



IN SITU INFILTRATION TEST REPORT

**SOUTHWICK NURSERY
15 ROMAN WAY
SOUTHWICK
WEST SUSSEX**

PROJECT REFERENCE: P17510

REPORT REFERENCE: R17003

Report Beneficiary: Darren Tanner

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1. INTRODUCTION

Ashdown Site Investigation Ltd was requested to undertake in situ infiltration testing at the site of Southwick Nursery, 15 Roman Way, Southwick, West Sussex to assist others in undertaking drainage design for the proposed development.

The scope of the works covered by this report, and the terms and conditions under which they were undertaken, were set out within the offer letter Q15853, dated 24th October 2025. The instruction to proceed was received on behalf of the client.

The specific objectives of the works were to:

- a) Establish the expected geology and hydrogeology at the site;
- b) Investigate the shallow ground and groundwater conditions in the area of the proposed development; and
- c) Undertaken in situ infiltration testing and provide calculated soil infiltration rates to assist with the preliminary design of the stormwater drainage system.

A Combined Preliminary and Quantitative Ground Contamination Risk Assessment Report will also be prepared for the site by Ashdown Site Investigation Ltd and issued under separate cover¹.

¹ Ashdown Site Investigation Ltd Project Ref: P17510, Report Ref: R17013.

2. SITE CONTEXT

2.1 Site Location

The site is located at the former Southwick Nursery, 15 Roman Way, Southwick, West Sussex, and is centred on the approximate Ordnance Survey national grid reference 524335, 105786. A site location plan and site plan are presented as Figure 1 and Figure 2, respectively.

2.2 Geological and Hydrogeological Setting

The following provides a brief summary of the geological and hydrogeological settings beneath the site. Further details will be provided with the preliminary ground contamination risk assessment report to be issued separately.

2.2.1 Expected Geology and Aquifer Designation

The stratigraphic succession that may be expected to underlie the site has been established by reference to British Geological Survey (BGS) mapping and the BGS Lexicon of Named Rock Units. The expected stratigraphy is presented in the following table.

Table 1. Expected Strata and Aquifer Designation

Type	Stratum	Aquifer Designation
Superficial	Head	Secondary Undifferentiated Aquifer
Bedrock	White Chalk Subgroup	Principal Aquifer

The superficial Head is a polymict deposit generally comprising clay and sandy clay with variable amounts of gravel and cobbles. The lithology of the Head reflects the nature of the parent solid strata; the gravel and cobble fraction comprising chalk and flint. The material is likely to have been disturbed by intense frost action in a periglacial environment. It is usually poorly sorted but may be stratified where it has been subject to solifluction and/or hillwash and soil creep. It may form infill to solution features within the chalk.

The White Chalk Subgroup comprises chalk with flints. The Subgroup contains discrete marl seams, nodular chalk and flint seams throughout. The formation is of Maastrichtian to Cenomanian age (66 to 100.5 million years old; Late Cretaceous). The subgroup is recorded by the BGS to range in thickness up to 470 to 515m in the Hampshire/Sussex Area.

2.2.2 Natural Ground Subsidence

The chalk can be expected to have a deeply convoluted upper surface as a result of solution weathering and erosion. The presence of natural cavities in the chalk is very rare and solution features, if present, can be expected to be infilled with Quaternary Superficial Deposits. The infill material may be significantly weaker than the surrounding chalk. Solution features can comprise pipes extending to several metres deep into the chalk or conical depressions and basin shaped structures.

The British Geological Survey data indicates the site is in an area with a very low hazard rating for ground dissolution of soluble rocks.

2.2.3 *Groundwater Source Protection Zones (SPZ)*

The Environment Agency defines SPZs as those areas where groundwater supplies are at risk from potentially polluting activities and accidental releases of pollutants. SPZs are primarily a policy tool used to control activities close to water supplies intended for human consumption.

The site does not lie within a SPZ.

3. SITE WORKS

The intrusive site works comprised the drilling of a series of dynamic sampler boreholes. Boreholes WS01 and WS05 were drilled to a depth of 3.00m to enable in situ infiltration testing to be carried out. The remaining exploratory holes were limited to a depth of 1.00m and had been undertaken for the purposes assessing potential ground contamination; the information relating to these shallow boreholes has not been included within this report.

The intrusive work was carried out on the 27th November 2025. The exploratory hole locations which were drilled to assist the drainage design are shown on Figure 2.

Variable (falling) head testing was undertaken in both boreholes; the methodology in general accordance with BS EN ISO 22282-2:2012².

Descriptions of the strata encountered and comments on groundwater conditions are shown in the exploratory hole records which are appended to this report along with explanatory notes to assist in their interpretation. The results of the infiltration testing along with the infiltration rate calculations are also included in the appendices.

² Geotechnical investigation and testing – Geohydraulic testing. Part 2: Water permeability tests in a borehole using open systems.

4. GROUND CONDITIONS

4.1 Stratigraphy

4.1.1 *Surface Covering*

Boreholes WS01 and WS05 were excavated through a surface cover of concrete some 190mm and 210mm in thickness, respectively.

4.1.2 *Made Ground*

Made ground, generally comprising clay with variable gravel and silt content, was recorded immediately beneath the concrete surfacing at both positions, extending to respective depths of 0.80m and 1.00m below ground level. The gravel fraction comprised variable quantities of flint, brick, chalk, crystalline rock and charcoal-like material.

4.1.3 *Head*

Underlying the made ground, the investigation progressed into undisturbed slightly gravelly to gravelly silty clays, with localised clayey gravel and sand horizons. These soils continued to the full depths of the boreholes at 3.00m below ground level and are considered to represent the Head indicated to underlie the site on BGS geological maps.

4.2 Groundwater Conditions and Stability

Whilst borehole WS01 remained stable, borehole WS05 was recorded to be unstable within the sand deposits below 2.85m depth. No groundwater seepages occurred during the course of drilling of either borehole, although the soils were noted as wet in borehole WS01 below a depth of 2.00m below ground level.

It should be noted that water levels within the exploratory holes may not have equilibrated with the groundwater table at the time the readings were recorded and that groundwater levels should be expected to fluctuate seasonally.

5. STORMWATER INFILTRATION SYSTEMS

Variable (falling) head testing³ was undertaken in both boreholes. From the test results, calculations were made to estimate the infiltration rate that could be expected for soakaways constructed to discharge into the underlying soils within the test zone.

For each test carried out in both boreholes, some 25 litres of water was introduced into the borehole, but the water level could not be raised significantly. Therefore, the soil infiltration rates have been calculated by dividing the volume of water introduced into the borehole by either the length of the test section below the casing (WS01) or 50% of the surface area of the full borehole (WS05) and the test duration in seconds.

The infiltration rates derived from the tests are summarised in the following table.

Table 2. Calculated Infiltration Rates

Exploratory Hole	Assumed Length of Test Section/ Drained Area (m)	Bottom of Response Zone (m bgl)	Stratum	Infiltration Rate (f) (m/sec)
WS01 Test 1	1.00	3.00	Head	2.00×10^{-3}
WS01 Test 2	1.00	3.00	Head	1.96×10^{-3}
WS01 Test 3	1.00	3.00	Head	1.72×10^{-3}
WS05 Test 1	1.50	3.00	Head	9.18×10^{-4}
WS05 Test 2	1.50	3.00	Head	8.64×10^{-4}
WS05 Test 3	1.50	3.00	Head	8.77×10^{-4}

The value 'f' is equivalent to the soil infiltration coefficient 'q' quoted in the Construction Industry Research and Information Association (CIRIA) Report 156.

The results from the infiltration tests should be provided to engineers responsible for the design of the drainage system.

To comply with building regulations⁴, point discharging infiltration systems (conventional ring or trench soakaways) are required to be constructed a minimum of 5.0m away from proposed or existing buildings.

The infiltration testing conducted in the boreholes is intended to provide calculated soil infiltration rates to assist in the preliminary design of infiltration systems at the site. However, it should be noted that Regulators/Local Authorities may require further testing to be undertaken at a later stage in accordance with the BRE365 guidance. This guidance states the testing should be carried out at the locations and depths of the proposed soakaways, which will not be known until preliminary drainage design has been undertaken. The guidance also states that "designers should note that the results of tests may be affected by seasonal factors. In the winter and spring, the soil moisture and groundwater level will be higher than in the summer. Testing under a worst-case basis should be undertaken"; often local authorities may insist that soakage testing to support detailed design of the drainage system is undertaken within defined periods of the year which can vary from authority to authority.

³ Conducted in general accordance with the test procedure outline in BS EN ISO 22282-2:2012.

⁴ The Building Regulations 2010; Part H; Drainage and Waste Disposal

Monitoring of groundwater levels during the worst annual case (winter period) is often a requirement of Local Authorities and the BRE365 guidance suggests this should be undertaken prior to finalising design of infiltration systems.

FIGURES AND APPENDICES

Figure 1 Site Location Plan
Figure 2 Site Plan
Explanatory Notes
Exploratory Hole Records
Borehole Infiltration Test Results



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Site

Southwick Nursery
15 Roman Way
Southwick
West Sussex

Project Ref

P17510

Figure No

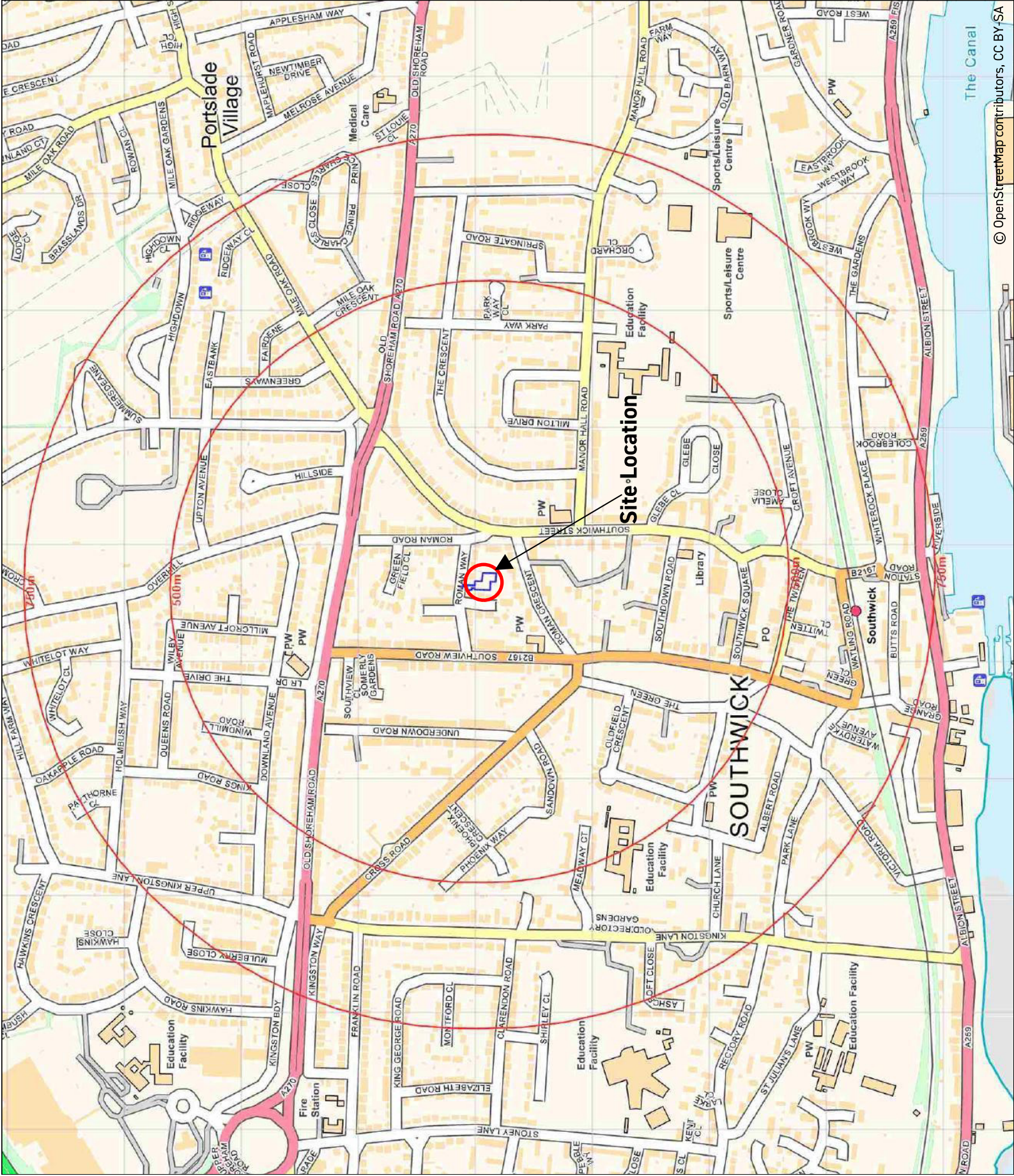
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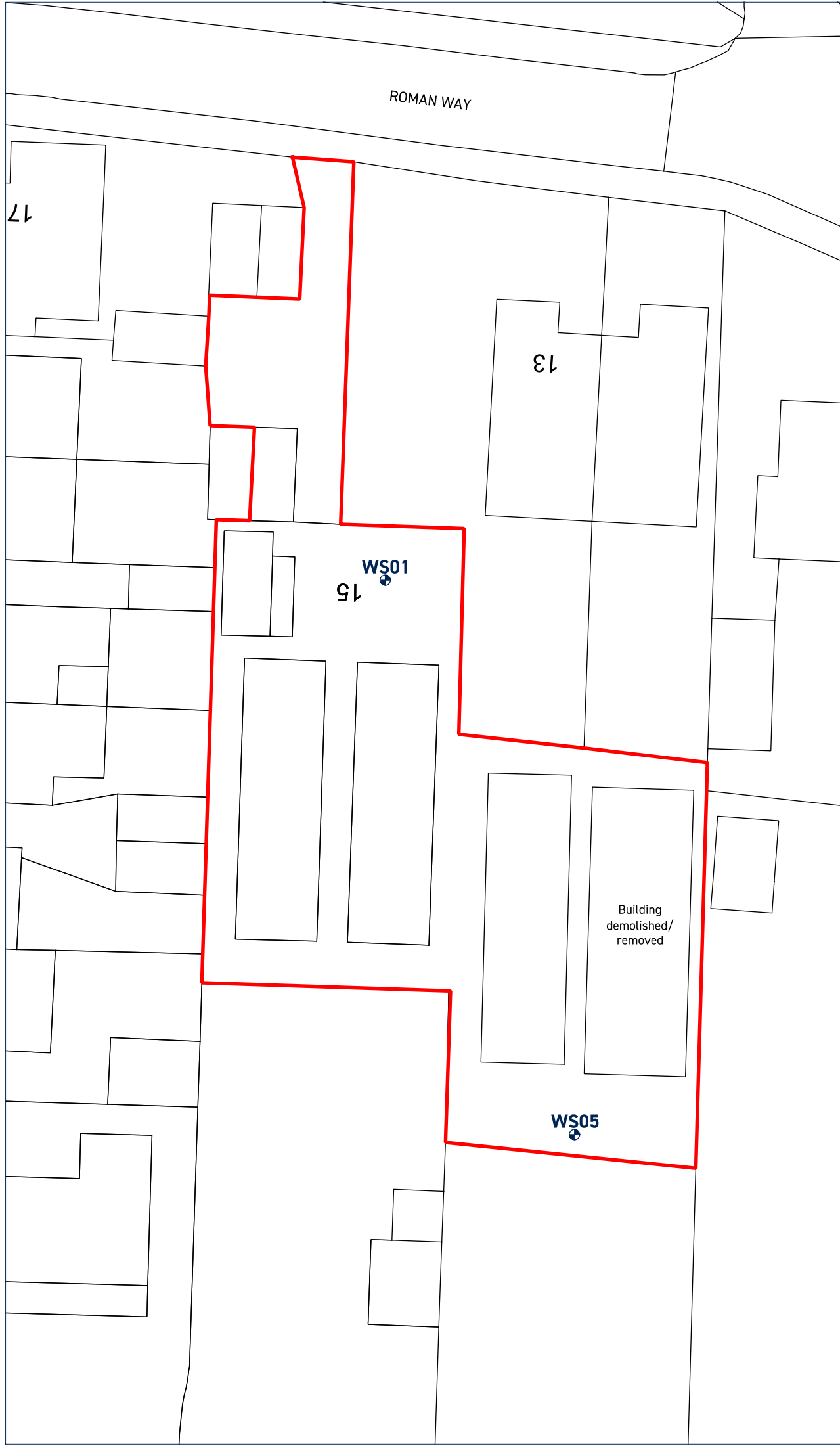
Drawing Title

Site Location Plan

Scale

Not To Scale





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Figure No

2

Drawing Title

Site Plan

Scale

Not To Scale

EXPLANATORY NOTES

Symbols and abbreviations on Exploratory Hole Records

Samples

U	'Undisturbed' Sample: - 100mm diameter by 450mm long. The number of blows to drive in the sampling tube is shown after the test index letter in the SPT column.
L	Liner sample cut to length indicated.
D	Disturbed Sample
B	Bulk Disturbed Sample
W	Water Sample
ES	Environmental Suite (on older records may be referenced J T)

In Situ Testing

SPT	Standard penetration test (SPT): Using the split spoon sampler.
SPT(C)	Standard Penetration Test (SPT): Using a solid cone instead of the sampler – conducted usually in coarse grained soils or weak rocks.
HV	Shear Vane Test: Undrained shear strength (cohesion).
PP	Hand penetrometer Test: Undrained shear strength (cohesion).
P	Perth Penetrometer Test: Number of blows for 300mm penetration shown under remarks section.

Excavation Method

CP	Cable Percussion Borehole
RC/RO	Rotary Cored Borehole/Rotary Open Hole Borehole
WLS	Dynamic Sampler Borehole using windowless sampler tubes
WS	Dynamic Sampler Borehole using window sampler tubes
TP	Trial Pit excavated using mechanic excavator
HP	Trial Pit excavated using hand tools
HA	Hand Auger borehole

Soil Description

Description and classification of soils has been carried out using as a general basis the British Standard Geotechnical investigation and testing – Identification and classification of soil, Part 1 Identification and description (BS EN ISO 14688-1) and Part 2 Principles of classification (BS EN 14688-2) as well as the BS5930 code of Practice for Ground Investigations.

Rock Description

Description and classification of rocks has been carried out using as a general basis the British Standard Geotechnical investigation and testing – Identification and classification of rock, Part 1 Identification and classification (BS EN ISO 14689-1) as well as the BS5930 code of Practice for Ground Investigations. TCR – Total Core Recovery, SCR – Solid Core Recovery, RQD – Rock Quality Designation, NI – Non Intact, If – indicative fracture spacing (min/ave/max), FI – Fracture Index.

Chalk Description

Chalk description is based on BS EN ISO 14688, BS EN ISO 14689 and BS5930. The classification of chalk generally follows the guidance offered by the Construction Industry Research and Information Association (CIRIA) C574, 'Engineering in Chalk'. This is based on assessment of chalk density, discontinuity and aperture spacing, and the proportion of intact chalk to silt of chalk.

In Situ Strength Testing (where undertaken)

Standard penetration testing (SPT) carried out in accordance with BS EN ISO 22476-3:2005.

Continuous dynamic probe testing conducted using a super heavy DPSH-B (As defined by BS EN ISO 22476-2:2005) probing geometry. The DPSH-B configuration is similar to that of the standard penetration test (SPT); the main differences being that the tip comprises a 90° cone, the driving rods are lighter than those used for SPT testing and the blow counts are recorded over 100mm increments rather than 300mm, as is the case for the SPT.

Perth penetrometer tests carried out in accordance with Australian Standard AS 1289:6.3.3-1997, Method of Testing Soils for Engineering Purposes; no equivalent European or British Standard having been published to date.

Undrained shear strength determinations made in-situ using a Geonor hand shear vane or a hand penetrometer.

Testing to determine the in-situ California Bearing Ratio (CBR) of soils conducted at shallow depths using a hand-held Transport Research Laboratory (TRL) cone penetrometer.



Dynamic (Windowless) Sampler

WS01
Sheet 1 of 1

Hole Type WLS	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name Southwick Nursery, 15 Roman Way, Southwick	Project No. P17510	Start Date 2025-11-27	End Date 2025-11-27	

Client	Consultant	Contractor
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Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) (thickness)	Strata		
		Depth (m)	Type/ Ref	Results			Legend	Description	
						(0.19)		Concrete.	
						0.19 (0.06) 0.25		MADE GROUND: Orange brown sand.	
		0.40	ES			(0.55)		MADE GROUND: Brown gravelly clay. Gravel is subangular to subrounded fine to coarse brick, flint, chalk, crystalline rock and charcoal-like material.	0.5
		0.85	ES			0.80		Brown slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse flint and chalk. [Head]	1.0
		1.30	ES			(1.05)		becoming very gravelly (chalk) between 1.10m and 1.30m depth. (1.10 - 1.30m) with rare gravel below 1.30m depth. (1.30m)	1.5
		1.70	ES			1.85			
		2.10	ES			(1.15)		Brown gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse flint and chalk. [Head]	2.0
		2.90	ES			3.00			2.5
								End of Borehole at 3.00m	3.0
									3.5
									4.0
									4.5
									5.0

Remarks Borehole cased to 2.00m depth. Borehole dry on completion, although soils noted as being wet below 2.00m depth.	Method, Plant, Stability, Dimensions 0.00 - 3.00m WLS Borehole stable on completion.	Logger GRD
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Dynamic (Windowless) Sampler

WS05
Sheet 1 of 1

Hole Type WLS	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name Southwick Nursery, 15 Roman Way, Southwick	Project No. P17510	Start Date 2025-11-27	End Date 2025-11-27	

Client	Consultant	Contractor
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Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) (thickness)	Strata		
		Depth (m)	Type/ Ref	Results			Legend	Description	
						(0.21)		Concrete.	
		0.30	ES			0.21 (0.19)		MADE GROUND: Dark brown slightly gravelly clay. Gravel is subangular to subrounded fine to coarse flint, brick and charcoal-like material.	
		0.60	ES			0.40 (0.60)		REWORKED: Brown silty clay with rare gravel of flint.	0.5
		1.20	ES			1.00 (1.00)		Brown gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse flint. [Head]	1.0
		1.80	ES			2.00			1.5
		2.40	ES			(0.80)		Brown very clayey subangular to subrounded fine to coarse GRAVEL of flint. [Head]	2.0
		2.90	ES			2.80 (0.20)		Orange brown fine to medium SAND. [Head]	2.5
						3.00		End of Borehole at 3.00m	3.0
									3.5
									4.0
									4.5
									5.0

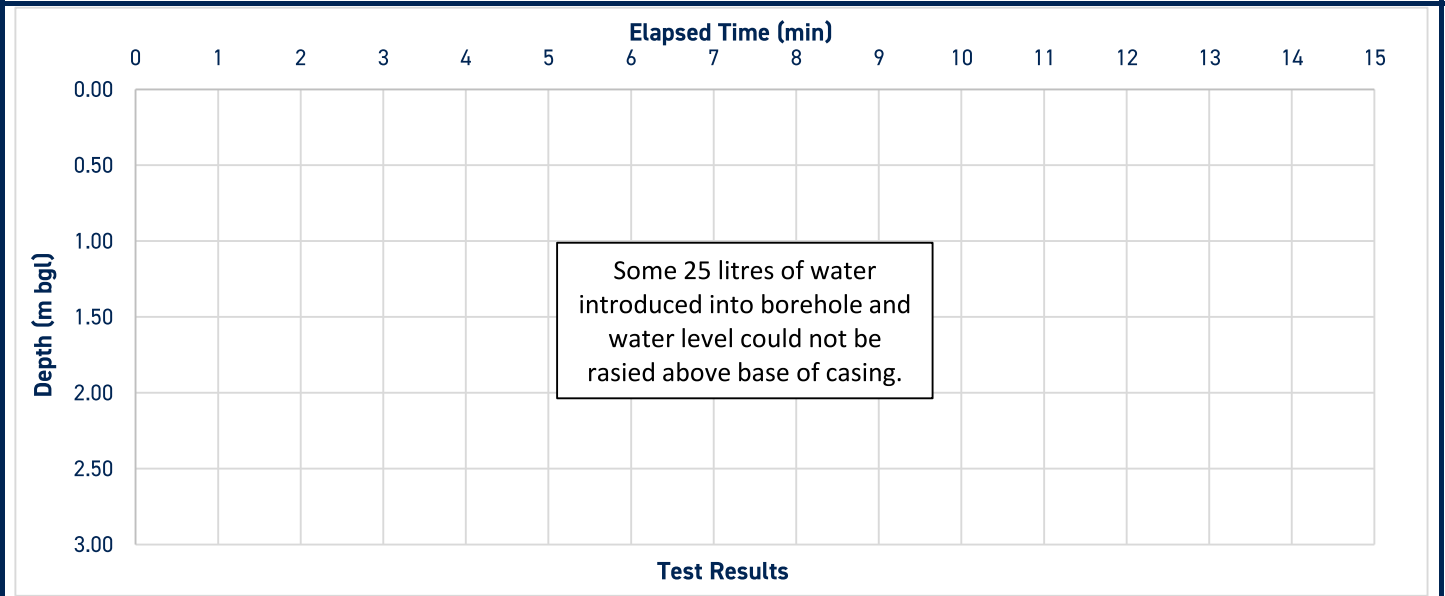
Remarks Borehole dry on completion.	Method, Plant, Stability, Dimensions 0.00 - 3.00m WLS Borehole unstable below 2.85m depth.	Logger GRD
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Site: Southwick Nursery, 15 Roman Way, Southwick, West Sussex

Project Ref: P17510

Test Location Reference	WS01
Test Number	1

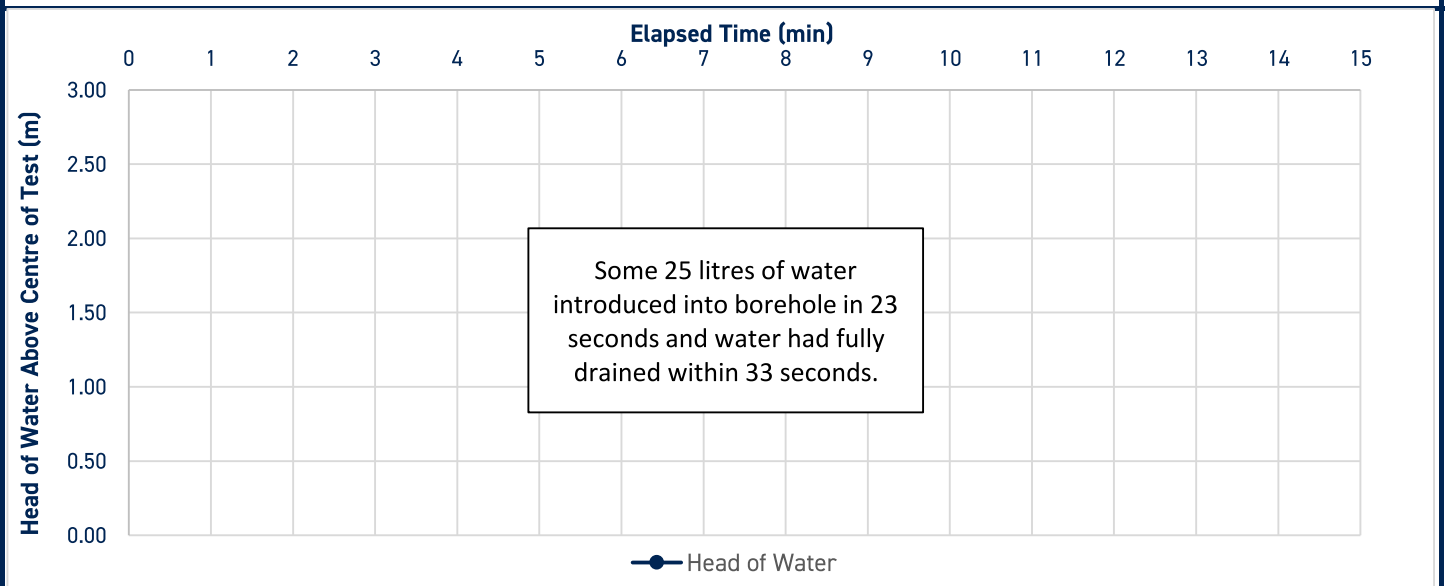
Casing Depth	2.00 m bgl
Borehole Depth	3.00 m bgl
Casing Diameter (d)	0.105 m
Average Borehole Diameter (D)	0.070 m



Length of Test Zone	1.00 m	L
Depth to Center of Test Zone	2.50 m	X
Water level at start of test	n/a m	
Water level at end of test	n/a m	
Duration of test	56 secs	
Average Depth Of Water	n/a m	
Test Section Area	0.22 m ²	
Volume of Water Introduced	0.025 m ³	

Infiltration rate **2.00E-03 m/sec**

Calculation method: Non-Standard -The soil infiltration rate has been calculated by dividing the volume of water introduced into the borehole by the surface area of the exposed test section and the test duration in seconds.

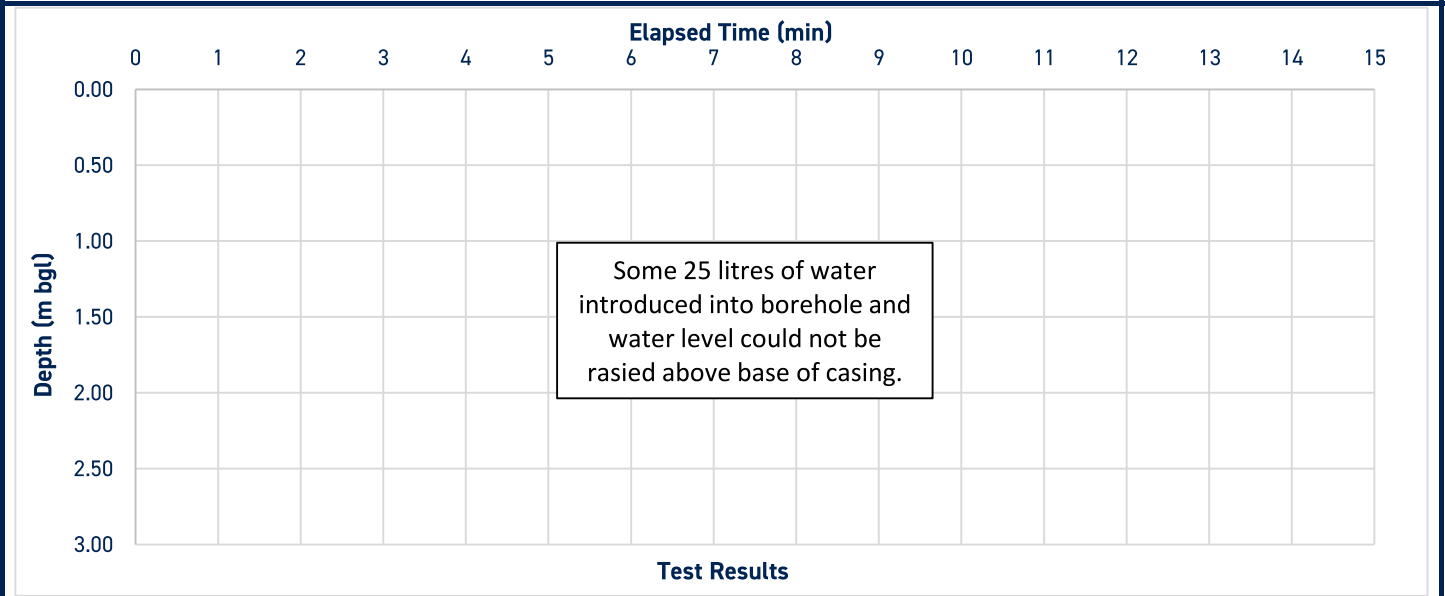


Site: Southwick Nursery, 15 Roman Way, Southwick, West Sussex

Project Ref: P17510

Test Location Reference	WS01
Test Number	2

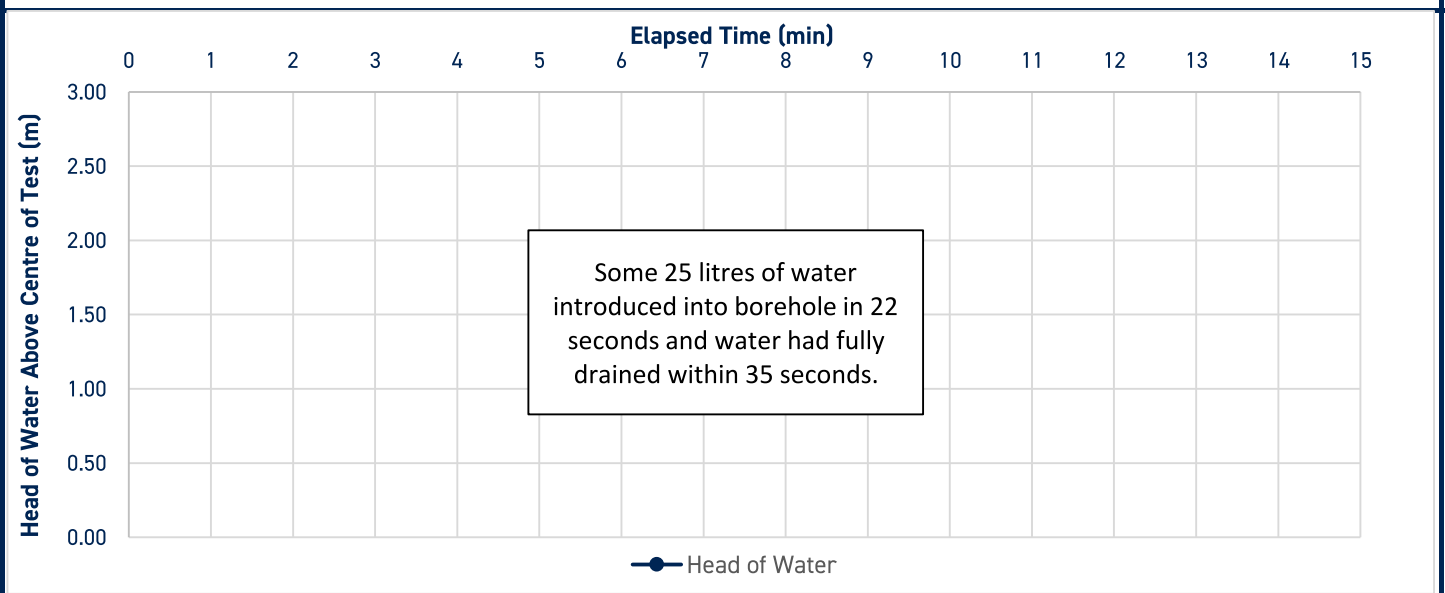
Casing Depth	2.00 m bgl
Borehole Depth	3.00 m bgl
Casing Diameter (d)	0.105 m
Average Borehole Diameter (D)	0.070 m



Length of Test Zone	1.00 m	L
Depth to Center of Test Zone	2.50 m	X
Water level at start of test	n/a m	
Water level at end of test	n/a m	
Duration of test	57 secs	
Average Depth Of Water	n/a m	
Test Section Area	0.22 m ²	
Volume of Water Introduced	0.025 m ³	

Infiltration rate **1.96E-03 m/sec**

Calculation method: Non-Standard -The soil infiltration rate has been calculated by dividing the volume of water introduced into the borehole by the surface area of the exposed test section and the test duration in seconds.

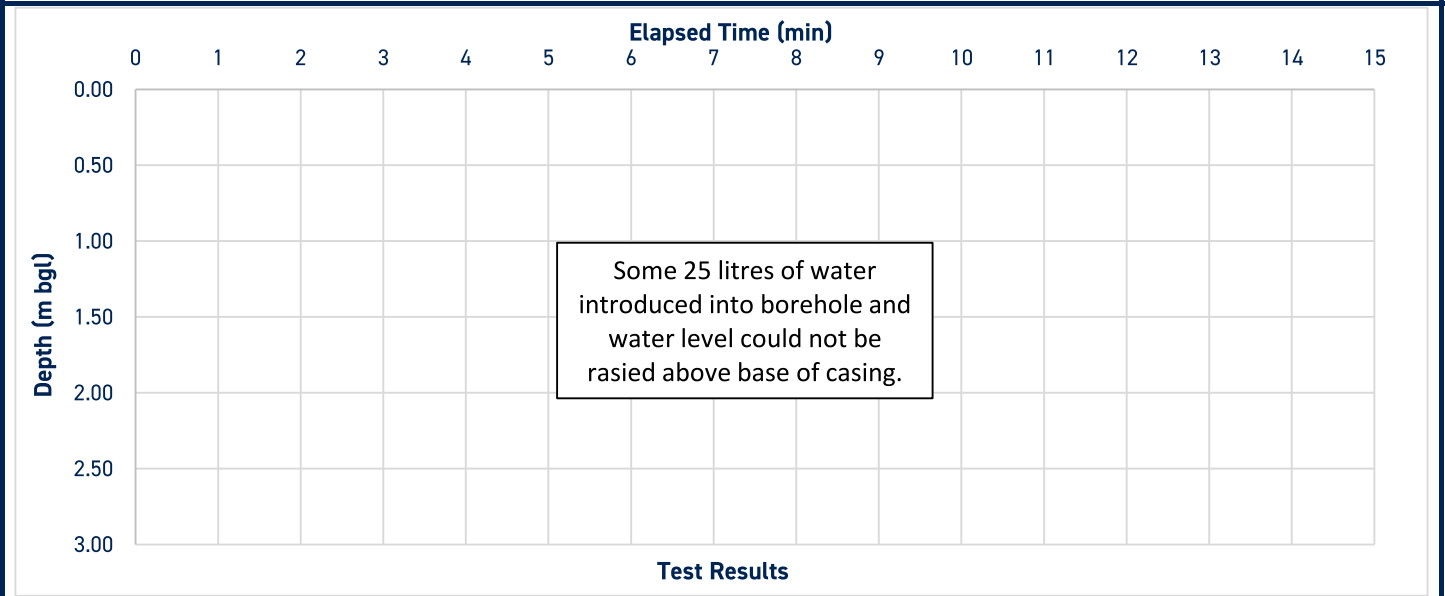


Site: Southwick Nursery, 15 Roman Way, Southwick, West Sussex

Project Ref: P17510

Test Location Reference	WS01
Test Number	3

Casing Depth	2.00 m bgl
Borehole Depth	3.00 m bgl
Casing Diameter (d)	0.105 m
Average Borehole Diameter (D)	0.070 m

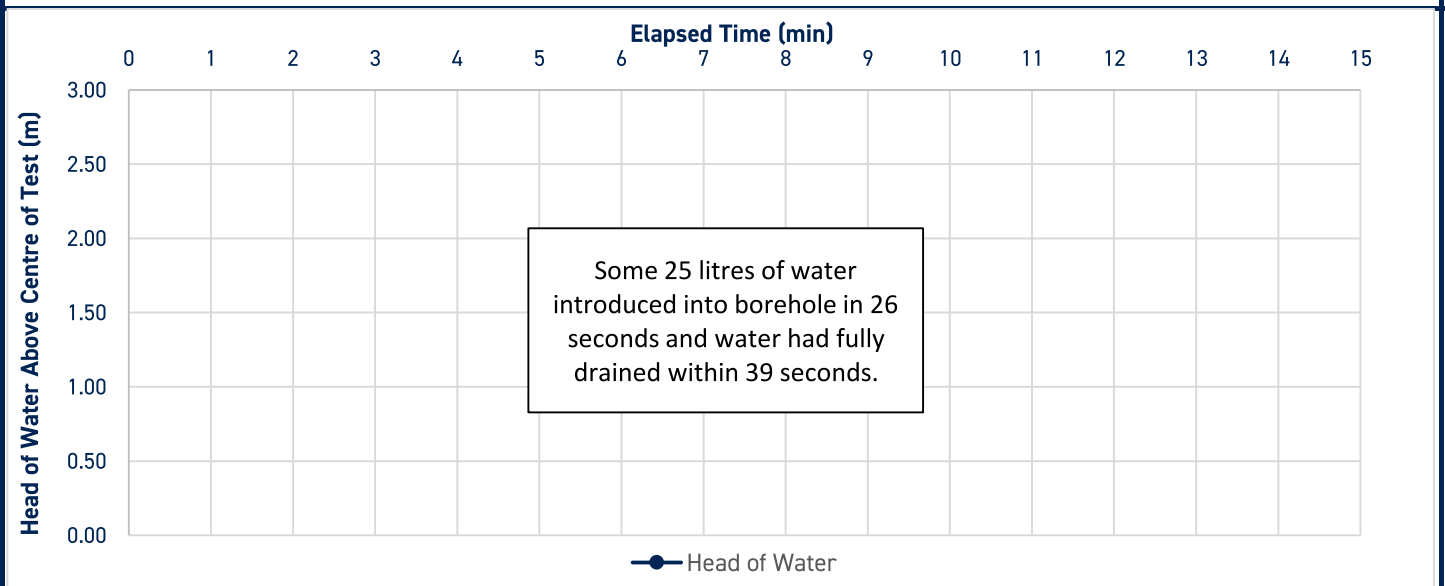


Length of Test Zone	1.00 m	L
Depth to Center of Test Zone	2.50 m	X
Water level at start of test	n/a m	
Water level at end of test	n/a m	
Duration of test	65 secs	
Average Depth Of Water	n/a m	
Test Section Area	0.22 m ²	
Volume of Water Introduced	0.025 m ³	

Infiltration rate

1.72E-03 m/sec

Calculation method: Non-Standard -The soil infiltration rate has been calculated by dividing the volume of water introduced into the borehole by the surface area of the exposed test section and the test duration in seconds.

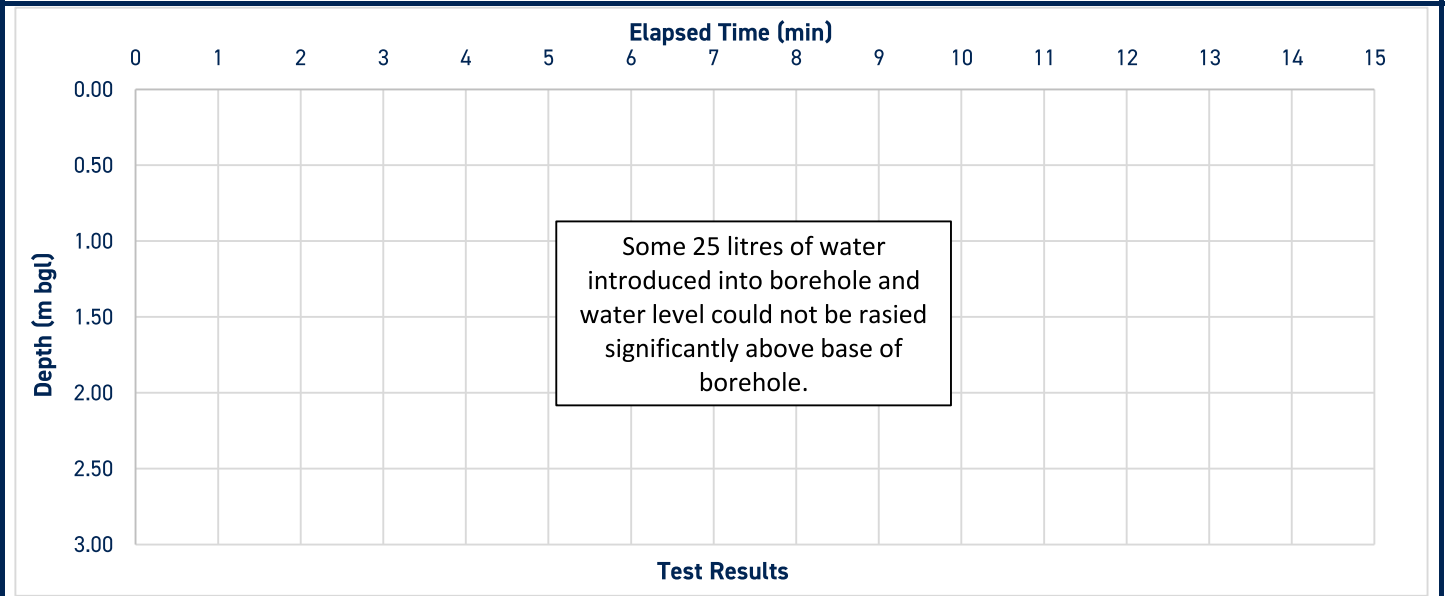


Site: Southwick Nursery, 15 Roman Way, Southwick, West Sussex

Project Ref: P17510

Test Location Reference	WS05
Test Number	1

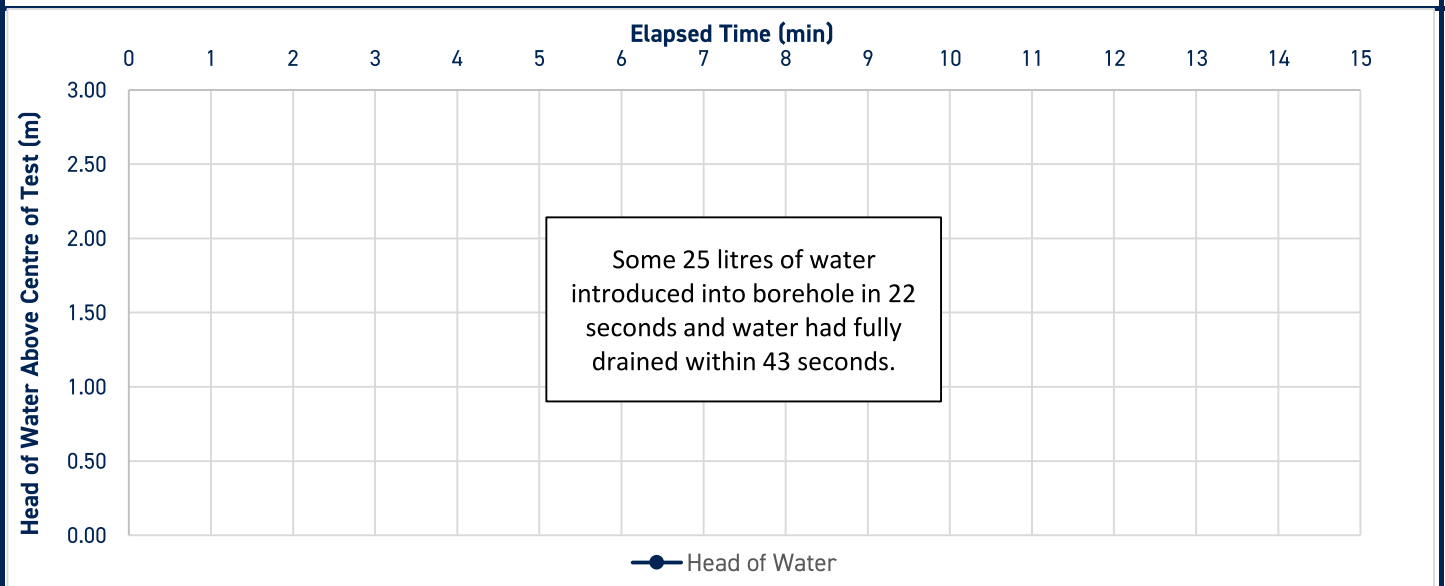
Casing Depth	Not Used m bgl
Borehole Depth	3.00 m bgl
Casing Diameter (d)	Not Used m
Average Borehole Diameter (D)	0.088 m



Length of Test Zone	3.00 m	L
Depth to Center of Test Zone	1.50 m	X
Water level at start of test	n/a m	
Water level at end of test	n/a m	
Duration of test	65 secs	
Average Depth Of Water	n/a m	
Average Drained Area	0.42 m ²	
Volume of Water Lost	0.025 m ³	

Infiltration rate **9.18E-04 m/sec**

Calculation method: Non-Standard -The soil infiltration rate has been calculated by dividing the volume of water lost during the test by the product of the 50% of the surface area of the borehole and the test duration in seconds.

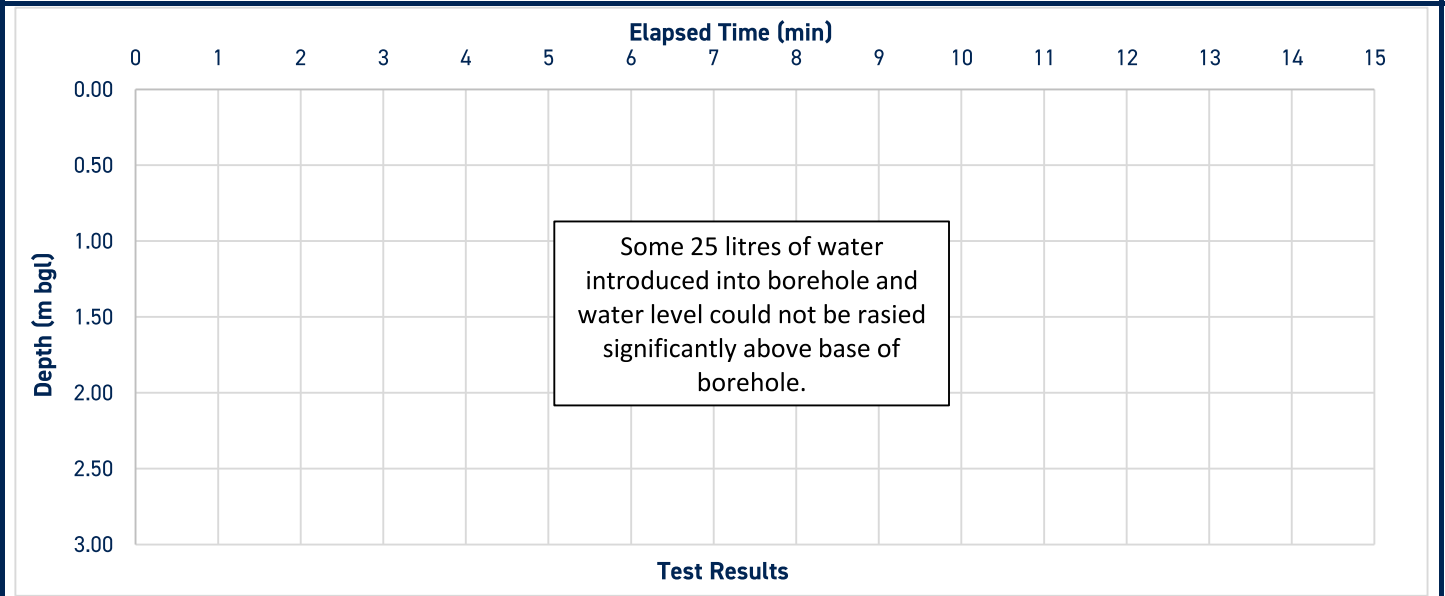


Site: Southwick Nursery, 15 Roman Way, Southwick, West Sussex

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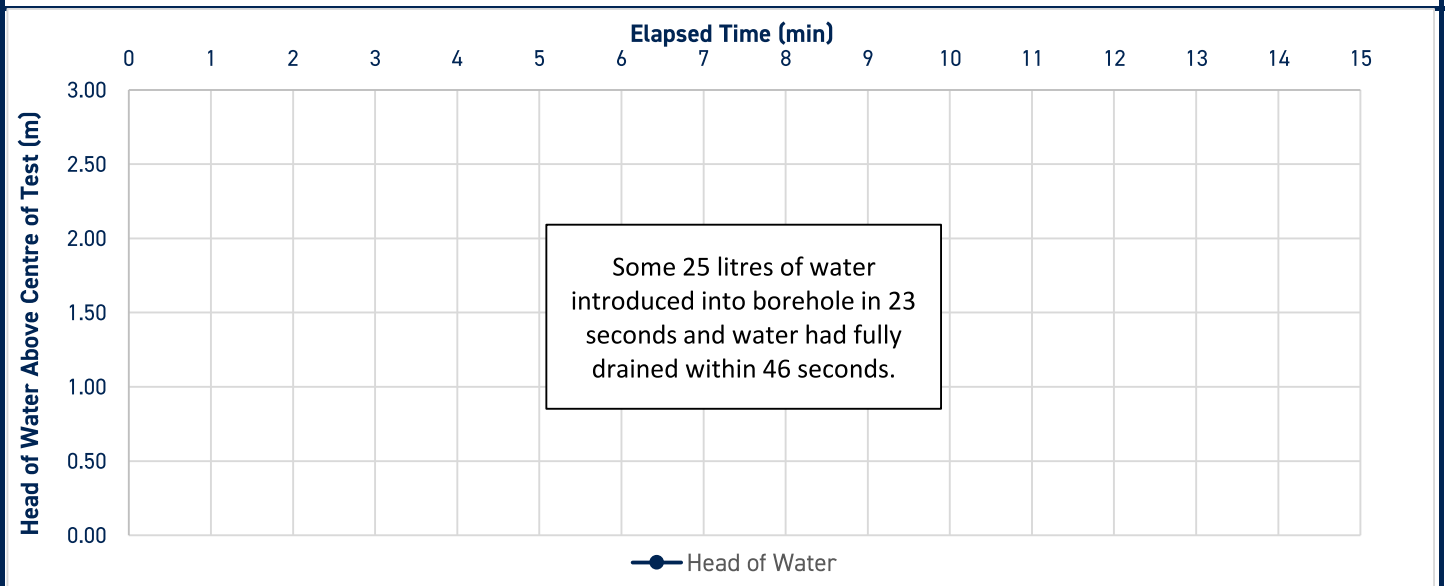
Test Location Reference	WS05
Test Number	2

Casing Depth Not Used m bgl
 Borehole Depth 3.00 m bgl
 Casing Diameter (d) Not Used m
 Average Borehole Diameter (D) 0.088 m



Length of Test Zone	3.00 m	L
Depth to Center of Test Zone	1.50 m	X
Water level at start of test	n/a m	
Water level at end of test	n/a m	
Duration of test	69 secs	
Average Depth Of Water	n/a m	
Average Drained Area	0.42 m ²	
Volume of Water Lost	0.025 m ³	

Infiltration rate **8.64E-04 m/sec**
 Calculation method: Non-Standard -The soil infiltration rate has been calculated by dividing the volume of water lost during the test by the product of the 50% of the surface area of the borehole and the test duration in seconds.

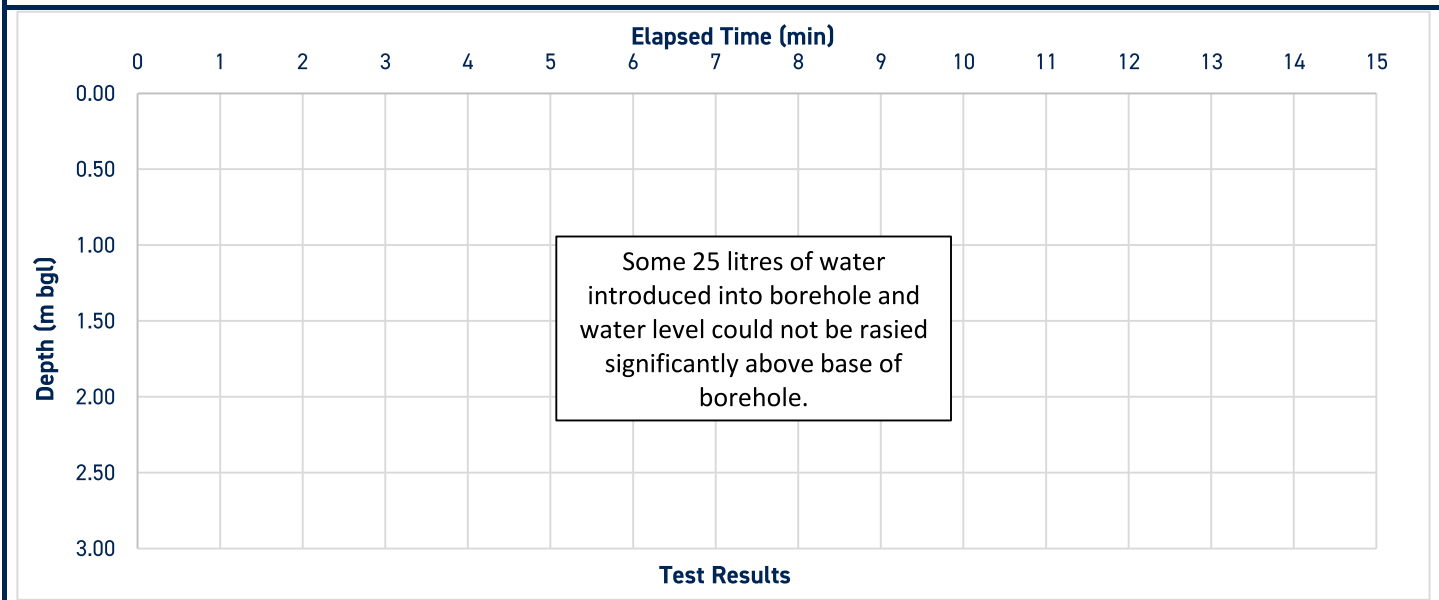


Site: Southwick Nursery, 15 Roman Way, Southwick, West Sussex

Project Ref: P17510

Test Location Reference	WS05
Test Number	3

Casing Depth Not Used m bgl
 Borehole Depth 3.00 m bgl
 Casing Diameter (d) Not Used m
 Average Borehole Diameter (D) 0.088 m



Length of Test Zone	3.00 m	L
Depth to Center of Test Zone	1.50 m	X
Water level at start of test	n/a m	
Water level at end of test	n/a m	
Duration of test	68 secs	
Average Depth Of Water	n/a m	
Average Drained Area	0.42 m ²	
Volume of Water Lost	0.025 m ³	

Infiltration rate **8.77E-04 m/sec**
 Calculation method: Non-Standard -The soil infiltration rate has been calculated by dividing the volume of water lost during the test by the product of the 50% of the surface area of the borehole and the test duration in seconds.

