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Planning Construction Method Statement

Contents

PREAMBLE:

This report has been prepared on ~~the instruction of the client,~~ acting on behalf of the client and is for the sole use and benefit of the client. We shall not be responsible for any use of the report or its content for any purpose than that it was prepared and provided. If the client wishes to pass copies of the report to other parties, the whole of the report should be copied. No professional liability or warranty is extended to other parties as a result of permitting the report to be copied or by any other cause without the express written agreement of the author.

TERMS OF REFERENCE:

We were appointed by the client to prepare a supporting Structural Design Statement in support of a planning application for the refurbishment and sub-structure works.

Construction Method Statement

1.0 ~ Introduction:

We are a firm of Consulting Structural and Civil Engineers operating from offices in North West London. High end residential refurbishments and developments of differing scales have been central to the workload of the practice within central London and the surrounding Greater London area. As a practice, we have produced many single and multilevel basements designs to both new and existing buildings. Our general understanding of the development of London, its geology and unique features together with direct experience on many sites puts us in a strong position to advise clients on works to their buildings, and particularly the design and construction of their basement and a swimming pool within the basement.

This report sets out the design philosophy for the proposed works. It should be read in conjunction with the detailed planning stage structural drawings and calculations attached in appendices which detail both the temporary and permanent design stages of the subterranean development along with all other relevant consultant's reports submitted with the application. The aim of the method statement is to ensure safe and proper construction of the proposed works and to ensure no adverse effects to the existing or neighbouring structures.

While considering the most appropriate method of retaining the soil around the basement levels in both the temporary & permanent conditions, several potential methods were assessed. A feasibility study was undertaken to determine the most appropriate construction method. The first stage of the feasibility was to assess the Architect's proposal and to suggest alterations to the project where necessary from a structural point of view to ensure long term stability of the building and minimise the requirements of temporary works during construction. The study allowed for an appraisal of the different potential construction methods available. In this study the merits and shortcomings of sheet piling, bored piling and traditional underpinning techniques were examined.

Having examined the results of this study, it was felt that at this stage the most appropriate solution would be for a traditional underpinning technique to be employed; this will be discussed further in detail below. The construction sequence will deal with any issues of excavations under or adjacent to an existing property or road while minimising the potential losses of usable floor area. Given the preference to minimise any inconvenience to neighbouring properties and to maximise usable floor area of the proposed development, an underpinning solution would lend itself best to fulfilling all the aforementioned, and the structural requirements of this development. For these reasons it was decided to detail the proposed solution shown in the appendix A drawings.

Following this a series of calculations were carried out (a summary of which is attached in the appendices) to allow the production of planning stage drawings. These were used to prepare preliminary budget costs to the project, to access potential program savings, and are submitted as a viable engineering solution for planning; in addition they allowed the party wall process to be commenced and will provide a solid base for engineering discussion should the project progress to the detailed design stage.

The preliminary calculations carried out, a summary of which is attached in appendix B, ensure the overall structural integrity of both the existing and neighboring structures is retained throughout development. The stability of the building in all stages of construction and in the completed stage is provided for by careful sequencing of works to support the new existing building above the proposed basement works.

Due to the nature and makeup of the existing underlying soil types, slope instabilities are not of concern and loading patterns have been checked to ensure they will not occur . This is particularly evident with retaining wall solutions as the size and speed of the excavations under or adjacent to the existing structure can be carefully controlled and monitored as necessary to ensure no rotations of the wall segments, individually or as a group can occur. The proposed solution ensures no instabilities are created or allowed to occur within the soil mass during both the construction process and in the permanent state; therefore, any settlement to the surrounding area will be negligible. By following the step by step installation method in Section 9, any adverse effects on neighbouring properties will be minimised/mitigated.

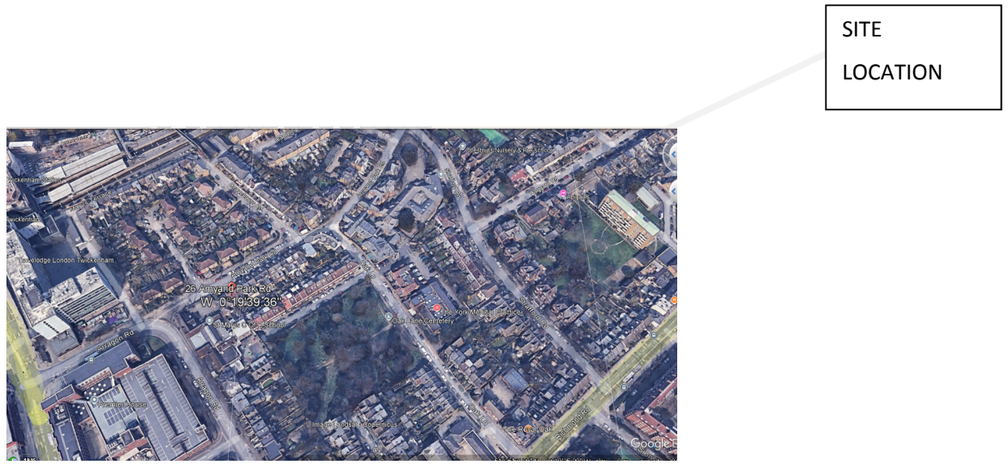
A party wall agreement is required, and this will detail the allowable construction tolerances and impacts on the neighboring properties (currently there are no foreseen effects to the integrity of surrounding structures). A suitably experienced surveyor will need to prepare a fair and impartial party wall agreement. This agreement will deal with the right to execute the party wall works, the time and manner of executing any party wall work, and any other matter that arises between the parties connected to the party wall works.

This method statement should only be used as a guide. Responsibility for site safety and the implementation of applicable building practices and British Standards are the responsibility of the Main Contractor. This method statement is not exhaustive and assumes the Main Contractor has the competence and relevant experience to undertake building works of this nature.

2.0~ Existing Structure:

The existing property is of relatively modern construction currently laid out over three floors. The property is a terraced house and is currently used as single residential dwelling. The surrounding buildings are of a similar age and construction.

The front of the building is setback circa 3m from the footpath line.



The local topography is reasonably flat; therefore, the site is unlikely to be surcharged during periods of heavy rainfall.

An inspection of the existing building was carried out to determine the condition of the existing structure and its ability to deal with the proposed development. The existing structure appears to be in reasonable condition as there are no signs of significant degradation or subsidence. The roof and floors appear to be of a traditional timber construction. The floor and roof structures are supported on structural masonry walls with commonly encountered corbel bases and strip footings that bears directly onto the soil foundation. The existing footings appear sufficient to support the existing structure and will work incorporated into the new proposal.

Responsibility for site safety and the implementation of applicable building practices and British Standards are the responsibility of the Main Contractor. This method statement is not exhaustive and assumes the Main Contractor has the competence and relevant experience to undertake building works of this nature.

3.0 ~ Party wall:

The proposed works include the excavation of a new basement level within 6m of the adjacent property; therefore, full procedures under The Party Wall Act 1996 will be required. The procedures should outline allowable construction tolerances and impacts on the adjacent property. There are currently no foreseen effects on the integrity of the adjacent property due to the works proposed in this report.

The structural scheme adopted has been designed with due regard to maintaining the structural stability and integrity of neighbouring buildings & structures and surrounding land. The structural form of the basement and the method of construction have been developed to ensure that lateral deflections, and associated ground movements, are kept within acceptable limits during and post construction. An initial assessment of the predicted ground surface movements using the approach set out in CIRIA C850 has indicated that the predicted category of damage to adjacent properties would be category 0/1– very slight.

4.0 ~ General descriptions of works:

The proposal works involve the construction of a new basement below the footprint of the existing property, along with alteration to the structure above ground level.

The removal of loadbearing masonry is proposed at ground level to open-up the living space. This will require the installation of steel frames to support the remaining walls above and to replicate the lateral stability that is currently being provided by the walls.

Access for materials and the removal of spoil will be via the front of the property. The exact method in which soil is to be removed from the site will be detailed in a construction management plan.

5.0 ~ Historic Background:

The site appears to have escaped direct bomb damage following a review of the WW2 bomb maps. Reports suggest bomb strikes to the south of the site towards the river but these are a significant distance away, given the evidence recorded during an inspection, no impact is expected on the basement construction from these.

6.0 ~ Ground Conditions / Geology:

Local knowledge of the area backed up by a review of the surrounding boreholes scans from British Geological Survey suggest the underlying soil to be moderate thicknesses of made ground (approx. 1.0 to 1.3m) over silty coarse sand and gravel (1.3m to 4.0m) which over lies on silty clay and gravel and then the London clay. The water table would appear to sit below our excavation, therefore the water should not interfere with the proposed construction of the basement but some local pumping of standing water maybe required. Additional monitoring of the water levels will be carried out to monitor this situation.
In line with design standards we need to allow for uplift within the design of the base floor slab. The uplift forces can be easily counteracted by the self-weight of the basement structure itself in addition to the use of tension piles if necessary.

A detailed site-specific soil investigation is planned prior to carrying out works to confirm assumptions.

Given the depths at which the water table appears and the proposed depth to which it is planned to excavate the lower ground levels, it is likely that the construction will not project into the water level. However, given any potential this minimal intrusion during construction, it is safe to conclude there will be no adverse effects by the development to the local hydrology of the area.

As the formation level of the pins is likely to sit on the gravel, there would be the occasional lenses of silty clay, care will need to be taken to ensure the excavation head stays dry. As such, the head will be covered immediately following excavation with a sacrificial concrete layer and external water sources (such as leaking supply pipes or irrigation systems) will be minimized.

A desk top investigation has been carried out to establish the positions of any underground utilities, main drainage or infrastructure and ensure the basement works do not impact on these. The initial investigation will be backed up by a full detailed site survey which positions the services. The contractor should carry out works under the assumption that there may be additional unknown service locations and take all necessary precautions. It will be necessary to carry out some works to the drainage locally within the curtilage of the development to allow for the new requirements on both surface and foul water drainage of the new layouts but these will not impact in any way on the neighboring properties.

Given the depth to the underside of the proposed basement, and assuming the basement is constructed as per the suggested methodology drawings, minimal temporary works should be required.

6.1 Ground Bearing Pressure & Suitability:

London Clays and gravels, which is commonly found throughout the borough, is generally suitable for a basement construction of this type and provides an allowable bearing pressure of 150kN/m^2 which has been assumed in the design of the structure at this stage. We have constructed similar basements using the proposed constructed methodology.

7.0 ~ Watercourses and Existing Trees:

7.1 Ground Water

The local area is considered to be flat.
There are no ponds, streams, or other surface water features on or immediately adjacent to site.
The local area is predominantly residential properties intersected by highways. The current surface water flow regimes can therefore be summarised as follows:

- Rain water falls onto hard standing surfaces and roofs with most discharging directly into the existing drainage system and some being taken up in evaporation.
- Garden, permeable areas and green areas where present will absorb rainfall directly into the ground and discharge back to the local ground water.

The proposals do not materially alter the existing surface water flow path.

Subterranean ground water flow paths are most likely to be in an approximate north to south direction with water gently flowing along the top of the Clay. The proposals would appear not to materially affect these potential flows, with water simply flowing around the basement before continuing along its normal flow path.

7.2 Watercourses:

A desk top study and review of the “Lost Rivers of London” show there are no immediate underground rivers, however there is the Chelsea Creek located circa 0.5 miles away and the Thames River located circa 0.55 miles away.

Neither of these are expected to influence the proposed basement works.

The substratum is suspected as gravel. These layers are permeable and some perched water could be expected on site. Seasonal variations in the ground water are to be expected and the contractor will be required to have considered suitable remediation measures during excavations and general basement works.

7.3 Existing Trees:

There is no trees on the front or rear of the site within the boundary line.

The depth of influence in terms of soil shrinkage is not expected to be greater than 2.5m below ground and as the depth of the proposed foundations is significantly beyond this; there is no risk of any shrubbery causing movements of the foundation.

7.4 Flooding:

A review on the environment agency website has shown that the site is at potential risk of flooding, as it is in zone 3. However, being in an area of medium probability of flooding, there are also good flood defence and therefore minimising the risk of flooding from the river. It is also understood that there has been no history of surcharging of local combined sewer systems in periods of heavy rainfall.

Due to the present hydrological status, we would not expect the proposal to have an adverse effect on the ground water flow in the area.

8.0 ~ Description of Proposed Structure:

The proposal is to construct a new basement below the full area of the building, including new rear extension area, with some alteration to the inner structural elements as well as a loft conversion. For the basement below ground level a traditional concrete underpin is to be provided and designed with adequate capacity to support both vertical loading from above and surcharges from the adjacent road, neighboring properties and above ground structure as per the current architect's proposal.

A series of frames and beams will be installed above the basement and through the building to replace some of the current load bearing structural masonry walls allowing for excavation of the basement and refurbishment works.

The following gives a proposed overview of the installation sequence for the proposed development.

1. The basement retaining wall RC pins can be installed in the standard hit and miss pattern in line with the structural engineer's drawings.
   Once the pins have cured and temporary propping is in place, the main bulk excavation can take. Complete the basement works, primarily base and top slab.
   Install temporary needles and propping to support high level masonry where ground floor walls are to be removed. Remove existing walls as per design drawings.
2. Install steel and frame supports beneath high level masonry walls as per structural engineer's drawings.
3. Construct ground floor extensions and proceed to move to floors above.

Please note that all temporary works are the responsibility of the main contractor and a full package of works and method statements will be required prior to works commencing.

See appendix A with planning stage drawings showing further details of the proposed structural solution.

It is recommended these works are carried out by a suitable experienced contractor familiar with this type of construction and the techniques required to produce the desired end result.

9.0 ~ Construction Method:

In addition to the detailed description of the underpinning sequence given below, reference should be made to the drawing attached in Appendix A which gives a visual representation of the proposed works.

9.1 Traditional underpin concept used for excavation:

The retaining walls will be formed in reinforced concrete approximately 350mm thick. The walls will be constructed in short sections in a hit and miss pattern, approximately 1.0 to 1.2m wide and connected with steel dowels. The walls will need to remain back propped until the concrete has sufficiently cured. These steps are typical for this type of construction.

When forming each cantilevering L-shaped section of wall, an access trench is dug down to the formation level of the base slab. Reinforcement is fixed and the base of the underpin is poured. Following this the wall reinforcement is fixed and the walls are shuttered and poured. By using hit and miss sequencing it is possible to safely work on more than one pin, up to a maximum of four pins around the perimeter of the basement at any one time.

9.2 Traditional underpin step by step:

i. Mark out datum line to determine various surface heights.
ii. Following sequencing guidance on engineer's drawings, mark out proposed digging area for current sequence.
iii. Begin digging within marked area to a depth of 1m, using laser meter to determine appropriate depths.
iv. Install sheeting against the retained earth face, planking and strutting segment made up of two sheets of 18mm plywood across all sides of pit, timber struts of 125mm x 50mm at 500mm centres which are reinforced with mini-Acrow steel props set at 1m centres as per details on drawings.
v. Install 1m high timber railing guard around pit.
vi. If site manager deems it appropriate, install timber guard to prevent loose material from falling onto workers whilst digging.
vii. Continue digging for further 1m, and then install further planking and strutting segment to same specifications as above.
viii. From 2m depths, continue digging in 600mm segments with planking and strutting segment to same specifications as above.
ix. Water table should be lower than this level of excavation but if necessary it should be lowered below the level of basement excavation. This is to be achieved through the installation of appropriate submersible pumps to

remove water locally from the area being excavated. Should ingress become more than a minor flow, stop digging and back fill immediately. Seek advice from engineer.

x. In sequences, set between two other sequences (or adjacent to each other) already completed, install 1100mm long 12mm diameter dowel bars at 200mm centres in completed underpins on either side as proposed by engineers.

xi. Fix reinforcement and install shuttering. The wall is tied to the base with starter reinforcement.

xii. Pour concrete mix (engineer's specification) into shuttered mould.
After 48 hours, remove timber shuttering.

xiii. Begin next sequence as directed in accordance with direction of engineers.

xiv. Continue above steps until all the wall sequences have been completed.

Once the shuttering has been removed from the last sequence, the central mass of soil can start to be removed in sections to allow for installation of temporary propping and the floor slab.

9.3 Temporary Works:

No Structural works will commence without a detailed temporary works design, and a drawing and calculation package in place including all necessary method statements.

The attached structural drawings give proposed acceptable details for the excavations and a proposed sequence for the works. By following this sequence, the extent of temporary supporting works can be minimised and stability of the building above and adjacent building is maintained. The contractor is advised to have some sheeting available to deal with any unexpected pockets of poor ground.

10.0 ~ Potential Ground Movements to Adjoining Properties:

Anticipated movements are expected to be minimal and suppressed by the stiffness of the above structure and those adjoining. The stability of the existing building, and the adjoining building, has been carefully considered at this stage. The proposed basement works should have a negligible effect on the stability of the above and surrounding structures.

The category of movement expected for this element of works would be a category 0-1 as per the building damage classification table based on CIRIA C580 guidance (see appendix D).

The Contractor will be required to monitor ground movements during the works to check the validity of the ground movement analysis and the performance of the temporary works and construction methods. A 'traffic light' system of green, amber, red trigger values will be set with specific Contractor actions set against each trigger values.

Traffic light	Trigger Value (mm)	Contractor Action
Green	<8	No action required.
Amber	8-12	Notify the CA and Party wall Surveyors. Increase frequency of monitoring. Implement contingency measures if movement continues
Red	>12	Notify the CA and the party wall surveyors. Implement measures to cease movement and stop work.

A suitable experienced contractor familiar with propping techniques and sequential operations should be appointed. The designer has considered the risk to the adjoining properties and the proposed foundation system offers an inherently strong foundation to existing load bearing walls.

Monitoring of the surrounding building will be carried out during the works to assess possible movements, and the findings will be reported to the adjoining surveyors periodically if necessary.

11.0 ~ Underground Structures & Existing services:

A desk top investigation has been carried out to establish the positions of any underground utilities, main drainage or infrastructure to ensure no impact on these. Investigations show the positions of services; however, the contractor should carry out works under the assumption that there may be additional unknown service locations, taking all necessary precautions. It is the contractor's responsibility to coordinate any alterations of these incoming services with the appropriate service suppliers. All appropriate measures to be taken for any required alterations.

A preliminary search shows that the closest underground station to the development is Fulham Broadway (District Line); however, as the distance is circa 300m away, the proposed works will not have any influence on these structures. It is not necessary to advise London underground asset protection department to check alignments and the proposed works will not affect any existing tunnels or access shafts. No other underground structures, tunnels or vaults are expected near the proposed works.

12.0 ~ Surface Water and Sewer Drainage

Where possible, the existing drainage and sewage connections will be maintained. It may be necessary to locally carry out some works to the surface and foul water drainage within the curtilage of the development to suit the requirements of the new basement and internal layout changes. These works will not impact in any way on the neighbouring properties. A sustainable, environmentally friendly and responsible approach will be taken where possible in the design of the surface water for the development.

To prevent the basement from flooding due to backflow from the mains networks, a non-return valve should be installed in conjunction with an overhead pipe system.

The proposed works will not alter the current state of the property as it will remain as a single-family residence. Therefore, the volume of both foul and surface water that is discharged into the mains sewers is not expected to be affected. A detailed analysis at design stage will be carried out to ensure that existing discharge rates to the main sewers are not increased beyond existing levels.

13.0 ~ Excavation of soil:

The soil will be excavated and removed using small excavators / conveyor belts up to ground level and transferred from site as per a suitable traffic management plan. Public rights of way will be maintained where necessary and the footpaths and street adjacent to the site will be cleaned each evening. The frequency of vehicle movements will be confirmed by the chosen contractor and approved by the council before works commence.

14.0 ~ Waterproofing and Ground Water:

Concrete elements where practically possible will be design to BS8007 in minimise water ingress. In addition to this a drainage system (cavity type or other) should be installed in accordance with BS8102 to provide a fully water proof envelope in the event of any water ingress through the concrete.

A sump pump will be required to remove any water ingress through the concrete structure and this will need to be designed by a specialist drainage engineer.

15.0 ~ Considerate Contractors Scheme:

The Contractor will be required to demonstrate a positive attitude and commitment toward minimising environmental disturbance to local residents and will be required to be registered to the Considerate Contractors Scheme and adhere to the guidelines set out by the scheme and the Council's Control of Pollution & Noise from Demolition and Construction Sites Code of Practice.

16.0 ~ Dust:

The BRE 'Control of Dust from Construction and Demolition Activities' 2003, London Councils/GLA Best Practice Guide "Control of dust and emissions from construction and demolition" and Mayor of London's SPG on 'Control of Dust and Emissions' 2014, which gives best practice guidance on the control of dust and vehicle fumes will be implemented and followed where possible.

17.0 ~ Noise

On site when construction works are in progress, everybody has a responsibility to see that the activities are carried out in the quietest practicable manner. Where noisy activities are unavoidable, the disturbance shall be minimised/attenuated by choice of technique, timing, shielding or protection as appropriate.

Where any person is liable to be exposed to noise levels greater than 80 dB (A), he/she shall be informed and provided with suitable ear protection. The most likely protection, in ascending order of attenuation is ear plugs, ear muffs and noise attenuation helmets. Noise will be kept to a minimum always and any further restrictions imposed under the terms of the construction contract shall be strictly adhered to.

18.0 ~ Vibration

All works involving vibration shall be minimised, and where possible, eradicated by design and the use of controlled mechanical equipment. Any operation involving vibration will have a HAVS risk assessment and procedures put into place to minimize the effects on personnel.

20.0 ~ Conclusion:

We do not anticipate any damage to the existing structure, adjoining structures or public road as a result of these works if they are carried out in the approved manner described above by competent contractors. There should not be any impact on the integrity of the adjoining structures. Due to the soil conditions and the suggested foundation solution; we do not anticipate any significant settlement following the excavation.

There will be no slope stability issues because of the development as the ground is generally level across the site. The proposed structure is basically a traditional underpin solution; this form of construction will provide adequate support to the existing structure and public road facilities, and we do not anticipate any adverse effects on the surrounding properties. Excessive temporary works are not deemed necessary for the proposed basement excavation as the structure has been developed to allow for all loading which may occur during both the construction phases and the permanent load cases. A detailed description of the propping and full-face support is given in section 9. The contractor selected for the works should have suitable experience carrying out this type of underpinning works and will be required to be a member of the considerate contractor scheme.

The existing drainage where possible will be retained and reused. The main connection to Thames water mains will be retained and alterations will be required within the curtilage of the project only. In addition, employing SUDS should ensure the current discharge rates are maintained and that the new basement structures are protected from flooding.

There are several small trees surrounding the development but consideration of the protection of the root zone has been undertaken and we consider that all these trees of worth will remain unaffected by the works.

Internally at lower ground level, a series of steel box frames and load bearing elements will be designed to enable the removal of loadbearing walls but the contractor will need to design a suitable set of temporary works for the installation along with methods statements which the engineer should approve.

It is my opinion that the proposed works can be carried out within a safe and cost-effective manner by a suitable contractor.

Nathan Masil BEng MSc ICIOB
Senior Structural Engineer
NMN Partnership Ltd

Appendix A: Drawings

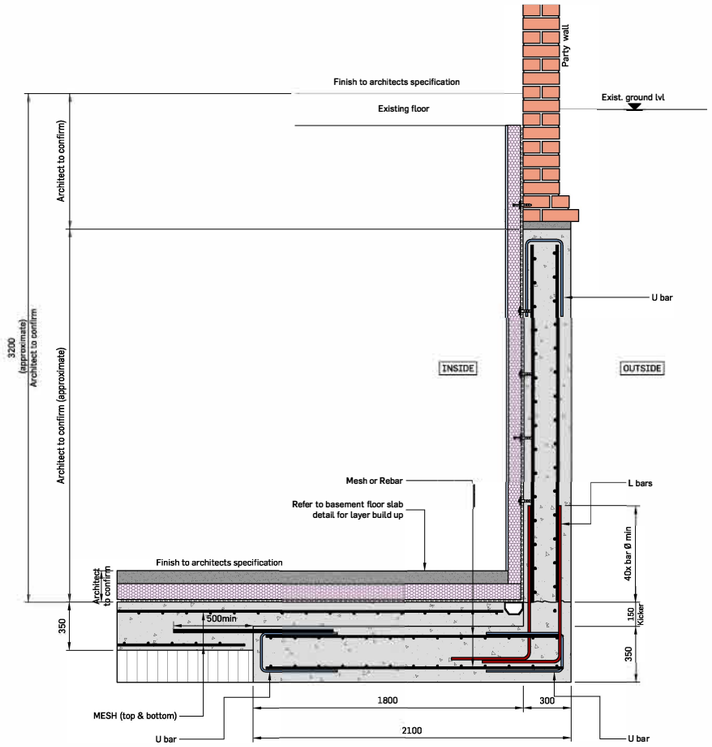
FOUNDATION LEGEND

- UNDERPINNING TYPE 1
- UNDERPINNING TYPE 2
- UNDERPINNING TYPE 3
- RETAINING WALL TYPE 1
- STRIP FOUNDATION

PROPOSED FOUNDATION PLAN

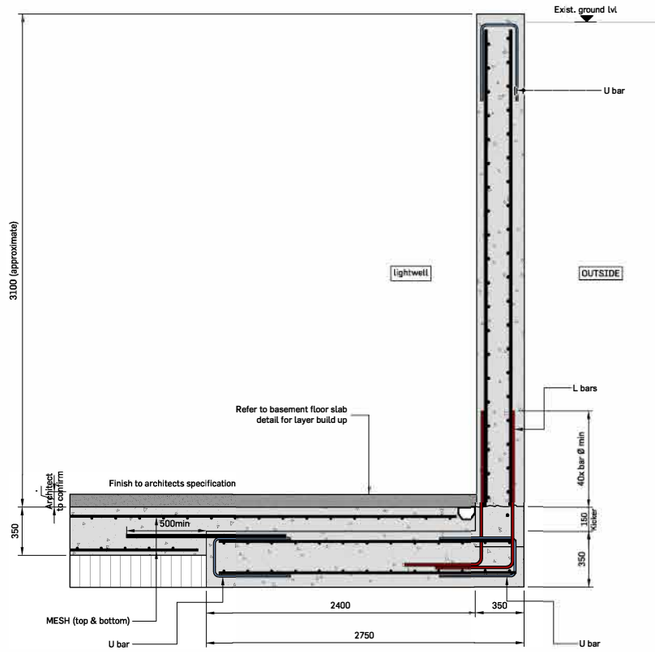
SCALE 1:50 (STRUCTURE BELOW)

0 1 2



UP 01 TYPE 1 UNDERPIN

Scale: 1:20



RW 01 RETAINING WALL TYPE 1

Scale: 1:20

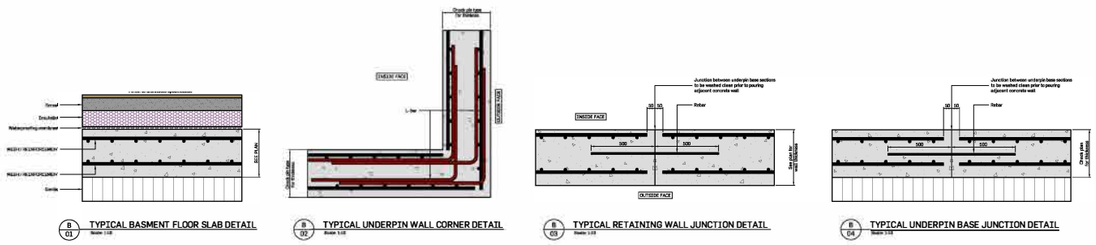
REBAR COVER:

Basement slab
Top - 50mm
Bottom - 75mm

Retaining wall
Inside face - 50mm
Outside face - 50mm

WATERPROOFING AND FINISHES TO ARCHITECTS DETAILS

C40 CONCRETE

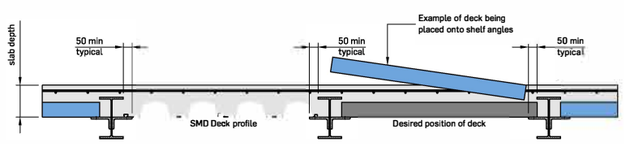


B 01 TYPICAL BASMENT FLOOR SLAB DETAIL

B 02 TYPICAL UNDERPIN WALL CORNER DETAIL

B 03 TYPICAL RETAINING WALL JUNCTION DETAIL

B 04 TYPICAL UNDERPIN BASE JUNCTION DETAIL



DECKING BEARING OF SHELF ANGLE DETAIL

Notes:

1. This drawing is to be read in conjunction with all relevant architects, engineers & specialist sub-contractors drawings and the specification.
2. Any discrepancies between the site conditions and these drawings to be reported to Engineer. Dimensions must not be scaled and should be checked on site.
3. All dimensions are in millimetres, levels are in metres a.o.d. (above ordnance datum).
4. Foundations have been designed on a safe increase in bearing pressure of 150kN/m² bearing 200mm into sandy gravel strata.
5. All new steelwork to be grade S355 and be supplied to site blast cleaned to Swedish standard SA2½ painted with high build zinc phosphate alkyd primer to 80 microns after fabrication. Any mechanical damage to coating to be touched up on site in accordance with the specification.
6. All new steel beams to have a minimum of 100mm bearing either end.
7. Lengths of all members are to be verified on site by the Contractor.
8. Catric type lintels to have a minimum bearing of 150mm either end.
9. All temporary works to ensure the structural stability of all elements in the temporary state during construction are to be the responsibility of the contractor.
10. Cover to reinforcement to be 25mm to all bars unless noted otherwise.
11. Checking the location of the existing services in relation to the elements of the new construction works is the responsibility of the principal contractor. Any discrepancy between the existing services and the new construction works should be reported to Engineers before the commencement of the works.
12. The principal contractor is to provide all necessary flexible sleeves or lintels where drainage pipes pass through walls or foundations.
13. The principal contractor is to ensure that at all times the excavations shall remain free from standing water.
14. Movement joints to be positioned @ 6m c/c in blockwork and @ 12m c/c in brickwork.
15. Movement joints to be 15mm hydrocell or similar joint filler with a 15x15mm two part polysulphate sealant. (colour and fire resistance of sealant to be advised by architect).
16. All load bearing blockwork below DPC to be 7N/mm² dense concrete block.
17. Provide Ancon ST1 wall ties in accordance with: DD140 @ 450 c/c vertically and @ 900 c/c horizontally, staggered u.n.o.
18. All bolts to be Grade 8.8 M20 unless noted otherwise.
19. All insulation details have been produced to comply with relevant regulations where possible. However, the responsibility for checking the compliance and execution of insulation details lies with the main contractor.
20. Floor joists spanning in excess of 2.5m should be strutted by one or more rows of solid or herringbone strutting as follows:

Joists <2.5m - None required
Joists 2.5 - 4.5m - One row required
Joists >4.5m - Two rows required

21. All beam end reactions shown are unfactored unless noted otherwise.

FOR PLANNING

Rev.	Date	Description	by	ch'd	app.
B	01/11/23	ISSUED FOR INFORMATION	NS	JGF	NJR
A	12/10/23	ISSUED FOR INFORMATION	NS	JGF	NJR

Project

Title: FOUNDATION PLANS & DETAILS

C/A: ADworkshop LTD

Scales (A1)	ASSHOWN	Dg. No	ev
Drawn	NS 12/10/2023	23 20180520-01	
Checked	JGF 12/10/2018		
Approved	JGF 12/10/2018		

Method 1:

Used in area's where vertical load from existing structure above is present.
As long as each pin is no more that 1200mm wide and carries loading from above then the pin is stable in all temporary conditions without the presence of the basement floor slab.
The existing foundation at ground level will have adequate capacity to span the 1200mm of the excavation necessary for the installation of the pin.

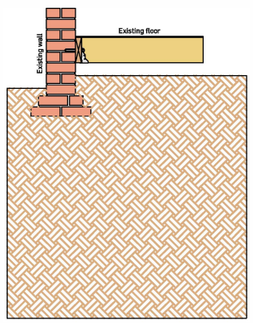
Sequence for Pin installation

- Pins marked 1 can be installed first to a maximum width of 1000mm, but to their full required depth using temporary supports as shown
- Adjacent pins marked 2 can be installed after completion of the installation of number 1 pin but only after the first pins have been allowed to fully cure
- Pins marked 3 can be installed
- Pins marked 4 can be installed
- Finally pins marked 5 can be installed

Pin installation notes.

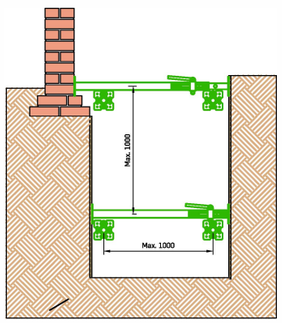
- The sequencing shows a typical underpin profile. Check plans for sizes

NOTE:
REINFORCEMENT SHOWN INDICATIVELY
REFER TO PIN TYPES FOR REINFORCEMENT



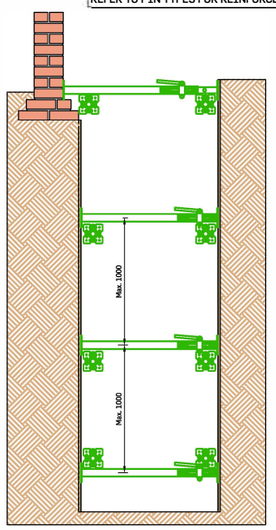
STAGE 1

Remove existing floor



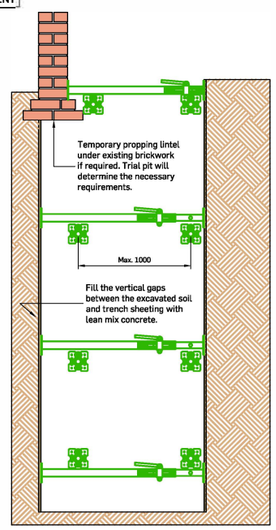
STAGE 2

Excavate working space to a max depth of 1.5m.
Temporary support the excavation as per the detail.



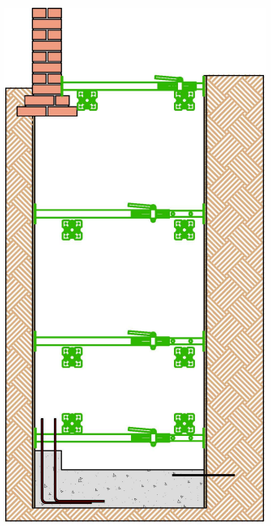
STAGE 3

Excavate working space to the bottom of the base of the underpin. Temporary support the excavation as per the detail.



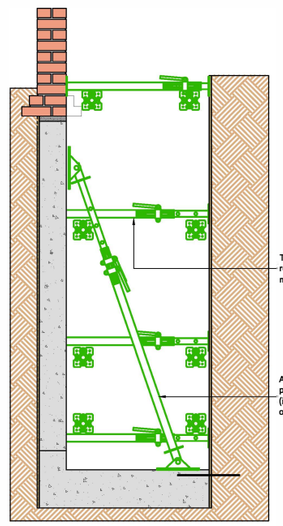
STAGE 4

Excavate working space under existing foundation. Existing foundation at ground level will span over the excavation.
Temporary support the excavation as per the detail.



STAGE 5

Cast base of the underpin with kicker and reinforcement. Bar left for full lap length connection to rest of wall stem and slab connection
Temporary support the excavation as per the detail



STAGE 6

Final section of the stem is cast and once concrete has been cured, neighbouring pin can be excavated.
Temporary support the excavation as per the detail

Method 2:

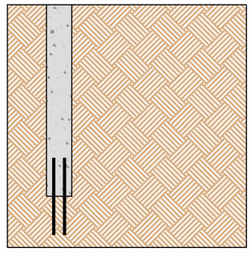
Used in area's where little / no vertical load is applied to wall in permanent load case.

Sequence for Pin installation

- Pins marked 1 can be installed first to a maximum width of 1000mm, but to their full required depth using temporary supports as shown
- Adjacent pins marked 2 can be installed after completion of the installation of number 1 pin but only after the first pins have been allowed to fully cure
- Pins marked 3 can be installed
- Pins marked 4 can be installed
- Finally pins marked 5 can be installed

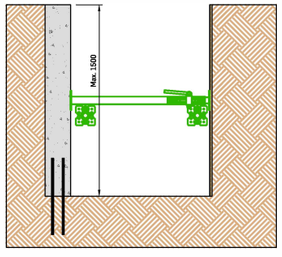
Pin installation notes.

- The sequencing shows a typical underpin profile. Check details for sizes



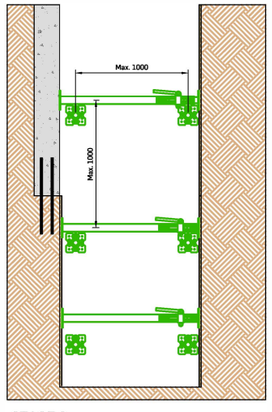
STAGE 1

A trench is dug and the top 1500mm of the retaining wall is cast along the full length of this type of retaining wall. This acts as a ring beam along the excavation. Bar left for full lap length connection to rest of wall stem.



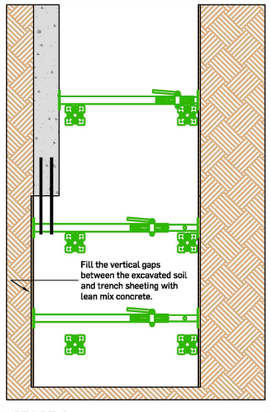
STAGE 2

Excavate working space to a max depth of 1.5m.
Temporary support the excavation as per the detail.
Bar left for full lap length connection to rest of wall stem.



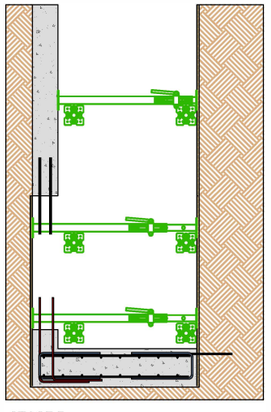
STAGE 3

Excavate working space to the bottom of the base of the underpin. Temporary support the excavation as per the detail.



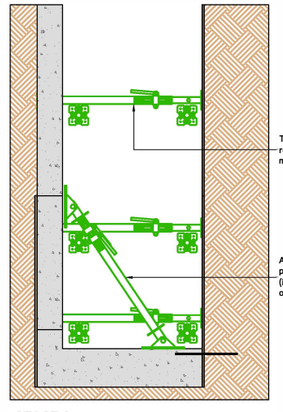
STAGE 4

Excavate working space under recently poured section.
Temporary support the excavation as per the detail



STAGE 5

Base of the underpin with kicker has been cast after reinforcing steelwork has been placed. Bar left for full lap length connection to rest of wall stem.
Temporary support the excavation as per the detail



STAGE 6

Final section of the stem is cast and once concrete has been cured, neighbouring pin can be excavated.
Temporary support the excavation as per the detail

0 1 2

Notes:

1. This drawing is to be read in conjunction with all relevant architects, engineers & specialist sub-contractors drawings and the specification.
2. Any discrepancies between the site conditions and these drawings to be reported to Engineer. Dimensions must not be scaled and should be checked on site.
3. All dimensions are in millimetres, levels are in metres a.o.d. (above ordnance datum).
4. Foundations have been designed on a safe increase in bearing pressure of 150kN/m² bearing 200mm into sandy gravel strata.
5. All new steelwork to be grade S355 and be supplied to site blast cleaned to Swedish standard SA2½ painted with high build zinc phosphate alkyd primer to 80 microns after fabrication. Any mechanical damage to coating to be touched up on site in accordance with the specification.
6. All new steel beams to have a minimum of 100mm bearing either end.
7. Lengths of all members are to be verified on site by the Contractor.
8. Catric type lintels to have a minimum bearing of 150mm either end.
9. All temporary works to ensure the structural stability of all elements in the temporary state during construction are to be the responsibility of the contractor.
10. Cover to reinforcement to be 25mm to all bars unless noted otherwise.
11. Checking the location of the existing services in relation to the elements of the new construction works is the responsibility of the principal contractor. Any discrepancy between the existing services and the new construction works should be reported to Engineers before the commencement of the works.
12. The principal contractor is to provide all necessary flexible sleeves or lintels where drainage pipes pass through walls or foundations.
13. The principal contractor is to ensure that at all times the excavations shall remain free from standing water.
14. Movement joints to be positioned @ 6m c/c in blockwork and @ 12m c/c in brickwork.
15. Movement joints to be 15mm hydrocell or similar joint filler with a 15x15mm two part polysulphate sealant. (colour and fire resistance of sealant to be advised by architect).
16. All load bearing blockwork below DPC to be 7N/mm² dense concrete block.
17. Provide Ancon ST1 wall ties in accordance with: DD140 @ 450 c/c vertically and @ 900 c/c horizontally, staggered u.n.o.
18. All bolts to be Grade 8.8 M20 unless noted otherwise.
19. All insulation details have been produced to comply with relevant regulations where possible. However, the responsibility for checking the compliance and execution of insulation details lies with the main contractor.
20. Floor joists spanning in excess of 2.5m should be strutted by one or more rows of solid or herringbone strutting as follows:

Joists <2.5m - None required
Joists 2.5 - 4.5m - One row required
Joists >4.5m - Two rows required

21. All beam end reactions shown are unfactored unless noted otherwise.

FOR PLANNING

Rev	Date	Description	by	chd	app
A	12/10/23	ISSUED FOR INFORMATION	NS	JGP	NJR

Project

Title
SEQUENCE & TEMPORARY WORKS

CIA
ADworkshop LTD

1.0 Project Description

We were engaged to consult on the structural engineering of the project.
The details set out below are the standard criteria and documentation used by the engineer to assess the project from a structural engineering point of view. It details out standard materials and the specifications to be used in addition to the minimum standards and quality the materials must meet to be compliant with both our design, British and European standards.

2.0 Design Standards

The following are the principal standards used in the design:

BS6399: Part 1:1996	British Standards: Loading for buildings. Part 1: Code of Practice for dead and imposed loads.
BS En 1991-1	Euro code 1. Code of Practice for wind loads
BS6399: Part 3:1988	British Standard: Loading for Buildings (amended May 1997). Part 3: Code of Practice for imposed roof loads.
BS En 1992 -1	Euro code 2 Code of Practice for design and construction of concrete structures.
BS En 1993 -1	Euro code 3 Structural use of steelwork in building.
BS8004:1986	British Standard: Code of practice for foundations.

3.0 Materials

3.1 Concrete

Normal weight concrete to BS 8500.

Assumed concrete grades and cover to reinforcement in given locations are as follows:

Concrete Grade	Location	Cover
C40	Foundations	50mm for formed sides 75mm for cast against ground
C35	Internal areas	35mm (typical)

Concrete Properties:

Density:	24 kN/m^3 (normal-weight concrete)
Young's Modulus (short-term):	Ec = 27,000 N/mm^2 for Grade C35
Poisson's Ratio:	ν = 0.30
Coefficient of thermal expansion:	α = 10 x 10 –6/°C
Long term elastic modulus	$Ec_{long\ term}$ = 13,500 N/mm^2 for Grade C35

3.2 Reinforcement

Deformed reinforcing bars: BS 4449, Grade 460 (fy = 460 N/mm^2).

Steel fabric: BS 4483 (minimum fy = 460 N/mm^2).

3.3 Structural Steelwork

Hot-rolled sections, bars and plates: BS EN 10025, Grades S355.

Steel Designation	Minimum yield strength (N/mm2) by nominal thickness						Minimum tensile strength (N/mm2)	
	t<16	>16 <40	>40 <63	>63 <80	>80 <100	>100 <150	t<100	>100 <150
S275	275	265	255	245	235	225	410	400
S355	355	345	335	325	315	295	490	470

Steel hollow sections: BS EN 10210, Grade S355 (and Grade S275).
Steel shapes shall be selected from BS 4 and BS EN 10210.
Angle shapes shall be selected from BS4848.

Steel properties:

Density:	78 kN/m^3
Young's Modulus (short-term):	E = 205,000 N/mm^2
Poisson's Ratio:	ν = 0.30
Coefficient of thermal expansion:	α = 11.7 x 10 –6/°C

3.4 Bolts

HSFG bolts: BS 4395. Preferred sizes are 20 ∅ and 24∅.

Bearing bolts: BS3692, Grade 8.8. Preferred sizes are 20 ∅ and 24∅.

3.5 Welding

For S275 steel: Grade E43 to BS639.
For S355 steel: Grade E51 to BS639.

	Project				Job no.	
	Church Row					
	Calcs for				Start page no./Revision	
	Roof rafter				4	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	J	12/10/2018				

Check deflection

Permissible deflection $\delta_{adm} = 0.003 \times L_{eff} =$ **10.414** mm

Bending deflection $\delta_b = L_{eff}^3 \times (5 \times F \times L_{eff} / 384 + F_p \times \cos(\alpha) / 48) / (E_{mean} \times I) =$ **5.366** mm

Shear deflection $\delta_s = 12 \times L_{eff} \times (F \times L_{eff} + 2 \times F_p \times \cos(\alpha)) / (5 \times E_{mean} \times A) =$ **0.239** mm

Total deflection $\delta_{max} = \delta_b + \delta_s =$ **5.605** mm

PASS - Total deflection within permissible limits

Appendix C: Damage category classification from CIRIA C580

Category of damage		Description of typical damage (ease of repair is underlined)	Approximate crack width (mm)	Limiting tensile strain %
0	Negligible	Hairline cracks of less than about 0.1mm are classes 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 linings. 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, floors 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	