

12 Portsdown Hill Road, Havant



Image is indicative

FRA and DRAINAGE STRATEGY

Prepared for: Mr V Patel
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1 Flood Risk Statement

Donnager Civil Engineering has been commissioned to review Flood Risk for the proposed residential development at 12 Portsdown Hill Road, Bedhampton, Havant, PO9 3JX.

The site is located in Flood Zone 1, is approximately 0.19 hectares in size and includes 2 new properties, the existing house and a small portion of the access road.

The following Flood Risks have been reviewed as part of the assessment:

Flood risk type	Present	Source
Rivers and Seas	no	Environment Agency Flood Map ⁽¹⁾
Surface Water	Yes	Environment Agency Flood Map ⁽¹⁾ Defra: Risk for Flooding from Surface Water ⁽²⁾
Groundwater Flooding	no	Havant SFRA 2024 Flood Maps, Figure 5C ⁽³⁾
Reservoir	no	Defra: Reservoir Flood Extents – Wet Day ⁽⁴⁾ Havant SFRA 2024 Flood Maps, Figure 6C ⁽³⁾
Historic Flooding	no	Historic Flooding: Defra Historic Flood Map ⁽⁵⁾

Table 1 - Flood Sources and Risk

(1)<https://flood-map-for-planning.service.gov.uk/map?cz=469830.9,106568.8,18.75584&seg=fz,fzcl>

(2) <https://flood-map-for-planning.service.gov.uk/map?lyr=&cz=469903.7,106558.5,19.507008&seg=sw,pd,mr,depthAll>

(3)<https://www.havant.gov.uk/planning-services/planning-policy/local-plan/pfsh-strategic-flood-risk-assessment-2024>

(4)<https://environment.data.gov.uk/explore/d81646cf-37e5-4e71-bbcf-b7d5b9ca3a1c>

(5) <https://environment.data.gov.uk/explore/889885c0-d465-11e4-9507-f0def148f590>

The site lies entirely within Flood Zone 1, with no fluvial or tidal sources in the surrounding area. The geology is underlain by permeable chalk bedrock, and there are no artificial flood risk sources within the immediate vicinity. Review of available datasets indicates that the only identifiable flood risk at the site relates to surface water. No evidence has been found of historic flooding or groundwater emergence affecting the site.

1.1 Surface Water Flooding

The site is shown on Environment Agency maps to be at risk of surface-water flooding, with the mapped extent coinciding with part of the proposed development. The flooding is associated with the site's low-lying, isolated landform, which historic mapping dating from around 1900 identifies as a former chalk pit.

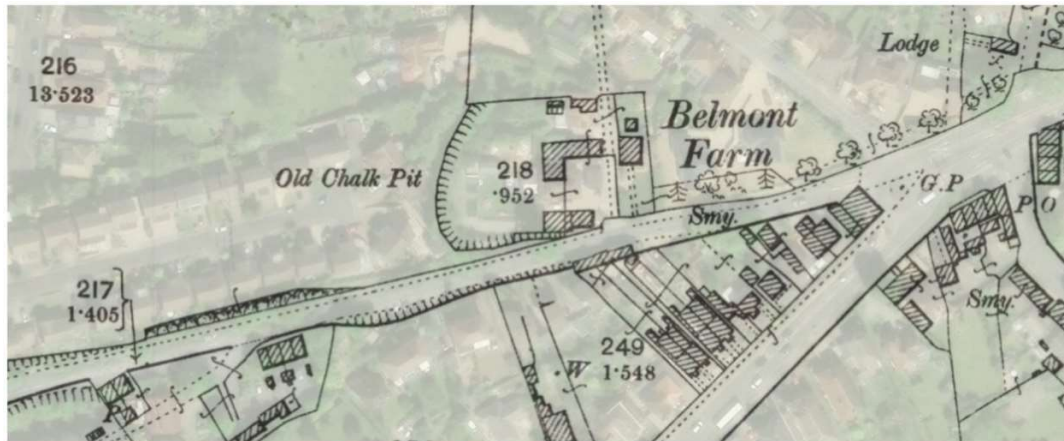


Figure 1 - Historic mapping from circa 1900 showing old chalk pit

The Havant SFRA and other data sources do not show any flood records at the site. There is also no known evidence of the site flooding during the locally significant rainfall events on 28 June 2012 (45 mm, WMO03865) and 12 August 2020 (52 mm, E13261 Eastney Rain Gauge). This is consistent with the current occupier's experience during more than 50 years of residence.

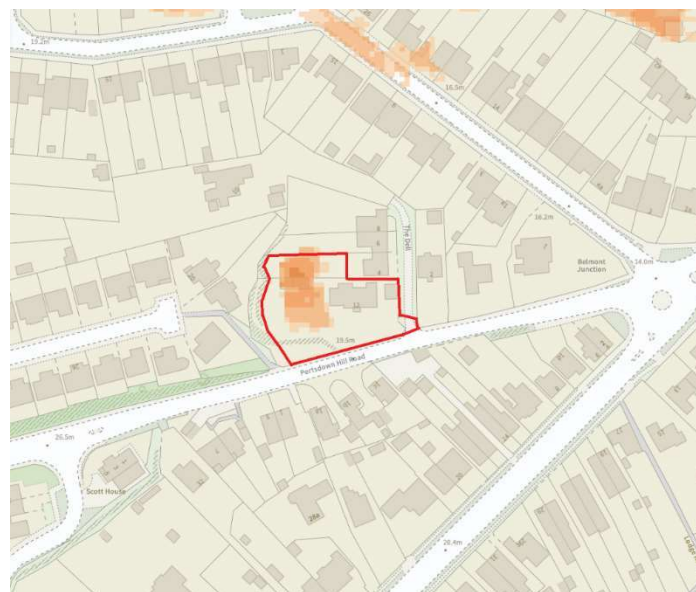


Figure 2 - Risk of Flooding from Surface Water Map (all depths and all events)

The RoFSW mapping was developed nationally by the Environment Agency using a 2 m resolution. The mapped flood extents were overlaid onto 1 m LiDAR data on Drawing L033-DON-DR-C-001 in the Drawings section.

The flood levels cannot be determined precisely from the overlay due to discrepancies between the datasets within the site boundary. To establish flood levels, the rear-garden Lidar contours were used to extrapolate the following flood levels:

- 16.80m AOD for 0.1% (1-in-1,000 year)
- 16.50m AOD for 1% (1-in-100 year)

A site visit was undertaken to understand the overall RoFSW catchment and correlate the national model against local site constraints. The detailed assessment is presented in Technical Note L033-DON-TN-C-001 and considers topographical survey data, local geology, infiltration testing and observations made during the site visit. The visit identified walls, kerbs, raised ground and other physical controls that interrupt the flow routes represented by the national mapping.

LiDAR data was used to confirm the approximate Environment Agency catchment outline, which was then refined using the site-specific information.



Figure 3 – Estimated Environment Agency catchment (left) vs catchment with local controls applied (right)

The overall conclusion is that the Environment Agency flood mapping is a broad-scale representation and is not fully supported when assessed against local site data. Approximately 65% of the mapped contributing catchment does not reach the site flooding area when local physical controls are considered. The site-specific geology and infiltration characteristics would further reduce the volume of surface water reaching or remaining within the flooding area.

1.2 Surface Water Risk mitigation

Conservatively, the proposed development can be made safe by setting the dwellings above the currently identified surface-water flood levels. A finished floor level of 17.00 m AOD is proposed, approximately 200 mm above the indicative upper level of the existing mapped flood extent (1-in-1,000 year) and around 500mm above the 1-in-100 year flood extent. No additional property-level flood-protection measures are considered necessary, as the finished floor levels would be above the potential flood level and safe access and egress would be available at the front of the properties, as shown on the architectural drawings.

The assessment provides a reasonable and proportionate basis for concluding that the development can be made safe and that the displaced flood volume can be managed within the site.

To ensure that flood risk is not increased elsewhere, detailed 1D/2D hydraulic modelling will be undertaken following planning permission. This work will:

- (a) verify the expected reduction in surface water reaching the development land;
- and

- (b) inform the detailed engineering and reprofiling of ground levels around the existing and proposed dwellings, ensuring that the displaced flood volume is maintained within the site and rear gardens and that the proposed flood levels do not exceed the existing flood levels.

The modelling will verify the existing and proposed flood volumes, levels and flow routes. The garden landform will then be designed and reprofiled to provide the required storage without increasing flood risk to the existing dwellings, neighbouring properties or land elsewhere.

As the site lies within Groundwater Source Protection Zone 1, the detailed landform design would incorporate an improved vegetated soil/filter layer between the temporary surface-water storage area and the underlying chalk. This will ensure that reprofiling of the flood storage area does not increase risk to groundwater quality or the public water supply. The details would be developed post planning in consultation with the Environment Agency and Portsmouth Water. This principle is generally supported by both organisations, see attached correspondence in Appendix

1.3 Sequential Test

The site lies entirely within Flood Zone 1 and is not identified as being at risk from rivers or the sea, groundwater, reservoirs or other artificial sources. The site is at risk of flooding from surface water.

Paragraphs 173 to 175 of the National Planning Policy Framework set out the application of the Sequential Test. It states that where a site-specific Flood Risk Assessment clearly demonstrates that the proposed layout, design and mitigation would keep occupiers and users safe from current and future surface-water flood risk throughout the lifetime of the development, without increasing flood risk elsewhere, the Sequential Test need not be applied.

Havant Borough Council's *Flood Risk Sequential Test & Exception (January 2026)* provides further locally specific guidance. Section 3.1.4(a) recognises the numerous, generally small-scale pockets of mapped surface-water risk within the Borough and confirms that the Sequential Test will not be required where surface water is the only identified source of flood risk, subject to appropriate consideration of drainage and site-specific flood risk.

As demonstrated in Section 1.1, the proposed development can remain safe throughout its lifetime, and the displaced surface-water flood volume can be retained within the site without increasing flood risk elsewhere. Accordingly, in line with Planning Practice Guidance paragraph 027 and Havant Borough Council's published guidance, the Sequential Test need not be applied.

2 Drainage Strategy

2.1 Introduction

Donnager Civil Engineering has been commissioned by the Client to prepare a Drainage Strategy to support a planning application for a proposed development at 12 Portsdown Hill Road, Bedhampton, Havant, PO9 3JX. The Site falls within the administrative boundary of Havant. The application site covers a total area of approximately 0.19ha within red line boundary;

The scheme consists of two new dwellings, alterations to the existing dwelling, a new access road and associated works within the site boundary.

The site is an old chalk pit, and the topography includes steep slopes to the west and a generally bowl-shaped profile, with local ground levels sloping towards the rear garden areas.



Figure 4 - Old Chalk pit (left), The Dell access to properties off Portsdown Hill Road (right)



Figure 5 - View West with steep earth banks (left), Existing House (right)

2.2 Geology

BGS mapping shows the site to be underlain by the Portsdown Chalk Formation. The boundary with the Lambeth Group, comprising clay, silt and sand, lies immediately to the east/northeast. No superficial deposits are mapped within the site, although Head deposits comprising clay, silt, sand and gravel are mapped nearby to the north.



Bedrock geology

Portsdown Chalk Formation Chalk. These sedimentary rocks are shallow-marine in origin. They are biogenic and detrital, generally comprising carbonate material (coccoliths), forming distinctive beds of chalk.

Minimum Age (Years):	72,100,000
Minimum Period:	Cretaceous
Maximum Age (Years):	83,600,000
Maximum Period:	Cretaceous

Bedrock geology

Lambeth Group Clay, silt and sand. These sedimentary rocks are fluvial, palustrine and shallow-marine in origin. They are detrital, forming deposits reflecting the channels, floodplains and deltas of a river in a coastal setting (with periodic inundation from the sea).

Minimum Age (Years):	47,800,000
Minimum Period:	Palaeogene
Maximum Age (Years):	58,200,000
Maximum Period:	Palaeogene

Figure 6 - BGS site geology

2.3 Ground Conditions

The geotechnical investigation comprised two trial pits and soakage testing in the rear garden of 12 Portsdown Hill Road.

The investigation encountered variable, heterogeneous soils associated with the former chalk pit, including gravelly clay overlying shallow chalk. No groundwater was encountered during the investigation. Ground conditions were more clayey towards the road, while chalk predominated across the remainder of the site.

Depth (m) (Thickness)	Description	Legend	Water
(0.35)	Brown, sandy, SILT, blended with some rootlets. Fine sand. (TOPSOIL)		
0.35	Firm brown, sandy, gravelly, SILT, blended with scattered brick fragments. Gravels are chalk (medium to high density) and flints, fine to cobble size, angular to subrounded (MADE GROUND)		
(0.50)	...Thin layer of black CLAY, between 0.70 to 0.80mbgl.		
0.85	Interbedded layer of off-white sandy, GRAVEL CHALK (Grade Dc) and soft-firm, brown, gravelly, CLAY. Gravels are chalk (medium to high density) and flints, angular to subrounded. (HEAD)		
(0.60)			
1.45	Dense, off-white, sandy, GRAVEL CHALK (Grade Dc). Gravels of high density are fine to cobble size. Angular to subrounded. (PORTSDOWN CHALK FORMATION)		

Depth (m) (Thickness)	Description	Legend	Water
(0.35)	Black silty Clay, blended with many rootlets and occasional brick fragments. (TOPSOIL)		
0.35	Medium dense, off-white, silty, sandy, GRAVELS (Grade Dc). Gravels of chalk of high density and flintstones. Rounded to sub angular. Fine to cobble size.		
(0.55)			
0.90	Soft to firm, brown CLAY. (HEAD)		
(0.20)			
1.10	Complete at 1.10m		

Figure 7 - Geotechnical Ground Conditions

2.4 Infiltration Testing

Soakage testing was undertaken on 17 April 2026 at two trial-pit locations within the rear garden. TP01 was excavated to 2.90 m below ground level, where Portsdown Chalk Formation was encountered from 1.45 m to the base of the pit. Approximately 2,000 litres of water discharged into the chalk over five minutes without producing a measurable rise in water level. A BRE 365 infiltration rate could not therefore be calculated, although the geotechnical engineer estimated the permeability to be between 10^{-1} and 10^{-3} m/s.

TP02 was excavated to 1.10 m below ground level (made ground). Chalk gravel was encountered between 0.35 m and 0.90 m, underlain by Head deposits comprising clay. Two soakage tests returned infiltration rates of 3.59×10^{-5} m/s and 1.79×10^{-5} m/s. The geotechnical engineer noted that both tests were predominantly influenced by the chalk horizon and that the underlying clay may have a lower permeability.

The results demonstrate that infiltration is feasible as the primary means of surface-water disposal, although the design must account for the variable strata encountered across the site. Relevant trial-pit logs and soakage-test results are included in Appendix.

2.5 Source Protection Zone

The Site is located within Source Protection Zone 1 – Inner Protection Zone. Groundwater in a SPZ1 is most vulnerable to pollution given the close proximity of the abstraction point and the water's intended use for human consumption.

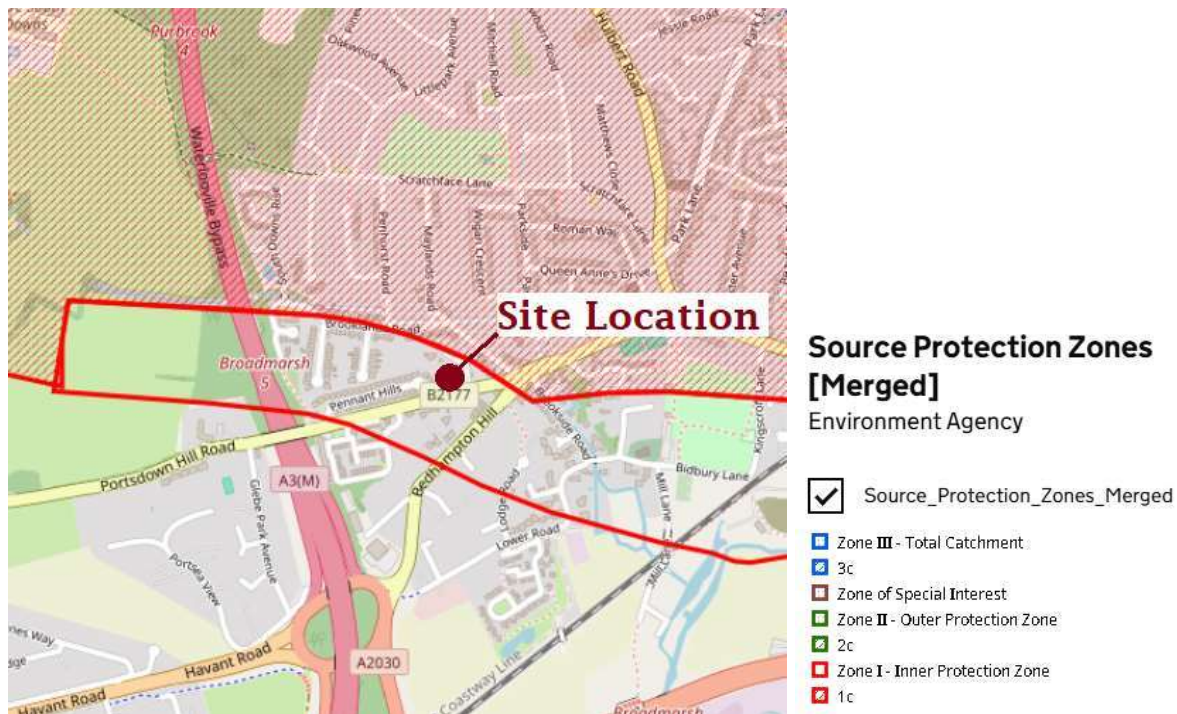


Figure 8 - Site location within SPZ1 – Inner Protection Zone

The Environment Agency's approach to groundwater protection, including position statements G8, G9, G12 and G13, will be followed in the design as follows:

- The foul-water network will be designed to meet all relevant standards. The foul-water network will be separate from the surface-water network. Foul water will discharge to the public Southern Water sewer
- Roof rainwater downpipes will be separate to foul water. All rainwater downpipes will have sealed connections, or a similarly effective arrangement, before discharging to local soakaways.
- Shallow SuDS will be implemented for roads and pavements, designed to meet CIRIA C753 Pollution mitigation requirements, with consideration of their location within SPZ1, ground conditions and with allowance of component failure.
- If required, hydrogeological risk assessment will be undertaken post-planning

3 Proposed Development

The proposed development layout is shown below. It consists of two new plots and amendments to the existing plot at #12 and new access road and parking.

For the purposes of this technical note, the 2 new dwellings and existing dwelling will be considered and the area within red line boundary taken into account for calculations.

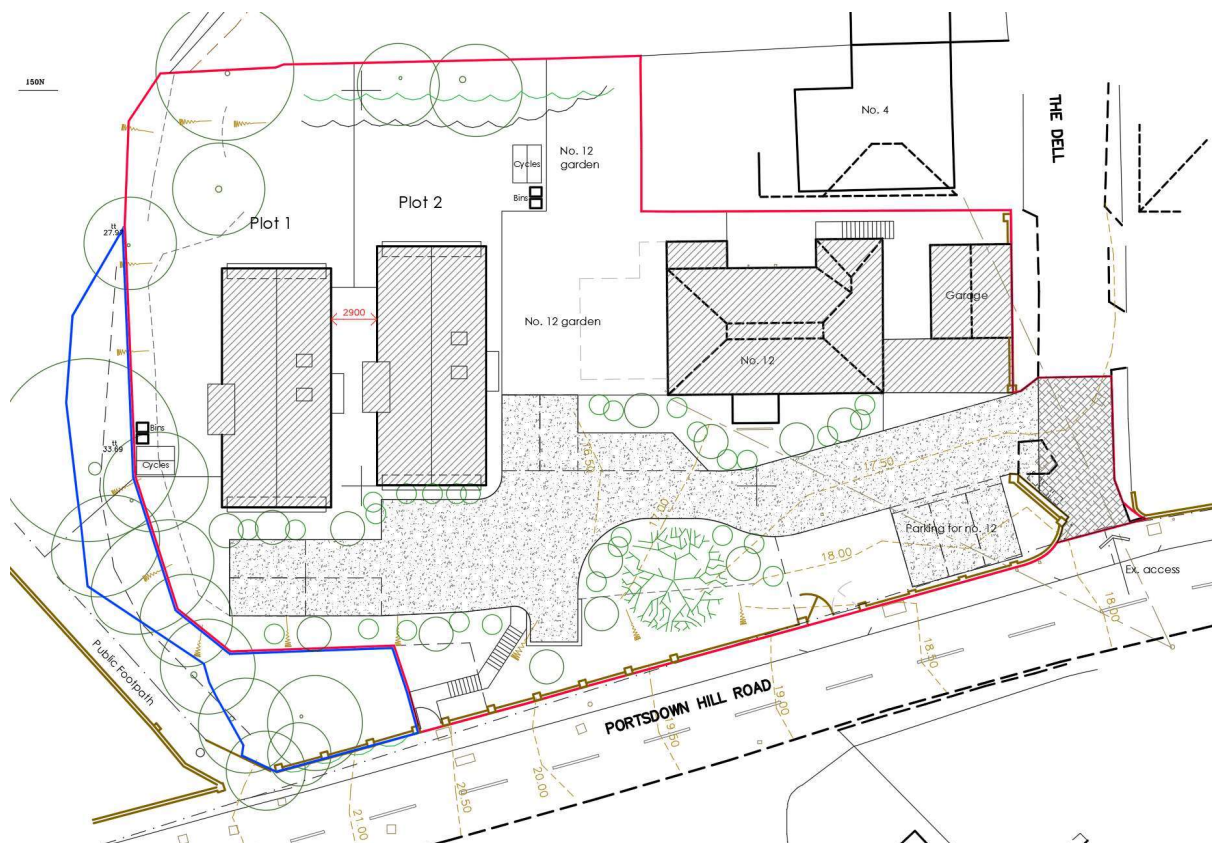


Figure 9 - Proposed development

3.1 Sustainable Drainage (SuDS) and Drainage Hierarchy

The surface-water drainage strategy has been developed to manage the quantity and quality of runoff using sustainable drainage systems. Runoff from the proposed development will be managed close to source using permeable asphalt, bioretention systems and filter drains before infiltration within the site.

Site testing has demonstrated that infiltration into the underlying chalk is feasible. Infiltration has therefore been adopted as the primary means of surface-water disposal, with no discharge to a surface-water sewer or watercourse proposed.

As all surface-water runoff will be managed and infiltrated within the site, no restricted off-site discharge is proposed and greenfield runoff-rate calculations are not applicable. Final sizing and construction details of the drainage components will be confirmed during detailed design.

3.2 Proposed Drainage Concept

Proposed Drainage Layout Concept drawing number L033-DON-DR-C-002 is presented in Drawings Section. The proposal consists of the following elements:

New Dwellings

New dwellings principle rainwater collection system will be either filter drains or bioretention system, wrapped in impermeable membrane to prevent damage to building and stop early contaminate release into the soil. RWP's will be either discharge subsurface (sealed) or discharge over bioretention/filter medium.

Plot 2 with trees planted close to building will have bioretention medium suitable for tree planting and root protection membrane.

Subsurface pipes within filter drains will be minimised, and instead the runoff will flow through the subsurface medium (sand) to the downstream outfall. This will mimic the natural filtration not only through the top layers of SuDS, but also continuous filtration through the high quality sub-soil.

Where SuDS needs to cross entrances and other features, diffuser units will be used to reconnect the SuDS elements, maintaining continuous flow through the subsurface medium.

Plot 1 and Plot 2 will be equipped with their own traditional ring soakaway with sump. Given proposed filter trench / bioretention and associated membranes, silt load expected to be minimal. The soakaway will discharge surface water directly into chalk after SuDS treatment. Soakaways have been positioned 5m away from footings, and 2.5m away from the site boundary.

This provides necessary treatment of surface water prior to discharge to soil.

Existing Dwelling

The Existing dwelling will have its drainage system investigated post planning to determine whether its foul-water and surface-water systems are combined or separate.

The foul-water system will be retained and will discharge to Southern Water sewer.

Bioretention planters will be added to the surface-water downpipes to capture and treat roof runoff. If the existing surface-water and foul-water systems are separate, then the network will be maintained, with only RWP's fully sealed and gullies removed. If the existing network is combined, then brand new dedicated storm water network will be provided for the existing dwelling.



Figure 10 - Bioretention Planter

External Areas

New access road will be provided, replacing current gravel driveway. New road would be permeable asphalt type, permeable pavements Type A, with infiltration into the below ground soil.

To prevent contamination, the existing ground will be investigated to ensure no contaminant mobilisation. Furthermore, the permeable pavement will be placed on top of existing made ground. Where existing made ground is not present and road is directly underlaid by chalk, then the soil will be over-excavated and a slow filtrating sub-soil material will be added in addition to treatment membranes within permeable pavements

3.3 SuDS System Design

The development is a low risk residential development comprising only a local access road and roofs. SuDS pollution criteria and mitigation requirements are presented below.

	TSS	Metals	Hydrocarbons
Residential Roofs	0.2	0.2	0.05
Common Driveway	0.5	0.4	0.4

Table 2 - Pollution Hazard Indices

The following SuDS components are proposed in accordance with CIRIA SuDS Manual (C753), Chapter 26 – Simple Index Approach:

	TSS	Metals	Hydrocarbons
Permeable Pavement	0.7	0.6	0.7
Filter Drain	0.4	0.4	0.5
Bioretention	0.8	0.8	0.8

Table 3 - Mitigation Indices

The combination of bioretention/filtration systems for residential roofs and permeable pavement for the access road is sufficient to provide the required pollution mitigation indices and generally aligns with the Environment Agency's approach to groundwater protection.

3.4 System Resilience

The drainage strategy uses simple, predominantly passive SuDS components. In the event of blockage or failure, the affected component would surcharge to the surface, with exceedance flowing through the landscaped areas towards the rear flood-storage basin and away from the proposed dwellings.

3.5 Drainage and Infiltration Design

Soakage testing at TP01 demonstrated exceptionally rapid infiltration into the underlying chalk. Approximately 2,000 litres of water were discharged over five minutes without producing a measurable rise in water level. A BRE 365 infiltration rate could not therefore be calculated, although the geotechnical engineer estimated permeability within the range of 10^{-1} to 10^{-3} m/s.

The proposed infiltration features will discharge into the underlying chalk and will not rely on infiltration through the variable overlying soils. The investigation therefore provides strong evidence that infiltration is viable as the primary means of surface-water disposal. The final dimensions and construction details of the traditional ring soakaways, including the addition of filter membranes, will be confirmed during detailed design,

3.6 Maintenance

A detailed Operation and Maintenance (O&M) plan will be prepared at the detailed design stage for the development to ensure all SuDS elements continue to perform as intended over the lifetime of the site.

Responsibility for maintaining drainage features within each plot will rest with the respective property owner, with responsibility for any shared drainage features established as part of the detailed design and property arrangements.

For the purposes of this report, the key considerations for maintenance of the proposed systems are outlined below. The systems selected are low maintenance in general.

Maintenance will be undertaken with the recommendations outlined within the CIRIA C753 The SuDS Manual Table 18.3 for Bioretention Basins

Operation and Maintenance requirements for bioretention system.

Maintenance schedule	Required action	Typical frequency
Regular inspections	Inspect infiltration surface for silting and ponding, record de-watering time of the facility and assess standing water levels in underdrain (if appropriate) to determine if maintenance is necessary	Quarterly
	Check operation of underdrains by inspecting of flows after the rain	Annually
	Assess plants for disease infection, poor growth, invasive species etc, and replace as necessary	Quarterly
	Inspect inlets and outlets blockage	Quarterly
Regular inspections	Remove litter and surface debris and weeds	Quarterly
	Replace any plants, to maintain planting density	Quarterly
	Remove sediment, litter and debris build-up around inlets.	Quarterly to bi-annually
Occasional maintenance	Infill any holes or scour in the filter medium, improve erosion protection if required	As required
	Repair minor accumulation of silt by raking away surface mulch, scarifying surface of medium and replacing mulch	As required
Remedial Actions	Remove and replace filter medium and vegetation above	As required but likely >20 years

Table 4 - Bioretention maintenance schedule

Soakaways

As the soakaways have pre-treatment in the form of filter/bioretention, the likely maintenance requirements would be as follows:

Maintenance schedule	Required action	Typical frequency
Occasional Maintenance	Remove sediment and silt from the soakaway ring chamber	As required
Remedial Actions	Replace internal geotextile and stone as required	As required
Monitoring	Check soakaway to ensure emptying is occurring	Annually

Table 5 - Soakaway Maintenance

Filter Drain maintenance requirements

Maintenance schedule	Required action	Typical frequency
Regular Maintenance	Remove litter (including leaf litter) and debris from filter surface.	Monthly (as required)
	Inspect filter drain surface, inlet/outlet pipework for blockages, clogging, standing water and structural damage	Monthly
	Inspect surface level pre-treatment system, pipework and establish appropriate silt removal strategies	Six monthly
	Remove sediment from pre-treatment devices	As required
Occasional Maintenance	Remove or control tree roots where they are encroaching the sited of the filter drain, using recommended methods.	As required
	Remove surface geotextile and replace as needed.	As required
	Clear pipe blockages	As required

Table 6 - Filter Drain Maintenance

Permeable Pavements

Maintenance schedule	Required action	Typical frequency
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Annually
Occasional	Stabilise and mow adjacent areas	As required
Remedial Actions	Remove any landscaping which through vegetation maintenance or soil slip, has been raised to within 50mm of the level of paving	As required
	Remedial work to any depressions, potholes or rutting considered detrimental to the structural performance of the pavement.	As required
	Rehabilitation of surface and upper substructure by remedial sweeping.	Every 10-15 years depending on infiltration performance
Monitoring	Initial inspection	Monthly for 3 month after installation.
	Inspect for evident for poor operation or weed growth – if required take remedial action.	Annually
	Inspect silt accumulation rates and overall performance during rainfall.	Annually and after large storms

Table 7 - Permeable Pavements (porous asphalt)

3.7 Foul Water Design

Foul Water from the proposed dwellings will discharge via gravity to Southern Water MH8511. The Sewer depth will be investigated during detailed design phase post planning.

4 Conclusion

The proposed development at 12 Portsdown Hill Road has been assessed in relation to all relevant sources of flood risk and surface-water management. The site lies entirely within Flood Zone 1 but is affected by identified surface-water flood risk. No significant flood risk from other sources has been identified.

The proposed dwellings will be made safe by setting finished floor levels above the indicative flood level for the 0.1% AEP (1-in-1,000-year) event. Post-planning 1D or 2D modelling will refine the surface-water catchment and flood characteristics and inform the final site levels and reprofiling. The detailed design will ensure that flooding remains outside the proposed dwelling footprints and that flood risk elsewhere is not increased, including allowance for climate change.

The proposed SuDS strategy incorporates permeable paving, bioretention systems and filter drains, with infiltration into the underlying chalk as the primary means of surface-water disposal. The proposed treatment train has been assessed in accordance with the CIRIA Simple Index Approach.

The site lies within Source Protection Zone 1. The proposed SuDS treatment measures have therefore been selected with regard to the Environment Agency's groundwater-protection position statements. The need for any hydrogeological risk assessment specifically relating to the permeable pavement will be agreed with the Environment Agency and Portsmouth Water and, if required, undertaken during detailed design.

Foul water will discharge to the public foul sewer.

Overall, the strategy provides a proportionate basis for the sustainable management of surface water and foul water, subject to the post-planning modelling and detailed design.

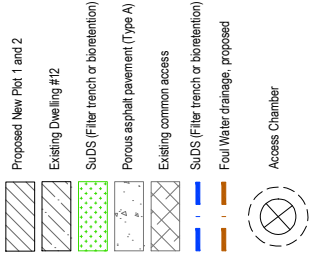
Drawings



Notes

1. Do not scale from this drawing

Legend



THE DELL

No. 4

Garage

Existing foul and surface water
drainage arrangement to be
investigated after planning

New or raised sewer to be
confirmed after planning

Existing common
access surface

Southern Water Sewer
Manhole 8511
Depth to be investigated

Ex. access

Southern Water Sewer 1150 - 1.22' fall

No. 12
garden

Bins

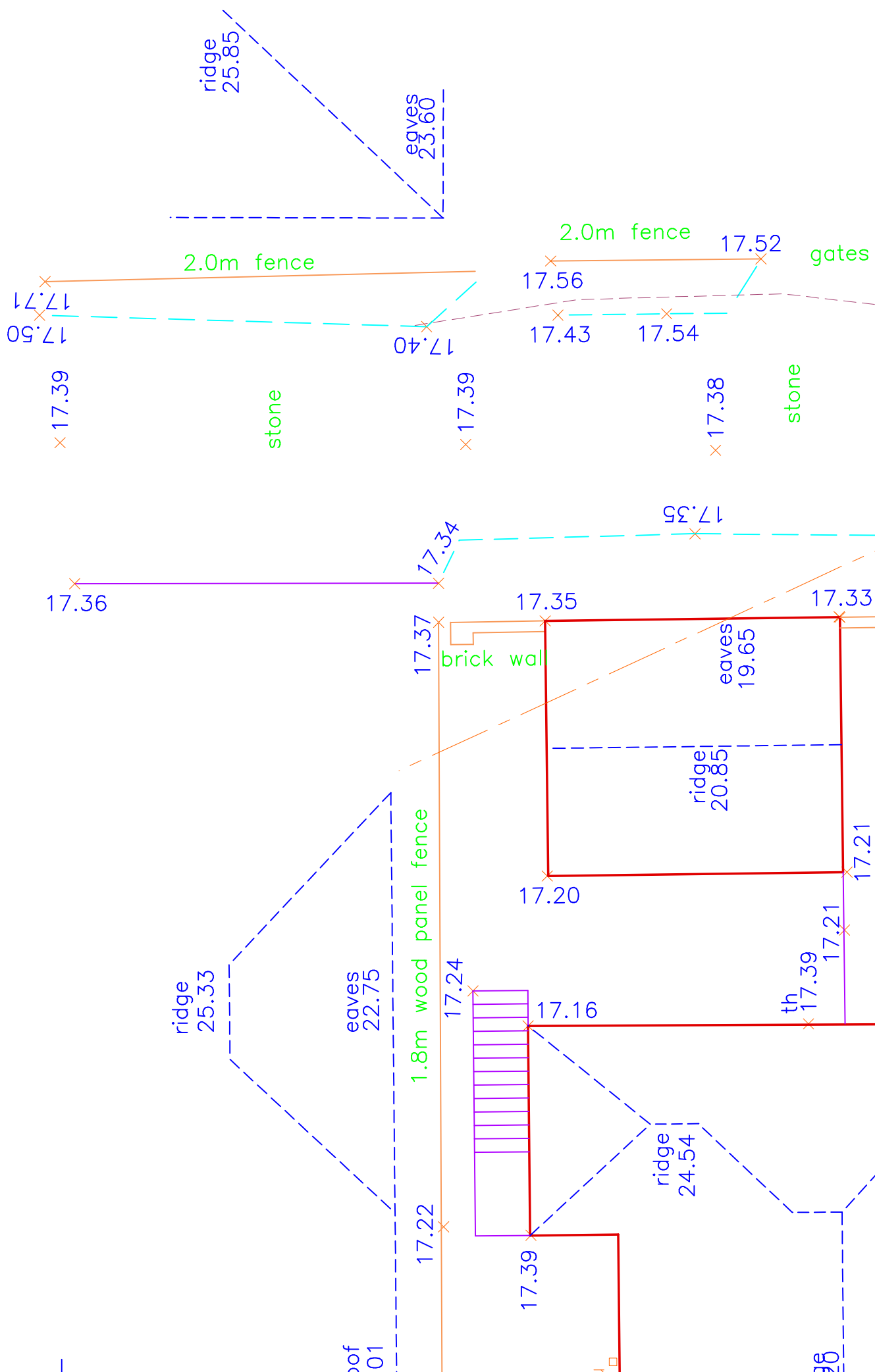
No. 12 garden

Soakaway 3
(Plot 12)

Permeable Asphalt
Type A Permeable
Pavement

Soakaway 2
(Plot 2)

Soakaway 1
(Plot 1)



Appendix A – Surface-Water Catchment Review Technical Note

TECHNICAL NOTE

Donnager Civil Engineering 11 High Street Mews, London, SW19 7RG 03488 0590 Email: vlad@donnager.uk	
No: L033-DON-TN-C-001.P03	
Date: 26.05.2026	

to review surface water flood risk at 12 assessment for a full planning application.

agency mapping (flood risk, depth, velocity and analysis using LiDAR data, topographical survey,

significant rainfall events on 28 June 2012 (45mm, Putney Rain Gauge).



RoFSW EA Maps and Background

Defra RoFSW mapping has been reviewed to understand the predicted extent, depth, velocity, and direction of surface water flooding.

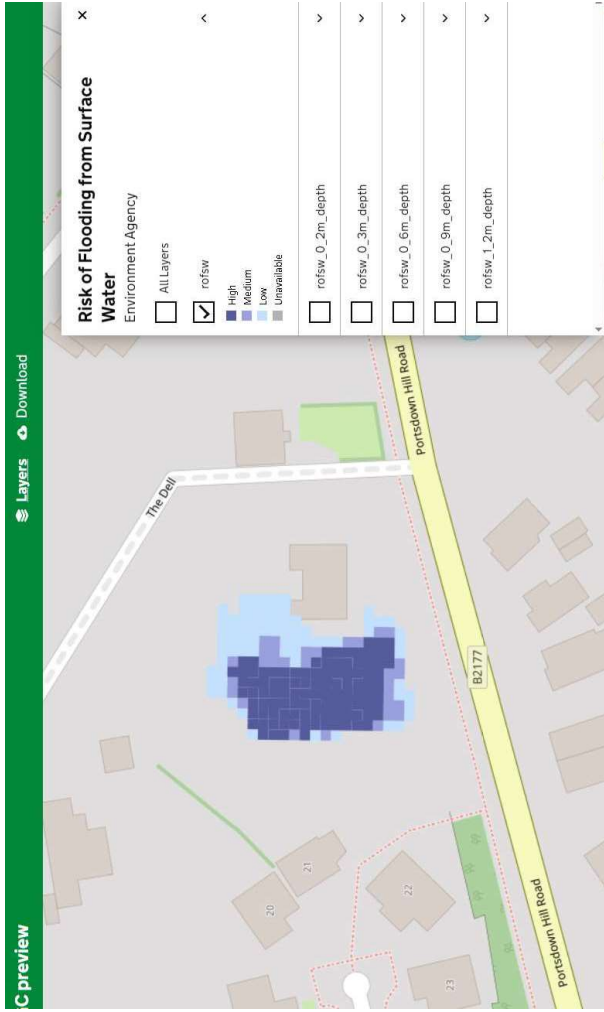


Figure 2 - Risk of Flooding from Surface Water



range of 0.3–0.6m under baseline conditions

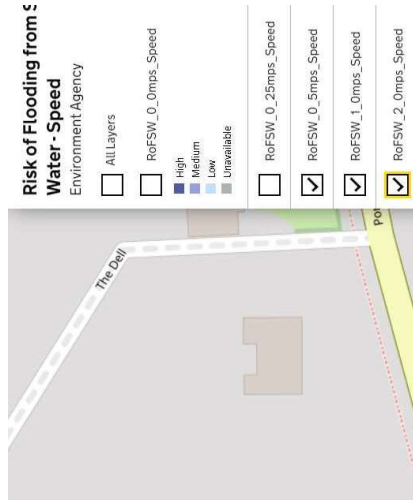
Flooding from Surface
Flow Direction
Agency

FD1MV_2m_1in100

FD1MV_2m_1in1000

FD1MV_2m_1in30

road and The Dell



Lidar Data and contributing catchment

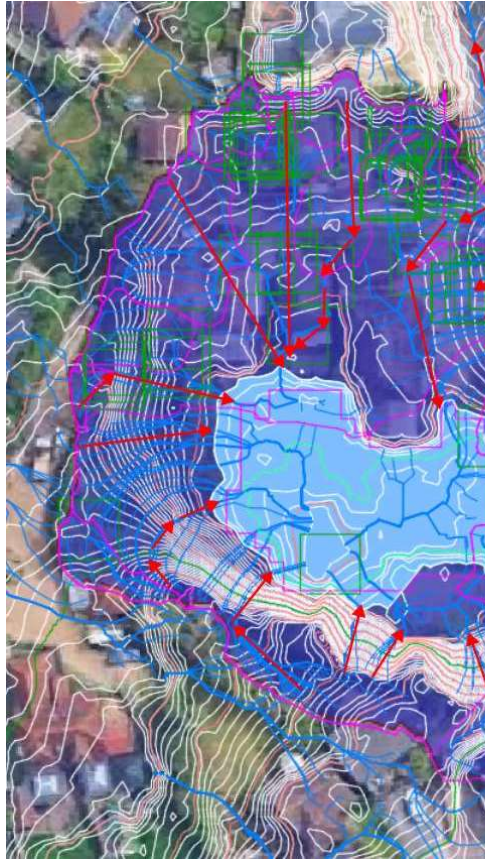
LiDAR Composite DTM (2022, 1m resolution) was used to define the contributing catchment and refine surface water flow routing. The dataset was processed in QGIS to generate 0.15m contours and analysed in Civil 3D using waterdrop analysis, supported by aerial imagery for context.



Figure 6 - catchment map LiDAR

The resulting analysis indicates that predominant surface water flow is routed along Portsdown Hill Road, consistent with the primary topographic gradient across the site.

Contours and waterdrop analysis supporting this interpretation are shown for reference.



interpretation and confirm site-specific surface
drainage datasets and represents surface water
runoff from the localised berming (Photos 4 and 5)
along the Portstown Hill Road) constrain and channel
the runoff and define the contributing catchment based on observed surface



Figure 9 - Photo 2





Figure 13 - Photo 7 (google image)

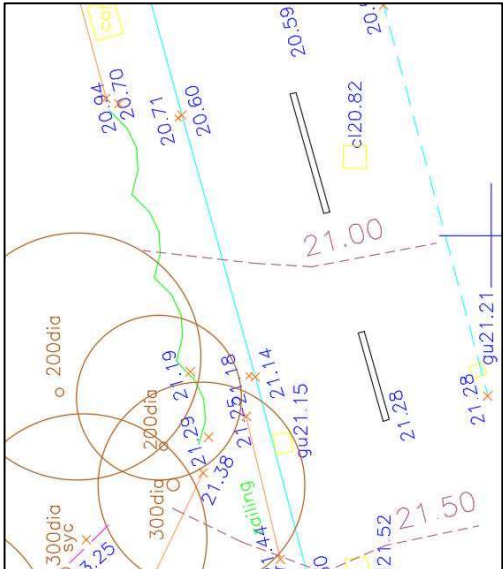
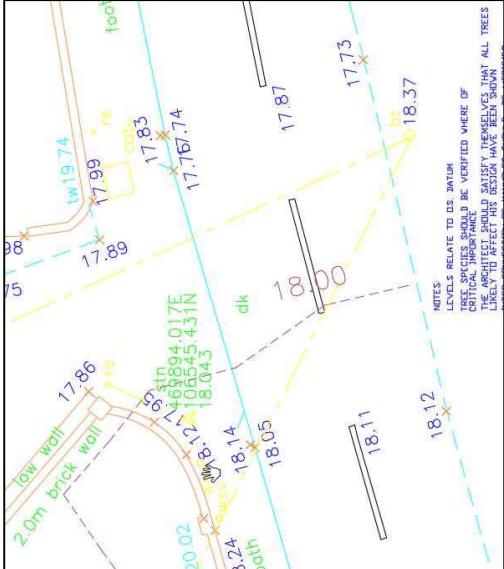




Figure 17 - Google 3D Globe view



Extracts relevant to flow routing are shown



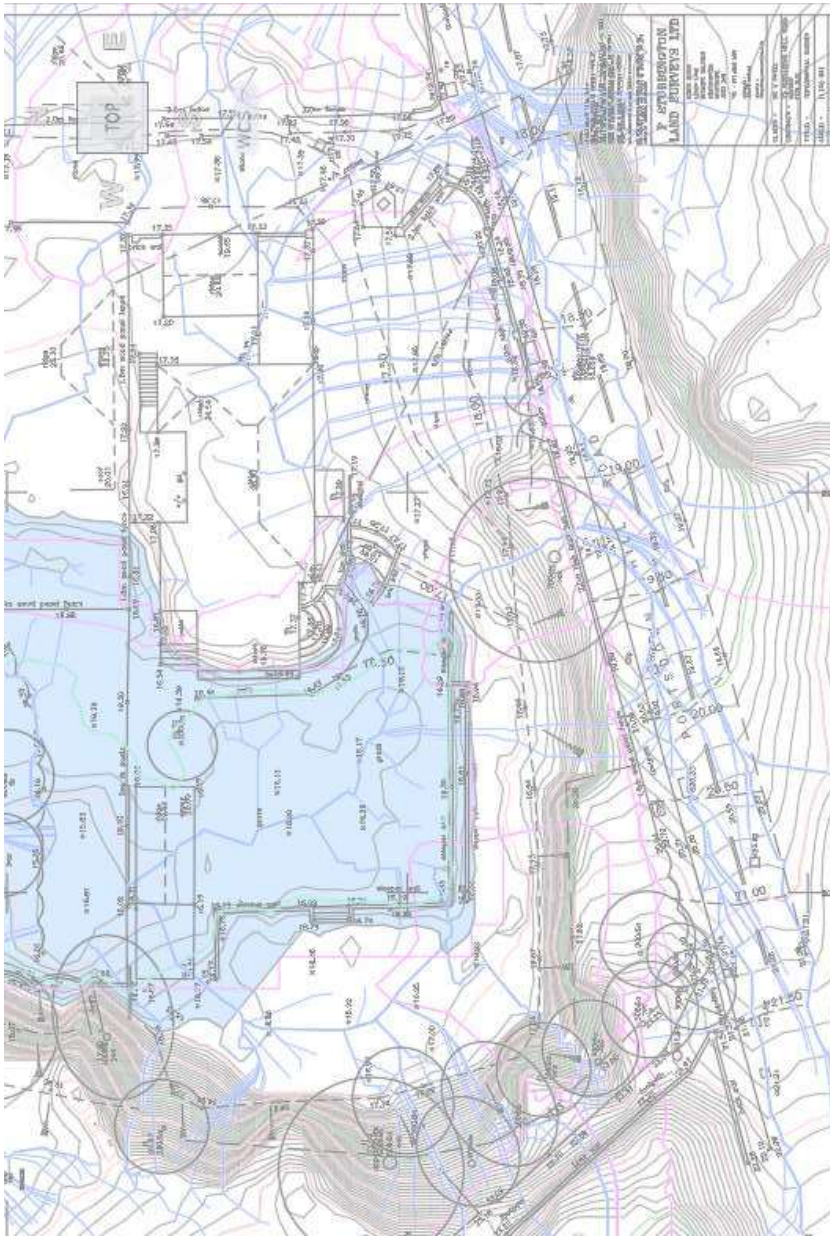
at-gate and Drive Entrance

approximately 1:22 with a crossfall of



Figure 21 - Main entrance - The Dell

Lidar Data has been overlaid over topographic data and the waterdrop information.



The EA Risk of Flooding from Surface Water inundation. LiDAR-derived flow paths indicate the site at a strategic level; however, site-ground level.

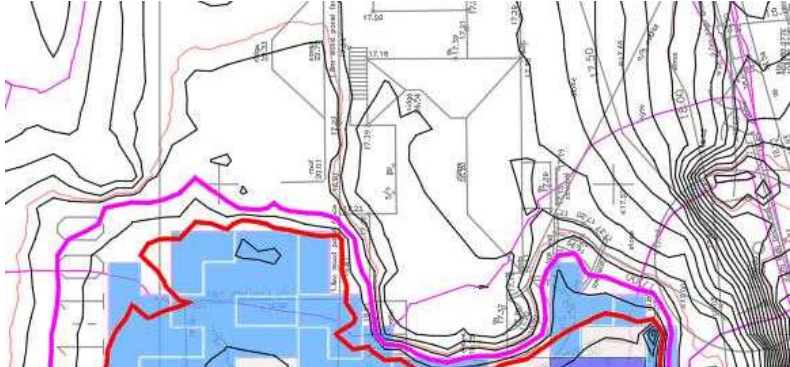
At highway-access interface, solid brick wall, threshold levels act as physical controls that the driveway threshold provides an additional drainage conditions.

Road has been removed through localisation. based on this localised interpretation of flow extent from 1.4 ha to 0.48 ha.



ch

with Hampshire guidance, to represent the
oe set, to ensure proposed flooding does not
flooding to neighbouring properties. The EA
derstand the maximum flood levels.



on Contours

erlaid against LiDAR data. These do not align

Geotechnical investigation

Geotechnical investigation was undertaken at the site, including two soakaway tests. The brief report is included at the end of this Technical Note.

Key findings indicate that the site is underlain by Portsmouth Chalk deposits with relatively high permeability, typically in the order of 1×10^{-1} to 1×10^{-3} . During soakaway testing, the inflow rate was approximately 15 L/s, with no noticeable increase in water level within the trial pit, indicating rapid infiltration into the underlying chalk strata.

Overlying the chalk is heterogeneous made ground comprising head deposits, gravelly, sandy and clayey soils, clay lenses, and material associated with previous site activities. Permeability testing undertaken within one localised lens returned results of approximately 3.59×10^{-5} during the first test and 1.79×10^{-5} during the second test.

The variation between the two tests, together with the heterogeneous nature of the made ground, indicates that local permeability conditions are likely to vary significantly across the site depending on the composition and distribution of granular and cohesive materials. Accordingly, the test results should be considered representative only of the specific locations tested and may not be directly representative of ground conditions elsewhere on site.

Catchment calculations

The following data was used to build up the catchment in Causeway Flow.

- Overall catchment size: 0.48ha
- Impermeable areas
 - External contribution 0.093ha (hard standing outside red line boundary)
 - Additional 0.032ha (hard standing inside red line boundary)
- CV – 1.0
- Climate change – 40%
- Infiltration rate: 3×10^{-4} (highly permeable, good quality chalk, subject to BRE365 tests)
 - Safety factor 3.0



been considered in relation to the distance flow is not concentrated and is dispersed may be relaxed, as flows would be similar to

ended as a SuDS feature for rare exceedance or very infrequently, if ever. Under normal garden and not as a dedicated infiltration

Rainfall	Depth of water (m)	Max level(mAOD)	Water stored
1-in-2 year +40% CC	0.142	16.142	16.50 m ³
1-in-10 year +40% CC	0.265	16.265	33.91 m ³
1-in-30 year +40% CC	0.347	16.347	47.11 m ³
1-in-50 year +40% CC	0.384	16.384	53.55 m ³
1-in-100 year +40% CC	0.435	16.435	62.84 m ³
1-in-200 year +40% CC	0.488	16.488	73.20 m ³

Figure 26 - Causeway results summary

Above table shows a very conservative upper bound estimate based on drainage failure, and zero ground infiltration, until water reaches the infiltration basin. In reality, the following processes will significantly reduce the volume of runoff reaching the basin:

- Overland flow across permeable garden areas, allowing continuous infiltration during routing
- Presence of gravel margins and unbound surfaces, which provide higher infiltration capacity than typical soils
- Sheet flow conditions across relatively shallow gradients, increasing residence time and infiltration opportunity
- Surface roughness and vegetation, which slow runoff and promote localised ponding and infiltration
- Highly permeable chalk substrate, enabling rapid vertical drainage once water enters the ground profile
- Distributed flow pathways, reducing the likelihood of concentrated, efficient conveyance to the basin

Cv unknowns

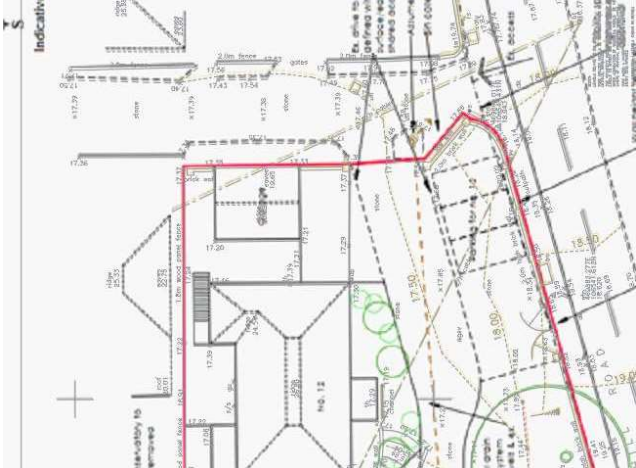
Taking these factors into account, it is appropriate to apply a reduction in runoff coefficient (Cv) from the conservative value of 1.0 to a range of approximately **0.15 to 0.60** reflecting the combined effects of infiltration and attenuation across the site. This equates to an overall volume reduction of

and shallow infiltration basin and applying a
ble or grass areas.

ed long-term performance, with no recorded
roximately 50 years, further supporting the
tenuation significantly limit surface runoff

indicatively to demonstrate position and land

- Infiltration and attenuation across permeable soils, gravel surfaces, and highly permeable chalk reduce the effective runoff coefficient to the basin from 1.0 to approximately 0.15–0.6, equating to a 40–85% reduction in runoff volume.
- The calculated reduction in runoff generation and conveyance pathways provides an explanation for why surface water flooding has not been observed at the site over approximately 50 years, despite exposure to intense rainfall events.



Indication

isions are as follows:
scale representation and is not fully supported

Appendix B – Geotechnical Report with Infiltration Testing Results

BY EMAIL ONLY

27th April 2026

Our Ref: LS9237

Donnager Civil Engineering
20-22 Wenlock Road,
London, N1 7GU



Unit 10, 19 Albert Drive, Burgess Hill,
West Sussex, RH15 9TN

T: 01444 882 084
w: www.landscience.co.uk
e: info@landscience.co.uk

Dear Sir

RE: 365BRE Soakage testing - 12 PORTSDOWN HILL ROAD, HAVANT PO9 3JX

Land Science was instructed to undertake 2no. trial pits to perform BRE365 soakage testing at 12 Portsdown Hill Road, Havant, PO9 3JX, on 17th April 2026.

Scope of work

The trial pits were excavated using a mechanical excavator to a depth of 2.90m and 1.10m to perform BRE365 soakage testing in each trial pit to determine the permeability of different strata at various depths, following client's request. Visual identification and a logging description (see appendix A) of the ground conditions encountered was also carried out.

Soakage testing

Trial pits 1 and 2 were excavated for soakage testing and measured 3000mm long, 450mm wide and 2900mm deep, and 1200mm long, 450mm wide and 1100mm deep respectively.

The layer tested at TP01 was the Portadown Chalk Formation (ranging between 1.45 to 2.90mbgl). 2000lt of water was used to fill the response zone, using a 150mm diameter hose. The bowser was emptied after approximately 5min, and no measurable rise in water level was observed, indicating an estimated permeability to be in the range of 10^{-1} to 10^{-3} m/s.

Soakage testing at TP02 was carried out to determine the permeability of the shallow deposits of Chalk (from 0.35 to 0.90mbgl) and Head (from 0.90 to 1.10mbgl). The results are presented in appendix A. The calculated permeability was 3.59×10^{-5} and 1.79×10^{-5} in the two tests carried out.

It should be noted that both tests carried out in TP02 were predominantly influenced by the chalk horizon. Below the chalk, the underlying clay exhibited significantly lower permeability. As a result, the permeability of the Head deposits may be lower than the values obtained from these tests.

Kind regards
For and on Behalf of Land Science

ALEJANDRO RODRIGUEZ B.Sc., M.Sc.
Senior Geotechnical Engineer



APPENDIX A

Machine : Mechanical excavator	Dimensions 3000mm long, 450mm wide and 2900mm deep.	Ground Level (mOD)	Client Donnager Civil Enginnering	Job Number LS9237
Method : Trial Pit	Location Rear garden	Dates 17/04/2026	Project Contractor Land Science	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						Brown, sandy, SILT, blended with some rootlets. Fine sand. (TOPSOIL)		
					0.35	Firm brown, sandy, gravelly, SILT, blended with scattered brick fragments. Gravels are chalk (medium to high density) and flints, fine to cobble size, angular to subrounded (MADE GROUND)		
					0.50	...Thin layer of black CLAY, between 0.70 to 0.80mbgl.		
					0.85	Interbedded layer of off-white sandy, GRAVEL CHALK (Grade Dc) and soft-firm, brown, gravelly, CLAY. Gravels are chalk (medium to high density) and flints, angular to subrounded. (HEAD)		
					1.45	Dense, off-white, sandy, GRAVEL CHALK (Grade Dc), blended with scattered lumps of brown plastic CLAY. Gravels of high density are fine to cobble size. Angular to subrounded. (PORTSDOWN CHALK FORMATION)		
					2.90	Complete at 2.90m		



Remarks GROUNDWATER: None encountered. STABILITY: Stability during the excavation and soakage testing. BACKFILL: Backfilled with arisings.		
Scale (approx) 1:25	Logged By AR	Figure No. LS9237.HP01

Machine : Mechanical excavator Method :	Dimensions 1200mm long, 450mm wide and 1100mm deep.	Ground Level (mOD)	Client Donnager Civil Engineering	Job Number LS9237
	Location Back garden	Dates 17/04/2026	Project Contractor Land Science	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						Black silty Clay, blended with many rootlets and occasional brick fragments. (TOPSOIL)		
					0.35	Medium dense, off-white, silty, sandy, GRAVELS (Grade Dc). Gravels of chalk of high density and flintstones. Rounded to sub angular. Fine to cobble size.		
					0.55			
					0.90	Soft to firm, brown CLAY. (HEAD)		
					1.10	Complete at 1.10m		



Remarks GROUNDWATER: None encountered. STABILITY: Stability during the excavation and soakage testing. BACKFILL: Backfilled with arisings.		
Scale (approx) 1:25	Logged By AR	Figure No. LS9237.HP02

Site : 12 Portsdown Hill Road, Havant, PO9 3JX

Client : Donnager Civil Engineering

Project Contractor
: Alex Rodriguez

Job Number
LS9237

Sheet
1 / 1

Location	Date	Level	Location
HP02	17/04/2026		Rear Garden

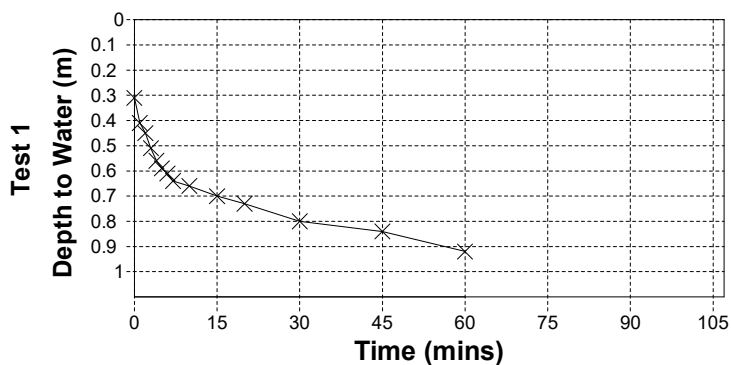
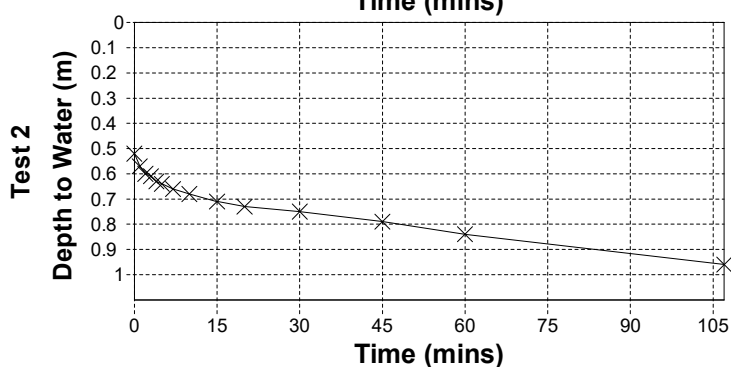
Pit Width (m)	0.45
Pit Depth (m)	1.10
Pit Length (m)	1.20

Soil type at test level	Chalk
Groundwater	
Drain discharge depth	
Sidewall stability	Yes
Stone filled or open pit	Open pit

	1	2
Effective depth (m)	0.79	0.58
Volume outflowing between 75% & 25% (m3)	0.21	0.16
Mean surface area through which outflow occurs (m2)	1.84	1.50
Time for outflow between 75% & 25% (min)	53.76	97.29
SOIL INFILTRATION RATE (ms-1), f	3.59E-5	1.79E-5

Remarks

Elapsed time (mins)	Depth to Water Test 1	Depth to Water Test 2
0	0.31	0.52
1	0.41	0.57
2	0.45	0.60
3	0.51	0.61
4	0.56	0.63
5	0.59	0.64
6	0.61	
7	0.64	0.66
10	0.66	0.68
15	0.70	0.71
20	0.73	0.73
30	0.80	0.75
45	0.84	0.79
60	0.92	0.84
107		0.96



Appendix C – Environment Agency and Portsmouth Water correspondence

Catchment_Management <catchment.management@portsmouthwater.co.uk >

Fri, 08 May 2026 12:32:56 PM +0100

To " ", "Catchment_Management"
<catchment.management@portsmouthwater.co.uk>

Hi Vlad,

We have reviewed your email, and we support the response from the EA (Tom Wickens). We have no objection in principle to the use of SuDS, though we would require further information on the design and capability of the bioretention system.

The main risk is what is the quality of the surface water i that is being discharged into the bioretention system is able to treat it and no cause any risks to groundwater quality.

Kind Regards,

Sophie

Sophie Emms | Catchment Management Officer
Portsmouth Water

Sophie Emms BSc Hons
Tel: Mobile: 07545 928070
Web: portsmouthwater.co.uk

Excellence | Integrity | Future Focus

08:30 – 16:45 Mon - Thurs

08:30 – 16:00 Friday

Small changes make big impact.

Please consider the environment before printing this email.

From: Vlad

Sent: 07 May 2026 13:07

To: Catchment_Management <catchment.management@portsmouthwater.co.uk>

Subject: [EXTERNAL] Fwd: RE: 260423/PB12 Development in SPZ1 - 12 Portsdown Hill Road, PO9 3JZ

CAUTION: This email originated from outside Portsmouth Water.

Do not click links or open attachments unless you recognise the sender and are confident the content is safe.

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Use the Phish Alert Button in Outlook (envelope with a hook icon).

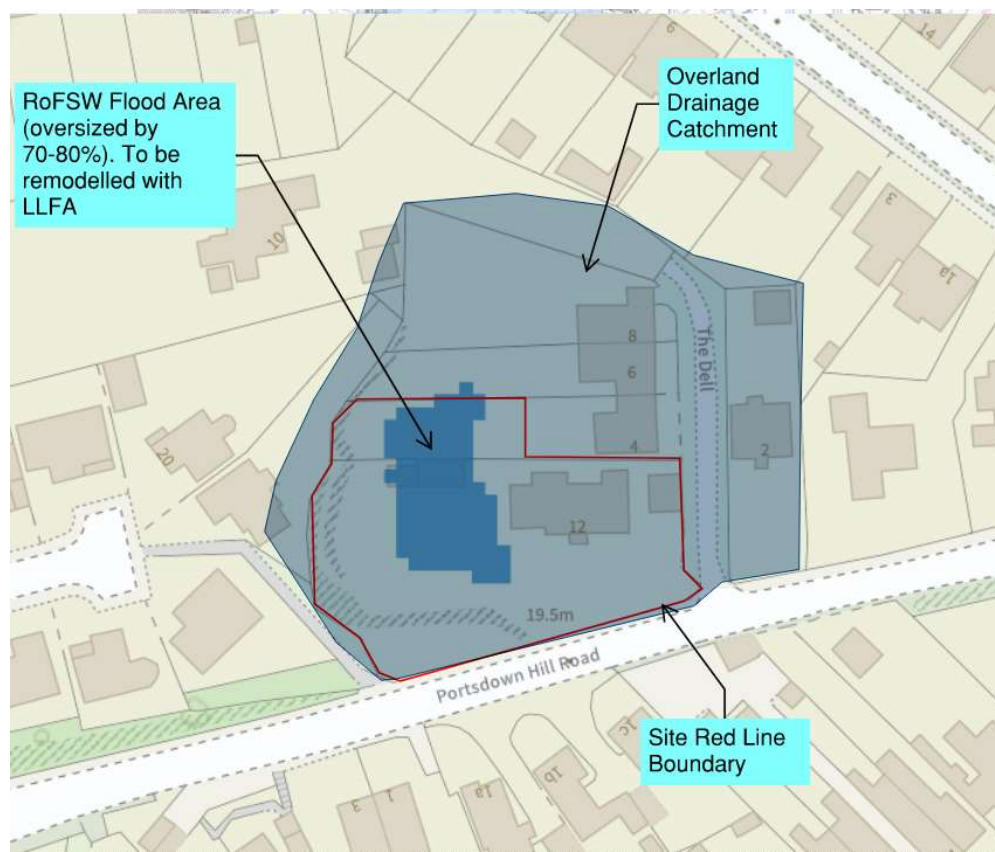
If you cannot find the button, [watch this short guide](#).

Hello,

Environment Agency recommended we reach out to Portsmouth Water regarding the unusual questions related to a proposed site within SPZ1 over a Principal Aquifer: This is not standard development question, please read to the end, as this relates specifically to natural overland surface water flows which we cannot control but is geographically located on our site.

Original email and Environment Agency response in in papertrail below.

The site is a historic chalk pit forming a local low point, which receives overland runoff from surrounding land and drains rapidly into the underlying chalk. The Surface Water Flood Risk map from Flood Maps for Planning is shown below. We are currently working with the LLFA to refine the flood modelling as local features significantly reduced catchment size to that shown on the EA maps. We estimate the contributing catchment area is approximately 0.5 ha, with the site itself being around 0.15 ha.



Geotechnical investigation found highly permeable chalk with infiltration capacity exceeding 1×10^{-3} m/s. This is overlain by around 1.5m of superficial, variable made ground and patchy clay lenses, which are not continuous and allow rapid drainage into the underlying chalk.

We are considering formalising flood storage by reshaping the flood area, and replacing approximately 1m of existing made ground with engineered bioretention soils in accordance with CIRIA SuDS principles.

Could you advise whether the Portsmouth Water would follow Environment Agency recommendations in principle: The objective of replacing made ground with a dedicated SuDS treatment layer (engineered bioretention soils) or whether this would typically raise groundwater protection concerns? The alternative option would be to leave existing made ground unchanged.

Kind Regards,

Vlad Myrsikov

Director



20-22 Wenlock Road, London, N1 7GU

Tel: 020 3488 0590

www.donnager.uk

Company #: 12648484

===== Forwarded message =====

From: SSD Groundwater Protection <SSDGroundwaterProtect@environment-agency.gov.uk>

To: [REDACTED]

Cc: "SSD Enquiries" <SSDEnquiries@environment-agency.gov.uk>

Date: Tue, 05 May 2026 13:04:29 +0100

Subject: RE: 260423/PB12 Development in SPZ1 - 12 Portsdown Hill Road, PO9 3JZ

===== Forwarded message =====

Hi Vlad,

Sorry for the delay in responding on this matter.

The site is located within SPZ1 for the Havant and Bedhampton Springs public water supply abstraction. These springs are of critical importance to the regional water supply, providing water to Portsmouth, and I believe they are the largest public spring supply in the UK. They are also particularly susceptible to pollution due to rapid groundwater transit in the Chalk in this area, associated with karstic flow mechanisms. The springs are managed by Portsmouth Water and, as such, require a very high level of protection.

Having reviewed your proposal, I do not consider that we would have any automatic objection to the use of a dedicated SuDS treatment layer, such as engineered bioretention soils. However, we would require further details of any proposed treatment layer before being able to agree the approach.

We would welcome the removal of potentially contaminated made ground or waste material, but it would be essential to ensure that any dedicated SuDS treatment layer has negligible leachate generation potential. For example, if waste-derived compost is proposed within the soil profile, we would need to be satisfied that pesticide and nutrient concentrations are sufficiently low to pose no leaching risk. This may require additional leachate testing of the compost material (or any other materials used within the soils).

We would also recommend that you engage directly with Portsmouth Water regarding the proposal, as they manage the springs, and may have additional concerns.

The relevant team to contact is the Catchment Management Team (email address below).

Catchment_Management catchment.management@portsmouthwater.co.uk

Kind Regards

Tom

Tom Wickens

Technical Specialist - (Groundwater Quality and Contaminated Land)
Solent and South Downs
Environment Agency

Romsey Office, Canal Walk, Romsey ,Hampshire,SO51 8DU
Tel - 07867 200775

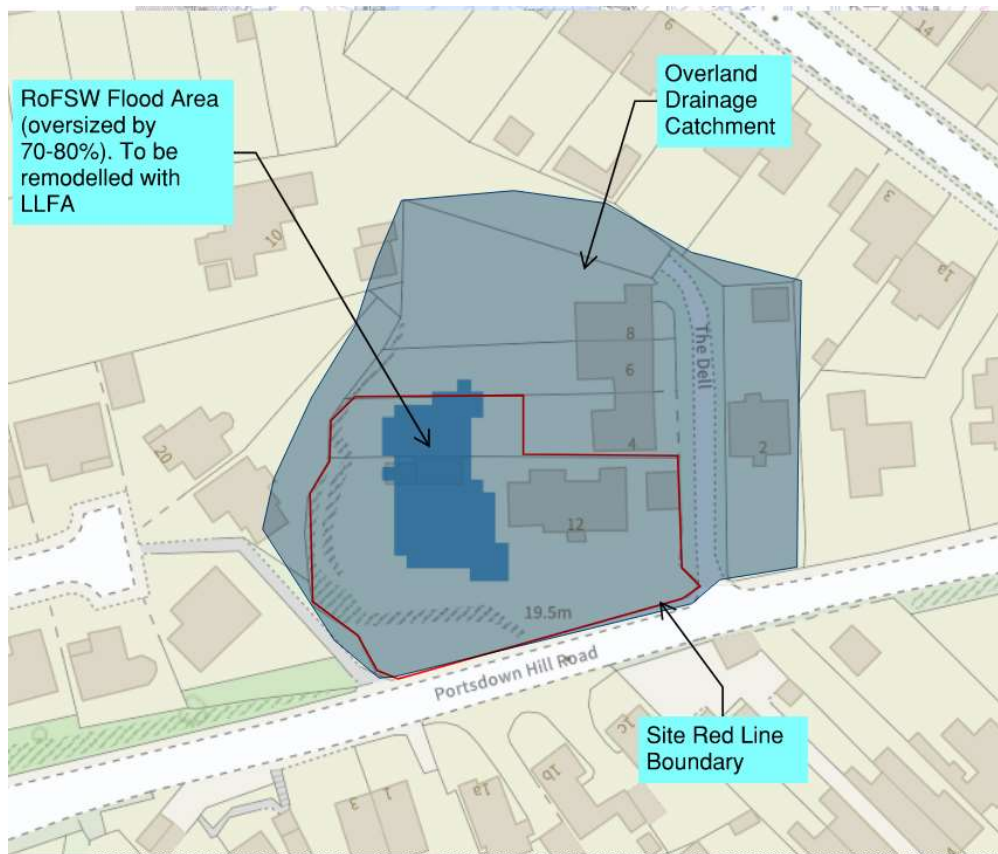
tom.wickens@environment-agency.gov.uk

From: Vlad [REDACTED]
Sent: 22 April 2026 15:28
To: Enquiries, Unit <enquiries@environment-agency.gov.uk>
Subject: 260423/PB12 Development in SPZ1 - 12 Portsdown Hill Road, PO9 3JZ

Hi,

I have a slightly unusual question relating to a proposed site within SPZ1 over a Principal Aquifer. Please read to the end, as this relates specifically to natural overland surface water flows which we cannot control, rather than a standard development drainage question.

The site is a historic chalk pit forming a local low point, which receives overland runoff from surrounding land and drains rapidly into the underlying chalk. The Surface Water Flood Risk map from Flood Maps for Planning is shown below. We are currently working with the LLFA to refine the flood modelling. The contributing catchment area is approximately 0.5 ha, with the site itself being around 0.15 ha.



Geotechnical investigation found highly permeable chalk with infiltration capacity exceeding 1×10^{-1} m/s. This is overlain by around 1.5m of superficial, variable made ground and patchy clay lenses, which are not continuous and allow rapid drainage into the underlying chalk.

We are considering formalising flood storage by reshaping the flood area, and replacing approximately 1m of existing made ground with engineered bioretention soils in accordance with CIRIA SuDS principles.

Could you advise whether the Environment Agency would generally support, in principle, the objective of replacing made ground with a dedicated SuDS treatment layer (engineered bioretention soils) or whether this would typically raise groundwater protection concerns? The alternative option would be to leave existing made ground unchanged.

Kind Regards,

Vlad Myrsikov
Director

DONNAGER
CIVIL ENGINEERING

20-22 Wenlock Road, London, N1 7GU
Tel: 020 3488 0590

www.donnager.uk

Company #: 12648484

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Appendix D – Southern Water Sewer Records

