

CRADDYS

CIVIL & STRUCTURAL ENGINEERING DESIGN CONSULTANCY

Nine Mile Ride, Finchampstead

Surface Water Drainage Technical Note

For
Elivia Homes (Central) Limited

////
Date: 08/10/2025
Document reference: 135555w0005b

Document Control Sheet

Job Details					
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Title		Surface Water Drainage Technical Note			
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Executive Summary

Introduction

It is proposed to construct 26 dwellings at a brownfield site at land off Nine Mile Ride, RG40 3QD.

The site has Planning Permission from Wokingham Borough Council, application number 250655.

This document has been produced to support a variation of the drainage strategy condition. It contains information that support the revised surface water drainage strategy.

Proposed Surface water Drainage Strategy

The BRE365 infiltration rate test report shows that the on-site infiltration rates are of the order of 10^{-7} m/s, which is too low for the use of soakaways as a discharge point for surface water drainage. It is proposed to discharge surface water drainage offsite to the Thames Water surface water sewer which is situated along Nine Mile Ride.

The QBar greenfield runoff rate is 2.5 l/s. However, Thames Water have agreed to a maximum discharge rate of 3.3 l/s to their surface water sewer because of the site constraints which make it impractical to discharge at the greenfield runoff rates.

The surface water drainage system and stormwater attenuation system was designed using the 1 in 2 yr storm events, 1 in 30 yr storm events plus 35% climate change and for the 1 in 100 yr storm events plus 40% climate change.

Responses to the LLFA's Queries dated 12/09/2025

The LLFA's comments have been addressed as follows. Our responses in red.

Based on available mapping and site description, the development appears to be on a greenfield site. Development on greenfield land inherently risks increasing surface water runoff and flood risk downstream unless carefully managed. [Response] There are existing buildings on site, Plots 238 and 240, as shown on the site location plan in appendix A and the existing site plan in appendix B. The site is therefore technically a brownfield site.

National and local planning policies strongly recommend that any development on greenfield sites must incorporate comprehensive SuDS, which:

- Mimic natural drainage through infiltration, attenuation, and conveyance,
- Minimise runoff volume and peak flows to greenfield (pre-development) rates,
- Improve water quality to protect receiving water bodies,
- Provide additional benefits such as biodiversity and amenity value. [Response] Points noted.

Building housing without such measure's risks increasing flood risk both on and off site and may lead to regulatory and planning concerns. [Response] Point noted.

Key Concerns with the Proposed SuDS Strategy

1. Inadequate Use of Sustainable Drainage Techniques

The current design relies primarily on attenuation and discharge to the Thames Water sewer with no meaningful use of SuDS features such as permeable paving, swales, filter strips, or rain gardens. This approach fails to adhere to the principles of sustainable drainage and falls short of policy expectations. [Response] The drainage layout drawings in appendix F show tanked permeable pavements for private car parking bays. Also, it is proposed to allow runoff from patios and footpaths to discharge to the ground.

2. Insufficient Supporting Documentation

- The exceedance route plan referenced in the submission is missing, making it impossible to assess how extreme flows will be safely managed on site. [Response] The flood





exceedance route plan is in appendix H.

- o No detailed hydraulic calculations or justification for the attenuation volume and discharge control have been provided. [Response] The hydraulic calculations are in appendix G.
- o The maintenance strategy for drainage infrastructure is absent. [Response] Refer to document number 13555w0008a Private Drainage O&M Manual for maintenance of the private drainage assets.

3. Discharge Rate Above Greenfield QBar

While Thames Water's agreement to a 3.3 l/s discharge rate is noted, this exceeds the greenfield QBar rate of 2.5 l/s, and further justification and mitigation are required. [Response] It is not practical to have a single gravity-fed stormwater attenuation system because of site topography. As such, we propose to discharge surface water drainage offsite via a number of flow control devices with a maximum discharge rate of 3.3 litres/sec. Refer to the hydraulic calculations in appendix A of the surface water drainage strategy document, number 13555w0005a.

Recommendations

To align with best practice and national guidance, we strongly recommend:

- Revising the drainage strategy to incorporate a full SuDS treatment train, including source control and water quality features. [Response] It is proposed to utilise tanked permeable pavements for car parking bays. The drainage layout drawings show the location of tanked permeable paving.
- Submitting a detailed exceedance route plan showing how surface water will be managed safely in extreme events. The flood exceedance route plan is in appendix H.
- Providing comprehensive hydraulic modelling and calculations to justify the design. [Response] The hydraulic calculations are in appendix G.
- Including a maintenance and management plan for all drainage assets. [Response] I attach the document number 13555w0008a Private Drainage O&M Manual for maintenance of the private drainage assets.
- Ensuring the proposed discharge rate does not increase flood risk downstream. [Response] Refer to the surface water drainage strategy document, number 13555w0005a, for the hydraulic calculations.





1. Introduction

1.1. Background and Purpose of Report

It is proposed to construct 26 dwellings at a brownfield site at land off Nine Mile Ride, RG40 3QD. Refer to appendix A for the site location plan on a Thames Water asset map.

The site has Planning Permission from Wokingham Borough Council, application number 250655.

This document has been produced to support a variation of the drainage strategy condition. It contains information that support the revised surface water drainage strategy.

1.2. Site Location and Description

The site is located at brownfield site at land off Nine Mile Ride, RG40 3QD. The site is situated off Nine Mile Ride and is accessed via two access lanes. There are two existing houses on site, Plots 238 and 240, at the north of the site. The southern part of the site is undeveloped.

The topography generally slopes towards the north, towards Nine Mile Ride. Refer to appendix B for the existing site plan.

1.3. Proposed Development

It is proposed to demolish the existing houses and construct 36 houses, including the associated parking, and drainage infrastructure. The proposal also includes utilising the existing access road for the site. Refer to appendix F for the proposed drainage layout with the site plan background.

2. Surface Water Drainage Strategy

2.1. Drainage Design Guides

The scheme design of the drainage system was carried out in accordance with all relevant Codes of Practice and Design Guides. These include, but are not limited to the following:

- Wokingham SuDS Strategy (To adhere to local SuDS guidance)
- CIRIA C753: SuDS Manual (For environmental and sustainability assessment of different surface water management options and soakaway design).
- The Government of England's Planning Practice Guidance (For flood risk considerations).
- The Approved Documents: Building Regulations 2000 Part H: Drainage and Waste Disposal (To adhere to UK building regulations).
- BS EN752:2018 Drain and Sewer Systems Outside Buildings.
- BS EN124:2015 Gully Tops and Manhole Tops for Vehicular and Pedestrian Areas (To specify manhole covers).
- Design and Construction Guidance Appendix C (To adhere to the adoptable drainage design guidance)

2.2. Surface Water Discharge Point

The surface water drainage strategy for the site was developed in accordance with SuDS principles and current best practice. Different surface water management techniques that can avoid, reduce or delay the surface water discharge from site were assessed. The techniques considered, in accordance with WokBC-LS41's order of priority is as follows:

- discharge to the ground (infiltration), or where not reasonably practicable,
- discharge to a surface water body, or where not reasonably practicable,
- discharge to a surface water sewer, highway drain, or another drainage system; or where not reasonably practicable,
- discharge to a combined sewer.

2.3. Discharge to the Ground (Infiltration),





The BRE 365 tests report by Geo-Environmental, number GE22003/WH01/230912, shows that the infiltration rates are of the order of 10^{-7} m/s, which is too low for the use of soakaways as a discharge point for surface water drainage. Refer to appendix C for pages from the BRE365 report

2.4. Discharge to a Surface Water Body

There are no watercourses near the site.

2.5. Discharge to a Surface Water Sewer, Highway Drain, or Another Drainage System

There is a Thames Water surface water sewer situated along Nine Mile Ride. It is proposed to discharge surface water drainage offsite to the surface water sewer. Thames water are satisfied with the proposal, subject to approval by the LLFA. Refer to appendix D for the drainage connection approval letter from Thames Water.

2.6. Surface Water Discharge rate

The QBar greenfield runoff rate is 2.5 l/s. Refer to appendix E for the greenfield runoff rate calculations. However, Thames Water have agreed to a maximum discharge rate of 3.3 l/s to their surface water sewer because of the site constraints which make it impractical to discharge at the greenfield runoff rates. Refer to appendix D for the drainage connection approval letter from Thames Water. It is proposed to discharge surface water drainage offsite to the Thames Water surface water sewer at a maximum discharge rate of 3.3 litres/sec during all storm durations up to and including the 1 in 100 plus 40% climate change.

2.7. Surface Water Drainage Calculations

Infodrainage was used to size the pipework and to size the stormwater attenuation system. Refer to appendix F for the drainage layout and appendix G for the surface water drainage calculations.

2.8. Flood Exceedance Flows

The Infodrainage calculations in appendix G show that there is minor flooding, less than 3.0 m³, during the 1 in 100 year return period storm event plus 40% CC. Any flooding will be contained by road kerbs within the site before being collected by road gullies. No flood water is expected to flow off the site during all storm events up to and including the 1 in 100 year return period storm event plus 40% climate change.

The levels strategy for the site was also developed to ensure that no surface runoff or flood water can enter buildings if the surface water surface water drainage system fails to work as designed. Refer to appendix H for the Flood Exceedance Route plan.

2.9. Above Ground SuDS Features and Infiltration Systems

The above ground SuDS features were considered were considered for water quality improvement. The features that were considered include traditional soakaways, swales, ponds and permeable pavement.

- Traditional soakaways. The BRE 365 infiltration rate tests report saved in appendix C shows that soakaways are not suitable as a discharge point for surface water drainage. Soakaways are therefore not considered further.
- Swales and ponds. The site does not have enough space for swales and ponds. The communal areas are either paved access roads or soft landscape within Root Protection Areas. Swales and ponds were therefore not considered further.
- Permeable pavement. Permeable pavement that allow water infiltration into the ground are not suitable because the infiltration rate is too low. However, tanked permeable pavement systems are being utilised within car parking areas. This reduces the potential of pollution associated with car parks (heavy metals, chemicals or oil pollution) entering the drainage system. This is a technique recommended by the Environment Agency's PPG3 Pollution Prevention Guideline. The system traps organic matter, silt and loam, stabilising heavy metals and digesting hydrocarbons. The indicative mitigation indices for permeable pavement indicated in Table 26.3





of the CIRIA C753 are also higher than the pollution hazard indices in Table 26.2 of the CIRIA C753 for individual property driveways and low traffic roads.

3. Flood Risk Assessment

The flood risk assessment for the site is covered in document number 70011-FRA-001 by SWP. The report concludes that the development is deemed appropriate in this location, is not at risk of flooding and its development will not increase the risk of flooding to the neighbouring properties.

4. Private Drainage Operation And Maintenance

It is proposed to offer other most of the drainage for adoption by Thames Water. The maintenance of adoptable drainage will therefore be by Thames Water.

Private drainage within individual plots will be maintained by the plot holders. The communal private drainage and public access roads shall be maintained by a managing agent with a quantified regime.

Refer to document number 13555w0008 for the private drainage operation and maintenance requirements. The document shall be made available to the private individual plot holders, via Elivia Homes sales literature.





Appendix A

Site Location on a Thames Water Asset Map



The map displays a residential area with a central site outlined in green. The site is bounded by Nine Mile Ride to the north and Wick Hill Lane to the south. Surrounding the site are various buildings, including houses and cottages, and landmarks such as Spring Copse, Green Pastures, and Wick Vale Cottage. A red arrow points to the green-outlined site boundary with the label "Site boundary".

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.



Appendix B

Existing Site Plan





© Crown copyright and database rights 2023 Ordnance Survey 0100031673

0 10 20 30 40 m

Application boundary
Not all individual trees indicated

REV	NOTES	AU/CH	DATE
	Nine Mile Ride, Finchampstead Existing Site Plan	B	
		JH / DC	
230122 L 01 02		1:500 @ A1	July 2023

CliftonEmerydesign

Bristol • Exeter • London • Plymouth
www.cliftonemerydesign.co.uk mail@cliftonemerydesign.co.uk

Drawing Status PLANNING

CONTRACTORS MUST CHECK ALL DIMENSIONS ON SITE. ONLY FIGURED DIMENSIONS ARE TO BE WORKED FROM. © THIS DRAWING IS COPYRIGHT.



Appendix C

Pages from the BRE365 Infiltration Rate Test Report





Geo-Environmental

12th September 2023

Our ref: GE22003/WH01/230912

Paul McKeown
Elivia Homes Central,
Apollo House,
Mercury Park,
High Wycombe, HP10 0HH

Dear Paul,

RE: Nine Mile Ride, Finchampstead – Soakage Testing

Further to your instruction, we write to present the results of the soakage testing undertaken at the above site. The soakage tests were undertaken in broad accordance with BRE Digest 365 'Soakaway Design' BRE, 2016 with the testing limited to a two-day period.

A Geo-Environmental engineer attended the site on 7th and 8th September 2023 to undertake the intrusive investigation. Five hand excavated trial pits (HP05 – HP09) were completed to depths of 1.1 - 1.4m bgl (dependent on ground conditions) to assess ground, groundwater conditions and soakage infiltration rates.

The exploratory holes were positioned approximately adjacent to hand pits (HP105 – HP109) undertaken by Omnia Consulting (ref: A12057/1.0, May 2023). The exploratory hole locations are shown on Figure 2.

Site Description

The site comprised woodland south of No.238 & No.240 Nine Mile Ride. Access was via the rear garden of No.238. The site moderately sloped upwards towards the south. The site was covered by mature and semi-mature trees and bushes. Limited fly-tipping was noted, including asbestos roofing near HP08. A fire had been lit near the entrance of the site.

Low rise fencing defined the site boundaries. Residential properties were located to the north, east and west. Further woodland was located to the south of the site.

Ground Conditions

The ground conditions encountered comprised a mantle of Topsoil overlying the Camberley Sand Formation. A generalised summary of the encountered conditions is presented in Table 1.

Top (m bgl)	Base (m bgl)	Geology	Locations
0.00	0.05 – 0.09	TOPSOIL: Dark brown fine to medium sand with abundant organic material. Root bound.	All
0.05 – 0.09	0.27 – 0.50	CAMBERLEY SAND FORMATION: Grey to greyish brown slightly clayey fine to medium SAND with occasional rootlets and flint gravel.	All
0.27 – 0.40	1.10 – 1.20+	CAMBERLEY SAND FORMATION: Yellowish brown to brown slightly clayey fine to medium SAND with rare rootlets and frequent clay nodules.	HP05 – HP07 & HP09
0.50	1.40+	CAMBERLEY SAND FORMATION: Yellowish brown with slight grey mottling very clayey fine to medium SAND with frequent clay nodules and rare flint gravel.	HP08

Table 1 Summary of Ground Conditions

Geo-Environmental Services Ltd
Unit 7 Danworth Farm, Cuckfield Road, Hurstpierpoint, West Sussex BN6 9GL
+44(0)1273 832972 www.gesl.net

Environmental Consultants | Geotechnical Engineers | Site Investigations

Geo-Environmental Services Ltd incorporated in England number 3214980 VAT number 679544479



Roots and rootlets were encountered across the site to the maximum depth of 1.20m bgl. For further details of the ground conditions encountered, reference should be made to the trial pit logs included within Appendix A.

Obstructions

No manmade or were encountered during the investigation. The presence of obstructions elsewhere at the site cannot be discounted.

All intrusive positions refused before target depth due to the density of the ground conditions encountered.

Groundwater

No groundwater was recorded within the trial pits during the investigation. Monitoring to determine any possible variation in groundwater levels over time did not form part of the agreed scope of investigation.

Soakage Testing

Soakage testing was undertaken in broad accordance with BRE Digest 365 Soakaway Design within five hand excavated trial pits. Testing was undertaken in HP05 – HP09 at depths of 1.1 - 1.4m bgl. Due to the limited time on site (two days) three filling and drainage cycles were not possible. Two tests were completed within all positions.

The results of the testing are summarised in Table 2 below.

Location	Depth (m bgl)	Infiltration Rate (m/s)	
		Test 1	Test 2
HP05	1.1	$7.9 \times 10^{-7} *$	$7.1 \times 10^{-7} *$
HP06	1.1	$6.6 \times 10^{-7} *$	$2.6 \times 10^{-7} *$
HP07	1.2	$1.0 \times 10^{-6} *$	$9.3 \times 10^{-7} *$
HP08	1.4	$2.7 \times 10^{-8} *$	$6.9 \times 10^{-8} *$
HP09	1.2	$4.6 \times 10^{-7} *$	$2.8 \times 10^{-7} *$

*data extrapolated

Table 2: Soakage Test Results

The testing undertaken indicates that the clayey Sands of the Camberley Sand Formation have low infiltration rates and there is potential that attenuation and further consideration to other types of drainage solutions will be required.

Closure

We trust that we have interpreted your instructions correctly, and please do not hesitate to contact us should you have any queries.

Yours sincerely

For and on Behalf of Geo-Environmental



William Hughes MGeol (Hons), MSc, FGS



Appendix D

Drainage Connection Approval Letter from Thames Water





Mr Christos Sibanda – Craddys
63 Macrae Road
Eden Office Park, Ham Green
BRISTOL
BS20 0DD

22 August 2025



Pre-planning enquiry: Confirmation of sufficient capacity

Site address: R/O 240 Nine Mile Ride, Finchampstead RG40 3QD

Dear Mr Sibanda,

Thank you for providing information on your [proposed development of 26 houses](#) with:

- [foul water discharge via gravity to the 100 mm Ø foul water sewer via manhole ref. SU80641906; and](#)
- [surface water discharge via gravity at 3.3 l/s to the 225 mm Ø surface water sewer via manhole ref. SU8064391H.](#)

We have completed the assessment of the [foul water and surface water](#) flows based on the information submitted in your application with the purpose of identifying sewerage capacity within the existing Thames Water sewer network.

As the development is located on a [brownfield](#) site there may be existing sewers or rising mains crossing the site. Where these are to become redundant or to be diverted, the full cost of administering and undertaking the works shall be financed [by the developer](#).

Foul Water

If your proposals progress in line with the details you've provided, we're pleased to confirm that there will be sufficient sewerage capacity in the nearby [foul water](#) sewer network to serve your development.

This confirmation is valid for 12 months or for the life of any planning approval that this information is used to support, up to a maximum of three years.

[You'll need to keep us informed of any changes to your design – for example, an increase in the number/density of units. Such changes could mean that there is no longer sufficient capacity.](#)



Surface Water

In accordance with the Building Act 2000 Clause H3.3, positive connection of surface water to a public sewer will only be consented when it can be demonstrated that the hierarchy of disposal methods have been examined and proven to be impracticable.

Discharges shall be attenuated to reduce the likelihood of flooding downstream of the point of connection. A discharge rate of 2 l/s/ha will be applied unless otherwise stated above. The system shall not show signs of flooding above ground for the worst 1 in 30-year storm and shall be tested for exceedance in a 1 in 100-year storm to demonstrate that any potential flooding will not flood properties.

In order for us to consider any potential surface water needs, you'll need [written approval from the lead local flood authority](#) that you have followed the sequential approach to the disposal of surface water and considered all practical means, as per the below hierarchy.

- 1) Storage and reuse (rainwater harvesting, blue roofs for irrigation, ...).
- 2) Infiltration to ground at or close to source.
- 3) Attenuation in green infrastructure features for gradual release (green roof, rain garden, ...).
- 4) Discharge direct to a watercourse (unless not appropriate).
- 5) Controlled discharge to a surface water sewer.
- 6) Controlled discharge to a combined water sewer.

Providing the above requirements are met, we're pleased to confirm that there will be sufficient sewerage capacity in the nearby [surface water](#) sewer network to serve your development.

This confirmation is valid for 12 months or for the life of any planning approval that this information is used to support, up to a maximum of three years.

[You'll need to keep us informed of any changes to your design – for example, an increase of the impermeable area. Such changes could mean that there is no longer sufficient capacity.](#)

What happens next?

Please make sure to submit your sewer connection application, giving us at least 21 days' notice of the date you wish to make your new connection(s).

If you have any queries, please give me a call on 07747 644 979 (9am to 5pm, Monday to Friday) or email developer.services@thameswater.co.uk.

Yours sincerely,

A handwritten signature in red ink, appearing to read "Nicholas Short", with a long horizontal line extending to the right.

Nicholas Short BSc (Hons)

Adoption & Pre-planning Engineer

Waste Adoptions Thames Valley & Home Counties

Service Delivery



Appendix E

Greenfield Runoff Rate Calculations



Project:	Date: 30/05/2025			
	Designed by: sibandac	Checked by:	Approved By:	
Report Title: UK and Ireland Rural Runoff Calculator	Company Address:			

ICP SUDS / IH 124

Details

Method	ICP SUDS
Area (m²)	5150.00
SAAR (mm)	700.0
Soil	0.47
Region	Region 6
Urban	0
Return Period (years)	0

Results

Region	QBAR Rural (L/s)	QBAR Urban (L/s)	Q 1 (years) (L/s)	Q 30 (years) (L/s)	Q 100 (years) (L/s)
Region 6	2.5	2.5	2.1	5.6	7.9



Appendix F

Proposed Drainage Layout

