

Technical Note

Project	56a Church Hill						
Reference	J5129-C-FN-0001_04_S3						
Scope	Drainage Strategy - Stage 3						
Date	21/03/2024	Job number	J5129	Author	DK	Reviewed	RW

1. Introduction

Webb Yates Engineers (WYE) has been appointed to undertake the Sustainable Drainage Systems Design for the proposed development of a private residential property at 56a Church Hill, Enfield N21 1JA.

This technical note covers the drainage strategy for the site and outlines the information required for a minor development in accordance with the Enfield minor SuDS proforma.

2. Existing Site

The existing site has an area of approx. 0.06ha and is currently undeveloped. The site has a gradual slope from southwestern edge, which has a level of approx. 52.49m AOD to the north-eastern edge of the property which borders Church Hill Road, which has a level of approx. 50.94m AOD.

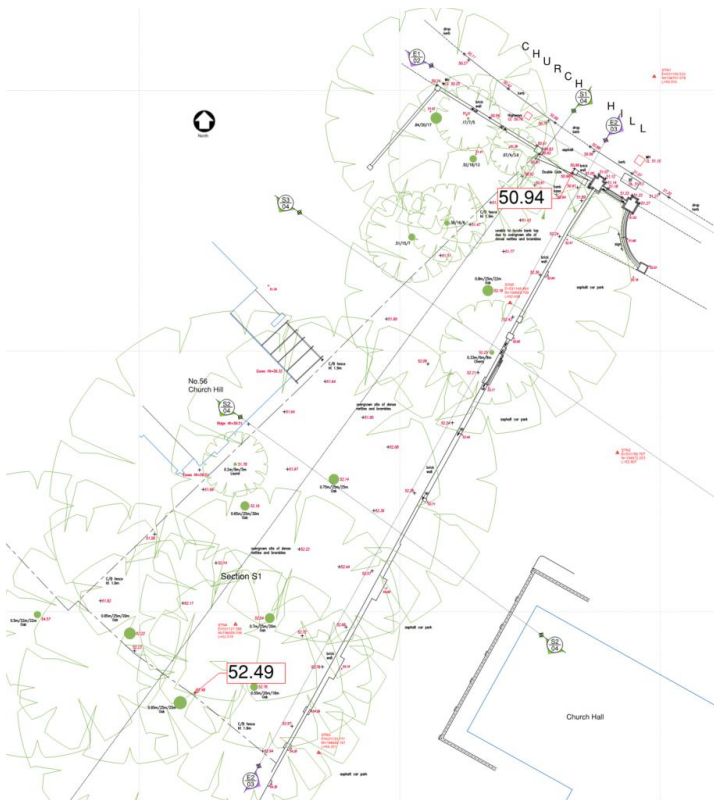


Figure 1 – Existing Site and Topography (from Topographical Survey drawing ref 13573-01 by CADPlan)

3. Existing drainage

As the site is currently undeveloped, there are no drainage connections from the site to the public system.

Thames Water records show the closest public sewers are along Church Hill, which consists of separate surface water and foul water sewers as shown on the extract in Figure 2.

Thames Water records do not show any public sewers within the site boundary, however this is to be confirmed by a utility survey which is to be undertaken at the next design stage.

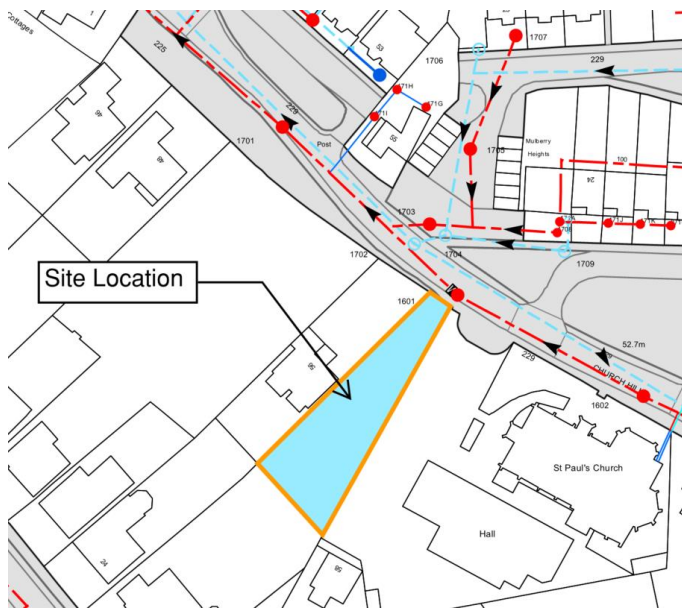


Figure 2 – Extract from Thames Water Records.

4. Flood Risk

4.1. Flooding from Rivers and the Sea

As shown in Figure 3 below the site lies within Flood Zone 1 (Very low risk) - Land having a less than 1 in 1,000 annual probability of river or sea flooding.

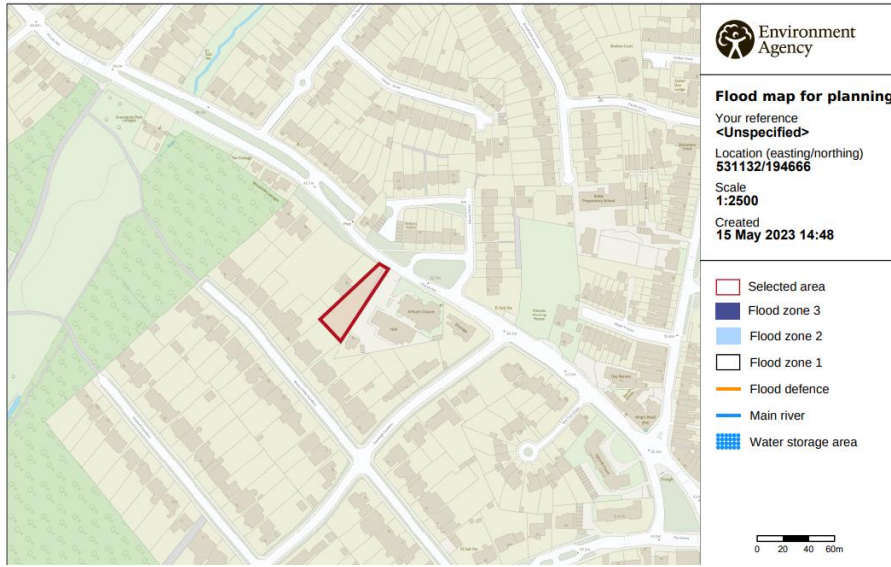


Figure 3: Online Flood Map from Sea and Rivers (Source: <https://flood-map-for-planning.service.gov.uk>).

4.2. Flooding from Surface water

As shown in Figure 4 below the site is in an area at a very low risk of surface water flooding (less than 0.1% each year).

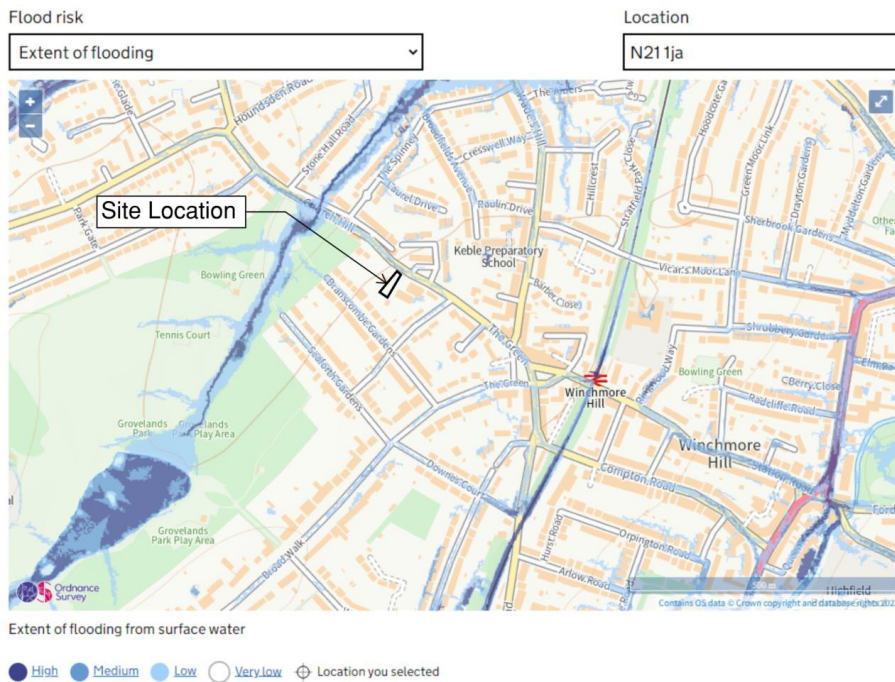


Figure 4: Online Flood Map from Sea and Rivers (Source: <https://check-long-term-flood-risk.service.gov.uk>)

5. The Proposed Development

The proposed development is for a single storey private residential property. The total site area is approximately 600 sq.m and the roof area which consists predominantly of wildflower green roofs is approximately 200 sq.m. The extent of green roof is shown on Figure 5 below. The extent of the terraced areas, permeable hard landscaped areas and planting areas are shown on the Landscape General Arrangement drawing 06-1116-300 by enplan. The terraced areas are raised above existing ground levels and consist of grilles which allow rainwater to pass through and infiltrate into the underlying ground. Resin bound permeable paving is proposed for the pathways and driveway.

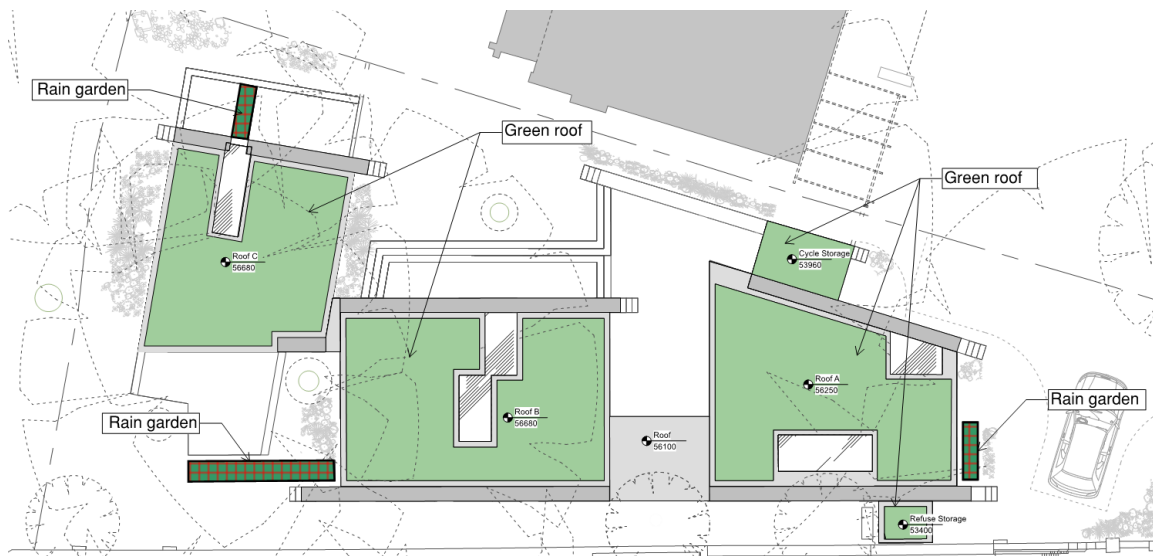


Figure 5 – Proposed green roof extents (based on architects drawing 22002-101)

6. The Proposed Surface Water Drainage Strategy

In accordance with the local and national policy guidelines, the development will utilise sustainable drainage systems (SuDS) to achieve greenfield run-off rates and ensure surface water run-off is managed as close to its source as possible.

It is proposed storm water from the site will be drained by infiltration which will be facilitated by the incorporation of several SuDS features as follows:

- Green roofs
- Permeable paving
- Rain planters/gardens
- Gravel strips

Typical Sections for these SuDS features are shown in Appendix C.

As indicated on Figure 5, wildflower green roofs are proposed for the roof areas. Rainwater downpipes from the roof areas will discharge into the gravel strips along the southeast edge of the buildings and where feasible via rain planter areas. For the more intense rainfall events, overflows will be provided to the planters which will connect into gravel strips adjacent to and below the raised building ground slabs to ensure the roof drainage is distributed below the building footprint and infiltrates into the ground in a similar way to the existing site. The overall surface water drainage strategy is illustrated on sketch J5129-SK-C-0001 in Appendix A. As shown on this sketch, the gravel strips will be orientated such that they are at right angles to the general slope of the site (i.e. parallel to the site contours) to increase the potential for any surface runoff to infiltrate into the ground.

As the building footprint is raised above ground level, the effective area available for infiltration will be similar to that of the existing site. The additional SuDS features proposed will further assist with managing storm water during the more critical rainfall events. The design of the SuDS features will be developed further in the subsequent design stages in coordination with the other design disciplines.

Even though the effective permeable area of the site is not reduced, due to the underlying soil being a clay subgrade, it is assumed only partial infiltration is feasible. It is therefore proposed an overflow pipe is provided along the northwest edge to capture any run-off which doesn't infiltrate into the ground during the more critical storm events. It is proposed this overflow pipe will connect to the Thames Water surface water sewer on Church Hill, which will be subject to a new connection application.

Resin bound permeable paving will be used for external hard landscaping to allow rainwater to infiltrate into the ground. Permeable no dig paving systems will be specified within the root protection zones to prevent damage to tree roots.

7. The Proposed Foul Water Drainage Strategy

A separate system will be provided for the foul water drainage from the development, which will connect to the public system on Church Hill Road. Where a gravity system is considered feasible, where possible the pipe system will be specified above existing ground levels to avoid impacting the tree roots. Where a gravity system is constrained due to site levels or tree protection requirements, a pumped system shall be specified up until the final connection to the Thames Water sewer which will be a gravity connection.

All drainage works will be installed in accordance with the approved arboricultural method statements.

8. SuDS Management plan

The drainage system will be designed to minimise maintenance requirements and be. The surface and foul drains and SuDS features will be maintained by free holders in accordance with the guidance in the CIRIA 753 SuDS Manual and to the manufacturer’s recommendations (where applicable). The maintenance plan outlined below will be refined and developed at the next design stage.

8.1. Gullies, Channel Drains and Catchpit Manholes

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Inspect for sediment and debris in catchpit manhole chambers	Monthly in the first year and then annually
	Remove litter (including leaf litter) and debris from access chambers and pre-treatment devices	Monthly (or as required)
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required based on inspections)
Occasional maintenance	Inspect for sediment and debris in catchpit manhole chambers	As required, based on inspections
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year and then annually

8.2. Rain Gardens/Planters

The most intensive maintenance is required during the establishment period. Herbicides and pesticides (such as Roundup) and fertilizers should not be used on bioretention systems. This is because these pollutants will wash through the system quite easily.

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	inspect infiltration surfaces for silting and ponding, record de-watering time of the facility and assess standing water levels in underdrain (if appropriate) to determine if maintenance is necessary	Quarterly
	Check operation of underdrains by inspection of flows after rain	Annually
	Assess plants for disease infection, poor growth, invasive species etc and replace as necessary	Quarterly
	Inspect inlets and outlets for blockage	Quarterly
Regular maintenance	Remove litter and surface debris and weeds	Quarterly (or more frequently for tidiness or aesthetic reasons)
	Replace any plants, to maintain planting density	As required
	Remove sediment, litter and debris build-up from around inlets or from forebays	Quarterly to biannually
Occasional maintenance	Infill any holes or scour in the filter medium, improve erosion protection if required	As required
	Repair minor accumulations of silt by raking away surface mulch, scarifying surface of medium and replacing mulch	As required
Remedial Actions	Remove and replace filter medium and vegetation above	As required but likely to be > 20 years

8.3. Green roofs

Maintenance Schedule	Required Action	Typical Frequency
Regular inspections	Inspect all components including soil substrate, vegetation, drains, irrigation systems (if applicable), membranes and roof structure for proper operation, integrity of waterproofing and structural stability.	Annually and after severe storms
	Inspect soil substrate for evidence of erosion channels and identify any sediment sources.	Annually and after severe storms
	Inspect drain inlets to ensure unrestricted runoff from the drainage layer to the conveyance or roof drain system.	Annually and after severe storms
	Inspect underside of roof for evidence of leakage	Annually and after severe storms
Regular maintenance	Remove debris and litter to prevent clogging of inlet drains and interference with plant growth	As required, based on inspections
	During establishment (ie year one), replace dead plants as required	Monthly (but usually responsibility of manufacturer)
	Post establishment, replace dead plants as required (where >5% of coverage)	Annually (in Autumn)
	Remove fallen leaves and debris from deciduous plant foliage	Six monthly or as required.
	Remove nuisance and invasive vegetation, including weeds	Six monthly or as required.
	Mow grasses, prune shrubs and manage other planting (if appropriate) as required – clippings should be removed and not allowed to accumulate.	Six monthly or as required.
Remedial actions	If erosion channels are evident, these should be stabilized with extra soil substrate similar to the original material, and sources of erosion damage should be identified and controlled.	As required
	If drain inlet has settled, cracked or moved, investigate and repair as appropriate.	As required

8.4. Permeable Pavement

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface area)	Twice a year, after autumn leaf fall and 6 months later
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosphate applied directly into the weeds by an application rather than spraying	As required – once per year on less frequently used pavements
Remedial actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the parking	As required
	Remedial works to any depressions, rutting, and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation or surface and upper substructure by remedial sweeping	Every 10-15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48h after large storms in the first 6 months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

9. Conclusion

The site currently lies within Flood Zone 1 and is at very low risk of flooding from rivers/seas and surface water and other artificial water bodies and as such is deemed suitable for development in terms of flood risk.

It is considered the surface water strategy outlined above meets the requirements set out by Building Regulations Part H, the Enfield Sustainable Drainage guidance for minor developments and the guidance provided in the CIRIA SuDS manual. Several SuDS features such as green roofs, rain planters, gravel strips and permeable paving will be used to slow down the rate of surface water runoff and facilitate infiltration into the ground. In addition to storm water management, these features will also benefit water quality and biodiversity.

A separate foul water drainage system is proposed to discharge into the existing public system on Church Hill road.

The site drainage scheme would be managed and maintained by the freeholder after completion, as part of their upkeep works for the site.

Appendix A – Proposed Surface Water Drainage Layout

Appendix B – Minor SuDS Proforma

Key



1. Project and Site Details			
1	Project/Site Name	56a Church Hill	
2	Site Address	56a Church Hill, Enfield N21 1JA	
3	LPA Reference	N/A	
4	Type of Development	New Build	
5	Total Site Area (m ²)	600	
6	Total Proposed Impermeable Area (m ²)	0	
7	Is the site subject to flooding from rivers?	Very Low Risk	
8	Is the site subject to surface water flood risk?	Very Low Risk	
9	Is the site within 8m of a watercourse or culvert?	No	
10	Site infiltration potential	Partial Infiltration	
2. Additional Information			
11	Have you submitted drawings of SuDS proposals?	Yes	
12	Have you submitted a management plan for SuDS features?	Yes	
3. Design Details			
13	No. of SuDS Features	3	
14	Total attenuation provided (m ³)	12	
		0.00	
		0.00	
Type of Feature	Area of SuDS feature (m ²)	Area Drained to SuDS feature (m ²)	Attenuation Volume of SuDS feature (m ³)
A Green Roof	119	150	1.8
B Permeable Paving	182	182	8.2
C Rain Planter	5.4	Area in column C plus sections of green roof (TBC at next design stage)	1.8

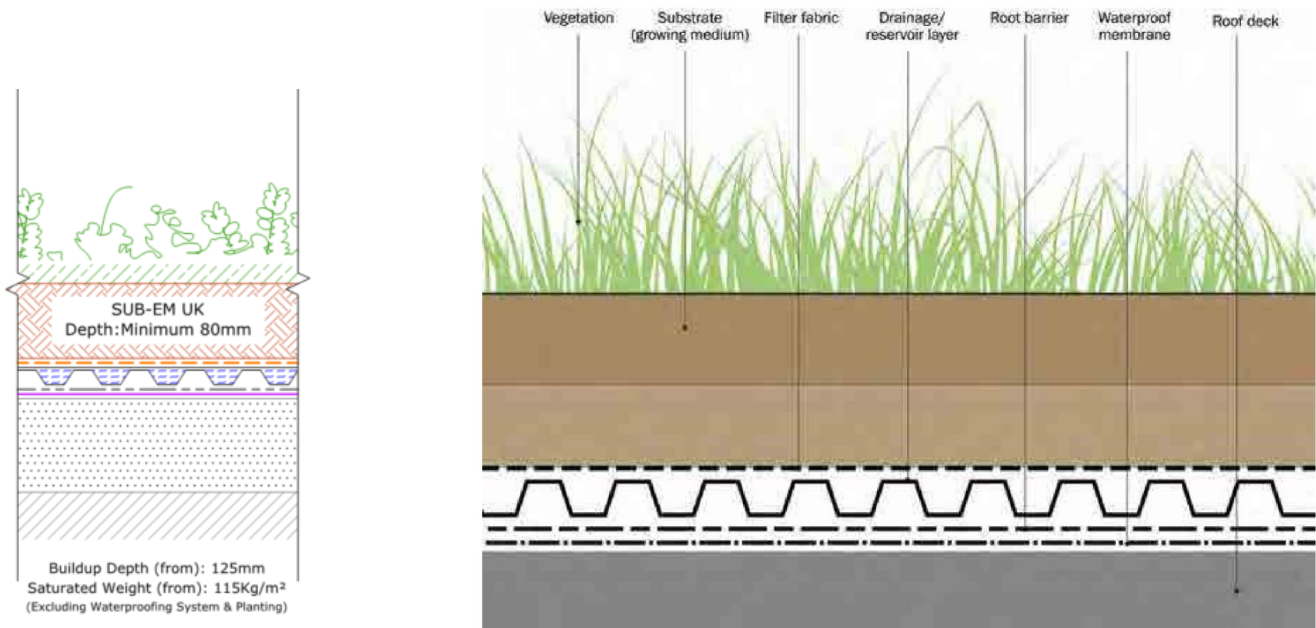
Please provide reasoning if target attenuation is not provided

The permeable area of the site is retained as per the existing undeveloped site. Surface level SuDS features and soft landscaping are provided to cover full extent of the site to improve potential for infiltration

Appendix C – Typical Sections of SuDS features

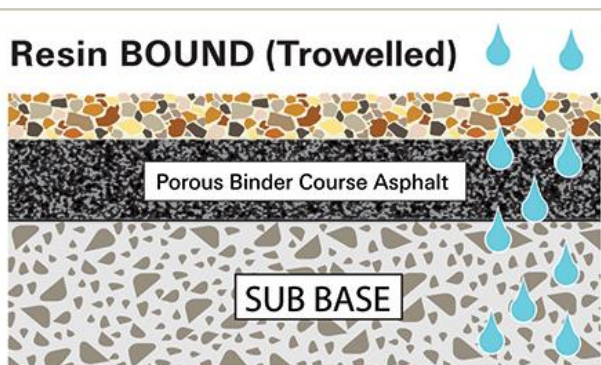
Green roof

Extensive green roof system by Bauder for 0°-4° slope (detail to be developed further at the next design stage)



Resin Bound Permeable Paving - (Typical Section from www.clearstonepaving.co.uk)

Sub-base to be minimum 150mm Type 3 or similar with >30% voids.



Top surface: **15 -18mm** thick 'bound' mixture of stones and resin

Rain garden - typical section based on SuDS manual

