Job Number: 231013

Croft Structural Engineers
Clock Shop Mews
Rear of 60 Saxon Road
London SE25 5EH

Subterranean Basement Impact Assessment Statement

Site Details: 10 Winterbrook Road
SE24 9JA
London

Client's Details: Matt Jack Robinson and Ashley Rogers
10 Winterbrook Road
SE24

Report by	Sudeep Gurung MSc GMIStructE
Report Reviewed by	Pawel Rogalewicz MSc BEng
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	By	Comment
-	15-12-2023	SG	Draft Issue
1	18-01-2024	SG	Updated with SI Information
2	23-02-2024	SG	Basement and Ground floor changed. FRA & SUDS updated.

Contents

1. Executive Summary

The is BIA has been completed I line with the guidance of Southwark SPD for Dulwich.

In line with the SPD Section 5.7.2

The Key Elements of the report are;

- Desk Study
  - Inspection of Site and Adjacent Site
  - Geology
  - Hydrology
  - Impact upon buried archaeological remains.
  - Listed Buildings
  - Dulwich Estate
- Impact on the structural integrity of existing and neighbouring structures
- Harm to nearby trees from disturbance of the tree roots
- 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
- Increased flood risk from reduced drainage capacity. Initial Flood Risk, Drainage and SuDS completed by a Chartered Civil Engineer
- Potential flooding of basement premises
- Construction Sequence
- Temporary works
- Structural GA's and Sections
- Harm to the character of historic streetscapes & The Impact on the quality of life for neighbours has not been included within this report and is not within Croft's brief

We are recommending that a positive pumped system be used for basement drainage. For additional protection against flooding a one-way flow valve is required.

Should the proposal achieve planning 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. Desk Study

2.1. Proposed Works

The proposed work constitutes a new basement under the footprint of the property. This will be constructed in reinforced concrete retaining walls underpinning the existing external walls. A lightwell will be created at the front with a metal grill walkway over.

Croft Structural Engineers Ltd has extensive knowledge of the design and construction of new basements. Over the last 4 years we have completed over 150 basements in and around the local area. The method developed is:

1. Excavate front to allow for conveyor to be inserted.
2. Form 'front of basement' with cantilevered retaining walls
3. Slowly work from the front to the rear inserting 1000mm long cantilevered retaining walls sequentially.
4. Cast ground slab.
5. Waterproof internal space with a drained cavity system.

2.2. Age of Property & Site History

Age of Property

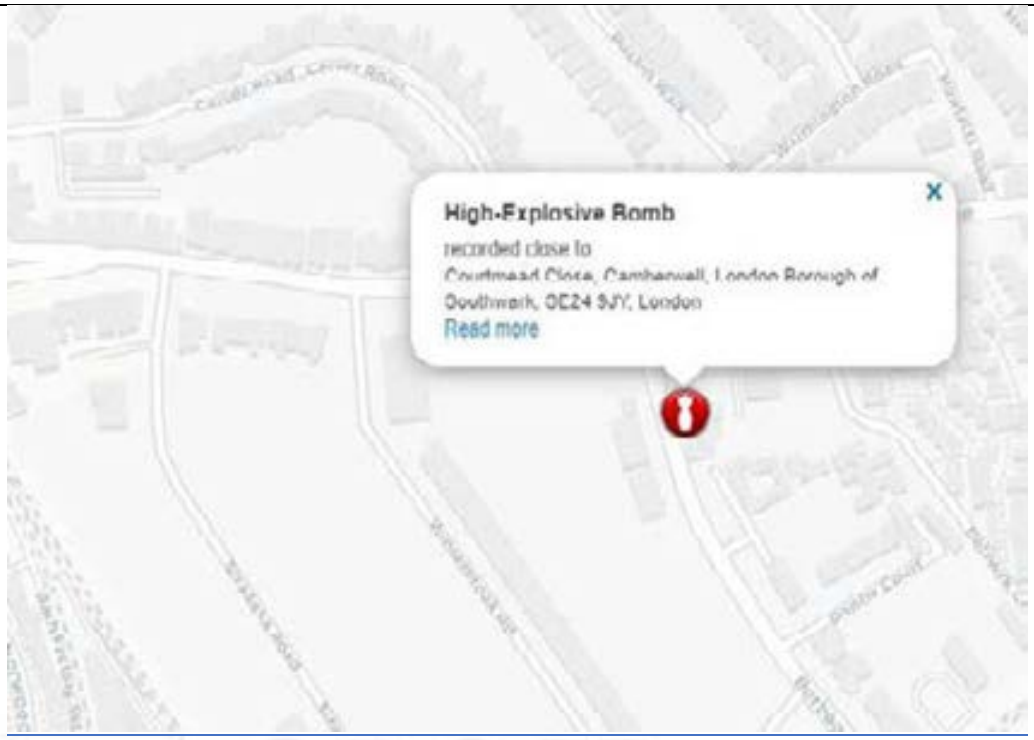
The 10 Winterbrook Rd is a typical semi-detached Victorian property.

Site History

What was the previous usage of the site?

It can be seen from 1913-1914 ordnance survey map that site has been used as residential for over 100 years.

Figure 1; 1913-1914 ordnance survey

Local Bombing	 From bomb site map, it can be seen thar the site has not been hit directly by a bomb. The closest registered hit was at Courtmead Close.
	## 2.3. Listed Buildings
	Is the building listed?  **Are the adjacent buildings listed?** Neither 10 Winterbrook Rd nor properties adjacent are listed.

2.4. Dulwich Estate and Conservation Areas

Is the property in the Dulwich Estate?

Yes, the property lies within Dulwich Estate.

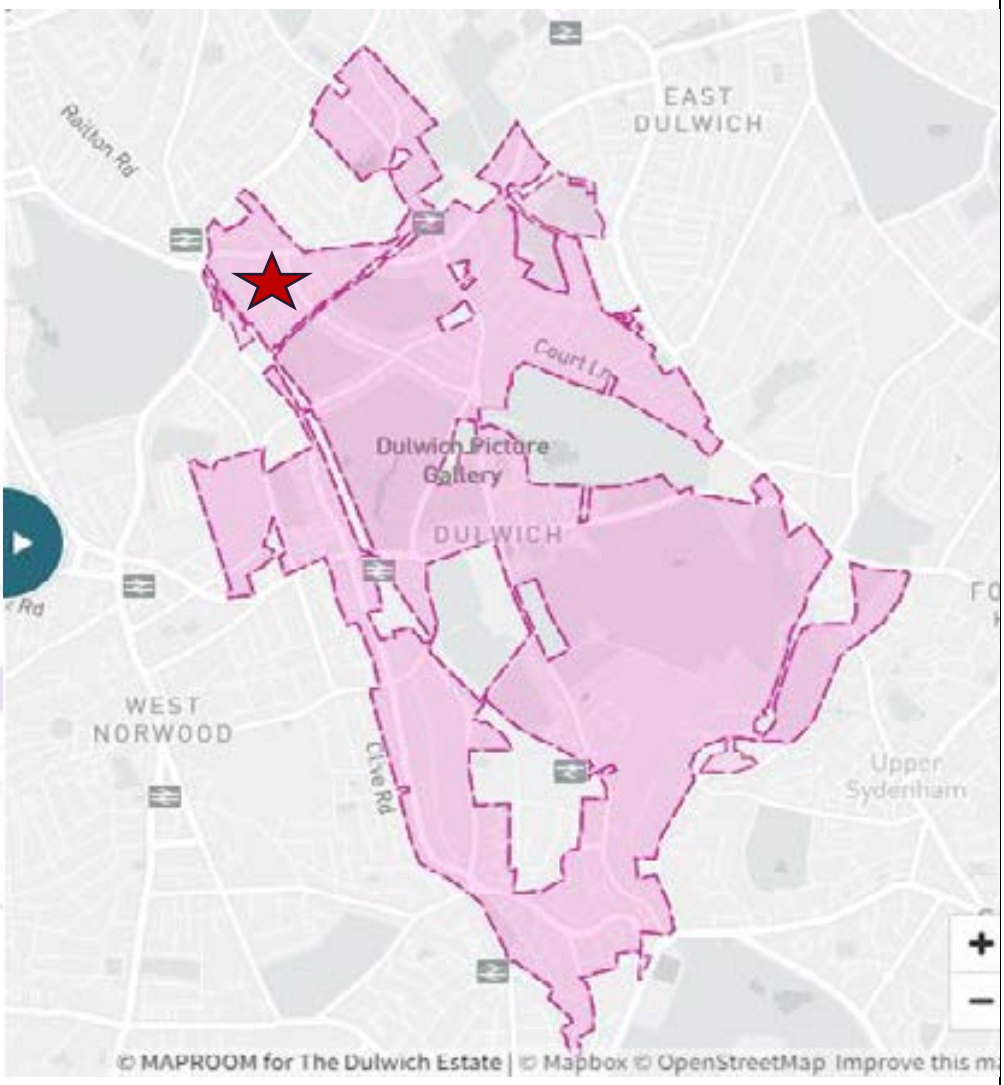


Figure 2: Dulwich Estate Boundary Map

Is the property in a conservation area?

Yes, the property lies within Stradella Road conservation area.

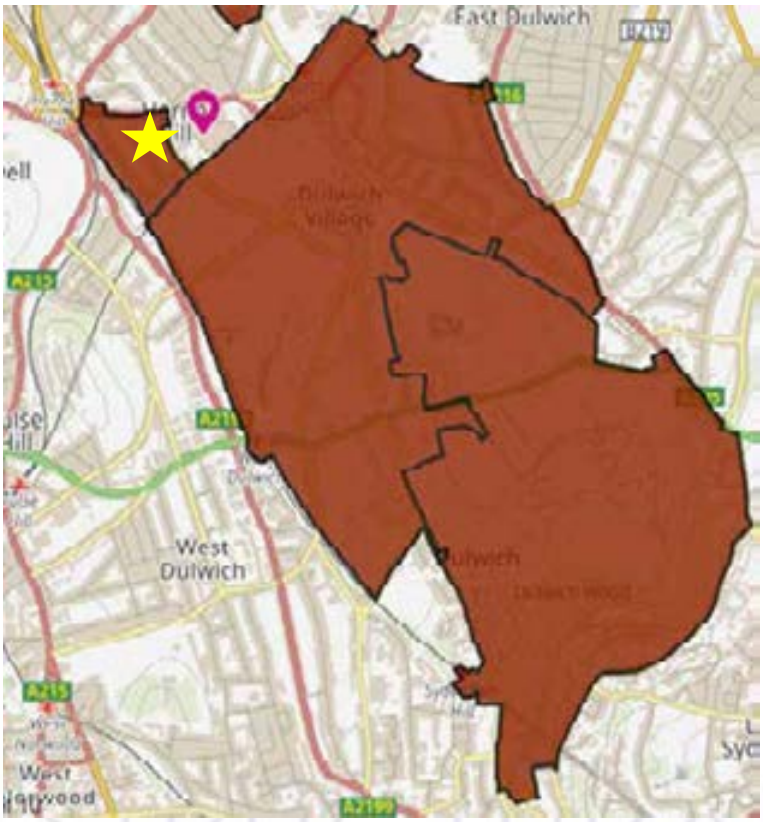


Figure 3: Dulwich Village Conservation Area map

Figure 4: Property Location indicated on Stradella Road Conservation Area map

	## 2.5. Heritage Assets The archaeological heritage of Southwark is amongst the richest in London and comprises remains of local, regional, national, and international importance that date from the pre-historic period to recent history, including seven Scheduled Ancient Monuments. The historic area of Dulwich Village is designated as an Archaeological Priority Zone (APZ). Planning applications affecting archaeological potential should be accompanied by an archaeological assessment and evaluation of the site. Development proposals will be required to preserve in situ, protect and safeguard scheduled ancient monuments and important archaeological remains and their settings, and where appropriate, provide for the permanent display and interpretation of the monument or remains. Is the basement within the Dulwich Village Archaeological Priority Zone? **No**. The proposed basement does not lie within The Dulwich Village Archaeological Priority Zone.
	## 2.6. Adjacent Properties
	The condition of the adjacent buildings has been inspected to consider whether the basement will significantly affect their structure. Visual inspections of the external facades have been undertaken of the properties.
Nos 8 – Property to Left	Property: 8 Winterbrook Road Age: Victorian. Property use: Residential. Number of storeys: 3 Is a basement present? No Structural Defects Noted: From outside visual inspection of property no structural defects were seen.
Nos 12 – Property to Right	Property: 12 Winterbrook Road Age: Victorian. Property use: Residential Number of storeys: 3 Is a basement present? No Structural Defects Noted: From outside visual inspection of property no structural defects were seen.

	2.7. Topography
Slope Stability	**Does the existing site include slopes, natural or manmade greater than 7° (approximately 1 in 8)?** **No.** Difference in height between the rear garden and front is less than 1 in 8 slope (approx. flat). There are no major falls within 20m which will increase the risk of land slip. **Will the proposed re profiling of landscaping at site change slopes at the property boundary to more than 7° (approximately 1in 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 in 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 in 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?** **Yes.** **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 1920's.
	2.8. Highways, Rail and London Underground
Highways	**Is the site within 5m of a highway or pedestrian footway?** **Yes.** Site is within 5m of the footpath/alleyway and the road surface is further than 5m from the front lightwell. <u>Highways loading allow:</u>

	10kN/m² if within 45° of road 100kN point loads if under road or with in 1.5m 5kN/m² if within 45° of Pavement Garden Surcharge 2.5kN/m² Surcharge for adjacent property 1.5kN/m² + 4kN/m² for concrete ground bearing slab
London Underground and Network Rail	**Is the site over (or within the exclusion zone) of any tunnels, e.g. railway lines?** **No.** Nearest is the Overground Rail line (Chatham Main Line), +/- 150m from site.  *Figure 5: Railway line nearby Site.*
UK Power Networks	Will the basement works affect any UK Power Network Assets? No, the proposed basement works won't affect any power network assets.
	2.9. Trees
Vicinity of Trees	There is a medium size tree(Magnolia species) at front of property. Some shrubbery and general vegetation trees are in the front of adjacent neighbour's garden(12 Winterbrook Road). A mature tree(Japanese Pagoda) is also present in the rear garden with Some shrubbery and general vegetation shrubs.

	Are any trees to be removed due to the basement? **No**. trees will not be removed for proposed new basement.
Special precautions due to Trees	The increased depth of foundations necessary for the basement places the new foundations outside the effects of trees. The building will be more stable due to the new basement. Please refer to Arboricultural Impact Assessment which will be attached separately.

3. Site Investigation, Existing foundations, and Ground Water

3.1. Desk Study Geology

The British Geological Survey drift sheet shows the superficial deposits of clay ,silt and gravel. And underlaying soil strata to be Lambeth Group formation(Clay, silt, and sand).

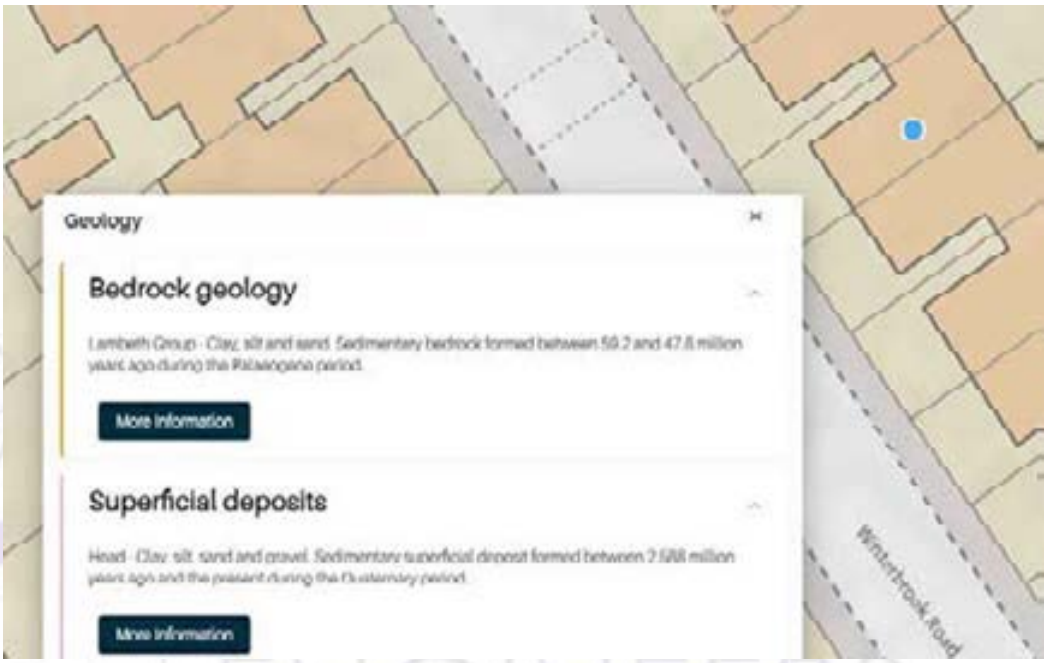


Figure 6: Extract from BGS map viewer.

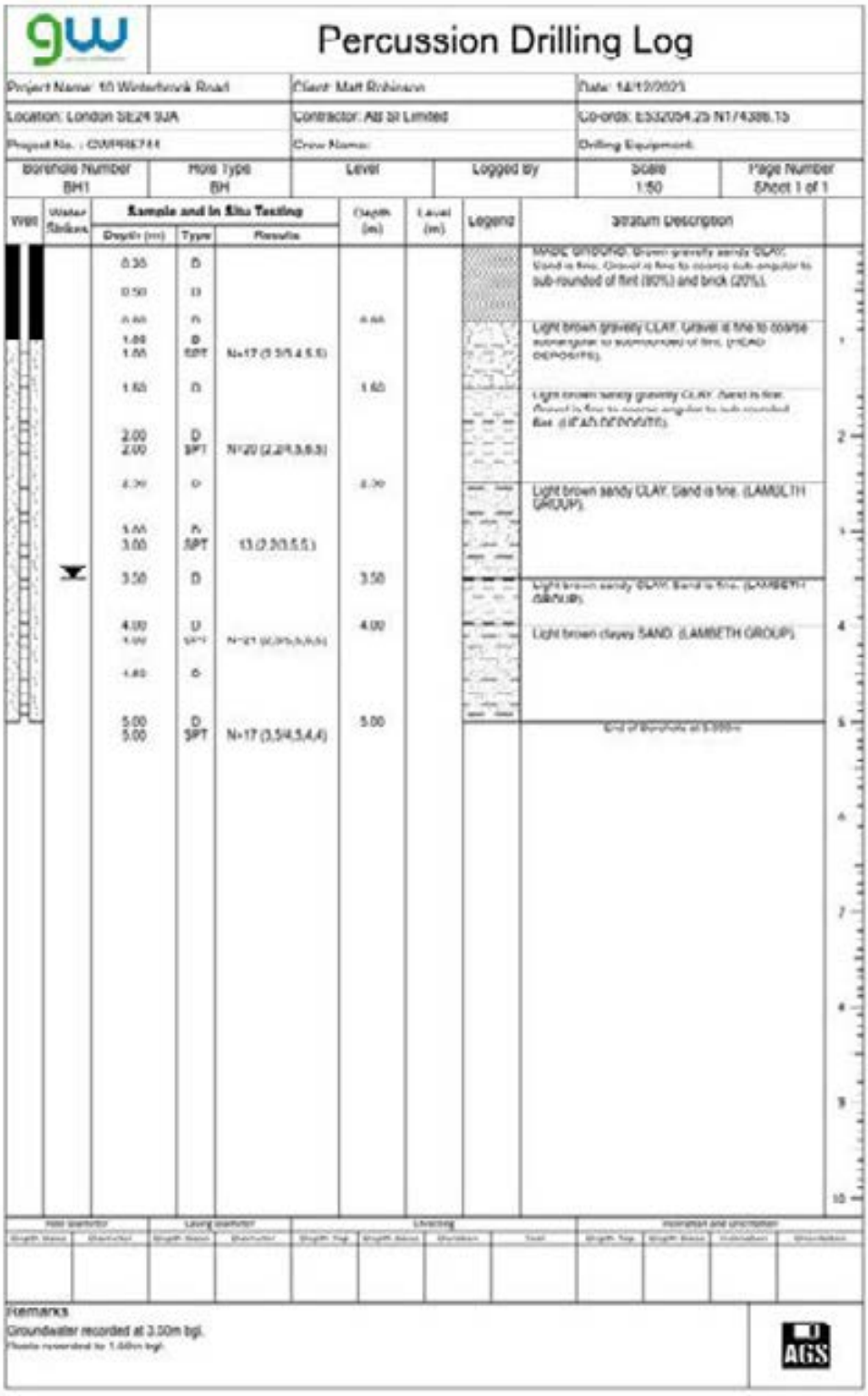
3.2. Summary of Site investigation

Has a Site soil investigation been carried out?

Yes.

Ground and Water undertook soil investigation works on site on 14th of December 2023 comprised of drilling 1 No cable percussion bore hole to depth of 5 m BGL at front of property and four no of trial pits two at front and two at rear. Detailed report from Ground and water is separately attached. Please refer to ground and water factual report (Appendix E-Ref:GW-2532) for detailed report.

Bore Hole results



Percussion Drilling Log

Project Name: 10 Winterbrook Road	Client: Matt Robinson		Date: 14/12/2021
Location: London SE24 9JA	Contractor: AG 3I Limited		Co-ords: E532094.23 N174388.13
Project No. : GWR8744	Crew Name:		Drilling Equipment:
Borehole Number: BH1	Hole Type: BH	Level	Logged by
Scale: 1:50	Page Number: Sheet 1 of 1		

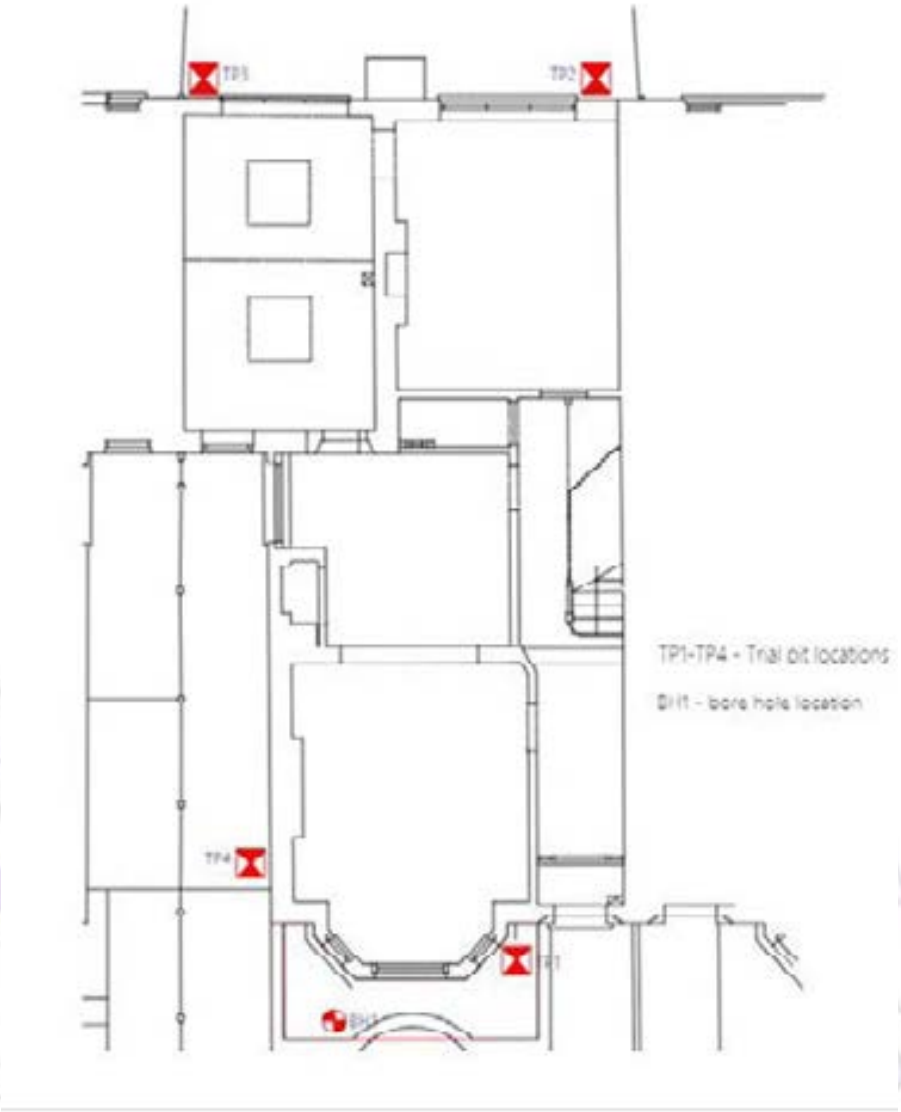
Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.35	D					MADE GROUND: Brown gravelly sandy CLAY. Sand is fine. Gravel is fine to coarse sub-angular to sub-rounded of flint (80%) and brick (20%).
		0.50	D					
		0.60	D		0.60			
		1.00	D					Light brown gravelly CLAY. Gravel is fine to coarse subangular to subrounded of flint. (HEAD DEPOSITS).
		1.00	SPT	N=17 (3,5/5,4,5,3)				
		1.60	D		1.60			
		2.00	D					Light brown sandy gravelly CLAY. Sand is fine. Gravel is fine to coarse angular to sub-rounded flint. (HEAD DEPOSITS).
		2.00	SPT	N=20 (2,2/5,5,6,6)				
		2.30	D		2.30			
		3.00	D					Light brown sandy CLAY. Sand is fine. (LAMBETH GROUP).
		3.00	SPT	13 (2,3/3,5,5,)				
		3.50	D		3.50			
		4.00	D		4.00			Light brown clayey SAND. (LAMBETH GROUP).
		4.00	SPT	N=21 (2,3/5,5,6,5)				
		4.40	D					
		5.00	D		5.00			End of Borehole at 5.00m
		5.00	SPT	N=17 (3,5/4,5,4,4)				

Hole Diameter | Casing Diameter | Chiselling | Remarks and Instrumentation

Remarks
Groundwater recorded at 3.00m bgl.
Flooded recorded to 1.60m bgl.

AGS

Figure 7:Site Specific Bore hole log.

Existing Foundations/ Trial Pit Results	Ground & Water Undertook trial pits on site two at front and two at rear.  Result from trial pits(1,2,3&4) shows made ground consisting of brown gravelly sandy clay.Please refer to Appendix E(Ref:GW-2532) for detailed results.
Conclusion	Trial pit result shows made ground (brown gravelly sandy clay).Bore hole record of site-specific soil investigation shows that existing soil condition is made ground (brown gravelly sandy clay) up to 0.8m BGL followed by light brown gravelly clay up to 2.5m BGL and light brown sandy clay (Lambeth Group) up to 5 m BGL at end of bore hole. Please refer to Appendix E(Ref:GW-2532) for detailed report.

Bearing Stresses	In line with CP111 Assumed bearing Design stress = 100 kN/m^2
Slope 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. For the retaining wall and angle of friction of Ø= 30° is used.

Groundwater flow

3.3. Ground Water Desk Study

Is the site located directly above an aquifer?

Yes, Site is located above secondary Aquifer. The site is underlain by Lambeth Group formation(Clay, silt, and sand)is the top layer and is not close to any boundaries. The Environment Agency maps show the site to lie above an aquifer: The site is located above the London Aquifer which is to be found at depth below the London clay at around 100m. Above the Clay a perch secondary aquifer is present

The site is not near boundary of soil interfaces. It is not considered that the new basement will cause new springs to appear.

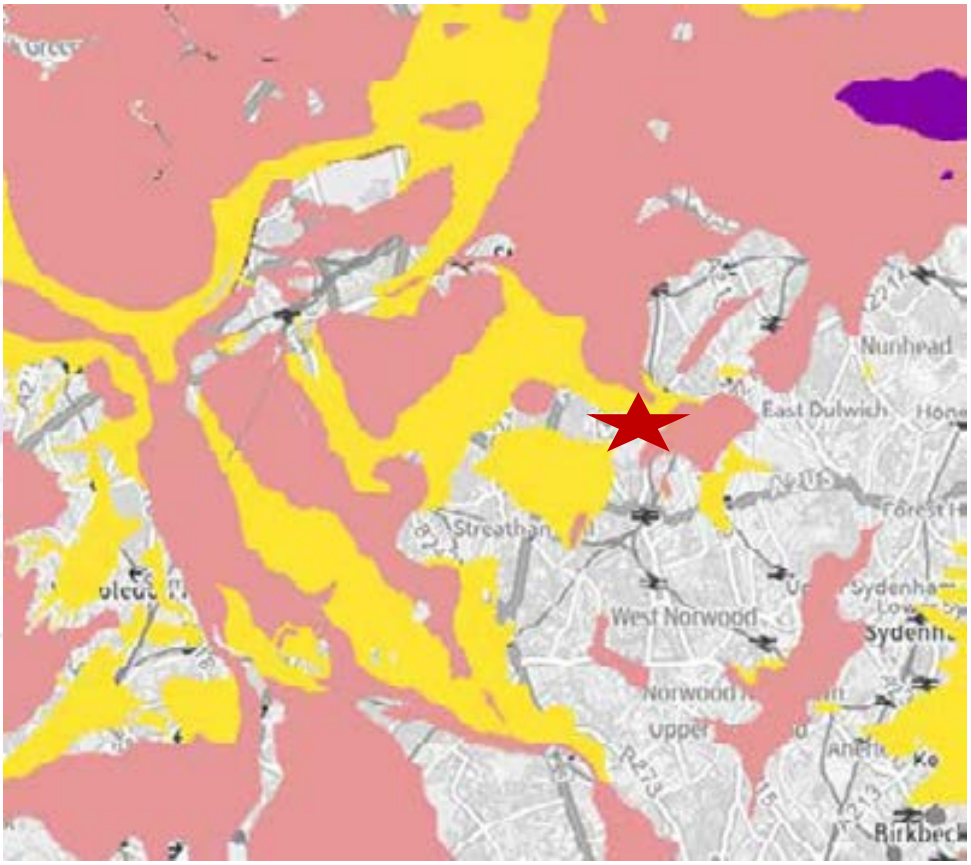


Figure 8: Extract from Environment agency map.

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

No. OS maps and local walkover survey show no wells, watercourses, or potential spring lines within 100m of the site.

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

	The Environment Agency map shows the site to lie above a secondary aquifer: The site is located above the London Aquifer which is to be found at depth below the London clay at around 100m. Above the Clay a perch secondary aquifer is present **Site Water Table –** A ground water strike was recorded at 3.5 m BGL in bore hole at front of property. No ground water was found during trial pits. Please refer to soil investigation report by Ground and water (Appendix E-GW-2532).
River & Water Course	
Flood Risk	
Fluvial Flood Risk	• **Is the Area in a Flood Risk Zone** No, from the flood map below it can be seen that the site is on flood zone 1 and is not in risk of flooding.  *Figure 9: Flood Risk map from Environment agency*

Surface Water	• **Is the Site noted on the Southwark CDA Street list for additional flood risk assessments?** Yes, the site lies within Critical Drainage Area of Southwark Borough.

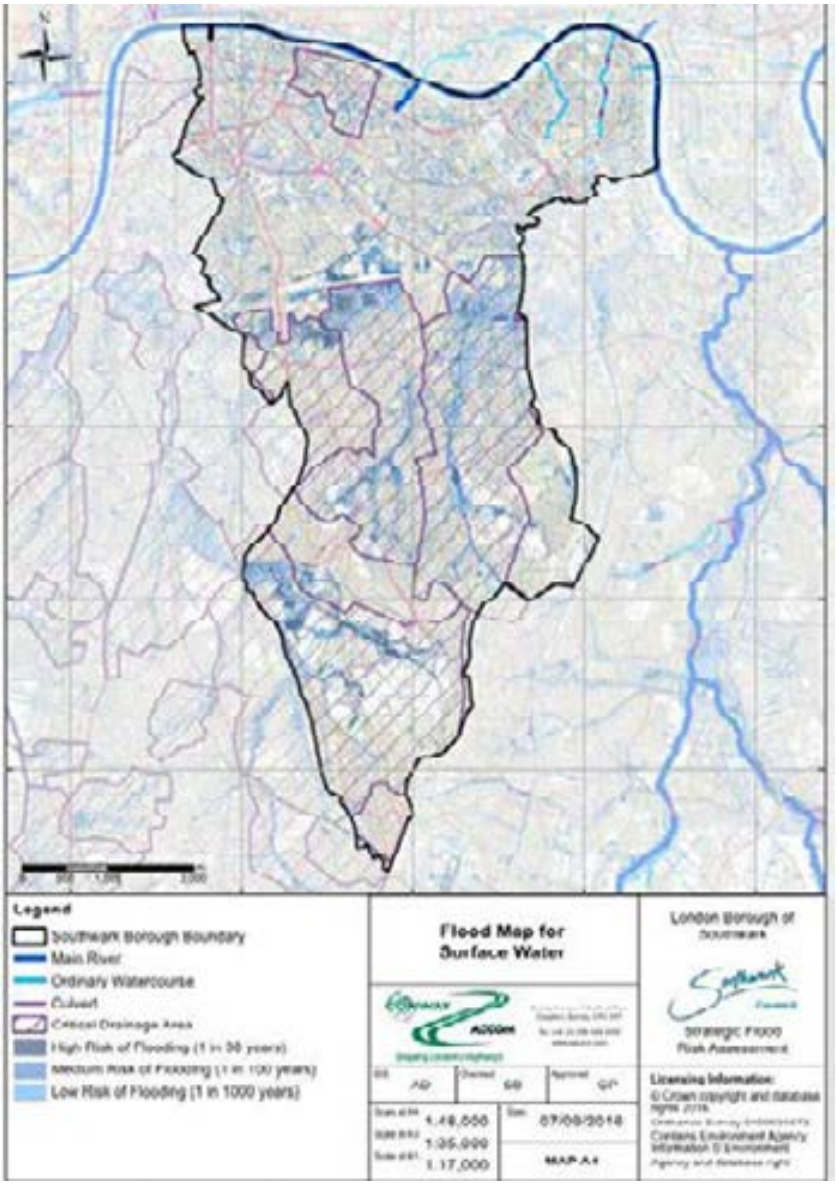


Figure 10: Flood map for surface water of Southwark Borough.

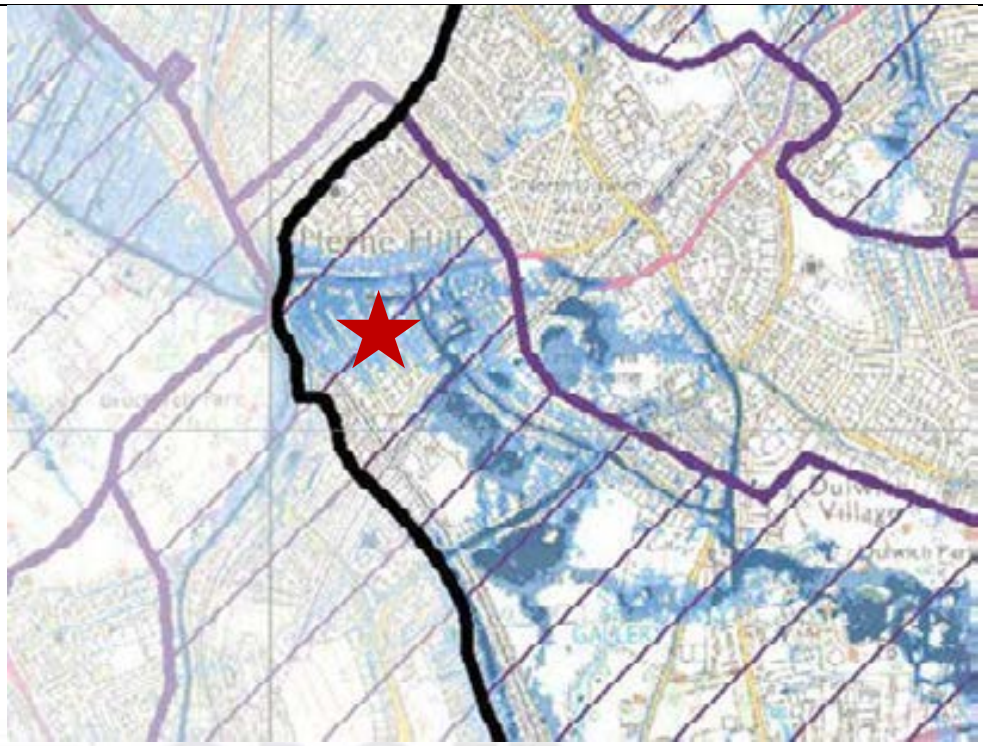


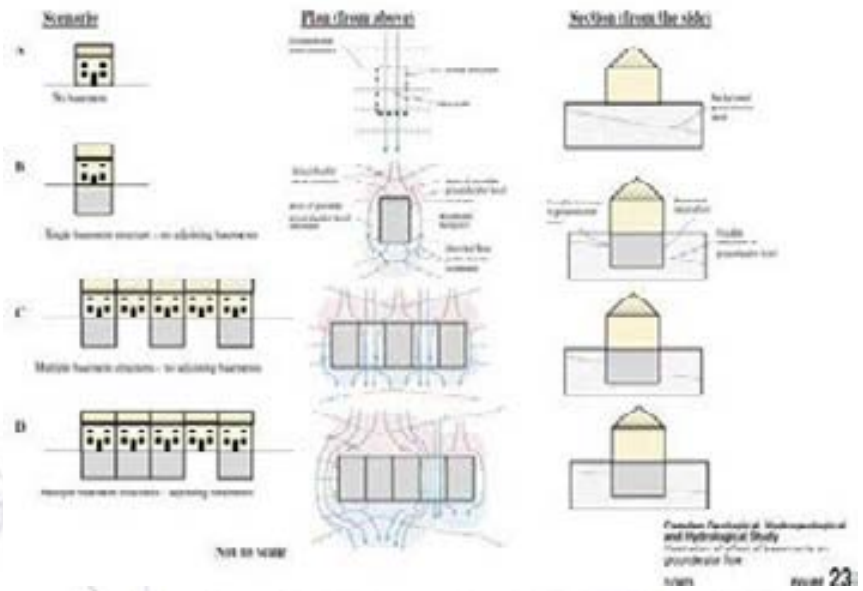
Figure 11: Indicative site location.

Ground water

- **Is the site in an area known to be at risk from surface water flooding?**

No.Separate checks have been made through the Environment Agency map ; this area is not susceptible to surface water flooding as shown below.

Figure 12:Extract from Environment agency map of surface water flooding.

	3.4. Ground Water Assessment
Ground Water and Cumulative Effects	If clays are encountered at depth, then a 150mm layer of compacted type I should be provided to prevent damming.  Figure 13 Extract from Arup report on ground water flow The reinforced retaining walls have been designed to withstand ground water flooding and there is no defence from surface flood if the Thames floods.
Surface Water & SuDS Desk Study	• **As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route?** **No**. The rainwater run-off will still percolate into the ground. • **Will the proposed basement development result in a change to the hard surfaced /paved external areas?** **Yes.** The amount of hard standing will slightly change. • **Will the proposed basement result in changes to the inflows (instantaneous and long term of surface water being received by adjacent properties or downstream watercourses?** **No**. The proposed development will enter the current drainage system.

	• **Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?** **No**. The quality of water is unlikely to be altered; the route it uses to reach the adjacent land will be altered. Water collected in proposed development will enter the current drainage system. **As part of the site drainage will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground?** **No.** Existing roof drainage will run into the existing drainage system. Surface water will still discharge to ground.
Surface Water Proposals & SuDS Proposals	The proposed basement will be under the existing footprint of the building and increase in hard surface due to proposed basement, front lightwell and staircase from basement to rear garden wall. The groundwater has been assumed to be at full height of the retaining walls which have been designed for localized failure (Burst Mains etc) Place a 150mm deep drainage layer across the site to prevent damming. Provide a 150mm deep by 1200mm wide Type (i) wrapped in terram below one line of pins across the width of the property. This proposal is considered to be in an area at risk of flooding. Flood risk assessment will be provided separately. The flow of surface water (above the basement) will need to be considered. A 150mm high protrusion of the wall from the lightwell will minimise the risk of localized flooding though the lightwell.
Control of water in basement	It is not intended for water to enter the basement. However, should water enter it will need to be removed. To accommodate this into the scheme the following will be incorporated; • Sump pump required with positive pressure pumping. • Dual pumps with automatic float values. • Battery backup for 24 hours to allow for continuous working if power supply fails. If external drainage is low and gravity drainage is possible then any drainage must incorporate one way flow values.

Drainage and Damp proofing	Details are not provided within planning brief. Our recommendation is that drained cavity systems are used to habitable basements with pumped sumps. This is a specialist contractor design item. Concrete is not designed BS 8007. But where possible BS 8007 detailing is observed to help limit crack widths of concrete.

Desk Study Flood Risk Assessment	
Table 1: Basement Development and Different Sources of Flooding	
River and Tidal (Fluvial) Flooding	**Flood Risk Assessment Required**
Flood Risk Zone 3	Yes
Flood Risk Zone 2	Yes
Flood Risk Zone 1	No

	Is a Flood Risk Assessment needed? **Yes.** Although proposed site lies in Flood Risk Zone 1 it lies in in Critical Drainage area (CDA) of Southwark Borough. As stated in London Borough of Southwark Strategic Flood Risk Assessment (SFRA) adopted in March 2017 site specific Floor Risk Assessment needs to be submitted.

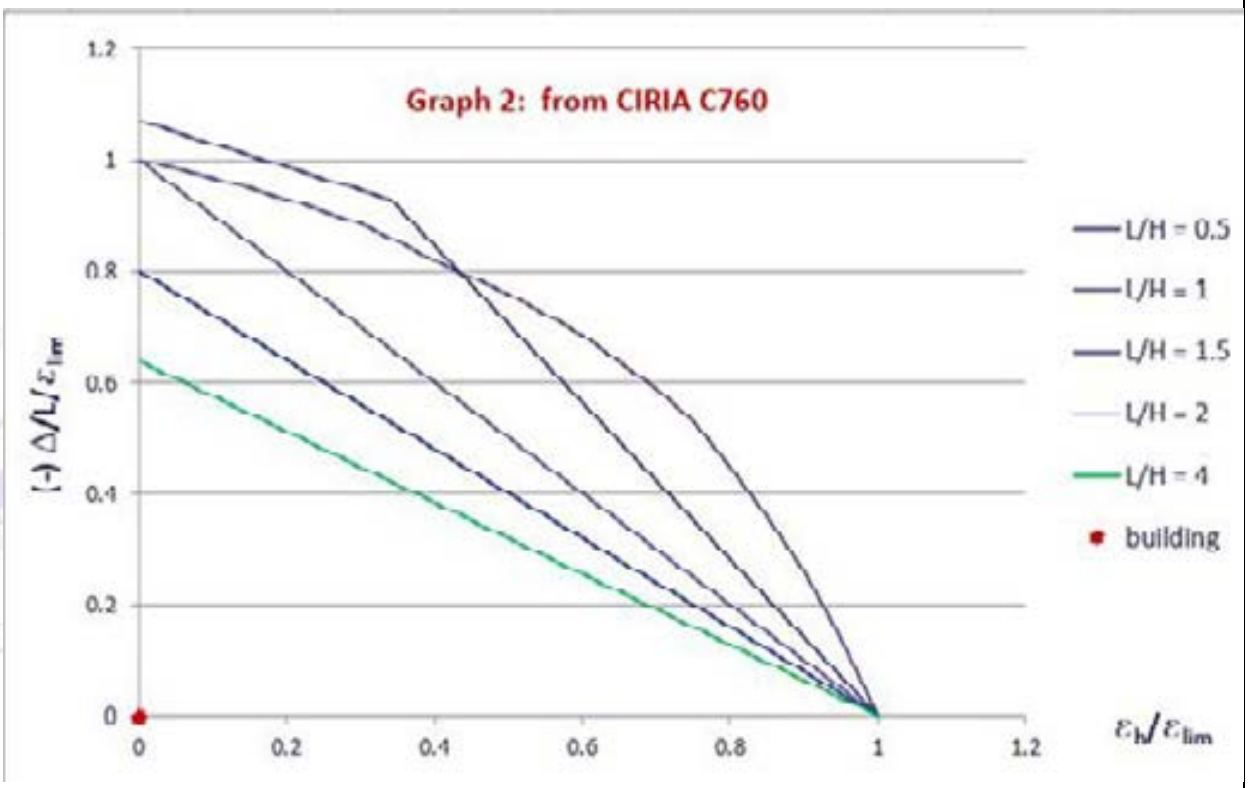
Flood Risk Assessment	
	Site specific Floor risk assessment (FRA) provided separately. Please refer to Appendix C for flood risk assessment

SUDS Assessment and Calculations	
	Please Refer to appendix C for SUDS design and calculations.

4. Ground Movement Assessment & Predicted Damage Category

This assessment covers both short term and long-term movements relating to the construction and the performance of the permanent works. The design and construction methodology aims to limit damage to the existing building on the site and to all adjoining buildings to Category 1 as set out in Table 2.5 of CIRIA report C 760 .

This assessment has used empirical means as set out in CIRIA C760 Embedded Retaining Walls: Guidance for Economic Design.



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Movement of closest neighbouring property (No 8 Winterbrook Road)

This is a conservative approach for movement assumming the values in CIRIA C760

Neighbouring building

Neighbours Building width, L = 6500 mm

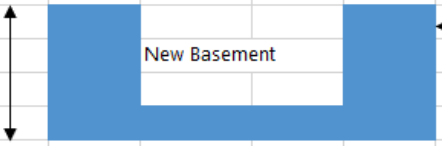
Distance to furthest point of building from excavation & installation, L_1 = 9400 mm

Neighbours building Height H= 9600 mm

L/H = 0.68

L2= 3200 mm

Excav'n depth H_b= 3.3 m



analysis depth, D = 3.3 m

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

From CIRIA C760

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

Potential movement due to excavation of wall

using parameters from CIRIA C760

(high stiffness: excavation will be propped during construction)

Horizontal Surface Movement / excavation depth = -0.15%

max d_h = -0.15% x 3300 = -4.95 mm

Distance behind wall to negligible movement (multiple of excav'n depth) = 4

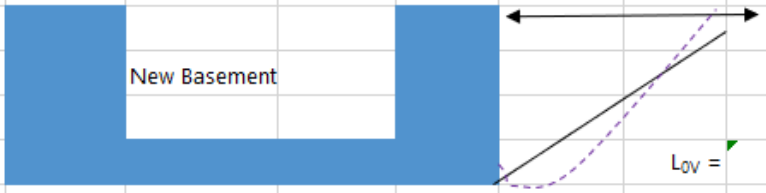
L_{0H} = 3300 x 4 = 13200 mm

Vertical Surface Movements

Distance behind wall to negligible movement (multiple of excav'n depth = 3.5

L_{0V} = 3300 x 3.5 = 11550 mm

L_{0H} = 13200 mm



L_{0V} = 11550 mm

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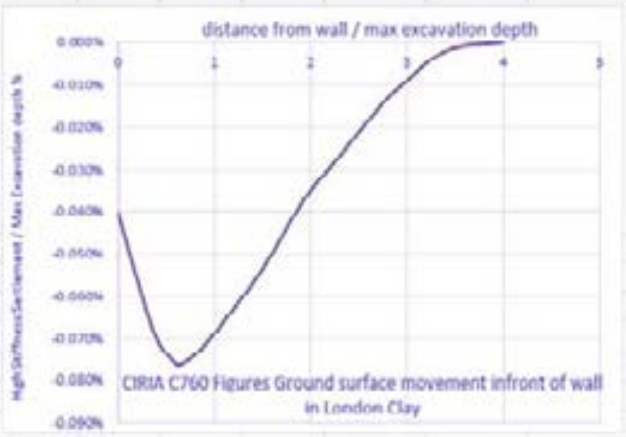
C760 Tables

distance from wall / max excavation depth (x / D)	settlement / max excavation depth (%) [from Fig 2.11b]	Distance From Excavation	horizontal (d_h) in mm	vertical (d_v) in mm
0	-0.040%	0	-4.95	-1.3
0.2	-0.056%	660	-4.7025	-1.8
0.4	-0.070%	1320	-4.455	-2.3
0.6	-0.076%	1980	-4.2075	-2.5
0.637	-0.076%	2102.1	-4.16171	-2.5
0.8	-0.074%	2640	-3.96	-2.4
1	-0.069%	3300	-3.7125	-2.3
1.1	-0.066%	3630	-3.58875	-2.2
1.4	-0.057%	4620	-3.2175	-1.9
1.6	-0.050%	5280	-2.97	-1.7
1.7	-0.046%	5610	-2.84625	-1.5
1.8	-0.042%	5940	-2.7225	-1.4
2	-0.035%	6600	-2.475	-1.2
2.3	-0.027%	7590	-2.10375	-0.9
2.4	-0.024%	7920	-1.98	-0.8
2.8	-0.013%	9240	-1.485	-0.4
2.9	-0.011%	9570	-1.36125	-0.4
3.4	-0.002%	11220	-0.7425	-0.1
4	0.000%	13200	0	0.0

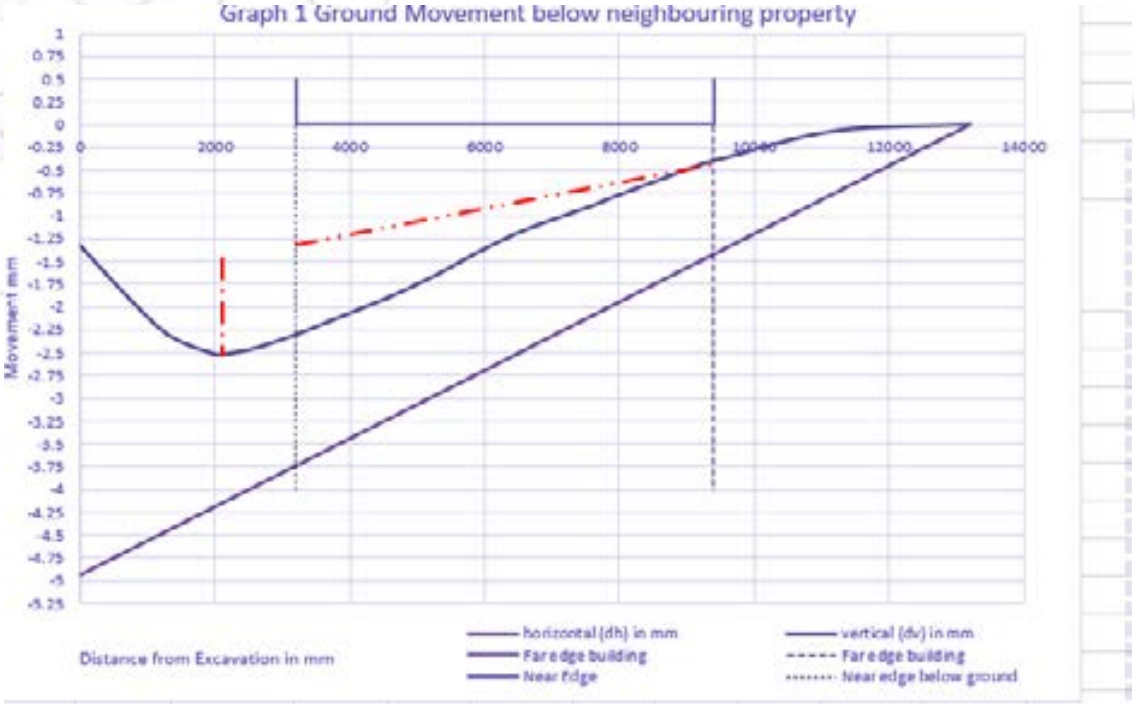


	Vertical Movement		Horizontal Movement	
	Diagonal line			
3200	-1.3 mm		3200	-5.0 mm
9400	-0.429 mm		9400	-1.485 mm

Distance	d_v		Horizontal Movement	
3100	-2.442	Iteration values	3100	-3.96
9400	-0.429		9400	-1.485

Building movement at max d_v (top of vertical red line)

At 2102 = -1.478 mm



Total differential movement

from Graph 1,

Horizontal movement at L2 =	-4.95		
Horizontal movement at L1 =	-1.485		
Total Horizontal Movement	d_h =	3.5	mm
Total Vertical Movement	**D =**	**1.5**	**mm**

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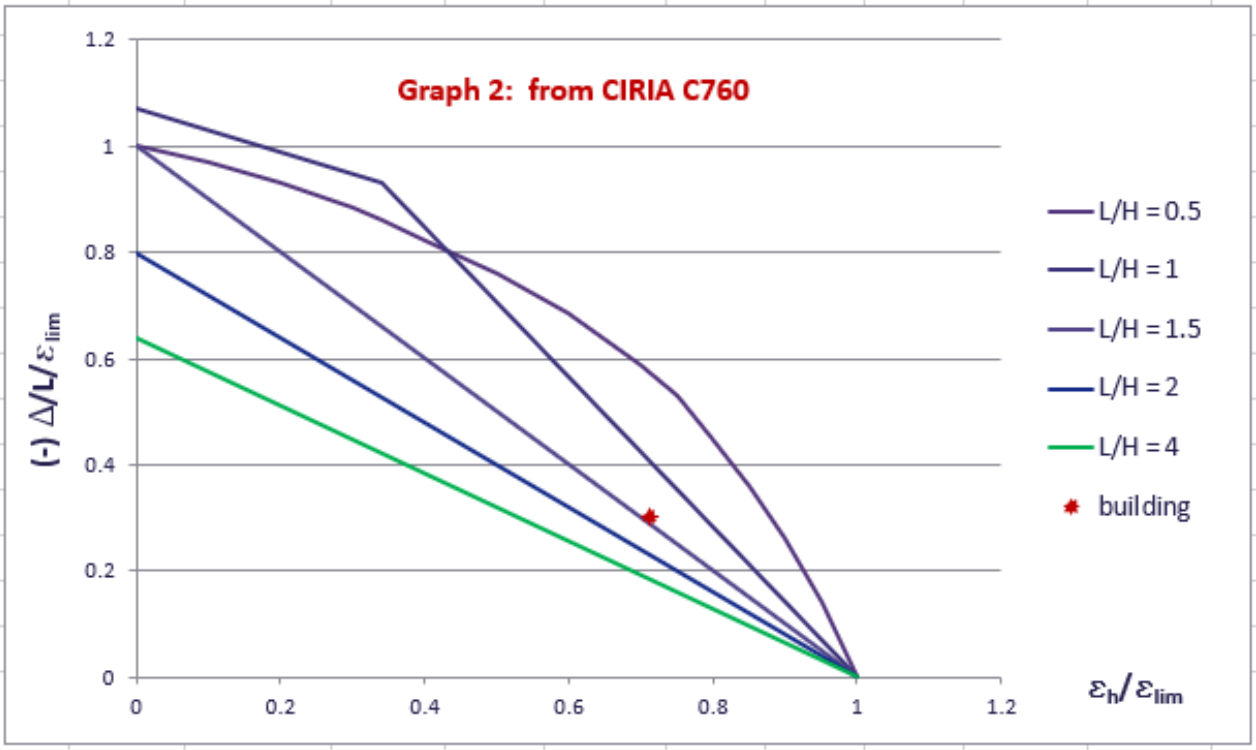
TOTAL STRAIN (EXCAVATION AND INSTALLATION) From CIRIA C760 tables Below

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 - 2 (separate sheet)
e_h	=	0.053%	e_h/e_{lim}	=	0.71	
D/L	=	0.023%	$D/L/e_{lim}$	=	0.30	



Building is below appropriate L/H Line therefore is within acceptable limits to C760 excavation limits

L/H = 0.67708 Dot sites below line

	Any ground works pose an elevated risk to adjacent properties. The proposed works undermines the adjacent property along the party wall line: The party wall is to be underpinned. Underpinning the party wall will remove the risk of the movement to the adjacent property. The works must be carried out in accordance with the party wall act and condition surveys will be necessary at the beginning and end of the works. The method statement provided at the end of this report has been formulated with our experience of over 120 basements completed without error. The design of the retaining walls is completed to K_O lateral design stress values. This increases the design stresses on the concrete retaining walls and limits the overall deflection of the retaining wall. It is not expected that any cracking will occurring during the works. However, our experience informs us that there is a risk of movement to the neighbours. To reduce the risk the development: • Employ a reputable firm for extensive knowledge of basement works. • Employ suitably qualified consultants. Croft Structural engineer has completed over 120 basements in the last 4 years. • Design the underpins to be stable without the need for elaborate temporary propping or needing the floor slab to be present. • Provide method statements for the contractors to follow. • Investigate the ground, now completed.

- Record and monitor the external properties. This is completed by a condition survey on under the Party Wall Act before and after the works are completed. See end of method statement.

- Allow for unforeseen ground conditions: Loose ground is always a concern. The method statement and drawings show the use of precast lintels to areas of soft ground; this follows the guidance by the underpinning association.

With the above the maximum level of cracking anticipated is Hairline cracking which can be repaired with decorative cracking and can be repaired with decorative repairs. Under the party wall Act damage is allowed (although unwanted) 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.

Burland Scale

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

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.**

The anticipated damage Category for the new basement is 1

5. Engineer Works

Structural Summary

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.

Existing building is a Victorian Semi-detached with load bearing external walls. Building shares party wall with 12 Winterbrook Road and boundary with 8 Winterbrook Road. Load-bearing masonry cross wall with stud partitions on the ground floor. Stud walls on floor above.

Proposed new basement will be constructed within the existing footprint of the building.

Intended use of structure and user requirements

Family/domestic use

Loading (BS 6399-1)

	UDL kN/m²	Concentrated Loads kN
Domestic Single Dwellings	1.5	1.4

Is Live Load Reduction included in design — No

Progressive Collapse

Number of Storeys — 3

Is the Building Multi Occupancy? — No

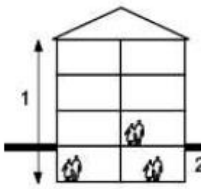
Part A3 Progressive collapse

EN 1991-1-7:1996 Table A1

Class 1	Single occupancy houses not exceeding 4 storeys.

Progressive collapse Change of use

To NHBC guidance compliance is only required to other floors if a material change of use occurs to the property.

	Initial Building Class: 1 Proposed Building Class: 1 If class has changed material change has occurred: No  3 storey over basement
Additional Design Requirements to Comply with Progressive Collapse	Class1 – Design to satisfy EN 1990 to EN 1999 stability requirements.

	Lateral Stability
Exposure and wind loading conditions	0.6 kN/m^2

Stability Design	The existing masonry walls which carry the stability of the house are not being altered. The reinforced concrete retaining walls are designed to carry the lateral loading applied from above. The lateral earth pressure exerts a horizontal force on the retaining walls. They will be checked for resistance to overturning this produces.
Lateral Actions	Lateral Forces applied from; Soil loads Hydrostatic pressure Surcharge loading. These produce retaining wall thrust; this is restrained by the opposing retaining wall.
Retained soil Parameters	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.
Roads and Adjacent Loads	Check for <u>Highways loading allow:</u> 10kN/m² if within 45° of road 100kN point loads if under road or with in 1.5m 5kN/m² if within 45° of Pavement Garden Surcharge 2.5kN/m² Surcharge for adjacent property 1.5kN/m² + 4kN/m² for concrete ground bearing slab

CE Marking of construction products	All products used in construction must have CE marking to demonstrate compliance where either a harmonized European standard or European Technical Assessment (ETA) is in force. 1. Consequence Class

Table B.1 – Definition of Consequence Classes

Consequence Class	Description	Examples
CC3	**High** consequence for loss of human life **or** economic, social or environmental consequences **very great**	Grandstands, public buildings where consequences of failure are high(e.g. a concert hall)
CC2	**Medium** consequence for loss of human life; economic, social or environmental consequences **considerable**	Residential and office buildings, public buildings where consequences of failure are medium

CC1	**Low** consequence for loss of human life **and** economic, social or environmental consequences **small or negligible**	Agricultural buildings where people do not normally enter (e.g. storage buildings), greenhouses

2. Service Category

Table B.1 – Suggested Criteria for Service Categories	
Categories	Criteria
SC1	• Buildings and components designed for quasi static actions only • Structures and components with their connections designed for seismic actions in regions with low seismic activity and in DCL • Structures and components designed for fatigue actions from cranes (class S_0).
SC2	• Structures and components designed for fatigue actions according to BS EN 1993; structures susceptible to vibrations caused by wind, crowd or rotating machinery • Structures and components with their connections designed for seismic actions in regions with medium or high seismic activity and in DCM and DCH.

3. Production Category

Table B.2 – Suggested Criteria for Service Categories	
Categories	Criteria
PC1	• Non welded components manufactured from any steel grade products. • Welded components manufactured from steel grade products below S355
PC2	• Welded components manufactured from steel grade products from S355 and above. • Components essential for structural integrity that are assembled by welding on construction site. • Components with hot forming manufacturing or receiving thermic treatment during manufacturing. • Components of CHS lattice girders requiring end profile cuts

4. Production Category

Table B.3 – Recommended Matrix for Determination of Execution Classes							
Consequence classes		CC1		CC2		CC3	
Service categories		SC1	SC2	SC1	SC2	SC1	SC2
Production Categories	PC1	EXC1	EXC2	EXC2	EXC3	EXC3/EXC4	EXC3/EXC4
	PC2	EXC2	EXC2	EXC2	EXC3	EXC3/EXC4	EXC4

Execution Class 2 (EXC2) will be appropriate for majority of building constructed in the UK. If execution class is not specified on a project EXC2 applies.

	## Basement Design
	Our design considers a risk managed approach. With over 450 basements completed we have moved away from solely relying on soil testing of 2-3 discrete points as providing a reasonable description of the ground. Our design now considers what we assume to be the worst-case ground that the building will encounter. Our design now has a risk managed approach considering the worst cases that may be found. This report is for planning purposes only and is not for construction: 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 member Calculations for retaining wall design and basement uplift check.
Water Table	Has a soil investigation been carried out Yes. Known water table from boreholes. During bore hole drilling water was encountered at 3.5 m BGL.
Drainage and Damp proofing	Details are not provided within our brief. It is recommended that a water proofing specialist is employed to ensure all the water proofing requirements are met. Croft structural engineers are not the waterproofing designer nor act as the structural waterproof designer. Croft are not the structural Waterproofer. The waterproofing specialist must name who is their structural Waterproofer. The Structural Waterproofer must inspect the structural details and confirm that are happy with the robustness. Due to the construction nature of the segmental basement, it is not possible to waterproof the joints. All water proofing must be made by the waterproofing specialist. They should make review of our details and recommend to us if water bars and stops are necessary. The waterproof design must not assume that the structure is watertight. To help reduce water floor through joints in the segmental pins all faces should be; • Cleaned of all debris and detritus

	• Faces between pins should be needle hammered to improve key • All pipe work and other penetrations should have puddle flanges or hydrophilic strips.
Localised Dewatering	Localised dewater to pins may be necessary. Some engineers may raise the theoretical questions about pumping of water causing localised settlement. We believe that this argument is a red herring when applied to single storey basements and our reason for stating this is: • The water table in the area is variable, • The water level naturally rises and falls over time and does not lead to subsidence. • The water table has naturally been rising and falling for over the last 20,000 years, any fines that will have been removed from the soil would have done so already. • If the water table rises and falls naturally why does this not cause subsidence due to fine removals every year? It does not because the soil has been soil is naturally consolidated by the rise and fall of the water table in the area. • The effect of local pumping for small excavations will not affect the local area. • There is only a risk of subsidence from large scale pumping of soil which lowers the water table below is natural lowest level.

	Temporary Works 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 Croft Structural Engineers. Particular attention should be paid to the point loads from above. Critical areas where point loads are present from above: Cross wall Chimney Stacks

5.1. Structural Design Calculations

Wall-1 (Party Wall Design)

Loadings

Existing masonry wall (DL)(325mm & 225mm) ×4.3m=**46.700**kN/m	DLm=7kN/m^2 ×3.6m+5kN/m^2
Floor (GF, FF & SF)DL	DLfloor=0.7kN/m^2 ×5.8m/2*6=**12.180**kN/m
Roof (DL)	DLroof=1.1kN/m^2 ×5.8m/2*2=**6.380**kN/m
Total DL	DL=DLm+DLfloor+DLroof=**65.260**kN/m
Floor (GF, FF & SF)LL	LLfloor=1.5kN/m^2 ×5.8m/2*6=**26.100**kN/m
Roof (LL)	LLroof=0.6kN/m^2 ×5.8m/2*2=**3.480**kN/m
Total LL	LL=LLfloor+LLroof=**29.580**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 2.9.22

Analysis summary

Design summary

Overall design utilisation 0.978

Overall design status Pass

Description	Unit	Capacity	Applied	F o S	Result
Overturning stability	kNm/m	223.5	86.3	2.591	PASS
Bearing pressure	kN/m^2	125	122.3	1.022	PASS

Design summary

Description	Unit	Provided	Required	Utilisation	Result
Shear resistance	kN/m	150.8	113.1	0.750	PASS
Base bottom face - Flexural reinforcement	mm^2/m	1340.4	509.0	0.380	PASS
Base - Shear resistance	kN/m	150.8	113.1	0.750	PASS
Min. transverse stem reinf.	mm^2/m	392.7	350.0	0.891	PASS
Min. transverse base reinf.	mm^2/m	392.7	268.1	0.683	PASS

Retaining wall details

Stem type Cantilever

Stem height h_{stem} = **3100** 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} = **2000** mm		
Base thickness	t_{base} = **350** mm		
Base density	γ_{base} = **25** kN/m^3		
Height of retained soil	h_{ret} = **3100** mm	Angle of soil surface	β = **0** deg
Depth of cover	d_{cover} = **0** mm		
Height of water	h_{water} = **2100** mm		
Water density	γ_w = **9.8** kN/m^3		

Retained soil properties

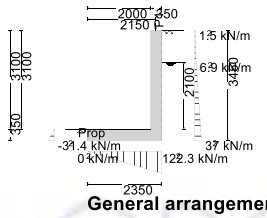
Soil type	Firm silty clay
Moist density	γ_{mr} = **18** kN/m^3
Saturated density	γ_{sr} = **18** kN/m^3

Base soil properties

Soil type	Firm silty clay
Soil density	γ_b = **18** kN/m^3
Presumed bearing capacity	$P_{bearing}$ = **125** kN/m^2

Loading details

Variable surcharge load	$Surcharge_Q$ = **5** kN/m^2		
Vertical line load at 2150 mm		P_{G1} = **65.3** kN/m	
	P_{Q1} = **29.6** kN/m		



General arrangement - sketch pressures relate to bearing check

Calculate retaining wall geometry

Base length	l_{base} = **2350** mm		
Saturated soil height	h_{sat} = **2100** mm		
Moist soil height	h_{moist} = **1000** mm		
Length of surcharge load	l_{sur} = **0** mm		
Vertical distance	x_{sur_v} = **2350** mm		
Effective height of wall	h_{eff} = **3450** mm		
Horizontal distance	x_{sur_h} = **1725** mm		
Area of wall stem	A_{stem} = **1.085** m^2	Vertical distance	x_{stem} = **2175** mm
Area of wall base	A_{base} = **0.823** m^2	Vertical distance	x_{base} = **1175** mm

Retained soil properties

Design moist density	γ_{mr}' = **18** kN/m^3	Design saturated density	γ_{sr}' = **18** kN/m^3

Base soil properties

Design soil density	γ_b' = **18** 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 = **0.301**	Passive pressure coefficient	K_P = **4.977**

Bearing pressure check

Vertical forces on wall

Total $F_{total\_v} = F_{stem} + F_{base} + F_{P\_v} + F_{water\_v}$ = **142.5** kN/m

Horizontal forces on wall

Total $F_{total\_h} = F_{sur\_h} + F_{sat\_h} + F_{water\_h} + F_{moist\_h} + F_{pass\_h}$ = **52.6** kN/m

Moments on wall

Total $M_{total} = M_{stem} + M_{base} + M_{sur} + M_P + M_{sat} + M_{water} + M_{moist}$ = **224.2** kNm/m

Check bearing pressure

Propping force	F_{prop_base} = **52.6** kN/m		
Bearing pressure at toe	q_{toe} = **0** kN/m^2	Bearing pressure at heel	q_{heel} = **122.3** kN/m^2
Factor of safety	FoS_{bp} = **1.022**		

PASS - Allowable bearing pressure exceeds maximum applied bearing pressure

RETAINING WALL DESIGN

In accordance with EN1992-1-1:2004 incorporating Corrigendum dated January 2008 and the UK National Annex incorporating National Amendment No.1

Tedds calculation version 2.9.22

Concrete details - Table 3.1 - Strength and deformation characteristics for concrete

Concrete strength class	C32/40		
Char.comp.cylinder strength	f_{ck} = **32** N/mm^2	Mean axial tensile strength	f_{ctm} = **3.0** N/mm^2
Secant modulus of elasticity	E_{cm} = **33346** N/mm^2	Maximum aggregate size	h_{agg} = **20** mm
Design comp.concrete strength		f_{cd} = **18.1** N/mm^2	Partial factor γ_C = **1.50**

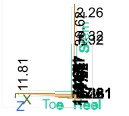
Reinforcement details

Characteristic yield strength	f_{yk} = **500** N/mm^2	Modulus of elasticity	E_s = **200000** N/mm^2
Design yield strength	f_{yd} = **435** N/mm^2	Partial factor	γ_S = **1.15**

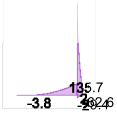
Cover to reinforcement

Front face of stem	c_{sf} = **50** mm	Rear face of stem	c_{sr} = **75** mm
Top face of base	c_{bt} = **50** mm	Bottom face of base	c_{bb} = **75** mm

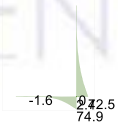
Loading details - Combination No.1 - kN/m

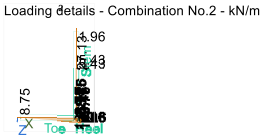


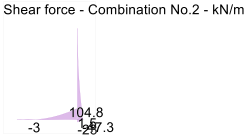
Shear force - Combination No.1 - kN/m

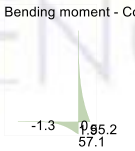


Bending moment - Combination No.1 - kNm/m









Check stem design at base of stem

Depth of section h = **350** mm

Rectangular section in flexure - Section 6.1

Design bending moment M = **61.5** kNm/m K = **0.027** K' = **0.207**

K' > K - No compression reinforcement is required

Tens.reinforcement required $A_{sr.req}$ = **558** mm^2/m

Tens.reinforcement provided 16 dia.bars @ 200 c/c Tens.reinforcement provided $A_{sr.prov}$ = **1005** mm^2/m

Min.area of reinforcement $A_{sr.min}$ = **420** mm^2/m Max.area of reinforcement $A_{sr.max}$ = **14000** mm^2/m

PASS - Area of reinforcement provided is greater than area of reinforcement required

Deflection control - Section 7.4

Limiting span to depth ratio 16 Actual span to depth ratio 11.6

PASS - Span to depth ratio is less than deflection control limit

Crack control - Section 7.3

Limiting crack width w_{max} = **0.3** mm Maximum crack width w_k = **0.266** mm

PASS - Maximum crack width is less than limiting crack width**Rectangular section in shear - Section 6.2**

Design shear force V = **62.6** kN/m

Rectangular section in shear - Section 6.2

Design shear force V = **62.6** kN/m Design shear resistance $V_{Rd.c}$ = **137** kN/m

PASS - Design shear resistance exceeds design shear force

Horizontal reinforcement parallel to face of stem - Section 9.6

Min.area of reinforcement $A_{sx.req}$ = **350** mm^2/m Max.spacing of reinforcement s_{sx_max} = **400** mm

Trans.reinforcement provided 10 dia.bars @ 200 c/c

Trans.reinforcement provided $A_{sx.prov}$ = **393** mm^2/m

PASS - Area of reinforcement provided is greater than area of reinforcement required

Check base design at toe

Depth of section h = **350** mm

Rectangular section in flexure - Section 6.1

Design bending moment M = **56.1** kNm/m K = **0.025** K' = **0.207**

K' > K - No compression reinforcement is required

Tens.reinforcement required $A_{bb.req}$ = **509** mm^2/m

Tens.reinforcement provided 16 dia.bars @ 150 c/c Tens.reinforcement provided $A_{bb.prov}$ = **1340** mm^2/m

Min.area of reinforcement $A_{bb.min}$ = **420** mm^2/m Max.area of reinforcement $A_{bb.max}$ = **14000** mm^2/m

PASS - Area of reinforcement provided is greater than area of reinforcement required

Library item: Rectangular single summary

Crack control - Section 7.3

Limiting crack width w_{max} = **0.3** mm Maximum crack width w_k = **0.16** mm

PASS - Maximum crack width is less than limiting crack width**Rectangular section in shear - Section 6.2**

Design shear force V = **113.1** kN/m

Rectangular section in shear - Section 6.2

Design shear force V = **113.1** kN/m Design shear resistance $V_{Rd.c}$ = **150.8** kN/m

PASS - Design shear resistance exceeds design shear force

Secondary transverse reinforcement to base - Section 9.3

Min.area of reinforcement $A_{bx.req}$ = **268** mm²/m Max.spacing of reinforcement s_{bx_max} = **450** mm

Trans.reinforcement provided 10 dia.bars @ 200 c/c

Trans.reinforcement provided $A_{bx.prov}$ = **393** mm²/m

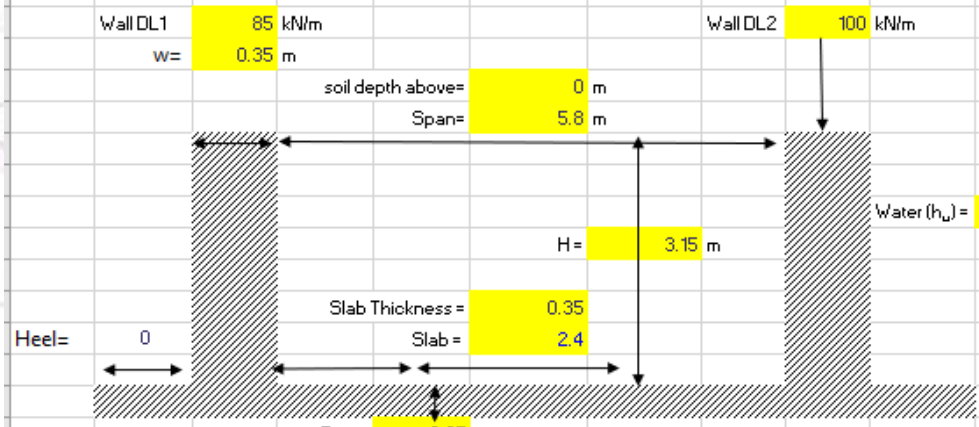
PASS - Area of reinforcement provided is greater than area of reinforcement required

CRØFT STRUCTURAL+ CIVIL
Clock Shop Mews
Rear of 60 Saxon Road
London SE25 5EH
T: 020 8684 4744
W: www.croftse.co.uk

Project:	10 Winterbrook Roiad			Section	Sheet
Date	Dec-23	Rev	Date	Description	
By	SG				
Checked					
Job No	231013	Status			Rev

Ref

Slab Uplift



Global Uplift Calc

Total Dead Load =	Slab=	21.0	kN/m	= slab thickness x slab weight x 25kN/m³
	Toe and heel =	37.6	kN/m	= (heel length + wall thickness + toe length) x slab thickness x 25kN/m³ x 2No
				(heel + weight of soil above heel ignored, which is a more conservative approach)
	RC Wall =	55.125		= wall height above heel x wall thickness x 25kN/m³ x 2No
	Weight above wall =	185		= weight applied from ground floor and structure above (DL1+DL2)
	Soil=(	0	+	0)x2+ 0 = 0 15.225
	Total Dead load =	298.8	kN/m	
Total Uplift Force=		136.5	kN/m	= (wall thickness + span + wall thickness) x h_u x 10kN/m³
	F.o.S.=	2.19	No Global Uplift	

	6. Noise Vibration and Dust
	Best construction method should be chosen to reduce the unnecessary Noise, Vibration, and dust. The following table is a guidance to minimise the effect of the same. Borehole test, soil investigation, CTMP and CMS. Full investigations and reports have to be carried out ahead of building works to formalize the best practical means to be used.

CONSTRUCTION METHOD	**Measure,**	**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	Airborne noise is contained within development	Airborne dust is contained within the development	Windows being sealed shut (taped) stops any rattling of windows or

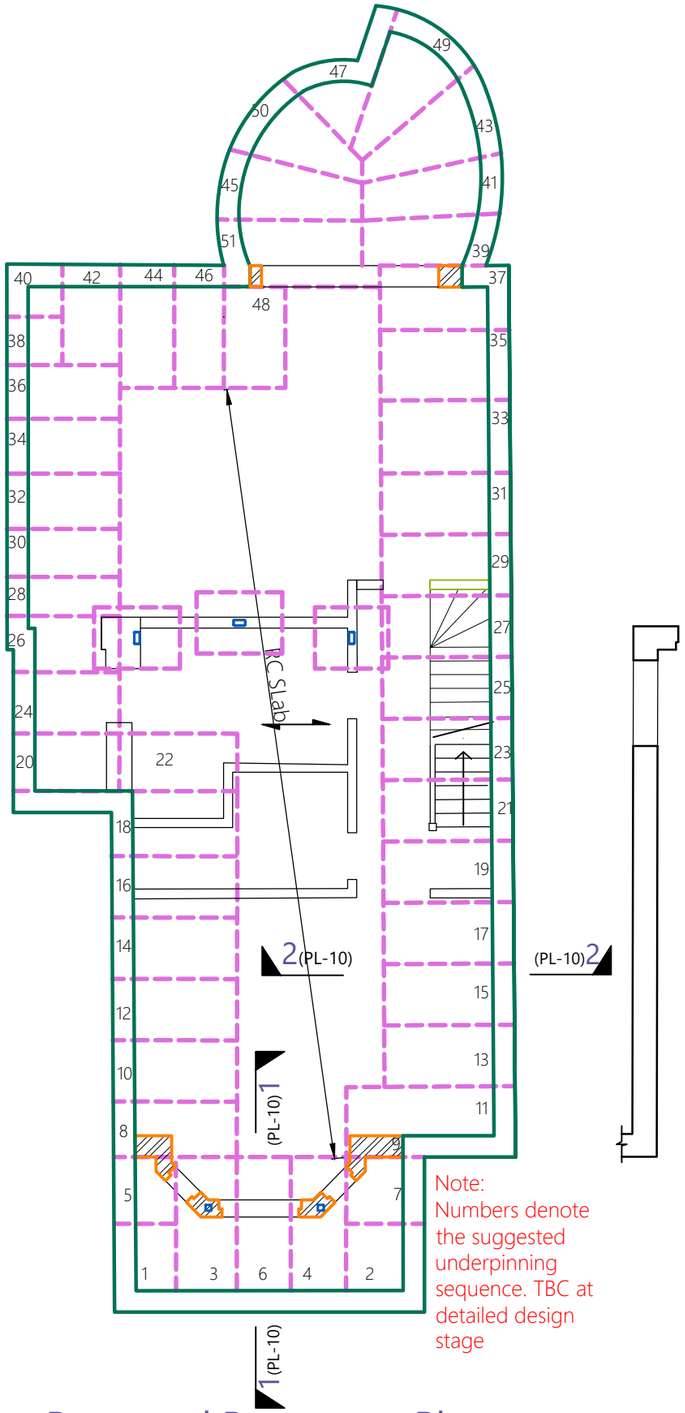
CONSTRUCTION METHOD	Measure,	NOISE	DUST	VIBRATION
	during construction, including front door and terrace doors kept closed			accentuation of any vibrations on site
	Hording and sheeting to cover roof terrace.	Covering with hording and sheeting restricts airborne noise from escaping as best can be.	Sheeting to roof terrace stops window blowing up dust from excavation and any dust generated from works escaping to vicinity.	Hording and sheeting stops vibration as best is practicable.
	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.

CONSTRUCTION METHOD	Measure,	NOISE	DUST	VIBRATION
2. Management and hours of working	Project manager to manage all works on site, member of Considerate Contractors Scheme	Hours of working are restricted, and staff supervised to use tools appropriately. No radio on site. Small team working reducing noise. Coordination between workers ensured.	Hours of working are restricted, and staff supervised to use tools appropriately with appropriate guarding to prevent dust migration.	Hours of working are restricted, and staff supervised to use tools appropriately and reduced use of power 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	Measure,	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.

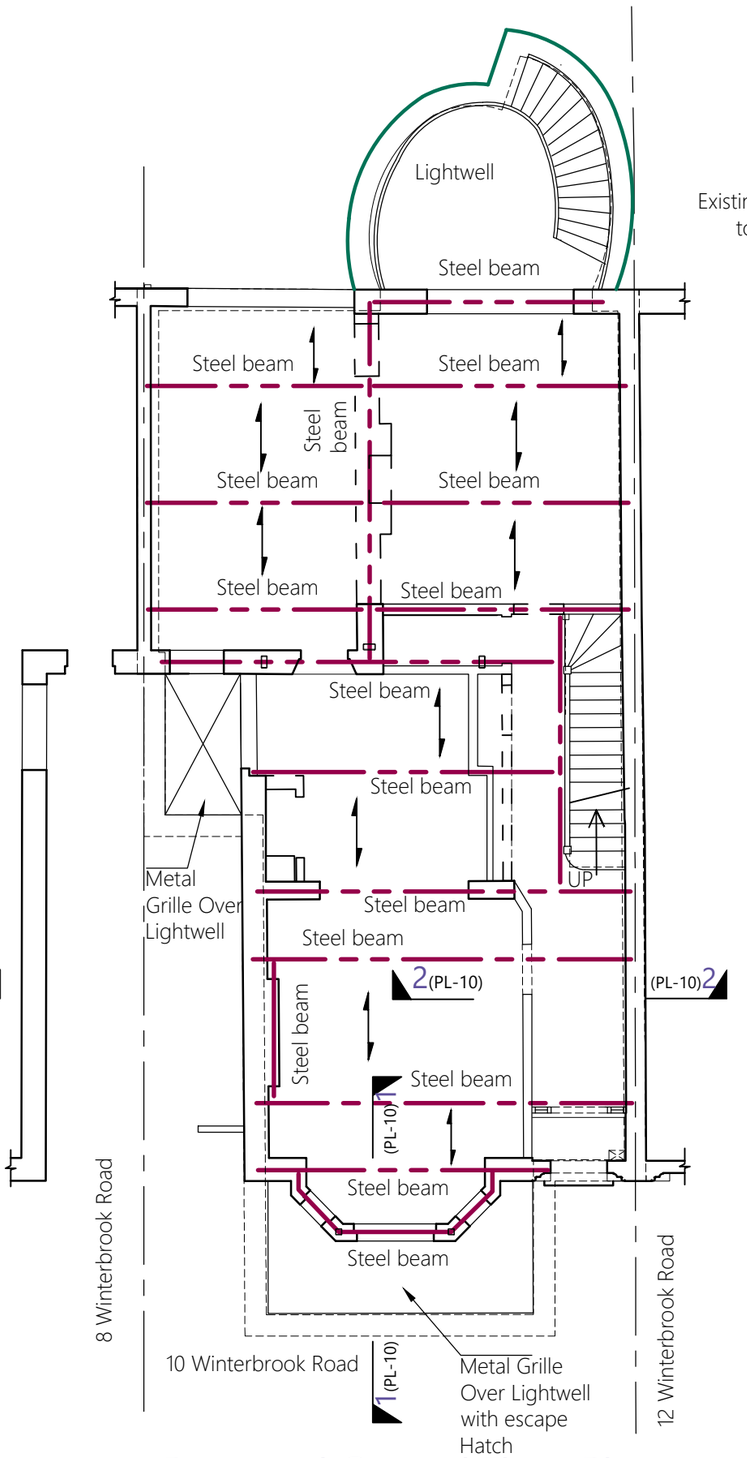
Appendix A-Structural Plans and Details

- Structural Drawings Plans 1:100
- Structural Sections 1:50
- Temporary Works & Sequence Plan



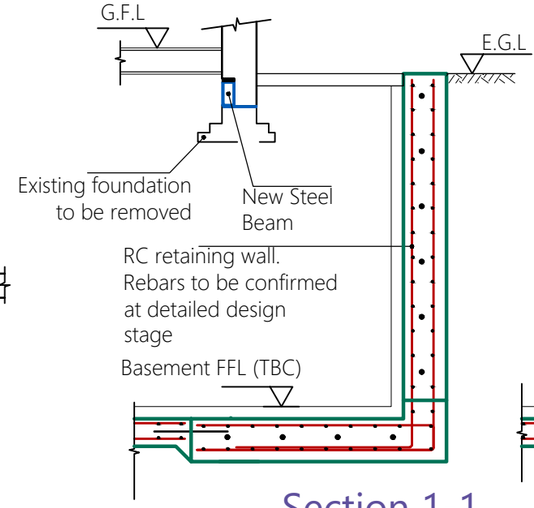
Proposed Basement Plan

Scale 1:100



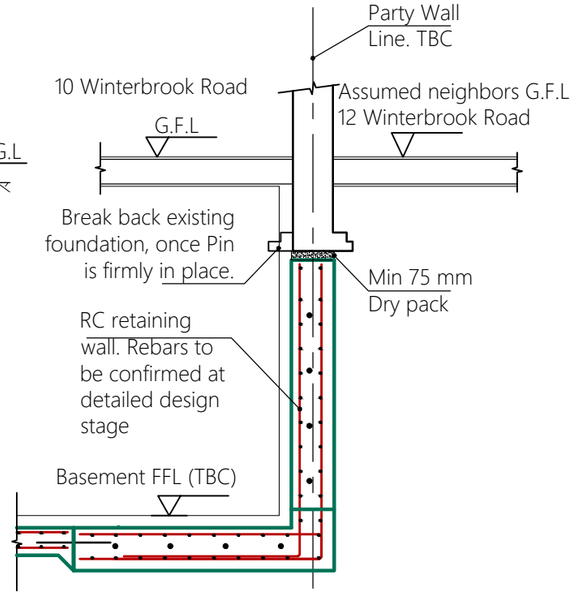
Proposed Ground Floor Plan

(1:100)



Section 1-1

Scale 1:50



Section 2-2

Scale 1:50

Job Number	Dwg Number
231013	PL-10
Scale	Rev
1:100 @A3	2
By	Approved by
-SG-	-PR-

Matt Jack Robinson and Ashley Rogers

10 Winterbrook Road
SE24 9JA

Proposed Basement , Ground Floor Plan and Sections for BIA

Issued for **PLANNING ONLY**

Rev	Date	by	Amendments
2	11-03-24	sg	Basement & Ground floor plan slightly changed
1	23-02-24	sg	Basement & Ground floor plan slightly changed
-	14-11-23	sg	First Issue

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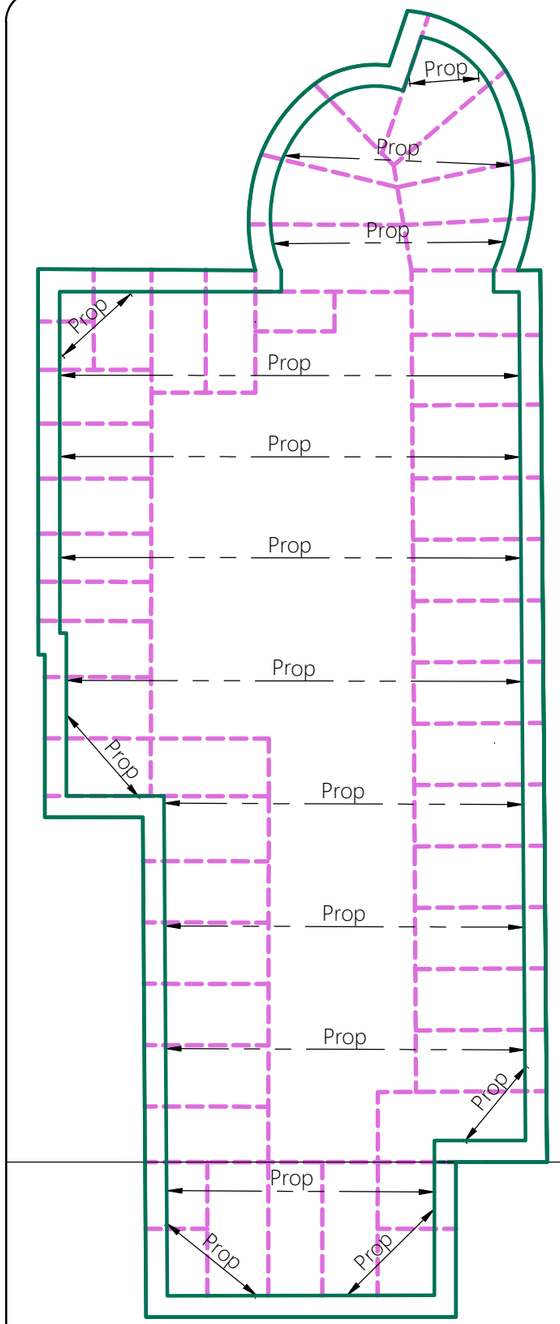
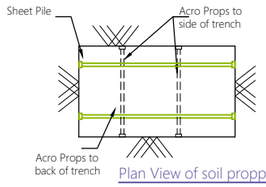
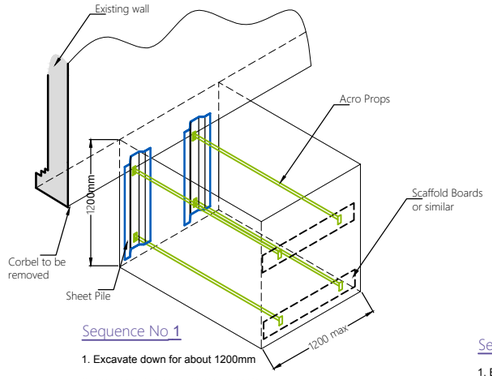


Proposed Basement Temporary Works Plan

Scale 1:100



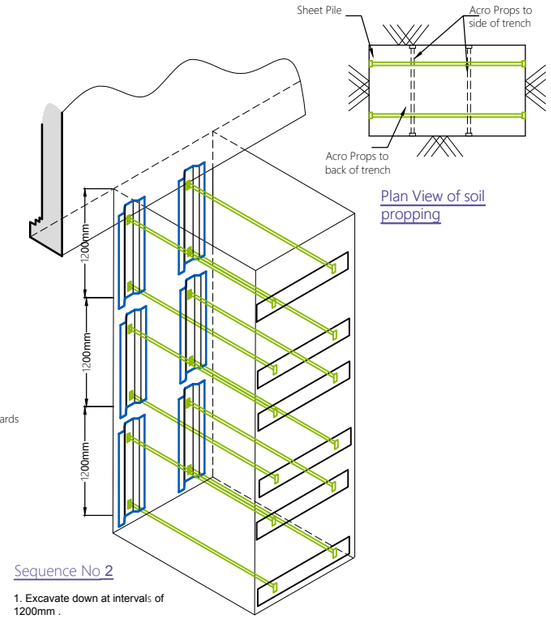
Plan View of soil propping



Sequence No 1

1. Excavate down for about 1200mm

2. prop back the soil with steel sheets and acros.

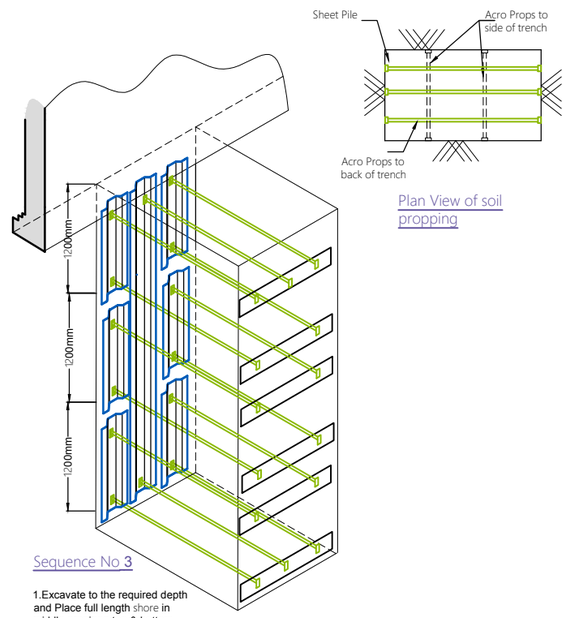


Plan View of soil propping

Sequence No 2

1. Excavate down at intervals of 1200mm .

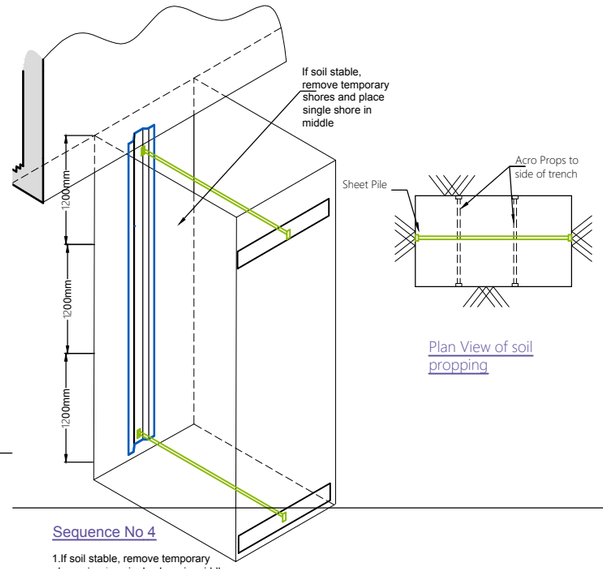
2. prop back the soils in section with steel sheets and acros.



Plan View of soil propping

Sequence No 3

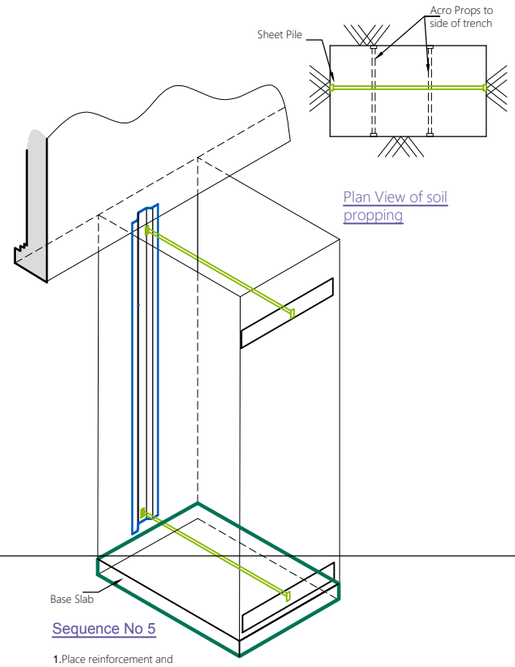
1.Excavate to the required depth and Place full length shore in middle propining top & bottom.



Plan View of soil propping

Sequence No 4

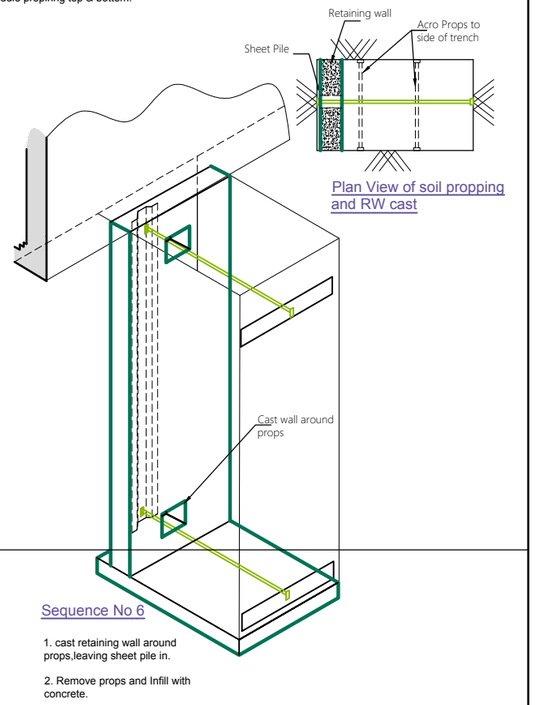
1.If soil stable, remove temporary shores leaving single shore in middle



Plan View of soil propping

Sequence No 5

1.Place reinforcement and cast base slab



Plan View of soil propping and RW cast

Sequence No 6

1. cast retaining wall around props,leaving sheet pile in.

2. Remove props and Infill with concrete.

Rev	Date	by	Amendments
1	23-02-24	sg	Basement plan slightly changed
-	14-11-23	sg	First Issue

Job Number 231013	Dwg Number PL-15
Scale 1:100 @A3	Rev 1
By -SG-	Approved by -PR-

Matt Jack Robinson and Ashley Rogers

10 Winterbrook Road
SE24 9JA

Temporary work plan and Sequences for BIA

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Appendix B – Basement Method Statement

December 2023

CRØFT STRUCTURAL+ CIVIL

Basement Method Statement

Site Address: 10Winterbrook Road
SE24 9JA
London

Client: Matt Jack Robinson and Ashley Rogers
10 Winterbrook Road
SE24 9JA
London

Completed By	Sudeep Gurung MSc GMIStructE
Reviewed By	Pawel Rogalewicz MSc BEng

Rev	Date	Rev By	Comment
-	14-12-2023	SG	First issue

Croft Structural Engineers Ltd
Rear of 60 Saxon Road, London, SE25 5EH
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CRØFT STRUCTURAL+ CIVIL

Contents

10 Winterbrook Road

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. Temporary props will be provided along the height of the pin in the temporary condition. Before the base is cast cross props are needed. The base/ground slab provides propping in the final condition. In the temporary condition, the edge of the slab is buttressed against the soil in the middle of the property. Also, the skin friction between the concrete base and the soil provides further resistance. The central soil mass is to be removed in portions (thirds but no greater than 8m) and cross propping subsequently added as the central soil mass is removed

1.7. A site-specific ground investigation has not been undertaken. From BGS Map viewer underlaying soil strata is of Lambeth Group (Clay, silt, and sand)

1.8. The bearing pressures have been limited to 100kN/m2.

1.9. The water table is not expected to be encountered during construction.

1.10. 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.

1.11. 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 sections (less than 1m3). 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.

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. 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. Begin by placing cantilevered walls 1, 2 noted on plans. (Cantilevered walls to be placed in accordance with numbering shown on plan.)

3.2. Needle and prop the first floor/ walls over.

3.3. Insert steel over and sit on cantilevered walls.

3.4. Beams over 6m to be jacked on site to reduce deflections of floors.

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

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

3.5. Excavate first front corner of lightwell. (Follow methodology in Section 4)

3.6. Excavate second front corner of lightwell. (Follow methodology in Section 4)

3.7. Continue excavating section pins to form front lightwell. (Follow methodology in Section 4)

3.8. 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.

3.9. Needle and prop bay/front wall. Insert supports.

Figure 1 Example of needling to existing wall

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

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

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

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

3.12. Cast base to internal wall. Construct wall to provide support to floor and steels as works progress.

3.13. Excavate and cast floor slab

3.13.1. Excavate 1/3 of the middle section of basement floor. As excavation proceeds, place Slim Shore props at a maximum of 2.5m c/c across the basement. Locate props at a third of the height of the wall.

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

3.13.3. 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.

3.13.4. Place reinforcement for basement slab.

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

3.13.6. Once inspected, pour concrete.

3.14. 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

Appendix C-FRA and SuDS Report

MERIDIAN

CIVIL ENGINEERING CONSULTANCY

10 WINTERBROOK ROAD,

LONDON,

SE24 9JA

FLOOD RISK ASSESSMENT & SURFACE WATER DRAINAGE STRATEGY

DECEMBER 2023

Meridian Civil Engineering Consultancy,
Sussex Innovation Centre, Science Park Square, Brighton BN1 9SB
Tel 01273 102743

CONTENTS

APPENDICES

Client: Croft Structural + Civil

Rev	Date	Prepared by	Checked by	Approved by
P0	04/12/2023	SL	BB	MN
P1 – Updated Layout	22/02/2024	SL	BB	MN

Meridian Civil Engineering Consultancy,
Sussex Innovation Centre, Science Park Square, Brighton BN1 9SB
Tel 01273102743

1.0 INTRODUCTION

1.1 Meridian Civil Engineering Consultancy LTD (MCEC) has been instructed by Croft Structural + Civil to prepare a site-specific Flood Risk Assessment (FRA) and surface water drainage strategy (SWDS) for the development at 10 Winterbrook Road, London, SE24 9JA.

1.2 It is understood that the proposals are for renovations to an existing dwelling including the construction of a basement level with step access from rear garden.

1.3 The British Geological Survey (BGS) Geology Viewer indicates that the bedrock underlying the site is part of the Lambeth group Formation, comprising of clay, silt & sand (Source: BGS). The BGS Geology Viewer also indicates that there are superficial deposits of head – clay, sand & gravel recorded on the site. Based on the information above and the proximity to surrounding properties, it is unlikely that infiltration will be feasible on site and therefore has been dismissed as a method of discharging surface water from the site.

1.4 The Environment Agency (EA) mapping for Flood Risk, shows the site located within Flood Zone 1 (low risk of fluvial or tidal flooding). The risk from fluvial and tidal sources is deemed low.

1.5 The EA surface water models show the site to have areas at low and very low risk from surface water flooding. Low risk means that each year this area has a chance of flooding of between 0.1% and 1%. Very low risk means that each year this area has a chance of flooding of less than 0.1%.

1.6 In accordance with local guidance, developments are required to use SuDS to reduce runoff rates to the public drainage system. The proposals are to attenuate and limit the discharge of surface water runoff from proposed new external hardstanding/roof areas onsite to as close as feasible to greenfield runoff rates whilst also managing existing roof rear pitch prior to discharging into combined sewer beneath Winterbrook Road via an existing connection on site.

1.7 A geocellular attenuation tank is proposed within the garden area. The tank will have a plan area of 2.5m^2 with a depth of 0.4m and a porosity of 0.95 giving a volume of 0.9m^3. The geocellular tank would provide storage volume sufficient to allow managed areas to discharge at as close as possible to greenfield runoff rates.

1.8 This report has been produced broadly in accordance with the National Planning Policy Framework (NPPF) and based on the findings of this report, it is deemed that the development could be constructed without worsening the flood risk on site or offsite.

2.0 POLICY COMPLIANCE

2.1 The purpose of this assessment is to demonstrate that the development proposal outlined above can be satisfactorily accommodated without worsening flood risk for the area and without placing the development itself at risk of flooding, as per the:

- National Planning Policy Framework
- London Borough of Southwark SFRA
- CIRIA SuDS Manual
- DEFRA Non-statutory technical standards for sustainable drainage systems

3.0 SITE LOCATION AND DESCRIPTION

3.1 The development location is at 10 Winterbrook Road, London, SE24 9JA. It is shown in red outline in Figure 1.

Figure 1: Site Location.

3.2 It is understood that the proposals are for renovations to an existing dwelling including the construction of a basement level with step access from rear garden (see Appendix 1 showing the architect proposals for the site).

4.0 EXISTING DRAINAGE ARRANGEMENTS

4.1 The existing site is developed and according to a CCTV survey undertaken at the site (see appendix IV), it is understood that private combined water drains are present at the site. These are assumed to connect to a combined Thames Water sewer beneath Winterbrook Road (as per Thames water asset location plan).

5.0 GEOLOGY AND INFILTRATION POTENTIAL

5.1 The British Geological Survey (BGS) Geology Viewer indicates that the bedrock underlying the site is part of the Lambeth group Formation, comprising of clay, silt & sand (Source: BGS). The BGS Geology Viewer also indicates that there are superficial deposits of head – clay, sand & gravel recorded on the site.

5.2 Based on the information above and the proximity to surrounding properties, it is unlikely that infiltration will be feasible on site and therefore has been dismissed as a method of discharging surface water from the site.

6.0 SEQUENTIAL TEST/EXCEPTION TEST

6.1 Under the NPPF, all new planning applications should undergo a Sequential Test. This test should be implemented by local planning authorities with a view to locating particularly vulnerable new developments (e.g. residential, hospitals, mobile homes etc.) outside of the floodplain. A full sequential test is considered outside the scope of this report.

6.2 The Environment Agency (EA) mapping for Flood Risk, shows the site located within Flood Zone 1 (low risk of fluvial or tidal flooding). Areas within Flood Zone 1 have been shown to be at a less than 0.1% annual probability of flooding from rivers and/or a less than 0.1% annual probability of flooding from the sea.

6.3 Following the published Flood Risk and Coastal Change Planning Policy Guidance (PPG) Table 2 and NPPF guidelines, the proposed development is classed as 'More vulnerable'.

6.4 The NPPF Sequential Test: Flood Risk Vulnerability and Flood Zone 'Compatibility' Table is reproduced below;

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	**Zone 1**	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test Required	✓	✓
	Zone 3a	Exception Test Required	✓	×	Exception Test Required	✓
	Zone 3b *Functional Floodplain*	Exception Test Required	✓	×	×	×

Table 1 The Sequential Test: Flood Risk Vulnerability and Flood Zone 'Compatibility' Table as specified by NPPF. Please note: ✓means an exception test is not required; ×means the development should not be permitted.

6.5 Using the principles of the Sequential Test outlined above, the proposed development is classed as 'More Vulnerable' under the NPPF. The development areas are shown to be located within Flood Zone 1 (as defined by the EA flood map for planning in Figure 2) and therefore, in accordance with Table 1 above the proposed development would be acceptable without the need for an Exception Test.

7.0 SOURCES OF FLOODING

7.1 Tidal and Fluvial

7.1.1 The Environment Agency (EA) mapping for Flood Risk (Figure 2), shows the site located within Flood Zone 1 (low risk of fluvial or tidal flooding). Areas within Flood Zone 1 have been shown to be at a less than 0.1% chance of flooding from rivers and/or the sea in any given year.

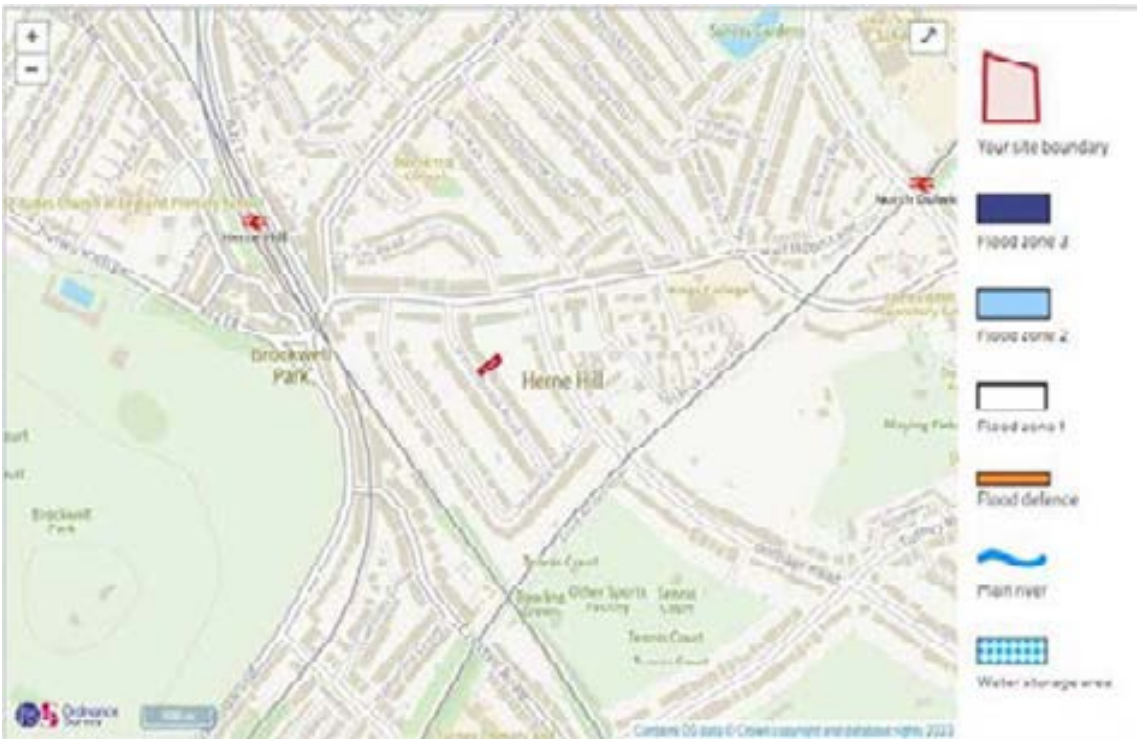

Figure 2: Flood Map for Planning. Red line shows extent of proposed development site

7.2 Surface Water

7.2.1 The EA Long Term Risk of Flooding from Surface Water (RoFSW) map data (figure 3) below shows part of the site to be at low risk from flooding with the rest at very low risk. Low risk means that each year this area has a chance of flooding of between 0.1% and 1%. Very low risk means that each year this area has a chance of flooding of less than 0.1%. Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding.

Figure 3: Long Term RoFSW map extract – Extent of SW flooding (Source: EA)

7.2.2 As the site is shown to be at risk from surface water flooding MCEC have downloaded the EA RoFSW data in order further explore the nature of surface water flood risk to the site.

Figure 4: EA RoFSW depth data for the 1 in 100 year surface water event

Figure 5: EA RoFSW depth data for the 1 in 1000 year surface water event

7.2.3 The EA RoFSW depth data within figure 4 shows the site to be unaffected by the design flood event (1 in 100 year event). The data shows that for the 1 in 1000 year event (figure 5) there is predicted up to a maximum of 0.6m of inundation depth at the site, with the flooding at the rear of the house.

7.3 Groundwater

7.3.1 The London Borough of Southwark interactive groundwater mapping (see figure below) shows the site to be at <25% susceptibility to groundwater flooding. As such, risk of flooding from this source could be considered to be low.

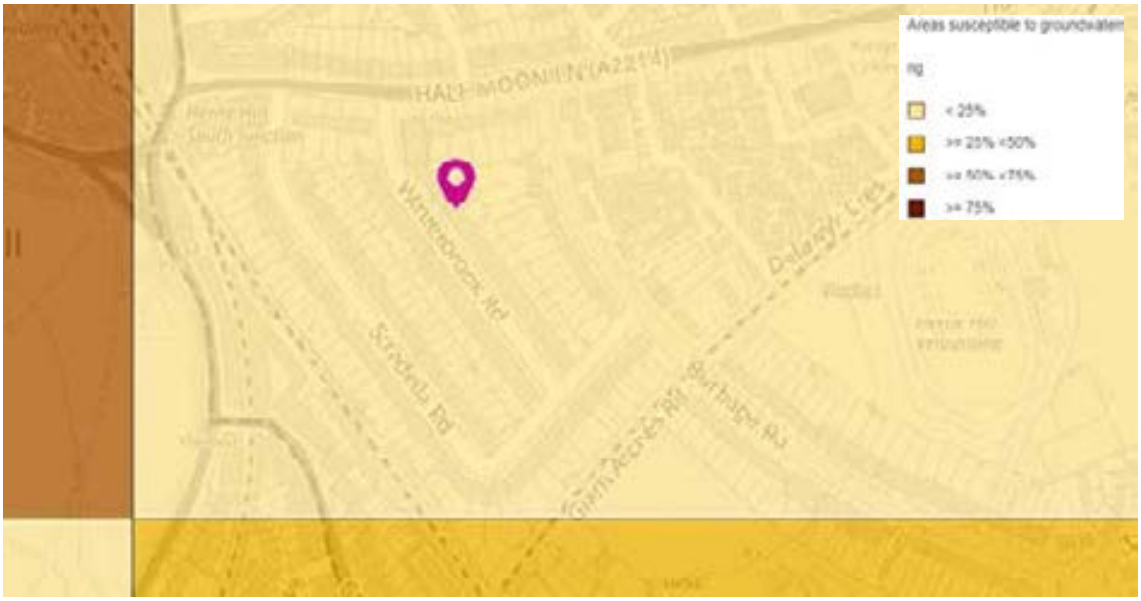

Figure 6 - Southwark interactive groundwater mapping data

7.4 Sewer

7.4.1 The London Borough of Southwark interactive sewer map (see figure below) shows the site to have 7-12 recorded sewer incidents. As such, risk of flooding from this source could be considered to be medium.

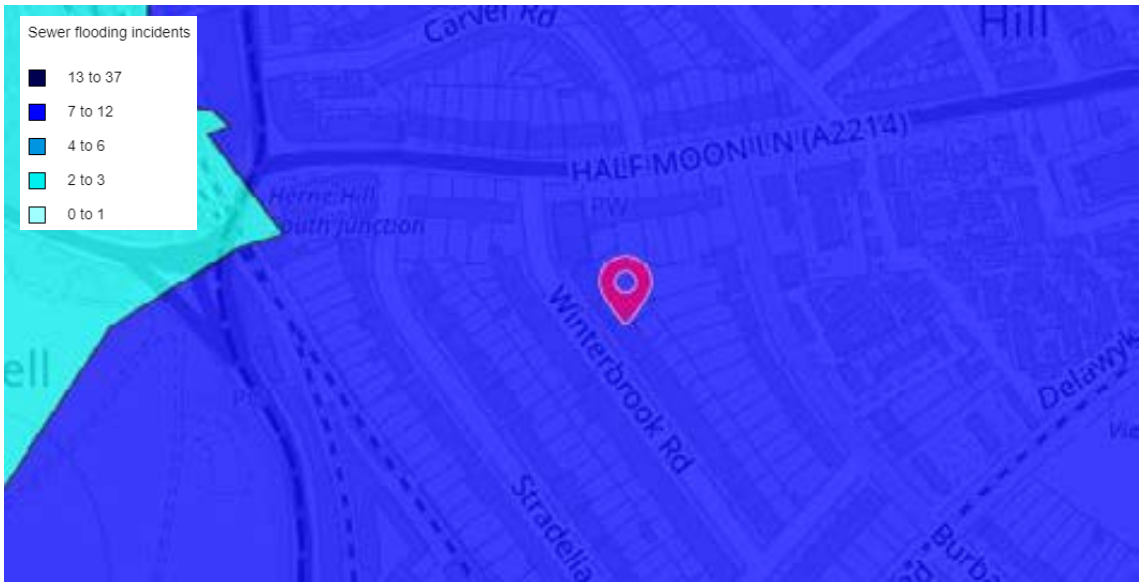

Figure 7 - Southwark interactive sewer mapping data

7.4.2 In order to minimise the risk of sewer waters backing up into the site in the event of public sewer surcharge, it is proposed that non-return valves are fitted to the offsite connections from the site. This is deemed to be a suitable mitigation measure for the level of risk to the site. Any new offsite sewer connections are subject to the approval of the local sewer authority and any approvals should be sought prior to commencement onsite.

7.5 Reservoir

7.5.1 The proposed development site is not shown to be within the extent of reservoir flooding, according to the EA long term flood risk mapping.

8.0 CLIMATE CHANGE ALLOWANCES

8.1 Making an allowance for climate change in the design of surface water drainage systems will help to minimise vulnerability and provide resilience to flooding and coastal change in the future. Climate Change allowances vary across the UK subject to catchment conditions and are based on climate change projections and different scenarios of carbon dioxide (CO2) emissions to the atmosphere.

8.2 Climate change allowances were recently updated by the EA and the climate change allowances are now defined by River Catchment peak rainfall allowances and River Catchment peak river flow allowances.

8.3 The data published on the DEFRA database shows the site located within the Upper and Bedford Ouse Management Catchment and for this development (lifespan 100 years) an upper end allowance of 40% should be applied to rainfall events.

8.4 As the site is located within Flood Zone 1 a climate change allowance for peak river flow does not need to be applied to this development.

9.0 RESIDUAL RISKS

9.1 Residual risks will be limited to exceedance rainfall events causing overtopping of the designed drainage or blockage in underground drainage. The following section of flood risk management measures details mitigation strategies.

9.2 Given the relatively low level of flood risk on site, finished floor levels are to be raised 150mm above external ground levels where feasible to mitigate potential residual risks.

9.3 Any drainage at basement level should be pumped to high level, rather than drain by gravity, to mitigate the risk of backflow from sewers in a flood event.

10.0 FLOOD RISK MANAGEMENT MEASURES

10.1 Given the relatively low level of flood risk on site the following flood mitigation measures are deemed to be suitable:

- Finished floor levels are to be raised 150mm above external ground levels where feasible to prevent overland flows during exceedance events from entering the houses.
- Any drainage within the basement should be pumped to high level, rather than drain by gravity, to mitigate the risk of backflow from sewers in a flood event.

10.2 As the site is only affected by surface water events beyond the 'design event' (considered in the NPPF to be the 1 in 100-year surface water event), it is not considered necessary to mitigate against surface water flooding on site. However, the proposed raising of finished floor level will help to mitigate against events beyond the design event.

10.3 Internal access to the upper floors is also provided which may be used by inhabitants in the event of flooding on site.

10.4 As the proposals include the construction of a basement level, it is recommended that ground water monitoring is undertaken in order to measure ground water levels at the site.

10.5 Basements constructed at or below the groundwater table may impact on the natural groundwater flow and impact groundwater levels. For small, isolated basements, the impact is likely to be minimal due to the small associated building volume as compared to the aquifer. However, the cumulative impact of this type of development could lead to an impact on local hydrogeology. It is the duty of the developer to demonstrate that the basement will have no effects on groundwater.

10.6 If the basement is proposed to be at or below groundwater levels, appropriate mitigation should be covered within a site-specific BIA. Levels of the basement in relation to groundwater are to be confirmed.

10.7 Surface water runoff should be managed and reduced in line with current SUDS guidance outlined within the Ciria SUDS manual C753 and local guidance. The surface water management and SUDS strategy are discussed within the following sections of this report.

11.0 SUSTAINABLE URBAN DRAINAGE (SUDS) ASSESSMENT

11.1 In accordance with the SuDS management train approach, the use of various SuDS measures to reduce and control surface water flows have been considered in detail for the development.

11.2 The management of surface water has been considered in respect to the SuDS hierarchy below as detailed in the CIRIA 753 'The SUDS Manual', Section 3.2.3:

SUDS DRAINAGE HIERARCHY				
			Suitability	Comment
	1.	Store rainwater for later use	✓	Rainwater harvesting is being considered by the developer and could be used around the wider site where feasible
	2.	Use infiltration techniques, such as porous surfaces in non-clay areas	x	According to bedrock/superficial geology, infiltration rates do not look to be suitable for infiltration SuDS
	3.	Attenuate rainwater in ponds or open water features for gradual release	x	Insufficient space on site to accommodate open water SuDS features
	4.	Attenuate rainwater by storing in tanks or sealed water features for gradual release	✓	Attenuation will be provided on site and discharged back to the existing system at a lower rate
	5.	Discharge rainwater direct to a watercourse	x	There are no watercourses in close proximity to the site
	6.	Discharge rainwater to a surface water sewer/drain	x	There does not look to be an existing surface water sewer serving the site
	7.	Discharge rainwater to Combined Sewer	✓	Re-use of the existing system (combined) is proposed

Table 2: SuDS Drainage Hierarchy

11.3 Following the SuDS drainage hierarchy infiltration rates are unlikely to be suitable for managing surface water runoff according to the bedrock geology shown in the BGS Geology Viewer.

11.4 The suitability of SuDS components has been assessed in order to provide a sustainable means of providing the required attenuation volumes. The following components have been assessed as follows in Table 2, below.

SUITABILITY OF SUDS COMPONENTS		
SuDS Component	Comment	Suitability
Infiltrating SuDS	Bedrock geology onsite and the lack of sufficient space on site suggests that infiltration on site may not be feasible for infiltration SuDS	x
Permeable Pavement	There is not sufficient space for permeable pavement on site.	x
Green / Blue Roofs	Unsuitable due to slope of roofs	x
Rainwater Harvesting	It is recommended that Water butts be provided as a minimum to offer water reuse for garden areas.	✓
Swales	Unsuitable due to insufficient space on site to implement	x
Rills and Channels	Not deemed necessary for this site	x
Bioretention Systems	Bioretention systems could be retrofitted into the proposed garden but would overall provide little benefit to storage volumes.	x
Retention Ponds and Wetlands	Unsuitable due to insufficient space on site to implement	x
Detention Basins	Unsuitable due to insufficient space on site to implement	x
Geocellular Systems	Geocellular systems can be configured to suit almost every site/development. They can be used in this development to provide necessary attenuation storage.	✓
Proprietary Treatment Systems	Roof runoff is considered to be largely uncontaminated and there will be permeable pavement to treat and drain hard surfaced areas.	x
Filter Drains and Filter Strips	Not deemed necessary for this site	x

Table 3: Suitability of SuDS Components

11.5 Rainwater Harvesting

11.5.1 Rainwater harvesting (RWH) systems should be considered for rainwater re-use. Rainwater harvesting can take various forms including simple water butts to utilise runoff for watering and irrigation, to more complex pumped RWH systems to be used in grey water uses, such as toilet flushing.

11.5.2 As such, downpipes could be routed through a RWH system prior to overflow discharge to the underground system if the client wished to adopt this approach. The siting and dimensions of such a tank could be established at detailed stage involving a rainwater harvesting specialist.

11.5.3 It should be noted that RWH tanks are generally deemed unsuitable for water that has been drained through green roofs due to silt and colouring of the water. Further advice should be sought from RWH specialist if this option is pursued.

11.5.4 The standard position taken by regulators, is that the storage provided within water butts or rainfall harvesting measures does not normally count towards the attenuation storage requirements as there is no guarantee that these devices would be empty at the time that a rainfall event occurs. The principle which allows rainwater systems to be designed to provide surface water control (prevent runoff) is based on demand being greater (on average over a period of time) than the supply to it. As such, rainwater harvesting can be considered around the site, but has been excluded from any storage calculations.

11.6 Geocellular storage

11.6.1 Geocellular systems can be used to control and manage rainwater surface water runoff either as a soakaway or as a storage tank. In this instance as a soakaway in the rear garden area.

11.6.2 The modular/honeycomb nature of geocellular systems means that they can be tailored to suit the specific requirements of any site. The maintenance of Geocellular crates consists of regular inspection of silt traps, manholes, pipework and pre-treatment devices, with removal of sediment and debris as required.

11.6.3 Guidance about proper use, installation and maintenance of any proprietary system should be provided by the supplier and incorporated into the site proposals at detailed design stage.

12.0 SURFACE WATER DRAINAGE STRATEGY

12.1 In accordance with local guidance, developments are required to use SuDS to reduce runoff rates to the public drainage system. The proposals are to attenuate and limit the discharge of surface water runoff from proposed new external hardstanding/roof areas onsite to as close as feasible to greenfield runoff rates whilst also managing existing roof rear pitch prior to discharging into combined sewer beneath Winterbrook Road via an existing connection on site.

12.2 Unchanged front pitch of roof/external areas will drain as existing – see MCEC surface water drainage proposed layout CIV01 within appendix II.

12.3 A CCTV survey undertaken on site shows the presence of an existing combined drainage system. This is to be re-used where possible. If re-using the existing system is not feasible, then new drainage runs are to be implemented.

12.4 The existing rear pitch of the roof and new proposed roofs/external hardstanding areas are to utilise the new surface water drainage system. Runoff from new roofs and new external hardstanding areas within the garden and front/rear lower ground levels are to be limited to as close as feasible to greenfield runoff rates.

12.5 A geocellular attenuation tank is proposed within the garden area. The tank will have a plan area of 2.5m^2 with a depth of 0.4m and a porosity of 0.95 giving a volume of 0.9m^3. The geocellular tank would provide storage volume sufficient to allow new roof and external hardstanding areas to discharge at as close as possible to greenfield runoff rates.

12.6 The table below shows causeway calculation outputs of the existing and proposed betterment in runoff rates for all managed areas on site (see MCEC drawing CIV01).

SURFACE WATER DISCHARGE RATES SUMMARY						
	Area (ha)	Discharge Rates (l/s)				
		1 year	2 year/Q_{BAR}	30 year	100 year	100+40%CC
Greenfield Rates	0.011	0.04	0.047	0.11	0.149	-
Brownfield Runoff Rates	0.011		1.6	4.9	6.3	8.9
Proposed Runoff Rates	0.011	-	1.0	1.8	1.9	2.3

Table 1 - Calculated Runoff Rates

12.7 A proposed storm drainage strategy plan layout is included in Appendix II with relevant calculations within Appendix III.

13.0 WATER QUALITY

13.1 The primary risk to water quality is from the residential roofs. Residential roof runoff is largely considered to be uncontaminated and as such specific pollution mitigation measures are not considered necessary.

13.2 The Pollution Hazard Indices are summarised in Table 4 – Summary of Pollution Hazard Indices for different Land Use below (based on Table 26.2 of The SuDS Manual):

POLLUTION HAZARD INDICES FOR DIFFERENT LAND USE CLASSIFICATIONS				
LAND USE	**Pollution Hazard Level**	**Total Suspended Solids**	**Metals**	**Hydrocarbons**
Residential roofs	Very Low	0.2	0.2	0.05

Table 5: Summary of Pollution hazard Indices for different Land Use

14.0 SCHEDULE OF MAINTENANCE

14.1 All onsite SuDS and drainage systems will be privately maintained. A long-term maintenance regime should be agreed with the site owners before adoption.

14.2 In addition to a long-term maintenance regime, it is recommended that all drainage elements implemented on site should be inspected following the first rainfall event post-construction and monthly for the first quarter following construction.

14.3 The property owner will be responsible for the management and maintenance of SuDS devices.

14.4 General maintenance of key SuDS components are provided below.

PROPOSED SCHEDULE OF MAINTENANCE FOR BELOW GROUND DRAINAGE				
Item	Visual Inspection	Cleanse / De-sludge	CCTV Survey	Comments
Surface Water Drainage System (pipework, chambers etc.)	5 years	10 years	10 years	Cleansing to be carried as necessary
Gullies/Channels	1 year	1 year	N/A	Cleansing to be carried as necessary
Soakaways and catchpits	1 year		N/A	Cleansing to be carried as necessary
Pumps	-	-	-	Refer to manufacturer guidelines

Table 6: Schedule of maintenance for below ground drainage

14.5 The maintenance of the geocellular system/pumps should be in accordance with the manufacturer's recommendations.

15.0 CONCLUSION

15.1 Meridian Civil Engineering Consultancy LTD (MCEC) has been instructed by Croft Structural + Civil to prepare a site-specific Flood Risk Assessment (FRA) and surface water drainage strategy (SWDS) for the development at 10 Winterbrook Road, London, SE24 9JA.

15.2 It is understood that the proposals are for renovations to an existing dwelling including the construction of a basement level with step access from rear garden.

15.3 The British Geological Survey (BGS) Geology Viewer indicates that the bedrock underlying the site is part of the Lambeth group Formation, comprising of clay, silt & sand (Source: BGS). The BGS Geology Viewer also indicates that there are superficial deposits of head – clay, sand & gravel recorded on the site. Based on the information above and the proximity to surrounding properties, it is unlikely that infiltration will be feasible on site and therefore has been dismissed as a method of discharging surface water from the site.

15.4 The Environment Agency (EA) mapping for Flood Risk, shows the site located within Flood Zone 1 (low risk of fluvial or tidal flooding). The risk from fluvial and tidal sources is deemed low.

15.5 The EA surface water models show the site to have areas at low and very low risk from surface water flooding. Low risk means that each year this area has a chance of flooding of between 0.1% and 1%. Very low risk means that each year this area has a chance of flooding of less than 0.1%.

15.6 In accordance with local guidance, developments are required to use SuDS to reduce runoff rates to the public drainage system. The proposals are to attenuate and limit the discharge of surface water runoff from proposed new external hardstanding/roof areas onsite to as close as feasible to greenfield runoff rates whilst also managing existing roof rear pitch prior to discharging into combined sewer beneath Winterbrook Road via an existing connection on site.

15.7 A geocellular attenuation tank is proposed within the garden area. The tank will have a plan area of 2.5m^2 with a depth of 0.4m and a porosity of 0.95 giving a volume of 0.9m^3. The geocellular tank would provide storage volume sufficient to allow managed hardstanding areas to discharge at as close as possible to greenfield runoff rates.

15.8 This report has been produced broadly in accordance with the National Planning Policy Framework (NPPF) and based on the findings of this report, it is deemed that the development could be constructed without worsening the flood risk on site or offsite.

APPENDIX I Architects plans

Note

Drawing issued for planning purposes, not for construction.

Location Plan

1:1250

Block Plan

1:500

R2 STUDIO ARCHITECTS

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+44 (0)20 8766 6116

10 Winterbrook Road, London SE24 9JA

Planning
11.03.24

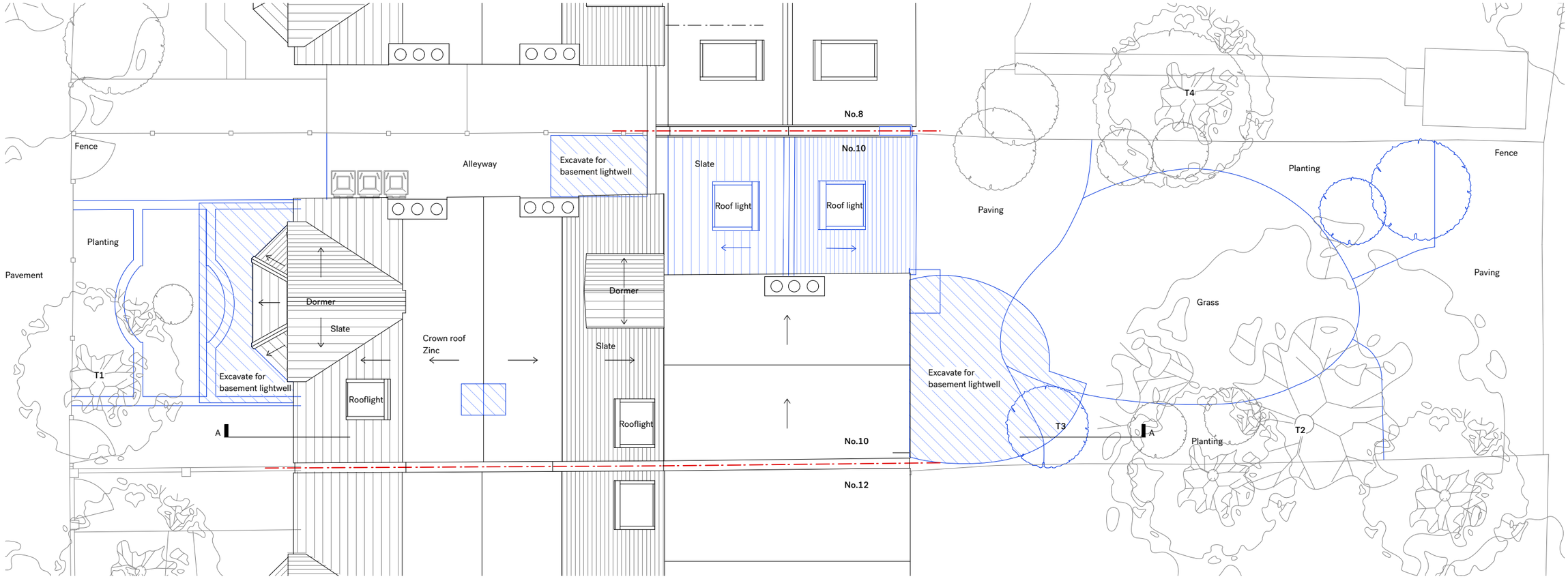
Location Plan
W10 P-01 -

Note

Drawing issued for planning purposes, not for construction.

Key

- Existing - retained
- Existing - demolished
- Proposed
- Assumed boundary



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10 Winterbrook Road, London SE24 9JA

0 | 1 | 2 | 3 | 4 | 5 m
Scale 1:100 @ A3

Planning
11.03.24

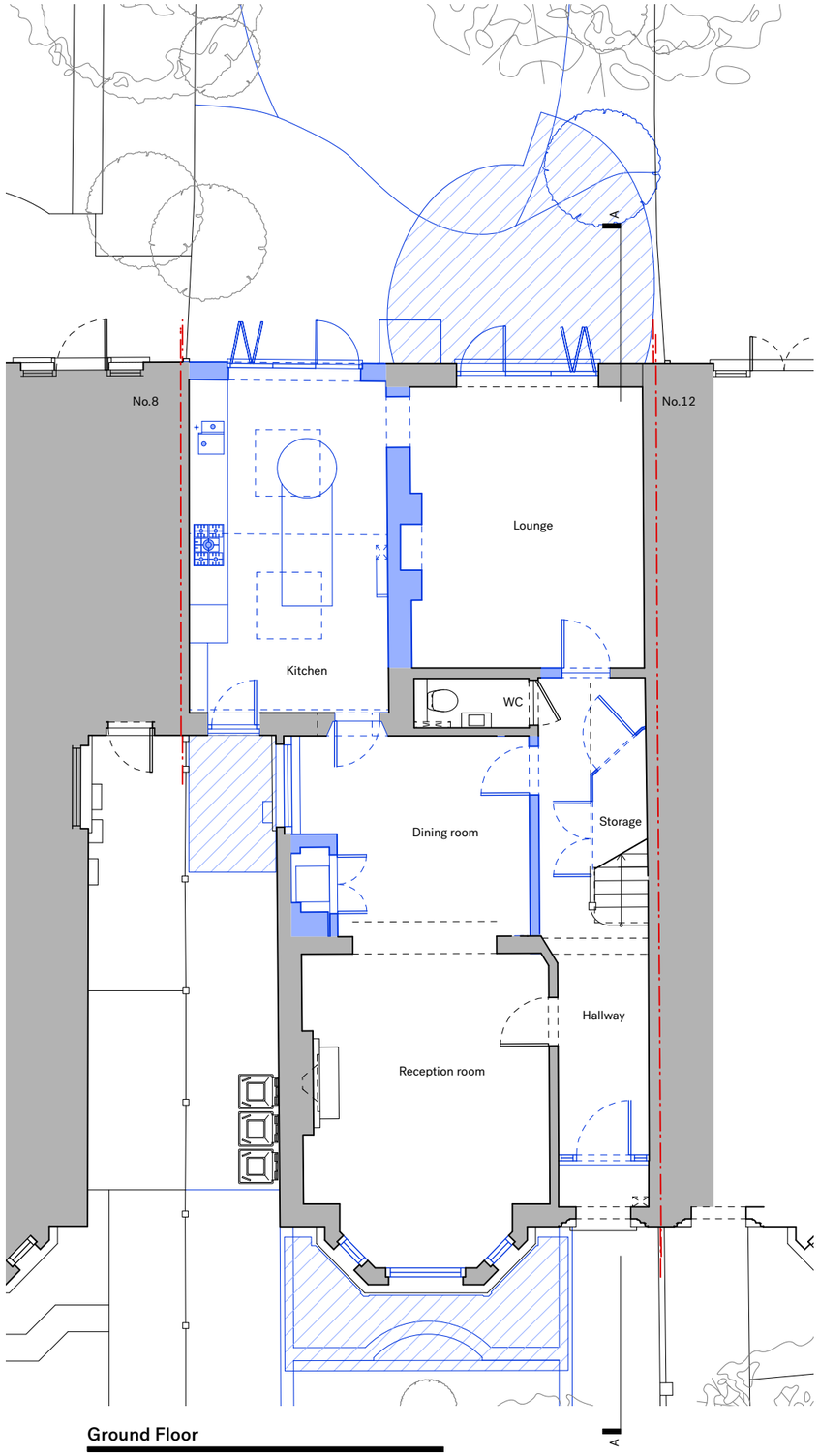
Existing Site/Roof plan
W10 P-02 -

Note

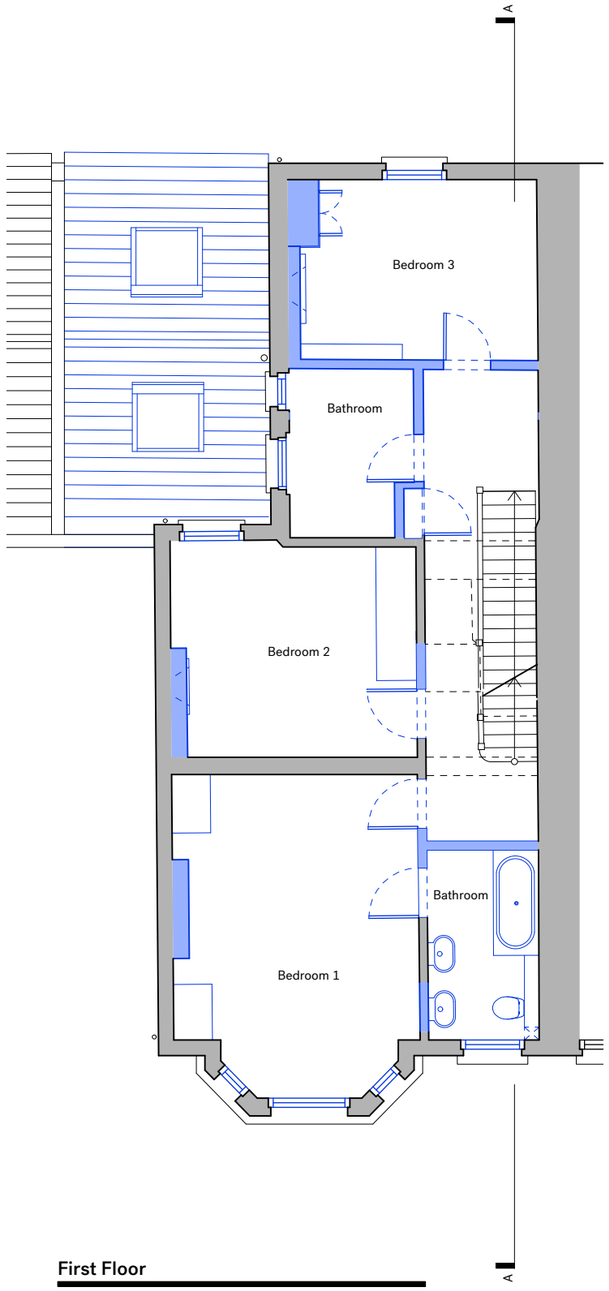
Drawing issued for planning purposes, not for construction.

Key

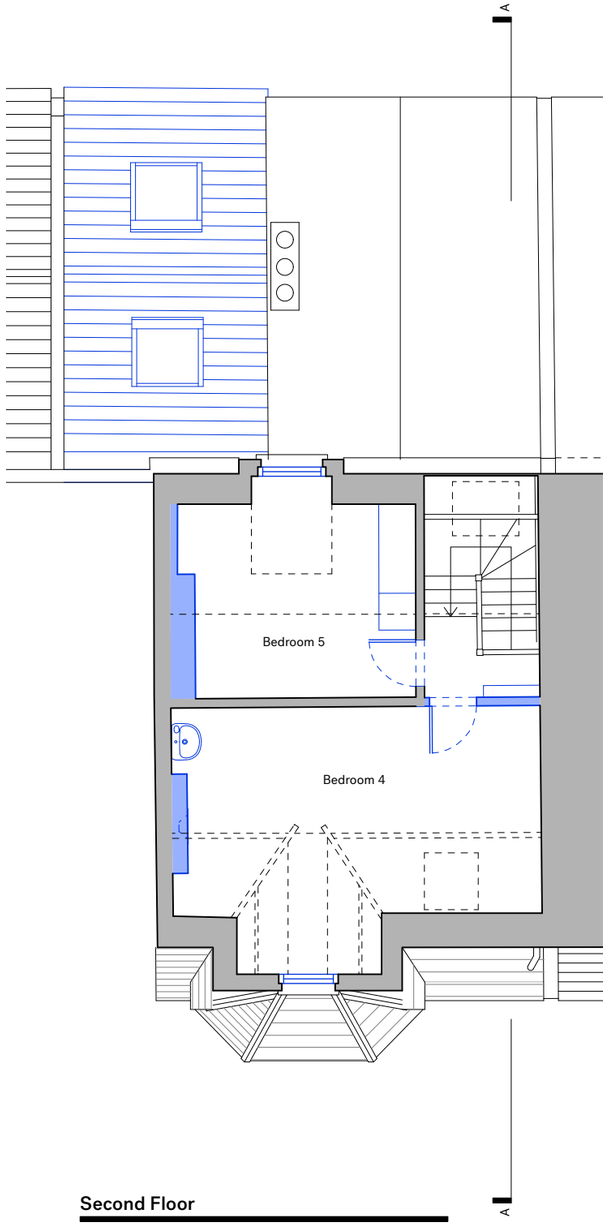
- Existing - retained
- Existing - demolished
- Proposed
- Assumed boundary



Ground Floor



First Floor



Second Floor

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10 Winterbrook Road, London SE24 9JA

0 | 1 | 2 | 3 | 4 | 5 m

Scale 1:100 @ A3

Planning
11.03.24

Existing Plans
W10 P-03 -

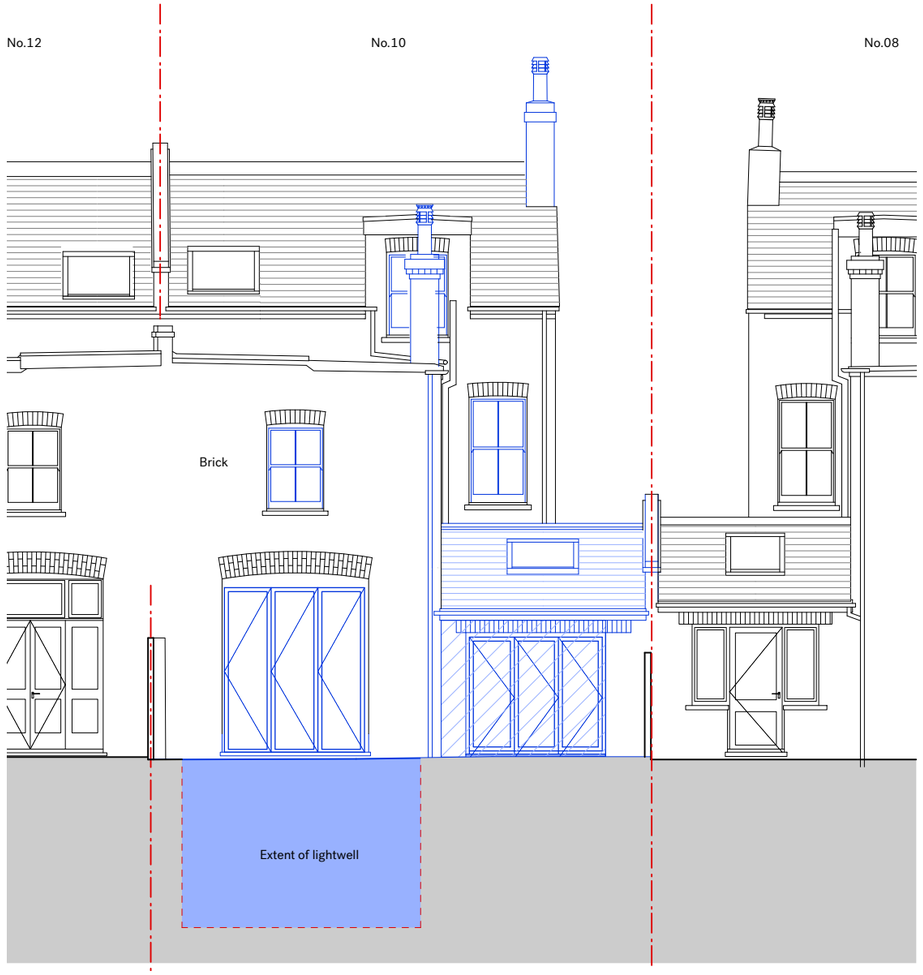
Note

Drawing issued for planning purposes, not for construction.

Key

- Existing - retained
- Existing - demolished
- Proposed
- Assumed boundary

Front elevation



Rear elevation

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10 Winterbrook Road, London SE24 9JA

0 | 1 | 2 | 3 | 4 | 5 m
Scale 1:100 @ A3

Planning
11.03.24

Existing Elevations - Front and Rear
W10 P-04 -

Note

Drawing issued for planning purposes, not for construction.

Key

- Existing - retained
- Existing - demolished
- Proposed
- Assumed boundary

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10 Winterbrook Road, London SE24 9JA

0 | 1 | 2 | 3 | 4 | 5 m

Scale 1:100 @ A3

Planning
11.03.24

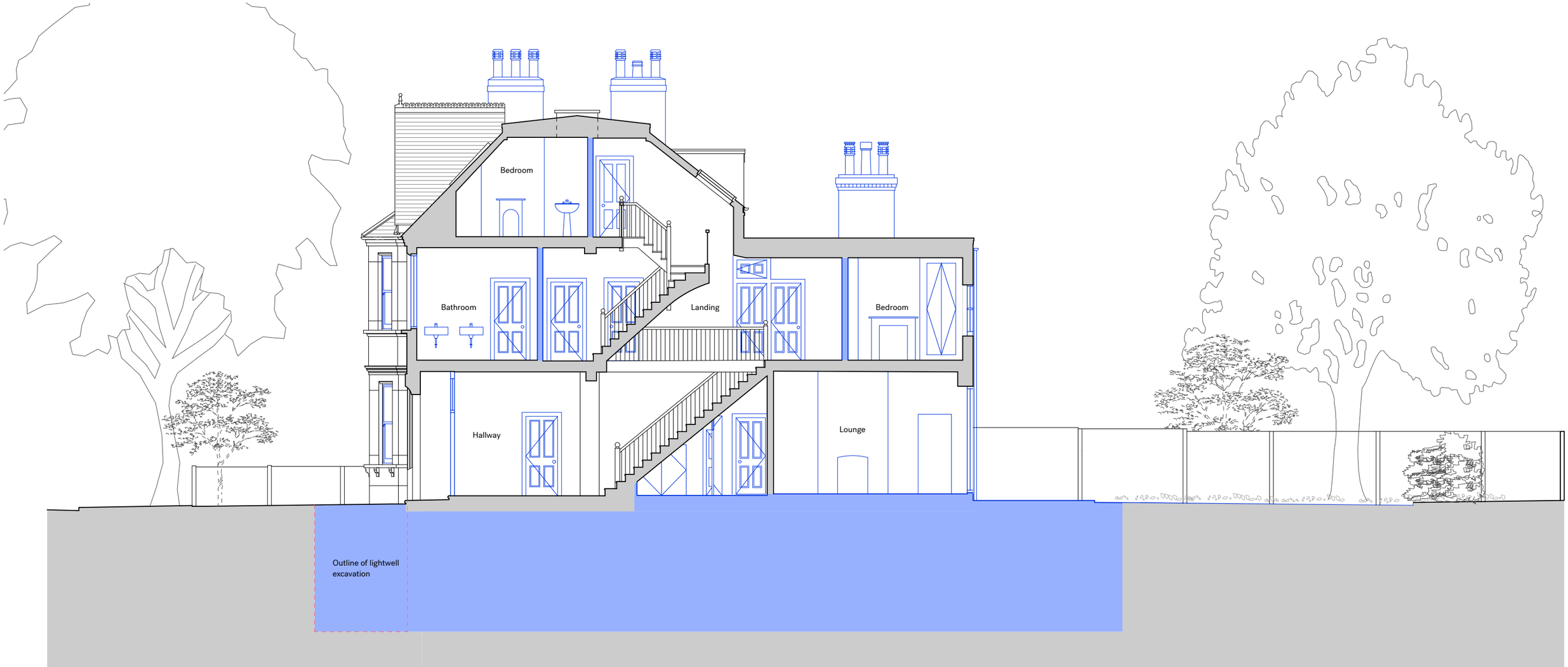
Existing Side Elevation/Section
W10 P-05 -

Note

Drawing issued for planning purposes, not for construction.

Key

- Existing - retained
- Existing - demolished
- Proposed
- Assumed boundary



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10 Winterbrook Road, London SE24 9JA

0 | 1 | 2 | 3 | 4 | 5 m
Scale 1:100 @ A3

Planning
11.03.24

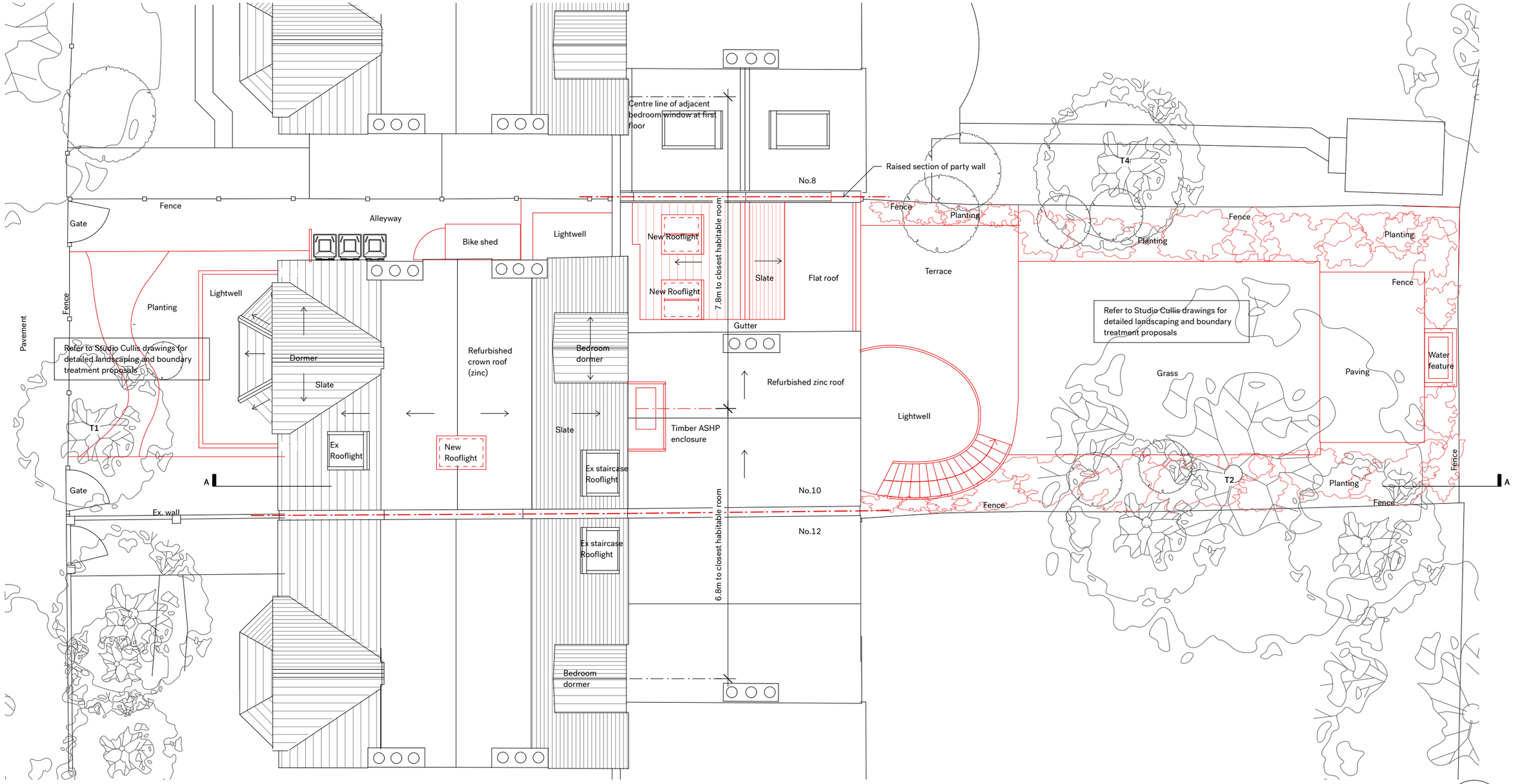
Existing Section A
W10 P-06 -

Note

Drawing issued for planning purposes, not for construction.

Key

- Existing - retained
- Existing - demolished
- Proposed
- Assumed boundary



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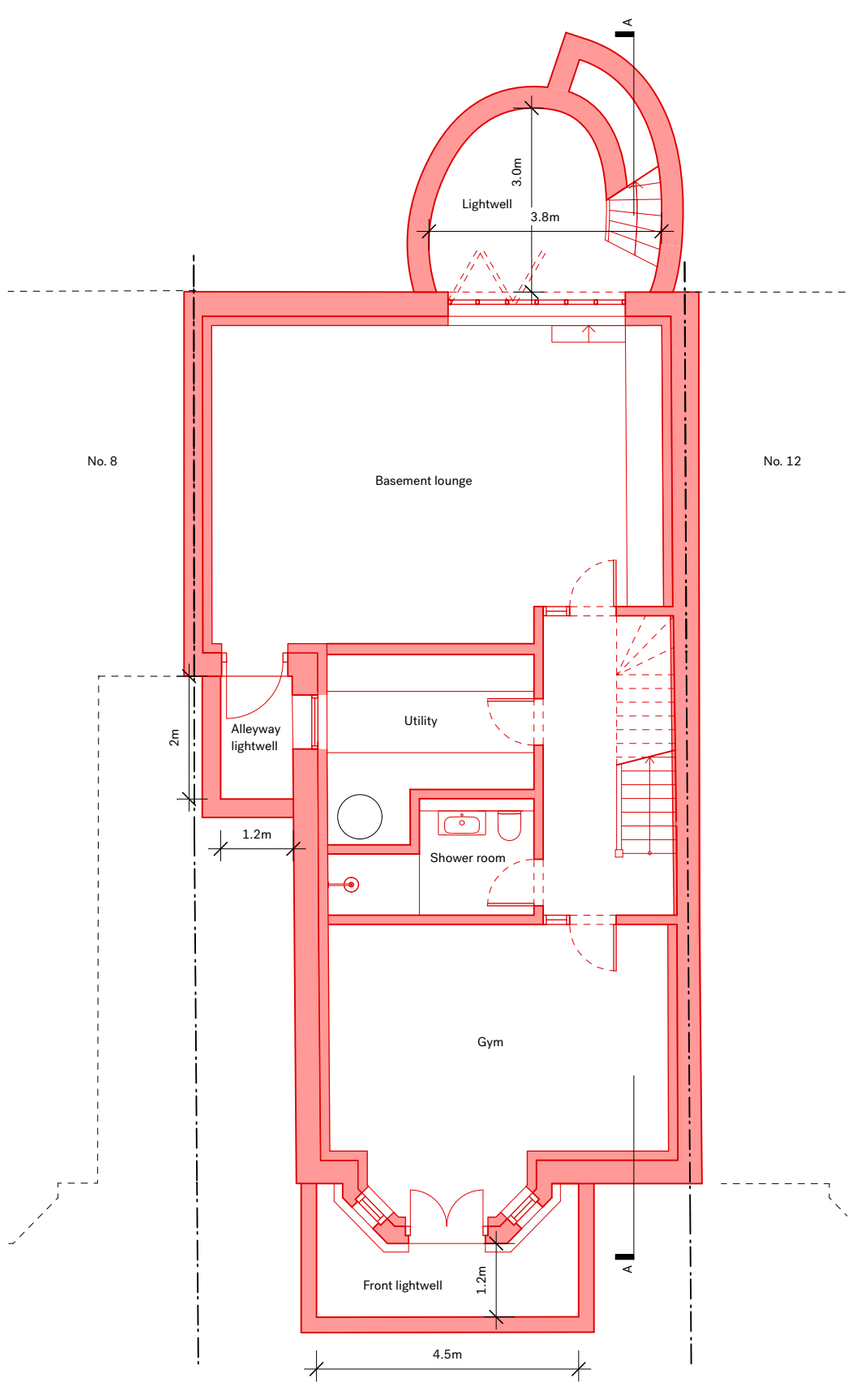
10 Winterbrook Road, London SE24 9JA

0 | 1 | 2 | 3 | 4 | 5 m

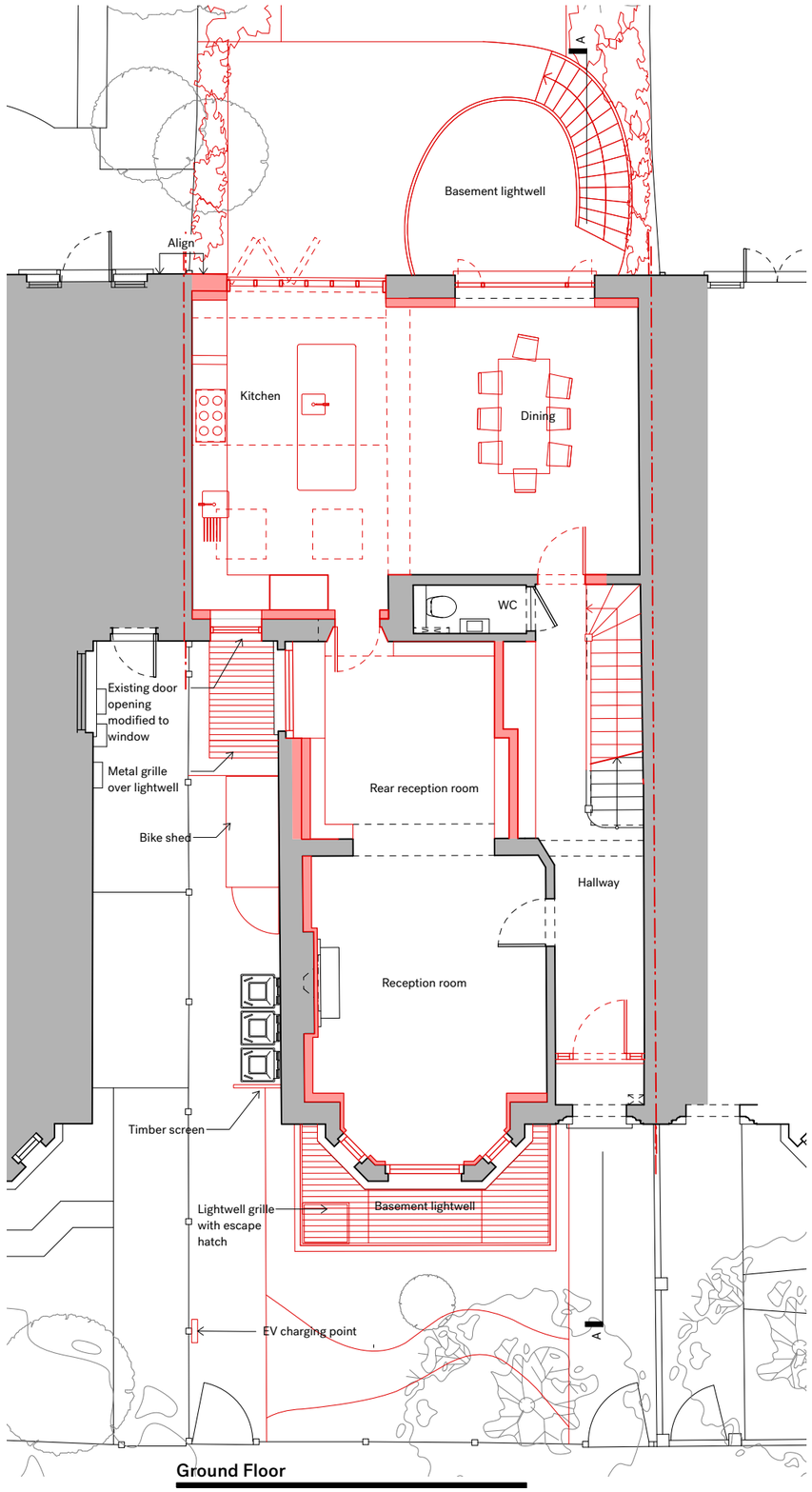
Scale 1:100 @ A3

Planning
11.03.24

Proposed Site/Roof plan
W10 P-11 -



Basement Floor



Ground Floor

Note

Drawing issued for planning purposes, not for construction.

Key

- Existing - retained
- Existing - demolished
- Proposed
- Assumed boundary

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10 Winterbrook Road, London SE24 9JA

0 | 1 | 2 | 3 | 4 | 5 m
Scale 1:100 @ A3

Planning
11.03.24

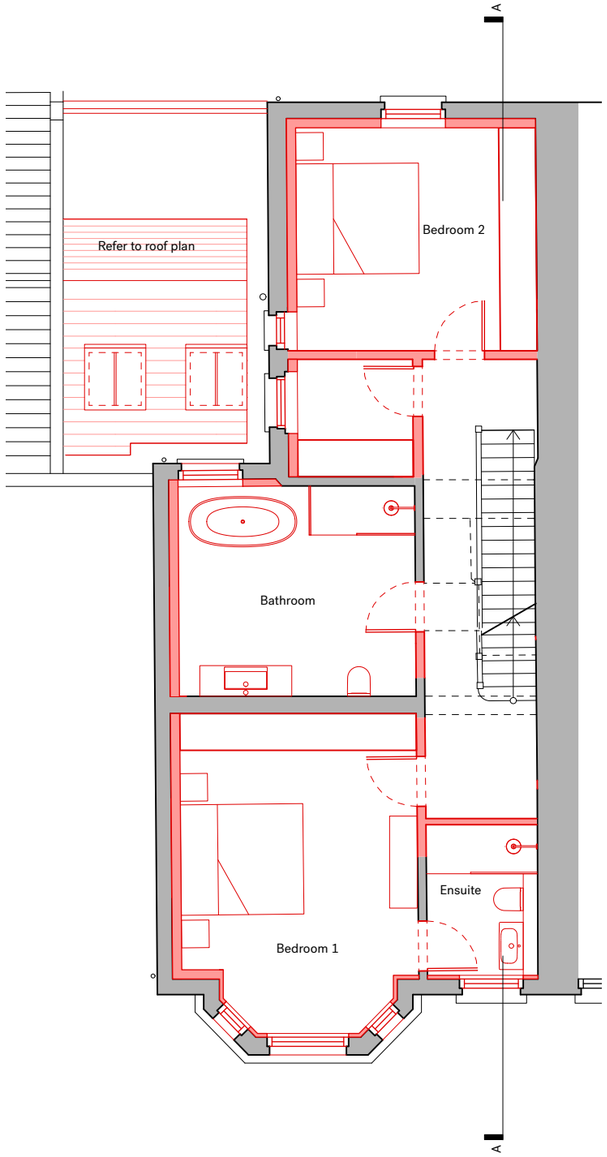
Proposed basement & ground floor plans
W10 P-12 -

Note

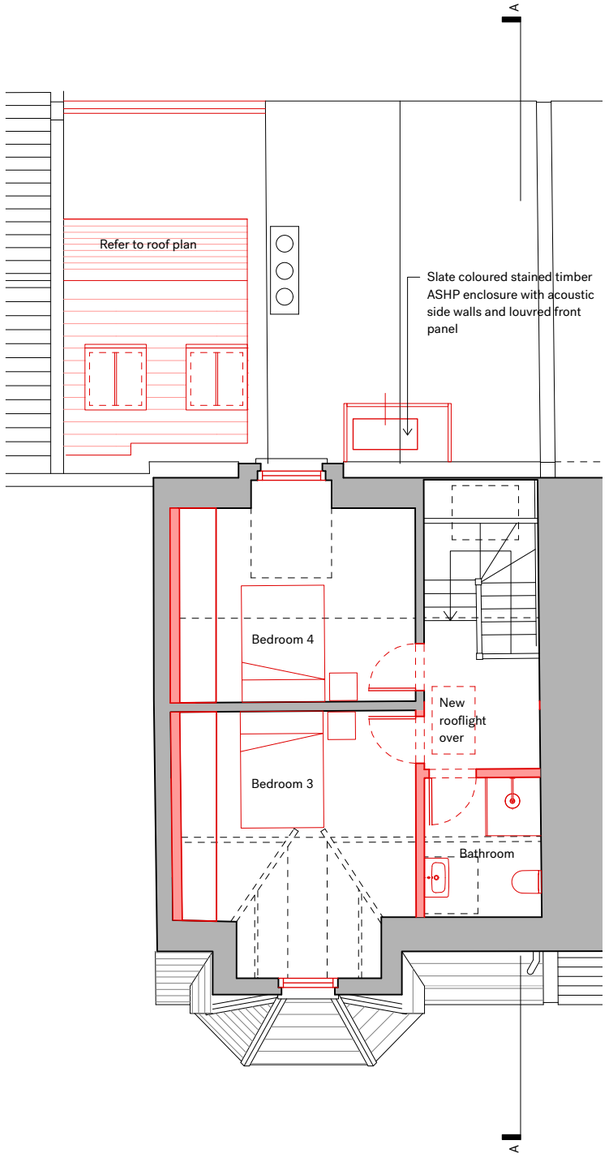
Drawing issued for planning purposes, not for construction.

Key

- Existing - retained
- Existing - demolished
- Proposed
- Assumed boundary



First Floor



Second Floor

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+44 (0)20 8766 6116

10 Winterbrook Road, London SE24 9JA

0 1 2 3 4 5 m
Scale 1:100 @ A3

Planning
11.03.24

Proposed first and second floor plans
W10 P-13 -

Note

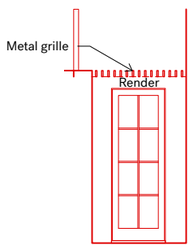
Drawing issued for planning purposes, not for construction.

Key

- Existing - retained
- Existing - demolished
- Proposed
- Assumed boundary

Front elevation

Rear elevation



Alleyway lightwell section

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10 Winterbrook Road, London SE24 9JA

0 | 1 | 2 | 3 | 4 | 5 m

Scale 1:100 @ A3

Planning
11.03.24

Proposed Elevations - Front and Rear
W10 P-14 -

Note

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Key

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- Existing - demolished
- Proposed
- Assumed boundary

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0 | 1 | 2 | 3 | 4 | 5 m
Scale 1:100 @ A3

Planning
11.03.24

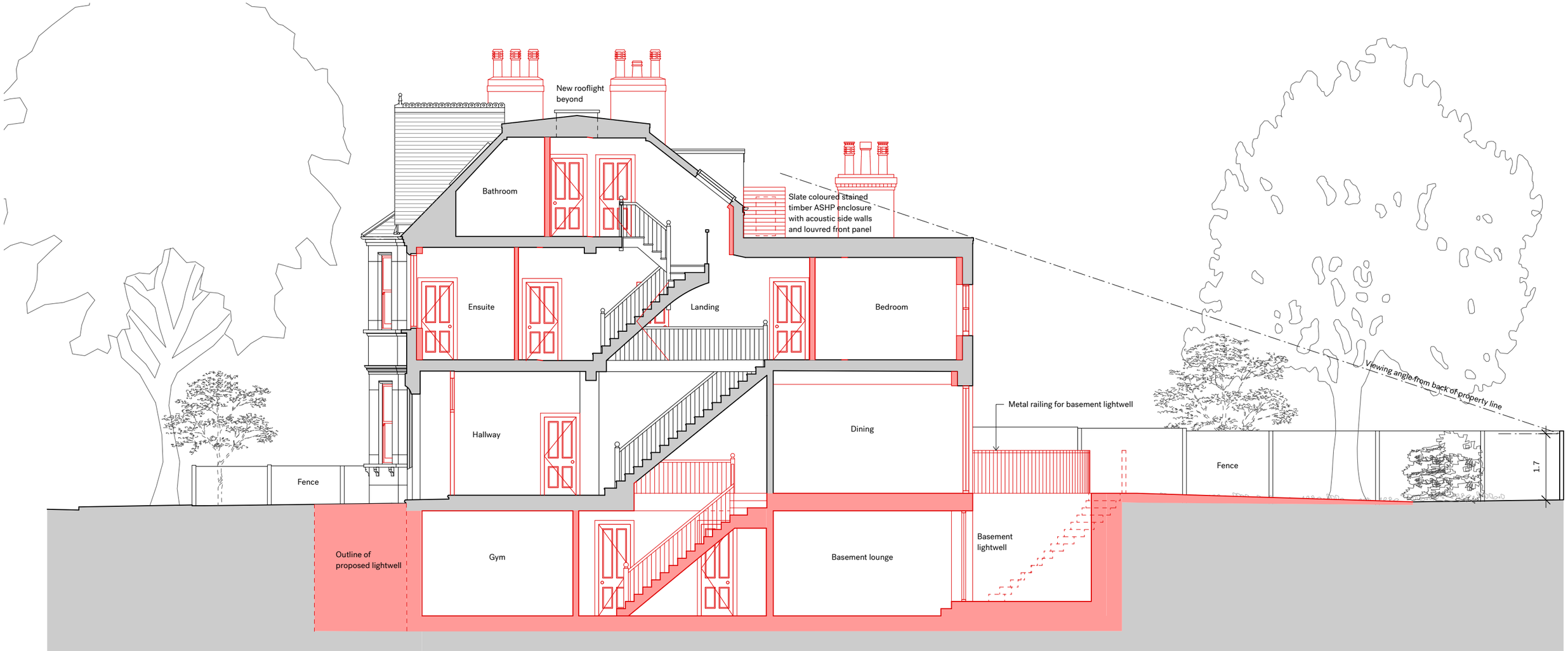
Proposed Side Elevation/Section
W10 P-15 -

Note

Drawing issued for planning purposes, not for construction.

Key

- Existing - retained
- Existing - demolished
- Proposed
- Assumed boundary



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10 Winterbrook Road, London SE24 9JA

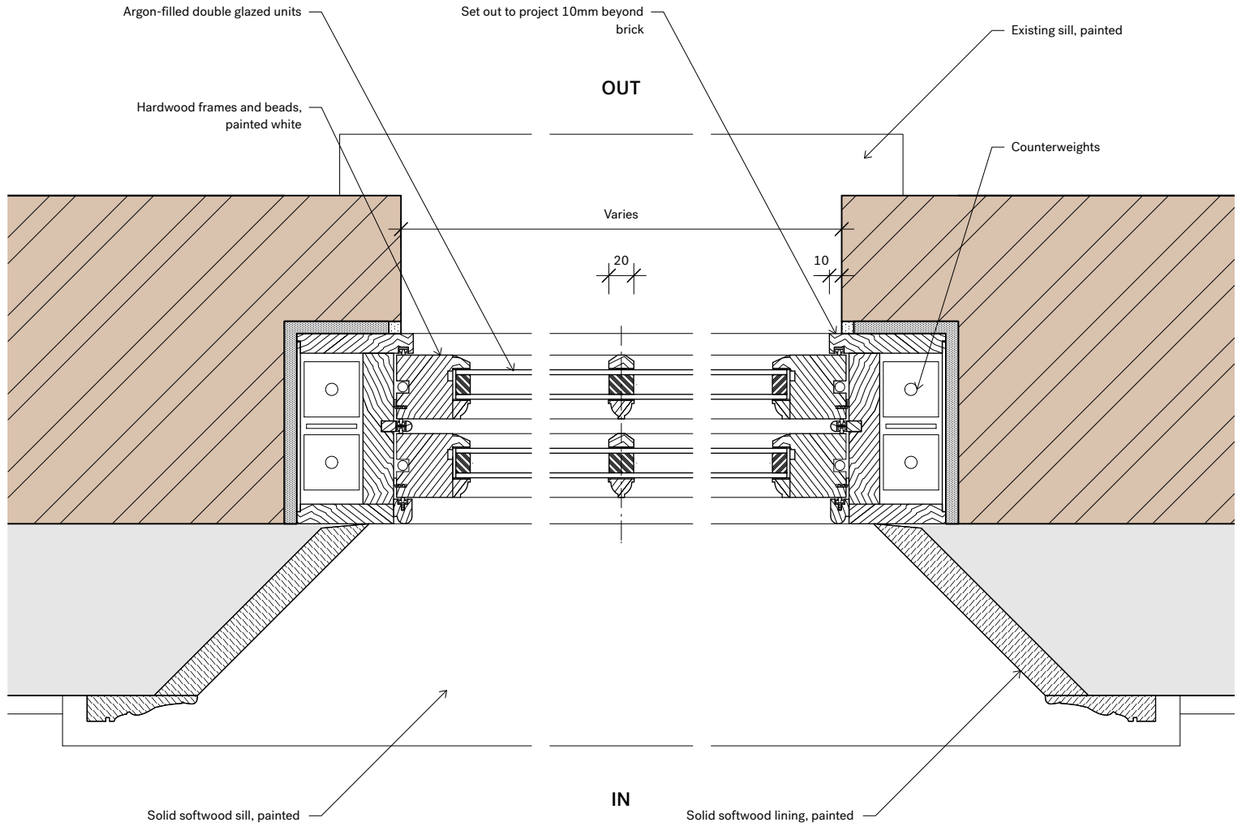
0 | 1 | 2 | 3 | 4 | 5 m
Scale 1:100 @ A3

Planning
11.03.24

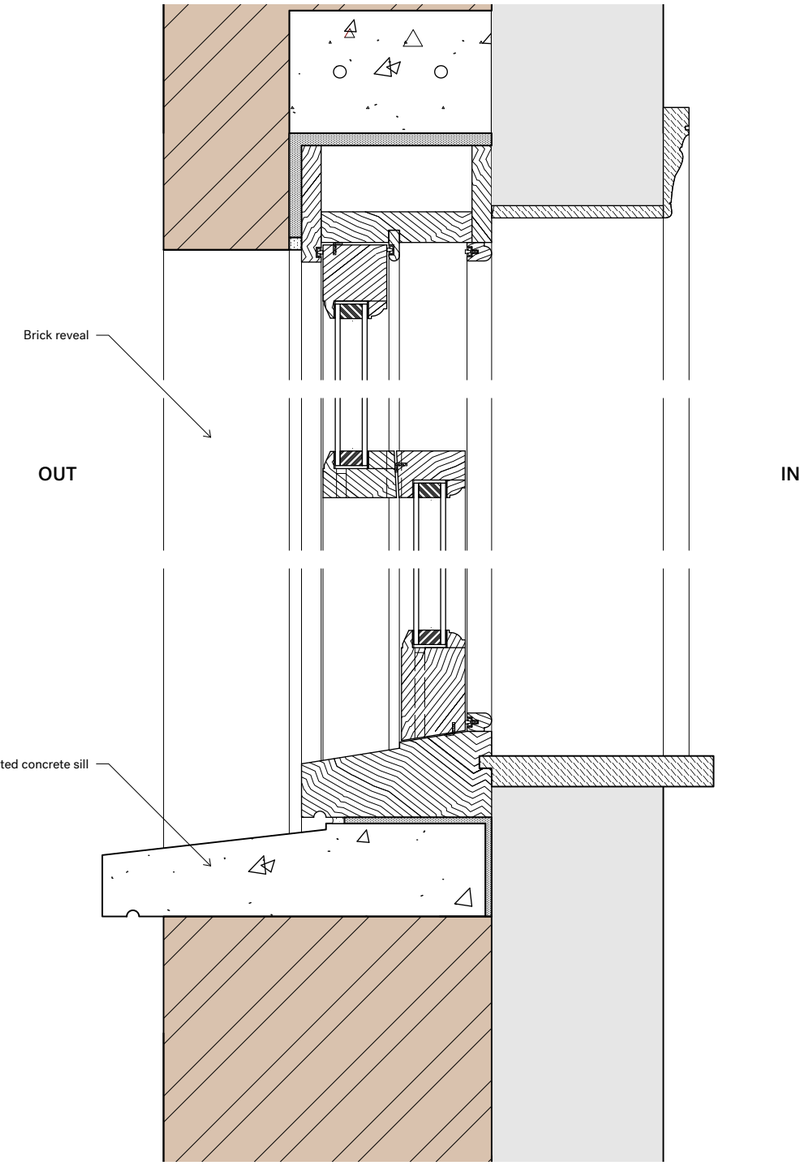
Proposed Section A
W10 P-16 -

Note

Drawing issued for planning purposes, not for construction.



Plan



Section

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10 Winterbrook Road, London SE24 9JA

0 | 50 | 100 | 150 | 200 | 250 mm

Scale 1:5 @ A3

Planning
11.03.24

Replacement window details
W10 P-21 -

APPENDIX II Proposed Drainage Layout

DESIGN PHILOSOPHY

UNCHANGED ROOF AREA HATCHED RED TO DRAIN AS EXISTING. ROOF/EXTERNAL HARDSTANDING AREA HATCHED GREEN TO BE MANAGED AND FLOWS LIMITED TO AS CLOSE AS FEASIBLE TO GREENFIELD RUNOFF RATES. ROOF AREA HATCHED ORANGE TO DRAIN VIA NEW ATTENUATION SYSTEM HOWEVER TO BE DISCHARGED AT EXISTING RATE.

FOUL/SURFACE WATER TO DISCHARGE INTO COMBINED SEWER BENEATH WINTERBROOK ROAD AS PER THAMES WATER ASSET LOCATION PLAN

EXISTING DRAINAGE TO BE UTILISED, IF THIS IS NOT POSSIBLE THEN NEW DRAINAGE TO BE IMPLEMENTED

LEVELS TO SLOPE AWAY FROM ENTRANCES/EXITS

RELEVANT PERMISSIONS TO BE GAINED FROM LOCAL SEWER AUTHORITY PRIOR TO CONSTRUCTION

RWP LOCATIONS AS PER ARCHITECTS DRAWINGS AND ARE TBC.

FOUL DRAINAGE TO BE RE-ROUTED AS NECESSARY TO AVOID CLASHES.

SPECS/DETAILS OF PUMPS AT LOWER LEVELS TO BE CONFIRMED BY SPECIALIST

ATTENUATION TANK DETAILS TO BE CONFIRMED AT DETAILED DESIGN STAGE

INFILTRATION ASSUMED NOT FEASIBLE DUE TO UNDERLYING CLAY (BGS) AND LIMITED PROXIMITY TO NEIGHBORING SITES

LEVELS AND DETAILS OF OUTFALL TO BE CONFIRMED AT DETAILED DESIGN STAGE

APPROXIMATE LOCATION OF COMBINED SEWER BENEATH WINTERBROOK ROAD AS PER THAMES WATER ASSET LOCATION PLAN - DETAILS TO BE CONFIRMED

NEW HYDROBRAKE MANHOLE TO BE CONSTRUCTED IN ORDER TO LIMIT FLOW OFF SITE TO 2.3L/S DURING THE 1 IN 100+40%CC RAINFALL EVENT

PRODUCT NO: CTL-SCU-0051-1800-0400-1800

TO CONNECT INTO EXISTING DRAINAGE IF POSSIBLE

ATTENUATION TANK - AQUACELL CORE R OR SIMILAR
AREA: 2m²
DEPTH: 0.4m
POROSITY: 0.95
COVER LEVEL: 4.85mAOD
INVERT LEVEL: 4.05mAOD
VOLUME: 0.76m³

BGS RECORDS SHOW LAMBETH GROUP - CLAY, SILT AND SAND - AS SUCH INFILTRATION IS ASSUMED NOT TO BE FEASIBLE. AS SUCH, STORM WATER IS PROPOSED TO BE DISCHARGED EXISTING SYSTEM

TANK SPECS TO BE CONFIRMED WITH MANUFACTURER

TREE ROOT PROTECTION TBC - SOAKAWAY TO BE MOVED IF NECESSARY

PIPE RUN TO BE SUSPENDED ON WALL OVER LIGHTWELL

DETAILS OF FOUNDATIONS/BELOW-GROUND CONSTRUCTION TO BE CONFIRMED PRIOR TO CONSTRUCTION OF SUSPENDED PIPE RUN

EXISTING MANHOLE ON SITE TO BE RE-USED IF POSSIBLE

Outfall
CL 4.700
IL 2.865
450mm Dia

SWM2
CL 4.790
IL 2.940

Hydrobrake
CL 4.940
IL 3.780
1200mm Dia

SWM6
CL 5.050
IL 4.030

Attenuation Tank
CL 4.850
IL 4.050

SWP1.005 ←
100mm@1in38.9

SWP1.004 ←
100mm@1in13.2

SWP1.003 ←
100mm@1in24.7

SWP1.002 ←
100mm@1in30.2

SWP1.001 ←
100mm@1in19.5

SWM8
CL 4.850
IL 4.500
450mm Dia

PUMP MANHOLE LIMITING FLOW TO 0.5L/S DURING THE 1 IN 100 YEAR +40% STORM EVENT

SPECS OF PUMP TO BE CONFIRMED BY MANUFACTURER

Pump Front
CL 2.300
IL TBC
450mm Dia

Storm
0.000Ha
TO NODE Pump Front

RWP9
CL 4.820
IL 4.520 RWP
100mm Dia

RWP2.000
100mm@1in0.2

SWP1.000
100mm@1in1.5

Storm
0.005Ha
TO NODE RWP9

Pump Rear
CL 2.300
IL 1.800
450mm Dia

Storm
0.002Ha
TO NODE SWM8

PUMP MANHOLE LIMITING FLOW TO 0.5L/S DURING THE 1 IN 100 YEAR +40% STORM EVENT

SPECS OF PUMP TO BE CONFIRMED BY MANUFACTURER

DETAILS OF RAINWATER COLLECTION AT LOWER LEVELS TO BE CONFIRMED

DETAILS OF RAINWATER COLLECTION AT LOWER LEVELS TO BE CONFIRMED

1:50 @ A1
0 0.5 1.0 1.50 2.0 2.5m

1. GENERAL
a. THIS DRAWING IS NOT TO BE SCALED, WORK TO FIGURED DIMENSIONS ONLY, CONFIRMED ON SITE.
b. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL DRAWINGS, DETAILED SPECIFICATIONS WHERE APPLICABLE AND ALL ASSOCIATED DRAWINGS IN THIS SERIES.
c. ANY DISCREPANCY ON THIS DRAWING IS TO BE REPORTED IMMEDIATELY TO THE PARTNERSHIP FOR CLARIFICATION.
d. THE CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY WORKS AND FOR THE STABILITY OF THE WORKS IN PROGRESS.
e. CDM REGULATIONS 2015. ALL CURRENT DRAWINGS AND SPECIFICATIONS MUST BE READ IN CONJUNCTION WITH THE DESIGNER'S HAZARD RISK AND ENVIRONMENT ASSESSMENT RECORD. DESIGN HAS BEEN PRODUCED BASED ON INFORMATION PROVIDED BY THE CLIENT/PRINCIPLE DESIGNER AVAILABLE AT TIME OF ISSUE. CONTRACTOR TO REVIEW DRAWING AND SPECIFICATION IN CONTEXT WITH THE WIDER SITE AND SPECIFIC SITE INVESTIGATION, CONTAMINATION ASSESSMENT, ASBESTOS SURVEY, ENVIRONMENTAL SURVEY, UXO SURVEY AND ANY OTHER RELEVANT INFORMATION AND MANAGE RISKS RELATING TO THE WORKS OUTLINED IN THE DRAWINGS AND SPECIFICATION. PRINCIPLE CONTRACTOR TO MAKE DESIGNER AND CLIENT AWARE OF SITE SPECIFIC RISKS THAT MAY AFFECT THE DRAWING AND SPECIFICATION.
f. CDM REGULATIONS 2015 FOR GENERIC MAINTENANCE AND MANAGEMENT RISKS REFER TO CHAPTER 36 OF CIRIA 752 SUDS MANUAL. FOR PROPRIETARY SYSTEMS SEE MANUFACTURER'S MANAGEMENT AND MAINTENANCE DETAILS AND RISK ASSESSMENT WITH REGARDS TO MAINTENANCE OF PROPRIETARY SYSTEMS.

2. CONSTRUCTION NOTE
a. THE MAIN CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF ALL TEMPORARY WORKS, AND IS ALSO RESPONSIBLE FOR THE SAFE MAINTENANCE AND STABILITY OF EXISTING BUILDINGS AT ALL TIMES.
b. THE MAIN CONTRACTOR IS RESPONSIBLE FOR ALL OCCURRENCES OF GROUND WATER DURING THE CONSTRUCTION PERIOD.
c. ANY INFORMATION GIVEN REGARDING EXISTING UNDERGROUND SERVICES IS GIVEN IN GOOD FAITH AFTER CONSULTATION WITH THE RELEVANT AUTHORITY, HOWEVER ACCURACY IS NOT CERTAIN. THE MAIN CONTRACTOR IS RESPONSIBLE FOR CHECKING ALL INFORMATION ON SITE PRIOR TO WORK COMMENCING AND TAKING DUE CARE AND ATTENTION WHILST UNDERTAKING THE WORKS.
d. THE CONTRACTOR MUST COMPLY WITH ALL CURRENT LEGISLATION RELATING TO HEALTH & SAFETY.
e. ALL PRODUCTS SPECIFIED SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS AND INSTRUCTIONS. IF THERE ARE DISCREPANCIES BETWEEN THAT INFORMATION AND THE DETAILS ON ANY MERIDIAN DRAWINGS, THE MANUFACTURERS INSTRUCTIONS MUST BE USED

3. BELOW GROUND DRAINAGE
a. UPVC-U PIPES TO BS 4660 : 2000 AND PLASTIC INSPECTION CHAMBERS AND FITTINGS TO BS EN 13598-1:2020. CLAY PIPES TO BS EN 295-1:2013. CONCRETE MANHOLE AND INSPECTION CHAMBERS TO BS EN 1917:2002
b. ALL ADOPTABLE DRAINAGE TO BE CONSTRUCTED IN ACCORDANCE WITH SEWERAGE SECTOR GUIDANCE App C - DESIGN AND CONSTRUCTION GUIDANCE AND THE RELEVANT COUNCIL DESIGN GUIDE.
c. ALL PRIVATE FOUL WATER SEWERS TO BE LAID AT 1 IN 40 AT THE HEAD OF PIPE RUNS AND 1 IN 80 ELSEWHERE UNLESS OTHERWISE STATED.
d. ALL PRIVATE FOUL SEWER PIPES TO BE 100mm DIAMETER FROM SOIL STACKS UNLESS OTHERWISE STATED ON THE DRAWING AND 150mm WHERE SERVING MORE THAN 9 PROPERTIES.
c. ALL PRIVATE SURFACE WATER SEWERS TO BE LAID AT 1 IN 100 UNLESS OTHERWISE STATED ON THE DRAWING.
d. ALL PRIVATE SURFACE WATER SEWER PIPES TO BE 100mm DIAMETER FROM DOWNPIPES AND 150mm DIAMETER ELSEWHERE UNLESS OTHERWISE STATED ON THE DRAWING.
e. ALLOW FOR RODDING ACCESS ABOVE GROUND WHERE RAINWATER DOWNPIPES OR SOIL STACKS DO NOT HAVE A DIRECT CONNECTION TO AN INSPECTION CHAMBER.
f. EXISTING SEWER PIPE TO BE RE-USED TO BE SURVEYED AND LEVELED PRIOR TO COMMENCEMENT OF THE DRAINAGE WORKS AND REFURBISHED IF NECESSARY.
g. CONNECTIONS TO AN ADOPTED SEWER ONLY TO BE MADE FOLLOWING APPROVAL FROM THE RELEVANT ADOPTING AUTHORITY.
h. ALL DRAINS, SEWER PIPES AND MANHOLES TO BE CLEANED AND TESTED FOR WATER TIGHTNESS ON COMPLETION OF CONSTRUCTION.

4. MANHOLE COVERS AND FRAMES
a. MANHOLE COVERS TO BE CLASS D400 IN HIGHWAYS, CLASS B125 IN FOOTWAYS AND VERGES, CLASS A15 IN NON-TRAFFICKED AREAS.
b. MANHOLE COVER AND FRAME TO BE BEDDED AND SURROUNDED IN 1:3 MORTAR.

LEGEND

- TO DRAIN AS EXISTING
- TO BE MANAGED TO AS CLOSE AS FEASIBLE TO GREENFIELD RUNOFF RATES
- RUNOFF RATES TO SAME AS EXISTING BUT UTILISE NEW DRAINAGE SYSTEM
- GEOCELLULAR ATTENUATION - TANKED
- PROPOSED SW PIPE RUN
- PROPOSED SW RISING MAIN
- PROPOSED TYPE 4 SW INSPECTION CHAMBER
- HB PROPOSED HYDROBRAKE MANHOLE
- P PROPOSED SW PUMP
- RWP PROPOSED SW RAINWATER PIPE
- EXISTING PUBLIC COMBINED RUN - RETAINED
- EXISTING PRIVATE COMBINED RUN - RETAINED

REV:	DESCRIPTION:	BY:	DATE:
A	Revised Layout	SL	22/02/2024

STATUS: Preliminary

MERIDIAN
CIVIL ENGINEERING CONSULTANCY

CLIENT: CROFT Structural + Civil

SITE: 10 Winterbrook Road, London, SE24 9JA

TITLE: Surface Water Drainage Strategy - Proposed Layout

SCALE AT A1:	DATE:	DRAWN:	CHECKED:
1:50	30/11/23	SL	MN

PROJECT NO:	DRAWING NO:	REVISION:
MC0372	CIV01	A

APPENDIX III Calculations

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Sam Lee
Site name:	10 Winterbrook
Site location:	SE24 9JA

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	51.45183° N
Longitude:	0.09768° W
Reference:	2269272220
Date:	Nov 28 2023 16:31

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 1

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm):	627	627
Hydrological region:	6	6
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates Default Edited

Q_{BAR} (l/s):	4.24	4.24
1 in 1 year (l/s):	3.61	3.61
1 in 30 years (l/s):	9.76	9.76
1 in 100 year (l/s):	13.54	13.54
1 in 200 years (l/s):	15.87	15.87

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	0.600
Time of Entry (mins)	4.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
Pump Rear	0.001	4.00	2.300	450	128.402	-30.786	0.500
9	0.005	4.00	4.820	100	128.287	-30.351	0.300
8	0.002	4.00	4.850	450	129.290	-29.606	0.350
Attenuation Tank			4.850		129.132	-27.661	0.800
6			5.050		127.330	-27.725	1.020
Pump Front	0.000	4.00	2.300	450	111.906	-29.076	0.700
Hydrobrake	0.002	4.00	4.940	1200	121.155	-27.350	1.160
2			4.790		110.097	-27.322	1.850
Outfall			4.700	450	105.683	-27.300	1.835

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.005	4.414	58.9	100	SW_Standard	4.790	2.940	1.750	4.700	2.865	1.735
1.004	11.058	13.2	100	SW_Standard	4.940	3.780	1.060	4.790	2.940	1.750
1.003	6.187	24.7	100	SW_Standard	5.050	4.030	0.920	4.940	3.780	1.060
1.002	1.803	90.2	100	SW_Standard	4.850	4.050	0.700	5.050	4.030	0.920
1.001	1.951	19.5	100	SW_Standard	4.850	4.500	0.250	4.850	4.400	0.350
1.000	1.477	-0.5	100	SW_Rising main	2.300	1.800	0.400	4.850	4.500	0.250
2.000	1.249	62.5	100	SW_Standard	4.820	4.520	0.200	4.850	4.500	0.250
3.000	9.408	-3.2	100	SW_Standard	2.300	1.600	0.600	4.940	4.540	0.300

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.005	2		Junction		Outfall	450	Manhole	SW_Standard
1.004	Hydrobrake	1200	Manhole	SW_HB	2		Junction	
1.003	6		Junction		Hydrobrake	1200	Manhole	SW_HB
1.002	Attenuation Tank		Junction		6		Junction	
1.001	8	450	Manhole	SW_Standard	Attenuation Tank		Junction	
1.000	Pump Rear	450	Manhole	SW_Pump	8	450	Manhole	SW_Standard
2.000	9	100	Manhole	SW_RWP	8	450	Manhole	SW_Standard
3.000	Pump Front	450	Manhole	SW_Pump	Hydrobrake	1200	Manhole	SW_HB

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m³/ha)	0.0
Summer CV	0.750	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	0.840	Drain Down Time (mins)	1440	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	0	0	0
100	40	0	0

Node Hydrobrake Online Hydro-Brake® Control

Flap Valve	x	Objective	(CU) Linear Discharge
Downstream Link	1.004	Sump Available	✓
Replaces Downstream Link	x	Product Number	CTL-SCU-0051-1800-0400-1800
Invert Level (m)	3.780	Min Outlet Diameter (m)	0.075
Design Depth (m)	0.400	Min Node Diameter (mm)	1200
Design Flow (l/s)	1.8		

Node Pump Front Online Pump Control

Flap Valve	x	Invert Level (m)	1.600	Switch on depth (m)	0.015
Downstream Link	3.000	Design Depth (m)	0.700	Switch off depth (m)	0.005
Replaces Downstream Link	x	Design Flow (l/s)	0.5		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.001	1.000	0.700	1.000

Node Pump Rear Online Pump Control

Flap Valve	x	Invert Level (m)	1.800	Switch on depth (m)	0.020
Downstream Link	1.000	Design Depth (m)	0.700	Switch off depth (m)	0.010
Replaces Downstream Link	✓	Design Flow (l/s)	0.5		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.001	1.000	0.700	1.000

Node Attenuation Tank Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	4.050
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	15

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	2.5	0.0	0.400	2.5	0.0	0.401	0.0	0.0

Results for 2 year Critical Storm Duration. Lowest mass balance: 94.54%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	Pump Rear	18	1.820	0.020	0.1	0.0032	0.0000	OK
15 minute summer	9	10	4.544	0.024	0.8	0.0002	0.0000	OK
15 minute summer	8	10	4.526	0.026	1.1	0.0041	0.0000	OK
15 minute summer	Attenuation Tank	10	4.080	0.030	1.8	0.0717	0.0000	OK
15 minute winter	6	11	4.052	0.022	1.2	0.0000	0.0000	OK
15 minute summer	Pump Front	10	1.615	0.015	0.1	0.0024	0.0000	OK
15 minute winter	Hydrobrake	13	3.907	0.127	1.5	0.1440	0.0000	SURCHARGED
15 minute winter	2	13	2.965	0.025	1.0	0.0000	0.0000	OK
15 minute winter	Outfall	13	2.889	0.024	1.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	Pump Rear	Pump	8	1.0				
15 minute summer	9	2.000	8	0.8	0.598	0.101	0.0019	
15 minute summer	8	1.001	Attenuation Tank	1.8	1.182	0.132	0.0030	
15 minute summer	Attenuation Tank	1.002	6	1.3	0.802	0.197	0.0028	
15 minute winter	6	1.003	Hydrobrake	1.3	0.333	0.104	0.0281	
15 minute summer	Pump Front	3.000	Hydrobrake	0.0	0.000	0.000	0.0021	
15 minute winter	Hydrobrake	1.004	2	1.0	0.874	0.060	0.0131	
15 minute winter	2	1.005	Outfall	1.0	0.682	0.128	0.0066	0.6

Results for 30 year Critical Storm Duration. Lowest mass balance: 94.54%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	Pump Rear	76	1.820	0.020	0.2	0.0032	0.0000	OK
15 minute summer	9	10	4.565	0.045	2.4	0.0004	0.0000	OK
15 minute summer	8	10	4.541	0.041	4.2	0.0065	0.0000	OK
15 minute winter	Attenuation Tank	14	4.196	0.146	3.7	0.3471	0.0000	SURCHARGED
15 minute winter	6	14	4.195	0.165	3.5	0.0000	0.0000	SURCHARGED
30 minute summer	Pump Front	14	1.615	0.015	0.2	0.0024	0.0000	OK
15 minute winter	Hydrobrake	14	4.191	0.411	3.8	0.4649	0.0000	SURCHARGED
15 minute winter	2	14	2.973	0.033	1.8	0.0000	0.0000	OK
15 minute winter	Outfall	14	2.897	0.032	1.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute summer	Pump Rear	Pump	8	1.0				
15 minute summer	9	2.000	8	2.4	0.790	0.308	0.0040	
15 minute summer	8	1.001	Attenuation Tank	4.1	1.451	0.299	0.0055	
15 minute winter	Attenuation Tank	1.002	6	3.5	1.027	0.546	0.0141	
15 minute winter	6	1.003	Hydrobrake	2.9	0.475	0.239	0.0484	
30 minute summer	Pump Front	3.000	Hydrobrake	0.0	0.000	0.000	0.0217	
15 minute winter	Hydrobrake	1.004	2	1.8	1.009	0.106	0.0197	
15 minute winter	2	1.005	Outfall	1.8	0.796	0.225	0.0098	2.0

Results for 100 year Critical Storm Duration. Lowest mass balance: 94.54%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Pump Rear	16	1.820	0.020	0.7	0.0032	0.0000	OK
15 minute winter	9	10	4.572	0.052	3.0	0.0004	0.0000	OK
15 minute winter	8	10	4.546	0.046	5.0	0.0072	0.0000	OK
15 minute winter	Attenuation Tank	14	4.287	0.237	5.0	0.5620	0.0000	SURCHARGED
15 minute winter	6	14	4.286	0.256	3.2	0.0000	0.0000	SURCHARGED
30 minute summer	Pump Front	23	1.615	0.015	0.2	0.0024	0.0000	OK
15 minute winter	Hydrobrake	14	4.279	0.499	4.1	0.5639	0.0000	SURCHARGED
15 minute winter	2	14	2.975	0.035	1.9	0.0000	0.0000	OK
15 minute winter	Outfall	14	2.899	0.034	1.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	Pump Rear	Pump	8	1.0				
15 minute winter	9	2.000	8	3.0	0.843	0.390	0.0047	
15 minute winter	8	1.001	Attenuation Tank	5.0	1.521	0.361	0.0064	
15 minute winter	Attenuation Tank	1.002	6	3.2	1.017	0.506	0.0141	
15 minute winter	6	1.003	Hydrobrake	3.1	0.516	0.256	0.0484	
30 minute summer	Pump Front	3.000	Hydrobrake	0.0	0.000	0.000	0.0294	
15 minute winter	Hydrobrake	1.004	2	1.9	1.033	0.116	0.0210	
15 minute winter	2	1.005	Outfall	1.9	0.816	0.246	0.0105	2.5

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 94.54%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	Pump Rear	18	1.821	0.021	0.8	0.0033	0.0000	OK
15 minute winter	9	10	4.585	0.065	4.3	0.0005	0.0000	OK
15 minute winter	8	10	4.555	0.055	6.7	0.0087	0.0000	OK
30 minute winter	Attenuation Tank	23	4.479	0.429	5.1	0.9512	0.0000	SURCHARGED
30 minute winter	6	24	4.478	0.448	2.7	0.0000	0.0000	SURCHARGED
15 minute winter	Pump Front	5	1.615	0.015	0.4	0.0024	0.0000	OK
30 minute winter	Hydrobrake	24	4.473	0.693	3.1	0.7835	0.0000	SURCHARGED
30 minute winter	2	24	2.978	0.038	2.3	0.0000	0.0000	OK
30 minute winter	Outfall	24	2.902	0.037	2.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	Pump Rear	Pump	8	1.0				
15 minute winter	9	2.000	8	4.3	0.912	0.561	0.0061	
15 minute winter	8	1.001	Attenuation Tank	6.7	1.629	0.486	0.0080	
30 minute winter	Attenuation Tank	1.002	6	2.7	0.954	0.430	0.0141	
30 minute winter	6	1.003	Hydrobrake	2.3	0.386	0.189	0.0484	
15 minute winter	Pump Front	3.000	Hydrobrake	0.0	0.000	0.000	0.0368	
30 minute winter	Hydrobrake	1.004	2	2.3	1.076	0.135	0.0236	
30 minute winter	2	1.005	Outfall	2.3	0.851	0.288	0.0118	4.7

APPENDIX IV Supplementary Documents

CASCADIAWATER
Powering water into your home

Frederik Rossom
R2 Studio Architects
Studio D116
62 Tritton Road
London
SE21 8DE

Our Ref: CW12502 CCTVRpt001 26th September 2023

Dear Frederik,

Re: Drainage Investigations – 10 Winterbrook Road, London SE24 9JA

In accordance with your recent instruction and following our subsequent visit to the above property to carry out a CCTV Survey to the underground drainage, we take pleasure furnishing you with our completed report for your consideration.

We trust the information contained herein meets with your requirements, although if you require any further clarification please do not hesitate in contacting us.

In the meantime, we submit our invoice for completed works which we trust you will settle in due course.

We trust the above is of assistance.

Yours Sincerely

Colin Horrix

CCTV CAMERA
DRAIN SURVEY REPORT

---

10 Winterbrook Road
London
SE24 9JA

Our assessment of the drainage system is based on our visual inspection from information collated at the time of the survey. Where assumptions or opinions have been made, these are based on our own experience and do not constitute any form of guarantee, nor do we guarantee that any further deterioration will not occur following this survey.

Client

Frederik Rossom
R2 Studio Architects
Studio D116
62 Tritton Road
London
SE21 8DE

Contract/Surveyors

Cascadia Water Ltd
Kern House
Breakspear Road
Ruislip
Middlesex
HA4 7SQ

CONTENTS

Technical Data as follows. Major defects highlighted in *italics*: -

Run No. 1	**Foul Manhole 1 Upstream to Capped Run.** *Diameter: 100mm - Material: Vitrified Clayware - Usage: Combined*

Distance	**Defects/Connections/Joints**
0.0	Start of Survey
2.13	Slight displaced joint/***Silt in pipe 2%***
2.94	***Silt in pipe 10%***
3.53	Lateral entry at 3 o'clock unable to trace
4.07	Lateral entry at 3 o'clock unable to trace
4.07	***Silt in pipe 25%***
4.29	***Medium displaced joint***
4.90	***Silt in pipe 20%***
7.17	Lateral entry at 3 o'clock serving Rainwater Gully 1 / ***Circumferential Fracture at 6 – 12 o'clock***
7.84	Pipe deviates up to Capped Run
7.84	End of survey

Run No. 2	**Foul Manhole 1 Upstream Lateral A to Foul Water Gully 1 (Takes Rainwater Downpipe as well)** *Diameter: 100mm - Material: UPVC - Usage: Combined*

0.0	Start of Survey
0.49	Pipe deviates up to Foul Water Gully 1/Takes Rainwater Downpipe as well
0.49	End of survey

Run No. 3	**Foul Manhole 1 Upstream Lateral B to Soil Vent Pipe (takes WC as well)** *Diameter: 100mm - Material: UPVC - Usage: Foul*

0.0	Start of Survey
2.28	Pipe deviates right
5.24	Pipe deviates up to Soil Vent Pipe
5.24	End of survey

Run No. 4	**Foul Manhole 1 Downstream to Foul Manhole 2** *Diameter: 150mm - Material: Vitrified Clayware - Usage: Combined*

0.0	Start of Survey
0.61	Slight displaced joint
1.37	Slight displaced joint
2.51	Slight displaced joint
3.24	Slight displaced joint
3.86	Slight displaced joint
4.45	***Medium displaced joint***
5.06	Slight displaced joint
5.67	Slight displaced joint
7.53	Slight displaced joint
8.15	Lateral entry at 12 0'clock serving Rainwater Gully 2 / ***Fractures to Junction***
8.65	***Medium displaced joint***
9.35	Slight Displaced Joint
10.20	***Silt in pipe 20%***
10.81	Camera located at Foul Manhole 2
10.81	End of survey

Run No. 5	**Foul Manhole 2 Upstream Lateral C to Soil Vent Pipe B** *Diameter: 100mm - Material: UPVC - Usage: Foul*

0.0	Start of Survey
0.00	Pipe deviates up slightly
0.56	Pipe deviates right slightly
3.21	Pipe levels out
8.22	Pipe deviates right slightly
9.02	Pipe deviates up to Soil Vent Pipe B
9.02	End of Survey

Run No. 6	**Foul Manhole 2 Downstream to Main Sewer** *Diameter: 150mm - Material: Vitrified Clayware - Usage: Foul*

0.0	Start of Survey
0.00	Pipe holding water 1% hose running
0.61	Slight displaced joint
1.80	Slight displaced joint/Pipe deviates right and down
2.19	***Medium displaced joint***
2.39	Camera joins main run to adjacent property's
3.18	Slight displaced joint
4.45	Slight displaced joint
7.65	***Medium displaced joint***
8.42	Pipe deviates right and down
8.96	Camera located at Main Sewer
8.96	End of survey

Run No. 7	**Rainwater Gully 1 Downstream to Main Run** *Diameter: 100mm - Material: UVPC- Usage: Surface*

0.0	Start of Survey
0.00	Pipe holding water 1%
0.01	Pipe deviates down
0.02	Pipe material changes to Vitrified Clayware
0.75	Pipe deviates left
1.34	***Medium displaced joint***
2.23	Pipe deviates left
2.63	Camera located at Main Run
2.63	End of survey

Manhole Details:

Manhole	Manhole Depth	Condition	Construction	Comments
Foul Manhole 1	1.16m	Satisfactory	Brick	Located at side of the property.
Foul Manhole 2	1.85m	Fair	Brick	Fine root infiltration in walls. 150mm interceptor 100 mm rodding eye. Located in front garden.

Conclusion

We write to confirm our operative has attended the above property on 25th September 2023 in order to conduct a drainage investigation.

During our visit the interceptor trap inside FMH2 was found to be blocked. Our operative has conducted a cleaning operation to successfully restore flow.

The results of our investigations are as follows:

1. FMH1 upstream to disused run

The CCTV survey has revealed this drain to be constructed from 100mm diameter vitrified clay pipe-work. Areas of structural defect were located in the form of joint displacement and a circumferential fracture. This drain contains connecting junctions serving RWG1 and also two further unknown connections. We would mention that the fracture is present on the junction for RWG1.

We would be pleased to provide an estimate for repair on request.

2. FMH1 upstream to lateral A serving FWG1 (also removing surface water from RWDP)

The CCTV survey has revealed this drain to be constructed from 100mm diameter UPVC pipe-work. No obvious structural defects were located.

3. FMH1 upstream to lateral B serving SVP

The CCTV survey has revealed this drain to be constructed from 100mm diameter UPVC pipe-work. No obvious structural defects were located.

4. FMH1 downstream to FMH2

The CCTV survey has revealed this drain to be constructed from 150mm diameter vitrified clay pipe-work. Areas of structural defect were located in the form of circumferential fracturing and joint displacement. This drain contains a connecting junction serving RWG2 and the fracturing is present on this junction.

We would be pleased to provide an estimate for repair on request.

5. FMH2 upstream to lateral C serving SVPB

The CCTV survey has revealed this drain to be constructed from 100mm diameter UPVC pipe-work. No obvious structural defects were located.

6. FMH2 downstream to main sewer, passing over interceptor trap

The CCTV survey has revealed this drain to be constructed from 150mm diameter vitrified clay pipe-work. Areas of structural defect were located in the form of joint displacement. This drain connects onto the main run for the adjacent property ay 2.39m.

We would be pleased to provide an estimate for repair on request.

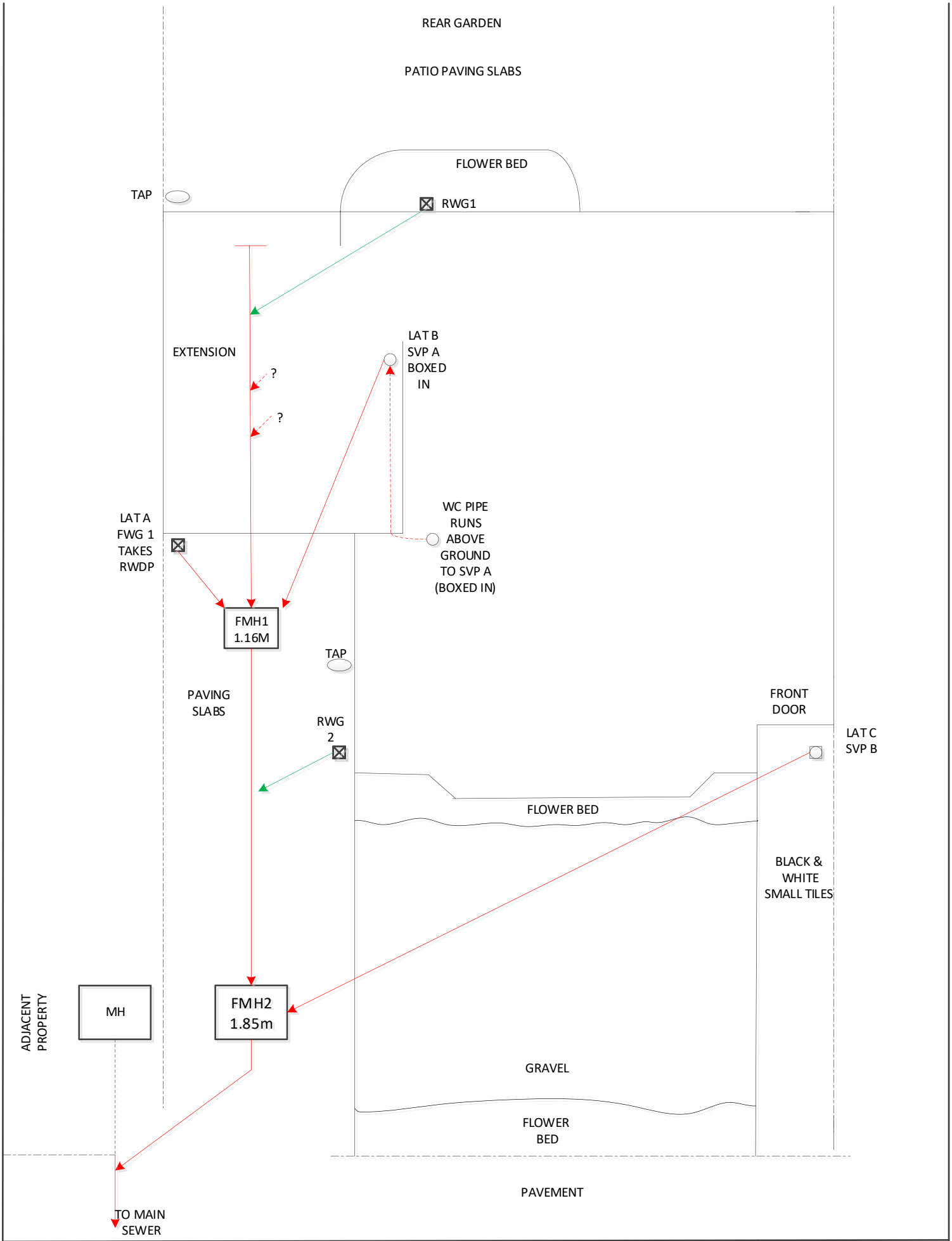
7. RWG1 downstream to main run

The CCTV survey has revealed this drain to be constructed from a mixture of 100mm diameter UPVC and vitrified clay pipe-work. One area of structural defect was located in the form of a joint displacement.

We would be pleased to provide an estimate for repair on request.





Cascadia Water Limited
Kern House
Breakspear Road
Ruislip
Middlesex
HA4 7SQ
Tel: 01895 624 600
www.cascadiawater.co.uk

REF: CW12502

DATE: 25th September 2023

Not to Scale

KEY:

- FOUL DRAINAGE
- FOUL DRAINAGE (UN-SURVEYED)
- SURFACE DRAINAGE
- SURFACE DRAINAGE (UN-SURVEYED)
- WATERMAIN (SUSPECTED ROUTE)
- WATERMAIN (PROPOSED ROUTE)

SITE ADDRESS

10 Winterbrook Road
London
SE24 9JA

Asset location search

Property Searches

Meridian Civils
62Balsdean Road
BRIGHTON
BN2 6PF

Search address supplied 10
Winterbrook Road
London
SE24 9JA

Your reference MC0372

Our reference ALS/ALS Standard/2023_4917424

Search date 28 November 2023

Notification of Price Changes

From 1st April 2023 Thames water Property Searches will be increasing the prices of its CON29DW, CommercialDW Drainage & Water Enquiries and Asset Location Searches. Historically costs would rise in line with RPI but as this currently sits at 14.2%, we are capping it at 10%.

Customers will be emailed with the new prices by January 1st 2023.

Any orders received with a higher payment prior to the 1st April 2023 will be non-refundable. For further details on the price increase please visit our website at www.thameswater-propertysearches.co.uk

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0800 009 4540

Asset location search

Property Searches

Search address supplied: 10, Winterbrook Road, London, SE24 9JA

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This searchprovides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0800 009 4540, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk
Web: www.thameswater-propertysearches.co.uk

Asset location search

Thames Water Property Searches

Waste Water Services

Please provide a copy extract from the public sewer map.

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an ‘as constructed’ record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and pressure test to be carried out for a fee.

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

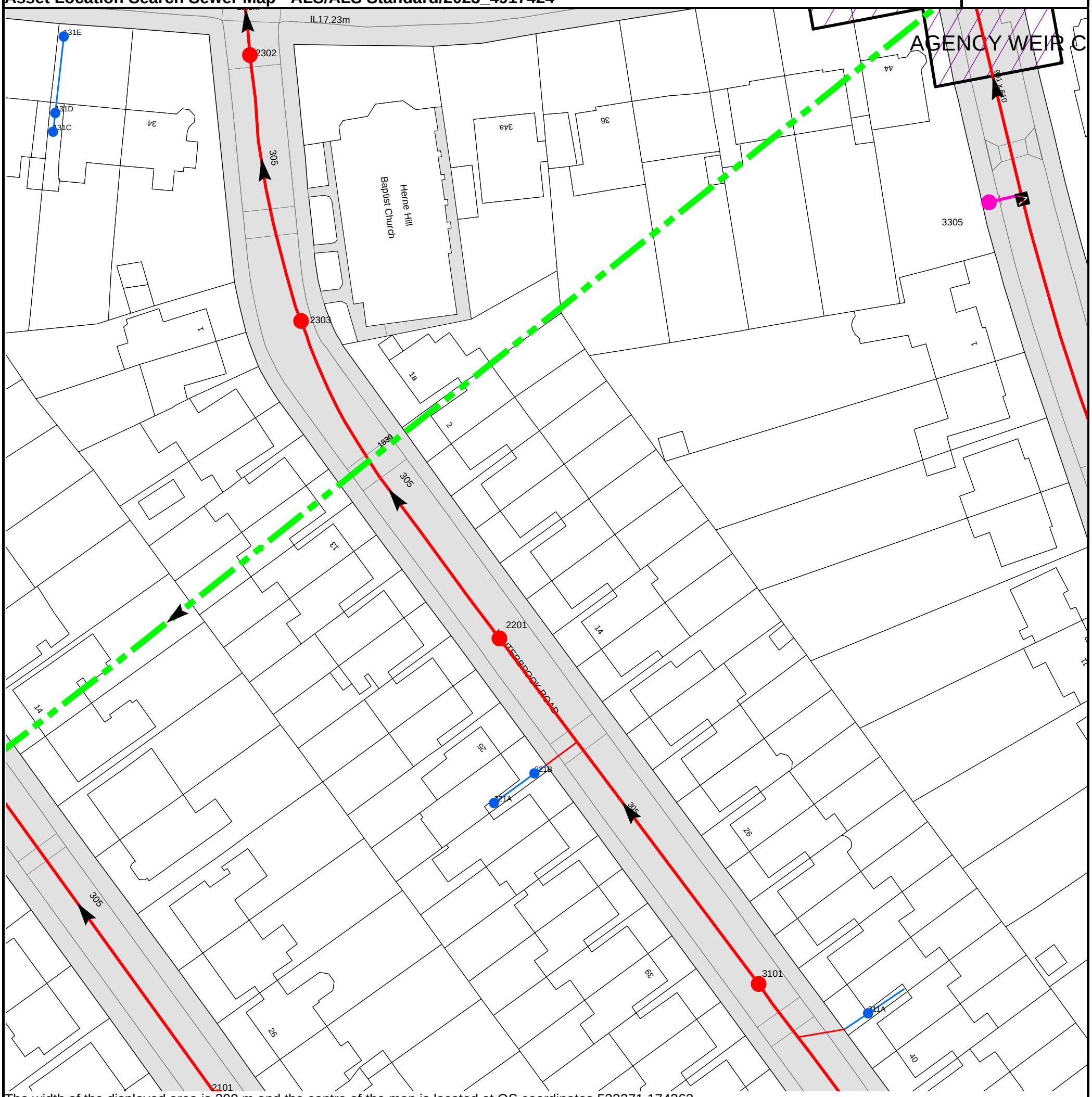
Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Asset Location Search Sewer Map - ALS/ALS Standard/2023_4917424



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 532271,174263

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
3305	22.04	18.68
131C	n/a	n/a
131D	n/a	n/a
131E	n/a	n/a
2302	n/a	n/a
2303	n/a	n/a
221A	n/a	n/a
2201	n/a	n/a
221B	n/a	n/a
3101	n/a	n/a
311A	n/a	n/a

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Asset Location Search - Sewer Key

Public Sewer Types (Operated and maintained by Thames Water)

Foul Sewer: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water Sewer: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined Sewer: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

- Storm Sewer
- Sludge Sewer
- Foul Trunk Sewer
- Surface Trunk Sewer
- Combined Trunk Sewer
- Foul Rising Main
- Surface Water Rising Main
- Combined Rising Main
- Vacuum
- Thames Water Proposed
- Vent Pipe
- Gallery

Other Sewer Types (Not operated and maintained by Thames Water)

- Sewer
- Culverted Watercourse
- Proposed
- Decommissioned Sewer
- Owners of this drainage network is currently unknown
- Ownership of this drainage network is currently unknown

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

- Air Valve
- Meter
- Dam Chase
- Vent
- Fitting

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

- Ancillary
- Drop Pipe
- Control Valve
- Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol. Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

- Inlet
- Outfall
- Undefined End

Other Symbols

Symbols used on maps which do not fall under other general categories.

- Change of Characteristic Indicator
- Public / Private Pumping Station
- Invert Level
- Summit

Areas

Lines denoting areas of underground surveys, etc.

- Agreement
- Chamber
- Operational Site

Ducts or Crossings

- Casement
- Conduit Bridge
- Subway
- Tunnel

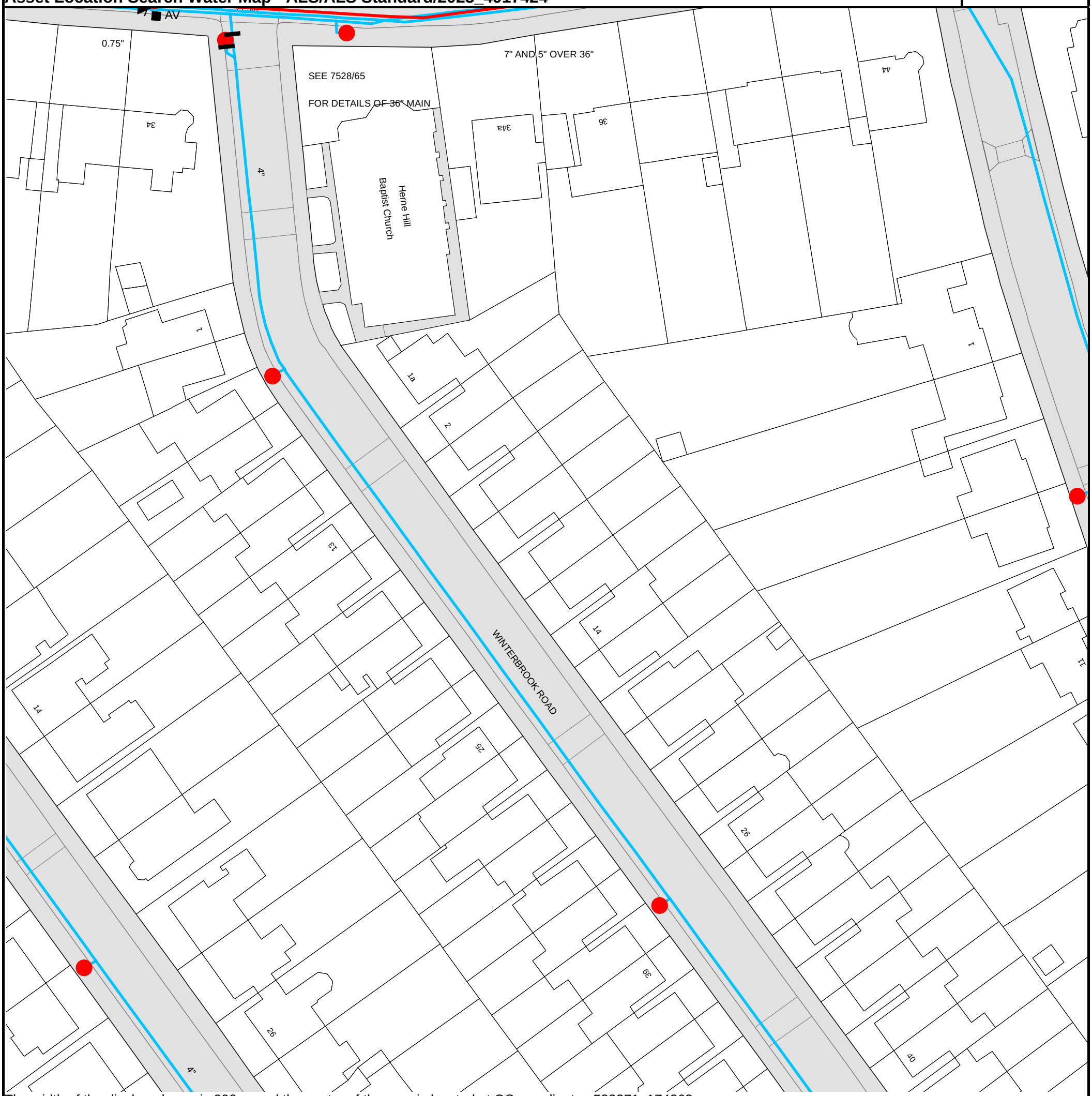
Ducts may contain high voltage cables. Please check with Thames Water.

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plan are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate the direction of flow.
4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
5) 'na' or '0' on a manhole indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimeters. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement.

If you are unsure about any text or symbology, please contact Property Searches on 0800 009 4540.

Asset Location Search Water Map - ALS/ALS Standard/2023_4917424



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 532271, 174263.

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Asset Location Search - Water Key

Water Pipes (Operated & Maintained by Thames Water)

Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.

Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.

Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.

Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.

Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.

Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.

Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1150mm (3' 6")
600mm and bigger (24" plus)	1200mm (4')

Valves

- General Purpose Valve
- Air Valve
- Pressure Control Valve
- Customer Valve

Hydrants

- Single Hydrant

Meters

- Meter

End Items

Symbol indicating what happens at the end of a water main.

- Blank Flange
- Capped End
- Emptying Pit
- Undefined End
- Manifold
- Customer Supply
- Fire Supply

Operational Sites

- Booster Station
- Other
- Other (Proposed)
- Pumping Station
- Service Reservoir
- Shaft Inspection
- Treatment Works
- Unknown
- Water Tower

Other Symbols

- Data Logger
- **Casement:** Ducts may contain high voltage cables. Please check with Thames Water.

Other Water Pipes (Not Operated or Maintained by Thames Water)

Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.

Private Main: Indicates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Payment Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment within 14 days of the date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service or will be held to be invalid.
4. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
5. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
6. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800.

If you are unhappy with our service, you can speak to your original goods or customer service provider. If you are still not satisfied with the outcome provided, we will refer the matter to a Senior Manager for resolution who will provide you with a response.

If you are still dissatisfied with our final response, and in certain circumstances such as you are buying a residential property or commercial property within certain parameters, The Property Ombudsman will investigate your case and give an independent view. The Ombudsman can award compensation of up to £25,000 to you if he finds that you have suffered actual financial loss and/or aggravation, distress, or inconvenience because of your search not keeping to the Code. Further information can be obtained by visiting www.tpos.co.uk or by sending an email to admin@tpos.co.uk.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0300 034 2222 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	**BACS Payment**	**Telephone Banking**
Please Call **0800 009 4540** quoting your invoice number starting CBA or ADS	Account number **90478703** Sort code **60-00-01** A remittance advice must be sent to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.** or email **ps.billing@thameswater.co.uk**	By calling your bank and quoting: Account number **90478703** Sort code **60-00-01** and your invoice number

Appendix D-Soil Investigation Report

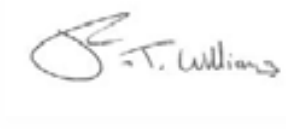
geotechnical and environmental consultants

ground&water

Factual Site Investigation Report

10 Winterbrook Road, London, SE24 9JA

On behalf of Matt Robinson

Report Reference: GWPR5744/Factual/January 2024 V1.01			Status: Final
Issue	Prepared By	Checked By	Verified By
V1.01			
	Alex Stratford BSc (Hons) MSc Geotechnical and Geoenvironmental Engineer	Miltiadis Mellios MSc(Eng) GMICE FGS Principal Engineer	Francis Williams MGeol (Hons) FGS CEnv CGeol Director

Site Investigations | Environmental Consultants | Geotechnical Engineers

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**
Registered Office Kineton House 31 Horse Fair Banbury Oxfordshire OX16 0AF Registered in England No 07052001

EXECUTIVE SUMMARY	
PROPOSED DEVELOPMENT	At the time of reporting, January 2024, it was understood the proposed development was to comprise the construction of a basement beneath the existing property. No formal development plans had been provided by the client at the time of reporting.
GEOLOGY	The BGS Solid and Drift Geological Map for the Brixton Area (South London Sheet Number 270) revealed that the site was underlain by the superficial Head deposits with bedrock deposits of the Lambeth group recorded below. The geological map shows and the London Clay formation was located 105m north-west of the site. No other superficial deposits, bedrock deposits or areas of Made/Worked Ground were noted within a 250m radius of the site.
HYDROGEOLOGY	The DEFRA online maps indicated that the site was located on a secondary undifferentiated superficial aquifer associated with the Head Deposits and a Secondary A Aquifer associated with the Lambeth Group. No surface water features were noted within a 250m radius. The nearest surface water feature was a pond associated with Sunray Gardens 580m north-east of the site. The River Thames was noted to be 4.35km north-west of the site flowing in a roughly west to east direction. From analysis of hydrogeological and topographical maps the groundwater table was anticipated to be encountered at depth within the Lambeth Group. It was considered that the groundwater was flowing in a north westerly direction, towards the River Thames and in alignment with local topography. Perched water was also likely to be found within the Made Ground, especially after periods of intense or prolonged rainfall. Examination of the Defra records showed that the site is within a Zone II Outer protection zone as classified in the Policy and Practice for the Protection of Groundwater.
VOLUME CHANGE POTENTIAL	Volume change potential testing was beyond the scope of this report.
FOUNDATION DESIGN	Foundation Design was beyond the scope of this report.
CONTAMINATION	Contamination risk assessment was beyond the scope of this report.

1.0 INTRODUCTION

1.1 General

Ground and Water Limited were instructed by Matt Robinson on the 29th November 2023 to conduct a Ground Investigation Report on the site referred to as 10 Winterbrook Road, London SE24 9JA. The scope of the investigation was detailed within the Ground and Water Limited fee proposal (reference: GW-2532).

1.2 Aims of the Investigation

The aim of the investigation was understood to be to supply the client and their designers with factual information regarding the ground conditions underlying the site to assist them in preparing an appropriate scheme for development.

The investigation was to be undertaken to provide factual information for the design of foundations by means of in-situ site testing and concrete classification. No laboratory geotechnical testing was undertaken on soil samples recovered from trial holes. No geotechnical interpretation was to be included or any sort of dissolution risk assessment or basement impact assessment.

An Environmental Desk Study and Contamination Assessment including a gas/radon/vapour/groundwater/soils risk assessment were not part of the remit of this report.

The techniques adopted for the investigation were chosen considering the requirements of the client, anticipated ground conditions, and bearing in mind the nature of the site, limitations to site access and other logistical limitations.

1.3 Conditions and Limitations

This report has been prepared based on the terms, conditions and limitations outlined within Appendix A.

2.0 SITE SETTING

2.1 Site Location

The site comprised a ~295m^2 rectangular shaped plot of land with access being gained to the site from Winterbrook Road, in the borough of Southwark. An approximate grid reference for the centre of the site is TQ 32298 74236. A Site Location Plan is provided within Figure 1 and a plan showing the site development area is given within Figure 2. An aerial photograph is shown in figure 3.

2.2 Site Description

At the time of site works, January 2024, the site comprised a three storey brick built residential semi-detached property. At the front of the property was a garden area comprising a mixture of soft and hard landscaping areas. The rear of the site comprised a garden with a number of mature trees.

2.3 Proposed Development

At the time of reporting, January 2024, it was understood the proposed development was to comprise the construction of a basement beneath the existing property. No formal development plans had been provided by the client at the time of reporting.

2.4 Geology

The BGS Solid and Drift Geological Map for the Brixton Area (South London Sheet Number 270) revealed that the site was underlain by the superficial Head deposits with bedrock deposits of the Lambeth group recorded below. The geological map shows, and the London Clay formation was located 105m north-west of the site. No other superficial deposits, bedrock deposits or areas of Made/Worked Ground were noted within a 250m radius of the site.

Superficial deposits (Drift) are the youngest geological deposits formed during the most recent period of geological time. They rest on older deposits or rocks referred to as bedrock (Solid), which are the main mass forming the Earth. Bedrock is present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

2.4.1 On-Site Geology

Head Deposits

The majority of Head Deposits are clay-dominated, derived from the London Clay. Generally less than 2m thick, they probably accumulated in shallow mudslides of softened brecciated bedrock in the active layer. They consist of soft, ochreous brown silty clay with blue-grey mottling in places and angular, frost-shattered fragments of flint occur sporadically throughout. At the base of these deposits and interbedded in places, there is a bed of pebbly clay, generally less than 0.2m thick, with well-rounded flint pebbles derived from nearby outcrops of 'high level' gravel such as Stanmore Gravel.

Lambeth Group

The Lambeth Group (formerly known as the Woolwich and Reading Beds) are a sedimentary complex comprising a basal bed (the Bottom Bed) composed of glauconitic sand, sandy clay and gravel, with laterally variable sand and clay above. In the eastern part of the area the basal bed is mostly overlain by a shelly grey sandy clay or silty sand. Lignite, or brown coal, a carbonaceous rock composed of plant remains which has not been subject to the same intensity of heat and pressure as has ordinary coal, is occasionally found within the Lambeth Group, as are individual logs and groups of logs indicating

the position of a former log jam, which was covered by sand and clay at the time of deposition.

2.4.2 Off-Site Geology

London Clay Formation

The London Clay Formation comprises stiff grey fissured clay, weathering to brown near surface. Concretions of argillaceous limestone in nodular form (Claystones) occur throughout the formation. Crystals of gypsum (Selenite) are often found within the weathered part of the London Clay Formation, and precautions against sulphate attack to concrete are sometimes required. The lowest part of the formation is a sandy bed with black rounded gravel and occasional layers of sandstone and is known as the Basement Bed. In the north London area the upper part of the London Clay Formation has been disturbed by glacial and/or periglacial action and may contain pockets of sand and gravel.

2.4.3 BGS Borehole Records

A BGS borehole record in similar geology ~280m north-west of the site (ref.: TQ37SW3) noted topsoil from ground level to 0.60m bgl overlying clay and stones to 1.85m bgl. A mottled clay was recorded below to 3.95m bgl and a black clay below to 5.20m bgl. A black sand was recorded below to 7.60m bgl. The soils from 0.60-7.60m were classified as head deposits. From 7.60 to 26.80m bgl the Woolwich and Reading Beds (Lambeth Group) comprising clays, sands and gravels. The Thanet sand was recorded below to 35.00m bgl with chalk recorded below to the base of the borehole at 61.60m bgl. Groundwater was recorded at 32.30m bgl.

2.5 Hydrogeology and Hydrology

The DEFRA online maps indicated that the site was located on a secondary undifferentiated superficial aquifer associated with the Head Deposits and a Secondary A Aquifer associated with the Lambeth Group.

No surface water features were noted within a 250m radius. The nearest surface water feature was a pond associated with Sunray Gardens 580m north-east of the site. The River Thames was noted to be 4.35km north-west of the site flowing in a roughly west to east direction.

From analysis of hydrogeological and topographical maps the groundwater table was anticipated to be encountered at depth within the Lambeth Group. It was considered that the groundwater was flowing in a north westerly direction, towards the River Thames and in alignment with local topography. Perched water was also likely to be found within the Made Ground, especially after periods of intense or prolonged rainfall.

Examination of the Defra records showed that the site is within a Zone II Outer protection zone as classified in the Policy and Practice for the Protection of Groundwater.

Zone II

Examination of the Environment Agency records showed that the site lay within a Zone II (Outer Protection Zone) as classified in the Policy and Practice for the Protection of Groundwater. This zone is defined by the 400-day travel time, or 25% of the source area, whichever is larger. The travel time is derived from consideration of the minimum time required to dilution and attenuation of slowly degrading pollutants.

Examination of the Environment Agency records showed that the site fell within a **Flood Zone 1** (an area with a low probability of fluvial or coastal flooding). The site was not protected by flood defences or benefiting from flood storage.

2.6 Radon

The up-to-date Public Health Database, included within www.ukradon.org, indicated that the site was located in an area where less than 1% of homes are above the action level. Basic radon protection measures are required in areas where more than 3% of houses are at or above the Action Level.

The site was in an area where a risk assessment was not required.

2.7 Online Data

A number of sources of data are available online, which have been summarised within this section.

2.7.1 Landfill Tool Review

A review of the data available on www.groundsure.io/ revealed that no historical landfill and/or authorised landfill sites were located within a 250m radius of the site.

2.7.2 Unexploded Ordnance Review

A review of the data available on www.zeticauxo.com/ revealed the site was located within the London high-risk area associated with unexploded ordnance (UXO). The London area is further separated into 25No. categories based on bombing densities, where green is indicated for areas having <10 bombs dropped per km^2 and red is indicated for areas having >150 bombs dropped per km^2. The site is situated within the orange area, ~halfway through the spectrum. A number of UXO finds were recorded within a 500m radius of the site, the nearest record was 150m north-east of the site.

3.0 SITE WORKS

3.1 Scope of Works

Site works were undertaken on the 14th December 2023 and comprised the drilling of 1No. Windowless sampler Borehole (BH1) to a depth of 5.00m bgl. Standard Penetration Tests were carried out at 1.00m intervals. Borehole BH1 was terminated early due to density of strata. Super Heavy Dynamic Probe (DP1) was undertaken through the base of boreholes to final depth of 7.10m bgl. 4No. hand excavated trial pits were excavated to depths of 0.80-1.10m bgl.

The approximate trial hole locations can be seen within Figure 4.

Prior to commencing the ground investigation, a walkover survey was carried out to identify the presence of underground services and drainage. Where underground services/drainage were suspected and/or positively identified, the exploratory position was relocated away from these areas.

As a further precautionary measure, the borehole was hand excavated to 1.00m below the local ground level (bgl) and scanned with a Cable Avoidance Tool (CAT scanner) to minimise the risk to services.

Upon completion of the drilling works, the trial holes were backfilled and made good, in relation to the surrounding area.

3.2 Sampling Procedures

Small disturbed samples were recovered from the trial holes at the depths shown on the trial hole records. Soil samples were generally retrieved from each change of strata and/or at specific areas of concern. Samples were also taken at approximately 0.5m intervals during broad homogenous soil horizons.

No samples were scheduled for geotechnical analysis. One sample was tested for buried concrete design.

4.0 ENCOUNTERED GROUND CONDITIONS

4.1 Soil Conditions

The trial holes were logged by a Ground and Water Limited representative, generally in accordance with BS EN 14688 'Geotechnical Investigation and Testing – Identification and Classification of Soil'.

The ground conditions encountered within the trial holes constructed on the site did generally conform to that anticipated from examination of the geology map. A capping of Made Ground was noted to overlie superficial Head Deposits and bedrock deposits of the Lambeth Group.

The succession of conditions and description of soils encountered in the trial holes in descending order is tabulated below.

Summary of Strata Encountered (BH1)			
Strata	**Top Depth (m bgl)**	**Base Depth (m bgl)**	**Thickness (m)**
MADE GROUND: Brown gravelly sandy CLAY. Sand is fine. Gravel is fine to coarse sub-angular to subrounded of flint (80%) and brick (20%).	0.00	0.80	0.80
HEAD DEPOSITS: Light brown gravelly sandy CLAY. Sand is fine. Gravel is fine to coarse sub-angular to sub-rounded of flint.	0.80	2.50	1.70
LAMBETH GROUP: Light brown clayey SAND/ sandy CLAY. Sand is fine.	2.50	>5.00	>2.50

Summary of Strata Encountered (TP1-TP4)			
Strata	**Top Depth (m bgl)**	**Base Depth (m bgl)**	**Thickness (m)**
MADE GROUND: Brown gravelly sandy CLAY. Sand is fine. Gravel is fine and medium sub-angular to sub-rounded of flint (80%) and brick (20%).	0.00	>0.80->1.10	>0.80->1.10

For details of the composition of the soils encountered at particular points, reference must be made to the individual trial hole logs within Appendix C of this report. A trial hole location plan can also be viewed within Figure 4.

4.1.1 Foundation Exposures

Summary of Foundations Encountered			
Trial Hole	**Depth of Foundation (m bgl)**	**Width at the Base of Foundation (mm)**	**Bearing Stratum**
TP1 (External Wall)	0.88	400	Made Ground
TP2 (External Wall)	0.75	620	Made Ground
TP3 (External Wall)	0.95	100	Made Ground
TP4 (External Wall)	1.00	320	Made Ground

The foundation exposure drawings are shown in figures 5-8.

4.2 Roots Encountered

Roots were recorded down to 1.50m bgl in BH1. Roots were recorded down to the base of the foundation exposure trial pits at depths of between 0.80-1.10m bgl.

It must be noted that the chance of determining actual depth of root penetration through a narrow diameter borehole is low.

4.3 Groundwater Conditions

A Groundwater strike was recorded in BH1 at 3.50m bgl, no groundwater strikes were recorded in the trial pits. It should be noted that groundwater strikes may be obscured by the drilling/excavation process.

Changes in groundwater level occur for a number of reasons including seasonal effects and variations in drainage. The investigation was undertaken in December 2023 when groundwater levels are likely to be at their annual maximum (highest elevation). Exact groundwater levels may only be determined through long term measurements from monitoring wells installed on-site.

Groundwater monitoring was undertaken on one occasion to date. The results can be seen tabulated below.

Groundwater Observations			
Date	**Trial Hole**	**Water Level**	**Final Well Depth**
02/01/2024	BH1	2.60	3.50

4.4 Obstructions

No artificial or other natural sub-surface obstructions were noted during construction of the trial holes.

5.0 IN-SITU AND LABORATORY TESTING

5.1 In-Situ Strength Testing

Standard Penetration Tests (SPTs) and Super Heavy Dynamic Probes (SHDPs) were undertaken as part of the site investigation. The results of the SPT's have not been amended to consider hammer efficiency, rod lengths and overburden pressure in accordance with Eurocode 7. The test results are presented on the borehole logs within Appendix C. An interpretation of the in-situ geotechnical testing results is given in the table below.

Interpretation of In-situ Geotechnical Testing Results					
Strata	**SPT "N" Blow Counts and Equivalent SPT "N Value from DP**	**Equivalent Undrained Shear Strength (Cu) (kPa) (Stroud (1974))**	**Soil Type**		**Trial Hole/s**
			Granular (Density)	**Cohesive (Cu)**	
Head Deposits (cohesive)	17-20	85-100		High Cu	WS1/1.00 – 2.45
Lambeth Group (Granular)	13-21	-	Medium	-	WS1/3.00 – 5.45
*Assumed Lambeth Group (Granular)**	*9-61*	-	*Medium to extremely dense*	-	*DP1/5.00 – 7.00*
***Dynamic probing may underestimate the strength of the underlying soils**					

It must be noted that field measurements of undrained shear strength (Cu) are dependent on a number of variables including disturbance of sample, method of investigation and also the size of specimen or test zone.

5.1.1 BRE Special Digest 1 Testing

In accordance with BRE Special Digest 1 'Concrete in Aggressive Ground' (BRE, 2005), one sample was scheduled for laboratory analysis to determine parameters for concrete specification. The results of the chemical analysis undertaken are given within Appendix D and a summary is tabulated below.

Summary of BRE Special Digest 1 Testing Results		
Determinand	**Unit**	**Head Deposits**
pH	-	8.72
Total Sulphate as SO_4	%	0.0257
Water Soluble Sulphate as SO_4	mg/l	55.5
Total Sulphur	%	<0.02
Ammonium as NH_4	mg/l	2.20
Water Soluble Chloride (2:1)	mg/l	15.9
Water Soluble Nitrate (2:1) as NO_3	mg/l	1.56
Water Soluble Magnesium	mg/l	<8

5.2 Excavations and Stability

Shallow excavations in the Made Ground and Head Deposits are likely to be marginally stable at best. Long, deep excavations, through these strata and into the underlying Lambeth Group are likely to become unstable.

Unsupported earth faces formed during excavation may be liable to collapse without warning and suitable safety precautions should therefore be taken to ensure that such earth faces are adequately supported before excavations are entered by personnel.

5.3 Duty of Care

Groundworkers must maintain a good standard of personal hygiene including the wearing of overalls, boots, gloves and eye protectors and the use of dust masks during periods of dry weather.
To prevent exposure to airborne dust by both the general public and construction personnel the site should be kept damp during dry weather and at other times when dust would be generated as a result of construction activities.

The site should be securely fenced at all times to prevent unauthorised access. Washing facilities should be provided and eating restricted to mess huts.

FIGURES

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
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Site Boundary

10 Winterbrook Road, London, SE24 9JA	
Matt Robinson	**January 2024**
Figure 1 – Site Location Plan	**GWPR5744**

ground&water

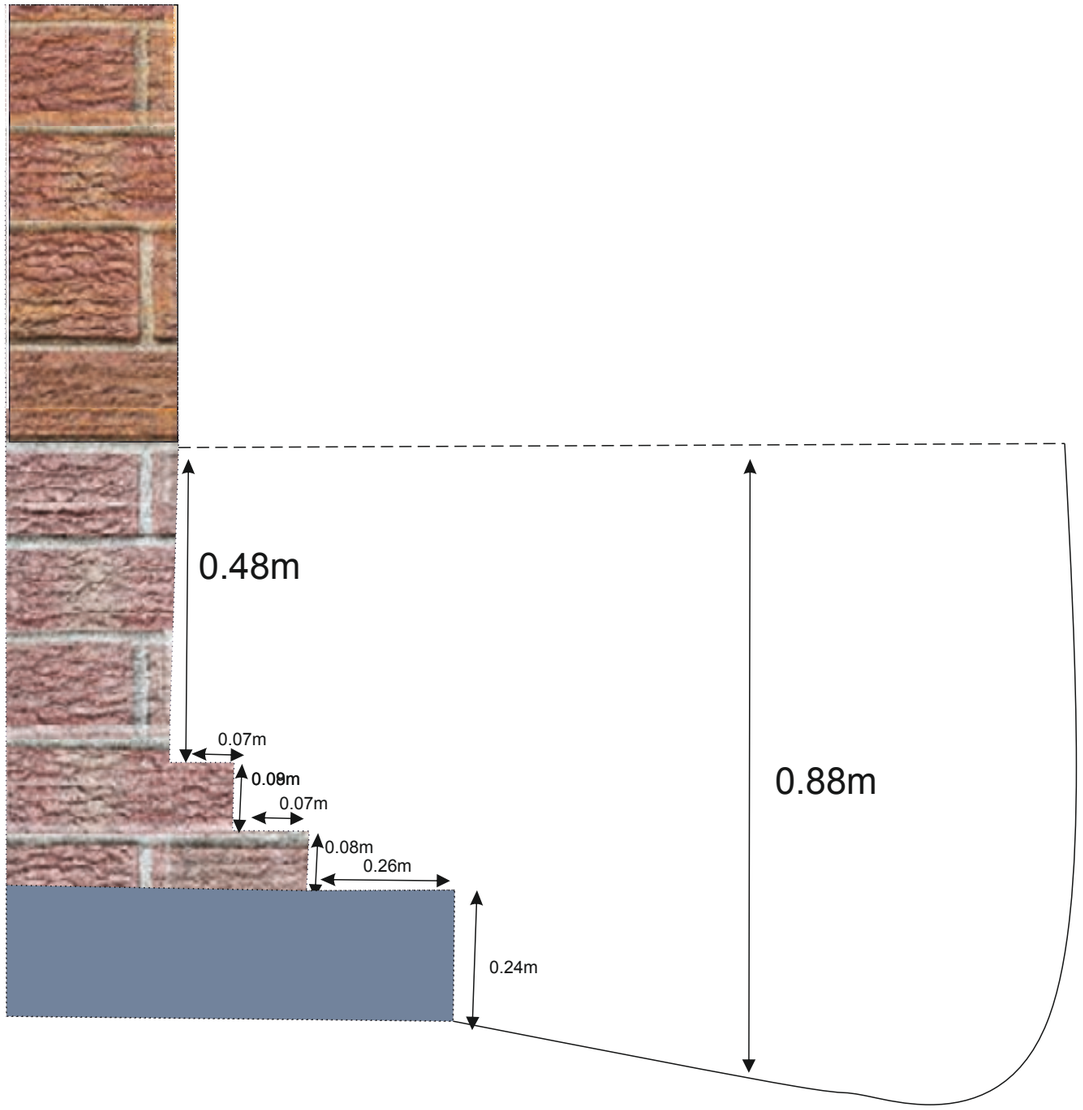
10 Winterbrook Road, London, SE24 9JA	
Matt Robinson	**January 2024**
Figure 2 – Proposed Development Plan	**GWPR5744**

10 Winterbrook Road, London, SE24 9JA	
Matt Robinson	**January 2024**
Figure 3 – Aerial Photograph	**GWPR5744**

Site boundary

10 Winterbrook Road, London, SE24 9JA	
Matt Robinson	**January 2024**
Figure 4 – Trial Hole Location Plan	**GWPR5744**

TP 1



GL - 0.88 MADE GROUND: Brown gravelly sandy CLAY. Sand is fine. Gravel is fine and medium sub-angular to sub-roundedof flint (80%) and brick (20%).

Concrete

Brick Wall

0.10m Distance in Metres

PROJECT
10 Winterbrook Road, London

CLIENT
Matt Robinson

DRAWING TITLE
Foundation Exposure TP 1

DRAWING NUMBER	DATE
GWPR5744 - Figure 5	January 2024
DRAWN BY	CHECKED BY
AS	MM

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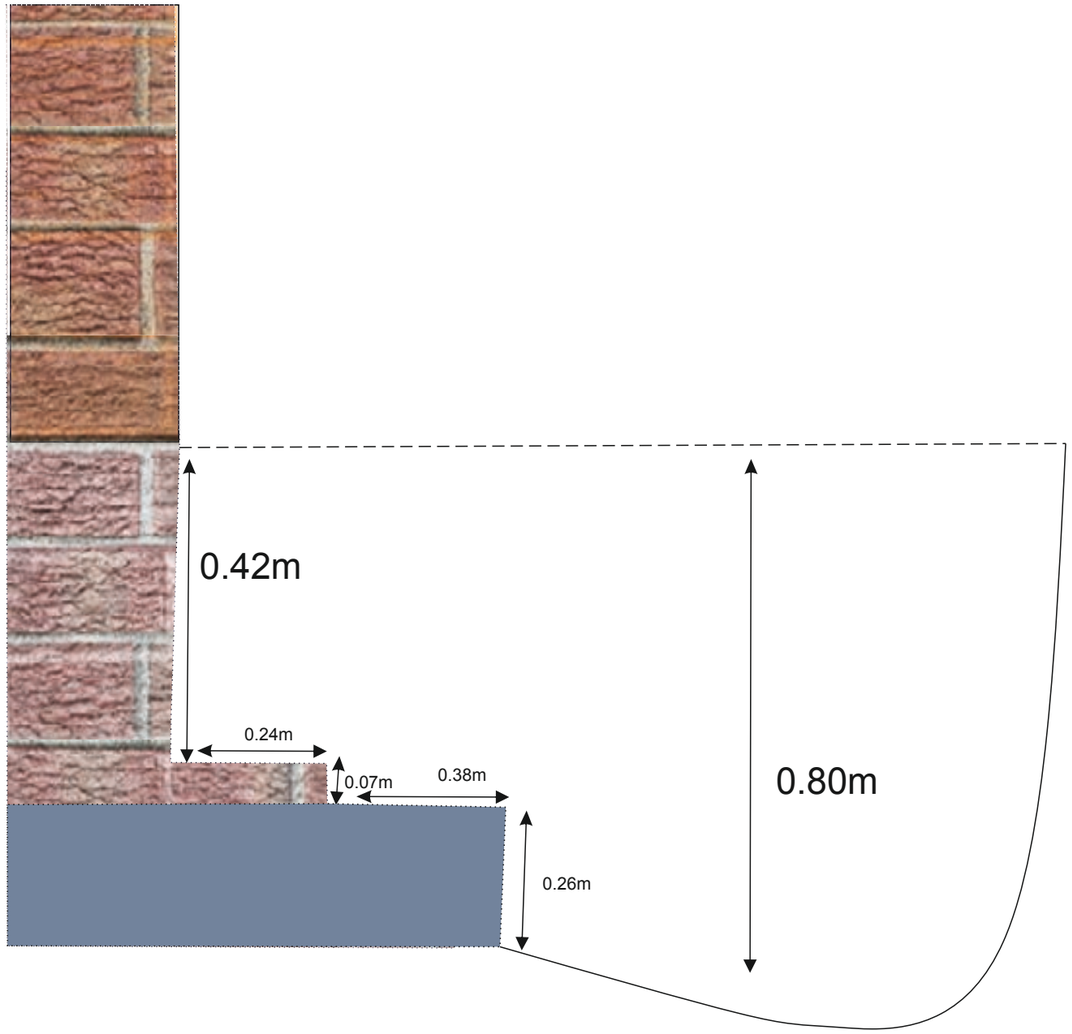
TP 2



GL

GL - 0.80 MADE GROUND:Brown gravelly sandy CLAY. Sand is fine. Gravel is fine to coarse sub-angular to sub-rounded of flint (80%), brick (20%).

Concrete

Brick Wall

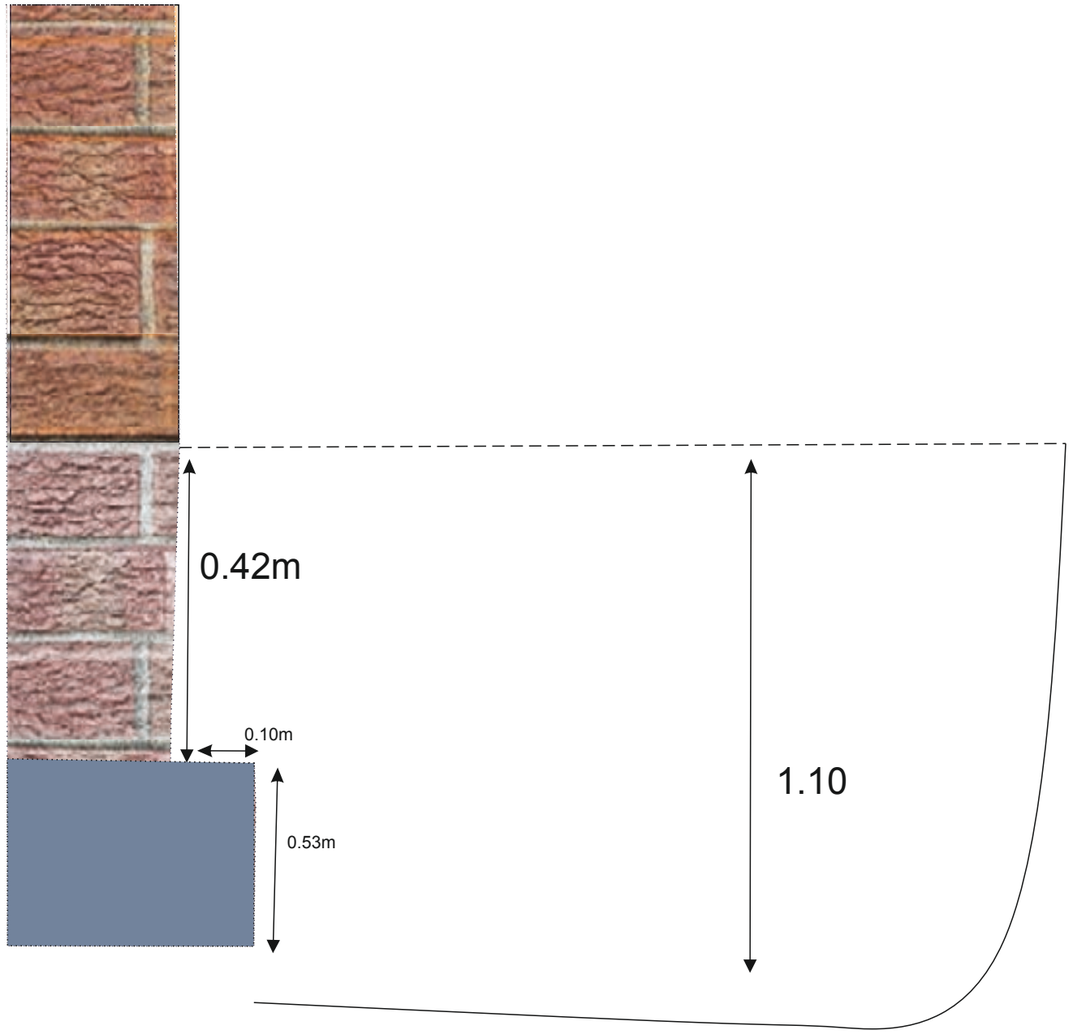
0.10m Distance in Metres

PROJECT	10 Winterbrook Road, London
CLIENT	Matt Robinson
DRAWING TITLE	Foundation Exposure TP 2
DRAWING NUMBER	GWPR5744 - Figure 6
DATE	January 2024
DRAWN BY	AS
CHECKED BY	MM

ground&water

2 The Long Barn, Norton Farm, Selborne Road, Selborne, Alton, Hampshire, GU34 3NB

TP 3



GL

GL - 1.10 MADE GROUND: Brown gravelly sandy CLAY. Sand is fine. Gravel is fine to coarse sub-angular to sub-rounded of flint (80%) brick (20%).

Concrete

Brick Wall

0.10m Distance in Metres

PROJECT
10 Winterbrook Road, London

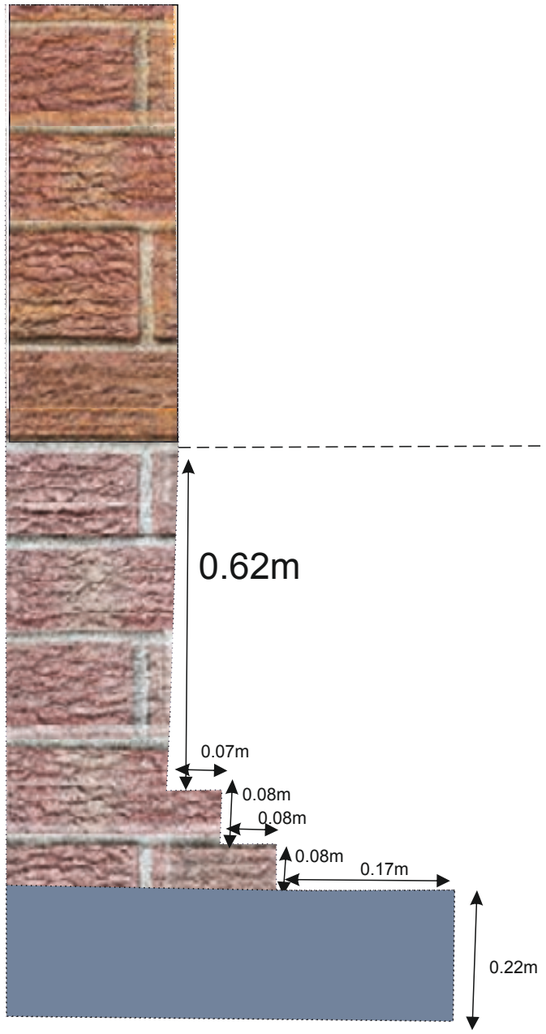
CLIENT
Matt Robinson

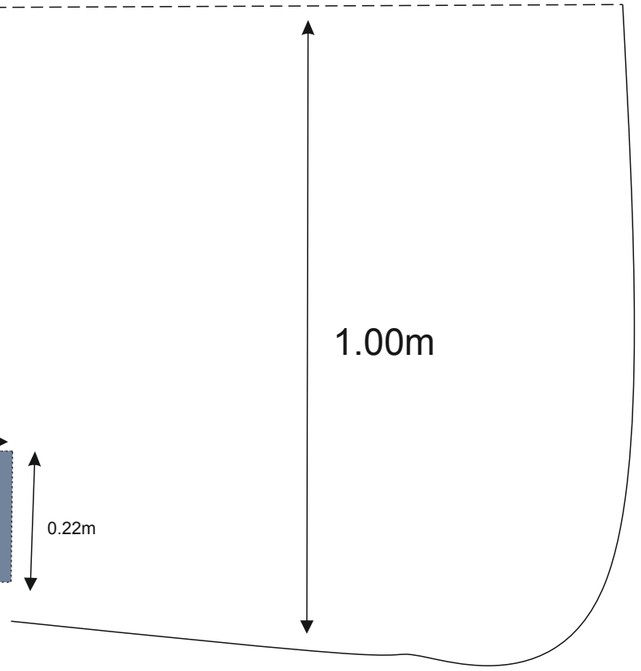
DRAWING TITLE
Foundation Exposure TP 3

DRAWING NUMBER	DATE
GWPR5744 - Figure 7	January 2024
DRAWN BY	CHECKED BY
AS	MM

2 The Long Barn, Norton Farm, Selborne Road, Selborne, Alton, Hampshire, GU34 3NB

TP 4





GL

GL - 1.00 MADE GROUND: Brown gravelly sandy CLAY. Sand is fine. Gravel is fine and medium sub-angular to sub-rounded of flint (80%) brick (20%).

Concrete

Brick Wall

0.10m Distance in Metres

PROJECT
10 Winterbrook Road, London

CLIENT
Matt Robinson

DRAWING TITLE
Foundation Exposure TP 4

DRAWING NUMBER	DATE
GWPR5744 - Figure 8	January 2024
DRAWN BY	CHECKED BY
AS	MM

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APPENDIX A: Conditions and Limitations

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The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and also with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

The report has been prepared on the basis of information, data and materials which were available at the time of writing. Accordingly, any conclusions, opinions or judgements made in the report should not be regarded as definitive or relied upon to the exclusion of other information, opinions and judgements.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief; as such these do not necessarily address all aspects of ground behaviour at the site. No liability is accepted for any reliance placed on it by others unless specifically agreed in writing.

Any decisions made by you, or by any organisation, agency or person who has read, received or been provided with information contained in the report ("you" or "the Recipient") are decisions of the Recipient and we will not make, or be deemed to make, any decisions on behalf of any Recipient. We will not be liable for the consequences of any such decisions.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

Any Recipient must take into account any other factors apart from the Report of which they and their experts and advisers are or should be aware. The information, data, conclusions, opinions and judgements set out in the report may relate to certain contexts and may not be suitable in other contexts. It is your responsibility to ensure that you do not use the information we provide in the wrong context.

This report is based on readily available geological records, the recorded physical investigation, the strata observed in the works, together with the results of completed site and laboratory tests. Whilst skill and care has been taken to interpret these conditions likely between or below investigation points, the possibility of other characteristics not revealed cannot be discounted, for which no liability can be accepted. The impact of our assessment on other aspects of the development required evaluation by other involved parties.

The opinions expressed cannot be absolute due to the limitations of time and resources within the

context of the agreed brief and the possibility of unrecorded previous in ground activities. The ground conditions have been sampled or monitored in recorded locations and tests for some of the more common chemicals generally expected. Other concentrations of types of chemicals may exist. It was not part of the scope of this report to comment on environment/contaminated land considerations.

The conclusions and recommendations relate to 10 Winterbrook Road, London, SE24 9JA.

Trial hole is a generic term used to describe a method of direct investigation. The term trial pit, borehole or window sampler borehole implies the specific technique used to produce a trial hole.

The depth to roots and/or of desiccation may vary from that found during the investigation. The client is responsible for establishing the depth to roots and/or of desiccation on a plot-by-plot basis prior to the construction of foundations. Where trees are mentioned in the text this means existing trees, recently removed trees (approximately 15 years to full recovery on cohesive soils) and those planned as part of the site landscaping.

APPENDIX B: Technical Glossary

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TECHNICAL GLOSSARY

The list of possible definitions within the report may be seen below. Please note that some definitions may not be relevant to this report.

HYDROGEOLOGY:

A **Principal Aquifer** is a layer of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.

Secondary (A) Aquifers consist of deposits with permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as Minor Aquifers.

Secondary (B) Aquifers consist of deposits with predominantly lower permeability layers with may stoke and yield limited amounts of groundwater due to localised features such as fissures, think permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.

Secondary Aquifers (Undifferentiated) are assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both a minor aquifer and non-aquifer in different locations due to the variable characteristics of the rock type.

Unproductive Strata are rock layers with low permeability that have negligible significance for water supply or river base flow. These were formerly classified as non-aquifers.

FLOOD ZONES:

Environment Agency Flood Zone 2, defined as; land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.

Environment Agency Flood Zone 3 shows the extent of a river flood with a 1 in 100 (1%0 or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year.

Environment Agency Flood Zone 3 area that benefits from flood defences, defined as; land and property in this flood zone would have a high probability of flooding without the local flood defences. These protect the area against a river flood with a 1% chance of happening each year, or a flood from the sea with a 0.5% chance of happening each year.

GROUNDWATER SOURCE PROTECTION ZONES (SPZS):

Inner Zone (SPZ1): This zone is 50 day travel time of pollutant to source with a 50 metres default minimum radius.

Outer Zone (SPZ2): This zone is 400 day travel time of pollutant to source. This has a 250 or 500 metres minimum radius around the source depending on the amount of water taken.

Total Catchment (SPZ3): This is the area around a supply source within which all the groundwater ends up at the abstraction point. This is the point from where the water is taken. This could extend some distance from the source point.

Zone of Special Interest (SPZ4): This zone is where local conditions require additional protection.

IN-SITU STRENGTH GEOTECHNICAL TESTING:

Windowless Sample and/or Cable Percussion and/or Rotary Boreholes provide samples of the ground for assessment but they do not give any engineering data. The standard penetration test (SPT) is an in-situ dynamic penetration test designed to provide information on the geotechnical engineering properties of soil. The test uses a thick-walled sample tube, with an outside diameter of 50mm and an inside diameter of 35mm, and a length of around 650mm. This is driven into the ground at the bottom of a borehole by blows from a slide hammer with a weight of 63.5kg falling through a distance of 760mm. The sample tube is driven 150mm into the ground and then the number of blows needed for the tube to penetrate each 75mm up to a depth of 450mm is recorded. The sum of the number of blows is termed the "standard penetration resistance" or the "N-value".

Dynamic Probing involves the driving of a metal cone into the ground via a series of steel rods. These rods are driven from the surface by a hammer system that lifts and drops a 63.5kg (SHDP) hammer onto the top of the rods through a set height, thus ensuring a consistent energy input. The number of hammer blows that are required to drive the cone down by each 100mm increment are recorded. These blow counts then provide a comparative assessment from which correlations have been published, based on dynamic energy, which permits engineering parameters to be generated. (The Dynamic Probe 'Super Heavy' (SHDP) Tests were conducted in accordance with BS 1377; 1990; Part 9, Clause 3.2).

APPENDIX C: Trial Hole Logs

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
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Percussion Drilling Log

Project Name: 10 Winterbrook Road	Client: Matt Robinson	Date: 14/12/2023
Location: London SE24 9JA	Contractor: AB SI Limited	Co-ords: E532054.25 N174386.15
Project No. : GWPR5744	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH1	BH			1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.20	D					MADE GROUND. Brown gravelly sandy CLAY. Sand is fine. Gravel is fine to coarse sub-angular to sub-rounded of flint (80%) and brick (20%).
		0.50	D					
		0.80	D		0.80			
		1.00	D					Light brown gravelly CLAY. Gravel is fine to coarse sub-angular to sub-rounded of flint. (HEAD DEPOSITS).
		1.00	SPT	N=17 (2,2/3,4,5,5)				
		1.50	D		1.50			
		2.00	D					Light brown sandy gravelly CLAY. Sand is fine. Gravel is fine to coarse angular to sub-rounded flint. (HEAD DEPOSITS).
		2.00	SPT	N=20 (2,2/4,5,6,5)				
		2.50	D		2.50			
		3.00	D					Light brown sandy CLAY. Sand is fine. (LAMBETH GROUP).
		3.00	SPT	13 (2,2/3,5,5,)				
	▼	3.50	D		3.50			
		4.00	D		4.00			Light brown sandy CLAY. Sand is fine. (LAMBETH GROUP).
		4.00	SPT	N=21 (2,3/5,5,6,5)				Light brown clayey SAND. (LAMBETH GROUP).
		4.50	D					
		5.00	D		5.00			
		5.00	SPT	N=17 (3,5/4,5,4,4)				End of Borehole at 5.000m

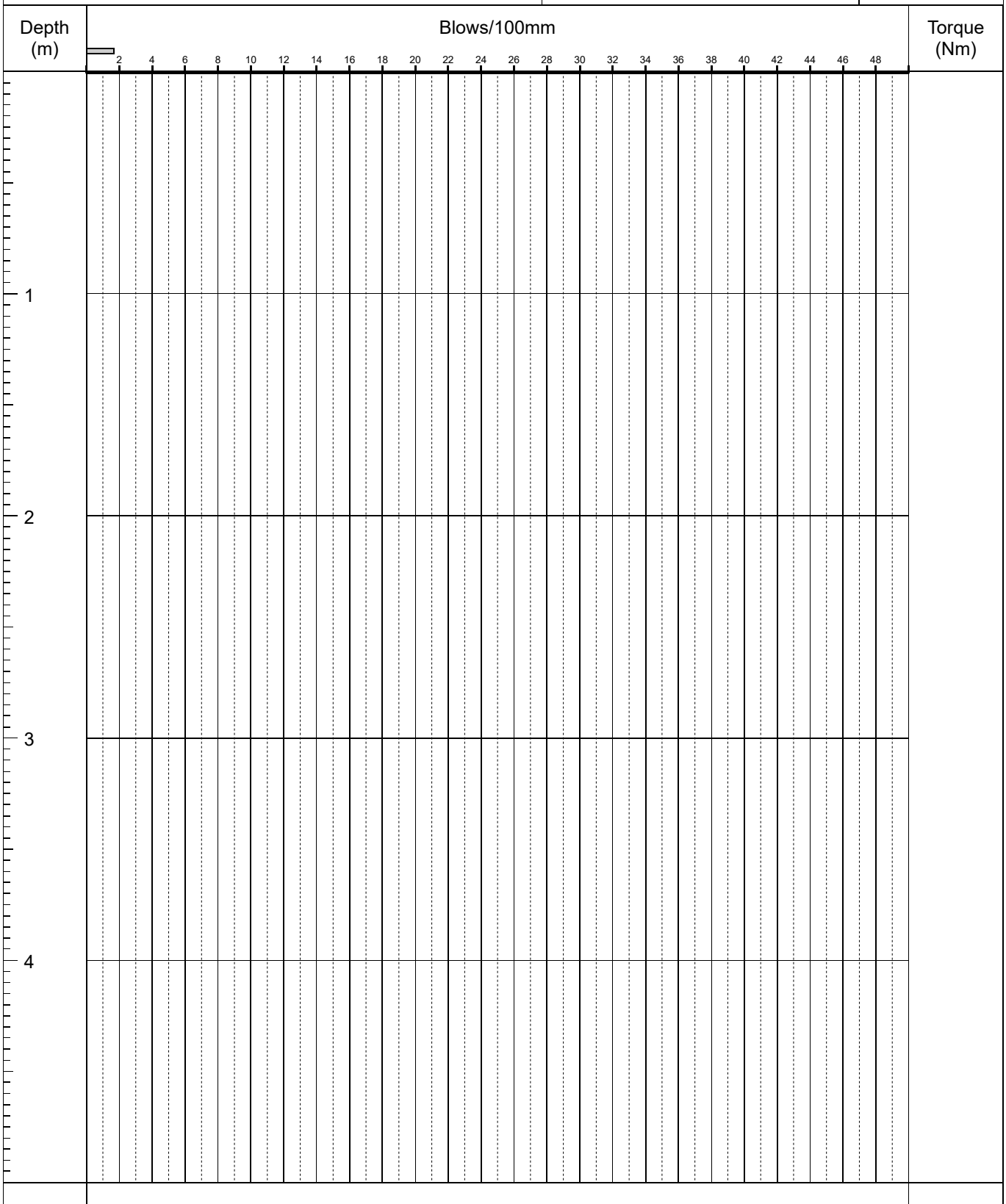
Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

Groundwater recorded at 3.50m bgl.
Roots recorded to 1.50m bgl.

Probe Log

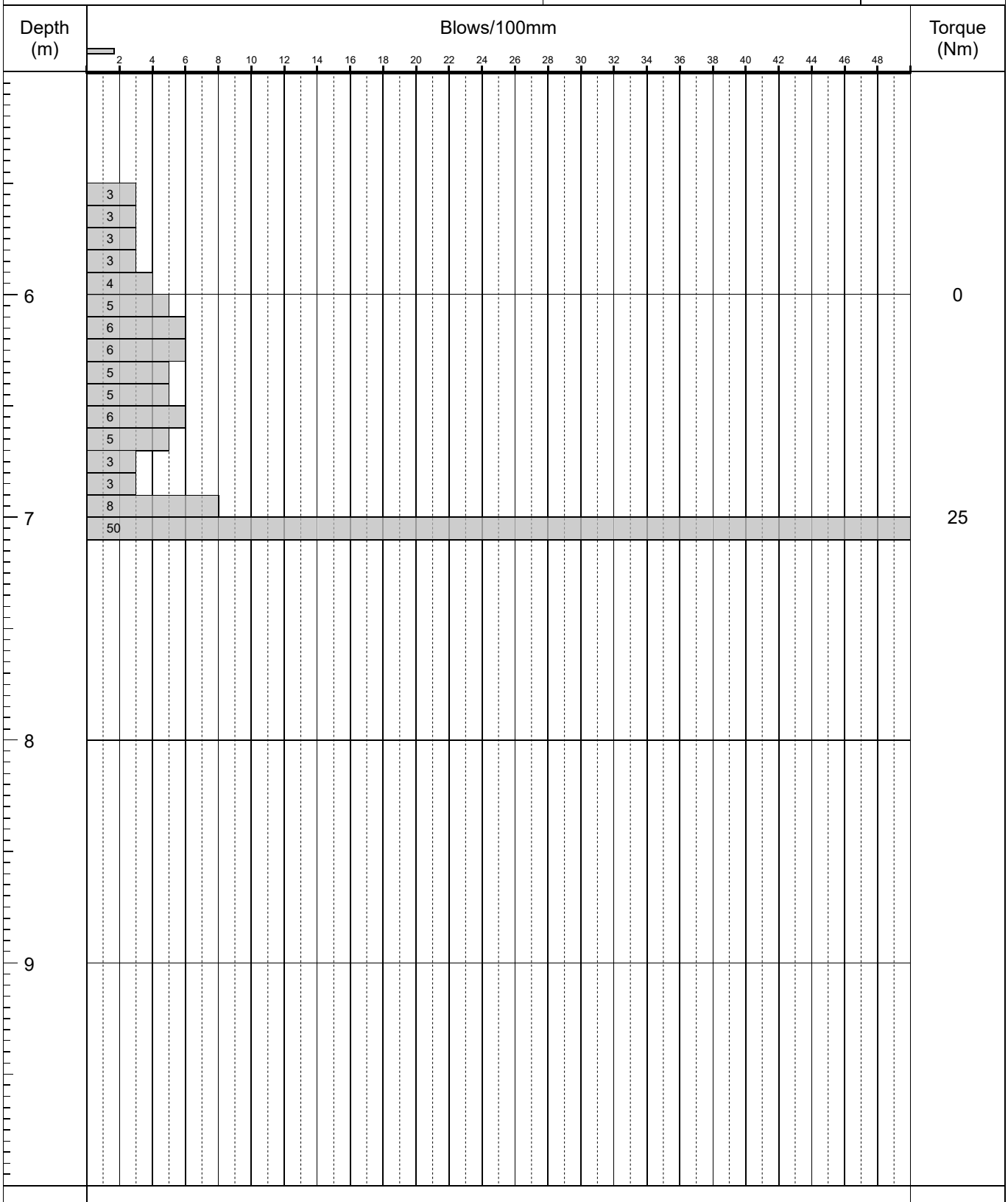
			Probe No DP1 Sheet 1 of 2
Project Name: 10 Winterbrook Road	Project No. GWPR5744	Co-ords:	Hole Type DP
Location: London SE24 9JA		Level:	Scale 1:25
Client: Matt Robinson		Dates: 14/02/2023 - 14/12/2023	Logged By



Remarks:	Fall Height	750	Cone Base Diameter	
	Hammer Wt	64	Final Depth	7.10
	Probe Type	DPSH-B		

Probe Log

			Probe No DP1 Sheet 2 of 2
Project Name: 10 Winterbrook Road	Project No. GWPR5744	Co-ords:	Hole Type DP
Location: London SE24 9JA		Level:	Scale 1:25
Client: Matt Robinson		Dates: 14/02/2023 - 14/12/2023	Logged By



Remarks:	Fall Height	750	Cone Base Diameter	
	Hammer Wt	64	Final Depth	7.10
	Probe Type	DPSH-B		

Trial Pit Log

Project Name: 10 Winterbrook Road	Client: Matt Robinson	Date: 14/12/2023
Location: London SE24 9JA	Contractor: AB SI Limited	
Project No. : GWPR5744	Crew Name:	Equipment:

Location Number	Location Type	Level	Logged By	Scale	Page Number
TP1	TP			1:25	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND. Brown gravelly sandy CLAY. Sand is fine. Gravel is fine and medium sub-angular to sub-rounded of flint (80%) and brick (20%).
		0.50	D					
		0.80	D					
					0.88			End of Borehole at 0.880m

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks

No Groundwater recorded.
Roots recorded to 0.88m bgl.

Trial Pit Log

Project Name: 10 Winterbrook Road	Client: Matt Robinson	Date: 14/12/2023
Location: London SE24 9JA	Contractor: AB SI Limited	
Project No. : GWPR5744	Crew Name:	Equipment:

Location Number	Location Type	Level	Logged By	Scale	Page Number
TP2	TP			1:25	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND: Brown gravelly sandy CLAY. Sand is fine. Gravel is fine to coarse sub-angular to sub-rounded of flint (80%), brick (20%).
		0.50	D					
		0.80	D		0.80			End of Borehole at 0.800m

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks

No Groundwater recorded.
Roots recorded to 0.80m bgl.

Trial Pit Log

Project Name: 10 Winterbrook Road	Client: Matt Robinson	Date: 14/12/2023
Location: London SE24 9JA	Contractor: AB SI Limited	
Project No. : GWPR5744	Crew Name:	Equipment:

Location Number	Location Type	Level	Logged By	Scale	Page Number
TP3	TP			1:25	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND. Brown gravelly sandy CLAY. Sand is fine. Gravel is fine to coarse sub-angular to sub-rounded of flint (80%) brick (20%).
		0.50	D					
		0.80	D					
		1.00	D					
					1.10			End of Borehole at 1.100m

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks

No Groundwater recorded.
Roots recorded to 1.10m bgl.

Trial Pit Log

Project Name: 10 Winterbrook Road	Client: Matt Robinson	Date: 14/12/2023	
Location: London SE24 9JA	Contractor: AB SI Limited		
Project No. : GWPR5744	Crew Name:	Equipment:	

Location Number	Location Type	Level	Logged By	Scale	Page Number
TP4	TP			1:25	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					MADE GROUND. Brown gravelly sandy CLAY. Sand is fine. Gravel is fine and medium sub-angular to sub-rounded of flint (80%) brick (20%).
		0.50	D					
		0.80	D					
		1.00	D		1.00			End of Borehole at 1.000m

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks

No Groundwater recorded.
Roots recorded to 1.00m bgl.

APPENDIX D: Chemical Laboratory Testing

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528777
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Ground and Water Ltd
Head Office
2 The Long Barn
Norton Farm, Selborne Road
Alton
Hampshire
GU34 3NB

Attention: Alex Stratford

CERTIFICATE OF ANALYSIS

Date of report Generation:	11 January 2024
Customer:	Ground and Water Ltd
Sample Delivery Group (SDG):	240105-36
Your Reference:	GWPR5744 10 Winterbrook Road
Location:	10 Winterbrook Road, London, SE24 9JA
Report No:	716768
Order Number:	GWPR5744

We received 1 sample on Friday January 05, 2024 and 1 of these samples were scheduled for analysis which was completed on Thursday January 11, 2024. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.

Approved By:

Sonia McWhan
Operations Manager

CERTIFICATE OF ANALYSIS

SDG: 240105-36 **Report Number:** 716768 **Superseded Report:**
Client Ref.: GWPR5744 10 Winterbrook **Location:** 10 Winterbrook Road, London, SE24 9JA

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
29168012	BH1		2.00 - 2.00	14/12/2023

Only received samples which have had analysis scheduled will be shown on the following pages.

CERTIFICATE OF ANALYSIS

SDG: 240105-36 **Report Number:** 716768 **Superseded Report:**
Client Ref.: GWPR5744 10 Winterbrook **Location:** 10 Winterbrook Road, London, SE24 9JA

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

	Lab Sample No(s)		29168012
	Customer Sample Reference		BH1
	AGS Reference		
	Depth (m)		2.00 - 2.00
	Container		1kg Cardboard Container
	Sample Type		S
Ammoniacal N as NH4 in 2:1 extract	All	NDPs: 0 Tests: 1	X
Anions by Kone (soil)	All	NDPs: 0 Tests: 1	X
Magnesium (BRE)	All	NDPs: 0 Tests: 1	X
NO3, NO2 and TON by KONE (s)	All	NDPs: 0 Tests: 1	X
pH	All	NDPs: 0 Tests: 1	X
Sample description	All	NDPs: 0 Tests: 1	X
Total Sulphate	All	NDPs: 0 Tests: 1	X
Total Sulphur	All	NDPs: 0 Tests: 1	X

CERTIFICATE OF ANALYSIS

SDG: 240105-36 **Report Number:** 716768 **Superseded Report:**
Client Ref.: GWPR5744 10 Winterbrook **Location:** 10 Winterbrook Road, London, SE24 9JA

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
29168012	BH1	2.00 - 2.00	Light Brown	Clay	Stones	Vegetation

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

CERTIFICATE OF ANALYSIS

SDG: 240105-36 **Report Number:** 716768 **Superseded Report:**
Client Ref.: GWPR5744 10 Winterbrook **Location:** 10 Winterbrook Road, London, SE24 9JA

Results Legend	
#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+$@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref. BH1
			Depth (m) 2.00 - 2.00
			Sample Type Soil/Solid (S)
			Date Sampled 14/12/2023
			Sample Time 12:00
			Date Received 05/01/2024
			SDG Ref 240105-36
			Lab Sample No.(s) 29168012
			AGS Reference
Moisture Content Ratio (% of as received sample)	%	PM024	13
Sulphur, Total	<0.02 %	TM132	<0.02 @ #
pH	1 pH Units	TM133	8.72 M
Sulphate, acid soluble (total)	<0.0048 %	TM221	0.0257 M
Soluble Sulphate 2:1 extract as SO4 BRE	<0.004 g/l	TM243	0.0555 M
Chloride 2:1 water/soil extract BRE	<0.0025 g/l	TM243	0.0159 M
Nitrate as NO3, 2:1 water soluble (BRE)	<0.0003 g/l	TM243	0.00156
Ammoniacal N as NH4 in 2:1 extract BRE	<0.0003 g/l	TM248	0.0022
Magnesium (BRE)	<0.008 g/l	TM282	<0.008

Table of Results - Appendix

Method No	Description
PM024	Soil preparation including homogenisation, moisture, screens of soils for Asbestos Containing Material
TM132	ELTRA CS800 Operators Guide
TM133	Determination of pH in Soil and Water using the GLpH pH Meter
TM221	Determination of Acid Extractable Sulphate in Soils by ICP OES
TM243	Mixed Anions In Soils By Kone
TM248	Determination of Ammonium BRE (2:1 Extract) on solids
TM282	Extraction of Magnesium by BRE Method

NA = not applicable.
Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).

CERTIFICATE OF ANALYSIS

SDG: 240105-36 **Report Number:** 716768 **Superseded Report:**
Client Ref.: GWPR5744 10 Winterbrook **Location:** 10 Winterbrook Road, London, SE24 9JA

Test Completion Dates

Lab Sample No(s)	29168012
Customer Sample Ref.	BH1
AGS Ref.	
Depth	2.00 - 2.00
Type	Soil/Solid (S)
Ammoniacal N as NH4 in 2:1 extract	10-Jan-2024
Anions by Kone (soil)	09-Jan-2024
Magnesium (BRE)	09-Jan-2024
NO3, NO2 and TON by KONE (s)	09-Jan-2024
pH	09-Jan-2024
Sample description	05-Jan-2024
Total Sulphate	11-Jan-2024
Total Sulphur	11-Jan-2024

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 15 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of 15 days after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Matrix interference**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**
§	**Sampled on date not provided**

20. **Asbestos**

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials andd soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.