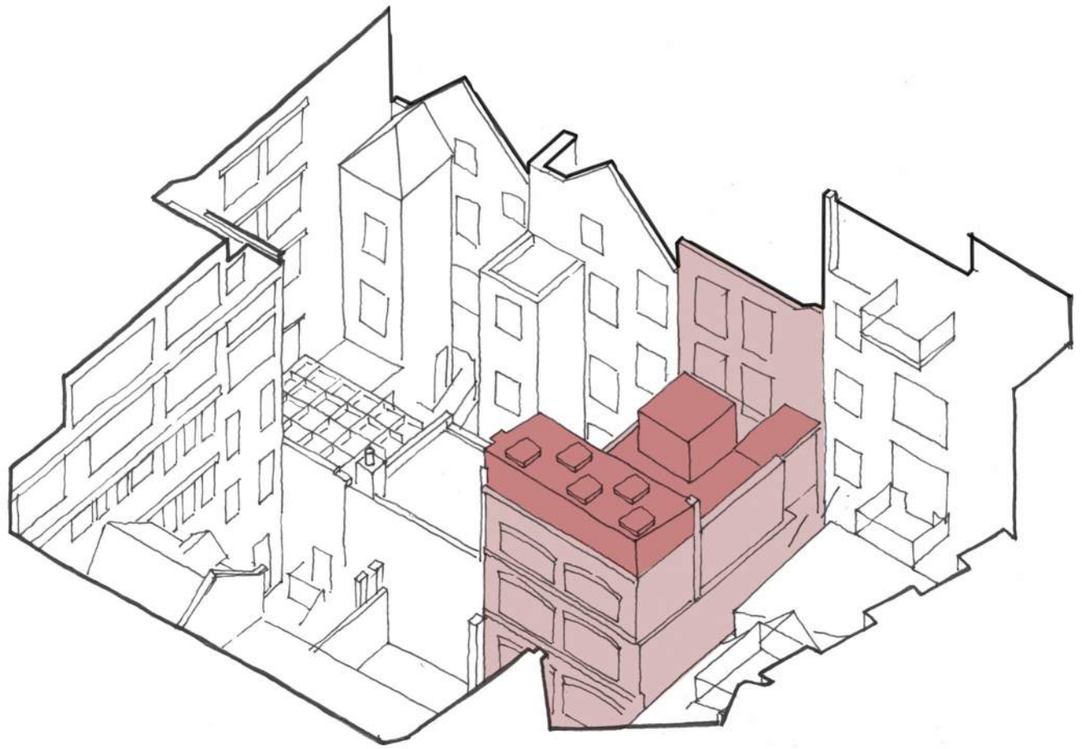
5 Denmark Street, London

Consented works implemented to date

Ian Chalk Architects, December 2024



5 Denmark Street & Book Mews,
Existing Isometric

Works undertaken to date

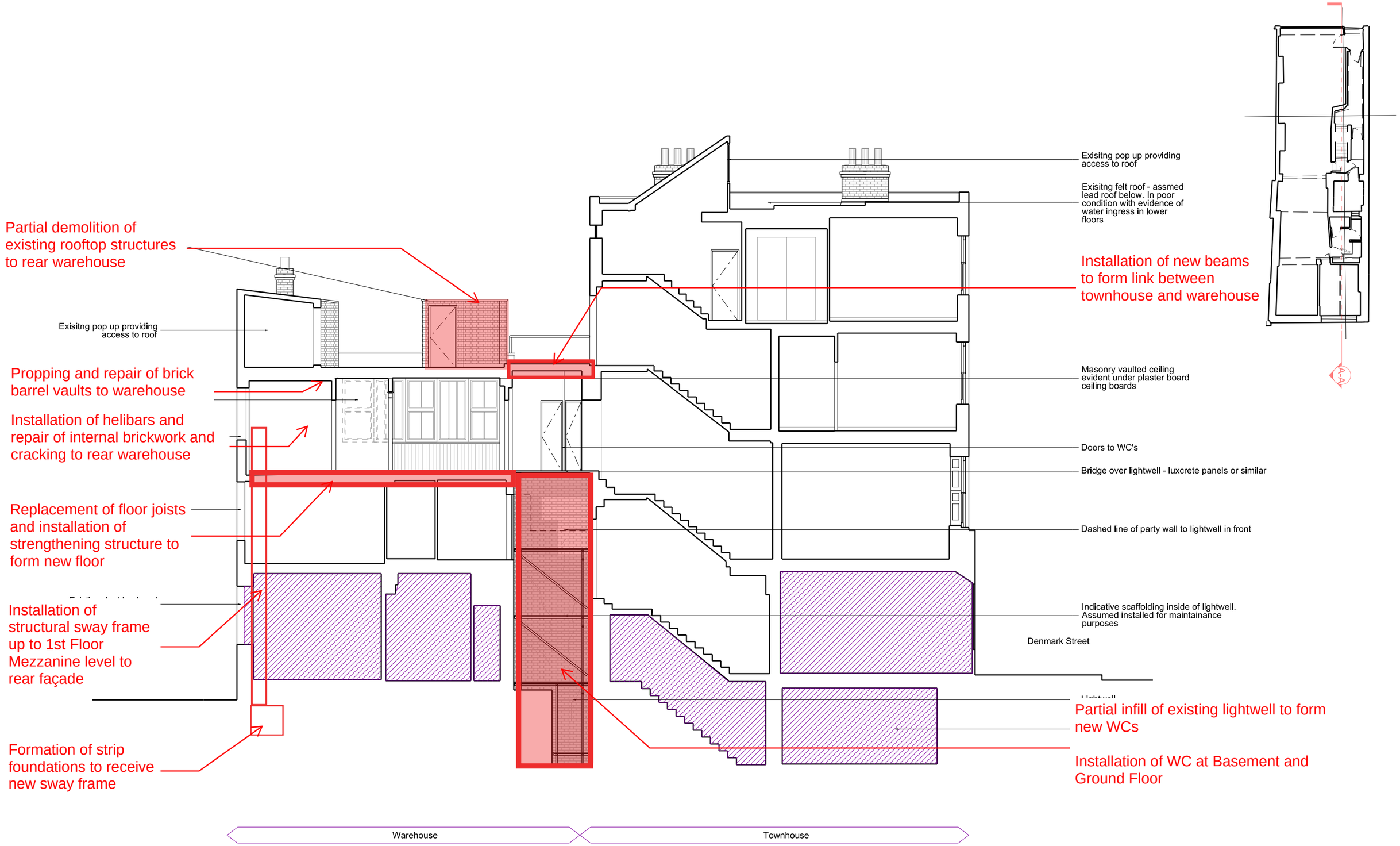
Application references:

2021/5128/P
2021/5707/L

The works to date have mainly focussed on stabilising/making safe and strengthening the warehouse to the rear. These works include:

- Soft strip to rear warehouse internally
- Formation of strip foundations to receive new sway frame
- Installation of structural sway frame up to 1st Floor Mezzanine level to rear façade
- Installation of helibars and repair of internal brickwork and cracking to rear warehouse
- Replacement of floor joists and installation of strengthening structure to form new floor
- Erection of top-hat scaffold to rear warehouse
- Partial demolition of existing rooftop structures to rear warehouse
- Propping and repair of brick barrel vaults to 1st Floor Mezzanine warehouse
- Partial infill of existing lightwell to form new WCs
- Installation of new beams to form link between townhouse and warehouse
- Installation of WC at Basement and Ground Floor

These works are highlighted on the existing section overleaf. Site photos of the works up to December 2024 are appended to this document.



0 2 4 Metres

Scale 1:100

Revisions
PL1 19/10/21 FOR PLANNING

Client
John Farrell

Project
5 Denmark Street

Drawing Title
5 Denmark Street
Existing
Section A-A

Drawing Number
1502_00_130 REV: PL1

Scale 1:100 Status For Planning

Drawn by GW Date 21/04/2021

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Conesented structural works

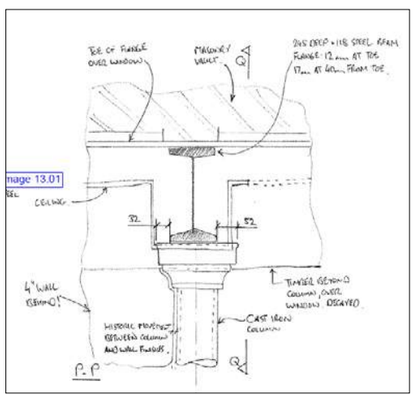
The following pages are an extract from the Design + Access Statement consented as part of applications :

2021/5128/P
2021/5707/L

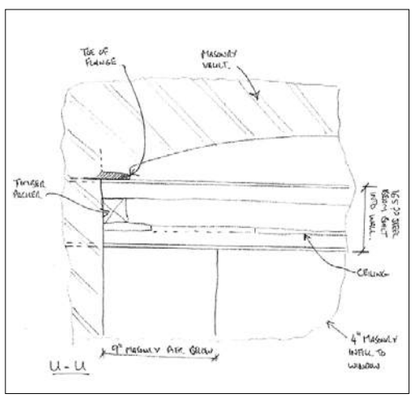
These are the structural works that are being undertaken on site at present.

Second Floor - Internal Works

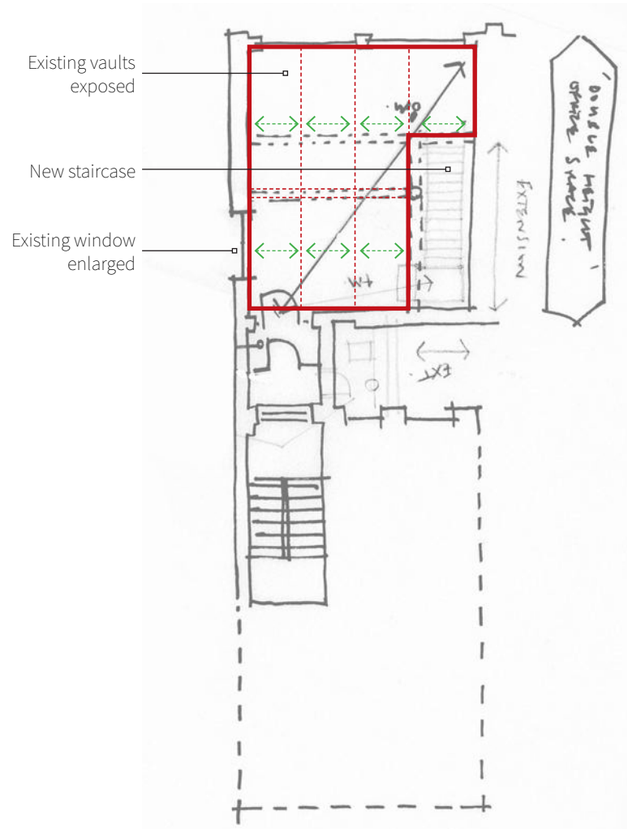
Opening up works at second floor ceiling level shows evidence of existing masonry vaults concealed behind the ceiling void. This is seen in the right-hand photograph below. These have been plastered over and painted. The proposal would look to retain these and expose as a feature of the refurbished second floor. The ambition would be to remove the plaster and expose the concrete or brickworks vault beneath. It also proposes exposing the existing down-stand steel beam which supports secondary beams that support masonry vaulted roof. The existing steel column will be 'freed' from its existing wall condition adjacent the window by the new infill to the side which allows for the new stair to the extension above.



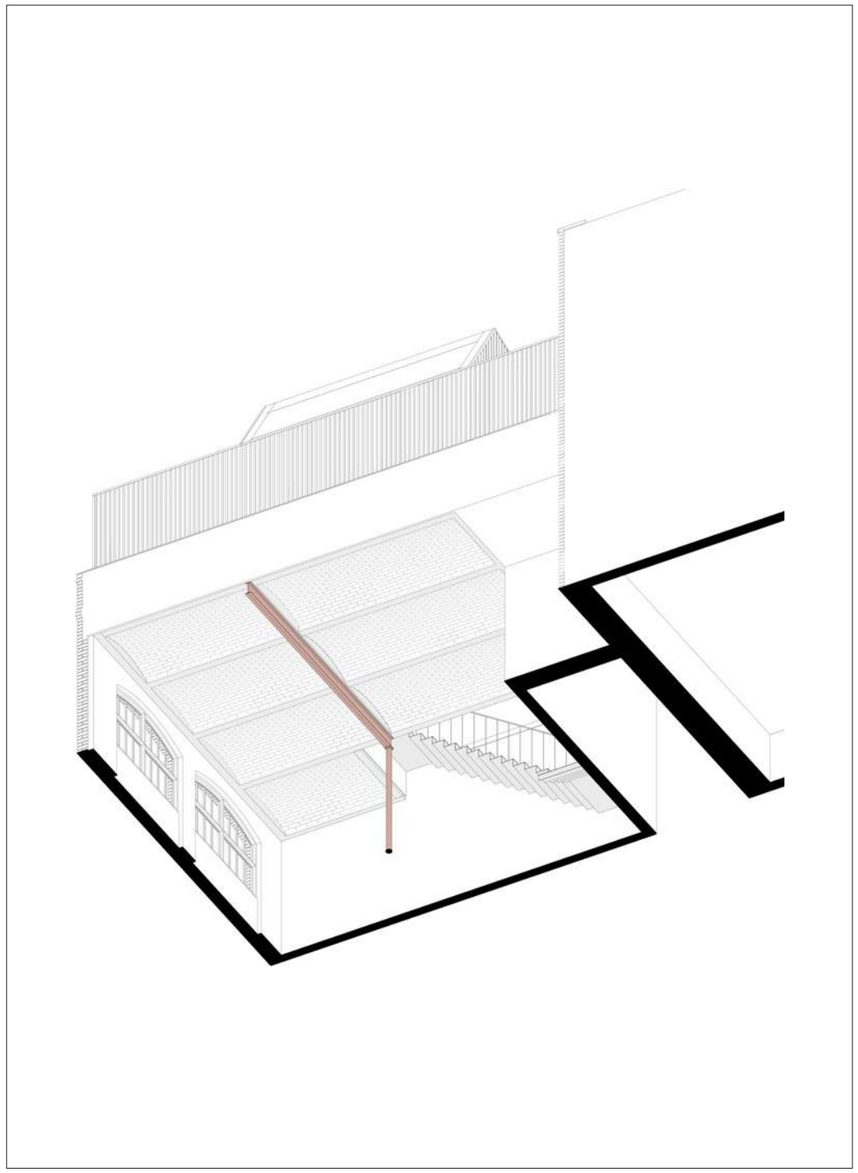
Existing detail Section - beam connection
not to scale



Existing detail Section - masonry vaults
not to scale



Proposed Second Floor Plan
not to scale



Proposed Worms Eye
not to scale

Proposed Internal visual - brickwork illustrative
Second Floor, Warehouse

Structural Strategy

The below is a summary of an assessment of the loads on the existing structure from the vaulted roof and the 1950s brick extensions that sit on the vaulted roof which has been prepared by Engenuiti.

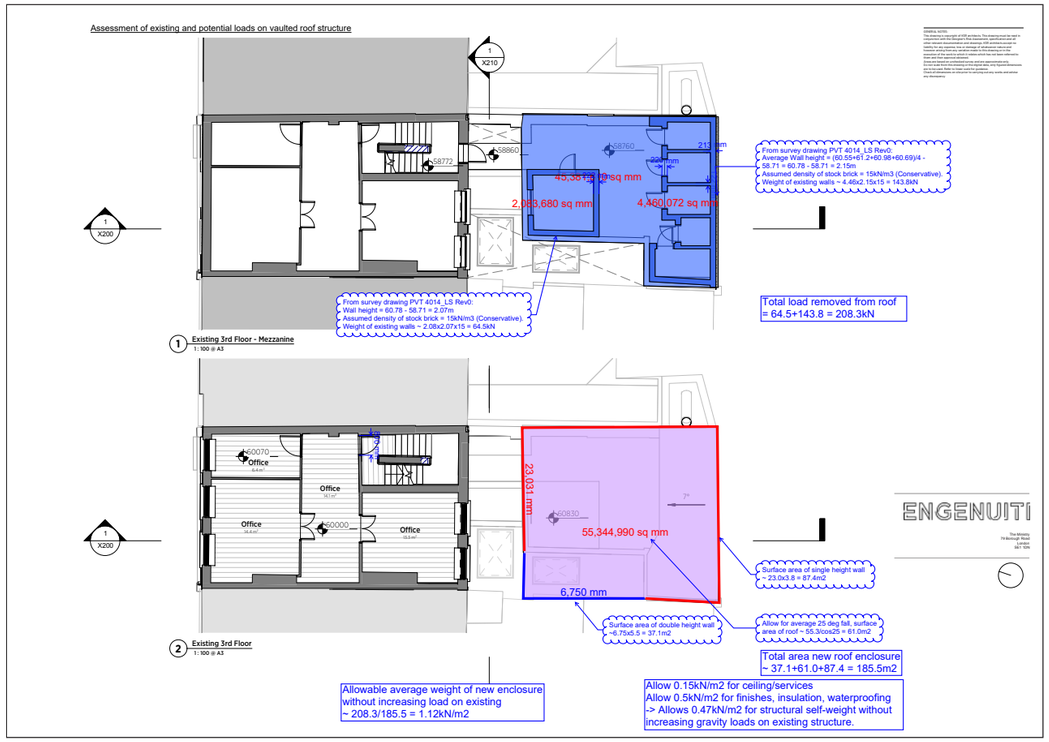
The removal of the 1950's brick extensions a will allow a new extension to be added whilst retaining the existing second floor slab, assumed to be a brick vaulted arch roof.

This assumes that a relatively lightweight form of construction is used for the roof top extension such as timber frame, CLT or a lightweight steel frame. This assessment is based on a conservative assumption about the weight of the existing 1950's masonry construction, some density testing of the bricks may give us more loading allowance. The weight of any floor finishes or furrings on the vaulted roof structure will need to balance the existing self-weight of the roof finishes above the vaulted roof which should be removed.

By matching or reducing the gravity loads compared to the existing situation we can be confident that the proposed roof top extension will not have an adverse effect on the ground floor walls and the foundations. In order to transfer the load from the vaulted roof to the existing walls on the west and east sides it is necessary to provide new support to the cast iron column at the second floor mezzanine level. It is proposed to achieve this with a pair of new 254UB steel beams at second floor mezzanine level that will span across the width of the building to replace the existing overloaded timber beam. This pair of beams will require a new pad stone and strengthened (and enlarged) masonry pier between first floor and second floor mezzanine level. The pair of beams will also support the reconstructed floor and roof at this level.

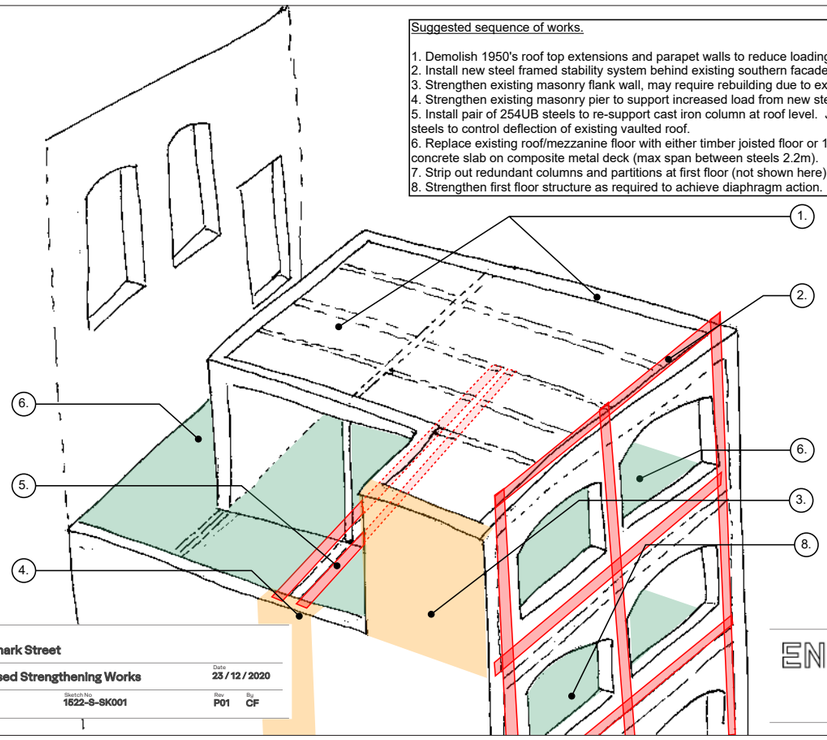
Options for a timber floor or a lightweight concrete floor on composite metal deck at second floor mezzanine level have been considered with the timber floor offering advantages in terms of heritage and the lightweight concrete floor offering increased durability and robustness but increased weight and constructibility issues. By keeping the thickness of the lightweight concrete floor down to 125mm (with deeper steel beams at approx. 2.2m centres) it is possible to construct a concrete floor with little overall increase in gravity load, although this will be difficult to achieve if external masonry walls are used on roof top extension. Assessment of the thickness and density of the concrete pugging to the existing timber floor would further aid the evaluation of the two forms of construction.

The existing timber joisted floor at first floor level in the rear extension will need to be repaired and plywood boarding added so that the floor can act as a diaphragm to brace the walls against stability



loads. Overall stability in the east-west direction will be enhanced by the installation of a new steel sway frame behind the south façade that will extend from ground floor to the vaulted roof and be fixed back to the existing masonry walls. This sway frame will be sized to accommodate east-west stability loads from the roof top extension. In the north-south direction stability will be provided by the existing masonry walls as before.

The lightwell will be in-filled to create new floors for WCs and access to the rear extension using the same flooring system as selected for the reconstruction of the second floor mezzanine.



Suggested sequence of works.

1. Demolish 1950's roof top extensions and parapet walls to reduce loading on existing structure..
2. Install new steel framed stability system behind existing southern facade.
3. Strengthen existing masonry flank wall, may require rebuilding due to excessive bowing.
4. Strengthen existing masonry pier to support increased load from new steels (see 4.)
5. Install pair of 254UB steels to re-support cast iron column at roof level. Jack load into new steels to control deflection of existing vaulted roof.
6. Replace existing roof/mezzanine floor with either timber joisted floor or 125mm thick lightweight concrete slab on composite metal deck (max span between steels 2.2m).
7. Strip out redundant columns and partitions at first floor (not shown here).
8. Strengthen first floor structure as required to achieve diaphragm action.

Project
5 Denmark Street

Sketch Title
Proposed Strengthening Works

Date
23 / 12 / 2020

Project No **1522** | Sketch No **1522-S-SK001** | Rev **P01** | By **CF**

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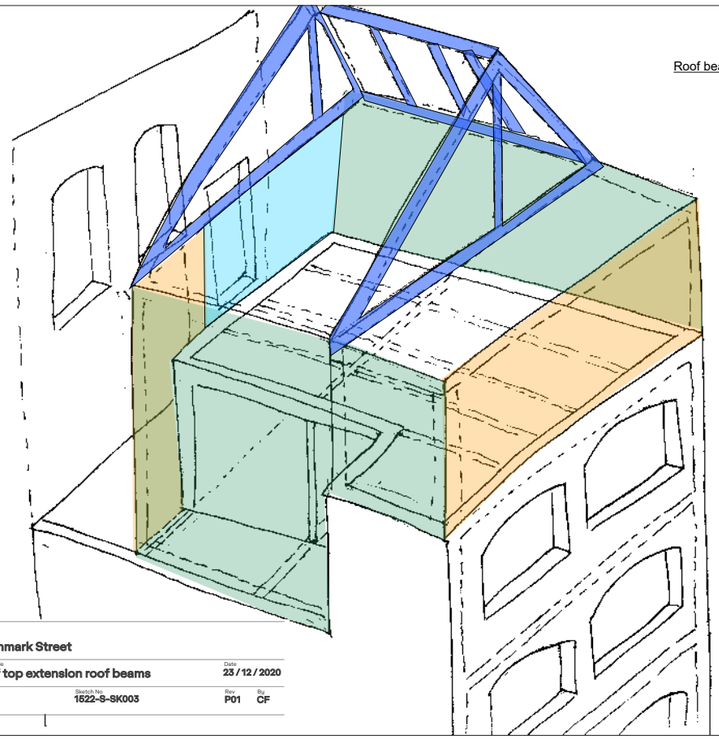

Roof beams/trusses for roof top extension.

Trussed or Panelised gables to control deflection. If trussed can allow daylight on north and south gables.

Roof light on east facing roof.

Allows for:
A: Glulam frame construction.
B: Oak/hardwood frame construction.
C: Steel frame construction

If Panelised, also allows for:
C: Timber frame construction.
D: Panelised Cross Laminated Timber Construction (CLT).
E: Lightweight Steel Framing System (SFS)

Project
5 Denmark Street

Sketch Title
Roof top extension roof beams

Date
23 / 12 / 2020

Project No **1522** | Sketch No **1522-S-SK003** | Rev **P01** | By **CF**

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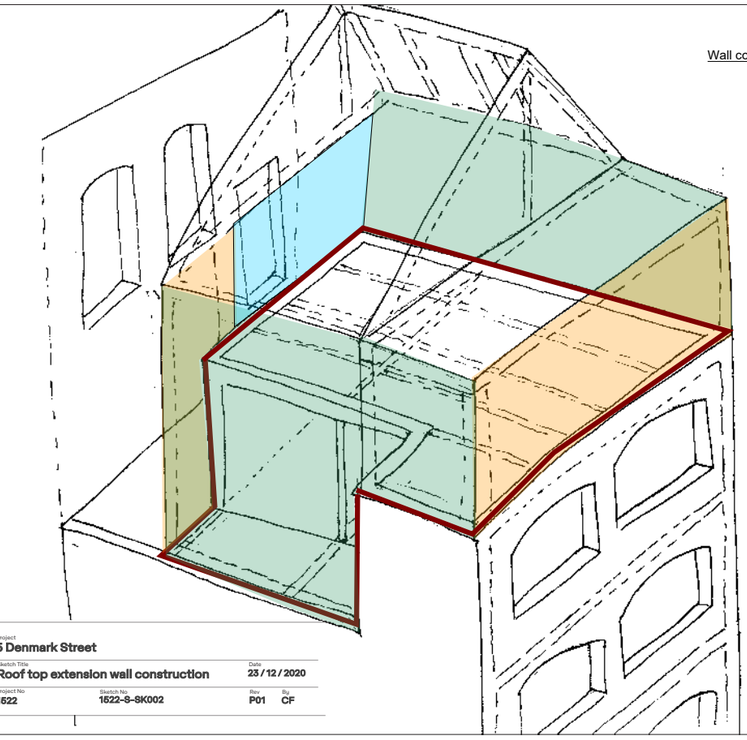

Wall construction for roof top extension.

Spreader beam or plate fixed down to existing masonry structure.

Stability wall (minimal openings) in east-west direction.

Stability wall (minimal openings) in north-south direction

Potential glazed elevation on north side.

Panelised construction within allowable weight limit of 1.12kN/m2 (114kg/m2) of complete wall build up including finishes, 0.47kN/m2 (48kg/m2) limit of structural self weight.

Allows for:
A: Timber frame construction. Estimate 120mm deep studs at 450mm centres typically, 200mm deep studs at 450mm centres on west elevation (double height)
B: Panelised Cross Laminated Timber Construction (CLT). Estimate 90mm thick.
C: Lightweight Steel Framing System (SFS). Estimate 100mm deep studs at 450mm centres typically, 180mm deep studs at 450mm centres on west elevation (double height)

Project
5 Denmark Street

Sketch Title
Roof top extension wall construction

Date
23 / 12 / 2020

Project No **1522** | Sketch No **1522-S-SK002** | Rev **P01** | By **CF**

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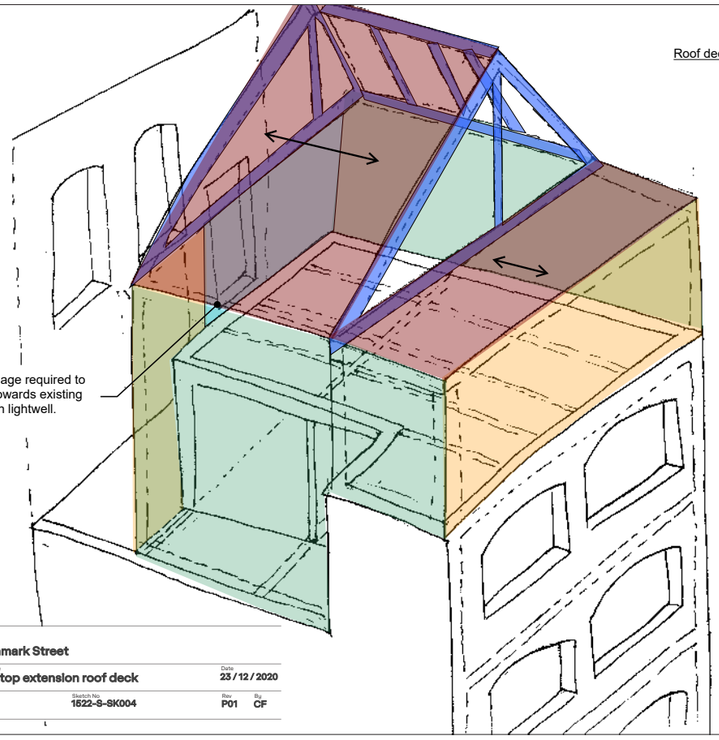

Roof decking for roof top extension.

Roof deck acts as a diaphragm to transfer stability forces. Laid to falls.

Roof drainage required to fall back towards existing drainage in lightwell.

Panelised construction within allowable weight limit of 1.12kN/m2 (114kg/m2) of complete wall build up including finishes, 0.47kN/m2 (48kg/m2) limit of structural self weight.

Allows for:
A: Joisted timber frame construction. Estimate 200mm deep joists at 450mm centres.
B: Panelised Cross Laminated Timber Construction (CLT). Estimate 120mm thick.
C: Lightweight Steel Framing System (SFS). Estimate 180mm deep joists at 450mm centres.

Project
5 Denmark Street

Sketch Title
Roof top extension roof deck

Date
23 / 12 / 2020

Project No **1522** | Sketch No **1522-S-SK004** | Rev **P01** | By **CF**

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