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Surface Water and SuDS Assessment Rev0

Southgate Progressive Synagogue,
75 Chase road,
London,
N14 4QY

30 January 2024

Appendices

Appendix A - Site Location Plan
Appendix B - Existing Site Layout Plans
Appendix C - Proposed Site Layout Plans
Appendix D - Greenfield Runoff (Total Site)
Appendix E - British Geological Survey Borehole Records

Prepared by	Checked by	Date
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This document has been prepared solely as a Surface Water and SuDS Assessment for BS Initiative Ltd. Base Energy accepts no responsibility or liability for any use that is made of this document other than by the Client for the purposes for which it was originally commissioned and prepared.

1. Introduction

This Surface Water and SuDS Assessment (Rev0) has been prepared to support the planning application for proposals at Southgate Progressive Synagogue, 75 Chase Road.

A site location plan is provided in **Appendix A.**

Site Details

The application site comprises two Principal Buildings. The front building, known as "The House ", being a detached property which is used for worship and activities ancillary to the main use, is the subject of the Planning Application. For the avoidance of doubt, the rear building, known as "The Schindler Hall" is not subject to any application.

A copy of the existing plans is provided in **Appendix B**.

Proposals

Proposals are for a full planning application for two extensions of the existing building to provide:

- **Front Extension comprising:**
  Judaica Shop
  Entrance lobby
  Cloaks

- **Rear Extension comprising:**
  Rabbi Office
  Kitchen
  Shower Room

Multi-function Room

- **Refurbishment:**
  Existing Ground Floor Front area
  W.C's and provision of accessible W.C.

A copy of the development proposals is provided in **Appendix C**.

2. Planning Policy- Surface Water Management

The London Plan 2021

Policy SI 13 Sustainable drainage

A Lead Local Flood Authorities should identify – through their Local Flood Risk Management Strategies and Surface Water Management Plans – areas where there are particular surface water management issues and aim to reduce these risks. Increases in surface water run-off outside these areas also need to be identified and addressed.
B Development proposals should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible. There should also be a preference for green over grey features, in line with the following drainage hierarchy:
1) rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)
2) rainwater infiltration to ground at or close to source
3) rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)
4) rainwater discharge direct to a watercourse (unless not appropriate)
5) controlled rainwater discharge to a surface water sewer or drain 6) controlled rainwater discharge to a combined sewer.
C Development proposals for impermeable surfacing should normally be resisted unless they can be shown to be unavoidable, including on small surfaces such as front gardens and driveways.
D Drainage should be designed and implemented in ways that promote multiple benefits including increased water use efficiency, improved water quality, and enhanced biodiversity, urban greening, amenity and recreation.

9.13.1 London is at particular risk from surface water flooding, mainly due to the large extent of impermeable surfaces. Lead Local Flood Authorities have responsibility for managing surface water drainage through the planning system, as well as ensuring that appropriate maintenance arrangements are put in place. Local Flood Risk Management Strategies and Surface Water Management Plans should ensure they address flooding from multiple sources including surface water, groundwater and small watercourses that occurs as a result of heavy rainfall.

9.13.2 Development proposals should aim to get as close to greenfield run-off rates as possible depending on site conditions. The well-established drainage hierarchy set out in this policy helps to reduce the rate and volume of surface water run-off. Rainwater should be managed as close to the top of the hierarchy as possible. There should be a preference for green over grey features, and drainage by gravity over pumped systems. A blue roof is an attenuation tank at roof or podium level; the combination of a blue and green roof is particularly beneficial, as the attenuated water is used to irrigate the green roof.

9.13.3 For many sites, it may be appropriate to use more than one form of drainage, for example a proportion of rainwater can be managed by more sustainable methods, with residual rainwater managed lower down the hierarchy. In some cases, direct discharge into the watercourse is an appropriate approach, for example rainwater discharge into the tidal Thames or a dock. This should include suitable pollution prevention filtering measures, ideally by using soft engineering or green infrastructure. In addition, if direct discharge is to a watercourse where the outfall is likely to be affected by tide-locking, suitable storage should be designed into the system. However, in other cases direct discharge will not be appropriate, for example discharge into a small stream at the headwaters of a catchment, which may cause flooding. This will need to be assessed on a case-by-case basis, taking into account the location, scale and quality of the discharge and the receiving watercourse. The maintenance of identified drainage measures should also be considered in development proposals.

9.13.4 The London Sustainable Drainage Action Plan complements this policy. It contains a series of actions to make the drainage system work in a more natural way with a particular emphasis on retrofitting.

Enfield Council

Enfield Council's Development Management Document (Adopted November 2014) provides detailed criteria and standard based policies which support the objectives of the Core Strategy.

DMD 61 – Managing Surface Water

DMD 61 states: *A Drainage Strategy will be required for all developments to demonstrate how proposed measures manage surface water as close to its source as possible and follow the drainage hierarchy in the London Plan. All developments must maximise the use of and, where possible, retrofit Sustainable Drainage Systems (SuDS) which meet the following requirements:*

1. Suitability a. SuDS measure(s) should be appropriate having regard to the proposed use of site, site conditions/context (including proximity to Source Protection Zones and potential for contamination) and geology.
2. Quantity a. All major developments must achieve greenfield run off rates (for 1 in 1 year and 1 in 100 year events). **b**. All other development should seek to achieve greenfield run off and must maximise the use of SuDS, including at least one 'at source' SuDS measure resulting in a net improvement in water quantity or quality discharging to sewer in-line with any SuDS guidance or requirements.
3. Quality a. Major developments must have regard to best practice and where appropriate follow the SuDS management train by providing a number of treatment phases corresponding to their pollution potential and the environmental sensitivities of the locality. **b**. Measures should be incorporated to maximise opportunities for sustainable development, improve water quality, biodiversity, local amenity and recreation value
4. Functionality a. The system must be designed to allow for flows that exceed the design capacity to be stored on site or conveyed off-site with minimum impact. **b**. Clear ownership, management and maintenance arrangements must be established.
5. Other a. Where appropriate, developments must incorporate relevant measures identified in the Surface Water Management Plan.

Non-Statutory Technical Standards for SuDS

The Non-Statutory Technical Standards for SuDS, (and accompanying Local Authority SuDS Officer Organisation (LASOO) Practice Guidance) sets out the details which should be addressed within a SuDS Report, including:

- Flood Risk Outside of the Development
- Peak Flow Control and Volume Control
- Flood Risk Within the Development
- Runoff Destinations
- Structural Integrity
- Designing for Maintenance Considerations
- Construction

3. Surface Water Management

As previously detailed, whilst the application site comprises two Principal Buildings, it is the front building, known as "The House" which is the subject of the Planning Application. The rear building, known as "The Schindler Hall" is not subject to any application, nor is the car parking area at to the front of the site.

Therefore, for the purposes of this SuDS strategy, consideration is only being given to the area associated with "The House" which comprises approximately 420m^2 and is occupied by "The House" and associated hardstanding areas (see **Figure 1**).

Surface Water Runoff from the Existing Site

As previously noted, Policy 9.13.2 of the London Plan 2021 states: *Development proposals should aim to get as close to greenfield run-off rates as possible depending on site conditions. The well-established drainage hierarchy set out in this policy helps to reduce the rate and volume of surface water run-off. Rainwater should be managed as close to the top of the hierarchy as possible. There should be a preference for green over grey features, and drainage by gravity over pumped systems.*

As such, in the first instance the **ICP SuDS** method within Micro Drainage has been used to calculate flow rates from the total site (as detailed in **Appendix D** and shown in **Table 1**.

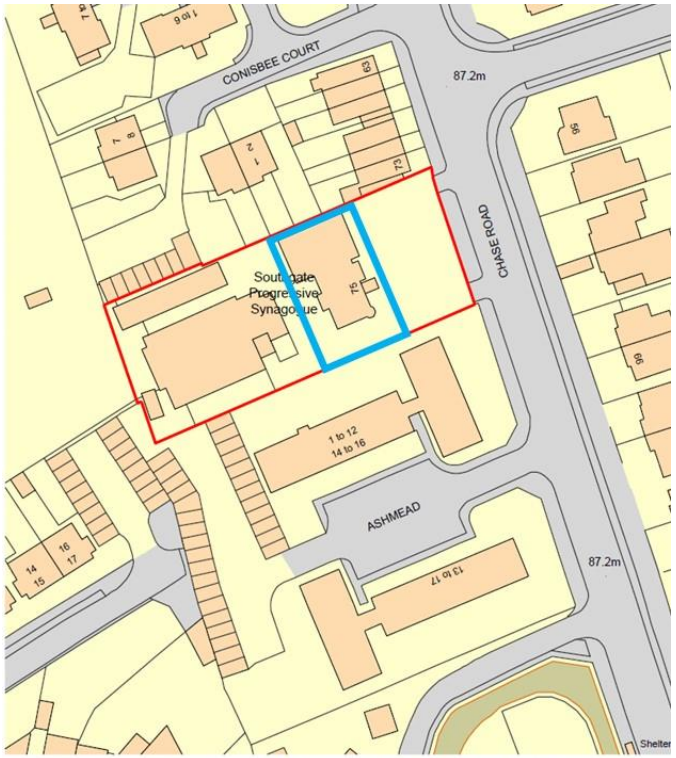


Figure 1 - SuDS Strategy Area (in blue)

Table 1 – ICP SuDS – Site Greenfield Runoff Rates (l/s)

Return Period	Flow Rate for 420m² (l/s)
QBAR	0.1
1 in 30 year	0.4
1 in 100 year	0.5

Surface Water Runoff from the Redeveloped Site

The proposals are for two extensions; a small extension (~14m^2) to the front entrance of "The House", and a larger extension (~56m^2) to the rear of "The House" which will be located on areas that are currently hardstanding.

Whist surface water runoff will continue to drain as existing, and the proposal will not result in an increase in hardstanding areas, there is the scope to incorporate SuDS to manage flows from the new roof areas.

The London Plan 2021 Hierarchy

The London Plan 2021 sets out the preferred hierarchy for the disposal of surface water runoff.

***1**) Rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)*
There is the potential for simple rainwater harvesting. See the following section of this report.

***2)** Rainwater infiltration to ground at or close to source*
At the time of writing, no ground investigation / infiltration testing has been carried out to confirm the suitability of the underlying ground conditions for infiltration.

The British Geological Survey (BGS) Geology Maps show that the site is underlain by London Clay.

BGS also provide borehole records, and there is a record available for a site to the north of the application site, on Chase Road (**Appendix E**). This confirms the presence of clay.

As such, we would not recommend a SuDS strategy based on infiltration. Furthermore, the proposal are solely for the two extensions to the existing building; no other external works are proposed.

3) *Rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)*
There is the potential for rain planters to be installed to manage flows from the new extension roof areas.

4) *Rainwater discharge direct to a watercourse (unless not appropriate)*
There are no known watercourses in the immediate vicinity of the site.

5) *Controlled rainwater discharge to a surface water sewer or drain*
It is understood that surface water runoff from the existing site connects into the public sewer system and surface water will continue to drain as existing.

SuDS Option

Based on the proposed site layout and the desktop study of the underlying ground conditions, and in line with the London Plan drainage hierarchy, the following are the preferred options for the management of surface water runoff from hardstanding areas:

- Rainwater recycling (water butt)
- Rain planters

Rainwater Recycling

In order to provide a level of rainwater recycling, a water butts will be provided to the rear extension.

Water butts afford the opportunity for future occupants to reuse water collected in the water butt, for example when watering the garden/or washing cars etc. If this supply is used frequently this may also ensure that some additional storage is available during an extreme rainfall event.

However, it is not recommended that water butts are used for storm water storage as there is a possibility that they maybe full before the onset of a storm and as such there is no guarantee that these types of system will provide additional storage when required.

Typical Design

- Freeboard – 100mm
- Topsoil – 300mm (ratio of approximately 50% sand, 30% topsoil and 20% compost)
- Subbase –400mm, underdrain needs to be above the base.
- Underdrain at 550mm below ground level
- Orifice to reduce flows to 0.5l/s – this is the existing 1 in 100 year greenfield rate of runoff
- Overflow into newly constructed gully.
- Connecting into manhole – public sewer
- Planting to be shrubs / wildflowers / perennial flowering plants
- The downpipe will feed water directly onto the rain planter. Stones or gravel will be used to dissipate the energy of the water and prevent heavy flows from washing away soil.

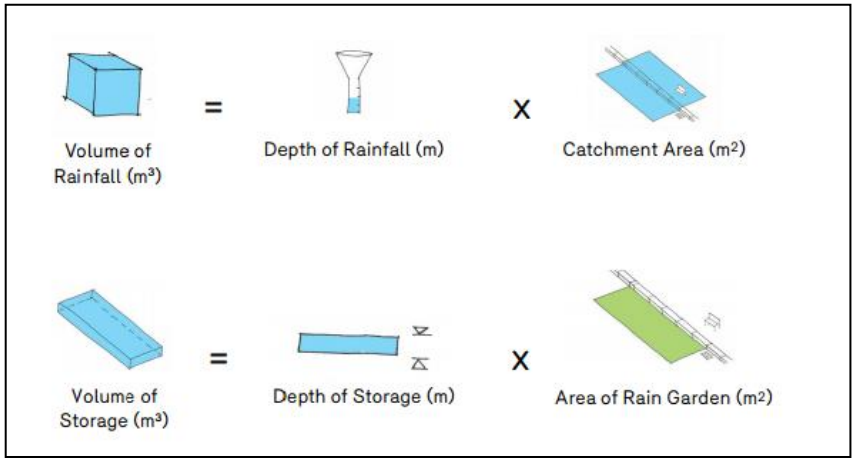


Figure 2- Rain Garden Calculations

Calculations

As a general rule a rain garden should be 5-10% of the catchment area. A good aim is to store the first 20mm of rainfall – in London this is the estimated depth of rainfall for an hour storm with an annual probability of 1 in 5. Storing this amount of water contributes to reducing flood risk. Storing more water is even better, if there is adequate space to do so.

To determine how much rainfall the rain planter can store the two simple calculations shown in Figure 2 should be carried out.

The storage depth is a combination of the freeboard and the sub-base storage. Only 30% of the depth of sub-base is used because this is the typical porosity of the gravel layer, i.e. 30% of gravel volume is space available for storing water.

For a given design standard, if the Volume of Storage is greater than the Volume of Rainfall it can be assumed that the Design Standard has been achieve.

Front Extension – Rain Planter

- **Area of Rain Garden = 3.5m²**
- **Catchment Area = 14m²**
- **Depth of Freeboard = 0.1m / Depth of Sub-base = 0.4m**

Depth of storage (m)	=	depth of freeboard (m)	+	30% depth of subbase (m)
	=	0.1m	+	30% of 0.4m
	=	**0.22m**		

Volume of storage (m³)	=	depth of storage (m)	x	area of rain garden (m²)
	=	0.22m	x	3.5m²
	=	**0.77m³**		

Design Standard	Depth of Rainfall	Volume of Rainfall (m³)	Volume of Storage (m³)	Result
First flush	5mm	0.07	0.77	Okay
1 in 5 year	20mm	0.28	0.77	Okay
1 in 100 year	50mm	0.70	0.77	Okay

Rear Extension – Rain Planter PLUS Water Butt/s

- **Area of Rain Garden = 5.5m²**
- **Catchment Area = 56m²**
- **Depth of Freeboard = 0.1m / Depth of Sub-base = 0.4m**

Depth of storage (m)	=	depth of freeboard (m)	+	30% depth of subbase (m)
	=	0.1m	+	30% of 0.4m
	=	**0.22m**		

Volume of storage (m^3)	=	depth of storage (m)	x	area of rain garden (m^2)
	=	0.22m	x	$5.5m^2$
	=	**$0.77m^3$**		

Design Standard	Depth of Rainfall	Volume of Rainfall (m^3)	Volume of Storage (m^3)	Result
First flush	5mm	0.28	1.21	Okay
1 in 5 year	20mm	1.12	1.21	Okay
1 in 100 year	50mm	2.80	1.21	-

It is important to note that these calculations are based on the desktop study of underlying ground conditions, along with our understanding of the site layout. The recommendations and advice of the SuDS manufacturer / installer should be followed.

4. SuDS Maintenance

Operation and maintenance schedules are provided below (taken from Ciria C753 The SuDS Manual).

Water Butt/s

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	*The water butt should be routinely checked for litter – leaves can become trapped in the water butt which could lead to blockage of the taps and overflow*	*Monthly*
	Where appropriate, and if safe to do so, the water butt should be cleaned annually to prevent smells associated with stagnant water, and to remove any algae.	*Annually*

Rain Planters

Maintenance Schedule	Required Action	Typical Frequency
During Establishment Period (Years 1 and 2)	Watering	Weekly
	Weeding Litter picking Pruning and trimming Check / clean channels, inlets and outlets	3 Monthly
	Mulching	Annually or as required
Following Establishment Period (Year 3 onwards)	Weeding Litter picking Pruning and trimming Check / clean channels, inlets and outlets	6 Monthly
	Replanting	Annually or as required

5. Conclusions

This Surface Water and SuDS Assessment (Rev0) has been prepared to support the planning application for two extensions (front and rear at Southgate Progressive Synagogue, 75 Chase Road.

The application site comprises two Principal Buildings. The front building, known as "The House", being a detached property which is used for worship and activities ancillary to the main use, is the subject of the Planning Application.

For the purposes of this SuDS strategy, consideration is only being given to the area associated with "The House" which comprises approximately 420m^2 and is occupied by "The House" and associated hardstanding areas.

Whist surface water runoff will continue to drain as existing, and the proposal will not result in an increase in hardstanding areas, there is the scope to incorporate SuDS to manage flows from the new roof areas.

Based on the proposed site layout and the desktop study of the underlying ground conditions, and in line with the London Plan drainage hierarchy, the following are the preferred options for the management of surface water runoff from hardstanding areas:

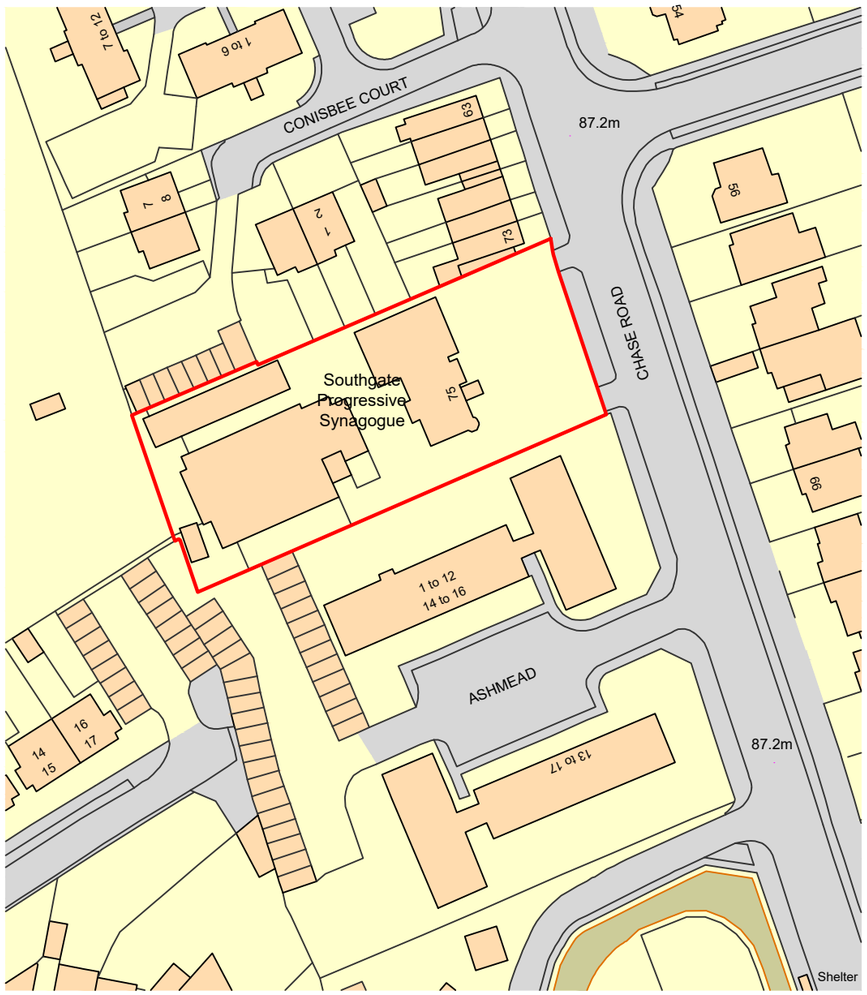
- Rainwater recycling (water butt/s) to the rear extension
- Rain planters to the front and rear extensions

Operation and maintenance schedules have been provided (taken from Ciria C753 The SuDS Manual).

It is important to note that the calculations in this report are based on the desktop study of underlying ground conditions, along with our understanding of the site layout. The recommendations and advice of the SuDS manufacturer / installer should be followed.

Appendices

Appendix A - Site Location Plan



Rev	Remarks	Date
A	Planning Issue	23/09/2022

Client:- SOUTHGATE PROGRESSIVE SYNAGOGUE	Project No.:- 23148
Site:- 75 CHASE ROAD LONDON N14 4QY	Drawing Title:- LOCATION PLAN
Drawn by:- SV / Date:- 27.11.23	Scale at A3:- 1:1250
Drawing Number:- 23148.111	Revision:- A

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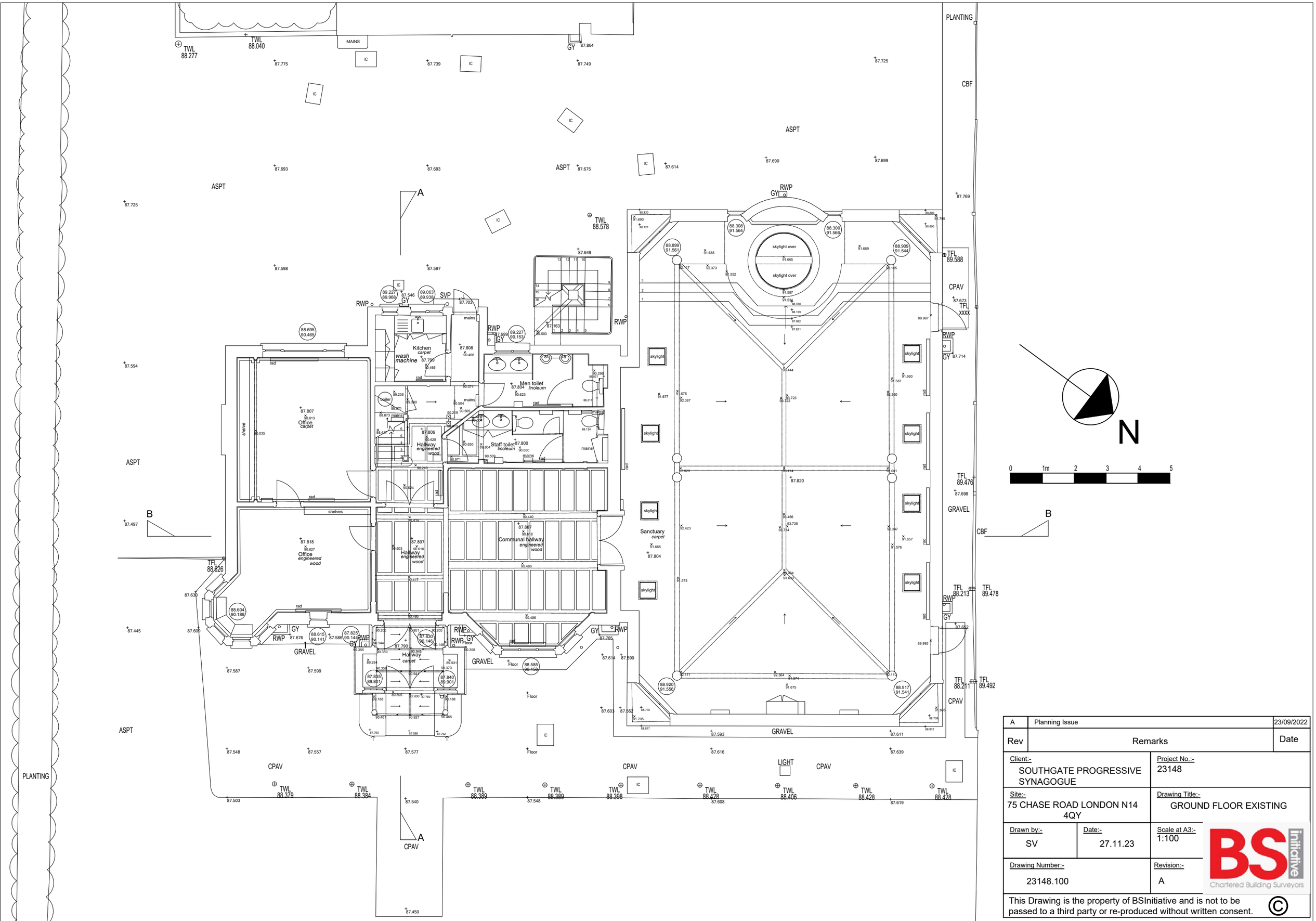
Appendix B - Existing Site Layout Plans



Rev	Remarks	Date
A	Planning Issue	23/09/2022

Client:- SOUTHGATE PROGRESSIVE SYNAGOGUE	Project No.:- 23148
Site:- 75 CHASE ROAD LONDON N14 4QY	Drawing Title:- GROUND FLOOR EXISTING
Drawn by:- SV	Date:- 27.11.23
Scale at A3:- 1:100	
Drawing Number:- 23148.100	Revision:- A

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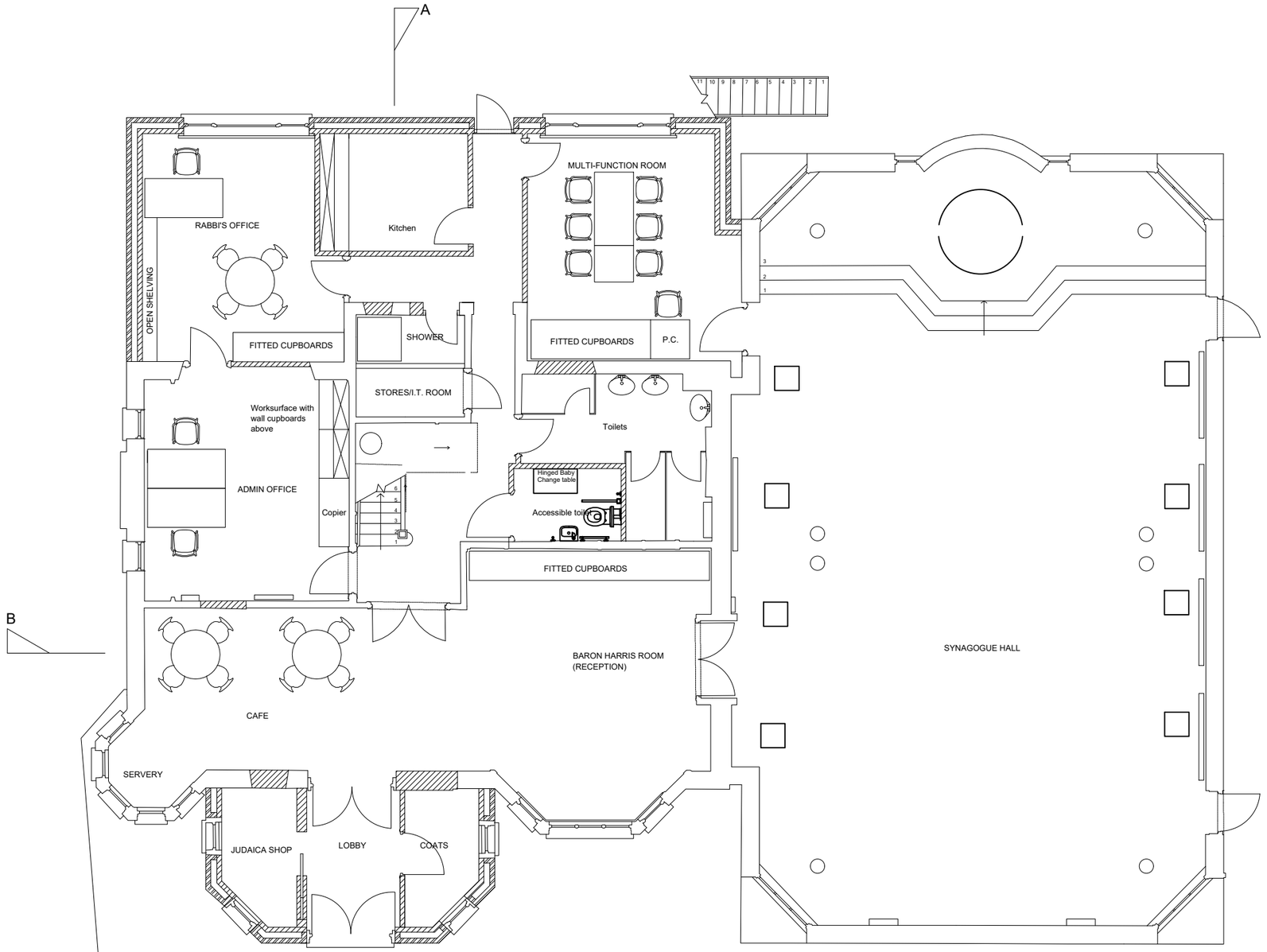
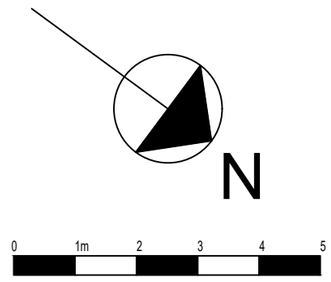
Appendix C - Proposed Site Layout Plans





Rev	Remarks	Date
A	Planning Issue	23/09/2022

Client:- SOUTHGATE PROGRESSIVE SYNAGOGUE	Project No.:- 23148
Site:- 75 CHASE ROAD LONDON N14 4QY	Drawing Title:- GROUND FLOOR PROPOSED
Drawn by:- SV / Date:- 27.11.23	Scale at A3:- 1:100
Drawing Number:- 23148.200	Revision:- A

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Appendix D - Greenfield Runoff (Total Site)

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	0.040	Urban	0.000
SAAR (mm)	654	Region Number	Region 6

Results l/s

QBAR Rural	0.2
QBAR Urban	0.2
Q100 years	0.5
Q1 year	0.1
Q30 years	0.4
Q100 years	0.5

Appendix E - British Geological Survey Borehole Records

Shell and Auger Borehole Log Sheet

Number 2

Site:– CHASE ROAD, ENFIELD

Job Number:– B1042

Machine Type:– PILCON

Date:– 24.10.91.

C.J. Associates Geotechnical Ltd.

Sheet 1 of 2

Sampling Details	Depth m	Penetration Tests [mm] 75	75	75	75	75	75	Boring Details	Depth m	Thickness m	Legend	Description of Strata	Datum m O.D.
									0.70	0.70		MADE GROUND (Dark brown clayey sand with clay layers and fine brick fragments – Drillers description)	
U1	1.00							31b				Stiff to very stiff brown to yellowish–brown with pale grey mottling clay, with many white to grey chalky areas and chalk gravels. Becoming sandy and gravelly clay with depth	
D2 U3	1.50							42b					
D4 SPT5 B6	2.00 2.05	2	4	4	5	7	11	N = 27					
									2.30	1.60			
CPT7	3.00	5	9	10	13	17	14	N > 50				Medium dense, and very dense in upper levels, pale brown silty sandy fine to coarse angular to rounded GRAVEL. Very clayey at top of stratum	
CPT8	4.00	2	4	7	6	10	6	N = 29					
CPT9	5.00	3	5	4	7	5	6	N = 22					
D10	5.60								5.60	3.30			
									5.90	0.30		Brown with some yellowish–brown mottling silty CLAY	
U11	6.00							16b					
D12	6.50												
U13	8.00							19b				Firm becoming very stiff with depth, greyish–brown and brownish–grey fissured silty CLAY (Continued.....)	
D14	8.50												
U15	10.00							21b					

Client LONDON BOROUGH OF ENFIELD

Remarks

150mm dia casing to 12.00m depth
Water added to assist drilling from 2.60m to 5.40m depth

Chiselling

From [m]	To [m]	Time [hours]

Water Level Observations During Boring

Date	Time	Depth in metres Hole	Casing	Water	Remarks
24.10.91				2.20	SEEPAGE

Shell and Auger Borehole Log Sheet

Number 2

Site: – CHASE ROAD, ENFIELD

Job Number: – B1042

Machine Type: – PILCON

Date: – 24.10.91.

C.J. Associates Geotechnical Ltd.

Sheet 2 of 2

Sampling Details	Depth m	Penetration Tests [mm] 75 75 75 75 75 75	Boring Details	Depth m	Thickness m	Legend	Description of Strata	Datum m o.d.
D16	10.50						(....cont.)	
U17	12.00		24b					
D18	12.50			12.50			END OF BOREHOLE	

Client LONDON BOROUGH OF ENFIELD

Remarks

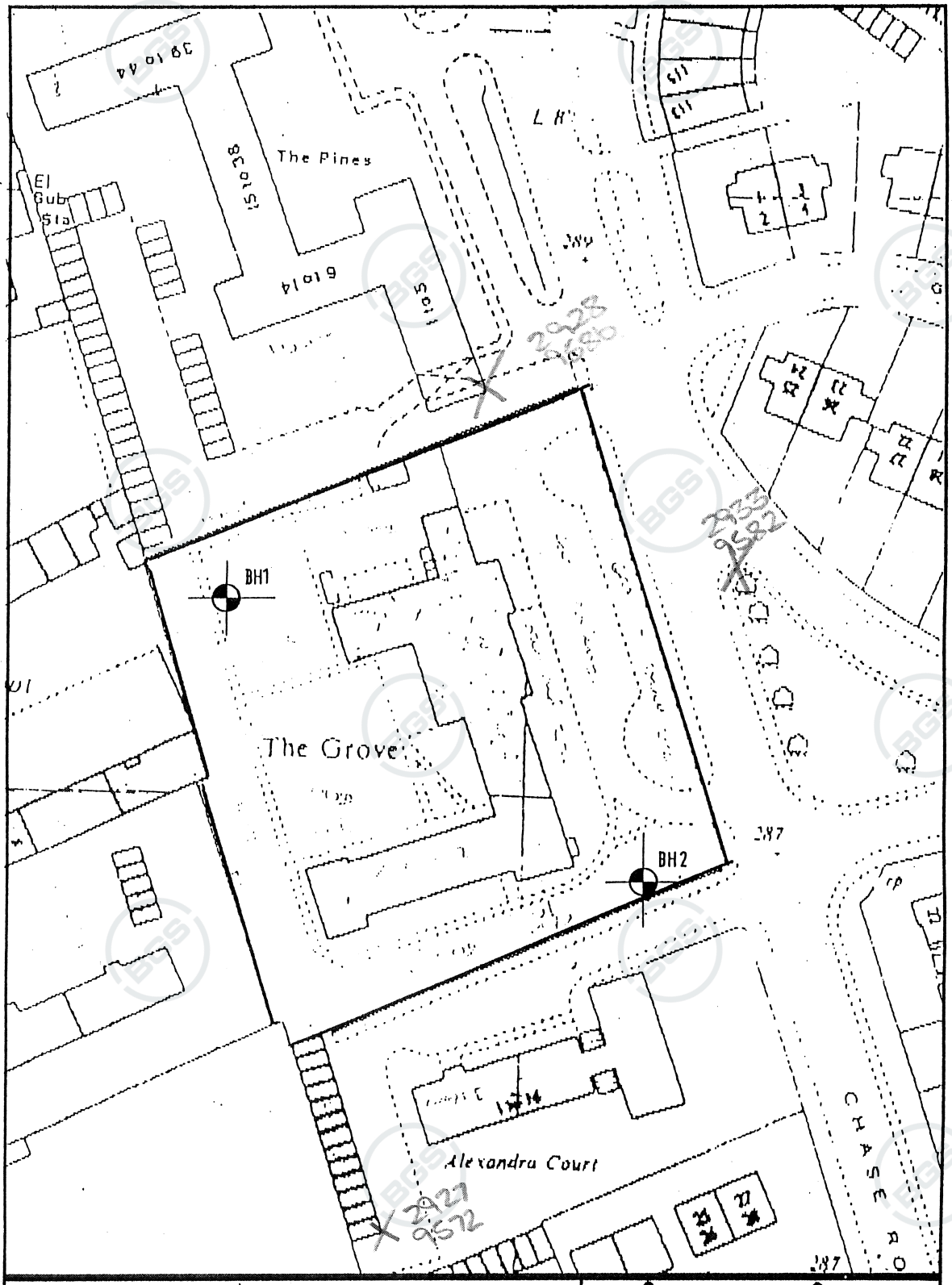
150mm dia casing to 12.00m depth
Water added to assist drilling from 2.60m to 5.40m depth

Chiselling From [m]	To [m]	Time [hours]

Water Level Observations During Boring

Date	Time	Depth in metres Hole	Casing	Water	Remarks
24.10.91		12.50		2.20	SEEPAGE

BGS ID: 12709999 : BGS Reference: TQ29NE133
British National Grid (27700) : 529310,195780

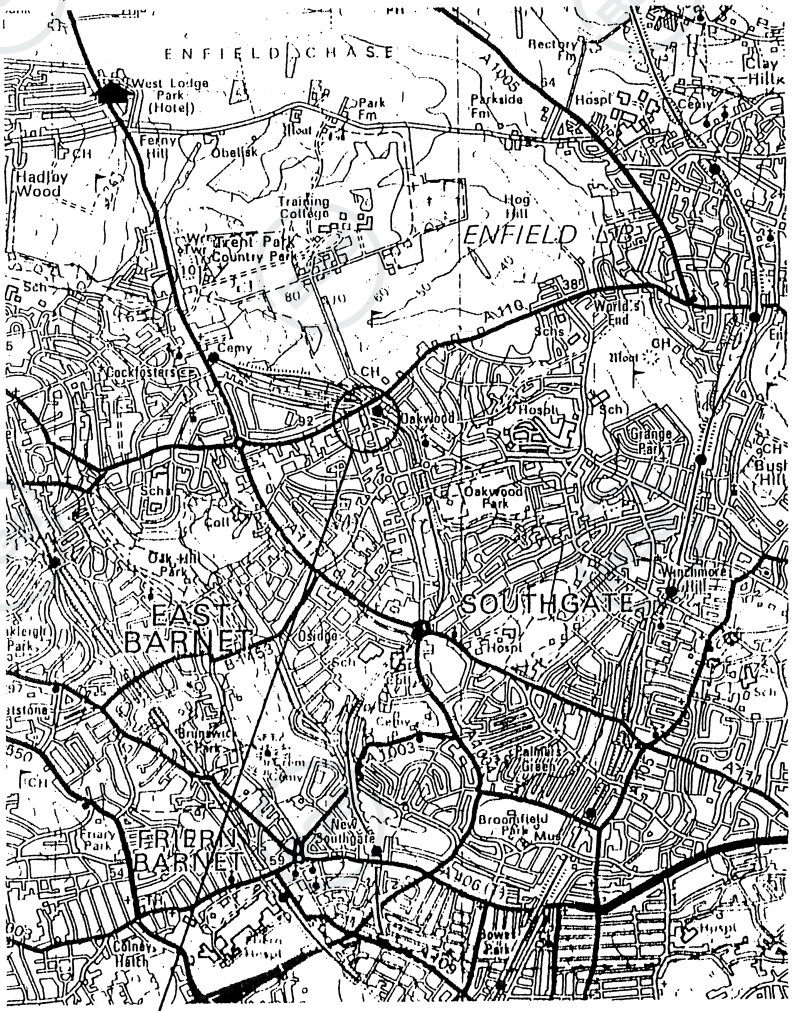


Title: LOCATION OF BOREHOLES
THE GROVE, CHASE ROAD, ENFIELD

c.j. associates

job no.	drawn by:	date	scale
B1042		OCT 91	NTS

MY 244023R



Location of Site

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Title: SITE LOCATION PLAN THE GROVE, CHASE ROAD, ENFIELD				**c.j. associates**
job no. B1042	drawn by:	date OCT 91	scale 1:50.000	

MY 244023R