METHOD STATEMENT

DOCUMENT NO. 2

BASEMENT EXCAVATION

AT

28-29 HANS PLACE
LONDON
SW1X 0JY

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20 June 2014
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1.0 PROPOSED WORKS

1.1 The proposed works comprise the excavation and construction of a new single storey basement Beneath the existing Lower Ground floor at Nos. 28 & 29 Hans Place, London SW1 beneath the full footprint of the property and part of the back garden at the rear left hand corner.

1.2 The structural design concept comprises “A box in a box”, by construction of a reinforced concrete inner box structure, on the inside of a conventional mass concrete underpinned party and perimeter walls.

1.3 The inner box will comprise reinforced concrete retaining walls, which will be laterally braced by reinforced concrete slabs at Lower Ground floor and new basement floor levels.

The Lower Ground floor slab will comprise a reinforced concrete slab, in conjunction with steel beams and permanent steel formwork.

The basement slab will comprise cast-in-situ reinforced concrete, which will be locally deepened for a swimming pool area.

1.4 Prior to commencement of excavations and underpinning works, the main contractor will undertake superstructure works of temporary propping and bracing of door and window openings.

The Sequence of Temporary Works and Construction will be as follows:-
(See Drawing Nos. 14062/MS-01 to MS-05 attached)

1. Brace door and window openings.
2. Remove lower ground floor.
3. Form a temporary opening in the side wall for machine access.
4. Waling walls and Stage 1 underpinning to front; rear; party wall Nos. 29/30 and gable wall No. 28.
   Install trench boxes as works progress.
   Final excavations to depth by hand. All safety measures to be put in place.
   Cast 1.0 metre depth concrete in bottom, lower in steel columns and backfill around the columns with mass concrete.
6. Install piled walls to rear left hand corner. RC spreader beam over.
7. Install all temporary steelwork for temporary works support of central party wall plus all internal walls above, using steel beam needles and spreader beams.
8. Successive stages of underpinning stages 2–4, with lateral propping installed as works proceed.
   Bulk excavate as works proceed.
9. When all perimeter walls are underpinned to full depth plus foundations and fully laterally restrained, excavate between thrust blocks and cast in sections, the 3.0 metre wide strip of RC foundations for new central row of permanent columns.
10. Install new permanent beam to central party wall at lower ground floor level, overhead the new basement and support on temporary props until new steel columns are installed beneath.

11. Install new row of central columns under, connect to new beam over. Pack and shim beneath column baseplate and fully grout up. The two end bays to be X-braced.

12. Fully pin-up above new beam over (10).

13. Install all new permanent steel beams between new central columns and side walls to carry retained internal walls over (walls above lower ground level). Fully pin-up.


15. Vertical membrane, wall rebar, internal wall shutters and cast new inner box walls in sections. Progressively transfer lateral props and spreaders from faces of underpins to face of inner box walls as works proceed.

16. Install steel beams and permanent steel formwork for new lower ground floor concrete slab on trestle/prop supports.

2.0 UNDERPINNING AND LATERAL PROPPING

2.1 Sections of underpinning are to be numbered 1,2,3,4,5,6,7,8 and are to be undertaken in a sequence 1,4,7,2,5,8,3,6,1,4.

2.2 Individual underpins are to be constructed to width not exceeding 1.2 metres.

2.3 The conventional mass concrete underpinning will be undertaken in alternate bay sequence as noted above, working from within trench enclosures of waling walls and trench struts. These will be constructed alongside the walls which are to be underpinned, leaving a retained soil mass at the centre of the building. The excavations will be propped back to the face of the retained soil mass and secured to 50mm x 225mm timber spreaders. The underpins will be progressively deepened in stages and accompanied by bulk excavations as each stage progresses. The lateral props will be braced back to the thrust blocks as bulk excavations progress.

2.4 At commencement stage, the existing concrete Lower Ground floor slab will be removed using quiet method saw cutting and machine extraction. All perimeter walls would then be underpinned down to 1.5 metres below the existing, working within waling walls, (Stage 1 underpins).
2.5 An initial site strip will then be undertaken, to a depth of 1.0 metre below existing Lower Ground floor level.
Working from this level, a 3 tonne 360 degree excavator will excavate two rows of pits along the longitudinal centre line of the building, to a depth of approximately 5.0 metres and sacrificial steel column sections will be lowered into the pits and the pits filled with concrete to act as temporary vertical supports and thrust blocks for lateral propping during bulk excavations.
The excavation machine will then only be used for spoil handling and bulk excavation, with all further underpinning excavation by hand.

2.6 Continuous steel beam waling spreaders will be attached to the face of the underpinning on a hit and miss basis, with the spreaders propped back to the central soil mass and the thrust blocks.

2.7 The underpinning will be extended down in stages, with each stage having a temporary foundation toe, to maintain full bearing width of the existing foundation.
These toes will be removed after the permanent foundation is completed at final depth.

2.8 As the underpinning continues down, successive layers of lateral waling spreaders will be introduced and propped back to the thrust blocks and the bulk excavations will be extended down.
The bulk excavations will be controlled so that the underpins are at least 1.0 metre lower than the bulk excavation level and accompanied by lateral props back to the thrust blocks at each stage.

2.9 When the formation level is reached and the permanent foundation installed, the lowest level lateral props will be installed above the level of the proposed new inner box reinforced concrete slab.

2.10 The mass concrete underpins will be laterally propped at 3 to 4 levels.
The inner box R.C. walls will be formed in 1.5 metre wide panels and taken up in stages, working between lateral props.

2.11 The lateral props will be transferred from the underpinned wall faces to the faces of the new R.C. walls, as works progress and taken to the thrust blocks.

2.12 The pairs of thrust blocks will be propped between for mutual load transfer and will push against the mass of retained soil mass during the works.

2.13 Underpin shafts are to be excavated to the face of underpins on a top down basis from Lower Ground floor level.
As the excavation proceeds, temporary propping is to be introduced from the face of the exposed excavation to the retained central soil mass, then to thrust blocks.

2.14 Once the formation level of each stage has been reached, temporary timber formwork shuttering should be formed and concrete placed to form the mass concrete underpin section.
2.15 The final level of the underpins shall terminate approximately 75mm below the level of the existing foundations and subsequent underpinning stages, to allow for pinning-up at each underpinning stage. Vertical and horizontal steel dowels between successive underpins.

2.16 Sharp sand and cement dry packing in proportion 1:3 cement:sand to be fully rammed into place with hammer and timber batten between the top of the concrete underpin and the underside of the existing foundation/previously underpinned stage.

2.17 Ensure there are no voids or hollows on completion and that the dry packing has been thoroughly rammed in.

2.18 Additive material TECROC “A” grout add mixture will be mixed with the dry pack to provide small expansion of the dry pack during curing. This will ensure full contact between the previous foundations and the new underpins.

2.19 Concrete for underpinning shall be Grade C35 to BS 5328, ready mixed concrete. Maximum aggregate size 20mm.

2.20 The designated concrete mix for reinforced concrete foundations, plus the “Inner Box” retaining walls; basement slabs and Lower Ground floor levels to be minimum Grade C35 to BS 5328. The concrete will be reinforced. Nominal maximum size of aggregate: 20mm. Concrete cast below ground is to be Class DS-2 Sulphate Resisting Cement concrete. (Reference – Site Investigation Report).

3.0 TEMPORARY VERTICAL PROPPING

3.1 Structural steel columns will be used for temporary supports to steel needle beams.

3.2 Steel needle beams and temporary support columns to be re-cycled where possible.

3.3 Lesser loads will be vertically supported on adjustable MEGASHORES.

3.4 The temporary works have been designed to ensure that there will be no significant movement of the existing and surrounding structures.
4.0 BULK EXCAVATIONS AND PROGRESSION OF BASEMENT CONSTRUCTION

4.1 The bulk excavations will commence at the front of the building, to enable the first section of inner “R.C. Box” to be constructed to the stage of R.C. walls and new basement slab, leaving the lateral props in place.

4.2 As the bulk excavations and each new section of retaining wall construction progress towards the rear, full width lateral props will be installed just above the new basement slab and just below the top of the new R.C. retaining walls, plus intermediate lateral props. The thrust blocks and initial lateral props will be retained until each full section of inner box is completed and then removed as one of the last stages.

4.3 The new foundations for the new row of free standing columns along the centre of the building, will comprise a 3.0 metre wide strip of reinforced concrete 1.0 metre thick, to run from front to rear of the building.

4.4 The new R.C. Lower Ground floor slab will be constructed, leaving a central access opening for materials removals. The access opening will be infilled when no longer required.

4.5 When the reinforced concrete inner “box” is completed and all vertical loads transferred to permanent foundations, remove temporary propping.

5.0 GENERAL CONSTRUCTION TECHNIQUES

5.1 Excavate to investigate the extent of the existing building foundations for all walls, by removing existing Lower Ground floor slabs as necessary.

5.2 Install conveyor belt system, which will be situated at the front of 28 Hans Place and supported on the scaffolding at the front of the property. The conveyor will discharge directly into road licenced vehicles which will be positioned on the highway at the front of the building. Parking bay suspensions will be required. The site hoarding will be adjusted to suit. A second conveyor may also be installed, to discharge to waiting dumpers at the side garden. Grab lift discharge to disposal vehicles.

5.3 Monitoring stations to detect any settlement in the footings during the course of the excavation will be installed on the existing brickwork prior to any excavation commencing and base readings taken.

5.4 The excavation will be completed across the site to expose the underside of the existing foundations prior to commencement of underpins. A storage area in the rear garden will be created for materials and equipment.
All material will be disposed off site using the conveyor belt loading systems into road licenced vehicles.

5.5 The underpins will be completed in depths of 1.2 to 1.5 metres depending on the ground conditions. The underpins will be carried out in a 3 or 4 sequence to suit the location. Where indicated on the drawings, polystyrene void formers will be used to isolate load paths.

5.6 Concrete for the underpins will be ready mixed and delivered. Underpins will have a letterbox opening to allow the concrete to flow into the forms and fully compact under the underpins.

5.7 The bulk excavation will be by 3t excavator loading onto the conveyor belt from an adjacent stockpile. Spoil will then be removed by road licenced vehicles for disposal to a suitably licenced tip.

5.8 On completion of the underpins, concrete blinding will be cast over the whole footprint of the new basement structure. Sump pits to be cast in the basement raft slab.

5.9 The pit for the proprietary pump station will be formed to the rear.

5.10 The concrete will be placed by concrete pump positioned off the carriageway within the scaffold at the front of the property with a fixed line through the house. A polythene lined plywood box will be used to collect any concrete wash out to prevent any damage to the carriageway and contamination of the sewerage system.

5.11 The perimeter walls will be constructed to the thickness indicated on the Engineers drawings. Walls will be cast in a maximum of 2m lengths between basement and lower ground floor slab, and placed with static line pump.

5.12 New external walls will be formed to incorporate part of the existing back garden of No. 28 Hans Place into the new basement, with a concrete slab over, at existing lower ground floor level. One metre depth of soil will be reinstated over the new slab.

5.13 The permanent works structure will comprise a basement raft slab and in situ concrete perimeter walls with watertight concrete to provide Type B watertight construction. The “box” will be completed by a new concrete slab at lower ground floor level. The walls and floor will also have an internal tanking membrane providing an additional Type C construction as defined in BS 8102. Waterproofing works will be carried out under a separate contract.

5.14 The proposed techniques have been developed in order to maintain the integrity of the existing and surrounding structures and utilities.
Access/Egress

5.15 All access to the site will be in through the site entrance on Hans Place. Traffic flows and controlled routes will be in accordance with the parameters to be set out in the Traffic Management Plan. No vehicles will be allowed to access the site prior to 8.00am and all vehicle operators will be advised on issues relating to neighbours and requirements of London Borough of Kensington and Chelsea.

A conveyor belt system will be used to load vehicles, which will be sheeted prior to leaving the site to licenced tip. It is not intended that the vehicles will leave the highway and therefore the wheels should not have any debris from the site. A Banksman will be in attendance at all times and will clear any debris that may overspill from the vehicle.

Concrete will be pumped from the front of the building using a static pump and fixed discharge line. Concrete wagons will be parked on the carriageway at the front of the site.

Wash out for concrete wagons will be into skips on site to prevent wash water running into the public sewerage system.

5.16 There are no tunnels or man-made cavities beneath the site.

5.17 The development will not initiate slope instability to threaten the neighbours. The impact of the Subterranean Development upon surface water will have no significant effect. (Refer to attached report – Description of Existing Building (Hydrology)).

The existing arrangements for sewage and surface water drainage will be maintained. The existing surface water and sewage drainage will be maintained and simply diverted at existing discharge level. The sewage from the new basement construction will be pumped-up, to discharge to mains gravity drainage above.

5.18 Proposed Subterranean Development has been engineered to ensure that there will be no significant impact upon the existing and adjoining buildings, especially Listed Buildings.

5.19 There will be no impact upon any existing or proposed trees on the site.

5.20 The techniques and sequencing of the Temporary Works is as shown on the drawings in order to ensure that there will be no significant effect on the neighbours.

5.21 The proposed methods of Temporary Works mitigates the effects upon neighbours and the design and techniques are shown on the drawings, on a step-by-step basis.
Plant and Equipment

5.22 The site will be managed by a full time Foreman Chargehand with visiting assistance from a Project Supervisor for the procurement of materials. The Site Supervisor holds up to date SMSTS qualifications.

During the excavation stage of the project, it is envisaged that the project will be led by a site based working Foreman and Chargehand with operatives at the workforce and a Banksman, who will direct vehicles at the entrance of the site and main pedestrian routes on Hans Place.

The main items of plant will include a 3t 360 degree excavator operated by a competent driver. There will also be a conveyor belt system to remove materials for disposal off site, plus dumper.

As the programme progresses towards the concrete construction stage, the site team will comprise the Foreman and Chargehand, together with tradesmen and supporting operatives. The 3t 360 degree excavator will also be used for handling and offloading materials at site with suitably rated and tested lifting equipment.

All plant and hand tools will be appropriately tested and certified.

Operatives using hand held break out and vibrating equipment will be limited to using equipment in accordance with the manufacturers’ instructions to minimise the risk of hand arm vibration.

The Excavator will carry all of the necessary Test Certificates and only Operators with the appropriate Certificates will be permitted to drive.
A dumper will be used to carry the excavated material to the temporary stockpile in preparation for disposal. The Driver will also carry the relevant Certification for this.

Operatives using particular hand tools including hand held grinders and impact guns will also be required to have Certificates and appropriate PPE.

Materials

5.16 All materials used in the works will have a COSHH assessment.

The main hazard during the course of these operations will be the risk of cement burns from exposure to wet concrete.

It is not suspected that any materials or products containing chemicals or solvents will be used within the concreting and underpinning works. Follow manufacturers’ instructions for additive to dry packing.
5.17 **Risks and Controls**

A risk assessment has been developed for:-

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<th>Risk</th>
<th>Controls</th>
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<tr>
<td>Supporting existing structures</td>
<td>Temporary works design</td>
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<tr>
<td>Working in confined spaces</td>
<td>Assess Ventilation</td>
</tr>
<tr>
<td>Handling concrete and materials</td>
<td>PPE requirements</td>
</tr>
<tr>
<td>Operating excavator and conveyor system</td>
<td>Competent operators</td>
</tr>
<tr>
<td>Manual handling</td>
<td>Weight assessments</td>
</tr>
</tbody>
</table>

5.18 **Personal Protective Equipment**

Personal protective equipment appropriate for the works being undertaken should be provided and works at all times.

Confined space working at the face of the excavation will require appropriate air monitoring and escape equipment as necessary.

Operatives involved in the breakout of brickwork and concrete using hand held equipment will be time restricted in accordance with the manufacturers’ instructions to minimise the risk of hand arm vibration. Gloves will be worn as appropriate.

In particular, handling of reinforcement and concrete. All Operatives undertaking concrete works should cover exposed skin and wear gloves and appropriate footwear at all times.

6.0 **DE-WATERING**

6.1 In view of the results of the site investigation, it is unlikely that water will be encountered at the lowest stage of the lowest investigations.

6.2 In the event that any perched ground water is encountered during the course of excavation, a localised excavated sump of size 1.0M x 1.0M x 1.0M will be formed at a lower level than the progressive phase of the excavation being carried out.

6.3 A timber perforated plywood shell will be constructed as a box to support the perimeters of any temporary working sump and placed within the sump zone.

6.4 Any ground water which is present will naturally be drawn to the sump area and from that point, a 50mm diameter suitable water pump will be introduced, with a 50mm diameter discharge hose which will then be taken to the nearest manhole for water disposal.
7.0  MOVEMENT MONITORING

7.1  The proposals for movement monitoring during the works are as the attached Monitoring Specification.

END OF METHOD STATEMENT
BRYAN PACKMAN MARCEL
20 June 2014
APPENDIX A

PROPOSED MOVEMENT MONITORING REGIME
DURING STRUCTURAL WORKS PHASE
NEW BASEMENT CONSTRUCTION

APPENDIX A TO METHOD STATEMENT

PROPOSED MOVEMENT MONITORING REGIME
DURING STRUCTURAL WORKS PHASE

Job No. 14062

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Tel: 0207 8347899
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20 June 2014
PROPOSED MOVEMENT MONITORING

The proposed method for movement monitoring is by means of fixed target points with cross-hair stadia lines, to be read from pre-established station points using total station instrument for line and level.

The targets would be secured to the existing walls at the locations (to be agreed) just above Lower Ground and just below 1st floor level internally, plus a vertical external array on the front wall in order to check for any horizontal or vertical movement at basement level and above, during the structural works. They would be read from pre-established station points.

For increased assurance during construction, it is also proposed to record Disto observations from external reference points to detect any changes in distances between the internal wall faces.

The System and Monitoring Regime would include:-

1. Installation of 35 No. fixed targets (15 No. at just above ground floor and 4 No. just below 1st floor plus 10 No. at the front elevation). 6 No. targets on side gable and rear walls.

2. Installation of level datums on Hans Place outside the zone of influence of construction.

3. Two sets of base readings taken prior to construction works.

4. Installation of Disto targets and fixings on the internal walls.

5. Weekly monitoring during construction works and for one month afterwards then monthly monitoring for two further months.

6. A “traffic light” system to be operated with “Amber” being set at 8mm horizontal or vertical movement and “Red” set at 12mm.

At Amber, the monitoring to be increased to twice weekly and reports sent out within 4 days, allowing for weekends.

At Red, the works are to stop and the Contractor is to make the site safe, with reports to be submitted to the Party Wall Surveyors. Immediate reporting in event of Red.

Results of horizontal and vertical movement to be plotted on separate graphs in addition to being shown in tabular form.

BRYAN PACKMAN MARCEL
20 June 2014
APPENDIX B

SITE INVESTIGATION REPORT & CHEMICAL ANALYSIS
17th September 2013

Bryan, Packman, Marcel
26 Moreton Street
London
SW1V 2PE

Dear Sirs,

Re: 28-29 Hans Place, London, SW1X

Geotechnical Investigation

1.0 Introduction

1.01 In accordance with your instructions, we visited the above site during August 2013.

1.02 The purpose of our visit was to undertake a single percussive drilled borehole with two hand excavated trial pits.

1.03 The comments and opinions expressed are based purely on the conditions encountered and the subsequent laboratory.

1.04 Therefore, it is possible that some special conditions prevailing on site have not been encountered or taken into account.

1.05 All groundwater recordings or their absence relate to short term observations and do not allow for fluctuations due to seasonal or other effects.
H & E SI

2.0 Description of Site

2.01 At the time of our visit the site consisted of a triple storey residential structure, with various soft and hard landscaped areas surrounding it.

2.02 The site is shown within the British Geological Survey online Geology Viewer (Scale 1:50 000, Solid & Drift), which shows that the site situated within an area of Kempton Park Gravel.

3.0 Fieldwork

3.01 The hand excavated trial pit were undertaken upon the existing structure in order to detail the existing footings. The percussive drilled borehole was undertaken within the rear garden, in order to establish geology at depth. The trial pit/borehole locations are shown on the site plan forming appendix one.

3.02 The various strata encountered were noted and are recorded within the borehole logs forming appendix two.

3.03 Bulk samples were recovered from the boreholes, as noted within the associated log for laboratory testing.

3.04 The location, type and height of any trees should be taken from a survey for later use with NHBC Chapter 4.20, if required.

4.0 Laboratory Testing

4.01 All samples were tested in accordance with BS:1377:1990 Methods of Test for Soils for Civil Engineering purposes.

4.02 Selected samples were tested to determine their, Moisture Content, Atterburg Limits, Particle Size Distribution, Soluble sulphate content and pH value.

4.03 The results of all laboratory testing are summarised in appendix three.
5.0 Fieldwork Results

Trial Pit Result

5.01 Trial pit one (a & b), encountered as mass concrete footing founded beyond 1.20m.

5.02 Trial pit two, recorded mass concrete stepping out 700mm from the face of the wall, and 0.95m in depth.

Borehole Results

5.03 Borehole one, encountered made ground to 1.80m, with a firm-stiff orange brown mottled light grey sandy CLAY with occasional fine gravel seen beyond to a depth of 4.40m. Beyond this and seen to the close of the borehole at 7.00m a dense orange brown SAND & GRAVEL was encountered.

5.04 The trial pit/borehole logs can be found forming appendix two.

Other Observations from Site Works

5.05 No groundwater water was encountered within the excavations undertaken.

5.06 Within the underlying geology SPT 'N' values of 16-100+ were achieved. Therefore a safe bearing capacity of 150kn/m² can be used within the design.

6.0 Laboratory Testing Results

6.01 The laboratory testing proved the CLAY to be of Low-Intermediate plasticity (PI=14-20%) which indicates a Low-Medium susceptibility of movement associated with moisture content change.

6.02 Laboratory testing proved the SANDS & GRAVEL'S to contain less than 35% fines which indicates they are not susceptible to movement associated with moisture content change.

6.03 Samples have been tested in accordance with BRE Digest 363 in order to confirm the likelihood of sulphate attack on any concrete used. From the information gained, we can say that the subsoil contains more than 0.50g/l of soluble sulphate, therefore any concrete in contact with the subsoil would be required to be of class 'DS-2' sulphate resistant cement.
In addition to the geotechnical testing above, we were asked to recover two samples for 'Muck Away' testing. The results of this testing can be found within the attached appendices and should be passed on to the intended recipient of the material, for classification.

We hope that this is satisfactory, however if you should require any further information, please do not hesitate to contact us.

Yours faithfully,

D.A. Hudd
Contract Engineer

M. R. Smith M.Sc
Principal Engineer
Existing Footing Detail

Trial Pit One (a)

No Roots

Paving over Sand

Compact dark brown silty/sandy slightly claybound brick hardcore = FILL

Closed @ 1.20m

Trial pit Collapsing

NOTES

= Standing Water

= Water Strike

= Bulk Sample

= Shear Vane Test (kN/M²)

= SPT 'N' - Value

Scale 1 : 20
Existing Footing Detail

Trial Pit One (b)

No Roots

Paving over Sand

Compact dark brown silty/sandy slightly claybound brick hardcore – FILL

Closed @ 1.20m

Trial pit Collapsing

NOTES

\[ \text{Standing Water} = \text{Standing Water} \]
\[ \text{Water Strike} = \text{Water Strike} \]
\[ \text{Bulk Sample} = \text{Bulk Sample} \]
\[ \text{Shear Vane Test (kN/M}^2\text{)} = \text{Shear Vane Test (kN/M}^2\text{)} \]
\[ \text{SPT 'N'–Value} = \text{SPT 'N'–Value} \]
Trial Pit Two

No Roots

VOID

Closed @ 0.95m
No Progress

NOTES

= Standing Water
= Water Strike
B = Bulk Sample
V = Shear Vane Test (kN/M²)
N = SPT 'N' Value

Scale 1 : 20
# Borehole One

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<th>Thickness (m)</th>
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<th>Samples No.</th>
<th>S.P.T. N-Value or Vane Strength (lbf/ft²)</th>
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Remarks:  
Scale 1:50

Key:
- U = Undisturbed Sample
- B = Bulk Sample
- D = Disturbed Sample
- W = Water Sample
- N = S.P.T. N-Value
- V = Vane Strength (lbf/ft²)

Note: (100mm diameter)
<table>
<thead>
<tr>
<th>Borehole No.</th>
<th>Depth (m)</th>
<th>Sample</th>
<th>Natural Moisture Content (%)</th>
<th>Liquid Limit (%)</th>
<th>Plastic Limit (%)</th>
<th>Plasticity Index (%)</th>
<th>Group Symbol</th>
<th>Amended Plasticity Index (%)</th>
<th>Roots Present</th>
<th>Desiccation Profile</th>
<th>Percentage Retained on 425 Micron Sieve (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.00</td>
<td>U2</td>
<td>23</td>
<td>40</td>
<td>20</td>
<td>20</td>
<td>CI</td>
<td>20</td>
<td>No</td>
<td>Nil</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>2.00</td>
<td>U3</td>
<td>19</td>
<td>29</td>
<td>12</td>
<td>17</td>
<td>CL</td>
<td>17</td>
<td>No</td>
<td>Slight</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>3.00</td>
<td>U4</td>
<td>20</td>
<td>28</td>
<td>14</td>
<td>14</td>
<td>CL</td>
<td>14</td>
<td>No</td>
<td>Nil</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>4.00</td>
<td>U5</td>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Nil</td>
<td>0</td>
</tr>
</tbody>
</table>
PARTICLE SIZE DISTRIBUTION

Particle Size Distribution (mm)

<table>
<thead>
<tr>
<th>CLAY</th>
<th>FINE</th>
<th>MEDIUM</th>
<th>COARSE</th>
<th>FINE</th>
<th>MEDIUM</th>
<th>COARSE</th>
<th>FINE</th>
<th>MEDIUM</th>
<th>COARSE</th>
<th>COBBLES</th>
</tr>
</thead>
</table>

Site: 28-29 Hans Place, London, SW1X

Borehole No.: 1

Sample No.: U6

Depth: 5.00m

Description of Soil:

British Standard Sieve Test As Per Test (7a)

53% Gravels
42% Sands
5% Fines
**Particle Size Distribution**

- **Clay**
- **Fine**
- **Medium**
- **Coarse**
- **Silt**
- **Fine**
- **Medium**
- **Coarse**
- **Sand**
- **Fine**
- **Medium**
- **Coarse**
- **Gravel**
- **Cobbles**

**Site**: 28-29 Hans Place, London, SW1X

**Borehole No.**: 1

**Sample No.**: U7

**Depth**: 6.00m

**Description of Soil**: British Standard Sieve Test As Per Test (7a)
PARTICLE SIZE DISTRIBUTION

Particle Size Distribution (mm)

CLAY | FINE | MEDIUM | COARSE | FINE | MEDIUM | COARSE | FINE | MEDIUM | COARSE | COBBLES
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
63  | 1.50 | 2.12 | 2.00 | 2.40 | 5.63 | 10.20 | 20.60 | 50.60 | 100

Site: 28-29 Hans Place, London, SW1X

Borehole No.: 1

Sample No.: U7

Depth: 7.00m

Description of Soil:

British Standard Sieve Test As Per Test (7a)
### SULPHATE ANALYSIS TEST RESULTS

<table>
<thead>
<tr>
<th>Borehole No.</th>
<th>Depth (m)</th>
<th>Sample</th>
<th>Concentrations of Soluble Sulphate</th>
<th>Soil Classification</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total SO₄ (%)</td>
<td>SO₄ in 2:1 Water:soil (g/l)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2.00</td>
<td>U3</td>
<td>0.57</td>
<td></td>
<td>7.37</td>
</tr>
<tr>
<td>1</td>
<td>4.00</td>
<td>U5</td>
<td>0.63</td>
<td></td>
<td>7.29</td>
</tr>
</tbody>
</table>
Herts & Essex Site Investigations
The Old Post Office
Wellpond Green, Standon
Ware, Hertfordshire
SG11 1NJ

FAO D Hudd
09 September 2013

Dear D Hudd

Test Report Number  237837
Your Project Reference  11648 - 28-29 Hans Place, London, SW1X

Please find enclosed the results of analysis for the samples received 3 September 2013.

All soil samples will be retained for a period of one month and all water samples will be retained for 7 days following the date of the test report. Should you require an extended retention period then please detail your requirements in an email to customerservices@chemtest.co.uk. Please be aware that charges may be applicable for extended sample storage.

If you require any further assistance, please do not hesitate to contact the Customer Services team.

Yours sincerely

Darrel Hall, Director

Notes to accompany report:
- The sign < means 'less than'
- Tests marked 'U' hold UKAS accreditation
- Tests marked 'F' hold MCertS (and UKAS) accreditation
- Tests marked 'N' do not currently hold UKAS accreditation
- Tests marked 'S' were subcontracted to an approved laboratory
- 'N/E' means 'not evaluated'
- 'U/S' means 'insufficient sample'
- 'U/S' means 'unsuitable sample'
- Comments or interpretations are outside of the scope of UKAS accreditation
- The results relate only to the items tested
- Stoichiometries represent the quantity of material removed prior to analysis
- All results are expressed on a dry weight basis
- The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, phenols
- For all other tests the samples were dried at < 37°C prior to analysis
- Uncertainties of measurement for the determinands tested are available upon request
- Soil descriptions, including colour and texture, are beyond the scope of MCertS accreditation
- None of the test results included in this report have been recovery corrected
LABORATORY TEST REPORT

Results of analysis of 2 samples
received 3 September 2013

11648 - 28-29 Hans Place, London, SW1X

Login Batch No

<table>
<thead>
<tr>
<th>Chemtest LIMS ID</th>
<th>237837</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample ID</td>
<td>AJ12234 AJ12235</td>
</tr>
<tr>
<td>Sample No</td>
<td>BH1    BH1</td>
</tr>
<tr>
<td>Sampling Date</td>
<td>T1     T2</td>
</tr>
<tr>
<td>Depth</td>
<td>30/8/2013 30/8/2013</td>
</tr>
<tr>
<td></td>
<td>1.00m   2.00m</td>
</tr>
<tr>
<td>Matrix</td>
<td>SOIL   SOIL</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>SOP</th>
<th>Determinand</th>
<th>CAS No</th>
<th>Units</th>
<th>Result</th>
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<tbody>
<tr>
<td>2030</td>
<td>Moisture</td>
<td>%</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>15.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9.15</td>
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<tr>
<td></td>
<td>Stones content (&gt;50mm)</td>
<td></td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>2040</td>
<td>Soil colour</td>
<td>%</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>brown</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>brown</td>
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<tr>
<td></td>
<td>Soil texture</td>
<td>%</td>
<td></td>
<td>M</td>
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<td>Other material</td>
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<td></td>
<td>stones</td>
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<tr>
<td>2010</td>
<td>pH</td>
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<td></td>
<td>M</td>
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<tr>
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<td></td>
<td></td>
<td>8.6</td>
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<td></td>
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<td></td>
<td></td>
<td>7.9</td>
</tr>
<tr>
<td>2020</td>
<td>Electrical Conductivity (2:1)</td>
<td>EC</td>
<td>µS cm⁻¹</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>190</td>
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<td></td>
<td></td>
<td>230</td>
</tr>
<tr>
<td>2300</td>
<td>Cyanide (free)</td>
<td>mg kg⁻¹</td>
<td>M</td>
<td>&lt;0.50</td>
</tr>
<tr>
<td></td>
<td>Cyanide (total)</td>
<td>mg kg⁻¹</td>
<td>M</td>
<td>&lt;0.50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.50</td>
</tr>
<tr>
<td>2625</td>
<td>Organic matter</td>
<td>%</td>
<td></td>
<td>M</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>1.7</td>
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<td></td>
<td>0.43</td>
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<tr>
<td>2120</td>
<td>Boron (hot water soluble)</td>
<td>mg kg⁻¹</td>
<td>M</td>
<td>&lt;0.4</td>
</tr>
<tr>
<td></td>
<td>Sulfate (2:1 water soluble) as SO4</td>
<td>g l⁻¹</td>
<td>M</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td></td>
<td>Chromium (hexavalent)</td>
<td>mg kg⁻¹</td>
<td>M</td>
<td>&lt;0.5</td>
</tr>
<tr>
<td></td>
<td>Sulfate (total) as SO4</td>
<td>mg kg⁻¹</td>
<td>M</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>2450</td>
<td>Arsenic</td>
<td>mg kg⁻¹</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cadmium</td>
<td>mg kg⁻¹</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chromium</td>
<td>mg kg⁻¹</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Copper</td>
<td>mg kg⁻¹</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mercury</td>
<td>mg kg⁻¹</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nickel</td>
<td>mg kg⁻¹</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lead</td>
<td>mg kg⁻¹</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Zinc</td>
<td>mg kg⁻¹</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>2870</td>
<td>TPH &gt;C5-C6</td>
<td>mg kg⁻¹</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TPH &gt;C6-C7</td>
<td>mg kg⁻¹</td>
<td>U</td>
<td></td>
</tr>
</tbody>
</table>

*The sample container/fill level was not appropriate for the specified analysis - these results may be compromised. The accreditation for these results remains unaffected.*
# LABORATORY TEST REPORT

Results of analysis of 2 samples received 3 September 2013

Report Date 09 September 2013

11648 - 28-29 Hans Place, London, SW1X

| 237837 | | |
|--------|--------|
| 2670 | TPH >C7-C8 | mg kg⁻¹ | M | < 0.1⁺ | < 0.1⁺ |
| | TPH >C8-C10 | mg kg⁻¹ | M | < 0.1⁺ | < 0.1⁺ |
| | TPH >C10-C12 | mg kg⁻¹ | M | < 0.1⁺ | < 0.1⁺ |
| | TPH >C12-C16 | mg kg⁻¹ | M | 3.4⁺ | 0.23⁺ |
| | TPH >C16-C21 | mg kg⁻¹ | M | 8.0⁺ | 2.9⁺ |
| | TPH >C21-C35 | mg kg⁻¹ | M | 20.1⁺ | 10.1⁺ |
| | Total Petroleum Hydrocarbons | mg kg⁻¹ | U | 31.1⁺ | 13.1⁺ |
| 2700 | Naphthalene | 91203 | mg kg⁻¹ | M | < 0.1 | < 0.1 |
| | Acenaphthylene | 208968 | mg kg⁻¹ | M | 0.1 | < 0.1 |
| | Acenaphthene | 83329 | mg kg⁻¹ | M | 0.18 | < 0.1 |
| | Fluorene | 86777 | mg kg⁻¹ | M | < 0.1 | < 0.1 |
| | Phenanthrene | 85018 | mg kg⁻¹ | M | 0.86 | 0.11 |
| | Anthracene | 120127 | mg kg⁻¹ | M | 0.32 | < 0.1 |
| | Fluoranthen | 206440 | mg kg⁻¹ | M | 1.8 | < 0.1 |
| | Pyrene | 129000 | mg kg⁻¹ | M | 1.6 | < 0.1 |
| | Benzo[a]anthracene | 56553 | mg kg⁻¹ | M | 0.89 | < 0.1 |
| | Chrysene | 218019 | mg kg⁻¹ | M | 1.1 | < 0.1 |
| | Benzo[b]fluoranthene | 205902 | mg kg⁻¹ | N | 0.98 | < 0.1 |
| | Benzo[k]fluoranthene | 207689 | mg kg⁻¹ | N | 0.59 | < 0.1 |
| | Benzo[a]pyrene | 50328 | mg kg⁻¹ | M | 1.2 | < 0.1 |
| | Dibenzo[a,h]anthracene | 53703 | mg kg⁻¹ | M | 0.1 | < 0.1 |
| | Indeno[1,2,3-cd]pyrene | 193395 | mg kg⁻¹ | M | 0.82 | < 0.1 |
| | Benzo[g,h,i]perylene | 191242 | mg kg⁻¹ | M | 0.89 | < 0.1 |
| | Total (of 16) PAHs | mg kg⁻¹ | M | 11 | < 2 |
| 2920 | Phenols (total) | mg kg⁻¹ | M | < 0.3 | < 0.3 |

*The sample container/fill level was not appropriate for the specified analysis - these results may be compromised. The accreditation for these results remains unaffected.*
# LABORATORY TEST REPORT

**Asbestos in Soils**

Results of analysis of 2 samples received 3 September 2013

11648 - 28-29 Hans Place, London, SW1X

Report Date: 09 September 2013

Login Batch No: 237837

## Qualitative Results

<table>
<thead>
<tr>
<th>Chemtest ID</th>
<th>Sample ID</th>
<th>Sample Desc</th>
<th>Depth (m)</th>
<th>ACM Type</th>
<th>SOP 2190</th>
<th>Asbestos Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>AJ12234</td>
<td>BH1</td>
<td>T1</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>No Asbestos Detected</td>
</tr>
<tr>
<td>AJ12235</td>
<td>BH1</td>
<td>T2</td>
<td>2.50</td>
<td>-</td>
<td>-</td>
<td>No Asbestos Detected</td>
</tr>
</tbody>
</table>

The detection limit for this method is 0.001%

Signed

Steve McGrath
Asbestos Analyst
Herts & Essex Site Investigations  
The Old Post Office  
Wellpond Green, Standon  
Ware, Hertfordshire  
SG11 1NJ  

FAO D Hudd  
09 September 2013

Dear D Hudd

Test Report Number 237837  
Your Project Reference 11648 - 28-29 Hans Place, London, SW1X

Please find enclosed the results of analysis for the samples received 3 September 2013.

If you require any further assistance, please do not hesitate to contact the Customer Services team.

Yours sincerely,

Darrell Hall, Director

Notes to accompany report:

- The in-house procedure is employed to identify materials and fibres in soils
- The sample is examined by stereo-binocular and polarised light microscopy
- Sample size is reduced by coning and quartering to obtain a representative sub-sample if necessary
- The bulk identification is in accordance with the requirements of the analyst guide (RSG 248)
- Samples associated with asbestos are retained for six months
- The results relate only to the items tested as supplied by the client
- Comments or interpretations are beyond the scope of UKAS accreditation

Test Report 237837 Cover Sheet

Registered in England & Wales - Registration Number 6511738 - Registered Office: 11 Depot Road Newmarket Suffolk CB8 0AL