



SYMMETRYS
STRUCTURAL / CIVIL ENGINEERS

ADDENDUM TO THE BASEMENT IMPACT ASSESSMENT

139 CRANLEY GARDENS
N10 3AH
LONDON

21066-SYM-XX-XX-RP-S-0002-Rev B

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REVISION HISTORY

Revision	Description	Date	By	Checked
A	First issue	08/02/2024	SB/CE	VP/CA/RF
B	Second issue	19/02/2024	SB/CE	VP/CA/RF

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1.0 Symmetrys comments to Section 4 of the Audit reference 13979-03, November 2023

Paragraph	Campbell Reith audit	Symmetrys/GEA responses
4.1	The BIA has been carried out by Symmetrys supported by GEA. The individuals involved do not hold the qualifications required by LBH policy for the hydrogeology assessment. Clarification is required. Non-technical summaries are not presented in the BIA and are required. Clarification on whether a site walkover was undertaken is also required.	The hydrogeology assessment has been reviewed by Matthew Penfold (MSci MSc DIC CGeol FGS), Principal Engineer at GEA Ltd with over 15 years' experience of geological and hydrogeological assessments. Please refer to BIA report 21066-SYM-XX-XX-RP-S-0001-Rev F, clause 2.6, for full list of authors.
4.2	The site is a residential property consisting of a 3-storey semi-detached house including a driveway at the front and a rear garden, which includes a paved patio, a single storey outbuilding, a garden, and an astro-turf pitch. The main house does not have any basement or partial basement at present, however it is understood the outbuilding has a single storey basement. The property is attached to No. 137 Cranley Gardens to the west, while No. 141 Cranley Gardens is present to the east. It is unknown whether neighbouring properties have basements, however the BIA assumes no neighbouring basements are present. This is considered conservative in relation to the land stability assessment and, considering the anticipated groundwater flow and location of the proposed basement, neutral in relation to the hydrogeology assessment.	No action required.
4.3	The proposals include the construction of a double storey basement to host a new swimming pool and including a mezzanine level where a gym is proposed. The basement will extend to a maximum depth of c. 6.90m bgl. The basement will be located underneath a small portion of the southern end of the existing building and mainly underneath the rear garden and outbuilding. The basement is to be constructed following a 'hit and miss' sequence of retaining wall construction and multistage underpinning. It is understood the existing outbuilding will be demolished except for the boundary wall which is going to be underpinned.	No action required.
4.4	Screening and scoping assessments are presented and informed by desk study information. Most relevant figures/maps and other guidance documents are referenced within the BIA to support responses to screening questions. However, the assessment should be reviewed by qualified professionals as per LBH guidance.	Please refer to response to clause 4.1, and to BIA report 21066-SYM-XX-XX-RP-S-0001-Rev F, clause 2.1, for full list of authors.

4.5	A site-specific ground investigation was undertaken in April 2021. The exploratory hole location plan presented in the ground investigation report indicates a cable percussive borehole and 4 trial pits were undertaken. However logs for the trial pits have not presented and are required.	Trial pits were included in the initial site investigation specification; however, they were not dug due to site constraints. The Audit (Tracker query No 4) suggests that trial pits would have been useful to confirm presence/absence of any soft and water bearing deposits associated with a culverted brook. The information obtained with the borehole at 139 Cranley Gardens, and 112 Cranley Gardens (15 m to the northwest of the site, carried out by GEA) confirmed no water bearing deposits was found. The ground condition, and the allowance for dewatering measures to be put in place by the contractor should water be encountered in the excavation, are believed to be satisfactory on this respect.
4.6	The ground investigation encountered a limited thickness of Made Ground (to 0.60m bgl) over the London Clay Formation (to 12.00m bgl). Groundwater was not encountered during drilling. Although not shown on the borehole log, it is understood a standpipe was installed to a depth of 5.00m bgl and groundwater was monitored at 0.85m bgl as part of a single monitoring visit undertaken two weeks after completion of the borehole. Noting that there was only one monitoring visit which was undertaken more than two and a half years ago, it is not considered that the baseline has been established sufficiently to permit the assessment of impacts to/from hydrogeology or to inform the detailed design (including temporary works)	An additional reading was carried out on January 18 th , 2024. The depth of water recorded was 0.73m below ground level. This reading was interpreted being in line with seasonal fluctuations by Thomas Murray MSc BSc (Hons) FGS, Director at SAS. SAS also backed their previous statement of the water being perched water up top of the clay and not a true groundwater level.
4.7	The BIA acknowledges the presence of a culverted brook (Moselle Brook) in the vicinity of the site. Further confirmation of ground and groundwater conditions, for example from the trial pits, should be presented and sufficient evidence to confirm the presence/absence of any soft and water bearing deposits associated with the culverted brook and to confirm impacts on the wider hydrogeological environment.	The Upper Moselle Brook, now culverted, appears running along Cranley Gardens, according to the information included in the "Section 19 Flood Investigation report-McCloy Consulting, January 2022). See screen shot below. The site investigation carried out at 139 Cranley Gardens, and at 112 Cranley Gardens (15m northwest of the site), confirmed absence of any soft and water bearing deposits. Please refer also to Symmetrys comments to paragraph 4.5 herein.  The residual risk of encountering soft spots during the excavation would be dealt with by allowing for ground improvement across the site, digging the



		soft spots and replacing the soil with well compacted fill. The trial pits, originally scoped for the planning stage, were not carried out due to site constraints (stone finishes). We would recommend the trial pits to be dug across the site and logged by a geotechnical engineer prior to any construction works.
4.8	The BIA states that the site is at medium risk from surface water flooding and within a critical drainage area. A FRA and SuDS Report has been prepared and indicates that the impermeable areas are not going to increase. However, clarification is required with respect to the provision of permeable areas over the basement. The report states that the inclusion of attenuation will reduce the impact of flooding to 'low'. As the surface water flooding appears to be generated from offsite flow routes heading down the Cranley Gardens road and through the site towards the Cricket Ground to the south, the risk to the property is from external runoff generated from beyond the site boundary and it is unlikely to be reduced through the proposed development or the proposed onsite drainage system. As such clarification on this is also required.	FRA and SuDS Report (21066-SYM-XX-XX-RP-C-0001 rev B) has been amended to reflect the sites risk from pluvial flooding is 'medium' and the inclusion of attenuation will reduce the surface water flood risk. The existing surface water risk is associated with overland flows from impermeable areas from the road, following the topography of the ground. The proposed basement works are within an existing impermeable area, it is therefore assumed there is no increase on the surface water flows. It has been noted that a possible solution to reduce the flood risk from offsite surface water run-off is to alter the topography of the ground in order to prevent the run-off from entering the site. This could be in the form of an upstand or concrete bund in the form of a speed hump. The proposed development does not increase the total impermeable areas. Existing total impermeable = 310m², proposed total impermeable area = 250m². Attenuation is provided within the permeable paving located in the front garden area.
4.9	As indicated within the objection letter from Jason Small, there is a discrepancy between proposed discharge rates presented in Figure 33 and paragraph 10.81 and clarification is required. In addition, clarification whether consultation with the statutory sewer system owner has been undertaken is required. It is noted final drainage design and strategy will require approval by the lead local flood authority.	Proposed discharge rates have since been re-assessed and updated within the FRA and SuDS Report (21066-SYM-XX-XX-RP-C-0001 Rev B). In summary the proposed run-off rates have been reduced by 67% for the 1 in 100 year storm event. This is reflected throughout the FRA and SuDS report. A pre-capacity enquiry was submitted to Thames Water with surface and foul flows agreed with a condition that an investigation on site to locate a potential surface water sewer within the existing demarcation chamber was carried out at a subsequent date. A CCTV carried out confirmed that the surface and foul water combined on-site and discharged combined to the existing Thames Water foul sewer. Additionally, the CCTV confirmed there is no surface water connection from the demarcation chamber to the an existing Thames Water asset. It is therefore recommended that further communication is required with Thames Water to confirm acceptability of discharging combined sewerage into the foul water network, as per existing, with an

		approximate reduction on combined rates of 45% (bettering the existing situation). Note that the above information is included within the FRA and SuDS Report ref 21066-SYM-XX-XX-RP-C-0001 rev B.
4.10	Structural drawings for the proposed basement are presented with construction sequences for the underpinning and the construction of tension piles. These indicate transitional underpinning from ground level to proposed mezzanine level will be undertaken below the party wall to No. 137 to limit differential settlement. The typical sequence presented in the BIA indicates underpinning will be undertaken in two lifts. Structural drawings indicates that the proposed retaining walls will not be cantilevered at any time due to the inclusion of multi-level temporary props, shuttering and vertical struts and that a detailed temporary works design will be agreed with the appointed contractor at a later stage.	No action required.
4.11	Structural engineering calculations for the substructure are presented. Different sections of the proposed retaining walls are analysed with retained heights varying from 4.20 to 5.90m reflecting the structural proposal. It is noted this is a preliminary design sufficient to allow impact assessment. The structural information concludes that underpinning is a suitable retaining option for the proposed development, however, it assumes the underpins will be formed entirely in the London Clay and, as described above, this requires to be confirmed.	Please refer to consideration on soil condition discussed herein in Symmetrys comments to paragraph 4.5 and 4.7. Ground water might be encountered trapped in the made ground. As such, dewatering techniques like sump pumping should be allowed by the contractor.
4.12	The geotechnical parameters used for the Ground Movement Assessment (GMA) and the retaining wall calculations are presented in the GMA and the site investigation report. The site investigation report recommends a friction angle of 23° for the retained soil and an allowable bearing pressure of 250kPa at basement formation level. Although the calculated bearing pressure is typically below that value, a realistic and conservative value for the allowable bearing capacity should be presented.	SAS confirmed the bearing capacity is based off a shear vane result of 130kPa which converts to 265kN/m2, although they suggested 250Kpa as max allowable bearing pressure. Despite the above, Symmetrys approach was to adopt a much lower ground bearing pressure limit. The ground bearing pressure exerted by retaining wall RW1 at a depth of 5.9m is 82.3Kpa, while the ground bearing pressure exerted by retaining wall RW2 at a depth of 4.2m 56.8 Kpa. Equally, GEA adopted a conservative ground profile with the assessment consisting of a strength for the London Clay of 60 KPa at a depth of 1.0 m, with a 10 Kpa increase per meter increase in depth to the base of the borehole, i.e. 70 Kpa at 2 m (giving an approx. allowable bearing pressure of 140 Kpa) and 80 Kpa at 3 m, giving an approx. allowable bearing pressure of 160 Kpa. Refer to GEA document J23175 - MP Letter O in Appendix A
4.13	A GMA has been presented to demonstrate damage to neighbouring buildings will be limited to Category 1 of the Burland Scale. The sensitive structures relevant to this assessment	No action required.



	are Nos. 137 and 141 Cranley Gardens and the footpath and carriageway of Cranley Gardens. As indicated in the CCTV survey presented in the FRA and as raised in LHBGEO's report, a combined drain is present at the proposed development location which affects the feasibility of the proposals. Any impact on this and any other underground asset that may be present within the zone of influence of the basement is outside the scope of this report.	
4.14	Commercial software XDisp was used, and ground displacement curves presented in CIRIA C760 associated with construction and excavation were adopted in the analysis. Whilst the CIRIA approach is intended for embedded retaining walls, it is accepted that in certain situations the predicted ground movements can be within the range typically anticipated for underpinning techniques carried out with good control of workmanship. However, the GMA should be reviewed according to the comments below and updated as necessary.	See comments to paragraphs 4.41-1 to 4.41-5.
4.14 - 1	There is a discrepancy in the GMA construction sequence which indicates the proposed RC floor slab to be cast at the highest level first and subsequently notes it will be constructed at the end of the sequence. This should be clarified.	This is a typo that was picked up and addressed in Rev 2 of the GMA report. Refer to GEA document J23175 - MP Letter O in Appendix A
4.14 - 2	The GMA states that at least 5mm of ground movements should be considered in both the vertical and horizontal direction for each lift of underpinning. As two lifts are proposed total movements at the wall are expected to be 10mm in both the vertical and horizontal direction. However, the GMA indicates 3 to 8mm and 2 to 9mm in the vertical and horizontal direction respectively. This should be clarified.	The statement in the report is specifically related to the total horizontal movements and is relevant to a full height underpin of about 3 m (i.e., movements on underpinning that is less than this should fall below this value and increase where deeper underpinning is proposed; in short movements are expected to be proportional to the depth of excavation / retention). The range of movements reflects the variation in excavation depth across the basement footprint, i.e. some areas only extend as deep as the proposed mezzanine level and would be expected to be subject to less movement, and, where relevant, accounts for the presence of an existing basement beneath the footprint of the existing outbuilding (where any proposed underpinning is not required until a lower level and the subsequent depth of excavation is also much reduced – approx. 1.0 m to 2.5 m based on the information you provided). The movements shown on the contour plots and reported within the tables in the report are also those that will occur at foundation level of the structures being assessed; they are therefore slightly below the peak movements that would be predicted if taken from the highest ground / excavation level (which itself

		reduces across the proposed basement footprint, with a simplified approach based on the upper garden level being adopted for the purpose of the analysis) – our model can be adjusted to report these peak movements, but as the existing foundations will only be subject to the movements occurring below this level and are those upon which the existing damage assessment is based, this will not change the outcome of the GMA. Refer to GEA document J23175 - MP Letter O in Appendix A
4.14 - 3	On the basis of industry experience, the quoted movement of 5mm per lift is the minimum typically experienced with good control of workmanship. Other factors such as load induced settlement and the feasibility of excavating to 6.90m in two lifts of underpinning should be further considered.	Settlement due to loading of the underpinning is already included in the assessment. The query with respect to feasibility of underpinning to a depth of 6.9 m should be addressed in the CMS, although given the detail in your existing proposals we would have thought there is more than enough information to justify the feasibility of the design in any case. Refer to GEA document J23175 - MP Letter O in Appendix A
4.14 - 4	The GMA should include an impact assessment of the transitional underpinning proposed below the party wall to No. 137 Cranley Gardens.	As the transition underpinning is being included as a mitigation measure to limit the potential impact of any differential movement from the adjoining excavations, we would argue that it is more conservative for this not to be included, i.e. in the present model, any benefit from the deepening of these foundations is ignored, such that the existing party wall along this boundary is being subject to the highest range of differential movements from the adjoining excavation. We could run a separate analysis to include this underpinning to confirm any potential impacts. However, whilst this would be expected to result in a slight increase in vertical movements along these structures due to settlement, there would be a potentially larger reduction in the horizontal and vertical movements experienced from the subsequent basement excavations due to the increase in foundation depth – In short, inclusion of this underpinning is likely to produce a more favourable result. Refer to GEA document J23175 - MP Letter O in Appendix A
4.14 - 5	Clarification on whether ground movements occurring due to the underpinning of the existing outbuilding have been considered in the analysis is required.	As there is already an existing basement below this structure, the required depth of underpinning is very limited (as stated within the GMA report) when compared to the opposite side of the site, where the proposed underpins will extend from a much higher level and have a much greater retained height and are therefore subject to higher installation and excavation movements. An assessment is provided in this area, but of the underpinning and excavations that will extend from existing basement level to proposed formation level. Refer to GEA document J23175 - MP Letter O in Appendix A
4.15	The results of the Building Impact Assessment currently indicate damage to neighbouring structures will not exceed Burland Category 1	No action required.

	(Very Slight); however, the GMA requires further consideration as per the items discussed above.	
4.16	The BIA indicates that a monitoring strategy will be developed at a later stage and will be subject to discussions and agreements with the owners of the adjacent properties and structures as part of the Party Wall Agreement. Trigger levels are presented in the outline strategy and they may require update after the review of the GMA.	No action required.

2.0 Symmetry comments to the Audit Query Tracker

Query No	Subject	Query	Status	Comments 08.01.2024
1	BIA format	The hydrogeology impact assessment should be prepared and/or reviewed by qualified professionals as per LBH guidance.	Open – See 4.1.	The hydrogeology assessment has been reviewed by Matthew Penfold MSci MSc DIC CGeol FGS, Principal Geotechnical Engineer at Geotechnical & environmental Associates Limited (GEA). Please refer to BIA report 21066-SYM-XX-XX-RP-S-0001-Rev F, clause 2.6, for full list of authors.
2	BIA format	Non-technical summary to be included in the BIA.	Open – See 4.1.	Non-technical summary introduced in clause 1.0 of Symmetry's revised report 21066-SYM-XX-XX-RP-S-0001-Rev F.
3	BIA format	Clarification on whether a site walkover was undertaken is required.	Open – See 4.1.	Site walkover was undertaken on 13 th May 2021 as part of the site investigation works. Please refer to clause 3.3 of SAS "Phase 1 preliminary risk assessment", included in Appendix C of BIA report.
4	BIA format	Trial pit records to be submitted. Alternatively additional justification will be required to confirm the presence/absence of any soft and water bearing deposits associated with a culverted brook.	Open – See 4.6 (and 4.7)	Trial pits were included in the initial site investigation specification; however, they were not dug due to site constraints. The Audit (Tracker query No 4) suggests that trial pits would have been useful to confirm presence/absence of any soft and water bearing deposits associated with a culverted brook. The information obtained with the borehole at 139 Cranley Gardens, and 112 Cranley Gardens (15 m to the northwest of the site, carried out by GEA) confirmed no water bearing deposits was found. The ground condition, and the allowance for dewatering measures to be put in place by the contractor should water be encountered in the excavation, are believed to be satisfactory on this respect. The residual risk of encountering soft spots during the excavation would be dealt with by allowing for ground improvement across the site, digging the soft spots and

				replacing the soil with well compacted fill. The trial pits, originally scoped for the planning stage, were not carried out due to site constraints (stone finishes). We would recommend the trial pits to be dug across the site and logged by a geotechnical engineer prior to any construction works.
5	Hydrogeology	Baseline for groundwater regime not established. Additional evidence required.	Open – See 4.6.	An additional reading was carried out on January 18 th , 2024. The depth of water recorded was 0.73m below ground level. This reading was interpreted being in line with seasonal fluctuations by Thomas Murray MSc BSc (Hons) FGS, Director at SAS. SAS also backed their previous statement of the water being perched water up top of the clay and not a true groundwater level.
6	Hydrogeology	Impact assessment on the wider hydrogeological environment to be reviewed following confirmation of absence of soft/water bearing deposits associated with culverted brook.	Open – See 4.7.	The Upper Moselle Brook, now culverted, appears running along Cranley Gardens, according to the information included in the "Section 19 Flood Investigation report-McCloy Consulting, January 2022). See screen shot below. The site investigation carried out at 139 Cranley Gardens, and at 112 Cranley Gardens (15m northwest of the site), confirmed absence of any soft and water bearing deposits. An hydrogeological impact assessment is included in Symmetry's BIA report 21066-SYM-XX-XX-RP-S-0001-Rev F, clause
7	Hydrogeology	Clarification is required with respect to the provision of permeable areas over the basement and on the proposed decrease in the surface water flooding risk.	Open – See 4.8.	FRA and SuDS Report (21066-SYM-XX-XX-RP-C-0001 rev B) has been amended to reflect the sites risk from pluvial flooding is 'medium' and the inclusion of attenuation will reduce the surface water flood risk. The existing surface water risk is associated with overland flows from impermeable areas from the road, following the topography of the ground. The proposed basement works are within an existing impermeable area, it is therefore assumed there is no increase on the surface water flows. It has been noted that a possible solution to reduce the flood risk from offsite surface water run-off is to alter the topography of the ground in order to prevent the run-off from entering the site. This could be in the form of an upstand or concrete bund in the form of a speed hump. The proposed development does not increase the total impermeable areas. Existing total impermeable = 310m²,



				proposed total impermeable area = 250m ² . Attenuation is provided within the permeable paving located in the front garden area.
8	Hydrogeology	Clarification on proposed discharge rates and on whether liaison with the public sewer owner is ongoing is required.	Open – See 4.9.	Proposed discharge rates have since been re-assessed and updated within the FRA and SuDS Report (21066-SYM-XX-XX-RP-C-0001 Rev B). In summary the proposed run-off rates have been reduced by 67% for the 1 in 100 year storm event. This is reflected throughout the FRA and SuDS report. A pre-capacity enquiry was submitted to Thames Water with surface and foul flows agreed with a condition that an investigation on site to locate a potential surface water sewer within the existing demarcation chamber was carried out at a subsequent date. A CCTV carried out confirmed that the surface and foul water combined on-site and discharged combined to the existing Thames Water foul sewer. Additionally, the CCTV confirmed there is no surface water connection from the demarcation chamber to the an existing Thames Water asset. It is therefore recommended that further communication is required with Thames Water to confirm acceptability of discharging combined sewerage into the foul water network, as per existing, with an approximate reduction on combined rates of 45% (bettering the existing situation). Note that the above information is included within the FRA and SuDS Report ref 21066-SYM-XX-XX-RP-C-0001 rev B.
9	Land Stability	Clarification regarding the allowable bearing capacity value used in the retaining walls calculation is required.	Open – See 4.11.	The bearing capacity is based off of a shear vane result of 130+kPa which converts to 265kN/m2 and as such we were conservative in the value we provided, so we don't quite understand why this is being queried. The capacity is provided using site specific data and is a standard and anticipated result based on the general published data for the London Clay Formation.

10	Land Stability	The Ground Movement Assessment is to be reviewed and, where necessary, updated following the comments provided in Section 4.	Open – See 4.13.	Yes, as below, this will need to be updated in the SAS report and could potentially impact on the parameters in the GMA. However, we would note that we adopted a conservative ground profile with the assessment which should limit this – for reference purposes we assumed a strength for the London Clay of 60 KPa at a depth of 1.0 m, with a 10 Kpa increase per meter increase in depth to the base of the borehole – so at 2 m, the strength would be 70 Kpa (giving an approx. allowable bearing pressure of 140 Kpa) and at 3 m, it would be 80 Kpa (giving an approx. allowable bearing pressure of 160 Kpa). Basement formation is a little way below this and at these depths we would expect a higher ABP of 180 Kpa to 200 Kpa to be appropriate.
11	Land Stability	Trigger levels presented in the outline monitoring strategy may require amendments following GMA revision.	Open – See 4.15.	Based on the review of the reports and investigation available, it is believed that no update of the GMA is required. Please refer to clause 1.0 herein, Symmetrys comments to clause 4.15.
12	Third Party consultation	Impact on any underground asset running across or nearby the proposed basement is outside the scope of this report. Early liaison with the assets owners is encouraged to agree methods of assessment.	Open – See 4.12.	Noted
13	Hydrology	Final drainage design and strategy will require approval by the lead local flood authority.	Open – See 4.9.	Noted

APPENDIX A

INPUT FROM GEA

POST AUDIT

7 February 2024

Your ref:

Our ref: J23175/MP/0



GEA

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Simone Boncio
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By Email

Dear Simone

Re: 139 CRANLEY GARDENS, LONDON N10 3AG

Further to our recent correspondence, please find collated responses to queries raised by Campbell Reith with respect to our recent ground movement assessment report (ref J23175-Rev 3, dated October 2023) for the above site in their recent BIA audit carried out for the London Borough of Haringey (report ref 13979-03, dated November 2023).

For each query below, we have include the original text from the Campbell Reith report (in bold), the response we provide to you by email and additional comments on the outcome from your subsequent discussions with the engineer from Campbell Reith.

- 4.12. ***The geotechnical parameters used for the Ground Movement Assessment (GMA) and the retaining wall calculations are presented in the GMA and the site investigation report. The site investigation report recommends a friction angle of 23° for the retained soil and an allowable bearing pressure of 250kPa at basement formation level. Although the calculated bearing pressure is typically below that value, a realistic and conservative value for the allowable bearing capacity should be presented.***

This will need to be updated in the SAS report and could potentially impact on the parameters in the GMA. However, we would note that we adopted a conservative ground profile with the assessment which should limit this. for reference purposes we assumed a strength for the London Clay of 60 Kpa at a depth of 1.0 m, with a 10 Kpa increase per meter increase in depth to the base of the borehole – so at 2 m, the strength would be 70 Kpa (giving an approx. allowable bearing pressure of 140 Kpa) and at 3 m, it would be 80 Kpa (giving an approx. allowable bearing pressure of 160 Kpa). Basement formation is a little way below this and at these depths we would expect a higher ABP of 180 Kpa to 200 Kpa to be appropriate.

It Is understood that the above has been discussed directly with the engineer from Campbell Reith, and in the event that the SAS report is not updated, this matter is to be resolved through additional comments in your CMS / BIA report.

- 4.14 ***Commercial software XDisp was used and ground displacement curves presented in CIRIA C760 associated with construction and excavation were adopted in the analysis. Whilst the CIRIA approach is intended for embedded retaining walls, it is accepted that in certain situations the predicted ground movements can be within the range typically anticipated for underpinning techniques carried out with good control of workmanship. However, the GMA should be reviewed according to the comments below and updated as necessary.***

- 1) *There is a discrepancy in the GMA construction sequence which indicates the proposed RC floor slab to be cast at the highest level first and subsequently notes it will be constructed at the end of the sequence. This should be clarified.***

This is a typo that was picked up and addressed in Rev 2 of our report. However, it appears that Rev 1 was submitted for the audit.

It is understood that this has been discussed with the auditor and that no further action is necessary and / or that they will be provided with a copy of the correct report.

- 2) *The GMA states that at least 5mm of ground movements should be considered in both the vertical and horizontal direction for each lift of underpinning. As two lifts are proposed total movements at the wall are expected to be 10mm in both the vertical and horizontal direction. However, the GMA indicates 3 to 8mm and 2 to 9mm in the vertical and horizontal direction respectively. This should be clarified.***

The statement in the report is specifically related to the total horizontal movements and is relevant to a full height underpin of about 3 m (i.e., movements on underpinning that is less than this should fall below this value and increase where deeper underpinning is proposed; in short movements are expected to be proportional to the depth of excavation / retention). The range of movements reflects the variation in excavation depth across the basement footprint, i.e. some areas only extend as deep as the proposed mezzanine level and would be expected to be subject to less movement, and, where relevant, accounts for the presence of an existing basement beneath the footprint of the existing outbuilding (where any proposed underpinning is not required until a lower level and the subsequent depth of excavation is also much reduced – approx. 1.0 m to 2.5 m based on the information you provided). The movements shown on the contour plots and reported within the tables in the report are also those that will occur at foundation level of the structures being assessed; they are therefore slightly below the peak movements that would be predicted if taken from the highest ground / excavation level (which itself reduces across the proposed basement footprint, with a simplified approach based on the upper garden level being adopted for the purpose of the analysis) – our model can be adjusted to report these peak movements, but as the existing foundations will only be subject to the movements occurring below this level and are those upon which the existing damage assessment is based, this will not change the outcome of the GMA.

It is understood that the above comments were forwarded onto the engineer at Campbell Reith and that the following response was received:

‘On point 2 of 4.14. our experience indicates that a minimum of 5mm vertical ground movements due to underpinning should be considered for the entire basement perimeter regardless of the depth of the excavation/underpinning. However, the lower ground movements in the GMA are predicted in the area of the existing outbuilding which is remote from other properties. Therefore ground movements generated in that area are unlikely to affect any neighbouring buildings’.

Based on the above, it is understood that no further action is required with respect to this query.

- 3) *On the basis of industry experience, the quoted movement of 5mm per lift is the minimum typically experienced with good control of workmanship. Other factors such as load induced settlement and the feasibility of excavating to 6.90m in two lifts of underpinning should be further considered.***

The limits are not based on any published guidance and / or case studies. Settlement due to loading of the underpinning is already included in the assessment. The query with respect to feasibility of underpinning to a depth of 6.9 m should be addressed in the CMS, although given the detail in your existing proposals we would have thought there is more than enough information to justify the feasibility of the design in any case.

It is understood that the above comments were forwarded onto the engineer at Campbell Reith and

that the following response was received:

'We agree on point 3 and also point 5 considering that conservative ground movements and consequent category of damage have been estimated for the neighbouring outbuilding'.

Based on the above, it is understood that no further action is required with respect to this query.

4) The GMA should include an impact assessment of the transitional underpinning proposed below the party wall to No. 137 Cranley Gardens.

As the transition underpinning is being included as a mitigation measure to limit the potential impact of any differential movement from the adjoining excavations, we would argue that it is more conservative for this not to be included, i.e. in the present model, any benefit from the deepening of these foundation is ignored, such that the existing party wall along this boundary is being subject to the highest range of differential movements from the adjoining excavation. We could run a separate analysis to include this underpinning to confirm any potential impacts. However, whilst this would be expected to result in a slight increase in vertical movements along these structures due to settlement, there would be a potentially larger reduction in the horizontal and vertical movements experienced from the subsequent basement excavations due to the increase in foundation depth – In short, inclusion of this underpinning is likely to produce a more favourable result.

It is understood that the above response was discussed directly with the engineer from Cambell Reith and they confirmed that the above comments were acceptable and that no further action was required.

5) Clarification on whether ground movements occurring due to the underpinning of the existing outbuilding have been considered in the analysis is required.

Yes, however, as there is already an existing basement below this structure, the required depth of underpinning is very limited (as stated within our report) when compared to the opposite side the site, where the proposed underpins will extend from a much higher level and have a much greater retained height and are therefore subject to higher installation and excavation movements.

Based on the response to 4) included above, it is understood that no further action is required with respect to this query.

We trust that the above comments are sufficient for your present requirements, but please do not hesitate to contact us if we can be of any further assistance..

Yours sincerely

GEOTECHNICAL & ENVIRONMENTAL ASSOCIATES



Matthew Penfold

APPENDIX B

CORRESPONDENCE WITH SAS

POST AUDIT

From: Tom Murray - Site Analytical <tommurray@siteanalytical.co.uk>
Sent: 25 January 2024 15:57
To: Simone Boncio
Subject: RE: 139 Cranley Gardens, London N10 - Soil Investigation [Filed 25 Jan 2024 15:57]

Categories: Filed by Mail Manager

Hi Simone,

Yes, we still believe this backs up our previous statement of this being perched water up top of the clay and not a true groundwater level.

Best Regards,

Tom

Thomas Murray MSc, BSc (Hons), FGS
Director - Geotechnical

For and On Behalf of

Site Analytical Services Limited
Units 14 + 15
River Road Business Park
33 River Road
Barking, Essex
IG11 0EA

Tel: 0208 594 8134
Mob: 07809 904 132
Fax: 020 8594 8072
www.siteanalyticalgroup.co.uk



From: Simone Boncio <simone.boncio@symmetrys.com>
Sent: Thursday, January 25, 2024 3:55 PM
To: Tom Murray - Site Analytical <tommurray@siteanalytical.co.uk>
Subject: RE: 139 Cranley Gardens, London N10 - Soil Investigation

Hi Tom,

Based on the recent reading, and to satisfy Campbell Reith query on the baseline for ground water regime, could you please confirm whether you are happy to confirm your previous assessment included at clause 7.7 of Phase 2 SI report, i.e. perched water within the Made Ground.

Your view on the above would be really appreciated.

Many thanks.

Simone

SIMONE BONCIO
BSc MSc CEng AStructE
Principal Engineer



T 020 8340 4041
M 07859 875266



From: Tom Murray - Site Analytical <tommurray@siteanalytical.co.uk>
Sent: Thursday, January 18, 2024 11:51 AM
To: Simone Boncio <simone.boncio@symmetrys.com>
Cc: Alan Crawford <acrawford@crawfordpartnership.co.uk>; Lee <leedoherty46@btinternet.com>
Subject: RE: 139 Cranley Gardens, London N10 - Soil Investigation

Hi Simone,

The monitoring was as follows:

GROUNDWATER MONITORING RECORD			
Date	Weather Conditions	Ground Conditions	Temperature (°C)
18/01/2024	Clear Skies	Dry	-2.0
Monitoring Point Location	Depth to water (mBGL)		Depth to Base of well (mBGL)
BH1	0.73		5.12

This is slightly higher than previously monitored, but is in line with seasonal fluctuations.

Best Regards,

Tom

Thomas Murray MSc, BSc (Hons), FGS
Director - Geotechnical

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From: Simone Boncio <simone.boncio@symmetrys.com>
Sent: Thursday, January 18, 2024 11:32 AM
To: Tom Murray - Site Analytical <tommurray@siteanalytical.co.uk>
Cc: Alan Crawford <acrawford@crawfordpartnership.co.uk>; Lee <leedoherty46@btinternet.com>
Subject: RE: 139 Cranley Gardens, London N10 - Soil Investigation

Hi Tom,

We have been informed by Lee that a SAS operative attended site.

Could you please provide us with an email confirming the reading, and an interpretation of the reading to inform the baseline of the ground water regime. This will assist on subjects 4 to 6 on the Audit Query Tracker.

Should you wish to discuss this matter further, please let me know.

Best regards,

Simone

SIMONE BONCIO
BSc MSc CEng AStructE
Principal Engineer



T 020 8340 4041
M 07859 875266



SYMMETRYS.COM