was encountered at 0.85m depth in Borehole 1 after a period of two weeks. As the London Clay is a non-aquifer, the water is not believed to be groundwater, instead surface water trapped in the motinoring pipe. The appointed contractor should allow for dewatering measures should perched water be encountered during excavation and construction works.
- 4.5 A Waste Acceptance Criteria analysis (WAC) was carried out. The results confirmed the sample being non-hazardous in nature, and the same has been classified as Inert Waste.
- 4.6 The result obtained from tests for buried concrete (Appendix C), indicates that Design Sulphate Class DS-3 should be applied, hence according to BS 8500-1:2006, designated concrete to be DC-1 (min RC25/30)

5.0 Design Proposal

5.1 The design proposal is to construct a single storey basement. The proposed methodology consists of multi-stage underpinning.

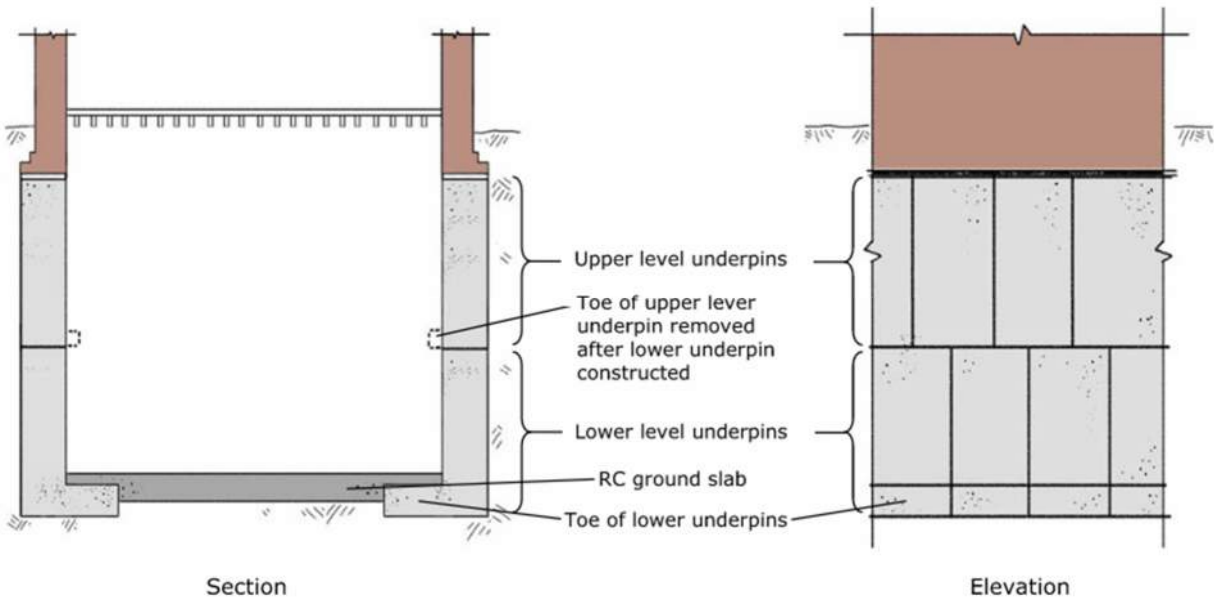


Figure 8. Typical underpinning multi-stage underpinning sequence (source: Guidelines on safe and efficient basement construction below or near to existign structures (ASUC)

- 5.2 Horizontal and vertical propping shall be provided at all stages of the basement construction up to completion. Continuity reinforcement shall be allowed between the different stages of underpinning. Temporary bases shall be allowed at intermediate stages of underpinning, trimmed off at a later stage to leave a flat vertical wall. A new suspended basement slab with suitable compressive void formers has been considered to accommodate the expected ground heave. Tensions piles have also been considered to provide additional resistance to uplift. See Structural drawings in Appendix A. A ground floor slab is envisaged providing permanent propping to the retaining walls at base and top level.
- 5.3 The retaining walls shall have adequate strength to resist anticipated lateral soil forces, water pressure and surcharge loading.
- 5.4 The retaining walls and the basement slab are proposed to be constructed in a sequential manner in lengths of maximum 1.2m, to be cast in sequence as specified in the temporary works method statement.
- 5.5 Existing trees located on site are to be retained and protected with appropriate protective measures during the course of the construction. Further investigation works must be carried out prior to any construction works to confirm that the proposed foundations meet the requirement indicated in the NHBC Standards, Chapter 4.2 "Building near trees".
- 6.0 Temporary Works**
- 6.1 The proposed temporary works sequence for the basement is provided in Appendix A. This is for design development purposes only and for the purposes of this planning application. The appointed contractor will be responsible for all temporary supports and for the stability of the structure during the works. The method of construction adopted for the basement construction minimises the quantity of temporary works required.
- 6.2 To ensure that the retained engineer's intent is correctly interpreted by the contactor, they will be required to submit all temporary works proposals for to review a minimum of 7 working days prior to commencing works. The contractor should also submit a dewatering strategy to ensure a strategy is agreed should water be encountered.

7.0 Construction Method Statement

7.1 A preliminary sequence of works is provided within the structural drawings in Appendix A (to be confirmed by the contractor).

8.0 Ground Stability and Stability of Neighbouring Structures

8.1 Due to the robust engineering principles and construction methods applied, the extent of movement is limited in accordance with British and European codes. We can confirm that the proposed structural design and method of construction of the basement have been developed with a view to ensuring structural safety and that if constructed in accordance with this document, the works will be able to be completed without any adverse impact on the structural stability of the neighbouring properties, other adjacent structure, adjoining land and gardens or the adjoining Public Highway.

8.2 The reinforced concrete structure will be designed to accommodate surcharges from the neighbouring properties, Public Highway and ground pressures. The structure will have adequate stiffness to ensure that the lateral deflections do not exceed the appropriate limits recommended by British Standards Codes of Practice in order to ensure that potential ground movements be kept to acceptable limits. Appointed contractors will also be advised to carry out movement monitoring as part of the basement construction.

8.3 The structure will be designed to withstand any uplift due to hydrostatic pressures as well as being designed to transfer vertical loads into the ground safely.

9.0 Drainage and SuDS

9.1 Refer to Symmetrys document number “21066-SYM-XX-XX-RP-C-0001 Flood Risk Assessment and SuDS Report” for details on Drainage and SuDS.

10.0 Party Wall Matters

10.1 The proposed works will fall within the Party Wall Act 1996. Procedures under the Act will be dealt with by the client’s Party Wall Surveyor. The Party Wall Surveyor will prepare and serve necessary Notices under the provision of the Acts and agree Party Wall Awards in event of disputes. The Contractor will be required to provide the Party Wall Surveyor with the appropriate drawings, method statements and all other relevant information covering the works notifiable under the Act. The resolution of the matters under the Act and provision of Party Wall Awards will protect the interests of all owners.

10.2 Monitoring

It is proposed that the structural stability of the adjacent properties is safeguarded by a system of movement monitoring. The Contractor shall monitor the position and movements of the elevations of the retained façade and adjacent properties around the perimeter of the proposed excavation. The monitoring shall be undertaken by a specialist survey company. The monitoring system will have at least the following characteristics:

- (1)

The retained façade and existing façades of the neighbouring properties as well as the flank wall of the neighbouring building will be monitored near ground level and at roof level, at intervals not exceeding 3m centres.
- (2)

Monitoring points (targets) shall be firmly attached, to allow 3D position measurement, for the duration of the work, to a continuous and uninterrupted accuracy of +/- 1mm. A suitable remote reference base/datum unaffected by the works will be adopted, one located at least 50m from the site.
- (3)

Points/targets shall be measured for 3D positioning on, at not less than the following intervals:

(a)

Before any works commence (base reading).

(b)

Weekly during the period of basement excavation/construction.

(c)

Fortnightly until permanent structure is in place

(d)

Monthly during the course of the remainder of the works.

(e)

Six months after the completion of all construction works.

- (4)

All measurements shall be plotted graphically, to clearly indicate the fluctuation of movement with time. The survey company shall submit the monitoring results to the Engineer (Symmetrys Ltd) and to the Adjoining Owners Party Wall Surveyors/Engineer within 24 hour of measurement, graphically and numerically.
- (5)

The following trigger levels for movement are proposed for agreement. In the event of a trigger value being reached the Contractor will immediately stop any work that might cause further movement, assess the situation and propose alternative methods for proceeding, with definitive further movement limits for those later steps.

(6) Trigger movement limits are proposed as follows:

Existing Buildings: Horizontal/Vertical Movement	
Amber +/-5mm	All parties notified
Red +/-10mm	Works Reviewed

11.0 Sustainability

- 11.1

As the basement construction will involve significant amounts of concrete, cement replacement alternatives should be considered. Cement replacements can used to replace up to 40% of the cement in concrete mix. These replacements are typically waste products from the energy production industry such as PFA (pulverised fuel ash) and GBFS (granulated blast furnace slag). By adopting them waste products from the energy production industry are recycled and not sent to landfill sites. Furthermore this also reduces the amount of cement that needs to be mined. Concrete should be bought from a local supplier to further reduce the carbon footprint of transport.
- 11.2

There is a significant amount of reinforced concrete on the project for which steel reinforcement bars will be required. By specifying reinforcement from a UK supplier it ensures that the rebar is made from 100% recycled steel. Any structural steelwork should be sourced from a British manufacturer to ensure that rolled sections are made from at least 60% recycled steel. Sourcing the steel from a local supplier will further reduce the transport carbon footprint.

12.0 Summary

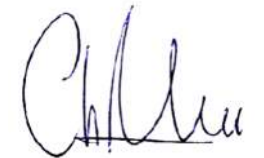
- 12.1

The proposed basement at 139 Cranley Gardens has been designed with robust structural principals and methods of construction that are widely used and known. This will ensure the integrity of neighbouring structures and roadways are not compromised during its construction.
- 12.2

This assumed Method Statement and Structural report has been completed by Simone Boncio, Senior Structural Engineer at Symmetrys Limited, reviewd by David Snaith BEng (Hons) PG Cert Structs, Associate at Symmetrys Limited, and checked by Christopher Atkins CEng MISTructE who is the Managing Director of Symmetrys Limited.



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