DEVISE ENGINEERS

CONSTRUCTION METHOD STATEMENT

109 GOLDHURST TERRACE, LONDON, W6 3HA

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Revision: PLANNING iii

1.0

APPOINTMENT & INTRODUCTION

1.1 Devise Engineers have been appointed by the Client as Structural Engineers for the structural design of the proposed basement conversion at 109 Goldhurst Terrance, in the London Borough of Camden.

1.2 This report is to outline a suitable method to construct the basement structure below the extent of the site, and is to be read in conjunction with the planning application information submitted by Eksalta and the Basement Impact Assessment (BIA) undertaken by Chelmer.

1.3 The report is based on the site investigation, BIA and Ground Movement Assessment (GMA) undertaken by Chelmer, as well as visual inspections undertaken and trial pits inspected by Devise Engineers.

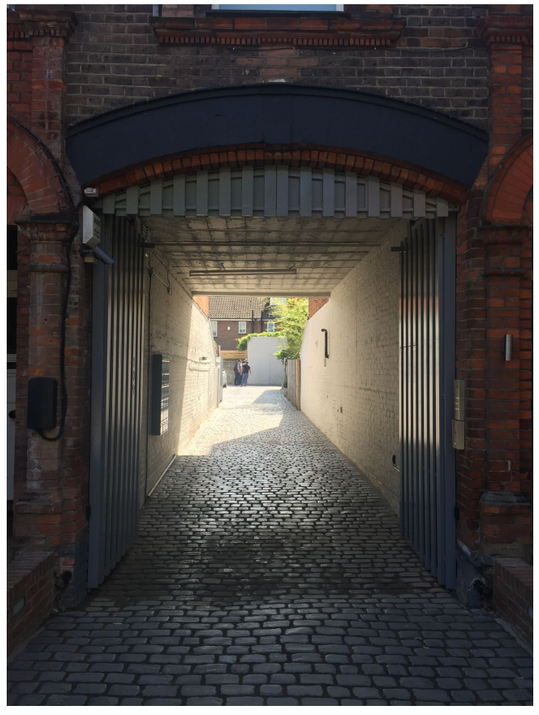
1.4 This report sets out the structural proposals and envisaged construction methods and sequencing to be undertaken by a competent building contractor.

2.0

EXISTING SITE & SURROUNDINGS

2.1 Devise visited site on 4th and 11th July 2015 to assess the existing building and overall site constraints.

2.2 109 Goldhurst Terrace is a detached two-storey dwelling located in the London Borough of Camden. The site is accessed via a gated entrance which forms part of a terrace property on Goldhurst Terrace and into a shared private road serving residential properties.



2.3 A car-port is present to the east of the house and a hardstanding courtyard to the south.

2.4 The surrounding area mainly consists of residential terraced properties. The site is bounded by properties on three sides, to the west, east and south, and by the shared private access road to the front (north).

SITE LOCATION PLAN

2.5 The west flank wall of the property bounds the garden to 111 Goldhurst Terrance and the west garden wall forms the boundary between the courtyard and the garden to 113 Goldhurst Terrace.

2.6 The party wall bounding the courtyard to the south, is the flank wall of 10d Fairhazel Gardens.

2.7 The boundary walls to the east of the site are party fence walls to 9, 11 and 13 Fairfax Place.

2.8 The London Overground line runs around 150m to the south of the site. The Jubilee and District London Underground lines are around 0.5km to north-east.

2.9 Regents canal is approximately 1.5km south east of the site. Chelmer's BIA outlines other historic surface water features in the vicinity of the site.

3.0

SITE HISTORY & GEOLOGY

3.1 The house is thought to have been constructed in the late 19th Century. The earliest historic London map for which Goldhurst Terrace is present is from 1886.

3.2 The World War II bomb maps show the property did not suffer bomb damage, though high-explosive bombs were recorded nearby in Fairhazel Gardens and Greencroft Gardens.

3.3 The British Geological Survey boreholes show the site site is underlain by London Clay. This has been confirmed by the site investigation carried out by Chelmer and the trial pits recorded by Devise Engineers, which show the existing shallow foundations generally bearing onto 'clayey made ground' above 'slightly sandy silty clay' over weathered London Clay formation.

3.4 Ground water seepage was encountered in one of the boreholes at 1.8m BGL with water being recorded at 1.28m BGL upon the final reading of the standpipe on 25th September 2015.

3.5 Seepage was also observed in one of the trial pits, TP7 at approximately 1.2m.

3.6 The results of the site investigation are recorded in greater detail in Chelmer's BIA.

4.0

EXISTING CONSTRUCTION

4.1 The building is a detached house, though the car-port roof bears onto the party walls to the properties along Fairfax Place. There are also beams which span over the rear courtyard onto the party wall with 10d Fairhazel Gardens.

4.2 Construction comprises solid 230mm thick load bearing masonry walls, bearing onto shallow corbelled masonry footings.

4.3 Internal walls are a mixture of loadbearing masonry and timber stud construction. The first floor and loft floors are in timber and span from front to back.

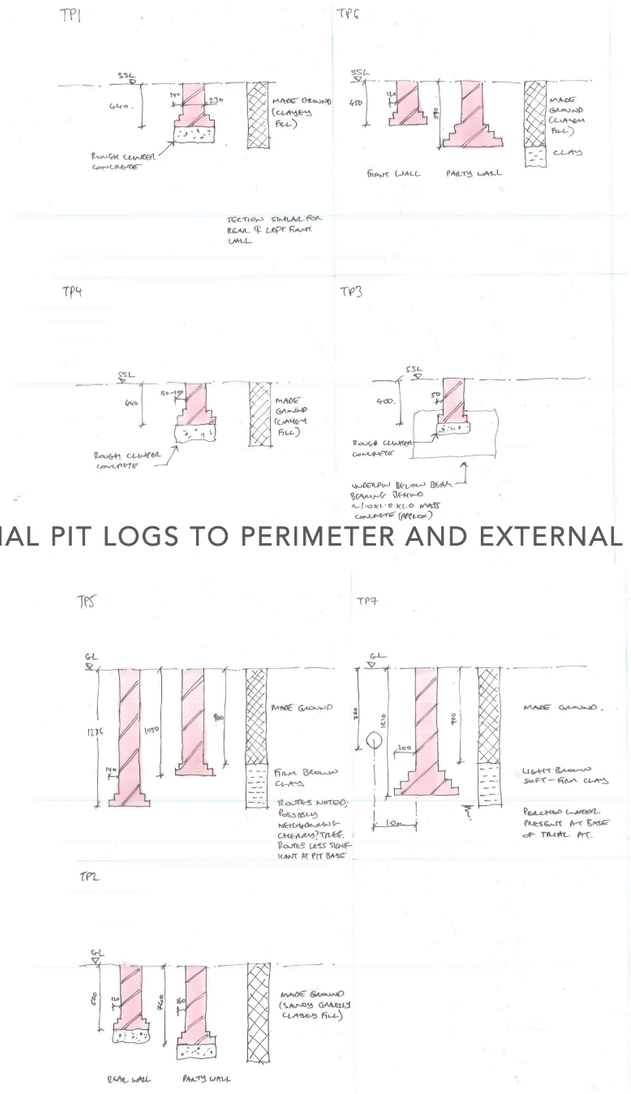
4.4 Steel beams have been installed more recently and span on to the internal masonry spine walls to support the first floor. The site investigation found the spine walls have been locally underpinned in mass concrete directly below the bearing of the beams.

4.5 The roof slopes on four sides; and currently relies on the internal stud walls and external walls for support.

4.6 The overall stability of the building relies on the cellular nature of the walls and floors.

4.7 Although the finishes have now been stripped back, the structure is in a good state of repair with no indication of significant movement.

4.8 The party/boundary walls to the adjacent properties bounding the site also appeared to be in good condition. However, any loose mortar should be raked out and repointed prior to commencing the basement works.



TRIAL PIT LOGS TO PERIMETER AND EXTERNAL WALLS

TRIAL PIT LOGS TO INTERNAL AND EXTERNAL WALLS

SITE LOCATION PLAN SHOWING TRIAL PITS

5.0

PROPOSED BASEMENT DESIGN & CONSTRUCTION

5.1 It is proposed to form a new basement below most of the site footprint. Along the south boundary, the proposed wall construction will be set back from the party wall with 10d Fairhazel Gardens.

5.2 The external walls of the existing building will generally be retained, though a full width opening in the rear wall at ground floor level is proposed.

5.3 Internally, the structure is to be remodelled throughout. The structure at each level will generally comprise new timber/concrete floors supported on steel beams.

5.4 Alterations to the roof are also proposed to make habitable use of the second floor.

5.5 The construction of the proposed basement will involve the following:

- mass concrete underpinning to the party fence (garden) walls to 9, 11 and 13 Fairfax Place and the party fence (garden) wall of 10d Fairhazel Gardens with a reinforced concrete lining wall
- reinforced concrete retaining walls to the party fence/flank wall to 111-113 Goldhurst Terrace.
- A contiguous piled retaining wall offset from the party wall with 10d Fairhazel Gardens with an RC liner wall

5.6 The thickened bases of the RC walls will form a continuous 800mm deep ground beam spanning between piles. A 300mm thick ground slab will span between the ground beams and will also be dowelled into the contiguous piled wall.

5.7 The piles will be designed for vertical gravity and uplift forces due to hydrostatic pressure.

5.8 Underpinning (both mass concrete and reinforced) will be carried out in a 'hit and miss' sequence and will be formed up to just below the underside of the existing foundations. The gap (circa 75mm) will then be well rammed with sand-cement dry pack. The details of any transitional underpinning of the part structures will be considered as part of the party wall process.

5.9 The reinforced concrete (RC) lining walls will be cast against the concrete underpins whilst propped.

5.10 All RC walls will be designed to resist the lateral forces due to earth pressure based on 'soil at rest' pressures, an appropriate surcharge load and hydrostatic pressure for the 'worst credible' ground water level (indicated to be at ground level within the BIA).

5.11 The contiguous piled wall will be designed to provide temporary support to the excavation during the temporary case, and vertical gravity and uplift forces in the permanent case.

5.12 The junction between the mass concrete underpins and RC liner walls will be separated by a slip membrane such as fibreboard which will provide a separation between the party wall and the basement structure to 109 Goldhurst Terrace. This will allow vertical movement between the two structures.

5.13 The proposed forms of construction in conjunction with the proposed sequencing and contractor designed temporary works, will be designed to ensure the structural stability of this and the neighbouring structures during construction. The works will be designed so as not inhibit the construction of similar basement works to the neighbouring buildings.

5.14 The effect of heave will be considered, which will cause an upward pressure on the new basement structure as a result of the relief of the overburden, following the excavation. This will be dealt with by the provision of a compressible heave protection beneath the slab and designing the slab and ground beams for the net upward forces.

5.15 Although some water was encountered within the borehole, this is thought to be within the granular lenses within the predominately clay strata. Where water is encountered during excavations, it can be dealt with by the use of submersible pumps and pumping into the surface water sewer.

5.16 Given the relatively impermeable ground conditions, ground water flows are not likely to be significant. Therefore, provided the contractor makes appropriate preparations, this should not adversely impact the construction of the proposed basement or any adjoining structures.

5.17 The structure as a whole is to be designed against upward pressures based on the 'worst credible' groundwater levels as indicated in the BIA.

5.18 The Contractor shall undertake the works in such a way as to minimise noise, dust and vibration when working close to adjoining buildings in order to protect the amenities of the nearby occupiers.

5.19 Excavation works will generally be carried out using hand tools in order to minimise noise and vibrations to neighbouring properties. Upon completion of the underpins, a mini-digger may be used to expedite the bulk excavation.

5.20 The breaking out of the existing structure shall be carried out by saw cutting where possible to minimise vibration to the adjacent properties and associated construction noise.

5.21 All demolition and excavation work will be undertaken in a carefully controlled sequence, taking into account the requirement to minimise vibration and noise.

5.22 The ground floor is to be constructed using steel beams supporting a reinforced concrete slab poured onto a profiled metal deck. The steel beams can be spliced and the metal deck can easily managed on site and forms a permanent formwork to the ground floor structure.

5.23 The ground floor will provide a prop to the top of the underpins thus minimising deflections and providing a robust construction.

5.24 It is envisaged that the RC walls and slab be constructed in waterproof concrete with waterstops at construction joints. This would form the primary barrier against water and would be detailed by the specialist supplier.

5.25 A drained cavity system will provide a secondary barrier against the ingress of water to ensure a Category 3 basement construction. This will be specified by others and detailed and installed by a specialist subcontractor.

6.0

DRAINAGE

6.1 The private drain serving the property runs behind the rear of the house and then along the side the flank wall before discharging into a private sewer within the shared access road at the front of the building. A rainwater pipe at the front also discharges into the private sewer via a manhole. The private sewer discharges into the mains sewer, which runs along in Goldhurst Terrace.

6.2 The proposed drainage system will be re-constructed within the proposed basement beneath the ground floor slab. Where possible gravity will be used to discharge the drain into the existing private sewer system.

6.3 Drainage from the w/c and ancillary space within the basement will be pumped up to discharge into the drainage system below ground floor level. It will then discharge into the existing private sewer at the front of the property. A non-return valve system to specialist's design will ensure water from the private sewer system cannot enter the basement during surcharge of the mains sewer.

6.4 A separate pump for the drained cavity system will be provided, to the waterproofing specialist's design. This will also be discharged into the private sewer.

6.5 Given the levels of part of the shared access road relative to the property, channel drains will be installed along the boundary of the carport. These will be designed with sufficient capacity to accommodate the run-off from a 'design' storm in order to mitigate against the risk of pluvial flooding.

7.0

PARTY WALL

7.1 The proposed works development falls within the scope of the Party Walls Act 1996. Procedures under the Act will be undertaken by the Owner's Party Wall Surveyor.

7.2 The Party Wall Surveyor will serve notices under the provisions of the Act and agree Party Wall Awards with the Adjoining Owners' Surveyors in the event of disputes.

7.3 The preparation of the Awards and the resolution of party wall matters will serve to protect the interests of both the Building Owner and all Adjoining Owners.

7.4 The Contractor will also be required to provide the Party Wall Surveyor with method statements and other necessary information covering all notifiable works.

7.5 The resolution of matters under the Act and provisions of the Party Wall Awards will protect the interests of all owners.

7.6 The proposed basement structure to 109 Goldhurst Terrace will be designed to mitigate as far as practicable movement caused to the adjoining properties. The future flexibility of adjacent buildings will be maintained by ensuring the proposed basement works will not inhibit future extension works. This will be verified by the Surveyors during the process under the Act.

8.0 MONITORING

8.1 The ground movement assessment undertaken as part of the BIA indicated the level of damage to the adjacent properties as Burland Category 0 'negligible' to each adjacent property except for the east wall of 10d & 10c Fairhazel Gardens where the damage category was stated to be Burland Category 1 'very slight'.

8.2 However, the Contractor shall provide monitoring to all structures adjacent to the basement excavation at the time of excavation and construction as outlined in the BIA.

8.3 The Contractor will be responsible for reviewing the movement monitoring and for providing appropriate measures to mitigate against movement, by provision of necessary temporary support. This is to be agreed with the party wall surveyors.

8.4 Monitoring shall be completed as follows:

i) One week prior to any works being started to provide a base reading.
Iii) On a weekly basis during the excavation and until all underpins and the basement slab has been cast.
ii) On a fortnightly basis until completion of the notifiable works.

8.5 Suggested trigger levels are noted below and relate to the cumulative movement of survey points:

Vertical Displacement:

Amber trigger level: +/-5mm

Red trigger level: +/-7mm

8.6 The requirements of the trigger levels are set out below:

Amber Trigger Level

Should the movement reach the amber trigger levels, the contractor should increase the frequency of readings as appropriate and outline to all parties their plan to implement any emergency remedial/supporting works necessary. The Contractor must be ready to carry out these works immediately if the movement continues and approaches the red trigger values.

Red Trigger Level

Works are to cease and be made safe by providing the necessary support/shoring. The Contractor is to ensure that the movement has stopped as a result of the remedial works installed. The structural engineer and party wall surveyors are to be informed immediately and the party wall surveyors should agree any additional precautions or modifications to the proposals prior to re-commencement of the works.

9.0

ENVISAGED METHOD OF CONSTRUCTION

9.1 The following outlines a sequence of works to construct the proposed basement below the existing property.

9.2 The works are to be carried out by a competent contractor, who can demonstrate experience in undertaking works of a similar scale.

9.3 This document will assist the Contractor in the preparation of their method statement. However, the Contractor is responsible for providing the actual method statement based on how they wish to programme and sequence the project and their temporary works design.

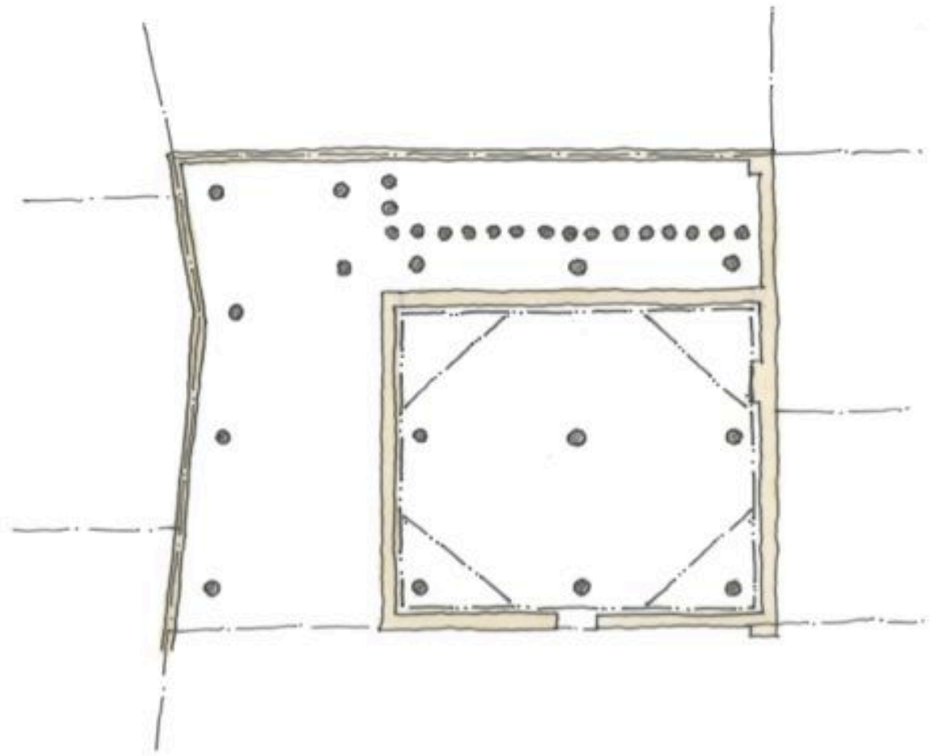
9.4 The sequence of works can be broken down as follows:

9.4.1 STAGE 1.0 – PRE-MOBILISING, SITE SET-UP & ENABLING WORKS

- Agree and sign Party Wall Awards with adjoining owners.
- Undertake services search and survey to confirm location of below ground service and identify those requiring rerouting or capping.
- Construct hoarding around front of property, following permission from freeholder.
- Provide site welfare.
- Strip out all non-loadbearing structure.
- Install timber bracing around window openings.
- Remove timber floors and roof and provide contractor design horizontal propping at each floor level.

9.4.2 STAGE 1.1 – PILE FROM GROUND LEVEL

- Remove all obstructions, install pile mat.
- Install piles and contiguous piled wall to rear of the site



STAGE 1 – TEMPORARY WALL RESTRAINT IN PLACE, PILE FROM GROUND LEVEL

9.4.3 STAGE 2.0 – UNDERPINNING

- Progress reinforced concrete underpins to front and right hand (party) wall in a hit and miss sequence, leaving each pin to cure 48 hours before dry packing up to underside of existing structure.
- Break down piles prior to casting of base.
- Continuity to be provided by bending bars into adjacent base prior to fixing reinforcement. Protruding ends of bars to be protected in temporary case.
- Provide necessary trench sheeting and shoring during excavation and prop.

9.4.4 STAGE 3.0 - INSTALL LONG SPAN BEAM IN REAR WALL AT FIRST FLOOR LEVEL

- Install contractor designed needling above first floor level and prop down to ground with necessary spreaders and brace.
- Break out rear wall at ground floor level and install columns.
- Install steel beam on columns bearing on to RC walls constructed in STAGE 2. Prop directly below at regular centres and brace.

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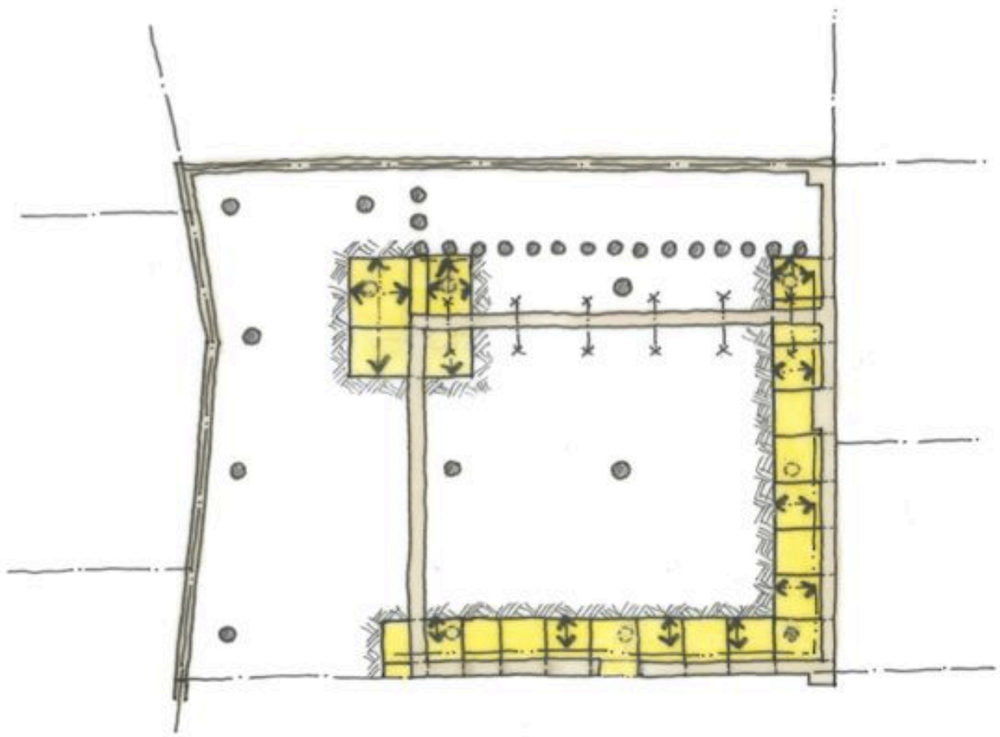


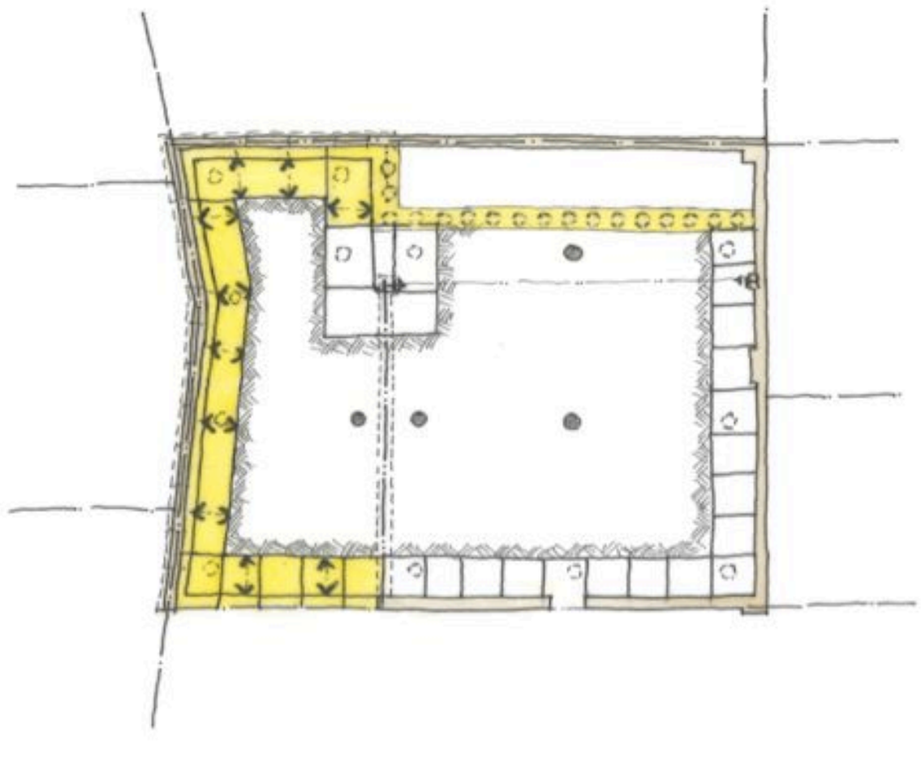
STAGE 2-3 – RC UNDERPINNING UNDERTAKEN AND PROPPED, NEEDLING TO REAR WALL IN PLACE FOR INSTALLATION OF FRAME AT FIRST FLOOR LEVEL

9.4.5 STAGE 4.0 – INSTALL BEAM AT GROUND FLOOR LEVEL ALONG LEFT HAND FLANK WALL

- Ensure sufficient shoring to excavations to front and rear underpins at left flank wall.
- Install needling above ground floor level along left hand flank wall.
- Install steel beam to form opening below flank wall bearing onto newly constructed RC walls at each end.

9.4.6 STAGE 5.0 – UNDERPIN REMAINING PERIMETER WALLS

- Underpin left and rear wall party walls in hit and miss sequence in mass concrete and prop each pin horizontally.
- Continue in traditional 5-stage hit and miss sequence.
- Form base and kicker for RC wall for length of rear then flank wall and cast up to face of mass concrete underpin behind slip membrane.
- Move prop to base of wall to enable upper 'stem' of retaining wall to be cast then prop.
- Install capping beam to piled wall prior to reduced dig



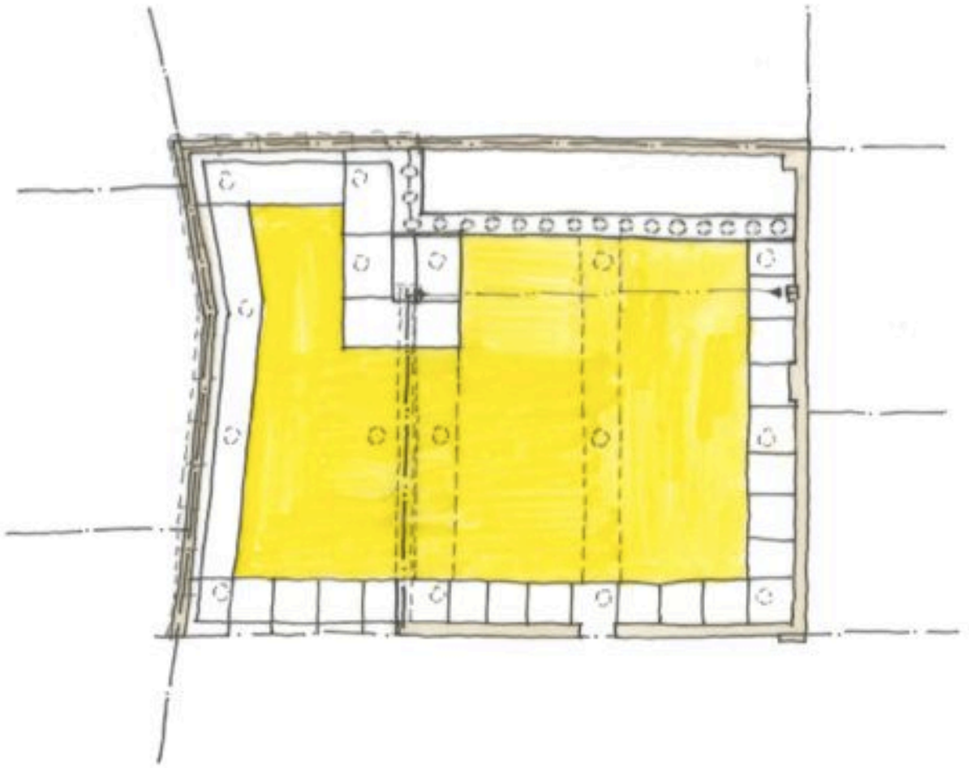
STAGE 3-5 – LONG SPAN STEEL BEAMS INSTALLED, REMAINING MASS CONCRETE AND RC WALLS CONSTRUCTED, CAPPING BEAM FORMED

9.4.7 STAGE 6.0 – FORM REMAINING BASEMENT SLAB

- Provide heave-board and form remaining RC basement raft slab, leaving walls propped
- Form internal RC walls / liner walls

9.4.8 STAGE 7.0 – INSTALL GROUND FLOOR STRUCTURE

- Install steel grillage to ground floor and place metal deck.
- Cast ground floor slab.
- Remove props when concrete has reached sufficient strength
- Proceed to construct superstructure



STAGE 6-7 – FORM BASEMENT SLAB AND GROUND FLOOR STRUCTURE

10.0 CONSTRUCTION MANAGEMENT PLAN

10.1 Routing of demolition, excavation and construction vehicles

10.1.1 Vehicles will turn off the A41 Finchley Road and left onto Greencroft Gardens. They will then take the first left on to Goldhurst Terrance and find the private road to 109 Goldhurst Terrance on the left hand side.

10.1.2 Access into the private access road is restricted by the size of the gated entrance, which measures approximately 2.8m wide, 3.1m high.

10.1.3 Depending on their size, lorries will either reverse into the private road to the front of the property or make drop offs and picks ups on Goldhurst Terrace within two suspended parking spaces.

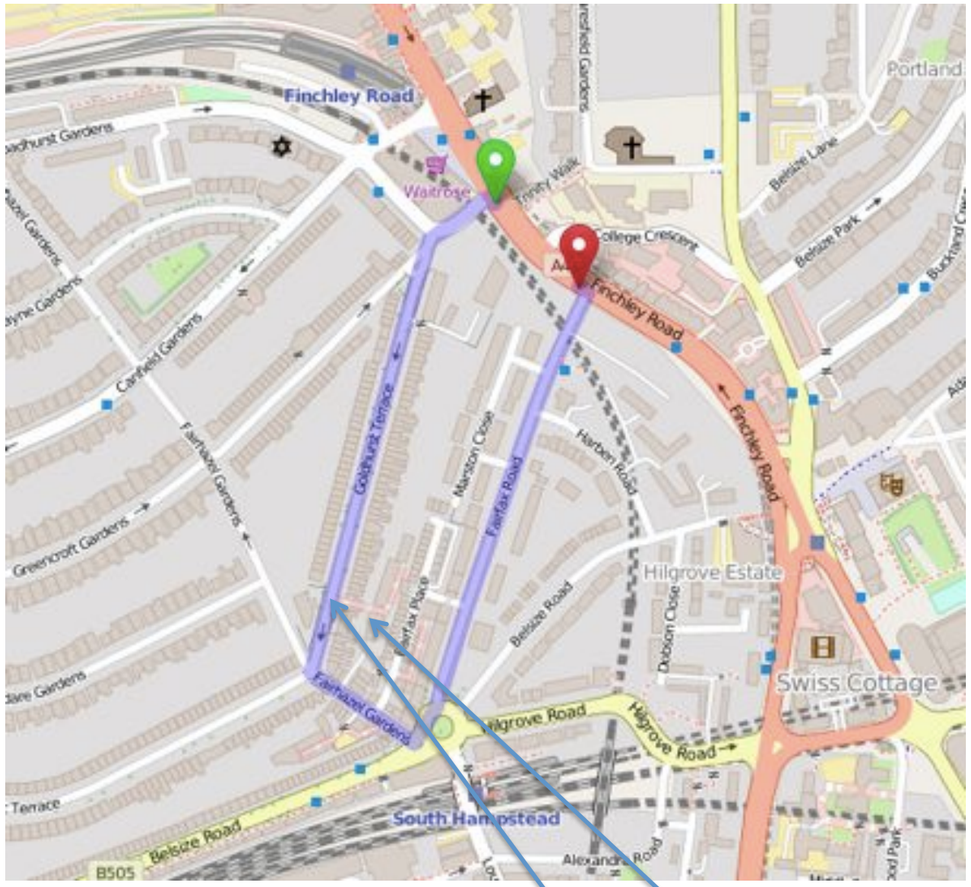
10.1.4 Once drop-offs are made, they will be wheel-borrowed through the private access road by hand, or for larger loads be transferred to the site via a small folk lift truck. The piling rig will be dropped off, and then tracked along the shared access road to the site.

10.1.5 Given the restricted access, it is intended that concrete will be mixed on site, rather than pumping from the road. A cube testing regime will be will be agreed to ensure the necessary quality assurance is maintained on site.

10.1.6 The excavated material will be bagged on site by hand. When the muck-away lorry gets the site, they will be transferred to the lorry, either by wheel-barrow or folk lift truck.

10.1.7 Banksmen will be available to assist and ensure the safety of passing pedestrians.

10.1.8 It is intended for vehicles to leave the site by continuing along Goldhurst Terrace and taking a left onto Fairhazel Gardens and then first left at the roundabout onto Fairfax Place. They will continue to the end of the road and then back onto the A41 Finchley Road.



PROPOSED ROUTING OF CONSTRUCTION VEHICLES

10.1.9 This arrangement minimises the amount of right hand turns that the construction traffic will take along its route through built up areas therefore reducing risk of incident.

10.2 Estimated number of vehicles per day and during the works

10.2.1 It is estimated that there will be 50 loads of excavated material and a further 25 other vehicle movements as part of the proposed works. On average there will be up to two grab lorries moving the excavated material per day. As far as possible, these will occur between 10am and 4pm.

10.3 Details of vehicle holding area

10.3.1 No off-site vehicle holding area is envisaged. Labour will be designated to control vehicle movements and offloading, and to ensure safe routes for vehicles and pedestrians are maintained.

10.4 Details of vehicle call up procedure

10.4.1 The site foreman will arrange deliveries to avoid delays and ensuring there is sufficient space for the vehicles being called on site. The call up procedure will reduce stoppage times to a minimum and prevent stacking of vehicles on the public highway.

10.5 Estimated number and type of parking suspensions that will be required

10.5.1 It will be necessary to suspend two residential only parking bays at the front of the property for the duration of the construction works. This is required so that access is provided for muck away lorries and other deliveries.

10.6 Details of any diversion or other disruption to the public highway during demolition, excavation and construction works

10.6.1 All works are contained within the site with hoarding extending approximately 1.5m onto the private access road at the front of the property. No diversion will be necessary and disruptions will be minimised.

10.7 Strategy for coordinating the connection of services on site with any programmed work to utilities upon adjacent land.

10.7.1 There are no planned alterations to utilities outside of the site boundary

10.8 Work programmes and timescale for each phase

10.8.1 The preliminary construction programme is summarised as follows for each construction stage:

Site setup, soft strip and enabling works	2 weeks
Piling	3 weeks
RC Underpinning to Stage 2 walls and installation of beams	5 weeks
Remaining RC walls and basement slab	3 weeks
Ground floor slab	2 weeks
Upper floors	2 weeks
First & second fix and finishes	15 weeks
Total Construction Period	32 weeks

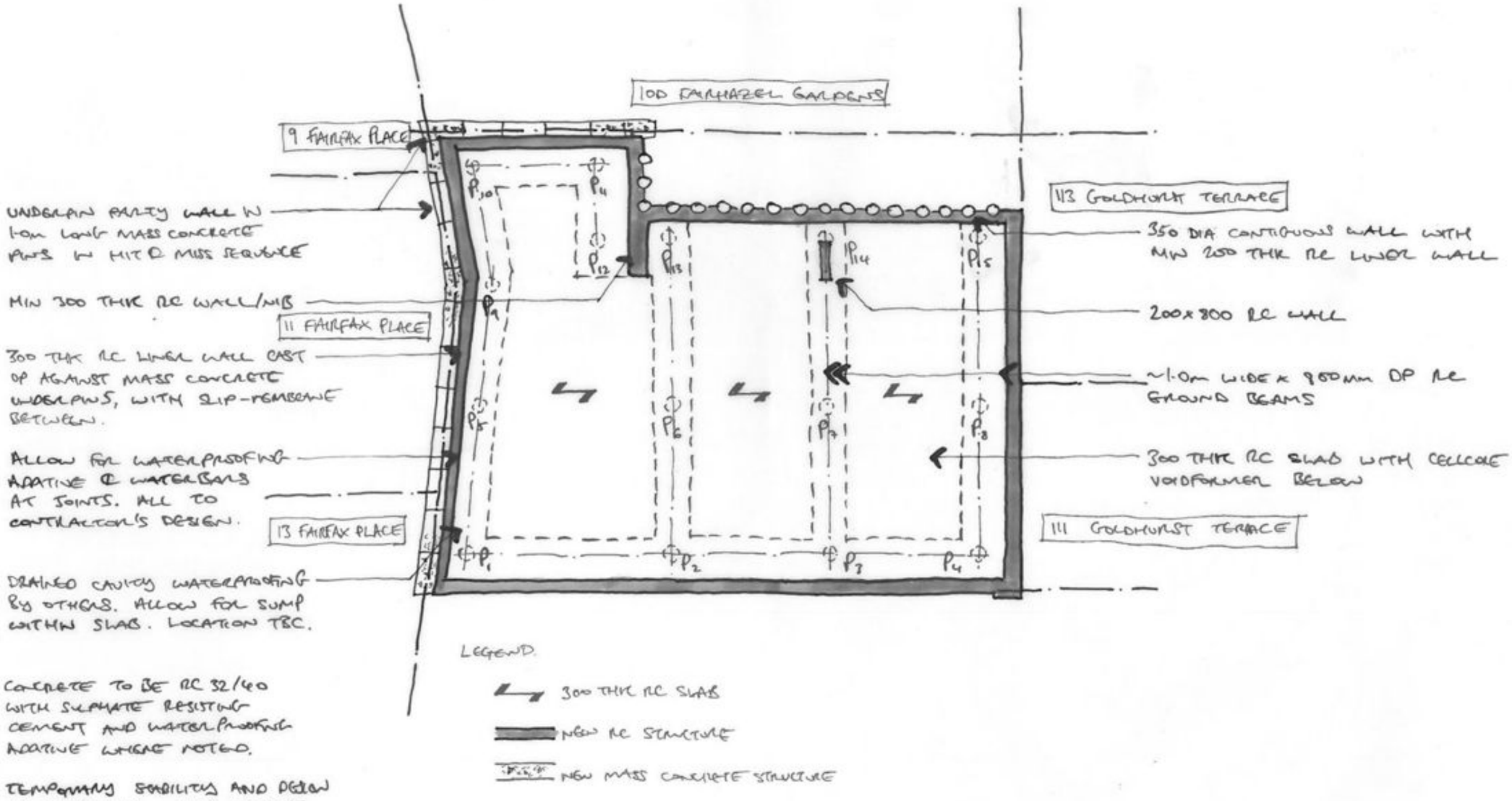
10.9 Nuisance Control

10.9.1 Measures will be implemented to ensure that the potential impact of the works on local residents and neighbours will be kept to a minimum.

10.9.2 Dust and dirt will be controlled by erecting panels around scaffolding to provide shelter and tarpaulins will be used when materials are being loaded onto vehicles.

10.9.3 All site accommodation and welfare facilities will be provided within the site boundary. The location of which will be moved as works progress.

11.0 APPENDIX A – PLANS



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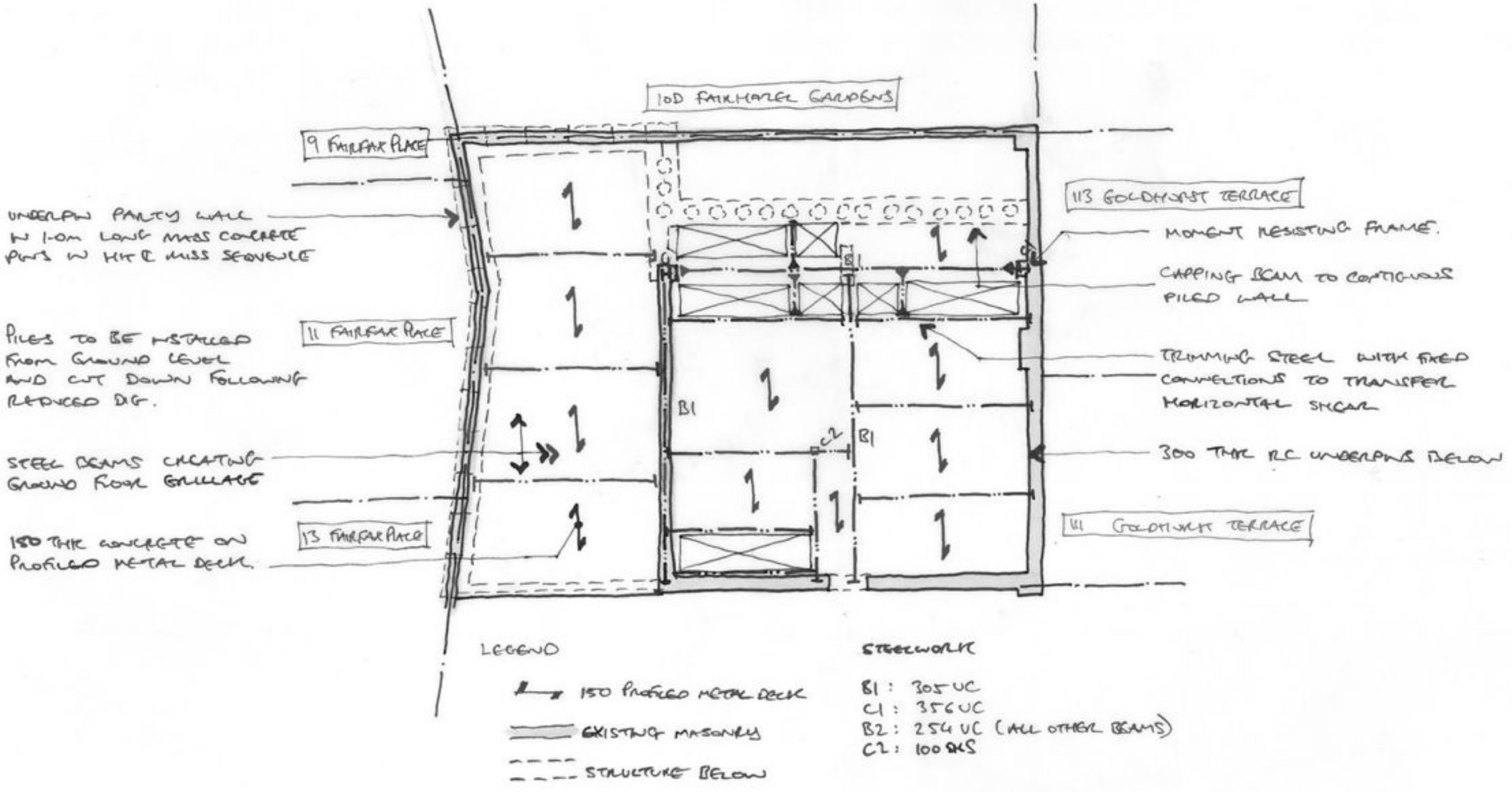
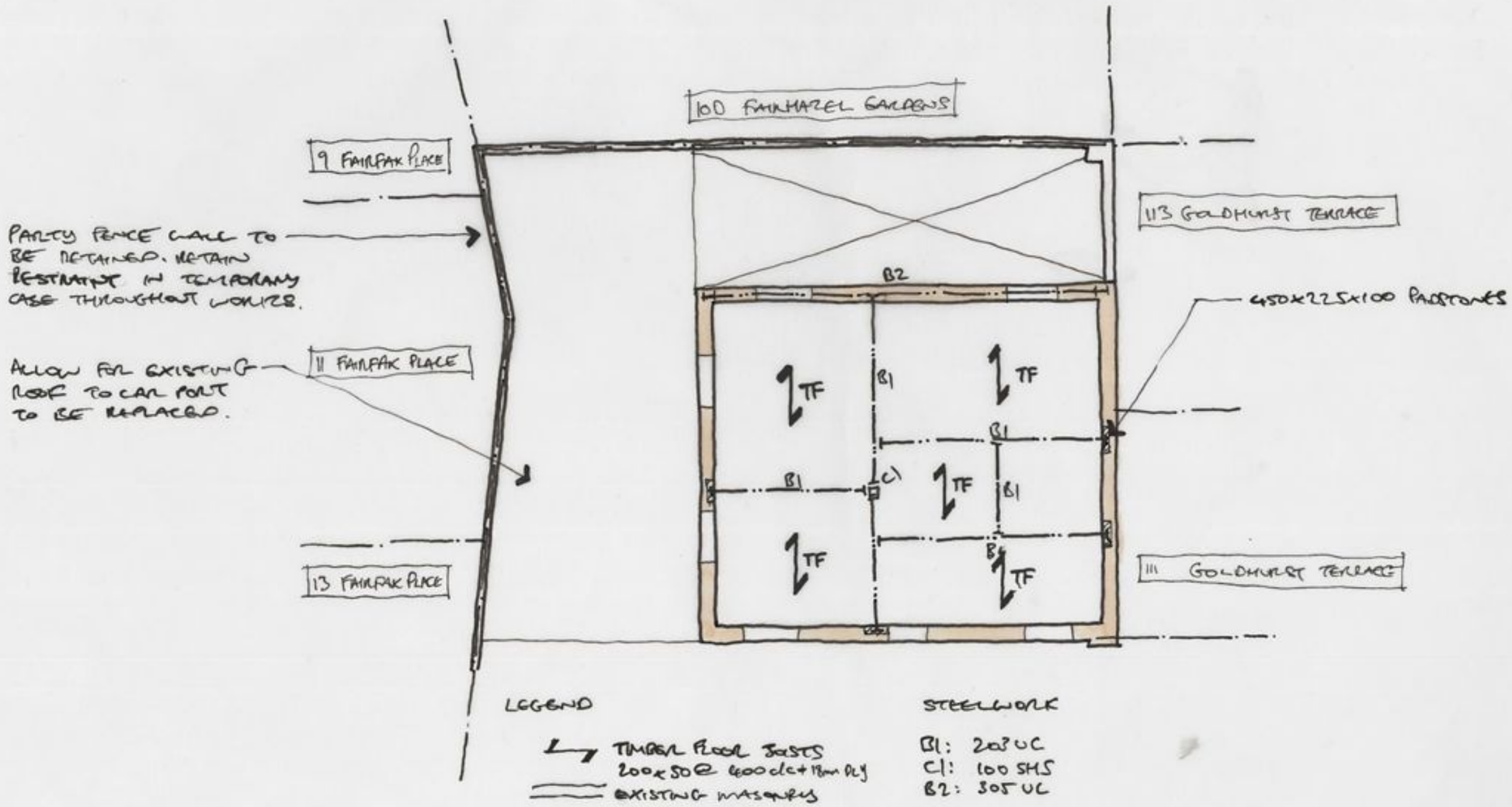
109 GOLDHURST TERRACE		JULY 2016
PROPOSED BASEMENT FLOOR PLAN	1508 | B | 5900	P2



DEVISE ENGINEERS

PRELIMINARY		1:100 AT A3
109 GOLDHURST TERRACE		JULY 2016
PROPOSED GROUND FLOOR PLAN	1508 | G | S1000	P2



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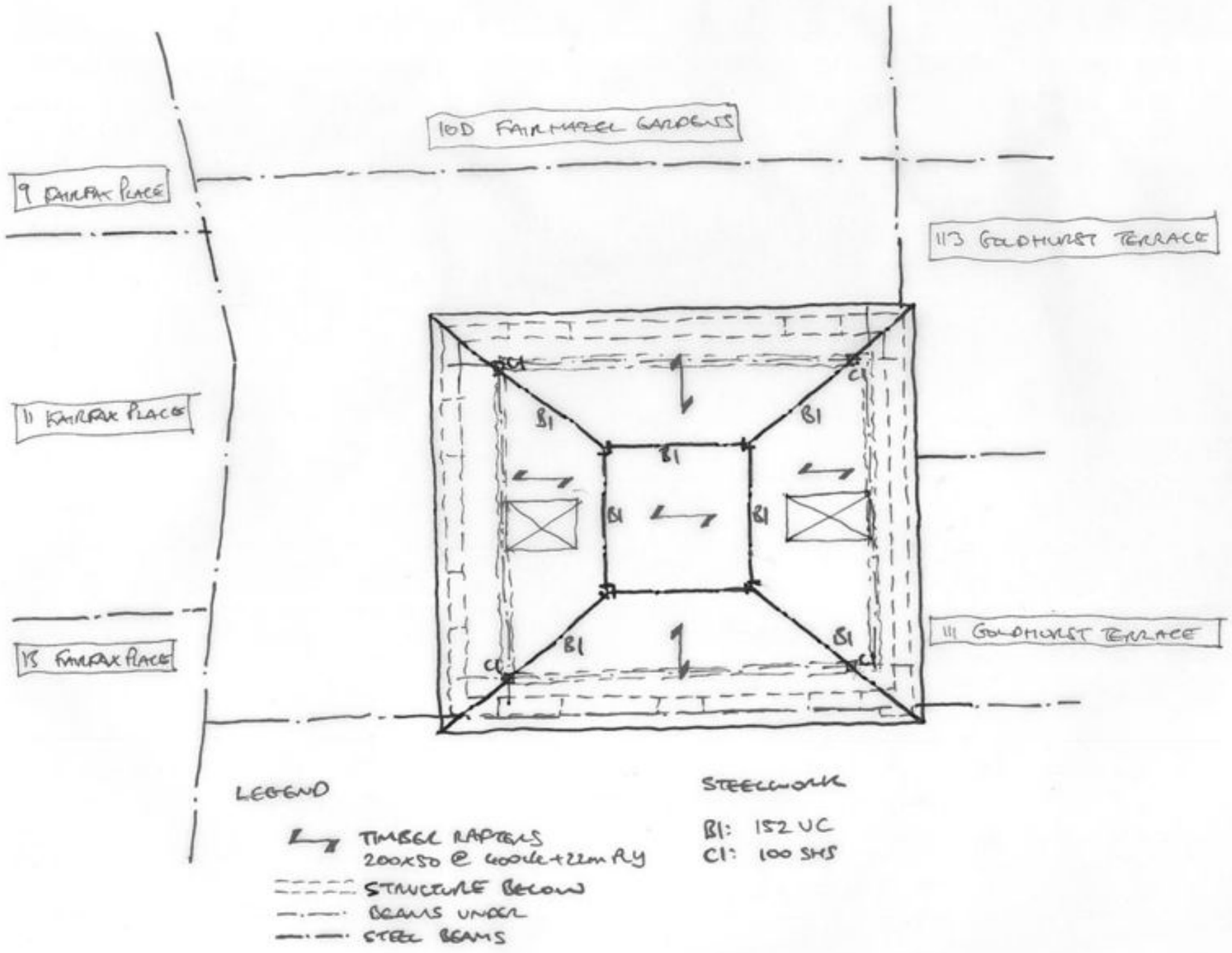
	PRELIMINARY	1:100 AT A3
	109 GOLDHURST TERRACE	JULY 2016
	PROPOSED FIRST/SECOND FLOOR PLAN	1508 | 1 | S1100 P2



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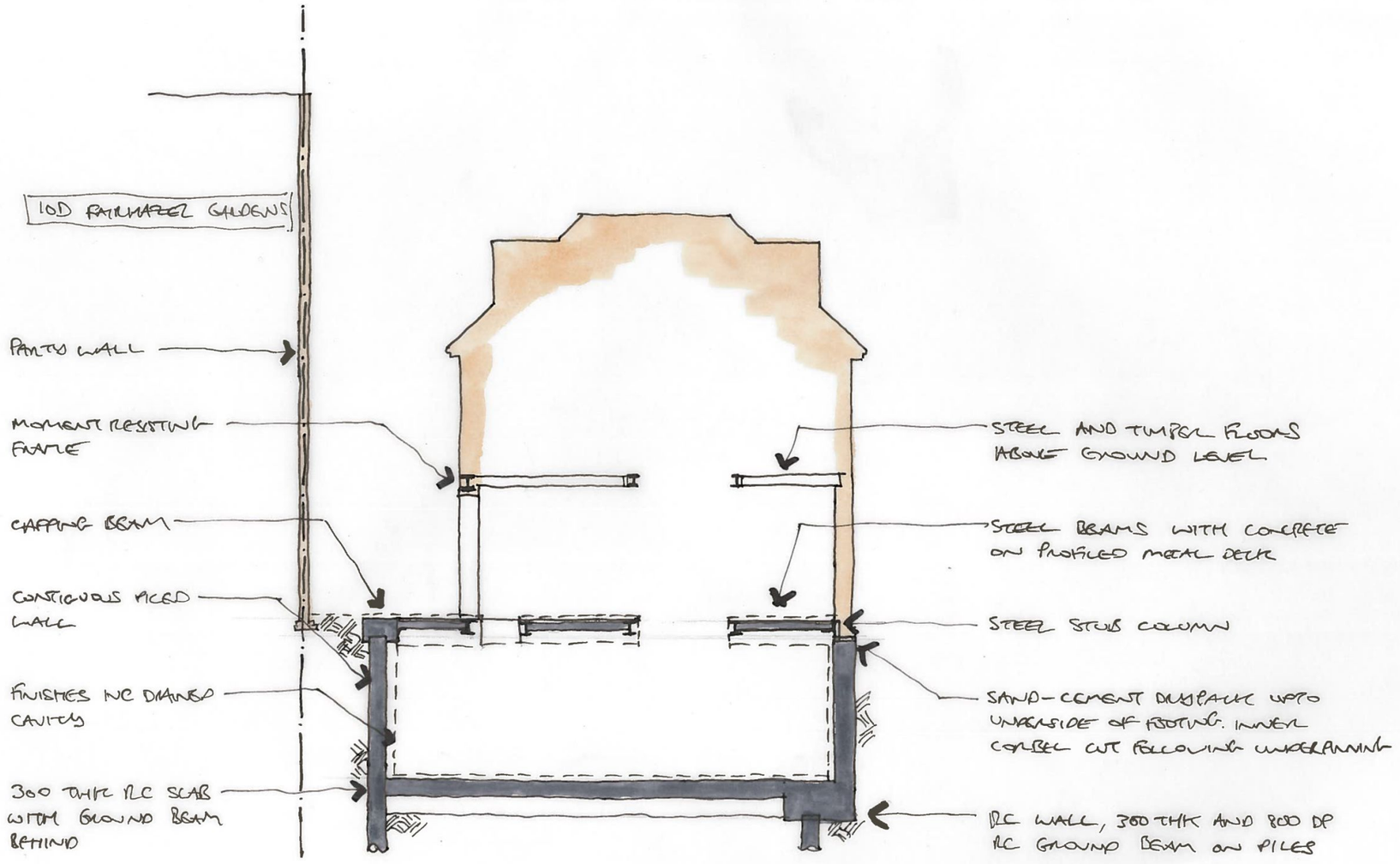
PRELIMINARY		1:100 AT A3
109 GOLDHURST TERRACE		JULY 2016
PROPOSED ROOF PLAN	1508 IR1 S1300	P2



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	PRELIMINARY	1:100 AT A3
	109 GOLDHURST TERRACE	JULY 2016
T: 07917875222 E: DEVISEENGINEERS@GMAIL.COM	PROPOSED SECTION	1508 | S | S2000 P2