1. BASEMENT IMPACT ASSESSMENT

27 MARESFIELD GARDENS
CAMDEN

LBHGEO

LBH4626bia

January 2021

Document Control				
			Darcy Kitson-Boyce MEng (Hons) GMICE FGS FRGS	Seamus Lefroy-Brooks BSc(hons) MSc CEng MICE CGeol FGS CEnv MIEnvSc FRGS SiLC NQMS SQP DoWCoP QP RoGEP UK Registered Ground Engineering Adviser
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LBHGEO Ltd.

12 Little Balmer

Buckingham

MK18 1TF

Tel: 01280 812310

email: enquiry@lbhgeo.co.uk

website: www.lbhgeo.co.uk

Company registered in England No. 4922494

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NON-TECHNICAL SUMMARY

It is proposed to construct a single storey lower ground floor extension to the rear of an existing semi-detached property at No. 27 Maresfield Gardens.

The proposals will necessitate up to 1.3m of excavation of the rear garden and thus will be classified as a basement development as parts of the new extension floor will be situated below the existing ground level.

This report provides an assessment of the potential impacts that the proposed development may have upon the host building, the neighbouring structures and the local environment.

GEOLOGY

The site is underlain by the London Clay.

HYDROGEOLOGICAL IMPACTS

There is no shallow groundwater table at this site and hence no scope for the basement construction to cause adverse hydrogeological impacts.

HYDROLOGICAL IMPACTS

The site is assessed as not being at current risk of flooding and there will be no change to flood risk at the sites or neighbouring sites as a result of the development.

A SuDS scheme is to be included as part of the development.

STABILITY IMPACTS

Ground movement assessments have been undertaken to demonstrate the acceptability of the proposed construction methodology upon the neighbouring structures, resulting in a prediction of negligible damage (Burland Category 0).

CONCLUSION

The assessment concludes that no adverse residual or cumulative stability, hydrological or hydrogeological impacts are expected to occur to either neighbouring structures or the wider environment as a result of this development.

FOREWORD-GUIDANCE NOTES

GENERAL

This report has been prepared for a specific client and to meet a specific brief. The preparation of this report may have been affected by limitations of scope, resources or time scale required by the client. Should any part of this report be relied on by a third party, that party does so wholly at its own risk and LBHGEO disclaims any liability to such parties.

The observations and conclusions described in this report are based solely upon the agreed scope of work. LBHGEO has not performed any observations, investigations, studies or testing not specifically set out in the agreed scope of work and cannot accept any liability for the existence of any condition, the discovery of which would require performance of services beyond the agreed scope of work.

VALIDITY

Any use of or reliance upon the report in circumstances other than those for which it was commissioned shall be at the client's sole risk. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should therefore not be relied upon in such altered circumstances.

THIRD PARTY INFORMATION

The report may present an opinion based upon information received from third parties. However, no liability can be accepted for any inaccuracies or omissions in that information.

1. INTRODUCTION

1.1 BACKGROUND

It is proposed to extend the existing lower ground floor of 27 Maresfield Gardens rearwards into the garden. The garden is set at a higher level and will need to be excavated to permit the rear extension.

1.2 BRIEF

LBHGEO have been appointed to prepare a Basement Impact Assessment (BIA) in support of a forthcoming planning application to be submitted to the London Borough of Camden.

1.3 PLANNING POLICY

The 2017 Camden Local Plan Policy A5 Basements reads as follows:

"The Council will only permit basement development where it is demonstrated to its satisfaction that the proposal would not cause harm to:

a) neighbouring properties;
b) the structural, ground, or water conditions of the area;
c) the character and amenity of the area;
d) the architectural character of the building; and
e) the significance of heritage assets.
In determining proposals for basements and other underground development, the Council will require an assessment of the scheme's impact on drainage, flooding, groundwater conditions and structural stability in the form of a Basement Impact Assessment and where appropriate, a Basement Construction Plan.

The siting, location, scale and design of basements must have minimal impact on, and be subordinate to, the host building and property. Basement development should:

f) not comprise of more than one storey;
g) not be built under an existing basement;
h) not exceed 50% of each garden within the property;
i) be less than 1.5 times the footprint of the host building in area;
j) extend into the garden no further than 50% of the depth of the host building measured from the principal rear elevation;
k) not extend into or underneath the garden further than 50% of the depth of the garden;
l) be set back from neighbouring property boundaries where it extends beyond the footprint of the host building; and
m) avoid the loss of garden space or trees of townscape or amenity value.

Exceptions to f. to k. above may be made on large comprehensively planned sites.

The Council will require applicants to demonstrate that proposals for basements:

n. do not harm neighbouring properties, including requiring the provision of a Basement Impact Assessment which shows that the scheme poses a risk of damage to neighbouring properties no higher than Burland Scale 1 'very slight';
o. avoid adversely affecting drainage and run-off or causing other damage to the water environment;
p. avoid cumulative impacts;
q. do not harm the amenity of neighbours;
r. provide satisfactory landscaping, including adequate soil depth;
s. do not harm the appearance or setting of the property or the established character of the surrounding area;
t. protect important archaeological remains; and
u. do not prejudice the ability of the garden to support trees where they are part of the character of the area.

The Council will not permit basement schemes which include habitable rooms and other sensitive uses in areas prone to flooding.

We will generally require a Construction Management Plan for basement developments.

Given the complex nature of basement development, the Council encourages developers to offer security for expenses for basement development to adjoining neighbours."

The following policies in the Local Plan are also relevant to basement development and will be taken into account when assessing basement schemes:

- "Policy A2 Open space";
- "Policy A3 Biodiversity";
- "Policy D1 Design";
- "Policy D2 Heritage"; and
- "Policy CC3 Water and flooding".

In addition to the Local Plan Policy, in 2018 Camden published updated Camden Planning Guidance (CPG) on Basements and Lightwells. These documents do not carry the same weight as the main Camden Development Plan documents (including the above Policy A5) but they are important supporting documents and refer back to the 2010 Camden Geological, Hydrogeological and Hydrological "Arup" Study.

1.4 REPORT STRUCTURE

This report commences with a desk study and characterisation of the site, before progressing to BIA screening and scoping assessments, whereby consideration is given to identifying the potential hydrogeological, hydrological and stability impacts that may be associated with the proposed development.

A ground model is then developed, which is followed by an outline basement construction methodology and an assessment of the potential ground movements affecting the neighbouring structures.

Finally, an assessment of the potential impacts of the proposed scheme is presented.

1.5 DOCUMENTS CONSULTED

Information contained in the following documents has been taken viewed during preparation of this report:

- 2020 October Existing Plans by 5D Architects
  Ref: 06.978.01, .02, .06, .09, .11
- 2020 October Proposed Plans by 5D Architects
  Ref: 06.978.03, .04, .05, .07, .08, .10, .12, .13
- 2020 December Arboricultural Impact Assessment by Landmark Trees
  Ref: SMP/27MFD/AIA/01a

2. THE SITE

2.1 SITE LOCATION

The site is located on the western side of Maresfield Gardens in South Hampstead, approximately 200m to the northeast of the Finchley Road Station.

The site may be located approximately by postcode NW3 5SD or by National Grid Reference 526440, 184875.

LOCATION PLAN

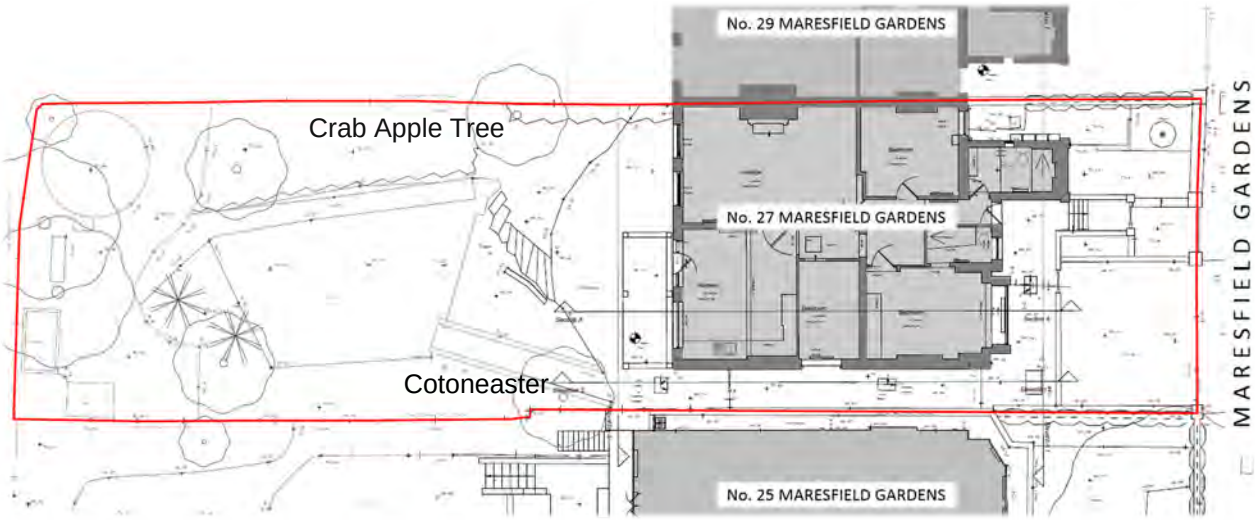
2.2 TOPOGRAPHICAL SETTING

The site lies on the south western slopes of the Hampstead Hill, with headwaters of the River Westbourne and the River Tyburn emerging to the west and east of the site respectively.

EXTRACT FROM FIGURE 16 OF THE CGHHS

2.3 SITE DESCRIPTION

The site is occupied by a four storey semi-detached Victorian building, with an elevated ground floor level set at approximately +71.8m OD, some 2.5m higher than street level (Approx. +69.3m OD). The lower ground floor is set some 0.6m lower than street level at approx. +68.7m OD.



EXISTING SITE PLAN

The ground floor is accessed from the street via a set of steps. A small front patio is set at the lower ground floor level and leads to a side passage between No. 27 and No. 25 Maresfield Gardens.

LOWER GROUND FLOOR LEVEL PATIO AT THE FRONT

A larger patio is present to the rear, beyond which the garden slopes up across a rockery to a lawn area set approximately 1.5m higher than the lower ground floor (approx. +70.2m OD).

A rear balcony is present at ground floor level, supported by three brick columns.

REAR ELEVATION

The rear garden comprises a lawn bordered by bushes, shrubs and a variety of trees.

VIEW OF THE REAR GARDEN FROM THE REAR PATIO

A crab apple tree is present approximately 5m from the rear elevation of the building close to the boundary with No. 29 Maresfield Gardens and a mature Cotoneaster acer is present in a similar position close to the boundary with No. 25 Maresfield Gardens. A young cherry tree is also present near the crab apple tree.

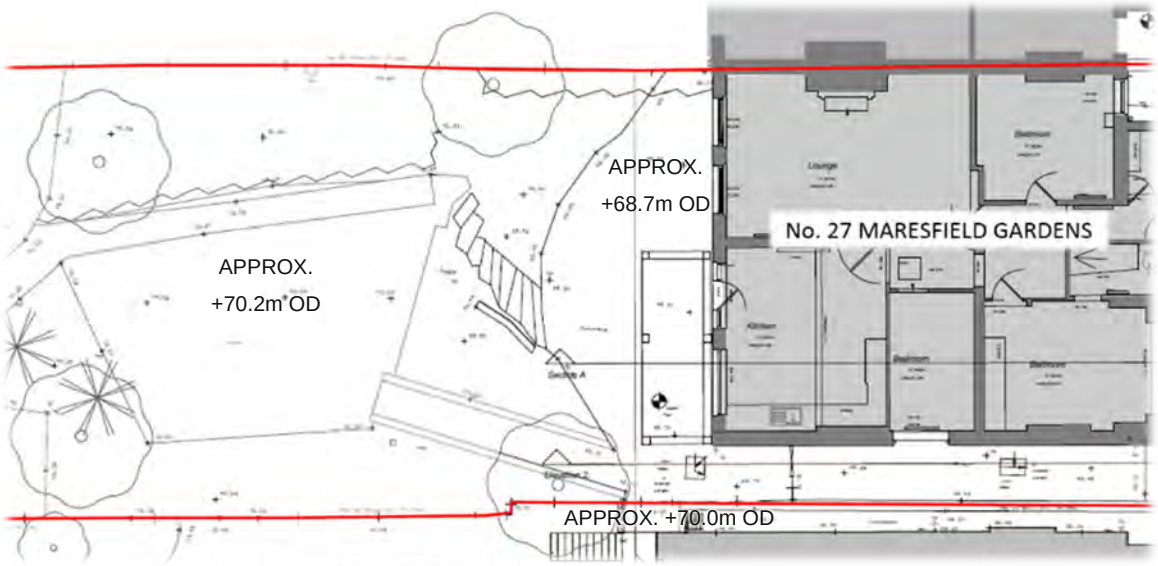
The lower ground floor and rear patio of No. 29, the adjoining property, is set at a similar level to that of No. 27. A planning application was recently approved for a single storey lower ground floor extension at No. 29.

No. 25 Maresfield Gardens is a detached house to the south, separated by side passages to both properties. Although the lower ground floor of No. 25 is set approximately 0.3m lower than that of No. 27, the rear garden and side passage is set higher at approximately +70m OD, with a low retaining wall between the two. It is understood that planning permission for a rear lower ground floor extension, similar in scope to the proposals at No. 27 and No. 29, was recently also granted for No. 25.

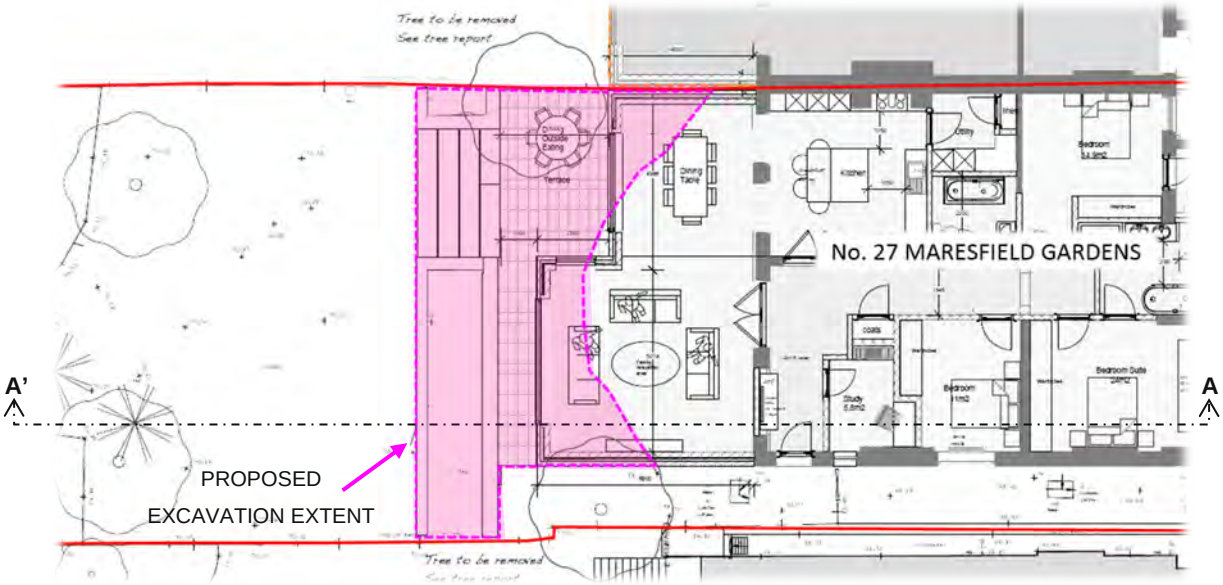
SIDE ELEVATION (SOUTHERN)

2.4 PROPOSED DEVELOPMENT

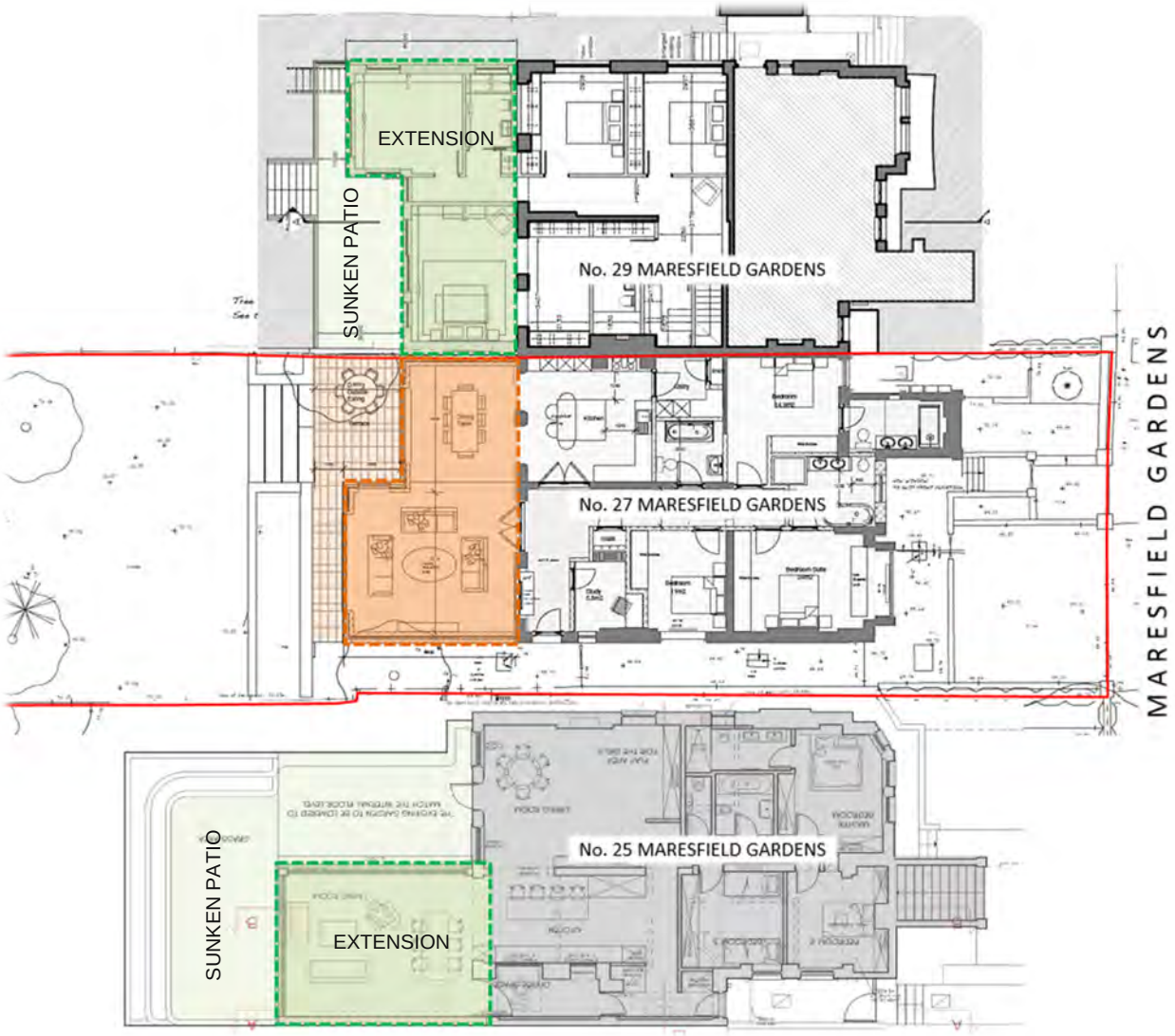
It is proposed to extend the existing lower ground floor rearwards by up to 6m rearwards. A small rear patio is to be created at the same level, together with stepped access up to the rear garden.



EXISTING LOWER GROUND FLOOR AND GARDEN PLAN



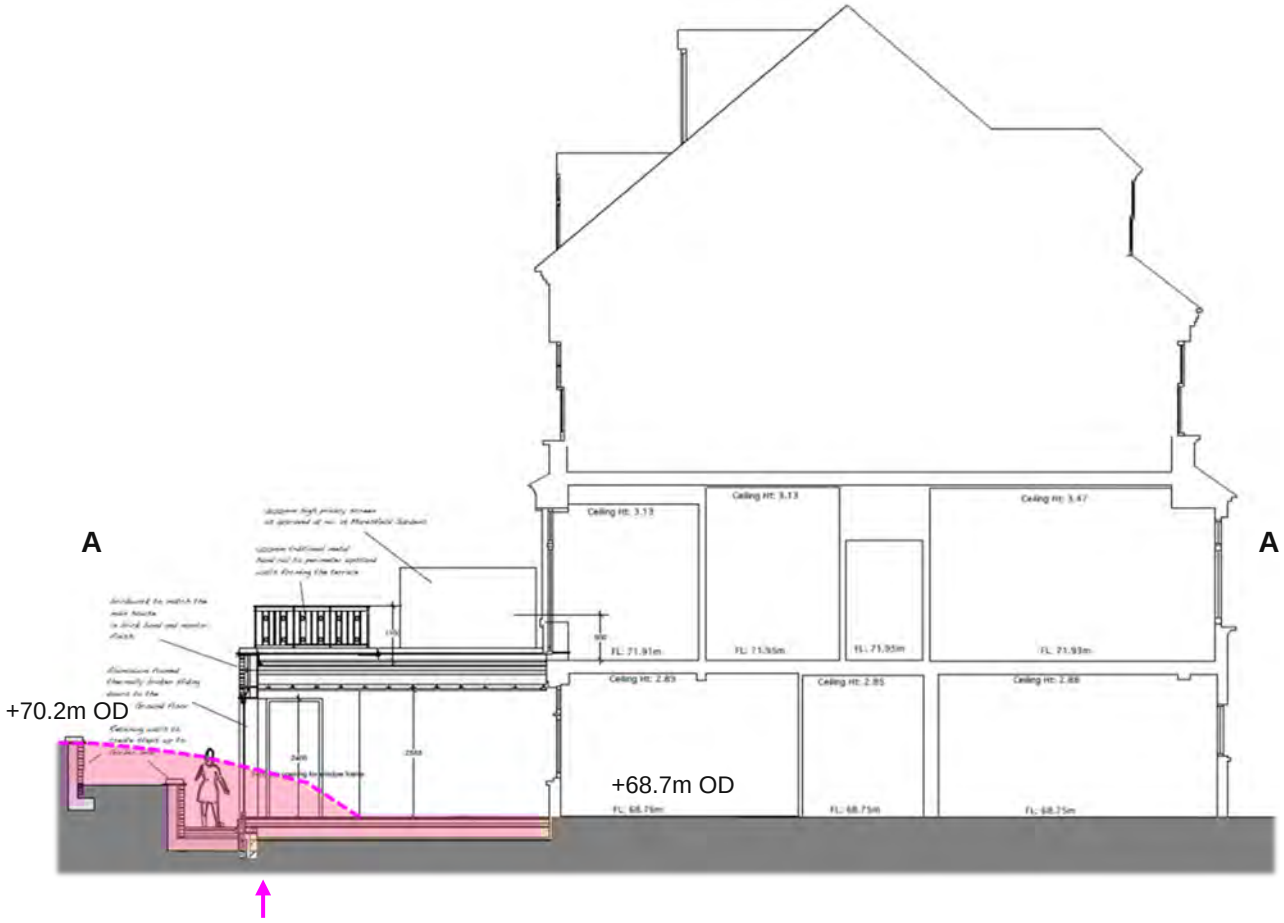
PROPOSED DEVELOPMENT PLAN



COMPARISON OF PROPOSED DEVELOPMENT ON SITE TO THE PROPOSED NEIGHBOURING DEVELOPMENTS

The development will necessitate excavation of the rear garden; the remainder of which will be supported by 1.5m high retaining walls.

Minimal excavation of the existing lower ground level will be required in order to cast a floor slab to match the existing Finished Floor Level (FFL).



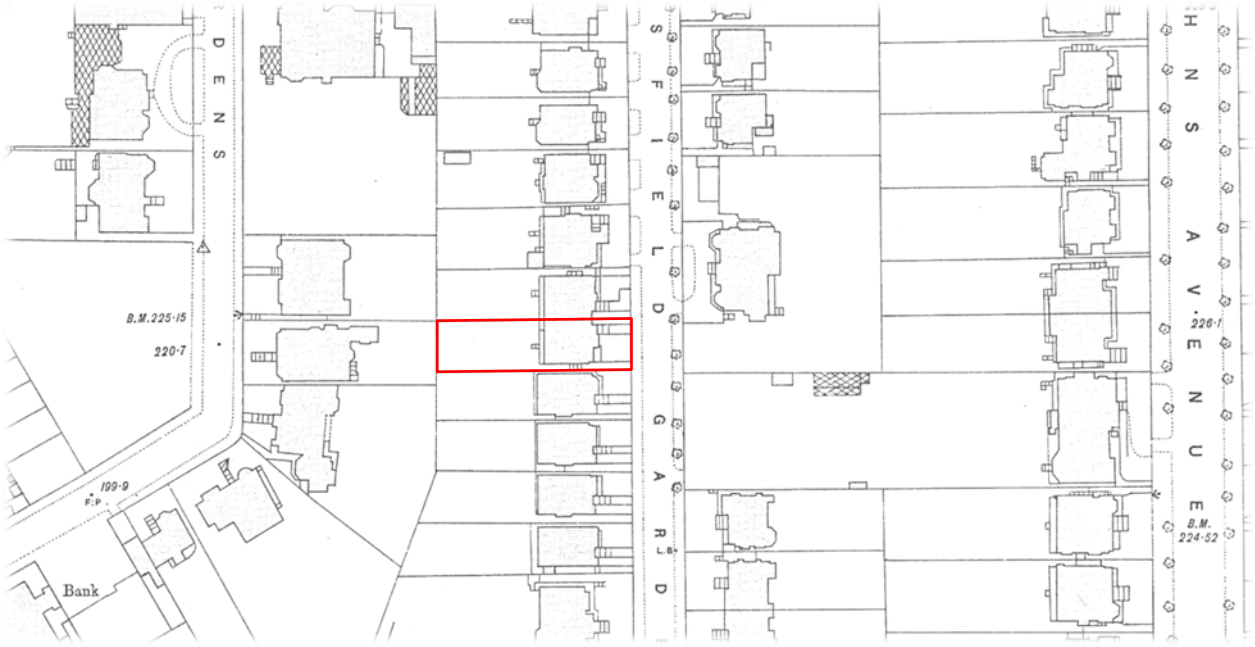
PROPOSED SECTION DRAWING

PROPOSED REAR ELEVATION

3. DESK STUDY

3.1 SITE HISTORY

The area remained largely undeveloped until the late 19th Century when it experienced extensive residential development, including the establishment of Maresfield Gardens.



1893 - 1896

Aside from minor extensions, the properties along Maresfield Gardens have remained relatively unchanged.

A number of similar lower ground floor rear extensions are being constructed along Maresfield Gardens, including No. 29 and No. 31.

3.2 GEOLOGICAL INFORMATION

The British Geological Survey (BGS) records indicate that the site is directly underlain by the London Clay Formation.

EXTRACTS OF FIGURE 2 (LEFT) AND FIGURE 3 (RIGHT) OF THE CGHHS

3.3 HYDROGEOLOGICAL INFORMATION

Figure 2 of the CGHHS (above) indicates that a tributary of the River Tyburn runs approximately 200m to the east of the site.

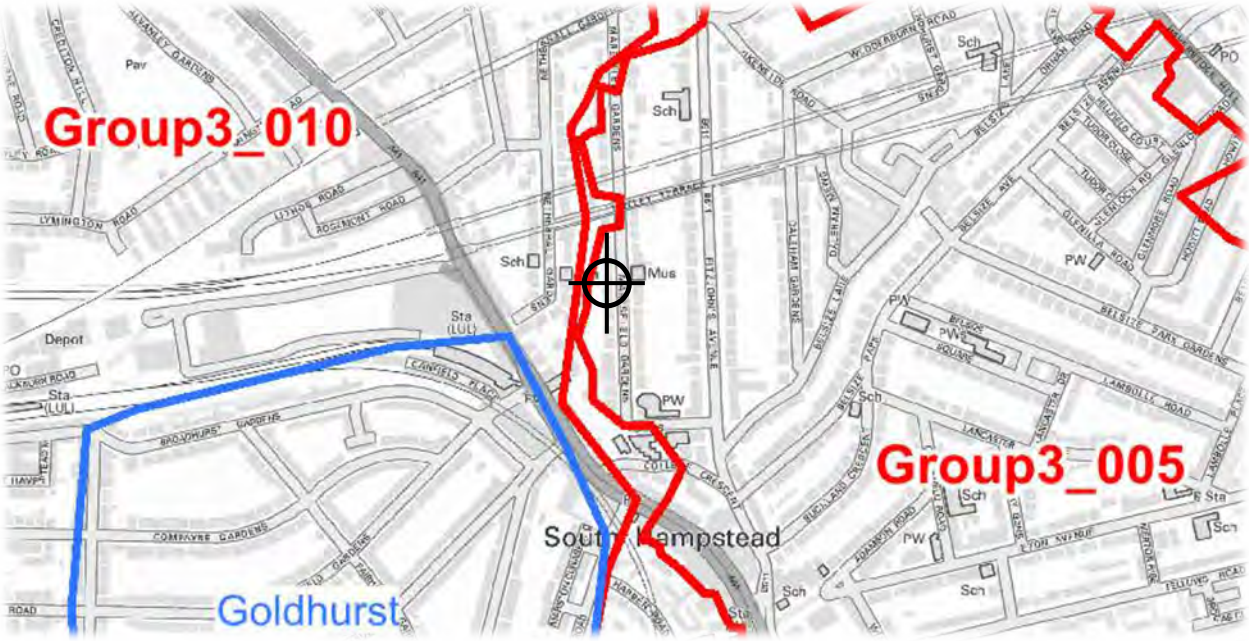
The London Clay formation is virtually impermeable; hence no significant groundwater presence is to be expected beneath this site.

3.4 HYDROLOGICAL INFORMATION

Environment Agency (EA) surface water flood maps suggest that the site and the surrounding area are at a low risk of surface water flooding.

EXTRACT OF EA SURFACE WATER FLOOD RISK MAP

Figure 6 of the Camden SFRA (overleaf) indicates that the site lies within a Critical Drainage Area (Group 3_005), but outside of any Local Flood Risk Zone.



EXTRACT OF FIGURE 6 OF THE CAMDEN SFRA

4. SCREENING & SCOPING ASSESSMENTS

The Screening & Scoping Assessments have been undertaken with reference to Appendices E and F of the CGHSS, which is a process for determining whether or not a full BIA is required.

4.1 SCREENING ASSESSMENT

The Screening Assessment consists of a series of checklists that identifies any matters of concern relating to the following:

- Subterranean (groundwater) flow
- Surface flow and flooding
- Slope stability

4.1.1 SCREENING CHECKLIST FOR SUBTERRANEAN (GROUNDWATER) FLOW

QUESTION	RESPONSE	JUSTIFICATION
Is the site is located directly above an aquifer?	No	The site is underlain by the impermeable London Clay Formation.
Will the proposed basement extend beneath the water table surface?	No	
Is the site within 100m of a watercourse, well (used/disused) or potential spring line?	No	The nearest watercourse is approximately 200m to the east of the site.
Is the site within the catchment of the pond chains on Hampstead Heath?	No	See CGHHS Fig.14.
Will the proposed development result in a change in the area of hard-surfaced/paved areas?	Yes	The proposed development will extend into the rear garden and thereby reduce the area of soft landscaping on site.
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)?	No	All surface water falling within the development will be attenuated and discharged as per the existing. Advice on the incorporation of SuDS at the development is provided by a separate Surface Water Drainage Assessment and Outline SuDS strategy prepared by LBHGEO.
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?	No	See CGHHS Fig. 12, there are no nearby ponds.

4.1.2 SCREENING CHECKLIST FOR SURFACE FLOW AND FLOODING

QUESTION	RESPONSE	JUSTIFICATION
Is the site within the catchment area of the pond chains on Hampstead Heath?	No	See CGHHS Fig.14.
As part of the site drainage, will surface water flows (e.g. rainfall and run-off) be materially changed from the existing route?	No	The existing drainage arrangement discharging to the public sewer will be maintained.
Will the proposed basement development result in a change in the proportion of hard-surfaced/paved areas?	Yes	The proposed development will extend into the rear garden and thereby reduce the area of soft landscaping on site.
Will the proposed basement result in changes to the profile of the inflows (instantaneous and long-term) of surface-water being received by adjacent properties or downstream watercourses?	No	The existing drainage arrangement discharging to the public sewer will be maintained.
Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	No	The existing drainage arrangement discharging to the public sewer will be maintained.
Is the site in an area known to be at risk from surface water flooding, or is it at risk from flooding for example because the proposed basement is below the static water level of a nearby surface water feature?	No	The EA Long Term Flood Risk service indicates the area of No. 27 Maresfield Gardens is at a low risk of surface water flooding.

4.1.3 SCREENING CHECKLIST FOR STABILITY

QUESTION	RESPONSE	JUSTIFICATION
Does the existing site include slopes, natural or manmade, greater than 7 degrees?	No	There are no slopes greater than 7 degrees within the site.
Does the proposed re-profiling of landscaping at the site change slopes at the property boundary to more than 7 degrees?	No	No re-profiling is planned at the site.
Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7 degrees?	No	There are no slopes greater than 7 degrees within the neighbouring land.
Is the site within a wider hillside setting in which the general slope is greater than 7 degrees?	No	See Figure 16 of the CGHHS.
Is London Clay the shallowest strata at the site?	Yes	The site is directly underlain by the London Clay.
Will trees be felled as part of the proposed development and/or are works proposed within tree protection zones where trees are to be retained?	Yes	Three trees are to be removed prior to the development: a mature Cotoneaster, a semi-mature crab apple and a young cherry tree.
Is there a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site?	No	
Is the site within 100m of a watercourse of a potential spring line?	No	The nearest watercourse is a tributary of the River Tyburn approximately 200m to the East of the site
Is the site within an area of previously worked ground?	No	See Fig. 3 of the CGHHS.
Is the site within an aquifer?	No	The Environment Agency (EA) maps indicate that the site is not underlain by an aquifer.
Will the proposed basement extend beneath the water table such that dewatering may be required during construction?	No	
Is the site within 50m of the Hampstead Heath ponds?	No	See CGHHS Fig.14.
Is the site within 5m of a highway or pedestrian right of way?	No	The proposed excavations will take place exclusively at the rear of the site, more than 20m away from the pavement of Maresfield Gardens.

Will the proposed basement significantly increase the differential depth of foundations relative to the neighbouring properties?	No	The adjacent No. 29 Maresfield Gardens is founded at the same level as No. 27 and no excavations below this level as proposed. The neighbouring No. 25 is founded approximately 0.3m lower than No. 27.
Is the site over (or within the exclusion zone of) tunnels, e.g. railway lines?	No	The Belsize Tunnels run underneath Nutley Terrace, approximately 95m to the North of the site.

4.2 SCOPING ASSESSMENT

Where the checklist is answered with a “yes” or “unknown” to any of the questions posed in the flowcharts, these matters are carried forward to the scoping stage of the BIA process. The other potential concerns considered within the screening process have been demonstrated to be not applicable or not significant when applied to the proposed development.

The scoping produces a statement which defines further the matters of concern identified in the screening stage. This defining should be in terms of ground processes, in order that a site specific BIA can be designed and executed (Section 6.3 of the CGHHS).

4.2.1 SCOPING FOR SUBTERRANEAN (GROUNDWATER) FLOW

The Screening assessment has identified a single issue to be carried forward to scoping, as follows:

- *The proposed basement development will result in a change in the proportion of hard surfaced / paved areas.*

  The guidance advises that the sealing off of the ground surface by pavements and buildings to rainfall will result in decreased recharge to the underlying ground. In areas underlain by an aquifer, this may impact upon the groundwater flow or levels. In areas of non-aquifer (i.e. on the London Clay), this may mean changes in the degree of wetness which in turn may affect stability. The guidance advises that a change in the in proportion of hard surfaced or paved areas of a property will affect the way in which rainfall and surface water are transmitted away from a property. This includes changes to the surface water received by the underlying aquifers, adjacent properties and nearby watercourses. Changes could result in decreased flow, which may affect ecosystems or reduce amenity, or increased flow which may additionally increase the risk of flooding.

It is, however, expected, that the site is underlain by the impermeable London Clay Formation and therefore no significant groundwater flow will be present.

4.2.2 SCOPING FOR SURFACE WATER FLOW AND FLOODING

- *The proposed basement development will result in a change in the proportion of hard surfaced / paved areas.*

The guidance advises that a change in the proportion of hard surfaced or paved areas of a property will affect the way in which rainfall and surface water are transmitted away from a property. This includes changes to the surface water received by the underlying aquifers, adjacent properties and nearby watercourses. Changes could result in decreased flow, which may affect ecosystems or reduce amenity, or increased flow which may additionally increase the risk of flooding.

The identified issue will be assessed separately as part of the Surface Water Drainage Assessment, which will provide an outline drainage strategy incorporating Sustainable Drainage Systems (SuDS) to manage the surface water run-off and discharge from the site.

4.2.3 SCOPING FOR STABILITY

- *London Clay is the shallowest strata at the site.*

The guidance advises that of the soil strata present in LB Camden, the London Clay is the most prone to seasonal shrink-swell (subsidence and heave).

- *Trees be felled as part of the proposed development.*

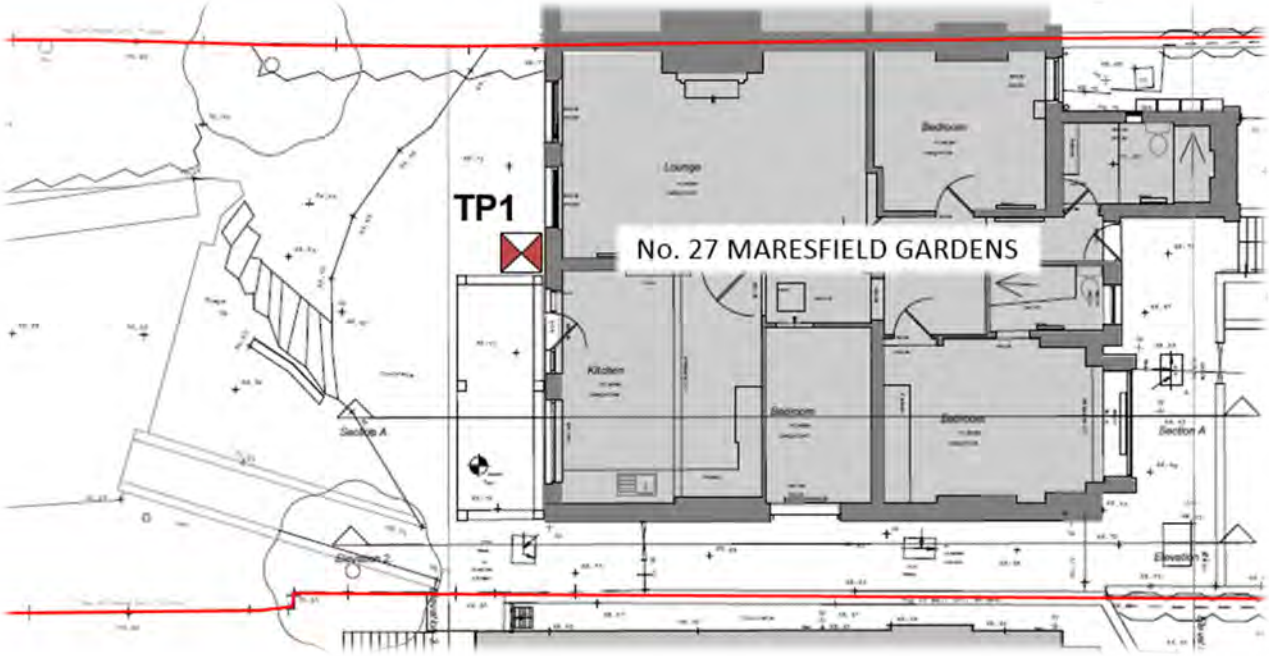
The guidance advises that the soil moisture deficit associated with felled tree will gradually recover. In high plasticity soils (such as London Clay) this will lead to gradual swelling of the ground until it reaches a new value. This may reduce the soil strength which could affect slope stability. Additionally the binding effect of the tree roots can have a beneficial effect on stability and the loss of a tree may cause loss of stability.

The impact of the removed trees on the underlying soils is to be assessed in terms of the depth of potentially affected / desiccated soils which may cause heave movement as moisture re-enters the soil. The depth of proposed foundations will need to be assessed in order to conform to the NHBC requirements.

5. SITE INVESTIGATION

An intrusive investigation comprising a single hand-excavated trial pit was undertaken in January 2021 to expose the configuration of the existing foundations and to confirm the ground conditions at the site. A record of this pit is appended to this report.

The pit was located at the rear elevation of the building on site, as shown on the plan below.



5.1 GROUND CONDITIONS

The London Clay is present at shallow depth below the rear patio of the site, underlying less than a metre of made ground and is recorded to comprise typical firm brown / grey silty clay.

The existing property appears to be supported on brick foundations, extending to approximately 800mm depth, sitting directly upon the London Clay.

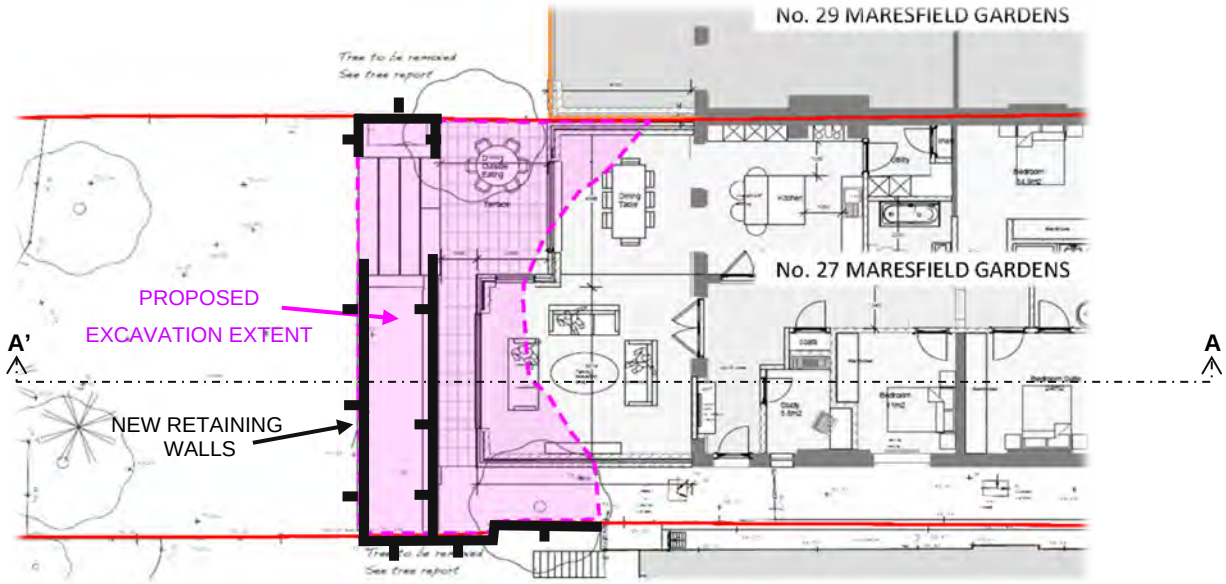
5.2 GROUNDWATER

No shallow groundwater table is present beneath the site.

6. BASEMENT CONSTRUCTION

6.1 EXCAVATION AND FOUNDATION CONSTRUCTION

The proposed development will require excavation of the rear garden, up to approximately 1.5m, to permit the construction of the new rear extension and will extend down into the London Clay.



PROPOSED DEVELOPMENT PLAN

The proposed extension will be directly adjacent to a new extension constructed at No. 29 Maresfield Gardens, situated at an approximately similar level to the existing terrace at No. 27.

The proposed extension is to be set at the same level to the existing terrace and hence no underpinning of existing walls is required.

Small retaining walls will support to the remaining rear garden and the adjacent gardens.

A proposed outline construction sequence is presented in section 7.4 of this report.

6.2 RETAINING WALLS

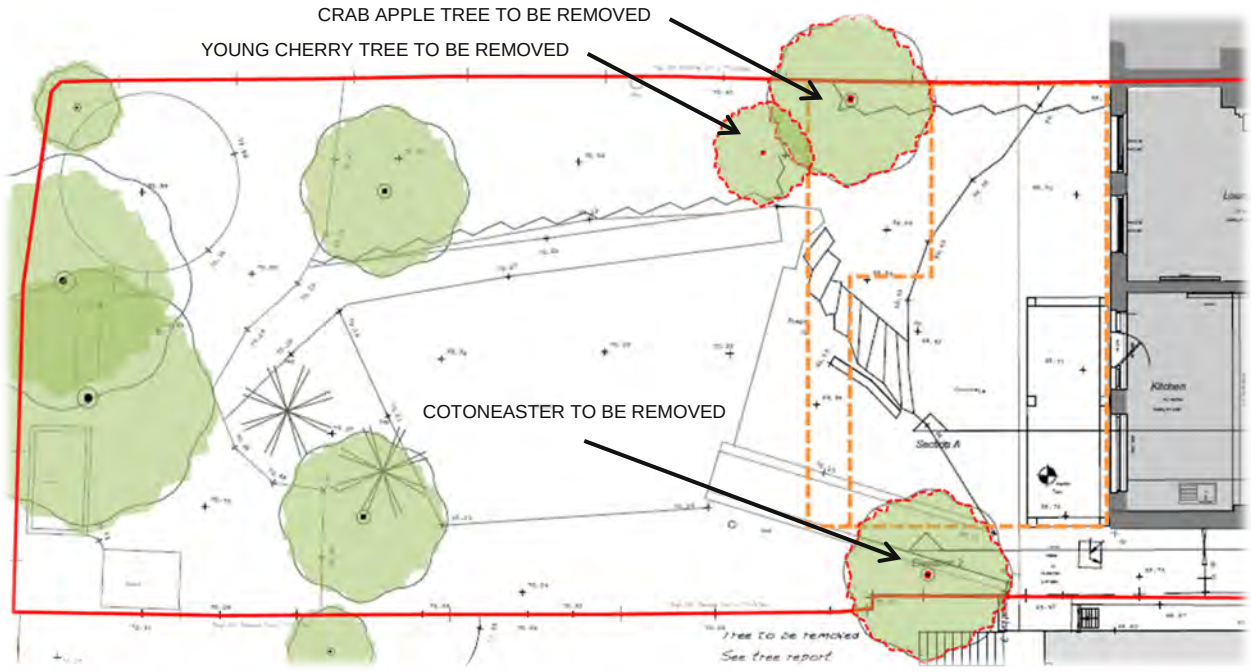
The following parameters may be considered in the design of the new retaining walls:-

RETAINING WALL DESIGN PARAMETERS			
STRATUM	BULK UNIT WEIGHT	EFFECTIVE COHESION	EFFECTIVE FRICTION ANGLE
	(kN/m^3)	(c' - kN/m^2)	(ϕ'- degrees)
London Clay	20	Zero	25

6.3 EFFECT OF TREES

Two semi-mature trees, a 7m tall crab apple and a 3.5m tall Cotoneaster, are present at the rear of the property, together with a young 5m tall cherry tree.

While only the former is located within the proposed excavation area, all three trees are to be removed to facilitate the development.



PLAN SHOWING THE EXISTING TREES AND THE PROPOSED DEVELOPMENT

The trees are situated at a higher level of approximately +70m OD, some 1.3m above the level of the proposed extension.

The crab apple tree is located within the proposed excavations for the rear patio, but approximately 1.7m from the proposed extension structure. The Cotoneaster is located approximately 1.2m from the proposed extension, while the cherry tree is approximately 3m distant.

The foundations to the rear extension will need to be designed in accordance with Chapter 4.2 'Building near Trees' of the NHBC guidance, assuming underlying soils of high volume change potential.

However, as the trees are to be removed, the new foundations should be taken below the level of any roots or affected clay.

6.4 OUTLINE CONSTRUCTION SEQUENCE

An indicative construction sequence is provided below.

1. Remove the existing ground floor level balcony, the rear terrace retaining walls and the trees to be removed.

2. Excavate the lower terrace rearwards and construct new retaining walls replacing the existing garden walls, constructed where necessary by hit-and-miss methods

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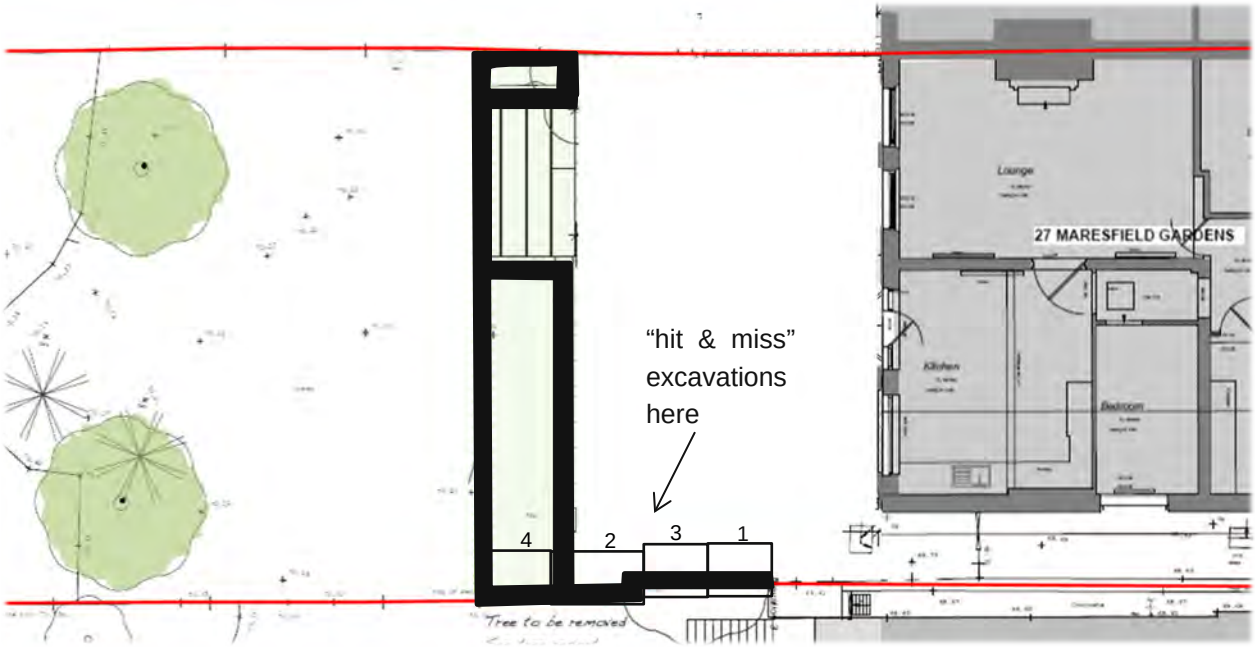
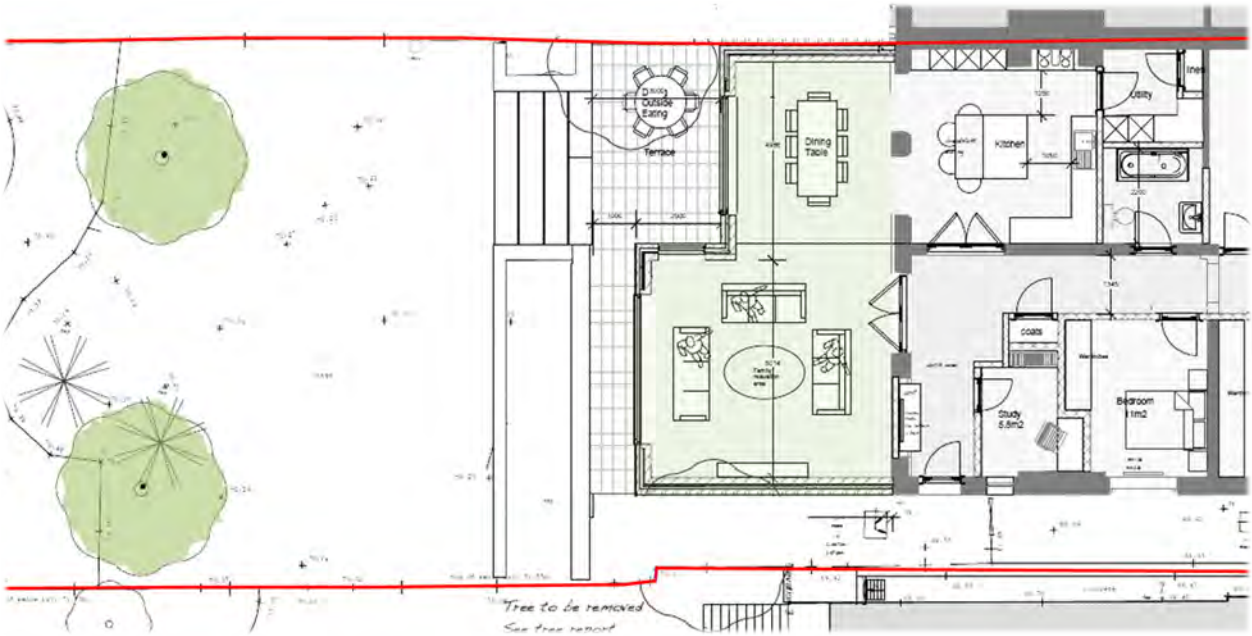


3. Construct the extension superstructure, paving to the terrace and finishing.



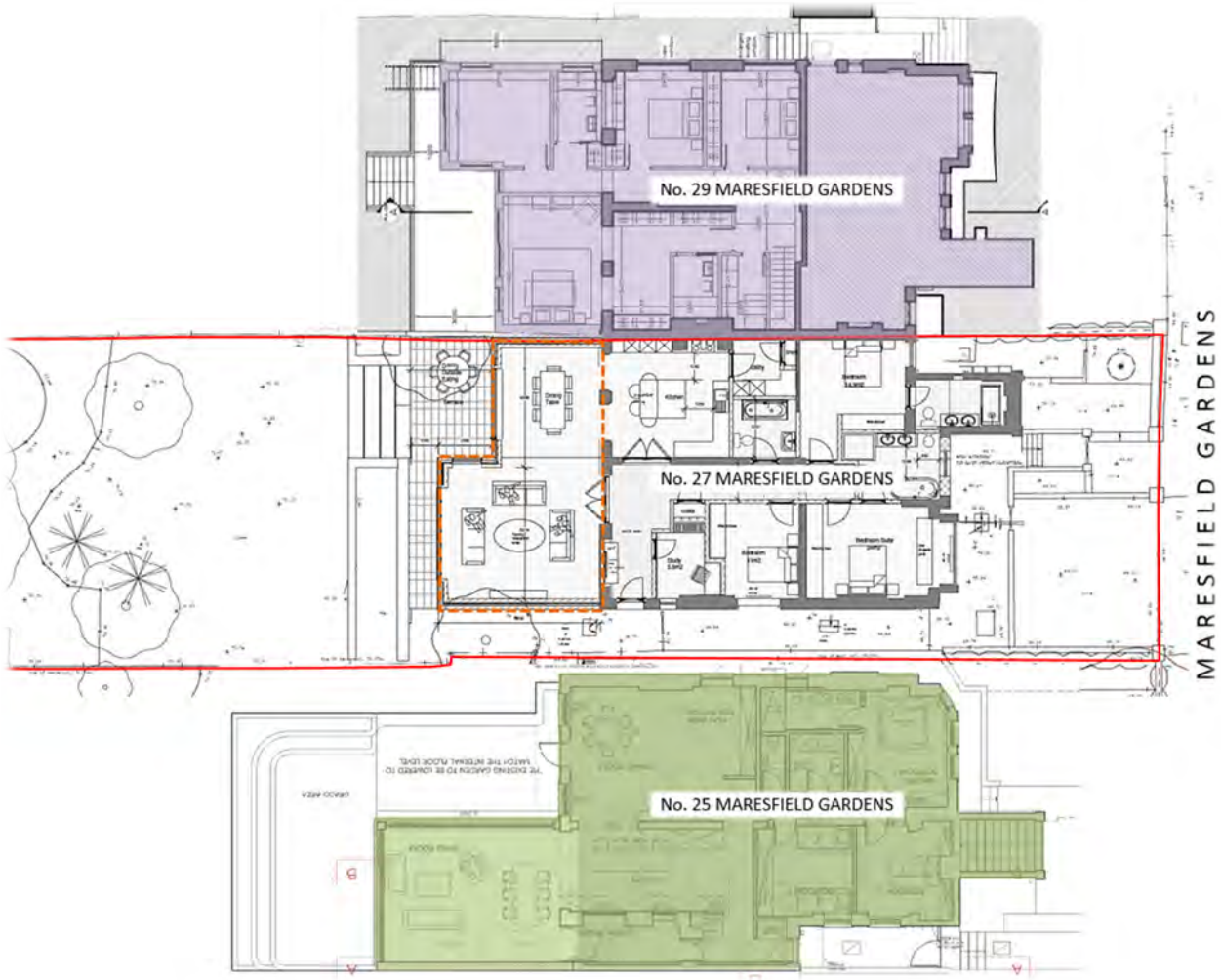
7. GROUND MOVEMENT TO NEIGHBOURING PROPERTIES

Camden Council seeks to ensure that harm will not be caused to neighbouring properties by basement development.

Camden Local Plan (June 2017) states that the BIA must demonstrate that the proposed basement scheme has a risk of damage to the neighbouring properties no higher than Burland Scale 1 'Very Slight'.

There will be potential ground movement as a result of unloading due to soil excavation.

7.1 STRUCTURES CONSIDERED FOR EFFECT OF GROUND MOVEMENT



NEIGHBOURING STRUCTURES CONSIDERED FOR GROUND MOVEMENT

7.1.1 NO. 25 MARESFIELD GARDENS

No. 25 Maresfield Gardens comprises a neighbouring four storey detached house, located approx. 2.5m from No. 27. The building is of similar massing to No. 27 and appears to have been built in a similar manner to other properties along Maresfield Gardens.

As such, it features an elevated ground floor as well as a lower ground floor located slightly below street level and in line with the lower ground floor level at No. 27.

A lower ground floor level rear patio is present at the rear of the building and it is understood that a rear extension, with a new rear terrace beyond, will be constructed prior to this development.

7.1.2 NO. 29 MARESFIELD GARDENS

No. 29 Maresfield Gardens is the other half of the pair of detached properties with No. 27, being similarly built and directly adjacent to the north of No. 27, sharing a party wall. The property comprises a lower ground floor extension at the same level as No. 27, with a terrace beyond, extending to a similar distance to the proposals at No. 27.

7.2 MODELLED GROUND CONDITIONS

Excavation for the rear extension and patio will result in unloading of the clay leading to theoretical heave movement of the underlying soil in both the short and long term. An analysis of the vertical movements has been carried out using the soil stiffness model detailed in the table below.

For design purposes a conservative undrained strength profile has been adopted for the London Clay, assuming an average Undrained Cohesion (Cu) of 77kN/m^2 at the surface of the stratum (approx. +69.0m OD), increasing by 6.7kN/m^2 per m depth.

STRATUM:	UNDRAINED ELASTIC MODULUS Eu (kN/m^2)	DRAINED ELASTIC MODULUS E' (kN/m^2)
London Clay	39,200kN/m^2 at surface increasing linearly to 124,600kN/m^2 at 30m depth	27,400kN/m^2 at surface increasing linearly to 87,200kN/m^2 at 30m depth

Poisson's Ratios of 0.5 and 0.1 have been used for short term (undrained) and long term (drained) conditions respectively. The analysis uses the above parameters for stratified homogeneity with the introduction of an assumed rigid boundary at approximately 20m depth.

7.3 MODELLED GROUND MOVEMENTS

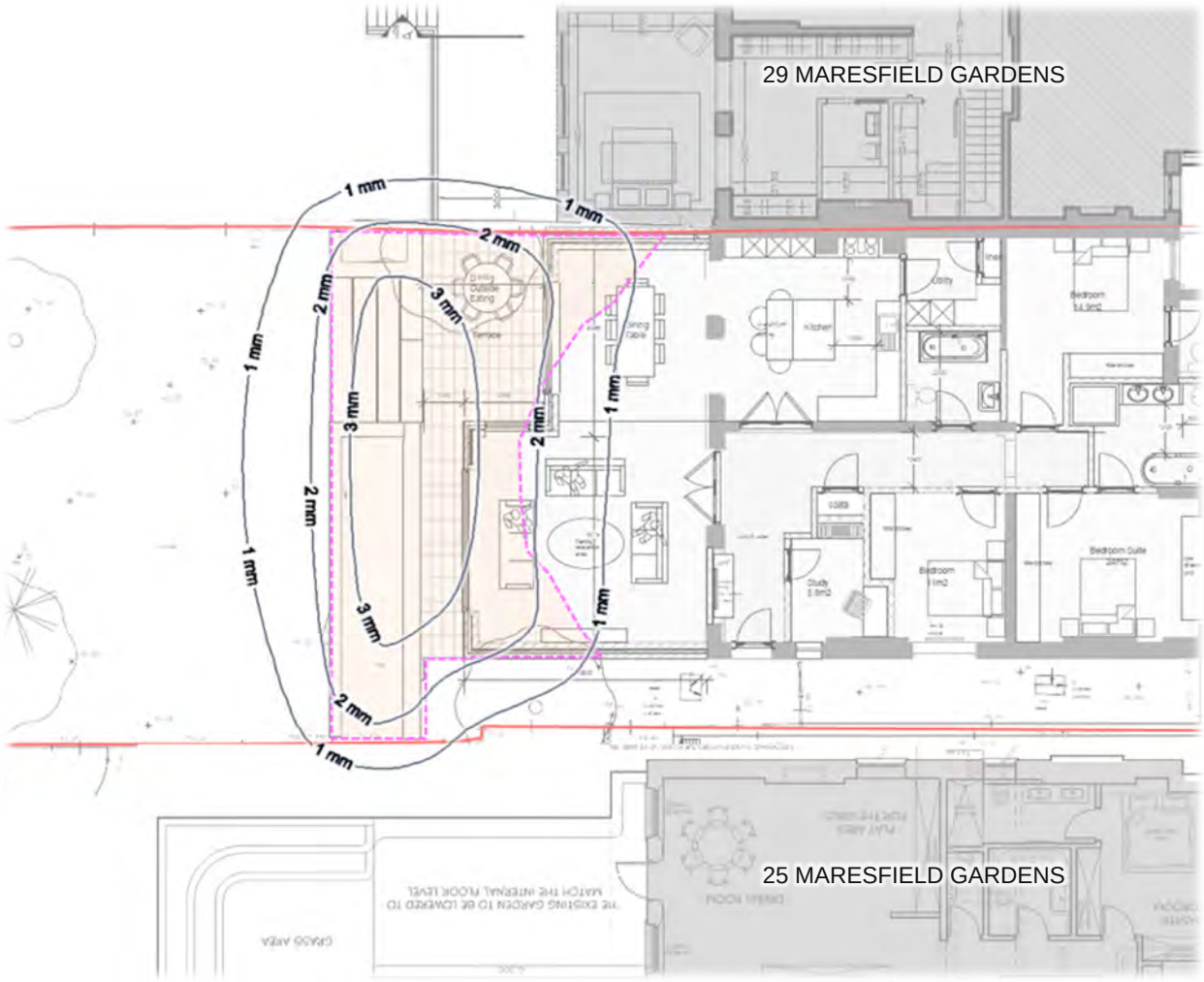
As the rear extension will be excavated within the London Clay Formation, a heave elastic response of the ground as a result of unloading can be expected to occur.

. Due to the existing sloping ground, the excavation depth will gradually increase from zero to approx. 1.5m towards the rearmost edge of excavations. Variable unloading of up to approximately -30kN/m^2 is therefore predicted to be caused by the excavation to form the extension.

7.3.1.1 SHORT TERM MOVEMENTS

Any short term movements below the excavation itself will go un-noticed, and the analysis suggests up to 3mm of heave movement below the centre of the excavated area, reducing to less than 2mm outside of this area.

Negligible movement is therefore expected at both the neighbouring structures as well as at the main building at No. 27.



THEORETICAL PREDICTED SHORT TERM HEAVE CONTOURS

7.3.1.2 POST CONSTRUCTION MOVEMENTS

The deepest excavation is to be undertaken outside of the extension structure; hence there will be no construction weight replacing the weight of soil that is to be removed. However, the magnitude of any long term component of heave movement is not expected to exceed the short term movement and is hence also predicted to have negligible impact on the host building, the new extension structure and the neighbouring buildings.

7.4 DAMAGE IMPACTS

As demonstrated above, the excavations for and subsequent construction of the proposed rear extension development are not predicted to result in any appreciable ground movement to the host building or neighbouring properties at Nos. 25 and 29 Maresfield Gardens.

Therefore, the potential degree of damage to both No. 25 and No. 29 Maresfield Gardens due to the proposed development can be assessed as Burland Category 0 - ‘Negligible’.

7.5 STRUCTURAL MONITORING

Given the minimal scale of the anticipated movements to buildings, structural monitoring is not considered to be necessary in this case, albeit this will be a matter for agreement with the neighbours as part of any Part Wall Agreements.

8. IMPACT ASSESSMENT

The screening and scoping stages identified potential aspects of the geological, hydrogeological and hydrological environment that could lead to the development having an unacceptable impact.

This stage is concerned with evaluating the direct and indirect implications of each of these potential impacts.

8.1 HYDROGEOLOGICAL IMPACT ASSESSMENT

The site is underlain by essentially impermeable clay soils and there is consequently no shallow groundwater table at this site.

It is therefore considered that the development will not have any impact upon groundwater flow and there is additionally no scope for any cumulative impact.

8.2 HYDROLOGICAL IMPACT ASSESSMENT

There will be a need to maintain the present water discharge regime and provide Sustainable Drainage Systems (SuDS) to provide an overall reduction in discharge rates as per the planning policy requirements.

A SuDS Assessment addressing this is presented as a separate report (LBH4626suds).

8.3 POTENTIAL STABILITY IMPACTS

8.3.1 LONDON CLAY

The London Clay soils are of high volume change potential.

However, the depth of the proposed foundations will be sufficient to obviate any concerns regarding potential seasonal movement.

8.3.2 EFFECT OF TREES

Three trees are to be removed as part of the development, However, the proposed foundations will be designed to prevent any problematic movement effects due to moisture extraction by tree roots.

8.3.3 GROUND MOVEMENTS

The Local Plan states that proposed basements should pose a risk of damage to neighbouring properties no higher than Burland scale Category 1 ‘Very Slight’, and mitigation measures should be incorporated if the assessed damage is not acceptable.

Very little heave ground movement is predicted to occur as a result of the development and the predicted neighbouring buildings damage levels due to ground movements have been assessed as Burland scale Category 0 ‘Negligible.

8.4 RESIDUAL IMPACTS

The proposed development will have no unacceptable residual impacts upon the surrounding structures, infrastructure or the environment.

9. CONCLUSION

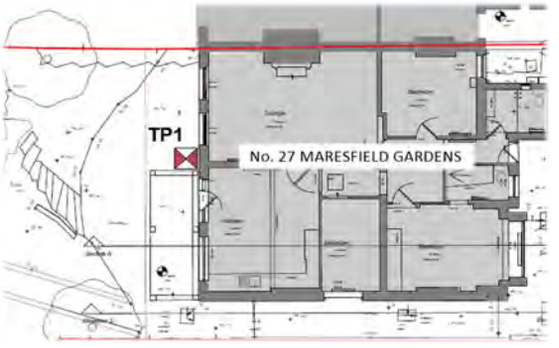
The assessment has demonstrated that no adverse residual or cumulative stability, hydrological or hydrogeological impacts are expected to either neighbouring structures or the wider environment as a result of this development.

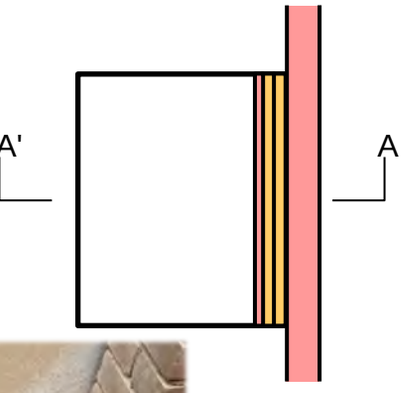
APPENDIX

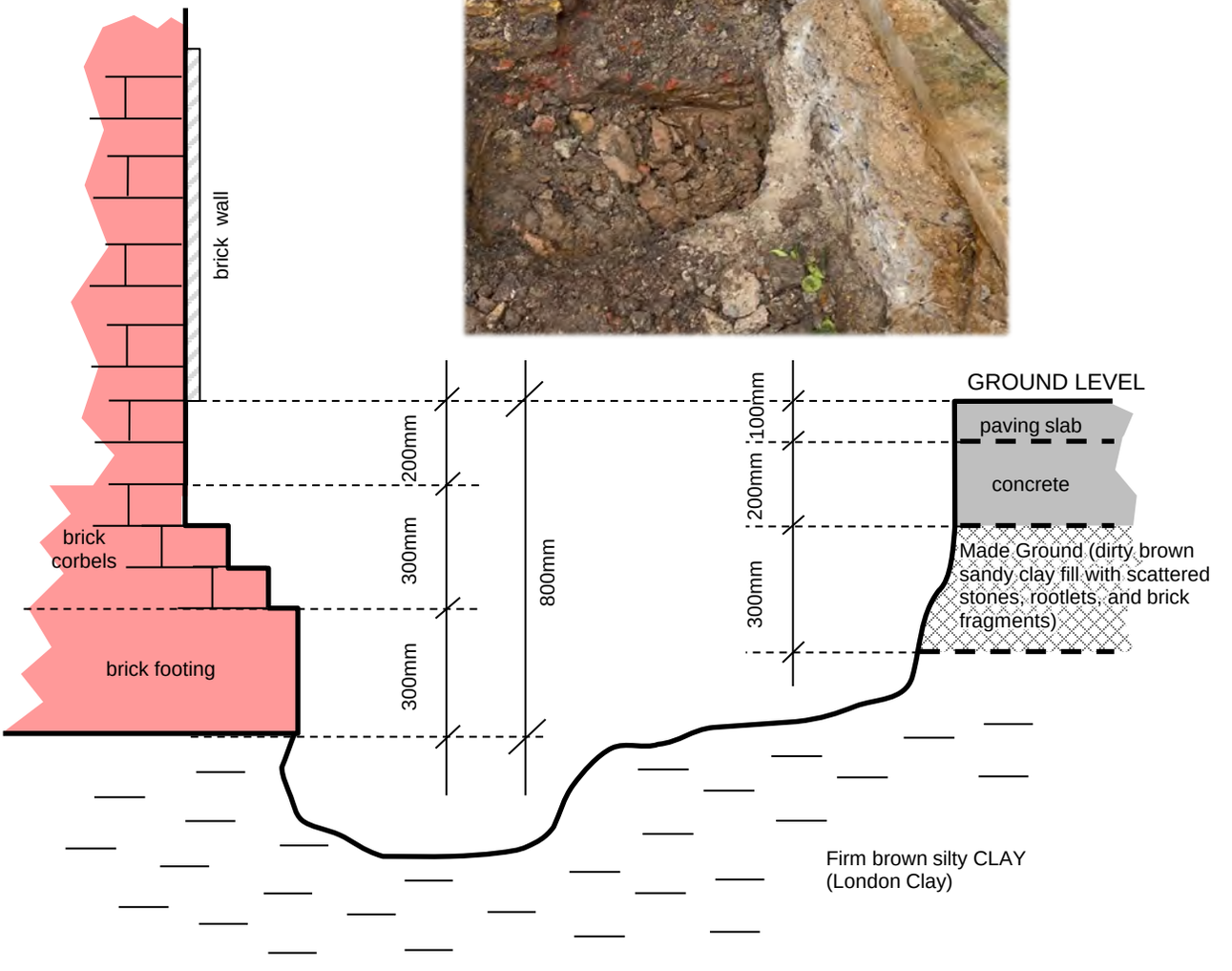
TRIAL PIT RECORD

SITE: 27 MARESFIELD GARDENS

TRIAL PIT 1







SECTION A - A'

Pit Constructed 8/01/21
G.L Approx. +68.7m OD
All Dimensions in mm
No groundwater observed
Do Not Scale