FLOOD RISK ASSESSMENT AND SUDS REPORT

FOR FLAT 1, 253 GOLDHURST TERRACE, LONDON, NW6 3EP

DOCUMENT NO: C3000-R2-REV-A

PREPARED BY

Nimbus
ENGINEERING CONSULTANTS

Contents

APPENDICES

1. SITE DETAILS

Site Name	Flat 1, 253 Goldhurst Terrace
Site Address	Flat 1, 253 Goldhurst Terrace, London, NW6 3EP
Purpose of Development	Residential
Existing Land Use	Brownfield
OS NGR	525815E, 184020N
County	Greater London
Country	England
Local Planning Authority	London Borough of Camden

1.1 Development Proposals

A set of drawings showing the existing and proposed site layouts are included in Appendix A. These show that the proposals are for a basement extension.

1.2 Geology of The Area

According to the British Geological Survey, the superficial deposits at the site are unknown, as shown in Figure 1, below. The bedrock at the area is of the London Clay Formation, shown in Figure 2, below.

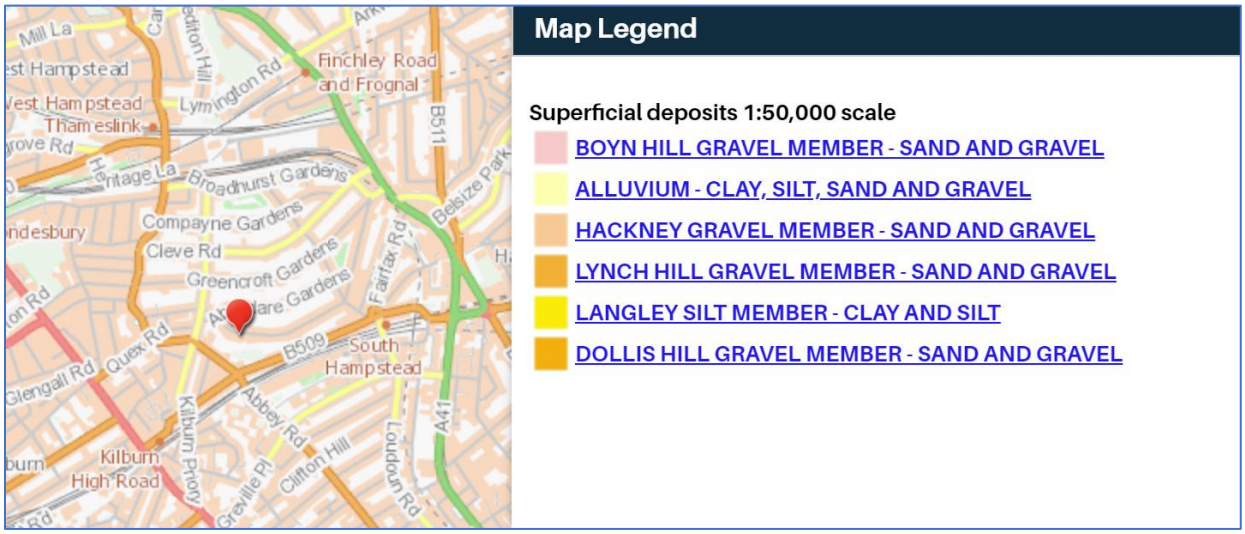


Figure 1- Superficial deposits at the site. (Source: British Geological Society Website (contains British Geological Survey materials © NERC2025)).

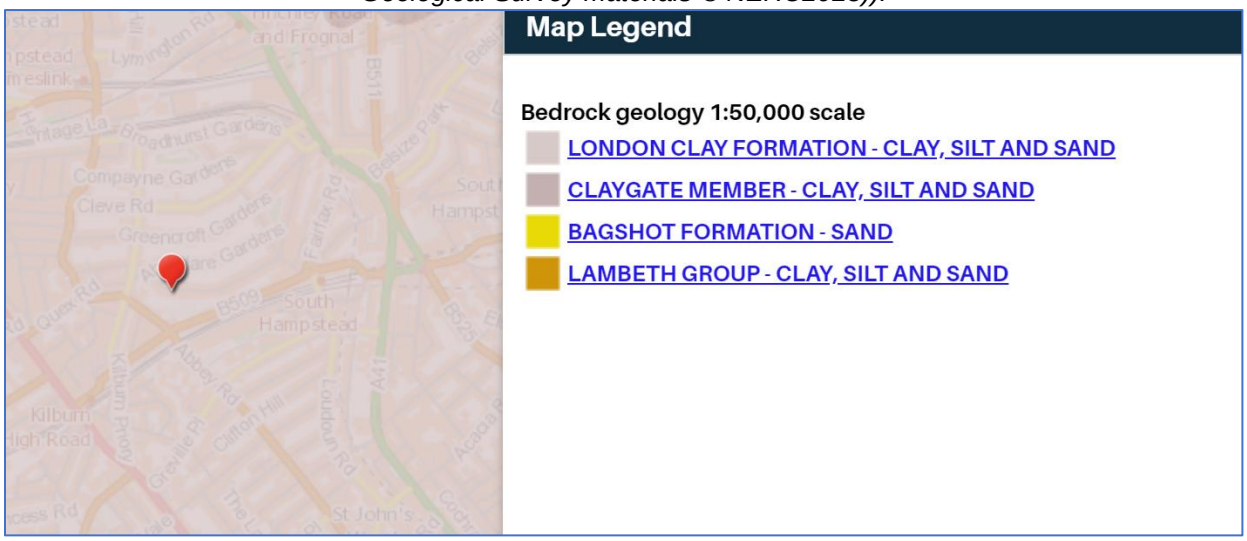


Figure 2 - Bedrock at the site. (Source: British Geological Society Website (contains British Geological Survey materials © NERC2025)).

Historic boreholes within the vicinity of the site were consulted in order to determine groundwater levels within the vicinity of the site. The location of these boreholes can be found in figure 3 below, and the results of boreholes can be found in Appendix B.

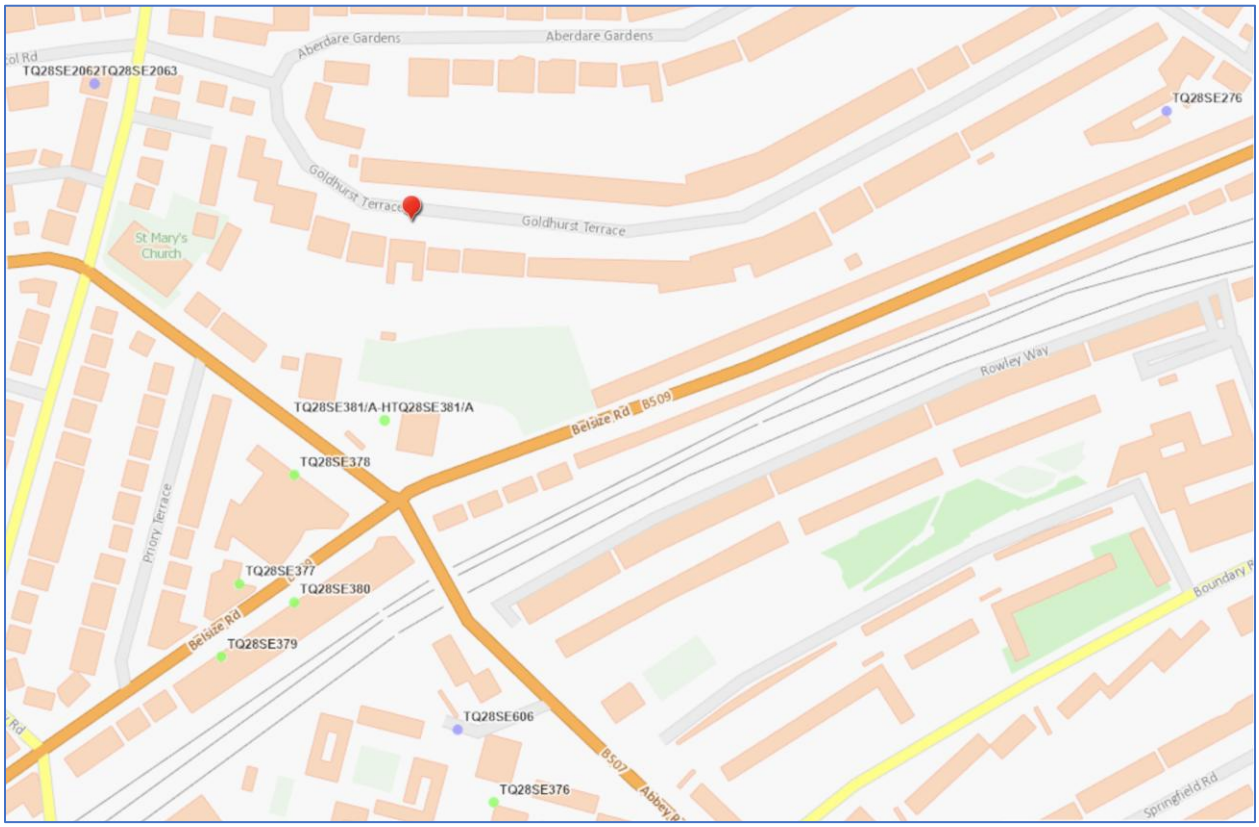


Figure 3 - Historic Boreholes at the site. (Source: British Geological Society Website (Contains British Geological Survey materials © URKI [2023]. Base mapping is provided by ESRI)).

The results of these historic boreholes show that no groundwater was encountered, and the Groundwater vulnerability MAGIC maps from DEFRA shown overleaf, also show the site to be in an area of unproductive strata, with a soluble rock risk.

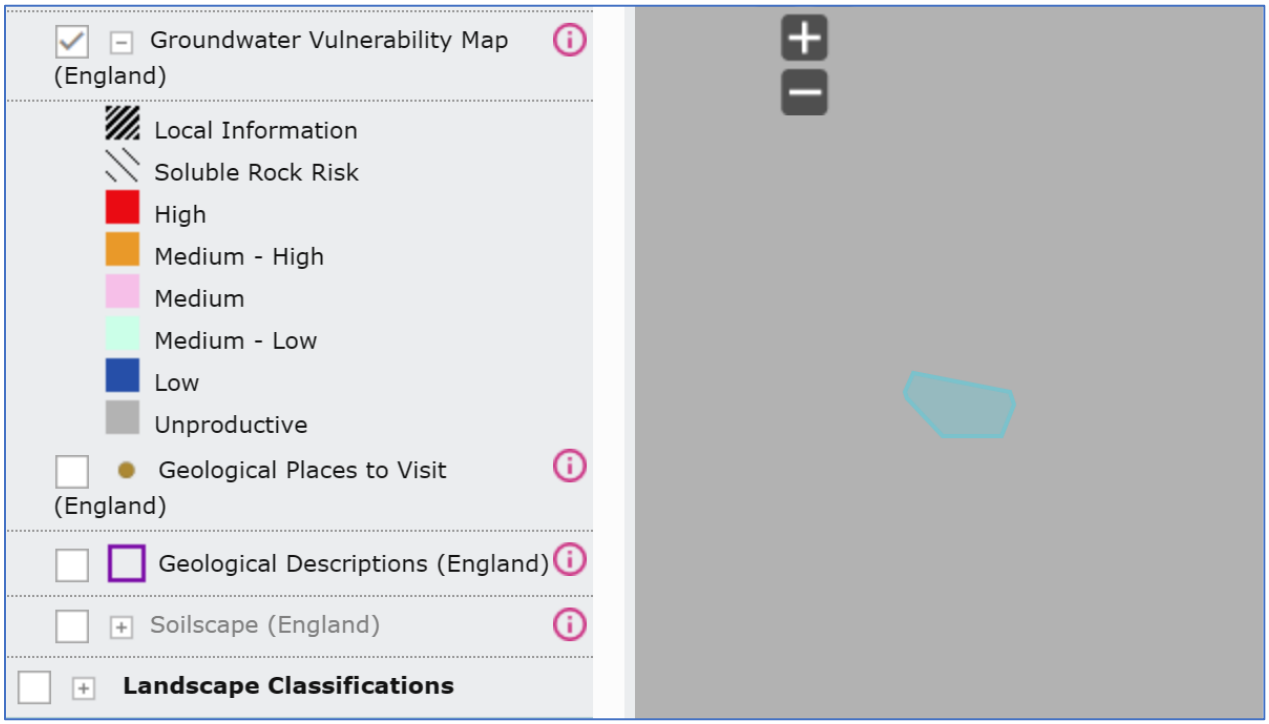


Figure 4 – Groundwater Vulnerability Map – Magic Maps (DEFRA)

2. FLOOD RISK ASSESSMENT

The possible causes of flooding set out in NPPF's technical guidance are considered in this section in relation to the flood risk to the site itself and the effects of the development of the site on flood risk elsewhere.

The Camden Local Plan states: The Council will require the submission of a development-specific flood risk assessment with applications for basements within flood risk areas identified on Map 6: Historic flooding and Local Flood Risk Zones, in the Flood Risk Strategy, or in any future updated Strategic Flood Risk Assessment in line with the criteria set out in the National Planning Practice Guidance on Flood Risk, unless it can be demonstrated to the Council's satisfaction that the scale of the scheme is such that there is no, or minimal, impact on drainage conditions (refer to our supplementary planning document Camden Planning Guidance on sustainability for further information). Figure 5, is shown overleaf:

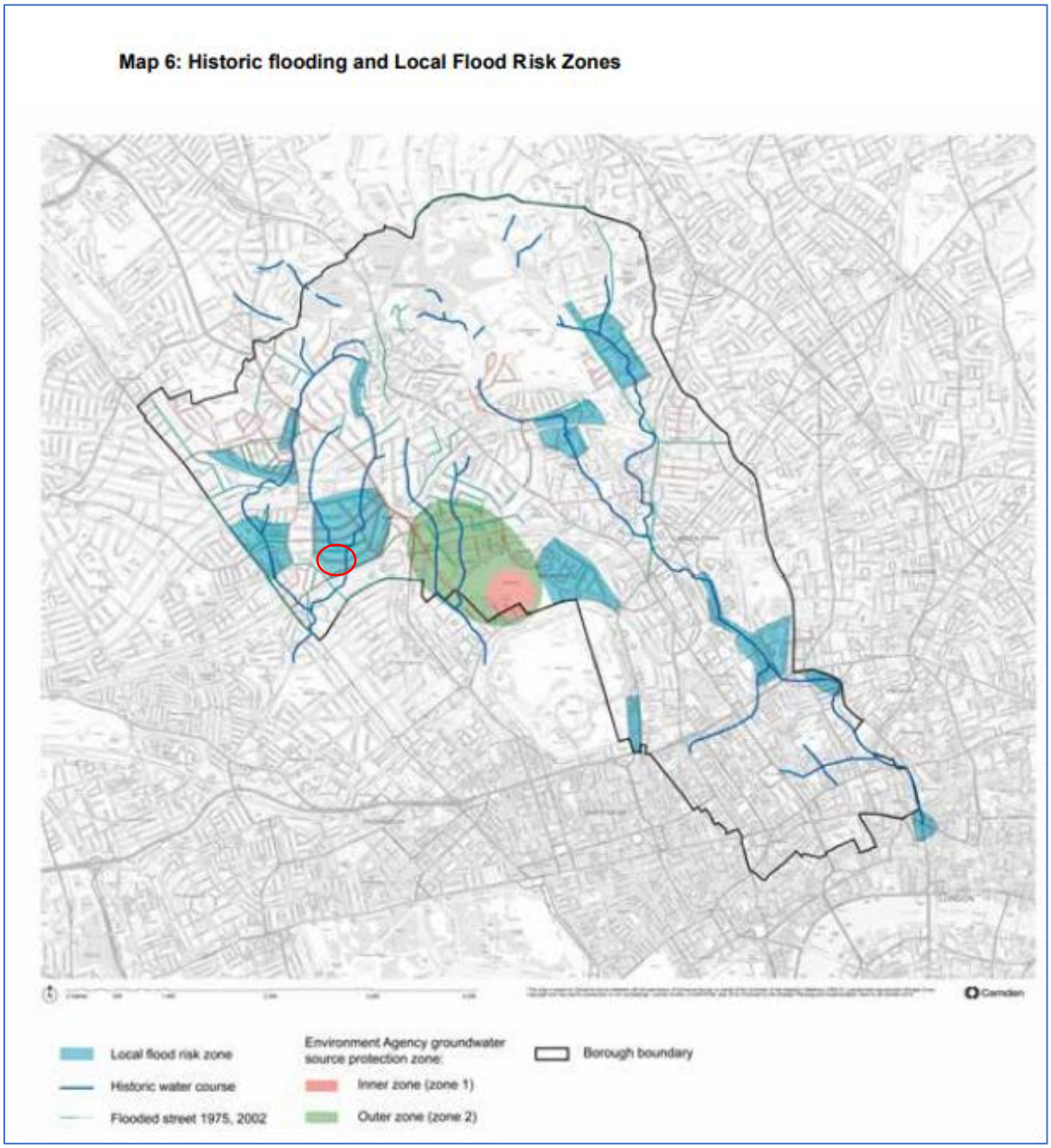


Figure 5: Historic Flood and Local Flood Risk Zones

The proposed development site is within a local flood zone, where there have been instances of flooding, however this will be discussed in detail, further on in this report.

2.1 Fluvial or Tidal Flooding

The Environment Agency's Flood Map for Planning (Rivers and Sea), shown below, indicates the site is in Flood Zone 1, and not at risk of flooding from rivers or the sea.

The site is also not at risk of tidal flooding, this can also be confirmed by the Environment Agency's Flood map, below.

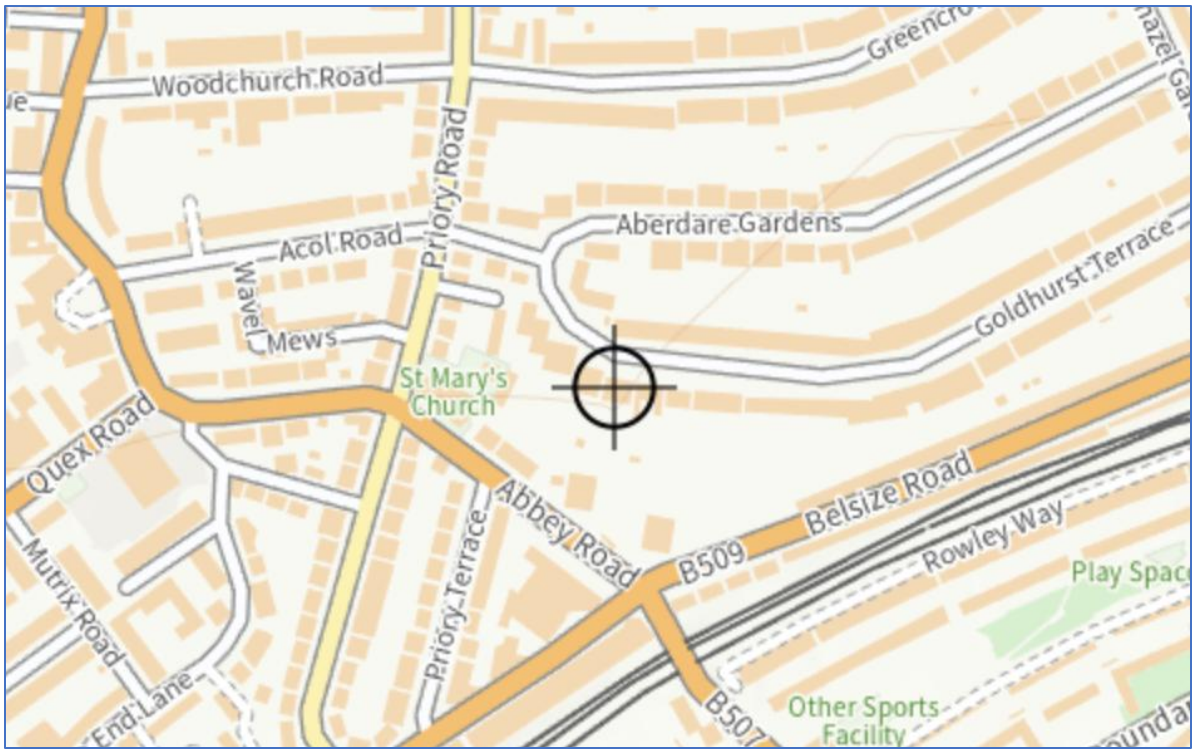


Figure 6 – Environment Agency Flood Map (from Rivers and the Sea) for the proposed development

2.2 Flooding from Land (Overland Flow)

The proposed development site is not at risk of surface water flooding, this can be confirmed by the Environment Agency's Flood map shown below.

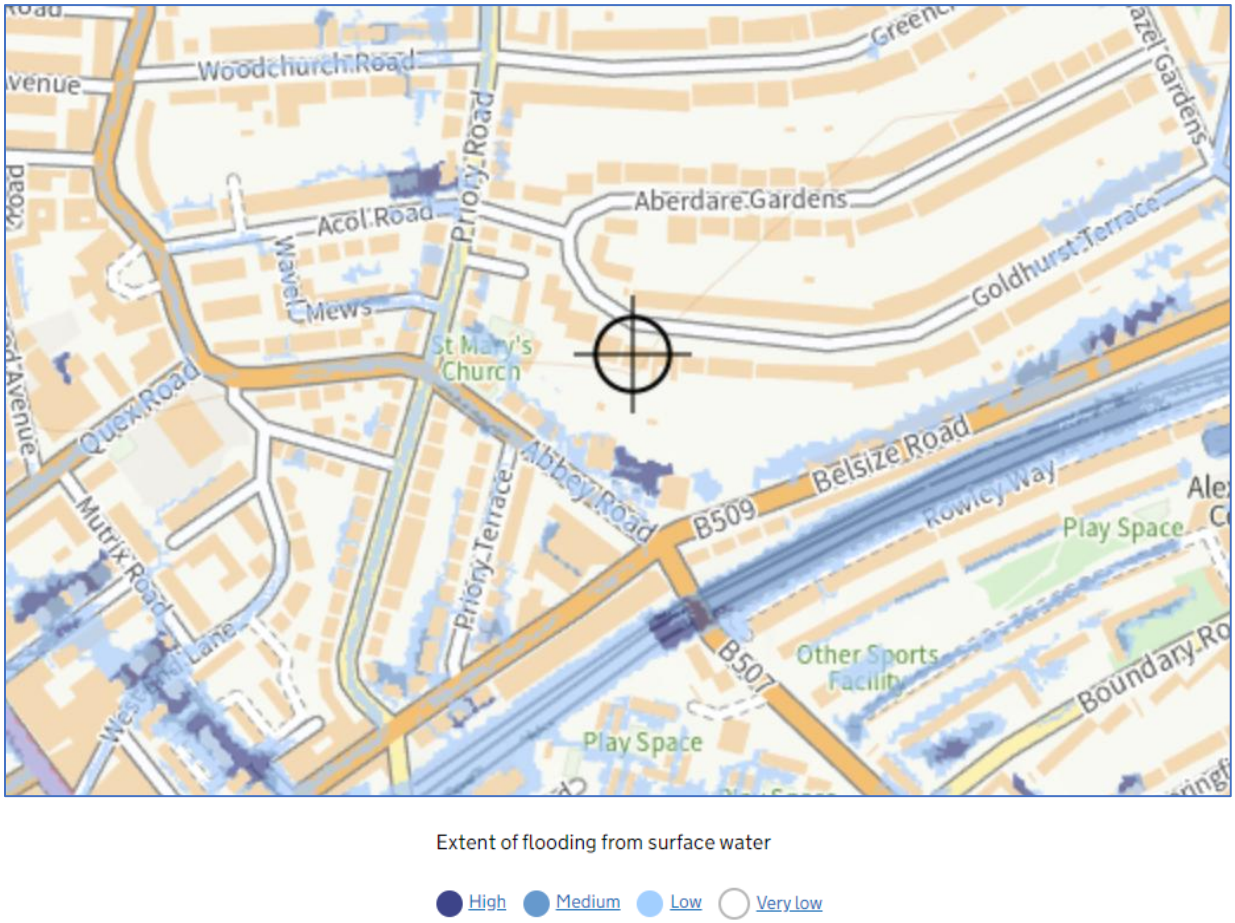


Figure 7 – Environment Agency Flood Map (from surface water) for the proposed development.

However, the site is within a local flood risk zone, as shown in Figure 4. Goldhurst Terrace has flooded during flooding events of 1975, 2002 and 2021. Therefore, this localised flooding is caused by the combined sewer in this area being surcharged during extreme storm events, caused by surface water combined sewer network.

Furthermore, the London Borough of Camden Section 19 Flood Investigation Report Flood Incidents on the 12th and 25th July 2021 states that the flooding during these dates was caused by surface water sources causing a surcharging of assets.

This report identified six flooding hotspots in the area, as shown below, which do not include the proposed development site, as shown in figure 8 overleaf:

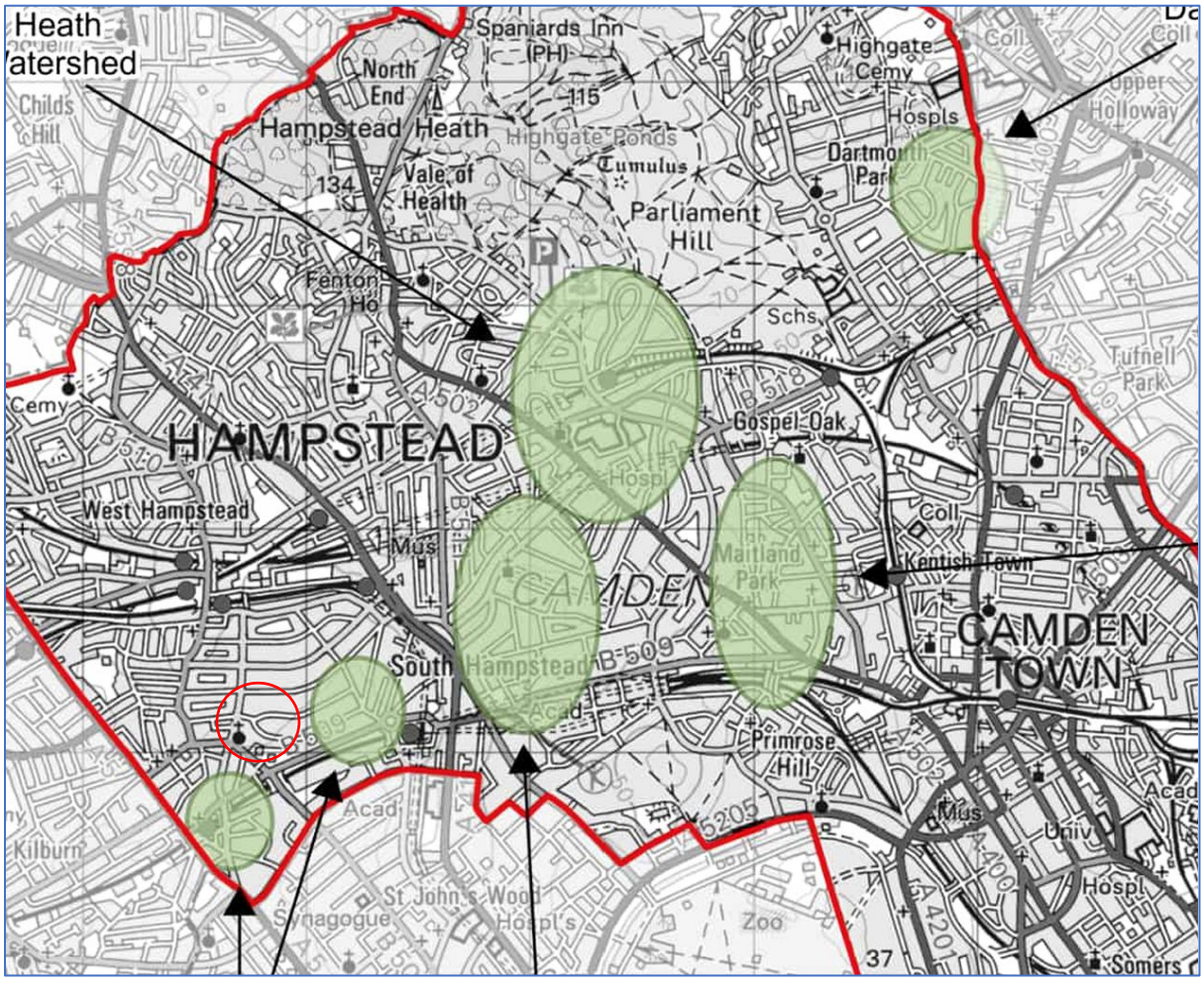


Figure 8 – Section 19, Flood Investigation Focus Area – Camden SFRA Report (2024)

The July 2021 flooding event was classed as exceptionally high, and the rainfall totals represented the fifth wettest three-month combined May, June and July rainfall totals, since 1891.

The flood area outlined in Figure 7, is in line with the ‘Floods in Camden’ report, which was published in 2003, following the flooding events of 2002. Which states that the

London Fire Brigade particularly had to assist residents in the Fairhazel Gardens/Goldhurst Terrace area.

It is clear from all of these reports that the majority of the flooding in this local flood risk area, pertaining to 253 Goldhurst Terrace, did not affect the proposed development site itself and was contained within the street.

However, due to the concerns and possible future flooding caused by the overloading of the combined sewer network in extreme storms, we have proposed a 400mm high glass wall to surround the lightwell, and this will ensure that no flood water will enter the basement floor or lightwell during any future flooding. Non return valves have also been proposed to ensure that there is no back of flow causing sewer flooding at the site.

Furthermore, the Camden Level 1 SFRA (2024) states:

- For proposed developments located on a Previously Flooded Street, as presented within **Appendix A** (**Figure 4**), Camden Council should consider setting as a requirement a minimum reduction in surface water runoff rates post-development to greenfield runoff rates The intention of such a requirement would be to reduce surface water runoff and also reduce the strain on the combined sewer network.
- When re-developing existing buildings in areas at risk from flooding, especially when identified on a Previously Flooded Street, the use of flood resilient measures should be promoted at the individual property level. Measures introduced for basement dwellings may need to be more robust, to protect from potential groundwater flood risk. Measures could include non-return valves.

Our SuDS proposals will ensure that any surface water run off proposed by the proposals, will restrict the flow to 0.5 l/s, and therefore reducing the load on the existing combined sewer system.

2.3 Flooding from Groundwater

We have consulted historic boreholes at the site and have also consulted the DEFRA Magic Maps and both show that the groundwater is very low at this site and there is no risk of groundwater flooding.

Furthermore, we have consulted the Camden Borough Council, Level 1, Strategic Flood Risk Assessment's Geo Flood map, as shown in figure 9 overleaf, and this shows the proposed development site to be in an area with no risk of groundwater flooding, therefore there will be no risk of groundwater flooding to this proposed basement.

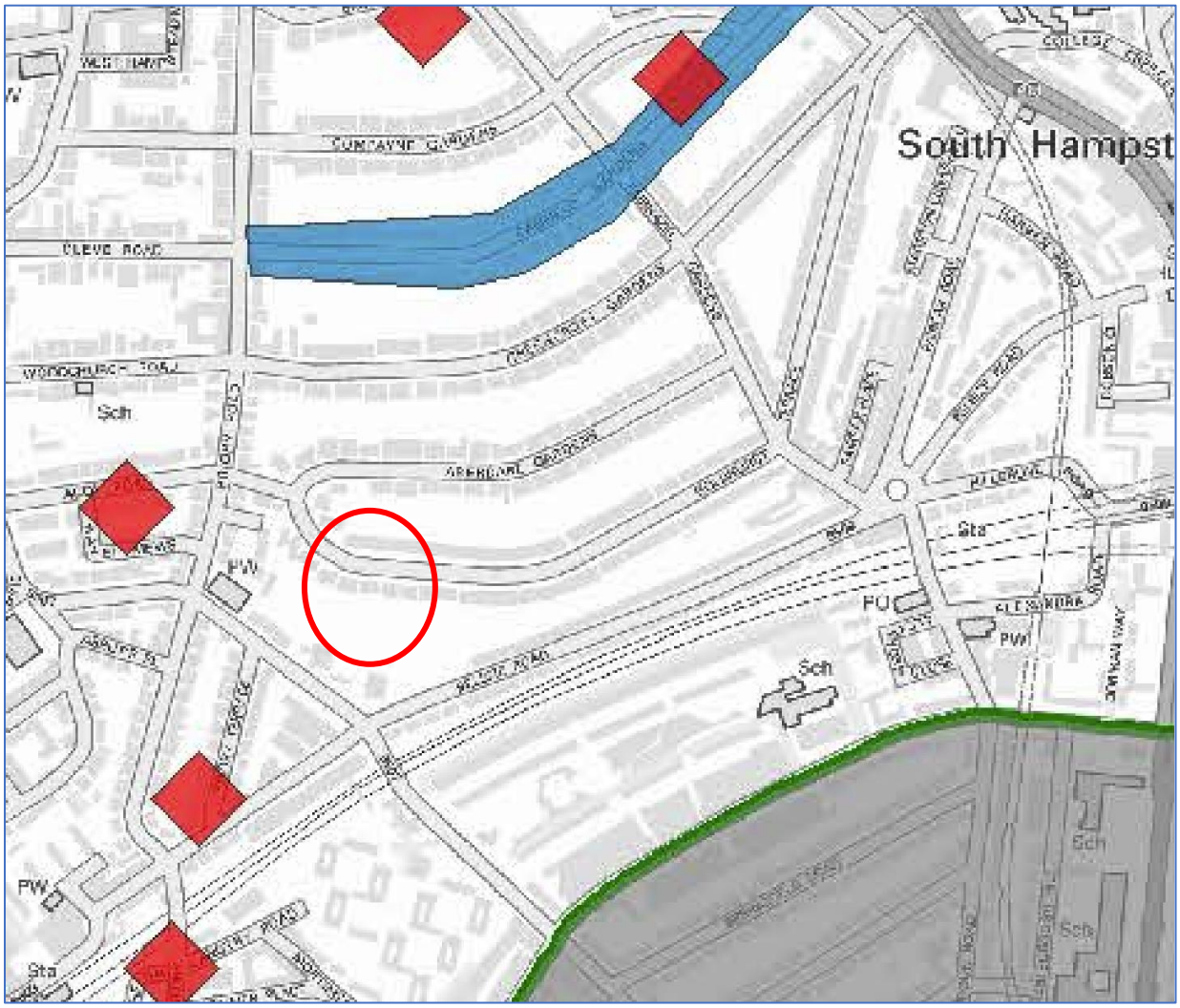


Figure 9 – Increased Susceptibility to Elevated Groundwater Map – Extracted from London Borough of Camden Level 1 Strategic Flood Risk Assessment Report

The client will undertake long term groundwater monitoring to ascertain the depth of any standing groundwater, and also provide a waterproofing membrane to ensure that any perched water has been dealt with and therefore the basement will be waterproof and will be designed as a watertight element. It should be noted that as the groundwater levels will be below the basement level, that the basement structure will not be adversely affected, and other than the waterproofing membrane, no other mitigation measures are required. As it is that the soils at likely foundation/basement depth will deteriorate rapidly in the prolonged presence of water, although there will be no groundwater ingress, other than the unlikely possibility of perched water, a waterproof membrane such as delta membrane or equivalent has been proposed. Consequently, a blinding layer of lean-mix concrete will be applied to all excavations if continuous working cannot be achieved. Fixtures and fittings for the basement will be located to ensure that if any flood water from perched water, does enter the building, the impact of floodwater on the property will be minimal.

It should also be noted that a separate basement impact assessment report has been produced and accompanies this application.

2.4 Flooding from Sewers

The Level 1 SFRA (2024) reported 60+ incidents of sewer flooding between January 2013 and April 2023, the map is shown below and shows the incidents of sewer flooding in the vicinity of the proposed development site.

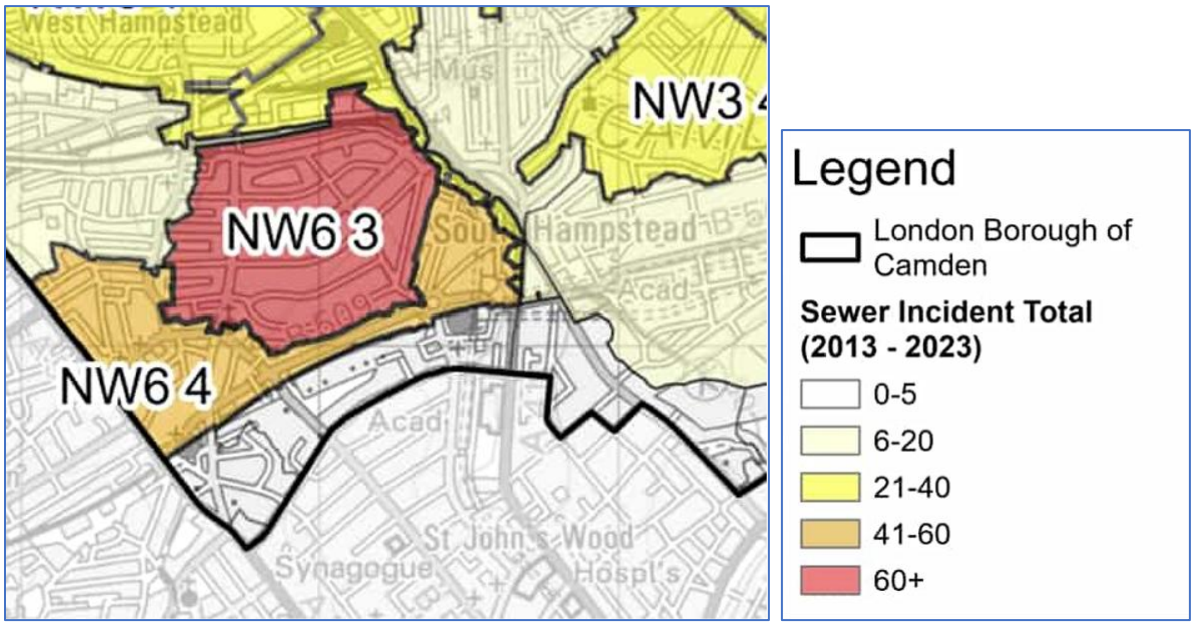


Figure 10 – Reported incidents of sewer flooding (January 2013 to April 2023) map – Extracted from the Camden SFRA (2024)

The sewerage system within the vicinity of the site is a combined system, so this flooding is caused by the sewers surcharging during extreme storm events. Due to the extreme flooding in 2021, even though the surface water flooding did not extend to the proposed development site, the main concerns of the council are that the combined sewer in the street surcharging due to extreme rainfall, and essentially extending and flooding the proposed basement extension and lightwell area.

Therefore, they have requested that we focus on solutions that will prevent this sewer flooding from entering the lightwell and basement floor of the proposed basement extension.

In order to mitigate against this, we have proposed 400mm high glass walls to surround the lightwell, as this will prevent any sewer flooding extending to the lightwells. We have also proposed flood proof windows and doors at the new basement extension as a secondary safety measure.

The Thames Tideway Tunnel super sewer is almost complete and will alleviate the strain on this combined sewer and others in London, reducing the risk of flooding at this site and elsewhere.

2.5 Flooding from Reservoirs, Canals, or Other Artificial Sources

The Environment Agency's Flood map shown below, shows the site not to be at risk of reservoir flooding.

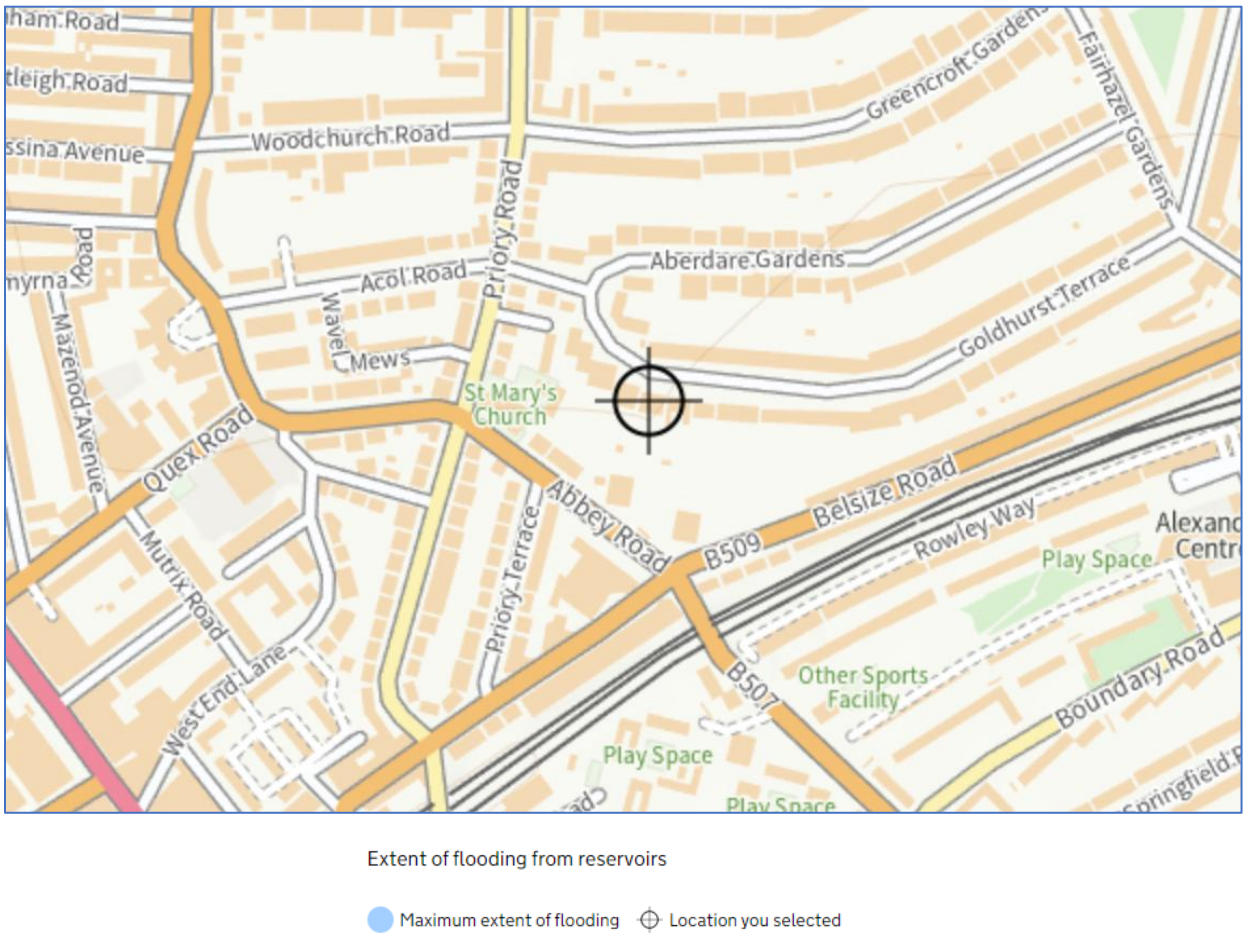


Figure 11 – Environment Agency Flood Map (from reservoirs) for the proposed development

6. SUSTAINABLE URBAN DRAINAGE SYSTEMS

The total area of the proposed basement extension is 59m^2, prior to any mitigation by using Sustainable Urban Drainage Systems (SuDS).

Surface water arising from a developed site should, as far as practicable, be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development, while reducing the flood risk to the site itself and elsewhere, taking climate change into account.

Reducing the rate of surface water discharge from Urban Sites is one of the most effective ways of reducing and managing flood risk.

Traditional piped surface water systems work by removing the surface water from our developments as quickly as possible, however this can cause various adverse impacts:

- Increased downstream flooding, and sudden rises in flow rates and water levels in local water courses.
- Reduction in groundwater levels dry weather flows in watercourses.
- Reduce amenity and adversely affect biodiversity due to the surface water run-off containing contaminants such as oil, organic matter and toxic materials.

SuDS are defined as a sequence of management principles and control structures designed to drain surface water in a more sustainable fashion than conventional piped drainage techniques. SuDS should utilise the environmental, ecological and social benefits.

These include:

- Protection and enhancement of water quality – As well as providing on-site attenuation, SuDS treat the water, resulting in an improved quality of water leaving the site. This is achieved when the water passes through the fine soils and the roots of specially selected plants, pollutants washed off the hard landscaping by rainfall will be safely removed before the water reaches the natural water course.

- A sympathetic approach to the environmental setting by providing the opportunities to create habitats for flora and fauna in urban watercourses and open spaces.

- Meeting the amenity and social needs of the local community and residents in the creation of attractive green spaces.

The various types of SuDS include:

Permeable paving;	
Soakaways;	
Swales and basins;	
Bioretention/ rain gardens;	
Green roofs and rainwater re-use;	
Infiltration trenches and filter drains	

Ponds and wetlands;	

Preferably a combination of these techniques should be used as part of the surface water management train, and it is important for all stakeholders; such as developers, architects, landscape architects and engineers, to work together at the planning stage in order to determine a feasible solution.

The SuDS management train is shown in Figure 12 below, this has been followed when proposing the proposed Sustainable Urban Drainage Systems for this site.

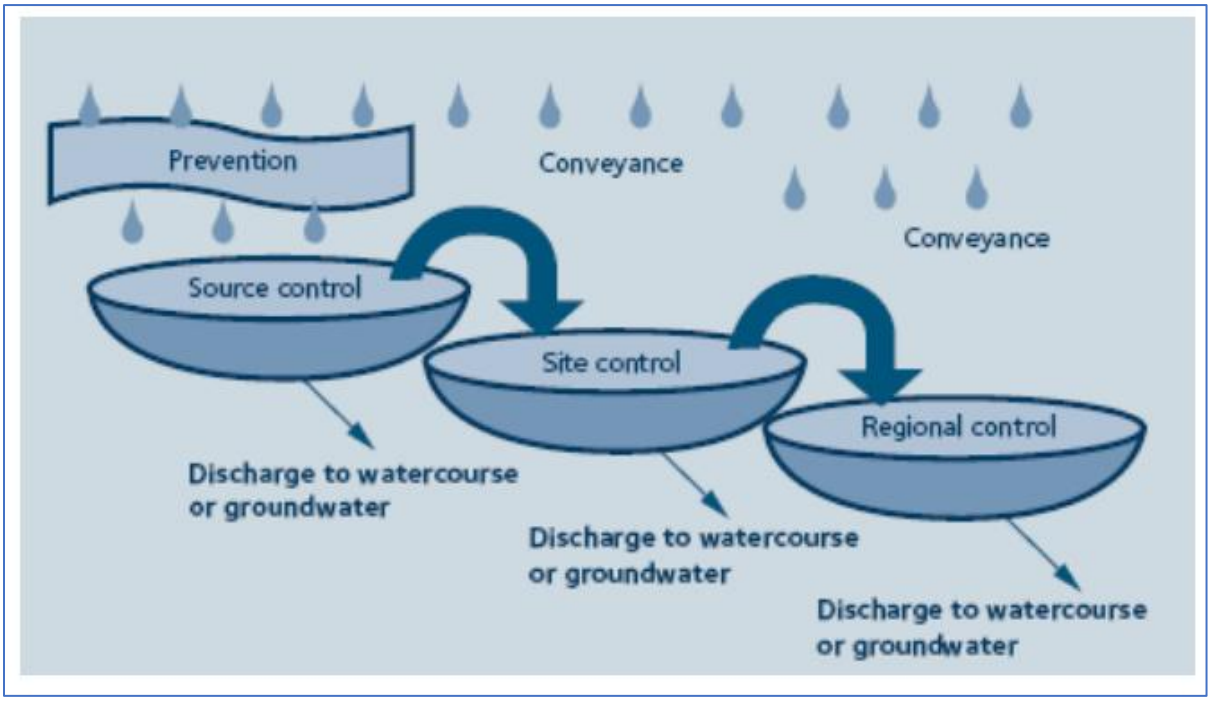


Figure 12 – SuDS Management Train

7. SuDS PROPOSALS FOR DEVELOPMENT

In accordance with the CIRIA SuDS Manual C753, the London Plan and Local Plan, we have considered the SuDS hierarchy in relation to the site-specific constraints and its surroundings. Table 1 below outlines the hierarchical approach we followed to develop the SUD proposals at 253 Goldhurst Terrace.

Sustainable Drainage Proposal	Description	Constraints/Comments	Appropriate
Rainwater Use as a Resource	Use of rainwater runoff for reuse, e.g. Rainwater harvesting tanks, Blue Roofs for irrigation	One wall mounted rainwater harvesting tanks has been proposed	Yes
Rainwater Full Infiltration to Ground (Source Control)	Infiltration devices and/or soakaways. Surface water runoff stored on site gradually percolating into the receiving ground	Due to underlying geology, which is consisting of clay, this has been deemed unfeasible.	No
Rainwater Partial Infiltration to Ground (Source Control)	Installation of permeable/porous surfacing	N/A	N/A
Rainwater attenuation in green infrastructure features for gradual release	The onsite storage of all surface water runoff can then be gradually conveyed to a nearby watercourse, sewer, or infiltration into the ground. Forms of green infrastructure features: Green	There is no available space for green or sedum roofs or any other above ground SuDS element	No

	Roofs, Raingardens, Ponds, Swales, Detention basins, Infiltration Trenches, Raingarden Planters		
Rainwater discharge directly to a watercourse	All surface water runoff on-site discharged at a restricted rate to a nearby watercourse.	No nearby watercourses to discharge to.	No
Controlled rainwater discharge to a surface water sewer or drain	All surface water runoff on-site is discharged at a restricted rate to a nearby surface water sewer or drain, and all rainwater runoff is stored in below-ground attenuation features. E.g. oversized pipes or geo-cellular tanks	Thames Water Asset plans show no surface water assets to discharge to.	No
Controlled rainwater discharge to a combined sewer	All surface water runoff on site is discharged at a restricted rate to a nearby combined sewer. All rainwater runoff is stored in below-ground attenuation features. E.g. oversized pipes or geo-cellular tanks	On site run-off will be attenuated and discharged at a restricted rate of 0.5l/s to the existing combined sewer system at the site.	Yes

Table 1: SuDS Control Measures for Development

8. PROPOSED SuDS SOLUTION

In order to ensure that the SuDS management train has been followed, onewall mounted rainwater harvesting tanks have been proposed at the site to encourage rainwater re-use.

The preferred method of dealing with remaining surface water from this basement extension would be to treat and deal with it at source using soakaways. However, due to the underlying geology consisting of clay, this has been discounted as an option.

Therefore, our proposed solution involves attenuated the remaining surface water runoff, from the basement extensions and attenuating this for a 1 in 100 year plus 45% CC storm event, with restricted flow leaving the site set to the 0.5 l/s, in order to avoid blockages. The flow control to be utilised with be an orifice system, which will achieve self cleansing.

The storage volume required is 2.32 m^3, and this will be stored in an underground crate system, then conveyed at a restricted rate of 0.5 l/s to the existing combined sewer system at the site. All surface water run off calculations can be found in Appendix C, and the water authority asset plans can be found in Appendix D.

A proposed drainage layout plan has been provided in Appendix A.

We believe the Sustainable Urban Drainage System hierarchy has been considered fully and is proportionate to the nature and scale of the development.

9. TIMESCALE AND MAINTENANCE OF DRAINAGE WORKS

All drainage works shall be completed prior to first occupation and there shall be no adoption of any of the drainage works within the site, and the homeowners will be responsible to oversee the long-term maintenance of the communal drains.

The following outline maintenance strategy sets out recommended timescales for maintenance of the proposed drainage works, in line with CIRIA SuDS Design Guide:

- Regular inspection will comprise the inspection and cleaning of catchment, gutters, filters and tanks to reduce the likelihood of contamination, this is recommended to be carried out every 3 to 6 months.

- The catchpit chamber and flow controls should be checked and cleaned every 3 months for the accumulation of debris/ silt, in order to ensure that there are no blockages.

- Regular jet-washing of permeable block paving can be used to keep joints and voids clear; this should be carried out every 3 to 6 months.

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspection of the tank for debris and sediment build-up, inlets/outlets/withdraw devices, overflow areas, pumps, filters.	Annually (and following poor performance)
	Cleaning of tank, inlets, outlets, gutters. Withdrawal devices and roof drain filters of silts and other debris	Annually (and following poor performance)
Occasional maintenance	Cleaning and/ or replacement of any filters	Three monthly (or as required)
Remedial actions	Repair of overflow erosion damage or damage to tank	As required
	Pump repairs	As required

Table 2: Operation and maintenance requirement for RWH systems.

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockages by sediment, algae or other matter: remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/ or internal forebays	Annually, or as required
Remedial actions	Repair/ rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

Table 3: Operation and maintenance requirements for attenuation storage tanks.

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect from surface and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then 6 monthly intervals
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	Orifice plates within plastic chambers or vortex controls to be jetted from the surface after heavy rainfall events to remove any debris or silt	As required
	Empty catchpits upstream of SuDS features to ensure no debris is passed downstream	3 months or as required
Remedial actions*	In the event of a blockage, a vortex flow control can be removed from the chamber via the lifting cabled located at the access, this will be cleaned at surface level and reinstalled into its original location	As required
	In the event of a blockage, the orifice plate should be jetted from surface, and if blockage is not cleared the orifice plate can be removed by removing fixing bolts. These fixing bolts should be checked and replaced if needed.	As required
Monitoring	Following installation, it is important that any extraneous materials i.e. building materials: granular backfill, in-situ pour concrete etc are removed from the unit and the new flow control chamber is fully jetted down	Upon installation
	Inspect/check chamber channel for any debris or silt build-up. Upstream chambers should be checked at the same time as these monitoring works to ensure network is operating at full capacity.	Annually

Table 4: Operation and maintenance requirements for flow control chambers

*All Remedial Works should be carried out by a competent and certified contractor, with no access to chambers or removal of parts to be undertaken by homeowners

If upstream network of flow control chamber is regularly maintained, little maintenance is required within the chamber as there are no moving parts.

3. SUMMARY AND CONCLUSIONS

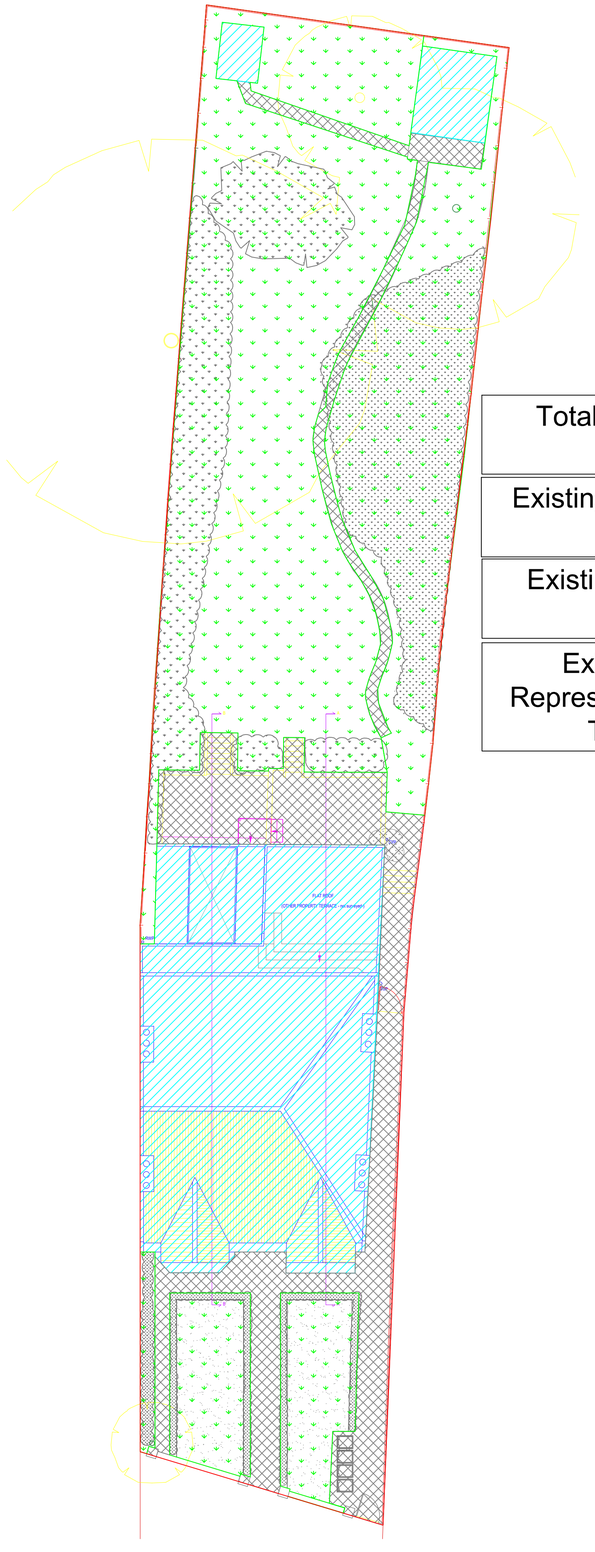
The site is at a very low risk from flooding from groundwater, tidal, fluvial, surface water, and reservoir flooding, and although there have been instances of sewer flooding within the vicinity of the site the clients confirms that there has been no history of sewer flooding at their site.

The groundwater levels are well below the proposed basement level; however the basement will still be designed as a watertight element in the unlikely event that there is any groundwater ingress from perched water.

The proposals will not impact on any known flood flow route or flood storage area.

The surface water run off produced as a result of the basement extension will be attenuated in a below ground crate system attenuation tank, with restricted flow discharging into the existing Thames Water Combined Sewer, via gravity, at a rate of 0.5l/s.

APPENDIX A – DRAWINGS



Total Site Area is Approx.798m²

Existing Impermeable Total Area is Approx. 341m²

Existing Permeable Total Area is Approx. 457m²

Existing Impermeable Area Represents Approx. 43% From The Total Considered Area.

DRAWING TO BE PRINTED IN COLOUR.

KEY

Permeable Areas

Hardstanding Areas

Roof Areas

NOT FOR CONSTRUCTION

REV	DATE	DRAWN	DESCRIPTION	CHECK	APPR.
A	12-05-25	A.L	For Information.	SL	SL

PROJECT:

C3000 - Goldhurst Terrace, London, NW6 3EP

TITLE:

Pre-Development Impermeable Areas Plan

CLIENT:

Matteo e Anna Falivene

Nimbus ENGINEERING CONSULTANTS
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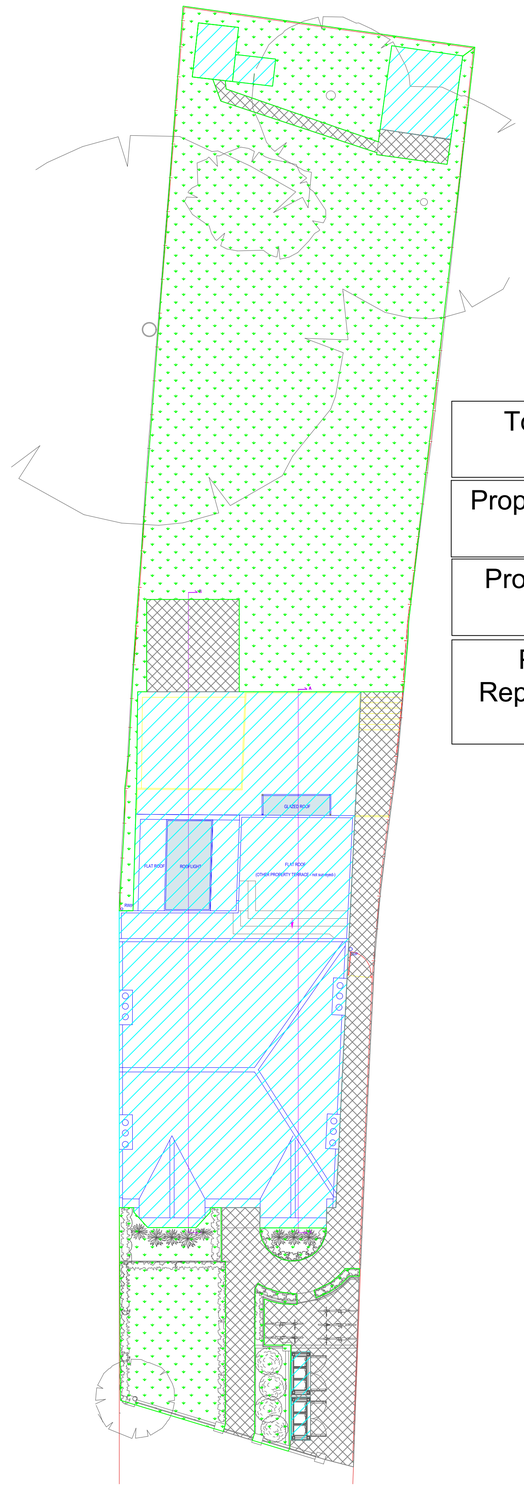
info@nimbusengineering.co.uk

CHECKED BY:	DATE:	APPROVED BY:	DATE:
S.L	12-05-25	S.L	12-05-25
DRN BY: A.L	SCALE: NTS	DRAWING NUMBER: C3000-01	REV: A
DATE: 12-05-25	SIZE: A1		



Total Site Area is Approx.798m²

Proposed Impermeable Total Area is Approx. 454m²

Proposed Permeable Total Area is Approx. 344m²

Proposed Impermeable Area Represents Approx. 57% From The Total Considered Area.

DRAWING TO BE PRINTED IN COLOUR.

KEY

Permeable Areas

Hardstanding Areas

Roof Areas

NOT FOR CONSTRUCTION

REV	DATE	DRAWN	DESCRIPTION	CHECK	APPR.
A	12-05-25	A.L	For Information.	SL	SL

PROJECT:

C3000 - Goldhurst Terrace, London, NW6 3EP

TITLE:

Post-Development Impermeable Areas Plan

CLIENT:

Matteo e Anna Falivene

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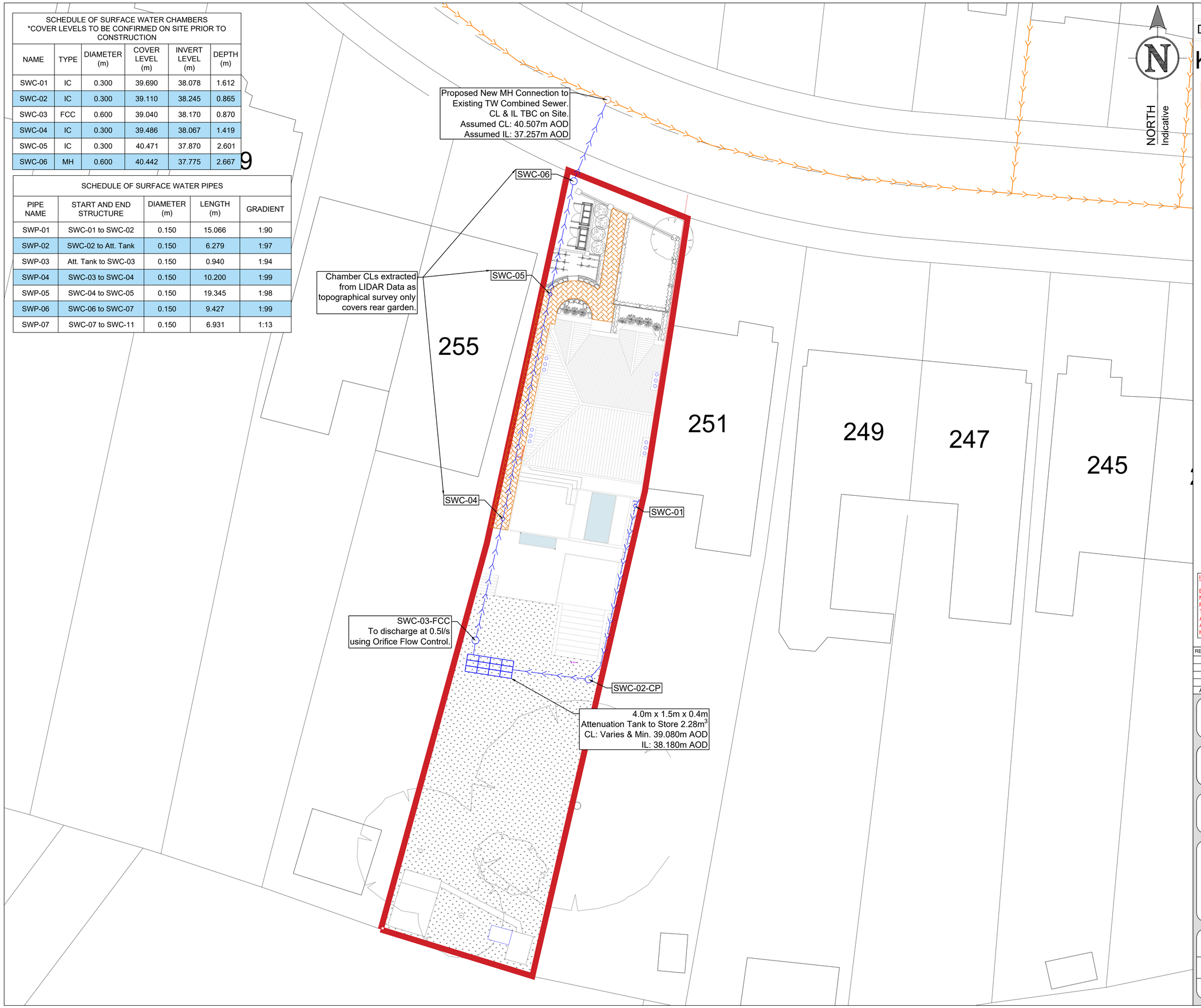
CHECKED BY:	DATE:	APPROVED BY:	DATE:
S.L	12-05-25	S.L	12-05-25
DRN BY: A.L	SCALE: NTS	DRAWING NUMBER: C3000-02	REV: A
DATE: 12-05-25	SIZE: A1		

SCHEDULE OF SURFACE WATER CHAMBERS *COVER LEVELS TO BE CONFIRMED ON SITE PRIOR TO CONSTRUCTION					
NAME	TYPE	DIAMETER (m)	COVER LEVEL (m)	INVERT LEVEL (m)	DEPTH (m)
SWC-01	IC	0.300	39.690	38.078	1.612
SWC-02	IC	0.300	39.110	38.245	0.865
SWC-03	FCC	0.600	39.040	38.170	0.870
SWC-04	IC	0.300	39.486	38.067	1.419
SWC-05	IC	0.300	40.471	37.870	2.601
SWC-06	MH	0.600	40.442	37.775	2.667

SCHEDULE OF SURFACE WATER PIPES				
PIPE NAME	START AND END STRUCTURE	DIAMETER (m)	LENGTH (m)	GRADIENT
SWP-01	SWC-01 to SWC-02	0.150	15.066	1:90
SWP-02	SWC-02 to Att. Tank	0.150	6.279	1:97
SWP-03	Att. Tank to SWC-03	0.150	0.940	1:94
SWP-04	SWC-03 to SWC-04	0.150	10.200	1:99
SWP-05	SWC-04 to SWC-05	0.150	19.345	1:98
SWP-06	SWC-06 to SWC-07	0.150	9.427	1:99
SWP-07	SWC-07 to SWC-11	0.150	6.931	1:13



DRAWING TO BE PRINTED IN COLOUR.

KEY:

- Proposed Permeable Paving
- Proposed Site Boundary
- Surface Water Inspection Chambers
- Surface Water UPVC Pipes
- Foul Water Pipe

NOT FOR CONSTRUCTION

REV	DATE	DRAWN	DESCRIPTION	CHECK	APPR.
A	14-05-25	M.HAM	For Information.	S.L	S.L

C3000 - Goldhurst Terrace, London, NW6 3EP

SuDS Layout & Location Plan

Matteo e Anna Falivene

Nimbus ENGINEERING CONSULTANTS

S.L	14-05-25	S.L	14-05-25
M.HAM	1:150	C3000-03	A
14-05-25	A1		

APPENDIX B – HISTORIC BOREHOLES

GEOLOGICAL SURVEY OF GREAT BRITAIN

RECORD OF SHAFT OR BORE FOR MINERALS

(*For Survey use only*)
6-inch Map Registered No.
TQ28SE/378

Name of Shaft or Bore given by Geological Survey:

Name and Number given by owner: Abbey estate no. 16.

For whom made L.C.C.

Town or Village Hampstead County London

Exact site See plan filed under TQ28SE/377 { Attach a tracing from a map, or a sketch-map, if possible.

Purpose for which made Trial

Nat. Grid Reference 25758390

1" N.S.Map No.	1" O.S.Map No.	Confidential or not
256		

Ground Level at shaft bore relative to O.D. If not ground level give O.D. of beginning of shaft bore

Made by Date of sinking

Information from Date received

Examined by

SPECIMEN NUMBERS AND ADDITIONAL NOTES

(*For Survey use only*) Geological Classification	Description of Strata	Thickness Ft.	Thickness In.	Depth Ft.	Depth In.
3'6"- 5'0"	Brown fissured clay with fine roots				
8'6"-10'0"	Brown fissured clay, blue in fissures with selenite crystals				
13'6"-15'0"	Brown fissured clay, blue in fissures with selenite crystals				
18'6"-20'0"	Brown fissured clay with selenite crystals				
23'6"-25'0"	Brown fissured clay with selenite crystals				
28'6"-30'0"	Blue fissured clay				
33'6"-35'0"	Blue fissured clay				
38'6"-40'0"	Blue fissured clay				

(5412) Wt.32837/PS.154 2m 10/54 G.W.B.Ltd. Gp.863

GEOLOGICAL SURVEY OF GREAT BRITAIN

RECORD OF SHAFT OR BORE FOR MINERALS

(*For Survey use only*)
6-inch Map Registered No.
TQ28SE/378

Name of Shaft or Bore given by Geological Survey:

Name and Number given by owner: Abbey estate no. 16.

For whom made L.C.C.

Town or Village Hampstead County London

Exact site See plan filed under TQ28SE/377 { Attach a tracing from a map, or a sketch-map, if possible.

Purpose for which made Trial

Nat. Grid Reference 25758390

1" N.S.Map No.	1" O.S.Map No.	Confidential or not
256		

Ground Level at shaft bore relative to O.D. If not ground level give O.D. of beginning of shaft bore

Made by Date of sinking

Information from Date received

Examined by

SPECIMEN NUMBERS AND ADDITIONAL NOTES

(*For Survey use only*) Geological Classification	Description of Strata	Thickness Ft.	Thickness In.	Depth Ft.	Depth In.
3'6"- 5'0"	Brown fissured clay with fine roots				
8'6"-10'0"	Brown fissured clay, blue in fissures with selenite crystals				
13'6"-15'0"	Brown fissured clay, blue in fissures with selenite crystals				
18'6"-20'0"	Brown fissured clay with selenite crystals				
23'6"-25'0"	Brown fissured clay with selenite crystals				
28'6"-30'0"	Blue fissured clay				
33'6"-35'0"	Blue fissured clay				
38'6"-40'0"	Blue fissured clay				

(5412) Wt.32837/PS.154 2m 10/54 G.W.B.Ltd. Gp.863

GEOLOGICAL SURVEY OF GREAT BRITAIN

RECORD OF SHAFT OR BORE FOR MINERALS

(For Survey use only)

6-inch Map Registered No. TQ28SE/377

Name of Shaft or Bore given by Geological Survey:

Name and Number given by owner: Abbey estate no 15.

Nat. Grid Reference 2572.8384

For whom made

Town or Village Hamp stead County London

Exact site see plan

Attach a tracing from a map, or a sketch-map, if possible.

Purpose for which made Trial

1" N.S.Map No.	1" O.S.Map No.	Confidential or not
256		

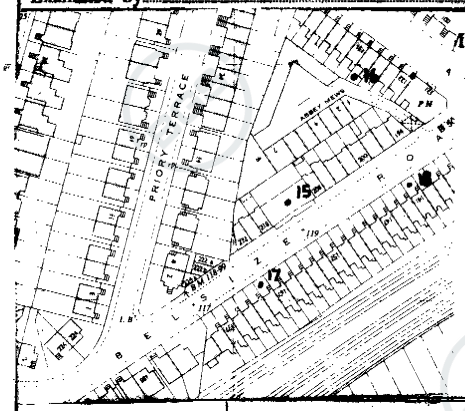
Ground Level at shaft bore relative to O.D. If not ground level give O.D. of beginning of shaft bore

Made by Date of sinking

Information from Date received

Examined by

NUMBERS AND ADDITIONAL NOTES



(For Survey use only) Geological Classification	Description of Strata	Thickness Ft.	Thickness In.	Depth Ft.	Depth In.
3'6"-5'0"	Brown fissured clay, blue in fissures with selenite crystals				
8'6"-10'0"	Brown fissured clay with selenite crystals				
13'6"-15'0"	Brown fissued clay with selenite crystals				
18'6"-20'0"	Brown fissured clay with selenite crystals				
23'6"-25'0"	Blue fissured clay				
28'6"-30'0"	Blue fissured clay				
33'6"-35'0"	Blue fissured clay				
38'6"-40'0"	Blue fissured clay				

(5412) Wt.32837/PS.154 2m. 10/64

GEOLOGICAL SURVEY OF GREAT BRITAIN

RECORD OF SHAFT OR BORE FOR MINERALS

(*For Survey use only*)
6-inch Map Registered No.
TQ28SE/380

Name of Shaft or Bore given by Geological Survey:

Name and Number given by owner: Abbey estate no. 18

Nat. Grid Reference
2575·8383

For whom made L.C.C.

Town or Village Hampstead County London

Exact site See plan with TQ28SE/377 { Attach a tracing from a map, or a sketch-map, if possible.

1" N.S.Map No.	1" O.S.Map No.	Confidential or not
256		

Purpose for which made Trial

Ground Level at shaft bore relative to O.D. If not ground level give O.D. of beginning of shaft bore

Made by Date of sinking

Information from Date received

Examined by

SPECIMEN NUMBERS AND ADDITIONAL NOTES

(*For Survey use only*) Geological Classification	Description of Strata	Thickness Ft.	Thickness In.	Depth Ft.	Depth In.
9'6"-11'0"	Brown fissured clay, blue in fissures with selenite crystals and fine roots				
14'6"-16'0"	Brown fissured clay, blue in fissures with selenite crystals				
19'6"-21'0"	Brown fissured clay, blue in fissures with selenite crystals				
24'6"-26'0"	Brown fissured clay with selenite crystals				
29'6"-31'0"	Brown fissured clay with selenite crystals				
24'6"-36'0"	Blue fissured clay				
38'6"-40'0"	Blue fissured clay				

(5412) Wt.32837/PS.154 2m. 10/64 G.W.B.Ltd. Gp.863

GEOLOGICAL SURVEY OF GREAT BRITAIN

RECORD OF SHAFT OR BORE FOR MINERALS

(*For Survey use only*)
6-inch Map Registered No.
TQ28SE/379

Name of Shaft or Bore given by Geological Survey:

Name and Number given by owner: Abbey estate no 17

For whom made LCC

Town or Village Hampstead County London

Exact site See plan with TQ28SE/377 { Attach a tracing from a map, or a sketch-map, if possible.

Purpose for which made Trial

Nat. Grid Reference 2571.8380

1" N.S.Map No.	1" O.S.Map No.	Confidential or not
256		

Ground Level at shaft bore relative to O.D. ..... If not ground level give O.D. of beginning of shaft bore .....

Made by ..... Date of sinking .....

Information from ..... Date received .....

Examined by .....

SPECIMEN NUMBERS AND ADDITIONAL NOTES

(*For Survey use only*) Geological Classification	Description of Strata	Thickness Ft.	Thickness In.	Depth Ft.	Depth In.
4'6"-6'0"	Brown fissured clay with fine roots				
9'6"-11'0"	Brown fissured clay, blue in fissures with selenite crystals				
14'6"-16'0"	Brown fissured clay, blue in fissures with selenite crystals				
19'6"-21'0"	Brown fissured clay with selenite crystals				
24'6"-26'0"	Brown fissured clay with selenite crystals				
29'6"-31'0"	Brown fissured clay with selenite crystals				
34'6"-36'0"	Blue fissured clay				
39'6"-41'0"	Blue fissured clay				
44'6"-46'0"	Blue fissured clay				

(3412) Wt.32837/PS.154 2m 10/64 G.W.B.Ltd. Gp.863

TQ28SE/276
2623.8410
256

GROUND EXPLORATIONS LIMITED

BOREHOLE SECTION SHEET

Date December 19 55

CONTRACT NAME Swiss Cottage. ORDER NO.

Bored for : Messrs. Goodhart-Rendel & Partners.

Address : Kirkland House, Whitehall S.W1.

Address of Site : Coleridge Gardens

District or Town : Swiss Cottage County : London

Standing Water Level : - below surface Dia. of Borehole : 6 Inches.

Water Struck (1) None (2) (3)

Boring Commenced : 5.12.55 Boring Completed : 6.12.55

Special Remarks :

Jar Samples : 2871 2'0"; 2872 5'0"; 2879 9'0"; 2876 13'0"; 2878 17'0"; 2880 22'0"

Core Samples : 2873 5'6" - 7'0"; 2875 10'0" - 11'6"; 2877 14'6" - 16'0"; 2879 18'6" - 20'0"; 2881 23'6" - 25'0"

Sand/Gravel Samples :

DESCRIPTION OF STRATA	Thickness Feet	Thickness Inches	Depth Below Surface Feet	Depth Below Surface Inches
The descriptions are given in accordance with the Civil Engineering Code of Practice No. 1 "Site Investigations." No responsibility is accepted for these descriptions and clients should examine the samples submitted.				
No. 1 Boring				
Topsoil	1	6	(0.46) 1	6
Loamy clay	3	6	(1.52) 5	0
Brown clay	20	0	(7.62) 25	0
TOTAL FROM SURFACE ...	25	0	25	0.

This form is to be returned to Head Office immediately the borehole is finished.

Foreman's Signature..... *Date*.....

P. & R. Ltd.—175

BOREHOLE ONE

65 Priory Road, Hampstead

Date of boring 6-7 January, 1983

Diameter of boring : 200mm

Lining tubes : 200 mm to 1.5 m

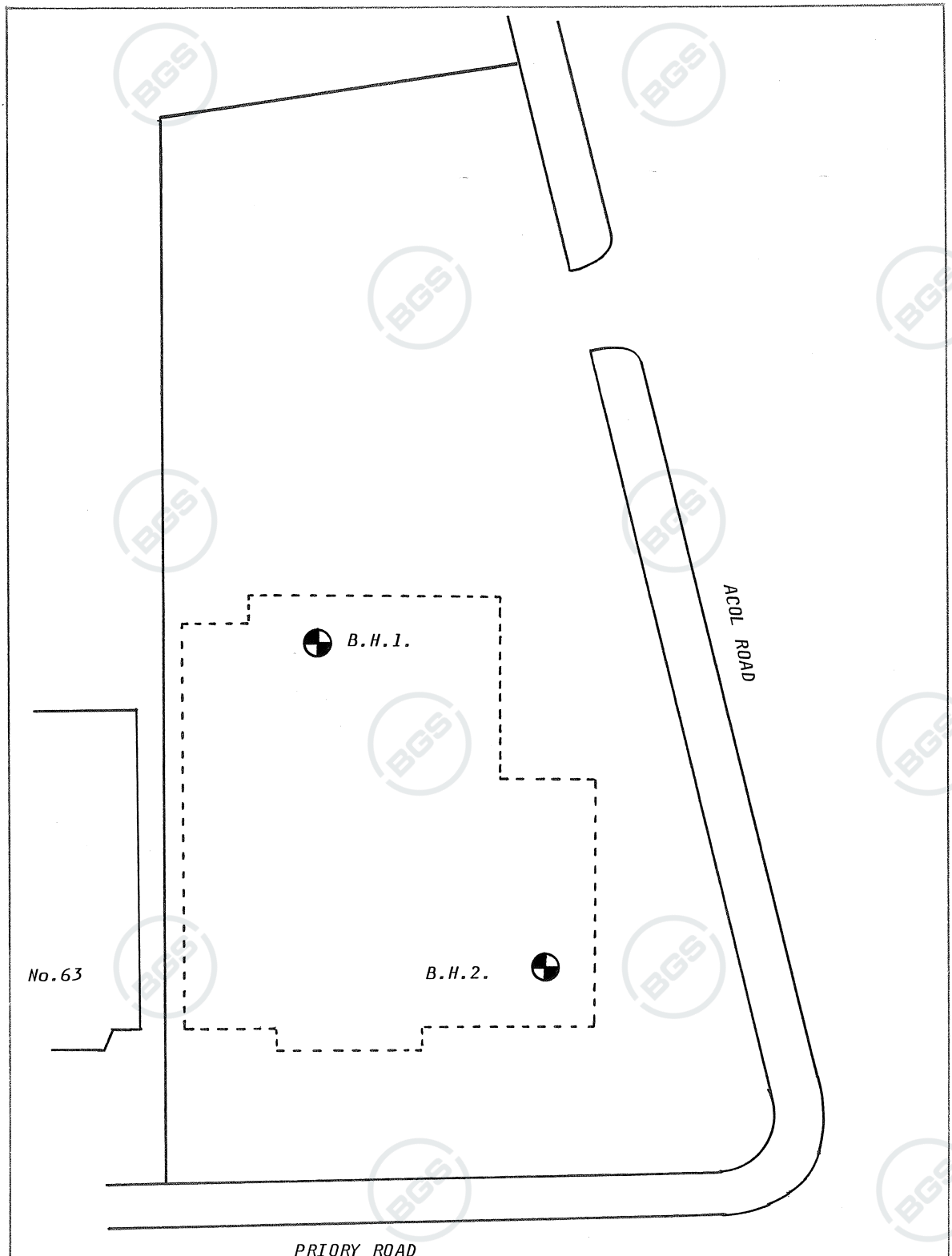
Ground Level -

Description of Strata	Change of Strata: Legend	Change of Strata: Depth	Change of Strata: Reduced Level	S.P.T. C.P.T. N-value	Samples: Depth	Samples: Type	Water Level	Depth of Casing
		m	m		m		m	m
MADE GROUND Soft to firm brown clay with many broken bricks and de-composed mortar		1.00						
LONDON CLAY Firm slightly silty brown mottled grey CLAY with extensive close fissuring. Occassional clay stones.		2.00		SPT 5	1.50	J		1.50
					2.50	U100		
Becoming firm to stiff		3.00			-2.95			
Very stiff slightly silty dark brown slightly mottled grey CLAY with some fissures and thin partings of grey fine silt					3.50	U100		
		4.00			-3.95			
					4.50	U100		
Gypsum crystals from 5.00m		5.00			-4.95			
		6.00		SPT27	6.00	J		
		7.00						
				SPT33	7.50	J		
Very stiff to hard slightly silty blue-grey CLAY with many large fissures. Some silty and sandy partings		8.00						
					8.75	J		
		9.00					B.H. Dry	
					9.50	U100		
Becoming hard		10.00			-9.95			

APPENDIX A

Report No. c 390 | BOREHOLE LOG | JANUARY 1983

BGS ID: 15948036 : BGS Reference: TQ28SE2062
British National Grid (27700) : 525640,184115



65 PRIORY ROAD – BOREHOLE LOCATIONS

APPENDIX B.

Report No. S.390

January 1983

TYRONE

APPENDIX C – SURFACE WATER RUN OFF CALCULATIONS

Nimbus Engineering Consultants Ltd
www.nimbusengineering.co.uk

Kemp House,
152 City Road,
London, EC1V 2NX
Mob:0772 339 3155
email: info@nimbusengineering.co.uk

Job No.	C3000
Sheet no.	1
Date	14/05/25
Project	Flat 1, 253 Goldhurst Terrace, London, NW6 3EP
Title	Hydrograph Storage Calcs @ 0.5l/s
By	M.HAM
Checked	
Reviewed	

MasterDrain SW

Data:-

Location = Camden
M5-60 (mm) = 21
Soil index = 0.45
Return period = 100
UCWI = 0.0

Grid reference = TQ1619
r = 0.43
SAAR (mm/yr) = 640
WRAP = 4
Climate change = 45%

Clayey, or loamy over clayey soils with an impermeable layer at shallow depth.

Pipeline storage = 0.0 m³
Offline storage = 0.0 m³

Available MH storage = 0.0 m³

Percentage runoff = 100.0% (manual setting)

Imperv. area = 59 m²
Total area = 59 m²
Total runoff = 3.6 m³

Pervious area = 0 m²
Equiv area = 59 m² (Tot. area x % runoff).
Discharge rate = 0.500 l/s

Storage (m³) = 2.2 m³ (Sum of all balance quantities)

Total rainfall depth = 61.7 mm

Calculations :-

Time (hrs)	%Mean intens	Rain mm/hr	Inflow (m3)	Outflow (m3)	Balance (m3)	Cumulative (m3)
0.010	20.0	12.3	0.007	0.018	0.000	0.000
0.020	20.0	12.3	0.007	0.018	0.000	0.000
0.030	21.0	13.0	0.008	0.018	0.000	0.000
0.040	21.0	13.0	0.008	0.018	0.000	0.000
0.050	22.0	13.6	0.008	0.018	0.000	0.000
0.060	23.0	14.2	0.008	0.018	0.000	0.000
0.070	24.0	14.8	0.009	0.018	0.000	0.000
0.080	26.0	16.1	0.009	0.018	0.000	0.000
0.090	27.0	16.7	0.010	0.018	0.000	0.000
0.100	29.0	17.9	0.011	0.018	0.000	0.000
0.110	31.0	19.1	0.011	0.018	0.000	0.000
0.120	32.0	19.8	0.012	0.018	0.000	0.000
0.130	33.0	20.4	0.012	0.018	0.000	0.000
0.140	34.0	21.0	0.012	0.018	0.000	0.000
0.150	36.0	22.2	0.013	0.018	0.000	0.000
0.160	38.0	23.5	0.014	0.018	0.000	0.000
0.170	39.0	24.1	0.014	0.018	0.000	0.000
0.180	40.0	24.7	0.015	0.018	0.000	0.000
0.190	42.0	25.9	0.015	0.018	0.000	0.000
0.200	45.0	27.8	0.016	0.018	0.000	0.000
0.210	49.0	30.3	0.018	0.018	0.000	0.000
0.220	53.0	32.7	0.019	0.018	0.001	0.001
0.230	57.0	35.2	0.021	0.018	0.003	0.004
0.240	62.0	38.3	0.023	0.018	0.005	0.009
0.250	66.0	40.7	0.024	0.018	0.006	0.015
0.260	71.0	43.8	0.026	0.018	0.008	0.023
0.270	77.0	47.5	0.028	0.018	0.010	0.033
0.280	84.0	51.9	0.031	0.018	0.013	0.045
0.290	91.0	56.2	0.033	0.018	0.015	0.060
0.300	98.0	60.5	0.036	0.018	0.018	0.078
0.310	105.0	64.8	0.038	0.018	0.020	0.098
0.320	114.0	70.4	0.042	0.018	0.024	0.122
0.330	125.0	77.2	0.046	0.018	0.028	0.149
0.340	135.0	83.3	0.049	0.018	0.031	0.181
0.350	143.0	88.3	0.052	0.018	0.034	0.215
0.360	154.0	95.1	0.056	0.018	0.038	0.253
0.370	164.0	101.3	0.060	0.018	0.042	0.294
0.380	173.0	106.8	0.063	0.018	0.045	0.339
0.390	183.0	113.0	0.067	0.018	0.049	0.388
0.400	194.0	119.8	0.071	0.018	0.053	0.441

Nimbus Engineering Consultants Ltd
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email: info@nimbusengineering.co.uk

Job No.	Sheet no.	Date
C3000	2	14/05/25

MasterDrain SW

Project: Flat 1, 253 Goldhurst Terrace, London, NW6 3EP

Title: Hydrograph Storage Calcs @ 0.5l/s

By	Checked	Reviewed
M.HAM		

Calculations (cont.) :-

Time (hrs)	%Mean intens	Rain mm/hr	Inflow (m3)	Outflow (m3)	Balance (m3)	Cumulative (m3)
0.410	204.0	125.9	0.074	0.018	0.056	0.497
0.420	212.0	130.9	0.077	0.018	0.059	0.556
0.430	219.0	135.2	0.080	0.018	0.062	0.618
0.440	226.0	139.5	0.082	0.018	0.064	0.682
0.450	233.0	143.8	0.085	0.018	0.067	0.749
0.460	239.0	147.6	0.087	0.018	0.069	0.818
0.470	244.0	150.6	0.089	0.018	0.071	0.889
0.480	248.0	153.1	0.090	0.018	0.072	0.962
0.490	249.0	153.7	0.091	0.018	0.073	1.034
0.500	250.0	154.3	0.091	0.018	0.073	1.107
0.510	250.0	154.3	0.091	0.018	0.073	1.180
0.520	249.0	153.7	0.091	0.018	0.073	1.253
0.530	248.0	153.1	0.090	0.018	0.072	1.325
0.540	244.0	150.6	0.089	0.018	0.071	1.396
0.550	239.0	147.6	0.087	0.018	0.069	1.465
0.560	233.0	143.8	0.085	0.018	0.067	1.532
0.570	226.0	139.5	0.082	0.018	0.064	1.597
0.580	219.0	135.2	0.080	0.018	0.062	1.658
0.590	212.0	130.9	0.077	0.018	0.059	1.718
0.600	204.0	125.9	0.074	0.018	0.056	1.774
0.610	194.0	119.8	0.071	0.018	0.053	1.827
0.620	183.0	113.0	0.067	0.018	0.049	1.875
0.630	173.0	106.8	0.063	0.018	0.045	1.920
0.640	164.0	101.3	0.060	0.018	0.042	1.962
0.650	154.0	95.1	0.056	0.018	0.038	2.000
0.660	143.0	88.3	0.052	0.018	0.034	2.034
0.670	135.0	83.3	0.049	0.018	0.031	2.065
0.680	125.0	77.2	0.046	0.018	0.028	2.093
0.690	114.0	70.4	0.042	0.018	0.024	2.116
0.700	105.0	64.8	0.038	0.018	0.020	2.137
0.710	98.0	60.5	0.036	0.018	0.018	2.154
0.720	91.0	56.2	0.033	0.018	0.015	2.169
0.730	84.0	51.9	0.031	0.018	0.013	2.182
0.740	77.0	47.5	0.028	0.018	0.010	2.192
0.750	71.0	43.8	0.026	0.018	0.008	2.200
0.760	66.0	40.7	0.024	0.018	0.006	2.206
0.770	62.0	38.3	0.023	0.018	0.005	2.211
0.780	57.0	35.2	0.021	0.018	0.003	2.213
0.790	53.0	32.7	0.019	0.018	0.001	2.215
0.800	49.0	30.3	0.018	0.018	0.000	2.214
0.810	45.0	27.8	0.016	0.018	0.000	2.213
0.820	42.0	25.9	0.015	0.018	0.000	2.210
0.830	40.0	24.7	0.015	0.018	0.000	2.207
0.840	39.0	24.1	0.014	0.018	0.000	2.203
0.850	38.0	23.5	0.014	0.018	0.000	2.199
0.860	36.0	22.2	0.013	0.018	0.000	2.194
0.870	34.0	21.0	0.012	0.018	0.000	2.188
0.880	33.0	20.4	0.012	0.018	0.000	2.182
0.890	32.0	19.8	0.012	0.018	0.000	2.176
0.900	31.0	19.1	0.011	0.018	0.000	2.169
0.910	29.0	17.9	0.011	0.018	0.000	2.162
0.920	27.0	16.7	0.010	0.018	0.000	2.154
0.930	26.0	16.1	0.009	0.018	0.000	2.145
0.940	24.0	14.8	0.009	0.018	0.000	2.136
0.950	23.0	14.2	0.008	0.018	0.000	2.126
0.960	22.0	13.6	0.008	0.018	0.000	2.116
0.970	21.0	13.0	0.008	0.018	0.000	2.106
0.980	21.0	13.0	0.008	0.018	0.000	2.096
0.990	20.0	12.3	0.007	0.018	0.000	2.085
1.000	20.0	12.3	0.007	0.018	0.000	2.074

Storage volume (m^3) = 2.2 m^3 (Sum of all balance quantities)

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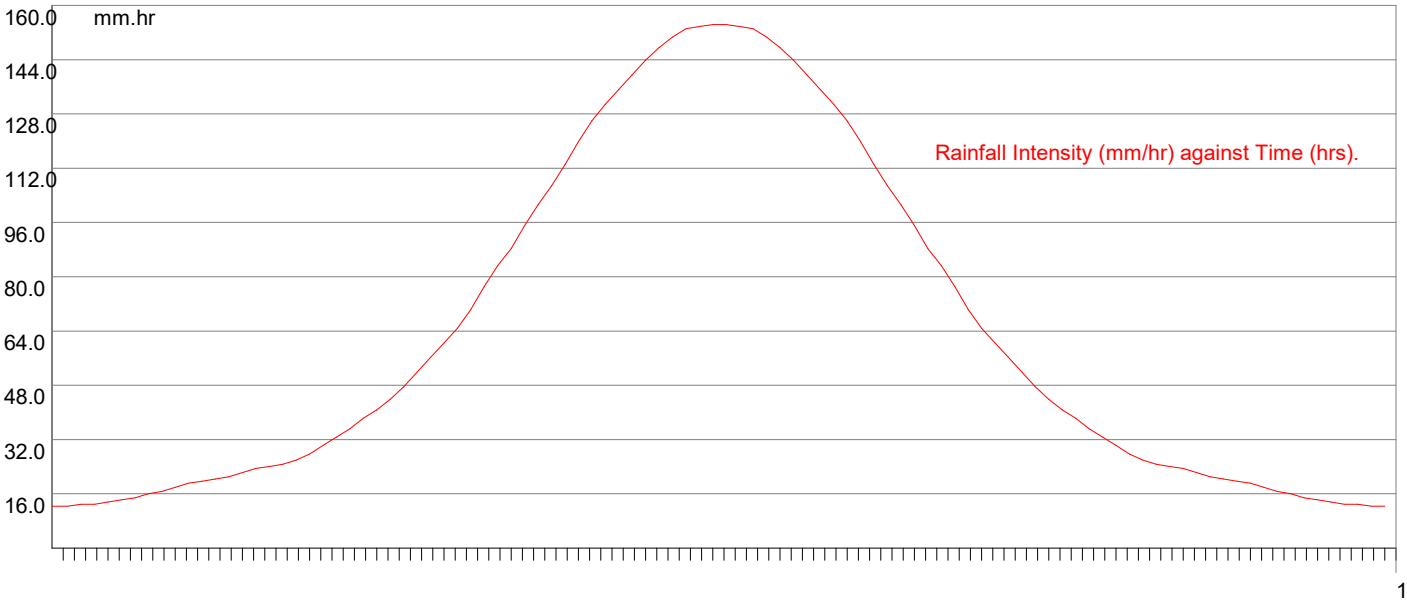
email: info@nimbusengineering.co.uk

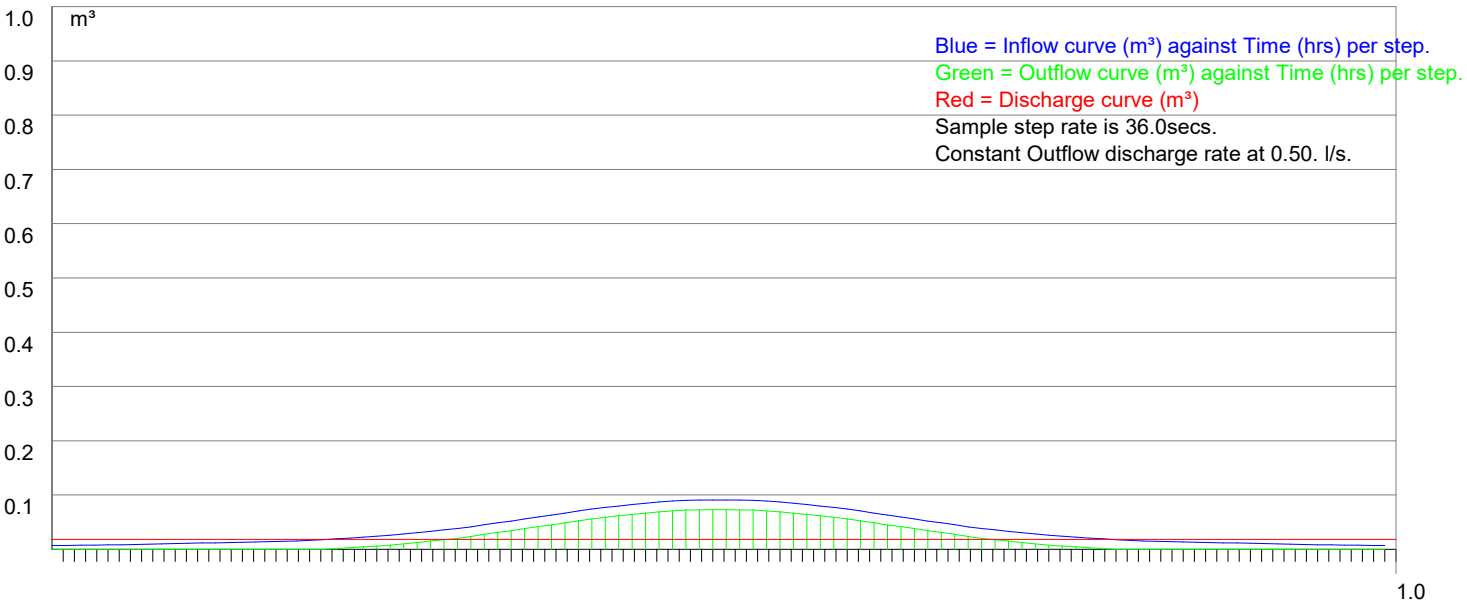
MasterDrain SW

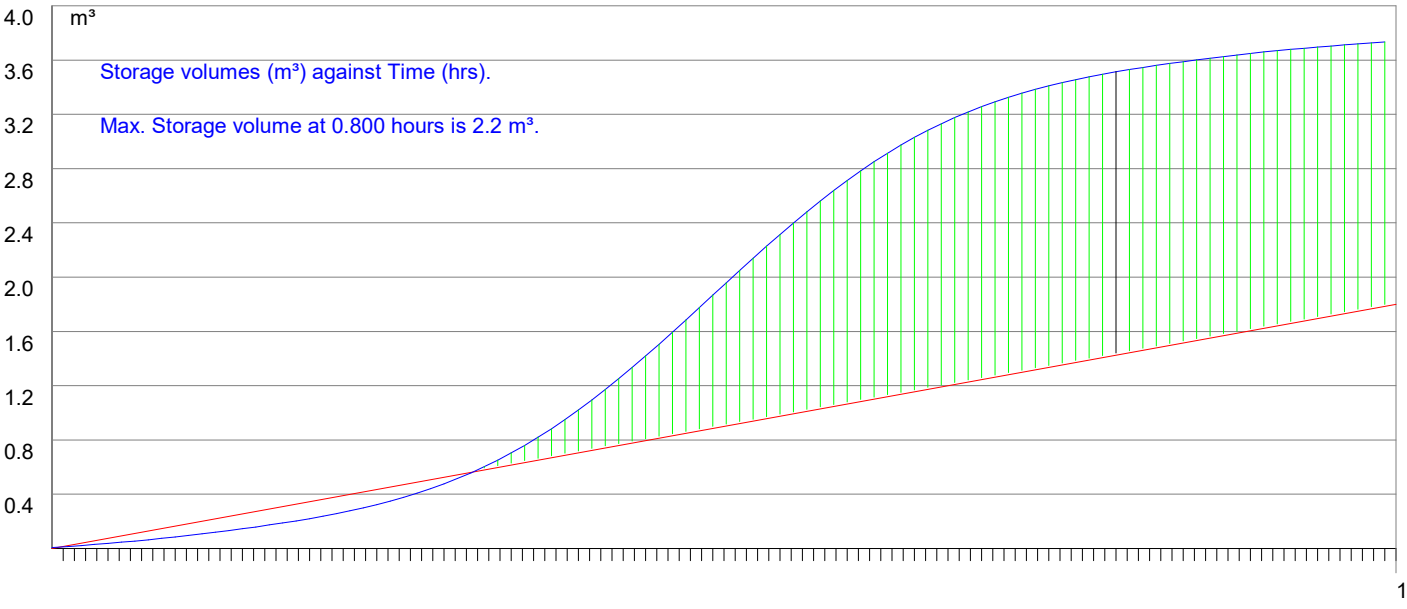
Job No.	C3000
Sheet no.	3
Date	14/05/25
By	M.HAM
Checked	
Reviewed	

Project: **Flat 1, 253 Goldhurst Terrace, London, NW6 3EP**

Title: **Hydrograph Storage Calcs @ 0.5l/s**







MasterDrain SW

Nimbus Engineering Consultants Ltd
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Kemp House,
152 City Road,
London, EC1V 2NX
Mob:0772 339 3155
email: info@nimbusengineering.co.uk

Job No.	C3000
Sheet no.	4
Date	14/05/25
Project	Flat 1, 253 Goldhurst Terrace, London, NW6 3EP
Title	Hydrograph Storage Calcs @ 0.5l/s

By	Checked	Reviewed
M.HAM		

Maximum storage volumes for varying duration storms.

Storm length (hrs)	Max. Vol (m^3)	Max. Vol time	Mean intens (mm/hr)	Step time. (mins)	Peak found
0.25	1.89	0.25	154.79	0.2	
0.5	2.17	0.50	100.26	0.3	
1	2.21	1.00	61.74	0.6	Peak found
2	1.88	---	36.70	1.2	
3	1.46	---	26.71	1.8	
4	1.03	---	21.20	2.4	
5	0.67	---	17.72	3.0	
6	0.36	---	15.31	3.6	
7	0.12	---	13.53	4.2	
8	0.00	---	12.14	4.8	
9	0.00	---	11.04	5.4	
10	0.00	---	10.14	6.0	
12	0.00	---	8.75	7.2	
15	0.00	---	7.29	9.0	
18	0.00	---	6.29	10.8	
20	0.00	---	5.77	12.0	
24	0.00	---	4.97	14.4	
30	0.00	---	4.14	18.0	
36	0.00	---	3.56	21.6	
42	0.00	---	3.14	25.2	
48	0.00	---	2.81	28.8	
54	0.00	---	2.55	32.4	
60	0.00	---	2.34	36.0	
66	0.00	---	2.16	39.6	
72	0.00	---	2.01	43.2	
84	0.00	---	1.77	50.4	
96	0.00	---	1.58	57.6	
120	0.00	---	1.32	72.0	
150	0.00	---	1.09	90.0	
175	0.00	---	0.96	105.0	
200	0.00	---	0.86	120.0	
250	0.00	---	0.71	150.0	
300	0.00	---	0.61	180.0	
375	0.00	---	0.51	225.0	
500	0.00	---	0.40	300.0	
750	0.00	---	0.29	450.0	
1000	0.00	---	0.23	600.0	
1250	0.00	---	0.19	750.0	
1500	0.00	---	0.16	900.0	
1570	0.00	---	0.16	942.0	
2000	0.00	---	0.13	1200.0	
2500	0.00	---	0.11	1500.0	
3000	0.00	---	0.09	1800.0	
3500	0.00	---	0.08	2100.0	
4000	0.00	---	0.07	2400.0	

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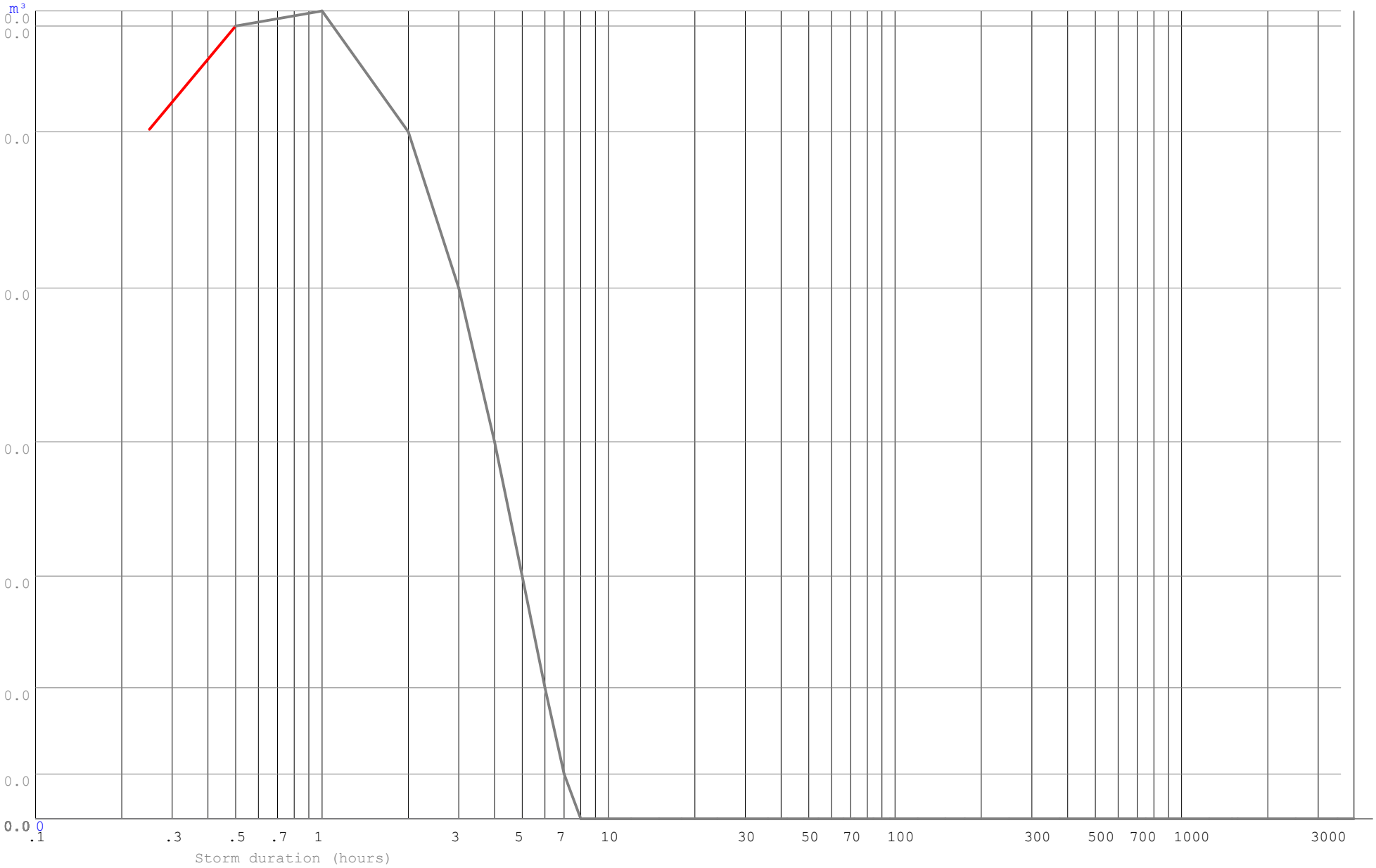
MasterDrain SW

Job No.	C3000
Sheet no.	5
Date	14/05/25
By	M.HAM
Checked	
Reviewed	

Project: **Flat 1, 253 Goldhurst Terrace, London, NW6 3EP**

Title: **Hydrograph Storage Calcs @ 0.5l/s**

Sequential storage volume at specific storm durations.



Explanatory notes for Peak Flow Storage

1) This system uses the rainfall intensity/ duration curve calculated using either the Wallingford or FEH method as selected.
2) The balance is calculated from the inflow minus the outflow.
3) The storage volume is the maximum value of the balance curve.
4) This method was described by Davis (1963) - see Butler & Davies, 2nd edition, p294
5) References to 'storm duration' relate only to the hydrograph method (qv).
6) There are always 600 steps in the calculation process, thus a 'run' time of 10 hours will be sampled every minute,

Explanatory notes for Hydrograph Storage

1) The user has the choice of Summer or Winter curves
2) The mean intensity varies with the duration of the storm curve
3) There are always 120 steps in the calculation process, irrespective of storm duration.
4) The balance is calculated from the inflow minus the outflow.
5) The storage volume is the sum of the balance values for each step.
6) Varying durations should be tried to find the maximum storage value - this can be narrowed down very closely.

*Modelling using the flow characteristics of the restrictor is available using Vortex Control modelling function. Please be aware that this function needs the full design data file to function.

Why do the two methods give different results?

The rainfall characteristics for each method are very different.

The Peak flow (using the Intensity/Duration/Frequency curve) does not model the actual rainfall. This curve is joined points which represent the mean intensity of a storm at a given duration i.e. a value of 19.5 mm/hr for a 60 minute storm indicates that over the sixty minute period, the mean intensity was 19.5 mm/hr. The calculation method samples the IDF curve for a given location and frequency (Return Period) and calculates the storage for that rate and duration less the outflow volume. The maximum value is displayed as the 'worst case' storage.

The hydrograph method uses a standard curve for either Winter or Summer storms. Traditionally these are symmetrical about the central peak. UK rainfall does not fit into this convenient curve, so the calculations are dealing with a stylised set of data. The mean intensity for the storm is calculated from the IDF curve and applied to the curve data, calculating the storage for that step less the outflow volume. The final storage volume is the sum of the storage for all the steps.

It can be seen that these two methods are very different, and the user may have the choice of which result to use. This is not an exact science, though is often treated as such by those that do not understand the principles of the calculations.

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Job No.	C3000
Sheet no.	1
Date	14/05/25

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HY 10.01

Project: Flat 1, 253 Goldhurst Terrace, London, NW6 3EP

Title: Pre & Post Development Surface Water Runoff Calcs

By	Checked	Reviewed
M.HAM		

Data:-

Hydrology (FSR):-

Location = Camden		WRAP	= 4
Long reference =	516119	Grid reference	= TQ1619
M5-60 (mm)	= 21	SAAR (mm/yr)	= 640
r	= 0.43	Soil	=0.47
Hyd. area	= 6	Hyd. zone	= 8
Hydrograph	= Winter	Area = England & Wales	

Site values used in design:-

Total site area	= 0.0798 ha	Climate change factor	= 45%
Pre-dev area drained	= 0.0341 ha	Post-dev area drained	= 0.0454 ha
Imperm runoff factor	= 100%	Perm runoff factor	= 20%

Pre-development

Area to soakaways	= 0.0000 ha	Area to other SUDS	= 0.0000 ha
Perv. area to SUDS	= 0.0000 ha	Pre-dev flow to drain	= 0.00 l/s

Post-development

Area to soakaways	= 0.0000 ha	Area to other SUDS	= 0.0000 ha
Perv. area to SUDS	= 0.0000 ha	Post-dev flow to drain	= 0.00 l/s

Calculations:-

Revised Post-dev Imperm. area = 0.045 ha
Equiv. Post-dev Imperm. area = 0.045 ha
Equiv. Post-dev Perm. area = 0.007 ha
Total Pre-dev equiv. area ha = 0.043 ha
Total Post-dev equiv. area ha = 0.052 ha
100 yr 6 hour mean intensity = 10.56mm/hr

Results:-

Pre-dev peakflow runoff (l/s) (m³/s)

R.P.	15	30	60	120	240	360	480	600	Max	CCF	Final	R.P.
1	10.1	6.6	4.2	2.6	1.5	1.1	0.9	0.8	10.1	N/A	10.1	1
30	24.6	15.8	9.7	5.8	3.4	2.4	1.9	1.6	24.6	N/A	24.6	30
100	32.1	20.8	12.8	7.6	4.4	3.2	2.5	2.1	32.1	N/A	32.1	100

Post-dev peakflow runoff (l/s)

R.P.	15	30	60	120	240	360	480	600	Max	CCF	Final	R.P.
1	12.2	8.0	5.0	3.1	1.8	1.4	1.1	0.9	12.2	45	17.7	1
30	29.8	19.1	11.8	7.0	4.1	3.0	2.4	2.0	29.8	45	43.2	30
100	38.8	25.1	15.5	9.2	5.3	3.8	3.0	2.5	38.8	45	56.2	100

100 year 6 hour (x Climate Change Factor) storm gives:-
Pre-dev runoff volume m³ = 27.4m³
Post-dev rainfall volume = 48.0m³
Post-dev volume m³ (excess above SUDS) = 48.0m³
100 yr 6 hour mean intensity = 10.56mm/hr
Pre-dev volume to drain at 0 l/s = 0.0 m³
Post-dev volume to drain at 0 l/s = 0.0 m³
Post-dev storage volume = 48.0m³
Post-dev 5mm imperm volume = 2.3 m³
Post-dev 5mm perm volume = 1.7 m³

$Q_{BAR(rural)}$ = 0.347 l/s or 4.347 l/s/ha or 0.000 cumecs - from IoH 124.

The rainfall rates are calculated using the location specific values above in accordance with the Wallingford procedure.

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Job No.	C3000
Sheet no.	2
Date	14/05/25
Project	Flat 1, 253 Goldhurst Terrace, London, NW6 3EP
Title	Pre & Post Development Surface Water Runoff Calcs

By	Checked	Reviewed
M.HAM		

MasterDrain
HY 10.01

Data summary.

Use the data below for the SUR1 form

Site areas:-

Total site area =	0.0798 ha ;798.0 m²	[3A]
Pre-development impermeable area =	0.0341 ha	[3B]
Pre-development permeable area =	0.0457 ha	
Post-development impermeable area =	0.0454 ha	[3C]
Post-development permeable area =	0.0344 ha	

Peak runoff:-

Pre-development 1 year storm (15min) =	10.1 l/s	[6A]
Pre-development 100 year storm (15min) =	32.1 l/s	[6C]
Post-development 1 year storm (15min) =	12.2 l/s	[6B]
Post-development 100 year storm (15min)=	38.76 l/s	[6D]

Greenfield runoff:-

$Q_{BAR(rural)}$ = 0.347 l/s or 4.347 l/s/ha or 0.000 cumecs - from IoH 124.

Climate change factor:-
CCF = 45%

Volumes:-
Pre-development 100 yr/6hr storm [12A]= 39.7m³
Post-development 100 yr/6hr storm (add. volume with no SUDS) [12B]= 48.0m³
Post-development 100 yr/6hr storm (add. volume with SUDS) = 48.0m³
Post-development add. predicted volume (No SUDS) [12C] = 8.3m³

You may also require
Data relating to the infiltration test calculations (if applicable)
Evidence to show runoff reduction (if applicable)
Information on calculation methods (if applicable see next sheet)

Note
Numbers in square brackets relate to the
Nov. 2010 v1.1 / issued 11/02/10 copy of SUR1

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Job No.	C3000
Sheet no.	3
Date	14/05/25

MasterDrain
HY 10.01

Project	Flat 1, 253 Goldhurst Terrace, London, NW6 3EP	By	Checked / Reviewed
Title	Pre & Post Development Surface Water Runoff Calcs	M.HAM	

Definitions and methods

Hydrology

The hydrological constants are derived from the Wallingford maps. They are used to calculate location specific rainfall figures.

Site values and factors

Areas of the site should be entered in hectares (10000 m²). If the Pre-development site is a green field, this box is blank.
Climate Change Factor is initially set at 20% - this may be changed as required.
Greenfield runoff is calculated using the method described in IoH 124.
Runoff factors

The impermeable runoff factor is initially set at 98%
The permeable runoff factor is initially set at 20%

Note: the CCF and the runoff factors may be changed by the user to suit the development
The areas draining to soakaways and other SUDS are entered in the appropriate box (in hectares)

Calculations

The post-development area is reduced by subtracting the areas that drain to soakaways or other SUDS, to give a revised figure.
All areas are then multiplied by the appropriate runoff factor to give an equivalent area with 100% runoff.
These are then summated.
This gives a total pre-development equivalent area, and a similar figure for the post-development area.
The 'Post-dev volume to drain (no SUDS)' gives the total runoff to drain if no SUDS were used.

Results

The pre- and post-development areas are subjected to 1,30 and 100 year return period storms with a duration of 15 to 600 minutes.
The Revised Post-dev Imperm. area is the area (in ha) that is not going to SUDS x impervious runoff factor.
The runoff rates are calculated for the chosen hydrograph (Summer or Winter) as l/s. Figures in red indicate m³/s
The peak value is measured, multiplied by the CCF and the total maximum rate is shown.
The pre- and post-development volumes for a 100 year / 6 hour storm are calculated from the area under the hydrograph curve.
Post-dev volume (i.e. excess above SUDS) is that volume produced by the drained area that does not go to SUDS.
Qbar(rural) is calculated in accordance with the procedure laid down in IoH 124

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Job No.	C3000
Sheet no.	1
Date	14/05/25
Project	Flat 1, 253 Goldhurst Terrace, London, NW6 3EP
Title	IoH 124 (Qbar(urban))Runoff Calcs
By	M.HAM
Checked	
Reviewed	

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Hydrological Data:-

FSR Hydrology:-

Location	= Camden	Grid reference	= TQ1619
M5-60 (mm)	= 21	r	= 0.43
Soil runoff	= 0.45	SAAR (mm/yr)	= 640
WRAP	= 4	Area = England & Wales	
Hydrological area = 6		Hydrological zone = 8	

Soil classification for WRAP type 4
Clayey, or loamy over clayey soils with an impermeable layer at shallow depth.

Design data:-

Area = 0.000798 Km² - 0.08 Ha - 798 m² % Urbanisation = 43.00%

Calculation method:-

Runoff is calculated from:-

$$Q_{BAR(urban);} = Q_{BAR(rural)} (1 + URBAN)^{2NC}[1 + URBAN\{(21/CIND) - 0.3\}]$$

where:-

NC varies with the value of SAAR:-
for 500<SAAR<1100 mm then NC = 0.92 - 0.00024SAAR
for 1100<SAAR<3000 mm then NC = 0.74 - 0.000082SAAR

CIND = 102.4SOIL + 0.28(CWI - 125) CWI = Catchment Wetness Index

so

CIND =29.732 CWI =66.615 NC =0.766

For areas less than 50Ha, a modified calculation which multiplies the 50Ha runoff value by the ratio of the site area to 50Ha is used
Reducing factor used for these calculations is 0.002

$Q_{BAR(rural)}$ = 0.316 (l/s)

$Q_{BAR(urban)}$ = 0.642 (l/s)

$Q_{BAR(urban)}$ is then multiplied by a growth factor - GC(T) - for different storm return periods derived from EA publication W5-074/A.

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Job No.	C3000
Sheet no.	2
Date	14/05/25
Project	Flat 1, 253 Goldhurst Terrace, London, NW6 3EP
Title	IoH 124 (Qbar(urban))Runoff Calcs
By	M.HAM
Checked	
Reviewed	

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HY 10.01
Calculated data:-

Mean Annual Peak Flow $Q_{BAR(urban)}$ = 0.64 l/s

Values for $Q_{BAR(urban)}$

Ret. per.	m³/hr	l/s	l/s/ha	Ret. per.	m³/hr	l/s	l/s/ha
1yr	0.001	0.545	6.834	100yr	0.002	2.021	25.327
2yr	0.001	0.565	7.075	100yr+20%	0.002	2.425	30.392
5yr	0.001	0.821	10.291	100yr+30%	0.003	2.627	32.925
10yr	0.001	1.039	13.025	200yr	0.002	2.374	29.749
30yr	0.001	1.431	17.930	200yr + 30%	0.003	3.086	38.674
50yr	0.002	1.681	21.065	500yr	0.003	2.881	36.101
				1000yr	0.003	3.311	41.488

Growth factors -

1yr	2yr	5yr	10yr	30yr	50yr	100yr	200yr	500yr	1000yr
0.85	0.88	1.28	1.62	2.23	2.62	3.15	3.70	4.49	5.16

The above is based on the Institute of Hydrology Report 124 to which you are referred for further details (see Sect 7). Note that the 200 year growth curve was taken from W5-074/A.

For WRAP type 1 soils, CIND can become negative for lower values of SAAR. In this case the CIND value is multiplied by -1 to return a positive value (CIND is very small at this point).

APPENDIX D – WATER AUTHORITY ASSET PLANS

Asset location search

Thames Water Property Searches

Nimbus Engineering Consultants LTD
Michealson Square,Office 8 Michealson Square

LIVINGSTON
EH54 7DP

Search address supplied 194
Goldhurst Terrace
London
NW6 3HN

Your reference C3146

Our reference ALS/ALS Standard/2023_4925852

Search date 19 December 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: 194, Goldhurst Terrace, London, NW6 3HN

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

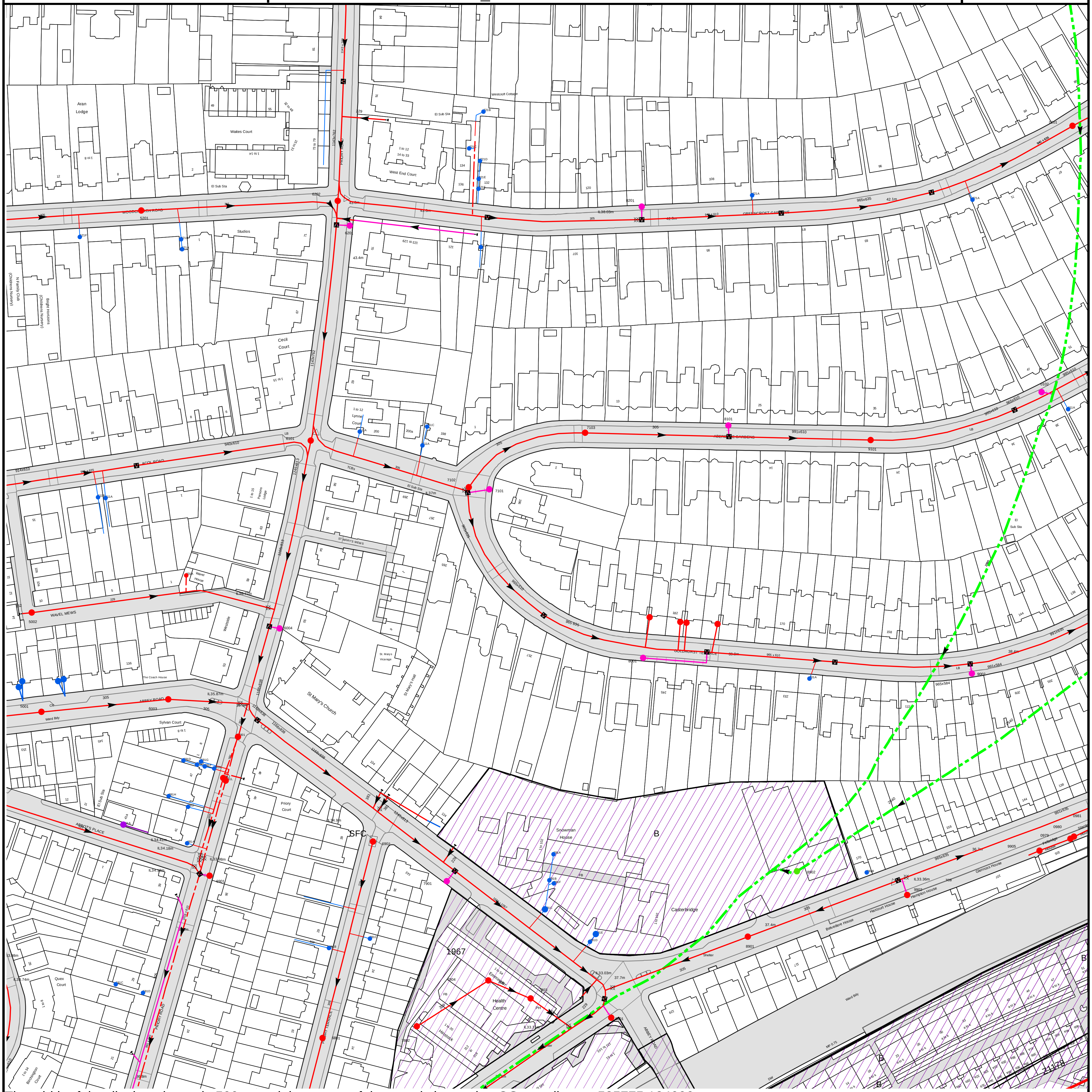
Clean Water queries

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_4925852



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 525775,184090

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.

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
9002	n/a	n/a
011A	n/a	n/a
0102	n/a	n/a
921A	n/a	n/a
0201	41.49	37.06
8101	n/a	n/a
721A	n/a	n/a
6201	n/a	n/a
8201	n/a	n/a
6202	43.92	39.41
821A	n/a	n/a
721F	n/a	n/a
721E	n/a	n/a
721D	n/a	n/a
721C	n/a	n/a
721B	n/a	n/a
801A	n/a	n/a
8001	n/a	n/a
6004	n/a	n/a
8007	n/a	n/a
8006	n/a	n/a
8005	n/a	n/a
8004	n/a	n/a
7101	n/a	n/a
7102	41.69	n/a
711A	n/a	n/a
6101	42.16	37.72
9101	40.53	35.92
7103	41.44	37.44
611A	n/a	n/a
711C	n/a	n/a
50BD	n/a	n/a
50BC	n/a	n/a
5002	41.76	40.42
5001	40.67	37.9
50BB	n/a	n/a
50BA	n/a	n/a
521F	n/a	n/a
511B	n/a	n/a
511A	n/a	n/a
5201	45.22	41.28
6003	40.11	n/a
621B	n/a	n/a
621A	n/a	n/a
601A	n/a	n/a
7803	37.01	33.48
791C	38.36	35.04
791B	36.9	35.11
791A	37.07	35.13
791F	36.97	35.92
791D	38.56	34.86
791E	37.41	34.89
8801	n/a	n/a
8901	37.29	33.45
8902	37.4	26.36
991B	n/a	n/a
9902	n/a	n/a
9905	n/a	n/a
0979	n/a	n/a
0980	n/a	n/a
581D	n/a	n/a
581C	n/a	n/a
691A	n/a	n/a
591A	n/a	n/a
691I	n/a	n/a
691H	n/a	n/a
691D	n/a	n/a
691E	n/a	n/a
691G	n/a	n/a
691F	n/a	n/a
6901	n/a	n/a
691K	n/a	n/a
691J	n/a	n/a
691L	n/a	n/a
6001	39.34	35.05
6801	36.62	32.66
691B	n/a	n/a
691C	n/a	n/a
6902	38.55	34.35
7802	36.8	34.48
7901	n/a	n/a
7804	36.84	33.81

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
- Content 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

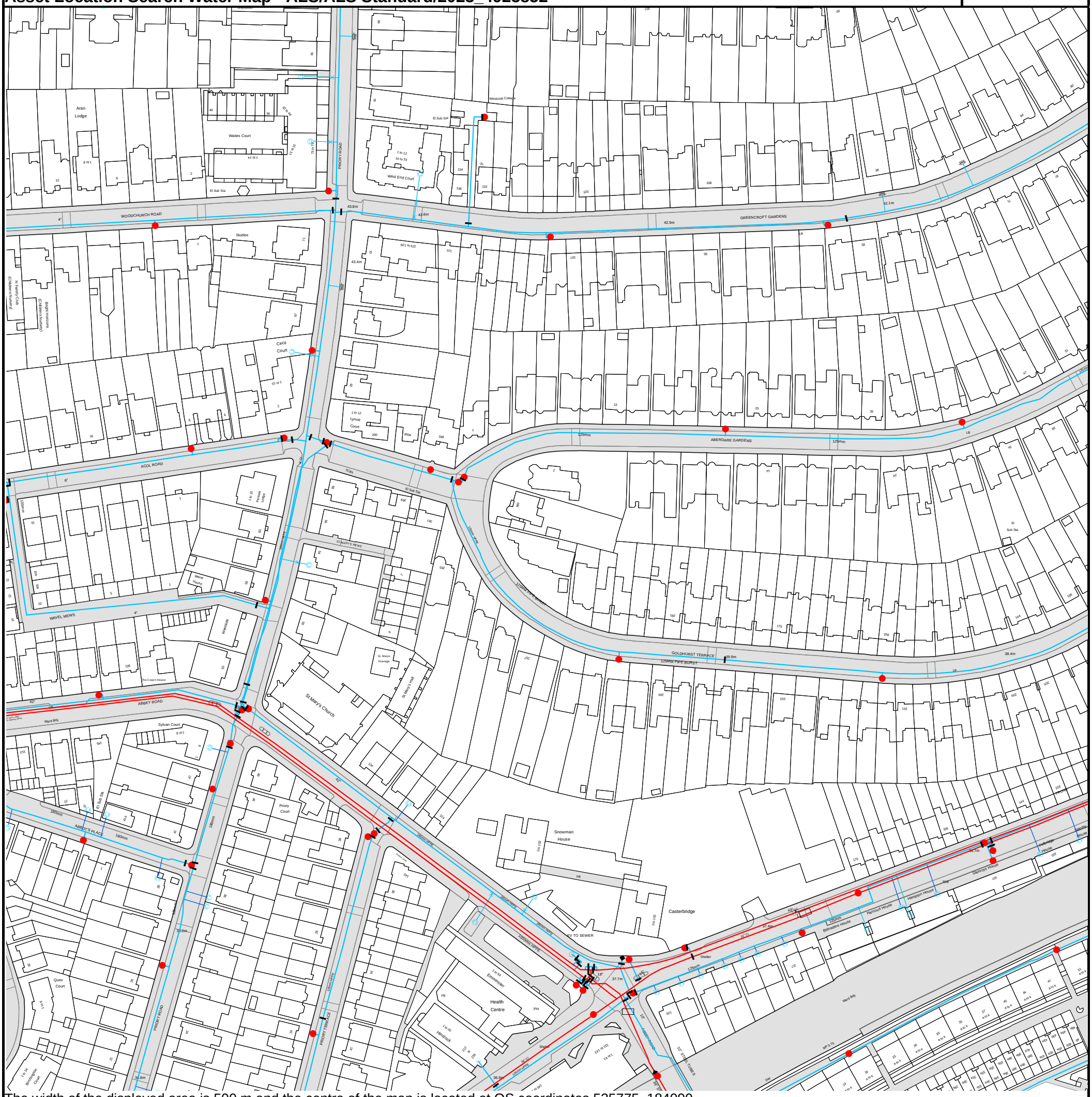
Ducts may contain high voltage cables. Please check with Thames Water.

- Conduit Bridge
- Subway
- Tunnel

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_4925852



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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")	1100mm (3' 8")
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: Indiates 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.

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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.
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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.

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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