Chalk Farm Gate

Design and Access Statement Engineering Report

Issue P01 – 14 July 2021

LABTECH

MEINHARDT

CHALK FARM GATE

DESIGN AND ACCESS STATEMENT ENGINEERING REPORT

Quality Assurance Page

Issue	Date	Prepared By	Checked By	Approved By	Remarks
P01	14/07/2021	Mr D. Feliciangeli	Mr S. Patel	Mr P. Hayes	Issued for information

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1 Introduction

Meinhardt (UK) Ltd have been commissioned as Consulting Structural Engineers for the refurbishment of Chalk Farm Wall Entrance within Camden Market. The proposal is to refurbish the existing entrance replacing the existing timber roof with a new one to create a food and beverage area.

1.1 Purpose of Report

This report has been prepared in order to summarise the history and the conditon of the existing structures and describe the proposed new structure as part of the Design and Access Statement prepared by the design Architect.

The document is based on the information currently available from the Design Team.

1.2 The Project Team

Client:	Labtech
Architect:	Moxon
Structural Engineer:	Meinhardt (UK) Ltd
Timber Specialist:	Xylotek

2 Site location

2 Site

The project site is located within Camden Market and creates one of its entrances along Chalk Farm Road. The site (shown in Figure 1) is bounded by the Stable Market building on the west side and the railway arch viaduct on the east side with access provided on the north side through the Chalk Farm wall (i.e. also known as Great Wall of Camden). The south side is open and it connects the entrance with the market.

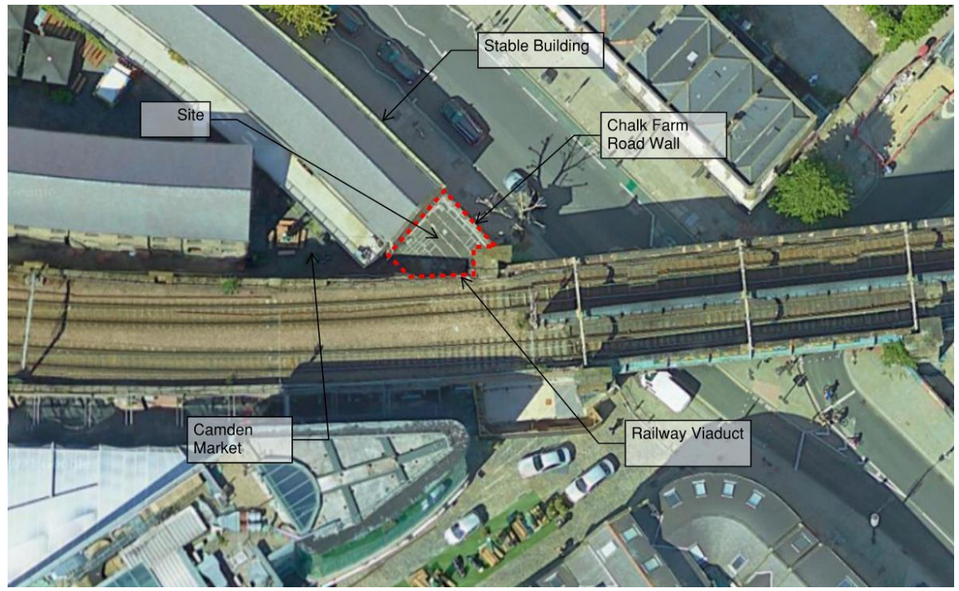

Figure 1 Chalk Farm Road Entrance Site

The site has three masonry walls of different nature along the perimeter and was covered by a timber roof structure which has been modified a few times over the past. The site is currently divided by a partition wall which separates the actual entrance area from a storage area used to accommodate some of the Stable Building's utilities.

3 History of Structures

To understand the history of the site and its structures a desktop study has been undertaken.

The site has been modified a few times over the past and early pictures done in 1975 (Figure 2) show the space used as storage area covered by a decaying roof surface supported by a timber truss similar to the one currently on site.

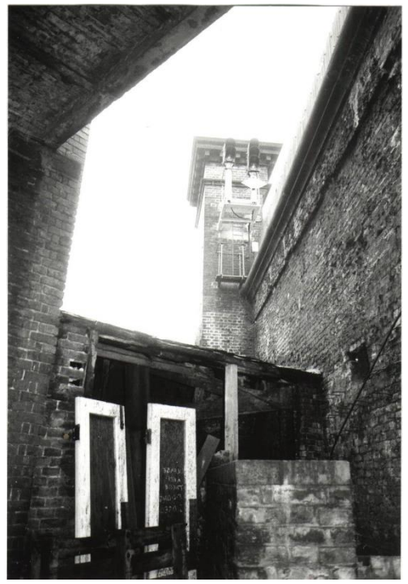

Figure 2 Chalk Farm Road Entrance in 1975

A planning approval to create an additional entrance to the market has been granted in September 1996 (ref. Reg No. P9600731R1) which led to a few modifications of the site and its structures.

The decaying roof surfacing from the 70s was replaced with a new one providing proper waterproofing protection to this area and the site was cleared of clutter to provide free access to the market (Figure 3).

Figure 3 Chalk Farm Road Entrance in the 1990s

The entrance wall was also modified creating two main openings topped by masonry arches. The modification is evident from historical pictures of the wall (Figure 4), as the partition between pillars and infill panels of the top part of the wall is not consistent with the arch arrangement. Bricks' colour show a clear difference between the original part of the wall and the later modifications.

Figure 4 Chalk Farm Road Entrance street façade in the 1990s

The two openings of the wall have been created to provide access to the market with the central pillar between arches located to provide support to the main timber truss sustaining the roof.

The picture taken from the inside (Figure 5) shows the main truss lining up with the masonry pillar and the embedded connection between the truss and the masonry wall. The secondary joists parallel to the truss were also embedded into the wall providing top lateral restrain to the masonry wall.

Figure 5 Chalk Farm Road Entrance inside view 1990s

It is likely that the partition wall separating the actual entrance space from the Stable Building's utilities was built together with the creation of the new gate to separate the two areas.

As the separation wall was built after the roof structure and the adjacent masonry walls, the wall is not continuous with the other walls and is also not connected to the roof. The wall is therefore self-standing and most likely built on top of the granite setts without a proper foundation.

Recently, the Chalk Farm Wall has been modified again to achieve visual consistency between the top and the bottom part of the masonry structure. So the previous arches have been replaced by steel lintels and the two entrances have been modified to line up with the original partition of wall (Figure 6).

In the new configuration the central pillar between openings does not provide support to the main truss which therefore was connected to the steel lintel of the bigger opening.

Figure 6 Chalk Farm Road Entrance façade (current state)

4 Structures Condition

4.1 Timber roof

The existing timber roof structure is composed by the main timber truss supported by a steel lintel creating the opening at the Chalk Farm Wall (i.e. north side) and a masonry pillar at the market side (i.e. south side).

The truss is then supporting three main purlins running perpendicular to the truss and embedded into the perimeter walls at railway viaduct side (i.e. east side) and at Stable Building side (i.e. west side). The purlins are not connected to the partition wall, separating the site in two different areas.

Timber joists running parallel to the main truss are regularly spaced and supported by the purlins and embedded into the Chalk Farm Wall providing, together with the timber roof, top lateral restrain to the wall (Figure 7).

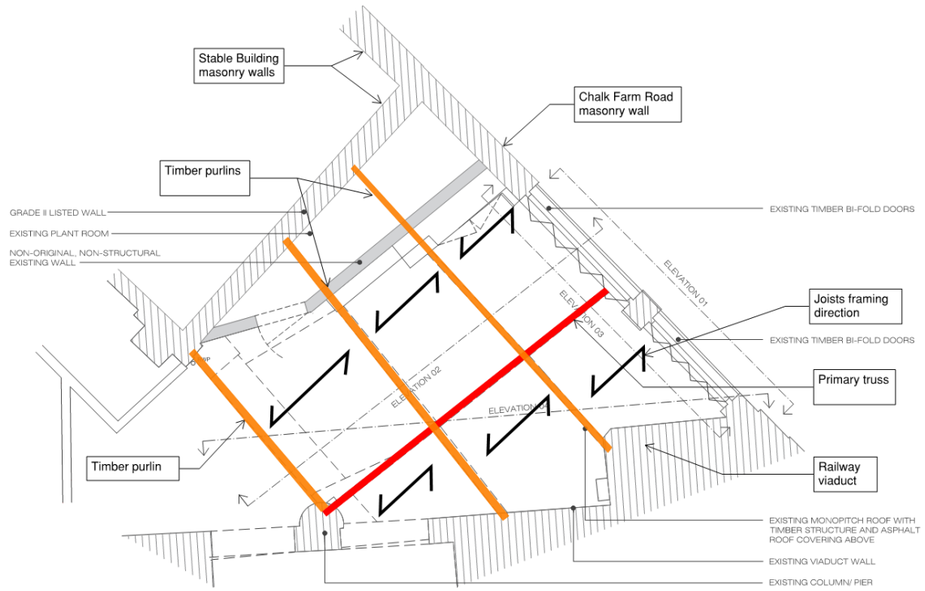

Figure 7 Existing Timber Roof Structure Framing

According to the historical information the timber structure was built before the 1975 as the primary truss was present in the first picture of the site made in the that year (see History of Structures section).

As the roof is likely to have about 50 years, it is in a reasonable condition for the age of the structure but at the end of its design life showing signs of distress especially at the connection between the timber purlins and the perimeter masonry structures due to water ingress.

It is evident from Figure 8 the settlement of the bricks under the purlins and the effect of rotting on these timber elements, reducing significantly their capacity (i.e. bearing, shear).

The main timber truss is also in a reasonable condition showing longitudinal splits on top and bottom chords, but some key locations (as the support at the masonry pillar) were not accessible during the visual assessment.

Is this likely that water ingress could have damaged the main truss too at this location.

Figure 8 Existing Timber Purlins

4.2 Chalk Farm Wall

The original wall is likely to have been built in the 1850s together with the Stable Buildings. The wall was built using London stock bricks with a thickness varying from about 430mm at the piers location and 320mm at the infill panels. As described on Section 3, this wall has been through many modifications over the time, which makes the nature of the brick wall inconsistent.

The wall is only continuous with the podium of the Stable building, below the infill panels which are thought to be a later addition of the market block, all other adjacent walls are separate and not connected to it. In particular, on the railway side, there is a continuous vertical joint between the wall and the viaduct abutment which makes the walls structurally independent.

As the wall is effectively not connected to the adjacent walls, it is spanning vertically being laterally restrained by the ground floor at the bottom and by the timber roof at the top.

The wall has no evident signs of distress, and it is typically flat, plumb, and in a reasonable condition for a structure of this age and type. However, there is some sign of movement to the higher courses, as the coping stone is not sitting parallel with the wall underneath at all locations.

The coping stone needs to be reset and repaired as it seems to be damaged.

4.3 Partition Wall

On the internal side of the entrance, there is a partition wall panel perpendicular to Chalk Farm Road wall (Figure 9) creating a store room for the Stable Building. This wall is approximately 1.5m from the face of the building and it is thought to have been built in the 90s as part of the works to create a new entrance from the road (see Section 3).

As the wall is a later addition to the site is likely to have been built on top of the granite setts without a proper foundation and the visual assessment confirms that the wall has no connection to any of the adjacent masonry structures or the roof.

Figure 9 Existing partition wall

5 Proposed Structure

The proposal is to demolish the existing roof structure together with the partition wall and replace them with a new timber roof supported at the existing masonry walls and at a new intermediate frame built in place of the partition wall.

5.1 Roof

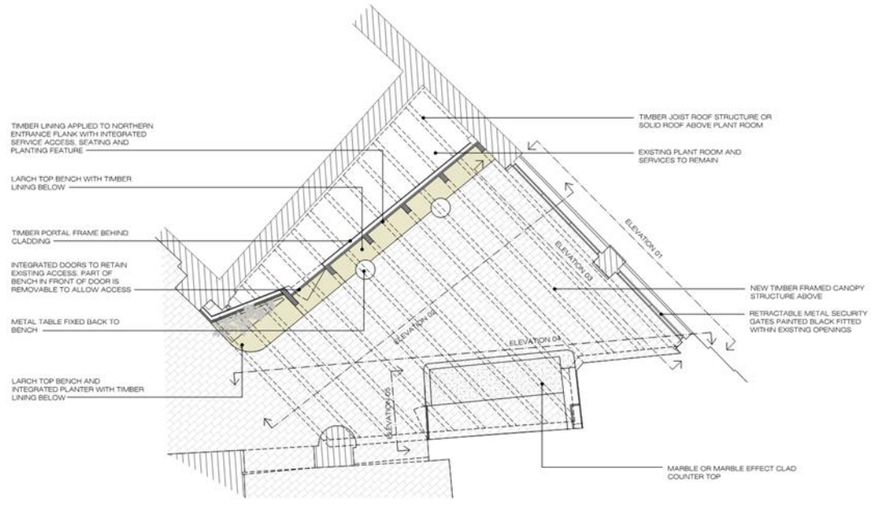

Figure 10 Proposed Timber Roof Structure Framing

The proposed roof structure has equally spaced Glulam arching joists spanning parallel to the Chalk Farm Road Wall, differently to the previous arrangement where the joist were perpendicular to the wall. The joist elements are connected to a Glulam wall plate acting as ring beam running along the perimeter of the roof connecting them with the railway viaduct abutment and a load frame in the position of the existing service wall. Separate softwood joists then complete the roof from the load frame to the Stable Building masonry wall.

The roof structure is therefore supported at three locations; the Stable Building and the railway masonry walls and at an intermediate support to be built in place of the existing partition wall.

The wall plate is proposed to be connected to the existing masonry structures by anchor bolts recessed into the timber element to create an “invisible” connection between the timber roof and the supporting structures.

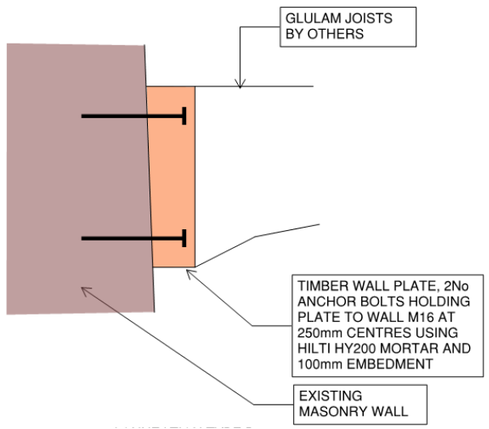

Figure 11 Proposed wall plate connection to perimeter walls

In addition to span in between the east and west walls, the proposed roof will also prop the Chalk Farm Wall by connecting the roof with the wall, as the intention is to not alter the current structural behavior of the wall. The proposed connection will use anchor bolts embedded and recessed to connect the timber wall plate and the Chalk Farm Wall providing visual consistency with the other connections.

Further explanation and details of the proposed connection types is provided later in this section.

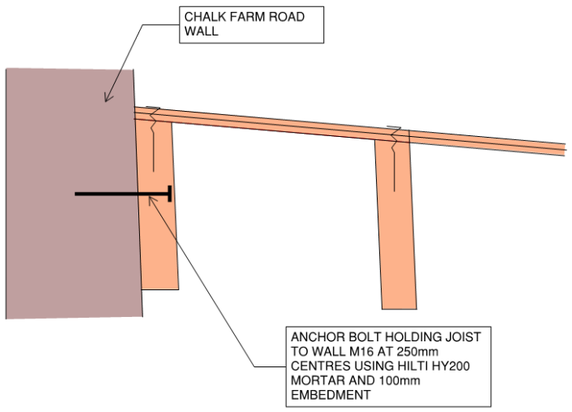

Figure 12 Proposed wall plate connection to Chalk Farm Road Wall

The roof structure is supporting different roof finishes, a solid finish along the east, west, and north walls and a glass finish in the central area. The glass panels are not used as part of the roof structure.

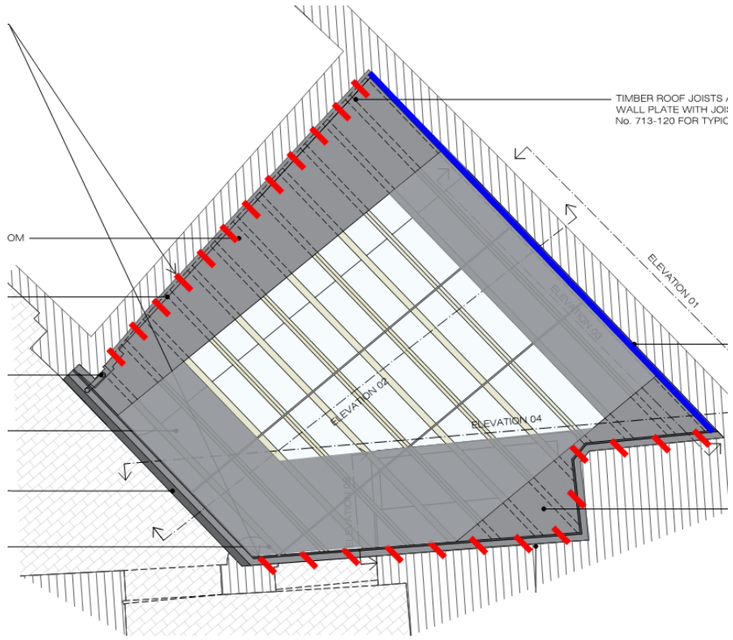

Figure 13 Proposed Roof finishes

5.2 Connection of the roof to the Chalk Farm Road

The proposed connection between the roof and the wall along Chalk Farm Road is to achieve top restrain of the wall against lateral loads (i.e. wind), therefore not altering the current structural behavior of the wall.

Currently, the lateral load is taken by the wall spanning in between top and bottom supports provided respectively by the ground floor and the existing roof structure with joists embedded into the masonry wall.

To keep the same behavior of the wall, the roof wall plate is then connected to the wall using anchor bolts. The bolts are embedded into the wall to achieve the required tension capacity and recessed into the timber member to hide the connection (Figure 12).

The first few bays of joists are tied together with a marine grade ply decking to create a horizontal diaphragm which transfers the lateral loads from the Chalk Farm wall back to the lateral walls and the intermediate support.

5.3 Connection of the roof to the Viaduct and Stable Building Walls

The proposed timber roof structure has joist spanning in between the railway viaduct and the Stable Building parallel to Chalk Farm Road. The joists are then connected to a ring beam running along the perimeter of the roof and connected to the supporting walls on the East and West sides.

The ring beam is directly connected to the supporting walls, to transfer vertical and horizontal forces coming from the roof. The proposed connection is made with pairs of anchor bolts drilled as required either side of the joist into the walls (Figure 11). Where possible one pair of bolts will be used at the joist location to minimize the number of penetration into the walls of the listed buildings.

To minimize the visual impact of the connection detail, the anchor bolts have been reduced in number and size as much as possible and where possible the hole left from the previous structure utilized. In addition, the anchor head will be recessed into the ring beam and either hidden behind the joists or covered by timber plugs to hide the connection completely providing visual consistency with the other connections.

5.4 Intermediate frame

The intermediate frame is intended to be made from timber columns, using the ring beam as the top member. Small steel baseplates fixed to the base of the columns will connect down to concrete foundations. Because of the lightweight frame proposed, concrete foundation will be reduced in size minimizing the impact on the existing granite setts.

The frame will be placed in a similar location to the existing services wall.

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