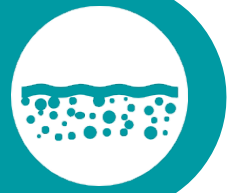


SuDSmart Design



Sustainable Drainage Assessment

Site Address

Robin Lodge Nursery
Part Lane
Swallowfield
Wokingham
RG7 1TB

Date

31/07/2026

Report Status

FINAL

Site Area

12,673 m²

Report Reference

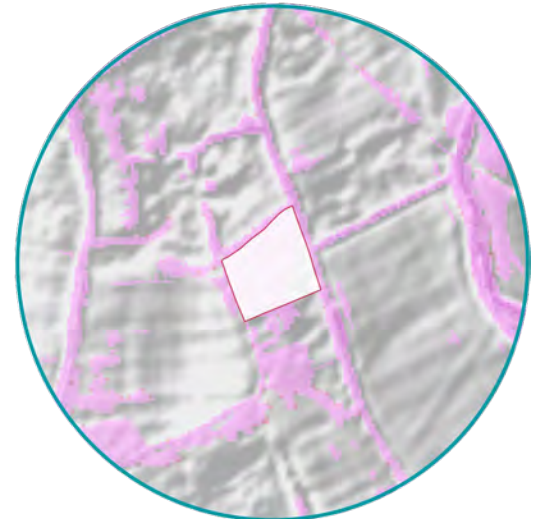
84709.01R2

Grid Reference

472756, 164608

Report Prepared for

Ex-Army Builders Ltd
99 Reading Road
Finchampstead
RG40 4RD



Infiltrate to Ground

The proposed Sustainable Drainage Scheme (SuDS) strategy is comprised of permeable paving to attenuate surface water runoff during the 1 in 100 plus 40% climate change event.

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1 Executive summary



This report assesses the feasibility of a range of Sustainable Drainage Scheme (SuDS) options in support of the Site development process. A SuDS strategy is proposed to ensure surface water runoff can be managed effectively over the lifetime of the development.

SuDS suitability

Risk	Issue	Result
Runoff destination feasibility	Priority 1: rainwater collected for non-potable use	No
	Priority 2: infiltration to ground	High*
	Priority 3: discharge to an above ground surface water body	High
	Priority 4: discharge to surface water sewer	Low
	Priority 5: discharge to combined sewer	Low
Flooding	What is the river (fluvial) and/or tidal flood risk at the Site?	Medium to High
	What is the surface water (pluvial) flood risk at the Site?	Very Low to High
	What is the groundwater flood risk at the Site?	Moderate
Pollution	Is the groundwater a protected resource?	No
	Is the surface water feature a protected resource?	No

*As confirmed via on-Site infiltration testing (Appendix F).

Summary of existing and proposed development

The Site is currently occupied by a concrete base, formerly on which was placed a mobile home, and two greenhouses (Units A and B on the current Site plan). Development proposals comprise the demolition of the current structures and the construction of two commercial buildings, an open log store, associated parking and landscaping, plus the construction of an acoustic screen surrounding the Site. Unit A contains an area of warehouse/storage and Unit B contains two offices, a canteen, lockers, a reception area and storage rooms.

National Standard 1: Runoff Destinations

Priority 1: collection for non-potable use

In line with DEFRA's national guidance, the potential for the collection of rainwater for non-potable use across the proposed development has been considered.

Given the use of the Site within a commercial capacity, there is limited scope for the collection and re-use of rainwater within the proposed development. As such, rainwater harvesting is not considered to be feasible.

Priority 2: infiltration to ground

According to GeoSmart's SD50 screening data, the Site has Moderate potential for infiltration. Based on the available hydrogeological information (Section 5) the permeability of the underlying strata cannot be reliably quantified using the available geological information; however, infiltration testing undertaken on-Site on 22/07/2026 and 23/07/2026 confirmed the ground conditions are suitable for infiltration to ground (Appendix F).

Priority 3: discharge to above ground surface water body

OS mapping indicates that a surface water feature (a drainage ditch) is located along the north and western boundaries of the Site. The feature is located within the Site boundary; therefore, it should be considered as a potential discharge destination.

Further discussions should be held with the regulators to agree a suitable discharge route and any easements required.

Priority 4: discharge to surface water sewer

The asset location plan included in Appendix C confirms that there are no public surface water sewers within the vicinity of the Site that could feasibly be discharged to. As such, discharge to surface water sewer is not considered to be feasible.

Priority 5: discharge to combined sewer

The asset location plan included in Appendix C confirms that there are no public combined sewers within the vicinity of the Site that could feasibly be discharged to. As such, discharge to combined sewer is not considered to be feasible.

Runoff rate and attenuation requirements

Discharging via infiltration requires 164.39 m³ of attenuation to be provided to ensure there is no flooding as a result of the development in all storm events up to and including the 1 in 100 year including a 40% allowance for climate change. This volume has been calculated using Causeway Flow based on confirmed rates of 6.03×10^{-6} and 6.28×10^{-6} m/s as per the infiltration testing undertaken on-Site (Appendix F).

A detailed drainage layout is included in Appendix B, and the associated calculations and management and maintenance plan are included within Appendices C and D, respectively.

2 National & local policy context



National Guidance

DEFRA - National standards for sustainable drainage systems (SuDS) (2025)

Standard 1: runoff destinations

A 'SuDS approach' shall be adopted to address the management of surface water by the development and where it should be discharged. Runoff shall be treated as a resource and managed in a way that avoids negative impacts of the development on flood risk, the morphology and water quality of receiving waters and the associated ecology.

Runoff from the development shall be discharged to the following final destinations, to the maximum extent practicable, in accordance with the below 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

Note 1: priority 1 is the highest priority and priority 5 is the lowest.

Note 2: for the purposes of this standard, a combined sewer is a sewer intended to receive both foul sewage and surface runoff and does not include a sewer intended to receive only foul sewage, even if it has the capacity to accommodate additional flows or has an element of surface water in it already.

To utilise a lesser priority final destination, appropriate evidence shall be provided that demonstrates all higher priority final destinations have been utilised to the maximum extent practicable. Higher cost alone shall not be a reason to utilise lower priority final destinations.

Where more than one final destination is utilised, each final destination's ability to accept runoff shall be maximised in order of priority.

Standard 2: management of everyday rainfall (interception)

Apply a 'SuDS approach' so that at least the first 5mm of rainfall for the majority of rainfall events does not result in runoff from the site to surface waters or piped drainage systems.

Evidence shall be provided that the approach to managing runoff from 'everyday' rainfall has been developed alongside and in support of the management of runoff quality (standard 4) and the delivery of amenity and biodiversity benefits (standards 5 and 6).

Standard 3: management of extreme rainfall and flooding

A 'SuDS approach' shall be adopted to address the management of development runoff during extreme rainfall, including allowances for climate change and urban creep to:

- 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

When discharging to an infiltration feature, the system shall be appropriately sized to accommodate the design event based on ground conditions and contributing areas.

When discharging to an above ground surface water body, sewer or other piped drainage system, the surface water runoff (rate and volume) for the 1% annual exceedance probability (AEP) event shall be controlled to ensure the runoff from the development does not increase flood risk elsewhere.

When discharging to an above ground surface water body, sewer or other piped drainage system, the surface water runoff rate for the 50% AEP event shall be controlled to ensure development runoff from an event of this magnitude has no negative impact.

Any flooding from the surface water drainage system for events up to the 1% AEP event shall be managed within the development.

Any flooding from off-site sources for the 1% AEP event should be managed on site or safely routed through the site, ensuring any downstream risks are not increased compared to the pre-development scenario.

The risks (both on and off the development) associated with flooding from the surface water drainage system for exceedance events greater than the 1% AEP event shall be appropriately managed.

Standard 4: water quality

Apply a 'SuDS approach' that protects surface waters, groundwater and coastal waters by managing the quality of the surface water runoff to adequately address water quality risks from the development.

The proposed SuDS management train(s) shall be based on a robust water quality risk assessment, appropriate to the pollution hazard and sensitivity of receiving waters, reflecting industry recognised guidance or other quantitative assessment as agreed with the approving body and permitting requirements.

Standard 5: amenity

A 'SuDS approach' shall be adopted that maximises benefits for amenity through the creation of multi-functional places and landscapes.

Standard 6: biodiversity

A 'SuDS approach' shall be adopted to ensure the surface water drainage system maximises biodiversity benefits throughout the development lifecycle.

The surface water drainage system shall add biodiversity value by:

- creating diverse, self-sustaining, resilient local ecosystems which contribute to net gains in biodiversity
- supporting and promoting natural local habitat and species, for example, through local nature recovery strategies (LNRS)
- contributing to the delivery of local biodiversity strategies
- contributing to habitat connectivity

Standard 7: design of drainage for construction, operation, maintenance, decommissioning and structural integrity

A 'SuDS approach' shall be adopted to ensure that surface water drainage systems are designed so they can be easily and safely constructed, operated and maintained taking account of the need to minimise negative impacts on natural resources and the environment.

The designer shall provide a management and maintenance plan that supports the design objectives detailed in standards 1 to 6 and ensures the performance of the surface water drainage system with regards to runoff destinations, everyday and extreme rainfall, water quality, amenity and biodiversity is maintained throughout the lifetime of the development.

Surface water drainage design shall examine for the likelihood and consequences of potential failure scenarios that may occur during the operation phase and safely manage the associated risks.

The surface water drainage system shall be designed to ensure structural integrity of all components under anticipated loading conditions for the design life of the development so that it does not affect the structural integrity of any existing or proposed components within, or adjacent to, the development.

Urban creep

Within developments an urban creep uplift factor shall be applied by adding a percentage increase to the calculated area of the impermeable area within the property curtilages. This shall be 10% for all developments unless there are no external private permeable spaces, for example, flats and apartments, when it shall be 0%.

Ministry of Housing, Communities & Local Government – National Planning Practice Guidance: Flood risk assessments: climate change allowances (2022)

The Peak rainfall intensity allowances section provides advice on the increased rainfall effects on river levels and land and urban drainage systems. As of May 2022, the applicable climate

change allowance is defined by specific Management Catchment for the 1 in 30 ($\geq 3.3\%$ AEP) and 1 in 100 (< 3.3 to 1% AEP) year event.

As the Site is located within the Loddon and tributaries Management Catchment the following climate change allowances are applicable.

Table 1. Loddon and tributaries Management Catchment peak rainfall allowances

Loddon and tributaries Management Catchment	3.3% Annual exceedance rainfall event		1% Annual exceedance rainfall event	
	2050s	2070s	2050s	2070s
Central	20%	25%	20%	25%
Upper end	35%	35%	40%	40%

The drainage system should be designed to make sure there is no increase in the rate of runoff discharged from the Site for the upper end allowance.

Where on-Site flooding for the upper end allowance presents a significant flood hazard (for example, depths and velocities of surface water runoff cause a significant danger to people), you will need to take further mitigation measures to protect people and property (for example, raising finished floor levels). As a minimum, there should be no significant flood hazard to people from on-Site flooding for the central allowance.

Local policy

Wokingham Borough Council – Wokingham SuDS Strategy – Guidance on the use of sustainable drainage systems (January, 2017):

Geological Suitability for SuDS Figure 2.1 shows the infiltration potential of the geology within the Borough of Wokingham. In order for infiltration SuDS to be used, permeable geology must be present to allow water to infiltrate. Developers should use this map to assess whether their site may be suitable for infiltration SuDS.

All of the bedrock within the Borough has been defined as having mixed ability to infiltrate. The British Geological Survey (BGS) study of the physical properties of major aquifers states that although Chalk is characterised by high porosity characteristics it shows significant regional and stratigraphic variation. This variation is due to dissolution on fracture surfaces causing rubbly materials in some areas, and reworking of chalk causing low permeability chalk in other areas.

Wokingham as Lead Local Authority provide seventy local standards which SuDS strategies should adhere to. The full list of these and additional guidance can be found through the link below:

<https://www.wokingham.gov.uk/community-and-safety/emergencies/drainage-and-flooding/>

Local standards considered to of particular relevance to the Site have been highlighted and are included below:

Local Standards

WokBC-LS11 Long term storage must be provided to limit the volume of runoff from the 1 in 100 year event with an allowance for 40% climate change, unless discharge rates have been restricted to QBar.

WokBC-LS12 All design of volume control must be supported by appropriate calculations and drawings that enable the performance of the drainage system to the required standards to be confirmed.

WokBC-LS13 All surface storage features (ponds, wetlands and basins) must provide a 300mm freeboard above the maximum design water level, unless otherwise agreed.

WokBC-LS14 All surface conveyance features (swales and channels) must provide a 150mm freeboard above the maximum design water level, unless otherwise agreed.

WokBC-LS15 The drainage system must be designed so that the capacity of the drainage system takes account of the likely impacts of climate change and likely changes in impermeable area within the development over the design life of the development. To allow for future urban expansion within the development (urban creep), an increase in paved surface area of 10% should be used, unless this would produce a percentage impermeability greater than 100%.

Further information is provided in Chapter 3 and 4 of the SuDS Manual (CIRIA C697).

3 Site analysis



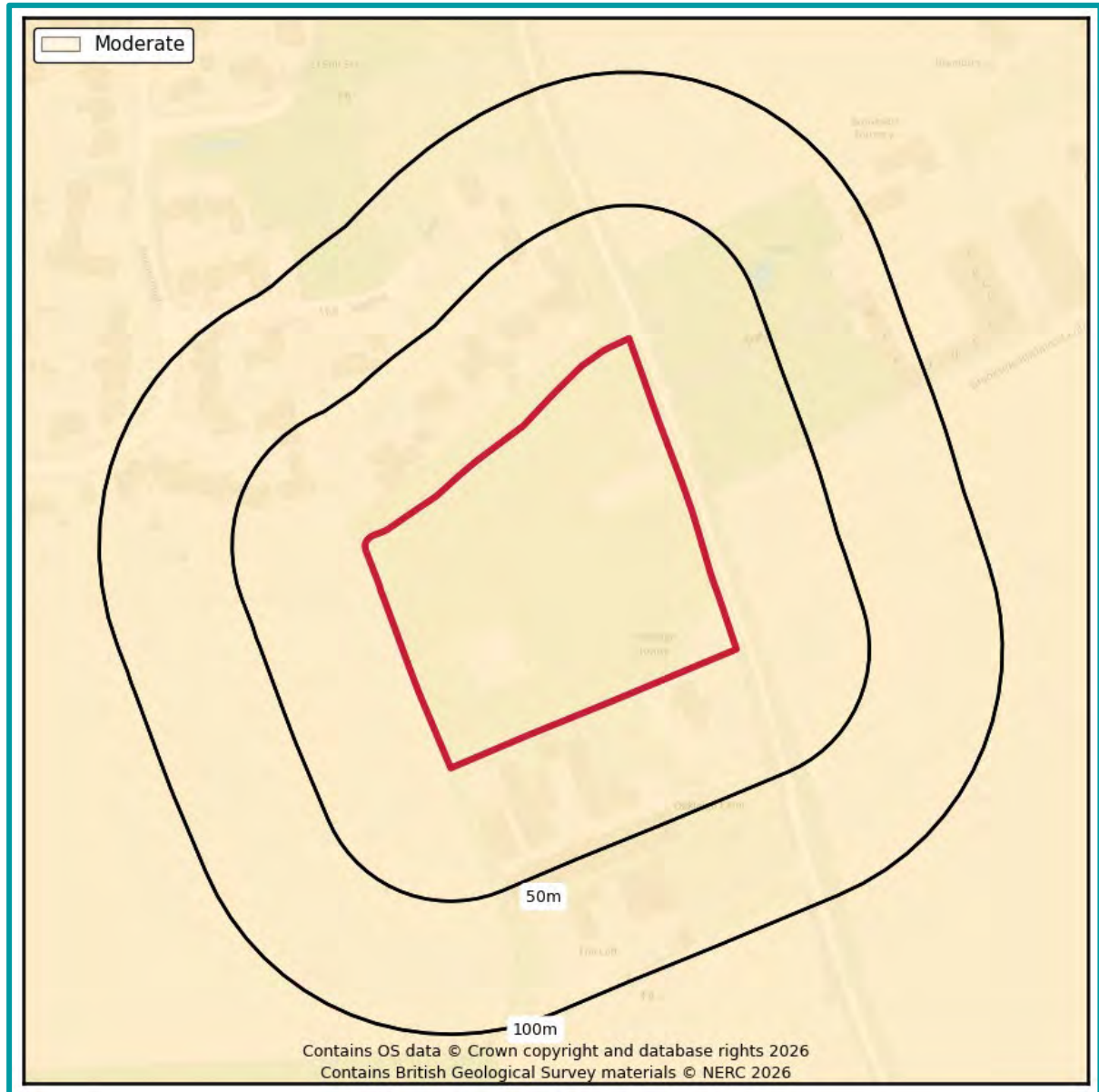
Site location

Figure 1. Aerial Imagery (Bluesky, 2026)



Infiltration suitability

Figure 2. SuDS infiltration suitability (SD50) map (GeoSmart, 2026)

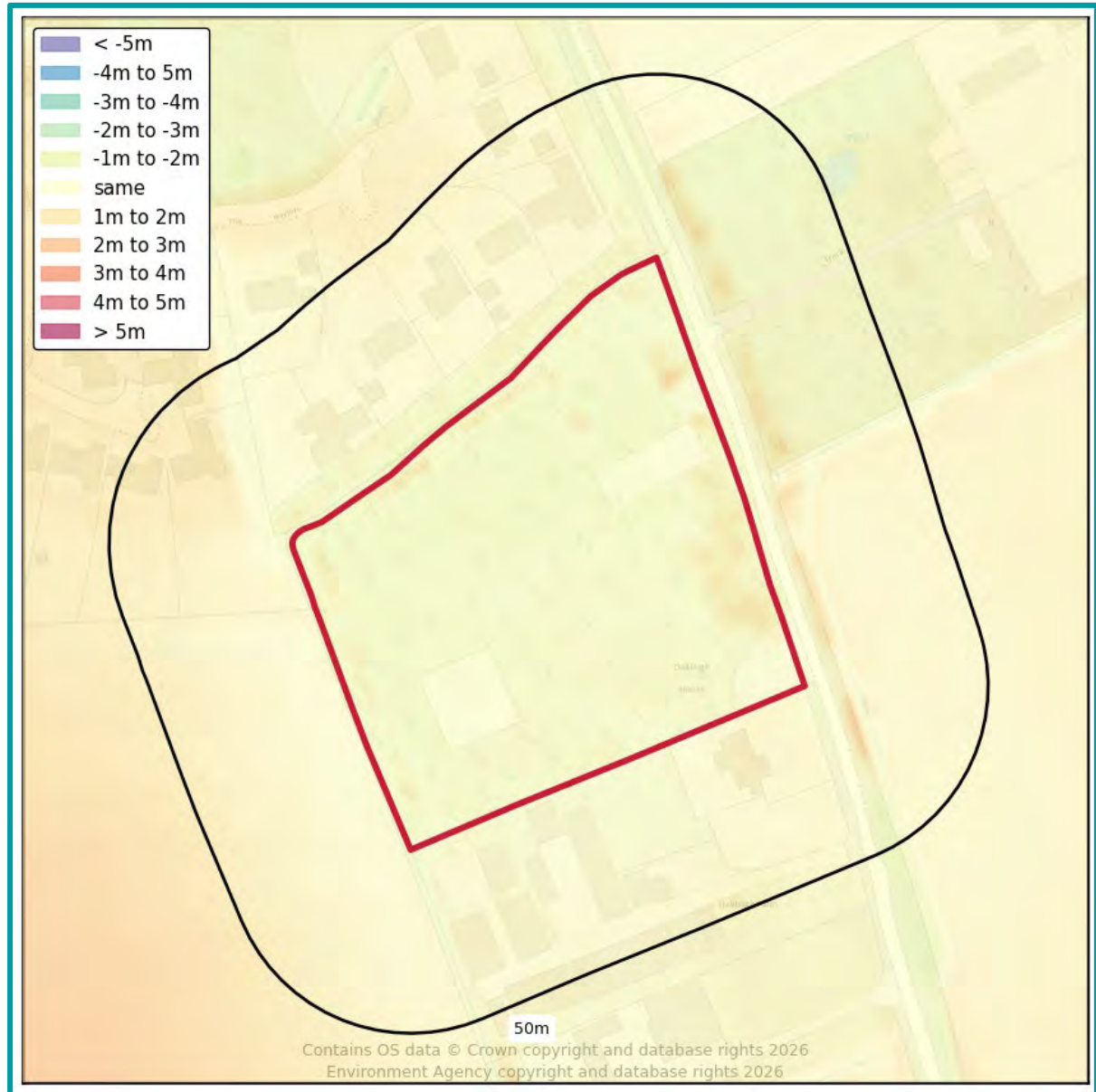


According to GeoSmart's SD50 mapping, there is a Moderate potential for infiltration SuDS across the Site. It is likely that the underlying geology at the Site has modest or variable permeability and an infiltration SuDS scheme may be possible at the Site.

Infiltration testing undertaken on-Site on 22/07/2026 and 23/07/2026 confirmed the ground conditions are suitable for infiltration to ground (Appendix F).

Topography

Figure 3. Site topography (GeoSmart, 2026)

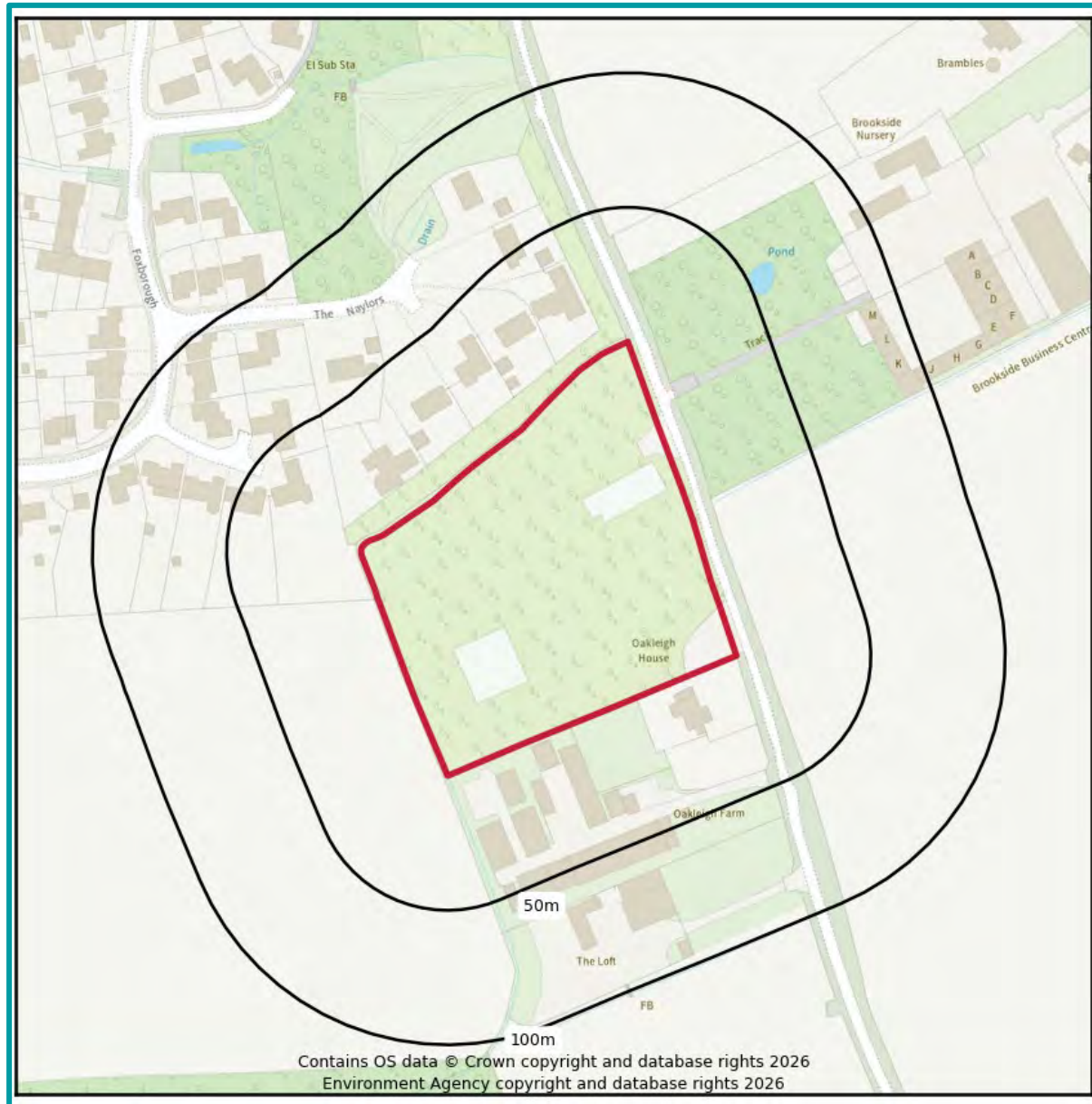


According to a review of the LiDAR DTM5 elevation data for the prevailing area, the ground levels within the vicinity of the Site typically rise to the west.

The topography on-Site typically falls to the center of the Site, with ground levels ranging from 42.86 to 45.63 mAOD. This is based upon a Site specific topographic survey undertaken by Cryfield Surveys in February 2024.

Land designations

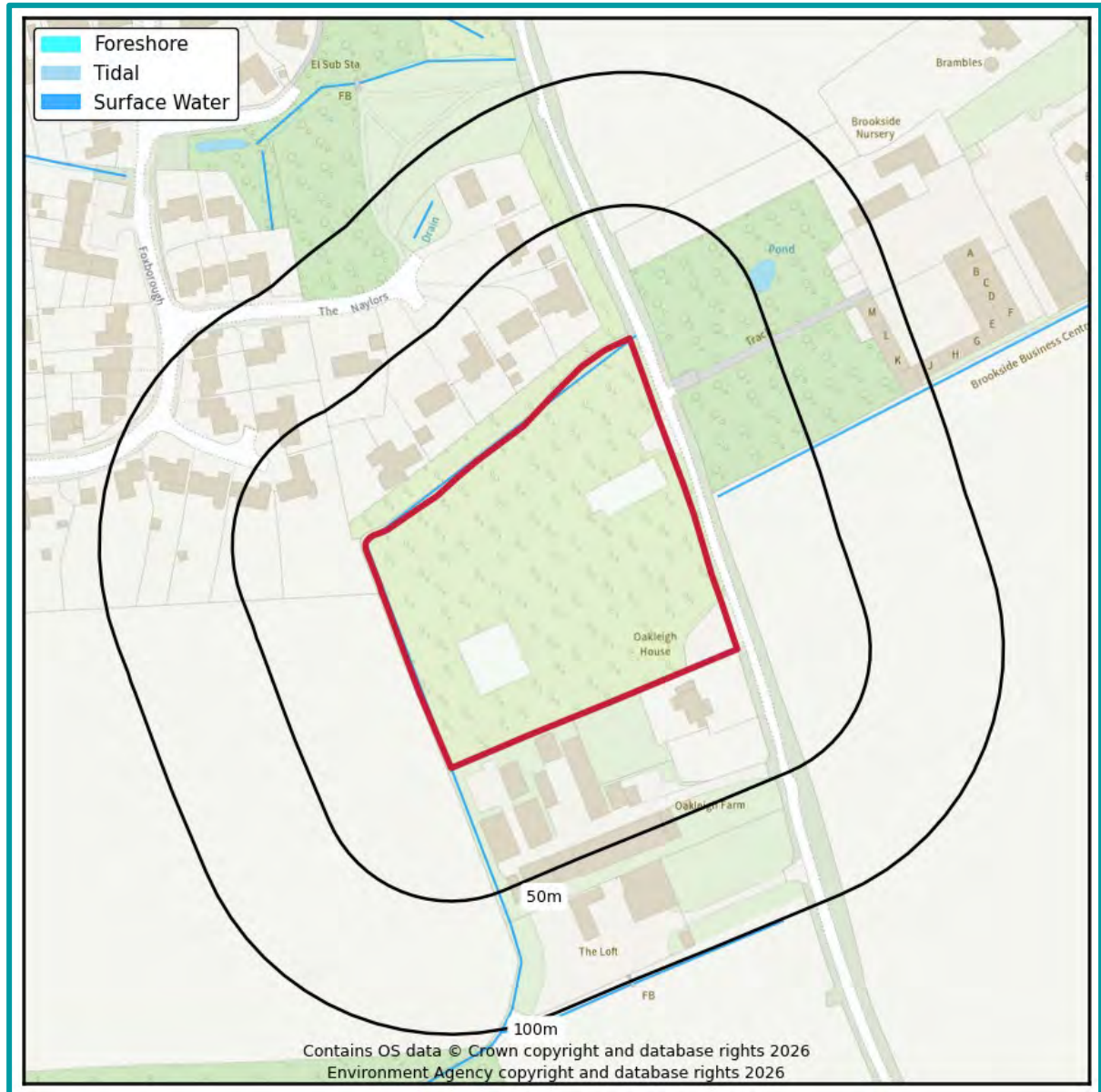
Figure 4. Source protection zone map (EA, 2026)



According to DEFRA's Magic Map, the Site is not located within a groundwater Source Protection Zone (SPZ). The mapping also confirms that the Site is not within 250m of a SSSI or SPA.

Surface water features

Figure 5. Surface water features map (EA, 2026)



OS mapping indicates that a surface water feature (a drainage ditch) is located along the north and western boundaries of the Site.

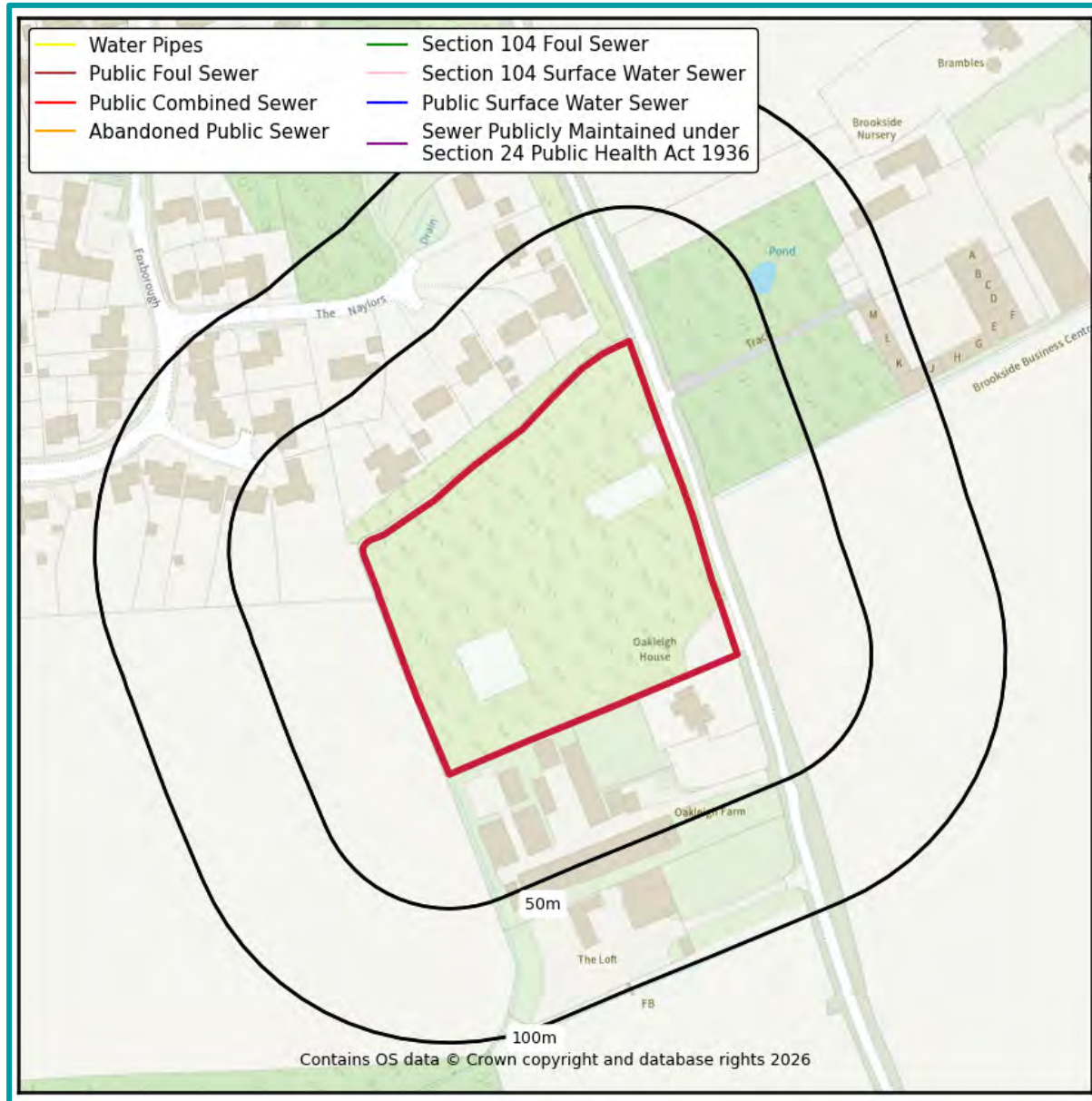
The feature is located within the Site boundary; therefore, it should be considered as a potential discharge destination.

Further discussions should be held with the regulators to agree a suitable discharge route and any easements required.

Further analysis could be undertaken by visiting the Site or by contacting the Local Council and the Environment Agency (EA) to confirm the presence, location and condition of any mapped or potentially unmapped surface water features.

Sewer features

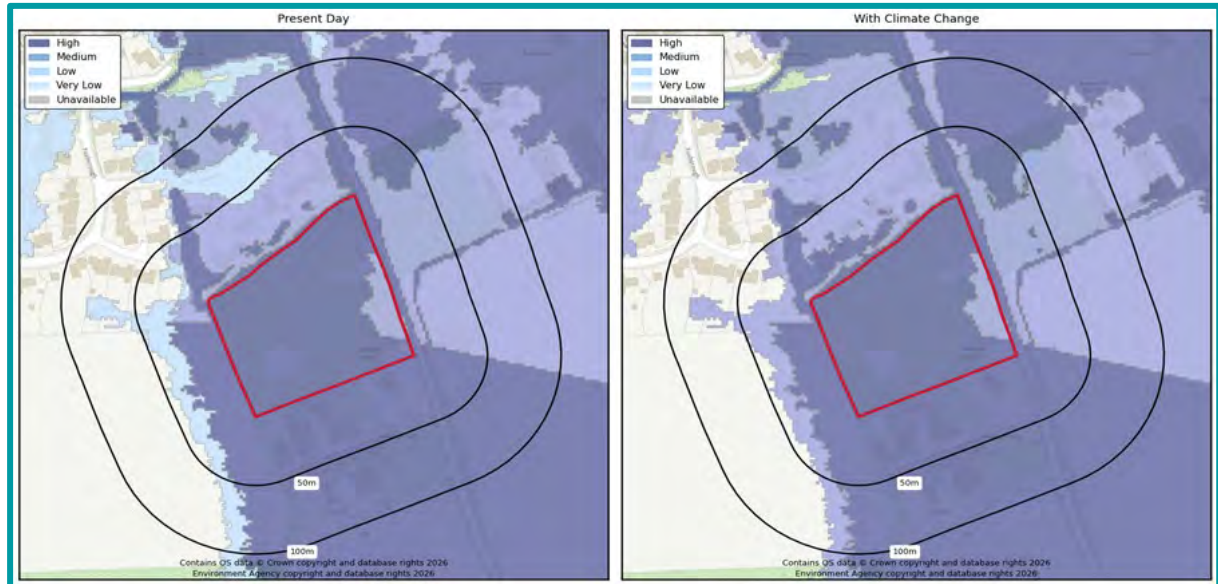
Figure 6. Sewer features map (OS & Thames Water, 2026)



According to the Thames Water asset location plan obtained for the Site (Appendix C), there are no public surface water sewer or combined sewers located within the vicinity of the Site.

Flood risk

Figure 7. Risk of flooding from rivers & sea map (EA, 2026)

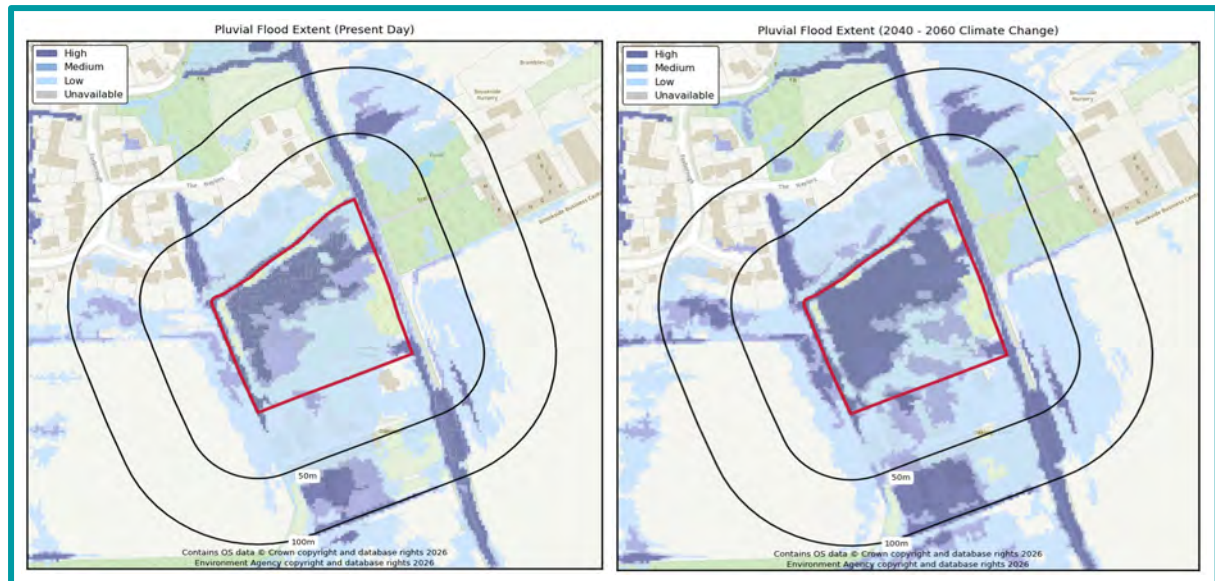


According to the EA's Risk of Flooding from Rivers and the Sea (RoFRS) map, the Site has a variable risk of flooding from Rivers and / or the Sea during both the present day and climate change (2036 to 2069) scenarios, ranging from Medium to High. Therefore, the SuDS design could potentially be affected by flooding in this event.

Further analysis could be undertaken by contacting the Local Council and the EA to confirm the risk and the associated flood depths.

A separate Flood Risk Assessment has been undertaken (ref: 84709), where the potential risks to the development are discussed further.

Figure 8. Risk of surface water flooding map (EA, 2026)



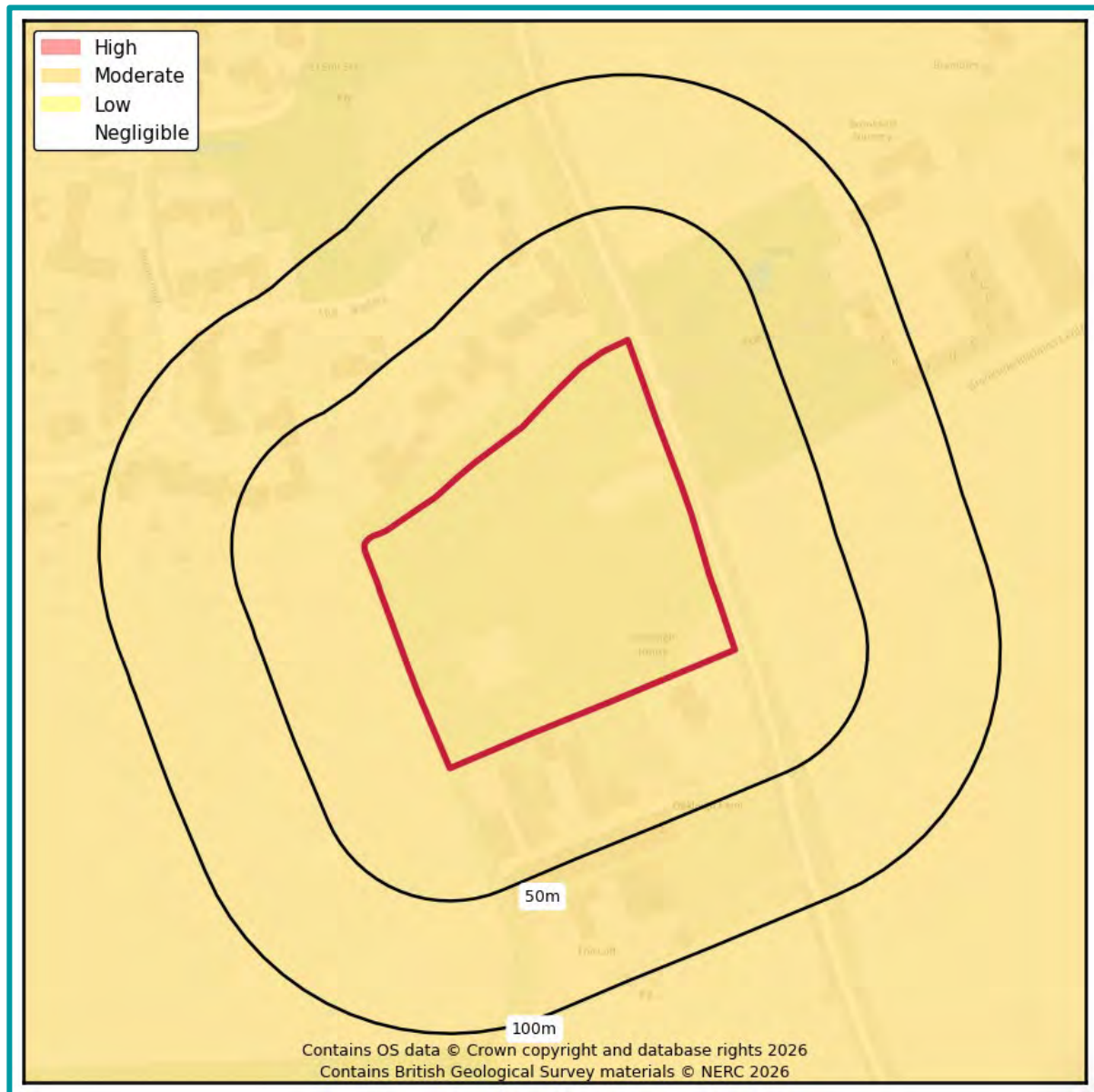
The EA's Risk of Flooding from Surface Water (RoFSW) mapping confirms the Site is considered to be at Very Low to High risk of surface water flooding during both the present day and climate change (2050s) scenarios.

The above map shows the extent of flooding during the >3.3% annual probability (AEP) (1 in 30 year – High risk), 3.3 – 1% AEP (1 in 100 year – Medium risk) and 1 – 0.1% AEP (1 in 1000 year – Low risk) events. This confirms there are areas where flooding could occur in the 1 in 30 year, 1 in 100 year and 1 in 1000 year events during the present day and climate change scenarios. Flooding in these areas may constrain certain types of SuDS features being used.

Further analysis could be undertaken by contacting the Local Council and the Environment Agency to confirm the pluvial flood risk, flood depths and velocities where applicable.

A separate Flood Risk Assessment has been undertaken (ref: 84709), where the potential risks to the development are discussed further.

Figure 9. Groundwater flood risk (GW5) map (GeoSmart, 2026)



GeoSmart's Groundwater Flood Risk Screening (GW5) map confirms the Site has a Moderate risk of groundwater flooding during a 1% annual probability (1 in 100 year) event.

The Moderate risk indicates the groundwater table may be particularly shallow in these areas and further investigation may be required.

The use of SuDS features may be constrained in areas where there is a High or Moderate risk of groundwater emergence.

A separate Flood Risk Assessment has been undertaken (ref: 84709), where the potential risks to the development are discussed further.

4 Site context



Site information

The purpose of this report is to assess the potential for disposing of surface water through a Sustainable Drainage System (SuDS) for the site of Robin Lodge Nursery, Part Lane, Swallowfield, Wokingham, RG7 1TB ('the Site'). The Site is located within a setting of predominantly mixed rural and residential land use.

Development

The Site is currently occupied by a concrete base, formerly on which was placed a mobile home, and two greenhouses (Units A and B on the current Site plan).

Development proposals comprise the demolition of the current structures and the construction of two commercial buildings, an open log store, associated parking and landscaping, plus the construction of an acoustic screen surrounding the Site. Unit A contains an area of warehouse/storage and Unit B contains two offices, a canteen, lockers, a reception area and storage rooms. Site plans and drawings are provided in Appendix A.

Geology, permeability, and thickness

British Geological Survey (BGS) national superficial and bedrock geology mapping confirms the geological formations underlying the Site; each formation may have a range of permeabilities.

Table 2. Site Geology

Geology present on-Site		Likely to be permeable?
Superficial geology (Figure 10)	River Terrace Deposits, 2 (RTD2) - sand and gravel	✓
Bedrock geology (Figure 11)	London Clay Formation (LC) - Clay, silt and sand	X

Infiltration testing undertaken on-Site confirmed the ground conditions are comprised predominantly of ballast stone and sand throughout (Appendix F).

According to a review of the BGS borehole database (BGS, 2026), the nearest available borehole records mapped within the same geological strata as the Site (ref: SU76SW62 and SU76SW155) are located c. 20 m to the west and c. 10 m to the east, respectively, at elevations of 44.38 and 45.03 mAOD (taken from the borehole record).

A summary of the geological strata encountered by the boreholes is provided within the table below:

Table 3. Summary of BGS borehole information

Strata encountered	BGS borehole SU76SW62		BGS borehole SU76SW155	
	Depth to base of stratum (m bgl)	Strata composition	Depth to base of stratum (m bgl)	Strata composition
Top Soil	0.30	Top Soil	0.61	Topsoil and clay – dark brown, loose then firm.
Gravel and clay (assumed RTD2)	0.61	Clay	2.44	Mixed with some clay in first 0.07 m then clean, 60% stone content, 0.61 m down, some larger.
Clay (assumed LC)	1.83	Sandy Clay	-	-
			-	-
	>1.83 (base of borehole)	Blue Clay	>3.05 (base of borehole)	Blue grey, stiff.

Figure 10. Superficial Geology (BGS, 2026)

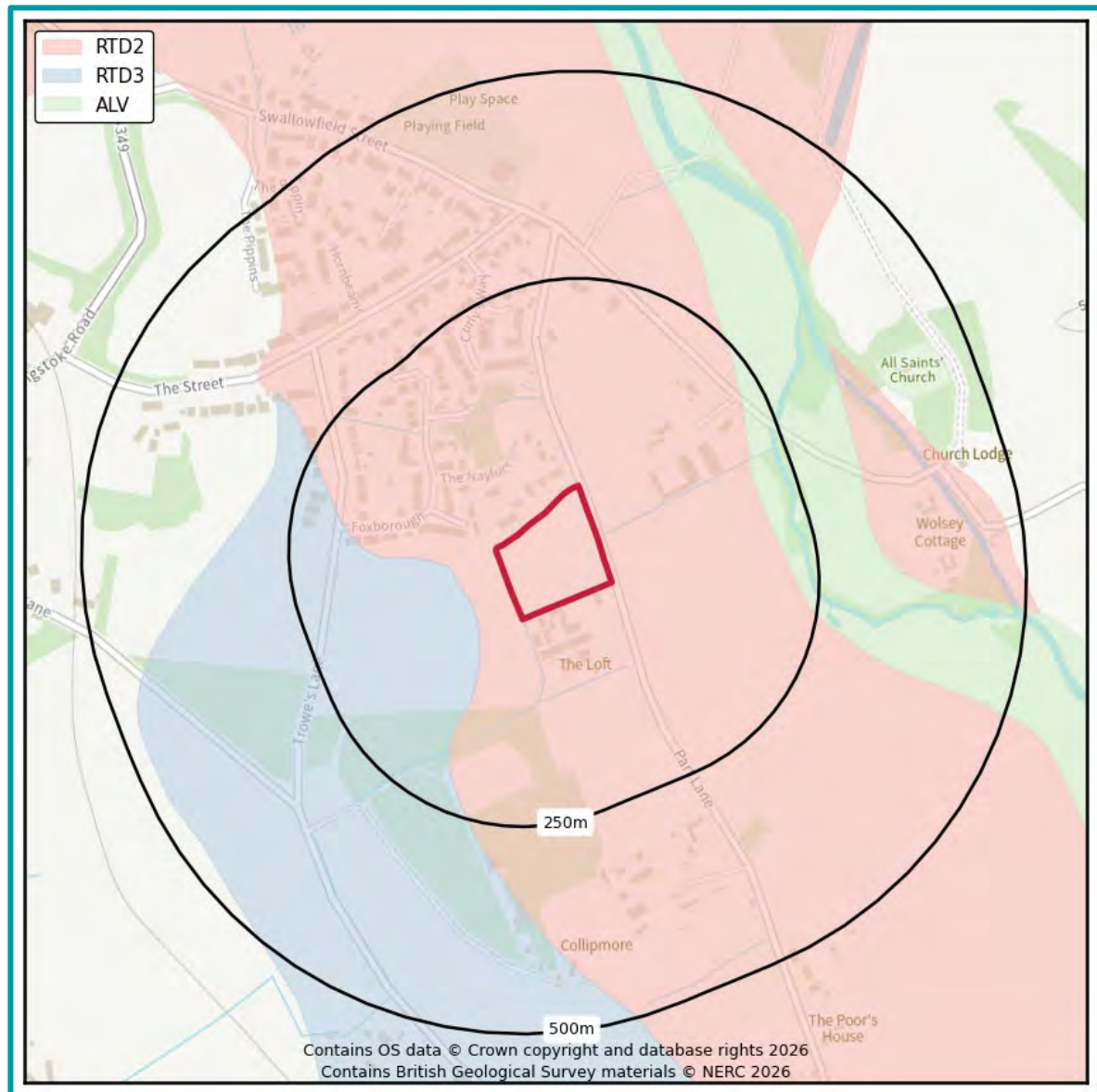
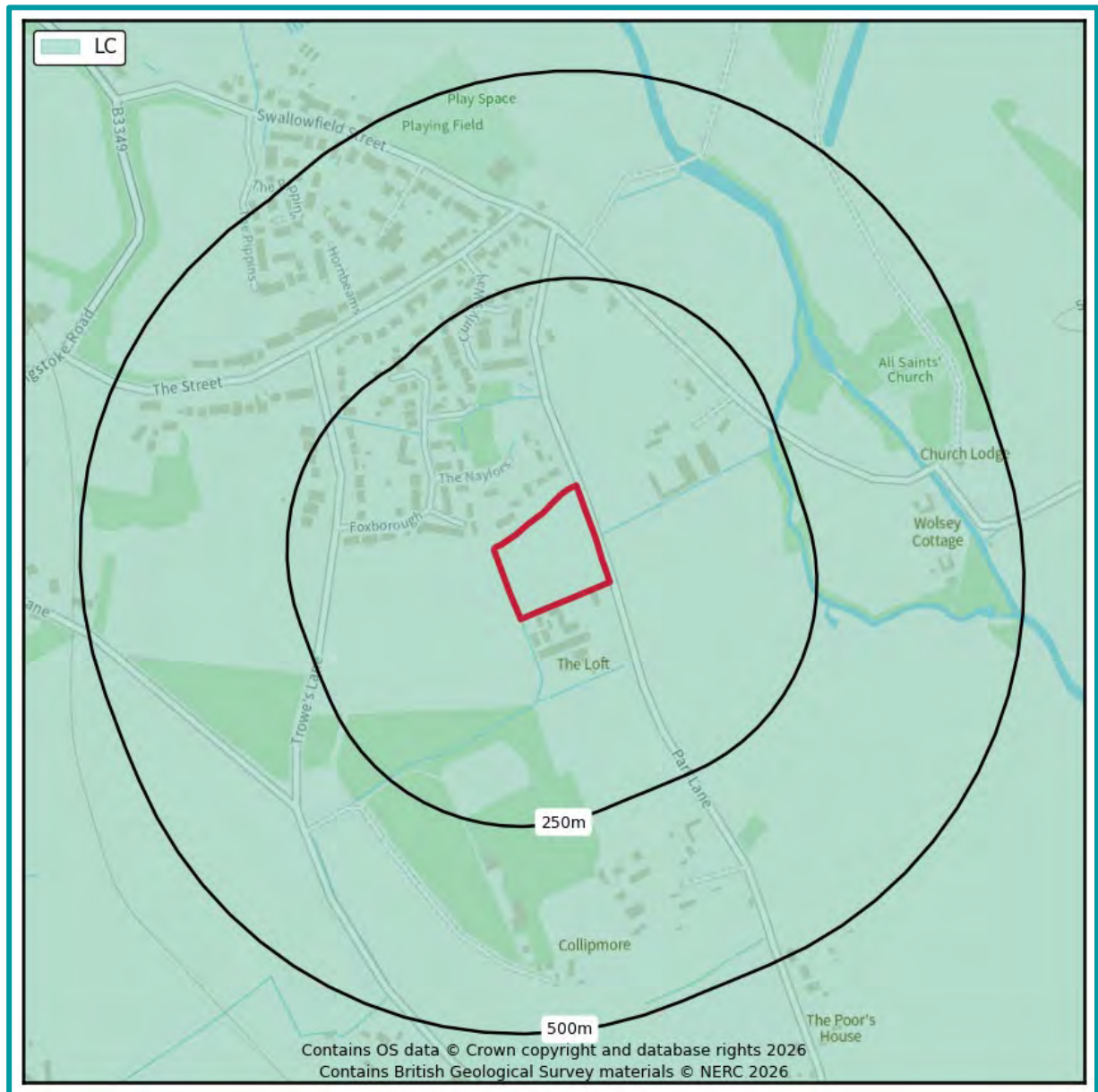


Figure 11. Bedrock Geology (BGS, 2026)



Depth to groundwater

The SuDS system should be designed to operate in periods of extreme groundwater levels.

On-Site infiltration testing confirmed a maximum groundwater level of 1.56 m bgl (Appendix F).

Borehole ref: SU76SW62 and SU76SW155 did not encounter groundwater within their 1.83 m depth and 3.05 m depth respectively, in October 1965 and May 1975, subject to seasonal variations.

According to borehole data, shallow groundwater is potentially a problem at the Site; however, there is a one metre buffer between the maximum groundwater level and permeable paving.

Ground conditions

Infiltration testing undertaken on-Site (Appendix F) confirmed infiltration rates of 6.03×10^{-6} m/s (0.02170 m/hr) and 6.28×10^{-6} m/s (0.02261 m/hr), which would be sufficient to feasibly accommodate focused infiltration SuDS features.

Water quality

The Site does not lie within an SPZ. The infiltrated water quality should be of sufficient quality that it does not give rise to pollution of the underlying groundwater. Further consultation with the water company is unlikely to be required.

Infiltration systems should not be used where there is a risk of contaminating groundwater by infiltrating polluted runoff or where receiving groundwater is particularly sensitive.

The influence of surface runoff on water quality will depend on whether there is a source of contamination on-Site and the sensitivity of the receiving environment, either groundwater or surface water. The intervening pathway from source to receptor including mitigation and natural attenuation will determine the final impact.

The impact of contaminants on the groundwater will be reduced by travel and natural attenuation through the unsaturated soil zone. A greater depth of unsaturated zone and the presence of significant clay and organic material will provide greater protection for the underlying groundwater. Rapid flow through fractures will provide less protection than intergranular flow around soil and rock particles.

5 Runoff destination



National Standard 1: runoff destinations

Options for the destination for the runoff generated on-Site have been assessed in line with the prioritisation set out in DEFRA's national standards for sustainable drainage systems (2025).

Priority 1: Collection for non-potable use

An assessment of the potential for rainwater collection and re-use across the proposed development has been undertaken, which confirms that there is the potential for the provision of rainwater harvesting measures at the Site. Captured water could be used to water vegetation in order to provide additional amenity and biodiversity benefits.

Priority 2: Discharge to ground

There are no known issues identified relating to Site contamination or the presence of a SPZ. According to GeoSmart's SD50 screening data, the Site has Moderate potential for infiltration. Based on the available hydrogeological information (Section 5) the permeability of the underlying strata cannot be reliably quantified using the available geological information; however, infiltration testing undertaken on-Site on 22/07/2026 and 23/07/2026 confirmed the ground conditions are suitable for infiltration to ground (Appendix F).

Priority 3: Discharge to above ground surface water body

OS mapping indicates that a surface water feature (a drainage ditch) is located along the north and western boundaries of the Site.

The feature is located within the Site boundary; therefore, it should be considered as a potential discharge destination.

Access would need to be arranged, and the outfall would be subject to river level and flood conditions. The Site is partly located within the EA's fluvial Flood Zone 3 with the risk of flooding originating from the River Blackwater. Additionally, outfall should consider the risk of pluvial flooding within the Site. According to the RoFSW mapping provided by the EA, the risk at the Site is Very Low to High. Therefore, it is advisable that discharge to the nearest surface watercourse is carefully considered. A flow control device would be required to limit peak discharge rates to the maximum selected rate as indicated in Section 7, along with the appropriate attenuation storage volume.

Priority 4: Discharge to surface water sewer

According to the Thames Water asset location plan obtained for the Site (Appendix C), there are no public surface water sewers within the vicinity of the Site.

Priority 5: Discharge to combined sewer

According to the Thames Water asset location plan obtained for the Site (Appendix C), there are no public combined sewers within the vicinity of the Site.

6 Storage, volume and peak flow rate



Surface water runoff

An increase in impermeable areas on-Site will result in greater rainfall runoff. A reduction in runoff will help mitigate flood risk both on and off-Site.

Table 4. Change in impermeable area associated with the development

Total Site area	12,673 m ²
Impermeable area	
Pre-development	Post-development
1358 m ² (11%)	3209 m ² (25%)
Impermeable land use: 942 m ² greenhouse buildings, 416 m ² hardstanding Permeable land use: 11,315 m ² landscaped areas	New impermeable land use: 2938 m ² permeable paving*, 271 m ² commercial buildings New permeable land use: 9464 m ² landscaped areas

*Please note, while these areas will be utilised for SuDS, for the calculations these areas will be classed as impermeable in order to assess the potential run-off volumes and rates for the Site post- development and the potential holding capability of the proposed SuDS features.

Storage requirements for an infiltration SuDS scheme for the development footprint are set out below.

Table 5. Storage requirements for the proposed development

Attenuation scenario	Attenuation required (m ³)	Explanation
1 in 100 year including 40% CC	164.39	Attenuation required to ensure surface water runoff is attenuated in all storm events up to and including the 1 in 100 year event including a 40% allowance for climate change. Calculations are based on confirmed rates of 6.03 x 10 ⁻⁶ m/s and 6.28 x 10 ⁻⁶ m/s as per the infiltration testing undertaken on-Site (Appendix F).

Peak discharge rates

The peak discharge rate is the maximum flow rate at which surface water runoff leaves the Site during a particular storm event, without considering the impact of any mitigation such as storage, infiltration or flow control. Proposed discharge rates (with mitigation) should be no greater than existing rates for all corresponding storm events. If all runoff is disposed of via infiltration, there will be no discharge off-Site.

The table below presents peak discharge rates for a range of storm events used to assess the impact of the proposed development and select the maximum permitted discharge rate.

Table 6. Peak discharge rates associated with the development

Rainfall event	Greenfield runoff rates (l/s)	Existing runoff rates ¹ (l/s)	Potential runoff rates without attenuation (l/s)	Potential minus existing (l/s)
QBAR	2.21	N/A	N/A	N/A
6 hour 1 in 1 year	1.87	5.36	6.82	1.46
6 hour 1 in 10 year	3.57	9.31	11.77	2.46
6 hour 1 in 30 year	4.94	11.96	15.22	3.26
6 hour 1 in 100 year	7.04	14.99	19.08	4.09
6 hour 1 in 100 year + 20% CC	N/A	N/A	22.90	7.90
6 hour 1 in 100 year + 40% CC	N/A	N/A	26.72	11.72

¹ Assumes 100% runoff from impermeable surfaces. Assumes Greenfield runoff from permeable surfaces calculated using the loH124 method.

Total discharge volumes

The table below presents discharge volumes for a range of storm events used to assess the impact of the proposed development and calculate the required storage volumes.

Table 7. Total discharge volumes associated with the development

Rainfall event	Greenfield runoff volume (m ³)	Existing runoff volume ² (m ³)	Potential runoff volume without attenuation (m ³)	Potential minus existing (m ³)
QBAR	99.61	N/A	N/A	N/A
6 hour 1 in 1 year	92.58	115.72	147.27	31.55
6 hour 1 in 10 year	162.15	201.16	254.33	53.17
6 hour 1 in 30 year	206.60	258.25	328.66	70.41
6 hour 1 in 100 year	259.10	323.88	412.18	88.30
6 hour 1 in 100 year + 20% CC	N/A	N/A	494.62	170.74
6 hour 1 in 100 year + 40% CC	N/A	N/A	577.06	253.18

² Assumes 100% runoff from impermeable surfaces. Assumes Greenfield runoff from permeable surfaces, as calculated using the loH124 method.

7 Water quality



A key requirement of any SuDS system is that it protects the receiving water body from the risk of pollution. This can be effectively managed by an appropriate “train” or sequence of SuDS components that are connected in series. The frequent and short duration rainfall events are those that are most loaded with potential contaminants (silts, fines, heavy metals and various organic and inorganic contaminants). Therefore, the first 5-10 mm of rainfall (first flush) should be adequately treated with SuDS.

The minimum number of treatment stages will depend on the sensitivity of the receiving water body and the potential hazard associated with the proposed development SuDS Manual (CIRIA, 2015). The proposed development is a combination of Low (other roof water) to Medium hazard (runoff from non-residential car parking, commercial yard areas). The Site does not lie within an SPZ and therefore additional treatment stages are not required.

Table 8. Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very Low	0.2	0.2	0.05
Other roofs (typically commercial/industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads and non-residential car parking within infrequent change (i.e. less than 300 traffic movements/day)	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (e.g. hospitals, retail), all roads except low traffic roads and trunk roads/motorways	Medium	0.7	0.6	0.7
Sites with heavy pollution (e.g. haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other	High	0.8	0.8	0.9

than domestic fuel oil) are to be delivered, handled, storage, used or manufactured: industrial sites; trunk roads and motorways				
--	--	--	--	--

Table 9. Indicative SuDS mitigation indices for discharges to groundwater

Characteristics of the material overlying the proposed infiltration surface, through which the runoff percolates	TSS	Metals	Hydrocarbons
A layer of dense vegetation underlain by a soil with good contaminant attenuation potential of at least 300 mm in depth	0.6	0.5	0.6
A soil with good contaminant attenuation potential of at least 300 mm in depth	0.4	0.3	0.3
Infiltration trench (where a suitable depth of filtration material is included that provides treatment, i.e. graded gravel with sufficient smaller particles but not single size coarse aggregate such as 20 mm gravel) underlain by a soil with good contaminant attenuation potential of at least 300 mm in depth	0.4	0.4	0.4
Constructed permeable pavement (where a suitable filtration layer is included that provides treatment, and including a geotextile at the base separating the foundation from the subgrade) underlain by a soil with good contaminant attenuation potential of at least 300 mm in depth	0.7	0.6	0.7
Bioretention underlain by a soil with good contaminant attenuation potential of at least 300 mm in depth	0.8	0.8	0.8
Proprietary treatment systems	These must demonstrate that they can address each of the contaminant types to acceptable levels for inflow concentrations relevant to the contributing drainage area		

As indicated within Tables 8 and 9, the proposed permeable paving would provide sufficient mitigation indices to treat the Low to Medium pollution hazard associated with the Site use.

8 Background information



Health and safety considerations for SuDS

The CDM Regulations place specific Health and Safety duties on those commissioning, planning and undertaking construction works. If you are uncertain what this means you should seek the advice of your architect, builder or other competent professional.

GeoSmart does not provide health and safety advisory services but we are required to advise you of your general responsibilities under CDM (visit <http://geosmartinfo.co.uk/knowledge-hub/cdm-2015/> for more information).

Please remember that any detailed design work should be undertaken by a competent professional who might be your engineer, architect, builder or another competent party.

GeoSmart SuDS Infiltration Suitability Map (SD50)

The GeoSmart SuDS Infiltration Suitability Map (SD50) screens the suitability for infiltration drainage in different parts of the Site and indicates where further assessment is recommended. In producing the SuDS Infiltration Suitability Map (SD50), GeoSmart used data from the British Geological Survey on groundwater levels, geology and permeability to screen for areas where infiltration SuDS may be suitable. The map classifies areas into 3 categories of High, Medium and Low suitability for infiltration SuDS. This can then be used in conjunction with additional data on Site constraints to give recommendations for SuDS design and further investigation.

The primary constraint on infiltration potential is the minimum permeability of the underlying material and in some cases the range in permeability may be considerable, ranging down to low. The map classifies these areas as moderate infiltration suitability requiring further investigation. In cases where the thickness of the receiving permeable horizon is less than 1.5 meters then additional Site investigation is recommended. If the Site is at risk of groundwater flooding for up to the 1% annual occurrence the map classifies these areas as moderate infiltration suitability requiring further investigation.

The GeoSmart SuDS Infiltration Suitability Map (SD50) is a national screening tool for infiltration SuDS techniques but a Site specific assessment should be used before final detailed design is undertaken. Further information on the GeoSmart SuDS Infiltration Suitability Map (SD50) is available at geosmartinfo.co.uk.

How was surface water runoff estimated from the Site?

In accordance with the SuDS Manual (C753) (CIRIA, 2015), the Greenfield runoff from the Site has been calculated using the IoH124 method and is assumed representative of the runoff generated on the undeveloped surfaces that are affected by the proposed development. The

method used for calculating the runoff complies with the NPPF (2024). For the impermeable surfaces, it has been assumed that 100% runoff will occur (calculations provided in Appendix C). Rainfall data is derived from the Flood Estimation Handbook (FEH), developed by NERC (2009). Only areas affected by the proposed development are considered in the flow and volume calculations. Permeable areas that remain unchanged are not included in the calculations as it is assumed these will not be actively drained and attenuated.

What is the peak discharge rate?

An estimation of peak runoff flow rate and volume is required to calculate infiltration, storage and discharge requirements. The peak discharge rate is the maximum flow rate at which surface water runoff leaves the Site during a particular storm event, without considering the impact of any mitigation such as storage, infiltration or flow control. Proposed discharge rates (with mitigation) should be no greater than existing rates for all corresponding storm events. If all runoff will be disposed of via infiltration there will be no discharge off-Site. Discharging all flow from Site at the existing 1 in 100 event would increase flood risk during smaller events. Flow restriction is generally required to limit the final discharge from Site during all events as a basic minimum to the green field QBAR rate. A more complex flow restriction which varies the final discharge rate from the Site depending on the storm event will reduce the volume of storage required on-Site. Drainage to infiltration SuDS is subtracted from the total discharge off-Site to achieve a beneficial net effect.

What is the total discharge volume?

The total discharge volume is calculated on the basis of the surface water runoff that has the potential to leave the Site as a result of the assumed 6 hour duration design storm event. The runoff is related to the underlying soil conditions, impermeable cover, rainfall intensity and duration of the storm event. The total volume generated by the current Site is compared to the potential total volume from the developed Site (not taking into consideration any mitigation). The difference provides the minimum total volume that will need to be stored and infiltrated on-Site or released at a controlled rate. Guidance indicates that the total discharge volume should never exceed the runoff volume from the development Site prior to redevelopment for that event and should be as close as is reasonably practicable to the Greenfield runoff volume.

9 Additional Products



The following table includes a list of additional products by GeoSmart:

Additional GeoSmart Products			
	Additional assessment: EnviroSmart Report		Provides a robust desk-based assessment of potential contaminated land issues, taking into account the regulatory perspective. Our EnviroSmart reports are designed to be the most cost effective solution for planning conditions. Each report is individually prepared by a highly experienced consultant conversant with Local Authority requirements. Ideal for pre-planning or for addressing planning conditions for small developments. Can also be used for land transactions. Please contact info@geosmartinfo.co.uk for further information.

10 References and glossary



- British Geological Survey [BGS] (2026). GeoIndex Onshore. Accessed from: <https://www.bgs.ac.uk/map-viewers/geoindex-onshore/> on 31/07/2026.
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- Ministry of Housing, Communities & Local Government (2024). National Planning Policy Framework (NPPF).
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- Wokingham Borough Council (2017). Wokingham SuDS Strategy Guidance on the use of sustainable drainage systems. Accessed from: <https://www.wokingham.gov.uk/sites/wokingham/files/2023-06/Sustainable%20drainage%20systems%20%28SuDS%29%20strategy.pdf> on 31/07/2026.

Glossary

General terms

Attenuation	Reduction of peak flow and increased duration of a flow event.
Combined sewer	A sewer designed to carry foul sewage and surface water in the same pipe.
Detention basin	A vegetated depression, normally is dry except after storm events, constructed to store water temporarily to attenuate flows. May allow infiltration of water to the ground.
Evapotranspiration	The process by which the Earth's surface or soil loses moisture by evaporation of water and by uptake and then transpiration from plants.
FEH	Flood Estimation Handbook, produced by Centre for Ecology and Hydrology, Wallingford (formerly the Institute of Hydrology).
Filter drain or trench	A linear drain consisting of a trench filled with a permeable material, often with a perforated pipe in the base of the trench to assist drainage, to store and conduct water, but may also be designed to permit infiltration.
First flush	The initial runoff from a site or catchment following the start of a rainfall event. As runoff travels over a catchment it will collect or dissolve pollutants, and the "first flush" portion of the flow may be the most contaminated as a result. This is especially the case for intense storms and in small or more uniform catchments. In larger or more complex catchments pollution.
Flood plain	Land adjacent to a watercourse that would be subject to repeated flooding under natural conditions (see Environment Agency's Policy and practice for the protection of flood plains for a fuller definition).
Greenfield runoff	This is the surface water runoff regime from a site before development, or the existing site conditions for brownfield redevelopment sites.
Impermeable surface	An artificial non-porous surface that generates a surface water runoff after rainfall.
Permeability	A measure of the ease with which a fluid can flow through a porous medium. It depends on the physical properties of the medium, for example grain size, porosity and pore shape.

Runoff	Water flow over the ground surface to the drainage system. This occurs if the ground is impermeable, is saturated or if rainfall is particularly intense.
Sewerage undertaker	This is a collective term relating to the statutory undertaking of water companies that are responsible for sewerage and sewage disposal including surface water from roofs and yards of premises.
Soakaway	A subsurface structure into which surface water is conveyed to allow infiltration into the ground.
Source Protection Zone (SPZ)	Areas where groundwater supplies are at risk from potentially polluting activities and accidental releases of pollutants. They are a policy tool used to control activities close to water supplies intended for human consumption.
Treatment	Improving the quality of water by physical, chemical and/or biological means.

The terms included in this glossary have been taken from CIRIA (2015) guidance.

Data sources

Aerial Photography	Contains Ordnance Survey data © Crown copyright and database right 2026 BlueSky copyright and database rights 2026
Bedrock & Superficial Geology	Contains British Geological Survey materials © NERC 2026 Ordnance Survey data © Crown copyright and database right 2026
Flood Risk (RoFRS/Pluvial/Surface Water Features/SPZ)	Environment Agency copyright and database rights 2026 Ordnance Survey data © Crown copyright and database right 2026
Flood Risk (Groundwater) and SuDS infiltration suitability (SD50)	GeoSmart, BGS & OS GW5 (v2.4) Map (GeoSmart, 2026) Contains British Geological Survey materials © NERC 2026 Ordnance Survey data © Crown copyright and database right 2026
Sewer Location	Contains Ordnance Survey data © Crown copyright and database right 2026 Contains Thames Water search data 2026
Topographic Data	OS LiDAR/EA Contains Ordnance Survey data © Crown copyright and database right 2026 Environment Agency copyright and database rights 2026

11 Appendices

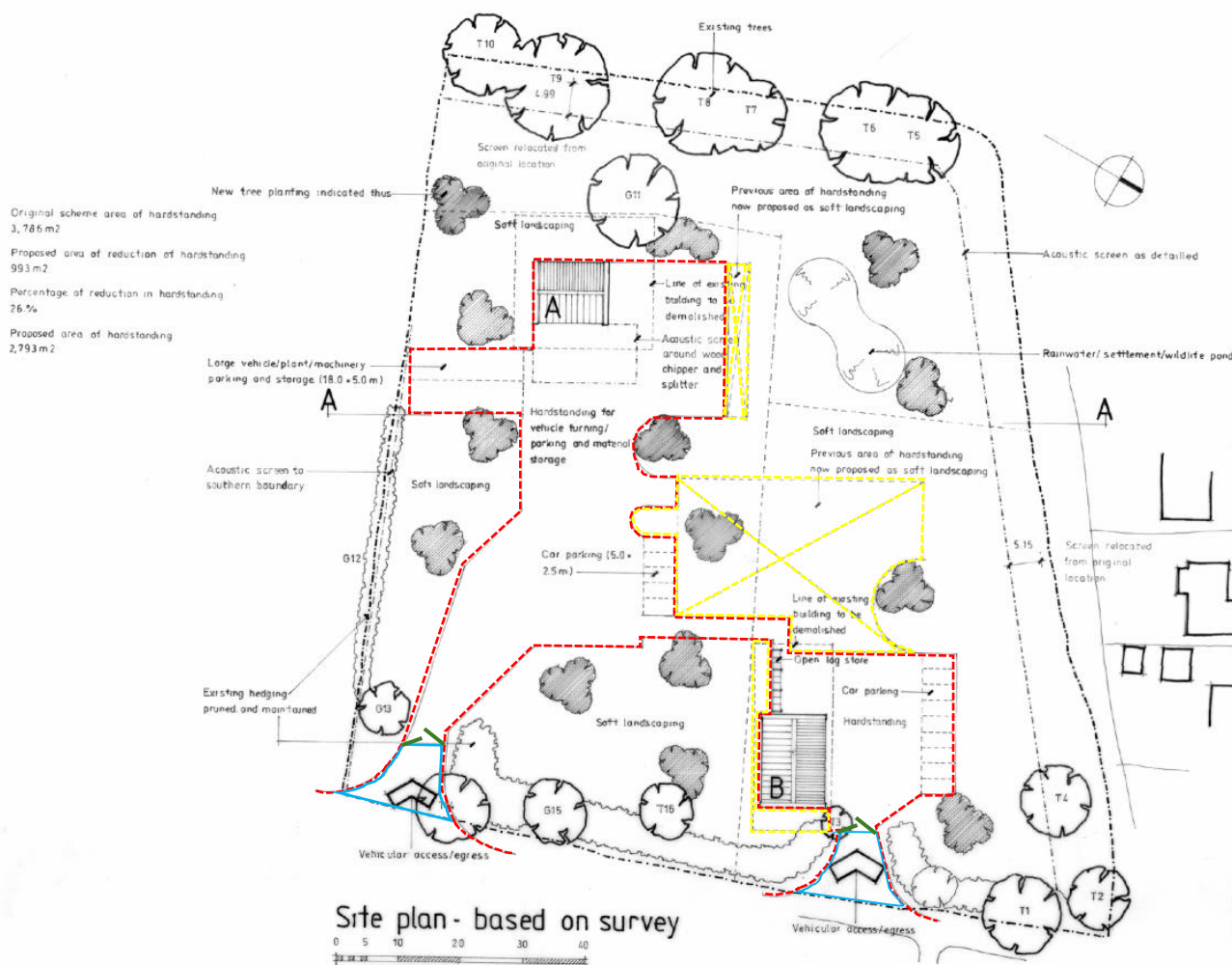


Appendix A

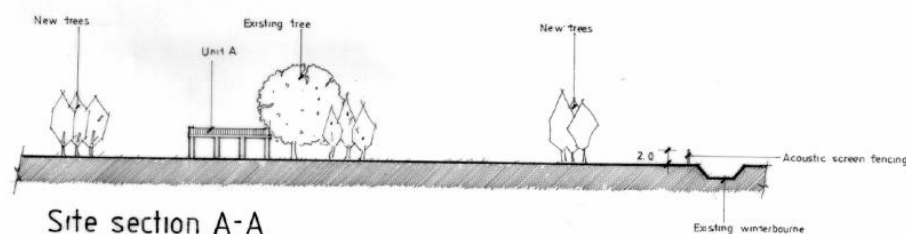


Site plans

- New Proposed hard standing - 2973m²
- Previous Proposed hard standing reduced by- 993m²
- 6ft Security Gates
- Site Entrances

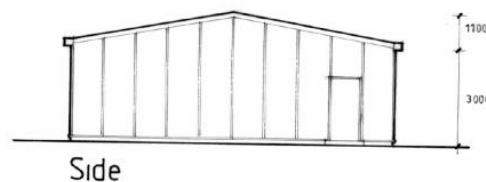


Site plan - based on survey

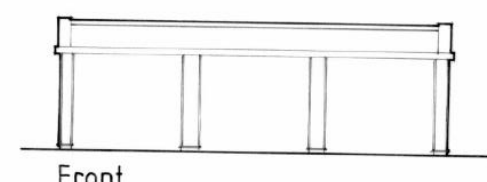


Site section A-A

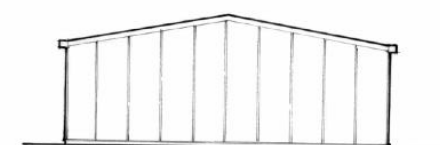
UNIT A



Side



Front



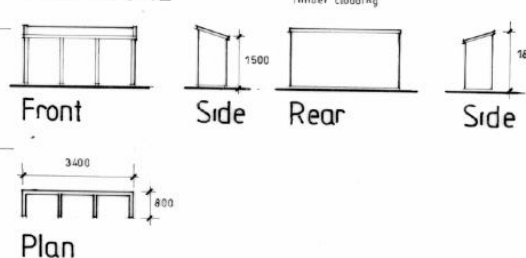
Side



Rear

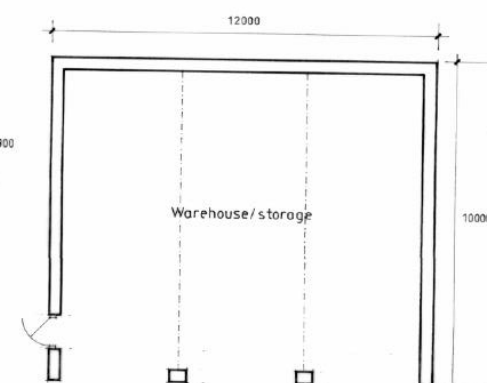
Profile steel sheet roof
Profile steel cladding

LOG STORE



ACOUSTIC SCREEN Elevation

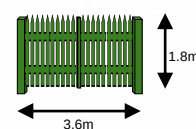
Acoustic screen typically formed of 20mm thick laths, overlapped or tongue and groove jointed with no gaps. Screen is to extend to ground with no gaps. Screen to incorporate hedgehog holes to ecologists guidance.



Floor plan

- C March 17 Acoustic screen relocated
- B January 15 Handstanding area reduced by 26%, bund removed from west/north boundary - acoustic screen indicated to west/north boundary
- A April Bund adjusted so no impingement on existing r.p.a. of trees. Acoustic screen indicated and detailed. Landscaping reduced to bund.

Palisade Security Gates

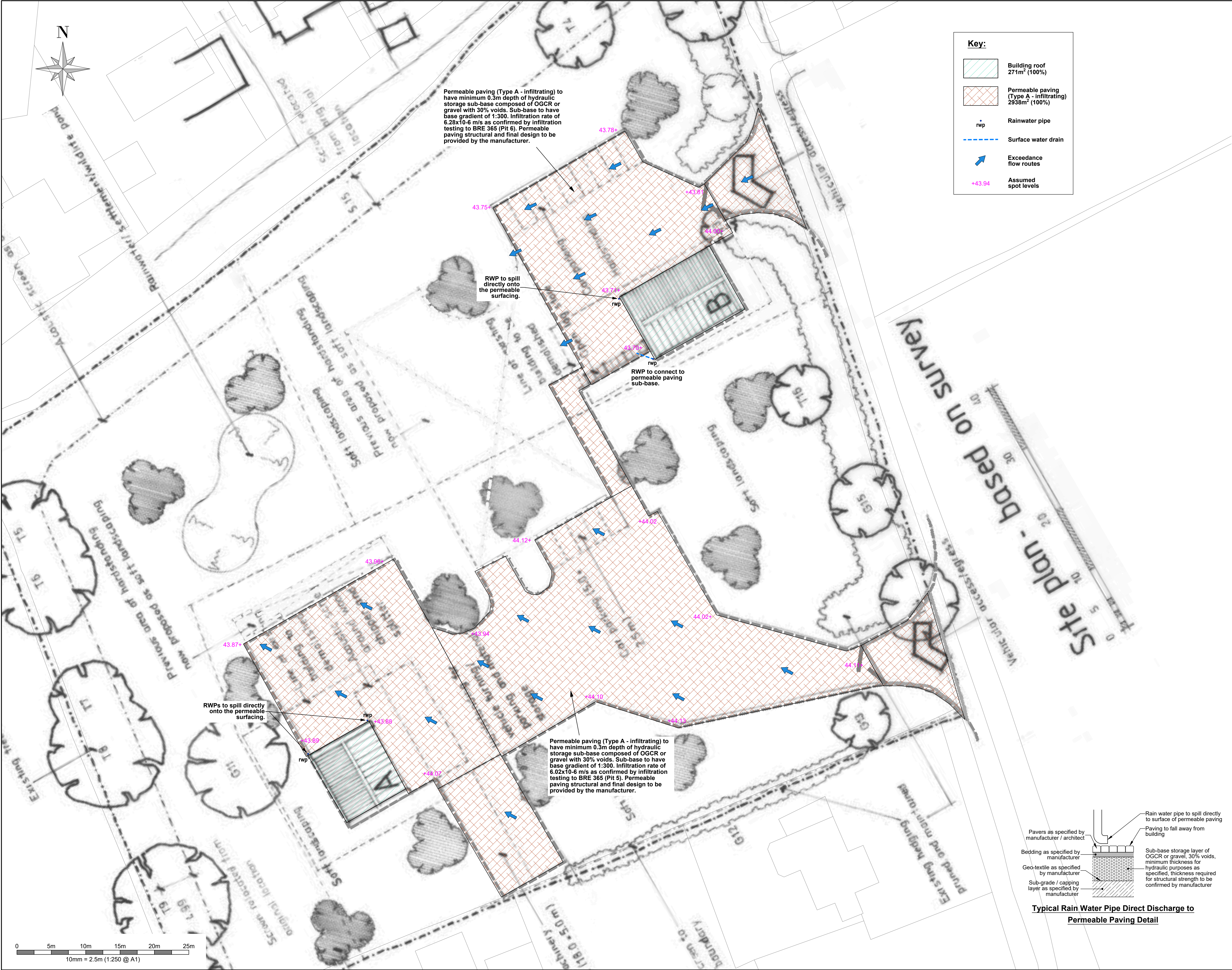


- project Change of use/redevelopment
- location Robin Lodge Nursery, Part Lane, Swallowfield
- drawing Revised proposal (1 of 2)
- drawing no. 979/11
- scale 1 : 100 1 : 500
- date October 2025

Appendix B



Detailed surface water drainage layout



Notes:

- Do not scale from this drawing.
- All dimensions are in meters unless otherwise stated.
- This drawing to be read in conjunction with all other relevant drawings and documents.
- All drainage to be constructed to SSG Design and Construction Guidance, current British standards and building regulations and other relevant standards.
- Exact locations of rain water downpipes and other internal drainage down pipes to be confirmed by architect / M&E engineer. Rain water pipes to discharge directly to permeable paving surface.
- Contractor to confirm locations of existing services prior to commencement on site and to arrange for any necessary diversions, lowering or protection works as required.
- All specialist drainage components such as permeable paving to be designed and installed as per manufacturers requirements.
- All levels based on LIDAR data, to be confirmed following topographical survey. Cover levels to be confirmed by landscape architect. Cover levels and invert levels are in meters unless otherwise stated.
- Infiltration features to be positioned at least 1m above ground water table and focused infiltration features to be positioned 5m from buildings and 10m from other infiltration systems unless otherwise specified by a structural / geotechnical engineer.
- Private surface water pipes to be 100Ø with minimum fall of 1:100 unless otherwise stated.
- Permeable paving and outlets to be as manufacturer design and recommendations.
- Proposed ground levels will influence the storage capacity of the permeable paving and the position of the drainage pick up features. When proposed ground levels are complete the permeable paving design should be reviewed to ensure sufficient storage is provided and that the drainage pick up features are positioned correctly.
- Minimum cover to thermoplastic pipes in garden or patio areas 0.6m, in driveway 0.9m, in road 1.2m, otherwise concrete protection will be required.
- Access chamber cover class A15 for garden and patio, B125 for driveway, C250 for lightly trafficked roads or small private car parks.
- Design is for planning purposes only and not for construction. Design should be confirmed prior to construction to ensure all available information is considered and any assumed information should be verified.
- Design is based on pdf print. Design should be verified and checked once accurate digital information is available.
- Design should be reviewed in light of any additional information or on validation or otherwise of any assumptions.

Drainage Strategy:

- Drainage strategy for new development consists of infiltration via permeable paving.
- Runoff from building roofs to spill to permeable paving.
- Infiltration rate to BRE365 has been undertaken at the Site with the worst case infiltration rates for their respective areas used for calculations. Permeable paving to manufacturer's design.
- As part of site investigation a 2.1m depth trial pit was undertaken which confirmed the water table to be located at depth of 2.1m. As the proposed permeable paving is 0.45m depth, a 1m buffer between the base of infiltration features and the groundwater table is present.

PL02	28.07.26	Amended for infiltration testing	DS	DS
PL01	10.03.26	Initial issue	DS	MG
Rev	Date	Detail	Drwn	Chkd

Client:

Ex-Army Builders Ltd

Project:

Robin Lodge Nursery
Part Lane, Swallowfield

Drawing Title:

Proposed Surface Water
Drainage Layout

Suite 1, 1 Bellstone Court, Bellstone, Shrewsbury, SY1 1JB

Drawn by:	Checked by:	Date:
DS	MG	March 2026
Scale:	Status:	
1:250 @ A1	Planning	
Drawing No:	Issue:	
84709-500-001	PL02	

Appendix C



Causeway Flow surface water drainage calculations

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	0.600
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	Cover Level (m)	Depth (m)	Invert Level (m)
1	0.225	44.000	0.450	43.550

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	0.750	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	0.840	Additional Storage (m³/ha)	20.0		

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 %)
2	0	0	0
30	0	0	0
100	0	0	0
100	40	0	0

Node 1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.02170	Invert Level (m)	43.550	Slope (1:X)	300.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	112	Depth (m)	0.300
Safety Factor	2.0	Width (m)	20.000	Inf Depth (m)	
Porosity	0.30	Length (m)	100.000		

Results for 2 year 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
180 minute winter	1	132	43.704	0.154	8.5	20.8713	0.0000	OK
Link Event (Upstream Depth)		US Node	Link	Outflow (l/s)				
180 minute winter		1	Infiltration	2.8				

Results for 30 year 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
120 minute winter	1	112	43.815	0.265	28.1	59.6194	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
120 minute winter	1	Infiltration	4.8

Results for 100 year 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
120 minute winter	1	116	43.856	0.306	35.9	78.8733	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
120 minute winter	1	Infiltration	5.5

Results for 100 year +40% 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
120 minute winter	1	118	43.925	0.375	50.3	116.3097	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
120 minute winter	1	Infiltration	6.0

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	0.600
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	Cover Level (m)	Depth (m)	Invert Level (m)
1	0.096	43.800	0.450	43.350

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	0.750	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	0.840	Additional Storage (m³/ha)	20.0		

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 %)
2	0	0	0
30	0	0	0
100	0	0	0
100	40	0	0

Node 1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.02263	Invert Level (m)	43.350	Slope (1:X)	300.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	119	Depth (m)	0.300
Safety Factor	2.0	Width (m)	20.000	Inf Depth (m)	
Porosity	0.30	Length (m)	40.000		

Results for 2 year 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
120 minute winter	1	88	43.436	0.086	4.6	7.1050	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
120 minute winter	1	Infiltration	1.6

Results for 30 year 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
120 minute winter	1	96	43.509	0.159	12.0	22.8586	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
120 minute winter	1	Infiltration	2.5

Results for 100 year 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
120 minute winter	1	114	43.544	0.194	15.3	31.3535	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
120 minute winter	1	Infiltration	2.5

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 100.00%

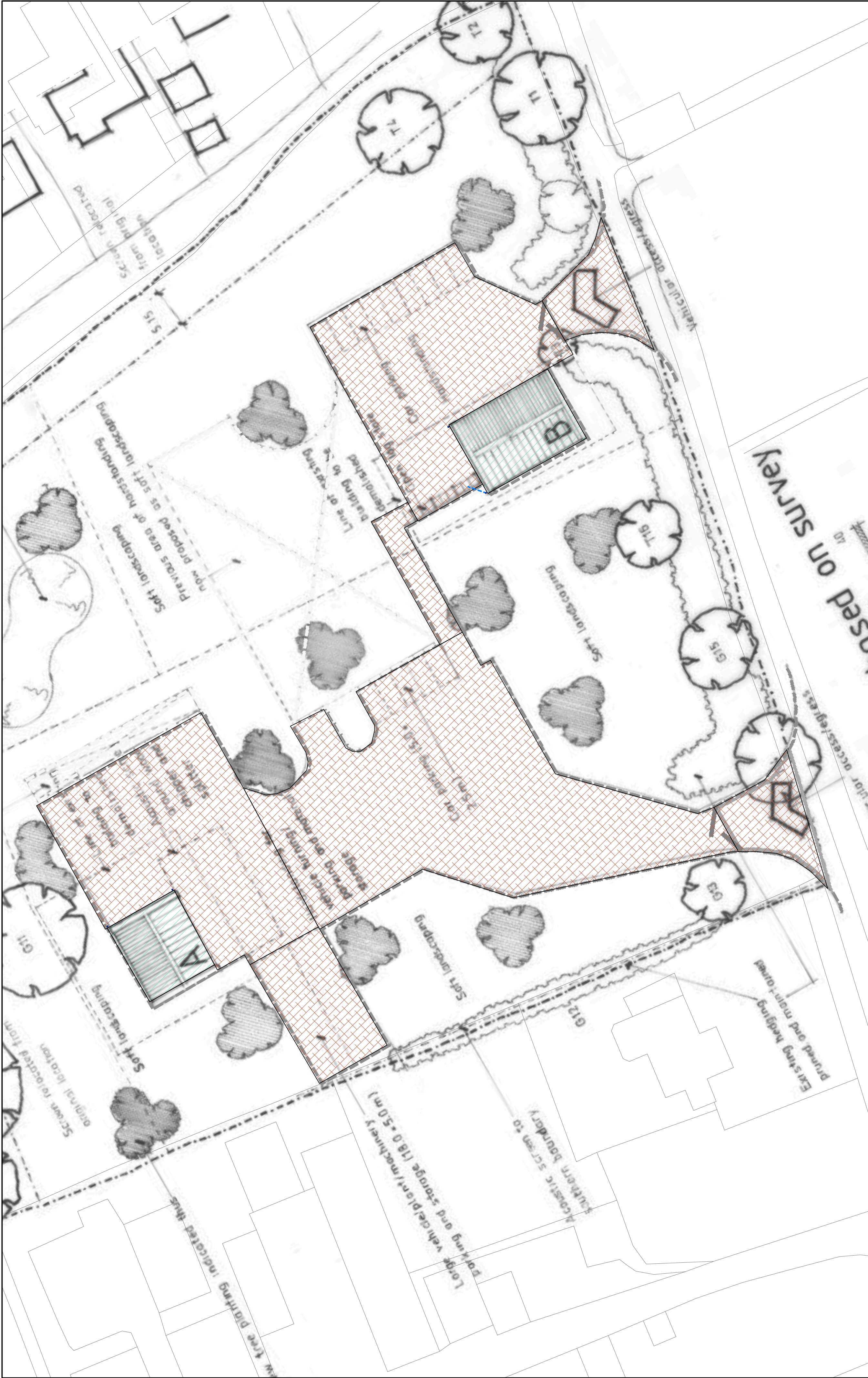
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	1	118	43.612	0.262	21.5	48.0765	0.0000	OK

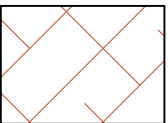
Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
120 minute winter	1	Infiltration	2.5

Appendix D



Management & maintenance plan



	Asset Type	Maintenance Schedule (and Frequency)	Party Responsible
	Permeable pavements	Regular maintenance: - Brushing and vacuuming (three time per year) - Trimming any roots and surrounding grass and weeds that may be causing blockages (annually or as required) Monitoring: - Initial inspection (monthly) - Inspect surface for poor performance or ponding (annually or after large storm events)	Privately owned and maintained by site owners or specialist asset management company as agreed / appointed by site owners.
	Underground drainage pipe network and manholes / catchpits	Regular maintenance: - Remove sediment and debris from pre-treatment devices and floor of inspection tube or chamber (annually) - Cleaning of gutters and any filters on downpipes (annually) - Trimming any roots that may be causing blockages (annually or as required) Monitoring: - Inspect silt traps and note rate of sediment accumulation (monthly in the first year and then annually)	
	Rain water pipe	Regular maintenance: - Remove sediment and debris from grating, channel and sump (monthly or as required) - Trimming any roots and surrounding grass blockages (as required) Monitoring: - Inspect inlets and outlets for blockages or silt accumulation (monthly or after a heavy storm)	

Notes:

- Do not scale from this drawing.
- All dimensions are in meters unless otherwise stated.
- This drawing to be read in conjunction with all other relevant drawings and documents.
- All drainage to be constructed to SSG Design and Construction Guidance, current British standards and building regulations and other relevant standards.
- Exact locations of rain water downpipes and other internal drainage down pipes to be confirmed by architect / M&E engineer. Rain water pipes to discharge directly to permeable paving surface.
- Contractor to confirm locations of existing services prior to commencement on site and to arrange for any necessary diversions, lowering or protection works as required.
- All specialist drainage components such as permeable paving to be designed and installed as per manufacturers requirements.
- All levels based on LIDAR data, to be confirmed following topographical survey. Cover levels to be confirmed by landscape architect. Cover levels and invert levels are in meters unless otherwise stated.
- Infiltration features to be positioned at least 1m above ground water table and focused infiltration features to be positioned 5m from buildings and 10m from other infiltration systems unless otherwise specified by a structural / geotechnical engineer.
- Private surface water pipes to be 100Ø with minimum fall of 1:100 unless otherwise stated.
- Permeable paving and outlets to be as manufacturer design and recommendations.
- Proposed ground levels will influence the storage capacity of the permeable paving and the position of the drainage pick up features. When proposed ground levels are complete the permeable paving design should be reviewed to ensure sufficient storage is provided and that the drainage pick up features are positioned correctly.
- Minimum cover to thermoplastic pipes in garden or patio areas 0.6m, in driveway 0.9m, in road 1.2m, otherwise concrete protection will be required.
- Access chamber cover class A15 for garden and patio, B125 for driveway, C250 for lightly trafficked roads or small private carparks.
- Design is for planning purposes only and not for construction. Design should be confirmed prior to construction to ensure all available information is considered and any assumed information should be verified.
- Design is based on pdf print. Design should be verified and checked once accurate digital information is available.
- Design should be reviewed in light of any additional information or on validation or otherwise of any assumptions.

Drainage Strategy:

- Drainage strategy for new development consists of infiltration via permeable paving.
- Runoff from building roofs to spill to permeable paving.
- Infiltration rate to BRE365 has been undertaken at the Site with the worst case infiltration rates for their respective areas used for calculations. Permeable paving to manufacturer's design.
- As part of site investigation a 2.1m depth trial pit was undertaken which confirmed the water table to be located at depth of 2.1m. As the proposed permeable paving is 0.45m depth, a 1m buffer between the base of infiltration features and the groundwater table is present.

P01	10.03.26	Initial issue	DS	MG
Rev	Date	Detail	Drwn	Chkd

Client:

Ex-Army Builders Ltd

Project:

Robin Lodge Nursery
Part Lane, Swallowfield

Drawing Title:

Management and
Maintenance Plan

Suite 1, 1 Bellstone Court, Bellstone, Shrewsbury, SY1 1JB

Drawn by:	Checked by:	Date:
DS	MG	March 2026
Scale:	Status:	
1:250 @ A1	Planning	
Drawing No:	Issue:	
84709-500-002	PL01	

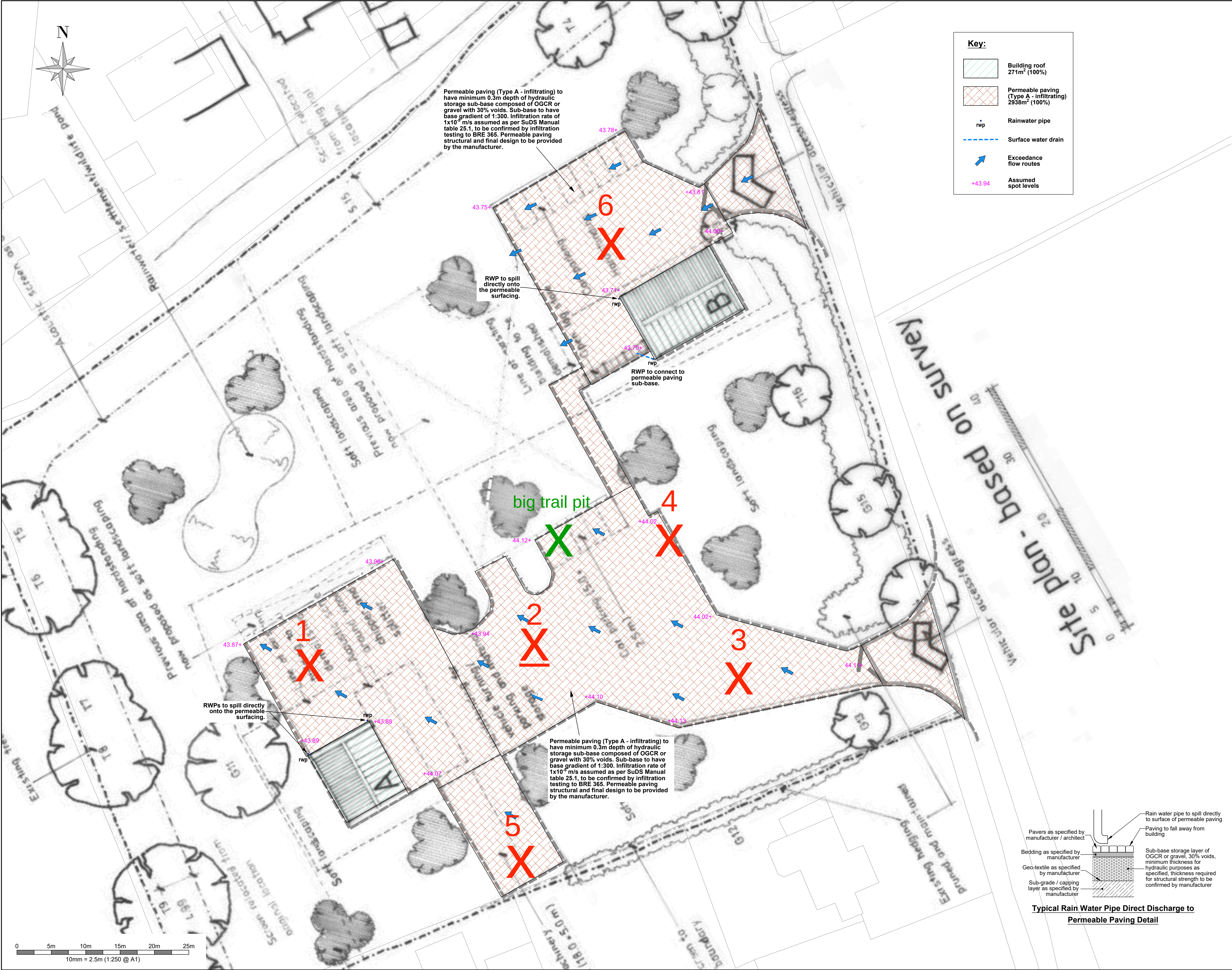


Thames Water asset location plan

Appendix F



Infiltration testing



Notes:				
1.	Do not scale from this drawing.			
2.	All dimensions are in meters unless otherwise stated.			
3.	This drawing to be read in conjunction with all other relevant drawings and documents.			
4.	All drainage to be constructed to SSG Design and Construction Guidance, current British standards and building regulations and other relevant standards.			
5.	Exact locations of rain water downpipes and other internal drainage down pipes to be confirmed by architect / M&E engineer. Rain water pipes to discharge directly to permeable paving surface.			
6.	Contractor to confirm locations of existing services prior to commencement on site and to arrange for any necessary diversions, lowering or protection works as required.			
7.	All specialist drainage components such as permeable paving to be designed and installed as per manufacturers requirements.			
8.	All levels based on LIDAR data, to be confirmed following topographical survey. Cover levels to be confirmed by landscape architect. Cover levels and invert levels are in meters unless otherwise stated.			
9.	Infiltration features to be positioned at least 1m above ground water table and focused infiltration features to be positioned 5m from buildings and 10m from other infiltration systems unless otherwise specified by a structural / geotechnical engineer.			
10.	Private surface water pipes to be 1000 with minimum fall of 1:100 unless otherwise stated.			
11.	Permeable paving and outlets to be as manufacturer design and recommendations.			
12.	Proposed ground levels will influence the storage capacity of the permeable paving and the position of the drainage pick up features. When proposed ground levels are complete the permeable paving design should be reviewed to ensure sufficient storage is provided and that the drainage pick up features are positioned correctly.			
13.	Minimum cover to thermoplastic pipes in garden or patio areas 0.6m, in driveway 0.9m, in road 1.2m, otherwise concrete protection will be required.			
14.	Access chamber cover class A15 for garden and patio, B125 for driveway, C250 for lightly trafficked roads or small private car parks.			
15.	Design is for planning purposes only and not for construction. Design should be confirmed prior to construction to ensure all available information is considered and any assumed information should be verified.			
16.	Design is based on pdf print. Design should be verified and checked once accurate digital information is available.			
17.	Design should be reviewed in light of any additional information or on validation or otherwise of any assumptions.			
Drainage Strategy:				
• Drainage strategy for new development consists of infiltration via permeable paving.				
• Runoff from building roofs to spill to permeable paving.				
• Infiltration rate assumed to be 1.0x10 ⁻⁵ m/s (0.036 m/hr), to be confirmed by infiltration testing to BRE365. Soakaway to manufacturer's design.				
• Depth to seasonal high ground water to be determined to ensure sufficient distance between base of soakaway and ground water of at least 1.0m.				
P01	10.03.26	Initial issue	DS	MG
Rev	Date	Detail	Drwn	Chkd
Client:				
Ex-Army Builders Ltd				
Project:				
Robin Lodge Nursery Part Lane, Swallowfield				
Drawing Title:				
Proposed Surface Water Drainage Layout				
GeoSmart Information				
Suite 9-11, 1st Floor, Old Bank Buildings, Bellstone, Shrewsbury, SY1 1HU				
Drawn by:	Checked by:	Date:		
DS	MG	March 2026		
Scale:	1:250 @ A1		Status:	
			Planning	
Drawing No:	84709-500-001		Issue:	
			PL01	

Ground Infiltration Test

The infiltration testing was carried out over two consecutive days.

Address

**Robin Lodge Nursery
Part Lane
Swallowfield
Berkshire**

Date of test: 22/07/2026 and 23/07/202

6 x pits @ 0.50m deep are shown on the plan with a Red x

1 x pit as deep as practically feasible. Shown on the plan with a Green X

Trail pit 1 - Water Storage and Drainage Test Results.

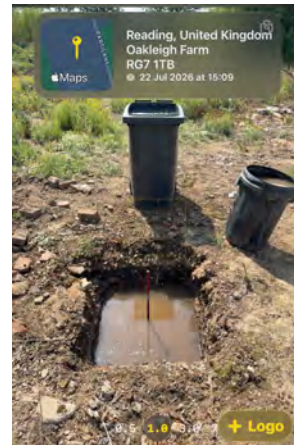
75% to 25% Test Time 1...**90**...Mins Time 2.....**131**...Mins Time 3.....**282**...Mins



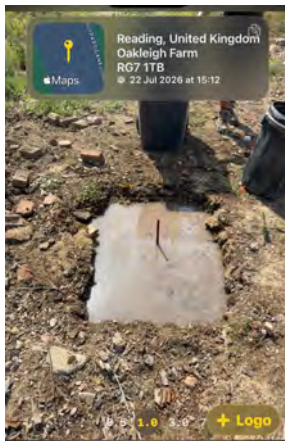
Pit 1 - empty.



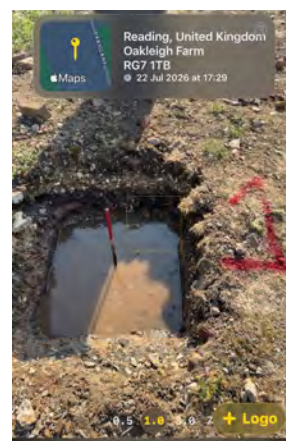
Pit 1 - filled first attempt.



Pit - 1 drained first attempt.



Pit 1 - filled second attempt.



Pit - 1 drained, second attempt.



Pit 1 - filled third attempt.



Pit - 1 drained; third attempt.

Trail Pit 2 - Water Storage and Drainage Test Results.

75% to 25% Test Time 1...**62**.....Mins Time 2.....**140**...Mins Time 3.....**281**...Mins



Pit 2 - empty.



Pit 2 - filled first attempt.



Pit - 2 drained first attempt.



Pit 2 - filled second attempt.



Pit - 2 drained; second attempt.



Pit 2 - filled third attempt.



Pit - 2 drained; third attempt.

Trail Pit 3 - Water Storage and Drainage Test Results.

75% to 25% Test Time 1... **68**Mins Time 2..... **141** ...Mins Time 3..... **269** ...Mins



Pit 3 - empty.



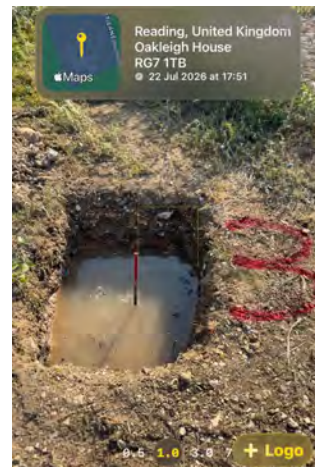
Pit 3 - filled first attempt.



Pit - 3 drained first attempt.



Pit 3 - filled second attempt.



Pit - 3 drained; second attempt.



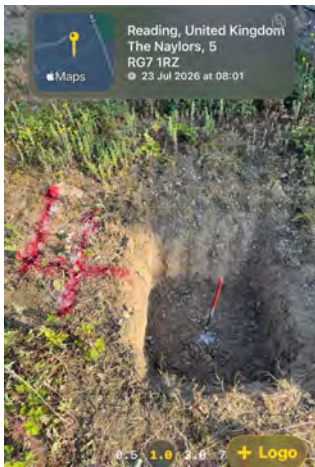
Pit 3 - filled third attempt.



Pit - 3 drained; third attempt.

Trail Pit 4 - Water Storage and Drainage Test Results.

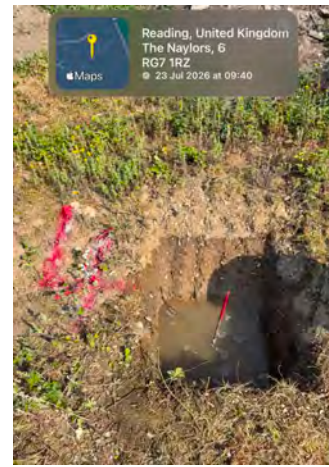
■ 75% to 25% Test Time 1...**35**Mins Time 2.....**47** ...Mins Time 3.....**58** ...Mins



Pit 4 - empty.



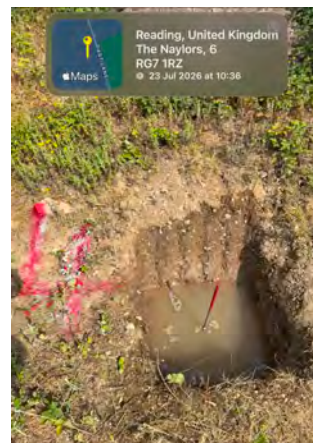
Pit 4 - filled first attempt.



Pit - 4 drained first attempt.



Pit 4 - filled second attempt.



Pit - 4 drained; second attempt.



Pit 4 - filled third attempt.



Pit - 4 drained; third attempt

Trail Pit 5 - Water Storage and Drainage Test Results.

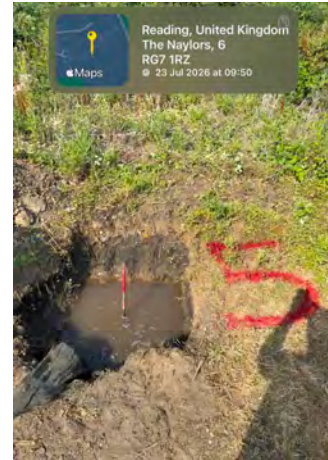
75% to 25% Time 1... **64**Mins Time 2..... **186** ...Mins Time 3..... **317** ...Mins



Pit 5 - empty.



Pit 5 - filled first attempt.



Pit - 5 drained first attempt.



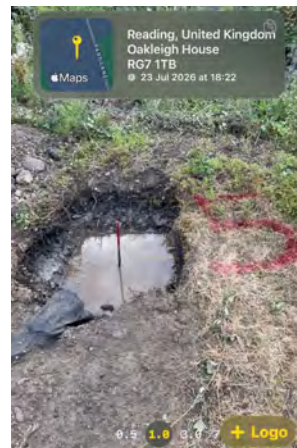
Pit 5 - filled second attempt.



Pit - 5 drained; second attempt.



Pit 5 - filled third attempt.



Pit - 5 drained; third attempt

Trail Pit 6 - Water Storage and Drainage Test Results.

■ 75% to 25% Time 1... **70**Mins Time 2.....**222** ...Mins Time 3.....**304** ...Mins



Pit 6 - empty.



Pit 6 - filled first attempt.



Pit - 6 drained first attempt.



Pit 6 - filled second attempt.



Pit - 6 drained; second attempt.



Pit 6 - filled third attempt.



Pit - 6 drained; third attempt.

Summary of Trial Pit Drainage Times
1 to 6, 1 being the best time.

1. Trail Pit 4 - Water Storage and Drainage Test Results.

■ 75% to 25% test Time 1...**35...**Mins Time 2...**47...**Mins Time 3...**58...**Mins

2. Trail Pit 2 - Water Storage and Drainage Test Results.

■ 75% to 25% test Time 1...**62...**Mins Time 2.....**140...**Mins Time 3.....**281...**Mins

3. Trail Pit 5 - Water Storage and Drainage Test Results.

■ 75% to 25% test Time 1...**68...**Mins Time 2.....**141...**Mins Time 3...**269...**Min

4. Trail Pit 3 - Water Storage and Drainage Test Results.

■ 75% to 25% Time 1...**64...**Mins Time 2...**186...**Mins Time 3...**317...**Min

5. Trail Pit 6 - Water Storage and Drainage Test Results.

■ 75% to 25% test Time 1...**70...**Mins Time 2...**222...**Mins Time 3...**304...** Mins

6. Trail Pit 1 - Water Storage and Drainage Test Results.

■ 75% to 25% test Time 1...**90...**Mins Time 2...**131...**Mins Time 3...**282...**Mins

Deep Trial Pit Investigation

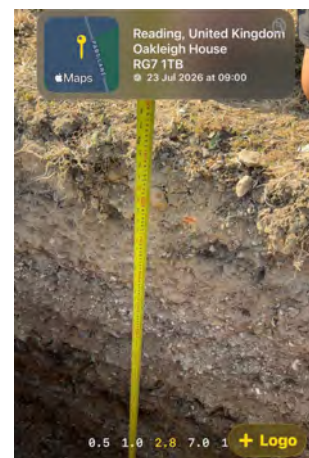
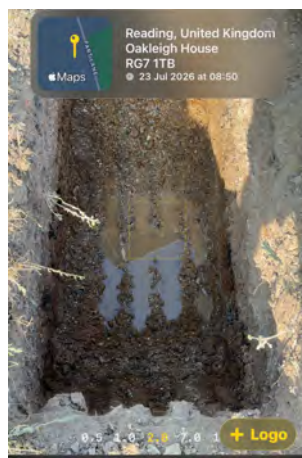
A trial pit was excavated to approximately 2.1 metres below ground level.

No groundwater was encountered at 1.0 m below ground level.

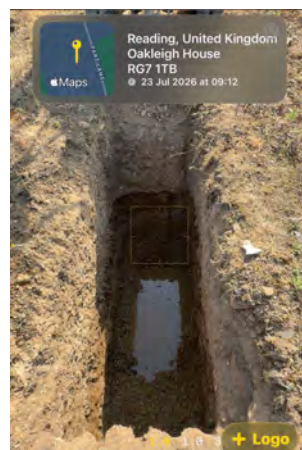
The ground is all ballast stone-sand.



2.1m down. We started to hit the water table; the ground is still all ballast stone-sand.



The 2.1m Trail pit started to fill with water at 9.12am.



**By 10:55 a.m., the water level
risen to 400 mm.**



**By 11:28 a.m., the water level
Risen to 450 mm.**



**By 12:10 a.m., the water level
risen to 460 mm.**



**By 14:02 p.m., the water level
risen to 520 mm.**

**By 15:04 p.m., the water level
risen to 540 mm**

The ground conditions comprised predominantly ballast stone and sand throughout, as shown in the attached photograph.



8. Conclusion

Six infiltration tests and one deep groundwater investigation were successfully completed over two days.

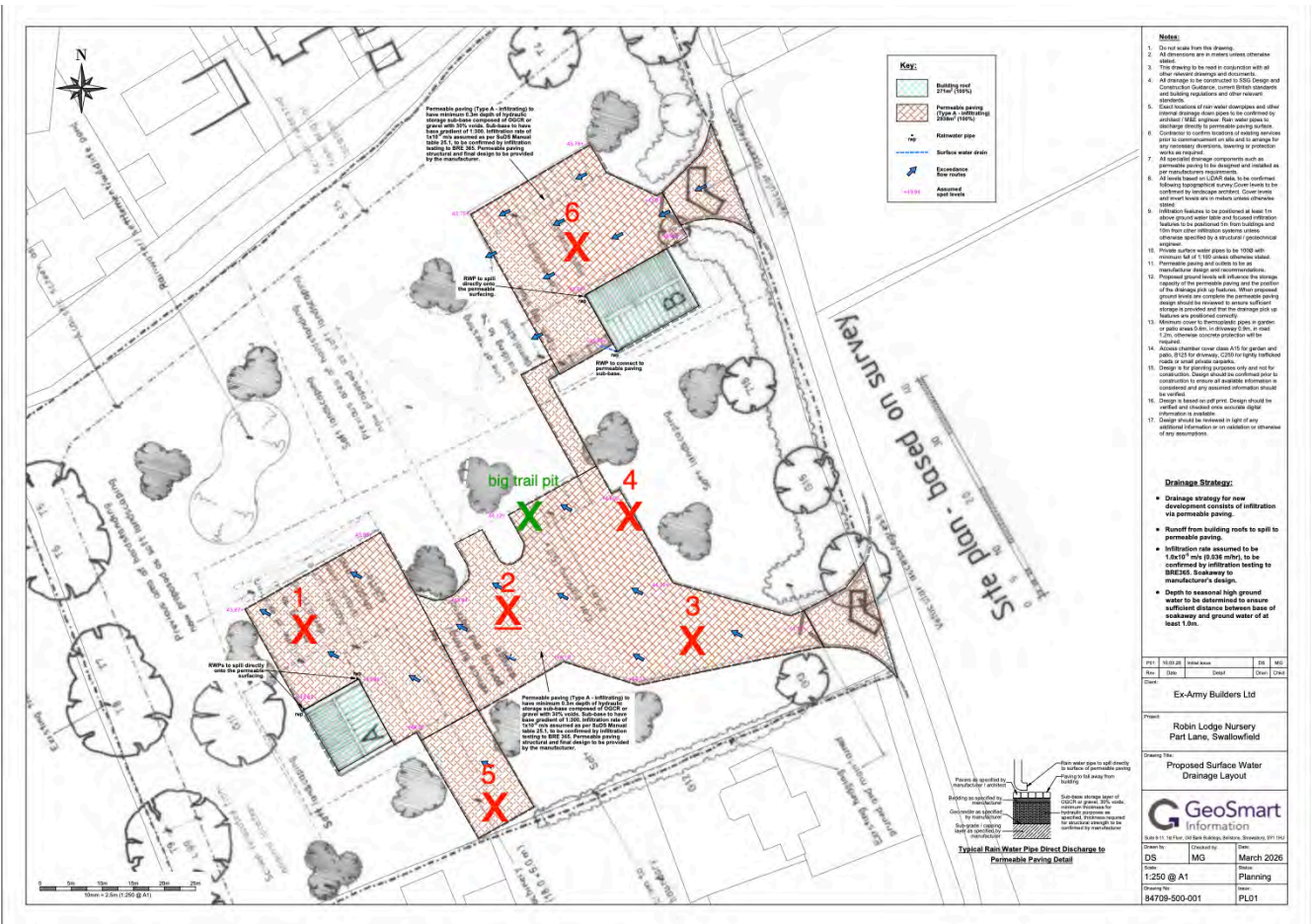
The results provide infiltration data for the proposed surface water drainage design and confirm the depth at which groundwater was encountered during excavation.

The attached photographs provide a chronological record of the testing process.

Map of Trail Pits.

6 x pits @ 0.50m deep are shown on the plan with a Red x

1 x pit @ 2.100m Shown on the plan with a Green X



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Important consumer protection information

This search has been produced by GeoSmart Information Limited, Suite 1, 1 Bellstone Court, Bellstone, Shrewsbury, SY1 1JB.

Tel: 01743 298 100

Email: info@geosmartinfo.co.uk

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- promotes the best practice and quality standards within the industry for the benefit of consumers and property professionals.
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services.
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- conduct business in an honest, fair and professional manner.
- handle complaints speedily and fairly.
- ensure that products and services comply with industry registration rules and standards and relevant laws.
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The Property Ombudsman scheme
Milford House
43-55 Milford Street
Salisbury
Wiltshire SP1 2BP
Tel: 01722 333306
Fax: 01722 332296
Email: admin@tpos.co.uk

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- Normally deal with it fully and provide a final response, in writing, within 20 working days of receipt.
- Keep you informed by letter, telephone or e-mail, as you prefer, if we need more time.
- Provide a final response, in writing, at the latest within 40 working days of receipt.
- Liaise, at your request, with anyone acting formally on your behalf.



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We will co-operate fully with the Ombudsman during an investigation and comply with his final decision. Complaints should be sent to:

Liz Lloyd

Finance Manager

GeoSmart Information Limited

Suite 1, 1 Bellstone Court,

Bellstone, Shrewsbury, SY1 1JB

Tel: 01743 298 100

support@geosmartinfo.co.uk

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