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53 Warminster Road

Structural report on building movement & remedial measures



SITE LOCATION

53 Warminster Road
London SE25 4DQ

CLIENT NAME

Brymore No 1 Ltd

CLIENT'S REPRESENTATIVE

Addington Capital

DATE

29th September 2023

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Issue sheet

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1.0 INTRODUCTION

Addington Capital, on behalf of Brymore No 1 Ltd, engaged Cluttons to undertake a structural investigation and assessment of the Victorian residential property at 53 Warminster Road, following reported cracking in various locations. A structural report was issued in February 2022, with recommendations for remedial works to control further cracking.

During the hot and dry summer of 2022, significant further movement was observed in the building fabric. This was confirmed by the ongoing movement monitoring of the building, undertaken by a separate surveying company. Further measures were then recommended to limit movement. These were developed into structural remedial measures and detailed on drawings, which were implemented on site by an appointed building contractor. These works finished in August 2023.

2.0 PURPOSE OF REPORT

The purpose of this report is to record the nature of the movement and cracking in the detached Victorian residential building and the design and implementation of remedial measures to the building fabric. The period covered is from the initial structural survey by structural engineers from Cluttons LLP in February 2022 to the completion of remedial works in August 2023.

The structural report has been prepared for the use of Brymore No 1 Ltd only and no responsibility is accepted to any third party for the whole or part of its content. Further details are noted at the end of the report.

The report is presented in sections in chronological order, expanding on the sequence outlined in the introduction.

3.0 INITIAL STRUCTURAL INVESTIGATION

The scope of the initial investigation is given below:

i) Visit the property, a house which has been converted to eight flats over four levels, for a general structural inspection, including the reported issues below:
   - Roof structure – potential defects
   - Movement of external masonry walls
   - Potential subsidence

ii) Ascertain likely causes of movement/ defects in structure

iii) Provide a report on the inspection, including relevant photographs

iv) Recommendations in principle for repairs/ remedial works and any further investigation required

v) Review monitoring data to date

vi) Relate monitored movements to building defects, if possible

The report from the site visit undertaken on 11th February 2022 is included in Appendix 1. The main conclusions from the report are summarised below:

- Significant deflection of roof-supporting timbers has occurred, together with downward movement of a related loadbearing wall in the region of the rear bay window
- The shallow pitched portion of the roof appears to have spread under increased loading, manifesting as outward movement of the rear brick wall
- Relatively large cracks are present internally at the highest floor level, together with full-height cracking on the southern flank wall (and likely at high levels at least on the opposing flank wall, not exposed to view)
- The likely cause of the above movement and cracking is a relatively recent change of roof covering from slate to heavier clay tiles. This may have been exacerbated both by the effect of the sloping site on foundation behaviour and by a buried tank near the centre of south flank wall
- A portion of the chimney breast at high level on the south flank wall has a significant outward bulge. The cause of this has not yet been concluded

It is noted that internal cracks of walls and ceilings do not appear to be of recent origin. There may have been slight changes in widths in recent times, however the initial causes of cracking could date to many years ago.

Recommended actions to limit further movement were described as below:

1) Trial pits: In order to confirm assumptions about foundation behaviour, it is suggested to excavate trial pits in three locations along the south flank wall - front, centre and rear. These should be dug adjacent to the wall until the base of wall footings are reached, then inspected. The middle pit should also be dug to at least the base of the buried tank. Details are shown on a sketch drawing in Appendix 2.

2) Tying restraint: The bulge in the south flank external wall is at a scale that requires immediate temporary restraint, in order to limit any further outward movement of this portion of brickwork. Details can be supplied to assist in the form of this restraint. Further investigation is recommended to determine the cause of this deformation.

3) Movement monitoring: This should be resumed, in order to provide movement data related to the seasons. It is suggested that this resumes within a month from the current date and continues for 9 months thereafter.

4) Roof remedial work: Timber purlins and their support details at the gable wall (south flank) are seen as at the limit of their design, given the increased loading suspected form the change in type of tiles. Evaluation and remedial work is recommended to ensure a further satisfactory period of performance.

4.0 DESIGN OF REMEDIAL MEASURES

Required action in the implementation of remedial measures was undertaken in the following order:

4.1 Temporary Restraint to Chimney Breast

Measures to temporarily restrain the bulging chimney breast in the western flank wall were issued and work undertaken before other significant site activities. Details are shown on sheet no. S-00220 to 00225 in Appendix 3, developed from an earlier sketch detail.

The wall including chimney breast was later rebuilt for the whole floor-to-floor level affected.

4.2 Load-Transfer Principles

An internal wall in the rear portion of the building was tracked downwards to understand how this could provide support to roof structure observed to be propped off the wall above second floor level. This is shown on sketch sheets S-SK01 and 02 in Appendix B of the investigation report, with an image taken from the lower floor levels shown below.

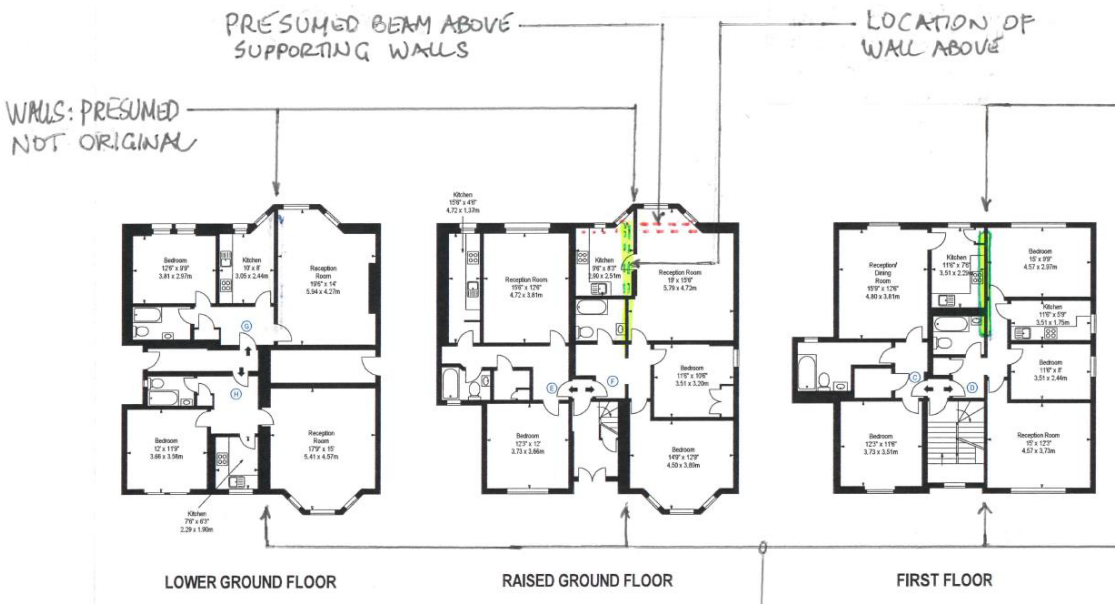


Figure 1 – Internal load path through lower floors

The internal load-bearing wall above ground floor level, depicted by the dashed green lines, is assumed to be originally supported by a Bressummer (beam) within the first floor structure (dashed red lines). This double timber beam was observed on site and appears to be spanning well beyond the extent of the bay window.

Given the significant additional loading transferred from replacement concrete roof tiles, when compared to the original slate, this explains the significant deflection of the original timber beam. The downward movement has manifested in distorted string course lines in the rear facade brickwork, readily observed from the lane to the rear of the property.

This issue has been addressed by the main steelwork strengthening item in the project, being a pair of steel channels introduced adjacent to the Bressummer (refer to details discussed below)

4.3 Remedial Works to Structure

The extent of remedial works to those parts of the building considered to have deflected significantly includes additional steel beams in the roof space at the rear of the building, together with posts and further beams to transfer loading down to sound parts of the existing building. Details are included on drawings in Appendix 3.

5.0 BUILDING MOVEMENT MONITORING

5.1 Initial Monitoring

In response to cracking observed on both external and internal walls during 2021, a regime of movement monitoring was set up in July 2021. Surveying and recording provided by THS Concepts included the following data:

- Movement monitoring (global position) at 16 points on the building exterior
- Crack width measurement at nine of the most significant cracks in the building interior

Measurements generally continued monthly until December 2021. In order to establish whether the raw data collected could indicate any trends or behaviour of the building, a review was undertaken on 28th February 2022. The review report by Cluttons is included in Appendix 4. Conclusions are summarised as follows:

a) The building is tilting slightly under vertical movement, with a weakness at an existing vertical crack in the southern flank wall

b) Both internal and external crack width changes over the measured period indicate widening of the vertical crack in the flank wall. This may well be occurring in the opposite flank wall, however lack of access has restricted measurements on that side

5.2 Further Monitoring

Monthly movement monitoring was resumed in March 2022, in order to capture seasonal variations in building movement. This period covered the extremely hot and dry UK summer of 2022.

A review by Cluttons on the data provided by THS Concepts over this period was undertaken in September 2023 (report included in Appendix 4). There was significant further movement in this period, summarised in the assessment below:

- Overall tilt: approximately 20mm for the whole building, downwards at the rear. This is not necessarily a problem, if the whole building moves as a homogeneous unit

- Flank wall cracking: crack widths increased by approximately 15mm in both flats A and B. These are the main vertical cracks near the centre of these walls, showing widening at the top floor (overall V shape up flank wall). This links to external measurements showing the rear of the flank wall moving away from the front wall by a similar amount

- Influence of buried metal tank: the exposed portion indicates the presence of a cast-iron tank of at least 1.5m diameter, which may project through or under the flank wall at ground level. If so, this could explain what appears to be a hard point under the centre of the flank wall, causing vertical cracks above it. It may also explain the tilting behaviour of the whole building, including measured lift at the front of the building. It may also be implicated in the bulging of the adjacent chimney breast

6.0 FURTHER REMEDIAL MEASURES

Following the significant widening of existing building cracks over the summer of 2022, further strengthening measures were proposed, in order to stabilise the building and limit further movement. These included the following:

- Through-building tying: external plates (pattresses) and tie rods were designed to tie the front and rear façade walls together, with ties transitioning to steel plates within the building. These were generally fitted at floor level in floorboard zones, with three ties at each of ground, first and second floor levels

- Repair of masonry cracks: use of Helifix twisted steel bars inserted in brickwork courses in significant crack zones, together with reverse bonding of face brickwork to span over previous crack locations. Cracks were also repaired with mortar

- Underpinning of rear façade: the rear wall, observed to have settled significantly, was underpinned nominally 800mm deeper into London Clay, aiming to reach a firm clay founding level. Underpinning continued for a short distance on the adjacent return walls, stepping upwards to provide a transition of footing depths

Details of the above strengthening measures were provided on sketch details, included in Appendix 5.

Repairs to deficient areas of structure, exposed during removal of finishes, were undertaken during the remedial works. These are included within the above sketch details.

7.0 SITE INSPECTIONS

Site visits were undertaken throughout the remedial works installation, with dates of visits and typical photographs of items inspected included in Appendix 6. Any items which required rectification were discussed and agreed with the contractor's technical representative, with significant issues being recorded for action on sketch sheets included above.

While we have attended site on nine occasions during the construction period to inspect the contractor's work, we have not been continuously observing their site activities. However, our site visit photographs and notes give us assurance that the design intent shown on our structural drawings has been met.

In addition, fabrication drawings of structural steelwork were commented on, with any significant amendments being made in the fabrication shop prior to delivery to site.

Relevant method statements by the contractor were also reviewed, with the main issue being a construction sequence which allowed major structural work to take place before finishes were subsequently completed.

8.0 CONTINUED MOVEMENT MONITORING

Monitoring of building movement continued throughout the installation of remedial works. A sufficient number of points on both front and rear walls were able to be monitored monthly throughout the period from November 2022 to August 2023.

A further review report has assessed the movement records in this period (refer to Appendix 4, report dated 30th August 2023). The conclusion is given below:

- Vertical movement of the perimeter walls has remained within a 10mm range over the entire period from November 2022 to August 2023. Some movement is expected over the seasons, as the Victorian building is founded on shrinkable London Clay and there is a significant slope downwards of the surrounding ground from front to rear.

9.0 CONCLUSION

This report covers the time from initial investigation of cracking evident in the building fabric in late 2021 to the completion of remedial measures in August 2023. During this period, the existing cracks widened significantly over the extremely hot and dry summer of 2022.

A regime of movement monitoring of particular points on the external walls, together with internal crack width measurements, was useful in aiding understanding of the following items:

- Deflection and settlement of those parts of the building structure supporting the heavy concrete roof tiles, replacing the original slate some years ago
- Behaviour of the building during hot and dry conditions, exacerbating movement in the already weakened building

Works on site included replacing the heavy concrete roof tiles with lighter slate, remedial works to strengthen weakened areas of the building and stiffening measures to reduce the scale of further building movement – principally through-building ties and underpinning of the rear façade.

Although the measures described above are designed to limit further movement to acceptable levels, the building remains a historic structure over 150 years old, constructed on shrinkable London Clay using brittle materials. It is inevitable that some future movement will occur in the building as it responds to the effect of the seasons and the more extreme climatic conditions expected in the future. Such movement may be revealed in slight cracking of walls and ceilings or sticking of doors and windows in their frames. The traditional remedy for these is to trim, plane and adjust as necessary then redecorate, as has been the practice over the building's lifespan.

10.0 NOTES

Please note our standard clauses:

During the investigation, design and works on site, we have not inspected those areas which were hidden, covered, unexposed or inaccessible.

It is a condition of your agreement with Cluttons LLP that (save where Cluttons LLP instructs independent experts, consultants or other third parties on your behalf) the duties and responsibilities owed to you are solely and exclusively those of Cluttons LLP and that no employed or member of Cluttons LLP shall owe you any personal duty of care or be liable to

you for any loss or damage howsoever arising as a consequence of the acts or omissions of such employee or member (including negligent acts or omissions) save and to the extent that such loss or damage is caused by defraud, dishonesty, wilful misconduct or unauthorised conduct on the part of such employee or member. This term is intended to be enforceable by and for the benefit of the employees and members of Cluttons LLP.

This structural investigation report has been prepared for the use of Brymore No 1 Ltd only and no responsibility is accepted to any third party for the whole or any part of its content. Similarly, neither the whole nor any part of this report, nor any reference thereto, may be included in any document, circular or statement without the prior written approval of the form and context in which it may appear.

Prepared by Malcolm Lyon Approved by Ian Paton

DATE 29TH SEPTEMBER 2023

For and on behalf of
Cluttons LLP
Project and Building Consultancy

APPENDIX 1

Investigation report

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CLUTTONS

53 Warminster Road
Structural report on building movement

SITE LOCATION

53 Warminster Road
London SE25 4DQ

CLIENT NAME

Brymore No 1 Ltd

CLIENT'S REPRESENTATIVE

Addington Capital

DATE

23rd February 2022

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Issue sheet

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1.0 INTRODUCTION

Addington Capital, on behalf of Brymore No 1 Ltd, engaged Cluttons to undertake a structural investigation and assessment of the Warminster Road property, following reported cracking in various locations. Records of movement monitoring have also been supplied for review.

As part of the assessment, Cluttons undertook a visual inspection of relevant parts of the property on 11th February 2022. Access was provided to the majority of the flats, as well as to the roof void via an access hatch in the common parts of second floor. The exterior was also viewed on three sides, with the fourth side (northern flank wall) not accessible due to the proximity of the neighbouring property.

2.0 SCOPE OF INVESTIGATION

The scope of this investigation is given below:

i) Visit the property, a house which has been converted to eight flats over four levels, for a general structural inspection, including the reported issues below:
   - Roof structure – potential defects
   - Movement of external masonry walls
   - Potential subsidence

ii) Ascertain likely causes of movement/ defects in structure

iii) Provide a report on the inspection, including relevant photographs

iv) Recommendations in principle for repairs/ remedial works and any further investigation required

v) Review monitoring data to date

vi) Relate monitored movements to building defects, if possible

Activities outside the scope of service are noted below:

i) Inspection of parts of the building not accessible at the time of the visit

ii) Trial pits for inspection of foundations

iii) Details of any structural work required for repairs/ remediation

iv) Employment of any specialists that may subsequently be recommended.

3.0 OBSERVATIONS

The detached residential property is situated at 53 Warminster Road, London SE25 4DQ. It was built as a solid brick Victorian house with Italianate features, likely to be dated to the 1870s. It is now divided into eight flats, two per storey from lower ground to second floor. Flats are labelled from A through to H, starting on second floor (flats A & B) and progressing downward to lower ground level.

The site slopes downward from front to rear. The front of lower ground floor is recessed, with the rear approximately level with the ground. The roof comprises a large pitched roof area to the right in plan when looking at the front façade, with a narrower pitched roof portion to the left. The front of the entrance stair core forms a short tower at roof level, capped by a flat roof. A dormer above the front bay window completes the roof-scape. A sketch plan of the roof is shown from observations on sheet S-SK02 in Appendix B. A separate small block projects from the northern flank of the building, appearing to be an original service stairwell.

Cluttons visited the property on the 11th February 2022, to undertake a visual inspection of the building. Access was gained to six of the eight flats (exceptions being flats D and E, which were not available for inspection), together with the roof void via a hatch on the second floor landing. The exterior was also inspected. The findings are as follows, grouped under the various zones of inspection:

3.1 Building Exterior

- Front elevation appears unaffected by significant cracking or movement (see photograph 1 in appendix A)
- Rear elevation shows signs of differential settlement of the façade, noticed in the level of the red brick string course at first floor level, particularly in the zone over the ground floor bay projection (photograph 2). This is discussed further below
- The southern flank elevation (RHS when viewed from the front of the building) displays a noticeable crack for the full height (photographs 3 and 4). The crack is located approximately in the centre of the facade and appears to widen progressively from the base below ground floor level up to roof level
- A buried cast iron tank is just visible at ground level in the vicinity of the crack. It is not obvious whether the tank continues into or under the external wall
- One of the wide wall thickenings on the southern flank wall has a noticeable bulge near the top (photographs 5 and 6). A capped chimney top provides evidence that the projection originally contained fireplaces and flues throughout the height of the wall
- On the opposite side of the building (northern flank), a block projects from the middle of the wall. There is clear evidence of differential settlement between the projection and the main building (photographs 7 and 8). The original function of this block appears to be a service stairwell, displaying windows which are (or were before infilling) at levels intermediate between the floors
- Due to the proximity of the adjacent property on the northern side, it is not possible to obtain a close-up view of the northern flank wall
- Returning to the rear elevation, close-up photographs (no's 9 and 10) show pronounced downward movement of the wall in the portion spanning over the ground floor bay window projection, evidenced in the dip in the red brick string course at first floor level. This is reflected in the string course at the floor level above (second floor), though not on the same scale
- Trees are present in the garden to the rear of the property, described as medium in size and girth. The distance to the line of trees is approximately seven metres from the main rear wall (photographs 11 and 12). It was also noticed that some larger trees

approximately 15m to the east of the building have recently been cut through at approximately two metres above ground level. These aspects are mentioned as ground movement due to the action of tree roots is often associated with building movement

3.2 Building Interior

- Flat A, underneath the steep pitched portion of the roof, shows internal cracking at high level of the wall between the lounge and the kitchen (photograph 13). The soffit profile of a valley rafter is clearly visible in this location
- A relatively wide crack is visible in the external (north flank) wall of the bedroom of flat A (photograph 14). A crack monitoring device has been installed here
- Flat B is beneath the shallow pitched part of the roof. It displays cracks to walls and ceilings in many places and consequently crack monitors have been installed at a number of these. A separate note is being prepared on assessment of monitoring measurements
- One of the most significant movements featured in flat B is in the external (south flank) wall at ceiling level, in the bathroom (photograph 15)
- Another significant form of movement in flat B is the sagging ceiling in the lounge room at the rear of the building. There is a pronounced bow in the location of what is seen later as a purlin in the roof space (photograph 16)
- Other significant cracks in the building are observed in flat F, on the ground floor. This flat is two levels beneath flat B, under the zone of the shallow pitched roof. One of these cracks is visible at ceiling level adjacent to the rear wall. The location is in the kitchen above the gas boiler (photograph 17). In terms of the elevation of the wall, this is adjacent to the bay window zone at his level
- Also in flat F, a significant crack has formed at the junction of the dividing wall between lounge and kitchen, with the rear facade bay window/wall (photograph 18). Note that a dividing wall projecting into a bay window is unlikely to be original

3.3 Roof Void

- Entry to the roof void revealed crucial information regarding the structural supports of the roof, now comprising clay pantiles on battens to timber rafters. The uppermost of two timber purlins supporting a substantial part of the rear of the shallow pitched roof is bowed significantly (photograph 19). A two-legged prop is visible at a distance of approximately 4.8m from the gable wall (south flank), supplemented by a single angled prop part-way along this bowed length of the purlin
- The end of this purlin at the gable wall is supported by a bearing detail that does not appear to be well constructed. There is only a small area of cut surface of the inclined purlin seating on a stone plate within the brickwork wall (photograph 20)
- At the other end, the long upper purlin meets a timber valley beam that is obviously a recent replacement. The detail of this connection appears incapable of supporting much load from the purlin (photograph 21)
- The lower of the two purlins supporting the rear of the shallow pitched roof shows that it spans over a stiff support approximately in line with the inner edge of the steep pitched roof line, presumably over a wall beneath (photograph 22). The purlin is “bent over” the support, linking to the observed bow in the adjacent ceiling below (flat B, observed above)
- At the front half of the shallow pitched roof, the upper timber purlin spanning to the south flank gable wall again shows a significant bow (photograph 23). The bearing detail to the gable wall is similar to the opposite side purlin noted above
- The junction of this same purlin at the valley rafter end is supported by a two-legged propping method (photograph 24), presumably to walls beneath

4.0 STRUCTURAL ASSESSMENT

4.1 Significant Movement

Based on the observations above, the following two areas of the building display the largest scale of movement:

- Deflection of the two uppermost purlins supporting the roof. The purlins are continuous over their lengths, with the heavily deflected end span being approximately 4.5m clear length between supports. The purlin sizes were measured as 175mm deep x 85mm thick
- String course at first floor level on the rear elevation, showing downward movement in the region immediately above the bay window

For a building of approximately 150 years of age, the above is unusual behaviour. Given that cracks are evident in the interior finishes, the movement will have occurred relatively recently.

4.2 Significant Cracking

Regarding cracks observed in the building, the areas most severely affected are as follows:

- Full-height crack in the middle of the southern flank façade. It seems that the building has been “broken” in this full-height wall, between two chimney zone thickenings and joining vertically along window openings
- Cracks in external walls of both uppermost flats (second floor level). These are the widest cracks observed, measured at 3-7mm range of width

It was not possible to determine the presence of cracking on the exterior of the northern flank wall, due to restricted access on this elevation. However, it is expected from the above that vertical cracking may be present in at least the upper levels on this elevation. Such cracking would echo that observed in the opposing elevation.

4.3 Cause of Movement/Cracking

Potential causes of movement and cracking are discussed below:

i. Roof covering replacement

A Victorian building constructed in London in the 1870s would be expected to clad with a slate roof. The roof is now observed to be covered in clay pantiles, which are significantly heavier per unit area of roof than the thin slates utilized in Victorian times.

The above change would significantly increase loading carried by the roof purlins and in turn by load-bearing walls down to the beam noted above as spanning over the rear bay window. This would cause significantly increased deflection, particularly in these parts of the building.

ii. Depth of Foundations

Being on a sloping site, wall foundations dug to consistent depths may found on differing soil strata, or with differing soil depth/stiffness. For any increase in building load, further settlement would be expected. On this site, this may occur as a differential settlement between the front and rear of the building.

This event could explain whole-building vertical cracks, as a result of “breaking the back” of the flank walls. This could be exacerbated by the presence of the buried cast-iron tank in the region of the base of the southern flank wall, i.e. a hard-point under the middle of the wall.

iii. Tree roots

Medium-sized trees are present in the rear garden, at approximately seven metres distance from the rear wall of the building. Changes in moisture level in the ground beneath foundations arising from the action of tree roots in prolonged dry or wet periods can cause settlement or heave of foundations respectively.

Although there may be some influence from trees, this does not explain the significant movement of the internal structure supporting the roof.

4.4 Behaviour under Movement

i. Deflections Above Ground

Plans of all floor levels, together with the observed positions of roof purlins and their supports, are shown on sketch no's S-SK01 & SK02 in Appendix B. These illustrate the mechanisms by which the observed deflections could take place. Of note is the position of a presumed load-bearing wall being supported by beams spanning over the ground floor bay window and having deflected significantly.

Increased loading from relatively recent replacement of slates with heavier roof tiles is the likely cause of the observed vertical deflections from the roof down to first floor level

ii. Roof Spread

Increased roof loading will cause general deflection of the shallow pitched roof, which will push the tops of supporting walls outward, unless directly restrained. In this case, rafter restraints are horizontal ceiling joist collars, which are located at 1/3 distance up the sloping roof rafters, thereby offering only partial restraint to spread of the shallow pitched roof over the majority of the roof area.

With the walls of the stairwell acting as a stiff restraint, roof spread/thrust would therefore push out the top of the rear brickwork wall. If internal walls are not sufficiently tied to the rear wall, then outward movement of the wall could occur over the top two or more storeys. This matches the observed vertical cracks seen in all of the rear flats inspected.

iii. Major Wall Cracking

The most significant cracks are the global external crack in a flank wall and corresponding cracking in internal walls at the highest floor levels. These are consistent with the building "breaking its back", with cracks increasing in width further up the building.

This behaviour can be linked to differential settlement on a sloping site under an overall increase of loading, such as from increased weight of roof tiles. This is based on an assumption of a constant level of the building's foundations, but with differing ground stiffness due to the sloped profile.

Such behaviour would be exacerbated by a stiff point under the middle of the flank wall, which may be provided by the buried cast iron tank adjacent to or underneath the wall in this location.

iv. Wall Foundations

The South London geological map (no. 270) by British Geological Survey (BGS) denotes the solid geology at Warminster Road as London Clay. This is confirmed by available local BGS borehole data (BGS website).

Concrete strip footings are the normal foundation type for this scale of domestic building. Any increase of load on footings bearing on London Clay will cause both

immediate and long-term deflection. The scale of ongoing deflection decreases with time following the application of new loading. Such foundation settlement is consistent with the established cracks in the building, which currently appear to be undergoing only small additional changes in width over time.

4.5 Monitoring of Movement

Monitoring of movement and cracks in the building has recently been set up by THS Concepts, commencing from July 2021 and continuing to December 2021. Measurement positions have been located as follows:

- Monitoring points: global position points in 16 locations on the exterior of the building
- Crack monitoring: crack width monitoring in nine locations within flats A and B on second floor

An initial review of their results shows the following:

- Up to 3mm increase in crack widths (two locations) from July to September 2021
- A maximum of 1mm further change in any of the crack widths from September to December 2021

Indications from the above are that the movements are from thermal changes over the seasons, rather than any ongoing structural cause. However, in order to confirm this, it is recommended that monitoring continues until at least summer 2022, to assess one complete year of seasons.

A more detailed assessment of monitoring will be undertaken separately.

4.6 Bulging of Wall

As noted earlier, a portion of the south flank wall at high level is exhibiting an outward bulge. This is located in a zone containing chimneys between second floor level and the roof.

This could be explained by a concentrated load from a roof purlin applied eccentrically to the centre of the wall, for example in a location where a fireplace provides little restraint to the rear of the wall.

Due to the scale of the bulge, it is recommended that this zone be restrained by tying back to floor and roof levels, pending further investigation.

5.0 CONCLUSIONS

The above observations and assessment lead to the following conclusions:

- Significant deflection of roof-supporting timbers has occurred, together with downward movement of a related loadbearing wall in the region of the rear bay window
- The shallow pitched portion of the roof appears to have spread under increased loading, manifesting as outward movement of the rear brick wall
- Relatively large cracks are present internally at the highest floor level, together with full-height cracking on the southern flank wall (and likely at high levels at least on the opposing flank wall, not exposed to view)
- The likely cause of the above movement and cracking is a relatively recent change of roof covering from slate to heavier clay tiles. This may have been exacerbated both by the effect of the sloping site on foundation behaviour and by a buried tank near the centre of south flank wall
- Movement monitoring during the latter half of 2021 shows little ongoing movement towards the end of this period
- A portion of the chimney breast at high level on the south flank wall has a significant outward bulge. The cause of this has not yet been concluded

It is noted that internal cracks of walls and ceilings do not appear to be of recent origin. There may have been slight changes in widths in recent times, however the initial causes of cracking could date to many years ago.

6.0 RECOMMENDATIONS

Recommended actions are described below:

1) Trial pits: In order to confirm assumptions about foundation behaviour, it is suggested to excavate trial pits in three locations along the south flank wall - front, centre and rear. These should be dug adjacent to the wall until the base of wall footings are reached, then inspected. The middle pit should also be dug to at least the base of the buried tank.

2) Tying restraint: The bulge in the south flank external wall is at a scale that requires immediate temporary restraint, in order to limit any further outward movement of this portion of brickwork. Details can be supplied to assist in the form of this restraint. Further investigation is recommended to determine the cause of this deformation.

3) Movement monitoring: This should be resumed, in order to provide movement data related to the seasons. It is suggested that this resumes within a month from the current date and continues for 9 months thereafter.

4) Roof remedial work: Timber purlins and their support details at the gable wall (south flank) are seen as at the limit of their design, given the increased loading suspected form the change in type of tiles. Evaluation and remedial work is recommended to ensure a further satisfactory period of performance.

7.0 NOTES

Please note our standard clauses:

We have not inspected those areas which were hidden, covered, unexposed or inaccessible.

It is a condition of your agreement with Cluttons LLP that (save where Cluttons LLP instructs independent experts, consultants or other third parties on your behalf) the duties and responsibilities owed to you are solely and exclusively those of Cluttons LLP and that no employed or member of Cluttons LLP shall owe you any personal duty of care or be liable to you for any loss or damage howsoever arising as a consequence of the acts or omissions of such employee or member (including negligent acts or omissions) save and to the extent that such loss or damage is caused by defraud, dishonesty, wilful misconduct or unauthorised conduct on the part of such employee or member. This term is intended to be enforceable by and for the benefit of the employees and members of Cluttons LLP.

This structural investigation report has been prepared for the use of Brymore No 1 Ltd only and no responsibility is accepted to any third party for the whole or any part of its content. Similarly, neither the whole nor any part of this report, nor any reference thereto, may be included in any document, circular or statement without the prior written approval of the form and context in which it may appear.

Prepared by Malcolm Lyon

Approved by Ian Paton

DATE 23RD FEBUARY 2022

For and on behalf of
Cluttons LLP
Project and Building Consultancy

APPENDIX A

Photographs



Photograph 1 – Front view



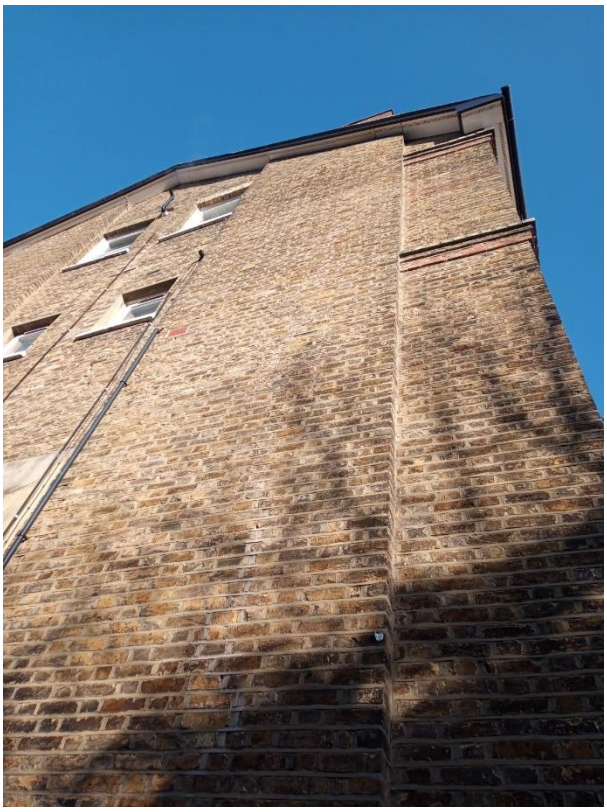
Photograph 2 – Rear view



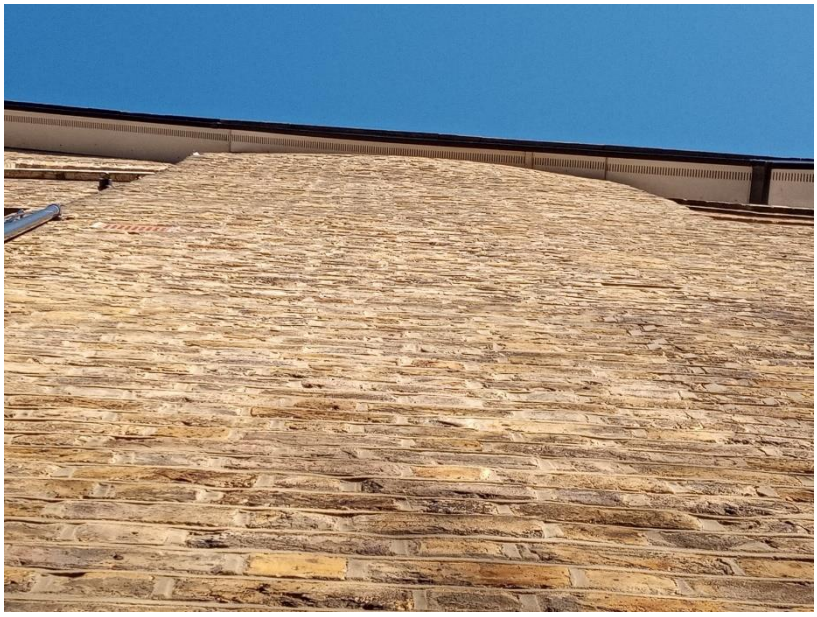
Photograph 3 – South flank wall at LGF



Photograph 4 – South flank wall at GF



Photograph 5 – South flank chimney



Photograph 6 – South flank bulge at top



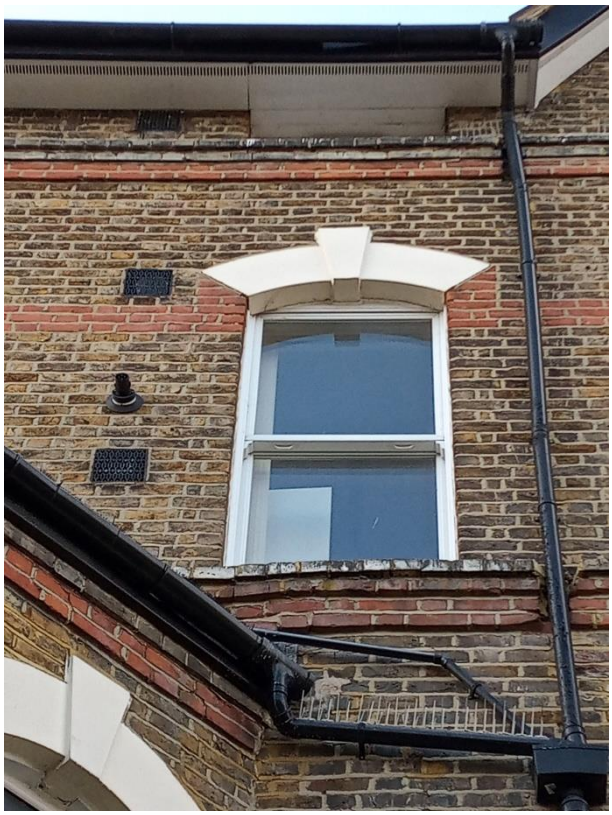
Photograph 7 – Front view, service block



Photograph 8 – Service block detail



Photograph 9 – Rear façade string courses



Photograph 10 – Rear string course detail



Photograph 11 – Rear garden trees



Photograph 12 – Trees behind building



Photograph 13 – Flat A ceiling at rear



Photograph 14 – Flat A flank wall in middle



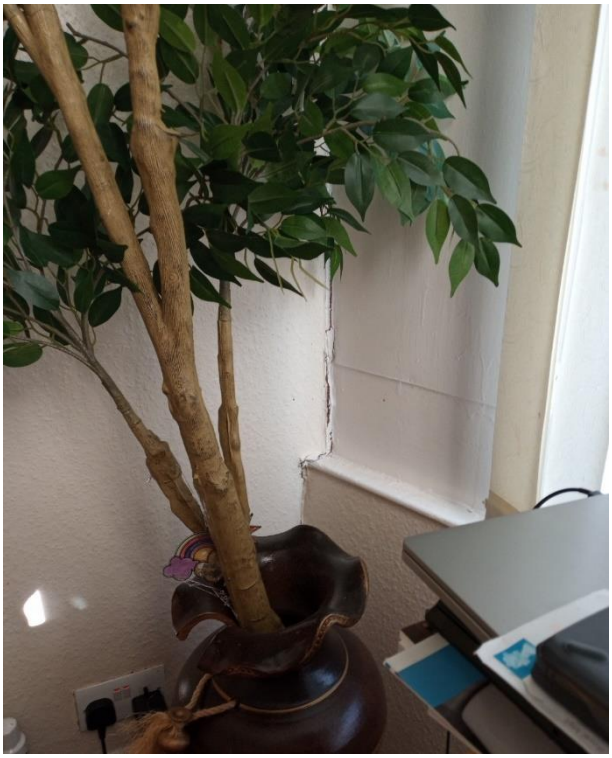
Photograph 15 – Flat B flank wall in middle



Photograph 16 – Flat B rear ceiling



Photograph 17 – Flat F rear adjacent to bay



Photograph 18 – Flat F rear wall at bay



Photograph 19 – Upper rear roof purlin



Photograph 20 – Purlin bearing at gable wall



Photograph 21 – Upper rear purlin at roof valley



Photograph 22 – Lower rear purlin over wall



Photograph 23 – Upper front roof purlin



Photograph 24 – Front roof valley struts

APPENDIX B

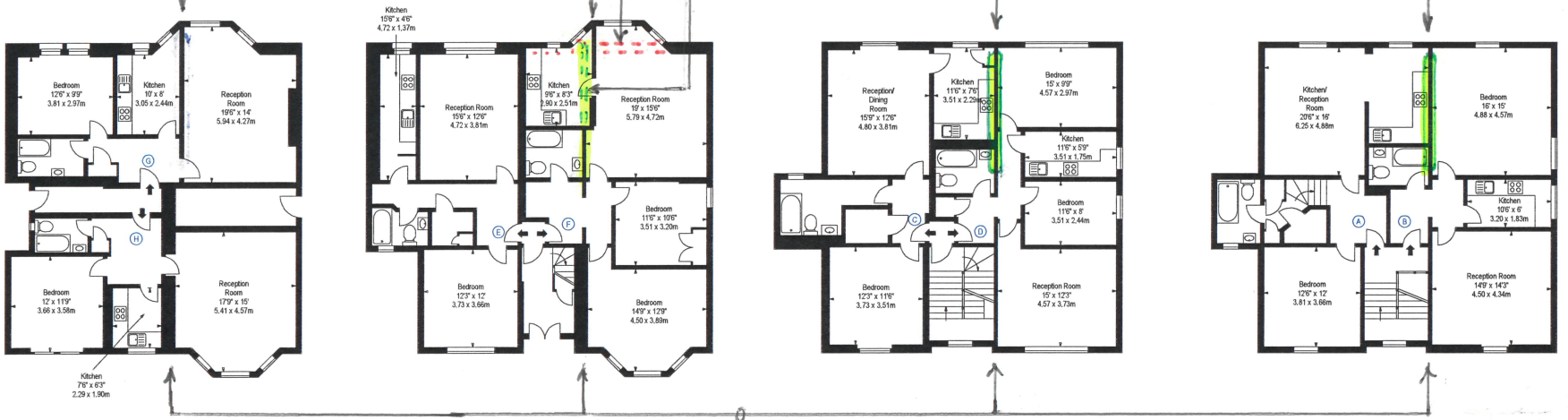
Sketch plans

PRESUMED BEAM ABOVE SUPPORTING WALLS

LOCATION OF WALL ABOVE

WALLS: PRESUMED NOT ORIGINAL

WALL SUPPORTING ROOF PURLINS



FULL HEIGHT WALL SUPPORTING ROOF PURLINS

NOTES RE WALLS SUPPORTING ROOF PURLINS

CLUTTONS

Job No. 27266.03

By: ML

Sheet: S-SK01

Date: 22.2.22

Property Details:

53 WARMINSTER ROAD
LONDON
SE25 4DQ

Surveyed and Drawn By:

BKR

Hideaway Work Space
1 Empire Mews
London
SW16 2BF

Tel: 0345 257 2023
info@bkrfloorplans.co.uk
www.bkrfloorplans.co.uk

© BKR 2018

Approx, Gross Internal Area*
5641 ft² - 524.05 m²

*As Defined by the RICS - Code of Measuring Practice

SCALE
1:250 @ A4

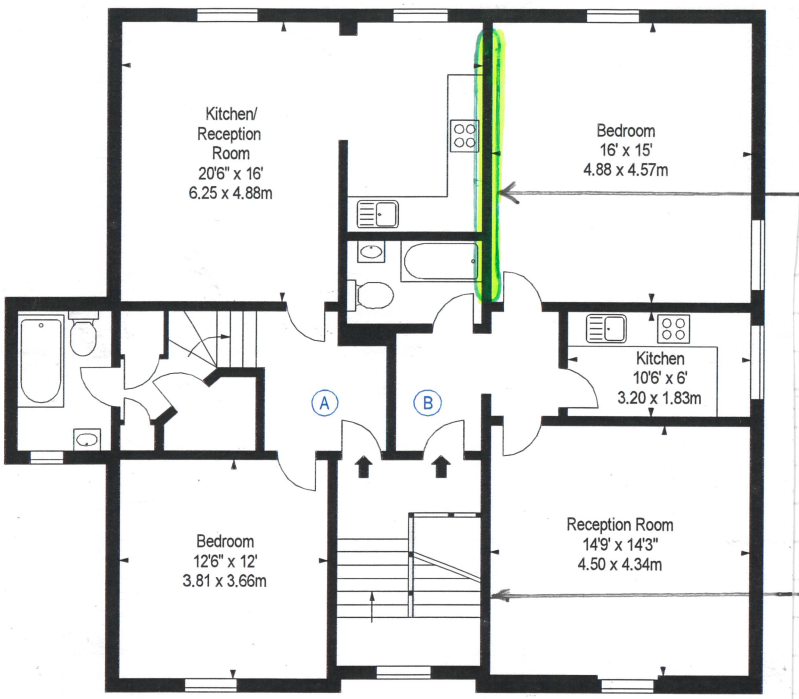
Plans Drawn: 30.10.2018

CLUTTONS
Chartered Surveyors • Property Consultants

Job No.	27266.03
By	ML
Date	22.2.22
Sheet	S-SK02

Project: 53 WARMINSTER ROAD, LONDON SE25 4DQ

PLANS SHOWING PRESUMED SUPPORT OF ROOF

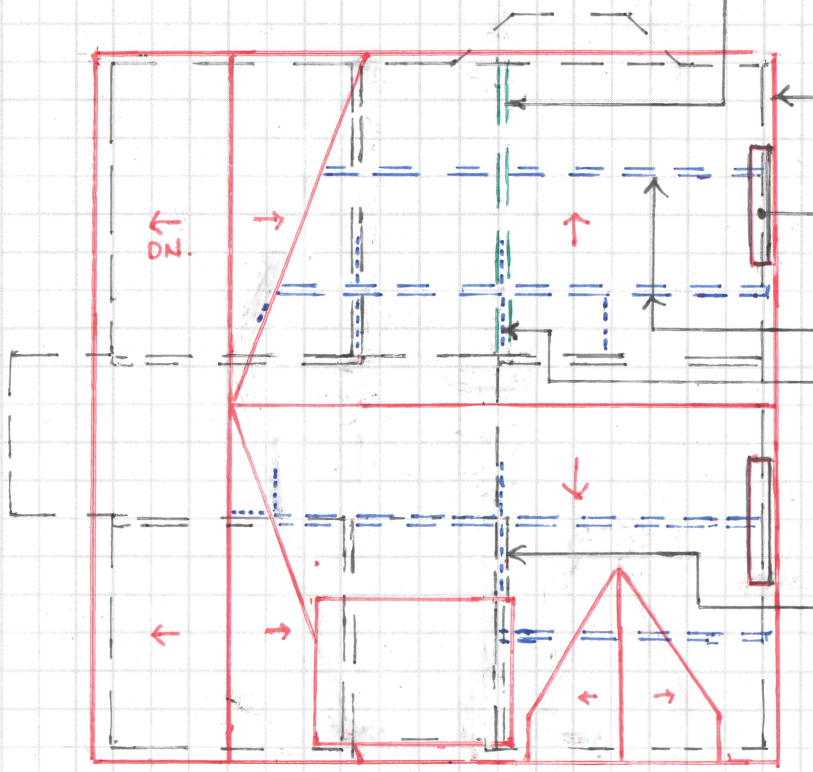


WALL FROM FIRST FLOOR TO ROOF *

LOAD-BEARING WALL (FULL HEIGHT)

* WALL SEEMS SUPPORTED BY BEAM AT FIRST FLOOR LEVEL (REF. S-SK01)

SECOND FLOOR PLAN



WALL UNDER (REF. NOTE ABOVE)

ROOF PROFILE

CHIMNEY

TIMBER PURLINS

PURLIN STRUT (:)

LOAD-BEAR^G WALL UNDER (||)

NOTE
PLAN AT LEFT PLOTS ROOF-SUPPORTING PURLINS OVER LOAD-BEAR^G WALLS SHOWN ON SECOND FLOOR PLAN.

ROOF PLAN

APPENDIX 2

Trial pits

CLUTTONS
Chartered Surveyors • Property Consultants

Job No.	27266.03
By	M.L.
Date	21.04.22
Sheet	S-SK06

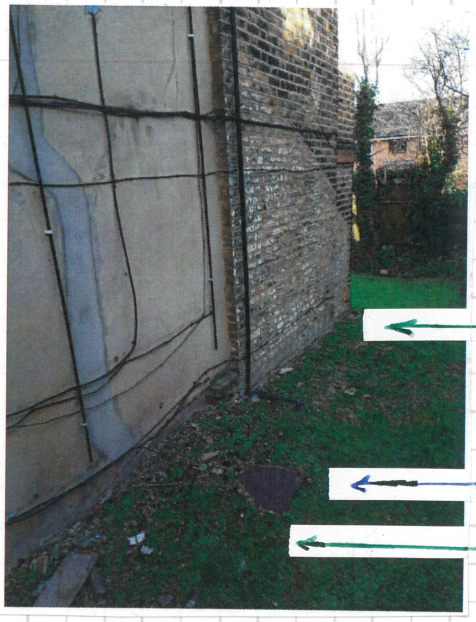
Project: 53 WARMINSTER RD, LONDON SE25 4DQ
TRIAL PITS

FRONT VIEW



TRIAL PITS AT SIDE OF BUILDING

SIDE ELEVATION



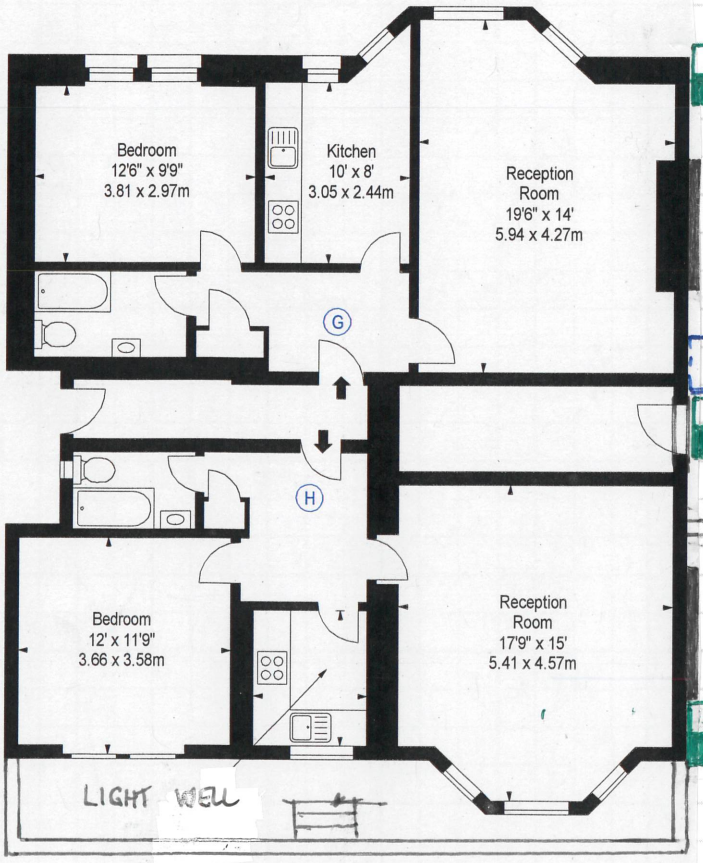
TP1

BURIED TANK

TP2

TP3 : RAISED GROUND AT FRONT

REAR



TP1

BURIED METAL TANK

TP2

GARDEN WALL STEP IN HEIGHT

TP3

FRONT

LOWER GROUND FLOOR

NOTES

1. TRIAL PITS ARE TO ASSESS EXISTING WALL FOUNDATIONS
2. TRIAL PIT SIZE:
   PLAN : 0.9m SQUARE
   DEPTH : TO U/SIDE OF FOUNDATION (1.2m MAX)
3. USE HAND-HELD EQUIPMENT DUE TO ACCESS RESTRICTIONS
4. NOTIFY ENGINEER FOR INSPECTION PRIOR TO BACKFILLING.
5. SCAN FOR EXIST' SERVICES PRIOR TO EXCAVATION
6. UNDERTAKE IN SEQUENCE TP1 TO TP3.
7. ONLY DIG TRIAL PITS AFTER CHIMNEY BREAST RESTRAINT IS IN PLACE (REF. S-SK05

APPENDIX 3

Drawings

Scale bar

1:20

400mm 0 400mm 800mm 1200mm 1600mm 2000mm

1:100

2m 0 2m 4m 6m 8m 10m

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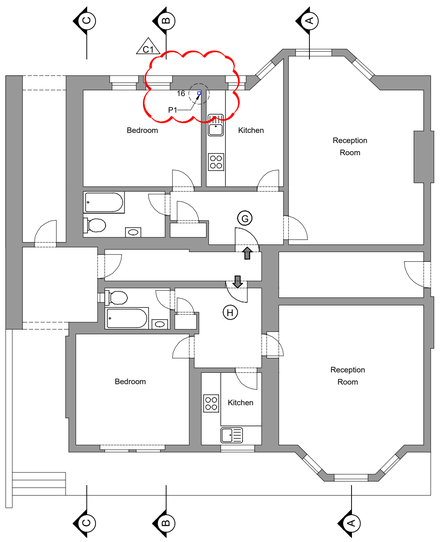
This drawing is to be read in conjunction with the specification and all relevant drawings.

All dimensions to be checked on site prior to commencement of any works.

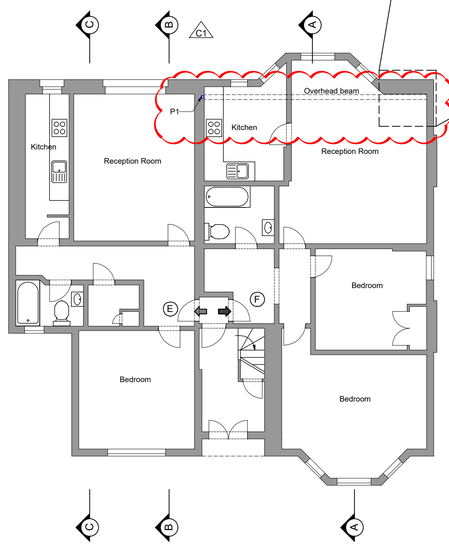
Refer any discrepancies to the surveyor.

Do not scale from this drawing.

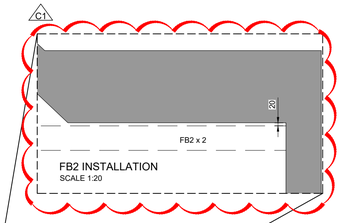
All dimensions are in mm unless otherwise specified.



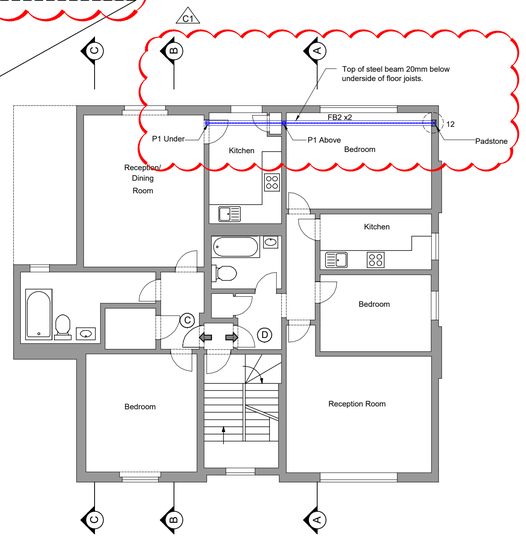
LOWER GROUND FLOOR PLAN
SCALE 1:100



RAISED GROUND FLOOR PLAN
SCALE 1:100



FB2 INSTALLATION
SCALE 1:20



FIRST FLOOR PLAN
SCALE 1:100

EXISTING FLOOR PLANS, ROOF PLAN AND SECTIONS ARE SHOWN INDICATIVELY. ALL DIMENSIONS AND POSITION OF PROPOSED STRUCTURAL ELEMENTS TO BE CONFIRMED ON SITE.

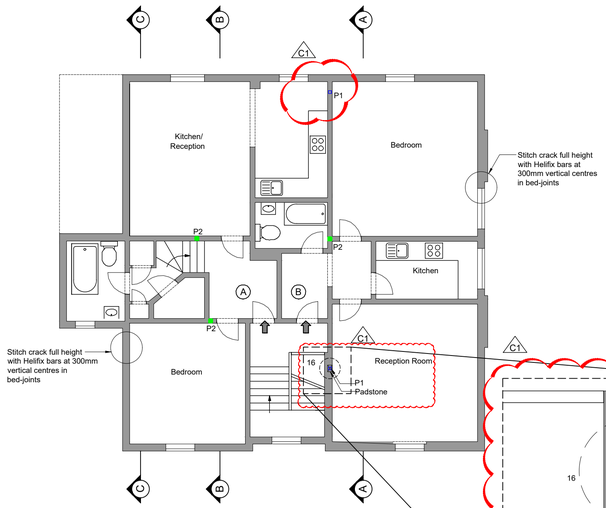
NOTES

Steel members to reinforce slate roof;
i) Grade S275 J0
ii) Sections:
- FB2 - 200x75 PFC
- RB1 - 150x75 PFC
- RP1 - 150x75 PFC
- P1 - 100x100x6.3 SHS
- T1 - 20Ø Steel Rod

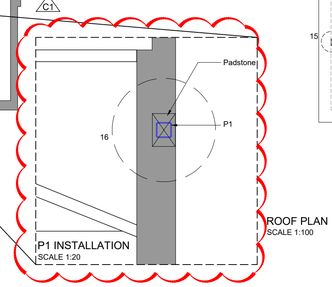
iii) Corrosion Protection:
Wire brushed
Primer: ALKYD 80mm
Top Coat: ALKYD 80mm

1. Timber Members:
i) Grade C24
ii) Sections:
- P2 - 100x100 Post

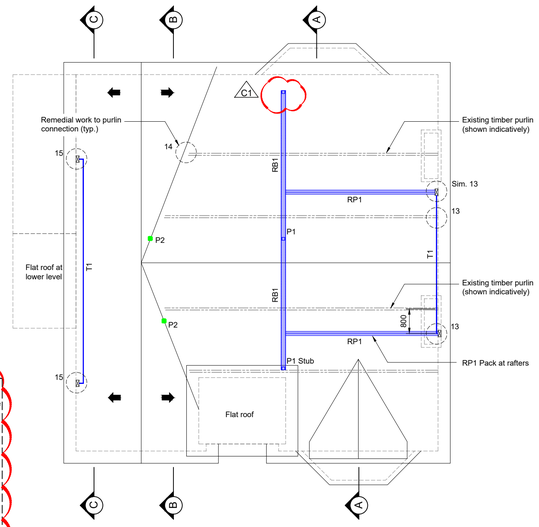
2. Purlins to Gable wall (south facade):
Prop to needles in wall, repair brickwork and place padstone, then pack to support purlin. (4No. Purlins)



SECOND FLOOR PLAN
SCALE 1:100



P1 INSTALLATION
SCALE 1:20



ROOF PLAN
SCALE 1:100

MASONRY NOTES

1. Brickwork shall be in accordance with BS5628
2. Mortar to be type (iii)
3. Replacement bricks to be same or better properties than existing

TIMBER NOTES

1. Timber shall be in accordance with BS5268
2. Refer to further notes in structural drawings

TEMPORARY WORKS

1. The contractor is responsible for the stability of the building and adjoining structures during construction and shall design, install, adapt and maintain all necessary propping and temporary works. A method statement for the temporary works must be submitted to the contractor administrator for comment before work begins.
2. Prior to commencing work, the contractor shall provide temporary restraint to a bulge at high level in the south gable wall. Preliminary details are shown in the drawings.

GENERAL CONCRETE NOTES

Concrete UNO to be in accordance with the specification, BS 8500: Part 2 and BS EN 206

Blinding - Grade GEN1
Mass Concrete - Grade GEN3
Reinforced concrete - Grade RC35

50mm concrete blinding is to be placed under all reinforced concrete in contact with the ground

All reinforcement to be high yield, minimum grade 500 N/mm², Type H to BS 8666 UNO.

Maintain c.50mm concrete cover to all steel reinforcement (40mm min.)

Concrete to be fully compacted using mechanical vibration.

The temperature at the time of placing concrete must not be less than 5°C and rising.

Concrete surfaces to be protected with polythene sheeting during specified curing period.

Reinforcement to be clean and free of corrosive pitting, loose rust, ice and substances which may adversely affect the reinforcement bonding to the concrete.

Mesh to be supported on proprietary spacers to maintain a min. of 40mm cover to reinforcement.

STEEL NOTES

All Structural Engineering drawings are to be read with all the relevant construction drawings and specifications.

All materials to comply with the relevant British Standard.

The contractor must allow for tolerance in fabrication and provide all shimming and packing necessary to obtain the correct levels shown on the drawings.

The contractor will be responsible for ensuring that steelwork installed fulfills the design brief and no changes to specification should be made unless expressly instructed by the CA.

All hot rolled steel to be grade S275 J0 or S355 (hollow sections) in accordance with BSEN 10 025.

All welding to be in accordance with BS 5153. Minimum fillet weld to be 6mm. All butt welds should be 'full penetration'. All fillet welds to have 6mm min. leg length, unless noted otherwise.

All bolting to be carried out using grade 8.8 bolts in 2mm clearance holes unless otherwise noted.

All dimensions to be checked on site by the Contractor prior to fabrication and erection of the steelwork.

A minimum of 150mm bearing must be given to steel beams, unless noted on drawings.

External and internal steelwork to be galvanised to BS EN ISO 1461, to receive a min mean coating thickness of 140 micrometers. Preparation: Blast clean to BS EN ISO 8501-1, Prep' grade SA 2.5 followed by chemical cleaning.

All bolted connections are to include a minimum of two M16 bolts per member unless specifically indicated otherwise on details. All bolts are to be grade 8.8 sheradized to BS 4921, class 1. All bolts, nuts and washers are to be to BS 5950 Part 2 clause 2.2. Washers are to be placed beneath the rotated item.

Steelwork fabricated to BS EN 1090-2 (and BS 5950-2001) to special tolerances Appendix B.

Fabrication drawings of steelwork shall be submitted for approval 3 weeks prior to commencement of fabrication.

Drawings shall include general arrangement and detail drawings including all connections.

Mill certifiates shall be included in the submission.

Rev	Date	Amendment	By
C1	24.11.22	Construction Issue	SS
T1	28.06.22	Tender Issue	MO
P1	10.06.22	Preliminary Issue	MO

Revisions

Drawing Status

CONSTRUCTION

Project and Building Consultancy
Cluttons LLP, Suite 2 Triumph House,
Parkway Court, Oxford Business Park South,
Oxford, OX4 2JY
Tel No: 01865 812755
www.cluttons.com

Project

Structural Design

53 Warminster Road
London SE25 4DQ

Client

Addington Capital

Drawing

Proposed Structural Works
Floor and Roof Plans

Drawn By MO Checked By ML

Scale As Shown @ A1 Status S01

Project	Originator	Funct.	Spat.	Form Disci.	Number	Rev
27266	CLT	XX	ZZ	D	S-00200	C01

CLUTTONS

\\cluttons_net\corporate\Offices\Oxford\Projects\Project and Building Consultancy\Department Jobs\27KOxford\27266 ML Various London Surveys (0521)\03 Warminster Rd\12 Drawings\01. Master Drawings\Warminster 27266-CLT-XX-ZZ-D-S.dwg 24/11/2022 Sonia Sarwar

Scale bar

1:20

400mm 0 400mm 800mm 1200mm 1600mm 2000mm

1:100

2m 0 2m 4m 6m 8m 10m

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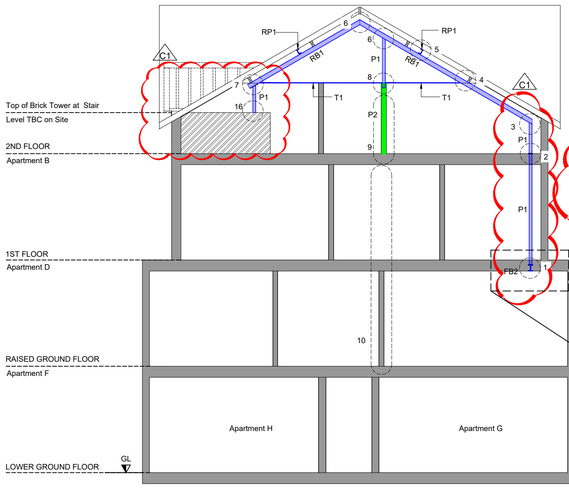
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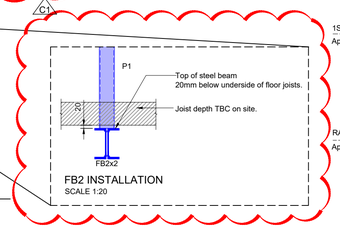
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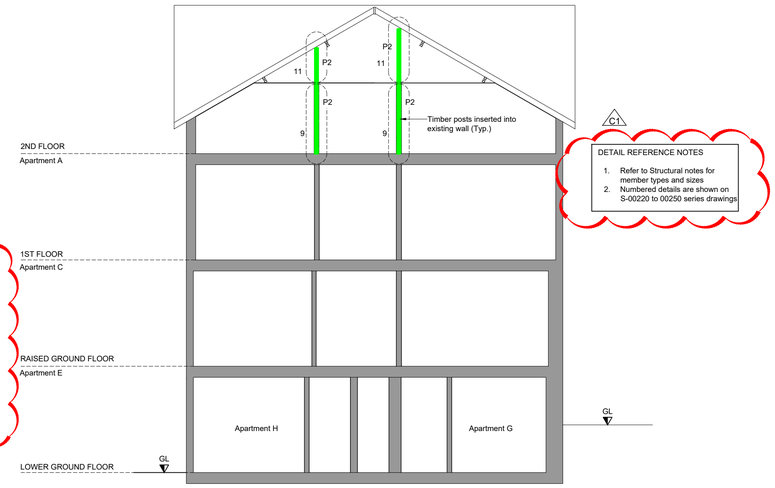
SECTION A-A
SCALE 1:100

DETAIL REFERENCE NOTES

1. Refer to Structural notes for member types and sizes
2. Numbered details are shown on S-00220 to 00250 series drawings



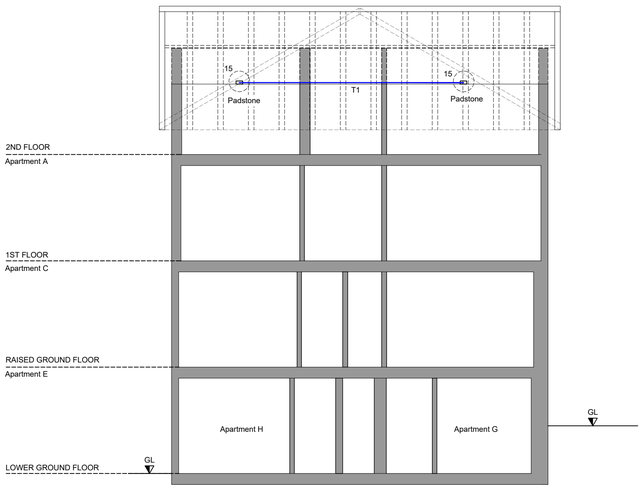
FB2 INSTALLATION
SCALE 1:20



SECTION B-B
SCALE 1:100

DETAIL REFERENCE NOTES

1. Refer to Structural notes for member types and sizes
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SECTION C-C
SCALE 1:100

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P1	10.06.22	Preliminary Issue	MO

Revisions

Drawing Status
CONSTRUCTION

Project and Building Consultancy
Cluttons LLP, Suite 2 Triumph House,
Parkway Court, Oxford Business Park South,
Oxford, OX4 2JY
Tel No: 01865 812755
www.cluttons.com

Project
Structural Design
53 Warminster Road
London SE25 4DQ

Client
Addington Capital

Drawing
Proposed Structural Works
Sections

Drawn By MO Checked By ML

Scale As Shown @ A1 Status S01

Project	Originator	Funct.	Spat.	Form	Disci.	Number	Rev
27266	CLT	XX	ZZ	D	S	00201	C01

CLUTTONS

\\cluttons_ref\corporate\db2\divisions$\Project and Building Consultancy\Department Jobs\2PROrford\27266 ML Various London Surveys (052)\03 Warminster Rd\12 Drawings\01. Master Drawings\Warminster 27266-CLT-XX-ZZ-D-S.dwg 24/11/2022 Sonia Sunwar

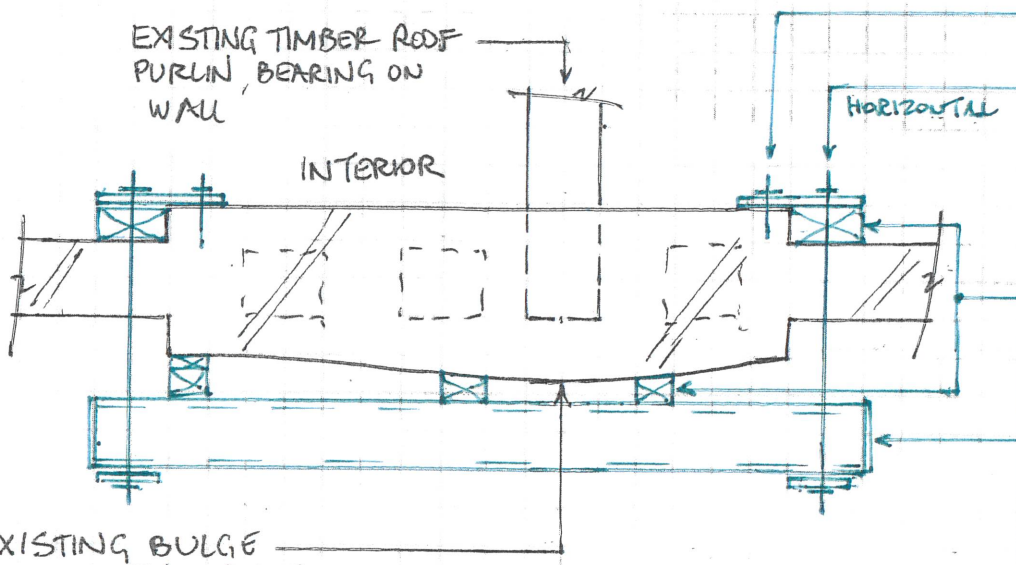
CLUTTONS
Chartered Surveyors • Property Consultants

53 WARMINSTER RD, LONDON SE25 4DQ

Project: MASONRY RESTRAINT DETAIL

Job No.	27266.
By	ML
Date	11.10.22
Sheet	S-00220 C1

SOUTH GABLE WALL, HIGH LEVEL

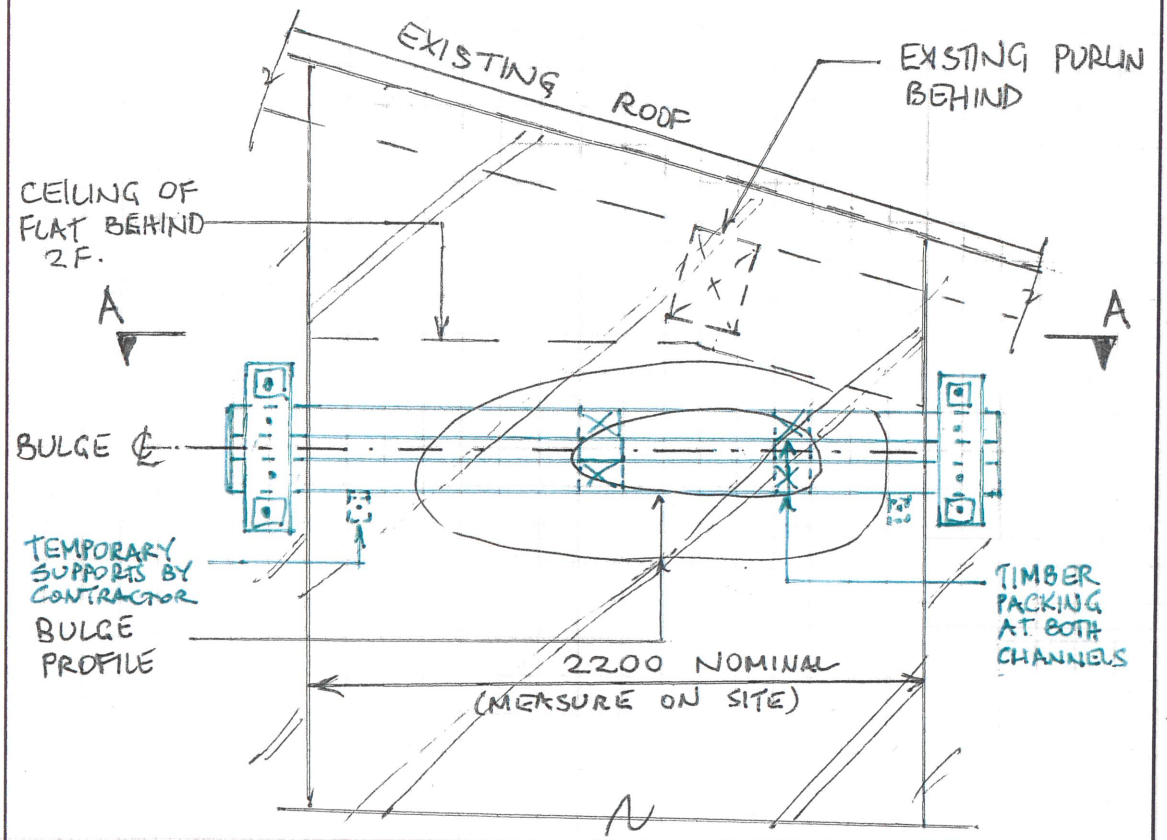


PLAN DETAIL
SECTION A-A

RESTRAINTS REQ'D:

- 2 M16 CHEMICAL ANCHORS, 100 EMBED.
- 2/16Φ TIE RODS, 200×100×10 STEEL PLATES
- ALL STEEL TO BE GALVANISED.
- TIMBER PACKING
- DOUBLE CHANNEL STEEL BEAM, MABEY MASS 25 OR EQUIVALENT:





WALL ELEVATION AT CHIMNEY BREAST
HIGH LEVEL: SECOND FLOOR TO ROOF

NOTES

1. PROVIDE SCAFFOLD ACCESS FOR FULL HEIGHT OF CHIMNEY BREAST
2. PREPARE AND SUBMIT METHOD STATEMENT FOR APROVAL TWO WEEKS PRIOR TO INSTALLATION ON SITE. INCLUDE FULL DETAILS OF ALL RESTRAINT COMPONENTS (ITEMS IN GREEN)
3. COORDINATE WITH BUILDING OWNER'S REPRESENTATIVE RE ACCESS AND TIMING OF WORKS
4. VISIT SITE TO CHECK SPECIFIC REQUIREMENTS PRIOR TO WORKS

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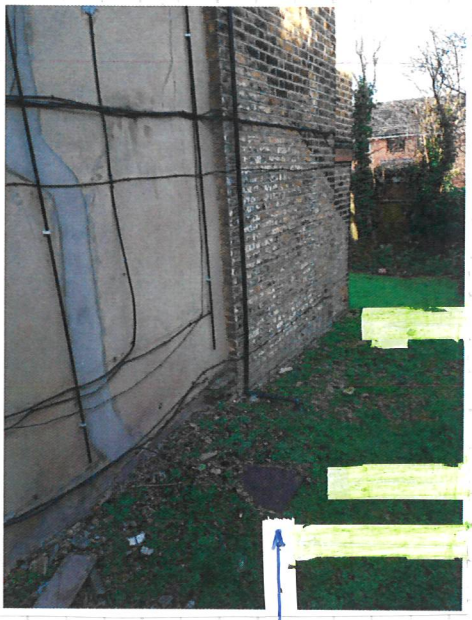
Job No.	27266.03
By	M.L.
Date	28-6-22
Sheet	S-00221 T1

Project: 53 WARMINSTER RD, LONDON SE25 4DA
REMOVAL OF BURIED TANK

FRONT VIEW

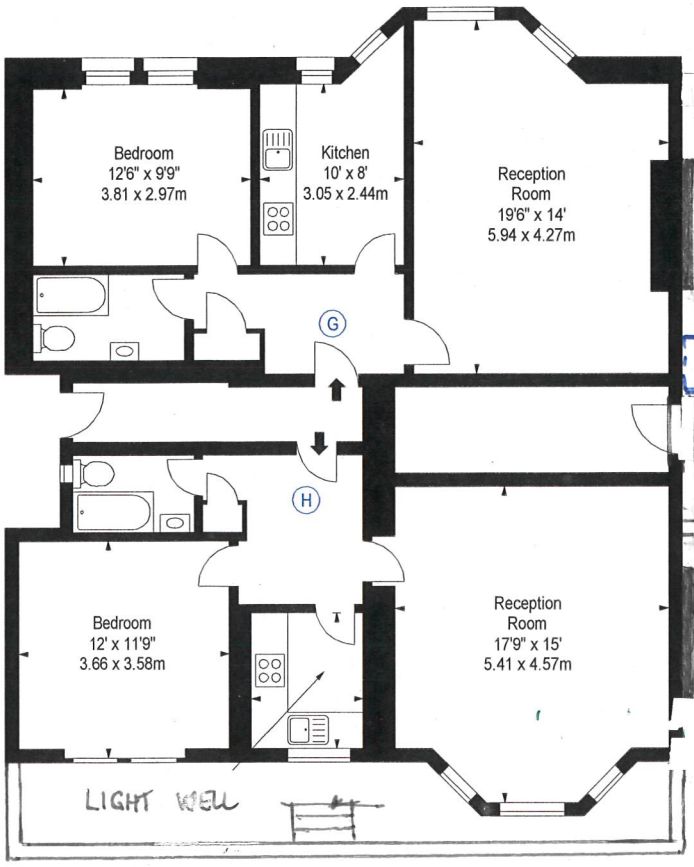


SIDE ELEVATION



PART-BURIED STEEL/C.I. TANK

REAR



BURIED METAL TANK

GARDEN WALL STEP IN HEIGHT

FRONT

LOWER GROUND FLOOR

NOTES

1. SEQUENCE FOR REMOVAL OF BURIED TANK:
   a) EXCAVATE AROUND WITH HAND-HELD TOOLS
   b) NOTIFY ENGINEER IF TANK EXTENDS BENEATH WALL & SUBMIT METHOD FOR REMOVAL
   c) CHECK FOR ANY CONNECTIONS TO TANK
   d) ONCE METHOD AGREED, CAREFULLY REMOVE TANK & DISPOSE OF
   e) BACKFILL WITH COMPACTED ORIGINAL MATERIAL IN 250 THK LAYERS
   f) REINSTATE TOPSOIL

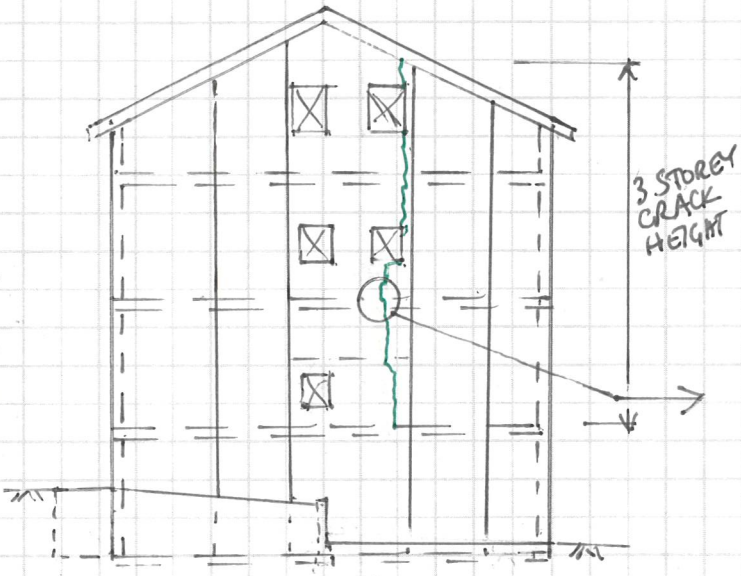
2. COORDINATE EXCAVATION OF TANK WITH ACCESS FOR RESTRAINT TO SOUTH GABLE WALL. REF. SHT. S-00220

CLUTTONS
Chartered Surveyors • Property Consultants

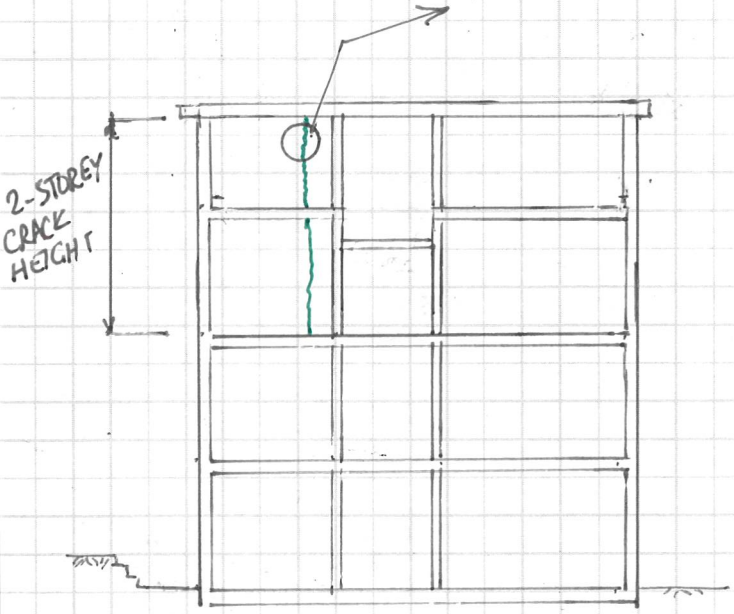
Job No.	27266.03
By	ML
Date	28-6-22
Sheet	S-00222 T1

Project: 53 WARMINSTER RD, LONDON SE25 4DQ

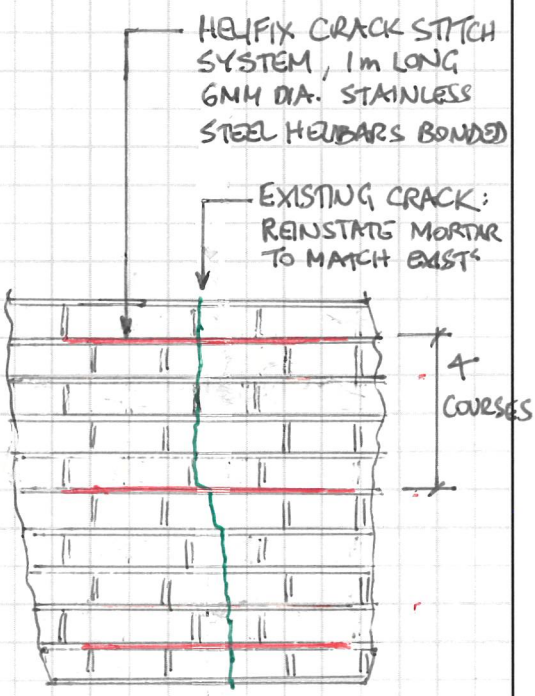
BRICKWORK CRACK REPAIR



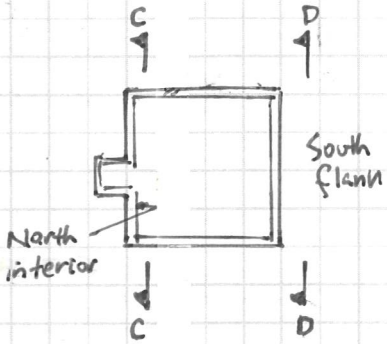
SECTION D-D
EXTERNAL FACE



SECTION C-C
INTERNAL FACE



BRICKWORK CRACK REPAIR DETAIL



KEY PLAN
EXT. WALLS

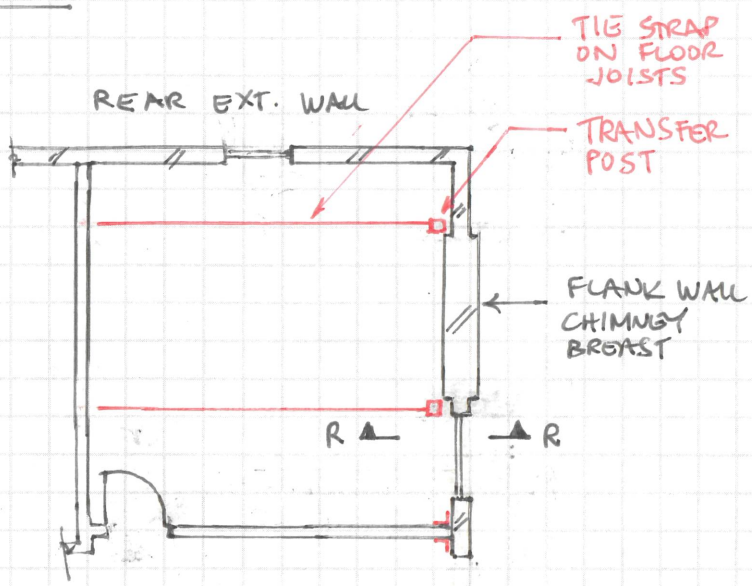
CLUTTONS
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53 WARMINSTER RD, LONDON SE25 4DQ

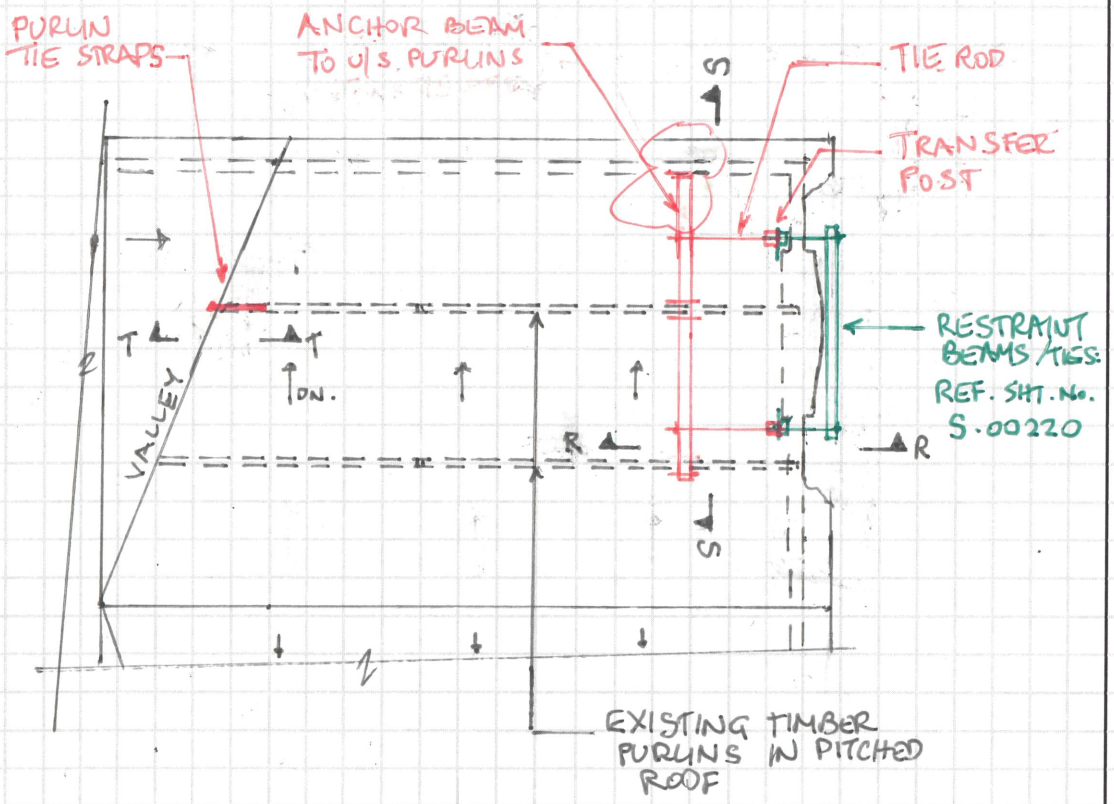
Project: MASONRY RESTRAINT : ANCHORAGE

Job No.	27266
By	ML
Date	11.10.22
Sheet	S-00223 C2

CHIMNEY BREAST BULGE ANCHORAGE PLANS



SECOND FLOOR PLAN



ROOF PLAN

REV.C2 - 2.11.22

NOTES

1. REF. S-00220 SERIES
2. FOR SECTIONS REF. S-00224 & S-00225
3. SITE MEASURE FOR ALL TIES/ RESTRAINTS ETC
4. RETAIN RESTRAINT TO CHIMNEY BULGE UNTIL ROOF PURLINS ARE PROPPED AND LOADING IS REMOVED FROM TOP OF CHIMNEY BREAST

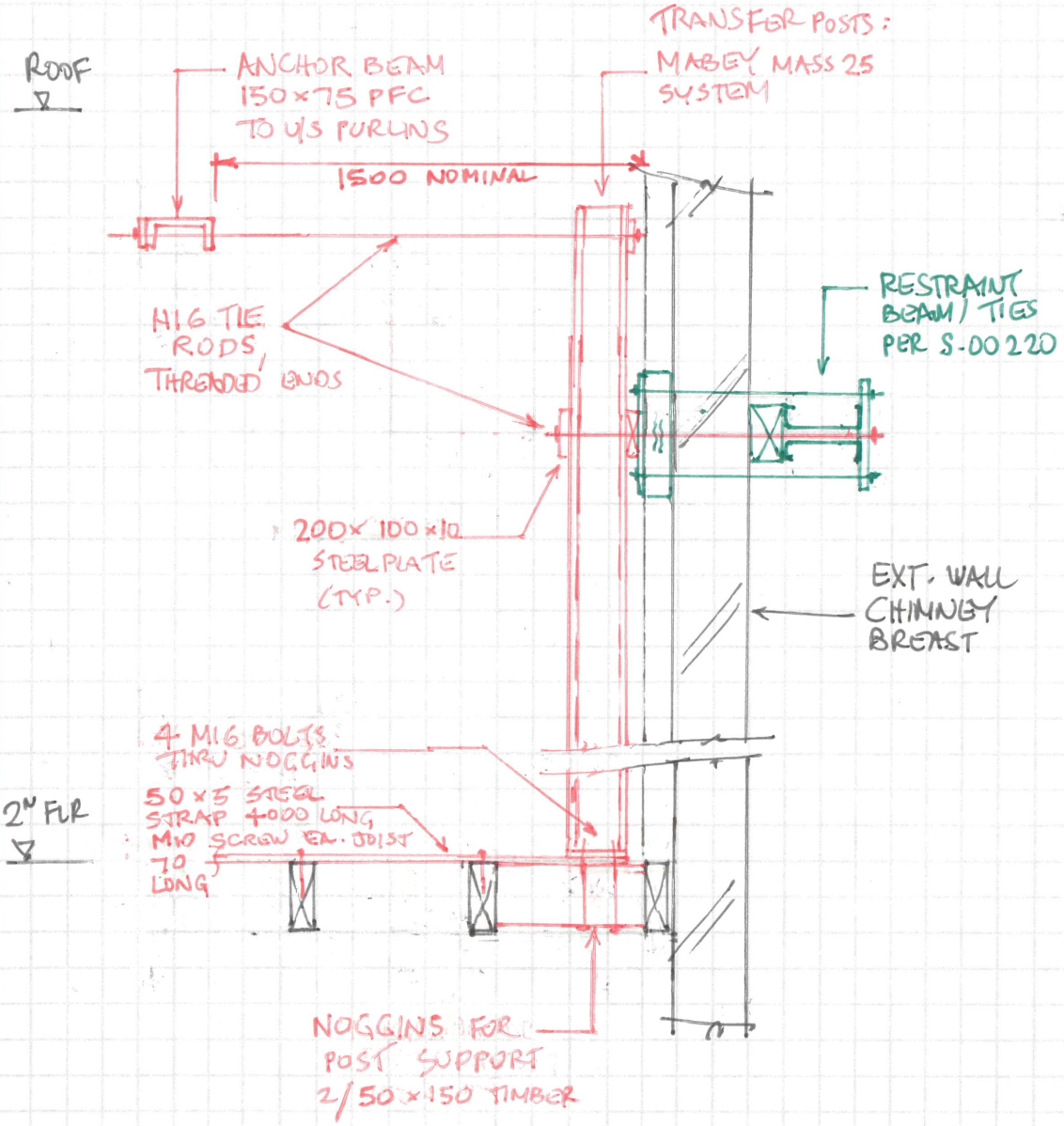
REV. C2: ANCHOR BEAM EXTENDED

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Project: 53 WARMINSTER RD, LONDON SE25 4DQ
MASONRY RESTRAINT : ANCHORAGE

Job No.	27266
By	ML
Date	11.10.22
Sheet	S-00224 C1

CHIMNEY BREAST BULGE ANCHORAGE DETAILS - SHEET 1



SECTION R-R

[Ref. S-00223]

NOTES

1. REF S-00220 SERIES

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Project: 53 WARMINSTER RD, LONDON SE25 4DQ

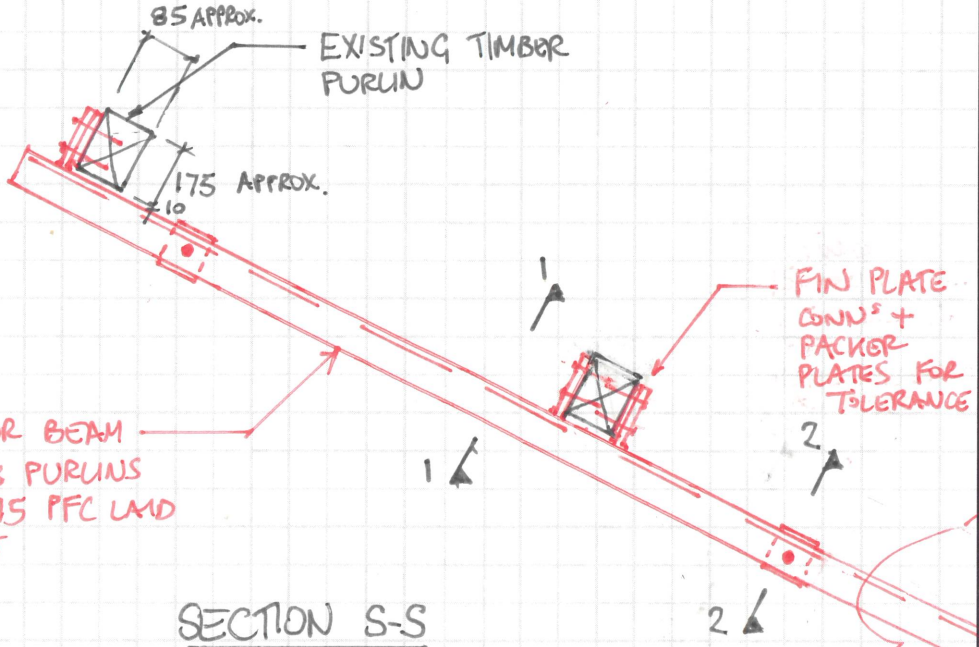
Job No.	27266
By	ML
Date	11.10.22
Sheet	S-00225 C2

CHIMNEY BREAST BULGE ANCHORAGE DETAILS - SHEET 2

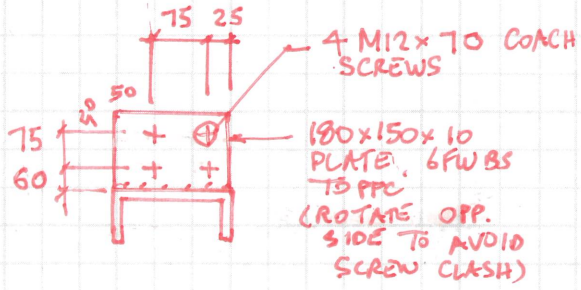
Rev. C2 - 2.11.22

NOTES

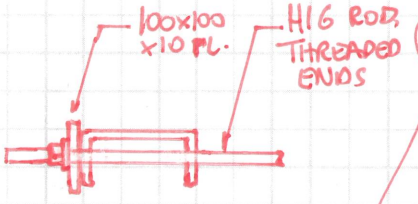
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SECTION S-S
[S-00223]

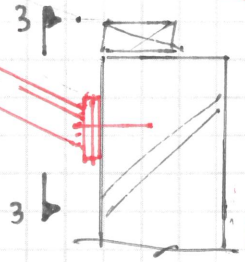


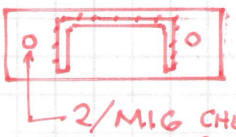
1 - 1



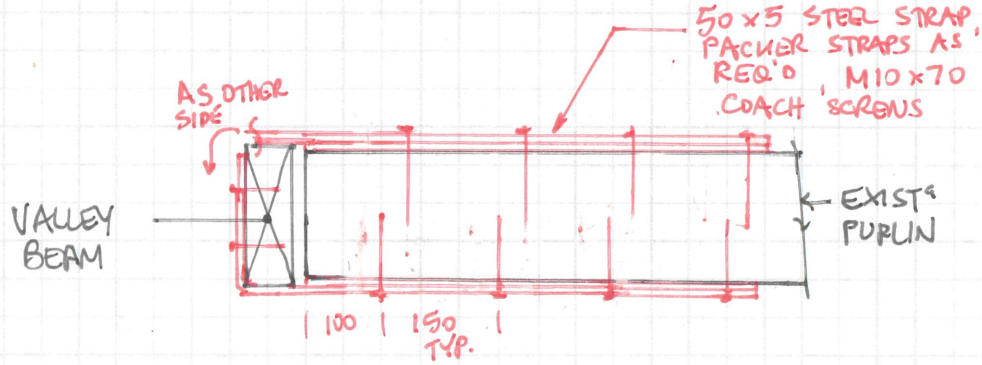
2-2

REV. C2





3-3



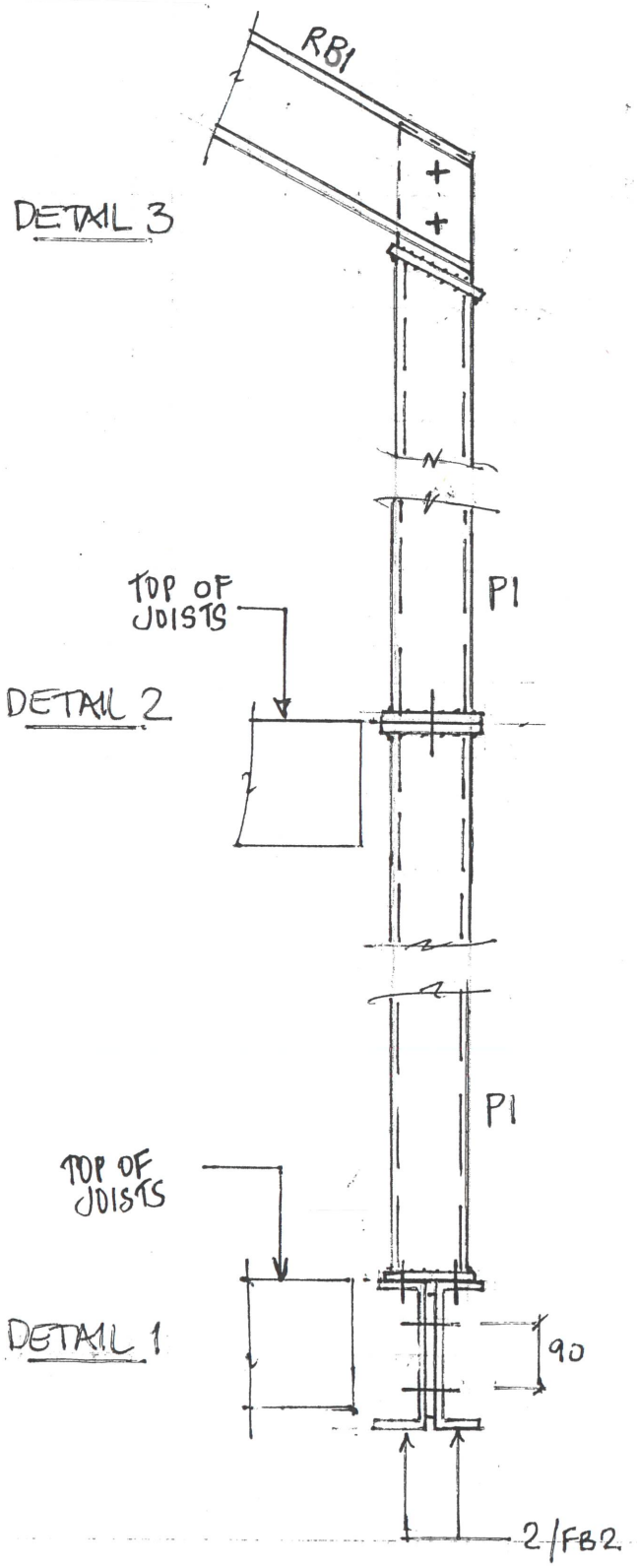
SECTION T-T
[S-00223]

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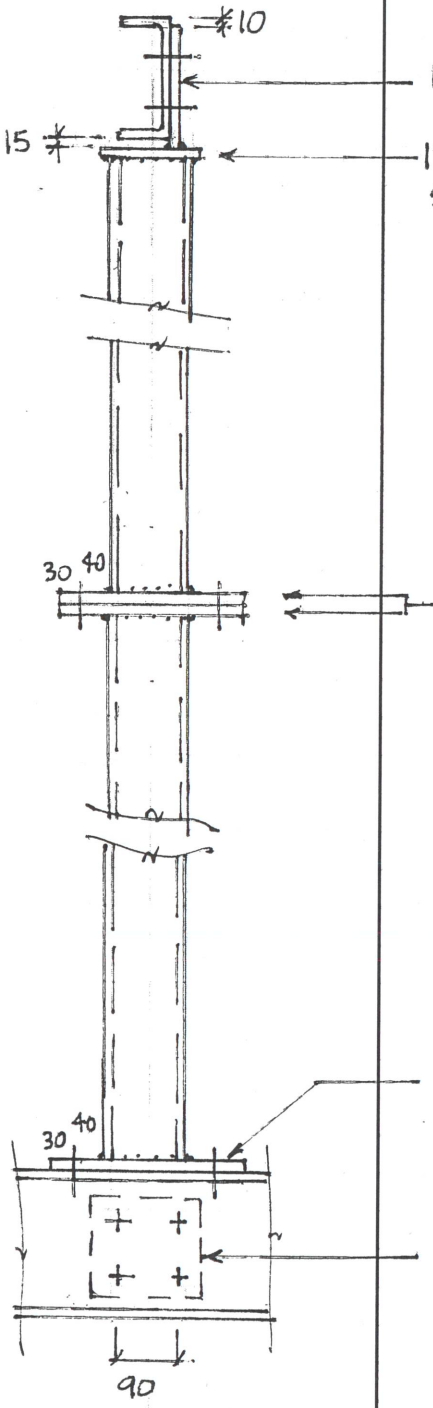
Job No.	27266
By	ML
Date	05.11.22
Sheet	S-00230 C1

Project: 53 WARMINSTER RD, LONDON SE25 4DQ

STEELWORK DETAILS: SHEET 1



SECTION



END ELEVN

NOTES

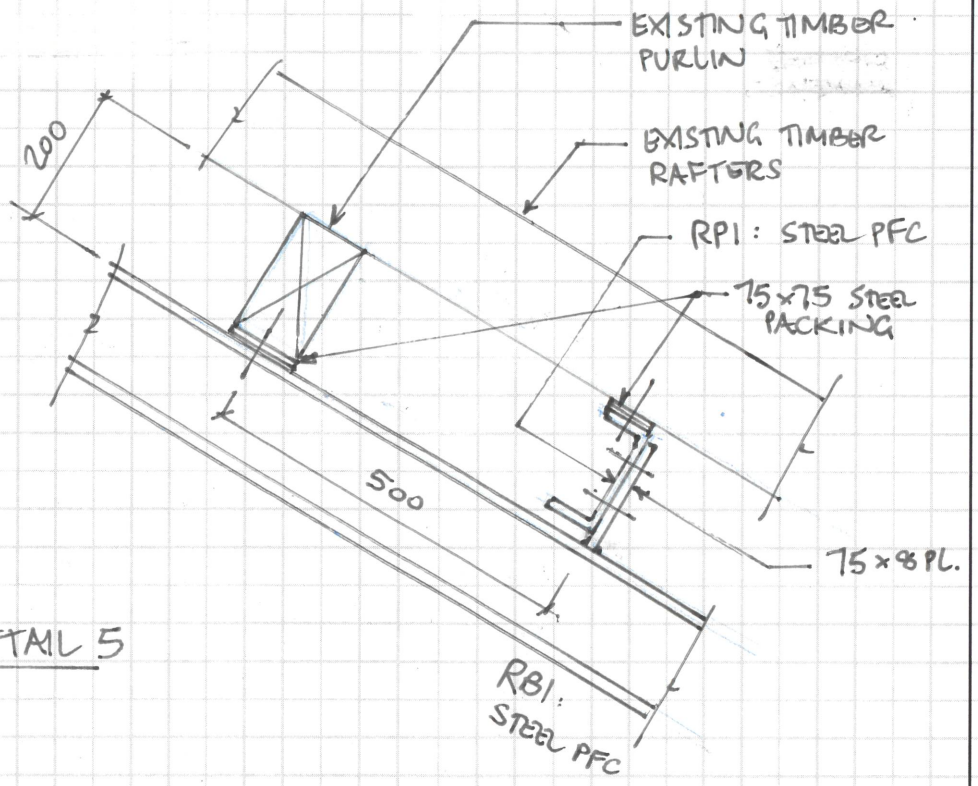
1. REF S-00200 FOR GEN. NOTES

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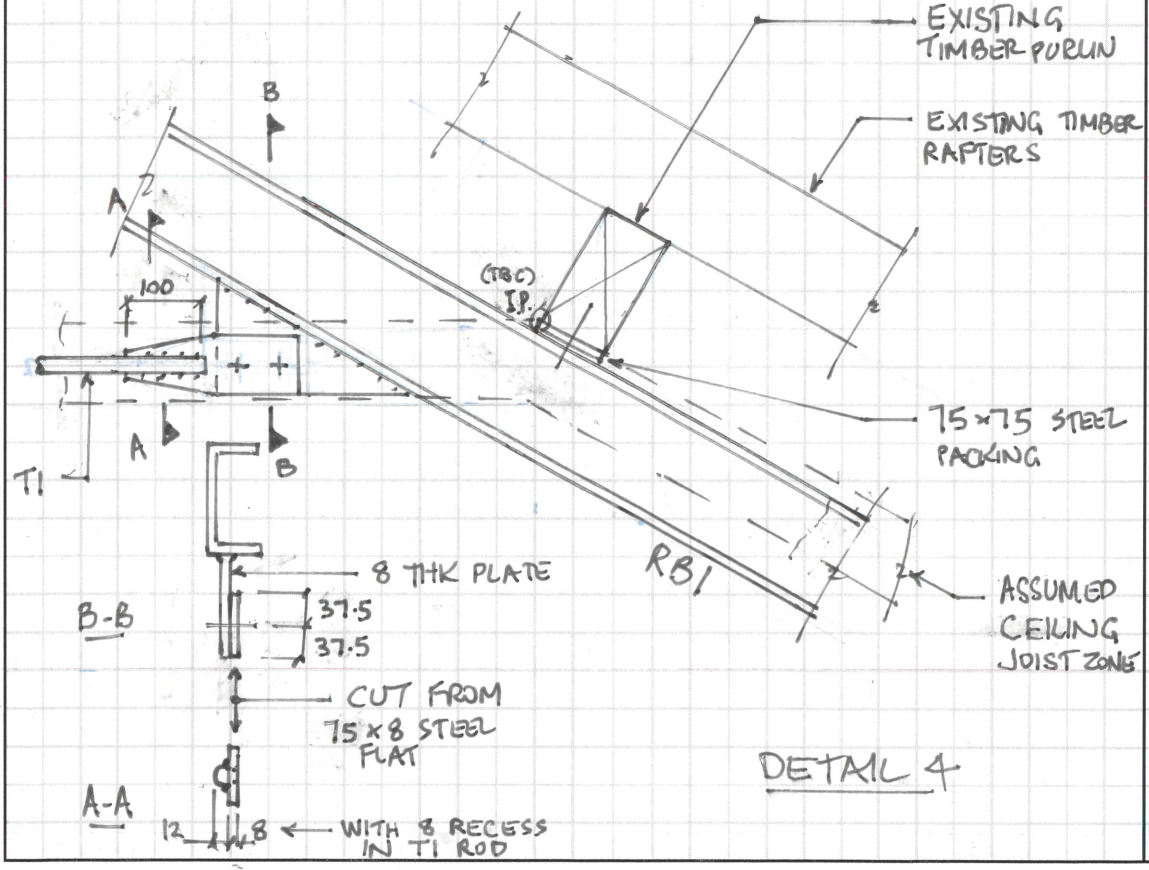
Job No.	27266
By	ML
Date	05.11.22
Sheet	S-00231 C1

Project: 53 WARMINSTER RD, LONDON SE25 4DQ

STEELWORK DETAILS: SHEET 2



DETAIL 5



DETAIL 4

NOTES

1. REF. S-00200 FOR GEN. NOTES

2. NOMINAL TIMBER SIZES (TBC ON SITE)
   - PURLIN 180 x 90
   - RAFTER 150 DP.
   - CEIL. JOIST 100 DP.

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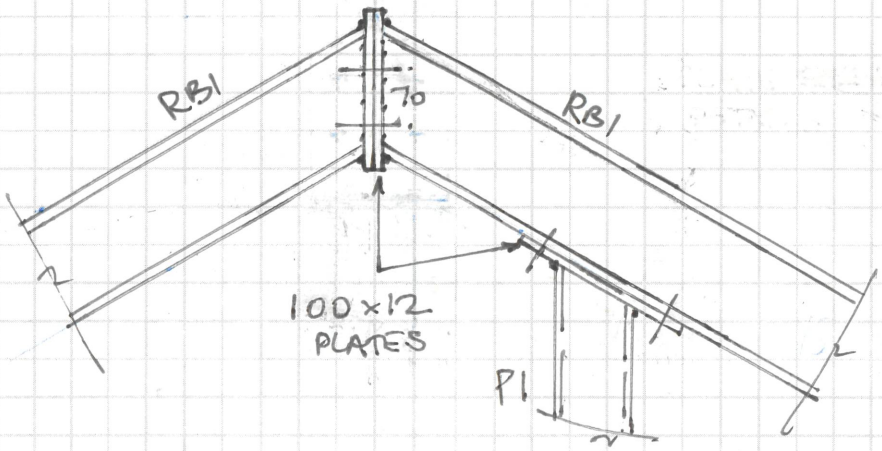
Job No.	21266.
By	MC
Date	05.11.22
Sheet	S-00232 C1

Project: 53 WARMINSTER RD, LONDON SE25 4DQ

STEELWORK DETAILS : SHEET 3

REV. C1
POST REV°.

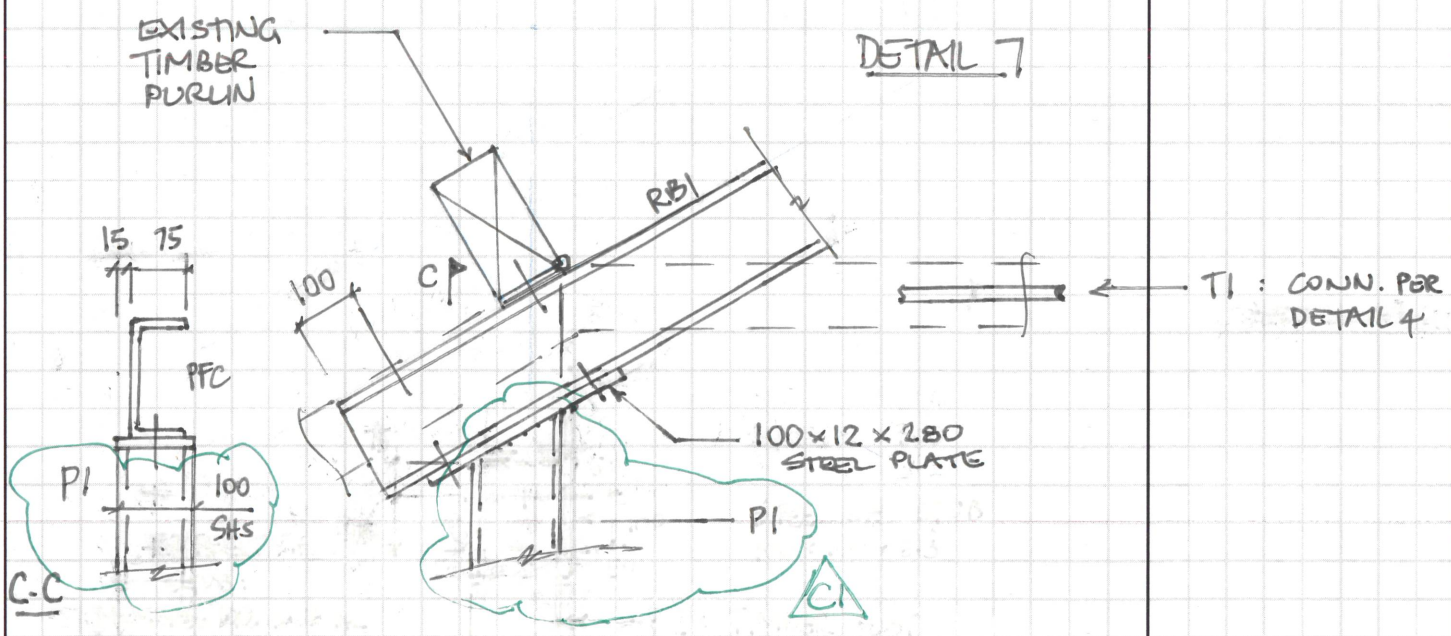
NOTES
1. REF. S-00200 FOR GEN. NOTES



DETAIL 6

[RAFTERS OMITTED FOR CLARITY]

DETAIL 7



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Job No.	27266
By	ML
Date	05.11.22
Sheet	S-00233 C1

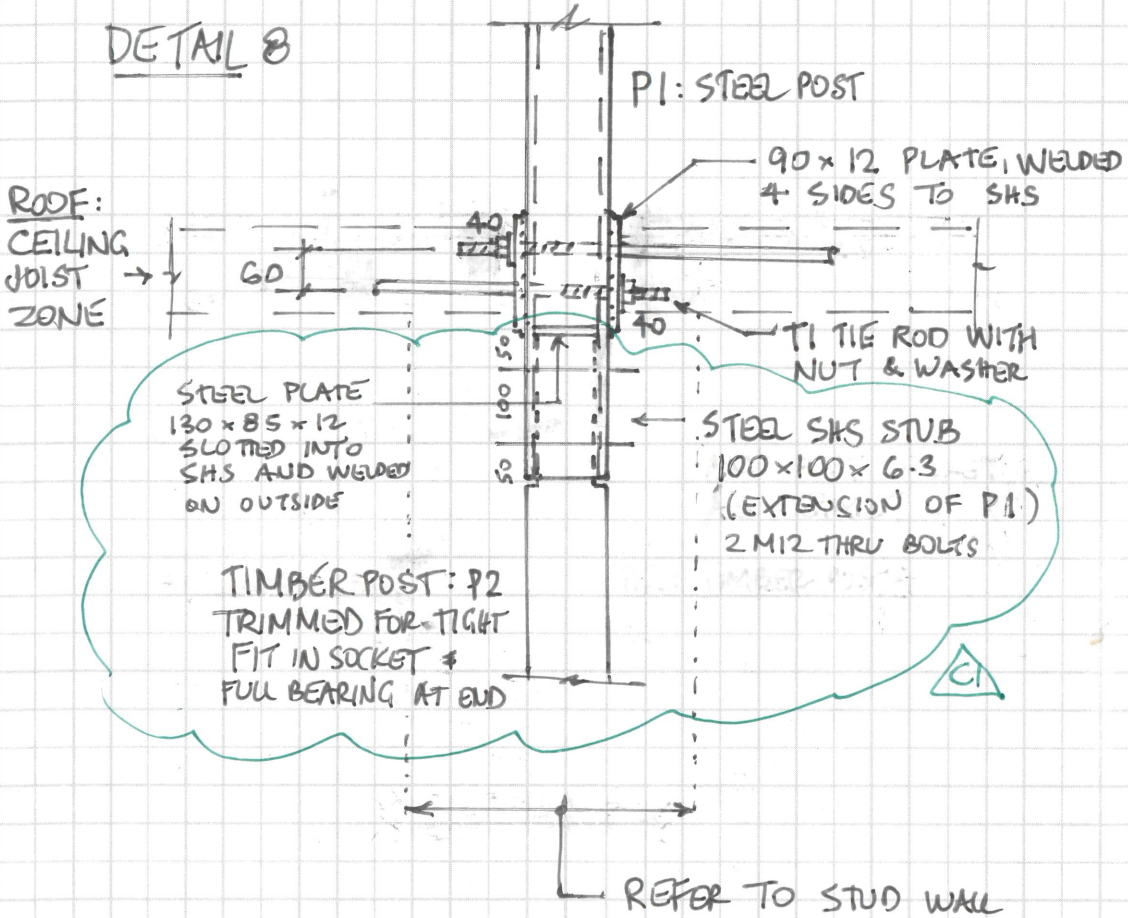
Project: 53 WARMINSTER RD, LONDON SE25 4DQ

STEELWORK DETAILS : SHEET 4

REV. C1
DETAILS ADDED

NOTES
1. REF. S-00200 FOR GEN. NOTES

DETAIL 8



REFER TO STUD WALL DETAILS FOR STRENGTHENING WORKS : DETAIL 9

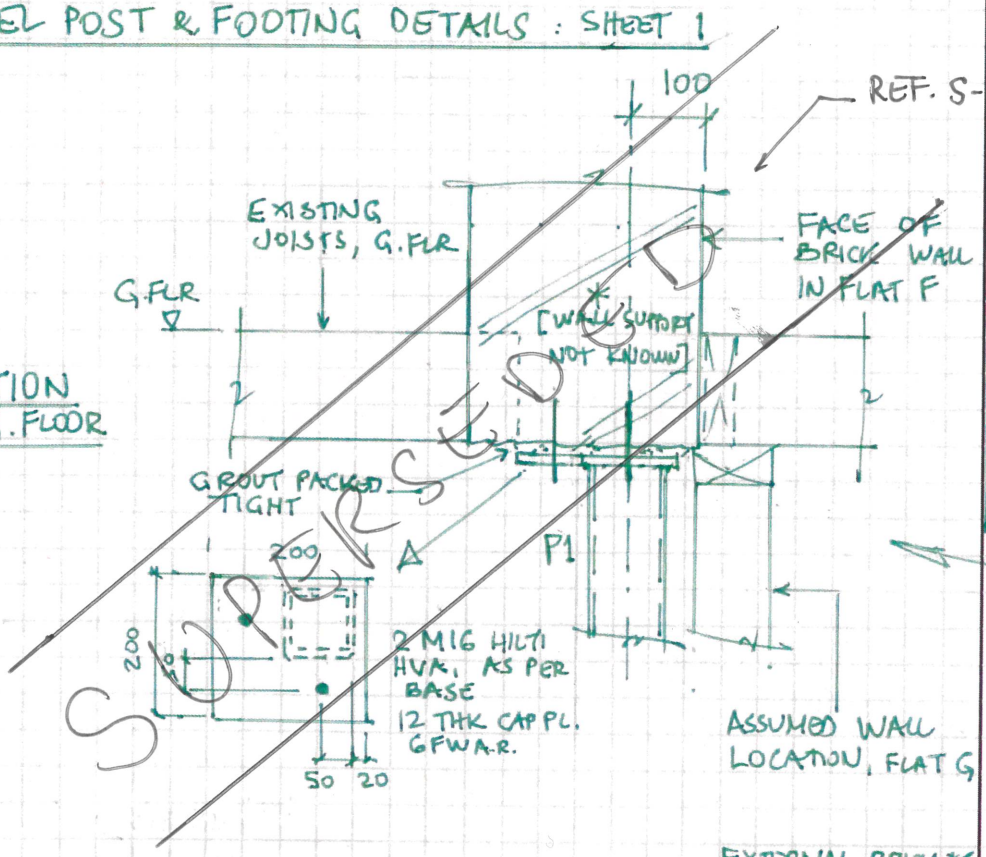
CLUTTONS
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Job No.	2726C
By	ML
Date	05.11.22
Sheet	S-00234 C2

Project: 53 WARMINSTER RD, LONDON SE25 4DQ

C2 - 23.01.2023

STEEL POST & FOOTING DETAILS : SHEET 1



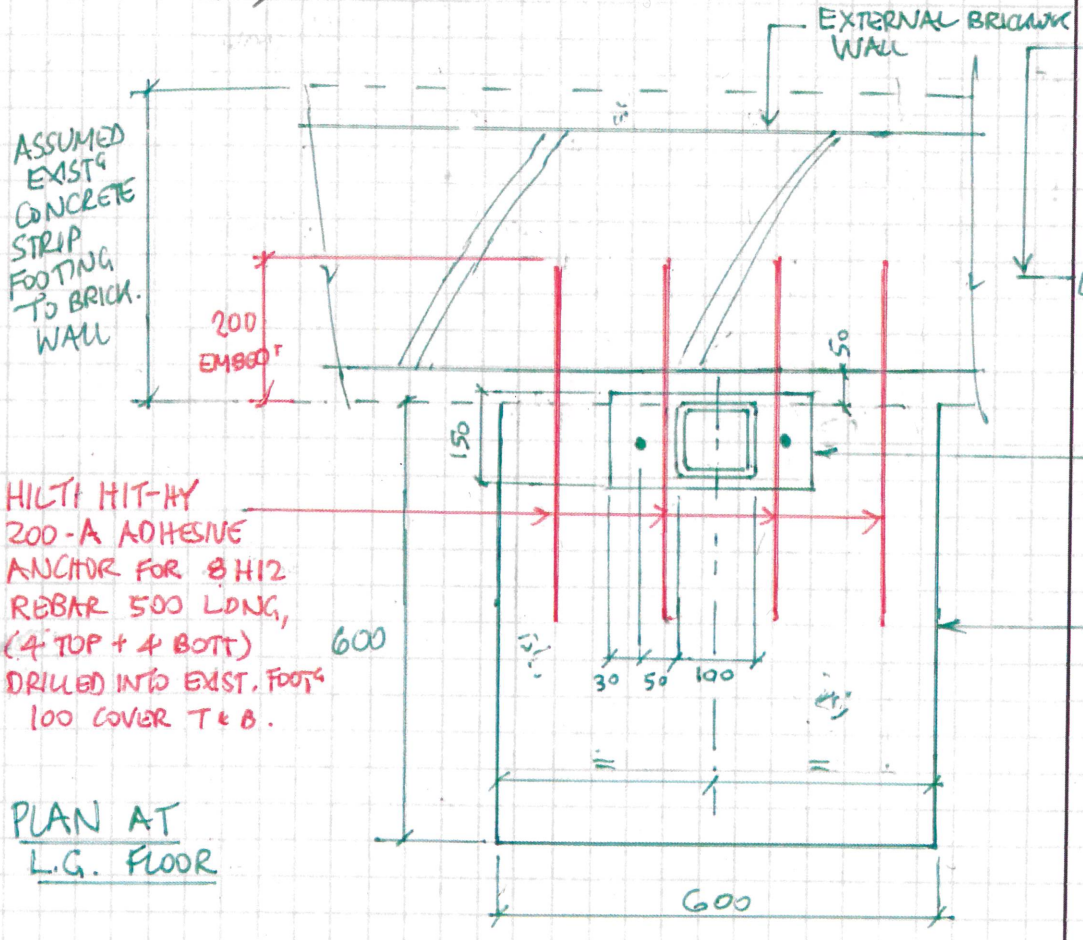
SECTION AT G. FLOOR

REF. S-00235.

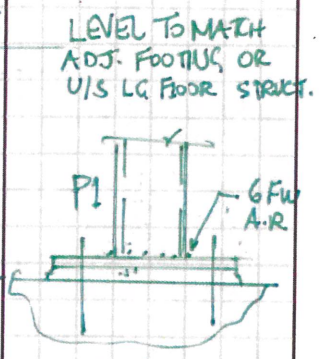
NOTES

1. REF. DRG. No: S-00200 FOR GEN. NOTES

2. OPEN-UP U/S OF EXISTING BRICKWK WALL WITH CARE. ALLOW THE ENGINEER TO INSPECT UPON OPENING UP.



PLAN AT L.G. FLOOR



P1 POST BASE PL. 12 THK, 2 M16 HILTI HVA ANCHOR 150 EMBED^T, 20 THK GROUT

MASS CONCRETE FOOTING, SAME DEPTH AS EXT. WALL FOOTING (600 MIN^M BELOW EXT. GROUND LVL)

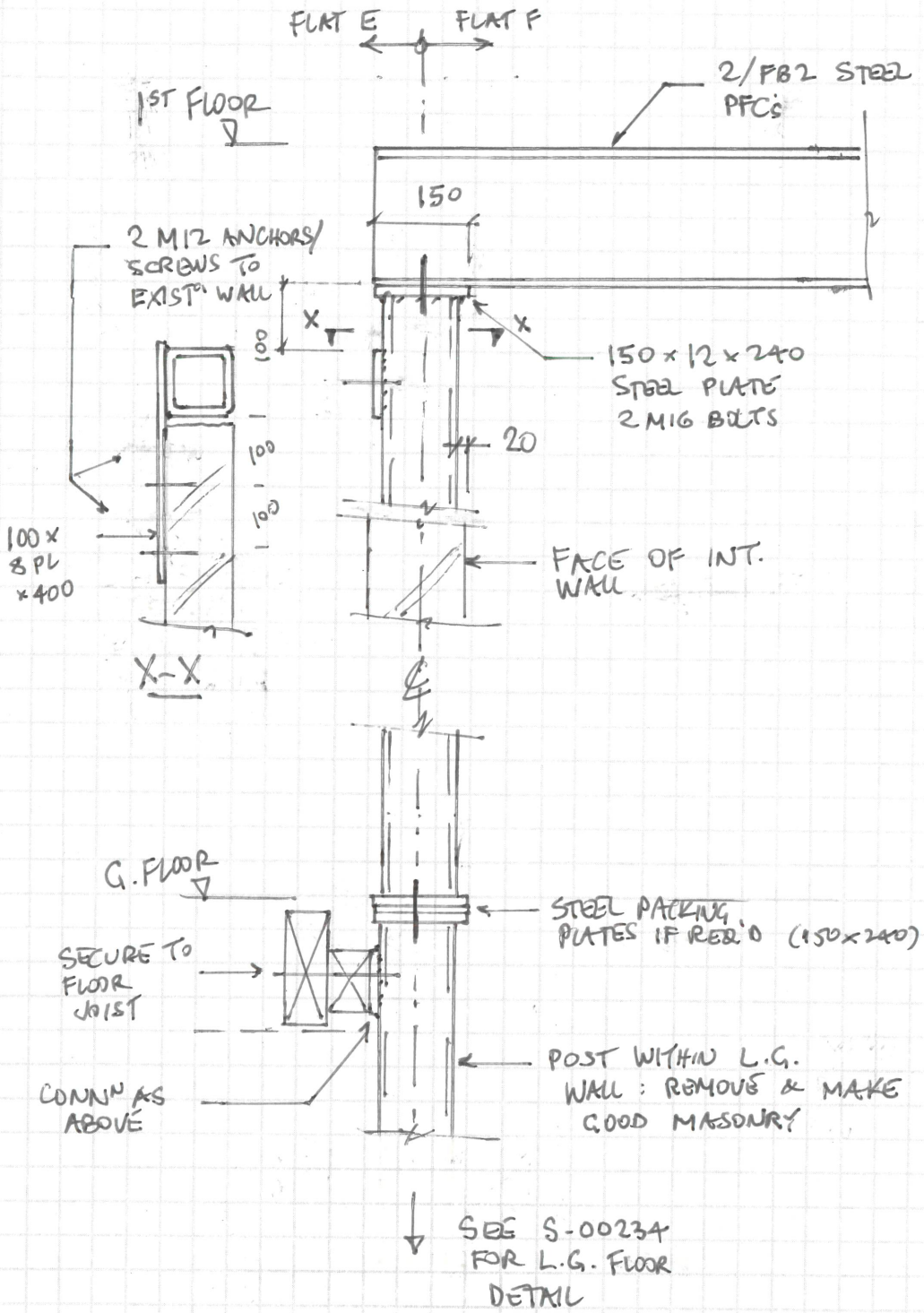
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Job No.	27266
By	ML
Date	23.01.23
Sheet	S-00235 C1

Project: 53 WARMINSTER RD, LONDON SE25 4QR

STEEL POST & FOOTING DETAILS : SHEET 2

POST ADJACENT TO REAR WALL:



NOTES

1. REF. S-00200 FOR GEN. NOTES

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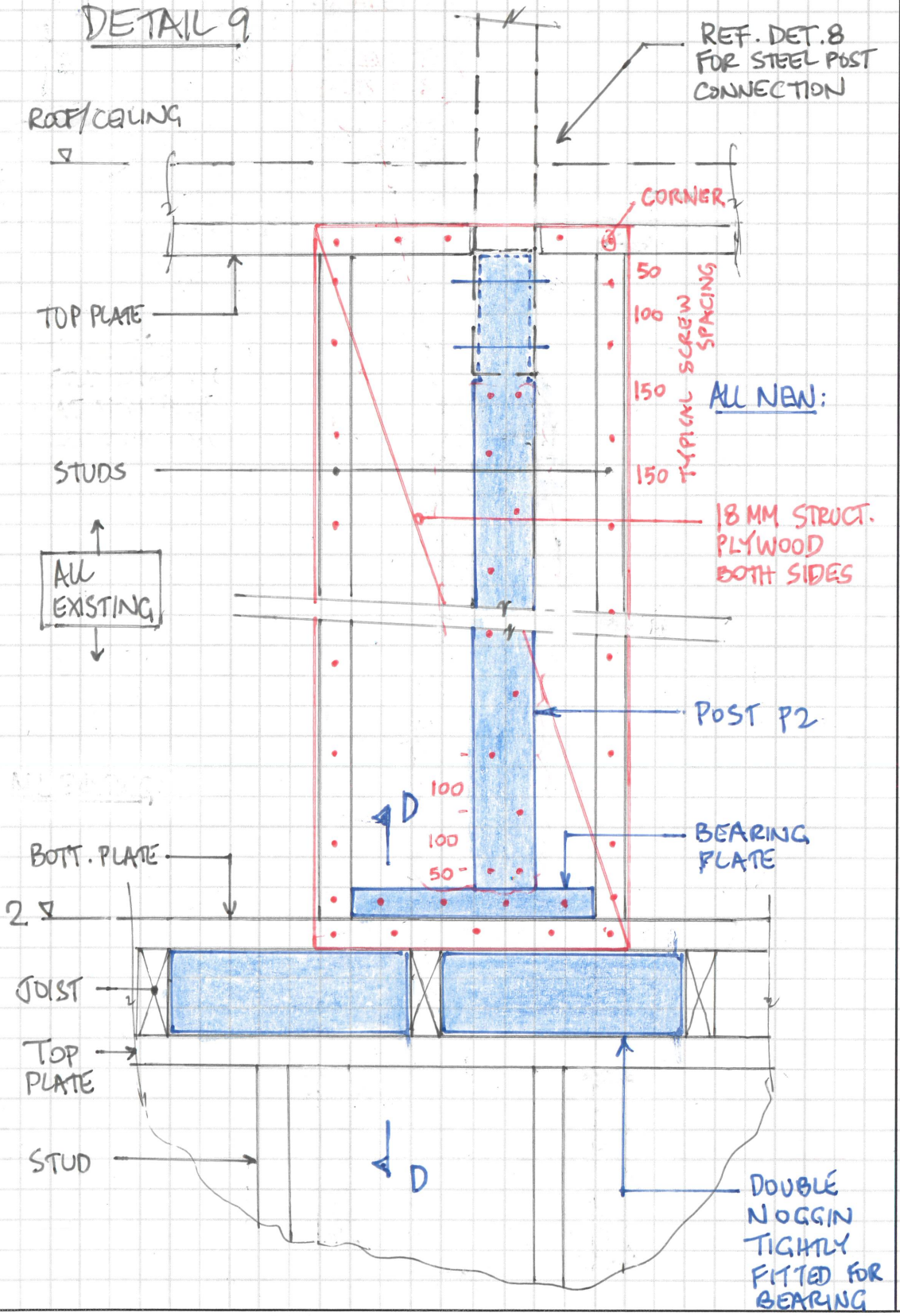
Job No.	27266
By	M.L.
Date	05.11.22
Sheet	S-00240 C1

Project: 53 WARMINSTER RD, LONDON SE25 4DQ

TIMBER DETAILS : SHEET 1

STUD WALLS : SECOND FLOOR AT POST LOCATIONS

DETAIL 9



NOTES

REF S-00200 & S-00240 SERIES

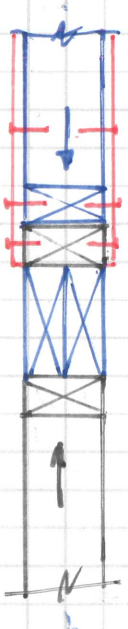
1. EXISTING STUD WALLS ASSUMED TO CONTAIN 100 x 50 STUDS AT MAX. 450 CRS: TBC ON SITE BY CONTRACTOR

2. NEW STUDS & NOGGINS TO MATCH EXISTING, WITH MIN^M SIZE 100 x 50.

3. SCREWS TO BE GALVANISED STEEL, SIZED AS BELOW:
   - PLY TO STUD #8
   - STUDS/NOGGINS #10

   EMBEDMENT 35MM MIN.

4. NOGGINS FIXED WITH GALV. STEEL PLATES/ANGLES SCREWED B.S.

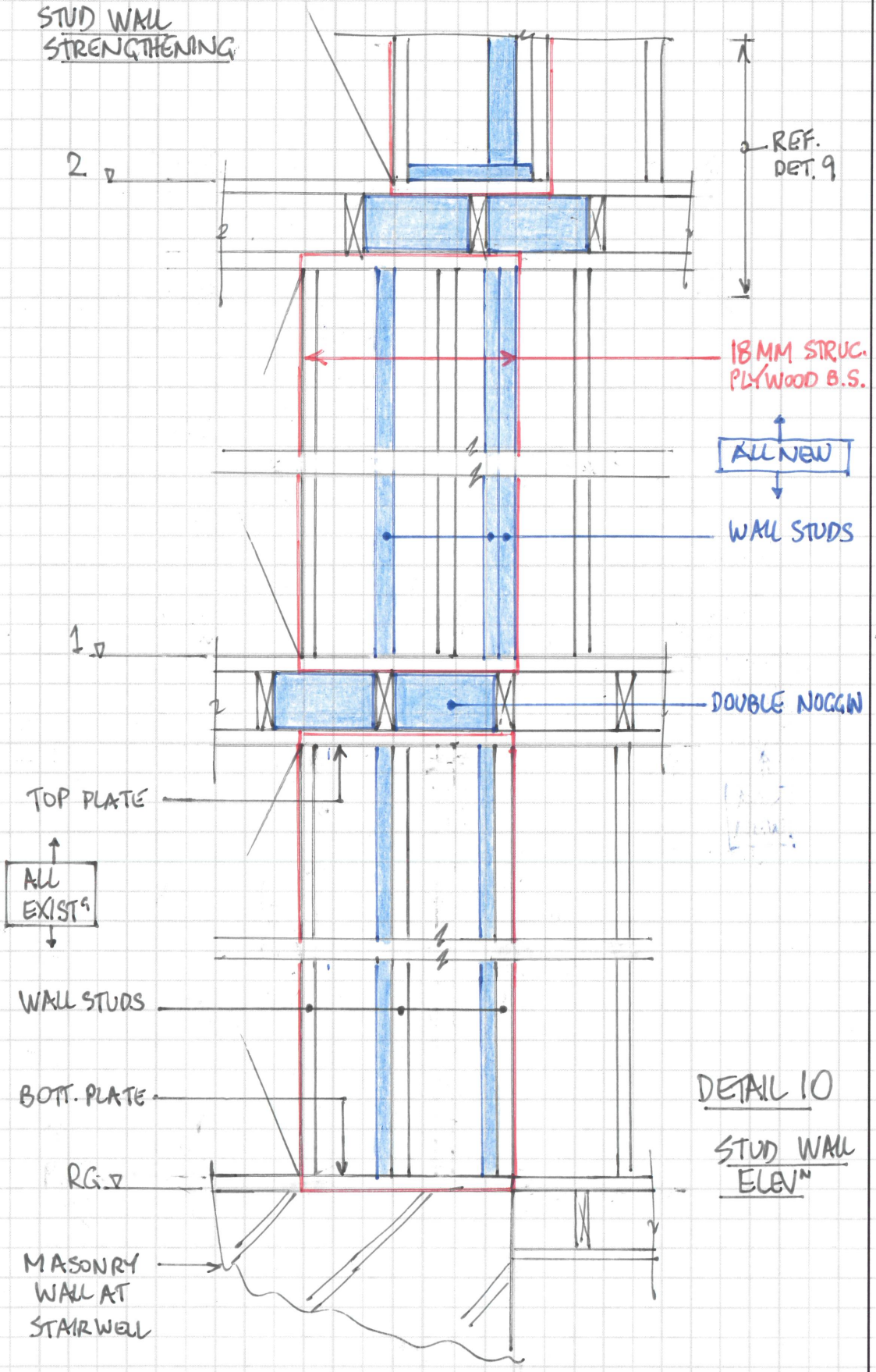


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Project: 53 WARMINSTER RD, LONDON SE25 4DQ

Job No.	27266
By	ML
Date	05-11-22
Sheet	S-00241 C1

TIMBER DETAILS : SHEET 2.



DETAIL 10
STUD WALL ELEV^N

NOTES

1. TO 4: REF. S-00200 & S-00240 SERIES
5. EXISTING TIMBER STUDS ASSUMED AT 450 MAX. SPACING. CONTRACTOR TO CONFIRM ON SITE AND NOTIFY ENGINEER OF PARTICULAR GEOMETRY FOR THIS AREA.
6. ALL NEW STUDS AND NOGGINS TO BE TIGHTLY PACKED TO ENSURE STIFF BEARING OF L-B STUD WALL.
7. SEQUENCE OF WORK RELATING TO STUD WALLS:
   A. EXIST. ROOF TILES REMOVED
   B. STUD WALL WORKS
   C. NEW TILES INSTALLED
8. SCREW FIXINGS TO BE AS FOLLOWS:
   - PLY TO STUDS AS PER DETAILS
   - STUDS IN CONTACT: 50 FROM ENDS & 150 CRS

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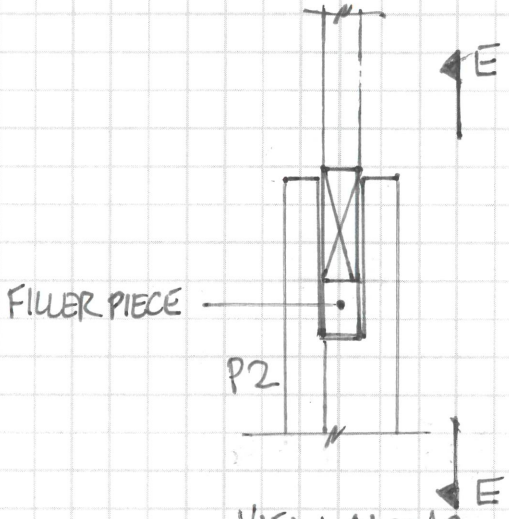
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By	ML
Date	05-11-22
Sheet	S-00242 C1

Project: 53 WARMINSTER RD, LONDON SE25 4DQ

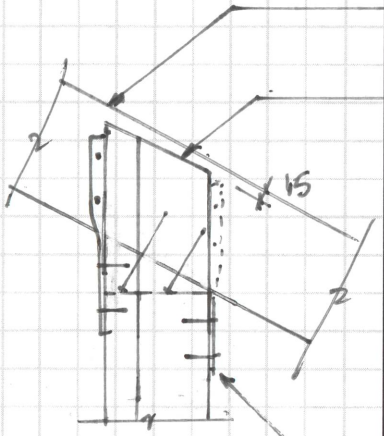
TIMBER DETAILS: SHEET 3

VALLEY BEAM POSTS

NOTES
1. REF. S-00200 & S-00240 SERIES

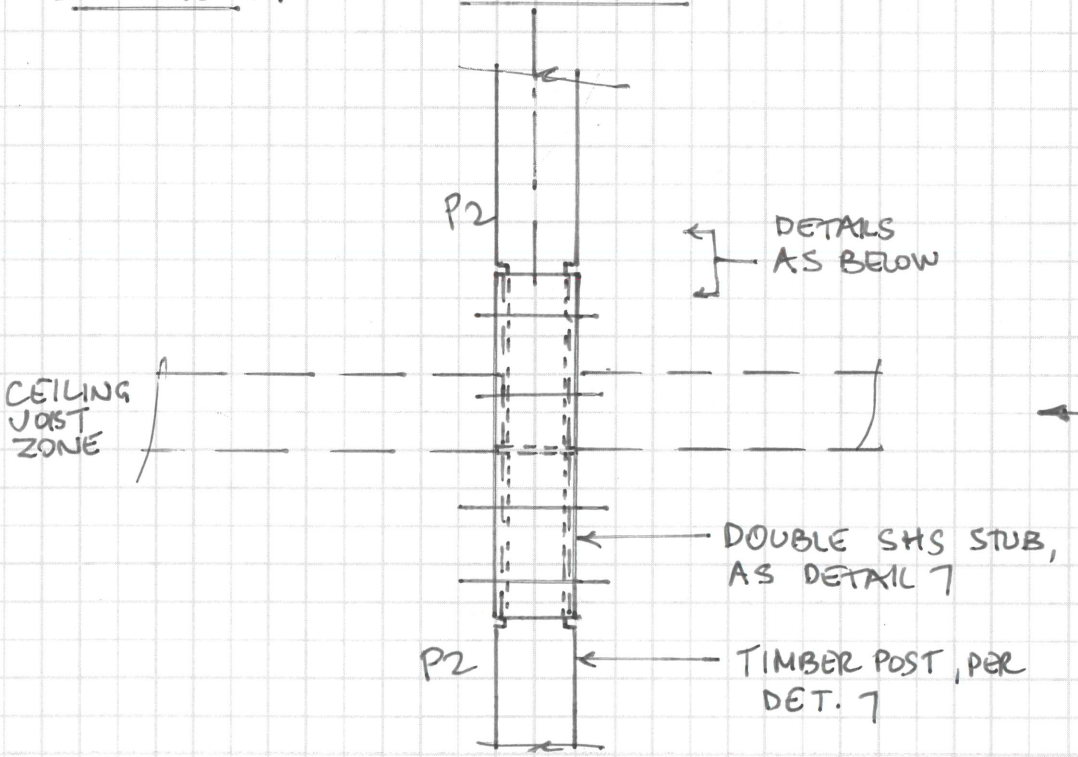


VIEW ALONG VALLEY BEAM

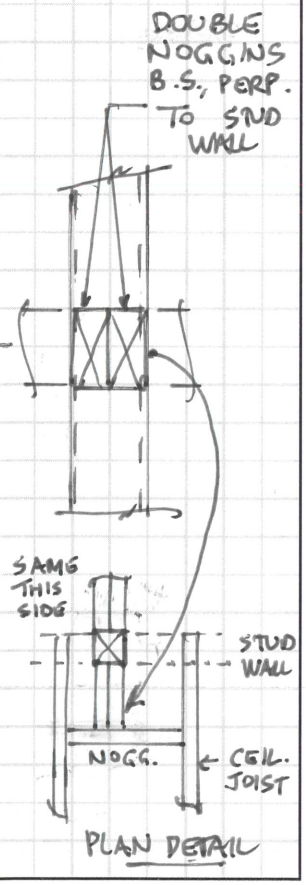


SECTION E-E

DETAIL 11



SECTION AT CEILING UNDER ROOF



PLAN DETAIL

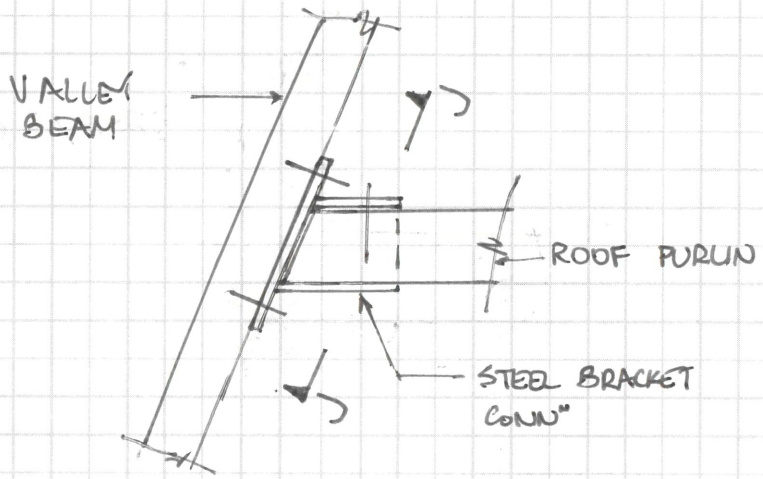
CLUTTONS
Chartered Surveyors • Property Consultants

Job No.	27266.03
By	ML
Date	05.11.22
Sheet	S-00243 C1

Project: 53 WARMINSTER RD, LONDON SE25 4DQ

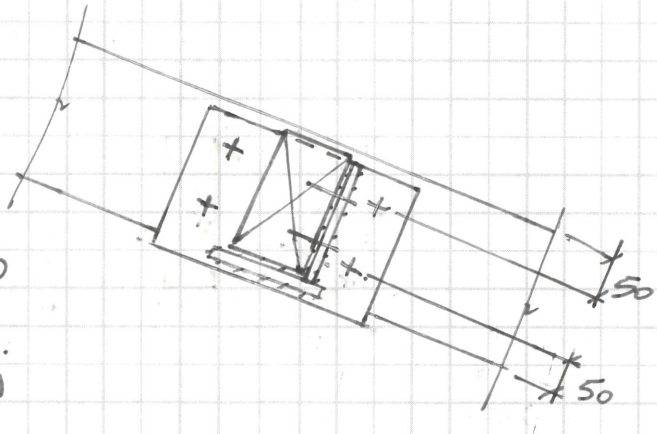
TIMBER DETAILS: SHEET 4

PURLINS TO VALLEY BEAMS



DETAIL 14

PLAN (IN PLANE OF SHALLOW ROOF)



M12 SCREWS TO PURLINS & VALLEY RAFTERS, 50 MIN. EDGE DISTANCE ON TIMBER

SECTION J-J

NOTES
1. REF. S-00200 & S-00240 SERIES

NOTES
1. SITE MEASURE FOR ANGLES AND DIMENSIONS OF STEEL PLATES
2. ALL PLATES 10 THICK STEEL
3. THIS DETAIL APPLIES TO UPPER PURLIN CONNECTIONS TO VALLEY BEAMS: TWO LOCATIONS

CLUTTONS
Chartered Surveyors • Property Consultants

Job No.	27266
By	ML
Date	05.11.22
Sheet	S-00250 C1

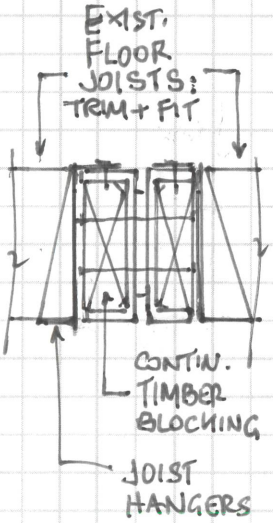
Project: 53 WARMINSTER RD, LONDON SE25 4DQ

PADSTONE DETAILS: SHEET 1

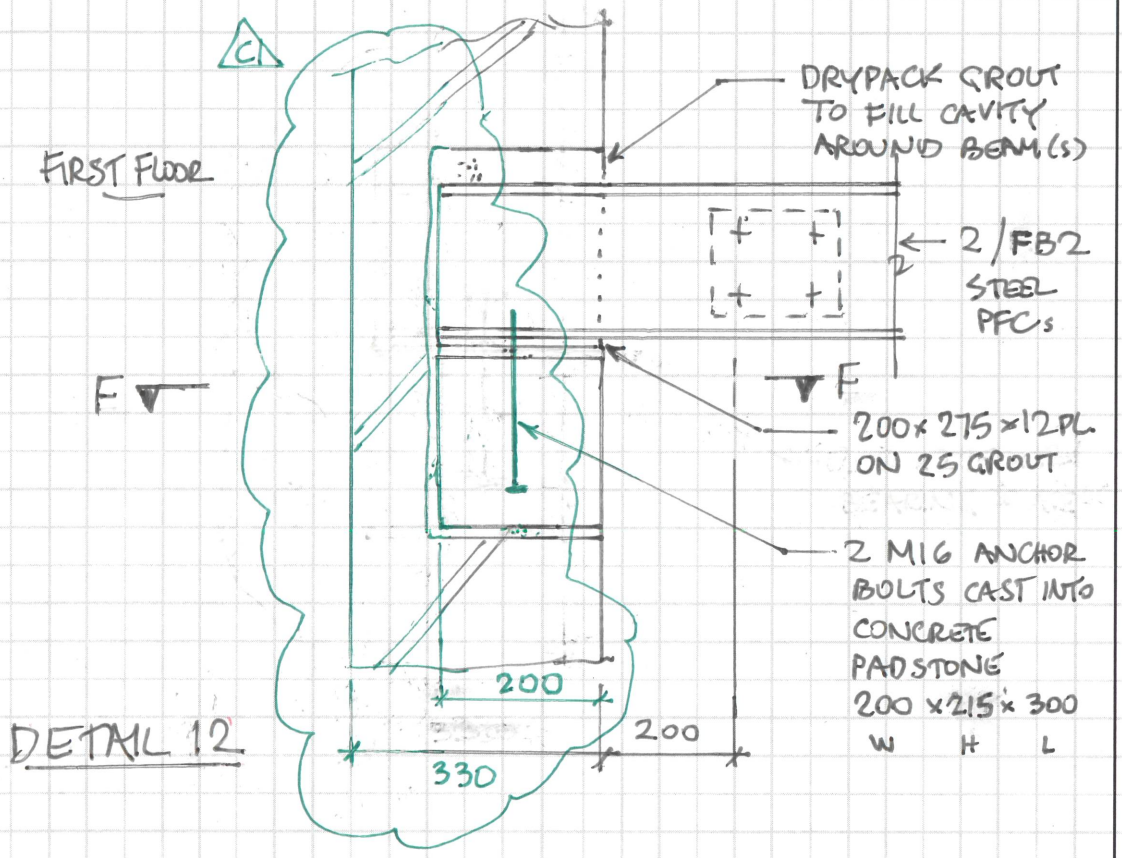
PADSTONE : BEAMS FB2

C1 REV^N 5.11.22
PADSTONE LOC^N REV^D.

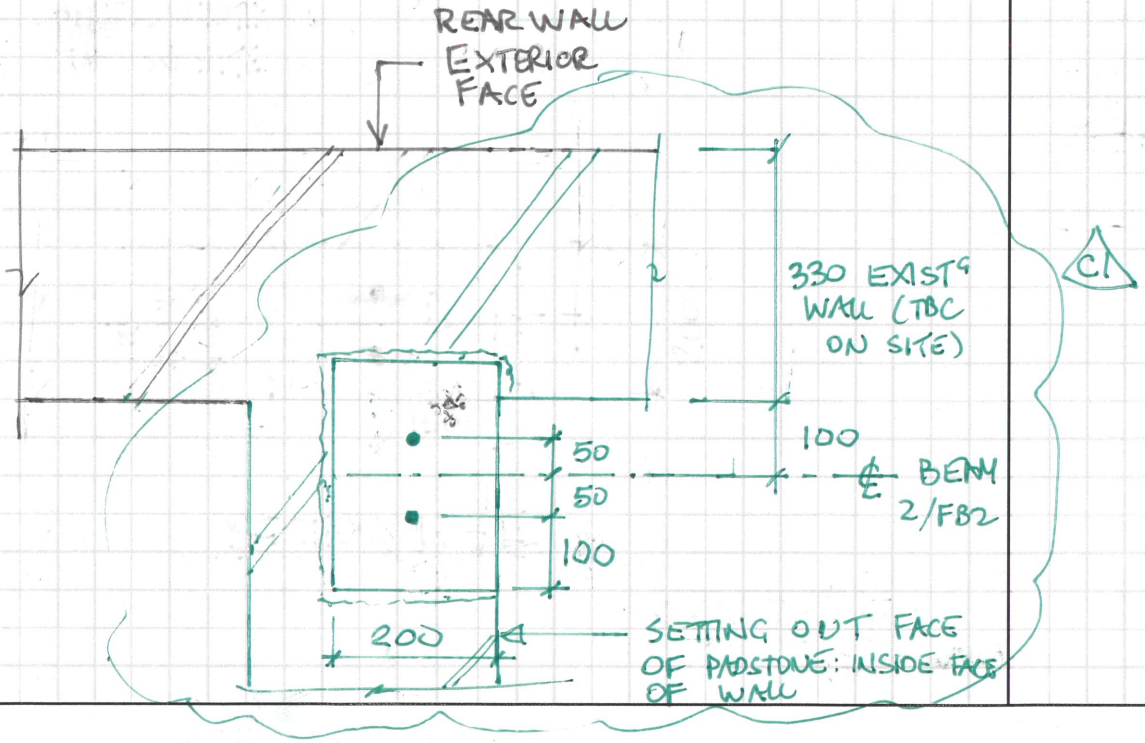
NOTES
1. REF. S-00200 FOR GEN. NOTES



JOIST CONN^NS TO NEW PFCs



DETAIL 12



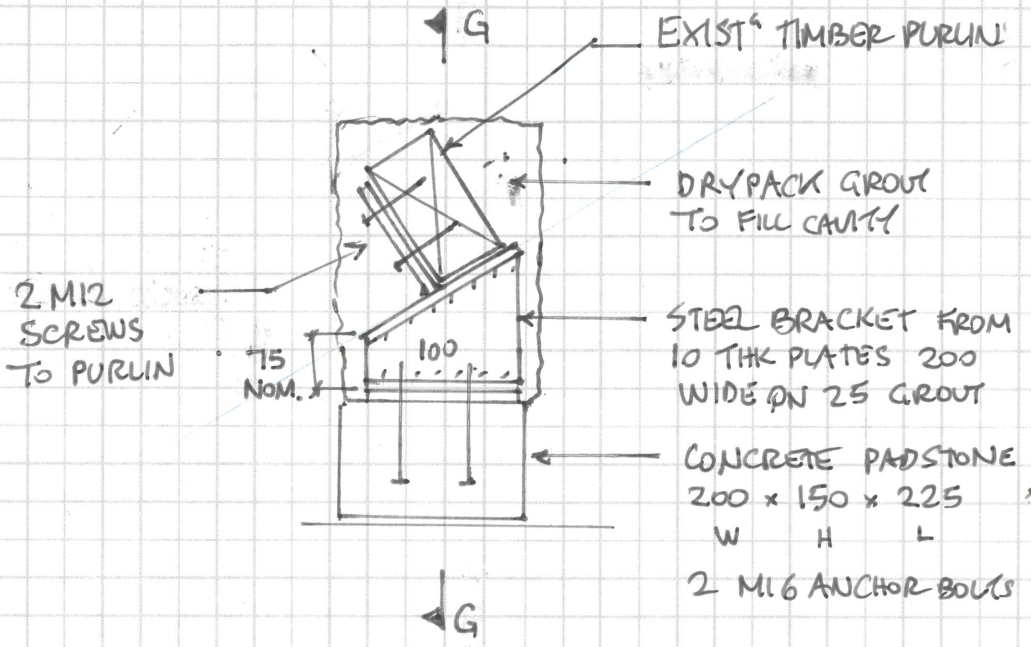
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Project: 53 WARMINSTER RD, LONDON SE25 4DQ

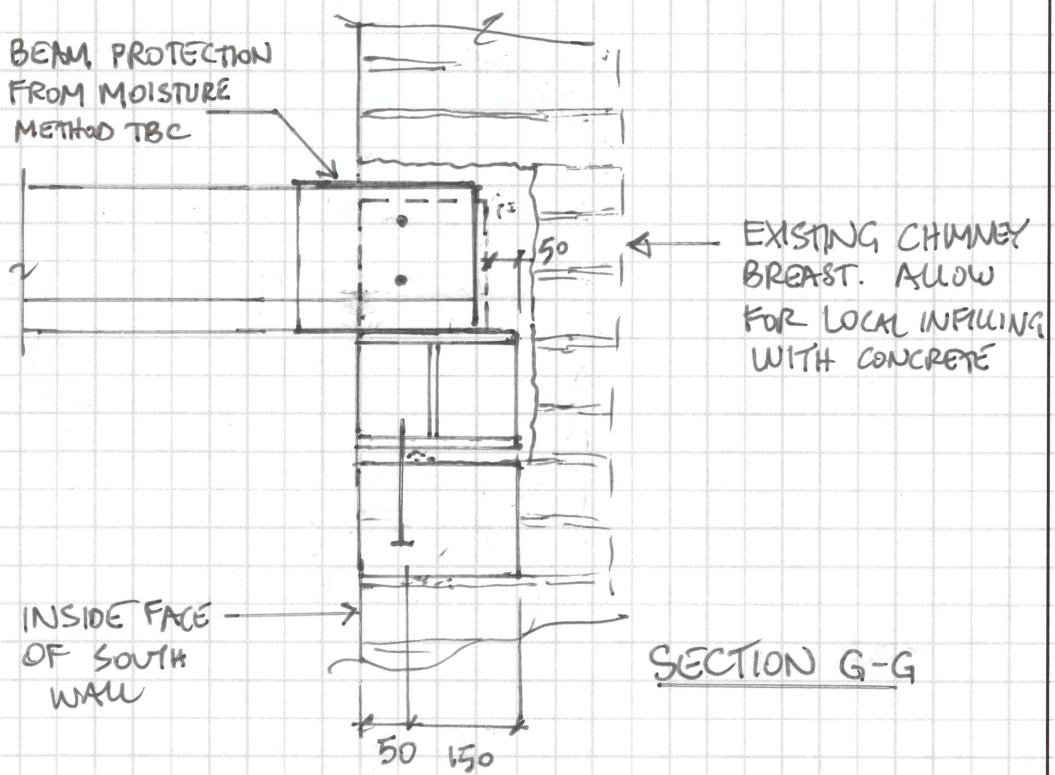
Job No.	27266
By	ML
Date	05-11-22
Sheet	S-00251 C1

PADSTONE DETAILS: SHEET 2

PADSTONES: PURLINS (TIMBER & STEEL TO SOUTH WALL)



ELEVATION DETAIL 13



SECTION G-G

NOTES

1. REF. S-00200 FOR GEN. NOTES

REQUIRED IN 6 NO. LOCATIONS IN SOUTH GABLE WALL:

- 4 TIMBER PURLINS
- 2 STEEL PFCs (SIMILAR DETAIL)

NOTE INCLUDE TI TIE CONN^N DETAIL TO TWO TIMBER PURLIN PADSTONES (REF. SHEET 3)

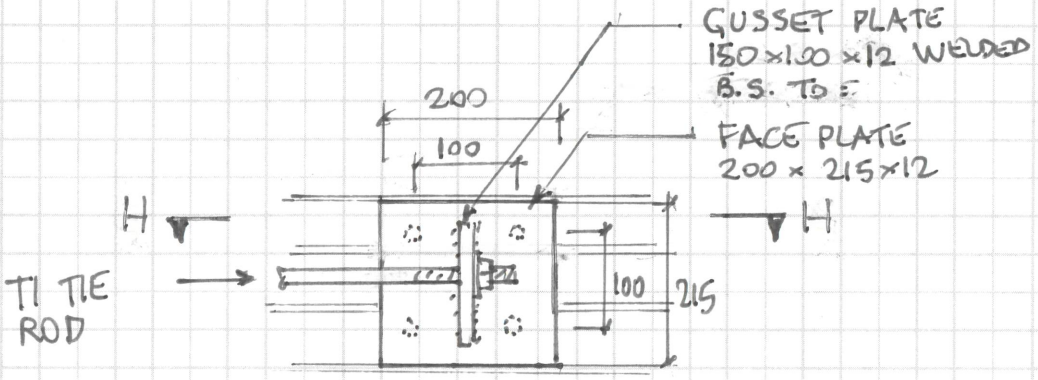
CLUTTONS
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Project: 53 WARMINSTER RD., LONDON SE25 4DQ

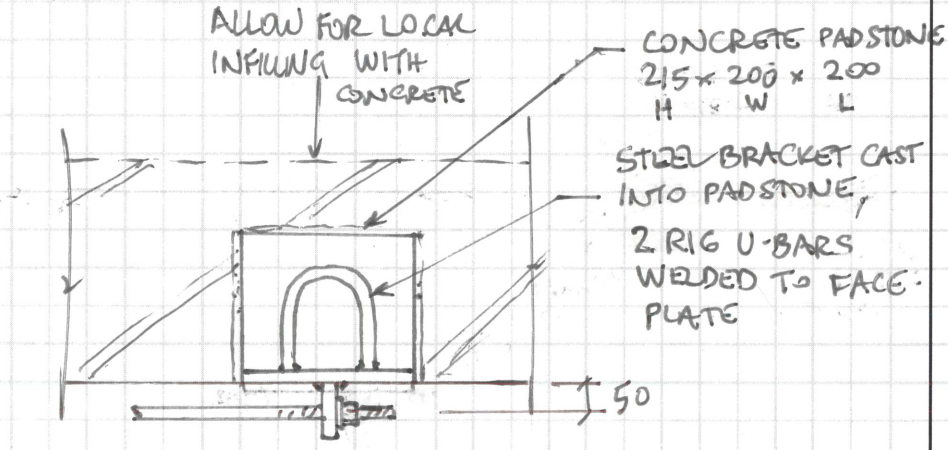
Job No.	27266
By	ML
Date	05-11-22
Sheet	S-00252 C1

PADSTONE DETAILS: SHEET 3

PADSTONES: TIE TO NORTH WALL



ELEVATION DETAIL 15



SECTION H-H

NOTES

1. REF. S-00200 FOR GEN. NOTES.

REQUIRED AT BOTH ENDS OF TIE T1 ON INSIDE OF NORTH WALL & ON SOUTH WALL.

: PADSTONE DRY-PACKED TIGHT AGAINST WALL.

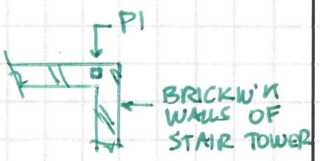
CLUTTONS
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Job No.	27266
By	ML
Date	05.11.22
Sheet	S-00253 C1

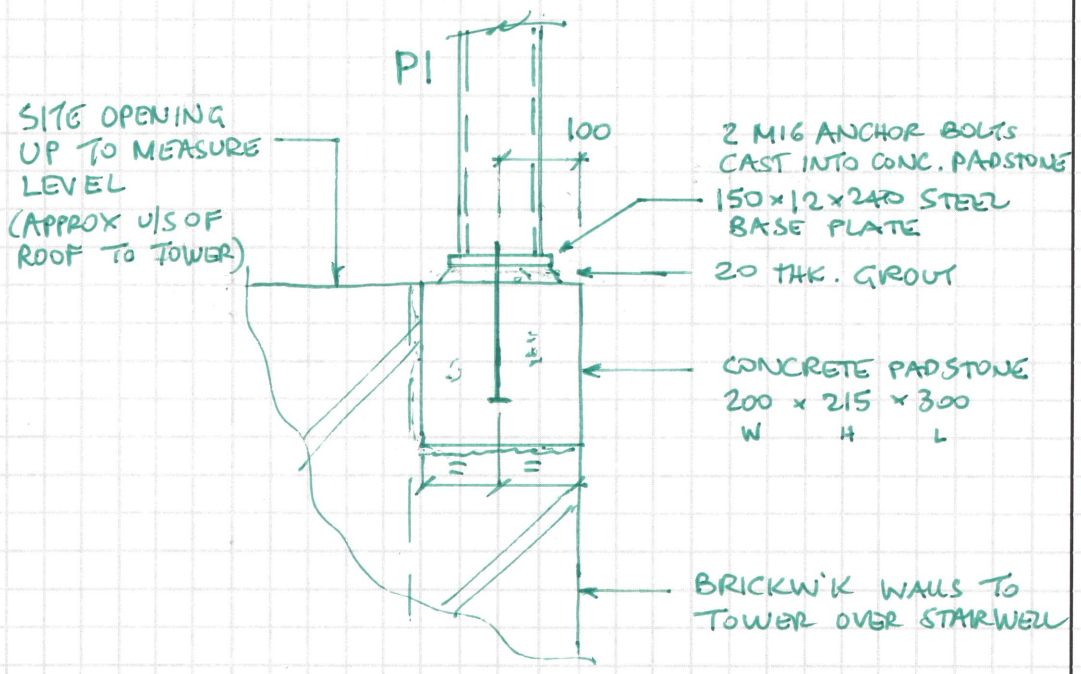
Project: 53 WARMINSTER RD, LONDON SE25 4DQ

PADSTONE DETAILS : SHEET 4

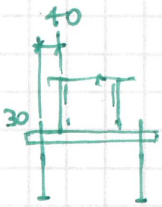
PADSTONE : STEEL POST P1



KEY PLAN



DETAIL 16



NOTES

1. REF. S-00200 FOR GEN. NOTES

APPENDIX 4

Monitoring

Fred Verity
Addington Capital LLP
6 Heddon Street
London
W1B 4BT

28 February 2022

Dear Fred

Re: 53 Warminster Road
London SE25 4DQ

Further to the recent issue of our report on building movement at the above property, we have undertaken a review of movement monitoring that took place during the latter months of 2021.

1. Monitoring Data

Monitoring data reported by THS Concepts is contained in their set-up report dated 3rd August 2021, together with follow-up visits at monthly intervals, to assess any changes in measurements and consequent movement over time. The data comprises the following types of measurement:

i. Movement monitoring (global position) at 16 points on the building exterior
ii. Crack width measurement at nine of the most significant cracks in the building interior

The latest complete set of measurements was on 25th November, with a further site visit in December collecting only the first type of measurement above. In order to provide consistent feedback on both external and internal movement monitoring, the November date will be used as the primary comparator with the initial (base) readings taken on the set-up date of 20th July 2021.

Firstly, raw measurement data was taken from the movement monitoring results sheet of Survey No. 4 (25th November), together with base readings from the report. These figures have been transcribed to the sheet attached to this letter. The differences have been calculated for the two plan positions (northings and eastings) as well as elevation levels. It is apparent that “northings” conveniently represent movements form the front directly towards the rear of the building, rather than magnetic compass directions. Similarly, eastings represent movement perpendicular to the front façade.

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Registered office and head office: Portman House, 2 Portman Street, London W 1H 6DU.

In overall terms, the total movements measured in the four-month period above are within the following ranges:

- Northings: +2 to +7mm
- Eastings: 0 to -2mm
- Level: +1 to +6mm

The above values exclude readings in set 3, from the rear of the building. The large initial differences calculated, of up to 90mm vertically between July and the first movement monitoring visit of September, are not consistent with a maximum of 3mm change in any of the subsequent readings in October, November and December. It is recommended that the initial elevation readings be checked and discarded if found to be incorrect.

Returning to the remainder of the movements reported, many have reached or exceeded the designated yellow monitoring “trigger” level of 5mm. In this case, the cause of such movement should be evaluated, with suitable action to follow. An proposed process for this, based on our movement report, is provided below.

2. Evaluation of Movement

To assist in evaluating building movement, locations of the monitoring points have been extracted and plotted on plans of all four floors of the building, shown on the attached pages. The three sets of figures relate to individual elevations: front, side wall and rear, with the left-hand flank being inaccessible for installation of monitoring points.

Within the range of figures reported above, there are some points to note:

i. Vertical movement: along the front façade, monitoring points at raised ground floor level (set 1) show consistent upward movement of 5 to 6mm. However, on the side wall to the right of the building, viewed for the front, the upward movement decreases from 6mm at the front to 1mm at the rear (set 2, points MP-105 & 107, highlighted in blue on the spreadsheet table). Although there is some upward movement, perhaps from swelling of clay soil approaching winter, there is a tilt evident along the flank wall

ii. Horizontal movement: on the side wall, global position results show a movement north-wards at second floor level of 5mm, while the rear of the same wall moves 7mm (points MP-202 and 203 respectively, highlighted brown). This “widening” of the wall at the top compares with a corresponding decrease of 1mm at the base (points MP-105 & 107). The simplest explanation is that the vertical crack reported previously in this wall has expanded by 3mm at the top in this time period

iii. Internal cracking: locations of crack-measuring devices on internal walls are shown on the top two floor plans. Changes in crack widths recorded in the November survey show that the largest changes in width occur for cracks designated C-201 and C-304. These

are the inside faces of the two flank walls, approximately in the middle of the length of the walls. The changes measured in the period are both a 3 to 4mm increase in crack width. This matches the apparent widening of the external crack on the observed flank wall.

3. Movement Comparison with Report

It is assumed that the large jump in readings at the rear wall is spurious, which remains to be confirmed.

Regarding the readings seen to be reliable, there are consistencies between the conclusions of our earlier report on building movement and the monitoring measurements evaluated here. These are summarised as follows:

a) The building is tilting slightly under vertical movement. This is not generally of concern, however in this case the rotation seems to be of the rear half compared to the front, as the middle of the flank wall has moved vertically in unison with the front wall. The weakness is at the existing crack, as described below
b) Both internal and external crack width changes over the measured period indicate widening of the vertical crack in the side wall. This may well be occurring in the opposite flank wall, however lack of access has restricted measurements there.

4. Recommendations

Based on the above evaluation of monitoring results, recommended actions are as flows:

i. THS Concepts to check readings at the rear of the building for anomalous early monitoring results
ii. Also check the differences in survey readings reported, compared to base, as our calculation of differences varies with that reported by THS in the surveys
iii. Resume monitoring during March 2022, in order to adequately capture seasonal variations in building movement. Monitoring should then proceed for an additional nine months

Yours sincerely

Malcolm Lyon BEng (Hons) CEng MIStructE
Senior Structural Engineer - Project & Building Consultancy

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E: malcolm.lyon@cluttons.com

53 Warminster Road **Project no. 27266.03**

Monitoring Review Sheet **v1** **Date: 28 Feb 2022**

Monitoring Points		Base Readings (m)			Surveyed Readings (m)			Difference to Base Readings (mm)		
Set no.	Point ID	Northing	Easting	Level	Northing	Easting	Level	dN	dE	dLev
1	MP-101	100.000	500.000	50.000	100.002	500.000	50.006	2	0	6
	MP-102	100.089	504.334	50.158	100.091	504.333	50.164	2	-1	6
	MP-103	100.462	506.023	50.155	100.464	506.022	50.161	2	-1	6
	MP-104	100.198	511.638	50.119	100.200	511.636	50.124	2	-2	5
	MP-201	100.057	501.110	57.298	100.060	501.111	57.302	3	1	4
	MP-202	100.196	509.612	57.300	100.201	509.611	57.305	5	-1	5
2	MP-105	100.257	511.671	49.222	100.260	511.670	49.228	3	-1	6
	MP-106	106.505	511.643	49.324	106.507	511.642	49.328	2	-1	4
	MP-107	111.139	511.671	49.314	111.141	511.669	49.315	2	-2	1
	MP-203	108.705	511.720	57.181	108.712	511.722	57.182	7	2	2
3	MP-108	-	508.208	*47.075*	-	-	47.032	-	-	*-43*
	MP-109	-	504.711	*47.056*	-	-	47.052	-	-	*-4*
	MP-110	-	498.782	*47.029*	-	-	47.077	-	-	*48*
	MP-111	-	508.268	*50.186*	-	-	50.099	-	-	*-87*
	MP-112	-	504.679	*50.096*	-	-	50.092	-	-	*-4*
	MP-113	-	498.608	*50.096*	-	-	50.188	-	-	*92*

Notes

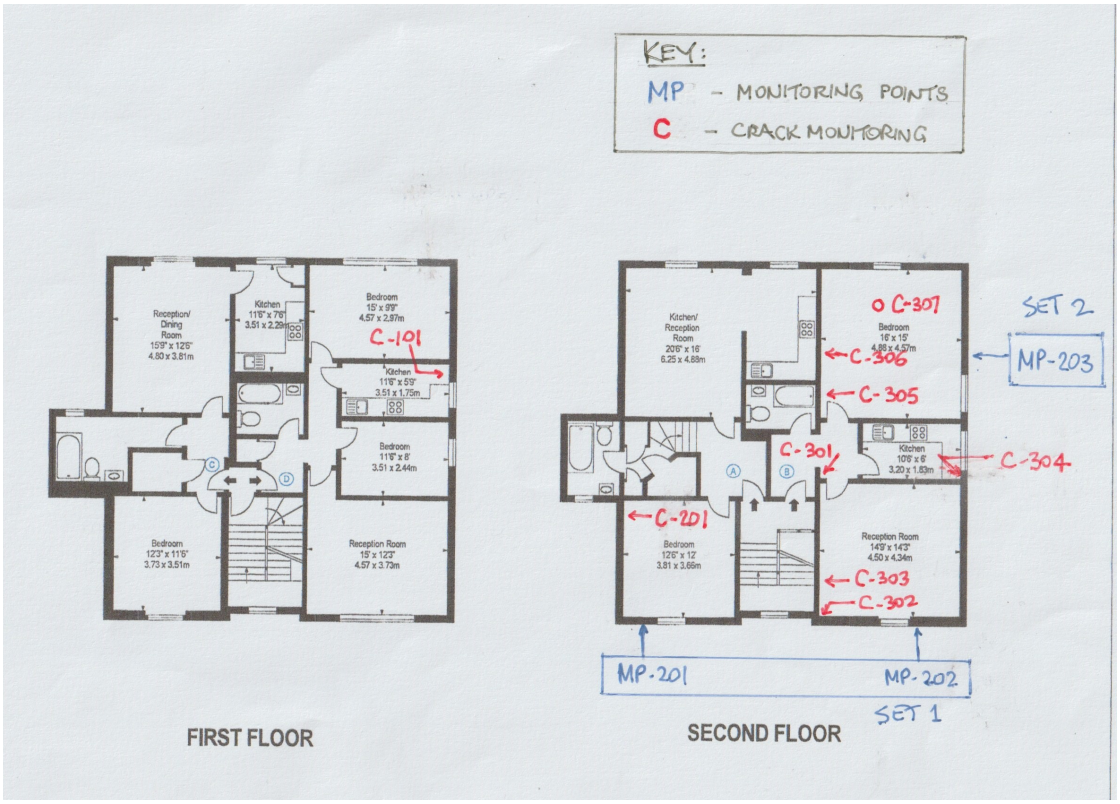
1. Monitoring points are taken from THS Concepts report dated 3 Aug 2022, extracted and marked separately on plans
2. Survey data is taken from the same report (base readings) and monitoring results from survey no. S4 dated 25 Nov 2022 (surveyed readings)
3. Measurement values displayed are to the nearest mm
4. Figures highlighted in red appear anomolous, as the surveyed readings above are within 2mm of surveys taken both before and after this date (ref. S3 and S5 surveys in above report)
5. Cell highlights refer to the following:

: Horizontal movement of survey point from front towards rear of the building

: Vertical movement (upward) of survey point on building

Sketches


KEY:
MP - MONITORING POINTS
SET 3
MP-110
MP-109
MP-108
MP-113
MP-112
MP-111
SET 2
MP-107
MP-106
MP-105
MP-101
MP-102
MP-103
MP-104
(100, 500) ORIGIN
SET. 1
LOWER GROUND FLOOR
RAISED GROUND FLOOR


KEY:
MP - MONITORING POINTS
C - CRACK MONITORING
C-101
C-307
C-306
C-305
C-304
C-301
C-201
C-303
C-302
SET 2
MP-203
MP-201
MP-202
SET 1
FIRST FLOOR
SECOND FLOOR

cluttons.com

CLUTTONS

53 Warminster Road Movement Monitoring Review No. 2



SITE LOCATION

53 Warminster Road
London SE25 4DQ

CLIENT NAME

Brymore No 1 Ltd

CLIENT'S REPRESENTATIVE

Addington Capital

DATE

10th October 2022

CONTENTS

1.0 INTRODUCTION 3
2.0 REVIEW OF MONITORING DATA 3
3.0 BUILDING MOVEMENT ASSESSMENT 4
4.0 EVIDENCE OF MOVEMENT 4
5.0 RECOMMENDATIONS 5
6.0 NOTES 5

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Issue sheet

Document	Version	Date issued	Structural Engineer	Checked by	Issue purpose
53 Warminster Road Monitoring review	No. 2	10.10.2022	ML	IP	Issue to client

1.0 INTRODUCTION

An initial review of building movement monitoring being undertaken by THS Concepts was issued in letter form on 28th February 2022. This covered sets of readings taken between August and December 2021.

This report considers monitoring results from the resumption of measurements in March until September 2022, together with their implications.

2.0 REVIEW OF MONITORING DATA

a) Plots of data

Data from THS Concepts has been received monthly, for the following time periods:

- August to December 2021
- March to Sept 2022

A base date for assessing data in 2022 has been selected as October 2021, being the earliest date with a complete set of monitoring results, following corrections to 2021 readings. Results from March to September 2022 are each compared with October 2021 readings, to assess changes since the base date

Global position readings are taken at monitoring points (MP), with northings referring to movement of the building forward from front façade towards the rear (or the reverse) and eastings being lateral readings. Devices installed at significant crack locations (C) measure crack widths. Both of these sets of points are at locations marked on plan in Appendix A.

Results of monitoring month by month, from March to September, have been plotted on sheets included in Appendix A. The differences in readings are compared with pre-determined “trigger” levels, with amber signifying that reasons for movement should be assessed and red denoting alert, where measures may need to be taken to prevent further movement. The trigger levels have been taken as those used by THS Concepts, which may readily be exceeded in extreme seasonal conditions.

b) Data analysis

Results of reading differences at monitoring points for the months March to May, compared to baseline readings, are generally within the 5mm amber movement limits. In June, almost all level readings showed settlement in the range of 4 to 6mm. None of these readings are considered abnormal.

However, from July through to September, significant building movements are recorded, summarised by type as below:

- Upward movement at the front façade together with downward movement at the rear, of approximately 20mm net difference
- Horizontal movement at the top of the front façade (MP-201 & 202), approximately 20mm towards the rear, with 40mm in the same direction at MP-203 on the RHS flank wall at the rear. These points are at high levels on the facades
- On the rear façade, a relative movement downwards of the bay window zone of 10mm compared to the ends of this wall

Crack width measurements show similar differences for the above two time periods. The critical crack measurement locations are designated C-201 and C-304, representing high level at the two flank walls. Figures of 3mm were recorded in June for both positions, increasing to 11mm in August and 14mm in September. THS Concepts did not report measurements in July.

3.0 BUILDING MOVEMENT ASSESSMENT

The analysis above can be interpreted as building movement behaviour as follows:

- Overall tilt: approximately 20mm for the whole building, downwards at the rear. This is not necessarily a problem, if the whole building moves as a homogeneous unit

- Flank wall cracking: crack widths increased by approx. 15mm in both flats A and B. These are the main vertical cracks near the centre of these walls, showing widening at the top floor (overall V shape up flank wall). This links to external measurements showing the rear of the flank wall moving away from the front wall by a similar amount

- Influence of buried metal tank: the exposed portion indicates the presence of a cast-iron tank of at least 1.5m diameter, which may project through or under the flank wall at ground level. If so, this could explain what appears to be a hard point under the centre of the flank wall, causing vertical cracks above it. It may also explain the tilting behaviour of the whole building, including measured lift at the front of the building. It may also be implicated in the bulging of the adjacent chimney breast

4.0 EVIDENCE OF MOVEMENT

An inspection of the exterior of the building was undertaken on 4th October 2022. Photographs taken of relevant parts of the building are included in Appendix B.

A general observation is that the widths of cracks present in the facades have increased in widths significantly compared to those observed at a previous inspection and report in February (r*ef the report)*. Observations are listed below, referring to photograph numbering.

- 1 & 2: Cracking in flank wall: there are now two significant vertical cracks in the full height of the wall. The LHS crack in the photos has developed since our report in February this year and likely during the summer, based on monitoring readings. The buried tank is just visible at the bottom RHS

- 3 & 4: Bulge in chimney breast, same flank wall: the projection of the bulge in the chimney breast brickwork this has noticeably increased, together with a kink in the chimney breast, when viewed along the wall

- 5 & 6: Rear wall cracking: recent movement is evident via new/expanded cracks

- 7 & 8: Garden area: none of the previous trees near the rear boundary fence remain, having been recently cut flush with the ground. There is a red brick garden wall at the change in ground level adjacent to the flank wall. This shows bed-joint separation near the base, evidently ground settling compared to the stiffer wall

5.0 RECOMMENDATIONS

Based on the above observations from monitoring results, together with evidence of building movement and cracking on site, the following recommendations are made:

1. The increased scale of the bulge in one of the chimney breasts on the exposed flank wall is judged to be serious. Urgent measures to minimise risks associated with this have been discussed and implemented separately
2. The buried metal tank should be carefully exposed, with a view to its removal. A methodology for this will be developed
3. The extent of remedial work is likely to increase following the significant movement that has taken place. Current structural drawings will be reviewed and additional measures advised

6.0 NOTES

Please note our standard clauses:

We have not inspected those areas which were hidden, covered, unexposed or inaccessible.

It is a condition of your agreement with Cluttons LLP that (save where Cluttons LLP instructs independent experts, consultants or other third parties on your behalf) the duties and responsibilities owed to you are solely and exclusively those of Cluttons LLP and that no employed or member of Cluttons LLP shall owe you any personal duty of care or be liable to you for any loss or damage howsoever arising as a consequence of the acts or omissions of such employee or member (including negligent acts or omissions) save and to the extent that such loss or damage is caused by defraud, dishonesty, wilful misconduct or unauthorised conduct on the part of such employee or member. This term is intended to be enforceable by and for the benefit of the employees and members of Cluttons LLP.

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Prepared by Malcolm Lyon

Approved by Ian Paton

DATE: 10TH OCTOBER 2022

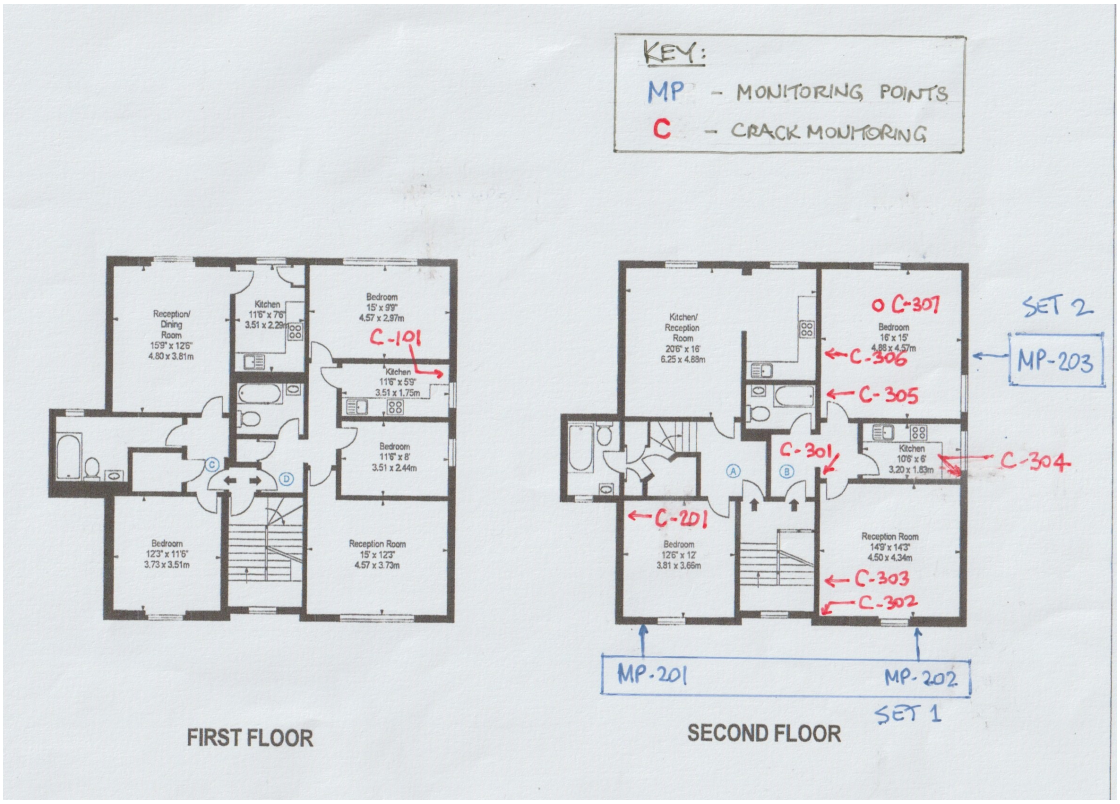
For and on behalf of
Cluttons LLP
Project and Building Consultancy

APPENDIX A

Monitoring review

Monitoring plans





53 Warminster Road **v2** **Project no. 27266.03**

Monitoring Review Sheet **S6** **Read date: 22 Mar 2022**

Monitoring Points		Ref. Readings (m) S3			Surveyed Readings (m) S6			Difference to S3 Readings (mm)		
Set no.	Point ID	Northing	Easting	Level	Northing	Easting	Level	dN	dE	dLev
1	MP-101	100.003	499.999	50.008	100.003	500.000	50.007	0	1	-2
	MP-102	100.092	504.332	50.166	100.093	504.334	50.164	1	1	-1
	MP-103	100.465	506.021	50.163	100.466	506.022	50.162	1	2	-1
	MP-104	100.201	511.636	50.126	100.202	511.637	50.125	1	1	-1
	MP-201	100.062	501.109	57.305	100.062	501.110	57.304	0	1	-1
	MP-202	100.202	509.610	57.307	100.201	509.610	57.306	-1	0	-2
2	MP-105	100.260	511.670	49.230	100.261	511.670	49.228	1	1	-1
	MP-106	106.508	511.641	49.330	106.508	511.641	49.330	0	0	0
	MP-107	111.143	511.669	49.316	111.143	511.669	49.318	0	0	2
	MP-203	108.714	511.720	57.185	108.710	511.719	57.186	-4	-1	1
3	MP-108	-	-	47.032			47.027	-	-	-5
	MP-109	-	-	47.051			47.050	-	-	0
	MP-110	-	-	47.076			47.073	-	-	-4
	MP-111	-	-	50.098			50.094	-	-	-5
	MP-112	-	-	50.090			50.090	-	-	0
	MP-113	-	-	50.187			50.183	-	-	-4

Notes

1. Monitoring points are taken from THS Concepts report dated 3 Aug 2021, extracted and marked separately on plans
2. Reference readings S3 (October 2021), Surveyed readings S6 (March 2022)
3. Measurement values displayed are to the nearest mm
4. Difference reading trigger levels:

Amber: 5

Red: 8

53 Warminster Road **v2** **Project no. 27266.03**

Monitoring Review Sheet **S7** **Read date: 20 Apr 2022**

Monitoring Points		Ref. Readings (m) S3			Surveyed Readings (m) S7			Difference to S3 Readings (mm)		
Set no.	Point ID	Northing	Easting	Level	Northing	Easting	Level	dN	dE	dLev
1	MP-101	100.003	499.999	50.008	100.004	500.001	50.008	2	2	0
	MP-102	100.092	504.332	50.166	100.093	504.334	50.166	1	2	0
	MP-103	100.465	506.021	50.163	100.466	506.023	50.163	1	2	0
	MP-104	100.201	511.636	50.126	100.202	511.638	50.126	1	2	0
	MP-201	100.062	501.109	57.305	100.062	501.111	57.305	0	2	0
	MP-202	100.202	509.610	57.307	100.201	509.611	57.307	0	2	0
2	MP-105	100.260	511.670	49.230	100.262	511.671	49.230	2	2	0
	MP-106	106.508	511.641	49.330	106.509	511.642	49.332	1	1	1
	MP-107	111.143	511.669	49.316	111.143	511.669	49.320	0	0	4
	MP-203	108.714	511.720	57.185	108.711	511.720	57.186	-4	0	1
3	MP-108	-	-	47.032			47.026	-	-	-6
	MP-109	-	-	47.051			47.050	-	-	-1
	MP-110	-	-	47.076			47.072	-	-	-5
	MP-111	-	-	50.098			50.092	-	-	-6
	MP-112	-	-	50.090			50.089	-	-	-1
	MP-113	-	-	50.187			50.182	-	-	-5

Notes

1. Monitoring points are taken from THS Concepts report dated 3 Aug 2021, extracted and marked separately on plans
2. Reference readings S3 (October 2021), Surveyed readings S7 (April 2022)
3. Measurement values displayed are to the nearest mm
4. Difference reading trigger levels:

Amber: 5

Red: 8

53 Warminster Road **v2** **Project no. 27266.03**

Monitoring Review Sheet **S8** **Read date: 24 May 2022**

Monitoring Points		Ref. Readings (m) S3			Surveyed Readings (m) S8			Difference to S3 Readings (mm)		
Set no.	Point ID	Northing	Easting	Level	Northing	Easting	Level	dN	dE	dLev
1	MP-101	100.003	499.999	50.008	100.001	499.997	50.005	-1	-1	-3
	MP-102	100.092	504.332	50.166	100.091	504.331	50.163	-1	-1	-3
	MP-103	100.465	506.021	50.163	100.463	506.021	50.160	-1	0	-3
	MP-104	100.201	511.636	50.126	100.201	511.635	50.124	-1	0	-2
	MP-201	100.062	501.109	57.305	100.059	501.108	57.302	-2	-1	-3
	MP-202	100.202	509.610	57.307	100.198	509.610	57.304	-4	0	-3
2	MP-105	100.260	511.670	49.230	100.260	511.670	49.227	0	0	-2
	MP-106	106.508	511.641	49.330	106.507	511.641	49.329	-1	0	-2
	MP-107	111.143	511.669	49.316	111.141	511.669	49.317	-2	0	1
	MP-203	108.714	511.720	57.185	108.708	511.718	57.184	-6	-3	-1
3	MP-108	-	-	47.032			47.027	-	-	-5
	MP-109	-	-	47.051			47.052	-	-	1
	MP-110	-	-	47.076			47.073	-	-	-3
	MP-111	-	-	50.098			50.093	-	-	-6
	MP-112	-	-	50.090			50.092	-	-	1
	MP-113	-	-	50.187			50.184	-	-	-3

Notes

1. Monitoring points are taken from THS Concepts report dated 3 Aug 2021, extracted and marked separately on plans
2. Reference readings S3 (October 2021), Surveyed readings S8 (May 2022)
3. Measurement values displayed are to the nearest mm
4. Difference reading trigger levels:

Amber: 5

Red: 8

53 Warminster Road **v2** **Project no. 27266.03**

Monitoring Review Sheet **S9** **Read date: 21 Jun 2022**

Monitoring Points		Ref. Readings (m) S3			Surveyed Readings (m) S9			Difference to S3 Readings (mm)		
Set no.	Point ID	Northing	Easting	Level	Northing	Easting	Level	dN	dE	dLev
1	MP-101	100.004	499.999	50.008	100.001	499.999	50.003	-2	1	-5
	MP-102	100.092	504.332	50.166	100.093	504.333	50.162	1	1	-4
	MP-103	100.465	506.021	50.163	100.465	506.022	50.159	1	1	-5
	MP-104	100.201	511.636	50.126	100.201	511.636	50.122	0	1	-4
	MP-201	100.062	501.109	57.305	100.064	501.109	57.300	2	0	-5
	MP-202	100.202	509.610	57.307	100.202	509.609	57.302	1	-1	-5
2	MP-105	100.260	511.670	49.230	100.260	511.670	49.225	0	1	-5
	MP-106	106.508	511.641	49.330	106.508	511.641	49.325	0	0	-5
	MP-107	111.143	511.669	49.316	111.143	511.668	49.312	0	-1	-5
	MP-203	108.714	511.720	57.185	108.713	511.718	57.178	-1	-3	-6
3	MP-108	-	-	47.032			47.026	-	-	-5
	MP-109	-	-	47.051			47.047	-	-	-4
	MP-110	-	-	47.076			47.073	-	-	-3
	MP-111	-	-	50.098			50.093	-	-	-6
	MP-112	-	-	50.090			50.087	-	-	-4
	MP-113	-	-	50.187			50.184	-	-	-3

Notes

1. Monitoring points are taken from THS Concepts report dated 3 Aug 2021, extracted and marked separately on plans
2. Reference readings S3 (October 2021), Surveyed readings S9 (June 2022)
3. Measurement values displayed are to the nearest mm
4. Difference reading trigger levels:

Amber: 5

Red: 8

53 Warminster Road **v2** **Project no. 27266.03**

Monitoring Review Sheet **S10** **Read date: 21 Jul 2022**

Monitoring Points		Ref. Readings (m) S3			Surveyed Readings (m) S10			Difference to S3 Readings (mm)		
Set no.	Point ID	Northing	Easting	Level	Northing	Easting	Level	dN	dE	dLev
1	MP-101	100.004	499.999	50.008	100.004	499.995	50.016	1	-4	8
	MP-102	100.092	504.332	50.166	100.095	504.328	50.174	3	-4	8
	MP-103	100.465	506.021	50.163	100.467	506.019	50.171	3	-2	8
	MP-104	100.201	511.636	50.126	100.204	511.633	50.135	2	-2	8
	MP-201	100.062	501.109	57.305	100.068	501.105	57.313	7	-4	8
	MP-202	100.202	509.610	57.307	100.210	509.607	57.316	9	-3	9
2	MP-105	100.260	511.670	49.230	100.262	511.668	49.238	2	-2	8
	MP-106	106.508	511.641	49.330	106.510	511.639	49.334	2	-2	4
	MP-107	111.143	511.669	49.316	111.148	511.667	49.314	5	-2	-2
	MP-203	108.714	511.720	57.185	108.727	511.717	57.185	13	-4	0
3	MP-108	-	-	47.032			47.029	-	-	-3
	MP-109	-	-	47.051			47.041	-	-	-10
	MP-110	-	-	47.076			47.075	-	-	-1
	MP-111	-	-	50.098			50.095	-	-	-3
	MP-112	-	-	50.090			50.082	-	-	-8
	MP-113	-	-	50.187			50.187	-	-	0

Notes

1. Monitoring points are taken from THS Concepts report dated 3 Aug 2021, extracted and marked separately on plans
2. Reference readings S3 (October 2021), Surveyed readings S10 (July 2022)
3. Measurement values displayed are to the nearest mm
4. Difference reading trigger levels:

Amber: 5

Red: 8

53 Warminster Road **v2** **Project no. 27266.03**

Monitoring Review Sheet **S11** **Read date: 18 Aug 2022**

Monitoring Points		Ref. Readings (m) S3			Surveyed Readings (m) S11			Difference to S3 Readings (mm)		
Set no.	Point ID	Northing	Easting	Level	Northing	Easting	Level	dN	dE	dLev
1	MP-101	100.004	499.999	50.008	100.009	499.996	50.018	5	-3	10
	MP-102	100.092	504.332	50.166	100.099	504.330	50.176	7	-2	11
	MP-103	100.465	506.021	50.163	100.472	506.019	50.174	7	-2	11
	MP-104	100.201	511.636	50.126	100.208	511.634	50.137	7	-1	11
	MP-201	100.062	501.109	57.305	100.076	501.107	57.315	14	-2	10
	MP-202	100.202	509.610	57.307	100.221	509.606	57.319	**20**	-3	11
2	MP-105	100.260	511.670	49.230	100.266	511.669	49.241	6	-1	11
	MP-106	106.508	511.641	49.330	*108.833*	*511.617*	*49.318*	*2325*	*-24*	*-12*
	MP-107	111.143	511.669	49.316	111.158	511.668	49.305	15	-1	-12
	MP-203	108.714	511.720	57.185	108.748	511.719	57.179	**33**	-1	-6
3	MP-108	-	-	47.032			47.028	-	-	-4
	MP-109	-	-	47.051			47.036	-	-	-15
	MP-110	-	-	47.076			47.072	-	-	-4
	MP-111	-	-	50.098			50.094	-	-	-4
	MP-112	-	-	50.090			50.076	-	-	-14
	MP-113	-	-	50.187			50.183	-	-	-4

Notes

1. Monitoring points are taken from THS Concepts report dated 3 Aug 2021, extracted and marked separately on plans
2. Reference readings S3 (October 2021), Surveyed readings S11 (August 2022)
3. Measurement values displayed are to the nearest mm
4. Difference reading trigger levels:

   Amber: 5

   Red: 8
5. Results for MP-106 are spurious and have been queried

53 Warminster Road **v2** **Project no. 27266.03**

Monitoring Review Sheet **S12** **Read date: 23 Sept 2022**

Monitoring Points		Ref. Readings (m) S3			Surveyed Readings (m) S12			Difference to S3 Readings (mm)		
Set no.	Point ID	Northing	Easting	Level	Northing	Easting	Level	dN	dE	dLev
1	MP-101	100.004	499.999	50.008	100.011	499.998	50.018	7	-1	10
	MP-102	100.092	504.332	50.166	100.101	504.332	50.176	9	-1	10
	MP-103	100.465	506.021	50.163	100.474	506.021	50.173	9	0	10
	MP-104	100.201	511.636	50.126	100.210	511.636	50.137	9	0	10
	MP-201	100.062	501.109	57.305	100.081	501.108	57.314	19	-1	9
	MP-202	100.202	509.610	57.307	100.225	509.608	57.317	**24**	-2	10
2	MP-105	100.260	511.670	49.230	100.268	511.670	49.240	8	0	10
	MP-106	106.508	511.641	49.330	106.516	511.644	49.330	8	3	0
	MP-107	111.143	511.669	49.316	111.162	511.669	49.298	19	0	-18
	MP-203	108.714	511.720	57.185	108.757	511.722	57.174	**43**	2	-10
3	MP-108	-	-	47.032			47.024	-	-	-8
	MP-109	-	-	47.051			47.031	-	-	**-20**
	MP-110	-	-	47.076			47.065	-	-	-11
	MP-111	-	-	50.098			50.090	-	-	-8
	MP-112	-	-	50.090			50.071	-	-	-19
	MP-113	-	-	50.187			50.176	-	-	-11

Notes

1. Monitoring points are taken from THS Concepts report dated 3 Aug 2021, extracted and marked separately on plans
2. Reference readings S3 (October 2021), Surveyed readings S12 (September 2022)
3. Measurement values displayed are to the nearest mm
4. Difference reading trigger levels:

Amber: 5

Red: 8

APPENDIX B

Photographs



1 Flank wall upper central, two vertical cracks



2 Flank wall lower central, u/g tank at RHS



3 Flank wall chimney breast, increased bulge at top



4 Edge view of chimney breast, kinked near top



5 Rear bay, showing cracking



6 Aisle at rear, differential settlement



7 Rear of garden, trees all cut down



8 Garden wall at flank wall, settlement under

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CLUTTONS

53 Warminster Road Movement Monitoring Review No. 3



SITE LOCATION

53 Warminster Road
London SE25 4DQ

CLIENT NAME

Brymore No 1 Ltd

CLIENT'S REPRESENTATIVE

Addington Capital

DATE

30th August 2023

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3.0 BUILDING MOVEMENT ASSESSMENT 4
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Issue sheet

Document	Version	Date issued	Structural Engineer	Checked by	Issue purpose
53 Warminster Road Monitoring review	No. 3	30.08.2023	ML	IP	Issue to client

1.0 INTRODUCTION

An initial review of building movement monitoring being undertaken by THS Concepts was issued in letter form on 28th February 2022. This covered sets of readings taken between August and December 2021. This was followed by a review of further readings covering a period of significant building movement, issued as a report (Review No. 2) on 10th October 2022.

This report (Review No. 3) considers subsequent movement monitoring results covering the period of remedial works to the building until completion in August 2023.

2.0 REVIEW OF MONITORING DATA

a) Plots of data

Data from THS Concepts has been received monthly, for the following time periods:

- August to December 2021
- March to September 2022
- November 2022 to August 2023

A base date for assessing data in this report has been selected as November 2022, being a time when seasonal drying out of the ground affecting foundations will largely have ceased. Movement monitoring results from December 2022 to August 2023 are each compared with November 2022 readings, to assess changes since this base date.

Global position readings are taken at monitoring points (MP), with northings referring to movement of the building forward from front façade towards the rear (or the reverse) and eastings being lateral readings. Devices installed at significant crack locations (C) measure crack widths. Both of these sets of points are at locations marked on plan in Appendix A.

Results of monitoring month by month for the above period have been recorded on sheets included in Appendix A. The differences in readings are compared with pre-determined "trigger" levels, with amber signifying that reasons for movement should be assessed and red denoting alert, where measures may need to be taken to prevent further movement. The trigger levels have been taken as those used by THS Concepts, which may readily be exceeded in extreme seasonal conditions.

b) Data analysis

Results of reading differences at monitoring points for the period in this report, compared to baseline readings, are generally below or within the amber range of 5 to 7mm. Exceptions are given below:

- Rear monitoring point MP108: +10mm in January (upward value, considered to be a rogue reading)
- Rear monitoring points in May and June 2023: several to -8mm (settlement)
- Eastings at front façade in June and July 2023: up to 15mm - potentially horizontal thermal movement of wall

At the end of the monitoring period in August 2023, at the completion of remedial works, the levels of both front and rear walls are recorded as within 2mm of the values from November 2022. At the rear facade, including the time when underpinning was installed to the wall (May 2023), the recorded range of settlement over this period was 8mm.

3.0 BUILDING MOVEMENT ASSESSMENT

The analysis above can be interpreted as building movement behaviour as follows:

- Overall tilt: as reflected in Northings (front-to-rear horizontal movement), the range of tilt in the period considered has remained within a range of approximately 5mm, which is not significant
- Flank wall cracking: crack widths of up to 20mm have been stitched and filled on the critical western flank wall. No further movement has been observed since repairs have taken place
- Influence of buried metal tank: the existing buried metal tank has been removed, having been found to be outside the building envelope. It is therefore not likely that it has influenced the behaviour of the building

4.0 CONCLUSION

This review covers the period of installation of remedial works designed to limit further movement of the building. During this time (November 2022 to August 2023), this review of the movement monitoring results by THS Concepts shows that vertical movement of the perimeter walls has remained within a 10mm range. Some movement is expected over the seasons, as the Victorian building is founded on expansive London Clay and there is a significant slope downwards of the surrounding ground from front to rear.

5.0 NOTES

Please note our standard clauses:

We have not inspected those areas which were hidden, covered, unexposed or inaccessible.

It is a condition of your agreement with Cluttons LLP that (save where Cluttons LLP instructs independent experts, consultants or other third parties on your behalf) the duties and responsibilities owed to you are solely and exclusively those of Cluttons LLP and that no employed or member of Cluttons LLP shall owe you any personal duty of care or be liable to you for any loss or damage howsoever arising as a consequence of the acts or omissions of such employee or member (including negligent acts or omissions) save and to the extent that such loss or damage is caused by defraud, dishonesty, wilful misconduct or unauthorised conduct on the part of such employee or member. This term is intended to be enforceable by and for the benefit of the employees and members of Cluttons LLP.

This report has been prepared for the use of Brymore No 1 Ltd only and no responsibility is accepted to any third party for the whole or any part of its content. Similarly, neither the whole nor any part of this report, nor any reference thereto, may be included in any document, circular or statement without the prior written approval of the form and context in which it may appear.

Prepared by Malcolm Lyon

Approved by Ian Paton

DATE: 10TH OCTOBER 2022

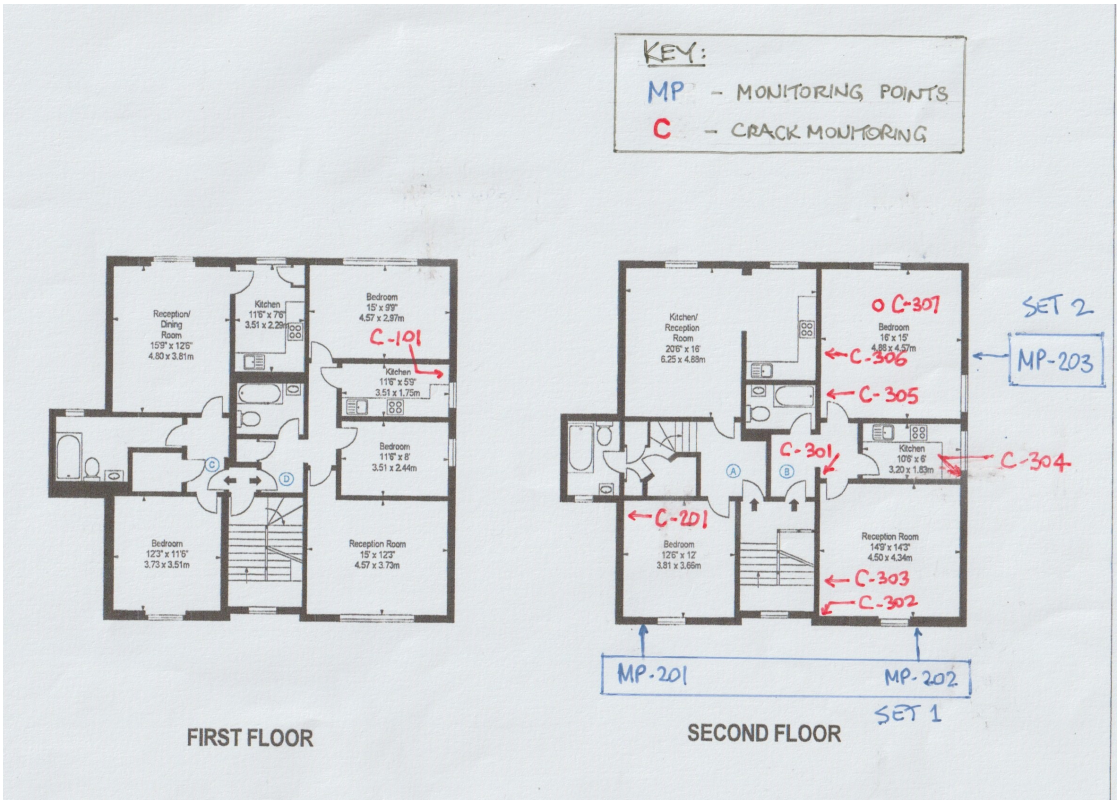
For and on behalf of
Cluttons LLP
Project and Building Consultancy

APPENDIX A

Monitoring review

Monitoring plans





53 Warminster Road **v3** **Project no. 27266.03**

Monitoring Review Sheet **S13** **Read date: 21 Nov 2022**

Monitoring Points		Ref. Readings (m) S3			Surveyed Readings (m) S13			Difference to S3 Readings (mm)		
Set no.	Point ID	Northing	Easting	Level	Northing	Easting	Level	dN	dE	dLev
1	MP-101	100.004	499.999	50.008	99.999	500.001	50.007	-5	2	-1
	MP-102	100.092	504.332	50.166	100.088	504.335	50.166	-4	2	0
	MP-103	100.465	506.021	50.163	100.461	506.024	50.163	-4	4	0
	MP-104	100.201	511.636	50.126	100.197	511.639	50.127	-4	3	1
	MP-201	100.062	501.109	57.305						
	MP-202	100.202	509.610	57.307						
2	MP-105	100.260	511.670	49.230						
	MP-106	106.508	511.641	49.330						
	MP-107	111.143	511.669	49.316						
	MP-203	108.714	511.720	57.185						
3	MP-108	-	-	47.032			47.005	-	-	-27
	MP-109	-	-	47.051			47.015	-	-	-36
	MP-110	-	-	47.076			47.044	-	-	-32
	MP-111	-	-	50.098				-	-	
	MP-112	-	-	50.090			50.055	-	-	-35
	MP-113	-	-	50.187			50.155	-	-	-32

Notes

1. Monitoring points are taken from THS Concepts report dated 3 Aug 2021, extracted and marked separately on plans
2. Reference readings S3 (October 2021), Surveyed readings S13 (November 2022)
3. Measurement values displayed are to the nearest mm
4. Difference reading trigger levels:

Amber: 5

Red: 8

53 Warminster Road **v4** **Project no. 27266.03**

Monitoring Review Sheet **S14** **Read date: 15 Dec 2022**

Monitoring Points		Ref. Readings (m) S13			Surveyed Readings (m) S14			Difference to S3 Readings (mm)		
Set no.	Point ID	Northing	Easting	Level	Northing	Easting	Level	dN	dE	dLev
1	MP-101	99.999	500.001	50.007	99.998	500.001	50.006	-1	0	-2
	MP-102	100.088	504.335	50.166	100.088	504.334	50.164	0	0	-2
	MP-103	100.461	506.024	50.163	100.460	506.024	50.161	-1	-1	-2
	MP-104	100.197	511.639	50.127	100.197	511.638	50.125	0	0	-2
	MP-201									
	MP-202									
2	MP-105									
	MP-106									
	MP-107									
	MP-203									
3	MP-108			47.005			47.004			-1
	MP-109			47.015						
	MP-110			47.044			47.044			0
	MP-111									
	MP-112			50.055			50.056			0
	MP-113			50.155			50.154			0

Notes

1. Monitoring points are taken from THS Concepts report dated 3 Aug 2021, extracted and marked separately on plans
2. Reference readings S13 (November 2022), Surveyed readings S14 (December 2022)
3. Measurement values displayed are to the nearest mm
4. Difference reading trigger levels:

Amber: 5

Red: 8

53 Warminster Road **v4** **Project no. 27266.03**

Monitoring Review Sheet **S15** **Read date: 19 Jan 2023**

Monitoring Points		Ref. Readings (m) S13			Surveyed Readings (m) S15			Difference to S3 Readings (mm)		
Set no.	Point ID	Northing	Easting	Level	Northing	Easting	Level	dN	dE	dLev
1	MP-101	99.999	500.001	50.007	99.995	500.004	50.004	-4	3	-4
	MP-102	100.088	504.335	50.166	100.085	504.335	50.162	-3	0	-4
	MP-103	100.461	506.024	50.163	100.456	506.027	50.159	-5	2	-4
	MP-104	100.197	511.639	50.127	100.193	511.641	50.123	-4	2	-4
	MP-201									
	MP-202									
2	MP-105									
	MP-106									
	MP-107									
	MP-203									
3	MP-108			47.005			47.014			10
	MP-109			47.015						
	MP-110			47.044			47.043			-1
	MP-111									
	MP-112			50.055						
	MP-113			50.155						

Notes

1. Monitoring points are taken from THS Concepts report dated 3 Aug 2021, extracted and marked separately on plans
2. Reference readings S13 (November 2022), Surveyed readings S15 (January 2023)
3. Measurement values displayed are to the nearest mm
4. Difference reading trigger levels:

Amber: 5

Red: 8

53 Warminster Road **v4** **Project no. 27266.03**

Monitoring Review Sheet **S16** **Read date: 15 Feb 2023**

Monitoring Points		Ref. Readings (m) S13			Surveyed Readings (m) S16			Difference to S3 Readings (mm)		
Set no.	Point ID	Northing	Easting	Level	Northing	Easting	Level	dN	dE	dLev
1	MP-101	99.999	500.001	50.007	99.995	500.004	50.004	-4	3	-4
	MP-102	100.088	504.335	50.166	100.084	504.337	50.162	-4	3	-4
	MP-103	100.461	506.024	50.163	100.456	506.026	50.159	-5	2	-4
	MP-104	100.197	511.639	50.127	100.193	511.641	50.122	-4	2	-4
	MP-201									
	MP-202									
2	MP-105									
	MP-106									
	MP-107									
	MP-203									
3	MP-108			47.005			47.002			-3
	MP-109			47.015			47.014			-1
	MP-110			47.044			47.042			-2
	MP-111									
	MP-112			50.055						
	MP-113			50.155			50.152			-2

Notes

1. Monitoring points are taken from THS Concepts report dated 3 Aug 2021, extracted and marked separately on plans
2. Reference readings S13 (November 2022), Surveyed readings S16 (February 2023)
3. Measurement values displayed are to the nearest mm
4. Difference reading trigger levels:

Amber: 5

Red: 8

53 Warminster Road **v4** **Project no. 27266.03**

Monitoring Review Sheet **S17** **Read date: 14 Mar 2023**

Monitoring Points		Ref. Readings (m) S13			Surveyed Readings (m) S17			Difference to S3 Readings (mm)		
Set no.	Point ID	Northing	Easting	Level	Northing	Easting	Level	dN	dE	dLev
1	MP-101	99.999	500.001	50.007	99.992	500.004	50.003	-7	3	-5
	MP-102	100.088	504.335	50.166	100.081	504.338	50.161	-7	3	-5
	MP-103	100.461	506.024	50.163	100.453	506.028	50.159	-7	3	-5
	MP-104	100.197	511.639	50.127	100.190	511.642	50.122	-7	3	-5
	MP-201									
	MP-202									
2	MP-105									
	MP-106									
	MP-107									
	MP-203									
3	MP-108			47.005			47.001			-4
	MP-109			47.015			47.013			-1
	MP-110			47.044			47.041			-3
	MP-111									
	MP-112			50.055						
	MP-113			50.155			50.151			-4

Notes

1. Monitoring points are taken from THS Concepts report dated 3 Aug 2021, extracted and marked separately on plans
2. Reference readings S13 (November 2022), Surveyed readings S17 (March 2023)
3. Measurement values displayed are to the nearest mm
4. Difference reading trigger levels:

Amber: 5

Red: 8

53 Warminster Road **v4** **Project no. 27266.03**

Monitoring Review Sheet **S18** **Read date: 18 Apr 2023**

Monitoring Points		Ref. Readings (m) S13			Surveyed Readings (m) S18			Difference to S3 Readings (mm)		
Set no.	Point ID	Northing	Easting	Level	Northing	Easting	Level	dN	dE	dLev
1	MP-101	99.999	500.001	50.007	99.994	500.006	50.006	-5	5	-1
	MP-102	100.088	504.335	50.166	100.082	504.340	50.165	-6	5	-1
	MP-103	100.461	506.024	50.163	100.454	506.029	50.161	-7	5	-2
	MP-104	100.197	511.639	50.127	100.190	511.643	50.125	-7	4	-2
	MP-201									
	MP-202									
2	MP-105									
	MP-106									
	MP-107									
	MP-203									
3	MP-108			47.005			46.999			-5
	MP-109			47.015			47.012			-2
	MP-110			47.044			47.039			-5
	MP-111									
	MP-112			50.055						
	MP-113			50.155			50.149			-5

Notes

1. Monitoring points are taken from THS Concepts report dated 3 Aug 2021, extracted and marked separately on plans
2. Reference readings S13 (November 2022), Surveyed readings S18 (April 2023)
3. Measurement values displayed are to the nearest mm
4. Difference reading trigger levels:

Amber: 5

Red: 8

53 Warminster Road **v4** **Project no. 27266.03**

Monitoring Review Sheet **S19** **Read date: 18 May 2022**

Monitoring Points		Ref. Readings (m) S13			Surveyed Readings (m) S19			Difference to S3 Readings (mm)		
Set no.	Point ID	Northing	Easting	Level	Northing	Easting	Level	dN	dE	dLev
1	MP-101	99.999	500.001	50.007						
	MP-102	100.088	504.335	50.166	100.083	504.337	50.164	-5	2	-2
	MP-103	100.461	506.024	50.163	100.454	506.026	50.161	-6	2	-2
	MP-104	100.197	511.639	50.127	100.192	511.640	50.125	-5	1	-2
	MP-201									
	MP-202									
2	MP-105									
	MP-106									
	MP-107									
	MP-203									
3	MP-108			47.005			46.997			-8
	MP-109			47.015			47.010			-5
	MP-110			47.044			47.037			-7
	MP-111									
	MP-112			50.055						
	MP-113			50.155			50.147			-8

Notes

1. Monitoring points are taken from THS Concepts report dated 3 Aug 2021, extracted and marked separately on plans
2. Reference readings S13 (November 2022), Surveyed readings S19 (May 2023)
3. Measurement values displayed are to the nearest mm
4. Difference reading trigger levels:

Amber: 5

Red: 8

53 Warminster Road **v4** **Project no. 27266.03**

Monitoring Review Sheet **S20** **Read date: 19 Jun 2022**

Monitoring Points		Ref. Readings (m) S13			Surveyed Readings (m) S20			Difference to S3 Readings (mm)		
Set no.	Point ID	Northing	Easting	Level	Northing	Easting	Level	dN	dE	dLev
1	MP-101	99.999	500.001	50.007						
	MP-102	100.088	504.335	50.166	100.084	504.346	50.164	-4	11	-2
	MP-103	100.461	506.024	50.163						
	MP-104	100.197	511.639	50.127	100.191	511.651	50.124	-6	12	-3
	MP-201									
	MP-202									
2	MP-105									
	MP-106									
	MP-107									
	MP-203									
3	MP-108			47.005			46.997			-8
	MP-109			47.015			47.011			-4
	MP-110			47.044			47.036			-8
	MP-111									
	MP-112			50.055						
	MP-113			50.155						

Notes

1. Monitoring points are taken from THS Concepts report dated 3 Aug 2021, extracted and marked separately on plans
2. Reference readings S13 (November 2022), Surveyed readings S20 (June 2023)
3. Measurement values displayed are to the nearest mm
4. Difference reading trigger levels:

Amber: 5

Red: 8

53 Warminster Road **v4** **Project no. 27266.03**

Monitoring Review Sheet **S21** **Read date: 18 Jul 2022**

Monitoring Points		Ref. Readings (m) S13			Surveyed Readings (m) S21			Difference to S3 Readings (mm)		
Set no.	Point ID	Northing	Easting	Level	Northing	Easting	Level	dN	dE	dLev
1	MP-101	99.999	500.001	50.007						
	MP-102	100.088	504.335	50.166	100.085	504.350	50.166	-3	15	0
	MP-103	100.461	506.024	50.163	100.456	506.039	50.163	-5	15	0
	MP-104	100.197	511.639	50.127	100.193	511.654	50.127	-4	15	0
	MP-201									
	MP-202									
2	MP-105									
	MP-106									
	MP-107									
	MP-203									
3	MP-108			47.005			47.001			-4
	MP-109			47.015			47.016			1
	MP-110			47.044			47.041			-3
	MP-111									
	MP-112			50.055						
	MP-113			50.155			50.151			-3

Notes

1. Monitoring points are taken from THS Concepts report dated 3 Aug 2021, extracted and marked separately on plans
2. Reference readings S13 (November 2022), Surveyed readings S21 (July 2023)
3. Measurement values displayed are to the nearest mm
4. Difference reading trigger levels:

Amber: 5

Red: 8

53 Warminster Road **v4** **Project no. 27266.03**

Monitoring Review Sheet **S22** **Read date: 21 Aug 2022**

Monitoring Points		Ref. Readings (m) S13			Surveyed Readings (m) S22			Difference to S3 Readings (mm)		
Set no.	Point ID	Northing	Easting	Level	Northing	Easting	Level	dN	dE	dLev
1	MP-101	99.999	500.001	50.007	99.992	500.002	50.006	-7	1	-1
	MP-102	100.088	504.335	50.166	100.082	504.336	50.164	-6	1	-2
	MP-103	100.461	506.024	50.163	100.454	506.026	50.161	-7	2	-2
	MP-104	100.197	511.639	50.127	100.191	511.640	50.125	-6	1	-2
	MP-201									
	MP-202									
2	MP-105									
	MP-106									
	MP-107									
	MP-203									
3	MP-108			47.005			47.006			1
	MP-109			47.015						
	MP-110			47.044			47.045			1
	MP-111									
	MP-112			50.055						
	MP-113			50.155			50.155			1

Notes

1. Monitoring points are taken from THS Concepts report dated 3 Aug 2021, extracted and marked separately on plans
2. Reference readings S13 (November 2022), Surveyed readings S22 (August 2023)
3. Measurement values displayed are to the nearest mm
4. Difference reading trigger levels:

Amber: 5

Red: 8

APPENDIX 5

Sketch plans

Scale bar

1:20

400mm 0 400mm 800mm 1200mm 1600mm 2000mm

1:100

2m 0 2m 4m 6m 8m 10m

This Drawing remains the property of Cluttons LLP January 2022 copyright ©

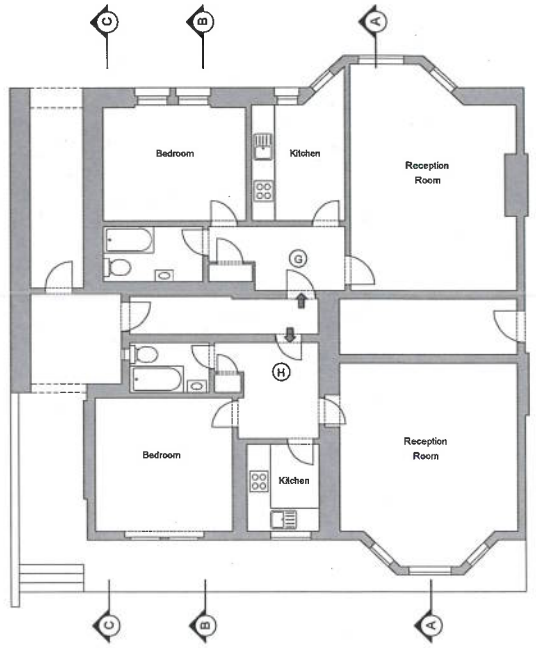
This drawing is to be read in conjunction with the specification and all relevant drawings.

All dimensions to be checked on site prior to commencement of any works.

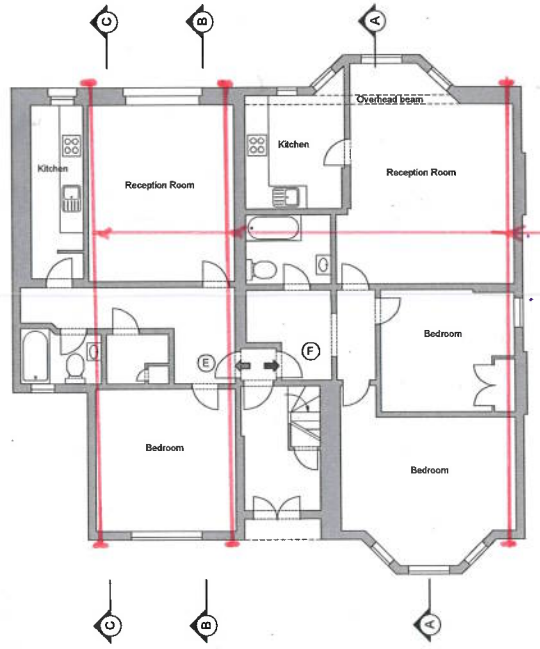
Refer any discrepancies to the surveyor.

Do not scale from this drawing.

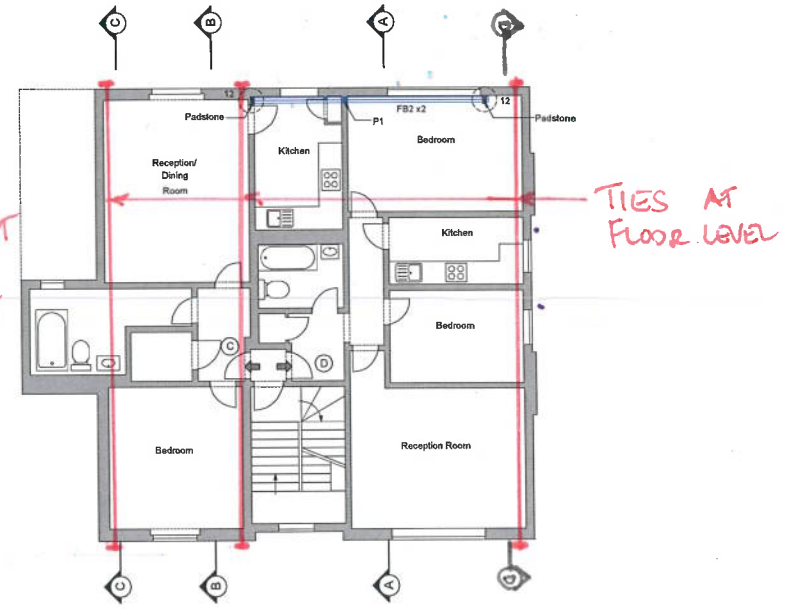
All dimensions are in mm unless otherwise specified.



LOWER GROUND FLOOR PLAN
SCALE 1:100



RAISED GROUND FLOOR PLAN
SCALE 1:100



FIRST FLOOR PLAN
SCALE 1:100

EXISTING FLOOR PLANS, ROOF PLAN AND SECTIONS ARE SHOWN INDICATIVELY. ALL DIMENSIONS AND POSITION OF PROPOSED STRUCTURAL ELEMENTS TO BE CONFIRMED ON SITE.

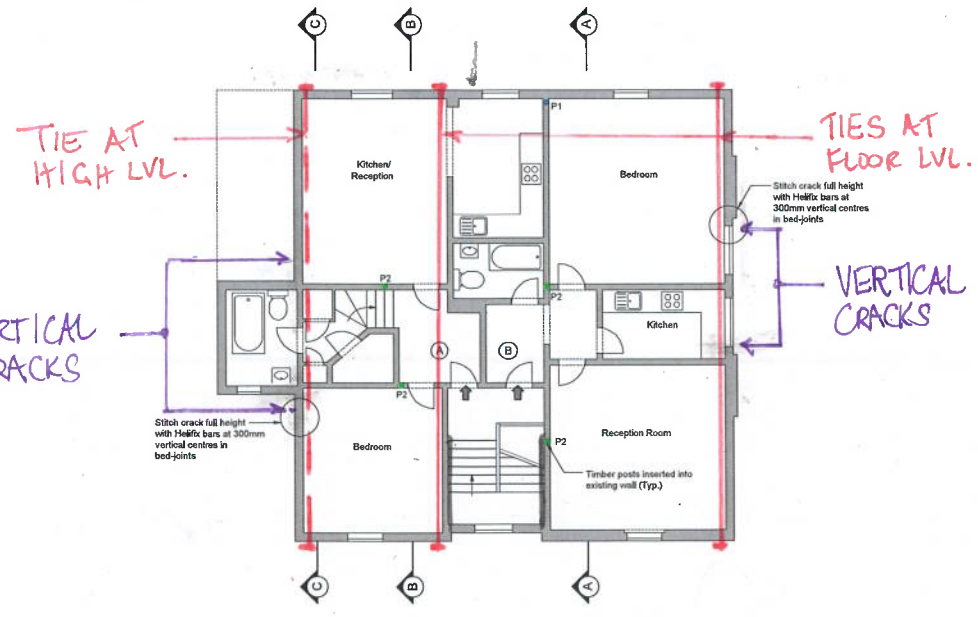
NOTES

Steel members to reinforce slate roof;
i) Grade S275 J0
ii) Sections:
- FB2 - 200x75 PFC
- RB1 - 150x75 PFC
- RP1 - 150x75 PFC
- P1 - 100x100x6.3 SHS
- T1 - 20Ø Steel Rod

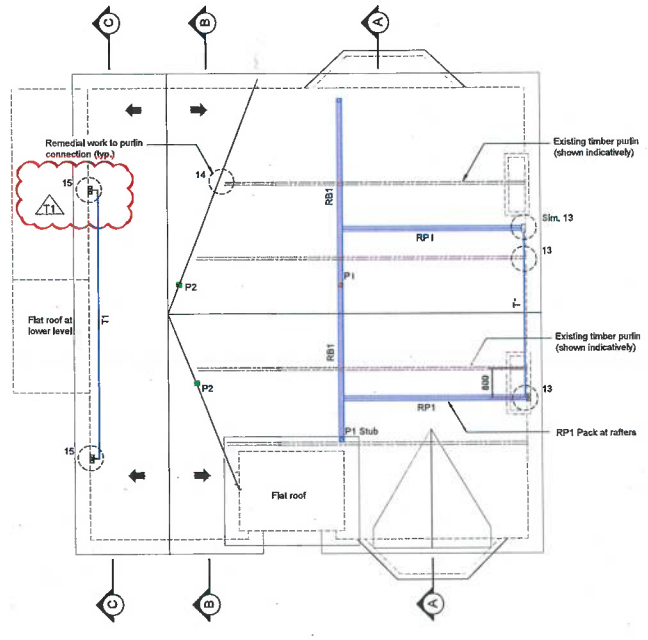
iii) Corrosion Protection:
Wire brushed
Primer: ALKYD 80mm
Top Coat: ALKYD 80mm

1. Timber Members:
i) Grade C24
ii) Sections:
- P2 - 100x100 Post

2. Purlins to Gable wall (south facade):
Prop to needles in wall, repair brickwork and place padstone, then pack to support purlin. (4No. Purlins)



SECOND FLOOR PLAN
SCALE 1:100



ROOF PLAN
SCALE 1:100

MASONRY NOTES

1. Brickwork shall be in accordance with BS5628
2. Mortar to be type (ii)
3. Replacement bricks to be same or better properties than existing

TIMBER NOTES

1. Timber shall be in accordance with BS5268
2. Refer to further notes in structural drawings

TEMPORARY WORKS

1. The contractor is responsible for the stability of the building and adjoining structures during construction and shall design, install, adapt and maintain all necessary propping and temporary works. A method statement for the temporary works must be submitted to the contractor administrator for comment before work begins.
2. Prior to commencing work, the contractor shall provide temporary restraint to a bulge at high level in the south gable wall. Preliminary details are shown in the drawings.

GENERAL CONCRETE NOTES

Concrete UNO to be in accordance with the specification, BS 8500: Part 2 and BS EN 206

Blinding - Grade GEN1
Mass Concrete - Grade GEN3
Reinforced concrete - Grade RC35

50mm concrete blinding is to be placed under all reinforced concrete in contact with the ground

All reinforcement to be high yield, minimum grade 500 N/mm², Type H to BS 8666 UNO.

Maintain c.50mm concrete cover to all steel reinforcement (40mm min.)

Concrete to be fully compacted using mechanical vibration.

The temperature at the time of placing concrete must not be less than 5°C and rising.

Concrete surfaces to be protected with polythene sheeting during specified curing period.

Reinforcement to be clean and free of corrosive pitting, loose rust, ice and substances which may adversely affect the reinforcement bonding to the concrete.

Mesh to be supported on proprietary spacers to maintain a min. of 40mm cover to reinforcement.

STEEL NOTES

All Structural Engineering drawings are to be read with all the relevant construction drawings and specifications.

All materials to comply with the relevant British Standard.

The contractor must allow for tolerance in fabrication and provide all shimming and packing necessary to obtain the correct levels shown on the drawings.

The contractor will be responsible for ensuring that steelwork installed fulfills the design brief and no changes to specification should be made unless expressly instructed by the CA.

All hot rolled steel to be grade S275 J0 or S355 (hollow sections) in accordance with BSEN 10 025.

All welding to be in accordance with BS 5153. Minimum fillet weld to be 6mm. All butt welds should be 'full penetration'. All fillet welds to have 6mm min. leg length, unless noted otherwise.

All bolting to be carried out using grade 8.8 bolts in 2mm clearance holes unless otherwise noted.

All dimensions to be checked on site by the Contractor prior to fabrication and erection of the steelwork.

A minimum of 150mm bearing must be given to steel beams, unless noted on drawings.

External and internal steelwork to be galvanised to BS EN ISO 1461, to receive a min mean coating thickness of 140 micrometers. Preparation: Blast clean to BS EN ISO 8501-1, Prep' grade SA 2.5 followed by chemical cleaning.

All bolted connections are to include a minimum of two M16 bolts per member unless specifically indicated otherwise on details. All bolts are to be grade 8.8 sheradized to BS 4921, class 1. All bolts, nuts and washers are to be to BS 5950 Part 2 clause 2.2. Washers are to be placed beneath the rotated item.

Steelwork fabricated to BS EN 1090-2 (and BS 5950-2001) to special tolerances Appendix B.

Fabrication drawings of steelwork shall be submitted for approval 3 weeks prior to commencement of fabrication.

Drawings shall include general arrangement and detail drawings including all connections.

Mill certifiates shall be included in the submission.

REFER TO S-SK32 FOR TIE DETAILS

BUILDING TIES FOR CRACK CONTROL PLANS S-SK 30 M.L. 21.11.22

PRELIMINARY

Rev	Date	Amendment	By
T1	28.06.22	Tender Issue	MO
P1	10.06.22	Preliminary Issue	MO

Revisions

Drawing Status

TENDER

Project and Building Consultancy
Cluttons LLP, First Floor, 7400 The Quorum, Alec Issigonis Way, Oxford Business Park, Oxford, OX4 2JZ
Tel No: 01865 728000
www.cluttons.com

Project

Structural Design
53 Warminster Road
London SE25 4DQ

Client

Addington Capital

Drawing

Proposed Structural Works
Floor and Roof Plans

Drawn By MO Checked By ML

Scale 1:100 @ A1 Status S01

Project	Originator	Funct.	Spat.	Form	Discl.	Number	Rev
27266	CLT	XX	ZZ	D	S	00200	T01

CLUTTONS

C:\Department Jobs\27k\Oldham\27266.ML.Vertical Loction Surveys (001)\03 Warminster Rd\13 Drawings\Warminster 27266-CLT-XX-ZZ-D-S-dwg 28/06/2022 William D'Arcy

Scale bar
1:100
2m 0 2m 4m 6m 8m 10m

This Drawing remains the property of Cluttons LLP January 2022 copyright ©

This drawing is to be read in conjunction with the specification and all relevant drawings.

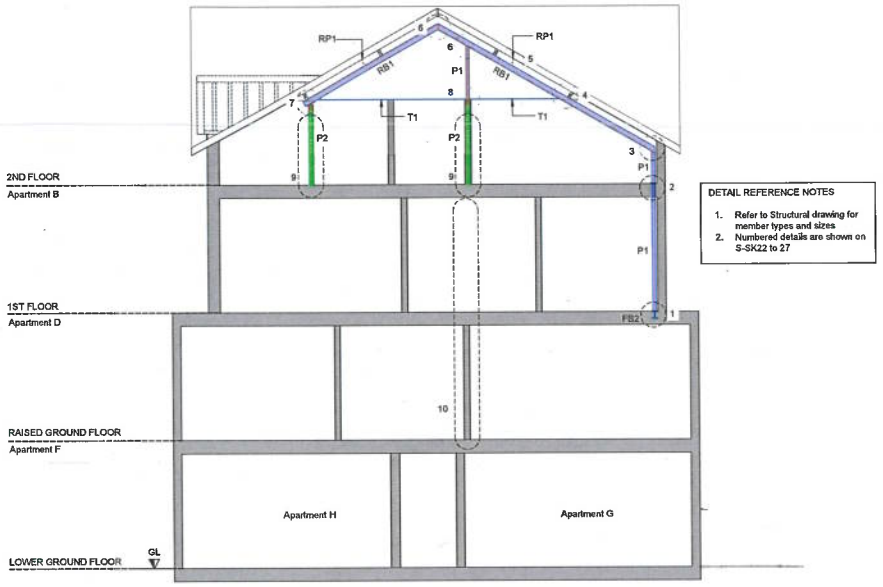
All dimensions to be checked on site prior to commencement of any works.

Refer any discrepancies to the surveyor.

Do not scale from this drawing.

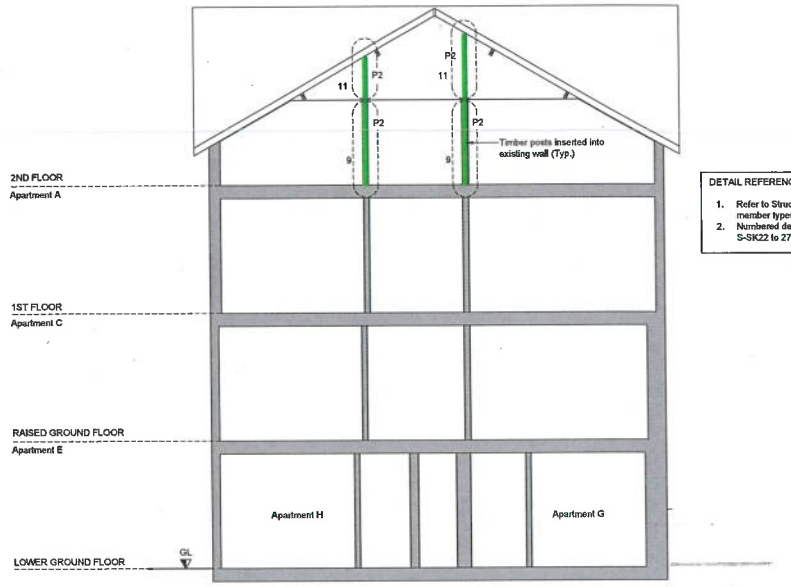
All dimensions are in mm unless otherwise specified.

The contractor is responsible for the stability of the building and adjoining structures during construction and shall design, install, adapt and maintain all necessary propping and temporary works. A method statement for the temporary works must be submitted to the contractor administrator for comment before work begins.



DETAIL REFERENCE NOTES
1. Refer to Structural drawing for member types and sizes
2. Numbered details are shown on S-SK22 to 27

SECTION A-A
SCALE 1:100



DETAIL REFERENCE NOTES
1. Refer to Structural drawing for member types and sizes
2. Numbered details are shown on S-SK22 to 27

SECTION B-B
SCALE 1:100

EXISTING FLOOR PLANS, ROOF PLAN AND SECTIONS ARE SHOWN INDICATIVELY. ALL DIMENSIONS AND POSITION OF PROPOSED STRUCTURAL ELEMENTS TO BE CONFIRMED ON SITE.

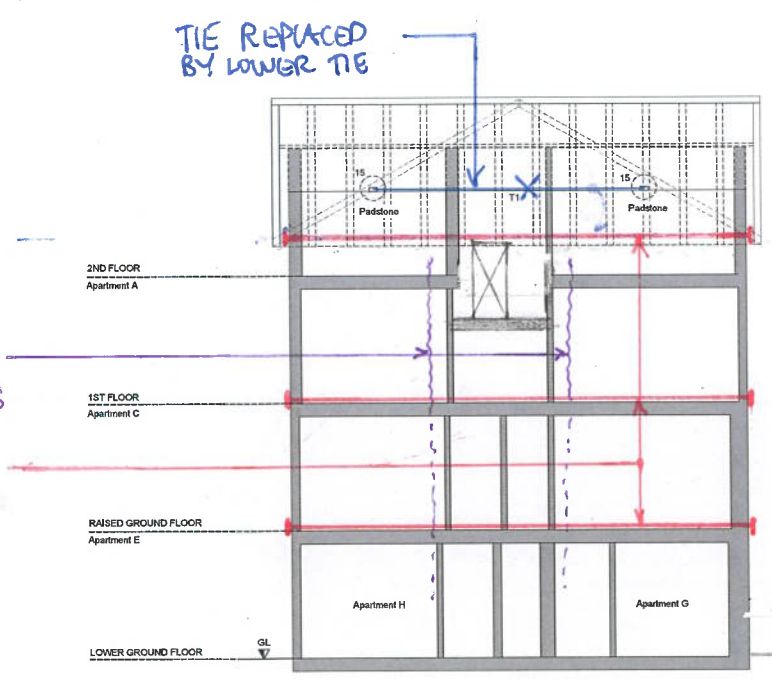
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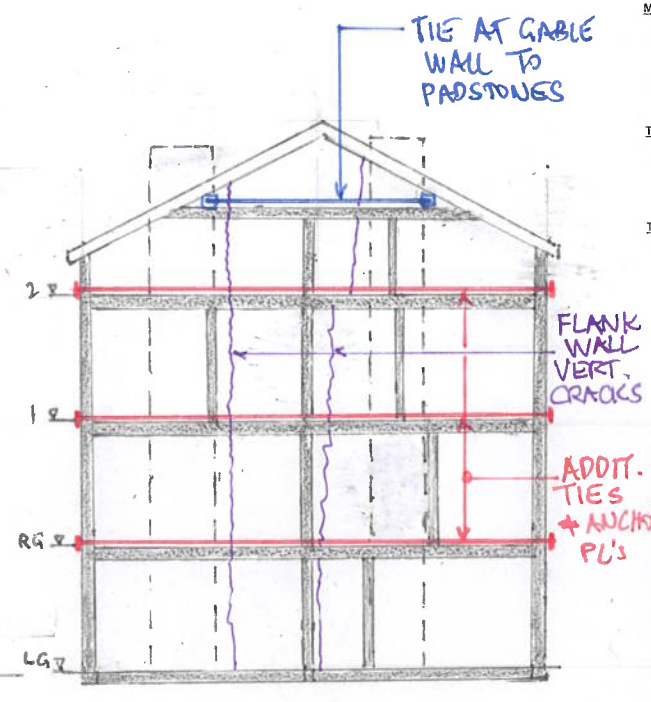
iii) Corrosion Protection:
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Primer: ALKYD 80mm
Top Coat: ALKYD 80mm

1. Timber Members:
i) Grade C24
ii) Sections:
- P2 - 100x100 Post

2. Purlins to Gable wall (south facade):
Prop to needles in wall, repair brickwork and place padstone, then pack to support purlin. (4No. Purlins)



SECTION C-C
SCALE 1:100



SECTION D-D

MASONRY NOTES
1. Brickwork shall be in accordance with BS5628
2. Mortar to be type (iii)
3. Replacement bricks to be same or better properties than existing

TIMBER NOTES
1. Timber shall be in accordance with BS5268
2. Refer to further notes in structural drawings

TEMPORARY WORKS
1. The contractor is responsible for the stability of the building and adjoining structures during construction and shall design, install, adapt and maintain all necessary propping and temporary works. A method statement for the temporary works must be submitted to the contractor administrator for comment before work begins.
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Maintain c.50mm concrete cover to all steel reinforcement (40mm min.)

Concrete to be fully compacted using mechanical vibration.

The temperature at the time of placing concrete must not be less than 5°C and rising.

Concrete surfaces to be protected with polythene sheeting during specified curing period.

Reinforcement to be clean and free of corrosive pitting, loose rust, ice and substances which may adversely affect the reinforcement bonding to the concrete.

Mesh to be supported on proprietary spacers to maintain a min. of 40mm cover to reinforcement.

REF. S-SK32 FOR TIE DETAILS

STEEL NOTES

All Structural Engineering drawings are to be read with all the relevant construction drawings and specifications.

All materials to comply with the relevant British Standard.

The contractor must allow for tolerance in fabrication and provide all shimming and packing necessary to obtain the correct levels shown on the drawings.

The contractor will be responsible for ensuring that steelwork installed fulfills the design brief and no changes to specification should be made unless expressly instructed by the CA.

All hot rolled steel to be grade S275 J0 or S355 (hollow sections) in accordance with BSEN 10 025.

All welding to be in accordance with BS 5153. Minimum fillet weld to be 6mm. All butt welds should be 'full penetration'. All fillet welds to have 6mm min. leg length, unless noted otherwise.

All bolting to be carried out using grade 8.8 bolts in 2mm clearance holes unless otherwise noted.

All dimensions to be checked on site by the Contractor prior to fabrication and erection of the steelwork.

A minimum of 150mm bearing must be given to steel beams, unless noted on drawings.

External and internal steelwork to be galvanised to BS EN ISO 1461, to receive a min mean coating thickness of 140 micrometers. Preparation: Blast clean to BS EN ISO 8501-1, Prep' grade SA 2.5 followed by chemical cleaning.

All bolted connections are to include a minimum of two M16 bolts per member unless specifically indicated otherwise on details. All bolts are to be grade 8.8 sheradized to BS 4921, class 1. All bolts, nuts and washers are to be to BS 5950 Part 2 clause 2.2. Washers are to be placed beneath the rotated item.

Steelwork fabricated to BS EN 1090-2 (and BS 5950-2001) to special tolerances Appendix B.

Fabrication drawings of steelwork shall be submitted for approval 3 weeks prior to commencement of fabrication.

Drawings shall include general arrangement and detail drawings including all connections.

Mill certifiates shall be included in the submission.

BUILDING TIES FOR CRACK CONTROL
SECTIONS M.L.
S-SK31 21.11.22
PRELIMINARY

Rev	Date	Amendment	By
T1	28.06.22	Tender Issue	MO
P1	10.06.22	Preliminary Issue	MO

Revisions

Drawing Status
TENDER

Project and Building Consultancy
Cluttons LLP, First Floor, 7400 The Quorum, Alec Issigonis Way, Oxford Business Park, Oxford, OX4 2JZ
Tel No: 01865 728000
www.cluttons.com

Project
Structural Design
53 Warminster Road
London SE25 4DQ

Client
Addington Capital

Drawing
Proposed Structural Works Sections

Drawn By MO Checked By ML
Scale 1:100 @ A1 Status S01

Project	Originator	Funct.	Spat.	Form Descl.	Number	Rev
27266-CLT-	XX-	ZZ-	D-	S-	00201-	T01

CLUTTONS

O:\Department Jobs\2RIO\Jobs\27266 Ms. Vanice London Surveys (BS)\03 Warminster Rd\02 Drawings\Warminster 27266-CLT-XX-ZZ-D-S.dwg 29/06/2022 Mihaela Ortega

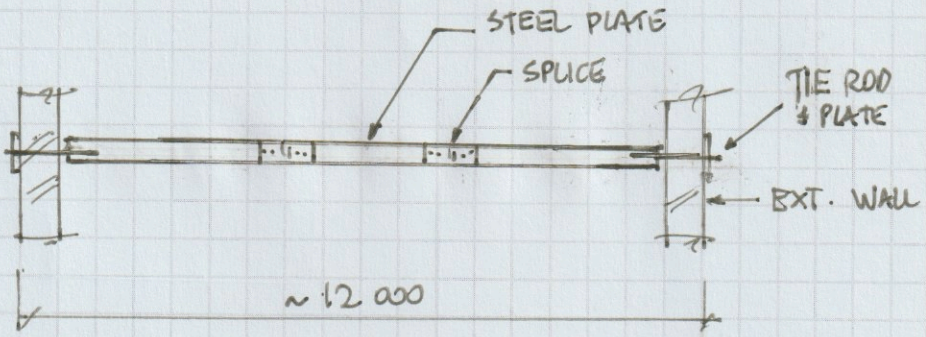
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Job No.	27266
By	ML
Date	22.11.22
Sheet	S-SK32

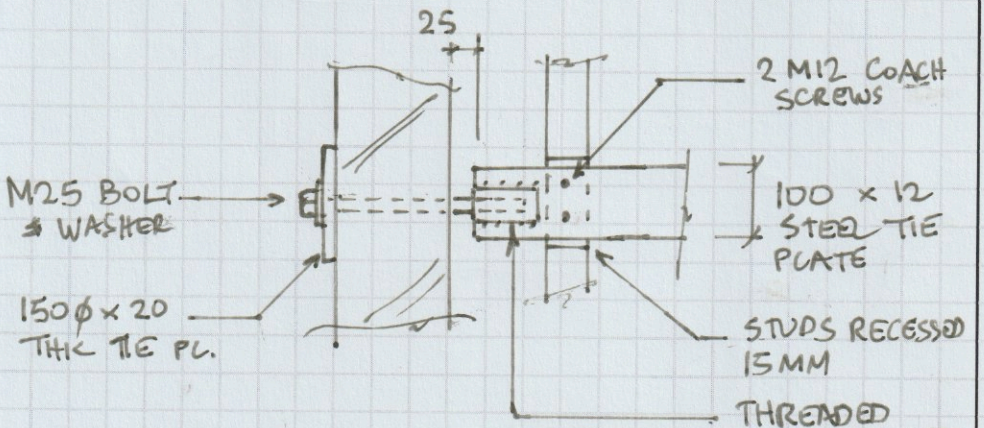
Project: 53 WARMINSTER RD, LONDON SE25

BUILDING TIE DETAILS

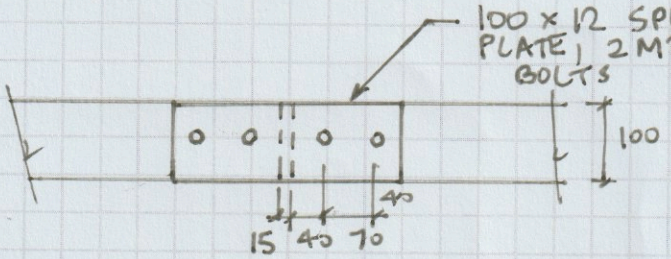
Typical tie across full width of building:



PLAN: TIE PLATE AT FLOOR LEVEL



TIE PLAN DETAIL EXT. WALL



TIE SPLICE DETAIL

NOTES

1. STEELWORK SHALL COMPLY WITH BS 5950 AND NSSS (SPEC")
2. TIE BOLT AND PLATE TO BE HOT DIP GALV", SOCKET TO BE PAINTED WITH GALVAFROID

← SCREWS TO END STUDS & EVERY SECOND FLOOR STUD

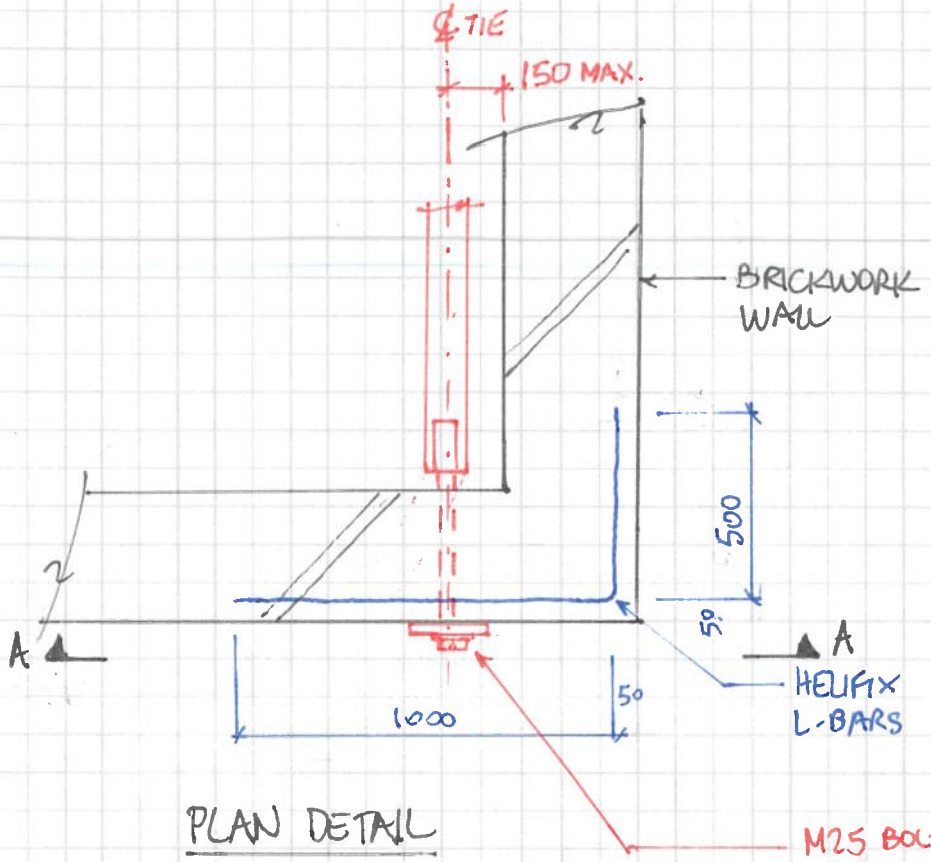
← FLOOR BOARDS TRIMMED AROUND SPLICE PLATE, EXTRA NOGGINS IF REQ'D FOR FLOOR BOARD SUPPORT.

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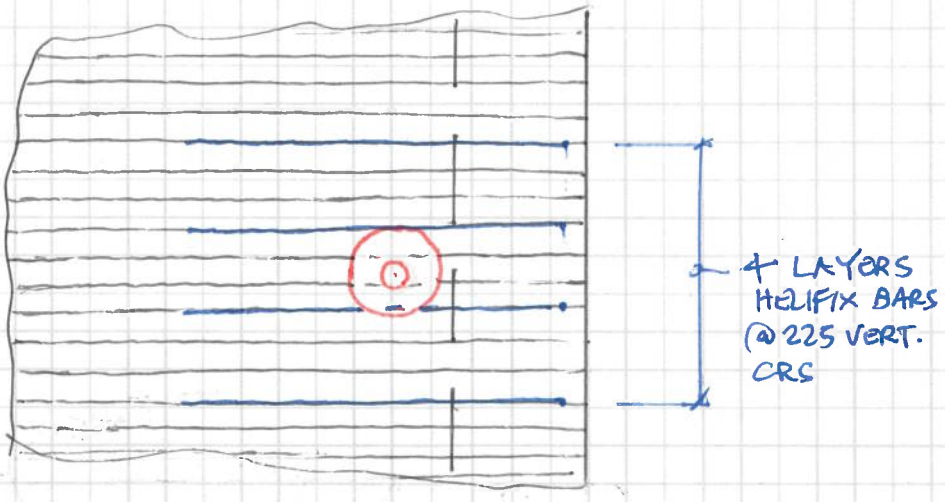
Job No.	27266-03
By	ML
Date	5.12.22
Sheet	S-SK33

Project: 53 WARMINSTER RD, LONDON SE25

TIE DETAILS AT BUILDING CORNERS



PLAN DETAIL



SECTION A-A

NOTES

1. REFER TO S-SK30 FOR TIE LOCATIONS

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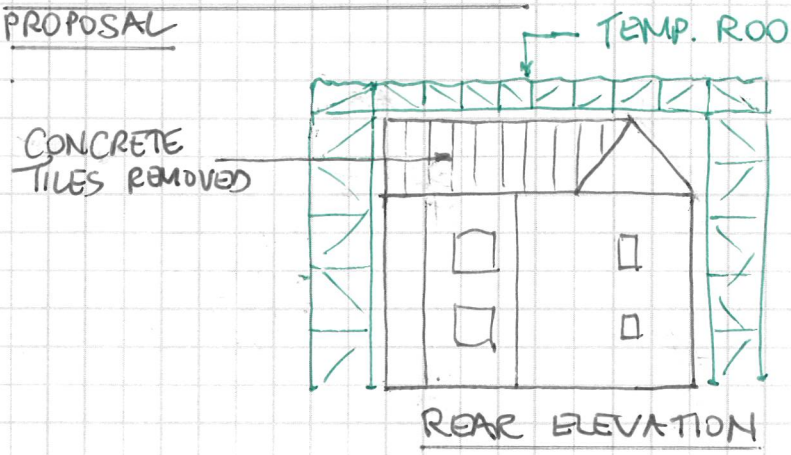
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By	ML
Date	7.12.22
Sheet	S-SK34

Project: 53 WARMINSTER RD, LONDON SE25 4DQ

PRELIMINARY: FOR DISCUSSION

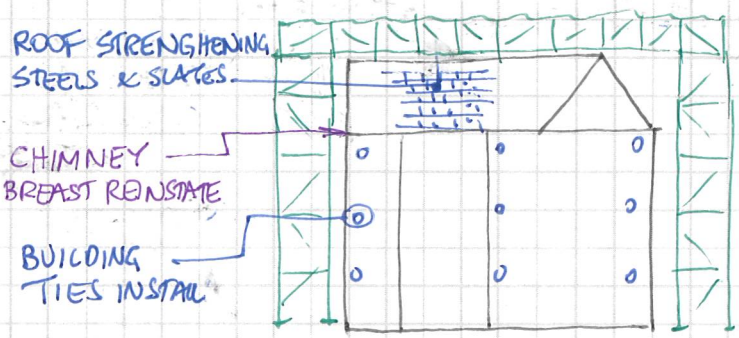
OUTLINE CONSTRUCTION STAGES PROPOSAL

STAGE #

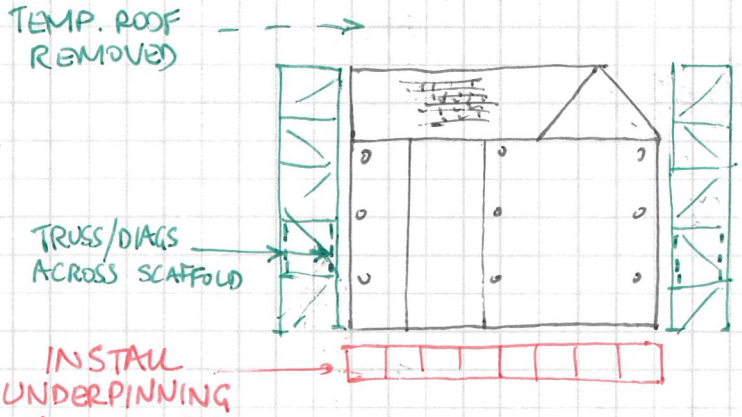


REAR ELEVATION

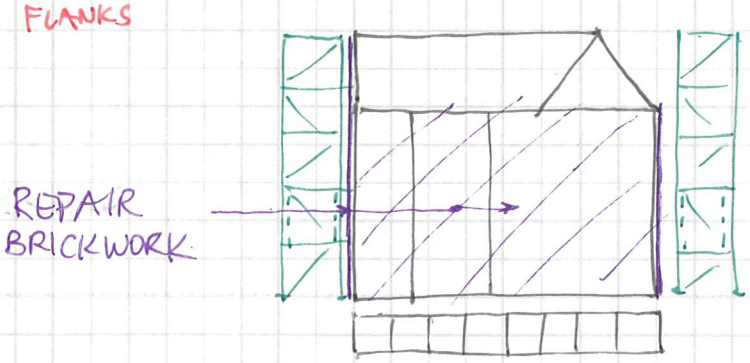
① STRIP BACK



② ROOF WORKS & BUILDING TIES



③ UNDERPINNING



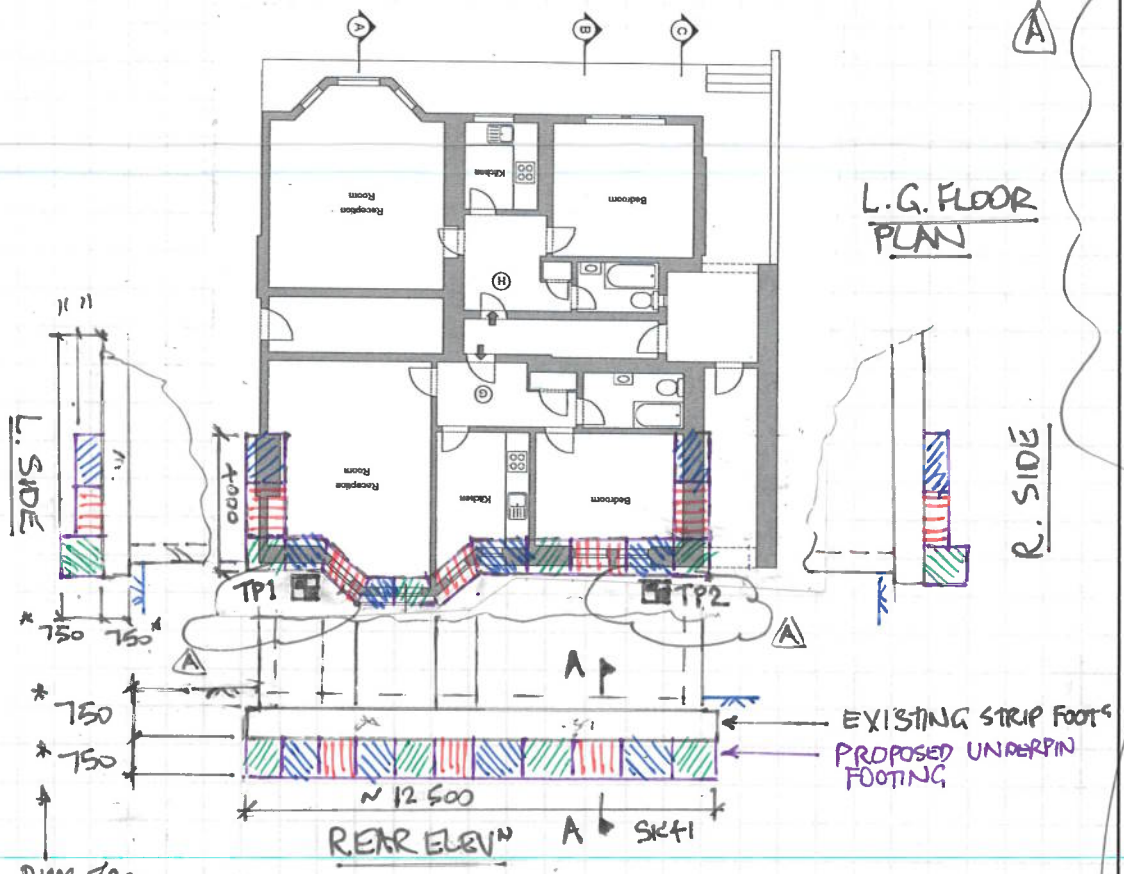
④ BRICKWORK REPAIR

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Job No.	27266
By	ML
Date	22.11.22
Sheet	S-SK40 - A

Project: 53 WARMINSTER RD, LONDON SE25 4DQ

PROPOSED FOUNDATION UNDERPINNING
REAR WALL & RETURNS



UNDERPINNING SEQUENCE DIAGRAM

REV. A: TRIAL PITS ADDED. 5.12.22

NOTES FOR TRIAL PITS
1. SIZE: 900 x 900 PLAN DEPTH TO U/S EXIST. FOOTINGS (MAX 1.2m)
2. SCAN FOR EXIST. SERVICES PRIOR EXCAV.
3. USE HAND-HELD EQUIPMENT TO MINIMIZE IMPACT
4. NOTIFY ENGINEER FOR INSPECTION PRIOR TO BACKFILLING

1
2
3

U/PIN SEQUENCE GROUPS

NOTES (CONT'D)
5. UNDERTAKE TPs PRIOR TO UNDERPINNING, IN ORDER TO PROVIDE DEPTHS OF UNDERPIN CONCRETE

NOTES

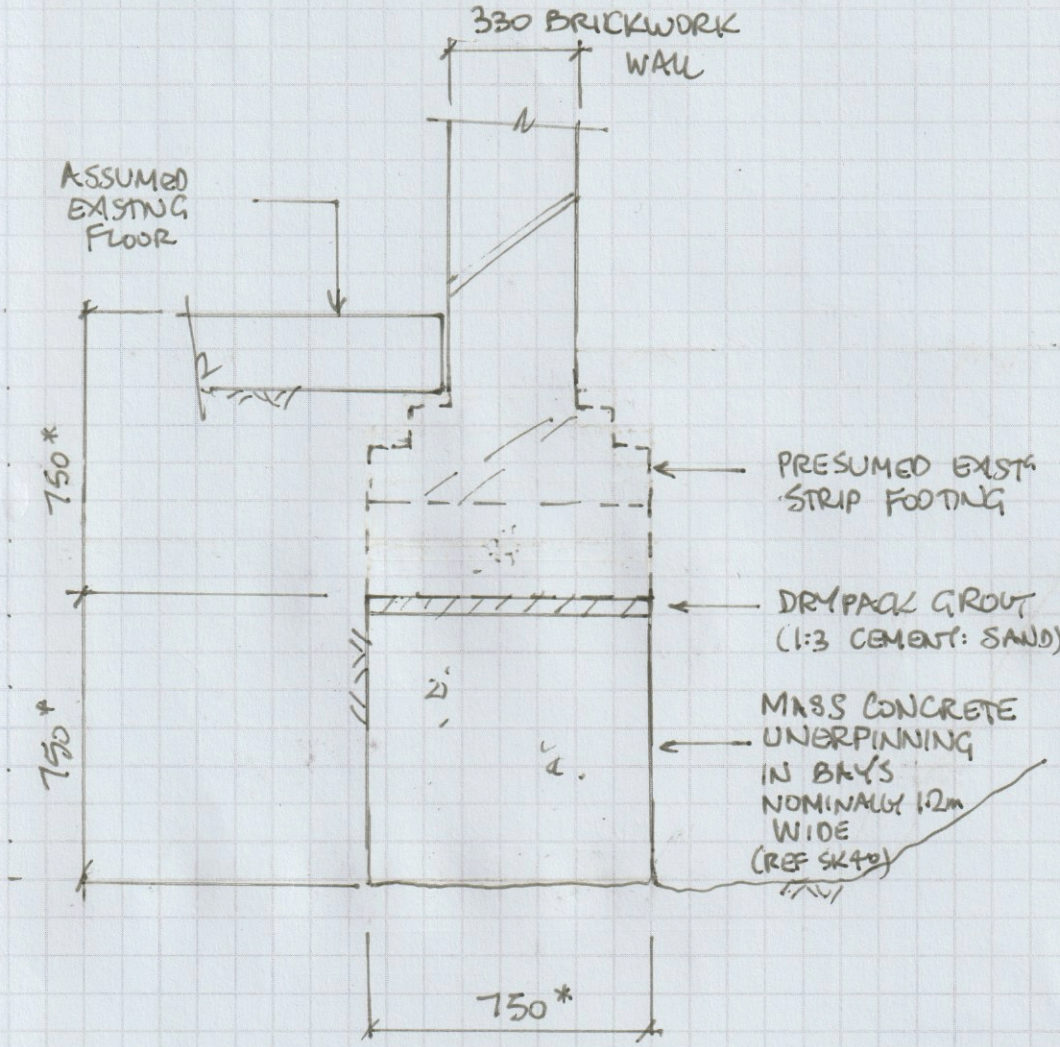
1. UNDERPINNING OF REAR BRICKWORK WALL IS REQUIRED DUE TO SETTLEMENT AT REAR, RECORDED DURING BUILDING MOVEMENT MONITORING AND CRACK WIDTH MONITORING IN 2022
2. TRIAL PITS ARE REQUIRED TO BE DUG ADJACENT TO BOTH ENDS OF THE REAR WALL, BEFORE EXCAVATION STARTS. THESE ARE TO DETERMINE CURRENT FOUNDATION SIZES AND REQUIRED UNDERPINNING DEPTH
3. UNDERPINNING SHALL FOLLOW THE SEQUENCE OF GROUPS OUTLINED ABOVE
4. THE CONTRACTOR SHALL SUBMIT THEIR DETAILED METHOD STATEMENT TWO WEEKS PRIOR TO COMMENCING WORKS THE METHOD STATEMENT SHALL BE SPECIFIC TO THIS SITE.

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Job No.	27266
By	ML
Date	22.11.22
Sheet	S-SK41

Project: 53 WARMINSTER RD, LONDON SE25

UNDERPINNING : TYPICAL SECTION



SECTION A-A

(REF. SK40)

NOTES

1. CONCRETE MATERIALS & WORKS SHALL BE TO BS8110
2. CONCRETE UNDERPINNING SHALL BE GRADE C25/30
3. CONCRETE SHALL BE CURED FOR 4 DAYS AND REACH 15MPa BEFORE COMMENCING NEXT SEQUENCE GROUP.

* DIMENSIONS ARE ASSUMED, TBC BY TRIAL PIT(S) BEFORE COMMENCING WORKS

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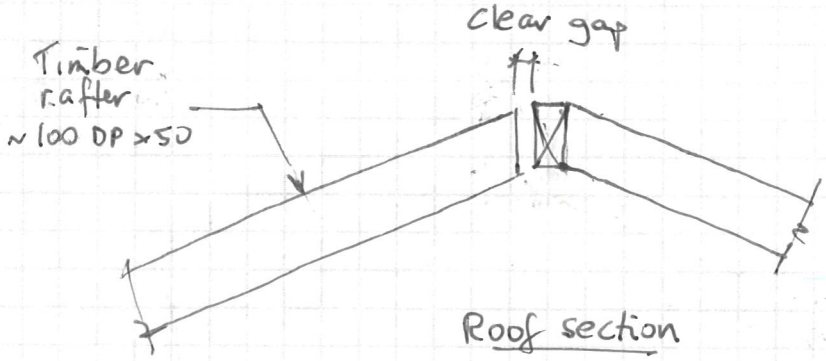
Job No.	27266.03
By	ML
Date	9.12.22
Sheet	S-SK50

Project: 53 WARMINSTER RD, LONDON SE25

RAFTER SPLICE

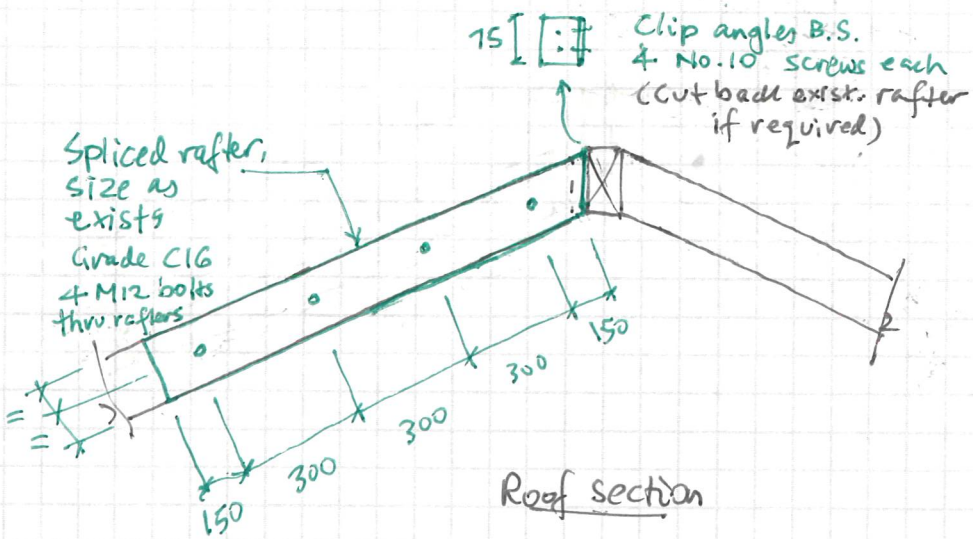
For pitch roof rafters separated from ridge board.

Existing



Roof section

Splice Repair



Roof section

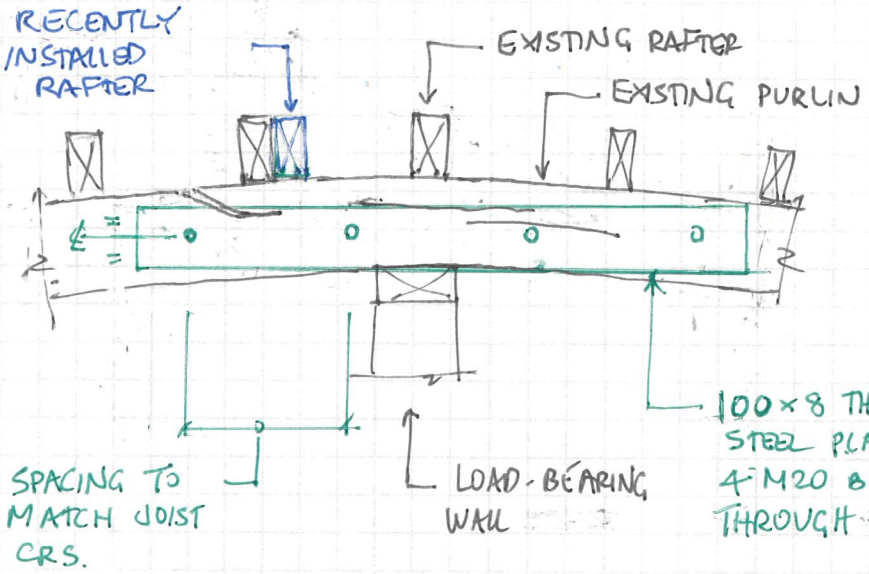
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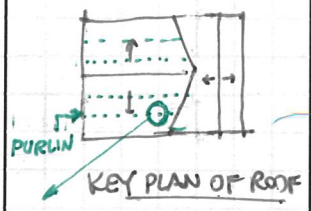
Project: 53 WARMINSTER RD, LONDON SE25

Job No.	27266.03
By	ML
Date	9.12.22
Sheet	S-SK51

PURLIN STREGTHENING

For roof purlin over supporting wall, where split (rear of shallow pitched roof)





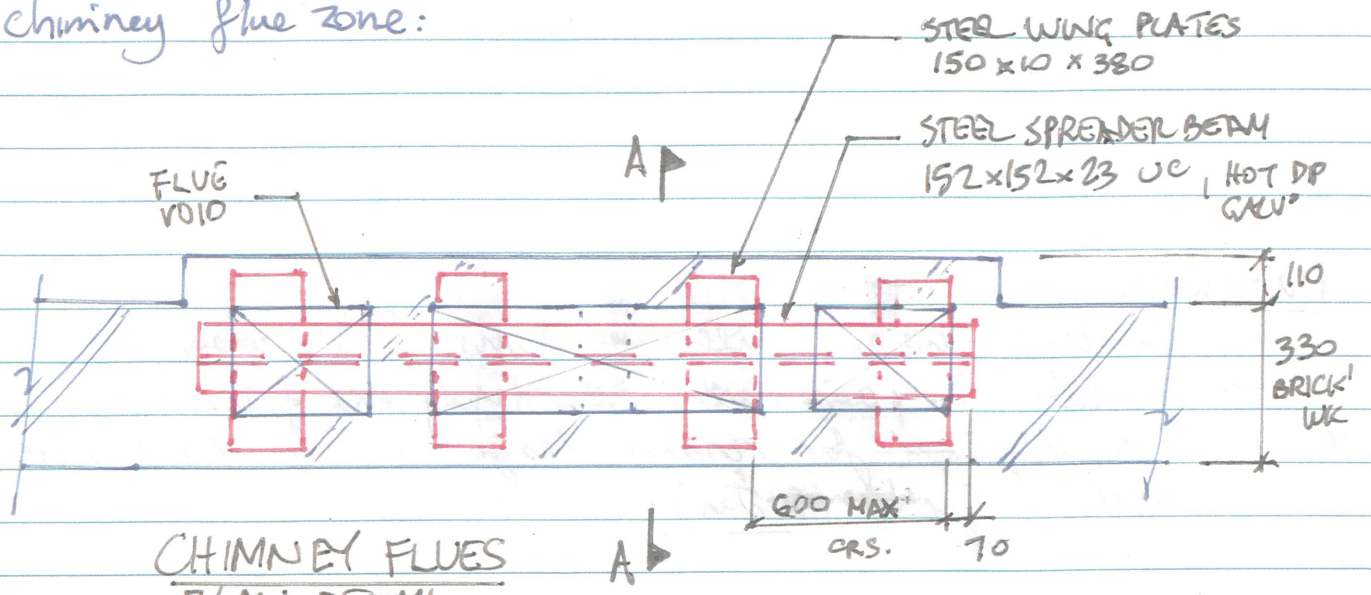
← SITE MEASURE BOLT LOCATIONS FOR SECOND PLATE HOLE DRILLING (22ϕ HOLES)

S-SK52 ML
12/01/23

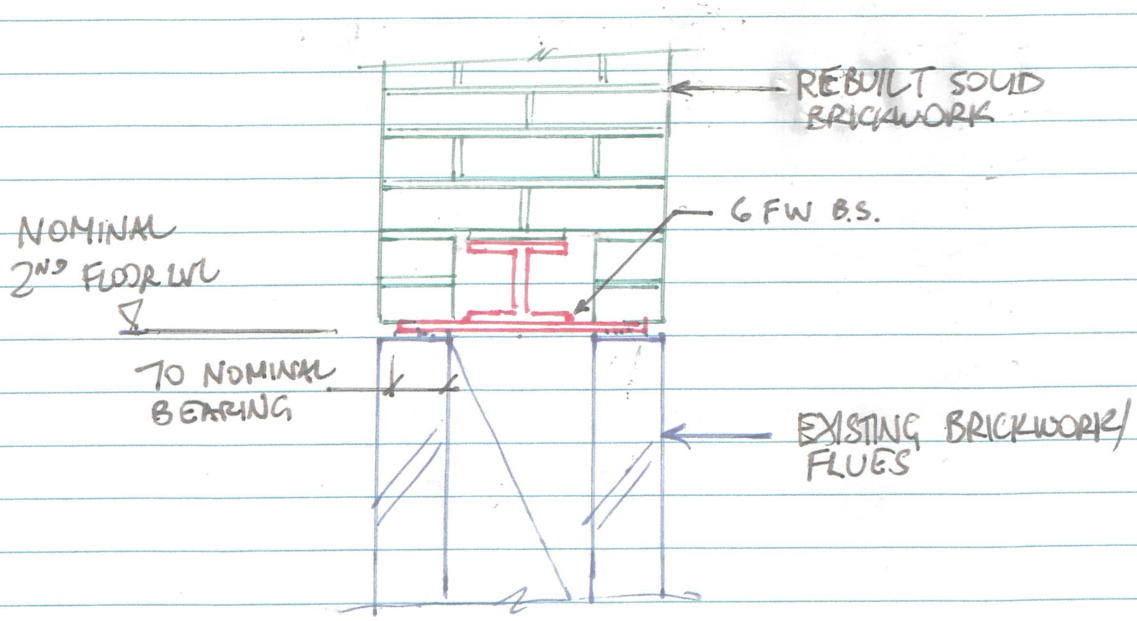
53 WARMINSTER RD.
LONDON SE25

CHIMNEY FLUES - SUPPORT BEAM

For support of brickwork re-built above cut-down chimney flue zone:



CHIMNEY FLUES
PLAN DETAIL



SECTION A-A

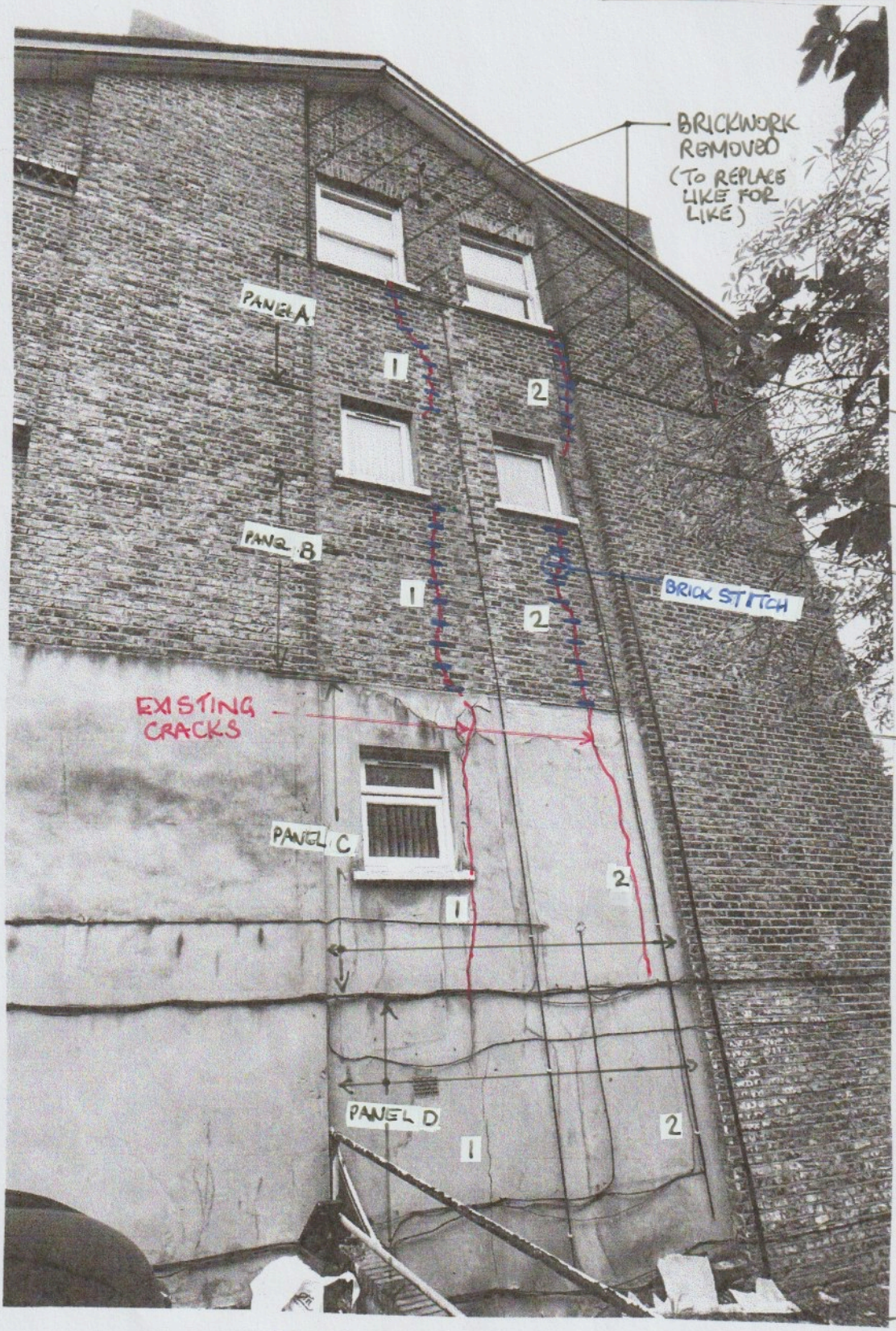
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Project: 53 WARMINSTER RD, LONDON SE25

Job No.	27266.03
By	M.L.
Date	22.2.23
Sheet	S-SK53

SOUTH FLANK WALL BRICKWORK REPAIR EXTENT

NOTE: HYDRAULIC LIME MORTAR FOR CRACK FILLING & NEW BRICKWK PER NOTE 3.



SOUTH ELEVATION

NOTES
1. SCOPE OF REPAIR SHOWN BELOW
2. DETAILS ON S-SK54
3. FILL ALL CRACKS WITH MORTAR NHL 3.5: SAND AT 1:2 RATIO
4. REPAIR RENDER ON FULL AREA C&D TO MATCH ORIGINAL
5. REUSE EXIST' BRICKS IF POSSIBLE

	CRACK No.	BRICK STITCH?	HELIFIX BARS?
A	1 & 2	YES	YES
	1 & 2	1	1
B	1 & 2	YES	YES
C	1 & 2	NO	YES
D	1 & 2	NO	NO

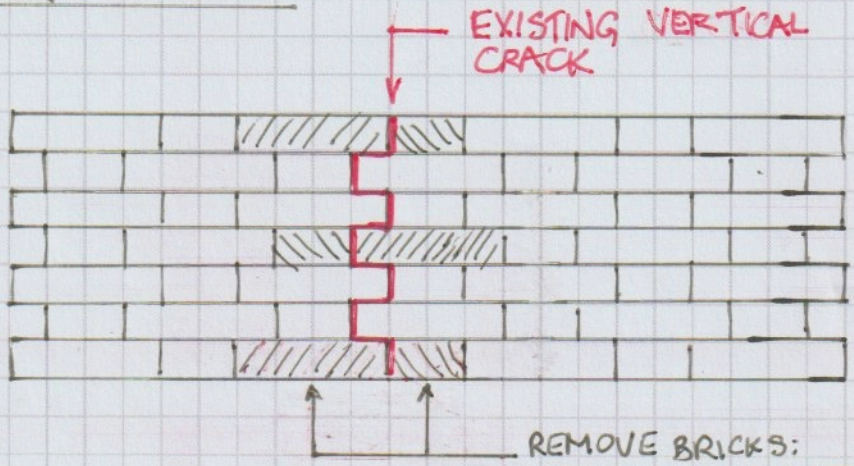
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Project: 53 WARMINSTER RD, LONDON SE25

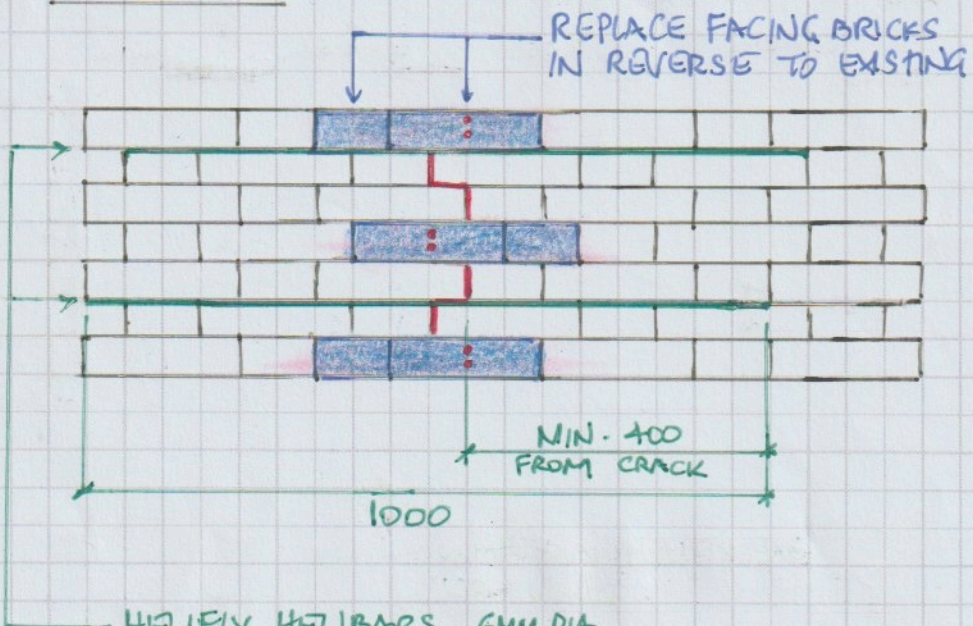
Job No.	27266.03
By	M.L.
Date	22.2.23
Sheet	S-SK54

CRACK REPAIR AT BRICKWORK FLANK WALL

1. EXISTING BRICKWORK AT CRACK LOCATION



2. BRICK STITCH & HELIFIX REPAIR



NOTES

1. REFER TO S.SK53 FOR LOCATIONS REQUIRING CRACK REPAIR AS PER THIS SHEET

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Job No.	27266.03
By	ML
Date	3.7.23
Sheet	S-SK55

Project: 53 WARMINSTER RD, LONDON SE25

REAR ELEVATION – HELIFIX BAR LOCATIONS



REF. SK57

NOTES

1. PLACE HELIFIX BARS PER DETAILS ON S-SK54

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Job No.	27266.03
By	ML
Date	3.7.23
Sheet	S-SK56

Project: 53 WARMINSTER RD, LONDON SE25

REAR ELEVATION – HELIFIX BARS : A & B

A



B



ZONE AT PASSAGE

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Job No.	27266.03
By	ML
Date	3.7.23
Sheet	S-SK57

Project: 53 WARMINSTER RD, LONDON SE25

REAR ELEVATION – HELIFIX BARS: C & D

C



L.G. LEVEL BAY

D



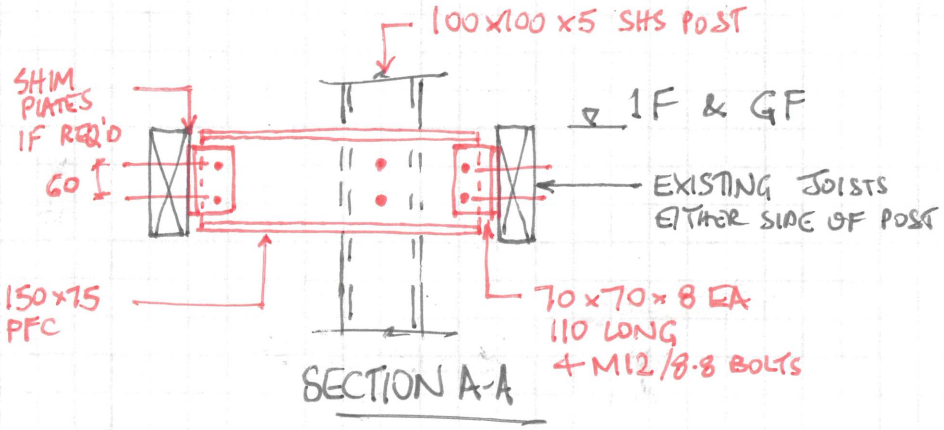
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Project: 53 WARMINSTER RD, LONDON SE25

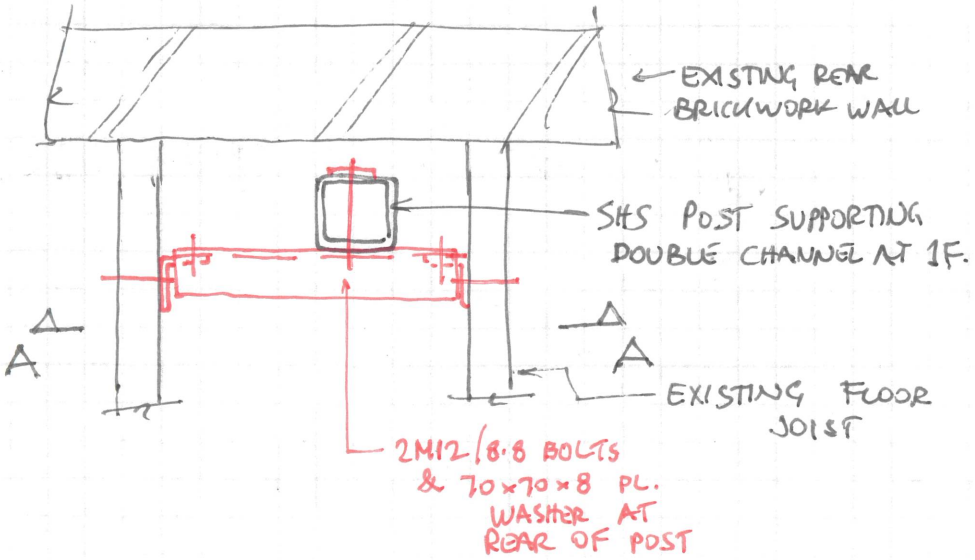
Job No.	27266.03
By	ML
Date	6.4.23
Sheet	S-SK60

STEEL POSTS – RESTRAINT DETAIL

For steel posts supporting first floor double channel beam, in lieu of detail on sheet no. S-00235:



SECTION A-A



PLAN DETAIL

NOTES

1. STEELWORK SHALL COMPLY WITH BS 5950 AND NSSS
2. CORROSION PROT° AS PER POST.
3. ALL HOLES TO BE DRILLED (18Ø NOMINAL)

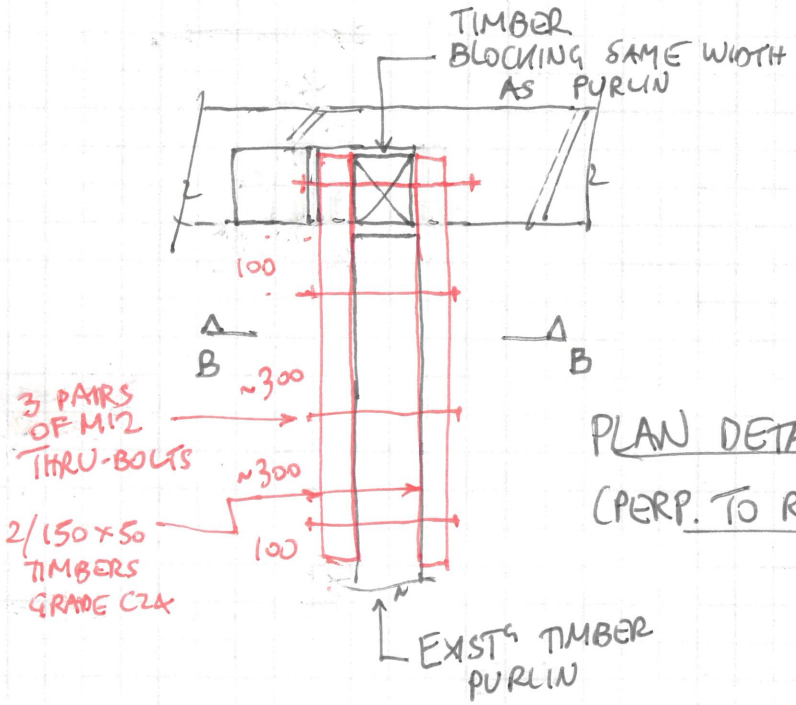
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Job No.	27266.03
By	ML
Date	6.K.23
Sheet	S-SK61

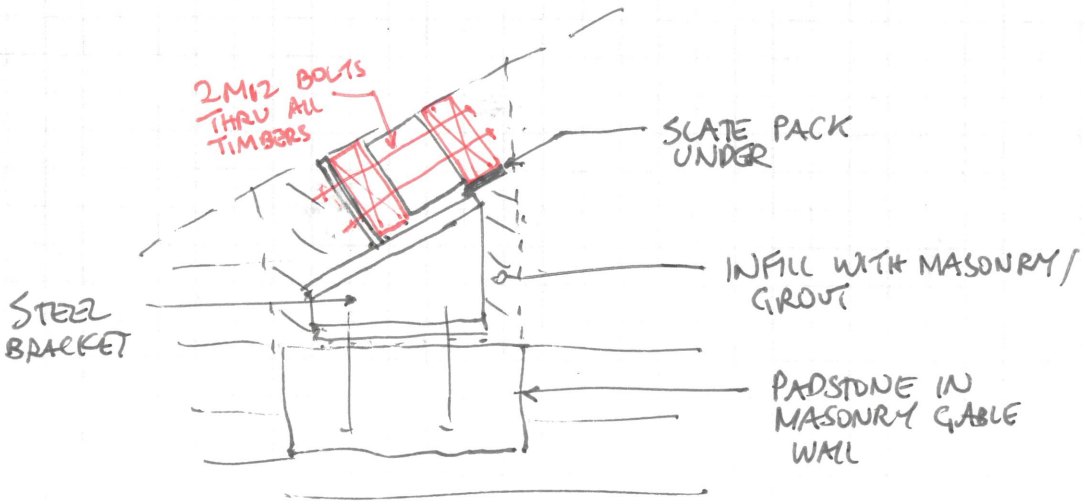
Project: 53 WARMINSTER RD, LONDON SE25

ROOF PURLIN EXTENSION

For timber roof purlin that no longer extends to south gable wall.



PLAN DETAIL
(PERP. TO ROOF SLOPE)



SECTION B-B (REF. S-00251 DET. 13)

APPENDIX 6

Site inspection photographs

Site Inspection: 4th October 2022



1 Flank wall upper central, two vertical cracks



2 Flank wall lower central, underground tank at RHS



3 Flank wall chimney breast, increased bulge at top

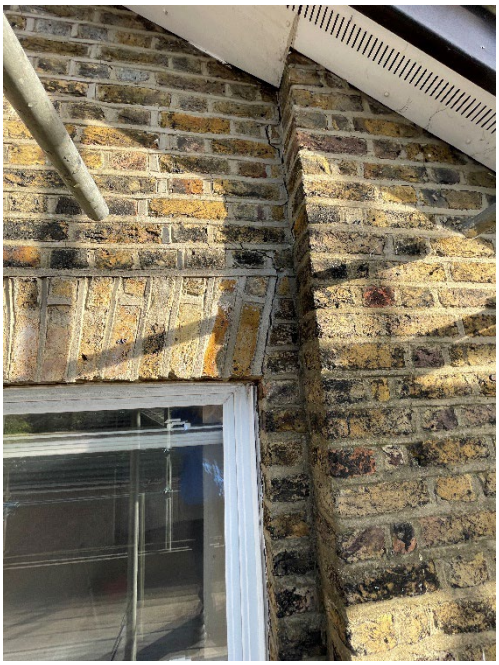


4 Aisle at rear, differential settlement

Site Inspection: 25th October 2022



5 Chimney bulge at second floor, flank wall



6 Wall cracking adjacent to chimney breast



7 Existing concrete roof tiles



8 Rear façade, with historic movement reflected in string courses (4th October)

Site Inspection: 14th November 2022



9 Tiles removed from rear of pitched roof



10 Typical existing concrete roof tiles



11 Temporary restraint installed at bulge in chimney breast



12 Exposed timber beams over rear bay window at ground floor (flat F)

Site Inspection: 6th December 2022



13 Roof stripped back to rafters, showing permanent sag in purlins from past roof loading



14 Rafters unsupported at ridge, requiring splicing

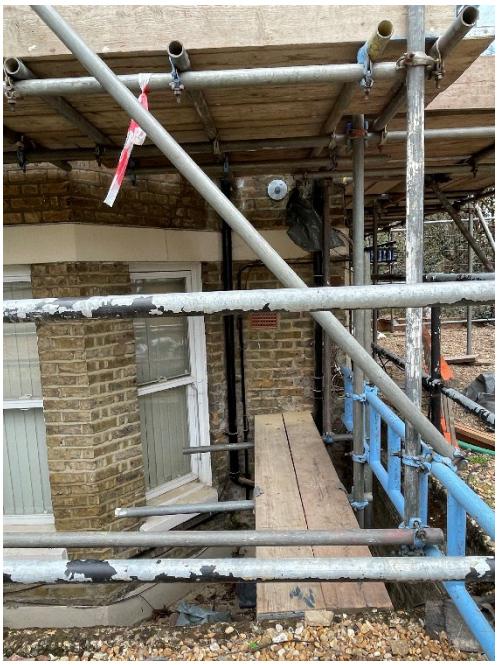


15 Purlin bent over stiff wall support beneath



16 Cracking in purlin at support, requiring strengthening with steel plates

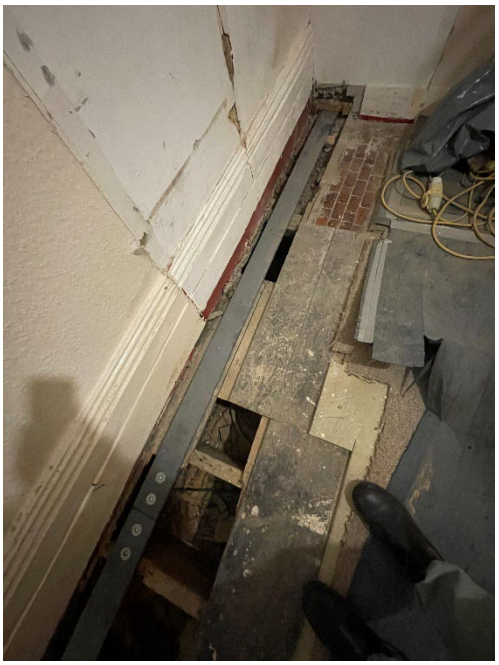
Site Inspection: 21st February 2023



17 Steel tie rod through front wall at first floor (visible above painted string course)



18 Detail of steel tie rod and disk



19 Internal steel plate across first floor in floorboard zone, connected to external rod. Tie carries through to rear external wall.



20 Transition detail from external steel rod to internal plate

Site Inspection: 21st February 2023 (cont'd)



21 Existing Bressumer (beam) over rear bay window



22 Cracked pier brickwork supporting Bressumer



23 New steel beam (double channel) spanning between load-bearing wall and steel post beyond bay zone



24 Steel beam ready for padstone installation

Site Inspection: 5th April 2023



25 Roof strengthening steelwork in place



26 Detail of tied steel truss



27 Flank wall brickwork repair, showing Helifix bar zones and rebuilt brickwork at crack location



28 Repaired brickwork at former crack adjacent to chimney breast

Site Inspection: 5th May 2023



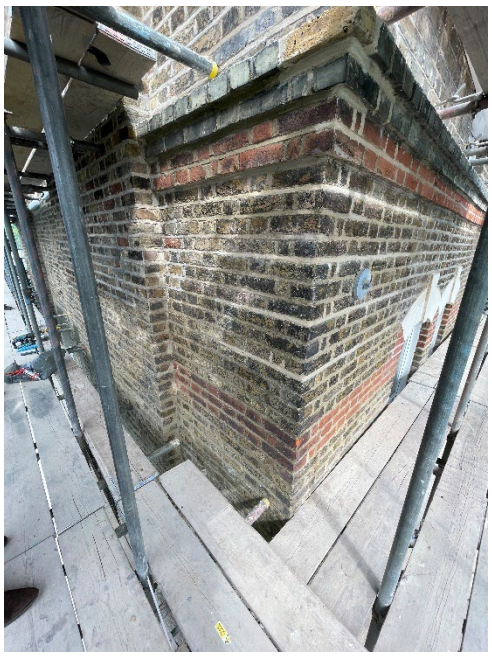
29 Slate roof installed



30 Slate thickness measurement confirming lighter roof loading



31 Rebuilt chimney breast to replace bulged portion



32 Helifix bars grouted in at tie bar locations

Site Inspection: 15th May 2023

	
33 Underpinning rear wall in segments 1.2m wide, hit 1 miss 2	34 Underpinning stepped up on return walls
	
35 Underpin at side of bay	36 Stepped brick footing on brick rubble (rubble removed) with underpin 1.0m deep beneath footing into London Clay

Site Inspection: 29th June 2023



37 Helifix bars specified at base of rear bay



38 Helifix also specified at support over rear aisle



39 Rear elevation, showing replacement slates and through-building ties and tie plates



40 Centre of rear facade, with historic differential settlement evident in string course

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