
Wallace House
Fitzroy Park, London, N6 6HT

Structural and Civil
Engineering Planning Report

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1.0	Assumed Sequence of Construction
2.0	Structural Drawings
3.0	Site Investigation
4.0	Arboriculture Report

1.0 Non-Technical Summary

- 1.1 The following report has been prepared to show that the property and neighbouring properties will be safeguarded during the works. This report follows the guidance given in the Camden Planning Guidance on Basements and Lightwells CPG4. This assessment has been prepared in accordance with the guidance given in CPG4, DP23 and DP27.
- 1.2 If the recommended measures and sequence of works outlined in this report are properly undertaken by a suitability qualified contractor, the development should not pose any significant threat to the structural stability to the property, the adjacent properties, or surrounding grounds.
- 1.3 A hydrological and geotechnical report, Ground Movement Assessment (GMA) and Basement Impact Assessment (BIA) has been prepared by GEA. The GMA predicts damage to the neighbouring properties would be 'negligible' (category 0 as set out in CIRIA Report 580 respectively).
- 1.4 Elliott Wood Partnership Ltd. (EW) will have an on-going role during the works on site to see that the structural works are being carried out generally in accordance with our design and specification. This role will typically involve weekly site visits at the beginning of the project and fortnightly thereafter.

2.0 Introduction

- 2.1 EW is a firm of consulting structural engineers approximately 120 strong operating from their head office in South West London, Central London and Nottingham. Residential developments of all scales have been central to the workload of the practice with many in the Greater London area. In particular EW has produced designs for numerous basements to both existing and new buildings, many of which have been in the London Borough of Camden. Our general understanding of the development of London, its geology and unique features together with direct experience on many sites puts us in a strong position to advise clients on works to their buildings and in particular the design and construction of their basement.
- 2.2 EW have been appointed by the building's owner Derrick Dale to advise on the structural implications of the proposed refurbishment works to this 3 storey residential property, which is T shaped on plan. The site is located on the outskirts of Hampstead Heath on Fitzroy Park.
- 2.3 The proposed works include:
- Demolition of the existing garage.
 - Construction of a new basement below where the existing garage once stood.
 - Constructing two storeys above the new basement.
 - Extending the west wing of the building currently housing the swimming pool area.
- 2.4 EW were responsible for designing the original structure in 1999. As such access to detailed archive drawings for the existing structure is available.
- 2.5 A site specific geological investigation has been undertaken by geotechnical and environmental specialists GEA, which can be found in Appendix 3.0 of this report. This included 7 trial pits, 2 window samples and a

cable percussion borehole. The information from this has been used to inform the structural design and GEA's GMA and BIA.

- 2.5 This report outlines the construction of the proposed subterranean works. It should be read in conjunction with the detailed set of drawings showing the existing site, buildings and proposed works by SOUP Architects, together with the proposed structural drawings appended to this report.



Figure 1 – Site Location Plan

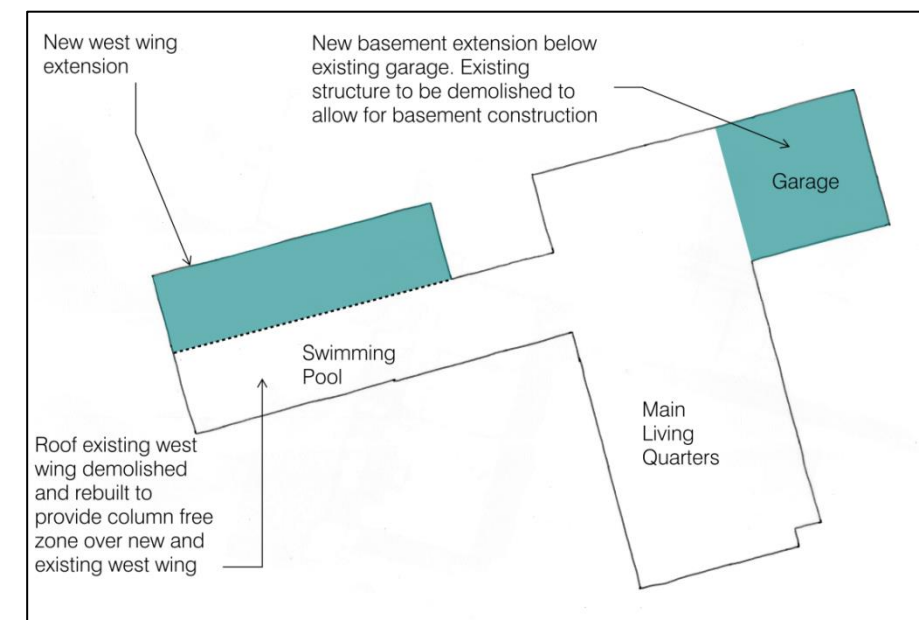


Figure 2 – Keyplan of existing building and alterations

3.0 Description of Existing Building and Site Conditions

- 3.1 The site is accessed via Fitzroy Park to the north. It shares a boundary with The Little House to the northeast and Fitzroy Farm Coach House to the north, Dormers to the east and The Water House to the south. The site slopes down towards the south west.
- 3.2 The Little House is the closest in proximity to Wallace house, approximately 2.8m. The Little House is also owned by the owner of Wallace House.
- 3.3 The building is not listed however it is in the Highgate Village Conservation Area in the London Borough of Camden.
- 3.4 The existing house is two storeys above ground level, with a basement (lower ground floor) partially built into to the slope of the site.
- 3.5 The site is understood to have originally formed part of the grounds to Fitzroy Park Farm, and appears to have been occupied by a small outhouse until 1999 when the current development was built.
- 3.6 British Geological Survey maps show the site is underlain by London Clay Formation. The borehole and window samples carried out show around 1m of made ground over generally firm-to-stiff fissured London Clay.
- 3.7 The geological maps of the area also indicate that there are some areas of Claygate beds to the north east of the site. The London Clay is defined as a non-aquifer, the Claygate member is defined as a minor aquifer. The London Clay effectively acts as a barrier to flow to the lower chalk major aquifer. Perched water is therefore likely to occur at the surface in the form of springs at the boundary between the Claygate member and the impermeable London Clay. London Clay has been proved directly below the made ground on this site and therefore springs associated with the boundary condition noted above do not occur, although near surface flows could be present in the made ground. Near surface water flow will be in a down slope direction Westerly or South-Westerly towards the Highgate ponds. Water flow within the London Clay is likely to be very slow.
- 3.8 The site lies outside the catchment of the Hampstead Heath Chain of Ponds but is located close to a tributary of the Highgate Chain of Ponds formally known as Highgate Brook. There are no Environment Agency (EA) designated Source Protection Zones on the site and no listed water abstraction points within 500m. The site is also not located in an area at risk of flooding as defined by the EA.
- 3.9 There are a number of trees within and adjacent to the site which affect the foundation strategy. Refer to the Arboricultural Report by Crown Consultants in Appendix 4.0 of this report for further information.
- 3.10 The building is formed of a reinforced concrete (RC) groundfloor slab, steel framed superstructure with suspended timber floors. Where the building cuts in to the ground, retaining walls are formed in RC. The structure is founded on piles to suit the local ground conditions, surface water flow and trees.

- 3.11 The overall stability is provided by the diaphragm action of the timber joisted floors carrying horizontal loads to RC shear walls and blockwork walls. The steel frame also contributes as a sway frame on the western wing.

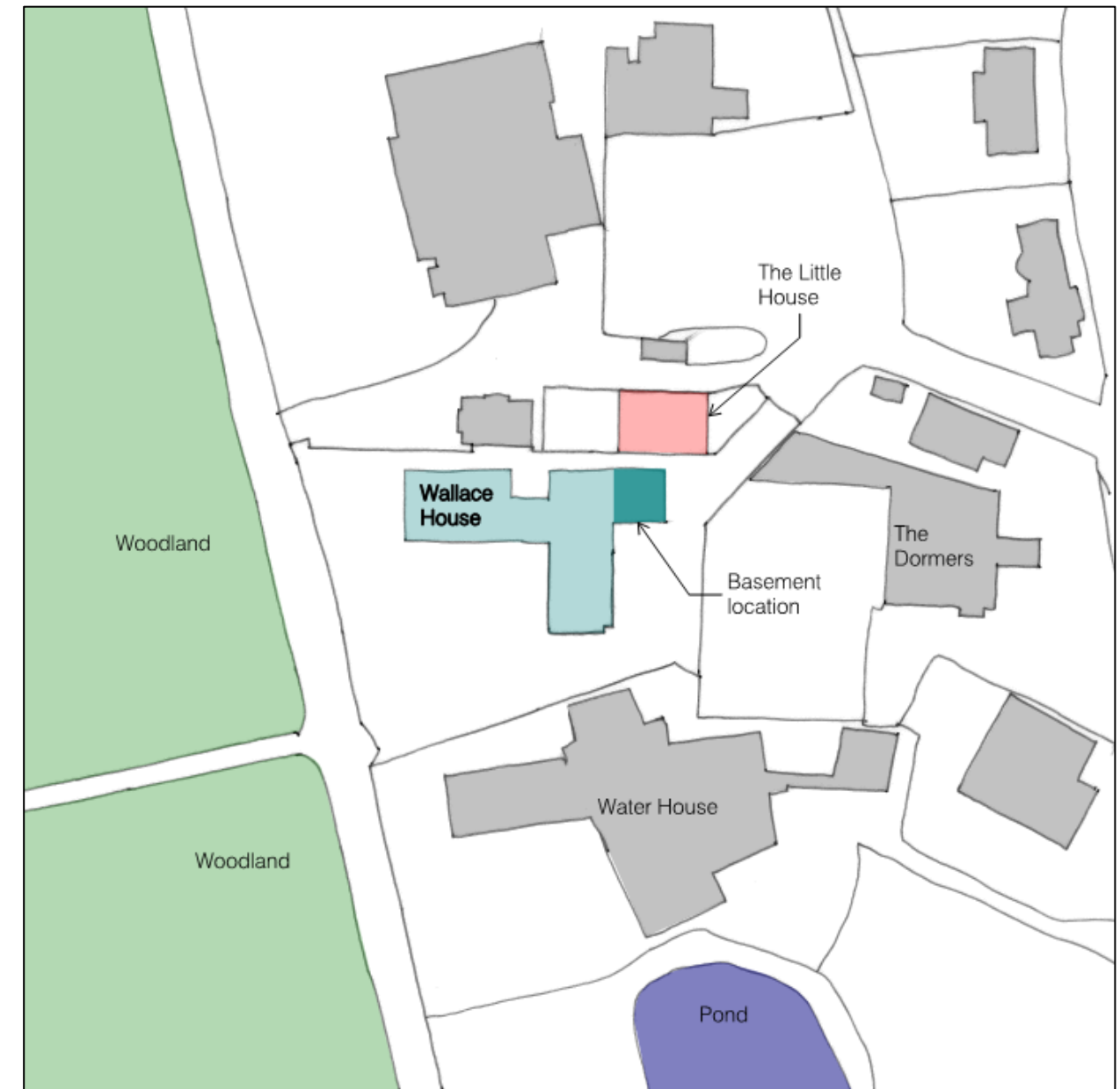


Figure 3 – Keyplan of existing building and adjacent properties

4.0 Proposed Works

- 4.1 The proposals are to demolish the existing garage, form a new basement below the footprint of the existing garage, construct a new two storey structure on top of the new basement and construct a new extension to the west wing.
- 4.2 The existing western wing roof is to be demolished, and replaced with a new steel roof with timber infill, which extends over both the new extension and existing wing. The ground floor to the western wing extension is to be formed of a suspended RC slab founded on piles. Clayboard (or similar) is to be used to protect the slab from ground movements. The new slab is to be tied to the existing using dowel bars.
- 4.3 The roof to the west wing is to be formed of a grillage of steel beams with timber joist infill supported on steel columns. The columns are to be founded on new piles in the extension, and on existing ground beams in the existing wing. An assessment of the capacity of these ground beams is required to justify the new column loads, strengthening works may be required.
- 4.4 As part of the enabling works to facilitate an open cut excavation in order to construct the new basement the foundations to The Little House will be underpinned in mass concrete.

- 4.5 The existing garage is to be demolished to facilitate the construction of the new basement structure below. Existing piled foundations are to be broken down to accommodate the new basement, but are not to be used to support the new building due to their reduced capacity. The new basement is to be constructed as an RC box founded on new piles. It is to be tied to the adjacent existing structure using dowel bars. Clayboard (or similar) is to be used to protect the slab from ground movements.
- 4.5 The superstructure to the new two storey construction above the basement is to be formed of load bearing blockwork walls and steel beams with timber joist infills.
- 4.6 A French drain is to be installed around the perimeter of the new basement to manage surface water flows. The new French drain will connect into the existing below ground drainage network on the site. Refer to Section 5.0 for further information.
- 4.7 The waterproofing strategy is to be consistent with the existing construction to maintain continuity in the waterproof lining. It is to be designed by a specialist sub-contractor.

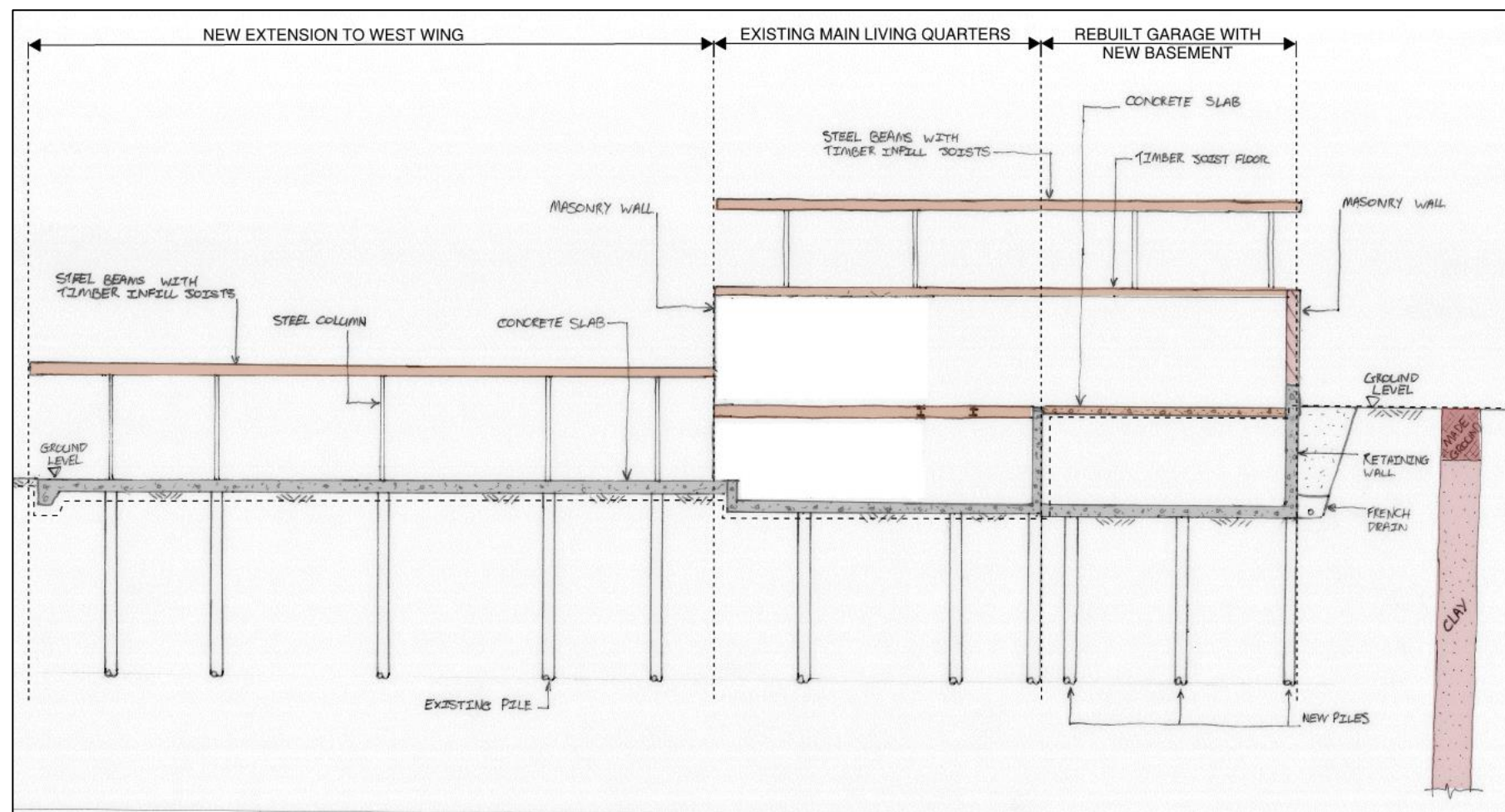


Figure 4 – Section through proposed structure

5.0 Hydrological and Hydrogeological Summary

- 5.1 EW were involved in the original design and construction of the existing Wallace House and as a result have a detailed knowledge of the geology and hydrology of this site. This experience and knowledge backed up with the detailed site investigation that was undertaken forms the basis for our understanding the existing site conditions.
- 5.2 In order to build the extended reinforcement concrete basement, the surrounding ground will be battered back at an angle of 45 degrees to ensure the soil remains stable during construction. Temporary surface water flow will be dealt with via gravity drainage and temporary pumping from sumps where necessary. In the permanent case the void between the battered back ground and retaining structure will be filled with compacted hardcore to form the French drain which will allow the free passage of surface water around and beneath the basement slab.
- 5.3 This will be formed by replicating the structural arrangement of the existing basement and forming a three sided retaining structure with external tanking/drainage back filled with free draining material. The void below the suspended slab will allow for any near surface water percolation to flow under the building. An external drain at low level will also connect to the land drainage scheme and connect to the existing landscaped pond within the garden.
- 5.4 The site as a whole has a strategic Surface Water Management System that was built as part of the construction of the Wallace House c. 1999. This system included a number of surface water drains that drain into a pond with an overflow into the ditch. This replicates the original arrangement when excess water would have flowed into the ditch on Millfield Lane.

- 5.5 The current system has been shown to work successfully with no reported incidents from either the current or previous owners. The new extension will connect to this system using the tried and tested features and details of the previously constructed building. There is unlikely to be any significant change in the ground water regime from the extension and as a result the existing Surface Water Management System will continue to function.

6.0 Proposed Below Ground Drainage

6.1 At ground level the building is to be extended by approximately 15m² from the west wing extension. It is proposed to extend the existing green roof over the west wing on to the roof of the new extension. The use of this form of roofing system has many benefits which include:

- Lowering the peak water runoff in lower intensity storms
- Reducing the overall annual volume of water draining from the roof
- Improve the thermal performance of the building
- Provides protection to the roofs waterproofing
- Enhances biodiversity

6.2 Generally rainwater will be directed via downpipes into the drainage system which passes via the existing balancing pond. It is considered that by providing a substantial element of green roof, and passing through the balancing pond that this acts as a suitable offset to the slight increase in drained roof area.

7.0 Party Wall Matters

7.1 The proposed development falls within the scope of the Party Walls Act 1996. Procedures under the Act will be dealt with in full by the Employer's Party Wall Surveyor. The Party Wall Surveyor will prepare and serve necessary Notices under the provisions of the Act and agree Party Wall Awards in the event of disputes. The Contractor will be required to provide the Party Wall Surveyor with appropriate drawings, method statements and other relevant information covering the works that are notifiable under the Act. The resolution of matters under the Act and provisions of the Party Wall Awards will protect the interests of all owners.

7.2 The designs for Wallace House will be developed so as not to preclude or inhibit any works on the neighbouring properties. This will be verified by the Surveyors as part of the process under the Act.

8.0 Sustainability

8.1 In addition to the SuDS considerations already discussed, there are a number of opportunities to implement sustainable construction techniques on the proposed development, such as the use of recyclable aggregates and cement replacement.

9.0 Ground Movement Assessment

9.1 Although basement construction inevitably results in some ground movement, the structural design has been developed with the safeguarding of this building and other adjacent properties in mind. The design of the RC wall, the sequence of construction and the permanent restraint to the walls have all been carefully considered and designed to control and minimise the ground movements.

9.2 Given their relative proximity to the build, a Ground Movement Assessment (GMA) has been carried out to quantify the impact of the proposals on the adjacent Little House building. Other adjacent properties are over 8m from the proposed basement works, so a GMA on has not been carried out for these properties. Refer to the report provided by GEA outlining the GMA and BIA.

9.3 We have produced a summary of the anticipated loads for the proposed works and these have been inputted into the ground movement assessment. The assessment takes into account both the long and short term effects of the proposed basement and it has shown that the settlement is within acceptable limits. Furthermore, GEA have concluded the category of damage to The Little House in accordance with C580 is category 0 (Negligible).

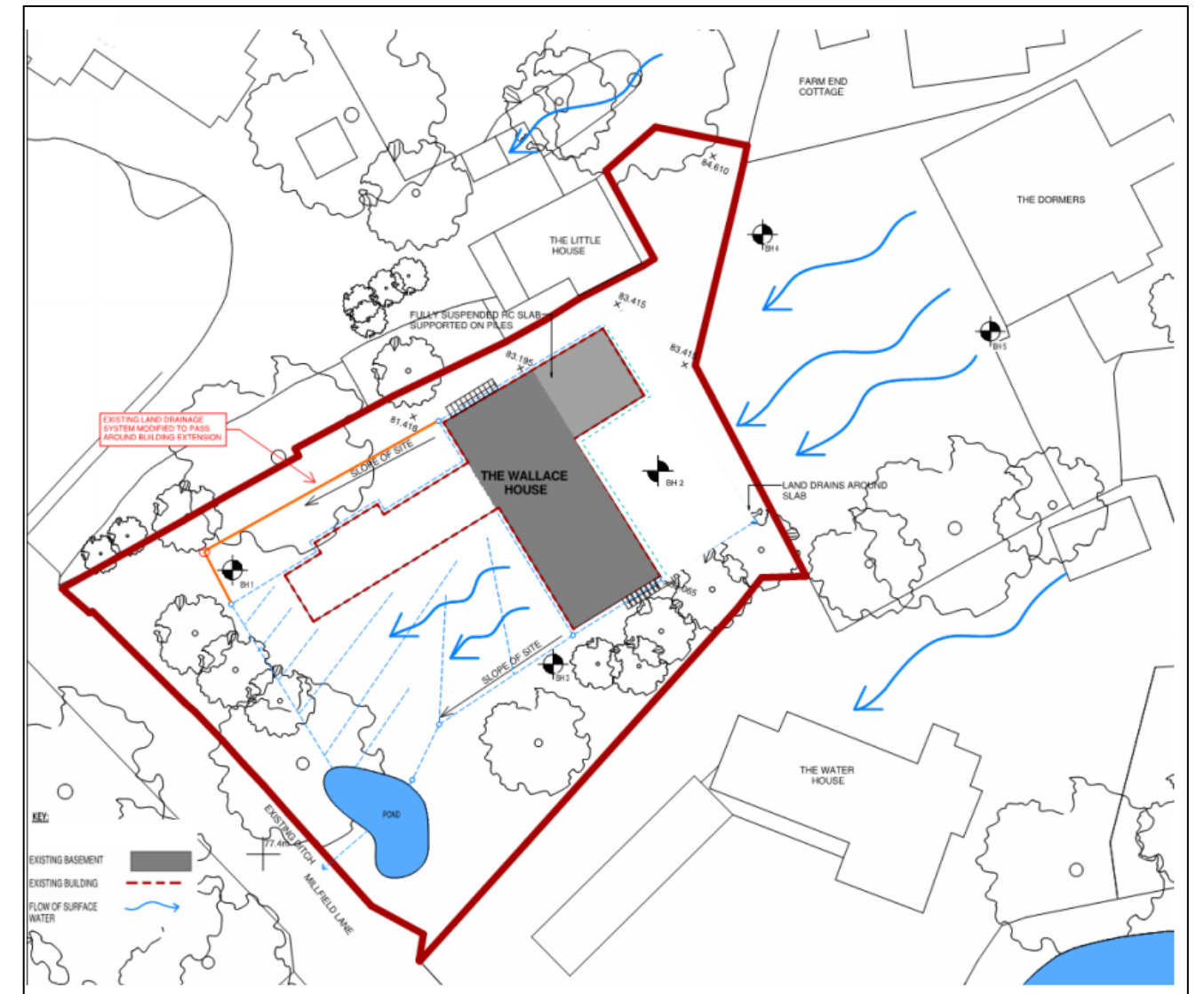


Figure 5 – Site below ground drainage

10.0 Structural Monitoring

10.1 It is anticipated that the Contractor shall provide monitoring to all structures and infrastructure adjacent to the basement excavation at the time of excavation and construction. However, this is to be agreed with the party wall surveyors.

10.2 Monitoring shall be completed as follows:

- a) One month prior to any works being started to provide a base reading.
- b) At the start and end of every shift during the excavation and until the ground floor slab has been cast.
- c) On a monthly basis thereafter for a 6 month period following completion of the notifiable works.

10.3 Cumulative movement of survey points must not exceed:

	Code amber trigger values	Code red trigger values
Settlement	+/-4mm	+/-8mm
Lateral displacement	+/-4mm	+/-8mm

10.4 When movement approaches critical values, the following steps are to be taken:

Code amber trigger value:

All interested parties, including the Adjoining Owner's Surveyor and his Engineer should be informed and further actions immediately agreed between Surveyors and implemented by the Building Owner. Notwithstanding the Party Wall requirements, the Contractor is to appoint, and to have permanently on site, a suitably qualified Structural Engineer who will be responsible for the reviewing of the movement monitoring results at the start and end of each day and provide immediate advice, remedial works and design as necessary in the event of movement being noted. The Contractor is to ensure that he has 24 hour/7 days a week access to emergency support provision including but not limited to additional temporary props, needles, waling beams and concrete supply at the start of the excavation and prior to any likelihood of this trigger value being reached. If this value is reached the Contractor, and his Engineer, must without delay provide all interested parties with his plan to implement any emergency remedial and supporting works deemed necessary. The Contractor must be ready to carry out these works without delay if the movement continues and approaches the trigger value below.

Code red trigger value:

All interested parties including Adjoining Owner's Surveyor and Engineer will be informed immediately. Works will stop and be made safe using methods and equipment agreed at the above stage. The Contractor is to ensure that the movement has stopped as a result of the implemented remedial works designed and installed at this stage. The requirements of the Party Wall Act will also ensure that, Surveyors and their advising Engineers shall then enter into an addendum Award, setting out whether or not the Building Owner's works can re-commence and when, and if so agree additional precautions or modifications to the proposals prior to re-commencement.

11.0 Conclusion

11.1 The proposed works involve the demolition of an existing single storey garage structure, the construction of a new basement under the footprint of the existing garage, the construction of a new two new stories above the basement and new single storey extension to the west wing is also proposed.

11.2 A GMA and BIA have been carried out by geotechnical specialists GEA, and concluded that the proposed development is unlikely to result in any specific land or slope stability issues, groundwater or surface water issues. The GMA also showed that proposals are not expected to have a significant adverse impact on the adjacent properties.

11.3 The design of substructure has been carefully considered to account for the local ground conditions, nearby trees and surface water flow.

11.4 The site is within Flood Zone 1 as defined by the EA so it is unlikely that it needs a Flood Risk Assessment.

11.5 SuDS are to be incorporated in to the drainage system, and options for sustainable construction of the structure are also to be considered.

11.6 The measures and sequence of works outlined in this report and the following Construction Method Statement are to be taken into account in the eventual design and construction of the proposed works.

11.7 Detailed method statements and calculations for the enabling and temporary works will need to be prepared by the Contractor for comment by all relevant parties including Party Wall Surveyors and their Engineers. Adequate supervision and monitoring is to be provided throughout the works particularly during the excavation and demolition stages.

11.8 EW will have an on-going role during the works on site to see that the works are being carried out generally in accordance with the design and specification. This role will typically involve weekly site visits at the beginning of the project and fortnightly thereafter. A written site visit record is to be provided to the design team, Contractor and Party Wall Surveyor following each site visit.

11.9 The undertaking of such projects to existing buildings is specialist work and EW will be involved in the selection of an appropriate Contractor who will need the relevant expertise and experience for this type of project.

12.0 Subterranean Construction Method Statement

12.1 The proposed works involves the construction of a new lower ground floor level set partially into the ground. Some of the issues that affect the sequence of works on this project are:

- The stability of adjacent buildings;
- The stability of the surrounding ground including the adjacent gardens;
- Providing a safe working environment.

12.2 A Construction Management Plan (CMP) including details of hoarding, access, holding areas and the principles for the removal of spoil is to be developed by the Contractor prior to commencement of the works.

12.3 Refer to Appendix 1.0 for a suggested sequence of construction for the proposed basement. The construction sequence is to be confirmed by the contractor once the final proposals have been agreed.

12.4 Tree Protection methods are to be agreed and installed to all retained trees where required. Refer to the Arboricultural Impact Assessment Report prepared by Crown Consultants – this can be found in Appendix 4.0 of this report.

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