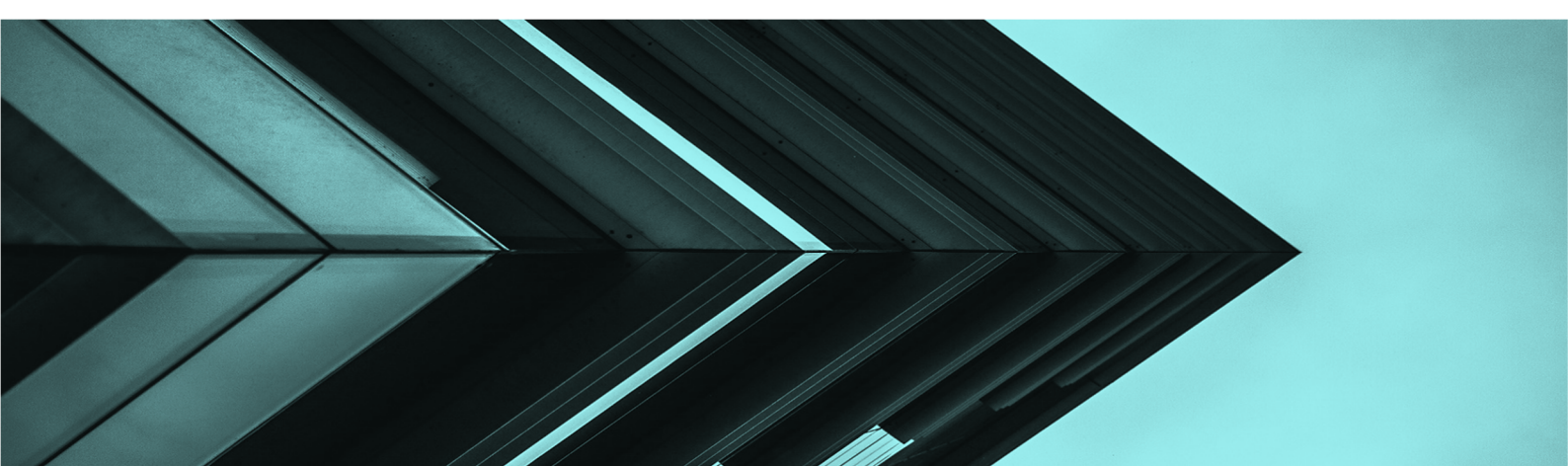




BASEMENT IMPACT ASSESSMENT FOR PROPOSED NEW DEVELOPMENT AT 25 SHELDON AVENUE

By Design4Structures on behalf of Cassion Castle Architects.

Full Site Address

**25 Sheldon Avenue
Highgate
London
N6 4JS**

Client Contact

Cassion Castle

Project No

D4S4710

Project Number	Rev	Revision Notes	Date	Prepared	Checked	Approved
D4S4710	P04	Issued for Planning	15/12/2021	JT	RP	JL
D4S4710	P03	Issued for Planning	08/12/2021	JT	RP	JL
D4S4710	P02	Issued for Planning	05/10/2021	RP	AM	JL
D4S4710	P01	Issued for Planning	01/10/2021	RP	AM	JL

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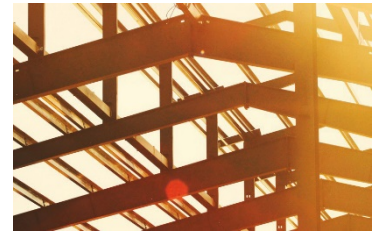


Our Services

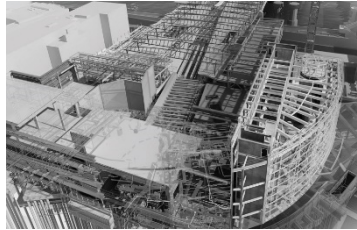


Infrastructure
Engineering

BIM (Building
Information Modelling)



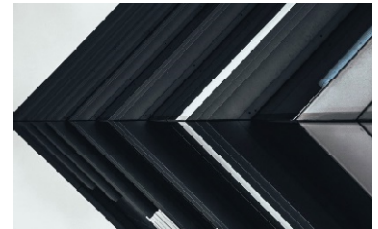
Construction
Engineering



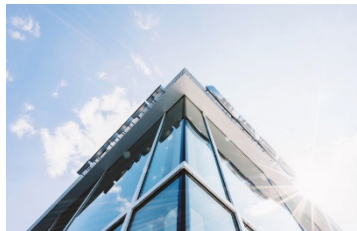
Structural
Engineering



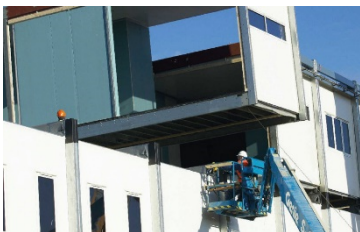
DfMA (Design for
Manufacture and Assembly)



Architectural Metalwork,
Balconies & Stairs



Architectural Aluminum
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For more about who we are, our projects and testimonials see:
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1 Introduction

1.1 Background

Design4Structures ("D4S") are appointed by Cassion Castle (Client), who are also the Architects for the project, to prepare a structural Basement Impact Assessment (BIA) for the proposed redevelopment of the existing property,

The redevelopment involves the formation of a new basement beyond the existing footprint of the building and demolition of the existing superstructure except from front façade wall. The existing footprint of the house is also to be increased by a single-story rear and double-story side extensions.

This Basement Impact Assessment (BIA) has been prepared in accordance with Haringey Council's Development Management DPD Pre-Submission Version, Policy DM18 dated January 2016. It also follows the principals set out in Haringey Council's draft Basement Development Guidance Note (BDGN), dated June 2012.

This report has been prepared by D4S and is for the sole use of the Client.

A walkover of the site was carried out by a structural engineer from D4S on the 15th of July 2020. Observations and photos taken during the visit are documented in the report.

1.2 Report Structure

This report commences with a desk study for the site, followed by screening and scoping assessment.

A ground model is then evaluated using the findings from intrusive ground investigation carried out for neighboring properties, No. 23, No. 27, and No. 28 Sheldon Avenue, which are publicly accessible on the Haringey planning portal.

Geotechnical issues are then presented followed by impact assessment that evaluates the mitigation of any predicted impacts of the proposed redevelopment.

Policy DM18

1.3 Policy DM18 – Basement and Lightwells

DEVELOPMENT MANAGEMENT DPD PRE-SUBMISSION VERSION (JANUARY 2016), POLICY DM18: RESIDENTIAL BASEMENT DEVELOPMENT AND LIGHT WELLS

A - Householder extensions to existing basements or the construction of new basements in existing dwellings will only be permitted where it can be demonstrated that the proposal:

a - Will not adversely affect the structural stability of the application building, neighboring buildings, and other infrastructure, including the adjoining highway, having regard to local geological conditions;

b - Does not increase flood risk to the property and nearby properties from any source;

c - Avoids harm to the appearance or setting of the property or the established character of the surrounding area;

d - Will not adversely impact the amenity of adjoining properties by reason of noise or increased levels of internal or external activity;

e - Will not adversely impact the local natural and historic environment;

And, where the proposed basement extends beneath the garden area:

f - Will not cause loss, damage, or long-term threat to trees of townscape or amenity value;

g - Maintains adequate soil depth satisfactory for preservation of landscaping consistent with neighboring properties;

And during the construction phase:

h - Will not cause harm to pedestrian, cycle, vehicular and road safety, adversely affect bus or other transport operations, significantly increase traffic congestion, nor place unreasonable inconvenience on the day-to-day life of those living, working, or visiting nearby; and

i - Will minimize construction impacts such as noise, vibration, and dust for the duration of the works.

B - The Council will not permit basements which include habitable rooms or other sensitive uses in areas prone to flooding and where there is no satisfactory means of escape.

C - In determining applications for light wells, the Council will consider whether: a) The architectural character of the building is protected; b) The character and appearance of the surrounding area is harmed; and c) - The development results in the loss of more than 50% of the front garden or amenity area.

3.41 Development of basements, particularly in established residential areas, has become an increasingly popular way of gaining additional space in homes. Like other authorities across London, Haringey has experienced an increase in the number of applications received for basement development in recent years.

3.42 It is important that basement development is carried out in a way that does not harm the amenity of neighbors, compromise the structural stability of adjoining properties, increase flood risk, or damage the character of the area or natural environments.

3.43 Some development falls within the scope of permitted development. However, where control can be exercised by the local planning authority, the Council will seek to appropriately manage adverse impacts. Where appropriate, applicants will need to submit specific information to demonstrate that these issues can and have been addressed.

3.44 This information should be contained in a Basement Impact Assessment (BIA) to be submitted as part of the planning application. The requirements and stages of the BIA will be set out in full detail in the Council's emerging guidance note on Basement Impact

Assessments. The various stages of a BIA should be carried out by qualified and recognized independent assessors and will be paid for by the applicant.

3.45 The introduction of light wells where they are not an established and positive feature of the streetscape can harm the character or appearance of an area. Where external visible elements are allowed, they need to be located and sensitively designed to avoid light pollution to neighbors and harm to the existing character and appearance of the building, streetscape, and gardens in the vicinity.

2 The Site

2.1 Site Location

The site is located on the western side of Sheldon Avenue, approximately 1.2km southwest of Highgate London Underground station, in an urban residential area of Highgate, London, N6 4JS: National Grid Reference 527370, 187798.

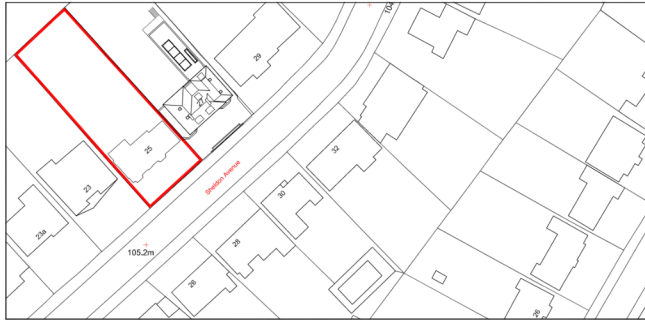


Figure 1: - 25 Sheldon Avenue, Site Map

The site is bordered to the northeast by 27 Sheldon Avenue and southwest by 23 Sheldon Avenue. The Highgate Golf Course is located to the northwest of the property and the front garden slopes slightly down toward Sheldon Avenue located to the southeast.

25 Sheldon Avenue falls within the Highgate Conservation Area. The proposed building is not a listed building, nor does it fall within an Article 4 direction area.

2.2 Topographical Setting

The site is situated on the lower northern slopes of Highgate Hills. The land slopes gently north-eastwards, towards the Mutton Brook, a tributary of the River Brent.

A topographical survey has been prepared for the site in March 2020 by Terrain Surveys.

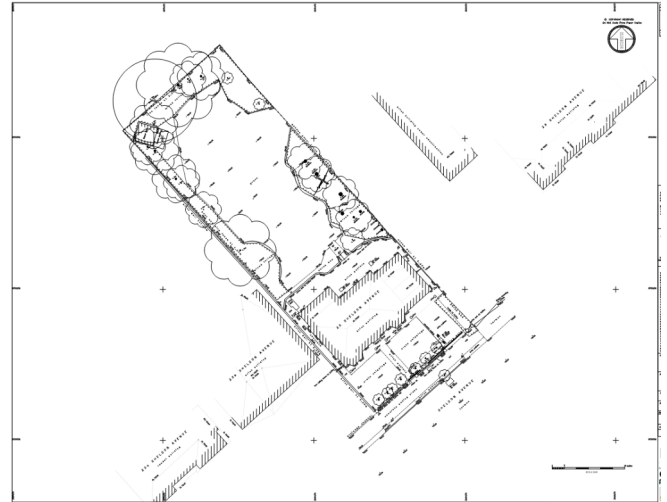


Figure 2: - Topographical survey of 25 Sheldon Avenue

The existing house level is at approximately +106.21m OD outside the front door with the rear garden at approximately +106.7m OD.

2.3 Site Description

The site is currently occupied by a two-storey detached house. Based on BGS maps of the site, ground information provided in the council's SFRA report and on the EA/Defra Magic map for Soilscape data, the ground at the site is formed of topsoil varying between 150mm and 1m deep underlain by the Claygate Member to a further 15m depth. The Claygate Member overlies the London Clay to a further depth of 20m. Infiltration techniques are therefore unsuitable at the site due to the 'orange-brown, mottled, greenish-grey and yellowish-brown silty clay' substrata.



Figure 3: - Front facade of 25 Sheldon Avenue

At the rear of the property there is an existing single storey extension dating back to 1977, a patio area adjacent to the building and an elevated rear garden lawn with vegetation around the perimeter.



Figure 4: - Rear garden at 25 Sheldon Avenue

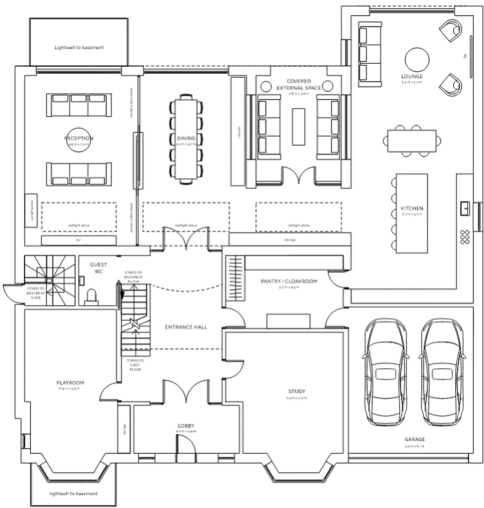


Figure 5: - Proposed GF Plan

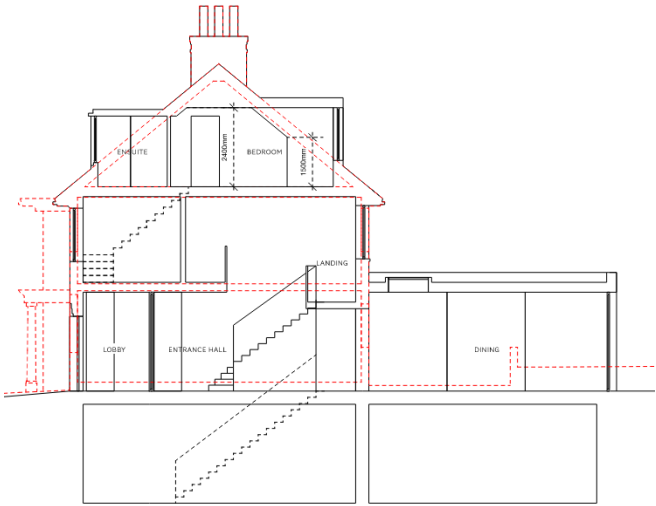


Figure 6: - Proposed Longitudinal Section

2.4 Proposed Redevelopment

The proposed development involves the formation of a new basement beyond the existing building footprint and demolition of the existing superstructure except from front façade wall. The existing footprint of the house is also to be increased by a single-story rear and double-story side extensions.

3 Desk study

3.1 Site History

Based on the 27 Sheldon Avenue desk study, the site and surrounding area was predominantly rural until the early 20th Century, when the properties along Sheldon Avenue were constructed.

Highgate Golf Course, which borders the site, opened in 1904 and aerial photographs from 1920 indicate that the area around the site was used as allotments.

In the late 20th Century alterations to the property took place, which required planning permission including extension to provide chauffeur's flat, a new porch, a new canopy, extension of the garage and erection of a single storey rear extension.

3.2 Geological Information

The British Geological Survey (BGS) records of the area show the site to be underlain by Claygate Member formed of clay, silt, and sand, which is subsequently underlain by the London Clay Formation.

3.3 Hydrogeological and Hydrological Information

In accordance with GEA Desk Study & Ground Investigation Report for 23A Sheldon Avenue 'the Claygate Member is classified by the Environmental Agency as a Secondary 'A' Aquifer, which refers to permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. In the absence of significant sand horizons, the Claygate Member is not capable of storing and transmitting water in usable amounts and receives very low levels of annual recharge due to very low permeability. Under the same classification system, the London Clay is designated as unproductive strata, which refers to deposits that have low permeability and negligible significance for water supply or river base flow'.

The Environment Agency flood maps indicate that Sheldon Avenue is in flood zone 1, which is in an area with a low probability of flooding, therefore the site itself is designated as very low risk of any form of flooding.

4 Stage 1 - Screening Assessment

The Screening and Scoping Assessments have been undertaken with reference to Appendix E and F of the CGHSS.

4.1 Screening Assessment

The screening assessment consists of the following:

- Groundwater flow
- Surface flow and flooding
- Land stability

4.2 Screening Checklist for Subterranean (Groundwater) Flow

Q1a. Is the site located directly above an aquifer?

Answer: Yes. In accordance with the CGHHS Environment Agency Maps and Camden Aquifer Designation Map Figure 8, the site located above Secondary 'A' Aquifer. The site is underlain by clay strata, which is not classified as a Major Aquifer. In the absence of significant sand horizons, the Claygate Member is not capable of storing and transmitting water in usable amounts and receives very low levels of annual recharge due to very low permeability. Therefore, the aquifer is highly unlikely to be impacted by the proposed basement works.

Q1b. Will the proposed basement extend beneath the water table surface?

Answer: Yes. The ground investigation for 23A Sheldon Avenue shows monitoring of standpipes on three occasions over a roughly six weeks recorded ground water at depths of between 105.41m OD and 102.78m OD within standpipes. The basement slab will be at the depth of approx. 101m OD. Further site-specific ground investigation will be carried out in due course; however, it is estimated that the basement will be beneath a potentially perched water table.

Q2. Is the site within 100m of a watercourse, well(used/disused) or potential spring line?

Answer: No. The site is not near an active watercourse and the nearest feature is a drain at the Highgate Golf Club located to the north of the site. There is no known active spring or well near the site therefore the impact of the proposed development on the groundwater flow regime or to the quality of groundwater is likely to be very low.

Q3. Is the site within the catchment of the pond chains on Hampstead Heath?

Answer: No. In accordance with Figure 14 of the CGHHS, the site is not within the catchment of the pond chain on Hampstead Heath. In accordance with 'The Lost Rivers of London' the site is not located within water catchments associated with Hampstead Heath.

Q4. Will the proposed basement development result in a change in the proportion of hard surfaced/paved area?

Answer: Yes. The proposed basement will extend beyond the line of the existing house and the paved rear garden patio.. The proposed peak surface water discharge rate has been reduced to the greenfield run-off rate in full compliance with the council's SuDS hierarchy and standards.

Q5. As part of the site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground (e.g. via soakaways and/or SuDS?)

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Answer: No, not directly into the ground. The clay substrata and underlying Aquifer prevents the use of soakaways or other infiltration techniques. Consequently, the proposed redevelopment is providing a significant betterment by controlling and reducing the peak surface water discharge rate from the site by providing large below-ground tanks to attenuate run-off generated by a severe 1 in 100-year storm of 6hr duration with an additional 40% allowance for climate change. Consequently, peak discharge from the site to the current Thames Water sewer is being reduced by 74% to the greenfield run-off rate of 2 l/s from the existing peak rate of 7.6 l/s to comply with the recommendation in the council's SFRA and Surface Water Management guidelines, SuDS policies and the London Plan 2021.

Q6. Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to, or lower than, the mean water level in any local pond or spring line?

Answer: No.

4.3 Screening Checklist for Surface Flow and Flooding

Q1. Is the site within the catchment of the pond chains on Hampstead Heath?

Answer: No. The closest Hampstead Heath pond, the Thousand Pound Pond, is approximately 750m away from the site.

Q2. As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route?

Answer: Yes. Significant betterment in Surface Water management is being provided by the proposed development in the form of SuDS localised source control and rainwater attenuation at greenfield run-off rate using below-ground attenuation to retain the severe 1 in 100 + 40% CC storm event of 6-hour duration.

Q3. Will the proposed basement development result in a change in the proportion of hard surface/paved external areas?

Answer: Yes, but the existing peak surface water discharge rate of 7.6 l/s is being reduced to the greenfield run-off rate of 2 l/s but the provision of below-ground attenuation and a discharge-control device. The proposed SuDS systems is therefore providing a betterment by reducing the risk of flooding to the property and to neighbouring properties.

Q4. Will the proposed basement result in changes to the profile of the inflows (instantons and long-term) of surface water being received by adjacent properties or downstream watercourses?

Answer: No. The basement will not impact on surface water flows at the site as the Environment Agency's surface water flood risk map confirms the site is not in an area exposed to overland flows. The impermeable nature of the underlying clayey soil also suggests the impact on neighbouring substrata will be insignificant. The risk of flooding from the proposed basement to upstream, adjacent/neighbouring, or downstream properties or infrastructure is very low.

Q5. Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?

Answer: Yes. The proposed development will provide a slight betterment as the peak run-off rate of surface water discharged from the existing site will be reduced from 7.6 l/s to 2 l/s, but the quality of the discharged run-off will pass through source control methods. The proposed trapped gullies and attenuation tanks will provide sufficient treatment for contaminants that may be present in surface water run-off that will be generated by, or flow onto, the proposed impermeable surfacing. Water from roof areas is generally considered 'clean' and does not require dedicated treatment. The proposed SW drainage system will improve the water quality from the development proposals entering the new

underground attenuation tanks. This will be done by using a treatment chain where each subsequent system within the proposed drainage network is treated to improve water quality, ie by filter undersoil or trapped gullies and sumps.

Q6. Is the site known in an area identified to have surface water flood risk according to either the Local Flood Risk Management or is it at risk from flooding, for example because the proposed basement is below the static water level of nearby surface water feature?

Answer: No. In accordance with Environmental Agency's surface water flood risk and fluvial flood risk maps, the site is in flood zone 1 and not exposed to overland flooding. There is no history of flooding at the site from any potential sources including sewers, reservoirs, and groundwater.

4.4 Screening Checklist for Slope Stability

Q1. Does the existing site include slopes, natural or manmade, greater than 7° (approximately 1 in 8)

Answer: No. In accordance with CGHHS Environment Agency Maps, Figure 14, there are no slopes greater than 7° within the site.

Q2. Will the proposed re-profiling of landscaping at site change slopes at the property boundary to more than 7° (approximately 1 in 8)

Answer: No. The development will not change slopes at the property boundary to more than 7°.

Q3. Does the development neighbor land, including railway cutting and the like, with a slope greater than 7° (approximately 1 in 8)

Answer: No. In accordance with CGHHS Environment Agency Maps, Figure 1, the site does not neighbor land, which would belong to railway or highway.

Q4. Is the site within a wider hillside setting in which the general slope is greater than 7° (approximately 1 in 8)

Answer: No. In accordance with CGHHS Environment Agency Maps, Figure 14, the site is not within a wider hillside setting in which the general slope is greater than 7°.

Q5. Is the London Clay the shallowest strata at the site?

Answer: No. Downwash Deposits overlain Claygate Member.

Q6. Will any tree/s be felled as part of the proposed development and/or are any works proposed within any tree protection zones where trees are to be retained?

Answer: Yes. trees within the building footprint will be removed with trees placed at the back of the garden to be retained. The new basement is to be kept off the tree protection area. An Arboricultural report outlining the tree protection zone during the construction will be required to establish extent of it.

Q7. Is there a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site?

Answer: No

Q8. Is the site within 100m of a watercourse or a potential spring line?

Answer: No. The site is not near an active watercourse and the nearest feature is a drain at the Highgate Golf Club located to the north of the site. There is no known active spring or well near the site therefore the impact of the proposed development on the groundwater flow regime or to the quality of groundwater is likely to be very low.

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Q9. Is the site within an area of previously worked ground?

Answer: No

Q10. Is the site within an aquifer? If so, will the proposed basement extend beneath the water table such that dewatering may be required during construction?

Answer: Yes. Temporary dewatering may be required to control rainwater ingress into the working area, but this is normally carried out by provision of pumps rather than specific dewatering plant and equipment. The safe method of working during the construction phase will be identified in the appointed contractor's method statements.

Q11. Is the site within 50m of the Hampstead Heath ponds?

Answer: No. The closest Hampstead Heath pond, Thousand Pound Pond, is approximately 750m away.

Q12. Is the site within 5m of a highway or pedestrian right of way?

Answer: No. The proposed basement is more than 5m from the highway or pedestrian right of way.

Q13. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?

Answer: Yes. 23 Sheldon Avenue has a basement at a similar depth to the proposed development. 27 Sheldon Avenue at the time of the site visit was under construction. In accordance with the Haringey Council planning portal there is a shallow foundation by the boundary with a basement more than 10m from 25 Sheldon Avenue. However, as the new 25 Sheldon Avenue basement is located more than 5m from the boundary it's not going to impact on the 27 Sheldon Avenue property.

Q14. Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines?

Answer: No. The site is not above or near the London Underground network or tunnels. The closest line is the Northern Line which runs to the east side of Archway Road, which is approximately 1km to the northeast of the site.

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5 Stage 2 - Scoping Assessment

The scoping assessment covers all list of the questions, where the answer for screening was “yes”. It has been highlighted where aspects of the development are considered to require further investigation or assessment. These aspects are then addressed in the Impact Assessment.

5.1 Scoping for Subterranean (Groundwater) Flow

Q1a. The site is located directly above a Secondary 'A' Aquifer; therefore, even though the impact in clayey sub-soil would be low, groundwater may be present due to localised features, e.g. fissures, thin permeable horizons, and weathering.

Q1b. The proposed basement may extend beneath the water table surface. Further site-specific measurements are required to determine the level of the water table on the site. The groundwater flow regime might be affected by a development, which could in turn lead to local changes in the water table level. The likelihood is low due to the clayey and impermeable nature of the underlying soil, but it will be considered in more detail in the Impact Assessment.

Q4 and Q5. The proposed basement will extend beyond the line of the existing house and the paved rear garden patio. More surface water will be generated at the site, but the volume discharged to ground will be significantly reduced by the provision of underground attenuation tanks and the existing peak surface water discharge rate from the site will be reduced by 74% to greenfield run-off rate. The above is to be considered in the Impact Assessment but the development is providing a betterment.

5.2 Scoping for Surface Flow and Flooding

Q2 and Q3. Peak surface water flows generated at the will be significantly reduced even though the development is marginally increasing the impermeable surfacing at the site. There is no risk of surface water/overland flows at or through the site and the proposed redevelopment will not alter potential exceedance flow routes at the site or to adjacent properties. The risk of surface water flooding or exceedance route through the site is very low.

The proportion of impermeable area across the site will increase slightly by the proposed works. Site Specific measurements are required to determine and confirm water table specifically at this site, but some evidence is available from geotechnical reports covering similar works carried out at adjacent properties. The risk of flooding from groundwater is also very low and there is no history of flooding at the site.

The site is less than 1 hectare in plan area, is located in Flood Zone 1, not located in a Critical Drainage Area and there is no change-of-use to the existing property as it will remain residential. It is considered to be at low risk of flooding from rivers, surface water, reservoirs, groundwater and sewers and it is not adjacent to a riverbank. Therefore, a formal site-specific Flood Risk Assessment report is not required.

The sewers in Sheldon Avenue are deep enough to provide flexibility in connection the new drainage of the basement to the public sewer.

5.3 Scoping for Land Stability

Site specific ground investigation is required to verify the ground conditions across the site.

Q6. The proposed works will be outside the tree protection zones where trees are to be retained.

An Arboricultural investigation will be required to outline tree protection zones during the construction stage.

Q10. The site is located directly above a Secondary 'A' Aquifer; therefore, even though the impact in clayey sub-soil would be low, groundwater may be present due to localised features, e.g. fissures, thin permeable horizons, and weathering.

Q13. 23 Sheldon Avenue has a basement at a similar depth to the proposed development. 27 Sheldon Avenue at the time of the site visit was under construction. In accordance with the Haringey Council planning portal, 27 Sheldon Avenue has a shallow foundation by the boundary with a basement more than 10m away from 25 Sheldon Avenue property. However, as the new 25 Sheldon Avenue basement is located more than 5m from the boundary, it's not going to impact on 27 Sheldon Avenue property.

5.4 Cumulative Development

The existing and approved basements in the vicinity of the proposed redevelopment have been identified.

As there is significant distance to the nearest basement, and the underlying ground conditions are predominantly clay and impermeable, the cumulative effect on the groundwater flows will be low and not considered to be a risk.

6 Stage 3 - Site Investigation and Desk Study

6.1 Ground Condition

The below desk study is based on ground investigation carried out for:

- 23A Sheldon Avenue (GEA report, dated April 2015)
- 27 Sheldon Avenue (LGH Wembley Engineering report, dated November 2018)
- 28 Sheldon Avenue (Jomas Associates Limited report, dated January 2014)

The BGS data and the position of the proposed development located within a triangular catchment amongst similar properties suggests the underlying ground conditions are unlikely to be significantly different. However, intrusive site-specific ground investigation to be carried out at the site in due course is expected to confirm that the underlying conditions, as outlined in the desk study, are similar to those encountered at neighboring sites.

It is expected that a moderate thickness (150mm to 1m) of made ground and topsoil is underlain by Claygate Member, which is subsequently underlain by London Clay Formation proven to some full depth investigations 85.90m OD.

- Made Ground

Based on site investigations for 23A Sheldon Avenue, made ground/topsoil is expected to extend to depth up between 150mm and 1m BGL (105.19m OD).

- Downwash Deposits

Downwash Deposits comprising soft or firm pale grey mottled orange-brown sandy gravelly clay are expected up to 1.2m depth as described in the ground investigation report for 27 Sheldon Avenue, (105.0m OD).

- Claygate Member and London Clay

The Claygate Member generally comprises firm orange-brown mottled greenish grey and yellowish brown silty sandy clay, becoming brownish grey was present up to the depth of 4.6m (101.40m OD) on the site for 23A Sheldon Av. Below this stiff grey silty sand clay with rare shell fragments was encountered. Similar stiff clay was found at the depth of 3m (103m OD) at 27 Sheldon Av.

- Groundwater

The ground investigation for 23A Sheldon Avenue shows monitoring of standpipes on three occasions over a roughly six weeks recorded ground water at depths of between 105.41m OD and 102.78m OD within standpipes.

No groundwater was encountered during the site investigation for 27 Sheldon Avenue.

7 Discussion of Geotechnical Issues

7.1 Basement Proposal

Outline structural proposals for the construction of the basement form part of the Appendices. The structural sizes are subject to detailed structural design.

It is proposed to construct the basement external walls as RC concrete walls. The underpinning sequence is to be used to support the existing masonry front façade wall and the section of the basement where there is a risk of undermining of neighbor building. As part of underpinning construction detail, the internal lining walls are proposed to prevent water ingress and to support the ground floor slab.

The way the pins are constructed will inherently limit any disruption due to noise and vibration as the excavation will be carried out in sections no longer than 1m.

The basement will be completed with load bearing RC raft with local RC slab thickenings under walls and columns to allow for peak loads. The Ground floor slab will be made of RC concrete and supported on the external retaining walls, lining walls and internal columns and walls as outlined in the Structural drawings.

The new side extension is to consist of cavity masonry walls with floors and roof matching the proposed superstructure's construction method of rest of the house. The ground floor slab is assumed to be formed by a suspended or ground bearing RC floor slab (depending on the soil conditions) with mass concrete strip footings.

7.2 Basement Heave

The uplift forces from the heave, which is expected to occur during the construction stage and the hydrostatic forces due to potential water table will be resisted by the self-weight of the structure. Potential tension piles located at the perimeter of the basement and under the raft slab will be required subject to site investigation findings.

7.3 Basement Waterproofing

Internal drained cavity system will be used to the perimeter of the basement to achieve Grade 3 Waterproofing construction for the basement. The concrete will also be designed to achieve 0.2mm cracking maximum.

7.4 Concrete for Foundation Construction

Based on the desk study of the neighboring sites (No. 28 Sheldon Avenue), a maximum water-soluble sulphate concentration was of 311mg/l, with associated pH concentration ranging between 5.9 and 8.4.

Based on the above, the required concrete class for the site is DS-1 assuming an Aggressive Chemical Environment for Concrete classification of AC11 in accordance with the procedures outlined in BRE Special Digest 1.

8 Stage 4 - Impact Assessment

8.1 Subterranean Ground Water Flow

The site is located directly above a Secondary 'A' Aquifer; therefore, even though the impact in clayey sub-soil would be low, groundwater may be present due to localized features, e.g. fissures, thin permeable horizons, and weathering. Site specific ground investigation will be carried out to confirm the ground water table on the site.

The proposed basement may extend beneath the water table surface. Further site-specific measurements are required to determine the level of the water table on the site. The proposed basement will not extend to the property boundaries and groundwater will be able to flow around the basement within the boundaries of the site.

The proposed basement will extend beyond the line of the existing house and the paved rear garden patio.

In accordance with the requirements of the council's Surface Water management strategy, SuDS policy and the requirements of the London Plan 2021, SuDS will be adopted to attenuate the surface water from the site and to ensure that the impact on groundwater flow is minimized. The clayey ground conditions do not allow for the use of soak ways or other infiltration methods.

The identified ditch on the neighboring golf course drains away from the site. Therefore, its presence will not affect the site or be affected by the redevelopment.

To summaries the above findings, the proposed basement construction will not have detrimental effect on groundwater flows or groundwater levels.

8.2 Surface Water Flow

In accordance with the mandatory requirements of the council's Surface Water management strategy, SuDS policy and the requirements of the London Plan 2021. SuDS will be adopted to attenuate the surface water from the site to cater for the 1 in 100 +40%CC storm of 6-hour duration and released from the site at greenfield run-off rate. SuDS will be adopted to attenuate the surface water from the drained areas and reduce peak flows to the public surface water sewer by 74% from 7.6 l/s to 2 l/s thus providing a significant betterment on the current condition.

Foul water drainage from the new basement will be collected in new package pump station and discharged to a manhole from where the flows would be conveyed under gravity to the Thames Water Sewer using the existing sewer connection. The pumped method for the basement facilities will avoid the need for new and deep gravity connections into the existing foul water manhole in Sheldon Avenue. The use of the existing sewer line and level will also avoid the need for construction and disruption in the public footpath and in Sheldon Avenue.

The foul water (wastewater) discharge will remain the same as the property will remain a single residential dwelling. The peak foul flow rate from a single dwelling is taken by Thames Water as 4,000 liters/dwelling/day which equates to a peak rate of 0.046 litres/second. Foul water discharges are not a constraint to the development and do not pose a flood risk.

To comply with the London Plan 2021 and the Council's SuDS Policy and hierarchy, the proposed peak surface water discharge rate from the redevelopment needs to be lowered from the existing rate of 7.6 liters/second to the greenfield

run-off rate of 2 liters/second which results in the need for significant attenuation at the site to cater for the 1 in 100 + 40%CC severe storm of 6-hour duration.

The risk of surface water flooding is very low to all floors, surrounding grounds and adjacent properties. Consequently, surface water flood risk is not a constraint to the proposed development and risk of surface water flooding will remain very low.

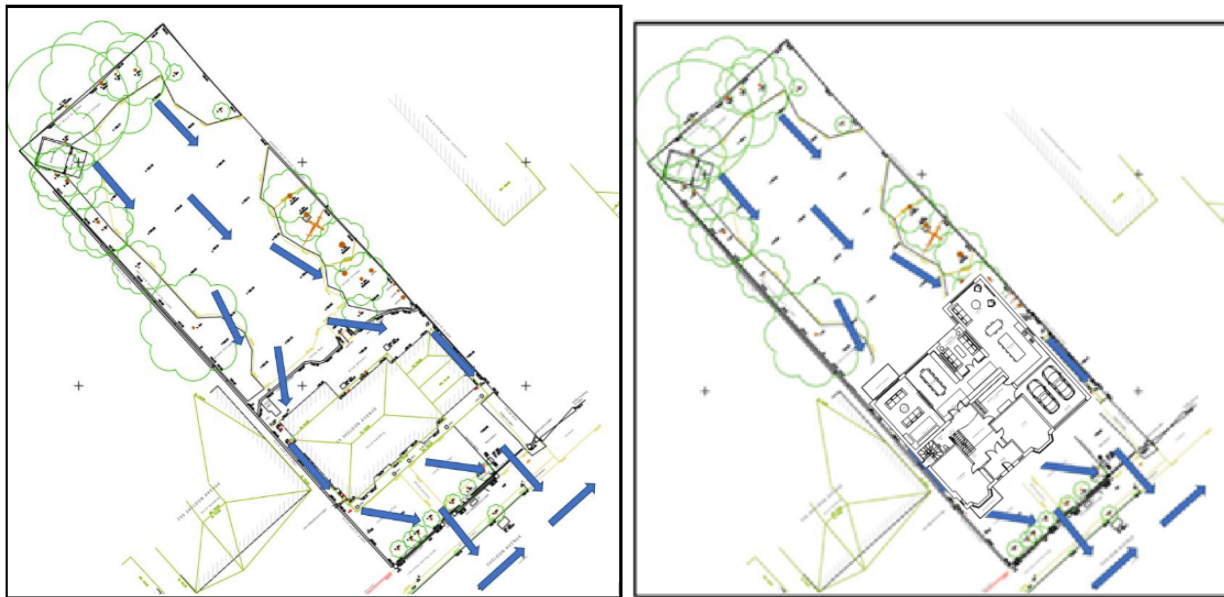


Figure 7-Existing and Proposed Flow Paths due to Overland Exceedance Flow through the Proposed Site

8.3 Land Stability

Heave is expected, as the result of the ground removal during the excavation of the basement to the Claygate member and the underlying London Clay strata. The majority of the heave is likely to occur during the excavation. Also, hydrostatic forces will act on the basement, due to the expected high-water table.

The uplift forces will be resisted by the self-weight of the structure. Potential tension pile might be required upon to ground movement analysis as part of the site investigation. As the result, there will be minimal upward movements of the completed structure.

Due to the proximity of the adjoining property No. 23 Sheldon Avenue, the use of RC wall pins cast in sections of 1m max length is proposed. This solution aims to avoid disruption to the surrounding ground and consequently to the adjoining property. For 27 Sheldon Avenue, considering that the basement is more than 10m away from the boundary, the use of a shallow strip footing for the side extension is not going to affect the adjoining property's basement.

The walls will be designed to span between the basement and ground RC slabs with temporary props to guarantee support of the walls during construction,

To minimize movement to the adjoining properties, the temporary propping design and construction will be developed along with the monitoring of movement of the adjacent buildings.

Tree Protection measures shall be implemented prior to commencement of works, in accordance with an Arboricultural report to be provided by the Client prior constructing the building.

As previously stated, there is a basement to the 23 and 23a Sheldon Avenue under the footprint of the main house, which is to the southwest of the proposed development. From the info available No. 27 Sheldon Avenue development also have a basement which is located more than 10m away from No. No.25.

Similarly, No. 28 Sheldon Avenue, located approximately 30m to the southeast of No. 23 comprises a basement.

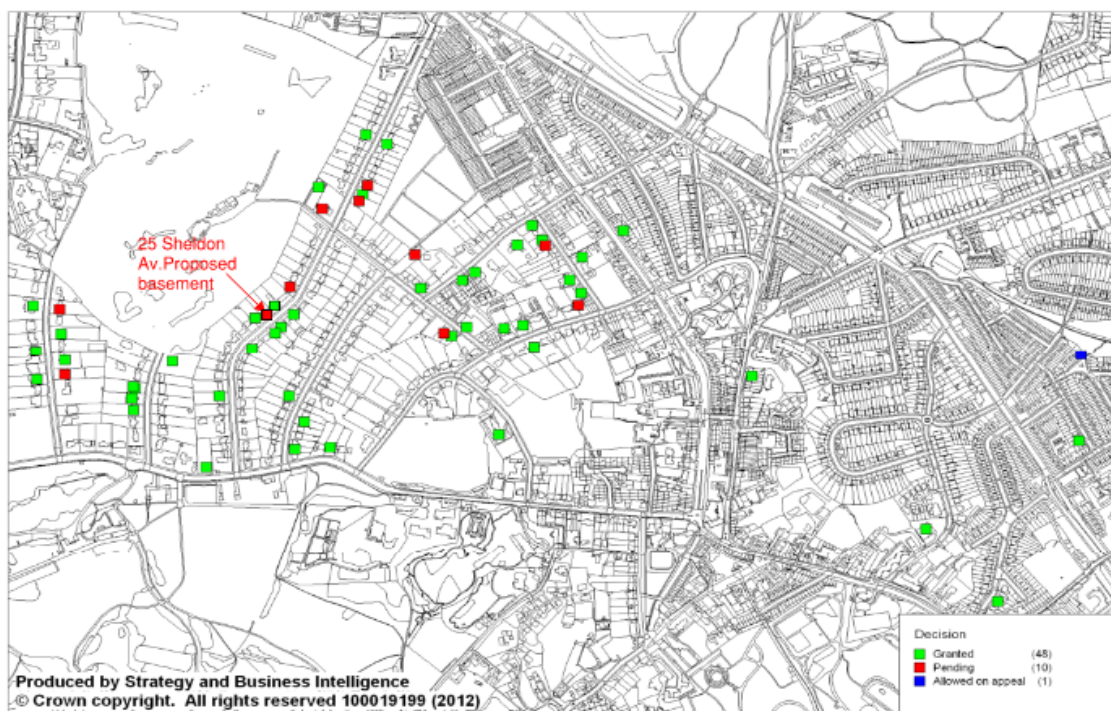


Figure 8: - Map of basements in Highgate from Haringey Council Planning regeneration & Economy Draft Basement Development Guidance Note

Despite the proximity of the basement structures within the nearby properties, there is adequate distance between the proposed basement at this site and any existing or future basements. Sufficient spacing is available between the structures to allow uninterrupted flow of groundwater between each property albeit the risk or volume of flow would be low in the underlying clayey subsoil. Therefore, the impact of the proposed works at this site is not expected to adversely impact on potential groundwater flows or groundwater levels.

8.4 Construction Management Plan

A site-specific Construction Management Plan will be prepared by the appointed contractor in due course in accordance with the principles of Policy DM18 – Basement and Lightwells, DEVELOPMENT MANAGEMENT DPD PRE-SUBMISSION VERSION (JANUARY 2016), POLICY DM18: RESIDENTIAL BASEMENT DEVELOPMENT AND LIGHTWELLS.

9 Construction Method Statement

The excavation and construction of the basement has the potential to cause some movement in the surrounding ground. The ground movements depend primarily on local geology, use of best practice methods of temporary supports during construction and workmanship.

The following provides an outline Method Statement for construction of the basement combining typical underpinning sequencing with traditional open-cut basement construction reflected on the drawing as part of the appendices. This will be developed and finalized in conjunction with the appointed Contractor and the Specialist Subcontractors, during the detailed design stage.

- Ground investigation works will be carried out to confirm the ground conditions and level of water table on the site. The ground investigation will also provide geotechnical parameters for the design of the retaining wall to form the new basement.
- The site boundary will be established, and safety fencing and hoarding shall be installed around the site perimeter.
- Notices of the basement work will be served on the adjoining owners and schedules of condition will be carried out to the adjoining properties in accordance with the requirements of the Party Wall etc. Act 1996. Monitoring targets to monitor movements during construction may be installed at this time as a result of the Party Wall negotiations.
- Tree protection zones will be installed in accordance with an Arboricultural Implications Assessment and Method Statement.
- A competent contractor will carry out the demolition of part the existing building structure ensuring that dust and vibration are controlled at all times. The existing front façade is to be retained as supported as necessary before demolishing the superstructure;
- A suitably qualified and experienced Engineer will assess potential differential ground movements likely to occur by the basement excavations and allow for or mitigate such that no greater than category O damage is anticipated to adjacent existing buildings.
- Detailed design of the underpinning walls, RC concrete retaining walls, propping and method of construction will be developed in collaboration with a temporary works designer and groundworks contractor.
- The wall underpinning will be installed by a competent contractor and according to an agreed construction method statement. The installation will be done in sections with each pin to be fully cured before installing the adjoining one;
- A key consideration in limiting movements of the surrounding ground will be the installation of effective temporary and permanent props, close to the existing ground level ('high level' as described in CIRIA C580);
- Pin wall excavation and RC retaining walls to be supported with trench support props.
- Following installation of all pins and the remaining RC retaining walls, the main props to be installed at the top and potentially middle height while the excavation on the central soil bulk is carried out;
- Basement ground floor slab to be cast with kicker for lining wall;
- Lining walls are to be cast following removal of the lower middle main prop;

- Ground floor slab to be cast and all remaining main props to be removed;
- Superstructure to be built;
- All arisings will be disposed of in accordance with the Waste Acceptance Criteria (WAC) test results.
- It is anticipated that there might be water inflows into the basement excavation during construction. Any groundwater which is trapped within the confines of the basement wall will be collected in temporary sumps and pumped away.
- The ground movement will be limited so that the possible damage of the adjacent buildings, will be assessed as per Classification of Visible damage to walls CIRIA C580 Table 2.5 below and limited to:

Category	Description
0 Negligible	Hairline cracks of less than about 0.1mm are classed as negligible. < 0.1 mm
1 Very Slight	Fine cracks that can easily be treated during normal decoration. <1mm
2 Slight	Cracks easily filled, redecoration probably required. Some repointing may be required externally. <5mm
3 Moderate	The cracks require some opening up and can be patched by a mason. Recurrent cracks can be masked by suitable linings. Repointing of external brickwork and possibly a small amount of brickwork to be replaced. 5-15mm or a number of cracks >3mm
4 Severe	Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows. 15-25mm but also depends on number of cracks
5 Very severe	This requires a major repair involving partial or complete re-building. >25mm but depends on number of cracks

Classification of visible damage to walls CIRIA C580 (table 2.5)

10 Appendices

10.1 Proposed Structural Drawings

10.2 Underpinning and Excavation Sequence

Studio 6
6-8 Cole Street
London
SE1 4YH

Studio D4S
22 Thimviou Street
Trikala (Greece)
42100

Telford Enterprise Hub
Hadley Park East
Telford
TF1 6QJ

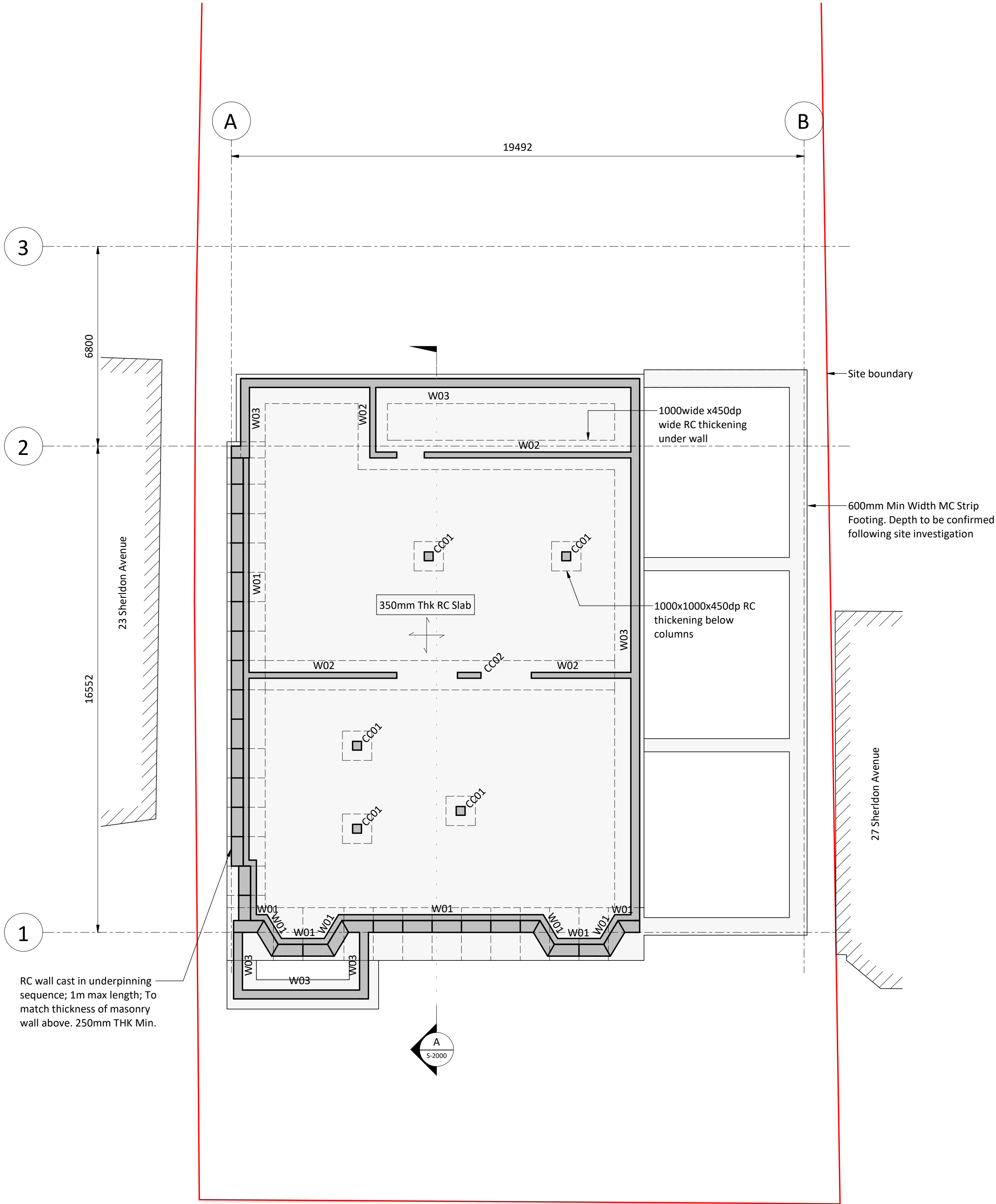
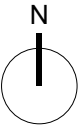
RC COLUMN SCHEDULE (32/40)		
COLUMN REF	SIZE	NOTES
CC01	300x300mm	
CC02	200x800 RC column	

RC BEAM SCHEDULE (C32/40)		
BEAM REF	SIZE (WxD)	NOTES
BC01	300x500mm	

Note:
For basement construction sequence refer to D4S drawing no 4000.

RC WALL SCHEDULE (C32/40)		
WALL REF	SIZE	NOTES
W01	200THK RC Lining Wall	
W02	200THK RC Wall	
W03	300THK RC Retaining Wall	

Notes:
- Structural sizes to be confirmed following detailed design stage
- Foundation layout shown indicatively; subject to Site Investigation survey and design development
- Basement waterproofing and the requirements for membranes/ waterproof concrete to achieve Grade 3 environment; Waterproofing strategy to be confirmed by Architect.
- Temporary works to contractors design and detailing



1
S-2000
Basement Plan
1 : 100

Health & Safety Information

In Addition to the Hazards/Risks normally associated with the types of work detailed on this drawing, note the following and refer to D4S Risk Assessment

Construction.

Maintenance/Cleaning/Operation.

Decommissioning/Demolition.

Notes

This drawing to be read in conjunction with all relevant Architects and Engineers drawings, details and specifications.

Do not scale from this drawing. Work to figured dimensions only.

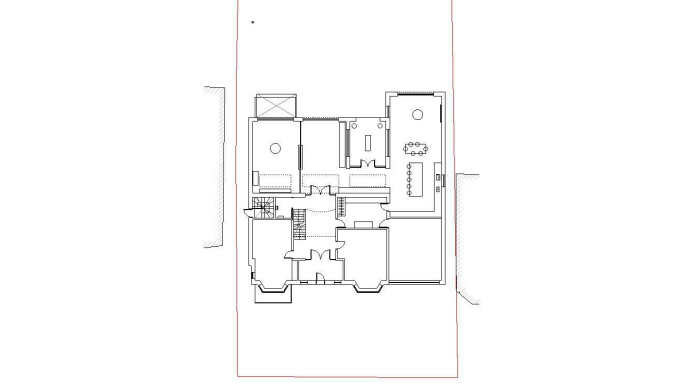
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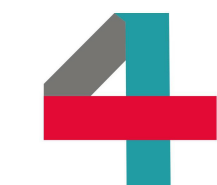
Any discrepancy shall be referred to the designer before work commences.

Architect responsible for setting out, levels and finishes.

Temporary works to contractor's design.

P 3	15.12.22	For Planning	OD	JT	RP
P 2	08.12.22	For Planning	OD	JT	RP
P 1	01.10.21	For Planning	LE	RP	MR
Rev	Date	Description	Drn	Chk	Apd





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Client
Cassion Castle Architects

Project
25 Sheldon Avenue

PRELIMINARY

Drawing Title
**GENERAL ARRANGEMENT
BASEMENT PLAN**

Date	Scale	Drawn By	Checked	Approved
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Drawing No. 4710-D4S-XX-B1-DR-S-0950	Revision P 3
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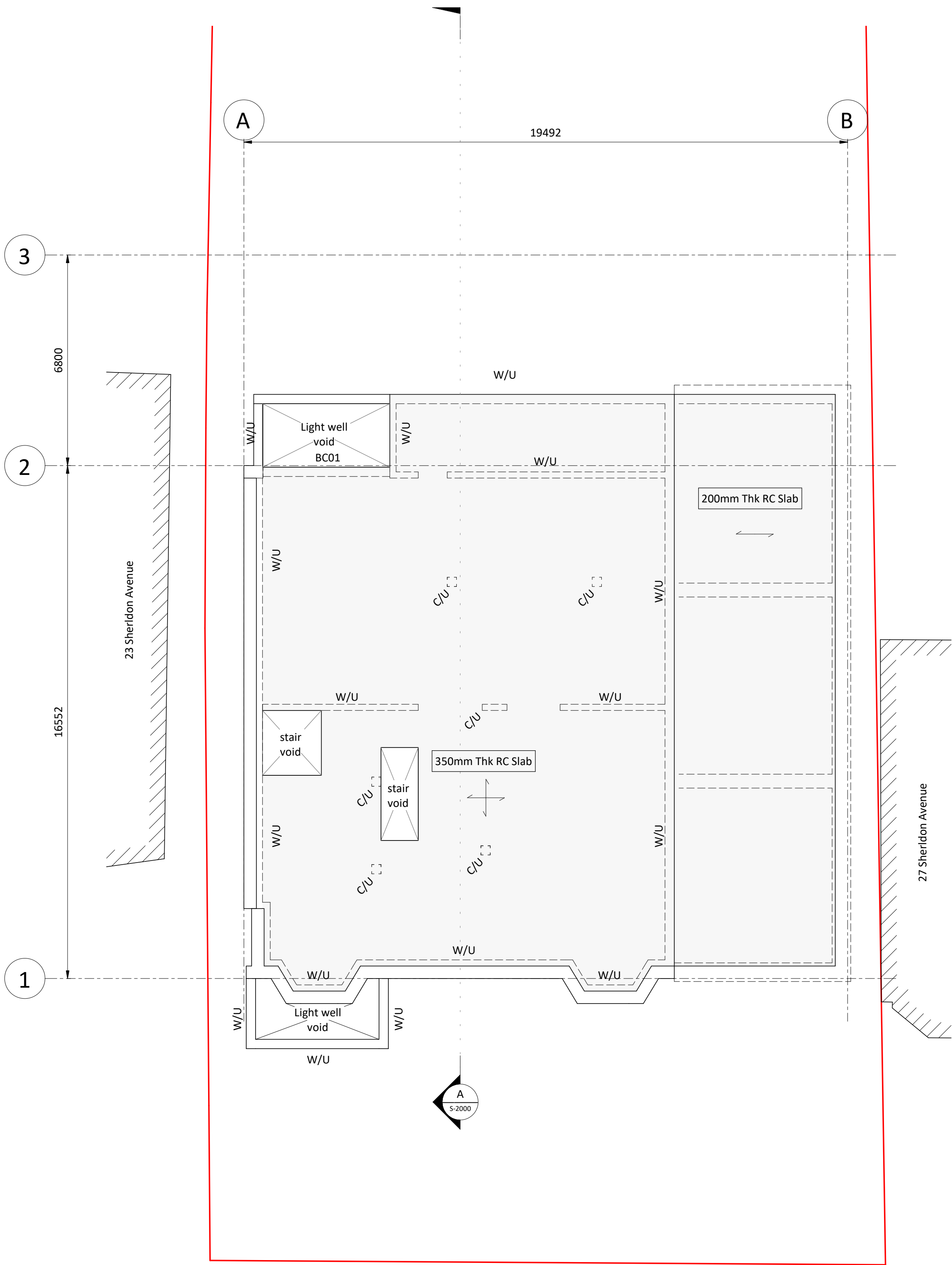
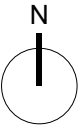
RC COLUMN SCHEDULE (32/40)		
COLUMN REF	SIZE	NOTES
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CC02	200x800 RC column	

RC BEAM SCHEDULE (C32/40)		
BEAM REF	SIZE (WxD)	NOTES
BC01	300x500mm	

Note:
For basement construction sequence refer to D45 drawing no 4000.

RC WALL SCHEDULE (C32/40)		
WALL REF	SIZE	NOTES
W01	200THK RC Lining Wall	
W02	200THK RC Wall	
W03	300THK RC Retaining Wall	

Notes:
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- Foundation layout shown indicatively; subject to Site Investigation survey and design development
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- Temporary works to contractors design and detailing



1
S-2000

Ground Floor Plan
1 : 100

Health & Safety Information

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Construction.

Maintenance/Cleaning/Operation.

Decommissioning/Demolition.

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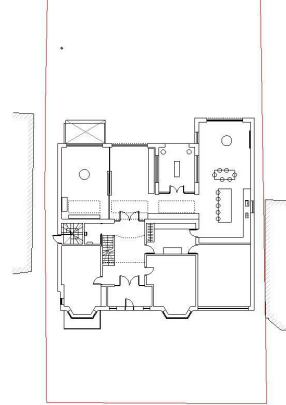
Architect responsible for setting out, levels and finishes.

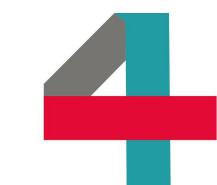
Temporary works to contractor's design.

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P 2	08.12.22	For Planning	OD	JT	RP
P 1	01.10.21	For Planning	LE	RP	MR

Rev	Date	Description	Drn	Chk	Apd
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Key Plan





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Drawing Title
**GENERAL ARRANGEMENT
GROUND FLOOR PLAN**

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Drawing No.	Revision
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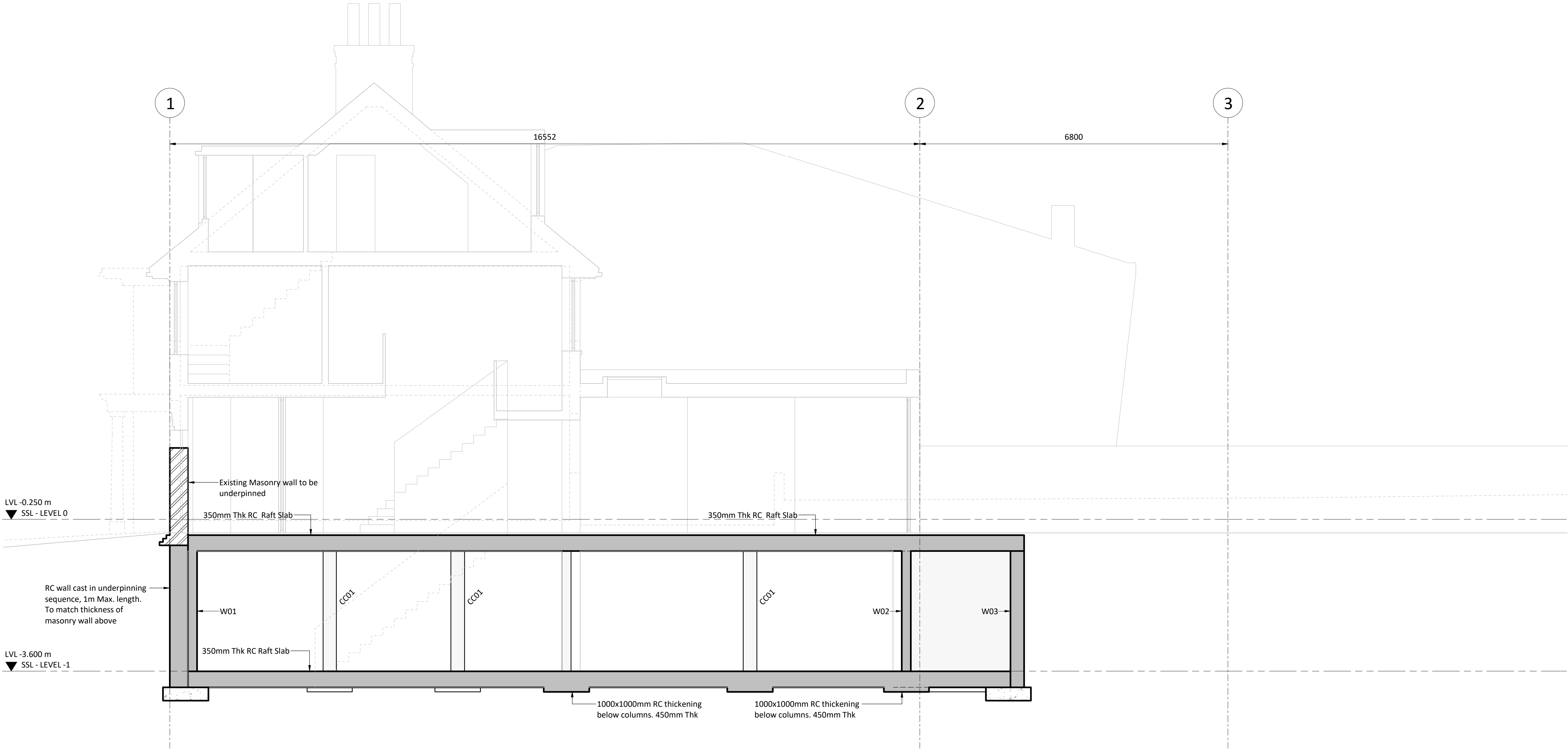
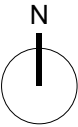
RC COLUMN SCHEDULE (32/40)		
COLUMN REF	SIZE	NOTES
CC01	300x300mm	
CC02	200x800 RC column	

RC BEAM SCHEDULE (C32/40)		
BEAM REF	SIZE (WxD)	NOTES
BC01	300x500mm	

Note:
For basement construction sequence refer to D45 drawing no 4000.

RC WALL SCHEDULE (C32/40)		
WALL REF	SIZE	NOTES
W01	200THK RC Lining Wall	
W02	200THK RC Wall	
W03	300THK RC Retaining Wall	

Notes:
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- Temporary works to contractors design and detailing



Section A-A
1 : 50

Health & Safety Information

In Addition to the Hazards/Risks normally associated with the types of work detailed on this drawing, note the following and refer to D45 Risk Assessment

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Maintenance/Cleaning/Operation.

Decommissioning/Demolition.

Notes

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Architect responsible for setting out, levels and finishes.

Temporary works to contractor's design.

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P 1	01.10.21	For Planning	LE	RP	MR
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Cassion Castle Architects

Project

25 Sheldon Avenue

PRELIMINARY

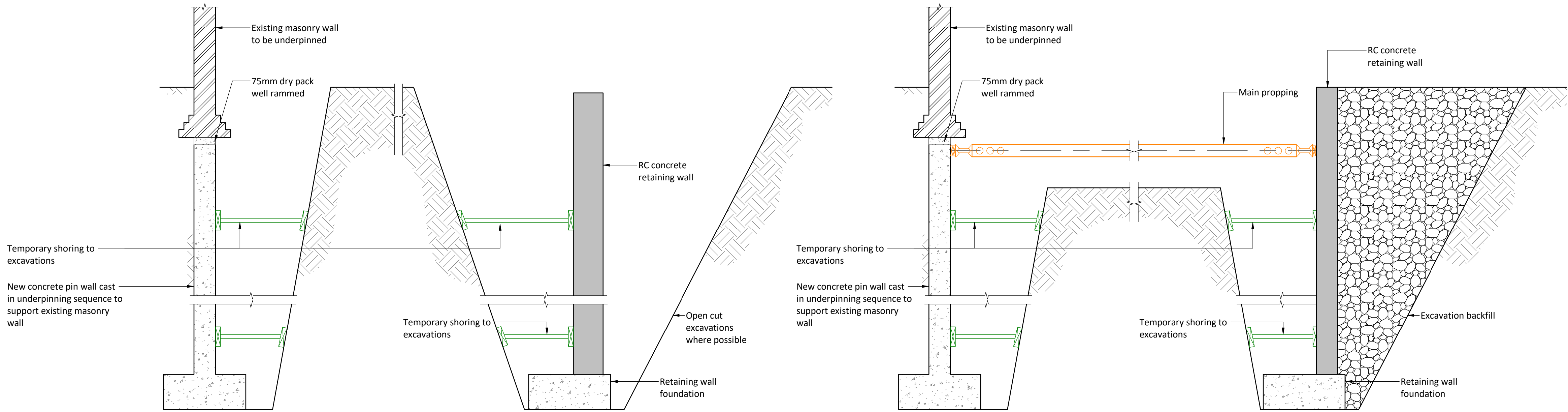
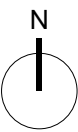
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SECTION A-A**

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Drawing No.	Revision
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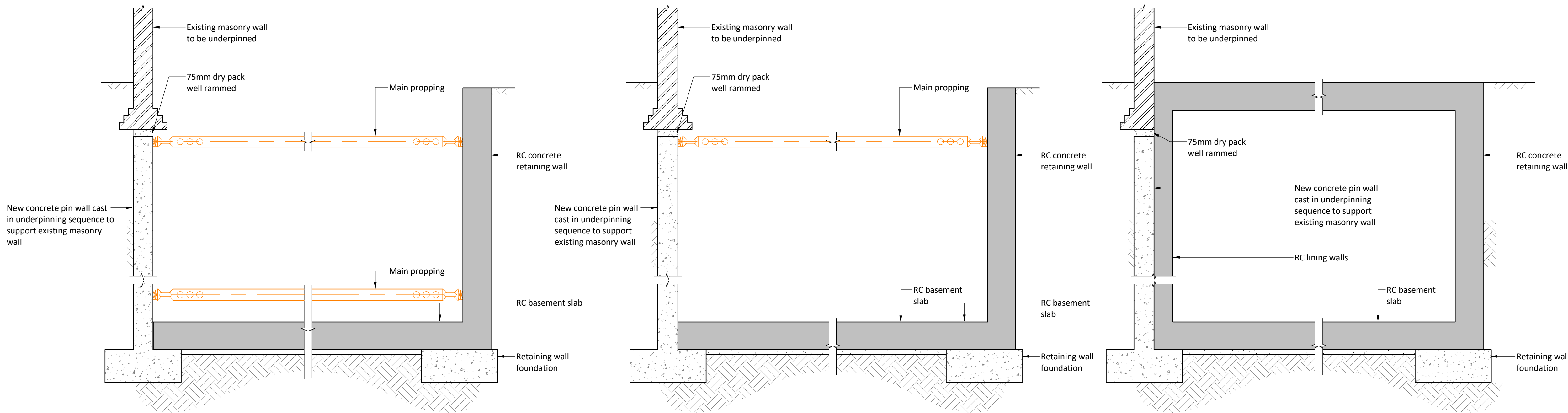
Note
Retained existing facade to be propped externally
before demolishing the superstructure;
Temporary works design by others.



1. Underpin Existing front elevation walls
and Install Trench Props

1.B Open-cut excavation to construct
foundations for new RC retaining walls

2. Further Excavate and Install Main Props



3. Reduce Formation Level and Install
Remaining Props

4. Cast Slab and Remove Lower Props

5. Cast Walls and Remove Remaining Props
in Sections

Health & Safety Information

In Addition to the Hazards/Risks normally associated
with the types of work detailed on this drawing, note the
following and refer to D4S Risk Assessment

Construction.

Maintenance/Cleaning/Operation.

Decommissioning/Demolition.

Notes

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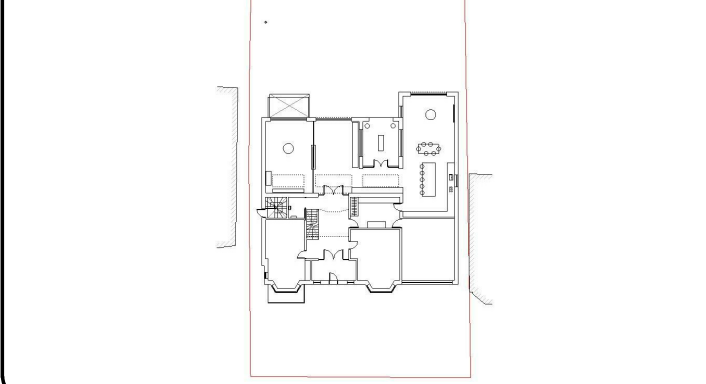
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PRELIMINARY

Drawing Title
**UNDERPINNING AND EXCAVATION
SEQUENCE**

Date	Scale	Drawn By	Checked	Approved
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Drawing No.
4710-D4S-XX-XX-DR-S-4000

Revision
P 2