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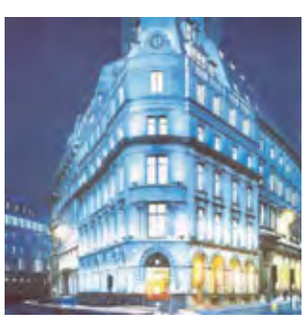

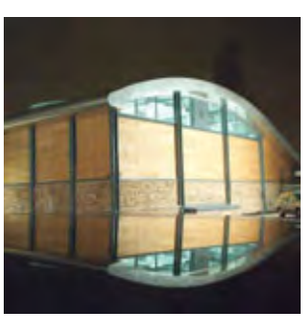

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BASEMENT IMPACT ASSEMENT FOR THE SUBTERRANEAN DEVELOPMENT AT 41-42 CHESTER TERRACE, NW1

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1. INTRODUCTION

1.1 The following Basement Impact Assessment (BIA) has been produced for inclusion with the planning application submitted the proposed subterranean development at 41-42 Chester Terrace, NW1 4ND.

1.2 In preparing this BIA reference has been made to the following London Borough of Camden documents:

- Camden Local Development Framework (LDF) Policy DP27.
- Camden Planning Guidance – Basement and lightwells CPG4.
- Camden Geological, Hydrogeological and Hydrological Study – Guidance for Subterranean Development' prepared by ARUP.

1.3 As stated in paragraph 2.8 of CPG4 '*the purpose of this document is to enable the Council to 'assess whether any predicted damage to neighbouring properties and the water environment is acceptable or can be satisfactorily ameliorated by the developer' as stated in DP27.3.'*

1.4 The various stages of the BIA have been undertaken by the following persons, holding the stated qualifications:

GEA Limited	-	Martin Cooper BEng CEng MICE
	-	Steve Branch BSc MSc CGeol FGS
Sinclair Johnston & Partners	-	Mr Thomas Musson BEng CEng MIStructE

2. PROPOSED DEVELOPMENT

2.1 The site address is 41-42 Chester Terrace, London, NW1 4ND and is located at approximate National Grid Reference 528729 182896.

2.2 A map and aerial photographic view of the local area showing the site location is provided in Appendix A and Appendix B of this report.

2.3 Chester Terrace is located on the east side of Regents Park. 41-42 Chester Terrace is located on the west side of the road at its north end.

2.4 The site comprises:

- 41 & 42 Chester Terrace, a four storey plus basement detached property built in 1825 as part of a ten year long development of the Regent Park Terraces, designed by John Nash.
- The property is grade I listed.
- The house fronts on to Chester Terrace with gardens to both sides and rear. An existing light well runs around the perimeter of the house, but is in part covered.
- Below ground vaults extend from the front of the property approximately out to the centre of Chester Terrace.
- The property is of traditional construction comprising external load bearing masonry walls, masonry internal spine wall, and internal masonry and timber partitions. The roof is of timber construction.
- The building was extensively refurbished in the 1960's as part of the restoration of Chester Terrace. From limited investigations the original internal historic fabric appears to have been completely replaced with more modern construction. The only remaining historic fabric being the external facades.

2.5 The proposed redevelopment comprises:

- Construction of a single storey basement extension adjacent to the existing property and within the grounds of the garden.
- Construction of a subterranean link between the new basement and the existing basement.

2.6 Reference is to be made to Sinclair Johnston & Partner's 'Structural Design & Construction Statement' reference 7851/SDCS/TM, Appendix D, for a detailed description of the existing and proposed structure.

3. STAGE 1 – SCREENING

3.1 The purpose of the screening stage of the BIA is to identify any matters of concern which should be investigated further through the BIA process.

3.2 The screening process has been undertaken as outlined in the Camden Planning Guidance – Basement and Lightwells CPG4 and the Camden geological, hydrogeological and hydrological study prepared by ARUP.

3.3 The screening flow charts, as given in Camden Planning Guidance – Basements and Lightwells CP4, are used and provided on the following pages.

3.4 The screening flow charts have identified the following areas that should be investigated further during the scoping stage of the BIA:

3.5 Subterranean (ground water) flow screening

No potential issues in respect to subterranean (ground water) flow have been identified at the screening stage.

3.6 Slope stability screening

Q5. *Is the London Clay the shallowest strata at the site?*
Other than a variable depth of Made Ground and topsoil, London Clay is the shallowest strata on site.

Q6. *Will any tree/s be felled as part of the proposed development and/or any works proposed within any tree protection zones where trees are to be retained?*
Trees will be felled to allow the basement to be constructed.

Q7. *Is there a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site?*
Yes the area is prone to seasonal shrink-swell subsidence as a result of the presence of London Clay and the presence of trees.

Q12. *Is the site within 5m of a highway or pedestrian right of way?*
The site is adjacent to Chester Terrace, Cumberland Place, and Outer Circle. Refer to site plans.

3.7 Surface water and flooding screening

No potential issues in respect to surface water and flooding have been identified at the screening stage.

SUBTERRANEAN (GROUND WATER) FLOW SCREENING CHART

	Question	*Answer*	*Evidence*
Q1a.	Is the site located directly above an aquifer?	No	Camden Geological, Hydrogeological and Hydrological Study – Figure 3 and Figure 4 indicate the site geology to comprise the London CLAY formation to depth. This is further confirmed on the local 1:50,000 British Geological Survey maps. The Camden Geological, Hydrogeological and Hydrological Study Table 2 indicates the London CLAY Formation as classified by the EA as an unproductive strata. This is further confirmed by the Camden Geological, Hydrogeological and Hydrological Study 'Camden Aquifer Designation Map' – Figure 8.
Q1b.	Will the proposed basement extend beneath the water table surface?	No	The basement will sit wholly within the London CLAY formation. As such there is no specific ground water table.
Q2.	Is the site within 100m of a watercourse, well (used/disused) or potential spring line?	No	Camden Geological, Hydrogeological and Hydrological Study 'Camden Aquifer Designation Map' – Figure 11 and other historical data shows that the site is not within 100m of a watercourse, well (used/disused) or potential spring line.

Q3.	Is the site within the catchment of the pond chains on Hampstead Heath?	No	Camden Geological, Hydrogeological and Hydrological Study 'Hampstead Heath Surface Water Catchments and Drainage' – Figure 14 shows that the site does not sit within the catchment of the ponds chains on Hampstead Heath.
Q4.	Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?	No	The proposed basement and associated landscaping proposals will not significantly change the proportions of hard surfaced paved areas.
Q5.	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	The surface water flow paths are not to be materially changed. Similar volumes of surface water drainage are to be discharged to the sewer system.
Q6.	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 (not just the pond chains on Hampstead Heath) or spring line?	No	There are no local surface water features. The nearest surface water feature, Regent's Park Boating Lake, is approximately 1100m west of the site.

SLOPE STABILITY SCREENING CHART

	Question	*Answer*	*Evidence*
Q1.	Does the existing site include slopes, natural or manmade, greater than 7°? (approximately 1 in 8)	No	Camden Geological, Hydrogeological and Hydrological Study 'Slope Angle Map' Figure 16 and a site walkover confirm that the site does not include slopes, natural or manmade, greater than 7°.
Q2.	Will the proposed re-profiling of landscaping at site change slopes at the property boundary to more than 7°? (approximately 1 in 8)	No	It is not proposed to re-profile the existing site landscaping levels.
Q3.	Does the developed neighbour land, including railway cutting and the like, with a slope greater than 7°? (approximately 1 in 8)	No	A site walkover has confirmed that developed neighbouring land does not slope greater than 7°.
Q4.	Is the site within a wider hillside setting in which the general slope is greater than 7°? (approximately 1 in 8)	No	A site walkover has confirmed that the site does not sit within a wider hill side setting in which the general slop is greater than 7°.
Q5.	Is the London Clay the shallowest strata at the site?	Yes	Other than a variable depth of Made Ground and topsoil,

			London Clay is the shallowest strata on site.
Q6.	Will any tree/s be felled as part of the proposed development and/or any works proposed within any tree protection zones where trees are to be retained?	Yes	Trees are to be felled to allow the basement to be constructed.
Q7.	Is there a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site?	Yes	Yes the area is prone to seasonal shrink-swell subsidence as a result of the presence of London Clay and the presence of trees.
Q8.	Is the site within 100m of a watercourse or a potential spring line?	No	Camden Geological, Hydrogeological and Hydrological Study 'Camden Aquifer Designation Map' – Figure 11 and other historical data shows that the site is not within 100m of a watercourse or a potential spring line.
Q9.	Is the site within an area of previously worked ground?	No	Historical data confirms that the site is not within an area of previously worked ground.
Q10.	Is the site within an aquifer? If so, will the proposed basement extend beneath the water table such that dewatering may be required during	No	The site is within 'unproductive strata'. See Q1 within the subterranean (ground water) flow screening chart.

	construction?		
Q11.	Is the site within 50m of the Hampstead Heath ponds?	No	Camden Geological, Hydrogeological and Hydrological Study 'Hampstead Heath Surface Water Catchments and Drainage' - Figure 14 and 'Hampstead Heath Map' – Figure 13 indicate that the site is not within 50m of the Hampstead Heath Ponds.
Q12.	Is the site within 5m of a highway or pedestrian right of way?	Yes	The site is adjacent to Chester Terrace, Cumberland Place, and Outer Circle. Refer to site plans.
Q13.	Will the proposed basement significantly increase the differential depth of foundation relative to neighbouring properties?	No	The adjacent buildings foundations are not founded significantly higher than the proposed basement formation.
Q14.	Is the site over (or within the exclusion zone of) any tunnels e.g. railway lines?	No	From OS maps, and the like, there are no tunnels close to the site.

SURFACE FLOW AND FLOODING SCREENING CHART

	Question	*Answer*	*Evidence*
Q1.	Is the site within the catchment of the pond chains on Hampstead Heath?	No	Camden Geological, Hydrogeological and Hydrological Study 'Hampstead Heath Surface Water Catchments and Drainage' – Figure 14 shows that the site does not sit within the catchment of the ponds chains on Hampstead Heath.
Q2.	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 proposed drainage scheme will not result in a material change to the existing route. As existing, a proportion of the surface water will flow into the Made Ground with the remainder discharging into the main sewers.
Q3.	Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	No	The existing and proposed proportion of hard standing is similar. A 'garden' build-up is to be installed over the new ground floor structure, similar in size and scale to existing.
Q4.	Will the proposed basement 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	Given the plan size and depth of the single storey basement and the expected ground conditions it is unlikely that the profile of inflows of surface water being received by adjacent

			properties or downstream water courses is to be changed.
Q5.	Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	No	Given the plan size and depth of the single storey basement and the expected ground conditions it is unlikely that the profile of inflows of surface water being received by adjacent properties or downstream water courses is to be changed.
Q6.	Is the site in an area known to be at risk from surface water flooding, such as South Hampstead, West Hampstead, Gospel Oak and King's Cross, or is it at risk from flooding, for example because the proposed basement is below the static water level of a nearby surface water feature?	No	The site is not within an area known to be at risk from surface water flooding as shown on Camden Geological, Hydrogeological and Hydrological Study 'Flood Map' – Figure 15.

4.0 STAGE 2 – SCOPING

4.1 The purpose of the scoping stage of the BIA is to define further the potential impacts identified within the screening stage as requiring additional investigation.

4.2 The scoping process has been undertaken as outlined in the Camden Planning Guidance – Basement and Lightwells CPG4 and the Camden geological, hydrogeological and hydrological study prepared by ARUP.

4.3 From the information obtained during the screening stage of the BIA, and using further readily available published data and application of hydrogeological principles, the following 'conceptual ground model' has been developed:

Site location: Central London.

Local geology: Made ground & topsoil over London Clay.

Local ground levels: The site can be considered level and flat.

Local surface water or below ground water features: There are no local surface or below ground water features close to the site. The site is sat within unproductive strata.

Local ground water level: As the local ground is London Clay there is no specific ground water surface. This is confirmed by the site investigation.

Local surface finishes: The local area is predominantly park land to the west with the remainder of the local area comprising residential properties with gardens intersected by roads. The site has a garden space around its perimeter.

Current local surface water path way: A proportion of local rainfall will be retained in the near surface soil (made ground and topsoil); with a proportion evaporating into the atmosphere or being taken up by plant and tree root systems. The remaining water within the top soil is likely to either sit within the Made Ground or, where possible, follow the natural gradient of the land finding its way into more permeable layers. A further proportion of local rainfall will run off the hard surfaced areas (highways, hard standing garden, and roofs) into the mains sewer.

Levels and infrastructure: The site is flat and level. The site has Chester Terrace, Outer Circle and Cumberland Place highways directly to the east, west, and north.

4.4 Using the above conceptual ground model the following potential impacts have been identified.

SLOPE STABILITY SCOPING CHART

Q5.	Is the London Clay the shallowest strata at the site?	Stability of the London Clay during excavation and shrink-swell characteristics can cause structural damage.
Q6.	Will any tree/s be felled as part of the proposed development and/or any works proposed within any tree protection zones where trees are to be retained?	Felling of trees causing moisture changes in London Clay leading to reduced soil strength and loss of ground stability.
Q12.	Is the site within 5m of a highway or pedestrian right of way?	Installation of the proposed basement and excavation for the basement may result in structural damage to highways and services within the highway.

5.0 STAGE 3 – BIA SITE INVESTIGATION

5.1 From the scoping stage a BIA site investigation, specific to the site, has been designed and implemented by GEA Ltd. A copy of their report, reference J13223, is included in Appendix C.

5.2 In summary the ground conditions comprise a variable depth of Made Ground over London Clay, proven to the full depth of the investigation 20.45m below ground level.

Ground water was not encountered during the excavation. However, small minor seepages were noted in return visit.

5.3 The site investigation has confirmed that the conceptual ground model is valid and that the 'no' answers provided at the screening stage are correct.

5.4 The site investigation has shown that the perched ground water can be considered as static and not flowing. Significant dewatering is not required during construction.

5.5 The site is essentially flat therefore the removal of the trees will not affect slope stability.

5.6 The ground investigation found elevated concentrations of poly-aromatic hydrocarbons (PAH) and lead within the made ground. These 'hot-spots' were isolated in occurrence and correspond to un-burnt charcoal fragments within the Made Ground. All made ground in the area of the development is to be taken off site to a licensed tip and is classified as non-hazardous under waste code 17 05 04. The natural ground, if separated out from the Made Ground, is classified as inert also under waster code 17 05 04. As all made ground is to be taken off site and disposed of no further remediation is considered necessary.

6.0 STAGE 4 – IMPACT ASSESSMENT

6.1 The impact assessment stage of the BIA describes the impacts of the proposed basement development on the environment; this is achieved by comparing the baseline situation with the hypothetical as constructed' basement situation. Refer to the tables on the following pages.

6.2 The form of basement structure proposed is outlined in the 'Structural Design and Construction Statement' provided in Appendix D and is summarised as follows:

- New contiguous bored piled retaining walls with reinforced concrete lining wall.
- New reinforced concrete 'box' forming the basement structure.

6.3 As described in the 'Structural Design and Construction Statement' ground movement predicted for the proposed development is estimated to result in a structural damage category to the existing property as 'Category 1 very slight' as defined under the Burland Category.

6.4 By comparing the baseline situation with the hypothetical 'as constructed' baseline situation the residual possible effects of the proposed basement on the local environment have been assessed as follows:

- Potential for structural damage to highways and services within the highway when excavating the basement.

6.5 The structural proposals have been developed to mitigate against the effects listed above by providing a stiff earth retention structure comprising:

- Contiguous bored piled walls with suitably designed temporary propping installed early in the excavation process to provide an inherently stiff form of basement construction and to limit ground movement.

6.6 During construction of the basement the Contractor should be required to undertake the following monitoring to ensure that the assumptions and findings of this BIA remain valid:

- Monitoring of ground conditions encountered to confirm expected ground model.
- Monitoring of ground water levels.

6.7 Reference should be made to the 'Structural Design and Construction Statement' provided in Appendix D for further explanation of the various structural considerations specific to the proposals.

6.8 Through the BIA process and with due consideration to the various site specific issues all potential impacts of the proposed basement can be mitigated. The proposed basement therefore is unlikely to cause detriment to the local ground water flow regime, slope stability and surface water flow regime.

SUBTERRANEAN (GROUND WATER) FLOW

Attribute	*Baseline value*	*As constructed value*
Groundwater levels	Perched ground water was encountered with the Made Ground.	A suitable depth of 'garden' build up is to be provided over the basement. This will in effect return the 'as built' situation back to the baseline condition. There is unlikely to be any adverse effect on groundwater levels.

SLOPE STABILITY EFFECTS

Attribute	Baseline value	As constructed value
Slope angle	The site is considered level.	No change. The site is considered level.
Existing tree regime	Several trees on site.	Existing trees onsite to be felled and replaced. As the site is level the removal of the trees during construction will not adversely affect ground stability. Desiccation was not encountered during the investigation and the new basement is to extend below the influence of any trees.
Stiffness and support to highways	As existing.	The proposed basement construction is to be sufficiently stiff to ensure integrity of the local ground. Temporary lateral propping to walls during construction will be installed by the Contractor to maintain the soil stability. No adverse effects.

SURFACE FLOW AND FLOODING EFFECTS

Attribute	Baseline value	As constructed value
Rate of runoff	As existing.	'Garden' build up provided over basement. 'As built' condition to be as existing. No adverse impacts.
Direction of overland flow	Perched ground water within the Made Ground may flow along the boundary with the London Clay following the natural contours of the land.	'Garden' build up provided over the basement to replace the Made Ground. Ground flows are not impeded by the basement. No change to baseline value.

7.0 CONCLUSION

7.1 A basement impact assessment, as required for planning by the London Borough of Camden, has been undertaken by Sinclair Johnston & Partners and GEA Limited for the proposed basement redevelopment at 41-42 Chester Terrace, London, NW1 4ND.

7.2 The following site conceptual ground model has been developed:

Site location: Central London.

Local geology: Made ground & topsoil over London Clay.

Local ground levels: The site can be considered level and flat.

Local surface water or below ground water features: There are no local surface or below ground water features close to the site. The site is sat within unproductive strata.

Local ground water level: As the local ground is London Clay there is no specific ground water surface. This is confirmed by the site investigation.

Local surface finishes: The local area is predominantly park land to the west with the remainder of the local area comprising residential properties with gardens intersected by roads. The site has a garden space around its perimeter.

Current local surface water path way: A proportion of local rainfall will be retained in the near surface soil (made ground and topsoil); with a proportion evaporating into the atmosphere or being taken up by plant and tree root systems. The remaining water within the top soil is likely to either sit within the Made Ground or, where possible, follow the natural gradient of the land and finding its way into more permeable layers. A further proportion of local rainfall will run off the hard surfaced areas (highways, hard standing garden, and roofs) into the mains sewer.

Levels and infrastructure: The site is flat and level. The site has Chester Terrace, Outer Circle and Cumberland Place highways directly to the east, west, and north.

7.3 This site conceptual ground model has been verified by the site investigation, and subsequent report, undertaken by GEA Limited. Refer to Appendix C.

7.4 The proposed basement construction comprises:

- New contiguous bored piled retaining walls with reinforced concrete lining wall.
- New reinforced concrete 'box' forming the basement structure.

7.5 The impacts to the local environment identified with the proposed basement construction are:

- Potential for structural damage to highways and services within the highway when excavating the basement.

7.6 These impacts are mitigated by providing:

- Contiguous bored piled walls with suitably designed temporary propping installed early in the excavation to provide an inherently stiff form of basement construction and to limit ground movement.

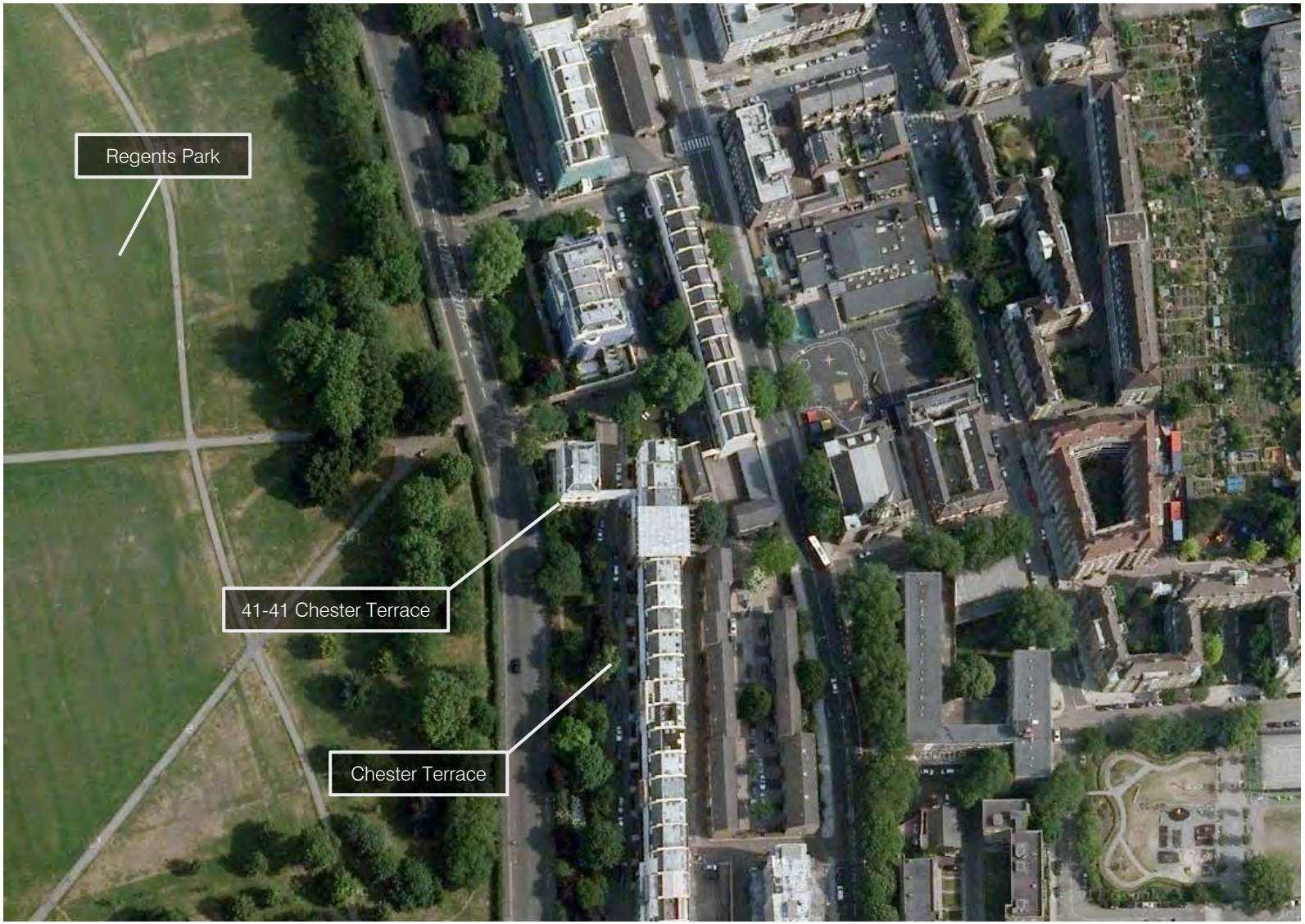
7.7 Reference should be made to the 'Structural Design and Construction Statement' provided in Appendix D for further details.

7.8 Through the BIA process and with due consideration to the various site specific issues all potential impacts of the proposed basement can be mitigated. The proposed basement therefore is unlikely to cause detriment to the local ground water flow regime, slope stability and surface water flow regime.

APPENDIX A - SITE LOCATION PLAN

Site Location Map (Map Data © 2013 Google)

APPENDIX B - SITE PHOTOGRAPHIC PLAN



Aerial View of Site and Surrounding Area (Imagery © 2013 Bluesky)

APPENDIX C - BIA SITE INVESTIGATION REPORT

APPENDIX D - STRUCTURAL DESIGN & CONSTRUCTION STATEMENT

SINCLAIRJOHNSTON

STRUCTURAL DESIGN & CONSTRUCTION STATEMENT FOR 41-42 CHESTER TERRACE, NW1

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-	08.04.14	Issued for Planning
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1. INTRODUCTION

1.1 The following Structural Design & Construction Statement has been prepared as part of the wider Basement Impact Assessment (BIA) undertaken for the planning application submitted for the proposed subterranean development at 41-42 Chester Terrace, NW1 4ND.

1.2 The purpose of this report is to describe the existing site, to present the structural scheme to be adopted for the proposed development and to describe the proposed construction methodology for the execution of the works.

1.3 This report should be read with Sinclair Johnston & Partners Basement Impact Assessment (BIA) report reference 7851/BIA/TM/Rev -.

1.4 The report has been prepared by Mr Thomas Musson BEng CEng MIStructE; Technical Director at Sinclair Johnston & Partners.

2. EXISTING SITE

2.1 The site address is 41-42 Chester Terrace, London, NW1 4ND and is located at approximate National Grid Reference 528729 182896.

2.2 Maps showing the site location are provided in Appendix A.

2.3 The site comprises:

- 41/42 Chester Terrace, a grade I listed, four storey plus basement detached property built in 1825 as part of a ten year long development of the Regent's Park Terraces designed by John Nash.
- The house fronts on to Chester Terrace with gardens to both sides and rear.
- The site is bounded to the north by Cumberland Place, to the east by Chester Terrace, and to the west by Outer Circular.
- Regent's Park is situated to the west beyond the Outer Circular.

2.5 The following description of the existing structure is provided from a visual inspection with limited opening up works. No assurance is given that areas that are inaccessible or covered are free from defect.

2.6 The existing property was substantial altered internally in the 1960's as part of the restoration of Chester Terrace. At this time the floors were replaced and the levels altered from the original levels.

2.7 Photographs of the existing site are given in Appendix B

2.8 The existing structure of the house comprises:

- Original external load bearing masonry walls.
- Brick, block, & timber stud internal partitions dating from the 1960's.
- Timber above ground floors, dating from the 1960's, spanning from external walls to party wall.
- Modern staircases and lift shaft thought to have been installed in the 1960's.
- Basement concrete ground bearing slab.
- Timber roof comprising timber trusses dating from the 1960's.

3. SITE GROUND CONDITIONS

3.1 The following is a brief description of the site ground conditions. Reference should be made to GEA Ltd's site investigation report reference J13223, included in the BIA, for detailed information.

3.2 The site ground profile comprises a varying thickness of made ground overlying the London Clay Formation proven to a maximum depth of 20.45m below existing ground level.

3.3 Ground water was not encountered during the investigation but minor seepages were recorded on return visits.

3.4 The Environment Agency indicate that the site is located in Flood Risk Zone 1 having less than 1 in 1000 per year chance (<0.1%) chance of flooding from rivers or sea.

4. PROPOSED DEVELOPMENT

4.1 The description of the proposed development given below is provided to give context to the following sections of the report. For a detailed description of the various disciplines proposals reference should be made to the various reports submitted with the planning application.

4.2 The proposed development comprises:

- Construction of a single storey basement extension adjacent to the existing property and within the grounds of the garden.
- Construction of a subterranean link between the new basement and the existing basement.

5. STRUCTURAL PROPOSALS

5.1 DESCRIPTION OF STRUCTURE

5.1.1 Drawings describing the structural proposals are provided in Appendix C.

5.1.2 The proposed substructure comprises:

- New contiguous bored piled retaining walls with reinforced concrete lining wall.
- New reinforced concrete 'box' forming the basement structure.

5.2 STRUCTURAL DESIGN

5.2.1 The proposed structure is to be designed to comply with The Building Regulations 2010.

5.2.2. The following current design documents are to be used to complete the structural design:

BS 8002:1994	Code of practice for earth retaining structures.
BS 8004:1996	Code of practice for foundations.
BS 5268-2:2002	Structural use of timber. Code of practice for permissible stress design, materials and workmanship.
BS 5628-1:1992	Code of practice for use of masonry. Structural use of unreinforced masonry.
BS 5628-2:2000	Code of practice for use of masonry. Structural use of reinforced and pre-stressed masonry.
BS 5628-3:2001	Code of practice for use of masonry. Materials and components, design and workmanship.
BS 5950-1:2000	Structural use of steelwork in building. Code of practice for design in simple and continuous construction: hot rolled and welded sections.
BS 5950-2:2001	Structural use of steelwork in building. Specification for materials, fabrication and erection, hot rolled.
BS 6399-1:1996	Loading for buildings. Code of practice for dead and imposed loads.
BS 6399-2:1997	Loading for buildings. Code of practice for wind loads.

BS 6399-3:1998	Loading for buildings. Code of practice for imposed roof loads.
BS 8110-1:1997	Structural use of concrete. Code of practice for design and construction.

5.3 STRUCTURAL STABILITY

5.3.1 The retaining structures are to be designed to withstand all lateral pressures resulting from the retained earth, surcharge loads, and hypothetical transient hydrostatic pressures.

5.3.2 The reinforced concrete box is to be structural stable in its own right. Sliding of the basement is resisted by the embedment of the contiguous piled walls and friction between the basement slab and earth

5.3.2 Heave forces due to the unloading of the clay ground, and uplift forces due to a hypothetical raised ground water level, are to be resisted by the contiguous piled walls through skin friction. The basement 'box' is to be effectively tied into the piles.

5.3.3 The new basement structure is to be designed to withstand the lateral pressures induced by the existing properties foundations. The new retaining walls are to be inherently stiff to limit deflection, maintaining the structural integrity of the adjoining building.

5.4 PREDICTED STRUCTURAL DAMAGE

5.4.1 Given the size and depth of basement and its distance from neighbouring buildings, some 12m away, the predicted ground movements are such that structural damage resulting from ground movement is unlikely to be of concern. Refer to drawing 7851/SK020 given in Appendix C.

5.4.2 Prediction of structural damage to the existing property immediately adjacent to the proposed development has been undertaken in accordance with CIRIA publication C580. Refer to Appendix D.

5.4.2 CIRIA C580 provides guidance on possible ground movements due to excavation and construction of embedded retaining walls within clay ground. The guidance set out in CIRIA C580 is therefore considered applicable in this instance.

5.4.3 The category of damage to the existing property, as classified under Burland et al, anticipated from the proposed construction of the new basement is expected to be no worse than category very slight. This is defined by Burland et al as 'fine cracks which are easily treated during normal decorative repair'.

6. PARTY WALL MATTERS

6.1 The works comprise the excavation for a new single storey basement adjacent to the site boundaries. However, it would appear that the surrounding buildings are sufficiently distant so that procedures under The Party Wall etc Act 1996 are not required.

6.2 A Party Wall Surveyor is to be appointed post-planning to review the proposals and advise accordingly.

7. CONSTRUCTION METHODOLOGY

7.1 CONSTRUCTION SEQUENCE

7.1.1 The proposed sequence of works given below has been assumed for the purposes of undertaking the structural design of the basement and is provided to demonstrate that the works can be executed with due regard to the local amenity. The sequence of works should be read in accordance with the drawings provided in Appendix C.

7.1.2 Proposed Sequence of Works

a) Contiguous bored piled wall to be installed.
b) Temporary works to the perimeter garden wall to be installed.
c) Capping beam excavated and constructed.
d) Reduced level dig undertaken to underside of capping beam level.
e) High level temporary lateral propping installed to support the head of the retaining wall during construction.
f) Excavation to continue down to basement formation level.
g) Over site blinding cast and basement ground slab constructed.
h) Reinforced concrete vertical elements constructed.
i) Reinforced concrete roof slab cast.
j) Once roof slab has reached sufficient strength, temporary lateral propping to be removed.
k) The structure is then complete.
l) The link to existing basement is then to be formed.

7.2 CONSTRUCTION GENERALLY

7.2.1 The works are required to be undertaken in accordance with all statutory legislation relating to construction works.

7.2.2 The Contractor will be required to demonstrate a positive attitude and commitment toward minimising environmental disturbance to local residents and will be required to be registered with the Considerate Contractors Scheme.

7.2.3 Noise, dust and vibration will be controlled by employing Best Practicable Means (BPM) as prescribed in the following legislative documents and the approved code of practice BS 5228:

The Control of Pollution Act 1972

The Health & Safety at Work Act 1974
The Environmental Protection Act 1990
Construction (Design and Management) Regulations 1994
The Clean Air Act 1993

7.2.4 General measures to be adopted by the Contractor to reduce noise, dust and vibration include:

- Erection of site hoarding to act as minor acoustic screen.
- Use of super silenced plant where feasible.
- Use of well-maintained modern plant.
- Site operatives to be well trained to ensure that noise minimisation and BPM's are implemented.
- Effective noise and vibration monitoring to be implemented.
- Reducing the need to adopt percussive and vibrating machinery.
- Bored piling techniques to be adopted to reduce piling induced vibration.
- Piles to be broken down using non-percussive techniques.
- Vehicles not to be left idling.
- Vehicles to be washed and cleaned effectively before leaving site.
- All loads entering and leaving the site to be covered.
- Measures to be adopted to prevent site runoff of water or mud.
- Water to be used as a dust suppressant.
- Cutting equipment to use water as suppressant or suitable local exhaust ventilation system.
- Skips to be covered.
- Drop heights to be minimised during deconstruction.
- Use of agreed wet cleaning methods or mechanical road sweepers on all roads around site.
- Set up and monitor effective site monitoring of dust emissions.
- Working hours to be restricted as required by the Local Auhtority.

7.3 DEMOLITION

7.3.1 The proposals comprise the demolition of a small section of the existing structure to form a link between the new basement and existing basement. The demolition works will be required to undertaken in accordance with the legislative documents stated in section 7.2 and, as stated in Camden Planning Guidance CPG4 Section 2.83, Contractors are to adopt the practices outlined within the ICE Demolition Protocol in order to mitigate the impact of the works.

7.3.2 Demolition of the existing structure will be undertaken using a 'clean' deconstruction method to reduce noise, dust and vibration. Slabs are to be cut into manageable sections using a wet saw or stitch drilling method and masonry is to be stitch drilled.

7.4 CONSTRUCTION & TEMPORARY WORKS

7.4.1 The Contractor will be required to be registered with the Considerate Contractor scheme.

7.4.2 Impacts on the local amenity will be strictly controlled and managed by the Contractor.

7.4.3 Working hours will be restricted as required by the Local Authority.

7.4.4 The Contractor will be required to provide a Construction Management Plan prior to undertaking the works. The contents of this plan must be agreed with the Local Authority and complied with unless otherwise agreed with the Council.

7.4.5 The Contractor will be required to provide a Site Waste Management Plan describing how site waste is to be minimised and dealt with.

7.4.6 Perched ground water has been encountered within the Made Ground. The volumes of water found and its relatively low flow rate mean that this water is unlikely to cause issues during construction. Significant dewatering is not proposed.

7.4.7 All temporary works are to be designed by a qualified and experienced Temporary Works Co-ordinator in accordance with BS 5975 'Code of practice for temporary works procedures and the permissible stress design of falsework'.

7.4.8 In regard to basement construction, as stated in CIRIA C580 *"The early installation of a stiff prop with a shallow first-stage excavation is one of the best ways to reduce wall deflection.*

7.4.9 Installation of the high level propping early in the excavation sequence, and the necessary level of good workmanship required for the works, allow ground movements due to wall defelction to be suitably controlled.

7.5 CONSTRUCTION TRAFFIC MANAGEMENT

7.5.1 A construction traffic management plan has been prepared and submitted for planning by Motion.

8. CONCLUSIONS

8.1 The structural proposals and construction methodology for the basement extension at 41/42 Chester Terrace have been developed with due regard to the existing site constraints, the site specific and local ground conditions, the local amenity, and the local highways.

8.2 The ground conditions are well understood and have been investigated by GEA Ltd. Refer to GEA Ltd report reference J13223 included in the Basement Impact Assessment.

8.3 There is no specific ground water table. Minor seepages of ground water were recorded. These would not cause significant issues during excavation.

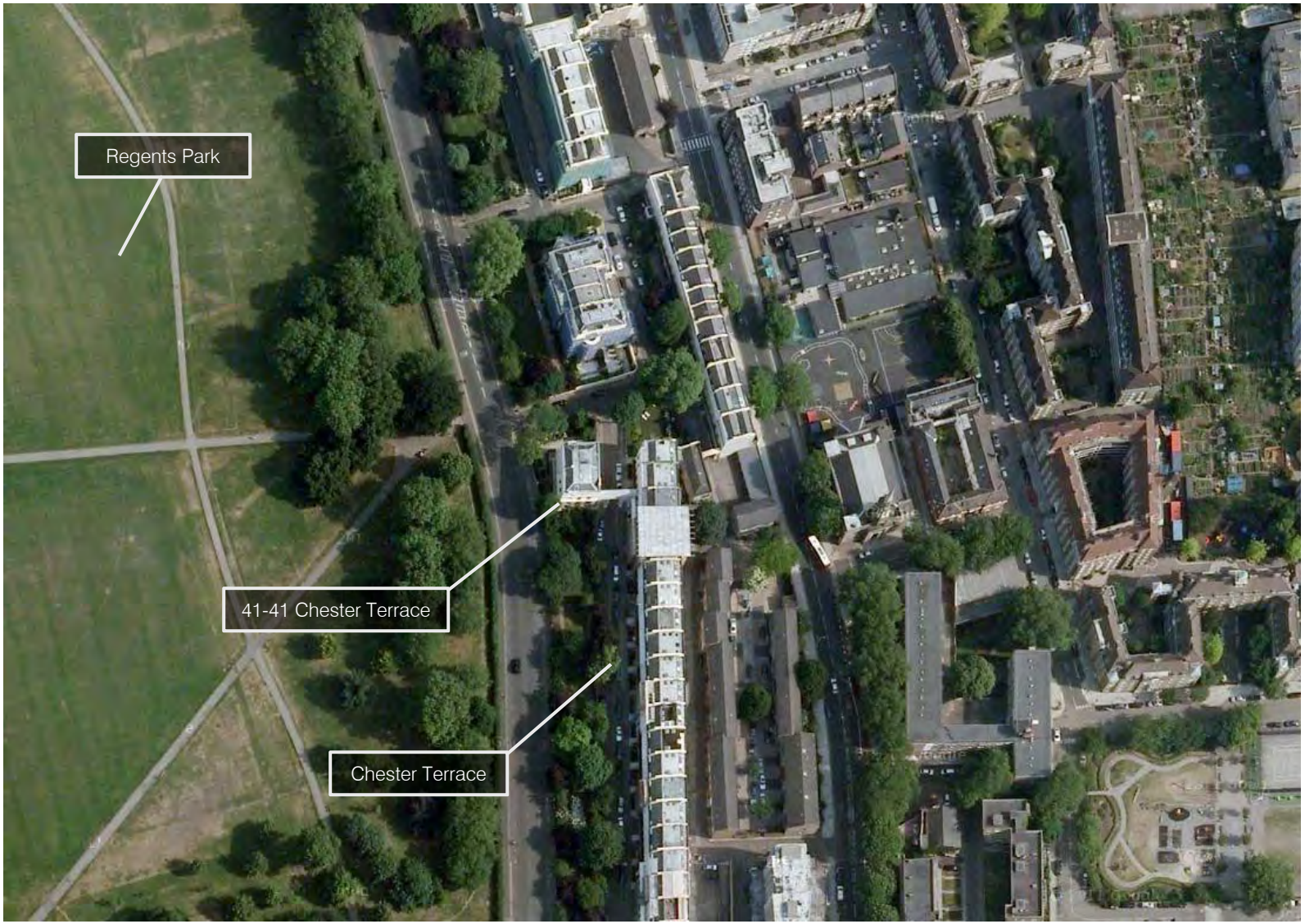
8.3 The structure has been designed to maintain the stability and integrity of the surrounding land and existing building, and below ground services.

8.4 The proposed basement is sufficiently distance from neighbouring buildings and is of a shallow depth so as not to cause detriment to nearby properties.

8.4 Anticipated ground movements have been shown not to cause significant damage to the existing building. Ground movements can be limited to acceptable values by a combination of the proposed structure, suitably designed temporary works, and good workmanship.

8.5 This report demonstrates that by adopting good construction practices the works can be executed in a safe manner while minimising the impact on the local amenity.

APPENDIX A - SITE PLAN



Aerial View of Site and Surrounding Area (Imagery © 2013 Bluesky)

Site Location Map (Map Data © 2013 Google)

APPENDIX B - EXISTING PHOTOGRAPHS

Photo 1 – 41/42 Chester Terrace viewed from Outer Circle

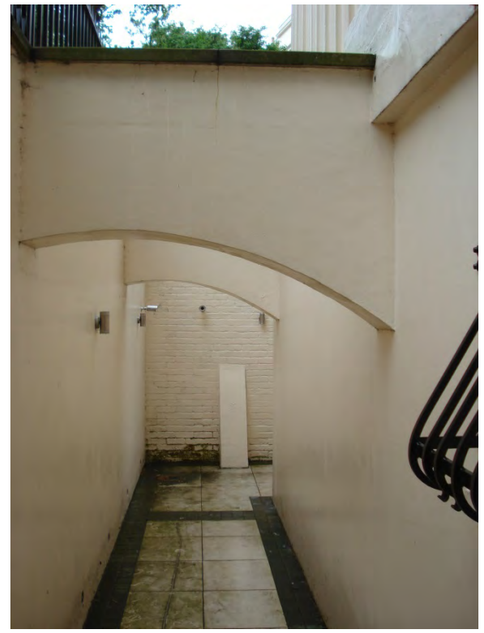
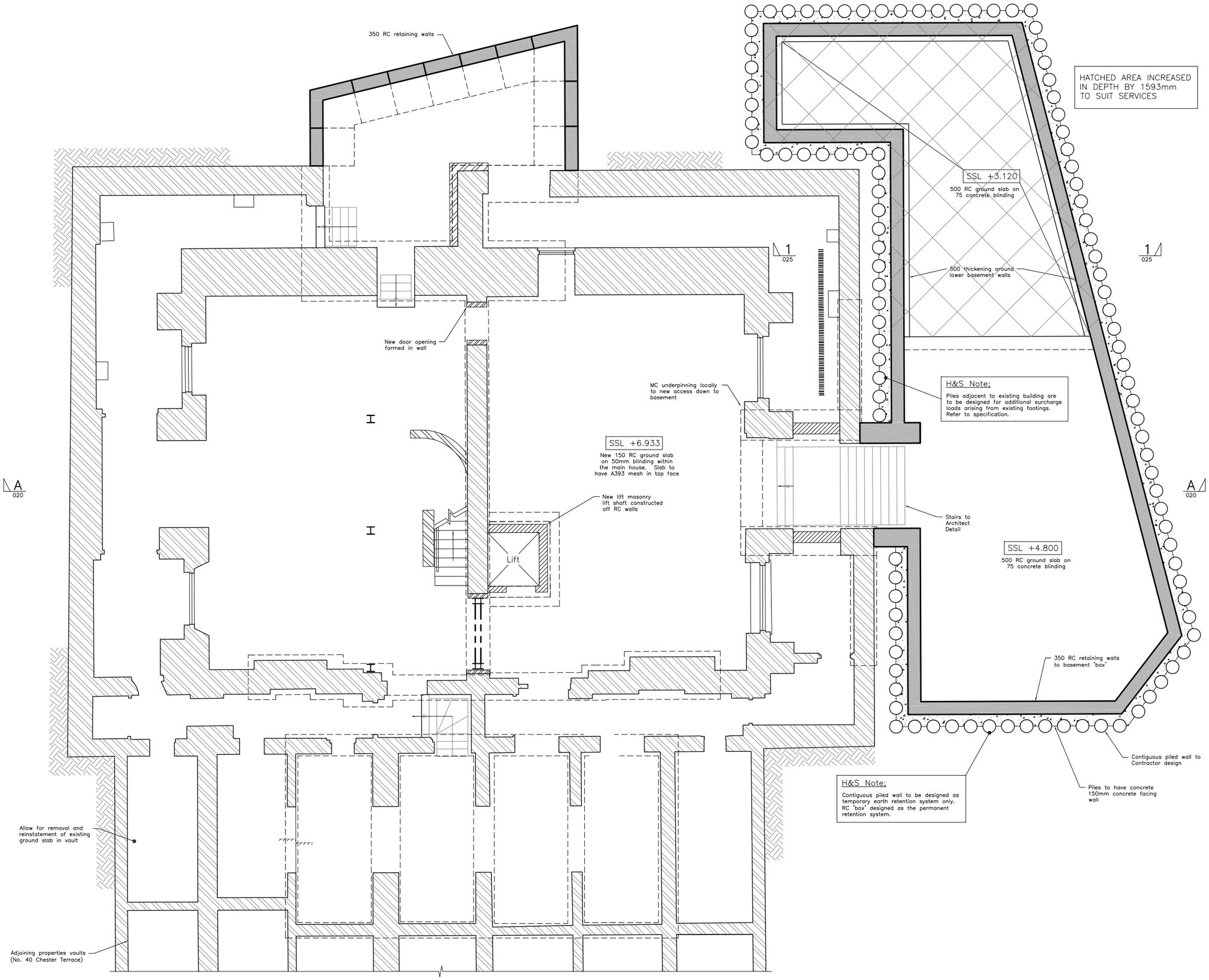


Photo 2 – Typical perimeter light well

Photo 3 – Existing rof space

Photo 4 – 41/42 Chester Terrace viewed from Cumberland Place

APPENDIX C - STRUCTURAL DRAWINGS



NOTES:

1. All structural engineering drawings are to be read with the specification and with all relevant Architect's and Service Engineer's drawings and specifications.
2. Do not scale from this drawing in either paper or digital form. Use written dimensions only. To check drawing has been printed to intended scale this bar should be 50mm long @ A1 or 25mm long @ A3:
3. All dimensions are in millimetres and levels in metres.
4. Refer to drawing 7851/001 for further notes.

KEY:

- Existing load bearing masonry.
- Structure under.
- New load bearing masonry.
- New reinforced concrete.

Rev	Date	Issued	Amendment
A	17.12.14	DS	Planning Addendum
–	08.04.14	DS	Issued for Planning

Status: *PLANNING*

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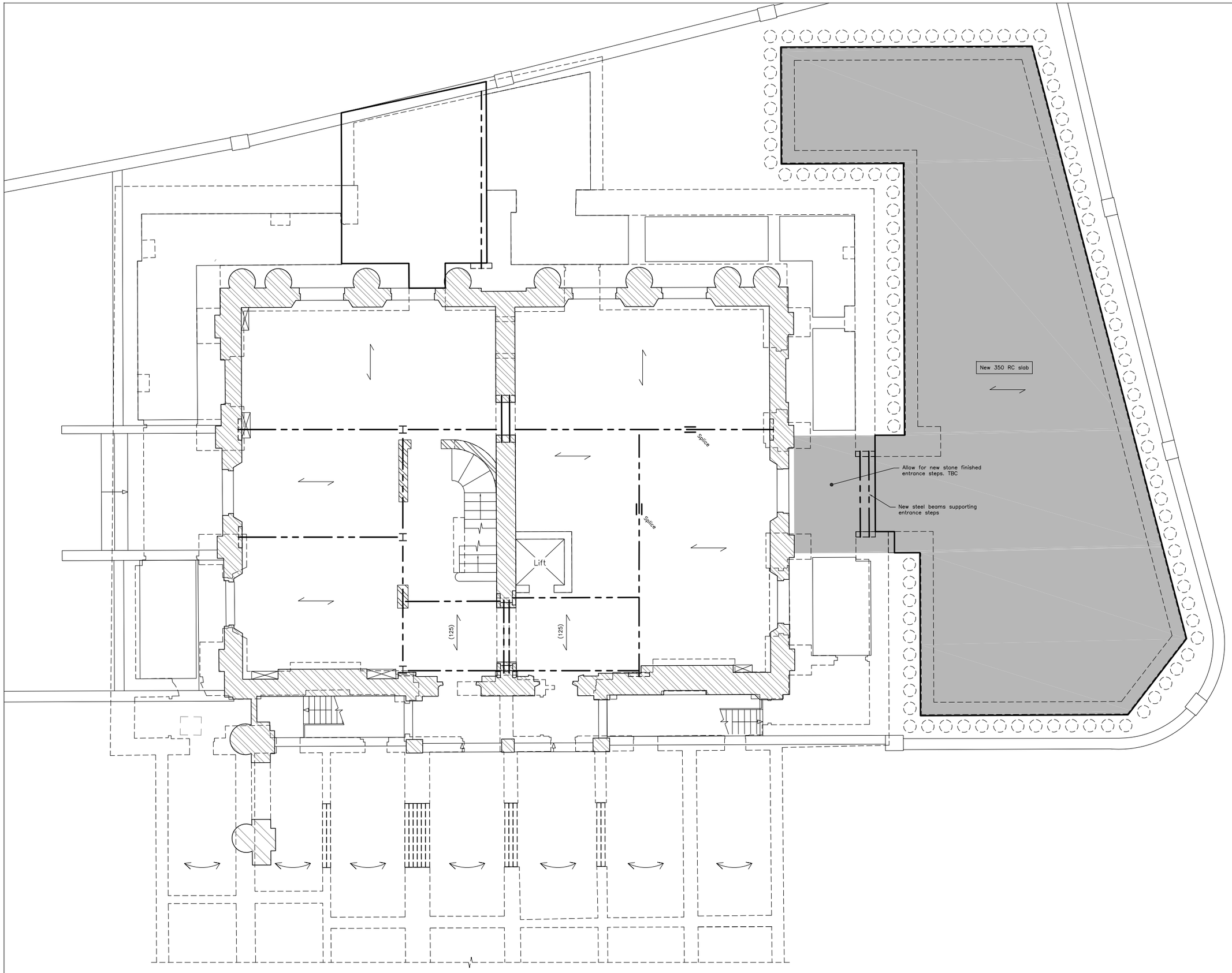
41–42 CHESTER TERRACE NW1

PROPOSED BASEMENT PLAN

Drawn T Musson | Scale 1:50 at A1

Project No./Drawing No. 7851/SK010 | Rev A



NOTES:

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3. All dimensions are in millimetres and levels in metres.

KEY:

- Existing load bearing masonry.
- Structure under.
- Structure demolished.
- New load bearing brick.
- Span of 225x50 C24 timber joists at 400crs with 18mm plyboard decking.
- (125) Span of 125mm RC slab cast on metal decking.
- (350) Span of new RC slab
- Existing span of vaults.

Rev	Date	Issued	Amendment
–	08.04.14	TM	Issued for planning.

Status *PLANNING*

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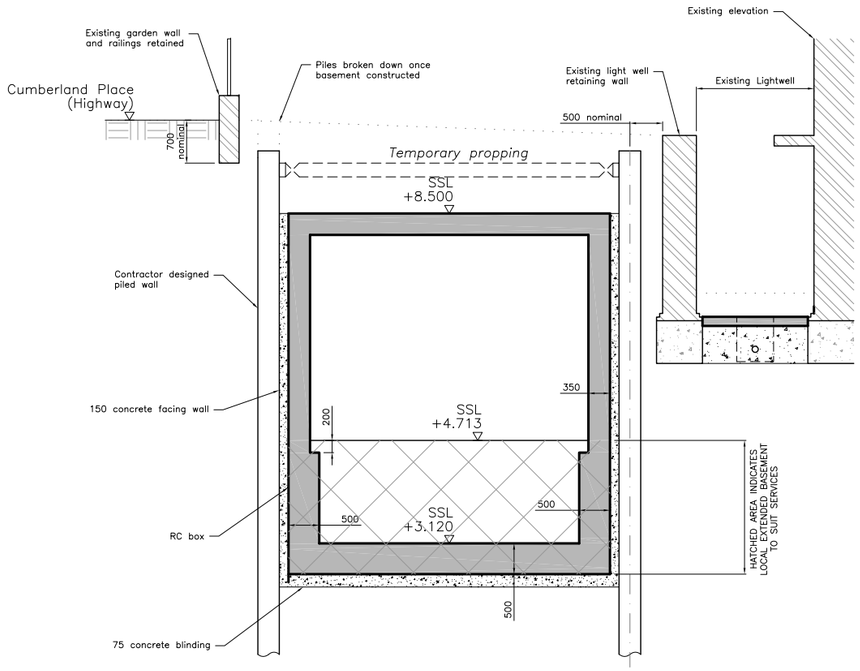
41–42 CHESTER TERRACE NW1

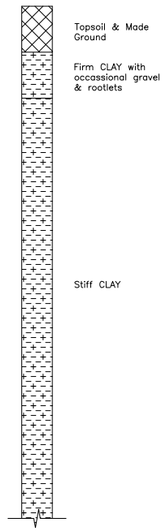
GROUND FLOOR PROPOSED PLAN

Drawn T Musson Scale 1:50 at A1

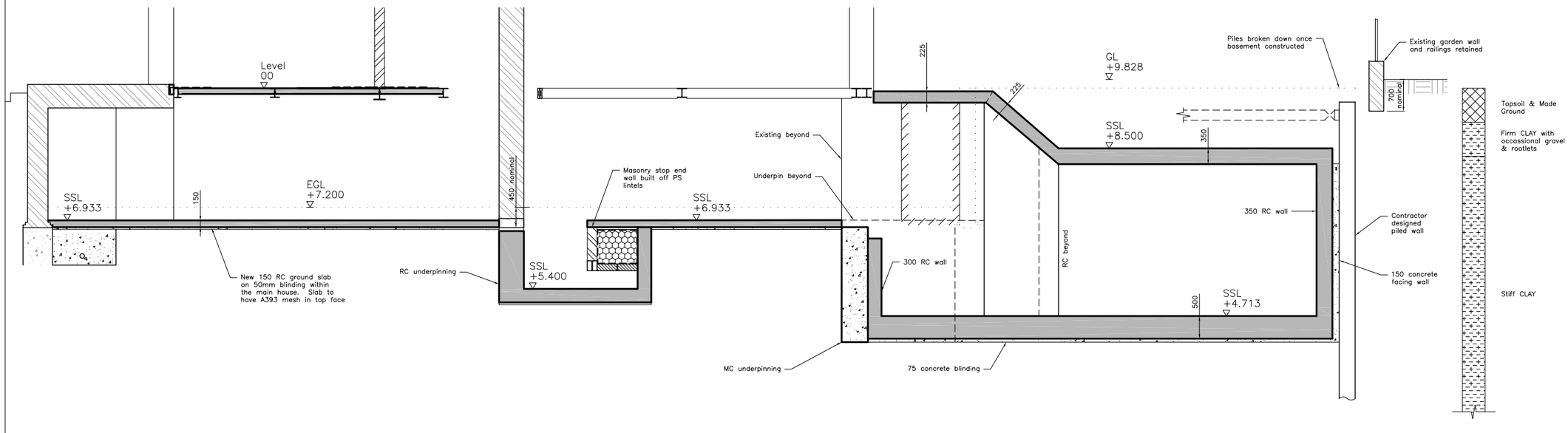
Project No./Drawing No. 7851/SK011 Rev –



SECTION 1–1
MODIFIED TO SUIT SERVICES



GROUND PROFILE



SECTION A–A
NO CHANGE FROM PREVIOUS APPLICATION

GROUND PROFILE

NOTES:

1. All structural engineering drawings are to be read with the specification and with all relevant Architect's and Service Engineer's drawings and specifications.
2. Do not scale from this drawing in either paper or digital form. Use written dimensions only. To check drawing has been printed to intended scale this bar should be 50mm long @ A1 or 25mm long @ A3:
3. All dimensions are in millimetres and levels in metres.
4. Refer to drawing 7851/001 for further notes.

Rev	Date	Issued	Amendment
A	17.12.14	DS	Planning addendum
–	08.04.14	TJM	Issued for Planning

Status
PLANNING

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41–42 CHESTER TERRACE NW1

PROPOSED SECTIONS SHEET 1

Drawn T Musson
Scale 1:50 at A1

Project No./Drawing No. 7851/SK015
Rev A

NOTES:

1. All structural engineering drawings are to be read with the specification and with all relevant Architect's and Service Engineer's drawings and specifications.
2. Do not scale from this drawing in either paper or digital form. Use written dimensions only. To check drawing has been printed to intended scale this bar should be 50mm long @ A1 or 25mm long @ A3:
3. All dimensions are in millimetres and levels in metres.
4. Predicted ground movements have been assessed in accordance with CIRIA C850.

Rev	Date	Issued	Amendment
–	xx.xx.xx	XXX	Full description of amendments

Status *PLANNING*

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7851, 41–42 CHESTER TERRACE, NW1

PREDICTED GROUND MOVEMENTS

Drawn T Musson | Scale 1:50 at A1

Project No./Drawing No. 7851/SK020 | Rev –

APPENDIX D - STRUCTURAL CALCULATIONS FOR PLANNING

SINCLAIRJOHNSTON

Project	41/42 Chester Terrace, NW1	Drg No.	-	Sheet No.	
Project No.	7851	By	Tom Musson	Date	August 2013

Ground Movement Prediction in accordance with CIRIA C580

Movements due to pile installation

Wall Type Contiguous

Pile depth 10 m

Distance from face of wall (m)	Movement due to pile installation	
	Horizontal (mm)	Vertical (mm)
0	4.0	4.0
5	2.0	3.0
10	1.0	2.0
15	0	1.0
20	-	0

Movements due to excavation

Excavation depth 5.5 m

Distance from face of wall (m)	Movement due to excavation	
	Horizontal (mm)	Vertical (mm)
0	8.3	2.2
3	7.2	4.1
5	6.7	3.7
6	6.2	3.3
10	4.8	2.6
11	4.1	2.2
15	2.9	1.4
17	2.1	0.8
20	1.0	0.4
22	0.0	0.0

Assumptions

1. Walls assumed to retain stiff clay. The above values are considered conservative.
2. The wall stiffness is asumed to be a stiff retaining system with temporary propping as shown on SJ&P drawings.

SINCLAIRJOHNSTON

Project	41/42 Chester Terrace	Drg No.	-	Sheet No.	
Project No.	7851	By	TJM	Date	Aug 13

Estimated building damage assessment

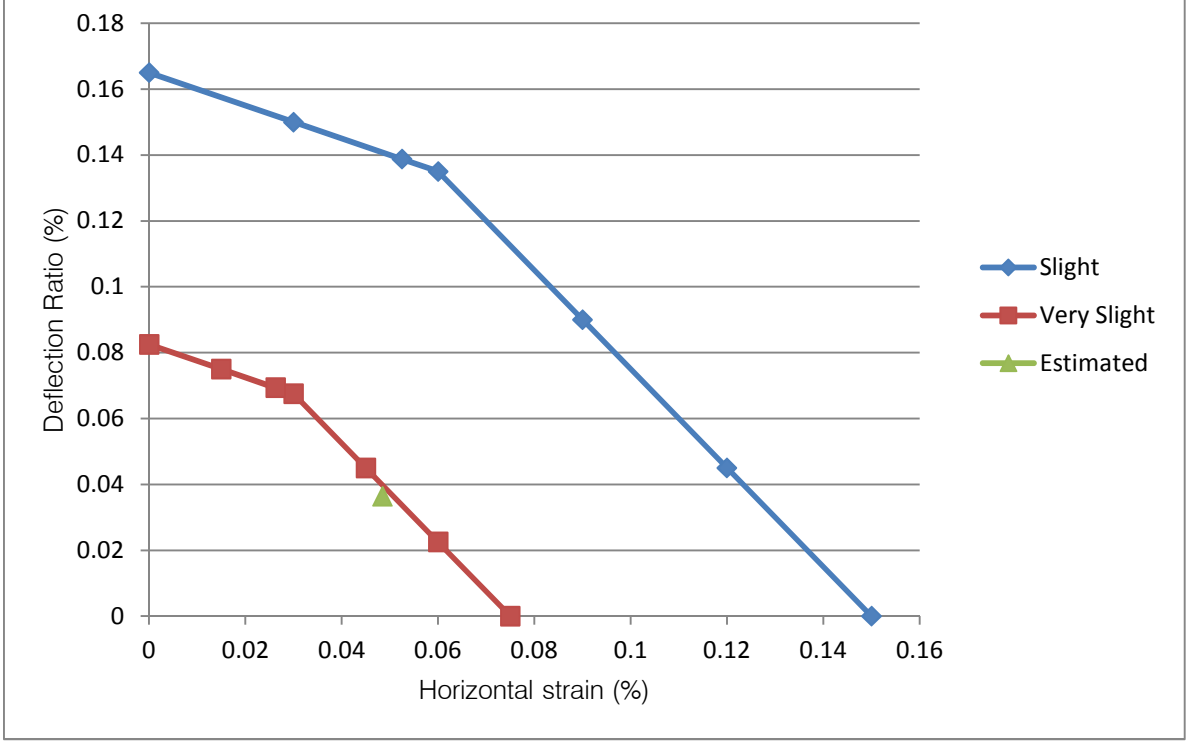
Building Data:

Building No.	41/42 Chester Terrace		
Building length	16.5	m	
Building height	17	m	
Length / height	0.97		*(Assume 1.0 for creation of chart)*

Vertical differential settlement	6	mm
Horizontal differential settlement	8	mm

Vertical strain	0.036	%
Horizontal strain	0.048	%

Relationship between damage category and deflection ratio and horizontal tensile strain for hogging for (L/H) = 1.0 (after Burland, 2001)



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