BASEMENT CONSTRUCTION METHOD STATEMENT

CLIENT: Mr C Benveniste

ADDRESS:
13 Aubrey Walk
London
W8 7JH

Planning Application Number: NOT KNOWN

PROJECT No. H421

PROJECT NAME: 13 Aubrey Walk

Revision A – 3rd August 2009
Revision B – 14th August 2009
Revision C – 3rd February 2010
CONTENTS

1 DESCRIPTION OF PROPOSALS.................................................................2
2 IMPACT ON EXISTING NEIGHBOURING STRUCTURES ..................2
3 BASEMENT DESIGN.............................................................................2
4 DEMOLITION WORKS.........................................................................3
5 BASEMENT PILING.............................................................................3
6 BASEMENT CONSTRUCTION (GROUND FLOOR)......................4
7 BASEMENT CONSTRUCTION (BASEMENT LEVEL 1) .............4
8 BASEMENT CONSTRUCTION (BASEMENT LEVEL 2) .............5
APPENDIX. A. - Schematic Drawings..................................................7
APPENDIX. B. – Design Guidelines....................................................10
APPENDIX. C. – Design Calculations................................................16
1 DESCRIPTION OF PROPOSALS

This Method Statement has been produced to accompany the Planning Permission Application for 13 Aubrey Walk, London, W8 7JH. The existing building is proposed to be demolished and 2 new dwellings constructed each with 2 basement storeys. The proposed basement storeys consist of a Secant Piled perimeter wall lined with Caltite Waterproof reinforced concrete with reinforced concrete floors up to and including ground floor – see Appendix A for proposed schematic drawings. A further 3 storeys of loadbearing masonry construction is built above the basement. This document provides a proposed sequence of works for the construction of the basement structure.

2 IMPACT ON EXISTING NEIGHBOURING STRUCTURES

The proposed method of construction will not affect neighbouring structures as support is maintained at all times. The proposed method of construction means that the secant piled wall is installed and concreted without any excavation or loss of support to adjacent structures, this piled wall is designed to accommodated all lateral forces in the permanent state and construction is carried out in a ‘top down’ procedure which means support is provided at each level prior to excavating down to the next level.

3 BASEMENT DESIGN

Basement design will be carried out by a suitably experienced Engineer and checked by a Chartered Engineer. Design will be in accordance with the following documents and approval will be obtained from Building Control and RBKC Transportation and Highways Department:

- BS 8110 - Structural use of Concrete.
- BS 8002 – Code of Practice for Earth Retaining Structures.
- General Requirements for the Design and Approval of Structures Supporting the Public Highway, see APPENDIX B.

The sequence of works described below is based on the ground conditions encountered in the soil report produced by Soil Consultants Limited – reference 4689/JRCB/OT. Prior to construction further investigation will be carried out to ensure these conditions extend across the site, and if any variations are found the design will be modified to take account of this.
4 DEMOLITION WORKS

Demolition will be carried out as described below to permit basement construction without undermining or causing loss of support to adjacent structures.

1) Provide pedestrian protection and signage, erect hoarding on footpath to provide protection to members of public during demolition and construction works. Erect hoarding as shown on tennis club land to provide access and protection during works.

2) Carry out demolition of existing property including front wall and rear retaining wall, regrade rear levels to allow installation of Secant Piled Wall. Any contaminated material encountered must be removed and disposed of in accordance with HSE Regulations.

3) Grub out all foundations and break out any hard surfaces within proposed construction area.

4) Dispose of all unwanted materials from demolition to suitable waste disposal site.

5 BASEMENT PILING

A secant piled wall will be provided to resist lateral earth pressures and will be installed prior to any excavation.

1) Close footpath and temporarily reposition hoarding in preparation for secant piling adjacent to footpath.

2) Install secant piles around perimeter of basement – secant piles to be to specialists design to support earth pressures and highway loads allowing for concrete floor slabs to act as horizontal props.

3) Install 2 temporary piles in each basement to provide support to slabs during top down construction.

4) Once secant piling is complete return hoarding to previous position and reopen footpath.

5) Trim pile heads to required cut off levels.
6 BASEMENT CONSTRUCTION (GROUND FLOOR)

Once the secant wall is installed the capping beam and ground floor will be installed as described below to provide support prior to excavating down to the next level.

1) Reduce levels as required for ground floor slab and secant wall capping beam. Any contaminated material encountered must be removed and disposed of in accordance with HSE Regulations.

2) Install formwork for capping beam and ground floor slab supported off existing ground.

3) Install reinforcement cage for slab and capping beam including wall starter bars. Pour concrete ground floor slab, using either Everdure Caltite waterproof concrete or alternative waterproofing system to be agreed.

4) Allow concrete slab to cure for 14 days before excavating below.

7 BASEMENT CONSTRUCTION (BASEMENT LEVEL 1)

All excavation will take place as described below within the confines of the secant piled wall thus ensuring adjacent structures remain supported at all times. The construction of the walls and slab will again ensure support when excavating down to the next level.

1) Excavate basement down to basement level 1 – note temporary support piles not to be damaged. Any contaminated material encountered must be removed and disposed of in accordance with HSE Regulations.

2) Install formwork supported off existing ground and dowell bars into secant piled wall for basement level 1 floor slab.

3) Install reinforcement cage for slab including wall starter bars. Pour concrete basement level 1 floor slab, using either Everdure Caltite waterproof concrete or alternative waterproofing system to be agreed.

4) Install reinforcement and shuttering for basement level 1 walls and columns. Pour concrete to basement level 1 walls and columns, using either Everdure Caltite waterproof concrete or alternative waterproofing system to be agreed.
5) Allow basement level 1 concrete slab to cure for 14 days before excavating below.

8 BASEMENT CONSTRUCTION (BASEMENT LEVEL 2)

All excavation will take place as described below within the confines of the secant piled wall thus ensuring adjacent structures remain supported at all times. The construction of the walls and slab will complete the basement shell construction without compromising support to adjacent buildings.

1) Excavate basement down to basement level 2 – note temporary support piles not to be damaged. Any contaminated material encountered must be removed and disposed of in accordance with HSE Regulations.

2) Formation to be blinded with 50mm concrete blinding.

3) Install dowell bars into secant piled wall for basement level 2 ground bearing floor slab.

4) Install reinforcement cage for slab including wall starter bars. Pour concrete basement level 2 floor slab, using either Everdure Caltite waterproof concrete or alternative waterproofing system to be agreed. Holes to be left around temporary support piles to be concreted after piles removed.

5) Install reinforcement and shuttering for basement level 2 walls and columns. Pour concrete to basement level 2 walls and columns, using either Everdure Caltite waterproof concrete or alternative waterproofing system to be agreed.

6) Construct basement stairs and ground floor level retaining wall on rear boundary.

7) Allow all basement concrete to cure for 28 days before carefully removing temporary support piles.

8) Make good slabs at temporary support pile locations and concrete basement slab holes once piles broken down.

9) Construct superstructure above.

10) Make good footpath and tennis club land adjacent to boundary and remove temporary hoarding once complete.
This Method Statement has been produced by Nigel Thulbon of Aventus Design Ltd. This should be used in conjunction with detailed design drawings, RC Details and Bending Schedules during construction and only as a stand alone document for the purposes of obtaining planning permission.

Project Director

Nigel Thulbon B.Eng.(Hons,) C.Eng, M.I.Struct.E
APPENDIX. A. - Schematic Drawings

H421/SK300 – Proposed Basement Plan

H421/SK301 – Basement Section A - A
PROPOSED BASEMENT PLAN

Scale 1:100

NOTE:

Hoarding to be temporarily relocated to edge of pavement and footpath closed during installation of piled wall.

Existing Boundary Wall

Temporary Hoarding on site boundary During Construction.

450 Ø Secant Piled Wall around basement perimeter

200mm min. thick Calitite Reinforced Concrete.

300 x 300 RC Column

300 x 300 RC Column

300 thick RC Wall

200mm min. thick Calitite Reinforced Concrete.

300 x 300 Column

300 x 300 Column

200mm min. thick Calitite Reinforced Concrete.

300 x 300 Column

300 x 300 Column

200mm min. thick Calitite Reinforced Concrete.

300 x 300 Column

300 x 300 Column

200mm min. thick Calitite Reinforced Concrete.

300 x 300 Column

300 x 300 Column

200mm min. thick Calitite Reinforced Concrete.

300 x 300 Column

300 x 300 Column

200mm min. thick Calitite Reinforced Concrete.

300 x 300 Column

300 x 300 Column

200mm min. thick Calitite Reinforced Concrete.

300 x 300 Column

300 x 300 Column

200mm min. thick Calitite Reinforced Concrete.

300 x 300 Column

300 x 300 Column

200mm min. thick Calitite Reinforced Concrete.

300 x 300 Column

300 x 300 Column

200mm min. thick Calitite Reinforced Concrete.

300 x 300 Column

300 x 300 Column

200mm min. thick Calitite Reinforced Concrete.

300 x 300 Column

300 x 300 Column

200mm min. thick Calitite Reinforced Concrete.

300 x 300 Column

300 x 300 Column

200mm min. thick Calitite Reinforced Concrete.

300 x 300 Column

300 x 300 Column

200mm min. thick Calitite Reinforced Concrete.

300 x 300 Column

300 x 300 Column

200mm min. thick Calitite Reinforced Concrete.

300 x 300 Column

300 x 300 Column

200mm min. thick Calitite Reinforced Concrete.

300 x 300 Column

300 x 300 Column

200mm min. thick Calitite Reinforced Concrete.

300 x 300 Column

300 x 300 Column

200mm min. thick Calitite Reinforced Concrete.

300 x 300 Column

300 x 300 Column

200mm min. thick Calitite Reinforced Concrete.

300 x 300 Column

300 x 300 Column

200mm min. thick Calitite Reinforced Concrete.

300 x 300 Column

300 x 300 Column

200mm min. thick Calitite Reinforced Concrete.

300 x 300 Column

300 x 300 Column

200mm min. thick Calitite Reinforced Concrete.

300 x 300 Column

300 x 300 Column

200mm min. thick Calitite Reinforced Concrete.

300 x 300 Column

300 x 300 Column

200mm min. thick Calitite Reinforced Concrete.
Notes:
1. Do not scale from this drawing.
2. All dimensions are in mm unless otherwise specified.
3. Assume all site details are existing unless otherwise specified.

Site Boundary

Temporary Hoarding During Construction

FOOTPATH

AUBREY WALK

NOTE:
Hoarding to be temporarily relocated to edge of pavement and footpath closed during installation of Piled Wall.

PROPOSED BUILDING OUTLINE

BASEMENT SECTION A - A
Scale 1:75

300mm thick Reinforced Concrete Slab with downstand beams.

200mm min. thick Calitile Reinforced Concrete.

225mm thick Reinforced Concrete Slab.

Site Boundary - existing retaining wall demolished and rebuilt.

Temporary Hoarding

1200

Approx. 4m

300

50

450 Ø Secant Piled Wall around basement perimeter

450 Ø Secant Piled Wall around basement perimeter

PROPOSED BASEMENT

Basement Floor

300mm thick Calitile Reinforced Concrete Slab.

POOL

POOL

PROPOSED BUILDING OUTLINE

UNDERGROUND TENNIS COURT

Refer to Drawing H421-SK300 for plan.

300

50

100

200

300

50

450 Ø Secant Piled Wall around basement perimeter

450 Ø Secant Piled Wall around basement perimeter
APPENDIX. B. – Design Guidelines

General Requirements for the Design and Approval of Structures Supporting the Public Highway - RBKC Transportation and Highways Department.
Dear Sir/Madam

GENERAL REQUIREMENTS FOR THE DESIGN AND APPROVAL OF STRUCTURES SUPPORTING THE PUBLIC HIGHWAY

1. STRUCTURAL REQUIREMENTS

1.1 General

Where a structure, ie, retaining wall, vault or cellar roof and walls supports the public highway the Council has certain requirements for imposed loadings. These requirements are for the structural design and constructional aspects of structures supporting the public highway only and do not relate to Town Planning, London Building Acts, Environmental Health and other matters.

1.2 British Standards and Limit States

These requirements which are based upon BS 5400: 1978: Steel, Concrete and Composite Bridges, must be allowed for in the design of members that directly or indirectly support or form part of the public highway. Foundations must be designed to BS 8004@ 1986. Two limit states are used, ultimate limit state and serviceability limit state.

In general, design to the ultimate limit state may satisfy the criteria for serviceability, but where in doubt this should be checked as under certain circumstances serviceability can be the overriding effect.

1.3 Loading Requirements

1.3.1 General

This leaflet specifies nominal loads and their application. Partial safety factors used in deriving design loads, can be read from Table 1 (BS 5400: Part 2: 1978).

Wind and temperature effects are not normally relevant for vault roofs/retaining walls. Overturning effects on high walls and parapets that may be supported by retaining walls due to wind and/or collision may require investigation.
1.3.2 **Loads to be Taken into Account**

Loads taken into account for the design of retaining walls and vault roofs shall normally consist of:

i. **Dead Load**, ie, the structural weight.

ii. **Superimposed dead load**, ie, all material loads on the structure which do not form part of the structure.

iii. **Imposed or live loads**, ie, loads due to vehicle or other traffic such as vertical load, collision, nosing, lurching, etc.

1.3.3 **Loading Combinations**

Table 1 of BS 5400: 1978: Part 2 gives three principal and two secondary combinations of loads. The load combination used must be that which would give the worst effect. Combination 1 is normally the only one to be considered for the structures in question. If in doubt, guidance should be sought from the Transportation and Highways Directorate.

i. **Combination 1**

   For highway, footway and cycleway supporting structures, the loads to be considered are the permanent loads together with the appropriate primary live loads.

ii. **Combination 2**

   As for combination 1 but also including wind and erection forces.

iii. **Combination 3**

   As for combination 1 but also including temperature effects and erection forces.

iv. **Combination 4**

   Permanent loads and secondary live loads together with the appropriate primary live loads associated with the secondary live loads.

v. **Combination 5**

   Not required for vaults and retaining walls.

1.3.4 **Application of Loads**

Each element and structure shall be examined under the effects of loads that can co-exist in each combination. Design loads shall be selected and applied in such a way that the most adverse total effect is caused in the element or structure under consideration.

1.3.5 **Overturning**

The stability of the structure and its parts against overturning shall be considered for the ultimate limit state. Where appropriate the structure must also resist the effects of sliding.
1.4 Load Cases

1.4.1 Where there is no carriageway or where vehicles of any kind cannot mount the footway a nominal live load of 5 kN/m² shall be used. (The use of bollards, railings, or similar such non-impact resisting devices may not be an effective barrier against vehicles).

1.4.2 Where the member supports a footway that vehicles can mount, a wheel load of 100 kN dispersed over a circular or square contact area giving an effective pressure of 1.1 N/mm² shall be taken instead of item 1.4.1 above.

( In the case of a retaining wall the distance of the point of application of the load from the face of the wall is dependant upon locational aspects and is to be agreed with the Director of Transportation and Highways prior to preparation of calculations. However, this is normally 600mm. In the case of a cellar roof the load shall be positioned such that maximum bending, deflection and shear are considered in the design of the member).

1.4.3 Where there is no footway or only a nominal margin or where the member supports the carriageway, then HA loading shall be taken. That is, a uniformly distributed load of 30 kN/linear metre (if vault and/or cellar roof is less than 3m wide), plus a knife edge load of 120 kN over the full width of the vault roof placed in the worst possible position.

The loading condition in item 1.4.2 shall also be checked as under certain circumstances the single point load may give a worse effect.

1.4.4 In the case of a classified road, or where there is no footway or only a nominal margin or where the member supports the carriageway, some units of HB loading may be required. The units required will vary between 25 and 45. Figure 11 (BS 5400: Part 2: 1978) shows the plan and axle arrangement for one unit of nominal HB loading.

1 unit of HB loading = 10 kN/ axle
= 2.5 kN/ wheel

Contact area for loading as per point load of item 1.4.2

1.4.5 Exceptional circumstances may be given special considerations.

1.5 Design Calculations and Drawings

The above loading requirements refer only to primary live loads (that is vertical live loads considered as static loads due directly to the mass of traffic). Secondary live loads (due to changes in speed or direction) may also have to be considered (i.e., lurching, nosing, skidding, collision). Full account must also be taken of dead load and superimposed dead load.

Design calculations shall follow the outlines contained in BS 5400. The ultimate moment of resistance as set out in BS 5400 is similar to BS 8110 and therefore under most normal conditions BS 8110 can be used for the design of reinforced concrete elements.

One copy of the design calculations together with a structural drawing and a general layout showing the position of each member in relation to the footway/carriageway should be submitted to the Director of Transportation and Highways for his approval, prior to the commencement of any works.
In the case of a cellar the calculations and drawing should also be submitted to the Building Control Officer for his approval at the following address:

The Royal Borough of Kensington and Chelsea
Building Control
Kensington Town Hall
Hornton Street
London
W8 7NX

While every reasonable effort is always made to check drawings and calculations within a time-scale acceptable to all parties, at least one month should normally be allowed for gaining approval.

2. GENERAL

2.1 If the work necessitates disturbing the highway then prior to the commencement of the work a permit must be obtained from the Highways Section of the Directorate of Transportation and Highways. A deposit must also be remitted to cover the cost of the final reinstatement of the highway surface as this can only be completed by the Council. The actual cost of the work plus an administrative fee and VAT at the current rates will be charged against the deposit.

2.2 The surface of the highway disturbed in connection with the work must be maintained by the Contractor in a safe and satisfactory condition until the area is permanently reinstated.

2.3 In the case of a new cellar roof the depth between the surface of the roof and the surface of the highway shall be a minimum of 750mm and shall be filled with well consolidated hoggin or other approved material. In the case of replacement of an existing cellar roof the depth requirement of 750mm may be relaxed if this is more than existing and/or will affect statutory headroom requirements in the vault below.

2.4 The Contractor shall during the period of the works, take all necessary precautions for the protection of the public. If in doubt, advice regarding hoarding, lighting, etc. can be obtained from the Directorate.

2.5 The Contractor shall not commence the works until written approval has been received from the Director and the Building Control Officer where applicable. He shall also keep the Director informed of the progress of the works so inspections can be made of the structural members during construction and shall also inform the Building Control Officer where applicable so that he too can inspect the works.

2.6 The owner of the property is responsible under the terms of the Highways Act 1980 and the Greater London Council (General Powers) Act 1986, for supporting the public highway at all times, ie, temporary support during the period of construction or permanent support.

2.7 If the owner should decide to relinquish a cellar then the following requirements apply:

(a) The roof and walls of the cellar be broken down to a minimum depth of 750mm below the existing level of the highway unless this adversely affects adjacent structures.

(b) The cellar then be filled with 20:1 concrete to the level of the top of the remaining brickwork.
(c) The depth between the surface of the concrete and the surface of the highway be filled with well consolidated hoggin or other approved material.

(d) When the work has commenced, the Contractor shall inform the Directorate so that an inspection can be made.

In addition to the above, items (2.1), (2.2) and (2.4) shall also apply to the relinquishment of cellars.

If any further information is required, please contact the Directorate of Transportation and Highways, using the telephone number and contact name on this letterhead.

Yours faithfully,

Graeme Swinburne
Director of Transportation and Highways
APPENDIX. C. – Design Calculations
BASEMENT RETAINING STRUCTURE:

BASEMENT WALLS TO CONSIST OF SECANT PILED RETAINING WALL LINED WITH 200MM THICK REINFORCED EVERDURE 'CALTITE' CONCRETE, BASEMENT SLAB 300MM THK 'CALTITE' R.C.

DESIGN PARAMETERS:

LIVE LOAD ON FOOTPATH/GARDEN = 5 KN/m²

POINT LOAD ON FOOTPATH = 100 KN.

\[ \phi = 30^\circ \quad C' = 0 \text{ KN/m}^2 \quad \gamma = 20 \text{ KN/m}^3 \]

\[ K_a = \frac{1 - \sin 30}{1 + \sin 30} = 0.33 \]

\[ K_p = \frac{1 + \sin 30}{1 - \sin 30} = 3.0 \]

AS BASEMENT STRUCTURE IS A 'BOX'

HORIZONTAL LOADS ARE TRANSFERRED THROUGH THE BASEMENT + FLOOR SLABS AND RESISTED BY PASSIVE PRESSURE ON BASEMENT WALL OPPOSITE.

\( \phi \) SLIDING OK AS \( K_p \) IS APPROXIMATELY 3.0 K.cr RESULTING IN A MORE THAN ADEQUATE FACTOR OF SAFETY.
- Consider retaining wall
  Secant piled wall propped between concrete basement floor slabs.
- **Applied Pressures on Retaining Wall:**

- **Soil Pressure:**
  
  0 kN/m² at ground level.

  \[
  \text{Total Load:} \quad \frac{40.1 \times 6.75}{2} = 135.4 \text{ kN}.
  \]

  \[
  18 \times 0.33 \times 6.75 = 40.1 \text{ kN/m}^2
  \]

- **Live Load Pressure:**

  \[
  0.33 \times 5^k = 1.65 \text{ kN/m}^2
  \]

  \[
  \text{Total Load:} \quad 1.65 \times 6.75 = 11.2 \text{ kN}.
  \]
- 100 kN Point load on pavement.

100 kN point load 0.6m from wall.

\[ M = \frac{x}{H} = \frac{0.6}{6.75} = 0.089 \text{ kN} \cdot \text{m} \]

\[ \theta^o = \frac{c_{sp}}{c_{sp} + 0.546} = 0.389 \]

Load applied to wall, \( P_{sp} = \frac{k_{sp} Q}{H} \)

\[ = \frac{0.546 \times 100}{6.75} = 8.09 \text{ kN/m} \]

Distance from surface, \( z = N_{sp} k = 2.626 \text{ m} \).

The soil pressures will be resisted by a 450° secant piled wall propped by the RC floor slabs.

Pile length and reinforcement design to be by chosen subcontractor.