Rose of York, Richmond
Below Ground Hotel Accommodation
Stage 2 Structural Report

April 2019

BLUE ENGINEERING

CONTENTS

ISSUE HISTORY

REV 1 - 16/4/19 issued for comment

Clive Goadby BSc (Eng) MIStructE MICE CEng

BLUE ENGINEERING

1.0 INTRODUCTION

This report has been produced by Blue Engineering on behalf of Andrews and Boyd Consultants Ltd, for their client Samuel Smith Old Brewery (Tadcaster), for the proposed development at Rose of York public house, Petersham Road, Richmond TW10 6UY. This document covers the work undertaken during the Stage 2 (Concept Design/Outline Proposals) stage of the project, a description of the main elements of the structure is given plus the design criteria and parameters to which the detail design of the project will be completed. Information has also been provided to allow the Cost Consultant develop an outline project cost plan.

It should be noted that this is preliminary and subject to refinement and amendment during the following stages of design. A suitable cost contingency should thus be made to allow for ongoing design development plus the unknowns and associated risks to the project.

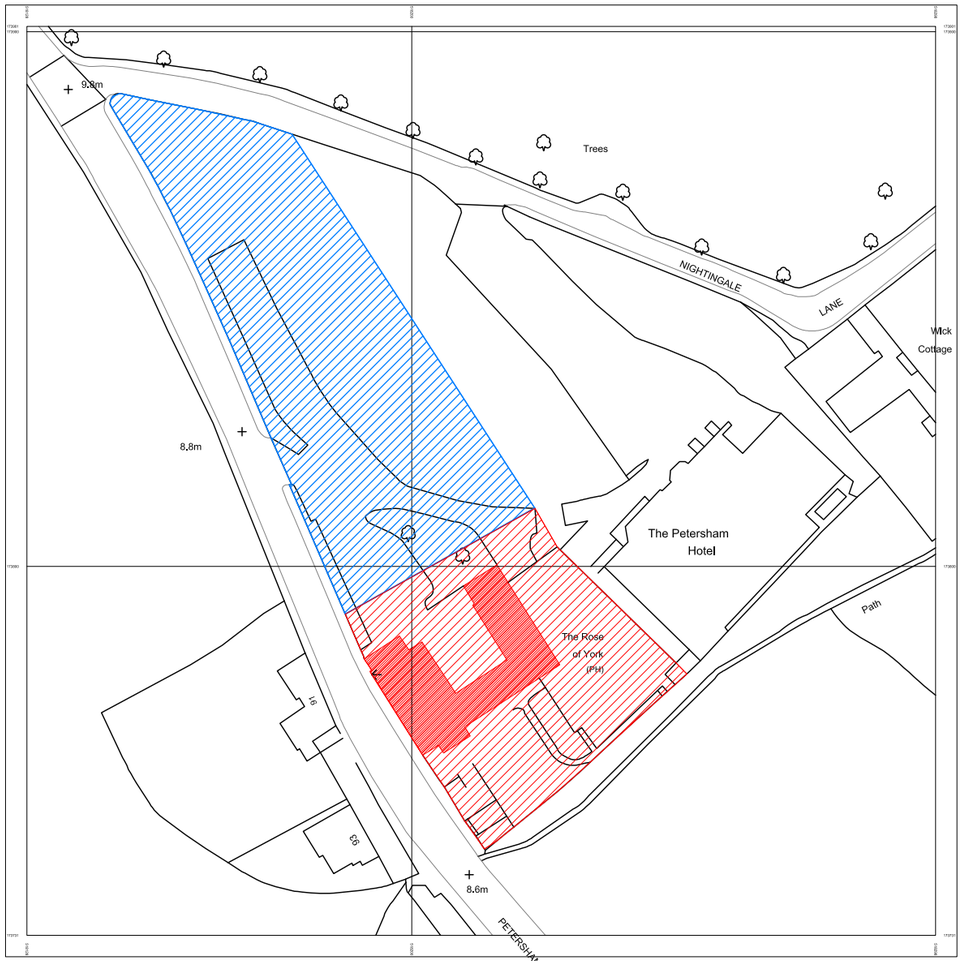


Fig 1 - Site Arrangement

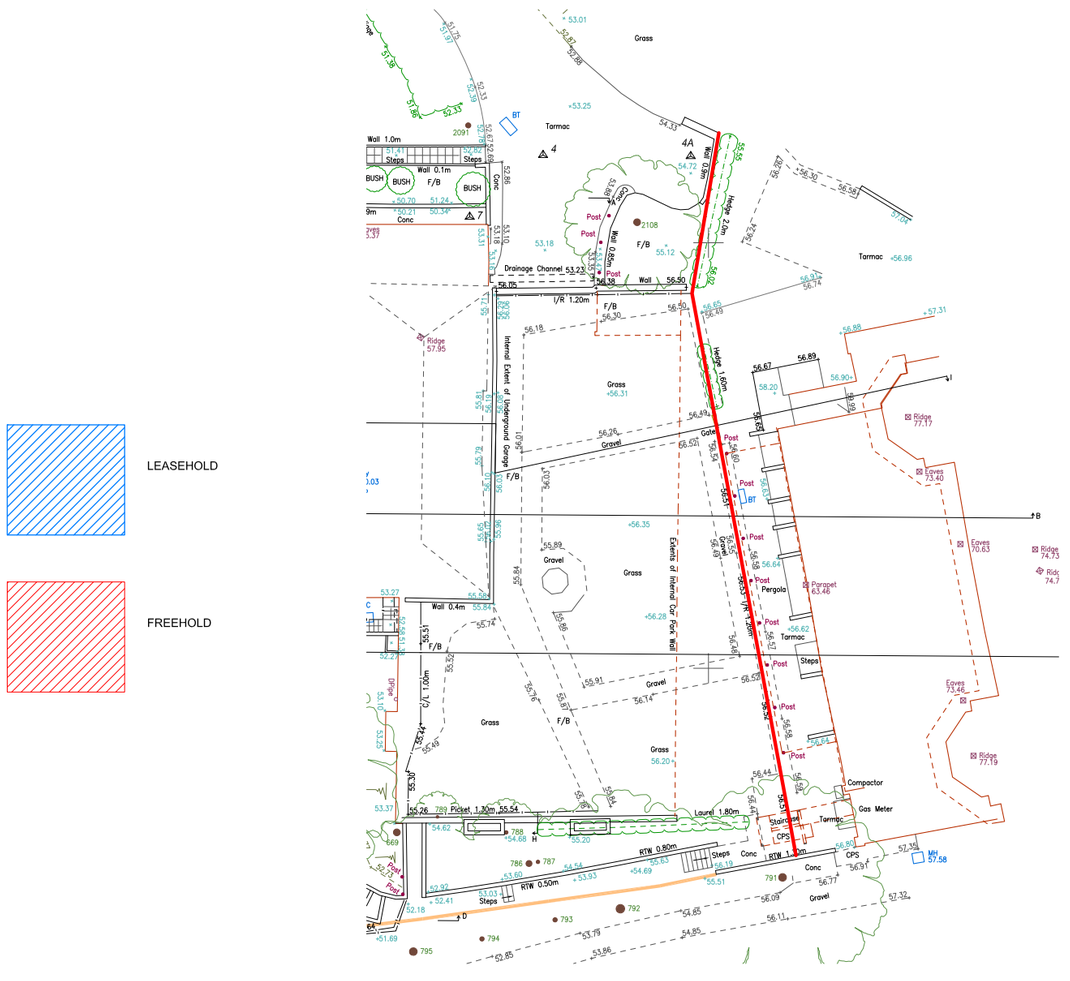


Fig 2 - Site boundary between Rose of York and the Petersham Hotel

2.0 THE PROJECT

It is proposed to create new bedroom accommodation for the Rose of York pub/hotel through the redevelopment of an underground car-park, and the construction of a new 2 storey block adjacent.

The underground car-park is currently little used, and as it is immediately adjacent to the main buildings is in a good location for creating a connection. The roof of the car-park is used as a lawn for events by the adjacent Petersham Hotel, under an arrangement, although the car-park is fully within the site boundary of the Rose of York. The car-park will be demolished and new accommodation will be constructed, again below ground, with appropriate headroom, water-tightness and insulation. Natural light will be introduced through a glazed roof. The solid part of the roof will be re-landscaped to enable continued use as an accessible area.

The Petersham Hotel building is adjacent, located a varying distance between 5m and 10.5m from the car-park structure. The principal focus of this report is to consider options for constructing the new below-ground accommodation, and to examine the extent to which the works would affect the foundations of the Petersham Hotel.

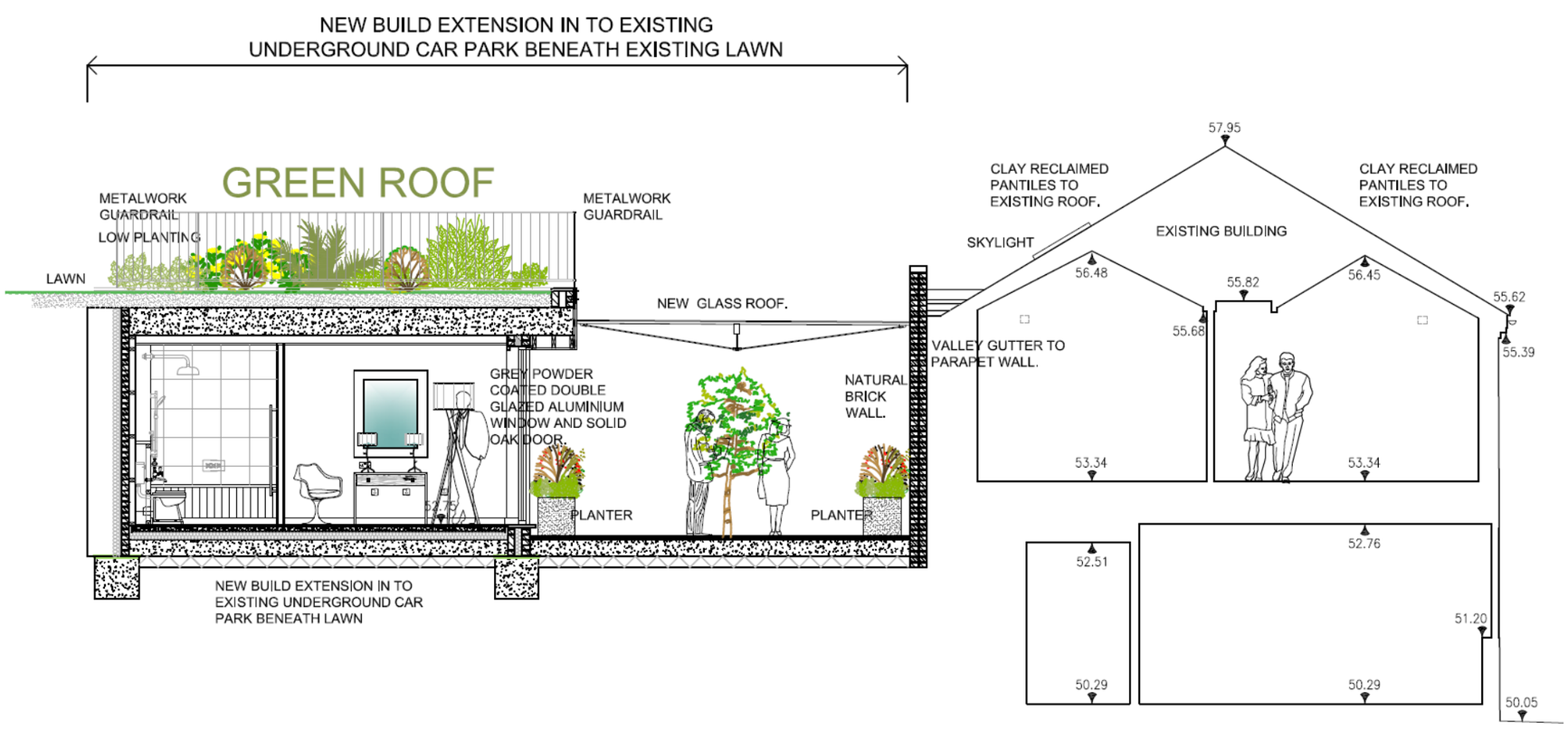


Fig 3 - Principal section

3.0 THE SITE

3.1 SITE LOCATION

The site is located in the London Borough of Richmond upon Thames, on Petersham Road adjacent to Petersham Meadows. The postcode is TW10 6UY and National Grid reference is TQ 18211 73786.
The main building faces North, with access from Petersham Road (A307) to the West. The site is sloped and situated to the North-East and uphill is the Petersham Hotel. To the South is Petersham Common, on the former grounds of the Royal Star and Garter home.
The surrounding area is partly residential, with open ground. .

3.2 EXISTING BUILDINGS

The existing buildings were reportedly constructed as stables attached to what is now the Petersham Hotel in the 18th century. The main pub/hotel is 2-storeys high, and is set into the hillside so, at the higher end, the ground floor is below ground. To the East a car-park was constructed in the mid 20th century (first appearing on the 1959 OS Map) and this is below ground with a landscaped roof used as a lawn by the adjacent Petersham Hotel. The main pub buildings are conventionally constructed with masonry walls and timber floors and roof, and they are in the form of a U-shape around a central courtyard.

The underground car-park is constructed in reinforced concrete, with insitu concrete columns and beams on a roughly 2.6 x 5.3 m grid, and precast concrete planks spanning between the beams. The roof and floor of the car-park both slope gently in two directions, to aid drainage. The back wall of the car-park is a reinforced concrete retaining wall. There is a small access passage to the South onto Petersham common, and there are two ventilation shafts on the same elevation. The car-park is L-shaped, wrapping around the hotel building. One bay in the corner is taken over by a plant room that was inaccessible and,potentially, contains electrical switch gear.

Fig 4 - Street plan

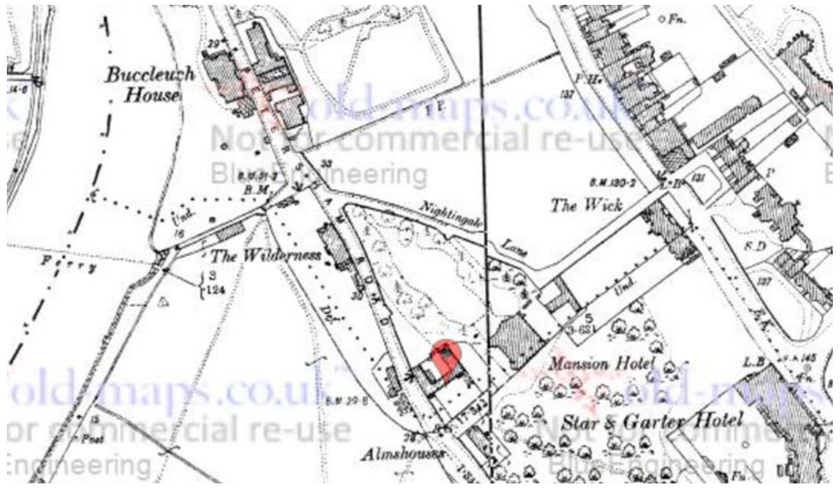


Fig 5 - OS County Plan - Surrey 1896

Fig 6 - View of car-park entrance

Fig 7 - Car-park entrance

Fig 8 - Car-park interior

3.3 GROUND CONDITIONS

3.3.1 SOIL STRATA

In this vicinity soil conditions are shown as London Clay on the publicly available records available from the British Geological Society. However the soil conditions in this are vary due to the proximity to the River Thames and Richmond Hill. Adjacent boreholes indicate varying depths of Made Ground and Ballast (river-bed sand/gravel material). The site is near the boundary between these two zones.

3.3.2 GROUNDWATER

The topography of the site suggests there may be a risk of perched groundwater within the made ground overlying the London Clay, possibly with a flow due to the slope. Note the existing garage structure would currently interrupt any flow, and the proposals would therefore not represent a change to the equilibrium. The presence of groundwater will be determined during the ground investigation undertaken during the next stage.

3.4 UNDERGROUND SERVICES AND FEATURES

Given the previous and current site uses, it is unlikely that there will be any major utilities crossing the site. There may be drainage located beneath the footprint of the new two-storey annex, and it is recommended that a detailed drain survey including CCTV to determine location and condition is undertaken during the next stage.

3.5 SURVEYS AND INVESTIGATIONS

No condition surveys of the existing building, ground conditions or drainage have been seen to date. It is recommended that surveys are undertaken during the next stage.
In particular determining the condition and form of relevant aspects of the Rose of York building would be valuable in terms of reducing construction risk.

Fig 9 - Hotel restaurant building

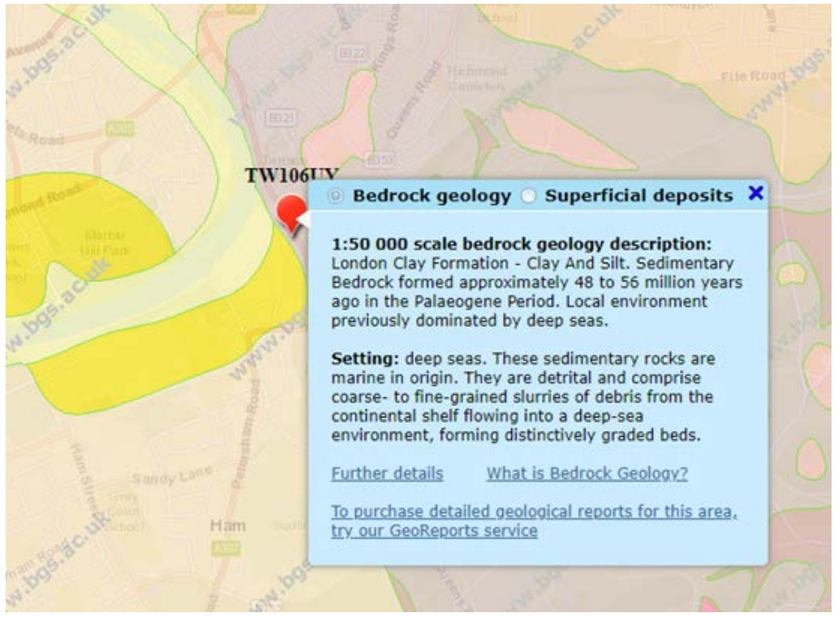


Fig 10 - BGS sub-surface geology plan

5.0 PROPOSED STRUCTURAL WORKS

The proposed accommodation provides robust support to the retained ground uphill of the building - including and associated live (surcharge) loads. It also supports the landscaping and live loads applied to the roof. The structure should be as open and flexible as possible, to allow maximum natural light into the rooms from the courtyard and, potentially, future alterations to the room layouts.

The tapered alignment of the Rose of York and Petersham Hotel Buildings creates a reasonably generous working space at one end and a 'pinch-point' at the other. This pinch-point represents the critical design case in terms of impact on the neighbouring property (see figs 11 and 12 below).

The 19th century structure, at its closest point, is approximately 11m from the basement. As the new basement is less than 5m deep the effect of construction on the older building will be insignificant.

The newer 2-storey dining block is closer - between 5.2m and 9.6m from the new basement. The construction methodologies will take this into account and minimise potential ground movements.

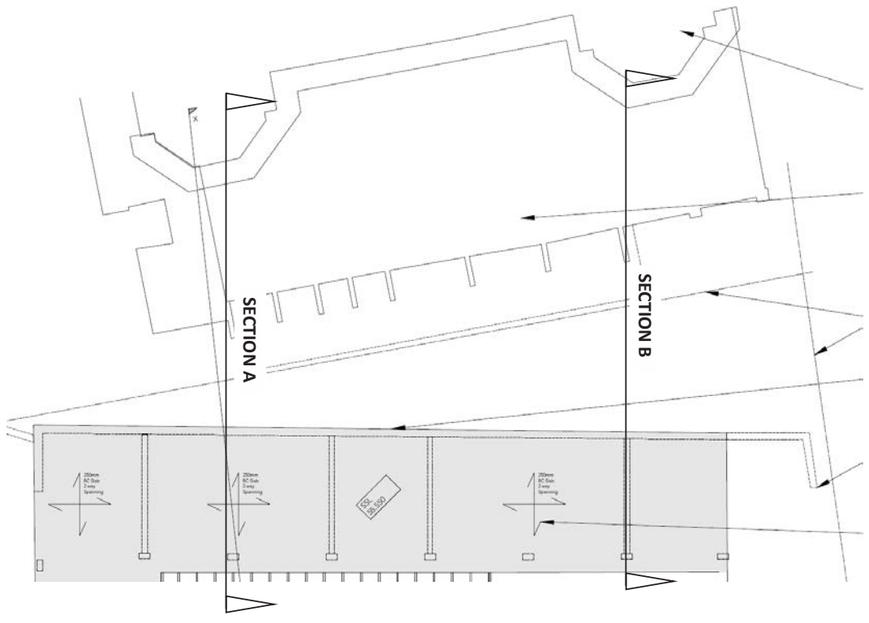
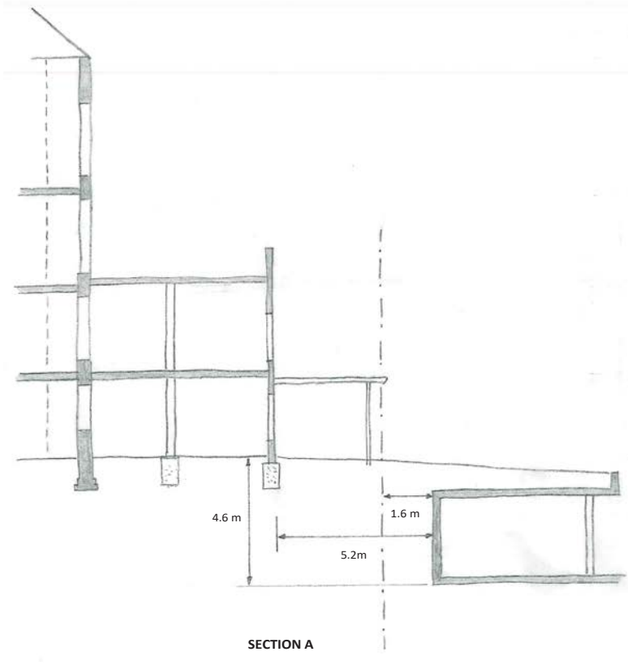


Fig 11 - Key Plan



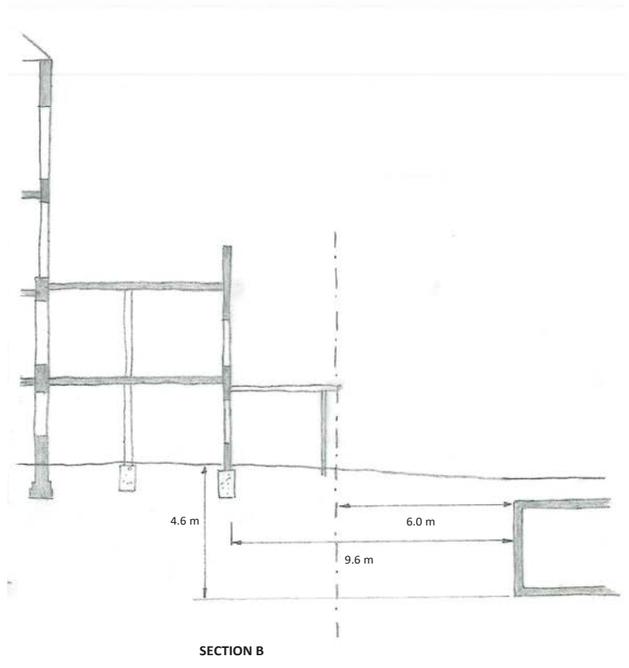


Fig 12 - Key sections

5.1 RETAINING WALL OPTIONS

There are a number of different ways to construct a storey-height retaining wall here. The construction is constrained by the proximity to the adjacent Petersham Hotel, at least at the northern corner, and the choice of structure is largely driven by the temporary works needed to maintain continued support to the soil.

Our design approach has been to assess the building and foundation loads on the main walls of the Petersham Hotel. We have considered the loads they impose on, and the support they require from, the new retaining walls and designed the new structure accordingly.

We have considered two main alternatives, together with the construction methodology required to demolish and build the structure:
- bored contiguous-piled concrete wall,
- cast-in-place reinforced concrete wall

Piling is a specialist contractor designed technology and typically procured under a performance specification route. The engineer would design the piling up to a stage sufficient for costing and initial coordination, and the final design would be produced by the installer.

5.1.1 Option 1 - Contiguous piles.

This approach uses modern piling technology to install a 'contiguous' series of piles, with small gaps between them to form a wall. This would carry both vertical and lateral loads and would perform as both temporary and permanent works. This is a good technique for keeping movements of retained structures to a minimum during construction and use. The alternative of interlocking secant piles (which are slower, more costly and noisier to construct) are not necessary.

The piled wall would not perform a water-retaining function in the permanent works although during construction and with the clay subsoil they are expected to control any water flow into the excavation. The building envelope would normally include a reinforced concrete lining wall as well as a drained cavity system (such as Deltadrain) to exclude water. The principal advantage of a piled retaining wall is that, other than propping that may be needed, no additional temporary works is required.

For the retained heights required, a pile diameter of 450mm would be sufficient, with a 200mm thick RC liner wall. As it is difficult to control construction tolerances to precise levels with bored piles, additional dimensional tolerance needs to be built into the setting-out to account for this.

5.1.2 Option 2 - Reinforced Concrete wall

This is a conventional reinforced concrete wall, with two layers of reinforcement and traditional shutters. If sufficient working space is created the rear of the wall could be shuttered and faced with a tanking membrane to provide water-resistance. Alternatively, and depending on setting-out, the rear of the wall could be poured directly against sheet piles. Again a drained cavity system (such as Deltadrain) would normally be provided on the inside to control water ingress. A wall thickness of 350mm would be sufficient to deal with the structural requirements. Because it will be integral with the roof slab it will be an efficient structure.

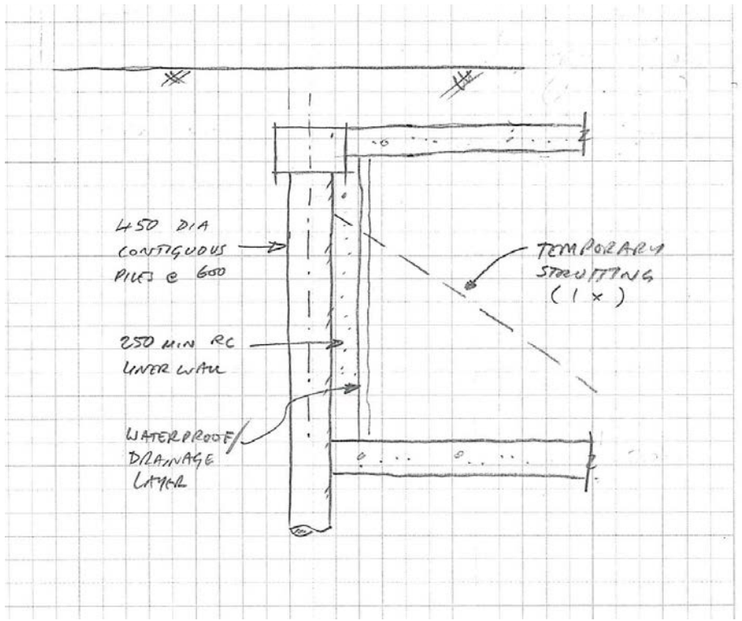


Fig 13 - Option 1 - contiguous piles

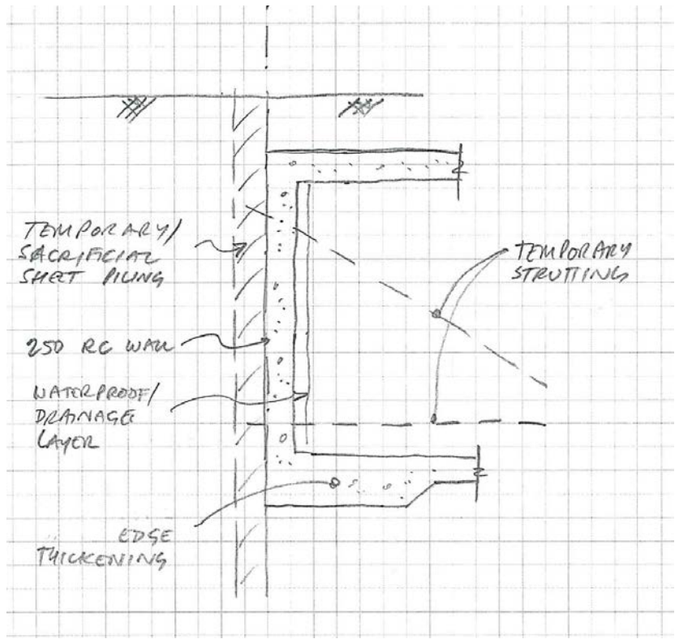


Fig 14 - Option 2 - reinforced concrete wall

5.3 ROOF STRUCTURE.

The roof needs to support soil and live loads from above, and also act to prop the top of the retaining walls against lateral forces. A number of types of construction could be considered here. However because the depth of the structure is critical any downstand beams are ruled out. Thus a flat reinforced concrete slab on columns is proposed. We have included a system of braced concrete shear walls at this stage to ensure lateral loads from the top of the retaining wall are fully dealt with. During the next stage we will look at the options for omitting these walls by designing the walls as cantilevers. A 250mm slab depth is sufficient for the spans and loads considered.

5.4 FLOOR/FOUNDATIONS.

It is proposed to use a thick raft slab, bearing directly on to the clay, to support the building loads. This will effectively spread any concentrated loads from columns and walls into the clay within the limits of bearing pressure proposed. However adjacent to the existing Rose of York building it is important not to surcharge the existing brick retaining walls by adding foundation loads at high level. Here it is proposed to support the slab on a row of small diameter piles, which would be sleeved to below the lowest floor level ensuring that no increase in loads occurs on the existing walls.

The alternative of a suspended slab – supported on pad or piled foundations – is a viable solution, albeit at additional cost. Where this might be required is where the underlying clay has been affected by tree-root activity, potentially at the southern end by Petersham Common. An assessment of the adjacent trees and their affect on the clay will need to be carried out during the site investigation to confirm this requirement.

5.5 MOVEMENT CONSIDERATIONS.

An initial appraisal of foundation movements of the Petersham Hotel, in relation to these proposals, has been carried out. The proposed method of construction is well tested and a proven form of a retaining structure. The contractor undertaking the works will have suitable experience and all necessary insurances and will follow current standards and good building guides. Providing the works are carried out correctly, movement to the surrounding structures should be no greater than described as 'very slight' under CIRIA C580 Category 1.

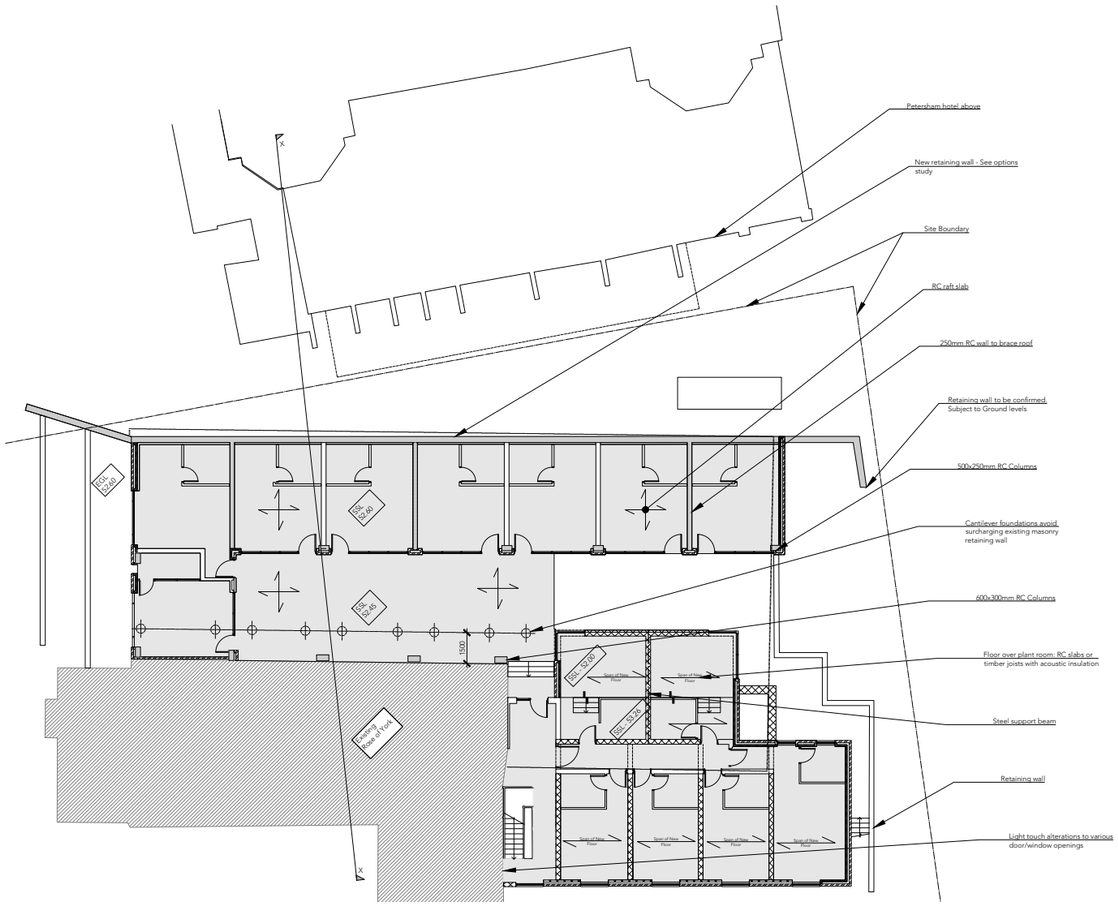


Fig 15 - Proposed structure

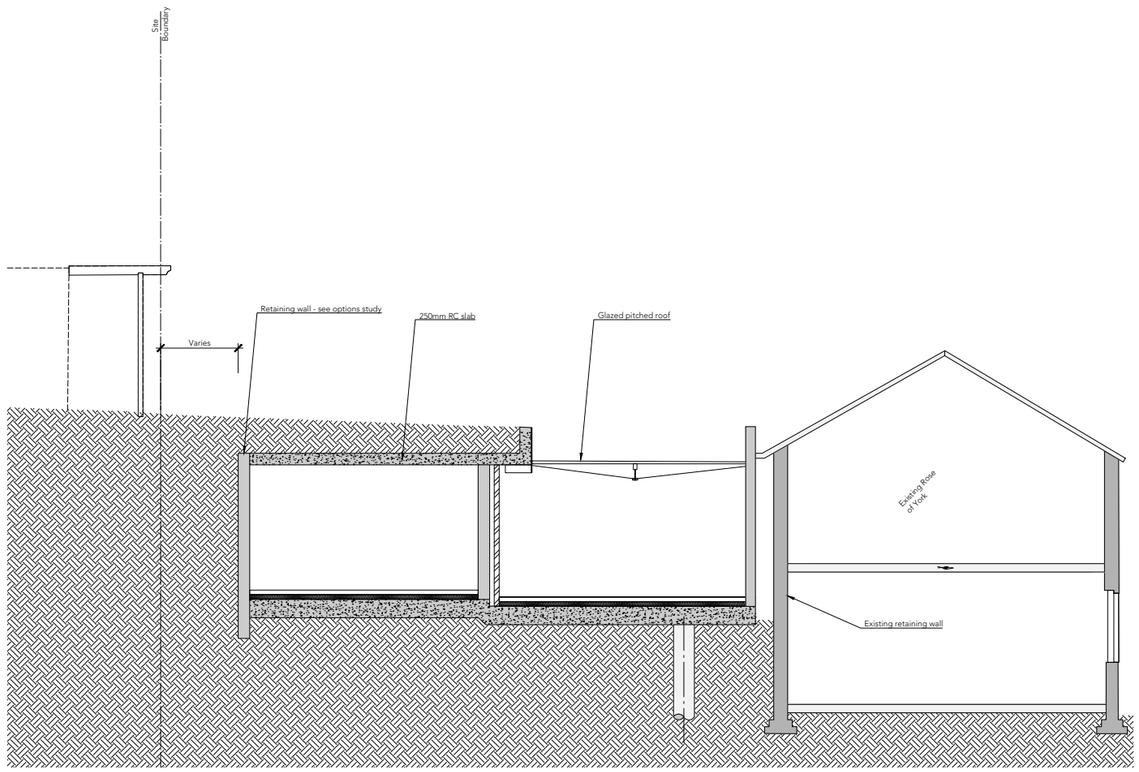


Fig 16 - Proposed structure: section

5.6 DEMOLITION / TEMPORARY WORKS/CONSTRUCTION SEQUENCE

A consideration of the construction options above with differing methodologies follows, including the perceived advantages and disadvantages of each.

5.6.1 - Contiguous piles on proposed wall alignment - Option 1

The proposed alignment of the new wall is (slightly) inside the old wall and so installation of piles on this alignment would require the original structure to be sequentially demolished and backfilled prior to piling. A piling platform would need to be formed at the high level in order to allow piles to be installed.
This requirement negates some of the advantages that contiguous piling offers, as the additional stages of demolition and backfill would add to both cost and programme. However, once the piles were installed, excavation and construction could proceed apace. This is a well understood form of construction. With appropriately sized piles the excavation could be formed with no propping during construction.

5.6.2 - Contiguous piles outside proposed wall alignment - Option 2

If the alignment were adjusted to be clear of obstructions (with suitable allowance for pile-probing in advance of operations to ensure no obstructions) then it would be possible to install the p1iles prior to demolition. This would require temporary back-propping of the car-park roof to support the weight of the plant which is a considerable weight.

The site boundary approaches the line of the car-park wall at its northern end and so the detailed setting-out would need to be checked to ensure the piles do not go beyond the site boundary locally.

5.6.3 - Reinforced concrete wall with sheet piles tight to back face of wall - Option 3

This is an alternative to contiguous piles, but in engineering terms and construction the advantages are very similar. The sheet piles could be installed from above and driven into the soil using silent 'push-in' techniques, instead of the more traditional vibration which would create significant disturbance to neighbours. Silent-piling techniques have been increasingly used in recent years.

The disadvantage of sheet piles is that they can be challenging to install in stiff clay subsoils. Techniques are available to ease this including pre-augering and water-jetting. These can, however, result in additional soil movements.

Because the piles would be faced with an insitu concrete wall, performing the permanent structural functions, the piles would be considered sacrificial.

Sheet piles are less stiff than concrete, and so the propping requirements are likely to be greater.

5.6.4 - Reinforced concrete wall with sheet piles spaced away from the wall - Option 4

The proximity of the Petersham Hotel, with the site boundary on a tapering alignment, offers the possibility of forming a larger excavation using sheet piles, creating working space to construct the basement 'box' inside.
The height of sheet piles could vary, depending on proximity to the site boundary, offering economies by battering the excavation to form a slope. Soil has a natural angle of repose related to its geotechnical properties and the loading to which it is subject. This angle would determine the slope of the batter, confirmation of this would depend on the results of the detailed soil investigation.

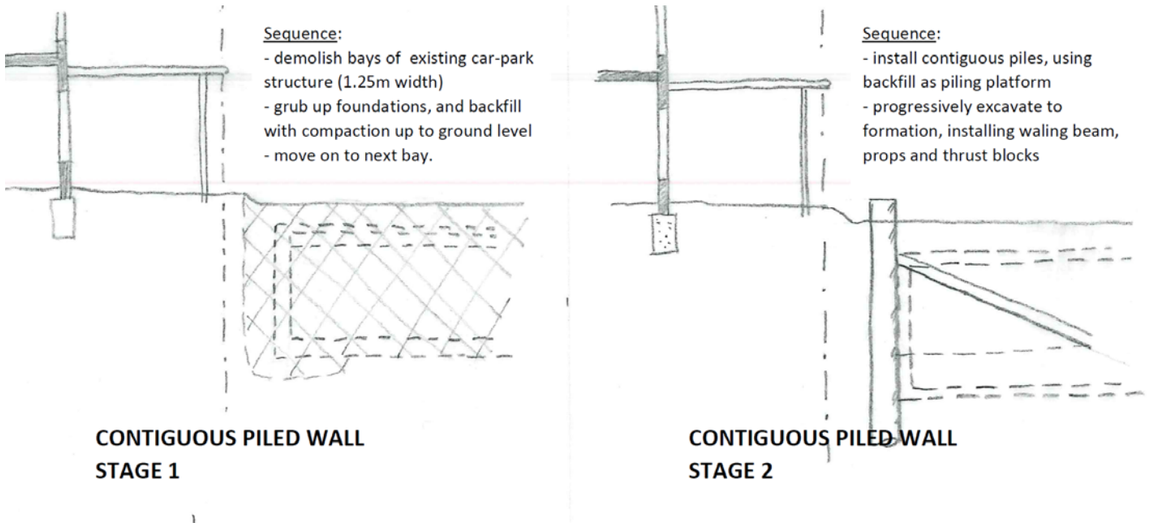


Fig 17 - Construction methodology - Option 1

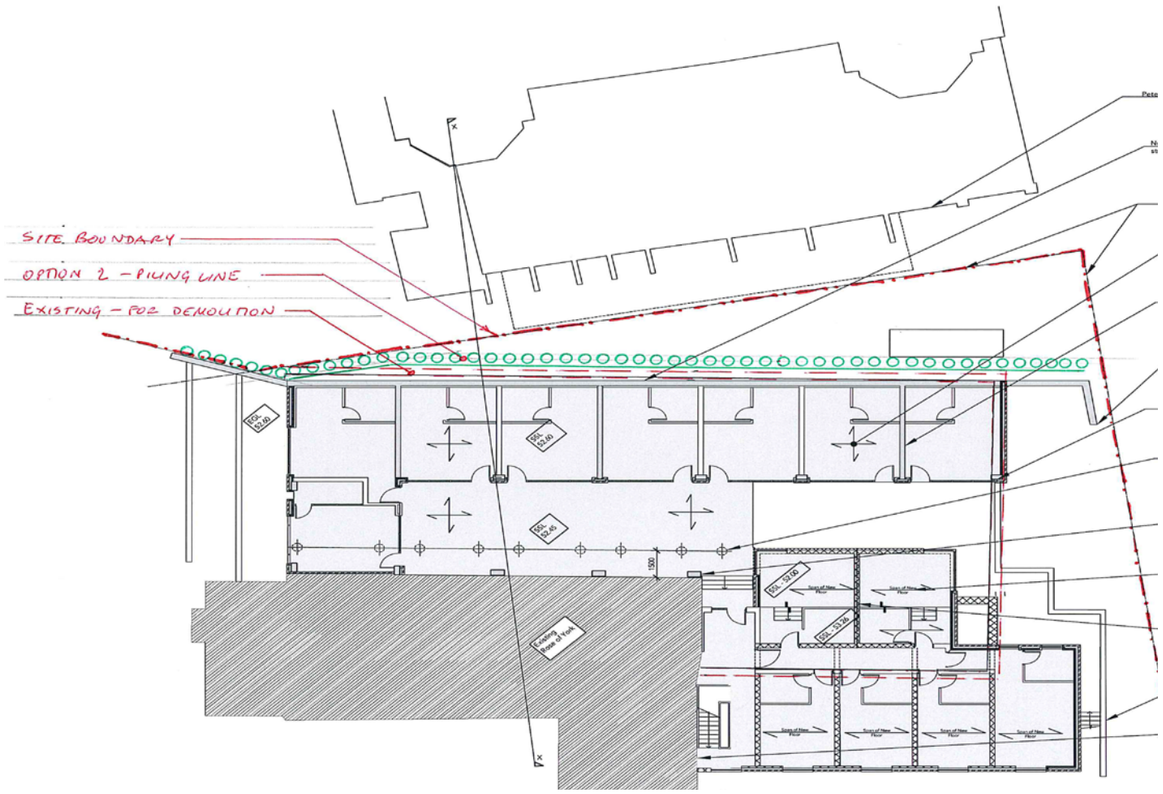


Fig 18- Key plan - contiguous piles Option 2

Pros	Cons
Contiguous piles tight to wall - Option 1	
Temporary works minimised	Slow demolition and backfill
Clean fast construction once initial demolition complete	Risk of soil movement
Contiguous piles outboard of wall - Option 2	
Temporary works minimised	Pinch point at North end
Clean fast construction once back-propping installed	Technical aspects of back-propping
Sheet piles tight to wall - Option 3	
Single layer of structure – no secondary wall required	Installation risk with press-in sheet piles in London Clay (test with specialist)
	Slow demolition and backfill
	Risk of soil movement, particularly if pre-auguring or water-jetting used
Sheet piles outboard of wall - Option 4	
Single layer of structure – no secondary wall required	Installation risk with press-in sheet piles in London Clay (test with specialist)
Allows tapering dig to site boundary	Pinch point at North end
Allows tanking	Technical aspects of back-propping
	Risk of soil movement, particularly if pre-auguring or water-jetting used

5.6.5 Conclusion/recommendation

Our recommendation, based on appraising the risks and benefits is to adopt **option 2 contiguous piles** outboard of the proposed wall alignment. We believe this offers the best balance of costs, risks, and construction programme whilst minimising ground movements.

This option creates the secondary benefit of a slightly larger construction, which may be advantageous for the development. However if this is not acceptable due to constraints from the planning permission then Option 1 would be the next best alternative in our view.

A draft Structural Method Statement (SMS) based on the above recommendations is included in the Appendices. This is of a form previously submitted to and accepted by LB Richmond. It would need to be updated prior to submission at the start of the next design stage.

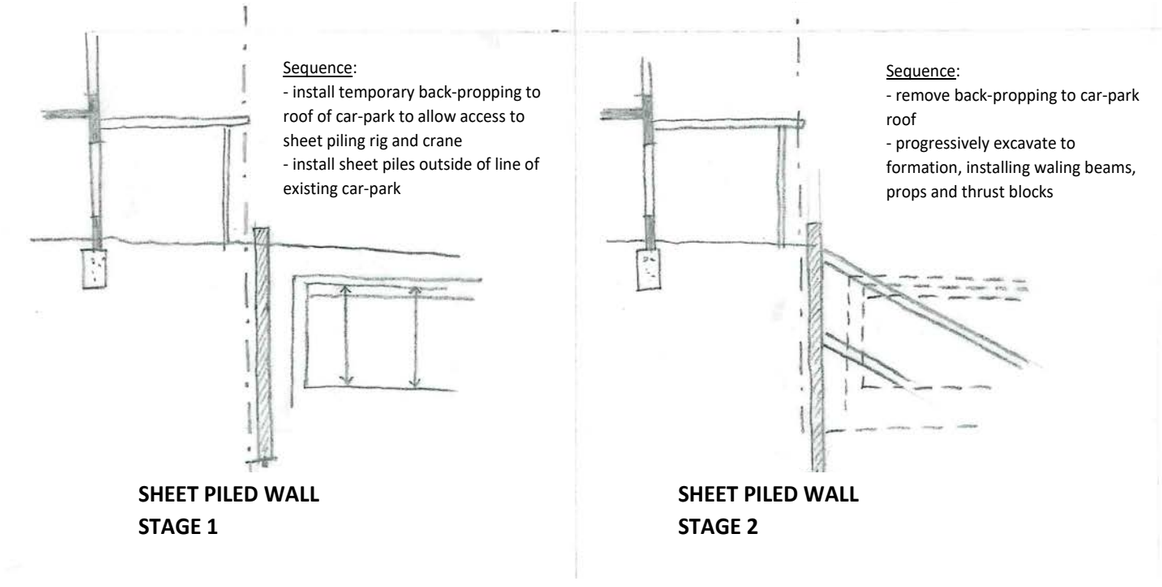


Fig 19 - Construction methodology - Option 4

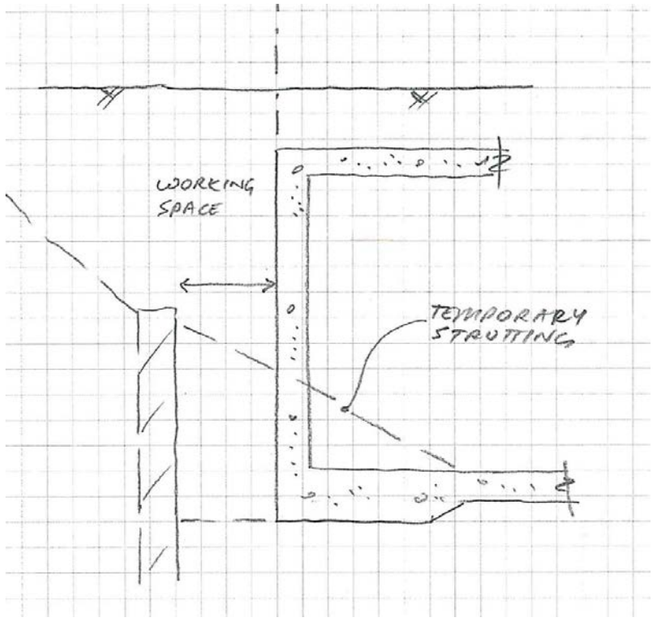


Fig 20 - Section - sheet piles Option 4

6.0 LOADS AND DESIGN CRITERIA

6.1 DEFLECTION

The structure has been designed such that deflections are limited to the following values.
Vertical Deflections
Slabs and beams generally
Deflection under total load = span/250
Deflection under imposed load = span/360 (or 20mm, whichever is lesser)
Cantilevers
Deflection under total load = span125
Deflection under imposed load = span/175 (or 20mm, whichever is lesser)
Horizontal Deflection
Deflection under total load = H/500
Note:
Horizontal deflection of vertical elements occurring under wind will be limited to the value above, where H is the height of the building above ground level.
All finishes, cladding and services, etc. will need to be detailed to accommodate the movements indicated above.

6.2 SETTLEMENTS

For the purposes of preliminary design differential settlement between column locations will be limited to distance/500 with an absolute limit of 20mm (Reference: CIRIA SP27 pp.69). Total settlement will be limited to 25mm. All cladding, finishes and services must be designed and detailed to accommodate the above settlements.

6.3 DURABILITY AND CORROSION PROTECTION

Durability of the reinforced concrete structure will be provided by ensuring adequate concrete cover to embedded reinforcement. This will be specified according to the specific environment of the elements an the construction tolerances achievable in each case. Typically this will vary between 30mm and 50mm.

6.4 FIRE PROTECTION

The structure is required to have 90 minutes of fire protection for all primary elements. Generally the inherent fire resistance of concrete means that no additional fire protection will be required for concrete elements through suitable cover to reinforcement and minimum concrete section sizes. Fire protection for any steel structure is to be specified by the Architect, but could be any one of the following: encasement with fire-resistant board, spray applied mineral fibre, or intumescent paint coatings.

6.5 ACOUSTICS

Where new floor structures are specified these may need enhancement to provide adequate acoustic performance.

6.6 DESIGN STANDARDS

Since March 2010 Eurocodes and their associated National Annexes (providing country-specific design parameters), have superseded British Standards as the principle design codes for structural elements in the United Kingdom. Reference will be made to British Standards and other technical guidance where topics are not adequately addressed in the Eurocodes.
It is of note that while no longer current, the superseded British Standards generally remain cited within UK Building Regulations. The following codes and design guides will be used principally in preparing the structural design for the project. For the sake of brevity National Annexes are not listed:
•• Eurocode 0: Basis of structural design:
BS EN 1990:2002
•• Eurocode 1: Actions on structures:
BS EN 1991-1-1:2002, BS EN 1991-1-2:2002, BS EN 1991-1-3:2003, BS EN 1991-1-4:2005, BS EN 1991-1-5:2003, BS EN 1991-1-6:2005, BS EN 1991-1-7:2006
•• Eurocode 2: Design of concrete structures:
BS EN 1992-1-1:2004, BS EN 1992-1-2:2004
•• Eurocode 3: Design of steel structures:
BS EN 1993-1-1:2005, BS EN 1993-1-2:2005
•• Eurocode 7: Geotechnical design:
BS EN 1997-1-1:2004
Building Regulations: all relevant sections, including Approved documents A & B concerning structure and fire safety.

6.7 DESIGN LOADS

6.7.1 VERTICAL LOADS

In accordance with the requirements of BS EN 1990 and the building brief the following design loads have been adopted.

Dead loads
All structure dead loads are calculated based on the proposed material densities as per BS EN 1991-1
- Finishes and Services 2.00 kN/m2
- Cladding (average inc glazing) 3.50 kN/m2

Imposed loads
New structure has been designed to comply with the following imposed loading requirements as per BS EN 1991-1:

Usage	Imposed Load kN/m2	Partitions kN/m2
Hotel bedrooms	2.00	1.00
Corridors and hallways	3.00	
External areas subject to crowd loads	5.00	

Construction loads
The permanent structure is to be designed for the loads outlined above. Where the Contractor proposes to support construction loads on the permanent structure he will be responsible for verifying that such loads do not exceed the capacity of the structure. Where additional load capacity is required from the to support construction loads, the Contractor will be required to design and install temporary works to support these loads.

6.7.2 LATERAL LOADS

In assessing the lateral load on the building, the critical design case is that of soil and surcharge loading (i.e. imposed loads on the ground creating lateral loads at depth). These are calculated in accordance with BS-EN 1997-1 2004 and using the following:
Soil density 19 kN/m^3
Ka 0.45
Imposed load 10.0 kN/m^2
In addition the structure has to resist the greater of either the notional horizontal forces or wind loading. Wind loads are calculated in accordance with EN 1991-1-4. The proposed structure has been designed for a wind load of 0.6 kN/m2. Notional horizontal forces, which account for lack of fit and eccentricities caused by construction tolerances, are calculated in accordance with the relevant material design code.

Steelwork EN 1993-1 cl 5.3.2:
0.5 % of total design (factored) dead and imposed load applied at that level

Concrete EN 1992-1cl.5.2:
0.5 of total design (factored) dead and imposed load applied at that level

6.7.3 MATERIAL GRADES

Insitu Concrete:
- Reinforced Concrete to EN 206-1 C35/45
- Steel Reinforcement to EN 10080 fyk = 500/mm2

Structural Steelwork to EN 10025-2:
- General internal steelwork S355J0, S355 J0H
- General external steelwork S355J2, S355 J2H

All bolts to be grade 8.8 in accordance with EN 1338-1-8

7.0 RISKS UNKNOWNS & OPPORTUNITIES

These items should be addressed during the following stages of design with the goal of minimising or removing them where possible. The main risks related to structure identified during the preparation of the Stage 3 design are as follows.

Risk/unknown/opportunity	Mitigation
Water ingress through retaining walls	Ensure site ground-water level is confirmed in advance. Make allowance made for keeping excavations clear of groundwater during construction. Develop strategy for waterproofing below ground spaces.
Predicted foundation settlements higher than anticipated once SI information obtained	Review foundation solution once SI information obtained
Presence of clay desiccation - impacting on choice of foundations	Review foundation solution once SI information obtained
Unanticipated discoveries during construction - existing Rose of York pub building	Carry out intrusive survey of key areas affected by works - exterior walls, existing retaining walls, roof areas. Include cost and programme contingencies during construction.
Third Party Agreements (Party Wall or related agreements with Petersham Hotel)	Engage Party Wall surveyor during next design stage to advise on strategy
Additional floor area available (Option 4)	Investigate implications for Planning to determine if desirable or not.

Next steps

At the start of the next stage, the following steps are anticipated in order to progress the strcutral design whilst minimising risk:

- Site-specific Geotechnical/Geoenvironmental Investigation to confirm parameters for foundations design and also presence/nature of any contamination
- Below ground drainage survey tracing all runs to identify condition and potential connection locations
- Survey/Investigation of Rose of York building - areas impacted by works. Intrusive investigations and testing as necessary
- Advice from Party Wall surveyor on agreements required with Petersham Hotel owner.

8.0 CDM

Under the CDM (2015) regulations designers have key duties including:

- When carrying out design work, avoiding foreseeable risks to those involved in this construction and future use of structure.
- Eliminating hazards and reducing risk associated with the hazards that remain.
- Providing information about significant residual risks associated with the design

Designers need to consider the hazards and risks to those who:

- Carry out construction of the design
- Are affected by the construction
- Clean and maintain the structure
- Occupy and use the structure
- Demolish the design at end of life

A preliminary hazard identification and risk assessment has been carried out for this project and is included in Appendix C. This assessment focuses on those risks specific to the project and which may not be immediately obvious to those using the design. Where possible, mitigation measures are suggested. A brief explanation is provided where these mitigation measures have already been implemented in the design to date. Further assessment and review will be carried out in detail during subsequent stages of the design. Key items identified during this stage of work that present significant risks to health and safety include:

APPENDICES

Appendix 1

Structural Drawings

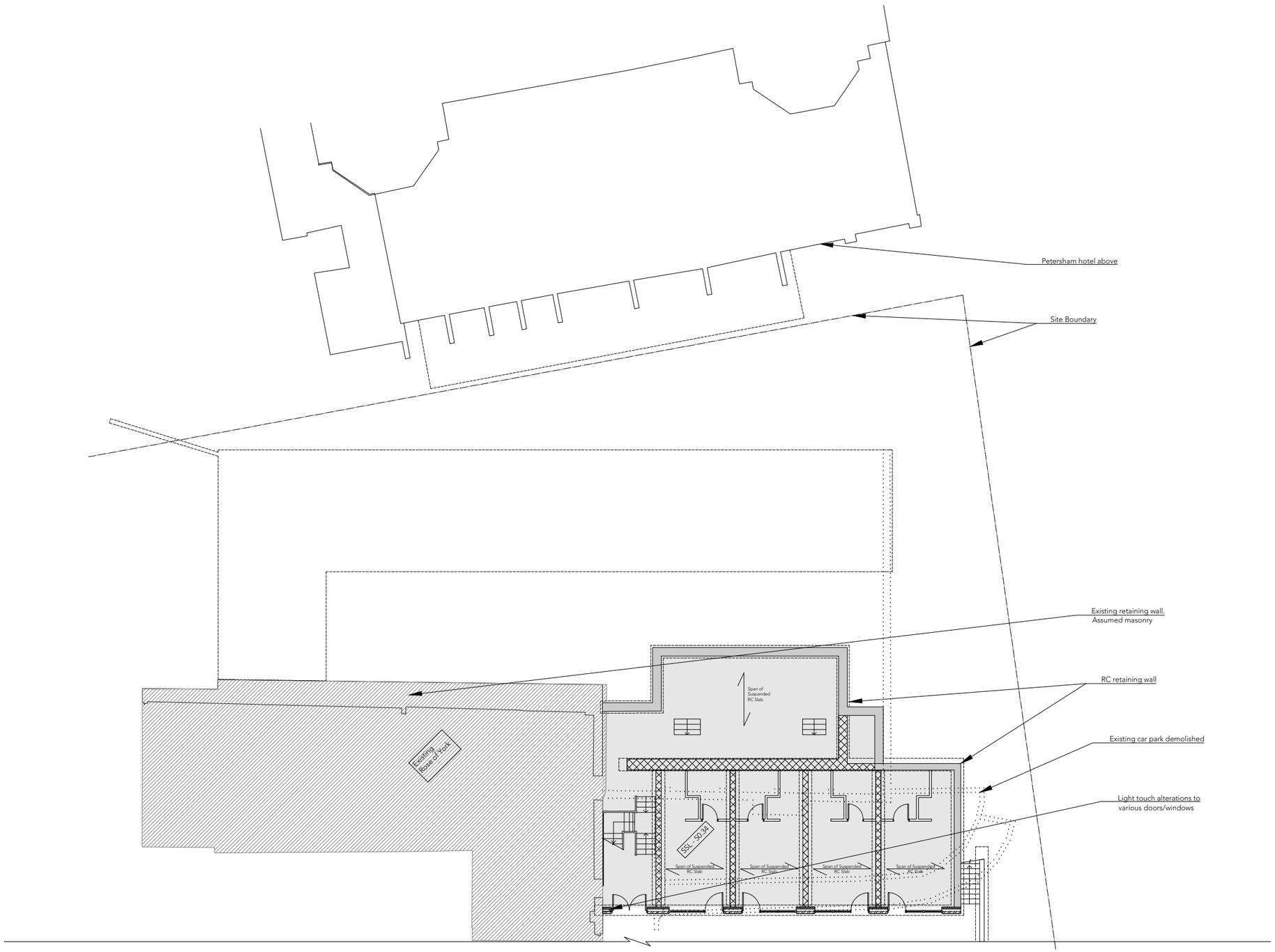
BLUE ENGINEERING

Blue Structural Engineering LLP
86-90 Paul Street, London, EC2A 4NE
T +44 (0) 207 247 3811 E info@blueengineering.co.uk
www.blueengineering.co.uk

DO NOT SCALE FROM THIS DRAWING
All dimensions to be verified on site before commencing work. All error and omissions are to be reported to the Engineer. This drawing is to be read in conjunction with all relevant Design Team drawings and specifications

Drawing History

Rev	Date	Description	Drawn	Checked
P1	15.04.19	For Comment	HM	CG



STAGE 2 DRAWING
PRELIMINARY
NOT FOR CONSTRUCTION

Title
Ground Floor Plan

Project
Rose Of
York,Richmond,
TW10 6UY

Client

Job No.
4787

Drawing No.
100

Revision
P1

Scale
1:100 at A1

A1

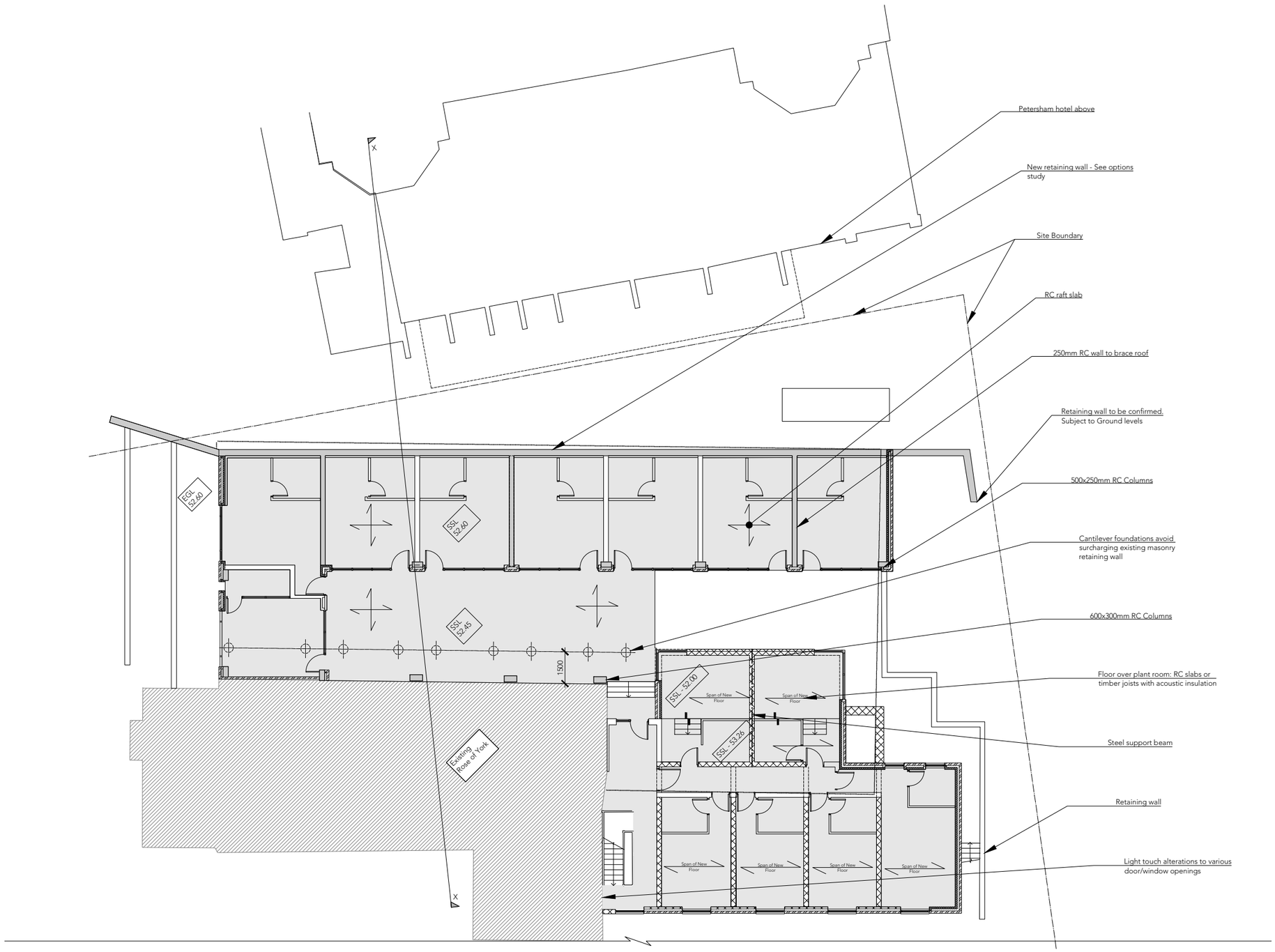
BLUE ENGINEERING

Blue Structural Engineering LLP
86-90 Paul Street, London, EC2A 4NE
T +44 (0) 207 247 3811 E info@blueengineering.co.uk
www.blueengineering.co.uk

DO NOT SCALE FROM THIS DRAWING
All dimensions to be verified on site before commencing work. All error and omissions are to be reported to the Engineer. This drawing is to be read in conjunction with all relevant Design Team drawings and specifications

Drawing History

Rev	Date	Description	Drawn	Checked
P1	15.04.19	For Comment	HM	CG



STAGE 2 DRAWING
PRELIMINARY
NOT FOR CONSTRUCTION

Title
First Floor Plan

Project
Rose Of York,Richmond, TW10 6UY

Client

Job No.
4787

Drawing No.
101

Revision
P1

Scale
1:100 at A1

A1

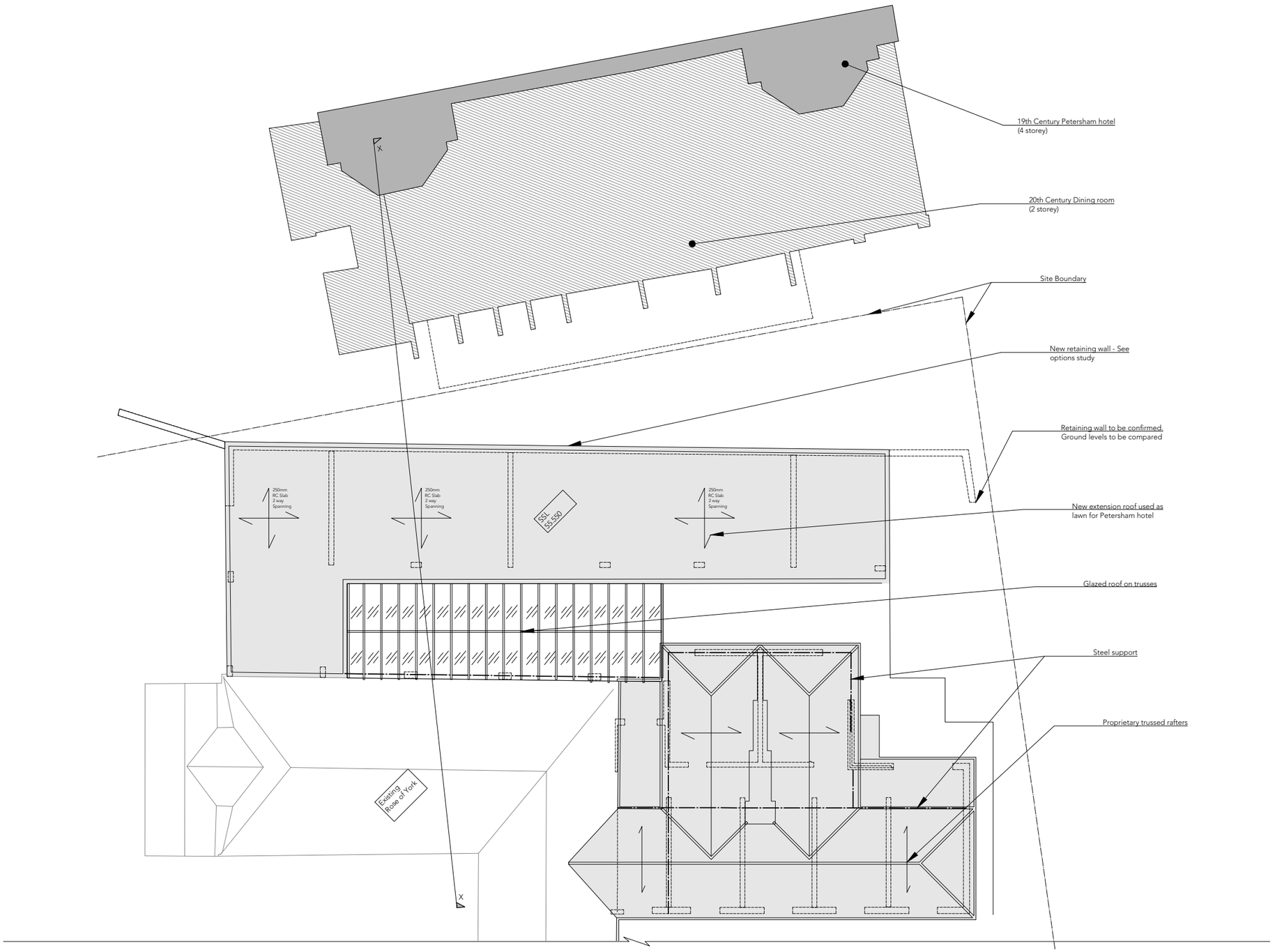
BLUE ENGINEERING

Blue Structural Engineering LLP
86-90 Paul Street, London, EC2A 4NE
T +44 (0) 207 247 3811 E info@blueengineering.co.uk
www.blueengineering.co.uk

DO NOT SCALE FROM THIS DRAWING
All dimensions to be verified on site before commencing work. All error and omissions are to be reported to the Engineer. This drawing is to be read in conjunction with all relevant Design Team drawings and specifications

Drawing History

Rev	Date	Description	Drawn	Checked
P1	15.04.19	For Comment	HM	CG



STAGE 2 DRAWING
PRELIMINARY
NOT FOR CONSTRUCTION

Title
Roof Plan

Project
Rose Of
York,Richmond,
TW10 6UY

Client

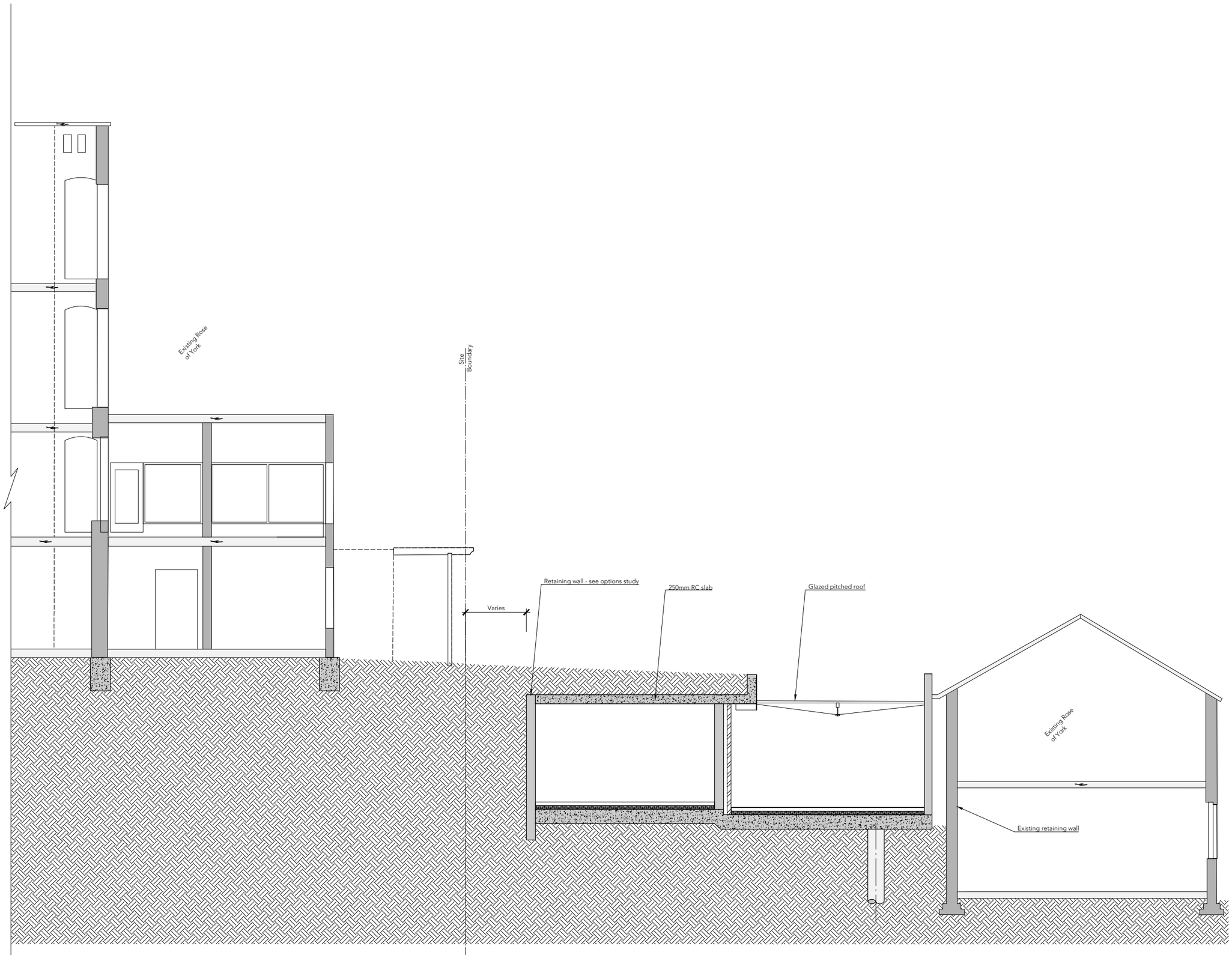
Job No.
4787

Drawing No.
102

Revision
P1

Scale
1:100 at A1

A1



BLUE ENGINEERING

Blue Structural Engineering LLP
86-90 Paul Street, London, EC2A 4NE
T +44 (0) 207 247 3811 E info@blueengineering.co.uk
www.blueengineering.co.uk

DO NOT SCALE FROM THIS DRAWING
All dimensions to be verified on site before commencing work. All error and omissions are to be reported to the Engineer. This drawing is to be read in conjunction with all relevant Design Team drawings and specifications

Drawing History

Rev	Date	Description	Drawn	Checked
P1	15.04.19	For Comment	HM	CG

STAGE 2 DRAWING
PRELIMINARY
NOT FOR CONSTRUCTION

Title
Structural Section

Project
Rose Of York,Richmond, TW10 6UY

Client

Job No.
4787

Drawing No.
200

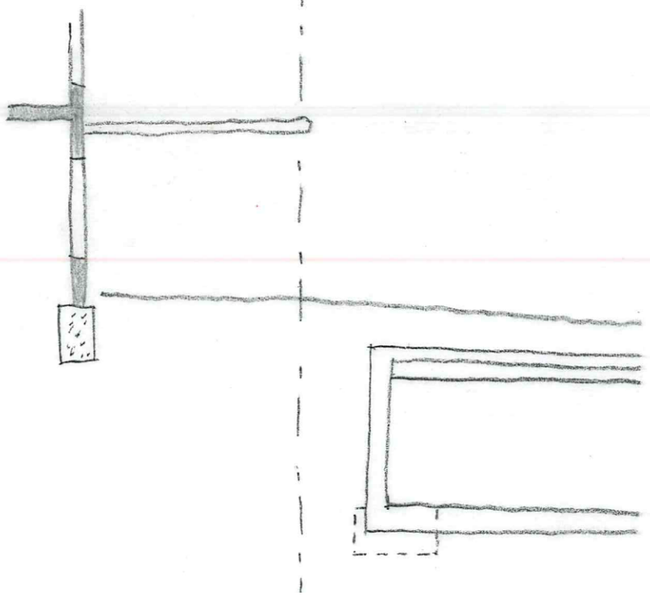
Revision
P1

Scale
1:50 at A1

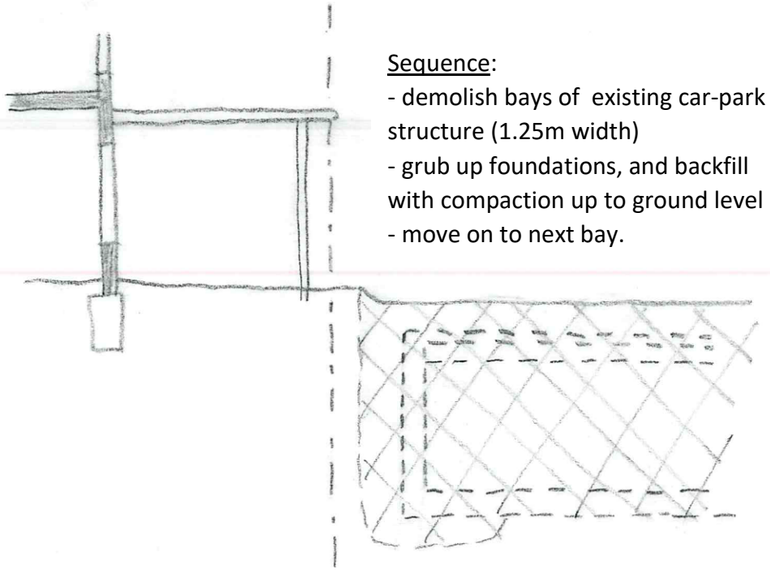
A1

Appendix 2

Structural Sketches

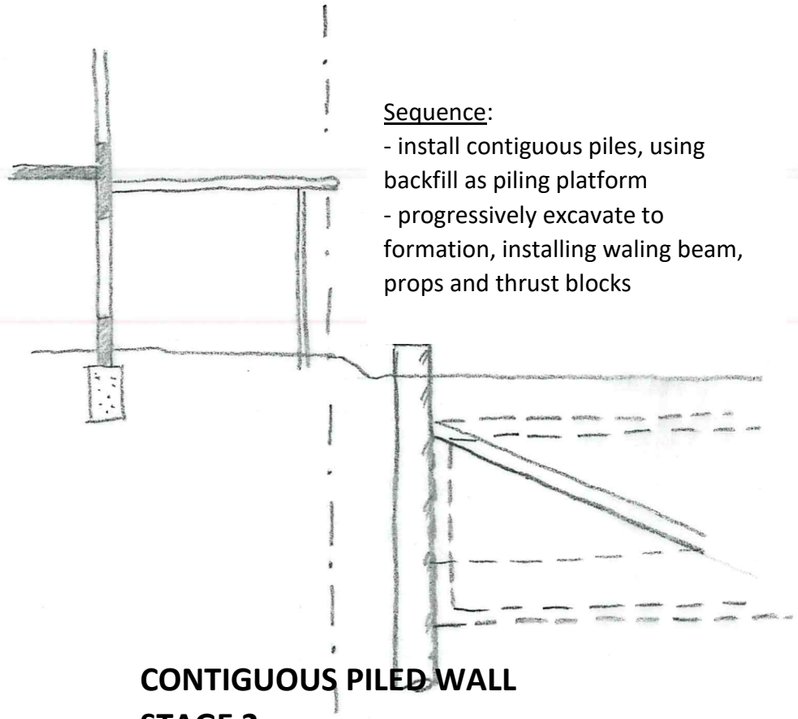


CURRENT SECTION



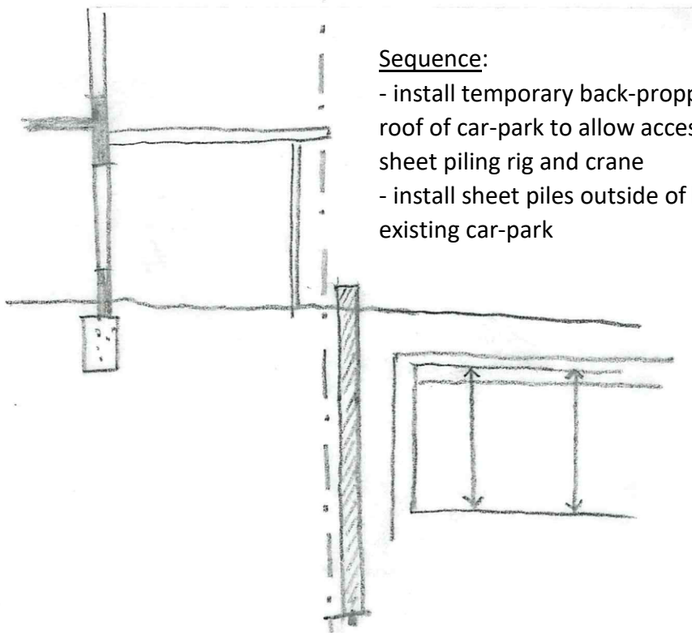
Sequence:
- demolish bays of existing car-park structure (1.25m width)
- grub up foundations, and backfill with compaction up to ground level
- move on to next bay.

CONTIGUOUS PILED WALL
STAGE 1



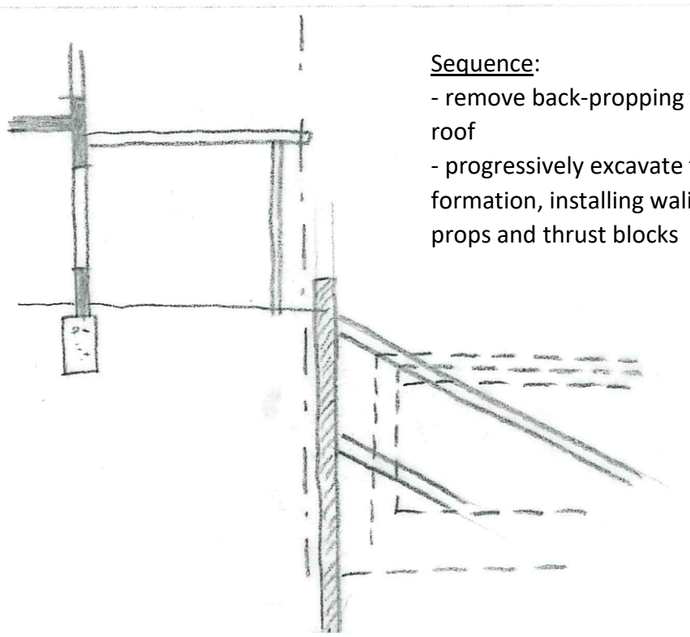
Sequence:
- install contiguous piles, using backfill as piling platform
- progressively excavate to formation, installing waling beam, props and thrust blocks

CONTIGUOUS PILED WALL
STAGE 2



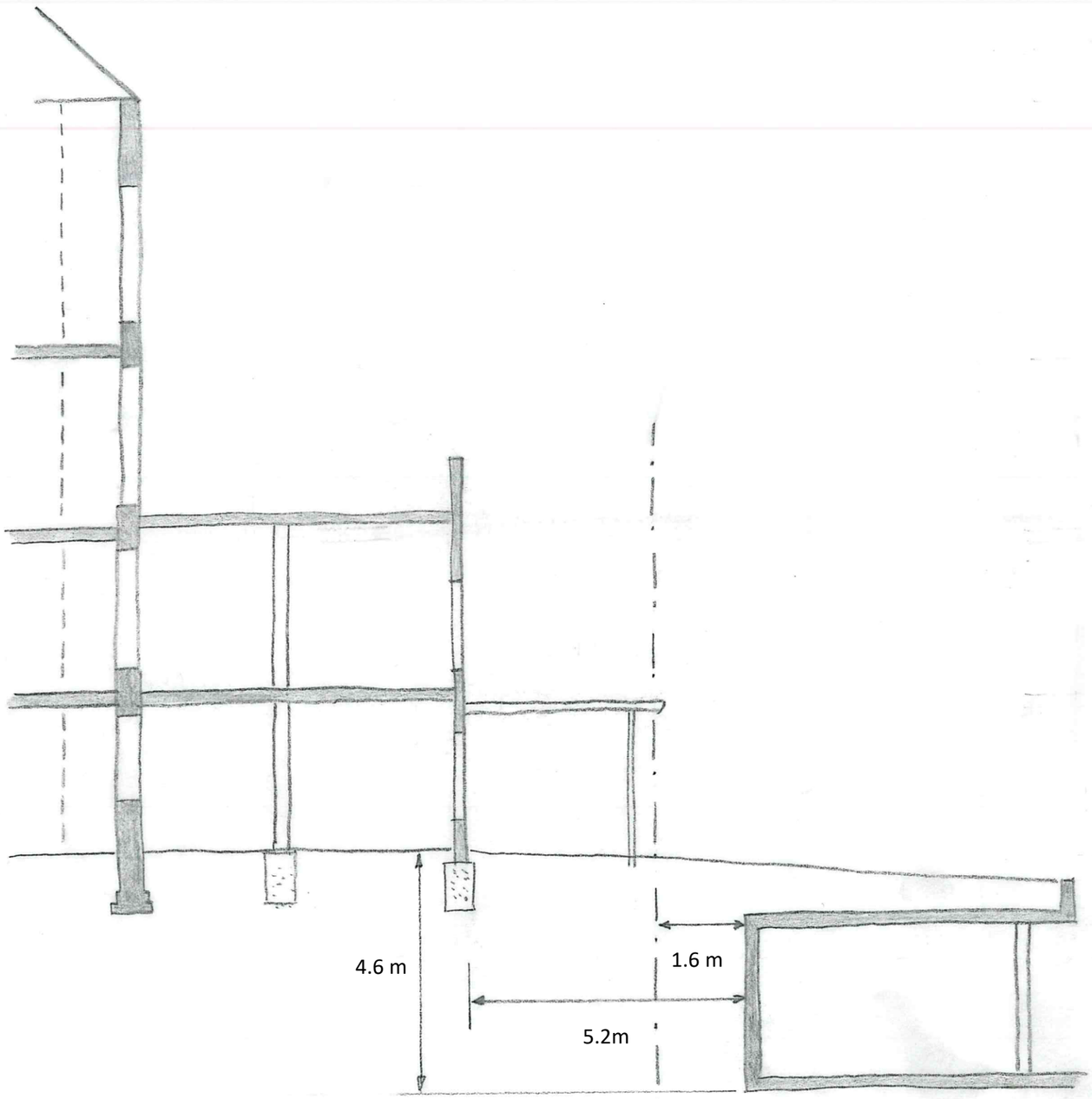
Sequence:
- install temporary back-propping to roof of car-park to allow access to sheet piling rig and crane
- install sheet piles outside of line of existing car-park

SHEET PILED WALL
STAGE 1

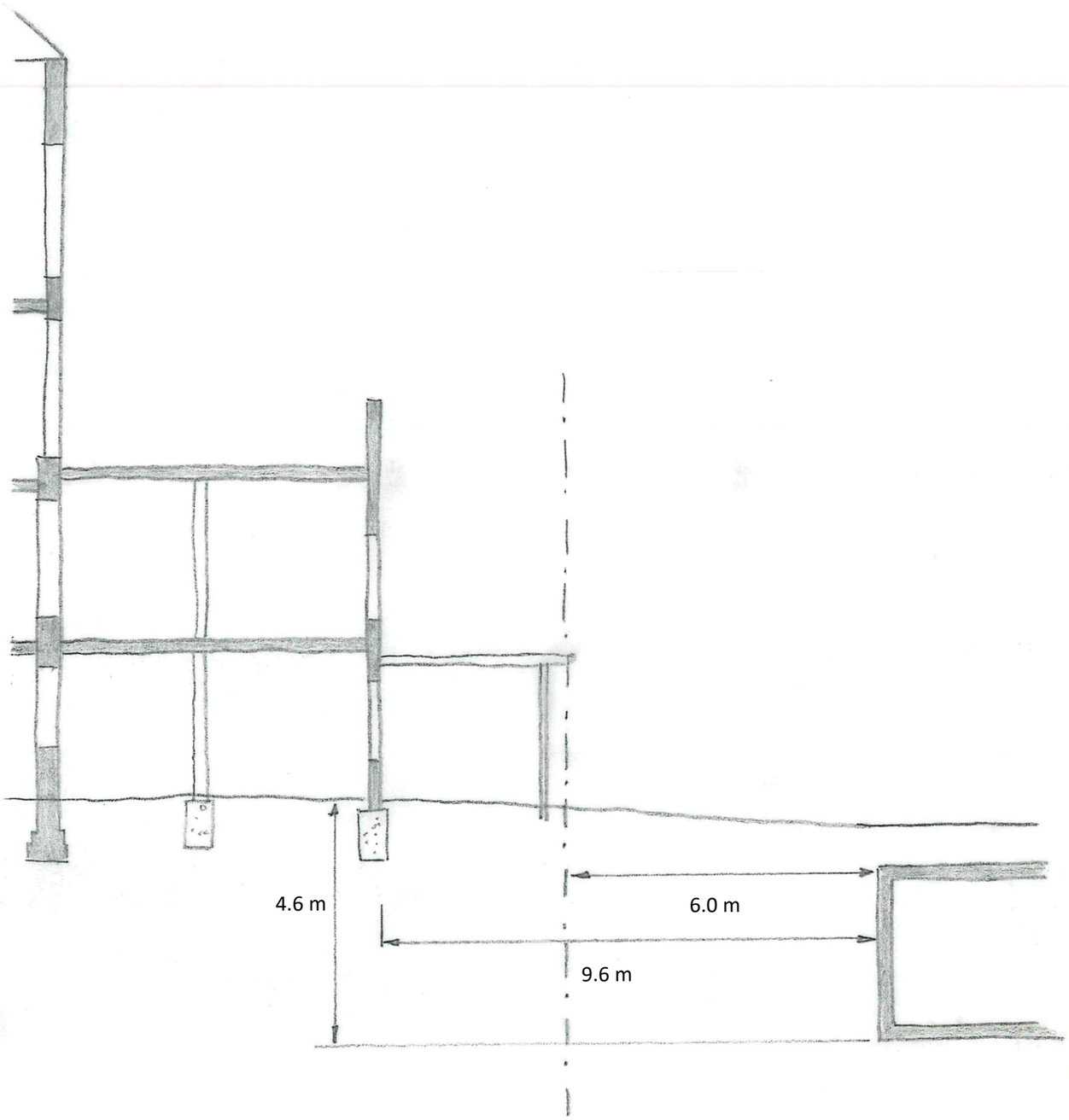


Sequence:
- remove back-propping to car-park roof
- progressively excavate to formation, installing waling beams, props and thrust blocks

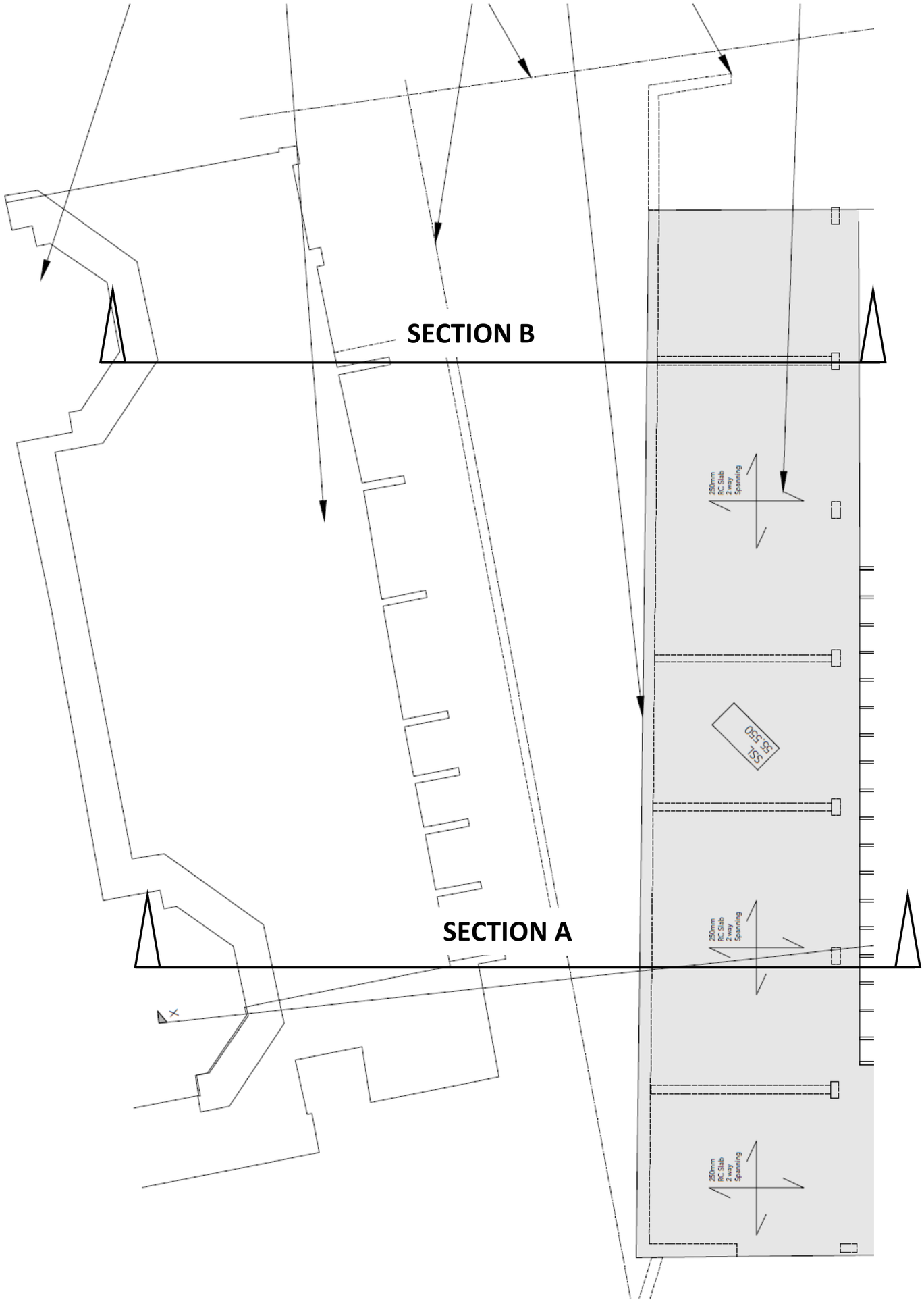
SHEET PILED WALL
STAGE 2



SECTION A

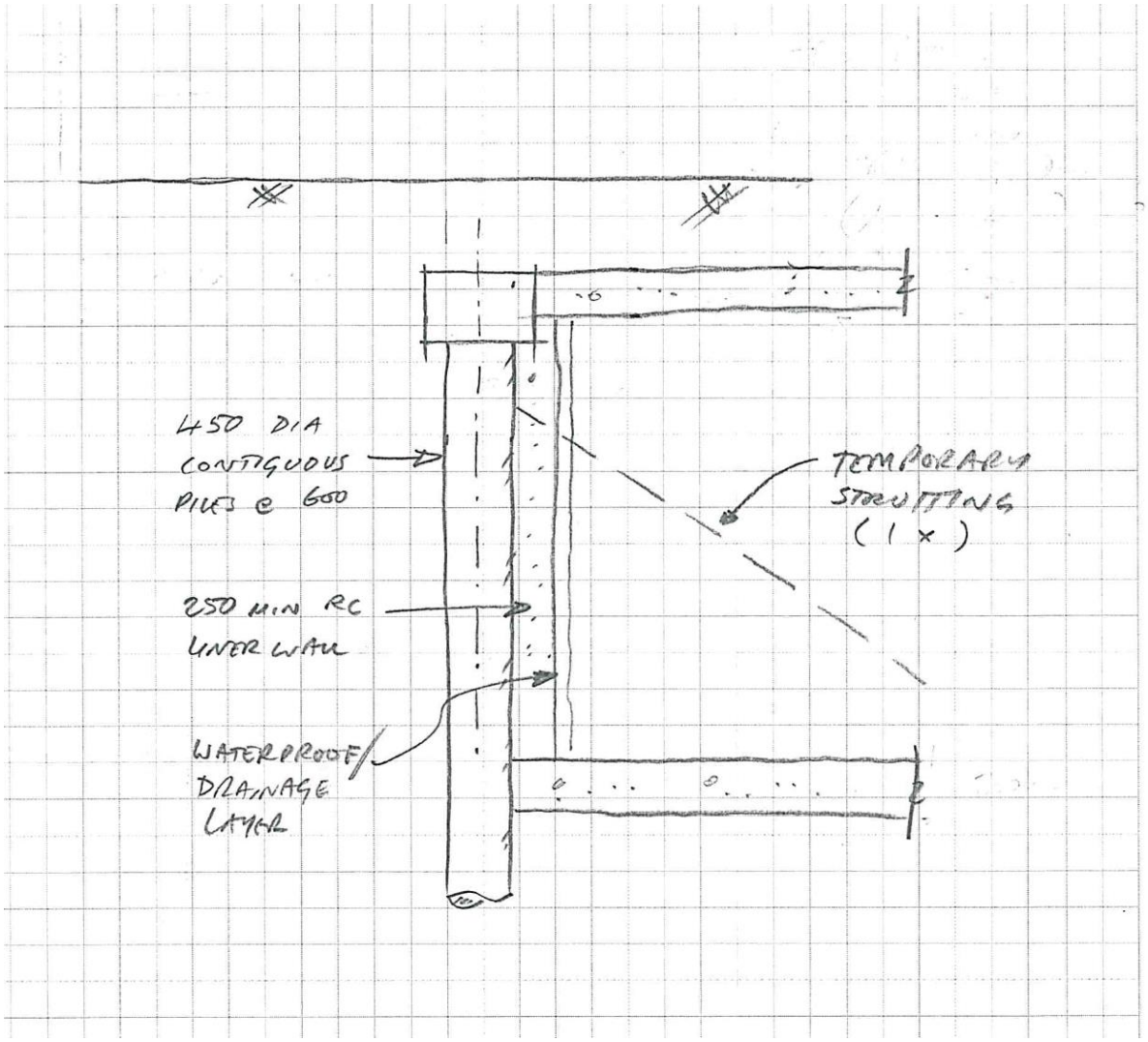


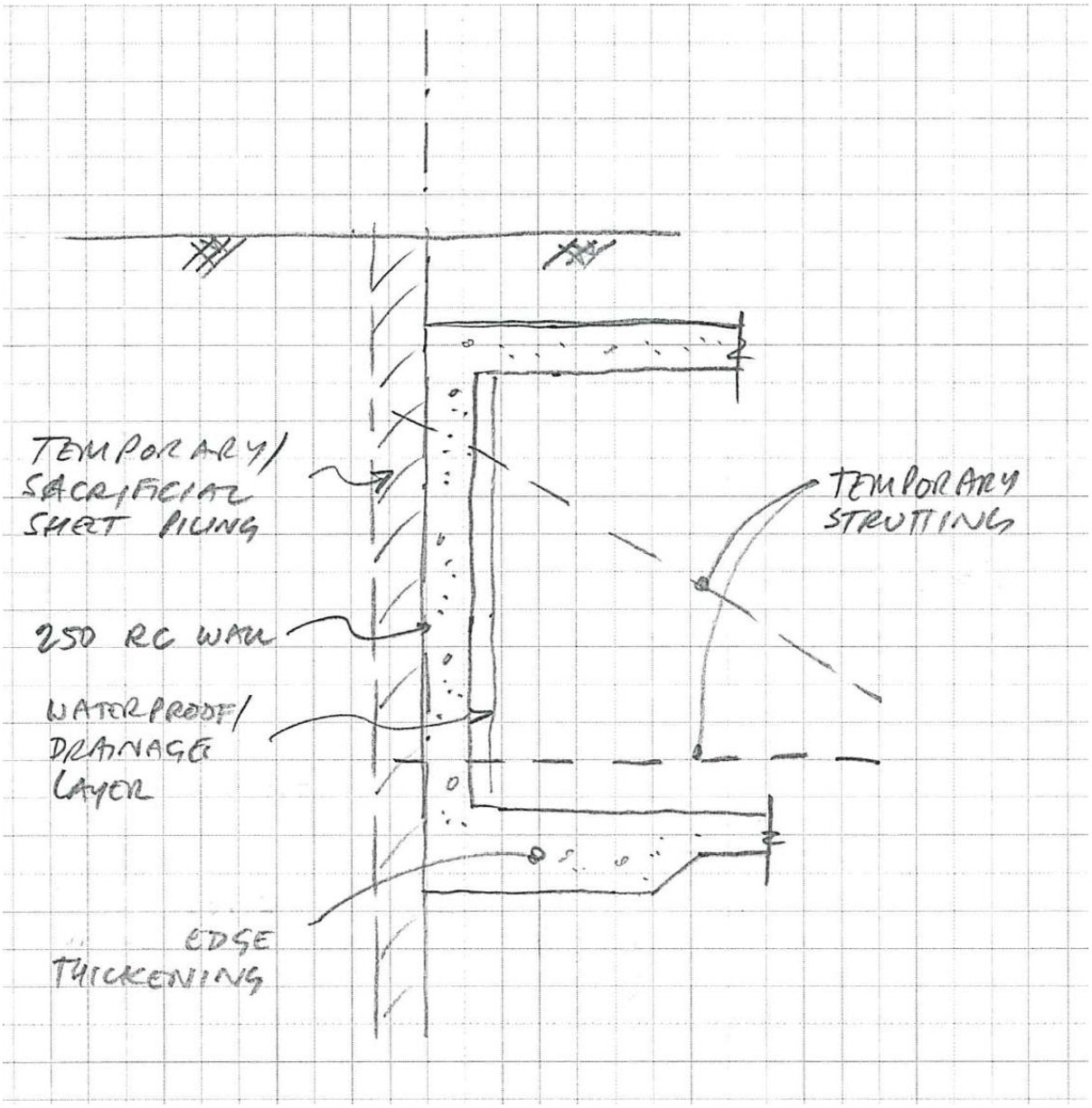
SECTION B


SECTION B
SECTION A
250mm RC Slab 2 way Spanning
SSL 55-550

OPTION 1 –

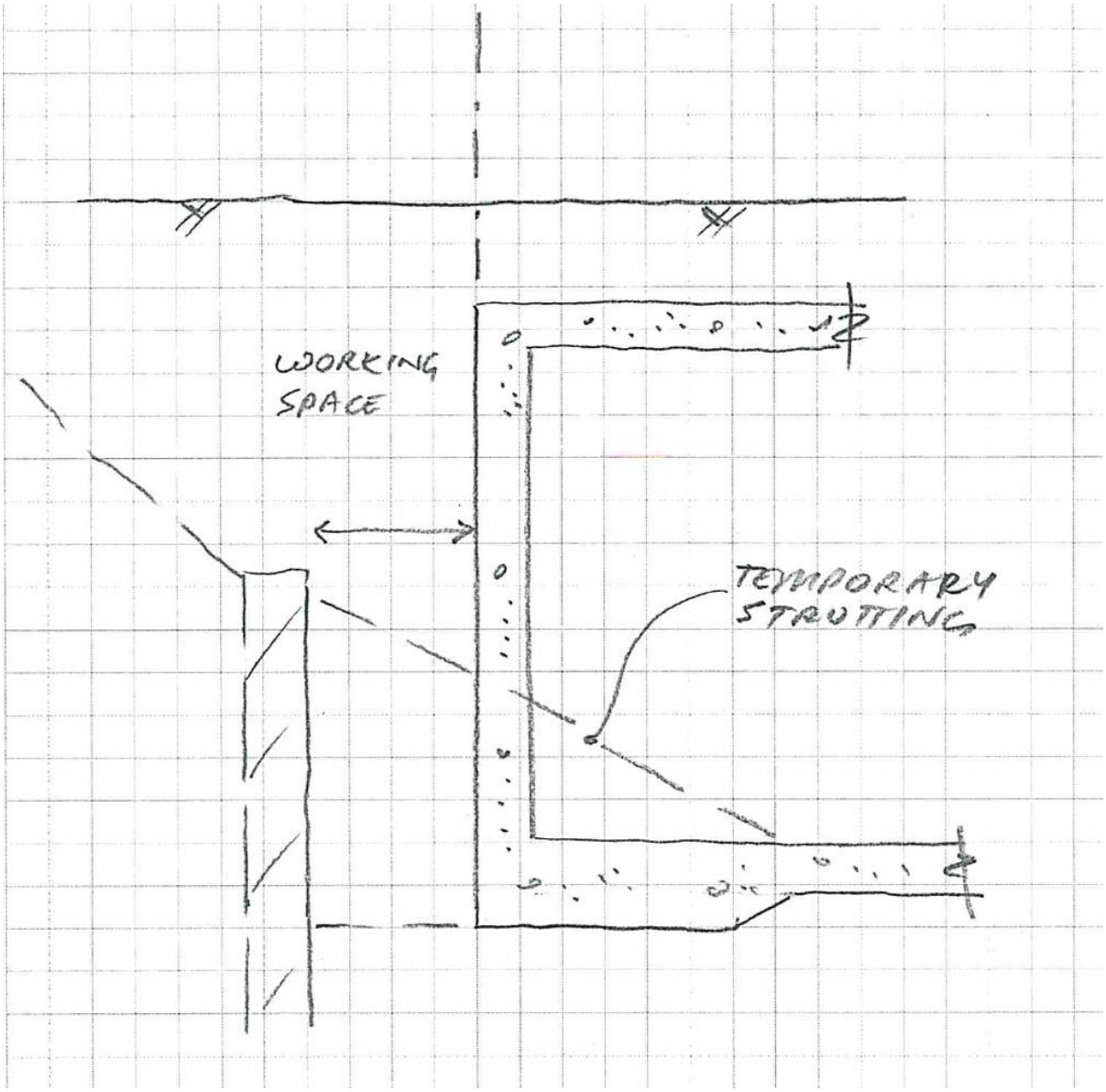
CONTIGUOUS PILED RETAINING WALL




TEMPORARY/
SACRIFICIAL
SHEET PILING
250 RC WALL
WATERPROOF/
DRAINAGE
LAYER
EDGE
THICKENING
TEMPORARY
STRUTTING

OPTION 2 –

TEMPORARY SHEET PILES AND RC RETAINING WALL



Appendix 3

Structural Method Statement

STRUCTURAL METHOD STATEMENT

Rose of York PH, Petersham Road, TW10 6UY

Project Number: 4787

Revision A

16 April 2019

Blue Structural Engineering LLP
Third Floor 16–28 Tabernacle St London EC2A 4DD
T +44 (0) 20 7247 3811 E info@blueengineering.co.uk
www.blueengineering.co.uk

Registered Office: 911 Green Lanes London N21 2QP United Kingdom
Partnership No: OC366872 – Registered in England | VAT No: 119 413 233

BLUE ENGINEERING

CONTENTS

This document is to be read in conjunction with all other planning documents submitted including drawings 4787-100, 4787-101, 4787-102, 4787-200.

Report by

Clive Goadby BSc (Eng) MIStructE MICE CEng
Technical Lead at Blue Engineering

1.0 DESCRIPTION OF EXISTING BUILDING AND SITE

1.1 The Rose of York, is a two-storey Public House building built in the 19th century. It has a single-storey garage structure, built into the hillside so semi-underground, constructed in reinforced concrete in the middle of the 20th century. Uphill of the Rose of York is the Petersham Hotel. The Hotel has an arrangement to use the roof of this garage for functions – it is landscaped as a lawn. Adjacent to this the hotel has a two-storey kitchen/dining room structure constructed in the late 20th Century and, beyond that, the 4-storey 19th Century hotel building itself.

1.2 The proposals are to demolish and rebuild the garage structure with a similar scaled building, open on the downhill side, which will house hotel rooms. It will be a retaining structure on the uphill side, with glazing to provide natural lighting on the downhill side. The engineering aspects of this are considered within this CMS.

1.3 A visual inspection of the site was undertaken. The findings were as follows:

i. The garage structure includes a retaining wall on the uphill side. This has no obvious structural defects but is clearly not watertight. The roof of the garage consists of precast concrete beam spanning between structural frames on an approximately 2.5m x 5.2m grid.

ii. The land to the South of the site is Petersham Common, and this is reasonably heavily wooded.

iii. The Rose of York public house is traditionally built, with masonry walls and timber floors and roof. No significant defects were seen.

1.4 There are no known tube lines passing under or close to the property.

1.5 Environment Agency flood map shown in fig. 1 indicates that the site is located within flood zone 1 with a 1 in 1000 year probability of flooding from fluvial sources. Additionally, the site is at very low risk of surface water flooding.

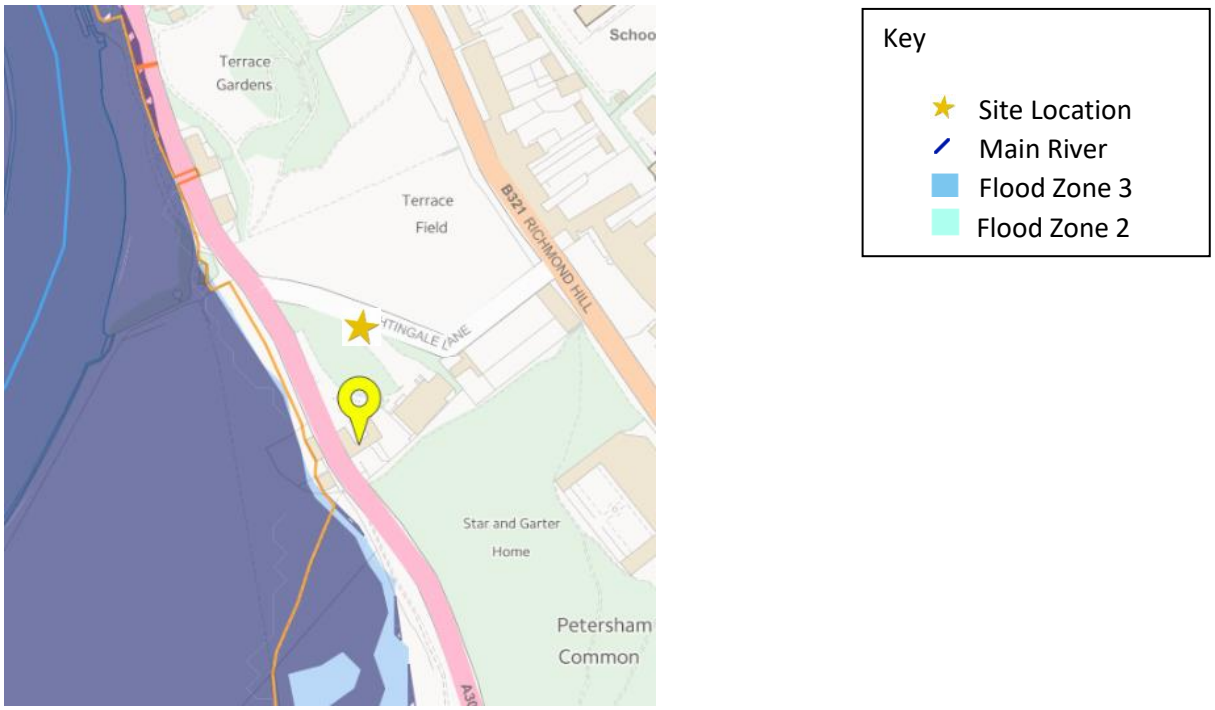


Figure 1 – Environment Agency flood risk map

2.0 GROUND CONDITIONS

2.1 A desk study has been undertaken using BGS Geology Viewer which indicates that the site is founded on London Clay Formation which extends to depth.

2.2 A full geotechnical investigation and interpretive report is planned during the next stages of design development. The new construction will bear onto London Clay with an assumed net safe bearing pressure in the order of 150 kN/m^2.

2.3 It is not anticipated that any significant groundwater will be experienced on site although shallow perched water is possible within the made ground overlying the London Clay. The uphill side of the substructure is to be designed as a fully sealed structure in accordance with BS 8007 to inhibit any groundwater ingress.

3.0 PROPOSED DEVELOPMENT

3.1 The proposed works include demolishing the existing reinforced concrete parking garage/retaining structure and constructing a single-storey hotel accommodation wing containing 8 bedrooms. It will include a glazed roof and open courtyard, a retaining wall on the uphill side, and a landscaped roof which will continue to be used for access by the public/hotel clients . Adjacent to this it is proposed to construct a 2-storey hotel wing with another 8 bedroooms plus circulation and plant space. This will include retaining walls to accommodate the sloping ground levels.

3.2 Retaining walls will be constructed from reinforced concrete RC ground floor slabs. The roof to the single-storey construction will also be in RC. The structure will resist horizontal forces by a combination of framing and cantilever action in the permanent condition.

3.3 The RC structure will be designed to ensure lateral loads due to earth pressures can be transferred to the soil, where friction and passive resistance will prevent movement.

3.4 Because of the slope of the land it is not considered possible for the ground water table to rise above the floor level and create an uplift force on the structure.

3.5 The overburden relief (from lowering the floor level of the garage) has been calculated to be approximately 15 kN/m^2. Heave movements will be small to insignificant with this level of relief.

3.6 The new development is adjacent to the Petersham Hotel. Consideration of the proximity and likely foundation movements during and after construction has been made (see section 5).

4.0 SEQUENCE OF WORKS

Contiguous Pile Construction

Prior to the piling platform being installed the ground surface must be prepared subject to the specific requirements of the piling rig. All underground obstructions must be removed and services diverted. Any soft spots found in the subgrade must be excavated and backfilled in a compacted layer using granular fill.

Piles are bored in a sequence so as not to damage any already constructed piles. Due to the presence of groundwater within the Kempton Park Gravel, as well as perched water with the London Clay Formation, bored piles are likely to require temporary casing throughout their depth. Alternatively the use of CFA injected bored piles will overcome this issue. All borings shall have water and loose material removed before

depositing concrete. On completion of the borehole the reinforcement cage is to be installed and the concreting is to take place as soon as practicably possible. No boreholes are to be left open overnight.

The head of each pile shall be cut back to the specified cut off level as specified on the structural drawings. Pile reinforcement is to be left clean and straight or bent as the drawings dictates.

The shuttering for the pile caps should be formed and the reinforcement installed ready for the pile caps to be cast prior to excavation. Initial excavation should be just below the pile cap where high level propping can be installed.

The ground is to be excavated to the required substructure level in preparation for the installation of the basement slab. Care is to be taken to avoid damage to the piles during the excavation. The basement slab is then to be cast as specified by Blue Engineering followed by the liner wall. After curing of the liner wall the basement can be considered waterproof.

All contiguous piling work is to be carried out in accordance with the ICE Specification for Piling and Embedded Retaining Walls (SPERW).

5.0 IMPACTS ON SURROUNDING STRUCTURES

The proposed method of construction is well tested and a proven form of a retaining structure. The contractor undertaking the works will have suitable experience and all necessary insurances and will follow current standards and good building guides. Providing the works are carried out correctly, movement to the surrounding structures should be no greater than described as 'very slight' under CIRIA C580 Category 1. Procedures, should any movement occur, will be covered by party wall agreements between the relevant parties. No visible change to the adjacent pavement is expected. Given the founding depth and bearing strata anticipated, any settlement would be considered immediate and no long term movement is expected.

6.0 PILING SPECIFICATION

Introduction

The sub-contract comprises of the design and all that is necessary to complete the installation of the foundation piles required to safely support the foundation loads specified by the Engineer, together with the installations and satisfactory testing of both working and non-working piles.

The Site

The location of the site is enclosed within the technical information provided by the design team. The Piling Contractor is not to enter upon or commence any work in areas which are not part of the contract site. The Piling Contractor shall visit and inspect the site and surroundings acquainting himself with the nature of the site, means of access, accommodation for the materials, amount of haulage and any other matters that may affect the execution of the work prior to submitting his tender. Any inconvenience sustained or difficulties encountered shall be the entire responsibility of the Piling Contractor and shall in no way relieve the Piling Contractor from fulfilling the terms of his contract. Requirements regarding access to the site should be cleared with the Local Authority prior to submission of the tender.

Site Investigation Report

A site investigation has been carried out and reports made upon the soil conditions found, together with details of their engineering properties. The full reports are contained within the tender documents.

The Piling Contractor should examine the site reports fully as no claim will be entertained which is based on lack of appreciation of any of the facts or opinions contained in the site investigation reports.

The Piling Contractor shall report immediately to the Engineer any circumstances which indicates that in his opinion the ground conditions encountered differ from those expected by him from his interpretation of the site investigation report.

Neither the Employer or Engineer accept responsibility for the accuracy of the information given in the report and the Piling Contractor is responsible for any conclusions which he draws from the information given.

Sequence of Works

The Piling Contractor shall commence piling in such order and sequences as the Main Contractor shall direct.

Piles shall be installed in such a sequence that their construction does not damage any piles already constructed.

Site Supervision

The Piling Contractor shall employ full time on site a competent and experienced engineer to supervise all aspects of the piling work. This person needs to be able to set out, level and plum piles, control the quality of the concrete, and recognise and assess unexpected variations in ground conditions.

The Piling Contractor shall keep at the site of the Works, copies of all drawings, specifications, instructions and a complete log and record of all piles formed and the actual length of each completed pile. These are to be available to the Architect or Engineer for inspection at all times. The Sub Contractor shall give every assistance to the Engineer to enable him to keep a similar record.

The Piling Contractors log shall record details of the concrete length, empty bore, obstruction, delays, ground strata for each pile.

The Main Contractor will be responsible for the setting out of main base lines and for providing a temporary bench mark adjacent to the work. The Piling Contractor will be responsible for his own setting out from the main base lines, and forming all piles to within the tolerances specified below.

Adjacent Building and Services

It is the responsibility of the Piling Contractor to ensure that the execution of his works does not damage or otherwise interfere with existing buildings, or cause nuisance to their occupants, affect drains, roads, services, boundary walls, any of which may be sited around or in close proximity to the site.

Attention is drawn to the special character of the neighbourhood in which the site is situated and that excessive noise and vibration is likely to prove objectionable to the public and local residents. The Piling contractor is to comply with all relevant clauses of BS 5228: Parts 1 & 2: 2009 in his attempts to reduce noise and vibration to a minimum.

Any damage or inference which is traceable or attributable to the Piling Contractor must be put right at the contractors own expense.

Pile Type

The pile type shall be such that the installation, including the effects of noise or vibration, does not cause disturbance or nuisance. End driven piles are not acceptable. In the event that a change in the piling technique, howsoever effected, becomes necessary due to unacceptable levels of disturbance or nuisance, then any increased costs shall be borne by the Piling Contractor.

Pile Design

The design of the piles is to be the full responsibility of the Piling Contractor and will be subject to the following:

i. The general design of piles shall be in accordance with British Standard Code of Practice for Foundations BS 8004: 1986.

ii. The Piling Contractor shall include with his tender a drawing showing his proposals in sufficient detail to enable the Engineer to agree the viability of the Contractors proposed design, including the Contractors proposed arrangement of piles.

Where an arrangement of piles is shown on the Engineers drawings, such an arrangement shall be considered as representing the Engineers assessment of a possible layout for the piles.

The pile lengths are to be determined by calculations based upon the findings of the soil investigation report and copies of the calculations are to be returned with the tender. The factor of safety shall be 2.5 minimum. The Piling contractor must however agree the value for his particular scheme with the district Surveyor or Borough Engineer before submitting his tender and to confirm that he has done so when tendering.

The Piling Contractor shall have full responsibility for determining the actual lengths necessary to give the required guaranteed loading capacity. A description of the method of forming the piles and a calculation by which the Piling Contractor proposes to assess the bearing capacity of each pile should also be included in the tender.

iii. The piles shall be designed to carry loads indicated and, if necessary, in addition, allowance shall be made for downdrag or uplift load. The maximum load determined from all these considerations is the design load.

iv. The axial compressive stress in concrete piles under design load shall not exceed 25% of the specified cube strength at 28 days.

Piles shall normally be designed to carry all comprehensive loads in the concrete on the effective cross sectional area of the pile.

In the case of piles required to act on tension or bending, the stresses on the reinforcement shall be in accordance with BS 8110.

The ultimate bearing capacity of a pile shall be taken as defined in BS 8004: 1986.

The factor of Safety shall be taken as defined in BS 8004:1986 as ratio of the ultimate bearing capacity to the design load.

v. The adequacy of the Contractors design shall be confirmed by testing 2 non-working test piles before the foundation piles are installed. (In accordance with clause 7.2 of this specification).

vi. The Piling Contractor is to submit the pile design to the Structural Engineer and the District Surveyor, at a suitable time, for approval prior to starting on site.

vii. A written guarantee of design and construction is to be provided by the Piling Contractor.

viii. A schedule of each designed pile length should be returned with any tender quotes.

Materials

All workmanship and materials shall be of a high standard and shall comply with all relevant clauses of BS 8110.

Unless stated otherwise all materials shall comply with the appropriate British Standard Specifications.

Cement

The cements shall meet the requirements of class 3 sulphate resistance and shall comply in all respects with the requirements of BS4027.

All cement shall be certified by the manufacturer as complying with the requirements of this specification, and the Piling Contractor shall, when required by the Engineer, obtain the manufacturers test certificate for any consignment as soon as possible after delivery. High alumna cement will not be permitted to be used.

Fine and Coarse Aggregate

The fine and coarse aggregate shall comply with BS822:1983 and shall be of 20mm maximum size. The aggregate shall be stored on site in such a manner that intermingling of materials in separate stockpiles is not possible, and to prevent contamination of the stockpiles from the ground or rubbish or windblown dust.

The use of marine aggregates shall not be permitted.

Water

The water shall comply with the requirements of BS3148 in respect of its suitability for making concrete.

Reinforcement

All reinforcement shall be designed to permit its placing to the depth specified through the concrete or grout of the pile at the completion of the casting. Suitable spacers shall be provided to maintain the specified cover.

The transverse reinforcement of any reinforcement cage may consist either of helical bar or steel bands.

Longitudinal reinforcement shall be provided for the full depth of the pile and all laps are full tension laps (or 40 times diameter of the bar). A minimum of 6no. bars are to be used in any reinforcing cage.

Reinforcement shall be supported at such level that it will provide the required projection above the cut-off level.

All reinforcement in the piles shall be provided with a minimum concrete cover of 40mm which shall be maintained with the aid of an adequate number of concrete spacing rings fixed to the main steel.

Concrete Quality

The concrete shall have a minimum crushing strength of 30N/mm² at 28 days with a minimum cement content of 330kg/m³ (or 290kg/m³ for sulphate resisting cement. The Piling Contractor shall design the mix to comply with these requirements and should note that compliance with the minimum cement content does not necessarily guarantee the minimum strength required. The concrete shall be of such consistency that it can be readily placed in the pile without segregation of the materials or bleeding of free water at the surface. The concrete shall be of such consistency that it can be readily placed in the pile without segregation of the materials but with sufficient workability to slump into any voids. Before commencing the work the Piling Contractor shall supply full details of the mix he proposes to use to the Engineer.

Concrete: Ready Mix

Ready mix concrete is to be used unless otherwise allowed by the Structural Engineer. This must be obtained from a plant which holds a current Certificate of Accreditation under the Quality Scheme for Ready Mix Concrete. The ready-mixed concrete shall conform to the relevant clauses of BS5328:1981. Details of cement type, aggregate grading and sources, with chloride and sulphate content of mixes to be submitted to the Structural Engineer for their approval prior to ordering any concrete.

Concrete for reinforced concrete structures, including ground bearing slabs, is to be designated mix RC35 to BS 5328, unless noted otherwise on the drawings.

Do not place concrete when the ambient air temperature is less than 5°C.

Pile Installation

Programme

The Piling Contractor is to state at the time of tendering the time required for installing the piled foundations.

Concreting

Concreting must follow boring as closely as possible and boreholes must not be left open overnight. Any hole which is left open shall be concreted and a replacement pile bored at a position to be agreed with the Engineer. This, together with any ground beams required shall be at the Piling Contractors own expense.

Boring

All borings shall be carried out without the use of water other than natural ground water, unless written permission is given by the Engineer.

All borings shall have water and loose material removed before depositing concrete and all piles shall be concreted immediately an approved depth has been reached.

The plant used for boring shall be such as to ensure that the piles shall remain to their full specified diameter throughout their length and within the tolerances specified. Care should be taken to avoid subsidence or heaving of the ground surface surrounding the area to be piled, and to avoid any form of damage to piles already cast.

Lining Tubes

All borings shall be lined with steel tubing until a depth is reached where no material or water from the sides of the boring will fall into the boring either during boring or placing of the reinforcement or concrete.

Spoil

All surplus spoil from the borings is to be deposited at locations to be agreed with the General Contractor, at a distance not exceeding 15m from the borehole.

Tolerances

Plan Position

For a pile cut off at or above ground level the maximum permitted deviation of the pile centre from point shown on the setting out drawings shall be 75mm in any direction.

Any additional costs involved in the strengthening of or enlarging pile caps or foundation beams, etc, to offset the incorrect positioning of piles will be borne by the Piling Contractor. Remedial measures are to be to the satisfaction of the Engineer.

Vertically

The maximum permitted deviation of the finished pile from the vertical shall be 1 in 75. All piles shall have straight shafts.

All piles will be checked by the Clerk of Works or the Engineer or his representative and any found out of vertical in excess of the accepted limit will be condemned and must be replaced by an additional pile or piles at the Piling Contractors expense.

Any additional costs involved in strengthening or enlarging pile caps or foundation beams, etc, to encompass the additional pile or piles will be borne by the Piling Contractor.

Placing Concrete

The process of concreting shall be carried out in such a manner and with adequate safeguards to prevent soil or other deleterious matter falling into the borehole. Unnecessary disturbance of the ground adjacent to the pile head is to be avoided.

The method of placing and the workability of the concrete shall be such that a continuous monolithic concrete shaft of the full cross section is formed. The concrete shall be placed without such interruption as would allow the previously placed batch to have hardened. The method of placing shall be to the Engineers approval.
The Piling Contractor shall take all precautions in the design of the mix and placing of the concrete to avoid arching of the concrete in the bore. No spoil liquid or other foreign matter shall be allowed to contaminate the concrete.

In the event of water forming at the bottom of the borehole the Piling Contractor shall place the concrete in the pile and tremie pile to ensure sound, densely compacted concrete at the pile toe.

Withdrawal of the casing is to receive particular attention to ensure that “necking” (reduced pile section) or cavities in the concrete do not occur. A sufficient head of wet concrete is to be maintained above the bottom of the casting tube as it is withdrawn to prevent the shaft sides below the tube falling into the wet concrete.

Concreting Plant

The concreting plant shall be suitable in type, capacity and design for its purpose.

Cut Off Level

The cut off level is the final trimmed down level of the top of the concrete and is level the stated on the Engineers piling drawing.

Where the finished level of the top of the pile is required to be below the existing ground level from which boring is made, all reinforcement protruding for the cast piling is to be resin coated to prevent corrosion. The empty bore is to be back filled with spoil up to ground level.

To avoid concrete that has been contaminated by earth fall, ground waters, etc, occurring at the cut off level the top level of the concrete of any pile must not be less than 150mm above the stated cut off level.

Permitted tolerances above the cut off level are:

- 300mm Where the cut off is 1m below platform level.
- 400mm Where the cut off level is 1.5m below piling platform level.
- 1000mm Where the cut off level is 2.5m below piling platform level or more.

Where the nature of the pile type is such that the concrete shaft be brought up to the level of the piling platform then the Piling Contractor must clearly indicate this at the time of tender.

The expense any cutting down additional to this shall be borne by the Piling Contractor.

A minus tolerance is not acceptable and if this occurs, then the cost of rectifications must be borne by the Piling Contractor.

All empty bores shall be backfilled with spoil up to ground level.

Trimming Pile Heads

The head of each pile shall be trimmed to the specified cut off level, (by a Main Contractor) as shown on the drawings. Care shall be taken to avoid damage to the pile during the excavation in the immediate vicinity.

A clean and sound connection must be provided between the piles and the structural member which they support. Pile reinforcement shall be left clean and straight or bent over into the structural member as the drawings dictate.

Cold Weather Work

When concrete is placed at or near freezing temperatures precautions shall be taken to ensure that it has a temperature of at least 4°C (40°f) and that its temperature is maintained at or above this temperature until it has hardened. When necessary the concrete materials (except the cement) shall be heated before being mixed and shall be carefully protected after being placed. No frozen materials or materials containing ice shall be used. The Engineer may suspend concreting operations if in his opinion, the above requirements are not being obtained. The Piling Contractor shall at his own expense, be bound to replace any concrete which does not comply with this specification.

Concrete Test Cubes

The Piling Contractor shall make, cure and arrange for testing at a Laboratory approved by the Engineer, standard 150mm cubes in moulds to be provided by the Piling contractor all in accordance with BS1881. He shall include in his tender for all expenses connected with the tests including transport and shall arrange for results of the tests to be sent to the Engineer.

Minimum concrete cube strengths for works tests shall be as follows:

28 days test	30.00 N/mm²
7 days test	20.00 N/mm²

Initially one set of three cubes are to be taken for each 3 piles or 20m³ of concrete whichever is the lesser. Subject to the 7 day results being acceptable the sampling rate may be reduced, with the permission of the Engineer to 3 cubes per 5 piles of 30m³ of concrete whichever is the lesser. Concrete cube results shall be analysed in accordance with BS8110.

No cubes are to be removed from site in a wet state for subsequent testing and analysis.

Safety

The safety precautions described in the latest revision of BS5573:1978 must be observed at all times during the execution of the works together with any statutory regulations and conditions of the main contract that may be relevant.

Statutory Requirements and Working Rules

The Piling Contractor is to allow for all cost arising in connection with statutory requirements in respect of all his employees including those arising from the National Insurance Acts, Redundancy Payments and the Graduated Pensions Scheme and for complying with the requirements of the National and Local working Rule Agreements including those in respect of the Buildings and Civil Engineering Annual and Public Holiday Agreement and the Sick Pay Scheme.

Extra Works

No variation either as an addition or as a deviation from contract is to be put in hand without the written authorisation of the Engineer.

Testing of Piles

Integrity Testing

All working piles shall be tested for the integrity of their shafts.

Testing shall be by means of simple seismic or echo test method, and the Piling Contractor shall produce a photographic record of all oscilloscope plotting's and a written confirmation that the findings are satisfactory except in any cases where remedial measures to the piles are proposed.

The preparation of pile surface for integrity testing shall be the responsibility of the Piling Contractor and shall be deemed to be included in the rates for integrity testing.

The Piling Contractor shall supply the Engineer with a full set of test results

Records

The Piling Contractor shall prepare in triplicate records of the following details of each pile cast and shall agree then with the Clerk of Works of the Engineer. After the latter's signature of the record sheet, one copy shall be sent to the Engineers and one retained by the Piling Contractor. These piling records will be used for measurements on which payments will be made.

i Pile reference number.
ii Data of installation of pile.
iii Ground level (to ordnance datum) at pile position.
iv Reduced level (to ordnance datum) at bottom of pile.
v Depth bored.
vi Depth concreted.
vii Details of man made obstructions encountered and natural obstruction with delay time.
Viii Volume of concrete actually in borehole.

7.0 CONTROL OF NOISE, DUST AND VIBRATION

In compliance with criterion (l) of Policy CL7; the mitigation of noise, vibration and dust has been considered as so they are '*kept to acceptable levels for the duration of the works*'. Criterion (l) is concerned with the demolition, excavation and construction process, and in part with the movement of vehicles on and off the site, however this is covered in far greater depth in the Construction Traffic Management Plan (CTMP) in compliance with criterion (k).

The primary receptors have been identified as local residents and pedestrians. The site is in a residential area, existing ambient noise and vibration levels are considered to be relatively low.

Noise and Vibration

1. Works will be carried out according to a stated schedule, production of which is the responsibility of the contractor, and conducted between the hours of 8am and 6pm Monday to Friday, or as agreed with the local council.

2. Contractor will develop a Liaison and Consultation Strategy involving the following:
   a) Identifying all stakeholders, and consulting with them **before** commencing works.

   b) Maintaining a dialogue and information exchange with all interested parties throughout the proposed works.

   c) Responding to complaints and resolving where practical.

   d) Ensuring neighbours and interested parties are kept informed of works as they progress and are consulted where necessary.

3. Noise will be kept within the legal limits as defined in the Environmental Protection Act 1990.

4. All works will be carried out in accordance with BS 5228-1:2009 and BS 5228-2:2009. All works will employ Best Practicable Means as defined by Section 72 of the Control of Pollution Act 1972 to minimise the effects of noise and vibration. All means of managing and reducing noise and vibration, which can be practicably applied at reasonable cost, will been implemented.

5. The impact of vibrations on adjacent properties have been considered in compliance BS 7385-1:1990 and BS 7385-2:1993. Contractor to familiarise themselves with both documents.

6. The following general measures will be taken:
   a) The employment of only modern, quiet and well-maintained equipment complying with the EC Directives and UK Regulations set out in BS 5228-1:2009.

   b) Avoidance of unnecessary noise such as loud radios, shouting and engines idling between operations by effective site management.

   c) Careful handling of materials and waste such as lowering rather than dropping items.

   d) Operating the site as a closed site, that is:
   i. Having all windows and doors closed during noisy operations.
   ii. Retaining the building front façade and roof during construction.
   iii. Installing insulation in the windows and other opening to reduce the amount of noise escaping the site.

7. The following specific measures will be taken during each stage of the construction:
   a) Demolition of corbels:
   i. Corbels will be cleanly disk cut back and carefully broken away from masonry. Percussive breaking techniques will not be used.

   b) Concrete demolition and removal:
   i. In compliance with the expectations of The Council, concrete is to be demolished using non-percussive breaking techniques (e.g. mechanical concrete pulverisers, hand-held concrete crunchers, diamond saw-cutters and drills and hydraulic bursting equipment).
   ii. Where practical, concrete will be levered from position and broken up off-site, or lowered to ground floor level and broken up when this is not possible.
   iii. Where appropriate, structural breaks will be cut between adjacent properties as soon as possible to reduce noise and vibration transfer.

   c) Excavation:
   i. The site will be excavated manually, causing minimal noise or vibration.
   ii. The conveyors will not be operated outside normal working hours and will be switched off when not in use. Conveyor will be well maintained with well-oiled rollers in good working order.
   iii. Lorries removing the spoil will only operate within normal working hours and will have their engines switched off while waiting. Further information regarding the movement of vehicles in and around the site is provided in the CTMP.

   d) Piling:
   i. If piling is required on site, fully silenced modern bored or hydraulically-jacked piling rigs will be used with careful operation of the rig so as to minimised disturbance.
   ii. Where practical, the transmission pathway will be cut by introducing a trench around the piling site.

   e) Concrete construction:
   i. Contractors will carefully plan and coordinate with concrete suppliers, subcontractors and any other parties involved in the pour to ensure the concrete pours can be done within normal working hours. Contractor is required to conduct an assessment of potential disruptions to the concrete pour and to form contingency plans.

f) Steelwork and reinforcement:

i. All fabrication and cutting of steelwork will be carried out off-site. Where not possible, contractor will erect a mobile acoustic screen or enclosure as appropriate.

ii. Hydraulic or pneumatic tools will be used in preference to angle grinders when cutting reinforcement bars.

Dust and Emissions

1. As defined in the Mayor of London's Best Practice Guidance on The control of dust and emissions from construction and demolition, November 2006, section 4.1 the site is classified as a low risk site, fitting the following criteria:
   a) A development less than 1,000 square metres of land.
   b) A development of ten or less properties.
   c) There is potential for emissions and dust to have an infrequent impact on sensitive receptors.

2. Contractor will follow good housekeeping practices with site being regularly swept to avoid the build-up of dust, and where possible washed down with wet methods.

3. Dust will be minimised by effective site planning, including doing the following:
   a) Erecting effective barriers around dusty activities.
   b) Covering stockpiles of sand and other dust generating materials.
   c) Planning the site layout as so dust generating activities and/or machinery are located away from sensitive receptors.
4. In regard to construction traffic:
   a) Idle vehicles to switch off engines
   b) Vehicles to be effectively washed or cleaned before leaving site.
   c) Construction materials entering or leaving the site to be covered.
5. During demolition works:
   a) Equipment with dust suppression (i.e. water spray) or a dust collection facilities will be used.
   b) Covering of skips, chutes and conveyors, completely enclosing if necessary, and minimising drop heights.

Contractor will provide a method statement and temporary works design which is to be approved by the Engineer, taking into account noise, dust and vibration. Contractor to notify the Engineer of any deviation from the above processes or procedures.

Appendix 4

CDM Designer's Risk Assessment

DESIGNER'S RISK ASSESSMENT

Job no.	Job address	This is a record of significant Health and Safety Risks as assessed by Blue. It is intended to be issued to the Architect. Where appropriate it is to be incorporated into the H&S File, and for the Contractor to make suitable provision within the Construction Phase H&S Plan.
4767	Rose of York Public House Petersham Rd Richmond TW10 6UY	
Date 16/4/19	Project Engineer Clive Goadby	Design Stage Stage 2

Ref No.	Activity/Element	Potential Hazard	Level of Risk L/M/H	Population at Risk	Mitigating actions taken by designer	Level of Residual Risk - L/M/H	Recommended further mitigation by contractor
Site Constraints/ surroundings							
01	Excavation adjacent to neighbouring buildings (Petersham Hotel)	Landslip and consequent structural damage/failure	M	Public	Careful consideration of levels and proximity during concept stage. Selection of construction methodology that maintains support	L	Contractor to follow outline method statement and develop in detail with reference to site specific soil investigations. Comply with any Third Party agreements.
02	Excavations around buried services	Unidentified buried services struck during excavations	M	Public, construction workers	Below ground services surveys recommended	M	Complete below ground services surveys. Develop safe method of working around any services identified
Foundations							
03	Construction adjacent to neighbouring buildings (Rose of York)	Overloading of retaining walls	M	Public	Consideration of levels and proximity during concept stage. Design developed to avoid loading fragile/unknown construction. Specify further investigation to mitigate unknowns	L	Contractor to follow outline method statement and develop in detail. To consider plant types and locations to avoid overloading during construction.
04	Foundations final design and construction	Unknown ground conditions with consequent ground movement or collapse	M	Users, construction workers	Geotechnical / Geoenvironmental survey to be specified – information required completing structural design	M	Confirm existing foundation construction at commencement of work by trial pit excavations
	Below ground drainage final design and construction	Unknown drainage layout with consequent deep excavations required	M	Construction workers	Below ground drainage survey recommended	M	Review survey prior to commencing works.
Primary structure							
05	Retaining wall construction	Landslip and consequent structural damage/failure	M	Public	Careful consideration of levels and proximity during concept stage. Selection of construction methodology that maintains support to soil	L	Contractor to follow outline method statement and develop in detail with reference to site specific soil investigations. Comply with any Third Party agreements.
06	Retaining wall construction	Collapse of support to piling equipment	M	Workers	Outline design of back-propping scheme to car-park roof to demonstrate feasibility and produce outline method statement	L	Contractor to follow outline method statement and develop in detail with reference to selected plant and plant movements.
07	Foundations adjacent to Rose of York	Overloading of retaining walls	M	Public	Consideration of levels and proximity during concept stage. Design developed to avoid loading fragile/unknown construction. Specify further investigation to mitigate unknowns	L	Contractor to follow outline method statement and develop in detail. To consider plant types and plant movements to avoid overloading during construction.
Secondary structures/finishes							

Blue Structural Engineering LLP
Lower Ground Floor 86-90 Paul St London EC2A 4NE
T +44 (0) 20 7247 3811 E info@blueengineering.co.uk
www.blueengineering.co.uk
Registered Office: 911 Green Lanes London N21 2QP United Kingdom
Partnership No: OC366872 – Registered in England | VAT No: 119 413 233

BLUE ENGINEERING