GROUND INVESTIGATION & BASEMENT IMPACT ASSESSMENT REPORT

39 Rosslyn Hill London NW3 5UJ

Client: Mr J Cohen & Ms A Lindsay

Engineer: Conisbee

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8.0 ADVICE AND RECOMMENDATIONS

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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 site investigation carried out by Geotechnical and Environmental Associates Limited (GEA) on the instructions of Conisbee, on behalf of Mr J Cohen and Ms A Lindsay, with respect to the extension of the existing lower ground floor below part of the rear garden. The purpose of the investigation has been to review previous desk study, ground investigation and Basement Impact Assessment (BIA) reports, to further establish the ground conditions and to provide an assessment of any possible effects of the proposed development on the local hydrogeological and hydrological setting and the stability of the natural and built environment, and to provide an updated BIA in accordance with the guidelines from the London Borough of Camden. Contamination testing did not form part of the project brief.

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 basement may extend below the water table.
- > There will be an increase in the proportion of hard-surfacing.
- Slopes of greater than 7° are present on the site and on neighbouring sites
- > The development will result in differential founding depths with respect to adjacent foundations

GROUND CONDITIONS.

The additional investigation has encountered the expected ground conditions in that, below a nominal thickness of made ground, the Claygate Member was encountered over the London Clay Formation. Below either a layer of concrete or a surface covering of topsoil or artificial grass, made ground was encountered to depths of between 0.40 m and 0.85 m, corresponding to levels of between 80.45 m OD and 84.74 m OD. It generally comprised a matrix of brown silty clay with gravel and fine brick and coal fragments. The Claygate Member was encountered in Borehole No 2 only, which was advanced from the highest level at the southwestern end of the site. It comprised firm pale brown mottled orange-brown silty slightly sandy clay with decayed rootlets, traces of selenite, partings of pale grey silt and fibrous rootlets to a depth of 2.00 m, a level of 82.74 m OD. The underlying London Clay was found to comprise an initial weathered horizon of firm becoming stiff fissured locally thinly laminated high strength brown silty clay with bluish grey veins, partings of pale grey silt, occasional pockets of orange-brown fine sand and selenite crystals, which extended to levels of between 78.76 m OD and 77.85 m OD. The weathered horizon was underlain by typical unweathered London Clay, which comprised stiff becoming very stiff fissured high strength to very high strength dark grey silty clay with occasional partings of pale grey and brownish grey silt and fine sand and traces selenite and was proved to the maximum depth investigated, of 20.45 m (60.85 m OD).

Seepage of groundwater was encountered in Borehole No 1 at a depth of 6.00 m (75.30 m OD) associated with a silt parting, although the borehole was noted to be dry on completion, and in Borehole No 3 at a depth of 2.00 m (80.46 m OD) associated with the presence of a claystone. Subsequent groundwater monitoring recorded variable water levels within the standpipes, which do not represent a continuous groundwater table, but rather perched water trapped within the standpipes.

BIA CONCLUSIONS

Through the results of the additional investigation and on the basis of the proposed development, it has been concluded that the lower ground floor extension will not have an impact on the hydrological or hydrogeological setting. The ground movement analysis has indicated that the predicted damage to the neighbouring properties will be Category 0 'Negligible' and is therefore within acceptable limits, whilst the slope stability analysis has indicated that the existing slope is in a stable condition, with the proposed development likely to provide an increased stability to the slope. There is therefore not considered to be a risk of slope instability and / or structural damage to neighbouring properties up slope from the proposed development.



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

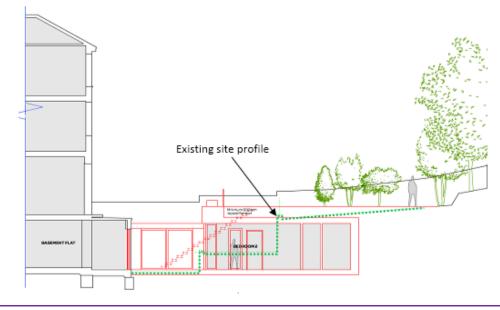
Geotechnical and Environmental Associates (GEA) has been commissioned by Conisbee, the consulting engineers, on behalf of Mr J Cohen and Ms A Lindsay, to carry out a ground investigation at 39 Rosslyn Hill, London NW3 5UJ. This site has previously been the subject of a desk study, ground investigation and Basement Impact Assessment (BIA), with the following reports being produced, which have been provided by Conisbee:

- □ Baseline Desk Study by Environmental Scientifics Group (ESG), Report ref: G4099, dated October 2014;
- □ Site Investigation Report by ESG, Report ref: G4099-14, Dated January 2015;
- □ Basement Impact Assessment Screening and Scoping Report by Conisbee, Report ref: 140321/HH, dated May 2015;

In addition to the above documents, an independent review of the BIA has been carried out by LBH Wembley (Ref: 4315, dated May 2015) on behalf of the London Borough of Camden. GEA has also been commissioned to carry out a review of all of the above documents and produce a revised BIA, in accordance with guidelines from the London Borough of Camden. Contamination testing did not form part of the project brief.

1.1 **Proposed Development**

It is understood that it is proposed to construct a single storey extension to the lower ground floor, which involves excavating further into the slope of the rear garden, beyond the existing concrete retaining walls, as shown by the cross-section of the proposed development 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 reports and BIA documents;
- to confirm the ground conditions and their engineering properties;
- **u** to identify the configuration and bearing stratum of existing foundations;
- □ to assess the possible impact of the proposed development on the local hydrogeology, hydrology and stability of surrounding structures; and
- □ 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 reports and documents, an intrusive ground investigation was carried out which comprised, in summary, the following activities:

- □ a single borehole advanced to a depth of 20.45 m by means of a dismantlable cable percussion drilling rig;
- □ standard penetration tests (SPTs), carried out at regular intervals in the borehole, to provide quantitative data on the strength of the soils;
- a series of three window sample boreholes advanced to a depth of 4.00 m and 5.00 m;
- □ the installation of two groundwater monitoring standpipes, to depths of 5.00 m and 7.00 m, and two subsequent monitoring visits over a four week period;
- \Box three manually excavated trial pits to depths of between 0.40 m and 1.30 m;
- □ laboratory testing of selected soil samples for geotechnical purposes; 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 also 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 CPG4¹ and their Guidance for Subterranean Development² 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



London Borough of Camden Planning Guidance CPG4 Basements and lightwells
 Ove Arup & Partners (2010) Camden geological hydrogeological and hydrologic

Ove Arup & Partners (2010) Camden geological, hydrogeological and hydrological study. Guidance for Subterranean Development. For London Borough of Camden November 2010

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, 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

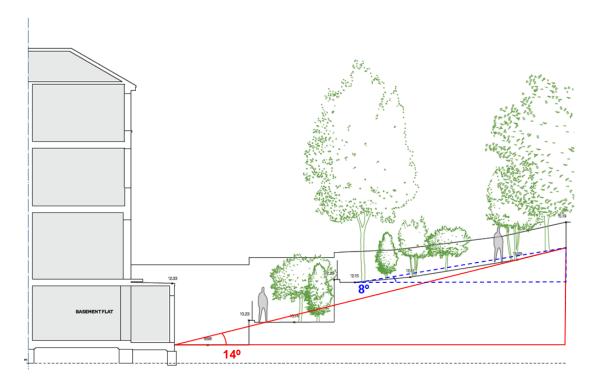
The site is located in Hampstead, northwest London, approximately 425 m to the southwest of Hampstead Heath Railway Station and approximately 530 m southeast of Hampstead London Underground station. It may be additionally located by National Grid Reference 526864,185485 as shown on the map below.

The site covers a rectangular area with maximum dimensions of approximately 32 m northeast-southwest by 13 m northwest-southeast and fronts onto Rosslyn Hill to the northeast. It is bordered to the northwest by No 41 Rosslyn Hill, a three-storey detached property with a lower ground floor, to the southwest by No 30A Thurlow Road, a single storey property, and No 30 Thurlow Road, a four-storey semi-detached property with loft space and a lower ground, to the southeast by No 37 Rosslyn Hill, an adjoining three-storey property with a lower ground floor and to the south by Nos 10b, 10c and 10d Eldon Grove, a terrace of three houses.



The site is currently occupied by No 39 Rosslyn Hill, a three-storey semi-detached property with a lower ground floor that is divided into self-contained apartments. The property that forms the subject of the current investigation comprises the lower ground floor flat, which is at a level of approximately 1.0 m below ground level and includes the rear garden to the property. The front of the building is occupied by a shared accessed communal garden, which is covered in rough grass with planted borders and a concrete paved path that leads down the side of the property for access to the lower ground flat and the associated rear garden. A mature evergreen tree is present in the front garden, which stands at a height of approximately 18 m.

The rear garden, in keeping with the surrounding topography, slopes up to the southwest, with the southwestern boundary elevated above lower ground floor by approximately 4.0 m to 5.0 m. The garden has however been terraced to form three tiers. The lower level is covered in decking at the same level as the lower ground floor, whilst the middle tier is between 1.2 m and 1.5 m higher and covered in artificial grass. The upper tier is approximately 3.5 m above the lower round floor level, but slopes up to the southwestern boundary at an angle of approximately 7° to 9°, as indicated by the existing cross-section and site photographs below. If the terraces had not been formed, the rear garden would form a slope angle of approximately 14°.



The terraces are supported by reinforced concrete retaining walls, with no evidence of slope instability or movement having taken place, although it is clear that soil placed behind the top retaining wall was not backfilled properly as some settlement has taken place. The upper tier is covered in grass with planted borders and includes a number of mature pear trees that stand at heights of up to approximately 12 m, a 12 m high ash tree and a holly tree about 8 m in height.





View down from top terrace.

View of the area behind the top retaining wall.

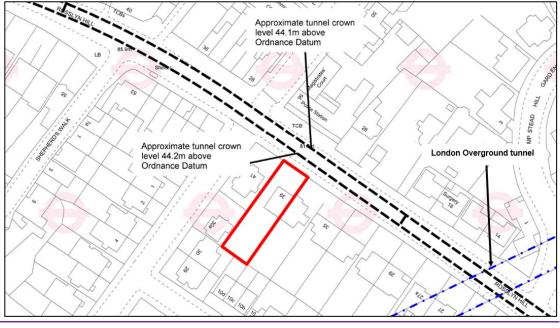
2.2 Summary of Previous Desk Study Findings

The ESG desk study indicates that the existing house had been constructed by the time of the earliest historical Ordnance Survey (OS) map studied, dated 1871. The surrounding area had also mostly been developed in its existing layout at that time, with only minor layout changes occurring throughout the recorded history.

The desk study indicates that there are no historical or existing landfill sites within 1 km of the site and that no substantiated pollution incidents or recorded pollution incidents to controlled waters have occurred within 250 m of the site.

2.3 **Other Information**

The Northern Line London Underground tunnels run below Rosslyn Hill, beyond the northeastern boundary of the site, with a tunnel crown at a level of 44 m OD, approximately 40 m below ground level. A London Overground tunnel is also present approximately 60 m to the southeast of the site, as can be seen by the tunnel location plan below, provided by Transport for London (TfL). The depth of the Overground tunnel is unknown, although is thought to be approximately 20 m below ground level.





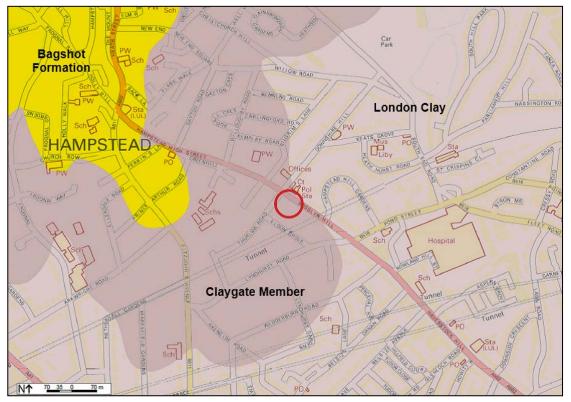
Information on the properties surrounding the site has been gathered by the project architects from the Local Authority planning portal and other sources, the results of which have been supplied to GEA by Conisbee. The results are summarised on the map below with the neighbouring properties along Rosslyn Hill including similar lower ground floor levels to the site, in addition to Nos 29 and 30 Thurlow Road, which also include a lower ground floor level. No 30a Thurlow Road currently has planning permission for a single level basement, although this work has not yet commenced. This property is understood to be currently supported on piled foundations.



2.4 Geology

The British Geological Survey (BGS) map of the area (sheet 256) indicates that the site is underlain by the Claygate Member, as shown by the digital geological map extract overleaf, which also indicates the site to be located close to the boundary with the underlying London Clay.





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 the upper unit of the London Clay is at a level of approximately 80 m OD. The Claygate Member is described in the geological memoir as typically comprising interbedded fine grained sand, silt and clay.

According to the BGS Sheet 256, dated 2006, the site is within an area also shown as having a "Head Propensity". Head propensity is shown on the BGS map as areas denoted as most likely to be covered by Quaternary Head Deposits as interpreted from digital slope analysis and confirmed by borehole data. These deposits are not mapped and have not been verified by fieldwork, but are noted as having properties similar to that of the London Clay and are shown to occur close to the boundary with the overlying Claygate Member.

The previous ESG ground investigation comprised two window sampler boreholes advanced to 6.00 m from the middle and top terraces in the area of the proposed extension. These were supplemented by the manual excavation of three trial pits in order to expose a number of existing foundations. The boreholes encountered a moderate thickness of made ground to depths of 0.70 m (81.73 m OD) and 0.80 m (84.28 m OD), whereupon, what is 'tentatively' interpreted as the Claygate Member was encountered and was proved to the maximum depth investigated (76.43 m OD). The Claygate Member was described as comprising firm to stiff light brown becoming grey slightly fine sandy clay.

2.5 Hydrology and Hydrogeology

The ESG desk study indicates that the Claygate Member is classified on aquifer designation maps 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). The underlying London Clay is classified as a Non-Aquifer and Unproductive Stratum, which refers to a soil



or rock with low permeability that has a negligible effect on local water supply or river base flow.

The previous desk study indicates that the nearest surface water feature is a culvert over 300 m from the site, with the Hampstead Ponds almost 500 m to the northeast. At this distance, the site is not within the catchment of the ponds, as indicated by Figure 14 of the Arup report. The site is not within an area at risk from flooding, as defined by the EA and Rosslyn Hill is not listed within a London Borough of Camden report³ as having suffered from surface water flooding in the past, with Figure 5 of the Arup report indicating that the site is not in an area with the potential to be at risk from surface water flooding.

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 more hydraulically like the underlying London Clay, which accounts for the variable permeability described above.

Existing and historical spring lines are present at the boundary between the Claygate Member and the underlying London Clay, although such springs occur more commonly at the boundary with the Claygate Member and the overlying Bagshot Formation. These springs have been the source of a number of London's "lost" rivers, notably the Fleet, Westbourne and Tyburn. Reference to Figure 11 of the Arup report indicates that the site is not located within 250 m of any springs or former rivers.

Groundwater was not encountered during the drilling of the boreholes or the excavation of the trial pits that were carried as part of the ESG investigation. A groundwater monitoring standpipe was installed in one of the boreholes and two monitoring visits recorded groundwater at depths of 0.60 m (84.48 m OD) and 0.97 m (84.11 m OD).

3.0 SCREENING

The previous answers to the screening questions included in the Conisbee BIA have been reviewed and updated, where necessary, using the results of the previous ESG investigation.

3.1 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 and responses to these questions are tabulated below.

3 London Borough of Camden (2003) Floods in Camden, Report of the Floods Scrutiny Panel



3.1.1 Subterranean (groundwater) Screening Assessment

Question	Response for 39 Rosslyn Hill
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?	Unlikely as the ESG investigation indicated the Claygate Member at the site to comprise a sandy clay, which cannot store or transmit groundwater under normal hydraulic conditions and therefore cannot not support a water table. The ESG monitoring recorded groundwater but further monitoring will be carried out during additional investigation.
2. Is the site within 100 m of a watercourse, well (used/ disused) or potential spring line?	No.
3. Is the site within the catchment of the pond chains on Hampstead Heath?	No.
4. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?	Yes. There will be an increase in area covered by decking and the underlying concrete slab.
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.
- Q1b There is a possibility that the proposed basement will encounter groundwater.
- Q4 There will be a slight increase in the proportion of hard-surfacing.

3.1.2 Stability Screening Assessment

Question	Response for 39 Rosslyn Hill
1. Does the existing site include slopes, natural or manmade, greater than 7°?	Yes. The overall slope would be about 14°, however the slope is terraced and currently retained by mass concrete retaining walls. The remaining slope at the rear of the site, above the retaining walls is approximately 8°.
2. Will the proposed re-profiling of landscaping at the site change slopes at the property boundary to more than 7° ?	No.
3. Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7°?	Yes. The neighbouring properties of Nos 37 and 41 Rosslyn Hill have similar profiles within the rear gardens and therefore the overall slopes would be about 14°.
4. Is the site within a wider hillside setting in which the general slope is greater than 7°?	No. Reference to Figure 16 of the Arup report indicates that the site is not in an area where slopes are generally 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.



Question	Response for 39 Rosslyn Hill
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.
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?	Yes. The extension will be constructed below the founding depths of the western and eastern boundary walls. The proposed founding depth will be lower than the foundations to 30 Thurlow Road, although this building is up slope from the development and includes a lower ground floor level, such that a 45° angle will not intercept the proposed extension. No 30A Thurlow Road is supported on piled foundations such that it will not be affected by the proposed development. No 10d Eldon Grove is at a sufficient distance not to be effected by the proposed development.
14. Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines?	No. A Northern Line underground tunnel is present below Rosslyn Hill and a London Overground tunnel is present 60 m to the southeast, but the area of the proposed development is not located in an exclusion zone.

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

- Q1 Although terraced, the rear garden forms a slope of approximately 14°.
- Q3 Neighbouring properties include a similar slope angle and profile within the rear gardens.
- Q10 The Claygate Member is a Secondary 'A' Aquifer.
- Q13 The founding depth of the proposed extension will be at a lower depth than two of the garden boundary walls.

3.1.3 Surface Flow and Flooding Screening Assessment

Question	Response for 39 Rosslyn Hill
1. Is the site within the catchment of the pond chains on Hampstead Heath?	No. Figure 14 of the Arup report confirms that the site is not located within this catchment area.
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. The lower ground floor extension will largely be beneath the footprint of the existing decking and artificial grass which are positively drained to the sewer system. Therefore, the existing drainage regime will remain the same. Whilst the extension will also extend into the permeable garden area, there will be 600 mm of topsoil between the roof of the extension and the ground surface thus maintaining the infiltration capacity of the soil.
3. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?	Yes. There will be an increase in area covered by decking and the underlying concrete slab.



Question	Response for 39 Rosslyn Hill
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. The lower ground floor extension will largely be beneath the footprint of the existing decking and artificial grass which are positively drained to the sewer system. Therefore, the existing drainage regime will remain the same. Whilst the extension will also extend into the permeable garden area, there will be 0.6m of topsoil between the roof of the extension and the ground surface thus maintaining the infiltration capacity of the soil.
5. Will the proposed basement result in changes to the quantity of surface water being received by adjacent properties or downstream watercourses?	The proposals are very unlikely to result in any changes to the quality of surface water being received by adjacent properties or downstream watercourses as the surface water drainage regime will be unchanged.
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?	No. The Camden Flood Risk Management Strategy dated 2013, together with Figures 3iii, 4e, 5a and 5b of the SFRA dated 2014, and Environment Agency online flood maps show that the site has a very low flooding risk from surface water, sewers, reservoirs (and other artificial sources), groundwater and fluvial/tidal watercourses. In accordance with paragraph 5.11 of the CPG a positive pumped device will be installed across the lower ground floor in order to further protect the site from sewer flooding. The site is not located within a Critical Drainage Area or a Local Flood Risk Zone, as identified in the Camden SWMP and Updated SFRA Figure 6/Rev 2.

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

Q3 There will be a slight increase in the proportion of hard-surfacing.

4.0 SCOPING AND SITE INVESTIGATION

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.

4.1 **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 proposed basement extends beneath the water table surface	The previous ESG investigation measured groundwater at depths of 0.60 m and 0.97 m within what was described as the Claygate Member and therefore it is possible that the basement excavation will extend below the water table. Should this happen, the basement structure is capable of diverting groundwater flow such that groundwater level is affected on both the up slope and down slope side of the basement structure. This in turn has the potential to affect the local hydrogeology and any adjacent structures.



There will be an increase in the proportion of hard-surfacing	An increase in hardstanding across a site, particularly as a result of covering highly permeable areas, can reduce the rate of infiltration of rainwater and increase surface run-off. If adequate drainage is therefore not installed to intercept and dispose of the increased run-off, it can lead to surface water ponding on the site, with the possibility of surface water flow being diverted into neighbouring sites.
The site contains slopes of greater than 7°. The site neighbours land that include slopes of greater than 7°.	Previous case studies of slopes within the Claygate Member and London Clay have generally been found to be stable in the long-term at angles of between 8° and 10°. Slopes greater than this therefore may be prone to slope failure unless adequately retained. Should slope failure occur, it may give rise to the damage of nearby property and infrastructure. It should be noted that, whilst the site is indicated on Figure 17 to be located in an area of landslide potential, there is no evidence of slope movement within the general area or within the site itself, with slope currently retained by a series of retaining walls.
The development will increase the differential founding depth	Should the design of retaining walls and foundations not take into account the configuration and bearing stratum of adjacent foundations, it may lead to the structural damage of associated structures.

An independent review of the BIA previously carried out by Conisbee has been undertaken by LBH Wembley, and concluded that further information and investigation was required on the groundwater regime and on potential ground movements, including slope stability, that may arise from the proposed development. Further investigation, as detailed below, has therefore been carried out in order to address these outstanding requirements and the above highlighted potential impacts.

4.2 Exploratory Work

In order to meet the objectives described in Section 1.2, to investigate the potential impacts identified by the BIA screening and to address the outstanding elements raised by the independent BIA review, a single borehole was drilled to a depth of 20.45 m using a dismantlable cable percussion drilling rig. Standard penetration tests (SPTs) were carried out at regular intervals in the boreholes and disturbed and undisturbed samples were recovered for subsequent laboratory examination and testing. The deep borehole was supplemented with a series of three window sampler boreholes advanced to depths of 4.00 m and 5.00 m, in order to provide further coverage of the area of the proposed lower ground floor extension and to confirm the shallow ground conditions.

Groundwater monitoring standpipes were installed in two of the boreholes, to depths of 5.00 m and 7.00 m and have subsequently been monitored, in addition to the standpipe installed as part of the previous ESG investigation, on a two occasions over a one-month period. During the second monitoring visit, a rising head test was carried in the standpipe installed as part of the previous ESG investigation

In addition to the boreholes, a series of three trial pits was manually excavated in order to determine the configuration of the foundations to a number of the existing boundary walls between neighbouring properties.

The borehole and trial pit records and results of the rising head test and laboratory analyses are appended, together with a site plan indicating the exploratory positions. The Ordnance Datum (OD) levels shown on the borehole records have been interpolated from spot heights shown on a site plan (reference 1411_1-011, dated August 2014), which was provided by



Conisbee. The spot heights shown on the site survey drawing are relative to an arbitrary datum, where 0 m OAD related to 72.33 m OD.

4.3 Sampling Strategy

The deep borehole was positioned at lower ground floor level on the decking area directly to the rear of the existing building and in the area of the proposed extension. The window sample boreholes were located to provide additional coverage of the development and were constructed through the existing terraces, one on the highest tier of the site and the other two on the middle tier. As the standpipe installed within the ESG investigation was found to be intact at the top of the site, groundwater monitoring standpipes were installed in one of the boreholes from the middle tier and within the cable percussion borehole at lower ground floor level.

Two of the trial pits were positioned adjacent to the rear boundary wall of the site, between No 10d Eldon Grove and No 30 Thurlow Road, which was not previously investigated. A third trial pit was excavated adjacent to the boundary wall with No 30A Thurlow Road to confirm the foundation configuration identified in the ESG investigation. All of the exploratory locations were positioned on site by an engineer from GEA as to avoid known buried services.

A number of disturbed samples recovered from the boreholes were submitted to a geotechnical laboratory for a programme of testing that included moisture content and Atterberg limit tests, undrained triaxial compression tests and soluble sulphate and pH level analysis.

5.0 GROUND CONDITIONS

The investigation has encountered the expected ground conditions in that, below a nominal thickness of made ground, the Claygate Member was encountered over the London Clay Formation.

5.1 Made Ground

Borehole No 1 was advanced through the existing decked area, with the decking found to be laid over a 200 mm void, below which a 350 mm concrete slab was present and was reinforced with 6 mm reinforcement. Below the concrete and below either a surface covering of topsoil or artificial grass in the other boreholes, made ground was encountered to depths of between 0.40 m and 0.85 m, corresponding to levels of between 80.45 m OD and 84.74 m OD. It generally comprised a matrix of brown silty clay with gravel and fine brick and coal fragments.

With the exception of notable fragments of extraneous material, no visual or olfactory evidence of significant contamination was observed within these soils. Contamination testing however did not form part of the project.

5.2 Claygate Member

Soils interpreted as comprising the Claygate Member were encountered in Borehole No 2 only, which was advanced from the highest tier at the southwestern end of the site. This stratum comprised firm pale brown mottled orange-brown silty slightly sandy clay with decayed rootlets, traces of selenite, partings of pale grey silt and fibrous rootlets to a depth of



2.00 m, a level of 82.74 m OD. The location of the boundary between the Claygate Member and underlying upper facies of the London Clay Formation can be difficult to identify as the lithologies have very similar compositions and material properties. It is therefore possible that these soils may form part of the London Clay, but as the geological map indicates the site to be on the boundary between the Claygate Member and the London Clay, and as from nearby borehole data the boundary is expected to be between 85 m OD and 80 m OD, it is thought that these soils form the base of the Claygate Member.

These soils were found to be free from the evidence of contamination and the results of Atterberg Limit tests indicate the clay to be of moderate shrinkability, with a plasticity index of 32%.

5.3 London Clay Formation

This formation was found to comprise an initial weathered horizon of firm becoming stiff fissured locally thinly laminated high strength brown silty clay with bluish grey veins, partings of pale grey silt, occasional pockets of orange-brown fine sand and selenite crystals, which extended to the maximum depth investigated in Borehole No 2, of 5.00 m (79.74 m OD) and to depths of between 3.45 m and 3.80 m, levels of between 78.76 m OD and 77.85 m OD, in the other boreholes

The weathered horizon was underlain by typical unweathered London Clay, which comprised stiff becoming very stiff fissured high strength to very high strength dark grey silty clay with occasional partings of pale grey and brownish grey silt and fine sand and traces of selenite and was proved to the maximum depth investigated, of 20.45 m (60.85 m OD).

These soils were found to be free from the evidence of contamination and of high shrinkability, with plasticity indices of between 41% and 45%. The results of quick undrained triaxial compression tests indicate the clay to increase in strength with depth from high strength and an undrained shear strength of 80 kPa to very high strength and an undrained shear strength of 153 kPa. A number of the triaxial tests yielded lower results than would be expected and it would appear that this was due to failure occurring along pre-existing fissures or being induced by the presence of silt and sand partings.

5.4 Groundwater

Seepage of groundwater was encountered in Borehole No 1 at a depth of 6.00 m (75.30 m OD) associated with a silt parting, although the borehole was noted to be dry on completion, and in Borehole No 3 at a depth of 2.00 m (80.46 m OD) associated with the presence of a claystone. Monitoring of the standpipes installed in Borehole Nos 1 and 3, in addition to the previous WS1 ESG borehole, has been carried out on two occasions over a one month period and the results are shown in the table below.

Date	Borehole No	Depth to water (m) [Level (m OD)]
14/09/2015	1	Not Monitored
	3	0.60 [81.86]
	ESG-WS1	2.23 [82.85]
5/10/2015	1	2.16 [79.14]
	3	0.60 [81.86]
	ESG-WS1	2.23 [82.85]



The measured groundwater levels vary considerably and therefore the water levels recorded are not considered to represent a continuous groundwater level. In order to provide an indication of the rate of any groundwater inflows, a rising head test was carried out in the ESG borehole WS1. The head of water was reduced by 1.50 m using a water bailer and over a period of two hours, the groundwater level did not rise. The result of the rising head test is included in the appendix.

5.5 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	Rear boundary wall between No 10d Eldon Grove	Concrete strip Top 200mm below ground level (bgl) Base 0.60m bgl (85.60m OD) Lateral projection 100mm	MADE GROUND
2	Northern boundary wall between 30A Thurlow Road	Concrete strip Top 1.10 m bgl (84.02 m OD) Base 1.30 m bgl (83.82 m OD) Lateral projection 180 mm	Firm brown silty slightly sandy clay CLAYGATE MEMBER
3	Rear boundary wall with No 30 Thurlow Road	Concrete strip Top 150 mm bgl Base 0.25 m bgl (85.74 m OD) Lateral projection 300 mm	MADE GROUND

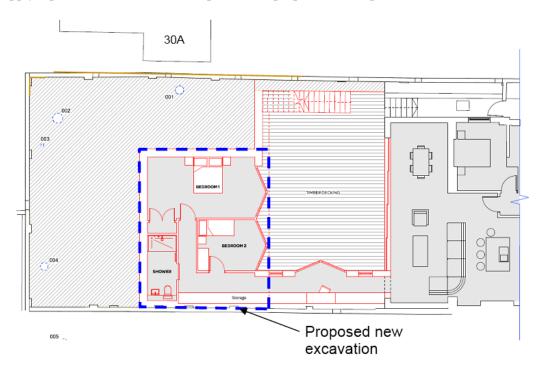


Part 2: DESIGN BASIS REPORT

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.

6.0 INTRODUCTION

It is understood that it is proposed to construct a single storey extension to the lower ground floor, which involves excavating further into the slope of the rear garden, beyond the existing concrete retaining walls. New wall loads along the proposed retaining walls are understood to be in the order of between 77 kN/m and 158 kN/m, whilst the proposed raft foundation will apply a pressure of 20.5 kN/m². A plan of the proposed development is shown below.



7.0 GROUND MODEL

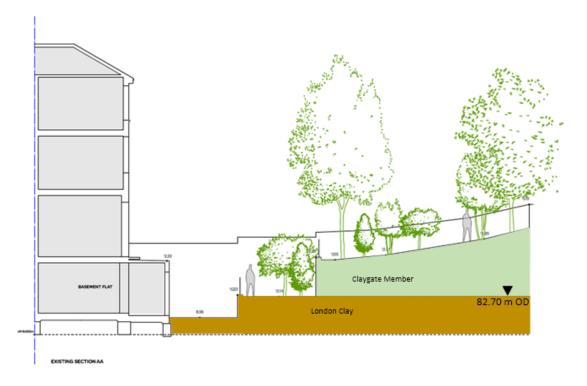
On the basis of the intrusive investigations, the ground conditions at this site can be characterised as follows and are shown in the cross-section overleaf:

- □ below a generally nominal thickness of made ground, the Claygate Member overlies the London Clay;
- □ made ground extends to depths of between 0.40 m and 0.85 m, levels of between 80.45 m OD and 84.74 m OD;
- □ the Claygate Member is only present below the southwestern portion of the garden to a level of 82.74 m OD and comprises firm pale brown mottled orange-brown silty



slightly sandy clay;

- □ the London Clay is present below the Claygate Member to the maximum depth investigated, of 20.45 m (60.85 m OD);
- □ groundwater monitoring indicated groundwater at levels of 79.14 m OD and 82.85 m OD, although rather than indicating a continuous groundwater table, the water levels are considered to represent perched groundwater within the standpipes; and
- □ groundwater seepages do occur within the London Clay associated with claystones and silt partings.



8.0 ADVICE AND RECOMMENDATIONS

It is understood that the proposed lower ground floor extension will require a 6.00 m lateral excavation into the existing slope at the same level as the existing lower ground floor and associated decking (81.30 m OD). This will also include the excavation of a 1.00 m thickness of soil that currently forms the middle terrace. It is also understood that it is proposed that the new structure will be supported on a raft foundation

8.1 Excavation

The formation level for the extension will be within the London Clay at a level of approximately 81.30 m OD. On the basis of the groundwater observations to date, perched groundwater inflows, as indicated by the monitoring to date are likely to be encountered in the excavation. As indicated by the rising head test carried out during the investigation, such inflows are considered to be relatively slow and not prolonged, such that they should be adequately dealt with using conventional methods.



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. In this respect the stability of the neighbouring properties and the existing slope will be paramount.

It is likely that most appropriate method of constructing the retaining walls will be the combination of localised conventional concrete underpinning of the existing garden boundary walls and a bored pile wall. As discussed above, perched groundwater may be encountered although these inflows should be adequately dealt with using sump pumping. It would however be prudent for the chosen contractor to have a contingency plan in place to deal with more significant inflows as a precautionary measure. The use of underpinning will require the soils being underpinned to stand unsupported and difficulties may be encountered with unsupported excavations in the made ground, particularly where groundwater is encountered. However the trial pits excavated during the investigation did not encountered groundwater and did not indicate major instabilities in the made ground.

On the basis of the monitoring results to date, the use of a contiguous bored pile wall should be suitable, with localised grouting between piles to prevent any minor inflows. The noise and vibrations associated with the installation of sheet piles is likely to render their use as a temporary retaining wall unacceptable.

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 stability of the existing foundations will need to be ensured at all times and the retaining walls will need to be designed to support the loads from these foundations unless they are underpinned. Careful workmanship will be required in the construction of the underpins and it is recommended that a suitable specialist contractor is consulted in this respect. It is also paramount that the retaining wall along the rear elevation of the proposed excavation is designed to maintain the stability of the existing slope. In this respect, the wall will need to be installed prior to any excavation or modification to the slope profile taking place. The stability of the slope is however considered further in Part 3 of this report.

8.1.1 Retaining Walls

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

Stratum	Bulk Density (kg/m³)	Effective Cohesion (c' – kN/m²)	Effective Friction Angle $(\Phi' - degrees)$
Made ground	1700	Zero	27
Claygate Member	1900	Zero	25
London Clay	2000	Zero	25

Significant groundwater inflows are unlikely to be encountered within the excavation, although monitoring of the standpipe should be continued in order to establish equilibrium levels. At this



stage, it is recommended that for the design of the retaining walls, that groundwater level should be assumed to be ³/₄ of the retained height, unless the risk of groundwater and surface water collecting behind the retaining walls can be suitably mitigated through the use of the use of a fully effective drainage system. The advice in BS8102:2009⁴ should be followed in the design of the basement retaining walls and with regard to waterproofing requirements.

8.1.2 Heave

The proposed development will require a maximum excavation depth of approximately 3.00 m, which will result in a net unloading of around 60 kN/m^2 . The excavation of an approximately 1.0 m thickness of soil from the lowering of the existing middle terrace will result in unloading of approximately 20 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 structures. Further consideration is given to heave movements in Part 3 of this report.

8.2 **Piled Foundations**

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, or alternatively the use of bored piles installed using continuous flight auger (cfa) techniques, which would not require the provision of casing, would also be an 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.

Stratum	Level m OD	kN / m²	
	Ultimate Skin Friction		
Made Ground and Claygate Member	All soil above 81.00	Ignore (Basement excavation)	
London Clay (clay – α = 0.5)	81.00 to 61.00	Increasing linearly from 35 to 75	
Ultimate End Bearing			
Claygate Member	69.00 to 61.00	Increasing linearly from 963 to 1350	

In the absence of pile tests, guidance from the London District Surveyors Association (LDSA)⁵ suggests that a factor of safety of 2.6 should be applied to the above coefficients in the computation of safe theoretical working loads. On the basis of the above coefficients it has been estimated that a 300 mm diameter pile extending to 69.00 m OD, approximately 12.00 m below lower ground level, should provide a safe working load of about 215 kN, whereas the same diameter pile extending to 72.00 m OD, approximately 15.00 m below lower ground level should provide a safe working load of approximately 300 kN. Alternatively a 450 mm diameter pile founding at 20.00 m, a toe level of 61 m OD, should provide about 670 kN.



⁴

BS8102 (2009) Code of practice for protection of below ground structures against water from the ground LDSA (2009) Foundations No 1 – Guidance notes for the design of straight shafted bored piles in London Clay. LDSA Publications

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 an appropriate piling scheme and their attention should be drawn to potential groundwater inflows within the made ground and silt and sand partings within the London Clay.

8.3 Effect of Sulphates

Generally moderate concentrations of total sulphate have been measured in samples of the made ground and therefore indicate that buried concrete should be designed in accordance with Class DS-2 conditions of Table C2 of BRE Special Digest 1: SD1 Third Edition (2005). The measured pH conditions are mildly alkaline 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.

These recommendations will also be reviewed upon completion of sulphate and pH level testing on samples of natural soil.



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.

9.0 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.

9.1 **Construction Sequence**

The following sequence of operations has been taken from drawings SSK003, SSK004 and SSK005, all dated October 2015, issued by Conisbee. It has been used to enable analysis of the ground movements around the excavation both during and after construction.

In general, the sequence of works for excavation and construction will comprise the following stages.

- 1. Construct retaining wall along the boundary with No 37 Rosslyn Hill through underpinning garden boundary wall with maximum 1.0 m wide underpins in a 'hit and miss' construction sequence. The 'hit and miss' sequence is typically formed by using a trench box excavation, commonly sheet lined, shored and strutted; all temporary shoring and propping to be inspected by a suitably qualified person.
- 2. Installation of contiguous bored piled wall to form temporary retaining walls running parallel to the boundary wall with No 30A Thurlow Road and the rear of the excavation, parallel to rear boundary wall.
- 3. Reduced dig and install blocks and props.
- 4. Second underpins formed along the boundary with No 37 with maximum 1.0 m wide underpins, followed by further reduced dig and additional props formed.
- 5. Ground slab cast with starter bars for permanent retaining walls.
- 6. Permanent concrete retaining walls formed and cast, top slab formed and cast and props removed once the concrete is at a sufficient strength.

The underpins should be adequately laterally propped and sufficiently dowelled together, with the concrete cast and adequately cured prior to excavation of the basement and removal of the formwork and supports.



The detail of the support provided to adjacent walls is beyond the scope of this report at this stage and the structural engineer will be best placed to agree a methodology with the underpinning contractors once appointed.

10.0 GROUND MOVEMENTS

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

The X-Disp program has been used to predict ground movements likely to arise from the construction of the proposed basement. This includes the settlement of the ground (vertical movement) and the lateral movement of soil behind the proposed retaining walls (horizontal movement).

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 northeast-southwest, whilst the y-direction is parallel with the orientation of northwest-southeast. 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.

10.1 Ground Movements Surrounding the Basement

For the X-Disp analysis, the soil movement relationships used for the embedded retaining walls are the default values within CIRIA report $C580^6$, which were derived from a number of historic case studies.

The ground movement curves for 'excavations in front of high stiffness wall in clay' have been adopted as being considered most appropriate for the proposed excavation and its support at this site.

The ground movement curves for 'installation of a planar diaphragm wall in stiff clay' have been adopted as being considered most appropriate for the proposed underpin phase at this site, whilst the ground movement curves for 'installation of contiguous bored pile wall in stiff clay' have been adopted for the proposed contiguous bored pile wall sections.

The results are presented to the degree of accuracy required to allow predicted variations in ground movements around the structure(s) to be illustrated, but may not reflect the anticipated accuracy of the predictions.

The predicted movements are based on the worst case of the individually analysed segments of 'hogging' and 'sagging' and are summarised in the table below.



⁶ Gaba, A, Simpson, B, Powrie, W and Beadman, D (2003) *Embedded retaining walls – guidance for economic design*.CIRIA Report C580.

Phase of Works	Wall Movement (mm)		
	Vertical Settlement	Horizontal Movement	
Combined underpin and contiguous bored pile wall installation	<5	<5	
Combined Movements	9	16	

The analysis has indicated that the maximum vertical and horizontal settlements that will result from underpin and contiguous piled wall installation are less than 5 mm. The movements arising from the combined underpin / contiguous piled wall and excavation are therefore not likely to exceed 10 mm vertical settlement, whilst the maximum horizontal movements are also anticipated to be less than 20 mm.

The movements set out in the table above are the maximum movements and generally occur immediately or just outside the line of the piled wall; the effects of the excavation reduce with distance away from the piled wall. For the example combined movements of between 6 mm to 10 mm occur at foundation level below No 30A Thurlow Road, while combined movements of between 4 mm to 8 mm occur at foundation level below No 30 Thurlow Road and 10d Eldon Crescent. Less than 10 mm of both combined vertical and horizontal movement occur along the existing retaining wall at the boundary with 30 Thurlow Road and 10d Eldon Grove.

For the purpose of the analysis the retaining wall parallel to No 30A Thurlow Road has been modelled using the movement curves for 'installation of contiguous bored pile wall in stiff clay'. However, only a 4.0 m stretch of this wall will be formed using a contiguous bored pile wall, with the remainder formed by essentially underpinning. Due to the limitations of the software, it is not possible to model both forms of installation along the same line and therefore the contiguous bored pile wall movement curves have been adopted in order to provide a worst case scenario.

Taking the above into account, in reality the movements along the northern extent of the proposed excavation would be expected to be less than those shown by the analysis, with the overall general movements resulting from the excavation likely to be somewhat less, as they will be minimised due to control of the propping in the temporary works and a regime of monitoring.

10.2 Ground Movements within the Excavation (Heave)

Unloading of the London Clay 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 drained and undrained stiffness respectively, to values of undrained cohesion,



as described by Padfield and Sharrock⁷ and Butler⁸ and more recently by O'Brien and Sharp⁹. 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 data¹⁰ 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 3.0 m thickness of soil across the majority of the proposed extension will result in a net unloading of roughly 60 kN/m^2 , whilst where only a 1.0 m excavation is required to form the extension, an unloading of approximately 20 kN/m^2 will occur, assuming a unit weight of 20 kN/m^3 for the London Clay and 19 kN/m^2 for the Claygate Member.

A rigid boundary for the analysis has been set at a depth of 60.0 m below the proposed excavation, 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 16 mm within the centre the excavation and reducing to between 5 mm and 8 mm toward the edges. These movements would be expected to be complete by the end of the excavation and construction period. Taking into account the loads of the proposed extension, the analysis has shown that in the 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 between 3 mm and 5 mm, whilst across the western half of the excavation, where the majority of the load from the proposed structure will be applied, between 1 mm and 4 mm settlement will take place below new foundations.

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 to 3 mm of heave, whilst beyond the western extent 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 negligible and will not have detrimental impact on any surrounding structures.

	Movement (mm)		
Location	Short-term Movement (Excavation Phase)	Total Movement	
Centre of new deep excavation	16 (heave)	1 to 3 (heave)	
Edge of excavations	5 to 10 (heave)	1 to 4	

The potential movements are summarised in the table below.

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 30% to 40% of the total unloading pressure.



⁷ Padfield CJ and Sharrock MJ (1983) *Settlement of structures on clay soils*. CIRIA Special Publication 27

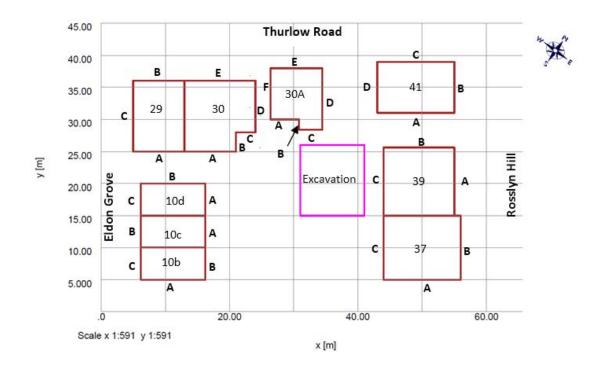
Butler FG (1974) *Heavily overconsolidated clays: a state of the art review.* Proc Conf Settlement of Structures, Cambridge, 531-578, Pentech Press, Lond

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

¹⁰ 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

11.0 DAMAGE ASSESSMENT

In addition to the above assessment of the likely movements that will result from the proposed development, some of the neighbouring structures have been considered as sensitive structures, requiring Building Damage Assessments, on the basis of the classification given in Table 2.5 of C580¹. The sensitive structures outlined above have been modelled as lines in the analysis and are the lines along which the damage assessment has been undertaken. A plan of the sensitive structures is provided below, and a key plan detailing the specific lines is included in the Appendix.



For the purpose of the analysis the below assumptions were made:

- □ ground level has been assumed to be the level of the highest from which excavation will take place, at a level of 84.33 m OD, in order to keep the models consistent with each other with regard to excavation depth and assumed founding levels of the existing foundations to neighbouring structures;
- neighbouring properties were drawn in the analysis from drawings '1411_L_001' and 1411_1-011, which were drawn by Square Feet Architects and provided by Conisbee;
- □ founding levels of neighbouring properties have been assumed from information provided by Conisbee and on the basis of the heights and approximate age of the buildings.
- □ the excavation founding level is 81.30 m OD as provided by Conisbee; and
- □ building heights have been derived from drawing '1411_L_015, which was drawn by Square Feet Architects and provided by Conisbee.



11.1 Damage to Neighbouring Structures

The combined short term movements resulting from both retaining wall installation and basement excavation calculated using the X-Disp modelling software have been used to carry out an assessment of the likely damage to adjacent properties and the results are summarised in the table below. The detailed tabular output is included in the Appendix alongside a key plan for reference.

Building Damage Assessment		
Sensitive Structure	Elevation	Category of Damage*
	А	0 (Negligible)
10b Eldon Grove	В	0 (Negligible)
100 Eldon Grove	С	0 (Negligible)
	Party Wall with No 10c	0 (Negligible)
	А	0 (Negligible)
10c Eldon Grove	В	0 (Negligible)
	Party Wall with No 10b	0 (Negligible)
	Party Wall with No 10d	0 (Negligible)
	А	0 (Negligible)
10d Eldon Grove	В	0 (Negligible)
100 Eldon Grove	С	0 (Negligible)
	Party Wall with No 10c	0 (Negligible)
	А	0 (Negligible)
29 Thurlow Road	В	0 (Negligible)
23 munow Road	С	0 (Negligible)
	Party Wall with No 30	0 (Negligible)
	А	0 (Negligible)
	В	0 (Negligible)
30 Thurlow Road	С	0 (Negligible)
So manow Nodu	D	0 (Negligible)
	E	0 (Negligible)
	Party Wall with No 29	0 (Negligible)



Building Damage Assessment		
Sensitive Structure	Elevation	Category of Damage*
	А	0 (Negligible)
	В	0 (Negligible)
30A Thurlow Road	C	1 (Very Slight)
SUA HIUHUW KUdu	D	2 (Slight)
	E	0 (Negligible)
	F	0 (Negligible)
	А	0 (Negligible)
41 Decelue Hill	В	0 (Negligible)
41 Rosslyn Hill	C	0 (Negligible)
	D	0 (Negligible)
	А	0 (Negligible)
20 Deselver Hill	В	0 (Negligible)
39 Rosslyn Hill	C	0 (Negligible)
	Party Wall with No 37	0 (Negligible)
	А	0 (Negligible)
27 Detakur Hill	В	0 (Negligible)
37 Rosslyn Hill	C	0 (Negligible)
	Party Wall with No 39	0 (Negligible)

*From Table 2.5 of C580¹: Classification of visible damage to walls.

The building damage reports for sensitive structures, highlighted in the above table, predict that the damage to the neighbouring structures would generally be Category 0 (Negligible) and therefore within acceptable limits. There is a single area, along the elevations C and D of 30A Thurlow Road, which are indicated by the assessment to fall within Category 1 (very slight) and Category 2 (Slight) respectively. However, this building is founded on a piled raft foundation and therefore this building will not be sensitive to the ground movements that might arise from the construction and excavation of the proposed development.

11.2 Monitoring of Ground Movements

The predictions of ground movement based on the ground movement analysis should be checked by monitoring of adjacent properties and structures. Condition surveys of the above existing structures should be carried out before and after the proposed works.

The precise monitoring strategy will be developed at a later stage and it will be subject to



discussions and agreements with the owners of the adjacent properties and structures. Contingency measures will be implemented if movements of the adjacent structures exceed predefined trigger levels. Both contingency measures and trigger levels will need to be developed within a future monitoring specification for the works.

12.0 SLOPE STABILITY

The answers to the stability screening questions in Section 3.1.2 identified the need to carry out an assessment of the potential impact of the proposed development on the stability of the existing slope and therefore the structural stability of the properties positioned up slope from the proposed development, in particular No 10d Eldon Grove and No 30 Thurlow Road. An analysis has therefore been carried out using the GeostudioTM 2007 Slope/W[©] software and is based on recognised correlations between site specific data and commonly accepted input parameters, using the Bishop-Janbu effective stress slip circle failure mechanism.

At present the slope is well vegetated with established mature trees and shows no sign of any previous movement, in particular there is no sign of damage to the existing retaining walls, which are considered to be performing adequately. The slope is therefore considered to be stable. Conservative soil parameters have been used for the Claygate Member and London Clay, in addition to assuming a theoretical groundwater table of approximately 1.00 m below ground level, which also provides a conservative approach.

Modelling of the existing profile has shown the overall slope to be stable with a factor of safety (FOS) of 1.3. This would be considered to be an adequate FOS despite taking a conservative approach, particularly with regard to the loads applied by the existing building at the toe of the slope and the effects of the existing retaining walls. Although the retaining walls have been placed within model, as the founding depths are not known, the self-weight of the walls have been applied at a shallow depth. In reality, these are going to be much deeper, providing greater stability to the slope.

Using the same conservative parameters and assumptions, the analysis of the re-profiled slope, based upon the layout of the proposed development, has indicated that no slip circles are likely to form beneath the level of the proposed extension and through the slope as a whole, with an increased FOS of 1.4. As with the initial analysis of the existing slope, the conservative approach to the model means that the actual FOS of the slope, post development, is likely to be much higher, particularly as conservative new loads of the proposed extension into the slope were used in the analysis. The proposed development is therefore considered to be provide an increased stability to the slope and will therefore not have an impact on the properties up slope of the development.

13.0 CONCLUSIONS

The ground movement analysis has concluded that the predicted damage to the neighbouring properties would generally be 'Negligible'. On this basis, the damage that would inevitably occur as a result of such an excavation would fall well within the acceptable limits. It is recommended that movement monitoring is carried out on all structures prior to and during the proposed excavation and construction.

The separate phases of work, including excavation of the proposed maximum 3.0 m thickness of soil, will in practice be separated by a number of weeks during which time construction of permanent supports, basement slab and underpin curing will take place. This will provide an



opportunity for the ground movements during and immediately after underpin and contiguous piled wall construction to be measured and the data acquired can be fed back into the design and compared with the predicted values. Such a comparison will allow the ground model to be reviewed and the predicted wall movements to be reassessed prior to the main excavation taking place so that propping arrangements can be adjusted if required.

The slope stability analysis has indicated that the existing slope is in a stable condition, with the proposed development likely to provide an increased stability to the slope. There is therefore not considered to be a risk of slope instability and therefore potential structural damage to the properties positioned up slope from the development.

14.0 BASEMENT IMPACT ASSESSMENT

The screening identified a number of potential impacts. The 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 located on the boundary between the Claygate Member and the London Clay, such that the Claygate Member is only present below the higher level of the site, in the southwestern half of the rear garden. The Claygate Member in any case comprises a sandy clay and therefore behaves more hydraulically like the underlying London Clay. A continuous groundwater table has not been encountered below the site, as discussed below.
The proposed basement extends beneath the water table surface	Seepages of groundwater were encountered in the London Clay associated with a claystone and silt parting, although at depths of 2.00 m and 6.00 m, levels of 75.30 m OD and 81.46 m OD, below the level of the proposed development of 81.32 m OD. Groundwater was measured in the standpipes, although it is clear that a continuous groundwater table is not present and therefore the proposed development will not have an effect on the hydrogeological setting.
There will be an increase in the proportion of hard-surfacing	Although the majority of the area currently covered in artificial grass will be replaced with a concrete slab and decking, resulting in an increase in the proportion of hardstanding, this area is currently drained using a land drain that feeds into the main sewer. This remain the case as the decking area will continue to be collected by combined drains such that an increase in surface run-off will not occur. Furthermore, the proportion of the permeable area will remain and actually slightly be increase with the provision of a green roof made up of a 600 mm thickness of permeable material.
The site contains slopes of greater than 7°.	The slope stability analysis has indicated that the existing slope is suitability retained and stable and that the proposed development will actually increase the stability of the slope, preventing slope failure and the potential for structural
The site neighbours land that include slopes of greater than 7°.	damage to occur to the properties positioned up slope.
The development will increase the differential founding depth	The investigation has indicated that the northern and southern boundary walls are currently founded on



conventional strip foundations bearing on the Claygate Member. As it is proposed to underpin these foundations as part of the construction, this will prevent differential founding depths and maintain structural stability. This has been confirmed by the results of the ground movement analysis which has indicated that any building damage is likely to be Category 0 and negligible.

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 investigation has indicated that the site is located on the boundary between the London Clay and Claygate Member, such that only the southwestern part of the existing garden, across the higher level, is underlain by the Claygate Member, whilst the remaining areas of the site is directly underlain by the London Clay, which is designated as a Non-Aquifer. A continuous groundwater table has not been encountered during the investigation, with groundwater not encountered within the Claygate Member during the drilling of the boreholes and only seepages of groundwater encountered in the London Clay associated with a claystone and silt parting. These were however encountered at depths below the formation level of the proposed extension.

Groundwater was measured in the standpipes, although rising head tests indicate no recharge rate, suggesting that the levels measured were as a result of the building up of surface water inflows within the standpipes, or draining very slowly from the clay

In any case, it is proposed to incorporate sufficient drainage as part of the retaining wall design, which will allow perched water from behind the wall to drain to the existing drainage, preventing any effect on neighbouring properties.

The search of records of nearby basements discussed previously in Section 2.3, has highlighted a number of or lower ground floor levels beneath properties neighbouring the site, with a planning application for the construction of a new basement recently submitted for No 30A Thurlow Road. There is adequate space between these structures, such that there will not be a cumulative impact on any groundwater flow.

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

There will be an increase in the proportion of hardstanding

Although the majority of the area currently covered in artificial grass will be replaced with a concrete slab and decking, resulting in an increase in the proportion of hardstanding, this area is currently drained using a land drain that feeds into the main sewer. This will remain the case as the decking area will continue to be collected by combined drains such that an increase in surface run-off will not occur. Furthermore, the proportion of the permeable area will remain and actually slightly be increase with the provision of a green roof made up of a 600 mm thickness of permeable material. The existing drainage plan is included in the appendix.



The site includes slopes of greater than 7°

The slope stability analysis has indicated that the existing slope is suitability retained and stable and that proposed development will actually increase the stability of the slope, preventing slope failure and the potential for structural damage to occur to the properties positioned up slope.

Differential founding depths

The northern and southern boundary walls, close to the proposed excavation, are currently founded on conventional strip foundations bearing on the Claygate Member. As indicated in the CMS produced by Conisbee, these foundations will be underpinned as part of the basement construction, which will prevent differential founding depths and maintain structural stability. This has been confirmed by the results of the ground movement analysis which has indicated that any building damage is likely to be Category 0 and negligible.

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?	the proportions of hardstanding and soft landscaping, which have been compared to the proposed drawings to determine the changes in the propostions. The eviciting drainage	
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 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 ESG 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 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 hills ide setting in which the general slope is greater than $7^\circ ?$	
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 and the measures for tree protection are set out in the Arboricultural Method Statement.
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.



Question	Evidence
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, showing exclusions zones, made available by Transport for London, as shown in Section 2.3 of this report.

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 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 9.0 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

Borehole Records

Borehole Cross-section

Trial Pit Records

Geotechnical Test Results

SPT & Cohesion/ Level Graph

Existing Drainage Plan

Site Plan

Slope Stability Analysis Results

X-DISP ANALYSIS

Basement Excavation Contour Plots of Vertical Movements and Horizontal Movements for both Existing Basement and New Basement Analysis

Installation of underpins Contour Plot of Vertical Movements and Horizontal Movements for both Existing Basement and New Basement Analysis

> Basement Excavation and Underpin Analysis Contour Plots of Combined Vertical Movements and Horizontal Movements for both Existing Basement and New Basement Analysis

> > P-DISP ANALYSIS Short Term Movement Total Movement

BUILDING DAMAGE ASSESSMENT (X-DISP)



d 3	Geotechnical & Environmental Associates					Widbury Hill Ware	Site	Numbe
			<u> </u>			SG12 7QE	39 Rosslyn Hill, London NW3 5UJ	BH1
Boring Metho	cable Percussion	De	pth	Diameter Diameter	Ground	Level (mOD)		Numbe
Dismantiable Drilling Rig	Cable Percussion		30	150		81.30	Mr J Cohen and Ms A Lindsay	J15236
		Location				Dates 09/2015 -	Engineer	Sheet
		526835.0	OE 18549	97.00N	03/	09/2015	Conisbee	Sheet 1 o
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend
					81.10	- (0.20) - 0.20	Decking	
						(0.35)	Concrete reinforced with 6 mm reinforcement	
0.65	D1				80.75 80.65	() () (0.20) 0.85	Made Ground (clayey sandy gravelly Type 1)	
0.85 1.00 - 1.45	D2 U3				80.45	0.85	Made Ground (building rubble in a brown clay matrix) Stiff fissured locally thinly laminated high strength brown	
1.00 - 1.45	05					-	silty CLAY with bluish grey veins, partings of pale grey silt and	<u> </u>
1.45	D4					-	selenite crystals	
1.70	D5							
2.00 - 2.45	D6					_		×_×_^
2.00 - 2.45	SPT (S)N=11	1.30		N=11		(2.60)		<u> </u>
				(1,2/2,2,3,4)		_		<u>xx</u> x
2.70	D7					– –		<u>× </u>
3.00 - 3.45	U8					-		××
						_		××
3.45	D9				77.85	3.45	Stiff becoming very stiff fissured high strength to very high	×
3.70	D10					_	strength dark grey silty CLAY with occasional partings of pale	××
4.00 - 4.45	D11					- -	grey and brownish grey silt and fine sand and traces of selenite	×
4.00 - 4.45	SPT (S)N=15	1.30		N=15 (2,2/3,3,4,5)		-		××
				(=,=, J, J, J, T, J)		-		<u> </u>
4.70	D12					_		
5.00 - 5.45	U13							
5.45	D14					_		×
						-		××
6.00	D15					 _	silt parting	××
						-		××
6.50 - 6.95 6.50 - 6.95	D16 SPT (S)N=20	1.30		N=20				×××
0.00	5 (5) 20	1.50		(2,2/3,5,5,7)		_		××
						-		××
7 50						-		×
7.50	D17					-		
9 00 9 4F	1110					-		<u></u>
8.00 - 8.45	U18					_		<u> </u>
8.45	D19					– –		××
						-		××
9.00	D20					_ 		××
5.00						_		××
9.50 - 9.95	D21					-		××
9.50 - 9.95	SPT (S)N=25	1.30		N=25		-		××
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d 3 ,	Geotechnical & Environmental					Widbury Barn Widbury Hill Ware	Site		Borehole Number
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Boring Methoo	d			Diameter	Ground	Level (mOD)	Client		Job Number
	able Percussion	Dep 1.3		Diameter 150	8	31.30	Mr J Cohen and Ms A Lindsay		J15236
Drilling Rig		Location			[Dates	Engineer		Sheet
		526835.0	00E 1854	97.00N)9/2015 - 09/2015	Conisbee		Sheet 2 of
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									<u> </u>
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						_			××
11.00 - 11.45	U23					 			××
11.45	D24					-			××
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12.00	D25					_ 			×
						-			<u></u>
12.50 - 12.95	D26					_			<u> </u>
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				(2,3) 3,0,0,0		-			××
						_			××
13.50	D27					- -			××
						-			<u> </u>
14.00 - 14.45	U28					_			
1 4 45	D20					_ _ _			<u> </u>
14.45	D29					-			<u> </u>
15.00	D 20					 (17.00)			××
15.00	D30					(17.00) 			××
15.50 - 15.95	D31					-			××
15.50 - 15.95	SPT (S)N=29	1.30		N=29		_			××
				(2,4/5,7,8,9)					
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17.00 - 17.45	U33					- 			××
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17.45	D34								××
						_			
18.00	D35					 			×
19 50 48 05	D26					_			^
18.50 - 18.95 18.50 - 18.95	D36 SPT (S)N=33	1.30		N=33		_			××
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19.50	D37					_			××
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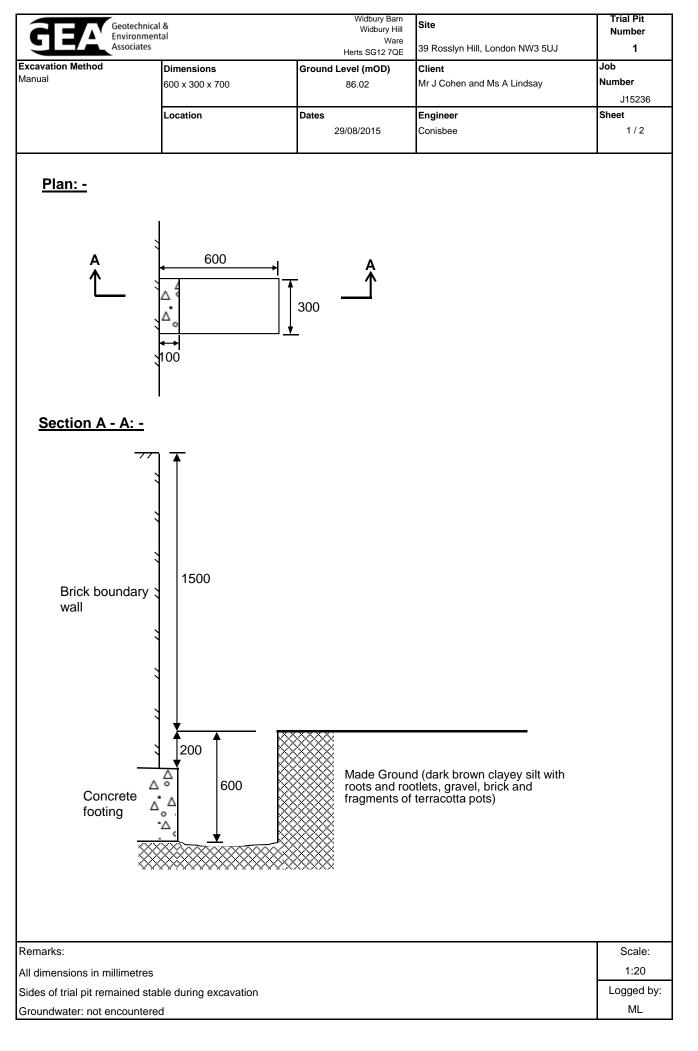
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Boring Metho	d		Casing D	Diameter	Ground	Level (mOD)	Client		Job
	able Percussion	Dep		Diameter					Numbe
Drilling Rig	able Percussion	1.3		150		81.30	Mr J Cohen and Ms A Lindsay		J15236
		Location				Dates	Engineer		Sheet
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0.45	D39				60.85	_ 20.45	Complete at 20.450m		
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nrs manhand	lling equipment to	o position	and liftin	g decking.				1:50	ML
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GE/	Geotechnical & Environmental Associates					W	dbury Barn /idbury Hill Ware SG12 7QE	Site 39 Rosslyn Hill, London NW3 5UJ	Borehole Number BH2
Boring Metho	od bo		Casing D	liameter	Ground		el (mOD)	Client	Job
-		Dep		Diameter				Mr J Cohen and Ms A Lindsay	Number J15236
		Location				84.74 Dates		Engineer	Sheet
		526833.0						Conisbee	Sheet 1 of
Depth		Casing	Water		29 Level	0/08/2	015 epth (m)		
(m)	Sample / Tests	Depth (m)		Field Records	(mOD)	(Th	ickness) $0:10^{)}$	Description	Legend
					84.64	F		Made Ground (brown silty clay with occasional gravel, fine	
0.40	ES1				84.14	L	0.50)	brick and coal fragments)	
0.70	D2				04.14	F	0.00	Firm pale brown mottled orange-brown silty slightly sandy CLAY with decayed rootlets, traces of selenite, partings of	$\overline{\times}$
						-		pale grey silt and fibrous rootlets to 2.00 m	$\xrightarrow{-\times}{\times}$
1.20	D3					= (1.40)		×_ ≍×
						-			XX
1.80	D4								××
2.20	D5				82.74	E	2.00	Firm becoming stiff below 4.70 m fissured brown silty CLAY	
2.20	60					F		with partings and small pockets of grey silt, occasional small pockets of orange-brown fine sand and fine selenite crystals	×
						F			
2.80	D6					E			<u></u>
3.20	D7					F			×
						= (3.00)		<u> </u>
2.00	D 0					Ē	,		××
3.80	D8					E			××
4.20	D9					E			<u>×_~_</u>
						F			××
4.80	D10					E			<u>~_~</u>
					79.74	F	5.00	Complete at 5.000m	<u>~×</u>
						E			
						F			
						E			
						-			
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						È			
Remarks								Scale (approx)	Logged By
Groundwater	not encountered.							1:50	ML

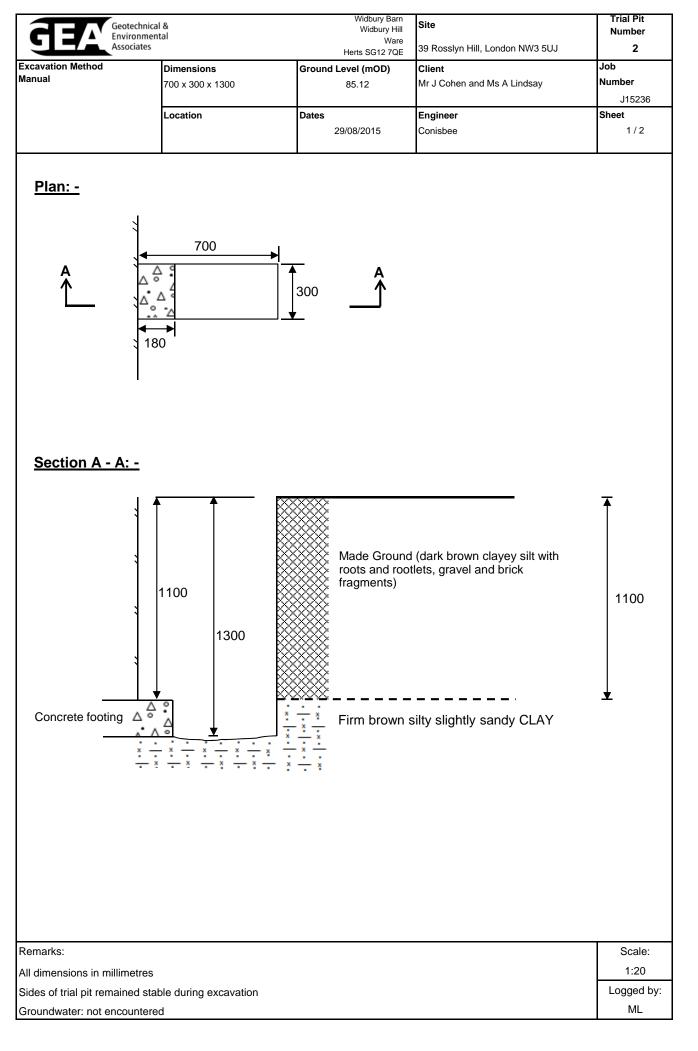
d 77	Geotechnical & Environmental Associates					Widbury Barn Widbury Hill Ware	Site	Number
						SG12 7QE	39 Rosslyn Hill, London NW3 5UJ	BH3
Boring Metho		Dej	Casing D	Diameter Diameter	Ground	Level (mOD)		Number
Drive-in Windo	ow Sampler			Diameter		82.46	Mr J Cohen and Ms A Lindsay	J15236
		Location				Dates	Engineer	Sheet
		526835.0	OE 18549	91.00N		08/2015	Conisbee	Sheet 1 o
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend
0.50	D1				81.96	(0.50) 0.50	Made Ground (artificial grass over geotextile over brown silty clay with gravel and fine brick fragments)	
					81.96	- 0.30 	Firm fissured locally thinly laminated brown silty CLAY with bluish grey veins, partings of pale grey silt, occasional pockets of orange-brown fine sand and selenite crystals	
1.50	D2						claystone	×× ×× ××
2.50	D3					- (3.20) 		
3.70	D4				78.76	- 3.70 - (1.30)	Stiff fissured dark grey silty CLAY with traces of selenite	
4.70	D5				77.46	- - - - 5.00	Complete at 5.000m	
Romarks							Scale	Logged
Remarks	nonitoring standp						(approx) 1:50	By ML

GE	Geotechnical & Environmental Associates					Widbury Barn Widbury Hill Ware SG12 7QE	Site 39 Rosslyn Hill, London NW3 5UJ	Borehole Number BH4
Boring Metho	d		Casing D	Diameter	Ground	Level (mOD)		Job
Drive-in Windo		Dep		Diameter			Mr J Cohen and Ms A Lindsay	Number
						82.44		J15236
		Location				Dates	Engineer	Sheet Sheet 1 of
Dauth		526828.0		96.00N	-	/08/2015 Depth (m)	Conisbee	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	(Thickness)	Description Made Ground (artificial grass over brown clayey silt with	Legend
0.30	ES1				82.04	- (0.40) - 0.40 	gravel and brick fragments) Firm fissured brown silty CLAY with bluish grey veins, partings of pale grey silt, sparse small pockets of orange- brown fine sand and selenite crystals	
						- (3.40) - (3.40) 		
					78.64 78.44	(3.80)	Stiff fissured dark grey silty CLAY Complete at 4.000m	××
Remarks							Scale	Logged
	not encountered.						(аррго) 1:50	S) By ML

Project Id: J15236 Project Title: 39 Rosslyn Hill, London NW3 5 Location: 39 Rosslyn Hill, London NW3 5UJ Client: Mr J Cohen and Ms A Lindsay	Project Id: J15236 Project Title: 39 Rosslyn Hill, London NW3 5UJ Location: 39 Rosslyn Hill, London NW3 5UJ Client: Mr J Cohen and Ms A Lindsay	Title: Borehole Section Vertical Scale: 1:192 Horizontal Scale: 1:93 Engineer: Matt Legg		E)	Geotechnical & Environmental Associates
				2	
	88			H9000000000000000000000000000000000000	85 84
	83		вна		83
	82	∟на[]	장물리수도		82
					80
		X	3.80		62
	78	345 ×	5.00		78
	77 				22 <u></u>
	/0 75				۹/ عد
	Q 22				6/
		×			7 7
	73				7 73
Legend Key	71				21
TOPSOIL					02
MADE	69				69
	68				68
	67 —				
x					99
Void	65 E1				65
	40 0	×			4 0
	6	×			6 6
60.00	61	2045			61
Chainage (m)	00'0	1.24	6.34 5.78	01.6	
Offset (m)		57.S	71.8 14.0		
Elevation (mAOD)	AOD)	05.18	44.28 64.28	47.48	

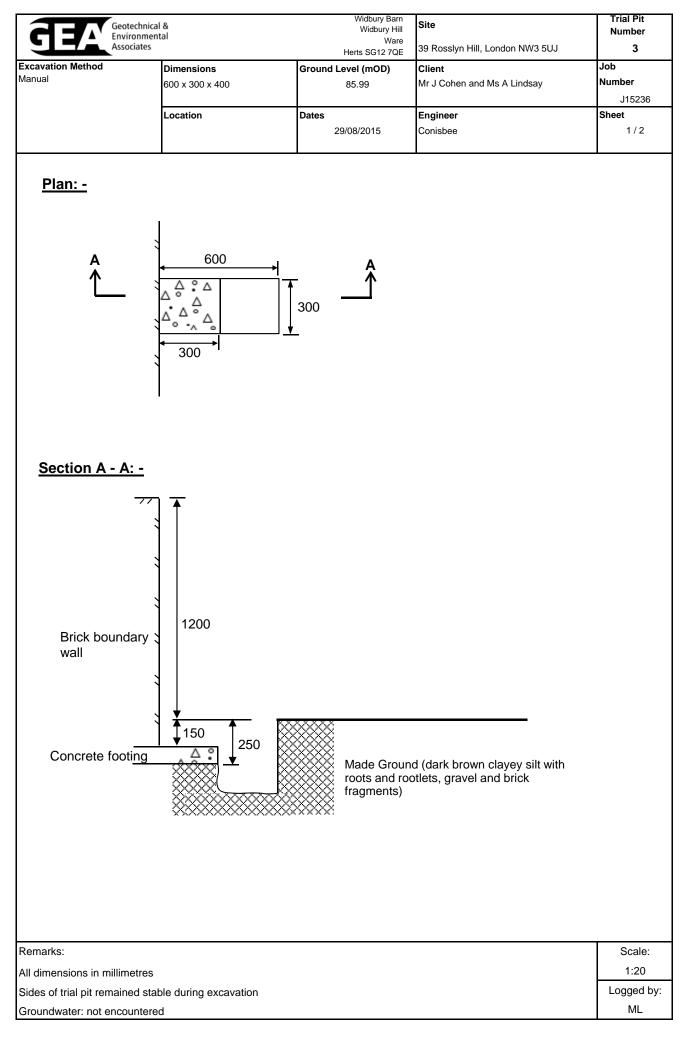






Geote Enviro	chnical & nmental ates	Widbury Barn Widbury Hill Ware	Site	Trial Pit Number
		Herts SG12 7QE	39 Rosslyn Hill, London NW3 5UJ	2
xcavation Method anual	Dimensions 700 x 300 x 1300	Ground Level (mOD) 85.12	Client Mr J Cohen and Ms A Lindsay	Job Number
				J15236
	Location	Dates	Engineer	Sheet
		29/08/2015	Conisbee	2/2

Remarks:	Scale:
All dimensions in millimetres	1:20
Sides of trial pit remained stable during excavation	Logged by:
Groundwater: not encountered	ML



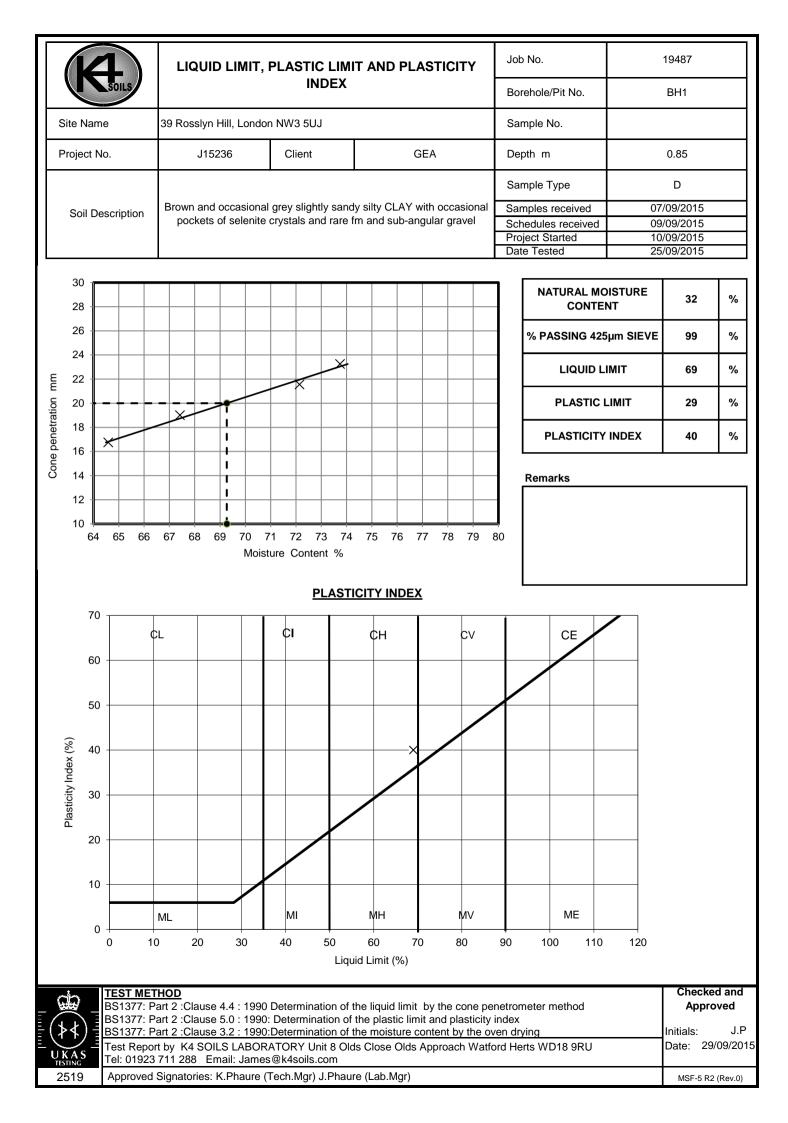


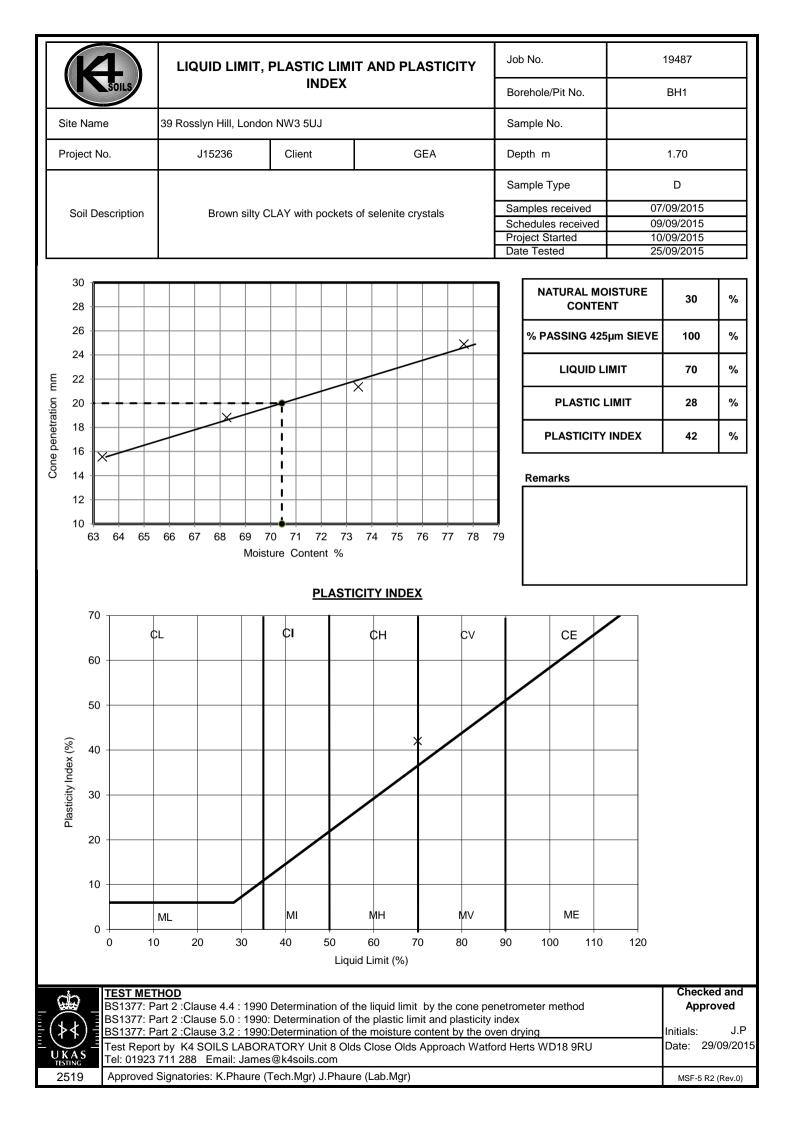
Sides of trial pit remained stable during excavation

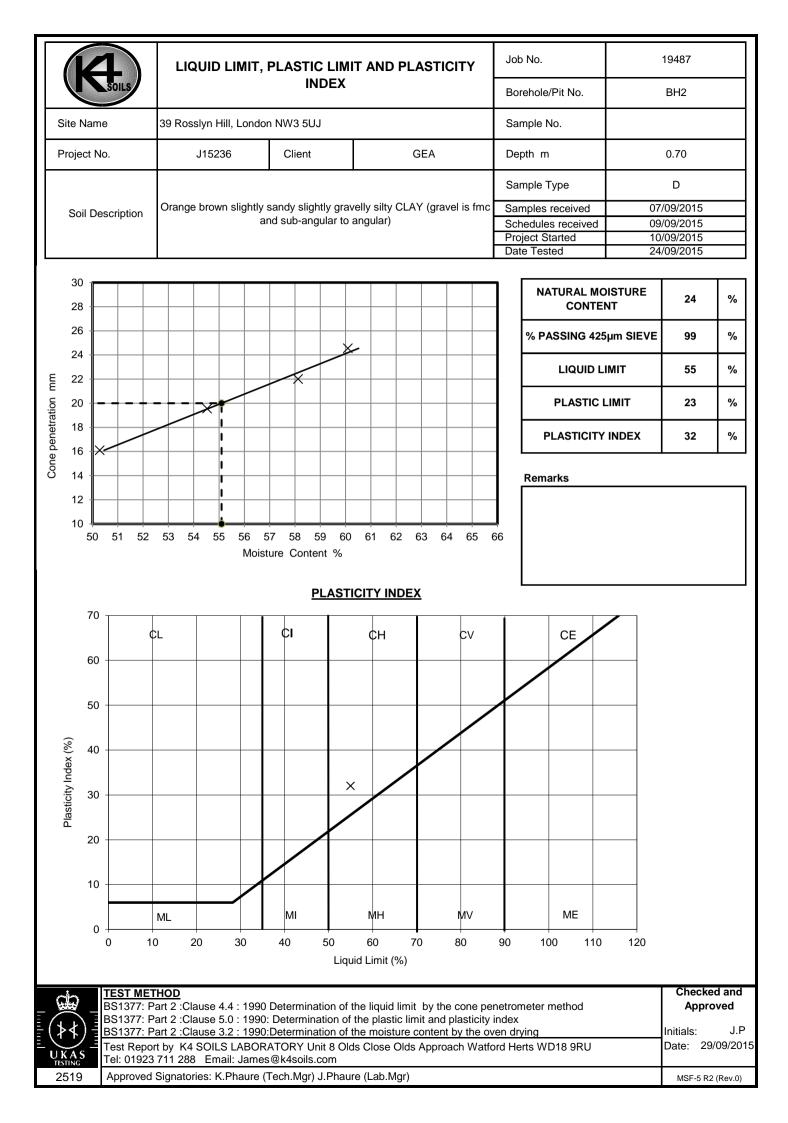
Groundwater: not encountered

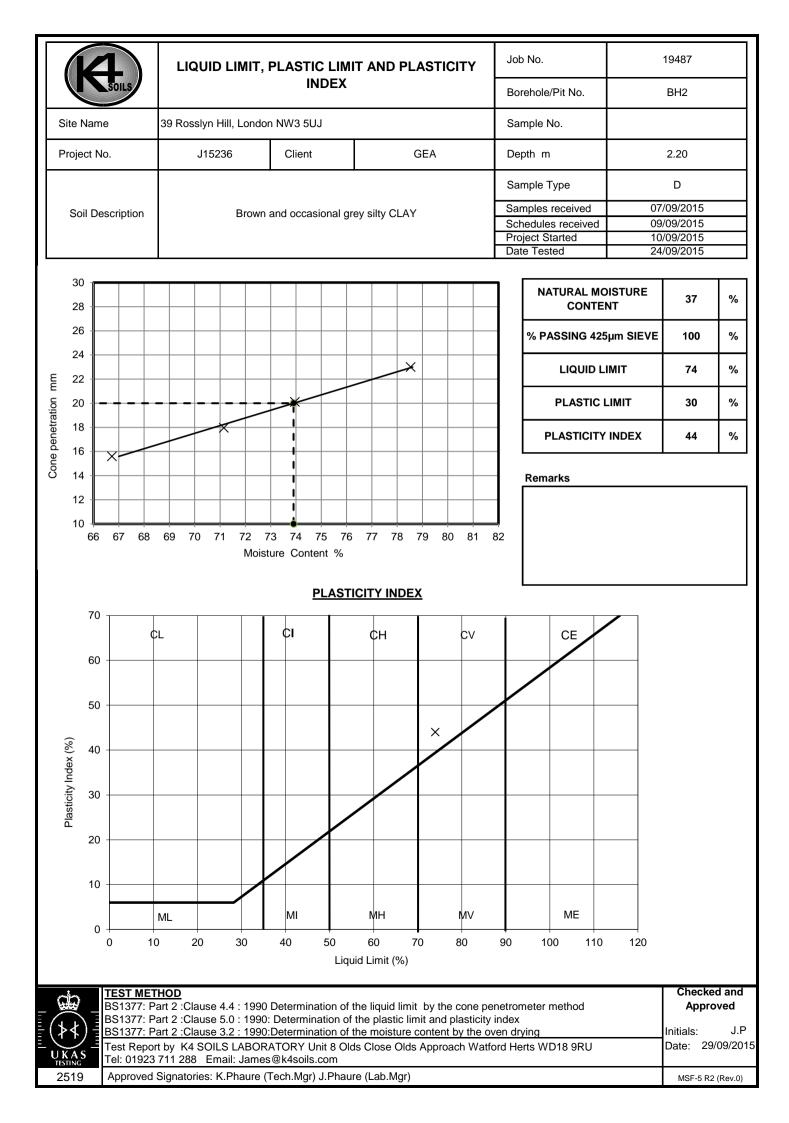
Ktsoils			Summary of Test Results												
Job No.			Project	Name	•			ramme							
19487			39 Ros	slyn H	ill, London NW3 5UJ	Samples Schedule)9/2015)9/2015						
Project No.			Client			Project sta			9/2015						
J15236			GEA								tarted	25/0	9/2015		
Hole No.		Sa	mple		· Soil Des	cription	NMC	Passing	LL	PL	PI	Re	marks		
	Ref Top		Base	Туре			%	425μm %	%	%	%	_			
BH1		0.85		D	Brown and occasiona sandy silty CLAY with pockets of selenite cr and sub-angular grav	n occasional rystals and rare fm	32	99	69	29	40				
BH1		1.70		D	Brown silty CLAY with selenite crystals	30	100	70	28	42					
BH2		0.70		D	Orange brown slightly gravelly silty CLAY (g sub-angular to angula	ravel is fmc and	24	99	55	23	32				
BH2		1.20		D	Orange brown and gr	rey silty CLAY	27								
BH2		1.80		D	Brown and occasiona with traces of carbona		28								
BH2		2.20		D	Brown and occasiona	al grey silty CLAY	37	100	74	30	44				
BH2		2.80		D	Brown and occasiona	al grey silty CLAY	31								
BH2		3.20		D	Brown and occasiona with rare fine gravel a traces of selenite		30								
BH2		3.80		D	Brown and occasiona with rare pockets of c		32								
BH3		1.50		D	Brown silty CLAY wit pockets of selenite cr		33	99	69	28	41				
BH3		2.50		D	Brown and occasiona with occasional pock sand/silt		32								
BH3		3.70		D	Brown and dark brow silty CLAY (gravel is angular)		30	99	72	27	45				
<u>a</u>			ds: BS13 re Conten		art 2: 1990:	Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach							ked and		
			s: clause				Watford	Herts WD	18 9RU				oroved		
								Initials Date:	J.P 29/09/2						
11511NG 2519	Appr	oved Sir	natories.	K.Pha	ure (Tech.Mgr) J.Phaure	e (Lab.Mor)						MSF-5-F	R1(a) -Rev		

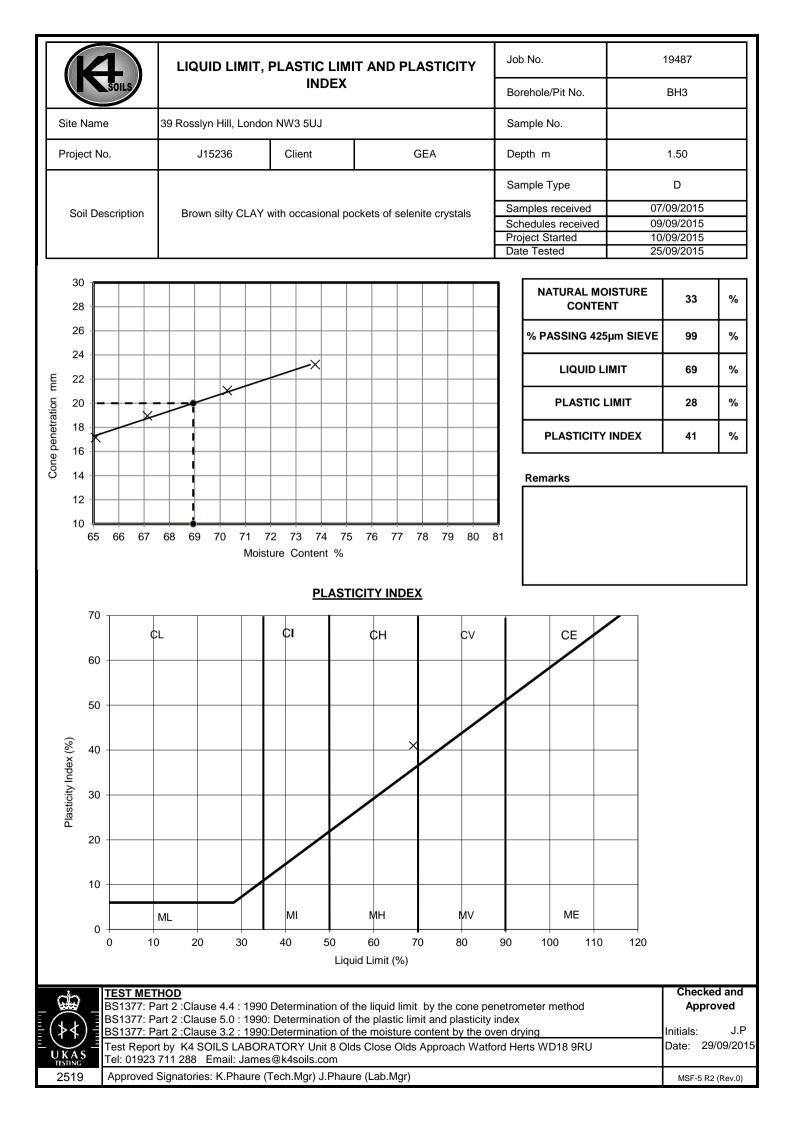
Kioils			Summary of Test Results													
Job No.	_		Project	Name	3		Prog	Programme								
19	9487		39 Ros	slvn H	lill, London NW3 5UJ				Samples I	07/09/2015						
Project No.			Client		,				Schedule Project sta		09/09/2015 10/09/2015					
J15	5236		GEA				-		Testing St	arted	25/09/2015					
Hole No.		1	mple	<u> </u>	- Soil Description	NMC	Passing 425µm	LL	PL	PI	Remarks					
	Ref	Тор	Base	Туре		%	%	%	%	%						
ВНЗ		4.70 D		D	Grey and occasional brown silty CLAY	30										
	Natur	al Moistu	is: BS13 re Content s: clause 4	t : clau	use 3.2 L	Tel: 0	Close Olds Herts WD 01923 711	288 Appro	ach		Checked and Approved Initials J.P					
UKAS TESTING 2519											Date: 29/09/2015 MSF-5-R1(a) -Rev. 0					

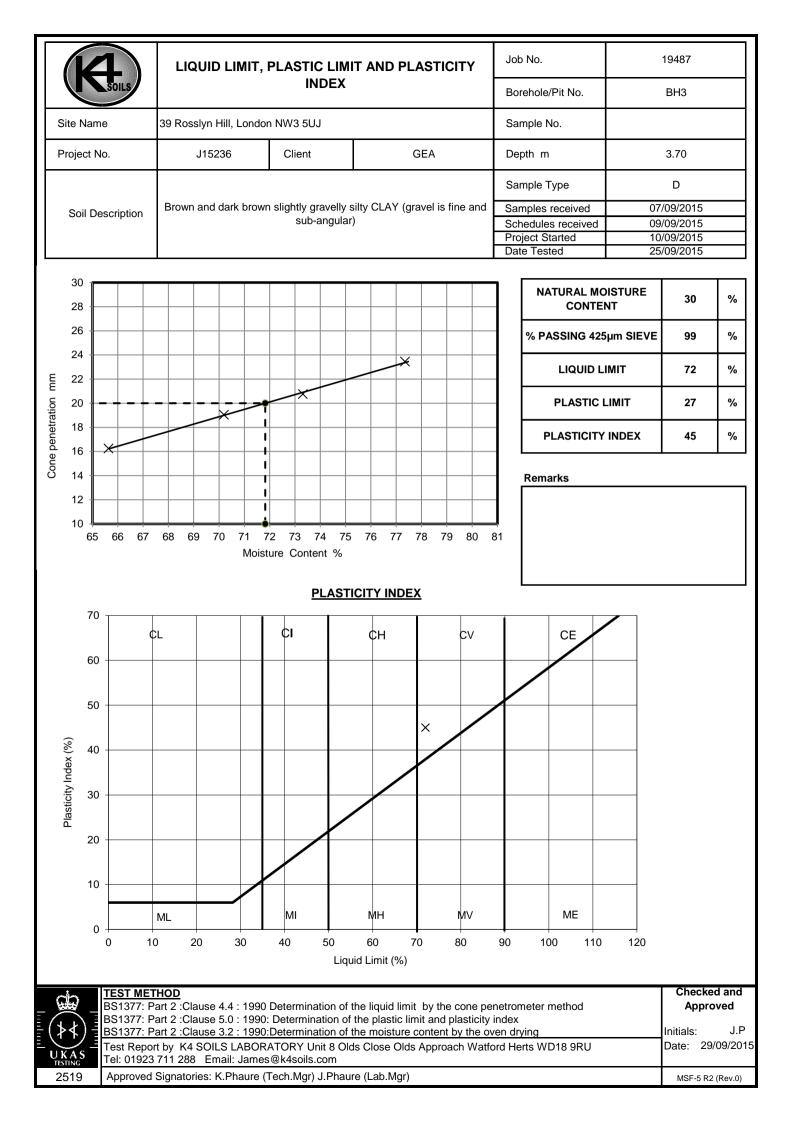






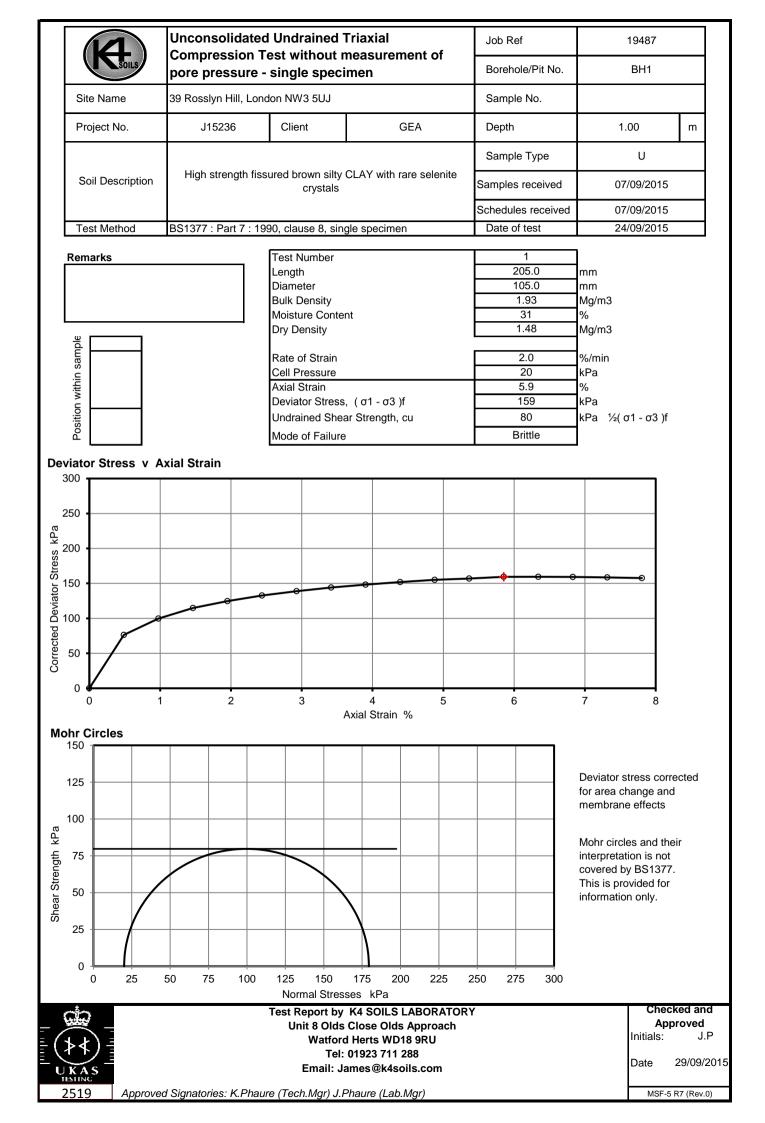


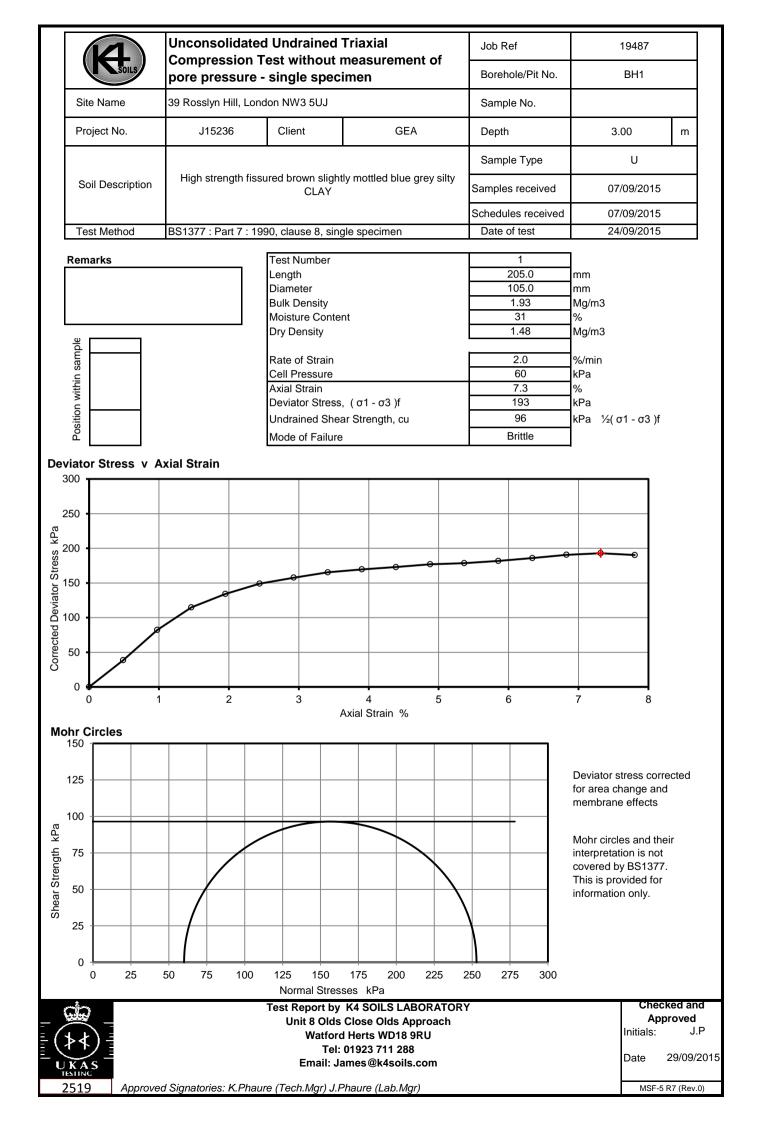


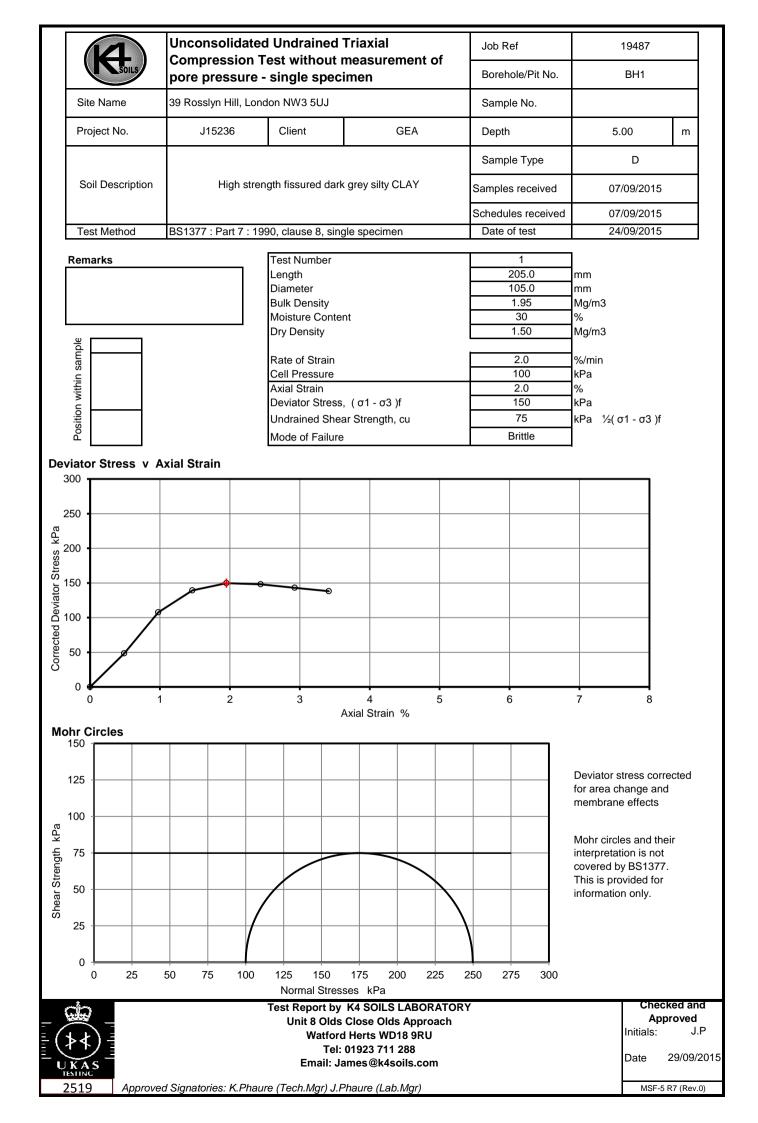


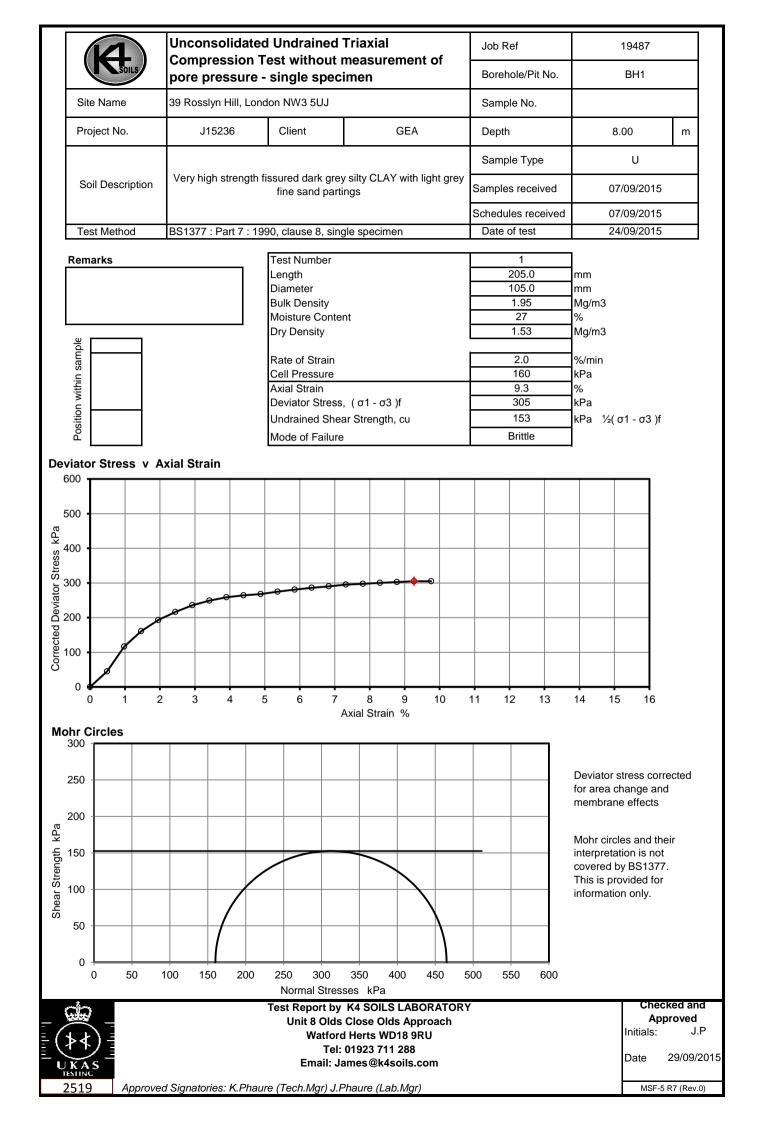
		8	Sul		Content (Gravimetric Method) for 2:1 Res Tested in accordance with BS1377 : I	ults					imary of	
Job No.			Project N		Progra	mme						
19487			39 Rossi	received 07/09/2015								
			Client	eceived	09/09/2015 10/09/2015							
Project No).								Project s		10/09/2013	
J15236			GEA						Testing S	Started	25/09/2015	
		Sa	mple			Dry Mass	SO3	SO4				
Hole No.	Ref	Тор	Base	Туре	Soil description	passing 2mm	Content	Content	pН	1	Remarks	
	Rei	тор	Dase	туре		%	g/l	g/l				
BH1		1.45		D	Brown silty CLAY with scatered traces of selenite crystals	100	1.42	1.70	8.02			
BH1		6.00		D	Dark grey sandy silty CLAY	100	0.80	0.96	7.99			
BH2		1.80		D	Brown and occasional grey silty CLAY with traces of carbonaceous deposits	100	0.28	0.34	8.12			
CĹ	3		Test Report by K4 SOILS LABORATORY									
					Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU					م Initials	pproved J.P	
	り				Tel: 01923 711 288					minuais	J.F	
	4C				Email: James@k4soils.com					Date:	29/09/2015 -5-R29 (Rev. 0)	
2519	9	Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)										

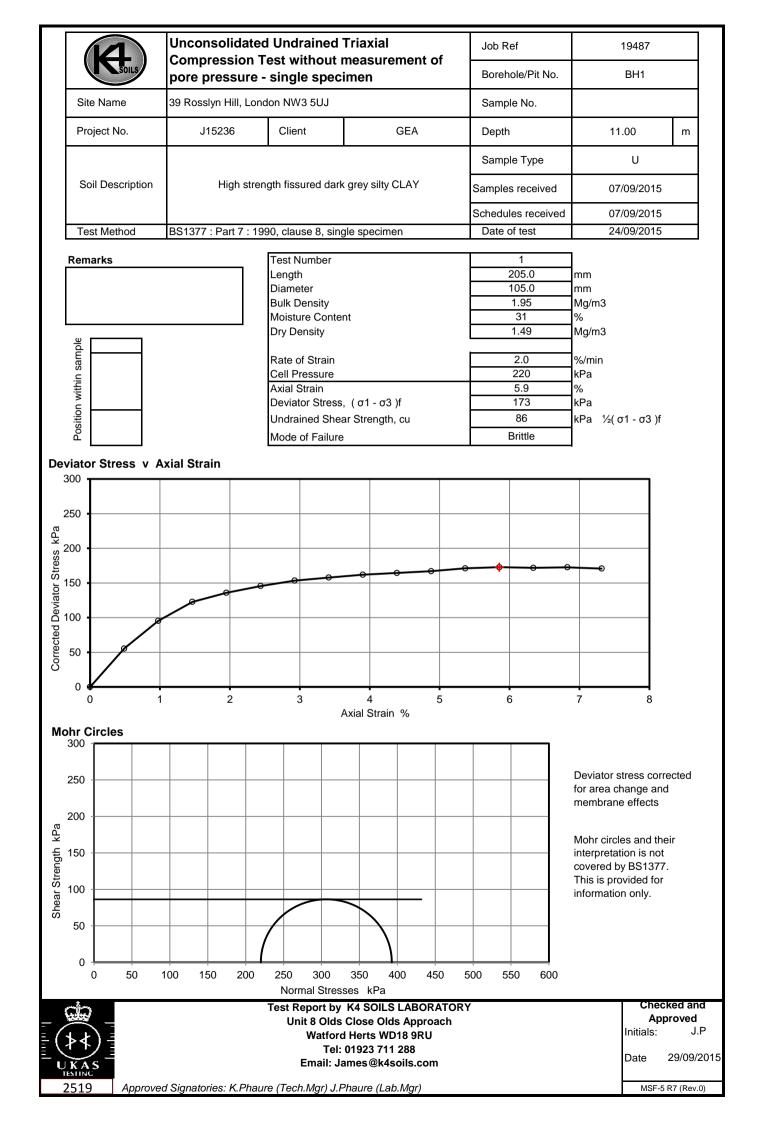
K)			olidated Undrained Tr		Su	mma	ry of	Resu	lts					-			
Job No.			Tes	ts c	arried out in accordan	ect Na		51377	':Par	t 7 : 1	990 c	laus	e 8 c	or 9 a			priate to test	
19487			20 Boo		Hill, London NW3 5UJ	ectival	ine						San	nples r			07/09/2015	
			Client											edule			09/09/2015	
Project N	0.		GEA												t started 10/09/2015 Started 24/09/2015			
J15236										1	1		Ie	sting	Started		24/09/2015	
		Sar	nple	<u> </u>		Test Type	Der	nsity	w	Length	Diameter	σ3	Axial	At fail	ure	м		
Hole No.	Ref	Тор	Base	Base Type	ase Type	Soil Description	туре	bulk	dry					strain	σ1 - σ	cu	o d	Remarks
							Mg	/m3	%	mm	mm	kPa	%	kPa	kPa	e		
BH1		1.00		U	High strength fissured brown silty CLAY with rare selenite crystals	υυ	1.93	1.48	31	205	105	20	5.9	159	80	В		
BH1		3.00		U	High strength fissured brown slightly mottled blue grey silty CLAY	UU	1.93	1.48	31	205	105	60	7.3	193	96	В		
BH1		5.00		D	High strength fissured dark grey silty CLAY	UU	1.95	1.50	30	205	105	100	2.0	150	75	В		
BH1		8.00		U	Very high strength fissured dark grey sity CLAY with light grey fine sand partings	UU	1.95	1.53	27	205	105	160	9.3	305	153	В		
BH1		11.00		U	High strength fissured dark grey silty CLAY	υυ	1.95	1.49	31	205	105	220	5.9	173	86	в		
BH1		14.00		U	High strength fissured dark grey silty CLAY	υυ	1.97	1.52	30	205	105	280	4.4	214	107	в		
BH1		17.00		U	High strength fissured dark grey silty CLAY	υυ	1.98	1.55	28	205	105	340	5.9	283	142	в		
BH1		20.00		U	High strength fissured dark grey silty CLAY	UU	1.96	1.54	27	205	105	400	3.4	213	107	в		
Legend	UU -	single st	age test (sinale	and multiple specimens)	σ3	Cell r	pressure	•	1		Mode	of failui	re;	B - E	l Brittle		
	UUM - Multistage test on a single specimen $\sigma 1 - \sigma 3$ Maximum corrected deviator stresssuffix R - remoulded or recompactedcuUndrained shear strength, $\frac{1}{2}$ ($\sigma 1 - \sigma 3$)										P - F	Plasti						
ന്റ	Test Report by K4 SOILS LABORATORY																	
					Unit 8 Olds Clo	ose Olo	ds App	roach							Che	CKE	ed and Approved	
-(≯≮)-					Watford H			νU							Initial	s:	J.P	
					Tel: 01 Email: jame			om							Date:		29/09/2015	
2519			Approv	/ed S	ignatories: K.Phaure (Tech.M				gr)							MS	F-5-R7b (Rev. 0)	

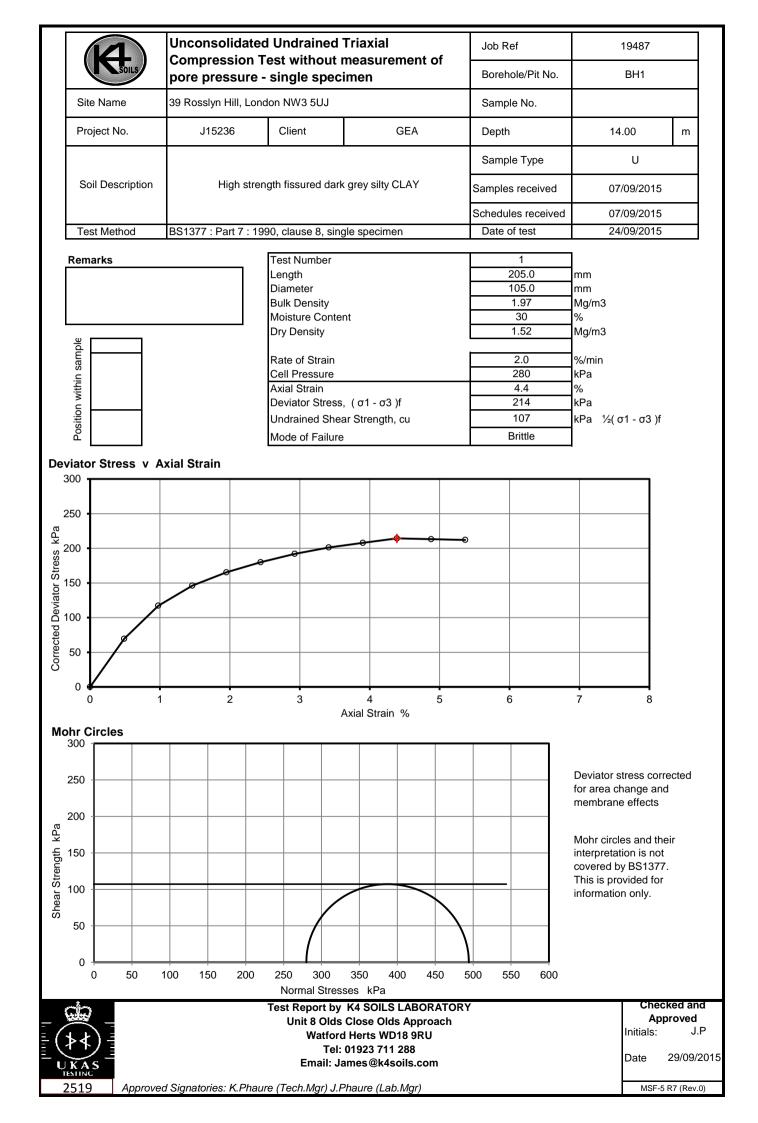


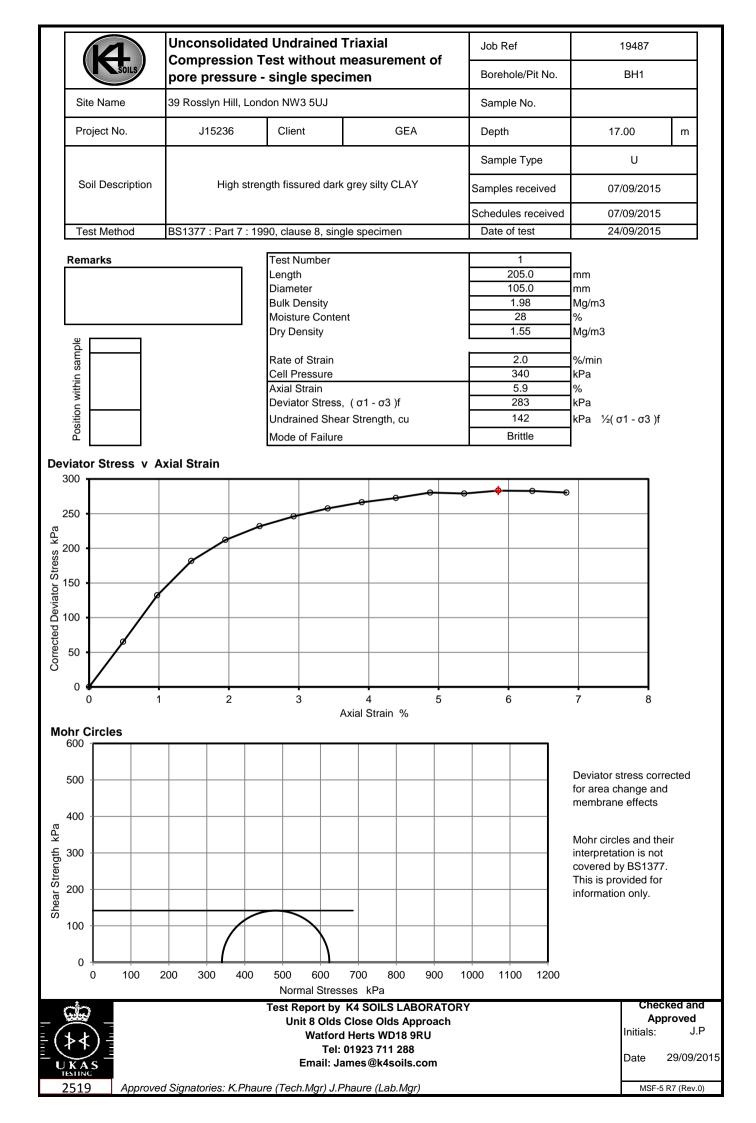


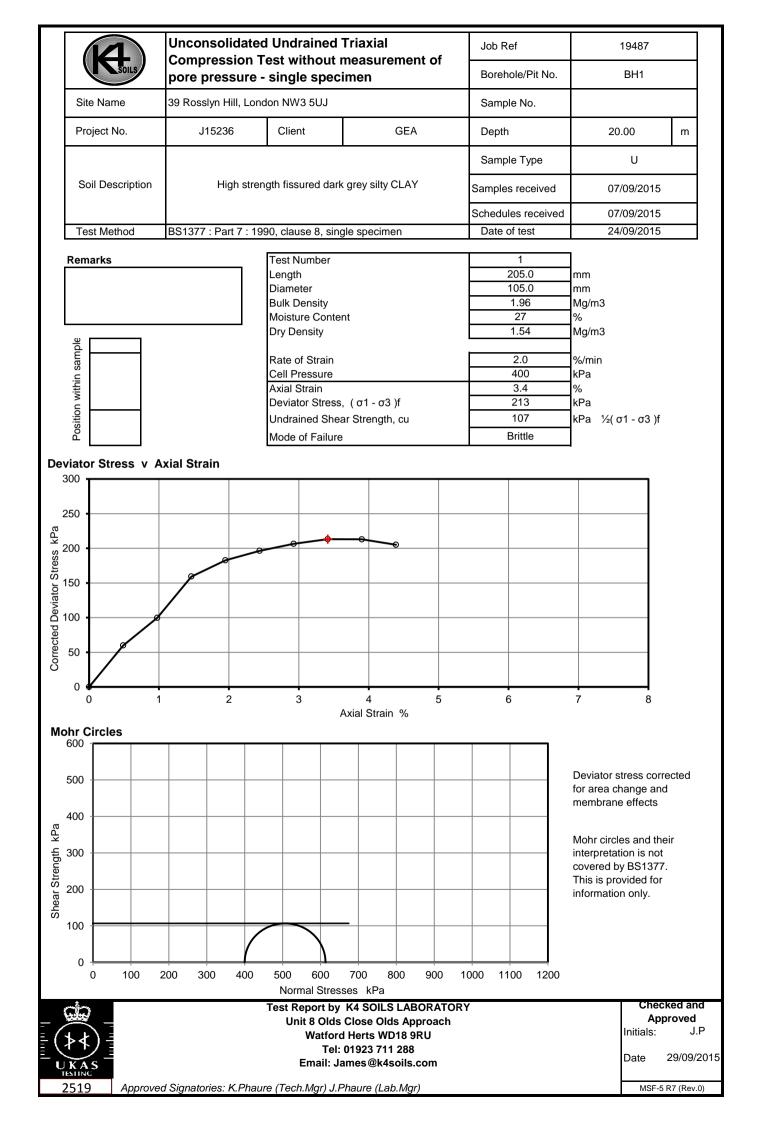


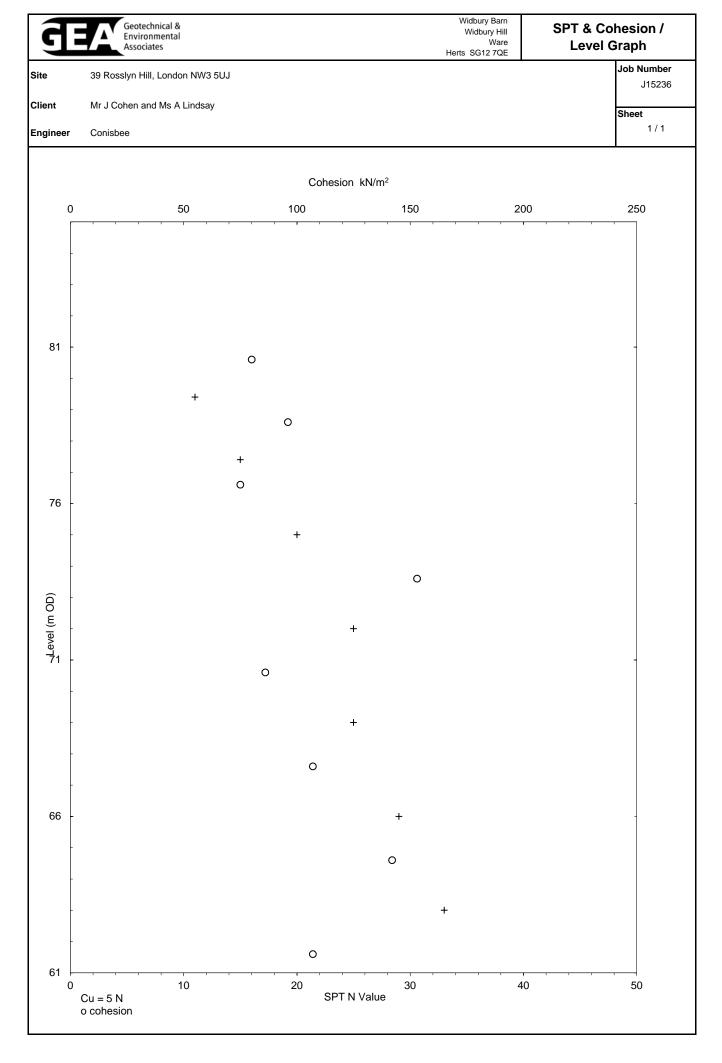


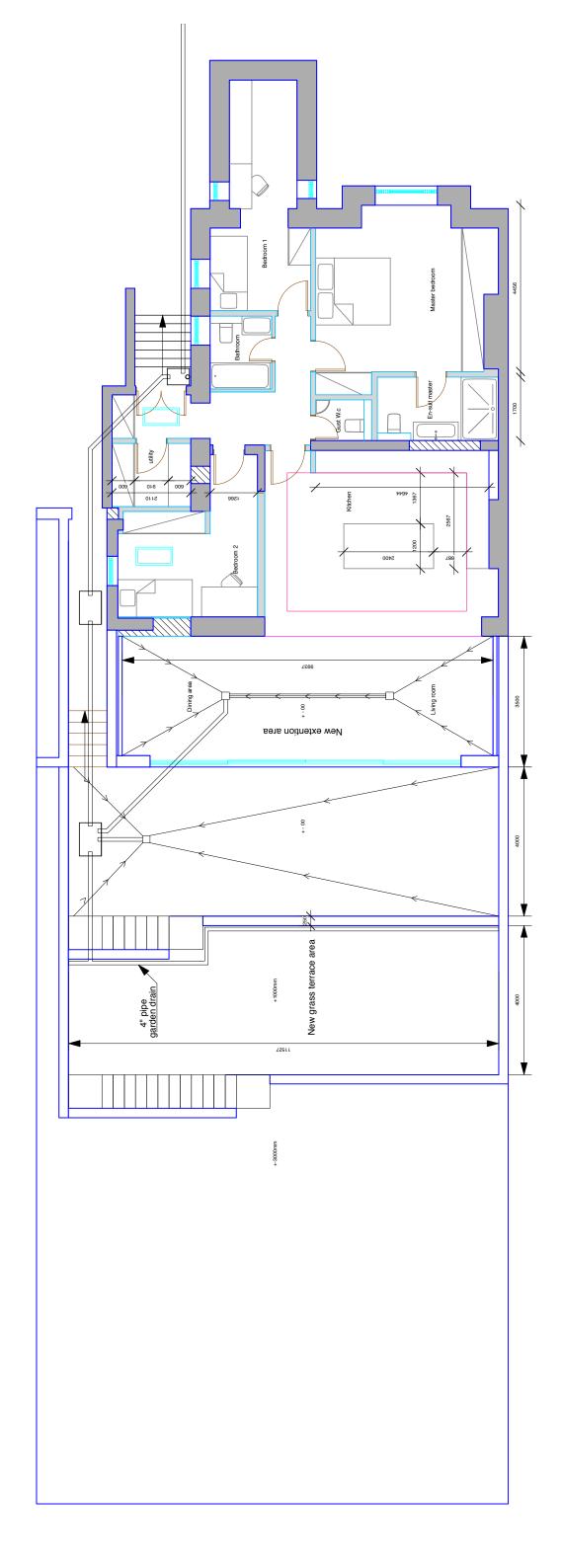


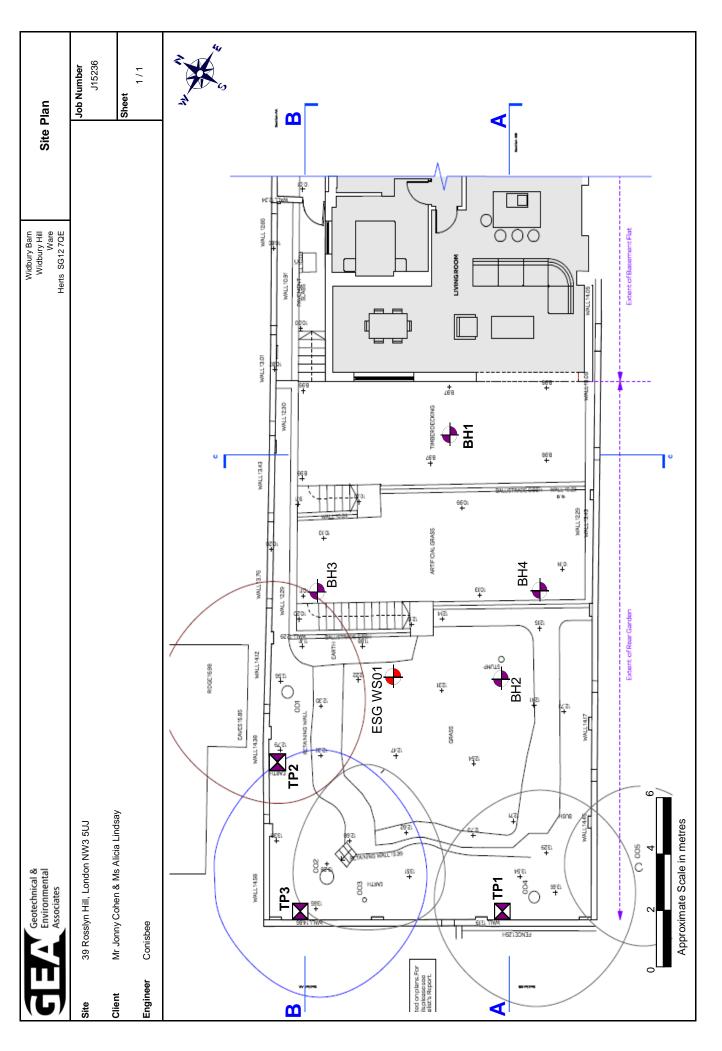


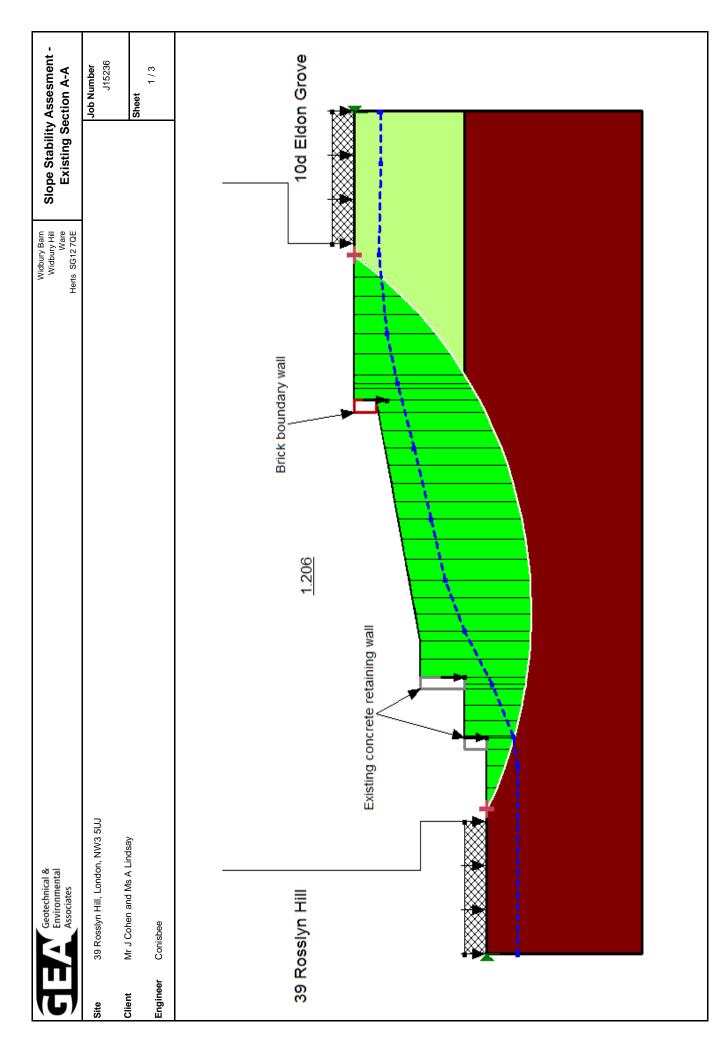


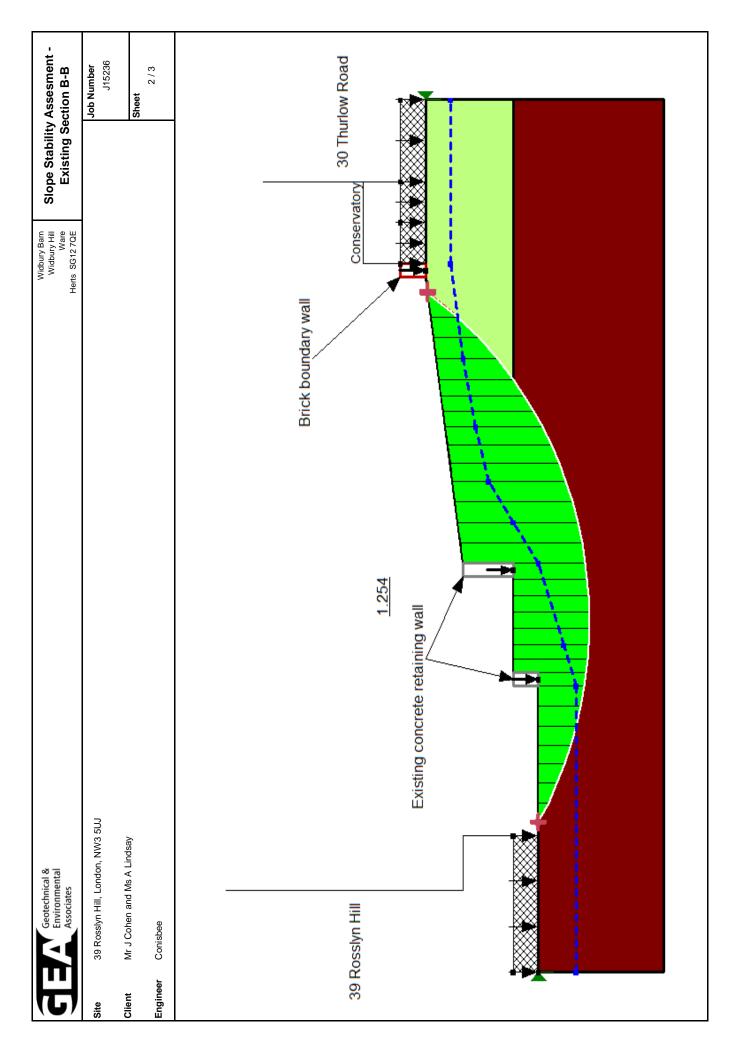


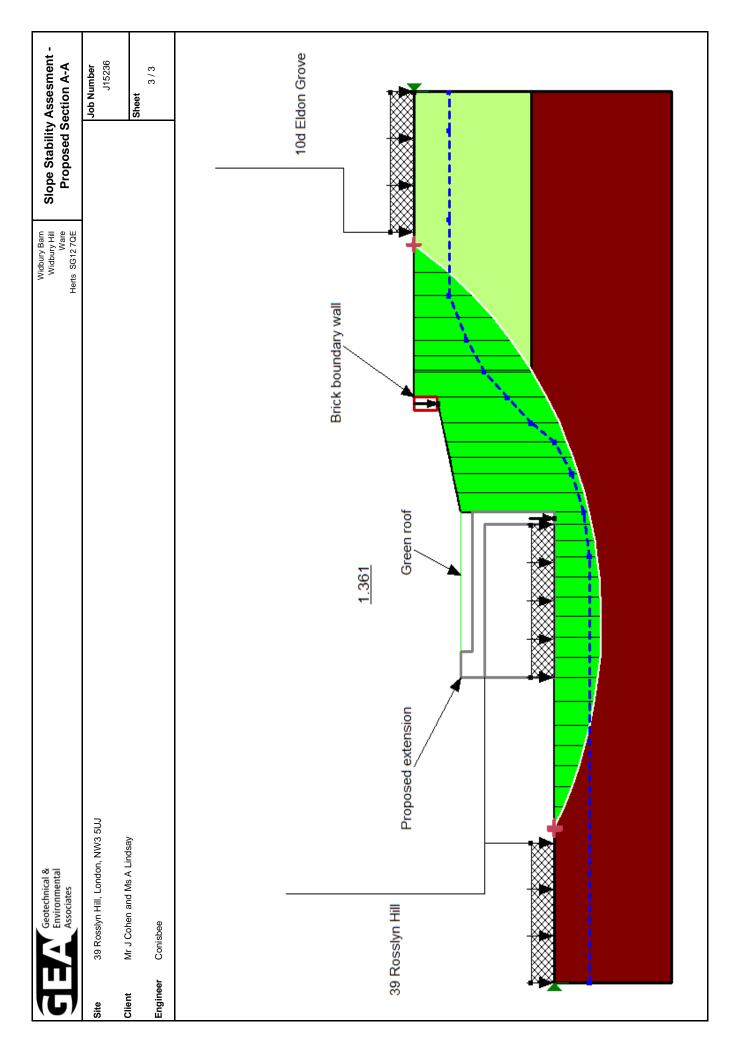


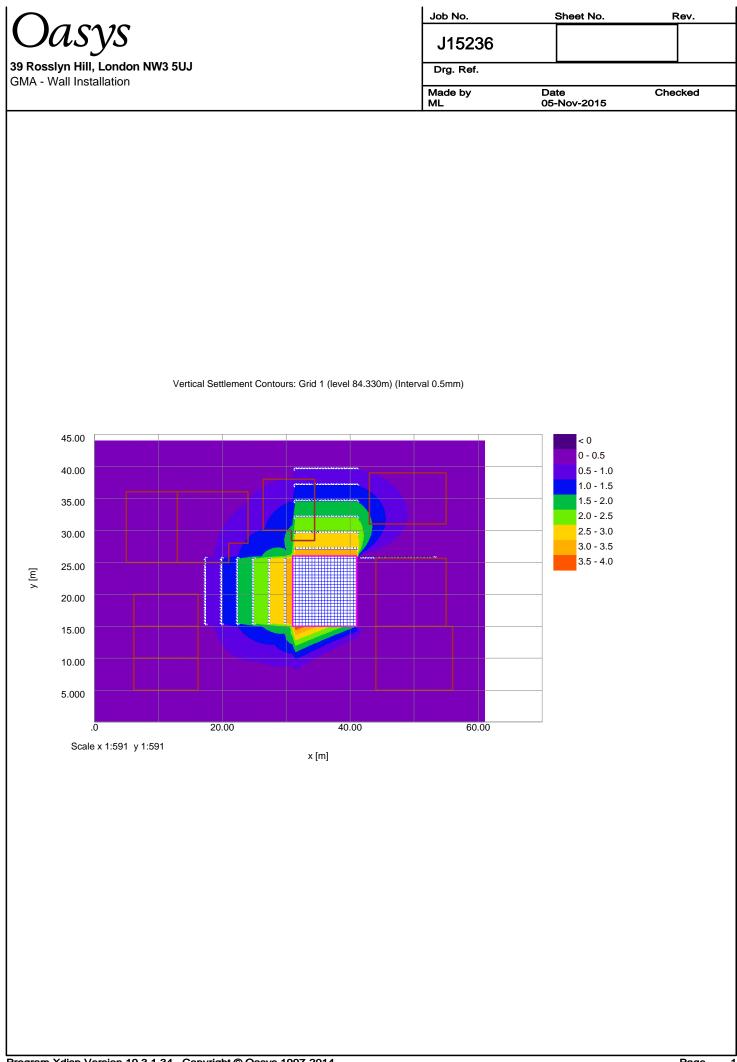


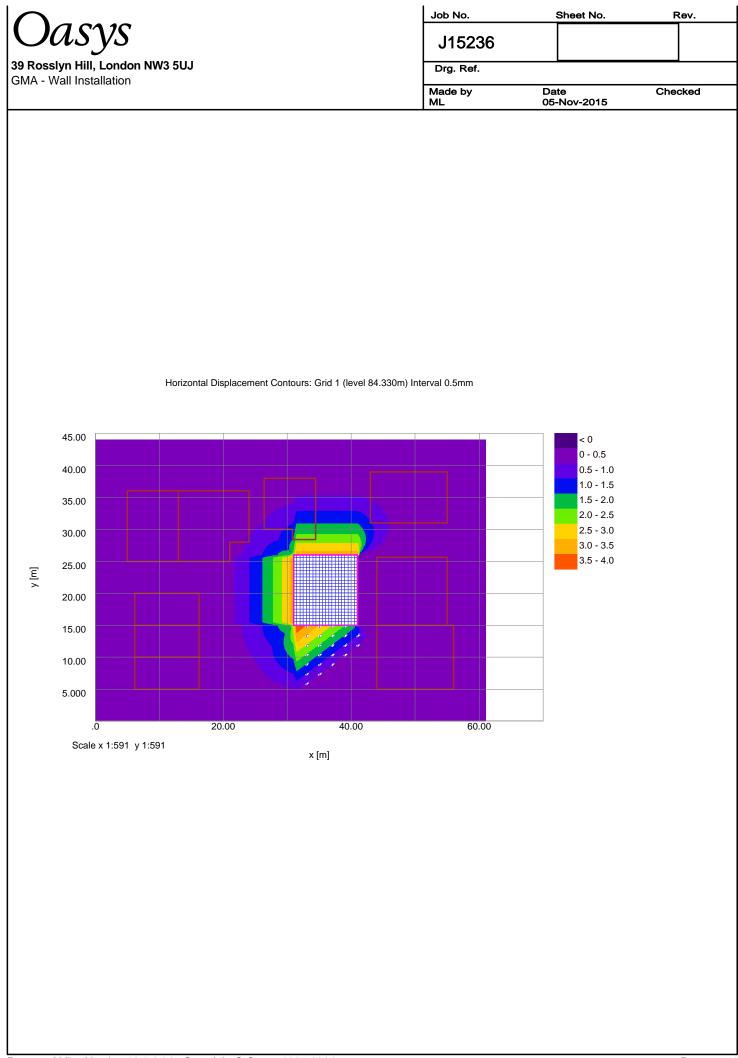


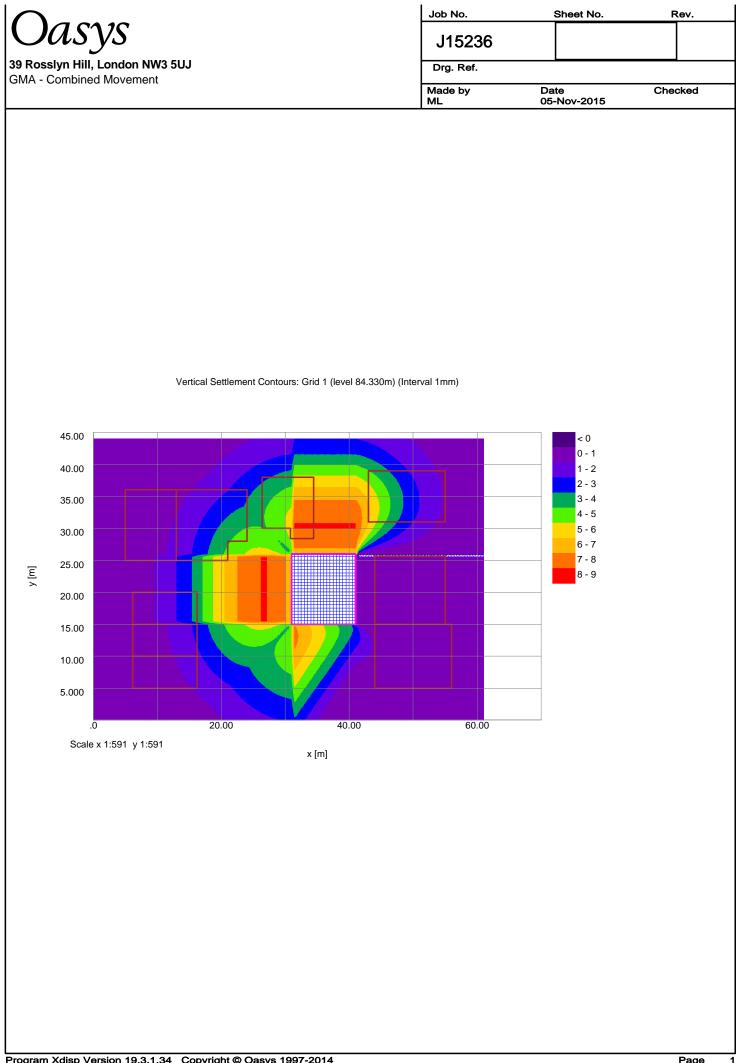


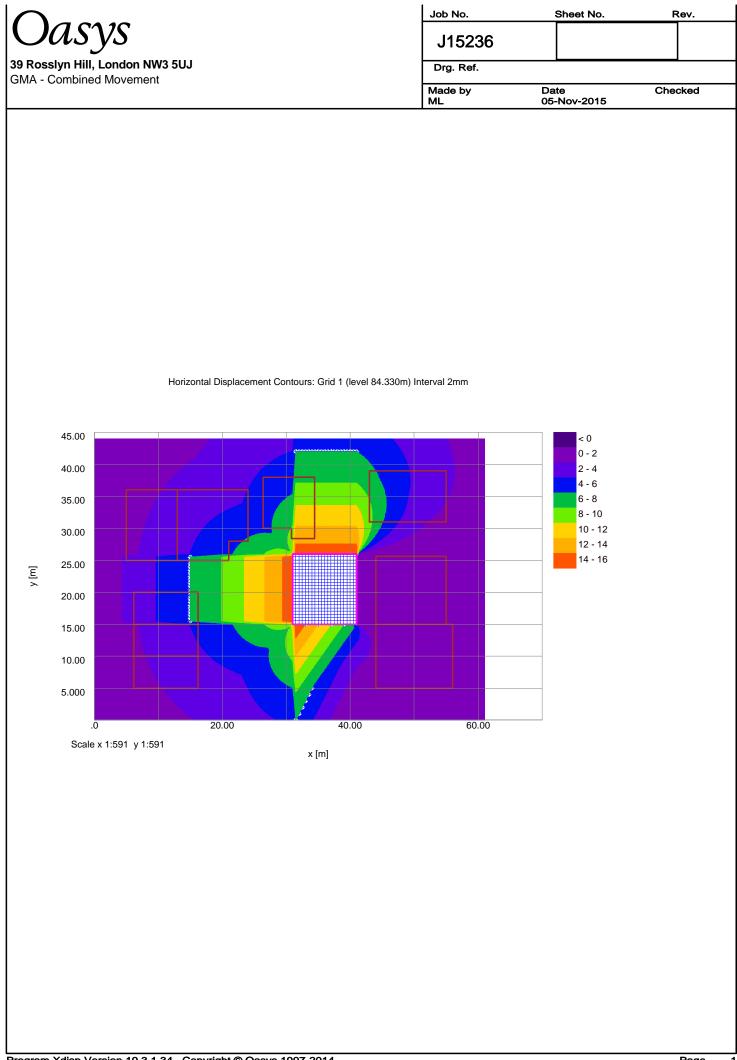


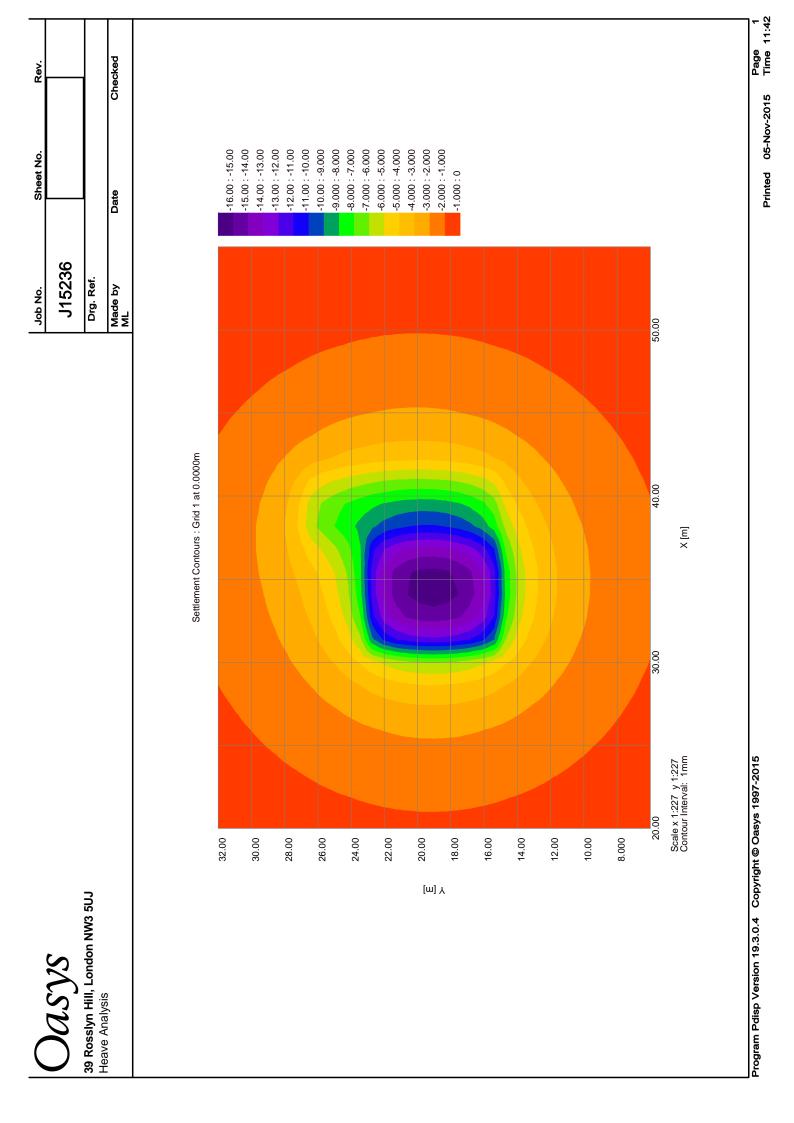












			Job No.	Sheet No.	Rev.
۲ [m] ۲ 33.00 30.00 14.00 14.00 14.00 12.00 14.			J15236		
۲ (m) ۲ (m) ۲ (m) ۲ (m) ۲ (m) ۲ (m) ۲ (m) ۲ (m) 1			Drg. Ref.		
32.00 33.00 28.00 28.00 24.00 22.00 18.00 18.00 18.00 11.00 11.00 12.00 30.00 30.00 30.00			Made by ML	Date	Checked
32.00 33.00 28.00 28.00 28.00 28.00 18.00 18.00 18.00 11.00 11.00 12.00 30.00 30.00 30.00					
32.00 30.00 28.00 28.00 22.000 18.00 18.00 19.00	Settlement Contours : Grid 1 at 0.0000m	tt 0.0000m			
30.00 28.00 28.00 24.00 22.000 18.00 18.00 14.00 14.00 12.00 30.00 20.000 20.00 20.00 20.00 20.00 20.000 20.00 20.00 20.00 20.00 20.00 200	32.00		-3.000 : -2.500		
28.00 28.00 22.00 18.00 18.00 14.00 12.00 33.00 33.00 34.00 34.00	30.00		-2.500 : -2.000 -2.000 : -1.500 -1.500 : -1.000		
26.00 24.00 22.00 18.00 16.00 14.00 12.00 33.00 34.00 34.00	28.00		-1.000 : -0.5000 -0.5000 : 0		
24.00 22.00 18.00 16.00 14.00 12.00 33.00 34.00 34.00	26.00		0.5000 : 1.000 1.000 : 1.500		
22.00 20.00 18.00 14.00 12.00 26.00 34.00 34.00	24.00		1.500 : 2.000 2.000 : 2.500 2.500 : 3.000		
20.00 18.00 14.00 12.00 33.00 34.00 34.00			3.000 : 3.500 3.500 : 4.000		
	20.00				
00 34.00	16.00				
8.00 34.00	14.00				
30.00	12.00				
	26.00 30.00 34.00 38.00	42.00	46.00		
Scale x 1:193 Contour Interval:0.5mm X [m]					

Printed 05-Nov-2015 Time 11:47

Program Pdisp Version 19.3.0.4 Copyright @ Oasys 1997-2015

\frown	Job No.	Sheet No.	Rev.
Oasys	J15236		
39 Rosslyn Hill, London NW3 5UJ GMA - Combined Movement	Drg. Ref.		
		Date 05-Nov-2015	Checked

Specific Building Damage Results - Horizontal Displacements

Struct	ure: 10b 1	Eldon A	Sub-stri	icture:			
Dist.		oordinate				placeme	
	x	У	z	x	У	Along	
						the	to Line
						Line	
[m]		[m]		[mm]			[mm]
	6.20000						
	7.20000						0.52456
2.0000	8.20000	5.00000	86.33000	1.4162	0.62114	1.4162	0.62114
3.0000	9.20000	5.00000	86.33000	1.5762	0.72304	1.5762	0.72304
	10.20000						0.83058
5.0000	11.20000	5.00000	86.33000	1.8692	0.94404	1.8692	0.94404
6.0000	12.20000	5.00000	86.33000	1.9997	1.0637	1.9997	1.0637
7.0000	13.20000	5.00000	86.33000	2.1177	1.1897	2.1177	1.1897
8.0000	14.20000	5.00000	86.33000	2.2215	1.3223	2.2215	1.3223
9.0000	15.20000	5.00000	86.33000	2.3091	1.4615	2.3091	1.4615
10.000	16.20000	5.00000	86.33000	2.3783	1.6070	2.3783	1.6070
Struct	10.000 16.20000 5.00000 86.33000 2.3783 1.6070 2.3783 1.6070 Structure: 10b Eldon B Sub-structure:						
Dist.	0	oordinate			Die	placeme	nte
2180.	×		2.0	x	v		Perpendicular
	*	У	2	*	Ŷ	the	to Line
						Line	to file

[m]	[m]		[m]				[mm]
0.0	16.20000	5.00000	86.33000	2.3783	1.6070	1.6070	-2.3783
1.0000	16.20000		86.33000				-2.5949
	16.20000		86.33000				-2.8173
3.0000	16.20000	8.00000	86.33000	3.0429	1.4392	1.4392	-3.0429
	16.20000		86.33000				-3.2681
5.0000	16.20000	10.00000	86.33000	3.4882	1.1785	1.1785	-3.4882

Structure: Eldon Party b-c | Sub-structure:

Dist.	Coordinates				Displacements				
	x	У	z	x	У	Along the	Perpendicular to Line		
						Line			
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]		
0.0	16.20000	10.00000	86.33000	3.4882	1.1785	-3.4882	-1.1785		
1.0000	15.20000	10.00000	86.33000	3.3297	1.0537	-3.3297	-1.0537		
2.0000	14.20000	10.00000	86.33000	3.1593	0.94026	-3.1593	-0.94026		
3.0000	13.20000	10.00000	86.33000	2.9790	0.83681	-2.9790	-0.83681		
4.0000	12.20000	10.00000	86.33000	2.7906	0.74217	-2.7906	-0.74217		
5.0000	11.20000	10.00000	86.33000	2.5952	0.65534	-2.5952	-0.65534		
6.0000	10.20000	10.00000	86.33000	2.3938	0.57544	-2.3938	-0.57544		
7.0000		10.00000					-0.50170		
8.0000	8.20000	10.00000	86.33000	1.9767	0.43348	-1.9767	-0.43348		
9.0000	7.20000	10.00000	86.33000	1.7622	0.37020	-1.7622	-0.37020		
10.000	6.20000	10.00000	86.33000	1.5443	0.31136	-1.5443	-0.31136		

Structure: 10b Eldon C | Sub-structure:

Dist.	Coordinates			Displacements				
	x	У	z	х	Y	Along	Perpendicular	
						the Line	to Line	
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]	
0.0	6.20000						1.5443	
1.0000	6.20000	9.00000	86.33000	1.4621	0.35374	-0.35374	1.4621	
2.0000	6.20000	8.00000	86.33000	1.3728	0.38748	-0.38748	1.3728	
3.0000	6.20000	7.00000	86.33000	1.2775	0.41210	-0.41210	1.2775	
4.0000	6.20000	6.00000	86.33000	1.1775	0.42732	-0.42732	1.1775	
5.0000	6.20000	5.00000	86.33000	1.0739	0.43301	-0.43301	1.0739	

Structure: 10c Eldon A | Sub-structure:

Dist.	Coordinates			Displacements			
	x	У	z	x	У	Along the	Perpendicular to Line
						Line	
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0.0	16.20000	10.00000	86.33000	3.4882	1.1785	1.1785	-3.4882
1.0000	16.20000	11.00000	86.33000	3.6982	0.99953	0.99953	-3.6982
2.0000	16.20000	12.00000	86.33000	3.8924	0.78900	0.78900	-3.8924
3.0000	16.20000	13.00000	86.33000	4.0647	0.54928	0.54928	-4.0647
4.0000	16.20000	14.00000	86.33000	4.2094	0.28442	0.28442	-4.2094
5.0000	16.20000	15.00000	86.33000	4.3215	0.0	0.0	-4.3215

Structure: Eldon Party c-d | Sub-structure:

Dist.	Co	oordinate	3		Di	splaceme	ents
	x	У	z	x	У	Along	Perpendicular
						the	to Line
						Line	
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
		15.00000		4.3215	0.0	-4.3215	0.0
1.0000	15.20000	15.00000	86.33000	4.0702	0.0	-4.0702	0.0
		15.00000		3.8190	0.0	-3.8190	0.0
3.0000	13.20000	15.00000	86.33000	3.5677	0.0	-3.5677	0.0
4.0000	12.20000	15.00000	86.33000	3.3165	0.0	-3.3165	0.0
		15.00000			0.0	-3.0652	0.0
6.0000	10.20000	15.00000	86.33000	2.8140	0.0	-2.8140	0.0
7.0000	9.20000	15.00000	86.33000	2.5627	0.0	-2.5627	0.0
8.0000	8.20000	15.00000	86.33000	2.3115	0.0	-2.3115	0.0
9.0000	7.20000	15.00000	86.33000	2.0602	0.0	-2.0602	0.0
10.000	6.20000	15.00000	86.33000	1.8090	0.0	-1.8090	0.0
5.0000 6.0000 7.0000 8.0000 9.0000	11.20000 10.20000 9.20000 8.20000 7.20000	15.00000 15.00000 15.00000 15.00000 15.00000	86.33000 86.33000 86.33000 86.33000 86.33000 86.33000	3.0652 2.8140 2.5627 2.3115 2.0602	0.0 0.0 0.0 0.0	-3.0652 -2.8140 -2.5627 -2.3115 -2.0602	0.0 0.0 0.0 0.0 0.0

Struct	ure: 10c	Eldon B	Sub-stru	cture:					
Dist.	st. Coordinates				Displacements				
	x	У	z	x	У		ong the		
							Line		
			[m]				[mm]	[mm	
			86.33000				0.0		1.8090
			86.33000						1.7790
			86.33000						1.7366
			86.33000				0.20356		1.6827
			86.33000						1.6183
5.0000	6.20000	10.00000	86.33000	1.5443	0.311	L36 -I	0.31136		1.5443
Struct		Eldon A oordinate	Sub-stru	icture:	Dis	splaces	ments		
	x	У	z	x	У		Perpend		
						the	to I	line	
						Line			
[m]			[m]					n]	
			86.33000			0.0		4.3215	
			86.33000			0.0		6.4500	
			86.33000			0.0		6.4500	
			86.33000			0.0		-6.4500	
			86.33000			0.0		-6.4500	
5.0000	16.20000	20.00000	86.33000	6.4500	0.0	0.0	-	6.4500	

Structure: 10d Eldon B | Sub-structure:

Oasys

39 Rosslyn Hill, London NW3 5UJ GMA - Combined Movement

Job No.	Sheet No.	Rev.
J15236		
Drg. Ref.		
Made by ML	Date 05-Nov-2015	Checked

I.

Dist.	Coordinate: x y	s z	x	Displa y Alo		licular
f 1	x y [m] [m] 16.2000 20.0000 15.2000 20.0000 14.2000 20.0000 13.2000 20.0000 11.2000 20.0000 10.2000 20.0000 8.2000 20.0000 6.20000 20.0000 6.20000 20.0000	f 1	f	th Lin	e to I e	ine
[m] 0.0	[m] [m] 16.20000 20.00000	[m] 86.33000	[mm] 6.4500	0.0 -6.4	J [mn 500 750	0.0
2.0000	14.20000 20.00000	86.33000	5.7000	0.0 -5.7	000	0.0
4.0000	12.20000 20.00000 11.20000 20.00000	86.33000 86.33000	4.9500	0.0 -4.9	500 750	0.0
6.0000	10.20000 20.00000 9.20000 20.00000	86.33000	4.2000	0.0 -4.2	000	0.0
8.0000	8.20000 20.00000 7.20000 20.00000	86.33000 86.33000	3.4500 3.0750	0.0 -3.4	500 750	0.0
10.000	6.20000 20.00000	86.33000	2.7000	0.0 -2.7	000	0.0
	ure: 10d Eldon C	Sub-stru	cture:			
Dist.	Coordinate x y	s z	×	Displace	ments Perpendicu	lar
	x y [m] [m] 6.2000 20.0000 6.2000 18.0000 6.20000 18.0000 6.20000 16.0000 6.20000 15.0000	-		the Line	to Line	1
[m] 0.0	[m] [m] 6.20000 20.00000	[m] 86.33000 :	[mm] [2.7000	mm] [mm] 0.0 0.0	[mm] 2.7	000
1.0000 2.0000	6.20000 19.00000 6.20000 18.00000	86.33000 86.33000	2.7000 2.7000	0.0 0.0 0.0 0.0	2.7	/000 /000
3.0000	6.20000 17.00000 6.20000 16.00000	86.33000 86.33000	2.7000	0.0 0.0	2.7	000
5.0000	6.20000 15.00000	86.33000	1.8090	0.0 0.0	1.0	1090
Structu	ure: 29 Thurlow A	Sub-str	ucture:			
Dist.	Coordinate x y	s z	x	Displac y Alon	ements g Perpendi	cular
				the Lin	ements g Perpendi to Li e] [mm] 00	ne
[m] 0.0	[m] [m] 5.00000 25.00000 6.00000 25.00000 8.00000 25.00000 9.00000 25.00000 10.00000 25.00000 11.00000 25.00000 12.00000 25.00000 13.00000 25.00000	[m] 84.33000	[mm] 2.2500	[mm] [mm 0.0 2.25] [mm] 00	0.0
1.0000	6.00000 25.00000 7.00000 25.00000	84.33000 84.33000	2.6250	0.0 2.62	50	0.0 0.0 0.0
4.0000	9.00000 25.00000	84.33000 84.33000	3.7500	0.0 3.75	00	0.0
6.0000	11.00000 25.00000	84.33000 84.33000	4.5000	0.0 4.50	00	0.0
8.0000	13.00000 25.00000	84.33000	5.2500	0.0 5.25	00	0.0
Structu	ure: Party 29-30	Sub-stru	cture:			
Dist.	Image Coordinates x y [m] [m] 13.0000 26.0000 13.0000 26.0000 13.0000 28.0000 13.0000 28.0000 13.0000 28.0000 13.0000 28.0000 13.0000 30.0000 13.0000 30.0000 13.0000 30.0000 13.0000 30.0000 13.0000 30.0000 13.0000 30.0000 13.0000 30.0000 13.0000 30.0000 13.0000 30.0000 13.0000 30.0000 13.0000 30.0000	s	v	Disp	lacements	rpendicular
[m]	[m] [m]	- [m]	[mm]	rum]	the Line	to Line
0.0	13.00000 25.00000 13.00000 26.00000	84.33000 84.33000	5.2500	0.0	0.0	-5.2500
2.0000 3.0000	13.00000 27.00000 13.00000 28.00000	84.33000 84.33000	3.4423 3.3443	-0.19124 -0.37159	-0.19124 -0.37159	-3.4423 -3.3443
4.0000	13.00000 29.00000 13.00000 30.00000	84.33000 84.33000	3.2263 3.0911	-0.53771 -0.68691	-0.53771 -0.68691	-3.2263 -3.0911
6.0000	13.00000 31.00000 13.00000 32.00000	84.33000 84.33000	2.9420	-0.81721	-0.81721	-2.9420
9.0000	13.00000 35.00000 13.00000 35.00000	84.33000 84.33000	2.4429	-1.0109	-1.01057	-2.4429
11.000	13.00000 36.00000	84.33000	2.0952	-1.1640	-1.1640	-2.0952
Structu	ure: 29 Thurlow B	Sub-str				
Structu Dist.	re: 29 Thurlow B Coordinate	Sub-str				
Structu Dist.	re: 29 Thurlow B Coordinate x y [m] [m]	Sub-str s [m]				
[m] 0.0 1.0000	rre: 29 Thurlow B Coordinates x y [m] [m] 13.00000 36.00000 12.00000 36.00000	Sub-stra z [m] 84.33000 84.33000				
[m] 0.0 1.0000 2.0000 3.0000	rre: 29 Thurlow B Coordinates x y [m] [m] 13.00000 36.00000 12.00000 36.00000 11.00000 36.00000 10.00000 36.00000	[Sub-str s [m] 84.33000 84.33000 84.33000 84.33000				
[m] 0.0 1.0000 2.0000 3.0000 4.0000 5.0000	rre: 29 Thurlow B Coordinate x y [m] [m] 13.00000 36.00000 12.00000 36.00000 10.00000 36.00000 9.00000 36.00000 8.00000 36.00000	[Sub-str				
Structu Dist. [m] 0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000	re: 29 Thurlow B Coordinate: x y [m] [m] 13.0000 36.00000 12.00000 36.00000 10.00000 36.00000 9.00000 36.00000 8.00000 8.00000 5.00000 36.00000 5.00000 36.00000	[Sub-str z [m] 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000				
[m] 0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000	Coordinate. x y [m] [m] 13.0000 36.0000 12.0000 36.0000 9.0000 36.0000 9.0000 36.0000 7.0000 36.0000 5.00000 36.0000	z [m] 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000	x [mm] 2.0952 1.9746 1.8417 1.6981 1.5445 1.2141 1.0382 0.85635			
<pre>[m]</pre>	Coordinate. x y [m] [m] 13.0000 36.0000 10.0000 36.0000 9.0000 36.0000 9.0000 36.00000 7.0000 36.00000 5.0000 36.00000 5.0000 36.00000 s.0000 36.00000	z [m] 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000	x [mm] 2.0952 1.9746 1.8417 1.6981 1.5445 1.2141 1.0382 0.85635	Dis; y [mm] -1.1640 -0.92086 -0.80861 -0.70222 -0.60140 -0.50586 -0.41528 -0.32936	placements Along E [mm] -2.0952 -1.9746 -1.8417 -1.5849 -1.3832 -1.2141 -1.0382 -0.85635 -0.85635	
[m] 0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000	Coordinate. x y [m] [m] 13.0000 36.0000 10.0000 36.0000 9.0000 36.0000 9.0000 36.00000 7.0000 36.00000 5.0000 36.00000 5.0000 36.00000 s.0000 36.00000	z [m] 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000	x [mm] 2.0952 1.9746 1.8417 1.6981 1.5445 1.2141 1.0382 0.85635	Disp y [mm] 2 -1.1640 -0.92086 -0.080861 -0.02086 2 -0.0140 -0.50586 2 -0.32936 pisp y	placements hlong II the Line [mm] -2.0952 -1.9746 -1.8417 -1.6981 -1.5449 -1.3832 -0.85635 lacements Along I	Perpendicular to Line [mm] 1.1640 1.0393 0.92086 0.80861 0.70222 0.60140 0.50586 0.41528 0.32936
Dist. [m] 0.0 1.0000 2.0000 3.0000 4.0000 5.0000 8.0000 Structu Dist.	Coordinate: x y [m] [m] 13.0000 36.0000 12.0000 36.0000 10.0000 36.0000 9.0000 36.0000 9.0000 36.0000 9.0000 36.0000 5.00000 36.0000 5.00000 36.0000 5.00000 36.0000 ice: 29 Thurlow C Coordinate: x y	s z [m] 84.33000 84.3400 84.3400 84.3400 84.3400 84.3400 84.3400 84.3400 84.3400 84.3400 84.3400 84.3400 84.3400 84.3400 84.3400 84.3400 84.34000 84.34000 84.34000 84.34000 84.34000 84.34000 84.34000 84.34000 84.34000 84.34000 84.34000 84.34000 84.34000 84.340000 84.340000 84.340000 84.340000 84.340000 84.340000 84.340000 84.340000 84.340000 84.340000 84.3400000 84.3400000000000000000000000000000000000	x [mm] 2.0952 1.9746 1.8417 1.6981 1.5449 1.3832 1.2141 1.0382 0.85635 ucture: x	Disg y [mm] 2 -1.1640 -0.20286 -0.20286 2 -0.20286 2 -0.32936 -0.32936 Disp y	placements Along I the Line [mm] -2.0952 -1.9746 -1.8417 -1.5449 -1.3832 -1.2141 -1.0382 -0.85635 lacements Along I the Line	Perpendicular to Line [mm] 1.1640 0.333 0.92086 0.80861 0.70222 0.60140 0.50586 0.41528 0.32936 Perpendicular to Line [mm]
Dist. [m] 0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 Structu Dist. [m] 0.0	Coordinate: x y 13.0000 6.00000 12.0000 5.00000 10.0000 5.00000 0.0000 5.00000 7.00000 36.00000 7.00000 36.00000 5.00000 36.00000 are: 29 Lurlow Coordinate: x y [m] [m] [m] [m] [m] [m]	s z [m] 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 1 Sub-str s z [m] 84.33000 1 Sub-str s	x [mm] 2.0952 1.9746 1.8417 1.6481 1.5445 1.3832 1.2141 1.0382 0.85635 ucture: x [mm] 0.85635	Dis; y [mm] 1.1640 - 0.2026 - 0.30286 - 0.50586 2 - 0.51586 2 - 0.32936 Disp y y [mm] - 0.32936	placements Along I the Line [mm] -2.0952 -3.9417 -3.6417 -1.649 -3.832 -0.85635 lacements Along [mm] (0.32936) 0.32936 0.32936	Perpendicular to Line [mm] 1.0393 0.92061 0.70222 0.60140 0.50586 0.41528 0.32936 Perpendicular to Line
Dist. [m] 0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 Structu Dist. [m] 0.0	Coordinate: x y 13.0000 6.00000 12.0000 5.00000 10.0000 5.00000 0.0000 5.00000 7.00000 36.00000 7.00000 36.00000 5.00000 36.00000 are: 29 Lurlow Coordinate: x y [m] [m] [m] [m] [m] [m]	s z [m] 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 1 Sub-str s z [m] 84.33000 1 Sub-str s	x [mm] 2.0952 1.9746 1.8417 1.6481 1.5445 1.3832 1.2141 1.0382 0.85635 ucture: x [mm] 0.85635	Dis; y [mm] 1.1640 - 0.2026 - 0.30286 - 0.50586 2 - 0.51586 2 - 0.32936 Disp y y [mm] - 0.32936	placements Along I the Line [mm] -2.0952 -3.9417 -3.6417 -1.649 -3.832 -0.85635 lacements Along [mm] (0.32936) 0.32936 0.32936	Perpendicular to Line [mm] 1.1640 0.92086 0.92086 0.92086 0.92086 0.41528 0.32936 Perpendicular to Line [mm] 0.85635 0.95051
Dist. [m] 0.0 2.0000 3.0000 4.0000 5.0000 8.0000 Structu Dist. [m] 0.0 1.0000 2.0000 3.0000 4.0000 5.00000 5.0000 5.000000 5.00000 5.00000 5.00000 5.000000 5.00000000 5.0000000000	Coordinate: x y [m] [m] 13.0000 36.0000 12.0000 36.0000 10.0000 36.0000 9.0000 36.0000 9.0000 36.0000 8.0000 36.0000 5.0000 36.0000 re: 29 Thurlow C Coordinate: y [m] [m] 5.0000 36.0000 5.0000 36.0000 5.0000 36.0000 5.0000 36.0000 5.0000 36.0000 5.0000 36.0000 5.0000 36.0000 5.0000 36.0000 5.0000 36.0000 5.0000 36.0000	s r [m] 44.33000 84.30	x [mm] 2.0952 1.9744 1.8417 1.6943 1.5445 1.3832 1.2141 1.0362 0.85635 0.85635 0.95051 1.0409 1.1265 1.2062 1.2792	Dis; y = -1.1640 = -1.0393 = -0.92066 = -0.80861 = -0.80861 = -0.50566 = -0.41528 = -0.32936 -0.32936 -0.32936 -0.32926 -0.32926 -0.32926 -0.32926 -0.32926 -0.32926 -0.32926 -0.32926 -0.2286 -0.22826 -0.22826 -0.22826 -0.22826 -0.22826 -0.22826 -0.22826 -0.22826 -0.22826 -0.22826 -0.22826 -0.22826 -0.22826 -0.2286 -0.2286 -0.2286 -0.22866 -0.2866 -0.2866 -0.2866 -0.2866 -0.2866 -0.28666	placements Along I the Line [mm] -2.0952 -1.9746 -1.8417 -1.6981 -1.3842 -1.3842 -1.3842 -1.3842 -1.3842 -0.85635 lacements Along I the Line [mm] 0.32902 0.32027 0.3028 0.228460 0.26661	Perpendicular to Line [mm] 1.1640 1.0393 0.92086 0.80861 0.70222 0.60140 0.50586 0.41528 0.32936 0.32936 Perpendicular to Line [mm] 0.85635 0.95051 1.0409 1.1265 1.2752 1.2752 1.3443
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Dist. [m] 0.0 1.0000 2.0000 3.0000 4.0000 5.0000 8.0000 Structu Dist. [m] 0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 9.0000 8.0000 9.0000 8.0000 9.0000 8.0000 9.0000 8.0000 9.0000 8.0000 9.0000 8.0000 9.0000 8.0000 9.0000 9.0000 8.0000 9.00000 9.00000 9.00000 9.00000 9.00000 9.000000 9.00000 9.0000000000	Coordinate: x y 13.0000 36.0000 12.0000 36.0000 10.0000 36.0000 10.0000 36.0000 0.0000 36.0000 7.00000 36.0000 7.00000 36.0000 7.00000 36.0000 5.00000 36.0000 x y [m] [m] 5.00000 36.00000 5.00000 36.00000 5.00000 36.00000 5.00000 36.00000 5.00000 36.00000 5.00000 36.00000 5.00000 36.00000 5.00000 36.00000 5.00000 30.00000 5.00000 30.00000 5.00000 30.00000 5.00000 30.00000 5.00000 30.00000 5.00000 30.00000 5.00000 30.00000 5.00000 30.00000	s [m] 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 1 Sub-str 5 2 [m] 84.33000 94.3555 94.3555 94.35555	x [rmm] 2.0955 1.9744 1.8417 1.6933 1.5445 1.3822 0.85635 0.85635 0.95051 1.0409 1.1265 1.2062 1.2792 1.3443 1.4005	Dis; y = .1.1640 - 0.20266 - 0.20266 - 0.32936 - 0.32936	placements Along I the Line [mn] -2.052 -2.052 -2.052 -2.052 -2.052 -2.052 -2.052 -2.052 -2.054 -1.5849 -1.3832 -0.85635 lacements Along I the Line [mn] 0.32936 0.33027 0.33027 0.33028 0.32027 0.33028 0.32027 0.33028 0.32027 0.33028 0.32027 0.33028 0.32027 0.33028 0.32027 0.33028 0.32027 0.33028 0.32027 0.33028 0.32027 0.33028 0.32027 0.32027 0.32027 0.33028 0.32027 0	Perpendicular to Line [mm] 1 0523 0 92086 0 80861 0 80861 0 80861 0 80861 0 80861 0 80861 0 80861 0 41528 0 32936 Perpendicular to Line [mm] 0 88635 0 95051 1 0409 1 1262 1 2722 1 3443 1 4405 1 4429
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Dist. [m] 0.0000 3.0000 5.0000 6.0000 7.0000 8.0000 Structu Dist. [m] 0.0 1.0000 2.0000 3.0000 8.0000 9.0000 5.0000 3.0000 5.0000 3.0000 5.0000 5.0000 3.0000 5.00000 5.00000 5.00000 5.00000 5.00000 5.00000 5.00000 5.00000 5.0000000000	Coordinate: x y 13.0000 36.0000 12.0000 36.0000 13.0000 36.0000 10.0000 36.0000 0.0000 36.0000 0.0000 36.0000 0.0000 36.0000 0.0000 36.0000 0.0000 36.0000 0.0000 36.0000 12.0000 36.0000 12.0000 36.0000 5.0000 36.0000 5.0000 36.0000 5.0000 30.0000 5.0000 30.0000 5.0000 30.0000 5.0000 30.0000 5.0000 30.0000 5.0000 20.0000 5.0000 20.0000 5.0000 20.0000 5.0000 20.0000 5.0000 20.0000 5.0000 20.0000 5.0000 20.0000 5.0000 20.0000 5.0000 20.0000 10.0000<	s s s s s s s s s s s s s s	ucture: x [mm] 1, 2, 055, 7, 1, 944 1, 945 1, 944 1, 945 1, 945 1, 944 1, 945 1, 945	Disp. y [-1.1640 -0.32086 -0.32086 -0.32086 -0.32086 -0.32936 -0.32936 -0.32936 -0.32936 -0.32936 -0.32920 -0.32920 -0.32027 -0.32027 -0.32028 -0.32027 -0.32028 -0.3008 -0.3008 -0.3008 -0.3008 -0.3008 -0.0	placements Along T the Line [Perpendicular to Line [mm] 1640 1.0393 0.92086 0.92086 0.92086 0.41528 0.32936 Perpendicular to Line [mm] 0.85051 1.0265 1.2265 1.2265 1.2265 1.2265 1.3443 1.4470 1.4470 1.4472 1.5075 2.2500 Cular ne
Dist. [m] 0.0000 3.0000 5.0000 6.0000 7.0000 8.0000 Structu Dist. [m] 0.0 1.0000 2.0000 3.0000 8.0000 9.0000 5.0000 3.0000 5.0000 3.0000 5.0000 5.0000 3.0000 5.00000 5.00000 5.00000 5.00000 5.00000 5.00000 5.00000 5.00000 5.0000000000	Coordinate: x y 13.0000 36.0000 14.0000 36.0000 10.0000 36.0000 10.0000 36.0000 0.0000 36.0000 0.0000 36.0000 0.0000 36.0000 0.0000 36.0000 0.0000 36.0000 0.0000 36.0000 0.0000 36.0000 0.0000 36.0000 5.0000 36.0000 5.0000 36.00000 5.0000 36.00000 5.0000 36.00000 5.0000 36.00000 5.0000 36.00000 5.0000 36.00000 5.0000 36.00000 5.0000 36.00000 5.0000 36.00000 5.0000 36.00000 5.0000 36.00000 5.0000 36.00000 5.0000 36.00000 5.0000 36.00000 5.0000 36.00000	s s s s s s s s s s s s s s	ucture: x [mm] 1, 2, 055, 7, 1, 944 1, 945 1, 944 1, 945 1, 945 1, 944 1, 945 1, 945	Disp. y [-1.1640 -0.32086 -0.32086 -0.32086 -0.32086 -0.32936 -0.32936 -0.32936 -0.32936 -0.32936 -0.32920 -0.32920 -0.32027 -0.32027 -0.32028 -0.32027 -0.32028 -0.3008 -0.3008 -0.3008 -0.3008 -0.3008 -0.0	placements Along T the Line [Perpendicular to Line [mm] 1.640 0.92086 0.92086 0.41528 0.32936 0.41528 0.32936 Perpendicular to Line [mm] 1.0409 1.1265 1.2402 1.2792 1.3408 1.4470 1.4259 2.2500 Cular .4470 1.4258 1.4470 1.4258 1.4470 1.4259 2.2500 Cular .4275 .2500 Cular .4275 .2500 Cular .4275 .2500 Cular .4275 .2500 Cular .4275 .2500 Cular .4275 .2500 Cular .4275 .2500 Cular .4275 .2500 Cular .4275 .2500 Cular .4275 .2500 Cular .4275 .2500 Cular .4275 .2500 Cular .4275 .2500 Cular .4275 .2500 Cular .4275 .2500 .4470 .4275 .2500
Dist. [m] 0.0 1.0000 2.0000 3.0000 5.0000 8.0000 Structu [m] 1.000 2.0000 3.0000 4.0000 5.0000 4.0000 5.0000 3.0000 8.0000 5.0000 3.0000 8.0000 5.0000 5.0000 3.0000 5.00000 5.00000 5.00000 5.00000 5.00000 5.00000 5.00000 5.00000 5.000000000 5.0000000000	Coordinate: x y 13.0000 6.0000 12.0000 36.0000 13.0000 36.0000 10.0000 36.0000 10.0000 36.0000 0.0000 36.0000 0.0000 36.0000 0.0000 36.0000 10.0000 36.0000 10.0000 36.0000 10.0000 36.0000 10.0000 36.0000 5.00000 36.0000 5.00000 30.0000 5.00000 30.0000 5.00000 30.0000 5.00000 30.0000 5.00000 30.0000 5.00000 30.0000 5.00000 20.0000 5.00000 20.0000 5.00000 20.0000 5.00000 20.0000 5.00000 20.0000 5.00000 25.00000 13.00000 50.0000 14.00000 25.00000 15.00000 25.00000 <	s s s s s s s s s s s s s s	ucture: x [mm] 1,9744 1,941 1,944 1,943 1,944 1,945 1,944 1,945 1,944 1,944 1,944 1,944 1,945 1,944 1,945 1,944 1,945 1,944 1,945 1,944 1,945 1,94	Disp. y [-1.1640 -0.32026 -0.50586 -0.32936 -0.00 -	placements Along I the Line I and the Line I and the line Along I the Line I and the li	Perpendicular to Line [mm] 1640 1.0393 0.92086 0.92086 0.92086 0.41528 0.32936 Perpendicular to Line [mm] 0.85051 1.0265 1.2265 1.2265 1.2265 1.2265 1.3443 1.4470 1.4470 1.4472 1.5075 2.2500 Cular ne
Dist. [m] 0.0 1.0000 2.0000 5.0000 5.0000 5.0000 5.0000 5.0000 5.0000 0.0000 5.00000 5.00000 5.000000 5.00000000 5.00000 5.00000 5.0000000000	Coordinate: x y 13.0000 6.0000 12.0000 36.0000 12.0000 36.0000 12.0000 36.0000 10.0000 36.0000 5.0000 36.0000 7.0000 36.0000 5.0000 36.0000 5.0000 36.0000 5.0000 36.0000 5.0000 36.0000 5.0000 36.0000 5.0000 36.0000 5.0000 30.0000 5.0000 30.0000 5.0000 30.0000 5.0000 20.0000 5.0000 20.0000 5.0000 20.0000 5.0000 20.0000 5.0000 25.0000 5.0000 25.0000 5.0000 25.0000 5.0000 25.0000 5.0000 25.0000 13.00000 25.0000 14.00000 25.0000 15.00000 25.00000 16.	s z (m) 84.33000 84.330	x x (mm) 1.0974 1.9474 1.9474 1.9474 1.9474 1.9474 1.9474 0.85635 0.85635 0.85635 0.85635 0.85635 0.85635 0.85635 1.0470 0.95051 1.0425 2.2500 ucture: x (mm) 5.2505 2.2505 0.4470 0.8573 8.6537 8.6533 0.2525 1.2525 1.2525 1.2525 1.2525 1.2575	Disg y -1.0393 -0.92086 -0.92086 -0.92086 -0.92086 -0.92086 -0.92086 -0.92086 -0.92086 -0.92086 -0.92086 -0.92986 -0.32936 -0.39	placements Along I the Line [mm] 52 -1.9746 -1.9746 -1.9746 -1.9746 -1.9746 -1.9746 -1.9746 -1.9746 -1.9746 -1.9746 -1.98635 Along I -1.9417	Perpendicular to Line [mm] 1 (393) 0.92086 0.80861 0.02026 0.41528 0.32936 Perpendicular to Line [mm] 0.95561 1.0262 1.2252 1.2792 1.3443 1.4470 1.4429 1.5075 2.2500 cular ne 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Dist. [m] 0.0 1.0000 2.0000 5.0000 5.0000 5.0000 5.0000 5.0000 5.0000 0.0000 5.00000 5.00000 5.000000 5.00000000 5.00000 5.00000 5.0000000000	Coordinate: x y 13.0000 6.0000 12.0000 36.0000 12.0000 36.0000 12.0000 36.0000 10.0000 36.0000 5.0000 36.0000 7.0000 36.0000 5.0000 36.0000 5.0000 36.0000 5.0000 36.0000 5.0000 36.0000 5.0000 36.0000 5.0000 36.0000 5.0000 30.0000 5.0000 30.0000 5.0000 30.0000 5.0000 20.0000 5.0000 20.0000 5.0000 20.0000 5.0000 20.0000 5.0000 25.0000 5.0000 25.0000 5.0000 25.0000 5.0000 25.0000 5.0000 25.0000 13.00000 25.0000 14.00000 25.0000 15.00000 25.00000 16.	s z (m) 84.33000 84.330	x x (mm) 1.0974 1.9474 1.9474 1.9474 1.9474 1.9474 1.9474 0.85635 0.85635 0.85635 0.85635 0.85635 0.85635 0.85635 1.0470 0.95051 1.0425 2.2500 ucture: x (mm) 5.2505 2.2505 0.4470 0.8573 8.6537 8.6533 0.2525 1.2525 1.2525 1.2525 1.2525 1.2575	Disg y -1.0393 -0.92086 -0.92086 -0.92086 -0.92086 -0.92086 -0.92086 -0.92086 -0.92086 -0.92086 -0.92086 -0.92986 -0.32936 -0.39	placements Along I the Line [mm] 52 -1.9746 -1.9746 -1.9746 -1.9746 -1.9746 -1.9746 -1.9746 -1.9746 -1.9746 -1.9746 -1.98635 Along I -1.9417	Perpendicular to Line [mm] 1 (393) 0.92086 0.80861 0.02026 0.41528 0.32936 Perpendicular to Line [mm] 0.95561 1.0262 1.2252 1.2792 1.3443 1.4470 1.4429 1.5075 2.2500 cular ne 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Dist. [m] 0.0 1.0000 2.0000 5.0000 5.0000 5.0000 5.0000 5.0000 5.0000 0.0000 5.00000 5.0000 5.0000 5.0000 5.0000 5.0000 5.0000 5.00	Coordinate: x y 13.0000 6.0000 12.0000 36.0000 12.0000 36.0000 12.0000 36.0000 10.0000 36.0000 5.0000 36.0000 7.0000 36.0000 5.0000 36.0000 5.0000 36.0000 5.0000 36.0000 5.0000 36.0000 5.0000 36.0000 5.0000 36.0000 5.0000 30.0000 5.0000 30.0000 5.0000 30.0000 5.0000 20.0000 5.0000 20.0000 5.0000 20.0000 5.0000 20.0000 5.0000 25.0000 5.0000 25.0000 5.0000 25.0000 5.0000 25.0000 5.0000 25.0000 13.00000 25.0000 14.00000 25.0000 15.00000 25.00000 16.	s z (m) 84.33000 84.330	x x (mm) 1.0974 1.9474 1.9474 1.9474 1.9474 1.9474 1.9474 0.85635 0.85635 0.85635 0.85635 0.85635 0.85635 0.85635 1.0470 0.95051 1.0425 2.2500 ucture: x (mm) 5.2505 2.2505 0.4470 0.8573 8.6537 8.6533 0.2525 1.2525 1.2525 1.2525 1.2525 1.2575	Disg y -1.0393 -0.92086 -0.92086 -0.92086 -0.92086 -0.92086 -0.92086 -0.92086 -0.92086 -0.92086 -0.92086 -0.92986 -0.32936 -0.39	placements Along I the Line [mm] 52 -1.9746 -1.9746 -1.9746 -1.9746 -1.9746 -1.9746 -1.9746 -1.9746 -1.9746 -1.9746 -1.98635 Along I -1.9417	Perpendicular to Line [mm] 1 (393) 0.92086 0.80861 0.02026 0.41528 0.32936 Perpendicular to Line [mm] 0.95561 1.0262 1.2252 1.2792 1.3443 1.4470 1.4429 1.5075 2.2500 cular ne 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Dist. [m] 0.0 1.0000 2.0000 5.0000 5.0000 5.0000 5.0000 5.0000 5.0000 0.0000 5.00000 5.0000 5.0000 5.0000 5.0000 5.0000 5.0000 5.00	Coordinate: x y 13.00003 6.00000 12.00003 36.00000 12.00003 36.00000 10.00003 36.00000 0.00003 36.00000 0.00003 36.00000 0.00003 36.00000 0.00003 36.00000 5.000003 36.00000 5.000003 36.00000 5.000003 36.00000 5.000003 36.00000 5.000003 30.00000 5.000003 30.00000 5.000003 26.00000 5.000003 27.00000 5.000003 27.00000 5.000003 27.00000 5.000003 27.00000 5.000003 27.00000 5.000003 27.00000 5.000003 25.00000 11.000003 25.00000 12.00002 25.00000 13.000003 25.00000 13.000003 25.00000 13.000003 25.00000 10	s z (m) 84.33000 84.330	x x (mm) 1.0974 1.9474 1.9474 1.9474 1.9474 1.9474 1.9474 0.85635 0.85635 0.85635 0.85635 0.85635 0.85635 0.85635 1.0470 0.95051 1.0425 2.2500 ucture: x (mm) 5.2505 2.2505 0.4470 0.8573 8.6537 8.6533 0.2525 1.2525 1.2525 1.2525 1.2525 1.2575	Disg y -1.0393 -0.92086 -0.92086 -0.92086 -0.92086 -0.92086 -0.92086 -0.92086 -0.92086 -0.92086 -0.92086 -0.92986 -0.32936 -0.39	placements Along I the Line [mm] 52 -1.9746 -1.9746 -1.9746 -1.9746 -1.9746 -1.9746 -1.9746 -1.9746 -1.9746 -1.9746 -1.98635 Along I -1.9417	Perpendicular to Line [mm] 1 (393) 0.92086 0.80861 0.02026 0.41528 0.32936 Perpendicular to Line [mm] 0.95561 1.0262 1.2252 1.2792 1.3443 1.4470 1.4429 1.5075 2.2500 cular ne 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.



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GMA - Combined Movement

Job No.	Sheet No.	Rev.
J15236		
Drg. Ref.		
Made by ML	Date 05-Nov-2015	Checked

	ML	05-Nov-2015
Dist. Coordinates Displacements x y z x y Along Perpendicular the Line to Line [m] [m] [m] [mm] [mm] [mm]		
[m] [m] [m] [mm] [mm] [mm] [mm] Dist. Coordinates Displacements x y z x y Along Perpendicular		
the to Line Line [m] [m] [m] [mm] [mm] [mm]		
0.0 21.00000 28.00000 84.33000 5.2275 -1.0455 5.2275 -1.0455 1.0000 22.00000 28.00000 84.33000 5.4999 -1.2222 5.4999 -1.2222 2.0000 23.00000 28.00000 84.33000 5.7493 -1.4373 5.7493 -1.4373 3.0000 24.00000 28.00000 84.33000 5.9640 -1.7040 5.9640 -1.7040		
Structure: 30 Thurlow D Sub-structure:		
Dist. Coordinates Displacements x y z x y Along Perpendicular the to Line Line		
[m] [m] [m] [m] [mm] [mm] [mm] [mm] [mm		
2.0000 24.0000 30.00000 84.33000 4.7022 -2.6870 -2.6870 -4.7022 3.0000 24.0000 31.00000 84.33000 4.0980 -2.9272 -4.0980 4.0000 24.0000 32.00000 84.33000 3.5492 -3.0421 -3.0421 -3.5492 5.0000 24.0000 33.00000 84.33000 3.6597 -3.0637 -3.6637 -3.6637		
6.0000 24.00000 34.00000 84.33000 2.7975 -3.1971 -3.1971 -2.7975 7.0000 24.00000 35.00000 84.33000 2.5335 -3.2574 -3.2574 -2.5335 8.0000 24.00000 35.00000 84.33000 2.2892 -3.2703 -2.2892		
Structure: 30 Thurlow E Sub-structure:		
Dist. Coordinates Displacements x y z x y Along Perpendicular the to Line		
Line Line [m] [m] [mm] [mm] 0.0 24.00000 36.00000 84.33000 2.2892 3.2703 1.0000 23.00000 36.00000 84.33000 2.3595 2.9448		
2.0000 22.00000 36.00000 84.33000 2.3792 -2.6436 -2.3792 2.6436 3.0000 21.00000 36.00000 84.33000 2.3676 -2.3676 -2.3676 2.3676 4.0000 20.00000 36.00000 84.33000 2.4261 -2.2056 -2.4261 2.2056		
5.0000 19.00000 36.00000 84.33000 2.4519 -2.0433 -2.4519 2.0433 6.0000 18.00000 36.00000 84.33000 2.4484 -1.8834 -2.4484 1.8834 7.0000 17.00000 36.00000 84.33000 2.4188 -1.7277 -2.4188 1.7277 8.0000 16.00000 36.00000 84.33000 2.3661 -1.5774 -2.3661 1.5774		
9.0000 15.00000 36.00000 84.33000 2.2930 -1.4331 -2.2930 1.4331 10.000 14.00000 36.00000 84.33000 2.2020 -1.2953 -2.2020 1.2953 11.000 13.00000 36.00000 84.33000 2.0952 -1.1640 -2.0952 1.1640		
Structure: 30A Thurlow A Sub-structure:		
Dist. Coordinates Displacements x y z x y Along Perpendicular the to Line		
Line Line [m] [m] [mm] [mm] 0.0 26.40000 30.00000 83.33000 4.2333 -3.6811 1.1000 27.50000 30.00008 83.33000 3.8559 -4.4068		
2.2000 28.6000 30.00000 83.33000 3.3589 -5.5981 3.3589 -5.5981 3.3000 29.70000 30.00000 83.33000 2.2532 -6.9330 2.2552 -6.9330 4.4000 30.80000 30.00000 83.33000 0.40310 -8.0520 0.40310 -8.0620		
Structure: 30A Thurlow B Sub-structure:		
Dist. Coordinates Displacements x y z x y Along Perpendicular the to Line Line		
[m] [m] [m] [m] [mm] [mm] [mm] [mm] [mm		
Structure: 30A Thurlow C Sub-structure:		
Dist. Coordinates Displacements x y z x y Along Perpendicular the to Line		
ime ime [m] [m] [mm] [mm] [mm] 0.0 30.80000 28.40000 33.3000 0.72400 -8.6880 0.90000 31.70000 28.40000 33.3000 -13.377 0.0 -13.377		
1.8000 32.60000 28.40000 83.33000 0.0 -13.377 0.0 -13.377 2.7000 33.50000 28.40000 83.33000 0.0 -13.377 0.0 -13.377 3.6000 34.40000 28.40000 83.33000 0.0 -13.377 0.0 -13.377		
Structure: 30A Thurlow D Sub-structure:		
Dist. Coordinates Displacements x y z x y Along Perpendicular the to Line Line		
[m] [m] [m] [m] [mm] [mm] [mm] [mm] 0.034.40000 28.40000 83.33000 0.0 -13.377 -13.377 0.0 0.96000 34.40000 29.36000 83.33000 0.0 -12.690 -12.690 0.0		
1.9200 34.40000 30.32000 83.33000 0.0 -12.034 -12.034 0.0 2.8600 34.40000 31.2600 83.33000 0.0 -11.406 -11.406 0.0 3.8400 34.40000 32.24000 83.33000 0.0 -10.802 -10.802 0.0 4.8000 34.40000 33.2000 83.33000 0.0 -10.220 -10.220 0.0		
5.7600 34.40000 34.16000 83.33000 0.0 -9.6554 -9.6554 0.0 6.7200 34.40000 35.12000 83.33000 0.0 -9.1047 -9.1047 0.0 7.6800 34.40000 36.08000 83.33000 0.0 -8.5666 -8.5646 0.0		
8.6400 34.40000 37.04000 83.33000 0.0 -8.0315 -8.0315 0.0 9.6000 34.40000 38.0000 83.33000 0.0 -7.5019 -7.5019 0.0		
Structure: 30A Thurlow E Sub-structure: Dist. Coordinates Displacements x y z x y Along Perpendicular		
the Line to Line [m] [m] [mm] [mm] 0.0 34.40000 38.00000 63.33000 0.0 -7.5019		
1.0000 33.40000 83.3000 0.0 -7.5019 0.0 7.5019 2.0000 32.40000 83.00000 83.3300 0.0 -7.5019 0.0 7.5019 3.0000 31.40000 83.00000 83.3300 0.0 -7.5019 0.0 7.5019 4.0000 31.40000 83.00000 83.33000 0.407 -4.9340 -7.49340		
5.0000 29.40000 38.00000 83.33000 0.53231 -4.7423 -0.63231 4.7423 6.0000 28.40000 38.00008 83.33000 0.97692 -4.5089 -0.97692 4.5089 7.0000 27.40000 38.00008 83.33000 1.2734 -4.2447 -1.2734 4.2447 8.0000 26.40000 38.00008 83.33000 1.5184 -3.9611 -1.5184 3.9611		
8.0000 20.40000 38.33000 1.5184 -3.9611 -1.5184 -3.9611 Structure: 30A Thurlow F Sub-structure:		
Dist. Coordinates Displacements x y z x y Along Perpendicular the to Line		
Line n [m] [m] [mm] [mm] 0.0 26.40000 38.00000 1.5184 -3.9611 1.5184		
1.0000 26.40000 37.00000 83.33000 1.7006 -4.0666 4.0666 1.7006 2.0000 26.40000 36.0000 83.33000 1.9399 -4.2173 4.2173 1.9399 3.0000 26.40000 35.00000 83.33000 2.2090 -4.3219 4.3219 2.2090		



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Job No.	Sheet No.	Rev.
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Made by ML	Date 05-Nov-2015	Checked

Dist.	-						
		oordinate: y	z	x	у	the	erpendicular to Line
4.0000 5.0000 6.0000 7.0000 8.0000	26.40000 26.40000 26.40000 26.40000 26.40000 26.40000	34.00000 33.00000 32.00000 31.00000 30.00000	83.33000 83.33000 83.33000 83.33000 83.33000 83.33000	2.5111 2.8480 3.2171 3.6062 4.2333	-4.3671 -4.3340 -4.1962 -3.9197 -3.6811	Line 1.3671 1.3340 1.1962 3.9197 3.6811	2.5111 2.8480 3.2171 3.6062 4.2333
Structu	re: 41 R	osslyn A	Sub-stru	ucture:			
Dist.	c x	oordinate: Y	s z	x	Dis y	Along	Perpendicular
[m]	[m]	[m]				Tine	co hine
0.0	43.00000	[m] 31.00000 31.00000 31.00000 31.00000 31.00000 31.00000 31.00000 31.00000	80.33000 80.33000	-3.1909	-7.977	3 -3.190 L -3.731	-7.9773 -6.2191 7 -4.7671
2.0000 3.0000 4.0000	46.00000	31.00000	80.33000 80.33000 80.33000	-3.6406	-3.640	5 -3.640 5 -3.349	-4.7671 5 -3.6406 9 -2.7916
5.0000	48.00000	31.00000 31.00000	80.33000 80.33000 80.33000	-3.0204	-2.157	1 -3.020 5 -2.692	4 -2.1574 L -1.6825 D -1.3239
8.0000	51.00000 52.00000	31.00000	80.33000 80.33000	-2.0999	-1.049	9 -2.099 2 -1.846	-1.0499 7 -0.83942
10.000 11.000 12.000	53.00000 54.00000 55.00000	31.00000 31.00000 31.00000	80.33000 80.33000 80.33000	-1.6530 -1.4785 -1.3214	-0.6887	5 -1.653 5 -1.478 2 -1.321	9 -1.0499 7 -0.83942 0 -0.68875 5 -0.56866 4 -0.47192
		osslyn B					
Dist.	c	oordinate			Di	splaceme	nts
[m]	x [m]	y [m]				CIIC 21.	Perpendicular ne to Line [mm]
0.0	55.00000 55.00000	31.00000	80.33000 80.33000 80.33000	-1.3214	-0.4719	2 -0.471	[mm] 92 1.3214 48 1.4898 22 1.6184
3.0000 4.0000	55.00000 55.00000	34.00000	80.33000 80.33000	-1.7083	-0.9761	3 -0.976 7 -1.13	1.6184 1.7083 27 1.7619
5.0000	55.00000 55.00000	[m] 31.00000 32.00000 33.00000 34.00000 35.00000 36.00000 37.00000 38.00000 39.00000	80.33000 80.33000 80.33000	-1.7827	-1.273	1 -1.27 1 -1.39	1.7827 1.7747 1.7747
3.0000	55.00000	39.00000	80.33000	-1.6882	-1.567	7 -1.56	30 1.7418 77 1.6882
		osslyn C	Sub-stru	ucture:			
Dist.	x	oordinate: y	s z	x	Dis] Y	Along the	ts Perpendicular to Line
[m] 0.0	[m]	[m] 39.00000	[m] 80.33000	[mm]	[mm] 2 -1.567	Line [mm]	[mm] 2 1.5677 1 1.8051 3 2.0717 1 2.3697 3 2.7011 4 3.0671 4 3.0671
1.0000	54.00000 53.00000	39.00000 39.00000 39.00000	80.33000 80.33000	-1.805	1 -1.805 3 -2.071	1.805 1.912	1.8051 2.0717
3.0000	52.00000 51.00000 50.00000	39.00000	80.33000 80.33000 80.33000	-2.005	1 -2.369 8 -2.701 4 -3.067	7 2.005 L 2.077	1 2.3697 3 2.7011 4 3.0671
6.0000	49.00000	39.00000	80.33000	-2.134	0 -3.467	3 2.134	3.4678
B.0000 9.0000	47.00000 46.00000 45.00000	39.00000	80.33000 80.33000 80.33000	-2.013 -1.864	8 -4.363 1 -4.846 5 -5 341	2 2.013	4.3632 4.8466 5 5.3412
11.000	44.00000	39.00000 39.00000 39.00000 39.00000 39.00000 39.00000	80.33000 80.33000	-1.346	2 -5.833	1.346 0.9702	5 5.3412 2 5.8333 5 6.3066
Structu	re: 41 R	osslyn D					
Dist.	c x	oordinate: Y	s z	x	Dis] Y	Along	Perpendicular
[m]							to Line
0.0	[m]	[m]	[m]	[mm]	[mm]	Line [mm]	[mm]
2 0000	[m] 43.00000 43.00000	[m] 39.00000 38.00000	[m] 80.33000 80.33000	[mm] -0.9702 -1.094	[mm] 5 -6.3060 2 -6.5650	Line [mm] 5 6.3066 1 6.5654	[mm] -0.97025 -1.0942 -1.2599
1.0000 2.0000 3.0000 4.0000	[m] 43.00000 43.00000 43.00000 43.00000 43.00000	[m] 39.00000 38.00000 37.00000 36.00000 35.00000	[m] 80.33000 80.33000 80.33000 80.33000 80.33000	[mm] -0.9702 -1.094 -1.259 -1.457 -1.689	[mm] 5 -6.306 2 -6.565 9 -6.929 3 -7.286 6 -7.603	Line [mm] 5 6.3066 4 6.5654 7 6.9297 5 7.2865 2 7.6032	[mm] -0.97025 -1.0942 -1.2599 -1.4573 -1.6896
1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000	[m] 43.00000 43.00000 43.00000 43.00000 43.00000 43.00000 43.00000	[m] 39.00000 38.00000 37.00000 36.00000 35.00000 34.00000 33.00000 32.00000	[m] 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000	[mm] -0.9702 -1.094 -1.259 -1.457 -1.689 -1.966 -2.299 -2.702	[mm] 5 -6.306 2 -6.565 9 -6.929 3 -7.286 6 -7.603 3 -7.865 4 -8.048 2 -8.049	Line [mm] 5 6.3066 4 6.5654 7 6.9297 5 7.2865 2 7.6032 3 7.8652 3 7.8632 3 7.8632 3 8.0480 5 8.1095	[mm] -0.97025 -1.0942 -1.2599 -1.4573 -1.6896 -1.9663 -2.2994 -2.7032
1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000	Lm] 43.00000 43.00000 43.00000 43.00000 43.00000 43.00000 43.00000 43.00000 43.00000	[m] 39.00000 38.00000 37.00000 36.00000 35.00000 34.00000 33.00000 32.00000 31.00000	[m] 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000	[mm] -0.9702 -1.094 -1.259 -1.457 -1.689 -1.966 -2.299 -2.703 -3.190	[mm] 5 -6.306 2 -6.565 9 -6.929 3 -7.286 3 -7.865 4 -8.048 2 -8.109 9 -7.977	Line [mm] 6 6.3066 4 6.5654 7 6.9297 5 7.2865 2 7.6032 3 7.8653 8.0480 5 8.1095 3 7.9773	[mm] -0.97025 -1.0942 -1.2599 -1.4573 -1.6896 -1.9663 -2.2994 -2.7032 -3.1909
Structu	re: Part	y 37-39	Sub-strue				[mm] -0.97025 -1.0942 -1.2599 -1.4573 -1.6896 -1.9663 -2.2994 -2.7032 -3.1909
Structu Dist.	re: Part C x	y 37-39 oordinates y	Sub-struc s z	x y	Displace Along the	ements Perpend to L	icular
Structu Dist.	re: Part C x	y 37-39 oordinates y	Sub-struc s z	x y	Displace Along the	ements Perpend to L	icular ine
Structu Dist.	re: Part C x	y 37-39 oordinates y	Sub-struc s z	x y	Displace Along the	ements Perpend to L	icular ine 0.0 0.0 0.0 0.0
Structu Dist.	re: Part C x	y 37-39 oordinates y	Sub-struc s z	x y	Displace Along the	ements Perpend to L	icular ine 0.0 0.0
Structu Dist.	re: Part C x	y 37-39 oordinates y	Sub-struc s z	x y	Displace Along the	ements Perpend to L	icular ine 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Structu Dist.	re: Part C x	y 37-39 oordinates y	Sub-struc s z	x y	Displace Along the	ements Perpend to L	icular ine 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
Structu Dist.	re: Part C x	y 37-39 oordinates	Sub-struc s z	x y	Displace Along the	ements Perpend to L	icular ine) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0
[m] 0.0 1.0000 2.0000 4.0000 5.0000 6.0000 7.0000 8.0000 10.000 11.000 Structu	re: Part (m] 44.00000 45.00000 46.00000 48.00000 50.00000 50.00000 51.00000 53.00000 53.00000 re: 39 R	y 37-39 oordinates y [m] 15.000000 15.00000 15.000000 15.000000 15.000000 15.0000000000 15.000000000000000000000000000000000000	Sub-struc s z [m] 80.33000 80.30000 80.30000 80.30000 80.30000 80.30000 80.	x y [mm] [m 0.0 0 0.0 0	Displac: Along the I.ine m] [mm] 0 0.0 0 0	ments Perpend to L [mm	icular ine) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0
[m] 0.0 1.0000 2.0000 3.0000 4.0000 5.0000 5.0000 8.0000 9.0000 10.000 11.000 Structu Dist.	re: Part C x [m] 44.00000 45.00000 46.00000 46.00000 51.00000 53.00000 55.000000 55.000000 55.000000 55.0000000000	y 37-39 oordinates y [m] 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 05.0000 05.00000 05.000000000 05.000000 05.0000000000	Sub-struc [m] 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 1 Sub-stru 8 2	x y [mm] [m 0.0 0 0.0 0.0	Displace Along Line m] [mm] .0 0.0 .0 0.0	ements Perpend to L [mm ements Perpend	icular 10 0.0 0.0 0.0 0.0 0.0 0.0 0.0
[m] 0.0 1.0000 2.0000 3.0000 4.0000 5.0000 5.0000 8.0000 9.0000 10.000 11.000 Structu Dist.	re: Part C x [m] 44.00000 45.00000 46.00000 46.00000 51.00000 53.00000 55.000000 55.000000 55.000000 55.0000000000	y 37-39 oordinates y [m] 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 05.0000 05.00000 05.000000000 05.000000 05.0000000000	Sub-struc [m] 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 1 Sub-stru 8 2	x y [mm] [m 0.0 0 0.0 0.0	Displace Along Line m] [mm] .0 0.0 .0 0.0	ements Perpend to L [mm ements Perpend	icular 0 0 0 0 0 0 0 0 0 0 0 0 0
[m] 0.0 1.0000 2.0000 3.0000 4.0000 5.0000 5.0000 8.0000 9.0000 10.000 11.000 Structu Dist.	re: Part C x [m] 44.00000 45.00000 46.00000 46.00000 51.00000 53.00000 55.000000 55.000000 55.000000 55.0000000000	y 37-39 oordinates y [m] 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 05.0000 05.00000 05.000000000 05.000000 05.0000000000	Sub-struc [m] 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 1 Sub-stru 8 2	x y [mm] [m 0.0 0 0.0 0.0	Displace Along Line m] [mm] .0 0.0 .0 0.0	ements Perpend to L [mm ements Perpend	icular) 0.0 0.0 0.0 0.0 0.0 0.0 0.0
[m] 0.0 1.0000 2.0000 3.0000 4.0000 5.0000 5.0000 8.0000 9.0000 10.000 11.000 Structu Dist.	re: Part C x [m] 44.00000 45.00000 46.00000 46.00000 51.00000 53.00000 55.000000 55.000000 55.000000 55.0000000000	y 37-39 oordinates y [m] 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 05.0000 05.00000 05.000000000 05.000000 05.0000000000	Sub-struc [m] 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 1 Sub-stru 8 2	x y [mm] [m 0.0 0 0.0 0.0	Displace Along Line m] [mm] .0 0.0 .0 0.0	ements Perpend to L [mm ements Perpend	icular ine) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0
Structu Dist. 0.0 1.0000 2.0000 3.0000 4.0000 5.0000 5.0000 8.0000 9.0000 10.000 11.000 Structu Dist.	re: Part C x [m] 44.00000 45.00000 46.00000 46.00000 51.00000 53.00000 55.000000 55.000000 55.000000 55.0000000000	y 37-39 oordinates y [m] 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 05.0000 05.00000 05.000000000 05.000000 05.0000000000	Sub-struc [m] 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 1 Sub-stru 8 2	x y [mm] [m 0.0 0 0.0 0.0	Displace Along Line m] [mm] .0 0.0 .0 0.0	ements Perpend to L [mm ements Perpend	icular ine) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0
[m] 0.0 1.0000 2.0000 3.0000 4.0000 5.0000 5.0000 8.0000 9.0000 10.000 11.000 Structu Dist.	re: Part C x [m] 44.00000 45.00000 46.00000 46.00000 51.00000 53.00000 55.000000 55.000000 55.000000 55.0000000000	y 37-39 oordinates y [m] 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 15.00000 05.0000 05.00000 05.000000000 05.000000 05.0000000000	Sub-struc [m] 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 1 Sub-stru 8 2	x y [mm] [m 0.0 0 0.0 0.0	Displace Along Line m] [mm] .0 0.0 .0 0.0	ements Perpend to L [mm ements Perpend	icular ine 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
<pre>Structu Dist. [m] 0.0 1.0000 2.0000 4.0000 4.0000 4.0000 1.0000 5.0000 1.000 Structu Dist. [m] 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.</pre>	re: Part x [m] 44.00000 45.00000 45.00000 49.00000 55.000000 55.00000 55.00000 55.00000 55.00000 55.00000 55.00000 55.00000 55.00000 55.00000 55.00000 55.00000 55.00000 55.000000 55.000000 55.000000 55.0000000 55.0000000000	y 37-39 ordinates y [m] 15.00000 15.00000 15.0000	Sub-struc [m] 80.33000	x y [mm] [m 0.0 0.0	Displace Along Line m] [mm] .0 0.0 .0 0.0	ements Perpend to L [mm ements Perpend	icular ine 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Structu [m] 0.0 1.0000 2.0000 4.0000 6.0000 8.0000 9.0000 010.000 Structu Dist. [m] 0.0 0.0500 2.1200 0.31800 4.2400 0.31800 4.2400 0.31800 4.2400 0.31800 4.2400 0.31800 4.2400 0.31800 4.2400 0.31800 4.2400 0.31800 4.2400 0.31800 4.2400 0.31800 4.2400 0.31800 4.2400 0.31800 4.2400 0.31800 4.2400 0.31800 4.2400 0.318000 0.31800 0.318000 0.31800 0.318000 0.318000 0.318000 0.318000 0	re: Part	y 37-39 ordinates y [m] 15.00000 25.00000 24.54000 24.54000 25.60000 cosslyn B cordinates	Sub-struc (m] 80.33000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000	x y [mm] [m 0.0 0.0 0.0	Displace Allong the Line m] [mm] 0 0.0 0 0.0	aments Perpend to L [mm Perpend to L [mm	icular ine) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0
Structu [m] 0.0 0.000 2.0000 4.0000 4.0000 8.0000 Structu Dist. [m] 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	re: Part x [m] 44.00000 45.00000 45.00000 49.00000 50.00000 51.00000 51.00000 52.00000 55.000000 55.00000 55.00000 55.000000 55.000000000 55.000000 55.0000000000	y 37-39 ordinates y [m] 15.00000 25.00000 02.42000 20.30000 21.450000 22.450000 25.60000 osslyn B ordinates y	Sub-struc (m] 80.33000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.30000	x y [mm] [m 0.0 0.0	Displace Along the Imm [mm] 0 0.0 0 0.	ments Perpend to L [mm Perpend to L [mm Perpend to L [mm	icular ine 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Structu [m] 0.0 0.0000 2.0000 4.0000 8.0000 10.000 Structu Dist. [m] 0.0 0.0 0.0 0.000 1.000 Structu Dist. [m] 0.0 0.0000 0.0000 0.0000 0.00	re: Part x [m] 44.00000 45.00000 45.00000 49.00000 50.00000 51.00000 51.00000 52.00000 55.000000 55.00000 55.00000 55.000000 55.000000000 55.000000 55.0000000000	y 37-39 ordinates y [m] 15.00000 25.00000 02.42000 20.30000 21.450000 22.450000 25.60000 osslyn B ordinates y	Sub-struc (m] 80.33000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.30000	x y [mm] [m 0.0 0.0	Displace Along the Imm [mm] 0 0.0 0 0.	ments Perpend to L [mm Perpend to L [mm Perpend to L [mm	icular ine 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Structu [m] 0.0 2.0000 2.0000 6.0000 8.0000 8.0000 Structu Dist. [m] 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	re: Part x [m] 44.00000 45.00000 45.00000 49.00000 50.00000 51.00000 51.00000 52.00000 55.000000 55.00000 55.00000 55.000000 55.000000000 55.000000 55.0000000000	y 37-39 ordinates y [m] 15.00000 25.00000 24.54000 24.54000 25.60000 cosslyn B cordinates	Sub-struc (m] 80.33000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.30000	x y [mm] [m 0.0 0.0	Displace Along the Imm [mm] 0 0.0 0 0.	ments Perpend to L [mm Perpend to L [mm Perpend to L [mm	icular ine 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.



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Job No.	Sheet No.	Rev.
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Drg. Ref.		
Made by ML	Date 05-Nov-2015	Checked

Dist.	x	oordinate: Y	z	x	у У	Along the	ments Perpendicu to Line	ılar	
5,0000	50.00000	25 60000	00.32000		- o ō	Line	to Line		
6.0000	49.00000	25.60000 25.60000 25.60000 25.60000 25.60000 25.60000 25.60000	80.33000	0.0	0.0	0.0		0.0	
8.0000 9.0000	47.00000 46.00000	25.60000 25.60000	80.33000 80.33000	0.0	0.0	0.0		0.0	
10.000 11.000	45.00000 44.00000	25.60000 25.60000	80.33000 80.33000	0.0	0.0	0.0		0.0	
		osslyn C							
Dist.						isplace	ments		
	x	У	z	x	У	Along the	ments Perpendica to Line	lar	
[m]	[m]	[m]	[m]	[mm]	[mm]	Line [mm]	Perpendic: to Line [mm]		
1.0600	44.00000	24.54000	80.33000	0.0	0.0	0.0		0.0	
3.1800	44.00000	22.42000 21.36000	80.33000 80.33000	0.0	0.0	0.0		0.0	
5.3000 6.3600	44.00000 44.00000	20.30000 19.24000	80.33000 80.33000	0.0	0.0	0.0		0.0	
7.4200 8.4800 9.5400	44.00000	18.18000	80.33000	0.0	0.0	0.0		0.0 0.0 0.0	
10.600	44.00000	15.00000	80.33000	0.0	0.0	0.0		0.0	
Struct	ure: 37 R	osslyn A	Sub-str	ucture	≥:				
Dist.	, c	oordinate: v	5 Z	~		Dis	placement:	a Po	rpendicular to Line [mm] 0.45627 0.32443 0.19377 0.071315 0.00 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
[m]	 [m]	, [m]	- [m]	[mm]]	2 [mm]	Line [mm]	re	to Line [mm]
0.0	44.00000 45.00000	5.00000 8	80.33000 80.33000	-0.1	3688 2977	0.4562	7 -0.136 3 -0.129	38 77	0.45627
2.0000	46.00000	5.00000 8	30.33000	-0.090	5887 2789	0.1937	7 -0.0968	37 39	0.19377
5.0000	49.00000	5.00000 8	30.33000 30.33000		0.0	0.	0 0	.0	0.0
7.0000 8.0000	51.00000 52.00000	5.00000	80.33000 80.33000		0.0	0.	0 0	.0	0.0
9.0000 10.000	53.00000 54.00000	5.00000 8	30.33000 30.33000		0.0	0. 0.	0 0	.0	0.0
11.000 12.000	55.00000 56.00000	5.00000 8	30.33000 30.33000		0.0	0. 0.	0 0	. 0 . 0	0.0
Struct	ure: 37 R	osslyn B	Sub-str	ucture	e:				
Dist.	c	oordinate	3		D	isplace	ments	_	
	x	y Y	z	x	У	Along the	Perpendic to Lind [mm]	lar	
[m]	[m] 56.00000	[m] 5.00000	[m] 80.33000	[mm]	[mm]	[mm]	[mm]	0.0	
1.0000 2.0000	56.00000 56.00000	6.00000 7.00000	80.33000 80.33000	0.0	0.0	0.0		0.0	
3.0000	56.00000	8.00000	80.33000	0.0	0.0	0.0		0.0	
6.0000	56.00000	11.00000	80.33000	0.0	0.0	0.0		0.0	
8.0000	56.00000	13.00000	80.33000 80.33000	0.0	0.0	0.0		0.0	
10.000	56.00000	15.00000	80.33000	0.0	0.0	0.0		0.0	
Struct		osslyn C							
Dist.	x	oordinate: Y	z	x	D Y	isplace Along	ments Perpendica	ılar	
Ι.						the	to Line	3	
[m] 0.0	[m] 56.00000	[m] 15.00000	[m] 80.33000	[mm] 0.0	[mm] 0.0	[mm] 0.0	[mm]	0.0	
1.0000	55.00000	12.00000	00.33000	υ.0	υ.Ο	0.0		υ.υ	
Struct	ure: 37 R	osslyn D		ucture	e: Su				
	x	oordinate: Y	z	x		У	Along	Perp	endicular o Line
[m] 0.0	[m] 44.00000	[m] 15.00000	[m] 80.33000	[mr	n] 0.0	[mm] 0.0	the Line [mm] 0.0 -0.24355 -0.71555 -1.0588 -1.2397 -1.2012	t	o Line [mm] 0.0
1.0000 2.0000	44.00000	14.00000 13.00000	80.33000	-0.73	3066 0733	0.24355	-0.24355 -0.71555		-0.73066
3.0000 4.0000	44.00000 44.00000	12.00000 11.00000	80.33000 80.33000	-1.0	0588 2978	1.0588	-1.0588		-1.0588
6.0000	44.00000 44.00000 44.00000	9.00000	80.33000	-0.62	2551	1.2510	-1.3012		-0.78074 -0.62551 -0.48070
8.0000	44.00000	7.00000	80.33000	-0.3	5112 3698	0.93632	-0.93632		-0.35112
	44.00000	5.00000	80.33000	-0.1	3688	0.45627	-0.45627		-0.13688
Specifi	c Building	Damage R	esults - V	ertical	Displ	lacemen	ts		
Struct	ure: 10b	Eldon A	Sub-stru	cture					
Dist.	C	oordinate	3	D		cements			
[m]	x [m]	y [m]	z [m]	z [mm]					
0.0	al Offset	5 00000 8	36.33000	0.152	11				
1.0000 2.0000	7.20000 8.20000	5.00000 8	36.33000 36.33000	0.1919 0.2420	91 05				
3.0000	9.20000	5.00000 8	36.33000	0.3052	28 41				
5.0000	11.20000	5.00000 8 5.00000 8	36.33000	0.473	5 13				
8.0000	14.20000	5.00000 8	36.33000	0.8223	24				
10.000	16.20000	5.00000	36.33000	1.09	32				

 Structure:
 10b Eldon B
 Sub-structure:

 Dist.
 Coordinates [m]
 a
 a

 [m]
 [m]
 [m]
 [m]
 [m]

 Vertical
 Offset
 [m]
 [m]

 0.0 16.20000
 5.0000
 8.33000
 1.0982

 1.0000 16.20000
 6.00000
 8.33000
 1.3244

 2.0000 16.20000
 8.00000
 8.33000
 1.4787

 4.0000 16.20000
 8.00000
 8.33000
 1.6044

 5.0000 16.20000
 10.00000
 8.33000
 1.7564

Structure: Eldon Party b-c | Sub-structure:

$\bigcap a c \gamma c$	Job No.	Sheet No.	Rev.
Oasys	J15236		
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Dist. Coordinates Displacements x y z z [m] [m] [m] [m]		05-1100-2015	
ist. Coordinates Displacements x y z z [m] [m] [m] [m] [m]			
Vertical Offset 1 0.0 16.20000 10.00000 86.33000 1.7564 1.0000 15.20000 10.00000 86.33000 1.5080 2.0000 14.20000 10.00000 86.33000 1.3034 3.0000 13.20000 10.00000 86.33000 1.1092 4.0000 12.20000 10.00000 86.33000 0.92896			
1.0000 11.0000 10.0000 86.33000 0.76532 0.000 11.2000 10.0000 86.33000 0.62018 0.000 10.2000 10.0000 86.33000 0.49468 0.000 8.2000 10.0000 86.33000 0.38915 0.000 6.20000 10.0000 86.33000 0.30314 10.000 6.20000 10.00000 86.33000 0.23537			
tructure: 10b Eldon C Sub-structure:			
ist. Coordinates Displacements x y z z [m] [m] [m] [mm]			
Vertical Offset 1 0.0 6.20000 10.0000 86.33000 0.23537 .0000 6.20000 9.0000 86.33000 0.21959 .0000 6.20000 8.0000 86.33000 0.20304 .0000 6.20000 7.00000 86.33000 0.18619 .0000 6.20000 5.00000 86.33000 0.15933			
tructure: 10c Eldon A Sub-structure:			
State Coordinates Displacements x y z z [m] [m] [m] [m]			
Vertical Offset 1 0.0 16.20000 10.0000 86.33000 1.7564 .0000 16.20000 11.0000 86.33000 1.8991 .0000 16.20000 12.0000 86.33000 2.0288 .0000 16.20000 13.00000 86.33000 2.1419 .0000 16.20000 14.00000 86.33000 2.1345 .0000 16.2000 15.0000 86.33000 2.3031			
tructure: Eldon Party c-d Sub-structure:			
ist. Coordinates Displacements x y z z [m] [m] [m] [m]			
Section Offset 1 0.016.2000 15.0000 66.33000 2.3031 .0001 5.20000 15.0000 66.33000 1.9007 .0001 41.2000 15.0000 66.33000 1.6162 .0000 12.2000 15.0000 66.33000 1.3735 .0000 11.2000 15.0000 66.33000 1.3493 .0000 11.2000 15.0000 86.33000 0.74636 .0000 11.2000 15.0000 86.33000 0.74636 .0000 8.2000 15.0000 86.33000 0.6185 .0000 8.2000 15.0000 86.33000 0.6185 .0000 8.2000 15.0000 86.33000 0.74531 .0000 8.2000 15.0000 86.33000 0.74751 .0000 7.2000 15.0000 86.33000 0.74781			
0.000 6.20000 15.00000 86.33000 0.28650 Structure: 10c Eldon B Sub-structure:			
ist. Coordinates Displacements x y z [m] [m] [m] [m]			
Yertical Offset 1 0.0 6.20000 15.00000 86.33000 0.28650 1.0000 6.20000 14.0000 86.33000 0.28129 2.0000 6.20000 13.00000 86.33000 0.27324 8.0000 6.20000 12.00000 86.33000 0.27324			
.0000 6.20000 12.00000 86.33000 0.26265 .0000 6.20000 11.00000 86.33000 0.24988 .0000 6.20000 10.00000 86.33000 0.23537			
tructure: 10d Eldon A Sub-structure: ist. Coordinates Displacements x y z z			
[m] [m] [m] [m] [mm]			
0.0 16.2000 15.0000 86.3300 2.301 .000 16.2000 15.0000 86.3300 3.4375 .0000 16.2000 17.0000 86.3300 3.4375 .0000 16.2000 18.0000 86.3300 3.4375 .0000 16.2000 19.0000 86.3300 3.4375 .0000 16.2000 20.0000 86.3300 3.4375			
tructure: 10d Eldon B Sub-structure: ist. Coordinates Displacements x Y z z			
[m] [m] [m] [m] [mm] ertical Offset 1 0.0 16.2000 20.00000 86.33000 3.4375			
.0000 15.20000 20.00000 86.33000 2.8369 .0000 14.2000 20.00000 86.33000 2.4122 .0000 13.20000 20.00000 86.33000 2.0499 .0000 12.20000 20.00000 86.33000 1.7154			
.0000 11.20000 20.00000 86.33000 1.4125 .0001 01.20000 20.00000 86.33000 1.1411 .0000 9.20000 20.00000 86.33000 0.91172 .0000 8.20000 20.00000 86.33000 0.71569 .0000 7.20000 20.00000 86.33000 0.55505 .000 6.2000 20.00000 86.33000 0.42762			
tructure: 10d Eldon C Sub-structure:			
Store Displacements x y z [m] [m] [m]			
extial Offset 1 0.0 6.2000 20.0000 86.33000 0.42762 .000 6.20000 12.00000 86.33000 0.42762 .0000 6.20000 18.0000 86.33000 0.42762 .000 6.2000 18.00000 86.33000 0.42762 .0000 6.20000 16.00000 86.33000 0.42762 .0000 6.20000 15.00000 86.33000 0.42762 .0000 6.20000 15.00000 86.33000 0.42762			
ructure: 29 Thurlow A Sub-structure:			
st. Coordinates Displacements m] [m] [m] [m]			

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Vertica 0.0	1 Offse	at 1	84.33000	0.31363	
1.0000	6.0000	at 1 00 25.00000 00 25.00000 00 25.00000 00 25.00000 00 25.00000 00 25.00000 00 25.00000 00 25.00000 00 25.00000 00 25.00000 00 25.00000 00 25.00000	84.33000	0.40584	
3.0000	8.0000	0 25.00000	84.33000	0.68078	
5.0000	10.0000	0 25.00000	84.33000	1.0947	
6.0000 7.0000	11.0000	0 25.00000 0 25.00000	84.33000 84.33000	1.3560 1.6521	
8.0000	13.0000	00 25.00000	84.33000	1.9807	
Structu	re: Par	ty 29-30	Sub-stru	icture:	
Dist.		Coordinates	1	Disp	lacements
[m]	x [m]	Coordinates y [m]	z [m]	z [mm]	
Vertica	1 Offse	at 1			
0.0	13.0000	25.00000	84.33000	1.9807	
2.0000	13.0000	0 27.00000	84.33000	1.2970	
4.0000	13.0000	28.00000	84.33000	1.2551	
5.0000	13.0000	0 30.00000 0 31.00000	84.33000 84.33000) 1.1411) 1.0719	
7.0000	13.0000	0 32.00000 0 33.00000	84.33000	0.99682	
9.0000	13.0000	0 34.00000	84.33000	0.83555	
11.000	13.0000	at 1 10 25.0000 10 26.0000 10 26.0000 10 28.0000 10 29.0000 10 31.0000 10 32.0000 10 32.0000 10 34.0000 10 35.0000 10 36.0000	84.33000	0.67070	
		Thurlow B			
Dist.		Coordinates			lacements
	x	y [m]	z	Dis z [mm]	pracements
[m]	[m]		[m]	[mm]	
Vertica 0.0	1 Offse 13.0000	1 00 36.00000 00 36.00000 00 36.00000 00 36.00000 00 36.00000 00 36.00000 00 36.00000 00 36.00000 00 36.00000 00 36.00000 00 36.00000 00 36.00000	84.33000	0.67070	
1.0000	12.0000	36.00000	84.33000	0.55619	
3.0000	10.0000	36.00000	84.33000	0.36586	
4.0000	9.0000	0 36.00000 0 36.00000	84.33000	0.29154	
6.0000	7.0000	0 36.00000 0 36.00000	84.33000	0.18333	
8.0000	5.0000	36.00000	84.33000	0.11904	
Structu	re: 29	Thurlow C	Sub-str	ucture:	
Dist.					Lacements
[m]	x [m]	Coordinates Y [m]	, z	Z	lucemented
Vertica 0.0	1 Offse 5.00000	at 1) 36.00000 8	4.33000	0.11904	
1.0000	5.00000) 35.00000 8) 34.00000 8	4.33000	0.13026	
3.0000	5.00000	33.00000 8	4.33000	0.15317	
5.0000	5.00000	31.00000 8	4.33000	0.17515	
7.0000	5.00000	29.00000 8	4.33000	0.18503	
8.0000	5.00000	28.00000 8 27.00000 8	4.33000	0.20099	
10.000 11.000	5.00000	at 1 36.00000 f 35.00000 f 34.00000 f 32.00000 f 31.00000 f 32.00000 f 30.00000 f 29.00000 f 28.00000 f 27.00000 f 26.00000 f 25.00000 f	4.33000	0.21013	
Structu	re: 30	Thurlow A	Sub-st:	ucture:	
Dist.		Coordinates	z [m]	Disp z	placements
[m]	x [m]	y [m]	z [m]	z [mm]	
Vertica	1 Offse	et 1			
1.0000	14.0000	0 25.00000	84.33000	2.3378	
2.0000	15.0000	0 25.00000 0 25.00000	84.33000 84.33000	2.7185 3.3165	
4.0000	17.0000	0 25.00000	84.33000) 3.9243) 4.5333	
6.0000	19.0000	at 1 00 25.00000 00 25.00000 00 25.00000 00 25.00000 00 25.00000 00 25.00000 00 25.00000 00 25.00000 00 25.00000 00 25.00000 00 25.00000 00 25.00000	84.33000	5.1334	
8.0000	21.0000	00 25.00000	84.33000	6.2608	
Structu	re: 30	Thurlow B	Sub-str	ucture:	
Dist.		Georginster		Dig	lacements
	x [m]	y [m]		z	FIRCEMENCS
[m]			[m]	[mm]	
Vertica 0.0	21.0000	1 1 0 25.00000	84.33000	6.2608	
1.0000 2.0000	21.0000	00 25.00000 00 26.00000 00 27.00000 00 28.00000	84.33000 84.33000) 4.1947) 4.0426	
3.0000	21.0000	00 28.00000	84.33000	3.8612	
Structu	re: 30	Thurlow C	Sub-str	ucture:	
Dist.		Coordinates			lacements
	x	У	z	z	placements
[m]	[m]	[m]	[m]	[mm]	
Vertica 0.0	1 Offse 21.0000	et 1 10 28.00000	84.33000	3.8612	
1.0000	22.0000	28.00000 00 28.00000 00 28.00000 00 28.00000 00 28.00000	84.33000	4.1449	
3.0000	24.0000	28.00000	84.33000	4.5561	
Structu	ro: 20	Thurlow D	Sub-sta	ucture:	
	x	Coordinates y		z	placements
Dist.		[m]	z [m]	[mm]	
Dist.	[m]				
Dist.	[m]	et 1 00 28.00000	84.33000	4.5561	
Dist.	[m]	et 1 00 28.00000 00 29.00000 00 30.00000	84.33000 84.33000 84.33000	4.5561 4.2812 4.0020	
Dist.	[m]	et 1 00 28.00000 00 29.00000 00 30.00000 00 31.00000	84.33000 84.33000 84.33000 84.33000	4.5561 4.2812 4.0020 3.7209	
Dist.	[m]	at 1 10 28.00000 10 29.00000 10 30.00000 10 31.00000 10 32.00000 10 33.00000	84.33000 84.33000 84.33000 84.33000 84.33000 84.33000	<pre>4.5561 4.2812 4.0020 3.7209 3.4389 3.1567</pre>	
Dist.	[m]	at 1 00 28.00000 00 29.00000 00 30.0000 00 31.00000 00 32.00000 00 34.00000 00 35.00000	84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000	<pre>4.5561 4.2812 4.0020 3.7209 3.4389 3.1567 3.0455 2.8894</pre>	
Dist.	[m]	at 1 00 28.00000 00 29.00000 00 31.00000 00 32.00000 00 34.00000 00 35.00000 00 36.00000 00 36.00000	84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000 84.33000) 4.5561) 4.2812) 4.0020) 3.7209) 3.4389) 3.1567) 3.0455) 2.8894) 2.6948	
Dist. [m] Vertica 0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 8.0000	[m] 1 Offse 24.0000 24.0000 24.0000 24.0000 24.0000 24.0000 24.0000 24.0000 24.0000 24.0000	at 1 00 28.00000 00 29.00000 00 30.00000 00 31.00000 00 32.00000 00 33.00000 00 35.00000 00 36.00000 00 36.00000 00 36.00000 00 37.00000 00 37.00000 00 36.00000 00 37.00000 00 36.00000			
Dist. [m] Vertica 0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 8.0000	[m] 1 Offse 24.00000 24.00000 24.000000 24.00000 24.00000 24.0000 24.0000 2		Sub-str	ructure:	placements
Dist. [m] Vertica 0.0 1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000 8.0000 Structu	[m] 1 Offse 24.00000 24.00000 24.000000 24.00000 24.00000 24.0000 24.0000 2	Thurlow E	Sub-str	ructure:	placements

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[m] [1	m] [17	.] [T	n] [mn	n]
Vertical O 0 0 2 1.0000 23. 2.0000 22. 3.0000 21. 4.0000 20. 5.0000 19. 5.0000 19. 7.0000 17. 8.0000 16. 10.0000 14. 11.0000 13. 10.000 14. 11.000 13. 10.000 14. 11.000 13. 10.000 14. 11.000 13. 10.000 13. 10.000 14. 11.000 13. 10.000 13. <td>ffset 1</td> <td></td> <td></td> <td></td>	ffset 1			
0.0 24.	00000 36.0	0000 84.3	33000 2.6	5948 1367
2.0000 22.	00000 36.0	0000 84.3	33000 2.1	1772
4.0000 20.	00000 36.0	0000 84.3	33000 1.9 33000 1.7	7337
5.0000 19. 6.0000 18.	00000 36.0 00000 36.0	0000 84.3	33000 1.5 33000 1.3	5296 3536
7.0000 17.	00000 36.0	0000 84.	33000 1.2	2122
9.0000 15.	00000 36.0	0000 84.	33000 1.0	3001
10.000 14. 11.000 13.	00000 36.0 00000 36.0	0000 84.3	33000 0.79 33000 0.67	9606 7070
Structure:			ub-structu	ire:
Dist.	Coordi x y	nates		Displacements
[m] [1	х у m] [т	. 2 1] [1	s z n] [mm	
Vertical O	ffrot 1			
0.0 26. 1.1000 27. 2.2000 28. 3.3000 29. 4.4000 30.	40000 30.0	0000 83.3	33000 4.02	236
2.2000 28.	50000 30.0 60000 30.0	0000 83.3	33000 4.09 33000 4.42	299
3.3000 29.	70000 30.0 80000 30.0	0000 83.3	33000 4.82 33000 5.27	255
Structure:	30A Thurl	ow B St	ub-structu	ire:
Dist.	Coord	inates		Displacements
[m]	x [m] [y m]		s nm.]
Vertical 0 0.0 30	.80000 30.	00000 83.	33000 5.2	2793
0.0 30 0.80000 30 1.6000 30	.80000 29. .80000 28.	20000 83. 40000 83.	.33000 5.1 .33000 5.0	L971)300
Structure:	30A Thurl	ow C St	ıb-structı	ire:
Dist.	Coord	inates		Displacements
[m]	x [m] [y m] [z z m] [n	s nm l
Ventinel O	66aab 1			-
Vertical 0: 0.0 30	rrset 1 .80000 28.	40000 83.	33000 5.0	300
0.0 30 0.90000 31 1.8000 32 2.7000 33 3.6000 34	.70000 28. .60000 28	40000 83.	33000 7.1	7120 7120
2.7000 33	.50000 28.	40000 83	33000 7.7	7120
3.6000 34	.40000 28.	40000 83.	.33000 7.1	/120
Structure:	30A Thurl	ow D Su	ub-structu	ire:
Dist.	Coord	inates		Displacements
	Coord x [m] [У	z 2 [m] [n	2
				nm]
Vertical 0: 0.0 34	ffset 1 .40000 28.	40000 83.	33000 7.7	7120
0.96000 34	.40000 29.	36000 83.	33000 7.9	9424
2.8800 34	.40000 31.	28000 83.	33000 7.9	9565
3.8400 34 4.8000 34	.40000 32. .40000 33.	24000 83.	.33000 7.4	1992
5.7600 34	.40000 34.	16000 83.	33000 7.1	
		12000 83	33000 6.7	7048
7.6800 34	.40000 35.	12000 83. 08000 83.	33000 6.2	7048 2185
7.6800 34 8.6400 34 9.6000 34	.40000 35. .40000 36. .40000 37. .40000 38.	12000 83. 08000 83. 04000 83. 00000 83.	33000 6.7 33000 6.2 33000 5.6 33000 5.1	7048 2185 5907 1334
			33000 7.5 33000 7.5 33000 8.0 33000 7.5 33000 7.4 33000 7.1 33000 6.2 33000 6.2 33000 5.1	
7.6800 34 8.6400 34 9.6000 34 Structure:				
Structure:	30A Thurl	ow E Su	ıb-structı	ire:
Structure: Dist. [m] [1	30A Thurl Coordi x y m] [m	ow E Su nates [] [T	ıb-structu s z n] [mm	nre: Displacements
Structure: Dist. [m] [1	30A Thurl Coordi x y m] [m	ow E Su nates [] [T	ıb-structu s z n] [mm	nre: Displacements
Structure: Dist. [m] [1	30A Thurl Coordi x y m] [m	ow E Su nates [] [T	ıb-structu s z n] [mm	nre: Displacements
Structure: Dist. [m] [1	30A Thurl Coordi x y m] [m	ow E Su nates [] [T	ıb-structu s z n] [mm	nre: Displacements
Structure: Dist. [m] [1	30A Thurl Coordi x y m] [m	ow E Su nates [] [T	ıb-structu s z n] [mm	nre: Displacements
Structure: Dist. [m] [m] Vertical O 0.0 34. 1.0000 32. 3.0000 31. 4.0000 30. 5.0000 29.	30A Thurl Coordi x y m] [m ffset 1 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0	ow E St nates 1 [n] 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2	b-structu z z n] [mm 33000 5.13 33000 5.13 33000 5.13 33000 3.21 33000 3.26	pre: Displacements n] 334 334 334 334 334 334 334 33
Structure: Dist. [m] [m] Vertical O 0.0 34. 1.0000 32. 3.0000 31. 4.0000 30. 5.0000 29.	30A Thurl Coordi x y m] [m ffset 1 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0	ow E St nates 1 [n] 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2	b-structu z z n] [mm 33000 5.13 33000 5.13 33000 5.13 33000 3.21 33000 3.26	pre: Displacements n] 334 334 334 334 334 334 334 33
Structure: Dist. [m] [1	30A Thurl Coordi x y m] [m ffset 1 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0	ow E St nates 1 [n] 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2	b-structu z z n] [mm 33000 5.13 33000 5.13 33000 5.13 33000 3.21 33000 3.26	pre: Displacements n] 334 334 334 334 334 334 334 33
Structure: Dist. [m] [m] Vertical O 0.0 34. 1.0000 32. 3.0000 31. 4.0000 30. 5.0000 29.	30A Thurl Coordig m] [m ffset 1 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0	ow E Su nates 1 [n 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2	ib-structu z z n] [mm] 33000 5.13 33000 5.13 33000 5.13 33000 5.13 33000 3.25 33000 3.25 33000 3.06 33000 2.92 33000 2.92 33000 2.73	nre: Displacements n] 334 334 334 334 334 80 0 100 241 313
Structure: Dist. [m] [i] Vertical O 0.034. 1.000032. 3.000032. 3.000032. 6.000028. 7.000025. 8.000025. Structure: Dist.	30A Thurl Coordi ffset 1 40000 38.0 40000 38.0	ow E St nates i] [n 0000 83.: 0000 83.	Lb-structu z z n] [mm 33000 5.12 33000 5.12 33000 5.12 33000 5.12 33000 3.22 33000 3.22 33000 3.25 33000 2.95 33000 2.95 350 350 350 350 350 350 350 35	nre: Displacements n] 334 334 334 334 334 80 0 100 241 313
Structure: Dist. [m] [m] Vertical O 0.0 34. 1.0000 32. 3.0000 31. 4.0000 30. 5.0000 29. 7.0000 27. 8.0000 26. Structure: Dist.	30A Thurl Coordi x y m] [m ffset 1 40000 38.0 40000 38.0 50000 38.0 40000 38.0 50000 58.0 50000 58.0 500000000000000000000000000000000000	ow E Si nates 1 0000 83.5 0000 83.5 0000 83.5 0000 83.5 0000 83.5 0000 83.5 0000 83.5 0000 83.5 0000 83.5 0000 83.5 0000 83.5 0000 83.5 0000 83.5 ow F St nates 2	Lb-structu z z n] [mm 33000 5.11 33000 5.12 33000 5.12 33000 5.12 33000 5.12 33000 5.12 33000 5.12 33000 5.12 33000 2.73 33000 2.73 ub-structu 2	<pre>ire: Displacements n] 334 334 334 334 334 334 334 334 334 33</pre>
Structure: [m] [1] Vertical O 0 0 34. 2 0000 32. 2 0000 32. 3 0000 31. 4 0000 30. 5 0000 27. 8 0000 27. 8 0000 27. 8 0000 27. 8 0000 27. 8 0000 27. 8 0000 27. 9 0000 27.	30A Thurl Coordia x y ml [m] ffset 1 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 30A Thurl Coordia x y m] [m]	ow E St nates 2 1 0000 83.1 0000 83.2	Lb-structu z z nl [mm 33000 5.11 33000 5.12 33000 5.13 33000 5.13 33000 5.13 33000 5.13 33000 3.37 33000 2.73 33000 2.73 ab-structu z z z z al [mm	<pre>ire: Displacements n] 334 334 334 334 334 334 334 334 334 33</pre>
Structure: [m] [1] Vertical O 0 0 34. 2 0000 32. 2 0000 32. 3 0000 31. 4 0000 30. 5 0000 27. 8 0000 27. 8 0000 27. 8 0000 27. 8 0000 27. 8 0000 27. 8 0000 27. 9 0000 27.	30A Thurl Coordia x y ml [m] ffset 1 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 30A Thurl Coordia x y m] [m]	ow E St nates 2 1 0000 83.1 0000 83.2	Lb-structu z z nl [mm 33000 5.11 33000 5.12 33000 5.13 33000 5.13 33000 5.13 33000 5.13 33000 3.37 33000 2.73 33000 2.73 ab-structu z z z z al [mm	<pre>ire: Displacements n] 334 334 334 334 334 334 334 334 334 33</pre>
Structure: [m] [1] Vertical O 0 0 34. 2 0000 32. 2 0000 32. 3 0000 31. 4 0000 30. 5 0000 27. 8 0000 27. 8 0000 27. 8 0000 27. 8 0000 27. 8 0000 27. 8 0000 27. 9 0000 27.	30A Thurl Coordia x y ml [m] ffset 1 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 30A Thurl Coordia x y m] [m]	ow E St nates 2 1 0000 83.1 0000 83.2	Lb-structu z z nl [mm 33000 5.11 33000 5.12 33000 5.13 33000 5.13 33000 5.13 33000 5.13 33000 3.37 33000 2.73 33000 2.73 ab-structu z z z z al [mm	<pre>ire: Displacements n] 334 334 334 334 334 334 334 334 334 33</pre>
Structure: [m] [1] Vertical O 0 0 34. 2 0000 32. 2 0000 32. 3 0000 31. 4 0000 30. 5 0000 27. 8 0000 27. 8 0000 27. 8 0000 27. 8 0000 27. 8 0000 27. 8 0000 27. 9 0000 27.	30A Thurl Coordia x y ml [m] ffset 1 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 30A Thurl Coordia x y m] [m]	ow E St nates 2 1 0000 83.1 0000 83.2	Lb-structu z z nl [mm 33000 5.11 33000 5.12 33000 5.13 33000 5.13 33000 5.13 33000 5.13 33000 3.37 33000 2.73 33000 2.73 ab-structu z z z z al [mm	<pre>ire: Displacements n] 334 334 334 334 334 334 334 334 334 33</pre>
Structure: [m] [1] Vertical O 0 0 34. 2 0000 32. 2 0000 32. 3 0000 31. 4 0000 30. 5 0000 27. 8 0000 27. 8 0000 27. 8 0000 27. 8 0000 27. 8 0000 27. 8 0000 27. 9 0000 27.	30A Thurl Coordia x y ml [m] ffset 1 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 30A Thurl Coordia x y m] [m]	ow E St nates 2 1 0000 83.1 0000 83.2	Lb-structu z z nl [mm 33000 5.11 33000 5.12 33000 5.13 33000 5.13 33000 5.13 33000 5.13 33000 3.33 33000 2.73 33000 2.73 Lb-structu z z z nl [mm	<pre>ire: Displacements n] 334 334 334 334 334 334 334 334 334 33</pre>
Structure: [m] [1] Vertical O 0 0 34. 2 0000 32. 2 0000 32. 3 0000 31. 4 0000 30. 5 0000 27. 8 0000 27. 8 0000 27. 8 0000 27. 8 0000 27. 8 0000 27. 8 0000 27. 9 0000 27.	30A Thurl Coordia x y ml [m] ffset 1 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 30A Thurl Coordia x y m] [m]	ow E St nates 2 1 0000 83.1 0000 83.2	Lb-structu z z nl [mm 33000 5.11 33000 5.12 33000 5.13 33000 5.13 33000 5.13 33000 5.13 33000 3.33 33000 2.73 33000 2.73 Lb-structu z z z nl [mm	<pre>ire: Displacements n] 334 334 334 334 334 334 334 334 334 33</pre>
Structure: Dist. [m] [1] Vertical O 0 0 34. 2 0000 32. 2 0000 32. 3 0000 31. 4 0000 28. 6 0000 28. 5 0000 26. Structure: Dist. [m] [1]	30A Thurl Coordia x y ml [m] ffset 1 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 30A Thurl Coordia x y m] [m]	ow E St nates 2 1 0000 83.1 0000 83.2	Lb-structu z z nl [mm 33000 5.11 33000 5.12 33000 5.13 33000 5.13 33000 5.13 33000 5.13 33000 3.33 33000 2.73 33000 2.73 Lb-structu z z z nl [mm	<pre>ire: Displacements n] 334 334 334 334 334 334 334 334 334 33</pre>
Structure: Dist. [m] [m] Vertical O 0.0 34. 1.0000 33. 2.0000 32. 3.0000 32. 3.0000 32. 3.0000 32. 3.0000 24. Structure: Dist. [m] [m] Vertical O 0.0 26. 3.0000 26. 3.00000 26. 3.00000 26. 3.00000 26. 3.00000000000000000000000000000000000	30A Thurl Coordi x y m] [π ffset 1 40000 38.0 40000 37.0 40000 37.0 40000 31.0 40000 3.0 40000 3.0 40000 3.0	ow E St nates 1] [n 0000 83.2 0000 83.	z z a) [mm 33000 5.11 33000 5.12 33000 5.12 33000 5.12 33000 5.12 33000 5.13 33000 5.13 33000 2.73 ab=structu z z z al [mm 33000 2.73 33000 2.73 ab=structu z z m al [mm 33000 3.03 33000 3.03 33000 3.63 33000 3.63 33000 3.63 33000 3.63 33000 3.83 33000 3.83 33000 4.02	<pre>sre: Displacements al 334 334 334 334 800 517 990 941 334 800 800 800 800 800 800 800 800 800 80</pre>
Structure: Dist. [m] [m] Vertical O 0.0.34. 1.0000 33. 2.0000 32. 3.0000 32. 3.0000 32. 3.0000 32. 3.0000 32. 3.0000 32. 3.0000 24. Structure: Dist. [m] [m] [m] Vertical O 0.26. 0.000 26. 3.0000 26. 5.0000 26. 5.00000 26. 5.0000 26. 5.000000000 26. 5.0000000	30A Thurl Coordi x y m] [n ffset 1 40000 38.0 40000 31.0 40000 3.0 40000 3.0 400000 3.0 40000	ow E St nates 1] 0000 83.1 0000 83.3 00000 83.3 00000 83.	z z a3000 5.12 a3000 5.13 a3000 2.73 about 3.2003 about 3.23 about 3.23 about 3.23 about 3.23	<pre>sre:: Displacements al, al, al, al, al, al, al, al, al, al,</pre>
Structure: Dist. [m] [m] [m] [m] [m] [m] [m] [m] [m] [m]	30A Thurl Coordi x y m] [n ffset 1 40000 38.0 40000 38.0 41 Rossly Coordi X X X	ow E St nates 1] 0000 83.1<	ab-structu s z n] [mm 33000 5.11 33000 5.12 33000 5.13 33000 5.13 33000 5.13 33000 5.13 33000 5.13 33000 2.73 ab-structu z z z n] [mm 33000 2.73 33000 2.73 33000 3.04 33000 2.73 33000 3.03 33000 3.03 33000 3.03 33000 3.03 33000 3.03 33000 3.83 33000 3.83 33000 4.02 >structur z	<pre>state Displacements al 334 334 334 334 334 334 334 334 334 33</pre>
Structure: Dist. [m] [] Vertical O 0.0 34. 1.0000 33. 2.0000 32. 3.0000 32. 3.0000 32. 3.0000 32. 3.0000 32. 3.0000 32. 3.0000 24. Structure: Dist. Structure: Dist. Structure: Dist.	30A Thurl Coordi x y 1 [ffset 1 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 30A Thurl Coordi x y m] [m ffset 1 40000 37.0 40000 37.0 40000 35.0 40000 35.0 400000 35.0 40000 35.0 400000 35.0 400000 35.0 400000 35.0 400000	ow E St nates 1] 0000 83.1<	z z 33000 5.12 33000 5.12 33000 5.12 33000 5.12 33000 5.12 33000 5.12 33000 5.12 33000 5.12 33000 2.92 33000 2.93 33000 2.93 33000 2.93 33000 2.73 33000 3.02 33000 3.02 33000 3.02 33000 3.02 33000 3.02 33000 3.62 33000 4.02 33000 4.02	<pre>state Displacements al 334 334 334 334 334 334 334 334 334 33</pre>
Structure: Dist. [m] [] Vertical O 0.0 34. 1.0000 33. 2.0000 32. 3.0000 32. 3.0000 24. 7.0000 27. 8.0000 26. Structure: Dist. [m] [] Vertical O 0.0 26. 1.0000 26. 3.0000 26. 3.00000 26. 3.0000 26. 3.0000 26. 3.0000 26. 3.000	30A Thurl Coordi x y ffset 1 40000 38.0 40000 38.	ow E St nates i] [n 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.2 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 1 [n nates j] [n	ab-structu s z a) [mm a)3000 5.13 a)3000 5.13 a)3000 5.13 a)3000 5.13 a)3000 5.13 a)3000 5.13 a)3000 2.73 a)3000 3.03 a)3000 2.73 a)3000 3.03 a)3000 3.03 a)3000 3.03 a)3000 3.03 a)3000 3.63 33000 3.63 33000 3.63 33000 3.63 33000 4.02 ->structur 2 a) [mm	<pre>set = :</pre>
Structure: Dist. [m] [] Vertical O 0.0 34. 1.0000 33. 2.0000 32. 3.0000 32. 3.0000 24. 7.0000 27. 8.0000 26. Structure: Dist. [m] [] Vertical O 0.0 26. 1.0000 26. 3.0000 26. 3.00000 26. 3.0000 26. 3.0000 26. 3.0000 26. 3.000	30A Thurl Coordi x y ffset 1 40000 38.0 40000 38.	ow E St nates i] [n 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.2 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 1 [n nates j] [n	ab-structu s z a) [mm a)3000 5.13 a)3000 5.13 a)3000 5.13 a)3000 5.13 a)3000 5.13 a)3000 5.13 a)3000 2.73 a)3000 3.03 a)3000 2.73 a)3000 3.03 a)3000 3.03 a)3000 3.03 a)3000 3.03 a)3000 3.63 33000 3.63 33000 3.63 33000 3.63 33000 4.02 ->structur 2 a) [mm	<pre>ure: Displacements al al al al al al al al al al al al al</pre>
Structure: Dist. [m] [] Vertical O 0.0 34. 1.0000 33. 2.0000 32. 3.0000 32. 3.0000 24. 7.0000 27. 8.0000 26. Structure: Dist. [m] [] Vertical O 0.0 26. 1.0000 26. 3.0000 26. 3.00000 26. 3.0000 26. 3.0000 26. 3.0000 26. 3.000	30A Thurl Coordi x y ffset 1 40000 38.0 40000 38.	ow E St nates i] [n 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.2 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 1 [n nates j] [n	ab-structu s z a) [mm a)3000 5.13 a)3000 5.13 a)3000 5.13 a)3000 5.13 a)3000 5.13 a)3000 5.13 a)3000 2.73 a)3000 3.03 a)3000 2.73 a)3000 3.03 a)3000 3.03 a)3000 3.03 a)3000 3.03 a)3000 3.63 33000 3.63 33000 3.63 33000 3.63 33000 4.02 ->structur 2 a) [mm	<pre>ure: Displacements a] 334 334 334 334 334 334 334 334 334 33</pre>
Structure: Dist. [m] [] Vertical O 0.0 34. 1.0000 33. 2.0000 32. 3.0000 32. 3.0000 24. 7.0000 27. 8.0000 26. Structure: Dist. [m] [] Vertical O 0.0 26. 1.0000 26. 3.0000 26. 3.00000 26. 3.0000 26. 3.0000 26. 3.0000 26. 3.000	30A Thurl Coordi x y ffset 1 40000 38.0 40000 38.	ow E St nates i] [n 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.2 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 1 [n nates j] [n	ab-structu s z a) [mm a)3000 5.13 a)3000 5.13 a)3000 5.13 a)3000 5.13 a)3000 5.13 a)3000 5.13 a)3000 2.73 a)3000 3.03 a)3000 2.73 a)3000 3.03 a)3000 3.03 a)3000 3.03 a)3000 3.03 a)3000 3.63 33000 3.63 33000 3.63 33000 3.63 33000 4.02 ->structur 2 a) [mm	rre: Displacements a] 334 334 334 334 334 334 334 33
Structure: Dist. [m] [] Vertical O 0.0 34. 1.0000 33. 2.0000 32. 3.0000 32. 3.0000 24. 7.0000 27. 8.0000 26. Structure: Dist. [m] [] Vertical O 0.0 26. 1.0000 26. 3.0000 26. 3.00000 26. 3.0000 26. 3.0000 26. 3.0000 26. 3.000	30A Thurl Coordi x y ffset 1 40000 38.0 40000 38.	ow E St nates i] [n 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.1 0000 83.2 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 0000 83.3 1 [n nates j] [n	ab-structu s z a) [mm a)3000 5.13 a)3000 5.13 a)3000 5.13 a)3000 5.13 a)3000 5.13 a)3000 5.13 a)3000 2.73 a)3000 3.03 a)3000 2.73 a)3000 3.03 a)3000 3.03 a)3000 3.03 a)3000 3.03 a)3000 3.63 33000 3.63 33000 3.63 33000 3.63 33000 4.02 -structu 2 a) [mm	<pre>ure: Displacements a) 334 334 334 334 334 334 334 334 334 33</pre>
Structure: Dist. [m] [1] Vertical 0 0.0 34. 1.000 32. 2.0000 32. 4.0000 30. 5.0000 24. 6.0000 24. 5.0000 26. Structure: Dist. [m] [1] Vertical 0 0.0 26. 3.0000 26. 3.000	30A Thurl Coordi x y ffset 1 40000 38.0 40000 30.0 40000 30.0 40000 30.0 40000 30.0 41 Rossly x y m] [m] ffset 1 0000 31.0 00000 31.0 000000 31.0 00000 31.0 000000 31.0 00000000000000000000000000000000000	own E Si nates 1 1 0000 83.2 1 1 1 1 0000 80.2 0000 80.2 0000 80.2 0000 80.2 0000 80.2 0000	b-structu z z 1 [mm] 33000 5.1 33000 5.1 33000 5.1 33000 5.1 33000 5.1 33000 5.1 33000 2.2 33000 2.7 33000 2.7 33000 2.7 33000 2.7 33000 2.7 33000 3.2 33000 3.2 33000 3.2 33000 3.2 33000 3.2 33000 3.2 33000 3.2 33000 3.2 33000 3.2 33000 4.0 2 2 a1 [m] 33000 5.1 33000 2.7 33000 2.7 33000 3.0 33000 3.0 33000 3.0	<pre>ure: Displacements a] 334 334 334 334 334 334 334 334 334 33</pre>
Structure: Dist. [m] [1] Vertical 0 0.0 34. 1.000 32. 2.0000 32. 4.0000 30. 5.0000 24. 6.0000 24. 5.0000 26. Structure: Dist. [m] [1] Vertical 0 0.0 26. 3.0000 26. 3.000	30A Thurl Coordi x y ffset 1 40000 38.0 40000 30.0 40000 30.0 40000 30.0 40000 30.0 41 Rossly x y m] [m] ffset 1 0000 31.0 00000 31.0 000000 31.0 00000 31.0 000000 31.0 00000000000000000000000000000000000	own E Si nates 1 1 0000 83.2 1 1 1 1 0000 80.2 0000 80.2 0000 80.2 0000 80.2 0000 80.2 0000	b-structu z z 1 [mm] 33000 5.1 33000 5.1 33000 5.1 33000 5.1 33000 5.1 33000 5.1 33000 2.2 33000 2.7 33000 2.7 33000 2.7 33000 2.7 33000 2.7 33000 3.2 33000 3.2 33000 3.2 33000 3.2 33000 3.2 33000 3.2 33000 3.2 33000 3.2 33000 3.2 33000 4.0 2 2 a1 [m] 33000 5.1 33000 2.7 33000 2.7 33000 3.0 33000 3.0 33000 3.0	<pre>ure: Displacements a] 334 334 334 334 334 334 334 334 334 33</pre>
Structure: Dist. [m] [1] Vertical 0 0.0 34. 1.000 32. 2.0000 32. 4.0000 30. 5.0000 24. 6.0000 24. 5.0000 26. Structure: Dist. [m] [1] Vertical 0 0.0 26. 3.0000 26. 3.000	30A Thurl Coordi x y ffset 1 40000 38.0 40000 30.0 40000 30.0 40000 30.0 40000 30.0 41 Rossly x y m] [m] ffset 1 0000 31.0 00000 31.0 000000 31.0 00000 31.0 000000 31.0 00000000000000000000000000000000000	own E Si nates 1 1 0000 83.2 1 1 1 1 0000 80.2 0000 80.2 0000 80.2 0000 80.2 0000 80.2 0000	b-structu z z 1 [mm] 33000 5.1 33000 5.1 33000 5.1 33000 5.1 33000 5.1 33000 5.1 33000 2.2 33000 2.7 33000 2.7 33000 2.7 33000 2.7 33000 2.7 33000 3.2 33000 3.2 33000 3.2 33000 3.2 33000 3.2 33000 3.2 33000 3.2 33000 3.2 33000 3.2 33000 4.0 2 2 a1 [m] 33000 5.1 33000 2.7 33000 2.7 33000 3.0 33000 3.0 33000 3.0	<pre>ure: Displacements a] 334 334 334 334 334 334 334 334 334 33</pre>
Structure: Dist. [m] [] Vertical O 0.0 34. 1.0000 33. 2.0000 32. 3.0000 32. 3.0000 24. 7.0000 27. 8.0000 26. Structure: Dist. [m] [] Vertical O 0.0 26. 1.0000 26. 3.0000 26. 3.00000 26. 3.0000 26. 3.0000 26. 3.0000 26. 3.000	30A Thurl Coordi x y ffset 1 40000 38.0 40000 30.0 40000 30.0 40000 30.0 40000 30.0 41 Rossly x y m] [m] ffset 1 0000 31.0 00000 31.0 000000 31.0 00000 31.0 000000 31.0 00000000000000000000000000000000000	own E Si nates 1 1 0000 83.2 1 1 1 1 0000 80.2 0000 80.2 0000 80.2 0000 80.2 0000 80.2 0000	b-structu z z 1 [mm] 33000 5.1 33000 5.1 33000 5.1 33000 5.1 33000 5.1 33000 5.1 33000 2.2 33000 2.7 33000 2.7 33000 2.7 33000 2.7 33000 2.7 33000 3.2 33000 3.2 33000 3.2 33000 3.2 33000 3.2 33000 3.2 33000 3.2 33000 3.2 33000 3.2 33000 4.0 2 2 a1 [m] 33000 5.1 33000 2.7 33000 2.7 33000 3.0 33000 3.0 33000 3.0	<pre>ure: Displacements a] 334 334 334 334 334 334 334 334 334 33</pre>
Structure: Dist. [m] [1] Vertical 0 0.0 34. 1.000 32. 2.0000 32. 4.0000 30. 5.0000 24. 6.0000 24. 5.0000 26. Structure: Dist. [m] [1] Vertical 0 0.0 26. 3.0000 26. 3.000	30A Thurl Coordi x y ffset 1 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 30.0 30.0 30.0 Thurl Coordi x y m] [m ffset 1 40000 37.0 40000 37.0 400000 37.0 4000000000 37.0 400000000000000000000000000000000000	ow E St nates il [n] 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 ow F St nates ji 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 80.2 0000 80.2 0000 80.2 0000 80.2 0000 80.2 0000 80.2 0000 80.2 0000 80.2 0000 80.2 0000 80.2 0000 80.2 0000 80.2	ab-atructi s z s z s z s z s z s z s z s z z z z z ab-atructi z z z ab-atructi z z z ab-atructi z z z about z s z s z z z about z s z z z z z z z z z z z z z z z z z z z z z z z z z z </td <td><pre>set: Displacements als als als als als als als als als al</pre></td>	<pre>set: Displacements als als als als als als als als als al</pre>
Structure: Dist. [m] [] Vertical 0 0.034, 1.000 35, 2.000 29, 6.0000 28, 7.0000 27, 8.0000 24, 7.0000 26, 3.000 26, 0.000 28, 7.000 26, 0.000 26, 0	30A Thurl Coordi x y ffset 1 40000 38.0 40000 38.0 400000 38.0 400000 38.0 40000000000 38.0 400000000000000000000000	ow E Su nates il [n 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 ow F Su 2 il [r 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 1 [n nates 2 1 [n 0000 80.2 0000 80.2 0000 80.2 0000 80.2 0000 80.2	z z z 33000 5.11 33000 5.11 33000 5.11 33000 5.11 33000 5.11 33000 5.11 33000 5.11 33000 5.11 33000 5.11 33000 5.11 33000 3.02 33000 2.92 33000 2.02 33000 2.73 33000 2.73 33000 3.02 33000 2.73 33000 3.03 33000 2.73 33000 3.73 33000 3.03 33000 3.73 33000 3.03 3.73 33000 3.63 33000 4.02 2.73 33000 4.02 2.73 33000 5.13 33000 3.02 33000 5.13 33000 2.73 33000 2.73 33000 1.13 33000 1.13 33000 2.73 33000 1.13 33	re:: Displacements a) 334 334 334 334 334 334 334 33
Structure: Dist. [m] [] Vertical 0 0.034, 1.000 35, 2.000 29, 6.0000 28, 7.0000 27, 8.0000 24, 7.0000 26, 3.000 26, 0.000 28, 7.000 26, 0.000 26, 0	30A Thurl Coordi x y ffset 1 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 40000 38.0 30A Thurl Coordi 40000 38.0 40000 31.0 00000 31.0 000000 31.0 00000 31.0 000000 31.0 000000 31.0 00000000000000000000000000000000000	ow E Su nates il [n 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 ow F Su 2 il [r 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 0000 83.2 1 [n nates 2 1 [n 0000 80.2 0000 80.2 0000 80.2 0000 80.2 0000 80.2	ab-atructu s z	re:: Displacements a) 334 334 334 334 334 334 334 33

$\mathbf{\cap}$	Job No.	Sheet No.	Rev.
Oasys	J15236		
39 Rosslyn Hill, London NW3 5UJ GMA - Combined Movement	Drg. Ref.		
		Date 05-Nov-2015	Checked

Vertical			[m]	[mm]
	Offset	1		
Vertical 0.0 55 1.0000 55 2.0000 55 4.0000 55 5.0000 55 6.0000 55 8.0000 55	.00000	31.00000	80.33000	0.74193 0.81887
2.0000 55	.00000	33.00000	80.33000	0.86327
4.0000 55	.00000	35.00000	80.33000	0.89882
5.0000 55	.00000	36.00000	80.33000	0.89341
7.0000 55	.00000	38.00000	80.33000	0.82675
8.0000 55	.00000	39.00000	80.33000	0.77157
Structure	e: 41 Ro	osslyn C	Sub-stru	icture:
Dist.	Co	oordinates	3	Displacements
[m]	x [m]	y [m]	z [m]	z [mm]
0.0 55	0115et	39.00000	80.33000	0.77157
1.0000 54	.00000	39.00000	80.33000	0.92532
3.0000 52	2.00000	39.00000	80.33000	1.2866
4.0000 51	.00000	39.00000	80.33000	1.4933
6.0000 49	.00000	39.00000	80.33000	2.0484
7.0000 48	.00000	39.00000	80.33000	2.3712 2.7036
9.0000 46	.00000	39.00000	80.33000	3.0405
11.000 44	.00000	39.00000	80.33000	3.7011
Vertical 0.0 55 1.0000 54 2.0000 53 4.0000 51 5.0000 50 6.0000 49 7.0000 48 8.0000 47 9.0000 45 11.000 44 12.000 43	.00000	39.00000	80.33000	4.0089
Structure	e: 41 Ro	osslyn D	Sub-stru	icture:
Dist.	Co	oordinates	3	Displacements
[m]	x [m]	y [m]	z [m]	z [mm]
Ventinal				
0.0 43	.00000	39.00000	80.33000	4.0089
1.0000 43	.00000	38.00000	80.33000	4.5057
3.0000 43	.00000	36.00000	80.33000	5.3820
4.0000 43	.00000	35.00000	80.33000	5.7300 5.9929
6.0000 43	.00000	33.00000	80.33000	6.1481
Vertical 0.0 43 1.0000 43 2.0000 43 3.0000 43 4.0000 43 5.0000 43 6.0000 43 7.0000 43 8.0000 43	.00000	32.00000 31.00000	80.33000 80.33000	6.1683 6.0184
Structure	: Party	v 37-39	Sub-strue	cture:
Dist.	x	y [m]	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical	Offset	1		
0.0 44	.00000	15.00000	80.33000	0.0
2.0000 46	.00000	15.00000	80.33000	0.0
3.0000 47 4.0000 48	.00000	15.00000	80.33000	0.0
5.0000 49	.00000	15.00000	80.33000	0.0
6.0000 50	.00000	15.00000	80.33000	0.0
8.0000 52	.00000	15.00000	80.33000	0.0
10 000 53	.00000	15.00000	80.33000	0.0
10.000 04		10.00000	00.33000	0.0
11.000 55	.00000	15.00000	80.33000	0.0
Vertical 0.0 44 1.0000 45 2.0000 46 3.0000 47 4.0000 48 5.0000 50 7.0000 51 8.0000 52 9.0000 53 10.000 54 11.000 55				
Structure	: 39 R	osslyn A	Sub-stru	ucture:
Structure	: 39 R	osslyn A	Sub-stru	ucture:
Structure Dist. [m]	2: 39 Ro Co x [m]	osslyn A oordinates y [m]	Sub-stru s [m]	Displacements z [mm]
Structure Dist. [m]	2: 39 Ro Co x [m]	osslyn A oordinates y [m]	Sub-stru s [m]	Displacements z [mm]
Structure Dist. [m]	2: 39 Ro Co x [m]	osslyn A oordinates y [m]	Sub-stru s [m]	Displacements z [mm]
Structure Dist. [m]	2: 39 Ro Co x [m]	osslyn A oordinates y [m]	Sub-stru s [m]	Displacements z [mm]
Structure Dist. [m]	2: 39 Ro Co x [m]	osslyn A oordinates y [m]	Sub-stru s [m]	Displacements z [mm]
Structure Dist. [m]	2: 39 Ro Co x [m]	osslyn A oordinates y [m]	Sub-stru s [m]	Displacements z [mm]
Structure Dist. [m]	2: 39 Ro Co x [m]	osslyn A oordinates y [m]	Sub-stru s [m]	Displacements z [mm]
Structure Dist. [m]	2: 39 Ro Co x [m]	osslyn A oordinates y [m]	Sub-stru s [m]	Displacements z [mm]
Structure Dist. [m]	2: 39 Ro Co x [m]	osslyn A oordinates y [m]	Sub-stru s [m]	Displacements z [mm]
Structure Dist. [m] Vertical 0.0 55 2.1200 55 3.1800 55 5.3000 55 6.3600 55 7.4200 55 8.4800 55 8.4800 55	2: 39 Ro Co x [m]	osslyn A oordinates y [m]	Sub-stru s [m]	Displacements z [mm]
Structure Dist. [m] Vertical 0.055 1.060055 2.120055 3.180055 4.240055 6.360055 6.360055 8.480055 9.540055 10.60055	2: 39 Rd x [m] Offset .000000 .000000 .000000 .0000000 .0000000 .00000000	osslyn A cordinates y [m]	Sub-stru 2 [m] 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000	Leture: Displacements 2 [mm] 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Structure Dist. [m] Vertical 0.055 1.0600 55 2.1200 55 3.1800 55 4.2400 55 5.3300 55 8.4800 55 9.5400 55 8.4800 55 9.5400 55 Structure	<pre>: 39 Rc</pre>	Desslyn A y [m] 1 15.00000 15.00000 17.12000 19.24000 20.30000 21.36000 22.42000 23.48000 24.454000 Desslyn B	<pre>Sub-stru g [m] 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000 80.33000</pre>	Leture: Displacements 2 [mm] 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Structure Dist. [m] Vertical 1.000 55 2.1200 55 3.1800 55 4.2400 55 5.300 55 9.5400 55 9.5400 55 Structure Dist.	2: 39 Rd x [m] Offset 000000	basilyn A y [m] 1 15.00000 16.06000 17.12000 20.30000 21.36000 22.42000 22.42000 22.454000 25.60000 basilyn B boordinates y	Sub-stru 2 [m] 80.33000 80.30000 80.30000 80.30000 80.30000 80.30000 80.30000 80.30000 80.30000 80.30000 80.30000	Displacements 2 [mm] 0.0
Structure Dist. [m] Vertical 0.0 55 1.0600 55 2.1200 55 3.1800 55 4.2400 55 5.3000 55 7.4200 55 9.5400 55 Structure Dist. [m]	<pre>2: 39 Rc x [m] Offset</pre>	Desslyn A y [m] 1 15.00000 16.06000 17.12000 19.24000 21.36000 22.42000 23.48000 25.60000 Desslyn B Desslyn B y [m]	Sub-stri 2 [m] 80.33000 80.30000 80.3000 80.3000 80.30000 80.30000 80.30000 80.30000 80	Acture: Displacements z [mm] 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Structure Dist. [m] Vertical 0.0 55 1.0600 55 2.1200 55 3.1800 55 4.2400 55 5.3000 55 7.4200 55 9.5400 55 Structure Dist. [m]	<pre>2: 39 Rc x [m] Offset</pre>	Desslyn A y [m] 1 15.00000 16.06000 17.12000 19.24000 21.36000 22.42000 23.48000 25.60000 Desslyn B Desslyn B y [m]	Sub-stri 2 [m] 80.33000 80.30000 80.3000 80.3000 80.30000 80.30000 80.30000 80.30000 80	Acture: Displacements z [mm] 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Structure Dist. [m] Vertical 0.0 55 1.0600 55 2.1200 55 3.1800 55 4.2400 55 5.3000 55 7.4200 55 9.5400 55 Structure Dist. [m]	<pre>2: 39 Rc x [m] Offset</pre>	Desslyn A y [m] 1 15.00000 16.06000 17.12000 19.24000 21.36000 22.42000 23.48000 25.60000 Desslyn B Desslyn B y [m]	Sub-stri 2 [m] 80.33000 80.30000 80.3000 80.3000 80.30000 80.30000 80.30000 80.30000 80	Acture: Displacements z [mm] 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Structure Dist. [m] Vertical 0.0 55 1.0600 55 2.1200 55 3.1800 55 4.2400 55 5.3000 55 7.4200 55 9.5400 55 Structure Dist. [m]	<pre>2: 39 Rc x [m] Offset</pre>	Desslyn A y [m] 1 15.00000 16.06000 17.12000 19.24000 21.36000 22.42000 23.48000 25.60000 Desslyn B Desslyn B y [m]	Sub-stri 2 [m] 80.33000 80.30000 80.3000 80.3000 80.30000 80.30000 80.30000 80.30000 80	Acture: Displacements z [mm] 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Structure Dist. [m] Vertical 0.0 55 1.0600 55 2.1200 55 3.1800 55 4.2400 55 5.3000 55 7.4200 55 9.5400 55 Structure Dist. [m]	<pre>2: 39 Rc x [m] Offset</pre>	Desslyn A y [m] 1 15.00000 16.06000 17.12000 19.24000 21.36000 22.42000 23.48000 25.60000 Desslyn B Desslyn B y [m]	Sub-stri 2 [m] 80.33000 80.30000 80.3000 80.3000 80.30000 80.30000 80.30000 80.30000 80	Acture: Displacements z [mm] 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Structure Dist. [m] Vertical 0.0 55 1.0600 55 2.1200 55 3.1800 55 4.2400 55 5.3000 55 7.4200 55 9.5400 55 Structure Dist. [m]	<pre>2: 39 Rc x [m] Offset</pre>	Desslyn A y [m] 1 15.00000 16.06000 17.12000 19.24000 21.36000 22.42000 23.48000 25.60000 Desslyn B Desslyn B y [m]	Sub-stri 2 [m] 80.33000 80.30000 80.3000 80.3000 80.30000 80.30000 80.30000 80.30000 80	Acture: Displacements z [mm] 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Structure Dist. [m] Vertical 0.0 55 1.0600 55 2.1200 55 3.1800 55 4.2400 55 5.3000 55 7.4200 55 9.5400 55 Structure Dist. [m]	<pre>2: 39 Rc x [m] Offset</pre>	Desslyn A y [m] 1 15.00000 16.06000 17.12000 19.24000 21.36000 22.42000 23.48000 25.60000 Desslyn B Desslyn B y [m]	Sub-stri 2 [m] 80.33000 80.30000 80.3000 80.3000 80.30000 80.30000 80.30000 80.30000 80	Acture: Displacements z [mm] 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Structure Dist. [m] Vertical 0.0 55 1.0600 55 2.1200 55 3.1800 55 4.2400 55 5.3000 55 7.4200 55 9.5400 55 Structure Dist. [m]	<pre>2: 39 Rc x [m] Offset</pre>	Desslyn A y [m] 1 15.00000 16.06000 17.12000 19.24000 21.36000 22.42000 23.48000 25.60000 Desslyn B Desslyn B y [m]	Sub-stri 2 [m] 80.33000 80.30000 80.3000 80.3000 80.30000 80.30000 80.30000 80.30000 80	Acture: Displacements z [mm] 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Structure Dist. [m] Vertical 0.0 55 1.0600 55 2.1200 55 3.1800 55 4.2400 55 5.3000 55 7.4200 55 9.5400 55 Structure Dist. [m]	<pre>2: 39 Rc x [m] Offset</pre>	Desslyn A y [m] 1 15.00000 16.06000 17.12000 19.24000 21.36000 22.42000 23.48000 25.60000 Desslyn B Desslyn B y [m]	Sub-stri 2 [m] 80.33000 80.30000 80.3000 80.3000 80.30000 80.30000 80.30000 80.30000 80	Acture: Displacements z [mm] 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Structure Dist. [m] Vertical 0.0 55 1.0600 55 2.1200 55 3.1800 55 4.2400 55 5.3000 55 7.4200 55 9.5400 55 Structure Dist. [m]	<pre>2: 39 Rc x [m] Offset</pre>	Desslyn A y [m] 1 15.00000 16.06000 17.12000 19.24000 21.36000 22.42000 23.48000 25.60000 Desslyn B Desslyn B y [m]	Sub-stri 2 [m] 80.33000 80.30000 80.3000 80.3000 80.30000 80.30000 80.30000 80.30000 80	Acture: Displacements z [mm] 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Structure Dist. [m] Vertical 0.055 2.120055 3.180055 5.300055 5.300055 9.540055 9.540055 9.540055 Structure Dist. [m] Vertical 0.055 1.0005	: 39 R. (m) 000000	Desilyn A y T 15.00000 17.12000 18.18000 21.40000 21.40000 21.42000 21.42000 21.42000 21.42000 21.42000 21.42000 25.600000 25.600000 25.600000 25.600000000 25.6000000000000000000000000000000000000	Sub-strn [m] 80.33000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.30000 80.30000 80.30000 80.30000 80.300	Acture: Displacements 2 [mm] 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Structure Dist. [m] Vertical 0.055 2.120055 3.180055 5.300055 5.300055 9.540055 9.540055 9.540055 Structure Dist. [m] Vertical 0.055 1.0005	: 39 R. (m) 000000	Desslyn A y [m] 1 15.00000 16.06000 17.12000 19.24000 21.36000 22.42000 23.48000 25.60000 Desslyn B Desslyn B y [m]	Sub-strn [m] 80.33000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.30000 80.30000 80.30000 80.30000 80.300	Acture: Displacements 2 [mm] 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Structure Dist. [m] Vertical 0.055 2.120055 3.180055 5.300055 5.300055 9.540055 9.540055 9.540055 Structure Dist. [m] Vertical 0.055 1.0005	: 39 R(x (1) 00164 000000	Selyn A (m) 1 15.0000 15.0000 17.1200 18.18000 19.24000 21.36000 21.36000 22.42000 23.48000 23.48000 25.60000 25	Sub-strn	Acture:
Structure Dist. [m] Vertical 0.055 2.120055 3.180055 5.300057 7.420055 9.540055 9.540055 9.540055 Structure Dist. [m] Vertical 0.055 1.000052 3.000052 4.4400055 1.000054 1.000055 1.000555 1.000555 1.000555 1.000555 1.000555 1.000555 1.000555 1.000555 1.000555 1.000555 1.000555 1.000555 1.000555 1.000555 1.0005555 1.0005555 1.00055555 1.000555555 1.00055555 1.000555555555555555555555555	:: 39 Rc X (m) Offset : 00000	<pre>sslyn A y [m] 1 5.00000 17.12000 18.18000 19.24000 21.46000 21.46000 21.46000 21.46000 21.45000 23.48000 25.600000 25.60000 25.60000 25.60000 25.60000 25.60000 25.</pre>	Sub-strn [m] 80.33000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.30000 80.30000 80.30000 80.30000	Acture:
Structure Dist. [m] Vertical 2,1200 55 3,1800 55 4,2400 55 5,3000 55 5,3000 55 5,3000 55 5,3000 55 5,3000 55 3,4800 55 3,4800 55 3,4800 55 Structure Dist. [m] Vertical 0,000 44 3,0000 44 1,000 44 Structure Dist. [m]	: 39 R(x x (1) 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 x 00000 00000 x 00000 00000 x 00000 00000 x 00000 00000 00000 x 00000 x 00000 00000 00000 x 00000 00000 x 00000 x 00000 00000 x 000000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x x x x x x x x x x x x x	SS1yn A y [m] 1 15.00000 15.00000 18.18000 19.24000 21.36000 22.42000 23.48000 24.54000 25.600000 25.60000 25.60000 25.60000 25.60000 25.60	Sub-strn [m] 80.33000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000	Acture: Displacements Z [mm] 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Structure Dist. [m] Vertical 2,1200 55 3,1800 55 4,2400 55 5,3000 55 5,3000 55 5,3000 55 5,3000 55 5,3000 55 3,4800 55 3,4800 55 3,4800 55 Structure Dist. [m] Vertical 0,000 44 3,0000 44 1,000 44 Structure Dist. [m]	: 39 R(x x (1) 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 x 00000 00000 x 00000 00000 x 00000 00000 x 00000 00000 00000 x 00000 x 00000 00000 00000 x 00000 00000 x 00000 x 00000 00000 x 000000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x x x x x x x x x x x x x	SS1yn A y [m] 1 15.00000 15.00000 18.18000 19.24000 21.36000 22.42000 23.48000 24.54000 25.600000 25.60000 25.60000 25.60000 25.60000 25.60	Sub-strn [m] 80.33000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000	Acture: Displacements Z [mm] 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Structure Dist. [m] Vertical 2,1200 55 3,1800 55 4,2400 55 5,3000 55 5,3000 55 5,3000 55 5,3000 55 5,3000 55 3,4800 55 3,4800 55 3,4800 55 Structure Dist. [m] Vertical 0,000 44 3,0000 44 1,000 44 Structure Dist. [m]	: 39 R(x x (1) 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 x 00000 00000 x 00000 00000 x 00000 00000 x 00000 00000 00000 x 00000 x 00000 00000 00000 x 00000 00000 x 00000 x 00000 00000 x 000000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x x x x x x x x x x x x x	SS1yn A y [m] 1 15.00000 15.00000 18.18000 19.24000 21.36000 22.42000 23.48000 24.54000 25.600000 25.60000 25.60000 25.60000 25.60000 25.60	Sub-strn [m] 80.33000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000	Acture: Displacements Z [mm] 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Structure Dist. [m] Vertical 2,1200 55 3,1800 55 4,2400 55 5,3000 55 5,3000 55 5,3000 55 5,3000 55 5,3000 55 3,4800 55 3,4800 55 3,4800 55 Structure Dist. [m] Vertical 0,000 44 3,0000 44 1,000 44 Structure Dist. [m]	: 39 R(x x (1) 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 x 00000 00000 x 00000 00000 x 00000 00000 x 00000 00000 00000 x 00000 x 00000 00000 00000 x 00000 00000 x 00000 x 00000 00000 x 000000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x 00000 x x x x x x x x x x x x x	SS1yn A y [m] 1 15.00000 15.00000 18.18000 19.24000 21.36000 22.42000 23.48000 24.54000 25.600000 25.60000 25.60000 25.60000 25.60000 25.60	Sub-strn [m] 80.33000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000 80.3000	Acture: Displacements Z [mm] 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Structure Dist. [m] Vertical 0.055 1.20055 2.120055 2.120055 3.180055 5.360055 9.540055 9.540055 9.540055 Structure Dist. [m] Vertical 0.055 1.000052 3.000052 4.000055 1.00055 1.000555 1.000555 1.000555 1.000555 1.000555	: 39 R(x x (m) Offset 0,00000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0	<pre>sslyn A y [] 1 5.00000 17.12000 19.24000 21.42000 22.42000 23.48000 24.554000 25.60</pre>	Sub-strn	Jisplacements 2 0.0 </td
Structure Dist. [m] Vertical 0.055 1.20055 2.120055 2.120055 3.180055 5.360055 9.540055 9.540055 9.540055 Structure Dist. [m] Vertical 0.055 1.000052 3.000052 4.000055 1.00055 1.000555 1.000555 1.000555 1.000555 1.000555	: 39 R(x x (m) Offset 0,00000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0	<pre>sslyn A y [] 1 5.00000 17.12000 19.24000 21.42000 22.42000 23.48000 24.554000 25.60</pre>	Sub-strn	Jisplacements 2 0.0 </td
Structure Dist. [m] Vertical 0.055 1.20055 2.120055 2.120055 3.180055 5.360055 9.540055 9.540055 9.540055 Structure Dist. [m] Vertical 0.055 1.000052 3.000052 4.000055 1.00055 1.000555 1.000555 1.000555 1.000555 1.000555	: 39 R(x x (m) Offset 0,00000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0	<pre>sslyn A y [] 1 5.00000 17.12000 19.24000 21.42000 22.42000 23.48000 24.554000 25.60</pre>	Sub-strn	Jisplacements 2 0.0 </td
Structure Dist. [m] Vertical 0.055 1.20055 2.120055 2.120055 3.180055 5.360055 9.540055 9.540055 9.540055 Structure Dist. [m] Vertical 0.055 1.000052 3.000052 4.000055 1.00055 1.000555 1.000555 1.000555 1.000555 1.000555	: 39 R(x x (m) Offset 0,00000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0	<pre>sslyn A y [] 1 5.00000 17.12000 19.24000 21.42000 22.42000 23.48000 24.554000 25.60</pre>	Sub-strn	Jisplacements 2 0.0 </td
Structure Dist. [m] Vertical 0.055 1.20055 2.120055 2.120055 3.180055 5.360055 9.540055 9.540055 9.540055 Structure Dist. [m] Vertical 0.055 1.000052 3.000052 4.000055 1.00055 1.000555 1.000555 1.000555 1.000555 1.000555	: 39 R(x x (m) Offset 0,00000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0	SS1yn A y [m] 1 15.00000 15.00000 18.18000 19.24000 21.36000 22.42000 23.48000 24.54000 25.600000 25.60000 25.60000 25.60000 25.60000 25.60	Sub-strn	Jisplacements 2 0.0 </td
Structure Dist. [m] Vertical 1.0.0055 2.100055 3.420055 3.00055 3.530055 3.530055 3.54005 3.54005 3.54005 3.54005 3.54005 3.54005 3.54005 3.5400 3.540 3.5400 4.5400 4.540 3.5400 4.540 3.5400 4.540 3.5400 4.540 3.5400 4.550 3.540 4.540 3.5400 4.55 3.5400 4.550 3.540 4.540 3.5400 4.55 3.540 4.540 3.540 4.540 3.540 4.540 3.540 4.540 3.540 4.540 3.540 4.540 3.540 4.540 3.540 4.540 3.540 4.540 3.540 4.540 5.540 4.540 5.55 5.540 5.550 5.55 5.540 5.550 5.55 5.55	: 39 Ref x x (m) Offset 0.000000 0.000000 0.0000000 0.000000 0.000000 0.00000 0.00000 0.00	Deslyn A (m] 1 15.00000 17.1200 10.224000 22.42000 23.48000 23.48000 24.54000 25.60000	Sub-strn [m] 80.33000 80.3000 80.3000 80.3000 80.3000 80.30000 80.30000 80.30000 80.30	Acture:
Structure Dist. [m] Vertical 1.0.0055 2.100055 3.420055 3.00055 3.530055 3.530055 3.54005 3.54005 3.54005 3.54005 3.54005 3.54005 3.54005 3.5400 3.540 3.5400 4.5400 4.540 3.5400 4.540 3.5400 4.540 3.5400 4.540 3.5400 4.550 3.540 4.540 3.5400 4.55 3.5400 4.550 3.540 4.540 3.5400 4.55 3.540 4.540 3.540 4.540 3.540 4.540 3.540 4.540 3.540 4.540 3.540 4.540 3.540 4.540 3.540 4.540 3.540 4.540 3.540 4.540 5.540 4.540 5.55 5.540 5.550 5.55 5.540 5.550 5.55 5.55	: 39 Ref x x (m) Offset 0.000000 0.000000 0.0000000 0.000000 0.000000 0.00000 0.00000 0.00	<pre>sslyn A y [] 1 5.00000 17.12000 19.24000 21.42000 22.42000 23.48000 24.554000 25.60</pre>	Sub-strn [m] 80.33000 80.3000 80.3000 80.3000 80.3000 80.30000 80.30000 80.30000 80.30	Acture:
Structure Dist. [m] Vertical 1.0.0055 2.100055 3.420055 3.00055 3.530055 3.530055 3.54005 3.54005 3.54005 3.54005 3.54005 3.54005 3.54005 3.5400 3.540 3.5400 4.5400 4.540 3.5400 4.540 3.5400 4.540 3.5400 4.540 3.5400 4.550 3.540 4.540 3.5400 4.55 3.5400 4.550 3.540 4.540 3.5400 4.55 3.540 4.540 3.540 4.540 3.540 4.540 3.540 4.540 3.540 4.540 3.540 4.540 3.540 4.540 3.540 4.540 3.540 4.540 3.540 4.540 5.540 4.540 5.55 5.540 5.550 5.55 5.540 5.550 5.55 5.55	: 39 R.(X (1) Offset (2) (2)	Deslyn A (m] 1 15.00000 17.1200 10.224000 22.42000 23.48000 23.48000 24.54000 25.60000	Sub-strn [m] 80.33000 8	Acture:

[m] [m] [m] [mm]

[m]

\mathbf{O}	Job No.	Sheet No.	Rev.
Oasys	J15236		
39 Rosslyn Hill, London NW3 5UJ GMA - Combined Movement	Drg. Ref.		
	Made by ML	Date 05-Nov-2015	Checked

0 (Negligible) 0

0 (Negligible)

[m] [m]	f 1	f 1	f								
Vertical Offse		[m]	[mm]								
0.0 44.0000 1.0000 45.0000	00 5.00000	80.33000	0.061791								
2.0000 46.0000 3.0000 47.0000	00 5.00000	80.33000 0	0.033027								
4.0000 48.0000 5.0000 49.0000	00 5.00000	80.33000	0.0								
6.0000 50.0000 7.0000 51.0000	00 5.00000	80.33000	0.0								
8.0000 52.0000 9.0000 53.0000	00 5.00000	80.33000	0.0								
10.000 54.0000	00 5.00000	80.33000	0.0								
12.000 56.0000	0 5.00000	80.33000	0.0								
Structure: 37	Rosslyn B	Sub-str	ucture:								
	Coordinate	s	Displace	ements							
[m] [m]	Coordinate y [m]	z [m]	z [mm]								
Vertical Offse	at 1	80.33000	0.0								
0.0 56.0000 1.0000 56.0000 2.0000 56.0000	0 6.00000	80.33000	0.0								
3.0000 56.0000	00 8.00000	80.33000	0.0								
5.0000 56.0000	00 10.00000	80.33000	0.0								
7.0000 56.0000 8.0000 56.0000)0 12.00000 00 13.00000	80.33000 80.33000	0.0								
9.0000 56.0000 10.000 56.0000)0 14.00000)0 15.00000	80.33000 80.33000	0.0								
Gh	D	L Cub utur									
Structure: 37	Coordinate		Displace	omonte							
[m] [m]	y [m]	z [m]	z	emerics							
Vertical Offse		[111]	[tutti]								
0.0 56.0000	00 15.00000										
a	D	L automation		27							
Structure: 37				acements							
[m] [m]	Coordinate y [m]	z [m]	z	acciences							
Vertical Offse											
0.0 44.0000	00 15.00000	80.33000	0.0								
2.0000 44.0000	00 13.00000	80.33000	0.74567								
3.0000 44.0000 4.0000 44.0000 5.0000 44.0000	0 11.00000	80.33000	0.84066								
6.0000 44.0000 7.0000 44.0000	00 9.00000	80.33000	0.53368								
8.0000 44.0000 9.0000 44.0000	0 7.00000	80.33000	0.20791								
10.000 44.0000	5.00000	80.33000	0.061791								
Specific Buildin	ng Damage I	Results - Al	ll Segments								
Churchurge 10k	h Eldon A	Cub at mu	ak								
Structure: 10b Vertical Offse			tart Length	Curvature	Deflection	Average	Max.	Maximum	Maximum	Min.	Damage
from Line for	c				Ratio	Horizontal Strain	Tensile Strain	Gradient of Horizontal	Gradient of Vertical	Radius of Curvature	Category
Vertical								Displacemen Curve	t Displacement Curve	2	
Vertical Movement			[m] [m] 0.0 9.9990	Hogging	[%] 0.0015201	[%] 0.013045	[%] 0.014055		6 -140.56E-6	[m] 5 72301.	
Vertical		1									(Negligible
Vertical Movement Calculations [m]	ontal strai		e, compress	ive horizon	tal strains	are -ve.					
Vertical Movement Calculations [m] 0 Tensile horizo		ns are +ve		ive horizon	tal strains	are -ve.					
Vertical Movement Calculations [m] 0 Tensile horizo Structure: 10b Vertical Offse	b Eldon B et Segm	ns are +ve Sub-strue			e Deflectio	n Average	Max.	Maximu	n Maximum	n Min.	Damag
Vertical Movement Calculations [m] 0 Tensile horizo Structure: 10fr Vertical Offse from Line for Vertical	b Eldon B et Segm	ns are +ve Sub-strue	cture:		e Deflectio	n Average	al Tensi	Maximu le Gradient n Horizon	of Gradient tal Vertica	of Radius of al Curvatu	of Catego
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Structure: 10b Eldon C | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m]		[m]	[m]		[%]	[%]	[8]			[m]	
0		1 0.0	2.6881	Sagging	20.897E-6	-0.0034620	692.47E-6	42.380E-6	16.850E-6	1.1146E+6	0 (Negligible)
		2 2.6881	2.3109	Hogging	14.005E-6	-0.0012369	247.51E-6	24.626E-6	16.850E-6	1.5820E+6	(Negligible)
Tensile horizontal :	strains are	+ve, co	npressi	ve horizon	tal strains	are -ve.					

Structure: 10c Eldon A | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Horizontal	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0		[m] 1 0.0	[m] 4.9990	Sagging	[%] 0.0011468	[%] -0.023568	[%] 0.0047555	284.50E-6	-142.69E-6	[m] 40032.	0

	10								
Jasy	S					J1	5236		
Rosslyn Hill, Lo						Drg.	Ref.		
MA - Combined M	lovement					Made ML	by	Date 05-Nov-2015	hecked
rtical Offset Segment rom Line for Vertical	Start Length Curvature	Deflection Average Ratio Horizont Strain	al Tensile	Maximum Gradient of Horizontal	Maximum Gradient of Vertical		Damage Category		
Movement	are +ve, compressive horizor			Displacement			(Negligible)		
	· -	ical berainb are ve							
ructure: Eldon Party c-d		Deflection Average	Max.	Maximum	Maximum	Min.	Damage		
rom Line for Vertical Movement			al Tensile	Gradient of G Horizontal Displacement H	Vertical (Displacement		Category		
[m] 0	[m] [m] 1 0.0 9.9990 Hogging	[%] [%] 0.0034829 0.0251	[%] 25 0.027438	Curve -251.19E-6	Curve 402.32E-6	[m] 7309.3	0 Negligible)		
ensile horizontal strains	are +ve, compressive horizor	ntal strains are -ve				(Negrigible)		
ructure: 10c Eldon B Su	b-structure:								
ertical Offset Segment from Line for Vertical	Start Length Curvature	Deflection Average Ratio Horizont Strain	al Tensile	Horizontal	Vertical		Damage Category		
Movement Calculations [m] 0	[m] [m] 1 0.0 4.9990 Sagging	[%] [%] 143.65E-6 -0.00622	[%]	Displacement Curve 71.739E-6	Displacement Curve 14.512E-6	[m] 344780.	0		
	are +ve, compressive horizor			/1./39E-0	14.5128-6		(Negligible)		
ructure: 10d Eldon A Su	b-structure:								
ertical Offset Segment From Line for Vertical			tal Tensile	Maximum Gradient of Horizontal		Min. Radius of Curvature	Damage Category		
Movement alculations [m]	[m] [m]	[%] [%]	n Strain	Displacement Curve		[m]			
0	1 0.0 3.0000 Sagging	0.025209	0.0 0.02473		-0.0011344	705.23	(Negligible)		
nsile horizontal strains	2 3.0000 1.9990 None are +ve, compressive horizor		0.0 0.0	0.0	0.0	-	0 (Negligible)		
ructure: 10d Eldon B Su rtical Offset Segment		Deflection Average	Max.			Min.	Damage		
rom Line for	Start Length Curvature								
Vertical		Strain	al Tensile	Maximum Gradient of O Horizontal	Vertical (Radius of Curvature	Category		
Vertical Movement Calculations	[m] [m]	Strain	al Tensile Strain	Gradient of (Vertical (Curvature	Category		
Vertical Movement alculations [m] 0	[m] [m] 1 0.0 9.9990 Hogging	[%] [%] 0.0051977 0.0375	al Tensile Strain [%] 00 0.040952	Gradient of G Horizontal Displacement H Curve	radient of H Vertical (Displacement	[m] 4898.4	O Negligible)		
Vertical Movement alculations [m] 0		[%] [%] 0.0051977 0.0375	al Tensile Strain [%] 00 0.040952	Gradient of G Horizontal Displacement H Curve	Vertical O Vertical O Displacement Curve	[m] 4898.4	0		
Vertical Movement alculations [m] 0 musile horizontal strains ructure: 10d Eldon C Su	1 0.0 9.9990 Hogging are +ve, compressive horizor b-structure:	Strain [%] [%] 0.0051977 0.0375 strains are -vential strains are -vential strains -vential strains	al Tensile Strain [%] 00 0.040952	Gradient of G Horizontal Displacement I Curve -374.86E-6	vertical of P Vertical of bisplacement Curve 600.40E-6	[m] 4898.4 (0 Negligible)		
Vertical Movement alculations [m] 0 musile horizontal strains ructure: 10d Eldon C Su prical Offset Segment rom Line for Vertical	1 0.0 9.9990 Hogging are +ve, compressive horizor b-structure:	Strain [%] [%] 0.0051977 0.0375 strains are -vential strains are -vential strains -vential strains	al Tensile Strain [%] 00 0.040952 e Max. tal Tensile	Gradient of G Horizontal Displacement I Curve -374.86E-6 Maximum Gradient of Horizontal	Maximum Gradient of J	[m] 4898.4 (Min. Radius of Curvature	0 Negligible) Damage : Category		
Vertical Movement alculations [m] 0 unsile horizontal strains ructure: 10d Eldon C Su wrtical Offset Segment rom Line for Vertical Movement alculations [m]	<pre>1 0.0 9.9990 Hogging are +ve, compressive horizor b-structure: start Length Curvature [m] [m]</pre>	[%] [%] 0.0051977 0.0375 atal strains are -ve beflection Averag Ratio Horizon Strai [%] [%]	al Tensile Strain [%] 00 0.040952 tal Tensile n Strain [%]	Gradient of C Horizontal Displacement I Curve -374.865-6 Maximum e Gradient of Horizontal Displacement Curve	radient of E Vertical C isplacement Curve 600.40E-6 Maximum Gradient of Vertical Displacement Curve	[m] 4898.4 (Min. Radius of Curvature [m]	0 Negligible) Damage : Category		
Vertical Movement alculations [m] o musile horizontal strains ructure: 10d Eldon C Su prical Offset Segment rom Line for Vertical Movement alculations	<pre>1 0.0 9.9990 Hogging are +ve, compressive horizor b-structure: Start Length Curvature [m] [m] 1 0.0 2.0000 None</pre>	Strain Strain [%] [%] 0.0051977 0.0375 atal strains are -ve b Deflection Averag Ratio Horizon Strain Strain [%] [%] [%] [%]	al Tensile Strain (%) 00 0.040952 tal Tensile n Strain 0.0 [%]	Gradient of C Horizontal Displacement I Curve -374.862-6 Gradient of Horizontal Displacement Curve	radient of E Vertical C isplacement Curve 600.40E-6 Maximum Gradient of Vertical Displacement Curve 0.0	[m] 4898.4 (Min. Radius of Curvature : [m]	0 Negligible) Damage Category (Negligible)		
Vertical Movement alculations [m] 0 musile horizontal strains ructure: 10d Eldon C Su prtical Offset Segment rom Line for Vertical Movement alculations [n] 0	<pre>1 0.0 9.9990 Hogging are +ve, compressive horizor b-structure: start Length Curvature [m] [m]</pre>	Strain Strain 0.0051977 0.0375 atal strains are -ve stal strains are -ve Deflection Averag Ratio Strain [%] 0.0 0.0031338 0.0	al Tensile Strain 00 0.040952 e Max. tal Tensile n Strain 0.0 [%] 0.0 0.00307!	Gradient of C Horizontal Displacement I Curve -374.862-6 Gradient of Horizontal Displacement Curve	radient of E Vertical C isplacement Curve 600.40E-6 Maximum Gradient of Vertical Displacement Curve 0.0	[m] 4898.4 (Min. Radius of Curvature : [m]	0 Negligible) Damage Category (Negligible)		
Vertical Movement alculations [m] 0 musile horizontal strains ructure: 10d Eldon C Su prtical Offset Segment rom Line for Vertical Movement alculations [n] 0	<pre>1 0.0 9.9990 Hogging are +ve, compressive horizor b-structure: Start Length Curvature [m] [m] 1 0.0 2.0000 None 2 2.0000 2.9990 Sagging are +ve, compressive horizor</pre>	Strain Strain 0.0051977 0.0375 atal strains are -ve stal strains are -ve Deflection Averag Ratio Strain [%] 0.0 0.0031338 0.0	al Tensile Strain 00 0.040952 e Max. tal Tensile n Strain 0.0 [%] 0.0 0.00307!	Gradient of C Horizontal Displacement I Curve -374.862-6 Gradient of Horizontal Displacement Curve	radient of E Vertical C isplacement Curve 600.40E-6 Maximum Gradient of Vertical Displacement Curve 0.0	[m] 4898.4 (Min. Radius of Curvature : [m]	Negligible) Damage Category (Negligible) 0		
Vertical Movement alculations [m] 0 musile horizontal strains ructure: 10d Eldon C Su mrtical Offset Segment alculations [m] 0 musile horizontal strains ructure: 29 Thurlow A S mrtical Offset Segment	<pre>1 0.0 9.9990 Hogging are +ve, compressive horizor b-structure:</pre>	Strain [%] [%] 0.0051977 0.0375 atal strains are -ve beflection Average Ratio Strain [%] [%] 0.00 0.0031338 ttal strains are -ve Deflection Average	al Tensile strain [%] [%] 0 0.040952 . . e Max.	Gradient of C Horizontal Displacement I Curve -374.862-6 Gradient of Horizontal Displacement Curve 0 0.0.0	Maximum Maximum Curve 600.40E-6 Maximum Gradient of Vertical Displacement Curve 0.(141.11E-6 Maximum	[m] 4898.4 (Min. Radius of Curvature - - 5 5666.9 Min.	Negligible) Damage Category (Negligible) (Negligible) Damage		
Vertical Movement laculations [m] 0 unsile horizontal strains ructure: 10d Eldon C Su vertical Offset Yertical Movement alculations [m] 0 msile horizontal strains ructure: 29 Thurlow A S prical Offset Segment Segment Segment	<pre>1 0.0 9.9990 Hogging are +ve, compressive horizor b-structure:</pre>	Strain [%] [%] 0.0051977 0.0375 atal strains are -ve beflection Average Ratio Strain [%] [%] 0.00 0.0031338 ttal strains are -ve Deflection Average	al Tensile Strain [%] 00 0.040952 • • • Max. 0.0 0.000075 • • Max. al Tensile	Gradient of C Horizontal Displacement I Curve -374.86E-6 Maximum Gradient of Displacement Gradient of Maximum Gradient of Horizontal	Maximum Gradient of J Maximum Gradient of Vertical 0.0 141.112-0 Maximum Fradient of F Vertical 0.0	[m] 4898.4 (Min. Radius of Curvature - - 5 5666.9 Min.	Negligible) Damage Category (Negligible) (Negligible)		
Vertical Movement alculations [m] 0 msile horizontal strains ructure: 10d Eldon C Su wrtical Offset Segment trom Line for Vertical Movement alculations [m] 0 msile horizontal strains ructure: 29 Thurlow A S wrtical Offset Segment from Line for Vertical	<pre>1 0.0 9.9990 Hogging are +ve, compressive horizor b-structure:</pre>	Strain [%] [%] 0.0051977 0.0375 tal strains are -ve b Deflection Average Ratio [%] [%] 0.0031338 atal strains are -ve Deflection Average Ratio Horizont Strain [%] [%]	al Tensile Strain [%] 00 0.040952 e Max. m Strain 0.0 0 0.0 0.000075 . . Max. al Tensile strain [%]	Gradient of C Horisontal Displacement I Curve -374.86E-6 Maximum Gradient of Bisplacement Curve Maximum Gradient of C Korisontal Displacement I Displacement I	Maximum Gradient of Vertical Curve 600.40E-6 Maximum Gradient of Vertical 141.11E-6 Maximum Fradient of Vertical 0.0	(m) (M) (M) (M) (M) (M) (M) (M) (M) (M) (M	Negligible) Damage Category (Negligible) (Negligible) Damage		
Vertical Movement laculations [m] 0 unsile horizontal strains ructure: 10d Eldon C Su vertical Offset Yertical Movement laculations (m] 0 multipertical offset Segment ructure: 29 Thurlow A S vertical Offset Segment ructure: 29 Thurlow A S vertical Movement laculations [m] 0	<pre>1 0.0 9.9990 Hogging are +ve, compressive horizor b-structure:</pre>	[%] [%] 0.0051977 0.0375 tal strains are -ve Deflection Average Ratio [%] 0.003338 atal strains are -ve Deflection Average Ratio Deflection Average Ratio Katio Katio Strain 0.0034391 0.0375	al Tensile Strain [%] 00 0.040952 e Max. Tensile 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 Max. al Tensile Strain [%] 00 0.038893	Gradient of C Horisontal Displacement I Curve -374.86E-6 Maximum Gradient of Bisplacement Curve Maximum Gradient of C Korisontal Displacement I Displacement I	Maximum Gradient of J Maximum Gradient of Vertical 0.0 141.112-0 Maximum Fradient of F Vertical 0.0	Lurvature [m] 4898.4 (Min. Radius of Curvature [m] 5 5666.9 Min. Radius of Lurvature [m] 27854.	Negligible) Damage Category (Negligible) (Negligible) Damage Category		
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Vertical Offset	Segment	Start	Length	Curvature Deflection	Average	Max.	Maximum	Maximum	Min.	Damage
from Line for				Ratio	Horizontal	Tensile	Gradient of	Gradient of	Radius of	Category
Vertical					Strain	Strain	Horizontal	Vertical	Curvature	



39 Rosslyn Hill, London NW3 5UJ GMA - Combined Movement

Job No.	Sheet No.	Rev.
J15236		
Drg. Ref.		
Made by ML	Date 05-Nov-2015	Checked

Movement Calculations [m] 0 ensile horizontal st						Displacemen	nt Displacemen	it	
		[m] [m] 1 0.0 0.25662 None	[%]	[%] .0 0.0375	[%] 00 0.03750	Curve	Curve	[m]	0
ensile horizontal et		2 0.25662 3.8223 Hogging	0.00574		00 0.03750				(Negligible) 0
ensile horizontal et		3 4.0789 3.9201 Sagging	0.00101	50 0.0466	62 0.04706	-555.37E-	-6 -608.72E-	6 28083.	(Negligible) (Negligible)
	rains are	e +ve, compressive horizon	tal strains	are -ve.					(
Structure: 30 Thurlow									
Vertical Offset S from Line for Vertical Movement Calculations	legment	Start Length Curvature	e Deflectio Ratio	n Average Horizonta Strain	Max. 1 Tensile Strain	Horizontal	Maximum Gradient of Vertical Displacemen Curve	Curvature	
[m] 0		[m] [m] 1 0.0 2.4694 Hogging	[%] 0.04577		[%] 1 0.03680	7 553.99E-		[m] 61 416.60	0 (Negligible)
		2 2.4694 0.52958 Hogging		0 -0.04918	2 0.009836	5 492.07E-	-6 181.44E-	6 1942.0	(Negligible)
		+ve, compressive horizon	tal strains	are -ve.					
tructure: 30 Thurlow	r C Sub-	structure: Start Length Curvature 1	Deflection	Average	Max.	Maximum	Maximum	Min.	Damage
from Line for Vertical Movement Calculations		-	Ratio	Horizontal Strain	Tensile G Strain I		Fradient of R Vertical C	adius of Curvature	Category
[m] 0		[m] [m] 1 0.0 2.9990 Sagging	[%] 0.0018713	[%] 0.024550	[%] 0.025120	-272.32E-6	-283.58E-6	[m] 15765. (N	0 egligible)
ensile horizontal st	rains are	+ve, compressive horizon	tal strains	are -ve.					
tructure: 30 Thurlow	/ D Sub-								
Vertical Offset S from Line for Vertical Movement Calculations	Segment	Start Length Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Horizontal	Maximum Gradient of Vertical Displacement Curve	Curvature	Damage Category
[m] 0		[m] [m] 1 0.0 3.0210 Sagging	[%] 115.71E-6	[%] -0.040569	[%] 0.0081140				0
		2 3.0210 3.1898 Hogging	0.0038115	-0.0087861	0.0029844	133.41E-6	5 282.21E-6	13558.	(Negligible) 0 (Negligible)
and the back of the		3 6.2108 1.7882 Sagging		-0.0033802	883.16E-6	60.271E-6	5 194.58E-6	24967.	(Negligible) (Negligible)
rensile horizontal st	rains are	+ve, compressive horizon	tal strains	are -ve.					
Structure: 30 Thurlow			D .(1)	•	м.			w/.	D
Vertical Offset S from Line for Vertical Movement Calculations	legment	Start Length Curvature	Deflection Ratio		Max. Tensile Strain	Horizontal	Maximum Gradient of Vertical Displacement Curve	Curvature	Damage Category
[m] 0		[m] [m] 1 0.0 1.0385 Sagging	[%] 4.7842E-6	[%] -0.0065058	[%] 0.0013012				0
		2 1.0385 9.9605 Hogging	0.0019950	0.0026247	0.0036157	-106.75E-6	5 259.46E-6	31763.	(Negligible) 0 (Negligible)
Tensile horizontal st	rains are	+ve, compressive horizon	tal strains	are -ve.					
Structure: 30A Thurlo	w A Sul								
Vertical Offset S from Line for Vertical Movement Calculations	Segment	Start Length Curvature 1		Average Horizontal Strain	Strain	Maximum Fradient of (Horizontal Displacement I Curve		Min. Radius of Curvature	Damage Category
[m] 0		[m] [m] 1 0.0 4.3990 Hogging	[%] 0.0056161	[%] -0.087031	[%] 0.017666	0.0016848	-413.18E-6	[m] 3705.4	0
Censile horizontal st	rains are	+ve, compressive horizon	tal strains	are -ve.				(N	egligible)
tructure: 30A Thurlo	w B Sul	o-structure:							
Vertical Offset S from Line for Vertical Movement Calculations	Segment	Start Length Curvature 1		Average Horizontal Strain	Strain	Maximum Fradient of (Horizontal Displacement I Curve	Maximum Fradient of R Vertical C Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0		[m] [m] 1 0.0 1.5990 Sagging	[%] 0.0026267	[%] 0.039124	[%] 0.040675	-403.67E-6	208.74E-6	[m] 7540.1	0
	rains are	+ve, compressive horizon						(N	egligible)
tructure: 30A Thurlo	w C Sul	-structure:							
	legment	Start Length Curvature	Deflection Ratio	n Average Horizonta Strain		Horizontal	Maximum Gradient of Vertical Displacement	Curvature	Damage Category
Calculations		[m] [m]	[%]	[%]	[%]	Curve	Curve	[m]	1 (Ter
[m]		1 0.0 2.7000 Sagging 2 2.7000 0.89900 Sagging	0.06623		0.050728			241.34 745.93E+15	1 (Very Slight) 0
[m] 0		<pre>2 2.7000 0.89900 Sagging e +ve, compressive horizon</pre>			- 0.0				(Negligible)
0 Tensile horizontal st									
0 Tensile horizontal st Structure: 30A Thurlc	w D Sul		Defi est i		Mar	Maurim	Manda	Nin -	
Tensile horizontal st Structure: 30A Thurlo Vertical Offset S from Lime for Vertical Movement		-structure: Start Length Curvature)	Deflection Ratio	Horizontal	Strain	Horizontal Displacement H		adius of Ca	amage tegory
O Tensile horizontal st Structure: 30A Thurlo Jertical Offset S from Line for Vertical	ow D Sul Segment		Ratio :	Horizontal	Tensile G Strain [%]	Fradient of G Horizontal	Fradient of R Vertical C	[m] 5759.8	2
Tensile horizontal st Structure: 30A Thurlo Vertical Offset S from Line for Vertical Movement Calculations 0	ow D Sul	Start Length Curvature 1	[%] 0.011417	[%] 0.061203	Tensile G Strain [%]	Fradient of (Horizontal Displacement I Curve	Fradient of R Vertical C Displacement Curve	[m] 5759.8	tegory
Tensile horizontal st Structure: 30A Thurlo Vertical Offset S from Line for Vertical Movement Calculations [m] 0 Tensile horizontal st	ow D Sul Segment	<pre>Start Length Curvature 1 [m] [m] 1 0.0 9.5990 Sagging +ve, compressive horizond</pre>	[%] 0.011417	[%] 0.061203	Tensile G Strain [%]	Fradient of (Horizontal Displacement I Curve	Fradient of R Vertical C Displacement Curve	[m] 5759.8	2
Tensile horizontal st Structure: 30A Thurlo Vertical Offset S from Line for Vertical Movement Calculations [m] Tensile horizontal st Structure: 30A Thurlo Vertical Offset S from Line for Vertical	ow D Sul Segment	<pre>Start Length Curvature 1 [m] [m] 1 0.0 9.5990 Sagging t +ve, compressive horizond</pre>	<pre>Ratio : [%] 0.011417 tal strains</pre>	<pre>Horizontal Strain [%] 0.061203 are -ve. Average</pre>	Tensile C Strain [%] 0.078222 Max.	Maximum Gradient of Marinum	Maximum Gradient of Waximum Gradient of Vertical	tadius of Ca Survature [m] 5759.8 (S Min. Radius of Curvature	2
Tensile horizontal st Structure: 30A Thurlo Vertical Offset S from Line for Vertical Movement Calculations [m] 0 Tensile horizontal st Structure: 30A Thurlo Vertical Offset S from Line for Vertical Movement Calculations [m]	ow D Sul Segment crains are	Start Length Curvature I [m] [m] 1 0.0 9.5990 Sagging a +ve, compressive horizond b-structure: Start Length Curvature [m] [m]	Ratio : [%] 0.011417 tal strains Deflection Ratio [%]	Horizontal Strain [%] 0.061203 are -ve. Average Horizontal Strain [%]	Tensile (Strain [%] 0.078222 Max. Tensile Strain [%]	radient of (Horizontal Horizontal Horizontal Curve -715.88E-6 Maximum Gradient of Horizontal Displacement Curve	Tradient of R Wertical C Vertical C Displacement Curve 580.23E-6 Maximum Gradient of Vertical Displacement Curve	tadius of Ca lurvature 5759.8 (S Min. Radius of Curvature :	2 light) Damage Category
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Yertical Offset from Line for Vertical	Segment	Start Length Curvatur	e Deflectior Ratio	n Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal	Maximum Gradient of Vertical	Min. Radius of Curvature					
Movement	3	3.5602 2.3858 Hogging	0.024076	5 -0.034374		Displacemen	t Displacemen	t	0				
	4	5.9460 2.0530 Sagging	477.47E-6	5 -0.027270	0.005460	1 344.73E-	6 192.94E-	6 45113.	(Negligible) 0 (Negligible)				
ensile horizontal	strains are ·	ve, compressive horizo	ntal strains	are -ve.					(negrigibie)				
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Yertical Offset from Line for Vertical Movement Calculations	Segment	Start Length Curvature	e Deflectior Ratio	n Average Horizontal Strain	Max. Tensile Strain	Horizontal	Maximum Gradient of Vertical t Displacemen Curve	Curvature	Damage Category				
[m] 0	1	[m] [m] 0.0 6.1378 Sagging	[%] 0.0036234	[%] 4 0.0032102	[%] 0.008543			[m] 6 15366.	0				
		6.1378 1.8612 Hogging		-0.025616	0.005574	5 276.52E-	6 -140.73E-	6 4749.5	(Negligible) 0 (Negligible)				
ensile horizontal	strains are -	ve, compressive horizo	ntal strains	s are -ve.									
tructure: 41 Rossl			B-61	•		Marcal	W	W /	B				
Yertical Offset from Line for Vertical Movement Calculations	Segment	Start Length Curvature	Ratio	Average Horizontal Strain	Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve		Damage Category				
[m] 0	1	[m] [m] 0.0 11.999 Hogging	[%] 0.0089707	[%] 0.015579	[%] 0.020882	540.84E-6	858.27E-6	[m] 8847.2	0				
ensile horizontal	strains are -	ve, compressive horizo	ntal strains	are -ve.				()	Negligible)				
tructure: 41 Rossl	lyn B Sub-st	ructure:											
Yertical Offset from Line for Vertical Movement	Segment	Start Length Curvature			Max. Tensile Strain	Horizontal	Maximum Gradient of Vertical Displacement		Damage Category				
Calculations [m]		[m] [m]	[%]	[%]	[%]	Curve	Curve	[m]					
0 Yensile horizontal		0.0 7.9990 Sagging		-0.013698 s are -ve.	u.uu29037	170.76E-6	-76.951E-6		0 (Negligible)				
tructure: 41 Rossl													
Yertical Offset from Line for Vertical	Segment	Start Length Curvature	e Deflectior Ratio		Max. Tensile Strain	Horizontal		Curvature	Damage Category				
Movement Calculations [m]		[m] [m]	[%]	[%]	[%]	Displacemen Curve	t Displacemen Curve	t [m]					
		[[[]] [[]]	L @ J	L 9]	[0]	6 149.71E-	6 -336.91E-	6 22305.	0				
0	1	0.0 8.6607 Hogging		3 0.0026168					(Negligible)				
	2	8.6607 3.3383 Sagging	490.77E-6	5 -0.028286			6 -336.91E-	6 50058.	(Negligible) 0 (Negligible)				
ensile horizontal	2 strains are -	8.6607 3.3383 Sagging	490.77E-6	5 -0.028286				6 50058.	0				
Censile horizontal	2 strains are - lyn D Sub-st	8.6607 3.3383 Sagging .ve, compressive horizo: :ructure:	490.77E-6 ntal strains	5 -0.028286 s are -ve.	0.005664				0 (Negligible)				
ensile horizontal	2 strains are -	8.6607 3.3383 Sagging ve, compressive horizo ructure: Start Length Curvature	490.77E-6 ntal strains Deflection Ratio	5 -0.028286 s are -ve. Average Horizontal Strain	0.005664 Max. Tensile Strain	0 376.04E- Maximum	6 -336.91E- Maximum Gradient of Vertical	Min. Radius of Curvature	0				
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ensile horizontal tructure: 41 Rossl ertical offset from Line for Vertical Movement Calculations [m] 0	2 strains are - lyn D Sub-st Segment 1	<pre>8.6607 3.3383 Sagging ve, compressive horizo ructure: Start Length Curvature [m] [m]</pre>	490.77E-6 ntal strains Deflection Ratio	-0.028286 s are -ve. Average Horizontal Strain [%] 0.020887	0.005664 Max. Tensile Strain [%]	0 376.04E- Maximum Gradient of Horizontal Displacement Curve	6 -336.91E- Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature [m] 5588.8	0 (Negligible) Damage				
ensile horizontal tructure: 41 Rossl ertical offset from Line for Vertical Movement Calculations [m] 0	2 strains are - lyn D Sub-st Segment 1 strains are -	8.6607 3.3383 Sagging ve, compressive horizo ructure: Start Length Curvature [m] [m] 0.0 7.9990 Sagging ve, compressive horizo	490.77E-6 ntal strains Deflection Ratio	-0.028286 s are -ve. Average Horizontal Strain [%] 0.020887	0.005664 Max. Tensile Strain [%]	0 376.04E- Maximum Gradient of Horizontal Displacement Curve	6 -336.91E- Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature [m] 5588.8	0 (Negligible) Damage Category 0				
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Vertical Offset from Line for Vertical

Movement Calculations

Vertical Offset from Line for Vertical Movement Calculations

[m] 0

39 Rosslyn Hill, London NW3 5UJ **GMA** - Combined Movement

Segment

Structure: 37 Rosslyn C | Sub-structure:

Structure: 37 Rosslyn D | Sub-structure: Sub 37

J15236 Drg. Ref. Made by Date Checked 05-Nov-2015 ML Start Length Curvature Deflection Average Max. Maximum Maximum Min. Damage Ratio Horizontal Tensile Gradient of Gradient of Radius of Category Strain Strain Horizontal Vertical Curvature Displacement Displacement Displacement (m) [%] [%] [%] [m] Calculations [m] [m] [%] <th[%]</th> <th [m] Vertical Offset Segment Start Length Curvature Deflection Average Max. Maximum Maximum Min. Damage from Line for Ratio Horizontal Tensile Gradient of Gradient of Radius of Category Vertical Strain Strain Horizontal Vertical Curvature Movement Displacement Displacement Displacement Displacement Displacement Calculations Curve Curve [m] Calculations [m] [m] [%] <th[%]</th> <th [m] Segment Start Length Curvature Deflection Average Max. Maximum Maximum Min. Ratio Horizontal Tensile Gradient of Gradient of Radius of Strain Strain Horizontal Vertical Curvature Displacement Displacement Curve Curve (-) (-) (*) (*) (*) (*) (*) Damage Category [m] 6150.1 0 (Negligible) 0 [m] [m] [%] [%] [%] [%] 1 1.0000 5.1386 Sagging 0.0077803 -0.019257 0.0061011 472.22E-6 -442.33E-6 1.00000 5.1366 Sagging 0.007755 0.00785 (NegligiDie) 2 6.1386 2.8614 Hogging 0.0014904 0.018248 0.018466 -254.60E-6 179.75E-6 21353. (NegligiDie)

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Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Specific Building Damage Results - Critical Values for All Segments within Each Sub-Structure

Vertical Movement Calculations	1	Horizontal Strain	Maximum Slope		Strain	Maximum Gradient of Horizontal Displacement Curve	Vertical	Curvature (Hogging)	Radius of Curvature	Damage Category
[m] 0	[%] 0.0015201	[%] 0.013045	-140.56E-6	[mm] 5 1.0980	[%] 0.014055	-174.56E-6	-140.56E-6	[m] 72301.	[m] - () (Negligible)
	Ob Eldon B									
Line for Vertical Movement Calculations [m]	[%]	Strain		[mm]	Strain	Curve	Vertical Displacemen Curve	Curvatur t (Hogging	e Curvature) (Sagging)	
0		-0.011573		1.7563	0.002339	1 146.45E-	5 -152.03E-	6 30235	. 1.7724E+6	0 (Negligible)
Vertical Offset from Line for Vertical Movement				Maximum Settlement !	Strain	Maximum Gradient of (Horizontal Displacement) Curve	Vertical	Curvature	Curvature	Damage Category
[m] 0	[%]	[%] 0.019439	248.40E-6	[mm] 1.7564	[%] 0.020967	-217.77E-6	248.40E-6	[m] 19182.	[m] - 0	(Negligible)
Structure: 1	.0b Eldon C	Sub-struct	ure:							
Vertical Dffset from Line for Vertical Movement Calculations		Average Horizontal Strain	Maximum Slope	Maximum Settlement		Maximum Gradient of Horizontal Displacement Curve	Vertical	Curvature	Curvature	Damage Category
[m] 0	[8]	[%] -0.0034620	16.850E-6	[mm] 0.23537	[%] 692.47E-6	42.380E-6	16.850E-6	[m] 1.5820E+6	[m] 1.1146E+6 () (Negligible)
Structure: 1	Oc Eldon A	Sub-struct	ure:							
Vertical Dffset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain		Maximum Gradient of Vertical Displacemen Curve	Curvatur	e Curvature	Damage Category
[m] 0	[8]	[%] -0.023568	-142.69E-6	[mm] 2.3031	[%] 0.004755	5 284.50E-	5 -142.69E-	[m] 6	[m] - 40032.	0 (Negligible)
Structure: E	ldon Party o	c-d Sub-st	ructure:							
Vertical Offset from Line for Vertical Movement Calculations			Maximum Slope		Strain	Maximum Gradient of Horizontal Displacement 1 Curve	Vertical	Curvature	Radius of Curvature	Damage Category
[m] 0	[%] 0.0034829	[%] 0.025125	402.32E-6	[mm] 2.3031	[%] 0.027438	-251.19E-6	402.32E-6	[m] 7309.3	[m] - 0	(Negligible)
	Oc Eldon B									
Vertical		Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Vertical	Curvature	Curvature	Damage Category
Line for Vertical Movement				[mm]	[%]	71.739E-6		[m]	[m]) (Negligible)
Line for Vertical	[%]	[%] -0.0062274	14.512E-6	0.28650	0.0012479	/1./396-0	14.512E-6	-	344780. ((Regrigible)
Line for Vertical Movement Calculations [m] 0	[%]	-0.0062274		0.28650	0.0012479	/1./39E=0	14.512E-6	_		(Acgligibic)
Line for Vertical Movement Calculations [m] 0 Structure: 1 Vertical	[%] 143.65E-6 Od Eldon A Deflection Ratio	-0.0062274 Sub-struct Average	ure: Maximum	Maximum	Max. Tensile	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical	Min. Radius of Curvature	Min. Radius of Curvature	Damage Category



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VIA - C	ombined		nent							Made by ML	ate 5-Nov-2015	Ch	ecked
Vertical fset from Line for Vertical	Deflection Ratio	Horizontal Strain		Maximum Settlement	Max. Tensile Strain	Horizontal	Maximum Gradient of Vertical Displacement	Curvature	Curvature	Damage Category			
Vertical Eset from Line for Vertical Movement	Deflection		Maximum	Maximum Settlement	Strain	Maximum Gradient of Horizontal Displacement Curve	Vertical	Curvature	Curvature	Damage Category			
[m] 0	[%] 0.0051977	[%] 0.037500	600.40E-6	[mm] 5 3.4375	[%] 0.040952	-374.86E-6	600.40E-6	[m] 4898.4	[m] - 0	(Negligible)			
ructure: 1	.0d Eldon C	Sub-struc	ture:										
Vertical ffset from Line for Vertical Movement		Average Horizontal Strain	Maximum Slope		Max. Tensile Strain	Horizontal	Maximum Gradient of Vertical Displacement Curve	Curvature	Curvature	Damage Category			
[m] 0	[%] 0.0031338	[%] 0.0	0 141.11E-6	[mm] 5 0.42762	[%] 0.0030751	0.0	141.11E-6	[m] -	[m] 5666.9	0 (Negligible)			
	9 Thurlow A												
Vertical ffset from Line for Vertical Movement alculations		Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Curvature	Curvature	Damage Category			
[m] 0	[%] 0.0034591	[%] 0.037500	-328.40E-	[mm] -6 1.9803	[%] 0.038893	-374.86E-6	-328.40E-6	[m] 27854.	[m] -	0 (Negligible)			
tructure: P	arty 29-30	Sub-struc	ture:										
Vertical ffset from Line for Vertical Movement		Average Horizontal Strain	Maximum Slope	Maximum Settlement	Strain	Maximum Gradient of Horizontal Displacement Curve	Vertical	Curvature	Curvature	Damage Category			
alculations [m] 0	[%]	[%] -0.012258	653.62E-6	[mm] 5 1.9807	[%] 0.010731	191.27E-6	653.62E-6	[m] 1278.0	[m] 95026. 0	(Negligible)			
tructure: 2	9 Thurlow B	Sub-stru	cture:										
Vertical ffset from Line for Vertical Movement alculations		Average Horizontal Strain	Maximum . Slope	Maximum Settlement	Strain	Maximum Gradient of Horizontal Displacement Curve	Vertical	Curvature	Curvature	Damage Category			
[m] 0	[%] 0.0012886	[%] 0.015486	5 114.50E-6	[mm] 5 0.67070	[%] 0.016005	-181.81E-6	114.50E-6	[m] 72126.	[m] - 0	(Negligible)			
tructure: 2	9 Thurlow C	Sub-stru	cture:										
Vertical ffset from Line for Vertical Movement alculations		Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Horizontal	Maximum Gradient of Vertical t Displacemen Curve	Curvatur	e Curvature	Damage Category			
[m] 0	[%]	[%] -0.0036721	-103.50E-	[mm] -6 0.31353	[%] 0.001650	8 57.038E-	6 -103.50E-	[m] 6 7975.	[m] 3 591400.	0 (Negligible)			
	0 Thurlow A					W 1				Barran Bahas			
Vertical offset from Line for Vertical Movement alculations		Average Horizontal Strain		Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve		Curvature	Curvature	Damage Category			
[m] 0	[%] 0.0057479	[%] 0.046662	-608.72E-	[mm] -6 6.2602	[%] 0.047063	-555.37E-6	-608.72E-6	[m] 8572.1	[m] 28083.	0 (Negligible)			
	0 Thurlow B												
Vertical ffset from Line for Vertical Movement alculations		Horizontal Strain		Maximum Settlement	Strain	Maximum Gradient of Horizontal Displacement Curve	Vertical	Curvature	Curvature	Damage Category			
[m] 0	[%] 0.045779	[%] -0.049182	0.0020661	[mm] 6.2608	[%] 0.036807	553.99E-6	0.0020661	[m] 416.60	[m] - 0	(Negligible)			
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Vertical ffset from Line for Vertical Movement alculations	1	Horizontal Strain	Maximum Slope		Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Curvature (Hogging)	Curvature (Sagging)	Damage Category			
[m] 0	[%] 0.0018713	[%] 0.024550	-283.58E-	[mm] -6 4.5559	[%] 0.025120	-272.32E-6	-283.58E-6	[m] -	[m] 15765.	0 (Negligible)			
tructure: 3	0 Thurlow D	Sub-stru	cture:										
ffset from Line for Vertical Movement		Average Horizontal Strain		Maximum Settlement	Max. Tensile Strain	Horizontal	Maximum Gradient of Vertical Displacement Curve	Curvature	Curvature	Damage Category			
alculations	1												

Movement Calculations [m] 0 [%] [%] [mm] [%] [m] [m] 0.0038115 -0.040569 282.21E-6 4.5561 0.0081140 584.29E-6 282.21E-6 13558. 24967. 0 (Negligible) Structure: 30 Thurlow E | Sub-structure:
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[mm] [%] [m] [m] 2.6948 0.0036157 -106.75E-6 259.46E-6 31763. 512340. 0 (Negligible) Structure: 30A Thurlow A | Sub-structure: Vertical Deflection Av Mavin Mont ν.

Vertical	Deflection	Average	Maximum	Maximum	Max.	Maximum	Maximum	Min.	Min.	Damage Category
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(Hogging) (Sagging)			
[m] [m] 3705.4 -	0 (Negligible)		
Min. Min.	Damage Category		
Radius of Radius of Curvature Curvature (Hogging) (Sagging)	Damage category		
[m] [m] - 7540.1 0	(Negligible)		

Vertical Movement Calculations						Displacement Curve	Displacement Curve	(Hogging)	(Sagging)	
[m] 0	[%]	[%] -0.087031	-413.18E-	[mm] -6 5.2789	[%] 0.017666	5 0.0016848	-413.18E-6	[m] 5 3705.4	[m] -	0 (Negligible)
Structure: 3 Vertical	Deflection	Average	Maximum	Maximum	Max.	Maximum	Maximum	Min.	Min.	Damage Category
Offset from Line for Vertical Movement Calculations	1	Horizontal Strain	Slope		Strain	Gradient of Horizontal Displacement : Curve	Vertical	Curvature ((Hogging)	Curvature (Sagging)	
[m] 0	[%] 0.0026267	[%] 0.039124	208.74E-6	[mm] 5 5.2793	[%] 0.040675	-403.67E-6	208.74E-6	[m] -	[m] 7540.1 0	(Negligible)
Structure: 3 Vertical	Deflection	Average	Maximum	Maximum	Max.	Maximum	Maximum	Min.	Min.	Damage Category
Offset from Line for Vertical Movement Calculations	1	Horizontal Strain	Slope	Settlement	Strain	Gradient of Horizontal Displacement Curve	Vertical	Curvature	Curvature (Sagging)	
[m] 0	[%] 0.066239	[%] -0.026815	-0.002982	[mm] 24 7.7120	[%] 0.050728	805.09E-6	-0.0029824	[m] 1 –	[m] 241.34	1 (Very Slight)
Structure: 3 Vertical				Massimum	New	Maurimum	Maximum	Min	Min.	Demose Geberen
Vertical Offset from Line for Vertical Movement Calculations	1	Horizontal Strain	Maximum Slope	Maximum Settlement	Strain	Maximum Gradient of Horizontal Displacement : Curve	Gradient of Vertical	Curvature (Radius of Curvature (Sagging)	Damage Category
[m] 0	[%] 0.011417	[%] 0.061203	580.23E-6	[mm] 5 8.0163	[%] 0.078222	-715.88E-6	580.23E-6	[m] -	[m] 5759.8 2	(Slight)
Structure: 3 Vertical	OA Thurlow : Deflection		ucture: Maximum	Maximum	Max.	Maximum	Maximum	Min.	Min.	Damage Category
Offset from Line for Vertical Movement Calculations	Ratio	Horizontal Strain		Settlement	Tensile Strain	Gradient of Horizontal Displacement : Curve	Gradient of Vertical	Radius of D Curvature (Radius of Curvature	Damage Category
[m] 0	[%] 0.029874	[%] -0.034374	0.0017558	[mm] 3 5.1334	[%] 0.025069	385.76E-6	0.0017558	[m] 2574.6	[m] 2126.8 0	(Negligible)
Structure: 3	OA Thurlow Deflection		ucture: Maximum	Maximum	Max.	Maximum	Maximum	Min.	Min.	Damage Category
Vertical Offset from Line for Vertical Movement Calculations	Ratio	Average Horizontal Strain		Maximum Settlement		Gradient of Horizontal	Gradient of	E Radius o: Curvature	f Radius of e Curvature	
[m] 0	[%] 0.0038040	[%] -0.025616	-294.54E-	[mm] -6 4.0234	[%] 0.008543	38 276.52E-	6 -294.54E-	[m] -6 4749.9	[m] 5 15366.	0 (Negligible)
Structure: 4				March	N	Maria	Mag	w/	Mir	Demons 7-1
Vertical Offset from Line for Vertical Movement Calculations		Average Horizontal Strain	Maximum Slope	Maximum Settlement	Strain	Maximum Gradient of Horizontal Displacement : Curve	Vertical	Curvature (Curvature	Damage Category
[m] 0	[%] 0.0089707	[%] 0.015579	858.27E-6	[mm] 5 6.0184	[%] 0.020882	540.84E-6	858.27E-6	[m] 8847.2	[m] - 0	(Negligible)
Structure: 4	-	•		Maximum		Maximum	Maximum	Min.		.
Vertical Offset from Line for Vertical Movement Calculations		Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Gradient of Horizontal	Gradient of	E Radius of Curvature	e Curvature	Damage Category
[m] 0	[%] 0.0017714	[%] -0.013698	-76.951E-	[mm] -6 0.89860	[%] 0.002903	37 170.76E-	6 -76.951E-	[m] -6	[m] - 29093.	0 (Negligible)
Structure: 4				v .					***	.
Vertical Offset from Line for Vertical Movement Calculations		Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacemen Curve		Curvature	e Curvature	
[m] 0	[%]	[%] -0.028286	-336.91E-	[mm] -6 4.0086	[%] 0.005664	10 376.04E-	6 -336.91E-	[m] -6 22305	[m] . 50058.	0 (Negligible)
Structure: 4										
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[m] 0	[%] 0.0090842	[%] 0.020887	-496.66E-	[mm] -6 6.1673	[%] 0.027833	-364.15E-6	-496.66E-6	[m] 5 –	[m] 5588.8	0 (Negligible)
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Program Xdisp Version 19.3.1.34 Copyright © Oasys 1997-2014 C:\Users\matt legg\Desktop\XDisp Working...\J15236 XDisp combined movement (alt).xdd

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Al a manual		Max. Tensile Strain	1			14.512E-6	0.28650	0.0012479	-		(Negligible)			
Image: Probability Image:		Curvature	-		-	-	-	-	-					
12 12 1		Min. Radius of Curvature	1	0.0 4.9990	Sagging	14.512E-6	0.28650	0.0012479	-	344780. 0	(Negligible)			
Image: Section of the sectio	10d Eldon A	Maximum Slope												
		Settlement Max. Tensile							-					
Image: Second		Min. Radius of	-		-	-	-	-	-					
Bail And		(Hogging) Min. Radius of	1	0.0 3.0000	Sagging	0.0011344	3.4375	0.024737	-	705.23 0	(Negligible)			
	10d Eldon B	(Sagging)	1	0 0 9 9990	Hogging	600 40E-6	3 4375	0 040952	4898 4	- 0	(Negligible)			
		Maximum Settlement	1	0.0 9.9990	Hogging	600.40E-6	3.4375	0.040952	4898.4	- 0	(Negligible)			
Normal with a second		Strain												
12 1		Curvature (Hogging)	Ĩ			000.402-0	5.4575	0.040552			(Megrigible)			
30 A D.0. C A Lober A D.0. C A Lober A D.0. C B		Curvature	-		-	-	-	-	-					
No. 1.0.10 No. 1.0	10d Eldon C	Maximum Slope Maximum												
Image: Second		Max. Tensile	2	2.0000 4.9990	Sagging	141.11E-6	0.42762	0.0030751	-	5666.9 0	(Negligible)			
No. Result Particle Parity Particle		Min. Radius of Curvature	-		-	-	-	-	-					
1 1		Min. Radius of	2	2.0000 4.9990	Sagging	141.11E-6	0.42762	0.0030751	-	5666.9 0	(Negligible)			
1 0.1	29 Thurlow A	(Sagging)	1	0.0 7.9990	Hogging	328.40E-6	1.9803	0.038893	27854.	- 0	(Negligible)			
Image: Strate in the		Settlement												
1 1 0		Strain												
Party 200 Party 200 <t< td=""><td></td><td>(Hogging)</td><td>-</td><td></td><td></td><td>_</td><td>_</td><td>_</td><td>_</td><td></td><td></td><td></td><td></td><td></td></t<>		(Hogging)	-			_	_	_	_					
Notion (No. 100) No. 1 0 0 0 0.0000 0 0.0000 0 0.00000 0 0.00000 0 0.00000 0 0.00000 0 0.00000 0 0.00000 0 0.00000 0 0.00000 0 0.00000 0 0.00000 0 0.00000 0 0.00000 0 0.00000 0 0.00000 0 0.00000 0 0.00000 0 0.00000 0 0.00000 0 0.00000 0 <th< td=""><td></td><td>Curvature (Sagging)</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>		Curvature (Sagging)												
Name Name 1 0 </td <td>Party 29-30</td> <td>Maximum</td> <td></td>	Party 29-30	Maximum												
2 Turking 2 </td <td></td> <td>Max. Tensile Strain</td> <td></td>		Max. Tensile Strain												
Ni. ¹ <		Curvature	1	0.0 2.9333	Hogging	653.62E-6	1.9807	0.010731	1278.0	- 0	(Negligible)			
28 Thurlsy B Maximum Language 1 0.0 7.999 0.010059 7.124 -0 0 0.00119019 10 0.0 7.999 Maysing 14.568-6 0.7079 0.010059 7.124 -0 0 000119019 11 0.0 7.999 Maysing 14.568-6 0.7079 0.010089 7.124 -0 0 000119019 12 1.0 0.0 7.999 Maysing 14.568-6 0.7079 0.01069 7.13 -0 0 0 0.00119119 12 1.0 0.0 7.999 Maysing 14.568-6 0.7133 0.010409 7.753 -0 0 000119119 12 0.0041 0.999 Maysing 14.568-6 0.7133 0.010409 7.753 -0 0 009119119 12 0.0041 0.999 Maysing 14.568-6 0.7133 0.01049 7.753 -0 0 0 0 0.01119119 12 0.0041 0.999 Maysing 14.568-6 0.7024 0.5632 0.7553 <td< td=""><td></td><td>Min. Radius of Curvature</td><td>2</td><td>2.9333 9.7375</td><td>Sagging</td><td>82.786E-6</td><td>1.2579</td><td>0.0022548</td><td>-</td><td>95026. 0</td><td>(Negligible)</td><td></td><td></td><td></td></td<>		Min. Radius of Curvature	2	2.9333 9.7375	Sagging	82.786E-6	1.2579	0.0022548	-	95026. 0	(Negligible)			
1 1 0.0 7.990 Rogella 1.4.507-6 0.0700 0.0200 7224. 0 0.0000 20 Thur bank 1 0.0 7.990 Rogella 0.0000 7224. 0 0.0000 20 Thur bank 1 0.0 7.990 Rogella 0.0000 7224. 0 0.0000 20 Thur bank 1 0.0 7.990 Rogella 0.0000 775. 0 <td>29 Thurlow B</td> <td>Maximum Slope</td> <td></td>	29 Thurlow B	Maximum Slope												
1 Nin. Ratiu of Construct 1 0.7.7.999 Regula 14.5.05- 0.7120 0.7120 0.71205 - 0 18215 2 Nurk of Construct 1 0.717 0.7999 0.7150 0.7150 0.7150 0 1975.3 - 0 1981111 2 Nurk of Construct 3 0.677 0.999 Regula 10.506- 0.1153 0.01500 7975.3 - 0 1881111 2 0.778 0.797 0.7976 0.01500 7975.3 - 0 1881111 2 0.778 0.797 0.1506- 0.1135 0.01500 7975.3 - 0 1881111 2 0.797 0.1506- 0.1335 0.01500 7975.3 - 0 1881111 2 0.797 0.1506- 0.1335 0.01500 7975.3 - 0 1881111 3 0.0167 0.1506- 0.1335 0.01500 7975.3 - 0 1981111 3 0.0172 0.0172 0.01726 0.21726 0.01726 0.		Settlement Max. Tensile												
1 1		Min. Radius of	1	0.0 7.9990	Hogging	114.50E-6	0.67070	0.016005	72126.	- 0	(Negligible)			
28 Thurle C (Separate content on the second on the sec		(Hogging) Min. Radius of	-		-	-	-	-	-					
Mailes Mailes<	29 Thurlow C	(Sagging)	3	8.0674 10.999	Hogging	103.50E-6	0.31353	0.0016508	7975.3	- 0	(Negligible)			
3 Thurlow B Strain (Ha, Radius of (Hosping) (H		Settlement								- 0	(Negligible)			
10 Curvature (regarding) (Strain												
20 Thurley is approximately interval interv		Curvature (Hogging)												
Maximu 3 4.0789 7.9990 Sigging 608.728-6 6.2602 0.047063 - 2003.0 0 Neglighle) Max. Tunalle 3 4.0789 7.9990 Sigging 608.728-6 6.2602 0.047063 - 2003.0 0 Neglighle) Max. Tunalle 2 0.25662 4.0789 7.9990 Sigging 608.728-6 3.0724 0.038622 852.1 - 0 (Neglighle) (Hogging) Maximus 1 0.0.2.4664 Hogging 0.0020661 6.2608 0.038607 416.60 - 0 (Neglighle) Maximus 1 0.0.2.4664 Hogging 0.0020661 6.2608 0.038607 416.60 - 0 (Neglighle) Maximus 1 0.0.2.4664 Hogging 0.0020661 6.2608 0.038607 416.60 - 0 (Neglighle) Maximus 1 0.0.2.4664 Hogging 0.0020661 6.2608 0.038607 416.60 - 0 (Neglighle) Maximus 1 0.0		Curvature	2	2.0785 8.0674	Sagging	11.475E-6								
Nax. mania Nax. mania 1 0.072-6 6.260 0.04763 - 2083. 0 (Negligible) 1 0.2562 0.078 Bogin 0.03620 872.1 - 0 (Negligible) 30 Thurley N. Radius of Curvature 1 0.0 2.494 Hoggin 0.0020661 6.260 0.04763 - 2805. 0 (Negligible) 30 Thurley N. Radius of Curvature 1 0.0 2.494 Hoggin 0.0020661 6.260 0.036807 416.60 - 0 (Negligible) Max. mania 1 0.0 2.494 Hoggin 0.0020661 6.260 0.036807 416.60 - 0 (Negligible) Max. mania 1 0.0 2.494 Hoggin 0.0020661 6.260 0.036807 416.60 - 0 (Negligible) Max. mania 1 0.0 2.494 Hoggin 0.022661 6.260 0.036807 416.60 - 0 (Negligible) Min. Radius of Curvature 1 0.0 2.999 Saggin	30 Thurlow A	Maximum	2	0.25662 4.0789 4.0789 7.9990	Hogging Sagging				8572.1	- 0 28083. 0	(Negligible) (Negligible)			
Min. Radius of Curvature (Rogging) Min. Radius of Curvature (Rogging) 2 0.25662 4.0789 Hoge 3.9724 0.038622 8572.1 - 0 (Regligible) 30 Thurlow B Min. Radius of (Ragging) 1 0.0 2.4694 Hogging 0.020661 6.2608 0.036807 416.60 - 0 (Regligible) 30 Thurlow B Maximum Slope Maximum Slope 1 0.0 2.4694 Hogging 0.0020661 6.2608 0.036807 416.60 - 0 (Regligible) 30 Thurlow C Min. Radius of Curvature (Rogging) 1 0.0 2.4694 Hogging 0.0020661 6.2608 0.036807 416.60 - 0 (Regligible) 30 Thurlow C Min. Radius of Curvature (Rogging) 1 0.0 2.4694 Hogging 0.0020661 6.2608 0.036807 416.60 - 0 (Regligible) 30 Thurlow C Min. Radius of Curvature (Rogging) 1 0.0 2.9990 Sagging 283.588-6 4.5559 0.025120 - 15755.0 0 (Regligible) 30 Thurlow D Maximum		Max. Tensile	3	4.0789 7.9990	Sagging	608.72E-6	6.2602	0.047063	-	28083. 0	(Negligible)			
Min. Radius of Curvature (Sagging) 1 0.0 2.4694 Hogging) 0.022661 6.2602 0.04763 - 28083. 0 (Negligile) 30 Thurlos B Maxiama tope Maxiama 1 0.0 2.4694 Hogging) 0.0022661 6.2608 0.036807 416.60 - 0 (Negligile) 30 Thurlos B Max. Tensile 1 0.0 2.4694 Hogging) 0.0020661 6.2608 0.036807 416.60 - 0 (Negligile) 30 Thurlos C Max. Tensile 1 0.0 2.4694 Hogging) 0.0020661 6.2608 0.036807 416.60 - 0 (Negligile) 30 Thurlos C Maximus Slope 1 0.0 2.9990 Sagging 283.588-6 4.5559 0.025120 - 15765.0 (Negligile) Maximus Slope 1 0.0 2.9990 Sagging 283.588-6 4.5559 0.025120 - 15765.0 (Negligile) Maximus Slope 1 0.0 2.9990 Sagging 283.588-6 4.5559 0.025120 - 15765.0 <td></td> <td>Min. Radius of Curvature</td> <td>2</td> <td>0.25662 4.0789</td> <td>Hogging</td> <td>608.72E-6</td> <td>3.9724</td> <td>0.038622</td> <td>8572.1</td> <td>- 0</td> <td>(Negligible)</td> <td></td> <td></td> <td></td>		Min. Radius of Curvature	2	0.25662 4.0789	Hogging	608.72E-6	3.9724	0.038622	8572.1	- 0	(Negligible)			
30 Thurlow B. Maximum Slope 1 0.0 0.0 0.020601 6.2608 0.036807 416.60 -0 0 (Negligihle) Maximum Settlement 1 0.0 2.4694 Hogging 0.002061 6.2608 0.036807 416.60 -0 0 (Negligihle) Max. Tenaile 1 0.0 2.4694 Hogging 0.002061 6.2608 0.036807 416.60 -0 0 (Negligihle) Min. Radius of 1 0.0 2.4694 Hogging 0.002061 6.2608 0.036807 416.60 -0 0 (Negligihle) 30 Thurlow C. Maximum Gange -		Min. Radius of	3	4.0789 7.9990	Sagging	608.72E-6	6.2602	0.047063	-	28083. 0	(Negligible)			
30 Thurlow D Settlement 1 0.0 2.499 Mogine 6.2008 0.036807 416.60 -0 (Negligible) 30 Thurlow C Min. Radius of curvature 1 0.0 2.499 Magine 2.500 2.6008 0.036807 416.60 -0 (Negligible) 30 Thurlow C Min. Radius of curvature 1 0.0 2.9990 Sagine 23.588-6 4.5559 0.025120 - 1 5765.0 (Negligible) 30 Thurlow D Maximm Slope 1 0.0 2.9990 Sagine 23.588-6 4.5559 0.025120 - 15765.0 (Negligible) 30 Thurlow D Maximm Slope 1 0.0 2.9990 Sagine 23.588-6 4.5559 0.025120 - 15765.0 (Negligible) Maximm Slope 1 0.0 2.9990 Sagine 23.588-6 4.5559 0.025120 - 15765.0 (Negligible) Min. Radius of Curvature 1 0.0 0.00 2.9990 Sagine 23.588-6 4.5559 0.025120 - 15765.0 (Negligible) <td>30 Thurlow B</td> <td>Maximum Slope</td> <td></td> <td></td> <td>Hogging</td> <td></td> <td></td> <td></td> <td></td> <td>- 0</td> <td>(Negligible)</td> <td></td> <td></td> <td></td>	30 Thurlow B	Maximum Slope			Hogging					- 0	(Negligible)			
Strain Min. Radius of 0.0 2.4694 Hogin 0.002061 6.2608 0.036807 16.60 - 0 (Negligible) 30 Thurlow C Min. Radius of -		Settlement												
10 Thurlov C (Hogging) Min. Radius of Curvature (Sagging) 1 0.0 2.9990 Sagging 283.588-6 4.5559 0.025120 - 15765.0 0 (Negligible) 30 Thurlov C Maxinum Slope 1 0.0 2.9990 Sagging 283.588-6 4.5559 0.025120 - 15765.0 0 (Negligible) 30 Thurlov C Maxinum Slope 1 0.0 2.9990 Sagging 283.588-6 4.5559 0.025120 - 15765.0 0 (Negligible) Statis Thurlov D Min. Radius of Curvature -		Strain Min. Radius of	1											
30 Thurlow C (Sagging) Maximum Slope Settlement Max. Tensile Strin 0.0 2.9990 Sagging 2.83.588-6 2.83.588-6 4.5559 0.025120 - 15765. 0 (Negligible) Maximum Slope Max. Tensile Strin 1 0.0 2.9990 Sagging 283.588-6 4.5559 0.025120 - 15765. 0 (Negligible) Min. Radius of Curvature (Rogging) - - - - - - Min. Radius of Curvature (Sagging) 2 3.0210 6.2108 Hogging 282.218-6 3.7150 0.029844 13558 0 0 (Negligible) 30 Thurlow D Maximum Slope Maximum Slope 2 3.0210 6.2108 Hogging 282.218-6 3.7150 0.0029844 13558 0 0 (Negligible) 30 Thurlow D Maximum Slope (Sagging) 1 0.0 3.0210 Sagging 281.958-6 4.5551 0.0029844 13558 0 0 (Negligible) 30 Thurlow D Maximum Slope (Sagging) 1 0.0 3.0210 Sagging 281.958-6 4.5551 0.0029844 13558 0 0 (Negligible) 30 Thurlow E Maximus Slope 1 0.0 3.0210 Sagging 281.958-6 4.5561 0.0029844 13558 0 0 (Negligible)		(Hogging) Min. Radius of	-		-	-	-	-	-					
Maximum 1 0.0 2.9990 Saging 283.588-6 4.5559 0.025120 - 15765.0 (Negligible) Settlement Max. Tensile 1 0.0 2.9990 Saging 283.588-6 4.5559 0.025120 - 15765.0 (Negligible) Strin Min. Radius of -	20 Thurlow C	(Sagging)	1	0 0 2 9990	Sagaing	292 598-6	4 5559	0 025120	_	15765 0	(Negligible)			
30 Thurlow E Strain Min. Radius of Curvature (Sagging) 1 0.0 2.999 Sagging) 283.58E-6 4.555 0.025120 - 15765.0 (Negligible) 30 Thurlow E Maxinum Slope Maxinum 2 3.0210 6.2108 Hogging) 282.21E-6 3.7150 0.0292844 13558. - 0 Negligible) 30 Thurlow E Maxinum 1 0.0 3.0210 Sagging) 282.21E-6 3.7150 0.0029844 13558. - 0 Negligible) 30 Thurlow E Maxinum 1 0.0 3.0210 Sagging) 282.21E-6 3.7150 0.0029844 13558. - 0 Negligible) Maxinum Slope 1 0.0 3.0210 Sagging) 282.21E-6 3.7150 0.0029844 13558. - 0 Negligible) Min. Radius of Curvature (Hogging) 1 0.0 3.0210 Sagging) 282.21E-6 3.7150 0.0029844 13558. - 0 Negligible) Curvature (Gagging) 1 0.0 0.0210 Sagging) 13558. - 0	50 Indiiow c	Maximum Settlement	1	0.0 2.9990	Sagging	283.58E-6	4.5559	0.025120		15765. 0	(Negligible)			
30 Thurlow F Curvature (Hogging) Max Radius of Curvature 1 0.0 2.9990 Sagging 283.58E-6 4.5559 0.025120 - 15765.0 (Negligible) 30 Thurlow F Maximum Slope 2 3.0210 6.2108 Hogging) 282.21E-6 3.7150 0.0292844 13558. - 0 (Negligible) Maximum Slope 1 0.0 3.0210 Sagging) 282.21E-6 3.7150 0.0029844 13558. - 0 (Negligible) Maximum Slope 1 0.0 3.0210 Sagging) 282.21E-6 3.7150 0.0029844 13558. - 0 (Negligible) Maximum Slope 1 0.0 3.0210 Sagging) 282.21E-6 3.7150 0.0029844 13558. - 0 (Negligible) Maximus Glope 1 0.0 3.0210 Sagging) 282.21E-6 3.7150 0.0029844 13558. - 0 (Negligible) Curvature - - 202380.0 0 (Negligible) - - 202477.0 (Negligible)		Strain	1			283.58E-6	4.5559	0.025120	-		(Negligible)			
30 Thurlow D Maximum Slope 2 3.0210 6.2108 Hogging 282.218-6 3.7150 0.0029844 13558. - 0 (Negligible) 30 Thurlow D Maximum Slope 2 3.0210 Sagging 281.958-6 4.5561 0.008140 - 202380.0 0 (Negligible) Station 1 0.0 3.0210 Sagging 281.958-6 4.5561 0.008140 - 202380.0 0 (Negligible) Strain 1 0.0 3.0210 Sagging 282.218-6 3.7150 0.0029844 13558. - 0 (Negligible) Curvature 1 0.0 3.0210 Sagging 282.218-6 3.7150 0.0029844 13558. - 0 (Negligible) Curvature 1 0.0 1.0210 Sagging 282.218-6 3.7150 0.0029844 13558. - 0 (Negligible) Curvature 1 0.0 1.0210 Sagging 282.218-6 3.7150 0.0029844 13558. - 0 (Negligible) Curvature 1 0.0 1.0385 Sagging 282.218-6 3.0126 883.168-6 - 24967.0 0 (Negligible) 30 Thurlow E Maximum Slope 1 0.0 1.0385 Sagging 259.468-6 2.6948 0.0013012		Curvature (Hogging)	-			-			-					
30 Thurlow D Maximum Slope 2 3.0210 6.2108 Hogging 282.218-6 3.7150 0.0029844 13558. - 0 (Negligible) Maximum Sttlement 1 0.0 3.0210 Sagging 281.955-6 4.5561 0.0081140 - 202380.0 (Negligible) Strain 1 0.0 3.0210 Sagging 281.955-6 4.5561 0.0081140 - 202380.0 (Negligible) Strain 1 0.0 3.0210 Sagging 282.218-6 3.7150 0.0029844 13558. - 0 (Negligible) Curvature (Hogging) 3.0210 6.2108 Hogging 282.218-6 3.7150 0.0029844 13558. - 0 (Negligible) Min. Radius of Curvature 3 6.2108 7.9990 Sagging 282.218-6 3.0126 883.168-6 - 24967.0 (Negligible) Min. Radius of Curvature - - 0.0 1.0385 Sagging 259.468-6 2.6948 0.0013012 - 512340.0 (Negligible) 30 Thurlow E Maximum Slope 1 0.0 1.0385 Sagging 259.468-6 2.6948 0.0013012 - 512340.0 (Negligible)		Curvature	1	0.0 2.9990	Sagging	283.58E-6	4.5559	0.025120	-	15765. 0	(Negligible)			
Settlement Max. Tensile 1 0.0 3.0210 Sagging 281.95E-6 4.5561 0.0089140 - 202380.0 (Negligible) Min. Radius of Curvature (Hogging) 2 3.0210 6.2108 Hogging 282.21E-6 3.7150 0.0029844 13558. - 0 (Negligible) Min. Radius of Curvature (Sagging) 3 6.2108 7.9990 Sagging 194.58E-6 3.0126 883.16E-6 - 24967.0 (Negligible) 30 Thurlow E Maximum Slope Maximum 1 0.0 1.0385 Sagging 259.46E-6 2.6948 0.0013012 - 512340.0 (Negligible)	30 Thurlow D	Maximum Slope Maximum		3.0210 6.2108 0.0 3.0210	Hogging Sagging		3.7150 4.5561	0.0029844 0.0081140	13558.	- 0 202380. 0	(Negligible) (Negligible)			
Min. Radius of Curvature 2 3.0210 6.2108 Hogging 282.21E-6 3.7150 0.0029844 13558. - 0 (Negligible) (Hogging) Min. Radius of Curvature 3 6.2108 7.990 Sagging 194.58E-6 3.0126 883.16E-6 - 24967.0 (Negligible) 30 Thurlow E Maximum Slope Maximum 1 0.0 1.0385 Sagging 259.46E-6 2.6948 0.013012 - 512340.0 (Negligible)		Max. Tensile	1	0.0 3.0210	Sagging	281.95E-6	4.5561	0.0081140	-	202380. 0	(Negligible)			
Min. Radius of Curvature (Sagging) 3 6.2108 7.9990 Sagging 194.58E-6 3.0126 883.16E-6 - 24967.0 (Negligible) 30 Thurlow E Maximum Slope Maximum 1 0.0 1.0385 Sagging 259.46E-6 2.6948 0.0013012 - 512340.0 (Negligible)		Min. Radius of Curvature	2	3.0210 6.2108	Hogging	282.21E-6	3.7150	0.0029844	13558.	- 0	(Negligible)			
(Sagging) 30 Thurlow E Maximum Slope 1 0.0 1.0385 Sagging 259.46E-6 2.6948 0.0013012 - 512340.0 (Negligible) Maximum 1 0.0 1.0385 Sagging 259.46E-6 2.6948 0.0013012 - 512340.0 (Negligible)		Min. Radius of	3	6.2108 7.9990	Sagging	194.58E-6	3.0126	883.16E-6	-	24967. 0	(Negligible)			
	30 Thurlow E	(Sagging) Maximum Slope		0.0 1.0385	Sagging	259.46E-6	2.6948	0.0013012	-	512340. 0	(Negligible)			
			1	0.0 1.0385	Sagging	259.46E-6	2.6948	0.0013012	-	512340. 0	(Negligible)			

Job No.

Sheet No.

Rev.

39 Rossly GMA - Co

	10110	•								Job N			Sheet No.	Rev.
U u	lsys									J1	5236			
-	Hill, Lond		IJ							Drg.	Ref.			
GMA - Con	nbined Mov	ement								Made	by		ate	Checked
Structure Name	Parameter	Critical	Critical	Start	End	Curvature		Maximum	Max.	Min.	Min.	Damage Cat	5-Nov-2015	
		Sub-Structure	-				Slope	Settlement	Strain	Radius of Curvature (Hogging)	Curvature			
	Max. Tensile Strain Min. Radius of					Hogging	259.46E-6 259.46E-6		0.0036157	31763. 31763.		(Negligible)		
	Curvature (Hogging)													
	Min. Radius of Curvature (Sagging)		1			Sagging	259.46E-6		0.0013012	-		(Negligible)		
30A Thurlow A	Maximum Slope Maximum Settlement		1			Hogging Hogging	413.18E-6 413.18E-6		0.017666 0.017666	3705.4 3705.4	- 0 - 0	(Negligible) (Negligible)		
	Max. Tensile Strain Min. Radius of		1			Hogging	413.18E-6		0.017666	3705.4 3705.4		(Negligible)		
	Curvature (Hogging)		T	0.0	4.3990	Hogging	413.18E-6	5.2789	0.01/666	3705.4		(Negligible)		
	Min. Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-				
30A Thurlow B	Maximum Slope Maximum Settlement		1			Sagging Sagging	208.74E-6 208.74E-6		0.040675 0.040675	-	7540.1 0 7540.1 0	(Negligible) (Negligible)		
	Max. Tensile Strain Min. Radius of		1	0.0	1.5990	Sagging	208.74E-6	5.2793	0.040675	-	7540.1 0	(Negligible)		
	Curvature (Hogging)		-	-	-	-	-	-	-	-				
	Min. Radius of Curvature (Sagging)		1	0.0	1.5990	Sagging	208.74E-6	5.2793	0.040675	-	7540.1 0	(Negligible)		
30A Thurlow C	Maximum Slope Maximum Settlement		1 2	0.0 2.7000	2.7000 3.5990	Sagging Sagging	0.0029824 0.0		0.050728	-	241.34 1 745.93E+15 0	(Very Slight) (Negligible)		
	Max. Tensile Strain		1	0.0	2.7000	Sagging	0.0029824	7.7120	0.050728	-		(Very Slight)		
	Min. Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-				
	Min. Radius of Curvature (Sagging)		1	0.0	2.7000	Sagging	0.0029824	7.7120	0.050728	-	241.34 1	(Very Slight)		
30A Thurlow D	Maximum Slope Maximum Settlement		1 1	0.0	9.5990 9.5990	Sagging Sagging	580.23E-6 580.23E-6			-		(Slight) (Slight)		
	Max. Tensile Strain		1	0.0	9.5990	Sagging	580.23E-6	8.0163	0.078222	-		(Slight)		
	Min. Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-				
	Min. Radius of Curvature (Sagging)		1	0.0	9.5990	Sagging	580.23E-6	8.0163	0.078222	-	5759.8 2	(Slight)		
30A Thurlow E	Maximum Slope Maximum		2 1	1.0000	3.5602 1.0000	Sagging Sagging	0.0017558 0.0		0.025069 0.0	-	2126.8 0 - 0	(Negligible) (Negligible)		
	Settlement Max. Tensile Strain					Sagging	0.0017558		0.025069	-		(Negligible)		
	Min. Radius of Curvature (Hogging)		3	3.5602	5.9460	Hogging	0.0017558	4.1501	0.017546	2574.6	- 0	(Negligible)		
	Min. Radius of Curvature		2	1.0000	3.5602	Sagging	0.0017558	5.1334	0.025069	-	2126.8 0	(Negligible)		
30A Thurlow F	(Sagging) Maximum Slope Maximum		1 2	0.0 6.1378	6.1378 7.9990	Sagging Hogging	294.54E-6 140.73E-6		0.0085438 0.0055745	- 4749.5		(Negligible) (Negligible)		
	Settlement Max. Tensile Strain		1	0.0	6.1378	Sagging	294.54E-6	3.8954	0.0085438	-	15366. 0	(Negligible)		
	Min. Radius of Curvature (Hogging)		2	6.1378	7.9990	Hogging	140.73E-6	4.0234	0.0055745	4749.5	- 0	(Negligible)		
	Min. Radius of Curvature		1	0.0	6.1378	Sagging	294.54E-6	3.8954	0.0085438	-	15366. 0	(Negligible)		
41 Rosslyn A	(Sagging) Maximum Slope Maximum		1 1			Hogging Hogging	858.27E-6 858.27E-6		0.020882	8847.2 8847.2		(Negligible) (Negligible)		
	Settlement Max. Tensile Strain		1			Hogging	858.27E-6	6.0184	0.020882	8847.2		(Negligible)		
	Min. Radius of Curvature		1	0.0	11.999	Hogging	858.27E-6	6.0184	0.020882	8847.2	- 0	(Negligible)		
	(Hogging) Min. Radius of Curvature		-	-	-	-	-	-	-	-				
41 Rosslyn B	(Sagging) Maximum Slope Maximum		1			Sagging Sagging	76.951E-6 76.951E-6		0.0029037	-		(Negligible) (Negligible)		
	Settlement Max. Tensile Strain		1			Sagging	76.951E-6		0.0029037	-		(Negligible)		
	Min. Radius of Curvature		-	-	-	-	-	-	-	-				
	(Hogging) Min. Radius of Curvature		1	0.0	7.9990	Sagging	76.951E-6	0.89860	0.0029037	-	29093. 0	(Negligible)		
41 Rosslyn C	(Sagging) Maximum Slope Maximum		1			Hogging Sagging	336.91E-6 336.91E-6		0.0045436	22305.		(Negligible) (Negligible)		
	Settlement Max. Tensile Strain					Sagging	336.91E-6		0.0056640	-		(Negligible)		
	Min. Radius of Curvature		1	0.0	8.6607	Hogging	336.91E-6	2.9262	0.0045436	22305.	- 0	(Negligible)		
	(Hogging) Min. Radius of Curvature		2	8.6607	11.999	Sagging	336.91E-6	4.0086	0.0056640	-	50058. 0	(Negligible)		
41 Rosslyn D	(Sagging) Maximum Slope Maximum		1			Sagging Sagging	496.66E-6 496.66E-6		0.027833	-		(Negligible) (Negligible)		
	Settlement Max. Tensile		1			Sagging			0.027833	-		(Negligible)		
	Strain Min. Radius of Curvature		-	-	-	-	-	-	-	-				
	(Hogging) Min. Radius of Curvature		1	0.0	7.9990	Sagging	496.66E-6	6.1673	0.027833	-	5588.8 0	(Negligible)		
Party 37-39	(Sagging)	are less than t												
	All settlements All settlements	are less than t are less than t	he Settlem he Settlem	ent Tro ent Tro	ugh Lim ugh Lim	it Sensiti it Sensiti	vity. vity.							
39 Rosslyn A	All settlements All settlements All settlements	are less than t	he Settlem he Settlem	ent Tro ent Tro	ugh Lim ugh Lim	it Sensiti it Sensiti	vity. vity.							
	All settlements All settlements All settlements	are less than t are less than t are less than t	he Settlem he Settlem he Settlem	ent Tro ent Tro ent Tro	ugh Lim ugh Lim ugh Lim	it Sensiti it Sensiti it Sensiti	vity. vity. vity.							
39 Rosslyn B	All settlements All settlements	are less than t	he Settlem he Settlem	ent Tro ent Tro	ugh Lim ugh Lim	it Sensiti it Sensiti	vity. vity.							
20 Possiler C	All settlements	are less than t	he Settlem he Settlem	ent Tro ent Tro	ugh Lim ugh Lim	it Sensiti it Sensiti	vity. vity.							
39 Rosslyn C	All settlements All settlements	are less than t are less than t	he Settlem he Settlem	ent Tro ent Tro	ugh Lim ugh Lim	it Sensiti it Sensiti	vity. vity.							
	All settlements	are less than t	he settlem	ent Tro ent Tro	ugn Lim ugh Lim	ut Sensiti it Sensiti	vity. vity.							

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	isys						J15	5236		
	/n Hill, London NW3 : mbined Movement	5UJ					Drg. I	Ref.		
IVIA - CO							Made ML	by	Date 05-Nov-2015	Checked
ructure Nam	e Parameter Critical Sub-Structu			End Curv		Maximum Max. Settlement Tensile	Min. Radius of R	adius of	e Category	
Rosslyn A	All settlements are less that	n the Settl	ement Troug	h Limit Se	nsitivity.	Strain	Curvature C (Hogging) (
	All settlements are less tha All settlements are less tha All settlements are less tha All settlements are less tha	n the Settl n the Settl	ement Troug ement Troug	h Limit Se h Limit Se	nsitivity. nsitivity.					
Rosslyn B	All settlements are less tha All settlements are less tha All settlements are less tha	n the Settl n the Settl	ement Troug ement Troug	h Limit Se h Limit Se	nsitivity. nsitivity.					
Rosslyn C	All settlements are less tha All settlements are less tha All settlements are less tha	n the Settl n the Settl n the Settl	ement Troug ement Troug ement Troug	h Limit Se h Limit Se h Limit Se	nsitivity. nsitivity. nsitivity.					
	All settlements are less tha All settlements are less tha All settlements are less tha All settlements are less tha	n the Settl n the Settl	ement Troug ement Troug	h Limit Se h Limit Se	nsitivity. nsitivity.					
Rosslyn D	Maximum Slope Sub 37 Maximum Sub 37 Settlement		1 1.0000 6 1 1.0000 6	.1386 Sagg	ing 442.33E-6	0.86816 0.0061011 0.86816 0.0061011	-	6150.1 0 (Negligi 6150.1 0 (Negligi		
	Max. Tensile Sub 37 Strain Min. Radius of Sub 37		2 6.1386 9 2 6.1386 9			0.50877 0.018466 0.50877 0.018466	21353. 21353.	- 0 (Negligi - 0 (Negligi		
	Curvature (Hogging) Min. Radius of Sub 37				ing 442.33E-6	0.86816 0.0061011	-	6150.1 0 (Negligi		
	Curvature (Sagging)								/	
pecific Buildir	ng Damage Results - All Combined	Segments								
	b Eldon A Sub-structure: Combined Start Length Curvature	Deflection	Average	Max.	Damage Category					
ffset from Line for Vertical			Horizontal Strain		Damage Category					
Movement alculations [m]	[m] [m]	[%]	[%]	[%]						
	have segments combined.	[0]	[0]	[0]						
Vertical	b Eldon B Sub-structure: Combined Start Length Curvature	Deflection	Average	Max.	Damage Category					
fset from : Line for Vertical	Segment	Ratio	Horizontal Strain	Tensile Strain						
Movement alculations [m]	[m] [m]	[%]	[%]	[%]						
	have segments combined.									
Vertical	don Party b-c Sub-structure: Combined Start Length Curvature Segment		Average Horizontal	Max.	Damage Category					
Line for Vertical Movement	Segment.	Ratio		Strain						
alculations [m]	[m] [m] have segments combined.	[%]	[%]	[%]						
	b Eldon C Sub-structure:									
ffset from	Combined Start Length Curvature Segment		Horizontal		Damage Category					
Line for Vertical Movement			Strain	Strain						
alculations [m] o structures	[m] [m] have segments combined.	[%]	[%]	[%]						
tructure: 10	c Eldon A Sub-structure:									
Vertical ffset from : Line for	Combined Start Length Curvature Segment		Average Horizontal Strain		Damage Category					
Vertical Movement alculations										
[m]	[m] [m] have segments combined.	[%]	[%]	[%]						
	don Party c-d Sub-structure:									
ffset from : Line for	Combined Start Length Curvature Segment	Deflection Ratio	Average Horizontal Strain		Damage Category					
Vertical Movement alculations										
[m] structures	[m] [m] have segments combined.	[%]	[%]	[%]						
	c Eldon B Sub-structure: Combined Start Length Curvature	Deflection	Average	Max.	Damage Category					
ffset from Line for Vertical	Segment	Ratio	Horizontal Strain	Tensile						
Movement alculations [m]	[m] [m]	[%]	[%]	[%]						
structures	have segments combined.									
Vertical	d Eldon A Sub-structure: Combined Start Length Curvature	Deflection	Average	Max.	Damage Category					
ffset from : Line for Vertical	Segment	Ratio	Horizontal Strain							
Movement alculations [m]	[m] [m]	[%]	[%]	[%]						
	have segments combined.									
	d Eldon B Sub-structure: Combined Start Length Curvature Segment			Max.	Damage Category					
ffset from : Line for Vertical Movement	seyment.	RATIO	Horizontal Strain							

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39 Rosslyn Hill, London NW3 5UJ

GMA - Combined Movement

Structure: 10d Eldon C | Sub-structure:

 $\begin{array}{c} \mbox{Movement} \\ \mbox{Calculations} \\ [m] & [m] & [m] \\ \mbox{No structures have segments combined.} \end{array}$

Structure: 29 Thurlow A | Sub-structure:

Line for Vertical

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	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage	Category
--	---------------------	-------	--------	-----------	---------------------	---------------------------------	---------------------------	--------	----------

[%]

[%] [%]

[m]	[m]	[m]	[%]	[%]	[%]
No structures have	segments	combined.			
Structure: Party 2	9-30 Sub	-structure:			

Vertical Combined Start Length Curvature Deflection Average Max. Offset from Segment Ratio Horizontal Tensile Line for Strain Strain Strain Vertical

Vertical Combined Start Length Curvature Deflection Average Max. Offset from Segment Ratio Horizontal Tensile Line for Strain Strain

Damage Category

Damage Category

Vertical Combined Start Length Curvature Deflection Average Max. Offset from Segment Ratio Horizontal Tensile Line for Strain Strain Strain Vertical Damage Category Movement Calculations

[m] [m] [m] No structures have segments combined. [%] [%] [%]

Structure: 29 Thurlow B | Sub-structure:

Vertical Offset from	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal	Max. Tensile	Damage	Category
Line for						Strain	Strain		
Vertical									
Manager and the									

Movement Calculations [m] [m] [m] No structures have segments combined. [%] [%] [%]

Structure: 29 Thurlow C | Sub-structure:

Vertical Combined Start Length Curvature Deflection Average Max. Offset from Segment Ratio Horizontal Tensile Line for Strain Strain Strain Strain Strain Strain Strain Damage Category

Calculations [m] [m] [m] [m] No structures have segments combined. [%] [%] [%]

Structure: 30 Thurlow A | Sub-structure:

Vertical	Combined	Start	Length	Curvature	Deflection	Average	Max.	Damage Category
Offset from	Segment				Ratio	Horizontal	Tensile	
Line for						Strain	Strain	
Vertical								
Movement								
Calculations								

[m] [m] [m] No structures have segments combined. [%] [%] [%]

Structure: 30 Thurlow B | Sub-structure:

	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage	Category
Movement									
Calculations									
[m] No structures	have se	[m] gments	[m] combine	ed.	[%]	[%]	[%]		

Structure: 30 Thurlow C | Sub-structure:

	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage	Category
Calculations [m]		[m]	[m]		[%]	[%]	[%]		

[m] [m] [m] No structures have segments combined.

Structure: 30 Thurlow D | Sub-structure:

Vertical	Combined	Start	Length	Curvature	Deflection	Average	Max.	Damage Ca	ategory
Offset from	Segment				Ratio	Horizontal	Tensile		
Line for						Strain	Strain		
Vertical									

Movement Calculations						
[m] No structures	have	[m] segments	[%]	[%]	[%]	

Structure: 30 Thurlow E | Sub-structure:

Vertical Offset from	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal	Max. Tensile	Damage	Category
Line for						Strain	Strain		
Vertical									
Movement									

Calculations							
[m]		[m]	[m]	[8]	[%]	[%]
No structures	have	segments	combined.				

Structure: 30A Thurlow A | Sub-structure:

Vertical Offset from Line for Vertical	Combined S Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage	Category
Movement Calculations [m] No structures	s have segm	[m] ments	[m] combine	ed.	[%]	[%]	[%]		

Structure: 30A Thurlow B | Sub-structure:

Vertical Combined Start Length Curvature Deflection Average Max. Damage Category

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GMA - Combined Movement

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Offset from Line for Vertical Movement	Segment		Ratio	Horizontal Strain	Tensile Strain	
Movement Calculations [m] No structures		n] [m] hts combined.	[%]	[%]	[%]	
Vertical Offset from Line for Vertical Movement	Combined Sta	Sub-structure: art Length Curvature		Average Horizontal Strain		Damage Category
Calculations [m] No structures	have segmer		[%]	[%]	[%]	
		Sub-structure:		•		D
Vertical Offset from Line for Vertical Movement Calculations	compined Sta	art Length Curvatur	e Deflection Ratio	Average Horizontal Strain		Damage Category
[m] No structures	have segmer		[%]	[%]	[%]	
		Sub-structure:		_		
Offset from Line for Vertical Movement Calculations	Segment	n] [m]		Average Horizontal Strain		Damage Category
[m] No structures	have segmer		[8]	[4]	[8]	
Vertical	Combined Sta	art Length Curvature			Max.	Damage Category
Offset from Line for Vertical Movement Calculations				Horizontal Strain	Strain	
[m] No structures		n] [m] nts combined.	[%]	[%]	[%]	
		Sub-structure:				
Vertical Offset from Line for Vertical Movement	Combined Sta Segment	art Length Curvatur	e Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage Category
Calculations [m] No structures	[n have segmen	n] [m] nts combined.	[%]	[%]	[%]	
Structure: 41	Rosslyn B	Sub-structure:				
Offset from Line for Vertical		art Length Curvature		Horizontal	Max. Tensile Strain	Damage Category
Movement Calculations [m] No structures	[1 have segmen	n] [m] nts combined.	[%]	[%]	[%]	
		Sub-structure:				
Vertical Offset from Line for Vertical		art Length Curvature		Average Horizontal Strain		Damage Category
Movement Calculations [m] No structures	[1 have segmen	n] [m] nts combined.	[%]	[%]	[%]	
Structure: 41	Rosslyn D	Sub-structure:				
Vertical Offset from Line for Vertical Movement	Combined Sta Segment	art Length Curvatur	e Deflection Ratio	Average Horizontal Strain		Damage Category
Calculations [m] No structures	[1 have segmen	n] [m] nts combined.	[%]	[%]	[%]	
		Sub-structure:	e Deflection	luerace	Max.	Damage Category
Vertical Offset from Line for Vertical Movement Calculations		and mengen curvature		Average Horizontal Strain	Tensile	Jamage Cacegory
[m] No structures		n] [m] hts combined.	[%]	[%]	[%]	
Structure: 39	Rosslyn A	Sub-structure:				
Vertical Offset from Line for Vertical Movement Calculations	Combined Sta Segment	art Length Curvatur	e Deflection Ratio	Average Horizontal Strain	Tensile	Damage Category
[m] No structures	[1 have segmen	n] [m] hts combined.	[%]	[%]	[%]	
		Sub-structure:				
Vertical Offset from Line for Vertical Movement		art Length Curvature		Average Horizontal Strain	Max. Tensile Strain	Damage Category

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Calculations [m] No structures			[m] combined.	[%]	[%]	[%]	
Structure: 39	9 Rosslyn	C S1	ub-structure:				
Offset from Line for Vertical Movement	Segment	Start	Length Curvature		Average Horizontal Strain		Damage Category
Calculations [m] No structures			[m] combined.	[%]	[%]	[%]	
Structure: 3	7 Rosslyn	A Si	ub-structure:				
Offset from Line for Vertical Movement	Segment	Start	Length Curvature				Damage Category
Calculations [m] No structures		[m] ments	[m] combined.	[%]	[%]	[%]	
Structure: 3	7 Rosslyn	B S1	ub-structure:				
Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length Curvature	Deflection Ratio	Average Horizontal Strain		Damage Category
[m] No structures		[m] ments		[%]	[%]	[%]	
Structure: 3	7 Rosslyn	C Sı	ub-structure:				
Offset from Line for Vertical Movement	Segment	Start	Length Curvature				Damage Category
[m] No structures				[%]	[%]	[%]	
Structure: 3	7 Rosslyn	D St	ub-structure: Sub	37			
Vertical Offset from Line for Vertical Movement		Start	Length Curvature		Average Horizontal Strain		Damage Category
Calculations [m]			[m]	[%]	[%]	[%]	

[m] [m] [m] [%] [%] [%] No structures have segments combined. Geotechnical & Environmental Associates (GEA) is an engineer-led and clientfocused independent specialist providing a complete range of geotechnical and contaminated land investigation, analytical and consultancy services to the property and construction industries.

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