45 Flask Walk - BIA Audit Responses Matrix

Query	Response and References
1 Surface water & flooding	
Attenuation proposals to be provided, see section 4.7.	
4.7. It is accepted that the site is largely covered by existing buildings and areas of hardstanding such that infiltration of rainwater into the ground is limited to the areas of soft landscaping in the front and rear gardens. It is noted that the area of hardstanding as a result of the development is slightly increased and that attenuation measures will be provided to accommodate the slightly increased flow. Outline proposals of the form and location of attenuation measures are requested for review.	Response provided by Hewitt Consulting Ltd - see attached **Document A1**
2 Retaining underpin design	
Preliminary retaining wall design and commentary to be provided, see section 4.8.	
4.8. The basement construction relies on reinforced concrete retaining wall underpins which it is assumed will act as propped cantilevers in the permanent case. Whilst detailed design of the structure is not required as part of the BIA, sufficient calculations should be provided to demonstrate that the stability of the property and surrounding buildings will be maintained. It is requested that these are provided along with sufficient commentary to clarify the structural approach assumed and show the worst case loads that it is anticipated that the structure will need to resist including building loads, earth, water and surcharge pressures. Geotechnical properties should be taken from the site investigation report. Consideration should be given to the fact that the worst case loads for structural retaining wall design may not be the worst case loads in terms of maximum bearing pressure and settlement.	Drawings and calculations within **Document A2** (pages PW01-PW1) show the load build up and the typical retaining wall calculations based upon the SI recommendations, and also allow for water tables at 2/3 the depth of the basement. Drawings and calculations within **Documents A3** and **Document A4** relate to the general design of the building (pages 01 – 44). These show the load build up and design of the superstructure to suit the proposed new scheme.
3 Structural stability	
Commentary & calculations in relation to overall basement stability, see section 4.9.	
In addition to the above, commentary should be provided to clarify what allowance has been made in the design of the basement for ground water levels to rise beyond the as recorded levels.	**Document A2** includes PW calcs at 2/3 the depth of the basement.
4 Construction sequence and underpinning	
Queries on underpin installation, refer to section 4.10-4.13 & 4.15.	
4.10. The extent of assumed basements to surrounding properties is identified on the figure within 2.6 of the BIA. Though it is noted that these are assumed basements, the Terence Fidler Partnership drawing 360219-02 Rev P1 states the assumed basement extents have been confirmed by site inspection and liaison with adjacent owners. It is noted that 43 Flask Walk has a cellar below the front half of the property however review of trial pits TP8 & TP9 show the footing to the party wall here terminating around 800mm below the ground floor level. This does not seem sufficient to be the wall of a cellar structure in the adjacent property. Whilst it is acknowledged that this footing level has been used in the ground movement assessment calculations, section B-B on the structural drawings showing the underpinning details assumes the wall goes much deeper. As this relationship may affect the feasibility of the underpinning details adopted, further clarification on this relationship should be established. If this information will not be available until works commence, details should be provided as to how the full make up of the wall(s) and the footings will be established such that the stability of both properties is maintained at all times.	Drawing 360219 / 02 rev P1 refers to basement to No 43, but at present the owner of the property, Dr Hayward will not allow us into the building to ascertain (a) the condition of the building or (b) the depth and size of his basement. The trial hole adjacent to No 43 was re-opened in April showing only clay beneath the party wall, no evidence of any lower foundations, simply clay to the termination of the trial hole. Section B-B is through the party wall where there is an existing basement to No9 45 Flask Walk. Clearly it is essential that the stability of the properties is maintained at all times, and we will be advising during the site works what is necessary. We have had discussions with the Architect about possibly also underpinning the party wall to 43/45 between the existing middle basement area and the front façade.
4.11. In relation to point 4.10, where new underpinning works meet the two party walls adjacent to the cellars with shallower foundations, particular care will need to be taken with the methods adopted to facilitate excavating and forming the underpins, to ensure the integrity of the ground below the shallower party wall footings is not compromised. Preliminary details of how this will be achieved are requested to ensure that the stability of the adjacent buildings will be maintained.	As noted in 4.10 above, it has been discussed with the Architect about possibly underpinning the party wall to 43/45 between the existing middle basement area and the front façade.
4.12. It is noted that the underpinning proposals are such that the front façade, internal spine wall and rear portion of the house will all be underpinned. As a result, only two sections of the existing party wall, within the front half of the building, will not be underpinned. It is accepted that these walls are in locations of adjoining basements, such that the differential depth between the underpinned walls and the adjacent walls which are not underpinned should be low. However, as noted in 4.9, the relationship between the party wall foundations and the cellar does not seem to be clearly defined. Clarification is requested as to whether this differential in foundation depth (whatever it may be) has the potential to cause issues with differential settlement between the front façade of 45 Flask Walk and the party walls / front façades of 43 & 47 Flask Walk.	Access to both adjoining properties is required to fully dimension with levels, be taken to enable an accurate detail be attached to the drawings, though at this point in time the lack of access to Dr Haywards property means that the definition of this detail will need to be addressed during the party wall process.
4.13. Terence Fidler Partnership drawing 360219-01 Rev P6 shows a layout of the proposed underpin retaining walls to be installed. Underpinning details appear to show the chimney breast on the party wall with 47 Flask walk being underpinned however it is not clear that the main party wall will be underpinned in this area to ensure its stability is maintained. Confirmation on this point is requested.	The area referred to in this comment is in fact underpinned buttressing not actually underpinning the chimney, as noted on drawing 360219 / 01 rev P6. We are not intending to underpin the PW 45/47 Flask Walk.
4.15 TFP drawing 360219-04 Rev P5 notes 'Possible underpinning to front wall is necessary, depth is to be subject to trial holes to be excavated and BIA report'. The BIA notes in Section 1.1 that ' the proposed refurbishment will also include underpinning to the front elevation of the house' . The drawing above should be updated to reflect the fact that underpinning will be provided and the depth of the underpins added to the drawings (plans and sections). It should be confirmed that the depth of the underpins is sufficient to deal with any existing or future desiccation, as well as complying with the requirements of the slope stability analysis contained with section 9.5 of the BIA.	The question about the depth will be agreed with GEA prior to starting works if possible, or alternatively it may have to be agreed when the first pin is being excavated depending on an inspection of the strata with GEA and TFP Ltd.
5 Movement monitoring	

Preliminary proposals to be provided	
4.14. A Construction Management Plan is provided in accordance with clause 4.3 of CPG 4 however this does not contain details of the monitoring proposals. It is acknowledged in 9.3.1, 9.3.2 and 9.5 of the BIA that monitoring will be carried out and that contingency measures will be implemented if movements of adjacent structures exceed pre-defined trigger levels. Outline proposals of the monitoring should be provided within the BIA or as part of an updated Construction Management Plan. It is accepted that the detailed monitoring proposals will be agreed as part of the party wall awards prior to any works commencing.	This was provided as part of the application submission, copy attached for information. Knight & Associates have been appointed and monitoring is already active and ongoing.
6 Slope stability	
Further commentary and outline proposals for retaining piles	
4.17. TFP drawing 360219-04 Rev P5 notes 'Possible piles to be located as advised by GEA as noted in the BIA report with regards to slope stability requirements'. As the BIA has noted that the slope to the front of the property will require stabilisation and the stability of the slope could be influenced, either directly or indirectly by the basement dig, it is requested that sufficient detail be provided as to the piling proposed to facilitate slope stabilisation. This could include preliminary details of the form and location of the piles proposed.	Details provided in attached drawings
7 Ground conditions	
Further investigation and monitoring required to confirm groundwater regime local to the basement	
4.18. Groundwater was not encountered in monitoring which lasted for approximately 2 weeks, with the exception of 4 days where it was recorded at levels of between 4.60m & 4.75m below ground level. As noted in both Section 8.1.1 and Section 10.0 of the BIA, the monitoring undertaken was for a relatively short period of time and at a location not within the footprint of the proposed basement itself. Given the potential for significant quantities of perched water and / or groundwater to have an impact on the wider hydrogeological setting and the surrounding basements, it is suggested that further investigation is required to ensure the groundwater in the area of the basement is fully understood.	There are difficulties associated with carrying out borehole investigations to the level suggested within this part of the building - it is considered that the combined information available covering the wider are should provide adequate information. Ongoing monitoring will of course be carried out here and is essential as the dig progresses given the nature of the site.
4.19. We would agree with the commentary in section 10.0 and 11.0 of the BIA that an extended period of standpipe monitoring within the footprint of the basement through the winter months should be carried out to fully understand the groundwater levels. If possible, trial excavations within the proposed footprint of the basement, extending as close to the proposed basement depth as possible should also be carried out during this period. At the end of the monitoring period, the applicant should confirm the findings and any amendments required to the information submitted.	Similarly, this monitoring will be carried out as part of the build programme in any event.
8 Ground movement assessment	
Queries raised on damage category calculated, mitigation measures proposed, and X-Disp analysis	
4.22. Section 9.3.1 of the BIA identifies the anticipated category of damage to adjacent properties based on the results of the ground movement analysis. The analysis identifies that a number of walls to adjacent properties where the damage according to the Burland Scale is Category 2 Slight. In accordance with the guidance of CPG 4, mitigation measures are required where damage higher than Category 0 is calculated.	It is not practical to determine the foundation depths of neighbouring buildings through intrusive fieldwork due to access restrictions to the neighbouring property at present. It is proposed that a manual calculation is carried out on each wall that is Category 2 – Slight. It is noted throughout the report that the use of X-Disp to predict underpinned wall movements is a very conservative approach and manual calculations with the published Burland curves are likely to provide a more accurate view of the likely damage category. Manual calculations shall be provided in advance of commencement of the construction works which will inform mitigation measures.
4.23. It is noted in 9.3.1 that the walls in question 'may require stabilisation prior to the excavation of the basement. It is recommended that the depth of the neighbouring foundations are confirmed, and the ground movement assessment is updated and monitoring of these structures and No 43 Flask walk will be required before and during basement construction' . It should be confirmed whether it is feasible to ascertain the depth of these foundations. If it is then the depths should be established and ground movement assessment updated. If this demonstrates that a damage category of 0 is achieved, no further action would be required. If however a damage category of 0 is not achieved, details of the mitigation measures, which may include as suggested, stabilisation and monitoring works should be detailed. If access to ascertain foundation depths to the critical walls is not possible, conservative assumptions on foundation depth should be made and the process described above repeated.	It is not practical to determine the foundation depths of neighbouring buildings through intrusive fieldwork. It is proposed that a manual calculation is carried out on each wall that is Category 2 – Slight. It is noted throughout the report that the use of X-Disp to predict underpinned wall movements is a very conservative approach and manual calculations with the published Burland curves are likely to provide a more accurate view of the likely damage category. Manual calculations shall be provided in advance of commencement of the construction works which will inform the process.
4.24. It is not clear whether the existing / proposed building loads and any associated settlement have been considered as part of the GMA. If the superstructure above the new basement has a net settlement effect (i.e. not heave), then the settlement induced by the new building loads should be taken into account in the GMA as these would have an effect on the party walls. Clarification is requested on this point.	Heave/settlement has been considered in Section 9.2.2 of the BIA. Proposed new pressures and unloading pressures are also detailed in this section. The resultant vertical movements analysed have not been incorporated back into the building damage assessment. X-Disp is based on ground movements as a result of actual basement construction case studies and as such heave movements are assumed to be included in the magnitudes of movement recorded, such that including the movements in the analysis a second time would be incorrect.
4.25. A review of the X-disp models presented in the BIA has been undertaken and the following comments require clarification:	
• With regards to basement level, the Terence Fidler Partnership drawing 360219-04 Rev P5 indicates an excavation depth of 3.6m for the new section of basement and an excavation depth of 3.4m where the existing basement is to be lowered. The xdisp model seems to indicate that the existing basement portion of the site will only be deepened to 2.6m. Clarification is requested on this point.	We can confirm that X-Disp model is based on a total excavation across the deepened areas of basement to a total depth of 3.4 m, with a negative contribution by the existing basement to a depth of 2.0 m.

• *The existing basement surface level appears to be modelled at 0.0m where as given it is existing, we believe this should be at -2.0m from the model's datum level of 0. Clarification is requested on this point.*	This section is modelling the existing basement which is between GL = 0 and 2 m depth. The basement at this location is modelled via the overall excavation depth of 3.4 m.
9 Geotechnical Properties	
Properties of made ground used in design	
4.21. Retaining wall design parameters are included on Page 10 of the Site Investigation report and further commentary is provided with 8.1.2 of the BIA. It is noted that the stiffness parameters (E) for the various strata encountered are assumed in Section 9.2.2. These values are considered reasonable and are generally accepted, however the stiffness of 20MPa assumed for the Made Ground is considered high. We would have anticipated a figure of circa of 8-10MPa would be more typical. It would be appreciated if this value could be confirmed and if it requires revision, that updated figures are used in the Ground Movement Assessment if required.	A stiffness of 20 MPa is in our view appropriate for the made ground at this site. In any case, we have rerun the heave analysis, which is the only part of the assessment that considers this parameter, and found that short term movements remain unchanged and total movements increase by 1 mm such that a reduction to the parameter and revision of the assessment is unnecessary in our opinion.