elliottwood

No.4 The Hexagon
London, N6 6HR

Structural and Civil Engineering Planning Report

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Date: October 2016

Document Control

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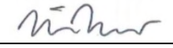
date:	October 2016	signature:		signature:		signature:	

Contents

Appendices

0.0 Non-Technical Summary

0.1 The following report has been prepared to show that the property and neighbouring properties will be safeguarded during the works. This report follows the guidance given in the Camden Planning Guidance on Basements and Lightwells CPG4. This assessment has been prepared in accordance with the guidance given in CPG4, DP23 and DP27.

0.2 If the recommended measures and sequence of works outlined in this report are properly undertaken by a suitability qualified contractor, the development should not pose any significant threat to the structural stability to the property, the adjacent properties, or surrounding grounds.

0.2 The Hydrological, Geotechnical and Ground Movement Assessment and Basement Impact Assessment (BIA) prepared by LBH predicts damage to the neighbouring properties would be either 'negligible' or 'very slight' (category 0 and 1 as set out in CIRIA Report 580 respectively).

0.3 Elliott Wood will have an on-going role during the works on site to see that the structural works are being carried out generally in accordance with our design and specification. This role will typically involve weekly site visits at the beginning of the project and fortnightly thereafter.

1.0 Introduction

1.1 Elliott Wood Partnership Ltd is a firm of consulting structural engineers approximately 120 strong operating from their head office in South West London Central London, and Nottingham. Residential developments of all scales have been central to the workload of the practice with many in the Greater London area. To date this numbers approximately 500 sites many of which have been in the London Borough of Camden. Our general understanding of the development of London, its geology and unique features together with direct experience on many sites puts us in a strong position to advise clients on works to their buildings and in particular the design and construction of their basement.

1.2 Elliott Wood Partnership Ltd (EW) were appointed by the building's owner Lorraine Ashbourne to advise on the structural implications of the proposed works which involve:
- Demolition of the existing residential building on the site
- Construction of a new residential building

1.3 EW have visited site and instructed a site investigation to be undertaken by Geotechnical and Environment Consultants LBH. This included 2no. boreholes down to approximately 8m deep and 4no. trial pits. The information from this has been used to inform the structural design and LBH's Hydrological, Geotechnical and Ground Movement Assessment and Basement Impact Assessment (BIA).

1.5 Aside from the site investigation, internal opening up works have not been required as it is intended that the existing building on the site will be demolished.

1.6 This report outlines the proposed subterranean works and their construction. It should be read in conjunction with the detailed set of drawings showing the existing site, buildings and proposed works by Soup Architects, together with the proposed structural drawings appended to this report.

Fig 1 – Site Plan

2.0 Description of Existing Building and Site Conditions

2.1 No.4 The Hexagon is an existing house on the outskirts of Hampstead Heath. It is part of a development of 6no. detached houses built in the 1960's. The site slopes towards the west. The existing house is positioned to the north-east of the site.

2.2 The building is not listed however it is in the Highgate Village Conservation Area in the London Borough of Camden.

2.3 The existing house is two storeys above ground level, with the lower ground set partly into the site, and extending over approximately half of the overall building's footprint.

2.4 The building appears to be constructed with timber floors supported on load bearing brickwork external walls on mass concrete footings.

2.5 The overall stability of the building is provided by the layout of the masonry walls and diaphragm action of the timber floors at each level.

2.8 There are several large trees in the garden to the rear. An arboricultural assessment has been undertaken to assess the impact of the development in relation to the adjacent trees and vice versa.

2.9 The results of the desk study produced by LBH can be summarised as follows;

- The site was initially developed in the C19th as part of grounds to a large detached house, further development occurred during the 1960s to create the current plot of 6no. detached houses.
- Environment Agency maps indicate that the western part of the site is at low risk of flooding (reference; www.environment-agency.gov.uk). The site may however be vulnerable to intermittent flooding during storm events.
- The site does not appear to be in the vicinity of any London Underground Ltd infrastructure (reference; www.google.co.uk/maps).
- There is no record of any historical bomb damage to the property (reference, The LCC London Bomb Damage Maps 1939-1945, LTS).

2.10 The ground investigations conducted by LBH confirmed the expected strata below the site

- Made ground (to approx. 1m BGL)
- Claygate Member (Sandy Clay to approx. 7m BGL)
- London Clay (to base of borehole)

2.11 Within one of the boreholes, seepage was encountered at the base of the made ground. Perched ground water was noted at this level within the standpipe upon a subsequent monitoring visit.

2.12 A review of Thames Water records and a CCTV survey of onsite drainage have revealed the presence of third party drainage within the site. A 150mm diameter sewer runs close to the southern boundary, passing via two Thames Water manholes within the site. In addition, the sewer records show other Thames Water owned assets within the site; however, the CCTV survey confirmed that these did not contain any third party drainage. Any alterations to the Thames Water assets will require prior authorisation.

2.20 Existing boundary conditions

No 4 The Hexagon is bounded by 4 properties as set out below:

- No 3 The Hexagon to the north of the site
  - The boundary to No 3, which generally comprises soft landscaping is approximately 1m from the edge of the existing building (ground floor level);
  - This building is approximately 2.5m from No 4 The Hexagon
- No 5 The Hexagon to the east
  - The boundary to No5 is adjacent to the east corner of the existing building
  - The building is set approximately 6m further back
- No 6 The Hexagon to the south-east
  - No 4 The Hexagon is built up against the boundary line to No 6 separated by a masonry retaining wall and timber fence assumed to belong to the adjacent building. The foundation to the masonry retaining wall is approximately 600mm-650mm deep BGL (refer to TP1 within LBH SI)
  - The building is approximately 8m from the edge of the existing building
- Boundary to south-west of the site
  - The south west boundary is approximately 3.5m from the existing building and comprises a brick garden wall with a 700mm deep BGL footing (refer to TP3 within LBH SI).
  - The brick garden wall is a listed Victorian wall.

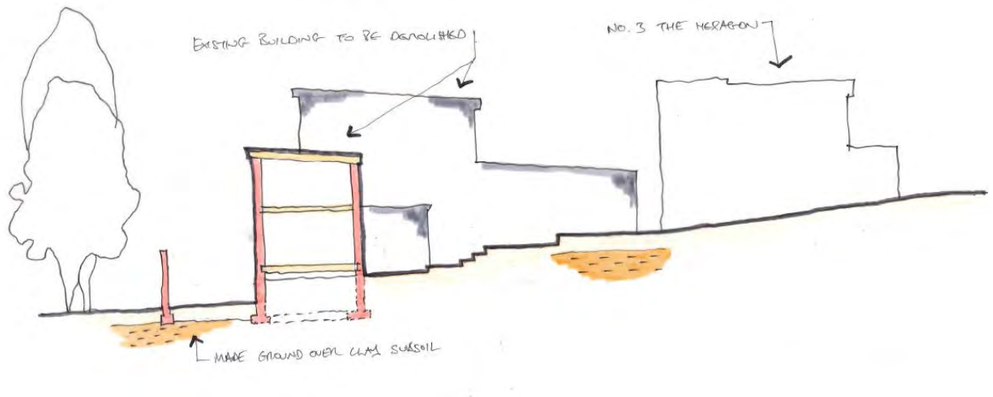


Fig 2 – Existing Section

3.0 Proposed Works

3.1 It is proposed to demolish the existing building and construct a new house with an extended lower ground floor, by cutting into the slope towards the North-East of the site.

3.2 A contiguous piles wall will be formed along the north-east of the proposed building to provide support to the existing ground behind. This will simplify the reduced excavation and mitigate against the risk of ground movements on the adjacent buildings at No 3 and No 5.

3.3 A reinforced concrete liner wall will be constructed up against the contiguous piles.

3.4 A reinforced concrete retaining wall will be constructed in a hit and miss sequence at the boundary to the south-east. and the south-west of the site and will generally be formed tight to the existing boundary wall. This will be constructed in a hit and miss sequence with a slip membrane so as not to undermine the existing wall foundations, whilst allowing the walls to move differentially. This will reduce the risk of disturbance to the boundary wall and neighbouring buildings. A 200mm wide near surface drainage trench will be installed between the existing brick boundary wall and the new RC wall, this will be installed prior to the casting of the wall.

The retaining wall sections will comprise a circa 300mm thick RC stem. Their bases will bear approximately 1.0m below ground level (BGL).

3.5 All reinforced concrete underpins will be designed to resist the proposed horizontal loads due to earth pressure, surcharge and hydrostatic pressure. In accordance with best practice, soil at rest pressures will be used for the design.

3.6 A 300mm wide drainage trench will be installed along the base of the existing Victorian wall between the Victorian wall and the new building foundations. The Victorian wall along the South-West boundary is to be underpinned in 1m sections in a hit and miss sequence, at locations where the installation of the drainage trench would require the wall to be undermined. The drainage will be adapted to limit the extent of undermining wherever possible.

3.7 Elsewhere the substructure generally comprises 1.0m BGL pad foundations and strip footings which support the loads from the superstructure and suspended lower ground floor slab.

3.8 Where foundations are in the proximity of nearby trees, their depths are to be increased in accordance with NHBC guidance.

3.9 It is proposed to retain tree T1 (refer to Crown Consultants Arboricultural Report). Where it is proposed to construct within the root protection area, foundations will be kept within the building footprint as far as practicable to reduce the impact on the tree roots.

3.10 A void former will be provided beneath the suspended lower ground floor slab to reduce the effects of heave; both due to the unloading of the clay soil and as a result of the effects of nearby trees.

3.11 It is proposed that the superstructure will be constructed as a steel frame with profiled concrete filled metal deck slabs. This allows for the long spans required by the architectural layout whilst providing a quick and efficient form of construction.

3.12 The waterproofing strategy is yet to be defined by the Architect, though it is expected that a combination of waterproof concrete construction and a cavity drainage system designed by a specialist sub-contractor will be adopted.

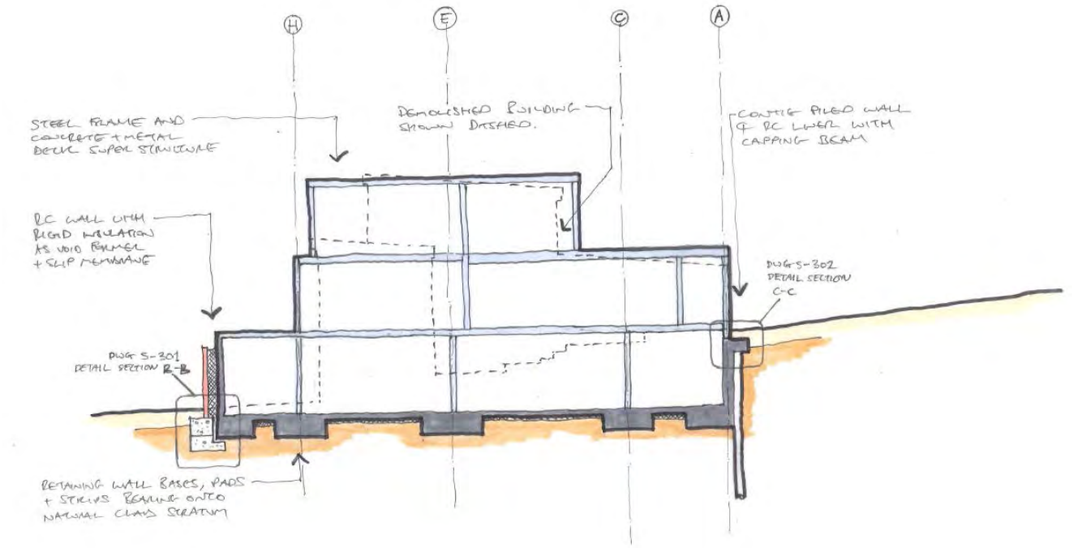


Fig 3 – Proposed Section

4.0 Hydrological and Hydrogeological Summary

4.1 The massing of the Lower Ground floor is not significantly different to that of the existing, albeit built further into the slope and to approximately 0.5m below the existing ground floor level.

4.2 LBH's SI notes that no groundwater was encountered at depth within the clay soils. Interconnected sand seams within the impermeable clay would have allowed groundwater flows to be present below the site, however no sand seams were found. Given the absence of ground water and sand seams found at depth, there is unlikely to be any significant ground water flow regime within the clay soils directly below the site which would be affected by the new construction.

4.3 LBH's Geotechnical, Hydrogeological & Ground Movement Assessment notes the presence of an intermittent perched groundwater table at the base of the made ground, and that 'there is some intermittent high level water seepage running through the more permeable zones of made ground over the top surface of the natural clay soils'. The report recommends that a near-surface bypass drainage system should be installed around the new structure such that the development does not impact any near-surface ground water flow regime through the made ground.

4.4 As shown in the below ground drainage plan, the proposals will incorporate gravel-filled drainage trenches around two sides of the new basement, in order to ensure that groundwater seepages within the made ground layer is intercepted and can continue to flow with minimal impedance.

4.5 The base of the trenches will be set approximately 100mm into the clay; they will consist of open graded stone and will be wrapped with geotextile.

4.6 Along the southwest side of the building is an existing listed wall. The trench cannot be extended through this area due to the risk of affecting the wall foundations through softening of the ground, as such a solid pipe is to be installed connecting the trench to the east side of the property with the disposal system in the garden.

4.5 From the trenches an enhance disposal system is to be provided to ensure any ground water passing around the trenches will return as per its original flow path at the interface with the clay.

5.0 Proposed Below Ground Drainage

5.1 The below ground drainage proposals can be found in drawing D5000 in Appendix 1. Surface and foul water will be separated within the site boundary and reconnect to the Thames Water combined sewer network. All below ground drainage will drain via gravity.

5.2 There is an increase in impermeable area of approximately 30m2 from that of the existing development. As the site is small, the rate of discharge generated is less than 5l/s. It is therefore considered not possible to apply a flow control limiting the discharge as a result of the increase in area. The reason for this is due to the concern of blockage as a result of orifice diameters being less than 50mm. The inclusion of SuDS has been considered and it is proposed to provide 60m^2 of green roof. The green roof will help reduce the total volume of surface water discharge from the site, as well as providing a reduction in peak rate of discharge in lower return period storms in non-saturated conditions. Infiltration has been discounted due to unsuitable ground conditions.

5.3 Foul drainage is directed to the existing outfall via gravity via inspection chambers. It is not expected that the existing foul discharge rate will change considerably.

5.4 It is proposed to upsize and lower the Thames Water sewer in the proposed courtyard area. This allows the sewer to pass below the proposed foundations from the building extension and reconnect to the Thames Water manhole in the south-west of the site. Details will need to be confirmed with Thames Water through a build-over agreement.

5.5 There are a number of other Thames Water assets within the site as indicated by the sewer records. These will be divested and abandoned as no third party drainage connects into these manholes.

5.6 Consultation with an Arboriculturalist will likely be required to assess the effect which the proposed pipe runs in the garden will have on tree roots.

6.0 Party Wall Matters

6.1 The proposed development falls within the scope of the Party Walls Act 1996. Procedures under the Act will be dealt with in full by the Employer's Party Wall Surveyor. The Party Wall Surveyor will prepare and serve necessary Notices under the provisions of the Act and agree Party Wall Awards in the event of disputes. The Contractor will be required to provide the Party Wall Surveyor with appropriate drawings, method statements and other relevant information covering the works that are notifiable under the Act. The resolution of matters under the Act and provisions of the Party Wall Awards will protect the interests of all owners.

6.2 The designs for No 6 The Hexagon will be developed so as not to preclude or inhibit any works on the neighbouring properties. This will be verified by the Surveyors as part of the process under the Act.

7.0 Sustainability

7.1 With regards to a sustainable design, various options for the superstructure construction can be explored, such as the use of recyclable aggregates and cement replacement. The use of SUDs principles will be adopted where possible.

7.2 The current proposals include green roofs as indicated on the architect's drawings. This will help to improve the thermal performance of the building, reduce the urban heat island effect, reduce both the total and peak surface water discharge, and enhance biodiversity in the surrounding area.

8.0 Ground Movement Assessment

8.1 Although basement construction inevitably results in some ground movement, the structural design has been developed with the safeguarding of this building and other adjacent properties in mind. The design of the contiguous piled and RC walls; the temporary propping to the walls, the sequence of construction and the permanent restraint to the walls have all been carefully considered and designed to control and minimise the ground movements.

8.2 Given their relative proximity to the build, ground movement assessments (GMA) have been carried out on No 3 and No 5 The Hexagon to help quantify the level of ground movement expected due to the works. Since No

6 is over 8m from the proposed works, a GMA on this property has not been carried out. Refer to LBH's Hydrological, Geotechnical and Ground Movement Assessment and BIA.

8.3 We have produced a summary of the anticipated loads for the proposed works and these have been inputted into the ground movement assessment. The assessment takes into account both the long and short term effects of the proposed basement and it has shown that the settlement is within acceptable limits.

8.4 LBH have concluded that with good workmanship including stiff propping/bracing to the excavations, the proposed basement to no. 6 The Hexagon can be constructed without imposing more than a 'very slight' level of damage to No 3 The Hexagon and negligible level of damage for No 5 The Hexagon on the adjoining properties.

9.0 Structural Monitoring

9.1 It is anticipated that the Contractor shall provide monitoring to all structures and infrastructure adjacent to the basement excavation at the time of excavation and construction. However, this is to be agreed with the party wall surveyors.

9.2 Monitoring shall be completed as follows:

a) One month prior to any works being started to provide a base reading.
b) At the start and end of every shift during the excavation and until the ground floor slab has been cast.
c) On a monthly basis thereafter for a 6 month period following completion of the notifiable works.

9.3 Cumulative movement of survey points must not exceed:

	Code amber trigger values	*Code red trigger values*
Settlement	+/-4mm	+/-8mm
Lateral displacement	+/-4mm	+/-8mm

9.4 When movement approaches critical values, the following steps are to be taken:

Code amber trigger value:
All interested parties, including the Adjoining Owner's Surveyor and his Engineer should be informed and further actions immediately agreed between Surveyors and implemented by the Building Owner. Notwithstanding the Party Wall requirements, the Contractor is to appoint, and to have permanently on site, a suitably qualified Structural Engineer who will be responsible for the reviewing of the movement monitoring results at the start and end of each day and provide immediate advice, remedial works and design as necessary in the event of movement being noted. The Contractor is to ensure that he has 24 hour/7 days a week access to emergency support provision including but not limited to additional temporary props, needles, waling beams and concrete supply at the start of the excavation and prior to any likelihood of this trigger value being reached. If this value is reached the Contractor, and his Engineer, must without delay provide all interested parties with his plan to implement any emergency remedial and supporting works deemed necessary. The Contractor must be ready to carry out these works without delay if the movement continues and approaches the trigger value below.

Code red trigger value:
All interested parties including Adjoining Owner's Surveyor and Engineer will be informed immediately. Works will stop and be made safe using methods and equipment agreed at the above stage. The Contractor is to ensure that the movement has stopped as a result of the implemented remedial works designed and installed at this stage. The requirements of the Party Wall Act will also ensure that, Surveyors and their advising Engineers shall then enter into an addendum Award, setting out whether or not the Building Owner's works can re-commence and when, and if so agree additional precautions or modifications to the proposals prior to re-commencement.

10.0 Conclusion

10.1 The proposed development involves forming a part-basement extending into the ground at the north east of the site using a contiguous piled walled construction. Elsewhere the substructure comprises cast in situ RC walls, pad and strip foundations and a suspended RC slab.

10.2 The superstructure comprises a steel frame with concrete on metal deck floors.

10.3 Near surface water flows are to be maintained through the provision of drainage trenches installed at three sides of the building just below the made ground. These will intercept any seepages at the interface of the made ground and clay soil and the water will be diverted and dissipated.

10.4 Drainage diversions and build-over proposals are subject to Thames Water approval.

10.5 The measures and sequence of works outlined in this report and the following Construction Method Statement are to be taken into account in the eventual design and construction of the proposed works.

10.6 Detailed method statements and calculations for the enabling and temporary works will need to be prepared by the Contractor for comment by all relevant parties including party wall surveyors and their engineers. Adequate supervision and monitoring is to be provided throughout the works particularly during the excavation and demolition stages.

10.7 EW will have an on-going role during the works on site to see that the works are being carried out generally in accordance with the design and specification. This role will typically involve weekly site visits at the beginning of the project and fortnightly thereafter. A written site visit record is to be provided to the design team, Contractor and Party Wall Surveyor following each site visit.

10.8 The undertaking of such projects to existing buildings is specialist work and EW will be involved in the selection of an appropriate Contractor who will need the relevant expertise and experience for this type of project.

10.9 If the works noted above are properly undertaken by suitably qualified Contractor, they should not pose any significant threat to the structural stability of the existing house or the neighbouring properties. We consider that if the works are carried out in this manner then the likelihood of damage to the adjacent properties and will be limited to Category 0 to 1 as set out in CIRIA report 580.

10.10 The proposed development is not expected to have a significant effect on the hydrogeological or hydrological setting.

10.11 The development is not within a flood risk zone so does not require a Floor Risk Assessment.

11.0 Subterranean Construction Method Statement

The proposed works involves the construction of a new lower ground floor level set partially into the ground. Some of the issues that affect the sequence of works on this project are:

- The stability of adjacent buildings;
- The stability of the surrounding ground including the adjacent gardens;
- Providing a safe working environment.

Refer to the Construction Management Plan (CMP) produced by Motion for details of hoarding, access, holding areas and the principles for the removal of spoil.

Note that the final CMP and overall sequence is to be agreed with the Contractor after final proposals have been agreed.

Tree Protection methods are to be agreed and installed to all retained trees where required. Refer to the Arboricultural Impact Assessment Report prepared by Crown Consultants.

11.1 Assumed Sequence of Construction:

Stage 1: Site set-up and enabling works

Erect a security fence and hoarding around the site, and set up a delivery/holding area.

Identify and isolate all services within the site as necessary. All below ground obstructions should also be removed to allow the works to progress.

Install monitoring system to the adjoining buildings and calibrate. The adjacent properties should be closely monitored for movements and the results logged and recorded at regular intervals throughout the works.

Carefully demolish the existing building whilst providing adequate temporary support to the existing garden retaining walls.

Create temporary diversion for public sewer running through the site.

Install temporary bypass drain to north east of site.

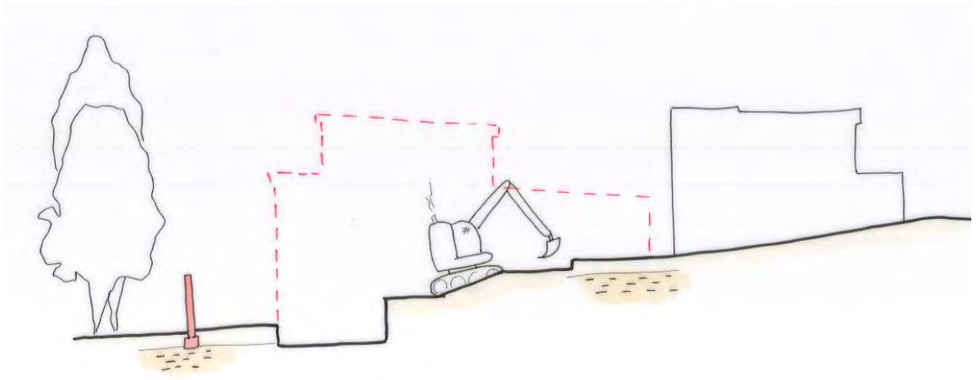


Fig 4 – Demolition of existing structure

Stage 2: Install contiguous piled wall

Install contiguous piled wall to the north-east of the site. Excavate and batter back the ground around the piled wall and cut piles to required top of pile level.

Stage 3: Install by-pass drain to the North

Excavate geotextile lined trench along piled wall and backfill with free draining material to direct near surface water flows around proposed structure. Maintain adequate propping to the trench throughout.

Stage 4: Cast capping beam

Cast the capping beam to the piled wall, trench sheeting to the drainage trench can be reused as sacrificial formwork to the capping beam.

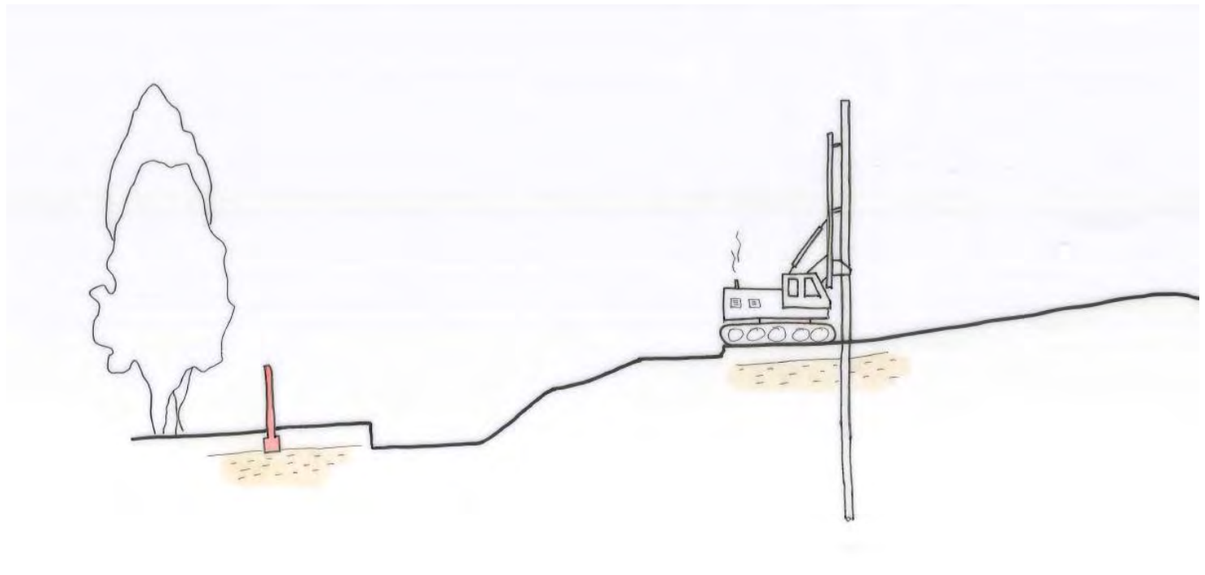


Fig 5 – Installation of piled wall to the north

Stage 5: Install by-pass drain to the South-East boundary

Excavate geotextile lined trench, backfill with free draining material to direct near surface water flows around proposed structure. The trench is to be propped to resist earth pressures during excavation.

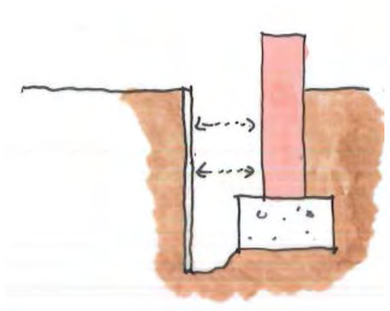


Fig 7 – Excavate trench for installation of bypass drain

Stage 6: Install RC underpins to the South-East of the site

Install new RC retaining wall in 1m sections in a hit and miss sequence (1, 3, 5, 2, 4…) to be confirmed with the contractor. Provide contractor-designed propping to the top of the wall designed to resist sliding and overturning due to the earth, surcharge and hydrostatic pressure.

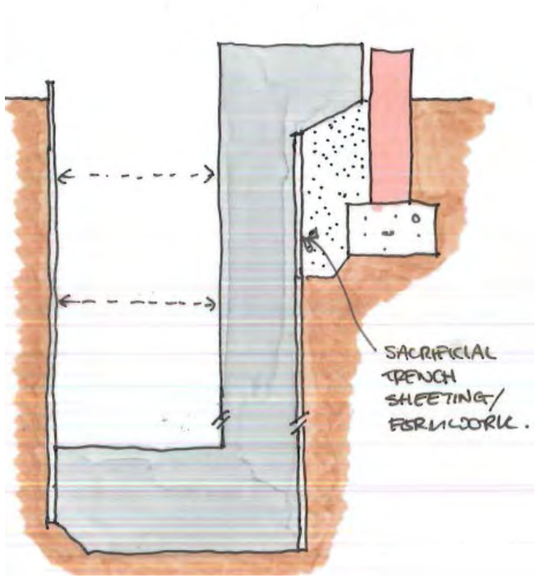


Fig 8 – Excavate trench for installation of bypass drain

Stage 7: Underpin the existing Victorian wall along the South-West

In sections no longer than 1m, the 350mm protruding part of the existing foundations will be cut back and the wall will be underpinned in a hit and miss sequence (1, 3, 5, 2, 4…).

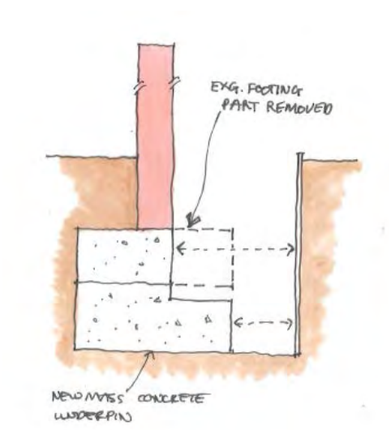


Fig 7 – Installation of underpins to Victorian wall

Stage 8: Install by-pass drain to the South-West

Install pipe run along the South-West wall. Trench sheeting to be used to contain the backfill material, this is to be propped until the new RC south wall is in place. Trench sheeting can form sacrificial formwork to RC wall.

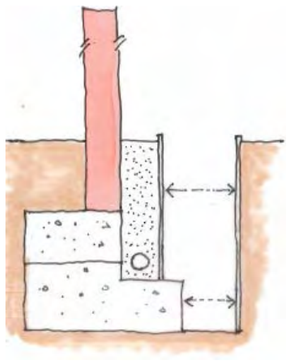


Fig 7 – Installation of bypass drain along the South-West boundary

Stage 9: Undertake reduced level dig

Whilst maintaining adequate support to the piled wall to the north-east, RC wall to the south-east, and drainage trench to the south-west, excavate down to formation level.

Stage 10: Form RC pad and strip foundations and cast floor and RC walls

Lay sand blinding as required. Install and fix reinforcement to pad foundations and cast pad and strip footings.

Lay blinding and void former as required and cast lower ground floor slab

Cast RC liner wall in front of the contiguous piled wall and prop. Also cast RC wall along South-West boundary in four lifts so as not to surcharge the Victorian wall, and prop.

Stage 11: Install lower ground floor columns and ground floor beams

Columns to be cast from Lower Ground to Ground level, and steel beams at ground floor to be installed. Profiled steel decking to be installed and ground floor to be cast.

Stage 12: Install remaining superstructure

Once ground floor slab has gained sufficient strength remove temporary propping to retaining structures. Install remaining superstructure.

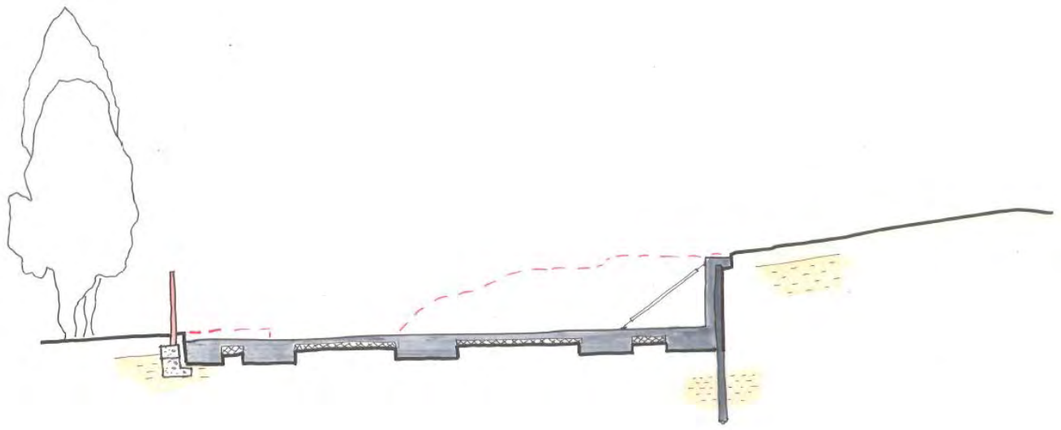


Fig 6 – Installation of substructure

Appendix 1 – Structural Drawings

350ø CONTIG PILES.

200 THK RC LINER + ALLOW 115mm TOLERANCE FOR CONTIG PILES, 1.5m BASE

500mm WIDE TRENCH FILL FOUNDS, 1.0m DP UNO

1.75 x 1.75 PAD FOUNDATIONS TYPICAL (UNO)

FOUNDATIONS TO BE 1.0m BGL MIN UNLESS MATCHED WHERE DEPTH = 1.4m BGL

NEW TREE, MATURE HEIGHT = 12m; D/H = 3/12 = 0.25; USE 1.4m DP FOUNDS FOR THOSE <3.6m FROM TREE

VICTORIAN WALL ALONG SOUTH BOUNDARY

UNDERPINNING TO VICTORIAN WALL FOUNDATIONS, CAST IN 1M HIT + MISS SEQUENCE (1,3,5,2,4) SHOWN INDICATIVELY - TO BE CONFIRMED WITH CONTRACTOR

02 03 07 A C E

PLG S-302 C-C

PLG S-301 A-A

B-B DWG S-301

2.2 x 2.2 PAD FOUND.

RC RETAINING WALL 300 THK STEM, CAST IN 1m HIT + MISS SEQUENCE, 1.5m BASE

250 THK RC WALL 1.5m BASE

1 3 5 2 4 1 3 5 2 4 1 3 5

This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.

Do not scale from this drawing.

= 250 THK SUSPENDED RC SLAB WITH HOLE PROTECTION BELOW.

BELOW GROUND DRAINAGE (WIDTH OF TRENCH DASHED INDICATIVELY)

NEAR SURFACE BYPASS DRAINAGE

rev	date	by	chk	description
P2	10/16	ZZ	GS	PRELIMINARY
P1	06/16	GS	GS	PRELIMINARY

elliottwood

Elliott Wood Partnership Ltd
Wimbledon • Central London • Nottingham
Consulting Structural and Civil Engineers
tel: (020) 7499 5888 www.elliottwood.co.uk

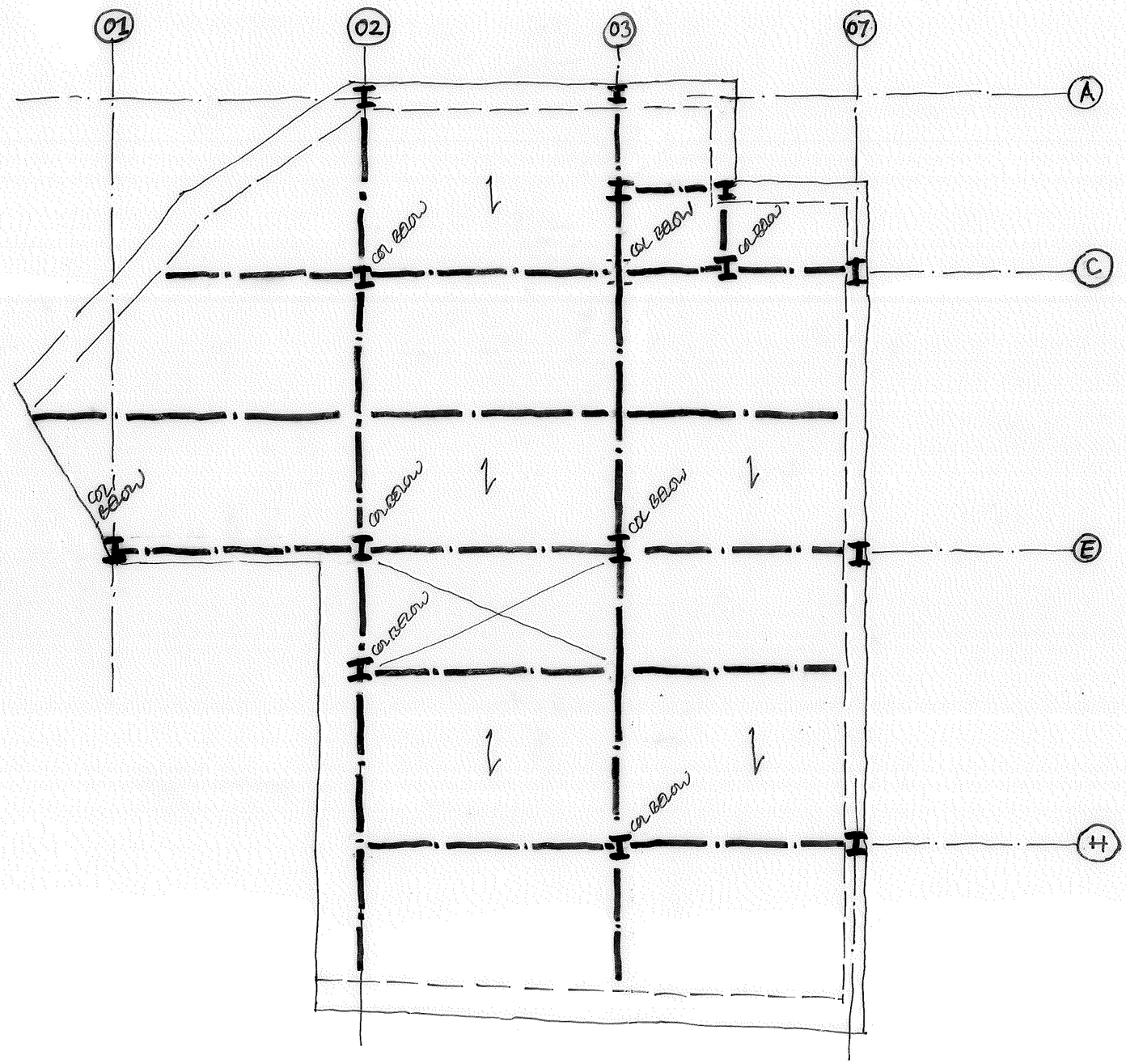
job title
NO.4 THE HEXAGON

drawing title
PROPOSED LOWER GROUND

scale(s) 1:100@A3 | date JUNE 16 | drawn GS

drawing status

job no	drawing no	revision
2150685	S-090	P2



This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.

Do not scale from this drawing.

130 mm PROFILED CONCRETE DECK

B1 UC 305

rev	date	by	chk	description

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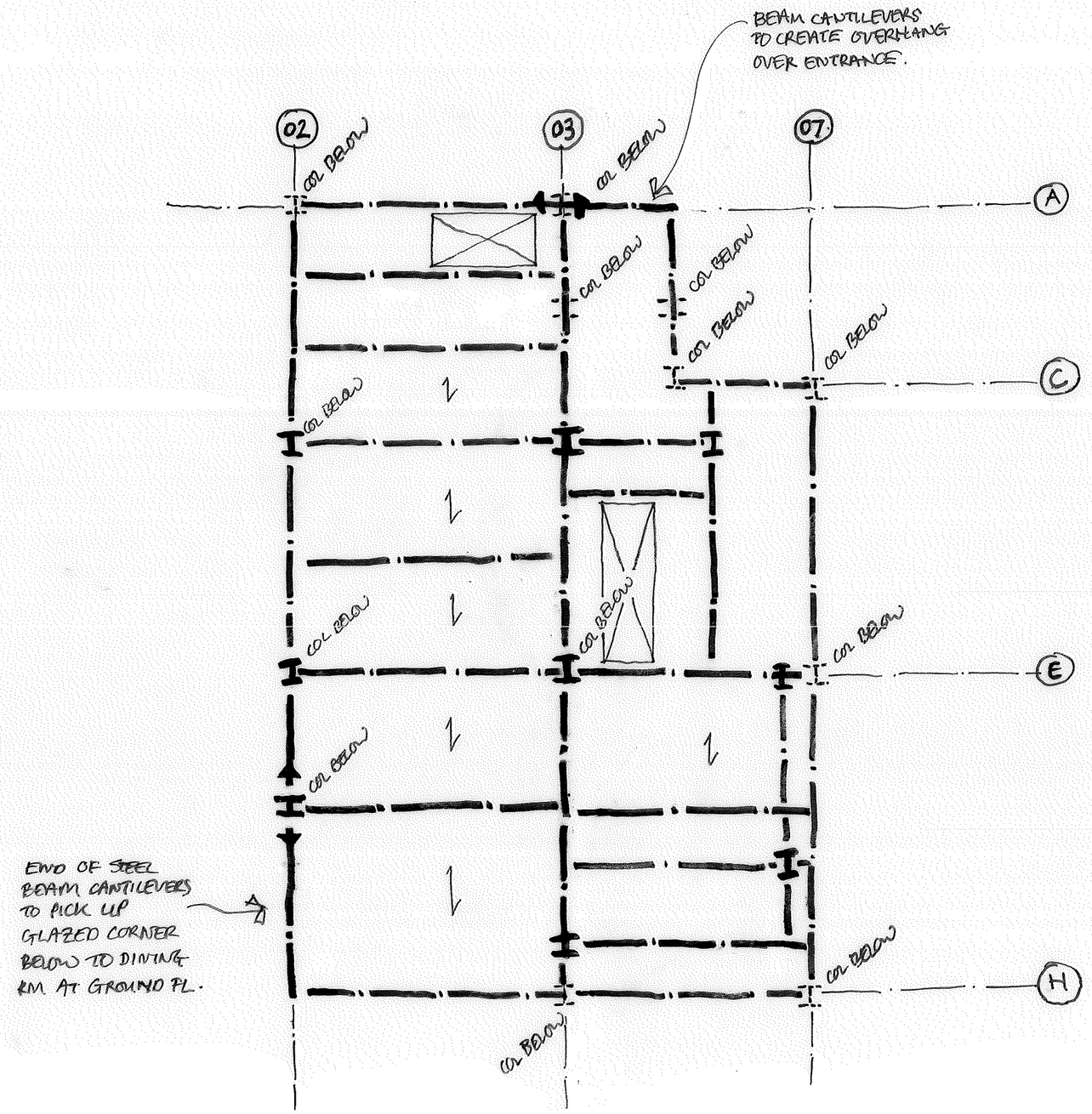
job title
NO 4 THE HEXAGON

drawing title
PROPOSED GROUND FLOOR

scale(s) 1:100 @A3 | date APRIL 2016 | drawn ZZH

drawing status

job no	drawing no	revision
2150655	S-100	P1



This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.

Do not scale from this drawing.

130 mm PROFILED CONCRETE DECK.

B1 305 UC

rev	date	by	chk	description

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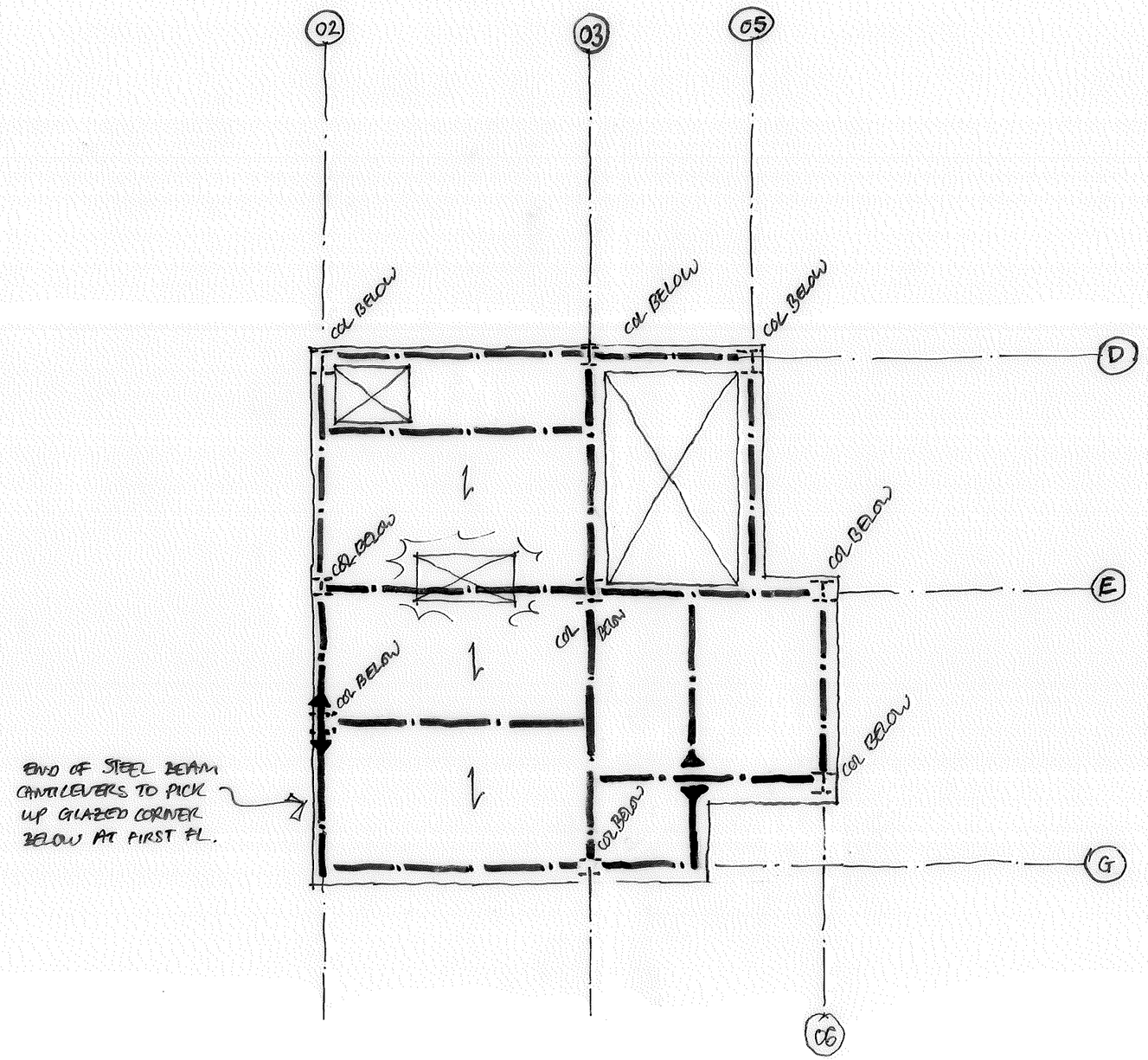
job title
NO.4 THE HEXAGON

drawing title
PROPOSED FIRST FLOOR

scale(s)	date	drawn
1:100@A3	APRIL 2016	ZZh

drawing status

job no	drawing no	revision
2150655	S-110	P1



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1 130mm PROFILED CONCRETE DECK.

rev	date	by	chk	description

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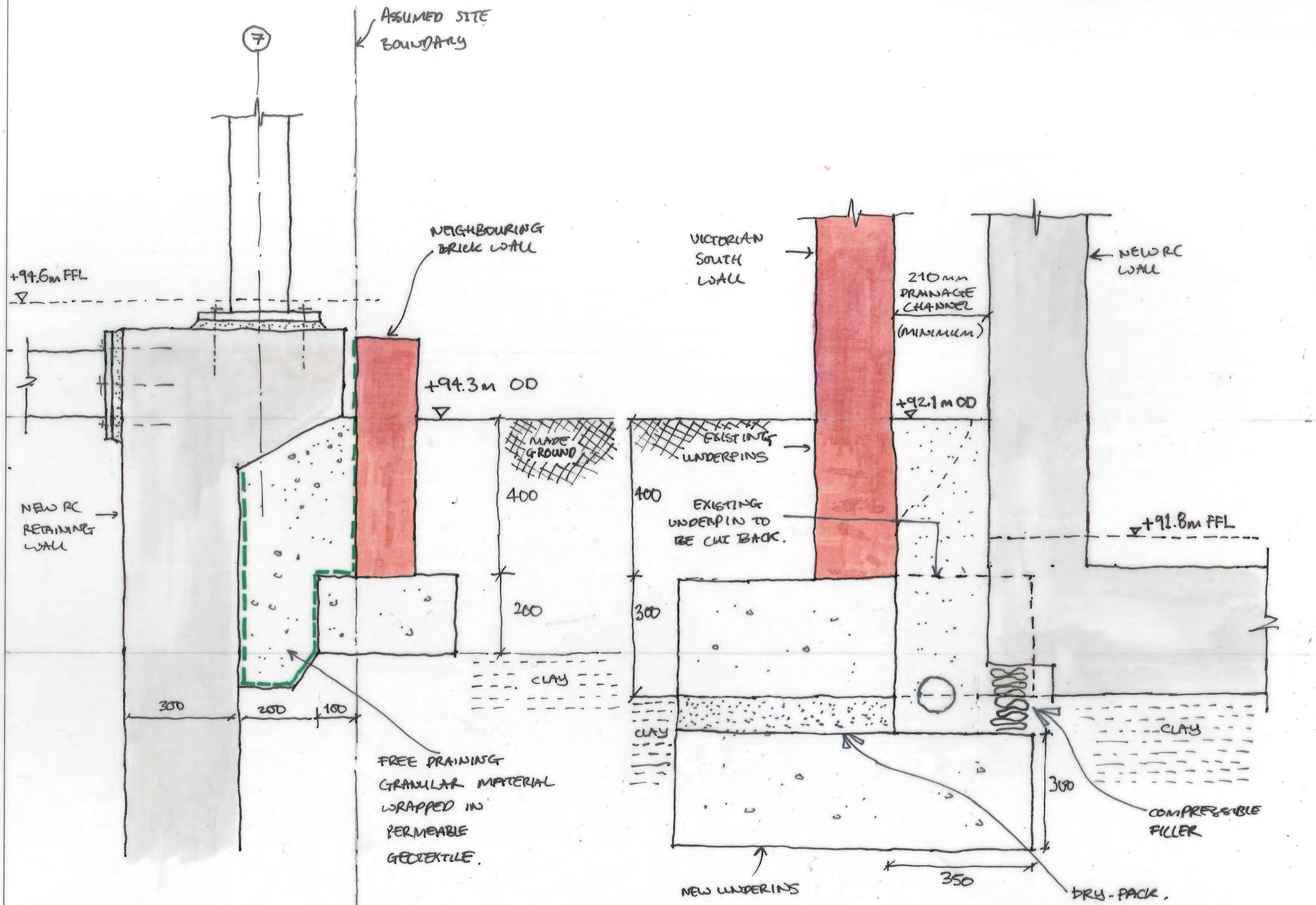
job title
NO. 4 THE HEXAGON

drawing title
PROPOSED ROOF PLAN

scale(s)	date	drawn
1:100@A3	APRIL 2016	ZLh

drawing status

job no	drawing no	revision
2150655	S-120	P1



SECTION A-A
THROUGH EAST WALL

SECTION B-B
THROUGH SOUTH WALL

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IMPERMEABLE GEOTEXTILE

PERMEABLE GEOTEXTILE.

rev	date	by	chk	description
P1	10/16	22	GS	PRELIMINARY

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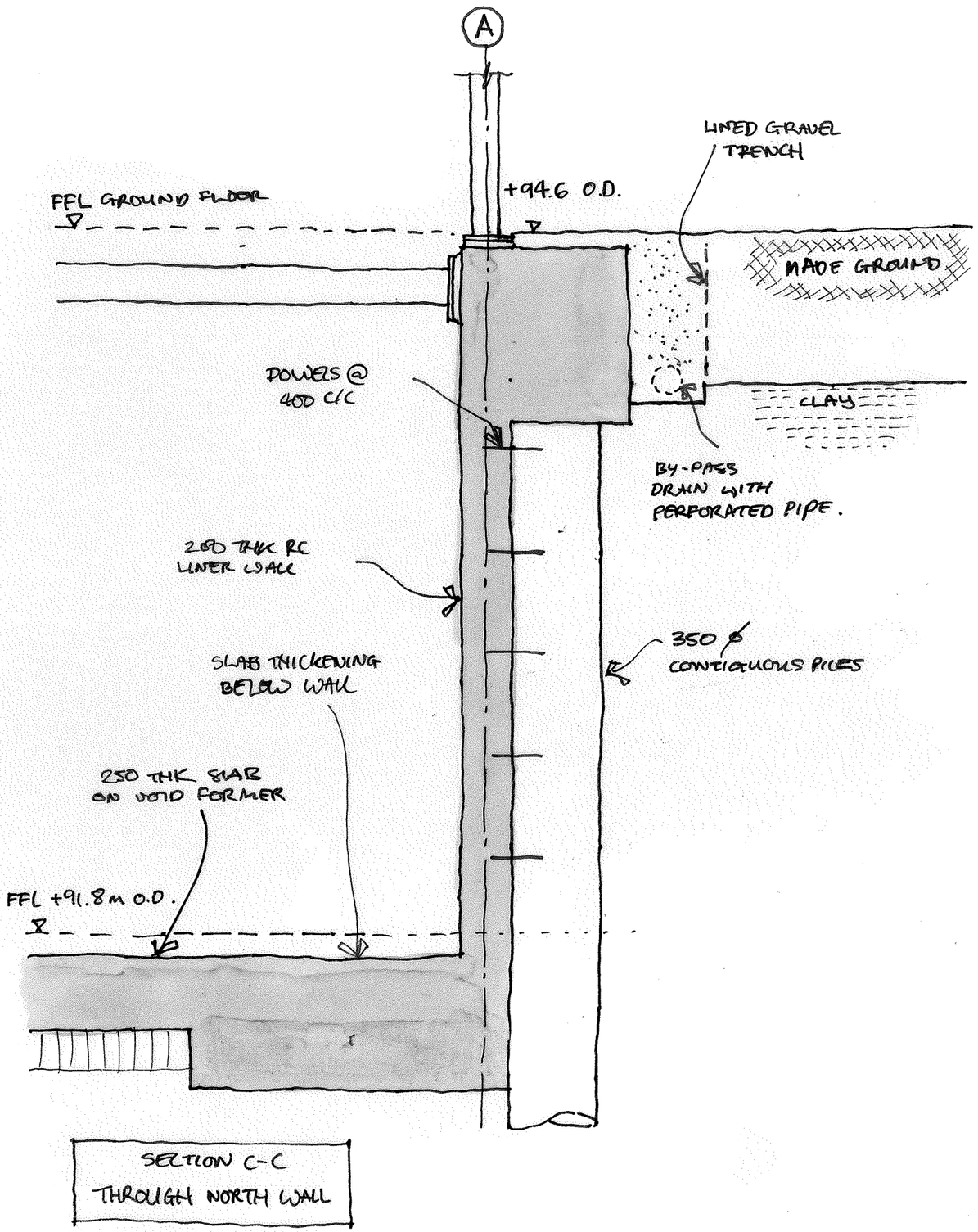
job title
NO.4 THE HEXAGON

drawing title
SECTIONS THROUGH EAST & WEST BOUNDARY WALLS.

scale(s) 1:10@A3 date OCT 2016 drawn 22h

drawing status PRELIMINARY

job no	drawing no	revision
2150655	S-301	P1



SECTION C-C
THROUGH NORTH WALL

This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.

Do not scale from this drawing.

rev	date	by	chk	description
P1	10/16	ZL	GS	PRELIMINARY

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job title NO. 4 THE HEXAGON

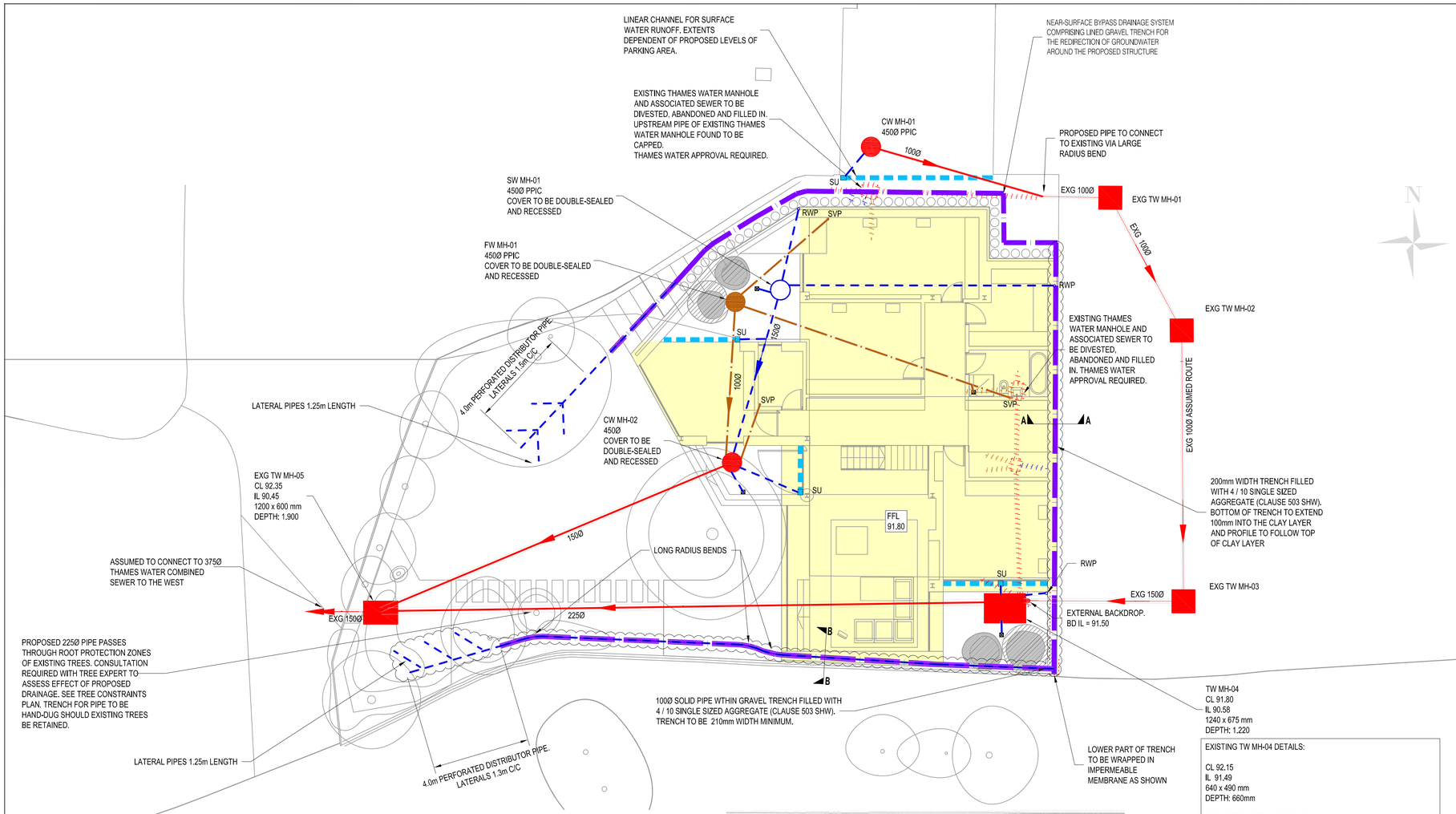
drawing title
SECTION THROUGH CONTIGUOUS PILES.

scale(s)	date	drawn
1:10 @A3	OCT 2015	ZL

drawing status
PRELIMINARY

job no	drawing no	revision
2150655	S-302	P1

Appendix 2 – Drainage Drawings



EXISTING TW MH-04 DETAILS:

CL 92.15
IL 91.49
640 x 490 mm
DEPTH: 660mm

PROPOSED DEPTH INCREASE: 560mm

THAMES WATER MANHOLE TO BE REBUILT TO SUIT NEW EXTERNAL LEVELS AND ALLOW OUTLET PIPE TO PASS BELOW FOUNDATIONS. EXISTING 150Ø SEWER TO ENTER VIA EXTERNAL BACK DROP. EXISTING 150Ø OUTLET PIPE REMOVED AND REPLACED WITH 225Ø PIPE TO MAINTAIN SEWER CAPACITY.

ALL PROPOSALS SUBJECT TO THAMES WATER APPROVAL.

SURFACE WATER DRAINAGE STRATEGY.

TOTAL EXISTING HARDSTANDING AREA: 345m2.
TOTAL PROPOSED HARDSTANDING AREA: 380m2.

INCREASE IN TOTAL HARDSTANDING AREA: 35m2.

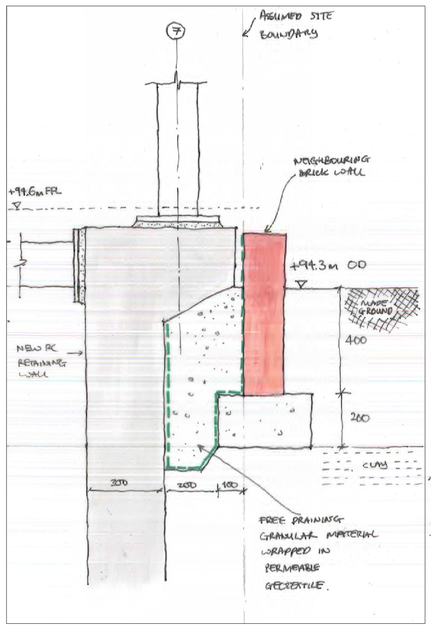
THE INCREASE IN HARDSTANDING AREA IS MITIGATED BY THE SuDS PROPOSALS:

- 60m2 OF GREEN ROOF AREA

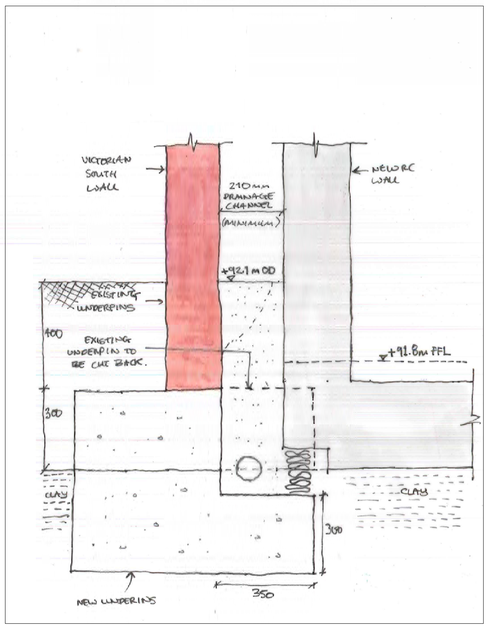
THE STRUCTURE AND RETAINING WALLS WILL BE PROTECTED FROM GROUND WATER FLOW OCCURRING AS A RESULT OF AN INTERMITTENT PERCHED WATER TABLE AT THE BASE OF THE MADE GROUND BY A NEAR-SURFACE BYPASS DRAINAGE SYSTEM. THIS SYSTEM WILL CONSIST OF A TRENCH FILLED WITH OPEN GRADED STONE SITUATED WITHIN THE MADE GROUND LAYER, AS WELL AS A TRENCH CONTAINING A SOLID PIPE. THIS SYSTEM WILL DIRECT THE GROUNDWATER TO THE GARDEN, WHERE IT WILL BIFURCATE VIA PERFORATED PIPES AS SHOWN.

SEE SECTIONS AA AND BB FOR DETAILS OF THE BYPASS SYSTEM.

SEE THE HYDROGEOLOGICAL, GEOTECHNICAL & GROUND MOVEMENT ASSESSMENT PRODUCED BY LBH WEMBLEY FOR DETAILS OF THE GROUNDWATER CONDITIONS OF THE SITE.



SECTION A-A (NOT TO SCALE)



SECTION B-B (NOT TO SCALE)

DRAINAGE NOTES

1. THE LOCATION AND LEVEL OF EXISTING DRAINAGE CONNECTIONS AND EXISTING SERVICES IS TO BE CHECKED PRIOR TO COMMENCEMENT OF DRAINAGE WORKS. ANY VARIANCE TO THE DETAILS ON THIS DRAWING AND THE SCHEDULE IS TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER.

2. THE DESIGN IS BASED ON THE INFORMATION AVAILABLE ON THE DATE OF ISSUE FROM OTHER PARTIES (EG. ARCHITECT AND M & E ENGINEER). IT IS SUBJECT TO CHANGE RESULTING FROM UPDATES TO THE AVAILABLE INFORMATION FROM OTHERS.

3. THE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE NBS SPECIFICATIONS, ASSOCIATED MANHOLE SCHEDULE AND STANDARD DRAINAGE DETAIL DRAWINGS WHERE APPLICABLE.

4. THE POSITIONS OF FOUL AND SURFACE WATER DRAINAGE POINTS ARE INDICATIVE ONLY, REFER TO THE ARCHITECTS DRAWINGS FOR SETTING OUT DETAILS.

5. MANHOLES, SEWERS, LATERAL CONNECTIONS ETC AND ANY OTHER PART OF THE WORKS INTENDED FOR ADOPTION UNDER A SECTION 104 AGREEMENT OR GULLIES ETC INTENDED FOR ADOPTION AS HIGHWAY DRAINAGE ARE TO BE CONSTRUCTED IN ACCORDANCE WITH SEWERS FOR ADOPTION 6TH EDITION (OR LATEST) AND TO THE APPROVAL OF THE WATER AND HIGHWAY AUTHORITIES.

6. UNADOPTED FW AND SW DRAINAGE IS TO BE CONSTRUCTED IN ACCORDANCE WITH THE CURRENT BUILDING REGULATIONS, BS EN752 AND BS EN12056.

7. DRAINS ARE TO BE CONSTRUCTED USING FLEXIBLY JOINTED VITRIFIED CLAY PIPES TO BS EN 295-1 SUPER STRENGTH SPECIFICATION (EG HEPWORTH SUPERSLEVE OR SIMILAR APPROVED) OR UPVC BUILDING DRAINAGE SYSTEM PIPEWORK TO BS 4660 AND BS EN1401-1, BEDDED AND BACKFILLED IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS AND THE SPECIFICATIONS UNLESS OTHERWISE SPECIFIED.

8. ALL SOIL CONNECTIONS UNDER BUILDINGS TO BE 100mm DIA LAID AT A MINIMUM GRADIENT OF 1/40 UNLESS NOTED OTHERWISE AND SHOULD BE RODDABLE FROM GROUND LEVEL.

9. ALL RWP CONNECTIONS TO BE 100mm DIAMETER AND TO BE LAID AT A MINIMUM GRADIENT OF 1/80 UNLESS NOTED OTHERWISE AND SHOULD BE RODDABLE FROM ABOVE GROUND LEVEL.

10. RAINWATER DOWN PIPES TO CONNECT TO A DRAIN VIA A REST BEND OR BE CONNECTED DIRECT TO A TRAPPED GULLY OR P TRAP ON A COMBINED SYSTEM, WHERE INTERNAL RWP'S OCCUR THESE MUST BE CONNECTED TO A 'P' TRAP WITH RODDABLE ACCESS ABOVE FLOOR LEVEL.

11. CHANNEL DRAINS TO BE ACO M100D 0.0 WITH SUMP UNIT OR SIMILAR APPROVED. GRATING TO BE IN ACCORDANCE WITH ARCHITECT OR LANDSCAPE ARCHITECT SPECIFICATION.

12. IN CASES OF IN SITU CONCRETE FLOOR SLABS, DRAINS ARE TO BE CAST INTEGRAL WITH THE SLAB WHERE PIPE COVER TO THE CROWN IS LESS THAN 300mm. - NOTE SPECIAL PROVISIONS APPLY TO BASEMENT FLOOR SLABS - SEE DETAILED DRAINAGE AND STRUCTURAL DRAWINGS. CONCRETE ENCASEMENT TO BE REINFORCED AS PER DRAINAGE DETAIL.

13. IN CASES OF SUSPENDED FLOORS WHERE A VOID OF 300mm OR MORE EXISTS BELOW FLOOR DRAINS ARE TO BE SUSPENDED USING A PROPRIETORY HANGER SYSTEM OR CAST INTEGRAL WITH THE FLOOR.

14. WHERE DRAINS PASS THROUGH FOUNDATIONS OR OTHER RIGID STRUCTURES A LINTEL OR SLEEVE IS TO BE USED AND PROVISION FOR FLEXIBILITY IS TO BE MADE USING ROCKER PIPES.

15. BACKFILLING OF DRAIN TRENCHES ADJACENT TO BUILDING OR OTHER STRUCTURES IS TO BE IN ACCORDANCE WITH DIAGRAM 8 OF THE BUILDING REGULATIONS.

16. DRAINS WITHIN AREAS OF MADE GROUND TO BE CONSTRUCTED BY FIRST MAKING UP THE AREA TO APPROX. FINISHED LEVEL AND THEN EXCAVATING THROUGH THE FILL MATERIAL INTO UNDISTURBED GROUND. THE DRAIN TRENCH IS THEN TO BE BACKFILLED TO FORMATION LEVEL USING SUITABLE GRANULAR FILL MATERIAL WELL COMPACTED IN LAYERS NOT EXCEEDING 225mm.

17. ALL INTERNAL FLOOR DRAINS TO BE SPECIFIED BY THE ARCHITECT.

18. ANY PIPE OR GULLEY OR OTHER FITTING OR DUCT PENETRATING THE BASEMENT SLAB OR WALL IS TO BE WATERPROOFED USING HYDROPHILIC STRIPS OR PUDDLE FLANGES TO ENSURE A WATER TIGHT JOINT. CONCRETE SURROUND TO DRAINAGE PIPES AND FITTINGS MAY BE REQUIRED IN CERTAIN CASES - REFER TO DETAILED DRAINAGE DRAWINGS AND RELEVANT STRUCTURAL DETAILS.

19. EXISTING FOUNDATIONS AND RETAINING WALLS MUST NOT BE UNDERMINED BY NEW DRAINAGE RUNS UNLESS AGREED IN WRITING WITH THE STRUCTURAL ENGINEER. CONTRACTOR TO SUBMIT METHOD STATEMENTS AND TEMPORARY WORKS PROPOSALS TO THE STRUCTURAL ENGINEER FOR COMMENT PRIOR TO COMMENCEMENT OF WORKS.

20. ADOPTED SEWER DIVERSION PROPOSALS ARE SUBJECT TO APPROVAL FROM THAMES WATER.

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Do not scale from this drawing.

LEGEND

- EXISTING/PROPOSED COMBINED MANHOLE
- PROPOSED FOUL MANHOLE
- PROPOSED SURFACE WATER MANHOLE
- EXISTING COMBINED WATER SEWER/DRAIN
- PROPOSED COMBINED WATER SEWER/DRAIN
- PROPOSED FOUL WATER SEWER/DRAIN
- PROPOSED SURFACE WATER SEWER/DRAIN
- FOUL WATER PIPE TO BE ABANDONED
- SURFACE WATER PIPE TO BE ABANDONED
- COMBINED WATER PIPE TO BE ABANDONED
- TRAPPED GULLY
- SS STUB STACK
- SVP SOIL VENT PIPE
- RWP RAIN WATER PIPE
- LINEAR CHANNEL WITH SUMP UNIT AND FOUL AIR TRAP
- GRAVEL TRENCH
- GRAVEL TRENCH WITH SOLID PIPE AT BASE
- IMPERMEABLE MEMBRANE

NOT FOR CONSTRUCTION

rev	date	by	chk	description
P5	14.10.16	CSc	PCh	Bypass drainage system
P4	11.10.16	CSc	PCh	Bypass drainage system
P3	10.06.16	CSc	PCh	Bypass drainage system
P2	10.06.16	CSc	PCh	Ommission of permeable paving
P1	03.06.16	CSc	PCh	Preliminary issue

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project
No. 4, The Hexagon
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drawing title
Proposed Below Ground Drainage Strategy
Lower Ground Floor

scale (s)	date	drawn
1:100@A1, 1:200@A3	June 2016	CSc

project no.			drawing status.		
2150655			Preliminary		
originator.	zone.	level.	role.	drg no.	revision
EW	00	L-01	D	5000	P5

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