

The Portico Library Manchester

Structural & Civil Engineering Stage 3 Report

Prepared by:	Tomasz Lukaszewicz MEng CEng MICE, Lizlie Jorolan MEng,
Reviewed by:	Tomasz Lukaszewicz MEng CEng MICE
Job Number:	31593
Document Reference:	31593-S-RP-0001

Date	Revision	Notes/Amendments/Issue Purpose
June 2025	P01	For information

Contents

Page

1	Introduction	4
	Client Brief	
	Project Description	
2	The Site	8
	Site Location	
	Topography	
	Site History	
	Ground Conditions	
	Ground Water	
	Contamination	
	Radon	
	UXO	
3	Existing Building	12
	Overview	
	Elevations	
	Roof	
	First Floor	
	Ground Floor	
	Basement	
	Foundations	
4	Opening Up Works	24
5	Proposed Structural Alterations	25
	Main Entrance	
	Light Box	
	Steel Grillage for Plant	
	Roof	
6	Design Criteria	28
	Codes and Standards	
	Design Life	
	Design Loads	
	Fire	
	Tolerances	
	Building Movements	
7	Civil Engineering	31
	Roof Drainage Leak	
	Existing Below Ground Drainage	
	Proposed Below Ground Drainage	
	Flood Risk	

Appendices:

- Appendix A** Existing Structural Sketches
- Appendix B** Proposed Structural Sketches
- Appendix C** Opening Up Works Sketches

Contains Ordnance Survey material © Crown copyright. All rights reserved. Licence number 0100058197
Contains British Geological Survey materials © NERC 2025 All rights reserved.

1 Introduction

Price & Myers (P&M) has been commissioned by The Portico Library to provide structural and civil engineering services for the Grade II* Listed Portico Library on Mosley Street, Manchester.

Developing heritage assets like the Portico Library requires sensitivity from the start. Understanding the building's historical context and the relevance of past structural changes is crucial. Any interventions must respect its grade II* listing status to enhance or preserve its heritage value.

This report describes Civil and Structural design progress to date. It sets out the design information, requirements and criteria to which the analysis and design have been completed commensurate with the Concept Design Stage.

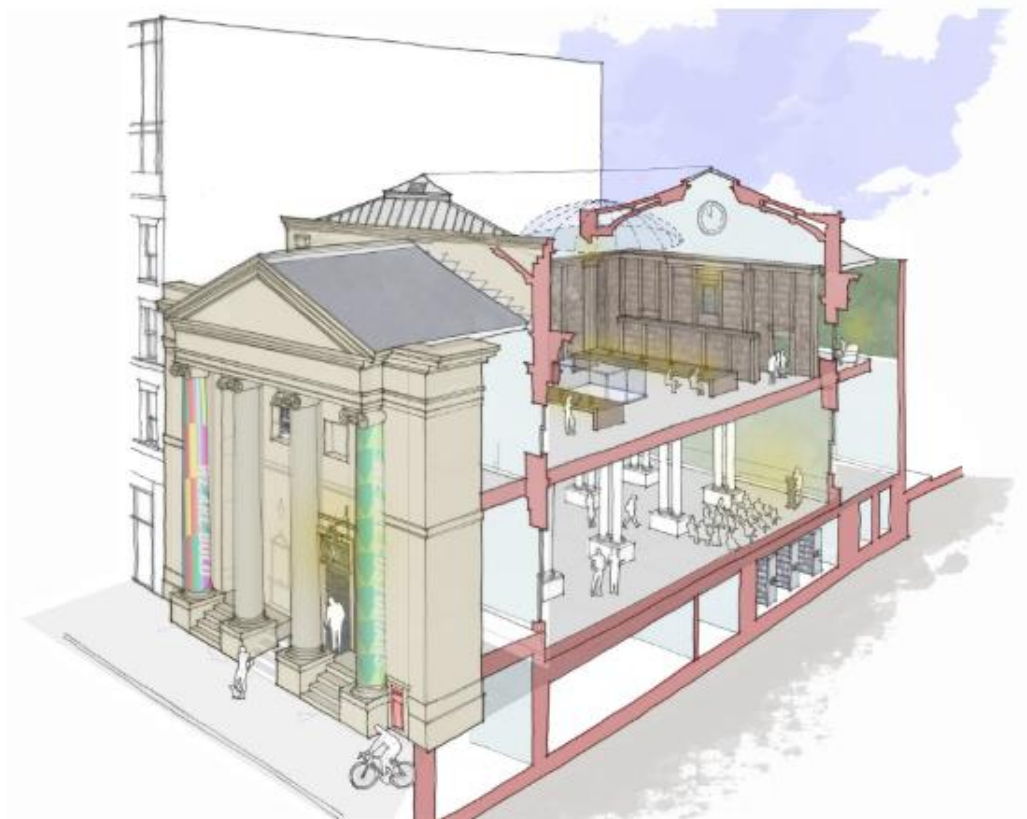


Figure 1.1 Extract of Architect's Proposed Perspective Cut-Away Section

Client Brief

The primary structural challenge set out in the Client's Brief is to alter the building's fabric discreetly and respectfully to fulfil the Portico's ambition to become the most accessible historic library in the country. This will include providing a new lift in the lobby and removing the front entrance stairs.

In addition to the above, other aspects of particular importance relevant to this report include updates to the dated M&E systems, creating a visual connection between the ground and first floors, and improving the building's energy use.

Since RIBA Stage 2, we have made the following advances, which will be presented in the report:

- Improved understanding of the building's fabric, including:
 - The complex timber roof structure. Structural analysis of the original roof and subsequent remedial works was carried as part of Stage 3 design.
 - Basement construction, condition and layout
 - 1st floor structural build-up, capacity and previous alterations
- Developed a general understanding of the structural defects.
- Designed high-level proposals for structural alterations in all areas of the building.
- Considered the impact of civil and structural design on the historic fabric. Minimising the impact and concealing the structure whilst enhancing future flexibility.
- Developed roof plant design.
- Developed coordinated structural/M&E strategy for roof void insulation and access.

During RIBA Stage 1 Brief Definition process the Portico has derived a set of requirements that the building must meet when the project is complete. The following is how the civil and structural concept responds to each of these requirements.

- The Most Accessible Library

The library does not currently provide level access to ground and first floors. It is proposed that a new lift is introduced in the east section of the lobby. This will require the partial removal of the basement, ground, first and attic slabs. The lift will likely be framed in blockwork to aid buildability and cost-effectiveness. Three sets of stairs within the Portico entrance will be removed, and the ground floor slab in this area will be lowered to the pavement level to provide level access.

- The Most Sustainable and Dynamic Library

Designing the library for Net Zero will involve major mechanical and electrical interventions, such as installing a new plant including heat pumps and new ventilation systems. These will, in turn, need to be supported by a new or strengthened structure within the library footprint.

The sustainability of the structural design will be achieved by specifying reversible (where possible) structural interventions that enhance the building's function and lifespan.

The aforementioned tenets align with the Art Council Investment Principles:

- Ambition and Quality
- Dynamism
- Environmental Responsibility

- Inclusivity and Relevance

Member Consultation

Price & Myers have joined a consultation session with the Members of the Library on 11th December 2024. The issues raised that were relevant to the civil and structural design included:

- Provision of equitable access and building use, including level access, lifts and accessible WCs.
- Safe access to the roof for maintenance and access to the proposed plant.

Project Description

The project involves structural modifications to a Grade II*-listed private library in the heart of Manchester City Centre. Currently, the library is on the first floor, accessible only via stairs from the side. The ground floor is occupied by a pub, accessed from Mosley Street via the main entrance. The majority of the existing basement footprint is used as the back-of-house pub space. The Portico Library currently have restricted access to part of the basement. At the end of the pub's lease period, the Portico Library will re-assume the basement and ground floor possession. The basement will house a kitchen, staff office, WCs, changing places, plant and archives. The ground floor will be occupied by a flexible exhibition space/café, while the 1st floor will remain as the library and event space.

The project aims to create the most accessible library in the UK by creating equitable access to the entire building, including the ground and first floors. This will be achieved by removing the existing main entrance stairs and lowering the lobby ground floor slab to the existing pavement level, which will create level access to a new lift.

Additionally, the project seeks to establish connections between the library spaces on the ground and first floors. A lightbox on the first floor is planned to enhance visibility between the two levels and allow natural light to flow through the entrance void.



Figure 1.2 Extract of Architect's Proposed Perspective Internal Sketch

2 The Site

Site Location

The site is situated in the heart of Manchester City Centre at 57 Mosley Street, Manchester M2 3HY. The building has three elevations with the main entrance to the pub opening onto Mosley Street and an additional entrance to the library on Charlotte Street and back to Back George Street. The grid reference for the site is SJ 84144 98150.

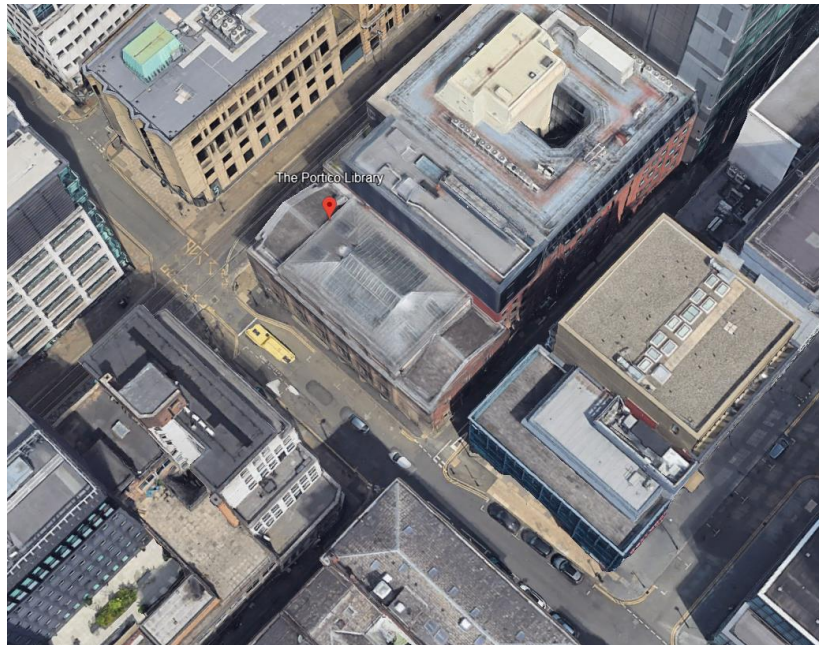


Figure 2.1 Aerial View of Site taken from Google Maps, 2023

Topography

The site's topography is fairly even, with ground levels around 59m AOD. Refer to Figure 2.2.

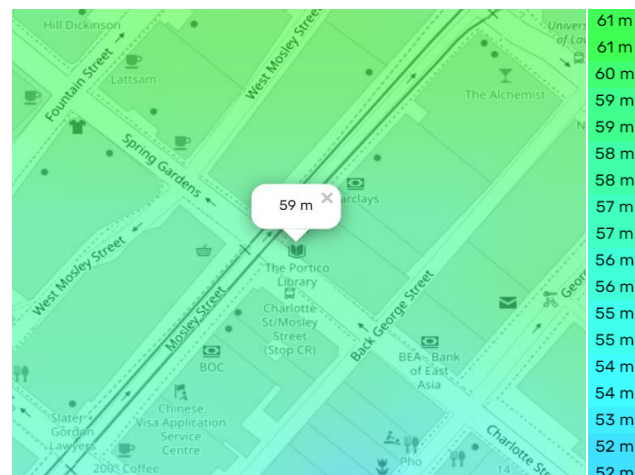


Figure 2.2 Topographical Map of Site

Site History

The Portico Library is a Grade II-listed building that has been integral to Manchester for 218 years. Established in 1806, historical maps show that it has consistently been a city centre feature. The building was designed in the Greek Revival style by Thomas Harrison of Chester and built between 1802 and 1806.

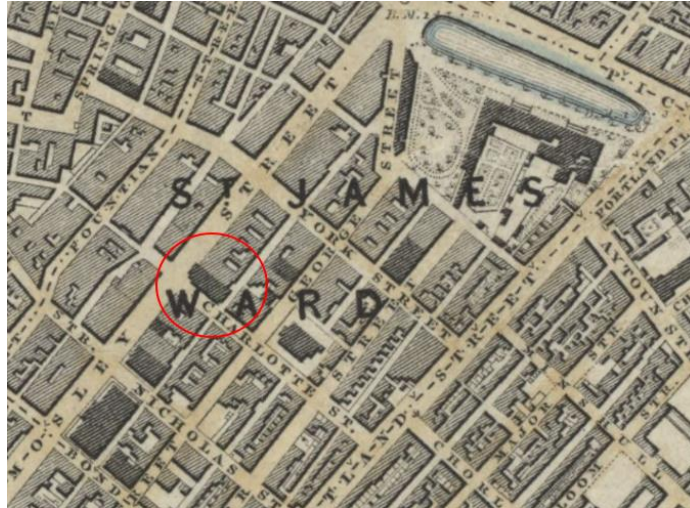


Figure 2.3 Extract from Historical Ordnance Survey Map, 1848



Figure 2.4 Extract from Historical Ordnance Survey Map, 1938

Ground Conditions

The British Geologic Survey (BGS) map for the site indicates that the superficial deposits are found to be Till, Devensian-Diamicton. Sedimentary superficial deposits formed between 116 and 11.8 thousand years during the Quaternary period.

The BGS map also indicates the Bedrock geology as Chester Formation – Sandstone. Sedimentary bedrock formed between 250 and 247.1 million years ago during the Triassic period.

Trail pits in the basement area were dug out on Tuesday 8th 2025. The revealed the foundations reaching the depth of 1m below basement FFL. The ground was of silty clay composition and not saturated.



Figure 2.5a) BGS Superficial Deposits Survey Map (left), 2024 b) BGS Bedrock Geology Survey Map (right), 2024

Ground Water

There have been no known encounters with groundwater at the site.

The water table level is unknown but at the time of investigation was below the 1m depth. Typically, the water table in Manchester City Centre is located very low, in the sandstone layers. However, there is a small risk of some perched water that could be encountered during excavation works, which may impact the lift pit design and construction sequence.

Contamination

Although the historic maps indicate no contaminative past uses, we would advise that specialist input is sought if there is a concern in relation to ground contamination

Radon

According to the UK Radon Map, the Library is situated in the lowest band of radon potential. Less than 1% of homes at or above the Action Level.

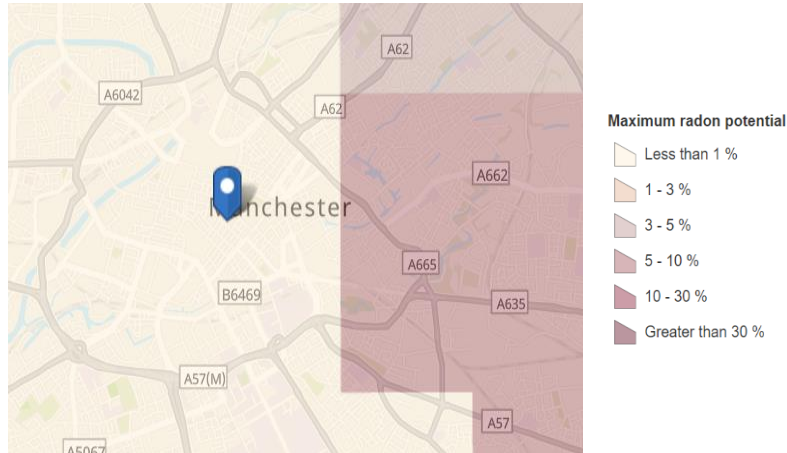


Figure 2.7 Extract from UK Radon Map of Site, 2025

UXO

The Zetica UXO risk maps indicate that the site has a moderate risk of encountering unexploded ordnance (UXO). However, most of the work will be conducted within the building's superstructure, with potential localised underpinning at the basement level. Therefore, it can be assumed that there is no direct risk of encountering any UXO.

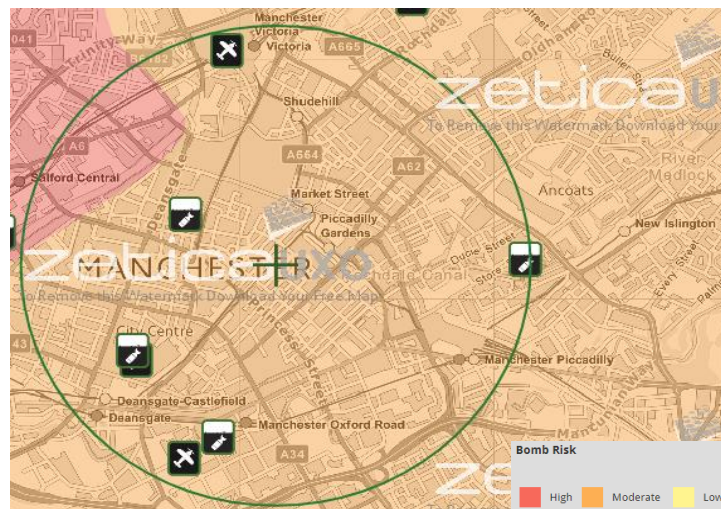


Figure 2.8 Extract from Zetica UXO Risk Map, 2025

3 Existing Building

Overview

The Portico Library is a Grade II* listed subscription library that has also served as a bank and, more recently, as a public house and library. It was constructed between 1802 and 1806 by Thomas Harrison of Chester. The building features two stories, a basement, and an attic and has experienced various modifications over the years, especially at the 1st floor roof levels. Several site walks were conducted between May '24 and January '25. Some opening up works were carried out in Apr' 25. Refer to 'Opening up Works' section for details.

Originally, the central part of the building featured a double-height space with a newsroom on the ground floor. The library occupied a mezzanine level, with bookshelves lining the walls of reading rooms at both ends and narrow galleries on the northeast and southwest sides.

In 1920, a proposal was approved to grant the Bank of Athens a 30-year basement and ground floor lease. The architect Joseph Sunlight made alterations to separate the ground floor and basement from the upper levels. The stairway in the west corner was reconfigured, and an existing window was modified to create a new entrance on Charlotte Street. The opening in the double-height central space was covered with stained glass laylights, which were supported by new steel beams and columns adorned with decorative plaster surrounds.

The lay lights in the central area were replaced with a timber floor, and the basement was remodelled to include ancillary facilities such as storage, staff rooms, a cellar, and a kitchen. Additional alterations and major repairs were undertaken in the late 1980s, including updates to the kitchen and workroom at the northwest end of the building, re-roofing with a new lead roof over the central area, stone repairs, and restoring the back staircase in the east corner.

The Portico Library and Gallery is located on the first floor, with its main entrance on Charlotte Street, near the junction with Mosley Street. The library and gallery occupy the central space of the building and feature a domed plaster ceiling with barrel vaults at the northwest and southeast ends. 'The Bank' Bar and Restaurant occupies the ground floor and basement. The bar and restaurant are situated in the main space on the ground floor directly beneath the library, with additional facilities in the basement.



Figure 3.1 Street View of the Portico Library, 2023

Elevations

The Mosley Street elevation features a stone central pediment supported by four Ionic columns. The Charlotte Street facade is also of stone masonry construction and is divided into seven bays, with the middle five bays further divided by Ionic semi-columns. The column bases rest on a plinth at the bottom of the wall. The Back George Street elevation has a gable wall constructed from brick masonry.



Figure 3.2 The Portico Library – Mosley Street Elevations



Figure 3.2 The Portico Library – Charlotte Street Elevations



Figure 3.3 The Portico Library – Back George Street Elevations

Roof

The roof is divided into three distinct sections: two duo-pitched roofs are located at the northwest and southeast ends of the building, and the central complex roof structure is above the main library chamber. The duo-pitch roofs are of conventional rafter construction, as shown in Figure 3.4. The timber purlins span between masonry walls, and the rafters are supported on the primary beams. It appears that the roof construction was replaced relatively recently, perhaps during the 1980s roof repair works.



Figure 3.4 Roof space showing rafter and purlin arrangement., 2024

The roof can be accessed through a hatch in the attic above the northwest end of the building. The central section of the roof can then be accessed from the duo-pitched roof level via two small hatches, as shown in Figure 3.5.

The central roof is a complex timber structure that frames the hipped upper roof while supporting a domed and arched ceiling. Both higher and lower roofs feature several rooflights. The higher-hipped roof timbers and ceiling structure are supported by a system of primary and secondary trusses, as illustrated in SK-01E and SK-01F.

The timber roof appears to be of original construction, judging by the apparent age of the timber beams. However, several members have been replaced or repaired. Notably, the ends of the roof trusses have likely been retrofitted with steel plates (although these could have been a part of original structure), likely to address previous timber decay (see Figure 3.7). Additionally, extensive plan bracing has been retrofitted to enhance the lateral stability of the structure (refer to SK01-E). This suggests that the roof has previously experienced displacement.

Twenty-millimetre diameter steel rods span between four EA 100x100 sections located around the truss posts and EA 80x80 galvanised 'ring beam', which runs along the entire inner perimeter of the building. This continuous angled section comprises numerous steel members spliced with plates. However, this member does not function like a typical ring beam (i.e. taking the load from the roof in tension); instead, it transfers the tension from the rods into shear along the wall length. The connection between the rods and the truss posts (Detail A-A SK-01G and Figure 3.8) is designed to transfer the tension through bending and shear to the angle sections. This, along with the questionable 'ring beam' construction, suggests that the load capacity of this remedial detail is somewhat limited compared to conventional roof plan bracing.

Despite evidence of previous roof distortion, there are currently no apparent signs of ongoing roof spreading. The only exception is a small localised area in the northwest section of the roof (see Figure 3.9), where some signs of water ingress were noted during the site walkover.

There is evidence of prior lath and plaster ceiling issues. Straps, dowels and pads repair detail to the ceiling shown in figure 3.9 can be found throughout the roof footprint.

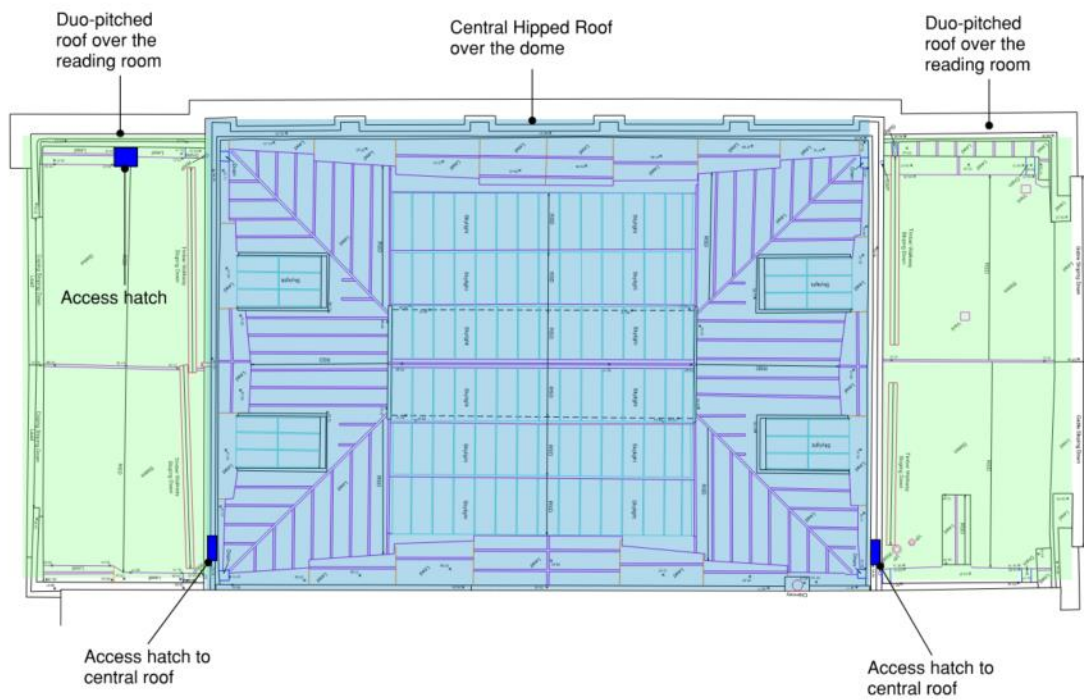


Figure 3.5 Existing Roof Plan Highlighting Access and the Roof Construction Types



Figure 3.6 Roof truss, tension rods and dome ceiling



Figure 3.7 Steel plated 'shoe' remedial detail to truss bearing end



Figure 3.8 Steel rod fixing detail to the angle



Figure 3.9 Localised water damage near a roof light in the arched section in the N-W corner of the central roof.

First Floor

The archive desktop study revealed that originally, the first floor featured a mezzanine with a large void in the centre of the building, surrounded by a timber balustrade, as shown in Figure 3.10. In 1920, when the ground floor was leased to the Bank of Athens, the void was filled with decorative glazing panels, as illustrated in Figure 3.11. The original columns were replaced with a Greek-style double-column arrangement on a different grid. Since then, the void has been filled with a timber joist floor supported by steel beams, as depicted in Figure 3.12. An extract from an archive drawing (Figure 3.13) indicates that the first-floor infill was previously assessed to have an imposed loading capacity of 2.5 kN/m².

The floor construction in the reading room and the office/kitchen is likely made of timber joists. The exact floor composition will be confirmed during the opening-up works.

In its current arrangement, the first floor is supported by eight double columns arranged on a rectangular grid. Figure 3.14, an archive photograph showing the column bases on the ground floor, indicates that the outer column is made of steel, while the inner column is purely decorative.

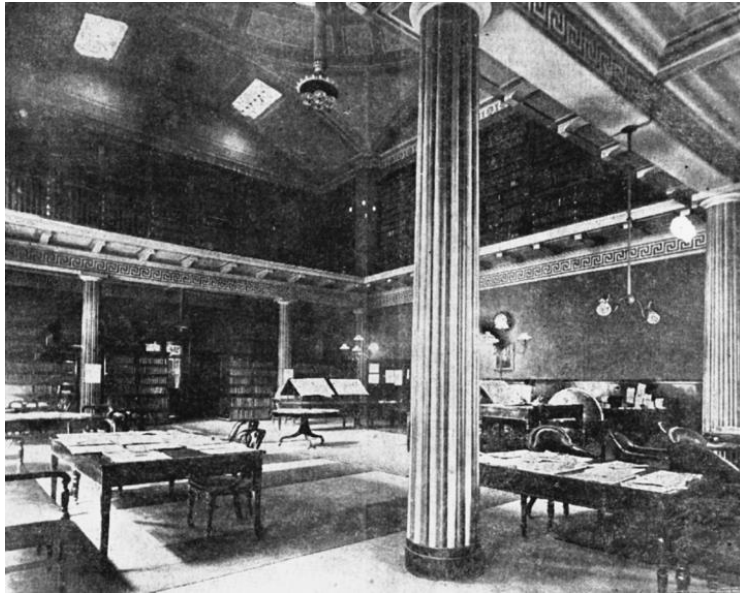


Figure 3.10 Original 1st floor construction showing large floor void and surrounding mezzanine with balustrade

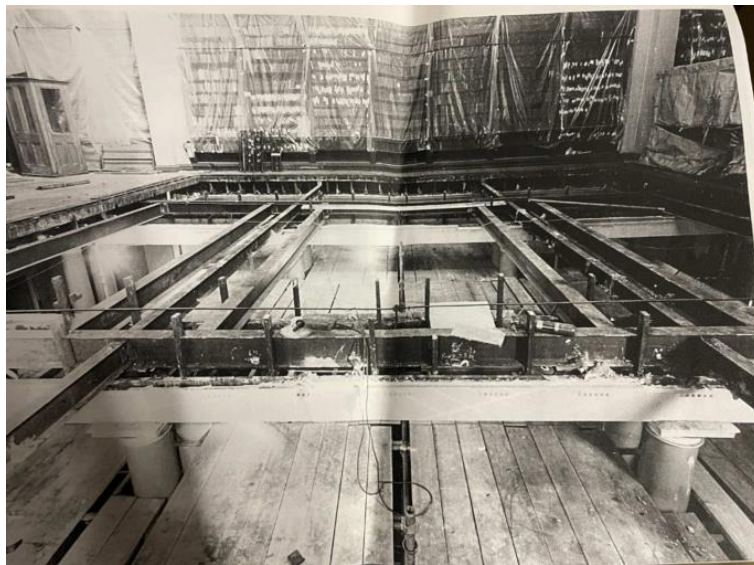


Figure 3.12 - 1st Steel beams and timber joists infill at 1st floor.

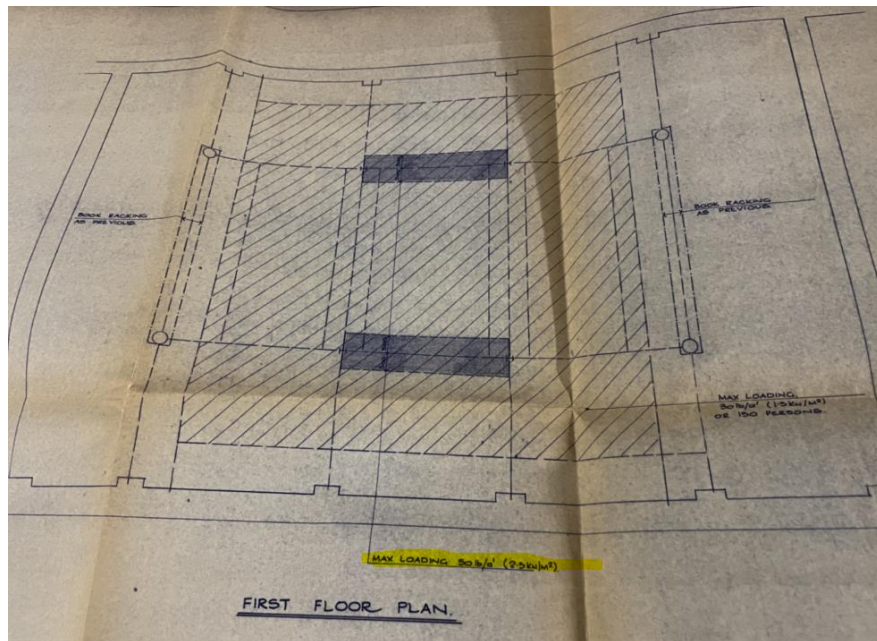


Figure 3.13 – Extract from an archive drawing showing 1st floor structural capacity



Figure 3.14 – Archive photograph showing column bases at ground floor stripped from cladding.

Ground Floor

The majority of the ground floor slabs appear to be either filler joist or hollow pots, but could potentially also be of reinforced concrete construction (refer to Fig. 3.15). The downstands are likely comprised of steel beams encased in concrete. This floor plate was installed during the adaptations made by the Bank of Athens in the 1920. The area directly beneath the existing portico stairs features original barrel vault construction (refer to Fig. 3.16). The concrete slab in the current boiler room is supported by steel beams encased in concrete. This slab is propped by a series of acrow props and is observed to be in poor condition (refer to Fig. 3.17).



Figure 3.15 – Underside of ground floor slab viewed from basement.

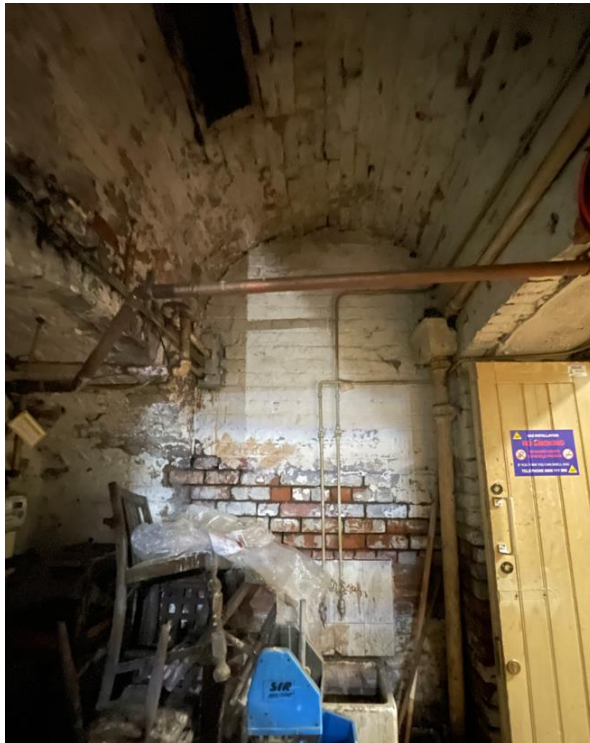


Figure 3.16 Masonry barrel vault under the portico.

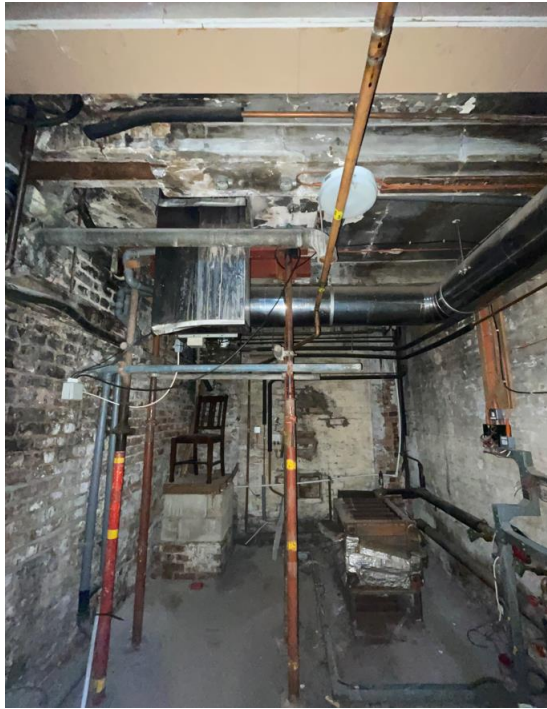


Figure 3.17 Underside of propped ground floor slab in the basement boiler room.

Basement

The basement is defined by perimeter brick masonry retaining walls and brick masonry load-bearing internal walls featuring barrel vaults along Mosley Street elevation. It remains uncertain whether the retaining walls are supported by the ground floor slab.

The basement slab consists of concrete and appears to be ground-bearing. However, the specific build-up and thickness of the slab are unknown and will require confirmation during the forthcoming opening-up works. Overall, the basement is observed to be in generally good condition.

Foundations

There are no archived drawings available regarding the existing foundations. It is likely that the steel columns are supported by concrete pad foundations, while the walls are supported by masonry corbel footings. The formation level of the foundation remains undetermined and must be verified during the opening-up works.

4 Opening Up Works

The opening up works specification sketch series SK900 was issued by O&M as part of the RIBA Stage 2 works back in November 2024. This included works to basement walls, foundations, slabs, GF slab and 1st Floor slabs.

However, due to the Ground Floor and basement being currently occupied by the tenant, the works specification was subsequently limited to basement trial pits near the new lift and 1st floor opening up works.

HH Smith have carried out the opening up works on 15th April 2025. 2no trial pits revealed the wall formation level at 1m below basement FFL. The thick basement walls do not appear to be corbelling out at base. The soil strata at formation level comprises of silty clay. No ground water was encountered during the excavation works.

HHS attempted the opening up works at the 1st floor but have encountered a cementitious substance within the floor finishes which at the time was thought to possibly contain asbestos. As such the works were immediately halted and a samples was tested for presence f asbestos. The test results have shown no asbestos presence. The works at 1st floor have been postponed. The client is currently in a process of agreeing an alterative date for the 1st floor opening works to take place.

The Ground floor and basement slab opening up works will take place after gaining vacant possession of these areas by the client. Date tbc.



Table 5.1 Basement trail pits

5 Proposed Structural Alterations

Main Entrance

The proposal to create level access at the main entrance involves partial removal of the existing stairs, barrel vault and concrete floors in the lobby area. This requires lowering the main entrance and vestibule to align with the external ground level. The retaining wall will need to be temporarily propped prior to the removal of the existing ground floor slab (refer to SK-02H). A part of the RIBA Stage 2 considerations P&M has suggested several flooring options.

At RIBA Stage 3, the options have undergone further rationalisation and refinement resulting the scheme shown in figure below.

The preferred solution includes metal decks floor on steel beam in the external area, and the timber floor internally in the foyer.

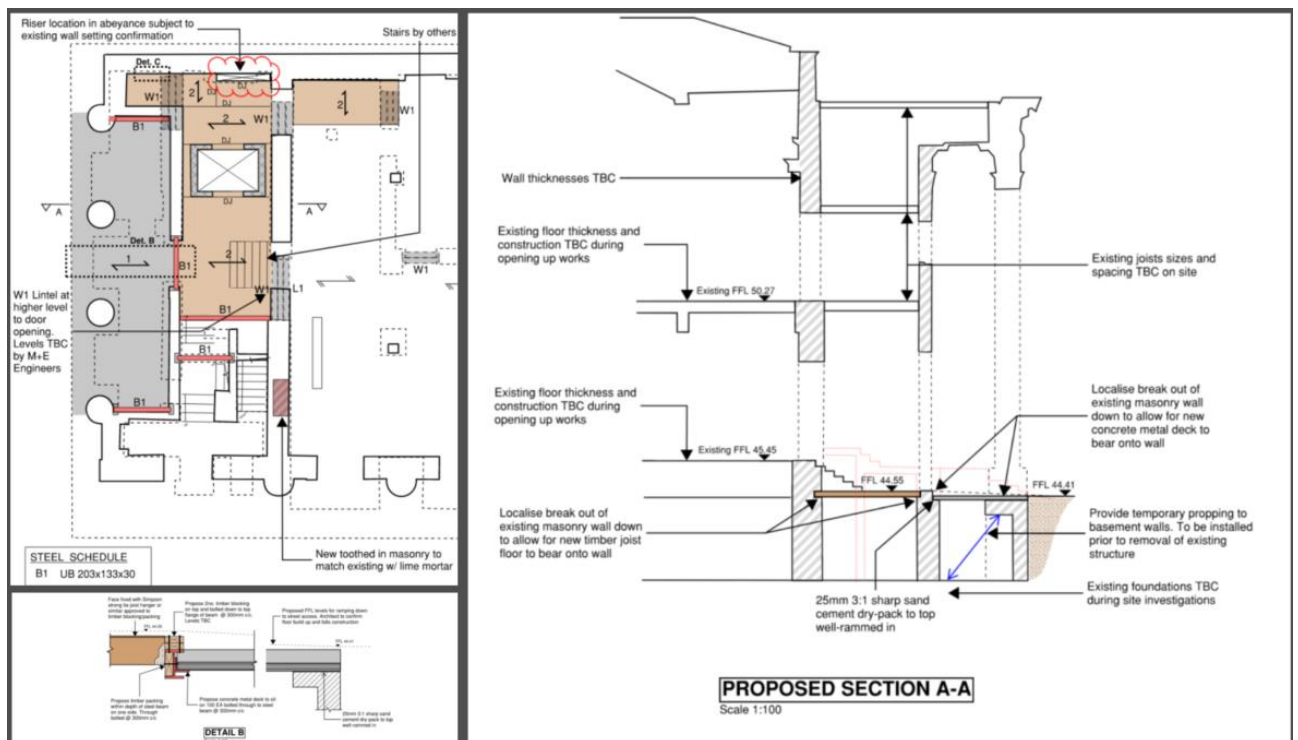


Table 5.1 Level Access Structural strategy

New Lift

A portion of the existing basement, ground floor, and first-floor slabs will need to be removed to accommodate the proposed passenger lift. The lift structure is planned to be constructed using blockwork. At the basement level, a waterproof concrete lift pit will be required. Additionally, the surrounding basement walls may need to be underpinned before the installation of the lift pit to prevent undermining (subject to opening up works). Refer to sketches SK-02A.

Light Box

The proposed glass light box for the first floor will be located within the existing steel beams grillage. The design strategy involves fitting the void with new steel beams where required and connecting them to existing steel beams. This approach will facilitate the transfer of the load back to the existing columns. Refer to sketches SK-02D.

Steel Grillage for Plant

A new plant enclosure is set to be constructed at the S-E end of the roof. The current duo-pitched roof structure in this area cannot adequately support the new plant equipment. Therefore, a new steel grillage above is proposed to support the new plant enclosure. Due to the pitched nature of the roof in this section, the existing roof will be partially removed and reinstated as flat roof below the plan grillage. The steel beams will rest on the masonry walls on either side, and additional 2-meter-high steel posts will cantilever from the beams to support the enclosure. As this is an external structure, all external steel components will be galvanised. Refer to sketches SK-02E and SK-02F.

Roof

The central roof of the Portico Library is a uniquely complex and delicate structure that has previously suffered from displacement and water ingress issues. This structure requires continuous care and attention, as any further modifications or strengthening will likely be very complicated in terms of analysis, design, and construction. Previous attempts at stabilising the roof with steel rods, although somewhat unorthodox, appear to have arrested the twisting of the roof trusses. This observation was bolstered by the binocular survey of the ceiling finishes carried out by P&M which did not show any signs of ongoing movement.

A part of RIBA Stage 3 works, we have created an analysis model of the existing trussed roof. The analysis revealed that the primary trusses as well as several purlins are heavily utilised (figure 4.2 and 4.3). Given, the trusses and overall geometry of the roof are already quite distorted (albeit the movement seems to have eased after the remedial works installation), it is not recommended that excessive additional loads are added. This would include double glazed rooflight, vents etc. Our study has shown that the primary truss would fail in bending if the superimposed deal load would increase by 0.5kN/m².

However, we found that a small load increase, including a thin layer of new insulation and a localised aluminium walkway around the dome, should not adversely affect the existing structure.

Additionally, better and safer access to the roof is necessary.

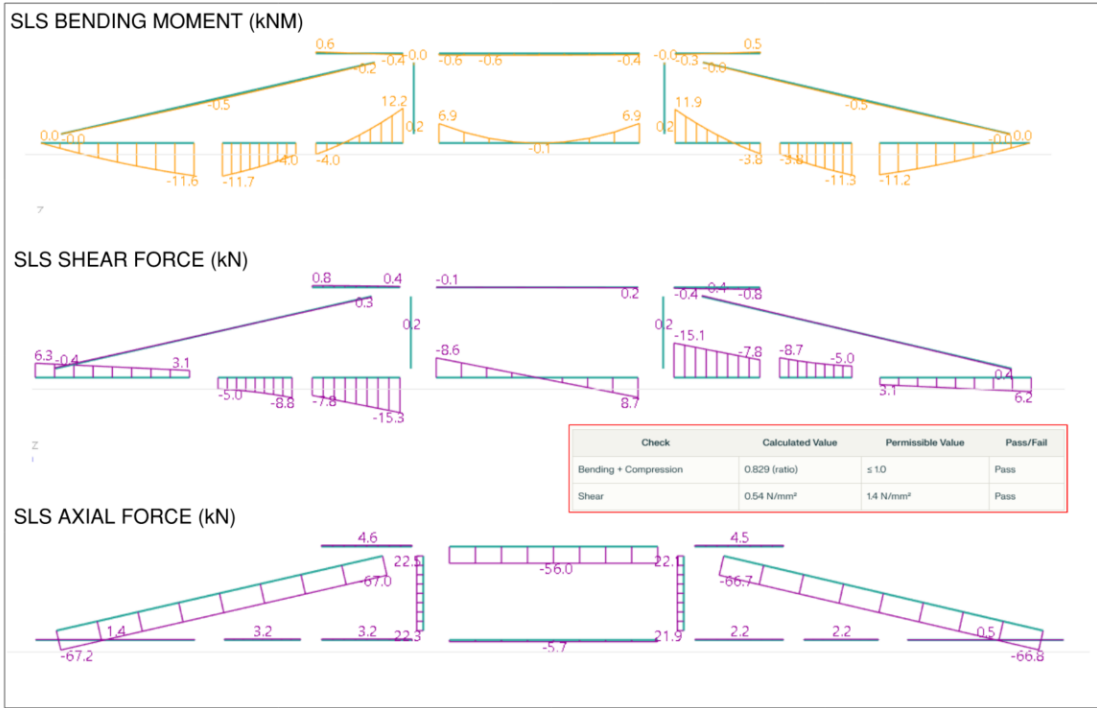


Figure 5.2 Utilisation of existing primary truss in its current state

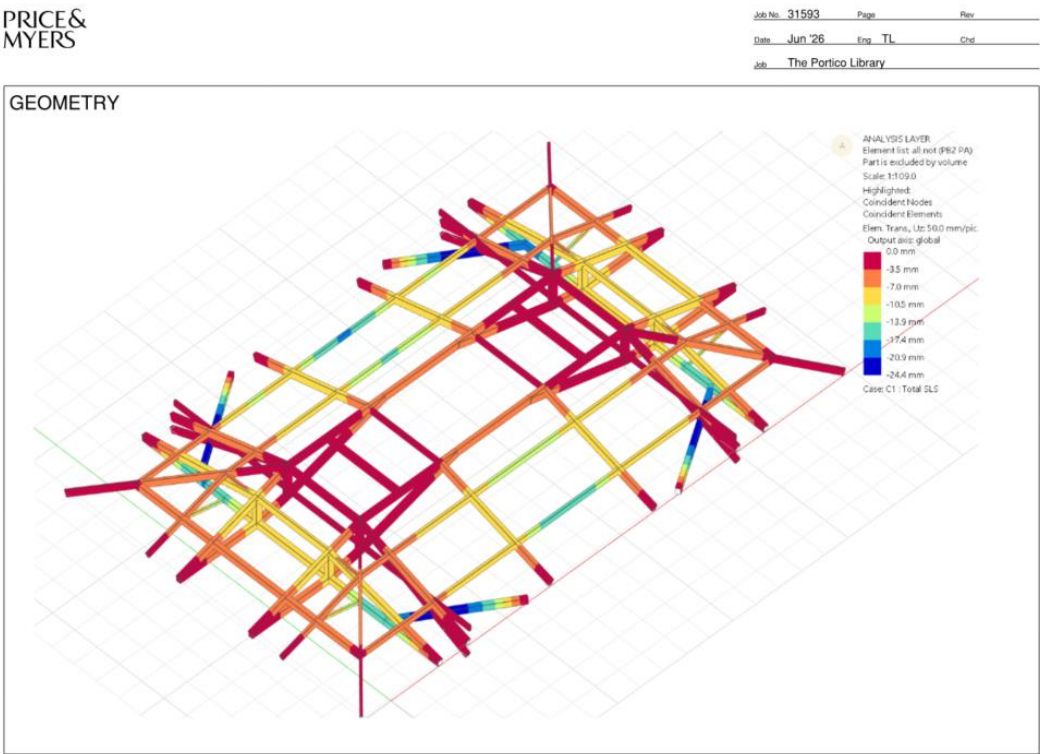


Figure 5.3 Deflection plot of existing roof structure

6 Design Criteria

Codes and Standards

Loading is assessed in accordance with Eurocodes:

BS EN 1991-1-1:2002 Actions

BS EN 1991-1-3:2003 Snow Loading

BS EN 1991-1-4:2005 Wind Loading

BS EN 1991-1-7:2006 Accidental Actions

Structural design is to be in accordance with Eurocodes:

BS EN 1992-1-1:2005 Concrete

BS EN 1996-1-1:2005 Masonry

Design Life

As the existing building bears witness, the life span of structural materials is indeterminate and can extend to many hundreds of years if maintained appropriately. However our design codes require us to define a figure, and this structure is classe as 'Category 4: Building structures and other common structures' requiring a design life of 50 years.

The structural frames are designed in accordance with BS EN 1992-1-1:2004 and BS EN 1993-1-1:2005, which provides a design life of 50 years. Appropriate paint/galvanising systems for steel elements and cover for concrete elements (considering sulphates, carbonation, chlorides, and freeze/thaw attack) will be specified as required to provide adequate protection to all new structures. Periodic inspection and maintenance will be required throughout the life of the building to ensure protection measures are performed adequately. External structures will require more frequent inspection and maintenance than internal structures due to more severe exposure conditions

Design Loads

Dead and superimposed dead loads (permanent fixed actions) are calculated in accordance with BS EN 1991-1-1: 2002 and the selected form of construction and will include steel self-weight and any applied finishes or suspended service.

Dead Loads

Existing Basement Level:

		kPa
Assumed ground bearing slab	150 mm thk	3.75
Assumed Screed	50 mm thk	1.20
TOTAL		4.95

Existing Ground Level (assumed):

	kPa
200thk filler joist floor	6.00
Raised Access Floor	0.60
Services	0.25
Ceiling	0.25
TOTAL	7.10

Existing First Level (assumed):

	kPa
Timber Joists & Deck	0.20
Steel Beams	0.40
Acoustic Boards	1.2
Insulation	0.10
Services	0.25
Ceiling	0.25
TOTAL	2.4

Existing Roof Level -Simple Duo-Pitched Roofs (assumed):

	kPa
Purlins +Timber Rafters + Boards + Battens	0.30
Slate tiles	0.60
Insulation	0.10
Services	0.25
Ceiling	0.25
TOTAL	1.50

Existing Roof Level - Hipped Double Layer Roof (assumed):

	kPa
Trusses + Purlins +Timber Rafters + Boards + Battens	0.50
Rooflights/lead covering	0.60
Insulation	0.10
Services	0.25
Decorative Ceiling	0.50
TOTAL	1.95

Imposed Loads

Imposed loads (variable free actions) are calculated in accordance with EN 1991-1-1: 2002. Imposed loads are to be as follows:

Basement Level:

	Category	qk (kPa)	Qk (kN)
Office	B1	2.5	2.7
Corridor	C31	3.0	4.5
Plant		5.0	4.5
Archive	E1	7.5	7.0

Ground Level:

	Category	qk (kPa)	Qk (kN)
Café/Exhibition	E12	4.0	3.6
Corridor	C31	3.0	4.5

First Level:

	Category	qk (kPa)	Qk (kN)
Event Space/ Library	E12	2.5	3.6
Corridor	C31	3.0	4.5

Roof Level:

	Category	qk (kPa)	Qk (kN)
Maintenance	H	0.6	0.6

Fire

The structure is not designed for any specified fire resistance period. A specialist fire engineer will need to provide the building's fire design criteria.

Tolerances

All concrete and steel tolerances will be in accordance with NBS Concrete Specifications, National Structural Concrete Specification (NSCS, Part 1 Fourth Edition and BS EN 13670) and the National Structural Steelwork Specification (NSSS).

Building Movements

Deflection limits assumed in design:

- Total vertical deflection of slabs span/250.
- Vertical deflection of slabs due to live load span/360.

7 Civil Engineering

Roof Drainage Leak

The neighbouring extension appears to be causing additional runoff to drain into the library's drainage system. In result, a leak has presented itself at the connection point to the rainwater downpipe. Visual inspection suggests that the roof's grated outlet is clear from debris and obstructions, however, it would be sensible to inspect this outlet during rainfall to understand how it performs during storm conditions.

Additional guttering to capture runoff from the neighbouring façade could be an avenue to explore, however, it may be more valuable to review the outlet detail itself. This is a sizeable catchment positively draining to one outlet only; the existing outlet therefore may need to be enlarged, or an additional outlet provided.

Purcell should review the waterproofing and interface details as remedial works may be required.

Existing Below Ground Drainage

The basement drainage serving the site was surveyed by Drainage Consultants Ltd in March 2025. This shows that the drainage network is a combined water system comprising of 100mm diameter vitrified clay pipework and five inspection chambers, three of which are recorded on the Terra Measurement topographical survey (January 2024).

The existing drainage routes westward and connects into the 300mm diameter United Utilities combined water public sewer, which is located in Mosley Street, as illustrated in Figure 1 and 2.

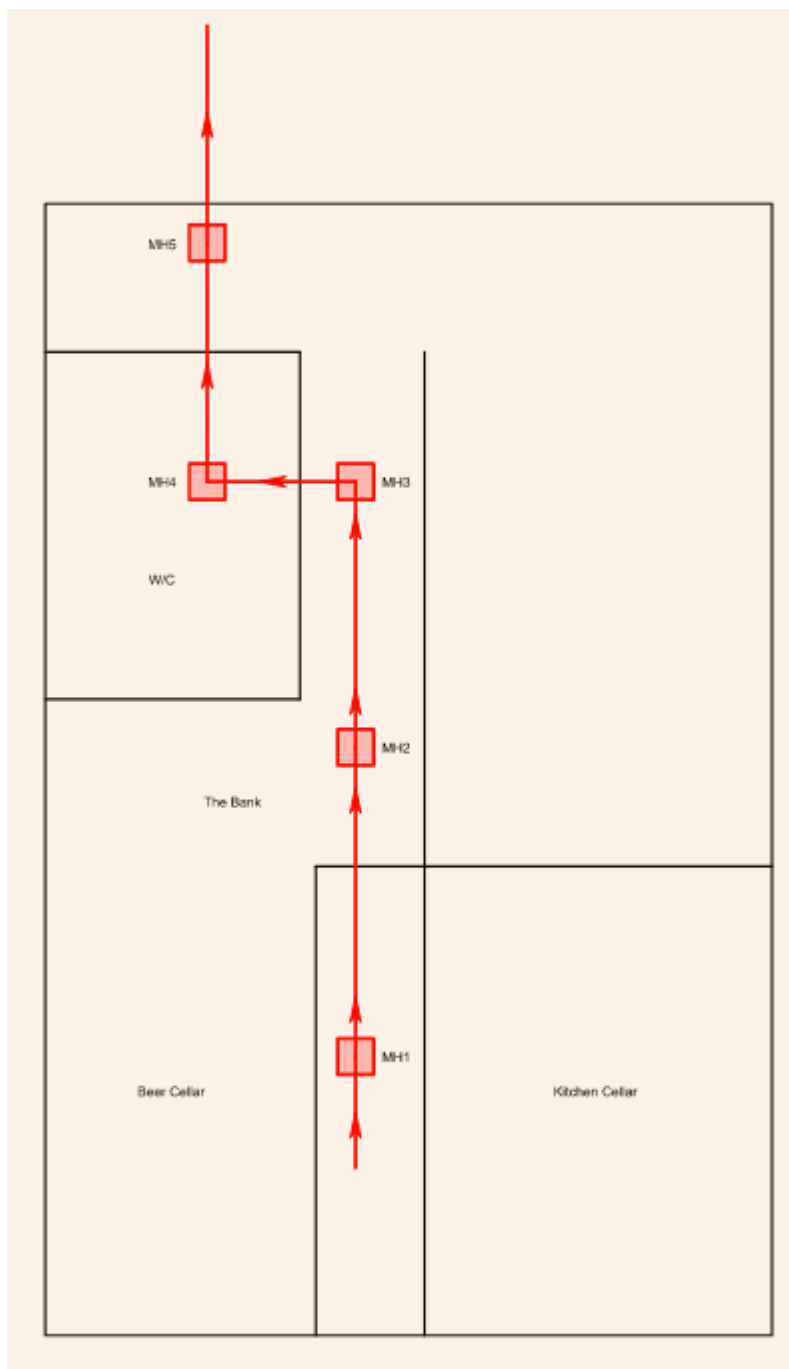


Figure 7.1: Indicative existing basement drainage layout by Drainage Consultants Ltd



Figure 7.2: United Utilities sewer records

The CCTV drainage survey condition report shows that the primary drainage is in good working order and free from defects. This excludes the final brick-built manhole at the outfall to the United Utilities public sewer. This appears to be blocked, and the interceptor trap should be remediated or replaced to mitigate the risk of future blockages occurring.

The CCTV survey provides limited information, and it is recommended that a further survey is instructed to inform the Stage 4 design, in accordance with P&M's drainage survey tender document. This survey will provide a better understanding of the existing drainage, including manhole depths, setting out, pop-up locations, routes to manholes and the condition of the pipework.

A siphonic drainage system serves the section of roof on Back George Street. This comprises two small diameter rainwater downpipes that are prone to blockages and cause the downpipes to surcharge, thereby increasing flood risk within the Grade II* Listed building.

Proposed Below Ground Drainage

It isn't practical to retrofit Sustainable Drainage Systems (SuDS), for example below ground attenuation tanks, rainwater harvesting systems, green roof, etc., into the drainage layout, therefore, it is proposed to retain and reuse the existing infrastructure, where viable.

Due to limited existing drainage information, it is proposed to construct new below ground connections to the primary drainage run and manholes. However, it is anticipated that some of the existing pop-ups serving the basement drainage can be retained and reused. The condition of this drainage is unknown and if defects are present, these will need to be remediated, for example:

- High-pressure jetting to clear debris/obstructions
- Relining/patch repairs to fractured pipework
- Replacement of collapsed pipework

It is assumed that the shared basement drainage is a 'Private Sewer', as noted on United Utilities asset record maps. The proposed lift pit is in proximity to this basement drainage, however, this is not subject to a 'Build-Over Agreement' from United Utilities due to the drainage's private ownership. Regardless, the structural proposals will ensure that the drainage is suitably protected from loading. For the avoidance of any doubt, P&M will liaise with United Utilities to define the sewer type.

It is proposed to abandon the existing siphonic drainage system serving the section of roof on Back George Street and replace this with a conventional gravity-fed system. Basements are more susceptible to sewer flooding and rerouting this roof area externally will relieve pressure on the basement drainage system.

The above ground drainage will be reconfigured and route externally via cast iron hoppers and square downpipes. New below ground drainage is required and this will be offered for adoption to United Utilities subject to Section 104 approval. To facilitate this, the existing services within the Back George Street road and footpath may need to be diverted to suit.

Grease management systems are required within the kitchen to capture fat, oils and grease (FOGs) before they enter the below ground drainage network. To minimise below ground excavation works, these grease management systems should be provided above ground and designed by a specialist in collaboration with the Catering Consultant.

Flood Risk

The EA's flood map for planning shows that the site is located in Flood Zone 1 and is not at risk of flooding. Developments in this flood zone do not have any restrictions, provided they do not increase the risk of flooding elsewhere.

The site appears to be at low risk of flooding from surface water, rivers and reservoirs as illustrated in Figures 3-5. According to the Manchester City Council Strategic Flood Risk Assessment (SFRA), the site is not at risk of groundwater flooding. However, the building does have a basement, which is more susceptible to this type of flooding.

Basements are also more susceptible to sewer flooding and the SFRA notes that site is located in the 'Conurbation Core' Critical Drainage Area (CDA), and developments within this CDA are generally at risk of surface water flooding and sewer surcharging.

Mitigation measures such as positively pumped devices or non-return valves should be considered to futureproof against climate change and the risk of sewer surcharging. It would also be appropriate to consider waterproofing systems to mitigate against groundwater ingress.

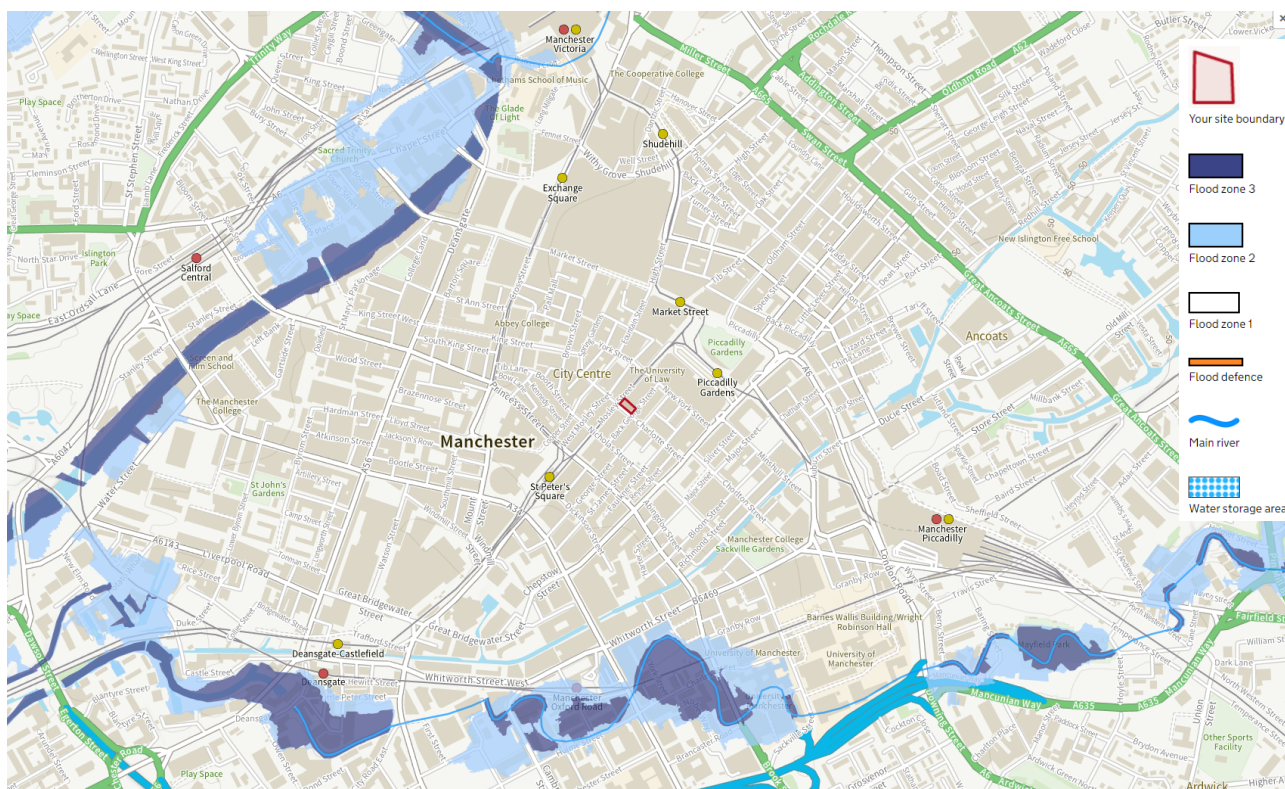


Figure 7.3 Environment Agency flood zone map

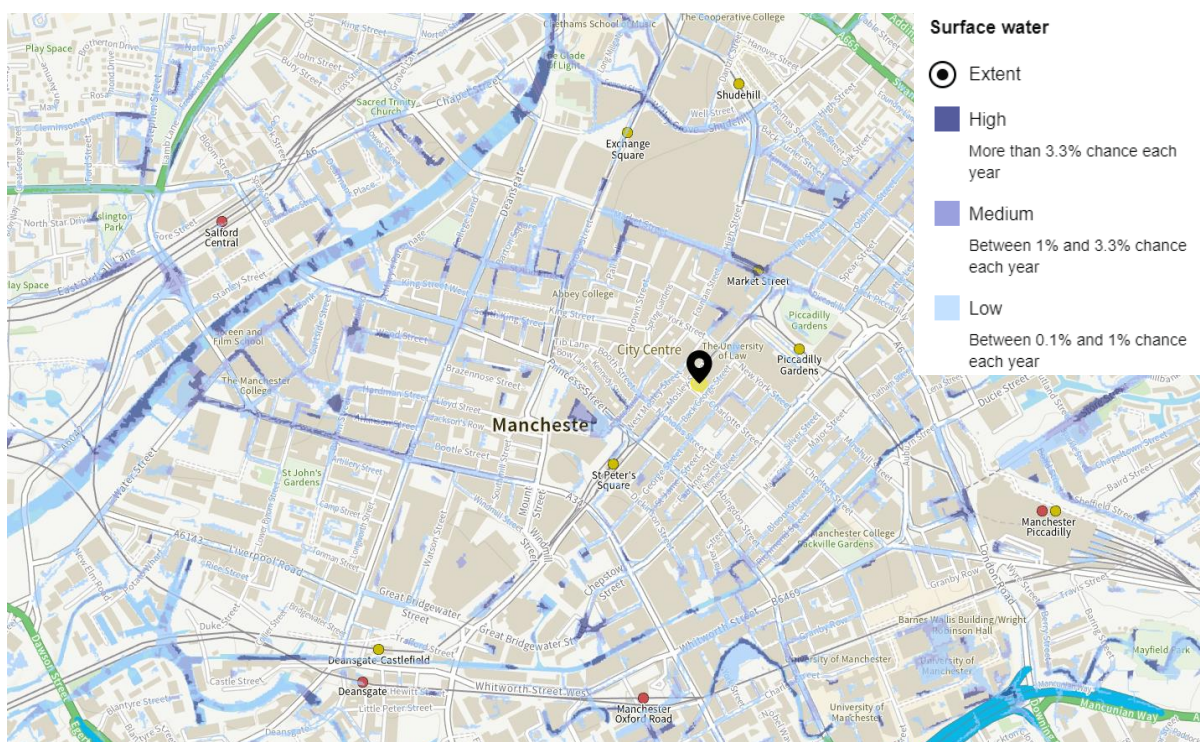


Figure 7.4 Environment Agency surface water flood risk map

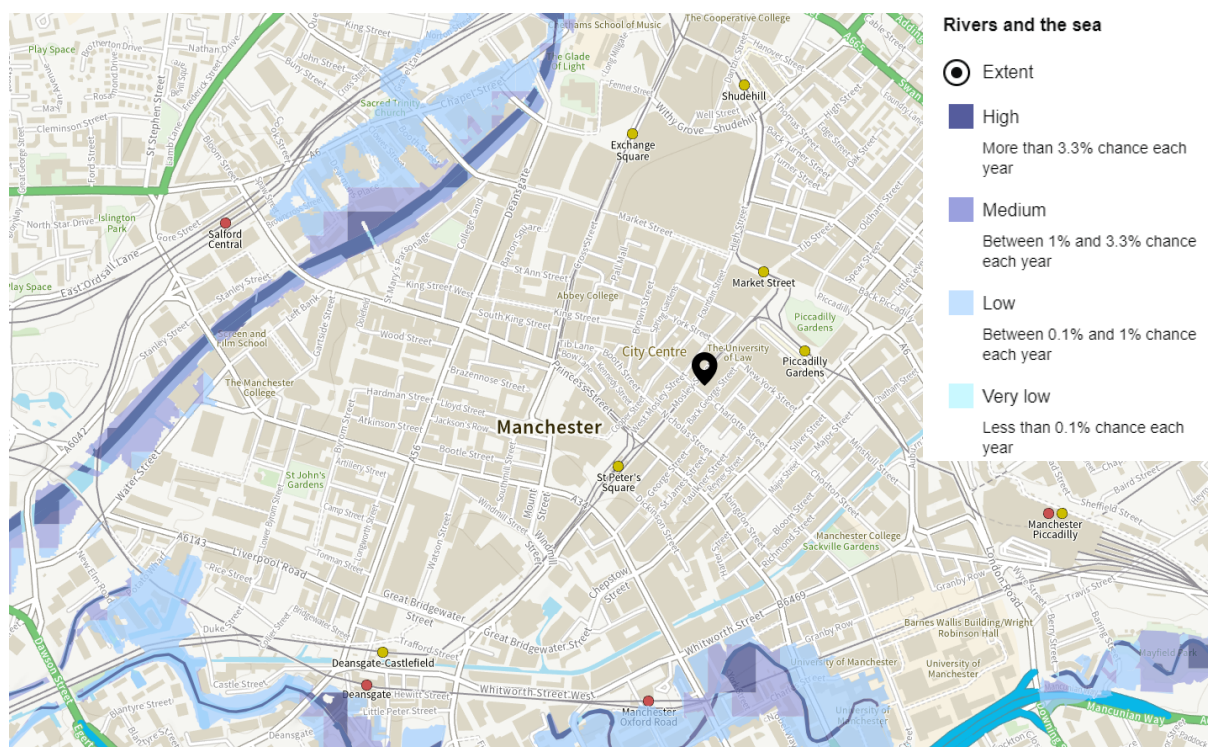


Figure 7.5 Environment Agency rivers and sea flood risk map

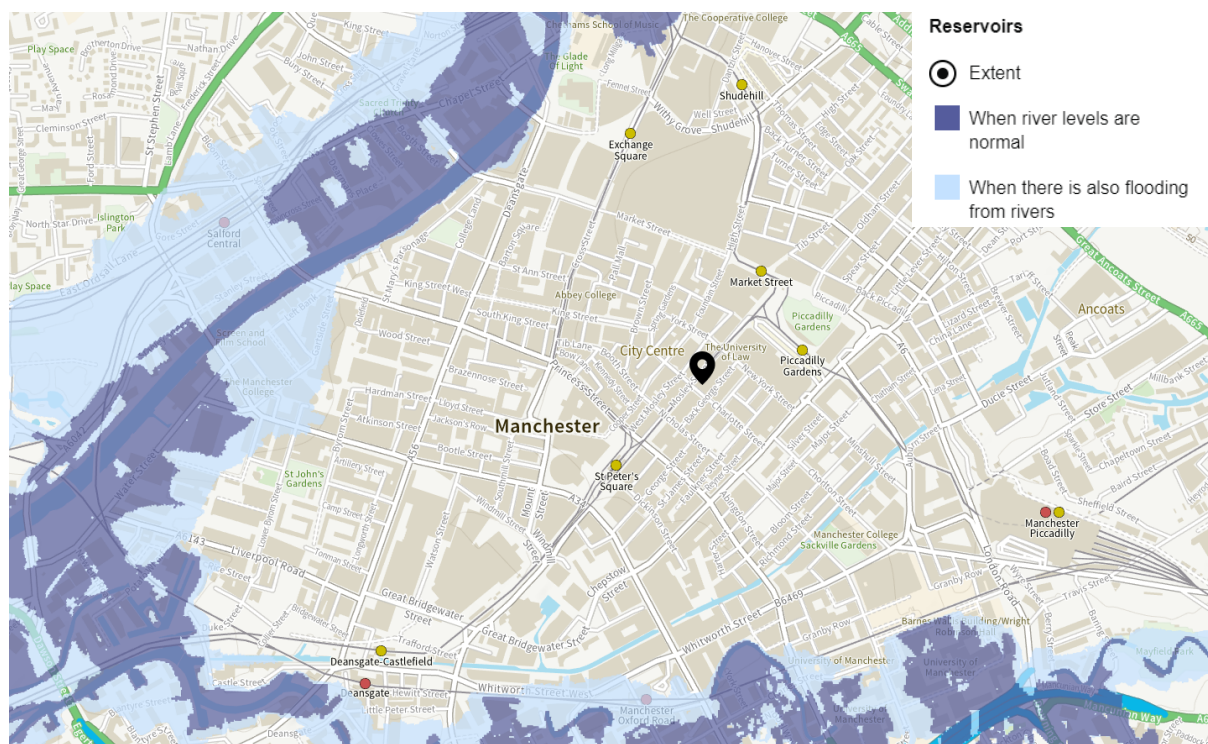


Figure 7.6. Environment Agency reservoir flood risk map

8 Considerations for Stage 4

As the design progresses into Stage 4, some items require further consideration as the design develops further. These include, but are not limited to:

Surveys:

- Price & Myers prepared the opening-up survey scope (refer to Appendix C). The opening up works carried out to date were very limited due to constraints specified in section n4 of this report. Comprehensive opening up works on all floors will be required to inform stage 4 design.
- The CCTV survey provides limited information, and it is recommended that a further survey is instructed to inform the Stage 4 design, in accordance with P&M's drainage survey tender document. This survey will provide a better understanding of the existing drainage, including manhole depths, setting out, pop-up locations, routes to manholes and the condition of the pipework.
- Timber survey—A new timber survey of the roof is required to inform the RIBA Stage 4 repairs of the roof.

Roof:

- Access to the roof is cumbersome and not entirely safe. High-level provisions for a proprietary aluminium walkway around the dome were to be made in RIBA Stage 3 design to improve the roof access. This will become a contractor Designed Item at Stage 4.
- Further detailed structural analysis of the roof structure will be required at Stage 4 once the proposed insulation thickness and build-up have crystallised. There is also a proposal to provide a new chandelier suspended from the central part of the dome. This will need to be further scrutinised at the next design stage.

1st Floor:

- As mentioned in the survey section, the opening-up works have not yet taken place at 1st floor. These works are required to be undertaken ASAP to further inform the spatial coordination of the proposed lightbox and the imposed load capacity assessment.
- Further coordination of M&E openings.

Lift:

- Spatial coordination including door and riser openings and floor void positioning.
- Design of the reinforced concrete lift pit.
- Possible underpinning to walls near the lift pit.
- Detailed design of the lift support structure once the lift specification is confirmed

Plant Enclosure:

- Structural design of the steel grillage following the receipt of the M&E equipment weights and specifications.
- Spatial coordination of the plant enclosure.
- Consideration to be given to balustrading, insulation, waterproofing and temporary roof.

Entrance:

- Further coordination of new beams and slab in the lobby.
- Agreement in Principle application to the Highway department on the proposed modifications the existing retaining wall to be carried out at stage 4 once the contractor is appointed.

Basement:

- Basement slab design – especially in highly loaded archive area.

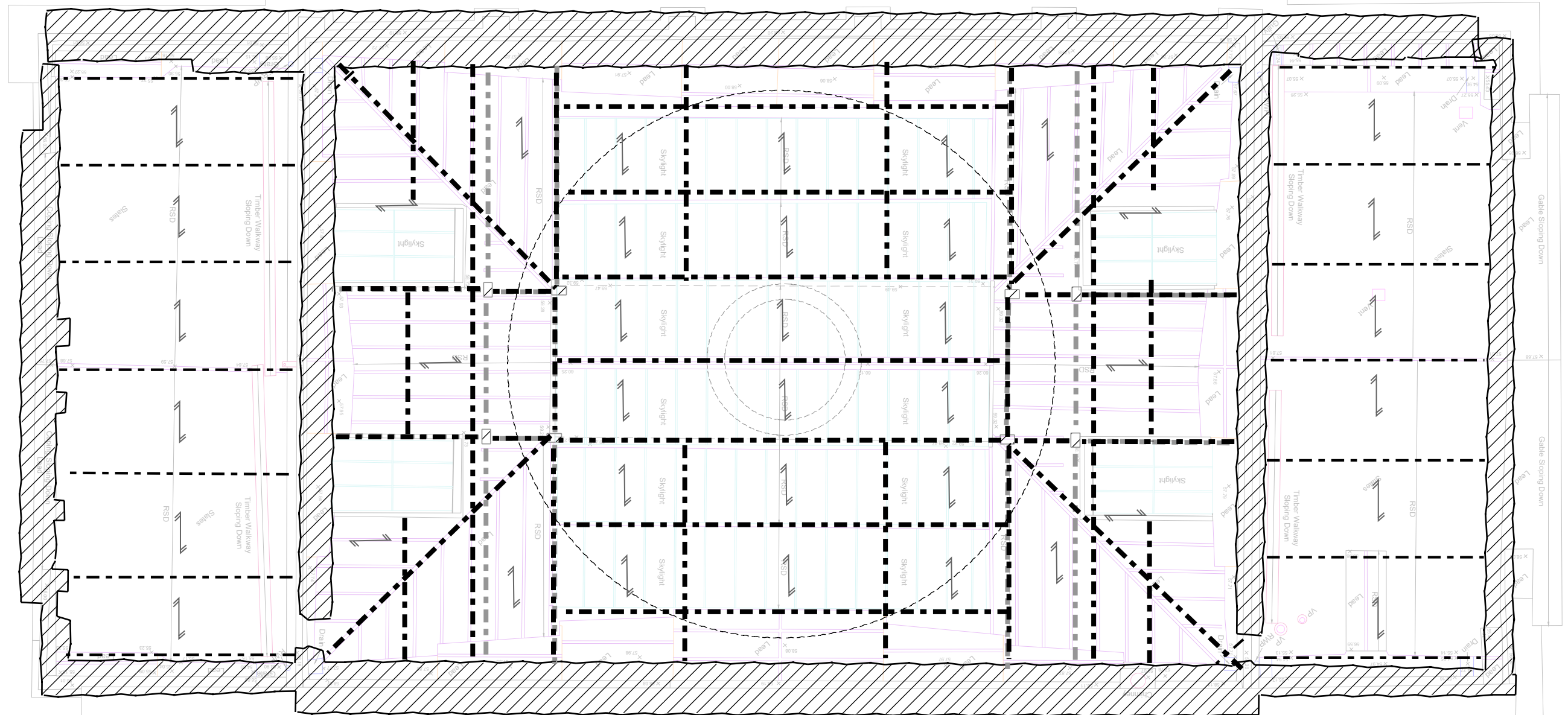
CAD:

- Stage 4 structural drawings to be developed in Revit from stage 4 onwards.

Appendix A

Existing Structural Sketches

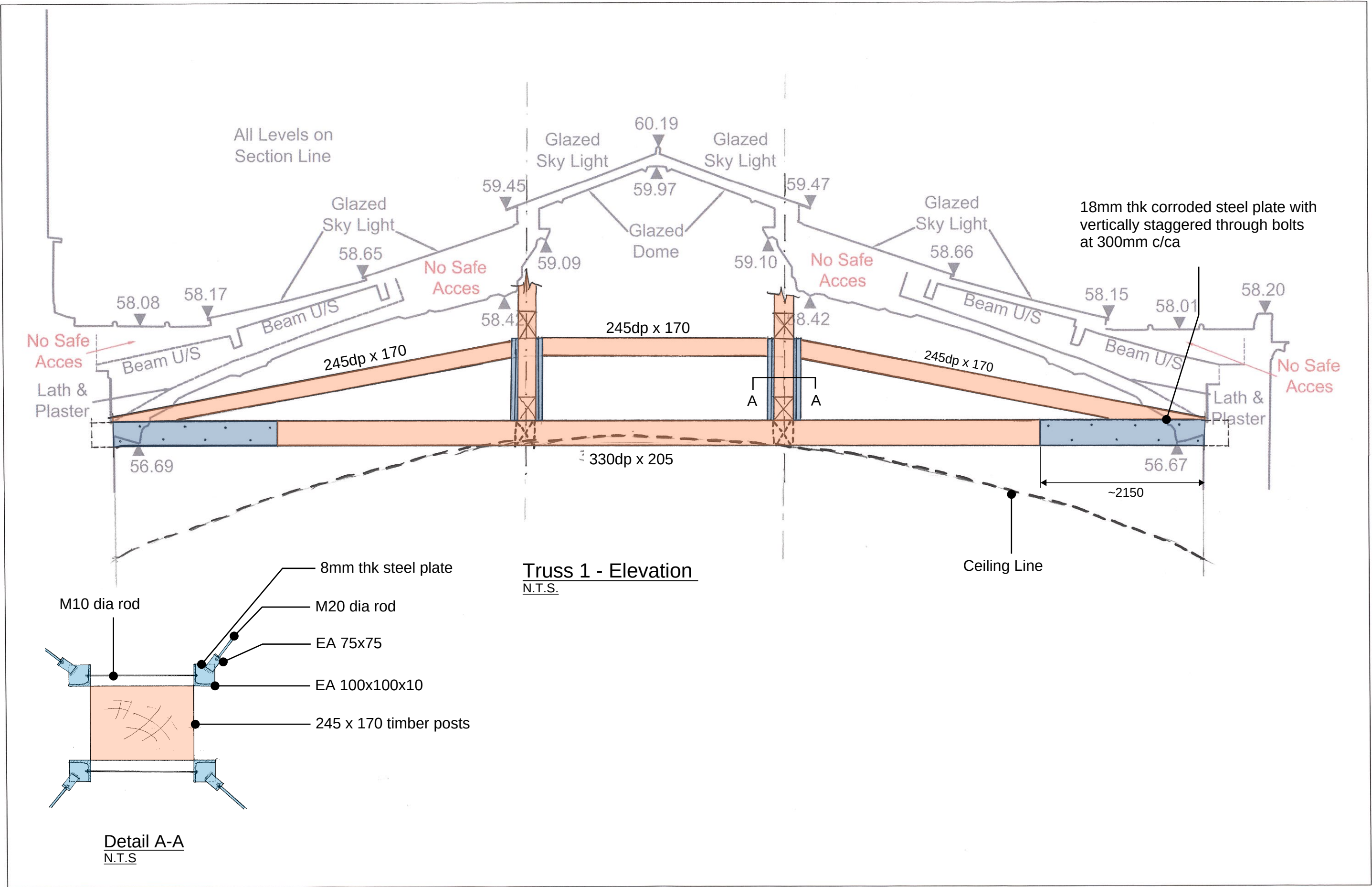
NOTE: Not all structural elements are shown for clarity and due to lack of survey information/lack of accessibility.

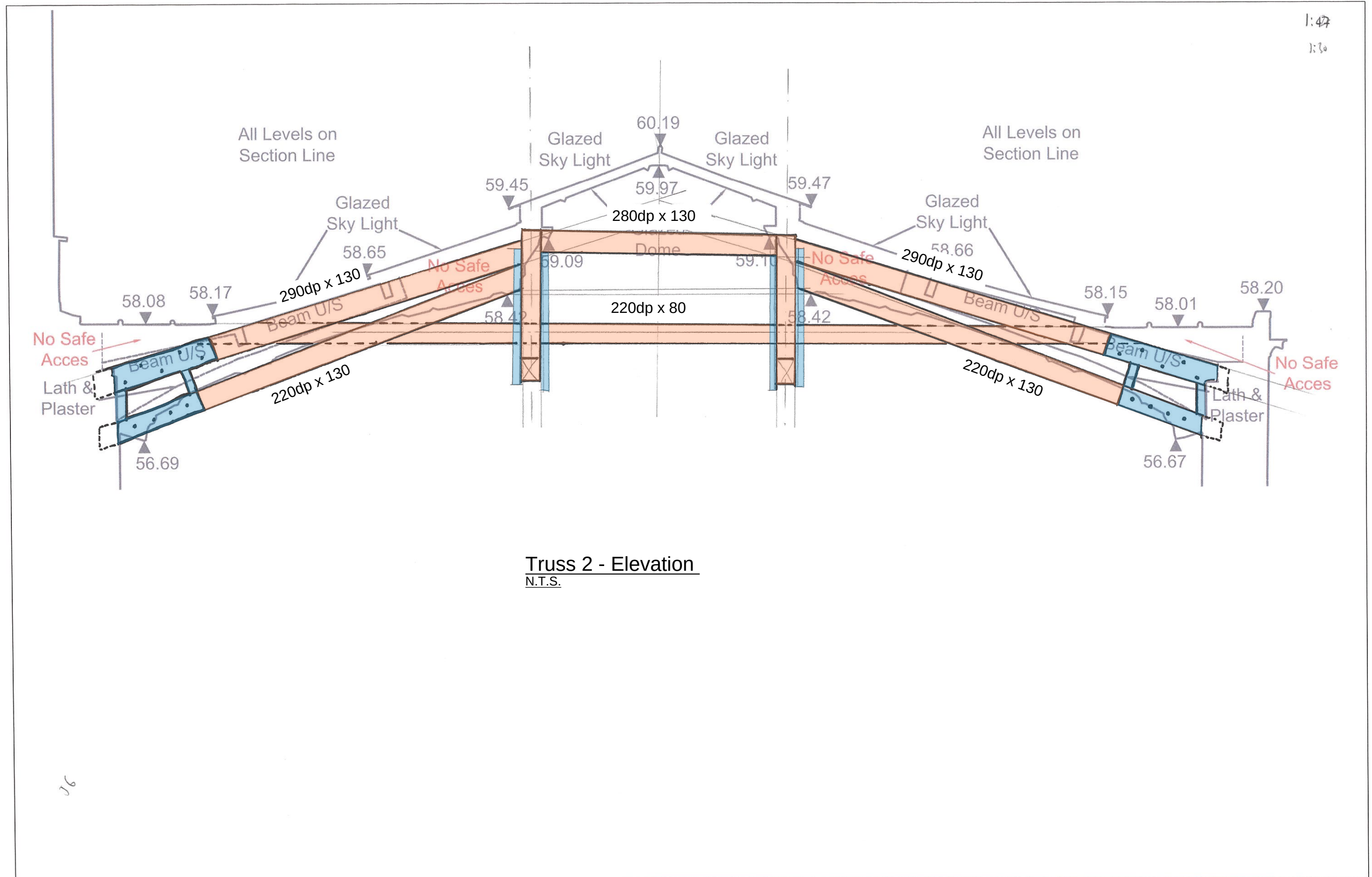


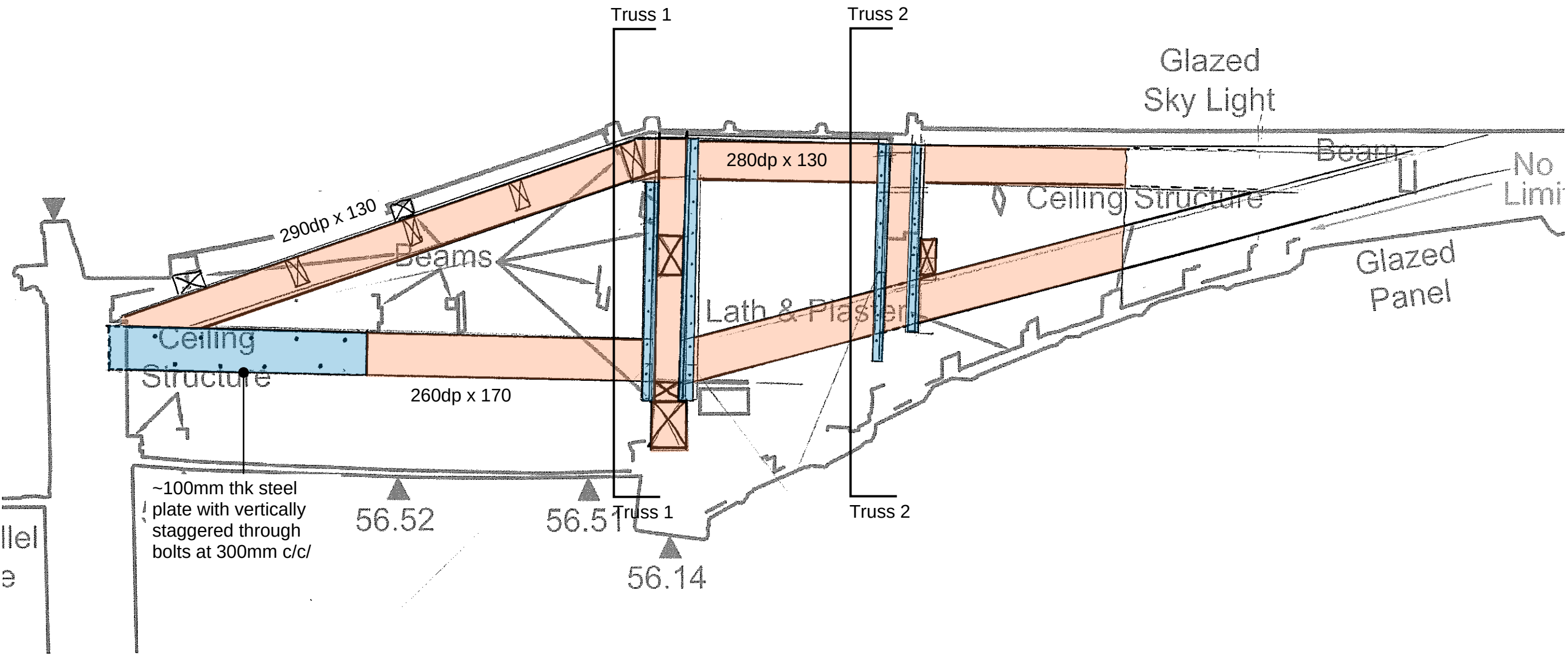
KEY

1. Do not scale the drawing.
2. This drawing is to be read in conjunction with all other Architects and Engineers drawings and specifications including outline structural specification
3. All dimensions are in millimetres unless noted otherwise.
4. Any discrepancies between structural and architectural setting out dimensions must be brought to the attention of the Architect and Engineers.
5. This is an existing building, any dimensions to existing structure should be confirmed by site measure, and any discrepancies brought to the attention of the Architect and the Engineers.

-  Structural walls
 Timber Truss Below
 Timber Roof Beams
 Roof span direction between rafters







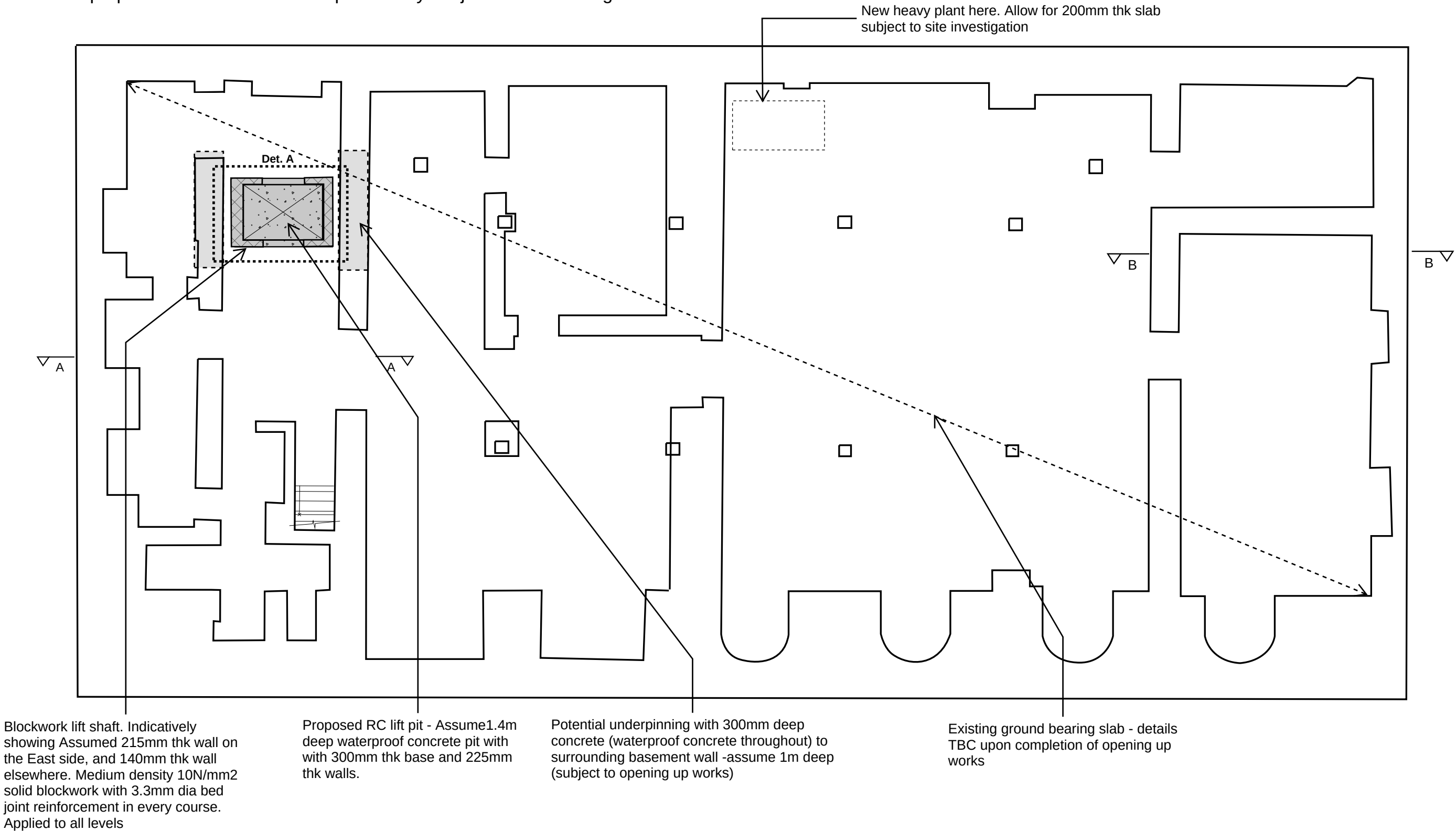
Truss 3 - Elevation
N.T.S.

Appendix B

Proposed Structural Sketches

NOTES
1. Do not scale the drawing.
2. This drawing is to be read in conjunction with all other Architects and Engineers drawings and specifications including outline structural specification
3. All dimensions are in millimetres unless noted otherwise.
4. Any discrepancies between structural and architectural setting out dimensions must be brought to the attention of the Architect and Engineers.
5. This is an existing building, any dimensions to existing structure should be confirmed by site measure, and any discrepancies brought to the attention of the Architect and the Engineers.

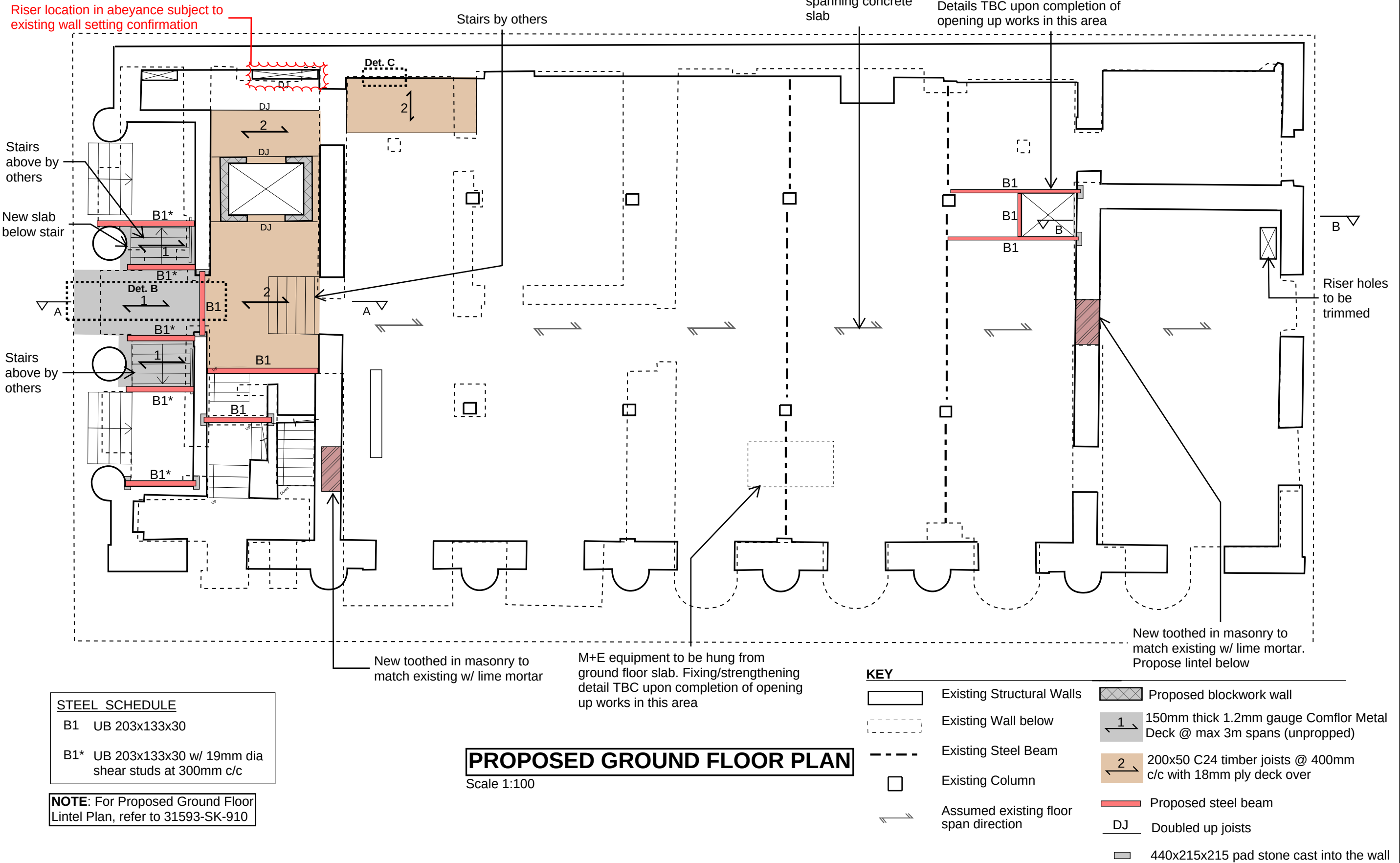
NOTE: All proposed members sizes are preliminary subject to site investigation



NOTE: For Proposed Basement Lintel Plan, refer to 31593-SK-900

NOTES
1. Do not scale the drawing.
2. This drawing is to be read in conjunction with all other Architects and Engineers drawings and specifications including outline structural specification
3. All dimensions are in millimetres unless noted otherwise.
4. Any discrepancies between structural and architectural setting out dimensions must be brought to the attention of the Architect and Engineers.
5. This is an existing building, any dimensions to existing structure should be confirmed by site measure, and any discrepancies brought to the attention of the Architect and the Engineers.

NOTE: All proposed members sizes are preliminary subject to site investigation

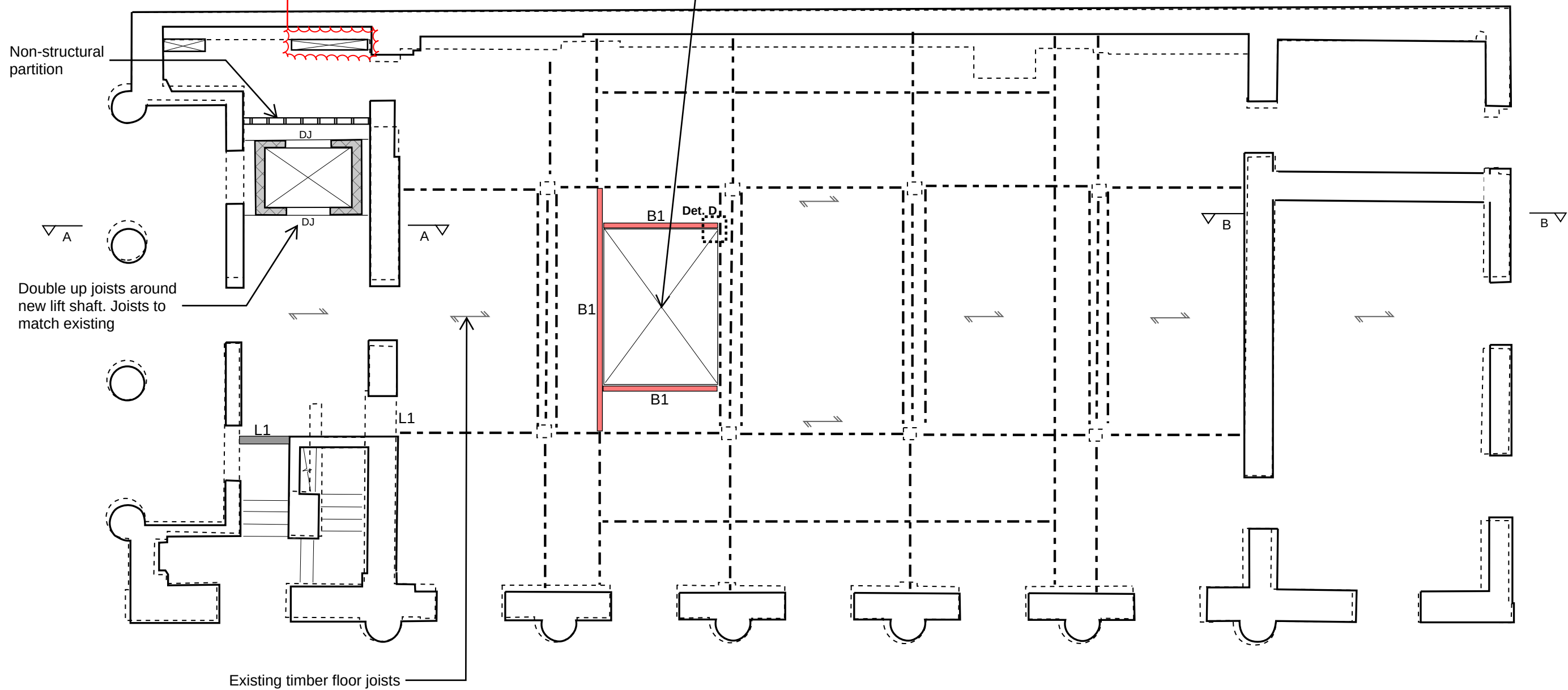


NOTES
1. Do not scale the drawing.
2. This drawing is to be read in conjunction with all other Architects and Engineers drawings and specifications including outline structural specification
3. All dimensions are in millimetres unless noted otherwise.
4. Any discrepancies between structural and architectural setting out dimensions must be brought to the attention of the Architect and Engineers.
5. This is an existing building, any dimensions to existing structure should be confirmed by site measure, and any discrepancies brought to the attention of the Architect and the Engineers.

NOTE: All proposed members sizes are preliminary subject to site investigation

Riser location in abeyance subject to existing wall setting confirmation

Proposed glass box (Designed by others) to be trimmed by new steel beams connected back to existing structure subject to site investigations



PROPOSED FIRST FLOOR PLAN

Scale 1:100

STEEL SCHEDULE

B1 UB 203x133x30

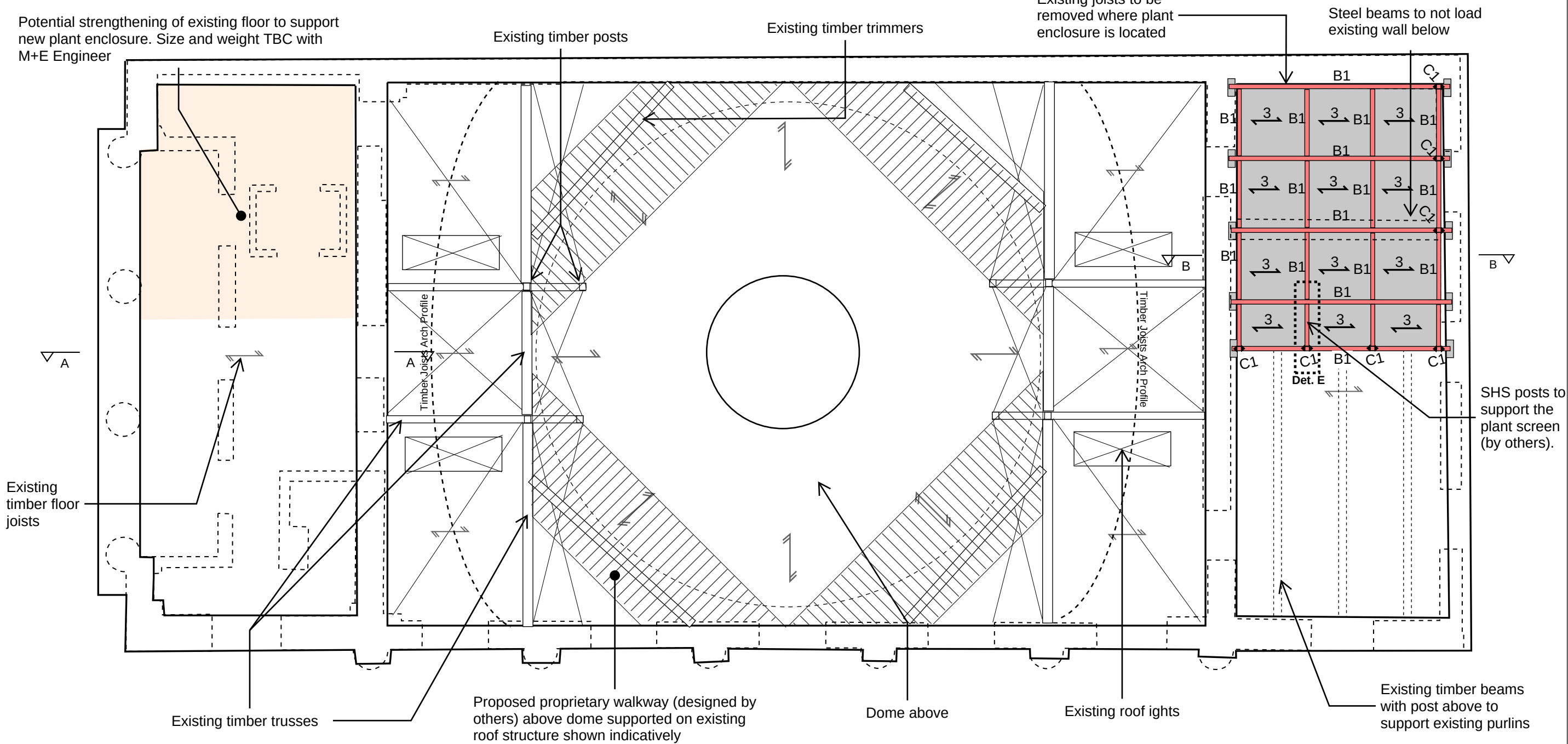
NOTE: For Proposed First Floor Lintel Plan, refer to 31593-SK-920

KEY

- | | | | |
|--|---------------------------------------|--|-------------------------|
| | Existing Structural Walls | | Proposed blockwork wall |
| | Existing Wall below | | Proposed steel beam |
| | Existing Steel Beam | | Doubled up joists |
| | Existing Column | | |
| | Assumed existing joist span direction | | |

NOTES
1. Do not scale the drawing.
2. This drawing is to be read in conjunction with all other Architects and Engineers drawings and specifications including outline structural specification
3. All dimensions are in millimetres unless noted otherwise.
4. Any discrepancies between structural and architectural setting out dimensions must be brought to the attention of the Architect and Engineers.
5. This is an existing building, any dimensions to existing structure should be confirmed by site measure, and any discrepancies brought to the attention of the Architect and the Engineers.

NOTE: All proposed members sizes are preliminary subject to site investigation



STEEL SCHEDULE

B1 UB 203x133x30
C1 SHS 100x100x5

LINTEL SCHEDULE

Note: Provide lintels for opening below
L1 Naylor Prestress Concrete Lintel or similar approved. No. of lintels to match width of existing wall

PROPOSED ATTIC FLOOR PLAN

Scale 1:100

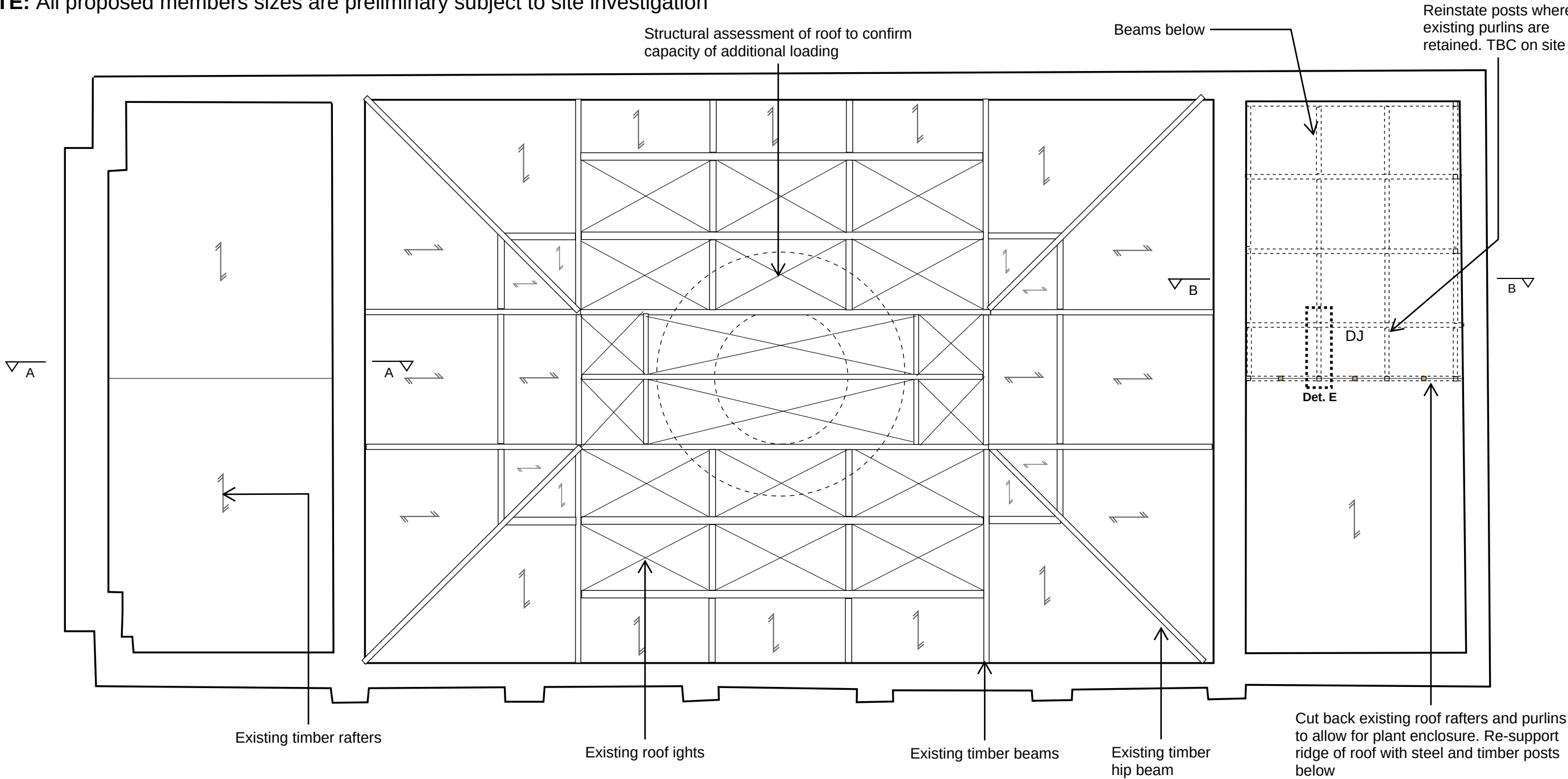
KEY

- Existing Structural Walls
- Existing Wall below
- Existing Steel Cable
- Existing Timber beam/truss
- Assumed existing joist span direction
- Proposed steel beam
- Doubled up joists
- 440x215x215 pad stone cast into the wall
- Proprietary aluminium walkway (CPD Item)

 Steel grating 50x3 LK 35mm Ball Proof @ max 1.73m spans

NOTES
1. Do not scale the drawing.
2. This drawing is to be read in conjunction with all other Architects and Engineers drawings and specifications including outline structural specification
3. All dimensions are in millimetres unless noted otherwise.
4. Any discrepancies between structural and architectural setting out dimensions must be brought to the attention of the Architect and Engineers.
5. This is an existing building, any dimensions to existing structure should be confirmed by site measure, and any discrepancies brought to the attention of the Architect and the Engineers.

NOTE: All proposed members sizes are preliminary subject to site investigation



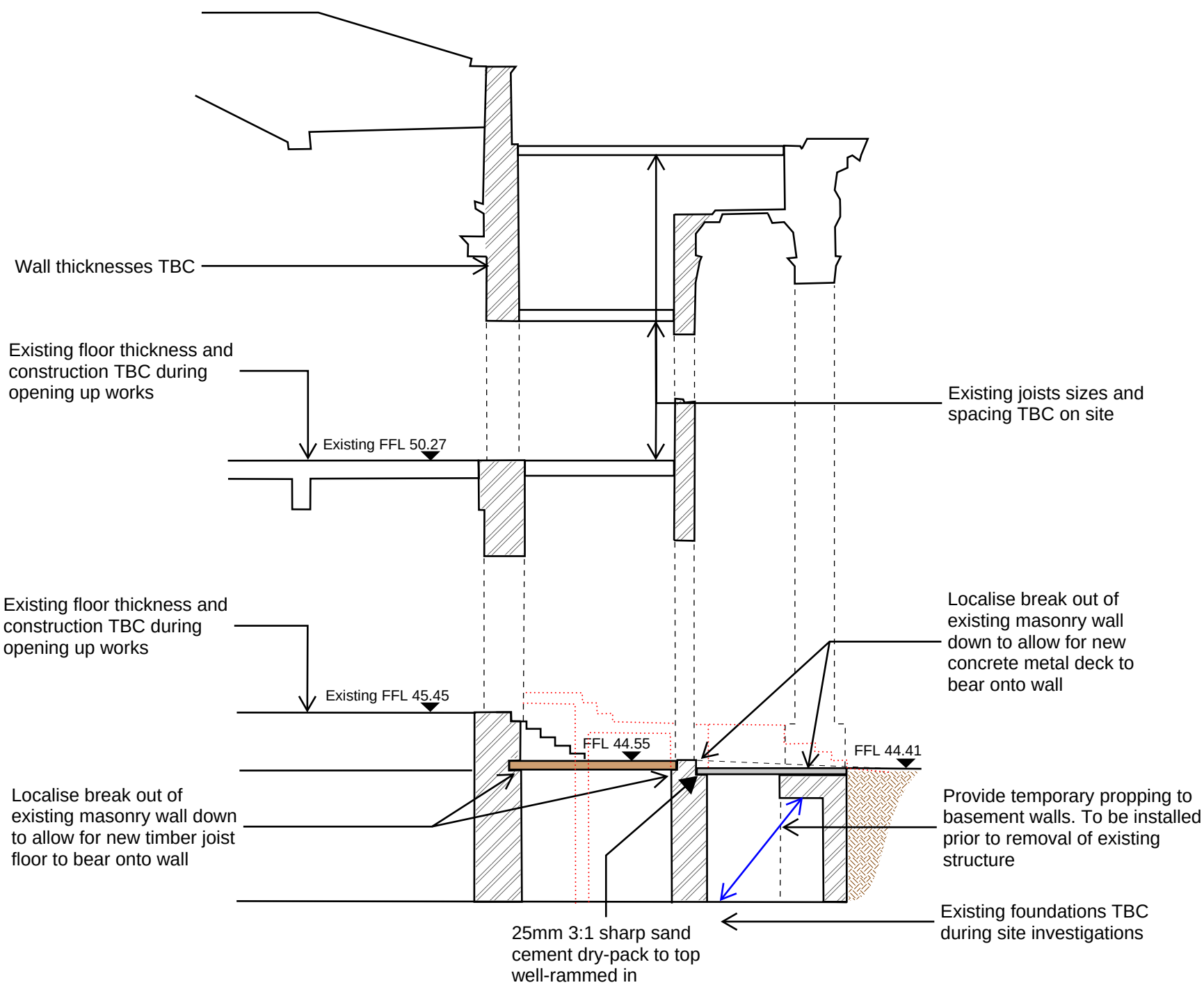
PROPOSED ROOF PLAN

Scale 1:100

KEY	
	Existing Structural Walls
	Existing Wall below
	Existing Steel Cable
	Existing Timber beam/truss
	Assumed existing joist span direction
	DJ Doubled up joists

NOTES
1. Do not scale the drawing.
2. This drawing is to be read in conjunction with all other Architects and Engineers drawings and specifications including outline structural specification
3. All dimensions are in millimetres unless noted otherwise.
4. Any discrepancies between structural and architectural setting out dimensions must be brought to the attention of the Architect and Engineers.
5. This is an existing building, any dimensions to existing structure should be confirmed by site measure, and any discrepancies brought to the attention of the Architect and the Engineers.

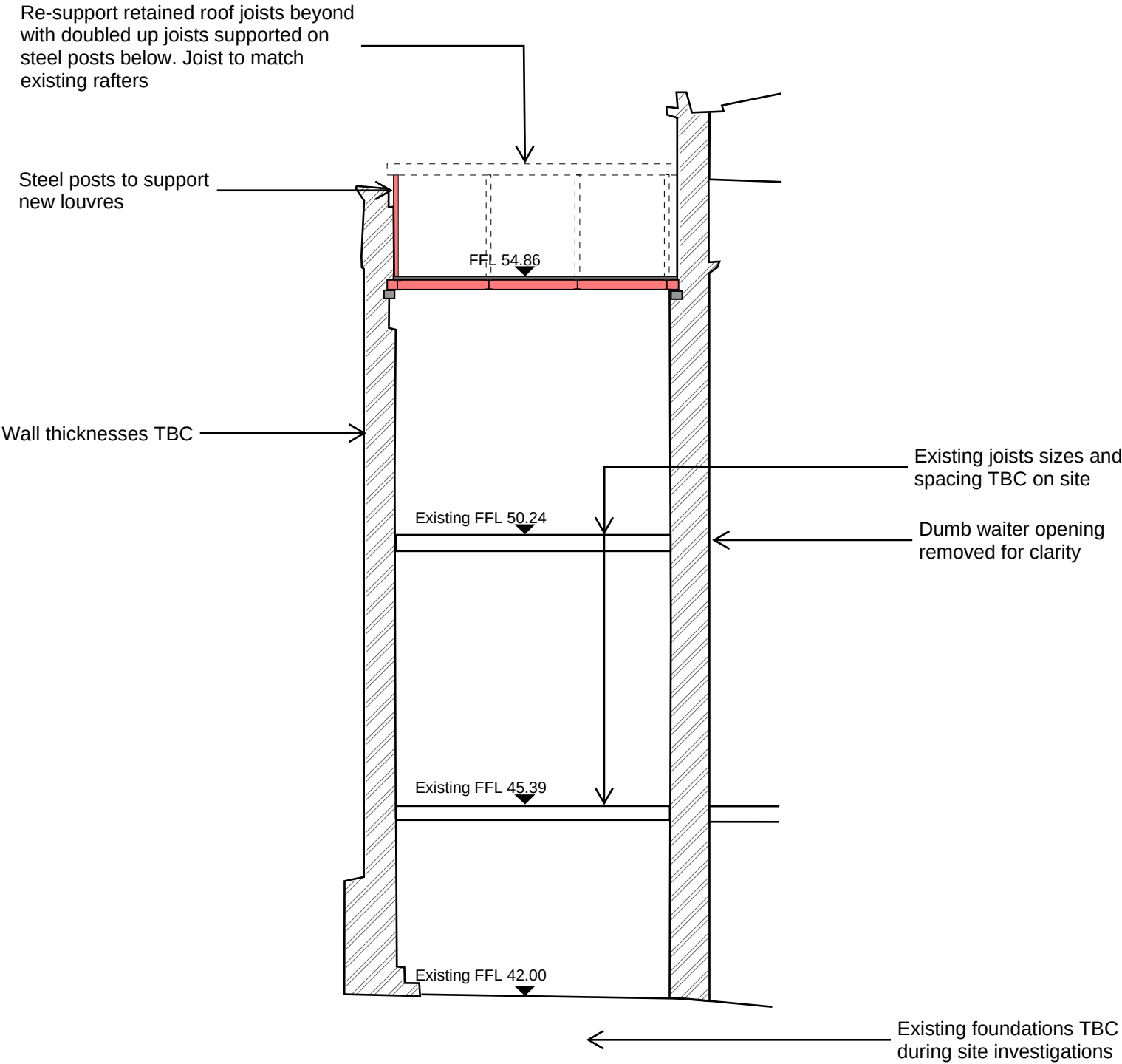
NOTE: All proposed levels TBC by Architect



PROPOSED SECTION A-A
Scale 1:100

NOTES
1. Do not scale the drawing.
2. This drawing is to be read in conjunction with all other Architects and Engineers drawings and specifications including outline structural specification
3. All dimensions are in millimetres unless noted otherwise.
4. Any discrepancies between structural and architectural setting out dimensions must be brought to the attention of the Architect and Engineers.
5. This is an existing building, any dimensions to existing structure should be confirmed by site measure, and any discrepancies brought to the attention of the Architect and the Engineers.

NOTE: All proposed levels TBC by Architect



PROPOSED SECTION B-B
Scale 1:100

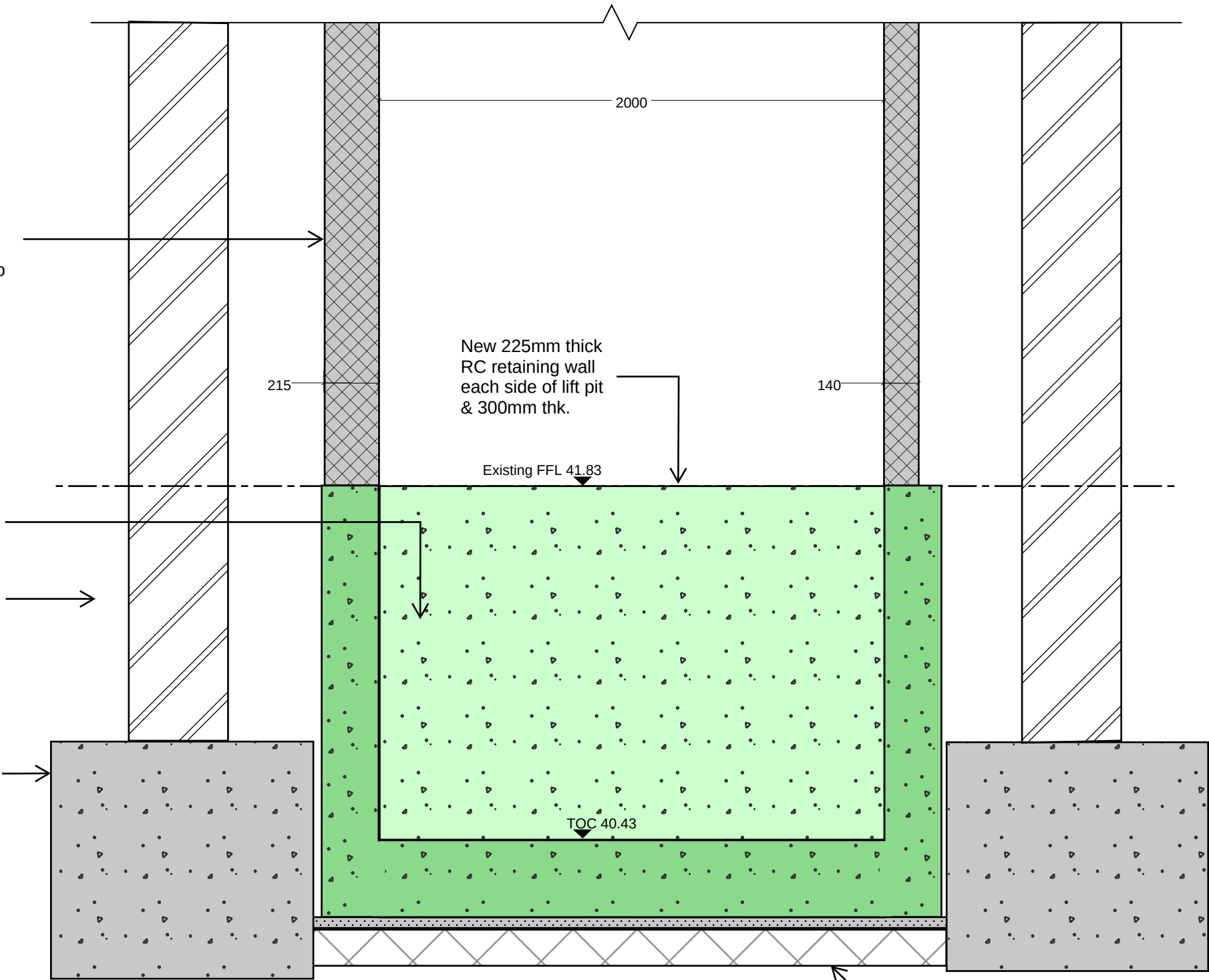
NOTES
1. Do not scale the drawing.
2. This drawing is to be read in conjunction with all other Architects and Engineers drawings and specifications including outline structural specification
3. All dimensions are in millimetres unless noted otherwise.
4. Any discrepancies between structural and architectural setting out dimensions must be brought to the attention of the Architect and Engineers.
5. This is an existing building, any dimensions to existing structure should be confirmed by site measure, and any discrepancies brought to the attention of the Architect and the Engineers.

Blockwork lift shaft. Indicatively showing Assumed 215mm thk wall on the East side. Medium density 10N/mm2 solid blockwork with 3.3mm dia bed joint reinforcement in every course. Applied to all levels

Proposed levels and setting out TBC by Architect

Existing footing shown indicatively, depth,width and levels TBC during site investigations

Potential underpinning with concrete (waterproof concrete throughout) to surrounding basement wall -assume 1m deep (subject to opening up works)

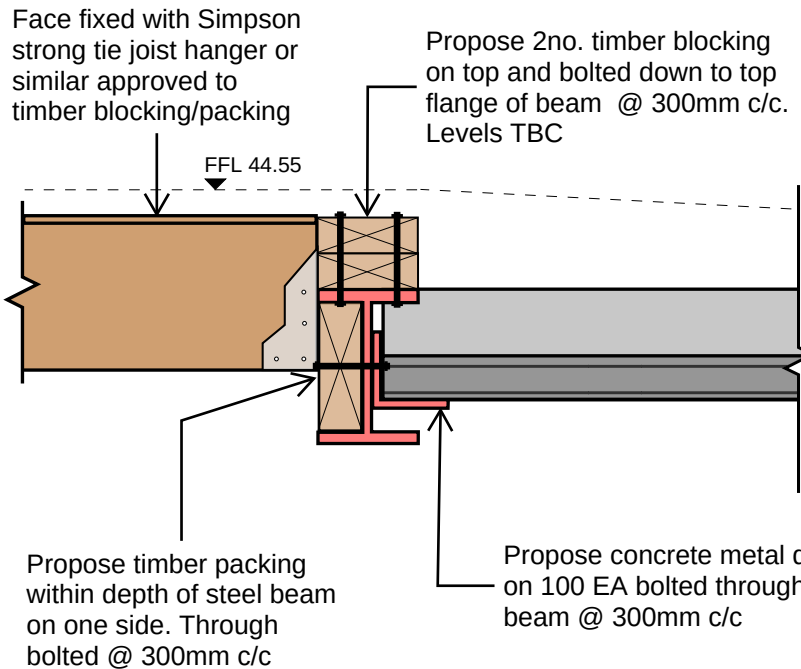


New 150mm thick ground bearing slab over 50mm blinding and 150mm well compacted type 1 subject to ground investigation

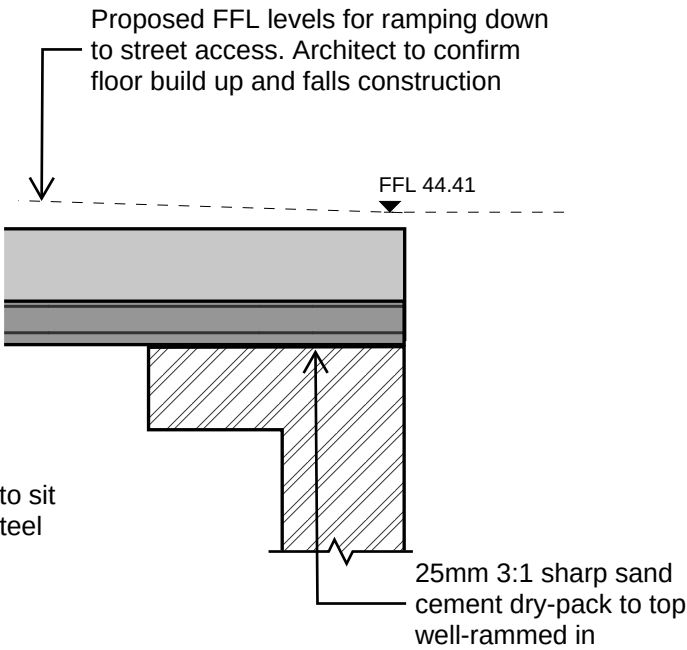
DETAIL A
Scale 1:20

NOTES
1. Do not scale the drawing.
2. This drawing is to be read in conjunction with all other Architects and Engineers drawings and specifications including outline structural specification
3. All dimensions are in millimetres unless noted otherwise.
4. Any discrepancies between structural and architectural setting out dimensions must be brought to the attention of the Architect and Engineers.
5. This is an existing building, any dimensions to existing structure should be confirmed by site measure, and any discrepancies brought to the attention of the Architect and the Engineers.

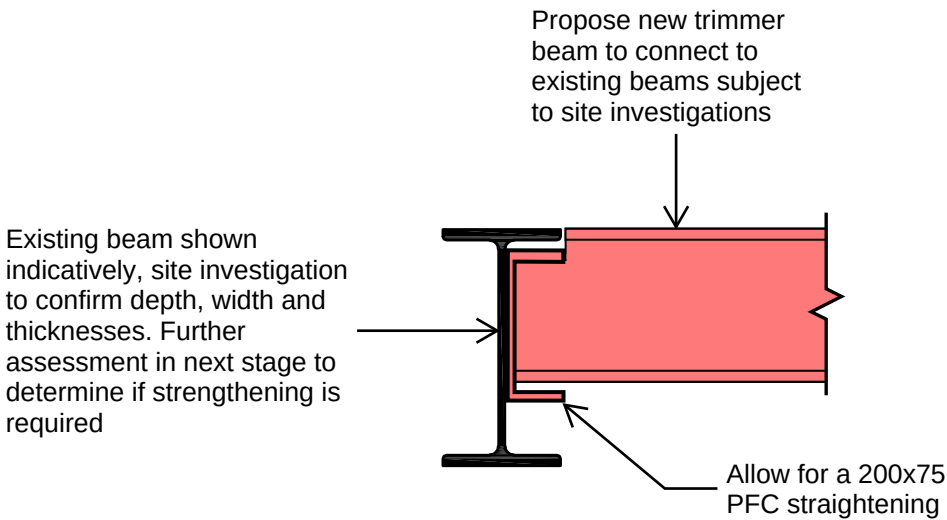
NOTE: All proposed levels TBC by Architect



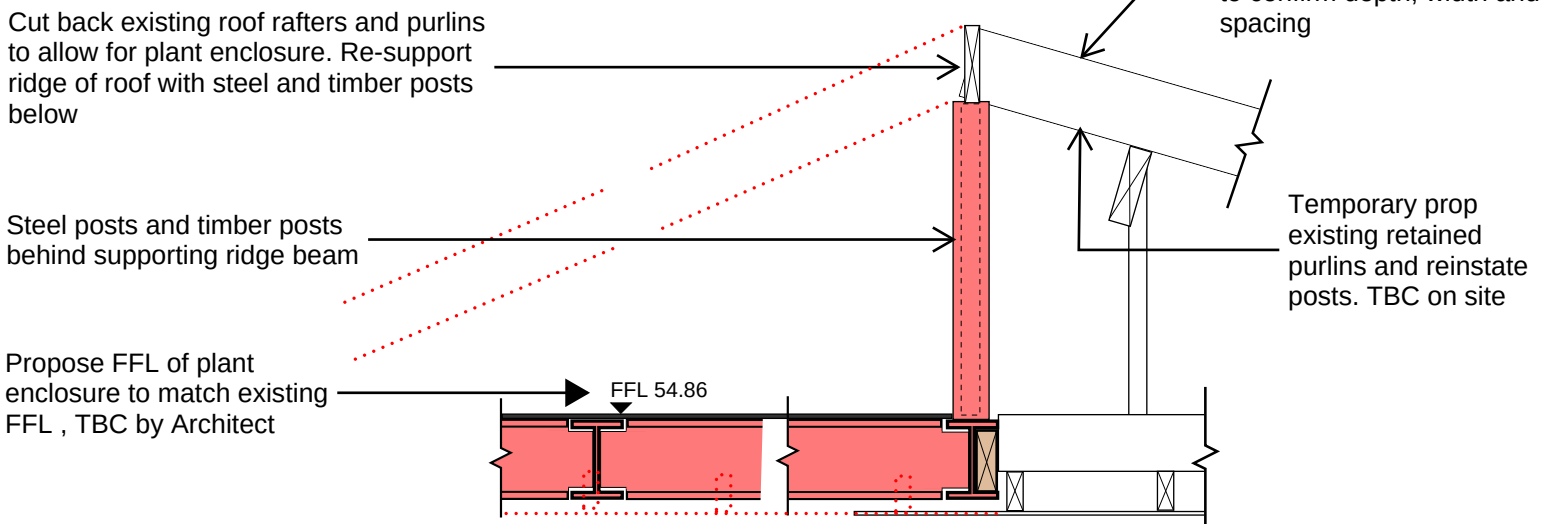
DETAIL B
Scale 1:10



DETAIL C
Scale 1:10



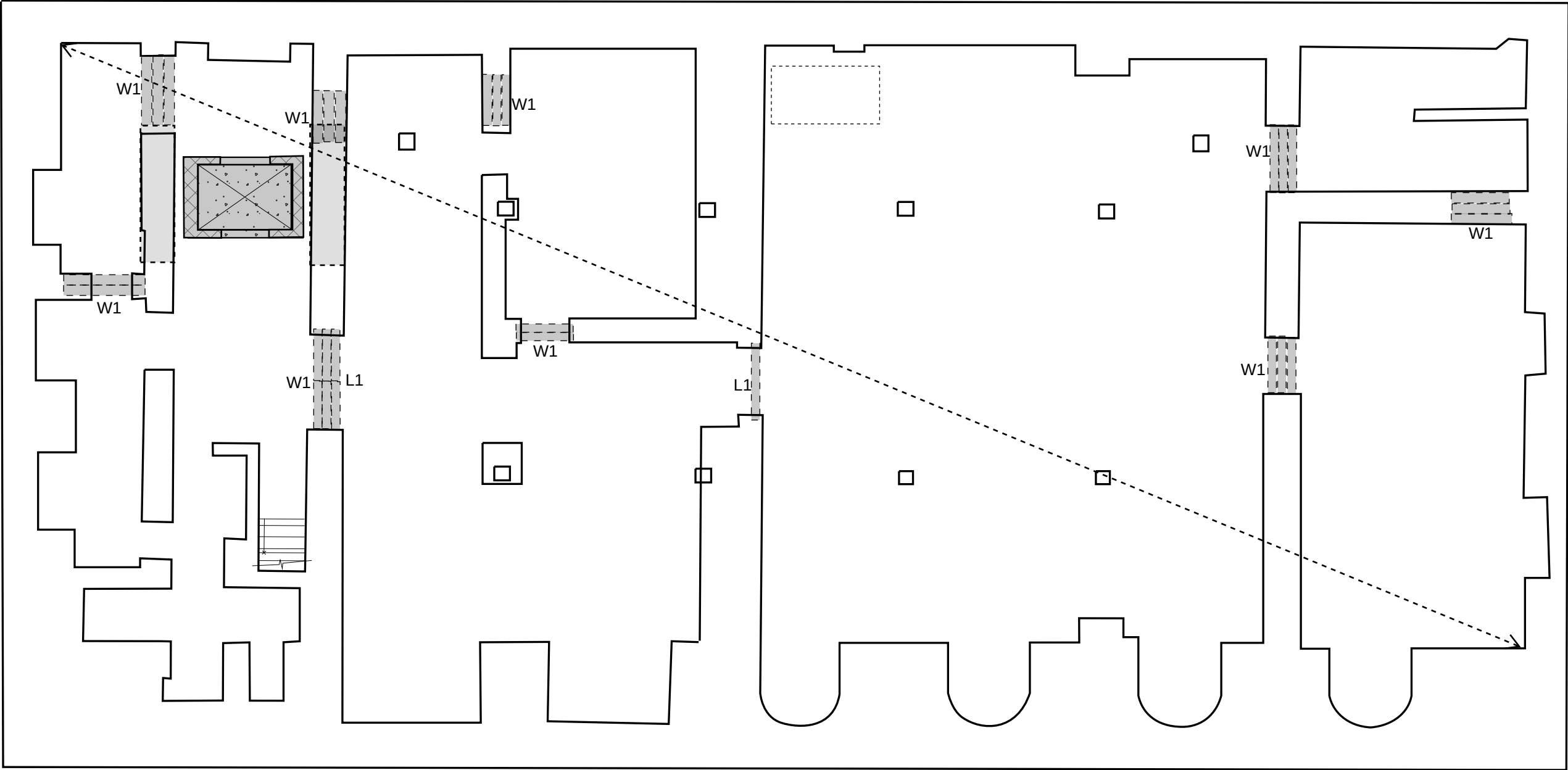
DETAIL D
Scale 1:10



DETAIL E
Scale 1:20

NOTES
1. Do not scale the drawing.
2. This drawing is to be read in conjunction with all other Architects and Engineers drawings and specifications including outline structural specification
3. All dimensions are in millimetres unless noted otherwise.
4. Any discrepancies between structural and architectural setting out dimensions must be brought to the attention of the Architect and Engineers.
5. This is an existing building, any dimensions to existing structure should be confirmed by site measure, and any discrepancies brought to the attention of the Architect and the Engineers.

NOTE: All proposed members sizes are preliminary subject to site investigation



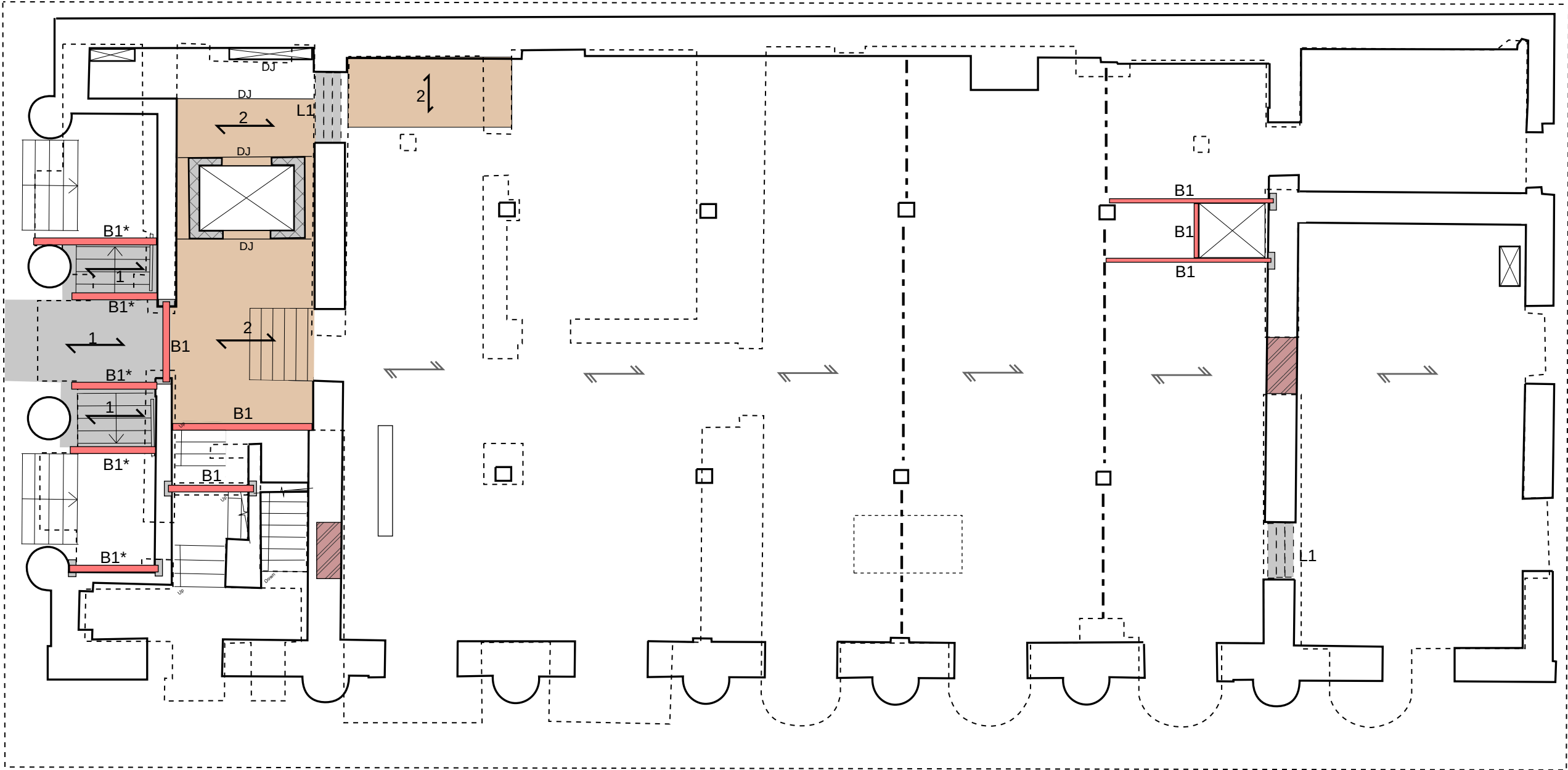
LINTEL SCHEDULE	
Note: LX lintels for door opening below WX lintels for BWIC opening below	
L1	Naylor Prestress Concrete Lintel or similar approved. No. of lintels to match width of existing wall
W1	Naylor Prestress Concrete Lintel or similar approved. No. of lintels to match width of existing wall

NOTE: For Proposed Basement
GA, refer to 31593-SK-10

PROPOSED BASEMENT LINTEL PLAN
Scale 1:100

NOTES
1. Do not scale the drawing.
2. This drawing is to be read in conjunction with all other Architects and Engineers drawings and specifications including outline structural specification
3. All dimensions are in millimetres unless noted otherwise.
4. Any discrepancies between structural and architectural setting out dimensions must be brought to the attention of the Architect and Engineers.
5. This is an existing building, any dimensions to existing structure should be confirmed by site measure, and any discrepancies brought to the attention of the Architect and the Engineers.

NOTE: All proposed members sizes are preliminary subject to site investigation



LINTEL SCHEDULE

Note: LX lintels for door opening below
WX lintels for BWIC opening below

L1	Naylor Prestress Concrete Lintel or similar approved. No. of lintels to match width of existing wall
W1	Naylor Prestress Concrete Lintel or similar approved. No. of lintels to match width of existing wall

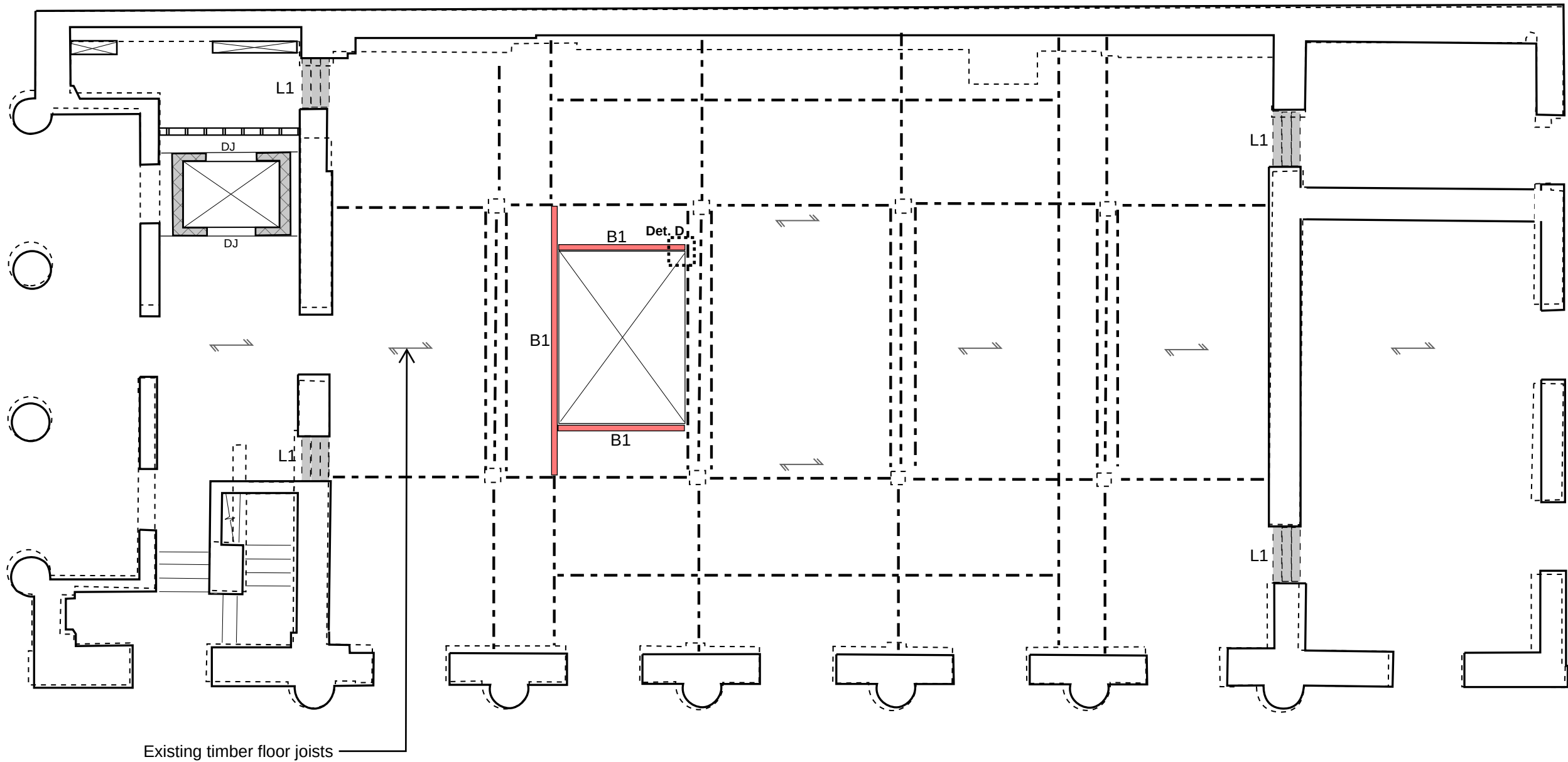
NOTE: For Proposed Ground Floor GA, refer to 31593-SK-11

PROPOSED GROUND FLOOR LINTEL PLAN

Scale 1:100

NOTES
1. Do not scale the drawing.
2. This drawing is to be read in conjunction with all other Architects and Engineers drawings and specifications including outline structural specification
3. All dimensions are in millimetres unless noted otherwise.
4. Any discrepancies between structural and architectural setting out dimensions must be brought to the attention of the Architect and Engineers.
5. This is an existing building, any dimensions to existing structure should be confirmed by site measure, and any discrepancies brought to the attention of the Architect and the Engineers.

NOTE: All proposed members sizes are preliminary subject to site investigation



PROPOSED FIRST FLOOR PLAN

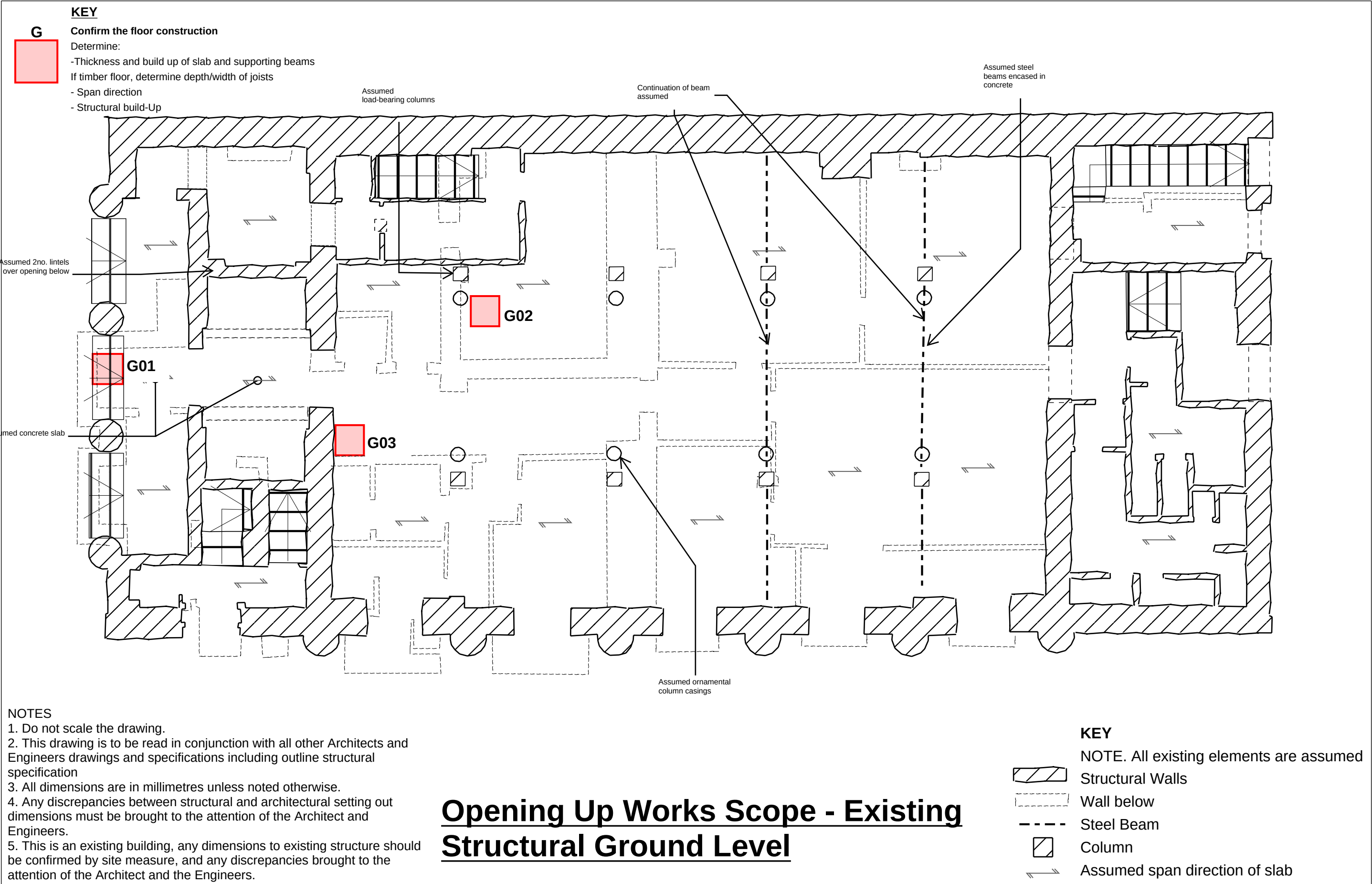
Scale 1:100

LINTEL SCHEDULE	
Note: LX lintels for door opening below WX lintels for BWIC opening below	
L1	Naylor Prestress Concrete Lintel or similar approved. No. of lintels to match width of existing wall
W1	Naylor Prestress Concrete Lintel or similar approved. No. of lintels to match width of existing wall

NOTE: For Proposed First Floor
GA, refer to 31593-SK-12

Appendix C

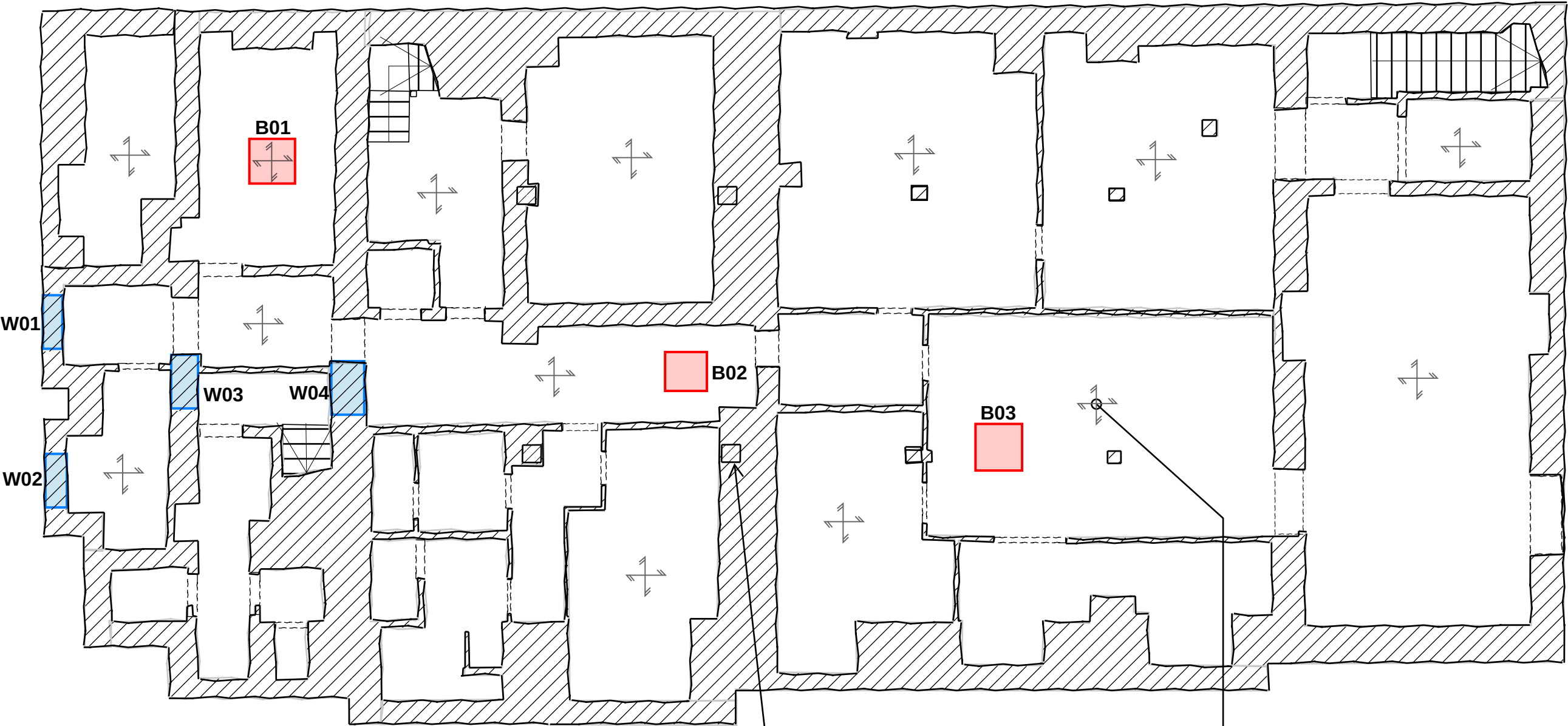
Opening Up Works Sketches



KEY

B Confirm the floor construction
Determine:
- Thickness of slab
- Structural build-up
Allow for coring and making good.

W Confirm the wall construction
Determine:
- Thickness of wall along the wall's height
- Structural build-up
Allow for 3no. coring and making good.



NOTES
1. Do not scale the drawing.
2. This drawing is to be read in conjunction with all other Architects and Engineers drawings and specifications including outline structural specification
3. All dimensions are in millimetres unless noted otherwise.
4. Any discrepancies between structural and architectural setting out dimensions must be brought to the attention of the Architect and Engineers.
5. This is an existing building, any dimensions to existing structure should be confirmed by site measure, and any discrepancies brought to the attention of the Architect and the Engineers.

Opening Up Works Scope - Existing Structural Basement Level

KEY
NOTE. All existing elements are assumed
Structural Walls
Wall below
Beam
Column
Assumed span direction of slab

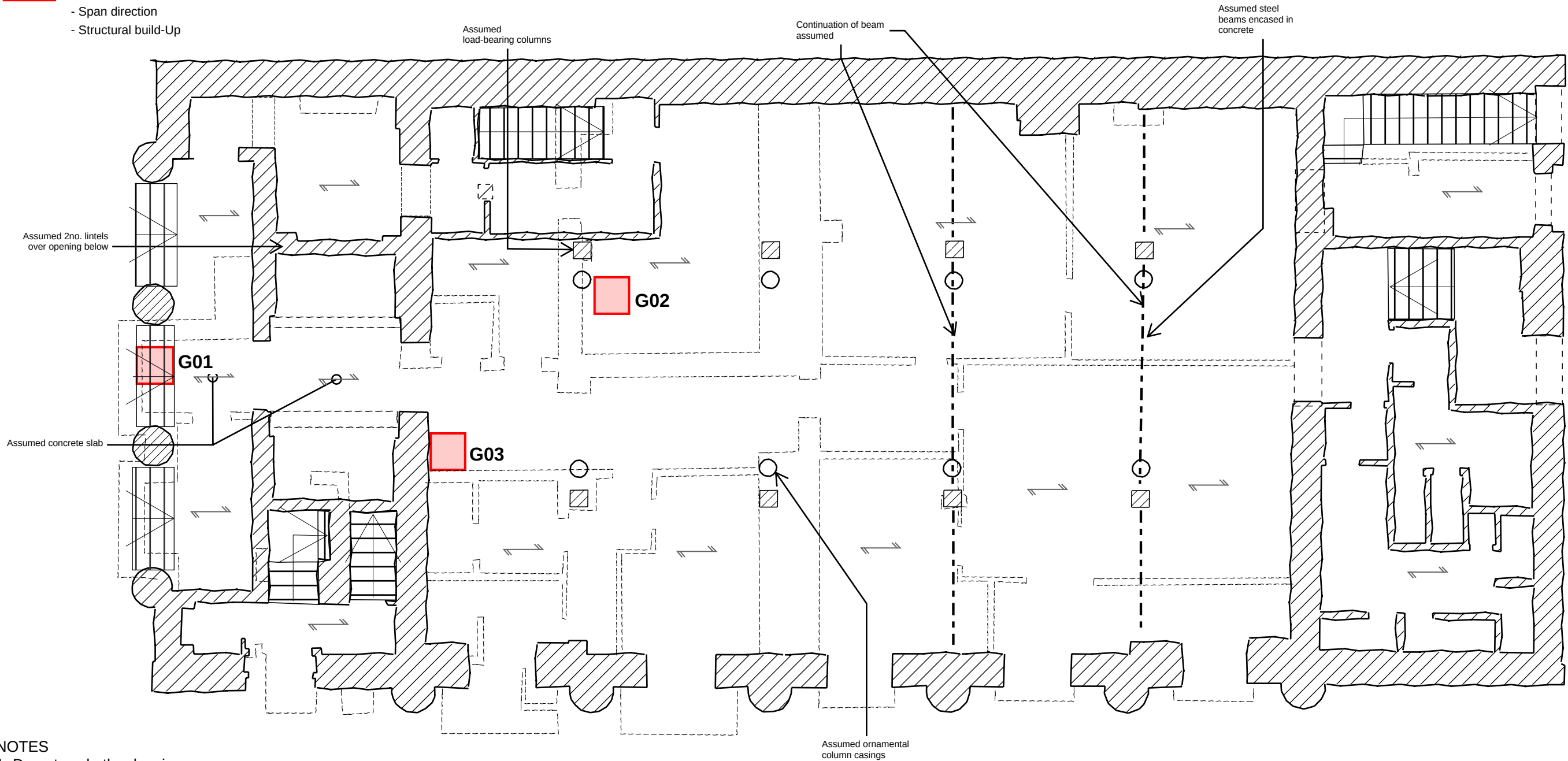
KEY

G

Confirm the floor construction

Determine:

- Thickness and build up of slab and supporting beams
- If timber floor, determine depth/width of joists
- Span direction
- Structural build-Up



NOTES

1. Do not scale the drawing.
2. This drawing is to be read in conjunction with all other Architects and Engineers drawings and specifications including outline structural specification
3. All dimensions are in millimetres unless noted otherwise.
4. Any discrepancies between structural and architectural setting out dimensions must be brought to the attention of the Architect and Engineers.
5. This is an existing building, any dimensions to existing structure should be confirmed by site measure, and any discrepancies brought to the attention of the Architect and the Engineers.

Opening Up Works Scope - Existing Structural Ground Level

KEY

NOTE. All existing elements are assumed

- Structural Walls
- Wall below
- Steel Beam
- Column
- Assumed span direction of slab

