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29 ABERDARE GARDENS

LONDON NW6 3AJ

ENGINEERING DESIGN AND CONSTRUCTION STATEMENT

1.0 STRUCTURAL REPORT RELATING TO THE PROPOSED TOWN PLANNING APPLICATION TO FORM A NEW BASEMENT TO THIS BUILDING

1.1 INTRODUCTION

It is proposed to form underground basement rooms under the footprint of the existing house with the basement extending beneath the front and rear gardens. The purpose of this report is to outline the structural considerations and likely method of construction for the proposed basement works.

1.2 DESCRIPTION OF EXISTING BUILDING

This building is a three storey semi detached house situated on the East side of Aberdare Gardens. The accommodation is set out on the ground and first floors with additional accommodation within the timber mansard roof enclosure. The site boundary at the rear of the property is bounded on all three sides by the gardens of adjoining properties.

The second storey is enclosed by a tiled timber mansard with a timber flat roof above. The perimeter walls are load bearing masonry cavity walls with facing brick from ground to second floor level. The first and second floors are assumed to be of timber construction supported on internal and perimeter load bearing masonry walls.

The ground floor and foundation system are unknown at this time but are assumed to be traditional trench fill foundations with either a ground bearing concrete or timber suspended ground floor slab. There is a single storey extension to the rear left hand corner of the property.

1.3 DESCRIPTION OF PROPOSED BASEMENT STRUCTURE

The proposed basement accommodation will be under the footprint of the existing house extending approximately 1.5m on plan from the front of the house beneath the front garden to provide lightwells to the basement accommodation at the front of the property and approximately 20.0m on plan from the back of the main house beneath the rear garden.

Generally the proposed works will be formed at approximately 3.5m below external ground level with a portion towards the rear of the basement formed at approximately 5.25m below external ground level to provide a swimming pool area.

The basement proposal beneath the footprint of the existing house will afford a large kitchen/dinning area, pantry bathroom, cloakroom, laundry room, utility room, services plant room and two bedrooms.

The extended basement beyond the line of the existing rear elevation to the main house will comprise a lightwell and swimming pool/gymnasium complex.

The main accommodation at basement level will be served by a single flight of stairs from the ground floor of the main house.

A second staircase will be provided within the lightwell at the rear of the property linking the rear basement to the garden area at ground level.

The extent of these proposed works is shown on Integrated Solutions drawing number IS.729/A4.

1.4 **EXISTING GROUND CONDITIONS**

Ground investigation works have been undertaken by Ground Engineering the details of which are to be found in Ground Engineering Report Ref: C12761 dated October 2012 .In terms of the field work one cable percussive borehole [BH1 15.0m] was sunk in the front garden with two window sampled boreholes [WSA 9.45m] and WSB 6.45m] sunk in the rear garden. Trial pits to expose the existing foundation details for the main house will be carried out in due course.

Specific details of the ground conditions found are recorded within the borehole records contained within Ground Engineering Report Ref: C12761. Essentially a thin layer of made ground was found covering a firm Head Deposit, which at 1.2m to 1.3m rested on the anticipated initially firm becoming stiff London CLAY, which extended to at least 15.0m below existing ground level.

1.5 **GROUND WATER**

Water seepage was encountered in BH1 from layers of concretionary limestone at 3.5m and 10.6m depth. BH1 and WSA and WSB remained dry on final completion. The water levels have been monitored using Piezometer readings on the 3rd and 11th October which found groundwater standing within the standpipe installations at depths between 0.48m [WSB] and 1.75m [WSA] appears constant at approximately 8.95 metres below ground level. The conclusions of Ground Engineering consider this to represent the perched groundwater table in the general region. It is considered that inflows of shallow groundwater perched on the relatively impermeable London CLAY or Head Deposit are likely to occur, particularly in wetter periods, from the made ground or Head Deposits as found in WSB and BH1. It is also considered that inflows are likely to be limited and should be dealt with by pumping from screened pumps.

The proposed basement area would be founded essentially into the London CLAY.

Due to the occurrence of fissured clay with occasional selenite and rare silt partings closed sided support to the excavations will be required to provide a safe working environment and to maintain stability and protection of the retained structure above and the adjoining properties.

1.6 **BOUNDARIES AND ADJOINING STRUCTURES**

No, 31 Aberdare Gardens is a three storey semi-detached house joined to 29 Aberdare Gardens and is of similar construction. We are of the understanding that No 31 Aberdare Gardens does not currently have a basement and therefore the proposed basement works will require the party wall to be underpinned by traditional construction methods.

Essentially for the majority of the rear basement works the perimeter of the basement is inset from the two side boundaries and as such any fencing or garden walling on the boundary lines will be retained during the works..

The front and rear boundaries will not be affected by the proposed works.

1.7 **PROPOSED FOUNDATIONS**

The basement to the existing house will be constructed with traditionally constructed reinforced concrete underpinning to the existing walls excavated and cast in short sections not exceeding 1.5 metres in length. A concrete slab will be cast at basement level.

The front and rear sections of the basement below the gardens will be formed in reinforced concrete construction including the suspended slabs to the “roofs” to the basements.

1.8 **DESIGN AND CONSTRUCTION**

The design and construction of the basement areas requires careful consideration of the support to the vertical building loads and lateral earth loads during the temporary (construction) and permanent conditions. The basement area will need to be designed for any upward water pressures and ‘floatation’ forces. The new basement areas will need to be waterproofed.

The reinforced concrete underpinning under the existing retained walls and the Reinforced concrete walls to the new front and rear sections will transfer the vertical loading from the building to foundation level and will be designed to resist the horizontal earth and water pressures, including surcharge loadings from adjacent buildings. The walls will be temporarily horizontally propped during construction. In the permanent condition the walls will be horizontally propped by the new concrete basement slab and lower ground floor structure. The concrete basement slab will be designed to resist any upward water pressure.

Any local surface water ingress will be locally removed from the excavations by pumping from the excavated area to a sump area. The effects if any are anticipated to be very localised and of limited duration and therefore are unlikely to significantly alter the soil characteristics adjacent to the foundations. In the final condition the new wall foundation is cast onto the bearing strata.

The design upward water pressure on the basement will be resisted in the existing house by the reinforced concrete basement slab tied into the concrete underpinning to the walls. There is sufficient weight in the loading to the underpinned walls and the basement structure to resist any ‘floatation’ effects.

In the new rear sections of the basement below the garden area the temporary condition will need to be considered to resist any floatation affects. If required hydrostatic pressure relief holes within the basement slab will be provided until such time as the ground floor slab is cast and cured.

Water and moisture will generally be excluded from the permanent structure by the reinforced concrete walls/slab and the provision of an internal drained cavity system on the inside face of the walls/slab. Any water from the cavity system will drain to sumps in the external light-well and be pumped into the house surface water drainage system. The concrete walls/slab will prevent the migration of large quantities of water or soil particles and therefore the drained cavity will only need to deal with a limited quantity of ground water.

The adjoining properties will be continuously monitored for any movement e during the basement construction works with all measures/details subject to agreement with the owners and occupiers of these buildings under the requirements of Party Wall Act.

Due to the careful consideration of the sequencing of the works and the introduction of propping at both high level and low level to the excavations and subsequently constructed retaining walls until such time as the basement and ground floor slabs are constructed and cured, it is considered that the likely perceived settlement or horizontal movements within the excavations will be controlled to an extent that any damage to the existing structure above or to the adjoining properties will be limited to category 1 or 2 of the Damage Category Chart [CIRIA C580]. This is considered to be within acceptable limits for this type of construction.

The detailed structural design of the proposed works will be carried out in accordance with current British Standards, Building Regulations and appropriate Guidance Documents published by CIRIA, ICE, IStructE etc. The design and drawings will be submitted to the local Building Control for approval and the construction inspected by the Building Inspector on site.

1.9 **CONCLUSIONS**

The proposed basement areas to this property can be safely constructed using established construction techniques, which have been used in other properties in the area to form new basements without any significant adverse effects on the adjacent properties.

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2.0 CONSTRUCTION METHODOLOGY

- 2.1 Suitable access can be made into the building from the private driveway through the front single storey bay which will be demolished to allow implementation of the works and reinstated once the basement works are completed. Access may also be provided to the rear garden via the alley way to the left hand boundary as viewed from the front.
- 2.2 This access is suitable for the Contractor to provide construction access and to transfer building materials/plant to the rear garden. All materials etc. for the rear basement extension can be manhandled through the property by this route.
- 2.3 The basement to the rear of the property will be constructed in sequence as per drawing 2012 182/TM1 using normal construction methods. Conveyer belts can be used to transfer the excavated spoil through the property to a skip located on the private drive at the front of the property, not on the public highway.
- 2.4 The underpinning works to the existing structure can be undertaken via access point at the front of the property working from the rear constructed basement towards the front of the property. Spoil will be removed as above.
- 2.5 There should be no need for the Contractor to require a crane or hoist at the front as materials, plant etc. can be transported through the front entrance.

3.0 METHOD STATEMENT FOR FORMATION OF PROPOSED BASEMENT AREAS

- 3.1 Access into the building for construction of the basement will be as 2.1 above.
- 3.2 The existing load-bearing structure above ground floor will be temporarily supported with steel needles and acrow props onto the new basement works at suitably appropriate stages of the works. Alterations to existing internal walls and support of the rear and front enclosure walls can be carried out once the temporary supports have been installed and inspected by the Engineer.
- 3.3 The existing ground floor will need to be removed to form the basement.
- 3.4 It is envisaged that the basement works will be constructed from the rear of the property towards the front, following the construction methodology as set out on drawing 2012 182 / TW2 and the temporary shoring methodology as set out on drawings 2012 182 / TW1.
- 3.5 When the works approach the rear of the existing house the existing rear wall above ground floor will be temporarily propped off of the new works to allow the installation of the supporting steelwork.
- 3.6 On completion of 3.5 and allowing suitable curing time of any dry pack the basement works can be continued.

- 3.7 When the works approach the existing front wall of the property, temporary works will be installed to support the front wall above ground floor level. These temporary works will take support off of the completed basement works immediately behind the wall. The foundations and steel support to the front wall can now be installed.
- 3.9 The basement works to the front of the property can be continued and completed.

4.0 GENERAL REQUIREMENTS FOR BASEMENT CONSTRUCTION WORKS

This method statement describes the work activities for the digging out, shuttering, mass pour concreting, backfilling and finishing of underpinning works.

- 4.1. Refer to drawing 2012 182/P1 for structural proposals.
- 4.2. **Digging out (Excavations).** Any existing services will be protected or moved as required. Break up and remove ground floor slab; excavate area to depth of shallowest footing. The holes are dug by hand, spoil moved by conveyer and grab; the excavations will be 1.2 metres wide maximum. To remove the potential for subsidence or movement, adhere strictly to the approved sequence of underpins. No adjacent sections are dug out until the concrete in the original excavations has been set for 48 hours.
- 4.3. **Excavation Safety.** No machines are allowed near the excavations to minimise the risk of collapse, all trenches will be protected from collapse with braced timber shuttering and acrow props, the site foreman will ensure the safety of each excavation prior to allowing work. Maintain constant horizontal bracing of all excavated faces, and single finished pins. Barriers will be erected around all excavations. Access and egress to trenches will be via short timber ladders, all excavations will have a banks man on duty and an evacuation hoist on site whilst the trench is being worked. Occasionally water enters the excavations and this has to be cleared out by hand bailing, severe flooding may require the use of a pump.

The construction staff will be made aware of the dangers of standing water and will take precautions to ensure contaminated water does not get onto the skin or enter the body. Good standards of hygiene will be maintained prior to eating, drinking and clearing site. After no less than 24 hours, ram dry pack to Engineer's specification. After 2 days, strike shuttering. During works, check rear of all pins; should any void be found, pack with compacted lean-mix.

- 4.4 **Shuttering.** Manually cut with spades the vertical far face of each pin to give an even and straight wall on the Neighbour's side of the excavation. No excavation machinery will be permitted therefore reducing any noise and vibration to the neighbour's property. Any loose ground should be retained by cement-board backfilled with lean-mix concrete (to remain permanently in place). The cement board is to be braced in position with concrete spacers from the reinforcing bar and top and bottom against the inside shutter or concrete wall base. Plywood shuttering will be fixed to the front face of the excavations and braced with 50 x 100 timbers fixed with 4" coach bolts to prevent movement. Acrow props will also be used to add strength to the shuttering. 12mm steel reinforcing bar will be fixed to tie each concrete block to its adjacent block. Retaining walls are to be propped after pouring until structure is complete. [Refer to sketch TM1.]

- 4.5 **Concreting.** The concrete will be delivered via cement mixer and poured against the face of the excavation. The concrete must be a minimum strength of 40 N/mm². Once poured the concrete will be vibrated with the use of a vibrating poker, the site foreman is responsible for ensuring the correct distribution of the concrete in to the shuttering and that the reinforcing rods are kept in position.
- 4.6 **Removal of Spoil.** Any spoil produced by the process will be removed via conveyer belts to skips located on the private drive at the front of the property and not on the public highway. The spoil will then be collected and removed from site to landfill.
- 4.7 **Finishing and Backfilling.** The holes will be backfilled externally with crushed limestone compacted in layers not exceeding 150mm and levelled off with either soil or paving. The finish level will be 150mm below dpc. It is the responsibility of the site foreman to ensure no hazards remain on the site and that the owners are informed of completion of the works.
- 4.8 **Inspections.** The Local Authority Engineer or Surveyor shall inspect each excavated base formation. All temporary works are to be inspected by the Engineer prior to removal of existing structure.

5.0 **FLOOD RISK ASSESSMENT**

- 5.1 **Proposals.** The proposal is to provide a basement below the footprint of the existing structure with associated lightwells to the front and an access lightwell to the rear serving an extended basement.
- 5.2 **Site.** In accordance with the North London Strategic Flood Risk assessment and the Environment Agency flood zone designation, the site falls within Zone [1] with a low probability [1 in 1000 annual probability of river or sea flooding]. As such all uses of land are appropriate in this area. However The Camden Flooding map 22 does designate Aberdare Gardens as a 1975 flood street which was attributed to an excessive amount of rainfall falling over a short period of time.
- 5.3 **Levels.** The level used for the 1:200 year flood is considered to be 5.32m AOD.

Site Investigation data shows the property to stand on a relatively level plot at an elevation of approximately 40.5m AOD.

- 5.4 **Risk Limitation:** Low level up-stands can be formed around the lightwells and external basement spaces to reduce the risk of localised flooding.

Practical measures can be taken to reduce the impact of flooding. Basement spaces are drained by a surface water pump and “dual” pumps are installed as standard. These are fitted with a high level alarm with battery back up to warn in the event of pump failure. A further battery back up system is available in high risk areas to ensure the pump continues to operate in the event of mains electricity failure.

5.5 **Conclusions.** The basement is not to be used as an independent self contained dwelling and has internal and external access to be maintained in order that occupants can reach external ground level or ground floor level in the event of an extraordinary flood event. In general terms the site is considered to be in an area of extremely low risk to flooding from river or sea sources.