

## Document Information

|                    |                                                             |
|--------------------|-------------------------------------------------------------|
| Project            | C&S Energy BESS                                             |
| BIM Reference      | MJF-JBA-XX-XX-CA-D-0002-Greenfield_Runoff_Rate_Calculations |
| Status             | A2                                                          |
| Revision           | P02                                                         |
| Calculation Title  | Greenfield Runoff Rate Calculations                         |
| No. of Calc Sheets | 2                                                           |

## Purpose of Calculations

These calculations aim to determine the  $Q_{bar}$  (the peak rate of flow from a catchment for the mean annual flood) greenfield runoff rate.

The result of this will provide the maximum outflow rate the site can discharge into local watercourses.

## Calculation Control & Revisions

| Revision | Date       | Description                     | Originator | Checker | Approver |
|----------|------------|---------------------------------|------------|---------|----------|
| P01      | 05.08.2024 | Calculation export              | GW         | WD      | JP       |
| P02      | 20.09.2024 | Review following layout changes | SC         | WD      | JP       |

|                |                   |
|----------------|-------------------|
| Calculated by: | Saffron Catterick |
| Site name:     | C&S Energy Bess   |
| Site location: | Cellarhead        |

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.

## Site Details

|            |                   |
|------------|-------------------|
| Latitude:  | 53.04412° N       |
| Longitude: | 2.07824° W        |
| Reference: | 1339067176        |
| Date:      | Sep 12 2024 08:54 |

## Runoff estimation approach

FEH Statistical

## Site characteristics

|                       |      |
|-----------------------|------|
| Total site area (ha): | 2.45 |
|-----------------------|------|

## Methodology

|                                             |                             |
|---------------------------------------------|-----------------------------|
| Q <sub>MED</sub> estimation method:         | Calculate from BFI and SAAR |
| BFI and SPR method:                         | Specify BFI manually        |
| HOST class:                                 | N/A                         |
| BFI / BFIHOST:                              | 0.44                        |
| Q <sub>MED</sub> (l/s):                     |                             |
| Q <sub>BAR</sub> / Q <sub>MED</sub> factor: | 1.12                        |

## Hydrological characteristics

|                                | Default | Edited |
|--------------------------------|---------|--------|
| SAAR (mm):                     | 911     | 911    |
| Hydrological region:           | 4       | 4      |
| Growth curve factor 1 year:    | 0.83    | 0.83   |
| Growth curve factor 30 years:  | 2       | 2      |
| Growth curve factor 100 years: | 2.57    | 2.57   |
| Growth curve factor 200 years: | 3.04    | 3.04   |

## Notes

### (1) Is $Q_{\text{BAR}} < 2.0 \text{ l/s/ha}$ ?

When  $Q_{\text{BAR}}$  is  $< 2.0 \text{ l/s/ha}$  then limiting discharge rates are set at  $2.0 \text{ l/s/ha}$ .

### (2) Are flow rates $< 5.0 \text{ l/s}$ ?

Where flow rates are less than  $5.0 \text{ l/s}$  consent for discharge is usually set at  $5.0 \text{ l/s}$  if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

### (3) Is $\text{SPR}/\text{SPRHOST} \leq 0.3$ ?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

|                               |  |       |
|-------------------------------|--|-------|
| <b>Q<sub>BAR</sub> (l/s):</b> |  | 17.87 |
| <b>1 in 1 year (l/s):</b>     |  | 14.83 |
| <b>1 in 30 years (l/s):</b>   |  | 35.75 |
| <b>1 in 100 year (l/s):</b>   |  | 45.93 |
| <b>1 in 200 years (l/s):</b>  |  | 54.33 |

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at [www.uksuds.com](http://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 [www.uksuds.com/terms-and-conditions.htm](http://www.uksuds.com/terms-and-conditions.htm). The outputs from this tool are estimates of 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, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.