London Irish Centre

RIBA Stage 2+ Structural Engineering Report and Subterranean Construction Method Statement

engineering a better society

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		Remarks:	**Preliminary**				
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Revision:	P3	Prepared by:	Andreas Papadogiannakis	Checked by:	Theo Tompoulidis	Approved by:	Mark Goodbrand
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Revision:	P4	Prepared by:	Andreas Papadogiannakis	Checked by:	Theo Tompoulidis	Approved by:	Mark Goodbrand
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Our practice

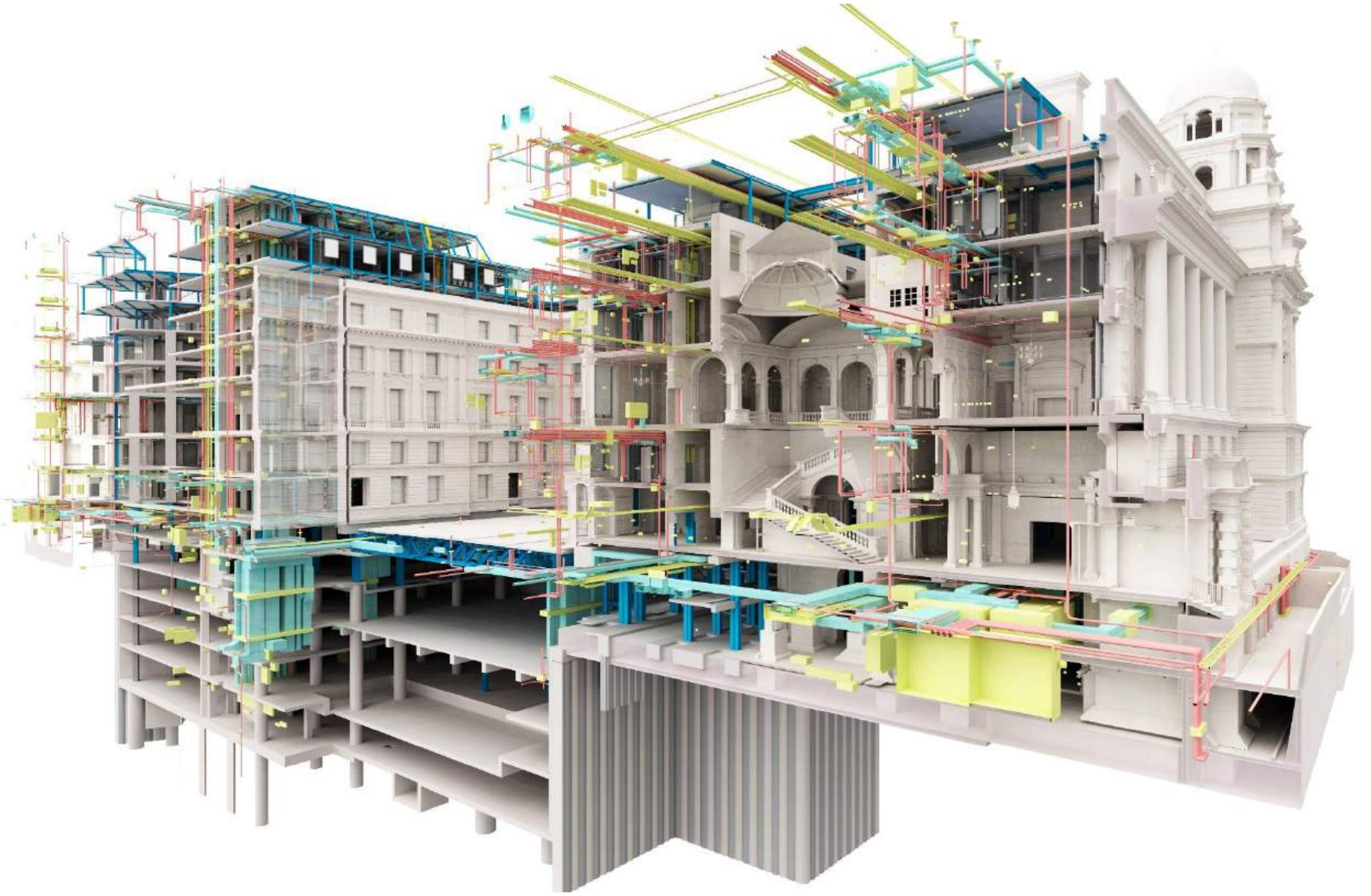
Elliott Wood work with likeminded people to
engineer a better society

Our portfolio is extraordinarily diverse, and we particularly enjoy those projects which provide the opportunity to engineer for the common good – from making dramatic improvements to the life of a town or city, through to nurturing a new generation of exceptional engineers in our own in-house academy.

Despite more than twenty years in practice, we continue to be curious and find ways to pass on the benefit of our collective experience. We foster enquiring minds and share ideas because we know that this knowledge can make a real difference to our clients.

Engineering is often about the unseen: much of what we do is hidden when a building is complete. But engineering is not a necessary evil – it's much cleverer than that. Our role is to demystify the invisible workings of a structure, to reveal unexpected opportunities and to make the existing engineering work harder.

We value both technical and creative thinking and are activists for a new kind of engineering profession in which our craft is pivotal to the design process. We are no ordinary engineers.



Reveal / Materialise / Impact

Engineers make a difference

We like to be involved at the start of our clients' creative and commissioning journey, because we are concerned that not enough people are realising the full potential of their buildings. They are only working with what they can see.

Our process challenges usual perceptions of the engineer's role, because we help clients to see the unseen and achieve results beyond the aspirations of the brief – and which have a positive legacy for their wider communities.

Reveal

We ask questions. With innovative thinking, we reveal the unexpected opportunities in an already ambitious brief.

Materialise

We give ideas life. Using expertise and imagination, we materialise new assets for our clients.

Impact

We make a difference. Our work not only benefits our clients, it has a positive impact on society as a whole.

One

Introduction

1.1

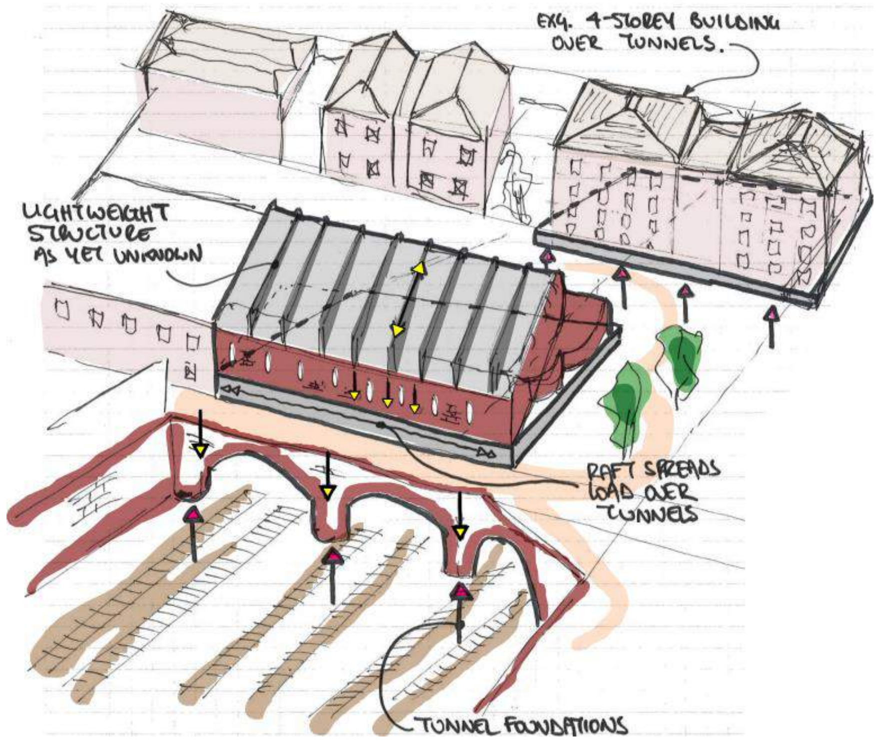
Elliott Wood Partnership (EW) have been appointed by Acumen Portfolio Solutions on behalf of the London Irish Centre to provide structural and civil engineering services for the proposed redevelopment of the buildings comprising the centre, at Camden Square.

This report describes the site constraints, existing structure and the proposed structural works up to RIBA Stage 2. A report describing the proposed civil engineering works has been prepared and issued separately.

The report is to be read in conjunction with the relevant structural drawings and the design information produced by the Architect and other consultants within the design team, as well as the civil engineering report.

Elliott Wood is committed to providing a professional service with sustainability at its core. To help the design achieve a sustainable outcome we have outlined the opportunities identified and adopted within the design at this stage, with reference to the selected accredited assessment tool.

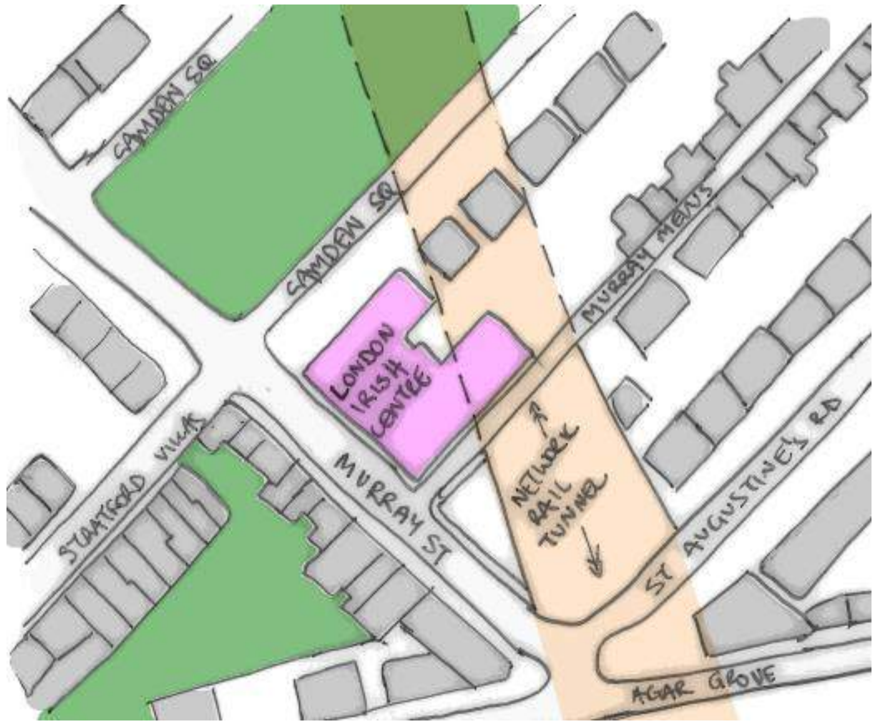
This report is for the sole use of the London Irish Centre for whom the report is undertaken and cannot be relied upon by third parties for any use whatsoever without the express authority of Elliott Wood.



Network Rail tunnel under McNamara Hall

1.2

The site is located on the corners of Camden Square, Murray Street and Murray Mews, within the London Borough of Camden and comprises a group of buildings that border the 19th Century villas along Camden Square and extend over the Network Rail tunnel to the west.



Site location

1.3

The proposed works include the refurbishment of Nos. 50, 51 and 52 Camden Square, as well as the McNamara Hall, and the demolition of the buildings along Murray Street and Murray Mews and construction of a new 4-storey building with basement in their place. The new building is to include a feature atrium opening to connect the levels.

Two

Site history and constraints

2.1

The site appears to have originally been occupied solely by the Villas on Camden Square, which were constructed in the mid-1800s, with Villa No. 52 undergoing some extension work in the later part of the century.

The London Irish Centre was founded in the Villa buildings in the 1950s and following that the buildings along Murray Street were constructed and included a part basement to the corner with Murray Mews.

The Centre took its current shape in the 1970s with the construction of the McNamara Hall over the Network Rail tunnel, along Murray Mews, with a glazed link building between the Camden Square buildings being constructed in the early 2000s.

Our assumptions on the construction and stability mechanisms for each building are based on visual observations only made during visits to the site and some limited archive information. Site investigations have not yet been undertaken and will be necessary to confirm our assumptions.

2.2 Boundary Conditions

The following site constraints have been identified:

2.2.1 Existing Basement

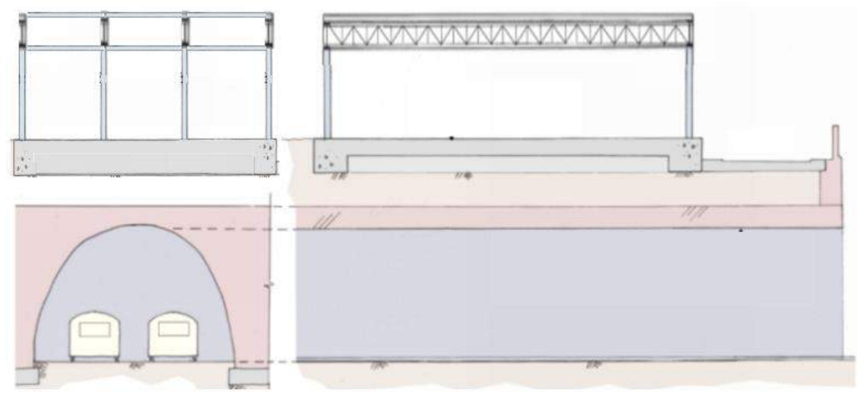
An existing part-basement is located at the corner of Murray Mews and Murray Street. This is used for plant and is envisaged that it will be removed to allow for the construction of the new basement in its place.

2.2.2 Network Rail Tunnel

St Pancras International Station is located 1.25km South-East of the site. The station operates as the terminus for Eurostar connecting the continent with Central London using the high-speed rail line (HS1). In addition, it provides services to South-Eastern, East Midlands and Thameslink train operator.The tunnel passes almost exclusively beneath the existing McNamara Hall and is approximately 200m long.

It is expected that the tunnel was constructed with a cut-and-cover method, with masonry retaining walls to its side and a series of masonry arches supporting the ground above.

The crown level of the existing tunnels is unknown however it is expected that the foundation of the McNamara Hall consists of shallow ground bearing beams on a regular grid and are constructed on top of the tunnel.



Expected tunnel construction below McNamara Hall

Site investigations have been proposed to expose these foundations in order to check their viability to support additional loads. These are intended to be carried out at a later stage in the design. Excavations above the tunnel will be limited, with any proposed works requiring statutory approvals by National Rail.

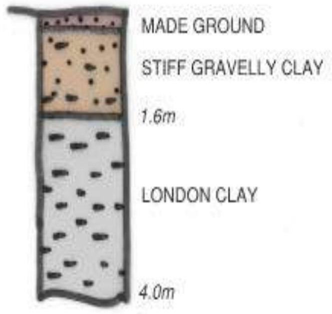
The proposed method of construction for the redevelopment will also need to be agreed in consultation with the National Rail requirements. Craneage exclusions zones will need to be established restricting the type of structures that can be constructed.

Three

Ground conditions

3.1 Geology

A site investigation has been completed on the site by Soiltechnics Ltd in February 2020 and consisted of one 4m deep borehole. The investigation indicated that the underlying ground is London Clay overlain by a very thin layer of made ground. This is in line with geological information obtain from the BGS website.



Site ground conditions

3.2 Ground water

Ground investigations carried out at a nearby development, available on the planning portal, indicated that the groundwater levels are typically around 3m below ground level.

Further site investigations will be carried out to establish a better understanding of the ground water conditions and will be a significant consideration in the construction of the new basement

3.3 Contamination

The site has primarily been used for residential and office purposes which would suggest that the risk of the ground being contaminated is low. Environmental reports for nearby developments that are available on the planning portal suggest that the proximity of the site to the railway might have had some contaminating effect on the soil.

Contamination testing will be carried out to identify any contamination risks.

Four

Observations

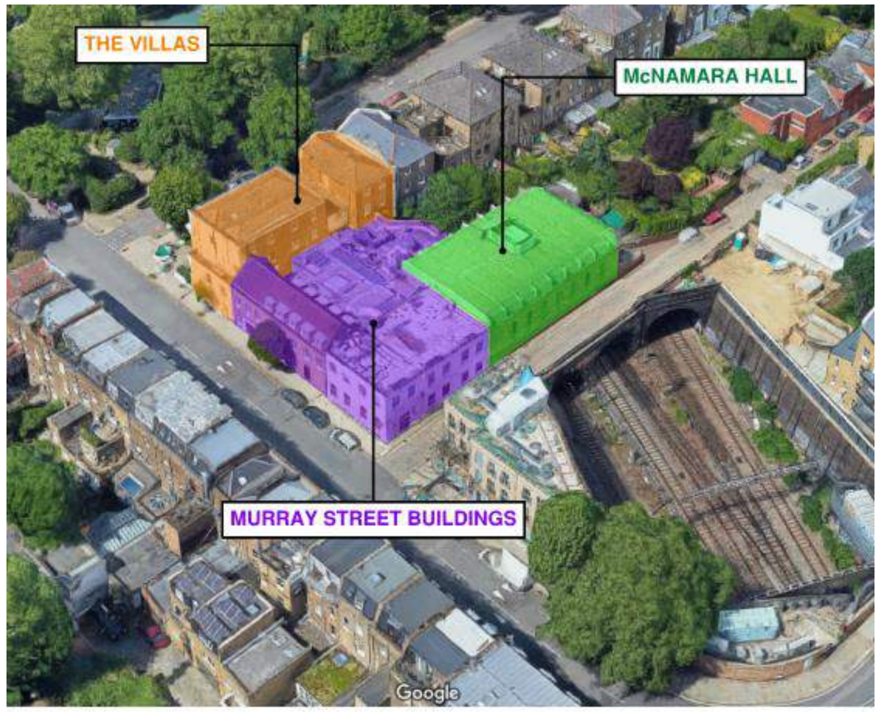
4.1 Existing Site

The site is located between Camden Gardens, Murray Street and Murray Mews within the London Borough of Camden.

It is directly over a live rail line which is approximately 7m below the site.

4.2 Existing Buildings

The following description of the existing building is based on limited visual observations only, during visits to site, that formed the basis for the assumptions of the existing building structural frame.



Buildings comprising the London Irish Centre

Extensive intrusive site investigations will be necessary to confirm the assumptions made and inform the design and should be carried out at early on to reduce risk as early as possible.

The existing site consists of three different types of frames and our assumptions on their construction are outlined below.

4.2.1 The Villas

The two villas (No. 50 and No.51-52) are facing Camden Square and are located at the corner with Murray Street. They consist of four storeys with pitched roofs and rendered facades and are assumed to be constructed with suspended timber floors supported on traditional loadbearing masonry walls. The roof is assumed to be formed from sown timbers. The Villas are thought to have been erected in the mid-1850's.

View of the Villas (No.50 – left and No.51-52 – right) from Camden Gardens

The villas are connected with a two-storey link building that was constructed in the early 2000s and is expected to consist of a steel frame with timber floors and a glass façade.

4.2.2 Murray Street Buildings

Behind the Villas, and extending along Murray Street to Murray Mews, a series of interconnected buildings are located. These buildings reflect the expansion of the Irish Centre over the years. The building at the corner of Murray Street and Murray Mews houses the Kennedy Hall and was constructed during the 1960s.

The structure is suspected to be consisting of a mix of steelwork, brick, concrete and timber, but due to the lack of any intrusive investigation of the structure this is an assumption based on visual inspection only.

View of the Murray Street Buildings

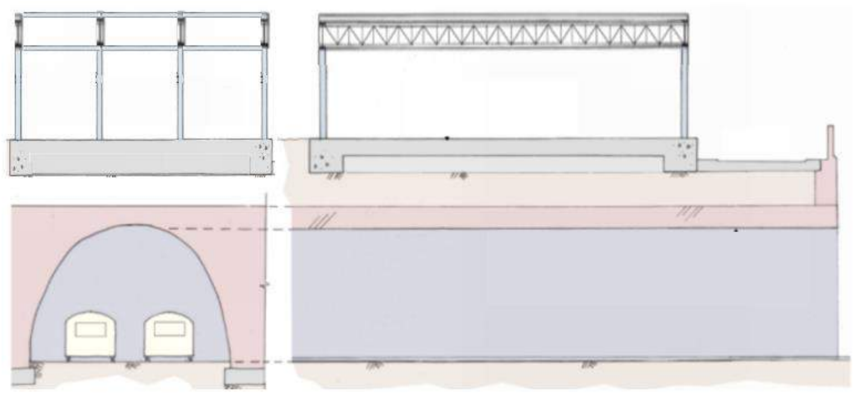
4.2.3 McNamara Hall

View of McNamara Hall from Murray Mews

Along Murray Mews and on top of the Network Rail tunnels sits a long-span, lightweight steel framed building with a masonry façade, which forms the McNamara Hall. The building was constructed during the 1980s.

The existing structure comprises steel columns and steel trusses spanning across the hall, approximately 15m wide. The steel columns are spaced approximately at 2.8m and are expected to be braced to resist lateral loads. The existing roof is assumed to be a lightweight steel frame comprising cold formed purlins and a metal deck. The anticipated design loads for the existing roof are assumed to have only allowed for access and maintenance and not plant or amenity space.

The stability of the existing frame is assumed to be provided by vertical bracing and the roof will also consist of horizontal bracing allowing the roof to span between stability elements, safely transferring all wind and lateral loads to the foundations.



Assumed existing McNamara Hall structure (elevation from Murray Mews – left, typical section through hall – right)

Based on very limited archive information it is believed that the existing foundations consists of a raised raft on a grillage of ground bearing beams that spread the weight of the building onto the piers of the tunnel below.

The McNamara Hall floor level connects into the first floor level of the Murray Street buildings, with a masonry wall expected to be located at their junction, to create the change in levels. Further site investigations are necessary to confirm the above assumptions and inform the design and opportunities for the McNamara Hall alterations.

Five

Proposed alterations

5.1

The proposed design by Coffey Architects consists of the refurbishment of the Villas and McNamara Hall; and the demolition and formation of new structure in the zone between the two, currently occupied by a number of buildings.

The proposals for each are presented below:

5.2 New Building to Murray Street

It is proposed that the existing buildings along Murray Street and Murray Mews are to be demolished to allow the construction of a new 4-storey building with an approximately 5m deep, single-storey basement located at the northwest side of the new building.

5.2.1 Stability

A single vertical circulation core and shear walls will be providing the stability for the proposed building to resist lateral loads.

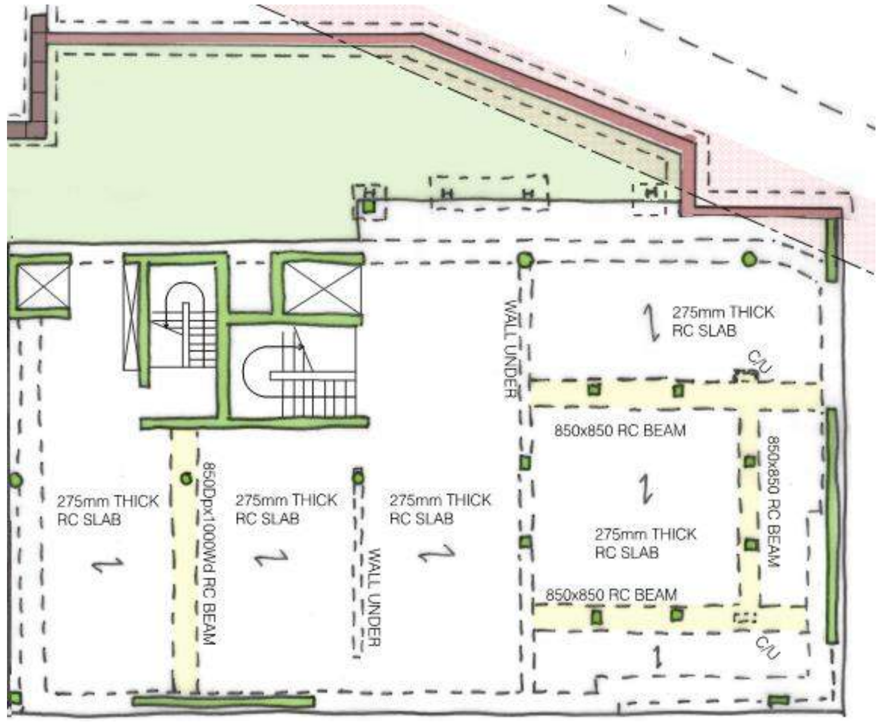
5.2.2 Proposed Substructure

Basement and ground floor slabs

Based on preliminary assessment of the proposed building loads and the anticipated clay ground conditions, a raft foundation would be the preferred solution to form the new basement slab. Preliminary calculations suggest that a 500mm thick RC raft slab is sufficient to spread the building load onto the substrata below and to resist upwards forces due to heave and hydrostatic pressures.

The zone of the building under which the basement does not extend will be formed with a suspended RC slab on piled foundations that will transfer the loads through the thick made ground layer into the stiff clay. Preliminary checks using the geological data available suggest that 600mm diameter piles extending 20m into the clay would be a reasonable allowance at this time.

A 5m exclusion zone from the outer face of the existing Network Rail tunnel is assumed at this time and all proposed foundations have been located outside of this zone and an allowance for sleeving of the piles near the tunnel should be made, to the tunnel foundation level to avoid surcharging the tunnel. The Network Rail requirements should be confirmed at the next stage of the project.



Proposed ground floor plan

Retaining walls

As the perched water table was found to be at high level (approximately 3m below ground level), water ingress needs to be carefully considered within the basement design and during construction.

A secant pile solution is the preferred option to form the majority of the basement walls. Due to the close proximity of the proposed basement to the foundation line of No. 51-52 Villa, it is preferable that a CFA piled wall is used, to reduce the risk of movement of the nearby buildings during construction works. Preliminary checks using the geological data available suggest that a 600mm thick secant pile wall is a reasonable thickness. The piled wall will be closed off with a 1000mm deep RC perimeter capping beam tied into the ground floor slab.

Local to the proposed lift at the north-west corner of the new building, the basement will be formed using reinforced concrete underpins, to ensure the foundations of the villa are not undermined.

The piled and RC wall will resist lateral loads from any soil, hydrostatic and surcharge pressures and will maintain the stress condition of the ground surrounding the new basement.

Final proposals for the foundations, including thickness of basement walls and raft slab will be confirmed following review of the full site investigations report in the next phase of design.

Existing basement

At the location of the existing basement, the line of the new retaining wall will be pushed back to avoid clashing with the existing walls of the basement.

Basement waterproofing

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

A reinforced concrete lining wall and basement slab will be cast using water resistant concrete to form the primary barrier with an internally 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.

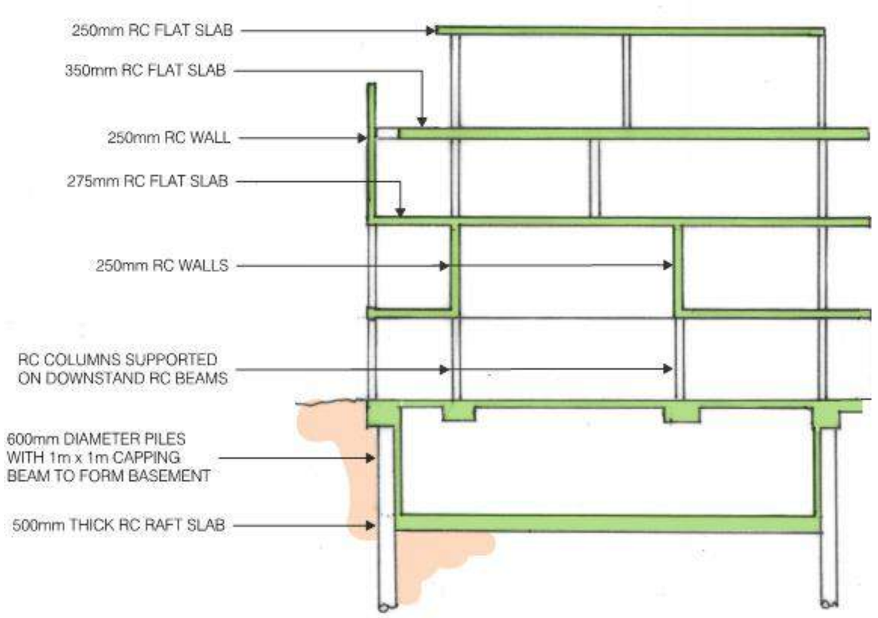
Basement Impact Assessment

A Basement Impact Assessment (BIA) is required as part of the planning application. This will likely require that some limited ground investigations be carried out prior to planning.

A separate BIA report which includes a ground movement assessment has been prepared and submitted by Soiltechnics Ltd. The analysis has concluded that the proposed basement excavations should not have an unacceptable impact on the surrounding properties and that with appropriate controls the potential damage can be limited to Burland Category 1.

In order to mitigate the risk of damage to the surrounding properties, the temporary works installed during works will be designed to support the surcharge from soil and surrounding buildings as well as the Network Rail tunnel. A ground movement monitoring system will also be installed to the adjoining properties, with trigger values set to allow the works to be controlled appropriately in the event of ground movement occurring (as outlined in Section 6).

5.2.3 Proposed Superstructure



The proposed superstructure comprises a statically determinate frame with the main core and shear walls providing lateral stability.

All gravitational loads such as permanent floor loads from finishes as well as live loads arising from occupancy are supported by the slabs. The slabs then transfer the loads by means of bending and shear to the columns which in turn take the loads to the basement and ground floor slabs. The reinforced raft distributes the loads onto the soil strata below and the ground floor spreads the loads onto the piles.

Section through proposed new building

All notional horizontal loads and wind loads will be applied to the external cladding and transferred to the floor at each level. The floors in turn will act as stiff diaphragms transferring the loads into the stability elements which in turn transfer it to the raft where they are resisted by the ground.

During the course of the project so far, EW have identified and presented several framing options to accommodate the evolving design. Following discussion with the design team, it was agreed that the reinforced concrete frame with flat slabs option is the preferred solution at this stage and as such has been adopted for this report.

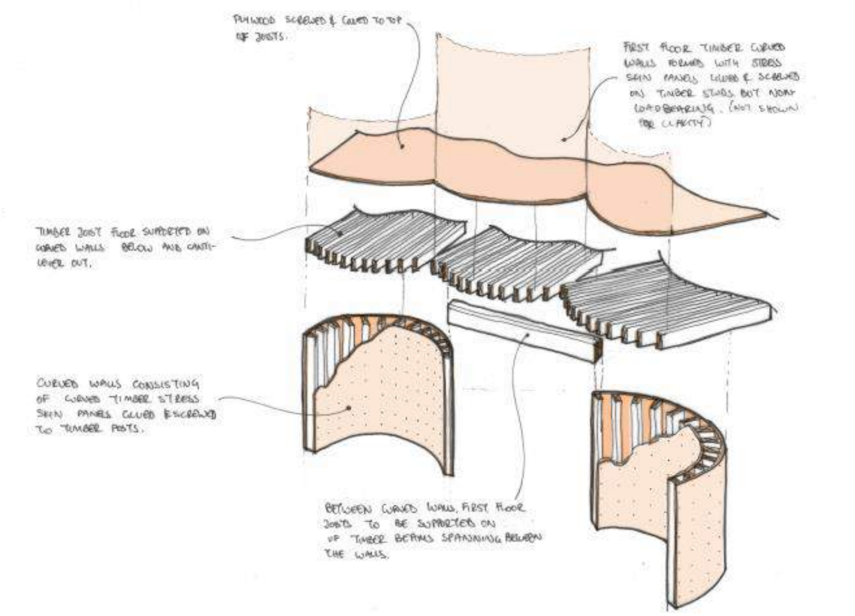
The chosen option comprises a reinforced concrete frame with traditional flat slabs and downstand beams to transfer the loads to columns. This was largely driven by the requirement to have the proposed finish floor levels of the new building matching the finished floor levels of the existing Villas, thus thicker slabs everywhere would impede on the headroom.

Services can run beneath the slab at each floor and can be distributed largely uninterrupted.

The column grid allows for 275mm thick flat slabs to be used generally, with a 350mm thick flat slab required at third floor to transfer the loads of the building step back above.

Atrium opening

This area of the building is the most important aesthetically and EW worked closely with the architect to achieve an elegant structural solution that does not compromise the architectural vision of the space.

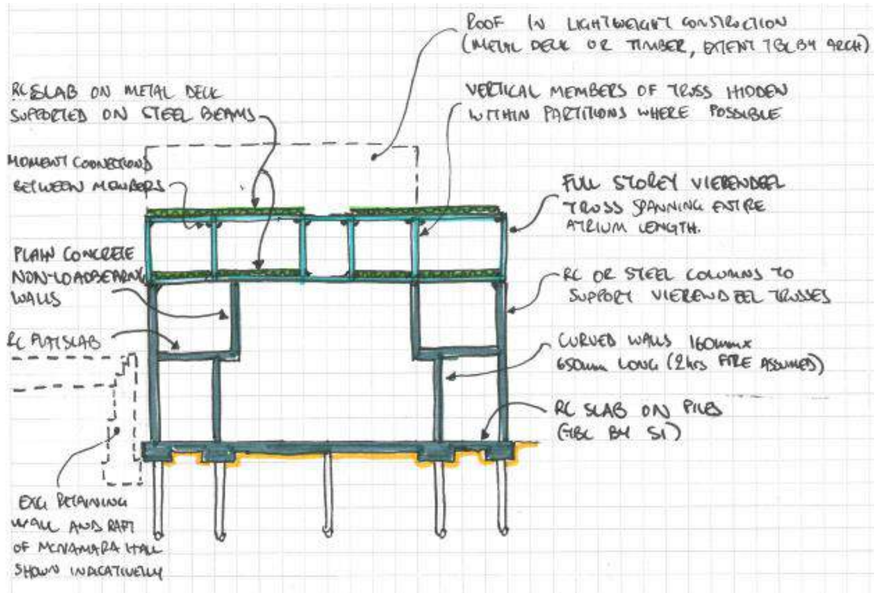


Timber framing option for atrium opening

Various framing options for the opening were considered during the design and included a timber option, as well as hybrid steel and timber and steel and concrete concrete options.

A vierendeel truss solution was also presented to support the upper floors without the need for intermediate columns, but due to the size of the steel sections required, this approach was abandoned.

The adopted solution consists of RC slabs, walls and columns and takes advantage of the vertical elements that have been located so that they overlap on every floot to achieve a clear load path to the ground floor, where beams transfer the load onto the basement slab and walls.



Vierendeel truss framing option explored

5.3 The Villas (No. 50 and 51-52 Camden Square)

5.3.1 No. 51-52 Villas

The proposals for the refurbishment of No. 51-52 Villas involve raising of the existing ground floor to meet architectural requirements and the removal of internal load bearing walls.

New steel moment frames will replace the lost stability from the walls removed and new steel beams installed under existing wall lines will resupport the existing floors.

A series of light steel beams are to reform the internal space allowing for longer uninterrupted spans.

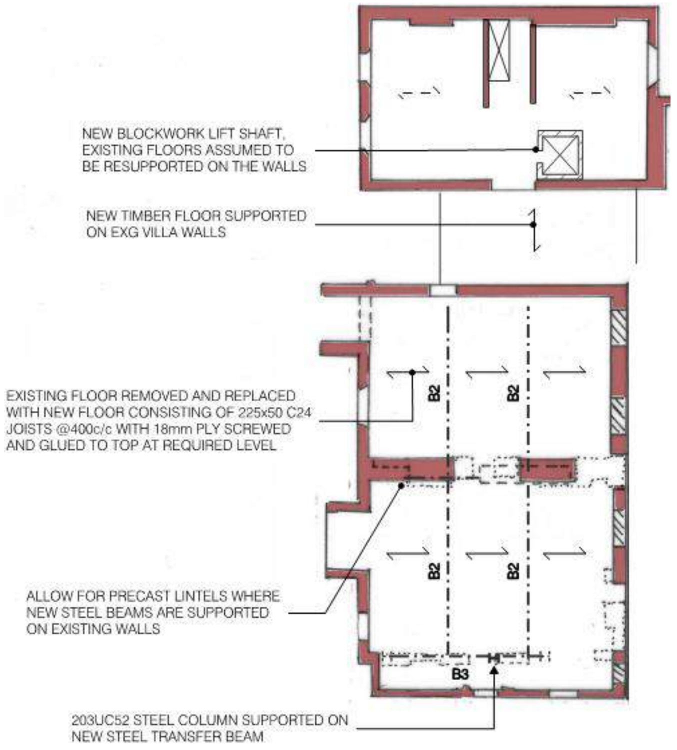
The development of these works will follow the site investigations and opening works which are currently being procured.

More details of the structural works to the Villas can be found within the structural plans and section in the Appendix of this report.

5.3.2 No. 50 Villa

The proposals for the refurbishment of No. 50 Villa involve the installation of a new lift to serve the floors of the building which currently only are only accessible via stairs. The proposed lift shaft is expected to be constructed in blockwork and supported on pad foundations.

Underpinning of the existing walls will be required to form the foundations for the new lift, the extent of which will be informed by the results of the site investigations and trial pits.



Proposed works to the Villas

5.3.3 Link building

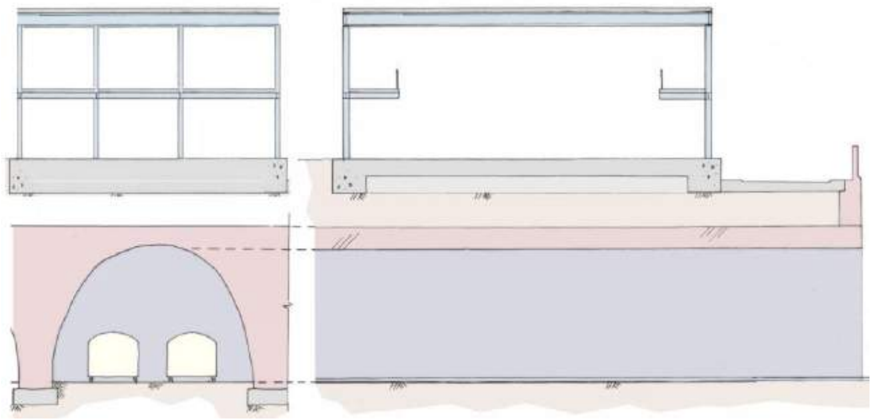
It is proposed that the link building is demolished and reconstructed, with the ground floor slab lowered. Underpinning of the villa walls will thus be required to achieve this without undermining the existing foundations.

The new link building will comprise two floors of timber construction and supported with wall plates on the masonry walls of the existing Villas.

5.4 McNamara Hall

5.4.1 Proposed Alterations

The proposals for the new McNamara Hall currently involve the demolition of the existing single storey superstructure while retaining the existing ground floor slab and foundations and the construction of a new function hall with a partial mezzanine floor.



Proposed works to McNamara Hall (elevation from Murray Mews – left and typical section through hall – right)

A new steel braced frame has been envisaged. The new steel columns will be located at the existing column positions to maintain the same load path but will be designed to include a cantilever mezzanine and a terrace roof.

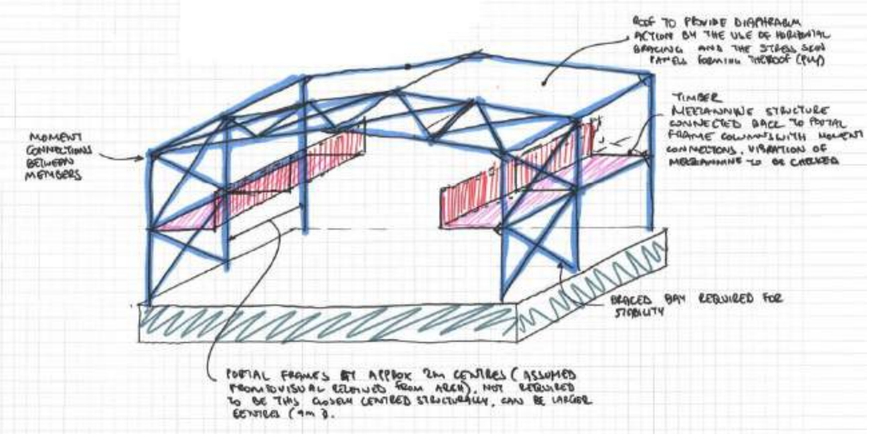
The mezzanine floor is proposed to cantilever from the façade columns using steel beams allowing a column free space below. The vibration of the mezzanine floor due to the crowd loadings will be assessed at the next design stage.

Where new column locations are introduced, the existing ground floor and foundations will need to be strengthened to allow for the new loads.

The new roof beams span approximately 15m and fabricated steel sections will be used replacing the existing steel truss to achieve maximum headroom for the hall.

A metal deck floor will span between the steel beams to support the PV panels, blue roof and plant that are proposed to be located on the proposed roof.

Stability of the new frame is being provided using vertical bracing at the end bays. Other stability mechanisms, such as portal frames (as shown below) were also considered but due to the increased steel sizes that would be required, the preferred option is the braced one.



Portal frame stability solution to McNamara Hall

5.4.2 Network Rail Risks

The new brief for the McNamara hall involves a new mezzanine floor as well as a roof with plant, PV panels and a blue roof. which will increase the load on the existing foundations over the Network Rail tunnels.

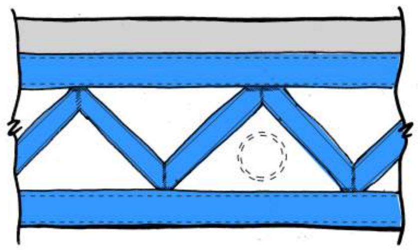
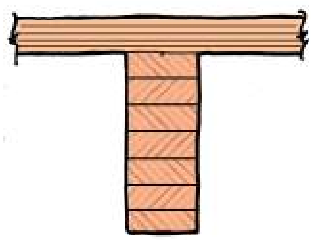
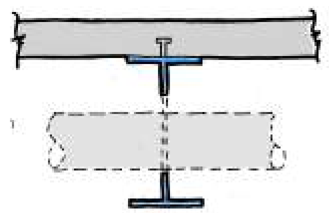
This increase in load as well as the logistics of the demolition and new construction will instigate a series of statutory approvals requirements. It will be prudent that an approval in principle with NR is sought as early as possible. Elliott Wood have met with Network Rail representatives to discuss the proposed works and a BAPA has been submitted by the client

Based on the assumptions of the existing building construction and the proposed uses, we expect approximately 30% load increase at the McNamara Hall formation level and approximately 10% load increase at the foundations of the railway tunnels. This is largely due to the increased floor area and change of use of the roof.

Considering that the surrounding buildings located on the Tunnels appear to be of heavier construction compared to the proposed McNamara Hall, EW do not expect that this load increase will impose a significant risk to the tunnels.

All the above risks will be managed at the next stages of the project, when the detailed constraints imposed by Network Rail are introduced.

Table 1: McNamara Hall Framing Options

Criteria	**Steel truss with metal deck or precast concrete roof**	**Steel girder with metal deck or precast concrete roof**	**Glulam beams with CLT roof**	**Composite castellated steel beams with metal deck or precast roof**
				
Structural depth (mm)	1150mm (150 slab and 1000 truss).	800mm (150 slab and 650 beam).	1150mm (150 slab and 1000 beam).	1000mm (200 slab and 850 beam).
Self-weight	The truss takes advantage of the 1m depth to create a lighter and more efficient structure.	This is the heaviest of the options, as the reduced depth of the beams require the sections to be very heavy in order to support the loads.	A very light option as it does not involve any concrete and the beams are of sufficient depth.	A light option as the beams are castellated.
Service zone (mm)	Can be accommodated within depth of trusses.	Below slab soffit.	Below slab soffit.	Can be accommodated within depth of beams
Integration of Services	Early coordination of services and openings required to inform the truss shape.	Limited penetrations through beams allowed only.	Limited penetrations through beams allowed only.	Early coordination of services and openings required to inform the cell size.
Fire Resistance	Fire protection required to steel frame – intumescent paint or fire board.	Fire protection required to steel frame – intumescent paint or fire board.	Fire protection required to timber beams frame – fire boarding or sacrificial charring layers.	Fire protection required to steel frame – intumescent paint or fire board.
Acoustic Properties	Good acoustic properties, particularly with preventing sound from noisier areas (i.e. plant rooms penetrating into habitable areas).	Good acoustic properties, particularly with preventing sound from noisier areas (i.e. plant rooms penetrating into habitable areas).	Lower acoustic performance, additional material (barriers) required to meet desired acoustic properties.	Good acoustic properties, particularly with preventing sound from noisier areas (i.e. plant rooms penetrating into habitable areas).
Thermal Mass	Good thermal properties.	Good thermal properties.	Additional material (insulation) required to meet desired thermal properties.	Good thermal properties.
Impact on Foundations and NR tunnel	Heavy option.	Heaviest option that will have the largest increase of loading on the NR tunnel below.	The most lightweight option which will limit the increase of load on the existing foundations and NR tunnel.	More lightweight option through use of composite action.
Construction Programme	Minimal requirement for temporary propping and formwork.	Minimal requirement for temporary propping and formwork	Quick construction programme with minimal requirement for temporary propping and formwork but longer lead in times.	Longer lead in times but minimal requirement for temporary propping and formwork.
Sustainability	Cement replacements and recycled aggregates can improve sustainability and reduce embodied carbon of concrete.	Cement replacements and recycled aggregates can improve sustainability and reduce embodied carbon of concrete.	No concrete used. Improved sustainability compared to the other options as it is a carbon negative solution.	Cement replacements and recycled aggregates can improve sustainability and reduce embodied carbon of concrete.

5.5 Project Risks

The table below summarises the key risks of the project.

Table 2 – Summary of key project risks and suggested mitigation

Item	Risk	Consequence	Rating *(H M L)	Mitigation measures
National Rail tunnel	Approval will be required from National Rail for any demolition and construction works near to or above the existing tunnels.	• This constraint may place limitations on the extent of the new building or create complicated transfer structures over the tunnel which could increase the cost and complexity of the building. • The approval process with NR can be lengthy and create programme delays.	H	• Early meetings have been held with NR to discuss proposals for the area over the tunnel. • Meetings and information exchange will continue to take place throughout design development. • An allowance should be made in the programme for approval periods (typically 6-8 weeks for each document submitted to NR).
Structure & condition of the existing buildings is largely unknown	There is limited information on the structure of the existing buildings and the condition of the structure is unknown as it is largely covered by finishes or inaccessible in certain areas.	• Modifications to the existing structure cannot be fully designed without further information. • Poor condition of the structure may mean that repairs are required. Extent of repairs is currently unknown. • Possible cost & programme implications.	M	• Elliott Wood have developed a scope of works for structural investigations including opening up works and materials testing. • The investigations are dependent on the asbestos removal but should be carried out as early as is feasibly possible.
Capacity of the existing floors to carry new loads is unknown	The structure and capacity of the floors of the existing buildings, where retained, is currently unknown. Floors may not be suitable for some increases in load such as storage areas, IT equipment or plant.	• New floors may not be suitable for the new proposed loads. Some strengthening works may be required.	L	• Elliott Wood have developed a scope of works for structural investigations including opening up works and materials testing. • The investigations are dependent on the asbestos removal but should be carried out as early as is feasibly possible.
Ground obstructions	Due to the developed nature of the site there may be a number of ground obstructions still present such as tunnels, old foundations from demolished buildings or old drainage infrastructure.	• Delay to the programme. • Possible late redesign of new foundations and substructure to avoid existing obstructions.	M	• The phase 2 site investigation which is currently being procured includes investigations to determine the type and extent of ground obstructions. • An allowance should be made in the Enabling Works package for the probing and removal of existing foundations.
Unknown ground conditions	The new foundation design cannot be finalised until ground conditions can be confirmed.	• New foundations cannot be designed in detail until a site investigation has been carried out. • Potential risk of contamination unknown.	M	• Elliott Wood have developed a scope for further ground investigations including deep boreholes. This is currently being procured.
Asbestos	Due to the age of the building asbestos is likely to be present. Removal of asbestos will be required before any opening up works or construction works can commence.	• Removal of asbestos may cause delays to the opening up works and the programme.	M	• Asbestos survey is planned and will be followed by asbestos removal. • This may delay the structural investigation works and therefore design of structural modifications in the existing building. • If possible, asbestos should be removed in key areas of the building to allow some of the structural investigations to be carried out at an earlier date.
Surface water drainage	Planning requirement to reduce surface water run-off to greenfield rates is onerous.	• Substantial attenuation in the form of blue roofs, geo-cellular attenuation or water tanks	M	• Submit pre-planning enquiry with the local authority / lead local flood authority
Sewer capacity	Sewers may have insufficient capacity to accept drainage from the development	• Project delays due to requirement for an impact assessment to be conducted by the Water Authority • Potential large cost due to upgrade works	L	• Submit pre-development enquiry with the water authority
Adopted Sewers	Existing adopted sewers within the site which could impact/restrict development proposals	• Building positions may be affected having a fundamental impact on proposals	L	• Obtain sewer records, undertake utility tracing and undertake a CCTV survey of on-site drainage

*High Risk – H (Red); Medium Risk – M (Orange), Low Risk – L (Green)

Six

Monitoring during excavation and construction

6.1

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

6.2

Monitoring shall be completed as follows:

1) One month prior to any works being started to provide a base reading.

2) On a weekly basis during the excavation and until the basement slab and lining wall has been cast.

3) On a monthly basis thereafter for a 6-month period following completion of the notifiable works.

6.3

Cumulative movement of survey points must not exceed:

a. Settlement
Code amber trigger values: +/-4mm
Code red trigger values: +/-8mm

b. Lateral displacement
Code amber trigger values: +/-4mm
Code red trigger values: +/-8mm

6.4 Movement approaching critical values:

6.4.1 Code amber trigger value:

All interested parties, including the Adjoining Owner's Surveyor and his Engineer, should be informed and further actions immediately agreed between two of the three Surveyors and implemented by the Building Owner. Notwithstanding the Party Wall requirements, the Contractor is to appoint a suitably qualified Structural Engineer who will be responsible for the reviewing of the movement monitoring results at the start and end of each day and provide immediate advice, remedial works and design as necessary in the event of movement being noted.

The Contractor is to ensure that he has 24 hour / 7 days a week access to emergency support provision including but not limited to additional temporary props, needles, waling beams and concrete supply at the start of the excavation and prior to any likelihood of this trigger value being reached. If this value is reached the Contractor, and his Engineer, provide all interested parties with his plan to implement any emergency remedial and supporting works deemed necessary. The Contractor must be ready to carry out these works without delay if the movement continues and approaches the trigger value below.

6.4.2 Code red trigger value:

All interested parties including Adjoining Owner's Surveyor and Engineer will be informed immediately. Works will stop and be made safe using methods and equipment agreed at the above stage. The Contractor is to ensure that the movement has stopped as a result of the implemented remedial works designed and installed at this stage. The requirements of the Party Wall Act will also ensure that two of the three Surveyors and their advising Engineers shall then enter into an addendum Award, setting out whether or not the Building Owner's works can re-commence and when, and if so agree on additional precautions or modifications to the proposals prior to recommencement.

Seven

Subterranean construction method statement

7.1 Construction generally

It is assumed that the below measures and assumed sequence of works are considered 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 will need to ensure that adequate supervision and monitoring is provided throughout the works particularly during the excavation and demolition stages.

To this end, Elliott Wood 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 is assumed to be from Murray Street and must be coordinated in a sensible manner to minimise disruption to the adjoining residents and provide a safe working environment.

Stage 1: Site set-up

- Erect a fully enclosed painted plywood site hoarding along the front boundary wall, 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 scope of the works, it is likely that conveyors will be used to move the spoil from within the building to a holding skip located in the front garden/driveway.
- Tree protection methods to be agreed and installed to all retained trees.
- 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.

Stage 2: Internal soft strip & demolition

- The complete soft strip of internal finishes within the building.
- Carefully demolish the existing building down to ground floor level in a staged sequence (TBC by the Contractor).

Stage 3: Install piles

- Complete secant piling from ground floor level around the perimeter of the proposed basement. These will resist the lateral forces from soil and surcharge pressures in the temporary and permanent states.
- Install tension piles (if required) within the basement perimeter leaving the upper section unreinforced (allowing them to be broken down at a later date). These will resist uplift forces from any residual overburden and hydrostatic pressures acting on the base slab.

Stage 4: Bulk excavation

- Reduce level dig down to approx. 1m below ground level.
- Install steel waling beams around the perimeter of the excavation.
- Install horizontal props spanning across the width of the basement between the waling beams.
- Continue excavating down to formation level in stages installing further waling beams and horizontal propping as the excavation progresses. The levels at which propping is required is to be determined by the temporary works Engineer. The propping levels will take into account the permanent works design such that the RC slabs can be cast above/below the props whilst the props remain in place.
- The ground between the lower and upper level basement slab should be raked back at a 45-degree angle.
- As excavation progresses the un-reinforced tension piles are broken down to formation level.

Stage 5: Cast RC base slab

- At formation level cast blinding layer and install the below ground drainage as required.
- Install and tie reinforcement for the raft slab including starter bars for RC walls.
- Cast the RC lower basement slab, local thickenings and kickers.
- Construct the RC wall which forms the step in the basement slab and the load bearing walls which support the upper level basement slab. Once this has cured the raked back excavation can be backfilled with well compacted material arising.
- Cast the RC upper level basement slab, local thickenings and kicker.

- Once the base slab has cured it will provide a permanent low-level prop to the basement retaining walls/piles and hence, the lowest level of horizontal propping and waling beams can be removed.

Stage 6: Construct up to ground floor level

- The remainder of the basement walls and columns can be constructed up to ground floor level. The temporary props should be retained and re-propped off the new walls.

Stage 7: Cast ground floor slab

- Once the walls have cured cast the ground floor slab. Once the ground floor slab has cured it will provide a permanent high-level prop to the basement retaining walls and hence, the remaining horizontal propping and waling beams can be removed.

Stage 8: Construct superstructure

- Once the ground floor slab has cured, the superstructure works can commence.

Eight

Dust, noise and vibration

8.1

The Camden Planning Guidance ‘basements and light wells’ states that “construction management plans should include management of noise, vibration, dust, and waste”.

A more detailed sequence of the works has been given in the previous section. Those most likely to be affected by noise dust and vibration will be the immediate neighbours at Murray Street. There may be some impact on other residents on Camden Square and Murray Mews due to the related construction traffic, but this should be minimal.

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

8.2 Mitigation measures for demolition of existing building

The breaking out of existing structures shall be carried out by diamond saw cutting and hydraulic bursting where possible to minimise noise and vibration to the adjacent properties. All demolition and excavation 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 practicable.

Dust suppression equipment should be used during the demolition process to ensure that any airborne dust is kept to a minimum. Where practical, concrete should also be wetted down prior to and during breakout to further inhibit airborne dust.

8.3 Mitigation measures for 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. An electrically powered conveyor will be used as detailed above.

8.4 Mitigation measures for the construction of the concrete basement shell

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 underpins and slabs 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.

8.5 Mitigation measures for piling

The secant 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 slab level once the basement works are complete. The contractor should ensure that they use non-percussive pile reduction techniques which are much quieter than traditional breakers.

8.6 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 practicable. If cutting, grinding and sawing is being carried out on site, surfaces are to be wetted down prior to and during these types of work whenever 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.

The building will be enclosed within suitable scaffold sheeting and any stockpiles of sand or dust-generating materials will be covered. Cement, fine aggregates, sand and other fine powders should be sealed after use.

Nine

Conclusions

9.1

It is intended that the above measures, monitoring and sequence of works are adopted for the eventual design and construction of the proposed works. If the works noted above are properly undertaken by suitably qualified contractors, these works should pose no significant threat to the structural stability of the existing buildings on site or the adjoining properties.

9.2

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 engineers. Elliott Wood will need to ensure that adequate supervision and monitoring are provided throughout the works particularly during the excavation and demolition stages. A specification and indication of monitoring requirements is given in the previous sections.

9.3

To this end, Elliott Wood 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.

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Ten

Sustainability

10.1 Material Usage Savings

Opportunity	Comments
Reduce extent of secondary framing in the façade	Careful detailing of the facade structure to integrate with the primary structure will reduce secondary framing material usage requirements.
Specification of lightweight/high recycled content blockwork	Many suppliers of high recycled content blockwork exist, representing a good opportunity that can be delivered through specification.

10.2 Embodied Carbon Reduction

Opportunity	Comments
Explore the use of lower strength concrete in localised floor areas	High strength concrete has a higher total cementitious content and therefore higher cost and embodied carbon. Identification of areas that can accommodate a reduced strength concrete is therefore likely to have benefits.
Modelling	We will look to integrate embodied carbon assessment for the structure into our future Revit models by using the embedded data in the model on material volume for each element to automatically produce embodied carbon tonnages for the structural frames. We are then able to use this to quickly compare the environmental impact of various options of material specifications and provide clear, quantitative data on the environmental impact of the structure.
GGBS substitute in concrete mixes	Strength gain and loading requirements carefully considered to ensure maximising cement reduction in areas where strength gain of the concrete does not significantly affect programme. Higher percentages of GGBS in thick concrete elements reduce the head of hydration and reduce the risk of thermal cracking. Also, GGBS improves the intrinsic concrete durability and so concrete in contact with the ground will benefit from improved performance against corrosives such as sulphates.

10.3 Waste Reduction

Opportunity	Comments
Use of permanent formwork systems/initiatives to maximise formwork reuse	Marginal cost and resource efficiencies may be demonstrated through the use of permanent formwork solutions or investing in systems that can be reused numerous times without impacting on the quality of finish required
Reuse of demolition material in piling mat	Quality of demolition will need to be controlled to ensure a suitable quality recycled aggregate is produced. Crushing should be undertaken under the WRAP Quality Protocol procedures. On-site mobile crushing is likely to be available but will need to be covered by an on-site mobile crushing and waste processing license and section 61 consents
50% coarse aggregate substitution in concrete mixes	Secondary aggregate made from waste materials from other industrial processes such as Stent and Granulated Blast Furnace Slag can be used in concrete and can be provided through Tarmac. Location of batching plants, availability and cost of replacement aggregates needs to be reviewed. There may be restrictions on the use of secondary aggregate in higher strength concrete.

10.4 Energy in Use and Whole Life Cost

Opportunity	Comments
Expose concrete soffits to increase thermal mass	Utilising the thermal mass of the structure by exposing the concrete soffits.
Designing for deconstruction	Stamping steelwork with grade and section size will allow these to be more easily reused. This could be particularly useful for mezzanines in plant spaces where future plant specifications may require alternative arrangements.

10.5 BREEAM opportunities relating to the structural and civil Engineering design

Credit	Description	Opportunities
Mat 01	Reductions in the building's environmental life cycle impacts through assessment of the main building elements	- Higher percentages of cement replacement and recycled aggregate in the slab improves the Green Guide rating - Look at specifying power-floated slabs in lieu of screeded as these will improve the rating from C to A however this needs to be agreed with the Architect and co-ordinated with the required build-ups - Where possible, use pre-stressed precast slabs which have a higher rating than reinforced precast slabs - Use of the Green Guide to Specification when choosing systems for curtain walling, floor construction, wall construction, roof construction.
Mat 02	Hard Landscaping and Boundary Protection	- Specification for build-ups for pedestrian, lightly trafficked areas and heavily trafficked areas to be in line with high performing specifications in the landscaping section of the Green Guide.
Mat 03	Responsible sourcing of materials.	- Input into the sustainable procurement plan (key areas: 1. timber/tbp; 2. Concrete; 3. metal; 4. Stone/aggregate; 7. Glass) - Specification to ensure FSC specified timber, BES 6001 for concrete production as well as the CARES standard for reinforcement.
Mat 05	Designing for durability and resilience	- Relevant building elements are foundations/substructure/lowest floor/retaining walls. Ensure that the structural specification addresses environmental factors and material degradation effects (i.e. concrete class, cover, etc.)
Mat 06	Material efficiency	- Several different design options have been considered for the frame construction, including CLT and composite decks. Each have their own benefits and restrictions relating to material efficiency.
Wst 01	Construction Waste Management	- Final compliance documents to be supplied by contractor but we will ensure that relevant requirements go in the preliminaries for tender. - Causes in the demolition section of the specification for the resource management plan (RMP) can be added however contractor requirements for BREEAM compliance should be clearly laid out by the CA at tender stage.
Wst 02	Recycled Aggregates	- Secondary aggregate such as stent (china clay), lytag (pulverised fly ash) and blast furnace aggregate can be specified but specification requirements and availability need to be checked with suppliers. - Reuse the material from the demolition as recycled aggregate for some of the new concrete elements, as well as the piling mat.
Pol 03	Surface water run off	- Flood Resilience: check flood zone and carry out a site-specific Flood Risk Assessment. Need to be careful of building proposed levels if in medium/high risk zone. - Ensure that peak run-off rate is not increased as a result of new development, needs to be designed for a 1 in 100 year storm with climate change allowance. For an extra credit need to show that flooding will not occur in the event of a local drainage system failure. - Watercourse pollution – design for infiltration of 5 mm rainfall. Where infiltration is not possible then need to show that all available pollution treatment measures have been considered.

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Appendices

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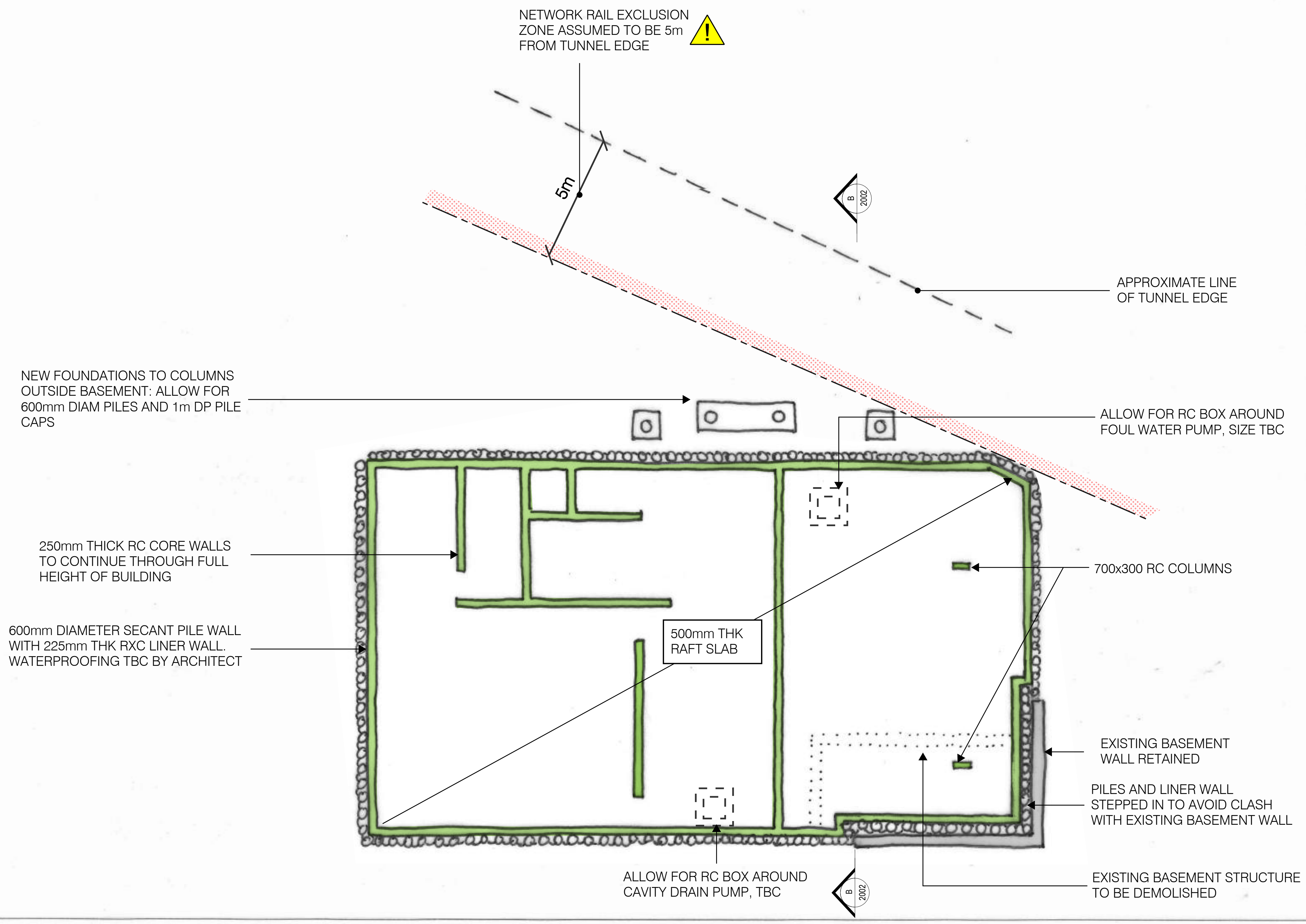
A Proposed Structural Drawings

NOTE:

EXISTING STRUCTURE SHOWN ASSUMED, TBC BY SITE INVESTIGATIONS

NEW FOUNDATIONS TBC FOLLOWING REVIEW OF SITE INVESTIGATION RESULTS AND GEOTECHNICAL REPORT

PROPOSED WORKS TO McNAMARA HALL SUBJECT TO NETWORK RAIL APPROVAL AND SITE INVESTIGATIONS



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rev	date	by	chk	description
P2	28/02/20	SCol	TTo	STAGE 2+ ISSUE
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Project
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Drawing title
PROPOSED BASEMENT PLAN

Scale	Date	Drawn
1:200	FEB '20	APa

Drawing status	Status	Revision
PRELIMINARY		P2

Project no.	Originator	Zone	Level	Type	Role	drg no.
2180676	EWP	ZZ	B1	DR	S	0900

NOTE:

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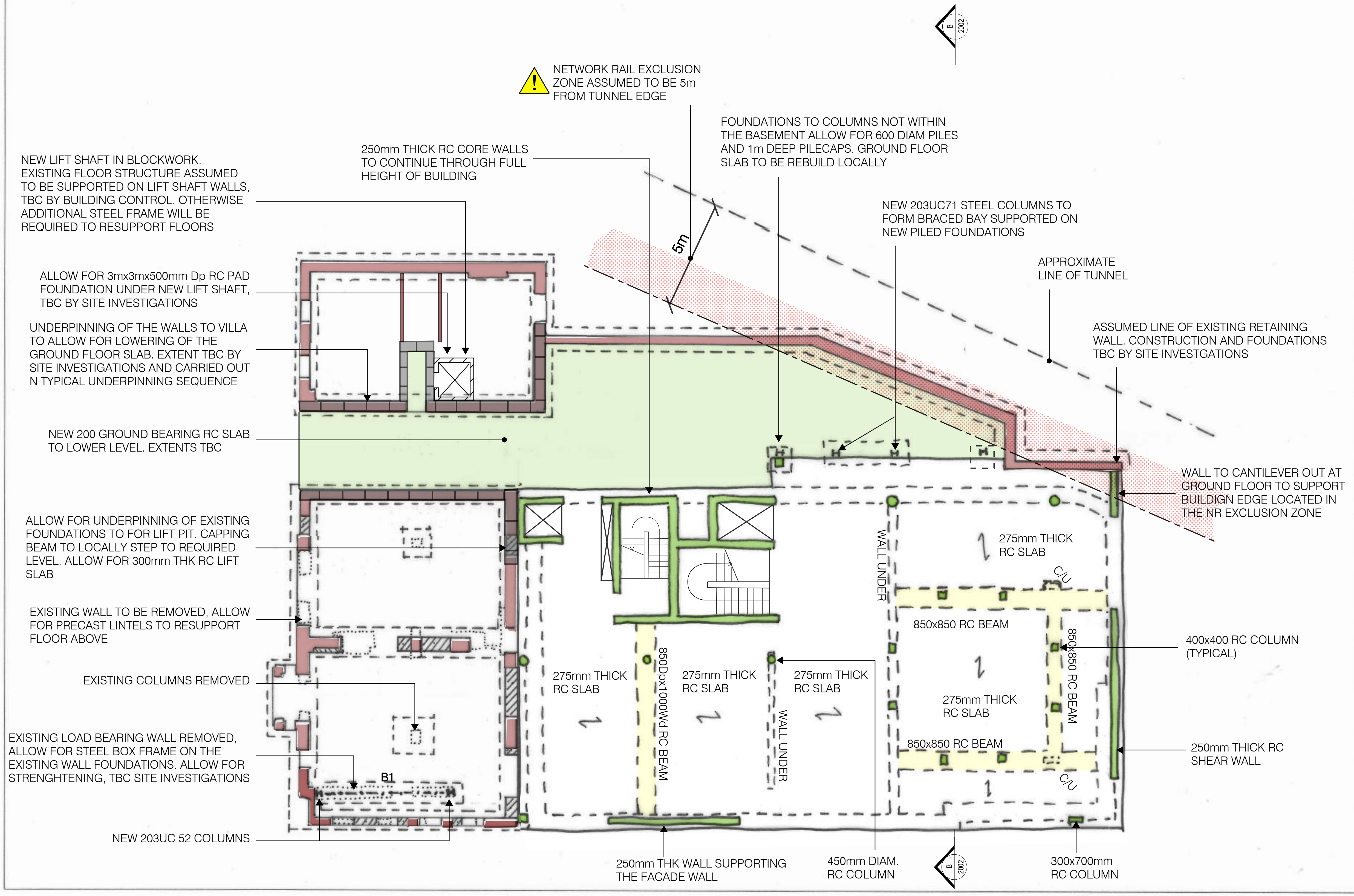

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B3	610x305x149 UB
B4	203x203x52 UC
B5	200x100x8 RHS
B6	305x165x54 UB
B7	200x200x8 SHS
B8	650x650 PLATE GIRDER

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Drawing title
PROPOSED GROUND FLOOR PLAN

Scale	Date	Drawn
1:200	FEB '20	APa

Drawing status	Status	Revision
PRELIMINARY		P2

Project no.	Originator	Zone	Level	Type	Role	drg no.
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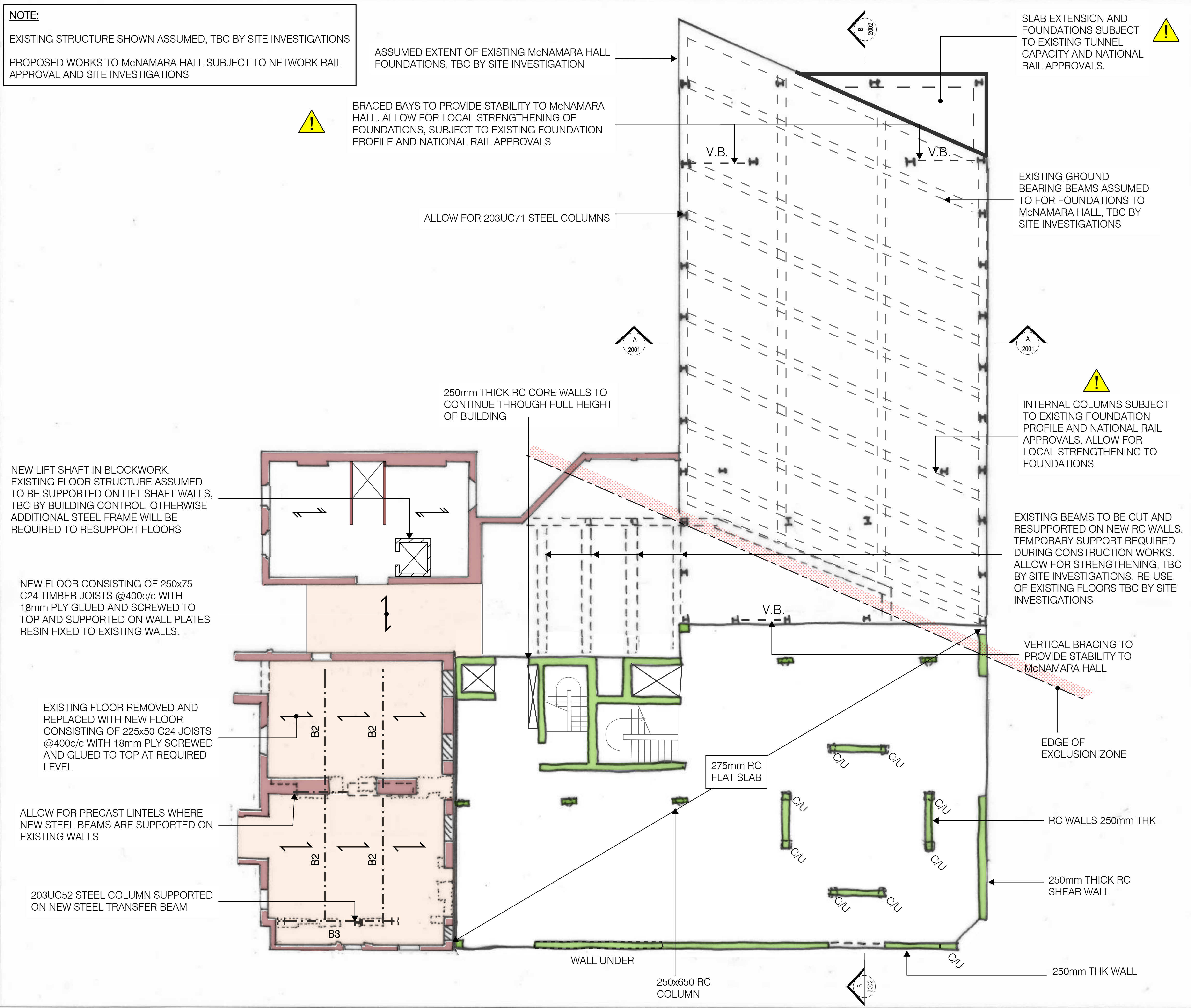

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Drawing title
PROPOSED FIRST FLOOR PLAN

Scale	Date	Drawn
1:200	FEB '20	APa

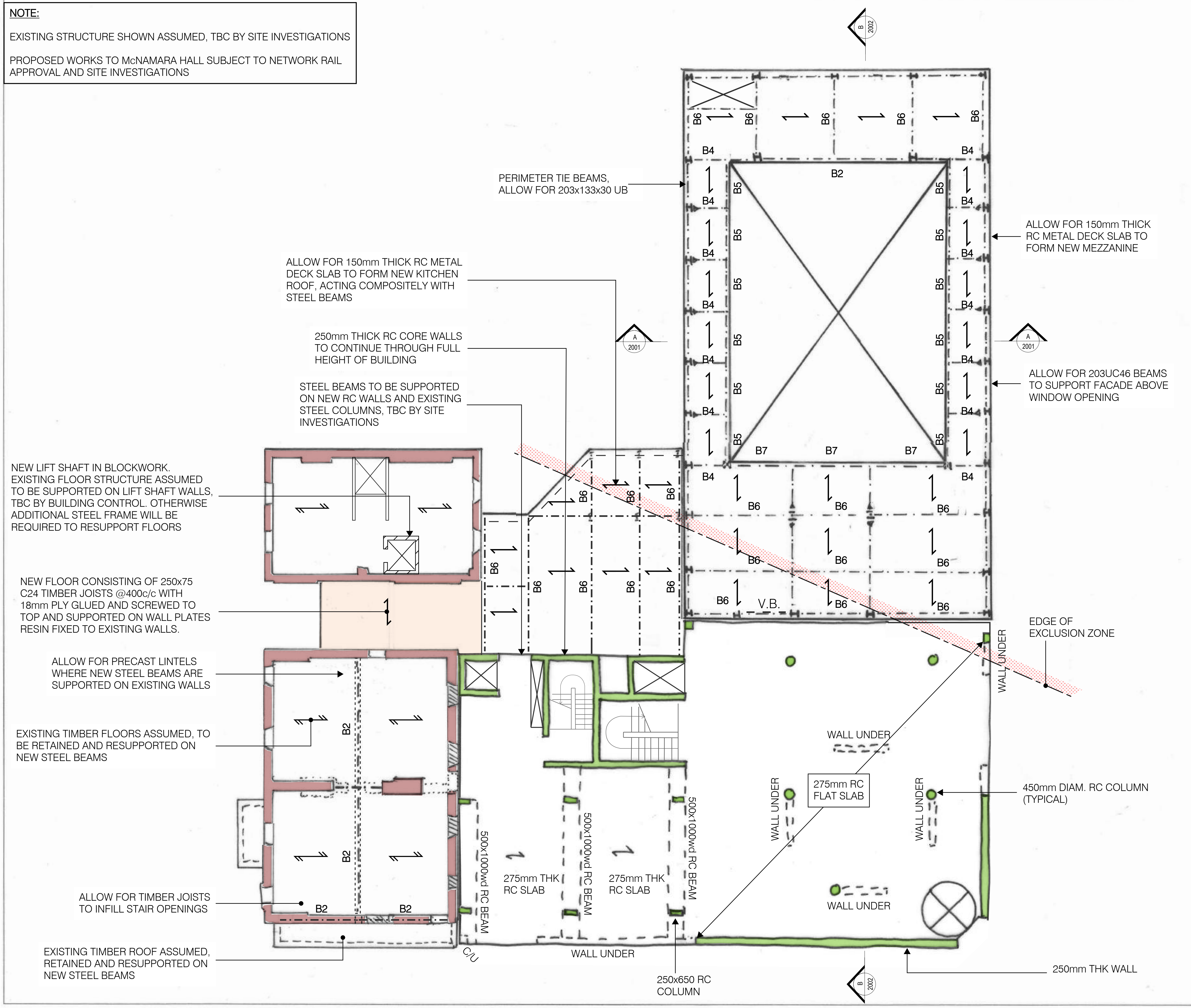
Drawing status	Status	Revision
PRELIMINARY		P2

Project no.	Originator	Zone	Level	Type	Role	drg no.
2180676	EWP	ZZ	L1	DR	S	1010

NOTE:

EXISTING STRUCTURE SHOWN ASSUMED, TBC BY SITE INVESTIGATIONS

PROPOSED WORKS TO McNAMARA HALL SUBJECT TO NETWORK RAIL APPROVAL AND SITE INVESTIGATIONS



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Drawing title
PROPOSED SECOND FLOOR PLAN

Scale	Date	Drawn
1:200	FEB '20	APa

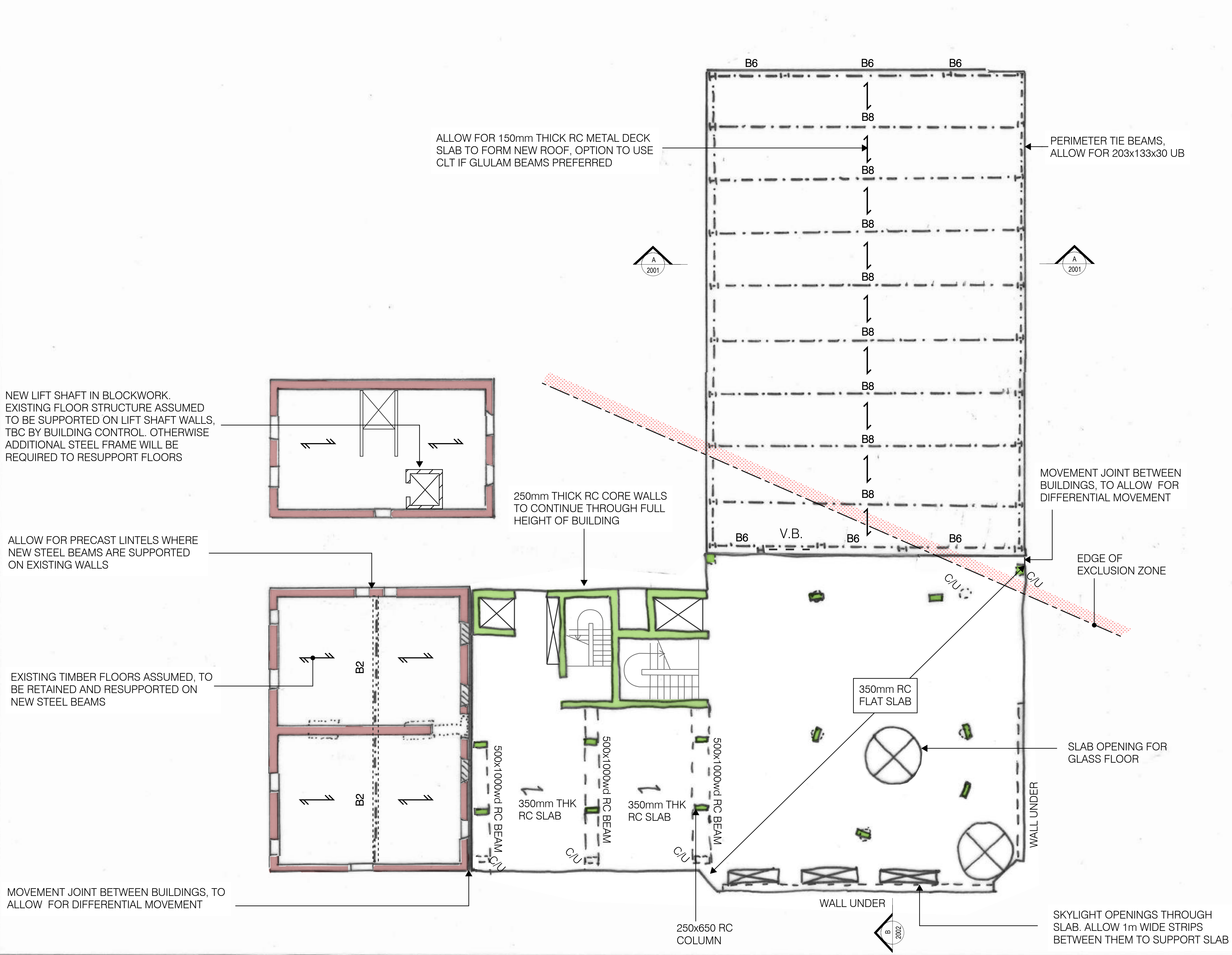
Drawing status	Status	Revision
PRELIMINARY		P2

Project no.	Originator	Zone	Level	Type	Role	drg no.
2180676	EWP	ZZ	L2	DR	S	1020

NOTE:

EXISTING STRUCTURE SHOWN ASSUMED, TBC BY SITE INVESTIGATIONS

PROPOSED WORKS TO McNAMARA HALL SUBJECT TO NETWORK RAIL APPROVAL AND SITE INVESTIGATIONS



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P2	28/02/20	SCol	TTo	STAGE 2+ ISSUE
P1	02/12/19	APa	TTo	STAGE 2 ISSUE

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Drawing title
PROPOSED THIRD FLOOR PLAN

Scale	Date	Drawn
1:200	FEB '20	APa

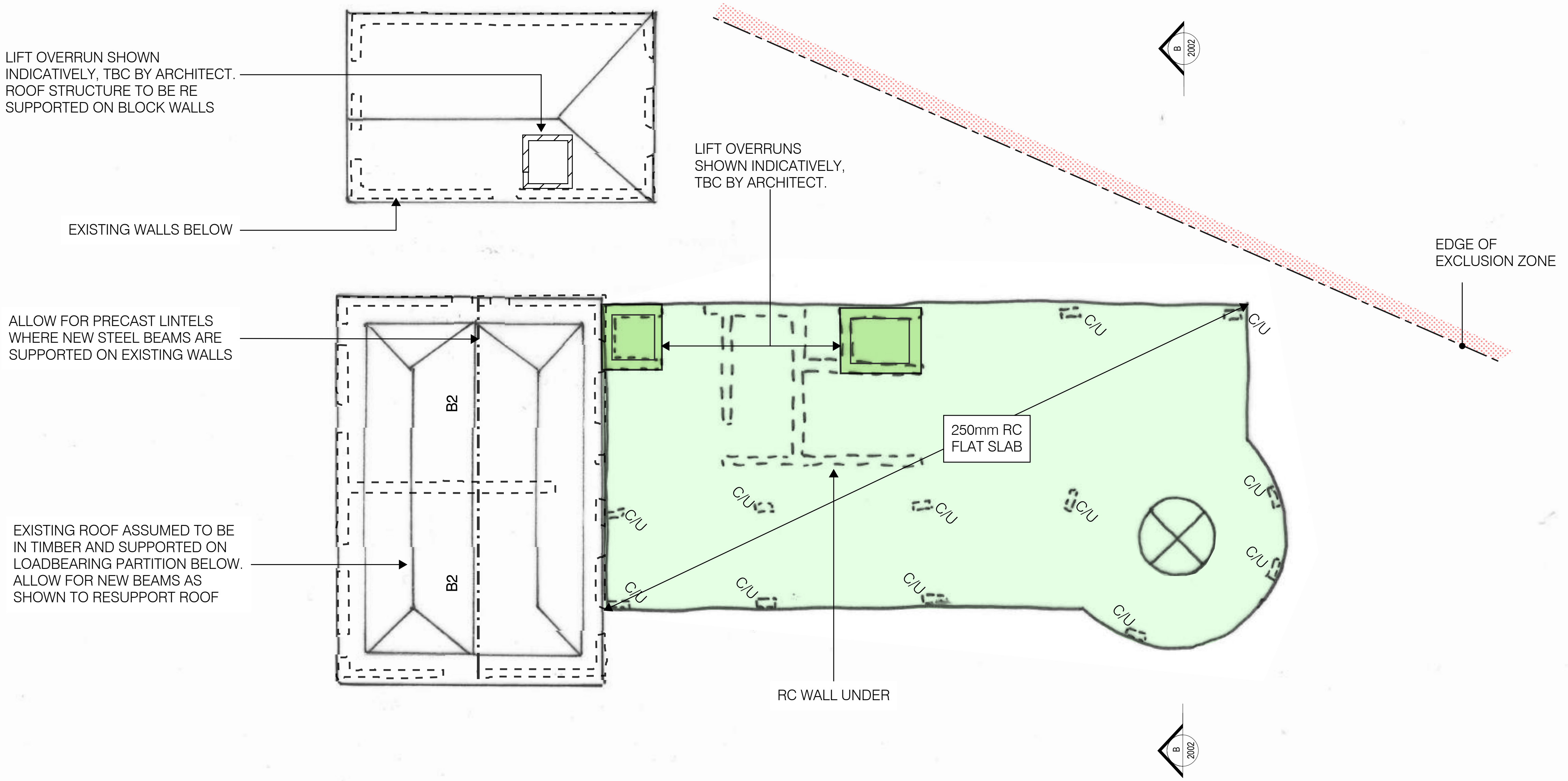
Drawing status	Status	Revision
PRELIMINARY		P2

Project no.	Originator	Zone	Level	Type	Role	drg no.
2180676	- EWP	- ZZ	- L3	- DR	- S	- 1030

NOTE:

EXISTING STRUCTURE SHOWN ASSUMED, TBC BY SITE INVESTIGATIONS

PROPOSED WORKS TO McNAMARA HALL SUBJECT TO NETWORK RAIL APPROVAL AND SITE INVESTIGATIONS



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rev	date	by	chk	description
P2	28/02/20	SCol	TTo	STAGE 2+ ISSUE
P1	02/12/19	APa	TTo	STAGE 2 ISSUE

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Drawing title

PROPOSED ROOF PLAN

Scale	Date	Drawn
1:200	FEB '20	APa

Drawing status	Status	Revision
PRELIMINARY		P2

Project no.	Originator	Zone	Level	Type	Role	drg no.
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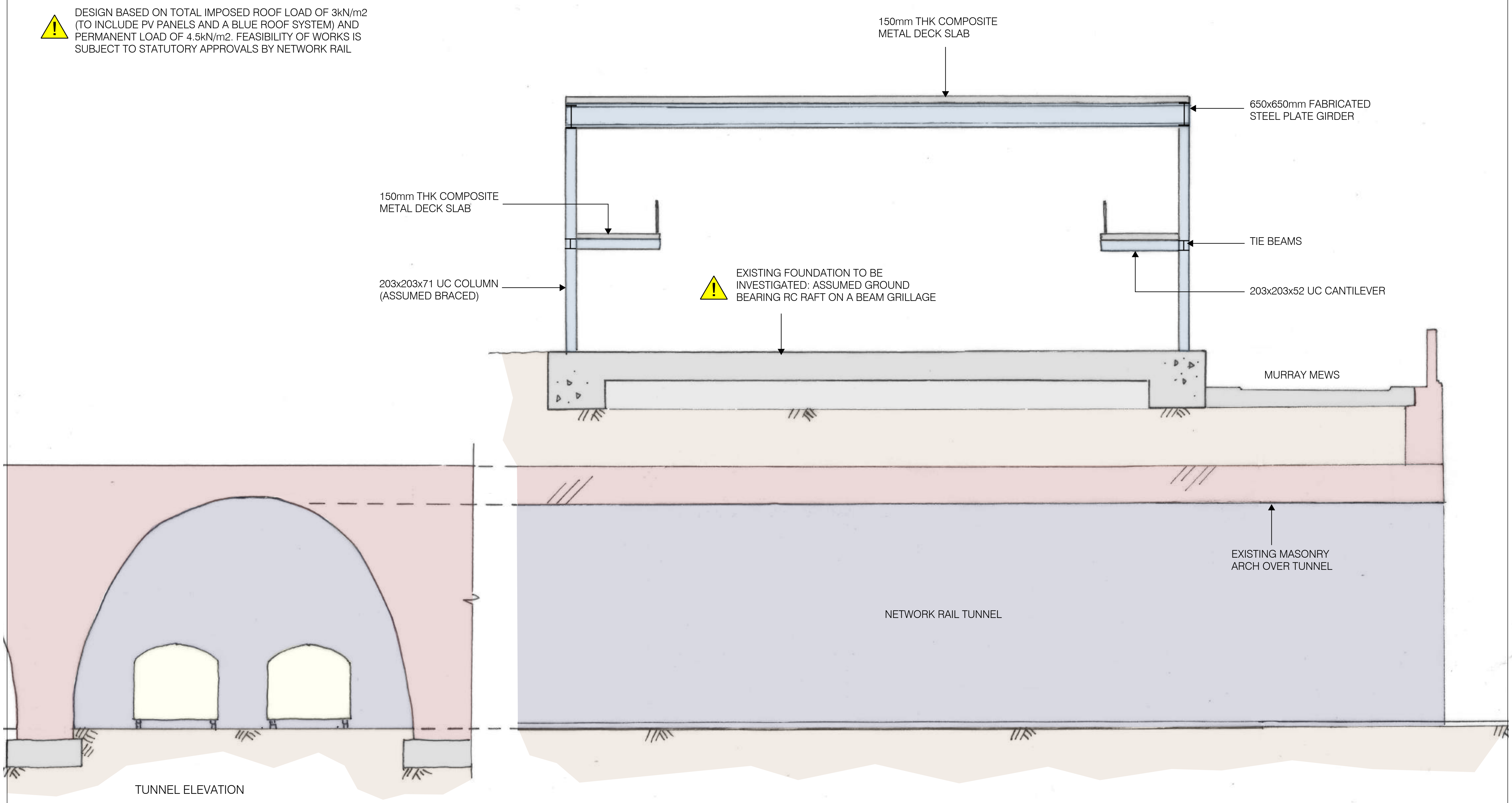

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P2	28/02/20	SCol	APa	Preliminary
P1	01/12/19	SCol	TTo	Preliminary

Drawing title
Section A-A
McNamara Hall

Scale	Date	Drawn
1:100@ A3	December 2019	SCol

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Project
London Irish Centre

Drawing status	Status	Revision
Preliminary	S2	P2

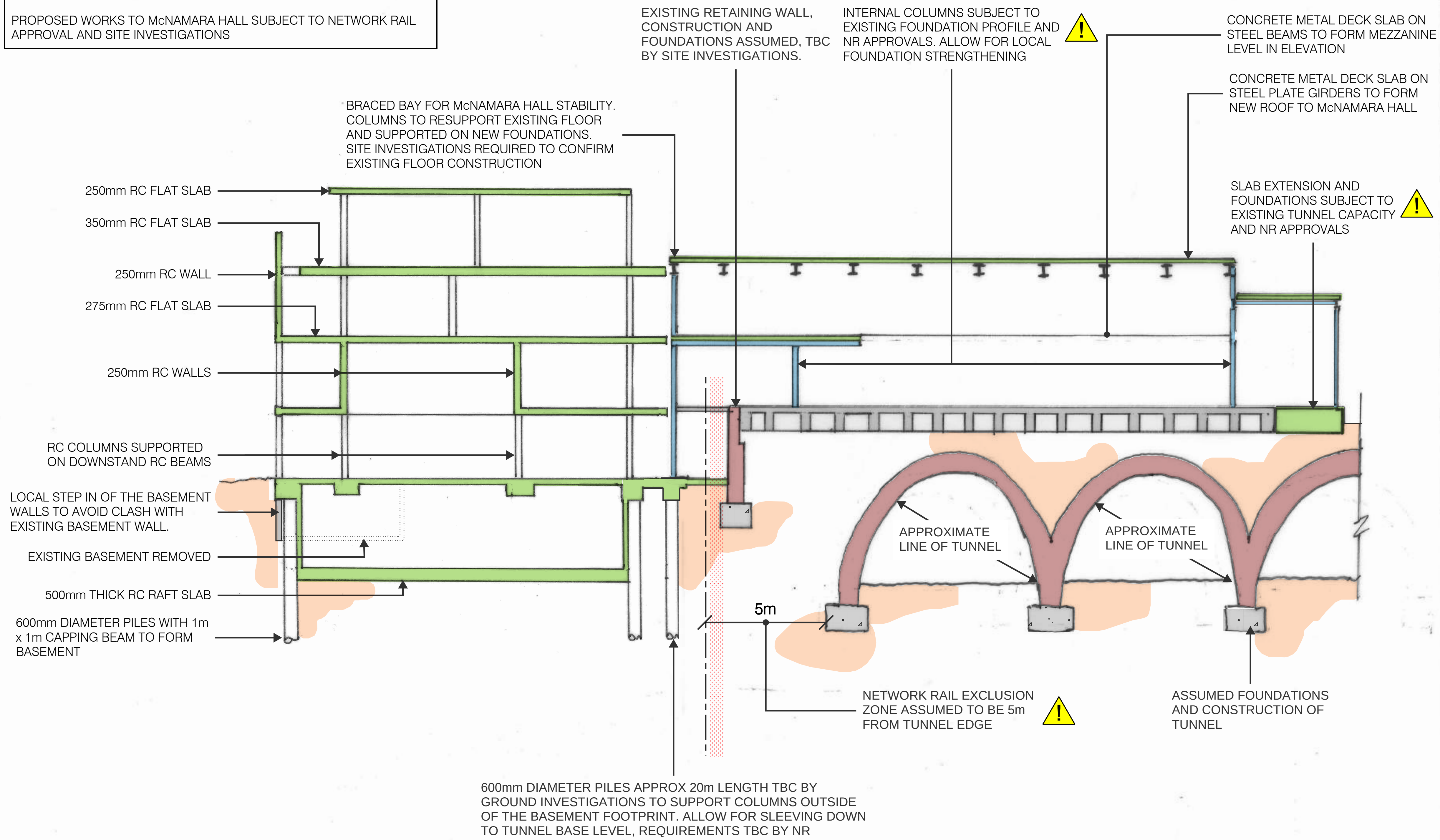
Project no.	Originator	Zone	Level	Type	Role	drg no.
2180676	EWP	ZZ	00	DR	S	2001

NOTE:

EXISTING STRUCTURE SHOWN ASSUMED, TBC BY SITE INVESTIGATIONS.

NEW FOUNDATIONS TBC BY GROUND INVESTIGATIONS

PROPOSED WORKS TO McNAMARA HALL SUBJECT TO NETWORK RAIL APPROVAL AND SITE INVESTIGATIONS



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
P2	28/02/20	APa	TTo	STAGE 2+ ISSUE
P1	03/12/19	APa	TTo	STAGE 2 ISSUE

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Project

LONDON IRISH CENTRE

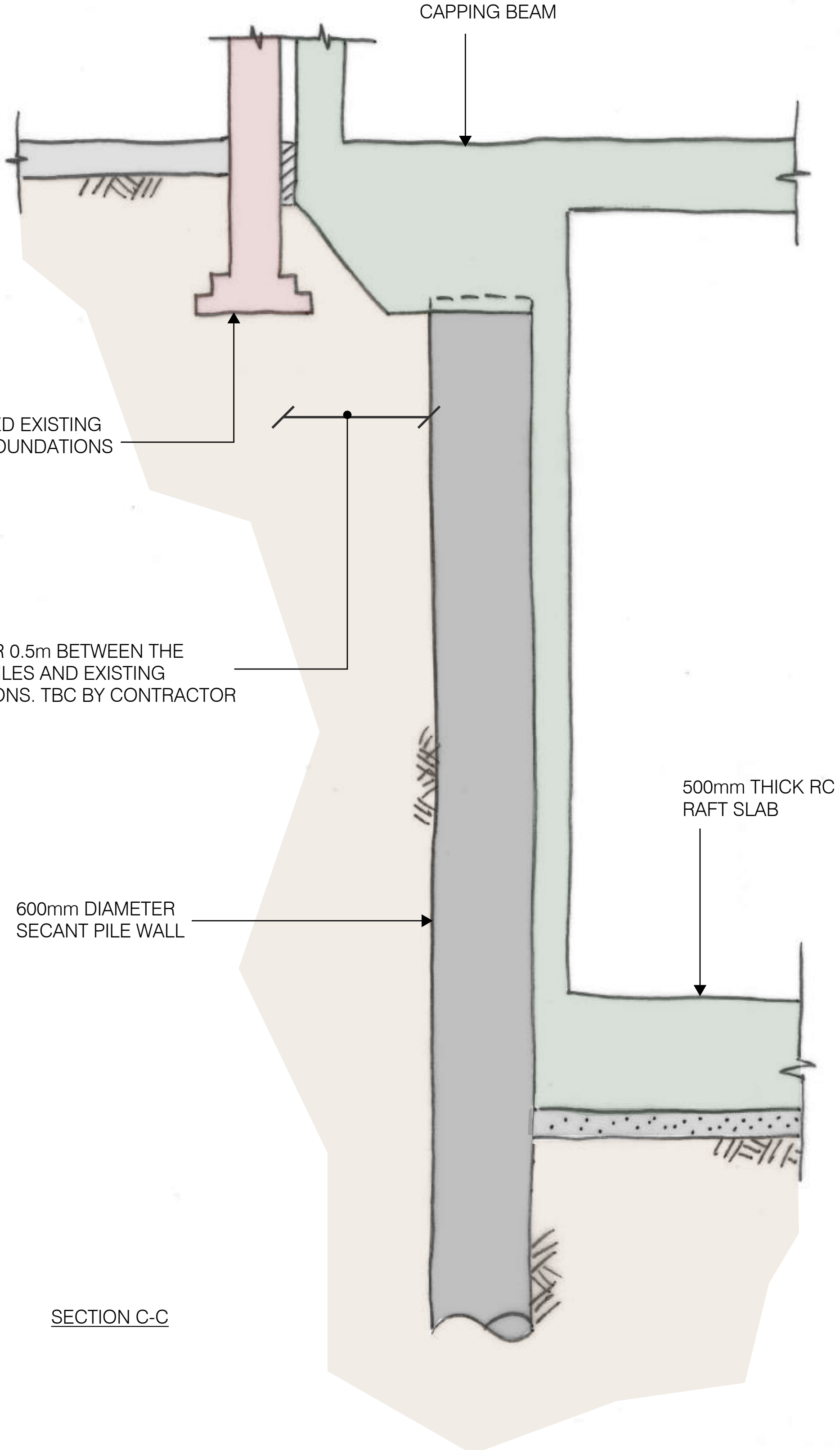
Drawing title

SECTION B-B

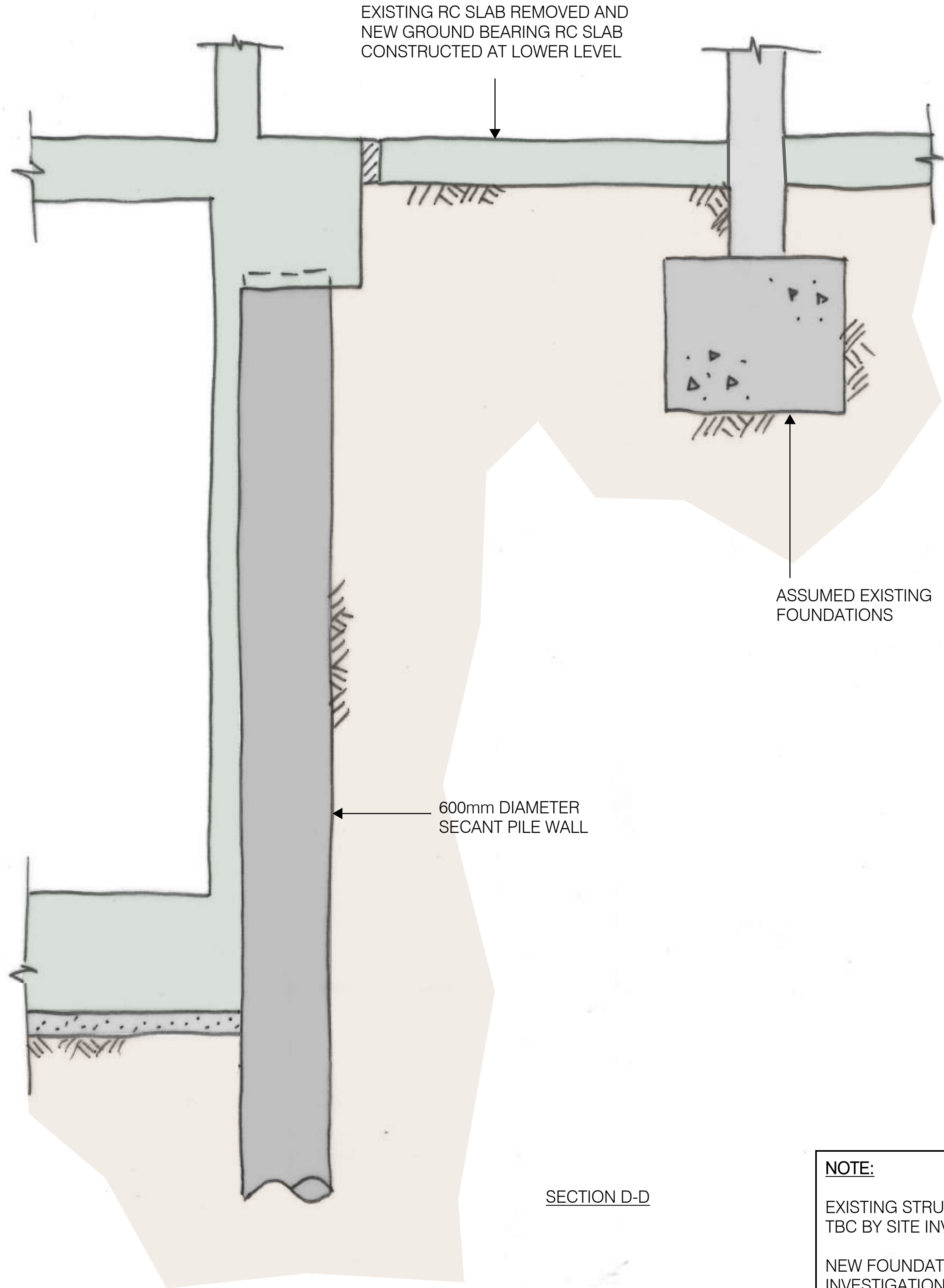
Scale	Date	Drawn
1:200	DEC '19	APa

Drawing status	Status	Revision
PRELIMINARY		P2

Project no.	Originator	Zone	Level	Type	Role	drg no.
2180676	EWP	ZZ	L1	DR	S	2002



SECTION C-C



SECTION D-D

NOTE:

EXISTING STRUCTURE SHOWN ASSUMED, TBC BY SITE INVESTIGATIONS.

NEW FOUNDATIONS TBC BY GROUND INVESTIGATIONS

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rev	date	by	chk	description
P2	28/02/20	SCol	TTo	Preliminary
P1	02/12/19	SCol	TTo	Preliminary

Drawing title
BASEMENT SECTIONS

Scale	Date	Drawn
1:50@ A3	DECEMBER 2019	SCol

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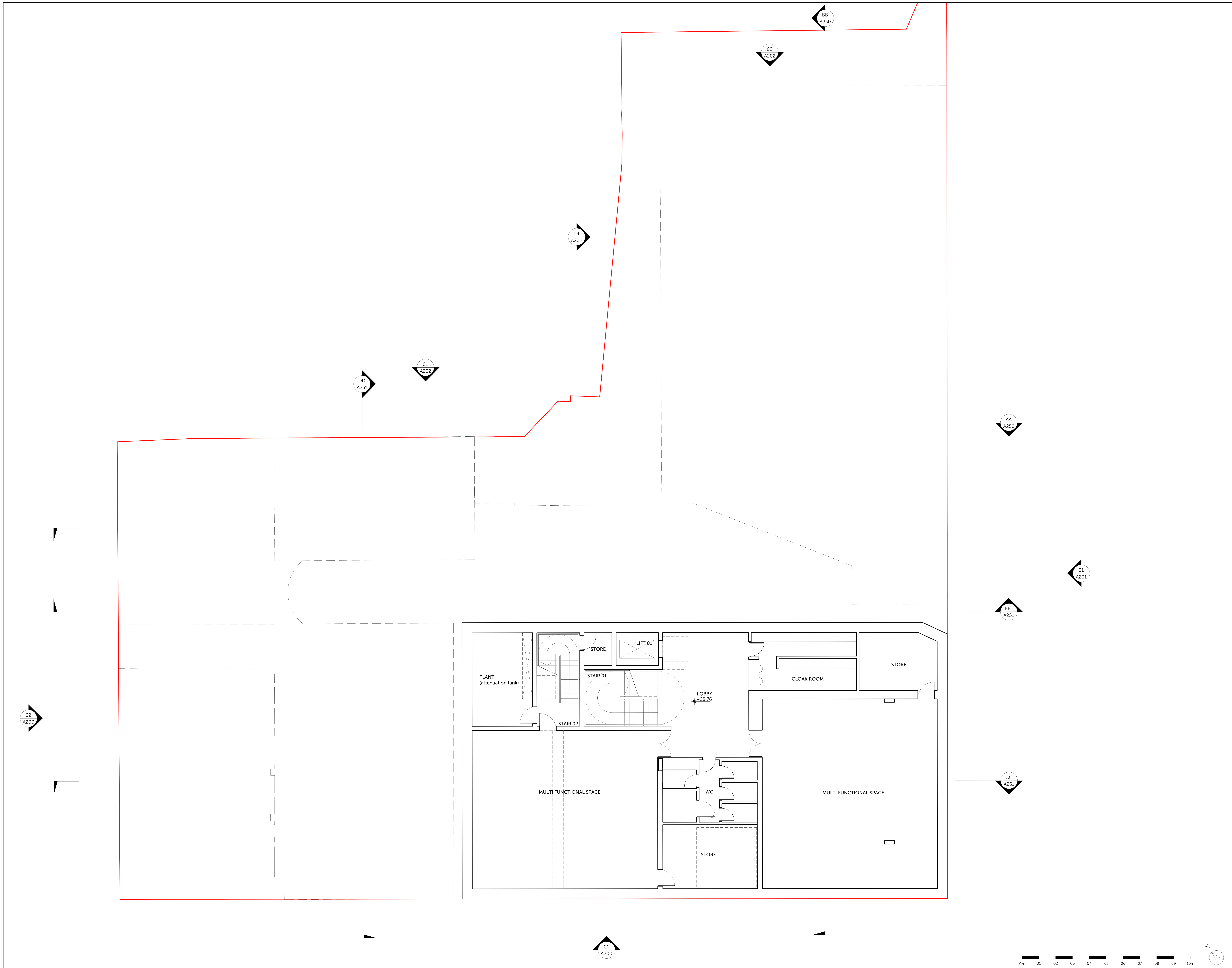
Project
LONDON IRISH CENTRE

Drawing status	Status	Revision
Preliminary	S2	P2

Project no.	Originator	Zone	Level	Type	Role	drg no.
2180676	EWP	ZZ	00	DR	S	2003

B Draft Architectural Planning Issue Drawings



Location Plan

Disclaimer

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Revision

REV	DATE	DESCRIPTION
-	05.06.19	FIRST ISSUE
01	23.09.19	ISSUED FOR COORDINATION
02	21.11.19	ISSUED FOR COORDINATION
03	05.12.19	STAGE 2 ISSUE
04	11.12.19	PRE-APP ISSUE
05	05.02.20	DESIGN FREEZE
06	25.02.20	DRAFT PLANNING ISSUE

Notes

OWNERSHIP BOUNDARY

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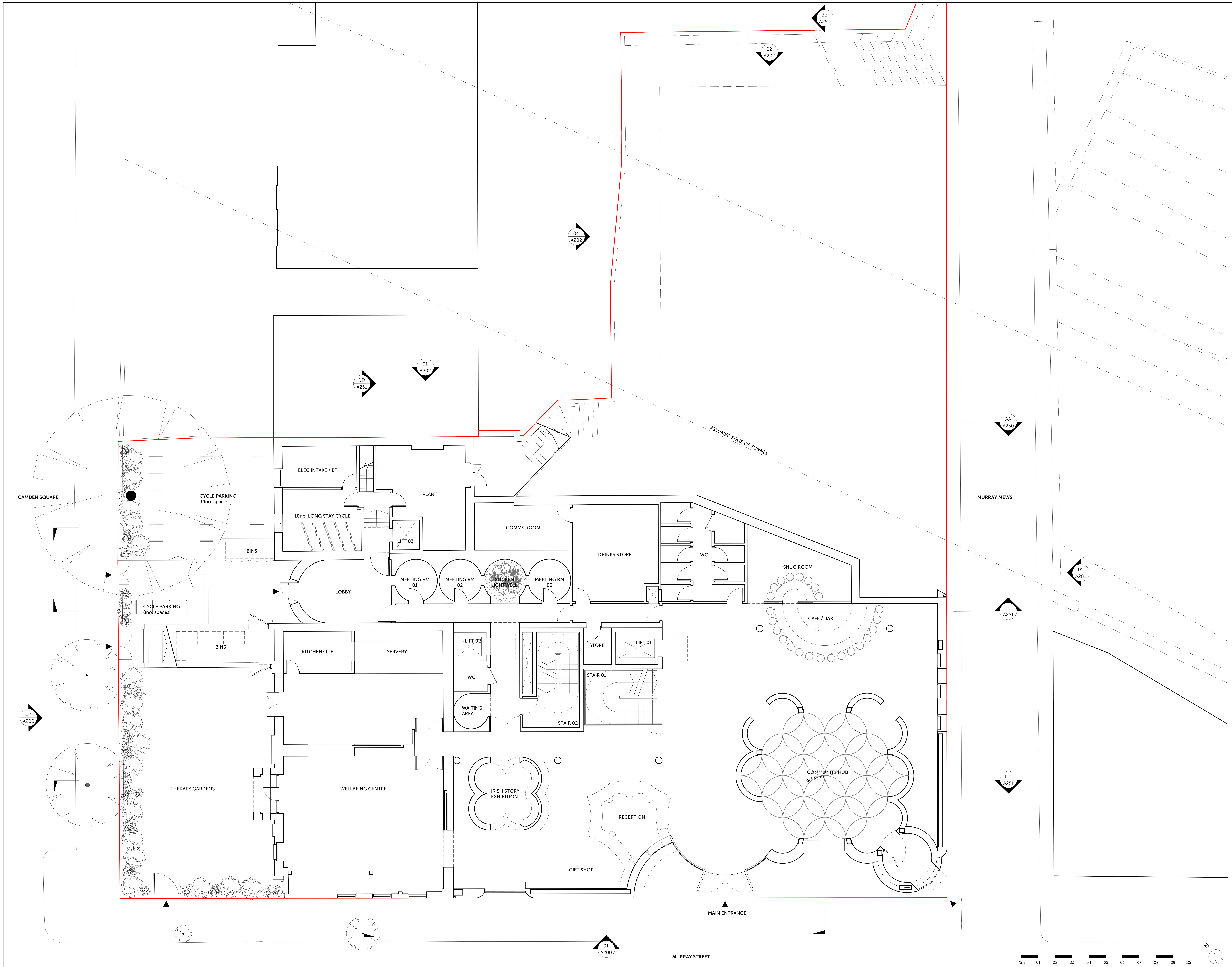
Project Name: LONDON IRISH CENTRE
Project No.: 1120

Drawing Name: PROPOSED BASEMENT FLOOR PLAN

Status: PLANNING

Drawn	Checked	Scale	Sheet
JW	LM	1:100 1:200	A1 A3

Drawing No.: 1120_A100
Revision No.: 06



Location Plan

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Revision

REV	DATE	DESCRIPTION
-	05.06.19	FIRST ISSUE
01	23.09.19	ISSUED FOR COORDINATION
02	21.11.19	ISSUED FOR COORDINATION
03	05.12.19	STAGE 2 ISSUE
04	11.12.19	PRE-APP ISSUE
05	05.02.20	DESIGN FREEZE
06	25.02.20	DRAFT PLANNING ISSUE

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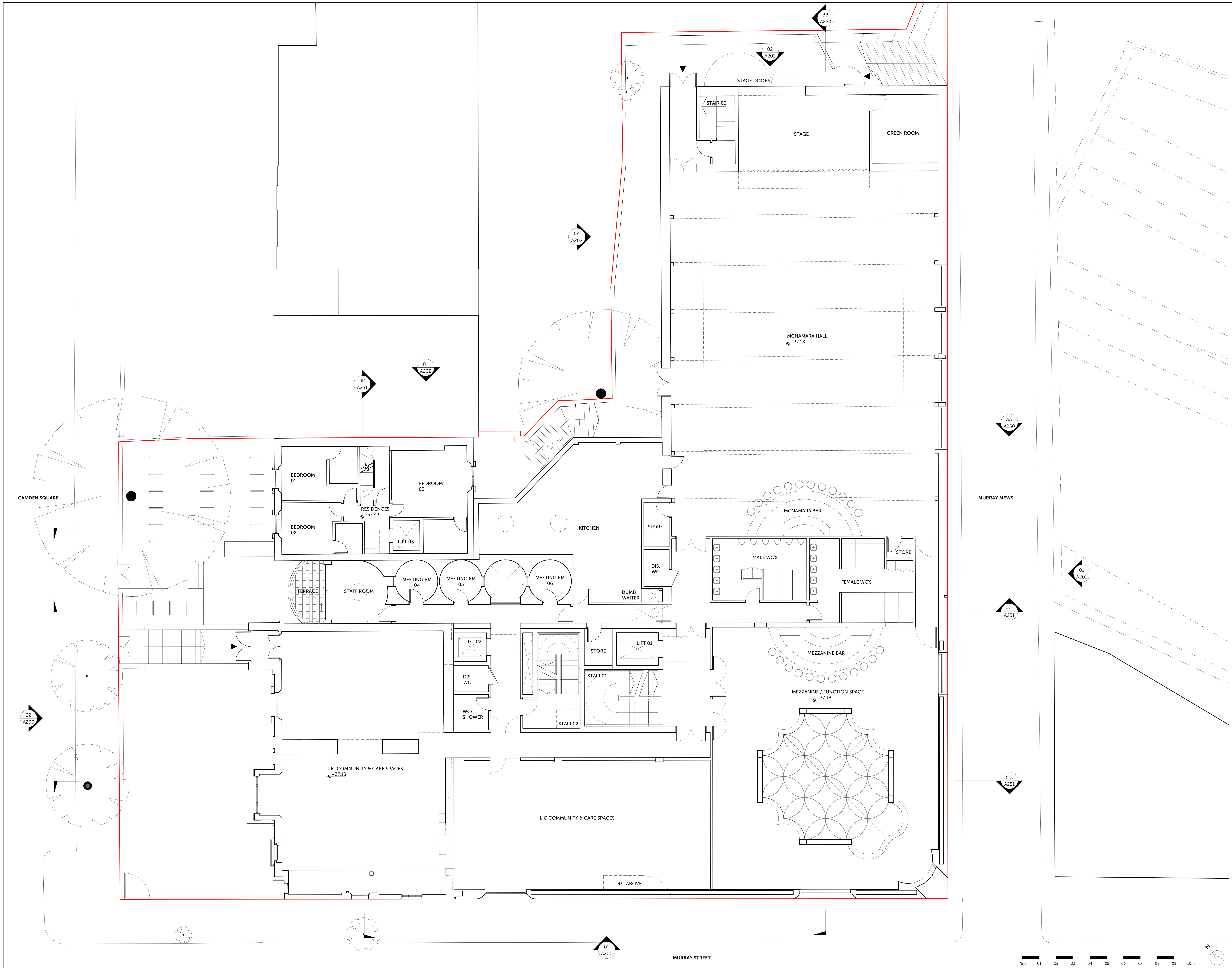
Project Name: LONDON IRISH CENTRE
Project No.: 1120

Drawing Name: PROPOSED GROUND FLOOR PLAN

Status: PLANNING

Drawn	Checked	Scale	Sheet
JW	LM	1:100 1:200	A1 A3

Drawing No.: 1120_A101
Revision No.: 06



Location Plan

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Revision

REV	DATE	DESCRIPTION
-	05.06.19	FIRST ISSUE
01	23.09.19	ISSUED FOR COORDINATION
02	21.11.19	ISSUED FOR COORDINATION
03	05.12.19	STAGE 2 ISSUE
04	11.12.19	PRE-APP ISSUE
05	05.02.20	DESIGN FREEZE
06	25.02.20	DRAFT PLANNING ISSUE

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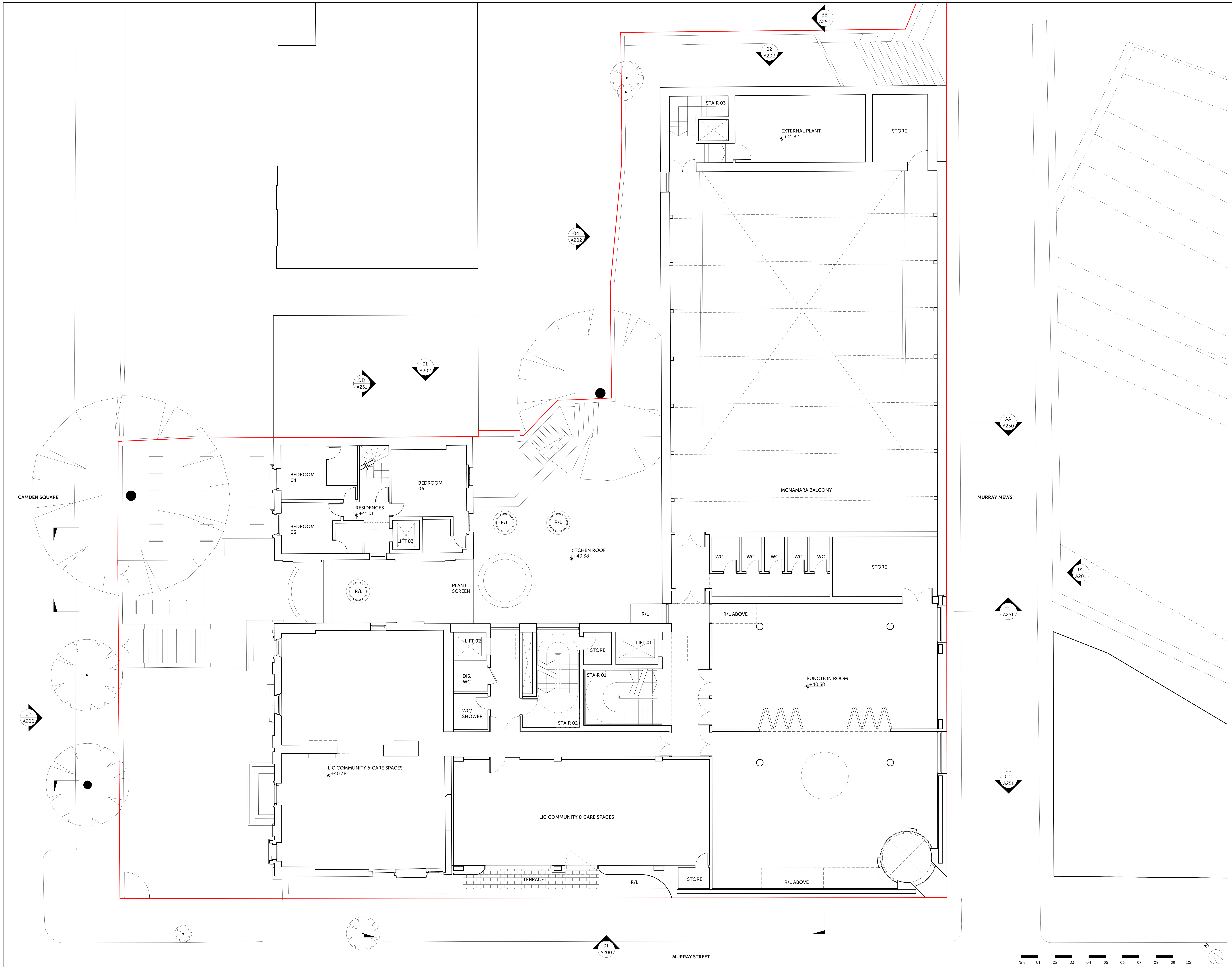
Project Name	Project No.
LONDON IRISH CENTRE	1120

Drawing Name
PROPOSED FIRST FLOOR PLAN

Status
PLANNING

Drawn	Checked	Scale	Sheet
JW	LM	1:100 1:200	A1 A3

Drawing No.	Revision No.
1120_A102	06



Location Plan

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Revision

REV	DATE	DESCRIPTION
-	05.06.19	FIRST ISSUE
01	20.09.19	ISSUED FOR COORDINATION
02	21.11.19	ISSUED FOR COORDINATION
03	05.12.19	STAGE 2 ISSUE
04	11.12.19	PRE-APP ISSUE
05	05.02.20	DESIGN FREEZE
06	25.02.20	DRAFT PLANNING ISSUE

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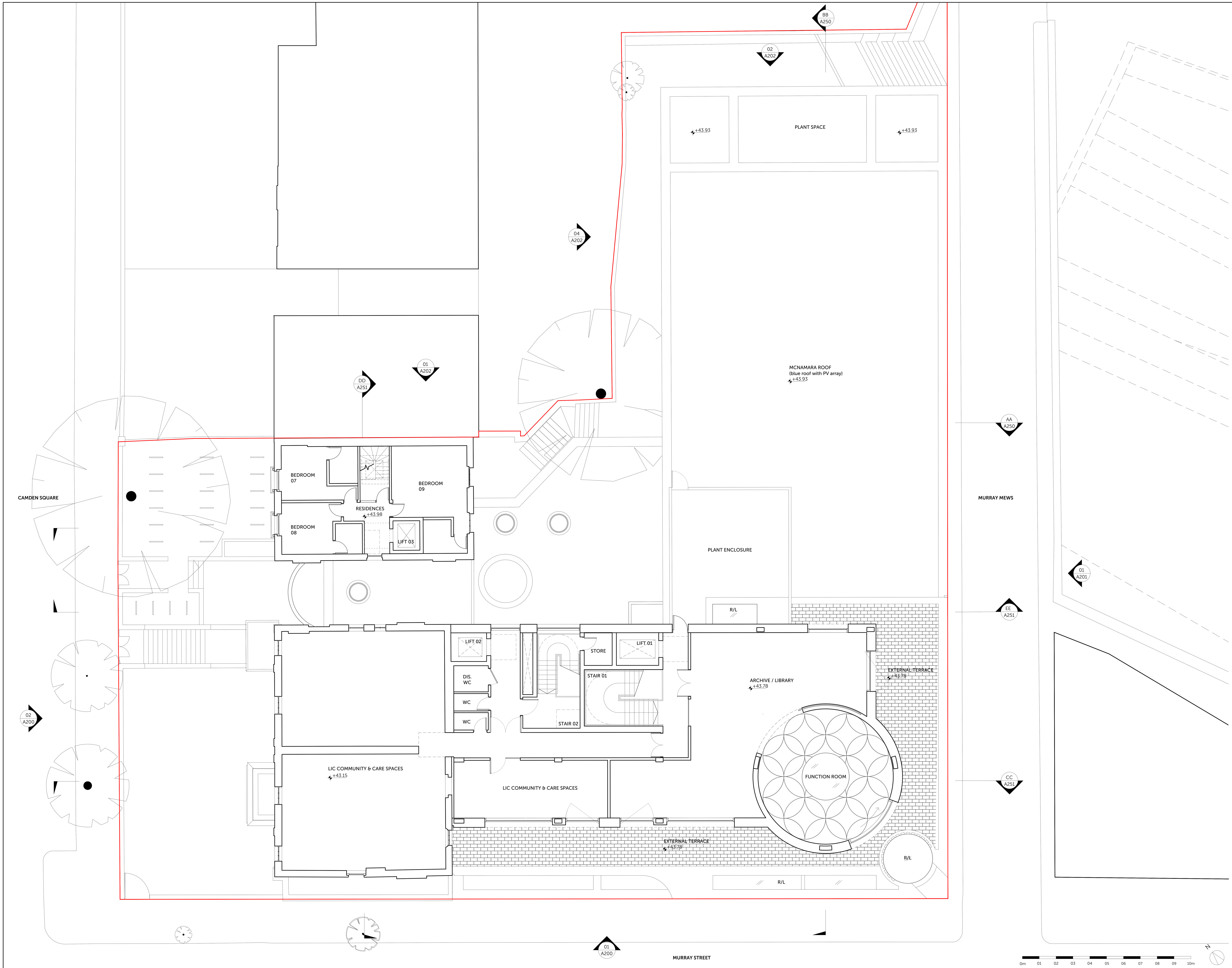
Project Name: LONDON IRISH CENTRE
Project No.: 1120

Drawing Name: PROPOSED SECOND FLOOR PLAN

Status: PLANNING

Drawn: JW
Checked: LM
Scale: 1:100 / 1:200
Sheet: A1 / A3

Drawing No.: 1120_A103
Revision No.: 06



Location Plan

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Revision

REV	DATE	DESCRIPTION
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03	05.12.19	STAGE 2 ISSUE
04	11.12.19	PRE-APP ISSUE
05	05.02.20	DESIGN FREEZE
06	25.02.20	DRAFT PLANNING ISSUE

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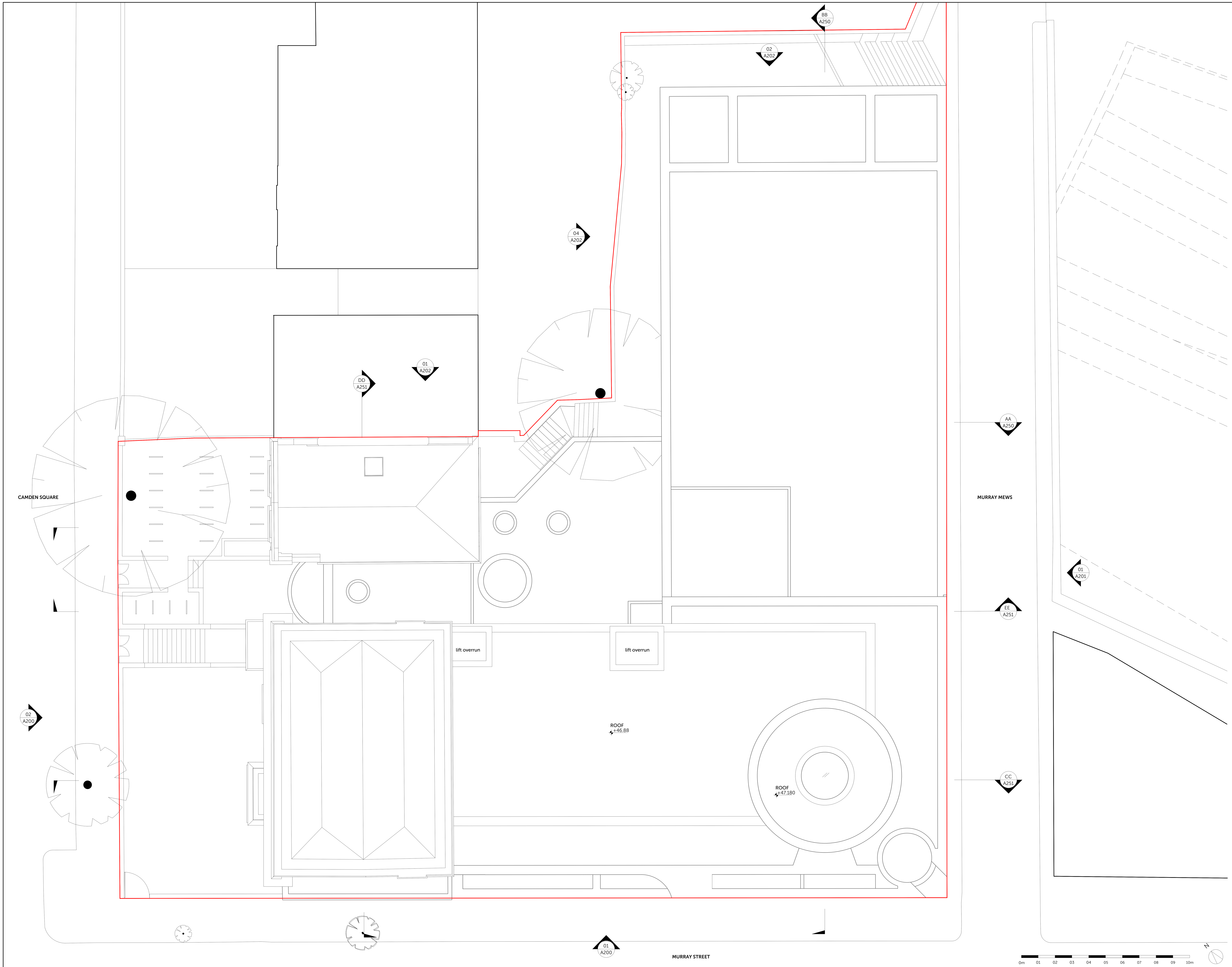
Project Name LONDON IRISH CENTRE	Project No. 1120

Drawing Name
PROPOSED THIRD FLOOR PLAN

Status
PLANNING

Drawn	Checked	Scale	Sheet
JW	LM	1:100 1:200	A1 A3

Drawing No.	Revision No.
1120_A104	06



Location Plan

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03	05.12.19	STAGE 2 ISSUE
04	11.12.19	PRE-APP ISSUE
05	05.02.20	DESIGN FREEZE
06	25.02.20	DRAFT PLANNING ISSUE

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Project Name	Project No.
LONDON IRISH CENTRE	1120

Drawing Name
PROPOSED ROOF PLAN

Status
PLANNING

Drawn	Checked	Scale	Sheet
JW	LM	1:100 1:200	A1 A3

Drawing No.	Revision No.
1120_A105	06

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