

We Are Symmetry



Drainage Design Validation Report

Downlands Park
Bolnore Farm Lane
Haywards Heath
RH16 4BQ

21279-SYM-XX-XX-RP-C-0100



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Revision History

Revision	Description	Date	By	Checked
A	First Issue	31/10/2024	CE	AH
B	Amendment following on-site infiltration test at location of proposed basin	13/02/2025	CE	AH

1.0 Executive Summary

- 1.1 This report outlines an updated surface water drainage strategy for the Downlands Park site, reflecting recent findings from extensive ground investigations, and in an attempt to progress a drainage strategy that does not rely on the use of deep bore soakaways due to their ineffectiveness as surface water discharge methods in other local developments.
- 1.2 This report references the previous and current planning references DM/20/4159 and DM/23/3195 respectively.
- 1.3 Due to low infiltration rates observed across most of the site, the initial site-wide infiltration design has been revised. A sand band identified running from north to south/southeast offers improved infiltration conditions, prompting the replacement of multiple site-wide infiltration structures with a single, strategically positioned infiltration basin in the southern area of the site.
- 1.4 Evidence from neighbouring developments, which successfully use infiltration within similar shallow sand bands, supports the feasibility of the proposed strategy for Downlands Park.
- 1.5 Initial infiltration testing has provided foundational data; however, additional tests will be conducted to confirm infiltration rates and ensure full compliance.
- 1.6 This report provides technical justification for the proposed drainage strategy and outlines next steps to confirm the viability of the infiltration basin within the current design.

Addendum to report following on-site infiltration testing at location of proposed basin – 13.02.2025

- 1.7 Further on-site testing was carried out to confirm suitability of the proposed basin. Infiltration test results concluded that the soil within the location of the proposed basin was suitable for infiltration.
- 1.8 Infiltration rate obtained during on-site testing confirms the soil is of good infiltration media, consisting of silty slightly clayey SAND to silty clayey SAND as described ISO 14688-1 (after Blake 2010), as stated within CIRIA 753 The SuDS Manual, Table 25.1. Refer to Appendix F for the on-site test report and site photos containing pit and arisings.
- 1.9 Additional testing therefore satisfies the requirement to obtain evidence to support the suitability of the soil to infiltrate at the location of the proposed basin.

2.0 Introduction

- 2.1 This report evaluates the feasibility of a revised surface water drainage strategy based on updated site investigation data. The original approach, utilising distributed infiltration structures, proved infeasible due to poor infiltration rates across much of the site. Revised plans now focus on a targeted, localised infiltration basin over a sand-rich area in the north, which offers better infiltration rates.
- 2.2 The purpose of this report is to present a viable surface water management solution that aligns with the planning condition, demonstrating that infiltration can be achieved effectively without resorting to deep bore soakaways. This solution is consistent with findings from nearby sites and provides a more reliable, sustainable approach based on current ground conditions.
- 2.3 Original scheme submitted for planning proposed use of several infiltration structures around the site.
- 2.4 Further site and ground investigation surveys have revealed that infiltration is not feasible in many of the suggested locations.
- 2.5 On-site trial pits and infiltration testing suggests an area of sand that bands through the site, from north to south towards the east. This is further supported by the new development to the north which discharges surface water via infiltration structures, again towards the east.
- 2.6 Therefore, the below ground surface water drainage strategy has changed to suit the now known ground conditions.
- 2.7 This has resulted in utilising the probable sand band that runs through the site, by moving from site wide infiltration to a localised infiltration approach using an infiltration basin.

3.0 Site Investigation Findings

- 3.1 This section summarises the findings of multiple site investigations, which revealed variable ground conditions affecting infiltration capacity. Three site investigations were conducted in 2016, 2022, and 2024, each contributing data to help establish the surface water drainage strategy.

3.2 Southern Testing – Borehole and Soakage Report – January 2016

- 3.2.1 Southern Testing carried out on-site testing and issued the findings within the Borehole and Soakage Report for Downlands Park, Haywards Heath, West Sussex report ref J12448.
- 3.2.2 Refer to Appendix A for the full report.

Site investigation included:
 - 4no. boreholes drilled to 10m (BH1-BH4).
 - 5no trial pit soakage tests (TP201-TP205).
 - Additional trial pit (TP206).
- 3.2.3 It should be noted that the report was not a fully comprehensive investigation report and was to an engineering design document. However, it does give details of soil conditions and infiltration rates within the site.
- 3.2.4 Summary of soils encountered from exploratory holes can be seen within Table 1.

Table 1: Summary of Soils – Southern Testing

Depth (m)	Soil Type	Description
GL – 0.2/0.5	TOPSOIL/ MADE GROUND	Brown, silty/sandy CLAY, with occasional flint gravel and brick fragments.
2.0 – 10.5	VARIABLE	Firm to stiff, orange/yellow brown, silty/sandy CLAY, with variable bands/fragments of weak siltstone, sandstone and mudstone.

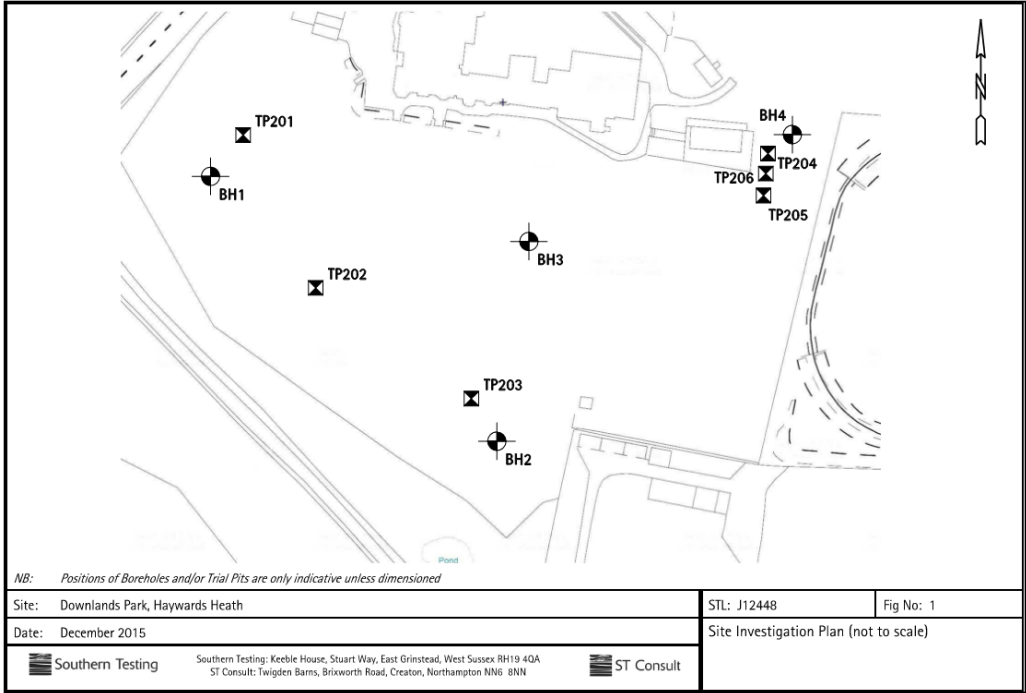
- 3.2.5 Summary of the 5no. soakage test results can be seen in Table 2 below. Note that BRE Digest 365 was followed for testing purposes.

Table 2: Summary of Infiltration Tests – Southern Testing

TP Ref	Depth (m)	f (l/m ² /min)	BRE Units (m/sec)	Comments
TP201	3	0	N/A	No water level fall in 240 mins
TP202	3	0.005	7.6x10 ⁻⁶	Water level fell only 0.02m in 240 min
TP203	3	N/A	N/A	Water level rose 0.01m over the course of the test due to near surface seepages
TP204	2	0.04	6.9x10 ⁻⁷	Water level fell only 0.08m in 240 mins
TP205	2.5	0.02	2.8x10 ⁻⁷	Water level fell only 0.09m in 240 mins

- 3.2.6 Table 2 indicates poor infiltration rates encountered at the test depths.
- 3.2.7 Figure 1 below shows the locations of the BHs and TPs in relation to the site.

Figure 1: Site Investigation Plan – Southern Testing



Source: Southern Testing, Borehole and Soakage Report, J12448

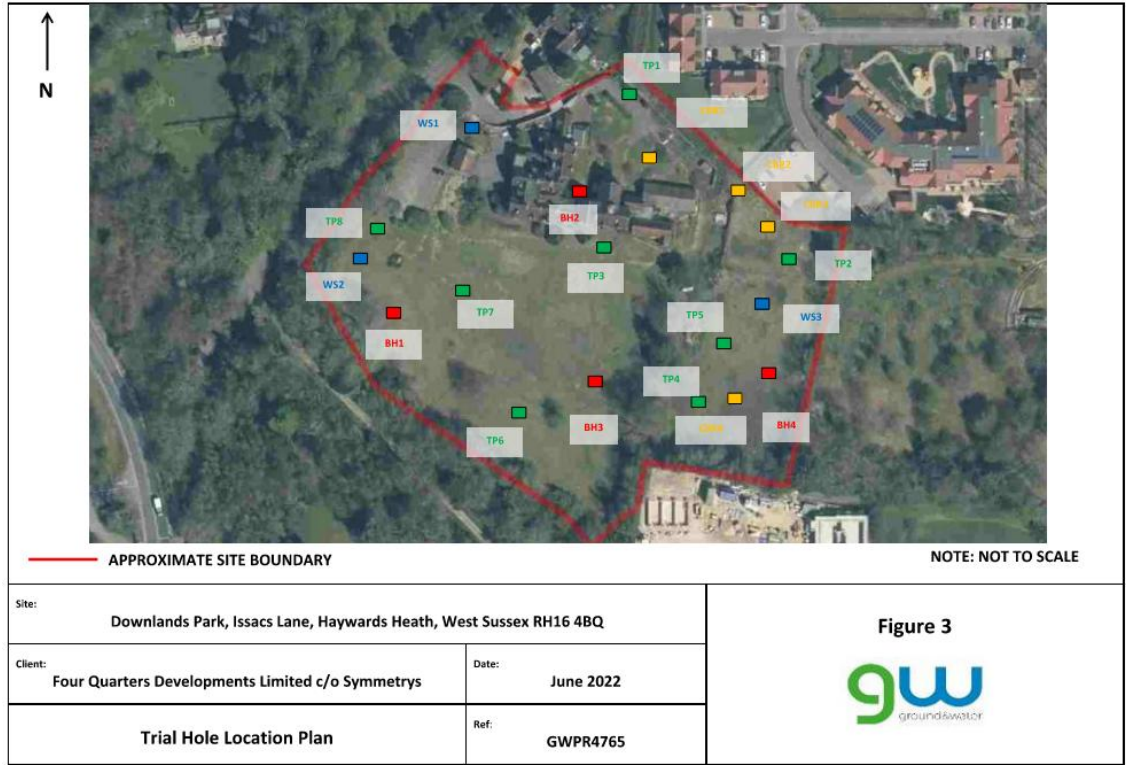
- 3.2.8 It's understood the indicated locations of the TPs and BHs are indicative only, however it's assumed they're accurate within a certain tolerance and therefore sufficient for the purpose of this report.
- 3.2.9 The sand band is estimated to be between BH3 and TP206, travelling north to south.
- 3.2.10 The current location of the proposed basin is within the area of BH2 and TP203. BH2 indicates clay to a depth of 2.8m where the strata changes to sandstone from 2.8m to 3.6m. Clay is encountered again at 3.6m to 4.5m, with sandstone found at 5.4m to 6.8m.
- 3.2.11 TP203 soakage test result was deemed N/A due to water level rising during test. From review of BH2, it's envisaged that the clay layer at 3.6m BGL was resulting in perched ground water and thus the soakage test at 3m BGL failed.
- 3.3 Ground&Water – Phase II Site Investigation Report – June 2022
- 3.3.1 Ground&Water carried out on-site testing and issued the findings within the Phase II Site Investigation Report, June 2022, report ref GWPR4765/SIR/June 2022.
- 3.3.2 Refer to Appendix B for the full report.
- 3.3.3 Site investigation included (From Phase I, II and III):
 - 4no. boreholes drilled to a depth between 15m (BH1, BH2 and BH4) and 25m (BH3).
 - 3no. windowless sampler to a depth between 1.5m and 3.0m (WS1 – WS3).
 - 7no trial pits to a depth between 1.35m and 2.3m (TP1 – TP7).
- 3.3.4 Summary of soils encountered from exploratory holes can be seen within Table 3.

Table 3: Summary of Soils – Ground&Water

Depth (m)	Soil Type	Description
0.2 – 0.45	TOPSOIL (BH1 – BH4, WS2 – WS3, TP1 – TP8)	Pale brown slightly gravelly fine SAND to brown sandy CLAY. The gravel was sub-angular to sub-rounded, fine to medium sandstone.
0.3 – 0.7	MADE GROUND (WS1, TP2)	Brown gravelly clayey fine to medium SAND to sandy CLAY. The gravel was sub-angular to sub-rounded, fine to coarse sandstone, flint and brick.
0.2 – 0.95	MADE GROUND (TP6 only)	Brown clayey GRAVEL. The gravel was sub-angular, fine to coarse brick and concrete.
0.2/0.95 – 1.2/4.6	UPPER TUNBRIDGE WELLS SAND FORMATION	Variable deposits ranging from a pale grey and orange brown mottled silty CLAY with pockets of orange silt to orange slightly gravelly to gravelly SAND. The sand was fine to medium and the gravel sub-angular, fine to medium flint. brown to grey slightly gravelly CLAY. Gravel is sub-angular to sub-rounded, fine to medium flint.
3.5/4.1 – 15/25	UPPER TUNBRIDGE WELLS SAND FORMATION (BH1 – BH4 only)	Interbedded pale grey and pale orange SANDSTONE, SILTSTONE and occasional dark grey MUDSTONE

- 3.3.10 Note that soakage tests were beyond the scope of this investigation.
- 3.3.11 Groundwater was not encountered in the boreholes and trial pits.
- 3.3.12 Figure 2 below shows the locations of the exploratory holes referenced.

Figure 2: Site Investigation Plan – Ground&Water



Source: Ground&Water, Phase II Site Investigation Report, GWPR4765/SIR/June 2022

3.3.13 The sand band is estimated along the length of TP4 and TP5. Results from the exploratory hole indicate shallow sand within these areas, further supporting the theory.

3.4 LMB Geosolutions Ltd – Soakage Tests – August 2024

3.4.1 LMB Geosolutions Ltd carried out on-site testing and issued the findings within the Infiltration Soakaway Testing Report, August 2024, report ref LMB_24.08.20_PILLET_Downlands Park_Soakaways_v1.0_ALL.

3.4.2 Refer to Appendix C for the full report.

3.4.3 Site investigation included:

- 8no. trial pits to a depth between 2.1 and 2.5m (BH1, BH2 and BH4) and 25m (BH3).

3.4.4 Summary of soils encountered from exploratory holes can be seen within Table 4.

Table 4: Summary of Soils – LMB Geosolutions

Depth (m)	Soil Type	Description
GL – 0.2	TOPSOIL	Typically found to comprise dark brown clayey sand with occasional rootlets
GL- 0.55	MADE GROUND	Comprises light to dark brownish grey slightly clayey gravelly Sand. Gravel brick and concrete
0.8 – 3.2	UPPER TUNBRIDGE WELLS SAND	Typically found to comprise firm becoming stiff orangish brown mottled light grey locally sandy Clay. In locations SW1, SW6, SW7 and SW8 overlies strata typically recovered as Siltstone gravel and cobbles.

3.4.5 Note that no groundwater was encountered during the trial pit excavations.

3.4.6 Summary of the 5no. soakage test results can be seen in Table 5 below. Note that BRE Digest 365 was followed for testing purposes.

Table 5: Summary of Infiltration Tests – LMB Geosolutions

TP Ref	Depth (m)	BRE Units (m/sec)	Lithology of Test Section
SW1	2.1	8.04x10 ⁻⁶	Upper Tunbridge Wells Sand
SW2	2.5	3.01x10 ⁻⁷	
SW3	2.5	3.62x10 ⁻⁶	
SW4	2.5	1.5x10 ⁻⁶	
SW5	2.5	5.57x10 ⁻⁷	
SW6	2.5	7.16x10 ⁻⁶	
SW7	2.1	1.15x10 ⁻⁵	
SW8	2.5	3.49x10 ⁻⁵	

3.4.7 It's noted within the report that the infiltration rates have been derived using the available data but this is not in accordance with the BRE 365 approach and it is recommended that this data should not be applied for drainage design for traditional soakaways.

3.4.8 It's therefore understood that further infiltration tests are required to ensure compliance with BRE Digest 365.

3.4.9 Figure 3 below shows the locations of the exploratory holes referenced.

Figure 3: Site Investigation Plan – LMB Geosolutions



Source: LMB Geosolutions, Soakage Tests, LMB_24.08.20_PILLET_Downlands Park_Soakaways_v1.0_ALL

3.4.10 Review of results indicates that SW7 has the most suitable infiltration rate at 1.15x10⁻⁵. Note that the majority of these tests were carried out within the sandstone strata.

3.5 Addendum – VE Build Ltd – Infiltration Test – February 2025

3.5.1 VE Build Ltd carried out an infiltration test at the location of the proposed basin on 7th February 2025. Document ref VE_07.02.2025_FILTEST_DP.

3.5.2 For the full report please refer to Appendix F.

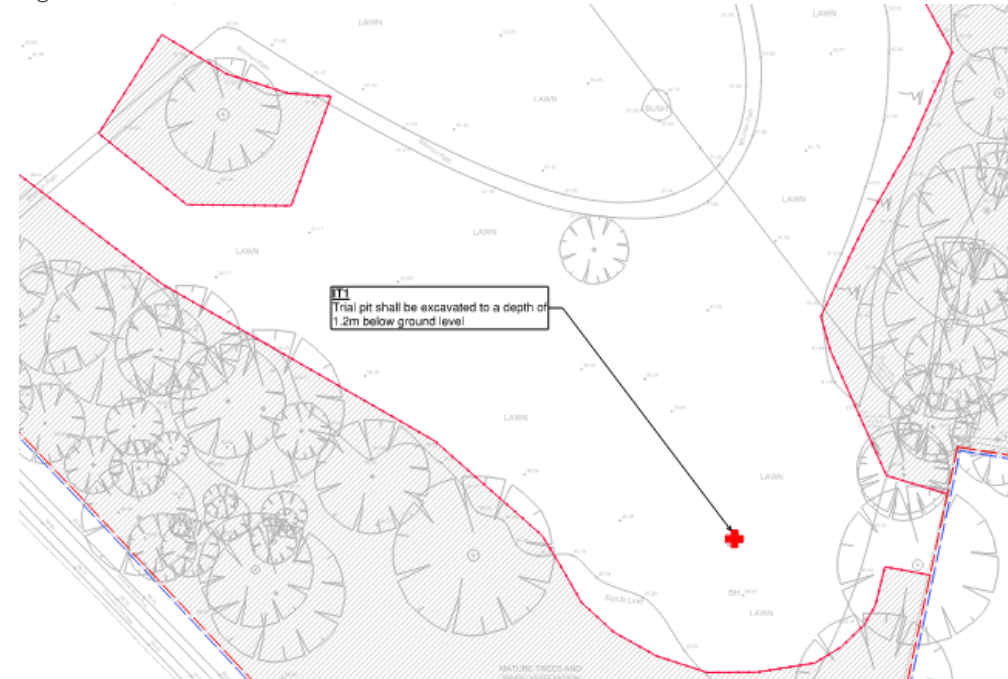
3.5.3 Summary of the 5no. soakage test results can be seen in Table 6 below. Note that BRE Digest 365 was followed for testing purposes.

Table 6: Summary of Infiltration Test – VE Build Ltd

TP Ref	Depth (m)	BRE Units (m/sec)	Lithology of Test Section
IT1	1.2	1.03x10 ⁻⁵	Upper Tunbridge Wells Sand

3.5.4 Results indicate that the infiltration rate typically equates to good infiltration media, within the ISO 14688-1 description (after Blake, 2010) of silty slightly clayey SAND to silty clayey SAND. This is further supported by the visual arisings of the trial pit, found within Appendix F.

Figure 4: Infiltration Test Location Plan – VE Build Ltd



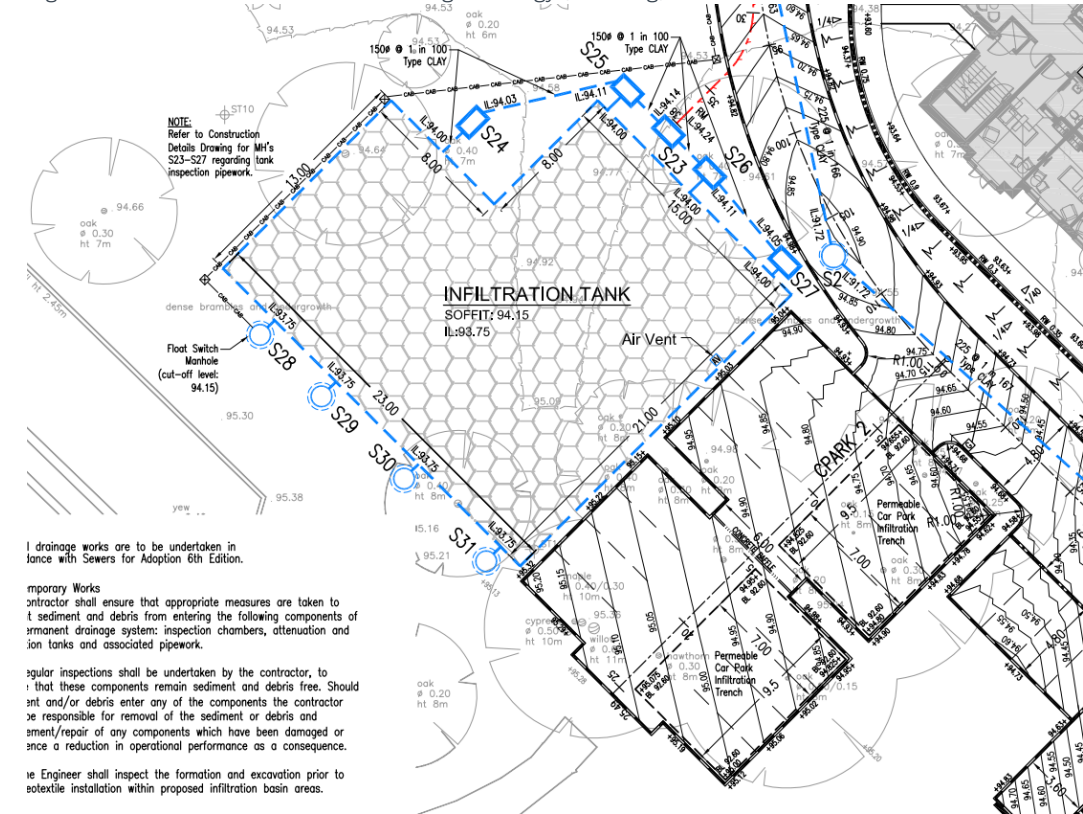
Source: VE Build Ltd, VE_07.02.2025_FILTEST_DP

- 3.5.5 From review of the infiltration test carried out within the footprint of the proposed basin and the resultant infiltration rate, it can be established that the soil is suitable for infiltration.

4.0 Supporting Evidence from Adjacent Development

- 4.1 Adjacent developments to the north, including Anchor and Goldbridge Care Home, successfully discharge surface water via infiltration into the same sand band identified on this site. Observations indicate the absence of drainage issues in the neighbouring development, which has operated effectively within the sand band.
- 4.2 The adjacent site uses a shallow infiltration structure situated at approximately 1m below ground level, designed to receive pumped water from an attenuation structure. This setup suggests that similar site conditions can support shallow infiltration structures, reinforcing the viability of a sand band-based drainage solution for this site.
- 4.3 The infiltration structure is immediately adjacent the boundary extents to the north of the proposed site, as highlighted within this report. For ease, the infiltration structure is immediately adjacent CBR test locations CBR2 and CBR3 as shown in Figure 2.
- 4.4 Given the success of the infiltration system in the neighbouring development, there is a reasonable expectation that a similar system at the proposed site, targeting the sand band, will also perform well. This further justifies the shift from deep to shallow soakaways.
- 4.5 Figure 5 below illustrates the location of the infiltration structure at the neighbouring site to the north.

Figure 5: North Site Surface Water Drainage Strategy (Planning)



Source: Planning Portal, midsussex.gov.uk

5.0 Estimated Sand Band

5.1 Addendum 13.02.2025

5.2 Figure 6 has been updated to show the extension of the likely sand band, following further on-site tests, more specifically in the location of the proposed basin.

5.3 Figure 6 provides an estimated outline of a sand band within both the site and the neighbouring site to the north, based on the observed sand strata from on-site exploratory hole results.

5.4 The top layer of sandy soil was largely excluded due to its minimal depth (generally less than 500mm from ground level).

5.5 Addendum 13.02.2025

5.6 Figure 6 has been updated to show the extension of the likely sand band, following further on-site tests, more specifically in the location of the proposed basin.

5.7 Figure 6 is intended as an indicative visualisation, offering an approximation of the sand band's extent.

5.8 The band is likely more extensive than illustrated, as its depiction relies on a limited number of tests; additional testing would enhance data accuracy and allow for a more precise extrapolation.

Addendum 13.02.2025

5.9 Figure 6 has been updated to show the extension of the likely sand band, following further on-site tests, more specifically in the location of the proposed basin.

Figure 6: Estimated Sand Band



Source: Google Maps, Symmetrys Markup (2025)

6.0 Proposed Basin and Site Discharge

6.1 The proposed location of the infiltration basin aligns with the natural slope of the site, positioned at a lower elevation in the southern portion. This positioning allows the basin to make use of the natural topography to facilitate gravity-fed drainage.

6.2 Earlier design proposals also placed an attenuation basin in the southern area. However, this basin has since been adapted to incorporate infiltration, capitalising on favourable soil conditions that support infiltration discharge within this zone.

6.3 Refer to Appendix D for the current surface water drainage strategy.

6.4 It should also be noted that infiltration tests were carried out in the sandstone strata. Therefore, it's expected that infiltration rates will be significantly better when carried out within the sand band.

6.5 The current design demonstrates that, even with the sandstone's low infiltration rate, the proposed attenuation basin is capable of containing runoff from a 1-in-100-year storm event, inclusive of climate change allowances.

6.6 Section 4.0 details the neighbouring site's discharge strategy. Given similar ground conditions, the solution outlined in this report may need to adopt a comparable approach.

Addendum 13.02.2025

- 6.7 Further on-site infiltration testing confirmed, at the location of the proposed basin, the suitability of the soil for infiltration. On-site excavation and the arisings further support the identification of sandy soil, for the full on-site test report refer to Appendix F.

It's therefore envisaged that the findings of the infiltration testing carried out in February 2025 satisfy requirement of additional testing to confirm soil suitability to infiltration, within the location of the proposed basin.

7.0 Foul Drainage

- 7.1.1 Foul water drainage strategy has been developed in accordance with local planning policy requirements, UK Government Planning Practice Guidance, Sewer Sector Guidance Design and Construction Guidance, Building Regulations, BS EN 752 and other relevant design standards and best practice guidance.
- 7.1.2 The foul water flow rates are calculated as per the current proposed design, therefore are subject to change with design updates.
- 7.1.3 The proposed foul water strategy is to utilise the existing below ground drainage network, where a proposed connection shall be made to the south east of the site, ref MH10 of the CCTV survey.
- 7.1.4 Therefore, the total proposed flow rate is 11.7 l/s for the site.
- 7.1.5 Foul water drainage strategy can be found within Appendix E.
- 7.2 For the purposes of this report, it is assumed that the drainage within the site shall be maintained by the riparian owner.

Appendix A

Southern Testing GI

Report

Appendix B

Ground & Water

GI Report

Appendix C

LMB Geosolutions

GI Report

Appendix D

Surface Water

Strategy

Appendix E

Foul Water Strategy

Appendix F

VE Build Ltd

Infiltration Test

Report

**TO DISCUSS YOUR PROJECT WITH US
PLEASE GET IN TOUCH ON 020 8340 4041
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