11-12 GRENVILLE STREET
LONDON
WC1N 1LZ

BASEMENT IMPACT ASSESSMENT

Report Ref	Revision	Notes	Issued by	Date
8108.2_FS_GB	1.0	Issued for Planning	GB	4th August 2016

3 Dufferin Avenue,
Barbican, London, EC1Y 8PQ
T: 020 7253 2626
F: 020 7253 2767
E: tws@tws.uk.com
W: www.tws.uk.com

CONTENTS

APPENDICES

EXECUTIVE SUMMARY

The Basement Impact Assessment (BIA) is prepared in accordance with London Borough of Camden's Local Development Framework (LDF), Camden Planning Guidance Basements and Lightwells CPG4 dated July 2015. Camden Development Policies – DP27 Basements and Lightwells. London Borough of Camden SFRA URS July 2014. London Borough of Camden - Camden Geological, Hydrogeological and Hydrological Study.

The Basement Impact Assessment is separated into seven sections covering 1.0 Introduction, 2.0 Structural Appraisal, 3.0 Hydrogeological Review, 4.0 Drainage and Surface Water Flow Appraisal 5.0 Flood Risk Assessment, 6.0 Conclusions and 7.0 Designers Hazard and Risk Identification.

The Introduction provides the screening aspect with Figures 1, 2 and 3 noting Yes or No if the basement is likely to have any affect on the surrounding area and referenced to each of the relevant sections 2.0, 3.0, 4.0 and 5.0, within which are provided the scoping and details of potential impact and any mitigation measures with Recommendations and Conclusions within section 6.0.

A topographic survey is available and soil investigation and ground water monitoring for the site and the SI information available were reviewed against the site requirements along with local borehole records. These provide the necessary site specific data to undertake the Basement Impact Assessment and to allow for the detailed design to be undertaken following Planning Approval.

The construction of the new basement in the temporary and permanent stages has been reviewed with an outline methodology included to demonstrate feasibility.

The BIA concludes that the proposed basement works can be carried out safely and without adverse affect on the adjacent structures, local hydrogeology, surface water flow or increase local flooding risks. The risks noted within the BIA, even though they are only slight, can be further mitigated by diligent detailed design and careful detailed installation of temporary works, a suitable on-site monitoring procedure and use of experienced contractors and an experienced design consultant team.

1.0 INTRODUCTION

1.1 This Basement Impact Assessment has been prepared by Taylor Whalley Spyra as requested by Calabar Properties part of the Freshwater Group, in support of a Planning Application for the construction of the basement under the existing rear of the property.

1.2 The information contained within this Basement Impact Assessment (BIA) has been produced to cover the information required within a BIA as set out by London Borough of Camden's Local Development Framework (LDF), Camden Planning Guidance Basements and Lightwells CPG4 dated July 2015. Camden Development Policies – DP27 Basements and Lightwells. London Borough of Camden SFRA URS July 2014. London Borough of Camden - Camden Geological, Hydrogeological and Hydrological Study.

1.3 The purpose of this Basement Impact Assessment document is to outline the key points for the safe construction of the proposed redevelopment of 11-12 Grenville Street.

1.4 It also sets out how the neighbouring buildings and the local environment and amenity will be protected.

1.5 The topics covered within the BIA are Structural Stability and Movement Assessment, Method of Construction, Hydrogeological, Drainage & Surface Water Flow, Flood Risk and Temporary Works during basement construction.

1.6 This is not the final design information but is intended to demonstrate that each of the aspects of the design and construction has been carefully considered. All aspects will be subject to detailed design once Planning Approval is granted.

1.7 The existing property is located on Grenville Street and spans over the Colonnade passage running under. The proposed basement and new residential property is along the Colonnade at the rear of the property where the existing single storey garage is located. The main building is four storeys plus an existing basement (refer to Appendix A).

1.8 The Client is proposing to refurbish the existing structure, extend the rear of the building over the Colonnade. The existing garage is to be demolished to allow a new residential property with basement and two storeys over with green roof to be constructed (refer to Appendix B).

1.9 The basement is 6m long and 6.5m wide and orientated approximately North to South. The nearest adjoining properties are 11 Grenville Street which is part of the site to the East boundary and Downing Court to the North-east corner with rear access forecourt to the North and access ramp to the West boundary. The Colonnade is along the South boundary which is single vehicular access (refer to Appendix A).

1.10 The floor level of the proposed basement is approximately 19.970 SSL with the ground floor level approximately 22.580. The external level in the Colonnade at the front is 22.600.

1.11 The existing building adjoining basement to the East side is 20.670 FFL with brick footings approximately 400mm below. To the North and West boundary there is a strip of land 3m wide at approximately 22.680 to 22.840 and behind this is the ramp and rear access forecourt at 20.660.

1.12 The existing brick walls of the garage have deep solid brickwork footings that extend at least 1.2m below the existing garage slab level of 22.610 FFL. These deep footings are assumed to extend to the same level as the adjoining basement see drawing 8108_BIA_02 (refer to Appendix C).

1.13 The proposed works will involve the demolition of the garage and removal of the brick footings and the installation of RC retaining walls along the front and two side boundaries and installation of new RC ground and basement floor slabs. The existing adjoining basement wall is to be underpinned. The installation of the new RC retaining walls and underpinned brickwork wall are to be undertaken as underpinning works in a phased sequence. The works will be braced with temporary waling and propping as works proceed and as the ground is excavated to basement formation level. This will form the watertight RC structure on three sides and be tied into the existing adjoining basement wall adjacent to the East elevation on site

1.14 The new reinforced concrete box structure is designed to form the permanent support works for the retaining walls and existing structure over.

1.15 Once the basement structure is completed the proposed two storey structure over can be built supported off the ground floor slab in traditional brick and blockwork walls with timber floor and flat roof.

1.16 The following screening stages in Figures 3, 4, and 5 taken from CPG4 are reviewed to see the effect of the proposed basement works on the surrounding area and the relevant scoping stages are noted in the adjacent contents items referenced to within this BIA report, which then outlines any possible impacts and any mitigation necessary to reduce the impact of the basement on the surrounding area.

1.17

Figure 3 - Subterranean (ground water) flow screening chart

Q 1a: Is the site located directly above an aquifer?	No	See Content 3.0, 4.0, 5.0
Q 1b: Will the proposed basement extend beneath the water table surface?	No	See Content 2.0, 3.0, 4.0
Q 2: Is the site within 100m of a watercourse, well (used/disused) or potential spring line?	No	See Content 3.0,
Q 3: Is the site within the catchment of the pond chains on Hampstead Heath?	No	See Content 3.0
Q 4: Will the proposed basement development result in a change in the proportion of hard surfaced/paved areas?	No	See Content 4.0
Q 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	See Content 4.0
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	See Content 2.0, 3.0, 4.0

Figure 4 - Slope stability screening chart

Q 1: Does the existing site include slopes, natural or man made, greater than 7° ? (approximately 1 in 8)	No	See Content 2.0, 3.0
Q 2: Will the proposed re-profiling of landscaping at site change slopes at the property boundary to more than 7° ? (approximately 1 in 8)	No	See Content 2.0, 3.0
Q 3: Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7° ? (approximately 1 in 8)	No	See Content 2.0, 3.0
Q 4: Is the site within a wider hillside setting in which the general slope is greater than 7° ? (approximately 1 in 8)	No	See Content 2.0, 3.0
Q 5: Is the London Clay the shallowest strata at the site?	No	See Content 2.0, 3.0,
Q 6: Will any tree/s be felled as part of the proposed development and/or are any works proposed within any tree zones where trees are to be retained?	No	See Arboriculture Report
Q 7: Is there a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site?	No	See Content 2.0
Q 8: Is the site within 100m of a watercourse or a potential spring line?	No	See Content 3.0, 4.0
Q 9: Is the site within an area of previously worked ground?	No	See Content 2.0, 3.0
Q 10: Is the site within an aquifer? If so, will the proposed basement extend beneath the water table such that dewatering may be required during construction?	No	See Content 3.0, 4.0
Q 11: Is the site within 50m of the Hampstead Heath ponds?	No	See Content 3.0
Q12: Is the site within 5m of a highway or pedestrian right of way?	No	See Content 2.0
Q 13: Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	No	See Content 2.0
Q 14: Is the site over (or with the exclusion zone of) any tunnels e.g. railway lines?	No	See Content 2.0

Figure 5 - Surface flow and flooding screening chart

Q 1: Is the site within the catchment of the pond chain on Hampstead Heath?	No	See Content 3.0, 5.0
Q 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	See Content 4.0
Q 3: Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	No	See Content 4.0
Q 4: 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	See Content 2.0, 3.0, 4.0 5.0
Q 5: Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	No	See Content 3.0, 4.0, 5.0
Q 6: Is the site in an area identified to have surface water flood risk according to either the Local Flood Risk Management Strategy of the Strategic Flood Risk Assessment or is it at risk from flooding, for example because the proposed basement is below the static water level of nearby surface water feature?	No	See Content 3.0, 4.0, 5.0

1.18 The Client will appoint a Project Manager to oversee the nominated building contractor and will liaise with London Borough of Camden and local residents to ensure the impact of the proposals are fully understood and mitigated as far as possible.

1.19 Safety both on site and adjacent to the site is of paramount importance and the method of construction proposed has taken this into account.

1.20 Taylor Whalley Spyra are retained as consulting civil and structural engineers for the project. The company was formed in 1955 and is a private company wholly owned by the directors. Our expertise covers all building types and we have particular experience of working in Central London locations where sites have tight urban constraints. Related examples of this type of work are included on the following page.

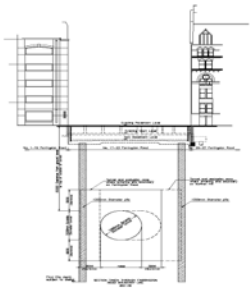
TYPICAL EXAMPLES OF DIFFICULT SUPERSTRUCTURE RETENTION AND SUBSTANTIAL BASEMENT CONSTRUCTION IN LONDON




16 Boltons Place, London
Formation of significant residential basements adjacent to and beneath existing

37 Loudon Road, London

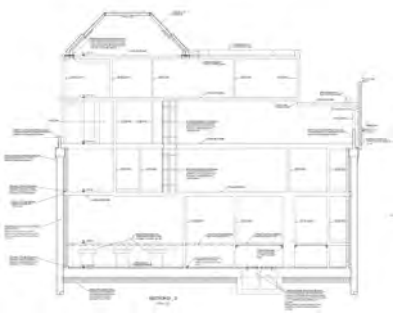


67 West Heath Road, London
New construction adjacent to existing buildings

17-23 Farringdon Road, London
Construction of new retail, commercial and residential building over the proposed Crossrail link

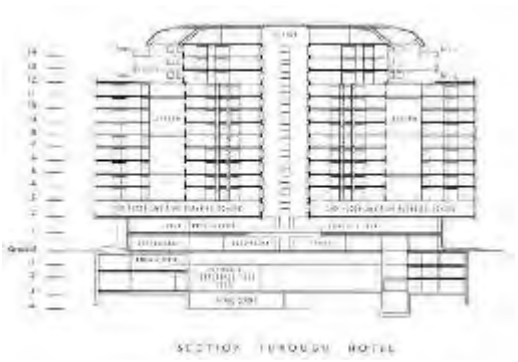




60 Addison Road W14,
Facade retention over new basement

1 St Kildas Road N16
New single basement office facility

5, Cannon Lane, NW3
New residential double basement

Westminster Park Plaza, London
Construction of new luxury hotel by top-down method incorporating 4 basement levels

2.0 STRUCTURAL APPRAISAL

2.1 A review of how best to construct the basement, taking into account the existing deep masonry footings exposed from the site investigation works, was undertaken and it was concluded that the most efficient form of construction would be a phased sequence of underpinning suitably propped by installing propping as works progress. This then allows the construction of a rigid reinforced concrete box with temporary propping as works progress to minimise any disturbance to the existing and surrounding areas.

2.2 In order to control ground movement the breaking out of the existing masonry footings and installation of sections of the new RC retaining walls will be undertaken in bays to an agreed underpinning sequence. Each underpinning bay will be undertaken from within the existing building and working towards the boundary. This will allow clear working areas and also easier installation of the temporary steel shoring as underpinning progresses.

2.3 Once all the RC wall underpinning has been completed, the existing adjoining brickwall underpinning installed and the props installed, the existing remaining ground within the building can be excavated and the basement RC slab with build-up can be installed. Then the ground floor RC slab constructed and once this has gained the required design strength the temporary propping can be removed.

2.4 With the basement box completed the main structure over can be constructed off the ground floor slab.

2.5 To the North-east corner boundary, Downing Court is a seven storey solid masonry building including basement level which abuts the proposed basement NE corner. Downing Court has an independent seven storey boundary wall against the five storey boundary wall of 11 Grenville Street and corner of the proposed basement.

2.6 To the East boundary, 11 Grenville Street is a terrace property which backs onto the proposed basement and is part of the development to be refurbished. The west wall will form the party wall with the new basement. The existing property has a basement, but the wall will need underpinning to allow for the slightly lower proposed basement floor level. See drawing 8108_BIA_02 showing the permanent and temporary works (refer to Appendix C).

2.7 To the South boundary, the Colonnade is adjacent to the front of the site and will be the ground floor entrance for the proposed property. The proposed basement is to be constructed along the site boundary. See drawing 8108_BIA_02 showing the permanent and temporary works (refer to Appendix C).

2.8 To the West boundary, is a restricted access pathway at ground floor level 3.5m wide, that is retained by a brick retaining wall against the 2.5m wide down ramp leading to the rear of Downing Court basement yard area. See drawing 8108_BIA_02 showing the permanent and temporary works (refer to Appendix C).

2.9 To the North boundary, is a continuation of the pathway at ground floor level 2.5m wide, that is retained by the return of the brick retaining wall against the rear of Downing Court basement yard. See drawing 8108_BIA_02 showing the permanent and temporary works (refer to Appendix C).

2.10 All properties that are adjacent to the proposed development will fall within The Party Wall Act 1996 which will require building condition surveys to be undertaken.

2.11 As part of the design and to control ground movement, a scheme will be agreed as part of the party wall agreements to install a movement monitoring system to monitor movement and vibration during the course of the basement works. This will involve the location of monitoring nodes to be located along the surrounding ground, on the retaining walls and also on adjacent property walls, where allowed, as part of the party wall agreements. Readings will be taken at regular intervals and additional readings undertaken when specific works are planned. See drawing 8108_BIA_04 (refer to Appendix H).

2.12 The design of the RC wall underpinning sequence, basement floor slab and temporary support works is to be undertaken to minimise any structural disturbance to the adjoining properties or infrastructure. See drawing 8108_BIA_02 showing the proposed underpinning sequence works (refer to Appendix C).

2.13 The nearest buildings adjacent to the proposed basement are Downing Court and 11 Grenville Street. See existing building drawings (refer to Appendix C). The design of the reinforced retaining walls and reinforced box structure will incorporate an allowance for a surcharge loading to take into account the location and loads from the adjacent building foundations. An allowance will also be included to allow for any future surcharging of the adjacent ground along the site boundary next to the new reinforced retaining walls.

2.14 The temporary props against the new boundary walls are to minimise disturbance to the surrounding ground whilst excavating the basement and installing the basement slab.

2.15 A detailed analysis of the basement retaining walls and required temporary works will be undertaken as part of the detailed design stage.

2.16 From our experience of similar works movement can be limited to the adjoining properties as Very Slight, as categorised by Damage Category Chart (CIRCA C580).

2.17 There are three possible causes of ground movement; the installation of the RC boundary walls, underpinning, the excavation for the basement and the adjustment of the ground under the net load changes.

2.18 The estimated movements inside and outside the basement are calculated on basis of structural loads and levels.

2.19 The installation of the reinforced underpinning walls is away from any adjoining buildings, the closest is the corner of Downing Court and the basement will only extend 650mm below the basement slab level of Downing Court with foundations expected to be at a similar depth to the proposed basement. Any horizontal ground movement from the installation of the underpinning would be limited and with good workmanship horizontal movement would be negligible and not affect adjacent properties.

2.20 The process of excavation will result in the forward translation of the retaining wall and rise of ground inside the basement as the overburden is removed. Provided that the installation of the underpinning of the wall is carefully installed and sequenced properly and with additional temporary propping prior to excavation and casting of the basement floor slab, movement affecting the surrounding ground floor level path and Colonnade will be limited to acceptable amounts see drawing 8108_BIA_02 (refer to Appendix C).

2.21 Excavation depth on site will be about 3.0m to slab formation and settlements generally occur with movement at the wall being 0.05% of the excavation depth or less and reduce to zero at a distance of four times the excavation depths behind the wall. The peak movement behind the wall would be 1 to 2mm, with vertical movements of 1 to 2mm this would reduce to zero at a distance of about four times excavation from the wall.

2.22 With the excavation undertaken in stages and propping introduced prior to excavation, movements would be expected to be minimal and lie within its original position and with good workmanship these movements are unlikely to result in damage greater than category 1 – Very slight.

2.23 In the long term the London Clay Formation within which the basement is constructed will adjust to the changes that have taken place as a result of the net load changes and water pressure will build up on the underside of the slab. In this case there will be a net load reduction and there will be a tendency for the structure to rise a small amount. This readjustment may result in small upward movement of the surrounding ground, but this is unlikely to result in any significant effect on the adjacent structure.

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

Damage Category Chart (CIRIA C580)

Table 1.1

2.24 **Proposed Sequence of Works**

- Install monitoring points on site and the surrounding area.
- Contractor to review proposed underpinning and excavation sequence and supply full method statements to Project Engineer for approval.
- The proposed sequence for each underpin is the same for all three elevations on the South, West and North boundary walls with the existing East boundary brickwork wall being underpinned in a six bay sequence.
- All excavation for the three RC walls is to be undertaken from within the existing site boundary with excavation undertaken towards the new RC retaining walls supporting the adjacent ground.
- Excavation for the installation of the existing brick wall is to be undertaken from within 11 Grenville Street basement.
- Existing garage structure with brick footings and ground floor concrete slab to be demolished.
- Install temporary steel shoring to front, rear and side.

- Excavate 1.5m deep along side wall stage 1 and install reinforcement and cast 250 thick RC wall with 'L' Bars for rebar continuations for front wall.
- Excavate 1.5m deep along side wall stage 2 and install reinforcement and cast 250 thick RC wall with 'L' Bars for rebar continuations.
- Excavate 1.5m deep along top of wall stage 3 adjacent to front and install reinforcement and cast 250 thick RC wall with 'L' Bars for rebar continuations for stage 4.
- Install high level propping as works proceed.
- Repeat above for stages 4 to12 for all high level underpinning
- Excavate 1.5m deep below stage 2 to install stage 13 and install reinforcement and cast 250 thick RC wall with 'L' Bars for rebar continuations for stage 14.
- Repeat above for stages 14 to 24 for all Low level underpinning.
- Install low level propping as works proceed.
- Excavate for basement slab Stage 25 install reinforcement and cast with 'L' Bars for rebar continuations for stage 26.
- Repeat above for stages 26 to 35 for basement slab installation.
- Allow minimum 72 hours between cast of wall/slab and excavation of next stage.
- Install and cast RC ground floor slab.
- Allow ground floor RC slab to gain full design strength minimum 72 hours.
- Install temporary vertical props to support ground floor slab off basement slab and remove high and low level propping. Temporary vertical props to remain for 7 days.
- Cut back steel shoring or remove from site. If to be removed provide 2 layers of 1200 gauge Visqueen to act as slip membrane to ease removal.
- Installation of underpinning to existing basement adjoining brickwork wall is to be sequenced in 6 number 1m wide phased bays and undertaken from within number 11 Grenville street basement whilst stages 1-12 high level underpinning is being installed and allowed to cure for 72 hours.
- Construct above ground floor structure over.

2.25 Investigation works have been undertaken in the form of a 6m deep borehole and 1.2m deep trial hole to confirm existing foundations, soil type and ground water. The existing on site ground conditions are 1.8m of made ground overlaying 1.8m of clay/sand/gravel with firm to stiff brown silty London Clay (refer to Appendix D).

2.26 There was no ground water encountered during the SI works or on subsequent return visits.

2.27 Due to existing footing depths of the surrounding brick retaining walls and existing building foundations there is no ground water flow under the building and the proposed basement will not restrict ground water flow. The increased depth of the basement adjacent to the existing basements and rear yard area will have minimal effect on any future ground water flow and will not affect the existing condition.

2.28 The soil PH value was high and all concrete in contact with existing soil will need to be sulphate resisting.

3.0 HYDROGEOLOGICAL REVIEW

3.1 The existing local site ground level varies between 22.5 to 22.9 OD and is reasonably flat.

3.2 The site levels along the Colonnade are 22.525 OD and at the rear of the site the basement yard area is 20.660 OD with the existing adjoining basement of 20.670 OD (refer to Appendix E).

3.3 The geology of the area is well known as summarised on the relevant geological sheets, being London Clay Formation and confirmed on site by the soil investigation report (refer to Appendix F).

3.4 The current policy implemented by the Environment Agency is to maintain water levels in the lower underlying chalk aquifer to those which currently exist, i.e. approximately -10m OD (refer to Appendix G).

3.5 It is unlikely therefore that the site will be influenced directly by these ground water levels.

3.6 Ground water was not encountered within the borehole or trial hole. During subsequent return visits the borehole was dry (refer to Appendix D).

3.7 This indicates that there is no ground water flow or water seepage from within the shallow made ground or clayey silty gravel, but future ground water seepage perched above the underlying clay below the basement property would be slow seepage. This confirms that any ground water flow on site is considered to be very low and will not affect the proposed basement or adjoining properties.

3.8 The site is not within any ground water protection zone as reviewed with the Environment Agency maps and is classed by the EA as a minor aquifer zone with permeability. This is mainly due to the London Clay Formation.

3.9 By virtue of the existing basement level, rear basement yard and deep masonry footings for the surrounding buildings and existing masonry retaining walls, any ground water flow will not be restricted and the proposed design will allow future ground water to flow around and below, we confirm that the proposed development will not lead to an increase in flood potential or impediment of ground water flow.

4.0 DRAINAGE AND SURFACE WATER FLOW APPRAISAL

4.1 The existing garage site area is 39m² consisting of non-permeable hard flat roof.

4.2 The proposed new mews house site area is 39m² consisting of a 34m² green roof (refer to Architects second floor layout in Appendix B).

	Hard Standing	Soft Standing	Permeable storage (in Green Roof)
Existing	39m²	0m²	0m²
Proposed	39m²	0m²	34m²

4.3 Initial calculations based on a 1:100 year event have been undertaken which show that the existing volume of surface water runoff from the site area of the proposed mews house is in the region of 1m³ and the new surface taking into account 30% climate change, the surface water run off increases to 1.3m³.

4.4 The new 34m² of green roof will provide surface water retention of 40l/m³ at total of 1.5m³ of onsite storage within the green roof buildup (refer to Appendix I).

4.5 The existing 39m² area of hard standing surface water runoff from the site discharges to the public sewer system in the Colonnade.

4.6 The surface water drainage will discharge to the existing sewer in the Colonnade at the current discharge rate. A non-return valve will be installed at the discharge point within the site boundary.

4.7 There is an increase in the surface water runoff storage of 0.3m³ due to taking effect of climate change over the lifetime of the new mews house. This can be compensated for within the 34m² of permeable storage within the Green Roof of the proposed building.

4.8 The above ground drainage design for the foul water system will be gravity fed to the sewer in the Colonnade. The foul water drainage below the basement slab will fall to a separate foul water pumping chamber that will allow for initial storage prior to pumping to the high level gravity pipe under the ground floor slab.

4.9 The profile of surface water inflow to adjacent properties or water courses will not be materially changed and with the use of SUDS Green Roof this will reduce the surface water discharge into the main drainage system.

4.10 The basement structure will be designed to allow for water to flow between the site boundaries along the RC walls and will allow ground water seepage to flow freely.

5.0 FLOOD RISK ASSESSMENT

5.1 Reference to the Environment Agency maps confirms that the site is not within a flood zone area and is not at risk of flooding from local rivers/water features and defines the area as having a very low risk of flooding due principally to its geology and topography.

5.2 Thames Water have been consulted and confirm that there are no known incidents of historic flooding within the vicinity of the site from surcharging of the public drain system.

5.3 Reference to London Borough of Camden SFRA URS July 2014 confirms that the site is not at risk or in the vicinity of past surface water flooding, potential elevated groundwater, past flooded sewer incidents, past flooded ground water incidents or any main river/fluvial/tidal incidents.

5.4 The inclusion of SUDS on site will reduce the surface water runoff from site and the discharge of surface water into the main drainage system. The affect of this is to reduce volume of site runoff discharging into the main drainage system and reduce the effects of any possible flooding further down stream.

5.5 By virtue of the basement structure design, which will not restrict ground water flow and will allow groundwater to seep below and around the basement structure, this will not restrict ground water flow of any perched ground water within the surrounding ground.

5.6 The soil investigation work undertaken on site confirms the ground water seepage and any ground water flow on site is considered to be low.

6.0 CONCLUSIONS

6.1 Detailed analysis of the various aspects of construction has been undertaken to demonstrate how the level of sequencing will enable the development to be constructed safely with ground movements within acceptable levels.

6.2 The stability of the adjacent properties and surrounding ground will not be affected by the basement works, with the influence of adjoining building foundation depths taken into account during the initial design process as indicated on drawing 8108_BIA_02 (refer to Appendix C). Within the design an allowance has been allowed for surcharge from adjoining buildings and at the detailed design stage calculations will confirm final working sizes and depths of RC underpins, walls and slabs and temporary propping which will keep ground movement within the specified design limits.

6.3 No ground water was encountered on site but any temporary localized dewatering of the basement area will be reviewed, designed and monitored to reduce the water level locally to the area of works for the construction of the basement. Water levels will be monitored prior to the start of works.

6.4 Prior to commencement a full schedule of condition will be carried out to all relevant buildings as defined within The Party Wall Act 1996 where the excavations may be within the influence zone of existing foundations.

6.5 The desk top study carried out to date indicates that the construction of the basement will not lead to a cut off of natural ground water flow. Detailed designs will follow as part of the

construction design. If any supplemental drainage is required it will be included as necessary to ensure that the current ground water equilibrium levels are maintained and that there is no increase in the risk of flooding.

6.6 The construction of the basement will be founded within the London Clay Formation at a depth similar to the existing footings and is not envisaged as having a detrimental effect on the local or surrounding hydrogeological conditions.

6.7 There is no increase in hard standing areas and with the incorporation of a SUDS Green Roof at the site this will reduce the surface water runoff rates to the surrounding drainage system.

6.8 There will not be any increase in foul water flow from the site. This can be controlled by the use of a pumping chamber in the basement with in-built storage capacity to be pumped to match the existing flow rate from the site as to be agreed with Thames Water.

6.9 Safety both on site and adjacent to the site is of paramount importance and the method of construction proposed has taken this into account.

6.10 The selection of the main contractor and groundwork sub-contractor and designer of temporary works will be based on having previous experience constructing similar projects and a requirement to provide programmes and method statements detailing the final sequence of construction prior to carrying out works on site. The main contractor is to be registered with The Considerate Constructors Scheme.

6.11 One of the site requirements will be the selection of experienced site supervision staff and selection of plant and machinery based on minimising noise and vibration.

6.12 The project as currently envisaged is feasible in terms of the general construction process, structural stability, long term integrity of adjacent buildings and the existing site and surrounding infrastructure.

7.0 DESIGNER'S HAZARD AND RISK IDENTIFICATION

See report on following pages.

For and on behalf of
TAYLOR WHALLEY SPYRA

SIMON LANE
BSc(Eng), CEng, FICE, FIStructE, FConsE

11-12 GRENVILLE STREET
LONDON
WC1N 1LZ

Job No. 8108

DESIGNER'S HAZARD AND RISK IDENTIFICATION

3 Dufferin Avenue,
Barbican, London, EC1Y 8PQ

T: 020 7253 2626
F: 020 7253 2767

E: tws@tws.uk.com
W: www.tws.uk.com

INTRODUCTION

It is intended to refurbish the existing property on site which is constructed from solid brick walls, timber floors and with a timber roof over, and demolish the existing rear garage and excavate a basement under the garage footprint and rear external staircase passage to form a new Mews House.

The existing building consists of a rear single story garage, basement, ground floor, first floor, second floor and third floor.

Beneath the footprint of the existing garage and rear staircase that leads down to the existing basement it is proposed to excavate a new basement under and adjacent to the existing.

This is to be constructed with RC Walls installed in a sequence of underpinnings with RC basement slab raft and RC ground floor slab which will support the existing structure over.

The new works involve the installation of RC walls in a phased sequence of installation, underpinning the existing basement brick wall between and RC basement & ground floor slabs with propping to support the surrounding ground as excavation proceeds and this will allow the basement to be excavated and the installation of the watertight RC structure and perimeter retaining walls.

The Main Contractor will be required to make particular reference to the Pre-contract Health and Safety Plan which summarises all salient points.

The designer's hazard identification sheets as contained within this document are generic to the site but also to a degree similar for all types of structural work undertaken.

Where possible unusual risks have been highlighted, it will be the Main Contractor's responsibility however to highlight any areas of the design which they feel could be improved upon with regard to safe construction and for themselves to become fully aware of the building and its environment and ask questions with regard to any health and safety aspects which are not clear, either within the pre-contract health and safety plan or within the contract documents.

3 Dufferin Avenue, Barbican, London, EC1Y 8PQ: T: 020 7253 2626 F: 020 7253 2767 E: tws@tws.uk.com W: www.tws.uk.com

LOCATION/PROCESS	HAZARD	RISK	CONTROLS/ACTION
Generic risks	• Contractor competence • Inadequate site supervision • Inadequate contact programme	• Building stability • Damage to site and adjoining properties • Contract period overrun	• Competent tender process • Contractor to have proven track record of similar projects • Contractor to have an experienced site supervision team and experienced sub-contractors • Contractor to provide CV's of site management personnel • Contractor to provide Method Statements & Risk Assessments • All works to be carried out to the agreed programme and sequence of phasing. Any changes to be adequately programmed and agreed prior to be carried out • Site monitoring and supervision • Removal of temporary propping scheme phased to coincide with basement construction of RC structure and removed only upon confirmation of required concrete design strength achieved and permission to be given by Project Engineer
Working on a shared site and adjacent to: Other Public & Residential Buildings, Public Footpaths and Roads	• Conflict with other contractors and subcontractors sharing the site • Conflict with other site and building users • Conflict with others outside the site boundary	• Personal injury • Damage to property	• Clear warning signs. • Safe routes for traffic and pedestrians. • Close liaison with other site users. • Appoint a Neighbour Liaison Officer. • Keep local neighbours informed of works on site that may affect them. • Temporary hoarding. • Temporary crash deck and safety netting/bags.
Cranes Heavy lifting machinery	• Heavy machinery. • Falling debris. • Lifting and lowering of heavy loads near people / public.	• Being struck by machinery. • Machinery failure.	• Look-out in attendance. • Certified operators and certificates of maintenance for machinery. • Monitoring wind conditions. • Adequate outrigger spreaders to distribute loads.

3 Dufferin Avenue, Barbican, London, EC1Y 8PQ: T: 020 7253 2626 F: 020 7253 2767 E: tws@tws.uk.com W: www.tws.uk.com

LOCATION/PROCESS	HAZARD	RISK	CONTROLS/ACTION
Demolition works to existing structure	• Falls. • Falling debris. • Falling materials. • Noise. • Dust. • Live services. • Asbestos/cement roof sheets. • Out of plumb walls. • Stability of walls. • Cutting and removing existing steelwork. • Removing timber floor. • Collapse of enveloping walls. • Fire/explosion. • Demolishing walls. • Debris, walls falling, falling objects onto adjoining property. • Working adjacent to footpaths and publicly accessible areas.	• Injury to operatives from falling debris. • Shock and injuries from live services. • Noise/hearing damage. • Contaminated material ingestion, eye/skin irritation. • Dust inhalation. • Fire/explosion. • Flammable materials and gases. • Confined spaces. • Vibration. • Collapse.	• Contractor to check and survey for any live services. • Contractor to prepare method statements. • Contractor to provide all appropriate and necessary temporary works and support. • Provide protection from falling debris and materials. • Contractor to provide all necessary and appropriate PPE. • Refer to Code of Practice – Demolition BS6187 latest edition. • Provide all scaffolding, access to works, including guardrails, toe boards – all erected, regularly checked and inspected by competent persons. • Dust to be kept to a minimum – damp down. • Noise to be controlled – refer to BS5228 – Noise, latest edition. Provide baffling screens to reduce noise. • Dispose of waste safely to an approved source. • Check for asbestos/refer to asbestos survey. • Restrict personnel access in vicinity of demolition. • Vibration to be minimised. • Provide temporary shoring and propping to existing walls where required.
Sheet Shoring	• Heavy machinery. • Deep shafts. • Site traffic. • Manoeuvring of large loads	• Being struck by machinery. • Falling down shaft. • Trip hazards • Machinery failure. • Aligning sheet piles. • Danger to public and operatives when delivering ready mixed concrete.	• Look-out in attendance. • Open shafts to be covered over and clearly marked or cordoned off. • Provision of adequate access ramp and pile mat.

3 Dufferin Avenue, Barbican, London, EC1Y 8PQ: T: 020 7253 2626 F: 020 7253 2767 E: tws@tws.uk.com W: www.tws.uk.com

LOCATION/PROCESS	HAZARD	RISK	CONTROLS/ACTION
Excavations for basement, underpinning, Foundations, Drainage Trenches, Services Trenches	• Stability of excavations. • Heavy rain fall. • Confined spaces. • Falls into excavations. • Underground services. • Fire/explosion. • Contaminated soils. • Depth of excavation. • Underground drainage. • Water in excavation. • Breaking out obstructions. • Noise from plant. • Contaminated water.	• Injury to persons from collapsing excavations. • Damage to surrounding properties from excessive ground movement. • Injury/illness of site operatives/ personnel, eye/skin irritation. • Injury or electrocution from services. • Flying materials and debris from breaking out. • Gas/fuel pipes/tanks/methane. • Falls. • Hearing damage. • Dust inhalation & ingestion. • Giardiasis Syndrome (Wells Disease etc.).	• Adequate design and provision of suitable temporary propping scheme / permanent works to support excavations. • Monitoring of ground movement by installation of movement and vibration sensor monitoring points on site and surrounding buildings. • Properly sequenced phasing of excavation and propping. • Installation of Ground Water well points to control water ingress within excavated basement. • Leave soil formation 500mm above final excavation prior to excavation to final formation level. • Refer CIRIA reports. • HSE guidance notes. • Undertake survey to determine location of existing underground services crossing site and those within immediate vicinity. • Check with statutory authorities for underground services and drainage. • Protective barriers to be provided around all excavations. • Provision of all PPE. • Provision of pumps etc. to remove excess water. • Check for contaminated subsoils in excavations. • Disposal of contaminated materials to licensed tip. • COSHH assessment of materials. • Safe access to be provided with all necessary safety rails, harness, etc. • Investigate adjacent structures/ foundations. • Testing manholes, contaminated ground, etc for gas/methane. • Provide adequate personnel cleaning facilities on site.

3 Dufferin Avenue, Barbican, London, EC1Y 8PQ: T: 020 7253 2626 F: 020 7253 2767 E: tws@tws.uk.com W: www.tws.uk.com

LOCATION/PROCESS	HAZARD	RISK	CONTROLS/ACTION
Concrete works.	• Collapse of formwork/ shuttering/props. • Stability of framework. • Falls from heights. • Handling reinforcement. • Placing concrete • Sharp edges. • Spillage of materials. • Falling objects/debris. • Overhead working. • Projecting reinforcement. • Cement/concrete. • Weight of wet materials. • Delivery of ready mixed concrete.	• Tripping. • Injury from collapsing formwork, shuttering/frames. • Manual handling/muscular- skeletal injuries. • Injury/illness/skin irritation/inhalation/ ingestion. • Falls. • Fixing reinforcement. • Danger to public and operatives when delivering ready mixed concrete.	• Properly sequenced phasing of RC frame structure construction and removal of temporary propping scheme phased to coincide with basement construction of RC structure and removed only upon confirmation of required concrete design strength achieved. • Allow for concrete in fluid state. • Provision of all PPE. • Adequate design and specification of temporary works and supervision and installation. • Adequate design and specification for formwork, propping and adequate supervision and checking of installation. • COSHH assessment of materials. • Refer to HSE guidelines/notes. • Provision of guardrails and barriers. • Refer to building advisory services publications. • Provision of adequate lifting facilities. • Provision of off-street standing ready mixed concrete lorries.
Construction of brick and block work.	• Stability of walls during construction. • Weights of materials and components. • Falls. • Falling objects, debris. • Cement. • Off-loading. • Manoeuvring blocks in position. • Dust, debris, drilling when cutting & chasing. • Projecting ties. • Sharp edges. • Noise.	• Falling walls – injury to personnel. • Manual handling/muscular-skeletal injuries. • Falling components and debris. • Control of off-loading. • Illness/injury/skin irritation/ inhalation/ingestion/ cuts/hearing damage. • Falls.	• Walls to be temporarily supported laterally during construction. • Provision of adequate and suitable lifting facilities. • Provision of adequate scaffold, scaffold access towers, ladders with appropriate guardrails, toe boards, etc. all to be checked and inspected regularly by competent person. • Mechanical sawing and cutting of block and bricks to size and cutting chases. • Provision of all appropriate PPE. • COSHH assessment of materials. • Protect ends of projecting ties.

3 Dufferin Avenue, Barbican, London, EC1Y 8PQ: T: 020 7253 2626 F: 020 7253 2767 E: tws@tws.uk.com W: www.tws.uk.com

LOCATION/PROCESS	HAZARD	RISK	CONTROLS/ACTION
Steelwork Erection	• Weight of materials. • Sharp edges. • Raising and lifting material. • Site welding. • Site bolting. • Overhead working. • Cutting steelwork. • Falls from heights. • Manoeuvring steelwork into position. • Off/unloading materials.	• Control of off-loading materials, danger to operatives and general public. • Fire and explosion. • Falling materials, components, debris. • Manual handling/musculo-skeletal injuries.	• Refer to specification. • Protection against falling materials and components. • Protection from falling objects and debris. • Adequate and proper lifting facilities. • Hot work permits. • Adequate scaffolding, scaffold towers, including edge guards and guardrails. • Provision of all PPE. • Refer to British Standards and/or Codes of Practice for assembly and erection of steelwork. • Refer to HSE guidance notes and building advisory service publications. • COSHH assessment of paint and materials used for fire protection. • Provision of safety netting, harness, safety lines for erection of steelwork.
Construction and erection of timber flat roofing and framing	• Stability of floors and walls during construction. • Power tools/ cables • Weight of materials. • Falling objects, debris. • Sharp edges. • Raising and lifting material. • Dust, debris, drilling when cutting & chasing. • Site bolting/fixing. • Overhead working. • Cutting timber. • Falls from heights. • Manoeuvring timber into position. • Off/unloading materials.	• Falling walls – injury to personnel. • Electrocution/ trip hazards. • Control of off-loading materials, danger to operatives and general public. • Fire. • Falling materials, components, debris. • Illness/injury/skin irritation/ inhalation/ingestion/cuts/hearing damage. • Manual handling/musculo-skeletal injuries. • Falls/Tripping.	• Refer to specification. • Protection against falling materials and components. • Protection from falling objects and debris. • Adequate and proper lifting facilities. • Adequate scaffolding, scaffold towers, including edge guards and guardrails. • Provision of all PPE. • Refer to British Standards and/or Codes of Practice for assembly and erection of steelwork. • Refer to HSE guidance notes and building advisory service publications. • COSHH assessment of paint and materials used for fire protection. • Provision of safety netting, harness, safety lines for erection of timber.

3 Dufferin Avenue, Barbican, London, EC1Y 8PQ: T: 020 7253 2626 F: 020 7253 2767 E: tws@tws.uk.com W: www.tws.uk.com

APPENDIX A

TWS - 8108_BIA_01 – SITE LOCATION PLAN AND SURROUNDING AREA

IMAGE 01

COLONNADE ENTRANCE ON GRENVILLE STREET

IMAGE 02

VIEW ON SITE ENTRANCE ON COLONNADE

IMAGE 03

RAMP TO REAR OF DOWNING COURT GARAGES

IMAGE 04

REAR OF DOWNING COURT AND GARAGES

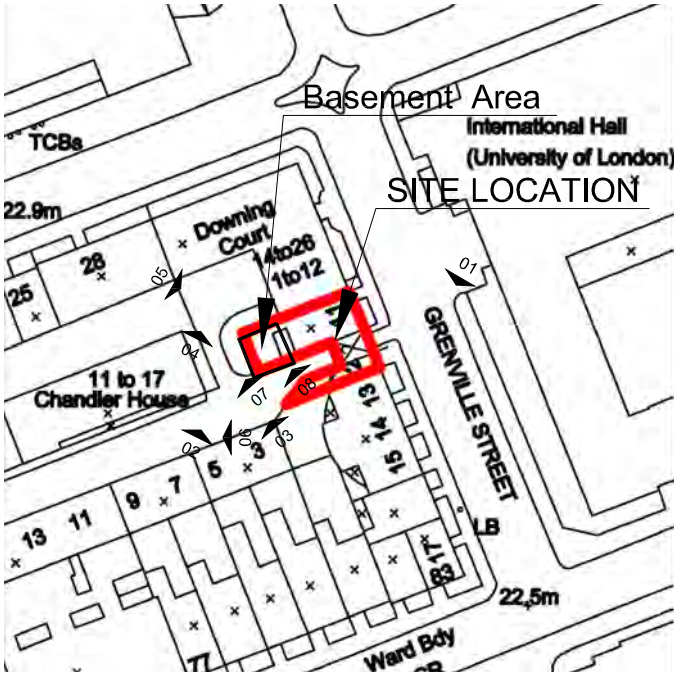


IMAGE 05

REAR OF SITE OVER WITH LOWER GROUND REAR RETAINING WALL AT DOWNING COURT

IMAGE 06

VIEW ALONG COLONNADE

IMAGE 07

ADJACENT LANDSCAPED AREA TO LEFT SIDE OF SITE

IMAGE 08

BASEMENT STAIRCASE AND PASSAGE TO RIGHT HAND SIDE OF SITE

taylor whalley spyra
tws
consulting civil and structural engineers
3 Dufferin Avenue, Barbican, LONDON EC1Y 8PQ
Tel (020) 7253 2626 Fax (020) 7253 2767
E-mail: tws@tws.uk.com Website: www.tws.uk.com

11-12 GRENVILLE STREET, LONDON, WC1N 1LZ,

SITE LOCATION SHOWING LOCAL AREA

Drawing No. BIA_01

Scales NTS

Date 16/05/16

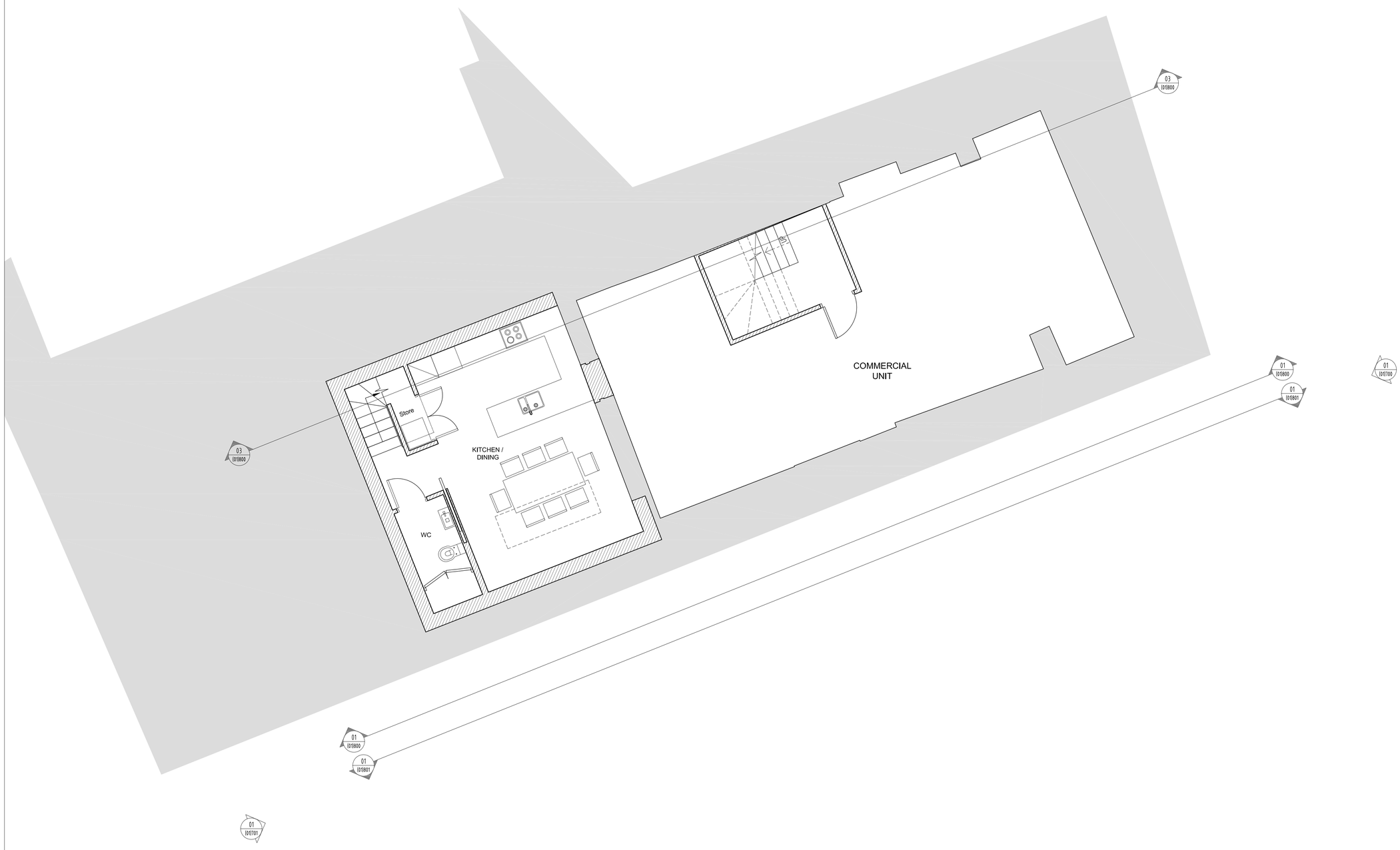
APPENDIX B

PROPOSED ARCHITECTS DRAWINGS FOR BASEMENT, GROUND, FIRST AND SECOND FLOOR LEVELS

KEY

EXISTING FABRIC

PROPOSED FABRIC



01
(01)600

Basement Plan
As Proposed

0 1 2 3 4 5 10

METERS

REV	ISSUE DATE	REVISION NOTES
G	2016.08.01	Issued for Planning
F	2016.07.22	Issued for Planning
E	2016.06.30	Issued for Planning
D	2016.04.05	Issued to client
C	2016.03.29	Issued to client
B	2014.07.21	Issued for pre-app
A	2014.05.20	Issued to client
-	2014.05.06	Issued to client

GENERAL NOTES

Do not scale. All written dimensions must be checked on site before work commences on site or in shop. Figured dimensions take preference over those scaled. Discrepancies, where identified, must be reported to the Architect immediately.

Any areas indicated on this drawing are for guidance purposes only. No responsibility is taken for their accuracy.

All work must be carried out in accordance with the Building Regulations and to the satisfaction of the Local Authority.

STATUS

PLANNING

N

Garnett+Partners LLP
Holborn Hall
195 High Holborn
London WC1V 7BD
Tel.+44 (0)20 7404 7677
Fax.+44 (0)20 7404 6648
mail@garnettpartners.com
www.garnettpartners.com

architects / planners / designers

GARNETT +PARTNERS

CLIENT

Calabar Properties Ltd

PROJECT

11-12 Grenville Street, WC1

DRAWING TITLE

Basement Floor Plan
As Proposed

SCALE		DATE
1:50@A1	1:100@A3	April '14

JOB NO.	DWG NO.	REV.
790	(01)600	G

KEY

EXISTING FABRIC

PROPOSED FABRIC

COMMUNAL HALL

UNITS 3-6

COMMERCIAL UNIT - 122msq

LIVING ROOM

Glazed panel to below

HALL

UNIT 1 - 96msq

COATS

UNIT 2 - 93msq

Cycle Storage

COATS

WC

HALL

CYCLE STORE (5 Cycles)

2.9L Kitchen

REFUSE STORE

140L Mixed Recycling

1100L Refuse / Food Bin

03 101800

01 101800

01 101801

01 101701

01 101700

01 (01)601 Ground Floor Plan As Proposed

0 1 2 3 4 5 10

METERS

REV	ISSUE DATE	REVISION NOTES
H	2016.08.03	Minor amendments
G	2016.08.01	Issued for Planning
F	2016.07.22	Issued for Planning
E	2016.07.01	Issued to client
D	2016.04.05	Issued to client
C	2016.03.29	Issued to client
B	2014.07.21	Issued for pre-app
A	2014.05.20	Issued to client
-	2014.05.06	Issued to client

GENERAL NOTES

Do not scale. All written dimensions must be checked on site before work commences on site or in shop. Figured dimensions take preference over those scaled. Discrepancies, where identified, must be reported to the Architect immediately.

Any areas indicated on this drawing are for guidance purposes only. No responsibility is taken for their accuracy.

All work must be carried out in accordance with the Building Regulations and to the satisfaction of the Local Authority.

STATUS

PLANNING

Garnett+Partners LLP
Holborn Hall
195 High Holborn
London WC1V 7BD
Tel.+44 (0)20 7404 7677
Fax.+44 (0)20 7404 6648
mail@garnettpartners.com
www.garnettpartners.com
architects / planners / designers

CLIENT

Calabar Properties Ltd

PROJECT

11-12 Grenville Street, WC1

DRAWING TITLE

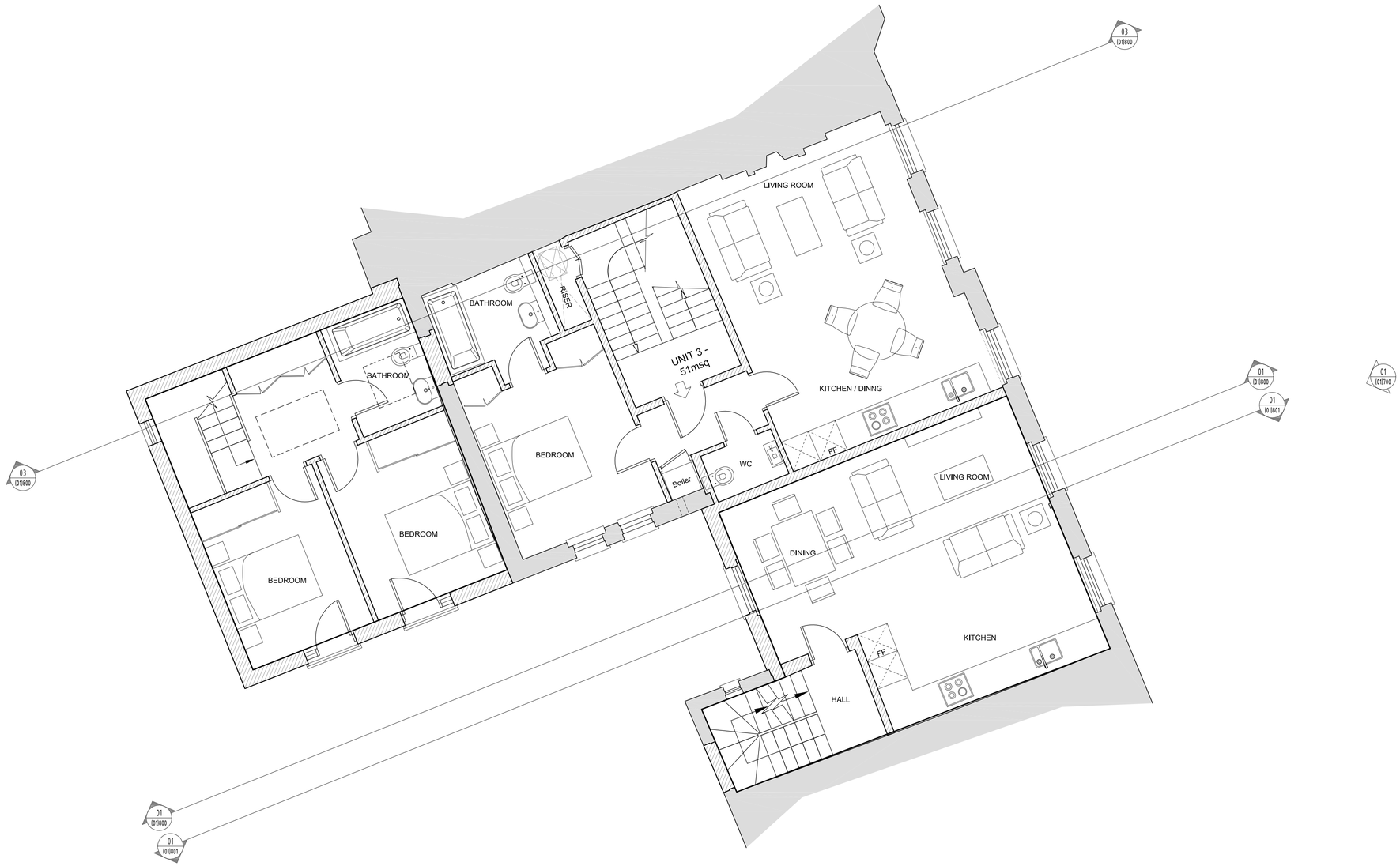
Ground Floor Plan
As Proposed

SCALE	DATE	JOB NO.	DWG NO.	REV.
1:50@A1 1:100@A3	April '14	790	(01)601	H

KEY

EXISTING FABRIC

PROPOSED FABRIC



01
(01)602 First Floor Plan
As Proposed

0 1 2 3 4 5 10
METERS

REV	ISSUE DATE	REVISION NOTES
F	2016.08.03	Minor Amendments
E	2016.07.22	Issued for Planning
D	2016.07.01	Issued to client
C	2016.04.05	Issued to client
B	2016.03.29	Issued to client
A	2014.05.20	Issued to client
-	2014.05.06	Issued to client

GENERAL NOTES

Do not scale. All written dimensions must be checked on site before work commences on site or in shop. Figured dimensions take preference over those scaled. Discrepancies, where identified, must be reported to the Architect immediately.

Any areas indicated on this drawing are for guidance purposes only. No responsibility is taken for their accuracy.

All work must be carried out in accordance with the Building Regulations and to the satisfaction of the Local Authority.

STATUS

PLANNING

N

Garnett+Partners LLP
Holborn Hall
195 High Holborn
London WC1V 7BD
Tel.+44 (0)20 7404 7677
Fax.+44 (0)20 7404 6648
mail@garnettpartners.com
www.garnettpartners.com

architects / planners / designers

GARNETT +PARTNERS

CLIENT

Calabar Properties Ltd

PROJECT

11-12 Grenville Street, WC1

DRAWING TITLE

First Floor Plan
As Proposed

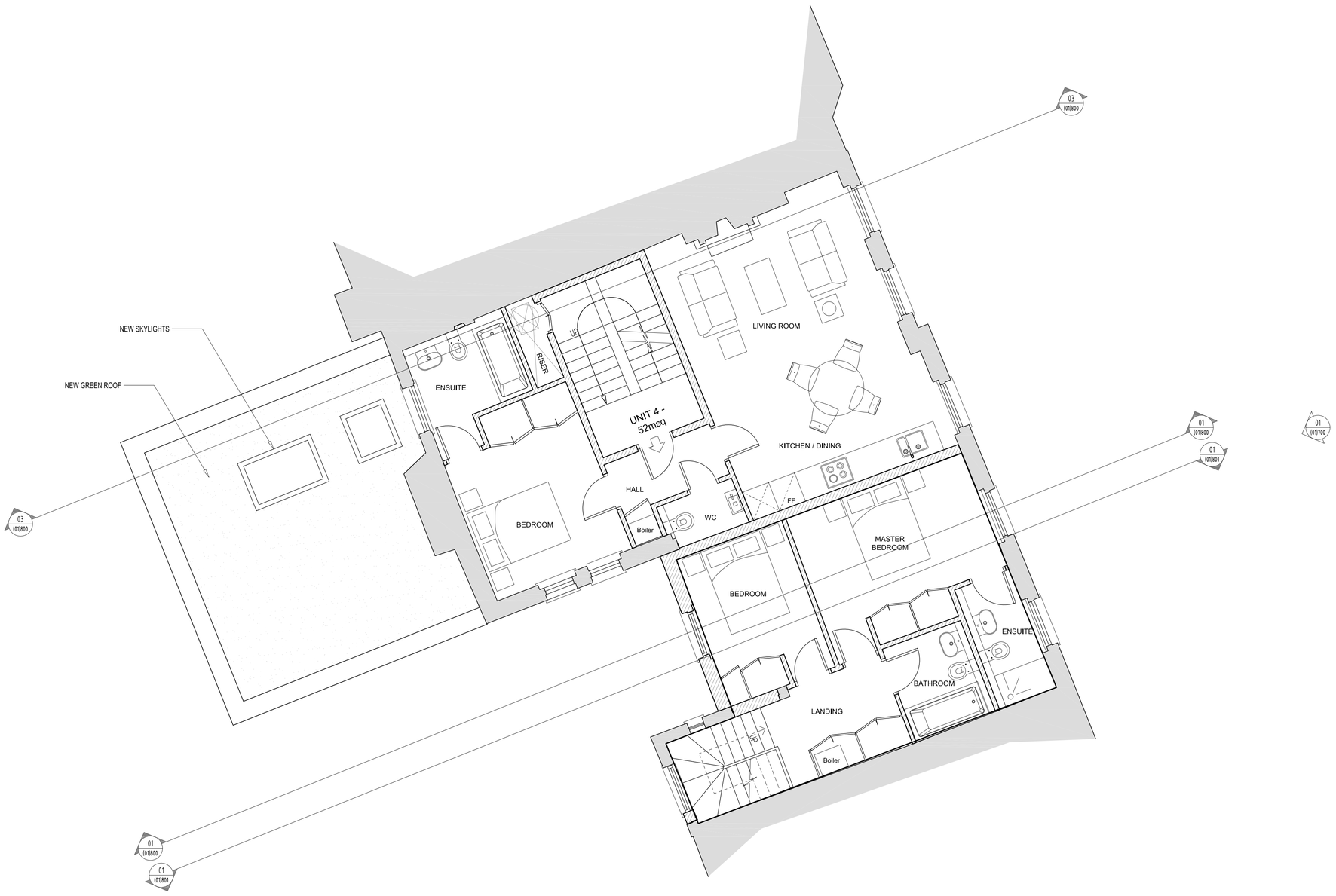
SCALE	DATE
1:50@A1 1:100@A3	April '14

JOB NO.	DWG NO.	REV.
790	(01)602	F

KEY

EXISTING FABRIC

PROPOSED FABRIC



01 (01)603 Second Floor Plan As Proposed

0 1 2 3 4 5 10

METERS

REV	ISSUE DATE	REVISION NOTES
F	2016.08.03	Minor amendments
E	2016.07.22	Issued for Planning
D	2016.07.01	Issued to client
C	2016.04.05	Issued to client
B	2016.03.29	Issued to client
A	2014.05.20	Issued to client
-	2014.05.06	Issued to client

GENERAL NOTES

Do not scale. All written dimensions must be checked on site before work commences on site or in shop. Figured dimensions take preference over those scaled. Discrepancies, where identified, must be reported to the Architect immediately.

Any areas indicated on this drawing are for guidance purposes only. No responsibility is taken for their accuracy.

All work must be carried out in accordance with the Building Regulations and to the satisfaction of the Local Authority.

STATUS

PLANNING

N

Garnett+Partners LLP
Holborn Hall
195 High Holborn
London WC1V 7BD
Tel.+44 (0)20 7404 7677
Fax.+44 (0)20 7404 6648
mail@garnettpartners.com
www.garnettpartners.com

architects / planners / designers

GARNETT +PARTNERS

CLIENT

Calabar Properties Ltd

PROJECT

11-12 Grenville Street, WC1

DRAWING TITLE

Second Floor Plan
As Proposed

SCALE 1:50@A1 1:100@A3

DATE April '14

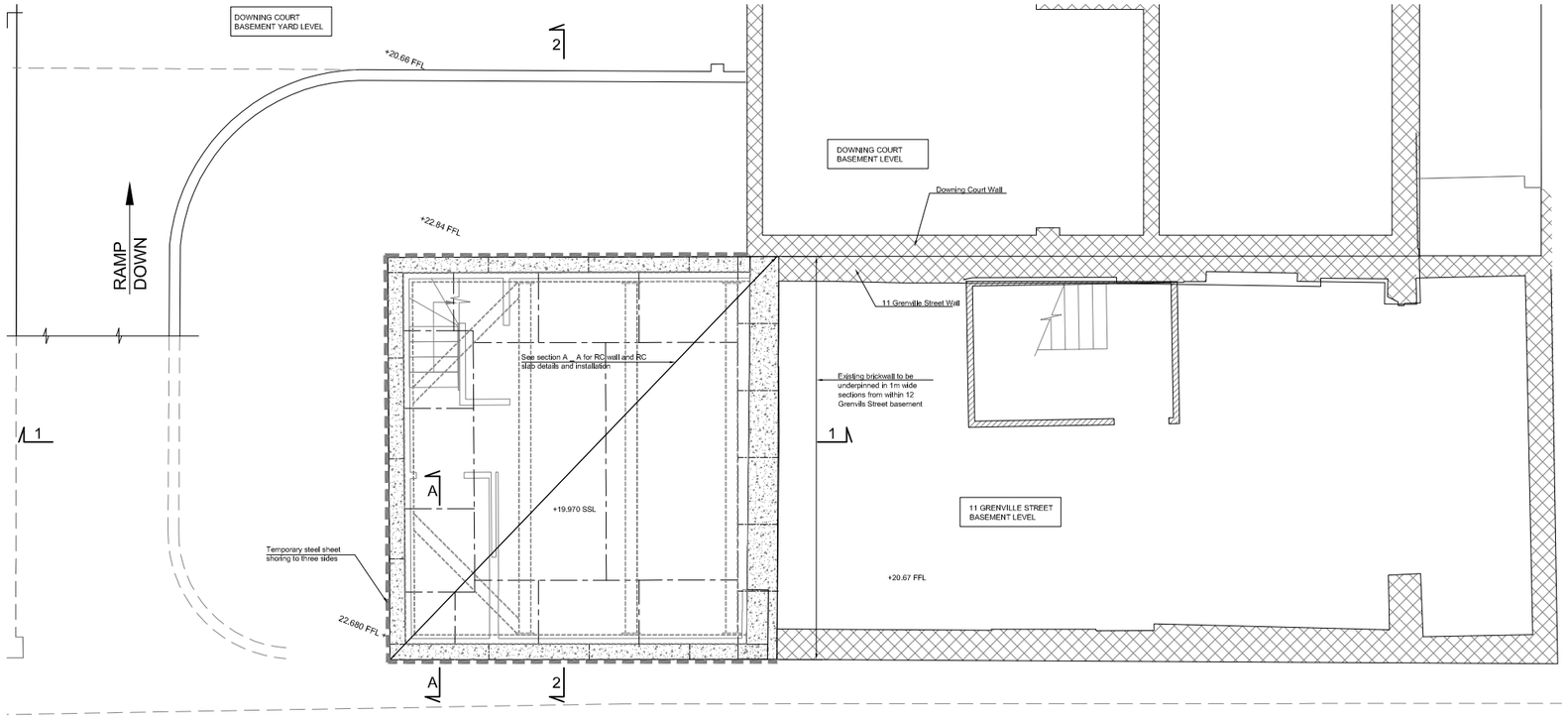
JOB NO. 790

DWG NO. (01)603

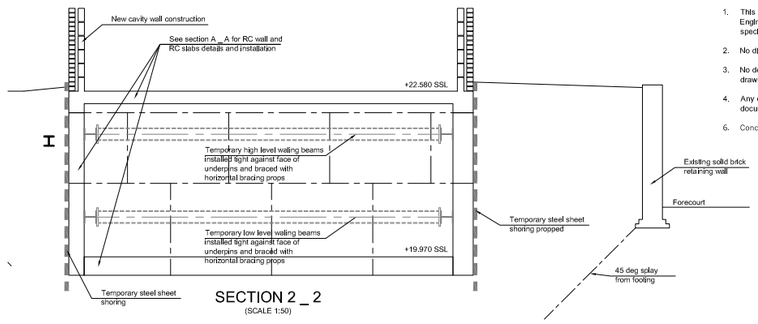
REV. F

APPENDIX C

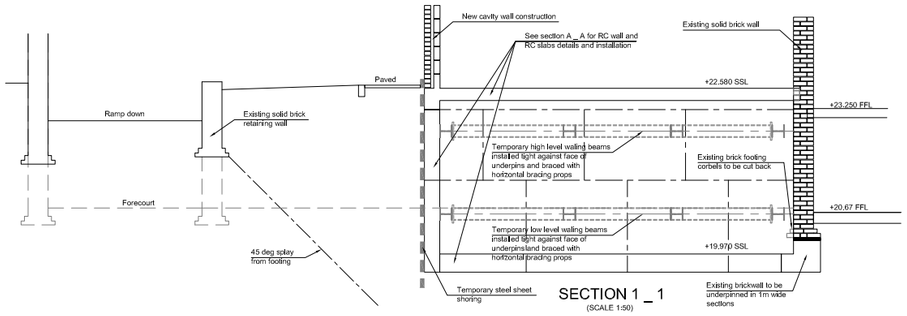
TWS - 8108_BIA_02 – PROPOSED WORKS FOR THE NEW BASEMENT INSTALLATION
EXISTING 11-12 GRENVILLE STREET EXISTING SURVEY DRAWINGS
EXISTING DOWNING COURT BASEMENT AND GROUND FLOOR LAYOUTS



BASEMENT LAYOUT
(SCALE 1:50)

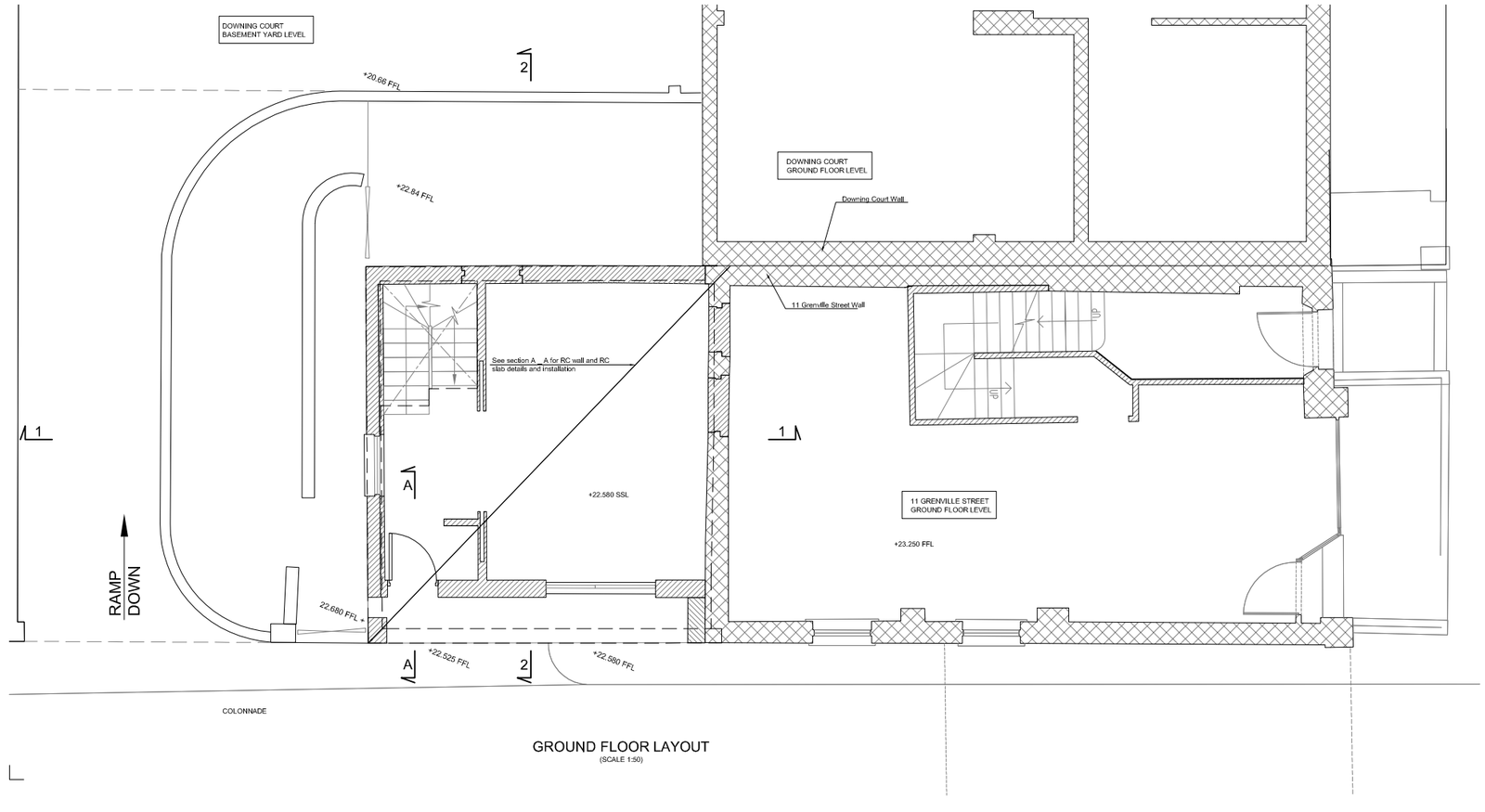


SECTION 2 _ 2
(SCALE 1:50)

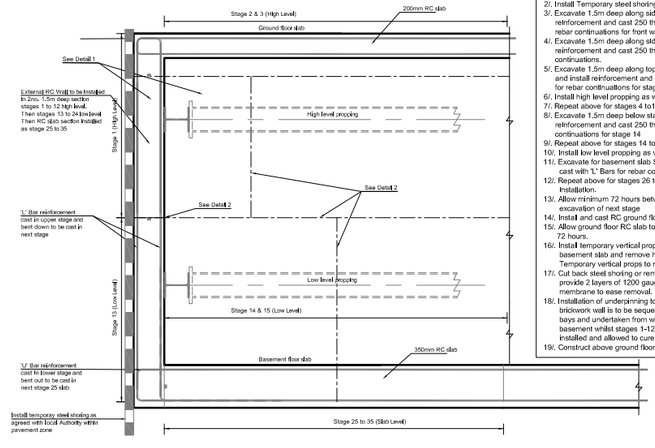


SECTION 1 _ 1
(SCALE 1:50)

1. This Drawing to be read in conjunction with all other Engineers, Architects and Specialists drawings and specifications.
2. No dimensions are to be scaled from this drawing.
3. No deviation may be made from the details shown on this drawing without prior agreement of the Engineers.
4. Any discrepancy between this drawing and any other document should be referred immediately to the Engineer.
6. Concrete to be Grade C40 SRC Waterproof Concrete



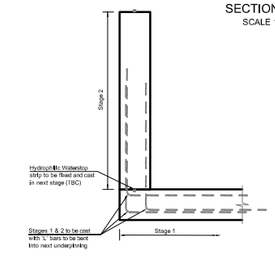
GROUND FLOOR LAYOUT
(SCALE 1:50)



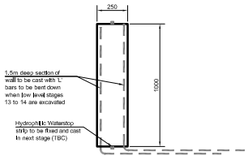
SECTION A_A
SCALE 1:25

SUGGESTED SEQUENCE OF WORKS

1/. Existing garage structure with brick footings and ground floor concrete slab to be demolished
2/. Install Temporary steel shoring to front, rear and side.
3/. Excavate 1.5m deep along side wall stage 1 and install reinforcement and cast 250 thick RC wall with 'L' Bars for rebar continuations for front wall.
4/. Excavate 1.5m deep along side wall stage 2 and Install reinforcement and cast 250 thick RC wall with 'L' Bars for rebar continuations.
5/. Excavate 1.5m deep along top of wall stage 3 adjacent to front and install reinforcement and cast 250 thick RC wall with 'L' Bars for rebar continuations for stage 4.
6/. Install high level propping as works proceed
7/. Repeat above for stages 4 to12 for all High level underpinning
8/. Excavate 1.5m deep below stage 2 to install stage 13 and install reinforcement and cast 250 thick RC wall with 'L' Bars for rebar continuations for stage 14
9/. Repeat above for stages 14 to 24 for all Low level underpinning.
10/. Install low level propping as works proceed
11/. Excavate for basement slab Stage 25 install reinforcement and cast with 'L' Bars for rebar continuations for stage 26
12/. Repeat above for stages 26 to 35 for basement slab Installation.
13/. Allow minimum 72 hours between cast of wall/slab and excavation of next stage
14/. Instal and cast RC ground floor slab.
15/. Allow ground floor RC slab to gain full design strength minimum 72 hours.
16/. Install temporary vertical props to support ground floor slab off basement slab and remove high and low level propping. Temporary vertical props to remain for 7 days.
17/. Cut back steel shoring or remove from site. If to be removed provide 2 layers of 1200 gauge Visqueen to act as slip membrane to ease removal.
18/. Installation of underpinning to existing basement adjoining brickwork wall is to be sequenced in 6 number 1m wide phased bays and undertaken from within number 12 Grenville street basement whilst stages 1-12 high level underpinning is being installed and allowed to cure for 72 hours
19/. Construct above ground floor structure over



DETAIL 1
GENERAL CORNER
PLAN FOR STAGES 1
& 2 to TIE TO STAGES
3 to 4



DETAIL 2
GENERAL SECTION
FOR STAGES 1 to 12

Ref.	Revisions	By	Date
.	.	.	.

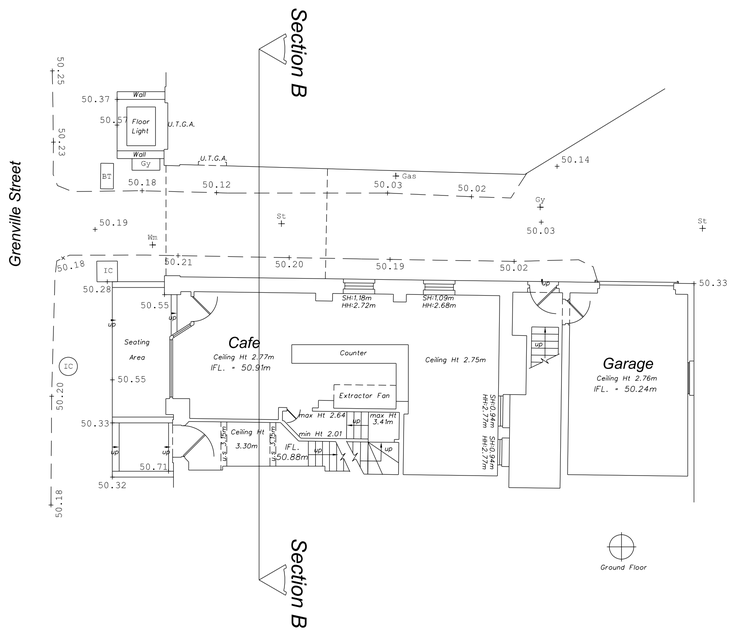
11-12 GRENVILLE STREET,
LONDON,
WC1N 1LZ,

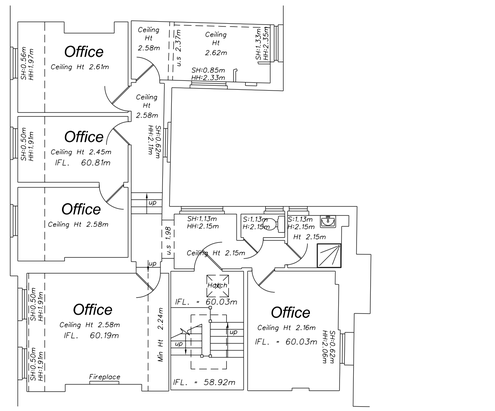
PROPOSED WORKS TO
INSTALL BASEMENT RC
RETAINING WALLS

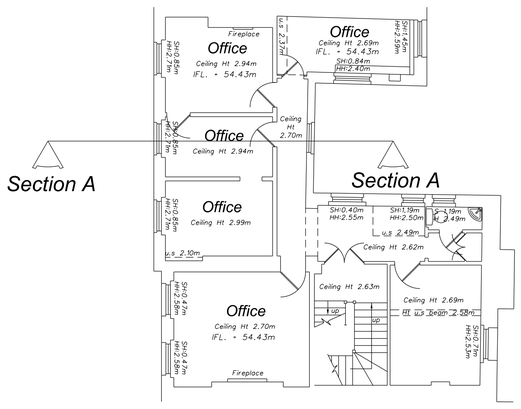
taylor whalley spyra
consulting civil and structural engineers
3 Dufferin Avenue, Barbican, LONDON EC1Y 8PQ
Tel (020) 7253 2626 Fax (020) 7253 2767
E-mail: tws@tws.uk.com Website: www.tws.uk.com

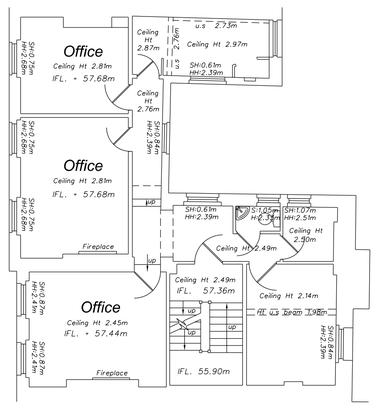
Scale at A1	Date	Drawn By	
1:50, 1:25	13/05/16	GB	

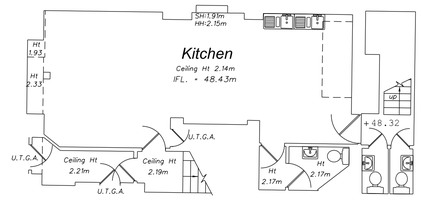
Project No.	Drg No.	Rev.
8108	BIA_02	-











NOTES

All dimensions are to be checked on site by the contractor before any work is commenced.

In the case of apparent discrepancy refer immediately to surveyors

The accuracy and completeness of the survey is dependent on the orliginal brief

The type and extent of information and the survey accuracy will have been matched to the client's original requirements.

All later users must refer to Greenhatch Group Ltd before relying on this survey.

The detail of this survey was established for a brief, requiring a hardcopy at a scale of 1:100. It is therefore suitable for plotting or planning/designing at this scale or smaller.

greenhatch group

Building Surveys

Rowan House
Duffield Road
Little Eaton
Derby
DE21 5DR

Tel (01332) 830044 Fax (01332) 830055
Email : admin@greenhatch-group.co.uk

CLIENT

Trehearne Architects

PROJECT

11-12 Grenville Street
London
WC1N 1LZ

TITLE

Existing Floor plans

SCALE 1: 100

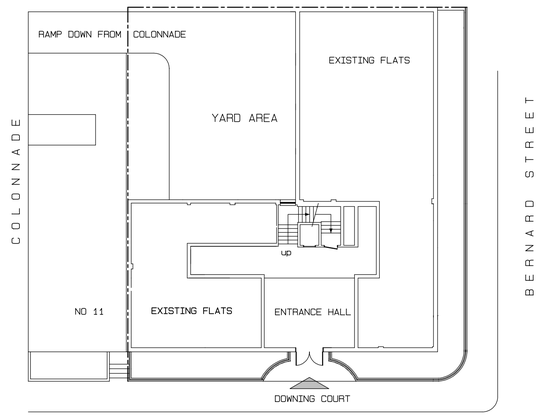
DATE July '07

Level datum.....stn 1 50.000m
Grid orientation.....arbitrary
Drawing number.....11462_01
Our Job number.....11462
Our Book number.....R0
Computer reference..11462\11462_01
Your reference.....
Data drawn by.....R O'Donnell
Data verified by.....

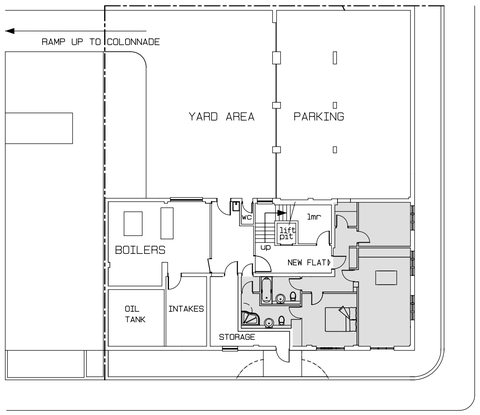
Comments

Revisions

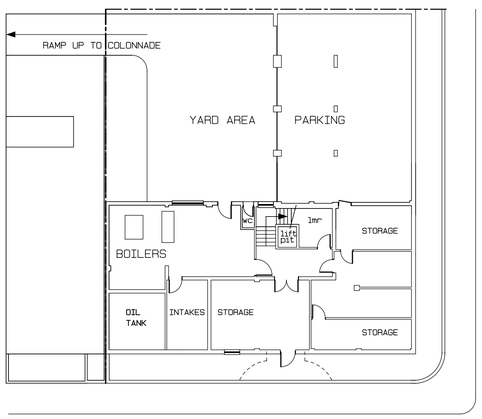
Rev	Date	Description	Surv.



EXISTING GROUND FLOOR



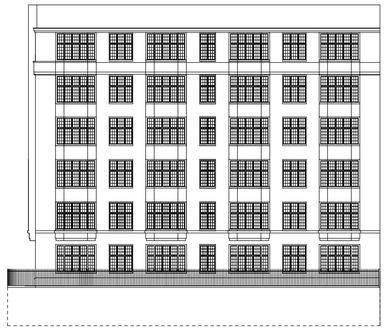
PROPOSED NEW FLAT IN BASEMENT



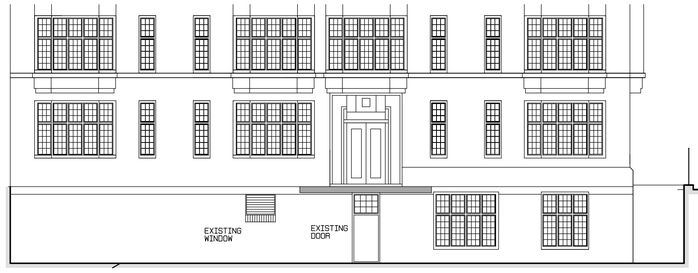
EXISTING BASEMENT

1.200

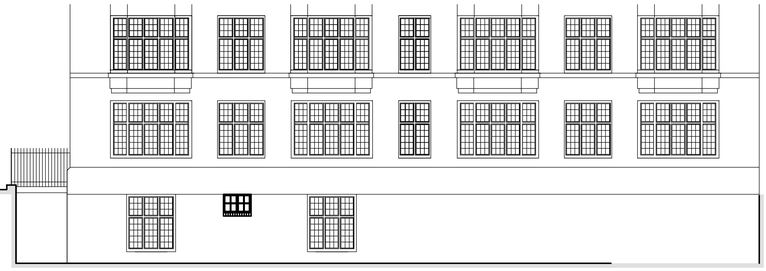
EXISTING ELEVATION TO GRENVILLE STREET
1.200



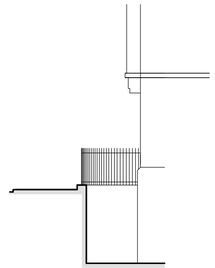
EXISTING ELEVATION TO BERNARD STREET
1.200



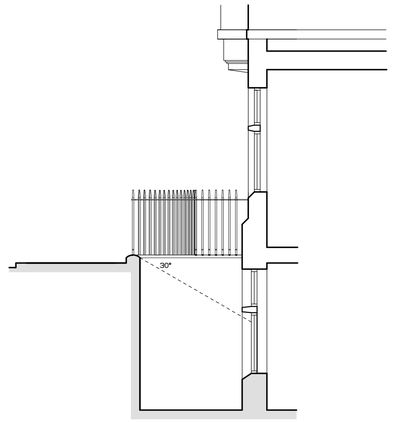
ELEVATION OF NEW FLAT (TO GRENVILLE STREET)
1.100 SHOWING NEW WINDOWS TO MATCH EXISTING TO NEW BR1 AND LR



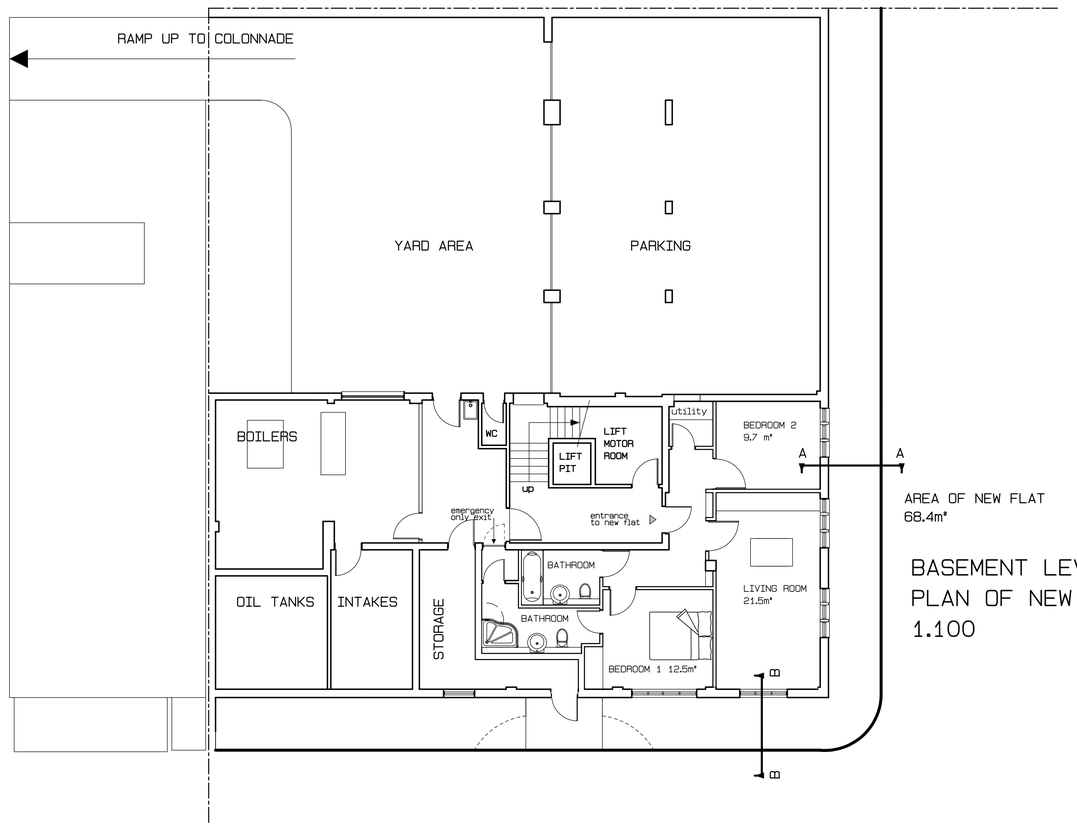
PART ELEVATION + SECTION OF NEW FLAT (TO BERNARD STREET)
1.100 SHOWING 3No NEW WINDOWS TO MATCH EXISTING, TO LR + BR2 AT BASEMENT LEVEL



SECTION
A-A



SECTION B-B
1:50



AREA OF NEW FLAT
68.4m²

BASEMENT LEVEL
PLAN OF NEW FLAT
1.100

MATERIALS

WINDOW FRAMES AND CASEMENTS
TO MATCH EXISTING
FACING BWK MADE GOOD AS EXISTIING

WINDOW AREAS ABOVE 30" FROM PLINTH	
LIVING ROOM (WINDOWS)	2.94m²
BEDROOM 1	1.70m²
BEDROOM 2	1.28m²

No	DATE		BY
E	10.08	1:100 ELEVATIONS NOMENCLATURE CORRECTED; EMERGENCY ESCAPE DOOR TO NEW FLAT NOTED	
D	09.08	1:50 SECTION B-B ADDED; BR 1 + DOORS REVD	
C	06.08	ALTERNATIVE EMERGENCY ESCAPE ROUTE FROM FLAT INDICATED	
B	07.07	FLAT PLAN REVISED FOR INTERNAL ACCESS NEW WINDOWS ADDED @ BASEMENT LEVEL	
A	04.07	1:50 DETAILS OF RAILINGS AS EXTG, + WITH NEW GATE + STAIRS ADDED	

REVISIONS

ROSENFELDER ASSOCIATES
Chartered Architects + Planning Consultants
10-12 Perrins Court Hampstead LONDON NW3 (020) 7794 4425

CLIENT :HIGHDORN CO LTD
PROJECT :NEW BASEMENT FLAT
SITE :DOWNING COURT
GRENVILLE STREET WC1
DRAWING :SCHEME 2
PLANS+ELEVATIONS

DATE: 01.07 | DRAWN BY: | SCALE: 1.50/1.100/200

JOB + DRAWING No:
GS.775.02 E

APPENDIX D

RISK MANAGEMENT SITE INVESTIGATION REPORT REF RML 6065

Unit 8, Paddock Barn Farm
Godstone Road, Caterham,
Surrey CR3 6SF
Tel: 01883 343572
Fax: 01883 344060
email: enquiries@riskmanagementltd.co.uk
Web: www.riskmanagementltd.co.uk

PROJECT No. RML 6065

SITE INVESTIGATION AT

11-12 GRENVILLE STREET, LONDON WC1V 1LZ

ON BEHALF OF
Mr. JOE KOWALSKI

July 2016

CONTENTS

APPENDICES

1.0 INTRODUCTION & SCOPE OF WORKS

1.1 This report has been prepared by Risk Management Limited to the instructions of the Client for the work, Mr. Joe Kowalski, under cover of his signed Instructions to Proceed, dated 18th May 2016.

1.2 Consulting Engineers for the project are Messrs. Taylor Whalley Spyra.

1.3 The site under consideration was Nos. 11-12 Grenville Street, London WC1N 1LZ.

1.4 It is understood that the site is to be re-developed with a new three-storey property including a new basement built into the existing basement level.

1.5 Risk Management Limited have now been commissioned to undertake investigation work to provide information on the sub-soil conditions at this site, together with laboratory testing, top enable foundation design by others, and the work includes three initial land-borne gas monitoring visits.

1.6 This report presents the work carried out and discusses the findings.

2.0 FIELDWORK

2.1 All fieldwork was generally executed in accordance with the recommendations given in British Standard BS 5930:2015, "Code of Practice for Ground Investigations", contamination sampling was undertaken in accordance with BS 10175 : 2011, "Code of Practice for the Investigation of Potentially Contaminated Sites".

2.2 Borehole and trial pit locations are shown on the appended Sketch Fieldwork Location Plan, Drawing No. RML 6065/1.

2.3 Fieldwork was undertaken on the 1st June 2016 and comprised the following.

Drive-in-Sampler Boreholes

2.4 One drive-in-sampler borehole (BH1) was drilled from within the existing garage on the site to a depth of 6.00m below existing garage floor slab level.

2.5 The drive-in-sampler comprises a series of 1 and 2 metre long metal tubes, varying in diameter from 80mm down to 35mm, driven into the ground using a mini-hydraulic breaker unit. The tubes are subsequently jacked out of the ground and side windows enable the tubes to be cleaned and small disturbed samples to be taken at regular intervals within each stratum.

2.6 Small disturbed samples were taken at regular depth intervals down the borehole.

2.7 Upon completion of borehole BH1 a combined groundwater/gas monitoring standpipe was installed to a depth of 5.00m below existing ground level. The monitoring installation comprised a 1 metre length of plain 19mm diameter HDPE pipe followed by slotted geotextile wrapped HDPE pipe, capped at the base. A cement/bentonite seal was installed from 1.00m to ground level and the installation was finished with a gas valve on top of the pipe and a lockable stopcock cover concreted in flush with ground level.

2.8 Full details of the drive-in-sampler borehole findings are given on the appended borehole record sheet.

Hand Excavated Trial Pit

2.9 In addition to the above work, one hand excavated trial pit (TP1) was undertaken against the garage side wall, through the existing garage concrete floor slab.

2.10 A further planned trial pit at the base of the existing metal stairwell stairs was unable to be undertaken owing to the presence of a manhole cover. A photograph of this manhole is include on the appended Sketch Fieldwork Location Plan, Drawing No. RML 6065/1.

2.11 Trial Pit TP1 found that the existing brick wall continued down to at least 1200mm but owing to the presence of loose brick fill was unable to be deepened and the foundation underside was not determined.

Landfill Gas Monitoring

2.12 Following the initial site work, three return gas/groundwater monitoring visits were made to the installation fitted within borehole BH1 on 1st, 7th and 10th June 2016.

2.13 During the visits the barometric pressure was recorded together with the level of Carbon Dioxide, Oxygen and Methane. In addition, gas flow measurements were taken and the depth to groundwater recorded.

2.14 Full details of the readings are included on the appended Gas/Groundwater Monitoring Record Sheet.

3.0 GROUND CONDITIONS

3.1 According to information published by the British Geological Survey (1:50,000 Series Sheet 256, North London) the underlying geology at this site is shown as being Recent Lynch Hill Gravel (Thames River Terrace Deposits) overlying London Clay of the Eocene Period.

3.2 River Thames Terrace Deposits generally comprise primarily gravels and sand sourced from varying materials within the rivers local catchment area. These Pleistocene deposits are widespread within the London Basin and occur typically as terraces on the valley sides. These terraces represent ancient floodplain deposits that have become isolated as the river has cut downwards to lower levels.

3.3 It is thought that the London Clay formation was deposited during a period of sea inundation in the area up to 200m in depth. The London Clay can be up to 150m thick beneath south Essex thinning across London to about 90m near Reading. The formation consists of mainly dark blue to brown grey clay containing variable amounts of fine-grained sand and silt. London Clay generally weathers to an orange-brown colour with pockets of silty fine sand. The formation is particularly susceptible to swelling and shrinking when subjected to moisture content changes. In addition, gypsum (selenite) crystals and pyrite nodules are commonly found throughout the formation.

3.4 Full details of the ground conditions encountered are presented on the borehole record appended to this report and can be summarised as follows:

Depth from (m)	Depth to (m)	Description
0.00	0.15	Concrete
0.15	1.80	MADE GROUND.
1.80	3.60	Lynch Hill Gravel
3.60	6.00 +	Weathered London Clay

3.5 Groundwater was not noted during boring or within the standpipe installed within borehole BH1 during the return monitoring visits.

4.0 LABORATORY TESTING

4.1 The following geotechnical and contamination tests have been carried out on samples recovered from the boreholes at this site.

4.2 Unless otherwise stated, the geotechnical tests have generally been carried out in accordance with the recommendations given in British Standard 1377:1990, "Methods of Test for Soils for Civil Engineering Purposes".

4.3 The chemical testing was carried out in accordance with standard industry methods in a UKAS approved laboratory which is also currently accredited in accordance with MCERTS for the majority of its testing. Further information regarding this accreditation is available on request together with a full list of test methods if required.

4.4 *Atterberg Limits and Natural Moisture Content Tests*

The Atterberg Limits and natural moisture contents have been determined for two samples of the Weathered London Clay from 4.00m and 4.50m depth.

The liquid limit (LL) was 74% in both samples, the plastic limit (PL) 25% and 26% and the plasticity index (PI) 48 and 49. The natural moisture content was 27% in both samples.

These results indicate that the Weathered London Clay can be classified as a clay of 'very high' plasticity (CV) in accordance with the Casagrande Geotechnical classification system.

In addition, both samples would fall into the "high" shrinkage potential category of the National House Building Councils (NHBC) classification system given in Part 4 of their Standards.

4.5 *Quick Undrained Triaxial Compression Tests.*

The undrained shear strength has been determined in single-stage triaxial compression for four, re-moulded, 38mm diameter samples underlying the site.

The resulting mean shear stress (undrained cohesion) C_u values varied between 75 kN/m^2 and 127 kN/m^2 indicating that material tested varied from the top end of 'firm' to 'stiff' in consistency.

4.6 *Particle Size Distribution*

The particle size distribution has been determined for two samples of the more granular soils encountered.

The results are presented as grading curves in the appendix to this report

4.7 *pH and Sulphate Tests*

The pH and sulphate content has been determined for two samples recovered from depths of 0.50m and 1.50m.

The pH was found to be 8.3 and 8.4 and the sulphate content, on a 2:1 water:soil extract, 1.47 g/l and 1.53 g/l.

4.8 *Chemical Analysis*

Two samples of MADE GROUND were selected and tested for a range of commonly occurring contaminants and indicators of contamination including those given by the Contaminated Land Exposure Assessment (CLEA).

The contamination suite undertaken at this site includes speciated **P**oly**A**romatic **H**ydrocarbon (**PAH**) and speciated **T**otal **P**etroleum **H**ydrocarbon (**TPH**), together with **BTEX**, **B**enzene, **T**oluene, **E**thylbenzene and **X**ylenes.

4.9 *Asbestos Identifications*

The same two samples, as discussed above, were submitted to a UKAS accredited laboratory for asbestos identification and full details of the results are appended.

4.10 *Waste Classification Tests*

One sample of the MADE GROUND from 0.50m depth was selected and tested for Waste Acceptance Criteria (WAC) in accordance with BS EN 12457 Part 3.

Full details of the results are given on the appended result sheet.

5.0 DISCUSSION

PROPOSED DEVELOPMENT & SCOPE OF WORKS

5.1 As discussed in Section 1 above, it is understood that the proposed re-development at this site will comprise demolition of the existing garage site and erection of a new three-storey property with a new basement built into the existing basement level.

5.2 The current report provides information on the sub-soil conditions at this site, together with laboratory testing, in order to assist foundation design by others, and includes initial land-borne gas and groundwater monitoring visits to assist in a Basement Impact Assessment (BIA) for the London Borough of Camden.

FOUNDATION DESIGN

5.3 Beneath the concrete garage floor slab, the current investigation has found MADE GROUND to 1.80m where Lynch Hill Gravel was encountered to 3.60m depth. Weathered London Clay was found beneath the Lynch Hill Gravel and this was not penetrated at the maximum borehole termination depth of 6.00m below existing ground level.

5.4 It is likely that the proposed basement will found within the Lynch Hill Gravel where an allowable bearing pressure of 150 kN/m^2 could be adopted for settlement of up to 25mm.

5.5 Foundations in both the MADE GROUND and Lynch Hill Gravel will require support in the short-term and we recommend that a contingency for this is allowed for at this stage.

5.6 The results of the Atterberg Limit tests indicate that the Weathered London Clay at depth would fall into the 'high' shrinkage potential in accordance with the National House Building Councils (NHBC) classification system given in Part 4 of their Standards. However, the Lynch Hill Gravel would be considered to be 'non-shrinkable'.

5.7 Groundwater was not noted during the current work, however, groundwater would be expected within the base of the Lynch Hill Gravel during particularly wet periods, "perched" above the underlying relatively impermeable Weathered London Clay. Therefore, if seasonal groundwater or surface water accumulates at the base of basement or foundation excavations it is very important that these are kept dry by, for example, pumping from a sump, the foundation base is kept square and that any soft spots are replaced and compacted prior to pouring foundation concrete. In addition,

we would recommend that the basement construction is "tanked" to prevent any future problems with ingress of groundwater.

5.8 Further, we recommend that where groundwater or surface water flows into foundation excavations, 'blinding' concrete is used at the base of the foundation excavations and that foundation concrete is poured as soon as possible thereafter

5.9 It should be noted that should ground conditions differing significantly from those described in our report be encountered during foundation excavation, then Risk Management Limited should be contacted immediately and that the above noted allowable bearing pressure or recommended foundation type may need to be altered accordingly.

BURIED CONCRETE

5.10 The results of the chemical tests at this site indicate that the the upper MADE GROUND would fall into Classes DS-2 and DS-3 of the Building Research Establishments (BRE) classification system.

5.11 We would therefore recommend the use of sulphate resisting cement for all foundation concrete at this site.

LAND-BORNE GAS

5.12 During the return gas/groundwater monitoring visits, no methane and a maximum carbon dioxide level of 0.3% were found.

5.13 CIRIA Publication C665 "Assessing Risks posed by Hazardous Ground gases to Buildings (Revised 2007) includes the NHBC "Traffic Light" system.

5.14 The carbon dioxide level was below 5% and, in addition, no flow was registered. Therefore, in accordance with the NHBC "Traffic Light" system we would consider that the current site would be classified as GREEN and, therefore, no land borne gas remedial measures would be required at this site.

PRELIMINARY CONTAMINATION ASSESSMENT

5.15 Part IIA of the Environmental Protection Act 1990 contains the legislative framework for the regulation of contaminated land and this was implemented in the Contaminated Land (England) Regulations 2000. This legislation allows for the identification and remediation of land where contamination is causing unacceptable risks to human health or the wider environment. The approach adopted by the UK contaminated land policy is "suitable for use" which implies that the land should be suitable for its current use and made suitable for any known future use.

5.16 For this ***Preliminary Contamination Assessment*** the site has been modelled using the Source-Pathway-Receptor approach to produce a Conceptual Site Model.

Source	(substances or potential contaminants which may cause harm)
Pathway	(a linkage route between the source and receptor)
Receptor	(something which may be harmed by the source e.g. humans, plant, groundwater etc.)

5.17 Source

Two samples of MADE GROUND from 0.15m and 1.00m depth were selected and tested for a range of commonly occurring contaminants and indicators of contamination including those given by the Contaminated Land Exposure Assessment (CLEA).

5.18 Pathways

The pathways needing to be considered, as discussed above, will depend on the land usage, and will include for, example; soil ingestion, inhalation of vapour and dust, and consumption of home-grown vegetables, where this is applicable.

5.19 Receptors

From the intended end site use the following potential receptors have been identified.

- Workers on the site likely to come into contact with the soils.
- Future users of new development and any shared access landscaped areas.
- Any proposed additional vegetation.
- Neighbours.

5.20 It should be noted that the CLEA software has limited functionality and contains algorithms, which the EA has publicly expressed its intention to update. As a consequence of this, some of the screening values generated by the CLEA software may not adequately reflect specific site conditions and in some instances are unduly

conservative. In addition, it should also be noted that the figures given in the appended table are based on a 6% soil organic matter content.

5.21 The DEFRA/EA model has been developed on the basis of many critical assumptions about possible exposure to soil contamination and the development of conceptual exposure models to describe different land uses as follows:

Residential with plant uptake	Mainly refers to residential gardens in which vegetables are grown.
Residential without plant uptake	Refers to areas which have gardens (e.g. blocks of flats) but without vegetable uptake.
Allotments	Areas allocated for Allotment usage.
Commercial/Industrial	Commercial/industrial usage where there are open areas which are not hard surfaced.

5.22 The Contaminated Land Exposure Assessment (CLEA) model was originally published in March 2002 as joint DEFRA/EA publications; Contaminated Land Research (CLR) Report CLR 10, with Reports CLR7, 8 and 9 as supporting documents, providing toxicity data and human tolerable daily intake (TDI) data to be used with this model. This model enabled the derivation of more site-specific values for contaminants present on a site, rather than the use of 'generic' values, which were previously used.

5.23 DEFRA/EA previously published a number of Soil Guideline Values (SGVs) for certain determinands, (common toxic metals), which were generic guideline criteria for assessing the risks to human health from chronic exposure to soil contamination for standard land-use functions. However, these were withdrawn in late 2008 and DEFRA/EA have now issued a new set of guidance documents. With regard to the Risk Management Limited standard suite of tests, currently SGV figures have only been issued for Arsenic, Cadmium, Mercury, Nickel, Phenols and Selenium.

5.24 In the absence of currently published SGV values for the remaining contaminants, Messrs. W. S. Atkins have derived ATRISK^{soil} Soil Screening Values (SSVs) based on the new 2009 guidance (SC050021/SR3 (the CLEA Report) and SC050021/SR2 (the TOX report)) for commercial/industrial, residential without homegrown produce, residential with homegrown produce and allotment land uses. These have been based on the default assumptions provided in the CLEA report which it is understand will be used in the development of future Soil Guideline Values by DEFRA and the Environment Agency. Atkins SSVs have been derived in line with the new guidance using CLEA model v1.04. As the inhalation of vapour pathway contributes less than ten percent of total exposure, this is unlikely to significantly affect the combined assessment criterion and the SSV values used are the combined assessment criterion given by CLEA if free product is not observed.

5.25 Neither CLEA or ATRISK currently publish values for Hexavalent Chromium. Therefore, both Total Chromium and Hexavalent Chromium values have been compared against the Land Quality Management/Chartered Institute of Environmental Health (LQM/CIEH) Generic Assessment Criteria published in 2009 and based on CLEA v1.04 with Total Chromium values based on Chromium III.

5.26 The SGV and SSV levels represent "intervention" levels above which the levels of contamination may pose an unacceptable risk to the health of site-users such that further investigation and/or remediation is required.

5.27 Total Petroleum Hydrocarbons are considered in accordance with the fractions proposed by The Environment Agency, drawing on the TPHCWG methodology. These are contained in Table 4.2 – Petroleum hydrocarbon fractions for use in UK human health risk assessment, based on Equivalent Carbon (EC) number, contained in Science Report P5-080/TR3, *The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils.*

5.28 The proposed development contains an element of residential, therefore, the contamination results have been compared against the ***Residential without plant uptake*** criteria as shown on the table below and any levels exceeding these criteria are highlighted in yellow on the appended results sheets.

Determinand (below)	Units	ATRISK Contaminated Land Screening Values (SSV) derived using CLEA v1.04 for 6% SOM			
		Residential with plant uptake	Residential without plant uptake	Allotments	Commercial / Industrial
Aliphatic Hydrocarbons (mg/kg)	>C8-C10	14.5	14.5	476	476
	>C10-C12	87.7	87.8	297	297
	>C12-C16	126	126	126	126
	>C16-C40	88200	88900	281000	1000000
Aromatic Hydrocarbons (mg/kg)	>C8-C10	23.7	24.1	53.2	2700
	>C10-C12	132	147	71.3	2190
	>C12-C16	452	700	132	925
	>C16-C21	804	1330	288	28400
	>C21-C40	1220	1330	1550	28400
TOTAL TPH					
Naphthalene	mg/kg	8.71	9.22	23.4	22700
Acenaphthylene	mg/kg	-	-	-	-
Acenaphthene	mg/kg	2130	4770	612	106000
Fluorene	mg/kg	1930	3100	725	72100
Phenanthrene	mg/kg	-	-	-	-
Anthracene	mg/kg	18300	24000	10400	545000
Fluoranthene	mg/kg	2160	3210	924	72700
Pyrene	mg/kg	1550	2400	620	54500
Benz(a)anthracene	mg/kg	8.54	9.04	15.1	142
Chrysene	mg/kg	927	1010	1170	14300
Benzo(b)fluoranthene	mg/kg	9.86	10.3	18.6	144
Benzo(k)fluoranthene	mg/kg	100	104	227	1440
Benzo(a)pyrene	mg/kg	0.998	1.04	2.1	14.4
Indeno(123-cd)pyrene	mg/kg	9.75	10.3	16.6	144
Dibenz(ah)anthracene	mg/kg	1	1.03	2.57	14.4
Benzo(ghi)perylene	mg/kg	103	104	342	1450
TOTAL PAH					
Cyanide (Free)	mg/kg	34	34	34	34
pH	unit	-	-	-	-
Copper (Total)	mg/kg	4020	8370	1110	109000
Lead (Total)	mg/kg	342	383	361	6490
Zinc (Total)	mg/kg	17200	46800	3990	917000
		LQM/CIEH Generic Assessment Criteria			
Chromium (Total)	mg/kg	627	627	15300	8840
Chromium (Hexavalent)	mg/kg	4.3	4.3	2.1	35
		CLEA Soil Guideline Values (SGV)			
Benzene	mg/kg	0.33	0.33	0.07	95
Toluene	mg/kg	610	610	120	4400
Ethylbenzene	mg/kg	350	350	90	2800
Xylenes	mg/kg	230	230	160	2600
Arsenic (Total)	mg/kg	32	32	43	640
Cadmium (Total)	mg/kg	10	10	1.8	230
Mercury (Total)	mg/kg	170	170	80	3600
Nickel (Total)	mg/kg	130	130	230	1800
Phenols (Total)	mg/kg	420	420	280	3200
Selenium (Total)	mg/kg	350	350	120	13000

ASSESSMENT OF RESULTS

5.29 From the samples tested at this site, no determinands exceeded the CLEA Soil Guideline Values (SGV) for ***Residential without plant uptake*** usage.

5.30 However, both samples had elevated levels of Lead when compared against the ATRISK Contaminated Land Screening Values (SSV) for ***Residential without plant uptake*** usage and both samples elevated levels of Lead when compared against the recently issued LQM/CIEH S4UL levels for ***Residential without homegrown produce*** usage.

5.31 No asbestos was identified in the two samples tested

5.32 ***Discussion***

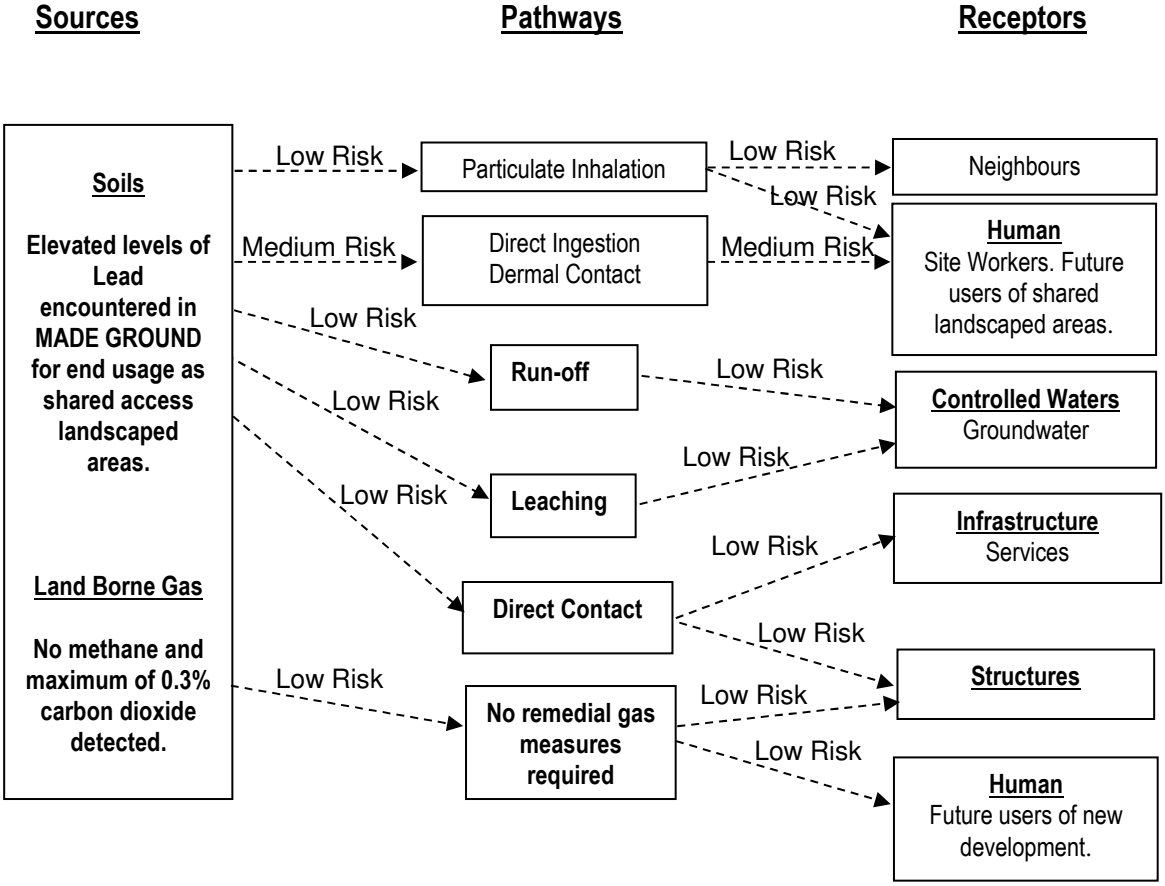
Any MADE GROUND should be removed from areas of proposed new shared landscaped areas as necessary and replaced to an appropriate depth usually considered to be 300-400mm of "clean" imported material with 200-300mm of "clean" topsoil above.

No remedial measures would be necessary beneath new building footprints, or hardstanding.

We would also recommend that standard Health and Safety precautions be taken with regard to ground workers at this site and these should include PPE equipment such as gloves, overalls etc. and normal washing facilities available on-site.

CONCEPTUAL SITE MODEL

5.33 The following diagram summaries the potential pollution linkages identified for this site in the form of a diagrammatic Conceptual Site Model (CSM).



5.34 By employing the recommendations give in Section 5.32 above the above noted medium risks can be reduced to low risks.

5.35 As always, the above recommendations are based on a selected number of representative samples and further testing may be required if any significant contamination is suspected or encountered during ground works.

WASTE ACCEPTANCE CRITERIA (WAC) TESTS

5.36 One EN 14473/02 Waste Acceptance Criteria (WAC) test has been undertaken during the current work and the certificate pertaining to this is appended to this report.

5.37 The results of the WAC test tend to indicate that the majority of the material tested would probably be classified as “inert”. However, elevated levels of Sulphate and Total Dissolved Solids (TDS) were noted which would classify the material as “non-hazardous”. Therefore, we strongly recommend that the WAC data should be presented to potential Waste Management Companies in order for them to confirm the waste classification of surplus soils to be removed from this site and to determine its acceptability at appropriate landfill sites for disposal/treatment.

SOIL SAMPLES

5.38 All soil samples will be kept for a period of 28 days after the date of the invoice for this project unless otherwise notified to Risk Management Limited in writing. Should samples be required to be stored for longer than 28 days then a storage charge will be levied.

Prepared By : Malcolm S. Price B.Sc., M.Sc., M.I.C.E., C.Eng.
Director

Distribution : Taylor Whalley Spyra - 1 copy + pdf

The recommendations made and the opinions expressed in this report are based on the borehole records, examination of samples and the results of site and laboratory tests.

The report is issued on the condition that Risk Management Limited will under no circumstances be liable for any loss arising directly or indirectly from ground conditions between the boreholes or trial pits which have not been shown by the boreholes, trial pits or other tests carried out during the investigation.

In addition, Risk Management Limited will not be liable for any loss whatsoever arising directly or indirectly from any opinion given on the possible configuration of strata both between the borehole and/or trial pit positions and/or below the maximum depth of the investigation. Such opinions, where given, are for guidance only.

Groundwater levels may also vary with time from those reported during our site investigation due to factors such as tidal conditions, heavy pumping from nearby wells or seasonal changes.

No person other than the client to whom this report is addressed, shall rely on it in any respect and no duty of care shall be owed to any such third party.

Copyright of this Report remains with Risk Management Limited and in addition we will not accept any responsibility for the report and recommendations given until our invoice is settled in full.

BOREHOLE NO. BH1

Site : 11-12 Grenville Street, London WC1N 1LZ

Job No. : RML 6065

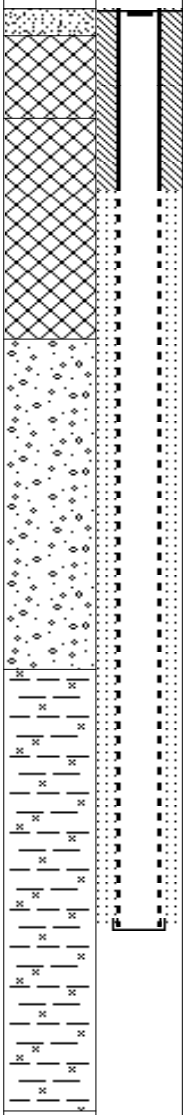
Diameter : 75mm/50mm

Date : 1st June 2016

Method : Drive-in-Sampler

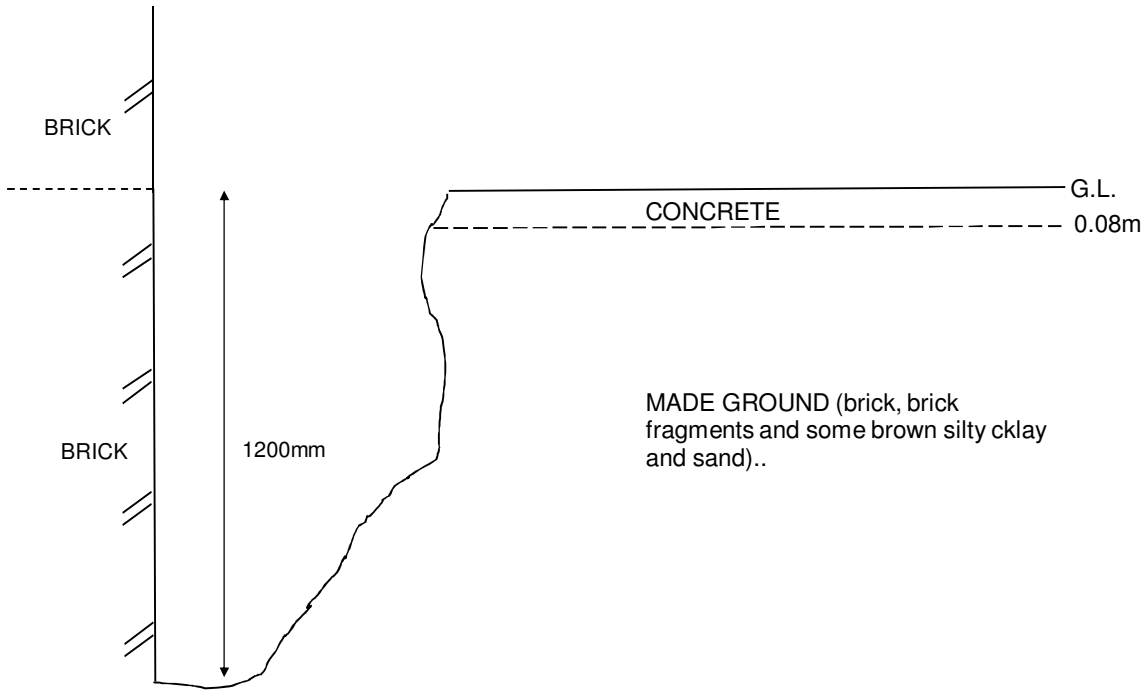
Sheet 1 of 1

(m)	Description	Strata Depth (m)	Legend	Ground water	Sample Depth (m)	Sample Type	Test	Remarks
0	Ground Level							
	Concrete	0.15			0.15	D1		
	MADE GROUND (brick and brick fragments).	0.60			0.50	D2		
1	***MADE GROUND*** (loose brick and brick fragments with some brown silty clay and sand)				1.00	D3		
					1.50	D4		
		1.80						
2	***Lynch Hill Gravel*** Brown and orange-brown, slightly clayey silty SAND and sub-angular to sub-rounded GRAVEL.				2.00	D5		
					2.50	D6		
3					3.00	D7		
					3.50	D8		
		3.60						
4	***Weathered London Clay*** Firm to stiff, brown silty CLAY with pockets of orange-brown and grey silt and selenite crystals.				4.00	D9		
					4.50	D10		
5	..... tending to grey with depth.				5.00	D11		
					5.50	D12		
6	End of Borehole	6.00			6.00	D13		



Remarks : Groundwater not noted during boring.
: Standpipe installed to 5.00m depth.
:

Key: D - Disturbed sample
W - Water sample
B - Bulk sample
V - Vane test
PP - pocket penetrometer
U - 38mm undisturbed sample



Depth to Foundation Underside > 1.20m

Risk Management	Title :	**TRIAL PIT TP1**	
	Project Location :	11-12 Grenville Street, London WC1N 1LZ	
RECORD OF HAND EXCAVATED TRIAL PIT	Job No : RML 6065	Scale :	Not To Scale
	Figure No. **1**	Date :	1st June 2016

PROJECT NAME : 11-12 Grenville Street, London WC1N 1LZ

PROJECT NO: RML 6065

Date	July 2016
Page	1 of 1

Sample Details				Classification Tests					Density Tests		Undrained Triaxial Compression Tests			Chemical Results				
BH No.	Depth (m)	Sample No.	Description	MC (%)	LL (%)	PL (%)	PI	<425 mic (%)	Bulk (Mg/m^3)	Dry (Mg/m^3)	Cell Pressure kPa	Deviator Stress kPa	Mean Shear Stress kPa	pH	W/S SO_4 (g/l)	Total SO_4 (%)	Water SO_4 (g/l)	Other tests and comments
BH1	0.50	D2												8.4	1.47			
	1.50	D4												8.3	1.53			
	4.00	D9	Firm to stiff, brown silty CLAY with pockets of orange-brown and grey silt and selenite crystals.	27	74	25	49	100	1.82	1.44	80	151	75					Class CV
	4.50	D10	Stiff, brown silty CLAY with pockets of orange-brown and grey silt and selenite crystals.	27	74	26	48	100	1.82	1.44	90	249	125					Class CV
	5.00	D11	Stiff, grey and brown, silty CLAY with pockets of orange-brown and grey silt and selenite crystals.	26					1.85	1.47	100	253	127					
	6.00	D13	Stiff, grey and brown, silty CLAY with pockets of orange-brown and grey silt and selenite crystals.	30					1.89	1.45	120	120	127					

SUMMARY OF GEOTECHNICAL TESTING

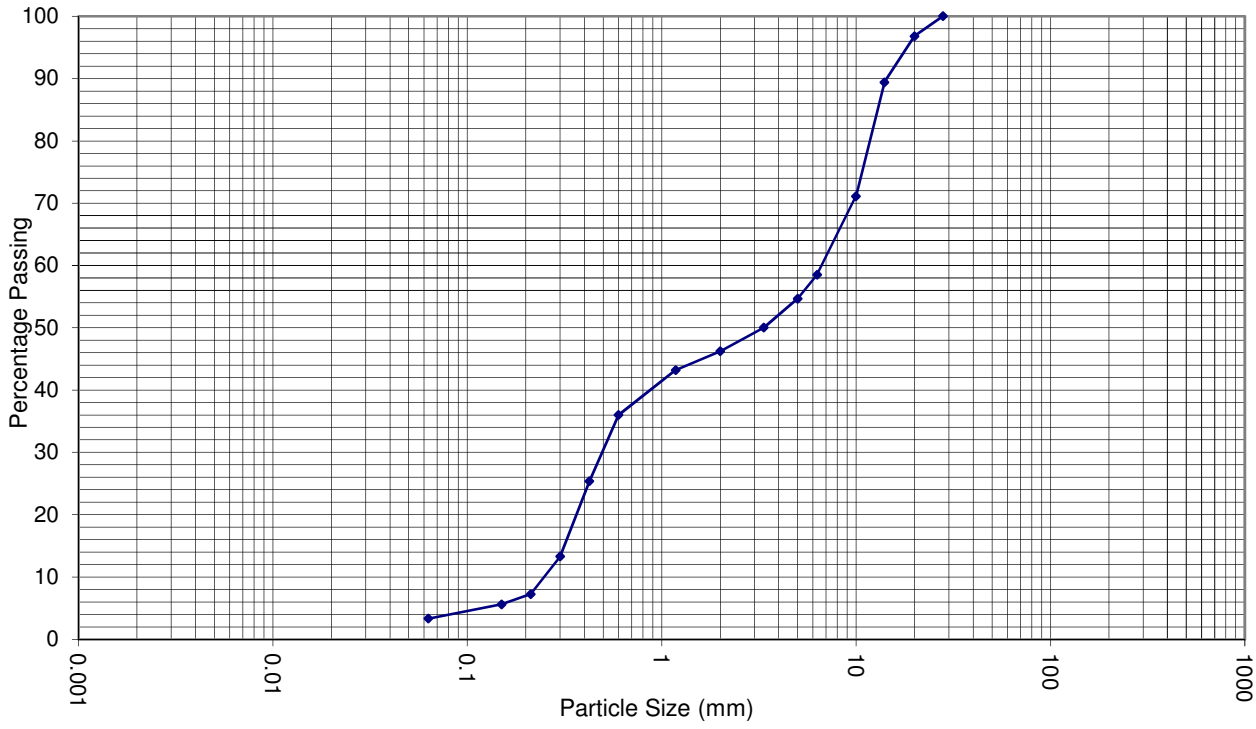
Risk Management

Results of Particle Size Distribution Tests

Project Name :	**11-12 Grenville Street, London WC1N 1LZ**			**Project No.**	**RML 6065**
Borehole No.	**BH1**	**Sample No.**	**D5**	**Depth (m)**	**2.00m**

Test Method : BS 1377 : Part 2 : 1990 : Clause 9

Sieve (mm)	Passing (%)	Sieve (mm)	Passing (%)
200	100	2	46
125	100	1.18	43
90	100	0.6	36
75	100	0.425	25
63	100	0.3	13
50	100	0.212	7
37.5	100	0.15	6
28	100	0.063	3
20	97	Pipette	
14	89	Particle Size	% Passing
10	71		
6.3	58		
5	55		
3.35	50		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Description :

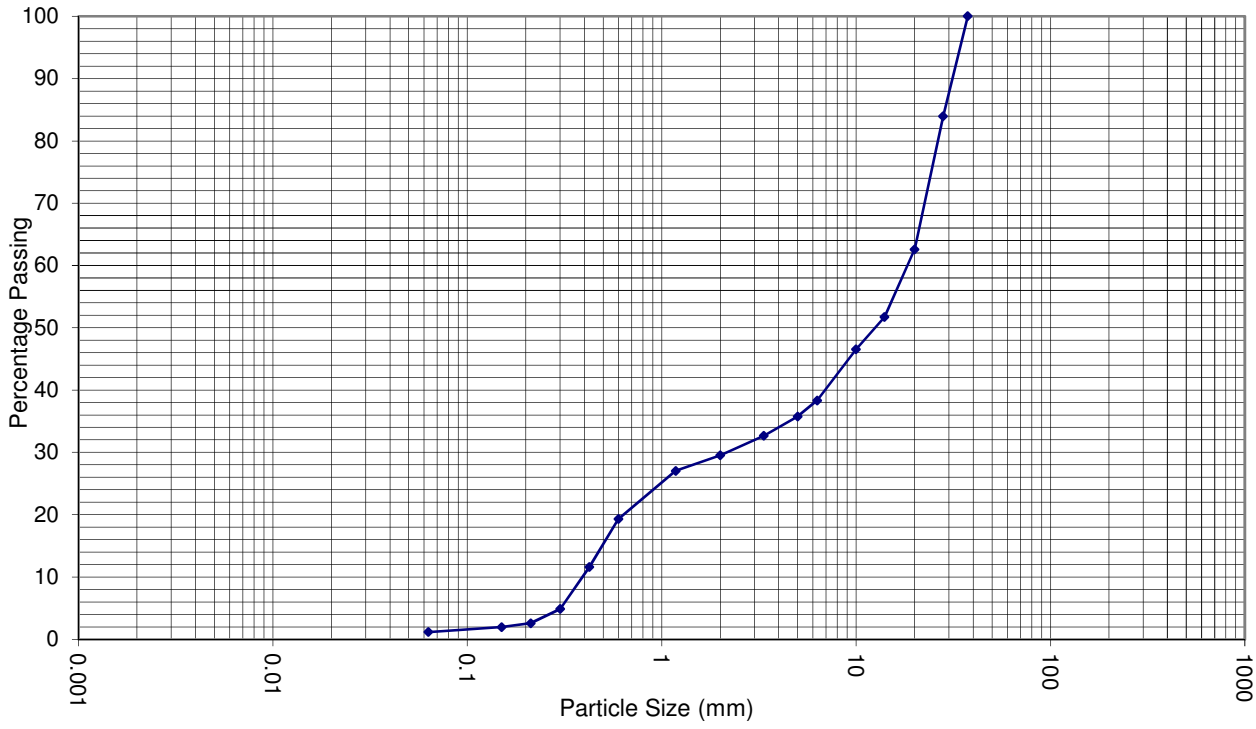
Brown and orange-brown, slightly clayey silty SAND and sub-angular to sub-rounded GRAVEL.

Results of Particle Size Distribution Tests

Project Name :	**11-12 Grenville Street, London WC1N 1LZ**			**Project No.**	**RML 6065**
Borehole No.	**BH1**	**Sample No.**	**D7**	**Depth (m)**	**3.00m**

Test Method : BS 1377 : Part 2 : 1990 : Clause 9

Sieve (mm)	Passing (%)	Sieve (mm)	Passing (%)
200	100	2	30
125	100	1.18	27
90	100	0.6	19
75	100	0.425	12
63	100	0.3	5
50	100	0.212	3
37.5	100	0.15	2
28	84	0.063	1
20	63	Pipette	
14	52	Particle Size	% Passing
10	47		
6.3	38		
5	36		
3.35	33		



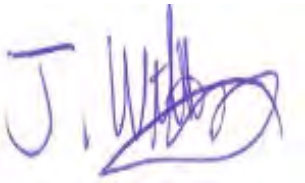
CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Description :

Brown and orange-brown, slightly clayey silty SAND and sub-angular to sub-rounded GRAVEL.

Unit A2
Windmill Road
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BY
Telephone: (01424) 718618
Facsimile: (01424) 729911
info@elab-uk.co.uk

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number:	16-07323
Issue:	1
Date of Issue:	24/06/2016
Contact:	Malcolm Price
Customer Details:	Risk Management Ltd Unit 8 Paddock Barn Farm Caterham SurrevCR3 6SF
Quotation No:	Q14-00012
Order No:	Not Supplied
Customer Reference:	RML 6065
Date Received:	16/06/2016
Date Approved:	23/06/2016
Details:	11-12 Grenville Street, London WC1N 1LZ
Approved by:	

John Wilson, Operations Manager

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683

Sample Summary

Report No.: 16-07323

11-12 Grenville Street, London WC1N 1LZ

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
65151	BH1 D1 0.15	01/06/2016	16/06/2016	Sandy silty loam	cfg
65152	BH1 D2 0.50	01/06/2016	16/06/2016	Sandy silty loam	cfg
65153	BH1 D3 1.00	01/06/2016	16/06/2016	Sandy silty loam	cfg
65154	BH1 D4 1.50	01/06/2016	16/06/2016	Sandy silty loam + brick	

Results Summary

Report No.: 16-07323

11-12 Grenville Street, London WC1N 1LZ

			ELAB Reference	65151	65152	65153	65154
			Customer Reference	D1	D2	D3	D4
			Sample ID	MADE GROUND	MADE GROUND	MADE GROUND	MADE GROUND
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sample Location	BH1	BH1	BH1	BH1
			Sample Depth (m)	0.15	0.50	1.00	1.50
			Sampling Date	01/06/2016	01/06/2016	01/06/2016	01/06/2016
Determinand	**Codes**	**Units**	**LOD**				
Metals							
Arsenic	M	mg/kg	1	18.7	n/t	17.4	n/t
Cadmium	M	mg/kg	0.5	< 0.5	n/t	< 0.5	n/t
Chromium	M	mg/kg	5	25.6	n/t	23.0	n/t
Copper	M	mg/kg	5	46.0	n/t	31.6	n/t
Lead	M	mg/kg	5	**1380**	n/t	**1340**	n/t
Mercury	M	mg/kg	0.5	2.7	n/t	1.4	n/t
Nickel	M	mg/kg	5	18.8	n/t	16.4	n/t
Selenium	M	mg/kg	1	< 1.0	n/t	< 1.0	n/t
Zinc	M	mg/kg	5	130	n/t	63.2	n/t
Anions							
Water Soluble Sulphate	M	g/l	0.02	n/t	1.47	n/t	^ 1.53
Inorganics							
Free Cyanide	N	mg/kg	1	f < 1.0	n/t	f < 1.0	n/t
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	n/t	< 0.8	n/t
Total Cyanide	M	mg/kg	1	f < 1.0	n/t	f < 1.0	n/t
Miscellaneous							
Acid Neutralisation Capacity	N	mol/kg	0.1	n/t	< 0.1	n/t	n/t
Loss On Ignition (450℃)	M	%	0.01	n/t	1.97	n/t	n/t
Moisture Content	N	%	0.1	13.8	n/t	19.6	n/t
pH	M	pH units	0.1	10.6	8.4	8.4	^ 8.3
Stones Content	N	%	0.1	23.2	n/t	13.8	n/t
Total Organic Carbon	N	%	0.01	n/t	0.18	n/t	n/t
Phenols							
Phenol	M	mg/kg	1	cf < 1	n/t	cf < 1	n/t
M,P-Cresol	N	mg/kg	1	cf < 1	n/t	cf < 1	n/t
O-Cresol	N	mg/kg	1	cf < 1	n/t	cf < 1	n/t
3,4-Dimethylphenol	N	mg/kg	1	cf < 1	n/t	cf < 1	n/t
2,3-Dimethylphenol	M	mg/kg	1	cf < 1	n/t	cf < 1	n/t
2,3,5-trimethylphenol	M	mg/kg	1	cf < 1	n/t	cf < 1	n/t
Total Monohydric Phenols	N	mg/kg	5	cf < 5	n/t	cf < 5	n/t
Polyaromatic hydrocarbons							
Naphthalene	M	mg/kg	0.1	cf < 0.1	n/t	cf < 0.1	n/t
Acenaphthylene	M	mg/kg	0.1	cf < 0.1	n/t	cf < 0.1	n/t
Acenaphthene	M	mg/kg	0.1	cf < 0.1	n/t	cf < 0.1	n/t
Fluorene	M	mg/kg	0.1	cf < 0.1	n/t	cf < 0.1	n/t
Phenanthrene	M	mg/kg	0.1	cf 0.3	n/t	cf < 0.1	n/t
Anthracene	M	mg/kg	0.1	cf < 0.1	n/t	cf < 0.1	n/t
Fluoranthene	M	mg/kg	0.1	cf 0.6	n/t	cf < 0.1	n/t
Pyrene	M	mg/kg	0.1	cf 0.5	n/t	cf < 0.1	n/t
Benzo(a)anthracene	M	mg/kg	0.1	cf 0.3	n/t	cf < 0.1	n/t
Chrysene	M	mg/kg	0.1	cf 0.3	n/t	cf < 0.1	n/t
Benzo (b) fluoranthene	M	mg/kg	0.1	cf < 0.1	n/t	cf < 0.1	n/t
Benzo(k)fluoranthene	M	mg/kg	0.1	cf < 0.1	n/t	cf < 0.1	n/t
Benzo (a) pyrene	M	mg/kg	0.1	cf 0.3	n/t	cf < 0.1	n/t
Indeno (1,2,3-cd) pyrene	M	mg/kg	0.1	cf 0.3	n/t	cf < 0.1	n/t
Dibenzo(a,h)anthracene	M	mg/kg	0.1	cf < 0.1	n/t	cf < 0.1	n/t
Benzo[g,h,i]perylene	M	mg/kg	0.1	cf 0.3	n/t	cf < 0.1	n/t
Total PAH(16)	M	mg/kg	0.4	cf 3.2	n/t	cf < 0.4	n/t
Total PAH (Including Coronene)	N	mg/kg	2	n/t	cf < 2	n/t	n/t

Tests marked N are not UKAS accredited.

Results Summary

Report No.: 16-07323

11-12 Grenville Street, London WC1N 1LZ

			ELAB Reference	65151	65152	65153	65154
			Customer Reference	D1	D2	D3	D4
			Sample ID	MADE GROUND	MADE GROUND	MADE GROUND	MADE GROUND
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sample Location	BH1	BH1	BH1	BH1
			Sample Depth (m)	0.15	0.50	1.00	1.50
			Sampling Date	01/06/2016	01/06/2016	01/06/2016	01/06/2016
Determinand	**Codes**	**Units**	**LOD**				
BTEX							
Benzene	M	ug/kg	10	cfg < 10.0	n/t	cfg < 10.0	n/t
Toluene	M	ug/kg	10	cfg < 10.0	n/t	cfg < 10.0	n/t
Ethylbenzene	M	ug/kg	10	cfg < 10.0	n/t	cfg < 10.0	n/t
Xylenes	M	ug/kg	10	cfg < 10.0	n/t	cfg < 10.0	n/t
Total BTEX	M	mg/kg	0.01	n/t	cfg < 0.01	n/t	n/t
TPH CWG							
>C5-C6 Aliphatic	N	mg/kg	0.01	cfg < 0.01	n/t	cfg < 0.01	n/t
>C6-C8 Aliphatic	N	mg/kg	0.01	cfg < 0.01	n/t	cfg < 0.01	n/t
>C8-C10 Aliphatic	N	mg/kg	1	cfg < 1.0	n/t	cfg < 1.0	n/t
>C10-C12 Aliphatic	N	mg/kg	1	cfg < 1.0	n/t	cfg < 1.0	n/t
>C12-C16 Aliphatic	N	mg/kg	1	cfg < 1.0	n/t	cfg < 1.0	n/t
>C16-C21 Aliphatic	N	mg/kg	1	cfg < 1.0	n/t	cfg < 1.0	n/t
>C21-C35 Aliphatic	N	mg/kg	1	cfg 7.3	n/t	cfg < 1.0	n/t
>C35-C40 Aliphatic	N	mg/kg	1	cfg < 1.0	n/t	cfg < 1.0	n/t
>C5-C7 Aromatic	N	mg/kg	0.01	cfg < 0.01	n/t	cfg < 0.01	n/t
>C7-C8 Aromatic	N	mg/kg	0.01	cfg < 0.01	n/t	cfg < 0.01	n/t
>C8-C10 Aromatic	N	mg/kg	1	cfg < 1.0	n/t	cfg < 1.0	n/t
>C10-C12 Aromatic	N	mg/kg	1	cfg < 1.0	n/t	cfg < 1.0	n/t
>C12-C16 Aromatic	N	mg/kg	1	cfg < 1.0	n/t	cfg < 1.0	n/t
>C16-C21 Aromatic	N	mg/kg	1	cfg < 1.0	n/t	cfg < 1.0	n/t
>C21-C35 Aromatic	N	mg/kg	1	cfg 7.3	n/t	cfg < 1.0	n/t
>C35-C40 Aromatic	N	mg/kg	1	cfg < 1.0	n/t	cfg < 1.0	n/t
Total (>C5-C40) Ali/Aro	N	mg/kg	1	cfg 14.6	n/t	cfg < 1.0	n/t
Total Petroleum Hydrocarbons							
Mineral Oil	U	mg/kg	5	n/t	cfg < 5	n/t	n/t
PCB (ICES 7 congeners)							
PCB (Total of 7 Congeners)	M	mg/kg	0.03	n/t	c < 0.03	n/t	n/t

Tests marked N are not UKAS accredited.

Results Summary

Report No.: 16-07323

WAC Analysis								
Elab Ref:	65152					**Landfill Waste Acceptance Criteria Limits**		
Sample Date:	01/06/2016					**Inert Waste Landfill**	**Stable Non-reactive Hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample ID:	BH1 D2							
Depth:	0.5							
Site:	11-12 Grenville Street, London WC1N 1LZ							
Determinand		**Code**	**Units**					
Total Organic Carbon		N	%		0.18	3	5	6
Loss on Ignition		M	%		2.0	--	--	10
Total BTEX		M	mg/kg		< 0.01	6	--	--
Total PCBs (7 congeners)		M	mg/kg		< 0.03	1	--	--
TPH Total WAC		M	mg/kg		< 5	500	--	--
Total (of 17) PAHs		N	mg/kg		< 2	100	--	--
pH		M			8.4	--	>6	--
Acid Neutralisation Capacity		N	mol/kg		< 0.1	--	To evaluate	To evaluate
Eluate Analysis			**2:1**	**8:1**	**10:1**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
			mg/l	**mg/l**	**mg/kg**			
Arsenic		N	< 0.005	< 0.005	< 0.05	0.5	2	25
Barium		N	0.028	0.015	0.17	20	100	300
Cadmium		N	< 0.001	< 0.001	< 0.01	0.04	1	5
Chromium		N	0.018	0.007	0.09	0.5	10	70
Copper		N	0.010	< 0.005	< 0.05	2	50	100
Mercury		N	< 0.005	< 0.005	< 0.01	0.01	0.2	2
Molybdenum		N	0.026	< 0.005	< 0.05	0.5	10	30
Nickel		N	0.002	< 0.001	< 0.05	0.4	10	40
Lead		N	0.010	0.007	0.07	0.5	10	50
Antimony		N	< 0.005	< 0.005	< 0.05	0.06	0.7	5
Selenium		N	< 0.005	< 0.005	< 0.05	0.1	0.5	7
Zinc		N	0.010	0.006	0.07	4	50	200
Chloride		N	82.000	8.000	186.00	800	15000	25000
Fluoride		N	< 1	< 1	< 10	10	150	500
Sulphate		N	1320.000	101.000	2740.00	**1000**	20000	50000
Total Dissolved Solids		N	2410.000	280.000	5830.00	**4000**	60000	100000
Phenol Index		N	< 0.01	< 0.01	< 0.10	1	-	-
Dissolved Organic Carbon		N	19.100	10.200	115.00	500	800	1000
Leach Test Information								
Eluent Volume (ml)		N	255	1410				
pH		N	7.7	7.9				
Conductivity (uS/cm)		N	2440	318				
Temperature (℃)		N	20	20				
Solid Information								
Dry mass of test portion (g)			179					
Moisture (%)			20.3					

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ELAB cannot be held responsible for any discrepencies with current legislation

Unit A2, Windmill Road, Ponswood Industrial Estate, St Leonards on Sea, East Sussex, TN38 9BY
Tel: +44 (0)1424 718618, Email: info@elab-uk.co.uk, Web: www.elab-uk.co.uk

Results Summary

Report No.: 16-07323

11-12 Grenville Street, London WC1N 1LZ

Asbestos Qualitative Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #) in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Result
65151	0.15	BH1 D1	Sandy silty loam	No asbestos detected
65153	1.00	BH1 D3	Sandy silty loam	No asbestos detected

Method Summary

Report No.: 16-07323

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
Free cyanide	N	As submitted sample	21/06/2016	107	Colorimetry
Hexavalent chromium	N	As submitted sample	21/06/2016	110	Colorimetry
Aqua regia extractable metals	M	Air dried sample	21/06/2016	118	ICPMS
Phenols in solids	M	As submitted sample	20/06/2016	121	HPLC
PAH (GC-FID)	M	As submitted sample	17/06/2016	133	GC-FID
Water soluble anions	M	Air dried sample	21/06/2016	172	Ion Chromatography
Total cyanide	M	As submitted sample	21/06/2016	204	Colorimetry
Aliphatic hydrocarbons in soil	N	As submitted sample	17/06/2016	214	GC-FID
Aliphatic/Aromatic hydrocarbons in soil	N	As submitted sample	20/06/2016	214	GC-FID
Aromatic hydrocarbons in soil	N	As submitted sample	17/06/2016	214	GC-FID
Low range Aliphatic hydrocarbons soil	N	As submitted sample	20/06/2016	214	GC-MS
Low range Aromatic hydrocarbons soil	N	As submitted sample	20/06/2016	214	GC-MS
Asbestos identification	U	As submitted sample	20/06/2016	PMAN	Microscopy
Leachate					
Arsenic*	N		23/06/2016	101	ICPMS
Cadmium*	N		23/06/2016	101	ICPMS
Chromium*	N		23/06/2016	101	ICPMS
Lead*	N		23/06/2016	101	ICPMS
Nickel*	N		23/06/2016	101	ICPMS
Copper*	N		23/06/2016	101	ICPMS
Zinc*	N		23/06/2016	101	ICPMS
Mercury*	N		23/06/2016	101	ICPMS
Selenium*	N		23/06/2016	101	ICPMS
Antimony	N		23/06/2016	101	ICPMS
Barium*	N		23/06/2016	101	ICPMS
Molybdenum*	N		23/06/2016	101	ICPMS
pH Value*	N		23/06/2016	113	Electrometric
Electrical Conductivity*	N		23/06/2016	136	Probe
Dissolved Organic Carbon	N		23/06/2016	102	TOC analyser
Chloride*	N		23/06/2016	131	Ion Chromatography
Fluoride*	N		23/06/2016	131	Ion Chromatography
Sulphate*	N		23/06/2016	131	Ion Chromatography
Total Dissolved Solids	N		23/06/2016	144	Gravimetric
Phenol index	N		23/06/2016	121	HPLC
WAC Solids analysis	N				
pH Value**	M	Air dried sample	22/06/2016	113	Electrometric
Total Organic Carbon	N	Air dried sample	22/06/2016	210	IR
Loss on Ignition**	M	Air dried sample	22/06/2016	129	Gravimetric
Acid Neutralization Capacity to pH 7	N	Air dried sample	22/06/2016	NEN 737	Electrometric
Total BTEX**	M	As submitted sample	20/06/2016	181	GCMS
Mineral Oil**	U	As submitted sample	17/06/2016	117	GCFID
Total PCBs (7 congeners)	M	Air dried sample	20/06/2016	120	GCMS
Total PAH (17)**	N	As submitted sample	20/06/2016	133	GCFID

Tests marked N are not UKAS accredited

Report Information

Report No.: 16-07323

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

Soil sample results are expressed on an air dried basis
Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
PCB congener results may include any coeluting PCBs
Uncertainty of measurement for the determinands tested are available upon request

Deviation Codes

a	No date of sampling supplied
b	No time of sampling supplied (Waters Only)
c	Sample not received in appropriate containers
d	Sample not received in cooled condition
e	The container has been incorrectly filled
f	Sample age exceeds stability time (sampling to receipt)
g	Sample age exceeds stability time (sampling to analysis)

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

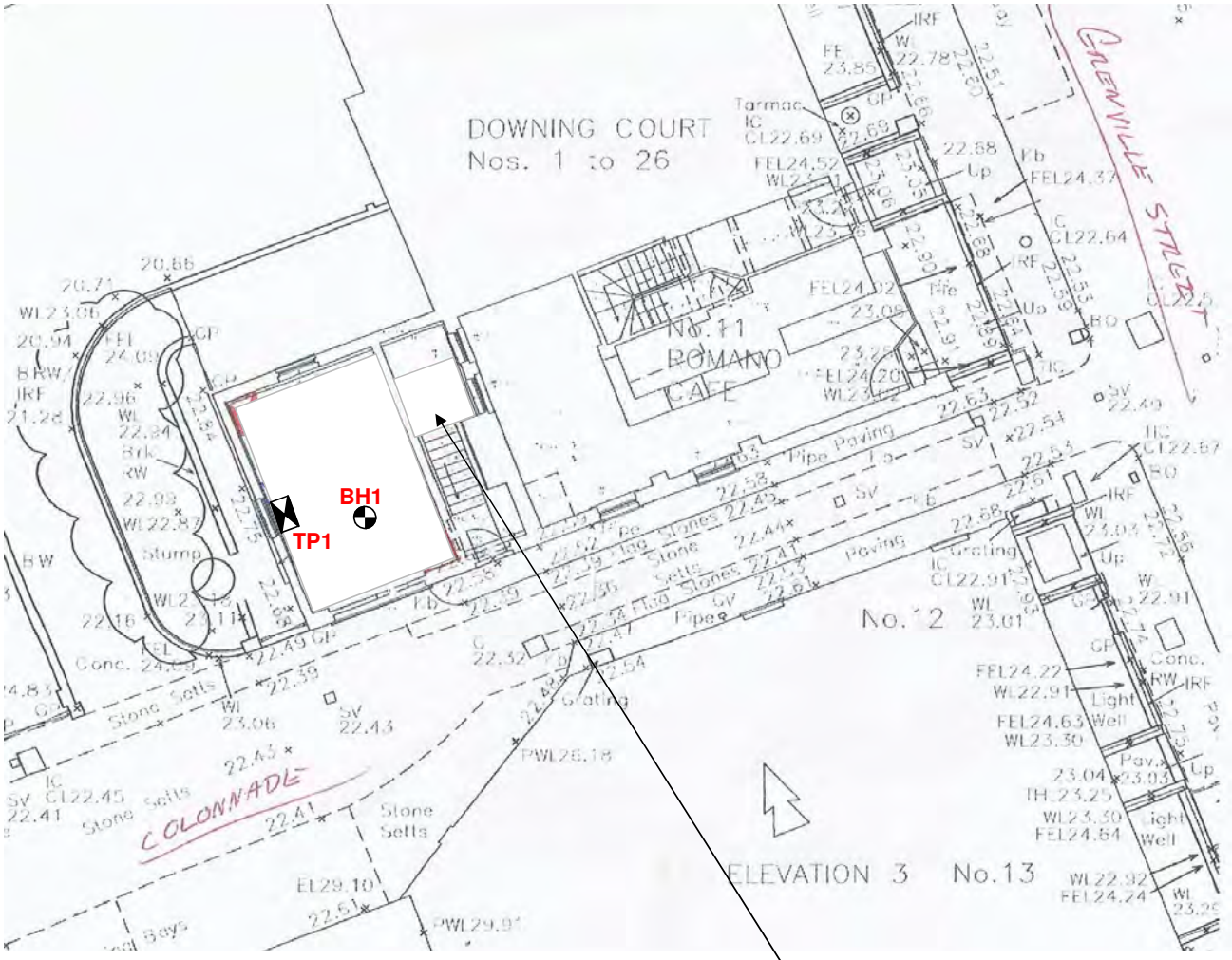
All soil samples will be retained for a period of one month
All water samples will be retained for 7 days following the date of the test report
Charges may apply to extended sample storage

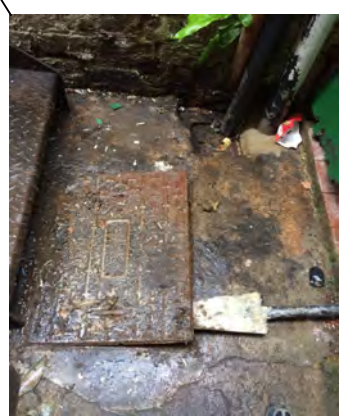
Risk Management Limited
Tel : 01883 343572

GROUNDWATER & GAS MONITORING RESULTS

Project Name:	11-12 Grenville Street, London WC1N 1LZ	Project No. :	RML 6065
		Date :	July 2016

BH No.	Date	Pressure	Oxygen	Carbon Dioxide	Methane	Methane LEL	Flow Rate	Groundwater Level
		(mb)	(%)	(%)	(%)	(%)	(l/hr)	(m)
BH1	1st June 2016	1020	19.8	0.3	0.0	0.0	0	'dry'
	7th June 2016	1021	20.1	0.1	0.0	0.0	0	'dry'
	10th June 2016	1010	20.0	0.2	0.0	0.0	0	'dry'



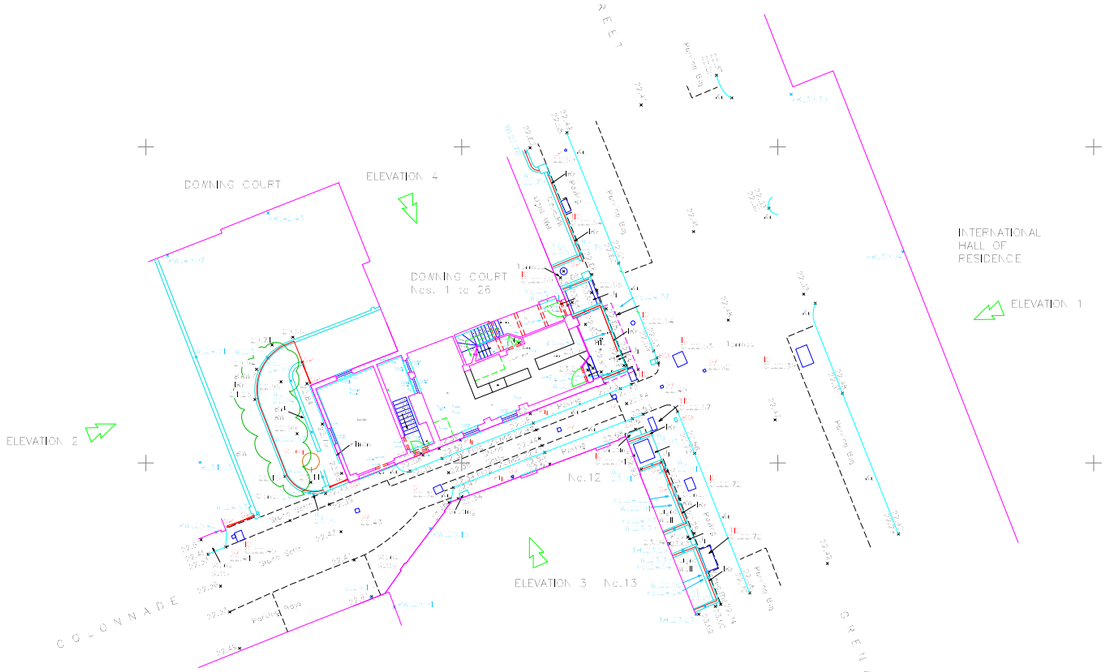


Manhole at bottom of stairs preventing trial pit.

Risk Management	Title : **SKETCH FIELDWORK LOCATION PLAN**	
RISK MANAGEMENT LIMITED Tel : 01883 343572 Fax : 01883 344060	Project Location : 11-12 Grenville Street, London WC1N 1LZ	
	Report Date : July 2016	Scale : NTS
	Drawn By : MSP	Drg. No. RML 6065 /1

APPENDIX E

TOPOGRAPHICAL SITE SURVEY



NOTES

DO NOT SCALE FROM DRAWING
ALL DIMENSIONS TO BE CHECKED ON SITE

NOTES:

ALL MEASUREMENTS ARE TAKEN TO EXISTING SURFACE FINISHES UNLESS STATED OTHERWISE

ALL HEIGHTS ARE IN M

ALL ARROWS POINT UP

ALL LEVELS IN METRES AND RELATE TO GPS CONTROL (OD)

Legend

AV	Air Valve	L/Bin	Litter Bin
BEB	Bellsha Beacon	LB	Letter Box
BH	Borehole	LP	Lamp Post
BL	Bed Level	M/Bole	Multiple Bole
BO	Bollard	Mem	Statue/Memorial
BrS	Brick Setts	MK	Marker
BS	Bus Stop	MS	Milestone
CATV	Cable TV Cover	NB	Notice Board
CB	Control Box	OHC	Overhead Cable
CCTV	Surveillance Camera	OSBM	Bench Mark
CH	Channel	Pav	Paving
CL	Cover Level	Pil	Pillar
Cob	Cobbles	PM	Parking Meter
Col	Column	PO	Post
Conc	Concrete	PWL	Parapet Wall Level
Cul	Culvert	RE	Rodding Eye
Cyc	Cycle Rack	RG	Rough Ground
DA	Drop Away	RL	Ridge Level
Dk	Drop Kerb	RTL	Root Line
DR	Drain	RN	Road Nail
DP	Down Pipe	RNB	Road Name Board
EL	Eave Level	RP	Reflector Post
EIC	Electricity IC	RS	Road Sign
EP	Electricity Pole	RWP	Rain Water Pipe
ER	Earth Rod	Sap	Sapling
FB	Flower Bed	Shr	Shrubs
Fd	Foundations	SL	Sump Level
FEL	Fence Level	Soak	Soakaway
FH	Fire Hydrant	ST	Step
FL	Floor Level	STW	Stay Wire
FP	Flag Pole	SV	Stop Valve
FLT	Floodlights	TacP	Tactile Paving
FRL	Flat Roof Level	TCB	Telephone Call Box
G	Gully	THL	Threshold Level
Gh	Glass House	TIC	Telecom IC
GP	Gate Post	TK	Tank
GV	Gas Valve	Tkm	Ticket Machine
HL	Hedge Level	TL	Traffic Light
Ht	Height	Tm	Tarmac
IC	Inspection Cover	TP	Telegraph Pole
IL	Invert Level	Tr	Tree
IrrV	Irrigation Valve	UTL	Unable To Lift
JB	Junction Box	VP	Vent Pipe
Kb	Kerb	WL	Water Level
KO	Kerb Outlet	WLL	Wall Level
		WM	Water Meter
		ø	Diameter

Boundary Descriptions

Fence Details

Barr	Barrier	Int_F	Interwoven
BWF	Barbed Wire	LLF	Larch Lap
CBF	Close Board	P	Post
CF	Concrete Fence	PCF	Post & Chain
CIF	Corrugated Iron	PRF	Post & Rail
CLF	Chain Link	PWF	Post & Wire
CPF	Chestnut Paling	PWM	Post & Wire Mesh
IRF	Iron Railings	–	–

Wall Details

BFW	Brick and Flint Wall	Ordnance Survey Bench Mark	OSBM
BlkW	Block Wall		
BW	Brick Wall	Temporary Bench Mark	TBM
CW	Concrete Wall		
FW	Flint Wall	Borehole	
RW	Retaining Wall		
SLM	Sloping Masonry		
W	Wall		

All underground service information should be checked prior to any works taking place. The type, size and route of all drainage has been ascertained by visual inspection only.
An arboriculturist must be contacted to verify tree species and descriptions if necessary.

DATE	REVISIONS

HAMPSHIRE LAND SURVEYS LTD
Land, Building and Engineering Surveys

MILL HOUSE
BOTLEY MILLS
BOTLEY
SOUTHAMPTON
HAMPSHIRE SO30 2GB

Tel. 01489 796912
Mobile 07721 423330
E-Mail hampls@aol.com
www.HLSltd.co.uk

CLIENT
Garnett & Partners LLP
Holborn Hall
195 High Holborn
London
WC1V 7BD

PROJECT No. HLS 1793

TITLE
11–12 Grenville Street
London
Site Survey Existing

SCALE 1:200

DRAWN KLB

DATE June 2015

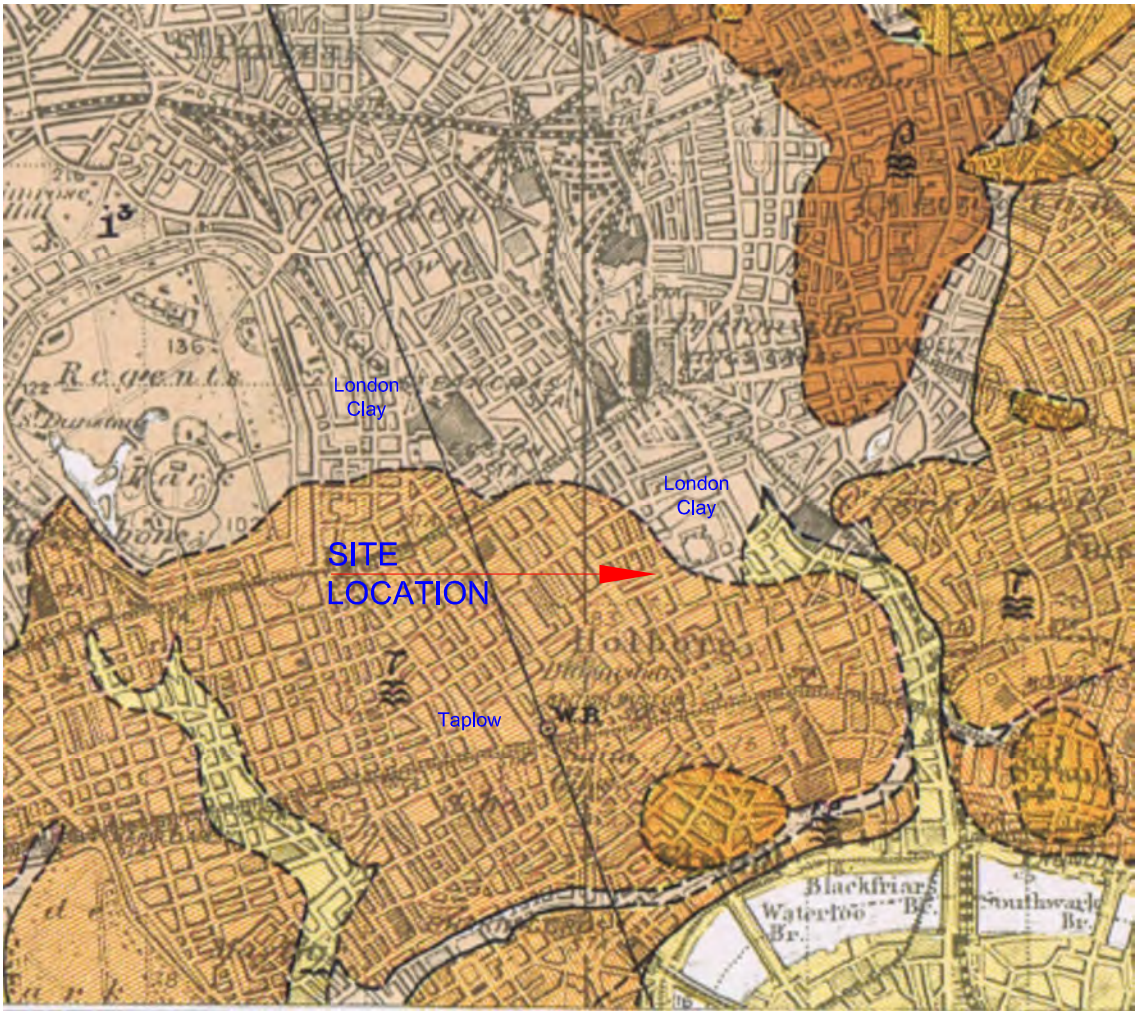
CHECKED DB

DRG No. 1793_15_06_01

REV. –

APPENDIX F

TWS - 8108_BIA_03 – GEOLOGICAL MAP



taylor whalley spyra
consulting civil and structural engineers
3 Dufferin Avenue, Barbican, LONDON EC1Y 8PQ
Tel (020) 7253 2626 Fax (020) 7253 2767
E-mail: tws@tws.uk.com Website: www.tws.uk.com

11-12 GRENVILLE STREET, LONDON, WC1N 1LZ,

GEOLOGICAL MAP OF LOCAL AREA

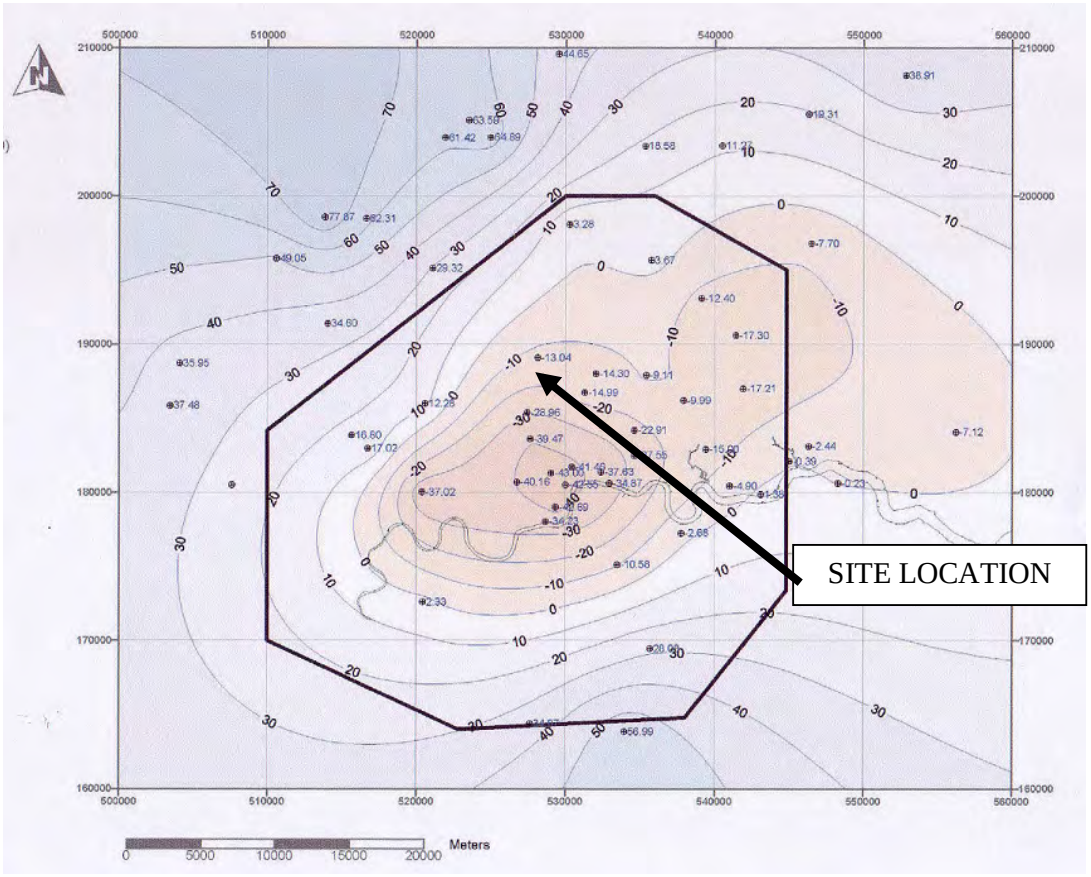
Drawing No. BIA_03

Scales NTS

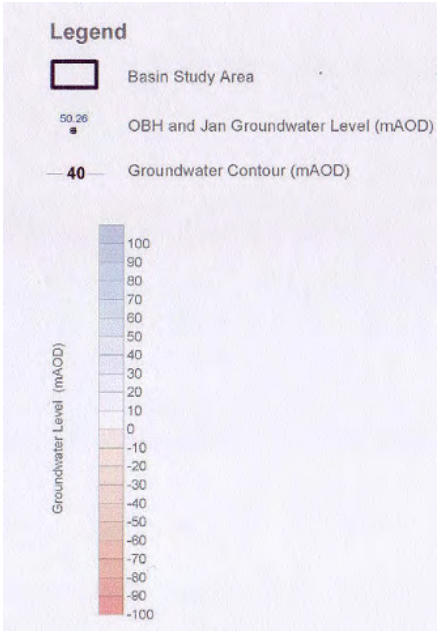
Date 16/05/16

APPENDIX G

ENVIRONMENT AGENCY GROUND WATER LEVELS



ENVIRONMENT AGENCY GROUND WATER MONITORING LEVELS OF THE LONDON BASIN



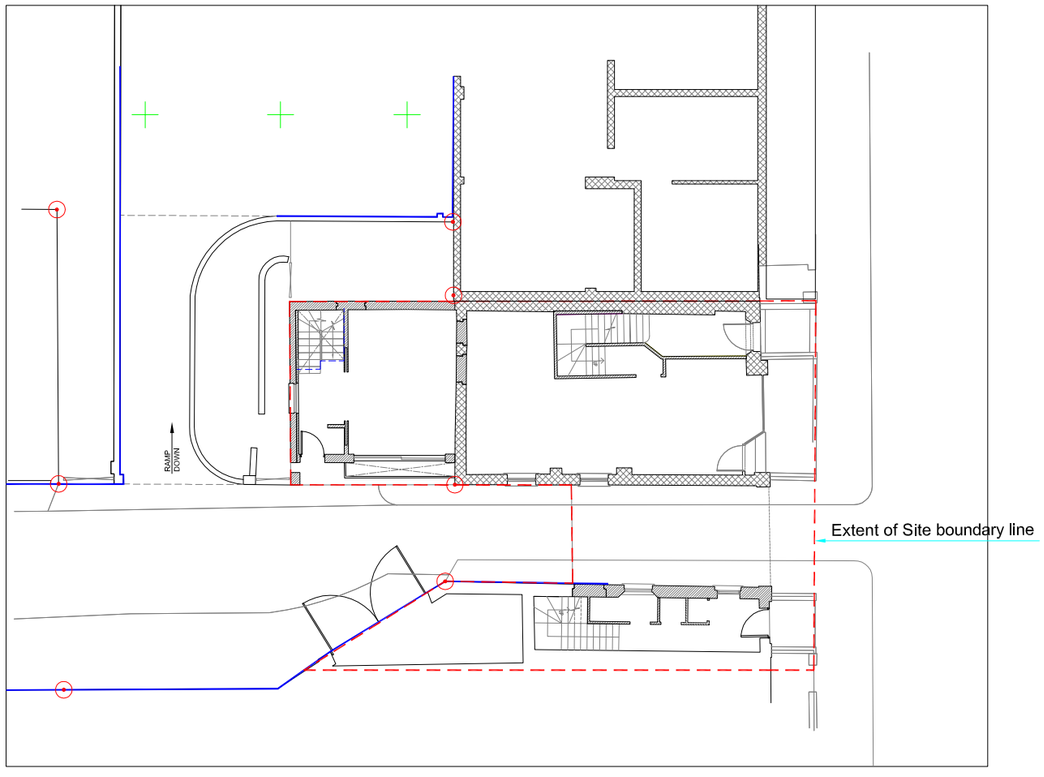
APPENDIX H

TWS – 8108_BIA_04 _ PROPOSED MONITORING OF MOVEMENT AND SETTLEMENT TO SITE AND SURROUNDING AREA

Movement Limits and Responses (ALL ADJACENT BUILDINGS)

Action Level	Response	Ground Surface Level	
		Vert., mm	*Horiz., mm*
Green	No Action	<2	<2
Green / Amber	Re-assess and agree course of action	3 to 5	3 to 5
Red	Stop works and secure adjoining the area	>6	>6

Stated movement limits and responses are subject to final agreement as part of the party wall process with adjoining party wall surveyors



All readings are to be reported to the Supervising Officer and additional members of the team (TBC) within 48 hours of them being made.

The surveying company is to provide a movement survey report with all readings to be provided in a spreadsheet format with accompanying graphs indication the development of each observation with time and appropriate suitable profiles. The accompanying text is to be provided highlighting any trends that are or are likely to be encountered and also record against them the type of work undertaken prior to the readings. Each report is to be dated and referenced and have the site location plan included for easy of locating survey points

If any unusual observations or observations suggesting excessive deformation and/or possible instability are made these should be checked and if confirmed, reported to the Contractor and Engineer immediately.

The survey company is to review the positions show are suitable for surveying from agreed base positions and positions are subject to final site survey.

The survey company is to provide a method statement confirming how the works are to be undertaken giving details of all equipment to be used with data sheets confirming up to date equipment calibration.

Timing of readings (grd level, survey & monitoring)
An initial base reading is to be undertaken 1 month prior to and at start on site and then every 2 weeks from start of underpinning and piling works.
Readings are to be taken every 2 weeks during basement excavation works.
If casting of slabs or removal of propping falls within the 2 week period then take additional reading in between at 1 week.
Once the basement box is completed above ground level readings are to be taken every 2 weeks for 2 months and if a trend of reducing rate of movement is established then revert to readings every 4 weeks
If during any of the readings excessive movement is noted revert back to 1 week readings until 2 weeks after readings show excessive movement has stop.
Then revert back to readings every 4 weeks.

KEY

- Surface levelling studs (~5m c/c)
- Wall(s); precise leveling at ground level (5m c/c by excavation)
- Structures(s); 3D Retro-targets top & bottom of wall (Final locations to be agreed)
- Site Boundary

The movement limits noted on this drawing are taken from basement impact assessment

The contractor is to review this and all other relevant documentation and It is the contractor's responsibility to review the monitoring results and to maintain all ground and building movement within the design parameters and where possible improve upon.

The limits given in the table are the maximum and not to be exceeded and If at any time it is deemed that the movement are likely to be exceeded, the contractor Is to make all necessary arrangement to bring the movement back to within the acceptable limits for the relevant phase or works.

The contractor is to immediately notify the Supervising Officer and Design Team of any such situation and the proposed remedial works.

1. This Drawing to be read In conjunction with all other Engineers, Architects and Specialists drawings and specifications.
2. No dimensions are to be scaled from this drawing.
3. No deviation may be made from the details shown on this drawing without prior agreement of the Engineers.
4. Any discrepancy between this drawing and any other document should be referred Immediately to the Engineer.
6. Concrete to be Grade C35 - DC2

Ref.	Revisions	By	Date

11-12 GRENVILLE STREET,
LONDON,
WC1N 1LZ,

PROPOSED MONITORING OF MOVEMENT AND SETTLEMENT TO SITE AND SURROUNDING AREA

taylor whalley spyra
consulting civil and structural engineers
3 Daffodil Avenue, Barbican, LONDON EC1Y 8PQ
Tel (020) 7253 2626 Fax (020) 7253 2767
E-mail: tws@tws.uk.com Website: www.tws.uk.com

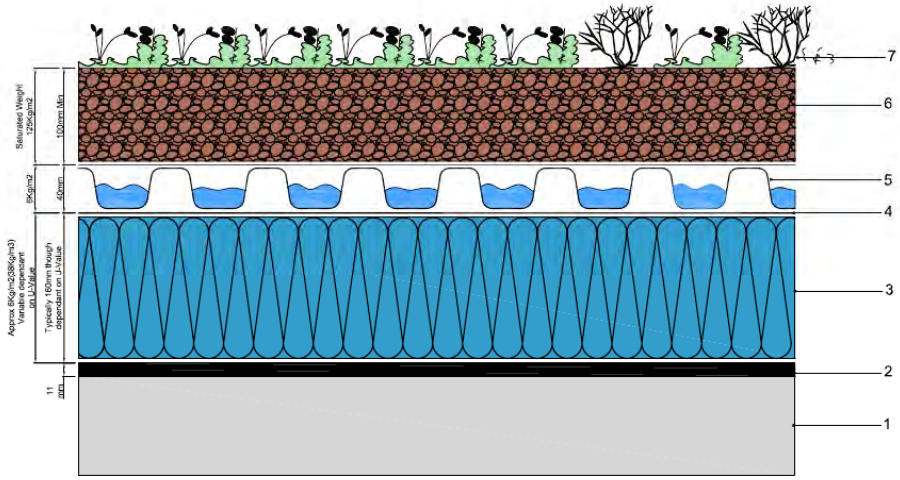
Scale at A1	Date	Drawn By	
NTS	13/05/16	GB	

Project No.	Drg No.	Rev.
8108	BIA_04	-

APPENDIX I

PERMAQUIK 6100 DATA SHEETS

PERMAQUIK 6100 SYSTEM INVERTED SEMI INTENSIVE ROOF GARDEN (FRONT GARDEN)



1. Concrete deck
2. Permaquik 6100 system
   - > Radmat Permaquik 6100 3mm hot melt membrane
   - > Radmat 2016 reinforcement fleece
   - > Radmat Permaquik 6100 3mm hot melt membrane
   - > Radmat 5mm root barrier membrane
3. Extruded polystyrene insulation board
4. Min-K thermal sheet
5. Radmat D40 water retention & drainage board G12 filter membrane
6. Radmat 100% recycled green roof growing media
7. Plant Layer either plug & plant wild flowers/perennials or selected herbs

Note: Expected rainwater retention from 40 litres/m2