30 Glenilla Road, NW3 4AN

Project No. 16-50

Construction Method Statement /
Basement Impact Assessment
DMAG-1650-CMS
February 2018

Produced for S and S Swycher

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REVISION HISTORY:

Rev	Date	Purpose/Status	Document Ref.
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P02	15/02/2018	Revised to clarify FRA	DMAG-1650-CMS P02
P03	11/06/2018	Revised following BIA Audit	DMAG-1650-CMS P03
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QUALITY CONTROL:

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Director

1 Introduction

1.1 Appointment

Davies Maguire were appointed by the client, Stuart Swycher, in August 2017 to provide structural and geotechnical engineering services for the basement design and construction methodology to assist with the planning application of 30 Glenilla Road.

This report has been produced for the exclusive use of the client and should not be used in whole or in part by any third party without the permission of Davies Maguire in writing.

The report should not be relied upon exclusively for decision making purposes and should be read in conjunction with other drawings and reports by the design team.

1.2 Executive Summary

The proposed development at 30 Glenilla Road will comprise demolition of the existing building and the construction of a new three storey residential property with a single storey of basement beneath the plan of the property.

As part of the process of developing this Construction Method Statement, Davies Maguire have undertaken a site specific historical and geological desk study to gain a detailed knowledge and understanding of the site. A site-specific ground investigation, conducted on behalf of the Client, by GEA has also been undertaken to confirm the soil characteristics beneath the site and any ground water that may be encountered or affected as part of the works.

With consideration of the existing site constraints Davies Maguire have undertaken preliminary structural design of the proposed house, including establishment of load paths, design of steelwork superstructure. new ground floor slabs, basement raft slabs and retaining walls. An indicative construction sequence has also been developed to confirm how the basement could be built safely without significant impact or disturbance to the surrounding buildings and highways.

In addition to this, preliminary design of temporary works associated with the proposed indicative construction sequence have been completed. Final design of these works is to be undertaken by the Contractor, once appointed, and developed to suit their preferred construction methodology.

The proposed structure and modifications have been designed to safeguard the structural stability of the nearby buildings and other infrastructure.

2 The Site

2.1 Location

30 Glenilla Road is located in Belsize Park, in North London. The site is bounded by Glenilla Road to the north, the adjacent detached properties to the east and west and the rear gardens to the south. The site is located in the London Borough of Camden and in the Belsize Park Conservation Area.

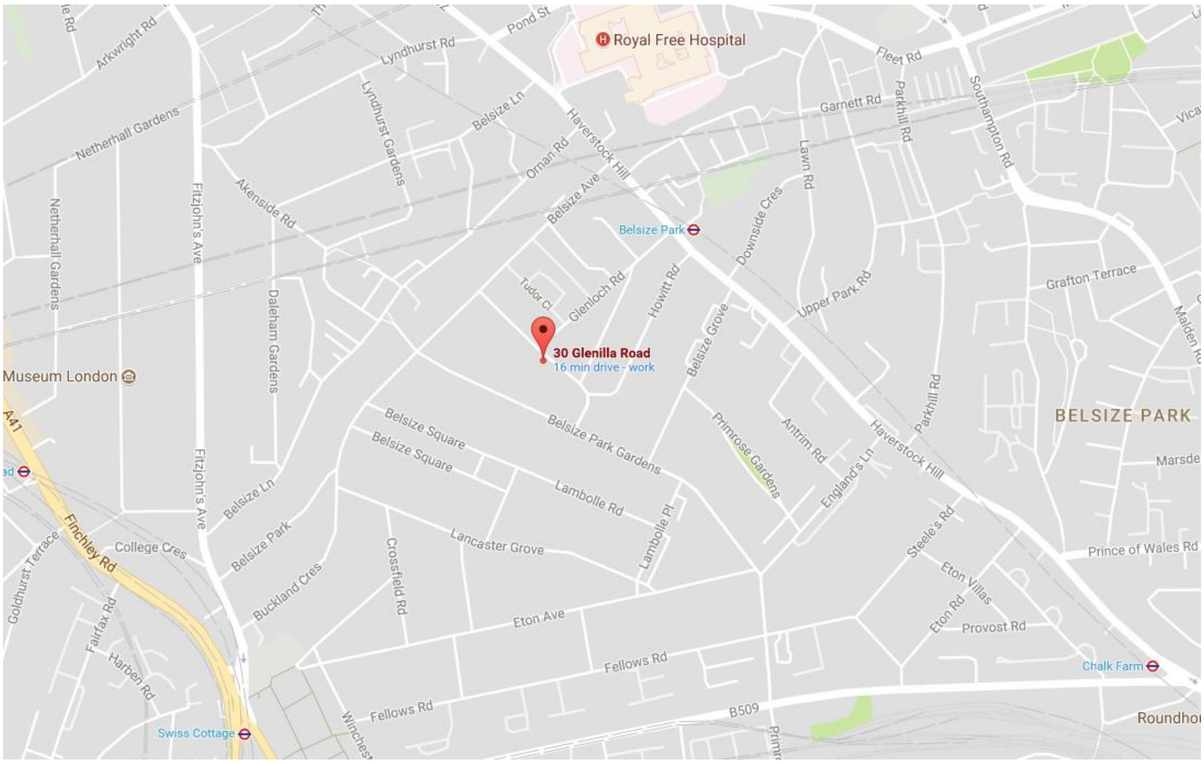


Figure 1 Site Location (Copyright © 2017 Google)

Figure 2 Existing Building (Copyright © 2017 Google)

3 Desk Study

3.1 Site History

The site history has been researched as part of the desk study with references made to historical Ordnance Survey maps.

The earliest map studied, dated 1862, shows the site to be undeveloped and situated within the historical Belsize Park. The area surrounding the site was later developed between 1862 – 1915, However the site of No. 30 Glenilla Road and its neighbouring project remains undeveloped. Only in the 1954 Ordnance Survey map can the existing property be seen to have been constructed, suggesting it is a post WWII structure.

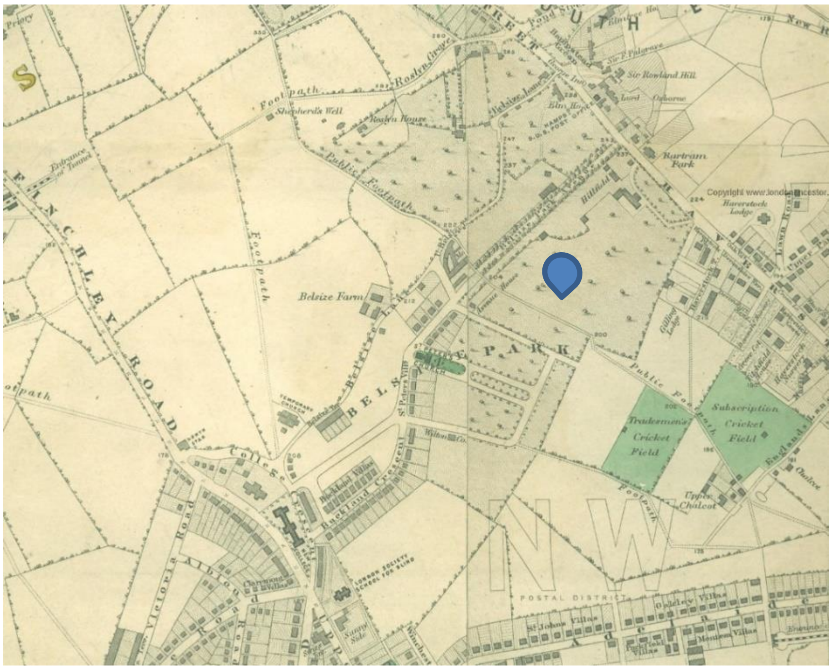


Figure 3 - Extract from Stanford (Edward), Library Map of London and its Suburbs. [1862]

Figure 4 - Extract from OS 25 Inch Map 1915

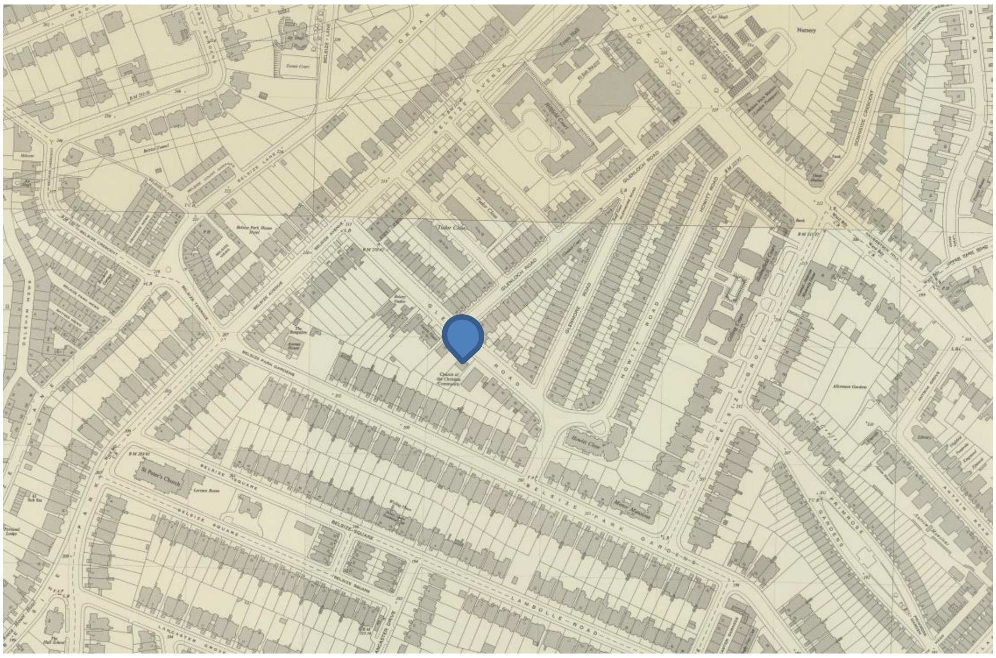


Figure 5 - Extract from OS 25 Inch Map 1954

3.1.1 Unexploded Ordnance

An initial investigation has been completed to determine the likelihood of encountering and detonating unexploded ordnance (UXO). The Bomb Sight Map indicates that the nearest impact location was a bomb on the road running parallel to the south, Belsize Park Gardens. The existing property is assumed to have been constructed post WWII. It is therefore considered unlikely to encounter an unexploded ordnance. The UXO risk assessment shown in the GEA report indicates the site as low risk.

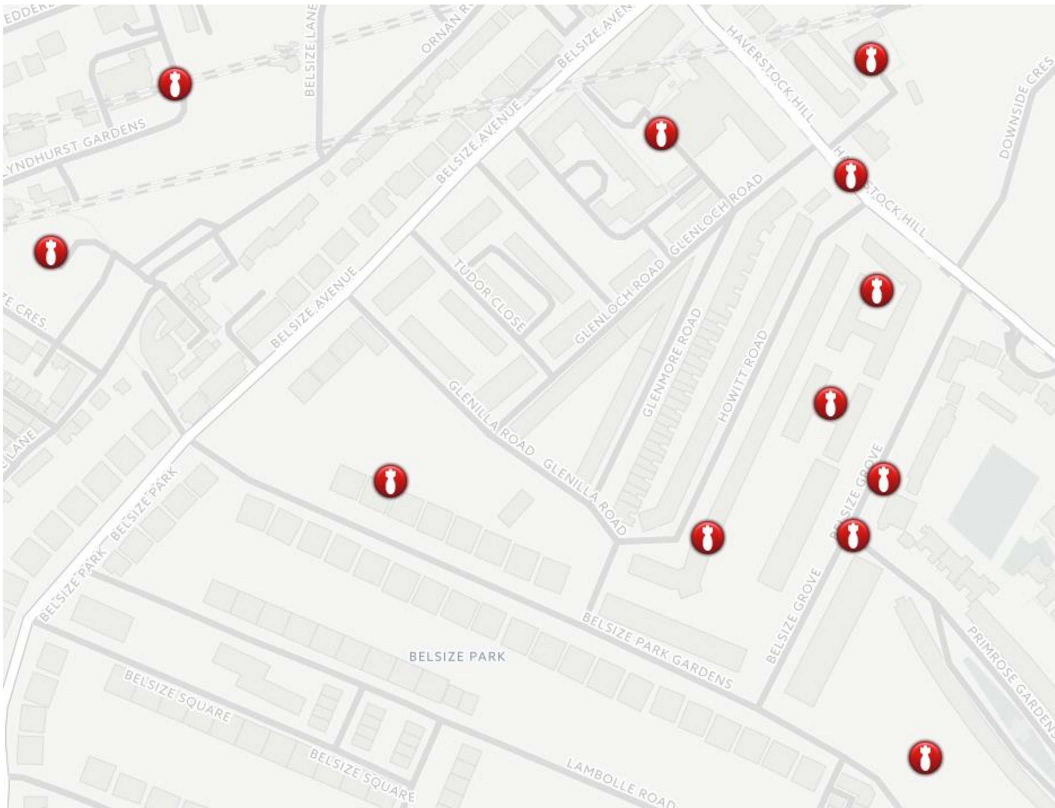


Figure 6 - Extract from the Bomb Sight Map

3.2 Description of Local Geology and Hydrology

A geoenvironmental desk study has been undertaken by Davies Maguire for the 4 Balliol Road site based upon publicly available borehole information in the local vicinity of the site. A summary of locations is shown below:

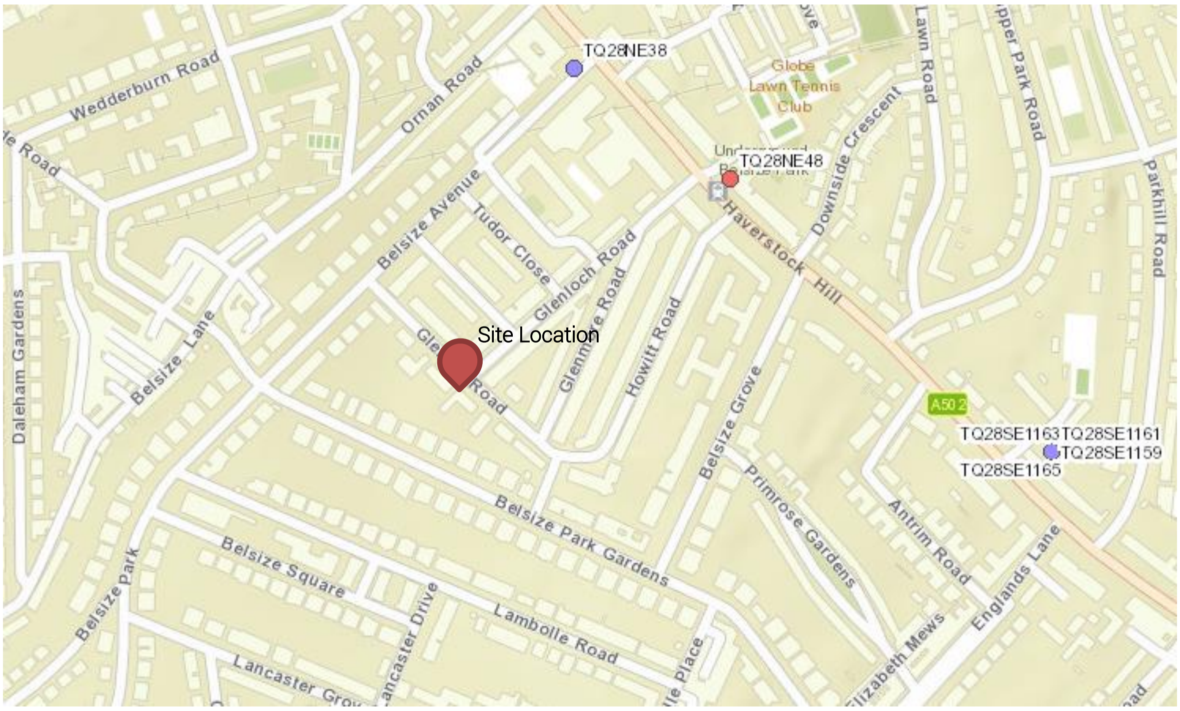


Figure 7 - BGS borehole logs local to site

The nearest boreholes, published by the British Geological Survey, are between 300m – 600m to the north and east and show that the ground conditions are made ground, overlying the London Clay. The London Clay horizon appears to vary between 1.5m and 3m below ground level.

Although all the boreholes identify the London Clay horizon, no ground water is noted in any of them. However, for the design of the basement structure, conservatively, a 1m head of water will be assumed.

GEOLOGICAL SURVEY OF GREAT BRITAIN

RECORD OF SHAFT OR BORE FOR MINERALS

(For Survey use only)
6-inch Map Registered No. TQ28NE/38

Name of Shaft or Bore given by Geological Survey:

Name and Number given by owner: c 16.

Nat. Grid Reference 2722.8520

For whom made

Town or Village Hampstead. County

Exact site Junction of Belsize Av. and Haverstock Hill. (Attach a tracing from a map, or a sketch-map, if possible.)

1" N.S.Map No. 256 | 1" O.S.Map No. | Confidential or not

Purpose for which made

Ground Level at shaft/bore relative to O.D. 234' If not ground level give O.D. of beginning of shaft/bore

Made by Date of sinking 1900.

Information from LCC. Date received

Examined by

SPECIMEN NUMBERS AND ADDITIONAL NOTES

(For Survey use only) Geological Classification	Description of Strata	Thickness Ft.	Thickness In.	Depth Ft.	Depth In.
MGR	Made Ground	4	-		
LC	Clay	16	-	20	-
	For Hampstead Tube Rly.				

Figure 8 - BGS Borehole Log TQ28NE38

69, Upper Ground, S.E.1.

The London Passenger Transport Board, 55, Broadway, S.W.1.

TQ28NE/48
2737.8510
256

April/May, 1941.

STRATA DETAILS OF TRIAL HOLE DRILLED BY MESSRS. B. RICHARDS & CO. FOR THE LONDON PASSENGER TRANSPORT BOARD, 55 BROADWAY, S.W.1.
Site - Belsize Park. — Belsize Park St.n
not sited.

	Thickness Ft.	Thickness In.	Depth Ft.	Depth In.
Ashes	0	6"	0	6"
Made up Ground	7	6	8	0
Mud with water	1	0	9	0
Made up Yellow Clay... ...	3	6	12	6
Yellow Clay	12	6	25	0
Blue Clay	118	0	143	0

Figure 9 – BGS Borehole Log TQ28NE48

Norwest Holst Soil Engineering Ltd. — BOREHOLE LOG — Borehole No. 6

Contract No. F7406
Location Haverstock Hill
Client London Borough of Camden
Method of Boring Shell & Auger
Diameter of Borehole 150mm
Sheet 1 of 2
Chainage
Ground Level m.A.O.D.
Date 20/5/87
TQ 28 SE 1164

Description of Strata	Depth Below G.L.(m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/ R.Q.D.%	Daily Progress
Concrete	0.05					
MADE GROUND: Firm, brown, slightly sandy silty CLAY with some fine to medium brick, flint, ash, glass and sandstone gravel. Becoming less sandy with depth mottled grey from 2.00m.	3.00		150mm to 1.50m	0.50 (30) 1.50 (50) 2.50 (50)		
Sitff, brown (locally mottled grey), slightly silty CLAY with occasional sand and fine gravel.	8.00			4.00 (50) 5.50 (50) 7.00 (50)		
Stiff, fissured, grey, slightly silty CLAY with occasional shell fragments.				8.50 (60)		

Type of Sample: S.P.T. / C.P.T. / Jar / Bulk / Undisturbed / Vane / Water / Piezometer

Remarks (Observations of Ground Water etc.) (-) U100 blows

Borehole dry during boring.

Water levels are subject to seasonal or tidal variations and should not be taken as constant

Norwest Holst Soil Engineering Ltd. — BOREHOLE LOG — Borehole No. 6

Contract No. F7406
Location Haverstock Hill
Client London Borough of Camden
Method of Boring Shell & Auger
Diameter of Borehole 150mm
Sheet 2 of 2
Chainage
Ground Level m.A.O.D.
Date 20/5/87
TQ 28 SE 1164

Description of Strata	Depth Below G.L.(m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/ R.Q.D.%	Daily Progress
Stiff, fissured, grey slightly silty CLAY, with occasional shell fragments.	11.00			10.00 (60)		
Very stiff, fissured, laminated, grey, slightly silty CLAY.				11.50 (60) 13.00 (70) 14.50 (70) 16.00 (70) 17.50 (70) 18.50 (70) 19.50 (80)		
End of Borehole.	20.00					

Type of Sample: S.P.T. / C.P.T. / Jar / Bulk / Undisturbed / Vane / Water / Piezometer

Remarks (Observations of Ground Water etc.) (-) U100 blows

Borehole dry.

Water levels are subject to seasonal or tidal variations and should not be taken as constant

Figure 10 - BGS Borehole Log TQ28SE1164

3.3 Hydrology

The site is located within flood zone 1, shown in the below extract from the Environment Agency flood map. The annual risk of flooding at the site is therefore perceived by the Environment Agency to be less than 1 in a 1000, and as such a flood risk assessment is not required, as noted on www.flood-map-for-planning.service.gov.uk.

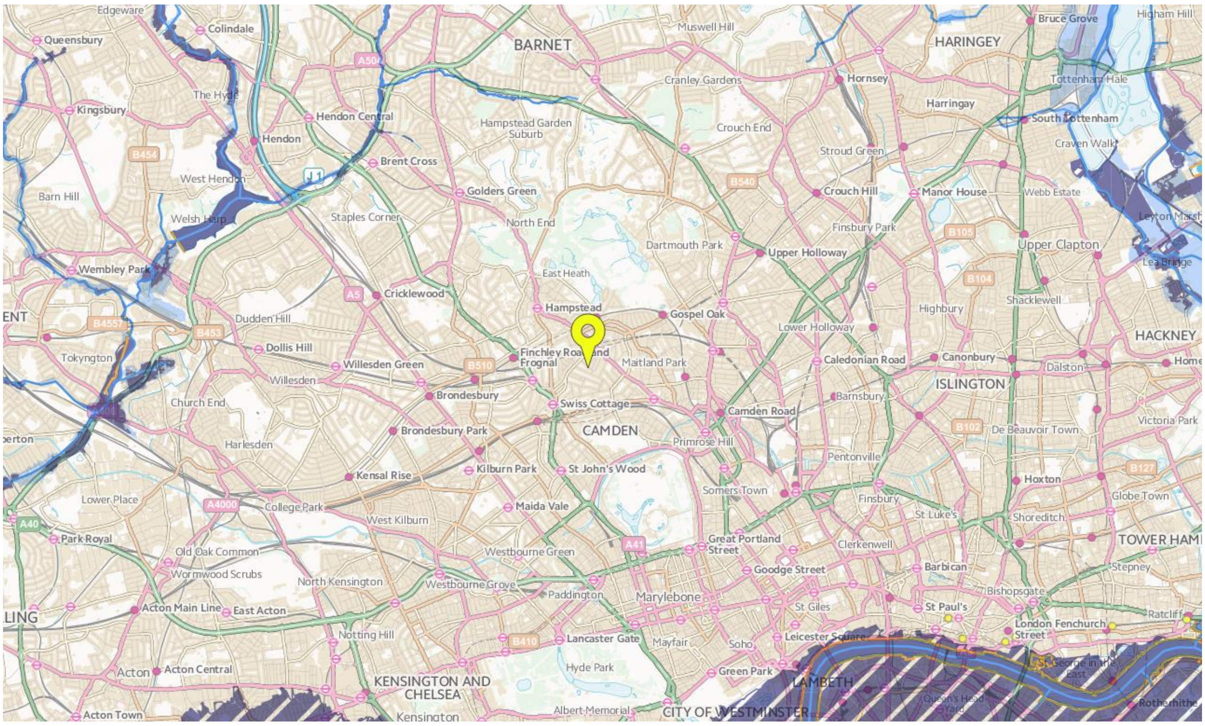


Figure 10 - Extract from the Environment Agency Flood Map

From the desk study, The Lost Rivers of London map shows our site to be in close proximity to a tributary to the historic river Tyburn, as indicated below. Therefore, the basement will be designed for a head of water 1m below the existing ground level to allow for the risk of flooding to the area.

Figure 11 - Extract from the Lost Rivers of London Map

3.4 Existing Underground Infrastructure

The nearest London underground station is Belsize Park, roughly 300m north-east of the site. The over ground runs east to west approx. 1km to the north of the site, through Hampstead Heath, see figure 12.

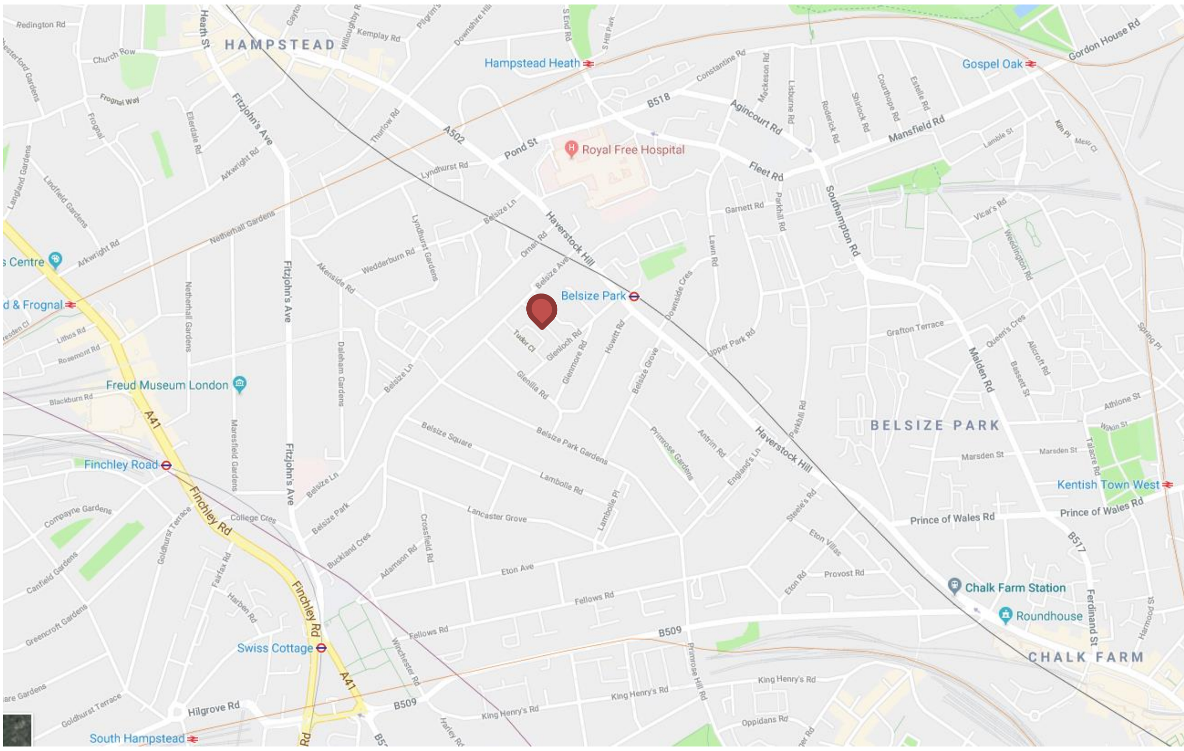


Figure 12 - Google Map of London Underground

The historic post office tunnels ran east to west through central London, and do not pass near the site, see figure 13.

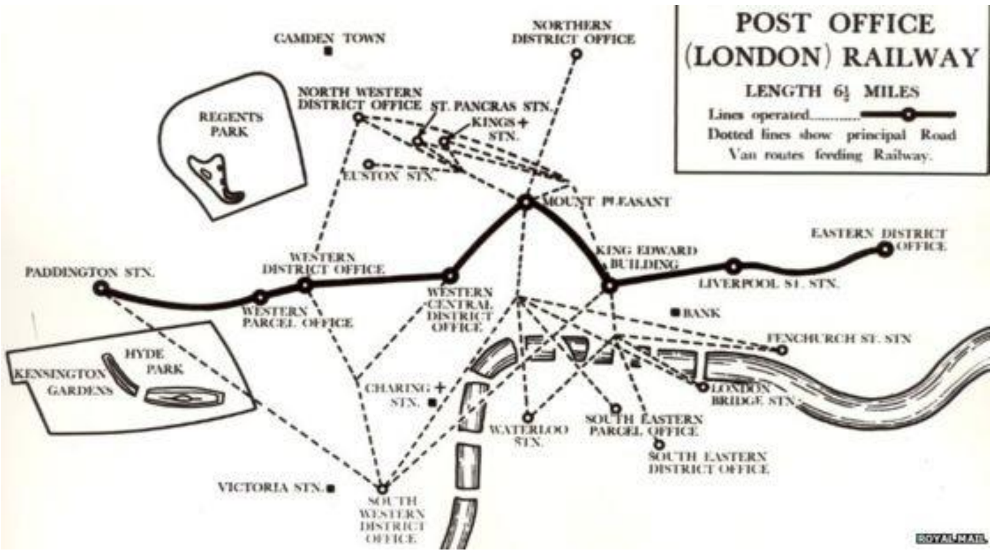


Figure 13 - Post Office Railway Tunnel Map

4 Site Investigation Findings

A site-specific ground investigation was undertaken in December 2017 by GEA on behalf of the Client. The ground investigation comprised of a window sample and borehole excavated in the rear garden of the Property and three trial pits around the boundary of the site. The factual report is appended to this report for reference.

4.1 Soil Conditions

The borehole confirmed that the site characteristics are a thin stratum of 1.6m of made ground overlying a thin layer of organic material, which in turn overlays the London Clay of increasing bearing strength to the full depth of the borehole, 20m, as shown in figure 15 and 16.

It is noted in the GEA report that the made ground thickness varies around the site between 1 – 2.5m depth.

4.2 Ground Water

The borehole confirmed the presence of ground water at a depth of 5.4m below ground level, however water was found within another smaller borehole at 0.73m below ground level. It is likely that this is a perched water table above the impermeable London Clay. The water observed is not believed to represent the Upper Aquifer as the depth to the London Clay horizon exceeds the depth the borehole reached. The proposed basement is not deep enough to affect the Upper Aquifer ground water flow. Temporary ground water management will be required during excavation to deal with the expected small inflow from the perched water table. This will be retained in the permanent case by the internal liner wall.

4.3 Flood Risk

The appended GEA site specific report notes that a flood risk assessment may be required following their findings. As mentioned above in section 3.3, the environmental agency notes that a flood risk assessment is only required, when the site is within zone 1, if affected by sources of flooding other than rivers and the sea, for example surface water drains.

GEA have noted that Camden's SFRA and Flood Risk Management Strategy indicate a potential for surface water flooding, however;

- The map of surface water runoff in Camden North in the Flood Risk Management Strategy states that Glenilla Road would be subject to 0.01m of ponding in a 1 in 75-year return period, the minimum value across the map.
- The map of groundwater flood risk in the Flood Risk Management Strategy shows Glenilla Road not in an area susceptible to groundwater flooding.
- The Updated Flood Risk for Surface Water Flooding in the Camden SFRA shows No. 28 Glenilla Road to be an area of high risk of flooding (up to 1 in 30 years). No. 28 Glenilla has a downward sloping driving, and thus a ground floor level below street level which increases flooding risk. No. 30 Glenilla Road's driveway and ground floor is at a similar level to the highway and can be seen to be within a low risk level (1 in 1000 year) shown below in Fig. 14.
- The DG5 Internal Sewer Flooding map shows that 1 property in a large area around the site has been subject to sewer flooding, suggesting this is not a critical area.

Therefore, from the above findings it is clear that the site is not in a location at risk to surface water flooding, and as such a flood risk assessment is not required. Please refer to the appended Topographical survey of the site for levels.

Figure 14 – Extract from Updated Flood Risk for Surface Water Flooding in the Camden SFRA

4.4 Slope Stability

Refer to GEA BIA document for slope stability screening in section 3.1. As it can be seen from the below figure, an extract from the ARUP Document Figure 16, the site is situated within the London Clay Formation and there are no slopes within close proximity to the site.

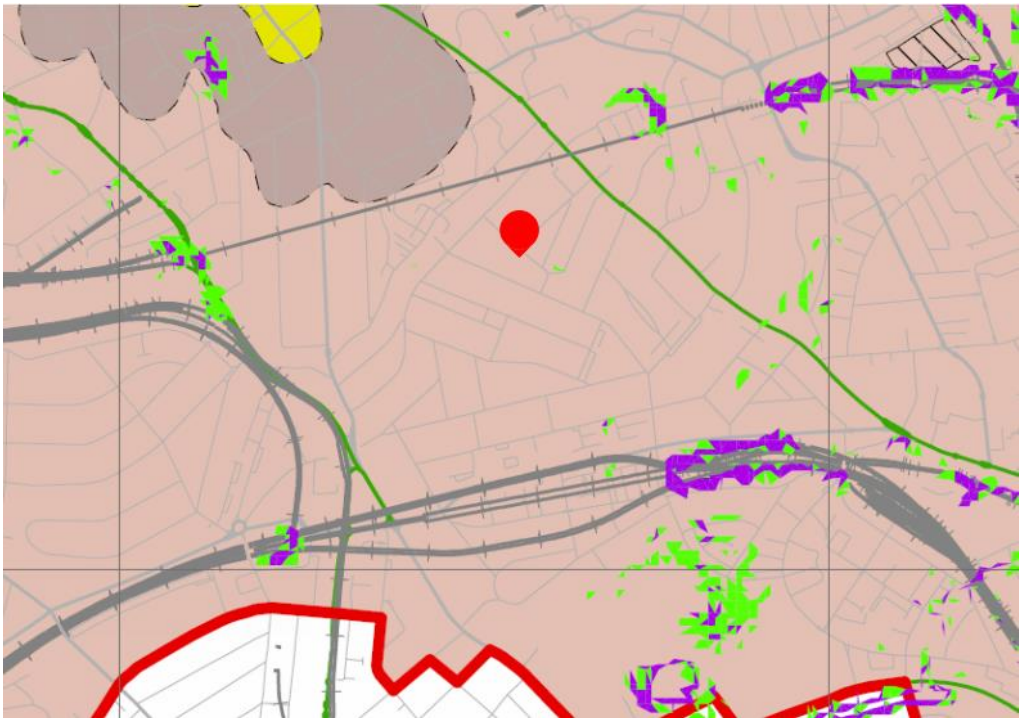


Figure 15 – Extract from ARUP Document, Figure 16

GEA Geotechnical & Environmental Associates Widbury Barn | Widbury Hill | Ware | SG12 7QE			Site 30 Glenilla Road, London NW3 4AN	Borehole Number **BH1**
Boring Method Cable Percussion	**Casing Diameter** 150mm cased to 7.00m	**Ground Level (mOD)**	**Client** S G Consulting Limited	**Job Number** J17299
	Location	**Dates** 05/12/2017- 07/12/2017	**Engineer** Davies Maguire	**Sheet** 1/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.25) 0.25	MADE GROUND (100 mm tarmac over sand subbase)		
0.25	D1						MADE GROUND (dark brown and light brown silty very sandy very gravelly clay with shell, brick, concrete, coal and wood fragments and roots to 1.6 m depth)		
0.50-1.00	B2								
						(1.35)			
1.00-1.45 1.00-1.45	SPT B3	1.00	DRY	1,0/0,1,2,2					
						1.60			
1.60	D4					(0.35) 1.95	Soft dark greenish grey clayey SILT with organic material		
2.00-2.45	U5						Firm to stiff medium to high strength brown, pale grey and orange-brown mottled fissured silty CLAY with pockets of orange-brown silt and pale brown and dark orange-brown coarse sand, occasional pockets of dark brown clay, blue veins and pockets of coarse selenite crystals, occasional mica, occasional fine shell fragments and a claystone between 5.40 m and 5.55 m depth		
2.45	D6								
2.70	D7								
3.00-3.45 3.00-3.45	SPT D8	2.00	DRY	1,2/2,3,3,4					
3.70	D9								
4.00-4.45	U10								
4.45	D11								
4.70	D12								
5.00-5.45 5.00-5.45	SPT D13	2.00	DRY	1,2/3,3,4,8					
5.40-5.85 5.50	B14 W18			SLOW(1) at 5.50m, rose to 5.40m in 20 mins.					1
6.00	D15					(8.35)			
6.50-6.95	U16								
6.95	B17			05/12/2017:6.85m					
				06/12/2017:6.60m					
7.50	D19								
8.00-8.45 8.00-8.45	SPT D20	7.00	DRY	2,2/3,4,4,6					
9.00	D21								
9.50-9.95	U22								

Remarks	Scale (approx)	Logged By
30 mins erecting safety fencing around rig and making area safe 1 hour 30 mins unloading an erecting rig 3 hours dismantling rig and manhandling rig back on to trailer Organic odour noted from 1.6 m depth Groundwater monitoring standpipe installed to a depth of 6.0 m with a response zone between 2.0 m and 6.0 m 1 hour 30 mins chiselling from ground level to 1.0 m depth 30 mins chiselling from 5.4 m to 5.5 m depth 30 mins dismantling safety fencing and placing it ready for collection	1:50	CA
	Figure No. J17299.BH1	

Figure 16 - Borehole (Page 1) from 30 Glenilla Road

GEA Geotechnical & Environmental Associates
Widbury Barn | Widbury Hill | Ware | SG12 7QE

Site 30 Glenilla Road, London NW3 4AN			**Borehole Number** BH1
Boring Method Cable Percussion	**Casing Diameter** 150mm cased to 7.00m	**Ground Level (mOD)**	**Client** S G Consulting Limited	**Job Number** J17299
	Location	**Dates** 05/12/2017-07/12/2017	**Engineer** Davies Maguire	**Sheet** 2/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
9.95	D23								
10.30	D24					10.30	Stiff and very stiff high and very high strength greyish brown fissured silty CLAY with mica and occasional fine selenite crystals, occasional shell fragments and brownish grey silt partings at 20.0 m depth		
11.00-11.45 11.00-11.45	SPT D25	7.00	DRY	2,3/4,5,5,7					
12.00	D26								
12.50-12.95	U27								
12.95	D28								
13.50	D29								
14.00-14.45 14.00-14.45	SPT D30	7.00	DRY	2,3/4,5,6,7					
15.00	D31					(9.70)			
15.50-15.95	U32								
15.95	D33								
16.50	D34								
17.00-17.45 17.00-17.45	SPT D35	7.00	DRY	3,4/5,6,7,9					
18.00	D36								
18.50-18.95	U37								
18.95	D38								
19.50	D39								
				06/12/2017:DRY		20.00			

Remarks
30 mins erecting safety fencing around rig and making area safe
1 hour 30 mins unloading an erecting rig
3 hours dismantling rig and manhandling rig back on to trailer
Organic odour noted from 1.6 m depth
Groundwater monitoring standpipe installed to a depth of 6.0 m with a response zone between 2.0 m and 6.0 m
1 hour 30 mins chiselling from ground level to 1.0 m depth
30 mins chiselling from 5.4 m to 5.5 m depth
30 mins dismantling safety fencing and placing it ready for collection

Scale (approx)	Logged By
1:50	CA
Figure No. J17299.BH1	

Figure 17 - Borehole (Page 2) from 30 Glenilla Road

4.5 Existing Structure

30 Glenilla Road is a two-storey detached residential structure, with the western wall acting as a boundary walls to No. 28 and a shared garden to No. 32 Glenilla Road. The two-storey building is set back from Glenilla Road, and is bounded by an individual private garden to the rear.

Figure 18 – 30 Balliol Road taken from Glenilla Road (© Googlemaps 2017)

The existing is to be fully demolished and replaced with the proposed scheme.

4.5.1 Neighbouring Structures

No. 28b Glenilla Road, to the east of the site is a three-storey residential building. From reviews of the information on the Camden planning portal, there is not expected to be a basement beneath this structure.

No. 32 Glenilla Road is a detached single storey masonry structure with no basement. There is currently a planning application in the Camden portal for the structure to be demolished and replaced with two semi-detached properties, each with their only single storey of basement.

4.6 Existing Trees

There are a number of large trees in the rear garden of the property and in those of the next-door neighbours. It is understood that that the existing trees within the property grounds will not be affected by the proposed works and these are to be detailed in the Contractor’s temporary works proposals prior to the commencement of works.

The clay found beneath the site has a high-volume change potential, proven by the plasticity index calculated in the geotechnical factual report, and so any seasonal moisture fluctuation due to the presence of trees or shrubs will have some impact upon the soil volume beneath the build. However, the proposed development will increase the depth of existing foundations reducing the foundation level away below the influence of the tree or shrub root ball.

If roots are exposed during the basement construction works, the Contractor is to seek the recommendations of a tree specialist before cutting or damaging the roots to mitigate the risk of damaging the nearby vegetation.

5 The Proposed Development

5.1 Superstructure

The proposed structural works involve the demolition of the existing residential house and the rebuild of a three-storey home, with a single storey of basement below the footprint of the house.

The superstructure is intended to be a steel frame with timber joist floors, with the cladding supported at each level, due to the complex shape of the building envelope. The primary columns will bear on the perimeter capping beam whilst ground floor steel beams will provide lateral support in the permanent case to the top of the contiguous piled retaining wall.

Timber joist and steel beam floors can be susceptible to vibration, so it will be critical during detailed design to ensure the members are designed with this in mind, as it is likely to be the critical factor.

5.1.1 Disproportionate Collapse

The new structure is to conform with The Building Regulations 2010 Edition (England and Wales): Approved Document A – Section A3 Disproportionate Collapse, the building should be considered as Class 1, therefore, no additional measures should be necessary.

5.2 Substructure

A single storey basement is to be constructed across the full plan area of 30 Glenilla Road. This is proposed to be constructed with a contiguous piled retaining wall with the basement and ground floor slabs fully tied into the wall thus providing lateral restraint.

A detailed Basement Impact Assessment has been carried our by GEA as part of the site investigation; for details of this refer to Appendix A, GEA Desk Study & Ground Investigation Report dated February 2018.

An arboricultural and tree protection report has been carried out by Arboricultural Solutions. The report identifies the required protection for the surrounding trees along with each tree's recommended root protection zones. It has been noted that the proposed works will not have any negative effects on the existing trees.

In the temporary condition, active earth pressure will resolve as bearing pressure distributed across the width of the underpin. As the soil matrix relaxes behind the underpinned basement wall, the lateral forces will increase towards the "at rest" pressure condition. As the basement slab is fully tied into the retaining wall, these increases in force will be resisted by the flexural capacity of the wall / slab and bearing pressure will spread across the basement slab ensuring that the bearing pressures do not exceed the allowable capacity of the soil.

5.2.1 Heave protection

The required excavation to achieve the basement level results in a significant amount of load removal from the assumed underlying clay layer. There will be an associated heave or upward movement of the clay following this load removal. A heave protection mat of Cordek Cellcore or similar is required to achieve an isolation between the underside of the new basement slab and the clay below to absorb this movement without affecting the structure above.

5.2.2 Retaining Walls

The basement is proposed to be excavated within the contiguous pile retaining wall installed around the perimeter. The contiguous pile system will provide permanent retention of soil. A internal concrete liner wall with waterproof admixture to maintain a watertight structural integrity.

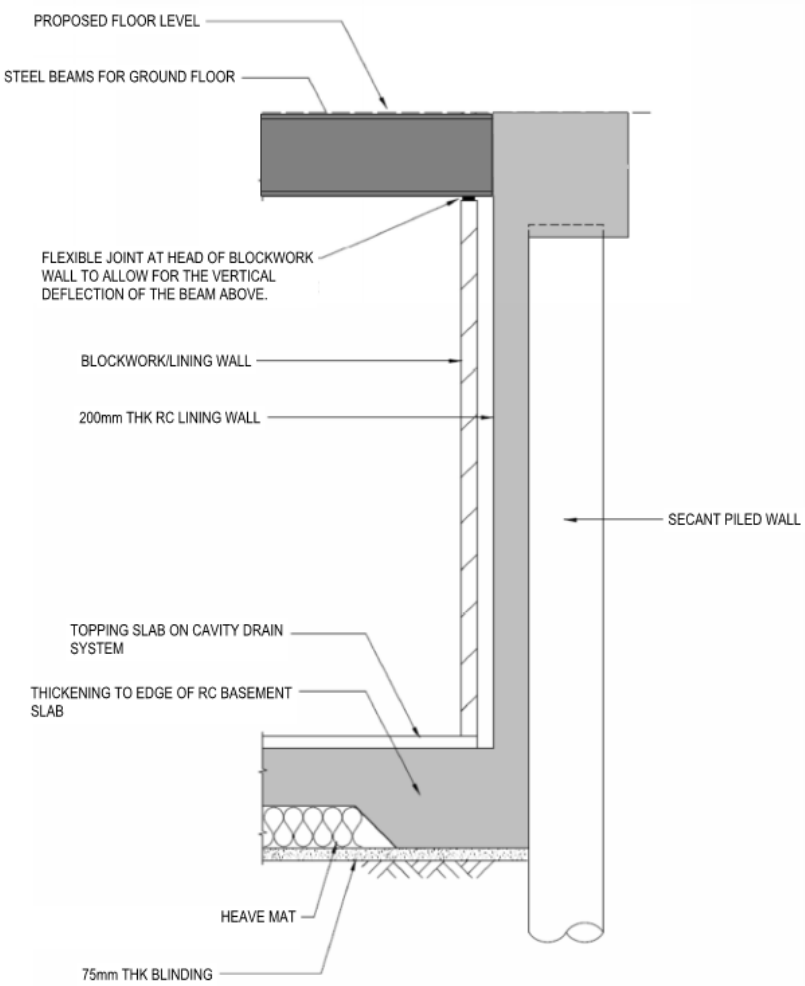


Figure 19 – Section through proposed Retaining wall

5.2.3 Drainage Strategy

Surface Water Attenuation
SuDS are to be utilised on the site with the use of a Green Roof, a permeable pavement and an underlying attenuation system. Due to the London Clay and proximity of the surrounding buildings, a soakaway or infiltration system would not be suitable on this site.

The minimum allowable pipe size under Part H is a 75mm drainage pipe. The minimum discharge rate for an orifice plate with a 75mm pipe is 2.5l/s. Therefore, this has been used as the maximum allowable discharge rate for the surface water.

	Hard Standing Area (m^2)	Attenuation Required (m^3)
Existing	233	-
Proposed	286	12

The above figures relate to the required volume of attenuation to limit discharge to 2.5l/s for a 1 in 100-year storm event with a 40% additional allowance for climate change.

Drainage Design
Thames Water were contacted by Davies Maguire regarding the location of their public sewer network. An asset location plan was received by them on 06/10/2017, this plan identified a combined sewer located within Glenilla Rd, adjacent to the proposed development.

Davies Maguire have done initial checks regarding the surface water run off rate and the potential foul water discharge rate based on the preliminary plans by the Architect. A comparison has been completed between the existing and proposed peak outflow rates. The surface water and foul outflow rates are shown in the table below. As we are attenuating the surface water, the overall outflow value is equivalent to the existing so will not have a negative effect on the existing Thames Water drainage network.

	Existing outflow rates (l/s)	Proposed outflow rates (l/s)
Surface Water (1 in 30-year event)	2.9	2.5
Foul Water	2.25	2.7
Total	5.15	5.2

Sewer Flooding Protection
To protect the proposed basement structure from potential sewerage surcharge and flooding, all drainage provisions located at this level will be fully segregated and collected by a pumped system with duplicate pumps provided within a wet well sump. In line with Part H, 24-hour emergency storage will be provided within the sump pump tank. These systems will include non-return/backflow prevention valves to the rising main and outfall systems. The pumping collection and disposal systems will be in accordance with Building Regulation Part H - 2.9 requirements.

5.3 Effect on Neighbouring Structures

No. 30 is a detached property, with the west building wall and the east garden wall acting as boundary walls between the two neighbouring structures. A movement analysis has been carried out by GEA on behalf of the client to determine likely deflection during and after the construction of the basement. This can be found in Appendix A.

The method of construction of the basement, and the temporary/permanent case will be designed to ensure that there will be no significant structural effect to either of the adjacent structures. The new basement construction will re-support the boundary walls to match the existing support.

An engineer is to supervise construction on site, in liaison with the contractor to ensure safe practices are used throughout. The superstructure and neighbouring properties will also be monitored during construction, to guarantee that any adverse movement is caught at the earliest opportunity. In addition, the existence of road to the north is taken into account during the design stages, to ensure there is no detrimental effect to the highways load bearing capacity during or after the works.

5.4 Construction Sequence Summary

5.4.1 Basement Construction Sequence

Following demolition of the existing building, along with all existing substructure the following sequence shall be implemented to construct the new basement at 30 Glenilla Road:

1. A pilling mat is to be installed at ground level on the site and the contiguous pile wall is to be constructed around the new perimeter. Internal piles are also to be installed from this level.

2. The ground level is then to be reduced with temporary whaling beams and props installed to support the contiguous pile walls as necessary. The internal piles are to be cut down to the required level. Temporary pumping may be required to remove inflow from the perched water table.

3. The basement level pile caps, ground beams and basement RC slab are to be cast along with an internal perimeter liner wall.

4. The new ground floor structure is to be installed to provide the permanent lateral support to the top of the contiguous pile wall, and only following this the temporary whaler beams and props can be removed.

Refer to SK-015 for the proposed construction sequence of the basement and ground floor slabs.

5.5 Design Assumptions

- The basement will be designed to create a grade 3 environment in accordance with BS 8102:2009. Structural waterproofing will be used as a secondary barrier to achieve this in combination with a primary form of waterproofing; most likely a drained cavity system designed to architect's details. The reinforced concrete basement structure will be constructed using a waterproof concrete admixture such as Pudlo or similar approved and the reinforcement shall be detailed to achieve a maximum crack width of 0.3mm.

- The proposed basement walls will be designed for lateral earth pressures associated with the "at rest" condition. In addition to this, a nominal live load surcharge associated with the use of the highway (HB Loading) shall be applied in accordance with the Design Manual for Highways and Bridges document BD37/01.

- The ground water has been identified in the desk study section at a depth of 0.73m below ground level and is therefore foreseen to affect the basement. It has been conservatively assumed that in the temporary condition, ground water levels may rise to ground level and this has been applied in the design of the basement structure.

5.6 Temporary Works Scheme

5.6.1 Responsibilities

The Contractual approach with regards to Temporary Works design is that the appointed Contractor has full design responsibility. They may in turn appoint their own Engineers to design the works. For tender purposes we would expect to define the project expectations in terms of permitted movements, approvals and general design criteria. This would be supported with an outline scheme which defines the minimum expectations.

5.6.2 Water control

As stated in section 4.2 we do anticipate the need to make special provisions due to the level of ground water found in the site investigation. Therefore, a temporary waterproofing solution will need to be developed to prevent excessive water flow in to the excavation. This is likely to be with sheeting and water pumping.

5.6.3 Temporary propping

In order to complete these works within the space defined by the RC retaining walls it will be essential to introduce a system of walers, struts and props. These will be introduced at regular intervals as the excavation gains depth. They will be designed to ensure that the works can be completed efficiently and safely. Alternatively, the contiguous pile retaining structure can be designed to act as a cantilever in the temporary case, removing the need for walers and struts. The phasing of the works and sizing of members will also be designed to keep lateral deflection of the foundations within the limits defined at the start of the project.

5.7 Noise, dust and vibration

Construction works generally are a source of noise and nuisance which can affect both operatives within the work site as well as neighbours and passing members of the public. Demolition and excavation works are particular sources of this potential harm so it will be necessary during these works at 4 Balliol Road for the contractor to mitigate the extent and impact of noise, dust, traffic and vibration.

5.7.1 Noise

Disruption: Noise which will be generated by the mechanical equipment used to demolish existing construction and excavate for the new basement.
Control Measure: Mitigated by undertaking demolition of the existing structure in a controlled and considered deconstruction sequence. By using saw cutting methods rather than pneumatic breakers to reduce noise. By working only within agreed and designated hours. By using machinery equipped with baffles and noise attenuation systems. By performing a noise monitoring regime to ensure acceptable noise levels are not routinely breached.

5.7.2 Dust

Disruption: Generated by excavation works and transfer of arisings from the work area to the disposal skip or wagon.

Control Measure: Mitigated by damping conveyors when in operation, damping ground before clearing sites,, by washing down vehicle wheels before leaving site. Using machinery with dust suppression systems fitted.

5.7.3 Vibration

Disruption: Generated by use of heavy machinery for sustained periods and by heavy vehicles.

Control measure: Mitigated by using concrete saws and crushers using demolition of the existing building which eliminate vibration. By undertaking disruptive works during agreed and designated hours. By using non-vibration alternative methods where possible.

The final methods of noise, dust and vibration control are the responsibility of the contractor. Once appointed, the contractor will issue detailed plans for the control of noise, dust and vibration in the form of a project Contractor's method statement for the review and comment of the design team.

Such measures listed above represent good working practices which are common place on the many construction projects we have experience of.

6 Outline Material Specification

6.1 Concrete

6.1.1 Grades

Location	Designated Mix to BS 8500	Characteristic Cube Strength
Substructure • General RC Foundations	RC35/45	45 N/mm^2

6.1.2 Material Properties

Density	2500kg/m^3 (normal weight) 1900kg/m^3 (light weight)
Young's Modulus	28kN/mm^2 (short term) 10kN/mm^2 (long term)
Poisson's Ratio	0.2 (allowing for creep and shrinkage)

Coefficient of Thermal Expansion 12 x 10^{-6} per ^oC

6.1.3 Covers

All covers to be in accordance with BS EN 1992-1-1:2004.

Nominal cover to all reinforcement shall be as follows unless noted otherwise on the drawings

Substructure	50mm (75mm if cast onto earth)
Superstructure	35mm (internal) 40mm (external)

6.1.4 Cast-in fixings/holes/chases

It is the responsibility of the Main Contractor to determine locations of all cast-in fixings, holes and chases required for cladding and services and any other fixings as required by the Architect.

6.1.5 Concrete Finishes

Formed concrete finishes are detailed in the Davies Maguire Concrete Specification.

6.2 Steelwork

6.2.1 Member sizes and connection design

Sizes of members and end connection loads are scheduled on the drawings for the final (completed) building state only.

It is the responsibility of the steelwork sub-contractor to produce calculations for the steelwork connections, taking account of any temporary works requirements, and submit them to the Architect/Engineer and Local Authority for approval.

All connections have a minimum of 2 No. M16 Grade 8.8 bolts unless noted otherwise.

6.2.2 Steel grades (Eurocode 3)

Grades of steelwork/bolts are to be as follows (unless noted otherwise on the drawings)

All steelwork	Grade S355
All bolts	Grade 8.8
Structural Stainless Steel	Grade 360

Material Properties – the following properties have been used in the design:

Density	7850 kg/m^3
Young's Modulus	210 kN/mm^2
Poisson's Ratio	0.27
Coefficient of thermal expansion	11.7 x 10^{-6} per ^{o}C
Shear modulus	80 kN/mm^2

6.3 Timber

6.3.1 Timber Sourcing

Timber (including timber for wood based products) should be obtained from well-managed forests and/or plantations in accordance with:

- The laws governing forest management in the producer country or countries.
- International agreements such as the Convention on International Trade in Endangered Species of wild fauna and flora (CITES).

Documentation – provide either:

- Documentary evidence (which has been or can be independently verified) regarding the provenance of all timber supplied.
- Evidence that suppliers have adopted and are implementing a formal environmental purchasing policy for timber and wood based products.

6.3.2 Timber Grades

All timber members are to be grade C24 to BS EN 1995-1-1:2004 unless noted otherwise. Timber to be pressure-impregnated with preservative and cut ends brush treated.

Material Properties – the following properties have been used in the design:

Density	400 – 600 kg/m^3
Shrinkage	3 – 4%
Bending parallel to grain	7.5 N/mm^2
Tension parallel to grain	4.5 N/mm^2
Compression parallel to grain	7.9 N/mm^2
Min. compression perpendicular to grain	1.9 N/mm^2
Shear parallel to grain	0.7 N/mm^2
Min. modulus of elasticity	7200 N/mm^2

6.3.3 Workmanship

All work to be in accordance with BS 8000-0:2014: Workmanship on Building Sites – Code of Practice for Carpentry, Joinery and General Fixings, and BS EN 1995-1-1:2004.

Sundry fixings:

- All plugging is to be executed in hardwood.
- Nails are to comply with BS EN 14592.
- Wood screws are to comply with BS EN 14592.
- Metal bolts and nuts are to comply with BS EN 14592.
- Rag bolts are to comply with BS EN 14592.

Joists marked DJ are to be doubled joists, TJ are to be triple joists, bolted together using M12 grade 8.8 bolts at centres along span to be specified by the Engineer.

All bolts into timber are to have 50sq x 3 thick ms washers below nut.

Solid blocking or herringbone strutting to be provided between all timber joists or rafters as follows:

- 2.5m to 4.5m span: midspan and at each end support.
- Spans longer than 4.5m: two rows equally spaced in span and at end supports.
- Outer joists or rafters to be blocked solidly to perimeter walls.

7 Fire Protection

In liaison with the architect and the Approved Inspector (Building Control) we understand that the current requirements are for a 60-minute fire rating.

8 Health and Safety

8.1 CDM Regulations

The role of Davies Maguire on this project is that of designer as defined by CDM regulation 9. As such, the design will be considered for foreseeable hazards and associated risks. The design has been developed and, where possible, the risks identified will be reduced or eliminated. The Principal Designer for this project is responsible for co-ordinating the Health and Safety plan. Health and Safety issues relating to the construction of the buildings and materials used will be identified in the plan. However, this item should in no way be considered as a complete and final list. The Contractor's normal Health and Safety obligations still apply when undertaking constructional operations on and off site.

9 Design Life

The design life of a building can be defined as the period of use intended by the designer as agreed with the client. It should be noted that the design life of a building's components may not be the same as the design life of the building. As such two categories arise for defining durability of building elements:

- Maintainable – with periodic treatment will last the life of the building
- Lifelong – will last for the life of the building

With a design life of 50 years the development can be categorised as 'normal life' to Eurocode 0.

Elements of structure can be categorised as follows:

Construction element	Material type	Category of design life	Maintenance / repair required
Floor slabs	Timber joist / Steel Frame	Maintainable	
Basement construction	Concrete	Lifelong	Damage or breaking of surface to be repaired to ensure water tightness.

10 Contractor Designed Portions during Basement Construction

This section outlines the elements to be designed by others:

- Temporary works during demolition and construction
- Temporary groundwater management
- Permanent formwork to in-situ concrete
- Reinforcement detailing

11 References

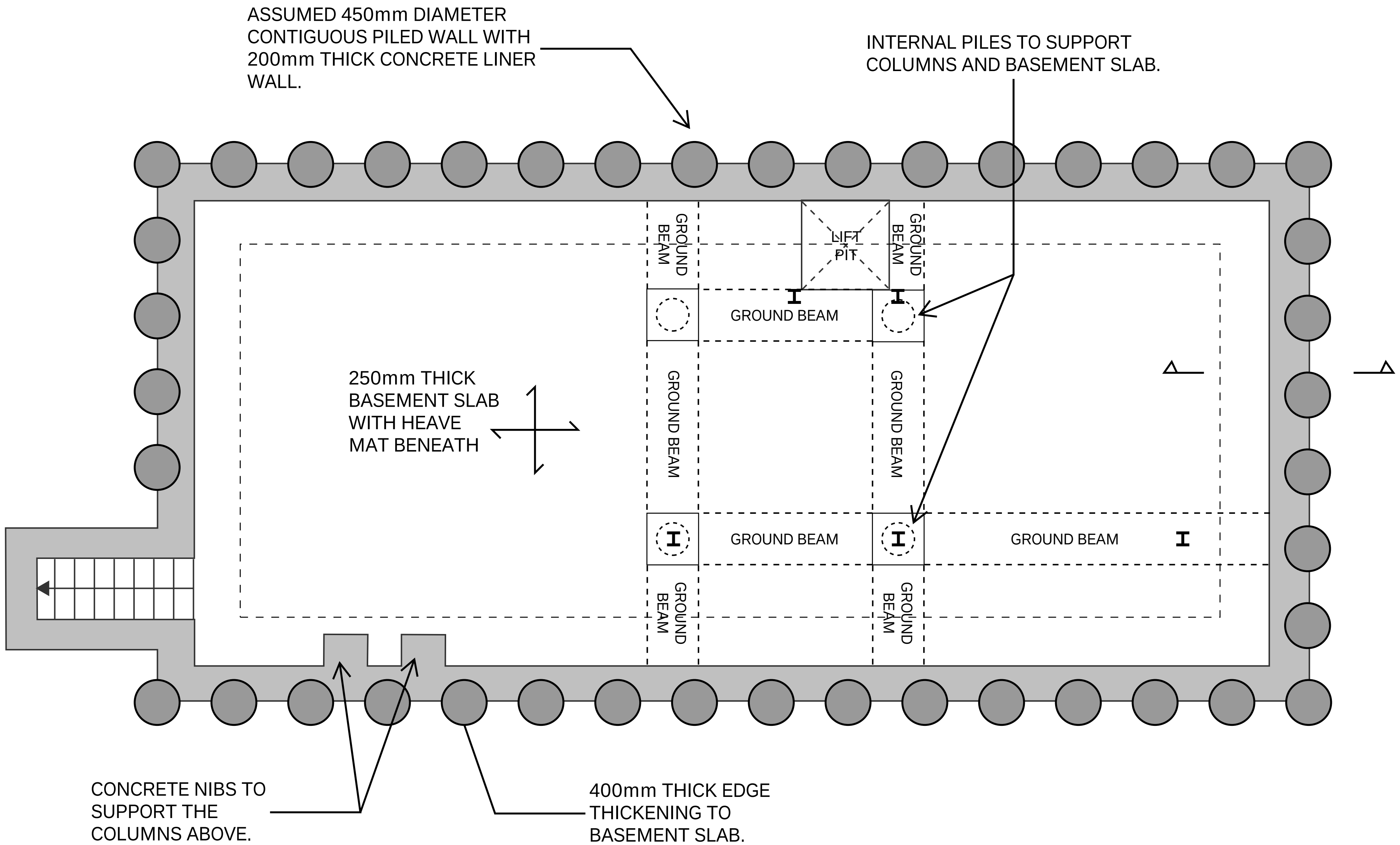
The following British Standards, Codes of Practice and References have been applied:

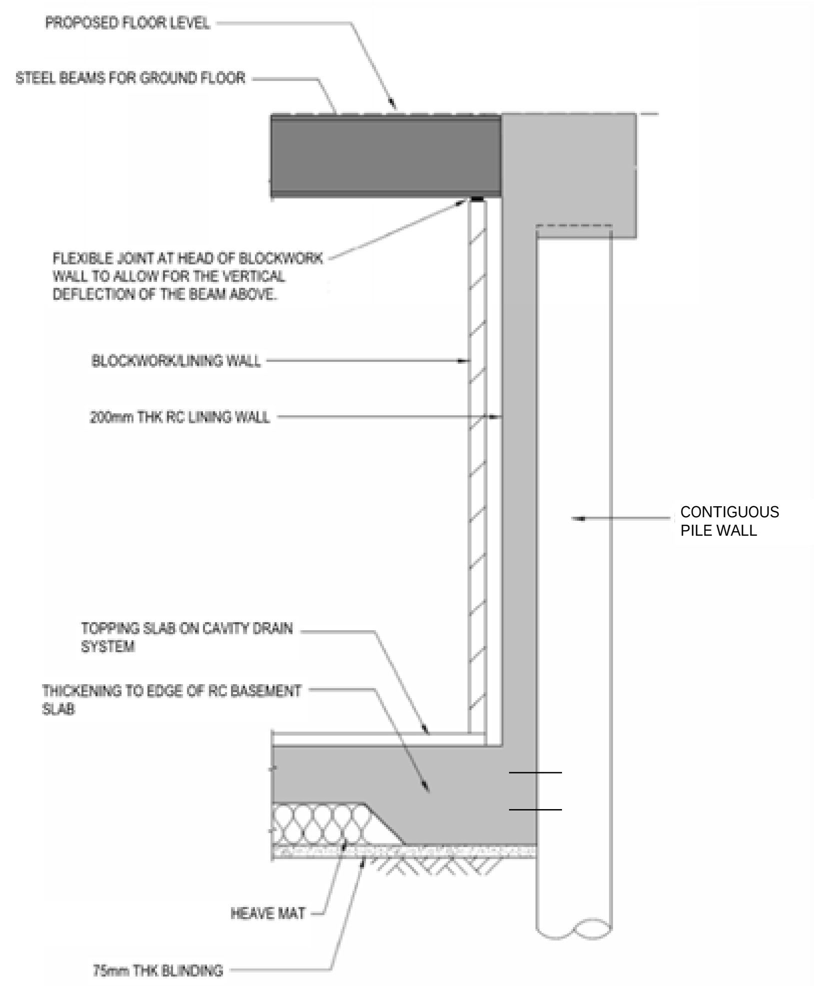
Building Regulations 2010 (2010 Edition)

BS 7543	Durability of Buildings and Building Elements, Products and Components
BS EN 1990	Eurocode: Basis of Structural Design
BS EN 1991	Eurocode 1: Actions on Structures
BS EN 1992	Eurocode 2: Design of Concrete Structures
BS EN 1993	Eurocode 3: Design of Steel Structures
BS EN 1995	Eurocode 5: Design of Timber Structures
BS EN 1996	Eurocode 6: Design of Masonry Structures
BS EN 1997	Eurocode 7: Geotechnical Design
BS 8102	Protection of Structures Against Water from the Ground
BS 8007	Design of Concrete Structures for Retaining Aqueous Liquids
CIRIA Report TN107	Design for movement in buildings
CIRIA Report 139	Water-resisting Basements

APPENDIX A – GROUND INVESTIGATION REPORT

APPENDIX B – PROPOSED STRUCTURAL DRAWINGS





SECTION

NOTE
PILES SHOWN INDICATIVELY - TO BE FURTHER DEVELOPED DURING DETAILED DESIGN.

Rev	Description	Date	By	App
P02	PRELIMINARY	31/07	HK	GD
P01	PRELIMINARY	07/02	HK	GD

Project Title:
30 GLENILLA ROAD

Drawing Title:
PROPOSED STRUCTURE - BASEMENT LEVEL

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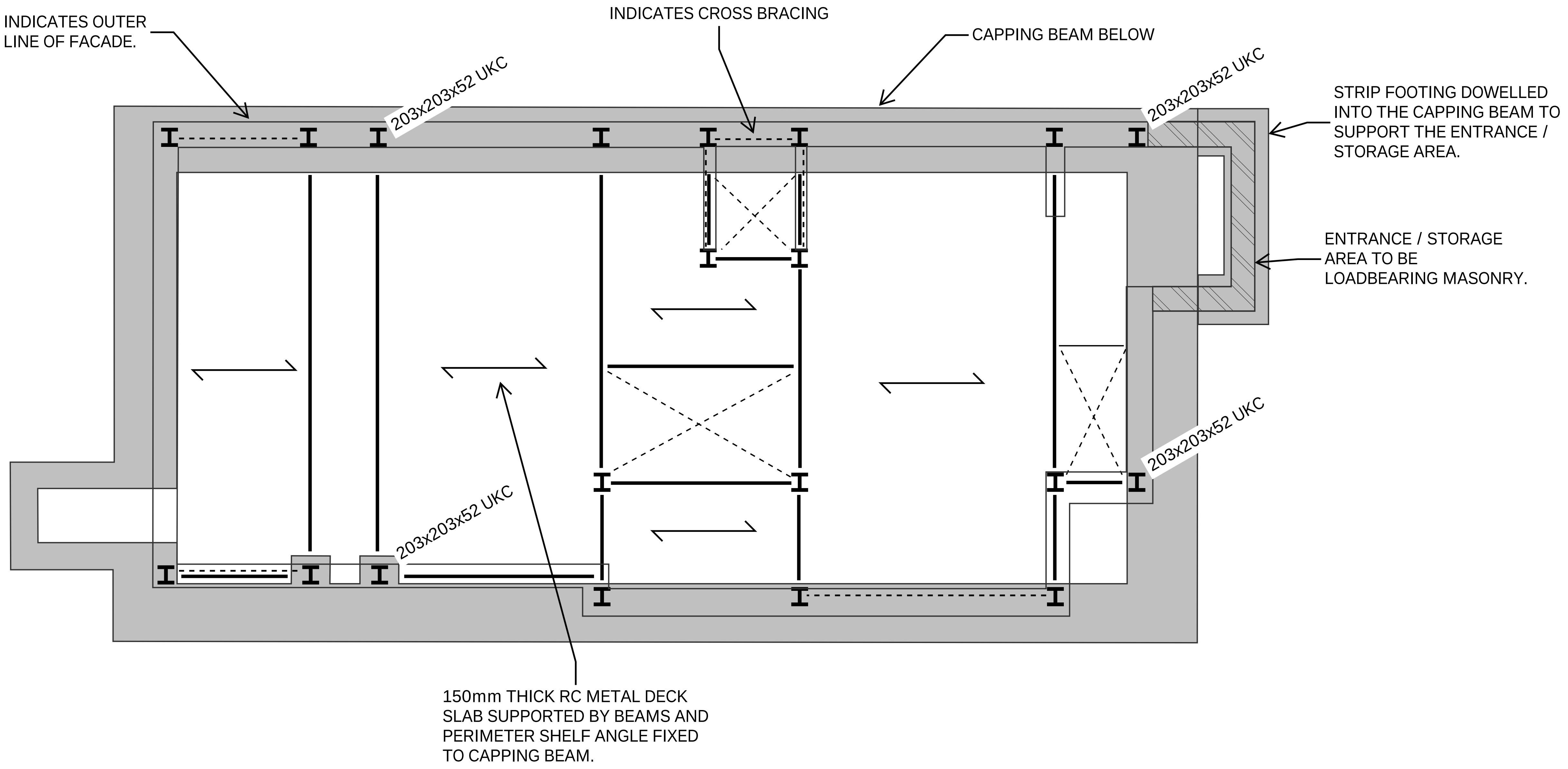
Stage:	Drawn:	Date:	Scale:	Project No.:	Drawing No.:	Rev:
PRELIMINARY	HK	31/07/2018	NTS	16-50	SK-010	P02



COLUMNS TO BE 152 x 152 x 37 UKC U.N.O
BEAMS TO BE 254 x 254 x 107 UKC ON GROUND FLOOR
BEAM TO BE TYPICALLY 203 x 203 x 52 UKC ABOVE.

Rev	Description	Date	By	App
P01	PRELIMINARY	07/02	HK	GD

Project Title: 30 GLENILLA ROAD

Drawing Title: PROPOSED STRUCTURE - GROUND FLOOR

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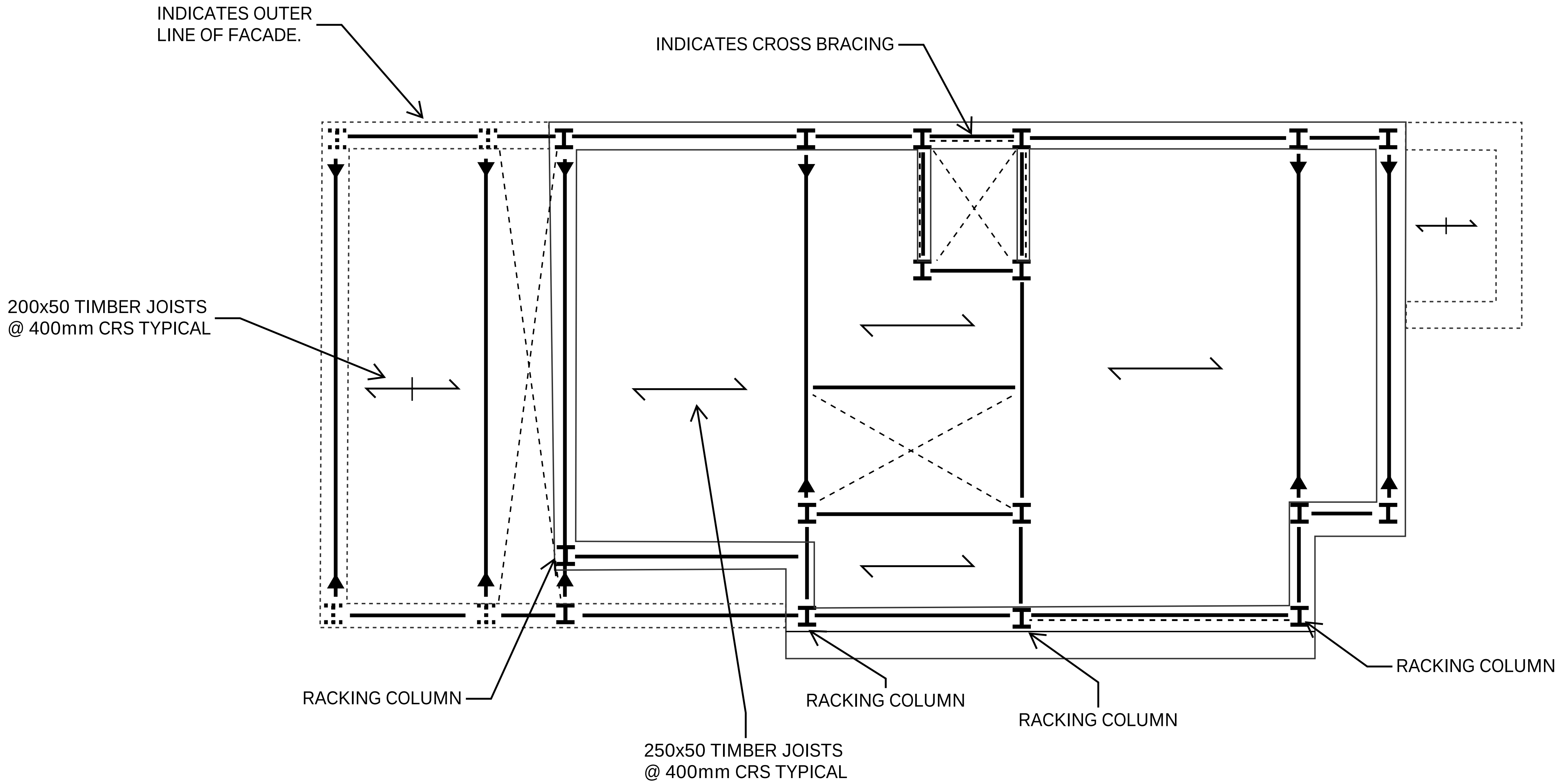
W dmag.com

Stage:	PRELIMINARY		
Drawn: HK	Date: 08/02/2018	Scale: NTS	
Project No.: 16-50	Drawing No.: SK-011	Rev: P01	



Rev	Description	Date	By	App
P01	PRELIMINARY	07/02	HK	GD

Project Title:
30 GLENILLA ROAD

Drawing Title:
PROPOSED STRUCTURE - FIRST FLOOR

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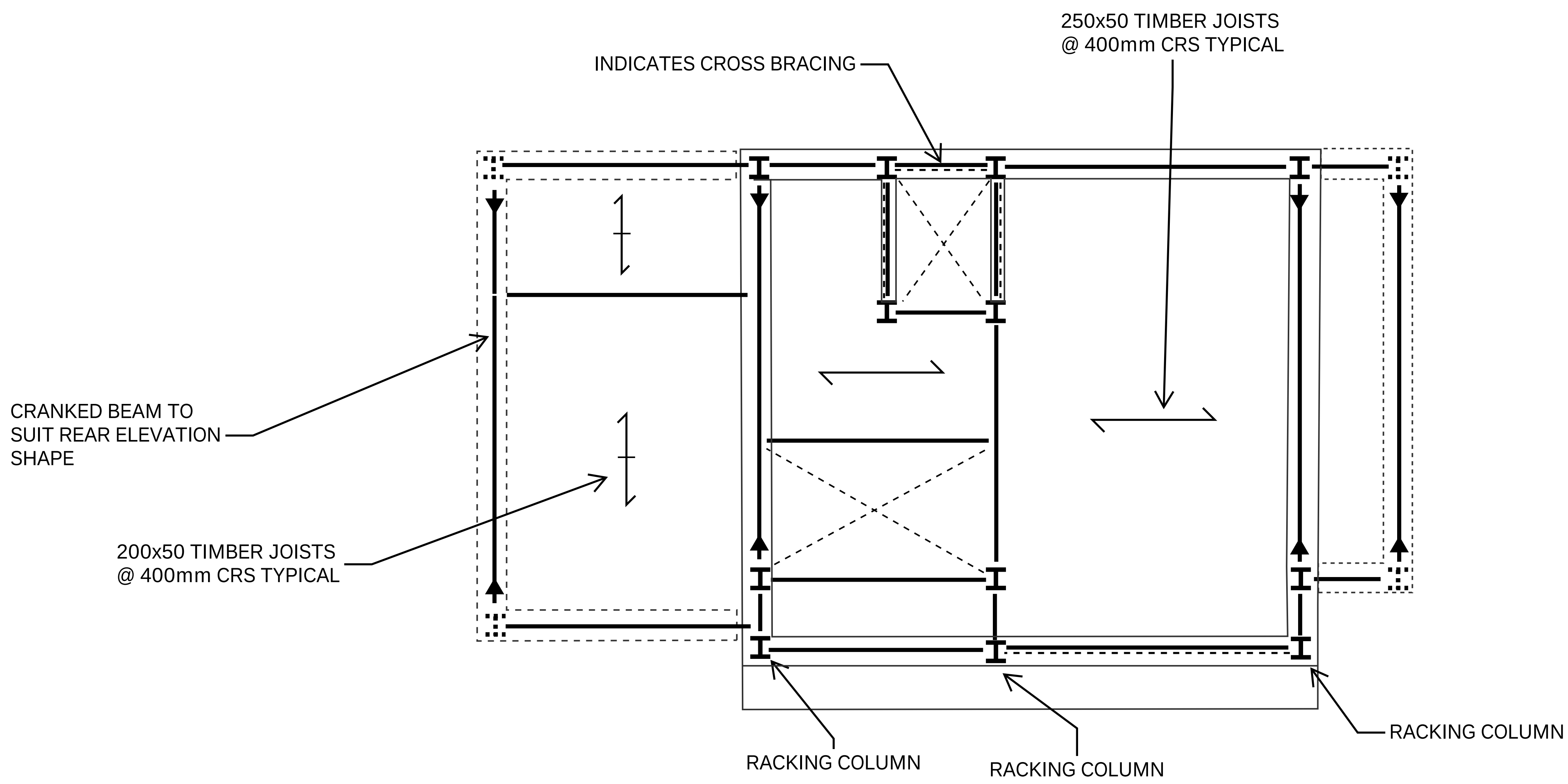
Stage: PRELIMINARY

Drawn:	Date:	Scale:
HK	08/02/2018	NTS

Project No.:	Drawing No.:	Rev:
16-50	SK-012	P01



Rev	Description	Date	By	App
P01	PRELIMINARY	07/02	HK	GD

Project Title:
30 GLENILLA ROAD

Drawing Title:
PROPOSED STRUCTURE - SECOND FLOOR

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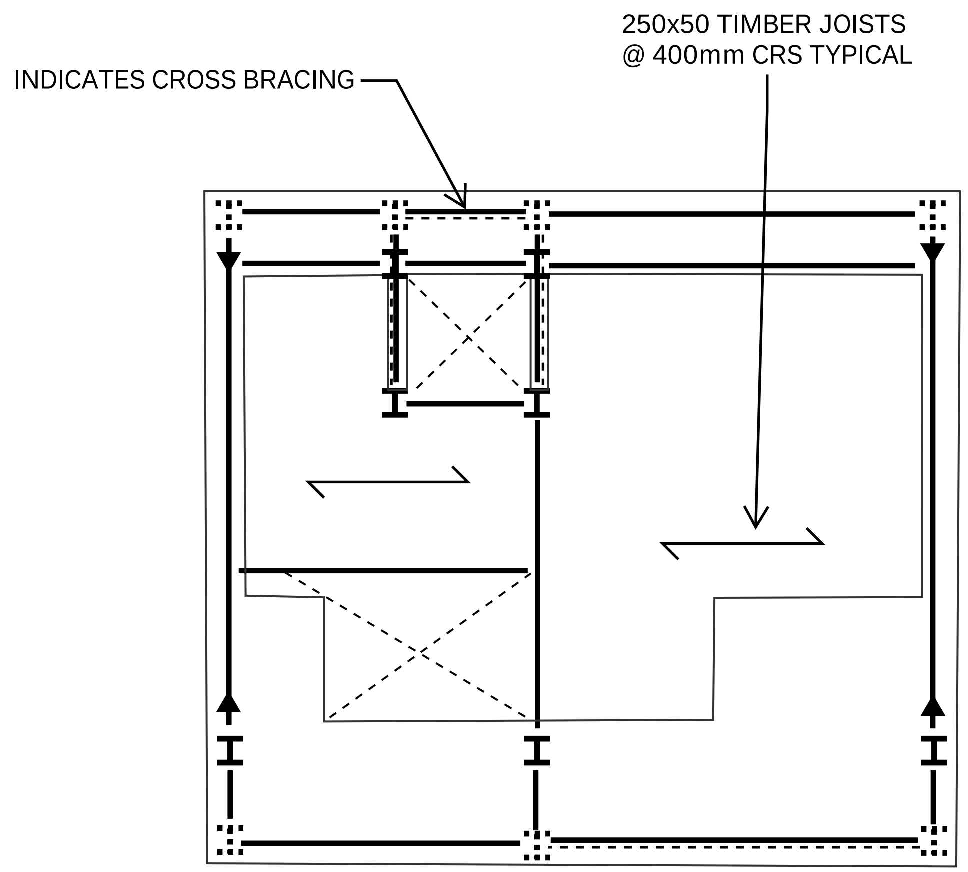
Stage:			
PRELIMINARY			
Drawn: HK	Date: 08/02/2018	Scale: NTS	
Project No.: 16-50	Drawing No.: SK-013	Rev: P01	



Rev	Description	Date	By	App
P01	PRELIMINARY	07/02	HK	GD

Project Title:
30 GLENILLA ROAD

Drawing Title:
PROPOSED STRUCTURE - THIRD FLOOR

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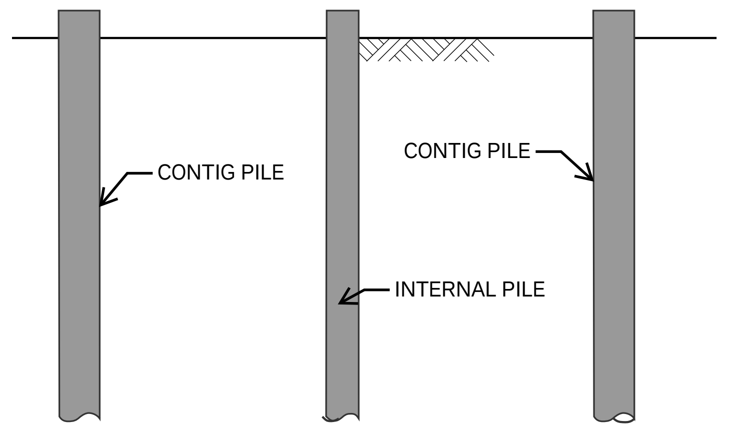
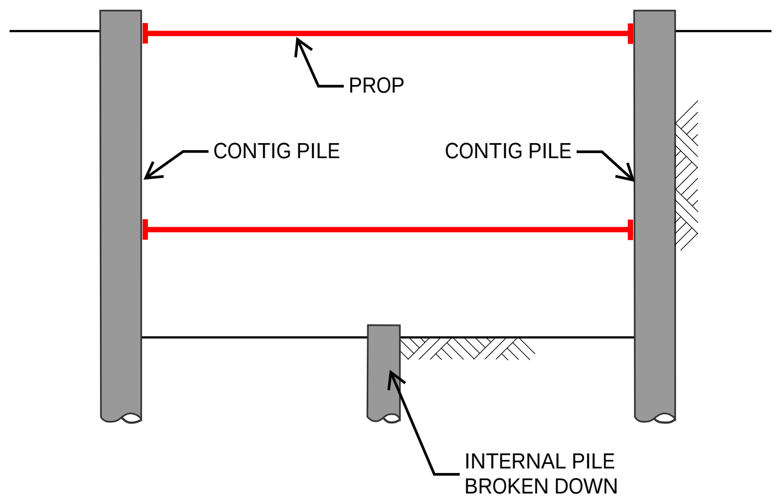
W dmag.com

Stage: PRELIMINARY		
Drawn: HK	Date: 08/02/2018	Scale: NTS
Project No.: 16-50	Drawing No.: SK-014	Rev: P01

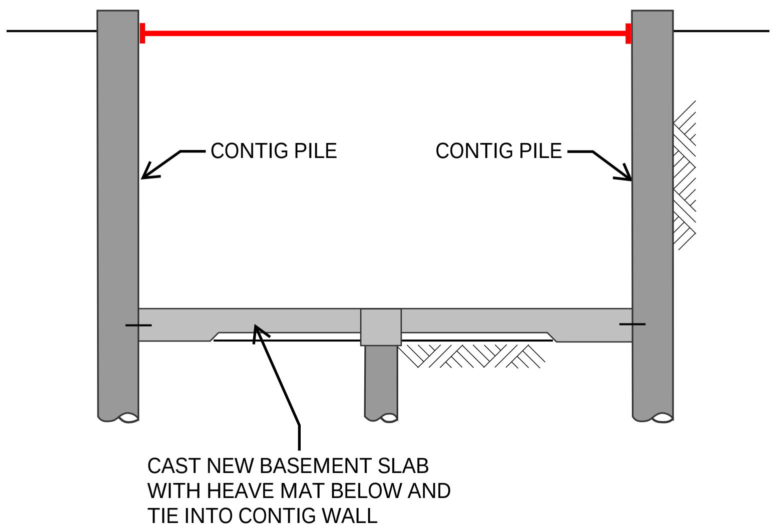
STEP 1:
PILES CONSTRUCTED ON SITE:



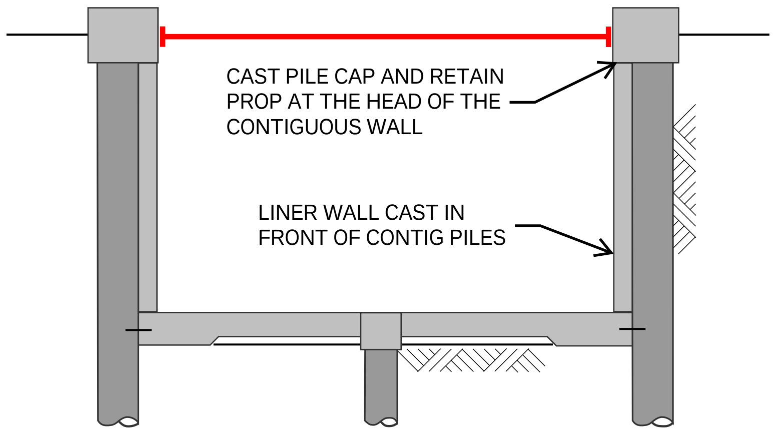
STEP 2:
EXCAVATE DOWN TO BASEMENT LEVEL AND INSTALL PROPS AND WALER BEAMS TO LATERALLY SUPPORT THE CONTIG PILE WALL:



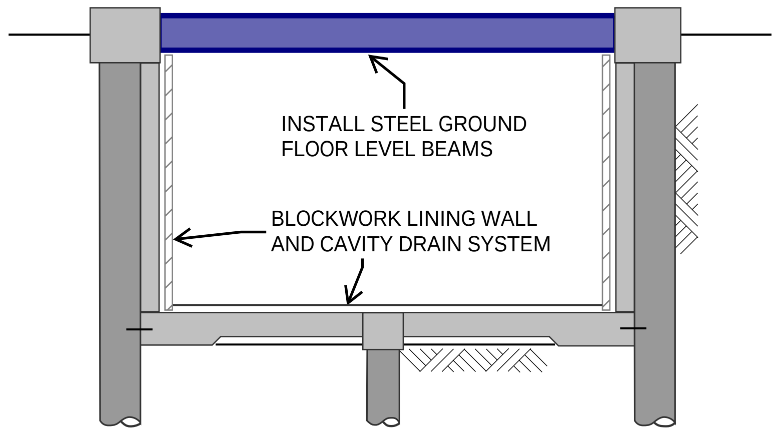
STEP 3:
CAST THE BASEMENT PILE CAPS, GROUND BEAMS AND SLAB. ONCE IN PLACE REMOVE LOW LEVEL LATERAL PROP.



STEP 4:
CAST THE CONTIG CAPPING BEAMS AND LINER WALL AND REINSTATE THE HIGHER LEVEL PROP BETWEEN CAPPING BEAMS.



STEP 5:
INSTALL GROUND FLOOR SLAB STRUCTURE TO PROVIDE PERMANENT LATERAL SUPPORT TO THE CONTIG PILE WALL.



Rev	Description	Date	By	App
P02	PRELIMINARY	31/07	HK	GD
P01	PRELIMINARY	07/02	HK	GD

Project Title: 30 GLENILLA ROAD

Drawing Title: PROPOSED CONSTRUCTION SEQUENCE

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Stage:			
PRELIMINARY			
Drawn: HK	Date: 31/07/2018	Scale: NTS	
Project No.: 16-50	Drawing No.: SK-015	Rev: P02	

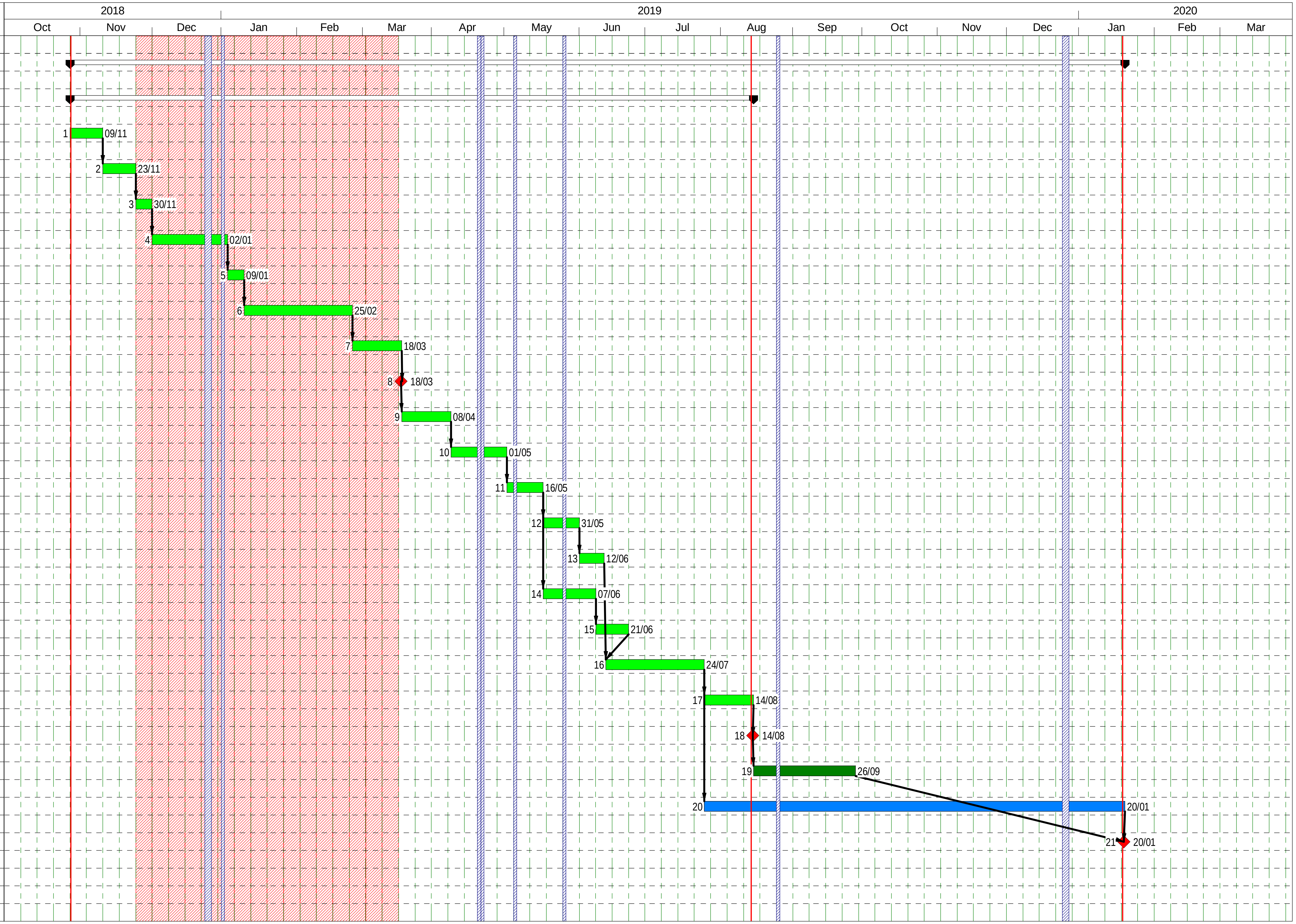
APPENDIX C – CONSTRUCTION PROGRAMME

30 Glenilla Road
Camden
London

Mr S.Swycher
01.06.2018

Red shading denotes basement impacat works

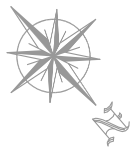
ID	Name	Start
	Project Duration	29/10/18
	Superstructure Duration	29/10/18
1	Enabling Works and Site Set Up	29/10/18
2	Demolishion works	12/11/18
3	Reduced Level Dig	26/11/18
4	Piling Works	03/12/18
5	Excavations and Lower Level Dig	03/01/19
6	Substructure works Inc.wall formations	10/01/19
7	Ground floor slab works	26/02/19
8	Substructure works completion	18/03/19
9	Steel frame works	19/03/19
10	G/F Block work and wall structures	09/04/19
11	1st/F wall and floor structures	02/05/19
12	2nd/F wall and floor structures	17/05/19
13	3rd/F wall and floor structures	03/06/19
14	G/F roof structures	17/05/19
15	1st/F roof structurews	10/06/19
16	2nd & 3rd/F roof structures	13/06/19
17	Windows and Glazing Systems	25/07/19
18	Superstructure works completion	14/08/19
19	External Lanscaping Works	15/08/19
20	Internal fit out works	25/07/19
21	Project Completion	20/01/20

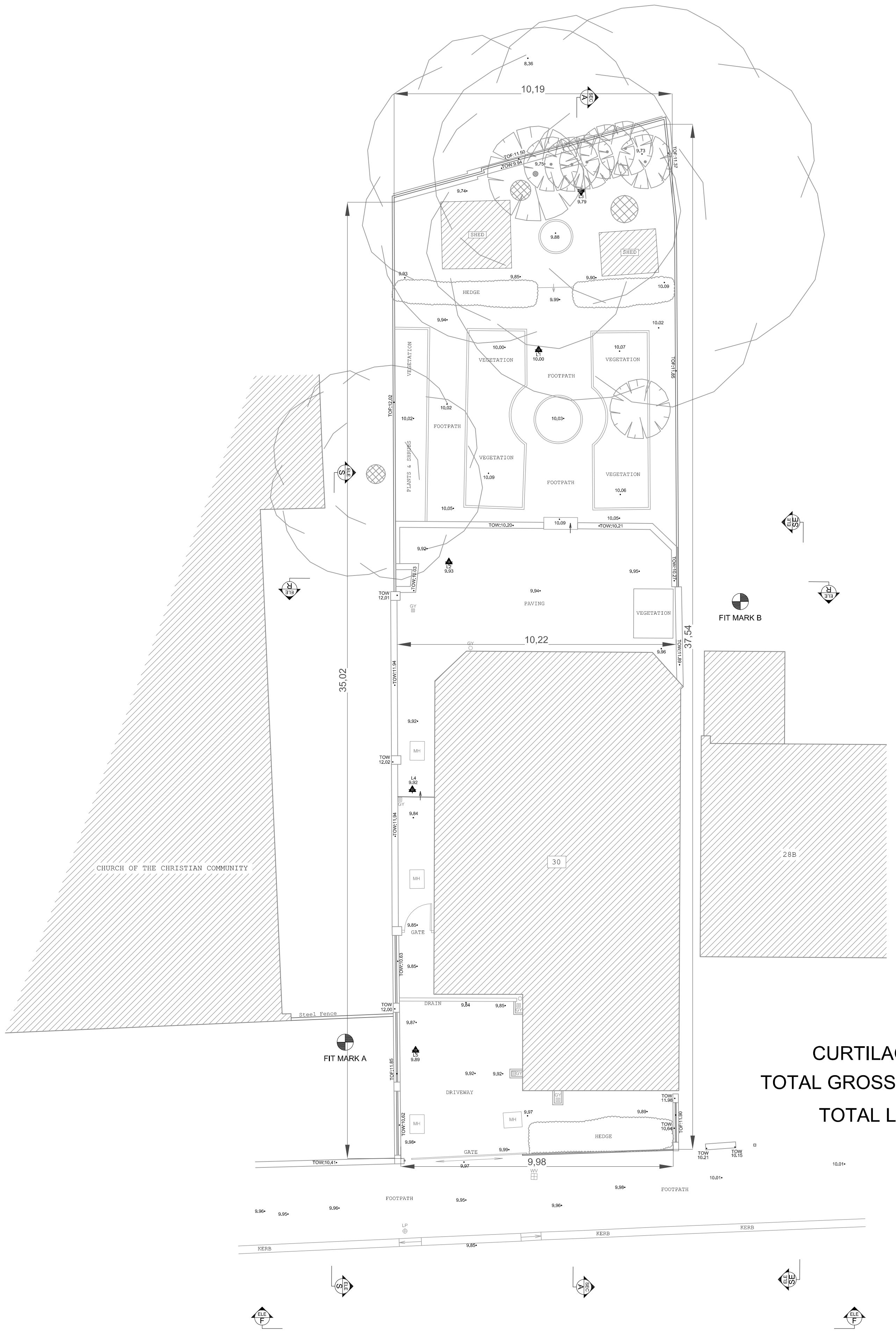


Superstructure | Internal Fit Out | Milestone | Landscaping

APPENDIX D – TOPOGRAPHICAL SURVEY

0 2000 4000 6000 8000
Millimeters (mm) Scale Bar





CURTILAGE: 240.42 m2 / 2587.86 ft2

TOTAL GROSS INTERNAL AREA: 243.11 m2 / 2616.81 ft2

TOTAL LAND AREA: 372.21 m2 / 4006.43 ft2

DO NOT SCALE FROM DRAWING
DO NOT RE-SCALE DRAWING
ALL DIMENSIONS TO BE CHECKED ON SITE

METRO PLANS SURVEYS

MEASURED BUILDING SURVEY

LEGEND

F–C 0.00	FLOOR TO CILL HEIGHT
C–H 0.00	CILL TO HEAD HEIGHT
(3.10)	FLOOR TO CEILING HEIGHT
FL 21.80	FLOOR LEVEL
0.00sp	SPRING HEIGHT
(155)	SINGLE STEP HEIGHT
AH	ACCESS HATCH
AHL	ARCH HEAD LEVEL
BLR	BOILER
BOL	BOLLARD
BM	BENCHMARK
BSL	BEAM SOFFIT LEVEL
BSH	BEAM SOFFIT HEIGHT
CAB	CABINET
CATV	CABLE TV
CBD	CUPBOARD
CCTV	CCTV CAMERA
CL	CEILING LEVEL
CNT	COUNTER
CH	CEILING HATCH
CL	CEILING LIGHT
CV	CEILING VENT
DH	DOOR HEIGHT
EAVE:00.00	EAVE LEVEL
EM	ELECTRIC METER
EP	ELECTRICAL POLE
FC	FALSE CEILING
FP	FIRE PLACE
FB	FUSE BOARD
FA	FIRE ALARM
FI	FIRE INDICATOR
FE	FIRE EXTINGUISHER
GM	GAS METER
GP	GATE POST
GV	GAS VALVE
GY	GULLY
IC	INSPECTION CHAMBER
KI	STORM WATER INLET
LP	LAMP POST
MH	MANHOLE
–CL:	COVER LEVEL
–IL:	INVERT LEVEL
OHC	OVER HEAD CABLE
OHG	OVERHANG
P	POLE
PAR:00.00	PARAPET LEVEL
P&T	POST & TELECOM
PS	POWER SUPPLY
RAD	RADIATOR
RE	RODDING EYE
RS	ROAD SIGN
RWP	RAIN WATER PIPE
RIDGE:00.00	RIDGE LEVEL
SLV	SHELVING
SL	SKYLIGHT
SV	STOP VALVE
SVP	SOIL VENT PIPE
SUS	SUSPENDED CEILING
SW	SWITCH
ToF:00.00	TOP OF FENCE
ToW:00.00	TOP OF WALL
TP	TELEPHONE POLE
WH	WATER HEATER
WM	WATER MAIN
WT	WATER TANK
WV	WATER VALVE
WL	WALL LAMP
WS	WORK SURFACE
B6 10.45	SURVEY STATION
	TREE DECIDUOUS– trunk (T): spread (S): height (H):
	TREE CONIFEROUS– trunk (T): spread (S): height (H):
BUSH	BUSH

ELECTRICAL LAYOUT

	SINGLE SOCKET
	DOUBLE SOCKET
	TELECOM
	TV
	ALARM
	LIGHTING
UPL	UPLIGHT
	SINGLE SWITCH
	DOUBLE SWITCH

NOTES

All levels to arbitrary datum
-

-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	FULL ISSUE	30/06/2016	DC

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WEB: www.metroplans.com
LAND & MEASURED BUILDING SURVEYS

CLIENT
STUART SWYCHER

PROJECT
No.30 GLENILLA ROAD, NW3 4AN

SURVEY TYPE
SITE PLAN

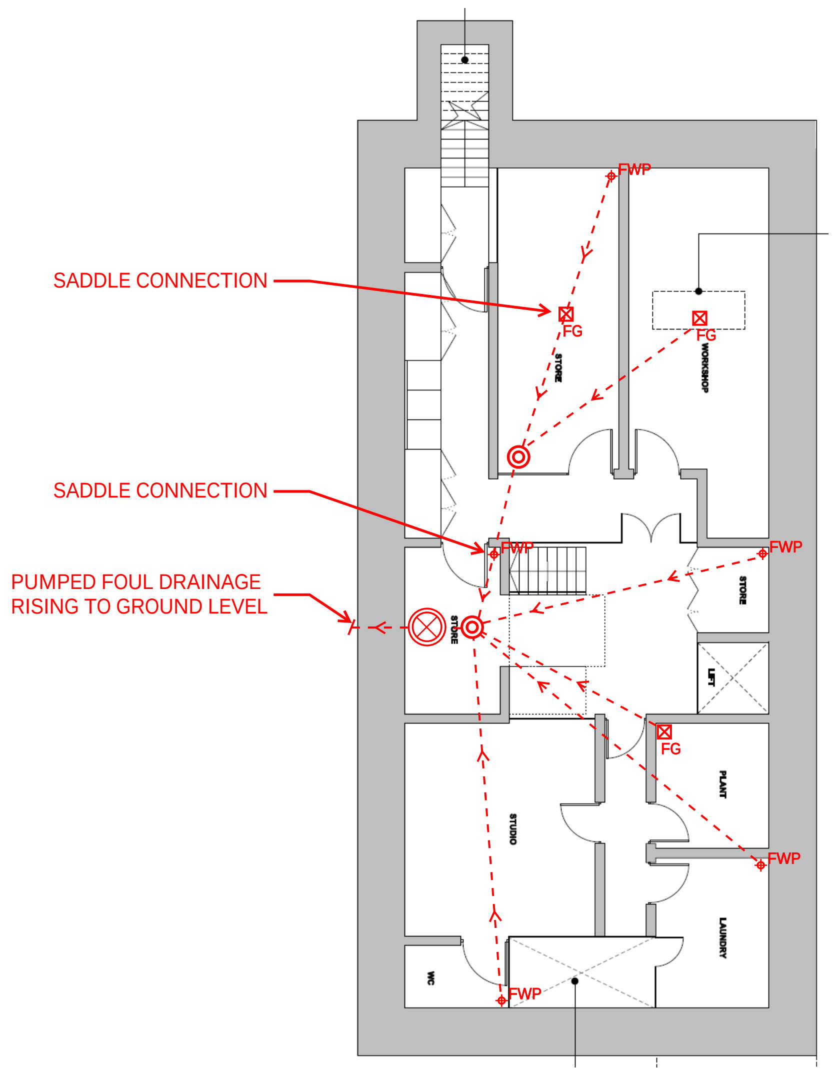
Drawn by	LZ	Scale	1:100 A1
Checked by	DC	Job No.	3776
Date	JUNE 2016	Dwg No.	3776-01

No.30 GLENILLA ROAD, NW3 4AN
SITE PLAN

APPENDIX E – PROPOSED DRAINAGE DRAWINGS

BASEMENT GENERAL ARRANGEMENT:

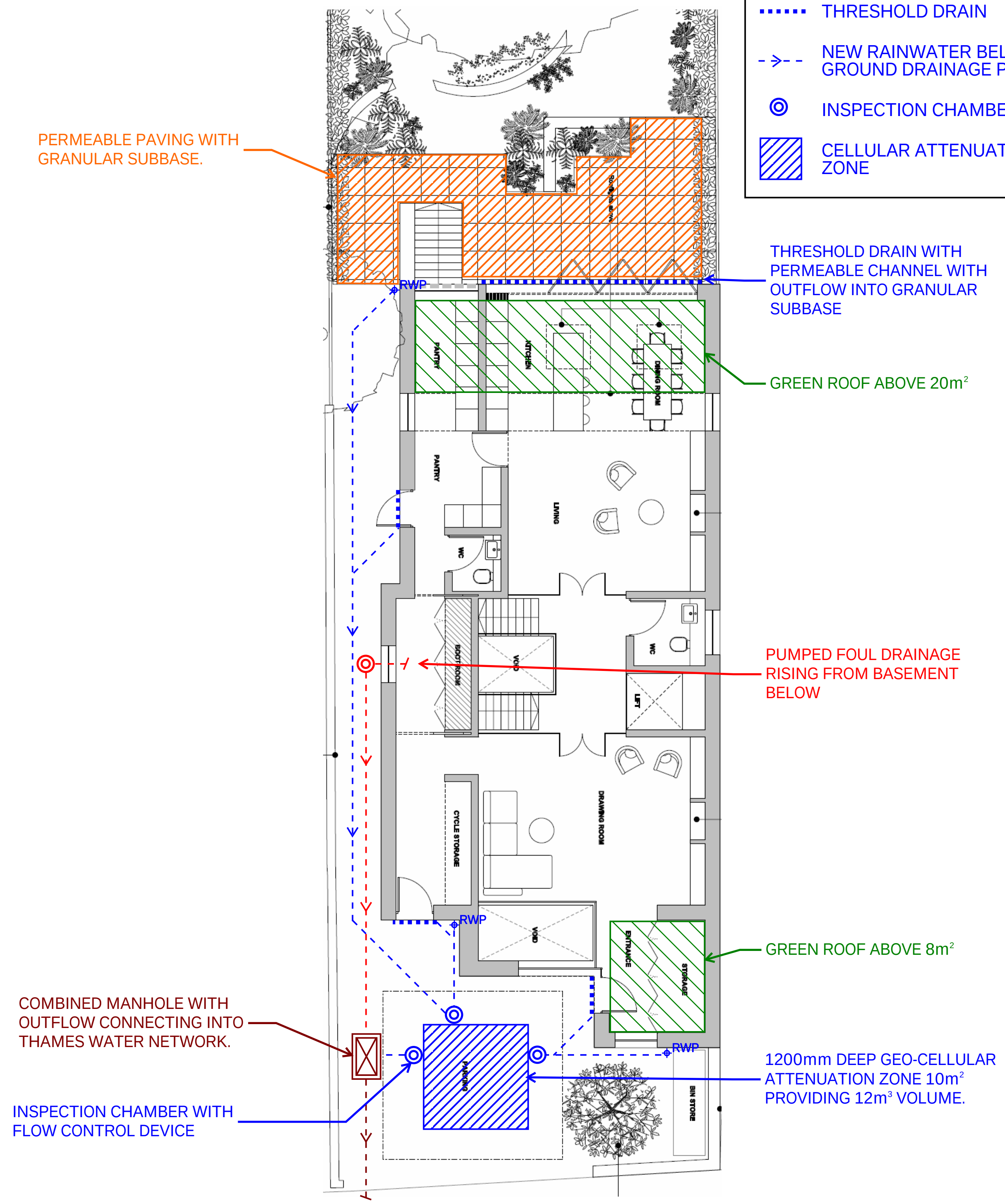
	FOUL SUMP PUMP
FG	FLOOR GULLEY
FWP	FOUL DRAINAGE FROM ABOVE
	NEW FOUL BELOW GROUND DRAINAGE PIPE
	INSPECTION CHAMBER



FWP LOCATIONS SHOWN ARE ASSUMED. THESE ARE TO BE CONFIRMED BY THE M+E ENGINEER.

GROUND FLOOR GENERAL ARRANGEMENT:

RWP	RAIN WATER PIPE FROM ABOVE
	THRESHOLD DRAIN
	NEW RAINWATER BELOW GROUND DRAINAGE PIPE
	INSPECTION CHAMBER
	CELLULAR ATTENUATION ZONE



RWP LOCATIONS SHOWN ARE ASSUMED. THESE ARE TO BE CONFIRMED BY THE ARCHITECT.

Rev	Description	Date	By	App
P01	PRELIMINARY	03/08	HK	GD

Project Title:	30 GLENILLA ROAD
Drawing Title:	PROPOSED BELOW GROUND DRAINAGE
Stage:	PRELIMINARY
Drawn:	HK
Date:	08/08/2018
Scale:	NTS
Project No.:	16-50
Drawing No.:	SK-016
Rev:	P01

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