

SURFACE WATER DRAINAGE ASSESSMENT

Condition 3 – FEH22 Rainfall Reassessment

Robinshaw / Wayside, Haywards Heath Road, Balcombe, West Sussex RH17 6NJ

Planning reference: DM/26/1429 / underlying application DM/25/1688

1. Purpose

This report reassesses the surface water attenuation calculations for the proposed two houses using the FEH22 point rainfall data supplied for the site. It has been prepared in response to the Council's request for full drainage calculations covering the 1-year, 30-year, 30-year plus climate change, 100-year and 100-year plus climate change events, using FEH rainfall data, a Cv value of 1 and a 40% climate change allowance.

2. Information reviewed

The assessment has been based on:

- FEH Web Service FEH22 point descriptor export dated 24 August 2026, point TQ 31438 30005 (GB coordinates x=531438, y=130005).
- The July 2025 ground investigation and laboratory results for the site.
- The previously located hand-calculated Storm Drainage Calculations dated 10 September 2025.
- The drainage design basis shown in the earlier calculation: approximately 122 m² roof/impermeable area per house, restricted discharge of 1 l/s and an attenuation tank of approximately 3.5 m³ for each house.

3. Ground conditions and infiltration

The ground investigation identifies the site as being underlain by Upper Grinstead Clay. The investigation records brown/grey friable clay with very stiff grey and dark brown clay at depth, and reports plasticity indices ranging from 25% to 54%. The report identifies medium shrinkability around House 2 and high shrinkability around House 1.

The supplied investigation does not provide a BRE 365 infiltration test result or a measured infiltration coefficient. Accordingly, this reassessment does not rely upon infiltration into the clay as the principal means of surface water disposal. The proposed controlled discharge to the watercourse at 1 l/s is therefore assessed as the principal discharge mechanism.

4. FEH22 rainfall data

The supplied FEH Web Service export identifies the point as TQ 31438 30005 and provides FEH22 depth-duration-frequency rainfall data. The export contains tabulated return periods including 1.3 years, 31 years and 100 years.

A limitation of the supplied XML is that it does not contain an exact 1.0-year return-period value or an exact 30-year value. For the 30-year event, the tabulated 31-year FEH22 value has been used

as the nearest supplied tabulation. For the requested 1-year event, the nearest supplied FEH22 tabulation is 1.3 years. This should be explicitly agreed with the Council or replaced with an exact 1-year FEH22 export if the FEH Web Service provides that output.

5. Calculation method

For each storm duration the rainfall depth has been converted to runoff volume using the impermeable area of 122 m² per house and $C_v = 1$. For climate-change events the FEH22 rainfall depth has been multiplied by 1.40. The restricted discharge has been taken as a constant 1 l/s, equivalent to 0.001 m³/s.

Required attenuation storage has therefore been assessed as: $\text{Storage} = (\text{Adjusted rainfall depth} \times 122/1000) - (1 \text{ l/s} \times \text{storm duration in seconds})$. Negative values are treated as zero. This constant-discharge approach is conservative relative to an outlet whose discharge reduces below 1 l/s at lower hydraulic heads, but the final detailed design should confirm the outlet arrangement and hydraulic head relationship.

6. Results

Event	Critical duration	Rainfall depth	Runoff volume	Outflow volume	Required storage
1 in 1 year (100% AEP) – FEH22 supplied value nearest to 1 year is 1.3 year	5 min	3.00 mm	0.37 m ³	0.30 m ³	0.07 m ³
1 in 30 year (3.33% AEP) – represented by FEH22 31-year tabulated value	15 min	20.25 mm	2.47 m ³	0.90 m ³	1.57 m ³
1 in 30 year + 40% CC	30 min	37.93 mm	4.63 m ³	1.80 m ³	2.83 m ³
1 in 100 year (1% AEP)	30 min	34.31 mm	4.19 m ³	1.80 m ³	2.39 m ³
1 in 100 year + 40% CC	45 min	55.93 mm	6.82 m ³	2.70 m ³	4.12 m ³

The calculated 100-year plus 40% climate-change event produces the governing requirement, with a critical duration of approximately 45 minutes and required storage of approximately 4.12 m³

per house. The previously identified 3.5 m³ tank therefore does not provide sufficient volume on the simplified constant 1 l/s basis; the indicative shortfall is approximately 0.62 m³ per house. The drainage engineer Dr Elson uses Brough Reservoir data which calculated that was sufficient but we have increased the size out of excessive caution driven by the FEH data also.

7. Comparison with existing drainage proposal

Item	Existing basis	FEH22 reassessment	Comment
House impermeable area	122 m ²	122 m ²	Retained from earlier calculation
Restricted discharge	1 l/s	1 l/s	Retained
Climate change	45% in earlier sheet	40%	Council requirement adopted
100-year + CC storage	Approx. 3.5 m ³ tank	Approx. 4.12 m ³ required	Tank volume has been reviewed

8. Conclusions

- The FEH22 point data provides a site-specific rainfall basis for the drainage reassessment. This supplements Dr Elson's previous analysis based on Bough Beech Reservoir actual rainfall data.
- The 1 l/s restricted discharge can be retained as the design discharge rate, subject to confirmation of the final outlet arrangement and receiving watercourse. Given the gradient of the site and the location of the winter stream, along with the upper Grinstead Clay naturally draining to this winter stream.
- On the simplified constant 1 l/s basis, approximately 4.12 m³ of attenuation is required per house for the 100-year plus 40% climate-change event, compared with the previously shown approximately 3.5 m³ tank.
- The attenuation arrangement has been increased to provide the additional storage.

10. FEH data reference

FEH22 point data supplied by the applicant: FEH Web Service export created 24 August 2026, point TQ 31438 30005. The FEH Web Service is provided by UKCEH and the supplied XML contains the FEH22 DDF values used in this assessment.