

10 Abbot's Place, London

For

James Wainwright

BUILDING DAMAGE ASSESSMENT REPORT

August 2024

Prepared by Earth Water GCE

Client Name: James Wainwright

Project Name: 10 Abbot's Place, London, NW6 4NP

Project No: 15688

Document No: EWGCE-15688-01-R-BDA-003

Quality Assurance – Approval Status

This document has been prepared and checked in accordance with Earth Water GCE internal management procedures.

Issue	Date	Prepared by:	Checked by:	Approved by:
1	02/08/2024	AR	AK	AR
2	05/08/2024	AR	AK	AR
3	19/08/2024	AR	AK	AR

Author: Ali Raza BEng (Hons) MSc DIC CEng FICE

Checker: Aliki Kokkinou MEng (Hons) MSc DIC CEng MICE

Comments:

Issue 1 – First draft.

Issue 2 – Included 41 Priory Road Building.

Issue 3 – Further comments addressed.

Disclaimer

This report has been prepared by Earth Water GCE, with all reasonable skill, care and diligence within the terms of the Contract with the client), incorporation of our General Terms and Condition of Business and taking account of the resources developed to us by agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at its own risk.

TABLE OF CONTENTS

1. Introduction	1
1.1 Study Aims and Objectives	1
1.2 Limitations	1
2. Site Location and Description	2
2.1 Site Location	2
2.2 Current Site and Surrounding Land Uses	2
2.3 Proposed Development	2
3. Third Party Assets	4
3.1 Building Damage Assessment (BDA)	4
4. Ground Model and Parameters	6
4.1 Ground Model and Geotechnical Parameters	6
4.2 Groundwater	6
5. Loading Information	7
6. Assessment Methodology	8
6.1 Pdisp Modelling Methodology	8
6.2 Xdisp Modelling Methodology	8
7. Results	10
7.1 Potential Building Damage Assessment	10
8. Conclusions	13
9. References	14

Figures

Figure 1: Current site layout (courtesy of google map)	2
Figure 2: Proposed basement plan (extract from architect's drawing)	3
Figure 3: Proposed section (extract from architect's drawing)	3
Figure 4: Adjacent building included in this BDA	4
Figure 5: Damage category classification – CIRIA C760 Table 6.4: Classification of visible damage to walls (after Burland et al., 1977, Boscardin and Cording, 1989 and Burland, 2001)	5
Figure 6: Potential building damage assessment model view	10

Tables

Table 1: Ground model and geotechnical parameters summary	6
Table 2: Building damage assessment results summary [Model 4]	10
Table 3: Building damage assessment results summary [Model 5]	11
Table 4: Building damage assessment results summary [Model 6]	12

Appendices

- A. Xdisp Tabular Output
- B. Pdisp Tabular Output

1. Introduction

Earth Water GCE has been instructed by Qaim Structures on behalf of James Wainwright to prepare a Building Damage Assessment (BDA) report for the proposed development at 10 Abbot's Place, London.

1.1 Study Aims and Objectives

This report aims to give a degree of certainty to the asset owners and the developer to understand the predicted ground movements and the potential impact at the location of the assets.

This ground movement assessment has included the following assets:

- Key Facades of 11 Abbot's Place.
- Key Facades of 41 Priory Road.

1.2 Limitations

This report is based upon information obtained from third party sources. The third-party data has been accepted at face value and has not been independently verified. Earth Water GCE can therefore give no warranty, representation, or assurance as to the accuracy or completeness of such information.

This report has been prepared for the sole internal use and reliance of the Client, James Wainwright, and shall not be relied upon by other parties without the express written authority of Earth Water GCE. If an unauthorised third party comes into possession of this report, then they rely on it at their own risk.

2. Site Location and Description

2.1 Site Location

The site is located at street address of 10 Abbot's Place, London NW6 4NP with a national grid reference of TQ 25582 83966. The site has an approximate area of 0.021ha. Figure 1 presents the current site layout.

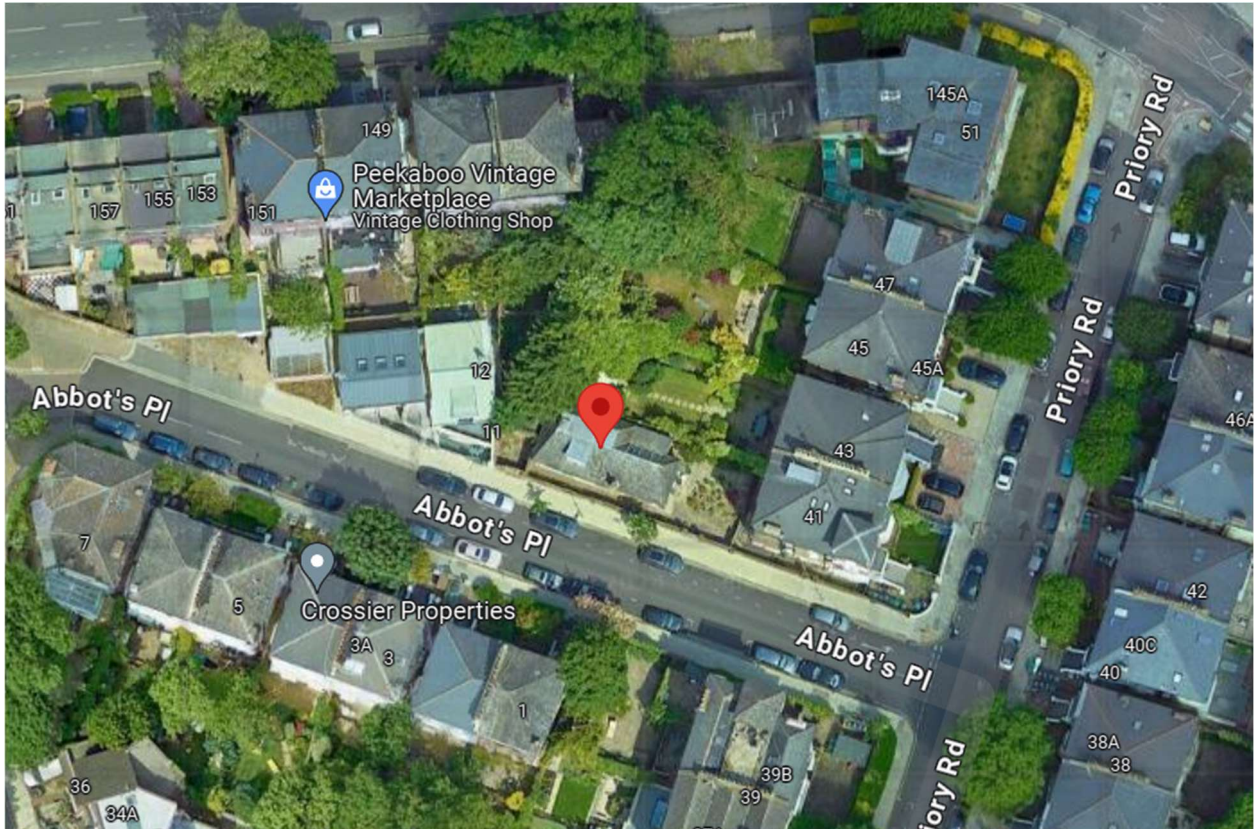


Figure 1: Current site layout (courtesy of google map)

2.2 Current Site and Surrounding Land Uses

The site is currently occupied by a single storey bungalow type building (as shown in Figure 1).

The site surrounding is predominantly consisting of residential buildings.

2.3 Proposed Development

The proposed development will consist of the construction of a new single-level basement, renovation of the existing building and internal structural alteration.

The new building structure will be as follows:

- A hit and miss sequence of underpinning along all four sides of the building.
- A 300mm thick raft foundation to support wall loading with local thickening of the raft under the walls.
- Transfer of building loading on the new foundation.

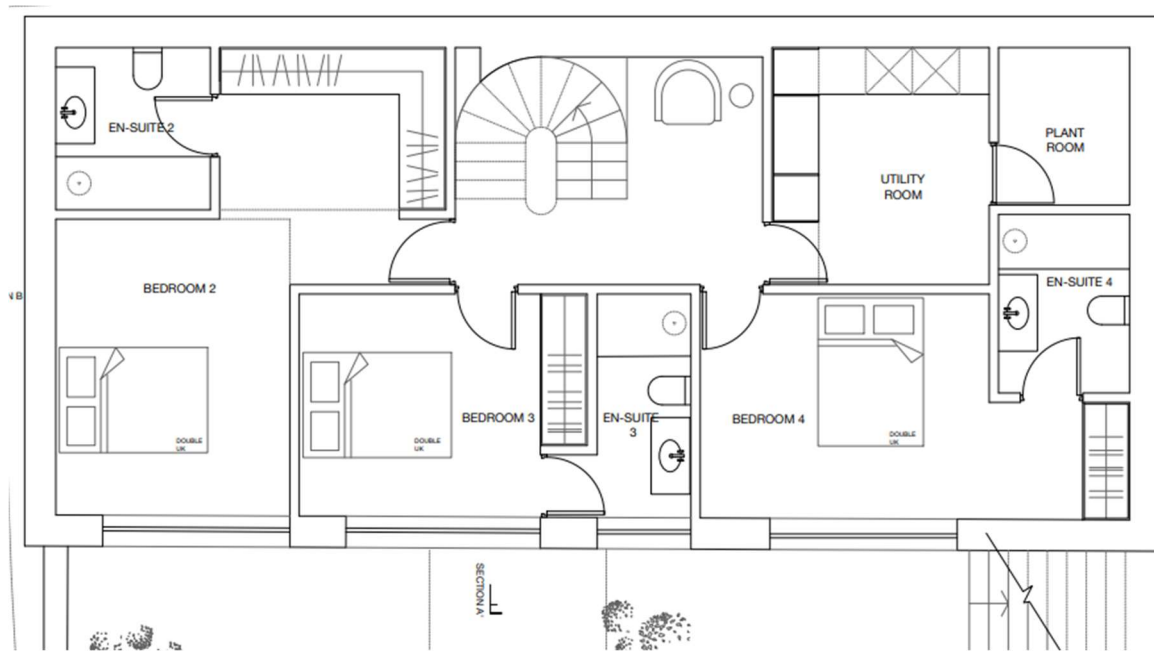


Figure 2: Proposed basement plan (extract from architect's drawing)

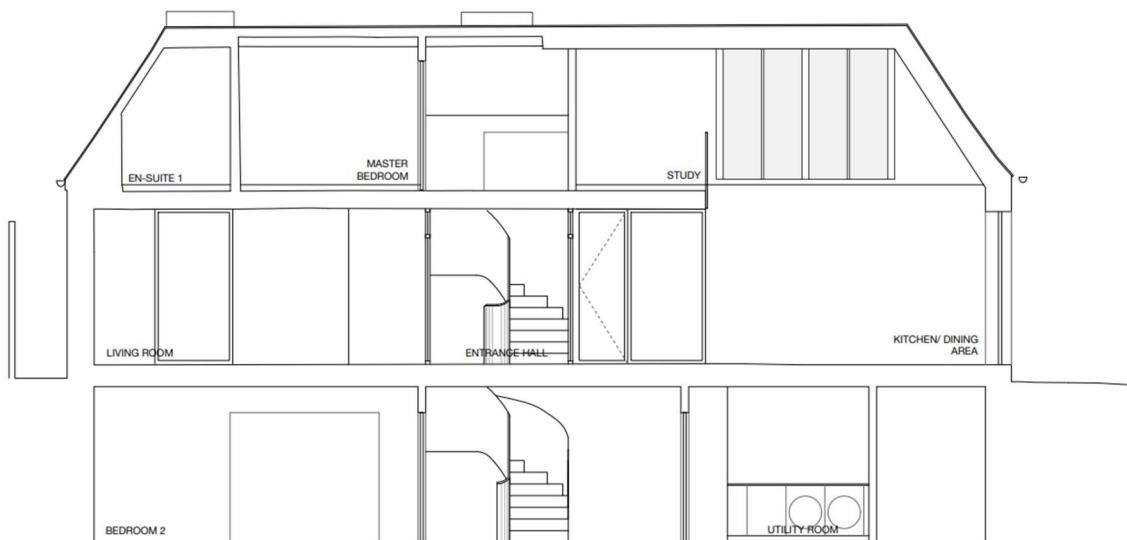


Figure 3: Proposed section (extract from architect's drawing)

3. Third Party Assets

The following neighbouring buildings have been included in this assessment.

- 11 Abbot's Place.
- 41 Priory Road.

The third-party assets are shown in Figure 4.

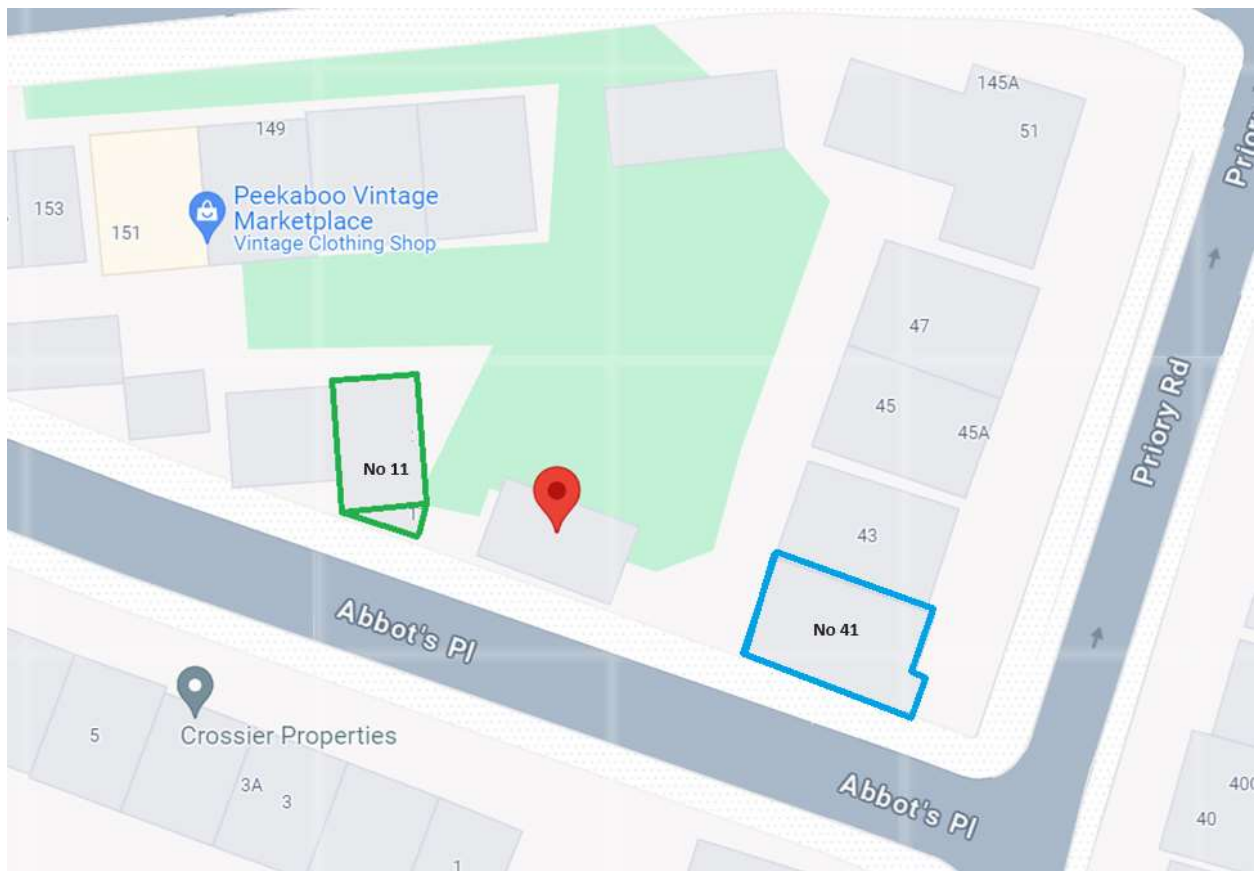


Figure 4: Adjacent buildings included in this BDA

3.1 Building Damage Assessment (BDA)

A building damage assessment has been undertaken to assess the potential impact of the proposed development on the adjacent buildings, due to the following key construction stages:

- Underpinning
- Excavation to Basement
- Long-term structural loading

The overall aim of this study is to evaluate the potential impact of the proposed redevelopment on the neighbouring

buildings. The building damage assessment has been undertaken in accordance with the Burland (2001) assessment criteria presented in CIRIA C760.

The damage criteria limiting tensile strain, description of the damage categories and associated approximate crack widths are presented in Figure 5. According to the various London Borough councils, the acceptable damage categories are "0 Negligible" to "2 Slight" and are highlighted in Figure 5. However, for this assessment the acceptable damage category has been considered to be 1 Very Slight.

Category of damage	Description of typical damage (ease of repair is underlined)	Approximate crack width (mm)	Limiting tensile strain, ϵ_{tm} (%)
0 Negligible	Hairline cracks of less than about 0.1 mm are classed as negligible	<0.1	0.0 to 0.05
1 Very slight	Fine cracks that can easily be treated during normal decoration. Perhaps isolated slight fracture in building. Cracks in external brickwork visible on inspection	<1	0.05 to 0.075
2 Slight	Cracks easily filled. Redecoration probably required. Several slight fractures showing inside of building. Cracks are visible externally and some repointing may be required externally to ensure weathertightness. Doors and windows may stick slightly.	<5	0.075 to 0.15
3 Moderate	The cracks require some opening up and can be patched by a mason. Recurrent cracks can be masked by suitable lining. Repointing of external brickwork and possibly a small amount of brickwork to be replaced. Doors and windows sticking. Service pipes may fracture. Weathertightness often impaired.	5 to 15 or a number of cracks >3	0.15 to 0.3
4 Severe	Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows. Windows and frames distorted, floor sloping noticeably. Walls leaning or bulging noticeably, some loss of bearing in beams. Services pipes disrupted.	15 to 25, but also depends on number of cracks	>0.3
5 Very severe	This requires a major repair, involving partial or complete rebuilding. Beams lose bearings, walls lean badly and require shoring. Windows broken with distortion. Danger of instability.	Usually >25, but depends on numbers of cracks	

Notes

- 1 In assessing the degree of damage, account must be taken of its location in the building or structure.
- 2 Crack width is only one aspect of damage and should not be used on its own as a direct measure of it.

Figure 5: Damage category classification – CIRIA C760 Table 6.4: Classification of visible damage to walls (after Burland et al., 1977, Boscardin and Cording, 1989 and Burland, 2001)

4. Ground Model and Parameters

4.1 Ground Model and Geotechnical Parameters

Ground model and geotechnical parameters have been evaluated based on the information from the experience in the area, borehole logs available from BGS archives and site-specific ground investigation undertaken by MRH geotechnical in December 2023.

A summary of ground condition and geotechnical parameters used in design are presented in Table 1.

Table 1: Ground model and geotechnical parameters summary

Stratum	Thickness (m)	Undrained Young's Modulus (MN/m ²)	Drained Young's Modulus (MN/m ²)	Drained Poisson's Ratio
Made Ground	1.0	-	5.0	0.2
London Clay	>7.0	17.5+1.75z	14.0+1.4z	0.2

Notes:

- The undrained stiffness for cohesive strata has been obtained by correlation with the undrained shear strength for the anticipated range of strain in the respective analytical models. The drained stiffness for cohesive strata has been taken as 80% of the undrained stiffness, following principles of elasticity theory (assuming a Poisson's Ratio of 0.2).
- The Made Ground stiffness has been assumed based on experience in the area.
- z is the depth below top of London Clay
- The Clay stiffness profiles indicated are based on the relationship $E_u = 350C_u$ corresponding to strain levels associated with unloading due to excavation/ demolition and subsequent loading on raft foundation.

4.2 Groundwater

No groundwater strikes were noted from the ground investigation works.

5. Loading Information

To represent the phasing of proposed development, underpinning loading during deepening of existing foundations, excavation unloading (removal of soil) and proposed development loading have been considered in corresponding stages in the modelling.

The underpinning loading during deepening of foundation to create new basement has been considered considering additional weight of concrete. Excavation unloading has been considered equivalent to removal of 3m of soil to achieve required basement level. The loading for the new built has been considered as maximum of 100kPa at the underpinning location and approximately 20kPa in the general area.

6. Assessment Methodology

6.1 Pdisp Modelling Methodology

A series of greenfield ground movement analyses have been carried out, using the commercial software Oasys Pdisp, to evaluate the short and long-term movements induced by the proposed construction works. The construction scheme comprises the partial demolition, underpinning of the existing foundation to enable basement excavation, excavation to the proposed formation level and the construction of the proposed structure. The analyses have been undertaken assuming undrained and drained conditions for the cohesive strata, in order to evaluate the short- and long-term effects, respectively. The excavation stage has been modelled as an upwards uniform surface load at the formation level.

Pdisp calculates the displacements and changes in vertical stress in a linear elastic soil medium, which arise from uniform normal or tangential pressures applied on a specific level. The analysis has been carried out using the Boussinesq (1885) method. This method calculates the stress distribution assuming a uniform isotropic material with a constant user-defined Poisson's ratio.

The following analyses have been carried out:

- **Model 1** – Pdisp Underpinning Short Term (ST) conditions.
- **Model 2** – Pdisp Underpinning + Excavation ST conditions.
- **Model 3** – Pdisp Underpinning + Excavation + Proposed Building Loading Long Term (LT) conditions.

6.2 Xdisp Modelling Methodology

A potential building damage assessment has been carried out using Oasys Xdisp. The software considers the imported global movements from Pdisp models and uses the Burland strain criteria (2001) to evaluate the building damage category of each façade of the building due to these movements. The Burland building damage assessment criteria are presented in Section 3.1. No horizontal movements have been considered due to underpinning assuming good workmanship.

The building damage assessment uses the work described in Burland et al (2001) and Gaba et al (2003). In this approach the façades of the buildings are represented by simple linear elastic beam with E/G of 2.6 for a Poisson ratio of 0.3, whose foundations are assumed to follow the “greenfield” soil movements at ground surface. The height of the buildings is also an input for the assessment and has been derived based on the visual assessment from google maps and site visit.

Although, this stage of assessment is relatively detailed, the assumptions made are moderately conservative. Consequently, the categories of damage derived in this level of assessment are only potential degrees of damage. The actual damage should be less than the predicted due to the inherent stiffness of the structures and their foundations, which tend to redistribute and reduce both the deflection ratio and the horizontal strains.

The following combined analyses have been carried out in Xdisp in order to simulate the ground movements occurring following existing building demolition, basement excavation and subsequent structural loading in short- and long-term conditions.

- **Model 4** – Xdisp Underpinning ST – model based on results from Model 1.
- **Model 5** – Xdisp Underpinning + Excavation ST – model based on results from Model 2.

- **Model 6** – Xdisp Combined Loading LT – model based on results from Model 3.

7. Results

7.1 Potential Building Damage Assessment

The view of the potential building damage assessment model is shown in Figure 6. The simplified shape of façades of adjacent buildings has been modelled. The potential building damage category for each façade is summarised in Table 2 to Table 4.

It is worth noting that the assessment carried out involves a number of conservative assumptions in terms of greenfield movements and no allowance for structural stiffness and therefore the anticipated ground movements are likely to be of smaller magnitude.

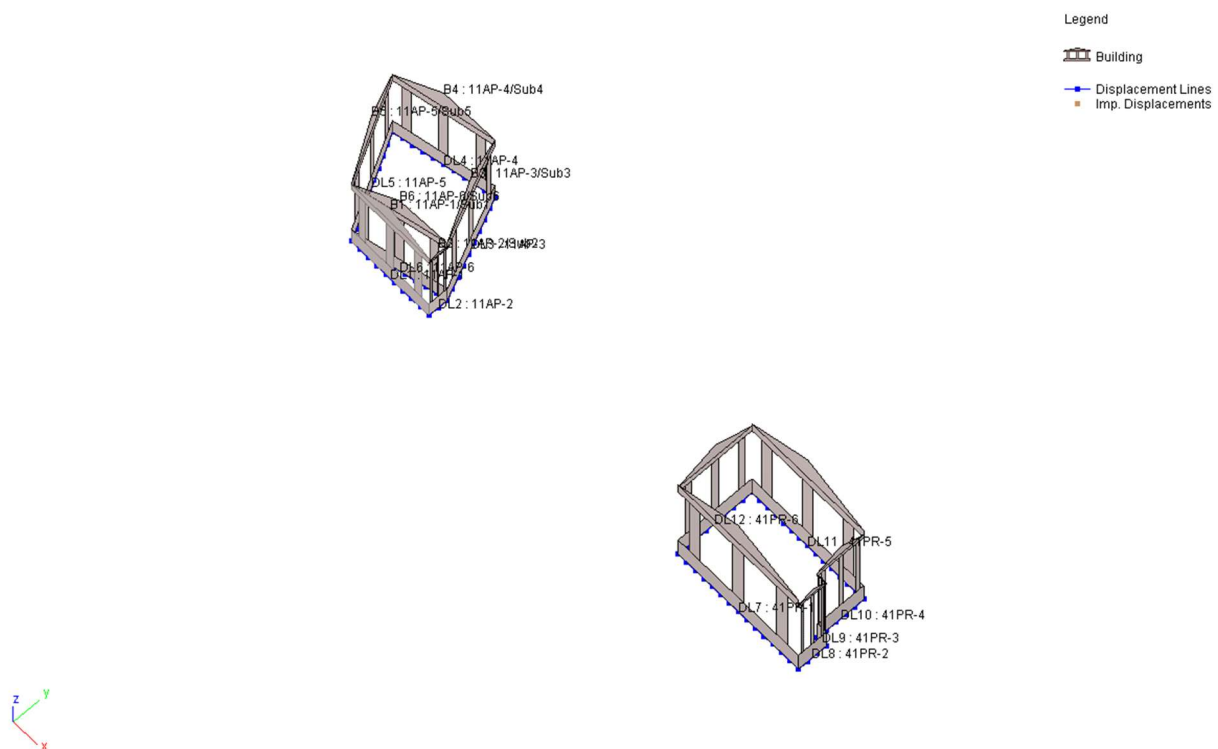


Figure 6: Potential building damage assessment model view

Table 2: Building damage assessment results summary [Model 4]

Building ID	Façade ID	Damage category	Maximum vertical displacement [1]	Max tensile strain
			[mm]	[%]
11 Abbot's Place	11AP-1	0 (Negligible)	<1	0.00
	11AP-2	0 (Negligible)	<1	0.00
	11AP-3	0 (Negligible)	<1	0.00
	11AP-4	0 (Negligible)	<1	0.00

Building ID	Façade ID	Damage category	Maximum vertical displacement [1]	Max tensile strain
			[mm]	[%]
41 Priory Road	11AP-5	0 (Negligible)	<1	0.00
	11AP-6	0 (Negligible)	<1	0.00
	41PR-1	0 (Negligible)	<1	0.00
	41PR-2	0 (Negligible)	<1	0.00
	41PR-3	0 (Negligible)	<1	0.00
	41PR-4	0 (Negligible)	<1	0.00
	41PR-5	0 (Negligible)	<1	0.00
	41PR-6	0 (Negligible)	<1	0.00

Table 3: Building damage assessment results summary [Model 5]

Building ID	Façade ID	Damage category	Maximum vertical displacement [1]	Max tensile strain
			[mm]	[%]
11 Abbot's Place	11AP-1	0 (Negligible)	<1	0.00
	11AP-2	0 (Negligible)	<1	0.00
	11AP-3	0 (Negligible)	<1	0.00
	11AP-4	0 (Negligible)	<1	0.00
	11AP-5	0 (Negligible)	<1	0.00
	11AP-6	0 (Negligible)	<1	0.00
41 Priory Road	41PR-1	0 (Negligible)	<1	0.00
	41PR-2	0 (Negligible)	<1	0.00
	41PR-3	0 (Negligible)	<1	0.00
	41PR-4	0 (Negligible)	<1	0.00
	41PR-5	0 (Negligible)	<1	0.00
	41PR-6	0 (Negligible)	<1	0.00

Table 4: Building damage assessment results summary [Model 6]

Building ID	Façade ID	Damage category	Maximum vertical displacement [1]	Max tensile strain
			[mm]	[%]
11 Abbot's Place	11AP-1	0 (Negligible)	-1	0.004
	11AP-2	0 (Negligible)	-1	0.001
	11AP-3	0 (Negligible)	-1	0.002
	11AP-4	0 (Negligible)	<1	0.0001
	11AP-5	0 (Negligible)	<1	0.00
	11AP-6	0 (Negligible)	-1	0.004
41 Priory Road	41PR-1	0 (Negligible)	<1	0.00
	41PR-2	0 (Negligible)	<1	0.00
	41PR-3	0 (Negligible)	<1	0.00
	41PR-4	0 (Negligible)	<1	0.00
	41PR-5	0 (Negligible)	<1	0.00
	41PR-6	0 (Negligible)	<1	0.00

Notes:

- +ve displacement is heave.
- -ve displacement is settlement.

8. Conclusions

Earth Water GCE has been instructed by Qaim Structures on behalf of James Wainwright to undertake a ground movement assessment (GMA) to evaluate the potential impacts of the proposed development on the adjacent buildings. This report aims to provide a degree of certainty to the asset owners and the developer in relation to the ground movement and the magnitude of potential impact induced by construction, at the location of these assets.

Ground model and geotechnical parameters have been evaluated based on the experience in the proximity of proposed development, using BGS borehole archives and site-specific ground investigation.

Some of the information and conclusions presented in this report are based on information provided by others. Earth Water GCE has endeavoured to assess all information provided to them but makes no guarantees or warranties as to the accuracy or completeness of this information.

A combination of analyses has been carried out, using the commercial software Oasys Xdisp and Oasys Pdisp, in order to evaluate the greenfield ground movements due to underpinning, excavation for the proposed basement construction and the long-term loading from the proposed structure.

The results from the GMA analyses are presented in Table 2 to Table 4 for adjacent buildings at 11 Abbot's Place and 41 Priory Road. The potential damage to the adjacent buildings has been predicted to be Category 0 Negligible. It should be noted that other than 11 Abbot's Place, all other buildings fall outside the 1mm contour of ground movements, therefore, there will not be any potential damage expected for these buildings.

The resulting damage categories predicted as part of this GMA are within the allowable limits adopted for such assessments and industry wide practice. It is noted that the predicted ground movements, the associated wall tensile strains and level of damage categorisation are considered to be conservative, in view of the relatively cautious data assumptions and greenfield nature of the assessment undertaken.

The GMA may be supplemented by a project-specific monitoring regime and Action Plan, which delineate lines of responsibility, trigger levels in accordance with the ground movements predicted as part of this study and appropriate mitigation measures (if required). The assessment presented herein is dependent and reliant on the works being undertaken by an experienced contractor, high quality workmanship and appropriate supervision of construction means and methods by experienced personnel.

It is recommended that this report is reviewed and understood in full by the project team and relevant stakeholders. Where significant changes are made to items such as construction sequencing and scheme design the engineer should thoroughly review the discrepancy and evaluate any potential impacts on ground movement and building damage.

It is critical that the permanent and temporary works designs are carried out in a coordinated manner between performance specified elements and substructure contractors, with the aim to ensure that such design elements are in alignment with the assumptions/findings of the GMA and overall design intent.

9. References

1. British Geological Survey borehole archives.
2. CIRIA R143 (1995) The Standard Penetration Test (SPT): Methods and Use.
3. CIRIA C760 (2017) Guidance on embedded retaining wall design.
4. Jardine, RJ et al. (1986) Studies of the influence of non-linear stress strain characteristics in soil structure interaction. *Geotechnique*, Vol 36, No 3, pp377-396.
5. Oasys Pdisp user manual.
6. Oasys Xdisp user manual.

APPENDICES

A. Xdisp Tabular Output

Specific Building Damage Results - Critical Segments within Each Building

Stage Ref.	Stage Name	Specific Building Ref.	Specific Building Name	Parameter	Critical Sub-Building	Critical Segment	Start [m]	End [m]	Curvature	Max Slope	Max Settlement [mm]	Max Tensile Strain [%]	Min Radius of Curvature (Hogging) [m]	Min Radius of Curvature (Sagging) [m]	Damage Category
0	Base Model	0	11AP-1	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	11AP-2	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	11AP-3	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	11AP-4	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	11AP-5	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	11AP-6	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	41PR-1	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	41PR-2	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	41PR-3	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	41PR-4	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	41PR-5	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	41PR-6	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											

Short-term Underpinning Stage



Specific Building Damage Results - Critical Segments within Each Building

Stage: Ref.	Stage: Name	Specific Building: Ref.	Specific Building: Name	Parameter	Critical Sub-Building	Critical Segment	Start [m]	End [m]	Curvature	Max Slope	Max Settlement	Max Tensile Strain	Min Radius of Curvature (Hogging)	Min Radius of Curvature (Sagging)	Damage Category
0	Base Model	0	11AP-1	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	11AP-2	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	11AP-3	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	11AP-4	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	11AP-5	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	11AP-6	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	41PR-1	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	41PR-2	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	41PR-3	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	41PR-4	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	41PR-5	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	41PR-6	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											

Short-term Underpinning + Excavation Stage

Specific Building Damage Results - Critical Segments within Each Building

Stage: Ref.	Stage: Name	Specific Building: Ref.	Specific Building: Name	Parameter	Critical Sub-Building	Critical Segment	Start [m]	End [m]	Curvature	Max Slope	Max Settlement [mm]	Max Tensile Strain [%]	Min Radius of Curvature (Hogging) [m]	Min Radius of Curvature (Sagging) [m]	Damage Category
0	Base Model	0	11AP-1	Max Slope	Sub1	1	1.0000	9.0000	None	305.09E-6	1.1155	0.0038527	-	-	0 (Negligible)
				Max Settlement	Sub1	1	1.0000	9.0000	None	305.09E-6	1.1155	0.0038527	-	-	0 (Negligible)
				Max Tensile Strain	Sub1	1	1.0000	9.0000	None	305.09E-6	1.1155	0.0038527	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)	-	-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)	-	-	-	-	-	-	-	-	-	-	-
		0	11AP-2	Max Slope	Sub2	1	0.0	2.0000	None	80.581E-6	1.2306	0.0011283	-	-	0 (Negligible)
				Max Settlement	Sub2	1	0.0	2.0000	None	80.581E-6	1.2306	0.0011283	-	-	0 (Negligible)
				Max Tensile Strain	Sub2	1	0.0	2.0000	None	80.581E-6	1.2306	0.0011283	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)	-	-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)	-	-	-	-	-	-	-	-	-	-	-
		0	11AP-3	Max Slope	Sub3	1	0.0	0.10527	None	171.11E-6	1.2306	35.763E-9	-	-	0 (Negligible)
				Max Settlement	Sub3	1	0.0	0.10527	None	171.11E-6	1.2306	35.763E-9	-	-	0 (Negligible)
				Max Tensile Strain	Sub3	2	0.10527	9.8890	None	171.11E-6	1.2119	0.0024937	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)	-	-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)	-	-	-	-	-	-	-	-	-	-	-
		0	11AP-4	Max Slope	Sub4	1	0.0	2.0004	None	25.699E-6	0.14892	81.575E-6	-	-	0 (Negligible)
				Max Settlement	Sub4	1	0.0	2.0004	None	25.699E-6	0.14892	81.575E-6	-	-	0 (Negligible)
				Max Tensile Strain	Sub4	1	0.0	2.0004	None	25.699E-6	0.14892	81.575E-6	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)	-	-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)	-	-	-	-	-	-	-	-	-	-	-
		0	11AP-5	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	11AP-6	Max Slope	Sub6	1	1.0244	9.2190	None	342.04E-6	1.2304	0.0044345	-	-	0 (Negligible)
				Max Settlement	Sub6	1	1.0244	9.2190	None	342.04E-6	1.2304	0.0044345	-	-	0 (Negligible)
				Max Tensile Strain	Sub6	1	1.0244	9.2190	None	342.04E-6	1.2304	0.0044345	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)	-	-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)	-	-	-	-	-	-	-	-	-	-	-
		0	41PR-1	Max Slope	Sub1	1	0.0	2.0000	None	46.543E-6	0.15215	273.55E-6	-	-	0 (Negligible)
				Max Settlement	Sub1	1	0.0	2.0000	None	46.543E-6	0.15215	273.55E-6	-	-	0 (Negligible)
				Max Tensile Strain	Sub1	1	0.0	2.0000	None	46.543E-6	0.15215	273.55E-6	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)	-	-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)	-	-	-	-	-	-	-	-	-	-	-
		0	41PR-2	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	41PR-3	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	41PR-4	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	41PR-5	Max Slope	Sub5	1	12.071	13.000	None	33.277E-6	0.14417	35.763E-9	-	-	0 (Negligible)
				Max Settlement	Sub5	1	12.071	13.000	None	33.277E-6	0.14417	35.763E-9	-	-	0 (Negligible)
				Max Tensile Strain	Sub5	1	12.071	13.000	None	33.277E-6	0.14417	35.763E-9	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)	-	-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)	-	-	-	-	-	-	-	-	-	-	-
		0	41PR-6	Max Slope	Sub6	1	0.0	8.0000	None	15.715E-6	0.20195	312.67E-6	-	-	0 (Negligible)
				Max Settlement	Sub6	1	0.0	8.0000	None	15.715E-6	0.20195	312.67E-6	-	-	0 (Negligible)
				Max Tensile Strain	Sub6	1	0.0	8.0000	None	15.715E-6	0.20195	312.67E-6	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)	-	-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)	-	-	-	-	-	-	-	-	-	-	-

Long term Underpinning + Excavation + Loading Stage

B. Pdisp Tabular Output

Results : Immediate : Displacement Data : Lines

Ref.	Name	x	y	z	Δz	Stress: Calc. Level	Stress: Vertical	Stress: Max Princ.	Vert. Strain
		[m]	[m]	[mCD]	[mm]	[mCD]	[kN/m²]	[kN/m²]	[μ]
1	11AP-1	0.00000	0.00000	0.00000	-0.02159	-0.25000	0.0	0.0	0.0
1	11AP-1	1.00000	0.00000	0.00000	-0.02086	-0.25000	0.0	0.0	0.0
1	11AP-1	2.00000	0.00000	0.00000	-0.01926	-0.25000	0.0	0.0	0.0
1	11AP-1	3.00000	0.00000	0.00000	-0.01643	-0.25000	0.0	0.0	0.0
1	11AP-1	4.00000	0.00000	0.00000	-0.01182	-0.25000	0.0	0.0	0.0
1	11AP-1	5.00000	0.00000	0.00000	-0.00469	-0.25000	0.0	0.0	0.0
1	11AP-1	6.00000	0.00000	0.00000	0.00605	-0.25000	0.0	0.0	0.0
1	11AP-1	7.00000	0.00000	0.00000	0.02209	-0.25000	0.0	0.0	0.0
1	11AP-1	8.00000	0.00000	0.00000	0.04602	-0.25000	0.0	0.0	0.0
1	11AP-1	9.00000	0.00000	0.00000	0.08222	-0.25000	0.0	0.0	0.0
2	11AP-2	9.00000	0.00000	0.00000	0.08222	-0.25000	0.0	0.0	0.0
2	11AP-2	9.00000	1.00000	0.00000	0.09216	-0.25000	0.0	0.0	0.0
2	11AP-2	9.00000	2.00000	0.00000	0.09647	-0.25000	0.0	0.0	0.0
3	11AP-3	9.00000	2.00000	0.00000	0.09647	-0.25000	0.0	0.0	0.0
3	11AP-3	8.54444	3.00000	0.00000	0.07357	-0.25000	0.0	0.0	0.0
3	11AP-3	8.08889	4.00000	0.00000	0.05151	-0.25000	0.0	0.0	0.0
3	11AP-3	7.63333	5.00000	0.00000	0.03207	-0.25000	0.0	0.0	0.0
3	11AP-3	7.17778	6.00000	0.00000	0.01610	-0.25000	0.0	0.0	0.0
3	11AP-3	6.72222	7.00000	0.00000	0.00366	-0.25000	0.0	0.0	0.0
3	11AP-3	6.26667	8.00000	0.00000	-0.00562	-0.25000	0.0	0.0	0.0
3	11AP-3	5.81111	9.00000	0.00000	-0.01227	-0.25000	0.0	0.0	0.0
3	11AP-3	5.35556	10.00000	0.00000	-0.01683	-0.25000	0.0	0.0	0.0
3	11AP-3	4.90000	11.00000	0.00000	-0.01979	-0.25000	0.0	0.0	0.0
4	11AP-4	4.90000	11.00000	0.00000	-0.01979	-0.25000	0.0	0.0	0.0
4	11AP-4	3.92000	10.80000	0.00000	-0.02093	-0.25000	0.0	0.0	0.0
4	11AP-4	2.94000	10.60000	0.00000	-0.02166	-0.25000	0.0	0.0	0.0
4	11AP-4	1.96000	10.40000	0.00000	-0.02202	-0.25000	0.0	0.0	0.0
4	11AP-4	0.98000	10.20000	0.00000	-0.02206	-0.25000	0.0	0.0	0.0
4	11AP-4	0.00000	10.00000	0.00000	-0.02184	-0.25000	0.0	0.0	0.0
4	11AP-4	-0.98000	9.80000	0.00000	-0.02142	-0.25000	0.0	0.0	0.0
4	11AP-4	-1.96000	9.60000	0.00000	-0.02084	-0.25000	0.0	0.0	0.0
4	11AP-4	-2.94000	9.40000	0.00000	-0.02014	-0.25000	0.0	0.0	0.0
4	11AP-4	-3.92000	9.20000	0.00000	-0.01937	-0.25000	0.0	0.0	0.0
4	11AP-4	-4.90000	9.00000	0.00000	-0.01855	-0.25000	0.0	0.0	0.0
5	11AP-5	-4.90000	9.00000	0.00000	-0.01855	-0.25000	0.0	0.0	0.0
5	11AP-5	-4.35556	8.00000	0.00000	-0.01927	-0.25000	0.0	0.0	0.0
5	11AP-5	-3.81111	7.00000	0.00000	-0.01993	-0.25000	0.0	0.0	0.0
5	11AP-5	-3.26667	6.00000	0.00000	-0.02050	-0.25000	0.0	0.0	0.0
5	11AP-5	-2.72222	5.00000	0.00000	-0.02098	-0.25000	0.0	0.0	0.0
5	11AP-5	-2.17778	4.00000	0.00000	-0.02134	-0.25000	0.0	0.0	0.0
5	11AP-5	-1.63333	3.00000	0.00000	-0.02158	-0.25000	0.0	0.0	0.0
5	11AP-5	-1.08889	2.00000	0.00000	-0.02169	-0.25000	0.0	0.0	0.0
5	11AP-5	-0.54444	1.00000	0.00000	-0.02168	-0.25000	0.0	0.0	0.0
5	11AP-5	0.00000	0.00000	0.00000	-0.02159	-0.25000	0.0	0.0	0.0
6	11AP-6	0.00000	0.00000	0.00000	-0.02159	-0.25000	0.0	0.0	0.0
6	11AP-6	1.00000	0.22222	0.00000	-0.02082	-0.25000	0.0	0.0	0.0
6	11AP-6	2.00000	0.44444	0.00000	-0.01912	-0.25000	0.0	0.0	0.0
6	11AP-6	3.00000	0.66667	0.00000	-0.01606	-0.25000	0.0	0.0	0.0
6	11AP-6	4.00000	0.88889	0.00000	-0.01105	-0.25000	0.0	0.0	0.0
6	11AP-6	5.00000	1.11111	0.00000	-0.00321	-0.25000	0.0	0.0	0.0
6	11AP-6	6.00000	1.33333	0.00000	0.00875	-0.25000	0.0	0.0	0.0
6	11AP-6	7.00000	1.55556	0.00000	0.02683	-0.25000	0.0	0.0	0.0
6	11AP-6	8.00000	1.77778	0.00000	0.05426	-0.25000	0.0	0.0	0.0
6	11AP-6	9.00000	2.00000	0.00000	0.09647	-0.25000	0.0	0.0	0.0
7	41PR-1	38.00000	0.00000	0.00000	-0.01643	-0.25000	0.0	0.0	0.0
7	41PR-1	39.00000	0.00000	0.00000	-0.01926	-0.25000	0.0	0.0	0.0
7	41PR-1	40.00000	0.00000	0.00000	-0.02086	-0.25000	0.0	0.0	0.0
7	41PR-1	41.00000	0.00000	0.00000	-0.02159	-0.25000	0.0	0.0	0.0
7	41PR-1	42.00000	0.00000	0.00000	-0.02171	-0.25000	0.0	0.0	0.0
7	41PR-1	43.00000	0.00000	0.00000	-0.02141	-0.25000	0.0	0.0	0.0
7	41PR-1	44.00000	0.00000	0.00000	-0.02084	-0.25000	0.0	0.0	0.0
7	41PR-1	45.00000	0.00000	0.00000	-0.02008	-0.25000	0.0	0.0	0.0
7	41PR-1	46.00000	0.00000	0.00000	-0.01922	-0.25000	0.0	0.0	0.0
7	41PR-1	47.00000	0.00000	0.00000	-0.01830	-0.25000	0.0	0.0	0.0
7	41PR-1	48.00000	0.00000	0.00000	-0.01736	-0.25000	0.0	0.0	0.0
7	41PR-1	49.00000	0.00000	0.00000	-0.01642	-0.25000	0.0	0.0	0.0
7	41PR-1	50.00000	0.00000	0.00000	-0.01550	-0.25000	0.0	0.0	0.0
7	41PR-1	51.00000	0.00000	0.00000	-0.01461	-0.25000	0.0	0.0	0.0
7	41PR-1	52.00000	0.00000	0.00000	-0.01375	-0.25000	0.0	0.0	0.0
8	41PR-2	52.00000	0.00000	0.00000	-0.01375	-0.25000	0.0	0.0	0.0
8	41PR-2	52.00000	1.00000	0.00000	-0.01380	-0.25000	0.0	0.0	0.0
8	41PR-2	52.00000	2.00000	0.00000	-0.01382	-0.25000	0.0	0.0	0.0
8	41PR-2	52.00000	3.00000	0.00000	-0.01381	-0.25000	0.0	0.0	0.0
9	41PR-3	52.00000	3.00000	0.00000	-0.01381	-0.25000	0.0	0.0	0.0
9	41PR-3	51.00000	3.00000	0.00000	-0.01467	-0.25000	0.0	0.0	0.0
10	41PR-4	51.00000	3.00000	0.00000	-0.01467	-0.25000	0.0	0.0	0.0
10	41PR-4	51.00000	4.00000	0.00000	-0.01463	-0.25000	0.0	0.0	0.0
10	41PR-4	51.00000	5.00000	0.00000	-0.01456	-0.25000	0.0	0.0	0.0
10	41PR-4	51.00000	6.00000	0.00000	-0.01446	-0.25000	0.0	0.0	0.0
10	41PR-4	51.00000	7.00000	0.00000	-0.01433	-0.25000	0.0	0.0	0.0
10	41PR-4	51.00000	8.00000	0.00000	-0.01418	-0.25000	0.0	0.0	0.0
11	41PR-5	51.00000	8.00000	0.00000	-0.01418	-0.25000	0.0	0.0	0.0
11	41PR-5	50.07143	8.00000	0.00000	-0.01497	-0.25000	0.0	0.0	0.0
11	41PR-5	49.14286	8.00000	0.00000	-0.01580	-0.25000	0.0	0.0	0.0
11	41PR-5	48.21429	8.00000	0.00000	-0.01664	-0.25000	0.0	0.0	0.0
11	41PR-5	47.28571	8.00000	0.00000	-0.01750	-0.25000	0.0	0.0	0.0
11	41PR-5	46.35714	8.00000	0.00000	-0.01836	-0.25000	0.0	0.0	0.0
11	41PR-5	45.42857	8.00000	0.00000	-0.01921	-0.25000	0.0	0.0	0.0
11	41PR-5	44.50000	8.00000	0.00000	-0.02000	-0.25000	0.0	0.0	0.0
11	41PR-5	43.57143	8.00000	0.00000	-0.02072	-0.25000	0.0	0.0	0.0
11	41PR-5	42.64286	8.00000	0.00000	-0.02132	-0.25000	0.0	0.0	0.0
11	41PR-5	41.71429	8.00000	0.00000	-0.02173	-0.25000	0.0	0.0	0.0
11	41PR-5	40.78571	8.00000	0.00000	-0.02188	-0.25000	0.0	0.0	0.0
11	41PR-5	39.85714	8.00000	0.00000	-0.02167	-0.25000	0.0	0.0	0.0
11	41PR-5	38.92857	8.00000	0.00000	-0.02096	-0.25000	0.0	0.0	0.0
11	41PR-5	38.00000	8.00000	0.00000	-0.01958	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	8.00000	0.00000	-0.01958	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	7.00000	0.00000	-0.01863	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	6.00000	0.00000	-0.01768	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	5.00000	0.00000	-0.01684	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	4.00000	0.00000	-0.01619	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	3.00000	0.00000	-0.01580	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	2.00000	0.00000	-0.01570	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	1.00000	0.00000	-0.01592	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	0.00000	0.00000	-0.01643	-0.25000	0.0	0.0	0.0

Short-term Demolition + Underpinning Stage



Results : Immediate : Displacement Data : Lines

Ref.	Name	x	y	z	Δz	Stress: Calc. Level	Stress: Vertical	Stress: Sum Princ.	Vert. Strain
		[m]	[m]	[m]	[mm]	[kPa]	[kN/m²]	[kN/m²]	[μ]
1	11AP-1	0.00000	0.00000	0.00000	0.05258	-0.25000	0.0	0.0	0.0
1	11AP-1	1.00000	0.00000	0.00000	0.05358	-0.25000	0.0	0.0	0.0
1	11AP-1	2.00000	0.00000	0.00000	0.05364	-0.25000	0.0	0.0	0.0
1	11AP-1	3.00000	0.00000	0.00000	0.05234	-0.25000	0.0	0.0	0.0
1	11AP-1	4.00000	0.00000	0.00000	0.04906	-0.25000	0.0	0.0	0.0
1	11AP-1	5.00000	0.00000	0.00000	0.04298	-0.25000	0.0	0.0	0.0
1	11AP-1	6.00000	0.00000	0.00000	0.03293	-0.25000	0.0	0.0	0.0
1	11AP-1	7.00000	0.00000	0.00000	0.01729	-0.25000	0.0	0.0	0.0
1	11AP-1	8.00000	0.00000	0.00000	-0.00615	-0.25000	0.0	0.0	0.0
1	11AP-1	9.00000	0.00000	0.00000	-0.04037	-0.25000	0.0	0.0	0.0
2	11AP-2	9.00000	0.00000	0.00000	-0.04037	-0.25000	0.0	0.0	0.0
2	11AP-2	9.00000	1.00000	0.00000	-0.05055	-0.25000	0.0	0.0	0.0
2	11AP-2	9.00000	2.00000	0.00000	-0.05528	-0.25000	0.0	0.0	0.0
3	11AP-3	9.00000	2.00000	0.00000	-0.05528	-0.25000	0.0	0.0	0.0
3	11AP-3	8.54444	3.00000	0.00000	-0.03322	-0.25000	0.0	0.0	0.0
3	11AP-3	8.08889	4.00000	0.00000	-0.01155	-0.25000	0.0	0.0	0.0
3	11AP-3	7.63333	5.00000	0.00000	0.00744	-0.25000	0.0	0.0	0.0
3	11AP-3	7.17778	6.00000	0.00000	0.02289	-0.25000	0.0	0.0	0.0
3	11AP-3	6.72222	7.00000	0.00000	0.03475	-0.25000	0.0	0.0	0.0
3	11AP-3	6.26667	8.00000	0.00000	0.04337	-0.25000	0.0	0.0	0.0
3	11AP-3	5.81111	9.00000	0.00000	0.04921	-0.25000	0.0	0.0	0.0
3	11AP-3	5.35556	10.00000	0.00000	0.05278	-0.25000	0.0	0.0	0.0
3	11AP-3	4.90000	11.00000	0.00000	0.05457	-0.25000	0.0	0.0	0.0
4	11AP-4	4.90000	11.00000	0.00000	0.05457	-0.25000	0.0	0.0	0.0
4	11AP-4	3.92000	10.80000	0.00000	0.05474	-0.25000	0.0	0.0	0.0
4	11AP-4	2.94000	10.60000	0.00000	0.05432	-0.25000	0.0	0.0	0.0
4	11AP-4	1.96000	10.40000	0.00000	0.05339	-0.25000	0.0	0.0	0.0
4	11AP-4	0.98000	10.20000	0.00000	0.05207	-0.25000	0.0	0.0	0.0
4	11AP-4	0.00000	10.00000	0.00000	0.05045	-0.25000	0.0	0.0	0.0
4	11AP-4	-0.98000	9.80000	0.00000	0.04861	-0.25000	0.0	0.0	0.0
4	11AP-4	-1.96000	9.60000	0.00000	0.04662	-0.25000	0.0	0.0	0.0
4	11AP-4	-2.94000	9.40000	0.00000	0.04455	-0.25000	0.0	0.0	0.0
4	11AP-4	-3.92000	9.20000	0.00000	0.04244	-0.25000	0.0	0.0	0.0
4	11AP-4	-4.90000	9.00000	0.00000	0.04032	-0.25000	0.0	0.0	0.0
5	11AP-5	-4.90000	9.00000	0.00000	0.04032	-0.25000	0.0	0.0	0.0
5	11AP-5	-4.38556	8.00000	0.00000	0.04217	-0.25000	0.0	0.0	0.0
5	11AP-5	-3.81111	7.00000	0.00000	0.04399	-0.25000	0.0	0.0	0.0
5	11AP-5	-3.26667	6.00000	0.00000	0.04565	-0.25000	0.0	0.0	0.0
5	11AP-5	-2.72222	5.00000	0.00000	0.04723	-0.25000	0.0	0.0	0.0
5	11AP-5	-2.17778	4.00000	0.00000	0.04866	-0.25000	0.0	0.0	0.0
5	11AP-5	-1.63333	3.00000	0.00000	0.04992	-0.25000	0.0	0.0	0.0
5	11AP-5	-1.08889	2.00000	0.00000	0.05100	-0.25000	0.0	0.0	0.0
5	11AP-5	-0.54444	1.00000	0.00000	0.05188	-0.25000	0.0	0.0	0.0
5	11AP-5	0.00000	0.00000	0.00000	0.05258	-0.25000	0.0	0.0	0.0
6	11AP-6	0.00000	0.00000	0.00000	0.05258	-0.25000	0.0	0.0	0.0
6	11AP-6	1.00000	0.22222	0.00000	0.05358	-0.25000	0.0	0.0	0.0
6	11AP-6	2.00000	0.44444	0.00000	0.05358	-0.25000	0.0	0.0	0.0
6	11AP-6	3.00000	0.66667	0.00000	0.05209	-0.25000	0.0	0.0	0.0
6	11AP-6	4.00000	0.88889	0.00000	0.04844	-0.25000	0.0	0.0	0.0
6	11AP-6	5.00000	1.11111	0.00000	0.04165	-0.25000	0.0	0.0	0.0
6	11AP-6	6.00000	1.33333	0.00000	0.03036	-0.25000	0.0	0.0	0.0
6	11AP-6	7.00000	1.55556	0.00000	0.01259	-0.25000	0.0	0.0	0.0
6	11AP-6	8.00000	1.77778	0.00000	-0.01453	-0.25000	0.0	0.0	0.0
6	11AP-6	9.00000	2.00000	0.00000	-0.05528	-0.25000	0.0	0.0	0.0
7	41PR-1	38.00000	0.00000	0.00000	0.05234	-0.25000	0.0	0.0	0.0
7	41PR-1	39.00000	0.00000	0.00000	0.05364	-0.25000	0.0	0.0	0.0
7	41PR-1	40.00000	0.00000	0.00000	0.05358	-0.25000	0.0	0.0	0.0
7	41PR-1	41.00000	0.00000	0.00000	0.05258	-0.25000	0.0	0.0	0.0
7	41PR-1	42.00000	0.00000	0.00000	0.05097	-0.25000	0.0	0.0	0.0
7	41PR-1	43.00000	0.00000	0.00000	0.04897	-0.25000	0.0	0.0	0.0
7	41PR-1	44.00000	0.00000	0.00000	0.04674	-0.25000	0.0	0.0	0.0
7	41PR-1	45.00000	0.00000	0.00000	0.04440	-0.25000	0.0	0.0	0.0
7	41PR-1	46.00000	0.00000	0.00000	0.04203	-0.25000	0.0	0.0	0.0
7	41PR-1	47.00000	0.00000	0.00000	0.03968	-0.25000	0.0	0.0	0.0
7	41PR-1	48.00000	0.00000	0.00000	0.03739	-0.25000	0.0	0.0	0.0
7	41PR-1	49.00000	0.00000	0.00000	0.03518	-0.25000	0.0	0.0	0.0
7	41PR-1	50.00000	0.00000	0.00000	0.03308	-0.25000	0.0	0.0	0.0
7	41PR-1	51.00000	0.00000	0.00000	0.03109	-0.25000	0.0	0.0	0.0
7	41PR-1	52.00000	0.00000	0.00000	0.02921	-0.25000	0.0	0.0	0.0
8	41PR-2	52.00000	0.00000	0.00000	0.02921	-0.25000	0.0	0.0	0.0
8	41PR-2	52.00000	1.00000	0.00000	0.02931	-0.25000	0.0	0.0	0.0
8	41PR-2	52.00000	2.00000	0.00000	0.02935	-0.25000	0.0	0.0	0.0
8	41PR-2	52.00000	3.00000	0.00000	0.02933	-0.25000	0.0	0.0	0.0
9	41PR-3	52.00000	3.00000	0.00000	0.02933	-0.25000	0.0	0.0	0.0
9	41PR-3	51.00000	3.00000	0.00000	0.03122	-0.25000	0.0	0.0	0.0
10	41PR-4	51.00000	3.00000	0.00000	0.03122	-0.25000	0.0	0.0	0.0
10	41PR-4	51.00000	4.00000	0.00000	0.03114	-0.25000	0.0	0.0	0.0
10	41PR-4	51.00000	5.00000	0.00000	0.03099	-0.25000	0.0	0.0	0.0
10	41PR-4	51.00000	6.00000	0.00000	0.03078	-0.25000	0.0	0.0	0.0
10	41PR-4	51.00000	7.00000	0.00000	0.03050	-0.25000	0.0	0.0	0.0
10	41PR-4	51.00000	8.00000	0.00000	0.03017	-0.25000	0.0	0.0	0.0
11	41PR-5	51.00000	8.00000	0.00000	0.03017	-0.25000	0.0	0.0	0.0
11	41PR-5	50.07143	8.00000	0.00000	0.03193	-0.25000	0.0	0.0	0.0
11	41PR-5	49.14286	8.00000	0.00000	0.03379	-0.25000	0.0	0.0	0.0
11	41PR-5	48.21429	8.00000	0.00000	0.03574	-0.25000	0.0	0.0	0.0
11	41PR-5	47.28571	8.00000	0.00000	0.03776	-0.25000	0.0	0.0	0.0
11	41PR-5	46.35714	8.00000	0.00000	0.03986	-0.25000	0.0	0.0	0.0
11	41PR-5	45.42857	8.00000	0.00000	0.04200	-0.25000	0.0	0.0	0.0
11	41PR-5	44.50000	8.00000	0.00000	0.04416	-0.25000	0.0	0.0	0.0
11	41PR-5	43.57143	8.00000	0.00000	0.04630	-0.25000	0.0	0.0	0.0
11	41PR-5	42.64286	8.00000	0.00000	0.04837	-0.25000	0.0	0.0	0.0
11	41PR-5	41.71429	8.00000	0.00000	0.05029	-0.25000	0.0	0.0	0.0
11	41PR-5	40.78571	8.00000	0.00000	0.05197	-0.25000	0.0	0.0	0.0
11	41PR-5	39.85714	8.00000	0.00000	0.05328	-0.25000	0.0	0.0	0.0
11	41PR-5	38.92857	8.00000	0.00000	0.05405	-0.25000	0.0	0.0	0.0
11	41PR-5	38.00000	8.00000	0.00000	0.05407	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	8.00000	0.00000	0.05407	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	7.00000	0.00000	0.05363	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	6.00000	0.00000	0.05312	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	5.00000	0.00000	0.05261	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	4.00000	0.00000	0.05218	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	3.00000	0.00000	0.05192	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	2.00000	0.00000	0.05185	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	1.00000	0.00000	0.05200	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	0.00000	0.00000	0.05234	-0.25000	0.0	0.0	0.0

Short-term Underpinning + Excavation Stage



Results : Immediate : Displacement Data : Lines

Ref.	Name	x	y	z	Σz	Stress: Calc. Level	Stress: Vertical	Stress: Sum Princ.	Vert. Strain
		[m]	[m]	[mCD]	[mm]	[mCD]	[kN/m²]	[kN/m²]	[μ]
1	11AP-1	0.00000	0.00000	0.00000	0.08311	-0.25000	0.0	0.0	0.0
1	11AP-1	1.00000	0.00000	0.00000	0.11019	-0.25000	0.0	0.0	0.0
1	11AP-1	2.00000	0.00000	0.00000	0.14560	-0.25000	0.0	0.0	0.0
1	11AP-1	3.00000	0.00000	0.00000	0.19015	-0.25000	0.0	0.0	0.0
1	11AP-1	4.00000	0.00000	0.00000	0.25372	-0.25000	0.0	0.0	0.0
1	11AP-1	5.00000	0.00000	0.00000	0.33588	-0.25000	0.0	0.0	0.0
1	11AP-1	6.00000	0.00000	0.00000	0.44670	-0.25000	0.0	0.0	0.0
1	11AP-1	7.00000	0.00000	0.00000	0.59841	-0.25000	0.0	0.0	0.0
1	11AP-1	8.00000	0.00000	0.00000	0.81038	-0.25000	0.0	0.0	0.0
1	11AP-1	9.00000	0.00000	0.00000	1.11547	-0.25000	0.0	0.0	0.0
2	11AP-2	9.00000	0.00000	0.00000	1.11547	-0.25000	0.0	0.0	0.0
2	11AP-2	9.00000	1.00000	0.00000	1.19605	-0.25000	0.0	0.0	0.0
2	11AP-2	9.00000	2.00000	0.00000	1.23057	-0.25000	0.0	0.0	0.0
3	11AP-3	9.00000	2.00000	0.00000	1.23057	-0.25000	0.0	0.0	0.0
3	11AP-3	8.54444	3.00000	0.00000	1.04254	-0.25000	0.0	0.0	0.0
3	11AP-3	8.08889	4.00000	0.00000	0.85729	-0.25000	0.0	0.0	0.0
3	11AP-3	7.63333	5.00000	0.00000	0.68872	-0.25000	0.0	0.0	0.0
3	11AP-3	7.17778	6.00000	0.00000	0.54415	-0.25000	0.0	0.0	0.0
3	11AP-3	6.72222	7.00000	0.00000	0.42512	-0.25000	0.0	0.0	0.0
3	11AP-3	6.26667	8.00000	0.00000	0.32960	-0.25000	0.0	0.0	0.0
3	11AP-3	5.81111	9.00000	0.00000	0.25412	-0.25000	0.0	0.0	0.0
3	11AP-3	5.35556	10.00000	0.00000	0.19499	-0.25000	0.0	0.0	0.0
3	11AP-3	4.90000	11.00000	0.00000	0.14892	-0.25000	0.0	0.0	0.0
4	11AP-4	4.90000	11.00000	0.00000	0.14892	-0.25000	0.0	0.0	0.0
4	11AP-4	3.92000	10.80000	0.00000	0.12321	-0.25000	0.0	0.0	0.0
4	11AP-4	2.94000	10.60000	0.00000	0.10084	-0.25000	0.0	0.0	0.0
4	11AP-4	1.96000	10.40000	0.00000	0.08165	-0.25000	0.0	0.0	0.0
4	11AP-4	0.98000	10.20000	0.00000	0.06540	-0.25000	0.0	0.0	0.0
4	11AP-4	0.00000	10.00000	0.00000	0.05176	-0.25000	0.0	0.0	0.0
4	11AP-4	-0.98000	9.80000	0.00000	0.04042	-0.25000	0.0	0.0	0.0
4	11AP-4	-1.96000	9.60000	0.00000	0.03104	-0.25000	0.0	0.0	0.0
4	11AP-4	-2.94000	9.40000	0.00000	0.02335	-0.25000	0.0	0.0	0.0
4	11AP-4	-3.92000	9.20000	0.00000	0.01707	-0.25000	0.0	0.0	0.0
4	11AP-4	-4.90000	9.00000	0.00000	0.01197	-0.25000	0.0	0.0	0.0
5	11AP-5	-4.90000	9.00000	0.00000	0.01197	-0.25000	0.0	0.0	0.0
5	11AP-5	-4.35556	8.00000	0.00000	0.01670	-0.25000	0.0	0.0	0.0
5	11AP-5	-3.81111	7.00000	0.00000	0.02227	-0.25000	0.0	0.0	0.0
5	11AP-5	-3.26667	6.00000	0.00000	0.02875	-0.25000	0.0	0.0	0.0
5	11AP-5	-2.72222	5.00000	0.00000	0.03615	-0.25000	0.0	0.0	0.0
5	11AP-5	-2.17778	4.00000	0.00000	0.04444	-0.25000	0.0	0.0	0.0
5	11AP-5	-1.63333	3.00000	0.00000	0.05353	-0.25000	0.0	0.0	0.0
5	11AP-5	-1.08889	2.00000	0.00000	0.06322	-0.25000	0.0	0.0	0.0
5	11AP-5	-0.54444	1.00000	0.00000	0.07321	-0.25000	0.0	0.0	0.0
5	11AP-5	0.00000	0.00000	0.00000	0.08311	-0.25000	0.0	0.0	0.0
6	11AP-6	0.00000	0.00000	0.00000	0.08311	-0.25000	0.0	0.0	0.0
6	11AP-6	1.00000	0.22222	0.00000	0.11113	-0.25000	0.0	0.0	0.0
6	11AP-6	2.00000	0.44444	0.00000	0.14809	-0.25000	0.0	0.0	0.0
6	11AP-6	3.00000	0.66667	0.00000	0.19716	-0.25000	0.0	0.0	0.0
6	11AP-6	4.00000	0.88889	0.00000	0.25279	-0.25000	0.0	0.0	0.0
6	11AP-6	5.00000	1.11111	0.00000	0.31460	-0.25000	0.0	0.0	0.0
6	11AP-6	6.00000	1.33333	0.00000	0.47256	-0.25000	0.0	0.0	0.0
6	11AP-6	7.00000	1.55556	0.00000	0.64094	-0.25000	0.0	0.0	0.0
6	11AP-6	8.00000	1.77778	0.00000	0.88019	-0.25000	0.0	0.0	0.0
6	11AP-6	9.00000	2.00000	0.00000	1.23057	-0.25000	0.0	0.0	0.0
7	41PR-1	38.00000	0.00000	0.00000	0.19215	-0.25000	0.0	0.0	0.0
7	41PR-1	39.00000	0.00000	0.00000	0.14560	-0.25000	0.0	0.0	0.0
7	41PR-1	40.00000	0.00000	0.00000	0.11019	-0.25000	0.0	0.0	0.0
7	41PR-1	41.00000	0.00000	0.00000	0.08311	-0.25000	0.0	0.0	0.0
7	41PR-1	42.00000	0.00000	0.00000	0.06232	-0.25000	0.0	0.0	0.0
7	41PR-1	43.00000	0.00000	0.00000	0.04630	-0.25000	0.0	0.0	0.0
7	41PR-1	44.00000	0.00000	0.00000	0.03393	-0.25000	0.0	0.0	0.0
7	41PR-1	45.00000	0.00000	0.00000	0.02436	-0.25000	0.0	0.0	0.0
7	41PR-1	46.00000	0.00000	0.00000	0.01696	-0.25000	0.0	0.0	0.0
7	41PR-1	47.00000	0.00000	0.00000	0.01123	-0.25000	0.0	0.0	0.0
7	41PR-1	48.00000	0.00000	0.00000	0.00680	-0.25000	0.0	0.0	0.0
7	41PR-1	49.00000	0.00000	0.00000	0.00338	-0.25000	0.0	0.0	0.0
7	41PR-1	50.00000	0.00000	0.00000	0.00076	-0.25000	0.0	0.0	0.0
7	41PR-1	51.00000	0.00000	0.00000	-0.00125	-0.25000	0.0	0.0	0.0
7	41PR-1	52.00000	0.00000	0.00000	-0.00277	-0.25000	0.0	0.0	0.0
8	41PR-2	52.00000	0.00000	0.00000	-0.00277	-0.25000	0.0	0.0	0.0
8	41PR-2	52.00000	1.00000	0.00000	-0.00269	-0.25000	0.0	0.0	0.0
8	41PR-2	52.00000	2.00000	0.00000	-0.00265	-0.25000	0.0	0.0	0.0
8	41PR-2	52.00000	3.00000	0.00000	-0.00267	-0.25000	0.0	0.0	0.0
9	41PR-3	52.00000	3.00000	0.00000	-0.00267	-0.25000	0.0	0.0	0.0
9	41PR-3	51.00000	3.00000	0.00000	-0.00111	-0.25000	0.0	0.0	0.0
10	41PR-4	51.00000	3.00000	0.00000	-0.00111	-0.25000	0.0	0.0	0.0
10	41PR-4	51.00000	4.00000	0.00000	-0.00119	-0.25000	0.0	0.0	0.0
10	41PR-4	51.00000	5.00000	0.00000	-0.00135	-0.25000	0.0	0.0	0.0
10	41PR-4	51.00000	6.00000	0.00000	-0.00156	-0.25000	0.0	0.0	0.0
10	41PR-4	51.00000	7.00000	0.00000	-0.00183	-0.25000	0.0	0.0	0.0
10	41PR-4	51.00000	8.00000	0.00000	-0.00214	-0.25000	0.0	0.0	0.0
11	41PR-5	51.00000	8.00000	0.00000	-0.00214	-0.25000	0.0	0.0	0.0
11	41PR-5	50.07143	8.00000	0.00000	-0.00059	-0.25000	0.0	0.0	0.0
11	41PR-5	49.14286	8.00000	0.00000	0.00140	-0.25000	0.0	0.0	0.0
11	41PR-5	48.21429	8.00000	0.00000	0.00393	-0.25000	0.0	0.0	0.0
11	41PR-5	47.28571	8.00000	0.00000	0.00713	-0.25000	0.0	0.0	0.0
11	41PR-5	46.35714	8.00000	0.00000	0.01117	-0.25000	0.0	0.0	0.0
11	41PR-5	45.42857	8.00000	0.00000	0.01625	-0.25000	0.0	0.0	0.0
11	41PR-5	44.50000	8.00000	0.00000	0.02262	-0.25000	0.0	0.0	0.0
11	41PR-5	43.57143	8.00000	0.00000	0.03062	-0.25000	0.0	0.0	0.0
11	41PR-5	42.64286	8.00000	0.00000	0.04064	-0.25000	0.0	0.0	0.0
11	41PR-5	41.71429	8.00000	0.00000	0.05320	-0.25000	0.0	0.0	0.0
11	41PR-5	40.78571	8.00000	0.00000	0.06892	-0.25000	0.0	0.0	0.0
11	41PR-5	39.85714	8.00000	0.00000	0.08861	-0.25000	0.0	0.0	0.0
11	41PR-5	38.92857	8.00000	0.00000	0.11327	-0.25000	0.0	0.0	0.0
11	41PR-5	38.00000	8.00000	0.00000	0.14417	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	8.00000	0.00000	0.14417	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	7.00000	0.00000	0.15988	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	6.00000	0.00000	0.17421	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	5.00000	0.00000	0.18631	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	4.00000	0.00000	0.19535	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	3.00000	0.00000	0.20071	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	2.00000	0.00000	0.20197	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	1.00000	0.00000	0.19904	-0.25000	0.0	0.0	0.0
12	41PR-6	38.00000	0.00000	0.00000	0.19215	-0.25000	0.0	0.0	0.0

Long term Underpinning + Excavation + Loading Stage



EARTH WATER

Geotechnical Consulting Engineers

76 Beckenham Road
Beckenham, BR3 4RH
info@earthwater-gce.com
www.earthwater-gce.com