

**34 Queens Grove
London
NW8 6HN**

Basement Engineering Method Statement



Construction Method Statement

Client: Ms L Clarke

Document details:

Project number:	2238
Issue date:	29 th June 2015
Written by:	James Lai
Reviewed by:	Mr Brian Cochrane Green Structural Engineering Ltd B.Eng.C.Eng. M.I.Struct.E.
Revisions:	-

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1.0 Introduction

- 1.01 This Method Statement has been prepared for Ms L Clarke in connection with the construction of proposed Basement at 34 Queens Grove
- 1.02 This Method Statement is based upon drawings submitted for Planning approval to Camden Council produced by Cranbrook Basements for the Client references

2238/100/101/102/103 and 2238/200/201/202/250/251/252.
- 1.03 The Structural and Technical Details to be relied upon will be produced for the Client by Horwitz Structural Engineers.
- 1.04 A copy of the Structural Engineering calculations and design drawings will be issued to Camden Council in due course.

2.00 Project Overview

- 2.01 The subject Property is located within a quiet London street with access for vehicular traffic.
- 2.02 Parking restrictions exist outside the property and an appropriate application for Suspension will be made to Camden Council.
- 2.03 The Property has been constructed with existing Lower Ground, Ground and First and Second floor levels and is of rendered wall construction with tiled pitched roof over.
- 2.04 An application will be required to Camden Council for Storage of materials and appropriate Enclosure Licenses to execute the works.
- 2.05 Party Wall Notices will be served upon adjoining owners of 34 Queens Grove.
- 2.06 There are no obvious structural defects visible upon initial inspection. The Property is in a good general condition as would be expected given its age and construction.

3.00 Site Investigation

- 3.01 Fast Track were commissioned to carry out a 6m rotary borehole investigation using a Second man hand auger.
- 3.02 The site investigation took place on 10th Dec 2014. The bore was located at the rear garden. As indentified within the factual report the bore hole extended to a depth of 6.0m
- 3.03 Having passed a depth of 0.8m, the ground was found to consist of dark brown top soil, brown clayey made ground containing brick and gravel.
- 3.04 From the depths of 0.8m to 6.0m, the ground condition was found to contain mid brown clay containing grey mottle.
- 3.05 The borehole was noted to be dry on completion at 6.0m.

4.00 Site Preparation & Enabling Works

- 4.01 The property is to be vacated during the construction period. Applications will be made to R Council for permission to site a builders hoarding to the front of the property.
- 4.02 The hoarding is to have an overall height of 2.4m and to be painted white.
- 4.03 Electrically operated lights are to be fitted to the perimeter of the hoarding together with chevron highway reflectors so that it is clearly visible during the hours of darkness.
- 4.04 A metal skip container is to be located within the hoarding structure for temporary storage of waste material pending its removal and clearance from site.
- 4.05 Temporary water supply and electrical services are to be provided to the hoarding zone and will be retained in a safe condition for the duration of the contract period.
- 4.06 Form temporary access via front elevation for the location of electrical conveyor system.
- 4.07 Install electrically operated 450mm wide conveyor belt to provide mechanised removal of spoil from proposed basement zone. Initially the conveyor is to be located at floor level and inclined not exceeding 40° to the appropriate discharge height located directly over a metal waste container / skip.
- 4.08 Provide proprietary 110 volt power supplier complete with associated cut out fuse and the like to the conveyor belt.

- 4.09 Provide flexible dust sheet protection to the discharge point on the proposed conveyor.
- 4.10 As the work extends to the deeper sections of the basement provide elongated conveyor sections suitably restrained to provide mechanised spoil removal from the deepening excavation.

5.00 Demolition and Strip Out

- 5.01 Provide twin layer dust resistant screening at first floor level to reduce the impact of site works on the unaffected areas of the first floor.
- 5.02 Isolate existing gas, electrical and water mains which may be running through ground floor structure.

6.00 Underpinning

- 6.01 Excavate for underpin bases. Individual bases are not to exceed 1.2m in width and no two adjacent sections are to be excavated simultaneously. Excavation sequence to pin's = 6,1,4,7,2,5,8,3,6,1,4.
- 6.02 At the prescribed level form the toe section to the proposed underpin installing fabric and general reinforcement as specified on Structural Engineers details. Minimum concrete cover to reinforcement to be 50mm.
- 6.03 To the exposed face of the excavation provide temporary propping which is to be propped back directly to the face of the retained unexcavated central soil mound.
- 6.04 In circumstances where the excavated face of the vertical pin section is deemed unstable provide temporary propping back to central soil mound.
- 6.05 Commence dry packing to top of vertical pin sections a minimum of 48 hours after concreting. Dry packing shall not exceed 75mm thick and shall only be placed after the underside of the existing foundation has been cleaned and regularised.
- 6.06 The central spoil mound is to be retained during excavation to provide suitable resistance against lateral movement in underpin wall sections.
- 6.07 Following completion of all underpin bays excavate remainder of central soil mound whilst introducing temporary lateral propping to concrete wall sections.
 - a) underpin bases and vertical sections are to be connected via steel reinforcement starter bars which are to be chemically anchored using proprietary fixing resin to the adjacent concrete underpin at 200mm centres.

- 6.08 Introduce 200mm thick reinforced concrete intermediate floor designed as per Structural Engineers details.
- 6.09 Lay fabric mesh reinforcement to form basement slab all strictly in accordance with Engineers Designs with a minimum of 50mm concrete cover to steel work. Pour concrete slab forming basement concrete floor.
- 6.10 Introduce structural steel framework at ground floor level complete with column sections located over thickened slab areas.

7.00 Dewatering / Hydrology

- 7.01 From published data and our own comprehensive understanding of the underlying ground conditions gained from the numerous Basement projects in the vicinity of the applicant site suggests that the groundwater is unlikely to be encountered.
- 7.02 As the formation level of the proposed works is approximately 3.5m below the ground level, groundwater is unlikely be encountered. The groundwater will flow beneath and around the existing building within the existing underlying natural soils and gravels.
- 7.03 Arup's Subterranean Development Scoping Study (para 5.1) June 2008, notes that the impact of subterranean development on groundwater flows is negligible as groundwater flows will find an alternative route if blocked by a subterranean structure.
- 7.04 In the event that ground water is encountered during the course of excavation a localised excavated sump of size 1m x 1m x 1m is to be formed at a level lower than the progressive base of excavation being carried out.
- 7.05 A timber perforated plywood shell is to be constructed to support the perimeter of the temporary working sump and placed within the excavated zone.
- 7.06 Any ground water which is present will naturally pull within the sump area and at this point a 50mm diameter semi trash water pump unit is to be introduced with a 50mm diameter discharge hose.
- 7.07 Once located adjacent to the excavation level sump the solids pump hose is to be routed to the nearest adjacent manhole for discharge.

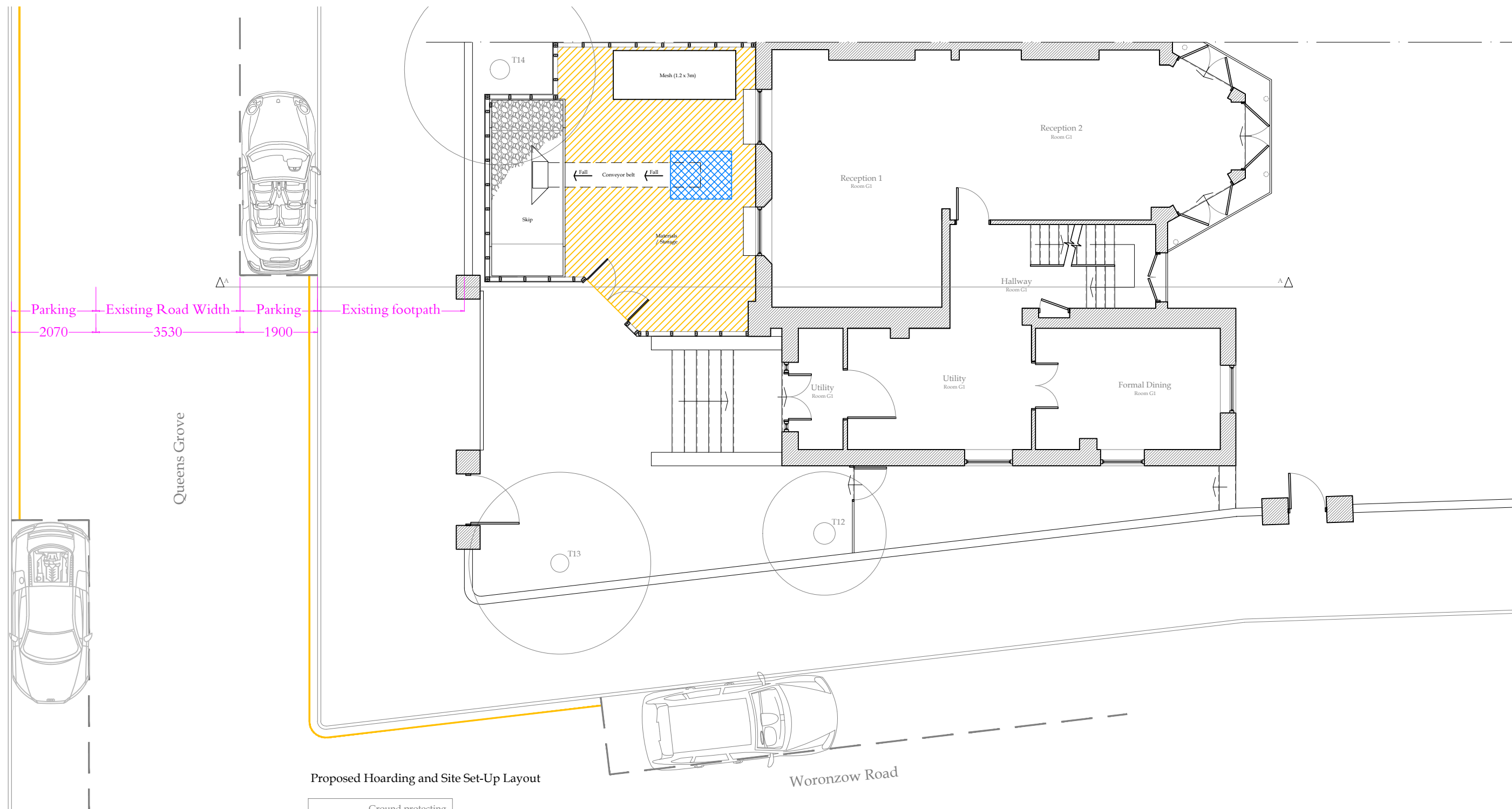
8.00 Below Ground Drainage

- 8.01 The basic waterproofing strategy is informed by the existing building and ground conditions. As previously noted ground water may be encountered. It is proposed that the concrete retaining walls and new floor slab will act as the primary barrier to possible water ingress. An internal drained cavity system will be installed to form a watertight enclosure.
- 8.02 The cavity drain system will include a cavity drain sump to collect any water which will then be pumped to the main private drainage system.
- 8.03 Record drawings indicate that existing foul and surface water sewers lie in Queens Grove. A survey of the existing drainage system on site will be carried out to assess its existing condition and the connection point to the public sewer. The connection to the public sewer will be retained and reused where possible.
- 8.04 As the basement is being constructed beneath the building, the existing drainage will potentially have to be repositioned as part of the works. The proposed basement level is likely to be lower than the level of the existing public sewer connection as such the foul effluent generated at basement level will require to be pumped to the main private drainage system. This will prevent any flooding from public sewers in case of backup.
- 8.05 The proposed Basement scheme will not increase existing surface water areas on the site.
- 8.06 Product literature for Delta MS 500 and Delta PT waterproofing solutions and Delta pumps is appended to this Method Statement for information purposes.



9.00 Conclusion

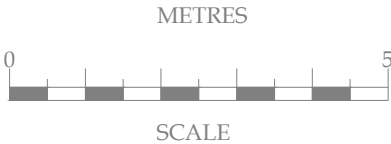
- 9.01 The proposed works will involve the construction of a new Basement over the full footprint of the existing dwelling and will be constructed with reinforced concrete underpinning
- 9.02 Given the depths to which this basement is being constructed it is essential that intermediate lateral propping is maintained until such time as the basement floor slab is constructed to ensure that movement in the underpinned sections does not occur.
- 9.03 The proposed works, if executed correctly and in accordance with the appointed Engineer's details and procedures will pose no significant threat to the structural stability of adjoining properties.




- 9.04 The proposed drainage scheme for the new basement includes a foul pumping chamber and a cavity drain sump. The proposals are relatively straightforward and have been successfully completed on a number of similar projects in London.
- 9.05 The impact of the new basement construction on the existing groundwater regime has been assessed. In this particular instance there is unlikely to be any noticeable effects on the hydrogeological environment in the area
- 9.06 The excavation of Basements below existing buildings is specialist work. RH Horwitz Associates Structural Engineer's. have been appointed to prepare detailed designs and calculations, thereafter RH Horwitz Associates will have an on-going role during the works on site to monitor that the works are being carried out generally in accordance with their designs and specifications.
- 9.07 The agreed contents of this Basement Engineering Method Statement must be complied with unless otherwise agreed with the Council. The project manager shall work with the Council to review this Statement if problems arise in relation to the construction of the development. Any future revised plan must be approved by the Council and complied with thereafter.

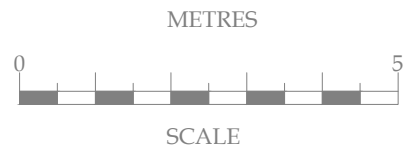




Proposed Hoarding and Site Set-Up Layout

	Ground protecting dpm over existing road overlaid with double layer of 18mm ply
	Denotes floor to be removed to access basement construction area



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Project : 34 Queen's Grove London NW8 6HN			
Drawing : Proposed Hoarding and Conveyor Layout			
Scale : 1:100 @ A3	Status : DESIGN	Rev :	
Date : 12 Mar 15	Dwg No : 2238-253		
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Project : 34 Queen's Grove London NW8 6HN				
Drawing : Proposed Hoarding and Conveyor Elevation				
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Date :	12 Mar 15	Dwg No : 2238-254		
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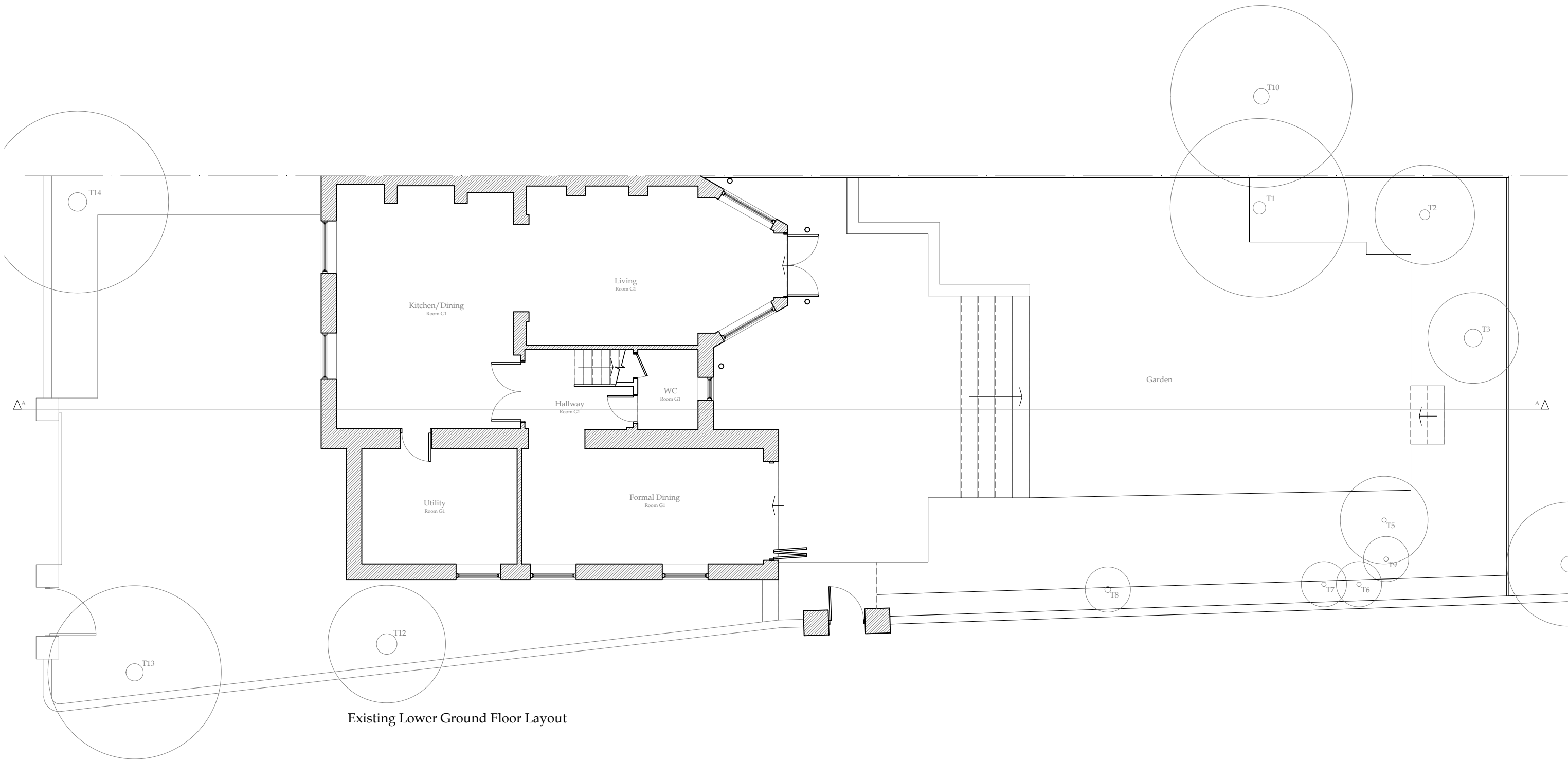
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Project :	34 Queen's Grove London NW8 6HN		
Drawing :	Proposed Hoarding and Conveyor Section		
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Date :	12 Mar 15	Dwg No :	2238-255
		Rev :	

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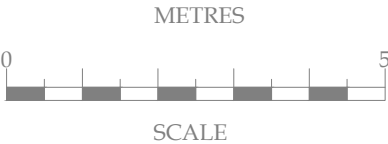
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Existing Lower Ground Floor Layout

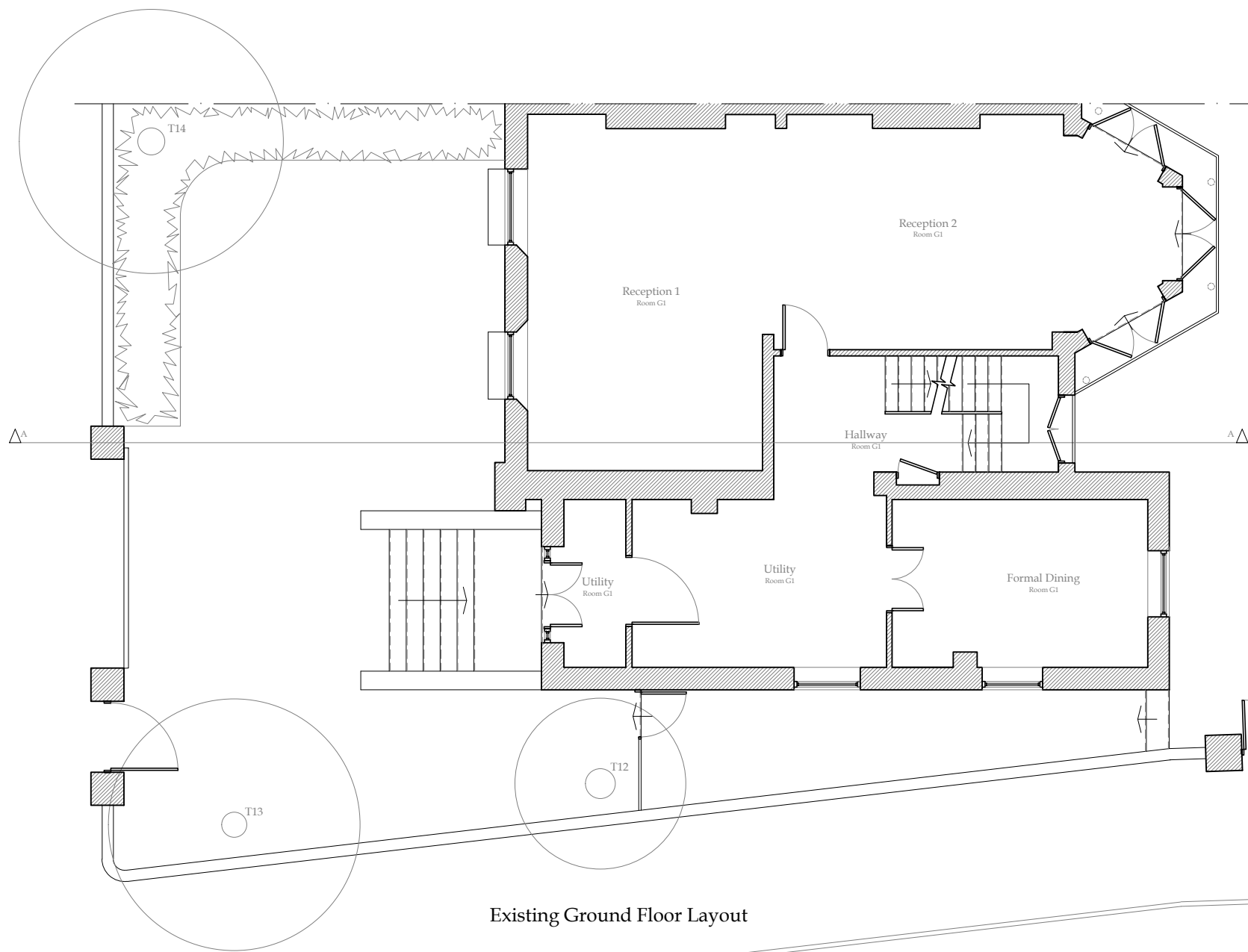


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Client : Ms L Clarke			
Project : 34 Queen's Grove London NW8 6HN			
Drawing : Existing Lower Ground Floor Layout			
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Date : 9 Jan 15	Dwg No : 2238-100		

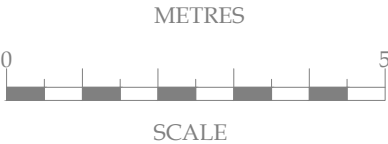
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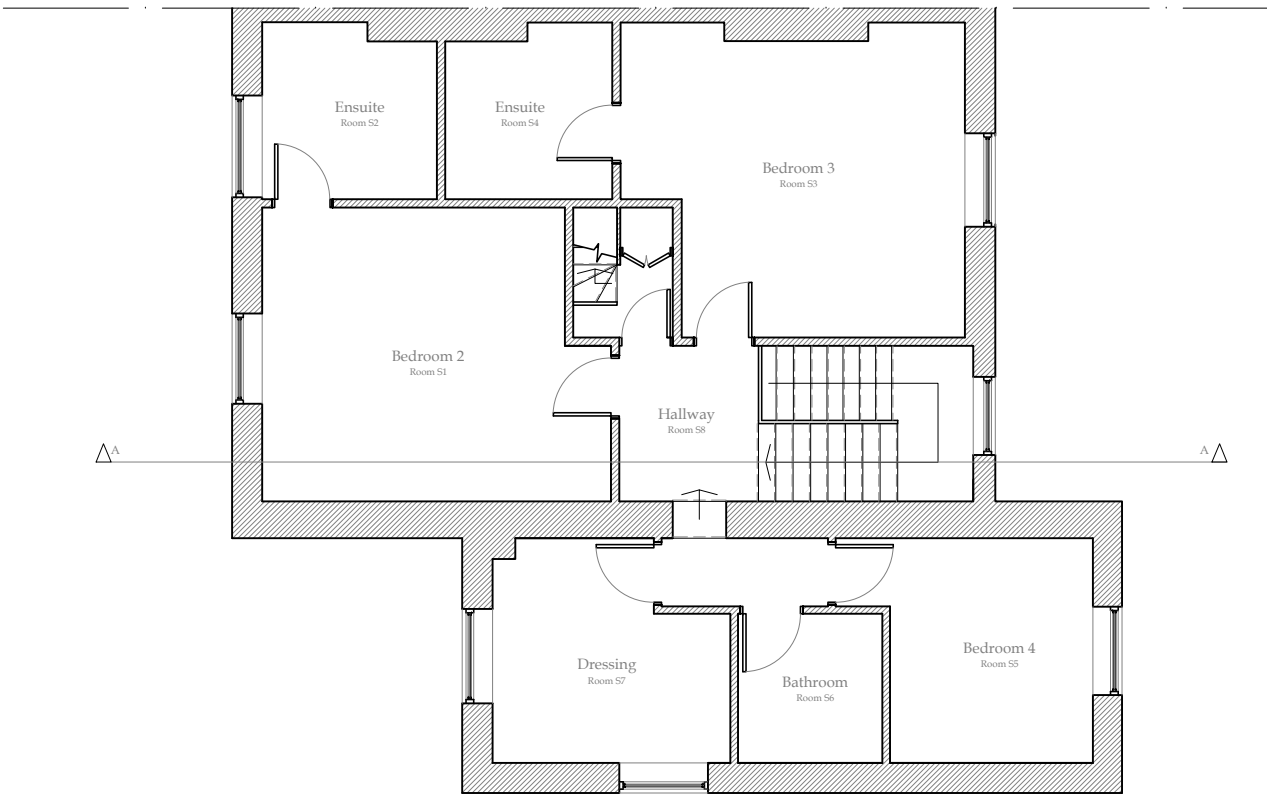
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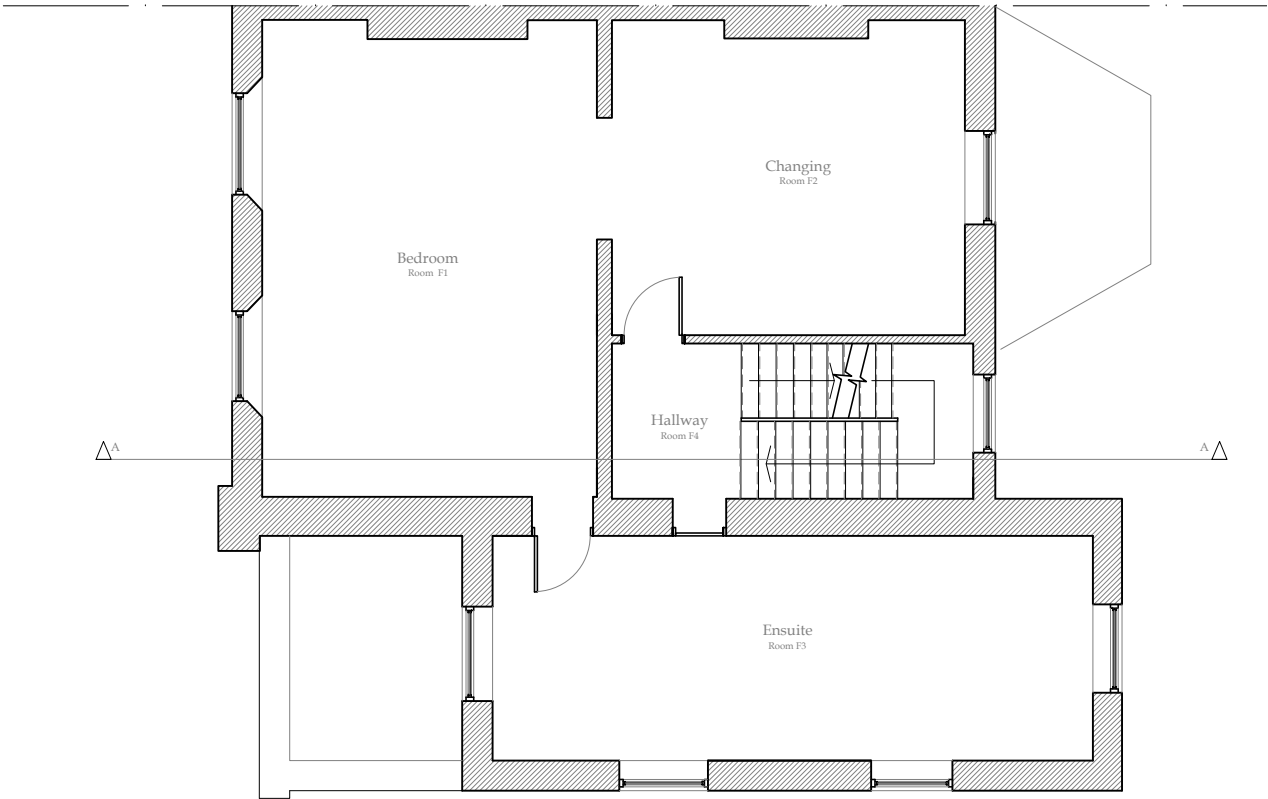
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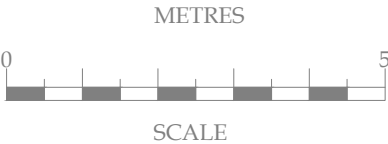
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<div> <div> Client : Ms L Clarke </div> <div> Project : 34 Queen's Grove London NW8 6HN </div> <div> Drawing : Existing Ground Floor Layout </div> </div> <div> <div> Scale : 1:100 @ A3 </div> <div> Date : 9 Jan 15 </div> </div> <div> <div> Status : DESIGN </div> <div> Dwg No : 2238-101 </div> </div> <div> <div> Rev : </div> <div> <div>  <p> Cranbrook Basements 26-28 Hammersmith Grove, Hammersmith, London, W7 7BA T +44 (0)208 551 5555 F +44 (0)208 551 1580 admin@cranbrook.co.uk www.cranbrook.co.uk </p> </div> <div>  </div> </div> </div> <p>© THIS DRAWING IS THE COPYRIGHT OF CRANBROOK BASEMENTS . It shall not be in any way used or reproduced without their prior written consent. All dimensions are to be checked on site or in the workshop prior to commencing any work. Work only to figured dimensions. Any discrepancies are to be reported to the Architect.</p>			



Existing Second Floor Layout



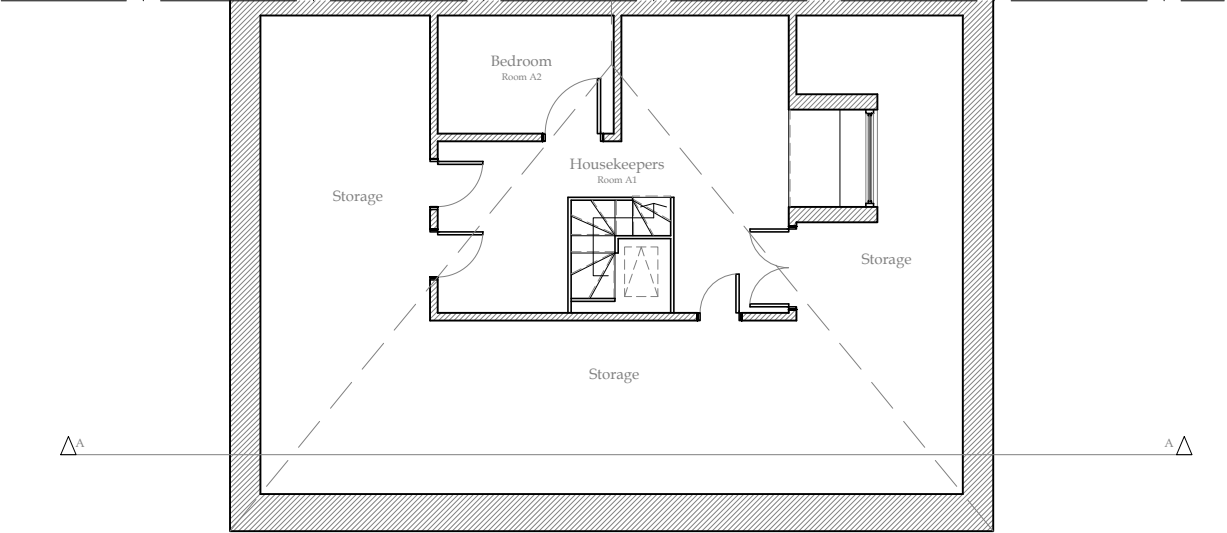
Existing First Floor Layout



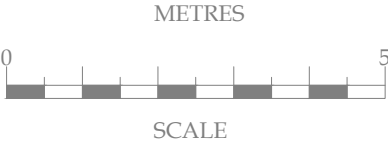
No.	Date	Amendment	Initials
Client : Ms L Clarke			
Project : 34 Queen's Grove London NW8 6HN			
Drawing : Existing First and Second Floor Layouts			
Scale : 1:100 @ A3	Status : DESIGN	Rev :	
Date : 9 Jan 15	Dwg No : 2238-102		

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Existing Attic Layout




No.	Date	Amendment	Initials
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Client : Ms L Clarke


Project : 34 Queen's Grove
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Drawing : Existing Attic Layout

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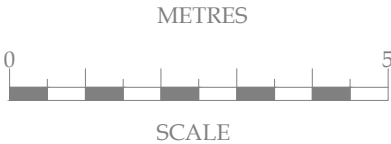
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Existing Front Elevation




Existing Rear Elevation



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Project : 34 Queen's Grove London NW8 6HN			
Drawing : Existing Front and Rear Elevations			
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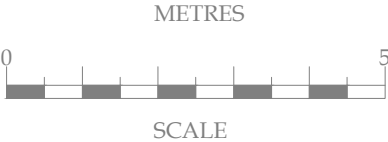


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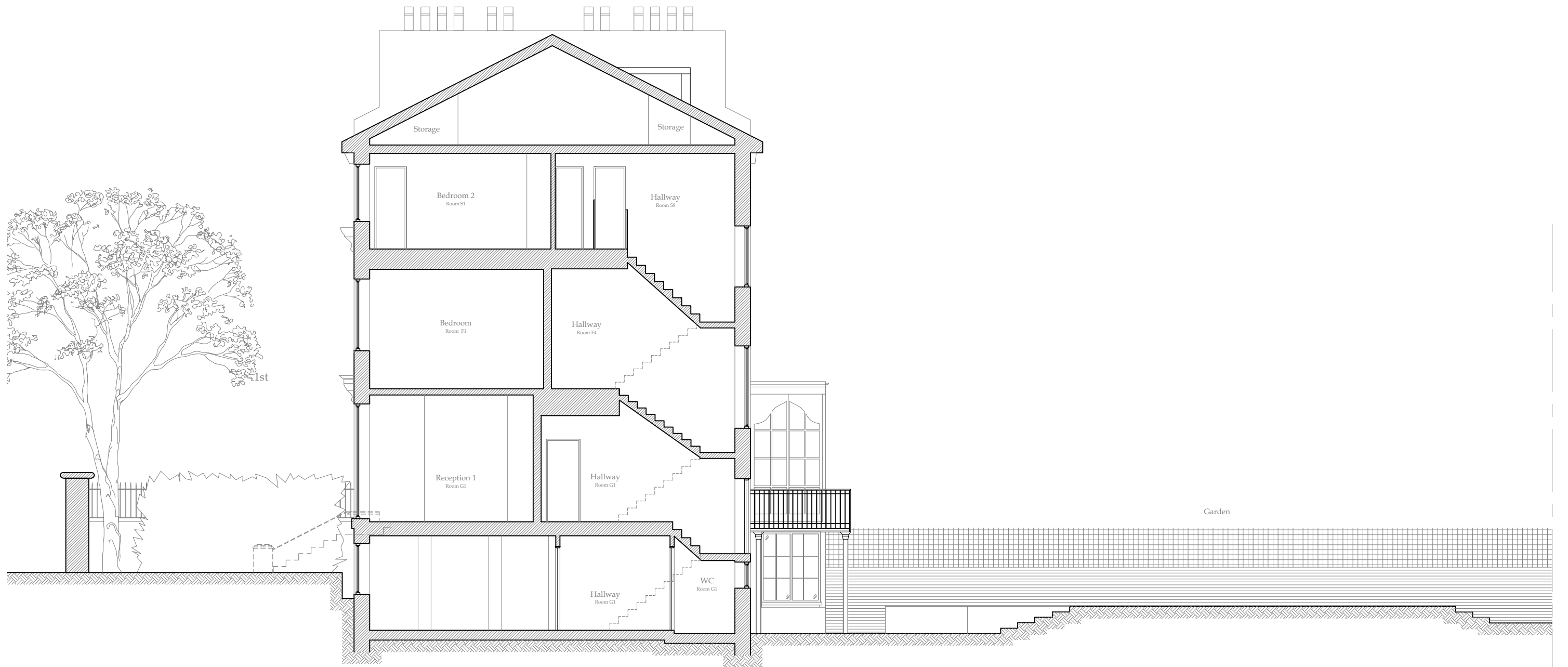
Existing Side Elevation



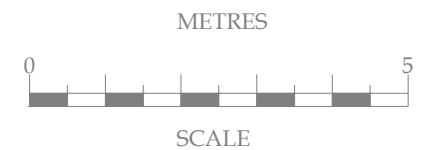
No.	Date	Amendment	Initials
Client : Ms L Clarke			
Project : 34 Queen's Grove London NW8 6HN			
Drawing : Existing Side Elevation			
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Existing Section A-A

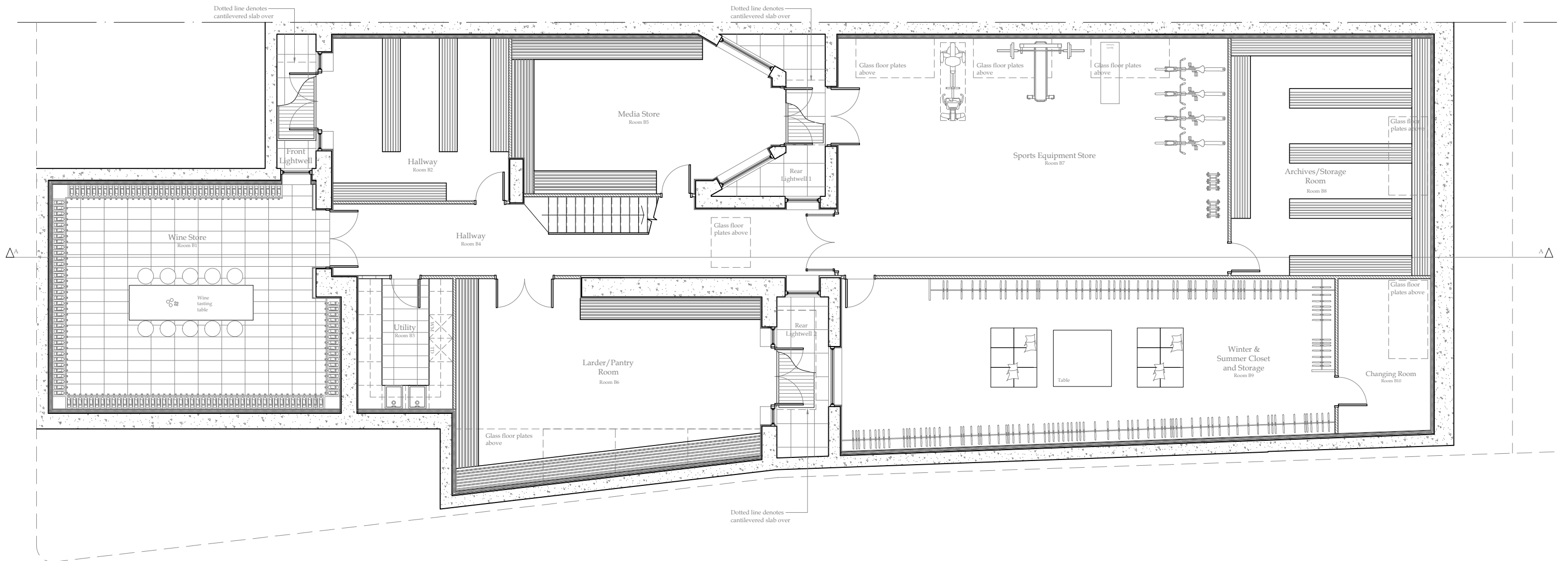


No.	Date	Amendment	Initials
Client : Ms L Clarke			
Project : 34 Queen's Grove London NW8 6HN			
Drawing : Existing Side Elevation			
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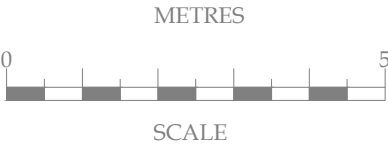
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Proposed Basement Layout



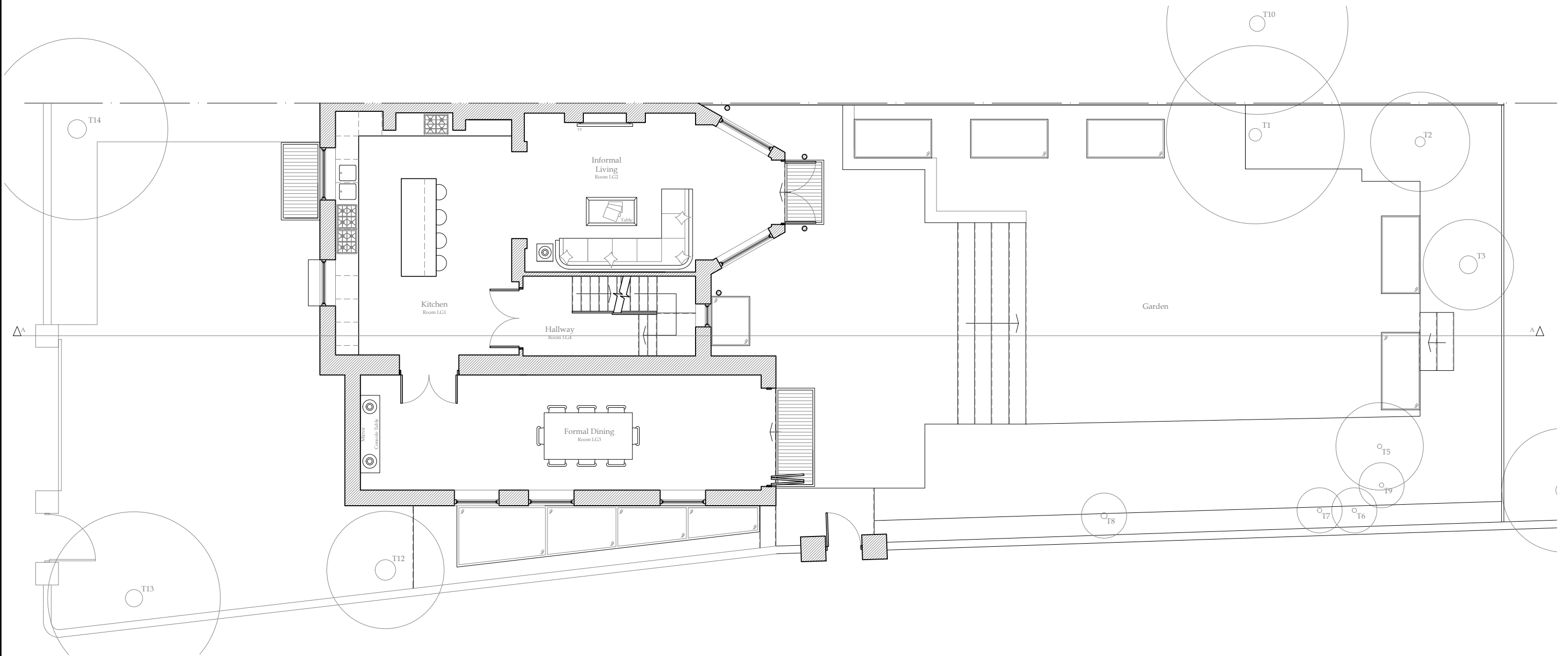
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Client : Ms L Clarke			
Project : 34 Queen's Grove London NW8 6HN			
Drawing : Proposed Basement Layout			
Scale : 1:100 @ A3	Status : DESIGN	Rev :	
Date : 29 Jan 15	Dwg No : 2238-200		

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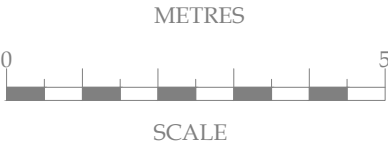


Proposed Lower Ground Floor Layout

No.	Date	Amendment	Initials
Client : Ms L Clarke			
Project : 34 Queen's Grove London NW8 6HN			
Drawing : ProposedLower Ground Floor Layout			
Scale :	1:100 @ A3	Status : DESIGN	Rev :
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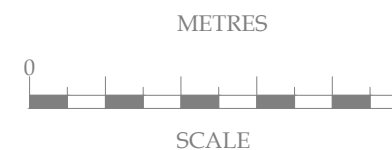




Existing Front Elevation
(As proposed)



Existing Rear Elevation
(As Proposed)



No.	Date	Amendment	Initials
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Client : Ms L Clarke

Project : 34 Queen's Grove
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Drawing : Proposed Front & Rear Elevations

Scale : 1:100 @ A3

Status : DESIGN

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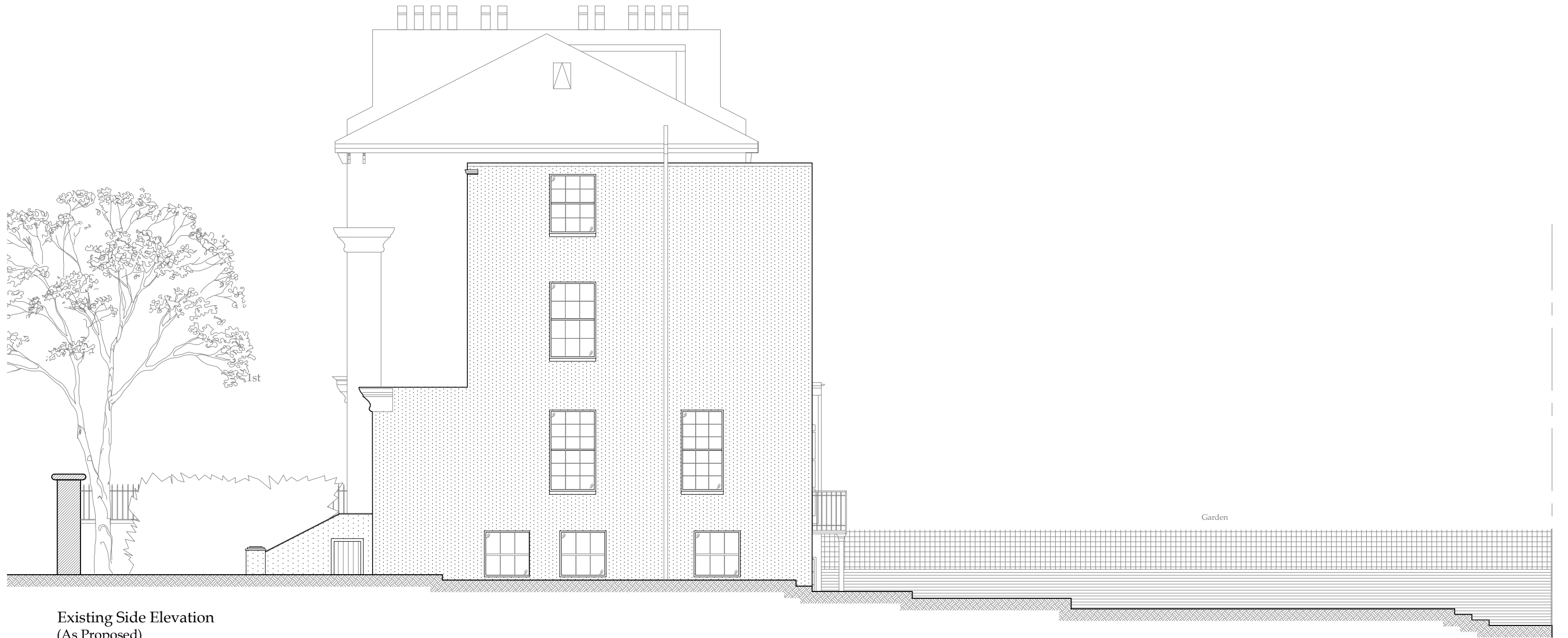
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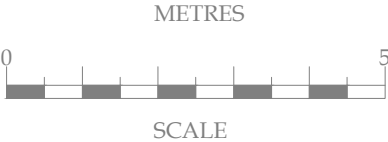
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Existing Side Elevation
(As Proposed)



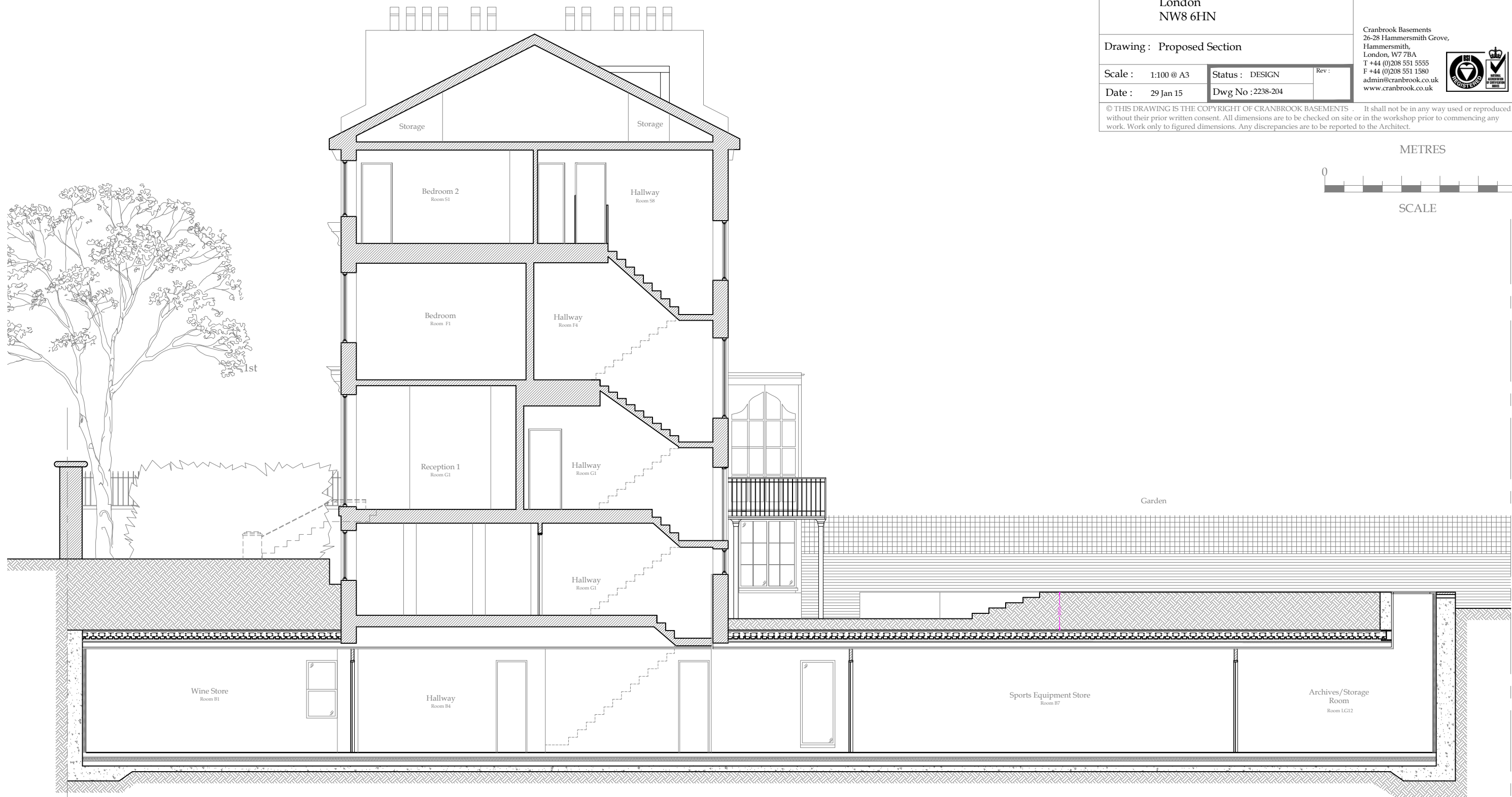
No.	Date	Amendment	Initials
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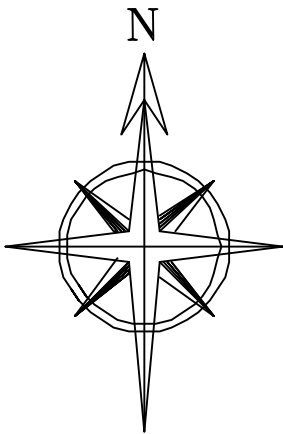
Proposed Section A-A

No.	Date	Amendment	Initials
Client : Ms L Clarke			
Project : 34 Queen's Grove London NW8 6HN			
Drawing : Proposed Section			
Scale : 1:100 @ A3	Status : DESIGN	Rev :	
Date : 29 Jan 15	Dwg No : 2238-204		
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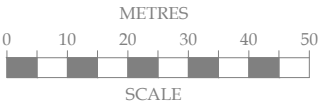




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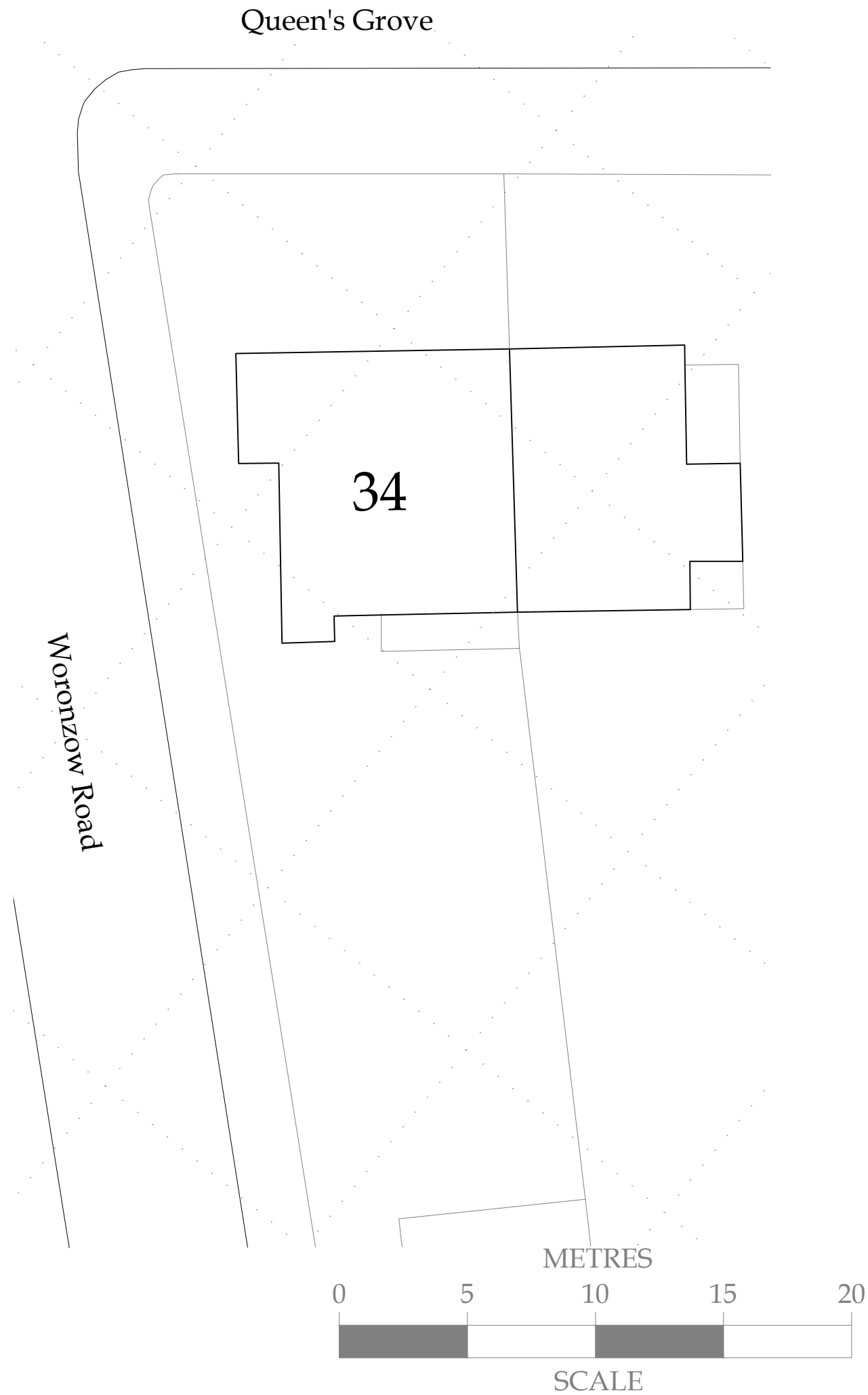




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No.	Date	Amendment	Initials
<div><div><div>Client : Ms Lesley Clarke</div><div>Project : 34 Queen's Grove London NW8 6HN</div><div>Drawing : Proposed Site Layout</div></div><div><div>Scale : 1:1250 @ A3</div><div>Date : 16 Dec 14</div></div><div><div>Status : PRELIMINARY</div><div>Dwg No : 2238-250</div></div><div><div>Rev : -</div></div></div> <div><div><div>Cranbrook Basements</div><div>Cranbrook Basements 26-28 Hammersmith Grove, Hammersmith, London, W7 7BA T +44 (0)208 551 5555 F +44 (0)208 551 1580 admin@cranbrook.co.uk www.cranbrook.co.uk</div><div></div></div><div><div>© THIS DRAWING IS THE COPYRIGHT OF CRANBROOK BASEMENTS . It shall not be in any way used or reproduced without their prior written consent. All dimensions are to be checked on site or in the workshop prior to commencing any work. Work only to figured dimensions. Any discrepancies are to be reported to the Architect.</div></div></div>			



No.	Date	Amendment	Initials
Client : Ms Lesley Clarke			
Project : 34 Queen's Grove London NW8 6HN			
Drawing : Proposed Block Plan			
Scale :	1:200 @ A3	Status : PRELIMINARY	Rev : -
Date :	16 Dec 14	Dwg No : 2238-251	

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Geotechnical Survey Report

FSI Ref: 9144
Issue Date: December 2014

Address: 34 Queens Grove
London
NW8

Engineer: David Kavanagh / Dan Vickerstaff

Company: Cranbrook Basements

Director: Martin Rush MSc FGS
Office Manager: Louise Hiscock BSc (Hons)
Report Writer: Perry Martin AMCIHT

Laboratory Manager: Lara Knight



Tyndales Farm, Southend Road, Woodham Mortimer,
Maldon, Essex, CM9 6TQ

Telephone: 0844 3358908
Fax: 0844 3358907
Email: enquiries@fastrackgroup.co.uk
Web: www.fastrackgroup.co.uk

Appendix No: 1
FSI Ref: 9144

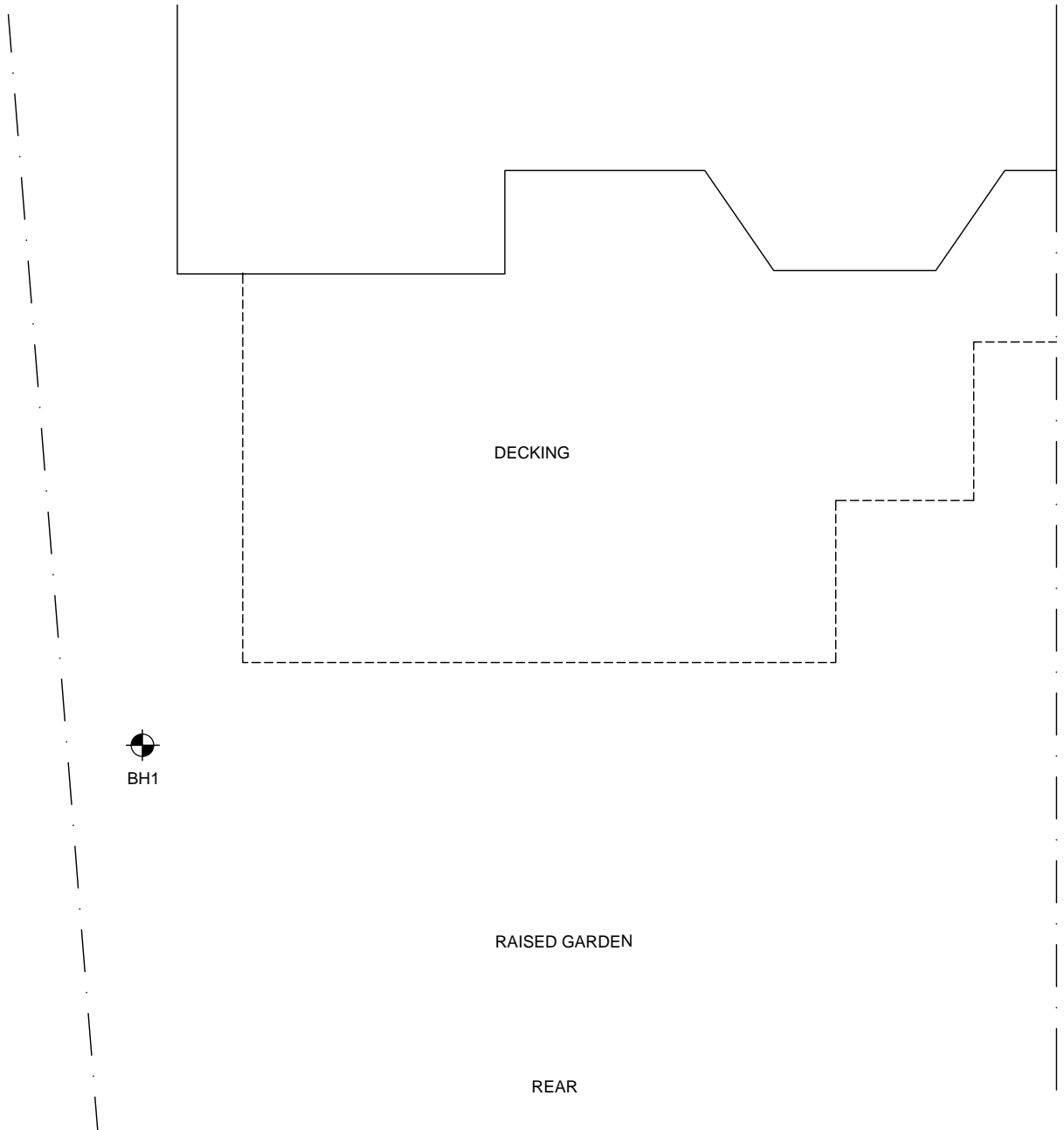
SITE PLAN

Property Address: 34 Queens Grove, London, NW8

Client Claim Ref: 34 Queens Grove

Survey date: 10/12/2014

Operative: SE1



Scale:
NTS

Drawn by:
LK

Key:

Trial Pit

Borehole



Manholes

Rain Water Pipe

Soil & Vent Pipe

Surface Water Gully

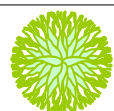
Foul Water Gully



Shrub



Tree (Conifer)



Tree (Deciduous)

BOREHOLE LOG

Property Address: 34 Queens Grove, London, NW8

Client Claim Ref: 34 Queens Grove




Survey date: 10/12/2014




Operative: SE1

Borehole ID: BH1

Hole Type: FA

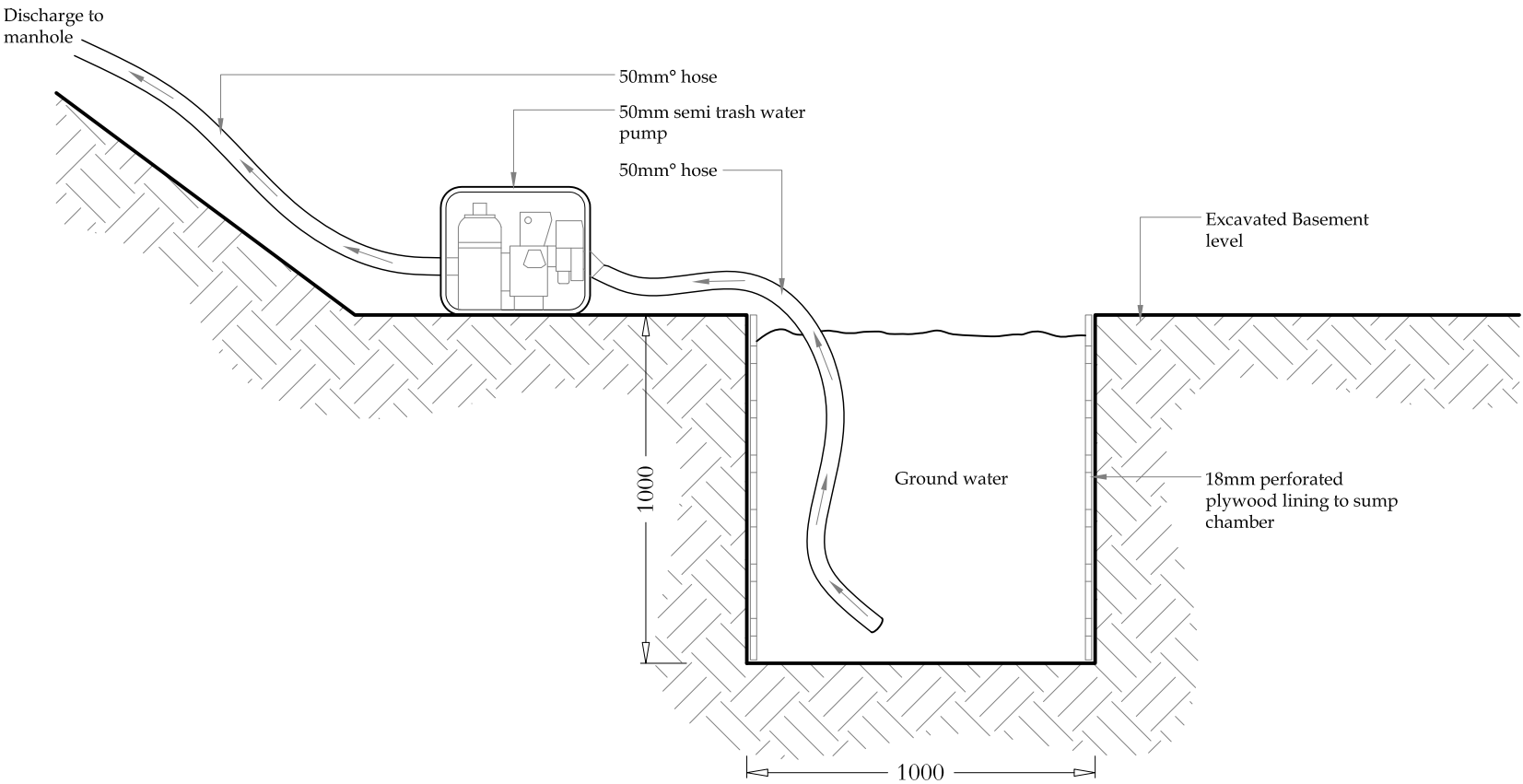
Scale: 1:35

Water Strikes	Samples		Insitu Tests		Depth (m)	Legend	Stratum Description and Observations
	Type	Depth (m)	Type	Results			
					0.30		Dark brown Topsoil
					0.80		Dark brown clayey MADE GROUND containing brick and gravel
		1.00	V	104.00 104.00			Mid brown CLAY containing grey mottle Noted to contain orange sand pockets from 0.80m to 2.20m
		2.00	V	118.00 122.00			
		3.00	V	140.00			
		4.00	V	140.00			
		5.00	V	140.00			
		6.00	V	140.00	6.00		End of Borehole at 6.00 m

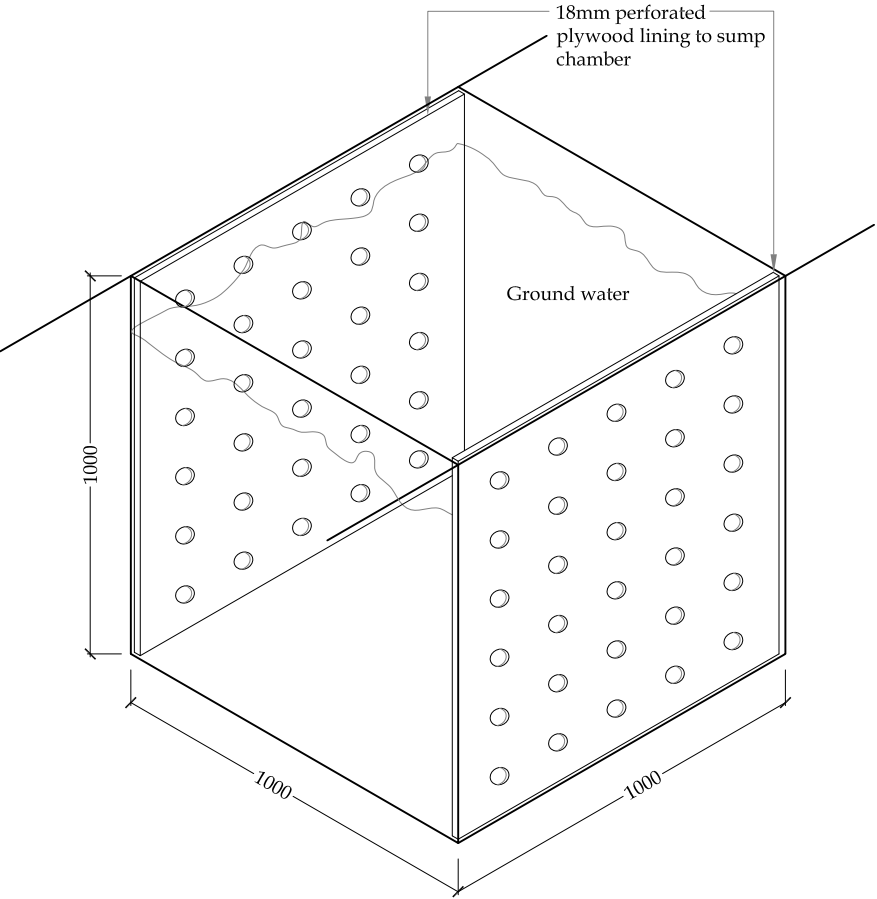
Key:  Water Strike  Disturbed Sample  Insitu vane test (kPa)  Mackintosh Probe Test

Remarks: Borehole was closed at 6.00m as requested. Borehole was noted to be dry on completion.

N.b. Unless otherwise stated small vane paddle used. To convert MP to SPT divide average blows for 75mm by 1.5



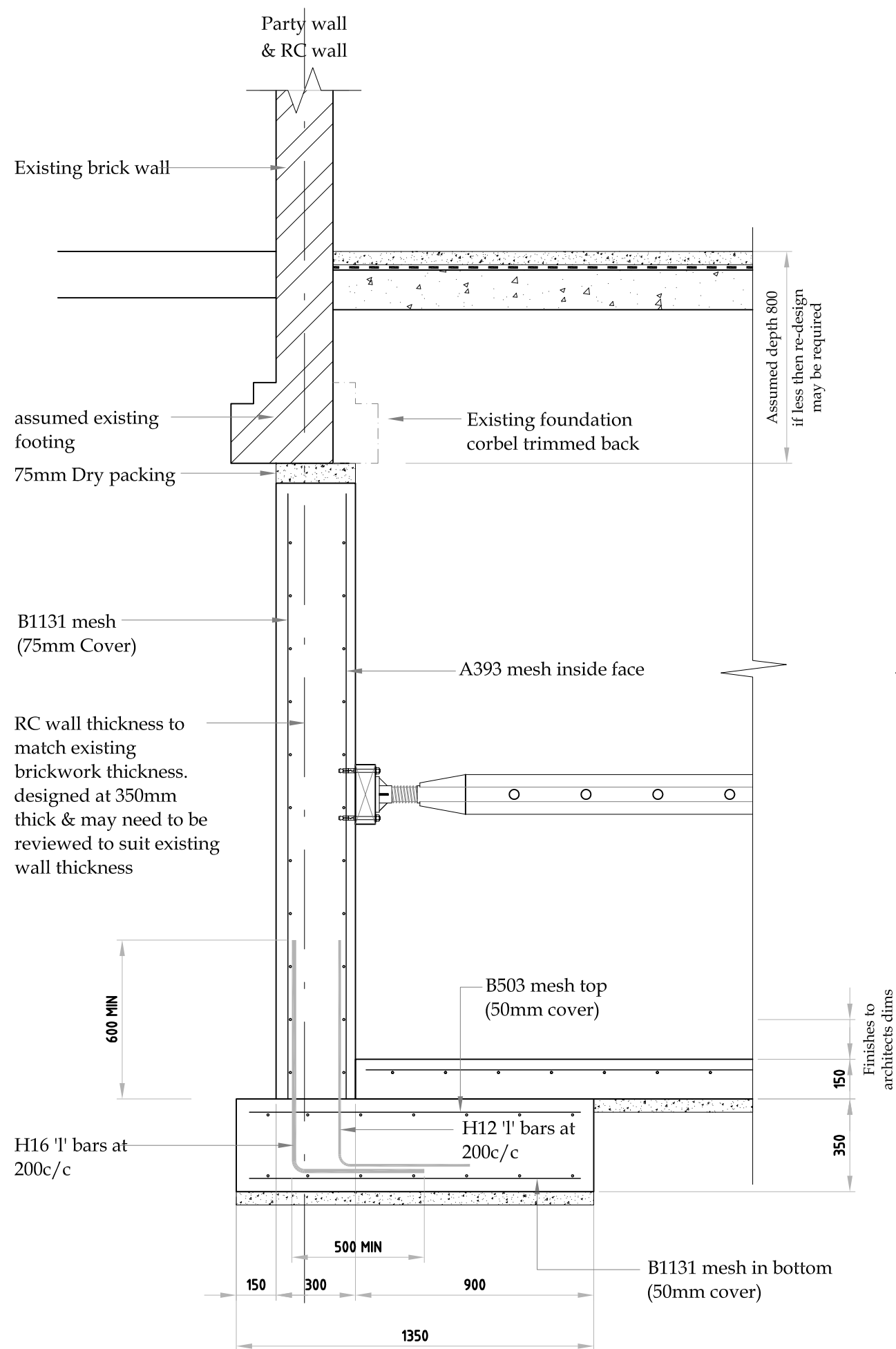
Typical Sump Chamber Section



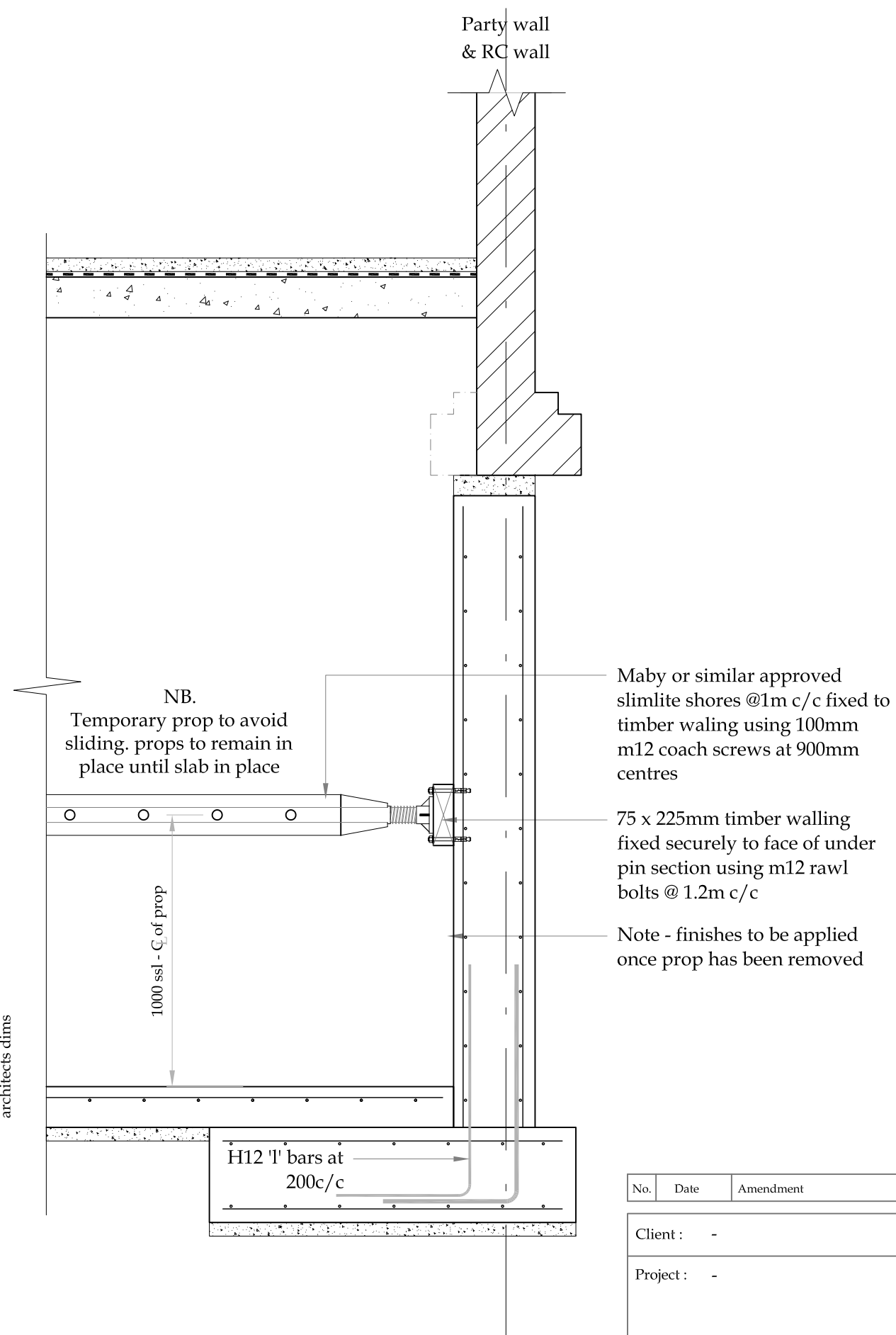
Typical Sump Chamber Isometric

No.	Date	Amendment	Initials
Client : Typical			
Project : Typical Detail			
Drawing : Typical Basement Water Pumping Layout			
Scale :	1:20 @ A3	Status : PRELIMINARY	Rev : -
Date :	21 Jul 2009	Dwg No : 0000 / 1008	
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TYPICAL SECTION INDICATING
UNDERPIN SUPPORT PROPS

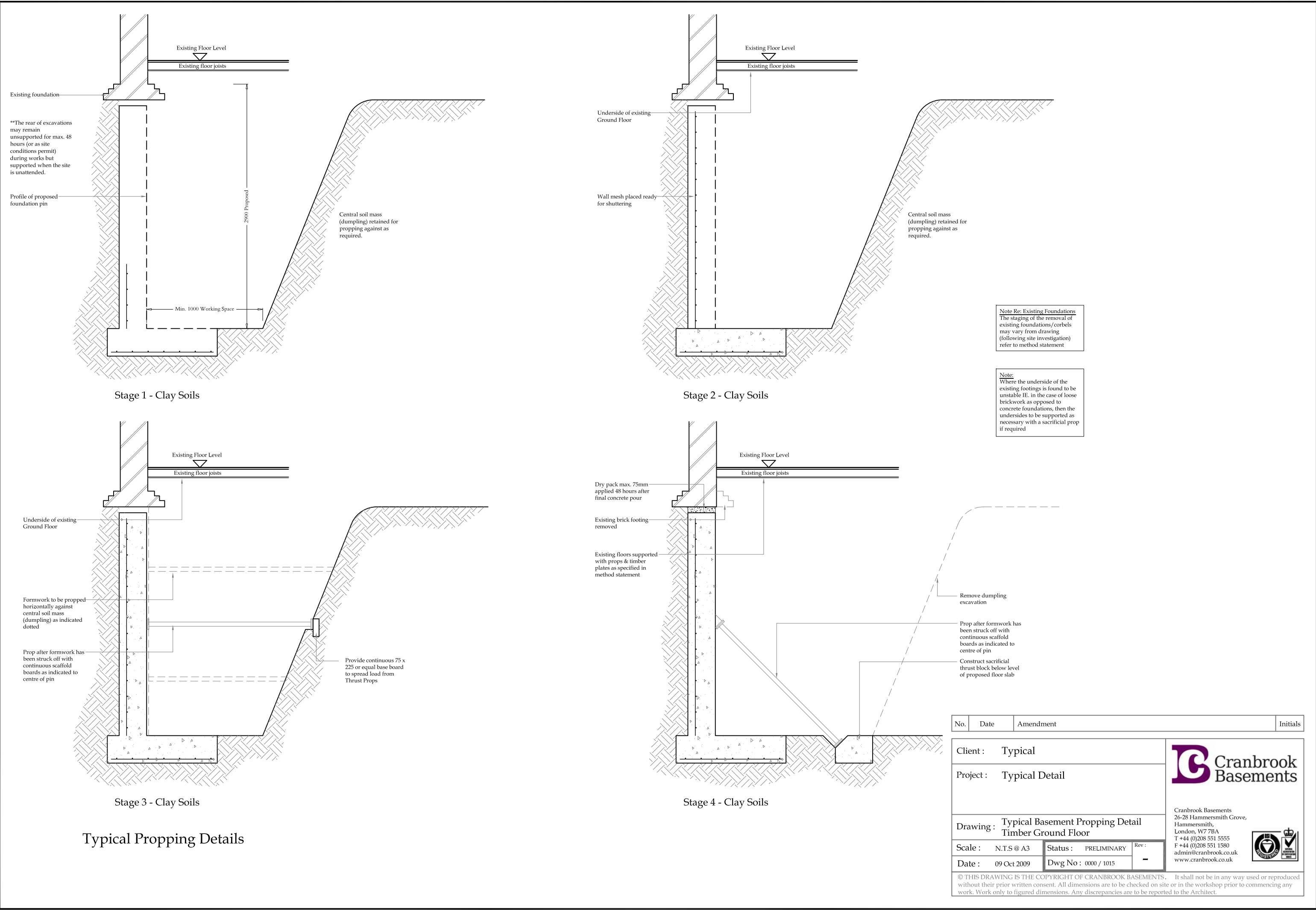


No.	Date	Amendment	Initials
Client : -			
Project : -			
Drawing : Underpin Lateral Bracing - Ground Bearing Slab Above - Typical			
Scale : N.T.S @ A3	Status : PRELIMINARY	Rev : -	
Date : -	Dwg No : TD 11		
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No.	Date	Amendment	Initials
Client : Typical			
Project : Typical Detail			
Drawing : Typical Basement Propping Detail Timber Ground Floor			
Scale :	N.T.S @ A3	Status : PRELIMINARY	Rev : -
Date :	09 Oct 2009	Dwg No : 0000 / 1015	
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DELTA MEMBRANE SYSTEMS LTD.



DELTA SYSTEM 500

‘Providing Waterproofing Solutions’

Uniclass L6814	EPIC F831
CI/SfB (13.9)	Ln6 (L34)

February 2006

The Sealed System

In soil retaining situations such as basements and vaults etc. the **DELTA** sealed system is recommended. The membrane selection depends on the required finish and flow rate if applicable. All membrane junctions, fixing points, service entries and other protrusions are sealed with the **DELTA** range of sealing products. Where active ground water is evident or expected drainage of one form or another should be incorporated into the specification. Our technical staff are available to give advice in this respect.

The Ventilated System

In above ground situations or in areas where no free running water is expected, for example where external pavements have been built up, the ventilated system can be used. The ventilated system with air gap at top and bottom does not require sealed joints or fixings, a 200mm overlap is sufficient in this situation. This method is seen as a sympathetic

solution in Heritage type properties as a general damp proofing system. The fabric of the building remains unchanged but the new internal surfaces are 'dry' and are salt and contamination free. Both dry lining or plaster direct finishes are available on the ventilated system.

Floors

As well as being a complete waterproofing and damp proofing system, the **DELTA** system is also used to upgrade damp and defective floors. With excellent crush resistance the system lends itself to a variety of different finishes which include conventional screeds, thin layer fast drying screeds and wood based floating floors. Insulation can also be used in conjunction with the system where required. The system can be linked to the D.P.C. constructed within a new wall or to an existing D.P.C.

Preparation

As the membrane systems are mechanically fixed there is no



reliance on the ability of the product to bond to the substrate. The **DELTA** system can be applied



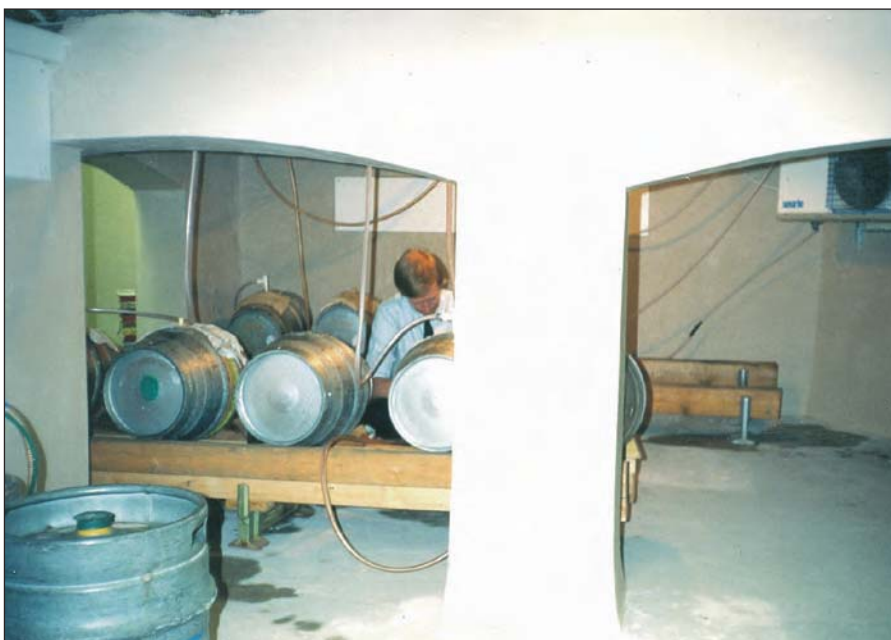
to a variety of different substrates for example over existing renders or broken down bitumen coatings, etc. This can be easily achieved without detriment to the integrity of the system.

Damp Pressure Equalisation

The studded structure of the membrane allows the dampness behind the membrane to move in all directions unhindered, therefore the whole of the wall or floor surface takes the damp loading. Break downs created by weak points are eliminated. The product does not divert the problem to other areas.

Flexibility

In structures where movement or vibration can be a problem, examples being under street vaults, railway arches, and buildings constructed with movement joints,



the **DELTA** system can cope. The **DELTA** membrane has an elongation break of greater than 50%.

Speed

As there is little or no preparation required the system is by comparison quick to install. When dry finishes are used the system is a 'fast track' solution. Decoration does not need to be delayed as there is no drying process.

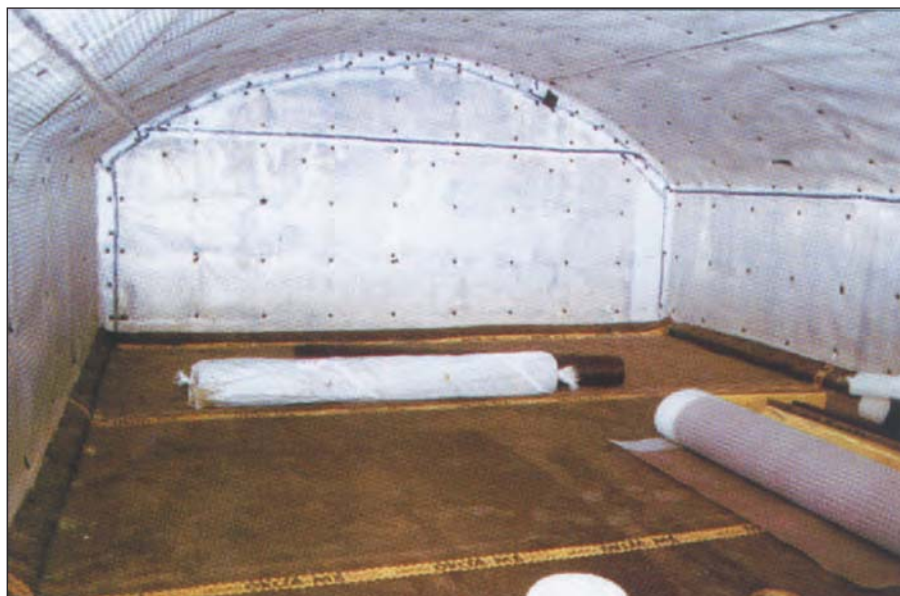
DELTA Membrane Systems is the U.K. arm of the world's largest producer of cavity drain systems. The market leading **DELTA** brand has a track record approaching three decades. The **DELTA** systems have been used successfully in many situations in the U.K, from small domestic basements up to major waterproofing projects such



as London Underground stations. There is rarely a dampness or water ingress problem that falls outside the scope of the capabilities of the **DELTA** system.

What are DELTA Systems

With the introduction of British Standard BS.8102:2009 'Protection of below ground structures against water from the ground', the use of



cavity membranes has been generally accepted in the U.K.

DELTA Systems are a complete range of products which are used together to solve many of today's problems in both new and old construction. **DELTA** Systems can easily deal with aggressive ground water conditions, where basements are liable to flooding, or indeed where simple dampness, contamination or salting problems are prevalent. Other more diverse applications include turf covered roofs, barn conversions, tunnel linings or even as a barrier against radon gas.

The main components of the system are the membranes themselves. These are manufactured from virgin high density polyethylene which is thermally and alkaline stabilised. The stud heights vary from 3mm for **DELTA-FM**, 8mm for **DELTA MS 500** & **DELTA PT** to 20mm for **DELTA MS 20**. The cavity created by the membrane contains between 2.1 and 10 litres of space respectively. This is known as either the 'Air Gap' or the 'Drained Cavity', in wet situations.

The Membranes

DELTA-MS 500 This is used for walls and floors, and is supplied in 2.4, & 2m x 20m rolls. This membrane can be used for light water ingress situations, and is available yellow (**DELTA-FM**), and clear. The MS 500 clear aids the selection of good fixing points in more difficult application i.e. random stone and friable brickwork. The sealed **DELTA-Plug** or **Qwik Seal Plug** is used to secure System 500, the centre shank of this fixing is also used for subsequent dry lining applications.

DELTA PT LATH This membrane has a mesh incorporated on the internal face which is attached by a thermic welding process at the time of manufacture. The sealed PT fixing plug is used to secure the



membrane at 250mm horizontal and vertical centres. The welded mesh and fixing plugs allow for direct render 1.1.6.

(cement/lime/sand), or plasters: Tarmac Whitewall, Carlite Bonding, or dab fixed plasterboard for internal applications. When this grade is used for external above ground protection polymer renders can be used as a finish. These renders are polymer modified and can also have reinforcing fibres incorporated for added strength and durability. This grade is available in clear 2.0m x 20m (40m²), 1.5m x 10m (15m²) or 1.0m x 15m (15m²).

DELTA MS 20 This is a heavy gauge version of System 500 with deep 20mm studs. This is used where extra drainage capacity is required, for example on deeper structures, or where a larger flow rate is required. MS 20 can also be

used as a 'cavity former' for many types of new construction. The rolls are a full 2 metre width by 20 metres in length (40m²).

Product Guarantee

DELTA membrane systems can come with a thirty year product guarantee when installed by registered installers. The guarantee covers the membrane and ancillary components. Based on experience, accelerated ageing tests and a quality manufacturing system to ISO 9001, the **DELTA** range can also be guaranteed with confidence.

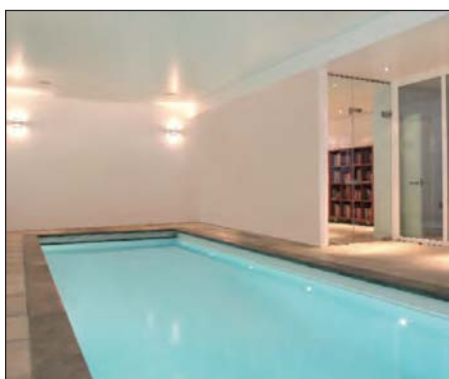
Technical site and/or office visits

Staff are available to visit site to give advice on particularly difficult or unusual situations, where appropriate specifications are prepared to assist in the correct use of the system.

Who Installs DELTA Systems

Although **DELTA** systems are by comparison, easy to install, it must be recognised that correct diagnosis of the problem is essential so that **DELTA** systems can be designed and tailored to the needs of the building, to give the best possible performance. It is therefore recommended that only competent specialist contractors, who understand dampness, and the associated problems, be employed to survey the site, install the system and thereby ensure the best possible performance of the system. **DELTA** systems are installed by a nationwide network of specialist contractors who are holders of 'Registered Installers' Certificates. These contractors also offer guarantees for their workmanship, giving peace of mind to the client.

COMPLETED BASEMENT PROJECTS



Leisure



Study



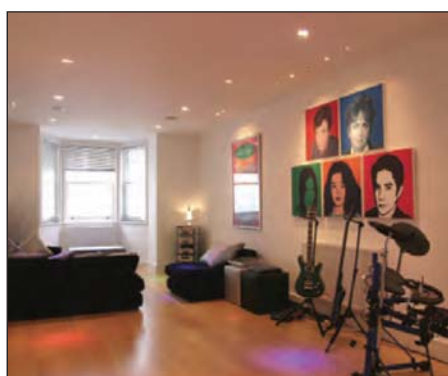
Photography Studio



Playroom



Home Cinema



Music Room

DRAINAGE OPTIONS

DELTA® SUMPS & PUMPS



When specifying a sealed cavity membrane system, full consideration must be given to drainage, when installed below ground.

The concept of the drained cavity system is to collect and manage any moisture which breaches the integrity of the structure by channelling, collecting, and discharging such free water via a suitable evacuation point.

Channels, laid to falls, can discharge passively into a sump or be connected to a drainage system but access for maintenance should be provided.

Access ports allow inspection and water jetting of channels, while sumps have a sealed access cover which allows for annual maintenance checks to be carried out, which are recommended.

If drainage has been installed, it should be flood tested before covering it up to make sure the system works.

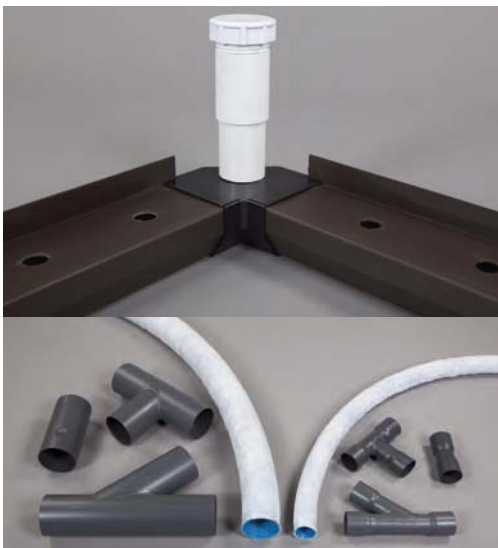
Delta offer a choice of sump+pump stations to fit the purpose, and free advice is available from their technical staff.

Service agreements can be arranged through Delta and are maintained by PPS Ltd.

Delta Retrofit Sumps are fitted with a dual pump system and have three 110mm/160mm side inlets to take ground water, and grey water from shower, laundry and sink waste.

DELTA® CHANNEL

DELTA® AQUADUCT



Delta Channel is a water collection conduit which is bedded into a preformed channel at the floor/wall angle. Holes in the channel wall allows water to ingress at this point to drain away to a sump or soak away. Access ports are available to allow maintenance and inspection. The system is joined with a range of connectors.

Delta Aquaduct is a drainage channel which acts as a perimeter conduit bedded in at the floor/wall angle. Where appropriate, it can be laid under the slab to take off ground water to a sump or soak away, and reduce flotation pressures from bearing on the slab.

Delta Aquaduct is fully perforated for maximum performance, and incorporates an outer geotextile filter to prevent particles from entering the channel.

The product comes on a roll 150m x 60mm diameter. It is also available in 100m x 100mm dia rolls.

'FREE LIME' RISK

When new concrete forms the structure, to walls or particularly floors, there is a risk of excess free lime leaching out during the curing process. When a cavity drainage system is used in this type of application, a silicification pre-treatment of the concrete should be used to prevent the risk of free lime build up, and blockage of the drainage cavity. Delta Polysil-TG 500 is applied by spray for this purpose, and is available in 10kg drums.



POWER FAILURE?

HELP IS AT HAND



If you've installed a cavity drained system internally, one of the main design considerations is how are you going to manage the water collection and discharge. This can be done passively into existing drainage points, if available and appropriate.

However, the majority of projects require a collection sump + pump, to automatically manage the evacuation of any water ingress. This type of unit requires mains power to operate, so what can be done if the power fails, and is coincident with high water ingress? Here are two options from Delta.

High Water Level Alarm - This system gives an audible warning if a high level situation occurs. It is fitted with it's own rechargeable battery, which is trickle charged, and will still operate in the event of mains power failure.

Delta Power-Pack - This unit is designed to run the secondary pump if a power failure occurs. The unit is trickle charged under normal conditions, and will auto switch to battery power if mains power fails. The unit will pump approx. 8,100 litres in back up mode.

Delta Power Pack Pumps 8,100 Ltr in back up mode.

DELTA®-MS 500:



Cavity drainage membrane for use on walls and floors, as a waterproof system. A choice of finishes are available. Can also be used externally for waterproof protection of sub-ground structures.

Material:	high density polyethylene
Thickness:	approx. 0.6 mm
Stud height:	approx. 8 mm
Roll size:	available in clear
(With flat edge of 7 cm on one side)	2.4 x 20 m
Compressive strength:	2.0 x 20 m
Drainage capacity:	> 250 kN/m ²
	approx. 2.25 l/s · m
	approx. 135 l/min · m
	approx. 8 100 l/h · m
Air volume between studs:	approx. 5.3 l/m ²
Temperature resistance:	- 30°C to + 80°C
Chemical properties:	resistant to chemicals, resistant to root penetration, rotproof, neutral towards drinking water
Behaviour in fire:	Class E

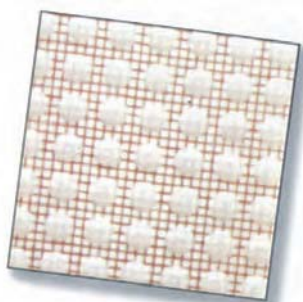
DELTA®-MS 20:



Dimpled sheeting with particularly high drainage capacity and compressive strength, suitable for high performance seepage layers in building and civil engineering construction.

Material:	high density polyethylene
Thickness:	approx. 1 mm
Stud height:	approx. 20 mm
Roll size:	2.0 x 20 m
	In the case of special requirements, also available in board format
Compressive strength:	approx. 150 kN/m ²
Drainage capacity:	approx. 10 l/s · m
	approx. 600 l/min · m
	approx. 36 100 l/h · m
Air volume between studs:	approx. 14 l/m ²
Temperature resistance:	- 30°C to + 80°C
Chemical properties:	resistant to chemicals, resistant to root penetration, rotproof, neutral towards drinking water
Behaviour in fire:	Class E

DELTA®-PT:



Dimpled sheeting with plastic mesh welded on, suitable as a damp-proof base for plaster or shotcrete, e.g., as a seepage layer in tunnel construction, or for repairing basements internally.

Material:	high density polyethylene
Thickness:	approx. 0.5 mm
Stud height:	approx. 8 mm / 8mm / 4mm
Roll size:	2.0 x 20 m / 1.5 x 10 m / 1.0 x 15m
Compressive strength:	approx. 70 kN/m ²
Drainage capacity:	approx. 5 l/s · m
	approx. 300 l/min · m
	approx. 18 100 l/h · m
Void between studs:	approx. 5.5 l/m ²
Temperature resistance:	- 30°C to + 80°C
Chemical properties:	resistant to chemicals, resistant to root penetration, rotproof, neutral towards drinking water
Behaviour in fire:	Class E

DELTA®-FM:



DELTA®-FM is specifically designed for floor applications, to combat dampness, and contamination. The special low stud profile (3mm) minimises changes in floor levels but still provides an air gap to achieve damp pressure equalisation.

The membrane is a fast-track application that allows various floor finishes to be achieved with zero 'down time'. The R.H. levels are isolated in the air gap, and

controlled. Delta-FM can be used in new build, remedial or refurbishment projects for floors, and walls.

Material:	Virgin high-performance PE-VHD
Application:	Special low stud profile for floor. Can be used on walls
Sheet thickness:	approx. 0.6 mm
Dimple height:	approx. 3 mm
Compressive strength:	approx 140 kN/m ²
Roll dimensions:	20m x 2m (40m ²)
Volume between dimples:	approx 2.1 l/m ²
Service temperature range:	-30degC / +80degC
Behaviour in fire:	Class E