Project No. 4150

Proposed Construction of a Single Level Basement and Alterations at;

7 Campden Hill Road, W8 7DX

Subterranean Construction Method Statement

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INTRODUCTION

This method statement should be read in conjunction with the architectural scheme drawings prepared by the Oxford & London Building Consultancy (O&LBC).

This method statement should be read in conjunction with the Structural Engineer’s Design Philosophy.

This method statement has been developed over a number of years in consultation with specialist basement construction companies and has been based on long established construction sequences and details.

Please also refer to the attached underpinning section drawing which details the construction method likely to be adopted based upon the ground conditions at the property.

The key stages are as follows:

- Establish access, hoarding and conveyor
- Investigatory works
- Temporary Support to Excavated Faces
- Underpinning
- Mass Concrete Underpinning
- Construction of Basement to Rear Garden
- Structural Steelwork installation
- Excavation, drainage and basement slab construction
- Internal waterproofing membrane and screed

ACCESS

The hoarding and conveyor will be positioned at the front of the property and will be subject to any restrictions imposed by the local governing authority. The layout will agreed prior to the commencement of any works.

Carefully protect and/or remove any internal or external fixtures and fittings affected by the works.

Erect plywood hoarding with vertical standards, anchored to the ground. The hoarding will be fully secure with a lockable door for access.

Provide protection to public where conveyor extends over footpath. Depending on the requirements of the local governing authority, construct a plywood bulkhead onto the pavement. Hoarding to have a plywood roof covering, night-lights and safety notices.

Install conveyor at basement level ensuring that the conveyor is adequately supported and secured to the hoarding using a temporary scaffold structure.

Install temporary electrical and water supplies from Client’s permanent connections.
INVESTIGATORY WORKS

Prior to any construction works the O&LBC will undertake trial pit investigation works as necessary to determine the existing foundation configuration and confirm the soil profile adopted for the permanent works design. Any discrepancies from the original design parameters will be incorporated into the permanent works structural design as necessary.

Ground conditions will be continuously assessed by a competent person to determine the means and method of supporting any face of any excavation, all necessary shoring equipment will be available for use on site, however given the changing nature of the ground conditions, encountered below an existing property and the difficulties in battering back, stepping or benching the ground to reduce the risk of collapse, the most likely method to be adopted will be the introduction of trench sheets supported by Acrow props in accordance with any temporary works design prepared by our temporary works consultant.

The subsoil anticipated is a firm to stiff sandy Clay to at least 4m below ground level below which a dense gravel. No significant water is expected.

A desk study will also be undertaken to research any previous works to the property, or indeed neighbouring properties, which may have an impact of the design and construction of the basement works.

Prior to installation of new structural beams in the superstructure, O&LBC may undertake local exploration of specific areas in the superstructure in order to confirm the exact form and location of the temporary works that are required.

The permanent structural work can then be undertaken while ensuring that the full integrity of the structure above is maintained.

TEMPORARY SUPPORT TO EXCAVATED FACES

Generally in all stages of the works excavations in clays, sands, gravels or other non-cohesive soils may on occasion require temporary shoring. At the discretion of the Engineer this may be implemented, depending on observed ground conditions and the surrounding structural environment. Please refer to the attached diagrams, which indicate the temporary works we may adopt during the underpinning works on this project.
This stage consists the construction of the reinforced concrete underpinning.

The sequence of construction of the underpinning will be agreed with O&LBC depending on the structural environment and access constraints.

The sacrificial trench sheets (if required) are installed at the back of the excavation. The method adopted to prevent localised collapse of the soil is to install these progressively one at a time. The trench sheets are held in place with Acrow props, until such time as the full underpinning excavation is sheeted.

Once the toe section is cast, the lower level propping to the trench sheets can be removed, prior to casting the stem section. This method ensures that at all times the excavation is controlled, and indeed the integrity of the surrounding soil and structure above is maintained, to enable permanent works construction.

The access trench is first excavated, directly underneath the wall to be underpinned. The length of any base is individually assessed on site with due regard to the type and condition of the foundation, and structural geometry above. The maximum length of any underpinning base will be 1000mm.

Break off projecting brick or concrete footing back to internal face of brick wall. Excavate using hand and compressed air tools removing spoil until the design depth is reached, and removed to muck away conveyer.

Soils, where unstable in the temporary condition, will be shored. For clays or dense sands exhibiting effective cohesion, shoring may not be implemented. Shoring system design will be undertaken by Basement Works.

Once the excavation is completed to the design depth and width the stratum at the proposed founding depth is confirmed as being appropriate by the Engineer or the local authority’s Building Control Inspector (BCI), whichever is appropriate.

The design steel reinforcement will be fixed in the toe section of the underpinning base; this will be checked by the Engineer and BCI prior to concreting.

Following construction of the toe, the design steel reinforcement will then be fixed in the stem or wall section. This will be checked by the Engineer and BCI prior to concreting. A single sided shutter is then erected, and concrete poured to form the underpinning base up to a maximum of 100mm below the underside of the existing foundation.

After 24 hours the temporary wall shutters are removed and the void between the top of the underpin base and underside of the existing foundation will then be drypacked with a mixture of sharp sand and cement in the ratio of 3:1.

A further 24 hours is allowed before adjacent sections can be excavated.

Construction joints, if required, are formed using a suitable shear key or joggle joint. In exceptional circumstances, dowel bars are incorporated. Typically these are post drilled and resin fixed with specification as per the engineer’s requirements.

A record will be kept of the sequence of construction, which will be in strict accordance with recognised industry procedures. The as-built records will be updated as necessary and issued to involved parties during the works.
MASS CONCRETE UNDERPINNING

This stage consists the construction of the mass concrete underpinning.

The sequence of construction of the underpinning will be determined by O&LBC, depending on the structural environment and access constraints.

A record will be kept of the exact sequence of construction, which will be in strict accordance with the recognised industry procedures. The as-built records will be updated as necessary and issued to involved parties during the course of the works.

The access trench is first excavated, directly underneath the wall to be underpinned. The length of any base is individually assessed on site with due regard to the type and condition of the foundation, and structural geometry above. The maximum length of any underpinning base will be 1000mm.

Break off projecting brick or concrete footing back to internal face of brick wall. Excavate using hand and compressed air tools removing spoil until the design depth is reached, and removed to muck away conveyor.

Once the excavation is completed to the design depth and width. The stratum at the proposed founding depth is confirmed as being appropriate by our engineers.

A single sided shutter is then erected, and concrete poured to form the underpinning stem up to a maximum of 100mm below the underside of the existing foundation.

After 24 hours the temporary wall shutters are removed. The void between the top of the underpin base and underside of the existing foundation will then be drypacked with a mixture of sharp sand and cement (Ratio 3:1 sharp sand:cement).

A further 24 hours is allowed before adjacent sections can be excavated.
CONSTRUCTION OF BASEMENT TO REAR GARDEN

The reinforced concrete retaining walls and roof slab to the rear garden area of the property will be constructed in two stages.

Stage 1

The shaft will be excavated down to the toe and heel formation level and the excavation will be carried out on a hit and miss basis along the line of the new basement perimeter walls. As the excavation progresses, sacrificial interlocking trench sheets will be installed to the excavated faces with lateral bracing, to ensure that all sides of the excavation are fully supported. This will also ensure that the surrounding property boundaries are protected at all times, and structural integrity maintained. At no time will more than 1000mm length of excavation be unsupported prior to installing temporary lateral shoring.

Once the excavation is complete to formation depth, the steel reinforcement to the toe can be fixed in place and continuity reinforcement will be placed so as to connect the stem. This will be checked by the engineer or building control inspector prior to concreting.

Following construction of the toe and heel, the design steel reinforcement will be fixed in the stem (or upper wall) section. This will be checked by the engineer or building control inspector prior to concreting.

A single sided shutter is then erected, and concrete poured to form the completed stem. After 24 hours the temporary wall shutters are removed. A further 24 hours is allowed before the dry packing can be commenced and a 1:3 ratio mix should be well rammed in horizontal layers not exceeding 75mm thick. Dry packing should be left to cure for a further 24 hours before adjacent sections can be excavated.

A record will be kept of the exact sequence of construction, which will be in strict accordance with the recognised industry procedures.

Stage 2

Once all the stems/walls have been constructed and following an adequate curing period after the installation of the dry packing, it will then be possible to commence work to the RC ground floor suspended slab. Suitable falsework decks will be erected and propped into position to allow for the design steel reinforcement to be fixed in the lid section. Continuity reinforcement will be placed as per the detailed design to connect the reinforced concrete lid to the perimeter walls. This will be checked by the engineer or building control inspector prior to concreting. The RC ground floor suspended slab will remain back propped after concreting for the full duration of the required curing period.

Concreting of the suspended RC slab will be via a concrete pump and concrete will be supplied by an approved ready mix supplier.

STRUCTURAL STEELWORK INSTALLATION

The new steelwork is to be installed to provide the new openings as per the architectural layouts. It will consist a system of steel beams and columns that will bear onto the new foundations at the new basement level.

The new steelwork will be installed in a sequence to be determined by the Engineer in conjunction with the appointed specialist contractor and to the approval of the BCI.

Once full internal investigation of the property has been concluded, O&LBC will carry out a temporary works design for the steelwork installation. No temporary works will be installed without the design having first been approved by the Engineer.
SUPPORTING EXISTING CONCRETE FLOORS ABOVE EXCAVATION:

The support of the existing concrete floor will be undertaken in conjunction with the underpinning process. Two opposite pins are constructed and allowed to cure as described elsewhere. The pins will project proud of the above existing perimeter walls by approx 100mm, this will allow bearing for the steel joists/beams spanning across & supporting the area of solid floor above. The area of solid floor exposed will be the approx width of the pin and generally accepted to be self-supporting during this process. However if the underside is found to be in poor shape then temporary boarding and props are to be introduced. This process is to continue one pin width at a time. Dry pack as described elsewhere.

SUPPORTING EXISTING WALLS ABOVE EXCAVATION

Where steel beams need to be installed directly under load bearing walls, temporary works will be required to enable this work. Support comprise the installation of steel needle beams at high level, supported on vertical props, to enable safe removal of brickwork below, and installation of the new beams and columns.

Once the props are fully tightened, the brickwork will be broken out carefully by hand. All necessary platforms and crash decks will be provided during this operation.

Decking and support platforms to enable handling of steel beams and columns will be provided as required.

Once full structural bearing is provided via beams and columns down to the new basement floor level, the temporary works will be redundant and can be safely removed.

Any voids between the top of the permanent steel beams and the underside of the existing walls will be packed out as necessary with a 1:3 cement and sharp sand mix between the top of the steel and underside of brickwork above.

Any voids in the brickwork left after removal of needle beams can at this point be repaired by bricking up and/or drypacking, to ensure continuity of the structural fabric.

EXCAVATION, DRAINAGE AND BASEMENT SLAB CONSTRUCTION

Once the underpinning is complete to all walls, the bulk excavation can be completed.

Depending on the structural design it may be a requirement to implement propping to resist sliding forces (as directed by the Engineer) at the base of the underpins, prior to construction of the new basement slab, and to allow for excavation to formation level.

Generally, the underpinning works are completed around the perimeter walls, with the central soil mass (dumpling) left intact. This enables the earth mass to act as a firm support for the underpinning stem single sided shutters, and also to provide a prop force at the base of the pins.

The pump sump units and associated underground drainage will then be installed in conjunction with the mechanical and electrical details and architectural layouts.

Once excavation to formation level has been completed, and the slab cast, any temporary shoring can be safely removed.

The design steel reinforcement will then be fixed in the slab; this will be checked by the Engineer and BCI prior to concreting.
INTERNAL WATERPROOFING MEMBRANE AND SCREED

Generally the waterproofing membrane will be in accordance with the Architect’s details.

Once the basement slab is complete, the DELTA internal waterproofing cavity membrane will be installed as per the architectural layouts and manufacturers technical specification.

The floor finishes which may include insulation and under floor heating, can be laid as per the final architectural details.

A cement and sand screed will be applied on the slab surface.

This completes the structural work by O&LBC in preparation for the fit out works.