Job Number:241104
Date: November 2024

CRØFT
STRUCTURAL+
CIVIL

Basement Impact Assessment

Site Address: 146 Castelnau

London

SW13 9ET

Client Address: The Basement Design Studio

Michael J Wiseman

Suite 17, Maple Court

Grove Park, White Waltham

Berkshire. SL6 3LW

Report by	Sudeep Gurung Structural Engineer M.Sc. GMIStructE
Report Reviewed by	Concetta Cosenza Chartered Civil Engineer BEng, MSc, CEng, MICE
Structural Design Reviewed by	Chris Tomlin MEng CEng MIStructE
Hydrogeology, Soils &Above Ground Drainage Reviewed by	Vijaya Dubagunta M.Tech B.Tech CEng MICE

Rev	Date	Rev By	Comment
-	27/11/2024	SG	First Issue-Draft
1	17/12/2024	SG	Updated with SI information

CRØFT STRUCTURAL+ CIVIL

1. Contents

CRØFT STRUCTURAL+ CIVIL

1. Executive Summary

Croft Structural Engineers has reviewed the scope of the proposed basement development at 146 Castlenau SW13 9ET

The Basement Impact Assessment (BIA) has been produced following the London Borough of Richmond *Good Practice Guide on Basement Developments (2015)*.

The key elements of the report are:

- Desk Study
- Inspection of Site and Adjacent Site
- Geology
- Hydrology
- Listed Buildings
- Soil investigation report
- Assessment of Ground Movements
- Anticipated movements are expected to be 0-1 on the Burland Scale.
- Engineering Design Work Completed by a Chartered Structural Engineer
- Initial Flood Risk, Drainage and SuDS completed by a Chartered Civil Engineer
- Construction Sequence
- Temporary works
- Structural GA's and Sections

Should the proposal receive planning permission and, ultimately, progress to site, the client has been informed that the services of a chartered structural engineer must be retained for the duration of the project.

2. Screening Assessment

2.1. Subterranean Characteristics

Does the recorded water table extend above the base of the proposed subsurface structure?

No, it does not. Water was struck at 4.7 m below ground level. Please refer to SI report by Fastrack (Appendix D)

Is the proposed subsurface development structure within 100m of a watercourse or spring line?

No. Proposed basement development is not within 100m of a watercourse or spring line.

Are infiltration methods proposed as part of the site's drainage strategy?

No. No infiltration methods are proposed.

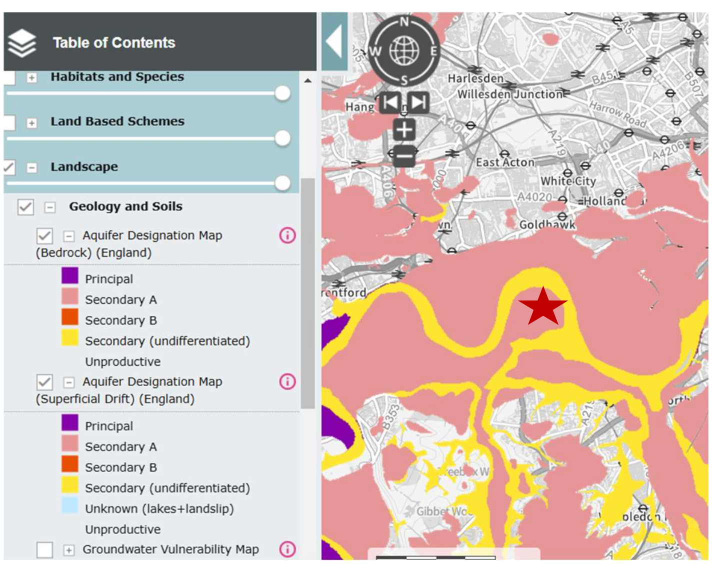
Does the proposed excavation extend below the local water table level or spring line during the construction phase?

No, it does not.

Is the shallowest geological strata at the site London Clay?

No, the shallowest soil strata are of Kempton Park Gravel underlain by London clay as per BGS map viewer of site.

Is the site underlain by an aquifer and/or permeable geology?



The site is underlain by a secondary aquifer.

2.2. Land Stability

Does the site, or neighbouring area, topography include slopes that are greater than 7°?

No. It does not.

Will changes to the site's topography result in slopes greater than 7°?

No. Proposed new basement will not change site's topography.

Will the proposed subsurface structure extend significantly deeper underground compared to the foundations of the neighbouring properties?

No. Proposed subsurface structure will not extend deeper underground than neighbours foundations.

Will the construction of the proposed subsurface structure require the felling or uprooting of any trees?

No trees will be felled or uprooting of trees for the proposed construction.

Has the ground at the site been previously worked?

No. The existing site has been residential since 1890's and was an empty filed before that.

Refer to site history (3.2)

Is the site within the vicinity of any tunnels or railway lines?

No, it is not within vicinity of any tunnels or railway line.

2.3. Flood Risk & Drainage

Will the proposed subsurface development result in a change in impermeable area coverage on the site?

No change in impermeable area coverage.

Will the proposed subsurface development impact the flow profile of throughflow, surface water or ground water to downstream area?

The proposed subsurface development does not impact the flow.

Will the proposed subsurface development increase throughflow or ground water flood risk to neighbouring properties?

The proposed subsurface development will not increase throughflow or ground water flood risk to neighbouring properties.

3. Desk Study

3.1. Proposed Works

Proposed work on site includes creation of a new basement under the existing footprint of the building including lightwells at rear and front.

3.2. Site History

Age of property: Victorian.

The existing property is a Semidetached three storey house with a partial cellar at rear. Property has a front vehicle driveway at and large rear garden. It shares Party wall with No 148

Figure 1:Front view of property.

The historical maps show that the site was an empty field on map published in 1873 and residential development occurred between 1894 to .1896

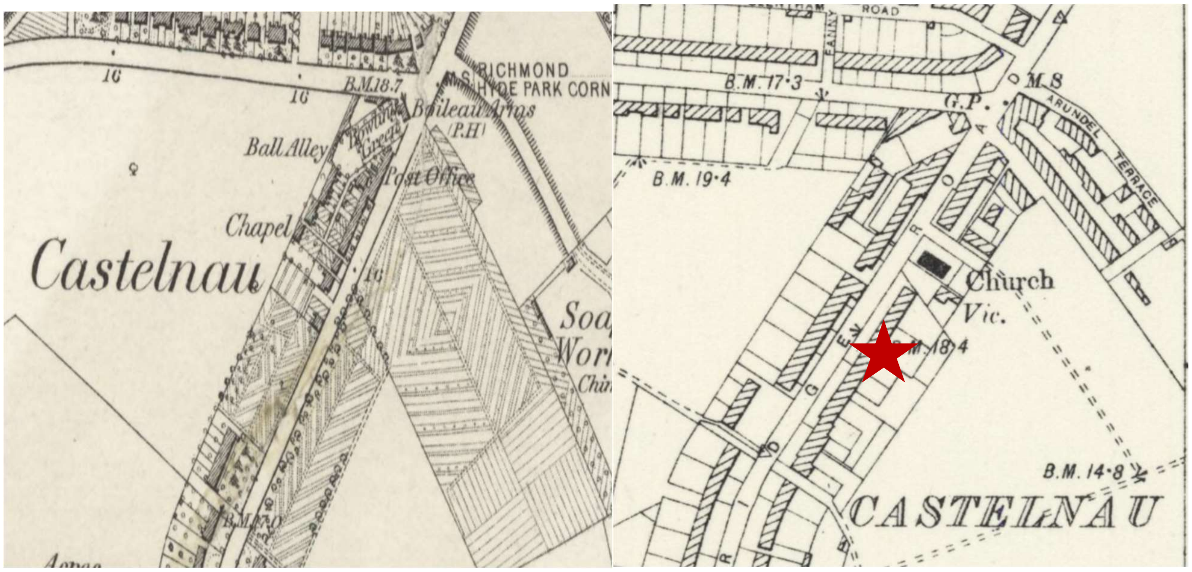


Figure 2: Extract from1873 map (Left) and 1894 to 1896 map (Source:maps.nls.uk)

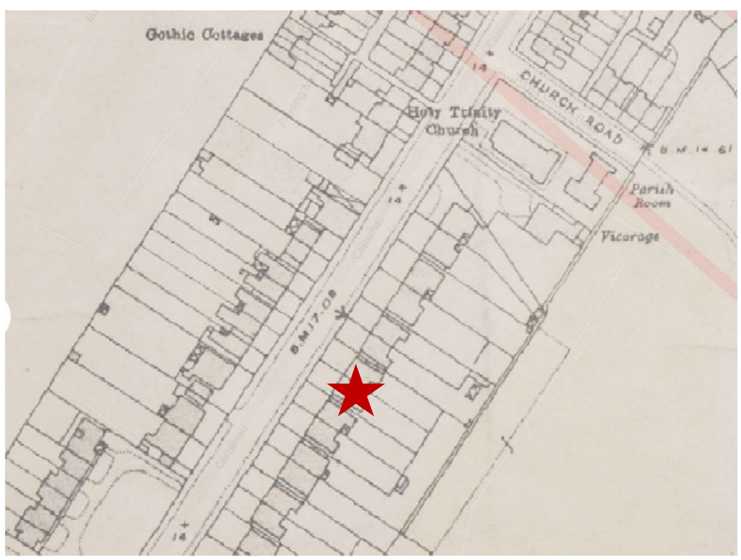


Figure 3:Extract from layers of London bomb damage 1945

During the Blitz the local area was not bombed.

3.3. Listed Buildings

The existing property is not listed.

There are no listed buildings in the surrounding area.

3.4. Adjacent Properties

Visual inspections of the external façades of the adjacent buildings have been inspected to consider whether the proposed basement will significantly affect their structure.

Figure 4:Aerial view of property. Extract from google earth.

3.4.1. 148 Castlenau - Property to the Left

- Property age: Victorian
- Property use: Domestic
- Number of storeys: Three
- Basement present: Partial cellar might be present.
- Structural defects noted: No defects noted from outside visual survey.

Figure 5:Front View of building.

3.4.2. 144 Castlenau - Property to the Right

- Property age: Victorian
- Property use: Domestic
- Number of storeys: Three
- Basement present: Partial cellar might be present.
- Structural defects noted: No defects noted from outside visual survey.

Figure 6: Front view of property.

3.4.3. 148 Castlenau- Garden- Property to the Rear

3.5. Topography

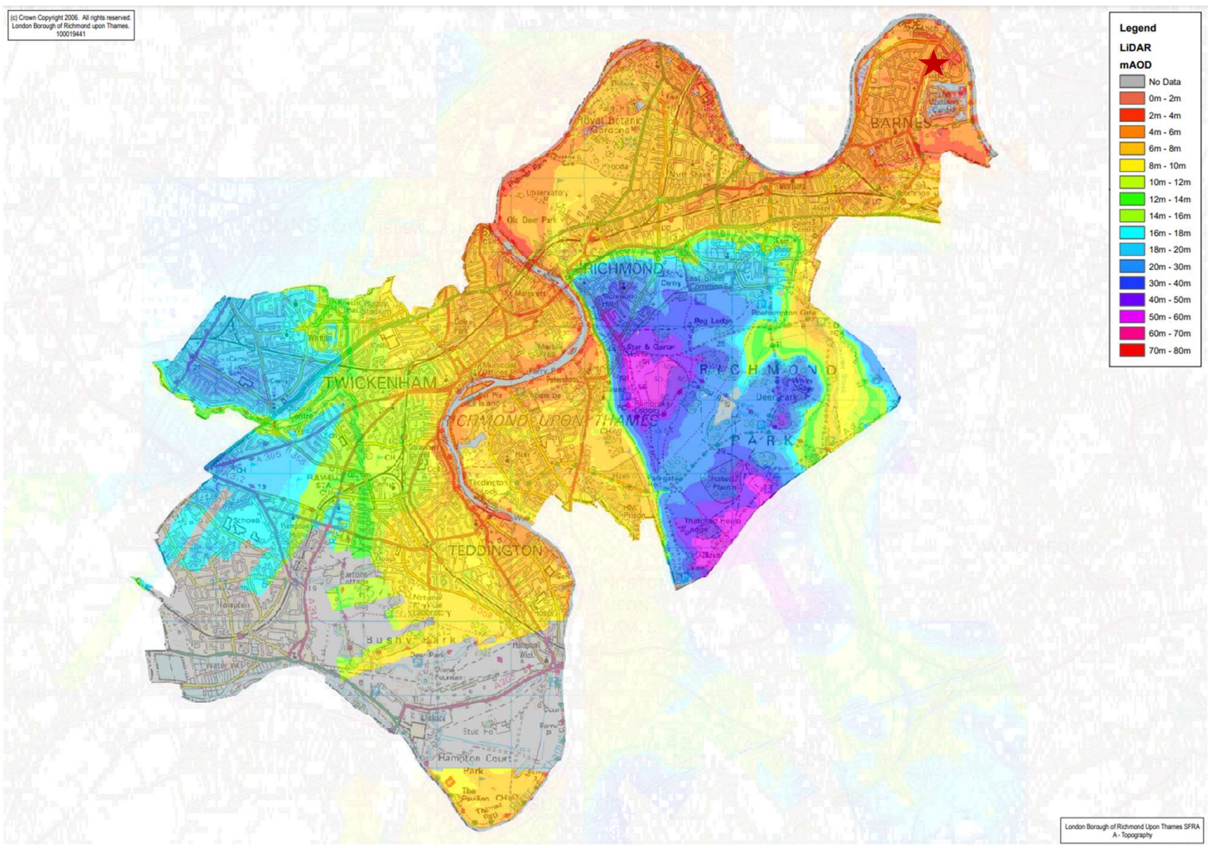


Figure 7: Topography of Richmond upon Thames

Does the existing site include slopes, natural or manmade, greater than 7° (approximately 1:8)?

No. Site is approximately flat. There are no major falls within 20m which will increase the risk of land slip.

Will the proposed reprofiling of the site change slopes at the property boundary to more than 7° (approximately 1:8)?

No. The proposed landscaping does not affect the slope.

Does the development neighbour land include railway cuttings and the like with a slope greater than 7° (approximately 1:8)?

No. There are no railway cuttings adjacent to the property.

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

No. The slope of the wider hillside setting is as per the property, approximately flat.

Is the London Clay the shallowest strata on site?

No. Kempton Park Gravel is the shallowest strata followed by London Clay formation as per BGS map viewer.

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

No. No local trees are to be felled.

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

No. Subsidence not considered as an issue on this site.

Is the site within an area of previously worked ground?

No. From the historical maps, the site has been residential for at least since 1890's.

3.6. Highways, Rail & London Underground

3.6.1. Highways

Is the site within 5m of a highway or pedestrian footway?

No. Site is not within 5m of the footpath/alleyway both footpath and the road surface are further than 5m from the front lightwell.

<u>Highways loading – allow:</u>

- $10kN/m^2$ if within 45° of road
- 100kN point loads if under road or with in 1.5m
- $5kN/m^2$ if within 45° of pavement
- Garden surcharge $2.5kN/m^2$
- Surcharge for adjacent property $1.5kN/m^2$ + $4kN/m^2$ for concrete ground bearing slab

3.6.2. London Underground & Network Rail

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

No. Nearest is the Railway line is +800m from site.

Will the basement works affect any UK Power Network Assets (substations etc)?

No. No UK Power Networks assets were noted during the initial site visit. A utilities search has not been conducted.

3.7. Trees

There are two mature trees at the rear garden of the property. But nearest tree is farther than 6m of the rear wall of proposed basement Henceforth proposed basement wall falling outside of tree protection zone. However, as a precaution, the contractor should follow guidance from BS 5837: 2005 Trees in relation to construction.

Are any trees to be removed to make way for the proposed basement?

No. All existing trees are to remain.

3.7.1. Special Precautions due to Trees

The increased depth of the foundations necessary for the basement places the new foundations outside the effects of trees. The building will be more stable with the proposed basement.

3.8. Geology – British Geological Survey Data

Extract from BGS map viewer indicates that the property is underlain by Kempton Park Gravel with London clay formation below.

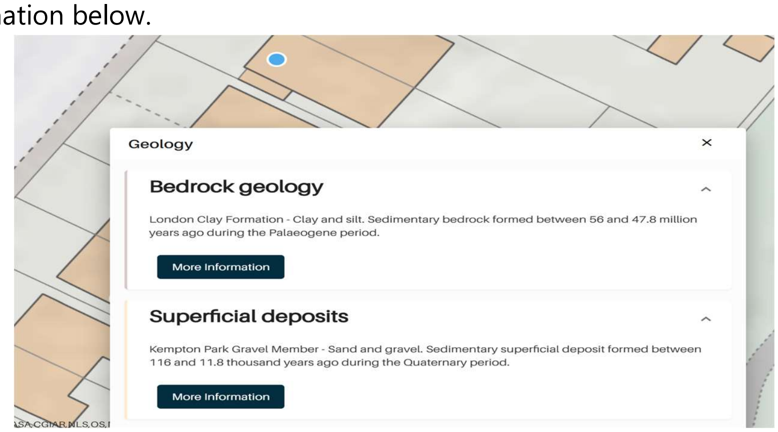
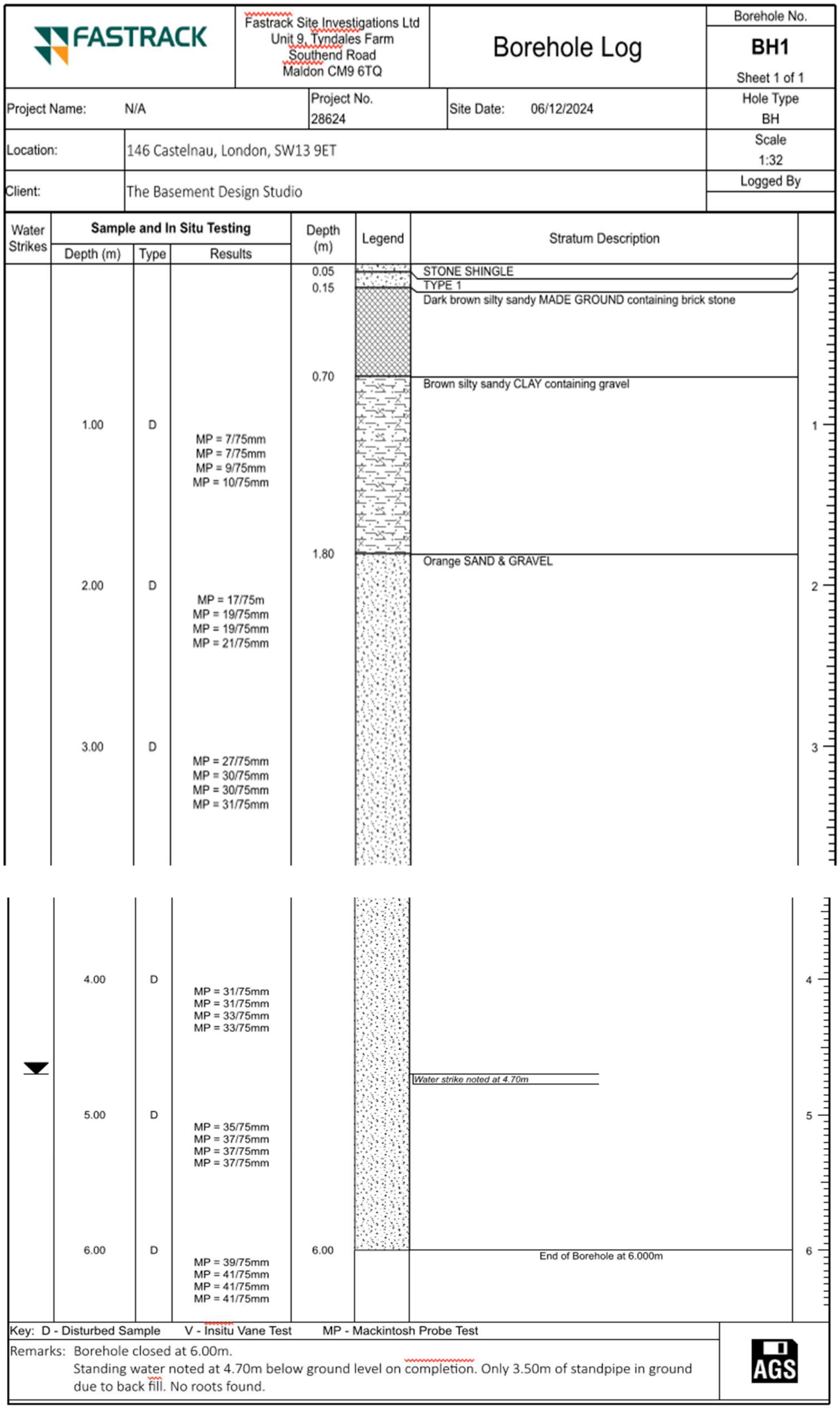


Figure 8: Extract from BGS maps

Site specific soil investigation was done by Fastrack on 6th December 2024. Please refer to bore hole record below. Underlaying soil on site is of sand and gravel.



FASTRACK	Fastrack Site Investigations Ltd Unit 9, Tyndales Farm Southend Road Maldon CM9 6TQ	Borehole Log	Borehole No. **BH1** Sheet 1 of 1
Project Name: N/A	Project No. 28624	Site Date: 06/12/2024	Hole Type BH
Location: 146 Castelnau, London, SW13 9ET			Scale 1:32
Client: The Basement Design Studio			Logged By

Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Legend	Stratum Description
				0.05		STONE SHINGLE
				0.15		TYPE 1
						Dark brown silty sandy MADE GROUND containing brick stone
				0.70		Brown silty sandy CLAY containing gravel
	1.00	D	MP = 7/75mm MP = 7/75mm MP = 9/75mm MP = 10/75mm			
				1.80		Orange SAND & GRAVEL
	2.00	D	MP = 17/75m MP = 19/75mm MP = 19/75mm MP = 21/75mm			
	3.00	D	MP = 27/75mm MP = 30/75mm MP = 30/75mm MP = 31/75mm			
	4.00	D	MP = 31/75mm MP = 31/75mm MP = 33/75mm MP = 33/75mm			
▼						Water strike noted at 4.70m
	5.00	D	MP = 35/75mm MP = 37/75mm MP = 37/75mm MP = 37/75mm			
	6.00	D	MP = 39/75mm MP = 41/75mm MP = 41/75mm MP = 41/75mm	6.00		End of Borehole at 6.000m

Key: D - Disturbed Sample V - Insitu Vane Test MP - Mackintosh Probe Test

Remarks: Borehole closed at 6.00m.
Standing water noted at 4.70m below ground level on completion. Only 3.50m of standpipe in ground due to back fill. No roots found.

AGS

Figure 9: Borehole record from SI report by Fastrack

Assumed bearing pressure:100kN/m2.

3.9. Flood Risk

3.9.1. Fluvial Flooding

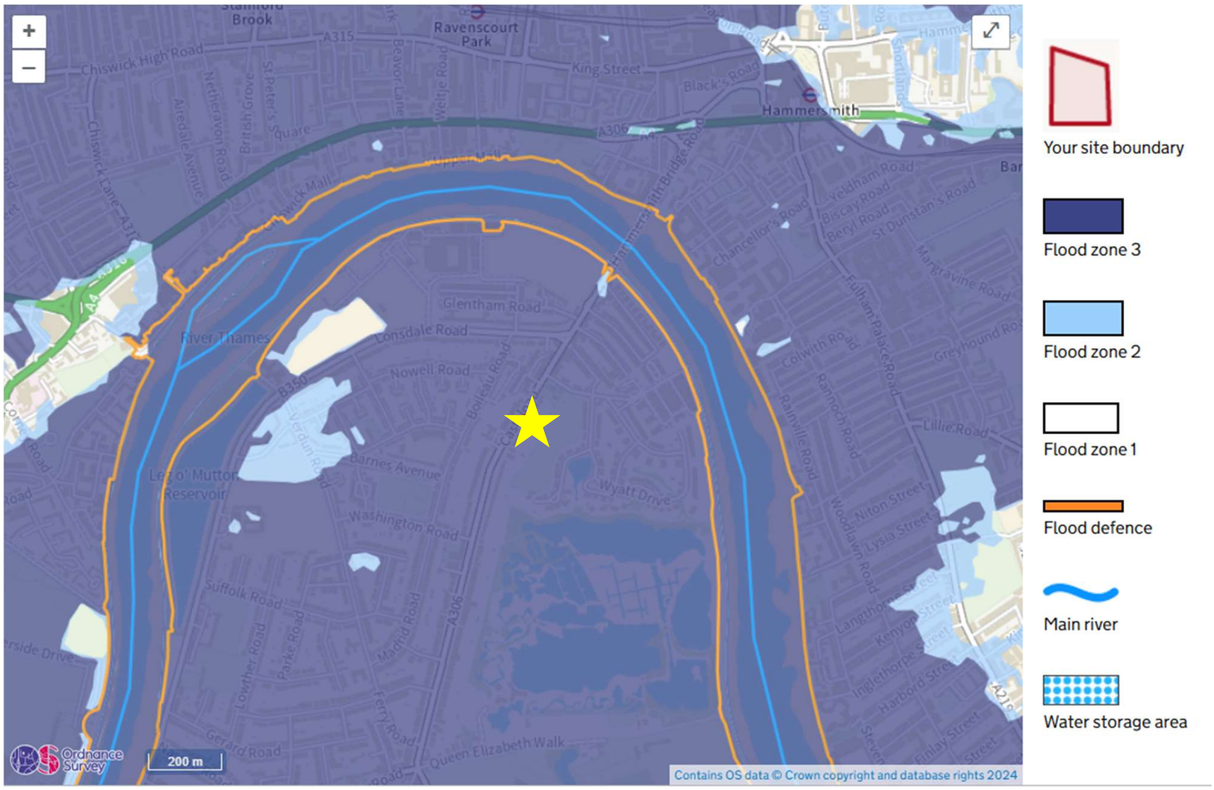


Figure 10: Extract from Flood map(Environment Agency)

Is the site in a fluvial or tidal flood risk zone?

Yes. Site lies within Flood zone 3. Meaning, it has high probability of flooding from river and the sea.

3.9.2. Surface Water Flooding

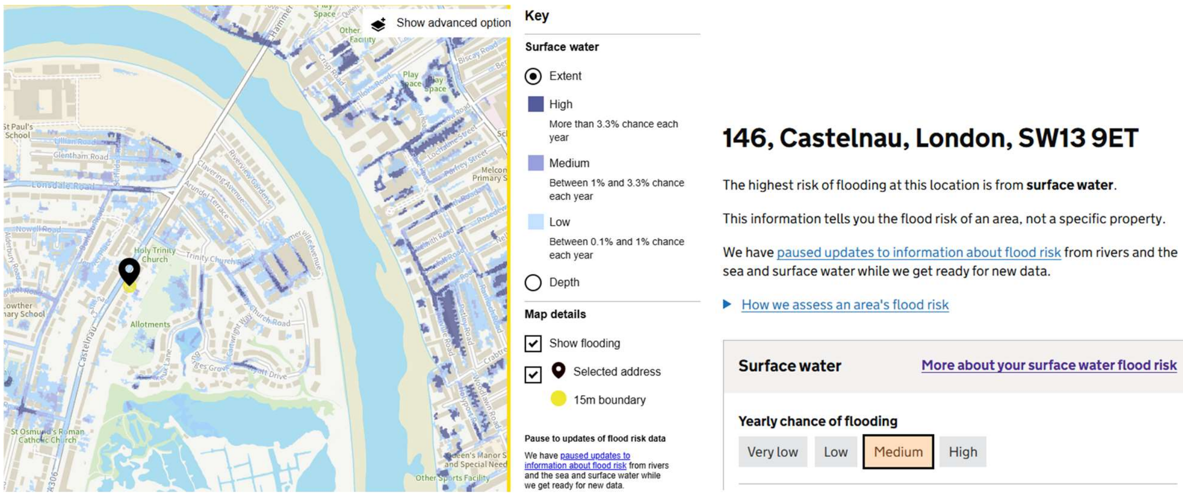


Figure 11: Extract of surface water flooding(Environment Agency)

Is the site in a surface water flood risk zone?

Yes. The site lies in medium zone flood risk zone due to surface water.

3.9.3. Ground Water & Sewer Flooding

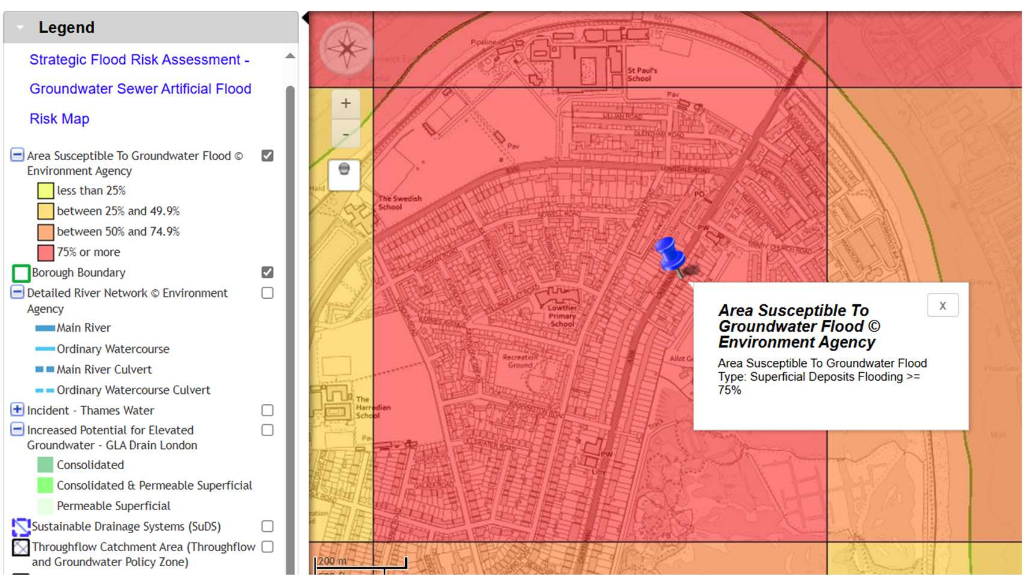


Figure 12: Extract from Richmond Strategic Flood Risk Assessment - Ground Water Sewer Artificial Flood Risk Map

Is the site at risk of flooding due to ground water or sewers?

Yes. The proposed site lies within high-risk zone of flooding due ground water flood.

3.9.4. Flood Risk Desk Study Summary

The site is located in flood zone 3. Also, the site lies in medium zone of flooding due to surface water.

A site-specific flood risk assessment (FRA) is required. Separate FRA by Evans Rivers and Coastal Ltd. Please refer to Appendix E.

3.10. Ground Water, Surface Water & Drainage

The basement will be founded on gravels and will not act as a dam. There will be capacity for the water to be displaced around and under the property.

If clay is encountered at depth, a 150mm thick layer of compacted type I should be provided to prevent damming.

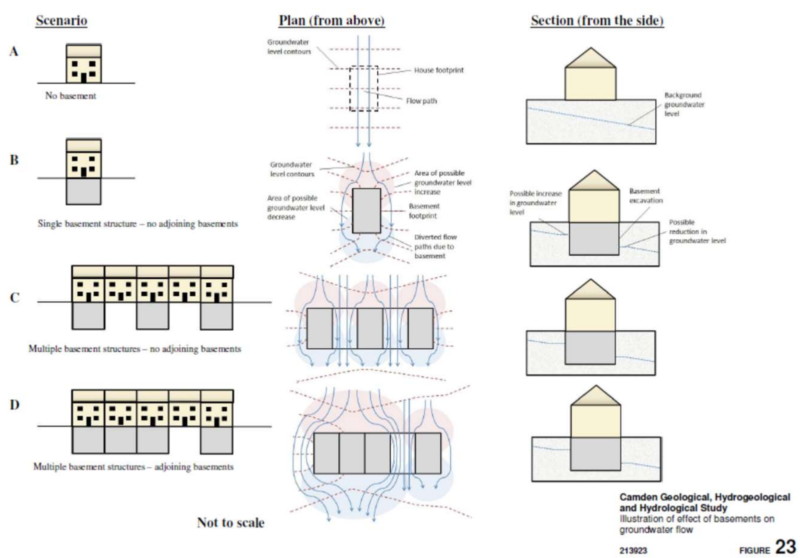


Figure 13: Extract from Arup report on ground water flow

The reinforced concrete retaining walls have been designed to withstand ground water flooding.

As part of the proposed site drainage, will surface water flows be materially changed from the existing route?

No. Surface water flow will not be changed.

Will the proposed basement development result in a change to the impermeable area of the site?

No. Proposed basement development will not change impermeable area of site.

Will the proposed basement result in changes to the instantaneous and long-term surface water being received by the adjacent properties or downstream water courses?

No. Proposed basement will not change surface water received by adjacent properties.

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

No. Proposed basement will not change quality of surface water received by adjacent properties.

As part of the site drainage, will more surface water be discharged to the ground than currently?

No. More surface water will not be discharged to ground that currently.

4. Ground Movement Assessment & Predicted Damage Category

CRØFT STRUCTURAL+ CIVIL	Project:	241104-146 Castlenau SW13	Section		Sheet	GMA - 1
Clock Shop Mews Rear of 60 Saxon Road London SE25 5EH T: 020 8684 4744 W: www.croftse.co.uk	Date	Nov-24	Rev	Date	Description	
	By	SG				
	Checked					
	Job No	241104	Status		Rev	

Ref

Movement of closest neighbouring property (No-144)

Neighbouring building

Neighbours Building width, L = **8000** mm

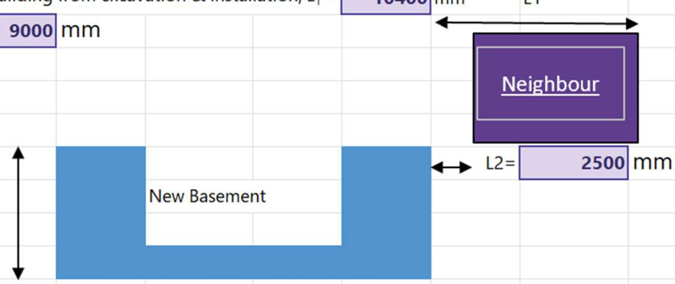
Distance to furthest point of building from excavation & installation, L_1 = **10400** mm

Neighbours building Height H= **9000** mm

L/H = 0.89

Excav'n depth H_b= **3.8** m

analysis depth, D = 3.8 m



Note: the height of the neighbouring building varies. Conservatively, the lowest height is used (height to eaves).

Table 2.4 of CIRIA C580

movement Type	High Support	Top & bottom Prop walls	Low Support Stiffness	Canitlever walls
	Surface movement % of max excavation depth	Distance behind wall to negliable movement	Surface movement % of max excavation depth	Distance behind wall to negliable movement
Horzontal	**-0.15%**	4	-0.40%	4
Vertical	-0.10%	3.5	-0.35%	4

Movement Assessment CIRIA C580: Embedded retaining walls - guidance for economic design

Potential movement due to excavation of wall

using parameters from Table 2.4 of CIRIA C580

(high stiffness: excavation will be propped during construction)

Horizontal Surface Movement / excavation depth					=	**-0.15%**	
	max d_h =	**-0.15%**	x	3800	=	-5.7	mm
	Distance behind wall to negligible movement (multiple of excav'n depth)				=	**4**	
	L_{0H} =	3800	x	**4**	=	15200	mm

Vertical Surface Movements

Distance behind wall to negligible movement (multiple of excav'n depth)				=	**3.5**		
L_{0V} =	3800	x	3.5	=	13300	mm	

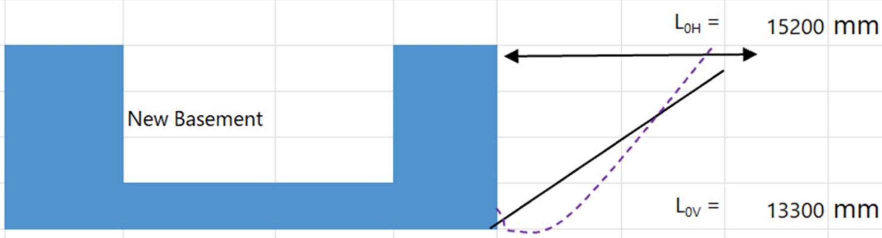
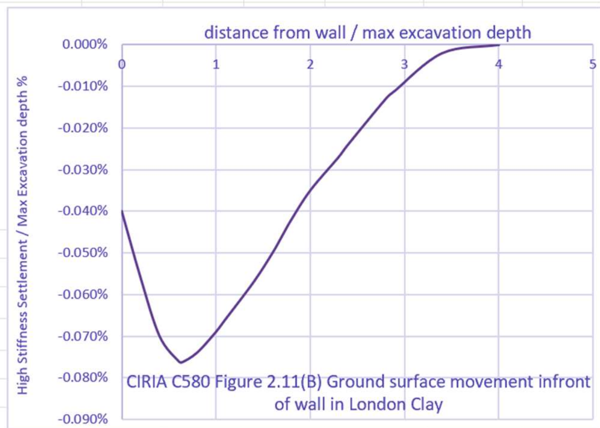


Table B

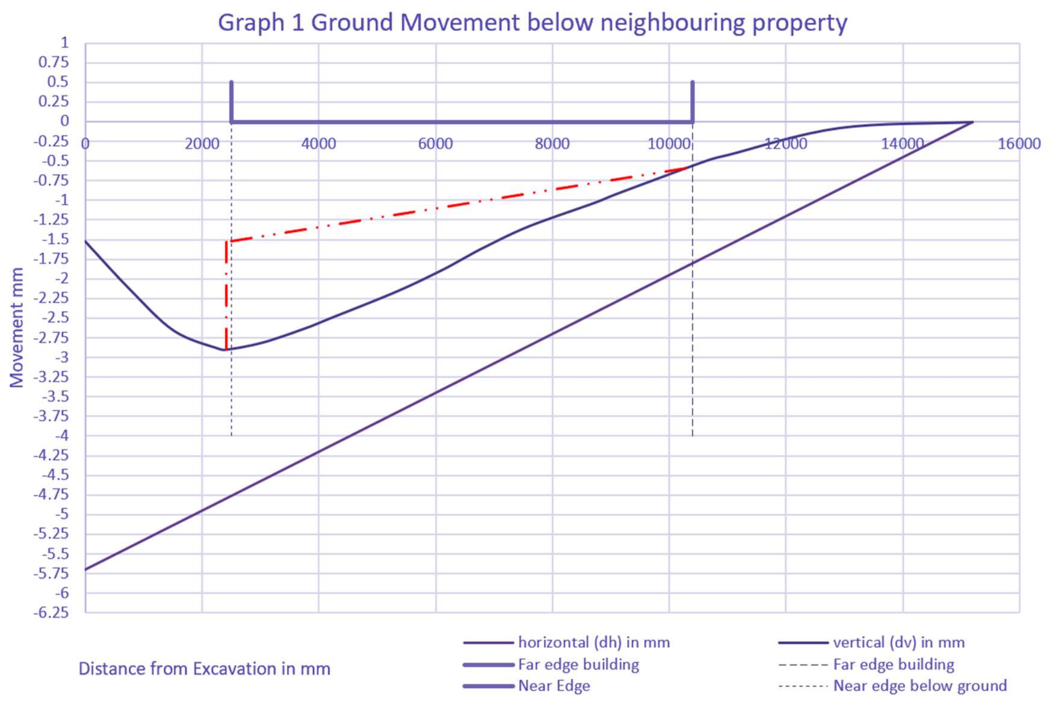
distance from wall / max excavation depth (x / D)	settlement / max excavation depth (%) [from Fig 2.11b]	Distance From Excavatgion	horizontal (d_h) in mm	vertical (d_v) in mm
0	-0.040%	0	-5.7	-1.5
0.2	-0.056%	760	-5.415	-2.1
0.4	-0.070%	1520	-5.13	-2.7
0.6	-0.076%	2280	-4.845	-2.9
0.637	-0.076%	2420.6	-4.79228	-2.9
0.8	-0.074%	3040	-4.56	-2.8
1	-0.069%	3800	-4.275	-2.6
1.1	-0.066%	4180	-4.1325	-2.5
1.4	-0.057%	5320	-3.705	-2.2
1.6	-0.050%	6080	-3.42	-1.9
1.7	-0.046%	6460	-3.2775	-1.7
1.8	-0.042%	6840	-3.135	-1.6
2	-0.035%	7600	-2.85	-1.3
2.3	-0.027%	8740	-2.4225	-1.0
2.4	-0.024%	9120	-2.28	-0.9
2.8	-0.013%	10640	-1.71	-0.5
2.9	-0.011%	11020	-1.5675	-0.4
3.4	-0.002%	12920	-0.855	-0.1
4	0.000%	15200	0	0.0



	Veritical Movement		Horzontal Movement	
	Diagonal line			
2500	-1.5 mm		2500	-5.7 mm
10400	-0.5833 mm		10400	-1.8 mm
7600	**-1.33**	Iteration values	**7600**	**-2.85**
8740	**-1.026**		**8740**	**-2.4225**

Movement where vertical Max vertical line & diagonal line intersect

At **2420.6** **-1.5294 mm**



Total differential movement

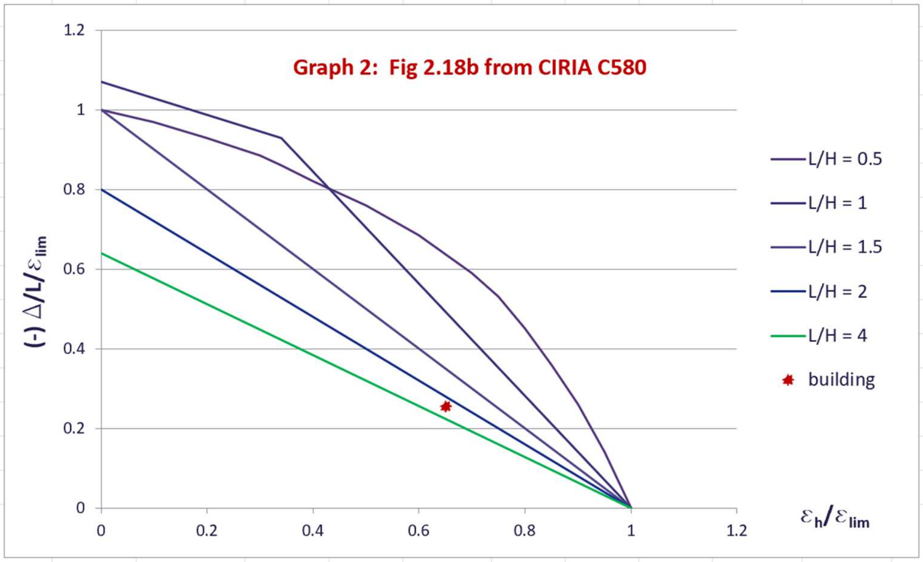
from Graph 1,			
Horiztonal movement at L2 =		-5.7	
Horiztonal movement at L1=		-1.8	
Total Horizontal Movement	d_h =	**3.9**	**mm**
Total Vertical Movement	**D =**	**1.5**	**mm**

TOTAL STRAIN (EXCAVATION AND INSTALLATION) From Table 2.5 CIRIA C580 Below

Category of Damage	Normal Degree	Limiting Tensile Strain %		
0	Negligible	0.00%	-	0.05%
1	Very slight	0.05%	-	0.075%
2	Slight	0.075%	-	0.15%
3	Moderate	0.15%	-	0.30%
4 to 5	Severe to Very Severe		>	0.30%

Max Anticipated Damage may be categorised as **'Very Slight' ; Category 1**

e_{lim}	=	**0.075%**				values above used for Graph 1, GMA - (separate sheet)
e_h	=	0.049%	e_h/e_{lim}	=	0.65	
D/L	=	0.019%	$D/L/e_{lim}$	=	0.25	



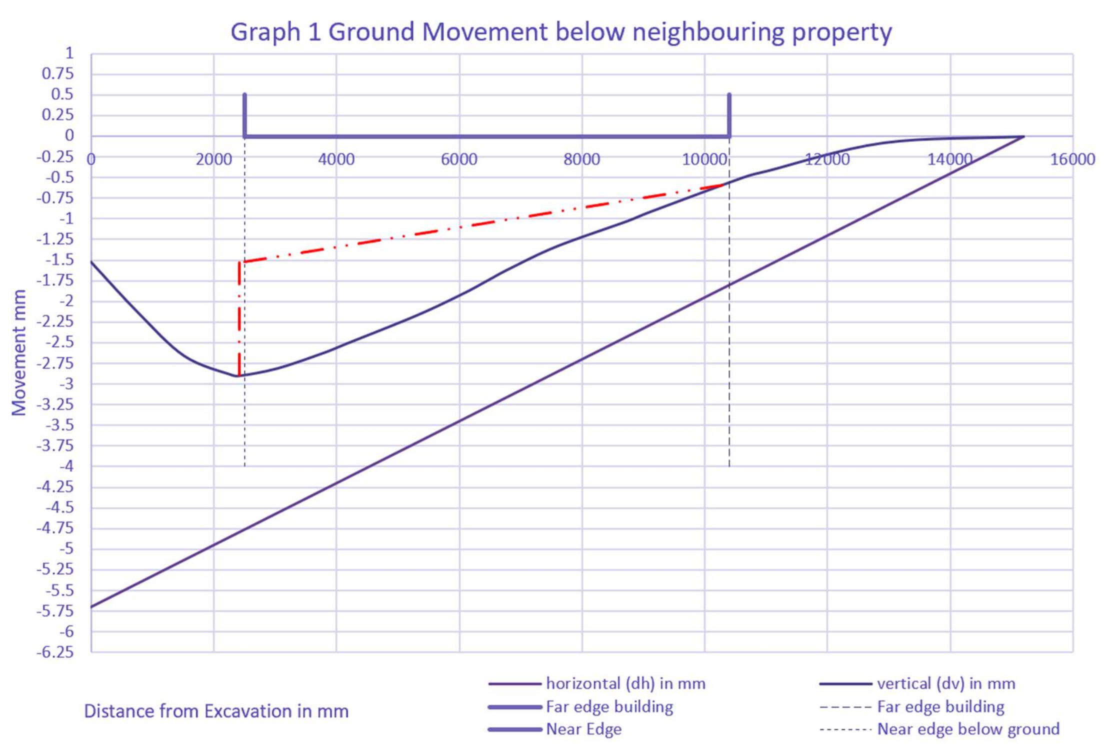
4.1. Burland Scale

CIRIA C720 is currently the most widely used technical document advising on the design of retaining walls. This includes guidance on predicting the damage category associated with the construction of retaining walls. It is pertinent to note that this guidance relies on empirical evidence based on data from large developments.

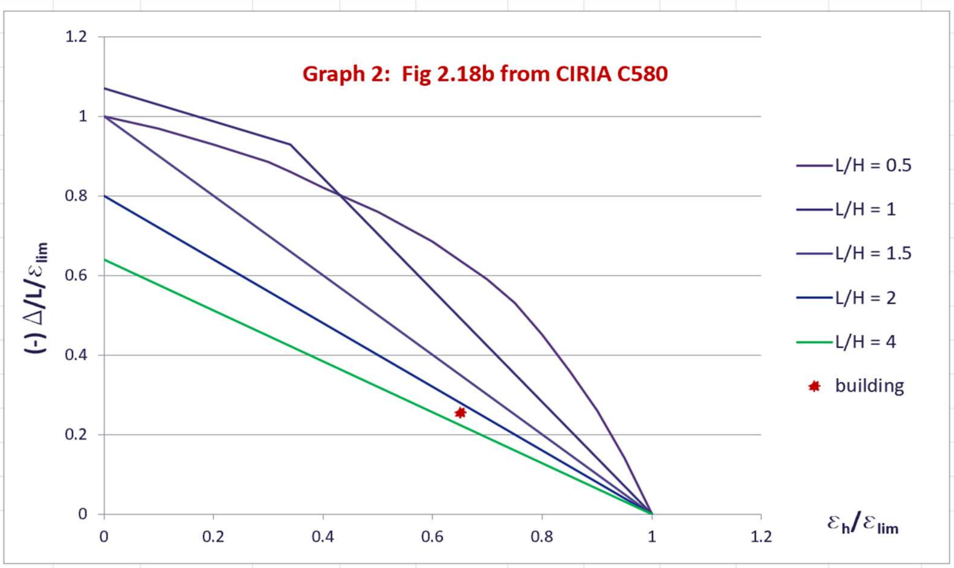
From CIRIA C580 empirical tables. Our results are noted below. The initial analysis **the anticipated Movement Category on the Burland Scale is between 0 and 1.**

Category of Damage	Approximate crack width	Limiting Tensile strain	Definitions of cracks and repair types/considerations
0	Up to 0.1	0.0-0.05	HAIRLINE – Internally cracks can be filled or covered by wall covering and redecorated. Externally, cracks rarely visible and remedial works rarely justified.
1	0.2 to 2	0.05-0.075	FINE – Internally cracks can be filled or covered by wall covering and redecorated. Externally, cracks may be visible, sometimes repairs required for weather tightness or aesthetics. NOTE: Plaster cracks may, in time, become visible again if not covered by a wall covering.

Table 1: Extract from The Institution of Structural Engineers "Subsidence of Low-Rise Buildings" Table 6.2 Classification of visible damage to walls with particular reference to type of repair, and rectification consideration



Max Anticipated Damage may be categorised as **'Very Slight' ; Category 1**					
e_{lim}	=	**0.075%**			values above used for Graph 1, GMA - (separate sheet)
e_h	=	0.049%	e_h/e_{lim}	= 0.65	
D/L	=	0.019%	$D/L/e_{lim}$	= 0.25	



The maximum damage category, as set out in CIRIA C580, is not expected to be greater than Category 1. As long as suitable mitigation measures are in place, any damage that may occur in the neighbouring buildings will be minor and can be repaired with standard decorative works.

4.2. Mitigation Measures

The basement will be constructed using standard underpinning procedures. A design and construction methodology is proposed and appended to this report. This aims to limit damage to the existing building on the site, and to the neighbouring buildings. Hit and miss installation of walls has been shown to provide 50% less movement than noted in CIRIA 720. The calculations presented in C720 are, therefore, over-estimate the movements for smaller scale excavations.

Croft would propose propping the sides of the excavations as they progress downwards from ground level. A method statement for the construction of the basement is appended. The procedures described in this have been formulated with Croft's experience of over 500 basements completed without error. The measures described in this statement will mitigate the impacts that the construction of the basement may have on nearby properties. Croft has been involved in a number of basement designs of a similar scale to the proposed development at 146 Castelnau. These previous projects have been followed through to the construction phase and have involved the use of regular movement monitoring before, during and after the basement works are complete.

To reduce the risk of damage associated with the development, the following measures are advised:

- Employ a reputable contractor that has extensive knowledge of basement works.
- Employ suitably qualified consultants.
- Provide method statements for the contractors to follow.
- Investigate the ground.
- Record and monitor the properties close-by. This is usually completed by a condition survey, under the Party Wall Act, before and after the works are completed. Refer to the end of the appended Basement Construction Method Statement.

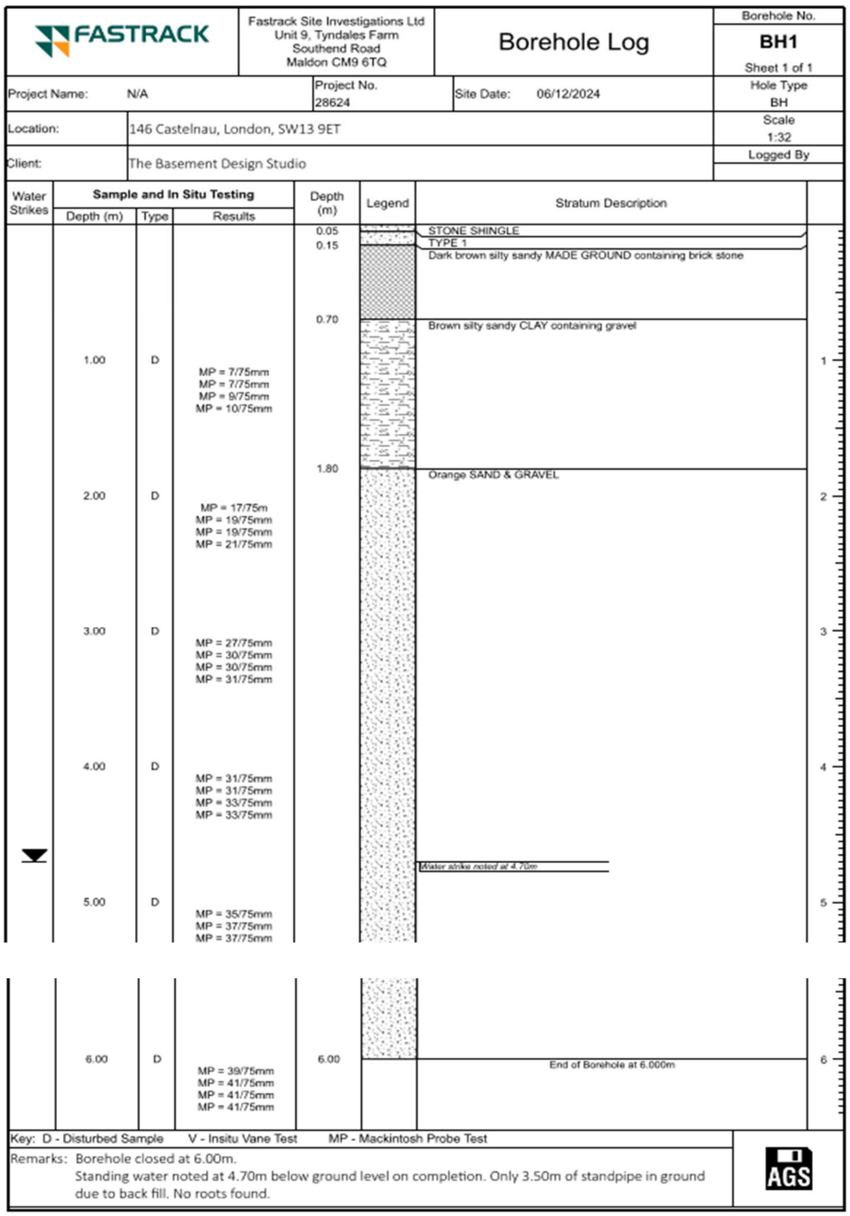
With the measures listed above, the maximum level of cracking anticipated is 0-1 cracking. This can be repaired with normal decorative works. At detailed design stage, the Party Wall Application and the appointment of Party Wall Surveyors will ensure that the above measures are applied. Under the Party Wall Act, minor damage, although unwanted, can be tolerated; it is permitted to occur to a neighbouring property as long as repairs are suitability undertaken to rectify this. To mitigate this risk, the Party Wall Act is to be followed, and a Party Wall Surveyor will be appointed.

Temporary works are described further in the following section and a proposed construction sequence for the works is appended.

5. Ground Investigation

A site-specific ground investigation has been completed for this planning application by Fasttrack.

Borehole log shows that existing soil under the site is of sand and gravel nature. Please refer to Appendix D.



FASTRACK

Fastrack Site Investigations Ltd
Unit 9, Tyndales Farm
Southend Road
Maldon CM9 6TQ

Borehole Log

Borehole No. BH1
Sheet 1 of 1

Project Name: N/A	Project No. 28624	Site Date: 06/12/2024	Hole Type BH
Location: 146 Castelnau, London, SW13 9ET			Scale 1:32
Client: The Basement Design Studio			Logged By

Water Strikes	Depth (m)	Type	Results	Depth (m)	Stratum Description
				0.05	STONE SHINGLE
				0.15	TYPE 1
					Dark brown silty sandy MADE GROUND containing brick stone
				0.70	Brown silty sandy CLAY containing gravel
	1.00	D	MP = 7/75mm MP = 7/75mm MP = 9/75mm MP = 10/75mm		
				1.80	Orange SAND & GRAVEL
	2.00	D	MP = 17/75m MP = 19/75mm MP = 19/75mm MP = 21/75mm		
	3.00	D	MP = 27/75mm MP = 30/75mm MP = 30/75mm MP = 31/75mm		
	4.00	D	MP = 31/75mm MP = 31/75mm MP = 33/75mm MP = 33/75mm		
▼					Water strike noted at 4.70m
	5.00	D	MP = 35/75mm MP = 37/75mm MP = 37/75mm		
	6.00	D	MP = 39/75mm MP = 41/75mm MP = 41/75mm MP = 41/75mm	6.00	End of Borehole at 6.000m

Key: D - Disturbed Sample V - Insitu Vane Test MP - Mackintosh Probe Test

Remarks: Borehole closed at 6.00m.
Standing water noted at 4.70m below ground level on completion. Only 3.50m of standpipe in ground due to back fill. No roots found.

AGS

Figure 14:Extract of bore hole log of site

In December 2024, Fast track carried out a ground investigation in the area of the proposed basement. The report for this (Ref:SI_Report_28624) is available as a separate document. The relevant conclusions of this are:

1. Groundwater is anticipated to be at 4.7m below ground level.
2. Underlaying soil is of sand and gravel formation.

5.1. Ground Considerations

The basement will be founded in sand and gravel. Croft has completed several basements in this type of ground. The basement can be completed with section underpins. Soft sand spots do occur. Croft would therefore recommend that all excavations are fully propped.

As a party wall is to be underpinned and will leave the party wall with a deeper footing than the neighbours other walls, the design should look at the available bearing capacity. As part of the Party Wall agreement, a pre-condition survey will be carried out. The design will consider the impact of the deeper footings.

5.2. Bearing Stress

In line with CP111 Assumed bearing Design stress = 100 kN/m^2

As explained previously, heave potential is considered low in this type of ground and an allowable bearing pressure of 100kN/m^2 may be used.

5.3. Ground Stability

Design overall stability to K_a & K_p values. Lateral movement necessary to achieve K_a mobilisation is height/500 (from Tomlinson). This is tighter than the deflection limits of the concrete wall.

The slope stability of gravels is in the region of 30˚. The design of the RC retaining walls will take this into account. For the design of the retaining walls, an angle of friction of Ø= 30º can be used.

6. Engineering Considerations

New reinforced concrete retaining walls will form the perimeter of the basement. These will resist lateral forces and also transfer the loads from the existing structure to the ground, forming a new foundation to the property.

The design proposals in this report are intended to demonstrate feasibility to support the planning application. The information, drawings, calculations, method statement and other information in this report are for planning purposes. Croft provides no design warranty or insurances for the final design. Further information and design considerations must be undertaken before Building Regulations submission. **__The information provided in this document is not for construction.__**

See Appendix A for initial calculations of retaining wall designs.

6.1. Surcharge Loading

The following loads should be accounted for:

Garden Surcharge 2.5kN/m^2

Surcharge for adjacent property 1.5kN/m^2 + 4kN/m^2 for concrete ground bearing slab

Is the site within 5m of a highway or pedestrian footway?

No. Site is not within 5m of the footpath/alleyway and the road surface is further than 5m from the front lightwell.

7. Temporary Works

Localised dewatering to the pins may be necessary.

The basements can be completed with section underpins. Soft sand and gravel spots do occur. Croft would therefore recommend that all excavations are fully propped. To deal with soft sports during excavation a store of precast lintels should be maintained. Once inserted these can be grout injected behind to stabilise ground.

Walls are designed to be temporarily stable. Temporary propping details will be required for the ground and soil, and this must be provided by the contractor. Their details should be forwarded to the design engineer.

The contractor should pay particular attention should be paid to the point loads from above.

A proposed construction method statement is appended.

8. Noise, Vibration & Dust

Full investigations and reports (such as ground investigations and construction traffic and management plans) should be carried out ahead of building works to formalise the best practical means to be used.

Best practice construction methods should be chosen to reduce unnecessary noise, vibration and dust. The following table is a guidance to minimise the effect of the same.

CONSTRUCTION METHOD	MITIGATION MEASURES	NOISE	DUST	VIBRATION
In accordance with the best practical means, to be used **To minimize, noise, vibration and dust during the construction of the basement, including the excavation, that is likely to affect adjacent residential premises and school(if any)**				
1. Preparation of site to fully contain the area	Boarding to front of house enclosing entrance, and windows kept in place for complete duration of construction	Boarding keeps noise inside the house and keeps house more rigid stopping attenuation, absorbs sound and Stops airborne sound escaping	Dust from debris stored internally is contained within boarded up house preventing it from escaping to neighbours before collection.	Any internal vibration is further reduced by additional boarding to absorb before emitting to neighbour: as timber absorbs vibration better than metal or glass. The house is also more rigid, stopping vibration
	Windows retained and sealed shut during construction, including front door and terrace doors kept closed	Airborne noise is contained within development	Airborne dust is contained within the development	Windows being sealed shut (taped) stops any rattling of windows or accentuation of any vibrations on site
	Hording and sheeting to cover roof terrace.	Covering with hording and sheeting restricts airborne noise from escaping as best can be.	Sheeting to roof terrace stops window blowing up dust from excavation and any dust generated from	Hording and sheeting stops vibration as best is practicable.

CONSTRUCTION METHOD	MITIGATION MEASURES	NOISE	DUST	VIBRATION
			works escaping to vicinity.	
	Retention of internal floors and structure during excavation works	Keeping the internal floors in situ during works allows the house to work as a buffer to contain noise and reduces the site area to the smallest volume reducing the effect noise can have.	Dust is contained to a smaller area and has several filters (ie floors and walls) to pass through and thus get stopped before it can affect neighbours, thus reduced.	Retaining the existing structure reduces vibration by keeping the house rigid and secondly by having a mix of materials all with different attenuation frequencies; vibration is absorbed and not accentuated, lastly floors and walls act as a break in otherwise continuous structure which acts as a buffer to stop vibration continuing out to neighbours.
	Temporary works and structure	Temporary works allow the house to be kept rigid and allow for small scale, less noise emitting methods of construction to be used.	Temporary works keep the house rigid and safe so stop other areas of the house degenerating through works and thus dust being created.	Temporary works keep the house rigid which stops vibrations.
2. Management and hours of working	Project manager to manage all works on site, member of Considerate	Hours of working are restricted and staff supervised to use tools appropriately. No radio on site.	Hours of working are restricted and staff supervised to use tools appropriately with appropriate guarding to	Hours of working are restricted and staff supervised to use tools appropriately and reduced use of power

CONSTRUCTION METHOD	MITIGATION MEASURES	NOISE	DUST	VIBRATION
	Contractors Scheme	Small team working reducing noise. Coordination between workers ensured.	prevent dust migration.	tools to minimize vibration.
3. Excavation of basement	Non-percussive tools used for excavation (ie hand dug)	Hand tools are quieter. Method chosen reduces need for any heavy noisy machinery	Less dust generated by hand tools than fast repetitive motor driven tools.	Vibration is minimized by not using percussive tools
	Excavation limited to 1m runs and shuttered for reinforced concrete foundations.	Each underpin is restricted to 1m lengths containing noise and amount of work that can be done at once to small area thus reducing overall hubbub. Method is quieter than piling or machine methods.	Dust is contained within shuttering, area is dampened with water to allow digging and eliminate dust.	Shuttering contains any subsequent vibration from excavation and keeping surrounding area soil intact.
	Removal of spoil	All spoil is hand bagged and stored internally by hand so no noise from skip or large refuse area, removed as per CTMP by small	Spoil hand bagged, not using electric conveyor belt, and reducing emission of dust.	Spoil bagged by hand (ie shovel) so no machinery to transmit vibration

CONSTRUCTION METHOD	MITIGATION MEASURES	NOISE	DUST	VIBRATION
		van and hand loaded		
	Removal of debris	Bagged debris is stored internally in a covered area and removed by waiting small van as per CTMP timed to cause least disruption	Debris removed by hand; dust contained within refuse sack, sealed shut.	Debris removed by hand, vibration minimized, in bags.
	Mixing and pouring of concrete for underpins	Concrete is mixed on site for small quantities for underpin, contained within the site for noise and for short period of time once underpin and shuttering formed (ie Separate activity)	Area set aside and shuttered off for mixing concrete to contain dust. Only small quantities mixed at time. Only small amounts of dry concrete Stored on site in internal area to avoid unnecessary dust.	Concrete mixer put on level base in clear working area to avoid vibration.
	Delivery of concrete for floor reinforced floor slabs	Large quantities are not mixed on site but delivered and pumped by specialist lorry to site in speedy low noise method from front of house through hording	No dust emitted from delivery of liquid concrete, area of road washed down before and after delivery. Area cordoned off as per CTMP (approx. ½ hour).	Large quantities of concrete mixed off site to reduce continuous vibration and delivered to site.

Appendix A – Structural Design (Retaining Wall)

As part of the building control application, full calculations must be undertaken and provided at detailed design stage once planning permission is granted. The calculations must be completed to a recognised standard (British Standards or Euro Codes). The calculations must consider the findings of this report.

The design must resist:

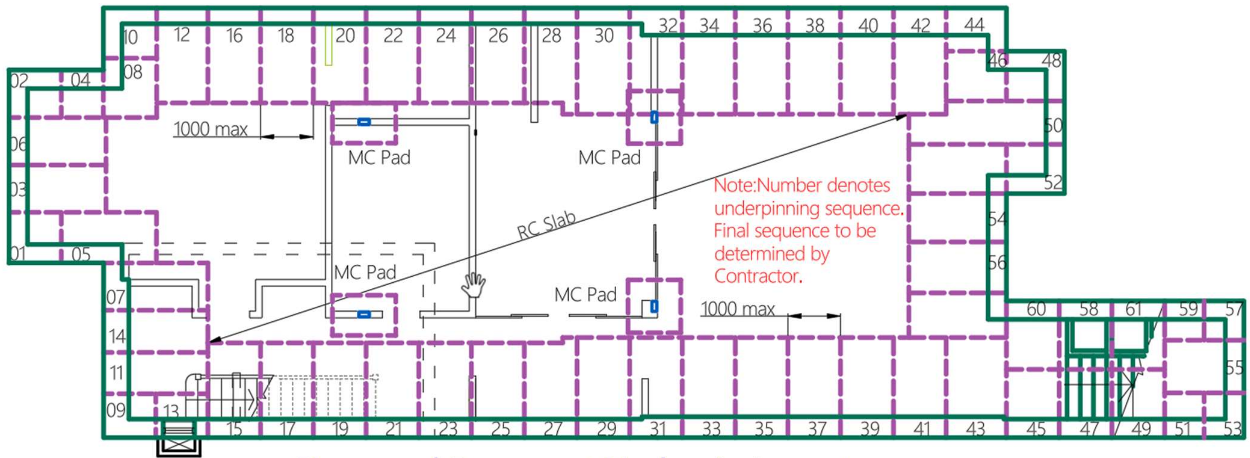
1. Vertical loads from the proposed works and adjacent properties.
2. Lateral loads from wind, soil water and adjacent properties.
3. Loadings in the temporary condition.
4. All other applied loads on the building.
5. Uplift forces from hydrostatic effects and soil heave.

The final proposed scheme must:

1. Provide stability in the temporary condition to all forces.
2. Provide stability to all forces in the permanent condition.

As part of the planning process, Croft Structural Engineers has considered some of the pertinent parts of the basement structure to ensure that it can be constructed. The following calculations are not a full set of calculations for the final design. The structural calculations that Croft considers pertinent are included in this appendix. Calculations relevant to the temporary works are in the proposed method statement in the next appendix.

MEMBER LOCATION INFORMATION(BASEMENT)



Proposed Basement Underpin Layout
(1:100)

MEMBER CALCULATIONS

This retaining wall will be supporting the party wall between 146 &148 Castelnau. The load will be doubled for all floors and roof to allow for neighbours.

Existing Masonry wall (325-GF+225-FF) (DL)

$DLm=7kN/m^2\times3.6m +5kN/m^2\times3.9m$ = **44.700**kN/m

Timber Floor (GF,FF,SF) (DL)	$DLf=0.88kN/m^2\times7.6m/4\times3\times2$ = **10.032**kN/m
Partition wall (GF,FF,SF) (DL)	$DLp=0.52kN/m^2\times2.9m/4\times3\times2$ = **2.262**kN/m
Timber Floor (GF,FF,SF)(LL)	$LLf=1.5kN/m^2\times7.6m/4\times3\times2$ = **17.100**kN/m
Existing Roof, DL	$DLr=1.1kN/m^2\times7.6m/4\times3\times2$ = **12.540**kN/m
Existing Roof, LL	$LLr=0.6kN/m^2\times7.6m/4\times3\times2$ = **6.840**kN/m
Total DL	DL=DLm+DLp+DLf+DLr=**69.534**kN/m
Total LL	LL=LLf+LLr=**23.940**kN/m
Total Load	TL=DL+LL=**93.474**kN/m

RETAINING WALL ANALYSIS

In accordance with EN1997-1:2004 incorporating Corrigendum dated February 2009 and the UK National Annex incorporating Corrigendum No.1

Tedds calculation version 2.9.23

Retaining wall details

Stem type Cantilever

Stem height	h_{stem} = **3500** mm
Stem thickness	t_{stem} = **350** mm
Angle to rear face of stem	α = **90** deg
Stem density	γ_{stem} = **25** kN/m^3
Toe length	l_{toe} = **1600** mm
Base thickness	t_{base} = **350** mm
Base density	γ_{base} = **25** kN/m^3
Height of retained soil	h_{ret} = **3500** mm
Angle of soil surface	β = **0** deg
Depth of cover	d_{cover} = **0** mm
Height of water	h_{water} = **2500** mm
Water density	γ_w = **9.8** kN/m^3

Retained soil properties

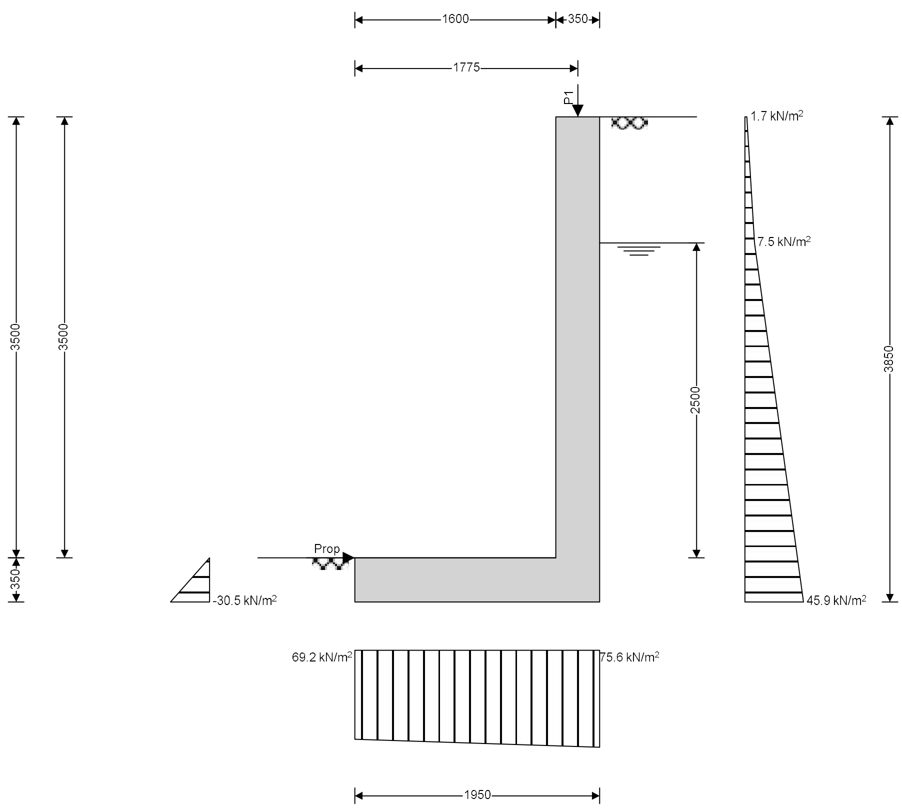
Soil type	Medium dense coarse and medium sand
Moist density	γ_{mr} = **17.5** kN/m^3
Saturated density	γ_{sr} = **20.8** kN/m^3

Base soil properties

Soil type	Medium dense coarse and medium sand
Soil density	γ_b = **17.5** kN/m^3
Presumed bearing capacity	$P_{bearing}$ = **100** kN/m^2

Loading details

Variable surcharge load	$Surcharge_Q$ = **5** kN/m^2
Vertical line load at 1775 mm	P_{G1} = **69.5** kN/m
	P_{Q1} = **23.9** kN/m



General arrangement - sketch pressures relate to bearing check

Calculate retaining wall geometry

Base length l_{base} = **1950** mm

Saturated soil height h_{sat} = **2500** mm

Moist soil height h_{moist} = **1000** mm

Length of surcharge load l_{sur} = **0** mm

Vertical distance x_{sur_v} = **1950** mm

Effective height of wall h_{eff} = **3850** mm

Horizontal distance x_{sur_h} = **1925** mm

Area of wall stem A_{stem} = **1.225** m^2 Vertical distance x_{stem} = **1775** mm

Area of wall base A_{base} = **0.683** m^2 Vertical distance x_{base} = **975** mm

Retained soil properties

Design moist density γ_{mr}' = **17.5** kN/m^3 Design saturated density γ_{sr}' = **20.8** kN/m^3

Base soil properties

Design soil density γ_b' = **17.5** kN/m^3

Soil coefficients

Coeff.friction to back of wall K_{fr} = **0.325**

Coeff.friction to front of wall K_{fb} = **0.325** Coeff.friction beneath base K_{fbb} = **0.325**

Active pressure coefficient K_A = **0.333** Passive pressure coefficient K_P = **4.977**

Bearing pressure check

Vertical forces on wall

Total $F_{total\_v} = F_{stem} + F_{base} + F_{P\_v} + F_{water\_v}$ = **141.2** kN/m

Horizontal forces on wall

Total $F_{total\_h} = F_{sur\_h} + F_{sat\_h} + F_{water\_h} + F_{moist\_h} + F_{pass\_h}$ = **75.3** kN/m

Moments on wall

Total $M_{total} = M_{stem} + M_{base} + M_{sur} + M_P + M_{sat} + M_{water} + M_{moist}$ = **139.7** kNm/m

Check bearing pressure

Propping force F_{prop_base} = **75.3** kN/m

Bearing pressure at toe q_{toe} = **69.2** kN/m^2 Bearing pressure at heel q_{heel} = **75.6** kN/m^2

Factor of safety FoS_{bp} = **1.323**

PASS - Allowable bearing pressure exceeds maximum applied bearing pressure

END

Appendix B – Basement Method Statement

CRØFT STRUCTURAL+ CIVIL

Basement Method Statement

Site: 146 Castelnau

London

SW13 9ET

Client: The Basement Design Studio

Michael J Wiseman

Suite 17, Maple Court

Grove Park, White Waltham

Berkshire. SL6 3LW

Report By	Sudeep Gurung Structural Engineer M.Sc. GMIStructE
Report Reviewed by	Concetta Cosenza Chartered Civil Engineer BEng, MSc, CEng, MICE

Rev	Date	Rev By	Comment
-	27-11-2024	SG	First Issue Draft
-1	17-12-2024	SG	Updated with SI information

CRØFT STRUCTURAL+ CIVIL

Contents

146 Castelnau

1. Preamble

1.1. This method statement provides an approach that will allow the basement design to be correctly considered during construction. The statement also contains proposals for the temporary support to be provided during the works. The Contractor is responsible for the works on site and the final temporary works methodology and design on this site and any adjacent sites.

1.2. This method statement has been written by a Chartered Engineer. The sequencing has been developed using guidance from ASUC (Association of Specialist Underpinning Contractors). Croft Structural Engineers are an Associate Member of ASUC.

1.3. This method has been produced to allow for improved costings and for inclusion in the Party Wall Award. Final site conditions need there to be flexibility in the method statement: Should the site staff require alterations to the Method statement this is allowed once an alternative methodology, of the changes is provided, and an Addendum to the Party Wall Award will be required.

1.4. Contact Party Wall Surveyors to inform them of any changes to this method statement.

1.5. On this development, the approach is: construct the underpin segments that will support the permanent steel work insert the new steelwork remove load from above and place it onto new supporting steelwork cast the remainder of the retaining walls that will form the perimeter of the basement.

1.6. On this project the retaining walls are required to be propped at both the top and bottom of the wall in the final case. During construction, in the temporary condition, the edge of the slab is buttressed against the soil in the middle of the property: Temporary props will be provided near the head and will provide support until the concrete has gained sufficient strength. Skin friction between the concrete base and the soil provides further resistance. In the temporary case, the main lateral support is provided by back propping to the central soil mass. The central soil mass is to be removed in 1/3 portions and cross propping subsequently added.

1.7. A site-specific ground investigation has been undertaken by Fastrack. The soil present is of sand and gravel.

1.8. The local geological drift sheets show the ground to be Kempton Park Gravel member (Sand and gravel) with underlaying London clay formation.

1.9. The bearing pressures have been limited to 100kN/m2. This is standard loading for the local ground conditions and acceptable to Building Control and their approvals

1.10. During soil investigation the water was struck at 4.7 m BGL.

1.11. The structural Waterproofer (not Croft) must comment on the proposed design and ensure that he is satisfied that the proposals will provide adequate waterproofing. When using drained cavities Lime reduction additives should be added to the concrete surface.

1.12. Provide engineers with concrete mix, supplier, delivery and placement methods two weeks prior to the first pour. Site mixing of concrete should not be employed apart from in small volumes (less than $1m^3$). The contractor must provide a method on how to achieve site mixing to the correct specification. The contractor must undertake toolbox talks with staff to ensure site quality is maintained, and cubes are to be taken for all hand mixed sections.

2. Enabling Works

2.1. The site is to be hoarded with ply board sheets, at least 2.2m high, to prevent unauthorised public access.

2.2. Licences for skips and conveyors should be posted on the hoarding.

2.3. Provide protection to public where conveyor extends over footpath. Depending on the requirements of the local authority, construct a plywood bulkhead over the pavement. Hoarding to have a plywood roof covering over the footpath, night-lights and safety notices.

2.3.1. Place a bore hole to the front of the property down to a depth of 6m.

2.3.2. No significant dewatering is expected. Localised removal of water may be required to deal with rain from perched water or localised water. This is to be dealt with by localised pumping. Typically achieved by a small sump pump in a bucket.

2.4. On commencement of construction, the contractor will determine the foundation type, width and depth. Any discrepancies will be reported to the structural engineer in order that the detailed design may be modified as necessary.

3. Basement Sequencing

3.1. Excavate lightwell to front of property down to 600mm below external ground level.

3.2. Excavate first front corner of lightwell. Follow suggested underpin sequence.(PL-30).

3.3. Excavate second front corner of lightwell.

3.4. Continue excavating section pins to form front lightwell.

3.5. Place cantilevered retaining wall to the left side of front opening. After 48 hours place cantilevered retaining wall to the right side of front opening.

3.6. Needle and prop front bay wall. Insert support.

Figure 1 Example of needling to existing wall/bay window

3.7. Excavate out first 1.2m around front opening, prop floor and erect conveyor.

3.8. Continue cantilevered wall formation around perimeter of basement following the numbering sequence on the drawings.

3.8.1. Excavation for the next numbered sequential sections of underpinning shall not commence until at least 8 hours after dry packing of previous works. Excavation of adjacent pin to not commence until 48 hours after dry packing. (24hours possible due to inclusion of Conbextra 100 cement accelerator to dry pack mix). No more than

3.8.2. Floor over to be propped as excavation progresses. Steelwork to support floor above to be inserted as works progress.

3.9. Excavate and cast column pad as work progresses. Install column and beam above supporting floor. Temporary props and timber to support floor above.

3.10. Needle and prop to internal walls and install steels as works progress.

3.11. Dry pack to steelwork. Ensure a minimum of 24 hours from casting cantilevered walls to dry-packing, Grout column bases

3.12. Excavate and cast floor slab.

3.12.1. Excavate 1/3 of the middle section of basement floor. As excavation proceeds, place Slim Shore props at a maximum of 2m c/c across the basement. Locate props at a third of the height of the wall.

3.12.2. For top propped and raising wall down. Fix top waler beams along head of wall. Excavate a 1/3 of the middle section of basement floor. As excavation proceeds place Slimhor props at a maximum of 2m c/c across the basement. Locate props at a 1m from the base of the wall and also to the waler beam at high level.

3.12.3. Continue excavating the next 1/3 and prop then repeat for the final 1/3.

3.12.4. Place below-slab drainage. Croft recommends that all drainage is encased in concrete below the slab and cast monolithically with the slab. Placing drainage on pea shingle below the slab allows greater penetration for water ingress.

3.12.5. Place reinforcement for basement slab.

3.12.6. Building Control Officer and Engineer are to be informed five working days before reinforcement is ready and invited for inspection.

3.12.7. Once inspected, pour concrete.

3.13. Provide structure to ground floor and water proofing to retaining walls as required. It is recommended to leave 3-4 weeks between completion of the basement and installing drained cavity. This period should be used to locate and fill any localised leakage of the basement

4. Approval

4.1. Building Control Officer/Approved Inspector to inspect pin bases and reinforcement prior to casting concrete.

4.2. Contractor to keep list of dates of pins inspected and cast.

4.3. If the Party Wall Surveyors included requirements of engineers in their award, then the party wall surveyors on completing the award must issue an unsigned copy of the award to Croft Structural Engineers.

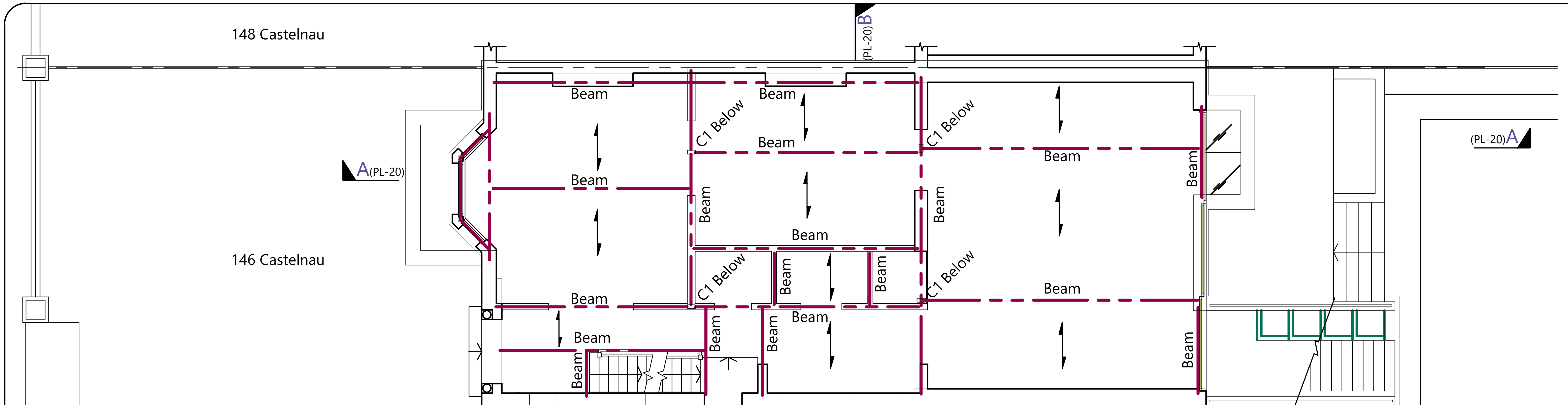
4.4. One month after the work is completed, the contractor is to contact Adjoining Party Wall Surveyor to attend site and complete final condition survey and to sign off works.

END

Appendix C – Structural Plans & Detail

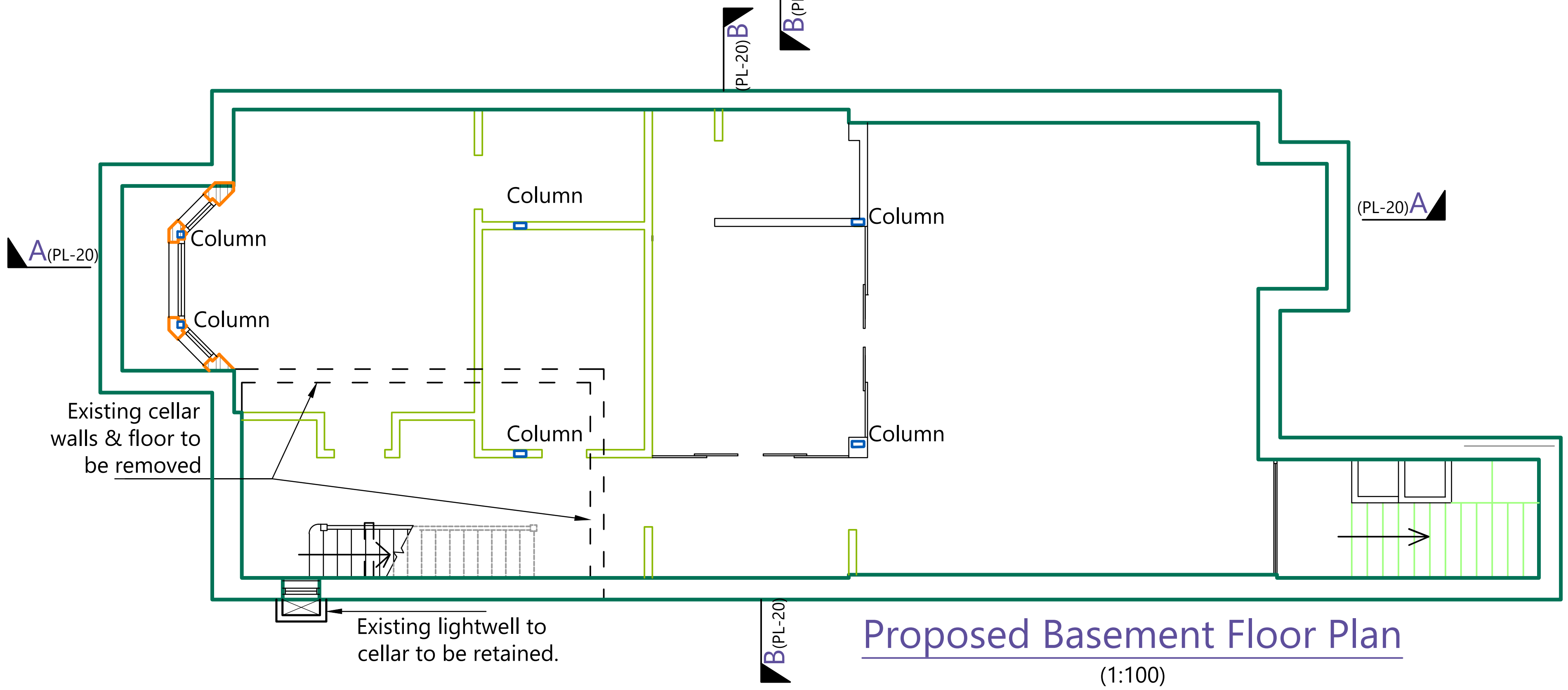
Structural Drawings Plans 1:100

Structural Sections 1:50



Proposed Ground Floor Plan

(1:100)



Proposed Basement Floor Plan

(1:100)

Rev	Date	by	Amendments
1	17-12-24	SG	**Basement floor plan altered slightly**
-	27-11-24	SG	**RIBA 2-For planning**

Job Number	Dwg Number
241104	PL-10
Scale	Rev
1:100 @A3	1
By	Approved by
SG	CC

The Basement Design Studio

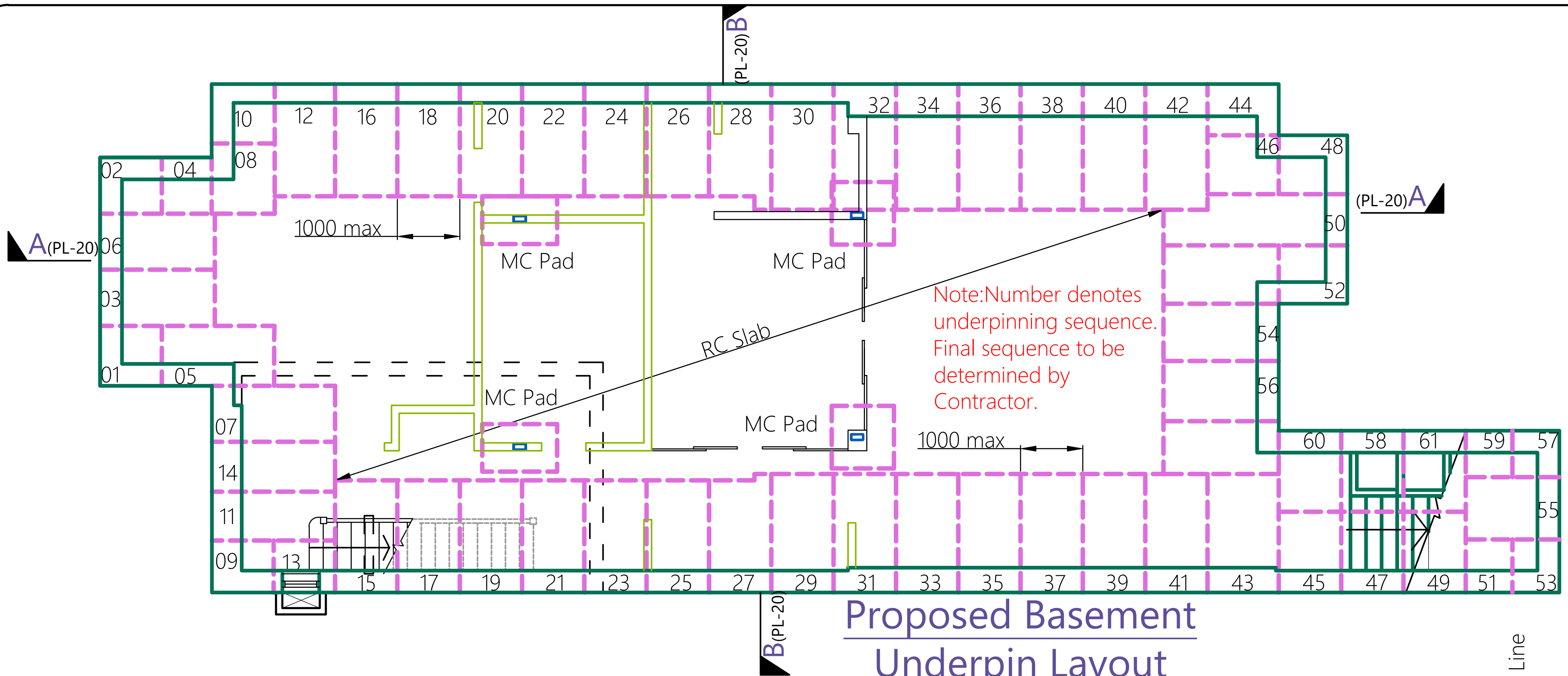
146 Castelnau, SW13 9ET

Proposed Basement & Ground Floor Plans

RIBA 2-For planning

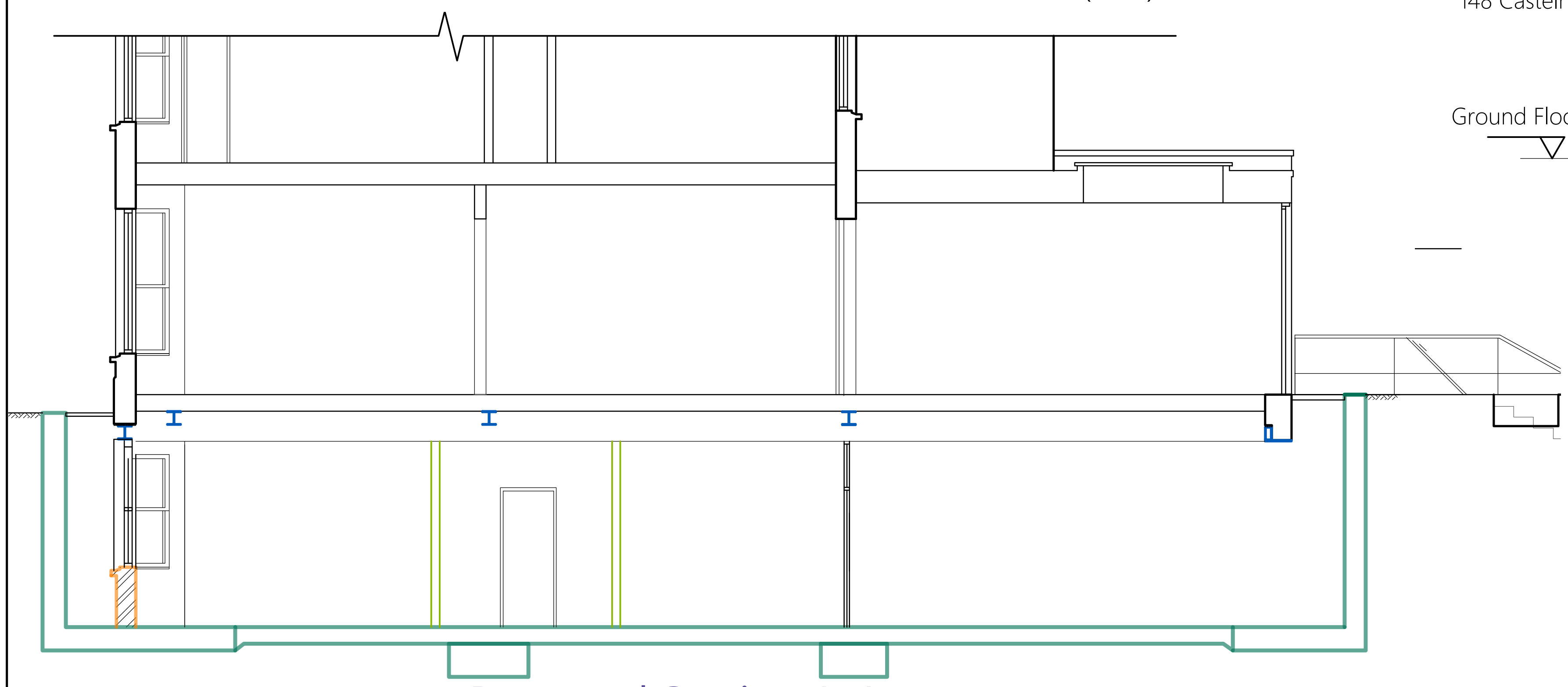
CRØFT STRUCTURAL+ CIVIL

r/o 60 Saxon Rd, London, SE25 5EH.
020 8684 4744
www.croftse.co.uk



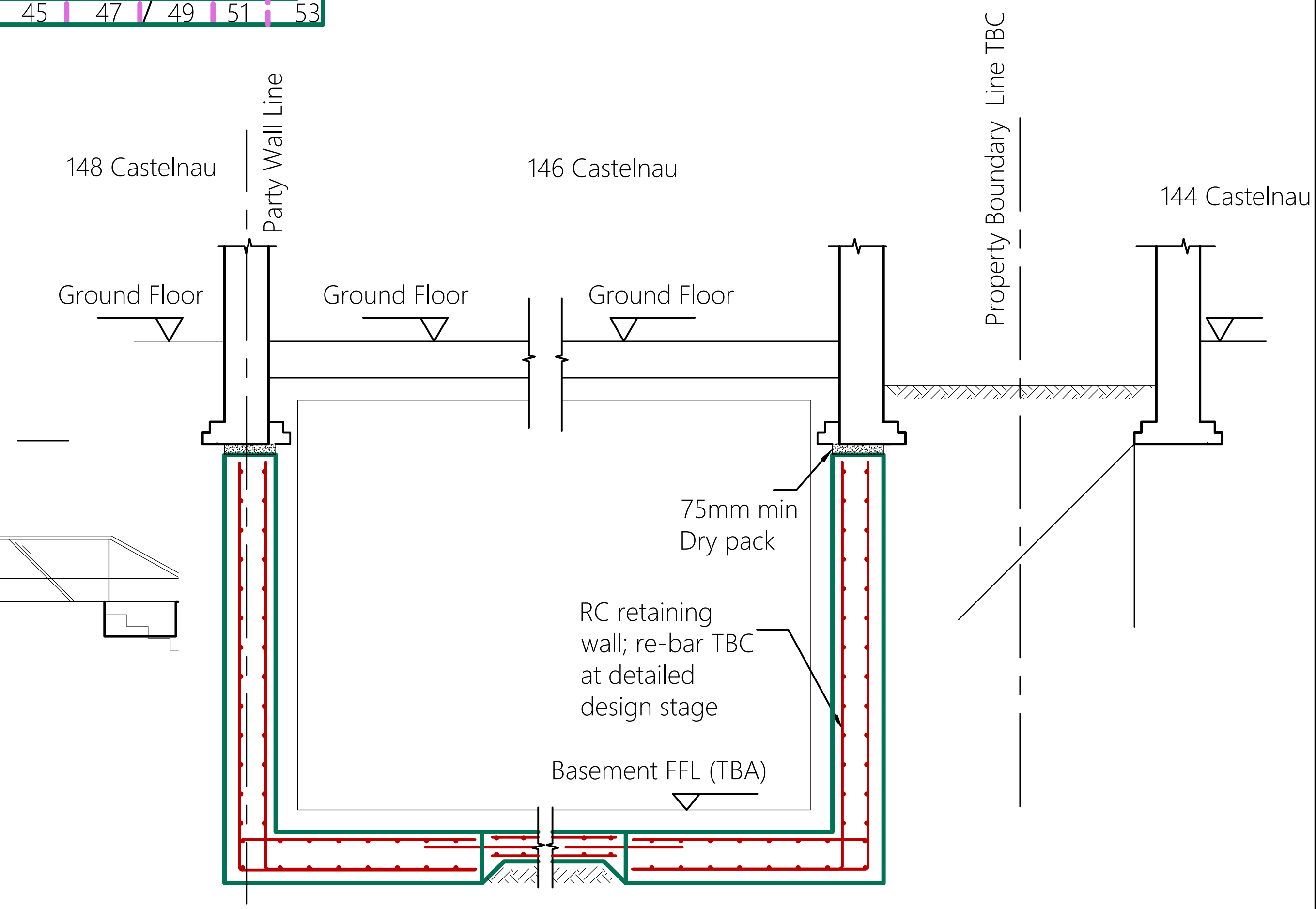
Proposed Basement Underpin Layout

(1:100)



Proposed Section A-A

(1:100)



Section B-B

Scale 1:50

Rev	Date	by	Amendments
1	17-12-24	SG	**Rear basement columns orientation changed**
-	27-11-24	SG	**RIBA 2-For planning**

Job Number	Dwg Number
241104	PL-20
Scale	Rev
1:100 @A3	1
By	Approved by
SG	CC

The Basement Design Studio

146 Castelnau, SW13 9ET

Proposed Basement Underpin Layout & Section Details

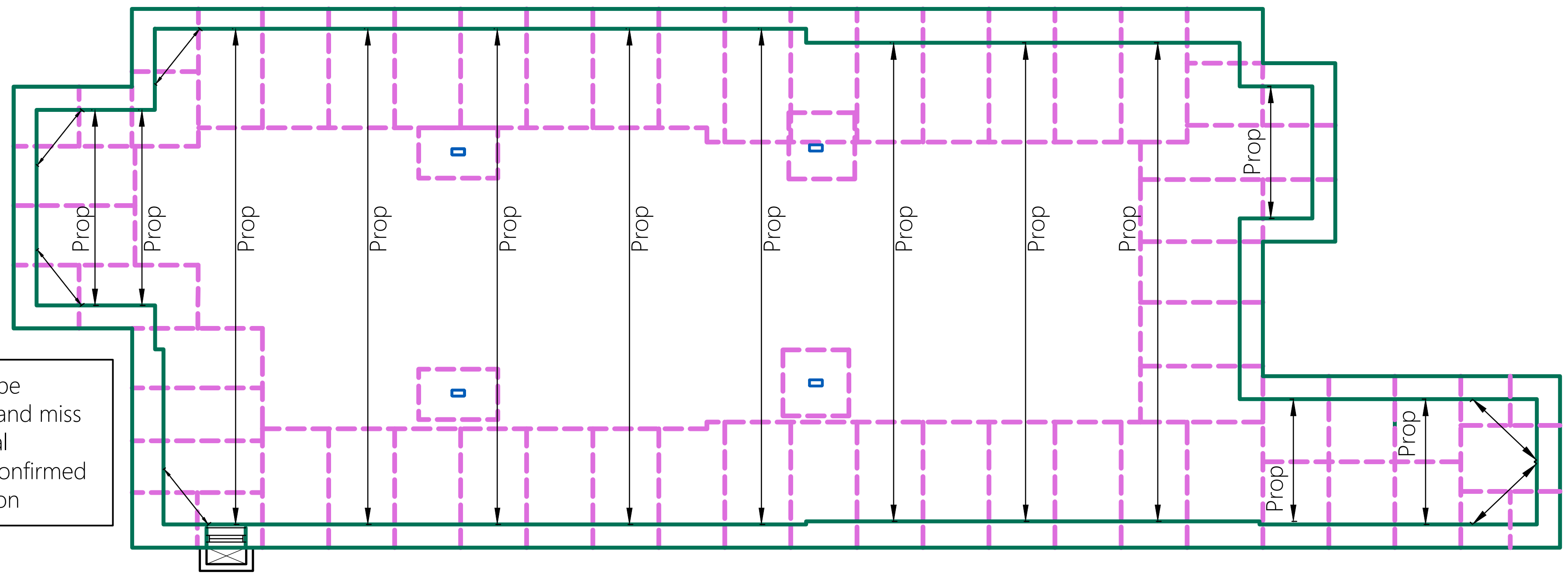
RIBA 2-For planning

CRØFT STRUCTURAL+ CIVIL

r/o 60 Saxon Rd, London, SE25 5EH.

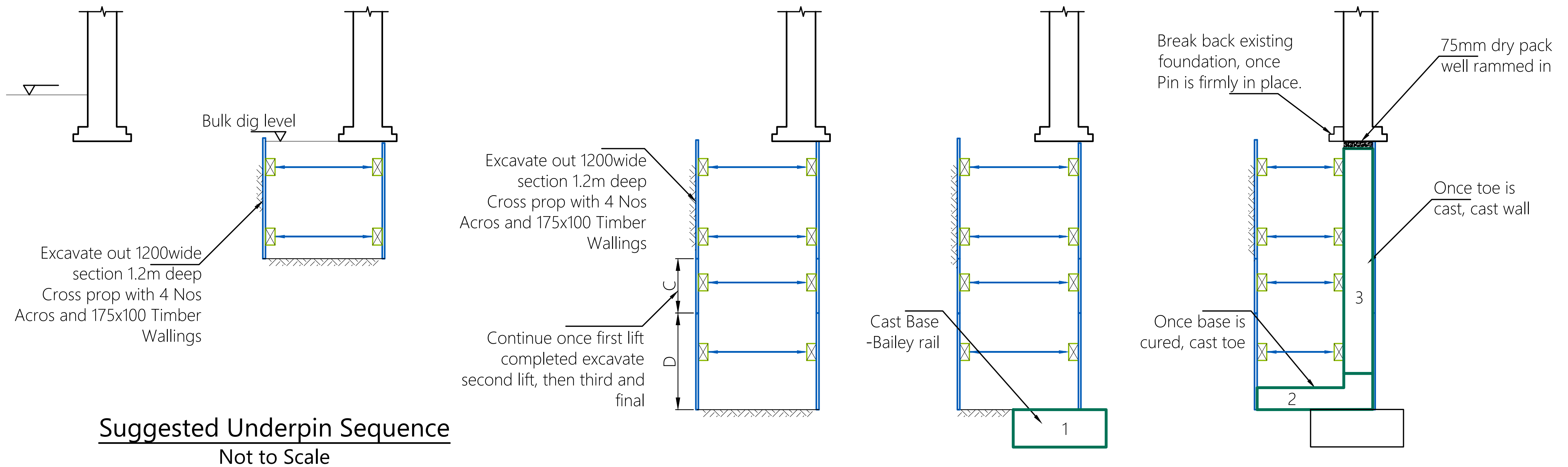
020 8684 4744
www.croftse.co.uk

Underpinning to be completed in hit and miss sequencing - Final sequence to be confirmed before construction



Proposed Basement Temporary Works Plan

(1:100)



Suggested Underpin Sequence

Not to Scale

Rev	Date	by	Amendments
1	17-12-24	SG	**Rear basement columns orientation changed**
-	27-11-24	SG	**RIBA 2-For planning**

Job Number	Dwg Number
241104	PL-30
Scale	**Rev**
1:100 @A3	1
By	**Approved by**
SG	CC

The Basement Design Studio

146 Castelnau, SW13 9ET

Temporary works plan and sequence

RIBA 2-For planning

CRØFT STRUCTURAL+ CIVIL

r/o 60 Saxon Rd, London, SE25 5EH.

020 8684 4744
www.croftse.co.uk

Appendix D – Soil investigation

Geotechnical Survey Report

FSI Ref:	28624
Issue Date:	December 2024
Risk Address:	146 Castelnau London SW13 9ET

Company:	The Basement Design Studio
Claim Ref:	N/A

Managing Director: Martin Rush MSc FGS
Finance Director: Louise Banks BSc (Hons)

Laboratory Manager: Jade McLellan

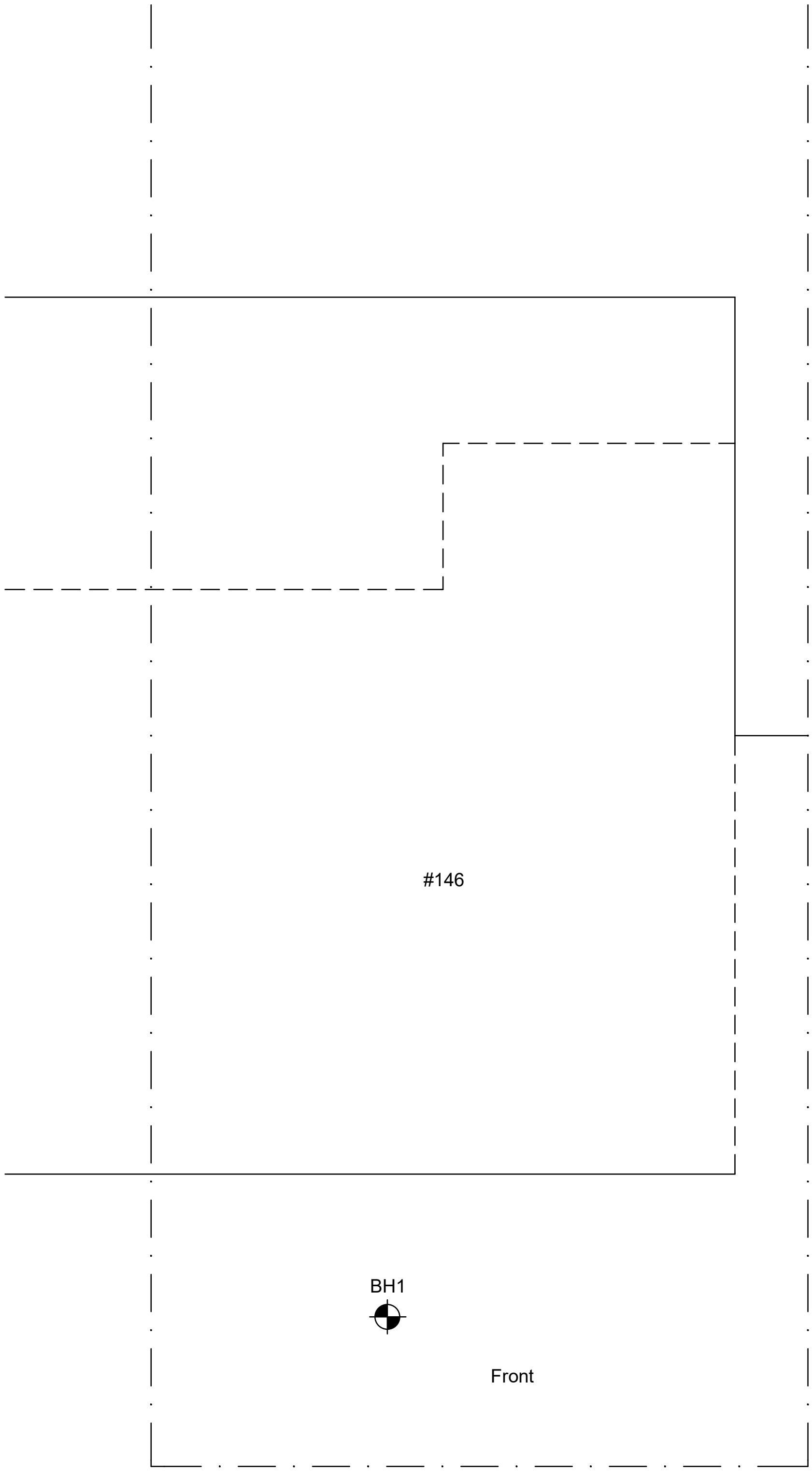
Senior Geologist: Thomas Lee BSc (Hons)
Assistant Geologist: Bradley Webb BSc (Hons)
Geotechnical Assistant: Sarah Brand

FASTRACK
197-199 High Street, Maldon, Essex CM9 5BU
Telephone: 01245223033
Email:enquiries@fastrackgroup.co.uk
Web: www.fastrackgroup.co.uk

Appendix No: 1
FSI Ref: 28624

SITE PLAN

Property Address: 146 Castelnau, London, SW13 9ET
Client Claim Ref: N/A
Survey date: 06/12/2024
Operative: SE1



Scale:	Drawn by:	Key:
NTS	SB	Trial Pit, Borehole, Manholes, Rain Water Pipe, Soil & Vent Pipe, Surface Water Gully, Foul Water Gully, Shrub, Tree (Conifer), Tree (Deciduous)

FASTRACK	Fastrack Site Investigations Ltd Unit 9, Tyndales Farm Southend Road Maldon CM9 6TQ	# Borehole Log	Borehole No. **BH1** Sheet 1 of 1
Project Name: N/A	Project No. 28624	Site Date: 06/12/2024	Hole Type BH
Location:	146 Castelnau, London, SW13 9ET		Scale 1:32
Client:	The Basement Design Studio		Logged By

Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Stratum Description
				0.05	STONE SHINGLE
				0.15	TYPE 1
					Dark brown silty sandy MADE GROUND containing brick stone
				0.70	Brown silty sandy CLAY containing gravel
	1.00	D	MP = 7/75mm MP = 7/75mm MP = 9/75mm MP = 10/75mm		
				1.80	Orange SAND & GRAVEL
	2.00	D	MP = 17/75m MP = 19/75mm MP = 19/75mm MP = 21/75mm		
	3.00	D	MP = 27/75mm MP = 30/75mm MP = 30/75mm MP = 31/75mm		
	4.00	D	MP = 31/75mm MP = 31/75mm MP = 33/75mm MP = 33/75mm		
▼					*Water strike noted at 4.70m*
	5.00	D	MP = 35/75mm MP = 37/75mm MP = 37/75mm MP = 37/75mm		
	6.00	D	MP = 39/75mm MP = 41/75mm MP = 41/75mm MP = 41/75mm	6.00	End of Borehole at 6.000m

Key: D - Disturbed Sample V - Insitu Vane Test MP - Mackintosh Probe Test

Remarks: Borehole closed at 6.00m.
Standing water noted at 4.70m below ground level on completion. Only 3.50m of standpipe in ground due to back fill. No roots found.

AGS