CampbellReith
consulting engineers

27A Lady Somerset Rd, London, NW5 1TX

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 13693-28
Revision: F1

July 2022

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Project Name	Flat A 27 Lady Somerset Road, London, NW5 1TX
Planning Reference	2021/3722/P

Contents

Appendices

1.0 NON-TECHNICAL SUMMARY

1.1. CampbellReith was instructed by London Borough of Camden, (LBC) to carry out an audit on the Basement Impact Assessment submitted as part of the Planning Submission documentation for Flat A 27 Lady Somerset Road, London, NW5 1TX (planning reference 2021/3722/P). The basement is considered to fall within Category B as defined by the Terms of Reference.

1.2. The Audit reviewed the Basement Impact Assessment for potential impact on land stability and local ground and surface water conditions arising from basement development in accordance with LBC's policies and technical procedures.

1.3. CampbellReith was able to access LBC's Planning Portal and gain access to the latest revision of submitted documentation and reviewed it against an agreed audit check list.

1.4. The Basement Impact Assessment (BIA) has been carried out by Blue Engineering and supported by input form CGL and Price and Myers. The individuals concerned in its production have suitable qualifications as per CPG: Basements 2021.

1.5. Desk study information and an outline construction programme is provided.

1.6. An updated ground investigation was undertaken by CGL and subsequent monitoring indicates dry conditions. The BIA indicates that the proposed basement will be founded within Weathered London Clay.

1.7. Geotechnical parameters to inform the foundation and retaining wall designs are provided.

1.8. A green roof will be implemented as part of the development to attenuate surface water and assessment provided demonstrates peak surface water run-off rates are reduced and mitigates against flood risk due to the proposed development.

1.9. A reinforced concrete retaining wall will be built by No. 29 utilising underpinning techniques, whilst the party wall to No. 25 is already formed by the existing basement to No. 25, and therefore no additional underpinning is required.

1.10. A ground movement assessment is presented within the CGL BIA that demonstrates damage will be limited to Category 1 of the Burland scale.

1.11. It is accepted that there will be no impact to slopes due to the proposed development.

1.12. It is accepted that the proposed development site is not subject to flooding.

1.13. It can be confirmed that the BIA complies with the requirements of CPG Basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 3rd December 2021 to carry out a Category B audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 27A Lady Somerset Road, London, NW5 1TX.

2.2. The audit was carried out in accordance with the Terms of Reference set by LBC. It reviewed the Basement Impact Assessment for potential impact on land stability and local ground and surface water conditions arising from basement development.

2.3. A BIA is required for all planning applications with basements in Camden in general accordance with policies and technical procedures contained within

- Camden Local Plan 2017 - Policy A5 Basements.
- Camden Planning Guidance (CPG): Basements. January 2021.
- Guidance for Subterranean Development (GSD). Issue 01. November 2010. Ove Arup & Partners.
- Kentish Town Neighbourhood Plan.

2.4. The BIA should demonstrate that schemes:

a) maintain the structural stability of the building and neighbouring properties;

b) avoid adversely affecting drainage and run off or causing other damage to the water environment;

c) avoid cumulative impacts upon structural stability or the water environment in the local area;

and evaluate the impacts of the proposed basement considering the issues of hydrology, hydrogeology and land stability via the process described by the GSD and to make recommendations for the detailed design.

2.5. LBC's Audit Instruction described the planning proposal as *"Erection of a single storey rear extension and alterations to front lower ground floor windows."*

The Audit Instruction confirmed 27A Lady Somerset Road did not involve, nor was a neighbour to, any listed buildings.

2.6. CampbellReith accessed LBC's Planning Portal on 10/12/2021 and gained access to the following relevant documents for audit purposes:

- Design Study, Basement Impact Assessment Report (BIA) & Structural Strategy Report (SSR) by Blue Engineering, Rev A, dated 8th July 2021.
- Planning Application Drawings by Polysmiths, dated 6th January 2021 consisting of

  Location Plan

  Existing Plans

  Proposed Plans
- Design & Access Statement by Polysmiths, dated 26th July 2021

2.7. CampbellReith were provided with the following documents relevant for audit purposes between March and May 2022:

- Basement Impact Assessment by CGL, Rev 1, dated 30th May 2022 (Ref No. - CGE/16661).
- Price & Myers Drainage Letter, dated 5th May 2022, (Ref No. – 30274).
- Email Correspondence with CGL including Figure 8 (Appendix 3).
- Outline Construction Programme Plan.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	In accordance with CPG Basements 4.7
Is data required by Cl.233 of the GSD presented?	Yes	Construction programme and desk study information presented
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	
Are suitable plan/maps included?	Yes	Information as Arup GSD Appendix G1 provided
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	Information as Arup GSD Appendix G1 provided
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3 of BIA. Question 8 response updated to acknowledge Historic River Fleet.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3 of BIA. Question 2 response updated to acknowledge Historic River Fleet.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3 of BIA. Responses updated
Is a conceptual model presented?	Yes	Model updated along with a ground investigation.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4.0 of BIA

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Updated ground investigation undertaken to confirm ground water conditions onsite.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Assessment provided for runoff rates for green roof.
Is factual ground investigation data provided?	Yes	New Ground Investigation undertaken by CGL as per Arup GSD Appendix G2.
Is monitoring data presented?	Yes	Monitoring installations provided during investigation.
Is the ground investigation informed by a desk study?	Yes	Section 5 of BIA.
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	Adjacent No.25 is stated as having a lower ground floor.
Is a geotechnical interpretation presented?	Yes	Section 5 of CGL BIA.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Section 5.9 of CGL BIA.
Are reports on other investigations required by screening and scoping presented?	Yes	Desk study, details on proposed green roof attenuation, GMA, appropriate site investigation and geotechnical information are provided.
Are the baseline conditions described, based on the GSD?	Yes	As above
Do the base line conditions consider adjacent or nearby basements	Yes	
Is an Impact Assessment provided?	Yes	Section 9 of BIA

Item	Yes/No/NA	Comment
Are estimates of ground movement and structural impact presented?	Yes	See also Appendix 3.
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	Yes	GMA and updated GI provided.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	Green roof
Has the need for monitoring during construction been considered?	Yes	Section 8.0 of CGL BIA.
Have the residual (after mitigation) impacts been clearly identified?	Yes	None
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	GMA undertaken and email correspondence attached in Appendix 3.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	Assessment on proposed green roof attenuation provided.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	As above.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	BIA report and GMA amendments in Appendix 3.
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by Blue Engineering and supported by input form CGL and Price and Myers. The individuals concerned in its production have suitable qualifications as per CPG: Basements 2021.

4.2. The LBC Instruction to proceed with the audit identified that the basement proposal was not a listed building, nor was it adjacent to listed buildings. The Design & Access Statement identified that 27A Lady Somerset Road is not located within a Conservation Area but sits between the Kentish Town and Dartmouth Park Conservation Areas.

4.3. The proposed works consists of a single storey extension into the rear garden at lower ground floor level across the full width of the garden. The extension would involve the excavation of approximately 1.50m soil below the existing garden level.

4.4. Desk study information is provided within the CGL BIA and an outline construction programme is provided.

4.5. The historic River Fleet is identified as being approximately 50m away from the site and responses to screening questions (Q8, land stability and Q2, hydrogeology) acknowledge this. It is noted the river is now culverted and the ground investigation did not encounter Alluvium or groundwater, and subsequent monitoring data reveal dry conditions. It is accepted that the development will not impact nor be impacted by the River Fleet.

4.6. Surface Water screening states the implementation of a green roof will serve as a storage area to attenuate surface water. An assessment carried out by Price and Myers demonstrate the green roof will achieve greenfield runoff rates and would provide benefit compared to the existing site drainage.

4.7. With respect to land stability, the following issues are identified and carried forward onto scoping to assess the potential outcomes:

- The London Clay is prone to shrinkage and swelling.
- Increase in differential depths of neighbouring properties, may lead to damage.

4.8. An updated ground Investigation was undertaken by CGL comprising of two windowless sample to a depth of 5.00m bgl. The logs show Made Ground to 0.50m bgl, Clay rich Head Deposits to 1.20m bgl, and weathered London Clay Formation to depth. According to the BIA, the proposed basement will be built within the weathered London Clay Formation.

4.9. Groundwater was not encountered during the investigation nor the subsequent monitoring period. BGS records have been reviewed and the London Clay is identified as being of very low permeability. There will be no impact to groundwater flow.

4.10. Sufficient geotechnical information is provided. Geotechnical parameters to inform the foundation and retaining wall designs are presented in Section 5.9 of the CGL BIA.

4.11. The site investigation identifies the presence of a lower ground floor at No. 25, with no lower ground floor / basement recorded at No. 29. The architectural section drawings indicate the maximum retained height along the party wall with No. 29 to be 1.50m.

4.12. The party wall of No. 25 (Section S3 of Drawing 101) already comprises a retaining wall due to the existing basement to No. 25. The existing foundation is to be scabbled back to allow for a blockwork liner wall to be built off the basement ground bearing slab. The party wall by No. 29 is to be underpinned to maximum depth of c. 1.50m and undertaken in short section not exceeding 1.00m in length.

4.13. An updated Building damage Assessment is provided by CGL and email correspondence is appended within Appendix 3. A PDISP assessment is undertaken to calculate vertical ground movement in the short and long term with the input of structural loading and movements due to workmanship being considered in the assessment.

4.14. Critical sections are walls perpendicular to the excavations of neighbouring properties and are appraised to establish a damage category. In order to limit damage to Category 1 (Very Slight) of the Burland Scale, the net horizontal movement is limited to 3.5mm, which allows for 5mm of movement at the basement wall, which is considered feasible, using a High Support Stiffness construction methodology.

4.15. A movement monitoring strategy is discussed in the CGL BIA, which should be implemented to ensure control of construction, limiting damage to a maximum of Category 1. It is proposed that trigger levels are finalised and agreed by the Party Wall surveyors prior to construction.

4.16. It is accepted that there will be no impact to slopes due to the development.

4.17. It is accepted that the proposed development site is not subject to flooding.

5.0 CONCLUSIONS

5.1. Evidence of input into the BIA by individuals who possess suitable qualifications is provided.

5.2. Desk study information and an outline construction programme is provided.

5.3. An updated ground investigation was undertaken by CGL and subsequent monitoring indicates dry conditions. The BIA indicates that the proposed basement will be founded within the weathered London Clay.

5.4. Geotechnical parameters to inform the foundation and retaining wall designs are provided.

5.5. A green roof will be implemented as part of the development to attenuate surface water run-off rates.

5.6. Sufficient structural information has been provided to inform the BIA.

5.7. A ground movement assessment is presented within the CGL BIA. Damage to neighbouring properties will be limited to Category 1 of the Burland scale.

5.8. It is accepted that there will be no impact to slopes due to the development.

5.9. It is accepted that the proposed development site is not subject to flooding.

5.10. It can be confirmed that the BIA complies with the requirements of CPG Basements.

Appendix 1: Residents' Consultation Comments

None

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA Format	Evidence of input into BIA by appropriately qualified professionals required, as CPG Basements 2021.	Closed	May 2022
2	BIA Format	Desk Study as GSD Appendix G1 required.	Closed	May 2022
3	BIA Format	Outline construction programme required.	Closed	May 2022
4	Land Stability / Hydrogeology / Hydrology	Screening responses to be reviewed as detailed in Section 4.	Closed	May 2022
5	Land Stability / Hydrogeology	Soil descriptions inconsistent with stated geology at formation level. Suitable investigation required to justify assessments at GSD Appendix G2 required.	Closed	May 2022
6	Land Stability / Hydrogeology	Geotechnical parameters to inform the foundation and retaining wall designs, as well as the temporary works strategy, should be presented, evidenced by suitable site investigation, as GSD Appendix G3.	Closed	May 2022
7	Land Stability	A ground movement assessment is required, as detailed in Section 4.	Closed	July 2022
8	Hydrology	The proposed development results in an increase in impermeable site area. The BIA states this will be mitigated by the provision of a green roof. Outline assessment sufficient to demonstrate adequate mitigation should be provided.	Closed	May 2022

Appendix 3: Supplementary Supporting Documents

Email Correspondence with CGL and CampbellReith

Figure 8 - Combined ground movement plot - 29 LSR

RE: 13693-28: 27a Lady Somerset Road <2021/3722/P>

Graham Kite to Amir Abbasi 17/06/2022 13:28

Cc "AnsaffAshraff@campbellreith.com", "Anna Wai", "camdenaudit@campbellreith.com", "charles wu", "Christoph Hus", "Young, Nathaniel", "Steve Morgan"

Hi Amir

Many thanks for your email.

In regard to the calculations presented, these are accepted and we will close out the BIA audit on that basis. FYI your email below and the attachment will be included within the Appendix 3 of the report for future reference.

As a general point for future reference, unfortunately the engineering controls / supervision for domestic basement projects are simply not as robust in practise as those for large scale commercial basement projects - theoretically of course they are, but the reality is that typically there is not the budget allowed within the domestic projects for monitoring / engineering supervision / contractor contingency response etc. Its also generally true that domestic projects are more sensitive than commercial ones, with impacts to neighbouring domestic properties being felt more acutely than impacts to commercial neighbours. And so, on that basis, we expect moderately conservative values to be adopted within impact assessments to provide some robustness. Its worth noting that, for the commercial basement project you have referenced, the limiting movement values agreed were subject to quite an onerous process of meetings including yourselves / contractor / LBC / Campbell Reith and agreed on the basis of the resources that could be feasibly be deployed on a development of that scale. It would also be common place for a Basement Construction Plan to be required in instances where very small movement tolerances might be deemed feasible, which again presents a a technical burden (and financial burden) on the design and construction process which would be unlikely to be acceptable with a domestic project.

Regards

Graham Kite

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"Amir Abbasi" Good afternoon Graham. Thank you for the... 06/15/2022 12:24:55 PM

From: "Amir Abbasi" <AmirA@cgl-uk.com>
To: "GrahamKite@campbellreith.com" <GrahamKite@campbellreith.com>
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Date: 06/15/2022 12:24 PM
Subject: RE: 13693-28: 27a Lady Somerset Road <2021/3722/P>

Good afternoon Graham.

Thank you for the email.

For No.29 Lady Somerset Road, the underpinned party wall, we are calculating 2mm of deflection. A combined ground movement plot for No. 29 is attached. In order to limit to Category 1 damage, we have limited the horizontal strain to 0.058%, by limiting the net horizontal movement/extension of the neighbouring structure to 3.5mm. Our rationale for this is as follows:

1. We assume that 5mm horizontal at the underpin is allowed over a typical excavation depth of ~2m
2. The distance behind the wall to negligible movement can be reasonably taken as ~8m based CIRIA C760 (extract below), and assuming a high (or low) support system.
3. Therefore, the corresponding movement at the rear of the building (~6m away) would be approximately ~1.5mm, therefore the corresponding net horizontal extension of the structure for the purpose of damage category calculations is ~3.5mm.

Movement type	**High support stiffness** (high propped wall, top-down construction)		**Low support stiffness** (cantilever or low-stiffness temporary props or temporary props installed at low level)	
	Surface movement at wall (per cent of max excavation depth)	*Distance behind wall to negligible movement (multiple of max excavation depth)*	*Surface movement at wall (per cent of max excavation depth)*	*Distance behind wall to negligible movement (multiple of max excavation depth)*
Horizontal	0.15	4	0.4	4
Vertical	0.1	3.5	0.35	3.5

Please also note that this assessment is already highly conservative, as we have removed all vertical heave from basement unloading in the long term model.
Also based on the above the anticipated maximum horizontal surface deflection would be ~3mm (2m/0.15%), and hence the adopted 5mm is conservative.

With regards to Steve Morgan's previous projects that you have mentioned, I understand that this was in relation to the project at 251-259 Camden High Street. Within that report (BIA Revision 7), the following was stated:

- *"The span between the footings of the adjacent party wall properties has been assumed from development plans to be approximately 5m. This span distance is taken perpendicular and not parallel to the basement footprint.*

  The limiting horizontal strain, in terms of millimetres for a 5m wide structure is 3.75mm, assuming a deflection ratio of zero, in order to maintain a damage category of 1. Underpinning is not expected to generate significant horizontal movements due to the nature of the work and the relative stiffness of the underpin as a wall. Monitoring data indicate that for double height (6.5m) underpins, lateral movements recorded were of the order of 2mm to 3mm. The underpinning for the current site is significantly lower than this, and therefore with good construction control no significant horizontal movements are expected.

  Horizontal limiting movements relate to net movement across the party wall structures."

For reference, a summary of the ground movements and corresponding damage category for that Project is included below. Please also note the highlighted elements of this table, which demonstrate the same approach that we have adopted

Critical Section	Max. net horizontal movement [c] (mm)	Calculated Maximum deflection (mm)	Limiting horizontal Strain εh [a] (%)	Deflection ratio Δ/L [b] (%)	Damage category
249 Camden High Street Party Wall	3.0	1.5	0.06	0.03	1 – very slight
261 Camden High Street Party Wall	2.9	1.8	0.058	0.036	1 – very slight
Office building to the rear of 251 Camden High Street Party Wall	3.5	0.5	0.07	0.01	1 - very slight
226 Arlington Road (The Glass Building) Party Wall	2.5	2.0	0.05	0.04	1 - very slight

a. *See Figure 2.18 (a) CIRIA C580 (2003) Embedded retaining walls guidance for economic design. (L = length of adjacent structure in metres, perpendicular to basement; Δ = relative deflection)*
b. *See Box 2.5 (v) CIRIA C580 (2003) Embedded retaining walls guidance for economic design. (δ_h = horizontal movement in metres*
c. *Net horizontal movement across party wall structures to generate strains, restricted to less than Cat 1.*

In this regard, the previous project that Steve Morgan was involved in, has taken the same approach and justification as we are stating, above.

I trust that the above is acceptable and closes out the remaining comments?

Kind regards

Amir

Amir Abbasi

Principal Engineer

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From: GrahamKite@campbellreith.com <GrahamKite@campbellreith.com>
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Subject: 13693-28: 27a Lady Somerset Road <2021/3722/P>

Hi Amir

I tried calling earlier and left a message. I wanted to have a quick discussion in regard to your BIA for this project, specifically the GMA and the correspondence you have had with Ansaff.

Notwithstanding any comments made specifically about the GMA methodology adopted, in summary we would be very concerned if you were unable to demonstrate that predicted damage to neighbouring properties could be kept to Category 1 without reducing you vertical or horizontal movement estimates to <5mm at the wall. This is because managing construction to ensure movements do not exceed these minimum values would be extremely difficult, even with a well managed and comprehensive monitoring strategy.

Reading through your previous responses to Ansaff, it appears that you are currently predicting 3mm of vertical movement at the wall. It was unclear to me whether you are predicting 3.5mm deflection at the wall or whether that is the net change in horizontal strain along the wall being assessed. It would be beneficial if you could attach some calculation outputs with future responses (e.g. contour plots) for clarity.

I have copied in Steve who I have met with / discussed this issue with previously on other GMAs, and therefore may be of some assistance.

Regards

Graham Kite

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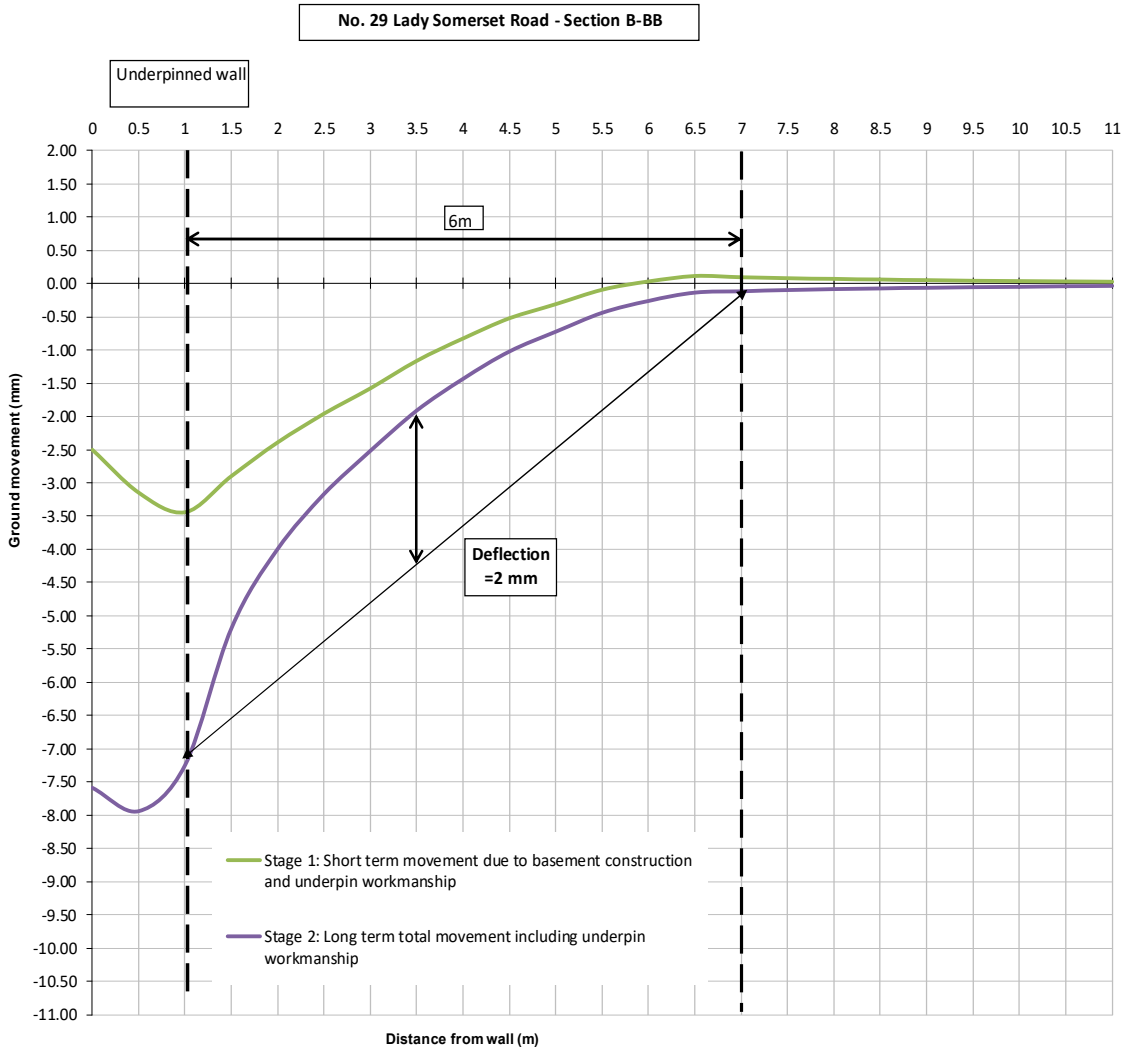

Client	Project	Job No
Mr Christoph Hus	**27a Lady Somerset Road, Camden, NW5 1TX**	**CGE/16661**
CGL	Title: **Combined Cumulative Vertical Movement Section B-BB**	**Figure 8**

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