



RIDGE

Drainage & Flood Risk Report

138–144 FRIAR STREET
NATIONAL PUB PORTFOLIO LTD.

30 July 2026

138-144 FRIAR STREET NATIONAL PUB PORTFOLIO LTD.

Prepared for

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1. INTRODUCTION

Ridge and Partners LLP has been commissioned by National Pub Portfolio Ltd to prepare a Drainage and Flood Risk Report in support of a detailed planning application for a new six storey building to provide 145 co-living units, together with the partial retention of the former Bugle Public House at 138-144 Friar Street, RG1 1EX.

The scope of this report is to review data in relation to the existing drainage regime, existing flood risk information and develop a drainage strategy.

1.1. National Policy

The following National Policy relating to Flood Risk is applicable to the site:

- National Planning Policy Framework (NPPF) (paragraphs 170 – 182)¹ – Ministry of Housing, Communities and Local Government, 2024
- Planning Practice Guidance on Flood Risk and Coastal Change² – Ministry of Housing, Communities and Local Government, 2025

The proposed surface water drainage scheme has been designed to take into consideration the seven national standards as stated in National Standards for SuDS.

- Standard 1: Runoff destinations
- Standard 2: Management of everyday rainfall (interception)
- Standard 3: Management of extreme rainfall and flooding
- Standard 4: Water quality
- Standard 5: Amenity
- Standard 6: Biodiversity
- Standard 7: Design of drainage for construction, operation, maintenance, decommissioning and structural integrity

1.2. Local Policy

This assessment has been carried out in line with the following relevant Local Policy relating to flood risk and drainage:

- Reading Borough Council (RBC) – Local Plan, 2019³
- Reading Borough Council – Level 1 Strategic Flood Risk Assessment (SFRA), 2024⁴
- Reading Borough Council – Level 2 Strategic Flood Risk Assessment (SFRA), 2025⁵
- Reading Borough Council – Partial Update of the Local Plan, 2023⁶

¹ [NPPF 2024](#)

² [PPG](#)

³ [Reading Borough Local Plan](#)

⁴ [Reading Borough Council Level 1 SFRA](#)

⁵ [Reading Borough Council Level 2 SFRA](#)

⁶ [Local Plan Review March 2023](#)

1.3. Guidance and Best Practice

This assessment has been carried out in line with the guidance and best practice listed below:

- Flood risk assessments: applying for planning permission⁷ – Department for Environment, Food & Rural Affairs and Environment Agency, 2025
- Preparing a flood risk assessment: standing advice⁸ – Environment Agency and Department for Environment, Food & Rural Affairs, 2025
- Flood risk assessments: climate change allowances⁹ – Environment Agency, 2022

2. EXISTING SITE

2.1. Site Location and Existing Development

Site Name: 138–144 Friar Street

Site Address: 138–144 Friar Street, Reading, RG1 1EX

Site Location: Easting: 471468, Northing: 173561

National Grid Reference: SU 71468 73561

Site Planning Boundary: Approx 0.1307ha

The site is located at 138–144 Friar Street with an approximate planning boundary as highlighted in red within Figure 1.

⁷ [Flood risk assessments if you're applying for planning permission – GOV.UK \(www.gov.uk\)](https://www.gov.uk)

⁸ [Preparing a flood risk assessment: standing advice – GOV.UK \(www.gov.uk\)](https://www.gov.uk)

⁹ [Flood risk assessments: climate change allowances – GOV.UK \(www.gov.uk\)](https://www.gov.uk)



Figure 1 – Site Location Plan

2.2. Land Use and Topography

A topography survey has been conducted and shows the site to be relatively flat with levels varying between 45.29m AOD and 45.63m AOD. The site topography can be found in **Appendix A**.

3. GROUND CONDITIONS

A desktop study of the geology at the site has been undertaken. The purpose of this assessment is to develop an understanding of the expected geology and the infiltration potential of the ground.

3.1. Geological Records

British Geological Survey (BGS) online mapping shows the site is likely to be underlain by a bedrock of Seaford Chalk Formation and Newhaven Chalk Formation. The mapping also shows superficial deposits comprising of Taplow Gravel Member sand and gravel. The BGS records can be seen in Figure 2 and Figure 3.

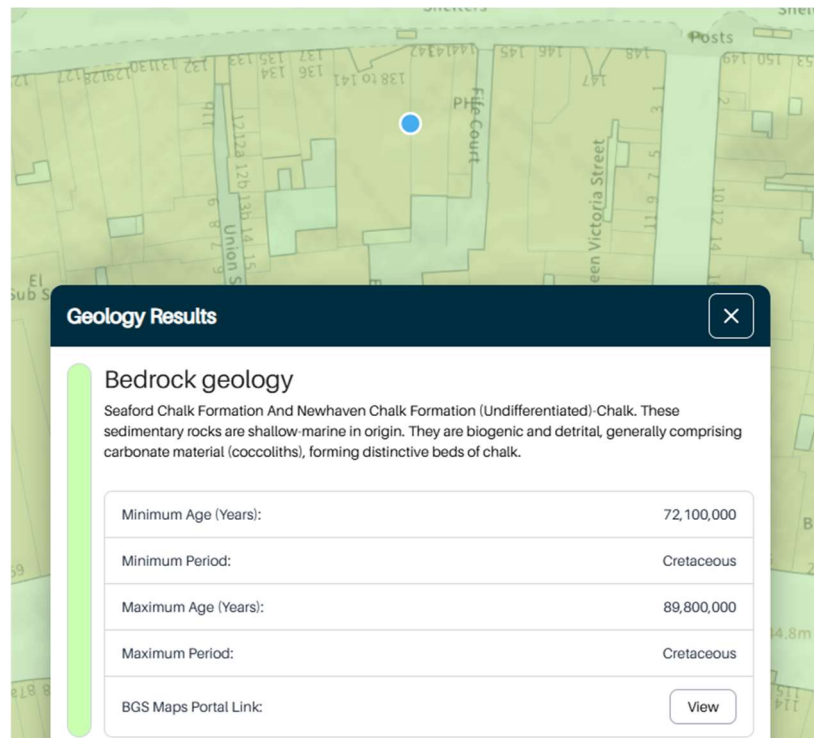


Figure 2 – Extract of Bedrock Geology (British Geological Survey, 2026)

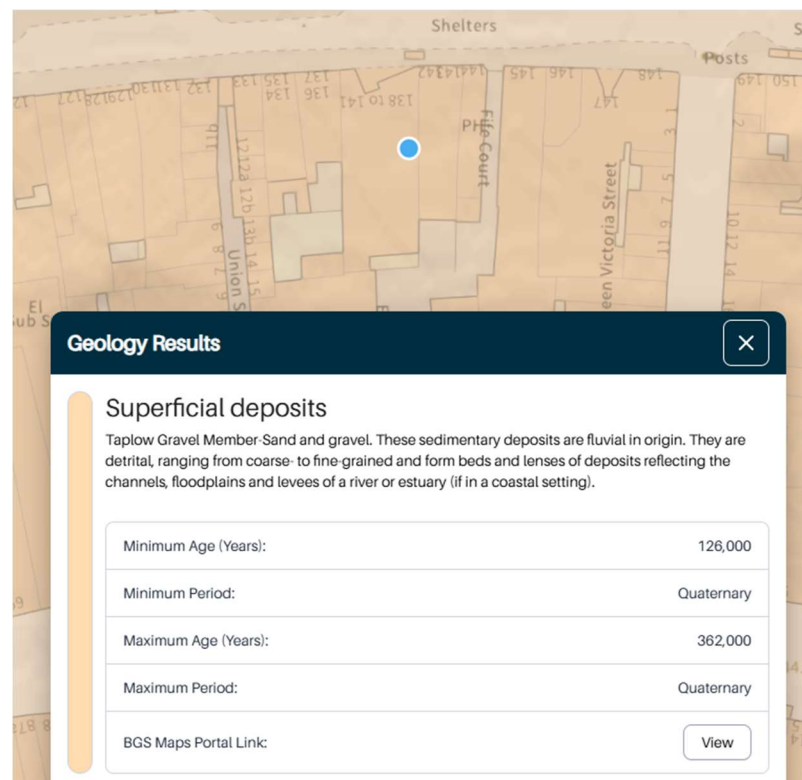


Figure 3 – Extract of Superficial Geology (British Geological Survey, 2026)

BGS borehole logs have also been reviewed with the nearest borehole to the site located approximately 30m to the south-west reference SU77SW45. This borehole indicates gravels extend to approximately 9m below ground level, below which is the chalk bedrock.

3.2. Infiltration Potential

Infiltration potential has been assessed based on the above British Geological Survey records and soil information obtained from Soilscales. An extract of the Soilscales mapping has been included in Figure 4.

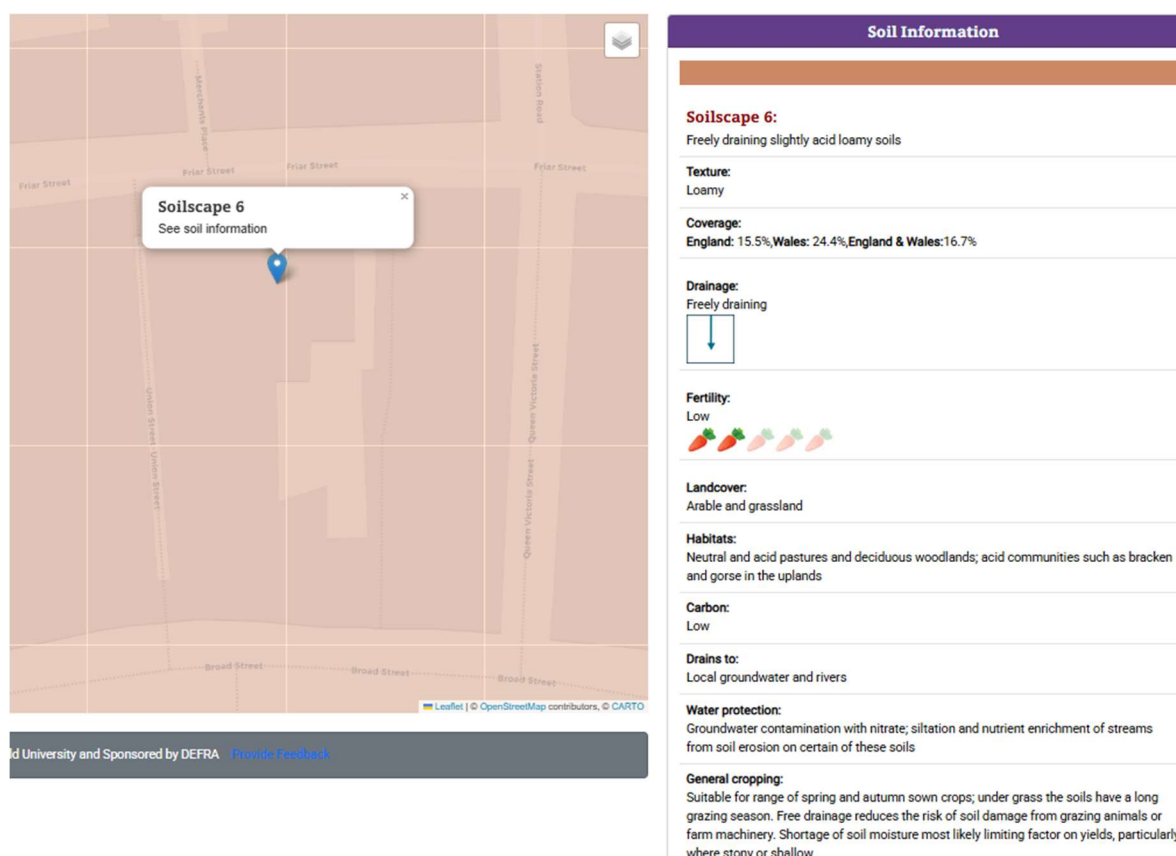


Figure 4 – Soilscale Mapping

The Soilscales mapping suggest that there is potential for infiltration across the site. This is aligned with the expected gravels and chalk geology which could have infiltration.

4. DEVELOPMENT PROPOSALS

The proposed development consists of the phased redevelopment of the site involving the demolition of Nos. 138–141 and 142–143 Friar Street, partial demolition of No. 144 Friar Street, and erection of a basement and 6-storey building to provide co-living residential accommodation (purpose-built shared living accommodation – Sui Generis use class), together with the partial retention of the former Bugle Public House as a standalone Class E commercial unit.

The planning boundary for the application is approximately 0.1307Ha.

An extract of the proposed site plan is shown in Figure 5, for full drawings refer to the architect drawings submitted as part of the planning application.



Figure 5 - Extract of Site Plan

5. EXISTING DRAINAGE

5.1. Existing Drainage

Within Friar Street north of the site, are separate foul and surface water sewers. As shown on Thames Water asset records, a 225mm diameter foul sewer runs west to east. A 225mm diameter surface water sewer runs west to east shown to start in the road to the north of 136 Friar Street. It appears based on the records, that surface water from the building connects onto 225mm diameter surface water sewer via an existing spur.

Level information for the existing surface water sewer is currently unavailable, therefore, the surface water sewer has been interpolated using a notional gradient 1:225 from known downstream surface water chamber 5553 located within Queen Vicotria Street.

An existing CCTV drainage survey was undertaken at 142–144 Friar Street dated July 2022 by C J Uden & Co. The survey indicates a series of 100mm and 225mm diameter foul drains running within Fife Court Road which picks up foul connections from the development and neighbouring building.

An extract of the Thames Water Asset Records can be seen in Figure 6.

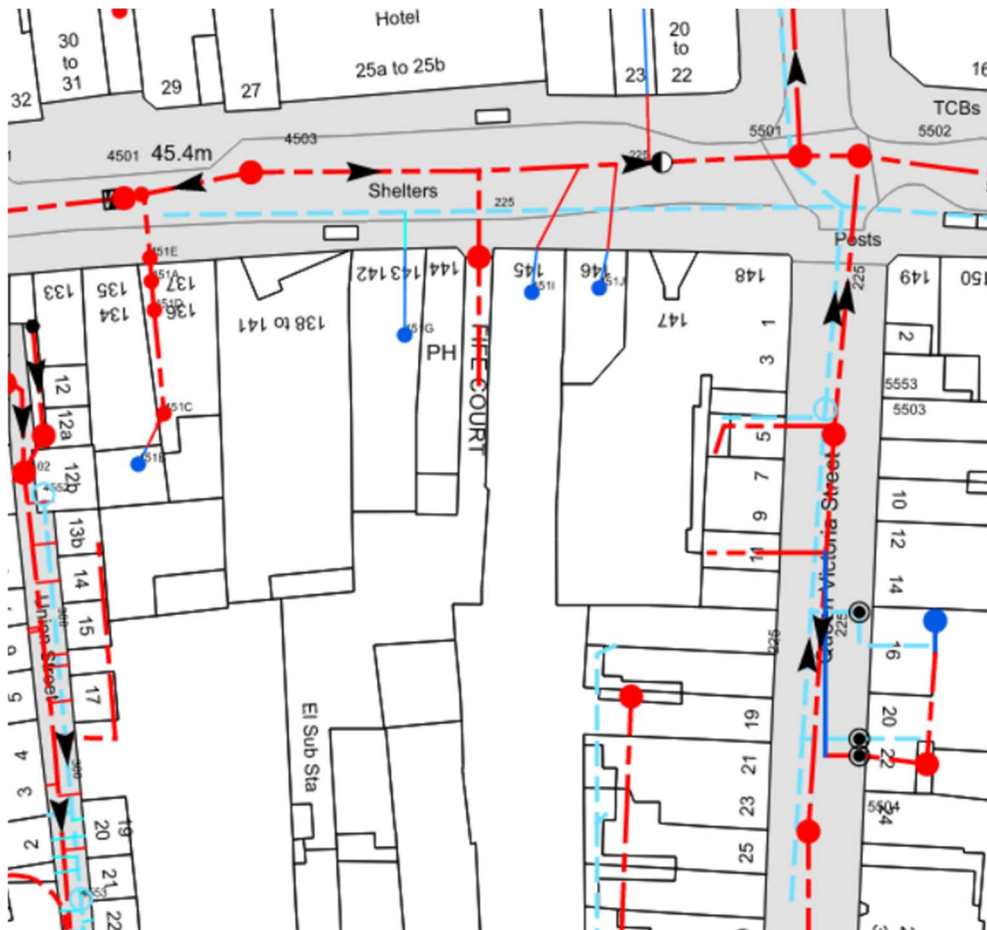


Figure 6 – Extract of Thames Water Asset Plans

5.2. Existing Surface Water Discharge Rate

As the existing site is brownfield with connection to the sewer network, the existing brownfield runoff rate has been calculated in line with the SuDS Manual C753 24.6.2 using the Modified Rational Method. The calculation summary is shown in Table 1 and full assessment in **Appendix B**.

$$Q = 2.78 \times C \times i \times A$$

Q = Peak rate of runoff (l/s)

C = C_v (volumetric runoff coefficient) $\times C_R$ (dimensionless routing coefficient) = 1.0

i = Rainfall Intensity (mm/hr)

A = Total Catchment Area being drained (ha)

Table 1 – Existing surface water discharge rates

STORM EVENT	L/S
1 in 2 year	14.0
1 in 30 year	26.6
1 in 100 year	33.9

The greenfield runoff rate for the proposed site boundary area has also been calculated using the HR Wallingford Greenfield Runoff Rate Estimation Tool. The runoff rate has been summarised in Table 2 and full output shown in **Appendix B**.

Table 2 – Greenfield Runoff Rate Summary based on FEH Rainfall Data 2025 (HR Wallingford Greenfield Runoff Rate Tool)

STORM EVENT	L/S
1 in 2 year	0.1
1 in 30 year	0.3
1 in 100 year	0.4
Qbar (greenfield runoff rate)	0.1

6. SOURCES OF FLOOD RISK

Baseline flood risk to the existing site from all sources has been considered based on publicly available information and mapping provided by the Environment Agency (EA).

6.1. Fluvial, Tidal and Breach Flooding

The site is located circa 700m south of the River Thames and 200m north of the culverted Holy Brook. The EA flood map for planning (extract provided below in Figure 7) indicates the site is located within flood zone 1, indicating a less than 0.1% Annual Probability (AP) of fluvial flooding.

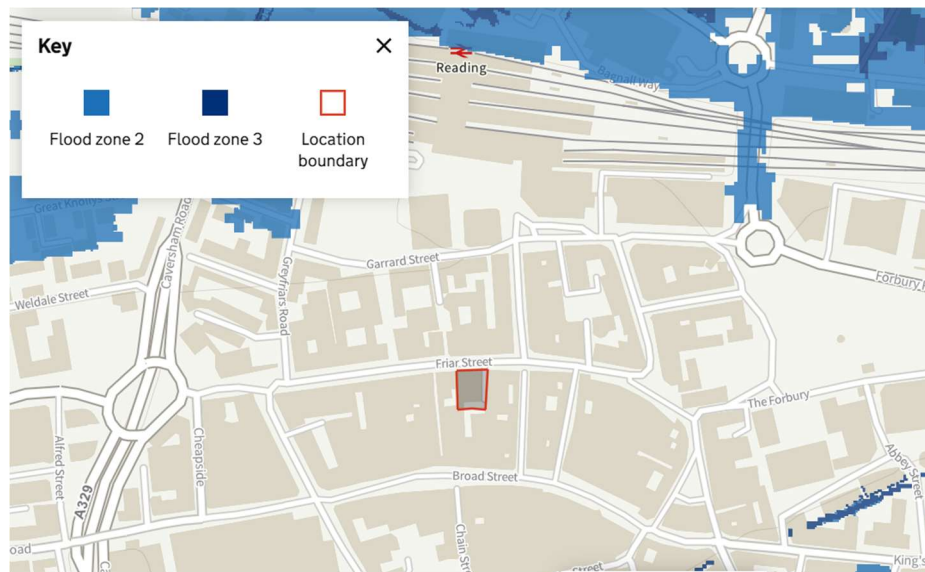


Figure 7 – Extent of Flooding from Rivers and Seas in Accordance with Flood Maps for Planning (Environment Agency, 2026)

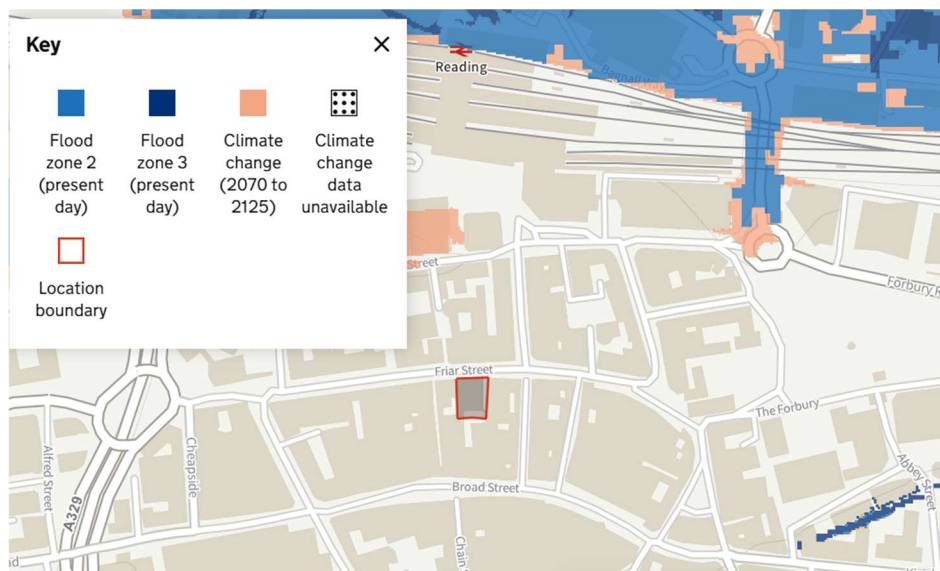


Figure 8 – Extent of Flooding from Rivers and Seas with Climate Change (2070-2125) in Accordance with Flood Maps for Planning (Environment Agency, 2026)

In accordance with the EA long term flood risk data, climate change projections indicate fluvial flood extents between years 2070-2125, which is shown in orange within Figure 8.

6.2. Surface Water

EA surface water mapping indicates the site to be at risk of surface water flooding during a 1% AP event in the present day and during a 30% AP event following climate change (2080s). The expected flood depths during the design event required for planning (1% AP+CC) are indicated in Figure 9.

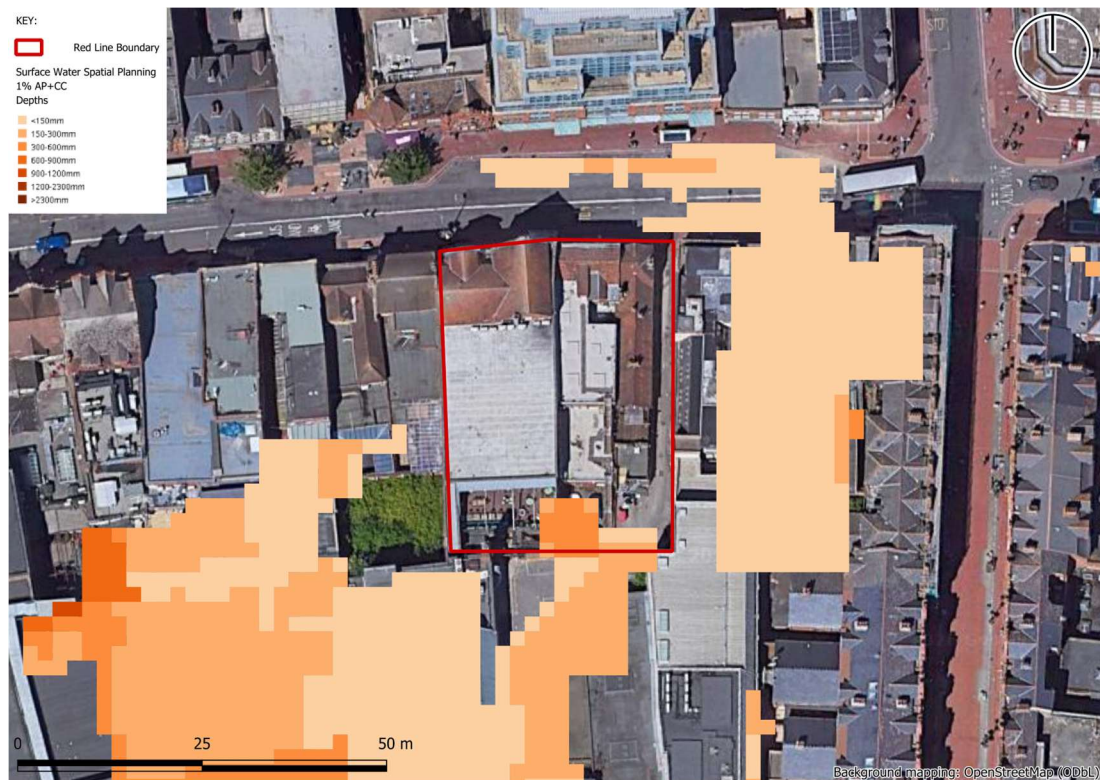


Figure 9 – Surface water flood depths during the design event (1% AP+CC)

During all events up to and including the 1% AP+CC design event, the flood extent is restricted to the existing car park area to the south of the building. Flood depths in this area are shown to be 300–600mm.

An assessment of EA LiDAR derived flow paths was undertaken to better understand surface water flow routing in the area, see Figure 10.



Figure 10 – Surface water flood depths during the design event (1% AP+CC) with flow paths.

LiDAR indicates that ground levels in the north of the site fall initially to the north-east and then to the north, while those in the south of the site fall towards the south-east and then continue south. This indicates that the surface water flooding shown on the mapping to the south of the building is generated from building roofs on site and would flow south-east, away from the building.

The topographic survey in **Appendix A** shows that ground levels within the parking area fall from 45.48m AOD in the south-west to a low spot at 45.18m AOD in the centre before rising to 45.27m AOD in the north-east corner. Levels adjacent to the south and east are around 40.4m AOD. This indicates that surface water could pond to depths of 300mm at the centre of the parking area if there was sufficient contributing catchment area to generate these volumes of runoff.

The area draining to this point is restricted to existing building roofs as shown in Figure 10 with vertical walls to the north and west, while ground levels fall away to the south. Therefore, it is considered that the mapping is lacking accuracy at this location being based solely on LiDAR which does not provide the accuracy of the detailed topographic survey or account for the storey height building walls surrounding this area.

This car parking area is proposed to be built over as part of the development as shown in **Error! Reference source not found.**, with an access door located at an existing level of 45.72m AOD outside the surface water floodplain. Finished floor levels for the proposed building are not indicated on the plans and elevations but are assumed to be in the order of 45.9m AOD allowing a standard 150mm threshold. No access is proposed along the southern boundary where existing ground levels are lower.

A substation is proposed along the east flank of the building where existing ground levels are 45.67m AOD. This is located outside the surface water floodplain and is anticipated to be protected by proposed finished floor levels, with no additional flood mitigation measures required.

The risk of surface water flooding to the proposed development is therefore considered to be low.

Although the proposed building would remove an area of existing car parking that is shown to be at a high risk of surface water flooding, the mapping is not considered to be accurate at this location. The flooding shown would be generated within the site and would be managed through the surface water drainage strategy, which would restrict flows off site as set out below.

As the risk of surface water flooding is managed by the development, the sequential test is not required in accordance with Planning Practice Guidance (PPG) Policy F5.

The mapping indicates no surface water flooding immediately north of the site, therefore safe access and egress would be achievable to the west along Friar Street during the 1% AP+CC event.

6.3. Groundwater

BGS data indicates the site to be overlain by chalk, with superficial deposits of sand and gravel. This bedrock has a high permeability meaning water can move through it towards the surface.

Reading's Strategic Flood Risk Assessment (SFRA) mapping indicates the site to be in an area that has a greater than 75% susceptibility to groundwater flooding.

No ground investigation has been carried out due to the presence of the existing buildings so there is no recent groundwater monitoring data available. However, BGS borehole log reference SU77SW45 located approximately 30m to the south-west of the site indicates that groundwater was struck at the interface of the gravel and chalk at a depth of 29 feet and 6 inches, i.e. 9m, as shown in **Appendix F**.

The proposals include a single storey basement beneath the northern part of the building, which is anticipated to have a maximum depth of 3m. Therefore, based on the available data there would be around 6m clearance between the basement slab and the recorded groundwater level.

It is therefore concluded that the risk of groundwater flooding to the development is low and that the proposed basement will not affect existing groundwater flows, with no increase in groundwater flood risk elsewhere.

6.4. Artificial Sources

The site is not located in an area that would be at risk of flooding in the event of a reservoir failure. There are no other canals or other potential sources of artificial flooding near the site. As such the risk of flooding from artificial sources is considered low.

7. PROPOSED DRAINAGE

The proposed drainage scheme has been developed in line with the National Standards for Sustainable Drainage.

The National Standards for Sustainable Drainage contains standards for the design of new surface water drainage systems on both brownfield and greenfield sites. The guidance contains the following two types of standards:

- The Hierarchy Standard (*Standard 1*) – providing criteria for the choice of discharge location from the proposed site.
- Fixed Standards (*Standards 2-7*) – the minimum design criteria for the SuDS features and guidance on how they should be built, maintained and operated.

7.1. Standard 1: Runoff destinations

In accordance with Standard 1, runoff from the proposed development should be discharged in accordance with the following hierarchy:

- Priority 1: Collected for non-potable use.
- Priority 2: Infiltrated to ground.
- Priority 3: Discharged to an above ground surface water body.
- Priority 4: Discharged to a surface water sewer or another piped surface water drainage system.
- Priority 5: Discharged to a combined sewer.

The drainage strategy has been developed in accordance with the hierarchy as evidenced in below.

7.1.1. Priority 1: Collected for non-potable use

Rainwater capture for reuse has been considered but is not proposed due to the lack of demonstratable yield vs demand for the proposed development.

For this building, rainwater re-use for toilet flushing is considered to offer limited (if any) sustainable benefit due to complexity of systems, additional pipework, additional maintenance, etc. Reuse has also been considered for irrigating landscaped area, but there is limited demand due to only notional proposed soft landscaping within the courtyard.

7.1.2. Priority 2: Infiltrate to Ground

Infiltration systems should be incorporated dependent on the ground conditions being suitable and adequate infiltration rates being identified. Based on the information outlined in the desktop ground investigation, infiltration systems may be viable due to superficial geology consisting of gravel over a chalk bedrock. However, as recommended within design guidance BRE 365, CIRIA C753 (The SuDS Manual) and CIRIA C574 (Engineering in Chalk) point focussed infiltration systems i.e. soakaways are to be located a minimum 5m distance from foundations, this extends to 10m where chalk is low density or the density is unknown. When considering the spatial arrangement of the site, adjacent building positions / layout of the new building, infiltration as a method of disposing surface water in general is considered

to be unsuitable with the exception of the courtyard area which can be permeable construction discharging water to ground.

7.1.3. Priority 3: Discharge to an above ground surface water body

The next priority is to discharge to a receiving above ground surface water body at an agreed flow rate and volume with the Environmental Agency (EA) and the Lead Local Flood Authority (LLFA).

The nearest waterbody is Holy Brook which is in excess of 3.1km to south of the site. See extract Figure 11.

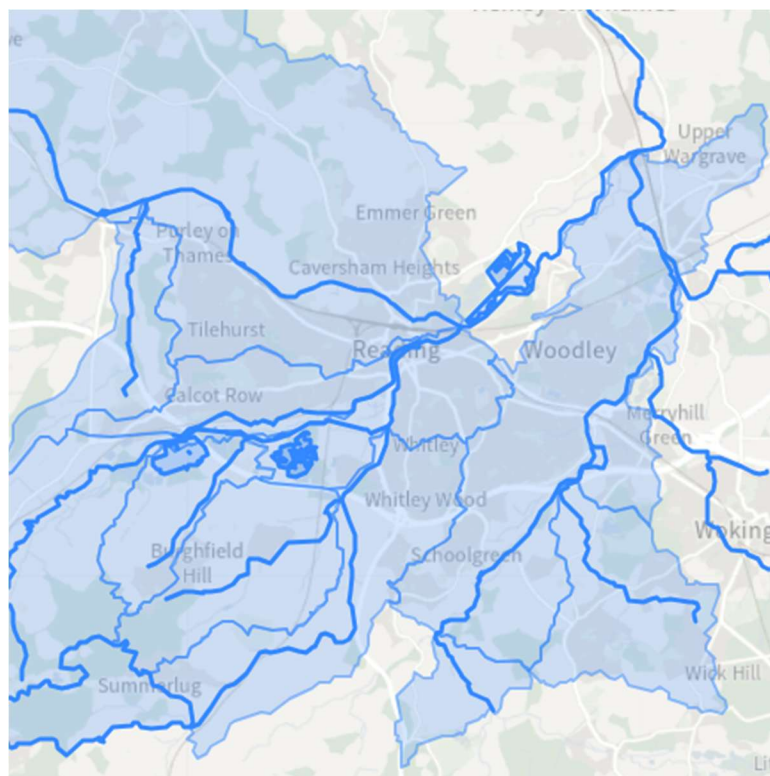


Figure 11 – Environmental Agency Watercourse Mapping

As the water body is a significant distance from the site, discharge to an above ground surface water body is not considered viable and is therefore not being proposed for the scheme.

7.1.4. Priority 4: Discharge to a surface water sewer

The proposed surface water strategy is to discharge into the existing 225mmDIA Thames Water surface water sewer within Friar Street north of the site, which is in line with the existing building drainage arrangement. Further investigation works to be conducted to confirm level information for the existing Thames Water 225mmDIA sewer.

7.1.5. Priority 5: Discharge to a combined water sewer

The proposed scheme does not propose to discharge to a combined water sewer.

7.2. Standard 2: Management of everyday rainfall

In accordance with Standard 2, at least the first 5mm of rainfall for the majority of rainfall events is either to be collected for use, infiltrated into the ground, or else captured, conveyed and stored within SuDS features.

7.2.1. Interception

The surface water strategy is proposed to manage discharge from the site for rainfall events of less than 5mm through a system comprising of green roofs and permeable surfacing. The site has been designed holistically so that catchments drain via SuDS, providing water quality, delivery of amenity and biodiversity benefits.

As outlined in the NSfS interception shall be considered to be compliant where:

- Green roofs only drain their own surface area.
- Permeable surfaces, whether lined or not shall be assumed to comply providing there is no additional area drained to the permeable pavement. Or where infiltration capacity of the ground beneath the permeable surface is greater than 1x10⁻⁶m/s and is unlined, up to 5 times the permeable surface area may be added as additional contributing area.

The proposed strategy is to maximise the extent of green roof to capture, store and convey runoff for the building roof area prior to connection onto the below ground drainage network. The new courtyard area is proposed to be of permeable construction. Surface water runoff from the courtyard is to be managed and stored within the open graded sub-base layer prior to infiltrating into the surrounding ground. Where permeable surfacing is proposed above the basement footprint, an impermeable liner is to be installed beneath to prevent water ingress into the basement.

7.3. Standard 3: Management of extreme rainfall and flooding

In accordance with Standard 3, surface water from the development for all rainfall events up to the extreme events including allowance for climate change, is managed on site and causes no adverse impacts to the following:

- Protect people and property on the development from flooding of the surface water drainage system
- Mitigate any increased flood risk to people and property adjacent to or downstream of the development
- Protect the receiving water body from morphological damage or minimise the impact on sewer capacity

7.3.1. Runoff Rates and Volumes

The proposed surface water discharge rate and storage volume for the development has been designed to ensure that no flooding occurs for all storm events up to the 1 in 100 year + 45 climate change events. Where surface water cannot be drained to ground additional surface water attenuation is provided using two geo-cellular attenuation tanks located beneath the courtyard (with a storage volume of 59m³) and hardstanding south of the building (with a storage volume of 12.8m³).

Section 3.19 states where the volume of runoff discharged from the development to surface waters or sewers for the 1% AEP, 6-hour rainfall event is greater than the volume of greenfield runoff for the same rainfall event, the peak allowable discharge rate from the development for the 1% AEP event shall be limited to the 50% AEP greenfield runoff rate or 3l/s/ha, whichever is the greater – this is relevant for this scheme, on the basis that the volume of runoff is greater than the greenfield volume.

Section 3.21 of the NSFS states that for previously developed sites a 'relaxation factor' shall be applied to the target 50% and 1% AEP greenfield runoff rates where evidence is provided that demonstrates why greenfield runoff or 3l/s/ha cannot be achieved.

Section 3.21.1 states: This relaxation factor shall be no greater than 5 times the greenfield runoff rate.

Section 3.22 states: Where the peak allowable discharge rate requires flow controls with orifices (or equivalent) with a diameter of less than 50mm, the flow control shall be robustly protected from blockage risks. Regardless of this, the risk of blockage for all flow controls shall be assessed and mitigated against.

The Qbar greenfield rate is calculated as 0.1l/s, when considering a relaxation factor of up to 5 times, the permissible rate of discharge is up to 0.5l/s for all events up to the 100 yr + CC event. This rate of discharge was incorporated into the below ground hydraulic model, however when used resulted in 24-hour half drain in the 30yr storm event (for the surface water attenuation) not being achieved and therefore failing to be compliant with best practice design.

It is therefore proposed to discharge at the lowest rate possible whilst achieving half-drain which is 1.4l/s. The flow control proposed is a vortex device with a 53mm diameter orifice to minimise blockage risk. This provides flow rate reduction of between 90–96% depending on the storm return period. Refer to

Table 3 for discharge rate summary and **Appendix E** for detailed hydraulic calculations.

Table 3 – Proposed Peak Discharge Rates

CRITICAL STORM BY RETURN PERIOD	SW FLOW CONTROL CHAMBER DISCHARGE RATE (L/S)	EXISTING SW DISCHARGE RATE (L/S)	% DIFFERENCE
1 in 2 year	1.4	14	90%
1 in 30 year	1.4	26.6	95%
1 in 100 year	1.4	33.9	96%
1 in 100 year + 45%cc	1.4	–	

It's worth noting that a green roof and permeable landscaping areas have been incorporated into the drainage strategy, however the benefits of the green roof and permeable landscaping areas have not

been included within the drainage calculations, with the catchment area of the green roof being added directly to the below ground hydraulic model (i.e. a conservative approach).

7.3.2. Exceedance

The surface water scheme has been designed and modelled to manage surface water runoff on site for all storms up to and including 1 in 100 year + 45%cc. In the event of exceedance of the design event, the site levels have been developed to convey surface water away from the proposed development and adjacent nearby buildings. Refer to proposed drainage strategy in **Appendix C** for exceedance flow routes.

7.4. Standard 4: Water Quality

7.4.1. Water Quality Management Criteria

The surface water strategy for the proposed development has been designed using SuDS which provide water quality treatment.

In accordance with Table 4.3 in Chapter 4 of the SUDS Manual (C753) a water quality assessment has been undertaken to meet the requirements of the Lead Local Flood Authority using the Simple Index Approach.

The approach followed is set out in Section 26.7.1 of the SUDS Manual and is an appropriate approach for this type of development.

From Table 26.2 of the SUDS Manual, the pollution hazard indices are notes as follows:

Table 4 – Pollution Hazard Indices (CIRIA C753, 2015)

LAND USE	POLLUTION HAZARD LEVEL	TOTAL SUSPENDED SOLIDS (TSS)	METALS	HYDROCARBONS
Residential Roofs	Very Low	0.2	0.2	0.05
Individual property driveways, residential car parks, low traffic roads and non-residential car parking with infrequent change	Low	0.5	0.4	0.4

To deliver adequate treatment, the selected SUDS components should have a total mitigation index that equals or exceeds the pollution hazard index.

$$\text{Total SUDS Mitigation} \geq \text{Pollution Hazard Index}$$

The SUDS mitigation indices for the SUDS components are shown in Table 5:

Table 5 – Pollution Mitigation Indices (CIRIA C753, 2015)

TYPE OF SUDS COMPONENT	MITIGATION INDICES		
	TSS	Metals	Hydrocarbons
Permeable pavement	0.7	0.6	0.7
Green roof	0.5	0.4	0.4

Two treatment trains are provided across the site depending on the location of the catchment in relation to the drainage strategy. The treatment trains have been listed below:

- Treatment Train 1: Green roof
- Treatment Train 2: Permeable Paving

The water quality assessment has been undertaken on each treatment train as demonstrated in Table 6.

Table 6 – Water Quality Assessment

POLLUTION SOURCES		POLLUTION HAZARD INDICES	MITIGATION INDICES	
Treatment Train 1	TSS	0.2	0.5	PASS
	Metals	0.2	0.4	PASS
	Hydrocarbons	0.05	0.4	PASS
Treatment Train 2	TSS	0.5	0.7	PASS
	Metals	0.4	0.6	PASS
	Hydrocarbons	0.4	0.7	PASS

As shown in Table 6, the treatment trains deliver the required level of treatment for each pollution hazard index (e.g., roofs, residential roads, and car parks). Therefore, the proposed SuDS provide sufficient pollution mitigation and compliance with the water quality requirements outlined in Chapter 4 of the SuDS Manual.

7.5. Standard 5 & 6: amenity & biodiversity

This standard requires a 'SuDS approach' that maximises benefits for amenity and biodiversity through the creation of multifunctional places and landscapes.

Designated communal shared amenity spaces are located within the courtyard south of the building. There is limited opportunity to include open SuDS features in the courtyard area due to limited space, shading and proximity to adjacent properties. Green roofs are to be incorporated to enhance biodiversity on site. Refer to architect drawings for green roof details and specification.

7.6. Standard 7: Construction, operation, maintenance

The proposed scheme has been designed in accordance with Building Regulations Part H, British Standards and the CIRIA SuDS Manual.

As below ground attenuation is required to achieve the surface water storage volumes, catchpit chambers with 400mm sumps are to be installed prior to connection to the tanks.

During the construction phase the contractor shall ensure SUDS are installed in accordance with CIRIA C698 – Site Handbook for the construction of SuDS.

During the operational phase, the drainage system shall be maintained by a suitably qualified maintenance company in accordance with the following maintenance plan and alongside the manufacturer's requirements.

A summary of the management and maintenance requirements and the expected design life of the above surface water drainage assets as laid out in CIRIA C753, The SuDS Manual, is provided in Table 7 below.

Table 7 – Management and Maintenance Plan

MAINTENANCE SCHEDULE	REQUIRED ACTION	TYPICAL FREQUENCY	ESTIMATED ASSET DESIGN LIFE
Permeable Paving			<i>As standard block paving</i>
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or as required based on site specific observations of clogging and manufacturer's recommendations.	
	Stabilise and mow contributing and adjacent areas	As required	
	Removal of weeds or management using glyphosate applied directly into the weeds by and applicator rather than spraying	As required – once per year on less frequently used pavements	

MAINTENANCE SCHEDULE	REQUIRED ACTION	TYPICAL FREQUENCY	ESTIMATED ASSET DESIGN LIFE
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of paving	As required.	
	Remedial 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 reduced due to significant clogging)	
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 h after large storms in first three months	
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually	
	Monitor inspection chambers	Annually	
Green Roof			<i>40–60 years</i>
Regular Maintenance	Remove debris and litter to prevent clogging of inlet drains and interference with plant growth	Six monthly and annually or as required	
	During establishment (ie year one), replace dead plants as required	Monthly (but usually responsibility of manufacturer)	
	Post establishment, replace dead plants as required (where > 5% of coverage)	Annually (in autumn)	

MAINTENANCE SCHEDULE	REQUIRED ACTION	TYPICAL FREQUENCY	ESTIMATED ASSET DESIGN LIFE
	Remove fallen leaves and debris from deciduous plant foliage	Six monthly or as required	
	Remove nuisance and invasive vegetation, including weeds	Six monthly or as required	
	Mow grasses, prune shrubs and manage other planting (if appropriate) as required – clippings should be removed and not allowed to accumulate	Six monthly or as required	
Remedial actions	If erosion channels are evident, these should be stabilised with extra soil substrate similar to the original material, and sources of erosion damage should be identified and controlled	As required.	
	If drain inlet has settled, cracked or moved, investigate and repair as appropriate	As required.	
	Repair / rehabilitate inlets, outlets and overflows	As required.	
Monitoring	Inspect all components including soil substrate, vegetation, drains, irrigation systems (if applicable), membranes and roof structure for proper operation, integrity of waterproofing and structural stability	Annually and after severe storms	
	Inspect soil substrate for evidence of erosion channels and identify any sediment sources	Annually and after severe storms	
	Inspect drain inlets to ensure unrestricted runoff from the drainage layer to the	Annually and after severe storms	

MAINTENANCE SCHEDULE	REQUIRED ACTION	TYPICAL FREQUENCY	ESTIMATED ASSET DESIGN LIFE
	conveyance or roof drain system		
	Inspect underside of roof for evidence of leakage	Annually and after severe storms	
Attenuation tank			<i>As per the manufacturer's geo-cellular crate specifications</i>
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually	
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly	
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary	Annually	
	Remove sediment from pre-treatment structures and/ or internal forebays	Annually, or as required	
Remedial actions	Repair/ rehabilitate inlets, outlet, overflows and vents	As required	
Monitoring	Inspect/ check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually	
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required	

MAINTENANCE SCHEDULE	REQUIRED ACTION	TYPICAL FREQUENCY	ESTIMATED ASSET DESIGN LIFE
Manholes/ Catchpits			>50 years
Regular Maintenance	Inspect chamber for build-up of any debris/ sediment in the base of catchpits and remove as required.	Annually.	
	Inspect covers and frames for any signs of damage, or indications of covers becoming loose/ tampered with.	Annually.	
Remedial Actions	Repair/ replace covers or frame. Remove silt/ debris from base of catchpit.	As required.	
Monitoring	As per 'Regular Maintenance' activities.	Annually.	
Pipes			>50 years
Regular Maintenance	Inspect chamber by visually checking for evidence of standing water in pipe runs (pipe invert submerged) and chamber is free-flowing. This may be an indication of blockages within the pipe. High-pressure jet/ rod as necessary to remove any blockage.	Annually.	
	Check for any obstructions across pipe inlets/ outlets within chamber/ Remove any debris or other obstructions as necessary.	Annually.	
Remedial Actions	Rodding and/ or CCTV condition survey and high-pressure jetting. Clearance of pipe inlets/ outlets within the chamber.	As required.	
Monitoring	Intrusive inspection (CCTV condition survey) to be	Every 10 years or as required.	

MAINTENANCE SCHEDULE	REQUIRED ACTION	TYPICAL FREQUENCY	ESTIMATED ASSET DESIGN LIFE
	undertaken of pipes and high-pressure jet washing/ rodding to be undertaken as required to cleanse systems of debris/ blockages. Undertake any other repairs e.g. pipe lining if identified from survey.		
Hydrobrake Flow Control			<i>Designed to be self-maintaining for the life of the installation</i>
Regular Maintenance	Inspect for build-up of any debris / algae / sediment and remove as required	Monthly for 3 months, then annually	
Remedial Actions	Replace permafilter geotextile if visible signs of damage / blockage	As required.	
Monitoring	As regular maintenance	Annually	

7.7. Summary of the Proposed Surface Water Drainage Strategy

The proposed scheme is to incorporate a green roof to capture surface water runoff from the building roof area to promote biodiversity and reduce runoff rate from the site. Rainwater for the building will be collected via rainwater downpipes that are to be developed by the MEP engineer. Each downpipe will connect below ground onto the proposed surface water drainage network draining into two new geo-cellular attenuation tanks before discharging onto the existing surface water via a vortex flow control restricting to 1.4l/s before connection onto the surface water sewer in Friar Street to the north of the site. Proposed external landscaping area is proposed to be of permeable construction with rainwater draining to ground.

A pre-capacity enquiry has been lodged with Thames Water, but at the time of writing this report, their response is outstanding.

The proposed drained areas are summarised in Table 8 and shown in further detail within **Appendix D**.

Table 8 – Proposed Catchment Area Breakdown

AREA	M ²	HECTARES	% OF SITE
Proposed build and associated landscaping	1066	0.1066	81%

Refer to **Appendix C** for the drainage strategy general arrangement, and **Appendix E** for InfoDrainage hydraulic calculations.

7.8. Proposed Foul Water Drainage

The foul water drainage strategy is proposed to be collected below ground and connect onto existing foul sewers within Fife Court Road and Friar Street.

Based on the current available data, the existing connection to the foul sewer in Friar Street will be reused. Further investigation works are required to confirm condition and connectivity of the existing foul pipework within Friar Street and Fife Court Road prior to installation of the proposed below ground foul drainage. (If required a new connection will need to be formed).

A pre-capacity enquiry has been lodged with Thames Water, at the time of writing this report to confirm capacity and proposed connection location to their asset – their response is outstanding at the time of writing this report.

8. CONCLUSION

The development proposals have been prepared in accordance with relevant adopted and emerging policies. The risk of flooding from all sources is considered to be low and does not require management or mitigation. The sequential test is not required, and safe access and egress will be available to and from the site during flood conditions.

It is proposed that surface water will be discharged into the Thames Water surface water network to the north of the site. SuDS have been included with a green roof and areas of new external works being permeable construction. In addition, to achieve the rate of surface water reduction and associated storage two below ground geo-cellular attenuation tanks are proposed.

The system has been designed to accommodate the 1 in 100 + 45% climate change storm event with a peak discharge rate of 1.4l/s – this is between 90–96% reduction when compared to the existing building. The proposed surface water drainage network provides sufficient capacity for the proposed development. A foul and surface water pre-capacity assessment has been submitted to Thames Water in which the results are not yet available.

APPENDIX A: TOPOGRAPHICAL SURVEY

APPENDIX B: BROWNFIELD & GREENFIELD RUNOFF RATE

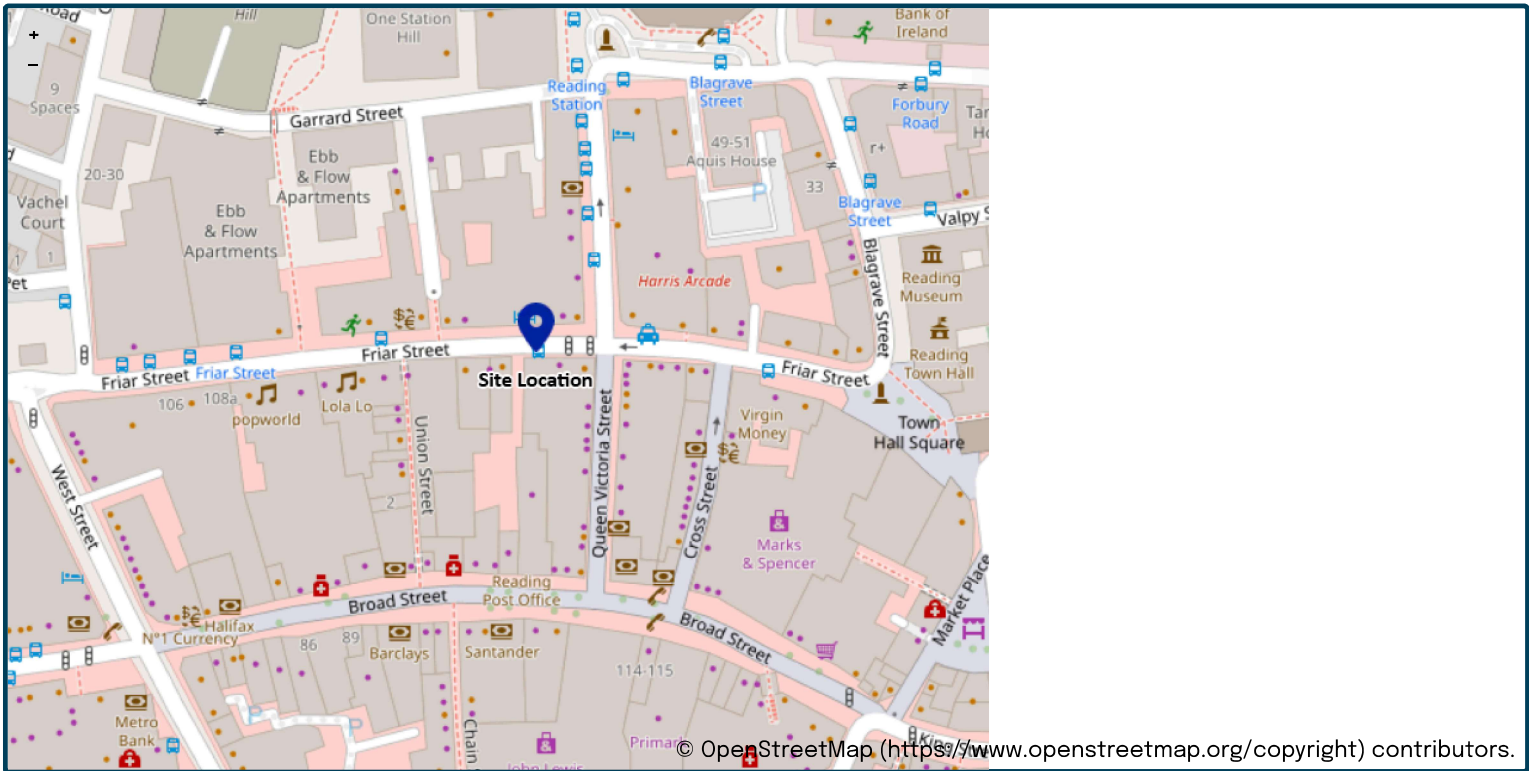
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	18/06/2026
Calculated by	TW
Reference	5033963 - 138-144 Friar Street
Model version	2.2.3

Location

Site name	138-144 Friar Street
Site location	138-144 Friar Street



Site easting (British National Grid)	471482
Site northing (British National Grid)	173573

Site details

Total site area (ha)	0.1307	ha
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MORE INFO

Greenfield runoff

Method

Method	FEH statistical (2025)
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FEH statistical (2025)

	My value		Map value
SAAR9120 (mm)	665	mm	
BFIHOST19scaled	0.769		
QMed-QBar conversion	1.136		1.136
QMed (l/s)	0.1	l/s	
QBar (FEH statistical 2025) (l/s)	0.1	l/s	

Growth curve factors

	My value		Map value
Hydrological region	6		6
1 year growth factor	0.85		
2 year growth factor	0.88		
10 year growth factor	1.62		
30 year growth factor	2.3		
100 year growth factor	3.19		
200 year growth factor	3.74		

Results

Method	FEH statistical (2025)	
Flow rate 1 year (l/s)	0.1	l/s
Flow rate 2 year (l/s)	0.1	l/s
Flow rate 10 years (l/s)	0.2	l/s
Flow rate 30 years (l/s)	0.3	l/s
Flow rate 100 years (l/s)	0.4	l/s
Flow rate 200 years (l/s)	0.4	l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent ‘zero’ figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.3) developed by HR Wallingford and available at uksuds.com (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of the data in the design or operational characteristics of any drainage scheme.

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Modified Ration Method for Brownfield Runoff

Project Number: 5033963
Project Name: 138-144 Friar Street
Date: 29/06/2026

Area (Ha) 0.1307

$Q = 2.78 * C_v * C_r * I * A$

Q = flow rate (l/s)
Cv = Volumetric Runoff Coefficient
Cr = Routing Coefficient
I - Rainfall intensity
A = Area (Ha)

Storm Return Period	Existing Discharge (L/S)
2yr	14.0
30yr	26.6
100yr	33.9
100yr+40%	47.5

Under summer rainfall conditions Cv ranges from 0.6 - 0.9, for fully impermeable areas value of 0.75 should be used.

The routing coeffcieint varies between 1 and 2 and accounts for the effect of rainfall characterisitcs and catchment shape on the peak runoff magnitude.
The SuDS manual recoomends a fixed value for Cr of 1.3 for design.

Rainfall intensity is calculated following Wallingford Procedure Volume 4 and is as follows:

1.0 Determination of M5-60 min and r

60 minute, 5 year storm (M5-60) has a rainfall depth M5-60 18.800
Ratio r 0.4

2.0 Determination of M5-D

M5-D = Z1 (M5-60min)
Z1 is taken from A3.a or A.3b for values between 0.12 and 0.45 and for durations between 5 minutes and 48 hours read to 0.01.

Assuming 2yr 15min, 30yr 15 min, 100yr 15min

Z1 0.64
M5-15 12.032 mm

3.0 Determination of MT-D

MT-D is obtained from the relationship:
MT-D = Z2(M5-D)

Taken from Table A1 for 2yr return period 15min storm
Z2 = 0.8
M1-15= 9.6

Taken from Table A1 for 30yr return period 15min storm
Z2= 1.56
M30-15= 18.8

Taken from Table A1 for 100yr return period 15min storm
Z2= 1.99
M100-15= 23.9

4 Determination of point rainfall intensities

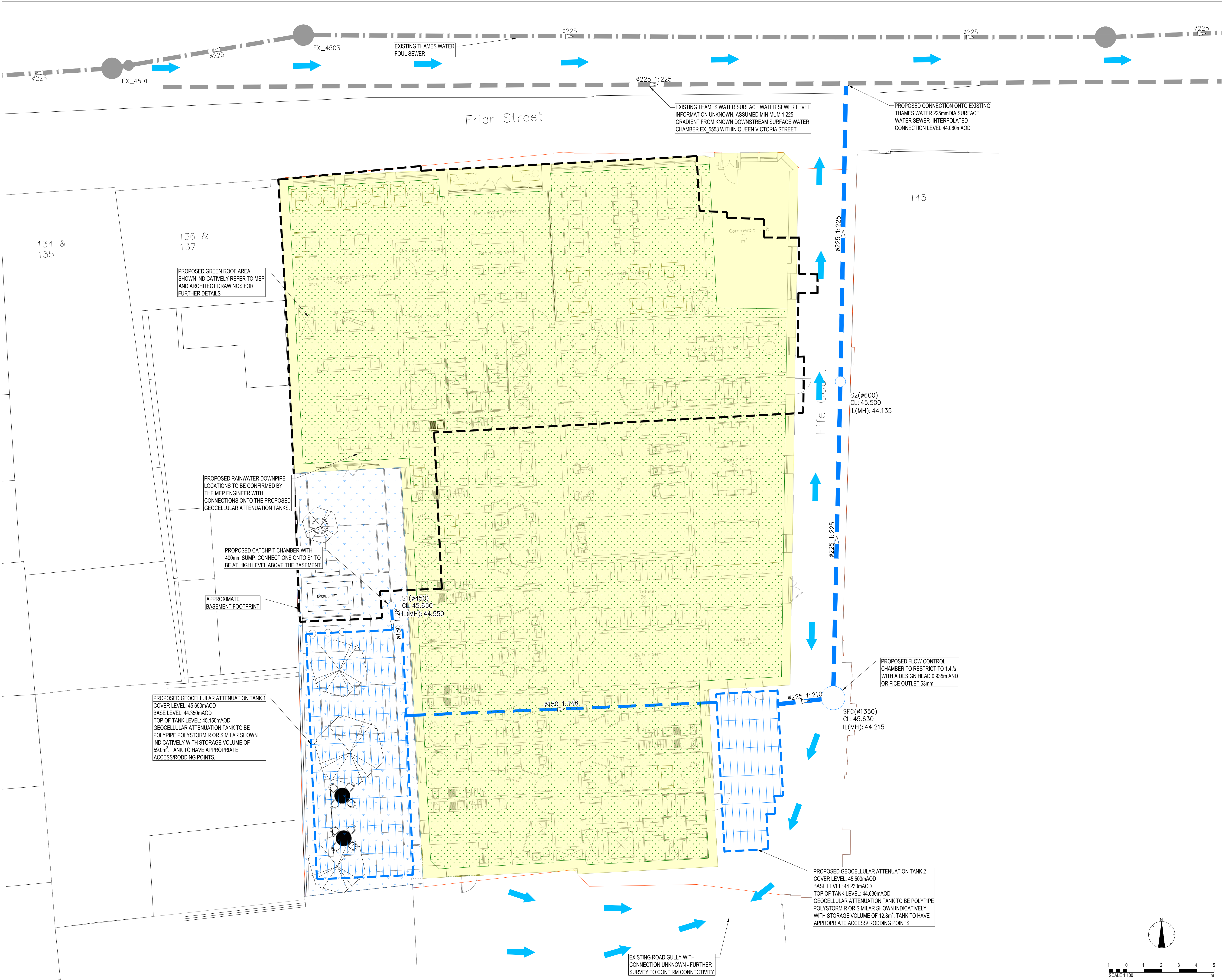
i= 38.5024 mm/hr i= 75.07968 mm/hr i= 95.77472 mm/hr

5 Application of areal reduction factor

From chart A4 where area is greater than 1km2
ARF= 1

Average 2yr intensity 38.5 Average 30yr intensity 75.1 Average 100yr intensity 95.8 Average 100yr+40% intensity 134.1

APPENDIX C: PROPOSED DRAINAGE STRATEGY



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DRAINAGE KEY (1:250)	
KEY	DESCRIPTION
	NEW SURFACE WATER CHAMBER AND DRAIN
	EXISTING SURFACE WATER CHAMBER AND DRAIN
	NEW GREEN ROOF AREA
	BUILDING FOOTPRINT
	EXISTING FOUL WATER CHAMBER AND DRAIN
	NEW ATTENUATION TANK
	NEW PERMEABLE AMENITY AREA AS PER LANDSCAPE ARCHITECT'S SPECIFICATION
	EXCEEDANCE FLOW ROUTE
	APPROXIMATE BASEMENT FOOTPRINT

P01 First Issue	24/07/2026	TW	PCh
REV DESCRIPTION	DATE	BY	CHKD
ORIGINATOR: www.ridge.co.uk			

RIDGE

PROJECT NUMBER: 5033963
CLIENT:
NATIONAL PUB PORTFOLIO LTD

IN ASSOCIATION WITH:

PROJECT:
138-144 FRIAR STREET

TITLE:
PROPOSED SURFACE WATER
DRAINAGE STRATEGY

DRAWN BY: TW CHECKED BY: PCh APPROVED BY: PCh

SCALE: 1:100 @ A1 DATE: JULY 2026

STATUS: DESCRIPTION
S2 - ISSUED FOR INFORMATION

MODEL REFERENCE:
PROJECT: 5033963 ORG: RDG FUNCTION: XX SPATIAL: XX FORM: D DISCIPLINE: C NUMBER: 110500 REV: P01

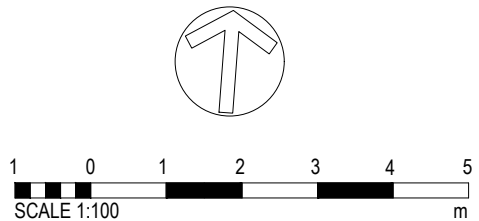
APPENDIX D: CATCHMENT AREA TAKEOFF PLAN

	PROPOSED HARDSTANDING AREA = 912m ²
	EXISTING HARDSTANDING AREA = 241m ²
	PROPOSED PERMEABLE LANDSCAPING AREA = 154m ²

Friar Street

145

Fife Court



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P01	First Issue	24/07/2026	TW	PCr
REV	DESCRIPTION	DATE	BY	CHKD
ORIGINATOR: www.ridge.co.uk				

RIDGE

PROJECT NUMBER: 5033963

CLIENT:
NATIONAL PUB PORTFOLIO LTD.

IN ASSOCIATION WITH:

PROJECT:
138-144 FRIAR STREET

TITLE:
CATCHMENT AREA PLAN

DRAWN BY: TW CHECKED BY: PCr APPROVED BY: PCr

SCALE: 1:100 @ A1 DATE: JUNE 2026

STATUS: DESCRIPTION:
S2 - ISSUED FOR INFORMATION

MODEL REFERENCE:
PROJECT: 5033963 ORG: RDG FUNCTION: XX SPATIAL: XX FORM: D DISCIPLINE: C NUMBER: 950001 REV: P01

APPENDIX E: SURFACE WATER CALCULATIONS

Project: 138-144 Friar Street	Date: 02/07/2026		
	Designed by: TW	Checked by: PCh	Approved By: PCh
Report Details: Type: Inflows Storm Phase: No blue roofs	Company Address: 3 Valentines Place, SE1 8QH		



Catchment Area

Type : Catchment Area

Area (ha)	0.04
-----------	------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff Coefficient	1.000
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Catchment Area (1)

Type : Catchment Area

Area (ha)	0.04
-----------	------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff Coefficient	1.000
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Catchment Area (2)

Type : Catchment Area

Area (ha)	0.016
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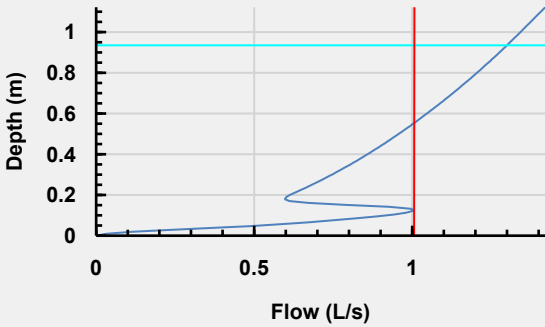
Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff Coefficient	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Project: 138-144 Friar Street	Date: 02/07/2026		
	Designed by: TW	Checked by: PCh	Approved By: PCh
Report Details: Type: Junctions Storm Phase: No blue roofs	Company Address: 3 Valentines Place, SE1 8QH		



Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
SFC1	Outlet	1.002	Hydro-Brake®
	Invert Level (m)	44.215	
	Design Depth (m)	0.935	
	Design Flow (L/s)	1.3	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☐	
	Unit Reference	CHE-0053-1300-0935-1300	
			
S2	Outlet	1.003	Free Discharge

Project: 138-144 Friar Street	Date: 02/07/2026		
	Designed by: TW	Checked by: PCh	Approved By: PCh
Report Details: Type: Stormwater Controls Storm Phase: No blue roofs	Company Address: 3 Valentines Place, SE1 8QH		





Geocellular Attenuation Tank 1

Type : Cellular Storage

Dimensions

Exceedance Level (m)	45.650
Depth (m)	0.800
Base Level (m)	44.350
Number of Crates Long	14
Number of Crates Wide	11
Number of Crates High	2
Porosity (%)	95
Crate Length (m)	1
Crate Width (m)	0.5
Crate Height (m)	0.4
Total Volume (m³)	59.020

Inlets

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area (1)
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (2)

Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet (1)

Outgoing Connection	1.000
Outlet Type	Free Discharge

Project: 138-144 Friar Street	Date: 02/07/2026		
	Designed by: TW	Checked by: PCh	Approved By: PCh
Report Details: Type: Stormwater Controls Storm Phase: No blue roofs	Company Address: 3 Valentines Place, SE1 8QH		





Geocellular Attenuation Tank 2

Type : Cellular Storage

Dimensions

Exceedance Level (m)	45.500
Depth (m)	0.400
Base Level (m)	44.230
Number of Crates Long	3
Number of Crates Wide	21
Number of Crates High	1
Porosity (%)	95
Crate Length (m)	1
Crate Width (m)	0.5
Crate Height (m)	0.4
Total Volume (m³)	12.840

Inlets

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	1.000
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area (2)
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	1.001
Outlet Type	Free Discharge

Project: 138-144 Friar Street	Date: 02/07/2026		
	Designed by: TW	Checked by: PCh	Approved By: PCh
Report Details: Type: Junctions Summary Storm Phase: No blue roofs	Company Address: 3 Valentines Place, SE1 8QH		





FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flooded Volume

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SFC1	FEH: 2 years: +0 %: 15 mins: Summer	45.630	44.215	44.373	0.158	1.1	0.178	0.000	1.0	0.979	OK
S2	FEH: 2 years: +0 %: 15 mins: Summer	45.500	44.135	44.162	0.027	1.0	0.008	0.000	1.0	0.891	OK
S3	FEH: 2 years: +0 %: 15 mins: Summer	45.350	44.060	44.086	0.026	1.0	0.000	0.000	1.0	0.891	OK

Project: 138-144 Friar Street	Date: 02/07/2026		
	Designed by: TW	Checked by: PCh	Approved By: PCh
Report Details: Type: Junctions Summary Storm Phase: No blue roofs	Company Address: 3 Valentines Place, SE1 8QH		





FEH: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flooded Volume

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SFC1	FEH: 30 years: +0 %: 15 mins: Summer	45.630	44.215	44.504	0.289	1.9	0.327	0.000	1.0	0.913	Surcharged
S2	FEH: 30 years: +0 %: 15 mins: Summer	45.500	44.135	44.160	0.025	1.0	0.007	0.000	0.9	0.842	OK
S3	FEH: 30 years: +0 %: 15 mins: Summer	45.350	44.060	44.085	0.025	0.9	0.000	0.000	0.9	0.842	OK

Project: 138-144 Friar Street	Date: 02/07/2026		
	Designed by: TW	Checked by: PCh	Approved By: PCh
Report Details: Type: Junctions Summary Storm Phase: No blue roofs	Company Address: 3 Valentines Place, SE1 8QH		





FEH: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flooded Volume

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SFC1	FEH: 100 years: +0 %: 15 mins: Summer	45.630	44.215	44.562	0.347	2.0	0.392	0.000	1.0	0.997	Surcharged
S2	FEH: 100 years: +0 %: 15 mins: Summer	45.500	44.135	44.160	0.025	1.0	0.007	0.000	0.9	0.922	OK
S3	FEH: 100 years: +0 %: 15 mins: Summer	45.350	44.060	44.084	0.024	0.9	0.000	0.000	0.9	0.922	OK

Project: 138-144 Friar Street	Date: 02/07/2026		
	Designed by: TW	Checked by: PCh	Approved By: PCh
Report Details: Type: Junctions Summary Storm Phase: No blue roofs	Company Address: 3 Valentines Place, SE1 8QH		





FEH: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Flooded Volume

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SFC1	FEH: 100 years: +45 %: 15 mins: Summer	45.630	44.215	44.702	0.487	6.5	0.551	0.000	1.0	1.182	Surcharged
S2	FEH: 100 years: +45 %: 15 mins: Summer	45.500	44.135	44.161	0.026	1.0	0.007	0.000	0.9	1.078	OK
S3	FEH: 100 years: +45 %: 15 mins: Summer	45.350	44.060	44.085	0.025	0.9	0.000	0.000	0.9	1.078	OK

Project: 138-144 Friar Street		Date: 02/07/2026		
Designed by: TW		Checked by: PCh	Approved By: PCh	
Report Details: Type: Stormwater Controls Summary Storm Phase: No blue roofs		Company Address: 3 Valentines Place, SE1 8QH		



FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flooded Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)
Geocellular Attenuation Tank 1	FEH: 2 years: +0 %: 15 mins: Summer	44.416	44.416	0.066	0.066	15.7	4.864	0.000	0.000	5.5	4.458		91.759
Geocellular Attenuation Tank 2	FEH: 2 years: +0 %: 15 mins: Summer	44.373	44.373	0.143	0.143	6.5	4.254	0.000	0.000	1.1	1.203		66.868

Project: 138-144 Friar Street	Date: 02/07/2026			
	Designed by:	Checked by:	Approved By:	
	TW	PCh	PCh	
Report Details: Type: Stormwater Controls Summary Storm Phase: No blue roofs	Company Address: 3 Valentines Place, SE1 8QH			

Status
OK
OK

Project: 138-144 Friar Street		Date: 02/07/2026		
Designed by: TW		Checked by: PCh	Approved By: PCh	
Report Details: Type: Stormwater Controls Summary Storm Phase: No blue roofs		Company Address: 3 Valentines Place, SE1 8QH		



FEH: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flooded Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)
Geocellular Attenuation Tank 1	FEH: 30 years: +0 %: 15 mins: Summer	44.508	44.508	0.158	0.158	40.8	11.585	0.000	0.000	14.6	6.731		80.371
Geocellular Attenuation Tank 2	FEH: 30 years: +0 %: 15 mins: Summer	44.504	44.504	0.274	0.274	19.6	8.173	0.000	0.000	1.9	1.318		36.344

Project: 138-144 Friar Street	Date: 02/07/2026			
	Designed by:	Checked by:	Approved By:	
	TW	PCh	PCh	
Report Details: Type: Stormwater Controls Summary Storm Phase: No blue roofs	Company Address: 3 Valentines Place, SE1 8QH			

Status
OK
OK

Project: 138-144 Friar Street		Date: 02/07/2026		
Designed by: TW		Checked by: PCh	Approved By: PCh	
Report Details: Type: Stormwater Controls Summary Storm Phase: No blue roofs		Company Address: 3 Valentines Place, SE1 8QH		



FEH: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flooded Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)
Geocellular Attenuation Tank 1	FEH: 100 years: +0 %: 15 mins: Summer	44.566	44.566	0.216	0.216	52.9	15.779	0.000	0.000	14.8	7.796		73.266
Geocellular Attenuation Tank 2	FEH: 100 years: +0 %: 15 mins: Summer	44.562	44.562	0.332	0.332	22.4	9.895	0.000	0.000	2.0	1.462		22.939

Project: 138-144 Friar Street	Date: 02/07/2026			
	Designed by:	Checked by:	Approved By:	
	TW	PCh	PCh	
Report Details: Type: Stormwater Controls Summary Storm Phase: No blue roofs	Company Address: 3 Valentines Place, SE1 8QH			

Status
OK
OK

Project: 138-144 Friar Street		Date: 02/07/2026		
Designed by: TW		Checked by: PCh	Approved By: PCh	
Report Details: Type: Stormwater Controls Summary Storm Phase: No blue roofs		Company Address: 3 Valentines Place, SE1 8QH		



FEH: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Flooded Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)
Geocellular Attenuation Tank 1	FEH: 100 years: +45 %: 15 mins: Summer	44.693	44.693	0.343	0.343	76.7	25.098	0.000	0.000	15.9	8.919		57.476
Geocellular Attenuation Tank 2	FEH: 100 years: +45 %: 15 mins: Summer	44.702	44.702	0.472	0.472	27.2	12.003	0.000	0.000	6.5	1.902		6.515

Project: 138-144 Friar Street	Date: 02/07/2026			
	Designed by:	Checked by:	Approved By:	
	TW	PCh	PCh	
Report Details: Type: Stormwater Controls Summary Storm Phase: No blue roofs	Company Address: 3 Valentines Place, SE1 8QH			

Status
OK
OK

Project: 138-144 Friar Street		Date: 02/07/2026		
Designed by: TW		Checked by: PCh	Approved By: PCh	
Report Details: Type: Connections Summary Storm Phase: No blue roofs		Company Address: 3 Valentines Place, SE1 8QH		



FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FEH: 2 years: +0 %: 30 mins: Summer	Pipe	Geocellular Attenuation Tank 1	Geocellular Attenuation Tank 2	45.650	44.421	0.112	5.645	0.8	0.45	6.4	OK
1.002	FEH: 2 years: +0 %: 60 mins: Summer	Pipe	SFC1	S2	45.630	44.418	0.027	3.489	0.4	0.03	1.0	OK
1.003	FEH: 2 years: +0 %: 15 mins: Summer	Pipe	S2	S3	45.500	44.162	0.026	0.891	0.4	0.03	1.0	OK
1.001	FEH: 2 years: +0 %: 60 mins: Summer	Pipe	Geocellular Attenuation Tank 2	SFC1	45.500	44.418	0.195	3.775	0.2	0.04	1.3	OK

Project: 138-144 Friar Street	Date: 02/07/2026		
	Designed by: TW	Checked by: PCh	Approved By: PCh
Report Details: Type: Connections Summary Storm Phase: No blue roofs	Company Address: 3 Valentines Place, SE1 8QH		





FEH: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FEH: 30 years: +0 %: 15 mins: Summer	Pipe	Geocellular Attenuation Tank 1	Geocellular Attenuation Tank 2	45.650	44.508	0.150	6.713	1.0	1.01	14.6	Surcharged
1.002	FEH: 30 years: +0 %: 120 mins: Summer	Pipe	SFC1	S2	45.630	44.655	0.027	10.281	0.4	0.03	1.0	Surcharged
1.003	FEH: 30 years: +0 %: 240 mins: Summer	Pipe	S2	S3	45.500	44.162	0.026	45.861	0.4	0.03	1.0	OK
1.001	FEH: 30 years: +0 %: 15 mins: Summer	Pipe	Geocellular Attenuation Tank 2	SFC1	45.500	44.504	0.225	1.300	0.3	0.05	1.9	Surcharged

Project: 138-144 Friar Street	Date: 02/07/2026		
	Designed by: TW	Checked by: PCh	Approved By: PCh
Report Details: Type: Connections Summary Storm Phase: No blue roofs	Company Address: 3 Valentines Place, SE1 8QH		





FEH: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FEH: 100 years: +0 %: 15 mins: Summer	Pipe	Geocellular Attenuation Tank 1	Geocellular Attenuation Tank 2	45.650	44.566	0.150	7.785	1.0	1.02	14.8	Surcharged
1.002	FEH: 100 years: +0 %: 240 mins: Winter	Pipe	SFC1	S2	45.630	44.840	0.027	58.859	0.4	0.03	1.0	Surcharged
1.003	FEH: 100 years: +0 %: 240 mins: Winter	Pipe	S2	S3	45.500	44.162	0.027	58.854	0.4	0.03	1.0	OK
1.001	FEH: 100 years: +0 %: 15 mins: Summer	Pipe	Geocellular Attenuation Tank 2	SFC1	45.500	44.562	0.225	1.451	0.3	0.06	2.0	Surcharged

Project: 138-144 Friar Street	Date: 02/07/2026		
	Designed by: TW	Checked by: PCh	Approved By: PCh
Report Details: Type: Connections Summary Storm Phase: No blue roofs	Company Address: 3 Valentines Place, SE1 8QH		





FEH: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FEH: 100 years: +45 %: 15 mins: Summer	Pipe	Geocellular Attenuation Tank 1	Geocellular Attenuation Tank 2	45.650	44.693	0.150	8.803	1.0	1.1	15.9	Surcharged
1.002	FEH: 100 years: +45 %: 240 mins: Winter	Pipe	SFC1	S2	45.630	45.495	0.032	77.190	0.4	0.04	1.4	Flood Risk
1.003	FEH: 100 years: +45 %: 240 mins: Winter	Pipe	S2	S3	45.500	44.167	0.031	77.147	0.4	0.04	1.4	OK
1.001	FEH: 100 years: +45 %: 15 mins: Summer	Pipe	Geocellular Attenuation Tank 2	SFC1	45.500	44.702	0.225	1.765	0.3	0.18	6.5	Surcharged

APPENDIX F: BGS BOREHOLE RECORD

[illegible]



RECORD OF WELL (SHAFT OR BORE)

At Union Street

Town or Village Reading

County Berk.

Exact site

SU 7142 7354

1" N.S.
1" O.S.
Grid
Ref.

Six-inch quarter sheet 37 N.E. 1/4

in parish of

Level of ground surface above sea-level (O.D.) 44.53 ft. If well starts below ground surface, state how far 3 ft.

Shaft 3 ft., diameter 3 ft. Bore 3 ft. Diameter of bore: at top 3 ins.; at bottom 3 ins.

Details of permanent lining tubes (internal diameters preferred) 3" tube to 45'

Water struck at depths of (feet)

Rest-level of water below top of well 29' 6" Suction at 3 feet. Yield on 3 hours' test

XXXX gallons per XXXX (with pump of capacity XXXX g.p.h.); depressing water level to XXXX feet

below top. Time of recovery XXXX hrs. Amount normally pumped daily 120 (1941) g.p.h. for XXXX hours.

Quality (attach copy of analysis if available) water representative

Sunk by Allsebrook, Reading for M.C.V. & A. Lester Ltd. Date of well 1937

Information from Union St., Reading.

(For Survey use only).
GEOLOGICAL
CLASSIFICATION.

NATURE OF STRATA
(and any additional remarks)

THICKNESS

DEPTH

Feet. Inches.

Feet. Inches.

<u>Depth</u>	<u>Pump Chamber</u>	<u>7</u>	<u>6</u>	<u>7</u>	<u>6</u>
	<u>Dirty Gravel</u>	<u>23</u>	<u>6</u>	<u>31</u>	<u>-</u>
	<u>Rubbly Chalk</u>	<u>11</u>	<u>-</u>	<u>42</u>	<u>-</u>
<u>U. Ch.</u>	<u>Hard Chalk and Flints</u>	<u>44</u>	<u>-</u>	<u>86</u>	<u>-</u>

1000
ft. to 45'

Visited by S.M. 1961.



W. A. Lester (now the baby shop) 4/1/52 TWA 44/84 268

Union Street Reading 367

This shop which was a butchers shop has been completely remodelled. The floor has been renewed as part of the decor and the base is completely covered over.

Just 8/1/77

GEOLOGICAL SURVEY AND MUSEUM,
SOUTH KENSINGTON,
LONDON, S.W.7.

For Survey use only

Date received

G.S.M. Office File No.

Site marked on 1" map (see symbol)

(7920) W15034/K010 6/00 18/88
A.B.N.W.166. Op.446