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Mr. D. Lazarus
3, Rosemont Road
London
NW3 6NG

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Dear Mr Lazarus,

1 RANULF ROAD –GROUND MOVEMENT IMPACT ASSESSMENT

This note estimates the expected ground movement associated with the basement extension at 1 Ranulf Road and discusses the potential impact of these movements on the surrounding structures.

The property includes a three storey detached house with basement. It has a single level extension to the west, which is currently used as a garage. This is set approximately 4.5m from the front line of the façade of the main house. There is a pathway to the west of the house that separates the property from the neighbouring No. 2 Ranulf Road. The pathway is at the level of the existing basement and there are stairs along the north-western boundary of the property that connect the pathway to street level.

The existing basement, which is currently under most of the main house, is to be deepened by about 1.5m and extended to the rear of the house over the existing terrace and westwards under the existing garage, to be aligned with the façade of the main house. The drawings 8776-PA02, 8776-06-C and 8776-07-C prepared by Taylor Whalley Spyra (TWS) show plans and sections of the proposed scheme.

The walls of the main house, including the western boundary wall of the property, will be deepened by 1m using underpinning techniques. A 3m deep and 3m long mass concrete wall will be created along the north-western edge of the proposed basement at the front of the existing garage. At the rear of the house the formation level of the basement is at the same level of the existing garden and a 1m deep mass concrete wall will be created to support the wall above. The area of the terrace immediately to the

rear of the house and the ground currently filling the area under the garage and at the front of it will be excavated.

The ground conditions at the site include Made Ground over London Clay, which extends to a depth probably in excess of 80m. It should be noted that the nature of the clay is siltier and sandier than is typical of London Clay in Central London.

The construction activities associated with the proposal that could cause ground movements are:

- The underpinning of the existing walls
- The excavation, which could cause movements in the excavated area and behind the retaining walls as these lose horizontal support.

The underpinning would involve a transfer of vertical loads from the current foundation level of the walls to a deeper foundation level. Along the existing walls only small net changes of loads would occur and most of the underpinning movements are likely to be due to construction effects resulting from the partial removal of support to the footings of the walls and compression of the ground. The depth of the proposed underpinning is approximately 1m under the existing internal and perimeter walls of the house. Experience suggests that, for shallow underpinning carried out with good workmanship and in the dry, the ground movements can be controlled so that these do not exceed 5mm. These movements would be localised settlements under the underpinned walls only and could cause cracks at the wall junctions that should be capable of being repaired afterwards.

The excavation to deepen the existing basement would cause upwards ground movements in the excavated area and under the walls as a result of the vertical change (reduction) of loads on the excavated surface. These upward movements would in part compensate the settlements occurred during underpinning. Under the existing basement and at the rear of the house the excavation would be in the order of about 1.5m and the expected ground movements would be small and confined within the boundary of the property.

Horizontal and vertical movements could occur behind the new retaining wall at the north-western corner of the proposed garage as a consequence of the 3m of soil excavated in front of this wall, which could make the wall move towards the excavation inducing the ground behind to settle and move horizontally towards the excavation.

These ground movements can be estimated using the database in CIRIA C580, which collects data of ground movements behind retaining walls from basement works in the London area. Although the database refers to embedded retaining walls, it is typically used also for excavations in front of underpinning.

The walls will be propped during construction and therefore the curve referring to stiff support of the walls in the CIRIA C580 database can be used. From this, the maximum ground movements expected from 3m deep excavation would be maximum settlements of less than 2.5mm and horizontal movements of about 4.5mm. The ground behind the walls will sag and the maximum settlements would occur at about 1.5m distance from the wall. The horizontal movements will reduce linearly with distance from the wall. All movements will reduce to zero at about 12m from the wall.

It should be noted that the limited extend of the section of the front wall and its vicinity to the corner would further reduce the predicted movements.

It is therefore concluded that the proposed works at No. 1 Ranulf Road could induce limited ground movements that are unlikely to exceed 5mm and would be limited to the area of the property (i.e. underneath and in the front pathway at the north-western corner of the property).

These movements are not expected to affect the adjacent property because the existing western wall is already at the level of the existing basement and there is no surcharge behind the wall from soil or other structures. Some strains could occur across the stairs to the pathway with No. 2 Ranulf Road, but these are unlikely to be significant and cause damage to these stairs that exceed Category 1 of the Burland Damage Category Chart in CIRIA C580.

Yours sincerely,
For Geotechnical Consulting Group,

Apollonia Gasparre

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