elliottwood

70 Elsworthy Road

London, NW3 3BP

Structural Engineering Report and Subterranean Construction Method Statement

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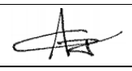
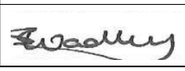
date:	13.08.15	signature:		signature:		signature:	

Contents

Appendices

Non-Technical Summary

Elliott Wood Partnership LLP has worked on a number of projects in the area and is aware of both the underlying soil and groundwater; the basement has been designed with this in mind. The corresponding Basement Impact Assessment (BIA) produced by Geotechnical & Environmental Associates concludes that the basement will have no adverse effect on the local hydrogeology.

If the works described within this report are properly undertaken by suitably qualified contractors, these works should pose no significant threat to the structural stability of the building or the adjoining properties. A ground movement assessment report has been conducted by Geotechnical & Environmental Associates (GEA) which concludes that the predicted damage to the neighbouring properties would generally be 'Negligible' with some limited areas of 'Very Slight' which falls within acceptable limits.

A construction traffic management plan has been completed by HB Surveyors & Valuers Ltd which gives advice on the likely programme, vehicular access and site set-up.

All reports have led to the same conclusion: the construction of a new basement on the site should not have any adverse effect on the property, neighbouring properties, groundwater, surface water or slope stability.

1.0 Introduction

1.1 Elliott Wood Partnership LLP (EWP) is a firm of consulting structural and civil engineers approximately 100 strong operating from their head office in South West London. Residential developments of all scales have been central to the workload of the practice with many in the Greater London area. In particular EWP have been producing designs for basements to both existing and new buildings. To date this numbers approximately 500 sites many of which have been in the Borough of Camden. 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 in particular the design and construction of their basement.

1.2 EWP were appointed by the building's owner to advise on the structural implications of the proposed construction of a new single-storey basement on the site of 70 Elsworthy Road. The following report has been prepared to ensure that the existing property and neighbouring properties are safeguarded during the works. This report follows the guidance given in the Camden Planning Guidance on Basements and Lightwells CPG4. This assessment has been prepared in accordance with the guidance given in CPG4 and the relevant Development Policies. The Basement Impact Assessment has been produced by persons holding the required qualifications relevant to each stage. It should be noted that EWP have been responsible for the design of a number of basements now completed in the borough of Camden.

1.3 The Contractor will provide a detailed method statement including all temporary works before the works can commence on site. The Contractor is to accept full responsibility for the stability and structural integrity of the works during the Contract and provide temporary support as necessary. The Contractor shall also prevent overloading of any completed or partially completed elements.

1.4 This statement focuses on the proposed subterranean works as opposed to the superstructure works and should be read in conjunction with all relevant Architects and Specialists supporting documents, some of which appear in the Appendices of this document.

1.5 A site investigation has been completed at the property comprising of two window samples and a borehole. No opening up works have been undertaken to confirm the structure of the existing building.

2.0 Description of Existing Building and Site Conditions

2.1 The site is approximately rectangular in shape bordered by Elsworthy Road to the South and neighbouring gardens / properties to the North, East and West.

2.2 No. 70 contains two existing buildings, the main two-storey detached building situated towards the North side of the site and a smaller two-storey semi-detached mews building towards the South of the site.

2.2 Both buildings are residential properties comprising a ground and first floor. They are assumed to be of traditional construction comprising timber floors and roof supported on load bearing masonry.

2.3 The overall stability is provided by the cellular layout of the masonry walls and diaphragm action of the timber floors at each level.

2.4 The existing buildings are not listed and are not within a conservation area according to Camden Borough.

2.5 Elsworthy Road is not considered a street at risk of surface water flodding (as listed by Camden Planning Guidance CPG4). The site is not located within a floodplain as shown on the latest Environment Agency flood maps. Therefore, a flood risk assessment has not been completed.

2.6 A site investigation consisting of two window samples and a borehole has been carried out by Geotechnical & Environmental Associates (GEA) in June 2015. The site investigation indicates that the underlying ground is London Clay overlaid by up to 1.2m of made ground. This is in line with geological records for this area. Groundwater was encountered as seepage at 3.7m depth in borehole 1 and at 0.3m depth in borehole 3. This is likely due to more permeable local strata and surface water infiltration. Sample testing indicated the underlying clay soil to be of high swelling and shrinkage potential.

2.7 There are no large trees present but foliage and large bushes are present around the perimeter of the site.

2.8 The results of our desk study can be summarised as follows;

- The site appears to be in the vicinity of the historic river Tyburn (reference Lost Rivers of London, Nicholas Barton – refer to Appendix B).
- The site is not located within the flood plain, and is therefore classed as being within Flood Zone 1 by the Environmental Agency Flood Maps (reference; www.environment-agency.gov.uk).
- The site is located within the outer zone (zone 2) of a Groundwater Source Protection Zone as shown on the latest Environment Agency maps (reference; www.environment-agency.gov.uk).

- The site is not in the vicinity of any London Underground Ltd infrastructure (refer to confirmation letter in Appendix C).
- There is no record of historical minor blast bomb damage to the properties (reference, The LCC London Bomb Damage Maps 1939-1945, LTS, map 37).

3.0 Proposed Works

3.1 The proposed works involve the demolition of the existing main property and constructing a new three-storey building in its place. The smaller mews property would be retained. It is proposed to construct a single-storey basement below the footprint of the new main building which will extend below the front garden to the retained mews building towards the South of the site.

3.2 The majority of the new basement will extend approximately 6m below ground level with a portion extending approximately 7.5m below ground level to form the pool area towards the West of the basement.

3.3 The majority of the basement perimeter walls will be formed using contiguous piles with an RC lining wall. The contiguous piles will resist the lateral soil and surcharge loads in the temporary and permanent case. They will also support the vertical loads of the basement and superstructure. A small section below the existing mews property, will be formed using L-shaped RC underpins. Around the perimeter the L-shaped underpins will be designed to resist lateral forces in the temporary and permanent cases and also to support the vertical load of the existing mews property. The L-shaped RC underpins will be formed in maximum 1m wide sections in an agreed sequence to ensure that the stability of the existing and neighbouring buildings is not compromised.

3.4 The construction of the new superstructure is beyond the scope of this document but is assumed to be constructed using load bearing masonry and RC floors.

3.5 The RC lining wall to the contiguous piles will be cast with waterproof concrete to form the primary barrier to water ingress. A cavity drain system will be installed (to Architect's details) to provide a secondary barrier.

3.6 The basement slab will be formed from a piled raft. The piled raft will be designed to support the downward vertical loads as well as resist any residual uplift forces from heave of the underlying cohesive soils.

3.7 Temporary horizontal propping will be required at ground level to prop the top of the contiguous piled wall until the ground floor slab has been cast and cured. Temporary piles and steel needles will also be required to support the vertical load of the existing mews building until the ground floor slab is constructed.

3.8 Refer to the Subterranean Construction Method Statement in section 11.0 and drawings in Appendix A for more information regarding the proposed works.

4.0 Proposed Below Ground Drainage & SUDS Assessment

4.1 Refer to separate Below Ground Drainage / SUDS Assessment report for details.

5.0 Basement Waterproofing

5.1 The proposed basement will be designed to achieve a Grade 3 level of waterproofing protection as outlined in BS 8102:2009.

5.2 The reinforced concrete lining wall and basement slab will be cast using water resistant concrete to form the primary barrier with an internal drained cavity system as a secondary barrier against possible water ingress. As part of the system any water that seeps through will be collected in a sump and be pumped up to high level where it will drain under gravity into the main drainage system.

6.0 Party Wall Matters

6.1 The proposed works development falls within the scope of the Party Walls Act 1996. Procedures under the Act will be dealt with in full by the Employer's Party Wall Surveyor. The Party Wall Surveyor will prepare and serve necessary Notices under the provisions of the Act and agree Party Wall Awards in the event of disputes. The Contractor will be required to provide the Party Wall Surveyor with appropriate drawings, method statements and other relevant information covering the works that are notable under the Act. The resolution of matters under the Act and provisions of the Party Wall Awards will protect the interests of all owners.

6.2 The designs for 70 Elsworthy Road will be developed so as not to preclude or inhibit similar, or indeed any, works on the adjoining properties. This will be verified by the Surveyors as part of the process under the Act.

7.0 Hydrogeological Statement Summary

7.1 Groundwater was encountered as seepage in boreholes 1 and 3 at depths of 3.7m and 0.3m respectively. Groundwater levels following standpipe monitoring were found to be at depths of 1.70m 4.10m in boreholes 1 and 2 respectively. No groundwater was observed in borehole 3 following monitoring. As the underlying ground was established as non-permeable clay, the encountered seepages and water observed during monitoring are likely to be due to a localised permeable soil layer in the location of the borehole and/or surface water infiltration as opposed to the actual ground water. For further information regarding the hydrogeology at the site, please refer to GEA's Basement Impact Assessment.

7.2 A Basement Impact Assessment has been prepared by Geotechnical & Environmental Associates to demonstrate that the proposed works should not have an adverse effect on the adjoining properties or the groundwater.

7.3 Arup's Subterranean Development Scoping Study (para 5.1), June 2008, notes that the impact of subterranean development on groundwater flows is negligible as groundwater flows will find an alternative route if blocked by a subterranean structure.

8.0 Monitoring During Excavation and Construction

8.1 The Contractor shall provide tri-axial monitoring to all structures and infrastructure adjacent to the basement excavation at the time of excavation and construction.

8.2 The Contractor is to ensure the monitoring locations are free from all obstructions prior to the monitoring surveyor's visit to allow readings to be taken and shall provide a report to show full tri-axial movements data for each monitoring point, with comparisons made against base reading and previous reading.

8.3 Monitoring proposals/requirements will be confirmed with the Contractor and adjoining Owner's Surveyor prior to works but are assumed to be in line with the principles outlined below:

8.3.1 Monitoring completed as follows:

1) 2no. readings (one week apart) prior to any works being started to establish a base reading.
2) On a weekly basis during the excavation and construction of the basement until all underpins have been completed; and 3no. consecutive readings show no significant movement.
3) Fortnightly until all major structural works are completed and temporary works removed; and 3no. consecutive readings show no significant movement.
4) On a monthly basis thereafter for a 3 month period following completion of the notifiable works, unless otherwise agreed with the adjoining Owner's surveyor.

8.3.2 Cumulative movement of survey points must not exceed:

a. Settlement

Code amber trigger values: +/-5mm

Code red trigger values: +/-10mm

b. Lateral displacement

Code amber trigger values: +/-4mm

Code red trigger values: +/-8mm

8.3.3 Movement approaching critical values:

Code amber trigger value:

All interested parties, including the Adjoining Owner's Surveyor and his Engineer should be informed. The contractor will consider the cause of the movement, and submit plans to limit movement thereafter. Further actions immediately agreed between the Party Wall Surveyors.

Code red trigger value:

All interested parties including Adjoining Owner's Surveyor and Engineer will be informed immediately. Works will stop in the affected area immediately, and if required actions will be taken to make the works safe. Actions to limit movement thereafter to be proposed by the Contractor for comment and any required remedial works shall be completed as soon as possible.

9.0 Noise, Vibration and Dust

9.1 As far as practically possible, the contractor is to adopt methods that ensure that construction impacts such as noise, vibration and dust are kept to acceptable levels for the duration of the works.

9.2 The main building which is to be demolished is located towards the North of the site away from Elsworthy Road, the basement works extend across the majority of the site. Therefore, those most likely to be affected by noise, vibration and dust will be the immediate neighbouring property to the East on Elsworthy Road and the properties on Avenue Road and Harley Road whose gardens are adjacent to the site.

9.3 Below we have described the mitigation measures that are proposed to keep noise, dust and vibration to acceptable levels:

9.3.1 Demolition of the existing main building

All demolition work will be undertaken in a carefully controlled sequence, taking into account the requirement to minimise vibration and noise. The contractor will need to utilise non-percussive breaking techniques where practical.

As the property is detached there is less of an issue with noise and vibration transference via connections to the neighbouring building. However, the contractor should ensure that where any slab is adjacent to the boundary the concrete slab should be diamond saw cut first along the boundary to isolate the slab from any adjoining structures.

Dust suppression equipment should be used during the demolition process to ensure that any airborne dust is kept to a minimum.

9.3.2 Underpinning works

The underpin shafts will be excavated using hand tools where possible. At the base of the underpin shaft it may be found that compressed air tools are required due to the compaction of the ground. Care should be taken in selecting a suitable air compressor that keeps noise to a minimum. The air compressor should be located within the site and behind a hoarding to minimise noise transfer to the adjoining properties.

The spoil will be removed from the excavation using an electrically powered conveyor. The contractor will need to ensure that this is regularly serviced and inspected to ensure any noise from this is kept to a minimum. The conveyor will be located as far from the neighbouring properties as practical. In order to minimise dust, skips and conveyors should be covered or completely enclosed to ensure that dust cannot escape.

9.3.3 Piling works

The contiguous piled wall will be formed using a continuous flight auger rig – this is a non-percussive technique and therefore produces significantly less noise and vibration than the alternative driven piles. Some of the temporary piles will require breaking down to basement level once they are no longer required for

temporary support. The contractor should ensure that they use non-percussive pile reduction techniques which are much quieter than traditional breakers.

9.3.4 Bulk excavation

Due to the size of the basement it is likely that some mechanical plant will be required to complete the bulk excavation. The contractor should ensure that any mechanical plant is switched off when not in use and is subject to regular maintenance checks and servicing.

9.3.5 Construction of the concrete slabs and walls

The contractor should ensure that any concrete pours are completed within the permitted hours for noise generating works. The contractor should allow for a contingency period to ensure that concrete pours can be completed within these hours regardless of unforeseen circumstances such as batching plant delays and traffic congestion.

The fabrication and cutting of steelwork for the reinforced concrete walls and underpins shall take place off site. If any rebar needs to be trimmed on site this should be completed using hydraulic or pneumatic tools instead of angle grinders.

9.3.6 Dust Control

In order to reduce the amount of dust generated from the site, the contractor should ensure that any cutting, grinding and sawing should be completed off site where possible. Any equipment used on site should be fitted with dust suppression or a dust collection facility.

The contractor will be responsible for ensuring good practice with regards to dust and should adopt regular sweeping, cleaning and washing down of the hoardings and scaffolding to ensure that the site is kept within good order. The contractor selected will be a member of the Considerate Contractors Scheme. Contact details of the contractor who will be responsible for containing dust and emissions within the site will be displayed on the site boundary so that the local residents can contact the contractor to raise any concerns regarding noise and dust.

Cement, fine aggregates, sand and other fine powders should be sealed after use and any stockpiles of sand or dust-generating materials should be covered.

10.0 Conclusions

10.1 It is intended that the above measures and sequence of works are considered for the eventual design and construction of the proposed works.

10.2 Detailed method statements and calculations for the enabling and temporary works will need to be prepared by the Contractor for comment by all relevant parties including Party Wall Surveyors and their advising Engineers. Elliott Wood Partnership will need to ensure that adequate supervision and monitoring is provided throughout the works particularly during the excavation and demolition stages. A specification and indication of monitoring requirements is given in section 9.0.

10.3 A ground movement assessment report has been conducted by Geotechnical & Environmental Associates (GEA) which concludes that the predicted damage to the neighbouring properties would generally be ‘Negligible’ with some limited areas of ‘Very Slight’ which falls within acceptable limits.

10.4 To this end, EWP will have an on-going role during the works on site to monitor that the works are being carried out generally in accordance with our design and specification. This role will typically involve weekly site visits at the beginning of the project and fortnightly thereafter. A written site report is provided to the design team, Contractor and Party Wall Surveyor.

11.0 Subterranean Construction Method Statement

11.1 Construction generally

It is assumed that the above measures and assumed sequence of works are taken into account in the eventual design and construction of the proposed works.

Detailed method statements and calculations for the enabling and temporary works will need to be prepared by the Contractor for comment by all relevant parties including Party Wall Surveyors and their Engineers. Elliott Wood Partnership will need to ensure that adequate supervision and monitoring is provided throughout the works particularly during the excavation and demolition stages.

To this end, EWP will have an on-going role during the works on site to monitor that the works are being carried out generally in accordance with our design and specification. This role will typically involve weekly site visits at the beginning of the project and fortnightly thereafter. A written site report is provided to the design team, Contractor and Party Wall Surveyor.

Access onto the site will be from Elsworthy Road and must be coordinated in a sensible manner to minimise disruption to the adjoining residents; and provide a safe working environment.

11.2 Assumed sequence of construction (Refer to sequence drawings in Appendix A):

Stage 1: Site set-up

- Erect a fully enclosed painted plywood site hoarding to the site boundary, this should not impede on the neighbouring properties.
- The services within the site should be identified and isolated as necessary. All below ground obstructions should also be removed to allow the works to progress.
- The principles for the removal of spoil shall be agreed. Given the size of the site it is likely that machinery will be used to move the spoil from the excavation to a holding skip located in the front garden/driveway. Grab lorries will be used to remove the material from the skip.
- Protection methods to be agreed and installed for all retained trees / foliage where required.
- Monitoring points should be installed to all neighbouring structures and infrastructure and a base reading should be taken prior to any construction works starting on the site. Refer to section 9.0 for a more detailed discussion with regards to monitoring.

Stage 2: Internal soft strip & demolition

- Complete soft strip of internal finishes within the building.
- Carefully demolish the existing main building down to ground floor level in a staged sequence (tbc by the Contractor) and then break out the existing ground floor slab.

Stage 3: Install piles and underpins

- Form piling mat at approximate existing ground floor level
- Complete contiguous piling from ground floor level around the majority of the basement perimeter, leaving the section below the existing mew building. These piles will resist the lateral forces from soil and surcharge pressures in the temporary and permanent cases.
- Install temporary piles where required to support the temporary works for the retention of the mews building.
- Construct L-shaped RC underpins below the existing masonry walls and footprint of the existing mews building. The underpins will be cast in max 1m wide sections in a traditional underpinning sequence (to be agreed with the Contractor). The agreed sequence will ensure that the RC underpins have a minimum of 48 hours to cure, prior to the subsequent pins being constructed. Transitional underpins will be constructed at progressively shallower founding depths along the front and rear of the mews building to accommodate the change in depth from basement to ground floor level.

Stage 4: Cast capping beam and install high level temporary works

- Install temporary steel needles and beams to support the vertical load of the existing mews building. These beams will be supported on the temporary piles at ground level and will remain in place until the mews building is supported by the ground floor slab in the permanent case.
- Excavate local trench around the perimeter, propping off the adjacent earth bund, to allow the ground floor RC capping beam to be formed.
- Where required, install temporary horizontal steel waling beams to the perimeter of the basement.
- Excavate local trenches across the basement and install temporary horizontal props between the waling beams / capping beam. The props will provide temporary restraint to any lateral forces and prop the top of the piled wall until the ground floor slab has been cured and cast.

Stage 5: Reduce dig and install low level temporary works

- Excavate within the basement down to a level approximately 1m above the proposed basement slab level. Batter-back the earth in a preferred location to form a ramp from ground to basement level for piling rig access.
- Install temporary horizontal steel waling beam around the perimeter of the basement at this level.
- Excavate local trenches across the basement and install low level temporary horizontal props between the waling beams. These will provide temporary restraint to any lateral forces at low level until the base slab has been cast and cured.

Stage 6: Install basement piles

- Reduce dig down to founding level and form piling mat.
- Install internal piles, removing and re-instating temporary props as required (a temporary works method will be completed by the Contractor and reviewed by EW prior to works). These piles will support the downward vertical load of the structure above and also resist uplift forces from the heave of the underlying clay soil.
- Remove piling rig from excavation and break down access ramp.

Stage 7: Cast RC base slab and pile caps

- Grub out piling mat and form local excavations for pile caps, drainage runs, lift pit etc.
- Install drainage.
- Tie reinforcement for RC pile caps and dowel into perimeter piles for shear connection to the base slab. This connection will enable the vertical loads acting on the slab and perimeter RC wall to be transferred into the piled wall.
- Cast RC base slab (including kickers for RC walls and columns) to form the piled raft. Once the base slab has cured it will provide a permanent low level prop to the piled retaining wall.

Stage 8: Construct basement walls and columns

- Cast RC walls and columns up to the underside of the proposed ground floor slab. The RC walls are cast around the high level horizontal props where required.

Stage 9: Construct ground floor slab

- Cast RC ground floor slab above the high level horizontal props spanning onto the RC pile cap around the perimeter. The slab will be cast around the temporary piles (supporting the mews building) where required.

Stage 10: Remove temporary works

- Once the ground floor slab has cured it will provide a permanent prop to the top of the piled retaining wall and therefore the temporary horizontal props can be removed and any holes in the internal RC basement walls can be filled in.
- The slab will also support the mews building in the permanent case and therefore once the masonry walls are built down off the slab, the temporary steel needles and beams can be removed and the masonry walls made good. The temporary piles can then be broken down and base slab filled in where required.
- With the basement structure complete up to ground floor, the superstructure works can commence.

APPENDICES

A Proposed Structural Layouts and Sequence of Construction Drawings

RC LINING WALL TO PROVIDE RESISTANCE TO ANY HYDROSTATIC PRESSURE AND CREATE PRIMARY BARRIER TO WATER INGRESS. PUMPED CAVITY DRAIN SYSTEM PROVIDES SECONDARY MEASURE TO PREVENT WATER INGRESS

APPROX 450THK RC PILED RAFT DESIGNED TO RESIST UPLIFT FORCES FROM HEAVE OF UNDERLYING CLAY SOILS

CONTIGUOUS PILED WALL TO RESIST LATERAL LOADS FROM SOIL AND SURCHARGE PRESSURES IN THE TEMPORARY AND PERMANENT CASE. PILES ALSO SUPPORT VERTICAL LOADS FROM BASEMENT AND SUPERSTRUCTURE THROUGH SHEAR CONNECTION TO BASE SLAB AND LINING WALL.

THICKENING/ PILECAP UNDER

SITE BOUNDARY

RC WALL

SWIMMING POOL

RC UNDERPINS TO SUPPORT EXG MEWS BUILDING FORMED IN MAX 1m WIDE SECTIONS IN AN AGREED SEQUENCE

INDICATIVE POSITION FOR SUMP AND PUMP FOR FOUL AND CAVITY DRAIN PUMPS HOUSED IN RC CHAMBERS

TENSION PILES TO PROVIDE RESISTANCE AGAINST HYDROSTATIC UPLIFT AND HEAVE FROM UNDERLYING CLAY SOILS

This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.

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P1	6/8/15	AAT	SWA	PLANNING

drawing title
PROPOSED BASEMENT PLAN

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drawing status
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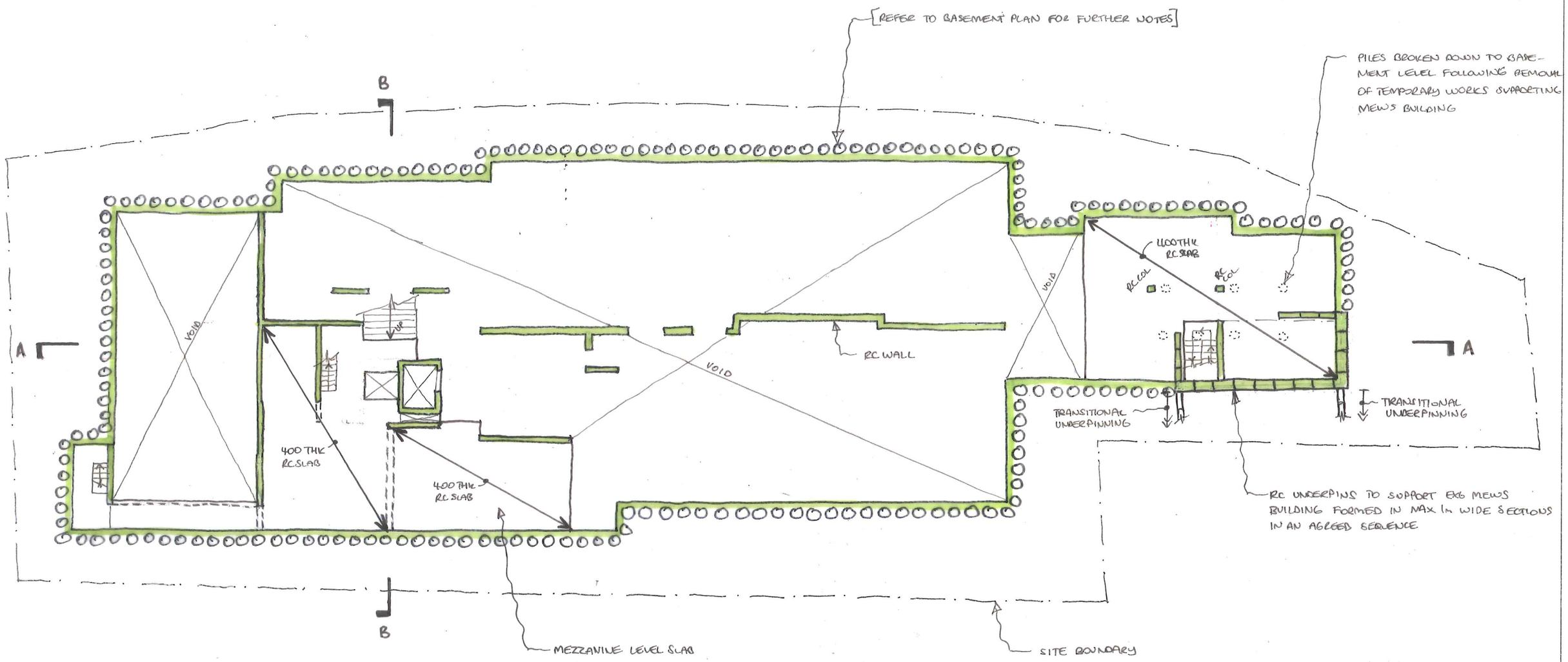

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PROPOSED MEZZANINE PLAN

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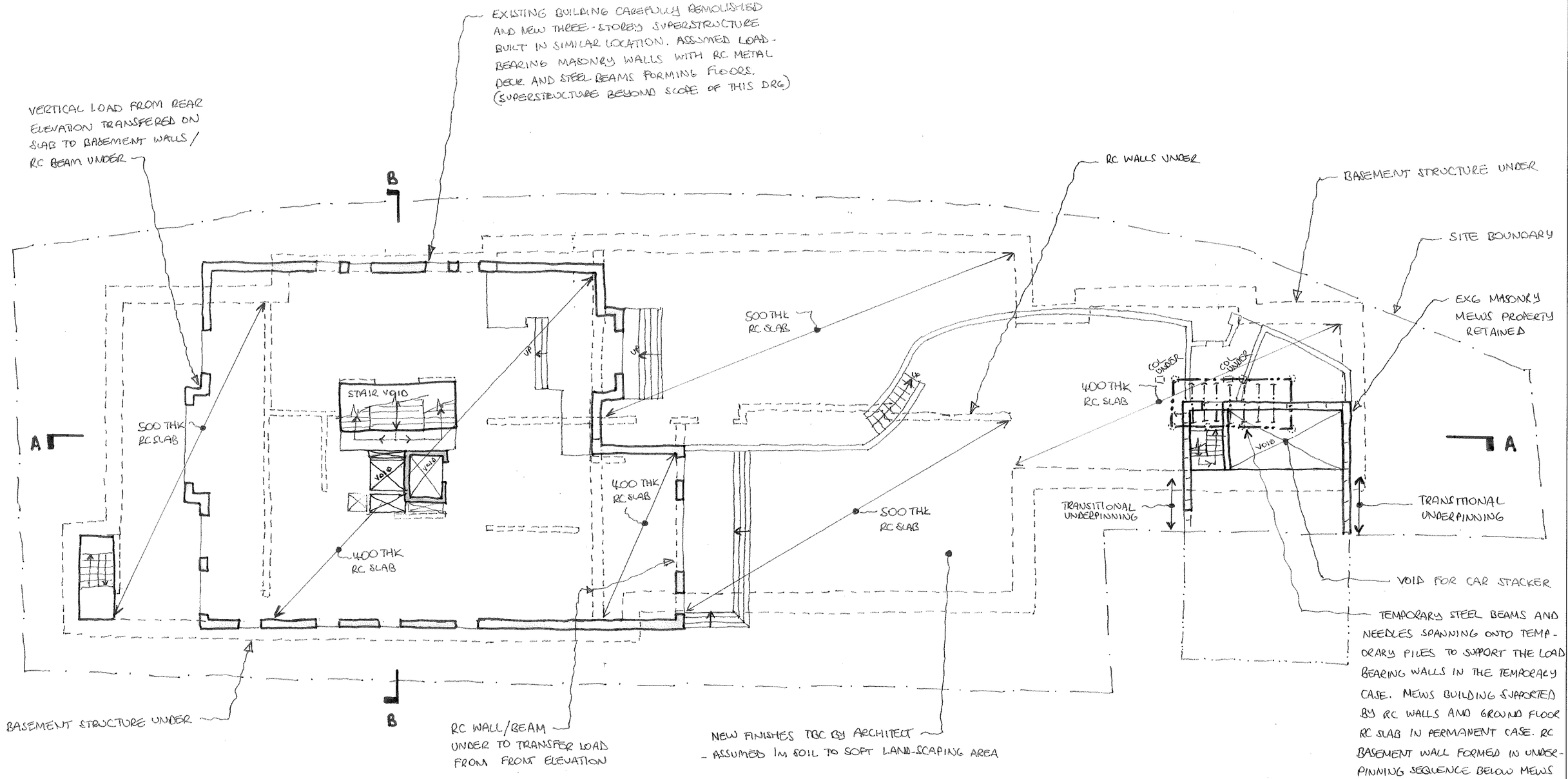

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PROPOSED GROUND FLOOR PLAN

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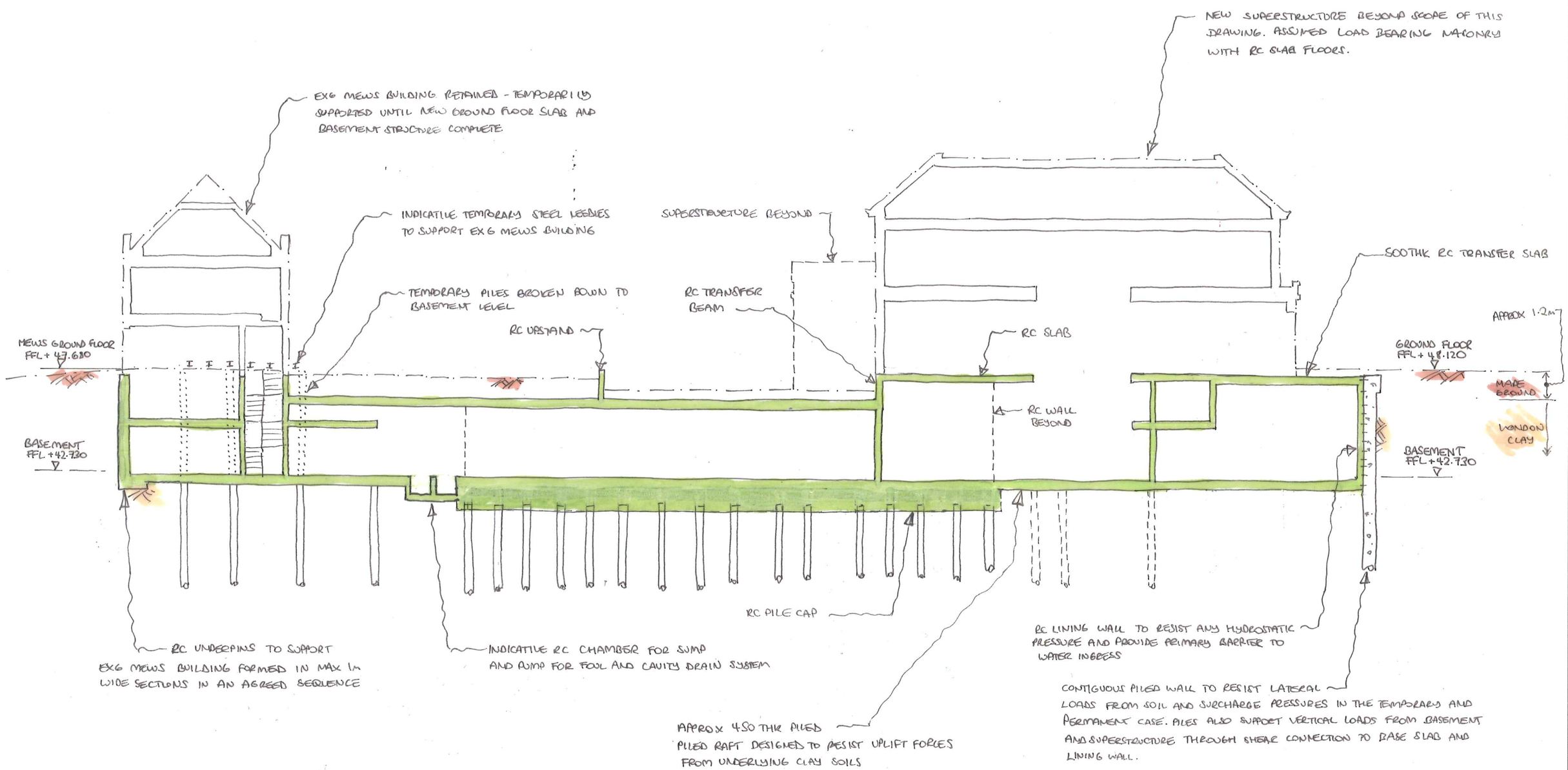

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job title
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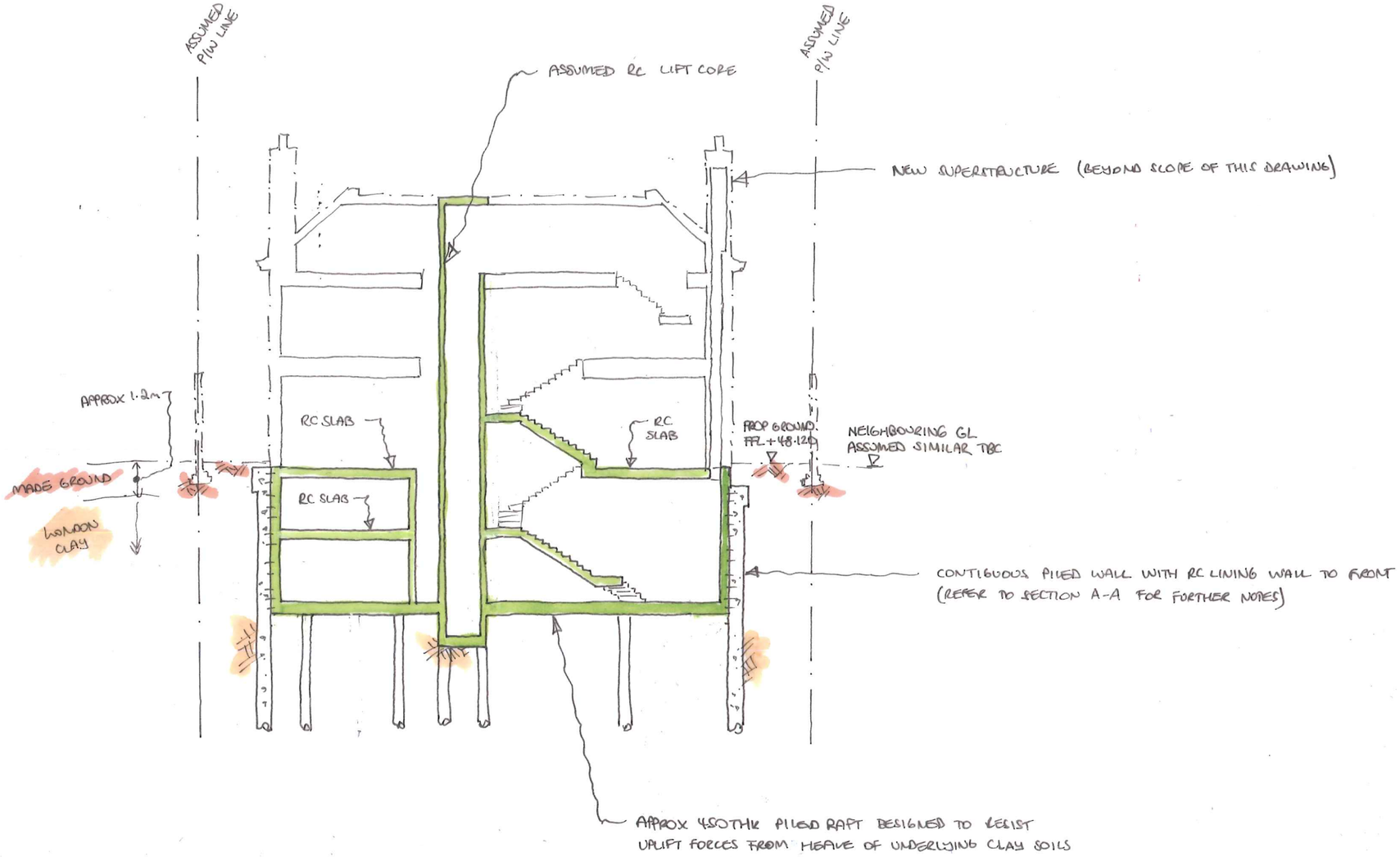

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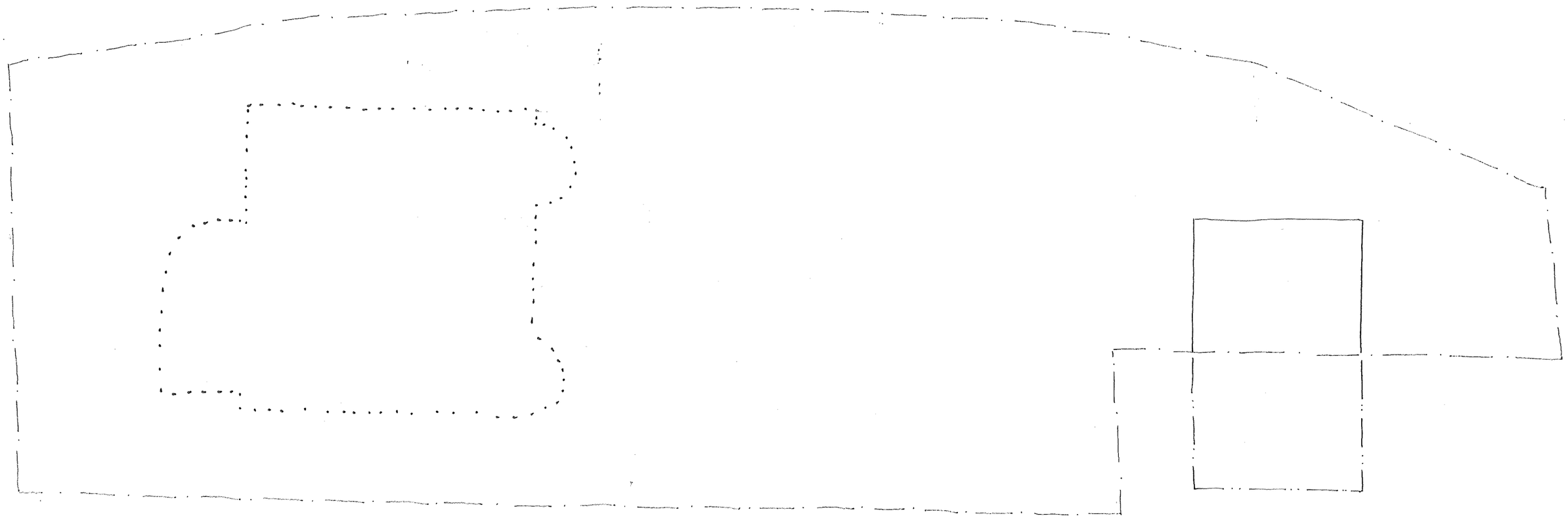
2150123	S/210	P1

Stage 1: Site set-up

- Erect a fully enclosed painted plywood site hoarding to the site boundary, this should not impede on the neighbouring properties.
- The services within the site should be identified and isolated as necessary. All below ground obstructions should also be removed to allow the works to progress.
- The principles for the removal of spoil shall be agreed. Given the size of the site it is likely that machinery will be used to move the spoil from the excavation to a holding skip located in the front garden/driveway. Grab lorries will be used to remove the material from the skip.
- Protection methods to be agreed and installed for all retained trees / foliage where required.
- Monitoring points should be installed to all neighbouring structures and infrastructure and a base reading should be taken prior to any construction works starting on the site. Refer to section 9.0 for a more detailed discussion with regards to monitoring.



Stage 2: Internal soft strip & demolition

- Complete soft strip of internal finishes within the building.
- Carefully demolish the existing main building down to ground floor level in a staged sequence (tbc by the Contractor) and then break out the existing ground floor slab.

This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.

Do not scale from this drawing.

rev	date	by	chk	description

drawing title
ASSUMED SEQUENCE - STAGES 1+2

scale(s)	date	drawn
NTS	JULY '15	AAT

drawing status
PRELIMINARY

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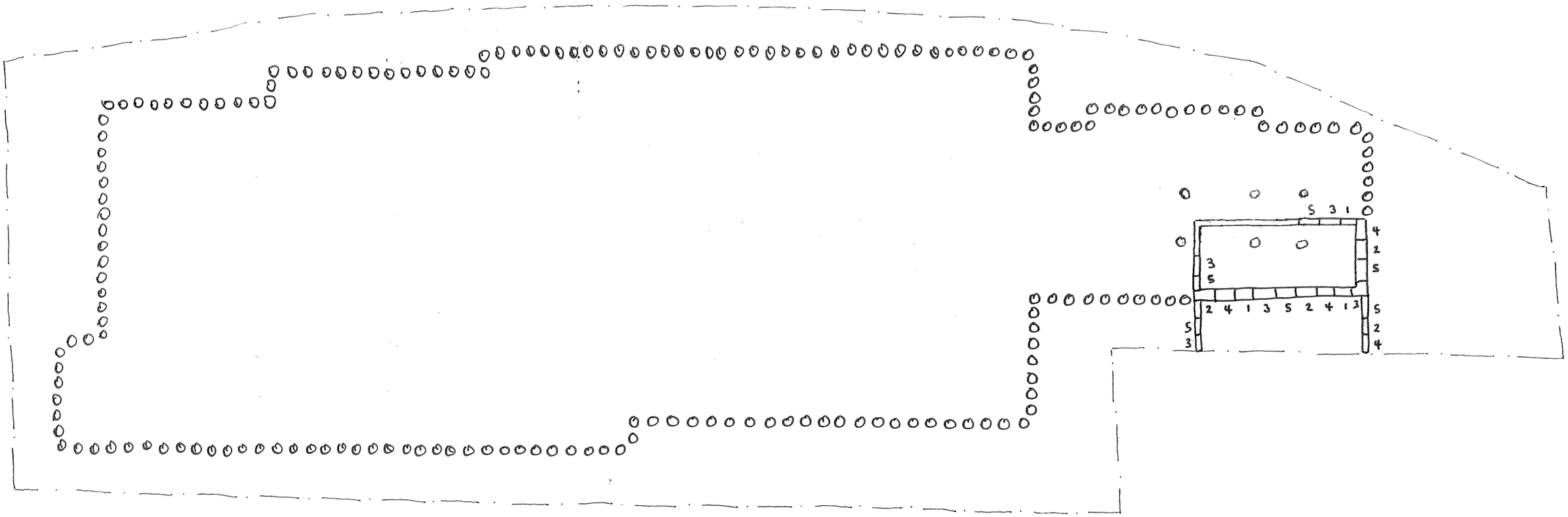
job no	drawing no	revision
2150123	S/501	P1

Stage 3: Install piles and underpins

- Form piling mat at approximate existing ground floor level
- Complete contiguous piling from ground floor level around the majority of the basement perimeter, leaving the section below the existing mew building. These piles will resist the lateral forces from soil and surcharge pressures in the temporary and permanent cases.
- Install temporary piles where required to support the temporary works for the retention of the mews building.
- Construct L-shaped RC underpins below the existing masonry walls and footprint of the existing mews building. The underpins will be cast in max 1m wide sections in a traditional underpinning sequence (to be agreed with the Contractor). The agreed sequence will ensure that the RC underpins have a minimum of 48 hours to cure, prior to the subsequent pins being constructed. Transitional underpins will be constructed at progressively shallower founding depths along the front and rear of the mews building to accommodate the change in depth from basement to ground floor level.



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rev	date	by	chk	description

drawing title: ASSUMED SEQUENCE – STAGE 3

scale(s): NTS | date: JULY '15 | drawn: AAT

drawing status: PRELIMINARY

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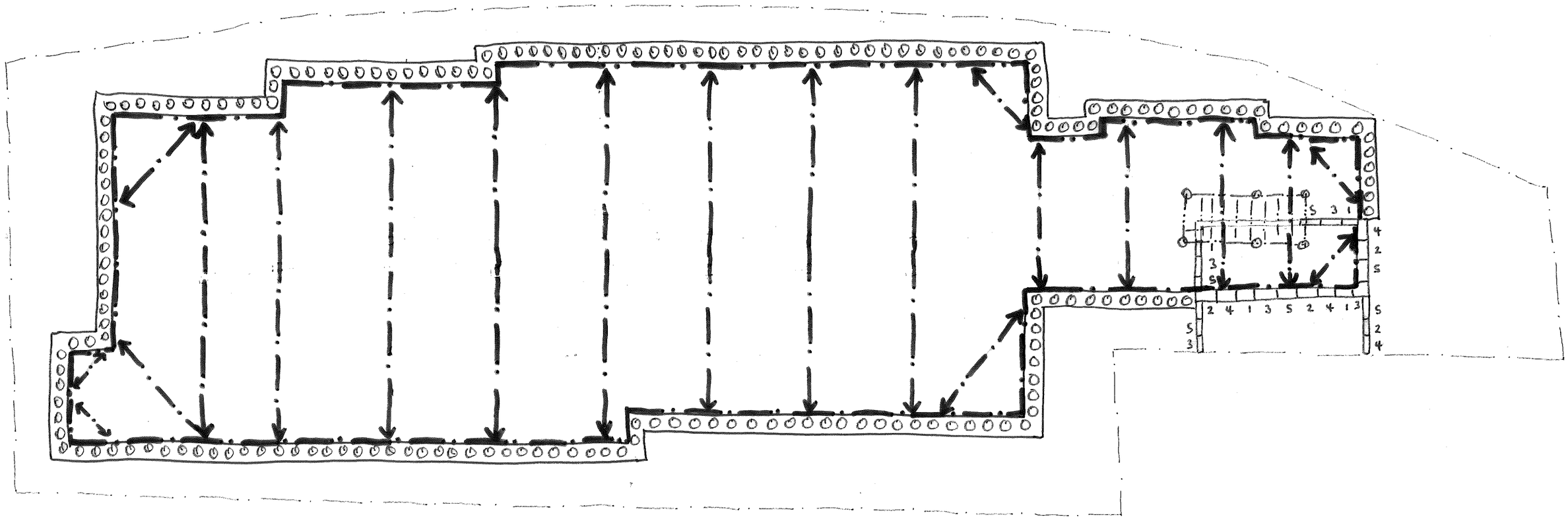
job no	drawing no	revision
2150123	S/502	P1

Stage 4: Cast capping beam and install high level temporary works

- Install temporary steel needles and beams to support the vertical load of the existing mews building. These beams will be supported on the temporary piles at ground level and will remain in place until the mews building is supported by the ground floor slab in the permanent case.
- Excavate local trench around the perimeter, propping off the adjacent earth bund, to allow the ground floor RC capping beam to be formed.
- Where required, install temporary horizontal steel waling beams to the perimeter of the basement.
- Excavate local trenches across the basement and install temporary horizontal props between the waling beams / capping beam. The props will provide temporary restraint to any lateral forces and prop the top of the piled wall until the ground floor slab has been cured and cast.



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Do not scale from this drawing.

rev	date	by	chk	description

drawing title
ASSUMED SEQUENCE
- STAGE 4

scale(s) NTS | date JULY '15 | drawn AAT

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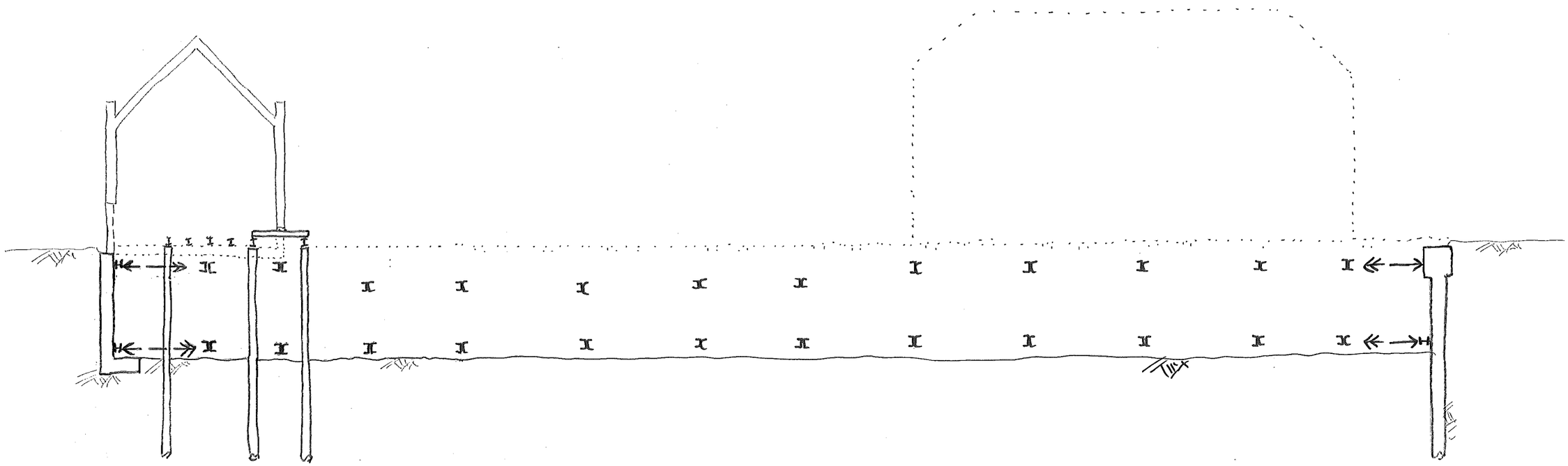
job no	drawing no	revision
2150123	S/S03	P1

Stage 5: Reduce dig and install low level temporary works

- Excavate within the basement down to a level approximately 1m above the proposed basement slab level. Batter-back the earth in a preferred location to form a ramp from ground to basement level for piling rig access.
- Install temporary horizontal steel waling beam around the perimeter of the basement at this level.
- Excavate local trenches across the basement and install low level temporary horizontal props between the waling beams. These will provide temporary restraint to any lateral forces at low level until the base slab has been cast and cured.



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rev	date	by	chk	description

drawing title: ASSUMED SEQUENCE - STAGE 5

scale(s): NTS | date: JULY'15 | drawn: AAT

drawing status: PRELIMINARY

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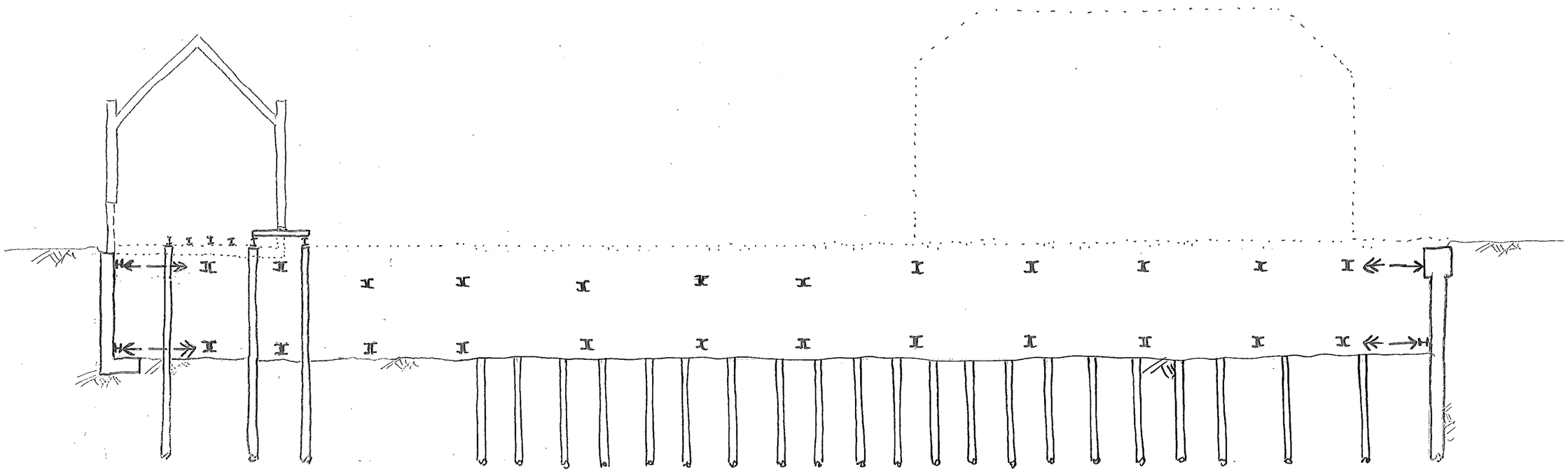
job no	drawing no	revision
2150123	S/504	P1

Stage 6: Install basement piles

- Reduce dig down to founding level and form piling mat.
- Install internal piles, removing and re-instating temporary props as required (a temporary works method will be completed by the Contractor and reviewed by EW prior to works). These piles will support the downward vertical load of the structure above and also resist uplift forces from the heave of the underlying clay soil.
- Remove piling rig from excavation and break down access ramp.



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Do not scale from this drawing.

rev	date	by	chk	description

drawing title: ASSUMED SEQUENCE - STAGE 6

scale(s): NTS | date: JULY '15 | drawn: AAT

drawing status: PRELIMINARY

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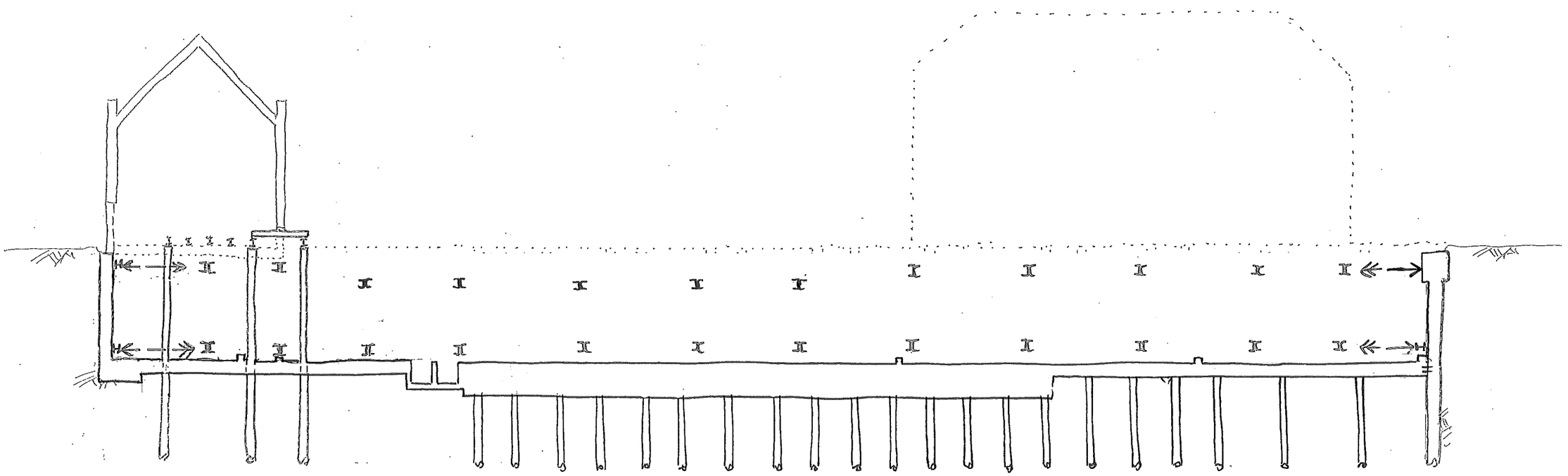
job title: 70 ELSWORTHY RD, LONDON, NW3 3BP

job no	drawing no	revision
2150123	S/S05	P1

Stage 7: Cast RC base slab and pile caps

- Grub out piling mat and form local excavations for pile caps, drainage runs, lift pit etc.
- Install drainage.
- Tie reinforcement for RC pile caps and dowel into perimeter piles for shear connection to the base slab. This connection will enable the vertical loads acting on the slab and perimeter RC wall to be transferred into the piled wall.
- Cast RC base slab (including kickers for RC walls and columns) to form the piled raft. Once the base slab has cured it will provide a permanent low level prop to the piled retaining wall.



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rev	date	by	chk	description

drawing title
ASSUMED SEQUENCE - STAGE 7

scale(s) NTS | date JULY'15 | drawn AAT

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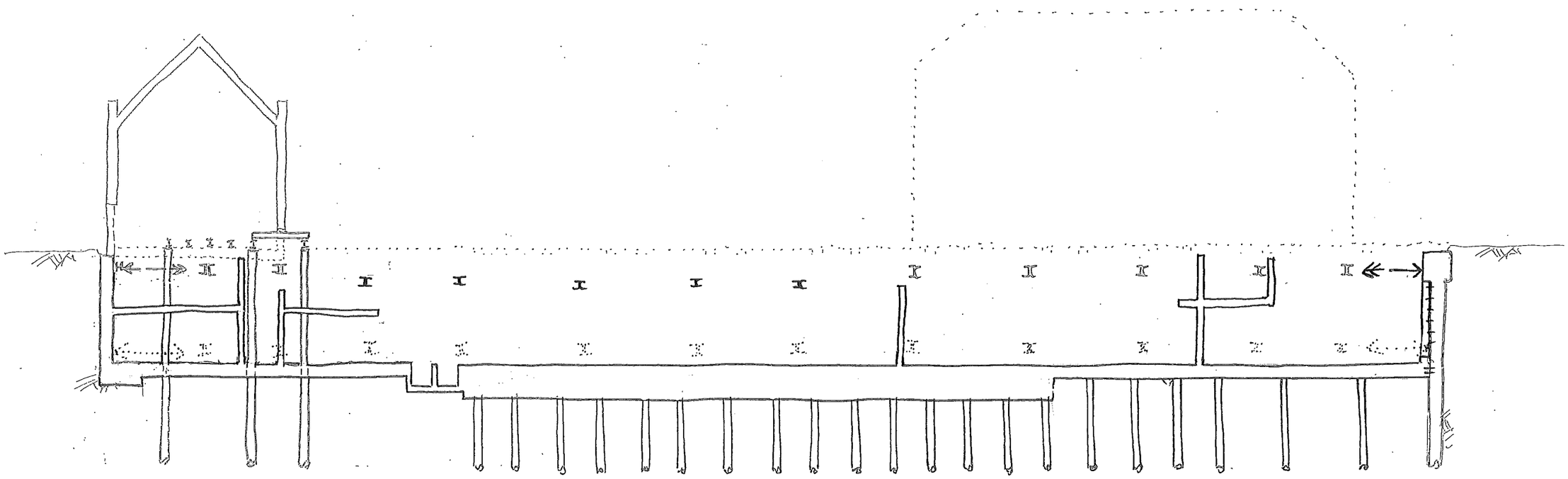
job no	drawing no	revision
2150123	S/506	P1

Stage 8: Construct basement walls and columns

- Cast RC walls and columns up to the underside of the proposed ground floor slab. The RC walls are cast around the high level horizontal props where required.



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rev	date	by	chk	description

drawing title
ASSUMED SEQUENCE - STAGE 8

scale(s) NTS | date JULY '15 | drawn AA

drawing status
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job title
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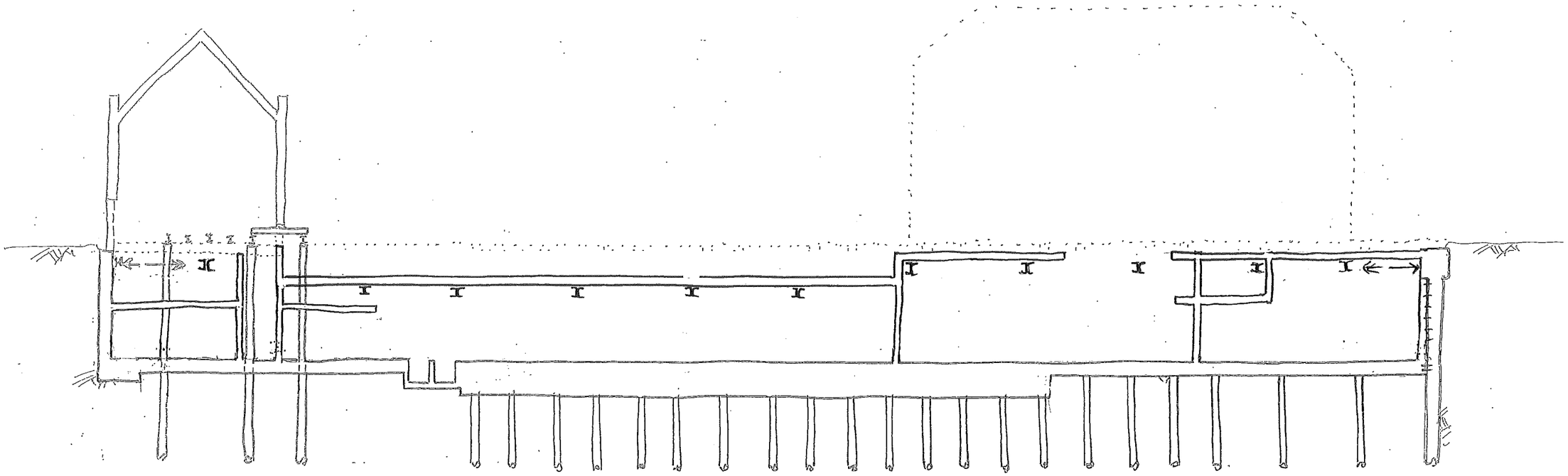
job no	drawing no	revision
2150123	S/507	P1

Stage 9: Construct ground floor slab

- Cast RC ground floor slab above the high level horizontal props spanning onto the RC pile cap around the perimeter. The slab will be cast around the temporary piles (supporting the mews building) where required.



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rev	date	by	chk	description

drawing title
ASSUMED SEQUENCE – STAGE 9

scale(s) NTS. date JULY '15 drawn AAT

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job title
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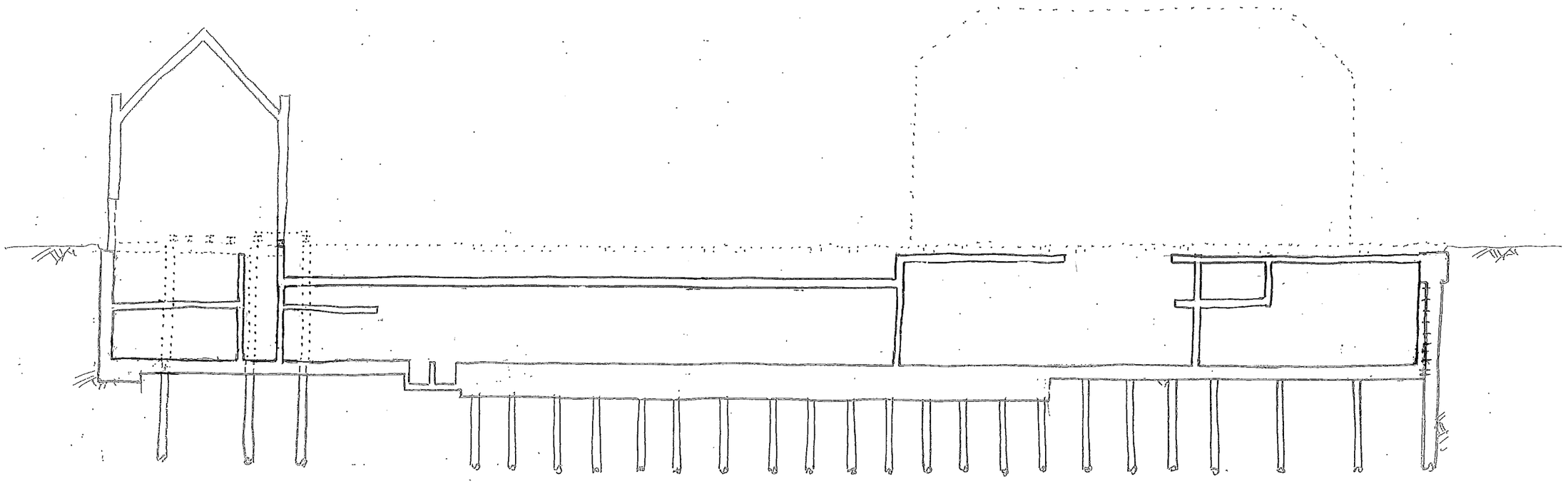
job no	drawing no	revision
2150123	S/508	P1

Stage 10: Remove temporary works

- Once the ground floor slab has cured it will provide a permanent prop to the top of the piled retaining wall and therefore the temporary horizontal props can be removed and any holes in the internal RC basement walls can be filled in.
- The slab will also support the mews building in the permanent case and therefore once the masonry walls are built down off the slab, the temporary steel needles and beams can be removed and the masonry walls made good. The temporary piles can then be broken down and base slab filled in where required.
- With the basement structure complete up to ground floor, the superstructure works can commence.



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rev	date	by	chk	description

drawing title

ASSUMED SEQUENCE - STAGE 10

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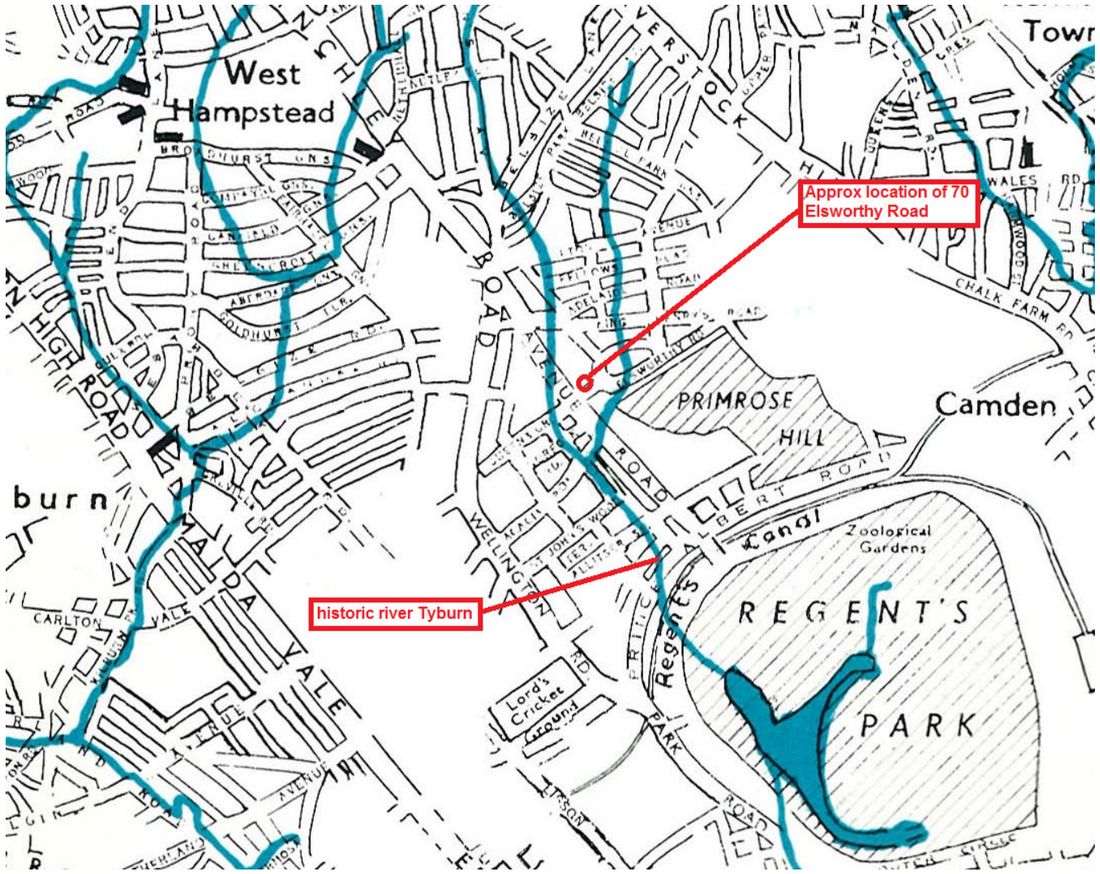
job no	drawing no	revision
2150123	S/509	P1

B Lost Rivers of London Map



Elsworthy Road appears to be in the vicinity of the historic river Tyburn.

Ref: A portion of the map showing the course of the Lost River Tyburn taken from Lost Rivers of London © 1962 and 1992 by Nicholas Barton, used by kind permission of Historical Publications Ltd

C London Underground Asset Location Confirmation

Transport for London
London Underground

London Underground
Infrastructure Protection

3rd Floor
Albany House
55 Broadway
London SW1H 0BD

www.tfl.gov.uk/tube

Your ref:
Our ref: 20878-SI-8-020715

Adam Atkinson
Elliott ood
a.atkinson@elliottwood.co.uk

02 July 2015

Dear Adam,

70 Elsworthy Road London NW3 3BP

Thank you for your communication of 1t July 2015.

I can confirm that London Underground has no assets within 50 metres of your site as shown on the plan you provided.

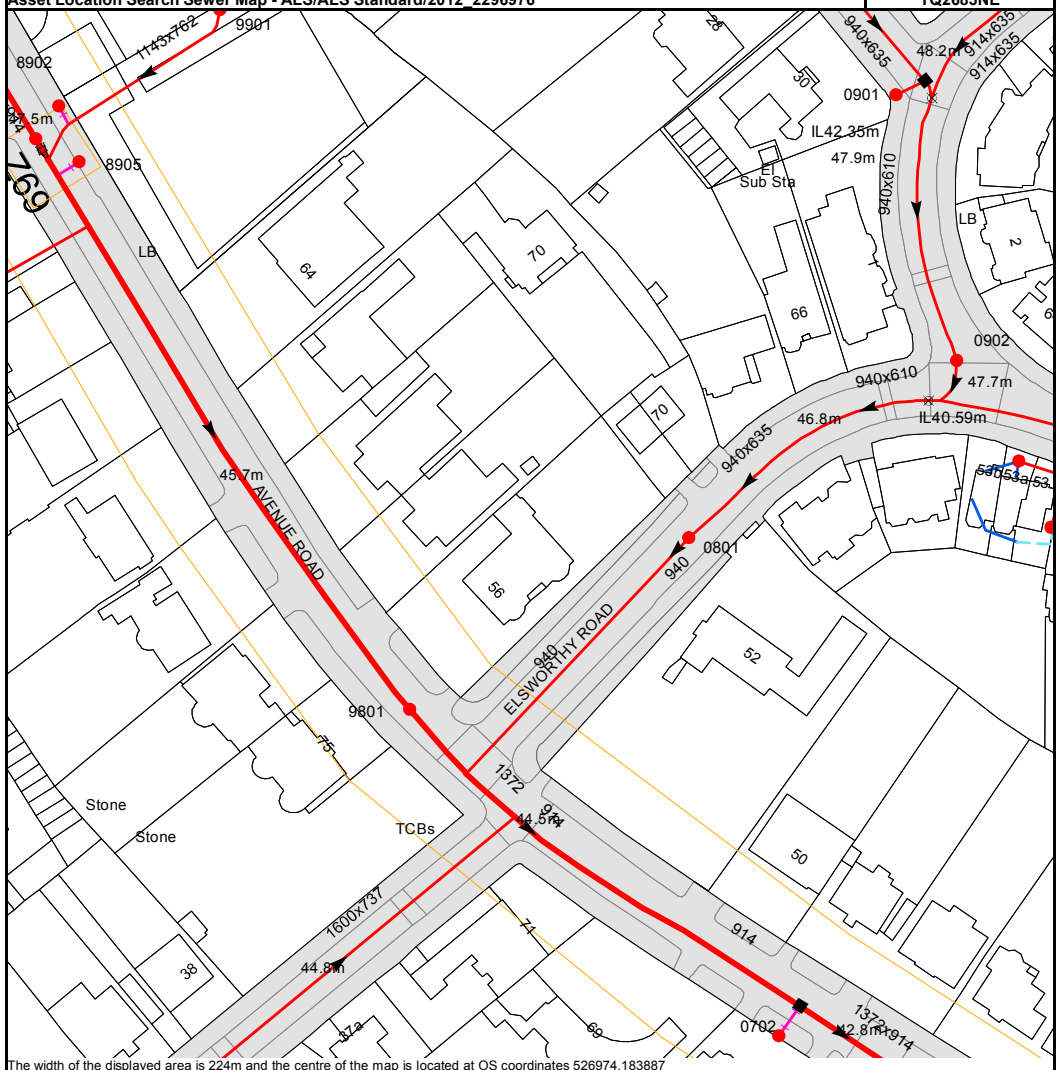
If I can be of further assistance, please contact me.

Yours sincerely

Shahina Inayathusein
Information Manager
Email: locationenquiries@tube.tfl.gov.uk
Direct line: 020 7918 0016

D Thames Water Sewer Records

Asset Location Search Sewer Map - ALS/ALS Standard/2012_2296976 | **TQ2683NE**



The width of the displayed area is 224m and the centre of the map is located at OS coordinates 526974,183887

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
N/a	47.31	43.37
n/a	n/a	n/a
n/a	n/a	n/a
n/a	n/a	n/a
n/a	n/a	n/a
n/a	n/a	n/a
n/a	44.68	39.4
n/a	46.29	40.07
n/a	n/a	n/a
-	-	-
n/a	n/a	n/a

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