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Our Ref: IDL-1143-LLFA-01
Your Ref: 7969APP20231473
11th September 2023

Hillingdon Council SuDS Team
FAO Lead Local Flood Authority

Dear Sirs,

Re: The Barn Hotel, West End Road, Hillingdon, Ruislip, HA4 6JB
Planning Ref no: 7969APP20231473
Response to Lead Local Flood Authority Holding objection (dated 17th July 2023)

We write in response to the Lead Local Flood Authority's Holding Objection letter regarding full application for the above scheme.

Our point-by-point responses are noted below each of the concerns raised in italics.

LLFA Comment No:1
Elaborates on the spatial constraints discussed when justifying the exclusion of rainwater harvesting.

IDL Response

Rainwater harvesting requires sufficient space to accommodate both the below-ground tank(s) and the additional metering (per plot) that will be needed given the mains top-up during periods of drought/high usage. Such space does not exist for large tanks given the provision of all other services, drainage, SuDS, tree planting, street furniture and the like, nor within the provision of extra plant space internally.

We would also be concered with the potential for cross-contamination via a future mis-connection should a sink or basin be retro-fitted at a later date.

We would however confirm that RWH has been included to provide the following facilities;

i) Binstore washdown to the apartment buildings
ii) Communal landscape watering points
iii) Water butts to houses.

LLFA Comment No:2

Demonstrates that the applicant has considered the implementation of blue roofs or water butts within the design, giving sufficient justification if they are deemed unfeasible.

IDL Response
Blue roofs are not suited to this scheme as there are little in terms of flat roofs and no concrete podiums. Waterbutts will be provided to houses for garden watering.

LLFA Comment No:3

Infiltration testing should be carried out to determine whether this is a suitable method of discharge.

IDL Response
For reasons given previously, infiltration has been discounted given the underlying geology. Please find attached as ***Appendix A*** to this letter a technical note from the Geotechnical Consultant (CGL) which further explains that such testing would not be fruitful.

LLFA Comment No:4

An area of 0.466ha has been used to calculate the greenfield runoff rates, which is not the full development area. These should be revised to include the development area of 0.804ha.

IDL Response
The greenfield runoff calculation is based on the proposed impermeable area that the new development will positively drain. The public open spaces and other soft landscaped areas will only contribute to offsite runoff at greenfield rates

LLFA Comment No:5

Demonstrates the greenfield, existing and proposed runoff volumes for a 1 in 100-year 6hr storm event.

IDL Response
Refer to the revised drainage strategy report for the calculation. 1 in 100-year 6hr storm events existing and proposed runoff volume has been shown.

LLFA Comment No:6

Updates the values for attenuation volume in the report to align with those in the calculations.

IDL Response
In the hydraulics calculation, we have used a porosity value of 0.95 (95% void ratio). For this reason, the storage volume figure in the calculation will be 5% less for the crates.

We have to provide full storage volume figures in the report/plans to avoid any confusion in the estimation and construction purposes.

We have added a note in the report that a 95% void ratio has been calculated in the drainage calculation to avoid any confusion.

LLFA Comment No:7

Complete the attenuation volume section of the SuDS proforma.

IDL Response
Storage calculation added in the SuDS proforma.

LLFA Comment No:8

It should be clarified whether the full development area has been included within the calculations.

IDL Response
We confirm that all impermeable areas have been included in the calculations. Please note that the public open space and landscape areas will only contribute to offsite runoff at greenfield rates

LLFA Comment No:9

States the maintenance tasks for the proposed green roof and hydrobrakes.

IDL Response
Noted and added to the management & maintenance regime.

LLFA Comment No:10

Demonstrates that Thames Water have been consulted about the proposed connection to their surface water sewers.

IDL Response
We have carried out a pre-planning enquiry with Thames Water, and they have confirmed that they have sufficient capacity available in the foul and surface water network. Refer to the revised drainage strategy report for a copy of the correspondence.

Please would you kindly review the above responses with a view to offering your support for the scheme.

If you have any queries or require further information, please do not hesitate to contact us.

Yours faithfully,

Brijesh Mistry

For and on behalf of **Infrastructure Design Ltd**

Enc: Appendix A – Technical Note from CGL dated 8th September 2023

Technical Note:
Infiltration SuDS Assessment

To	Steve Hall (Chase New Homes)
Cc	Phil Thomes (Infrastructure Design Limited)
From	Adam Cadman, Associate Director, *MSc BSc (Hons) CGeol FGS*
CGL Ref	CG/39435
Date	8 September 2023
Revision	Rev 0
Project	Barn Hotel West End Road Ruislip HA4 6JB

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1. Introduction

CGL previously completed a combined geotechnical and geoenvironmental site investigation at the site, including a desk study and ground investigation. CGL has subsequently been instructed to provide a technical note on the viability of soakaway drainage at the site to support the design of the proposed redevelopment.

2. Approach

The infiltration SuDS (sustainable drainage system) assessment has been undertaken based on the approach[1] set out by the British Geological Survey (BGS) utilising dataset[2] obtained from the BGS. As the BGS dataset is intended to *"provide the information required to make a preliminary decision on the extent to which the subsurface at a site is suitable for the installation of infiltration SuDS"*, the dataset has been supplemented with the findings of the site investigation[3] previously completed by CGL for the

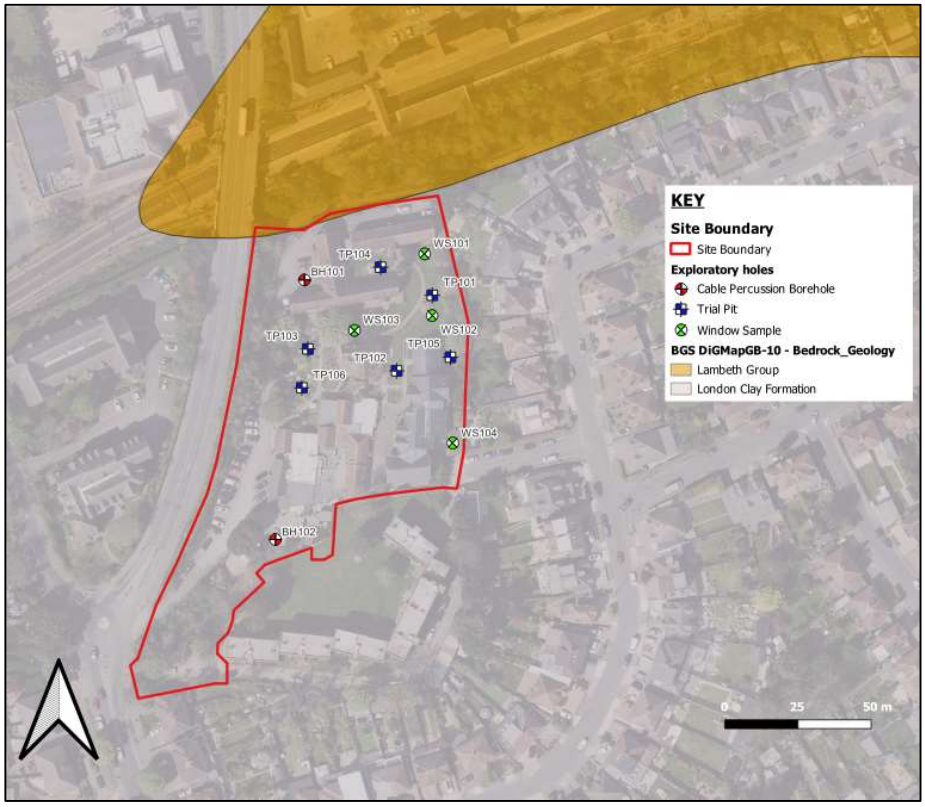
[1] BGS. (2026). *Infiltration SuDS Map: Detailed*. OPEN REPORT OR/16/009.
[2] BGS. (2026). *Infiltration SuDS Map: Summary*. OPEN REPORT OR/16/010.
[3] CGL. (January 2023). *The Barn Hotel, West End Road, Ruislip, HA4 6JB. Desk Study, Geotechnical and Geoenvironmental Interpretative Report*. Reference: CG/39435.

site to allow a detailed site-specific assessment. This technical note should be read alongside the CGL site investigation report.

3. Geological and Hydrogeological Setting

With reference to the published geological records, the site is underlain by the London Clay Formation over the Undivided Reading Formation (comprising the Upper and Lower Mottled Clays), with the Upnor Formation and the White Chalk Subgroup at depth. An extract of the British Geological Survey (BGS) 1:10,000 scale digital geological map is present as Plate 1.

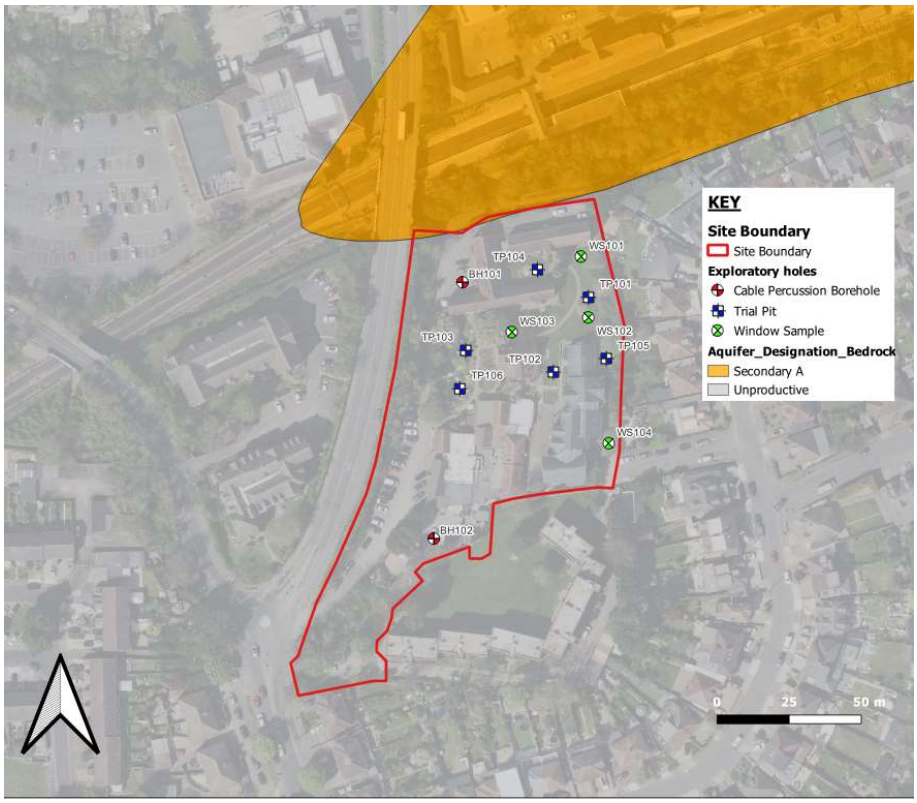
Plate 1. Extract of BGS 10k digital bedrock geology map (site boundary in red)



The London Clay Formation and Reading Formation (of the Lambeth Group) are typically stiff, overconsolidated clays. Whilst there is the potential for sand lenses within the clays or subordinate beds of sand in the Reading Formation, which based on the material grading alone would be more permeable than the clays, the beds/lenses are rarely laterally persistent owing to the depositional environment of the upper formations of Lambeth Group (sands tending to form in channels / depressions in the clay in a braded river setting). On this basis, groundwater within the Reading Formation tends to be confined.

The Environment Agency has designated the London Clay as an unproductive stratum. Whilst the underlying Lambeth Group is designated as a Secondary A aquifer, this is a broad designation as the Lambeth Group includes three distinct formations: the Reading Formation comprising mottled clays; the Woolwich Formation comprising shelly clays/sands; and the Upnor Formation comprising sands. The aquifer designations for the bedrock geology are shown in Plate 2. It is noted that the unproductive strata of the London Clay is anticipated across almost the entirety of the site

Plate 2. Extract of bedrock aquifer designation map (site boundary in red)



4. Ground and Groundwater Conditions (site specific)

The CGL site investigation included a desk study and ground investigation. The ground investigation included a combination of trial pits, windowless sampler boreholes and cable percussion boreholes. Groundwater monitoring installations were installed within the shallow soils in two WS boreholes (WS101 and WS103) and in the deeper soils in two CP boreholes (BH101 and BH102). Groundwater monitoring was completed in December 2022.

The ground conditions encountered at the site comprised a topsoil or hardstanding over a variable thickness of Made Ground between 0.25m and 1.3m thick). The shallow ground conditions differ somewhat from the anticipated geology, with superficial Head Deposits (locally absent) overlying the Reading Formation (Lambeth Group) with no London Clay encountered. The Head Deposits were between 1m and 1.5m thick and comprised soft to firm clay. The Reading Formation was encountered

at depths between 1.9m and 2.0m below ground level (bgl), was between 10m and 12m thick and comprised firm to stiff, becoming very stiff, mottled clay with subordinate beds of slightly clayey sand.

The Reading Formation was underlain by the Upnor Formation (Lambeth Group), comprising silt sand with subordinate beds of silt and clay. The Upnor Formation was between 6.2m and 7.5m thick and was underlain by chalk (of the White Chalk Subgroup) at 19.5m bgl.

Groundwater was at shallow depth (0.8m to 1m bgl) within the Head Deposits and under subartesian pressure in the Lambeth Group and Chalk.

The monitoring installation response in BH102 was between 9m and 13m bgl targeted on a subordinate sand bed within the Reading Formation; the resting groundwater depth was 6.1m bgl, corresponding to a hydrostatic head of 3m.

The monitoring installation response in BH101 was between 17m and 20m bgl within the Upnor Formation and Chalk; the resting groundwater depth was 7m bgl, corresponding to a hydrostatic head of 10m.

5. Infiltration SuDS Assessment

The objective is to assess the viability of filtration SuDS at the site based by addressing the following four questions:

- Question 1. Are there any constraints that mean infiltration SuDS should only be used if the potential for, and consequences of flooding and geohazards are known?
- Question 2. What is the drainage potential of the subsurface?
- Question 3. Are there any ground stability considerations?
- Question 4. Is the groundwater susceptible to deterioration in quality?

These questions are addressed in the following sections of this report.

5.1. Infiltration constraints

The following constraints are present at the site:

- Made Ground
- Shallow groundwater within the Head Deposits

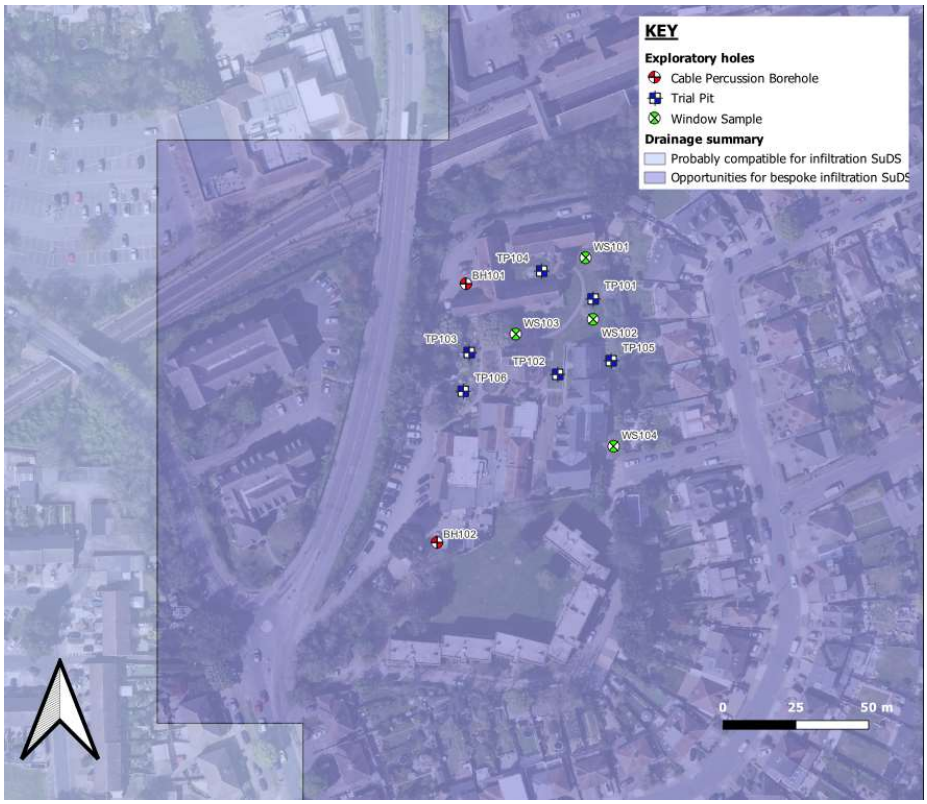
- Subartesian water pressure within the deeper aquifers (Lambeth Group and Chalk)

These constraints will significantly limit the potential for infiltration SuDS at the site.

5.2. Drainage potential

The BGS drainage potential dataset (Plate 3) indicates that there may be opportunities for bespoke infiltration SuDS at the site, depending on the properties of the subsurface that may influence the drainage potential.

Plate 3. Extract of BGS drainage summary (site boundary in red)



The subsurface conditions at the site are summarised in Section 3, with full details within the CGL site investigation report[3].

Although no superficial deposits are shown on the site on the geological maps for the area, Head Deposits were encountered. Head Deposits are formed by solifluction and are derived from superficial (if present) and bedrock deposits – in this case they are derived from the London Clay and Reading Formation. Whilst the soil structure of Head Deposits will differ from the deposits of which it is derived, the proportion of fine particles (silt and clay) will result in very low permeability.

The minimum and maximum permeability for the bedrock strata are shown in Plate 4 and Plate 5, respectively.

Plate 4. Extract of BGS minimum bedrock permeability (site boundary in red)

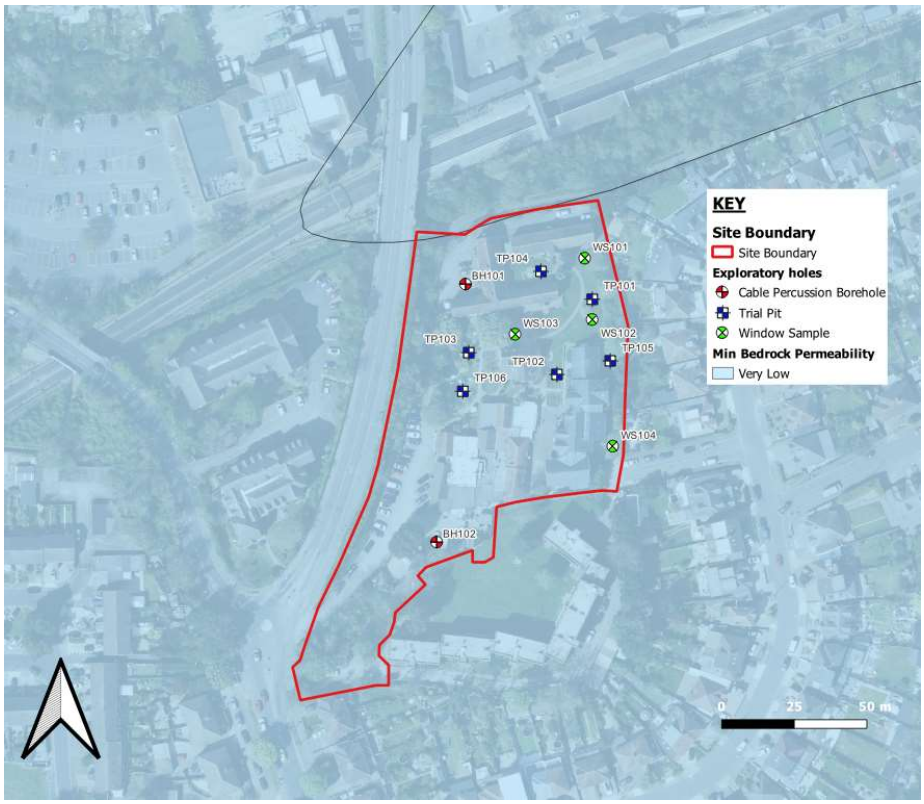
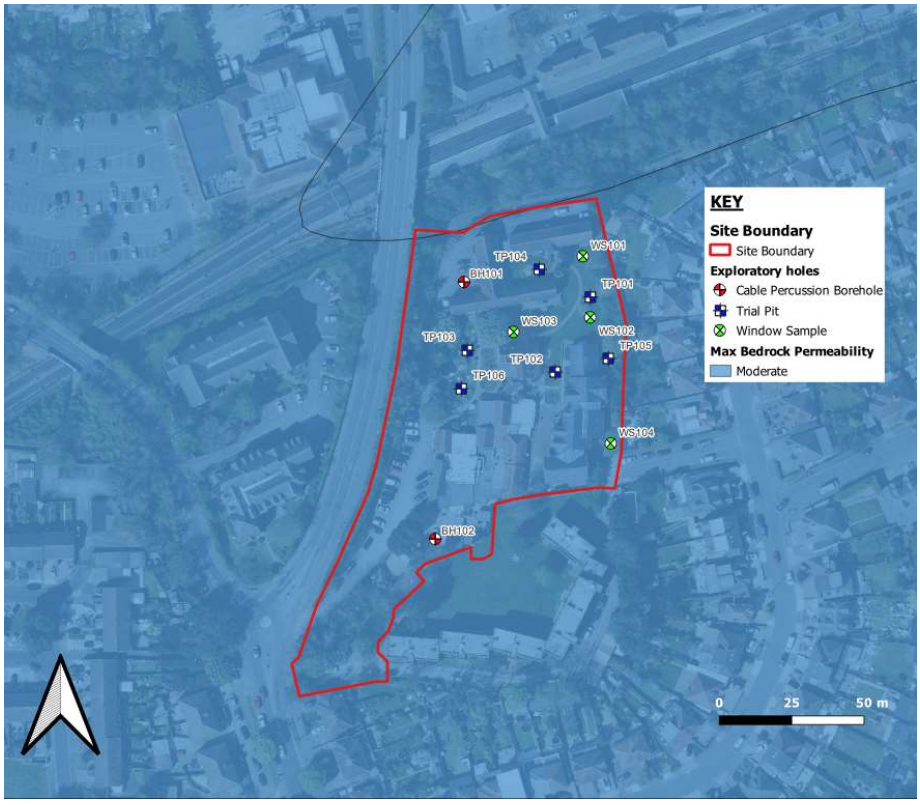
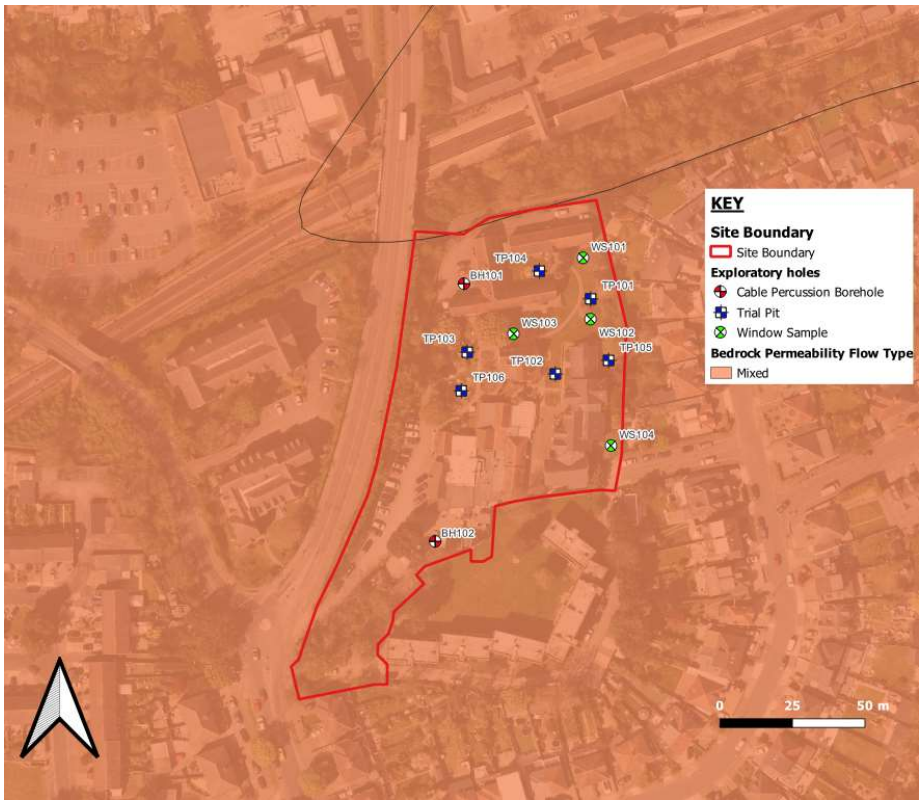


Plate 5. Extract of BGS maximum bedrock permeability (site boundary in red)



The BGS indicate that the permeability of the strata is moderate to very low. The flow type for the bedrock strata is shown on Plate 6 and indicates mixed flow type.

Plate 6. Extract of BGS bedrock permeability flow type (site boundary in red)



The plots above assume that London Clay is beneath the site, with the Lambeth Group outcropping to the north of the site and underlying the London Clay. However, the London Clay was absent at the site, with the Made Ground or Head Deposits directly overlying the Reading Formation of the Lambeth Group.

The Reading Formation at the site is a firm to stiff, becoming stiff, silt clay. No significant lenses of sand or subordinate beds of sand were recorded shallower than 9.7m bgl (BH101) and 10.5m (BH102) in the Reading Formation. Such intact clays are practically impermeable, with k <1x10^{-9} m/s[4]. Groundwater 'flow' within these deposits is limited to fractures/fissures. Based on the site-specific data, the BGS plots above are an overestimation of the permeability of the bedrock strata. On this basis, infiltration SuDS in the clays of the Reading Formation are not feasible.

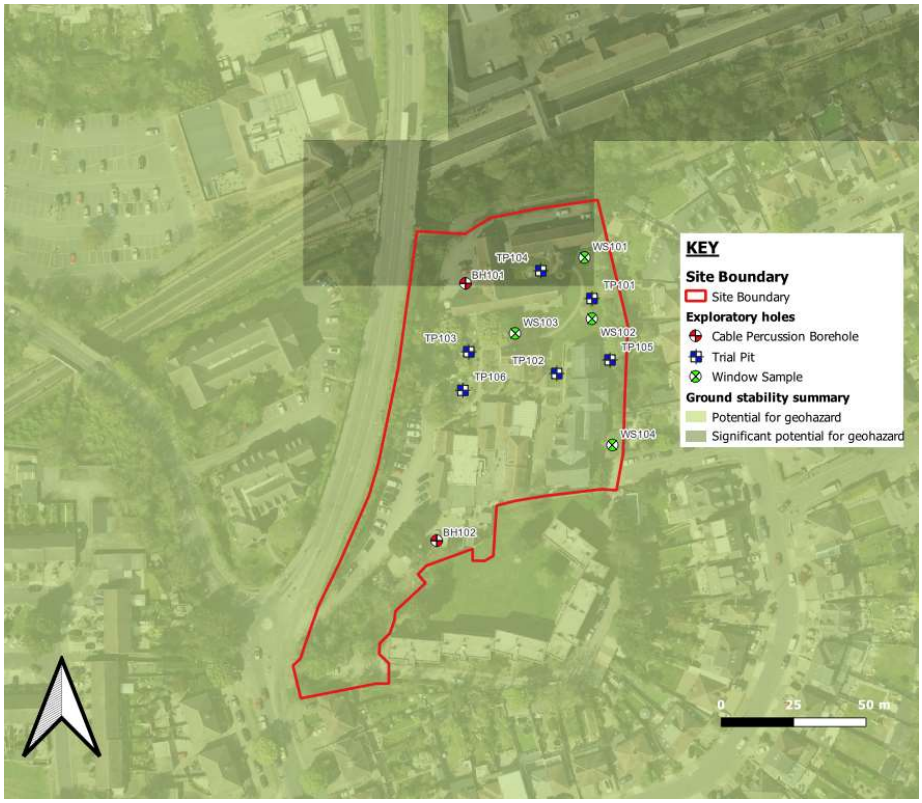
Where subordinate beds of sand where present, they were saturated, with groundwater confined and under subartesian pressure. For this reason, whilst these deposits are more permeable, infiltration SuDS in the sands of the Lambeth Group are not feasible.

[4] CIRIA. (2000). *Groundwater control – design and practice*. CIRIA C515.

5.3. Ground stability

Based on the BGS dataset (see Plate 7), there is potential for geohazards at the site associated with the London Clay (albeit this was absent in the ground investigation) and a significant potential for geohazards associated with the Lambeth Group (which was the shallowest bedrock deposits encountered during the ground investigation). With reference to the Groundsure report (included as Appendix D over the CGL site investigation report[3]), the geohazards include a moderate hazard due to shrink swell clays of the Lambeth Group.

Plate 7. Extract of BGS ground stability summary (site boundary in red)

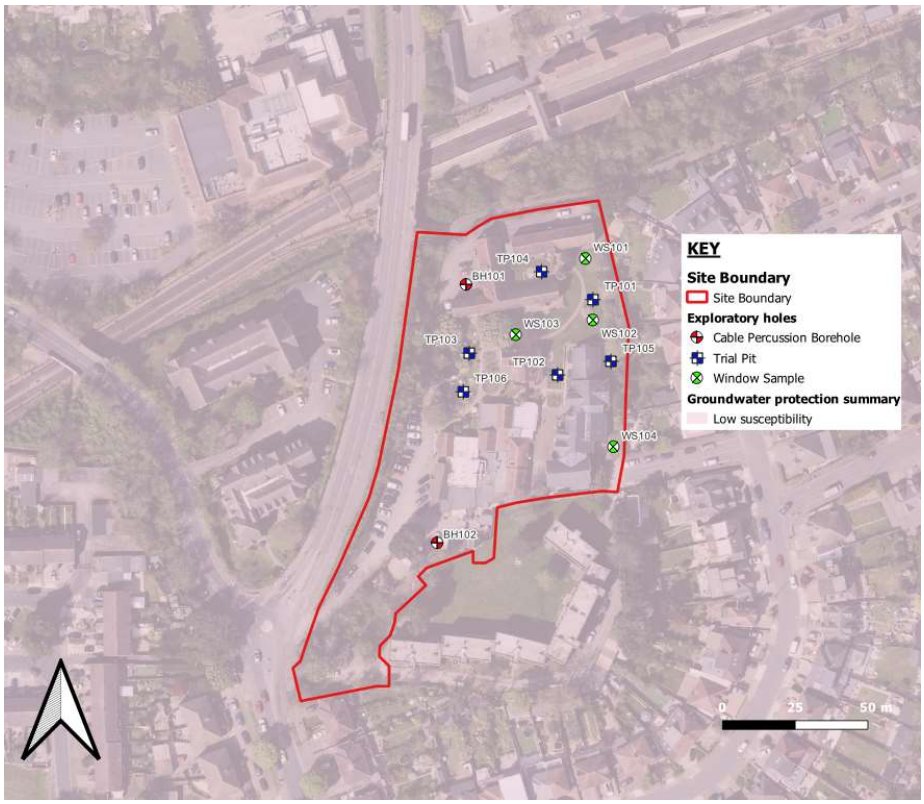


Infiltration SuDS within the clays of the Head Deposits and Lambeth Group would therefore have the potential to result in ground movements due to swelling.

5.4. Groundwater protection

The BGS dataset for groundwater protection (see Plate 8) indicates a low susceptibility.

Plate 8. Extract of BGS groundwater protection summary (site boundary in red)



Notwithstanding this, Made Ground is present at the site, which is generally not considered to be an appropriate medium for infiltration SuDS.

6. Conclusions

Based on the available datasets and site-specific ground investigation, infiltration SuDS are not feasible at the site due to the ground and groundwater conditions present. On the basis that there is no reasonable prospect of identifying conditions appropriate for infiltration SuDS at the site, no further investigation, testing or assessment is recommended.