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22nd July 2014

Dear Mr. Thuaire,

Please find below our commentary on the Basement Impact Assessment for The Waterhouse Millfield Lane (2011/4390/P).

CGL Comment 7 Feb 2014	Applicant Response 21st May 2014	Counter Response (Alan Baxter) June 2014	CGL Review 22nd July 2014
4a. The effect of the new basement on the neighbouring swimming pool at The Dormers should be considered. A cross section should be provided, showing the relative levels of the swimming pool and the basement, and the position of the proposed king-post retaining wall. It is understood that the ground level at The Dormers is some 2m higher than the ground level at Water House, this should be taken into account in the king-post wall design and in consideration of potential ground movements.	RSK provide additional analysis and data with respect to the swimming pool. It is stated that the swimming pool is between 9m and 12.4m from the excavation. A methodology for assessing ground movements due to installation is provided, based on CIRIA C580, the excavation depth is understood to be some 4.0m.	iii) Survey drawings by Greenhatch Group of the boundary with 49 Fitzroy Park are inaccurate and incomplete. No survey has been undertaken of the boundary with The Wallace House or the boundary with 55 Fitzroy Park. iv) The impact of the basement excavation on the boundary structure, pool plant room, pool services, spa and lap pool at 49 Fitzroy Park has not been adequately considered and the current design proposals will cause a level of damage significantly higher than estimated to the boundary structure and potentially to the pool plant room and spa pool. The impact on the *structural integrity of the* swimming pool has been under-estimated and a Category 2 damage with potential cracks up to 5mm is unacceptable. The estimate of damage should not exceed Category 1. vii) The installation of a king post retaining wall is not appropriate close to site boundaries and will cause significant ground movements and damage. vi) No explanation of how the fin drain is to be installed or what effect the installation will have on the boundary structures with any of the neighbouring properties. …No assessment has been made on the impact of the proposed basement on this boundary structure or the pool plant room which is approximately 1.0m from the boundary. The long sections through the site boundary do not reflect this and it does not appear that anyone has considered the situation across this boundary. This may also affect the assessment of heave due to the additional surcharge loading in this area. …We note that some survey information has been provided but no access to No. 49 Fitzroy Park was obtained. The survey is not particularly accurate and does not pick up the pool surround, the pool plant room or the spa pool. Also the survey does not pick up the significant level differences at the boundary. The boundary condition and retained structure in this area should be re-assessed – a contiguous bored pile wall solution may be more appropriate but even this may cause unacceptable movements at the boundary.	The derivation of movements that RSK have used for the king-post wall is contentious – however it is considered that the impact on the swimming pool is minor provided that the depth of excavation and distance to swimming pool is correct. This would mean that the neighbouring structures fall outside the 45 degree 'zone of influence' of the king post wall. The RSK damage assessment is not compatible with the above statement, and it is not clear how they have derived lateral movements at the location of the neighbouring structure. The Alan Baxter comments, however, refer to pool plant and a spa pool that is significantly closer than stated in the RSK assessment and has not been picked up by the survey. It is further noted that the king-post wall is to be excavated directly adjacent to the fenceline between the two properties which is understood to be leaning already and at a higher level than the Waterhouse property. The installation and construction of the king post wall is likely to cause higher movements than those predicted by the CIRIA C580 type assessment undertaken by RSK, and the wall will be relatively flexible. It is therefore considered that movements to any structures directly adjacent to, or retained by the wall, will be at risk of excessive damage. Similarly the construction of the fin drain may further disturb the ground in this area. Further detail needs to be provided on this boundary in particular in order to properly assess the potential damage and to revise the construction methodology if necessary.
4b – Comments regarding draiange It is proposed to install a fin-drain system around the perimeter of the basement in order to allow groundwater to flow around the basement. The BIA, however, indicates that groundwater seepage is relatively minor and very slow due to the nature of the soils, and that the major consideration would be surface water flow. It is therefore likely that the fin drains will just 'fill up' with water	Revised drainage drawings and covering letter have been provided.	i) The proposed run-off rate of 6l/sec is very significant (21.6m3/hr) and in excess of what would be usually permitted for large new developments. The run-off should be limited to the current 1:2 year run off or 5l/sec whichever is the lesser. ii) Given RSK's view that re-infiltration of the proposed soakaway is expected to be very low, all ground water picked up by the fin drain will be directed to the Heath via the gravel drain. This discharge could impact on the Bird Sanctuary	**Response from Jim Tamblyn, Horizon Consulting Engineers** The land drainage has been removed from any sewer connection and surface water storage tanks have been added. We have not paid particular attention to the reference to PPS 25, in SWP's statement, as these are no longer relevant considering that they were replaced by NPPF technical guidance. We also note

(predominantly from surface run off) to the level at which they drain on the downslope (southern) side of the basement. This would be likely to have the effect of permanently inundating the basement whilst not altering groundwater flow rates. The soakaway is unlikely to have a significant attenuating effect; it is likely to fill up rapidly in rainfall events and to remain full (it is currently a pond) for significant periods, being recharged regularly by additional rainfall. Furthermore, the rainwater harvesting system is unlikely to provide significant attenuation for the reasons given below. Detailed drainage plans have been provided and we comment on these as below: The drawings appear to conflict with the content of the Haskins Robinson Water letter (dated 15 Feb 2013) as the drawing suggest a land drainage connection to the sewer whilst the letter suggests downstream 'seepage channel' via a pipe beneath Millfield Lane (page 2 paragraph 2). If the text is correct this needs to be shown on an updated surface water drawing. However, if we assume that the drawings are correct we note the following: Starting with the 'Temporary Site Drainage' and the temporary point of outfall shown on SWP Ltd's drawing 2391-skph02. The temporary point of outfall, from the silt separator, is shown to a combined foul and surface water drain which connects to the Millfield Lane sewer, on the assumption that the Millfield Lane sewer is operated by the local water authority (Thames Water) then it is not permissible to connect land drainage into it. Connecting land drainage into a combined, foul or surface water sewer can reduce the pipe capacity and increase the risk of flooding. Extract from 'Sewers for Adoption 7th edition', Clause B1.3 3. Watercourses or land drainage are not permitted to be directly or indirectly connected to the public sewer system. Satisfactory and separate arrangements should be agreed with the local Land Drainage Authority and confirmed with the Undertaker unless it is a part of a sustainable drainage system approved by the SuDS Approval Body (SAB) in accordance with Section 32 and Schedule 3 of the Flood and Water Management Act 2010. Similarly the drawing 'Proposed surface water drainage' (reference 2391-skph04) shows land drains connecting to a soakaway which overflows to a rainwater harvester which in turns overflows to a combined drain and then connects to the Millfield Lane sewer. The land drainage should be separated from the system which connects to the main sewer as for the reason above it is not acceptable to discharge land drainage to a local authority sewer. It should also be noted that rainwater harvesters are not normally considered appropriate attenuation for surface water. The theory is with an attenuation system the surface water drains out at a controlled rate until it is empty and therefore you maintain your attenuation volume, if a second rainfall event occurs priorto it having drained down fully there is still some capacity and the system is still draining down during the second storm. With a rainwater harvester you store the water and use it when you need it which results in it being less likely to provide the original attenuation volume, if you consider for example a toilet flush is around 6 litres you would have to flush a lot to drain the tank of even 1m3 of surface water. Once the tank is at capacity it spills any excess surface water into the downstream system at an uncontrolled rate. It should also be noted that some rainwater harvesting systems have a connection to the water main so that when the retained surface water is used up it tops is up to a certain level to ensure a supply to whatever items it is connected to (i.e toilet flush / washing machine etc). In effect, the system does not provide attenuation. In our opinion the fin drains to the basement would not provide attenuation, they are not designed to and would provide such a negligible amount as to be irrelevant to any storage volume (fin drains are only 25 mm deep cuspated plastic). The fin drains main purpose is to collect and convey groundwater away from the structure and any reference to storage, in our opinion, should be removed.		Pond and any discharge needs to be agreed by the City of London. vii) No consideration has been given to contamination of land due to potential surcharging of combined sewer. The capacity of the existing sewer should be assessed together with the existing maximum flow rates to assess whether more attenuation is required.	that a copy of the MicroDrainage calculations have not been provided for review. We only have a few minor comments and these are more for the designer to consider than necessarily requiring further information for approval, we list below for reference: 1. As the surface water attenuation and rainwater harvesting tank will ultimately discharge to a combined sewer it is worth considering the inclusion of a chamber with a non-return valve downstream of the tanks and upstream of the sewer connection. Should the combined sewer surcharge or become blocked this will prevent any effluent from entering either tank. Subject to final design levels of the onsite drains this may or may not be necessary but is worth considering at the detailed design stage. 2. In addition to the above, a connection to the combined sewer could provide a route for odours / gases to migrate back into the surface water storage tank or rainwater harvesting tank. It is therefore worth considering a water trap / vented surface water tank or similar system to mitigate this possibility. 3. In our opinion the proposed gravel trench beneath the lane would have the potential to weaken the surface in this area by either washing fines out of the road construction or simply not achieving suitable compaction on the reinstatement. The applicant may wish to consider using a solid wall pipe beneath the road or a combination of geotextile wrap to the filter media with a geo-grid beneath the reinstated road construction. With regard to the Alan Baxter comments: The comparison of the proposed site discharge to the requirements for discharge rates for new large developments appears over the top, the site contains an existing property with an established point of connection to the sewer network. The scheme already proposes a reduction in surface water discharge from the site and any agreed rate of discharge will be at the discretion of Thames Water (subject to their capacity check) and not the Local Authority. In our view the information submitted by the applicant agrees a principle of drainage and it will then be down to their negotiations with Thames Water to finalise the offsite discharge rate and vary the surface water storage volumes as required.
4c - The applicant should provide a more detailed assessment of cumulative impacts.	RSK provide a commentary on potential cumulative impacts.	No comment	CGL have reviewed RSK's commentary and concur with its findings in general.No further comment.

Alan Baxter have added a further comment: *No consideration has been given to impact on the boundary structures with the Wallace House or with 55 Fitzroy Park.* This is an addition to previous comments, and whilst the applicant should consider these, it is noted that both properties are detached, and at greater distance from the site boundary than No. 49. It is not clear whether objections have been raised to the basement by *Wallace House* or with *55 Fitzroy Park* at this time.

Yours sincerely,

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