

**Highgate School, Dyne House,
Southwood Lane, N6**

Comments on the CMP

**Prepared for
Southwood Lane Residents
Association**

May 2023

Highgate School, Dyne House, Southwood Lane, N6**Comments on the CMP****1.0 Plant Deliveries**

- 1.1 All materials are to be delivered via Southwood Lane and off loaded at the front of Dyne House. However it appears that there is reference to an agreement that items of plant may be delivered via Kingsley Place. We have not seen this agreement.
- 1.2 Kingsley Place is a residential cul-de-sac. The road is steep and has parking for residential vehicles. The CMP notes that it is only really suitable for transit vans (which regularly access all parts of Kingsley Place). The CMP also notes that “even for commercial plant users it is difficult to navigate for all but the smallest vehicles”. It then notes that vehicle tracking has been carried out and that articulated vehicles could access the site if some car parking is suspended and existing bollards that restrict vehicle size are removed. The tracking should be checked to fully understand the implications.
- 1.3 There has not been any information provided in relation to which items of plant are to be delivered via Kingsley Place. However it is likely to consist the following as a minimum:
- Site portacabins – probably a minimum of 12
 - Mobile cranes on a number of occasions
 - Piling rig for sheet piling
 - Piling rig for bored piles
 - Major temporary props for basement walls x 3
 - 3-4 excavators
 - 3-4 dumpers
 - 4-6 scaffold lorries
 - Conveyors to move materials up the slope on the site
 - Hoists
 - Compressors
 - Formwork, probably a minimum of 10 lorries

All items of plant will be removed from site at a later stage, so there is likely to be in excess of 100 vehicle movements most of which will be articulated lorries or long flat bed vehicles.

I am not aware of the details of the agreement for the use of Kingsley Place or if it was ever envisaged that articulated vehicles would be used. However there are likely to be daily movements of plant particularly at the beginning of the project which will disrupt the residents of Kingsley Place. I do not consider that the likely vehicle movements comply with “only occasional plant” as noted in the CMP. The likely vehicle sizes needed, will require parts of the roads to be clear of all other obstructions including parked cars.

2.0 Craneage

- 2.1 Two luffing jib cranes are proposed each of which should be set to never oversail any neighbouring properties.
- 2.2 In order to erect the first one, a mobile crane will be set up in front of Dyne House. Southwood Lane will be closed for up to 3 days for the delivery and erection of the crane. It will then be shut for a further 2 days for the second crane meaning that all residents will have restrictions on how they can access their properties. Any road closures will need to be agreed with TfL, the local authorities and presumably in consultation with local residents.
- 2.3 Further closures of similar durations will be required when the cranes are removed.

3.0 Material Removals/Delivery

- 3.1 The majority of the removal of demolition arrisings and bulk excavation will be by skips and the cranes, although there is mention of the use of conveyors to move excavated soil up the slope and through Dyne House.
- 3.2 The CMP does not quantify the amount of materials to be removed or delivered to site or the estimated number of vehicle movements. However, the critical programme factor will be the hook time for the main luffing jib crane behind Dyne House. Significant quantities of materials will need double or treble handling all of which will greatly extend the construction period.
- 3.3 There is likely to be in the region of 10,000m³ of soil to be removed from site which equates to approximately 1,000 30T large lorry movements as a minimum. If the section of Southwood Lane with the 7.5T weight restrictions is to be used for the removal of spoil, there could be up to 4,000 smaller lorry movements for material removal.

In order to accurately assess the programme, a detailed analysis of material handling and crane hook time is needed. While I am not an expert programmer, I would expect that the removal of the soil will take up to 3 months due to the limitation on loading the vehicles.

In addition to this there will be several thousand other vehicle movements for the delivery of materials. The sheet piles will be up to approximately 20m long. Either these will have to be delivered at night as a special load and will have to be unloaded from Southwood Lane or delivered on standard articulated vehicles and then welded together on site.

- 3.4 There is likely to be in the region of at least 100 additional lorry movements to remove demolition arrisings before the groundworks commence. Prior to this it is likely that the site will need to have asbestos removed.
- 3.5 The key impact of this is on the construction programme.
- 3.6 The small area in front of Dyne House will need to be cleared including relocating services, a post box and the soft landscaping.
- 3.7 The CMP notes that this area is to be used for loading/unloading of vehicles. However, there is no tracking provided to show how vehicles enter and leave the site.
- 3.8 Given the weight restrictions on Southwood Lane, all large loaded vehicles will need to leave in a southerly direction, which is likely to require vehicles to turn. This will cause much more disruption to traffic on Southwood Lane.

- 3.9 While the basement in front of Dyne House is being constructed (~ 7 months) there will be no access for vehicles to park on the front courtyard. This overlaps with the construction of the rear basement and sub-structure which means that all vehicles will have to park on Southwood Lane while being loaded/unloaded. Typically this means that half the road width will be closed to traffic during this period requiring single way traffic light controlled vehicle movements.
- 3.10 The CMP fails to make any reference to this which will cause major disruption in the area. This is a very significant omission.

4.0 Programme

- 4.1 A 17 week period has been allowed for demolition of the existing rear buildings and will require one of the cranes to be positioned before the demolition can commence. Given the logistics of movement of materials and plant, this is optimistic.
- 4.2 The programme for the construction of the basement is noted as 33 weeks. As noted before, I am not an expert programmer, but based on my experience of other basements this appears too short even if there was good access to the site. As an example, I would expect that the time required for removal of the material will extend over a 10-12 week period which is 2 or 3 times more than would normally be required. This is due to the extended loading time for each vehicle due to the material handling logistics and would result in a lorry entering and then leaving every 20-25 minutes. This represents a third of the total construction period for the basement. The programme does not make adequate allowance for this.
- 4.3 A more detailed programme is needed together with an assessment of material movement logistics, crane hook time etc. However, my view is that the whole programme will be considerably longer than indicated, which will extend the period of disruption in the area. The construction period for the basement could extend up to nearly a year.

5.0 Access for lorries, concrete etc.

- 5.1 Access to and from the site will be via Southwood Lane which is a B road. When accessing the site from the north, no vehicles in excess of 7.5T are permitted. The spoil removal lorries have a gross weight of approximately 30T.
- There is similar weight restrictions for vehicles exiting the site in a northerly direction, which means that all large lorry movements will be routed through Highgate Village.
- 5.2 The CMP needs to address this.

6.0 Perimeter Piling

- 6.1 The CMP notes that a perimeter sheet pile wall is proposed rather than a bored pile wall which is the normal approach for the construction of basements in central London. The use of sheet piles would be more manageable from a construction logistics viewpoint. However sheet piles are much less stiff than bored piles and generally result in larger ground movements than would occur with large diameter bored piles. A much stiffer and more reliable propping system is required with more frequent levels of propping if sheet piles are used.

- 6.2 There is also a suggestion that the temporary support to the piled wall on the North Boundary where the depth of excavation proposed is the highest could be with ground anchors. In my experience, ground anchors in these soil conditions do not provide a stiff propping system and are prone to slippage. Should this occur, ground movements could be a magnitude larger than predicted and cause significant damage to nearby buildings and structures much greater than Category 1 damage.
- 6.3 A more traditional, robust propping system should be used which needs careful design to deal with the unbalanced loads due to the large level changes around the site.
- 6.4 Strong consideration should be given to using a secant piled wall which, while being more complex logistically, would be very beneficial in reducing ground movements and potential damage to surrounding properties.
- 7. Site Investigation**
- 7.1 The site investigation report is dated 2015 and some of the boreholes date back to 2008.
- 7.2 While there were a considerable number of boreholes, only 2 or 3 are relevant to the basement proposals. I would expect there to be at least double the number of site specific boreholes for a basement of this size and complexity. The boreholes on the parade ground site have little relevance to the proposals.
- 7.3 There are a selection of standpipe and piezometer readings. However it appears that all the monitoring results dated from before 2015 – these should be rechecked and monitored over the next year to establish whether there has been any changes particularly in relation to recent changes in rainfall intensity due to global warming.
- 7.4 The SI confirms the expected soil strata structure of made ground over Bagshot Beds over Claygate Beds and London Clay. There is ground water within the Bagshot Beds and also within the Claygate layer, all as expected.
- 8. Ground water**
- 8.1 There is a natural flow of ground water through the Bagshot and Claygate Beds which historically has resulted in springs that appear in the area where the Claygate Beds project as the surface geology (at approximately 111m OD).
- 8.2 The reports note the installation of the sheet piled wall will cause a blockage to the flow. They expect this will raise the level up stream by about 2m, meaning the water levels will be close to the current ground level on the site. The water will flow around the basement. While the report notes that the raised water level on either side will be less than the maximum 2m depth they anticipate, there is no modelling to support this statement.
- 8.3 The garden of the property on the Northern Boundary of Dyne House, No. 16 Southwood Lane is currently in the region of 3-4m above the current ground level of the Dyne House site. It is supported by a retaining wall. The foundations of the retaining wall may be affected by the increase in ground water level – this should be assessed as there is a risk that the wall could become unstable structurally.
- 8.4 While no increased water levels have been given, it appears that the ground water level will be close to or above the existing ground levels in the garden of No. 12 Southwood Lane. This would result in surface water flooding as has happened in other parts of Haringey when ground water flows are disrupted by basement construction.

- 8.5 A more detailed 3 dimensional study of the impact on the ground water levels is required to assess the impact caused by the blockage to the natural flow of ground water by the basement. A basement of this size that completely blocks the ground water flows in the Bagshot and Claygate beds is a significant engineering challenge. It has not been adequately resolved or thought through.
- 8.6 Active measures should be put in place to maintain the existing ground water levels. This requires the provision of significant drainage works within the confines of the site with infiltration arrangements to return the water into the Bagshot and Claygate beds to maintain the ground water status quo. This is the only way so as not to cause ground and surface water problems to adjacent properties or structures and indeed on the site itself. Currently there are no proposals for such works. This is important.
9. **Ground Movement Assessment**
- 9.1 The ground movement assessment which has been carried out is an empirical assessment based on CIRIA C760. This is currently used for assessing ground movements for small to medium sizes basements in Central London.
- 9.2 The guide was intended for walls embedded in stiff clay, although it is applicable in situations where there are some sands/gravels overlying stiff clay. Typically where this assessment is used, sites are approximately level and there is little variation in ground water level.
- 9.3 The Ground Movement Analysis (GMA) is based on a “high stiffness wall in stiff clay”. The GMA is based on movements for a contiguous piled wall although it notes that they have been deemed suitable for sheet piles assuming pre-boring or jetting installation aids. This is questionable.
- 9.4 The GMA does not appear to take any account of the very high ground water levels on the upstream side of the basement, or the significant level changes across the site.
- 9.5 There are a number of factors which indicate that the use of CIRIA C760 is not appropriate for assessing ground movements in this situation. A site specific FE model should be carried out to model the ground conditions, wall stiffnesses, construction sequence including prop stiffness and water levels to assess actual ground movements and damage categories.
- 9.6 There are two external swimming pools within the zone of influence of the basement construction. These should also be assessed for damage.
- 9.7 In my opinion, the ground movement assessment is not appropriate or adequate for this basement. There is a risk that ground movements and damage to adjoining properties could be greater than Burland Category 1 as is currently reported. It could easily increase to Category 2 damage or more, particularly if ground anchors are used which then slip.
- 9.8 We are not convinced that sheet piling is the right approach to forming the basement excavation, in particular if ground anchors are to be used. Also, the potential use of jetting to aid the installation of sheet piles is very risky in these ground conditions. If jetting is to be used, it needs a great deal of care so that water pressures and volumes are very carefully controlled.

10. Conclusion

- 10.1 The proposed basement development is a significant engineering challenge which has been greatly underplayed in the BIA.
- 10.2 The site logistics, materials deliveries and removal, and vehicle movements appear to be significantly understated and not fully thought through. The disruption to the residents and vehicle movements in the area will be much more than indicated on the CMP, including to Highgate Village.
- 10.3 The front of Dyne House will not be available for loading/unloading for many months while the small basement in the front of Dyne House is being constructed. This means that vehicles will have to be loaded/unloaded from Southwood Lane causing obstruction to traffic. This is not mentioned in the CMP.
- 10.4 The use of sheet piling to form the basement is questionable as proposed and needs further ongoing assessment and co-ordination. The option of a secant piled wall should be explored.
- 10.5 The ground movement assessment is not appropriate and may well be a significant underestimate of the actual ground movements that will occur on this complex site.
- 10.6 The ground water has not been adequately considered and is not properly dealt with in the proposals. It is critical that active damage control measures should be included in the proposals to maintain the existing ground water levels and pressures on the site to prevent surface water flooding happening. If this is not planned for as part of the construction, then it will be impossible rectify this within the site boundaries.
- 10.7 The programme for the construction of the basement appears too short as it does not take account of the very significant site constraints to material handling.
- 10.8 At planning stage, there should be sufficient information to support a basement proposal that demonstrates how it can be built safely without damaging neighbouring properties or impacting on ground water flow. The GMA and CMP vastly underplay the complications of this site. There is the very real risk that ground movements will be greater than predicted, there will be ground water issues and the programme will be significantly longer and cause more disruption than is implied. There should be much more details of the basement construction submitted as part of the planning application, propping systems and ground water control measures.
- 10.9 There also should be more clarity in what plant will be delivered via Kingsley Place together with a much more detailed programme.