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09 August 2021

Dominic Holder
FORM Structural Design
77 St John Street
London

EC1M 4NN

Our ref: CG/38181B

Please reply to: Madeleine Groves / Richard Ball

Dear Mr Holder,

79 Avenue Road – Review of construction sequence and development updates

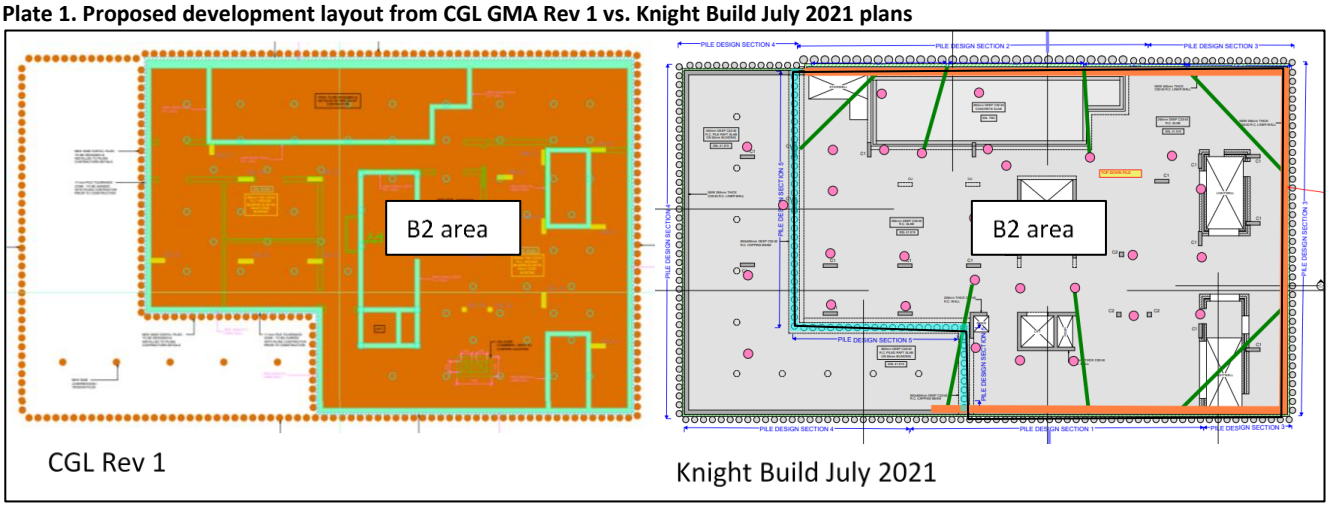
CGL has been instructed to review the proposed construction methodology for the new basement at 79 Avenue Road and assess the implications of these updates on the results of a ground movement assessment previously carried out by CGL[1]. The proposed construction methodology has been developed by Knight Build, the main contractor for the basement dig[2].

The CGL GMA provided building damage assessments for two neighbouring properties, 77 Avenue Road and 81 Avenue Road, both were found to lie within Damage Category 1 "very slight damage". This letter will provide a review of changes to the proposed development information and will assess the impacts of these changes on the predicted ground movements and consequently, the building damage assessments.

Proposed development

It is proposed to demolish the existing residential building on the site and replace this with the a new residential building, with a basement level (basement B1), a plant room level (basement B2) and three above ground storeys on piled foundations. The proposed development layout assessed in the CGL GMA Rev 1 is presented along side the current proposed development layout in Plate 1 below. There has been no significant change in layout since the CGL GMA Revision 1.

Plate 1. Proposed development layout from CGL GMA Rev 1 vs. Knight Build July 2021 plans



[1] CGL. (April 2020). *79 Avenue Road, London Borough Of Camden Basement Impact Assessment - Revision 1* Ref. CG/38181
[2] Knight Build. (2021). *79 Avenue Road Subterranean Construction Methodology. Rev 01 – 16th July 2021*

Construction methodology

The construction sequence and excavation / slab levels adopted for the CGL GMA Revision 1 are detailed and compared to the general construction sequence presented in the Knight Build July 2021 Construction Methodology document in Table 1 below. As shown in Table 1 there are no significant differences in construction sequence assessed in the CGL Revision 1 report compared to the Knight Build July 2021 Rev 1 construction methodology. There have been some minor updates to excavation levels, however the differences are less than 0.5m and would not be expected to have a significant impact on the predicted ground movements or building damage assessments.

Table 1. Summary of construction sequence

	CGL GMA Rev 1	**Knight Build Construction Methodology July 2021 Rev 1**
Stage 0 - Pre-construction work	Not relevant for GMA	1. Establish displacement monitoring as detailed in appendix A.
		2. Install hoardings and secure site.
		3. Install Tree Root Protection Zones.
		4. Establish Welfare.
		5. Disconnect services and establish Temporary Builders Supplies.
		6. Remove all asbestos and harmful materials from existing structure.
Stage 1 - Demolition	Demolish the existing building on the site. GMA refers to Underpinning consistent with point 9 of KB CM.	7. Deconstruct Main Building.
		8. Grub out foundations.
		9. Underpin wall where required.
Stage 2 - Pile installation	Install the contiguous pile wall around the upper (B1) level, followed by the lower (B2) basement level pile wall. Individual load bearing piles are installed after the pile walls are installed.	10. Grub out for pile line.
		11. Install Pile Mat
		12. Install Contiguous Piled Wall
		13. Install Bearing Piles
Stage 3 - Excavation of basement levels		14. Excavate to underside of GF slab at 45.5mOD.
	Install ground floor capping beam.	15. Trim down piles and cast capping beams.
	Install ground floor slab.	16. Cast Top Down GF Slab
	Excavate to B1 level at 41.06mOD.	17. Excavate to basement B1 formation level at 41.5mOD
	Break down contiguous pile wall around B2 area to B1 level.	
	Install capping beam to top of B2 contiguous pile wall at B1 level.	18. Install Low Level Contig Piled Wall and cast capping beam.
	Install temporary props across B2 capping beam level at 41.5mOD.	19. Install Mid-Level Propping at 42mOD to GF slab level / flying shore props at 42mOD.
	Excavate to B2 level at 38.49mOD.	20. Excavate to B2 formation level at 38.4mOD.
Stage 4 - Construction	Install 450mm thick B2 level slab with SSL 38.94mOD.	21. Cast Plant Level (B2) Slab with SSL at 38.94mOD.
	Install B2 level structural walls and columns.	22. Complete liner walls and internal structure to basement slab.
	Install 250mm to 450mm thick B1 level slab with SSL at 41.515mOD.	23. Cast basement (B1) slab with SSL at 41.5mOD
	Remove temporary props across B2 capping beam level.	24. Cast liner walls and vertical structure to GF.
	Construct remaining above ground levels	25. Cut Out Break Out Top down Piles.
		26. Complete shell and envelope works.
		27. Fit out and complete external landscaping.

Contiguous piled wall

At the time of the CGL GMA Revision 1 the basement was proposed to be excavated within a contiguous pile wall with 350mm diameter piles at 500mm centres with an exception at the northern wall against a proposed pool area, where the wall was proposed to be 450mm diameter at 500mm centres. The updated plans and contiguous wall design provided in the Knight Build Construction Methodology pack show the wall will now comprise 450mm diameter piles at 600mm centres. This arrangement provides a generally increased stiffness of the wall relative to the CGL assessment.

The predicted wall deflection movements from comparable piled wall sections and construction sequences around the basement have been reviewed and have been found to be broadly consistent between the CGL GMA Revision 1 and the WALLAP assessments provided in the Knight Build information. CGL predicted 15mm deflection for the double height basement area and 7mm for the single heigh basement area. These values are consistent with those predicted by Knight Build at 15mm and 9mm respectively. A difference of 2mm in predicted displacement is considered to be negligible with regard to impacts.

Loads provide for the contiguous pile wall in the Knight Build July 2021 information indicate loads on the contiguous pile wall will be similar / lower than those provided for the CGL GMA Revision 1. Toe levels for the contiguous pile wall would therefore be expected to be similar / shallower than the toe level assumed in the CGL assessment. The updated development plans are therefore not anticipated to have a significant / detrimental impact on the effect of ground movements from pile installation on the building damage assessments.

Internal loads

Updated internal building loads have been provided, however given these loads will be transferred to bearing piles which will transfer load to deeper soils, the loads on these piles, and changes to the loads since the CGL GMA Revision 1 report, are not anticipated to have a significant impact on the GMA and building damage assessment results.

Conclusions

CGL has previously provided ground movement assessment for the proposed development at 79 Avenue Road including building damage assessments for two neighbouring properties. The CGL GMA Rev 1 assessment found the damage to both properties would fall within the lower regions of Damage Category 1. Updates have since been made to the proposed development, eg. Minor changes in levels and changes to the proposed contiguous pile wall diameter. The extent and impacts of these changes have been reviewed, and they are not expected to increase the building damage category at either of the neighbouring properties.

The differences in the proposed development between the CGL GMA Rev 1 and the updated information will also not have an impact on aspects such as surface water and groundwater flow. These were assessed in the CGL GMA Rev 1 to be at a very low and low risk from the proposed development, respectively. As there have not been significant changes to the proposed basement size and depth in the updates the risk from groundwater and surface water flooding remains as assessed in the CGL GMA Rev 1.

Yours sincerely,

Madeleine Groves, Senior Engineer
Card Geotechnics Limited