

SUSTAINABLE DRAINAGE SYSTEMS

(SuDS) REPORT

Land at Pirton, Hitchin, SG5 3RA

Proposed development of 30 no. residential dwellings

Client / project	Land at Pirton - Proposed Residential Development (30 dwellings)
Site	Land at Pirton, Hitchin, SG5 3RA
Report date	September 2026
Prepared by	T. McArdle BSc. Hons MRICS
Organisation	PSK Rural Limited
Status	Planning / Indicative SuDS Strategy
Revision	C



Purpose of report

This report presents an updated indicative surface water drainage strategy for an outline proposal of 30 residential dwellings on the 3.420 ha arable site. It is intentionally based on a conservative nil-infiltration scenario because site-specific infiltration and groundwater testing has not yet been undertaken. The strategy therefore demonstrates the scale of attenuation that can be accommodated without relying on infiltration, while preserving the opportunity to move higher up the drainage hierarchy at Reserved Matters and discharge-of-condition stage if testing confirms that infiltration is safe and effective.

Executive Summary

The application site comprises approximately 3.420 ha of existing arable land on the northern edge of Pirton. The outline proposal is for 30 no. residential dwellings with internal access roads, parking, a playground, landscaped open space and biodiversity areas. The assessment retains the drainage area schedule used in the submitted planning-stage calculations; final catchment areas will be re-measured when the Reserved Matters layout and levels are fixed.

Component	Area	Planning-stage drainage treatment
Total site area	3.420 ha	34,200 m ²
Residential roof footprint	0.3000 ha	3,000 m ² ; contributing impermeable area
Roads / parking / playground / paving	1.0704 ha	10,704 m ² ; contributing impermeable area
Permeable hoggin pedestrian path	0.0211 ha	211 m ² ; treated as non-contributing in current estimate
Gardens / verges / BNG / soft landscape	2.0285 ha	20,285 m ² ; treated as non-contributing in current estimate
Total contributing impermeable area	1.3704 ha	13,704 m ² ; approximately 40.1% of site

The FEH Statistical (2025) assessment gives QBAR of approximately 1.0 l/s for the full site and a 1% AEP (100-year) greenfield runoff rate of approximately 3.7 l/s. The HR Wallingford storage estimate uses FEH22 rainfall and +40% climate change and identifies 1,427 m³ gross conceptual storage, equivalent to 1,284 m³ maximum water volume at 90% voids, for the 1% AEP event. The indicative crated attenuation design provides 1,590 m³ gross volume / 1,431 m³ stated effective storage.

Key planning-stage conclusion

No infiltration credit has been taken. On the current planning-stage assumptions, the proposed below-ground attenuation has capacity above the nil-infiltration storage estimate. This demonstrates that a robust SuDS strategy can be accommodated even on the conservative assumption that infiltration contributes nothing. Final hydraulic proof will still update pervious runoff, urban creep, levels, catchments, outfall conditions and the selected storage / flow-control system in accordance with the National Standards and HCC LLFA requirements.

1. Introduction

PSK Rural Limited has prepared this updated Sustainable Drainage Systems (SuDS) Report in support of the outline residential redevelopment of land at Pirton, Hitchin, SG5 3RA for 30 no. dwellings. The report reviews the submitted drainage calculations and geological evidence, strengthens the drainage-hierarchy assessment and establishes a clear planning-stage design basis for future Reserved Matters and discharge-of-condition work.

The strategy is deliberately proportionate to an outline application. It demonstrates that the site has sufficient space for a compliant attenuation-led system under a worst-case nil-infiltration scenario, while making clear that the final design will first seek to maximise rainwater reuse and infiltration where site-specific investigations show these to be suitable.

1.1 Documents reviewed

Document	Reference / date
Indicative Site Layout Plan - Proposed Residential Development	LAP SITE 001 Rev A, August 2026
Indicative drainage / attenuation design	Planning-stage drawing, August 2026
Greenfield runoff rate estimation	HR Wallingford UK SuDS tool, FEH Statistical (2025), 09/09/2026
Surface water storage volume estimation	HR Wallingford UK SuDS tool, FEH22 rainfall, 09/09/2026
Geological Map Extracts - Pirton Geology	BGS GeoReport BGS_350054/69986, 28/08/2026
Infiltration SuDS GeoReport - Pirton Infiltration	BGS GeoReport BGS_350053/69985, 28/08/2026
Existing Topographic Plan	LAP TOPO 001 Rev A, August 2026

1.2 Status of strategy

This is not a final construction drainage design. Pipe sizes, precise storage geometry, finished levels, exceedance routes, infiltration rates, seasonal groundwater levels, water-quality components, the lawful receiving outfall and adoption arrangements will be confirmed through Reserved Matters and/or the discharge of suitably worded planning conditions. The purpose of the present report is to demonstrate that a policy-compliant drainage solution is achievable and that the outline layout does not depend on solely an infiltration assumption.

2. Site and Proposed Development

The site is an existing arable field immediately north of the built-up edge of Pirton. The indicative 30-dwelling layout is arranged around an internal access road and includes a playground, extensive landscaped margins, new grass and mixed scrub planting and continued agricultural access at the northern boundary.

Agricultural land lies principally to the north and west, the existing settlement lies to the south and Holwell Road lies to the east.



Figure 1 - Extract from Indicative Site Layout Plan, Appendix 1.

2.1 Development surface areas

For the current planning-stage assessment, the existing area schedule is retained because no alternative final Reserved Matters hard-surface take-off has yet been fixed. The 0.0211 ha hoggin route is treated as permeable and the 2.0285 ha of gardens, verges, open space and BNG are treated as vegetated. Accordingly, 1.3704 ha is used as the directly contributing impermeable area in the appended storage estimate.

Surface	ha	m ²	% of site	Current model
Dwelling roofs	0.3000	3,000	8.77%	Contributing
Impermeable paving	1.0704	10,704	31.30%	Contributing
Permeable hoggin path	0.0211	211	0.62%	Non-contributing
Vegetated areas	2.0285	20,285	59.31%	Non-contributing
Total	3.4200	34,200	100.00%	-

3. Policy and Design Standards

The drainage strategy has been reviewed against the current national and local framework applicable to a major residential development in North Hertfordshire. Thirty dwellings constitutes major development, so the Lead Local Flood Authority (Hertfordshire County Council) is a key statutory drainage consultee.

Policy / guidance	Application to this proposal
National Planning Policy Framework, August 2026 - Policies CC3 and F8	Requires climate-resilient development and SuDS proportionate to the nature and scale of the proposal. SuDS are to control flow rates and runoff volumes, follow the National Standards, provide lifetime maintenance and, for major development, have regard to LLFA advice.

Policy / guidance	Application to this proposal
Defra National Standards for Sustainable Drainage Systems, 2025	Current technical framework covering runoff destination, interception, extreme rainfall, water quality, amenity, biodiversity, construction and long-term maintenance. Establishes the drainage hierarchy and requires higher-priority options to be maximised before lower-priority disposal is adopted.
North Hertfordshire Local Plan 2011-2031 - Policy NE8	Supports the most appropriate SuDS solution having regard to technical, viability and design considerations, with objectives including reduced surface-water flood risk, biodiversity, water quality, amenity, natural drainage mimicry and the SuDS hierarchy.
Hertfordshire County Council LLFA policy / guidance	Requires an appropriate surface-water drainage strategy for major development, hydraulic evidence, safe exceedance routing and clear long-term management / maintenance.
CIRIA C753 - The SuDS Manual	Industry guidance for source control, treatment trains, infiltration, storage, conveyance, water quality and maintenance.

Policy position

The outline application does not seek to defer whether drainage can be achieved. It demonstrates a conservative nil-infiltration solution now, while reserving the detailed optimisation of rainwater reuse, infiltration, attenuation geometry and outfall arrangements for Reserved Matters / discharge of conditions after site-specific investigations are available.

3.1 Drainage hierarchy

The drainage strategy follows the National Standards runoff-destination hierarchy. The order below will be tested again at detailed design, using the site-specific evidence then available.

Priority	Destination / measure	Site-specific approach
1	Collection for non-potable use	Rainwater harvesting and water butts will be incorporated where practicable. No storage credit is presently taken, so any effective reuse provides additional resilience.
2	Infiltration to ground	Potentially feasible on the BGS evidence, but no hydraulic credit is taken until infiltration testing, groundwater monitoring, groundwater-protection and geotechnical assessment confirm suitability.
3	Above-ground surface water body	No confirmed lawful receiving waterbody is presently identified. This option will be investigated at detailed design if a practical connection exists.
4	Surface water sewer / other piped system	A restricted discharge from attenuation may be used where higher-order destinations cannot accept all runoff. Final receiver, capacity, levels, easements and consent will be confirmed.
5	Combined sewer	Not proposed. This is a last-resort destination only.

4. Existing Drainage and Greenfield Runoff

The undeveloped site is arable and predominantly permeable. No formal existing piped drainage system, confirmed lawful receiving outfall or discharge consent has been evidenced in the information reviewed. The pre-development baseline is therefore represented by FEH greenfield runoff

for the full 3.420 ha site.

Return period	FEH growth factor	Greenfield runoff rate
1 year	0.87	0.9 l/s
2 year	0.89	0.9 l/s
10 year	1.65	1.7 l/s
30 year	2.45	2.5 l/s
100 year	3.56	3.7 l/s
200 year	4.21	4.3 l/s

5. Ground Conditions and Infiltration Potential

5.1 BGS geological setting

The BGS mapping shows chalk bedrock beneath the locality, predominantly the West Melbury Marly Chalk Formation with the Totternhoe Stone Member nearby and the Zig Zag Chalk Formation present in the wider area. Superficial deposits are spatially variable and much of the immediate site is mapped without a superficial deposit, indicating that chalk may be relatively shallow in places.

The BGS information is a planning-screening dataset and is not a substitute for site-specific ground investigation, infiltration testing, groundwater observations or geotechnical design. Those investigations are therefore deliberately reserved for the detailed design stage, when the final plot layout, highway geometry and levels are known.

5.2 BGS infiltration evidence

The BGS Infiltration SuDS GeoReport identifies opportunities for bespoke infiltration SuDS. It indicates that chalk bedrock may be free-draining or capable of moderate infiltration, while superficial permeability varies locally. Infiltration can therefore not reasonably be dismissed at outline stage.

The same evidence also identifies matters that must be checked before infiltration is adopted, including the possibility of seasonal groundwater at less than 3 m below ground level, groundwater vulnerability and geological / ground-stability considerations associated with chalk. These constraints are precisely why the present hydraulic assessment takes no infiltration credit.

Conservative nil-infiltration assumption

For the outline planning assessment, the design infiltration rate is taken as nil. This is a deliberately conservative assumption, not a conclusion that the site is impermeable. The BGS data indicates potential for infiltration, but field testing and groundwater monitoring will determine the extent to which that potential can safely be used.

5.3 Infiltration testing and detailed-design position

At Reserved Matters / discharge-of-condition stage, intrusive investigation will be undertaken at representative locations and depths. The work will establish the soil and chalk profile, infiltration rates, seasonal high groundwater levels, the required unsaturated zone beneath infiltration features, potential contamination / groundwater-protection issues and any geotechnical constraints. Testing will be targeted to

the actual locations of proposed infiltration measures so that the final design is based on observed site performance rather than regional mapping alone.

If the evidence is favourable, runoff presently routed to the attenuation system can be intercepted higher in the hierarchy through infiltration. Potential measures include conventional soakaways, infiltration trenches / basins, permeable pavement sub-bases and other shallow distributed SuDS. This could reduce discharge volumes and the required central attenuation volume, subject to full hydraulic re-modelling.

5.4 Deep borehole infiltration

The chalk setting also means that deeper infiltration may warrant investigation if shallow infiltration is constrained. However, the 2025 National Standards make clear that deep-bore infiltration is not treated as the normal SuDS approach and may be used only by exception, with agreement in principle from the relevant risk-management authority provided to the approving body. Any deep borehole soakaway option will therefore be considered only after conventional hierarchy options have been maximised, detailed hydrogeological and groundwater-protection evidence is available, and the relevant authority has agreed the principle.

Reserved Matters / condition commitment

Site-specific infiltration and groundwater-level testing will be completed before the final drainage design is approved. The final strategy will then re-run the hierarchy: first rainwater reuse, then safe infiltration where feasible, followed by attenuation and restricted discharge only for the residual runoff that cannot practicably be managed by higher-priority measures.

6. Proposed SuDS Strategy

The submitted design provides the planning-stage backbone of an attenuation-led strategy. Surface water from roofs and impermeable paved areas is collected and routed toward a below-ground attenuation feature in the northern part of the developed area, with restricted discharge. This arrangement is intentionally assessed without infiltration so that the planning case is not dependent on unverified ground performance.



Figure 2 - Extract showing the indicative attenuation arrangement. Final geometry and outfall details will be confirmed at detailed design stage.

6.1 Source control and conveyance

Surface / source	Proposed SuDS response
Roofs	Rainwater harvesting / water butts at dwelling level where practicable. Overflows to rain gardens, planted areas, infiltration or the site drainage network depending on detailed testing and levels.
Residential streets / parking	Sediment and pollutant treatment before attenuation. Detailed design may use trapped gullies, filter strips, bioretention / rain gardens, tree pits, swales, permeable paving and proprietary treatment where justified.
Playground / hard landscape	Direct runoff to adjacent landscape or vegetated treatment where practicable, avoiding nuisance ponding in active play areas.
Hoggin pedestrian route	Maintain permeability and vegetated edge drainage; avoid unnecessary direct connection to the piped system.
Landscape / BNG	Use shallow depressions, filter strips and vegetated conveyance where compatible with the approved landscape and habitat-management objectives.

6.2 Attenuation storage

The indicative drainage design identifies a crated attenuation volume of approximately 1,590 m³ gross, with 90% effective storage stated as approximately 1,431 m³. Where the final system operates as attenuation rather than infiltration it will be wrapped in a watertight geomembrane, with protective geotextile as required by the selected manufacturer. A geotextile alone is permeable and will not be relied upon as the hydraulic liner.

The storage will incorporate inspection / access points, upstream silt interception and maintainable flow-control infrastructure. Final crate depth, footprint, cover, structural loading, floatation risk, groundwater interaction, void ratio and clash avoidance with utilities / foundations will be fixed at detailed design.

6.3 Outfall and flow control

The planning-stage model restricts maximum discharge to approximately 3.7 l/s in the 1% AEP event, equivalent to the FEH 100-year greenfield rate. It achieves this through a modelled 38 mm orifice, while the tool itself records 40 mm as a minimum opening for blockage resilience. The final design will therefore use a maintainable control device - potentially a vortex control or equivalent - capable of achieving the agreed discharge regime with an opening and access arrangement acceptable to HCC LLFA.

The final lawful receiving outfall is not demonstrated by the information reviewed. This is a detailed-design matter and does not negate the on-site storage assessment, but a connection will not be assumed until the receiving system / waterbody, ownership, capacity, invert level, easements and any required consent are confirmed.

6.4 Relationship with the hierarchy

The attenuation shown on the outline scheme is a conservative backstop. At detailed design, any reliable rainwater harvesting and infiltration measures will be modelled as higher-order components of a distributed SuDS train. The central attenuation system will then be resized if appropriate, but only after the final strategy has demonstrated equivalent or better control of runoff volume, rate, water quality and exceedance risk.

Important

The outline strategy does not seek permission to bypass the drainage hierarchy. It demonstrates that the development remains drainable even if infiltration proves unavailable, while keeping higher-order SuDS options open for detailed design.

7. Storage and Hydraulic Assessment

7.1 Planning-stage storage calculation

The appended HR Wallingford storage estimate uses FEH22 rainfall, a +40% climate-change allowance, a 1% AEP design event and a conceptual 1.5 m deep storage feature with 90% voids. Contributing impermeable areas are 0.3000 ha of roofs and 1.0704 ha of impermeable paving. The hoggin route and vegetated areas are treated as non-contributing in this indicative model.

Return period	Critical duration	Peak outflow	Max water volume	Gross storage volume
1 year	5,760 min	2.1 l/s	440 m ³	489 m ³
2 year	5,760 min	2.3 l/s	515 m ³	572 m ³
10 year	1,440 min	3.0 l/s	837 m ³	930 m ³
30 year	1,440 min	3.3 l/s	1,037 m ³	1,152 m ³
100 year +40% CC	1,440 min	3.7 l/s	1,284 m ³	1,427 m ³
200 year	1,440 min	3.9 l/s	1,479 m ³	1,643 m ³

7.2 Comparison with indicative attenuation provision

Source	Gross / geometric volume	Effective water storage	Comment
Planning-stage model, 1% AEP +40% CC	1,427 m ³	1,284 m ³	Conceptual 90%-void storage
Indicative crated attenuation design	1,590 m ³	1,431 m ³	Stated 90% effective attenuation

On the current assumptions, the indicative design provides approximately 163 m³ additional gross crate volume and 147 m³ additional effective water-storage capacity relative to the corresponding model outputs. This demonstrates planning-stage spatial capacity for the nil-infiltration scenario. The comparison is not a substitute for final network modelling with the completed layout and levels.

7.3 Detailed hydraulic design requirements

The following matters will be addressed through future Reserved Matters and/or Discharge of Conditions:

- Finalise the design and quantum of the final roof, highway, parking, footway, playground, private curtilage and landscaped catchments from the approved Reserved Matters layout.
- Finalise contributing pervious surfaces in the post-development runoff model as required by the current National Standards.
- Apply the required urban-creep allowance to residential property curtilages once the final private plot arrangement is known; the current outline estimate does not rely on this as final proof.
- Use current FEH rainfall and the applicable climate-change allowance at the time of detailed design; the appended outline estimate

uses +40%.

- Model all relevant critical storm durations and confirm that the 3.3% AEP event is managed without unacceptable flooding and the 1% AEP event including climate change does not flood buildings or critical access routes.
- Test the final receiving-outfall tailwater / surcharge condition and demonstrate that it does not compromise storage or upstream flood performance.
- Model the final flow-control curve rather than relying on a single nominal orifice rate, and select a maintainable control device with blockage resilience.
- Provide an exceedance plan for events beyond the design standard and for blockage / temporary failure, routing water away from dwellings and vulnerable receptors.
- Where infiltration is proven, model it using site-tested design rates and conservative factors of safety, with groundwater level and unsaturated-zone constraints explicitly incorporated.
- Coordinate the final drainage model with the landscape, BNG, highways, utilities and structural designs so that the SuDS train is deliverable and maintainable.

Current standards check

The existing storage calculation is appropriately conservative in assuming nil infiltration, but final hydraulic approval will incorporate the completed layout, pervious runoff and urban creep. The planning conclusion is therefore that a compliant solution can be accommodated, not that the appended outline calculation is the final construction model.

8. Water Quality, Amenity and Biodiversity

The final system will be designed as a treatment train rather than as pipework and storage alone. Treatment will occur as close as practicable to source, especially for roads and parking where sediment, hydrocarbons and other diffuse pollutants may be present. This accords with the National Standards and North Hertfordshire Policy NE8 objectives for water quality, biodiversity and amenity.

Surface	Indicative hazard	Treatment approach
Roofs	Low	Rainwater reuse, vegetated source control and/or direct connection to clean-water SuDS; attenuation thereafter if required.
Roads / parking	Moderate	Vegetated treatment, permeable elements, filter strips / bioretention, trapped gullies and, where risk assessment requires, proprietary sediment / hydrocarbon controls.
Playground / footways	Low to moderate	Drain toward adjacent landscape or vegetated treatment where feasible; prevent sediment-laden construction runoff entering permanent features.
Hoggin path	Low	Maintain permeable construction and vegetated edge drainage; avoid direct connection unless locally required.

The substantial soft landscape and BNG areas provide good opportunities to integrate swales, shallow depressions, rain gardens and vegetated treatment at detailed design stage, provided their drainage function is compatible with habitat establishment and long-term ecological management.

9. Exceedance and Surface Water Flood Routing

The final levels strategy will define safe exceedance routes for flows above design capacity and for blockage or temporary failure. Roads, landscaped corridors and other low-risk spaces will be used as preferential routes so that flows are directed away from dwellings. Finished floor levels will be set above adjacent design flood levels with appropriate freeboard.

The appended 200-year sensitivity gives approximately 1,643 m³ gross storage, above the nominal 1% AEP storage figure. The strategy is not to contain every rarer event entirely below ground; exceedance above the design standard will instead be managed safely on the surface without increasing flood risk elsewhere.

10. Construction-Phase Surface Water Management

Construction can generate substantially greater sediment loads than the completed development. The permanent attenuation and flow-control system will therefore not be used as an uncontrolled sediment trap during bulk earthworks. A construction drainage method statement will be agreed before works affecting site drainage commence.

Control	Construction commitment
Site phasing	Retain existing drainage paths as far as practicable and phase earthworks to minimise exposed catchments.
Clean / dirty water separation	Use temporary cut-off drains and bunds to prevent clean off-site runoff mixing with disturbed construction areas.
Sediment control	Provide temporary silt fences, sediment sumps / tanks, check dams or settlement features as required; inspect and maintain them after significant rainfall.
Pollution prevention	Provide designated refuelling / chemical-storage areas and spill kits; prevent concrete washout, fuel or oil entering groundwater or surface-water systems.
Permanent SuDS protection	Cap or isolate permanent drainage until catchments are stabilised; inspect and clean the network before commissioning.
Permeable surfaces	Protect hoggins and permeable elements from construction traffic and fines; install / reinstate after adjacent works are substantially complete.
Groundwater protection	Where infiltration works are installed, follow any protective measures arising from the ground investigation and groundwater-risk assessment.

10.1 Construction sequencing

Where practicable, temporary surface-water controls will be installed early so that runoff is treated before discharge. The permanent system will be brought into service only once upstream areas are sufficiently stabilised and silt sources are controlled. Any pumping or dewatering required during construction will be managed in accordance with applicable environmental permits and pollution-prevention requirements.

Construction commitment

The works will be carried out so that construction does not increase flood risk or compromise the capacity, water quality or maintainability of the permanent drainage system.

11. Operation and Maintenance

The final drainage system will be supported by a detailed management and maintenance plan identifying the responsible adopting body / management company, access arrangements, inspection frequencies, routine maintenance, remedial actions, funding and record keeping. The indicative schedule below will be refined to suit the final components and manufacturers.

Asset	Indicative maintenance
Gutters / downpipes / RWH	Inspect at least twice yearly and after severe storms; clear debris and service harvesting components to manufacturer requirements.
Gullies / catchpits / silt traps	Inspect at least six-monthly and after severe storms; remove sediment when intervention levels are reached.
Bioretention / swales / filter strips	Frequent establishment checks in year 1, then routine quarterly visual inspection; remove litter / sediment, manage vegetation and repair erosion.
Permeable paving / hoggins	Quarterly visual inspection; remove weeds / silt, repair rutting and reinstate permeable material as required.
Flow-control chamber	Inspect at least six-monthly and after significant storms; clear debris / sediment and verify control operation and safe access.
Geocellular attenuation	Inspect via access points at least annually and after suspected blockage / flooding; cleanse where the system is designed for access.
Exceedance routes	Inspect annually and after significant storms; maintain route levels and keep clear of obstruction.

12. Outstanding Information for Detailed Design

The outline strategy is technically robust as a planning-stage framework. The items on the following page will be fixed as part of future submission and discharge of Reserved Matters and/or Discharge of Conditions.

12. Outstanding Information for Detailed Design

Matter	Requirement
Topographical / levels survey	Confirm final catchments, finished levels, positive drainage paths, attenuation cover / invert and exceedance routes.
Ground investigation / infiltration tests	Confirm soil / chalk profile, tested infiltration rates, geotechnical constraints and the suitability / siting of infiltration features.
Groundwater monitoring	Establish seasonal high groundwater and required separation beneath infiltration features.
Groundwater protection	Confirm contamination risk, Source Protection Zone status / groundwater sensitivity and treatment requirements for any infiltration.
Outfall investigation	Identify and survey the lawful receiver; confirm ownership, capacity, invert levels, easements and consents.
Hydraulic modelling	Re-run final catchments with current rainfall, climate change, pervious runoff, urban creep, all critical durations and tailwater conditions.
Flow control	Agree a maintainable device / discharge curve with HCC LLFA; resolve the current 38 mm-orifice / 40 mm blockage-resilience issue.
Storage detail	Confirm manufacturer, void ratio, geometry, structural design, groundwater interaction, inspection access and watertight liner where attenuation-only.

Matter	Requirement
Water quality / distributed SuDS	Specify the source-control and treatment train, including rainwater reuse and safe infiltration where testing supports it.
Adoption / maintenance	Confirm the responsible body, legal mechanism, access and long-term funding.

13. Conclusion

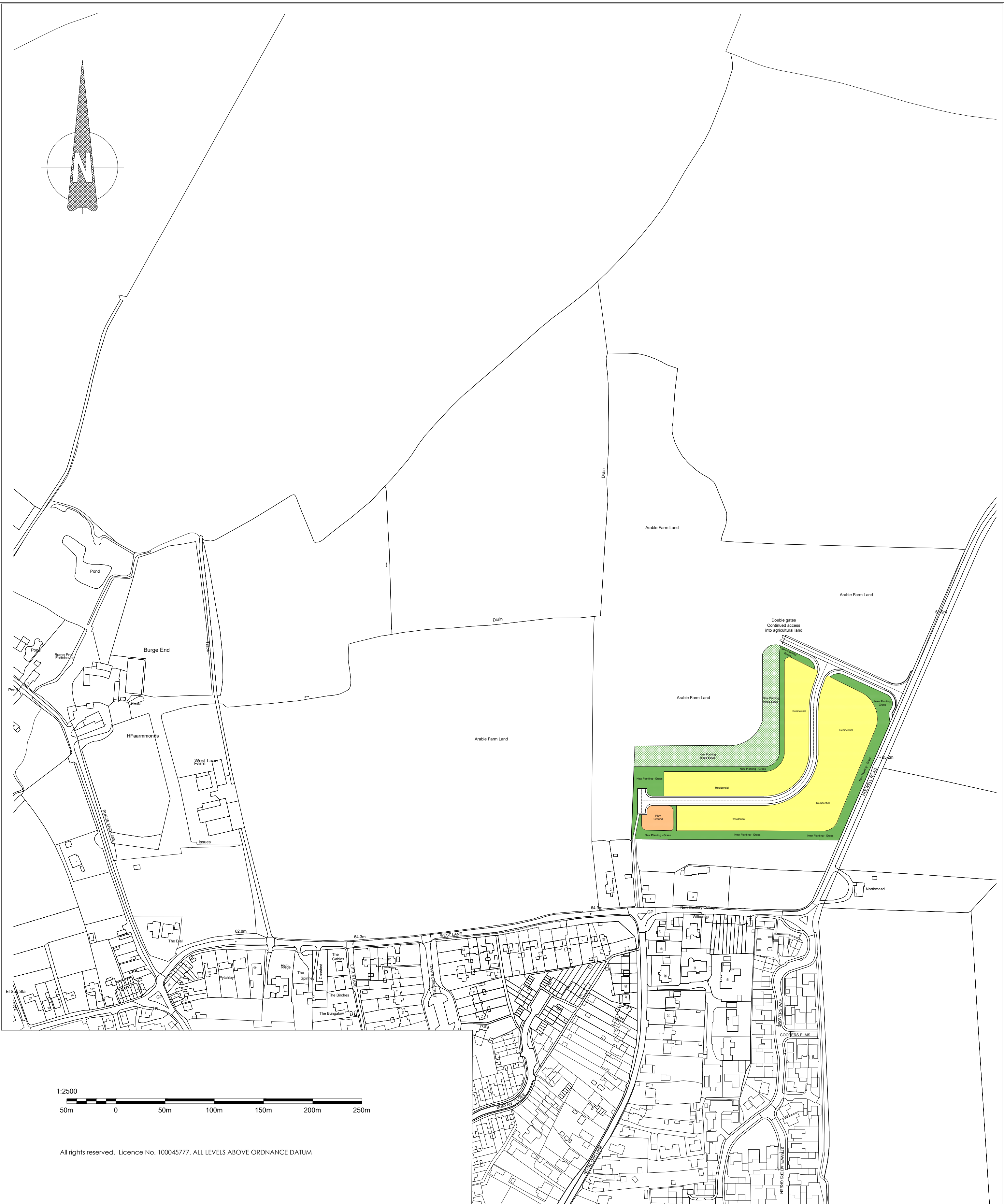
- The 3.420 ha site can accommodate a sustainable surface-water drainage strategy for the proposed 30 dwellings.
- The outline storage assessment deliberately assumes nil infiltration, so the drainage case does not depend on an unverified soakage rate.
- On the current planning-stage assumptions, 1,590 m³ gross / 1,431 m³ effective attenuation exceeds the corresponding 1% AEP +40% climate-change model volumes of 1,427 m³ gross / 1,284 m³ water storage.
- The BGS evidence indicates realistic potential for infiltration, subject to field testing, groundwater and groundwater-protection assessment; this may allow the final scheme to move higher up the hierarchy and reduce residual attenuation / discharge.
- Deep borehole infiltration, if investigated, will be treated as an exceptional option and progressed only with the relevant risk-management authority agreement and supporting hydrogeological evidence.
- Subject to the identified detailed-design matters, the outline proposal demonstrates that a policy-compliant SuDS strategy can be delivered in accordance with the NPPF, National Standards, North Hertfordshire Policy NE8 and HCC LLFA requirements.

References

- Ministry of Housing, Communities and Local Government. National Planning Policy Framework, published 17 August 2026. [Link](#)
- Department for Environment, Food & Rural Affairs. National standards for sustainable drainage systems (SuDS), published 19 June 2025 and updated 30 July 2025. [Link](#)
- North Hertfordshire District Council. North Hertfordshire Local Plan 2011-2031, including Policy NE8: Sustainable drainage systems. [Link](#)
- Hertfordshire County Council. Lead Local Flood Authority drainage and SuDS guidance / policies for developers. [Link](#)
- CIRIA. The SuDS Manual, C753 (2015). [Link](#)
- British Geological Survey. GeoReport BGS_350054/69986 - Geological Map Extracts, Pirton Geology, 28 August 2026.
- British Geological Survey. GeoReport BGS_350053/69985 - Infiltration SuDS GeoReport, Pirton Infiltration, 28 August 2026.
- HR Wallingford / UK SuDS. Greenfield runoff rate estimation and surface water storage volume estimation for Land at Pirton, 9 September 2026. [Link](#)

Appendix 1

Indicative Site Layout Plan



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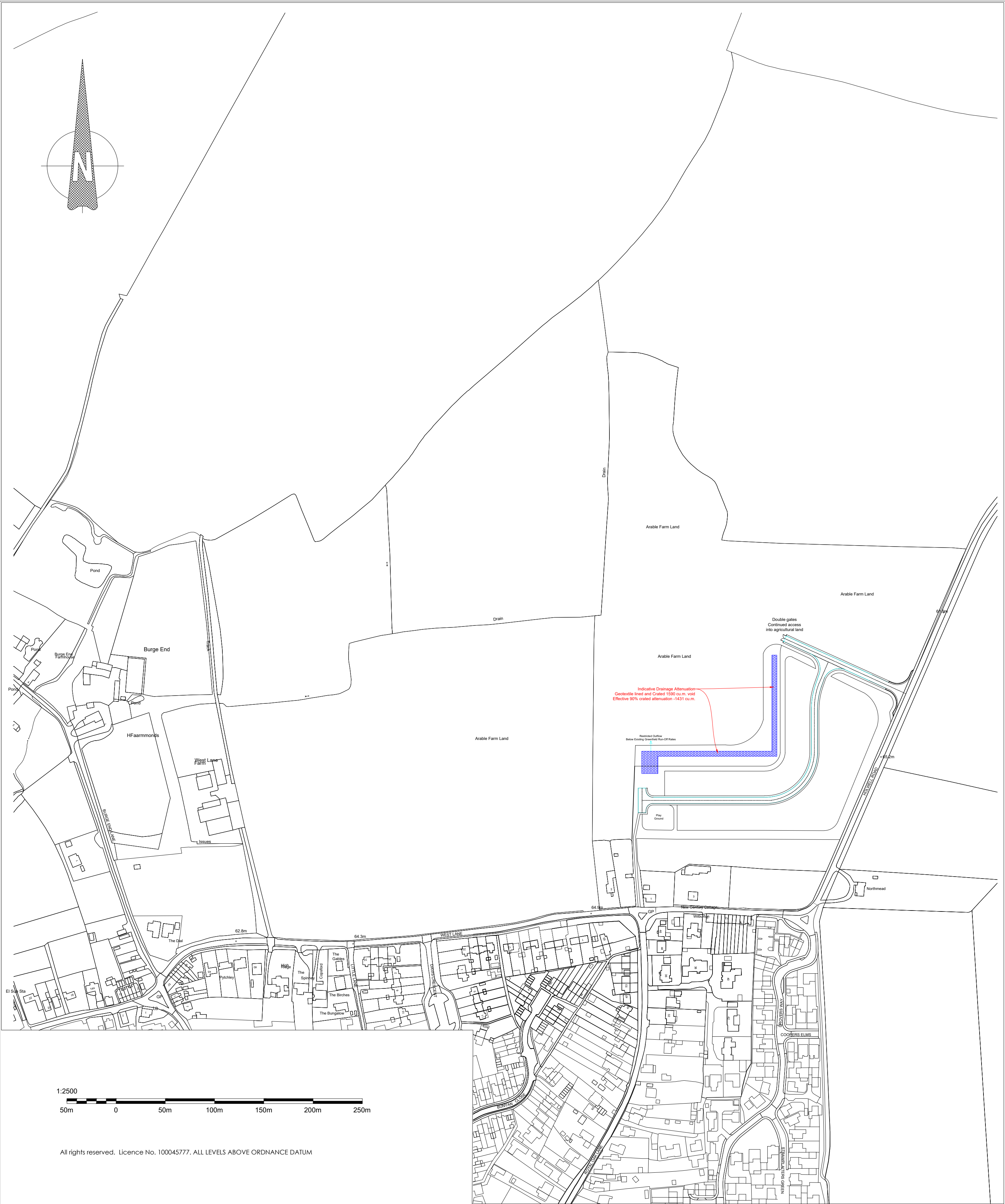


PSK Rural Limited
The Old Dairy, Hyde Farm, Marlow Road, Maidenhead, Berkshire, SL6 6PQ
www.pskrural.co.uk
01628 777666

Project	Land at Pirton Hitchin SG5 3RA						
Title	Indicative Site Layout Plan - Proposed Residential Development						
Drg. No.	LAP SITE 001	Rev	Drawn	Checked	Date	Scale	Status
			TM/C	SP4	18/02/26	1:2500 (A2)	Planning

Appendix 2

Indicative Drainage Attenuation Design



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PSK Rural Limited
The Old Dairy, Hyde Farm, Marlow Road, Maidenhead, Berkshire, SL6 6PQ
www.pskrural.co.uk
01628 777666

Project	Land at Pirton Hilchin SG5 3RA						
Title	Indicative Drainage Attenuation Design - Proposed Residential Development						
Drg. No.	LAP DD 001	Rev A	Drawn TMC	Checked JPH	Date 08/02/26	Scale 1:2500 (A2)	Status Planning

Appendix 3

Geological Map Extracts

PSK Rural Limited
The Granary
Hyde Farm
Marlow Road
Maidenhead
SL6 6PQ

Geological Map Extracts

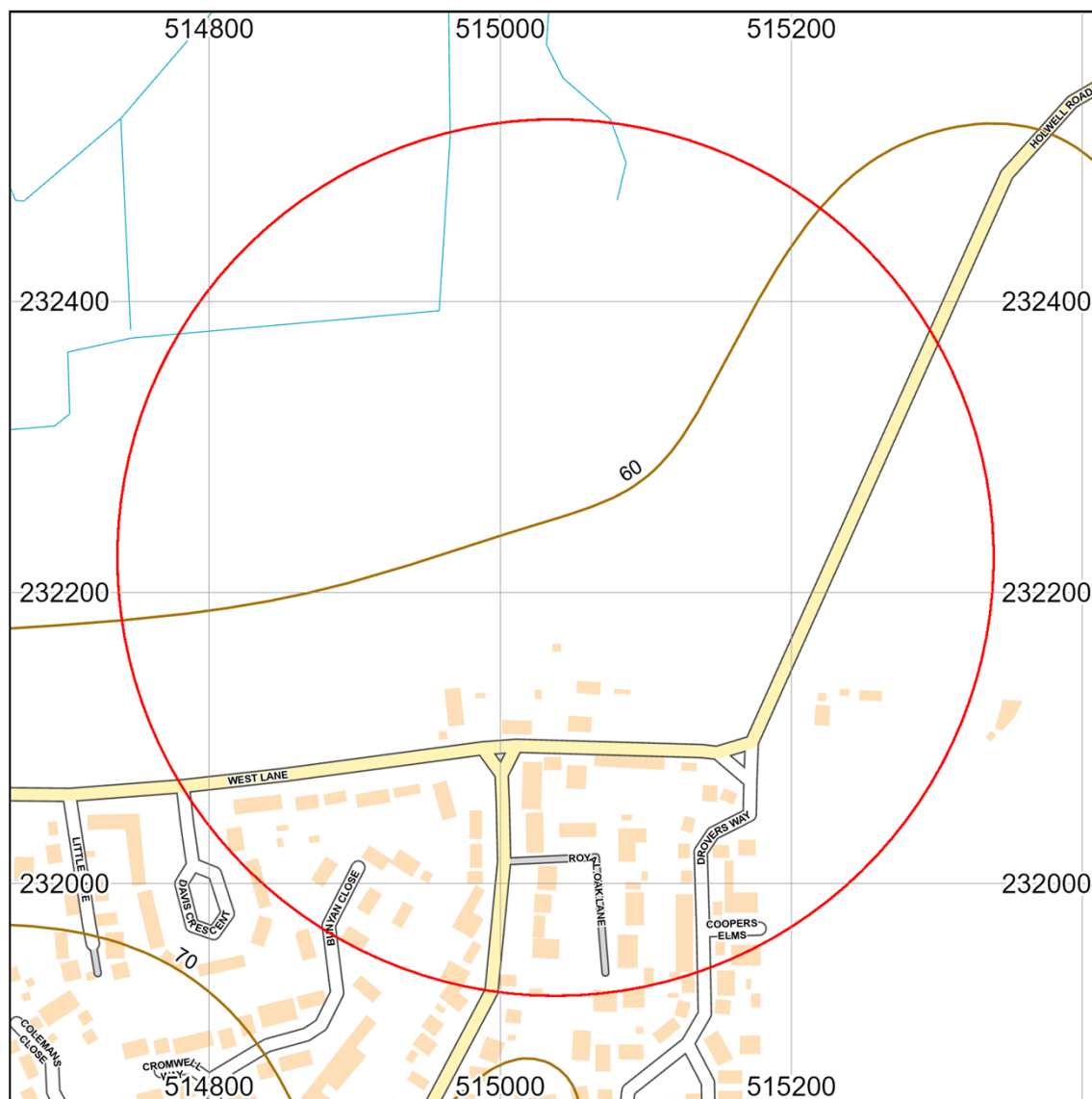
This report is designed for users carrying out preliminary site assessments who require geological maps for the area around their site, as well as for those who have a general interest in their local geology.

The report contains geological map extracts taken from the BGS Digital Geological Map of Great Britain at 1:10,000 scale (or 1:25,000 scale in some upland areas) (BGS Geology 10-25k) where available, otherwise at 1:50,000 scale (BGS Geology 50k). The various geological layers - artificial (man-made), landslip, superficial and solid (bedrock) geology - are displayed separately as 10 by 10cm extracts.

Report Id: *BGS_350054/69986*

Client reference: Pirton Geology

Search location



Contains OS data © Crown Copyright and database right 2026. OS OpenMap Local:

Search location indicated in red

Area centred at: 515038,232224

Radius of site area: 301 metres

Geological Map Extracts 1:10,000–1:25,000 Scale

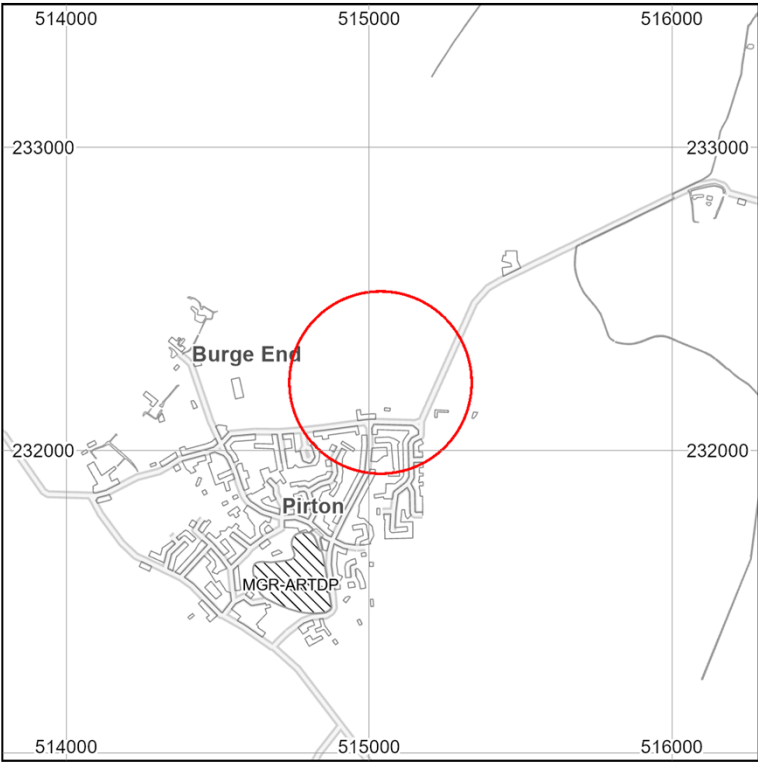
This part of the report contains extracts of geological maps taken from the 1:10 000 scale (or 1:25,000 in some upland areas) BGS Digital Geological Map of Great Britain (BGS Geology 10-25k). The geological information in BGS Geology is divided into four themes: artificial ground, landslide deposits, superficial deposits and bedrock, shown here in separate maps. The fifth ‘combined geology’ map superimposes all four of these themes, to show the uppermost geological formations.

More information about BGS Geology 10-25k is available here <https://www.bgs.ac.uk/datasets/bgs-geology-10k/> and information on the BGS geological classification schemes here <http://www.bgs.ac.uk/bgsrscs/>. The maps are labelled with two-part computer codes that indicate the name of the geological unit and its composition. Descriptions of the units listed in the map keys may be available in the BGS Lexicon of Named Rock Units (<http://www.bgs.ac.uk/lexicon/>). If available, these descriptions can be found by searching against the first part of the computer code used on the maps. Please consult the legend and the codes on the map in areas of complex geology. If in doubt, please contact BGS Enquiries for clarification.

In the map legends the geological units are listed in order of their age, as defined in the BGS Lexicon, with the youngest first. However, where units are of the same defined age they are listed alphabetically and this may differ from the actual geological sequence.

Artificial ground

This is ground at or near the surface that has been modified by man. It includes ground that has been deposited (Made Ground) or excavated (Worked Ground), or some combination of these: Landscaped Ground or Disturbed Ground.



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Scale: 1:25 000 (1cm = 250 m)

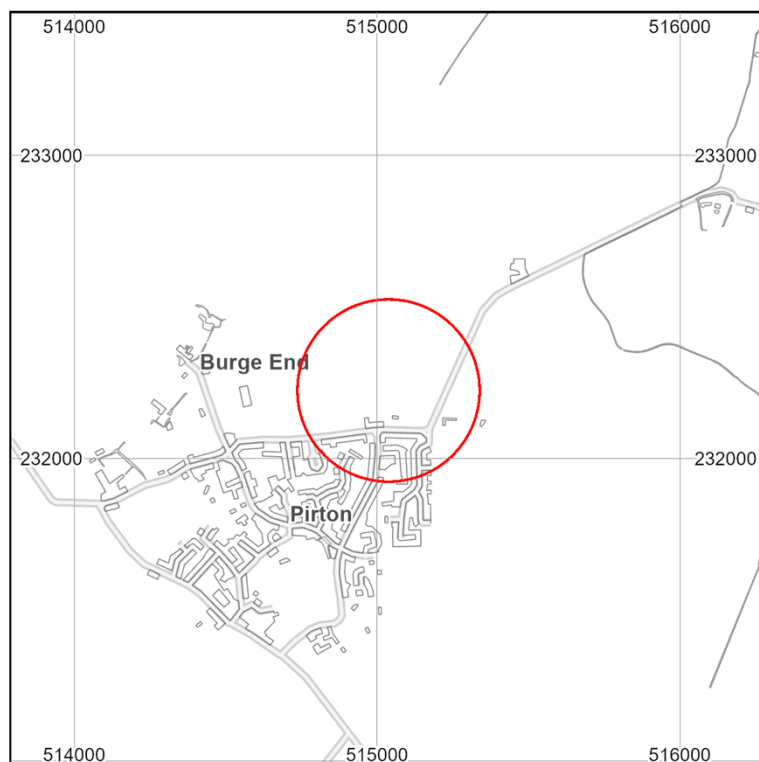
Search area indicated in red

Key to Artificial ground:

Map colour	Computer Code	Name of geological unit	Composition
	MGR-ARTDP	Made Ground	Artificial deposit

Landslide deposits

These are deposits formed by localised mass-movement of soils and rocks on slopes under the action of gravity. Landslides may occur within the bedrock, superficial deposits or artificial ground; and the landslide deposits may themselves be artificially modified.



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Scale: 1:25 000 (1cm = 250 m)

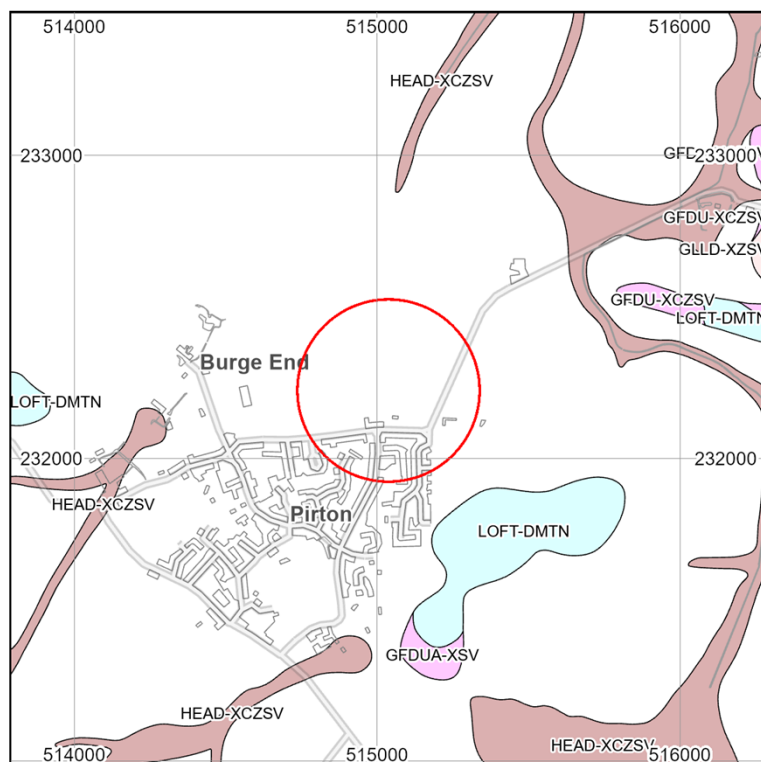
Search area indicated in red

Key to Landslide deposits:

No deposits found in the search area

Superficial deposits

These are relatively young geological deposits, formerly known as 'Drift', which lie on the bedrock in many areas. They include deposits such as unconsolidated sands and gravels formed by rivers, and clayey tills formed by glacial action. They may be overlain by landslide deposits or by artificial deposits, or both.



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Scale: 1:25 000 (1cm = 250 m)

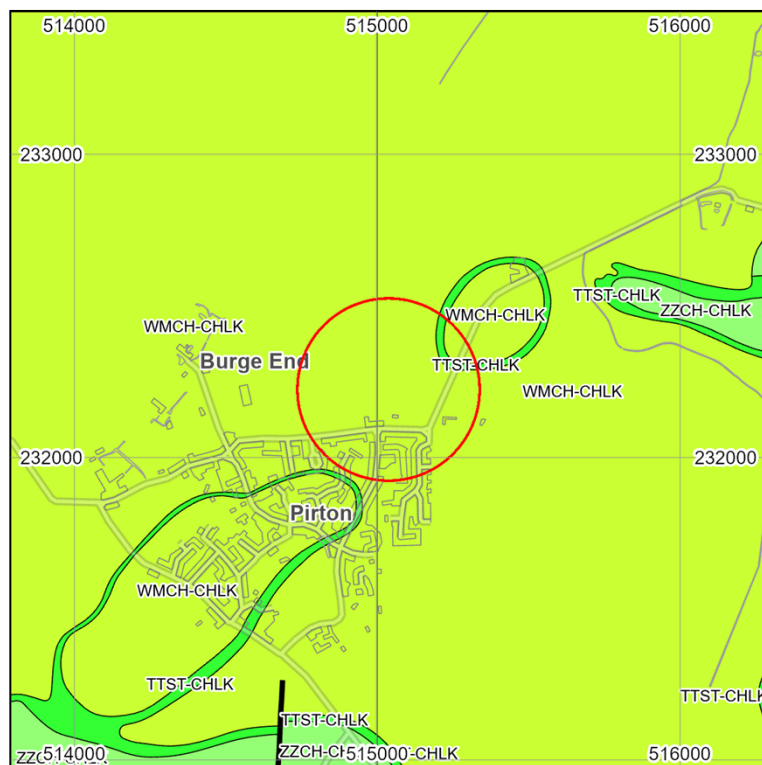
Search area indicated in red

Key to Superficial deposits:

Map colour	Computer Code	Name of geological unit	Composition
	GFDUA-XSV	Glaciofluvial deposits, Anglian	Sand and gravel
	LOFT-DMTN	Lowestoft Formation	Diamicton
	GFDU-XCZSV	Glaciofluvial deposits	Clay, silt, sand and gravel
	GLLD-XZSV	Glaciolacustrine deposits	Silt, sand and gravel
	HEAD-XCZSV	Head	Clay, silt, sand and gravel

Bedrock

Bedrock forms the ground underlying the whole of an area, commonly overlain by superficial deposits, landslide deposits or artificial deposits, in any combination. The bedrock formations were formerly known as the 'Solid Geology'.



Search area indicated in red

-  Fault
-  Coal, ironstone or mineral vein

Note: Faults are shown for illustration and to aid interpretation of the map. Because these maps are generalised from more detailed versions not all such features are shown and their absence on the map face does not necessarily mean that none are present. Coals, ironstone beds and mineral veins occur only in certain rock types and regions of the UK; if present here, they will be described under 'bedrock' below.

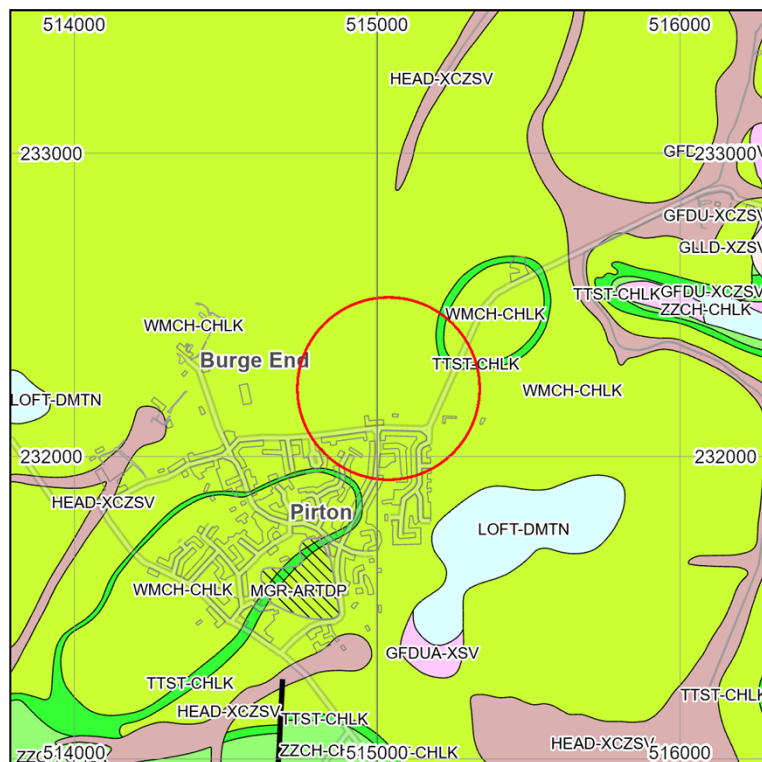
Contains OS data © Crown Copyright and database right 2026
Scale: 1:25 000 (1cm = 250 m)

Key to Bedrock geology:

Map colour	Computer Code	Name of geological unit	Rock type
	TTST-CHLK	Totternhoe Stone Member	Chalk
	WMCH-CHLK	West Melbury Marly Chalk Formation	Chalk
	ZZCH-CHLK	Zig Zag Chalk Formation	Chalk

Combined 'Surface Geology' Map

This map shows all the geological themes from the previous four maps overlaid in order of age.



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Scale: 1:25 000 (1cm = 250 m)

Search area indicated in red

Please see the Keys to the Artificial, Landslide, Superficial and Bedrock geology maps.

Contact Details

Keyworth Office

British Geological Survey
Environmental Science Centre
Nicker Hill
Keyworth
Nottingham
NG12 5GG
Tel: 0115 9363100
Email: enquiries@bgs.ac.uk

Edinburgh Office

British Geological Survey
Lyell Centre
Research Avenue South
Edinburgh
EH14 4AP
Tel: 0131 6671000
Email: enquiry@bgs.ac.uk

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- Detail, which is clearly defined and accurately depicted on large-scale maps, may be lost when small-scale maps are derived from them.
- Although samples and records are maintained with all reasonable care, there may be some deterioration in the long term.
- The most appropriate techniques for copying original records are used, but there may be some loss of detail and dimensional distortion when such records are copied.
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- Data, information and related records, which have been donated to BGS, have been produced for a specific purpose, and that may affect the type and completeness of the data recorded and any interpretation. The nature and purpose of data collection, and the age of the resultant material may render it unsuitable for certain applications/uses. You must verify the suitability of the material for your intended usage.
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- The topography shown on any map extracts is based on the latest OS mapping and is not necessarily the same as that used in the original compilation of the BGS geological map, and to which the geological linework available at that time was fitted.
- Note that for some sites, the latest available records may be historical in nature, and while every effort is made to place the analysis in a modern geological context, it is possible in some cases that the detailed geology at a site may differ from that described.

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**Report issued by
BGS Enquiry Service**

Appendix 4

BGS Infiltration SuDS GeoReport

PSK Rural Ltd
The Granary
Hyde Farm
Marlow Road
Maidenhead
SL6 6PQ

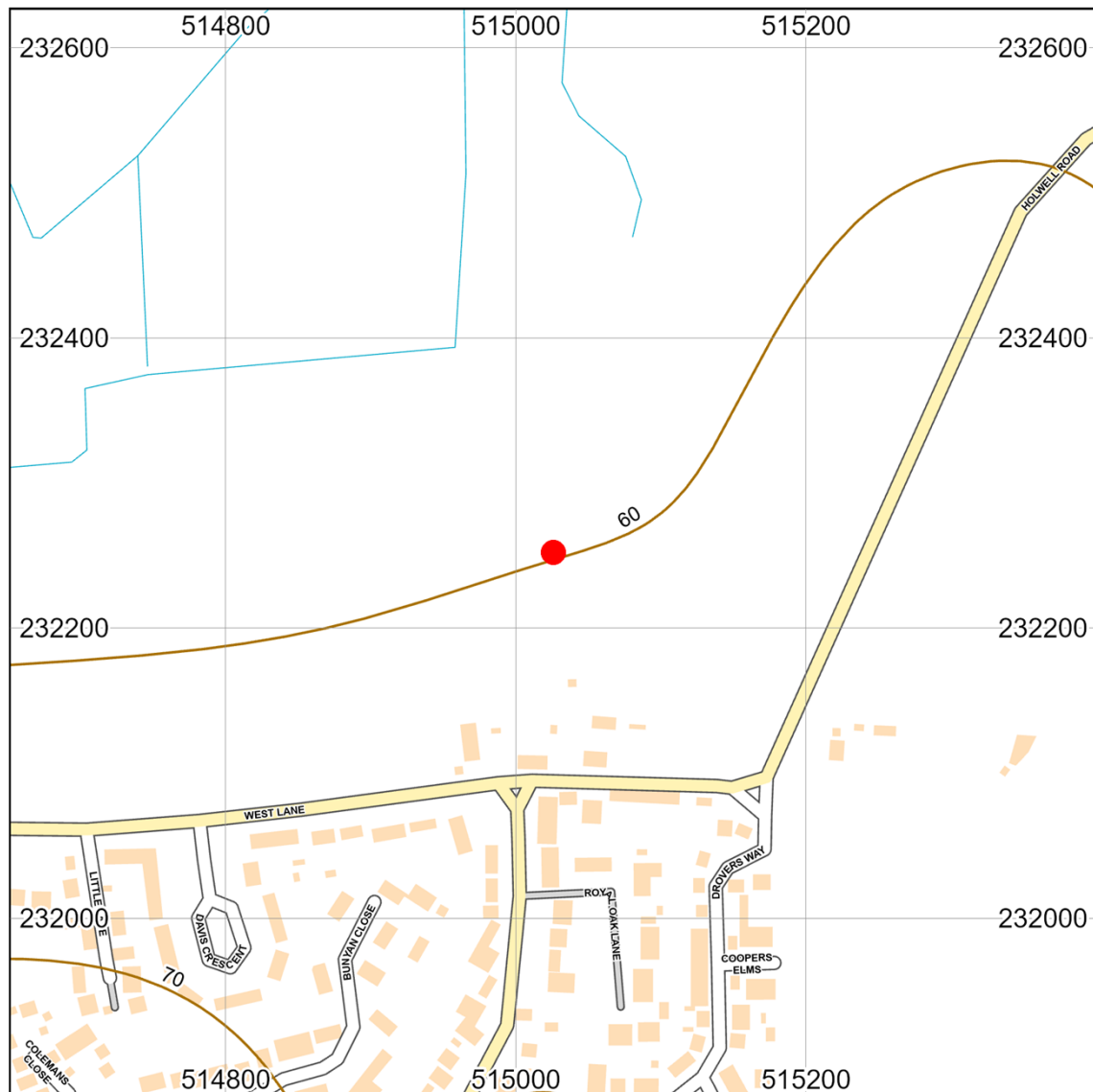
Infiltration SuDS GeoReport:

This report provides information on the suitability of the subsurface for the installation of infiltration sustainable drainage systems (SuDS). It provides information on the properties of the subsurface with respect to significant constraints, drainage, ground stability and groundwater quality protection.

Report Id: *BGS_350053/69985*

Client reference: Pirton Infiltration

Search location



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Search location indicated in red

Point centred at: 515026,232252

Assessment for an infiltration sustainable drainage system

Introduction

Sustainable drainage systems (SuDS) are drainage solutions that manage the volume and quality of surface water close to where it falls as rain. They aim to reduce flow rates to rivers, increase local water storage capacity and reduce the transport of pollutants to the water environment. There are four main types of SuDS, which are often designed to be used in sequence. They comprise:

- **source control:** systems that control the rate of runoff
- **pre-treatment:** systems that remove sediments and pollutants
- **retention:** systems that delay the discharge of water by providing surface storage
- **infiltration:** systems that mimic natural recharge to the ground.

This report focuses on infiltration SuDS. It provides subsurface information on the properties of the ground with respect to drainage, ground stability and groundwater quality protection. It is intended principally for those involved in the preliminary assessment of the suitability of the ground for infiltration SuDS, and those involved in assessing proposals from others for sustainable drainage, but it may also be useful to help house-holders judge whether or not further professional advice should be sought. If in doubt, users should consult a suitably-qualified professional about the results in this report before making any decisions based upon it.

This GeoReport is structured in two parts:

- **Part 1. Summary data.**

Comprises three maps that summarise the data contained within Part 2.

- **Part 2. Detailed data.**

Comprises a further 24 maps in four thematic sections:

- **Very significant constraints.** Maps highlight areas where infiltration may result in adverse impacts due to factors including: ground instability (soluble rocks, non-coal shallow mining and landslide hazards); persistent shallow groundwater, or the presence of made ground, which may represent a ground stability or contamination hazard.
- **Drainage potential.** Maps indicate the drainage potential of the ground, by considering subsurface permeability, depth to groundwater and the presence of floodplain deposits.
- **Ground stability.** Maps indicate the presence of hazards that have the potential to cause ground instability resulting in damage to some buildings and structures, if water is infiltrated to the ground.
- **Groundwater protection.** Maps provide key indicators to help determine whether the groundwater may be susceptible to deterioration in quality as a result of infiltration.

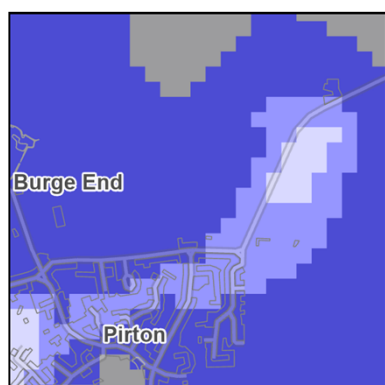
This report considers the suitability of the subsurface for the installation of infiltration SuDS, such as soakaways, infiltration basins or permeable pavements. It provides subsurface data to indicate whether, and which type of infiltration system may be appropriate. It does not state that infiltration SuDS are, or are not, appropriate as this is highly dependent on the design of the individual system. This report therefore describes the subsurface conditions at the site, allowing the reader to determine the suitability of the site for infiltration SuDS.

The map and text data in this report is similar to that provided in the '*Infiltration SuDS Map: Detailed*' national map product. For further information about the data, consult the '*User Guide for the Infiltration SuDS Map: Detailed*', available from <http://nora.nerc.ac.uk/16618/>.

PART 1: SUMMARY DATA

This section provides a summary of the data.

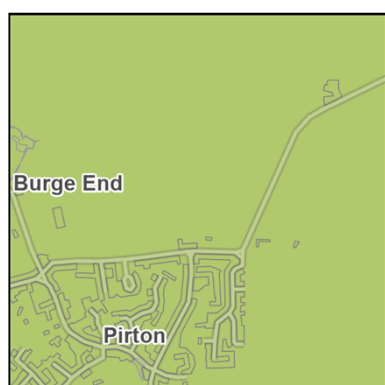
In terms of the drainage potential, is the ground suitable for infiltration SuDS?



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-  Highly compatible for infiltration SuDS. The subsurface is likely to be suitable for free-draining infiltration SuDS.
-  Probably compatible for infiltration SuDS. The subsurface is probably suitable although the design may be influenced by the ground conditions.
-  Opportunities for bespoke infiltration SuDS. The subsurface is potentially suitable although the design will be influenced by the ground conditions.
-  Very significant constraints are indicated. There is a very significant potential for one or more hazards associated with infiltration.

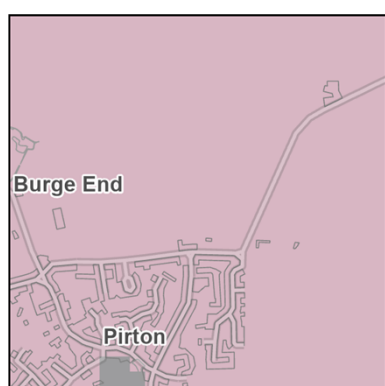
Is ground instability likely to be a problem?



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-  Increased infiltration is very unlikely to result in ground instability.
-  Ground instability problems may be present or anticipated, but increased infiltration is unlikely to result in ground instability.
-  Ground instability problems are probably present. Increased infiltration may result in ground instability.
-  There is a very significant potential for one or more geohazards associated with infiltration.

Is the groundwater susceptible to deterioration in quality?



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-  The groundwater is not expected to be especially vulnerable to contamination.
-  The groundwater may be vulnerable to contamination.
-  The groundwater is likely to be vulnerable to contaminants.
-  Made ground is present at the surface. Infiltration may increase the possibility of remobilising pollutants.

PART 2: DETAILED DATA

This section provides further information about the properties of the ground and will help assess the suitability of the ground for infiltration SuDS.

Section 1. Very significant constraints

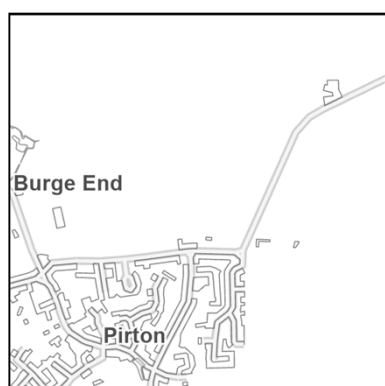
Where maps are overlain by grey polygons, geological or hydrogeological hazards may exist that could be made worse by infiltration. The following hazards are considered:

- soluble rocks
- landslides
- shallow mining (not including coal)
- shallow groundwater
- made ground

For more information read 'Explanation of terms' at the end of this report.

Soluble rock hazard	
 Contains OS data © Crown Copyright and database right 2026	☒ Very significant soluble rock hazard. Soluble rocks are present with a very significant possibility of localised subsidence that could be initiated or made worse by infiltration. The site investigation should consider whether the potential for or the consequences of subsidence as a result of infiltration are significant.
	☐ Very significant soluble rock hazards are not present; however this hazard may still need to be considered. See Part 3.
Landslide hazard	
 Contains OS data © Crown Copyright and database right 2026	☒ Very significant landslide hazard. Slope instability problems are almost certainly present and may be active. An increase in moisture content as a result of infiltration may cause the slope to fail. The site investigation should consider whether the potential for or the consequences of landslide as a result of infiltration are significant.
	☐ Very significant landslide hazards are not present; however this hazard may still need to be considered. See Part 3.

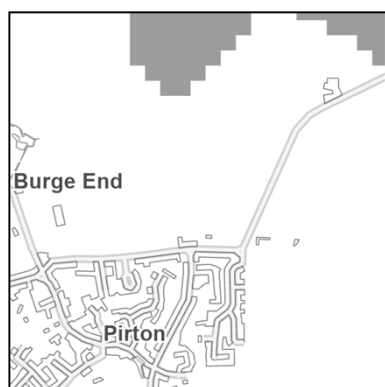
Shallow mining hazard (not including coal)



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- ☒ Very significant mining hazard.
Shallow mining is likely to be present with a very significant possibility of localised subsidence that could be initiated or made worse by increased infiltration. Also, infiltration may increase the possibility of remobilising pollutants. The site investigation should consider whether the potential for or consequences of subsidence and/or remobilisation of pollutants as a result of infiltration are significant.
- ☐ Very significant mining hazards are not present; however this hazard may still need to be considered. See Part 3.

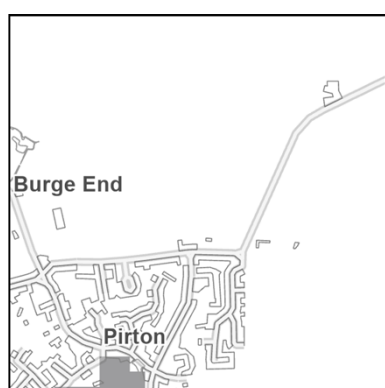
Persistent shallow groundwater



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- ☒ Very high likelihood of persistent or seasonally shallow groundwater.
Persistent or seasonally shallow groundwater is likely to be present. Infiltration may increase the likelihood of soakaway inundation, or groundwater emergence at the surface. The site investigation should consider whether the potential for or the consequences of groundwater level rise as a result of infiltration are significant.
- ☐ See Part 2 for the likely depth to water table.

Made ground



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- ☒ Made ground present.
Made ground is present at the surface. Infiltration may affect ground stability or increase the possibility of remobilising pollutants. The site investigation should consider whether the potential for or consequences of ground instability and/or pollutant leaching as a result of infiltration are significant.
- ☐ None recorded

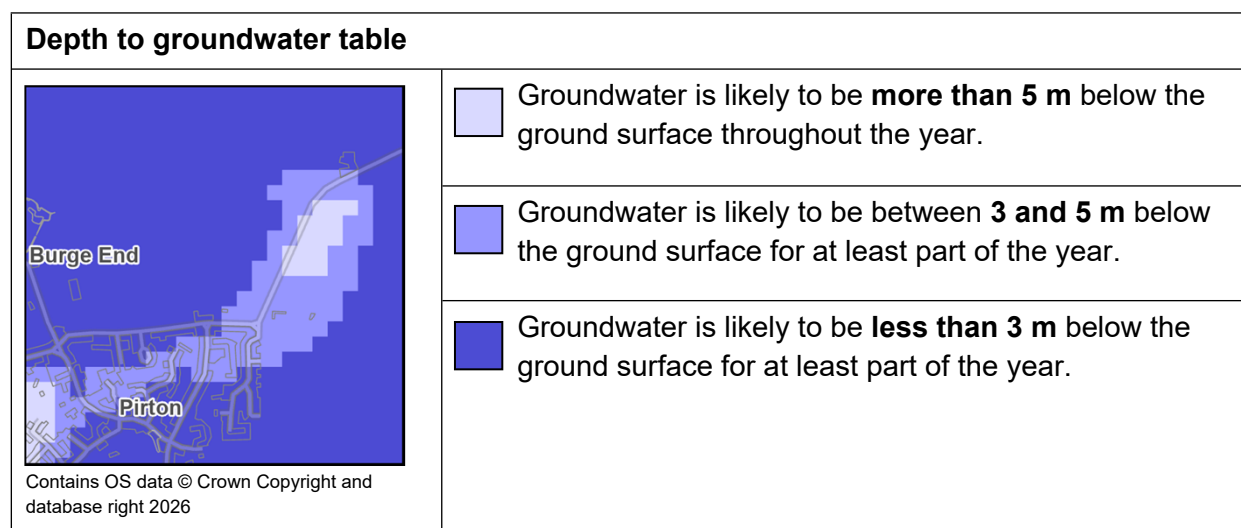
Section 2. Drainage potential

The following pages contain maps that will help you assess the drainage potential of the ground by considering the:

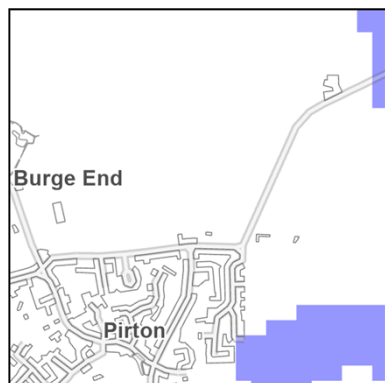
- depth to water table
- permeability of the superficial deposits
- thickness of the superficial deposits
- permeability of the bedrock
- presence of floodplains

Superficial deposits are not present everywhere and therefore some areas of the *superficial deposit permeability* map may not be coloured. Where this is the case, the *bedrock permeability* map shows the likely permeability of the ground. Superficial deposits in some places are very thin and hence in these places you may wish to consider both the permeability of the superficial deposits and the permeability of the bedrock. The *superficial thickness* map will tell you whether the superficial deposits are thin (< 3 m thick) or thick (>3 m). Where they are over 3 m thick, the permeability of the bedrock may not be relevant.

For more information read 'Explanation of terms' at the end of this report.



Superficial deposit permeability



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Superficial deposits are likely to be **free-draining**.



The superficial deposit permeability is **spatially variable**, but likely to permit moderate infiltration.

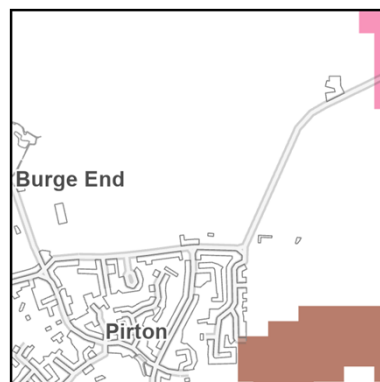


Superficial deposits are likely to be **poorly draining**.

These maps show the permeability range that is summarised above.

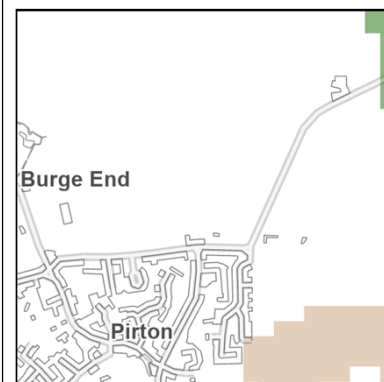
-  Very Low
-  Low
-  Moderate
-  High
-  Very High

Minimum



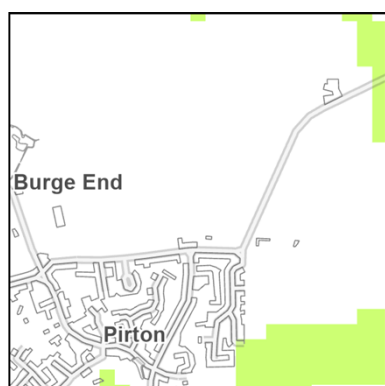
Contains OS data © Crown Copyright and database right 2026

Maximum



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Superficial deposit thickness



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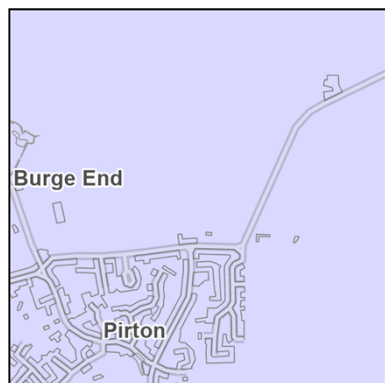


The thickness of superficial deposits is **< 3 m** and hence the permeability of the ground may be dependent on both the superficial deposits (where present) and underlying bedrock (see below).



The thickness of superficial deposits is **> 3 m** and hence the permeability of the superficial deposits is likely to determine the permeability of the ground.

Bedrock permeability



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Bedrock deposits are likely to be **free-draining**.



The bedrock permeability is **spatially variable**, but likely to permit moderate infiltration.



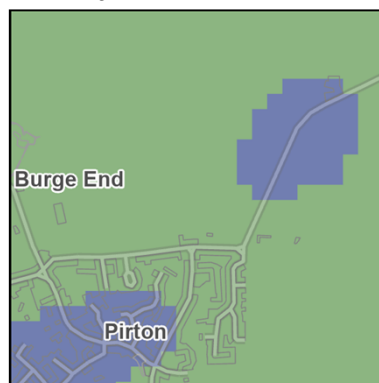
Bedrock deposits are likely to be **poorly draining**.

These maps show the permeability range that is summarised above.

Key

-  Very Low
-  Low
-  Moderate
-  High
-  Very High

Minimum



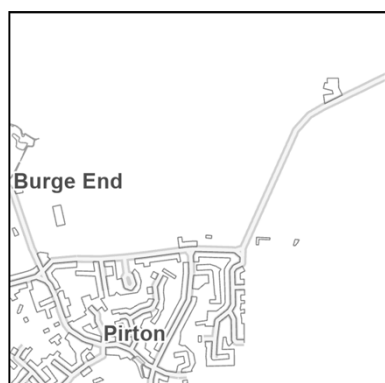
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Maximum



Contains OS data © Crown Copyright and database right 2026

Geological indicators of flooding



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Superficial floodplain deposits or low-lying coastal areas have been identified. Groundwater levels may rise in response to high river or tide levels, potentially causing inundation of subsurface infiltration SuDS.

Section 3. Ground stability

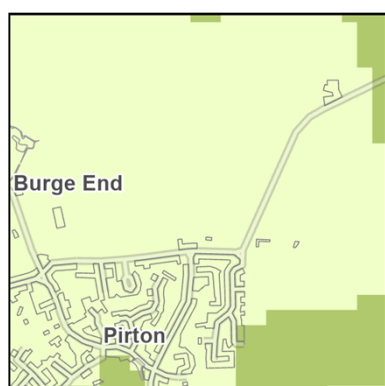
The following pages contain maps that will help you assess whether infiltration may impact the stability of the ground. They consider hazards associated with:

- soluble rocks
- landslides
- shallow mining
- running sands
- swelling clays
- compressible ground, and
- collapsible ground

In the following maps, geohazards that are identified in green are unlikely to prevent infiltration SuDS from being installed, but they should be considered during design. For more information read ‘Explanation of terms’ at the end of this report.

Soluble rocks	
 Contains OS data © Crown Copyright and database right 2026	 Increased infiltration is unlikely to result in subsidence.
	 Increased infiltration is unlikely to cause localised subsidence, but potential impacts should be considered.
	 Increased infiltration may result in localised subsidence. The potential for or the consequences of subsidence associated with soluble rocks should be considered.
	 Very significant possibility of localised subsidence that could be initiated or made worse by infiltration.

Landslides



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-  Increased infiltration is unlikely to lead to slope instability.
-  Slope instability problems may be present or anticipated, but increased infiltration is unlikely to cause instability
-  Slope instability problems are probably present or have occurred in the past, and increased infiltration may result in slope instability.
-  Slope instability problems are almost certainly present and may be active. An increase in moisture content as a result of infiltration may cause the slope to fail.

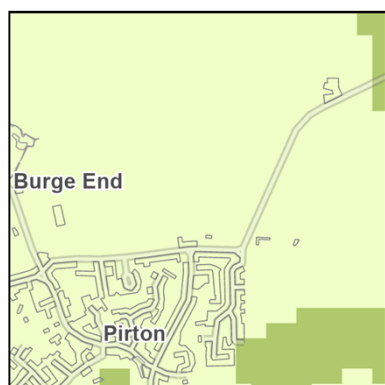
Shallow mining



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-  Increased infiltration is unlikely to lead to subsidence.
-  Shallow mining is possibly present. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered.
-  Shallow mining could be present with a significant possibility that localised subsidence could be initiated or made worse by increased infiltration.
-  Shallow mining is likely to be present, with a very significant possibility that localised subsidence may be initiated or made worse by increased infiltration.

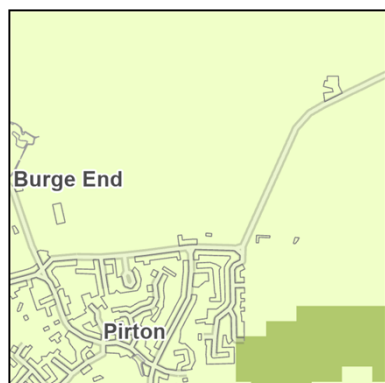
Running sand



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-  Increased infiltration is unlikely to cause ground collapse associated with running sands.
-  Running sand is possibly present. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered.
-  Significant possibility for running sand problems. Increased infiltration may result in a geohazard.

Swelling clays



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-  Increased infiltration is unlikely to cause shrink-swell ground movement.
-  Ground is susceptible to shrink-swell ground movement. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered.
-  Ground is susceptible to shrink-swell ground movement. Increased infiltration may result in a geohazard.

Compressible ground



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-  Increased infiltration is unlikely to lead to ground compression.
-  Compressibility and uneven settlement hazards are probably present. Increased infiltration may result in a geohazard.

Collapsible ground



Contains OS data © Crown Copyright and database right 2026

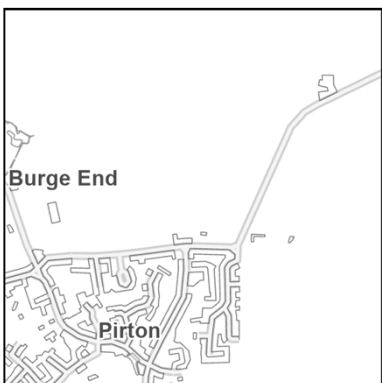
-  Increased infiltration is unlikely to result in subsidence.
-  Deposits with potential to collapse when loaded and saturated are possibly present in places. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered.
-  Deposits with potential to collapse when loaded and saturated are probably present in places. Increased infiltration may result in a geohazard.

Section 4. Groundwater quality protection

The following pages contain maps showing some of the information required to ensure the protection of groundwater quality. Data presented includes:

- groundwater source protection zones (Environment Agency data)
- predominant flow mechanism
- made ground

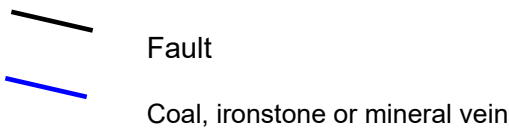
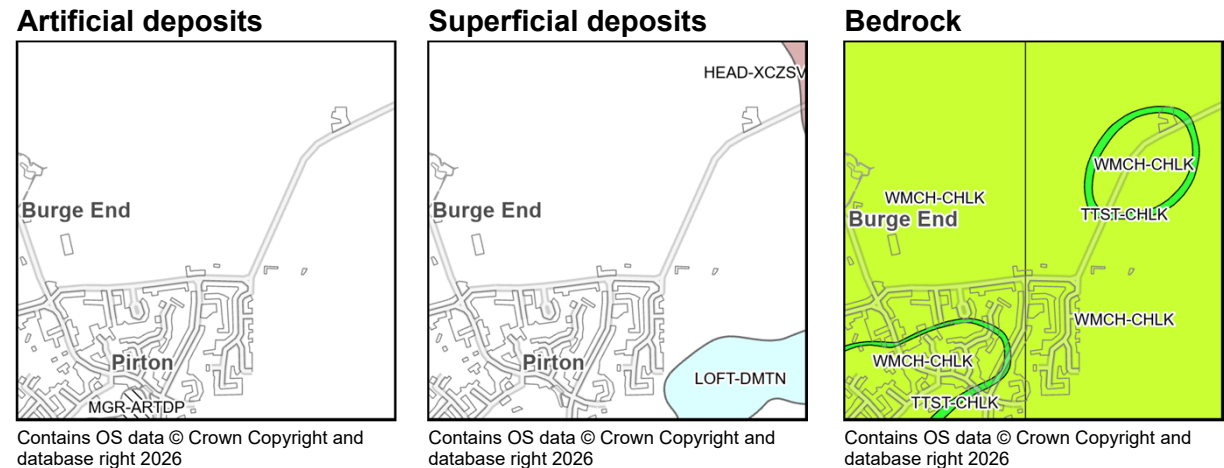
For more information read 'Explanation of terms' at the end of this report.

Groundwater source protection zones	
 Contains OS data © Crown Copyright and database right 2026 Derived in part from Source Protection Zone data provided under licence from the Environment Agency © Environment Agency 2026.	 Groundwater is not within a source protection zone.
	 Source protection zone IV
	 Source protection zone III
	 Source protection zone II
	 Source protection zone I
Predominant flow mechanism	
 Contains OS data © Crown Copyright and database right 2026	 Water is likely to percolate through the unsaturated zone to the groundwater through either the pore space in granular media or through porespace and fractures; these processes have some potential for contaminant removal and breakdown.
	 Water is likely to percolate through the unsaturated zone to the groundwater through fractures, a process which has little potential for contaminant removal and breakdown.

Made ground	
 Contains OS data © Crown Copyright and database right 2026	 Made ground is present at the surface. Infiltration may increase the possibility of remobilising pollutants.

Section 5. Geological Maps

The following maps show the artificial, superficial and bedrock geology within the area of interest.



Note: Faults and Coals, ironstone & mineral veins are shown for illustration and to aid interpretation of the map. Not all such features are shown and their absence on the map face does not necessarily mean that none are present

Key to Artificial deposits:

Map colour	Computer Code	Rock name	Rock type
	MGR-ARTDP	Made Ground	Artificial deposit

Key to Superficial deposits:

Map colour	Computer Code	Rock name	Rock type
	LOFT-DMTN	Lowestoft Formation	Diamicton
	HEAD-XCZSV	Head	Clay, silt, sand and gravel

Key to Bedrock geology:

Map colour	Computer Code	Rock name	Rock type
	TTST-CHLK	Totternhoe Stone Member	Chalk
	WMCH-CHLK	West Melbury Marly Chalk Formation	Chalk

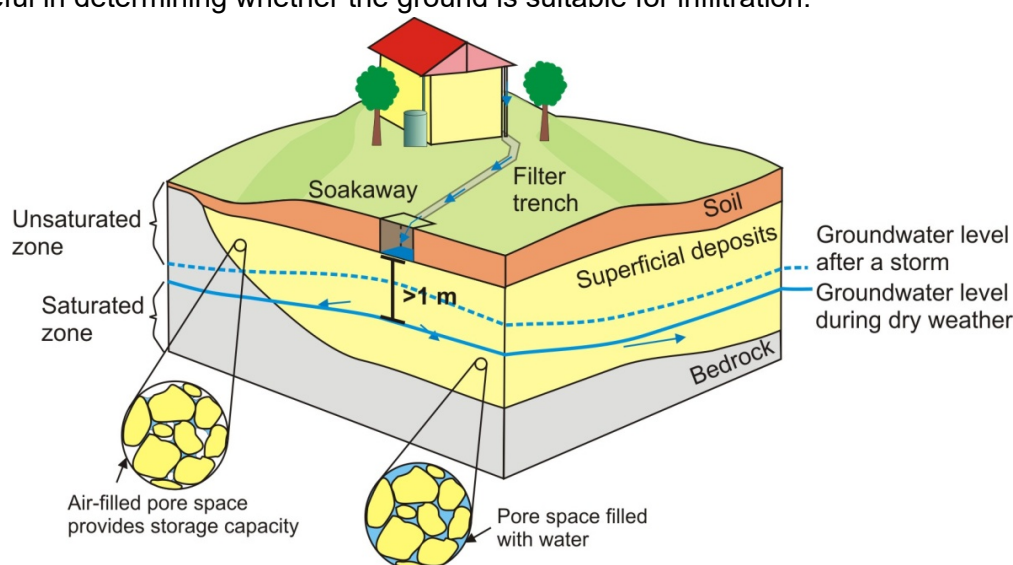
Limitations of this report:

- This report is concerned with the potential for infiltration-to-the-ground to be used as a SuDS technique at the site described. It only considers the subsurface beneath the search area and does NOT consider potential surface or subsurface impacts outside of that area.
- This report is NOT an alternative for an on-site investigation or soakaway test, which might reach a different conclusion.
- This report must NOT be used to justify disposal of foul waste or grey water.
- This report is based on and limited to an interpretation of the records held by the British Geological Survey (BGS) at the time the search is performed. The datasets used (with the exception of that showing depth to water table) are based on 1:50 000 digital geological maps and not site-specific data.
- Other more specific and detailed ground instability information for the site may be held by BGS, and an assessment of this could result in a modified assessment.
- To interpret the maps correctly, the report must be viewed and printed in colour.
- The search does NOT consider the suitability of sites with regard to:
 - previous land use,
 - potential for, or presence of contaminated land
 - presence of perched water tables
 - shallow mining hazards relating to coal mining. Searches of coal mining should be carried out via The Coal Authority Mine Reports Service: <https://www.miningremediation.co.uk/miningreports/>.
 - made ground, where not recorded
 - proximity to landfill sites (searches for landfill sites or contaminated land should be carried out through consultation with local authorities/Environment Agency)
 - zones around private water supply boreholes that are susceptible to groundwater contamination.
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Explanation of terms

Depth to groundwater

In the shallow subsurface, the ground is commonly unsaturated with respect to water. Air fills the spaces within the soil and the underlying superficial deposits and bedrock. At some depth below the ground surface, there is a level below which these spaces are full of water. This level is known as the groundwater level, and the water below it is termed the groundwater. When water is infiltrated, the groundwater level may rise temporarily. To ensure that there is space in the unsaturated zone to accommodate this, there should be a minimum thickness of 1 m between the base of the infiltration system and the water table. An estimate of the *depth to groundwater* is therefore useful in determining whether the ground is suitable for infiltration.



Groundwater flooding

Groundwater flooding occurs when a rise in groundwater level results in very shallow groundwater or the emergence of groundwater at the surface. If infiltration systems are installed in areas that are susceptible to groundwater flooding, it is possible that the system could become inundated. The susceptibility map seeks to identify areas where the geological conditions and water tables indicate that groundwater level rise could occur under certain circumstances. A high susceptibility to groundwater flooding classification does not mean that groundwater flooding has ever occurred in the past, or will do so in the future as the susceptibility maps do not contain information on how often flooding may occur. The susceptibility maps are designed for planning; identifying areas where groundwater flooding might be an issue that needs to be taken into account.

Geological indicators of flooding

In floodplain deposits, groundwater level can be influenced by the water level in the adjacent river. Groundwater level may increase during periods of fluvial flood and therefore this should be taken into account when designing infiltration systems on such deposits. The *geological indicators of flooding* dataset shows where there is geological evidence (floodplain deposits) that flooding has occurred in the past.

For further information on flood-risk, the likely frequency of its recurrence in relation to any proposed development of the site, and the status of any flood prevention measures in place, you are advised to contact the local office of the Environment Agency (England and Wales) at www.environment-agency.gov.uk/ or the Scottish Environment Protection Agency (Scotland) at www.sepa.org.uk.

Artificial ground

Artificial ground comprises deposits and excavations that have been created or modified by human activity. It includes ground that is worked (quarries and road cuttings), infilled (back-filled quarries), landscaped (surface re-shaping), disturbed (near surface mineral workings) or classified as made ground (embankments and spoil heaps). The composition and properties of artificial ground are often unknown. In particular, the permeability and chemical composition of the artificial ground should be determined to ensure that the ground will drain and that any contaminants present will not be remobilised.

Superficial permeability

Superficial deposits are those geological deposits that were formed during the most recent period of geological time (as old as 2.6 million years before present). They generally comprise relatively thin deposits of gravel, sand, silt and clay and are present beneath the pedological soil in patches or larger spreads over much of Britain. The ease with which water can percolate through these deposits is controlled by their permeability and varies widely depending on their composition. Those deposits comprising clays and silts are less permeable and thus infiltration is likely to be slow, such that water may pool on the surface. In comparison, deposits comprising sands and gravels are more permeable allowing water to percolate freely.

Bedrock permeability

Bedrock forms the main mass of rock forming the Earth. It is present everywhere, commonly beneath superficial deposits. Where the superficial deposits are thin or absent, the ease with which water will percolate into the ground depends on the permeability of the bedrock.

Natural ground instability

Natural ground instability refers to the propensity for upward, lateral or downward movement of the ground that can be caused by a number of natural geological hazards (e.g. ground dissolution/compressible ground). Some movements associated with particular hazards may be gradual and of millimetre or centimetre scale, whilst others may be sudden and of metre or tens of metres scale. Significant natural ground instability has the potential to cause damage to buildings and structures, especially when the drainage characteristics of a site are altered. It should be noted, however, that many buildings, particularly more modern ones, are built to such a standard that they can remain unaffected in areas of significant ground movement.

Shrink-swell

A shrinking and swelling clay changes volume significantly according to how much water it contains. All clay deposits change volume as their water content varies, typically swelling in winter and shrinking in summer, but some do so to a greater extent than others. Contributory circumstances could include drought, leaking service pipes, tree roots drying-out the ground or changes to local drainage patterns, such as the creation of soakaways. Shrinkage may remove support from the foundations of buildings and structures, whereas clay expansion may lead to uplift (heave) or lateral stress on part or all of a structure; any such movements may cause cracking and distortion.

Landslides (slope stability)

A landslide is a relatively rapid outward and downward movement of a mass of ground on a slope, due to the force of gravity. A slope is under stress from gravity but will not move if its strength is greater than this stress. If the balance is altered so that the stress exceeds the strength, then movement will occur. The stability of a slope can be reduced by removing ground at the base of the slope, by placing material on the slope, especially at the top, or by increasing the water content of the materials forming the slope. Increase in subsurface water content beneath a soakaway could increase susceptibility to landslide hazards. The assessment of landslide hazard refers to the stability of the present land surface. It does not encompass a consideration of the stability of excavations.

Soluble rocks (dissolution)

Some rocks are soluble in water and can be progressively removed by the flow of water through the ground. This process tends to create cavities, potentially leading to the collapse of overlying materials and possibly subsidence at the surface. The release of water into the subsurface from infiltration systems may increase the dissolution of rock or destabilise material above or within a cavity. Dissolution cavities may create a pathway for rapid transport of contaminated water to an aquifer or water course.

Compressible ground

Many ground materials contain water-filled pores (the spaces between solid particles). Ground is compressible if a building (or other load) can cause the water in the pore space to be squeezed out, causing the ground to decrease in thickness. If ground is extremely compressible the building may sink. If the ground is not uniformly compressible, different parts of the building may sink by different amounts, possibly causing tilting, cracking or distortion. The compressibility of the ground may alter as a result of changes in subsurface water content caused by the release of water from soakaways.

Collapsible deposits

Collapsible ground comprises certain fine-grained materials with large pore spaces (the spaces between solid particles). It can collapse when it becomes saturated by water and/or a building (or other structure) places too great a load on it. If the material below a building collapses it may cause the building to sink. If the collapsible ground is variable in thickness or distribution, different parts of the building may sink by different amounts, possibly causing tilting, cracking or distortion. The subsurface underlying a soakaway will experience an increase in water content that may affect the stability of the ground. This hazard is most likely to be encountered only in parts of southern England.

Running sand

Running sand conditions occur when loosely-packed sand, saturated with water, flows into an excavation, borehole or other type of void. The pressure of the water filling the spaces between the sand grains reduces the contact between the grains and they are carried along by the flow. This can lead to subsidence of the surrounding ground. Running sand is potentially hazardous during the drainage system installation. During installation, excavation of the ground may create a space into which sand can flow, potentially causing subsidence of surrounding ground.

Shallow mining hazards (non coal)

Current or past underground mining for coal or for other commodities can give rise to cavities at shallow or intermediate depths, which may cause fracturing, general settlement, or the formation of crown-holes in the ground above. Spoil from mineral workings may also present a pollution hazard. The release of water into the subsurface from soakaways may destabilise material above or within a cavity. Cavities arising as a consequence of mining may also create a pathway for rapid transport of contaminated water to an aquifer or watercourse. The mining hazards map is derived from the geological map and considers the potential for subsidence associated with mining on the basis of geology type. Therefore if mining is known to occur within a certain rock, the map will highlight the potential for a hazard within the area covered by that geology.

For more information regarding underground and opencast **coal mining**, the location of mine entries (shafts and adits) and matters relating to subsidence or other ground movement induced by **coal mining** please contact the Coal Authority, Mining Reports, 200 Lichfield Lane, Mansfield, Nottinghamshire, NG18 4RG; telephone 0845 762 6848 or at www.coal.gov.uk. For more information regarding other types of mining (i.e. non-coal), please contact the British Geological Survey.

Groundwater source protection zones

In England and Wales, the Environment Agency has defined areas around wells, boreholes and springs that are used for the abstraction of public drinking water as source protection zones. In conjunction with Groundwater Protection Policy the zones are used to restrict activities that may impact groundwater quality, thereby preventing pollution of underlying aquifers, such that drinking water quality is upheld. The Environment Agency can provide advice on the location and implications of source protection zones in your area (www.environment-agency.gov.uk/)

Contact Details

Keyworth Office

British Geological Survey
Environmental Science Centre
Nicker Hill
Keyworth
Nottingham
NG12 5GG
Tel: 0115 9363100
Email: enquiries@bgs.ac.uk

Edinburgh Office

British Geological Survey
Lyell Centre
Research Avenue South
Edinburgh
EH14 4AP
Tel: 0131 6671000
Email: enquiry@bgs.ac.uk

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- Raw data may have been transcribed from analogue to digital format, or may have been acquired by means of automated measuring techniques. Although such processes are subjected to quality control to ensure reliability where possible, some raw data may have been processed without human intervention and may in consequence contain undetected errors.
- Detail, which is clearly defined and accurately depicted on large-scale maps, may be lost when small-scale maps are derived from them.
- Although samples and records are maintained with all reasonable care, there may be some deterioration in the long term.
- The most appropriate techniques for copying original records are used, but there may be some loss of detail and dimensional distortion when such records are copied.
- Data may be compiled from the disparate sources of information at BGS's disposal, including material donated to BGS by third parties, and may not originally have been subject to any verification or other quality control process.
- Data, information and related records, which have been donated to BGS, have been produced for a specific purpose, and that may affect the type and completeness of the data recorded and any interpretation. The nature and purpose of data collection, and the age of the resultant material may render it unsuitable for certain applications/uses. You must verify the suitability of the material for your intended usage.
- If a report or other output is produced for you on the basis of data you have provided to BGS, or your own data input into a BGS system, please do not rely on it as a source of information about other areas or geological features, as the report may omit important details.
- The topography shown on any map extracts is based on the latest OS mapping and is not necessarily the same as that used in the original compilation of the BGS geological map, and to which the geological linework available at that time was fitted.
- Note that for some sites, the latest available records may be historical in nature, and while every effort is made to place the analysis in a modern geological context, it is possible in some cases that the detailed geology at a site may differ from that described.

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**Report issued by
BGS Enquiry Service**

Appendix 5

FEH Greenfield Run-Off Rates

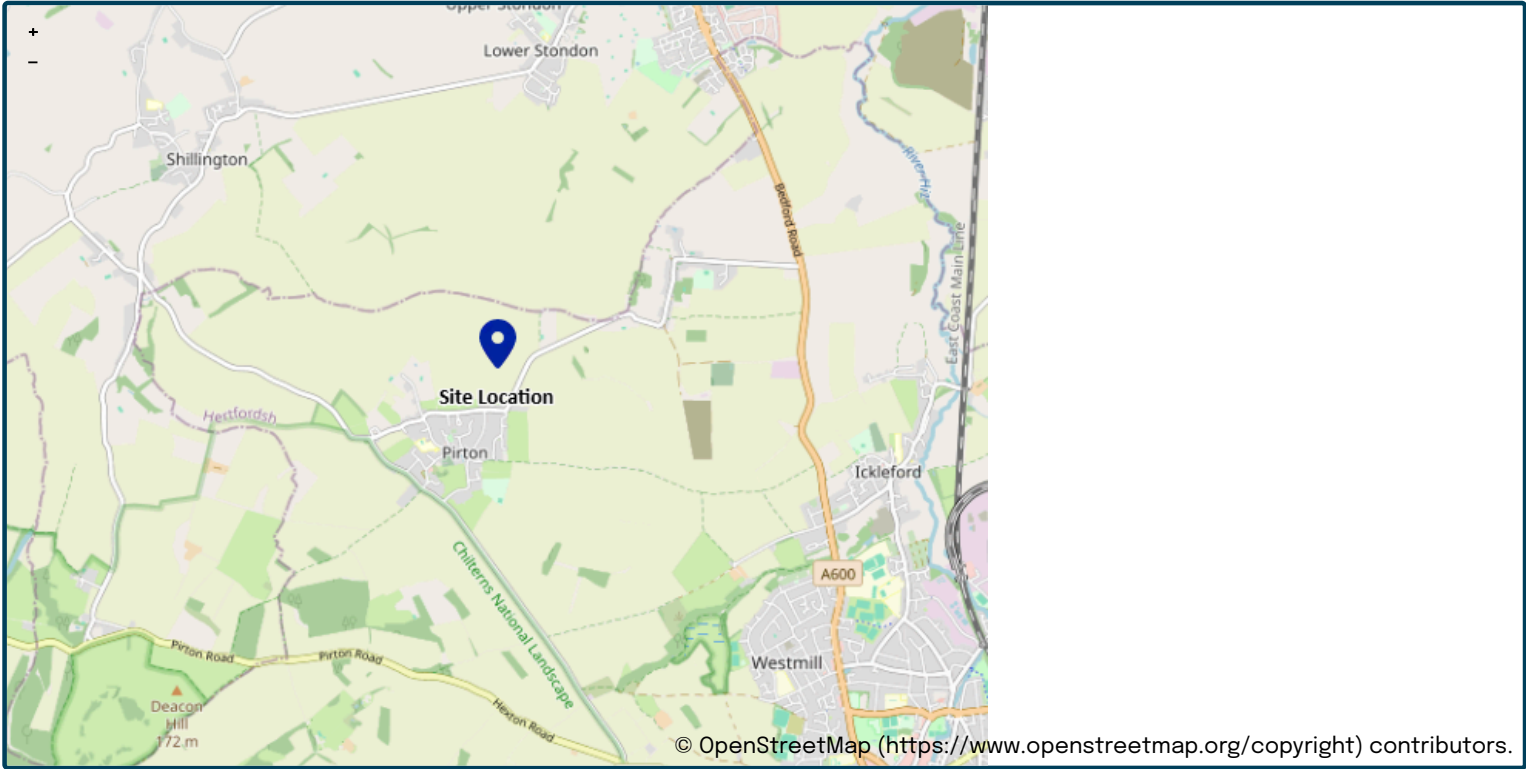
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). 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	09/09/2026
Calculated by	T McArdle BSc. Hons MRICS
Reference	Land at Pirton
Model version	2.2.3

Location

Site name	Land at Pirton
Site location	SG5 3RA



Site easting (British National Grid)	515094
Site northing (British National Grid)	232257

Site details

Total site area (ha)	3.420	ha
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Greenfield runoff

Method

Method	FEH statistical (2025)
--------	------------------------

FEH statistical (2025)

	<u>My value</u>	<u>Map value</u>
SAAR9120 (mm)	606	mm
BFIHOST19scaled	0.902	
QMed-QBar conversion	1.124	1.124
QMed (l/s)	0.9	l/s
QBar (FEH statistical 2025) (l/s)	1	l/s

Growth curve factors

	<u>My value</u>	<u>Map value</u>
Hydrological region	5	5
1 year growth factor	0.87	
2 year growth factor	0.89	
10 year growth factor	1.65	
30 year growth factor	2.45	
100 year growth factor	3.56	
200 year growth factor	4.21	

Results

Method	FEH statistical (2025)
Flow rate 1 year (l/s)	0.9
Flow rate 2 year (l/s)	0.9
Flow rate 10 years (l/s)	1.7
Flow rate 30 years (l/s)	2.5
Flow rate 100 years (l/s)	3.7
Flow rate 200 years (l/s)	4.3

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 these data in the design or operational characteristics of any drainage scheme.

Appendix 6

FEH Surface Water Storage Estimation Calculations

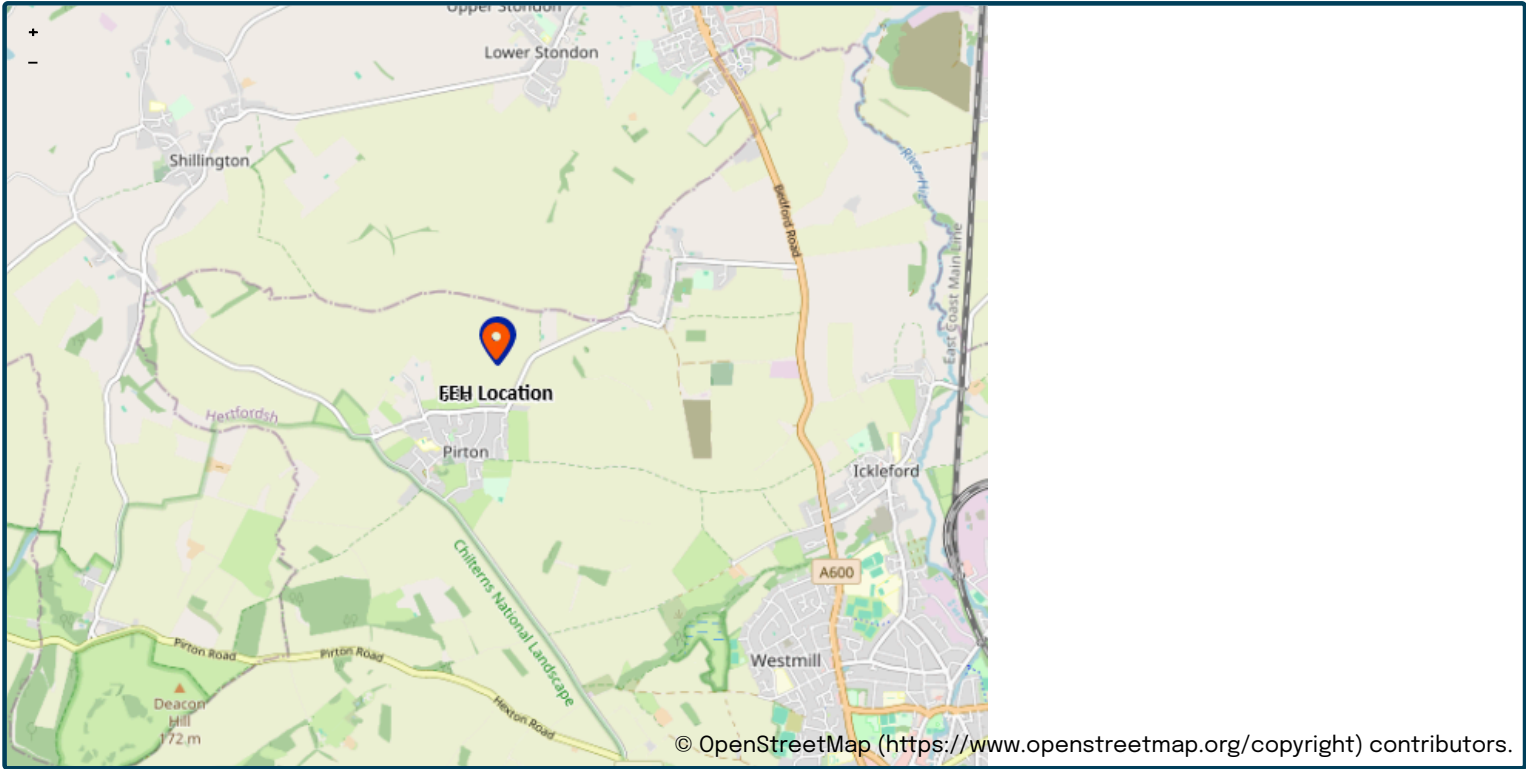
This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is recommended that the total storage volume for the site is distributed across the site using multiple SuDS and that hydraulic modelling software is used to undertake and finalise the detailed design of the drainage system.

Project details

Date	09/09/2026
Calculated by	T McArdle BSc. Hons MRICS
Reference	Land at Pirton
Model version	2.2.3

Location

Site name	Land at Pirton
Site location	SG5 3RA



Site easting (British National Grid)	515088
Site northing (British National Grid)	232265

Site areas

Total site area (ha)	3.420	ha
----------------------	------------------	----

Roof area

Total roof area (ha)	0.3	ha
Contributing roof area (ha)	0.3	ha
Non-contributing roof area (ha)	0	ha

Paved area

Total paved area (ha)	1.0915	ha
Contributing paved area (ha)	1.0704	ha
Non-contributing paved area (ha)	0.0211	ha

Grass / vegetated area

Total grass / vegetated area (ha)	2.0285	ha
Contributing grass / vegetated area (ha)	0	ha
Non-contributing grass / vegetated area (ha)	2.0285	ha

Total area

Total contributing area (ha)	1.3704	ha
------------------------------	-------------------	----

Contributing areas with urban creep allowance

Urban creep allowance factor	+10%	
Contributing roof area (adjusted for urban creep) (ha)	0.3	ha
Contributing paved area (adjusted for urban creep) (ha)	1.0704	ha
Contributing grass / vegetated area (adjusted for urban creep) (ha)	0	ha

Storage design parameters

Storage base shape	Rectangular / square	
Storage base length to width ratio	3:1	
Storage design depth (m)	1.5	m
Storage side slope (1 in x)	Vertical sided	
Storage voids ratio (%)	90% (e.g. geocellular crate systems)	
Storage volume design return period (years)	1:100 years	

Discharge flow rate from the site

Method

Type of site

Greenfield

Specify the method

FEH statistical (2025)

FEH statistical (2025)

My value

Map/default value

SAAR9120 (mm)

606

mm

BFIHOST19scaled

0.902

QMed (l/s)

0.9

l/s

QMed-QBar conversion

1.124

1.124

Total area for greenfield runoff calculation (ha)

3.42

ha

3.42

QBar (l/s)

1

l/s

Hydrological region

5

5

Return period (years)

1:30 years

Growth curve factor

2.45

Final discharge rate

Runoff calculation method

FEH statistical (2025)

Design flow rate (l/s)

2.5

l/s

Blockage risk

Specify the method

Orifice diameter

Minimum orifice diameter to prevent blockage (mm)

40

mm

My value

Calculated value

Design orifice diameter (mm)

38

mm

40

Flow rate of orifice (l/s)

3.67

l/s

Rainfall and runoff

Rainfall input type

FEH22 CSV file

FEH_Point_Rainfall_FEH22_AM_515081_232225.csv

Distance from FEH location to site (km)

0

km

Climate change allowance factor

140%

Specify the runoff method from grass / vegetated areas

Fixed percentage - based on rainfall event depth and SPR

My value

Map value

How should SPR be derived?

Estimate using BFI

BFIHOST19scaled

0.902

SPR

0.12

Model results

- **Maximum discharge flow rate:** 3.7 (l/s)
- **Outflow orifice diameter:** 38 (mm)
- **Storage base length:** 53 (m)
- **Storage base width:** 18 (m)
- **Storage base area:** 952 (m²)
- **Storage total volume:** 1427 (m³)
- **Storage total water volume:** 1284 (m³)
- **Storm return periods run:** 1, 2, 10, 30, 100, 200 (years)
- **Storm durations run:** 15, 30, 60, 120, 180, 240, 360, 540, 720, 900, 1080, 1440, 1800, 2160, 2880, 3600, 4320, 5040, 5760 (minutes)

Return Period (years)	Critical Duration (minutes)	Peak Flow Rate (l/s)	Max Depth (m)	Max water volume (m ³)	Max storage volume (m ³)
1	5760	2.1	0.51	440	489
2	5760	2.3	0.60	515	572
10	1440	3.0	0.98	837	930
30	1440	3.3	1.21	1037	1152
<u>100</u>	<u>1440</u>	<u>3.7</u>	<u>1.50</u>	<u>1284</u>	<u>1427</u>
200	1440	3.9	1.70	1479	1643

Please note runoff estimation and storage volume estimation are subject to uncertainty. Storage volume results are therefore reported to the nearest 1 m³ value, unless storage volumes are less than 10 m³, in which case, storage volumes are provided to 1 decimal place.

Disclaimer

This report was produced using the surface water storage volume design tool (2.2.3) developed by HR Wallingford and available at [uksuds.com](https://www.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) (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate surface water storage volumes for the whole site based on a limiting discharge rate from the site. 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 these data in the design or operational characteristics of any drainage scheme.

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Appendix A - Rainfall Depths

Rainfall depths (mm) with climate change

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
15	0.25	7.17	10.07	21.18	28.00	35.36	40.00
30	0.5	9.01	12.68	26.92	35.80	45.65	51.81
60	1	11.05	15.48	32.76	43.67	56.08	63.67
120	2	17.80	23.06	43.25	55.52	69.47	78.47
180	3	21.96	27.62	49.25	62.31	77.27	87.26
240	4	24.81	30.73	53.30	66.89	82.60	93.37
360	6	28.43	34.66	58.46	72.73	89.59	101.47
540	9	31.80	38.29	62.96	77.84	95.69	108.95
720	12	34.08	40.74	65.98	81.23	99.69	113.82
900	15	35.76	42.55	68.32	83.80	102.72	117.31
1080	18	37.15	44.04	70.24	85.90	105.13	120.04
1440	24	39.50	46.56	73.32	89.33	108.91	124.21
1800	30	41.47	48.69	75.96	92.20	111.99	127.33
2160	36	43.28	50.62	78.36	94.77	114.69	129.98
2880	48	46.54	54.12	82.67	99.36	119.45	134.47
3600	60	49.67	57.46	86.69	103.63	123.76	138.45
4320	72	52.70	60.65	90.50	107.65	127.75	142.09
5040	84	55.62	63.73	94.14	111.48	131.56	145.54
5760	96	58.48	66.74	97.68	115.21	135.23	148.86

Rainfall depths (mm) without climate change

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
15	0.25	5.12	7.19	15.13	20.00	25.26	28.57
30	0.5	6.44	9.06	19.23	25.57	32.61	37.01
60	1	7.89	11.06	23.40	31.19	40.06	45.48
120	2	12.71	16.47	30.89	39.66	49.62	56.05
180	3	15.69	19.73	35.18	44.51	55.19	62.33
240	4	17.72	21.95	38.07	47.78	59.00	66.69
360	6	20.31	24.76	41.76	51.95	63.99	72.48
540	9	22.71	27.35	44.97	55.60	68.35	77.82
720	12	24.35	29.10	47.13	58.02	71.21	81.30
900	15	25.54	30.39	48.80	59.86	73.37	83.79
1080	18	26.54	31.46	50.17	61.36	75.09	85.74
1440	24	28.22	33.26	52.37	63.81	77.79	88.72
1800	30	29.62	34.78	54.26	65.86	79.99	90.95

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
2160	36	30.91	36.16	55.97	67.69	81.92	92.84
2880	48	33.24	38.66	59.05	70.97	85.32	96.05
3600	60	35.48	41.04	61.92	74.02	88.40	98.89
4320	72	37.64	43.32	64.64	76.89	91.25	101.49
5040	84	39.73	45.52	67.24	79.63	93.97	103.96
5760	96	41.77	47.67	69.77	82.29	96.59	106.33

Appendix 7

Existing Topographic Plan

