GROUND INVESTIGATION AND BASEMENT IMPACT ASSESSMENT REPORT

Athlone House
Hampstead Lane
Highgate
London N6

Client: Virtus Real Estate

J16075

June 2016




GEA Geotechnical & Environmental Associates

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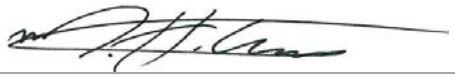
Report prepared by			
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	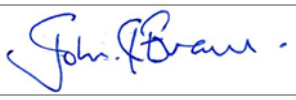		
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EXECUTIVE SUMMARY

This executive summary contains an overview of the key findings and conclusions. No reliance should be placed on any part of the executive summary until the whole of the report has been read. Other sections of the report may contain information that puts into context the findings that are summarised in the executive summary.

BRIEF

This report describes the findings of a Basement Impact Assessment (BIA) carried out by Geotechnical and Environmental Associates Limited (GEA) on the instructions of Virtus Real Estate, with respect to the refurbishment of the existing property, which is to include a single storey rear extension and single level basement for a swimming pool. GEA has previously carried out a desk study and ground investigation at the site (ref: J12224, dated July 2014) relating to a previous planning application, which involved demolition of the existing building and construction of a new house with a basement. The purpose of this new investigation has been to review the previous report, to establish the configuration of existing foundations and to carry out a BIA in accordance with the guidelines from the London Borough of Camden, in support of the new planning application.

SUMMARY OF BIA SCREENING STAGE

The previous BIA identified the following questions to be carried forward to the scoping stage, which have been verified by the review carried out as part of this report.

- The site is underlain by a Secondary 'A' Aquifer.
- The site is within the catchment of the Highgate Ponds.
- The site forms part of a wider hillside setting with slopes of greater than 7°.

GROUND CONDITIONS.

The ground investigation encountered a generally moderate thickness of made ground over the Claygate Member of the London Clay Formation, which was proved to the maximum depth investigated. In areas close to the house, the made ground was found to extend to depths of between 0.80 m (111.65 m OD) and 1.80 m (110.45 m OD), whilst in the lawn areas surrounding the house, made ground extended to a maximum depth of 0.40 m (109.01 m OD). It generally comprised brown clayey silt with rootlets, gravel, brick, concrete, coal and timber fragments. The Claygate Member generally comprised an initial horizon of firm becoming stiff medium to high strength brown and orange-brown mottled grey silty very sandy clay, with pockets of clayey fine sand and sandy silt, to depths of 6.00 m (106.25 m OD) and 7.30 m (105.34 m OD), whereupon stiff brownish grey silty sandy clay with partings and pockets of pale grey silt was encountered to depths of 7.30 m (104.95 m OD) and 9.00 m (103.64 m OD). Below these depths, stiff high strength dark grey silty clay to clayey silt was encountered to depths of 12.00 m (101.44 m OD) and 15.00 m (97.25 m OD) and was underlain by very stiff high strength to very high strength dark grey silty, locally sandy, clay with traces of selenite, which was proved to the maximum depth investigated, of 20.00 m (92.64 m OD).

During drilling of the boreholes, groundwater was encountered at depths of 12.10 m and 12.50 m, corresponding to levels of between 101.43 m OD and 99.75 m OD. Subsequent monitoring of the standpipes installed in boreholes during several phases over a number of years has measured groundwater at depths of between 9.02 m and 10.21 m, between 104.42 m OD and 101.99 m.

BIA CONCLUSIONS

Through the results of the investigation and on the basis of the proposed development, it has been concluded that the proposed single storey basement will not have an impact on the hydrological or hydrogeological setting, as the basement will not intercept the groundwater and will not increase surface run-off.

As it is proposed to excavate the basement within an open cut, horizontal and vertical movements outside of the basement will be negligible and in any case, there are no neighbouring structures within 30 m of the proposed basement. An assessment of potential damage to the existing house as a result of the movements associated with the proposed basement excavation has indicated that any damage to the existing house will be within Category 0 and negligible. The proposed basement is therefore not considered to pose a risk to the stability of the surrounding natural and built environment.

Part 1: INVESTIGATION REPORT

This section of the report details the objectives of the investigation, the work that has been carried out to meet these objectives and the results of the investigation. Interpretation of the findings is presented in Part 2.

1.0 INTRODUCTION

Geotechnical and Environmental Associates (GEA) has been commissioned by Virtus Real Estate, to prepare a Basement Impact Assessment (BIA) in support of a planning application for a basement development at Athlone House, Hampstead Lane, N6 4RU. The BIA largely draws on the information from a number of previous investigations, in particular GEA's previous desk study and ground investigation (report ref: J12224, dated July 2014), which was carried out between 2012 and 2014 in support of a previous planning application. In addition to the review of the previous report, some limited additional investigation has also been carried out in light of the revised proposed development, although additional geotechnical or contamination testing did not form part of the project brief. The BIA elements have been carried out in accordance with guidelines from the London Borough of Camden and also includes a ground movement analysis.

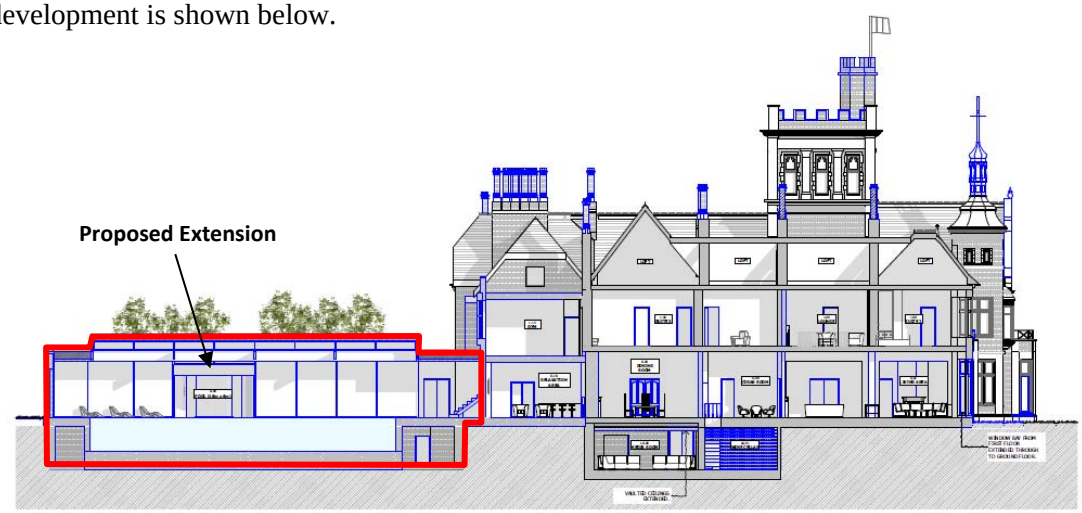
In addition to the GEA report, the following reports have been reviewed as part of this BIA:

- *Report on Ground Water for Athlone House* - LBH Wembley (report ref LBH2921(a), dated September 2003); and
- *A Groundwater Assessment Report* - RPS Health, Safety and Environment (report ref: FLC1578.002L, dated May 2004).

Copies of these reports were provided and reviewed by GEA as part of the previous investigation and the findings are discussed herein where appropriate.

1.1 Proposed Development

It is understood that it is proposed to refurbish and extend the existing detached property, which will include the construction of a single storey rear extension that will house an indoor swimming pool within a single level basement. A cross-section through the proposed development is shown below.



This report is specific to the proposed development and the advice herein should be reviewed once the development proposals have been finalised.

1.2 Purpose of Work

The principal technical objectives of the work carried out were as follows:

- to review the previous desk study and ground investigation;
- to identify the configuration and bearing stratum of existing foundations;
- to carry out additional groundwater monitoring;
- to assess the possible impact of the proposed development on the local hydrogeology, and hydrology;
- to carry out an analysis of the likely ground movements associated with the excavation and construction of the single level basement;
- to provide additional advice with respect to the design of suitable foundations and retaining walls for the proposed development.

1.3 Scope of Work

In order to meet the above objectives, following a review of the previous report, an intrusive ground investigation was carried out which comprised, in summary, the following activities:

- three trial pits manually and mechanically excavated to depths of between 0.90 m and 2.30 m;
- groundwater monitoring of existing standpipes on three occasions over a one-month period;
- ground movement analysis of the proposed basement structure; and
- provision of a report presenting and interpreting the above data, together with our advice and recommendations with respect to the proposed development.

1.3.1 Basement Impact Assessment

The work carried out includes a Hydrological and Hydrogeological Assessment and Land Stability Assessment (also referred to as Slope Stability Assessment), all of which form part of the BIA procedure specified in the London Borough of Camden (LBC) Planning Guidance CPG4[1] and their Guidance for Subterranean Development[2] prepared by Arup (the "Arup report"). The aim of the work is to provide information on surface water, groundwater and land stability and in particular to assess whether the development will affect neighbouring properties or groundwater movements and whether any identified impacts can be appropriately mitigated by the design of the development.

1.3.2 Qualifications

The land stability element of the Basement Impact Assessment (BIA) has been carried out by Martin Cooper, a BEng in Civil Engineering, a chartered engineer (CEng), member of the Institution of Civil Engineers (MICE), and Fellow of the Geological Society of London (FGS) who has over 20 years' specialist experience in ground engineering. The subterranean (groundwater) flow assessment has been carried out by John Evans, MSc in Hydrogeology,

1 London Borough of Camden Planning Guidance CPG4 *Basements and lightwells*
2 Ove Arup & Partners (2010) *Camden geological, hydrogeological and hydrological study. Guidance for Subterranean Development.* For London Borough of Camden November 2010

Chartered Geologist (CGeol) and Fellow of the Geological Society of London (FGS). The surface water and flooding assessment has been carried out by Rupert Evans, a hydrologist with more than ten years consultancy experience in flood risk assessment, surface water drainage schemes and hydrology / hydraulic modelling. Rupert Evans is a Chartered Environmentalist, Chartered Water and Environmental Manager and a Member of CIWEM.

The assessments have been made in conjunction with Steve Branch, a BSc in Engineering Geology and Geotechnics, MSc in Geotechnical Engineering, a Chartered Geologist (CGeol) and Fellow of the Geological Society (FGS) with over 25 years' experience in geotechnical engineering and engineering geology.

All assessors meet the qualification requirements of the Council guidance.

1.4 Limitations

The conclusions and recommendations made in this report are limited to those that can be made on the basis of the investigation. The results of the work should be viewed in the context of the range of data sources consulted, the number of locations where the ground was sampled and the number of soil, gas or groundwater samples tested; no liability can be accepted for information in other data sources or conditions not revealed by the sampling or testing. Any comments made on the basis of information obtained from the client or other third parties are given in good faith on the assumption that the information is accurate; no independent validation of such information has been made by GEA.

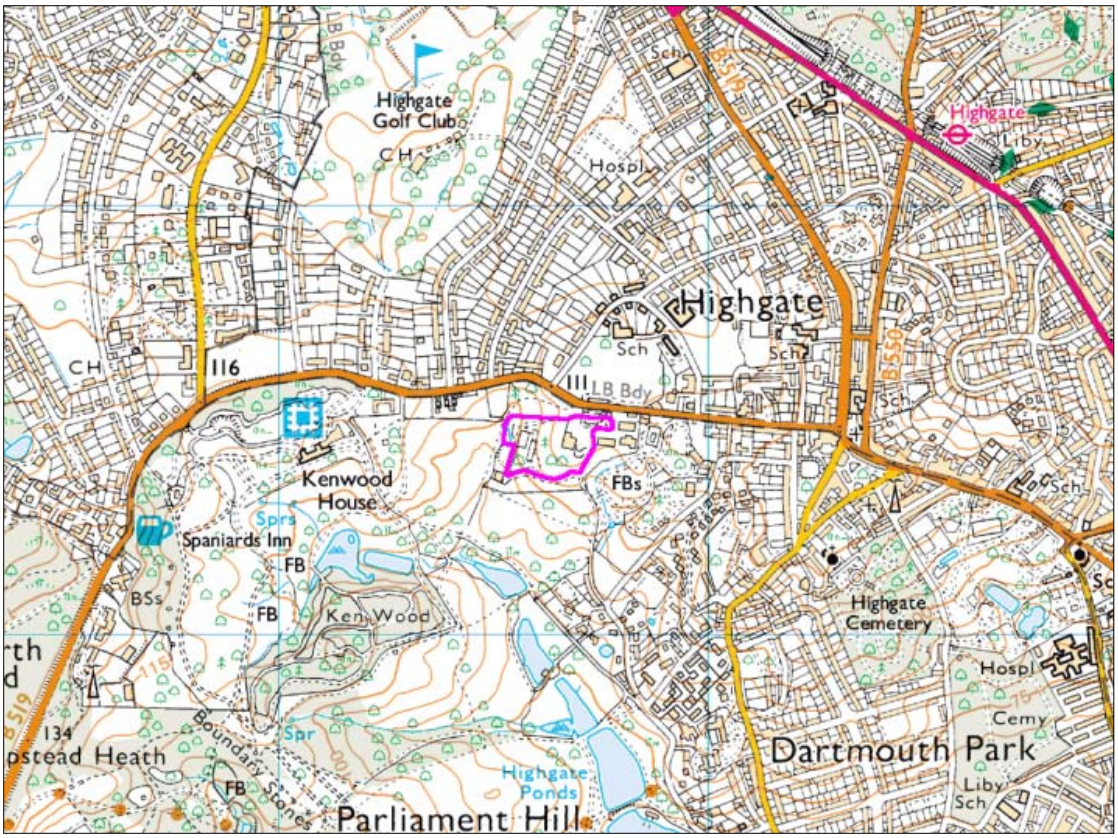
2.0 THE SITE

2.1 Site Description

The site is located in Highgate, north London, approximately 1 km to the southwest of Highgate London Underground station, along the northern boundary of Hampstead Heath. The site may be additionally located by National Grid Reference 527754,187097 and is shown on the map overleaf.

The site covers a roughly rectangular area with maximum dimensions of 190 m north-south by 230 m east-west and occupies an area of approximately 7.11 acres. It fronts onto Hampstead Lane to the north and is bordered to the east by a relatively recent residential development comprising three blocks of four-storey apartments, known as Caenwood Court, and to the south and west by Hampstead Heath, which to the west comprises the grounds of Kenwood House.

The site is currently occupied by Athlone House, a three-storey and four-storey former manor house, which is located in the eastern half of the site and includes a partial single level basement, which is below the majority of the western half of the building. The area to the northeast of the house is covered in hardstanding and was an area formerly occupied by another building that adjoined the house. With the exception of this area, and a paved terrace adjacent to the western elevation of the house, the remainder of the site is occupied by soft landscaped gardens. These comprise a large lawn around the western and southern elevations of the house and dense vegetation along the southern and western boundaries of the site.



A large number of species of deciduous and evergreen trees are present and stand at heights of up to 25 m. In the northwestern corner of the site, a small pond is present, which is surrounded by reeds. This is thought to represent a spring line and the remnants of a much larger pond shown on historical maps. The house and the area of hardstanding in the northeast are situated on relatively level plateaux, although the site level slopes relatively steeply down to the south and southwest beyond the house, in keeping with the topography of the surrounding area. The slopes are at an angle of between 4° and 6°.

2.2 Summary of Previous Desk Study Findings

2.2.1 Site History

At the time of the earliest map studied, dated 1870, the site was occupied by a Manor House known as Fitzroy House and its associated grounds; online information indicates that Fitzroy House was constructed between 1838 and 1839. By 1896, Fitzroy House had been replaced with what appears to be the existing house, although at this time it was known as Caen Wood Towers. Further online information indicates that this was constructed in 1872 but incorporated the original Fitzroy House. A portrait of Caen Wood Towers, dated 1880, can be seen below.

The map dated 1896 also shows a large pond in the northwestern corner of the site. The pond is still present, although is smaller than shown on the historical map, which also indicates that there was a boat house along the pond's banks, which would give an indication of its size at this time.

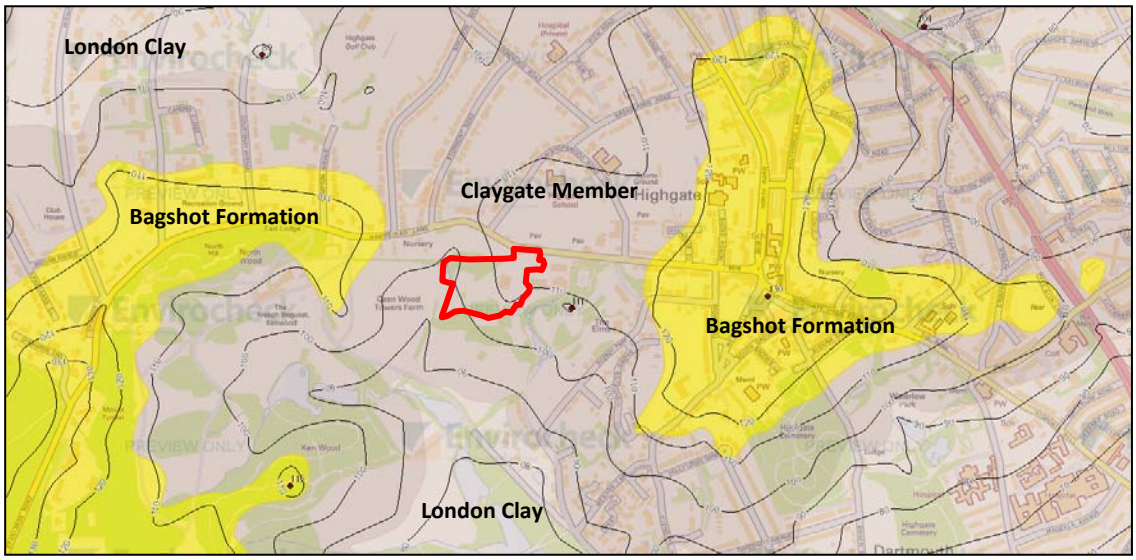
By 1935, the house had been extended northwards and a rectangular feature constructed within the grounds to the west, which on later maps is annotated as a tennis court. It was also by this time that the pond in the northwestern corner of the site had been reduced to what appears to be the existing size. The site remained unchanged until between 1953 and 1964, when a large rectangular building was constructed adjacent to the eastern elevation of the original house. It is on the map dated 1964 that the site is first referred to as Athlone House, which was occupied by Middlesex Hospital. Online information[3] indicates that the Ministry of Health acquired the site in 1951 and the buildings were turned into a geriatric hospital. The rectangular building constructed to the east was used for nurses' accommodation. This information also indicates that Athlone House was used in World War I as a military convalescent hospital, known as the American Hospital for English soldiers.

Middlesex Hospital occupied the site until 2003 when it was sold to developers. The site configuration however remained unchanged until between 2006 and 2012, when a number of low-rise buildings to the north and east of the house, including the large rectangular building to the east, were demolished to make way for the construction of the existing apartment blocks to the east. The site has remained unaltered since that time until the present day.

2.2.2 Geology

The British Geological Survey (BGS) map of the area (sheet 256) indicates that the site is underlain by the Claygate Member of the London Clay Formation, as shown by the geological map extract below.

3 Lost London Hospitals Website, *http://ezitis.myzen.co.uk/athlone.html*



The geology in this area is generally horizontally bedded such that the boundary between the geological formations roughly follows the ground surface contour lines. The boundary between the Claygate Member and overlying Bagshot Beds is present approximately 350 m to the west and east of the site, at a level of between approximately 110 m OD and 115 m OD. The boundary between the Claygate Member and the upper unit of the London Clay is located approximately 300 m south of the site, at a level of 85 m OD, approximately 25 m below the site. The Claygate Member is described as typically comprising interbedded fine-grained sand, silt and clay.

A borehole was drilled by the BGS to a depth of 66.74 m (61.97 m OD) approximately 1 km to the southwest of the site. This borehole, generally referred to as 'the Hampstead Heath Borehole', placed the boundary between the Bagshot Formation and Claygate Member at a level of 109 m OD, whilst the boundary between the Claygate Member and the underlying London Clay is indicated to be at a level of approximately 93.71 m OD. The boundary between these two strata can be very difficult to define, as their composition and description can be very similar.

The previous LBH Wembley Investigation comprised three boreholes, advanced to a maximum depth of 30.00 m (approximately 82.00 m OD) by means of cable percussion methods and a series of five mechanically excavated trial pits to depths of 3.50 m and 4.00 m. The investigation however included what is now the Caenwood Court site, so covered a wider area, with only a single cable percussion borehole drilled on the subject site in close proximity to the proposed basement. The borehole encountered a moderate thickness of made ground overlying the Claygate Member, which was reported to be proved to the maximum depth investigated. The Claygate Member was described as comprising an upper horizon of firm yellowish brown mottled grey silty sandy clay to a depth of 5.80 m (107.10 m OD), whereupon stiff grey fissured silty, locally sandy, clay with pockets and partings of silt and fine sand was encountered to a depth of between 18.00 m (94.90 m OD). Below that depth, very stiff grey fissured silty clay with occasional pockets and partings of silt and fine sand and was proved to the maximum depth investigated, of 21.50 m (91.40 m OD).

According to the BGS memoir, the Claygate Member comprises alternating beds of clayey silt, very silty clay, sandy silt and glauconitic silty fine sand. The lower part of the Claygate Member is generally more bioturbated. A bed of calcareous concretions is present near the base in many places. The London Clay Formation is homogenous, slightly calcareous silty clay to very silty clay, with some beds of clayey silt grading to silty fine grained sand.

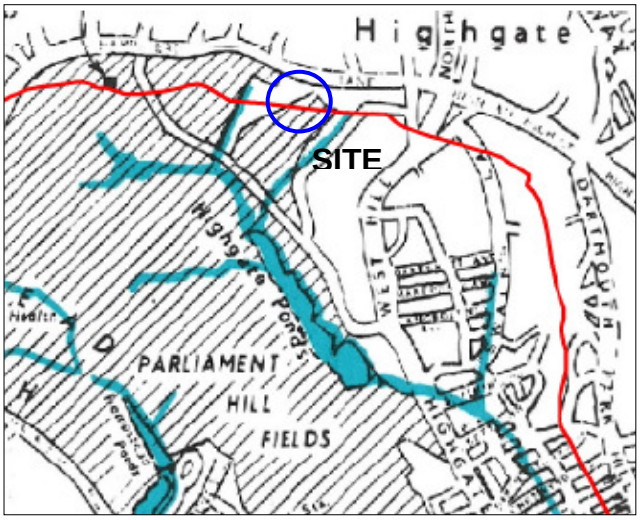
2.2.3 Hydrology and Hydrogeology

The Claygate Member is classified as a Secondary 'A' Aquifer, which refers to strata that contain permeable layers capable of supporting water supply at a local level and in some cases may form an important source of base flow for local rivers, as defined by the Environment Agency (EA).

Topographical maps show that the nearest surface water features are the small pond in the northwestern corner of the site, suspected of being a former spring line, and a spring line that forms the source of a small stream that flows in a southerly direction towards a series of small ponds, which is situated approximately 150 m to the southeast of the site. Both these features are at a level of between 100 m OD and 105 m OD and provide a good indication of the depth to the groundwater table below the site. The LBH Wembley investigation reportedly encountered groundwater at depths of 5.00 m (106.3 m OD) and 7.60 m (104.60 m OD).However the various reports, including the RPS report, indicates that the standpipes were found to be 'silted up' and that therefore the measured water levels were unlikely to be representative of true groundwater level.

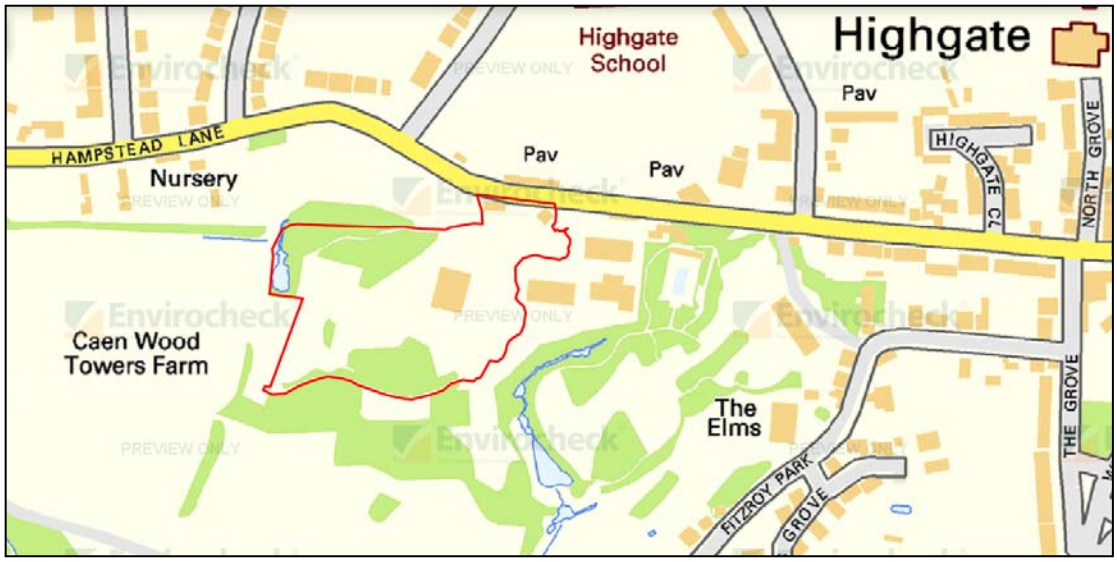
Approximately 300 m to the south of the site, in Hampstead Heath and Parliament Hill, is a further series of spring lines and ponds, which drain in a southerly direction, down the valley, towards both the Highgate and Hampstead Ponds, located approximately 400 m and 1.2 km south of the site respectively. The positions of these springs are likely to mark the boundary between the Claygate Member and underlying essentially impermeable London Clay. Within the area of Hampstead and Highgate, existing and historical springs are also present at the interface between the Claygate Member and the overlying more sandy Bagshot Beds. The springs at both geological boundaries have been the source of a number of London's "lost" rivers, notably the Fleet, Westbourne and Tyburn.

The extract of the Lost Rivers of London Map included overleaf, indicates that the pond in the northwestern corner of the site and the spring to the southeast of the site, both historically formed sources of the River Fleet. This river flowed southwards from the springs through the Highgate Ponds and on through Kentish Town and Camden Town before flowing through Clerkenwell and issuing into the Thames below Blackfriars Bridge. Although the river no longer comprises an open watercourse, surface and near surface waters will still flow towards the former river course and in particular the former spring lines.



Left: London's Lost Rivers extract map

Below: Present day locations of spring lines



On the basis of all of the above, groundwater below the site is expected to be flowing in a generally southerly direction.

The Claygate Member is predominantly cohesive in nature and therefore groundwater flow is likely to be relatively slow, although horizons of sandier soils do occur in this stratum, resulting in the permeability ranging from "very low" to "high". The Claygate Member is only designated as a Secondary Aquifer because it contains such sand horizons, which provide more permeable layers for the storage of groundwater. Where such sand beds are not present, the Claygate Member behaves hydraulically more like the underlying London Clay, which accounts for the variable permeability described above. Published data for the permeability of the London Clay indicates the horizontal permeability to generally range between 1 x 10^{-10} m/s and 1 x 10^{-8} m/s, with an even lower vertical permeability.

The site is not within an area at risk from flooding, as defined by the EA, and although Hampstead Lane is listed as having suffered from surface water flooding during a 1975 storm event, the site itself is not shown to be in an area known to be at risk from surface water flooding, as shown by Figure 15 of the Arup guidance report and EA surface water flood maps.

3.0 SUMMARY OF PREVIOUS GEA INVESTIGATION FINDINGS

The previous GEA investigation comprised three boreholes advanced to depths of 15.00 m and 20.00 m using cable percussion drilling methods. Standard penetration tests (SPTs) were carried out at regular intervals in the boreholes and disturbed and undisturbed samples were recovered for subsequent laboratory examination, geotechnical testing and contamination analysis. The boreholes were supplemented by a series of five trial pits, mechanically excavated using a JCB 3CX excavator to depths of 2.80 m and 3.10 m in order to provide additional coverage of the site and to assess the stability of the shallow soils.

The investigation encountered a generally moderate thickness of made ground over the Claygate Member of the London Clay Formation, which was proved to the maximum depth investigated. In the areas close to the house, the made ground was found to extend to depths of between 0.80 m (111.65 m OD) and 1.80 m (110.45 m OD), whilst in the lawn areas surrounding the house, made ground extended to a maximum depth of 0.40 m (109.01 m OD).

It generally comprised brown clayey silt with rootlets, gravel, brick, concrete, coal and timber fragments.

The underlying Claygate Member generally comprised an initial horizon of firm becoming stiff medium to high strength brown and orange-brown mottled grey silty very sandy clay with pockets of clayey fine sand and sandy silt. The initial horizon extended to the maximum depth investigated in the trial pits, of 3.10 m (108.94 m OD) and to depths of 6.00 m (106.25 m OD) and 7.30 m (105.34 m OD) in the cable percussion boreholes, whereupon stiff brownish grey silty sandy clay with partings and pockets of pale grey silt was encountered to depths of 7.30 m (104.95 m OD) and 9.00 m (103.64 m OD). Below these depths stiff high strength dark grey silty clay to clayey silt was encountered to depths of 12.00 m (101.44 m OD) and 15.00 m (97.25 m OD) and was underlain by very stiff high strength to very high strength dark grey silty, locally sandy, clay with traces of selenite, which was proved to the maximum depth investigated, of 20.00 m (92.64 m OD).

Desiccation of the clay soils was not encountered during the investigation and laboratory testing indicated the clay to be of moderate shrinkability.

During the drilling of the boreholes, groundwater was encountered at depths of 12.10 m and 12.50 m, corresponding to levels of between 101.43 m OD and 99.75 m OD. Subsequent monitoring of the standpipes installed in the boreholes was initially carried out over a period of three weeks after the intrusive work, with a second phase of monitoring carried out from July 2014, which included periodic monitoring and continuous groundwater monitoring using level loggers over a period of seven months. The results of the monitoring indicated groundwater at depths of between 9.62 m and 10.21 m, levels of between 101.99 m OD and 103.23 m OD and the full tabulated results and corresponding graphs are included in the appendix

4.0 SCREENING

The LBC guidance suggests that any development proposal that includes a subterranean basement should be screened to determine whether or not a full BIA is required.

4.1 Screening Assessment

A number of screening tools are included in the Arup document and for the purposes of this report reference has been made to Appendices E1, E2 and E3 which include a series of questions within screening flowcharts for surface flow and flooding, subterranean (groundwater) flow and land stability. The flowchart questions are tabulated below, along with the responses to each question, which have been answered using the results of the previous investigation.

4.1.1 Subterranean (groundwater) Screening Assessment

Question	Response for Athlone House
1a. Is the site located directly above an aquifer?	*Yes. The Claygate Member is a designated Secondary 'A' Aquifer*
1b. Will the proposed basement extend beneath the water table surface?	No. The proposed basement will extend to a level of 109.55 m OD and the extensive groundwater monitoring carried out to date indicates the water table to rise and fall within 101.99 m OD and 103.23 m OD, at least 6.00 m below basement level.

Question	Response for Athlone House
2. Is the site within 100 m of a watercourse, well (used/ disused) or potential spring line?	No. The nearest spring line to the proposed basement is over 150 m to the southeast.
3. Is the site within the catchment of the pond chains on Hampstead Heath?	*Yes. Figure 14 of the Arup report indicates that the site is within the catchment of the Highgate Ponds.*
4. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?	No. Although the proposed single storey extension and basement will be constructed over an area of soft landscaping, the existing hard surfaced area to the east of the existing house will be broken up and re-landscaped. If anything the proportion of hardstanding will decrease.
5. As part of the site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground (e.g. via soakaways and/or SUDS)?	No.
6. Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to or lower than, the mean water level in any local pond or spring line?	No.

The above assessment has identified the following potential issues that need to be assessed:

Q1a The site is located directly above the Claygate Member, which is a Secondary 'A' Aquifer.
Q3 The site is located within the Highgate Ponds catchment.

4.1.2 Stability Screening Assessment

Question	Response for Athlone House
1. Does the existing site include slopes, natural or manmade, greater than 7°?	No. The slopes within the site and immediately around the proposed basement area are generally between 4˚ and 6˚, which is also confirmed by Figure 16 of the Arup report.
2. Will the proposed re-profiling of landscaping at the site change slopes at the property boundary to more than 7°?	No. The extension and proposed basement will be constructed from a relatively level plateau of the site, which will remain post development.
3. Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7°?	No.
4. Is the site within a wider hillside setting in which the general slope is greater than 7°?	*Yes. Reference to Figure 16 of the Arup report indicates that areas to the west, east and southeast of the site includes slopes greater than 7˚.*
5. Is the London Clay the shallowest strata at the site?	No.
6. Will any trees be felled as part of the proposed development and / or are any works proposed within any tree protection zones where trees are to be retained?	No.
7. Is there a history of seasonal shrink-swell subsidence in the local area and / or evidence of such effects at the site?	No.
8. Is the site within 100 m of a watercourse or potential spring line?	No.
9. Is the site within an area of previously worked ground?	No.
10. Is the site within an aquifer?	*Yes a Secondary 'A' Aquifer.*
11. Is the site within 50 m of Hampstead Heath ponds?	No.

Question	Response for Athlone House
12. Is the site within 5 m of a highway or pedestrian right of way?	No.
13. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	No. The nearest buildings and infrastructure area between 30 m and 50 m to the north of the proposed basement.
14. Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines?	No.

The above assessment has identified the following potential issues that need to be assessed:

Q2 The site forms part of a wider hillside setting with slopes greater than 7˚.
Q10 The Claygate Member is a Secondary 'A' Aquifer.

4.1.3 Surface Flow and Flooding Screening Assessment

Question	Response for Athlone House
1. Is the site within the catchment of the pond chains on Hampstead Heath?	*Yes. Figure 14 of the Arup report indicates that the site is located across the northern part of the Highgate Ponds catchment.*
2. As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route?	No. Any additional surface water from the increased hardstanding area will be attenuated and discharged into the watercourse to ensure the existing surface water flow regime will be unchanged. The basement will be beneath the existing and proposed building footprint and therefore the 1m distance between the roof of the basement and ground surface as recommended by the Arup report and para 2.16 of the CPG4 does not apply across these areas.
3. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?	No. The overall proportion of hardstanding will remain essentially the same and the existing drainage system will be maintained. It is however proposed to incorporate new SUDS attenuation prior to discharge into the watercourse, which will maintain any potential impact to acceptable levels. The inclusion of the existing house into the attenuation strategy will also result in betterment. Infiltration SUDS systems will not work due to low permeability soils.
4. Will the proposed basement development result in changes to the profile of the inflows (instantaneous and long term) of surface water being received by adjacent properties or downstream watercourses?	No. It is proposed to allow for new SUDS attenuation to control how water is stored from new areas of hardstanding. The attenuation size will be based upon peak surface water flows and discharge rates into the watercourse.
5. Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	No. The proposed basement is very unlikely to result in any changes to the quality of surface water being received by adjacent properties or downstream watercourses. It is proposed to allow for new attenuation to control how water is stored from additional hardstanding areas and it will be unpolluted roof water draining into the watercourse.
6. Is the site in an area identified to have surface water flood risk according to either the Local Flood Risk Management Strategy or the Strategic Flood Risk Assessment or is it at risk of flooding, for example because the proposed basement is below the static water level of nearby surface water feature?	No The findings of this BIA together with the Camden Flood Risk Management Strategy dated 2013 and Figures 3iii, 4e, 5a and 5b of the SFRA dated 2014, in addition to the Environment Agency online flood maps show that the site has a low flooding risk from surface water, sewers, reservoirs (and other artificial sources), and fluvial/tidal watercourses.

The above assessment has identified the following potential issues that need to be assessed:

Q1 The site is located in the catchment of the Highgate Ponds.

5.0 SCOPING

The purpose of scoping is to assess in more detail the factors to be investigated in the impact assessment. Potential impacts are assessed for each of the identified potential impact factors.

5.1 Potential Impacts

The following potential impacts have been identified by the BIA screening process.

Potential Impact	Consequence
The site is located directly above an aquifer	The site is underlain by the Claygate Member, which is classified as a Secondary 'A' Aquifer. This has the potential of being able to support local water supplies as well as forming an important source of base flow for local rivers. There is the potential for the hydrogeological setting to be affected by a basement development.
The site is located in the catchment of the Highgate Ponds.	The construction of a basement typically removes permeable shallow ground, which reduces the capacity of the ground to store rainfall, potentially leading to greater surface run-off and greater risk of flooding. There is currently a medium risk of flooding from the pond chains but if a development within the catchment were to result in an increase in surface run-off, this could potentially lead to an increased frequency of flooding. In addition, heavy rainfall events have been noted to cause deterioration in the water quality of the bathing ponds as a result of increased overland flow. Therefore should a development increase the volume of water or alter the flow path of drainage and run-off from the site, this may increase overland flow and therefore contamination of the bathing ponds.
The site is part of a wilder hillside setting that include slopes of greater than 7˚.	Natural and manmade slopes that greater than 7 are more prone to slope failure, however it should be noted that this is an extensive hillside setting and the slopes of such angles are located downslope of the proposed basement and at a distance of over 100 m.

The above highlighted potential impacts are discussed further in Part 3 of the report.

6.0 ADDITIONAL EXPLORATORY WORK

In order to determine the configuration of existing foundations, a series of nine manually and mechanically excavated trial pits were advanced adjacent to various external elevations and within the existing basement. The locations of these trial pits were specified by the structural engineers and positioned on site by an engineer from GEA as to avoid known buried services.

In addition to the trial pits, the standpipes installed as part of the previous investigation have been monitored on three occasions, over a one-month period.

The Ordnance Datum (OD) levels shown on the previous exploratory records, and the most recent trial pit logs, have been interpolated from spot heights shown on a site survey drawing (ref: 22929_01_P, dated January 2016), which has been provided by the structural engineers.

6.1 Groundwater Monitoring Results

The table below indicates the results of the groundwater monitoring carried out over the last month. On inspection, the standpipe previously installed in BH102 was found to be damaged and therefore only BH101 and BH103 has been monitored. A table providing the results of all of the groundwater monitoring carried out to date since 2012 is included in the appendix, along with associated graphs, which show groundwater level plotted against average rainfall data from the nearest Met Office weather station.

Date	Borehole No	Depth to water (m) [Level (m OD)]
14/04/2016	101	9.14 [104.30]
	103	9.25 [103.00]
28/04/2016	101	9.16 [104.28]
	103	9.28 [102.97]
12/05/2016	101	9.02 [104.42]
	103	9.23 [103.02]

6.2 Existing Foundations

The findings of the trial pits are summarised in the table below and sketches and photographs of each pit are included in the Appendix.

Trial Pit No	Structure	Foundation detail	Bearing Stratum
1	Southeastern vault to existing basement Eldon Grove	Brick footing Top 300 mm below basement level (109.25 m OD) Base 0.47 m (109.08 m OD) Lateral projection two brick corbels - 90 mm	Brown mottled dark orange-brown clayey silty SAND
2	Internal basement wall	Concrete strip Top 230 m below basement level (109.05 m OD) Base 0.9 m (108.65 m OD) Lateral projection 260 mm	Brown mottled dark orange-brown clayey silty SAND
3	Internal basement wall	Concrete strip Top 440 mm below basement level (109.11 m OD) Base 0.85 m (108.70 m OD) Lateral projection 430 mm	Brown mottled dark orange-brown clayey silty SAND
4	Western elevation of existing house	Likely to be a concrete footing Top Not Proved Base Not Proved No lateral projection	Trial Pit terminated in made ground at 2.3 m (110.47 m OD) and base of footing not proved

Trial Pit No	Structure	Foundation detail	Bearing Stratum
5	Western elevation of existing house	Trial pit terminated on suspected relic drain	Not Proved
5A	Western elevation of existing house	Brick footing Top GL Base 1.20 m (111.45 m OD) No lateral projection	Orange-brown very clayey silty fine SAND
6	Northern elevation of existing house	Basement void discovered 400 mm below ground level. Void extended to 2.50 m (110.09 m OD)	Not Proved.
7	Southern elevation of existing house	Concrete footing Top 1.10 m (111.48 m OD) Base 1.60 m (110.98 m OD) Lateral projection 150 mm	Orange-brown mottled pale grey very clayey silty fine SAND with bands of silty very sandy CLAY
8	Eastern elevation of existing house	Concrete strip Top 660 mm (111.95 m OD) Base 1.10 m (111.45 m OD Lateral projection 300 mm	Firm orange-brown silty very sandy CLAY
9	Single storey sun room on southern elevation	Concrete strip Top 370 mm (112.08 m OD) Base 0.80 m (111.65 m OD) Lateral projection 300 mm	Orange-brown mottled pale grey very clayey silty fine SAND with bands of very sandy silty CLAY

Part 2: DESIGN BASIS REPORT

This section of the report provides an interpretation of the findings detailed in Part 1, in the form of a ground model, and then provides advice and recommendations with respect to foundation options and contamination issues.

7.0 INTRODUCTION

It is understood that it is proposed to refurbish the existing detached property, which will include the construction of a single storey rear extension that will house an indoor swimming pool within a single level basement. New landscaping works also form part of the proposals, in addition to the refurbishment of the existing single storey out-buildings along the northern boundary of the site.

8.0 GROUND MODEL

On the basis of the previous intrusive investigation and the most recent groundwater monitoring results, the ground conditions at this site can be characterised as follows:

- below a generally moderate thickness of made ground, the Claygate Member of the London Clay Formation is present and was proved to the maximum depth investigated;
- made ground extends to depths of between 0.80 m (111.65 m OD) and 1.80 m (110.45 m OD) and generally comprises brown clayey silt with rootlets, gravel, brick, concrete, coal and timber fragments;
- the underlying Claygate Member initially comprises firm becoming stiff medium to high strength brown and orange-brown mottled grey silty very sandy clay with pockets of clayey fine sand and sandy silt, which extends to depths of 6.00 m (106.25 m OD) and 7.30 m (105.34 m OD);
- the initial horizon is underlain by stiff brownish grey silty sandy clay with partings and pockets of pale grey silt to depths of 7.30 m (104.95 m OD) and 9.00 m (103.64 m OD), whereupon stiff high strength dark grey silty clay to clayey silt is present to depths of 12.00 m (101.44 m OD) and 15.00 m (97.25 m OD);
- below these depths the Claygate Member very stiff high strength to very high strength dark grey silty, locally sandy, clay with traces of selenite, which was proved to the maximum depth investigated, of 20.00 m (92.64 m OD); and
- groundwater monitoring visits have measured groundwater at depths of between 9.02 m and 10.21 m, levels of between 104.42 m OD and 101.99 m.

9.0 ADVICE AND RECOMMENDATIONS

It is understood that the proposed basement will be excavated to a depth of 3.20 m, a level of 109.55 m OD, in order to match the level of the existing basement. It is also understood that is it is proposed to utilise the available space on the site by excavating the basement in an open cut.

9.1 Basement Excavation

The formation level for the proposed basement will be within the Claygate Member at a level of approximately 109.55 m OD. On the basis of the groundwater observations, which has indicated the groundwater table to be present and fluctuate between levels of 104.42 m OD and 101.99 m, groundwater will remain between approximately 5.00 m and 7.00 m below the basement excavation.

There are a number of methods by which the sides of the excavation could be supported in the temporary and permanent conditions. The choice of wall may be governed to a large extent by whether it is to be incorporated into the permanent works and have a load bearing function. The final choice will depend to a large extent on the need to protect nearby structures from movements, the required overall stiffness of the support system, and the need to control groundwater movement through the wall in the temporary condition.

Given the anticipated absence of significant groundwater inflows and the available open space, the construction of insitu retaining walls within an open cut excavation, with the sides battered to a safe angle, is considered to be suitable option. Slopes within the made ground and underlying Claygate Member should be excavated at 1 (vertical) to 2 (horizontal), although care should be taken to protect the sides of any unsupported cut slopes during periods of rainfall and any run-off from construction operations until the retaining walls have been installed. Movement of plant at the top of any open cut should be prevented and daily inspections of the cut faces should be carried out to check stability.

The ground movements associated with the excavation will depend on the method of excavation and support and the overall stiffness of the basement structure in the temporary condition. Thus, a suitable amount of propping will be required to provide the necessary rigidity and the timing of the provision of support to the wall will have an important effect on movements. The movements associated with the proposed basement is however considered further in Part 3 of this report.

9.1.1 Retaining Walls

The following parameters are suggested for the design of the permanent basement retaining walls.

Stratum	Bulk Density (kg/m^3)	Effective Cohesion (c' – kN/m^2)	Effective Friction Angle (Φ' – degrees)
Made ground	1800	Zero	27
Claygate Member	2000	Zero	25

Groundwater is unlikely to be encountered within the excavation and at this stage, it is thought that the retaining walls may be designed assuming the groundwater level to be below the excavation. Consideration will however need to be given to the risk of groundwater and

surface water collecting behind the retaining walls.. The advice in BS8102:2009[4] should be followed in the design of the basement retaining walls and with regard to waterproofing requirements.

9.1.2 Heave

The proposed development will require a maximum excavation depth of approximately 3.20 m, which will result in a net unloading of around 60 kN/m^2. The unloading will result in heave of the underlying clay soils, although these movements will to certain extent be counteracted by the applied loads from the new extension and swimming pool structure. Further consideration is given to heave movements in Part 3 of this report.

9.2 Spread Foundations

The excavation of the basement extension will result in a formation level in the Claygate Member. It should be possible to adopt moderate width pad or strip foundations in the firm sandy clay and clayey sand at a depth below 3.20 m (109.55 m OD), which may be designed to apply a net allowable bearing pressure of 140 kN/m^2.

Some parts of the proposed extension do not include a basement and spread foundations excavated from existing ground level are likely to need to extend to approximately 1.80 m in order to bypass the made ground and bear within the natural clayey sandy soils of the Claygate Member. At this depth, foundations may be designed to apply a net allowable bearing pressure of 110 kN/m^2. Both the above bearing pressures include an adequate factor of safety to keep settlements within tolerable limits, however foundations that span both sand and clay soils will need to be suitably reinforced in order to protect against differential settlements.

The initial soils of the Claygate Member, whilst they include sand horizons, comprise predominantly a sandy clay. Therefore, foundations will need to be deepened in the vicinity of existing and proposed trees and National House Building Council (NHBC) guidelines should be followed in this respect. Moderate shrinkability clays should be assumed. Where trees are to be removed the required founding depth should be determined on the basis of the existing tree height if it is less than 50% of the mature height and on the basis of full mature height if the current height is more than 50% of the mature height. Where a tree is to be retained the final mature height should be adopted. Notwithstanding NHBC guidelines, all foundations should extend beyond the zone of desiccation. In this respect it would be prudent to have all foundation excavations inspected by a suitably experienced engineer. Due allowance should be made for future growth of the trees. The requirement for compressible material alongside foundations should be determined by reference to the NHBC guidelines.

9.3 Piled Foundations

If piles were to be considered, for the ground conditions at this site, some form of bored pile is likely to be the most appropriate type. A conventional rotary augered pile may be appropriate, with temporary casing installed to maintain stability and prevent groundwater inflows, although it is likely that groundwater will be encountered at depth within the Claygate Member. Therefore the use of bored piles installed using continuous flight auger (cfa) techniques, which would not require the provision of casing, are likely to be the most appropriate choice of pile.

The following table of ultimate coefficients may be used for the preliminary design of bored piles, based on the SPT & Cohesion / level graph in the appendix.

4 BS8102 (2009) *Code of practice for protection of below ground structures against water from the ground*

Stratum	Level m OD	kN / m²
Ultimate Skin Friction		
Made Ground and Claygate Member	All soil above 109.55	Ignore (Basement excavation)
Claygate Member (clay - α = 0.6)	109.55 to 92.75	Increasing linearly from 35 to 115
Ultimate End Bearing		
Claygate Member	97.75 to 92.75	Increasing linearly from 1350 to 1710

On the basis of the above coefficients and a factor of safety of 3, it has been estimated that a 450 mm diameter pile founding at a depth of 15 m below ground level, with a toe level of approximately 97.75 m OD, should provide a safe working load of about 400 kN. Alternatively, a 450 mm diameter pile founding at a depth of 20 m below ground level (92.0 m OD) should provide an increased safe working load of 665 kN.

In the design of piled foundations, the effect of potential future shrinkage and swelling of the clay should be taken into account. In designing for compressive loads it should be assumed that further desiccation, and hence shrinkage of the clay, could continue where trees are to remain. Pile shaft adhesion within the theoretical maximum future desiccated thickness should therefore be ignored, and this thickness should be determined by reference to the NHBC guidelines in line with the advice given above for spread foundations. Heave of the clay soils could also occur due to future swelling as a result of trees being removed. This would exert a tensile uplift force on the piles, unless piles are effectively isolated from the surrounding soil by means of a slip layer or sleeve around the pile shaft.

On completion of construction the uplift forces would, to some extent, be counteracted by the applied loads. However, since the full structural loads may well be less than the potential uplift forces the piles would, in the absence of sleeving, need to be sufficiently "anchored" below the desiccated zone to withstand the uplift forces. Adequate reinforcement would need to be provided to accommodate the resulting tension.

The above examples are not intended to constitute any form of recommendation with regard to pile size or type, but merely serve to illustrate the use of the above coefficients. Specialist piling contractors should be consulted with regard to the design of a suitable piling scheme for this site.

9.4 Shallow Excavations

On the basis of the trial pit findings, it is considered likely that it will be feasible to form relatively shallow excavations that extend through the made ground and terminate within the underlying sand without the requirement for lateral support, although localised instabilities may occur from within the made ground. Where personnel are required to enter excavations, a risk assessment should be carried out and temporary lateral support or battering of the excavation sides will be required in order to comply with normal safety requirements.

Although no shallow groundwater inflows have been encountered during the investigation, it is conceivable that seepages may be encountered from perched water tables within the made ground, particularly within the vicinity of existing foundations. Such inflows should be suitably controlled by sump pumping.

9.5 Basement Floor Slab

Following the excavation of the proposed basement, it is likely that the basement floor slab will need to be suspended over a void in order to accommodate the likely heave movements, unless the slab can be designed to accommodate these pressures. An analysis of potential heave movements has been carried out and is discussed in Part 3 of this report.

9.6 Effect of Sulphates

Generally low concentrations of total sulphate were measured in selected samples of made ground and natural soil recovered as part of the previous investigation and therefore indicate buried concrete can be designed in accordance with Class DS-1 conditions of Table C2 of BRE Special Digest 1: SD1 Third Edition (2005). The measured pH conditions are near neutral and therefore on the basis of static groundwater conditions being assumed for buried concrete an ACEC classification of AC-1s may be adopted.

The guidelines contained in the above digest should be followed in the design of foundation concrete.

Part 3: GROUND MOVEMENT ANALYSIS

This section of the report comprises an analysis of the ground movements arising from the proposed basement and foundation scheme discussed in Part 2 and the information obtained from the investigation, presented in Part 1 of the report.

10.0 INTRODUCTION

The sides of an excavation will move to some extent regardless of how they are supported. The movement will typically be both horizontal and vertical and will be influenced by the engineering properties of the ground, groundwater level and flow, the efficiency of the various support systems employed during underpinning and the efficiency or stiffness of any support structures used.

An analysis has been carried out of the likely movements arising from the proposed excavation and the results of this analysis have been used to predict the effect of these movements on surrounding structures.

10.1 Construction Methodology

It is proposed to excavate the basement in an open cut excavation. Once the excavation has been completed and the sides battered to a safe angle, the basement slab will be cast. The ground behind the walls will then be backfilled and compacted in layers. On the southern extent of the excavation, at the interface with the existing basement, sufficient propping will be installed to maintain stability of the existing house.

11.0 GROUND MOVEMENTS

An assessment of ground movements within and surrounding the excavation has been undertaken using the P-Disp computer programs licensed from the OASYS suite of geotechnical modelling software from Arup. This program is commonly used within the ground engineering industry and is considered to be appropriate tools for this analysis.

The analysis of potential ground movements within the excavation, as a result of unloading of the underlying soils, has been carried out using the Oasys P-Disp Version 19.3 – Build 12 software package and is based on the assumption that the soils behave elastically, which provides a reasonable approximation to soil behaviour at small strains.

For the purpose of these analyses, the corners have been defined by x and y coordinates, with the x-direction parallel with the orientation east-west, whilst the y-direction is parallel with the orientation of north-south. Vertical movement is in the z-direction.

The full outputs of all the analyses can be provided on request but samples of the output movement contour plots are included within the appendix.

11.1 Ground Movements Surrounding the Basement

As it is proposed to construct the basement in an open cut, there will be no vertical movement associated with the installation of a retaining wall, while horizontal movements, arising from the relief of the horizontal stresses are likely to be negligible. In any case, for a 3.0 m deep

excavation in sandy clay, no movement would be expected to occur beyond 6.0 m away from the basement retaining walls, as described in various published literature, including Peck (1969)[5]. As no structures are present within 30 m of the excavation, that no vertical and horizontal movements will occur below the existing house as the existing basement retaining walls are being retained and re-used and due to the open cut nature of the excavation, there is not considered to be any likely impact from horizontal and vertical movements outside of the excavation. Heave movements from the unloading of the clay soils will take place outside of the excavation, as discussed below.

11.2 Ground Movements within the Excavation (Heave)

Unloading of the Claygate Member will take place as a result of the excavation of the proposed lower ground floor extension. The reduction in vertical stress will cause heave to take place. Undrained soil parameters have been used to estimate the potential short term movements, which include the "immediate" or elastic movements as a result of the existing building and basement excavation. Drained parameters have been used to provide an estimate of the total long-term movement.

The elastic analysis requires values of soil stiffness at various levels to calculate displacements. Values of stiffness for the soils at this site are readily available from published data and we have used a well-established method to provide our estimates. This relates values of E_u and E', the undrained and drained stiffness respectively, to values of undrained cohesion, as described by Padfield and Sharrock[6] and Butler[7] and more recently by O'Brien and Sharp[8]. Relationships of $E_u = 500\ C_u$ and $E' = 300\ C_u$ for the cohesive soils and 2000 x SPT 'N' for granular soils have been used to obtain values of Young's modulus. More recent published data[9] indicates stiffness values of 750 x Cu for the London Clay and a ratio of E' to Cu of 0.75, but it is considered that the use of the more conservative values provides a sensible approach for this stage in the design.

The excavation of a 3.20 m thickness of soil across the majority of the proposed extension will result in a net unloading of roughly 60 kN/m, assuming a unit weight of 18 kN/m^3 for the made ground and 20 kN/m^2 for the Claygate Member. The existing basement, which is being retained and lowered by approximately 600 mm, forms the southeastern corner of the proposed basement and therefore the unloading in this corner is in the order of 14 kN/m^2. The basement will be founded on a basement raft foundation, which will apply a pressure of 48 kN/m^2, as indicated by the structural engineers.

A rigid boundary for the analysis has been set at a depth of 60.0 m below ground level (52.75 m OD), which will be within the London Clay. Below this depth the clay is considered to be essentially incompressible.

The P-Disp analysis indicates that the heave resulting from the excavation of the proposed basement will be up to 10 mm within the centre of the excavation and reducing to approximate 5 mm toward the edges. These movements would be expected to be complete by the end of the excavation and construction period, although depending on the time-scales of the excavation and subsequent construction, these movements may not be fully realised. Taking into account the loads of the proposed extension, the analysis has shown that in the

5 Peck R B (1969) *Deep excavations and tunnel-lining in soft ground*, State-of-the-Art Report, Proc 7th Int. Conf. SMFE, Mexico
6 Padfield CJ and Sharrock MJ (1983) *Settlement of structures on clay soils*. CIRIA Special Publication 27
7 Butler FG (1974) *Heavily overconsolidated clays: a state of the art review*. Proc Conf Settlement of Structures, Cambridge, 531-578, Pentech Press, Lond
8 O'Brien AS and Sharp P (2001) *Settlement and heave of overconsolidated clays - a simplified non-linear method.* Part Two, Ground Engineering, Nov 2001, 48-53
9 Burland JB, Standing, JR, and Jardine, FM (2001) Building response to tunnelling, case studies from construction of the Jubilee Line Extension.. CIRIA Special Publication 200

long term, the majority of the short-term movement will be recovered, with total heave movements at the centre of the excavation likely to actually be approximately 3 mm reducing to 1 mm at the edges. In the southeastern corner however, where the existing basement is present, up to 5 mm of settlement can be expected due to the limited unloading of this area coupled with the proposed loads.

The results of the P-Disp analysis also indicate the likely impact of the proposed basement construction beyond the site boundaries. On the basis of the analysis, total vertical movements outside the proposed extension to the east are unlikely to exceed 1 mm of heave, whilst beyond the southeastern corner between 1 mm and 2 mm of settlement maybe expected to occur. These movements however occur within 2 m of the edge of the excavation and are therefore considered to be very small and will not have detrimental impact on any surrounding structures.

The potential movements are summarised in the table below.

Location	Movement (mm)	
	Short-term Movement (Excavation Phase)	Total Movement
Centre of excavation	10 (heave)	3 (heave)
Edge of excavations	5 to 6 (heave)	1 to 2 (heave)
Southeastern corner	1 to 3 (heave)	5 to 6

If a compressible material is used beneath the slab, it will need to be designed to be able to resist the potential uplift forces generated by the ground movements. In this respect potential heave pressures are typically taken to equate to around 40% of the total unloading pressure.

12.0 DAMAGE ASSESSMENT

The potential heave movements predicted by P-Disp have been used to carry out an assessment of the likely longer term damage to closest elevations of the existing house. The methodology contained within CIRIA 580 has been used with deflection ratios calculated from the line plots appended over their respective wall lengths and for the roughly 12 m high neighbouring buildings. The calculated deflection ratios fall well below 1 in 400, which would be well within the 0.05 % strain that is within Burland Category 0 – negligible.

13.0 CONCLUSION

The Camden Planning Guidance for Basements and Lightwells (CPG4; July 2015) states that "The Council … will expect … mitigation measures where any risk of damage is identified of Burland category 1 'very slight' or higher. Following inclusion of mitigation measures into the proposed scheme the changes are to be re-evaluated and new net consequences determined."

No neighbouring structures will be affected by the proposed basement, whilst the analysis of the potential heave / settlements arising from the proposed basement and the associated building damage assessment, has indicated that the closest elevations of the existing house all fall within Category 0 and negligible damage and therefore will be within suitable and acceptable limits.

14.0 BASEMENT IMPACT ASSESSMENT

The screening identified a number of potential impacts. The previous desk study and ground investigation information has been used below to review the potential impacts, to assess the likelihood of them occurring and the scope for reasonable engineering mitigation.

The table below summarises the previously identified potential impacts and the additional information that is now available from the site investigation in consideration of each impact.

Potential Impact	Site Investigation Conclusions
The site is located directly above an aquifer	The investigation has indicated that the site is underlain by the Claygate Member, which is designated as a Secondary 'A' Aquifer. Groundwater has however been measured at a depth of between 5 m and 7 m below the proposed basement, which will therefore not intercept the water table. There is therefore not the potential for the basement to have an impact on the local hydrogeological setting. .
The site is located within the catchment of the Highgate Ponds	The current proposals will not significantly increase the proportion of hard surfaced areas on the site and therefore the volume of surface water inflow from surface run-off is unlikely to change due to the proposed development. Therefore, despite being in the catchment of the pond chains, the development is not considered to cause an increase of overland flow and therefore there is not considered to be a risk of flooding or increased contamination of the pond chains.
The site within a wilder hillside setting in which the general slope is greater than 7°	The hillside setting of which the site forms part of, includes slopes of 7° and greater, although this is an extensive hillside setting and slopes of such angles are only present downslope from the proposed basement excavation, which will therefore not have an effect on the stability of the wider hillside setting.

The results of the site investigation have therefore been used below to review the remaining potential impacts, to assess the likelihood of them occurring and the scope for reasonable engineering mitigation.

The site is underlain by a Secondary 'A' Aquifer

The formation level for the proposed basement will be within the Claygate Member at a level of approximately 109.55 m OD. On the basis of the groundwater observations, which has indicated the groundwater table to be present and fluctuate between levels of 104.42 m OD and 101.99 m, groundwater will remain between approximately 5.00 m and 7.00 m below the basement excavation. There are no other structures within 30 m of the proposed basement, with the nearest basements over 50 m from the development, such that there will not be a cumulative impact on any groundwater flow.

The site is located within the catchment of the Highgate Ponds

The proposals will not significantly increase the proportion of hard surfaced areas on the site and therefore the volume of surface water inflow from surface run-off is unlikely to change due to the proposed development. Therefore, despite being in the catchment of the pond chains, the development is not considered to cause an increase of overland flow and therefore the risk of flooding or increased contamination of the pond chains.

On the basis of all of the above, it is concluded that the proposed development will not have an impact on the hydrogeological setting.

The site forms part of a wider hillside setting that includes slopes of greater than 7º

The site forms part of an extensive hillside setting and the slopes of angles greater than 7˚ are located downslope of the proposed basement to the west and south / southeast, at distances of over 100 m. Furthermore, the topographical survey of the site has indicated that slopes of greater than 7˚ are not present within the site itself and therefore the proposed basement is not considered to pose a risk to the stability of natural or manmade slopes.

14.1 Non-Technical Summary of Evidence

This section provides a short summary of the evidence acquired and used to form the conclusions made within the BIA.

14.1.1 Screening

The following table provides the evidence used to answer the surface water flow and flooding screening questions.

Question	Evidence
1. Is the site within the catchment of the pond chains on Hampstead Heath?	Topographical maps acquired as part of the desk study and Figures 12 and 14 of the Arup report
2. As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route?	A site walkover and existing plans of the site have confirmed the proportions of hardstanding and soft landscaping, which have been compared to the proposed drawings to determine the changes in the proportions. The existing and proposed drainage drawings have also been consulted.
3. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?	
4. Will the proposed basement development result in changes to the profile of the inflows (instantaneous and long term) of surface water being received by adjacent properties or downstream watercourses?	As above.
5. Will the proposed basement result in changes to the quantity of surface water being received by adjacent	

Question	Evidence
properties or downstream watercourses?	
6. Is the site in an area known to be at risk from surface water flooding such as South Hampstead, West Hampstead, Gospel Oak and Kings Cross, or is it at risk of flooding because the proposed basement is below the static water level of a nearby surface water feature?	Flood risk maps acquired from the Environment Agency as part of the desk study, Figure 15 of the Arup report, the Camden Flood Risk Management Strategy dated 2013 and the North London Strategic Flood Risk Assessment dated 2008.

The following table provides the evidence used to answer the subterranean (groundwater flow) screening questions.

Question	Evidence
1a. Is the site located directly above an aquifer?	Aquifer designation maps acquired from the Environment Agency as part of the desk study and Figures 3, 5 and 8 of the Arup report.
1b. Will the proposed basement extend beneath the water table surface?	Previous nearby GEA investigations and BGS archive borehole records and LBH Wembley and GEA on site investigation.
2. Is the site within 100 m of a watercourse, well (used/ disused) or potential spring line?	Topographical maps acquired as part of the desk study and Figures 11 and 12 of the Arup report.
3. Is the site within the catchment of the pond chains on Hampstead Heath?	Topographical maps acquired as part of the desk study and Figures 12 and 14 of the Arup report
4. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?	A site walkover and existing plans of the site have confirmed the proportions of hardstanding and soft landscaping, which have been compared to the proposed drawings to determine the changes in the proportions. The existing and proposed drainage drawings have also been consulted.
5. As part of the site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground (e.g. via soakaways and/or SUDS)?	The details of the proposed development do not indicate the use soakaway drainage.
6. Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to or lower than, the mean water level in any local pond or spring line?	Topographical maps acquired as part of the desk study and Figures 11 and 12 of the Arup report.

The following table provides the evidence used to answer the subterranean (groundwater flow) screening questions.

Question	Evidence
1. Does the existing site include slopes, natural or manmade, greater than 7°?	Topographical maps and Figures 16 and 17 of the Arup report and confirmed during a site walkover
2. Will the proposed re-profiling of landscaping at the site change slopes at the property boundary to more than 7°?	The details of the proposed development provided do not include the re-profiling of the site to create new slopes
3. Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7°?	Topographical maps and Figures 16 and 17 of the Arup report and confirmed during a site walkover
4. Is the site within a wider hillside setting in which the general slope is greater than 7°?	
5. Is the London Clay the shallowest strata at the site?	Geological maps and Figures 3, 5 and 8 of the Arup report
6. Will any trees be felled as part of the proposed development and / or are any works proposed within any tree protection zones where trees are to be retained?	A site walkover confirmed that there are trees on site, but the proposals do not include for the removal of any trees

Question	Evidence
7. Is there a history of seasonal shrink-swell subsidence in the local area and / or evidence of such effects at the site?	Knowledge on the ground conditions of the area were used to make an assessment of this, in addition to a visual inspection of the buildings carried out during the site walkover
8. Is the site within 100 m of a watercourse or potential spring line?	Topographical maps acquired as part of the desk study and Figures 11 and 12 of the Arup report
9. Is the site within an area of previously worked ground?	Geological maps and Figures 3, 5 and 8 of the Arup report
10. Is the site within an aquifer?	Aquifer designation maps acquired from the Environment Agency as part of the desk study and Figures 3, 5 and 8 of the Arup report.
11. Is the site within 50 m of Hampstead Heath ponds?	Topographical maps acquired as part of the desk study and Figures 12 and 14 of the Arup report.
12. Is the site within 5 m of a highway or pedestrian right of way?	Aerial photography, site plans and the site walkover.
13. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	Records of basements being present below neighbouring properties and the site walkover confirmed the position of the proposed basement relative the neighbouring properties.
14. Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines?	Maps and plans of infrastructure tunnels were reviewed, in addition to online infrastructure maps.

14.1.2 Scoping and Site Investigation

The questions in the screening stage that there were answered ‘yes’, were taken forward to a scoping stage and the potential impacts discussed in Section 4.0 of this report, with reference to the possible impacts outlined in the Arup report.

A ground investigation was previously carried out, which has allowed an assessment of the potential impacts of the basement development on the various receptors identified from the screening and scoping stages. Principally the investigation aimed to establish the ground conditions, including the groundwater level, the engineering properties of the underlying soils to enable suitable design of the basement development and the configuration of existing party wall foundations. The findings of the investigation are discussed in Section 5.0 of this report and summarized in both Section 7.0 and the Executive Summary.

14.1.3 Impact Assessment

Section 13.0 of this report summarises whether or not, on the basis of the findings of the investigation, the potential impacts still need to be given consideration and identifies ongoing risks that will require suitable engineering mitigation. Section 8.0 of this report also provides recommendations for the design of the proposed development, whilst Part 3 provides the outcomes of a ground movement analysis, building damage assessment and slope stability analysis, which has also been used to provide a conclusion on any potential impacts from the proposed basement development.

15.0 OUTSTANDING RISKS AND ISSUES

This section of the report aims to highlight areas where further work is required as a result of limitations on the scope of this investigation, or where issues have been identified by this investigation that warrant further consideration. The scope of risks and issues discussed in this section is by no means exhaustive, but covers the main areas where additional work may be required.

The ground is a heterogeneous natural material and variations will inevitably arise between the locations at which it is investigated. This report provides an assessment of the ground conditions based on the discrete points at which the ground was sampled, but the ground conditions should be subject to review as the work proceeds to ensure that any variations from the Ground Model are properly assessed by a suitably qualified person.

APPENDIX

Previous Borehole Records

Borehole Cross-section

Trial Pit Records

Site Plan

P-DISP ANALYSIS
Short Term Movement
Total Movement

P-Disp Displacement Graphs

Proposed Development Drawings

Topographical Site Survey

Existing and Proposed Drainage Plan

Proposed Landscaping Plan

GEA Geotechnical & Environmental Associates	Wid□ur□ □arn Wid□ur□Hill Ware□Herts SG12 7□E	**Site** At□lone House□Ham□stead Lane□London N6 4RU	**Borehole Number** **BH101**

Boring Method Ca□le Percussion	**Casing Diameter** 150mm cased to 6.00m	**Ground Level (mOD)** 113.44	**Client**	**Job Number** J12224
	Location	**Dates** 12/09/2012□ 13/09/2012	**Engineer**	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.40	D1					□1.80)	Made Ground □ro□n cla□ □it□ □ric□and concrete ru□□le□ coal□terram and metal □ragments)		
1.00	D2								
1.20□1.65 1.20□1.65	CPT N□9 □1	1.20	DR□	2□2/3□1□3□2					
					111.64	1.80			
1.90 2.00□2.45	D3 U1						Firm □ecoming sti□medium to □ig□ strengt□ □ro□n silt□ □er□ sand□CLA□ □it□ □oc□ets o□cla□e□ □ine sand		
2.50	D4								
2.80	D5								
3.00□3.45 3.00	SPT N□5 D6	3.00	DR□	1□1/1□1□1□2					
3.70	D7								
4.00□4.45	U2					□4.50)			
4.50	D8								
5.00□5.45 5.00	SPT N□15 D9	5.00	DR□	1□2/3□4□4□4					
6.00□6.45	U3								
					107.14	6.30			
6.50	D10			12/09/2012□DR□ □ □ □ □ □ □ □ □ □ □ 13/09/2012□DR□			Sti□□□ig□strengt□ □ro□nis□gre□silt□CLA□ □it□ □oc□ets and □artings o□□lae gre□silt		
7.50□7.95 7.50	SPT N□17 D11	6.00	DR□	2□3/3□4□5□5		□2.70)			
9.00□9.45	U4				104.44	9.00	Sti□□□ig□strengt□ dar□gre□cla□e□SILT		
9.50	D12								

Remarks
Exca□ating ser□ices inse□ction □it □rom GL to 1.2 m □or 1 □r.
Ground□ater monitoring stnad□i□e installed in t□e □ore□ole to 13.0 m.
Ground□ater monitoring □isit on 01/10/2012 recorded ground□ater at a de□t□ o□9.63 m.
Ground□ater monitoring □isit on 10/10/2012 recorded ground□ater at a de□t□ o□9.62 m.
Ground□ater monitoring □isit on 16/10/2012 recorded ground□ater at a de□t□ o□9.63 m.

Scale (approx)	Logged By
1□50	ML

Figure No.
J12224.□H101

GEA Geotechnical & Environmental Associates Wid□ur□□arn Wid□ur□Hill Ware□Herts SG12 7□E	**Site** At□lone House□Ham□stead Lane□London N6 4RU		**Borehole Number** **BH101**
Boring Method Ca□le Percussion	**Casing Diameter** 150mm cased to 6.00m	**Ground Level (mOD)** 113.44	**Client**	**Job Number** J12224
	Location	**Dates** 12/09/2012□ 13/09/2012	**Engineer**	**Sheet** 2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.50□10.95 10.50	SPT N□22 D13	6.00	DR□	4□5/6□6□5□5		□3.00)			
12.00□12.45	U5			See□age□1) at 12.10m.	101.44	12.00	Sti□□□ecoming □er□sti□□□ig□strengt□to □er□□ig□strengt□ dar□gre□silt□sand□CLA□ □it□traces o□selenite		▽1
12.50	D14								
13.50□13.95	U6								
14.00	D15								
15.00□15.45	U7								
15.50	D16					□8.00)			
16.50□16.95	U8								
17.00	D17								
18.00□18.45	U9								
18.50	D18								
19.50□19.95 19.50	SPT N□32 D19	6.00	15.10	5□5/6□7□9□10 13/09/2012□15.10m □□□□□□□□□□	93.44	20.00			

Remarks	**Scale (approx)** 1□50	**Logged By** ML
	Figure No. J12224.□H101	

Geotechnical & Environmental Associates	Wid□ur□ □arn Wid□ur□Hill Ware□Herts SG12 7□E	**Site** At□lone House□Ham□stead Lane□London N6 4RU	**Borehole Number** **BH102**

Boring Method	**Casing Diameter**	**Ground Level (mOD)**	**Client**	**Job Number**
Ca□le Percussion	150mm cased to 3.00m	112.25		J12224
	Location	**Dates** 17/09/2012	**Engineer**	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						□0.35)	Concrete □a□ing sla□ o□er sand and gra□el su□□□ase		
					111.90	0.35	Made Ground □□ro□n cla□e□sand□silt □it□ gra□el□□ric□and concrete □ragments)		
0.70	D1								
						□1.45)			
1.20□1.65 1.20□1.65	CPT N□3 □2	1.20	DR□	1□0/1□0□1□1					
1.80	D2				110.45	1.80			
2.00□2.45 2.00	SPT N□8 D3	2.00	DR□	1□1/2□1□2□3			Firm medium to □ig□ strengt□ □ro□n mottled orange□□ro□n silt□sand□CLA□ □it□ □oc□ets o□cla□e□□ine sand		
2.80	D4								
3.00□3.45	U1								
3.50	D5								
						□4.20)			
4.00□4.45 4.00	SPT N□9 D6	3.00	DR□	1□1/2□2□2□3					
4.70	D7								
5.00□5.45	U2								
5.50	D8								
6.00□6.45 6.00	SPT N□15 D9	3.00	DR□	2□2/3□3□4□5	106.25	6.00	Sti□□□ro□nis□ gre□silt□sand□CLA□ □it□ □artings o□□ale gre□silt		
						□1.30)			
7.30	D10				104.95	7.30	Sti□□□ecoming □er□sti□□□ig□ strengt□ to □er□ □ig□ strengt□ dar□gre□silt□□locall□sand□□CLA□ □it□ traces o□selenite		
7.50□7.95	U3								
8.00	D11								
9.00□9.45 9.00	SPT N□19 D12	3.00	DR□	3□3/4□4□5□6					

Remarks
Exca□ating ser□ices ins□ection □ir □orm GL to 1.2 m □or 1 □r.
Ground□ater monitoring stand□i□e installed in □ore□ole to a de□t□ o□7.00 m.
Ground□ater monitoring □isit on 01/10/2012 recorded t□e stand□i□e to □e dr□
Ground□ater monitoring □isit on 10/10/2012 recorded t□e stand□i□e to □e dr□
Ground□ater monitoring □isit on 16/10/2012 recorded t□e stand□i□e to □e dr□

Scale (approx)	**Logged By**
1□50	ML

Figure No.
J12224.□H102

GEA Geotechnical & Environmental Associates

Wid□ur□ □arn
Wid□ur□Hill
Ware□Herts
SG12 7□E

Site
At□lone House□Ham□stead Lane□London N6 4RU

Borehole Number
BH102

Boring Method	**Casing Diameter**	**Ground Level (mOD)**	**Client**	**Job Number**
Ca□le Percussion	150mm cased to 3.00m	112.25		J12224
	Location	**Dates** 17/09/2012	**Engineer**	**Sheet** 2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.50□10.95	U4								
11.00	D13								
12.00□12.45 12.00	SPT N□24 D14	3.00	DR□	4□4/5□6□6□7 See□age□1) at 12.50m.		□7.70)			▽1
13.50□13.95	U5								
14.00	D15								
14.50□14.95 14.50	SPT N□27 D16	3.00	12.50	5□6/6□7□7□7					
					97.25	15.00	Com□lete at 15.00m		

Remarks

Scale (approx)	**Logged By**
1□50	ML

Figure No.
J12224.□H102

Geotechnical & Environmental Associates
Widbur Barn
Widbur Hill
Ware Herts
SG12 7BE

Site
Atbone House Hamstead Lane London N6 4RU

Borehole Number
BH103

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm cased to 1.50m	112.64		J12224
	Location	**Dates** 18/09/2012	**Engineer**	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(1.30)	Made Ground (brown clayey silt with rootlets gravel and brick fragments)		
0.70	D1								
1.20-1.65	CPT N=9	1.20	DRY	1/2/2/2/2/3	111.34	1.30	Firm becoming stiff medium to high strength brown silty sand CLAY with pockets of clayey fine sand		
1.20-1.65	B1								
1.80	D2								
2.00-2.45	SPT N=13	1.50	DRY	2/3/4/3/3/3					
2.00	D3								
2.70	D4								
3.00-3.45	SPT N=10	1.50	DRY	1/1/2/2/3/3					
3.00	D5								
3.80	D6								
4.00-4.45	U1					(6.00)			
4.50	D7								
4.80	D8								
5.00-5.45	SPT N=10	1.50	DRY	2/2/2/2/3/3					
5.00	D9								
6.00-6.45	U2								
6.50	D10								
7.30	D11				105.34	7.30	Stiff brownish grey silty sand CLAY with partings of pale grey silt		
7.50-7.95	SPT N=17	1.50	DRY	3/3/4/5/5					
7.50	D12					(1.70)			
9.00-9.45	U3				103.64	9.00	Stiff high strength dark grey silty CLAY with horizons of clayey SILT		
9.50	D13								

Remarks
Excavating services inspection pit from GL to 1.2 m for 1 hr.
Groundwater monitoring standpipe installed in borehole to a depth of 12.5 m.
Groundwater monitoring visit on 01/10/2012 recorded groundwater at a depth of 9.89 m.
Groundwater monitoring visit on 10/10/2012 recorded groundwater at a depth of 9.87 m.
Groundwater monitoring visit on 16/10/2012 recorded groundwater at a depth of 9.82 m.

Scale (approx)	Logged By
1:50	ML

Figure No.
J12224.BH103

Geotechnical & Environmental Associates	Wid□ur□ □arn Wid□ur□Hill Ware□Herts SG12 7□E	**Site** At□lone House□Ham□stead Lane□London N6 4RU	**Borehole Number** **BH103**

Boring Method	**Casing Diameter**	**Ground Level (mOD)**	**Client**	**Job Number**
Ca□le Percussion	150mm cased to 1.50m	112.64		J12224
	Location	**Dates** 18/09/2012	**Engineer**	**Sheet** 2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.50□10.95 10.50	SPT N□18 D14	1.50	DR□	3□3/4□4□5□5					
12.00□12.45	U4			See□age□1) at 12.10m.					▽1
12.50	D15					□6.00)			
13.50□13.95	U5								
14.00	D16								
15.00□15.45	U6				97.64	15.00	□er□sti□□er□ □ig□strengt□dar□gre□silt□sand□CLA□ □it□ traces o□selenite		
15.50	D17								
16.50□16.95	U7								
17.00	D18					□5.00)			
18.00□18.45	U8								
18.50	D19								
19.50□19.95 19.50	SPT N□35 D20	1.50	16.80	6□6/8□8□9□10					
					92.64	20.00			

Remarks

Scale (approx)	**Logged By**
1□50	ML

Figure No.
J12224.□H103

GEA Geotechnical & Environmental Associates Wid□ur□□arn Wid□ur□Hill Ware□Herts SG12 7□E	**Site** At□lone House□Ham□stead Lane□London N6 4RU		**Trial Pit Number** **TP101**
Excavation Method JC□ 3C□ □it□ 2□t □uc□et	**Dimensions** 2700 x 700 x 3000	**Ground Level (mOD)** 111.11	**Client**	**Job Number** J12224
	Location	**Dates** 12/09/2012	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					□0.30)	Made Ground □□ro□n cla□e□silt □it□ gra□el and occasional □ric□□ragments)		
0.20	D1			110.81	0.30			
0.50	D2					Orange□□ro□n □er□cla□e□silt□SAND to cla□e□SILT □it□ □artings o□□ale gre□cla□e□silt		
					□2.70)			
3.00	D3			108.11	3.00			
						Com□lete at 3.00m		

Plan

Remarks

Ground□ater not encountered.
Sides o□trial □it remained sta□le during exca□ation.

Scale (approx)	Logged By	Figure No.
1□50	ML	J12224.TP101

Geotechnical & Environmental Associates
Widbur□□arn
Widbur□Hill
Ware□Herts
SG12 7□E

Site
At□lone House□Ham□stead Lane□London N6 4RU

Trial Pit Number
TP102

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
JC□ 3C□ Exca□ator □it□ 2□t □uc□et	2700 x 700 x 3000	109.41		J12224
	Location	**Dates** 12/09/2012	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					□0.40)	Made Ground □□ro□n cla□e□silt □it□ rootlets□gra□el and occasional □ric□ □ragments)		
0.30	D1			109.01	0.40			
0.60	D2				□1.10)	Firm □ro□n mottled orange□□ro□n silt□sand□CLA□ □it□ □artings o□□ale gre□silt□coarse rounded gra□el and occasional rounded co□□les		
				107.91	1.50			
2.00	D3				□1.50)	Firm □ro□n mottled □ale gre□silt□sand□CLA□		
				106.41	3.00			
						Com□lete at 3.00m		

Plan

Remarks

Ground□ater not encountered.
Sides o□trial □it remained sta□le during exca□ation.

Scale (approx)	Logged By	Figure No.
1□50	ML	J12224.TP102

GEA Geotechnical & Environmental Associates Wid□ur□□arn Wid□ur□Hill Ware□Herts SG12 7□E	**Site** At□lone House□Ham□stead Lane□London N6 4RU		**Trial Pit Number** **TP103**
Excavation Method JC□ 3C□ Exca□ator □it□ 2□t □uc□et	**Dimensions** 700 x 2500 x 3100	**Ground Level (mOD)** 112.04	**Client**	**Job Number** J12224
	Location	**Dates** 12/09/2012	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					□0.20)	To□soil □□ro□n cla□e□silt □it□ rootlets and gra□el)		
0.10	D1			111.84	0.20	Firm □ro□n mottled orange□□ro□n and □ale gre□silt□sand□ CLA□ □it□ □artings o□□ro□n □ine silt□sand		
0.50	D2							
					□2.30)			
2.00	D3					□oc□et o□□ro□n □ine sand at 2.0 m		
				109.54	2.50			
2.60	D4					Orange□□ro□n □er□cla□e□silt□□ine SAND □it□ □oc□ets o□ gre□silt□cla□and cla□e□silt		
					□0.60)			
				108.94	3.10			
						Com□lete at 3.10m		

Plan

Remarks

Ground□ater not encountered.
Sides o□trial □it remained sta□le during exca□ation.

Scale (approx)	Logged By	Figure No.
1□50	ML	J12224.TP103

GEA Geotechnical & Environmental Associates
Wid□ur□ □arn
Wid□ur□Hill
Ware□Herts
SG12 7□E

Site	Trial Pit Number
At□lone House□Ham□stead Lane□London N6 4RU	TP104

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
JC□ 3C□ Exca□ator □it□ 2□t □uc□et	2400 x 700 x 3100	112.45		J12224
	Location	**Dates** 12/09/2012	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					□0.80)	Made Ground □□ro□n mottled dar□ □ro□n□orange□□ro□n and gre□silt□sand□cla□ □it□ gra□el□□ric□□concrete□metal and tim□er □ragments)		
0.50	D1			111.65	0.80			
					□1.70)	Firm orange□□ro□n mottled gre□silt□ □er□sand□CLA□ □it□ a□undant □artings o□silt□ □ine sand		
				109.95	2.50			
					□0.60)	□ro□n and orange□□ro□n cla□e□silt□ □ine SAND		
2.90	D2			109.35	3.10			
						Com□lete at 3.10m		

Plan

Remarks

Ground□ater not encountered.
Sides o□trial □it remained sta□le during exca□ation.

Scale (approx)	Logged By	Figure No.
1□50	ML	J12224.TP104

GEA Geotechnical & Environmental Associates Wid□ur□ □arn Wid□ur□Hill Ware□Herts SG12 7□E	**Site** At□lone House□Ham□stead Lane□London N6 4RU		**Trial Pit Number** **TP105**
Excavation Method JC□ 3C□ Exca□ator □it□ 2□t □uc□et	**Dimensions** 2400 x 700 x 2900	**Ground Level (mOD)** 113.64	**Client**	**Job Number** J12224
	Location	**Dates** 12/09/2012	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					□1.50)	Made Ground □ro□n silt□sand □it□ gra□el□demolition ru□□le□metal□concrete□coal□c□arcoal and tim□er □agments)		
0.80	D1			112.14	1.50			
					□1.40)	Firm orange□□ro□n silt□ □er□sand□CLA□ □it□ □artings o□ silt□ □ine sand		
				110.74	2.90			
						Com□lete at 2.90m		

Plan

Remarks

Ground□ater not encountered.
Sides o□trial □it remained sta□le during exca□ation.

Scale (approx)	Logged By	Figure No.
1□50	ML	J12224.TP105

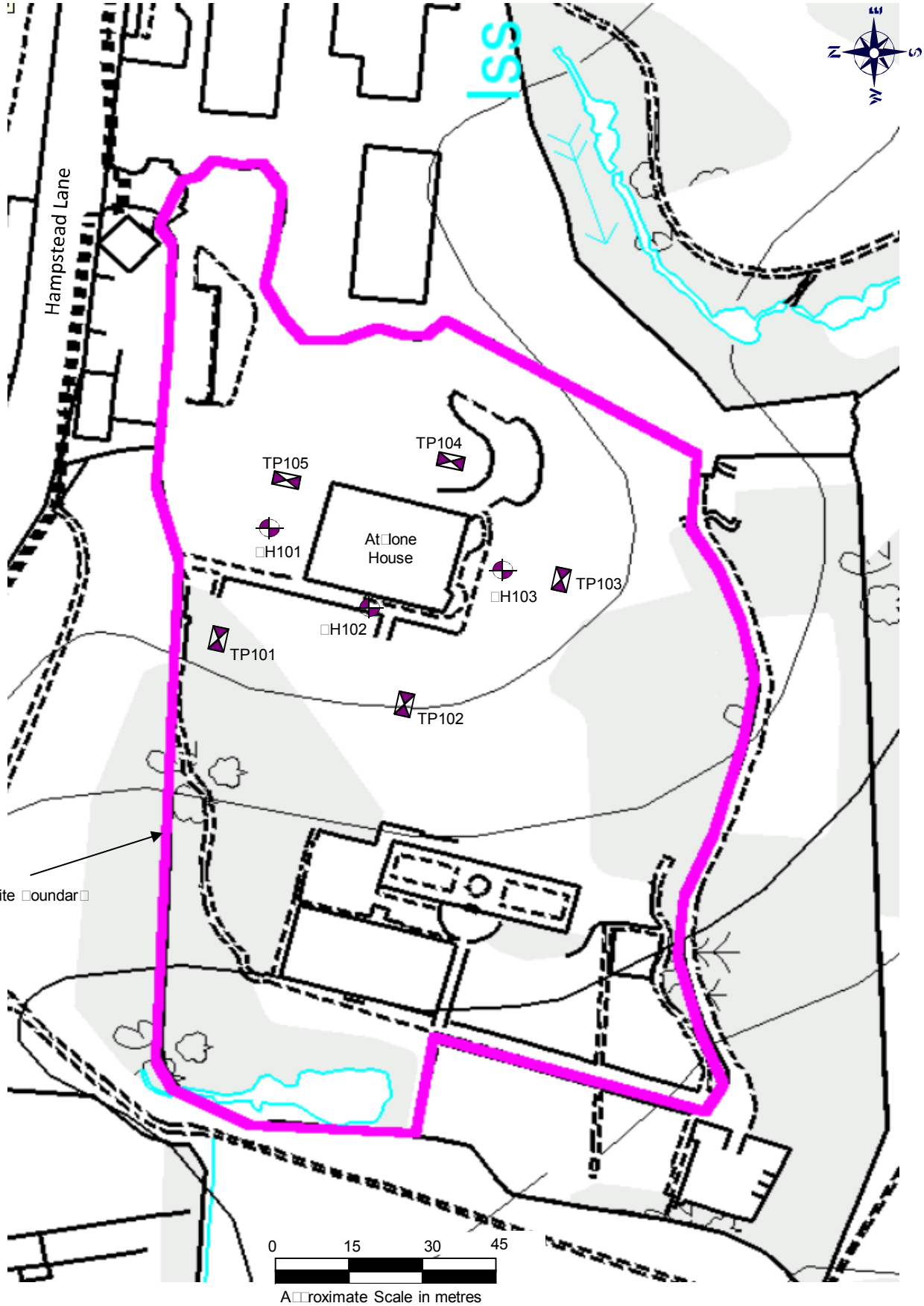
Geotechnical & Environmental Associates
Wid□ur□□arn
Wid□ur□Hill
Ware
SG12 7□E

Site Plan

Site At□lone House□Ham□stead Lane□London N6 4RU

Job Number
J12224

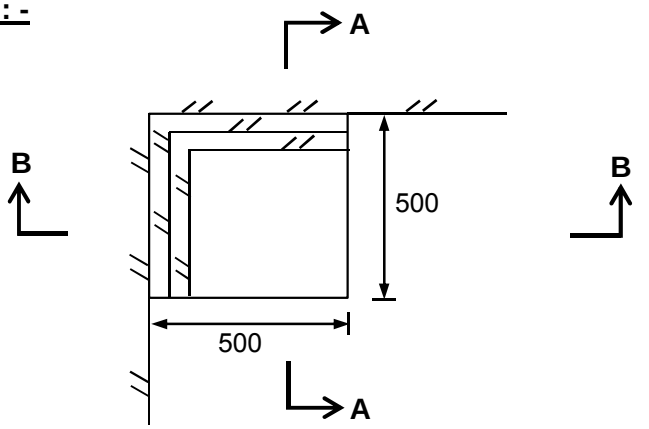
Sheet
1 / 1



Geotechnical & Environmental Associates	Wid□ur□□arn Wid□ur□Hill Ware Herts SG12 7□E	**Site** At□lone House□Ham□stead Lane□ Hig□gate□London NW5 4LS	**Trial Pit Number** **1**

Excavation Method **Manual**	**Dimensions** 500 x 500 x 700	**Ground Level (mOD)** 109.55	**Client** □irtus Real Estate	**Job Number** J16075
	Location	**Dates** 15/04/2016	**Engineer** Engineers HRW	**Sheet** 1 / 2

Plan: -



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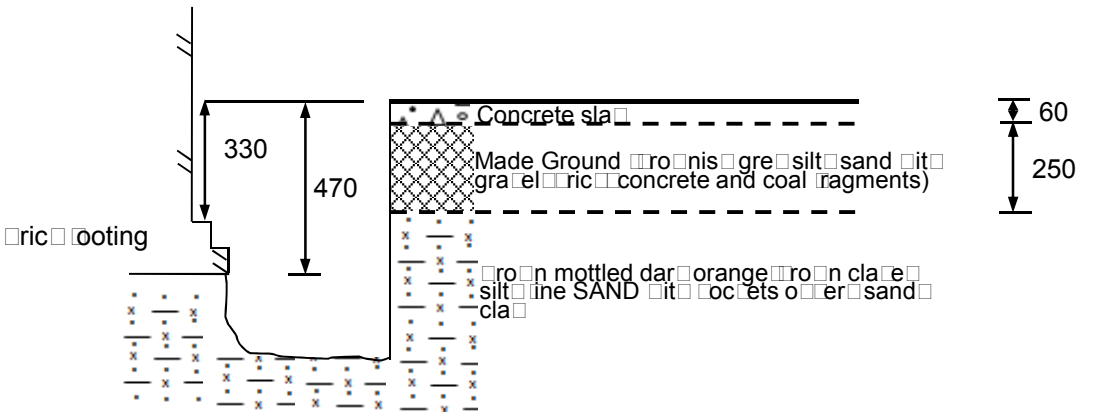


Remar□s□	Scale□
All dimensions in millimetres	1□20
Sides o□trial □it remained sta□le during exca□ation	Logged □□□
Ground□ater□Not encountered	ML

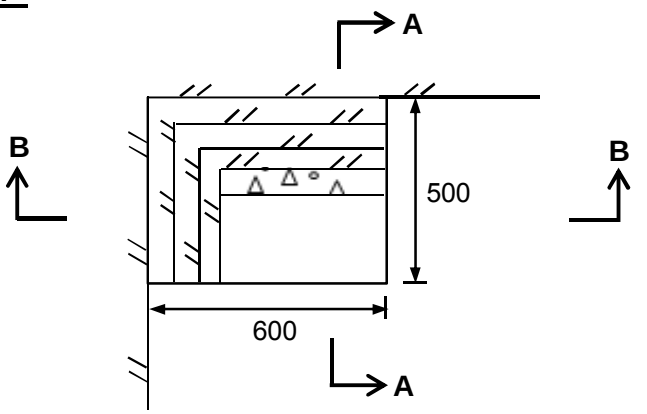
GEA Geotechnical & Environmental Associates	Wid□ur□□arn Wid□ur□Hill Ware Herts SG12 7□E		**Site** At□lone House□Ham□stead Lane□ Hig□gate□London NW5 4LS	**Trial Pit Number** **1**
Excavation Method **Manual**	**Dimensions** 500 x 500 x 700	**Ground Level (mOD)** 109.55	**Client** □irtus Real Estate	**Job Number** J16075
	Location	**Dates** 15/04/2016	**Engineer** Engineers HRW	**Sheet** 2 / 2

Remar□s□ All dimensions in millimetres Sides o□trial □it remained sta□le during exca□ation Ground□ater□Not encountered	Scale□ 1□20 Logged □□□ ML

Geotechnical & Environmental Associates	Wid□ur□□arn Wid□ur□Hill Ware Herts SG12 7□E	**Site** At□lone House□Ham□stead Lane□ Hig□gate□London NW5 4LS	**Trial Pit Number** **2**

Excavation Method	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number**
Manual	600 x 500 x 900	109.55	□irtus Real Estate	J16075
	Location	**Dates**	**Engineer**	**Sheet**
		15/04/2016	Engineers HRW	1 / 3

Plan: -



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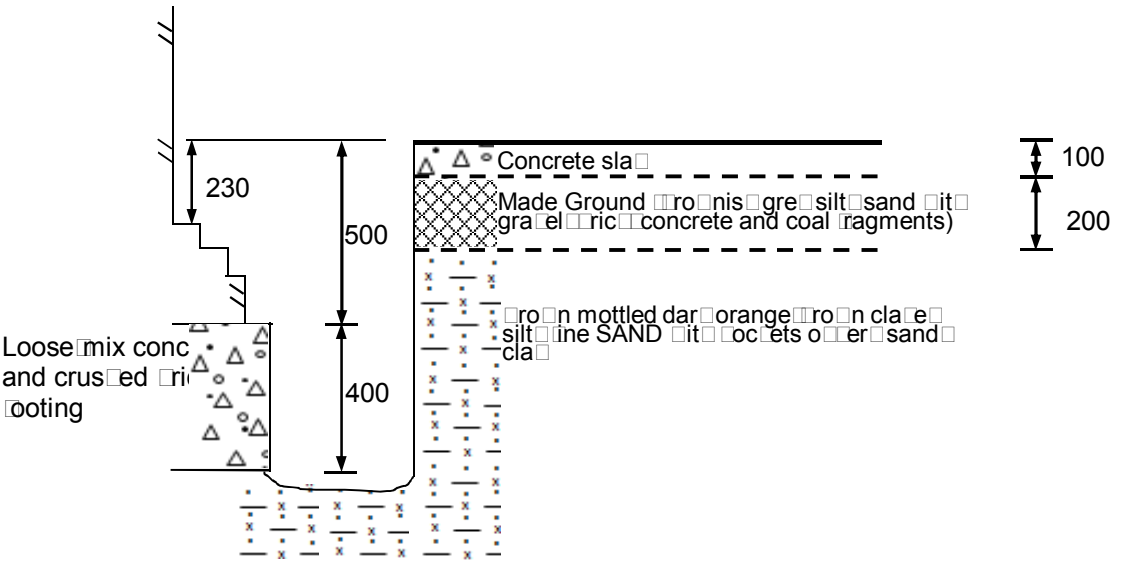
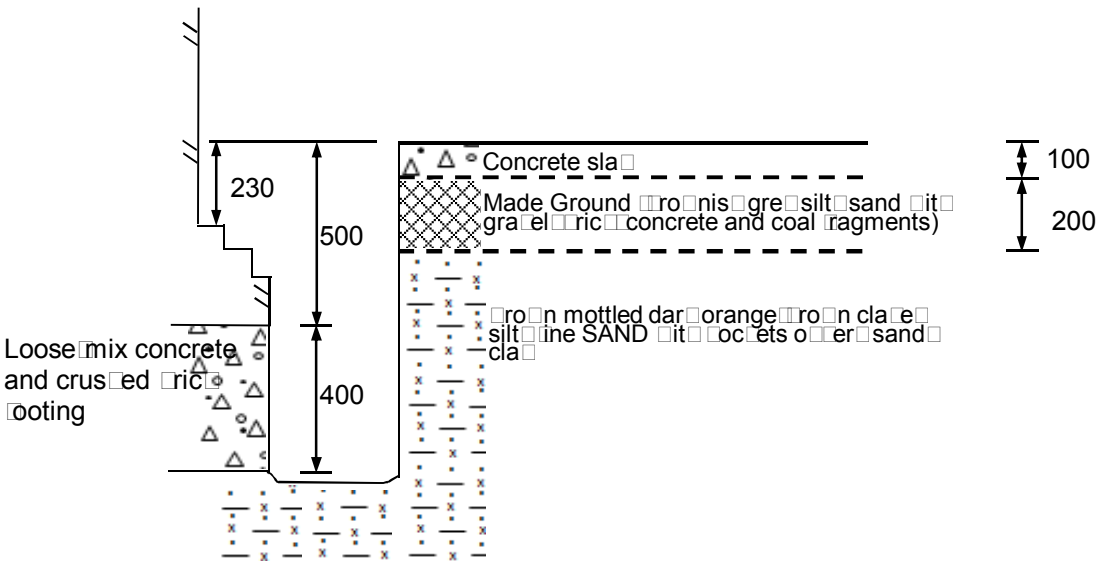


Remar□s□	Scale□
All dimensions in millimetres	1□20
Sides o□trial □it remained sta□le during exca□ation	Logged □□□
Ground□ater□Not encountered	ML

Geotechnical & Environmental Associates Wid□ur□□arn Wid□ur□Hill Ware Herts SG12 7□E			**Site** At□lone House□Ham□stead Lane□ Hig□gate□London NW5 4LS	**Trial Pit Number** **2**
Excavation Method Manual	**Dimensions** 600 x 500 x 900	**Ground Level (mOD)** 109.55	**Client** □irtus Real Estate	**Job Number** J16075
	Location	**Dates** 15/04/2016	**Engineer** Engineers HRW	**Sheet** 2 / 3

Section B - B: -



Remar□s□ All dimensions in millimetres Sides o□trial □it remained sta□le during exca□ation Ground□ater□Not encountered	Scale□ 1□20 Logged □□□ ML

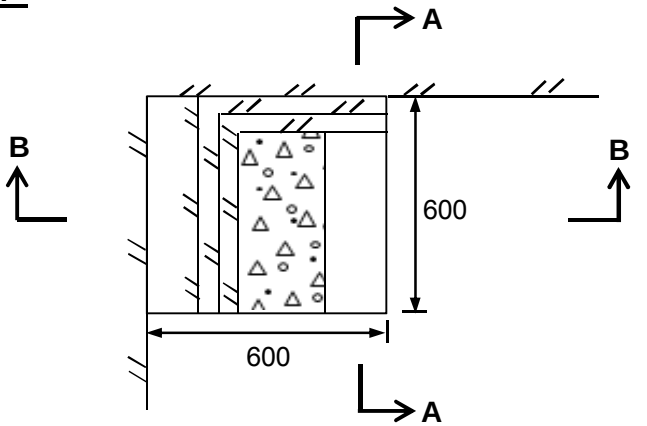
Geotechnical & Environmental Associates	Wid□ur□□arn Wid□ur□Hill Ware Herts SG12 7□E	**Site** At□lone House□Ham□stead Lane□ Hig□gate□London NW5 4LS	**Trial Pit Number** **2**

Excavation Method	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number**
Manual	600 x 500 x 900	109.55	□irtus Real Estate	J16075
	Location	**Dates**	**Engineer**	**Sheet**
		15/04/2016	Engineers HRW	3 / 3

Remar□s□	Scale□
All dimensions in millimetres	1□20
Sides o□trial □it remained sta□le during exca□ation	Logged □□□
Ground□ater□Not encountered	ML

Geotechnical & Environmental Associates Wid□ur□□arn Wid□ur□Hill Ware Herts SG12 7□E			**Site** At□lone House□Ham□stead Lane□ Hig□gate□London NW5 4LS	**Trial Pit Number** **3**
Excavation Method **Manual**	**Dimensions** 600 x 600 x 850	**Ground Level (mOD)** 109.55	**Client** □irtus Real Estate	**Job Number** J16075
	Location	**Dates** 15/04/2016	**Engineer** Engineers HRW	**Sheet** 1 / 3

Plan: -



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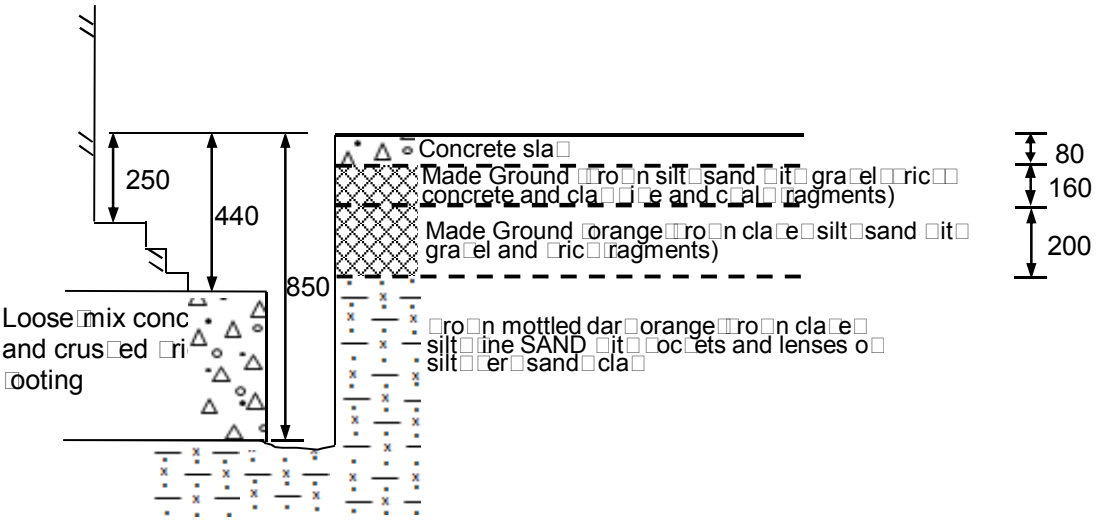
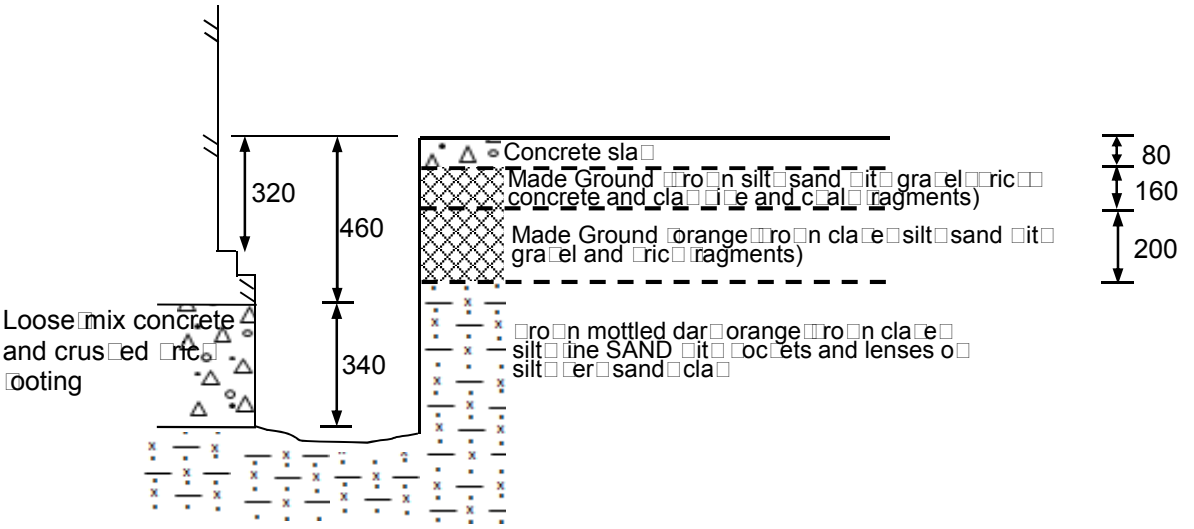


Remar□s□ All dimensions in millimetres Sides o□trial □it remained sta□le during exca□ation Ground□ater□Not encountered	Scale□ 1□20 Logged □□□ ML

GEA Geotechnical & Environmental Associates Wid□ur□□arn Wid□ur□Hill Ware Herts SG12 7□E			**Site** At□lone House□Ham□stead Lane□ Hig□gate□London NW5 4LS	**Trial Pit Number** **3**
Excavation Method **Manual**	**Dimensions** 600 x 600 x 850	**Ground Level (mOD)** 109.55	**Client** □irtus Real Estate	**Job Number** J16075
	Location	**Dates** 15/04/2016	**Engineer** Engineers HRW	**Sheet** 2 / 3

Section B - B: -



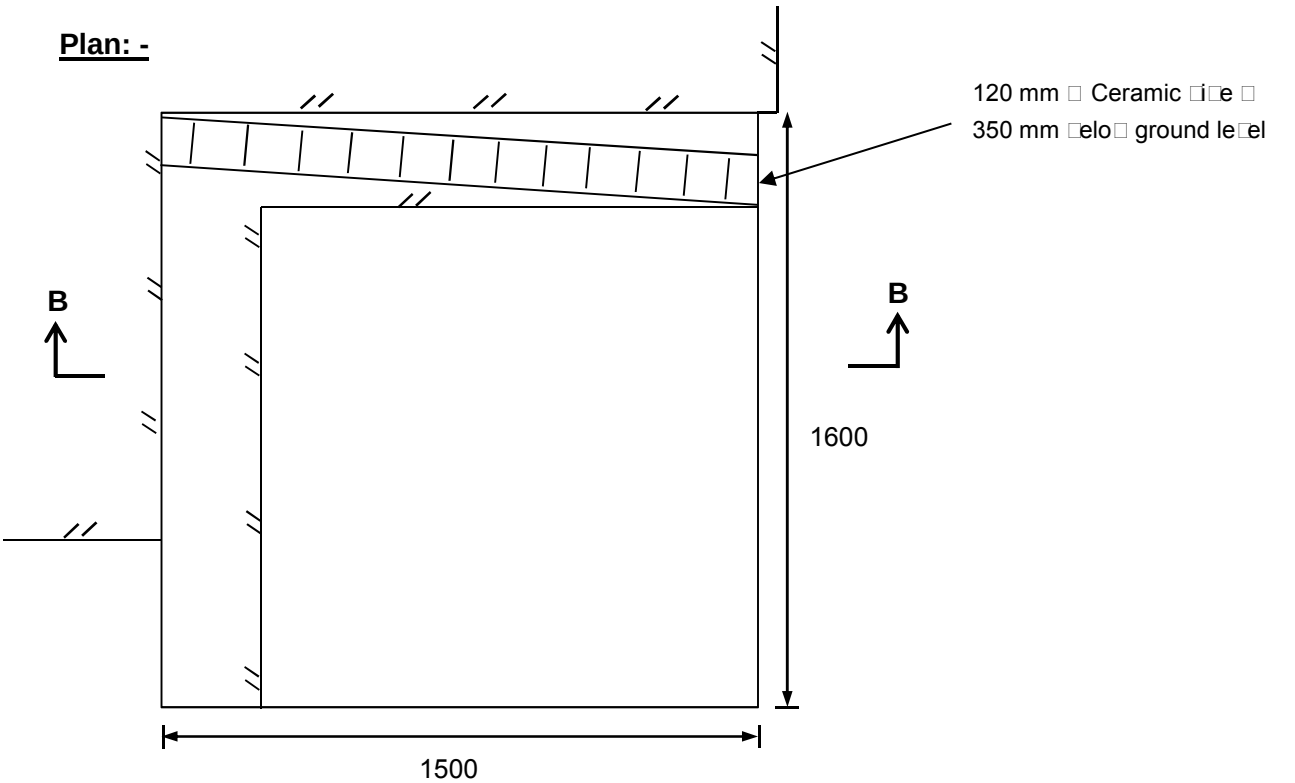
Remar□s□ All dimensions in millimetres Sides o□trial □it remained sta□le during exca□ation Ground□ater□Not encountered	Scale□ 1□20 Logged □□□ ML

Geotechnical & Environmental Associates Wid□ur□□arn Wid□ur□Hill Ware Herts SG12 7□E		**Site** At□lone House□Ham□stead Lane□ Hig□gate□London NW5 4LS	**Trial Pit Number** **3**
Excavation Method **Manual**	**Dimensions** 600 x 600 x 850	**Ground Level (mOD)** 109.55	**Client** □irtus Real Estate	**Job Number** J16075
	Location	**Dates** 15/04/2016	**Engineer** Engineers HRW	**Sheet** 3 / 3

Remar□s□ All dimensions in millimetres Sides o□trial □it remained sta□le during exca□ation Ground□ater□Not encountered.	Scale□ 1□20 Logged □□□ ML

GEA Geotechnical & Environmental Associates Wid□ur□□arn Wid□ur□Hill Ware Herts SG12 7□E			**Site** At□lone House□Ham□stead Lane□ Hig□gate□London NW5 4LS	**Trial Pit Number** **4**
Excavation Method **Manual**	**Dimensions** 1600 x 1500 x 2300	**Ground Level (mOD)** 112.77	**Client** □irtus Real Estate	**Job Number** J16075
	Location	**Dates** 15/04/2016	**Engineer** Engineers HRW	**Sheet** 1 / 2

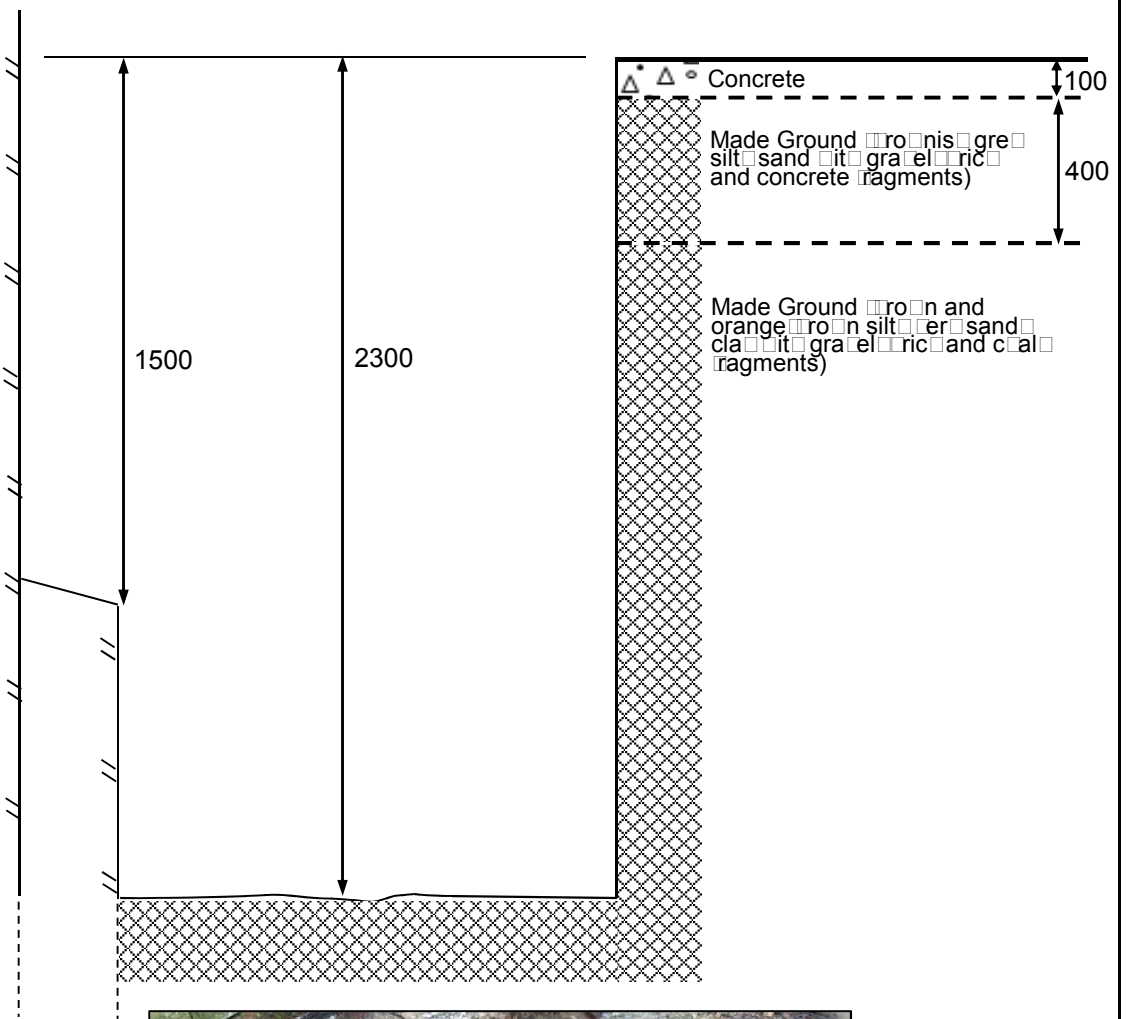
Plan: -



Remar□s□		Scale□
All dimensions in millimetres	□ase o□□ooting not □ro□ed.	1□20
Sides o□trial □it remained sta□le during exca□ation		Logged □□□
Ground□ater□Not encountered		ML

Geotechnical & Environmental Associates	Wid□ur□□arn Wid□ur□Hill Ware Herts SG12 7□E		**Site** At□lone House□Ham□stead Lane□ Hig□gate□London NW5 4LS	**Trial Pit Number** **4**
Excavation Method **Manual**	**Dimensions** 1600 x 1500 x 2300	**Ground Level (mOD)**	**Client** □irtus Real Estate	**Job Number** J16075
	Location	**Dates** 15/04/2016	**Engineer** Engineers HRW	**Sheet** 2 / 2

Section A - A: -

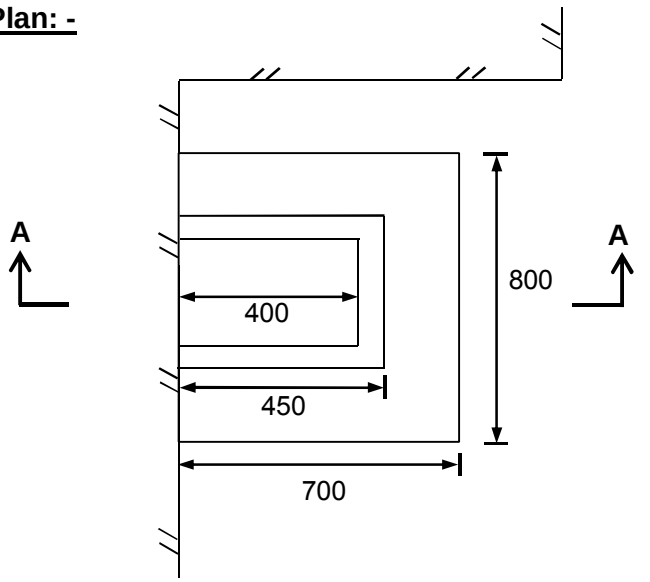


Remar□s□	Scale□
All dimensions in millimetres □ase o□□ooting not □ro□ed.	1□20
Sides o□trial □it remained sta□le during exca□ation	Logged □□□
Ground□ater□Not encountered	ML

Geotechnical & Environmental Associates	Wid□ur□□arn Wid□ur□Hill Ware Herts SG12 7□E	**Site** At□lone House□Ham□stead Lane□ Hig□gate□London NW5 4LS	**Trial Pit Number** **5**

Excavation Method **Manual**	**Dimensions** 700 x 800 x 900	**Ground Level (mOD)** 112.65	**Client** □irtus Real Estate	**Job Number** J16075
	Location	**Dates** 15/04/2016	**Engineer** Engineers HRW	**Sheet** 1 / 2

Plan: -



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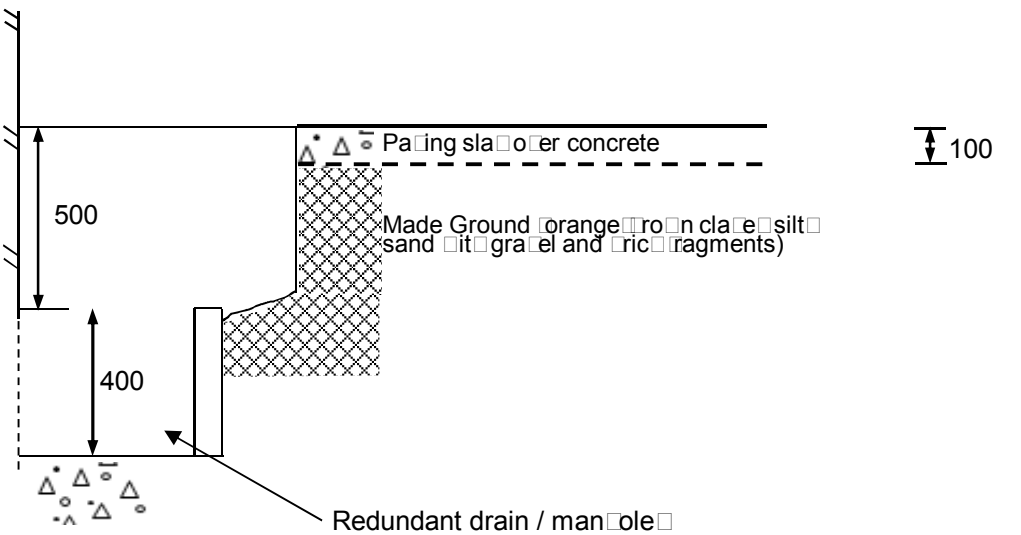


Remar□s□		Scale□
All dimensions in millimetres	□ase o□□ooting not □ro□ed□trial □it terminated on a redundant drain o□man□ole	1□20
Sides o□trial □it remained sta□le during exca□ation		Logged □□□
Ground□ater□Not encountered		ML

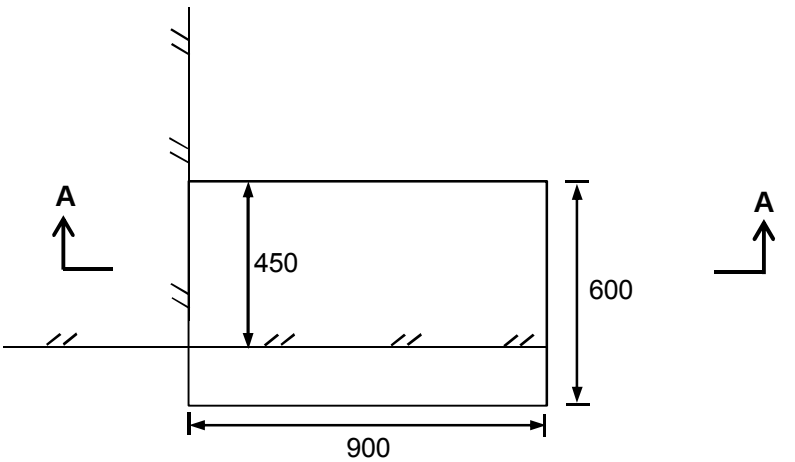
Geotechnical & Environmental Associates	Wid□ur□□arn Wid□ur□Hill Ware Herts SG12 7□E	**Site** At□lone House□Ham□stead Lane□ Hig□gate□London NW5 4LS	**Trial Pit Number** **5**

Excavation Method **Manual**	**Dimensions** 700 x 800 x 900	**Ground Level (mOD)** 112.65	**Client** □irtus Real Estate	**Job Number** J16075
	Location	**Dates** 15/04/2016	**Engineer** Engineers HRW	**Sheet** 2 / 3

Remar□s□		Scale□
All dimensions in millimetres	□ase o□□ooting not □ro□ed□trial □it terminated on a redundant drain o□man□ole	1□20
Sides o□trial □it remained sta□le during exca□ation		Logged □□□
Ground□ater□Not encountered.		ML

GEA Geotechnical & Environmental Associates Wid□ur□□arn Wid□ur□Hill Ware Herts SG12 7□E			**Site** At□lone House□Ham□stead Lane□ Hig□gate□London NW5 4LS	**Trial Pit Number** **5A**
Excavation Method **Manual**	**Dimensions** 600 x 900 x 1200	**Ground Level (mOD)** 112.65	**Client** □irtus Real Estate	**Job Number** J16075
	Location	**Dates** 15/04/2016	**Engineer** Engineers HRW	**Sheet** 1 / 2

Plan: -



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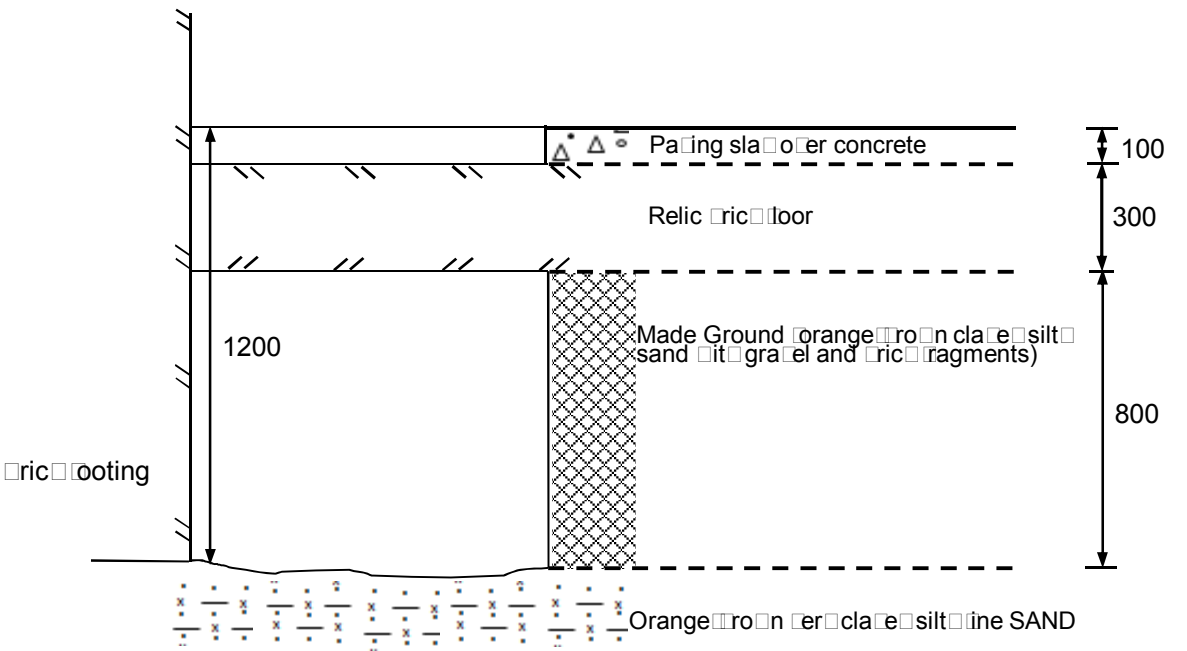


Remar□s□		Scale□
All dimensions in millimetres	□ase o□□ooting not □ro□ed□trial □it terminated on a redundant drain o□man□ole	1□20
Sides o□trial □it remained sta□le during exca□ation		Logged □□□
Ground□ater□Not encountered		ML

Geotechnical & Environmental Associates	Wid□ur□□arn Wid□ur□Hill Ware Herts SG12 7□E	**Site** At□lone House□Ham□stead Lane□ Hig□gate□London NW5 4LS	**Trial Pit Number** **5A**

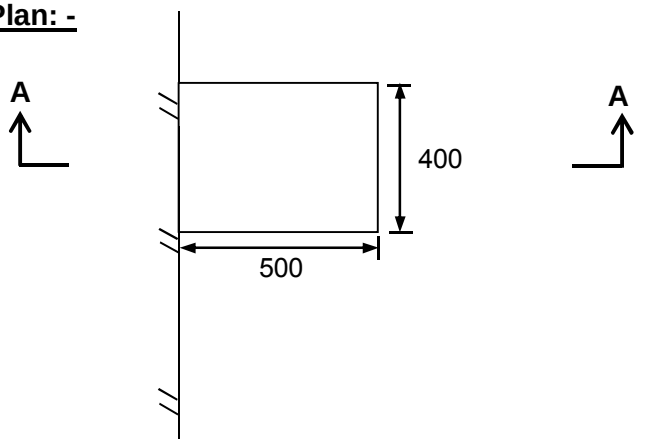
Excavation Method **Manual**	**Dimensions** 600 x 900 x 1200	**Ground Level (mOD)** 112.65	**Client** □irtus Real Estate	**Job Number** J16075
	Location	**Dates** 15/04/2016	**Engineer** Engineers HRW	**Sheet** 1 / 2

Remar□s□		Scale□
All dimensions in millimetres	□ase o□ooting not □ro□ed□trial □it terminated on a redundant drain o□man□ole	1□20
Sides o□trial □it remained sta□le during exca□ation		Logged □□□
Ground□ater□Not encountered		ML

Geotechnical & Environmental Associates	Wid□ur□□arn Wid□ur□Hill Ware Herts SG12 7□E	**Site** At□lone House□Ham□stead Lane□ Hig□gate□London NW5 4LS	**Trial Pit Number** **6**

Excavation Method **Manual**	**Dimensions** 500 x 400 x 2500	**Ground Level (mOD)** 112.59	**Client** □irtus Real Estate	**Job Number** J16075
	Location	**Dates** 15/04/2016	**Engineer** Engineers HRW	**Sheet** 1 / 2

Plan: -



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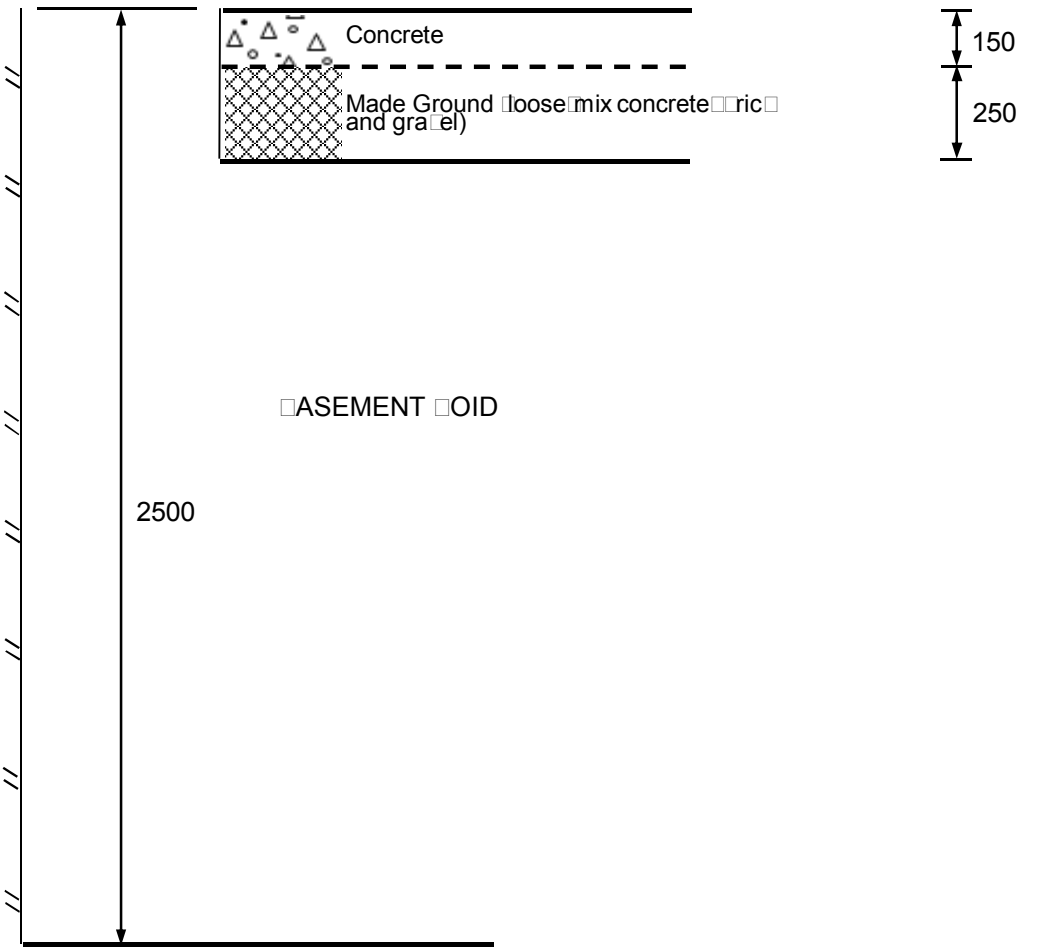


Remar□s□	Not □ooting □ro□ed□unex□ected □asement □oid encountered.	Scale□ 1□20
All dimensions in millimetres		
Sides o□trial □it remained sta□le during exca□ation		Logged □□□ ML
Ground□ater□Not encountered		

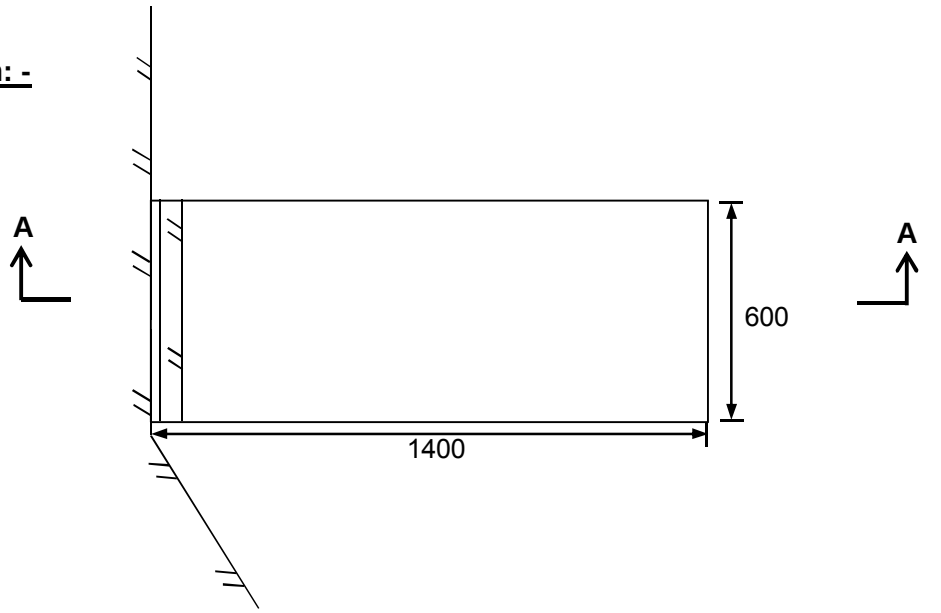
Geotechnical & Environmental Associates	Wid□ur□□arn Wid□ur□Hill Ware Herts SG12 7□E	**Site** At□lone House□Ham□stead Lane□ Hig□gate□London NW5 4LS	**Trial Pit Number** **6**

Excavation Method **Manual**	**Dimensions** 500 x 400 x 2500	**Ground Level (mOD)** 112.59	**Client** □irtus Real Estate	**Job Number** J16075
	Location	**Dates** 15/04/2016	**Engineer** Engineers HRW	**Sheet** 2 / 2

Remar□s□		Scale□
All dimensions in millimetres	Not □ooting □ro□ed□unex□ected □asement □oid encountered.	1□20
Sides o□trial □it remained sta□le during exca□ation		Logged □□□
Ground□ater□Not encountered		ML

Geotechnical & Environmental Associates Wid□ur□□arn Wid□ur□Hill Ware Herts SG12 7□E			**Site** At□lone House□Ham□stead Lane□ Hig□gate□London NW5 4LS	**Trial Pit Number** 7
Excavation Method Manual	**Dimensions** 1400 x 600 x 1600	**Ground Level (mOD)** 112.58	**Client** □irtus Real Estate	**Job Number** J16075
	Location	**Dates** 15/04/2016	**Engineer** Engineers HRW	**Sheet** 1 / 2

Plan: -



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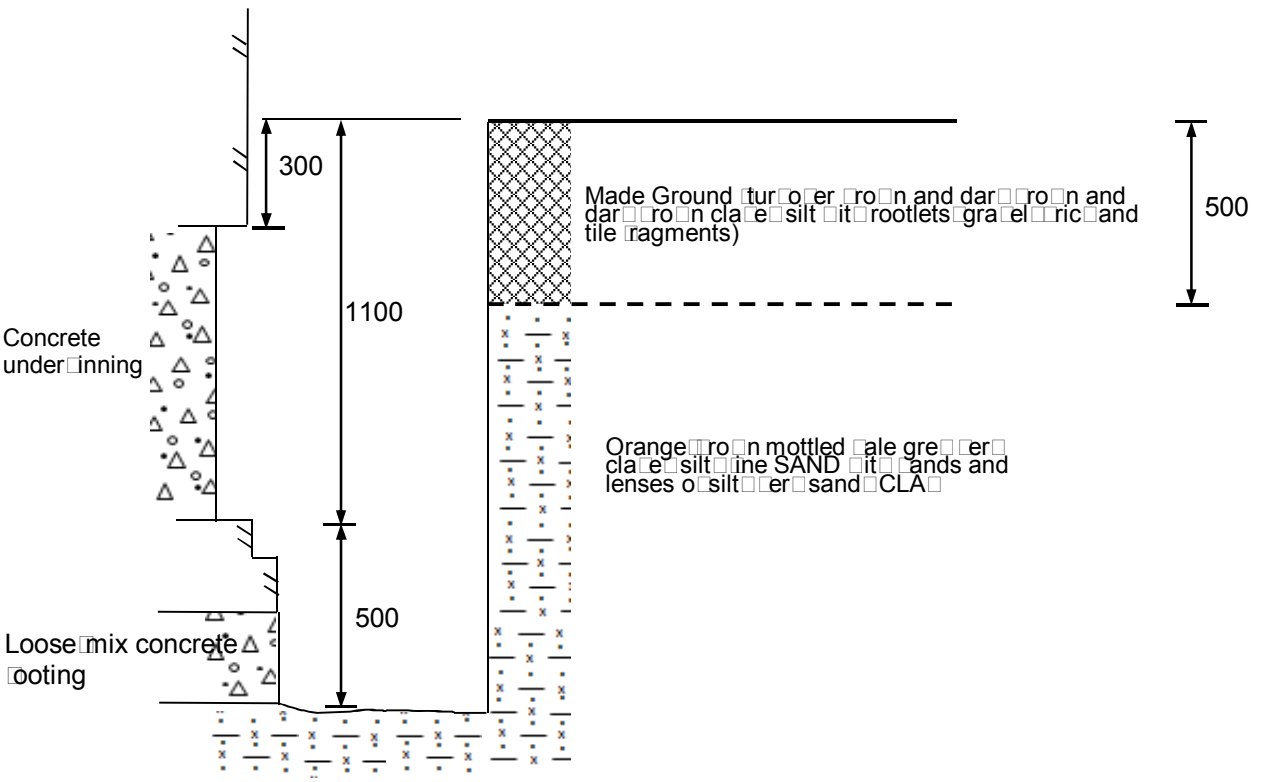


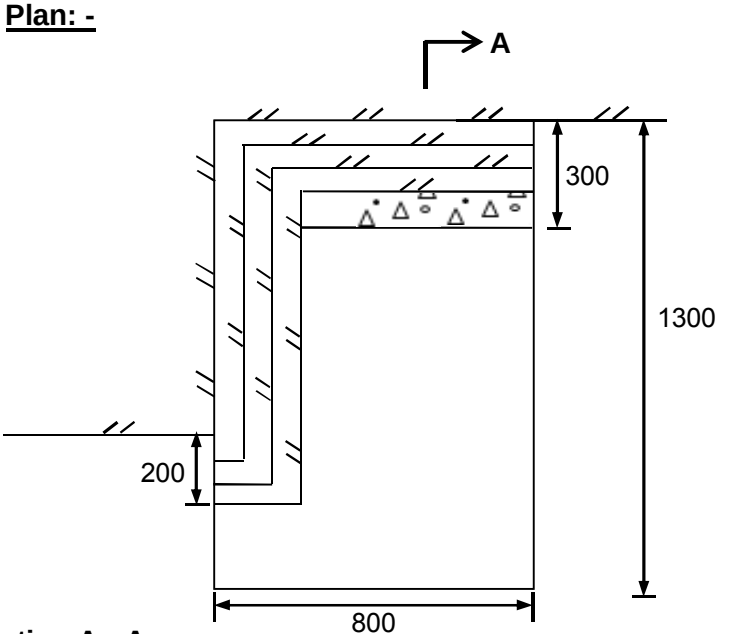
Remar□s□ All dimensions in millimetres Sides o□trial □it remained sta□le during exca□ation Ground□ater□Not encountered	Scale□ 1□20 Logged □□□ ML

Geotechnical & Environmental Associates	Wid□ur□□arn Wid□ur□Hill Ware Herts SG12 7□E	**Site** At□lone House□Ham□stead Lane□ Hig□gate□London NW5 4LS	**Trial Pit Number** **7**
Excavation Method **Manual**	**Dimensions** 1400 x 600 x 1600	**Ground Level (mOD)** 112.58	**Client** □irtus Real Estate	**Job Number** J16075
	Location	**Dates** 15/04/2016	**Engineer** Engineers HRW	**Sheet** 2 / 2

Remar□s□	Scale□
All dimensions in millimetres	1□20
Sides o□trial □it remained sta□le during exca□ation	Logged □□□
Ground□ater□Not encountered	ML

Geotechnical & Environmental Associates Wid□ur□□arn Wid□ur□Hill Ware Herts SG12 7□E			**Site** At□lone House□Ham□stead Lane□ Hig□gate□London NW5 4LS	**Trial Pit Number** 8
Excavation Method Manual	**Dimensions** 1300 x 800 x 1100	**Ground Level (mOD)** 112.55	**Client** □irtus Real Estate	**Job Number** J16075
	Location	**Dates** 15/04/2016	**Engineer** Engineers HRW	**Sheet** 1 / 2

Plan: -



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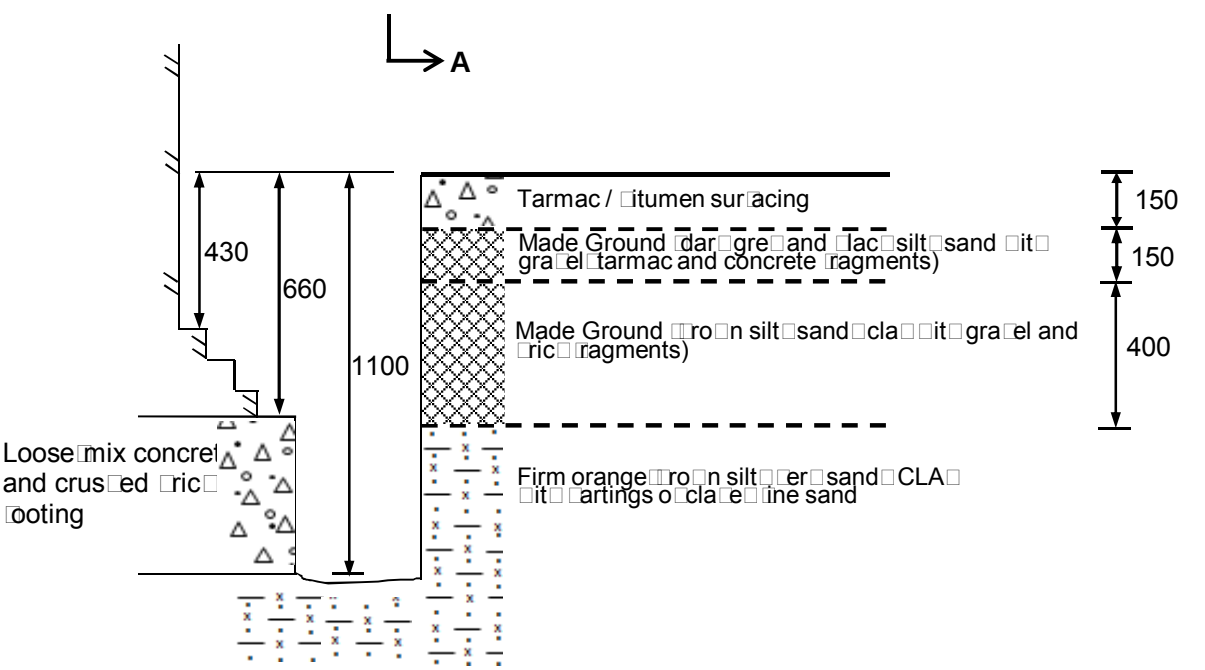


Remar□s□ All dimensions in millimetres Sides o□trial □it remained sta□le during exca□ation Ground□ater□Not encountered	Scale□ 1□20 Logged □□□ ML

Geotechnical & Environmental Associates	Wid□ur□□arn Wid□ur□Hill Ware Herts SG12 7□E	**Site** At□lone House□Ham□stead Lane□ Hig□gate□London NW5 4LS	**Trial Pit Number** **8**

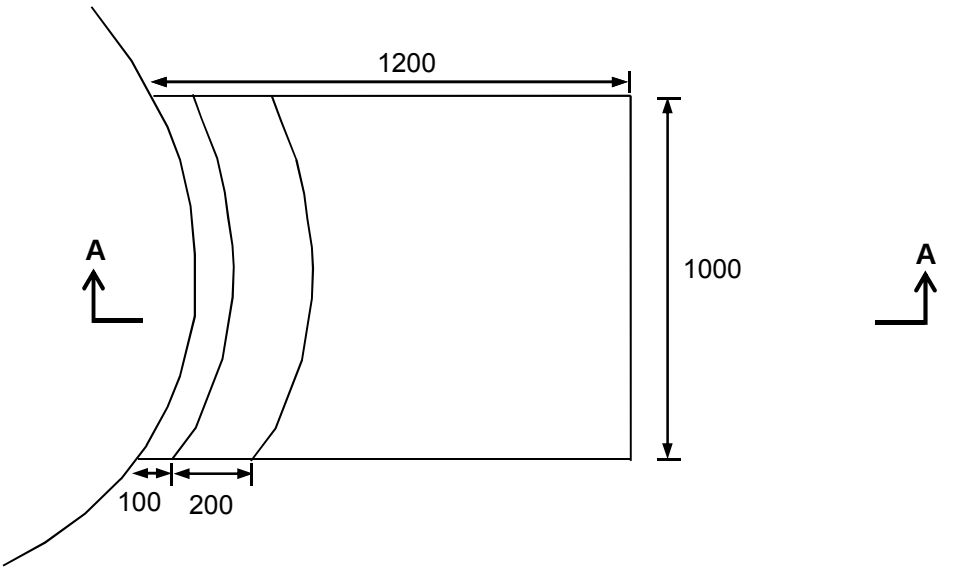
Excavation Method **Manual**	**Dimensions** 1300 x 800 x 1100	**Ground Level (mOD)** 112.55	**Client** □irtus Real Estate	**Job Number** J16075
	Location	**Dates** 15/04/2016	**Engineer** Engineers HRW	**Sheet** 2 / 2

Remar□s□	Scale□
All dimensions in millimetres	1□20
Sides o□trial □it remained sta□le during exca□ation	Logged □□□
Ground□ater□Not encountered	ML

Geotechnical & Environmental Associates	Wid□ur□□arn Wid□ur□Hill Ware Herts SG12 7□E	**Site** At□lone House□Ham□stead Lane□ Hig□gate□London NW5 4LS	**Trial Pit Number** **9**

Excavation Method **Manual**	**Dimensions** 1200 x 1000 x 800	**Ground Level (mOD)** 112.45	**Client** □irtus Real Estate	**Job Number** J16075
	Location	**Dates** 15/04/2016	**Engineer** Engineers HRW	**Sheet** 1 / 2

Plan: -



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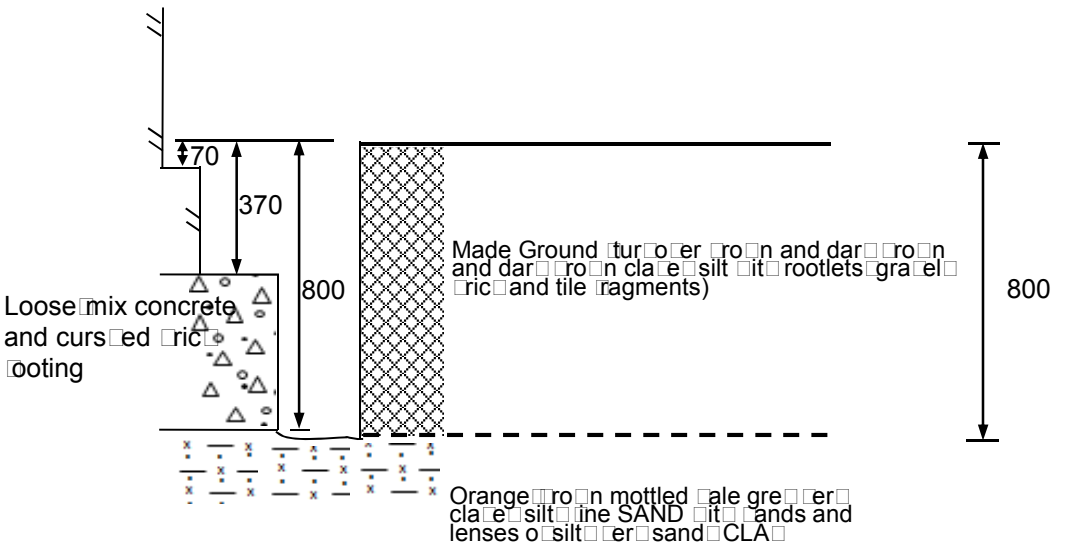

Remar□s□	Scale□
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Sides o□trial □it remained sta□le during exca□ation	Logged □□□
Ground□ater□Not encountered	ML

GEA Geotechnical & Environmental Associates	Wid□ur□□arn Wid□ur□Hill Ware Herts SG12 7□E		**Site** At□lone House□Ham□stead Lane□ Hig□gate□London NW5 4LS	**Trial Pit Number** **9**
Excavation Method **Manual**	**Dimensions** 1200 x 1000 x 800	**Ground Level (mOD)** 112.45	**Client** □irtus Real Estate	**Job Number** J16075
	Location	**Dates** 15/04/2016	**Engineer** Engineers HRW	**Sheet** 2 / 2

Remar□s□ All dimensions in millimetres Sides o□trial □it remained sta□le during exca□ation Ground□ater□Not encountered	Scale□ 1□20 Logged □□□ ML

Geotechnical & Environmental Associates

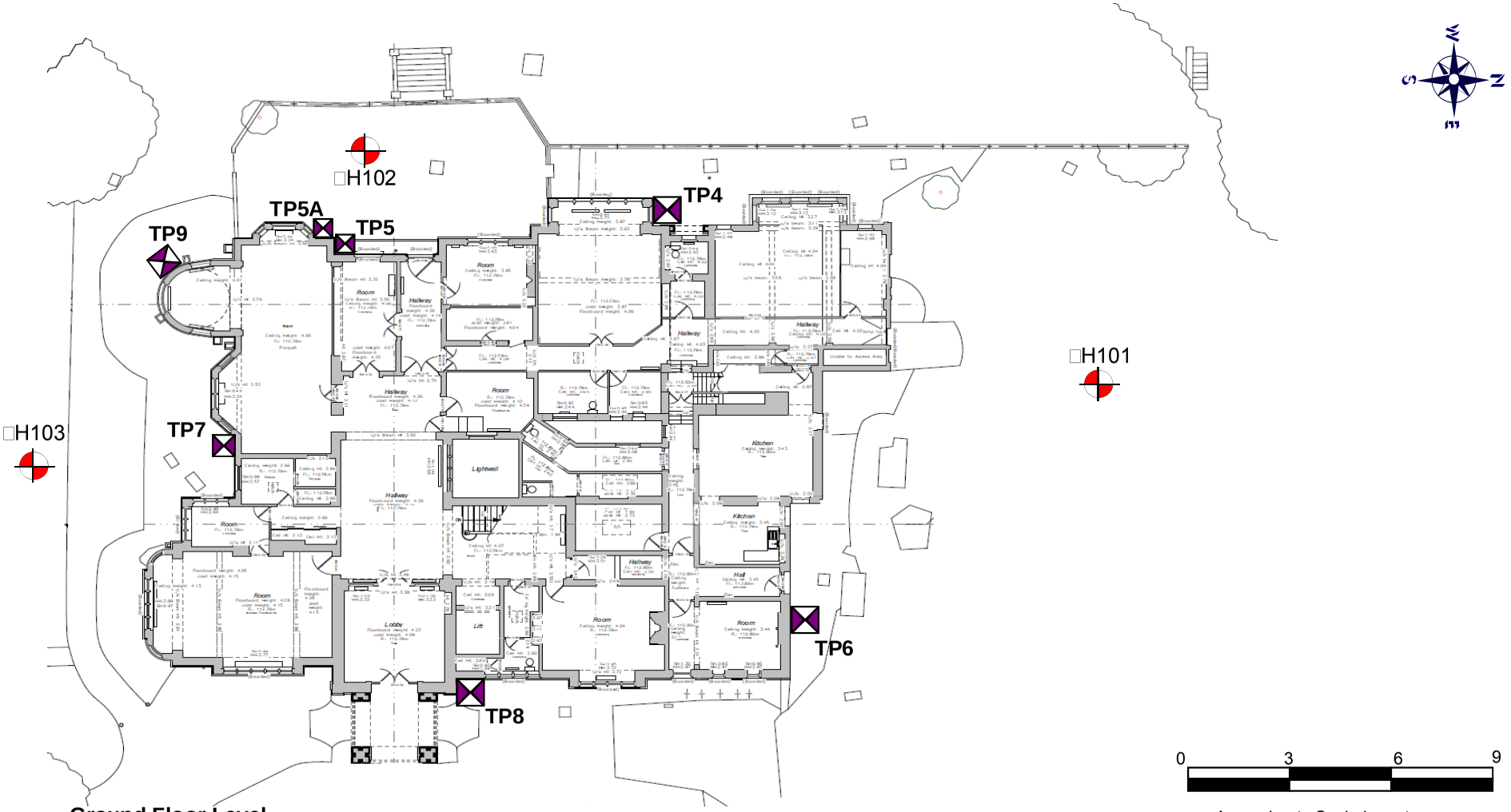
Wid□ur□□arn
Wid□ur□Hill
Ware
Herts SG12 7□E

Site Plan

Site	At□lone House□Ham□stead Lane□N6 4RU
Client	□irtus Real Estate
Engineer	Engineers HRW

Job Number J15258

Sheet 1 / 2



Geotechnical & Environmental Associates

Wid□ur□□arn
Wid□ur□Hill
Ware
Herts SG12 7□E

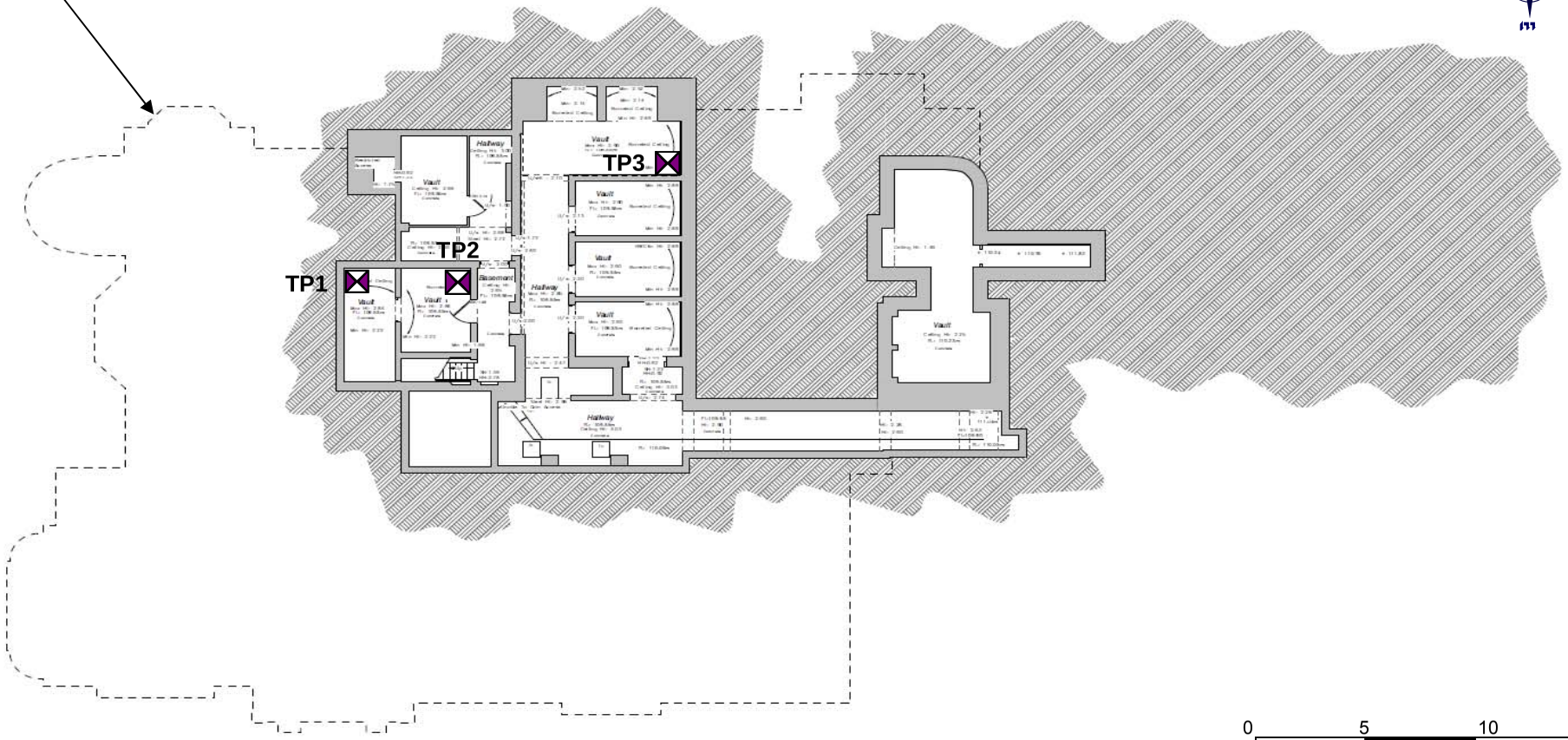
Site Plan

Site	At□lone House□Ham□stead Lane□N6 4RU
Client	□irtus Real Estate
Engineer	Engineers HRW

Job Number J16075

Sheet 2 / 2

Foot□rint o□ground □loor le□el



Basement Plan

0 5 10 15

A□□roximate Scale in metres

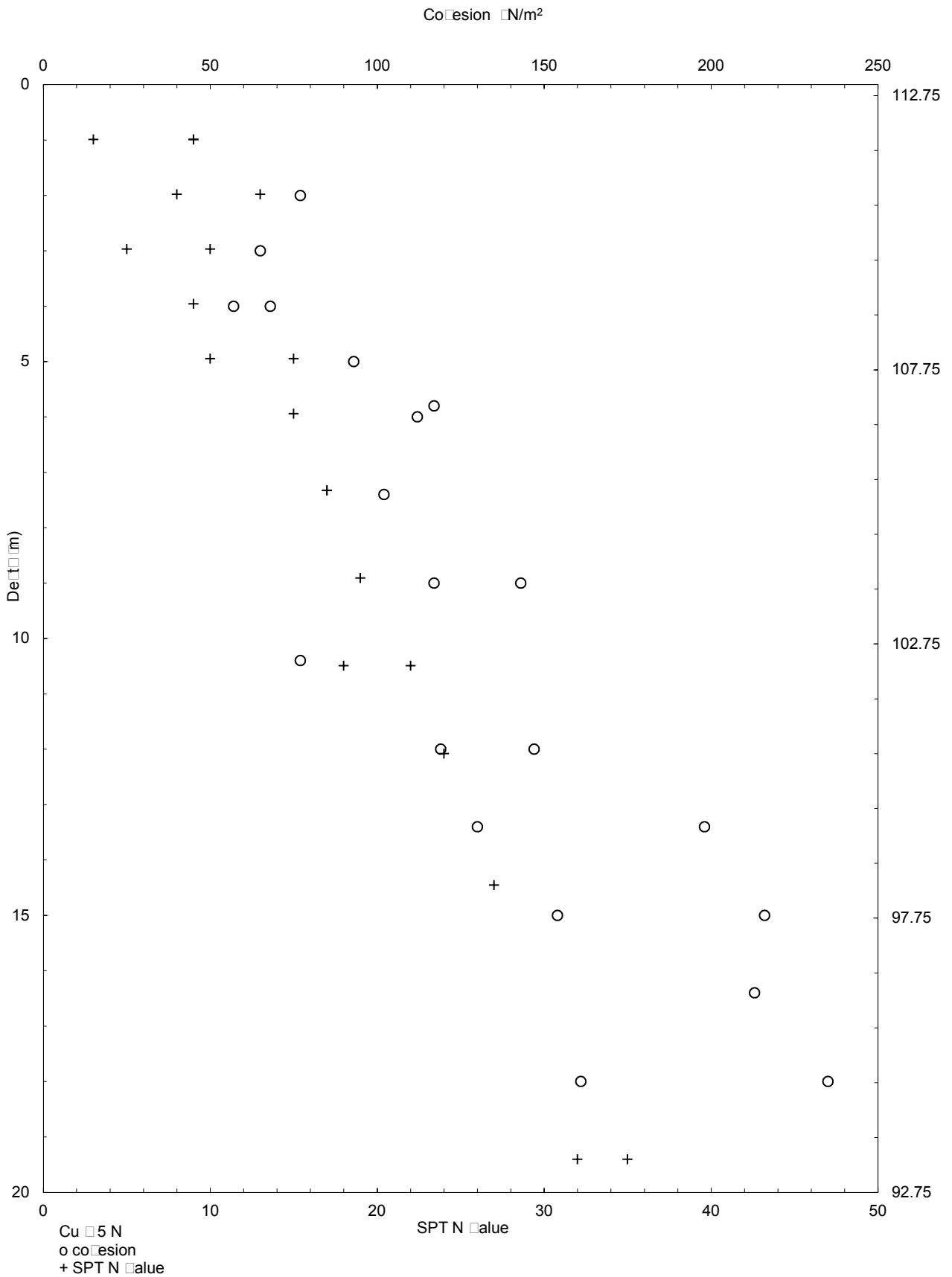
Geotechnical & Environmental Associates
Wid□ur□□arn
Wid□ur□Hill
Ware
Herts SG12 7□E

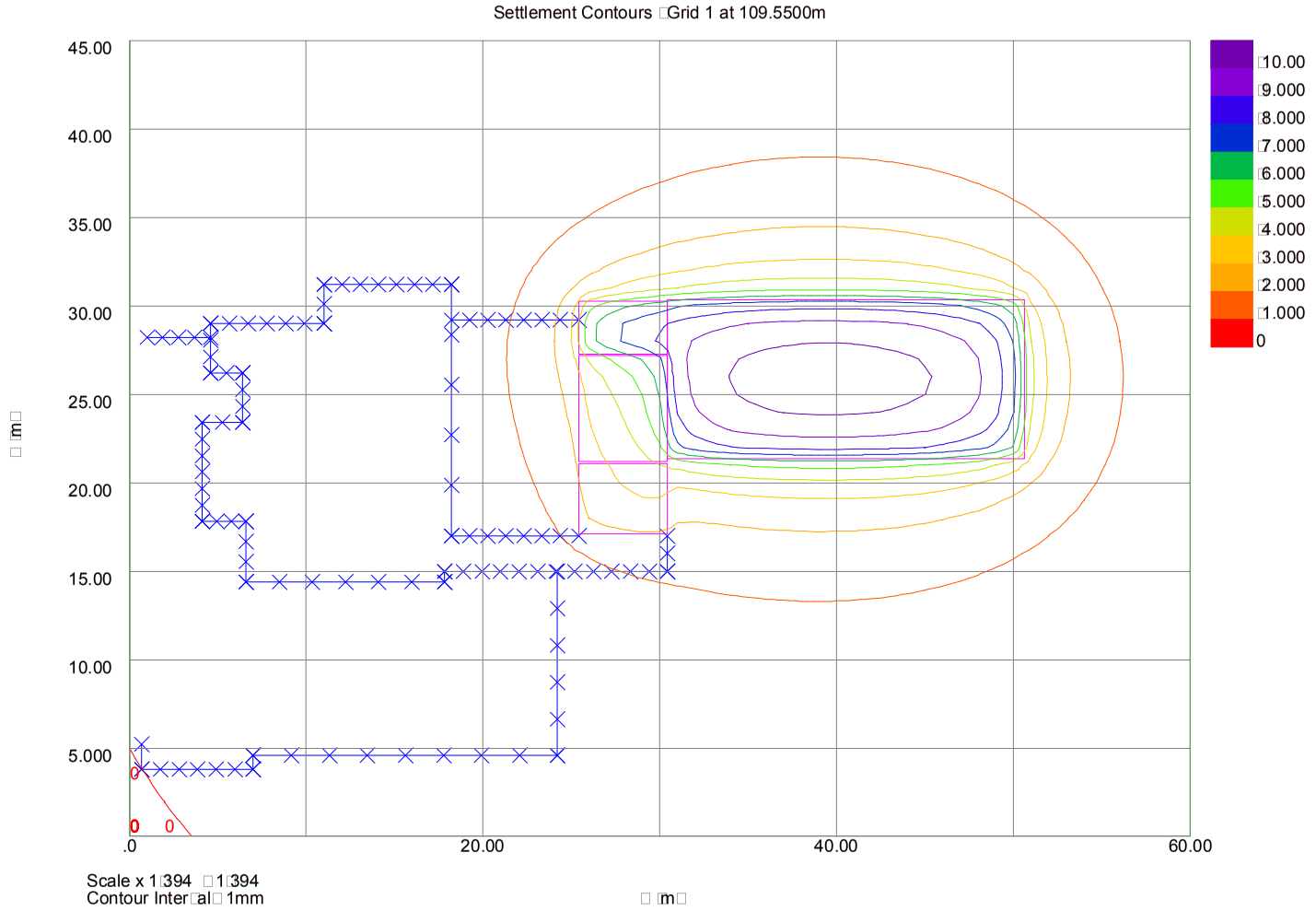
SPT & Cohesion / Depth Graph

Site	At□lone House□Ham□stead Lane□London N6 4RU
Client	□irtus Real Estate
Engineer	Engineers HRW

Job Number J16075

Sheet 1 / 1

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Oasys

Athlone House, Hampstead Lane, N6 4RU

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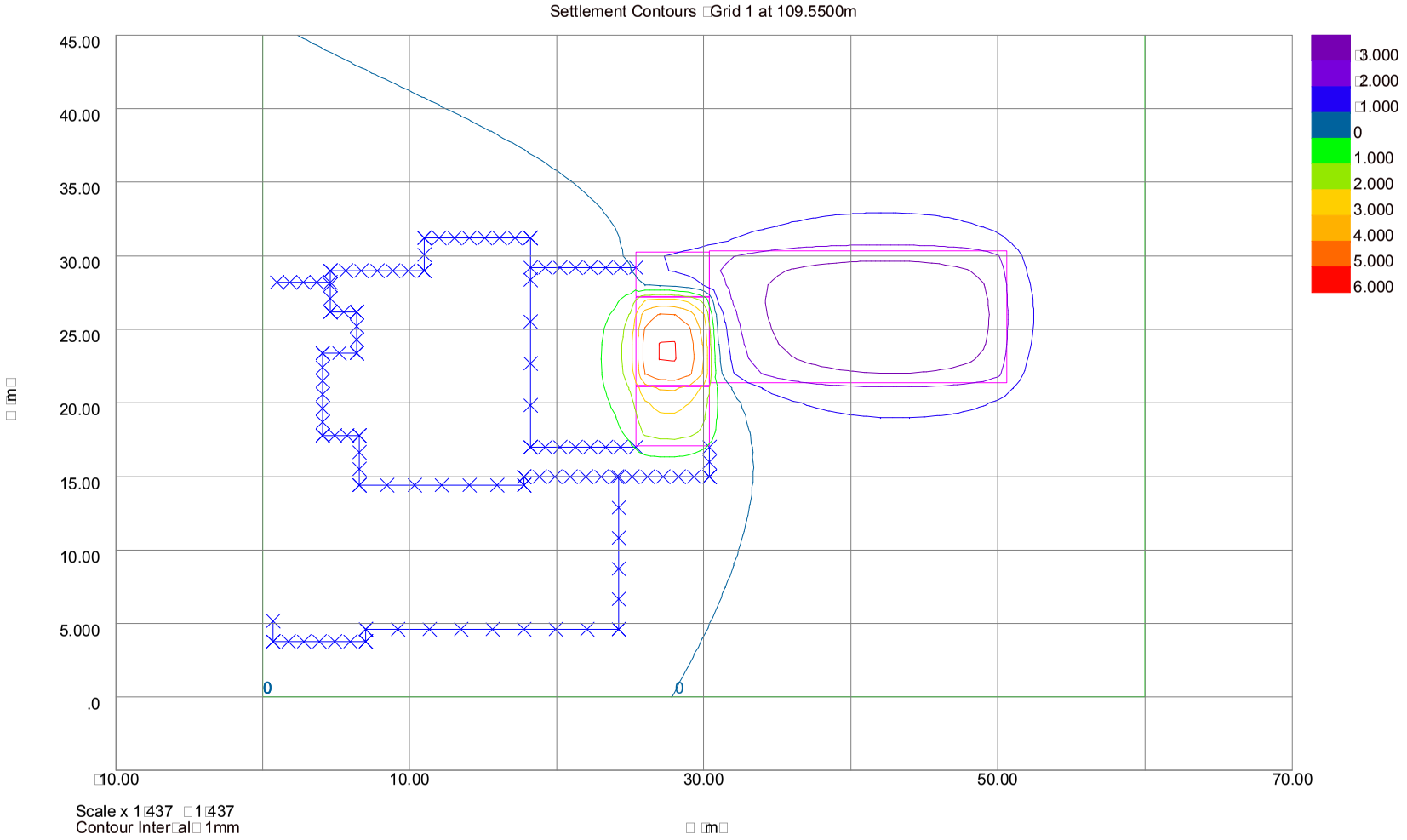

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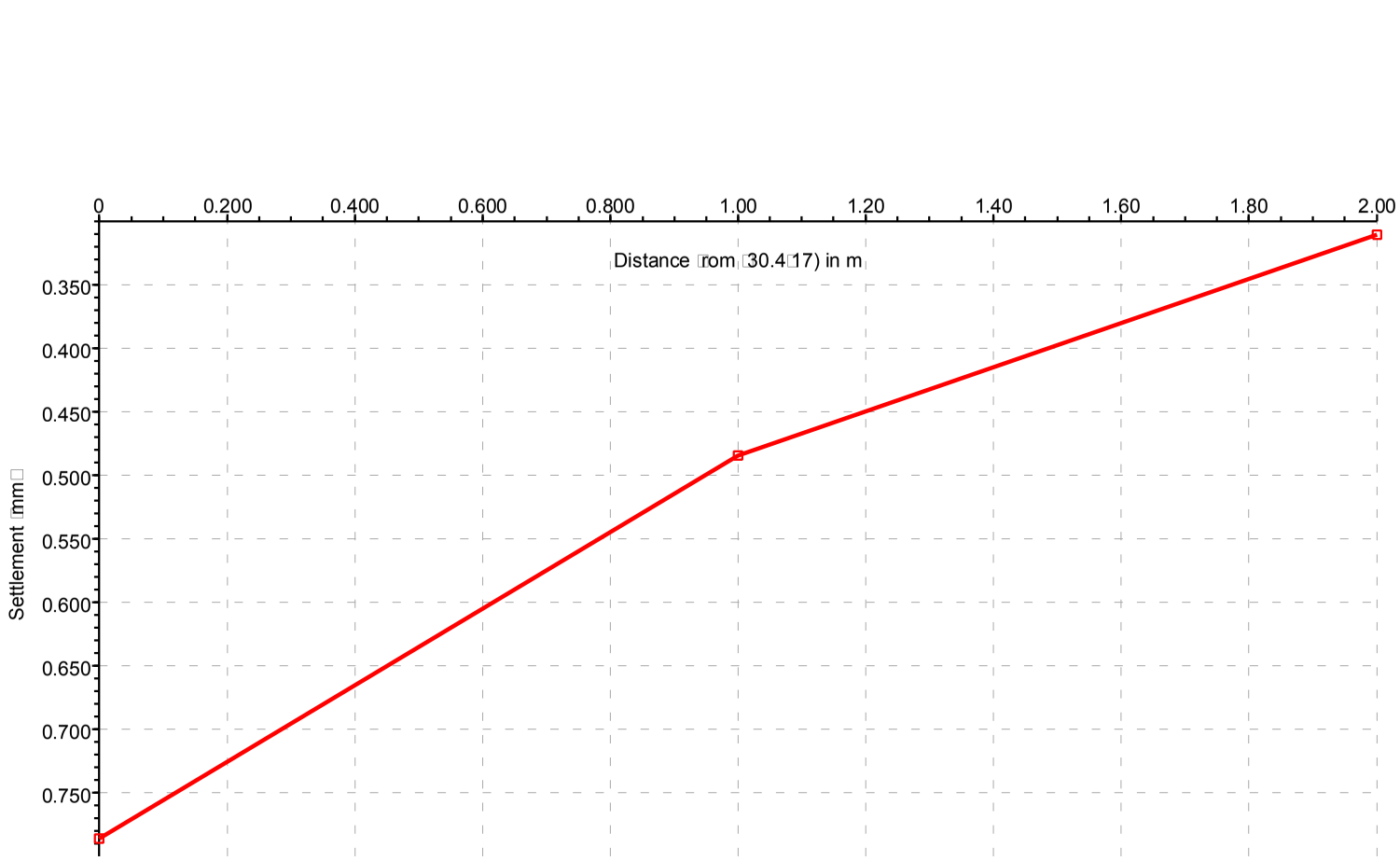

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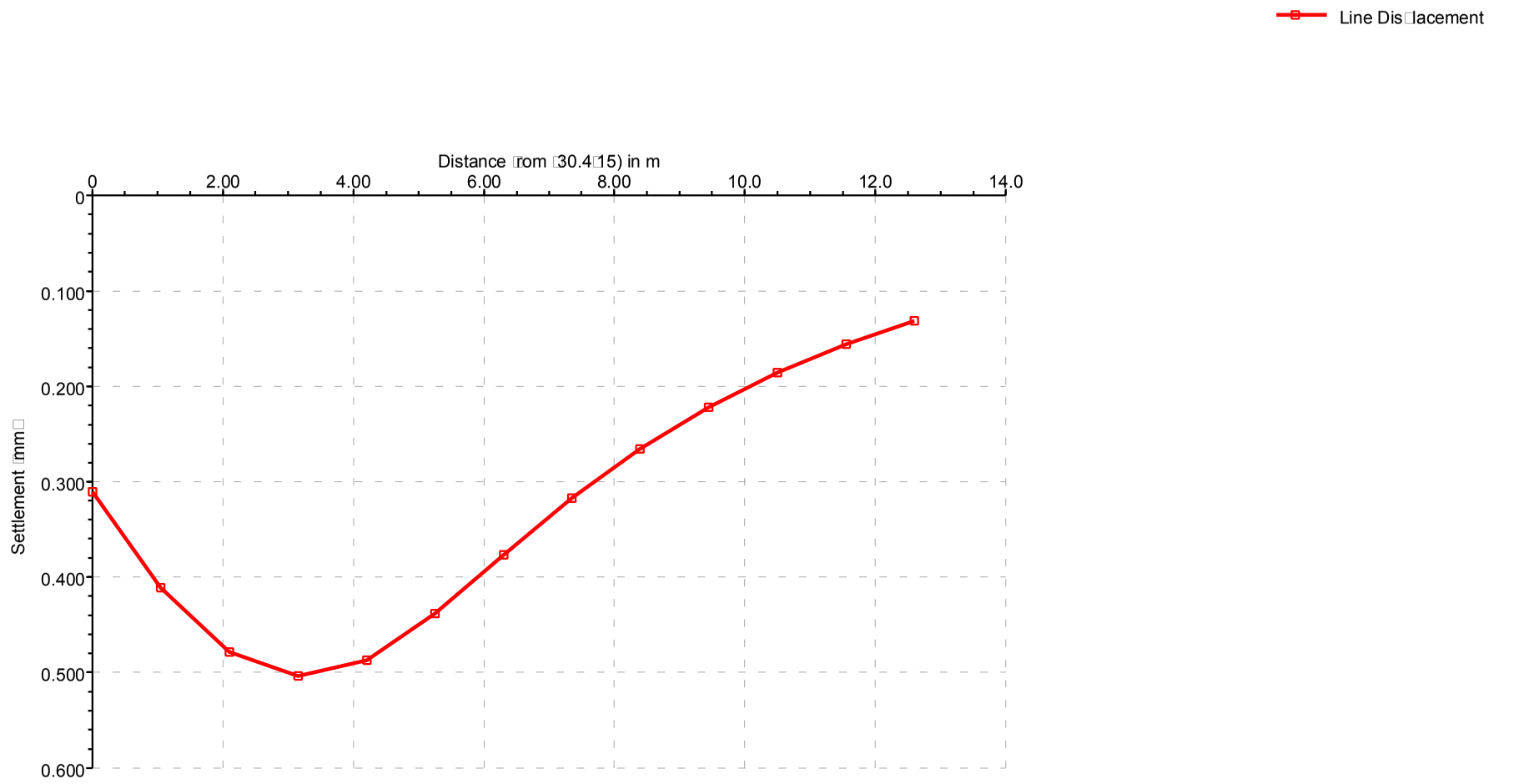

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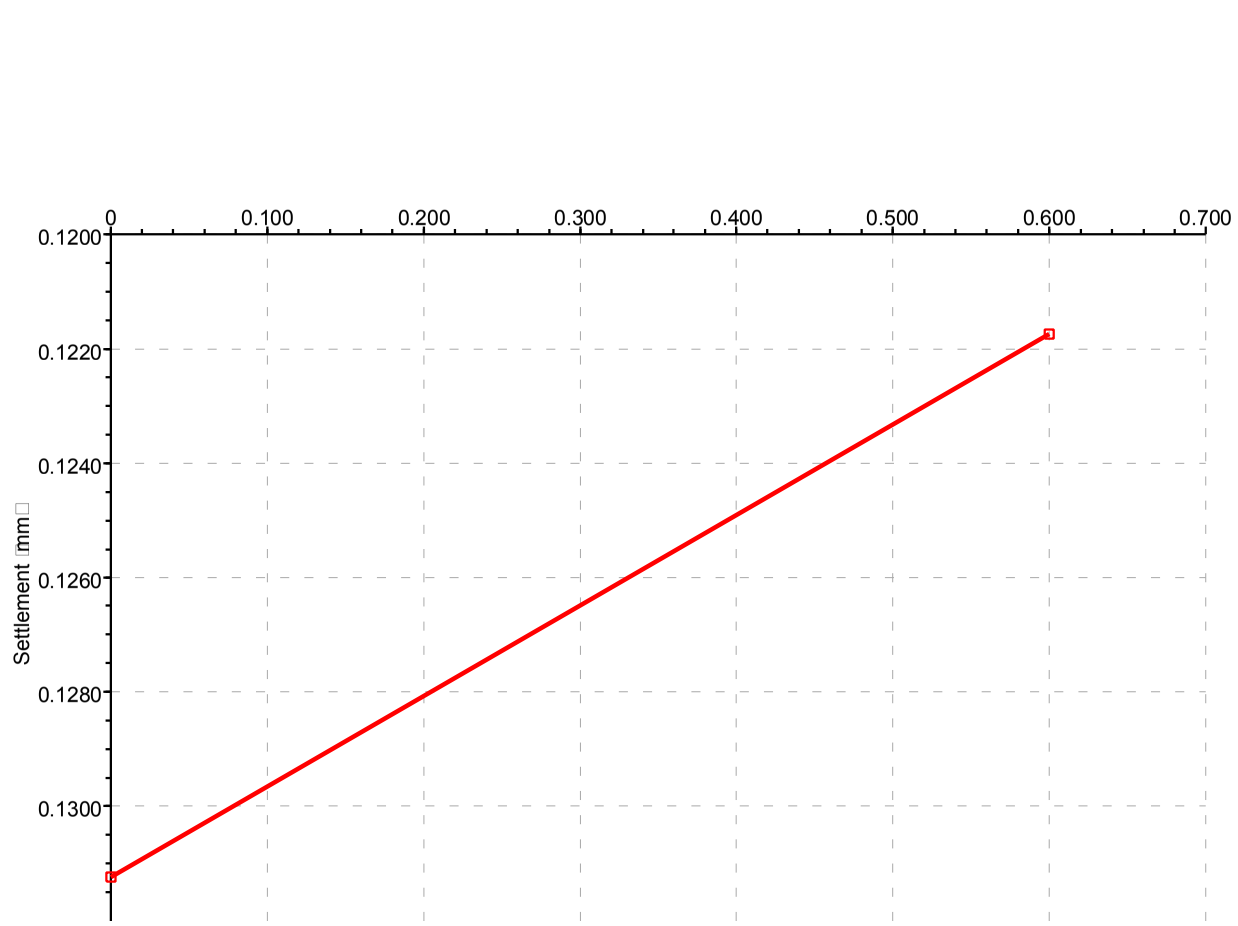

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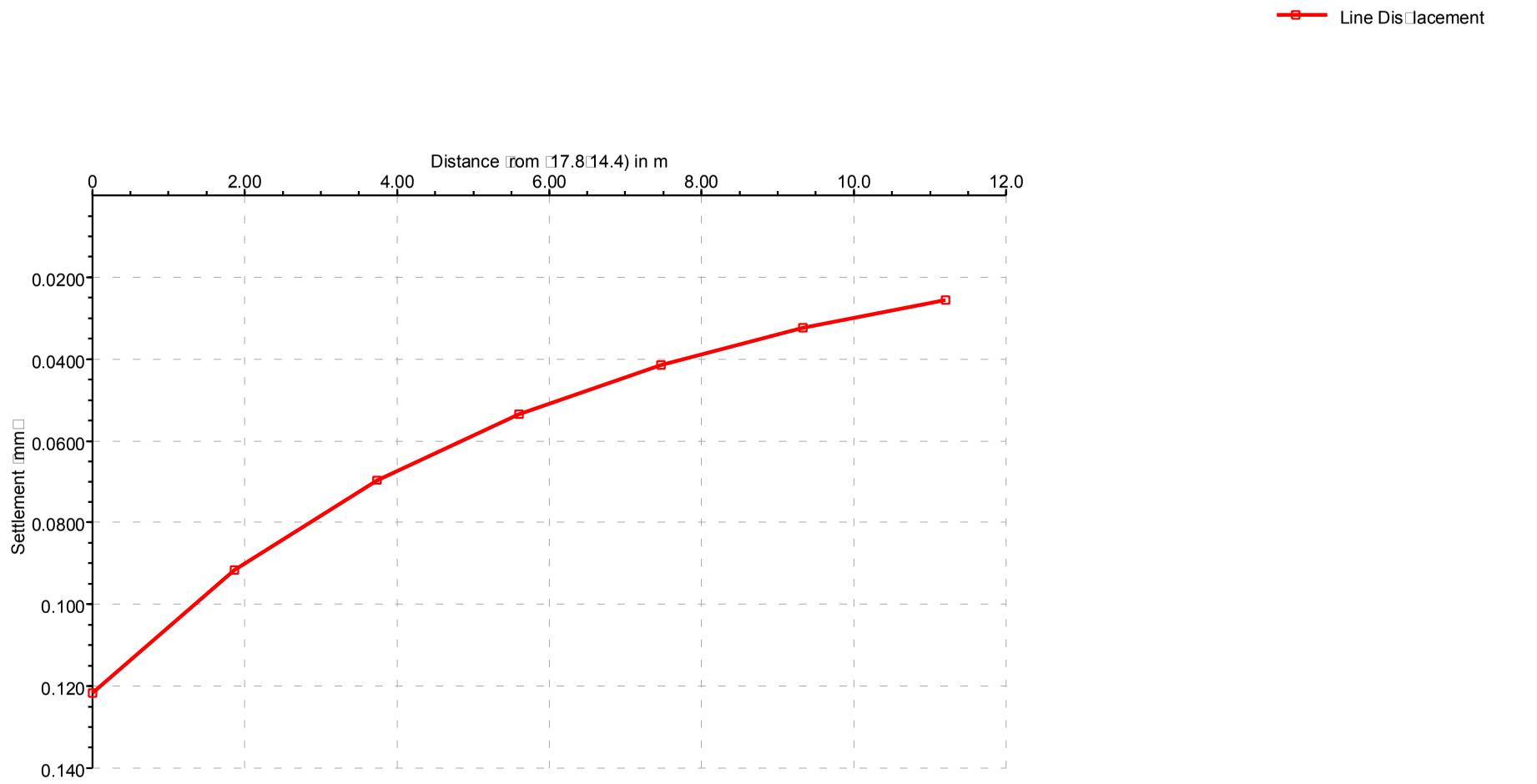

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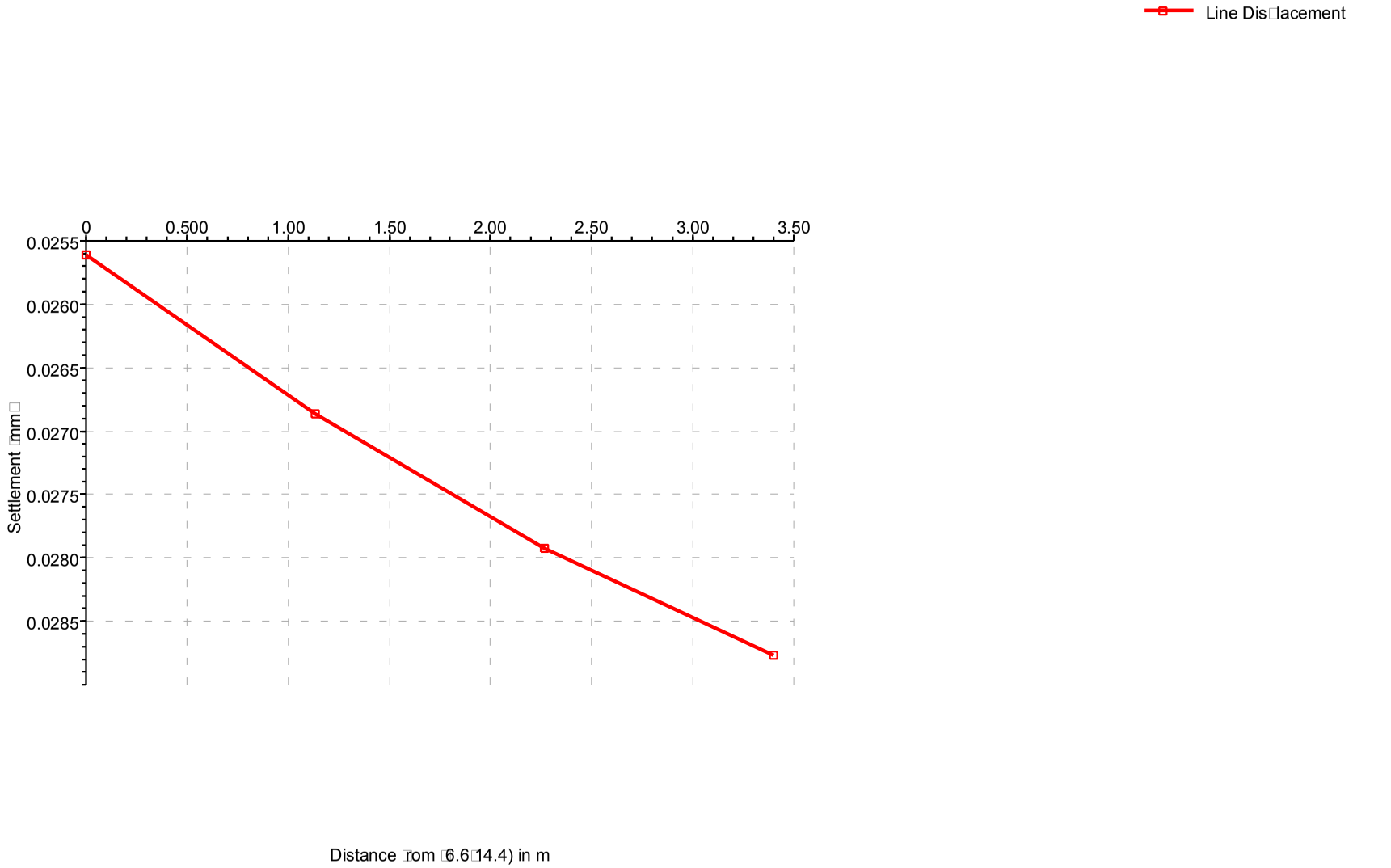

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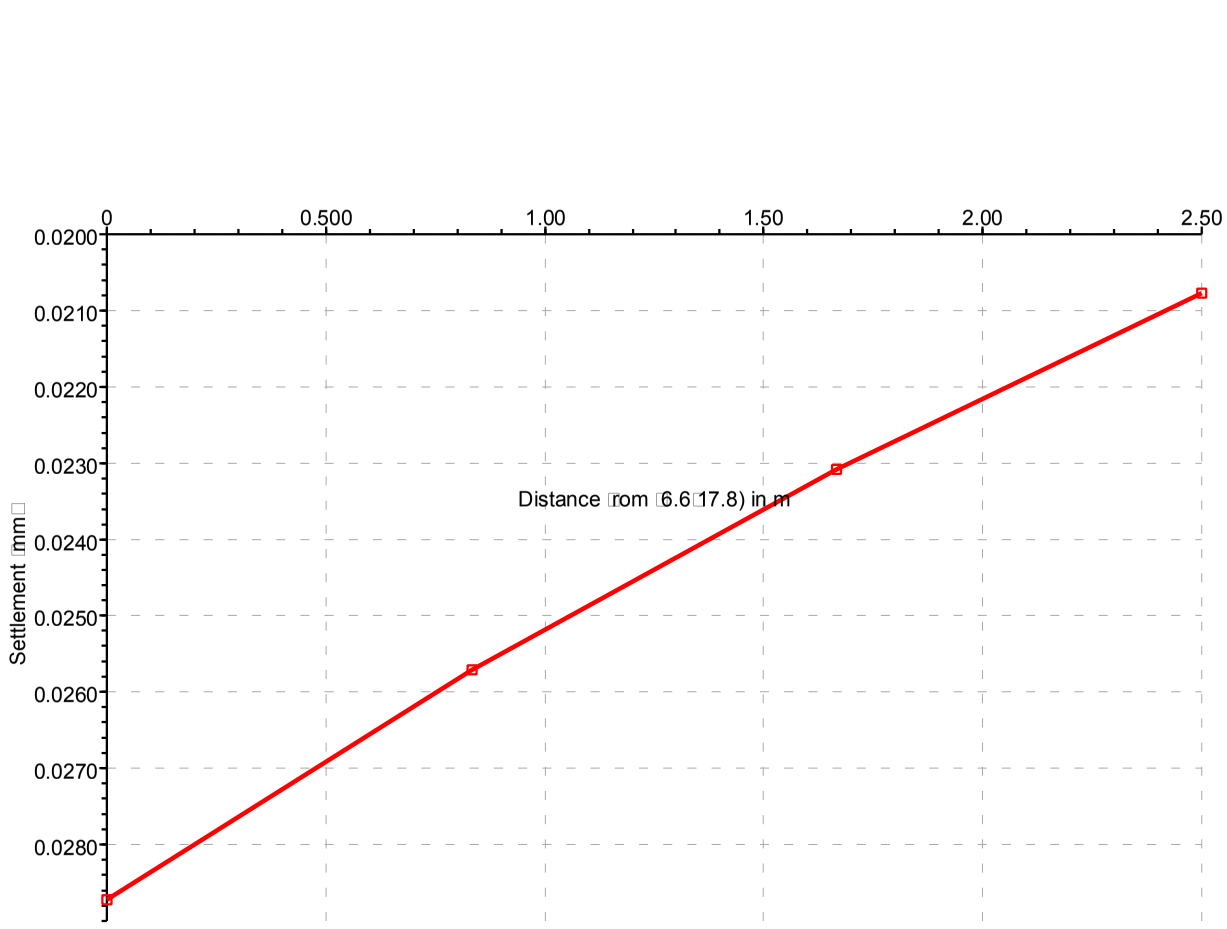

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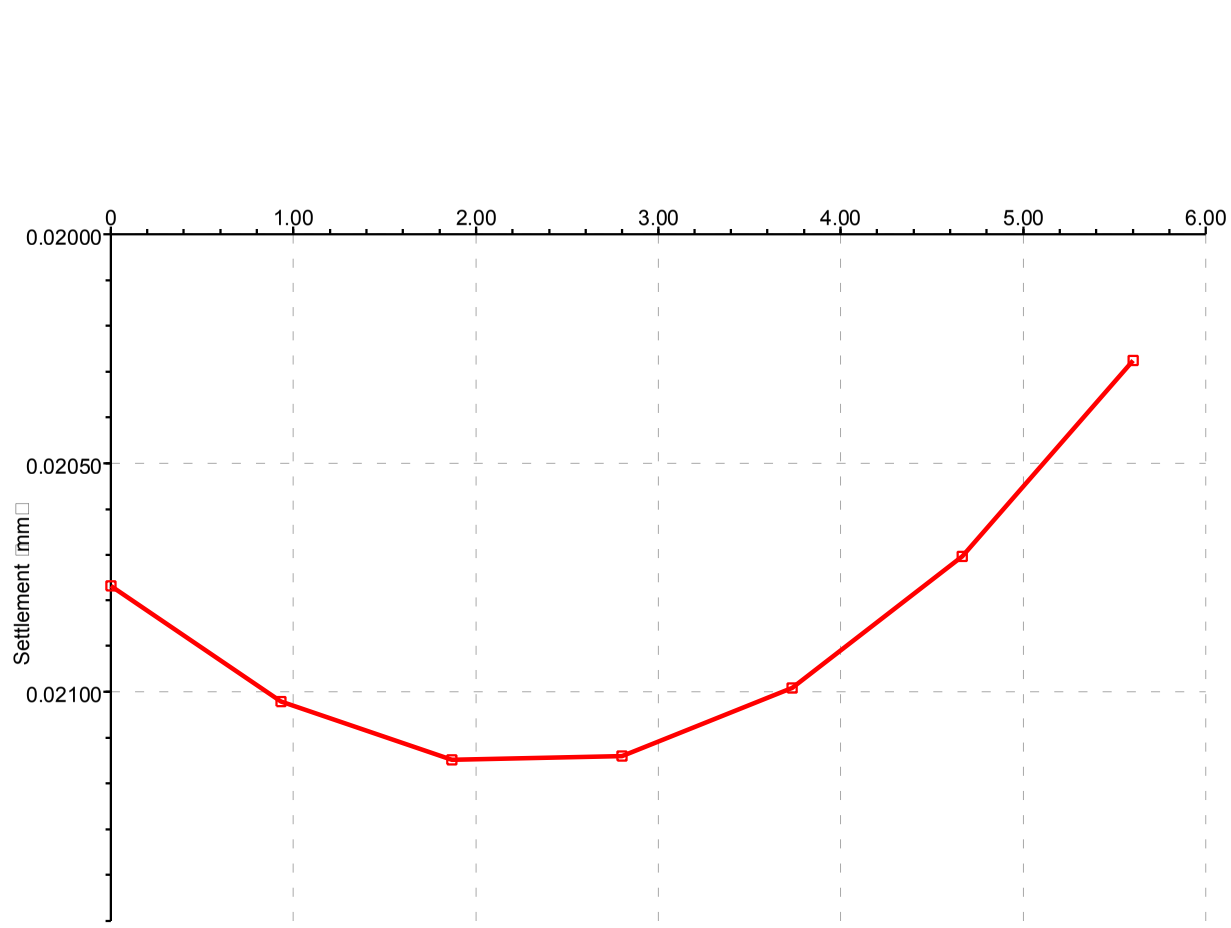

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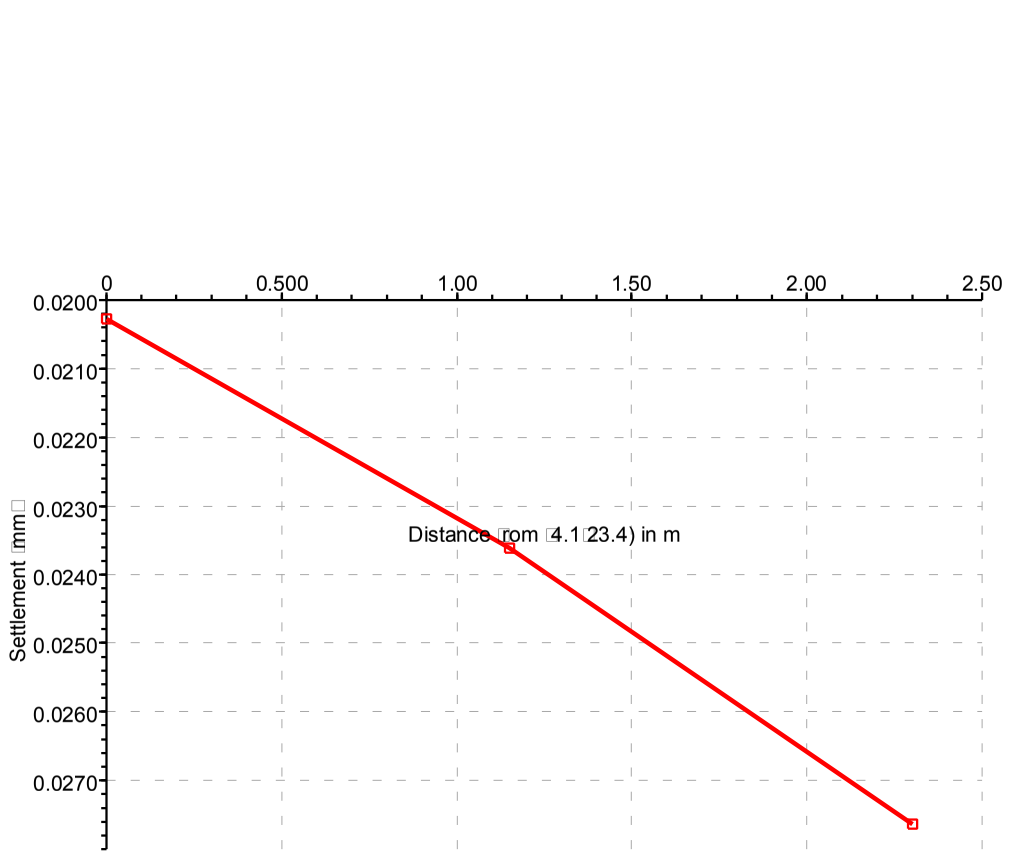

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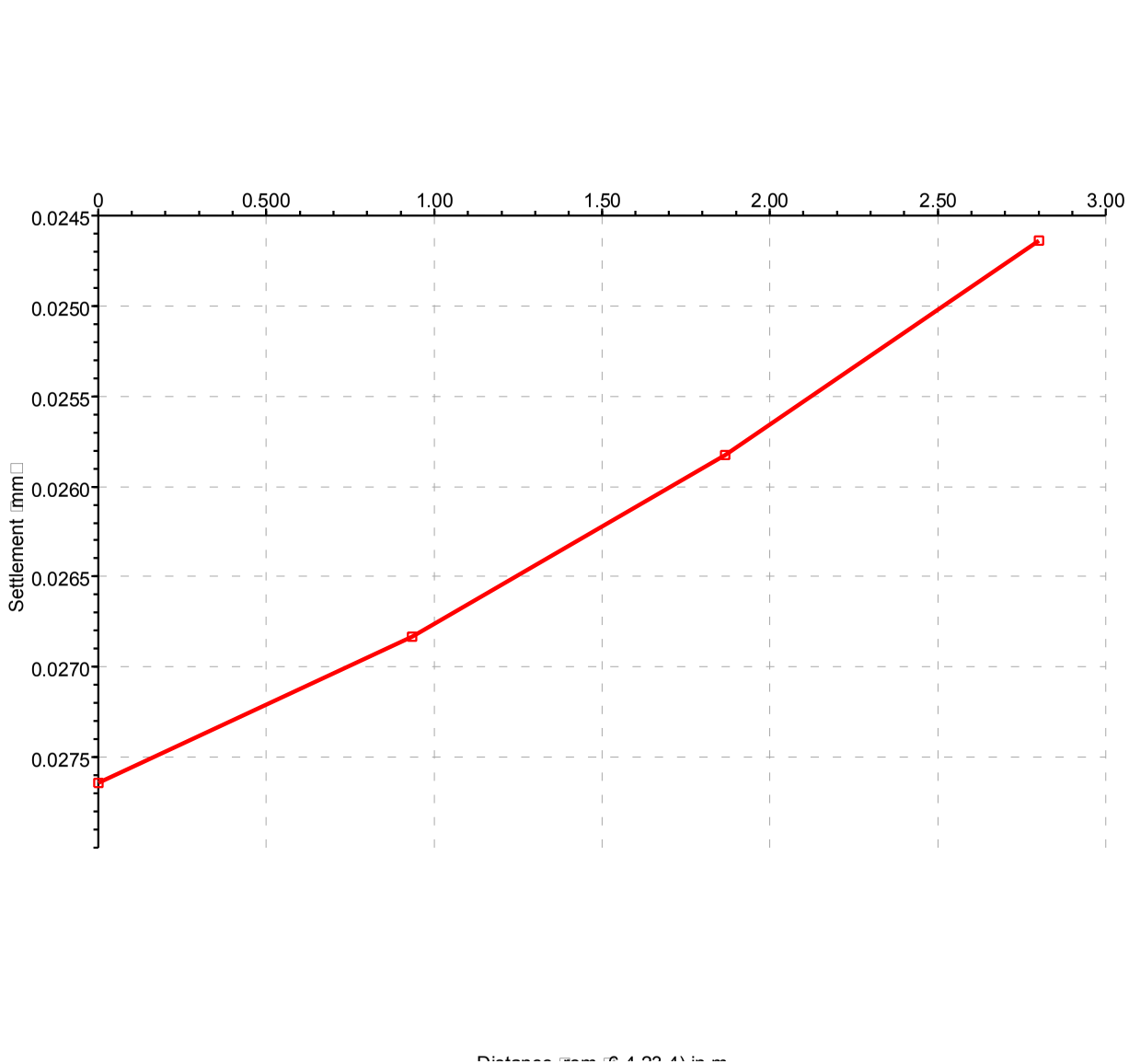

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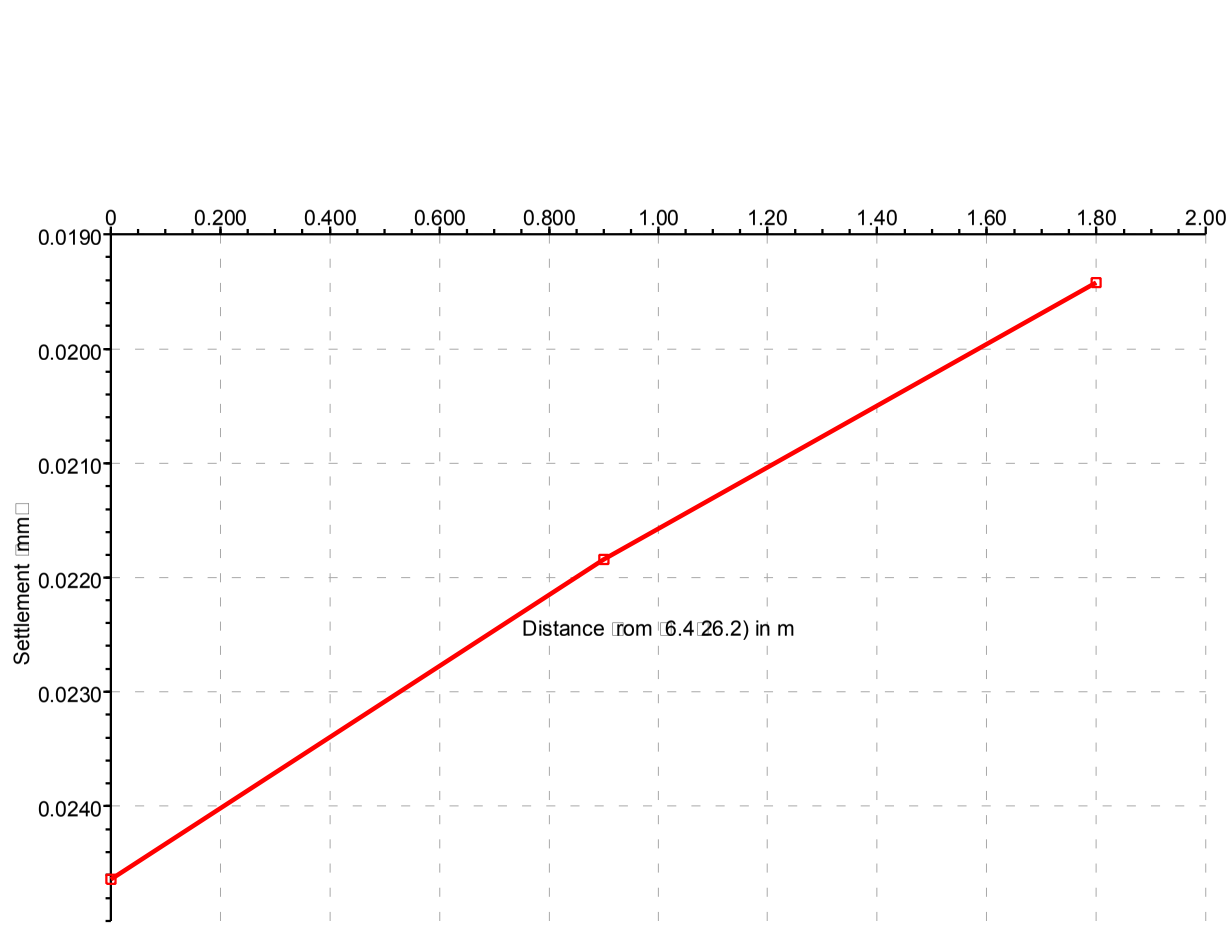

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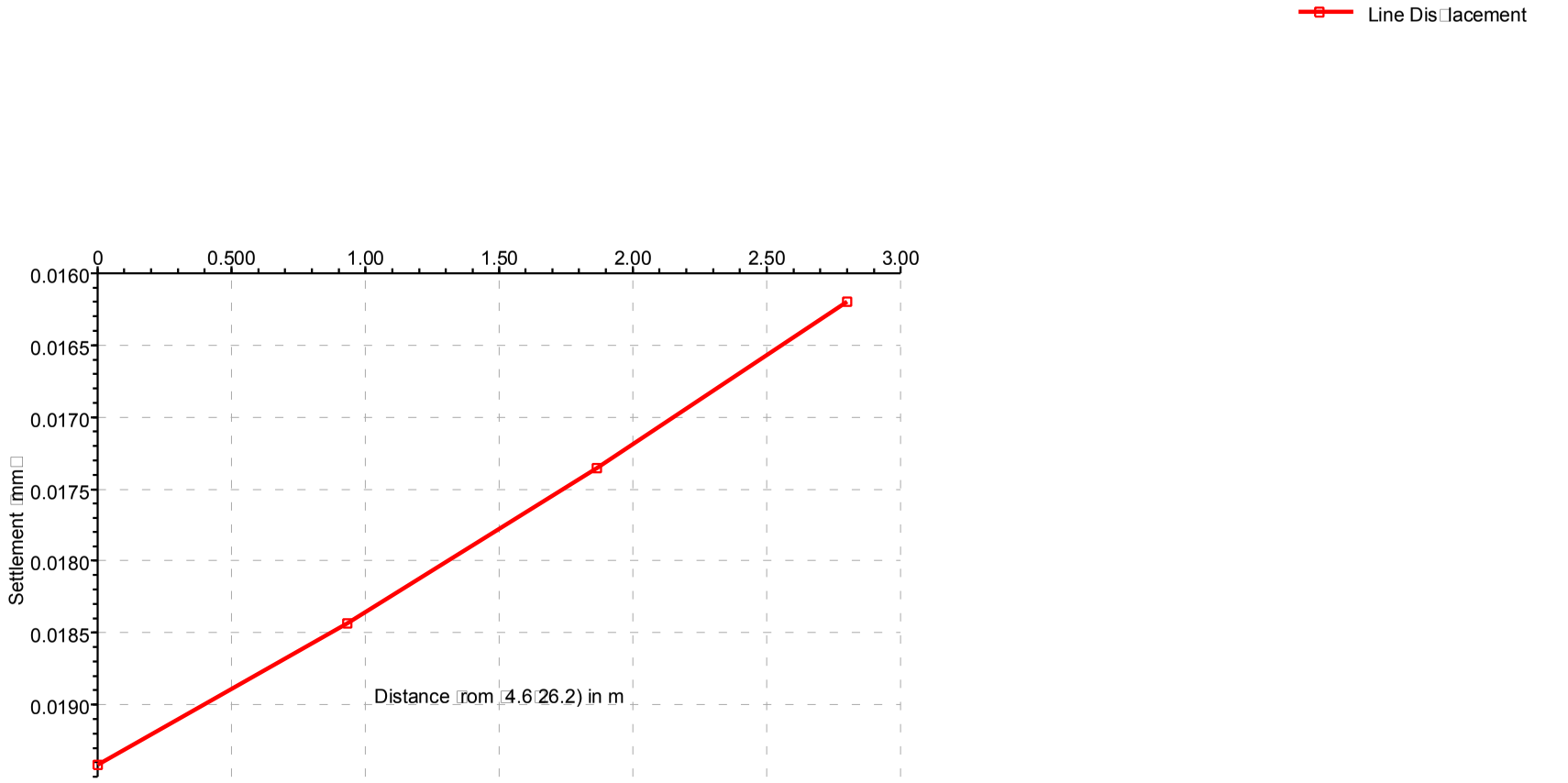

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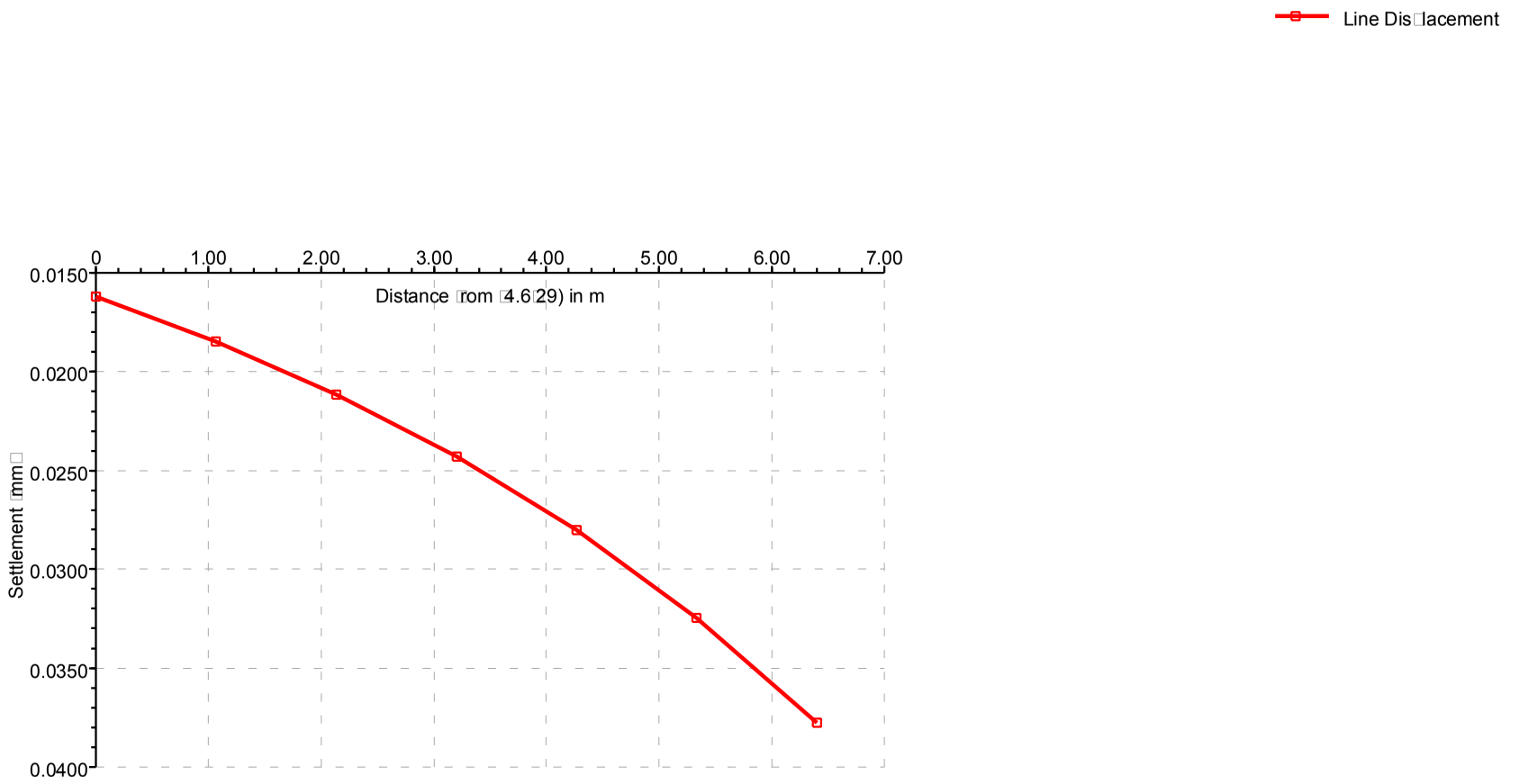

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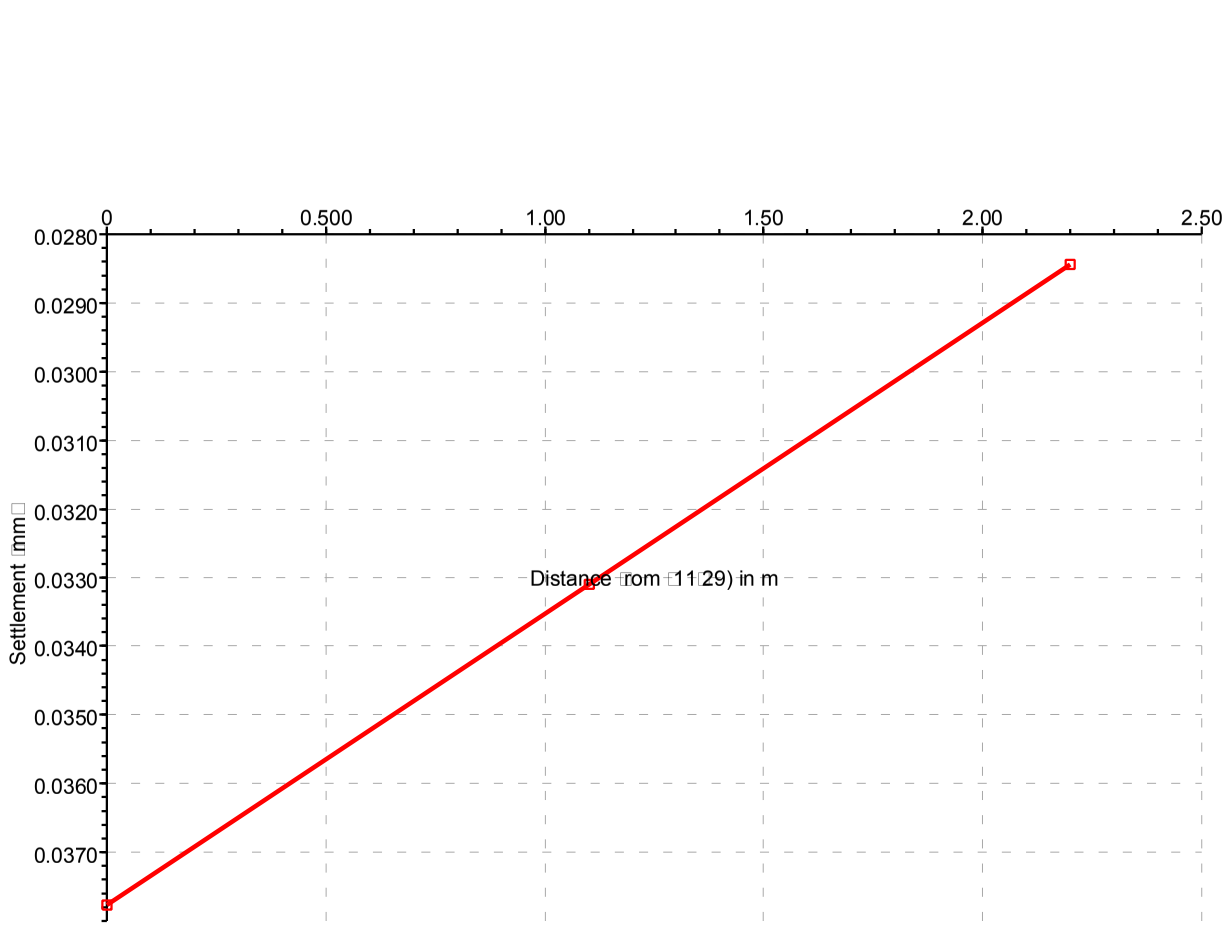

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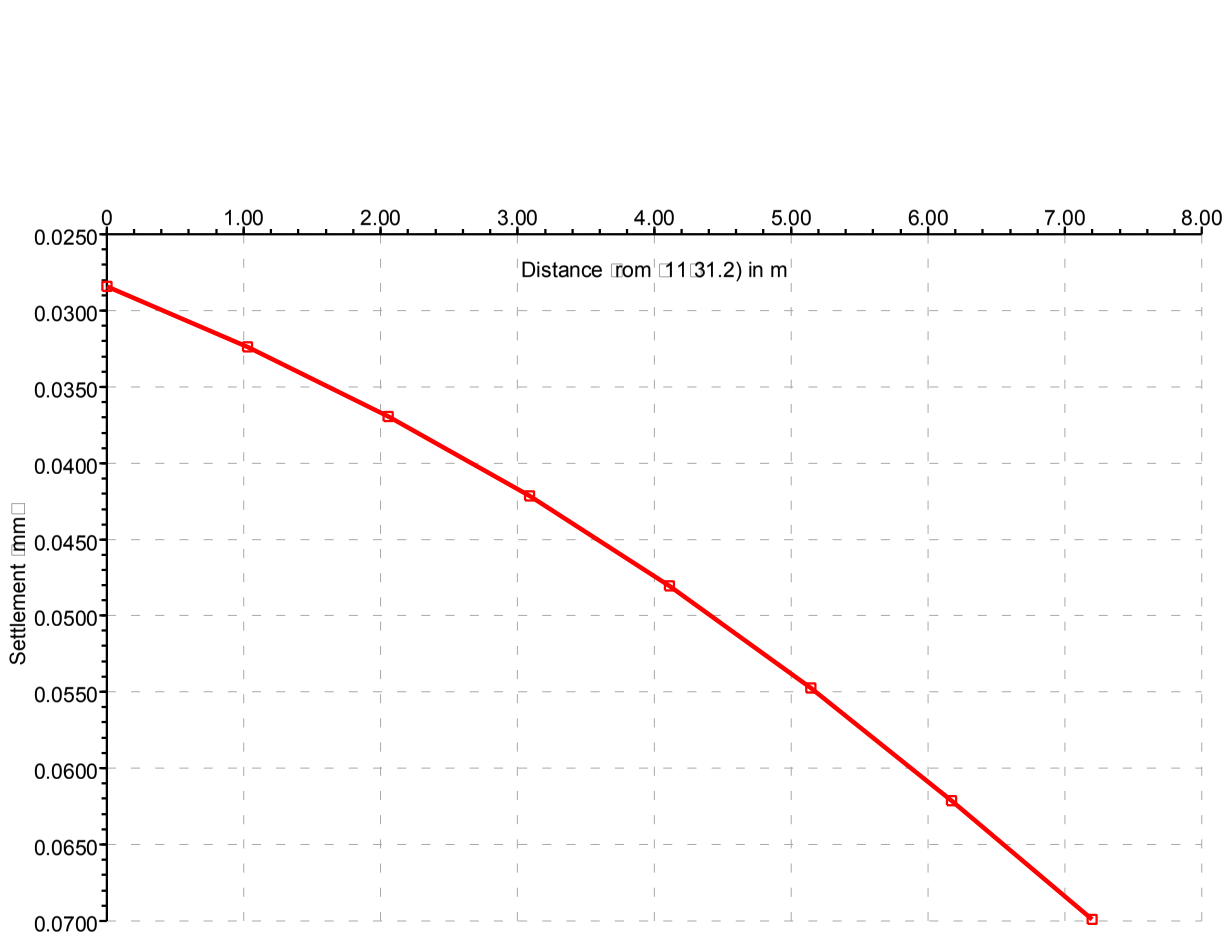

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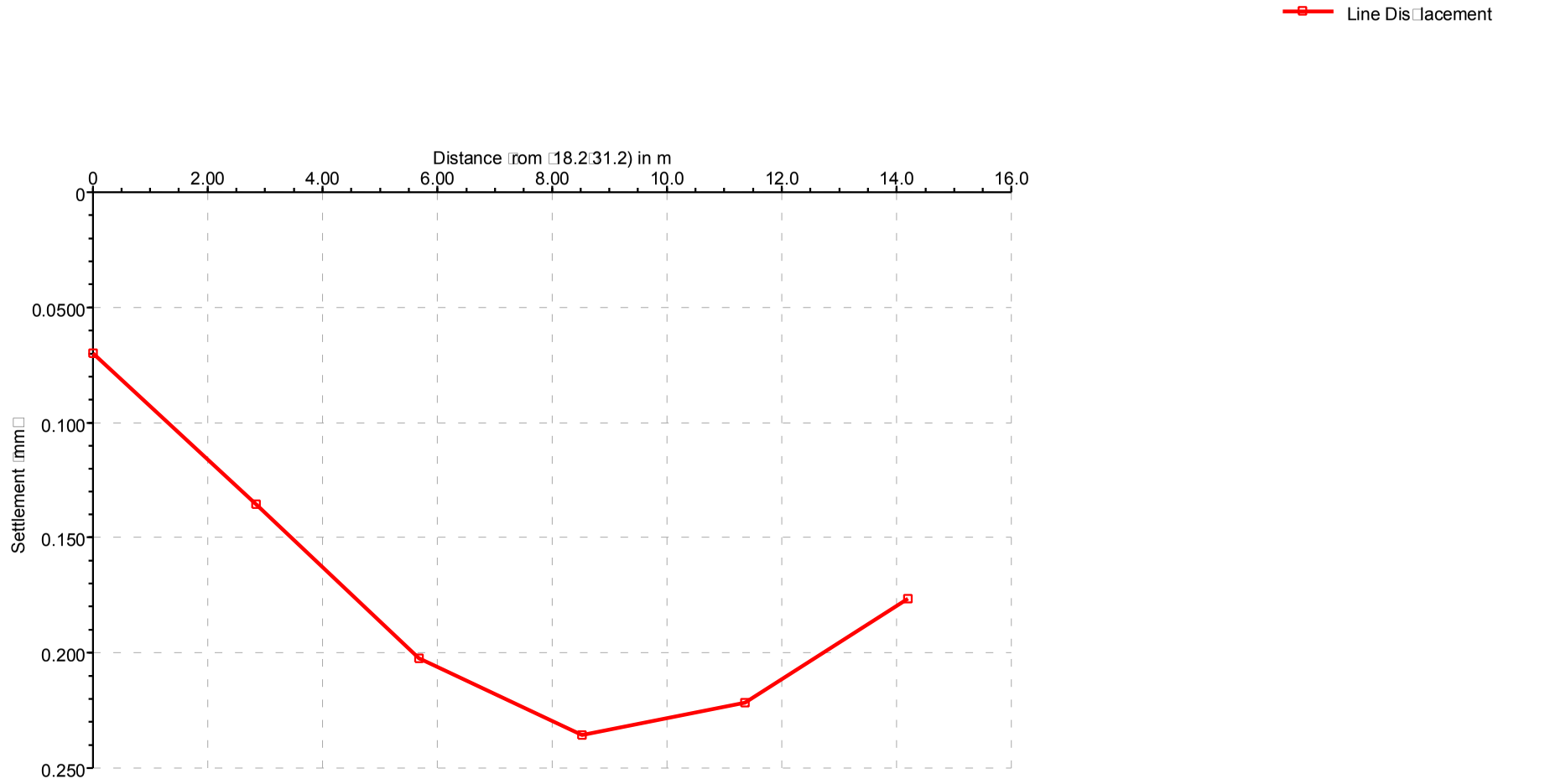

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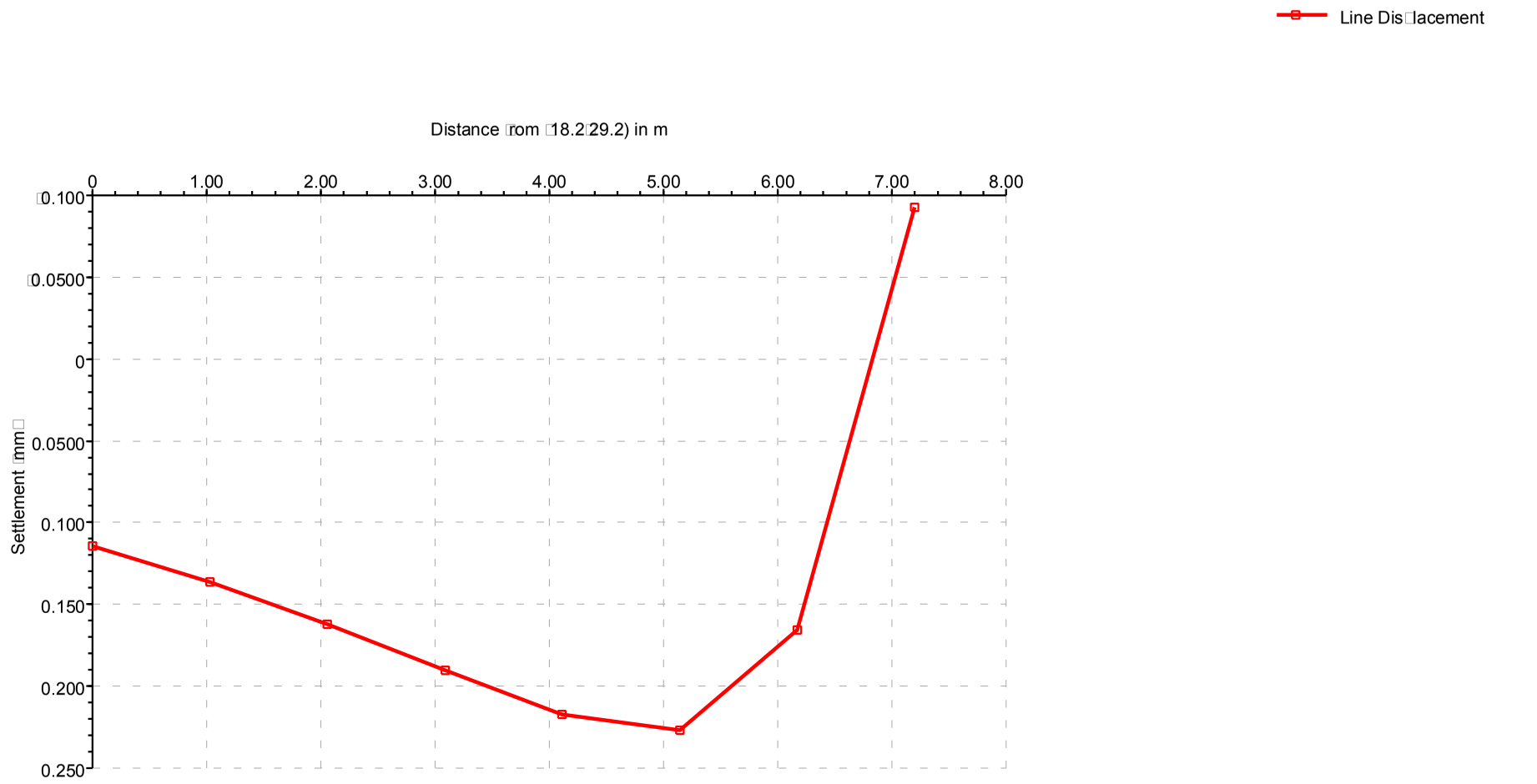

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Athlone House, Hampstead Lane, N6 4RU

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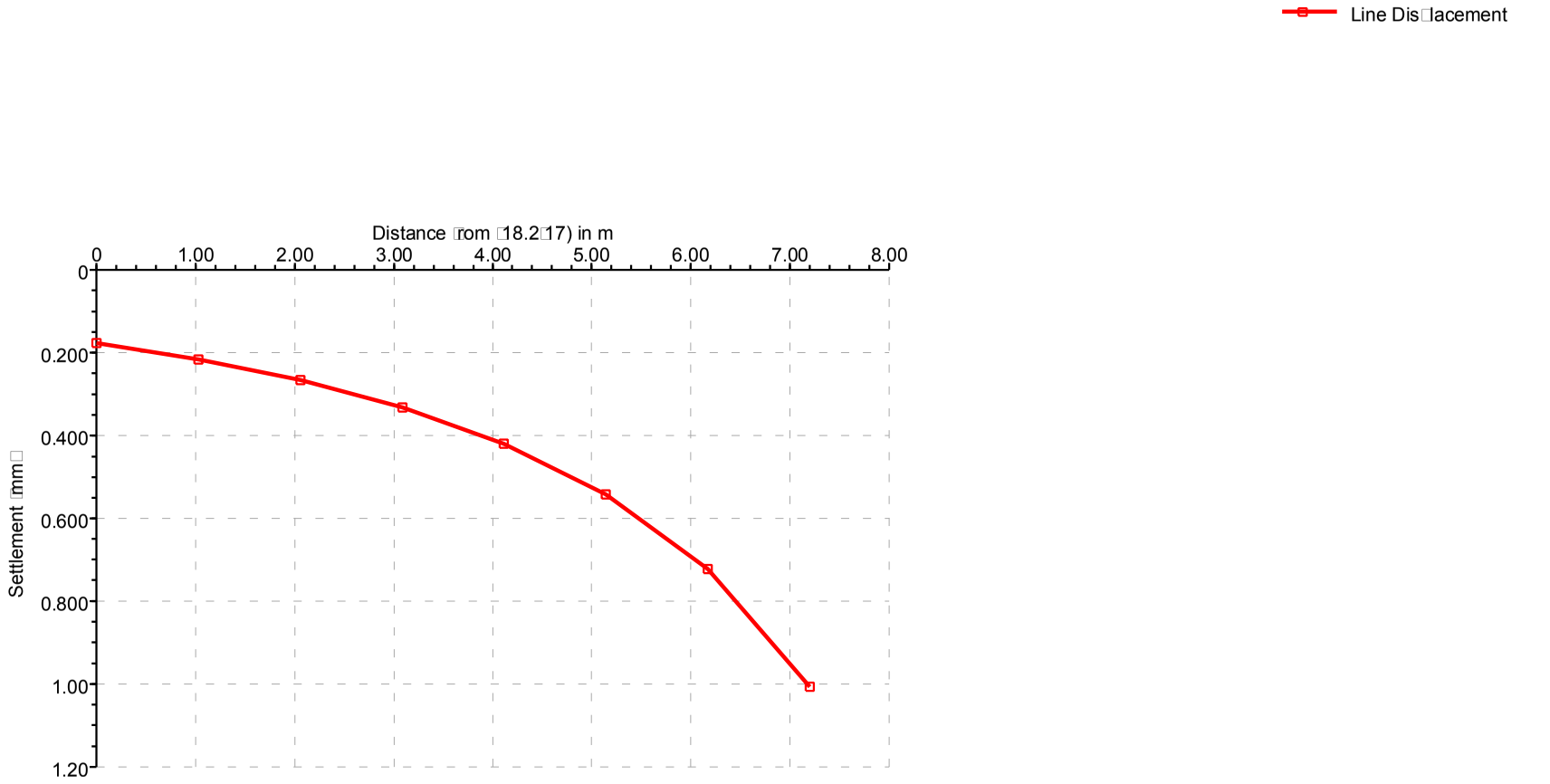

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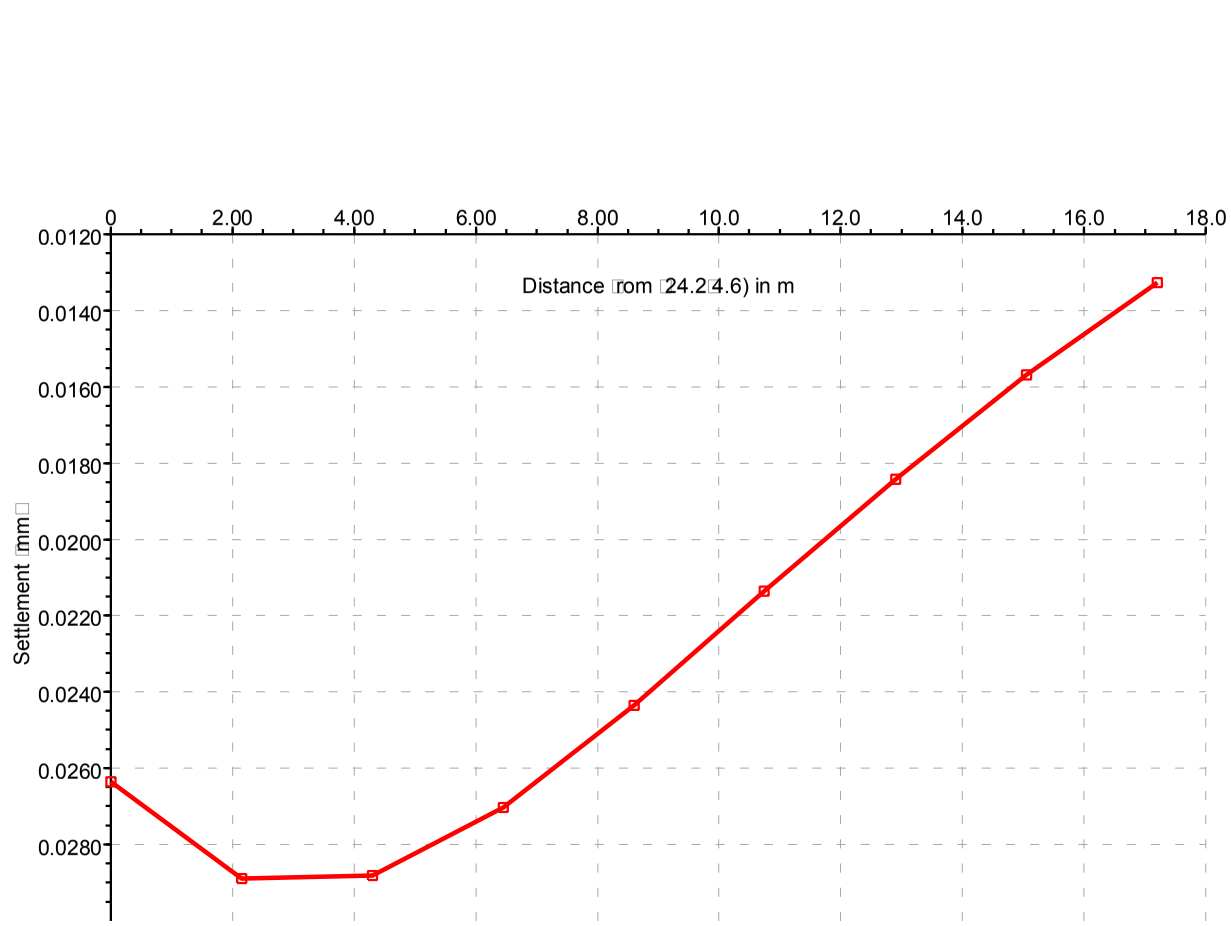

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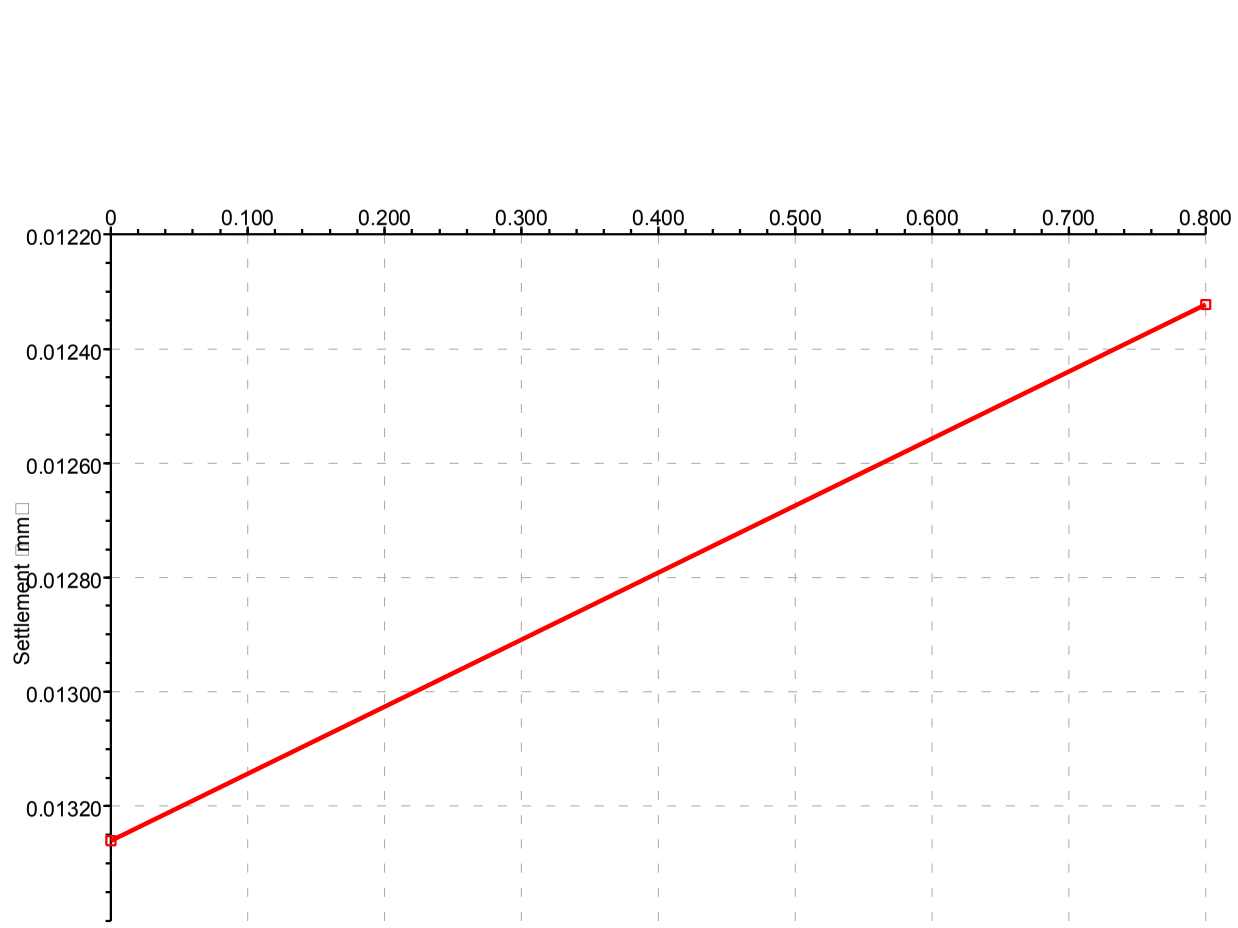

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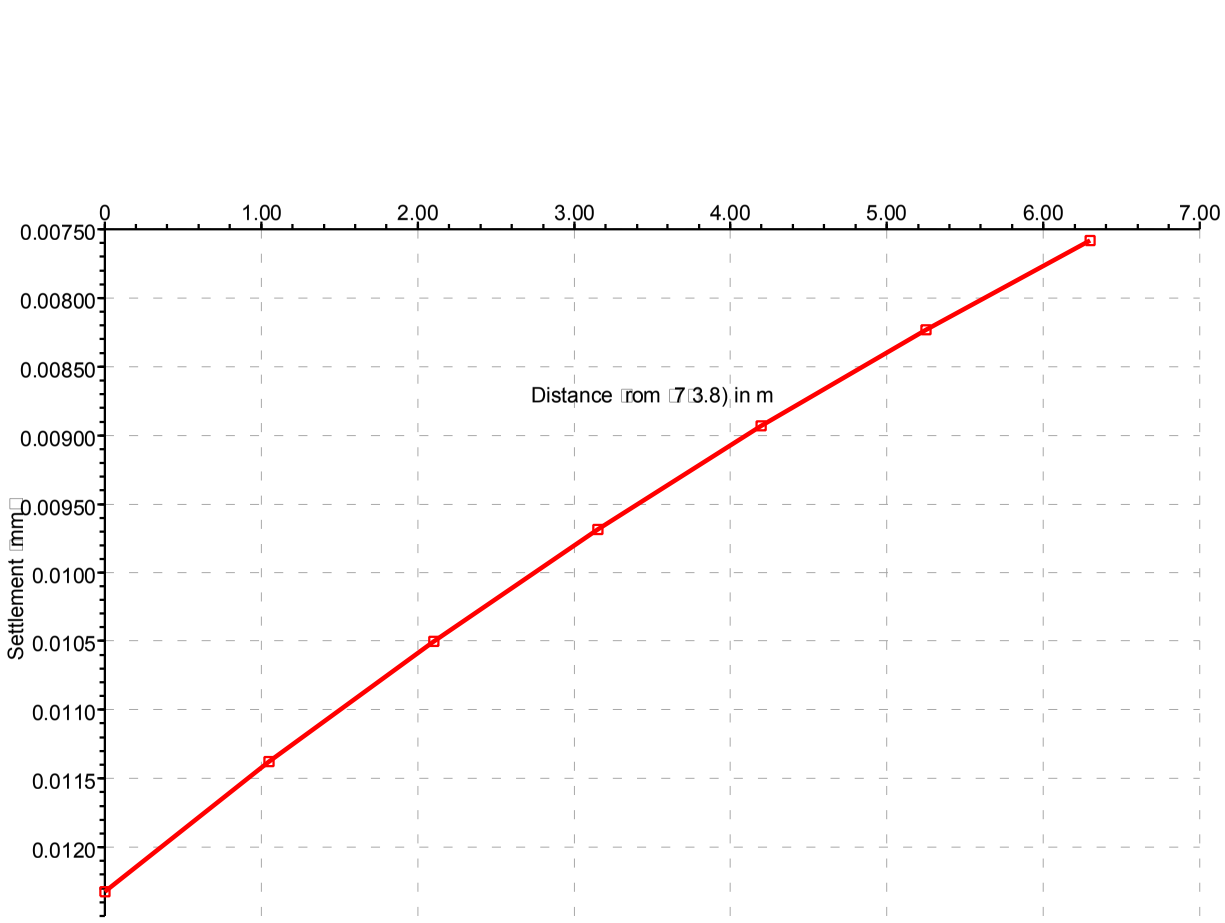

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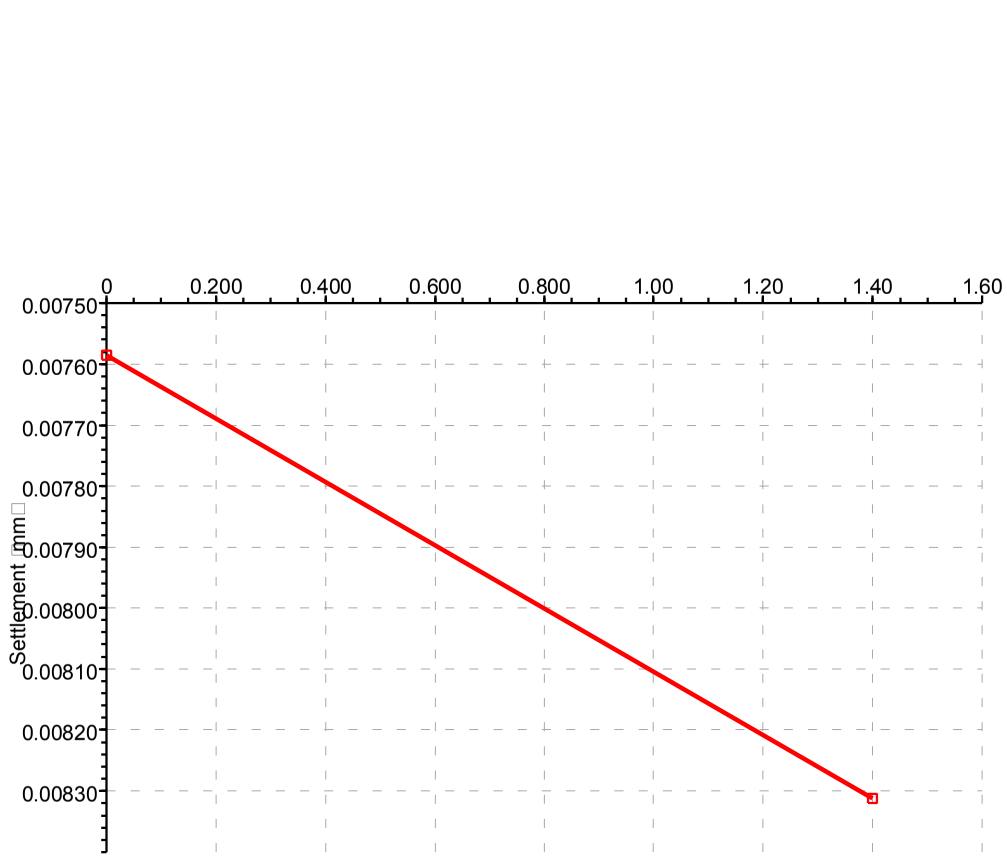

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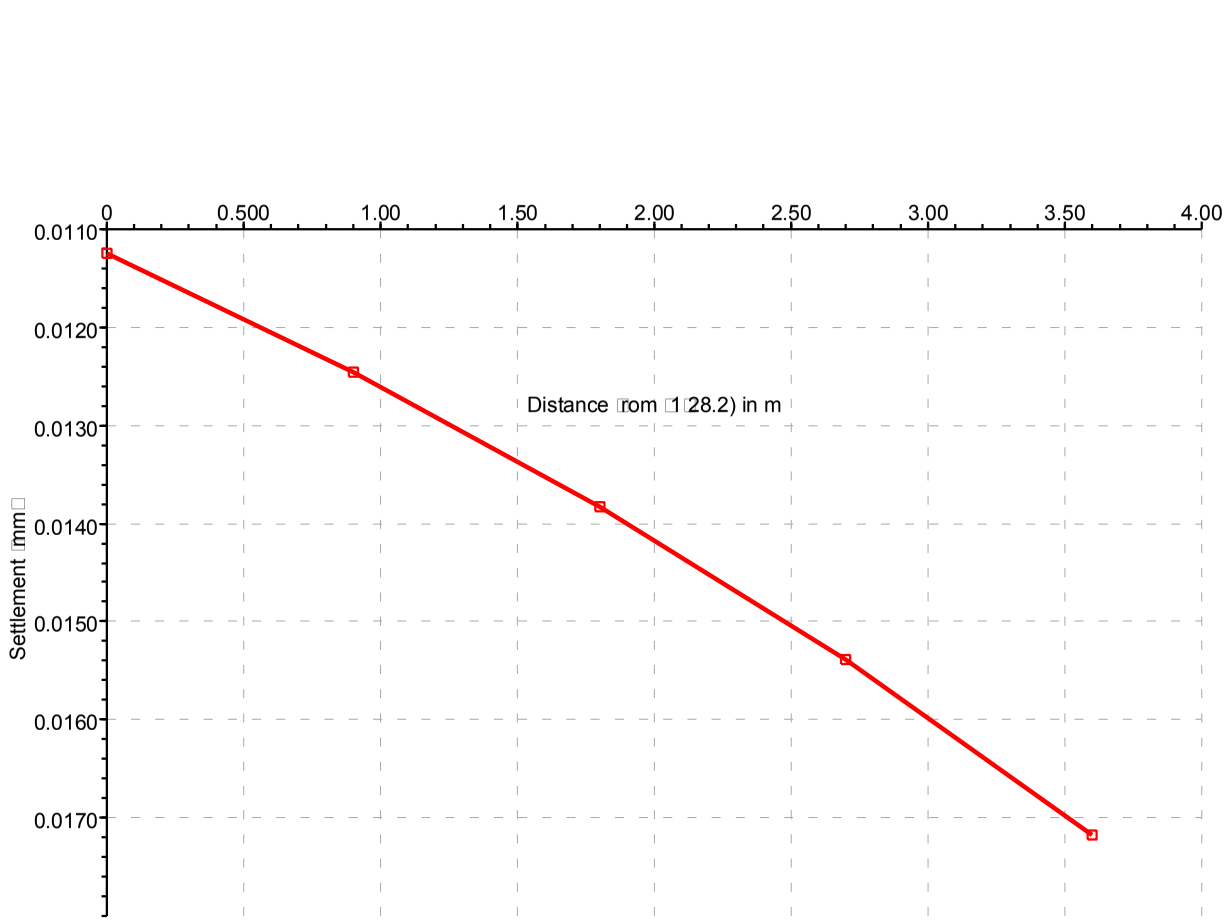

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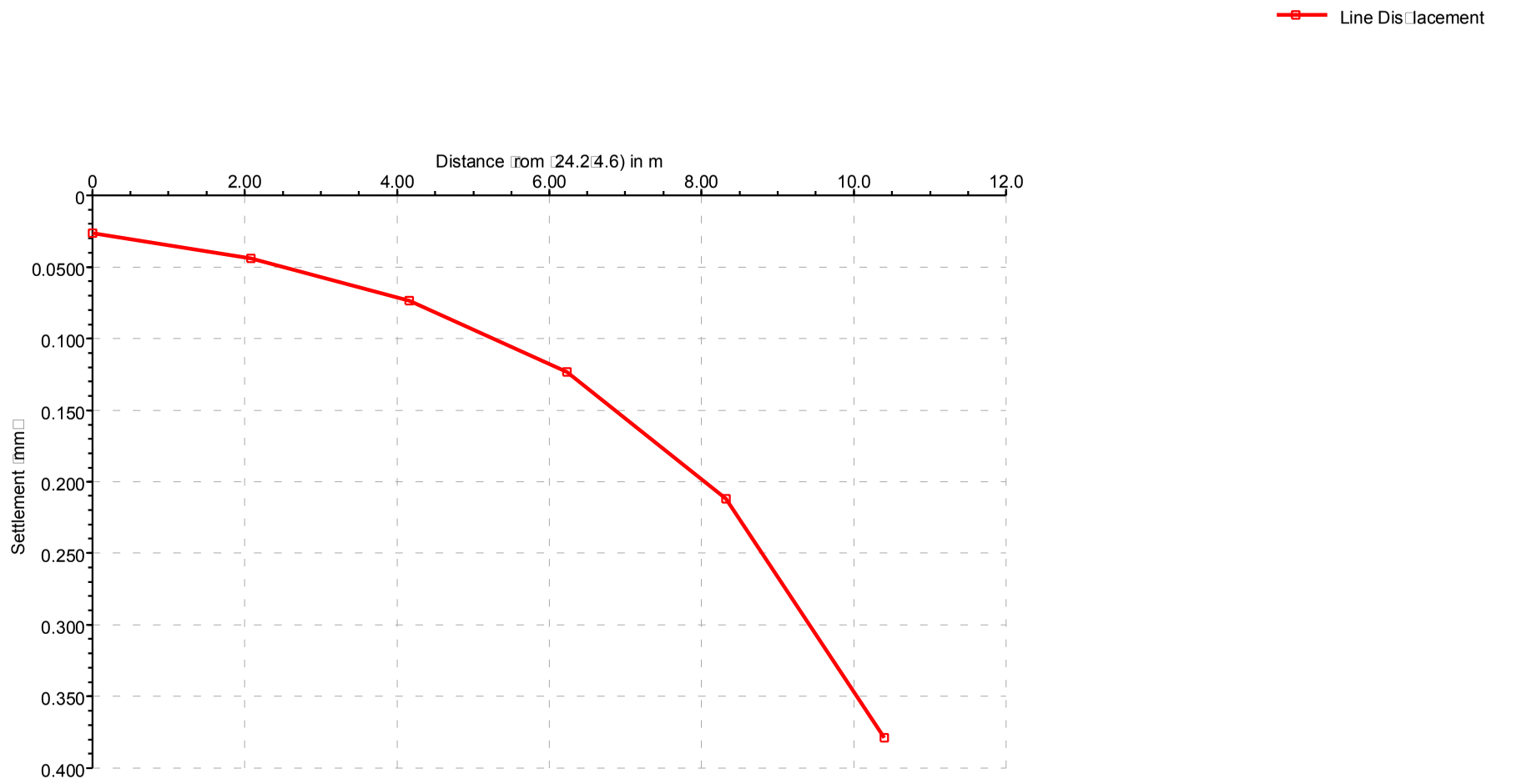

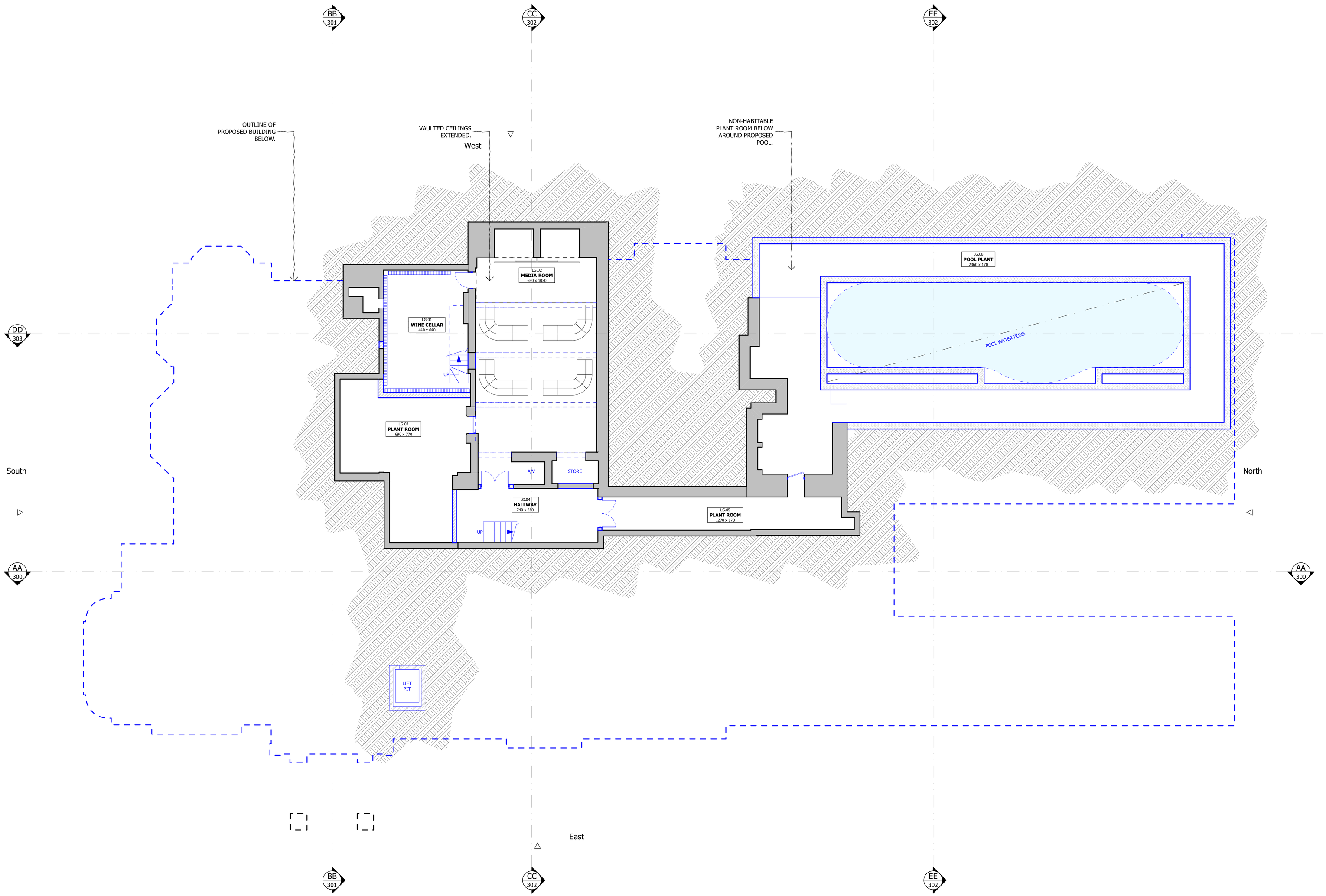

DO NOT SCALE FROM THIS DRAWING

Figured dimensions only are to be taken from this drawing. All dimensions are to be checked on site before any work is put in hand.
If in doubt, ask.

All SHH drawings to be read in conjunction with relevant SHH Finishes, Sanitaryware, Lighting & Ironmongery schedules.

Any discrepancies to be highlighted to SHH prior to procurement and in good time.

0 1 2 3 4 5m

Legends & Notes:

Existing

To be demolished/replaced

Proposed element

Rev	Date	Descriptor	Athr.

SHHARCHITECTS|INTERIORDESIGNERS
RIBA Chartered Practice
MEMBER
1 Vencourt Place, Ravenscourt Park
Hammersmith, London W6 9NU
Phone **+44 (0) 20 8600 4171** Email **info@shh.co.uk**
shh.co.uk

Project:

Athlone House

Hampstead Lane
London

Client:

Private Client

Drawing Title:

020 General Arrangements

Basement - Proposed

1

SCALE 1:100 @ A1, 1:200 @ A3

BASEMENT - PROPOSED

(Project number)DWG number_Revision:

(817)020_PL01

Checked:

BB 301 | CC 302 | EE 302 | DD 303 | AA 300

West

REPLACEMENT FULL-HEIGHT WINDOWS IN MATCHING STYLE OF EXISTING, ADJACENT WINDOWS.

STAIR TO WINE CELLAR BELOW.

ORIGINAL DINING ROOM CEILING RETAINED AND ENTRANCE RESTORED.

NEW WINDOW BAY IN CONTEMPORARY STYLE w. MATCHING PROPORTIONS OF EXISTING WINDOWS.

OUTDOOR TERRACE w. SUNKEN JAPANESE STYLE TUBS

SINGLE STOREY GARDEN WALL IN SIMILAR BRICK TO EXISTING HOUSE.

WINDOW BAY FROM FIRST FLOOR EXTENDED THROUGH TO GROUND FLOOR.

G.07 **LIVING AREA** 1170 x 1290

G.08 **CIGAR ROOM** 460 x 660

G.10 **DINING ROOM** 640 x 1200

G.19 **POOL (18m x 6m)** 2500 x 1070

G.18 **RELAXATION AREA** 770 x 820

EXTERNAL WATER FOUNTAIN TO MATCH STYLE OF GARDEN.

FERNERY CREATED IN POOL AREA TO REFLECT ORIGINAL PURPOSE OF THE GREENHOUSE CONSERVATORY.

SERVICE RISER

G.09 **WC** 270 x 200

G.16 **CHANGE** 270 x 350

G.11 **ATRIUM** 1410 x 430

G.17 **WC** 230 x 160

G.20 **CHANGE** 430 x 330

G.21 **HAMMAM** 520 x 290

G.22 **PLUNGE** 480 x 290

G.23 **SAUNA** 520 x 290

South

North

HALLWAY CONVERTED INTO DOUBLE-HEIGHT ATRIUM. SEE SECTION AA FOR DETAILS.

FULL HEIGHT GLAZED LIGHT WELL WITH CENTRAL POND OPEN TO SKY

G.15 **POOL LOBBY** 750 x 320

EXISTING WINDOW SILL RAISED TO CREATE CONSISTANCY ACROSS FULL HEIGH WINDOWS.

G.04 **TV SNUG** 760 x 490

G.05 **GRAND HALL** 540 x 800

G.06 **STAIRCASE** 590 x 410

KOI POND

G.14 **SITTING** 450 x 460

G.24 **SECONDARY ENTRANCE** 430 x 490

G.25 **BOOT ROOM** 390 x 320

SERVICE YARD 1790 x 600

TIMBER GATE TO SECONDARY ENTRANCE /COURTYARD

G.03 **STUDY** 940 x 580

FULL HEIGHT WINDOWS TO FLOOR LEVEL. SEE ELEVATION FOR DETAILS.

G.01 **ENTRANCE LOBBY** 320 x 360

LIFT

G.02 **COATS** 450 x 480

STORAGE

G.12 **FAMILY DINING** 620 x 480

G.13 **KITCHEN** 570 x 480

G.26 **PREP KITCHEN** 490 x 590

G.27 **SERVICE DROP OFF** 750 x 200

G.28 **UTILITY** 390 x 370

G.29 **WC** 180 x 150

G.30 **STAFF SITTING** 660 x 500

OUTDOOR STORAGE 890 x 510

FULL HEIGHT WINDOWS TO FLOOR LEVEL. SEE ELEVATION FOR DETAILS.

FULL HEIGHT WINDOWS TO FLOOR LEVEL. SEE ELEVATION FOR DETAILS.

FRONT DOOR RE-INSTATED.

FULL HEIGHT WINDOWS TO FLOOR LEVEL. SEE ELEVATION FOR DETAILS.

ORIGINAL PORCH AND DOOR TO KITCHEN RE-INSTATED TO SIMILAR DESIGN.

SINGLE STOREY GARDEN WALL IN SIMILAR BRICK TO EXISTING HOUSE.

CONTEMPORARY 'SLIT' WINDOWS.

NEW DRIVEWAY. SEE SITE PLAN AND LANDSCAPE PLANS FOR DETAILS.

UNDERCOVER STORAGE AREA.

East

DO NOT SCALE FROM THIS DRAWING

Figured dimensions only are to be taken from this drawing. All dimensions are to be checked on site before any work is put in hand.
If in doubt, ask.

All SHH drawings to be read in conjunction with relevant SHH Finishes, Sanitaryware, Lighting & Ironmongery schedules.

Any discrepancies to be highlighted to SHH prior to procurement and in good time.

0 1 2 3 4 5m

Legends & Notes:

Existing

To be demolished/replaced

Proposed element

Rev	Date	Descriptor	Athr.

SHH ARCHITECTS | INTERIOR DESIGNERS
RIBA Chartered Practice MEMBER
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Hammersmith, London W6 9NU
Phone **+44 (0) 20 8600 4171** Email **info@shh.co.uk**
shh.co.uk

Project:

Athlone House

Hampstead Lane
London

Client:

Private Client

Drawing Title:

020 General Arrangements

Ground Floor - Proposed

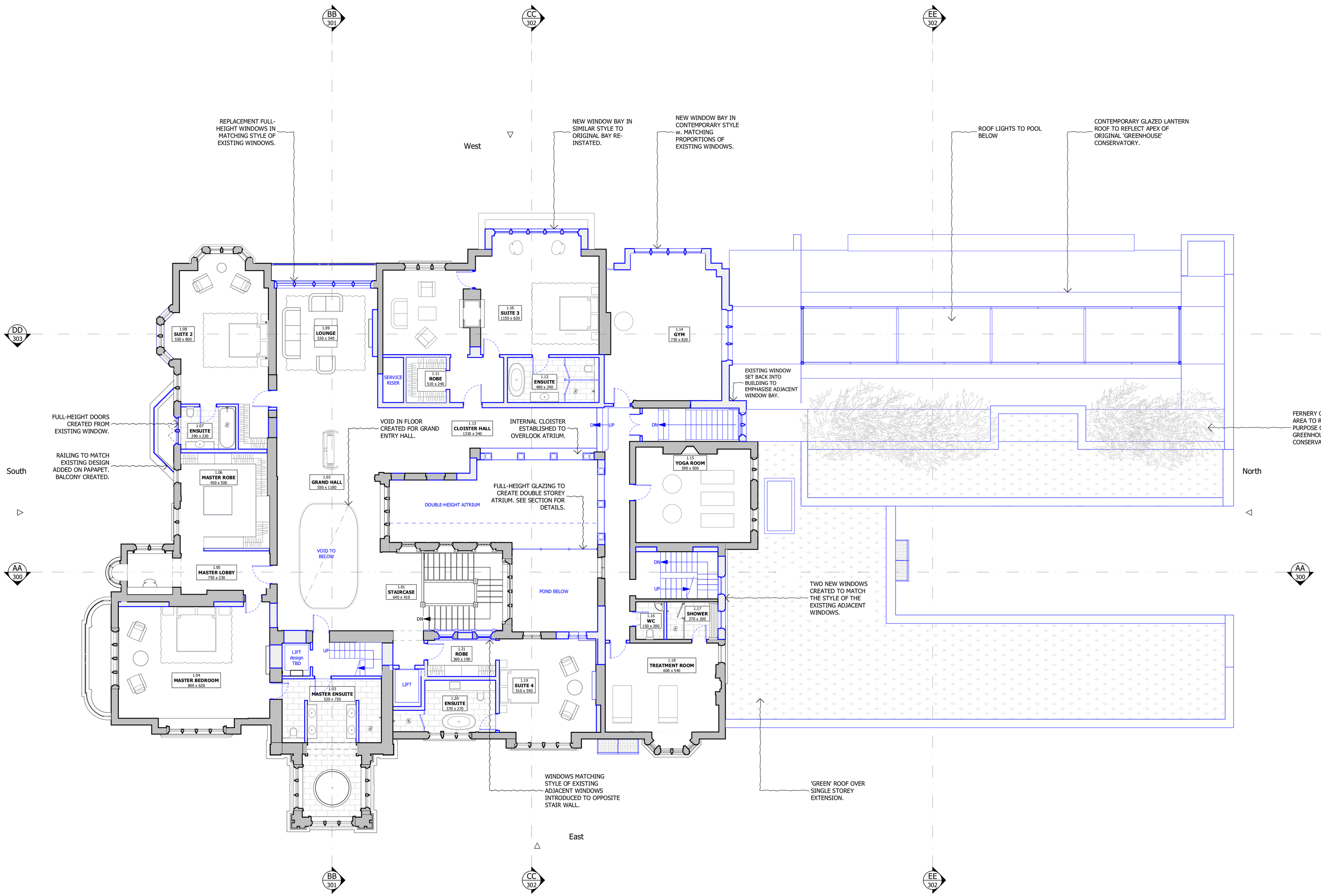
1 SCALE 1:100 @ A1, 1:200 @ A3

GROUND FLOOR - PROPOSED

(Project number)DWG number_Revision:

(817)021_PL01

Checked:



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0 1 2 3 4 5m

Legends & Notes:

Existing

To be demolished/replaced

Proposed element

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London

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020 General Arrangements

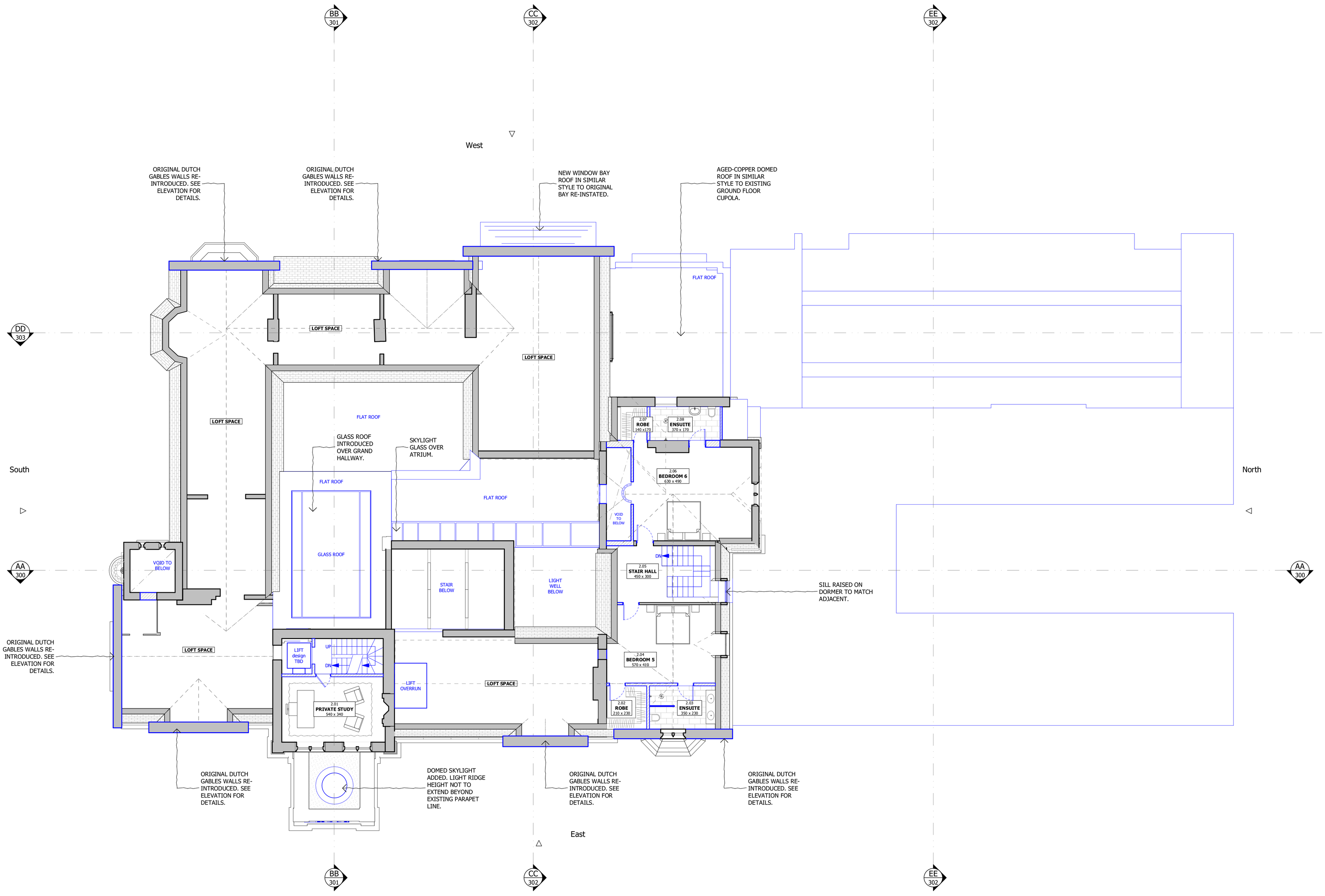
First Floor - Proposed

1 SCALE 1:100 @ A1, 1:200 @ A3

FIRST FLOOR - PROPOSED

(Project number)DWG number_Revision: **(817)022_PL01**

Checked:



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0 1 2 3 4 5m

Legends & Notes:

Existing

To be demolished/replaced

Proposed element

Rev	Date	Descriptor	Athr.

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020 General Arrangements

Second Floor - Proposed

1

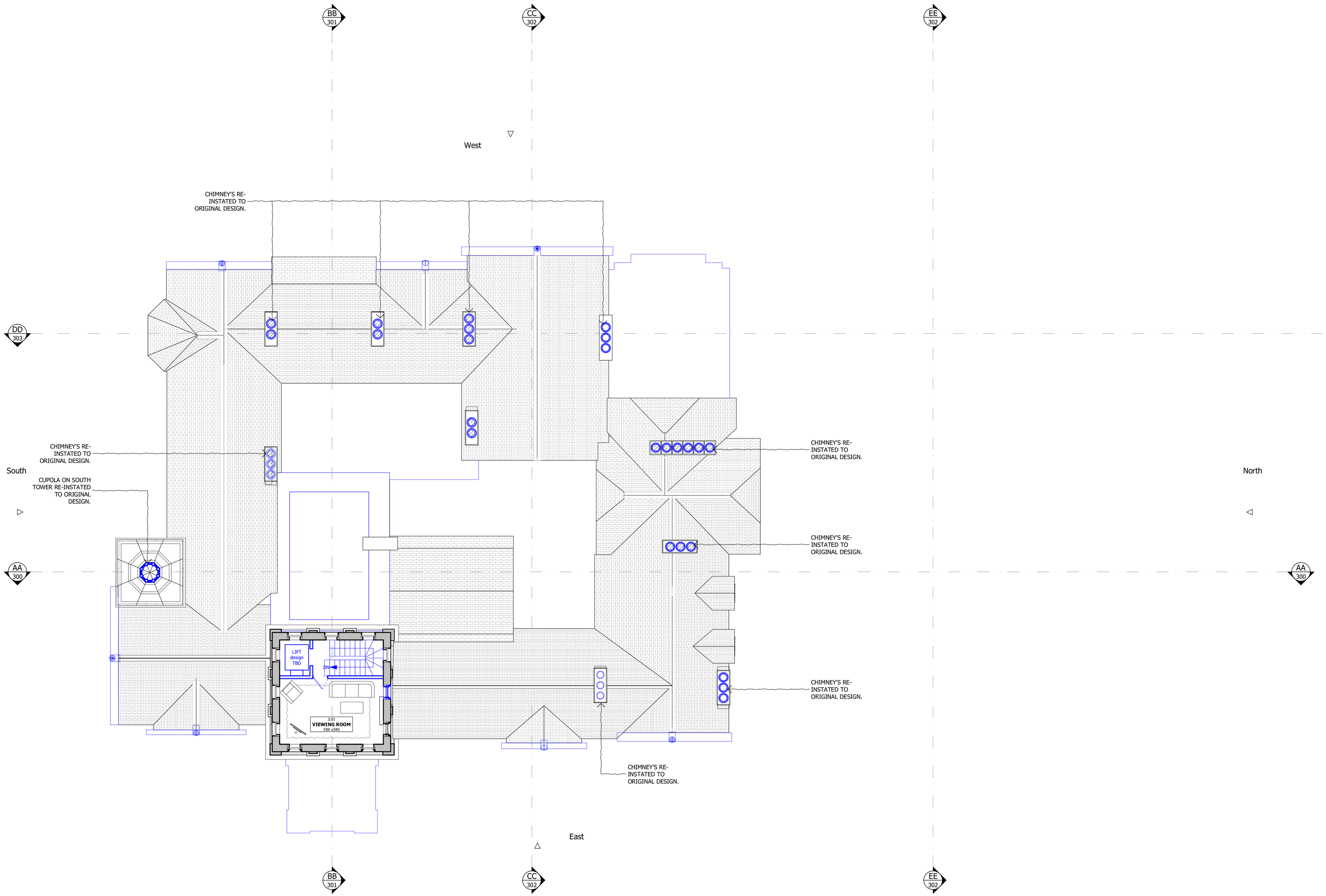
SCALE 1:100 @ A1, 1:200 @ A3

SECOND FLOOR - PROPOSED

(Project number)DWG number_Revision:

(817)023_PL01

Checked:



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0 1 2 3 4 5m

Legends & Notes:

Existing

To be demolished/replaced

Proposed element

Rev	Date	Descriptor	Athr.

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Private Client

Drawing Title:
020 General Arrangements

Third Floor - Proposed

1 SCALE 1:100 @ A1, 1:200 @ A3
THIRD FLOOR - PROPOSED

(Project number)DWG number_Revision: **(817)024_PL01**
Checked: