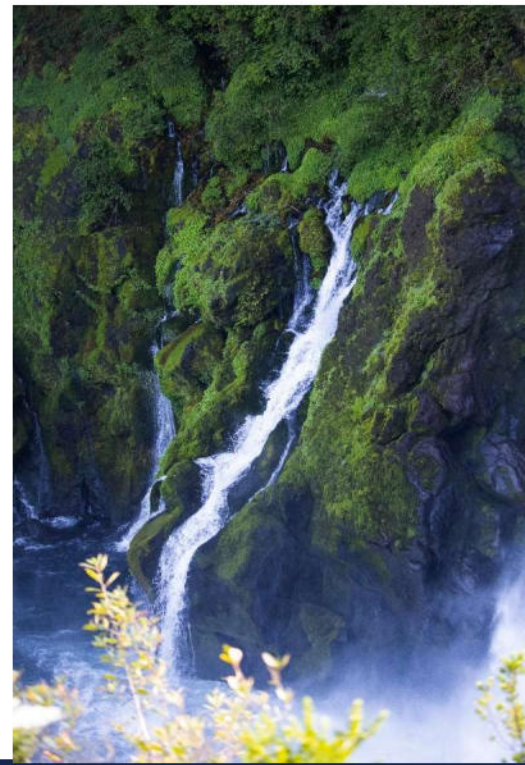




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Surface Water Drainage Strategy 4106_RG41_Wokingham_06

Site Address 424-426 Reading Road,
Winnersh,
Wokingham,
RG41 5EP

UK Experts in Flood Modelling, Flood Risk
Assessments, and Surface Water Drainage Strategies

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water, civils and environment

Document Issue Record

Project: 424-426 Reading Road

Prepared for: Upinder Aujla

Reference: 4106_RG41_Wokingham_06

Site Location: 424-426 Reading Road, Winnersh, Wokingham, RG41 5EP

Issue	Date	Author	Check	Authoriser	Comments
1	23/01/26	Alix Rouvrais	Victoria Walker	Victoria Walker	First issue

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1. Introduction

- 1.1. Aegaea have been commissioned by Upinder Aujla (the Client) to undertake a drainage strategy to discharge condition 6 of planning permission (203604) for the proposed development.
- 1.2. This document has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance.
- 1.3. The purpose of this document is to demonstrate a suitable drainage strategy for the disposal of surface flows from the development.

Site Overview

- 1.4. The site of the proposed development is 424-426 Reading Road, Winnersh, Wokingham, RG41 5EP.



Figure 1: Site Location. Site Location. (Map data ©2023 Google)

- 1.5. The site measures approximately 1146m² (0.0115ha) and currently comprises of a commercial/residential building with parking to the front & rear.
- 1.6. The site is accessed from Reading Road (A329).

- 1.7. The approximate centre of the site is located at Ordnance Survey National Grid Reference SU779706.
- 1.8. Wokingham Borough Council is the Local Planning Authority (LPA) for the site and the designated Lead Local Flood Authority (LLFA). The site sits within the Environment Agency's Thames region.
- 1.9. Thames Water are the water and sewage provider for the area.

Development Proposals

- 1.10. The development comprises of the erection of a three-storey building, including 6 No flats and 2 no. takeaway/restaurants to the ground floor with associated parking following demolition of existing takeaway restaurant and 2 no. flats.
- 1.11. The proposed site layout is included in Appendix A.

Topography

- 1.12. A topographic survey has been undertaken by Groundsurveys Ltd. in August 2020. The survey indicates that the site is relatively flat with the rear falling from northwest to southwest and the front falling from southwest to northwest.
- 1.13. The topographical survey is included in Appendix G.

2. Planning Policy and Guidance

National Planning Policy Framework (NPPF)

2.1. The National Planning Policy Framework (NPPF) (DLUHC, 2023) which includes UK Government policy on development and flood risk states:

"175. Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate. The systems used should:

- a) take account of advice from the lead local flood authority;*
- b) have appropriate proposed minimum operational standards;*
- c) have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and*
- d) where possible, provide multifunctional benefits.*

3. Surface Water Drainage Strategy

- 3.1. Existing Thames Water sewer mapping is included within Appendix B, with an extract provided below. The map shows an existing 150mm diameter foul water sewer running within the site boundary adjacent to Reading Road to the North of the site, where it is understood the site currently connects. There is currently no surface water sewers indicated on the Thames water mapping. There are various surface water gullies shown within reading road and adjacent properties leading to the assumption that the foul sewer shown on the records could be a combined sewer. This is to be confirmed with Thames water.



Figure 2: Extract of Thames Water's Sewer Map

- 3.2. A CCTV survey of the existing private surface water sewer network has yet to be undertaken, this will be undertaken at detailed design stage.
- 3.3. It is understood that surface water run-off from roofs and hard paved areas currently discharge to an assumed public combined Thames Water sewer located within the site boundary.

Site Geology

- 3.4. Geological maps published by British Geological Survey's (BGS) indicate that the site is underlain by London Clay Formation - Clay, silt and sand with superficial deposits recorded as River Terrace Deposits comprising gravel underlying the site.
- 3.5. Soils mapping provided by Cranfield University on behalf of DEFRA shows that the site is underlain by Loamy soils with naturally high groundwater which drains to Local shallow groundwater.

Infiltration Testing

- 3.6. Infiltration tests have been undertaken and confirm that disposal via permeable paving is feasible with an infiltration rate recorded of 0.00608m/hr (1.69×10^{-6} m/s). Refer to Appendix C for infiltration test results.

Brownfield Run-Off Rates

- 3.7. The total area of the site is approximately 1146m² (0.115 hectares) with 100% of the existing site being impermeable. Proposed plans indicate that the proposed impermeable area for the site is 994m² which is a reduction of 13%.
- 3.8. The brownfield runoff rate has been calculated as 11.1 l/s for the site, calculations can be found within Appendix D.

Proposed Drainage Strategy

- 3.9. Current guidance indicates that the following surface water disposal options should be considered, listed in order of preference:
 - i. **Surface water collection and re-use:** There are plot scale opportunities for rainwater harvesting measures such as water butts and these should be implemented where practical.
 - ii. **Disposal via on-site infiltration systems:** The access road and car parking for the development will be made up of permeable paving of which all RWP's will discharge to prior to infiltration to ground.

- iii. **Disposal to a watercourse/surface water body:** There are no watercourses within the vicinity of the site and therefore disposal of surface water to a watercourse or surface water body has been discounted.
- iv. **Disposal to surface water sewer:** there are no surface water sewers within the vicinity of the development and as such disposal via this option has been discounted.
- v. **Disposal to combined sewer:** Whilst it is assumed that the existing site discharges to combined sewer the proposed site drainage is to discharge to ground via infiltration.

3.10. On review of the SuDS drainage hierarchy, and with reference to both national and local policy, it is proposed that surface water generated from the proposed development will be managed on site via permeable paving to all hardstanding areas. The SuDS features have been sized to accommodate a 1 in 100-year rainfall event with 40% climate change. Refer to Appendix E for drainage layout and Appendix F for drainage calculations.

3.11. The permeable paving will provide the attenuation required to accommodate the 1:100 year +40% CC storm event with a half empty time of 582 minutes.

Future Maintenance Strategy

- 3.12. All drainage, whether piped or SuDS require regular maintenance. Below provides an overview of typical maintenance tasks and frequency of which they need to be undertaken.

General maintenance requirements as per CIRIA C753.

Maintenance Schedule	Required Action	Typical frequency
Regular Maintenance	Inspect for sediment and debris in catchpit manholes and gullies. Clean out as required	Twice Annually
	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)
Occasional Maintenance	Remove sediment and debris in catchpits, gullies, attenuation devices and inside concrete manhole rings.	As required, based on inspections.
Remedial actions	Reconstruct and/or replace components, if performance deteriorates or failure/blockage occurs.	As required
	Replacement of clogged components (flow restriction)	As required
Monitoring	Inspect silt traps/gullies/catchpits and note rate of sediment accumulation.	Monthly in the first year and then annually
	Check attenuation devices	Annually

- 3.13. The required maintenance for each component making up the drainage system is scheduled in the tables below, based on CIRIA report C753 – The SuDS manual.

Permeable Paving

General maintenance for permeable paving as per CIRIA C753.

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment.
Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying.	As required – once per year on less frequently used pavements
Remedial Maintenance	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving.	As required
	Remediate work 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 of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is
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, 48 hr after large storms in the first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually

- 3.14. Many of the specific maintenance activities for pervious pavements can be undertaken as part of a general site cleaning contract (many car parks or roads as swept to remove litter and for visual reasons to keep them tidy) and therefore, if litter management is already required at site, this should have marginal cost implications.

4. Pollution Prevention & Water Quality Management

SuDS Mitigation Indices

- 4.1. Chapter 26 of the CIRIA C753 The SuDS Manual, provides design advice to meet water quality standards by adopting the SuDS train treatment mechanism and thereby reduce the risk of pollution by evaluating potential pollution hazards at the outset.
- 4.2. The proposed site layout provides the opportunity to introduce SuDS into the scheme to reduce potential contaminant risk further.
- 4.3. Runoff from individual property driveways, residential car parks, low traffic roads and non-residential car parks with infrequent change <300 are generally viewed as low risk (as per Table 26.2 of C753), shown in the tables below.

Pollutant Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Individual property driveways, residential car parks and low traffic roads	Low	0.5	0.4	0.4

Indicative SuDS Mitigation Indices

	Mitigation Indices				Indices for Calculation		
	TSS	Metals	Hydrocarbons		TSS	Metals	Hydrocarbons
Permeable Paving	0.7	0.6	0.7	100%	0.7	0.6	0.7
Total Mitigation Indices score					0.7	0.6	0.7
Sufficiency of Pollution Mitigation Indices					Sufficient (No additional mitigation required)		

- 4.4. The mitigation indices offered by the proposed permeable pavement exceed the hazard indices and therefore provides adequate mitigation.

It is therefore considered that the proposed SuDS features on site are appropriate and acceptable in terms of water quality.

Appendix A - Proposed Site Layouts



39

EXISTING TREES
TO BE RETAINED

PTW PARKING

Appendix B - Thames Water Mapping

STRUCTURED NETWORK UNDER ADOPTION
AGREEMENT / RYDON CONST LTD
RAINBOW PARK

Appendix C - Infiltration Testing

A collage of six images related to construction and testing. Top left: A large concrete pipe. Top middle: A close-up of gravel and a circular filter. Top right: A pressure gauge. Middle left: A worker in a high-visibility suit. Middle right: A red truck with 'Southern' on the side. Bottom right: A person using a tool on a pile of material.

Soakage Test Report

Project Name: Reading Road, Winnersh

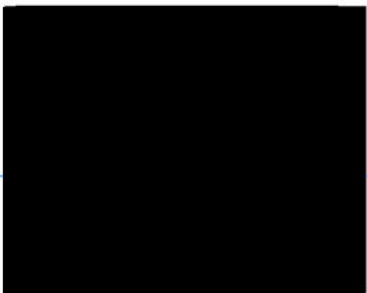
Location: BRE 365 at: 424-426 Reading Road,
Winnersh, Berkshire RG41 5GP

Client: Rockfort Properties Ltd

Project ID: JT0618

Report Date: 10 March 2025

Report Issue: 1

Author	Mr Christopher J Beech BSc MSc FGS	
Check / Review	Mr Robert Jiagge BSc (Hons) MSc FGS MEnvSc CSci	

For and on behalf of Southern Testing Laboratories Limited

DOCUMENT HISTORY AND STATUS

Issue No.	Date	Purpose or Status	Author	Check / Review
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In-Situ Test Methods and Results

APPENDIX C

Photographs

A INTRODUCTION

1 Authority

Our authority for carrying out this work is contained within ST Consult Project Order Form Q24-0389, signed by Rockfort Properties Limited and dated 8th January 2025.

2 Location

The site is located within a broadly rectangular plot (covering approximately 1.0ha in extent); and located immediately south of the Reading (A329) Road within the suburban village of Winnersh in Berkshire. The site lies approximately 150m north of the village centre.

The approximate National Grid Reference of the site is SU 77972 70660. The site location is indicated on **Figure 1** within **Appendix A**.

3 Investigation Brief

In accordance with the Client's instructions, and our quotation, the following was included in our brief for this soakage investigation:

- Soakage testing within machine excavated trial pits at two locations on site, using the BRE 365 method [1].

4 Scope

This factual report presents our exploratory hole logs and test results only.

A UXO risk assessment was not requested within our brief for the investigation.

As with any site there may be differences in soil conditions between exploratory hole positions.

This report is not an engineering design and the figures and calculations contained in the report should be used by the Engineer, taking note that variations will apply, according to variations in design loading, in techniques used, and in site conditions. Our figures therefore should not supersede the Engineer's design.

The findings and opinions conveyed via this investigation report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Limited believes are reliable. Nevertheless, Southern Testing Laboratories Limited cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

The investigation was conducted and this report has been prepared for the sole internal use of Rockfort Properties Limited and their appointed Engineers. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Southern Testing Laboratories Limited. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The recommendations contained in this report are made in respect of the particular context of the investigation as described in the report and may not be appropriate to alternative development schemes. This report should be considered in its entirety and Southern Testing Laboratories Limited accepts no responsibility for and excludes liability in respect of any omission or alteration made by others, and any use of the report for any purpose other than that for which it was produced.

B SITE SETTING

5 Geological Records

No formal desk study has been carried out, but reference has been made to both online and published geological maps to put the site into context.

5.1 Geology

The British Geological Survey (BGS) Map No 268 – Reading, 1:50,000 scale, indicates that the site geology consists of superficial River Terrace Deposits underlain by bedrock geology of the London Clay Formation.

5.1.1 River Terrace Deposits

The River Terrace Deposits are of fluvial origin and were laid down by the Thames when the climate was much wetter and cooler than at present. The terraces consist of sheets of gravel and sand with an overlying deposit of Brickearth (really an ancient alluvium). Some variability in soils is to be expected at junctions with the various terraces, as riverbanks existed there. The remains of these former riverbanks can be soft and silty or contain clay.

5.1.2 London Clay Formation

The London Clay mainly comprises blue-grey or grey-brown fissured clay and silty clay, which weathers to brown near the surface. It commonly contains thin courses of carbonate concretions ('cementstone nodules'), selenite crystals and disseminated pyrite. It also includes a few thin beds of shells and fine sand partings or pockets of sand, which commonly increase towards the base and towards the top of the formation.

Although slopes will stand in the clay at steep angles in the short term, the long-term stable slope angle is about 7° for grassed, or cleared slopes, and a few degrees more for wooded slopes.

This formation is known to contain pyrite.

C FIELDWORK

6 Strategy and Method

The strategy adopted for the soakage testing comprised the following:

Activity / Method	Purpose	Max Depth Range (m bgl)
*TP01-TP02 5 Tonne Tracked Excavator	Trial pits to investigate the shallow ground conditions, and allow for assessment of soakage potential using the BRE365 method.	0.6-1.55

Due to the presence of groundwater encountered at TP01, as instructed by the Client's Engineer, no soakage testing was undertaken within this exploratory hole.

Exploratory hole locations were specified by the Client's Engineers, and are shown in **Figure 2** in **Appendix A**.

In-situ test method descriptions employed are given in **Appendix B** together with the test results.

7 General Site Description

The site comprises an approximately 1.0ha rectangular-shaped parcel of land, consisting of two semi-detached mixed-use properties (consisting of Chinese and Indian Restaurants on the ground floor and apartments on the first) with front and rear car parking.

The site is bound to the east, west and south by private residential properties and to the north by Reading Road beyond which are private residential properties.

A number of telephone and electric LV overhead power lines on wooden poles were noted to intersect the northern half of the site.

The site is accessed via the Reading Road, immediately north of the site.

8 Weather Conditions

The fieldwork was carried out between the 25th and 27th February 2025, at which time the weather was generally dry, cold and clear with the exception of the 26th February 2025 where prevalent intermittent rainfall and overcast conditions were noted.

9 Soils as Found

The soils encountered are described in detail in the attached exploratory hole logs (**Appendix A**), but in general comprised a layer of surface hardstanding over made ground deposits overlying River Terrace Deposits. A summary is given below.

Max Depth (m bgl)	Thickness (m)	Soil Type	Description
0.02	0.02	BLACK TOP [HARDSTANDING]	Blacktop.
0.15	0.13	CONCRETE [HARDSTANDING]	Concrete. Encountered in TP02 only.
0.3-0.6	0.15-0.58	MADE GROUND	Loose grey very gravelly cobbly fine to coarse SAND. Gravel consists of brick concrete recycled aggregate and flint
*>0.6-1.55+	*>0.3-0.75+	RIVER TERRACE DEPOSITS	Loose dark grey and bluish grey clayey gravelly fine to coarse SAND/Soft dark grey becoming brown very sandy CLAY.

(*) Depth to base of stratum not proven.

10 Groundwater Observations

Groundwater was encountered in TP01 initially at both 0.8m bgl and 1.4m bgl, both as slow seepages, during the course of the excavation work.

D TEST RESULTS

11 Soakage Test Results

The BRE paper DG365, Ref [1] describes a method for site testing to determine soil infiltration rates at the proposed site of a soakaway. The in-situ test method is described in **Appendix B**.

The soakage tests were carried out at one location, TP02 as proposed by the Client's Engineers. The test locations are shown on the attached site plan **Figure 2, Appendix A**. The full results of the soakage tests are presented within **Appendix B**.

As per our instruction from the Client's Engineer, no soakage testing was carried out in TP01 due to the presence of groundwater.

The DG365 Ref [1], states that each pit should be allowed to drain three times to near empty, with filling on the same or consecutive days.

The infiltration rate from each trial hole is summarised in the table below. The soakage rate in this report is expressed as $\text{l/m}^2/\text{minute}$, which is a convenient rate to use. The BRE use a unit of m/sec , which is the value in $\text{l/m}^2/\text{minute}$ divided by 60,000.

Test ID	Test Depth (m bgl)	Test Number	Design Infiltration Rate		Notes
			$\text{l/m}^2/\text{minute}$	m/sec	
TP02	0.6	1	0.439	7.32×10^{-6}	
		2	0.12	2.00×10^{-6}	
		3	0.10	1.69×10^{-6}	

The initial proposed scope of the investigation was assess the infiltration potential of the soil at the rear of the property (TP01) for a standard soakaway design and front (TP02) for permeable pavement.

The above test results could be used for permeable pavement design.

11.1 General Guidance on Design of Soakaways

Any soakaway scheme may require the approval of the Environment Agency, Building Control and, where applicable, the adopting Highways Authority.

Soakaways are used to store the immediate surface water run-off from hard surfaced areas, such as roof or carparks, and allow for efficient infiltration into the adjacent soil. They should be designed to discharge their stored water sufficiently quickly to provide the necessary capacity to receive run-off from a subsequent storm. The time taken for discharge depends upon the soakaway shape and size, and the surrounding soil's infiltration characteristics.

Groundwater levels can vary considerably from season to season and year to year, often rising in wet or winter weather, and falling in periods of drought. As such, a high groundwater table may affect the storage capacity of soakaways. In addition, it should be noted that an unsaturated zone may be required between the base of soakaways and the groundwater table, by the Environment Agency. Longer term monitoring may be required to establish actual groundwater levels as part of the planning approval process.

The design of soakaways can be square, circular (conventional) or trench excavations, and may be rubble filled, perforated precast concrete ring units, plastic cells or any similar structure that collects rainwater and run-off and allow discharge directly into the ground. Depending on the geological conditions, and depth at which suitable infiltration is achieved, soakaways can also be deep bored.

Long-term maintenance and inspection must be considered during the design and construction process. Maintenance of silt traps, gully pots and interceptors will improve the long-term performance of soakaways. The use of wet well chambers within the soakaway system can further assist in pollutant trapping and extending the operating life of soakaways.

Soakaways generally should not be constructed less than 5m to any proposed building or structure. This standoff distance may be increased due to the risk of chalk dissolution at the site or within the general area surrounding the site.

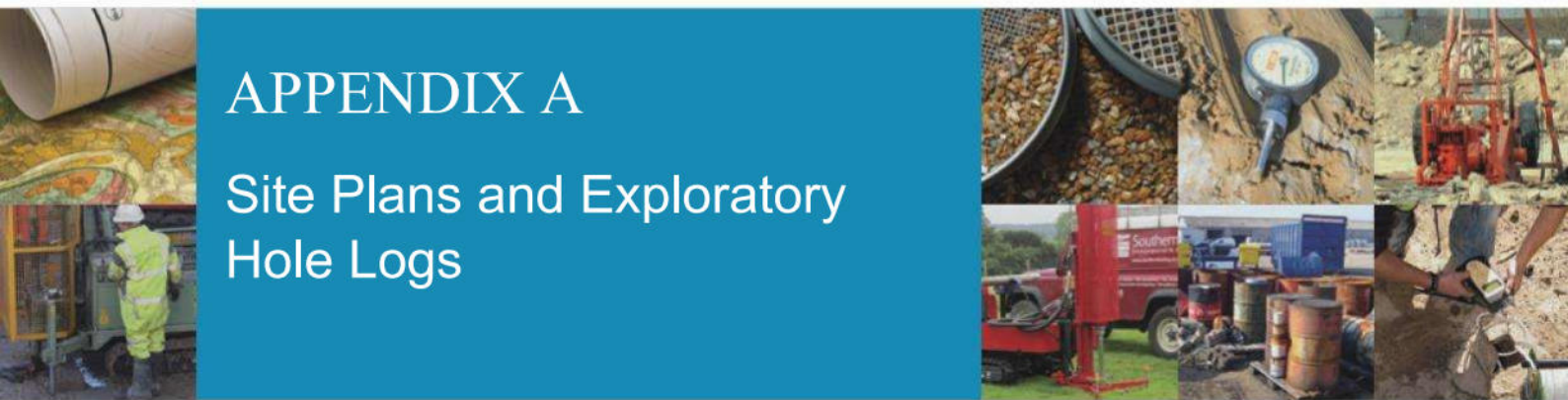
Risk of pollution to the quality of groundwater must be considered as part of the design.

Generally, roof and surface run-off should not significantly impact on groundwater quality and subject to appropriate approvals from the Environment Agency could be discharged directly to soakaways. However, although again subject to approvals from the Environment Agency, paved surface run-off for larger trafficked areas should generally be passed through a suitable form of oil interception device prior to discharge to the soakaway.

Care must be taken to ensure that the discharge of large volumes of surface run-off into the soil does not disrupt the existing sub-surface drainage patterns. Similarly in areas of sloping topography, consideration should be given to the siting of soakaways to avoid potential discharge and or flooding of down slope areas.

REFERENCES

- [1] Building Research Establishment (BRE), "DG365 Soakaway Design," 2016.
- [2] BSI Standards, "BS 5930 Code of practice for ground investigations," 2015.
- [3] BSI Standards, "BS 3882:2015 Specification for Topsoil," 2015.

A collage of six images related to geotechnical engineering. Top left: A large white pipe. Top middle: A close-up of a soil sample in a sieve. Top right: A pressure gauge on a rock surface. Middle left: A worker in a high-visibility suit. Middle right: A red truck with 'Southern' on the side. Bottom right: A person using a tool to sample soil.

APPENDIX A

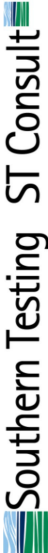
Site Plans and Exploratory Hole Logs





Contains Ordnance Survey Data © Crown Copyright and Database Right 2019

Site:	424-426 Reading Road, Winnersh	Project ID	JT0618
Figure 1	Site Location Plan	Date:	03/03/2025

 Southern Testing ST Consult	Project Name:	Reading Road, Winnersh	Project ID:	JT0618	Site Plan
	Location:	424-426 Reading Road, Winnersh, Berkshire RG41 5GP	Engineer:	CJB	
	Client:	Rockfort Properties Ltd.	Scale:	1:500	



Key to Exploratory Hole Logs, Plans and Sections

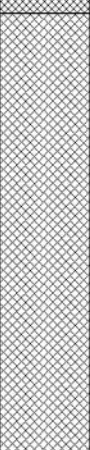
Backfill Symbols		Pipe Symbols		Principal Soil Types		Principal Rock Types		Drilling Records	
Arisings		Plain Pipe		Topsoil		Mudstone		Water Strike	
Concrete		Slotted Pipe		Made Ground		Claystone		Depth Water Rose	
Blacktop		Piezometer		Clay		Siltstone		Total Core Recovery (%) [TCR]	
Bentonite		Piezometer Tip		Silt		Sandstone		Solid Core Recovery (%) [SCR]	
Gravel Filter		Filter Tip		Sand		Limestone		Rock Quality Index (%) [RQI]	
Sand Filter		Extensometer		Gravel		Chalk		Fracture Index (fractures / m) [FI]	
		Inclinometers		Peat					

All soil and rock descriptions are in general accordance with BS5930 2015, BS EN ISO 14688-1:2002+A1:2013 and BS EN ISO 14689-1:2003. Chalk descriptions are also based on CIRIA C574 and "Logging the Chalk – R.N. Mortimer 2015". The Geology Code is only provided where a positive identification of the sample strata has been made.

Location / Method Identifiers		In-situ Test Location / Method	
BH	Borehole (undefined)	DP	Dynamic Probe
CP	Cable Percussive	CPT	Cone Penetration Test
RC	Rotary Core	CBR	In-situ CBR Test
RO	Rotary Open Hole	DCP	CBR using Dynamic Cone Penetrometer
ODC	Rotary Odex/Symmetrix drilling cased	CBRT	CBR using TRL Probe
CP+RC	Cable Percussive to Rotary Core	PB	Plate Bearing Test
SNC	Sonic	SPT (S)	Standard Penetration Test (Split Barrel Sampler)
CFA	Continuous Flight Auger	SPT (C)	Standard Penetration Test (Solid Cone)
FA	Flight Auger	N	SPT Result
VC	Vibro Core	-/-	Blows/Penetration (mm) after seating drive
WLS+RC	Windowless (Dynamic) Sampler to Rotary Core	-*/-	Total Blows / Penetration (mm)
WLS	Windowless Sampler	()	Extrapolated Value
WS	Window Sampler	PPT	Perth Penetration (In-House Method - Equivalent N Value)
HA	Hand Auger	HP / UCS	Strength from Hand Penetrometer (kN/m ²)
C	Road / Pavement Core	IVN	Strength from Hand Vane ((kN/m ²) P = peak, R = residual
IP	Inspection Pit (Hand Excavation)	PID	Photo Ionisation Detector (ppm)
TP	Trial Pit (Machine Excavated)	MEXE	Mexi-Cone CBR (%)
OP	Observation Pit (Supported Excavation Hand or Machine)		

Samples / Test Type	
B	Bulk Sample
BLK	Block Sample
C	Core Sample
CBRS	CBR Mould Sample
D	Small Disturbed Sample
ES	Environmental Sample (Soil)
EW	Environmental Sample (Water)
GS	Environmental Sample (Gas)

Samples / Test Type	
SPTLS	Standard Penetration Test Split Barrel Sample
TW	Thin Wall Push In Sample (e.g. Shelby Sampler)
U	Undisturbed Open Drive Sample (blows to take)
UT	Thin Wall Undisturbed Open Drive Sample (blows to take)
W	Water Sample (Geotechnical)
SP	Sample from Stockpile
P	Piston Sample
AMAL	Amalgamated Sample

				Start - End Date: 25/02/2025		Project ID: JT0618		Machine Type: ST Tracked Machine		TP01 Sheet 1 of 1	
Project Name: Reading Road, Winnersh				Remarks:		Co-ordinates: E 477951 - N 170636		Level (m AOD):		Logger: CJB	
Location: 424-426 Reading Road, Winnersh, Berkshire RG41 5GP				1) National Grid Reference inferred from Ordnance Survey mapping. 2) Elevation not stated. 3) Groundwater encountered at 0.8m and 1.4m bgl as slow seepages. 4) Exploratory hole backfilled with material arisings upon completion.							
Client: Rockfort Properties Ltd.											
Samples and Insitu Testing			Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description				
Depth (m)	Type	Results									
				(0.02)		0.02	HARDSTANDING comprising: Blacktop. MADE GROUND comprising: Loose (estimated) grey very gravelly cobbly fine to coarse SAND. Gravel consist of fine to coarse subrounded to angular brick anc concrete. at 0.2m bgl occasional ~50mm wide metal fragments.				
				(0.58)			at 0.4m bgl occasional concrete boulders encountered.				
				(0.20)		0.60	Soft (estimated) dark grey very sandy slightly gravelly CLAY with occasional ~2-10mm wide roots.				
				(0.75)		0.80	Soft becoming firm (estimated) light brown very sandy CLAY with rare light grey mottling and fine to medium subrounded quartzite.		1		
						1.55	Pit terminated at 1.55m.		2		
Pit Dimension (m)			Pit Stability:				Water Strikes:				
Width:	0.55		Stable.								
Length:	1.50										
Depth:	1.55										

				Start - End Date: 25/02/2025 - 28/02/2025		Project ID: JT0618		Machine Type: ST Tracked Machine		TP02 Sheet 1 of 1	
Project Name: Reading Road, Winnersh				Remarks:		Co-ordinates: E 477979 - N 170674		Level (m AOD):		Logger: CJB	
Location: 424-426 Reading Road, Winnersh, Berkshire RG41 5GP				1) National Grid Reference inferred from Ordnance Survey mapping. 2) Elevation not stated. 3) Groundwater not encountered. 4) BRE 365 testing undertaken. 5) Exploratory hole backfilled with material arisings upon completion.							
Client: Rockfort Properties Ltd.											
Samples and Insitu Testing			Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description				
Depth (m)	Type	Results									
				(0.02)		0.02	HARDSTANDING comprising: Blacktop.				
				(0.13)			HARDSTANDING comprising: Concrete.				
				(0.15)		0.15	MADE GROUND comprising: Loose (estimated) dark grey very gravelly fine to coarse SAND. Gravel consists of fine to medium subrounded to angular recycled aggregate concrete red brick and flint.				
				(0.30)		0.30	at 0.2m bgl ~50mm wide root encountered.				
							Loose (estimated) grey and bluish grey clayey gravelly fine to coarse SAND. Gravel consists of fine to coarse rounded to subrounded quartzite and flint.				
							at 0.4m bgl ~30mm wide root encountered.				
						0.60	Pit terminated at 0.60m.				
Pit Dimension (m)			Pit Stability:				Water Strikes:				
Width:	0.45		Stable.								
Length:	1.00										
Depth:	0.60										

APPENDIX B

In-Situ Test Methods and
Results

B

Soil and Rock Descriptions

All soil and rock descriptions are in general accordance with BS5930 Ref [2].

Anthropogenic soils ('made ground' or 'fill') describe materials which have been placed by man and can be divided into those composed of reworked natural soils and those composed of or containing man-made materials. 'Fill' is used to describe material placed in a controlled manner and 'made ground' is used to describe materials placed without strict engineering control.

The classification of materials such as topsoil is based on visual description only and should not be interpreted to mean that the material complies with criteria used in BS 3882 Ref [3].

The geology code is only provided on logs where a positive identification of the sample strata has been made.

Soakage Tests (after BRE DG365 2016)

The BRE DG365 Ref [1] paper on soakaway design allows for the design of trench soakaways as well as traditional square and circular soakaways.

The test to measure the soil infiltration rate is carried out in pits which are excavated to the full depth of the proposed soakaway. The trial pits are filled and allowed to drain to empty or near empty, three times, on the same day or on consecutive days. Water levels are recorded against time. Where the sides are unstable the pit should be filled with granular material to provide stability during the test.

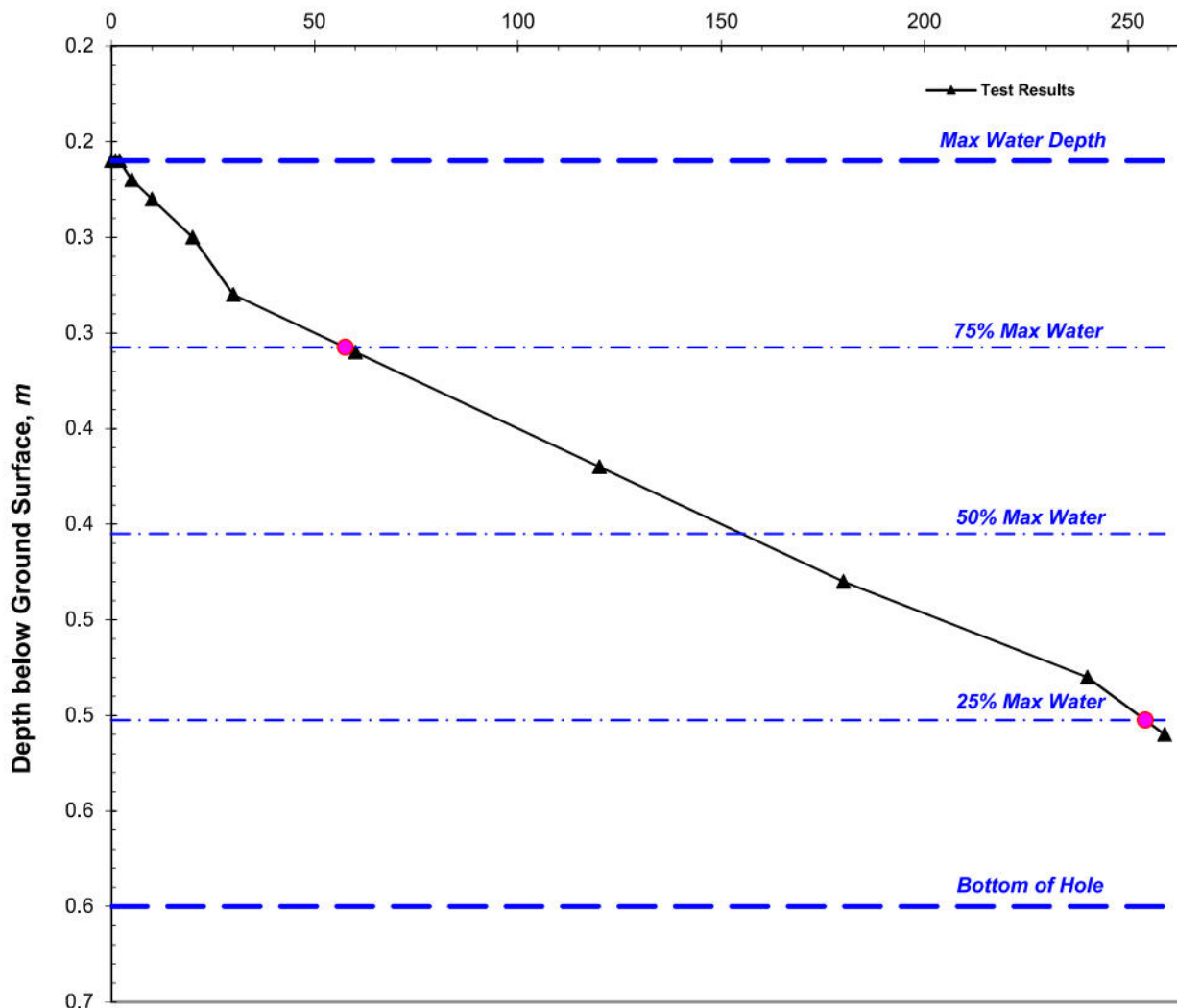
Calculated soakage rates are expressed as $\text{l/m}^2/\text{minute}$, which is a convenient rate to use. The BRE use a unit of m/sec , which is the value in $\text{l/m}^2/\text{minute}$ divided by 60,000.

BRE Digest DG365 Soakage Test

Test Hole No: TP02

Test No: Test No 1 (Initial)

Time from Filling to Maximum Water Depth, *minute*



Pit Length, m	1.000	Depth to Water at Start of Test, m	0.210
Pit Width, m	0.450	Max Water Dropdown during Test, m	0.300
Depth to Pit Base, m	0.600	Total Soakage Test Time, min	259.0
Depth to Top of Permeable Soils, m		Mean Internal Discharge Area, m ²	1.016
Depth to Groundwater Surface, m		Discharge Rate, litre/min	0.446
Depth to Top of Granular Fill, m		Soakage Rate, litre/m ² /min	0.439
Voids Assumed for Granular Fill, %	100%	BRE Soil Infiltration Rate, m/sec	7.32E-06

Comments: 250 litres used.
Pit was nearly emptied at finish of test.

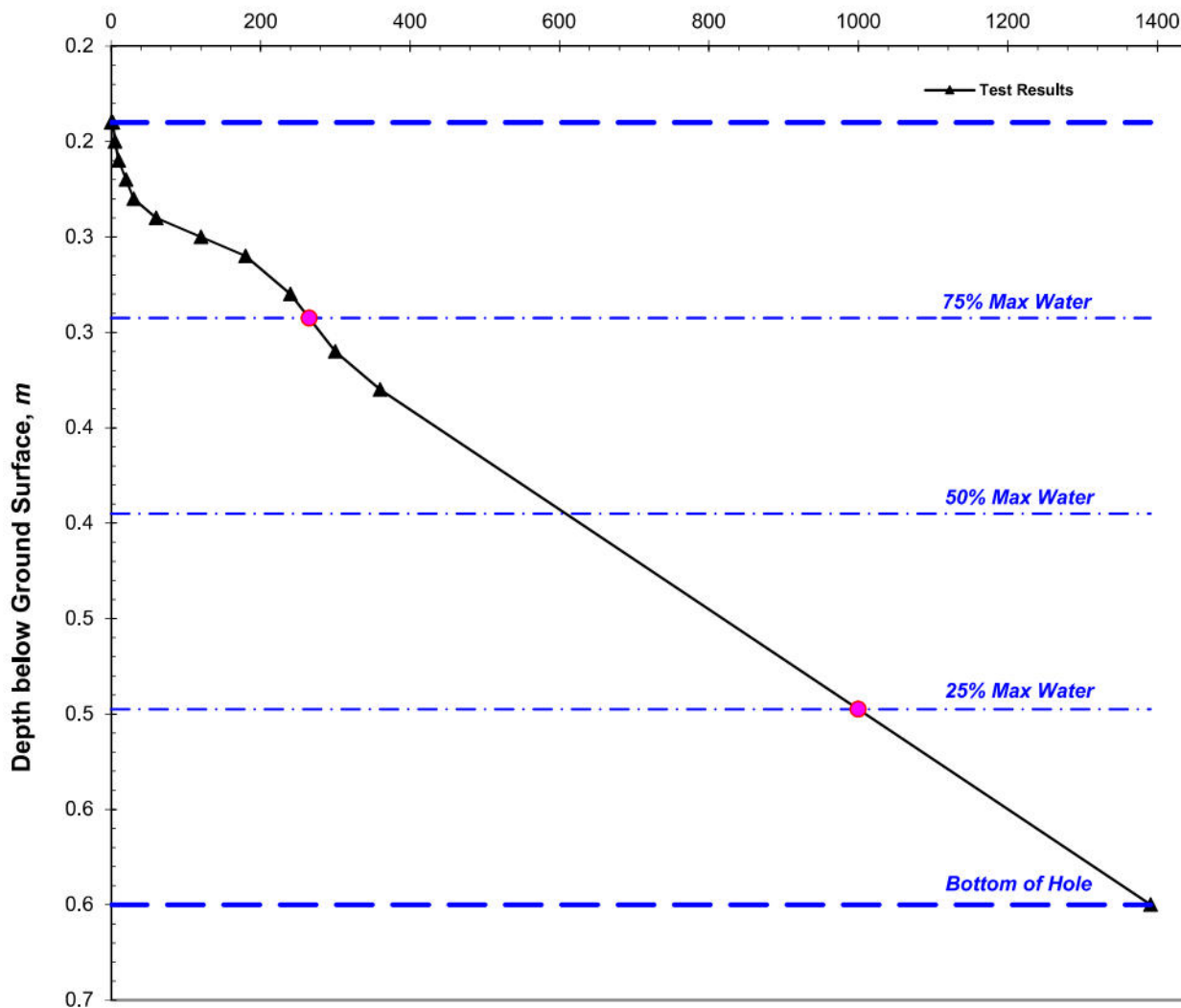
Client: Rockfort Properties Ltd.	Job No: JT0618	Test Date: 25/Feb/2025
Site: 424-426 Reading Road, Winnersh	Tested By: JS	Engineer: RJ
		Fig. S1

BRE Digest DG365 Soakage Test

Test Hole No: TP02

Test No: Test No 2 (Repeated)

Time from Filling to Maximum Water Depth, *minute*



Pit Length, m	1.000	Depth to Water at Start of Test, m	0.190
Pit Width, m	0.450	Max Water Dropdown during Test, m	0.410
Depth to Pit Base, m	0.600	Total Soakage Test Time, min	1391.0
Depth to Top of Permeable Soils, m		Mean Internal Discharge Area, m ²	1.045
Depth to Groundwater Surface, m		Discharge Rate, litre/min	0.126
Depth to Top of Granular Fill, m		Soakage Rate, litre/m ² /min	0.120
Voids Assumed for Granular Fill, %	100%	BRE Soil Infiltration Rate, m/sec	2.00E-06

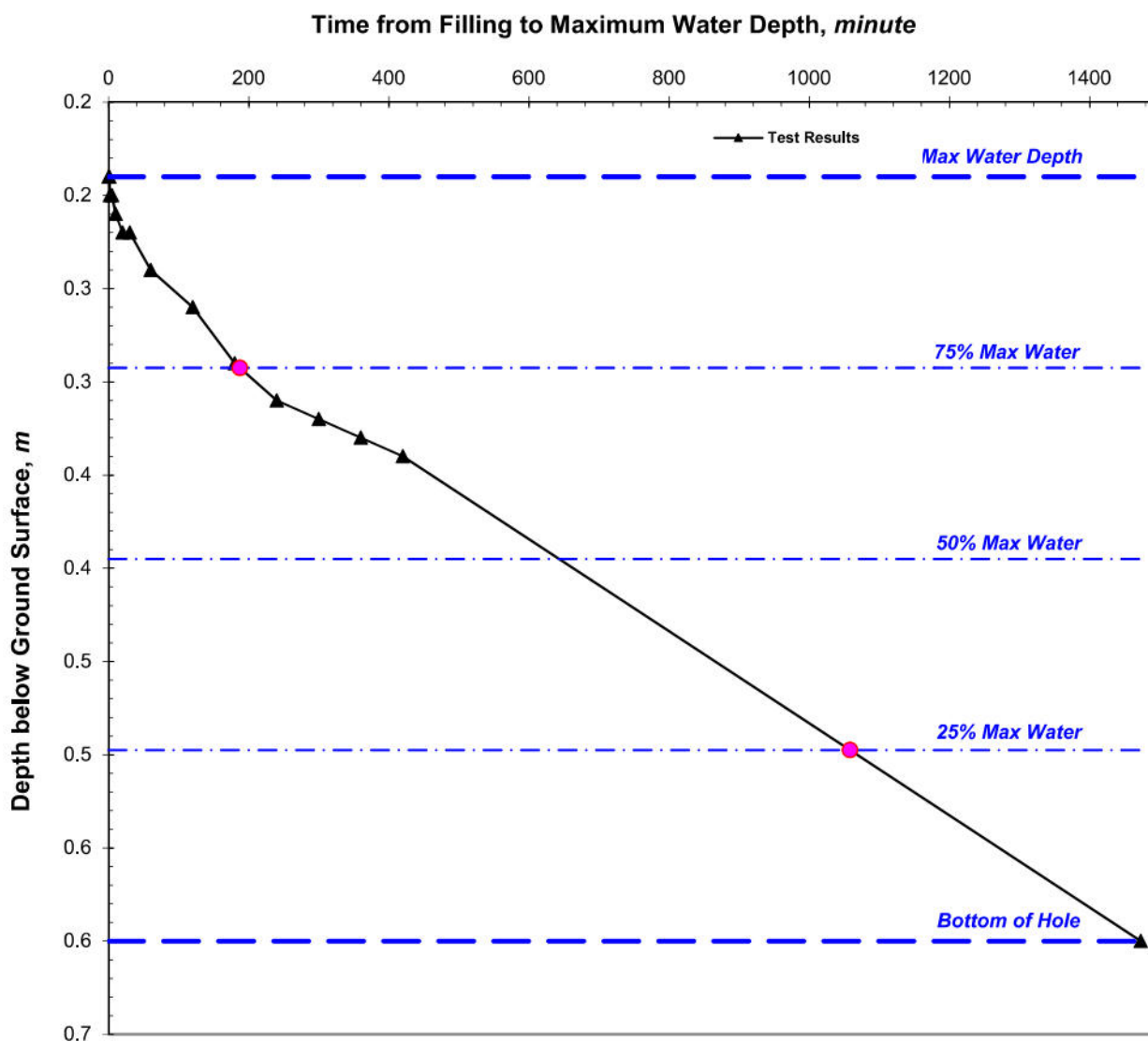
Comments: 250 litres used.
Pit was emptied at finish of test.

Client: Rockfort Properties Ltd.	Job No: JT0618	Test Date: 26/Feb/2025	
Site: 424-426 Reading Road, Winnersh	Tested By: JS	Engineer: RJ	Fig. S2

BRE Digest DG365 Soakage Test

Test Hole No: TP02

Test No: Test No 3 (Repeated)



Pit Length, m	1.000	Depth to Water at Start of Test, m	0.190
Pit Width, m	0.450	Max Water Dropdown during Test, m	0.410
Depth to Pit Base, m	0.600	Total Soakage Test Time, min	1473.0
Depth to Top of Permeable Soils, m		Mean Internal Discharge Area, m ²	1.045
Depth to Groundwater Surface, m		Discharge Rate, litre/min	0.106
Depth to Top of Granular Fill, m		Soakage Rate, litre/m ² /min	0.101
Voids Assumed for Granular Fill, %	100%	BRE Soil Infiltration Rate, m/sec	1.69E-06

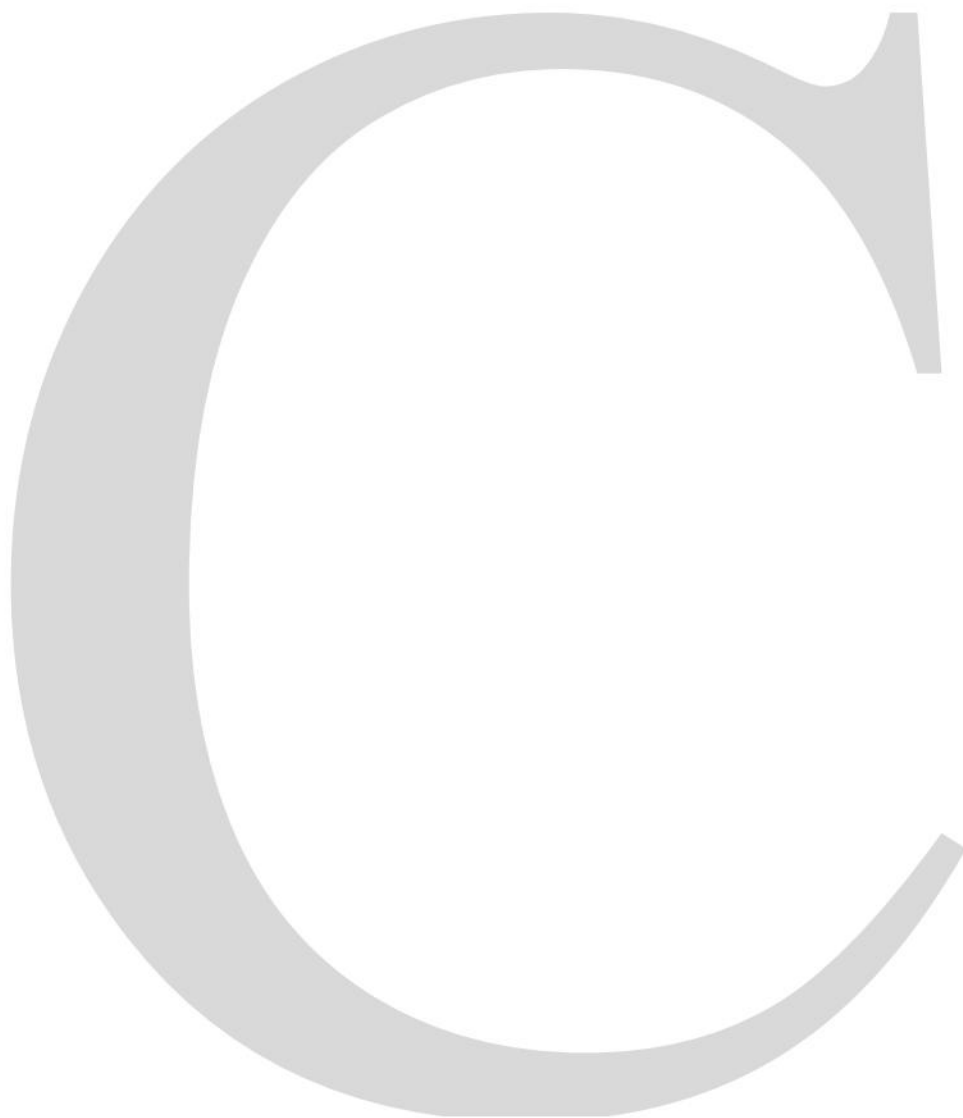
Comments: 250 litres used.
Pit was emptied at finish of test.

Client: Rockfort Properties Ltd.	Job No: JT0618	Test Date: 27/Feb/2025	
Site: 424-426 Reading Road, Winnersh	Tested By: JS	Engineer: RJ	Fig. S3



APPENDIX C

Photographs





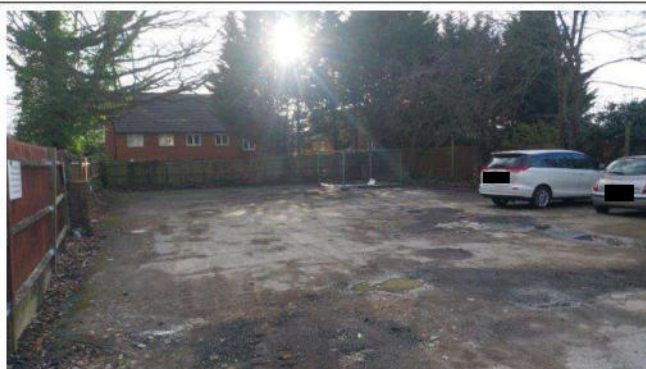
Photograph 1 - Broadly looking south-west at the shop frontage and front car park on the northern parts of the site.



Photograph 2 - Broadly looking west at the front car parking area.



Photograph 3 - Broadly looking north from the rear car park towards the rear side of the existing buildings on site.



Photograph 4 - Broadly facing south-west across the rear car park on site.



Photograph 5 - Looking down at water seepage encountered at 0.8m bgl within TP01.



Photograph 6 - Looking down at TP01 spoil arisings.



Photograph 7 - Looking down at water seepage encountered at 1.4m bgl within TP01.



Photograph 8 - Looking down at TP02.



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Appendix D - Brownfield Calculations

 water, civils and environment		Project		424-426 Reading Road		Job Ref.		AEG4106	
		Client		Upinder Aujla		Sheet		1	
		Element		Brownfield Runoff Calculations		Date		22/05/2024	
						Calc by		AR	
						Check by		VW	
Ref		Calculations						Output	
		Using the Modified Rational Method (as set out in CIRIA C753) to calculate the Brownfield runoff rate. $Q = 2.78 \times C \times i \times A$ (EQ. 24.5) i = Average rainfall intensity of the design storm in millimetres per hour, mm/hr. A = Effective impermeable area of the existing site in hectares, ha. Q = Rainfall runoff rate in litres per second, l/s. C = Dimensionless Runoff Coefficient. * 2.78 = Conversion factor to address the rainfall unit being in mm/hr. *Ciria C753 (Section 24.6.2), volumetric and routing coefficients CV & CR (CV of the order 0.6 and the routing coefficient, CR of the order of 1.3) the two coefficients are usually incorporated into a single term with a value of between 0.8 and 1.0 depending on how effectively the catchment is drained. A constant rainfall intensity of 35mm/hr has been assumed (24.6.2 – Rainfall intensity). The estimated brownfield rainfall rate has been based on the existing drainage systems draining a total area of 0.0197 ha. $Q = 2.78 \times 1.0 \times 35 \times 0.114 = 11.092$ l/s The above calculation demonstrates that the development currently drains unrestricted at 11.092 l/s. The proposed restricted discharge rate is to be set at 1l/s which is a 91% betterment over the existing discharge rate on site							
enquiries@aegaea.com - civils@aegaea.com - www.aegaea.com									

Appendix E - Proposed Drainage Layout

6 to 12

14 to 19



Appendix F - Proposed Drainage Calculations

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.400	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	45	0	0

Node sa Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00608	Invert Level (m)	47.900	Slope (1:X)	500.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.500
Safety Factor	2.0	Width (m)	20.000	Inf Depth (m)	
Porosity	0.30	Length (m)	30.000		

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	dummy chamber	1	48.283	0.000	0.0	0.0000	0.0000	OK
600 minute winter	sa	585	48.310	-0.010	5.9	68.3889	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
600 minute winter	sa	1.000	dummy chamber	0.0	0.000	0.000	0.0000	0.0
600 minute winter	sa	Infiltration		0.5				

Appendix G - Topographical survey

170740 N

477880⁺E

477900⁺E

477920⁺E

170720 N

+

+

+