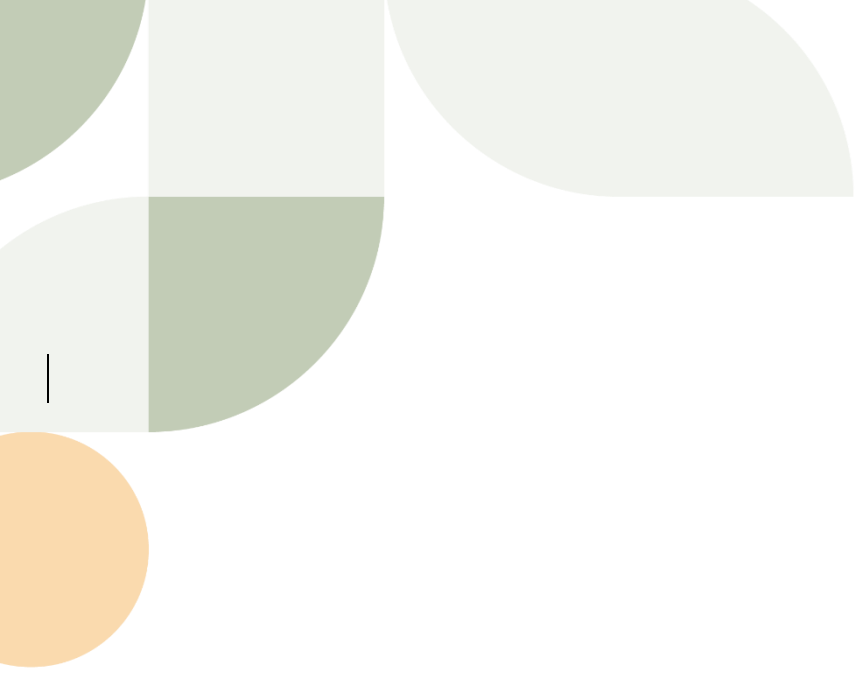




Lime Down

Solar Park

Environmental Statement

Volume 3, Appendix 11-8: Flood Risk Assessment and Outline Drainage Strategy – Lime Down E2 (Tracked)

[August 2026](#)

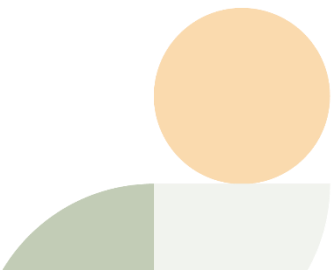
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Appendix 11-8: Flood Risk Assessment and Outline Drainage Strategy – Lime Down E2

For: Lime Down Solar Park Ltd

Site: Lime Down Solar Park

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1. Site Details

1.1.1 The aim of this section of the report is to outline key environmental information associated with the baseline environment of Lime Down E2.

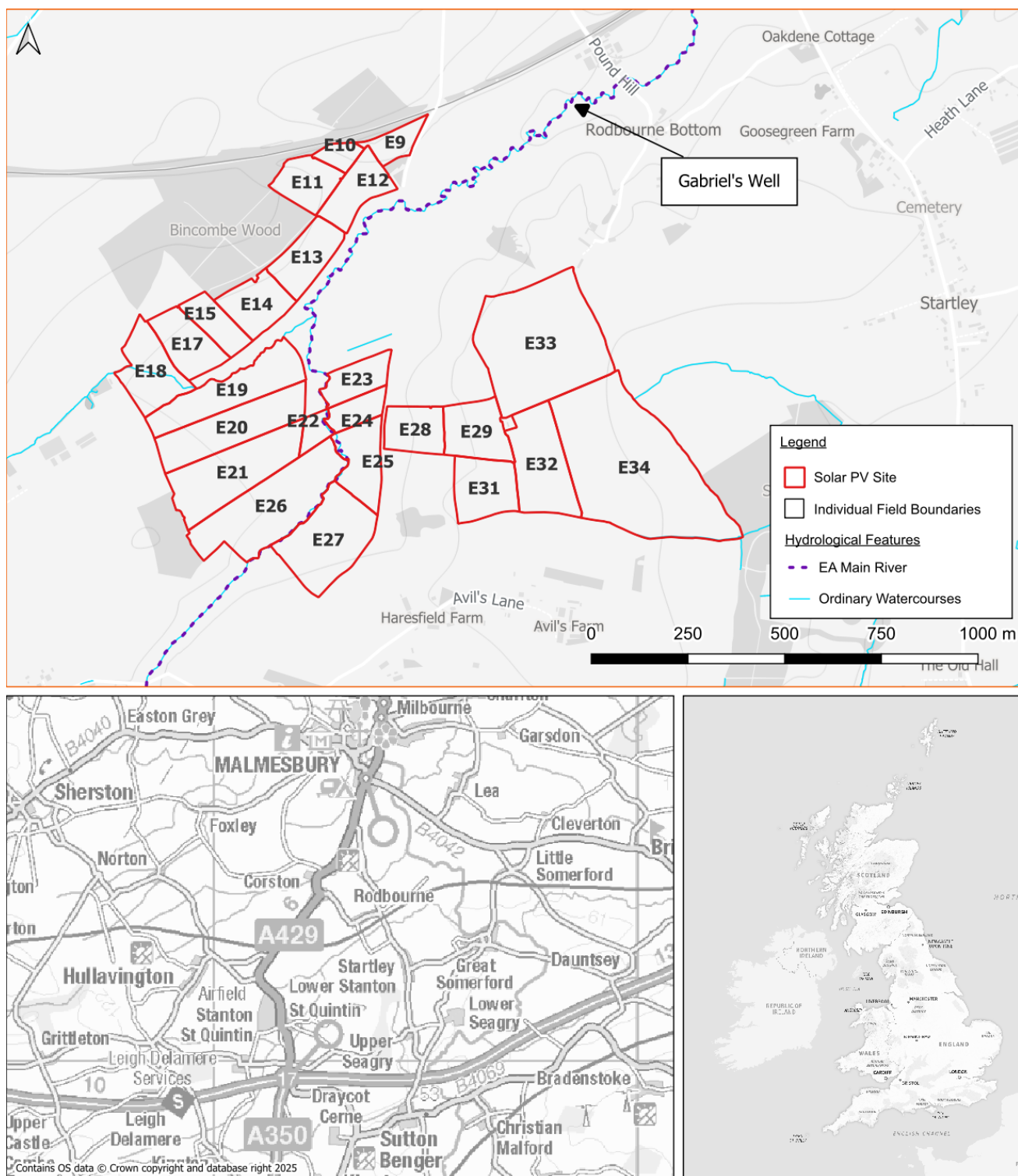


Figure 1: Site Location

1.2 Site Location

1.2.1 Lime Down E2 located to the east of Stanton St Quintin in the north-west of Wiltshire County and is approximately 2km north of the M4. The national grid references are 392840E, 182670N (north), to 393770E, 181450N (south).

1.3 Existing Site Conditions

1.3.1 Online mapping (including Google Maps / Google Streetview imageryⁱ (accessed May 2025) shows that Lime Down E2 comprises agricultural / arable fields. Lime Down E2 is bordered by more rural land in all orientations. Access is provided via an unnamed access road off Pound Hill.

1.4 Topography

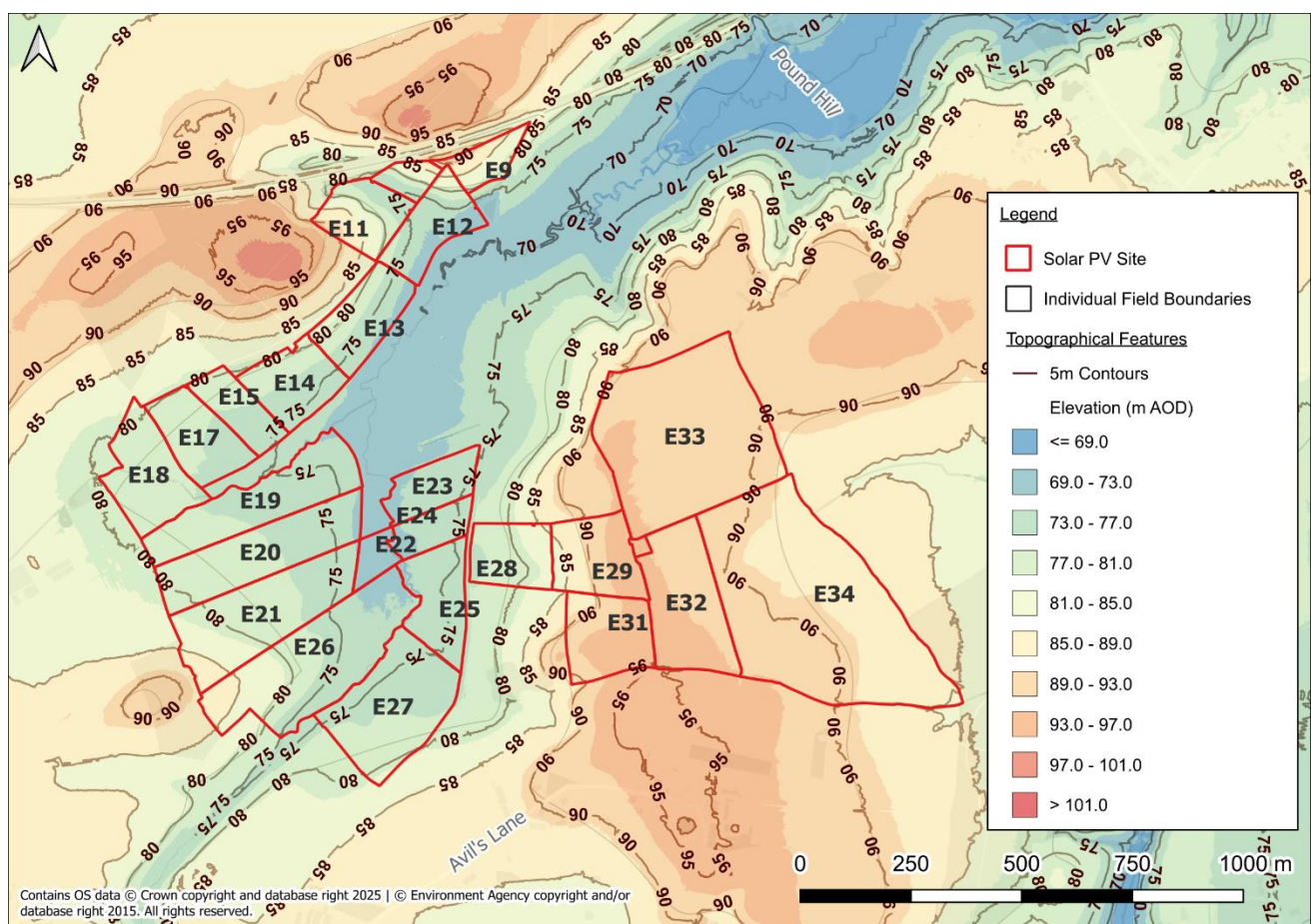


Figure 2: LiDAR Plan

1.4.1 Topographic levels to metres Above Ordnance Datum (m AOD) have been derived from a 1m resolution Environment Agency (EA) composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). A review of LiDAR ground elevation data shows that Lime Down E2 slopes from approximately 90m AOD in the south-west to approximately 72m AOD in the centre of Lime Down E2 before sloping in the northern sections to approximately 92.5m (Figure 2).

1.5 Hydrology

1.5.1 Gabriel's Well, a Main River is located through the centre of Lime Down E2, south-west to north. Gabriel's Well also has a tributary which runs from the western boundary in an eastward direction before joining Gabriel's Well in the central-western extent of Lime Down E2. Other watercourses in the area include two tributaries of an unnamed Ordinary Watercourse at the south-eastern boundary of Lime Down E2.

1.5.2 Main Rivers are within the jurisdiction of the Environment Agency (EA), whereas Ordinary Watercourses fall within the jurisdiction of the Wiltshire County Council Lead Local Flood Authority.

1.6 Water Framework Directive Status

1.6.1 Lime Down E2 is located within the Avon Bristol Rural Catchment, largely within the Rodbourne BK – source to conf R Avon (Brist) Water Body Catchment and partially within the Sutton Benger Bk – source to conf R Avon (Brist) Water Body Catchment.

1.6.2 The Rodbourne BK – source to conf R Avon (Brist) Water Body catchment has a Cycle 3 Ecological status of Moderate in 2019 and 2022 and a Failing chemical status in 2019 (no data in 2022). The Sutton Benger Bk – source to conf R Avon (Brist) Water Body catchment has a Cycle 3 Ecological status of Good in 2019 and 2022 and a Failing chemical status in 2019 (no data in 2022). A summary of the Water Body Classifications can be found in Annex A.

1.7 Geology

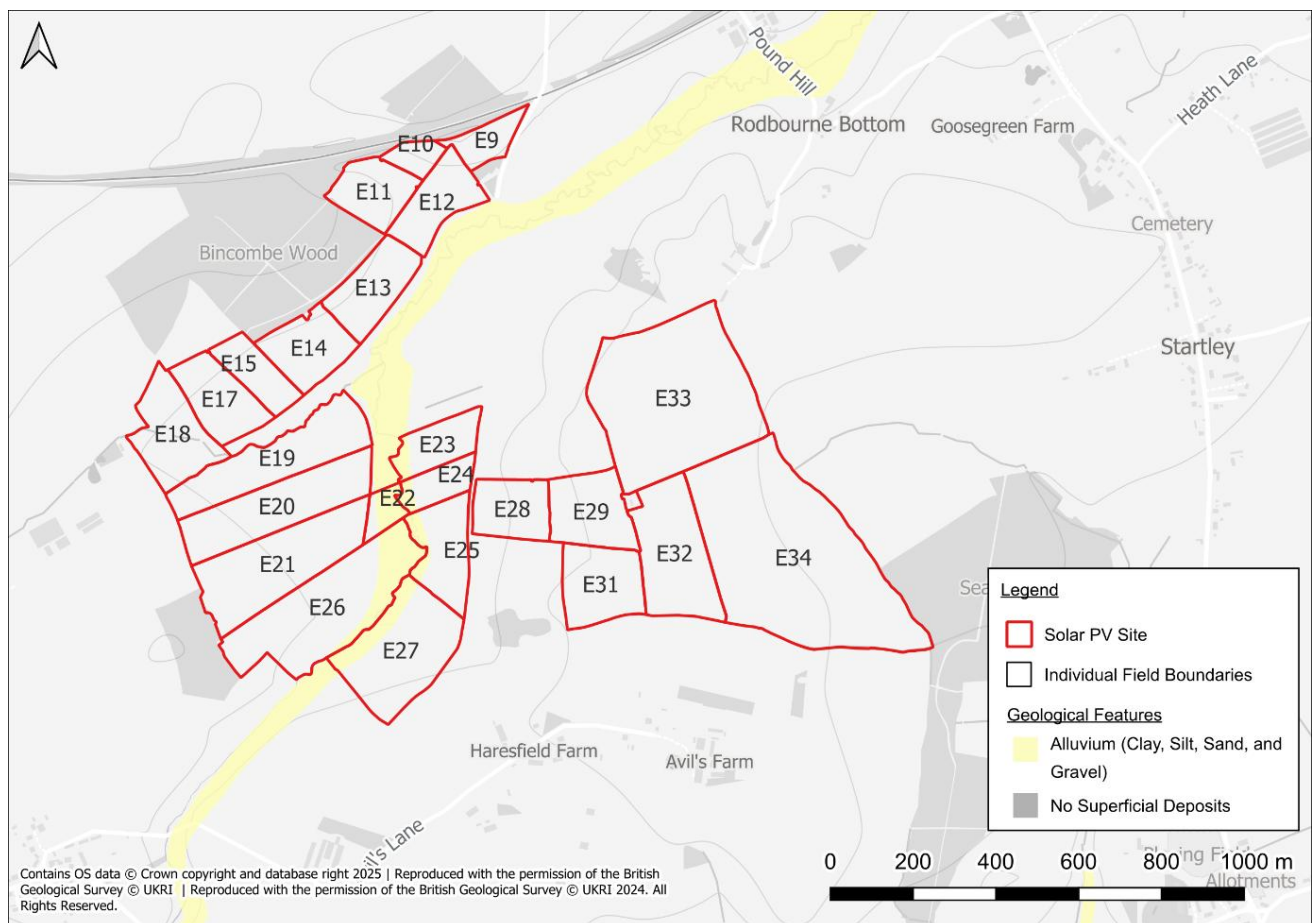


Figure 3: Superficial Deposits

- 1.7.1 Reference to the British Geological Survey (BGS) online mappingⁱⁱ (1:50,000 scale) indicates that Lime Down E2 is largely not underlain by superficial deposits, aside from an area of Alluvium, comprising clay, silt sand and gravel superficial deposits (see **Figure 3** for the deposit location).
- 1.7.2 Lime Down E2 is identified as being underlain by the following bedrock deposits (see **Figure 4** for the locations of the varying deposits):
- Kellyways Clay Member – Mudstone;
 - Kellways Sand Member – Sandstone and Siltstone, interbedded;
 - Cornbrash Formation – Limestone;
 - Forest Marble Formation – Mudstone; and
 - Oxford Clay Formation – Mudstone.
- 1.7.3 The geological mapping is available at a scale of 1:50,000 and as such may not be accurate on a site-specific basis.
- 1.7.4 There are no BGS boreholes at Lime Down E2 or within the immediate vicinity of Lime Down E2.

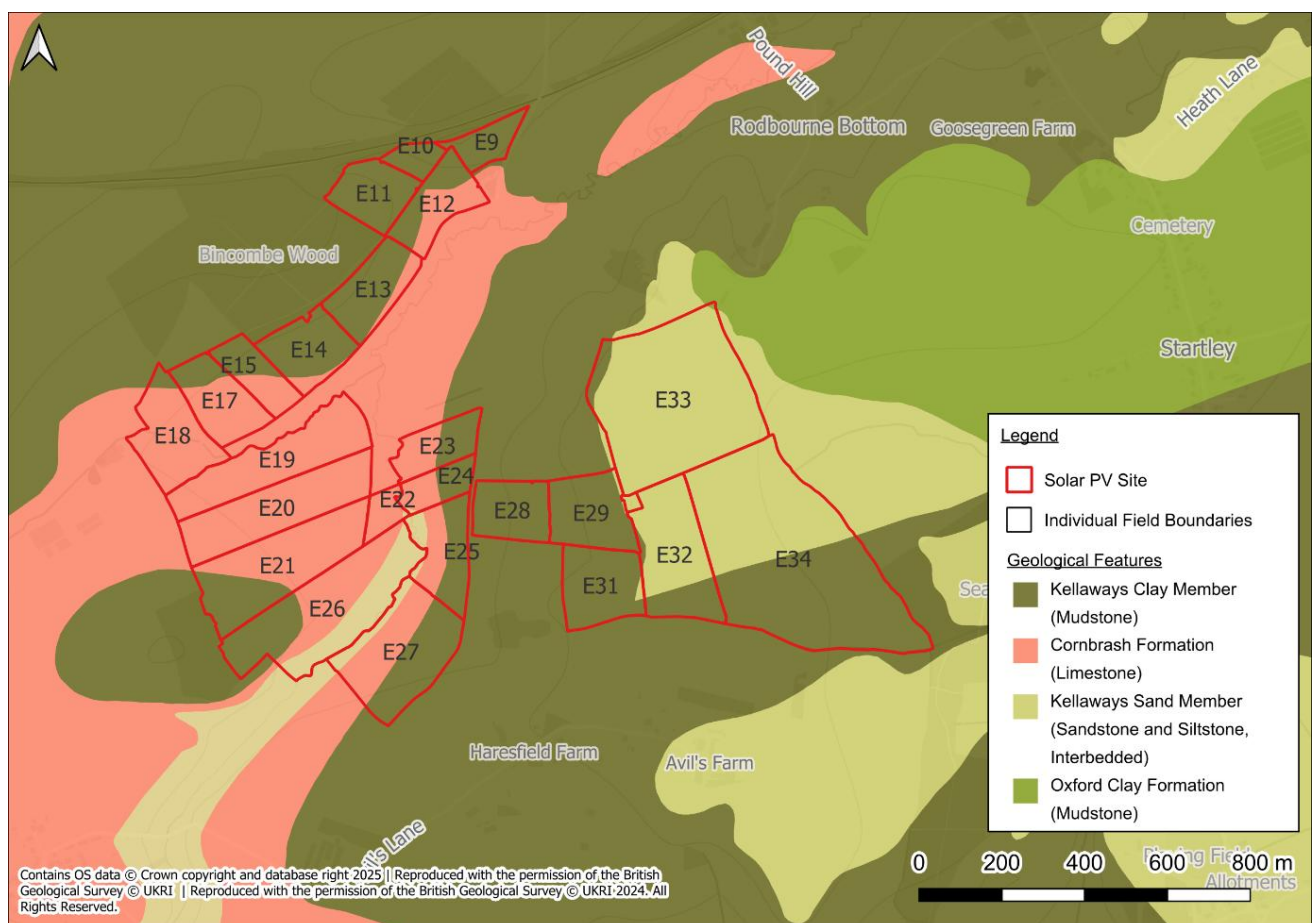


Figure 4: Bedrock Deposits

1.8 Hydrogeology

- 1.8.1 According to the EA's Aquifer Designation data, obtained from MAGIC Map's online mappingⁱⁱⁱ [accessed 02/06/25], the Alluvium Formation is described as a Secondary A Aquifer.
- 1.8.2 The underlying the Cornbrash Formation, Forest Marbie Formation and Kellaways Sand Member Deposits are classified as a Secondary A Aquifers. The Kellaways Clay Member and Oxford Clay Formation are classified as unproductive aquifers.
- 1.8.3 The EA's 'Source Protection Zones' data, obtained from MAGIC Map's online mapping [accessed 02/06/25], indicates that Lime Down E2 is located within a Groundwater Source Protection Zone (Zone I-Subsurface Activity).

1.9 Proposed Site Conditions

- 1.9.1 Lime Down E2 proposes a ground mounted solar photo-voltaic plant and associated electrical infrastructure and access. See Chapter 3: Scheme Description of the ES.
- 1.9.2 An **Outline Landscape and Ecological Management Plan (LEMP) [EN010168/APP/7.18]** has been developed to support the DCO application, and details that the vast majority of the Site is proposed to be utilised for Solar PV Pannels, supporting infrastructure, internal access and peripheral areas will comprise landscaped buffers in line with the embedded mitigation described throughout the ES.
- 1.9.3 The impermeable substation access roads are required to provide a robust, all weather access route to the compounds at Lime Down. These routes will need to accommodate exceptional loads associated with transformer delivery, installation and maintenance. The proposed transformers weights have individual weights of approximately 180-200tn, these loads will generate high axial loads to the load bearing track surface. In addition, these impermeable substation access tracks are needed for reliable year-round access/egress for emergency vehicles, including fire services. The use of the impermeable tracks in the substation route reflects both the operational requirements of the electrical infrastructure and the need to maintain a safe and resilient emergency access corridor throughout the lifespan of the project.

2. Assessment of Flood Risk

2.1.1 The aim of this section of the report is to assess and summarise the existing flood risk at Lime Down E2.

2.2 Tidal Flood Risk

2.2.1 Lime Down E2 is situated at a minimum of approximately 72m AOD and is significantly above sea level. Therefore, there is **Negligible** risk from tidal flooding.

2.3 Fluvial Flood Risk

2.3.1 According to the EA's Flood Map for Planning (updated in March 2025)^{iv}, Lime Down E2 is situated largely within Flood Zone 1 (meaning it is an area considered to have <0.1% annual probability of flooding from rivers or the sea) with the exception of Fields E20 – E27 which are located in Flood Zones 2 and 3. The extent of Flood Zone 3 is considered to be associated with Gabriel's Well (which flows in a north-easterly direction). Flood maps are included as Figure 5 below and **ES Volume 2, Figure 11-7: Lime Down E2 Fluvial and Surface Water Risk Map [EN010168/EXAM/6.2] (Rev 2)** produced at Deadline 3 of Examination

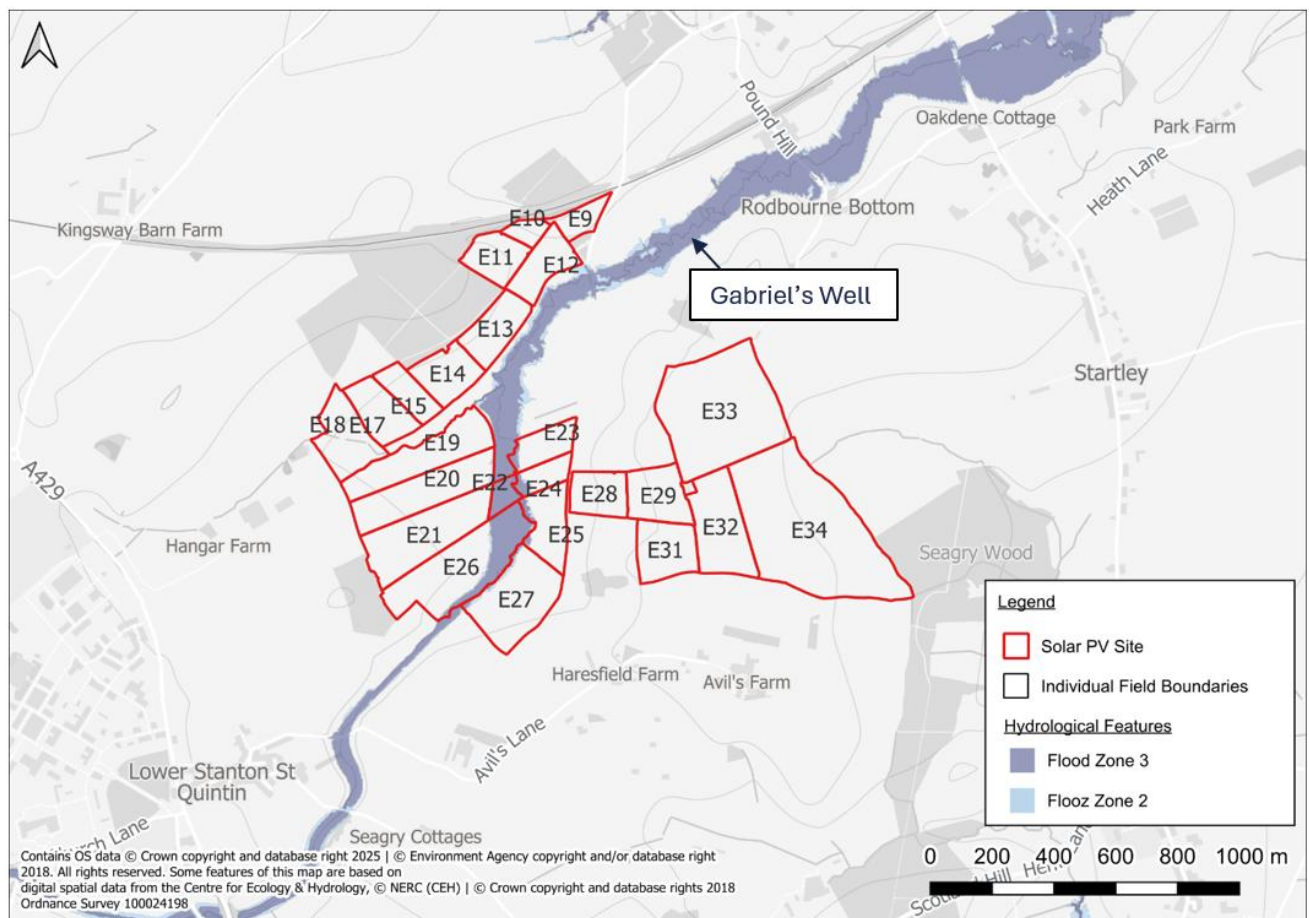


Figure 5: EA's Flood Map for Planning

Local Watercourses and Flooding Mechanisms

- 2.3.2 Gabriel's Well is designated as a Main River and flows through the centre of Lime Down E2. The mapped floodplain extents correspond largely with areas below approximately 74m AOD. Fluvial flooding could occur in these areas if Gabriel's Well overtopped its banks or became restricted by debris or sediment accumulation during or following extreme rainfall events.
- 2.3.3 According to the Environment Agency's Spatial Flood Defences with Standardised Attributes dataset, a natural high ground feature is present adjacent to Gabriel's Well. No engineered defences or defined crest levels are recorded, and the Standard of Protection and condition of this feature are unknown.

Historical Flooding

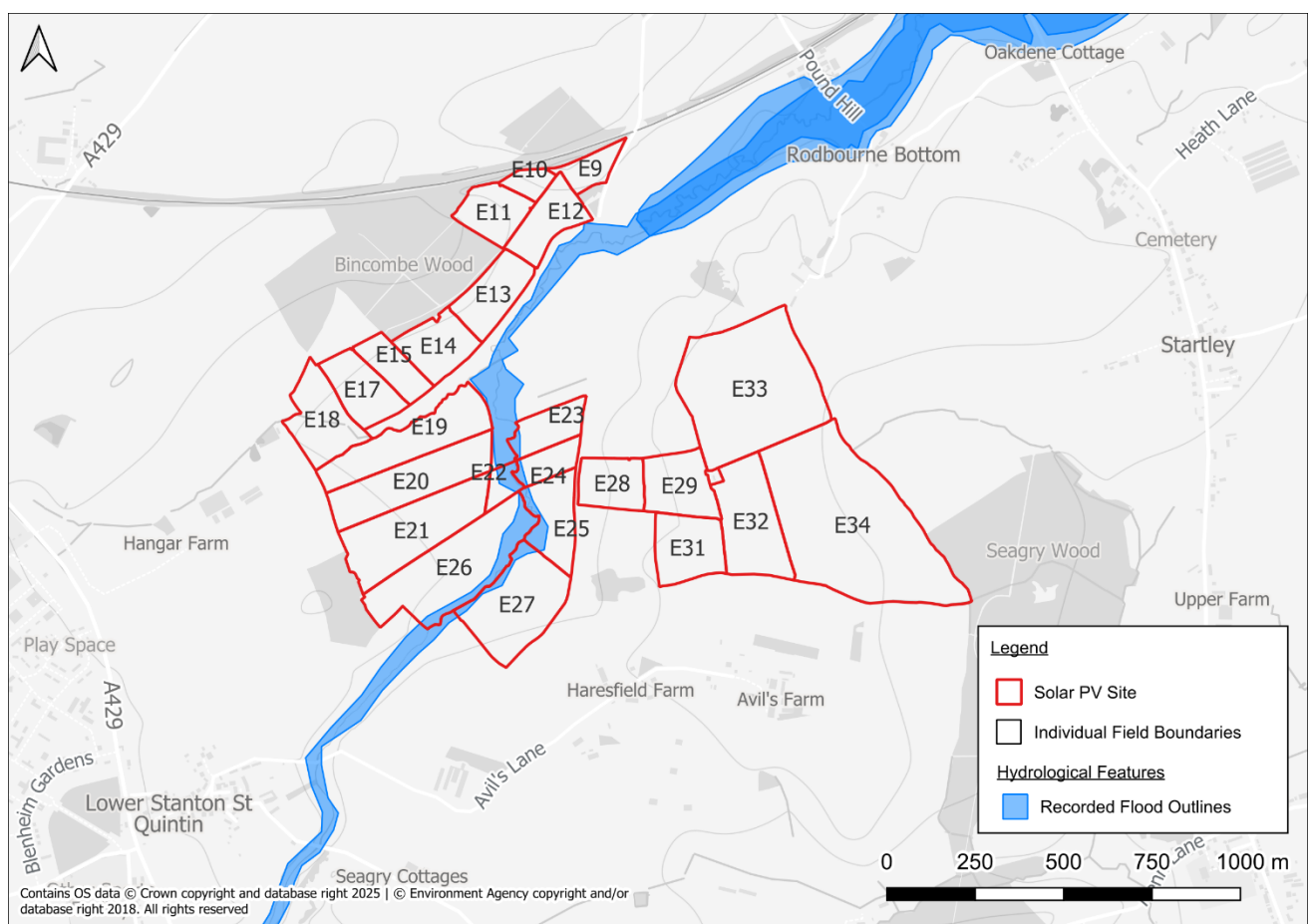


Figure 6: Historic Flood Map

- 2.3.4 The Environment Agency's Historical Flood Map (Figure 6) records a fluvial flood event in January 1925, understood to have resulted from overtopping of Gabriel's Well during prolonged rainfall. No additional site-specific records of historic fluvial flooding have been identified from Environment Agency datasets or third-party sources.

Hydraulic Model

- 2.3.5 Given the Site is potentially at risk of fluvial flooding and noting that the EA's flood data for Gabriel's Well

is based on a strategic level assessment, site-specific detailed hydraulic modelling has been carried out to more accurately assess potential fluvial flood extents and flood depths at the Site. Full details of the hydraulic modelling study and results are provided in **Lime Down E2 - Hydraulic Modelling Report [REP4-089]** submitted at Deadline 4; however, key results are summarised below.

- 2.3.6 Assessment of the 3.3%, 1% and 0.1% AEP events for the present-day scenario reaffirms the current EA's flood maps, showing flooding to be isolated to the lower lying floodplain corridor located along the watercourse's route, with the majority of the Site remaining free from fluvial flooding. Assessment of the future climate change scenario, accounting for a 39% and 71% uplift during the 1% AEP events, shows similar flooding mechanisms but with small increases to extent.
- 2.3.7 Modelled flood depths and extents, provided in Annex B, show that only small areas of field boundaries bordering the watercourse (E20, E21, E22, E23, E24, E25, E26, and E27) are potentially at risk during the present day and future climate change scenarios. Additional comparison of the development proposals and predicted flood extent during the worst-case present day 0.1% AEP event, illustrated in Figure 7, shows the closest proposed Conversion Units / 33kV sub distribution switch rooms are located outside areas at risk of flooding. Potential impacts to the solar arrays are limited to small areas within field boundaries E23, E24 and E26.
- 2.3.8 Flood depth and extent plots for all assessed AEP events are provided in Annex B.

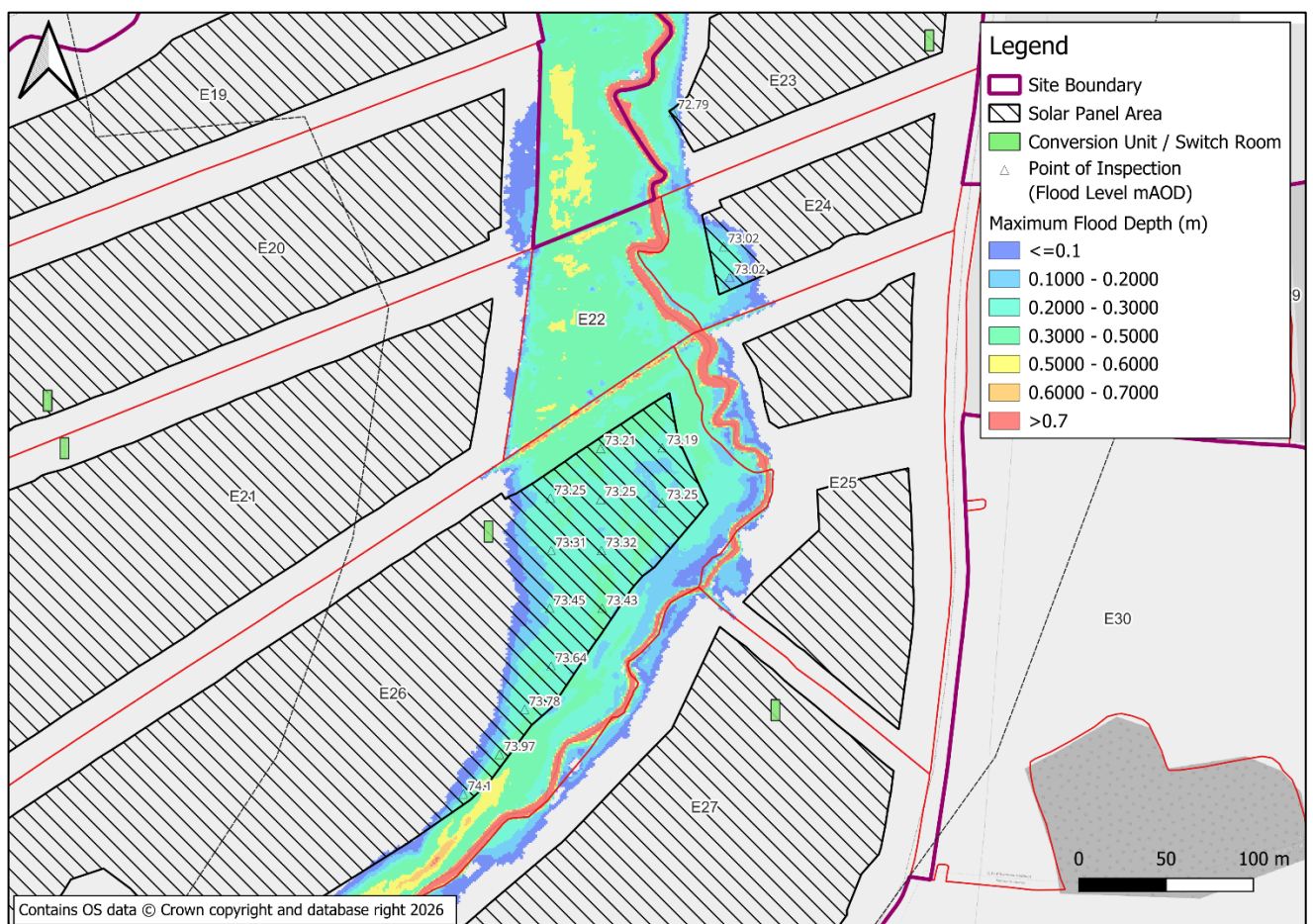


Figure 7: Water Level and Depth Map – 0.1% AEP

2.3.9 In line with the embedded mitigation strategy set out in **Appendix 11.1: Flood Risk Assessment and Drainage Strategy – Covering Report [EN010168/APP/6.3]**, the proposed solar panels and associated infrastructure have been designed to remain resilient to fluvial flood risk. Electrical infrastructure, including inverters, transformers and substations, together with all sensitive electrical equipment associated with the Solar PV Panels, will either be located outside of Flood Zone 3b / functional floodplain and modelled flood extents or raised above a minimum freeboard of 600mm above the design flood level including climate change allowance. The lowest leading edge of the Solar PV Panels themselves does not comprise sensitive electrical equipment and may therefore sit lower depending on the final panel configuration and mounting arrangement. Smaller components such as conversion units and switchgear, where present, will be minor in scale and made resilient through elevation or localised waterproofing. This ensures that all above-ground infrastructure remains operational during fluvial flood events and does not obstruct floodplain flow routes.

Assessment of Minor Watercourses and Ephemeral Drains

2.3.10 Detailed hydraulic modelling has been undertaken for Gabriel's Well. This model does not explicitly assess flood risk associated with the smaller watercourses, land drains and ephemeral drains within Lime Down E2.

2.3.11 A separate, proportionate assessment has therefore been undertaken for these features using Manning's open channel flow formula. This provides an estimate of flood levels for the 1% + CC (71%) event based on channel shape, gradient and roughness. The calculation, including the data sources and coefficients used, is provided in Annex C and is informed by cross-sectional data derived from EA LiDAR captured in Q1 2020.

2.3.12 The EA's surface water flood mapping has also been reviewed as a precautionary indication of potential flow routes associated with the smaller watercourses and ephemeral drains. The mapping identifies localised flow routes broadly corresponding with these features, with mapped depths generally not exceeding 0.3 m.

2.3.13 The flood extents derived from the Manning's assessment are more limited than those shown on the EA's 0.1% surface water mapping. The surface water mapping has therefore been used only to indicate potential exceedance flow routes and extents. The 1% + CC (71%) Manning's assessment forms the basis of the design event assessment for the smaller watercourses and ephemeral drains.

2.3.14 The Manning's assessment was completed before the updated NaFRA2 mapping was published in January 2025. The updated mapping shows a reduction in surface water flood extents across the Site. This does not alter the assessment and supports the conclusion that the Manning's approach remains suitably conservative.

Floodplain Storage Compensation

2.3.15 Flood Zone 2 and 3 extents are expected to impact the Site and solar areas in Fields E23, E24, and E26. Based on the available Flood Map for Planning information, detailed hydraulic modelling, and the Manning's-based assessment undertaken for this Annex, the layout of panelled development within Lime Down E2 has sought to avoid higher-risk areas and the main functional floodplain extent. The panelled areas that interact with mapped flood extents comprise flood-compatible development only and are not expected to give rise to material loss of floodplain storage or material obstruction of flood flow routes

within the meaning of NPS EN-1 Section 5.8.12.

- 2.3.16 The potential for floodwaters to interact materially with the solar PV panels or their supports is limited, as the development in impacted areas is raised above the design flood level with an appropriate freeboard allowance. Where Solar PV Panels are located within the 1% AEP plus climate change design flood extent, the lowest leading edge of the panels will be set no less than 600mm above the design flood level, with the final panel mounting height, tilt or tracker arrangement confirmed at detailed design. As a result, any associated displacement of floodplain storage is only associated with the solar panel supports and is considered negligible. Therefore, the implementation of specific flood compensation measures in these locations is not considered necessary or proportionate.
- 2.3.17 While negligible impacts are expected, the EA has advised that, for any development located within Flood Zone 3a (i.e. the 1 in 100-year plus climate change flood extent) and Flood Zone 3b (i.e. the 1 in 30-year plus climate change flood extent), floodplain storage compensation should be incorporated into the design. Compensation should be provided on a level-for-level and volume-for-volume basis, ensuring direct replacement of any lost storage. To demonstrate negligible loss of storage volume from the solar panel supports, and flood compensation measures are not necessary or proportionate, a flood compensation analysis has been carried out and is detailed below.
- 2.3.18 Noting that approximately 10 supports are required per 100m of panels, equating to approximately 608 supports across the total area of 0.661km² proposed for solar PV panels, the number of supports identified as potential at risk of flooding during the assessed AEP events has been calculated. Taking a support cross-sectional area of 28.65cm² and modelled maximum flood depths for the areas located within the flood extents, the potential displaced volume for the respective solar panel areas has been calculated.
- 2.3.19 Results for the 0.1% AEP event, outlined in Table 1, indicate that during this worst case present day scenario, a minimal volume of 0.0198m³ is displaced and results in a negligible loss of flood plain storage. During the more frequent 3.3% and 1% AEP events, maximum displaced volumes of 0.0119m³ and 0.0136m³ are displaced, respectively. When accounting for the potential impacts of climate change, during the 1%+CC(39%) and 1%+CC(71%), maximum displaced volumes are still minimal, equalling 0.0188m³ and 0.0204m³ respectively. Tables outlining results for all the aforementioned events are provided in Annex D.

Table 1: Potential Maximum Displaced Volume – 0.1% AEP

Field Boundary ID / Solar Panel Area	Area in Flood Extent (m ²)	Number of Supports in Flood Extent	Support Cross-sectional Area (m ²)	Maximum Flood Depth (m)	Maximum Displaced Volume (m ³)
E23	58	1	0.002865	0.22	0.0006
E24	863	1	0.002865	0.29	0.0007
E26	12804	12	0.002865	0.55	0.0186

- 2.3.20 To ensure a precautionary approach has been adopted, maximum displaced volumes have been assessed using the maximum predicted flood depth recorded within each respective solar panel area. In practice, however, flood depths will vary across these areas, with average depths being considerably

lower than the maximum values applied in the assessment. Consequently, the calculated maximum displaced volumes are conservative and will exceed the volumes that would occur in reality.

- 2.3.21 Furthermore, although the approximate number of supports within the flood extent was determined by applying the ratio of the solar panel area located within the flood extent to the Site's total solar panel area (0.661 km^2) to the total number of panel supports (608), the results presented in Table 1 demonstrate that the calculated displaced volume is largely insensitive to variations in support numbers due to the supports' extremely small cross-sectional profile. For example, even if the number of supports were increased tenfold, the resulting change in potential floodwater displacement would be negligible.
- 2.3.22 To assess the potential increase in flood levels resulting from the loss of floodplain storage, a deliberately conservative approach has also been adopted. The total combined displaced volume for each AEP event has been assumed to be redistributed uniformly across the modelled flood extents within the Site only. This approach is intentionally precautionary, as it assumes that all displaced floodwater is retained within the Site boundary, whereas in reality floodwaters are hydraulically connected to a wider floodplain and any displacement would be distributed over a substantially larger area.
- 2.3.23 On site flood extents and the resulting theoretical increase in flood levels are outlined in Table 2, which highlights that any potential increase on site is effectively zero for all the assessed AEP events. This increase is several orders of magnitude below the precision at which flood levels can be meaningfully defined, and is well within the inherent uncertainty of hydraulic modelling, topographic data, and natural floodplain variability. The effect is therefore imperceptible and would not result in any measurable change to flood levels, flood extents, flow routes, or flood risk to third parties.

Table 2: Potential Increase in Flood Level

AEP	Combined Displaced Volume from areas E23, E24, and E26 (m^3)	Site Flood Extent Area (m^2)	Increase in Flood level (m)
3.3%	0.0119	41959	2.84×10^{-7}
1%	0.0136	43850	3.10×10^{-7}
1%+CC (39%)	0.0188	47974	3.92×10^{-7}
1%+CC (71%)	0.0204	50293	4.06×10^{-7}
0.1%	0.0198	49969	3.96×10^{-7}

- 2.3.24 Furthermore, the proposed solar panel supports comprise discrete, widely spaced elements with a negligible cumulative footprint relative to the floodplain area. As such, they would not materially affect floodplain conveyance or flow paths. Where perimeter fencing is required within the mapped Flood Zone 2 or Flood Zone 3 extents, it will comprise post and wire mesh fencing specified with the widest mesh aperture available within the selected fencing system, so as to maximise the passage of floodwater and debris and avoid obstruction of flood flows. Fencing in these locations will not be solid, close-boarded or fine-mesh. The detailed fencing specification will be confirmed at the detailed design stage in accordance with this principle.
- 2.3.25 Given the extremely limited displacement, the conservative assumptions applied, and the imperceptible

increase in flood depth, the impact on flood storage capacity is considered de minimis. On this basis, it is concluded that further consideration or provision of compensatory flood storage resulting from panelled areas encroaching into the flood extents is not necessary or proportionate for the proposed development. The potential increase of flood depths are considered **negligible** and well within the natural variability of floodplain behaviour, and would result in no perceptible change in flood levels or flow routes. It therefore represents a highly conservative assessment of worst-case impacts.

Consultation

- 2.3.26 The EA were consulted in October 2024 regarding the availability of any site-specific flood data and hydraulic modelling for Lime Down E2. A formal response was received on 13 November 2024, included in Annex E.
- 2.3.27 The Product 4 data provided for the Site were generated using the EA's National Generalised Model (JFLOW). This dataset is suitable for defining indicative Flood Zones; however, it is not based on a detailed channel survey or locally calibrated model inputs. Model results produced as a part of the site-specific detailed modelling, outlined in the preceding section, therefore provide a more accurate and reliable assessment of potential flood risk at the Site and has been used to inform this reports assessment.
- 2.3.28 Consultation has been undertaken throughout the EIA process with the EA and Wiltshire Council. Comments and recommendations received during this engagement have been considered and incorporated, where appropriate, into this Flood Risk Assessment and Drainage Strategy. A record of consultation and Arthian's responses is provided in ES Chapter 11: Hydrology, Flood Risk and Drainage.
- 2.3.29 Lime Down E2 is not located within an Internal Drainage Board (IDB).
- 2.3.30 There is no site-specific information within third party reports relating to fluvial flood risk.

Summary

- 2.3.31 Given the above and the nature of the Scheme, Lime Down E2 is therefore considered to be at **Low** risk of fluvial flooding.

2.4 Surface Water Flood Risk

- 2.4.1 The EA's National Flood Risk Assessment Mapping (NaFRA), known as the 'Long Term Flood Risk Map' (Surface Water)^{vi}, was updated in January 2025. The NaFRA mapping provides an updated view of surface water flooding across the Site, however it should be noted that at the time of writing, the NaFRA mapping only delivers climate change insight up to the year 2060.
- 2.4.2 According to the EA's Long Term Flood Risk Map (Surface Water) the majority of Lime Down E2 is at Very Low risk of surface water flooding, meaning it has a <0.1% annual probability of flooding. However, there are some small areas of Low to High risk (0.1 - >3.3% annual chance of flooding), particularly in areas associated with the presence of Gabriel's Well which flows in a north-easterly direction.
- 2.4.3 With reference to the depth mapping provided by the NaFRA data, flood depths are anticipated to be low, with depths remaining largely below 0.3m which is considered passable to people and vehicles. Some

depths between 0.3 and 0.6m are anticipated in Fields E10 – E12, E14 – E18, E22, E25 – E26, and E33 – E34, however as above, these depths are associated with the presence of Gabriel's Well.

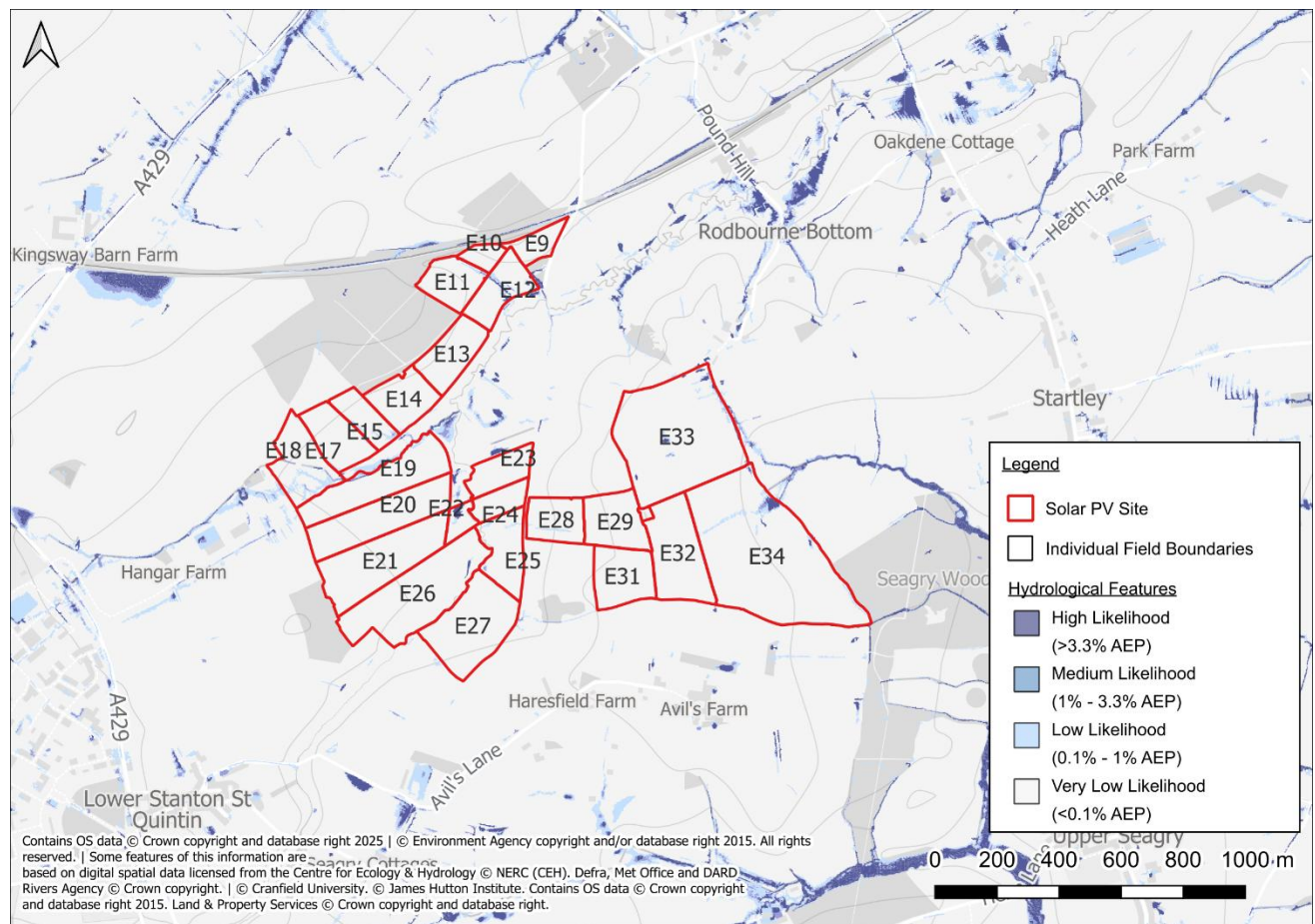


Figure 8: EA's Long-Term Flood Risk Map (Flood Risk from Surface Water)

- 2.4.4 There is no indication within relevant third-party reports (listed in 'Sources of Information' in **ES Volume 3, Appendix 11-1: Flood Risk Assessment and Outline Drainage Strategy – Covering Report [EN010168/APP/6.3]**) to suggest that Lime Down E2 has historically experienced surface water flooding.
- 2.4.5 Based on the above and considering the embedded mitigation as part of the design of the solar PV Panels, the overall risk of surface water flooding is considered to be **Low**. The proposed solar PV Panels and all other electrical infrastructure will be raised above surrounding ground levels and will be appropriately waterproofed thereby reducing the potential to be impacted in the event of surface water flooding.
- 2.4.6 Associated electrical infrastructure, such as inverters, transformers, cabling and substations, will be located outside mapped flood extents where feasible, or otherwise elevated above a minimum freeboard of 600 mm above the design flood level, in line with the embedded mitigation strategy outlined in **ES Volume 3, Appendix 11-1: Flood Risk Assessment and Outline Drainage Strategy – Covering Report [EN010168/APP/6.3]**.
- 2.4.7 Smaller electrical components such as switchgear and conversion units, where present, are minor in scale and will be protected through elevation or localised resilience measures, consistent with the approach set out in the Covering Report. This ensures that all above-ground infrastructure will remain

operational during fluvial or surface water flood events, and will not obstruct overland flow paths or exacerbate off-site flood risk.

- 2.4.8 The impact of the Scheme on surface water risk is covered in **ES Volume 3, Appendix 11-1: Flood Risk Assessment and Outline Drainage Strategy – Covering Report [EN010168/APP/6.3]**, to ensure that surface water risk is not exacerbated through appropriate SuDS measures.

2.5 Groundwater Flood Risk

- 2.5.1 The geology is identified above in Section 1.0. There were no legible boreholes in the near vicinity.
- 2.5.2 The 2015 SFRA interactive mapping^{vii} details that Lime Down E2 largely is identified as having ‘No risk’ from groundwater flooding. The western areas underlain by Cornbrash Formation and Forest Marble Formation are classified as having groundwater levels of between 0.025m and 0.5m below ground level (bgl) or 0.5m and 5m bgl. There is no further information within relevant third party reports (listed ‘Sources of Information’ in **ES Volume 3, Appendix 11-1: Flood Risk Assessment and Outline Drainage Strategy – Covering Report [EN010168/APP/6.3]**) to suggest that Lime Down E2 has experienced historical groundwater flooding.
- 2.5.3 Soils^{viii} indicates that Lime Down E2 is partially ‘*freely draining*’, with areas of ‘*impeded drainage*’.
- 2.5.4 No buildings and no basement levels are identified on plans which may otherwise be at increased risk from groundwater seepage.
- 2.5.5 It can be concluded that the risk of groundwater flooding is **Low** and no specific mitigation measures are required.

2.6 Sewer Flooding

- 2.6.1 No site-specific incidents of sewer flooding have been identified from relevant third-party reports.
- 2.6.2 On the basis of Lime Down E2’s rural setting, the presence of sewerage infrastructure is unlikely. Utility records have been checked and do not identify any public sewers within Lime Down E2.
- 2.6.3 It can therefore be concluded that the risk of sewer flooding is **Negligible**.

2.7 Reservoir and Canal Flooding

- 2.7.1 There are no canals within the vicinity of Lime Down E2, therefore there is no associated risk.
- 2.7.2 The EA ‘Flood Risk from Reservoirs’ map shows that Lime Down E2 is not at risk of flooding from reservoirs.
- 2.7.3 It can therefore be concluded that there is **Negligible** risk of flooding from artificial sources.

2.8 Residual Flood Risks

- 2.8.1 A residual risk is an exceedance event, such as the 1 in 1000 year (0.1% AEP) flood event that would

overtop the Gabriel's Well and potentially impact Lime Down E2. As the probability of a 1 in 1000 year flood event occurring is 0.1% in any given year, the probability is low and, therefore, no additional mitigation beyond the embedded mitigation measures of the Scheme is required.

- 2.8.2 In the event of the defences failing or an exceedance event occurring, the residual risk to people working or present in the vicinity, as construction workers, residents, or public right of way (PRoW) users, within Lime Down E2 can be managed through the implementation of an appropriate Site management plan. This plan will recognise the residual risks and outline the actions to be taken by staff in the event of a flood to ensure that occupants are placed in a place of safety.

2.9 Summary of Flood Risk

- 2.9.1 It can be concluded that the risk to Lime Down E2 from all sources of flooding is **Negligible to Low**.

2.10 Embedded Mitigation

- 2.10.1 Embedded Mitigation is detailed in **ES Volume 3, Appendix 11-1: Flood Risk Assessment and Outline Drainage Strategy – Covering Report [EN010168/APP/6.3]**, in which the FRA has informed.

2.11 Impact on Off-Site Flood Risk

- 2.11.1 The solar PV Panels and other electrical infrastructure, such as inverters, transformers, cabling and substations, which are to be sat on a concrete foundation/pad that will be mounted on frames and raised above ground level allowing flood water to flow freely underneath. Therefore, there will be no loss of floodplain volume as a result of the Scheme and no increase in flood risk elsewhere.
- 2.11.2 Associated Scheme, such as switch gears, inverters and conversion units, are insignificant in size. The various components dimensions can be found in detail in **ES Volume 1, Chapter 3: The Scheme [EN010168/APP/6.1]**. Given the embedded mitigation detailed above, including locating infrastructure outside of any areas considered to be at risk, there should be no increase in flood risk elsewhere.
- 2.11.3 Surface water management has been considered in **ES Volume 3, Appendix 11-1: Flood Risk Assessment and Outline Drainage Strategy – Covering Report [EN010168/APP/6.3]**.

3. Outline Drainage Strategy

- 3.1.1 Lime Down E2 forms part of the wider Scheme and includes Solar PV Panelled Areas, Solar PV Site Access Tracks and fourteen Conversion Units / 33kV Sub-distribution Switch Rooms. This section provides the Outline Drainage Strategy for Lime Down E2. It identifies the areas requiring formal drainage consideration, sets out the basis of the runoff and attenuation calculations, and demonstrates that a feasible drainage solution can be accommodated within the assessed design envelope. Excluding the fourteen Conversion Unit / 33kV Sub-distribution Switch Room equipment pads, Lime Down E2 will remain largely permeable following development. Solar PV infrastructure is not treated as contributing to the overall extent of positively drained hardstanding surfaces for the purposes of this Outline Drainage Strategy.
- 3.1.2 For the purpose of this assessment, this Outline Drainage Strategy is split as follows:
- A description of surface water drainage from the Solar PV Panelled Areas, excluding the fourteen Conversion Units / 33kV Sub-distribution Switch Rooms; and
 - An outline drainage strategy for the positively drained hardstanding surfaces, comprising the fourteen Conversion Units / 33kV Sub-distribution Switch Rooms.
- 3.1.3 The detailed drainage layout, final SuDS components, conveyance routes, levels, outfalls, flow controls, treatment train, isolation arrangements and maintenance regime will be confirmed at detailed design and secured through the relevant DCO drainage requirement.

3.2 Solar PV Panelled Areas

- 3.2.1 Solar PV panelled areas are not treated as formal impermeable drainage catchments within this Outline Drainage Strategy. The panels are elevated above ground level, drain to the existing ground, are not sealed into a drainage network, and do not create a connected impermeable surface.
- 3.2.2 This approach is supported by national policy and the submitted evidence base. **NPS EN-3 paragraph 2.10.84** recognises that solar PV panels drain to the existing ground and that the drainage impact will not, in general, be significant. This position is also addressed in **ES Volume 1, Chapter 11: Hydrology, Flood Risk and Drainage [REP3-015]**, **ES Volume 3, Appendix 11-1: Flood Risk Assessment and Outline Drainage Strategy - Covering Report [REP3-039]** and the **Applicant's Response to the Lead Local Flood Authority on Hydraulic Modelling Requirements [REP2-045]**.
- 3.2.3 The Applicant's review of the relevant research and guidance confirms that, where vegetated ground cover is established and maintained, soil compaction is avoided or remediated, and connected preferential flow routes are not created, solar PV panels are not predicted to increase surface water runoff rates or volumes in a manner that requires formal attenuation.
- 3.2.4 The principal effect of the panels is local redistribution of rainfall within the same field, including potential concentration at panel drip-lines. This does not generate additional rainfall volume. Whether redistributed rainfall becomes runoff is governed by the condition of the receiving ground, including vegetation cover, soil structure, compaction, surface roughness, slope and hydrological connectivity.
- 3.2.5 Those controlling factors are addressed through the embedded mitigation secured for the Scheme. Construction phase controls are secured through **the Outline Construction Environmental Management Plan [REP3-092]** and **Outline Soil Resources Management Plan [REP3-098]**, including controls on construction trafficking, soil handling, temporary drainage, decompaction and reinstatement. Operational ground cover and land management controls are secured through the

Outline Landscape and Ecological Management Plan [REP3-100] and **Outline Operational Environmental Management Plan [REP3-094]**, including the establishment and maintenance of vegetated ground cover beneath and between the arrays.

3.2.6 On this basis, no formal attenuation storage is proposed for the solar PV panelled areas. Additional built SuDS across the panelled fields would not be proportionate, as the policy and evidence base indicate that solar PV panels do not materially increase surface water runoff where the relevant ground condition, vegetation and flow connectivity controls are secured. The Outline Drainage Strategy for these areas is therefore to maintain diffuse drainage to the existing ground, preserve existing field-scale flow behaviour, protect existing drainage features, and manage soil and vegetation condition through the secured construction and operational controls. Internal access tracks within the Solar PV Panelled Areas will be formed using permeable materials and, where practicable, maintained at existing ground levels. These tracks are not treated as positively drained hardstanding surfaces requiring formal attenuation, except where specifically and conservatively assessed within this Outline Drainage Strategy, such as the Solar PV Site Access Tracks assessed in Table 1.

3.2.7 [The measures described above also represent the application of Natural Flood Management \(NFM\) principles where practicable, in accordance with NPS EN-1 paragraphs 5.8.12, 5.8.15 \(bullet 8\) and 5.8.32. At Lime Down E2, these measures include retaining permeable vegetated ground, maintaining diffuse drainage and existing field-scale flow routes, managing soil compaction and vegetation condition, protecting existing drainage features and watercourse buffers, and using permeable access tracks and source-control SuDS where appropriate. These measures complement the formal attenuation provided for positively drained infrastructure. No reliance is placed on unquantified NFM benefits to provide the attenuation storage or restricted discharge rates identified within this Outline Drainage Strategy. Further information on why NFM is not deemed appropriate for the Scheme are provided in 9.66 Lime Down D - Natural Flood Management Viability Report \[REP5-109\].](#)

3.3 Drainage Strategy – Proposed Hardstanding Surfaces

3.3.1 Lime Down E2 currently comprises agricultural land. For the purposes of the runoff calculations, the undeveloped areas are treated as greenfield and permeable, with existing field drainage and local drainage features forming part of the baseline drainage regime. Table 1 identifies the assessed hardstanding surfaces within Lime Down E2. These areas have been included within this Outline Drainage Strategy because they would either be positively drained or have been conservatively assessed as requiring positive drainage.

Table 3: Proposed Hardstanding Surfaces

Hardstanding Infrastructure	Hardstanding Area (m ²)
14 x Conversion Units / 33kV Sub-Distribution Switch Rooms	1,050 (14 × 75 m ²) gmm

3.3.2 The assessed hardstanding surfaces have been identified using the indicative infrastructure areas currently proposed for Lime Down E2, or, where the final equipment layout is not fixed, the relevant maximum design parameters set out in **ES Volume 1, Chapter 3: The Scheme [APP-055]**. Where the Works Plan envelope or indicative infrastructure area is smaller than the relevant Chapter 3 maximum parameter, the assessed area has been limited to the area that can feasibly be accommodated within Lime Down E2. This provides a conservative but realistic basis for demonstrating that the required drainage infrastructure can be delivered within the assessed design envelope.

3.3.3 The assessed hardstanding surfaces have the potential to increase surface water runoff rates and volumes if unmanaged. Surface water runoff from these areas will therefore be controlled so that the

Scheme does not result in a material increase in flood risk on-site or elsewhere.

3.3.4 Wiltshire Council Sustainable Drainage Systems (SuDS) Guidance¹ states the following:

“With regards the control of surface water discharges from new development, Wiltshire Council requires post development discharges from greenfield sites to provide 30% betterment over pre-development discharges for all storm events between the 1 in 1year and 1 in 100year return period events.”

3.3.5 A fixed detailed drainage layout drawing or sketch is not submitted at this outline stage. The purpose of this Outline Drainage Strategy is to demonstrate that a feasible drainage solution can be accommodated within Lime Down E2 based on the assessed hardstanding surfaces, greenfield runoff rates, controlled discharge rates, indicative attenuation volumes, SuDS options, treatment requirements and maintenance arrangements. The detailed drainage design, including the final layout, levels, outfall arrangement, isolation measures and maintenance access, will be submitted and approved in accordance with the relevant DCO drainage requirement before the relevant part of the authorised development commences.

3.4 Drainage Hierarchy

3.4.1 The proposed surface water drainage strategy has been prepared in accordance with the drainage hierarchy set out in the National Standards for Sustainable Drainage Systems (SuDS) and in line with Paragraph 080 of the National Planning Practice Guidance (NPPG): Flood Risk and Coastal Change. The hierarchy prioritises reuse and infiltration where feasible, followed by discharge to an above-ground surface water body, discharge to a surface water sewer or other surface water drainage system, and finally discharge to a combined sewer.

3.4.2 The following drainage hierarchy review considers normal operation. In the event of a potential pollution incident, any relevant drainage controls would be operated in accordance with the final drainage design and operational management procedures.

3.4.3 The hierarchy establishes the following order of preference for runoff destinations:

- Priority 1: Collect surface water for reuse within the development (e.g. irrigation or non-potable supply).
- Priority 2: Infiltrate runoff to the ground, where ground conditions and groundwater levels permit.
- Priority 3: Discharge runoff to an above-ground surface water body such as a watercourse, pond or wetland.
- Priority 4: Discharge runoff to a surface water sewer, highway drain or other drainage system.
- Priority 5: Discharge runoff to a combined sewer.

3.4.4 Where higher levels of the hierarchy cannot be achieved, proportionate justification must be provided to demonstrate compliance with national policy while ensuring effective flood risk management and long-

¹ https://www.wiltshire.gov.uk/media/13768/Wiltshire-Council-Drainage-Betterment-Strategy/pdf/Wiltshire_Council_Drainage_Betterment_Strategy__June_2024.pdf?m=1731336788693

term sustainability.

Priority 1: Surface Water Collected for non-Potable Use

- 3.4.5 Rainwater harvesting has been considered for the proposed development: ~~and may be incorporated at detailed design to provide water for operational use, including potable use where appropriate and subject to the necessary treatment and water quality requirements.~~ However, Lime Down E2 does not include a sustained non-potable demand capable of reliably receiving and using runoff from the positively drained hardstanding surfaces during design rainfall events. ~~Reuse Rainwater harvesting is therefore not relied upon for attenuation or flood storage and reuse cannot provide the sole means of surface water disposal, and~~ A secondary discharge route ~~is and the~~ required: ~~attenuation storage are therefore provided independently of any rainwater harvesting provision.~~

Priority 2: Surface Water Infiltrated to Ground

- 3.4.6 Where surface water collected for non-potable use (Priority 1) cannot be the sole method of disposal, the next consideration is infiltration (soakaways and permeable surfaces).
- 3.4.7 As described above, the Site is largely not underlain by superficial deposits, aside from an area of Alluvium (comprising clay, silt, sand and gravel) through the centre of the Site. The underlying bedrock comprises the Kellaways Clay Member (mudstone), Kellaways Sand Member (sandstone and siltstone), Cornbrash (limestone) and Oxford Clay Formation (mudstone). Soils mapping describes the majority of the Site, as having “*slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils with impeded drainage*”.
- 3.4.8 In line with the National Standards for SuDS, infiltration should only be used where ground conditions are suitable, groundwater is protected, and land stability is not compromised. The available ground condition information indicates that infiltration potential is likely to be limited, with impeded drainage soils and mudstone bedrock reducing the likelihood of reliable long-term soakaway performance.
- 3.4.9 Infiltration is therefore not considered suitable as the primary method of surface water disposal for the Solar PV Site Access Track drainage catchment. This avoids relying on soakaways where ground conditions are unlikely to provide adequate infiltration capacity, particularly during prolonged or high intensity rainfall.
- 3.4.10 This does not preclude the use of permeable surfaces, shallow filter drains or local French drain arrangements as source-control features for small, discrete areas of supporting infrastructure, where appropriate. Such features would manage small volumes locally and would not be relied upon as the primary outfall for the drainage catchment.
- 3.4.11 Surface water from the Solar PV Site Access Tracks and other positively drained hardstanding surfaces will therefore be managed through a controlled drainage system, with attenuation and restricted discharge to an appropriate receiving drainage feature or watercourse.

Priority 3: Discharge to an Above Ground Surface Water Body

- 3.4.12 Where surface water collected for non-potable use (Priority 1) cannot be the sole method of disposal,

and infiltration to ground (Priority 2) has been demonstrated to be unsuitable, discharge to an above ground waterbody should be the next consideration.

- 3.4.13 The nearest watercourse is Gabriel's Well, which is located through the centre of Lime Down E2. Discharge to this watercourse at controlled rates is considered feasible by gravity, subject to detailed design of the outfall arrangement and any necessary approvals.

Priority 4: Discharged to a Surface Water Sewer, or Another Piped Surface Water Drainage System

- 3.4.14 As described above, discharge to Gabriel's Well appears feasible; therefore, a connection to a public surface water sewer is not proposed. Should detailed design demonstrate that direct discharge to the watercourse is not feasible, alternative lower-priority destinations would be reviewed in accordance with the drainage hierarchy and subject to the relevant approvals.

Priority 5: Discharge to a Combined Sewer

- 3.4.15 As described above, discharge to Gabriel's Well appears feasible; therefore, discharge to a combined sewer is not proposed.

3.5 Surface Water Discharge

- 3.5.1 In accordance with the 2025 National Standards for SuDS in England Guidance, runoff destinations have been assessed following the required hierarchy.
- 3.5.2 As infiltration is not considered suitable as the primary discharge route for the drainage catchment, runoff from the positively drained hardstanding surfaces will be attenuated on site and discharged at controlled rates to Gabriel's Well in line with greenfield runoff principles and the LLFA requirement for 30% betterment.
- 3.5.3 Greenfield runoff rates have been calculated for each assessed hardstanding surface using the FEH Statistical (2025) method and are summarised in Table 2. The proposed discharge rates and associated attenuation volumes are indicative and have been prepared using the indicative infrastructure areas currently proposed, or the maximum relevant design parameters set out in **ES Volume 1, Chapter 3: The Scheme [APP-055]** where the final equipment layout is not fixed. Greenfield calculation input parameters and results are provided in Annex F.
- 3.5.4 This approach demonstrates that a feasible drainage solution can be accommodated within Lime Down E2 and that peak runoff from positively drained hardstanding surfaces can be controlled so that the Scheme does not result in a material increase in flood risk on-site or elsewhere. The attenuation volumes are indicative and are provided to demonstrate the feasibility of the Outline Drainage Strategy. The final drainage design may rationalise the number, location and form of SuDS components, provided the detailed design remains within the assessed design envelope and achieves the drainage principles secured through the relevant DCO drainage requirement.

Table 4: Greenfield Runoff Rates

Infrastructure	1 in 2 year (l/s)	1 in 30 year (l/s)	1 in 100 year (l/s)	1 in 2 year +30% betterment (l/s)	Proposed Discharge Rate (l/s)	Attenuation (m ³)
Conversion Units / 33kV Sub-distribution Switch Rooms	0.6	1.3	1.7	0.4	0.4	3.2* 44.8 cumulative

*The Conversion Unit / 33kV Sub-distribution Switch Room attenuation volume is calculated on a per-unit basis. For Lime Down E2, each unit requires approximately 3.2m³ of indicative local storage, to be provided through source-control SuDS such as perimeter French drains, filter drains or equivalent features. Fourteen units are proposed at Lime Down E2, giving a cumulative indicative local storage requirement of approximately 44.8m³.

3.6 Sustainable Drainage Systems

- 3.6.1 The SuDS appraisal approach outlined in the SuDS Manual (C753) has been applied to determine the most suitable methods for achieving sustainable surface water attenuation and conveyance to support the proposed development. The SuDS options summarised in Table 5 below have been considered:

Table 5: SuDS Options for Proposed Development

SuDS Measure	Amenity Benefit	Biodiversity Benefit	Suitability for Proposed Development	Reasoning
Soakaways	Although soakaways are typically below ground, they can contribute to amenity by allowing the land above to be used for landscaping or recreation. When integrated with visible SuDS features or planting, they can enhance the visual quality of a site and support multifunctional, attractive spaces.	Soakaways support biodiversity indirectly by promoting groundwater recharge and maintaining natural hydrological conditions. When combined with vegetated SuDS components, they can enhance habitat connectivity and contribute to ecological networks across a site.	×	As described above, the use of soakaways is not considered to be feasible.
Swales, Detention Basins and Ponds	Swales, detention basins and ponds contribute positively to site amenity by providing visually attractive, multifunctional spaces that enhance the quality and character of a development. These features can be integrated within the landscape as green corridors, linking open spaces and promoting interaction between people and water. When appropriately designed, they offer opportunities for recreation, education and visual interest, creating a more appealing and liveable environment.	Swales, detention basins and ponds deliver significant biodiversity value through the provision of varied and connected habitats. Swales function as linear green corridors, enabling wildlife movement and supporting diverse vegetation. Detention basins create temporary wetland conditions that benefit a range of species, while ponds provide permanent aquatic and marginal habitats supporting invertebrates, amphibians and birds. Collectively, these features enhance habitat diversity, strengthen ecological	✓	Sufficient space is available on site to utilise a pond, basin or swale as an above ground attenuation feature. In order to facilitate gravity drainage, attenuation features should be located towards the topographic lower levels.

		connectivity and contribute to the establishment of a resilient green-blue network across the site.		
Filter Drains/ Strips	Filter drains and filter strips can contribute to site amenity by creating attractive, vegetated edges that soften hard surfaces and integrate drainage within the landscape. When aligned along roads or paths, they form part of functional green corridors that enhance visual quality and support a sense of place.	These features provide ecological value through vegetated zones that support invertebrates and small fauna. When linked with other SuDS components, they strengthen habitat connectivity and contribute to the wider green-blue network promoted within the SuDS approach.	✓	Filter drains are trenches filled with stone/gravel that create temporary subsurface storage for the filtration, attenuation, and conveyance of surface water runoff. Ideally, filter drains receive lateral inflow from adjacent impermeable surfaces pretreated over a filter strip. Filter drains can help manage peak flows by naturally limiting rates of conveyance through the filter medium and by providing attenuation storage when the rate of flow at the outlet is controlled.
Bioretention Systems	Bioretention systems, including rain gardens and bioretention planters, provide attractive, vegetated features that enhance the streetscape and create visually appealing focal points within developments. They contribute to high-quality, multifunctional spaces by integrating drainage into the landscape and improving the relationship between people, water and planting.	These systems deliver biodiversity value through diverse planting and soil conditions that support pollinators, invertebrates and small fauna. They also play a key role in improving water quality by filtering and treating pollutants from surface runoff before infiltration or discharge. Collectively, they enhance ecological connectivity and contribute to the wider green-blue infrastructure.	✓	Bioretention systems (including rain gardens and raised box planters) are shallow landscaped depressions that can reduce runoff rates and volumes and treat pollution. They also provide attractive landscape features and biodiversity. Bioretention systems can help reduce flow rates from a site by promoting infiltration / evapotranspiration and providing some attenuation storage. Bioretention systems can also provide very effective treatment functionality. Bioretention systems are a very flexible surface water management component that can be integrated into a wide variety of developments / densities using different shapes, materials, planting, and dimensions. Bioretention systems (including rain gardens) should be considered within the detailed drainage design stage.

Rainwater Harvesting	Rainwater harvesting systems can contribute to site amenity by visibly demonstrating sustainable water management and promoting environmental awareness. When integrated within building or landscape design, they can enhance the character of a development by supporting water features, irrigation, or other non-potable uses that add functional and aesthetic value to spaces.	By reducing surface water runoff, rainwater harvesting systems help protect downstream SuDS features and receiving watercourses from pollution and erosion. Stored water can also be used to support planting and green infrastructure, indirectly benefiting biodiversity through improved vegetation health and habitat provision.	X	The attenuation benefits provided through the use of rainwater harvesting are considered to be limited and would only be realised when the tanks were not full. Water usage on-site is unlikely to be significant and therefore the benefit of retaining water is limited. Rainwater harvesting may be incorporated at detailed design to provide water for operational use, including potable use where appropriate and subject to the necessary treatment and water quality requirements. However, there is no sustained water demand that can be relied upon to ensure storage capacity is available during design rainfall events. Rainwater harvesting is therefore not relied upon for attenuation or flood storage, and the required attenuation storage and discharge controls are provided independently of any rainwater harvesting provision.
Green Roofs	Green roofs enhance the visual quality of buildings and contribute to the creation of more attractive and liveable urban environments. They can provide accessible or visual green spaces within dense developments, offering opportunities for recreation, relaxation, and improved wellbeing while demonstrating sustainable design in practice.	Green roofs support biodiversity by providing valuable habitats for invertebrates, birds, and pollinators, particularly where native or species-rich planting is used. They also improve water quality and reduce runoff rates by capturing, filtering, and slowly releasing rainfall, supporting the wider SuDS objectives of managing water quantity, quality, and ecology.	X	Green roofs are not identified on development plans. Given the nature of the Scheme, green roofs are not considered a practical option. The benefits achieved through installing a green roof would be disproportionate to the significant ongoing maintenance and construction costs involved.
Porous/ Permeable	Porous and permeable surfaces can enhance the quality and functionality of developed	Infiltration-based permeable surfaces promote natural groundwater recharge and	X	Where permeable surfacing is proposed, infiltration to ground would only be relied upon where supported by detailed design, local

Surfacing (infiltration)	areas by integrating drainage directly into hardstanding such as car parks, footpaths and access roads. They maintain a natural appearance, reduce surface water ponding, and contribute to safer, more attractive public spaces while supporting the seamless integration of SuDS within the built environment.	improve water quality by filtering and retaining pollutants within the sub-base before infiltration. When combined with adjacent vegetated SuDS features, they can contribute to habitat connectivity and support the wider green-blue network across a site.		ground conditions and groundwater protection considerations. Given the variable geology, impeded drainage soils and Source Protection Zone sensitivity, infiltration-based permeable surfacing is not relied upon as the primary disposal method within this Outline Drainage Strategy. The final extent, depth and configuration of any lined permeable surfacing or lined sub-base storage will be confirmed at detailed design.
Porous/ Permeable Surfacing (Lined)	Lined porous and permeable surfaces provide an attractive, functional drainage solution that manages runoff close to source while maintaining the appearance and usability of hardstanding areas such as car parks, courtyards and footpaths. They support high-quality, multi-functional urban design by integrating water management within the built environment without detracting from site amenity.	Although infiltration is prevented, lined permeable surfaces still contribute to SuDS objectives by providing effective pollutant removal through filtration and sedimentation within the surface and sub-base layers. By controlling and treating runoff before discharge to other SuDS components, they protect downstream water quality and can indirectly support biodiversity by maintaining cleaner flows to connected green-blue infrastructure.	✓	Where such storage is used, the available storage volume will be calculated based on the surface area, proposed depth and appropriate void ratio for the selected material. Typically, the storage offered can be calculated by multiplying the surface area of the permeable surfacing (m ²) by the proposed depth (m) by a porosity ratio of 0.3. Lined permeable surfacing may be suitable for Solar PV Site Access Tracks or local hardstanding where infiltration to ground is not appropriate. It can provide source control, treatment and temporary storage while preventing uncontrolled infiltration to ground. The final use of lined permeable surfacing will be confirmed at detailed design.
Underground Attenuation Tanks / Geocellular Storage /	Underground attenuation tanks and geocellular storage systems provide essential runoff control while preserving the use and appearance of surface areas. By locating	These systems offer limited direct biodiversity value but can contribute indirectly by facilitating above-ground green spaces and protecting downstream SuDS features.	✗	Underground attenuation storage is not proposed, as alternative SuDS features have been selected that provide sufficient on-site attenuation while offering additional water quality, amenity, and biodiversity benefits.

Oversized Pipes	storage below ground, they enable land above to be used for landscaping, parking, or recreation, supporting efficient land use and maintaining overall site amenity.	When designed with pre-treatment measures, they assist in pollutant removal, improving water quality prior to discharge and supporting the performance of connected ecological SuDS components.		
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3.7 Attenuation Storage

Extreme Rainfall

- 3.7.1 Attenuation storage will be required to manage surface water runoff from the positively drained hardstanding surfaces and achieve the controlled discharge rates set out below. A combination of SuDS features, and flow control devices is proposed to manage surface water runoff at Lime Down E2.
- 3.7.2 The hardstanding surfaces requiring positive drainage have been identified using either the indicative area of the infrastructure proposed at Lime Down E2, or, where the final equipment layout is not fixed, the relevant maximum design parameters for that equipment set out in **ES Volume 1, Chapter 3: The Scheme [APP-055]**. The calculations are therefore conservative and are provided for illustrative purposes to demonstrate that a feasible drainage solution can be accommodated within Lime Down E2 and within the assessed design envelope.
- 3.7.3 Greenfield runoff rates have been calculated for each assessed hardstanding surface. The proposed discharge rates have then been restricted in accordance with the LLFA drainage requirement, with attenuation storage sized to manage runoff up to and including the 1% AEP plus 45% climate change event.
- 3.7.4 The larger hardstanding surfaces, including the Solar PV Site Access Tracks where conservatively assessed as hardstanding surfaces, will be collected and conveyed to formal attenuation and flow control features prior to discharge at the restricted rate.
- 3.7.5 The fourteen Conversion Units / 33kV Sub-distribution Switch Rooms comprise small, discrete areas of supporting electrical infrastructure. Switchgear comprises electrical disconnect switches, fuses and circuit breakers used to control, protect and isolate electrical equipment. For the purposes of this assessment, runoff calculations have been based on the maximum 15m by 5m footprint for Integrated Conversion Units / 33kV Sub-distribution Switch Rooms defined in **ES Volume 1, Chapter 3: The Scheme [APP-055]**, equivalent to 75m² per unit. This provides a conservative basis for assessment.
- 3.7.6 For an individual 75 m² unit, the indicative local storage volume is approximately 3.2m³. Across Lime Down E2, fourteen Conversion Units / 33kV Sub-distribution Switch Rooms are proposed, giving a cumulative assessed area of 1,050m² and a cumulative indicative local storage requirement of approximately 44.8m³. The calculated greenfield runoff rates for the combined Conversion Unit / 33kV Sub-distribution Switch Room area are 0.6l/s for the 1 in 2 year event, 1.3l/s for the 1 in 30 year event and 1.7l/s for the 1 in 100 year event. Runoff from each unit will be managed locally through source-control SuDS, with final flow controls confirmed at detailed design.
- 3.7.7 Given the small contributing area, low calculated runoff volumes and dispersed nature of the infrastructure, it is not considered proportionate to provide long piped drainage connections from each unit to a formal outfall. Runoff from each unit will therefore be managed locally using a perimeter French drain, filter drain or equivalent source-control SuDS arrangement. These features will provide local storage and source control around the equipment pads and will not be relied upon as strategic attenuation basins or as part of a wider piped drainage network.

- 3.7.8 Final dimensions, aggregate specification, freeboard and maintenance requirements for the French drains will be confirmed at detailed design, having regard to the final equipment layout and local ground conditions. This approach is consistent with the drainage hierarchy and source control principles set out in CIRIA C753: The SuDS Manual, and avoids creating unnecessary point discharges from small, isolated areas of supporting electrical infrastructure.
- 3.7.9 Hydraulic calculations carried out in Causeway Flow demonstrate that the illustrative drainage approach has sufficient capacity to manage runoff from the assessed hardstanding surfaces up to and including the 1% AEP plus 45% climate change event. Key details for the proposed attenuation storage and flow control required to manage surface water runoff are summarised in the tables below. Hydraulic calculations are provided in Annex G.

Table 6: Conversion Unit/33kV Distribution Switch Room Attenuation Storage

Number of Units	14
Contributing Area	75m ² (75 m ² per unit (1,050 m ² cumulative))
Flow Rate	0.44 l/s per unit
Flow Control	HydroBrake
Flow Control Design Head	0.75m
Estimated Required Volume (1 in 100 year +45%CC)	3.2 m ³ (per unit (44.8 m ³ cumulative))

Everyday Rainfall

- 3.7.10 In addition to managing extreme rainfall events, measures should be implemented to ensure runoff generated during more frequent everyday rainfall events is sustainably managed. For these events, where practicable, the volume of runoff generated from the first 5mm of rainfall should not leave the Site.

Table 7: Conversion Unit/33kV Distribution Switch Room Everyday Rainfall*

Number of Units	14
Contributing Area	75m ² (75 m ² per unit (1,050 m ² cumulative))
Rainfall Depth	0.005m
Runoff Volume	0.4m ³ (0.4 m ³ per unit (5.3 m ³ cumulative))
Required Additional Depth	0.02m

**The calculations above assume that the storage is provided within a basin for the purposes of illustration. The final form of storage may differ depending on the detailed layout and may include other SuDS components capable of providing equivalent storage and treatment.*

** As shown above, the everyday rainfall volumes are limited and can be accommodated within the proposed source-control SuDS features. This allows the first 5 mm of rainfall to be retained and managed locally through infiltration where local ground conditions permit, evaporation, evapotranspiration, or subsequent controlled release depending on the final SuDS arrangement.*

3.7.11 As shown in the tables above, the everyday rainfall volumes are limited and can be accommodated within the preferred SuDS features by providing the required additional storage depth. This allows the first 5mm of rainfall to be retained and managed within the drainage system, through infiltration where local ground conditions permit, evaporation, evapotranspiration, or subsequent controlled release depending on the final SuDS arrangement.

3.8 Preferred Drainage Scheme

3.8.1 The viable SuDS features and associated hydraulic calculations have been reviewed above. The final extent and arrangement of hardstanding surfaces will be confirmed at detailed design; however, the calculations presented in this report have been prepared using the indicative infrastructure areas currently proposed, or the maximum relevant design parameters set out in **ES Volume 1, Chapter 3: The Scheme [APP-055]** where the final equipment layout is not fixed. The calculations are therefore conservative and are provided to demonstrate that a feasible drainage solution can be accommodated within Lime Down E2 and within the assessed design envelope.

3.8.2 Greenfield runoff rates have been calculated for the assessed hardstanding surfaces and the proposed discharge rates have been restricted in accordance with the LLFA drainage requirement. The identified receiving watercourse is Gabriel's Well through the centre of Lime Down E2, with the indicative cumulative controlled discharge rates provided within Table 6. The proposed SuDS features will attenuate surface water runoff from the positively drained hardstanding surfaces up to and including the 1% AEP plus 45% climate change event. The final drainage design will confirm the detailed layout, attenuation volumes, flow controls, outfall arrangement, treatment train, isolation measures and maintenance requirements, and will ensure that peak runoff from positively drained hardstanding surfaces are controlled so that the Scheme does not result in a material increase in flood risk on-site or elsewhere.

~~3.8.3 The drainage strategy is necessarily proportionate to the current stage of design. As such, an outline drainage sketch is provided in Annex F, however, a fixed detailed drainage layout drawing will not be submitted at this outline stage, as the final drainage layout will depend on the detailed design of the site.~~

~~3.8.4~~ 3.8.3 The final technology, equipment layout, finished levels, drainage catchments and configuration of the drainage system remain subject to detailed design. It is therefore neither possible nor appropriate at this stage to define separate drainage arrangements, dimensions and attenuation volumes for each individual item of infrastructure. For the purposes of demonstrating feasibility, the Causeway Flow calculation applies the total assessed hardstanding area and the committed restricted discharge rate to determine the indicative attenuation storage requirement. The generic tank shown within the calculation is a nominal software storage unit used solely to derive the required storage volume and does not represent a proposed tank or other drainage feature. The dimensions assigned to that unit should therefore not be interpreted as proposed drainage dimensions.

3.8.53.8.4 The assessment conservatively assumes that runoff from the identified hardstanding areas is managed through a controlled drainage system and demonstrates that sufficient attenuation can be provided within the available land using one or more appropriate SuDS or other attenuation features. Undertaking separate calculations and fixing dimensions for each component at this stage would imply a degree of design certainty that does not exist, unnecessarily constrain the subsequent optimisation of the Scheme and would not materially improve the assessment of flood risk. The final drainage arrangement, including the contributing catchments, conveyance system, storage type, dimensions and required volumes, will be recalculated and verified against the final technology and layout at detailed design stage. It will remain subject to the discharge limits, design standard and drainage principles established by this strategy and secured through Requirement 5 of the **Draft Development Consent Order [REP4-004]**.

3.9 Event Exceedance

- 3.9.1 The illustrative SuDS approach has been sized to manage surface water runoff from the positively drained hardstanding surfaces up to and including the 1% AEP plus 45% climate change event. Storm events in excess of this design event may result in temporary shallow exceedance flooding within lower-risk areas of Lime Down E2.
- 3.9.2 Finished levels for sensitive electrical infrastructure and equipment plinths will be set above surrounding ground levels where practicable. Exceedance routes will be confirmed at detailed design and will direct residual flows away from critical equipment, buildings and access points where practicable, so that exceedance flooding does not result in a material increase in flood risk on-site or elsewhere.

3.10 Surface Water Treatment

- 3.10.1 In accordance with DEFRA's National standards for sustainable drainage systems and the Simple Index Approach as described in C753 The SuDS Manual (2015), other roofs have a 'low' pollution hazard level, with commercial yards classified as having a 'medium' pollution hazard level. The table below shows the pollution hazard indices for each land use.

Table 8: Pollution Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Other Roofs (typically commercial/industrial roofs)	Low	0.5	0.2**	0.4
Commercial Yard and Delivery Areas, Non-residential Car Parking and all roads except Low Traffic Roads	Medium	0.7	0.6	0.7

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 26.2

* Indices values range from 0-1.

** up to 0.8 where there is potential for metals to leach from the roof

3.10.2 Runoff from positively drained hardstanding surfaces will be routed through an appropriate SuDS treatment train before controlled discharge. Table 9 below demonstrates the mitigation indices for typical SuDS components that may be used within the final drainage design.

Table 9: SuDS Mitigation Indices

Type of SuDS	Mitigation Indices		
	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Permeable Surfacing	0.7	0.6	0.7
Swale	0.5	0.6	0.6
Detention basin	0.5	0.5	0.6
Pond	0.7	0.7	0.5

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' -Table 26.3

3.10.3 It is concluded that a suitable combination of SuDS components, such as detention basins, ponds, swales, lined permeable surfacing and/or filter drains, can provide sufficient treatment for the assessed pollution hazard indices. The final treatment train will be confirmed at detailed design and will be coordinated with the required attenuation, isolation and maintenance arrangements.

3.11 Maintenance

3.11.1 Routine inspections and maintenance of the surface water drainage system will be required to ensure that the drainage infrastructure continues to operate effectively for the lifetime of the development, without increasing flood risk on or off site.

3.11.2 Maintenance of surface water drainage features will be the responsibility of the undertaker or operator. Maintenance of the operational drainage system will be carried out in accordance with the final drainage design and the principles set out in **Outline Operational Environmental Management Plan [REP3-094]**.

3.11.3 The final maintenance arrangements will be confirmed at detailed design and will reflect the final drainage components, flow controls, treatment measures, isolation valves and outfall arrangements.

4. Conclusions and Recommendations

Lime Down E2 comprises ground mounted Solar PV Panels, Solar PV Site Access Tracks, fourteen Conversion Units / 33kV Sub-distribution Switch Rooms and associated supporting infrastructure.

Flood Risk

- 4.1.1 Lime Down E2 is situated largely within Flood Zone 1 with the exception of Fields E20 – E27 which are located in Flood Zones 2 and 3. The extent of Flood Zone 3 is considered to be associated with Gabriel's Well (which flows in a north-easterly direction). All areas of proposed Scheme located within Flood Zones 2 / 3 have been included in floodplain storage compensation calculations and found the impact on flood depths to be negligible.
- 4.1.2 The majority of Lime Down E2 is at Very Low risk of surface water flooding. However, there are some small areas of Low to High risk, particularly in areas associated with the presence of Gabriel's Well which flows in a north-easterly direction.
- 4.1.3 The risk of flooding from all sources has been assessed and the flood risk is considered to be **Negligible to Low** and therefore does not require site-specific mitigation measures.
- 4.1.4 The solar PV Panels will be mounted on raised frames and therefore raised above surrounding ground level allowing flood water to flow freely underneath. The panel supports are discrete and widely spaced, and the floodplain storage assessment demonstrates that any displacement of floodplain volume would be negligible. The various components dimensions can be found in detail in Chapter 3: Scheme Description.

Drainage Strategy

- 4.1.5 Solar PV panelled areas are not treated as formal impermeable drainage catchments within this Outline Drainage Strategy. The panels are elevated above ground level, drain to the existing ground, are not sealed into a drainage network, and do not create a connected impermeable surface.
- 4.1.6 Greenfield runoff rates have been calculated for the assessed hardstanding surfaces and the proposed discharge rates have been restricted in accordance with the LLFA drainage requirement. The identified receiving watercourse is Gabriel's Well through the centre of Lime Down E2, with the indicative cumulative controlled discharge rates provided within Table 6. The proposed SuDS features will attenuate surface water runoff from the positively drained hardstanding surfaces up to and including the 1% AEP plus 45% climate change event. In addition, the everyday rainfall volumes are limited and can be accommodated within the [preferredproposed source-control](#) SuDS features ~~by providing the required additional storage depth.~~
- 4.1.7 It is concluded that a suitable combination of SuDS components, such as detention basins, ponds, swales and/or permeable surfacing, can provide sufficient treatment for the assessed pollution hazard indices.

4.2 Recommendations

- 4.2.1 Embedded mitigation is detailed in **ES Volume 3, Appendix 11-1: Flood Risk Assessment and Outline Drainage Strategy – Covering Report [REP3-039]**. The final drainage design for the Solar PV Site Access Tracks and supporting electrical infrastructure will be submitted and approved in accordance with the relevant DCO drainage requirement.

Annexes

Annex A- Water Body Catchment Classifications Summaries

Rodbourne Bk – Source to Conf R Avon Water Body Catchment Classification Summary

Classification Item	2019 Classification		2022 Classification	Cycle 3 Objectives		
	Cycle 2	Cycle 3	Cycle 3	Status	Year	Reasons
Ecological	Moderate	Moderate	Moderate	Good	2027 - Low Confidence	Disproportionately expensive: Disproportionate burdens
Biological Quality Elements	Moderate	Moderate	Moderate	Good	2027 - Low Confidence	Disproportionately expensive: Disproportionate burdens
Invertebrates	Moderate	Moderate	Moderate	Good	2015	
Macrophytes and Phytobenthos Combined	Moderate	Moderate	Moderate	Good	2027 - Low Confidence	Disproportionately expensive: Disproportionate burdens
Macrophytes subelement	Moderate	Moderate	Moderate			
Physio-Chemical Quality Elements	High	High	High	Good	2027 - Low Confidence	Disproportionately expensive: Disproportionate burdens
Ammonia (Phys-Chem)	High	High	High	Good	2015	
Dissolved Oxygen	High	High	High	Good	2015	
Phosphate	High	High	High	Good	2015	Disproportionately expensive: Disproportionate burdens
Temperature	High	High	High	Good	2015	
pH	High	High	High	Good	2015	
Hydromorphological Supporting Elements	Supports Good	Supports Good	Supports Good	Supports Good	2015	
Hydrological Regime	Supports Good	Supports Good	Supports Good		2015	
Specific Pollutants				N/A	2015	
Copper						
Triclosan						
Zinc						
Chemical	Fail	Fail	N/A	Good	2063	Natural conditions: Chemical status recovery time
Priority Hazardous Substances	Fail	Fail	N/A	Good	2063	Natural conditions: Chemical status recovery time
Benzo(a)pyrene	Good	Good		Good	2015	
Cadmium and Its Compounds						
Di(2-ethylhexyl)phthalate (Priority hazardous)						
Dioxins and dioxin-like compounds	Good	Good		Good	2015	
Heptachlor and cis-Heptachlor Epoxide	Good	Good		Good	2015	
Hexabromocyclododecane	Good	Good		Good	2015	
Hexachlorobenzene	Good	Good		Good	2015	
Hexachlorobutadiene	Good	Good		Good	2015	
Mercury and Its Compounds	Fail	Fail		Good	2040	Natural conditions: Chemical status recovery time
Nonylphenol						
Perfluorooctane sulphonate (PFOS)	Good	Good		Good	2015	
Polybrominated diphenyl ethers (PBDE)	Fail	Fail		Good	2063	Natural conditions: Chemical status recovery time
Tributyltin Compounds						
Priority substances	Good	Good	N/A	Good	2015	
Cypermethrin (Priority)	Good	Good		Good	2015	
Fluoranthene	Good	Good		Good	2015	
Lead and Its Compounds						
Nickel and Its Compounds						
Other Pollutants	N/A	N/A	N/A	N/A	2015	Did not require assessment

Sutton Benger Bk – Source to Conf R Avon Catchment Classification Summary

Classification Item	2019 Classification		2022 Classification	Cycle 3 Objectives		
	Cycle 2	Cycle 3	Cycle 3	Status	Year	Reasons
Ecological	Good	Good	Good	Good	2021	Disproportionately expensive: Disproportionate burdens
Biological Quality Elements	Good	Good	Good	Good	2021	Disproportionately expensive: Disproportionate burdens
Invertebrates	High	High	High	Good	2015	
Macrophytes and Phytobenthos Combined	Good	Good	Good	Good	2021	Disproportionately expensive: Disproportionate burdens
Macrophytes sub element	Good	Good	Good			
Physio-Chemical Quality Elements	High	High	High	Good	2015	
Acid Neutralising Capacity	N/A	N/A	High		2015	
Ammonia (Phys-Chem)	High	High	High	Good	2015	
Dissolved Oxygen	High	High	High	Good	2015	
Phosphate	High	High	High	Good	2015	
Temperature	High	High	High	Good	2015	
pH	High	High	High	Good	2015	
Hydromorphological Supporting Elements	Supports Good	Supports Good	Supports Good	Supports Good	2015	
Hydrological Regime	Supports Good	Supports Good	Supports Good	Supports Good	2021	Disproportionately expensive: Disproportionate burdens
Morphology	Supports Good	Supports Good	Supports Good			
Chemical	Fail	Fail	N/A	Good	2063	Natural conditions: Chemical status recovery time
Priority Hazardous Substances	Fail	Fail	N/A	Good	2063	Natural conditions: Chemical status recovery time
Benzo(a)pyrene	Good	Good	N/A	Good	2015	
Dioxins and dioxin-like compounds	Good	Good		Good	2015	
Heptachlor and cis-Heptachlor Epoxide	Good	Good		Good	2015	
Hexabromocyclododecane	Good	Good		Good	2015	
Hexachlorobenzene	Good	Good		Good	2015	
Hexachlorobutadiene	Good	Good		Good	2015	
Mercury and Its Compounds	Fail	Fail		Good	2040	Natural conditions: Chemical status recovery time
Perfluorooctane sulphonate (PFOS)	Good	Good		Good	2015	
Polybrominated diphenyl ethers (PBDE)	Fail	Fail		Good	2063	Natural conditions: Chemical status recovery time
Priority substances	Good	Good	N/A	Good	2015	
Cypermethrin (Priority)	Good	Good		Good	2015	
Fluoranthene	Good	Good		Good	2015	
Other Pollutants	N/A	N/A	N/A	N/A	2015	Did not require assessment

Annex B – Model Results: Flood Depths and Extents

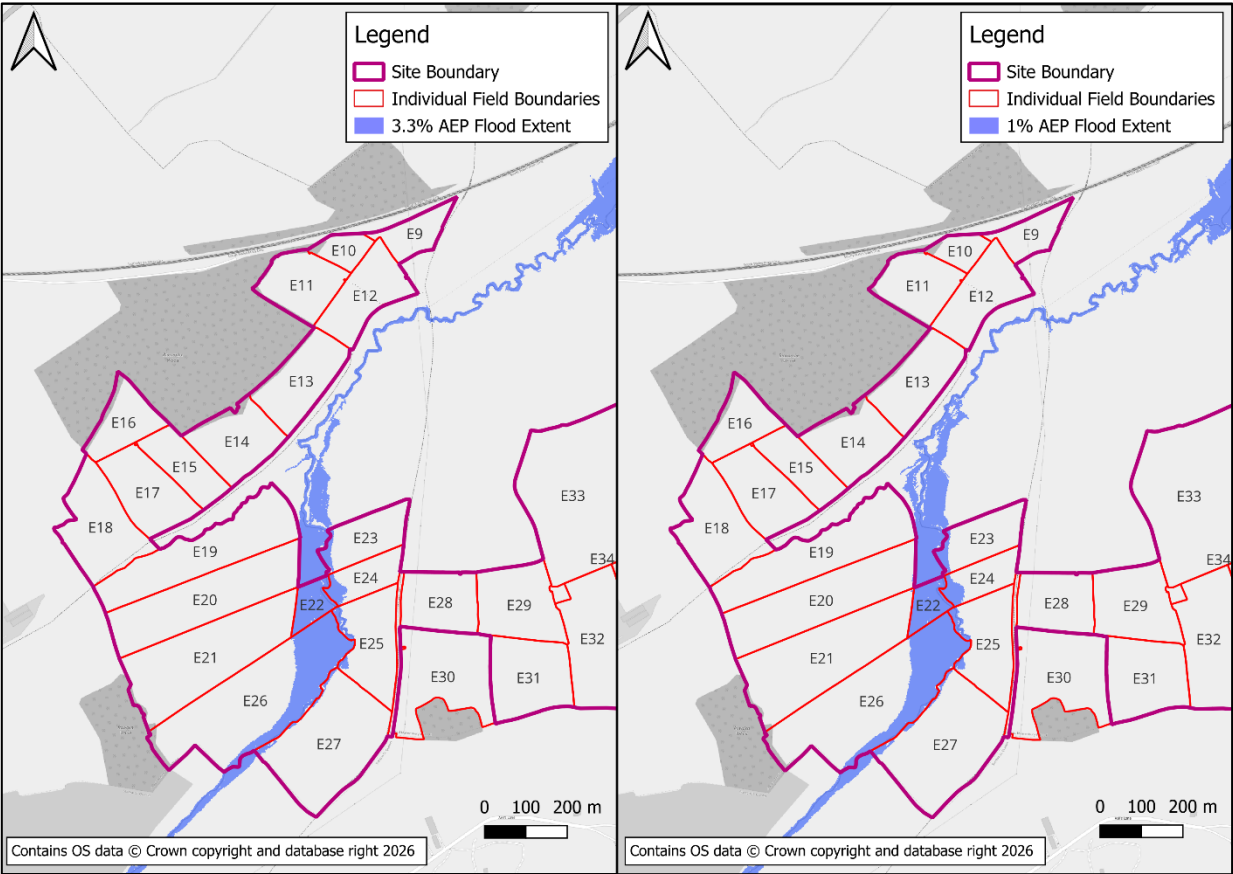


Figure 9: Maximum Modelled Flood Extent – 3.3% AEP (left) and 1% AEP (right)

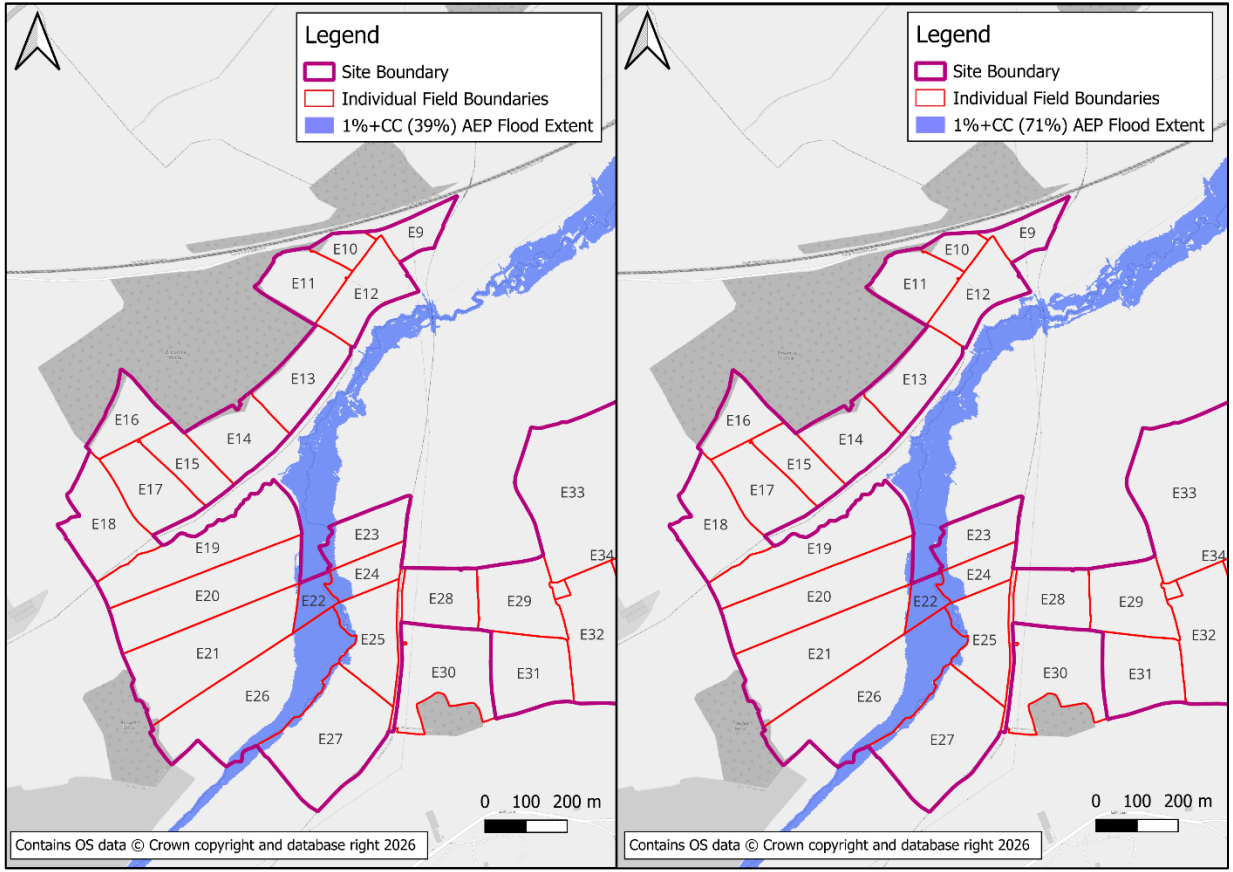


Figure 10: Maximum Modelled Flood Extent – 1%+CC (39%) AEP (left) and 1%+CC (71%) AEP (right)

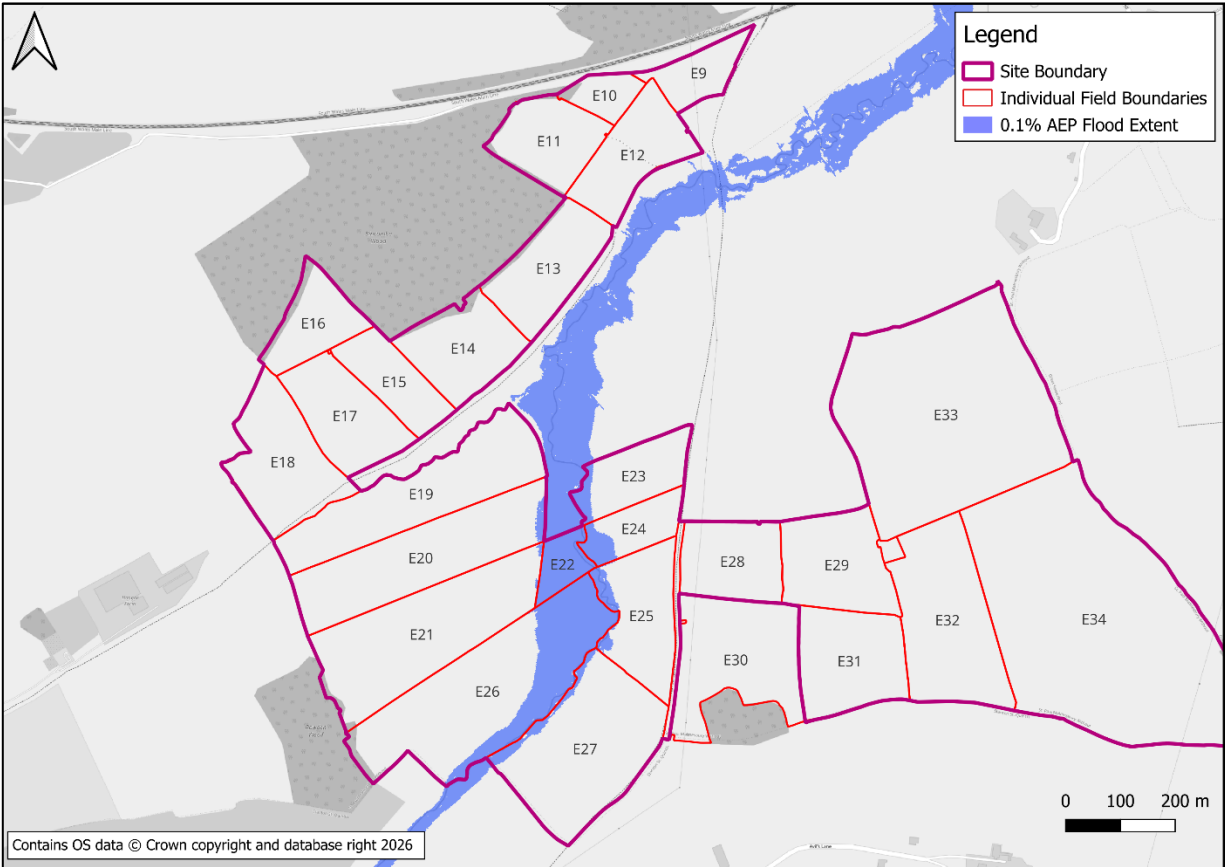


Figure 11: Maximum Modelled Flood Extent – 0.1% AEP

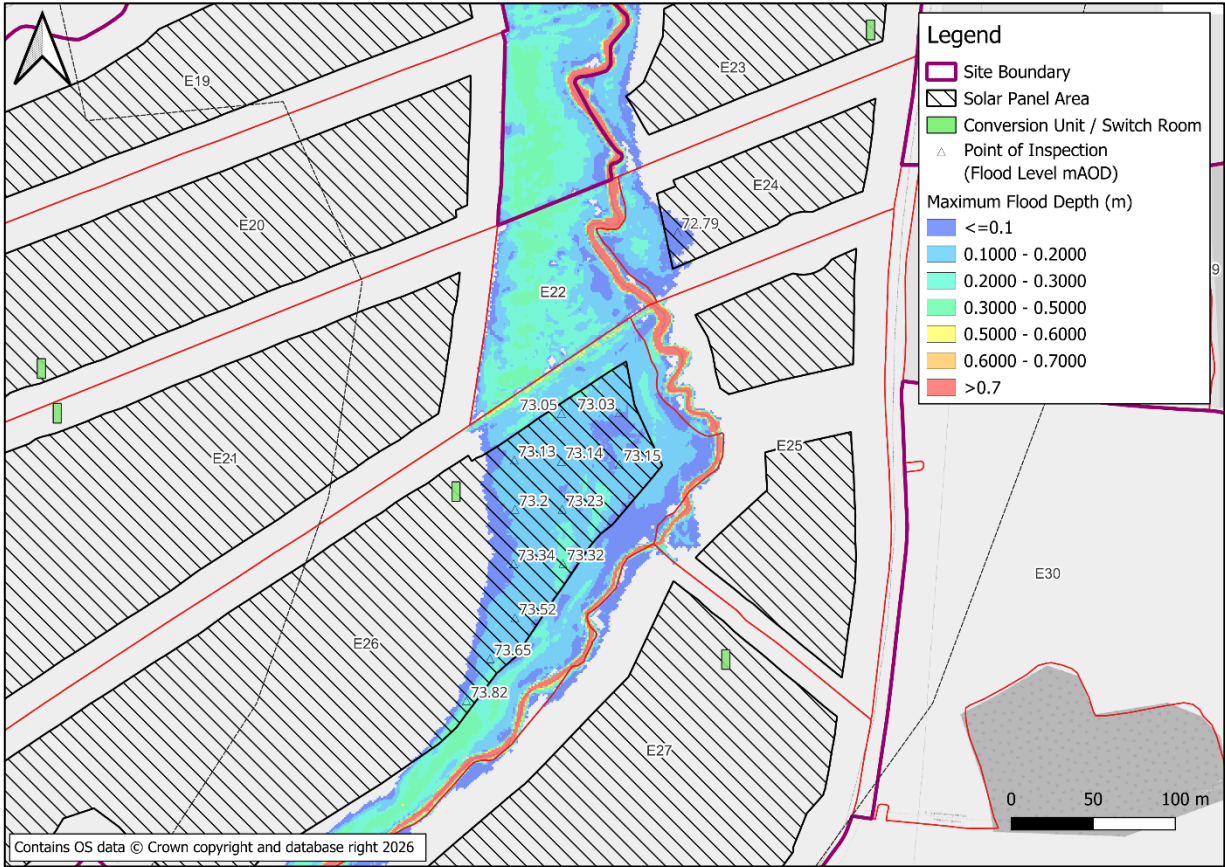


Figure 12: Maximum Modelled Flood Depths – 3.3% AEP

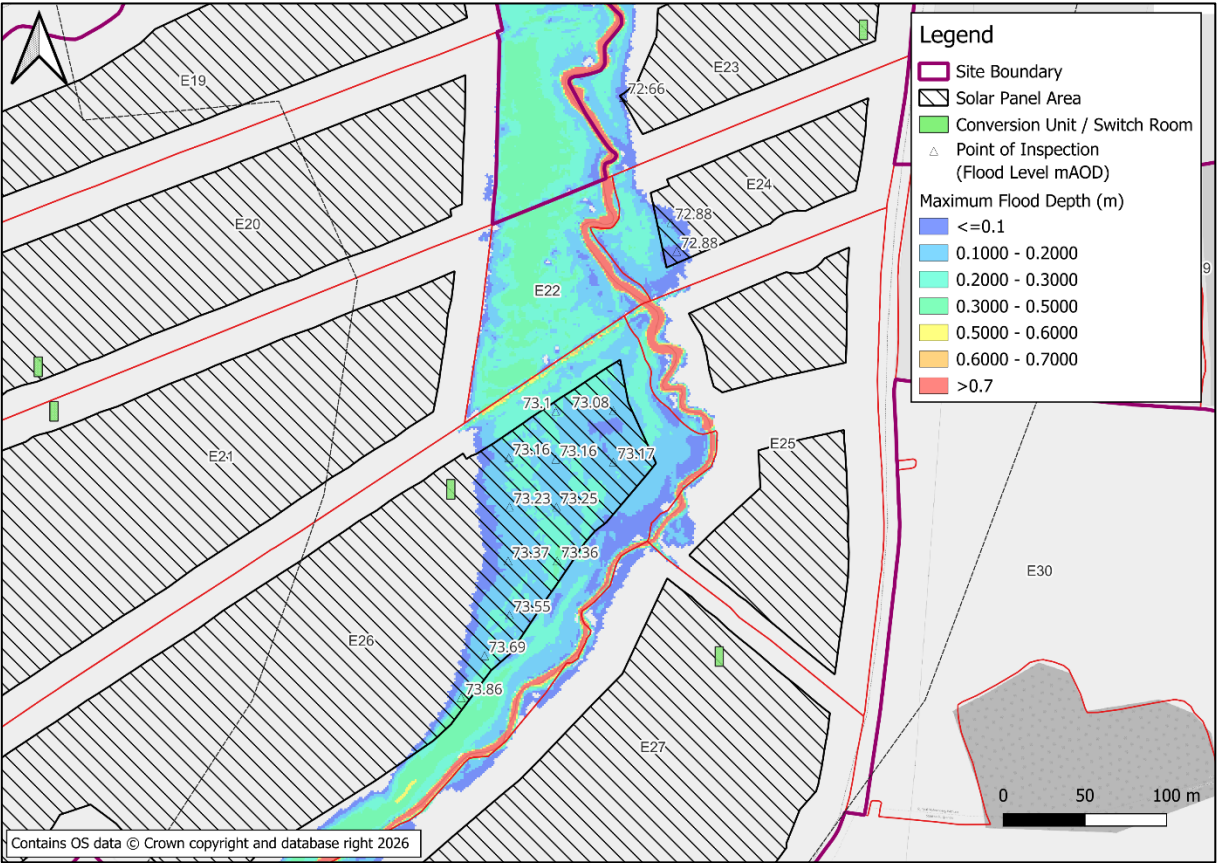


Figure 13: Maximum Modelled Flood Depths – 1% AEP

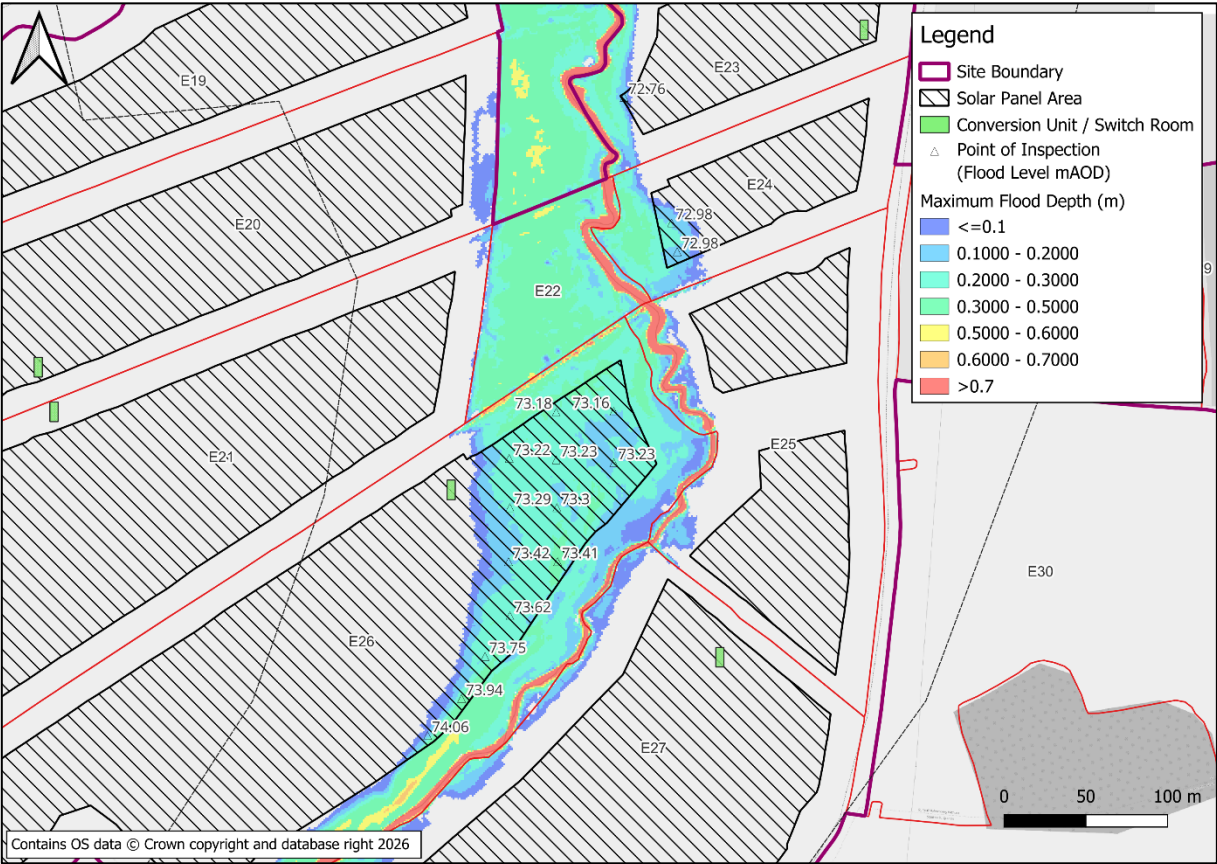


Figure 14: Maximum Modelled Flood Depths – 1%+CC (39%) AEP

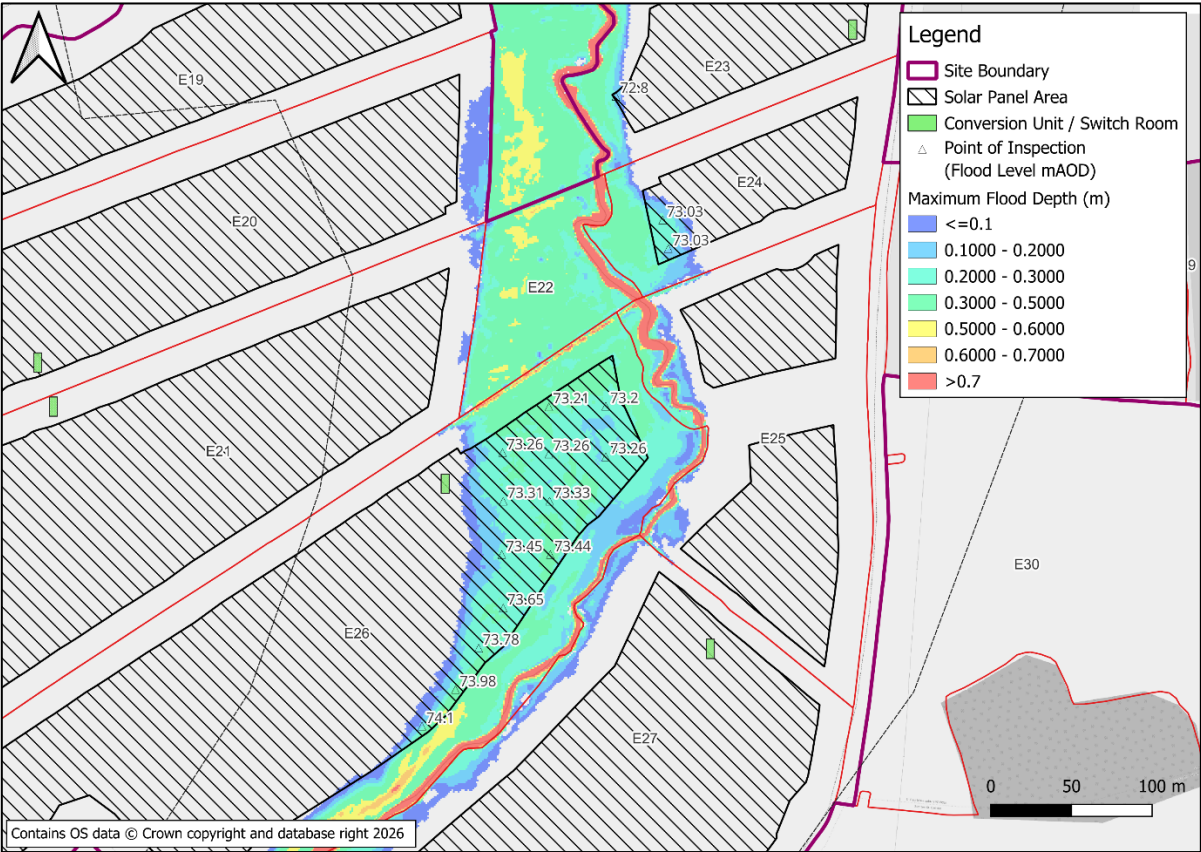


Figure 15: Maximum Modelled Flood Depths – 1%+CC (71%) AEP

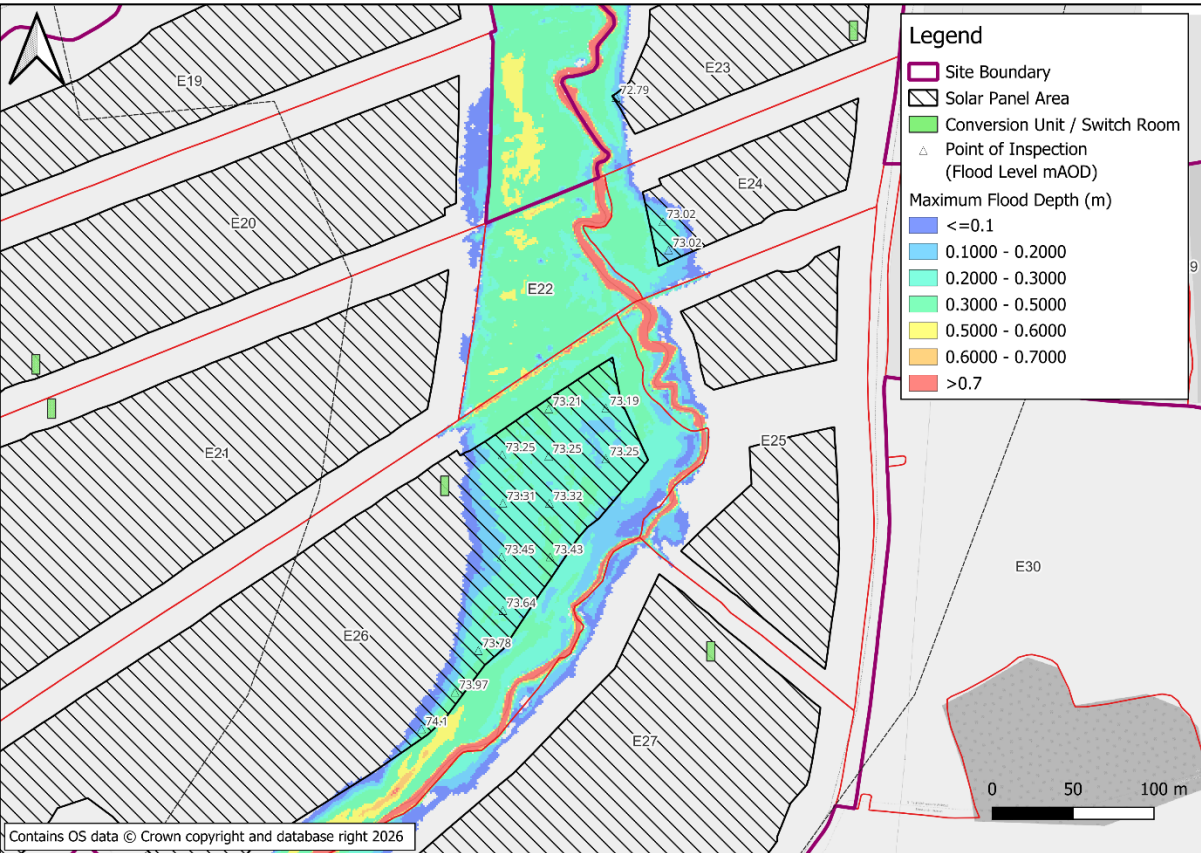


Figure 16: Maximum Modelled Flood Depths – 0.1% AEP

Annex C - Manning's Open Channel Flow Mapping

Manning's Open Channel Flow Calculation

Methodology

Cross-sections through the floodplain were extracted from Environment Agency (EA) LiDAR DTM data (flown March 2020) at the locations shown in Figure 1. These cross-sections can be considered representative of the channel and general floodplain adjacent to the site and at the location of the proposed development. The cross-sections were imported into Flood Modeller and the "tabulate cross section properties" tool was utilised to establish the level-flow relationship for the channel and wider floodplain. This tool utilises the Manning's open channel flow equation. Manning's 'n' roughness was set to 0.03s/m^{1/3} for the channel and 0.04s/m^{1/3} for the floodplain. These values were chosen based on Chow (1959)* and aerial imagery. The channel slope was set for each cross-section based on underlying LiDAR.

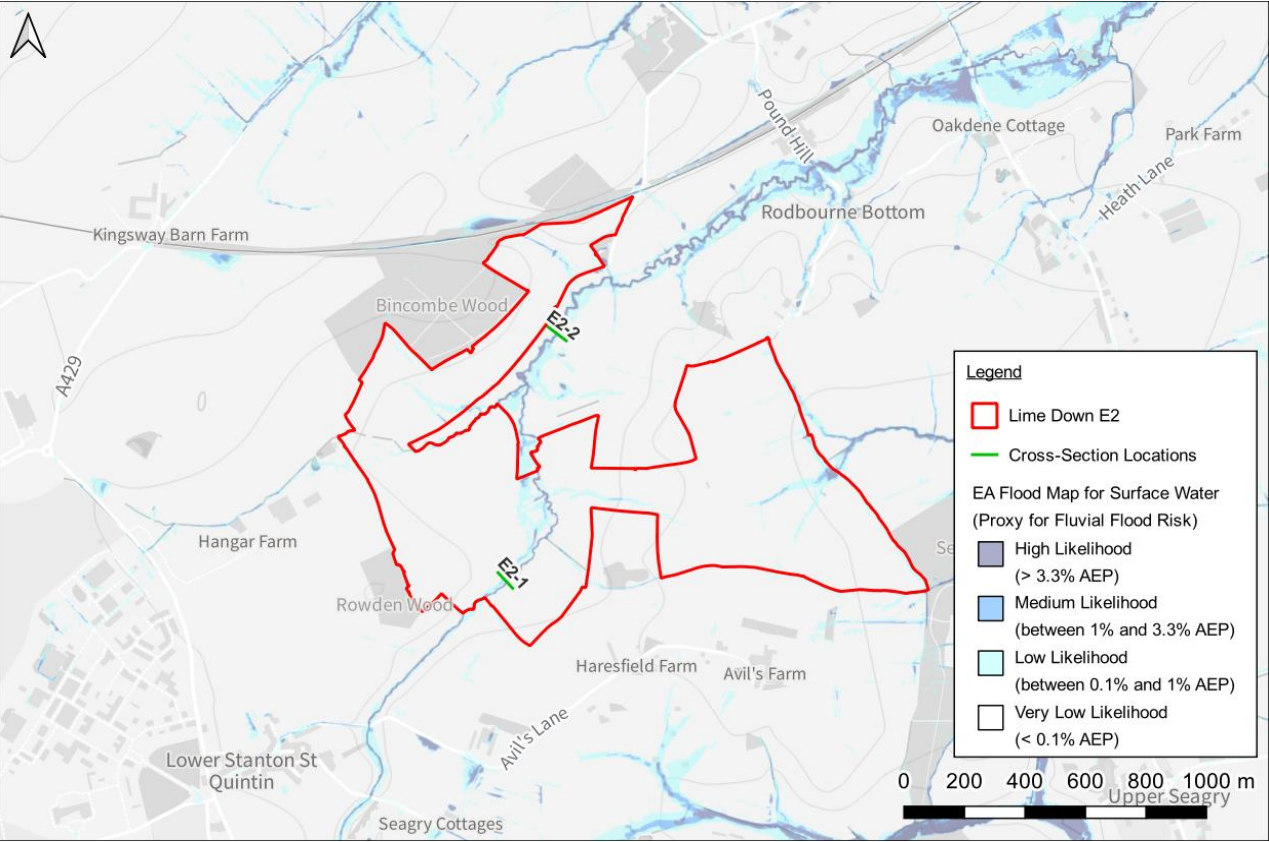
In the absence of detailed flood extent data covering the site, the extents of the EA surface water flood map (0.1% AEP event, present day) have been compared to underlying LiDAR data to provide an estimate of water levels. The surface water flood map has been used as a proxy for fluvial flooding given the similarity to the EA Flood Zone 2 extent and the additional detail it affords. The EA has since released the NaFRA2 mapping, however, a review of the flood extents indicates they are smaller across much of the study area. As such, the calculations presented here can be considered conservative.

Within this excel workbook, the xlookup function has been used along with the Flood Modeller level-flow relationship for the cross-sections to determine the equivalent flow for each estimated water level, rounding up where a direct match is not found. The appropriate climate change uplifts have then been applied to these flows and a second xlookup used to determine the equivalent level for the increased flow.

Cross-sections have been located at suitable locations throughtout the proposed development. Whilst it is acknowledged that the Manning's open channel flow equation used to determine the level-flow relationship does not constitute detailed hydraulic modelling, the calculation can still be considered suitable to demonstrate the scale of the changes in water level that can be expected when considering a +71% uplift in flows (Avon Bristol and North Somerset Streams Management Catchment, 2080's higher allowance).

*Chow, V.T. (1959). Open-Channel Hydraulics. New York, NY: McGraw-Hill.

Cross-Section Locations



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Calculated Flows and Levels

Cross-Section	Level Description	Estimated Flood Level (m AOD)	Estimated Equivalent Flow (m³/s)	Flow +71% CC Uplift (m³/s)	Equivalent Flood Level (m AOD)
E2-1	0.1% AEP EA FMFSW water level	73.90	9.0	15.3	74.03 (+129mm)
E2-2	0.1% AEP EA FMFSW water level	71.45	12.1	20.6	71.60 (+151mm)

Tabulated Cross-Section Properties // E2-1

(Calculated by Flood Modeller)

Node	Flow (m³/s)	Stage (m AOD)	Depth (m)	Velocity (m/s)	Froude no.	Area (m²)	Conveyance (m³/s)	Width (m)	W Perim. (m)	Slope
E2-1	0.000	73.245	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0149
E2-1	0.000	73.266	0.021	0.144	0.450	0.003	0.004	0.329	0.334	0.0149
E2-1	0.003	73.287	0.042	0.228	0.505	0.014	0.026	0.658	0.668	0.0149
E2-1	0.009	73.307	0.062	0.299	0.541	0.031	0.076	0.988	1.002	0.0149
E2-1	0.020	73.328	0.083	0.362	0.567	0.055	0.163	1.317	1.335	0.0149
E2-1	0.036	73.349	0.104	0.421	0.589	0.086	0.295	1.646	1.669	0.0149
E2-1	0.064	73.372	0.127	0.513	0.618	0.125	0.527	1.787	1.818	0.0149
E2-1	0.100	73.395	0.150	0.592	0.640	0.168	0.819	1.928	1.966	0.0149
E2-1	0.143	73.419	0.174	0.663	0.657	0.215	1.169	2.069	2.115	0.0149
E2-1	0.193	73.442	0.197	0.728	0.672	0.264	1.580	2.209	2.263	0.0149
E2-1	0.250	73.465	0.220	0.788	0.685	0.317	2.053	2.350	2.412	0.0149
E2-1	0.315	73.488	0.243	0.844	0.696	0.374	2.588	2.491	2.560	0.0149
E2-1	0.389	73.511	0.266	0.897	0.707	0.433	3.188	2.632	2.709	0.0149
E2-1	0.470	73.535	0.290	0.948	0.716	0.496	3.854	2.773	2.857	0.0149
E2-1	0.559	73.558	0.313	0.996	0.724	0.562	4.589	2.914	3.006	0.0149
E2-1	0.657	73.581	0.336	1.042	0.732	0.631	5.394	3.055	3.154	0.0149
E2-1	0.775	73.606	0.361	1.077	0.818	0.720	6.361	4.076	4.185	0.0149
E2-1	0.914	73.631	0.386	1.095	0.864	0.835	7.500	5.098	5.216	0.0149
E2-1	1.080	73.656	0.411	1.108	0.887	0.975	8.864	6.119	6.248	0.0149
E2-1	1.117	73.661	0.416	1.110	0.891	1.006	9.165	6.353	6.483	0.0149
E2-1	1.148	73.665	0.420	1.112	0.908	1.032	9.415	6.762	6.894	0.0149
E2-1	1.305	73.684	0.439	1.103	0.976	1.183	10.706	9.085	9.224	0.0149
E2-1	1.499	73.703	0.458	1.088	1.000	1.378	12.298	11.407	11.554	0.0149
E2-1	1.500	73.705	0.460	1.070	1.039	1.402	12.309	12.957	13.105	0.0149
E2-1	1.563	73.710	0.465	1.065	1.035	1.468	12.827	13.596	13.745	0.0149
E2-1	1.577	73.711	0.466	1.064	1.033	1.482	12.934	13.713	13.863	0.0149
E2-1	1.603	73.713	0.468	1.062	1.032	1.510	13.151	13.994	14.145	0.0149
E2-1	1.980	73.738	0.493	1.035	1.020	1.912	16.243	18.228	18.389	0.0149
E2-1	1.990	73.739	0.494	1.031	1.013	1.931	16.327	18.304	18.465	0.0149
E2-1	2.050	73.742	0.497	1.033	1.005	1.986	16.821	18.459	18.621	0.0149
E2-1	2.434	73.760	0.515	1.046	0.965	2.327	19.973	19.436	19.604	0.0149
E2-1	2.962	73.781	0.536	1.067	0.987	2.775	24.298	23.269	23.444	0.0149
E2-1	2.989	73.782	0.537	1.068	0.990	2.799	24.522	23.583	23.758	0.0149
E2-1	3.164	73.788	0.543	1.074	1.001	2.945	25.956	25.075	25.251	0.0149
E2-1	3.196	73.789	0.544	1.076	0.999	2.970	26.217	25.099	25.275	0.0149

Node	Flow (m³/s)	Stage (m AOD)	Depth (m)	Velocity (m/s)	Froude no.	Area (m²)	Conveyance (m³/s)	Width (m)	W Perim. (m)	Slope
E2-1	4.078	73.814	0.569	1.132	0.962	3.603	33.457	25.527	25.706	0.0149
E2-1	5.104	73.839	0.594	1.202	0.949	4.246	41.871	25.955	26.137	0.0149
E2-1	6.262	73.864	0.619	1.278	0.947	4.900	51.375	26.383	26.568	0.0149
E2-1	7.548	73.889	0.644	1.356	0.950	5.565	61.922	26.811	26.999	0.0149
E2-1	8.955	73.914	0.669	1.435	0.957	6.241	73.471	27.239	27.431	0.0149
E2-1	10.029	73.932	0.687	1.489	0.963	6.734	82.282	27.615	27.809	0.0149
E2-1	11.164	73.950	0.705	1.543	0.969	7.235	91.591	27.992	28.188	0.0149
E2-1	12.358	73.968	0.723	1.596	0.976	7.742	101.388	28.369	28.567	0.0149
E2-1	13.773	73.988	0.743	1.659	0.990	8.301	112.995	28.982	29.181	0.0149
E2-1	15.259	74.007	0.762	1.720	1.003	8.873	125.189	29.595	29.796	0.0149
E2-1	16.994	74.029	0.784	1.783	1.016	9.532	139.422	30.376	30.578	0.0149
E2-1	18.822	74.051	0.806	1.844	1.028	10.209	154.417	31.157	31.360	0.0149
E2-1	20.203	74.067	0.822	1.884	1.053	10.721	165.753	32.837	33.040	0.0149
E2-1	21.096	74.077	0.832	1.908	1.074	11.057	173.074	34.404	34.608	0.0149
E2-1	21.371	74.080	0.835	1.915	1.075	11.161	175.333	34.532	34.736	0.0149
E2-1	23.052	74.099	0.854	1.949	1.080	11.827	189.124	35.607	35.812	0.0149
E2-1	24.821	74.118	0.873	1.984	1.084	12.513	203.637	36.682	36.888	0.0149
E2-1	24.917	74.119	0.874	1.985	1.086	12.551	204.427	36.866	37.071	0.0149
E2-1	25.206	74.122	0.877	1.991	1.095	12.662	206.791	37.607	37.813	0.0149
E2-1	26.529	74.135	0.890	2.014	1.131	13.171	217.647	40.726	40.933	0.0149
E2-1	27.973	74.149	0.904	2.034	1.143	13.755	229.497	42.617	42.825	0.0149
E2-1	29.454	74.163	0.918	2.055	1.139	14.334	241.647	43.220	43.429	0.0149
E2-1	31.014	74.176	0.931	2.078	1.137	14.922	254.442	43.823	44.032	0.0149
E2-1	32.634	74.191	0.946	2.094	1.134	15.587	267.731	44.823	45.032	0.0149
E2-1	33.401	74.198	0.953	2.100	1.135	15.903	274.029	45.557	45.767	0.0149
E2-1	33.512	74.199	0.954	2.101	1.138	15.948	274.939	45.891	46.101	0.0149
E2-1	34.187	74.205	0.960	2.106	1.163	16.232	280.475	48.561	48.771	0.0149
E2-1	35.609	74.215	0.970	2.129	1.182	16.727	292.141	50.562	50.773	0.0149
E2-1	39.322	74.240	0.995	2.183	1.184	18.009	322.600	51.976	52.188	0.0149
E2-1	42.032	74.257	1.012	2.224	1.186	18.900	344.842	52.752	52.965	0.0149
E2-1	44.913	74.275	1.030	2.265	1.190	19.832	368.474	53.754	53.967	0.0149
E2-1	47.902	74.292	1.047	2.305	1.195	20.781	392.995	54.756	54.970	0.0149
E2-1	48.601	74.296	1.051	2.314	1.214	21.004	398.727	56.707	56.921	0.0149
E2-1	49.633	74.303	1.058	2.319	1.213	21.403	407.193	57.464	57.678	0.0149
E2-1	50.500	74.308	1.063	2.328	1.219	21.693	414.307	58.387	58.601	0.0149
E2-1	52.146	74.317	1.072	2.346	1.226	22.224	427.818	59.531	59.746	0.0149
E2-1	55.875	74.337	1.091	2.388	1.226	23.394	458.406	60.450	60.665	0.0149
E2-1	59.753	74.356	1.111	2.431	1.226	24.581	490.224	61.368	61.584	0.0149
E2-1	63.235	74.373	1.128	2.467	1.228	25.632	518.793	62.298	62.514	0.0149
E2-1	66.831	74.390	1.145	2.503	1.230	26.699	548.294	63.227	63.445	0.0149
E2-1	67.262	74.392	1.147	2.507	1.244	26.827	551.825	64.834	65.052	0.0149
E2-1	67.592	74.394	1.149	2.507	1.243	26.957	554.535	65.027	65.244	0.0149
E2-1	71.811	74.413	1.168	2.546	1.249	28.208	589.150	66.602	66.821	0.0149
E2-1	76.597	74.434	1.188	2.589	1.247	29.581	628.413	67.323	67.543	0.0149
E2-1	81.557	74.454	1.209	2.634	1.246	30.968	669.104	68.044	68.265	0.0149
E2-1	87.619	74.478	1.233	2.687	1.246	32.610	718.837	68.755	68.978	0.0149
E2-1	93.912	74.502	1.257	2.741	1.246	34.268	770.473	69.467	69.691	0.0149
E2-1	100.440	74.526	1.281	2.794	1.247	35.944	824.025	70.178	70.404	0.0149
E2-1	102.402	74.533	1.288	2.811	1.246	36.435	840.119	70.300	70.526	0.0149

Tabulated Cross-Section Properties // E2-2

(Calculated by Flood Modeller)

Node	Flow (m³/s)	Stage (m AOD)	Depth (m)	Velocity (m/s)	Froude no.	Area (m²)	Conveyance (m³/s)	Width (m)	W Perim. (m)	Slope
E2-2	0.000	70.518	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0147
E2-2	0.003	70.544	0.026	0.167	0.468	0.018	0.024	1.355	1.359	0.0147
E2-2	0.021	70.574	0.056	0.339	0.557	0.063	0.175	1.666	1.676	0.0147
E2-2	0.054	70.604	0.086	0.457	0.600	0.117	0.442	1.977	1.994	0.0147
E2-2	0.100	70.633	0.116	0.553	0.629	0.181	0.825	2.288	2.311	0.0147
E2-2	0.161	70.663	0.145	0.637	0.651	0.253	1.333	2.598	2.628	0.0147
E2-2	0.239	70.693	0.175	0.712	0.669	0.336	1.972	2.909	2.946	0.0147
E2-2	0.333	70.723	0.205	0.780	0.684	0.427	2.753	3.220	3.263	0.0147
E2-2	0.443	70.752	0.234	0.843	0.697	0.525	3.655	3.522	3.571	0.0147
E2-2	0.570	70.781	0.263	0.903	0.709	0.631	4.706	3.823	3.878	0.0147
E2-2	0.716	70.810	0.292	0.959	0.720	0.747	5.914	4.124	4.186	0.0147
E2-2	0.883	70.839	0.321	1.014	0.730	0.871	7.287	4.425	4.493	0.0147
E2-2	1.070	70.868	0.350	1.066	0.739	1.003	8.833	4.727	4.801	0.0147
E2-2	1.279	70.897	0.379	1.117	0.747	1.145	10.558	5.028	5.108	0.0147
E2-2	1.325	70.903	0.385	1.128	0.749	1.175	10.940	5.088	5.170	0.0147
E2-2	1.574	70.932	0.414	1.187	0.758	1.326	12.996	5.317	5.407	0.0147
E2-2	1.845	70.961	0.443	1.243	0.767	1.485	15.237	5.546	5.644	0.0147
E2-2	2.140	70.990	0.472	1.297	0.775	1.649	17.669	5.775	5.880	0.0147
E2-2	2.458	71.019	0.501	1.350	0.783	1.821	20.294	6.005	6.117	0.0147
E2-2	2.800	71.049	0.531	1.401	0.790	1.999	23.117	6.234	6.354	0.0147
E2-2	3.166	71.078	0.560	1.450	0.796	2.184	26.142	6.463	6.591	0.0147
E2-2	3.557	71.107	0.589	1.498	0.803	2.375	29.374	6.692	6.827	0.0147
E2-2	3.974	71.136	0.618	1.544	0.809	2.573	32.816	6.921	7.064	0.0147
E2-2	4.417	71.165	0.647	1.590	0.814	2.778	36.473	7.150	7.301	0.0147
E2-2	4.885	71.195	0.677	1.630	0.819	2.997	40.334	7.429	7.587	0.0147
E2-2	5.382	71.225	0.707	1.669	0.824	3.224	44.443	7.709	7.874	0.0147
E2-2	5.911	71.255	0.737	1.709	0.829	3.459	48.807	7.988	8.160	0.0147
E2-2	6.471	71.285	0.767	1.747	0.834	3.703	53.430	8.267	8.447	0.0147
E2-2	7.063	71.315	0.797	1.786	0.838	3.955	58.320	8.547	8.733	0.0147
E2-2	7.648	71.341	0.823	1.828	0.854	4.183	63.148	8.963	9.153	0.0147
E2-2	8.259	71.367	0.849	1.868	0.869	4.422	68.197	9.380	9.573	0.0147
E2-2	8.800	71.386	0.868	1.907	0.933	4.614	72.665	10.832	11.027	0.0147
E2-2	8.917	71.390	0.872	1.915	0.941	4.657	73.632	11.029	11.224	0.0147
E2-2	8.976	71.392	0.874	1.918	1.011	4.681	74.119	12.757	12.952	0.0147
E2-2	9.127	71.397	0.879	1.921	1.096	4.751	75.361	15.178	15.374	0.0147
E2-2	9.127	71.397	0.879	1.921	1.096	4.751	75.361	15.178	15.374	0.0147
E2-2	9.806	71.418	0.900	1.922	1.163	5.103	80.967	18.347	18.544	0.0147
E2-2	9.909	71.421	0.903	1.921	1.172	5.159	81.817	18.839	19.036	0.0147
E2-2	9.978	71.423	0.905	1.920	1.175	5.197	82.394	19.083	19.281	0.0147
E2-2	10.049	71.425	0.907	1.920	1.178	5.235	82.978	19.351	19.549	0.0147

Node	Flow (m³/s)	Stage (m AOD)	Depth (m)	Velocity (m/s)	Froude no.	Area (m²)	Conveyance (m³/s)	Width (m)	W Perim. (m)	Slope
E2-2	10.085	71.426	0.908	1.919	1.230	5.255	83.272	21.175	21.373	0.0147
E2-2	10.157	71.428	0.910	1.917	1.257	5.299	83.865	22.341	22.540	0.0147
E2-2	10.691	71.442	0.924	1.897	1.294	5.635	88.275	25.700	25.900	0.0147
E2-2	10.772	71.444	0.926	1.894	1.297	5.687	88.943	26.145	26.345	0.0147
E2-2	10.802	71.445	0.927	1.891	1.293	5.713	89.190	26.227	26.428	0.0147
E2-2	12.075	71.473	0.955	1.863	1.251	6.482	99.707	28.695	28.899	0.0147
E2-2	12.319	71.478	0.960	1.859	1.249	6.627	101.723	29.353	29.557	0.0147
E2-2	12.975	71.491	0.973	1.848	1.250	7.023	107.137	31.520	31.725	0.0147
E2-2	13.247	71.496	0.978	1.845	1.245	7.182	109.385	32.121	32.328	0.0147
E2-2	14.225	71.513	0.995	1.836	1.233	7.746	117.458	34.237	34.445	0.0147
E2-2	15.243	71.529	1.011	1.835	1.213	8.305	125.861	35.582	35.792	0.0147
E2-2	15.805	71.538	1.020	1.831	1.218	8.633	130.507	37.471	37.681	0.0147
E2-2	16.218	71.544	1.026	1.831	1.208	8.859	133.913	37.819	38.030	0.0147
E2-2	16.660	71.550	1.032	1.833	1.199	9.087	137.561	38.158	38.369	0.0147
E2-2	16.907	71.554	1.036	1.829	1.208	9.242	139.601	39.515	39.726	0.0147
E2-2	19.420	71.585	1.067	1.850	1.174	10.498	160.350	41.471	41.683	0.0147
E2-2	20.824	71.601	1.083	1.864	1.163	11.171	171.944	42.638	42.851	0.0147
E2-2	21.634	71.610	1.092	1.872	1.158	11.558	178.639	43.421	43.634	0.0147
E2-2	24.131	71.636	1.118	1.898	1.147	12.714	199.252	45.540	45.753	0.0147
E2-2	24.320	71.638	1.120	1.899	1.146	12.806	200.815	45.779	45.992	0.0147
E2-2	25.628	71.652	1.134	1.904	1.149	13.463	211.614	48.091	48.304	0.0147
E2-2	25.730	71.653	1.135	1.904	1.148	13.511	212.458	48.195	48.409	0.0147
E2-2	26.730	71.662	1.144	1.916	1.144	13.947	220.710	48.745	48.959	0.0147
E2-2	28.692	71.679	1.161	1.939	1.152	14.797	236.917	51.278	51.494	0.0147
E2-2	30.512	71.694	1.176	1.959	1.152	15.579	251.940	52.895	53.111	0.0147
E2-2	30.512	71.694	1.176	1.959	1.152	15.579	251.940	52.895	53.111	0.0147
E2-2	32.007	71.708	1.190	1.959	1.158	16.341	264.286	56.083	56.301	0.0147
E2-2	32.007	71.708	1.190	1.959	1.158	16.341	264.286	56.083	56.301	0.0147
E2-2	33.156	71.717	1.199	1.968	1.158	16.852	273.775	57.282	57.500	0.0147
E2-2	33.933	71.723	1.205	1.973	1.168	17.201	280.193	59.148	59.366	0.0147
E2-2	34.870	71.730	1.212	1.979	1.168	17.619	287.928	60.250	60.469	0.0147
E2-2	35.784	71.738	1.220	1.976	1.170	18.109	295.477	62.314	62.534	0.0147
E2-2	36.585	71.745	1.227	1.972	1.172	18.552	302.088	64.280	64.501	0.0147
E2-2	37.705	71.752	1.234	1.984	1.168	19.003	311.336	64.575	64.796	0.0147
E2-2	38.505	71.757	1.239	1.992	1.165	19.327	317.942	64.869	65.089	0.0147
E2-2	42.338	71.780	1.262	2.032	1.154	20.831	349.589	65.910	66.131	0.0147
E2-2	47.730	71.810	1.292	2.091	1.145	22.826	394.117	67.136	67.357	0.0147
E2-2	47.917	71.811	1.293	2.093	1.156	22.894	395.658	68.480	68.702	0.0147
E2-2	51.434	71.828	1.311	2.134	1.154	24.098	424.699	69.096	69.318	0.0147
E2-2	55.097	71.846	1.328	2.177	1.153	25.313	454.945	69.712	69.934	0.0147
E2-2	60.356	71.870	1.352	2.236	1.151	26.991	498.364	70.135	70.357	0.0147
E2-2	65.875	71.894	1.376	2.297	1.150	28.679	543.937	70.557	70.780	0.0147
E2-2	71.653	71.918	1.400	2.359	1.151	30.377	591.646	70.980	71.204	0.0147
E2-2	77.597	71.942	1.424	2.420	1.153	32.062	640.729	71.402	71.627	0.0147
E2-2	83.783	71.965	1.447	2.482	1.156	33.757	691.810	71.825	72.050	0.0147
E2-2	90.209	71.989	1.471	2.544	1.159	35.462	744.865	72.247	72.473	0.0147
E2-2	94.338	72.004	1.486	2.581	1.168	36.555	778.962	73.515	73.741	0.0147
E2-2	98.913	72.020	1.502	2.621	1.173	37.737	816.741	74.149	74.375	0.0147
E2-2	103.599	72.036	1.518	2.661	1.178	38.928	855.429	74.782	75.008	0.0147
E2-2	109.164	72.055	1.537	2.708	1.182	40.318	901.385	75.416	75.643	0.0147
E2-2	114.876	72.073	1.555	2.754	1.187	41.718	948.550	76.050	76.277	0.0147
E2-2	120.523	72.091	1.573	2.796	1.196	43.099	995.178	77.317	77.544	0.0147
E2-2	127.322	72.112	1.594	2.846	1.204	44.736	1051.312	78.585	78.812	0.0147

Annex D – Model Results: Displaced Volumes

Table 10: Potential Maximum Displaced Volume – 3.3% AEP

Field Boundary ID / Solar Panel Area	Area in Flood Extent (m ²)	Number of Supports in Flood Extent	Support Cross-sectional Area (m ²)	Maximum Flood Depth (m)	Maximum Displaced Volume (m ³)
E23	0	0	0.002865	0	0.0000
E24	367	1	0.002865	0.08	0.0002
E26	11564	11	0.002865	0.37	0.0117

Table 11: Potential Maximum Displaced Volume – 1% AEP

Field Boundary ID / Solar Panel Area	Area in Flood Extent (m ²)	Number of Supports in Flood Extent	Support Cross-sectional Area (m ²)	Maximum Flood Depth (m)	Maximum Displaced Volume (m ³)
E23	19	1	0.002865	0.08	0.0002
E24	568	1	0.002865	0.15	0.0004
E26	11876	11	0.002865	0.41	0.0129

Table 12: Potential Maximum Displaced Volume – 1%+CC (39%) AEP

Field Boundary ID / Solar Panel Area	Area in Flood Extent (m ²)	Number of Supports in Flood Extent	Support Cross-sectional Area (m ²)	Maximum Flood Depth (m)	Maximum Displaced Volume (m ³)
E23	53	1	0.002865	0.18	0.0005
E24	783	1	0.002865	0.26	0.0007
E26	12529	12	0.002865	0.51	0.0175

Table 13: Potential Maximum Displaced Volume – 1%+CC (71%) AEP

Field Boundary ID / Solar Panel Area	Area in Flood Extent (m ²)	Number of Supports in Flood Extent	Support Cross-sectional Area (m ²)	Maximum Flood Depth (m)	Maximum Displaced Volume (m ³)
E23	66	1	0.002865	0.22	0.0006
E24	877	1	0.002865	0.3	0.0009
E26	12854	12	0.002865	0.55	0.0189

Table 14: Potential Maximum Displaced Volume – 0.1% AEP

Field Boundary ID / Solar Panel Area	Area in Flood Extent (m ²)	Number of Supports in Flood Extent	Support Cross-sectional Area (m ²)	Maximum Flood Depth (m)	Maximum Displaced Volume (m ³)
E23	58	1	0.002865	0.22	0.0006
E24	863	1	0.002865	0.29	0.0007
E26	12804	12	0.002865	0.55	0.0186

Annex E - EA Product Data

[REDACTED]

[REDACTED]

- Lime Down C2: SPZ2c and SPZ3
- Lime Down D: SPZ1c and SPZ2c and SPZ3
- Lime Down E1: SPZ1c and SPZ2c
- Lime Down E2: SPZ1c and SPZ2c

The aquifer designations in the areas given are,

- Alluvium – Secondary A Aquifer with Medium to High Vulnerability
- Forest Marble limestone member - Principal Aquifer with High Vulnerability
- Forest Marble mudstone member - Secondary A Aquifer with High Vulnerability
- Cornbrash - Secondary A Aquifer with High Vulnerability
- Kellaways Clay – Unproductive Strata

Provision of FRA Product 4

Thank you for your recent request to use Environment Agency flood data. The information is attached.

If you have requested this information to help inform a development proposal, then you should note the information on [GOV.UK](https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion) on the use of Environment Agency Information for Flood Risk Assessments and our attached advisory text.

<https://www.gov.uk/planning-applications-assessing-flood-risk>

<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

Further details about the Environment Agency information supplied and the permitted use of this information can be found on the [GOV.UK](https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather) website:

<https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather>

<http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3>

We respond to requests under the Freedom of Information Act 2000 (FOIA) and Environmental Information Regulations 2004 (EIR).

If you are not satisfied with our response to your request for information you can contact us within 2 calendar months to ask for our decision to be reviewed.

We really value your thoughts on how we are doing and will always make changes where we can to improve our service. Please click on the link below and fill in our survey.

[Redacted]

Thank you.

Kind regards

[REDACTED]
Environment Agency, Wessex Enquiries, Customer & Engagement Team

03708 506 506.- Wessex Enquiries

[REDACTED]
[REDACTED]@mabbett.eu>

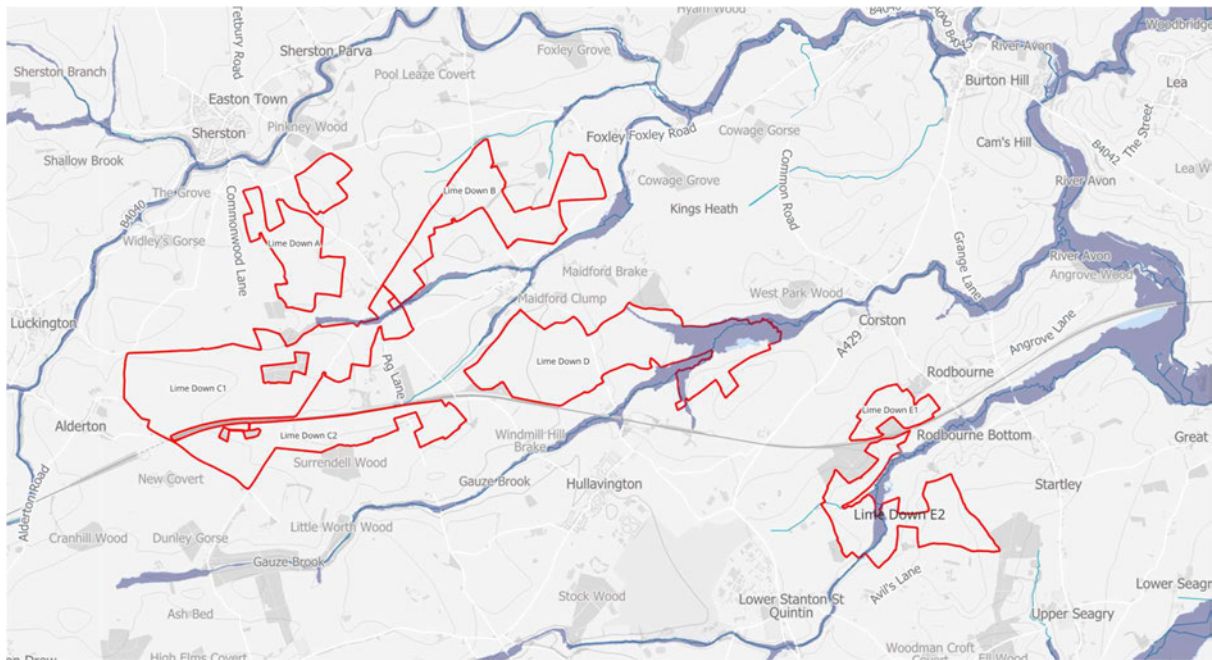
Sent: 15 October 2024 14:01

To: Enquiries, Unit <enquiries@environment-agency.gov.uk>

Subject: 317212 Lime Down Data Request

To whom it may concern,

Mabbett & Associates Ltd have been instructed to undertake a Flood Risk Assessment and Drainage Strategy in support of a proposed solar site in Wiltshire, known as the site hereon. I attach a site location plan and the site details below. The site has been split into parcels which can be seen below (Lime Down A, B, C1, C2, D, E1 and E2).



According to the EA online Flood M Planning, the Site is shown to be located within Flood Zones 1, 2 and 3, however we would be grateful if you could provide **any nearby modelled flood level data** in order to inform our assessment of the Site.

It would therefore be useful if you are able to confirm/provide the following information where available:

Site Details

Site Name Lime Down SOLar

Address

Lime Down A: SN16 0PU (NGR: 385982, 184814)

Lime Down B: SN16 0JS (NGR: 388179, 185419)

Lime Down C1: SN14 6NL (NGR: 385300, 183486)

Lime Down C2: SN16 0JZ (NGR: 386684, 182717)

Lime Down D: SN14 6EU (NGR: 389526, 183654)

Lime Down E1: SN16 0EX (NGR: 392655, 183066)

Lime Down E2: SN14 6DA (NGR: 393123, 181766)

Data Request

Please provide any of the following information to enable us to complete our assessment:

Historical Flooding Information

- Any records, photographs, flood extents from known historic events in the area

Technical Data

- Any hydraulic models covering the site
- Raw and processed results for the model(s) above
 - Hydraulic modelling report for the model(s) above
 - Modelled floodplain levels and flows for node points within and in the immediate vicinity of the Site taking into account the most recent climate change allowances (where these have been modelled);
- Hydrology report and/or flood estimation calculation records for the model(s) above
- Survey data used to build the model or inform nearby studies

Supporting Data

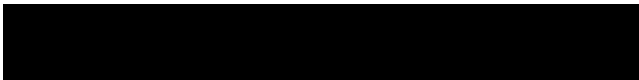
- Flood/coastal defence survey data
- Operational procedures for hydraulic structures
- Section 19 flood investigation reports
- The date and type of modelling that flood levels have been derived from;
- The technical report summarising the modelling methodology;
- Confirmation that the data is appropriate/relevant to inform flood risk within the Site;
- Details of any flood defences within the vicinity of the Site (i.e type, crest levels, Standard of Protection, condition, etc) and any associated breach and/or overtopping flood extents and depths;
- Hazard mapping detailing the depth, velocity and associated hazard rating for the Site;
- Any information in relation to surface water flooding including confirmation is located within or outside of a Critical Drainage Area;
- Any information in relation to on-Site drainage;
- Any information in relation to groundwater flooding in the area. Where possible, please provide borehole locations and ground water levels;
- Details of sensitive aquifers and known contamination issues;
- Any information/mapping of historical flooding events on Site from all sources of flooding (i.e fluvial, tidal, surface water, groundwater, sewer, reservoir, canal, etc).

Where available please can you provide flood levels, estimated return periods, photographs and other such data that may be relevant to our assessment;

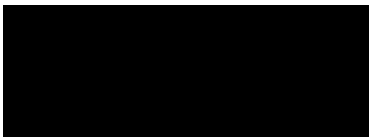
We trust this request is acceptable but please do not hesitate to contact us if you require any further information to assist with your response or wish to discuss the Site in further detail.

We look forward to hearing from you.

Thanks,



Consultant | Water Environment Team



www.mabbett.eu



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Inverness | Leicester | Manchester | Winchester**

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Please consider the environment before printing this e-mail

Our ref: 381197-WX
Date: 4th November 2024

[REDACTED]
[REDACTED]ett
[REDACTED]@mabbett.eu

Dear [REDACTED]

Thank you for your enquiry which was received on 15th October 2024. We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004.

Abstract

Name	Product 4
Description	Flood Risk Information for land at Lime Down NGR: ST9009082825
Licence	Open Government Licence
Information Warnings	<i>The mapping of features provided as a background in this product is © Ordnance Survey. It is provided to give context to this product. The Open Government Licence does not apply.</i>
Attribution	Contains Environment Agency information © Environment Agency and/or database rights. Contains Ordnance Survey data © Crown copyright 2023 Ordnance Survey AC0000807064.

Open Data

The following Environment Agency published datasets are now available on the weblink below as part of the Government's 'Open Data' project and are available for you to download free of charge.

Environment Agency published datasets: <https://data.gov.uk/data/search?publisher=environment-agency&unpublished=false>

You will need to search and select the name of the following datasets to take you directly to the weblink to enable you to download the data:

- Flood Map for Planning (Rivers and the Sea) – Flood Zones 2 and 3
- Flood Map for Planning (Rivers and Sea) – Areas Benefiting from Defences
- Flood Map for Planning (Rivers and Sea) Spatial Flood Defences
- Flood Map for Planning (Rivers and Sea) Flood Storage Areas
- Recorded Flood Outlines
- Historic Flood Map
- Risk of Flooding from Surface Water Extent for:
 - 3 percent annual chance
 - 1 percent annual chance
 - 0.5 percent annual chance

You can also access the Flood Map for Planning here: <https://flood-map-for-planning.service.gov.uk/>

You can also access the Risk of Flooding from Surface Water maps and Risk of Flooding from Reservoirs information here: <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>

Recorded Historic Flood Events

We no longer produce pdf copies of the Historic Flood Map. This information is available to search, select, and download free of charge as part of the Government's 'open data' as

- Recorded Flood Outlines
- the Historic Flood Map

Our historic records indicate that there was flooding in the area in **1925** (fluvial), **1932** (fluvial), **1954** (fluvial), **1979** (fluvial), **1999** (fluvial/unconfirmed source), **2007** (fluvial), **2009** (fluvial), **2012** (fluvial/unconfirmed source) and **2013** (fluvial).

Additionally, our historic records show a record of possible flooding pre 2012 for the area, however we are currently unable to confirm the date and source of this.

Please note - we cannot guarantee that this is an exhaustive list of all past flood events in this location. All reasonable care has been taken to ensure that the historical flood event data is as accurate as possible. The Environment Agency will update its records if new evidence emerges.

Modelled Fluvial Water Levels

We have not carried out any detailed fluvial flood risk modelling in this location.

The fluvial Flood Map in this area has been produced using our National Generalised Model (JFLOW). This modelling is fit for the purpose of the Flood Zones. However, it is not based on a specific channel survey. Neither water depths nor water levels were outputs specified when we commissioned this generalised modelling for the Flood Zones. Whilst the modelling process does provide some information on depth of water, it would have been possible to produce the flood extents without storing the water depth values, since water depth is only a 'by-product' of the calculation process. As this type of modelling was developed, tested and reviewed for production of the Flood Zone extents only, we have no information on the accuracy of the water depth data. Water depth or level outputs from this model are only suitable to be used for decision making at a broad catchment scale and is not fit for the purpose of a site-specific flood risk assessment.

For your information we have supplied maps showing the water depths derived from JFLOW for the 1% AEP (100yr) and 0.1% AEP (1000yr) fluvial modelled flood scenarios.

Please note - The Environment Agency is currently carrying out a project to update the National Generalised model (JFLOW). The New National Model outputs are expected in Spring 2025. Our published flood risk information for this area will be updated using outputs from the New National Model and this is expected to take place in late 2025 (current programme which may change). This will be carried out as part of the National project to update our National flood risk mapping and modelling information across England and will incorporate outputs from detailed local models together with updated National modelling.

New National Model Details.

The New National Modelling (NNM) is a set of models for rivers, surface water and the sea covering the whole of England. The NNM has been created to fill in gaps where we don't have local

hydraulic models, our local models require updating or we need additional model scenarios such as climate change runs.

Please also note - we are currently carrying out a National project to update our flood risk information for the whole of England. We will be updating our flood risk information in 2025 as part of the new National Flood Risk Assessment (NaFRA2). This will include the data displayed on the Check Your Long-Term Flood Risk service and the data displayed in the Flood Map for Planning (Rivers and Sea).

This should result in improvements to our mapping products, especially where we do not currently have any detailed local modelling. This means there will be some changes to our flood risk information in many areas when the new data is published.

You can find further information on the NaFRA2 project here: <https://www.gov.uk/guidance/updates-to-national-flood-and-coastal-erosion-risk-information>

For more information on climate change allowances please see the guidance on the Gov.UK website here: [Flood risk assessments: climate change allowances - GOV.UK](#). **Please be aware that this information is subject to change, please check the guidance regularly.**

Environmental Permit for Flood Risk Activities

In addition to any other permission(s) that you may have already obtained e.g. planning permission, you may need an environmental permit for flood risk activities (formerly known as Flood Defence Consent prior to 06 April 2016) if you want to do work:

- in, under, over or near a main river (including where the river is in a culvert)
- on or near a flood defence on a main river
- in the flood plain of a main river
- on or near a sea defence

For further information and to check whether a permit is required please visit: <https://www.gov.uk/guidance/flood-risk-activities-environmental-permits>.

For any further advice, please email Blandford.frap@environment-agency.gov.uk.

Ordinary Watercourse

Some of the watercourses adjoining this site are classed as an “Ordinary Watercourse” not a “Main River” under our control. Works to ordinary watercourses may require consent from either the Lead Local Flood Authorities or the Local Drainage Board.

Flood Asset Information

Please find enclosed details of Flood Assets within the area. This information has been taken from our Asset Information Management System database (AIMS).

Please note that flood defences can increase water levels elsewhere eg through channels being restricted by defences, or because defences prevent flood water flowing back into the river channel.

Planning

If you have questions regarding the planning nature of your enquiry, or require advice on floor levels, please contact our Sustainable Places team on wx.sp@environment-agency.gov.uk. Please be aware that we now charge for planning advice when consulted on pre-application enquiries. This new approach provides advice to developers in two ways. Firstly, there is the provision of ‘free’

Customer & Engagement, Wessex
Rivers House, East Quay, Bridgwater, Somerset, TA6 4YS
Email: wessexenquiries@environment-agency.gov.uk
www.environment-agency.gov.uk

advice available to everyone where we give a preliminary opinion on a proposed development. This sets out the environmental constraints together with any issues this raises for us. Should you wish us to review in detail any of these issues then we can do this through a chargeable scheme aimed at recovering our costs.

Strategic Flood Risk Assessment (SFRA)

When preparing a FRA to support a development proposal in this location you should refer to Wiltshire Council's SFRA Reports Level 1 which is available to download via the following link:

https://www.wiltshire.gov.uk/media/5691/Strategic-Flood-Risk-Assessment-Level-1/pdf/Wiltshire_Council_Level_1_SFRA_v5.0.pdf?m=637459765054370000

The Wiltshire Council Local Plan is available via this link: <https://www.wiltshire.gov.uk/planning-policy-local-plan-review-consultation>

Further Information

We advise that you also contact the drainage engineer/ flood risk management team at Wiltshire Council by email: drainage@wiltshire.gov.uk, or by phone: 0300 456 0105, based at: Bythesea Road, Trowbridge, Wiltshire, BA14 8JN, as they may be able to provide further advice with respect to localised flooding and drainage issues.

Further details about the Environment Agency information supplied can be found on our website: <https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather>

We hope you find this information helpful. It is provided subject to the attached notice 'Use of Environment Agency Information for Flood Risk Assessments', which we strongly recommend you read.

Yours sincerely


Customer & Engagement, Wessex
Rivers House, East Quay, Bridgwater, Somerset, TA6 4YS
Email: wessexenquiries@environment-agency.gov.uk

Enc: Use of Environment Agency Information for Flood Risk Assessments (below)
381197-WX 100yr JFLOW Depth Map (1%AEP)
381197-WX 1000yr JFLOW Depth Map (0.1%AEP)
381197-WX Defence Map
381197-WX Defence Data

Use of Environment Agency Information for Flood Risk Assessments (FRAs)

Important

Use of Environment Agency data: you should note that

1. Information supplied by the Environment Agency may be used to assist in producing a Flood Risk Assessment (FRA) where one is required, but the use of Environment Agency information does not constitute such an assessment on its own.
2. As part of your data request, we have provided all of the modelled data we hold for your location. Please note that some of our modelled information may have been produced for purposes other than for flood zone generation. This may mean that some of the modelled data you have been provided with has a lower confidence level, and has not been used in producing our flood map, nor definitively reflects the predicted flood water level at the property/development site scale. To check the suitability of the use of this information in your FRA please contact your local Partnership & Strategic Overview (PSO) team.
3. This information covers flood risk from main rivers and the sea, and you will need to consider other potential sources of flooding, such as groundwater or surface water runoff. The information produced by the Local Planning Authority and the Lead Local Flood Authority (LLFA) may assist in assessing other sources of flood risk.
4. Where a planning application requires a FRA and this is not submitted or deficient, the Environment Agency may well raise an objection.
5. For more significant proposals in higher flood risk areas, we would be pleased to discuss details with you ahead of making any planning application, and you should also discuss the matter with your Local Planning Authority.

Pre-Planning Advice from the Environment Agency

If you have requested this information to help inform a development proposal, then we recommend that you undertake a formal pre-application enquiry using the form available from our website:

Pre-application Preliminary Opinion:

<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

Pre-application Charged Service:

<https://www.gov.uk/government/publications/planning-advice-environment-agency-standard-terms-and-conditions>

Depending on the enquiry we may also provide advice on other issues related to our responsibilities, including flooding, waste, land contamination, water quality, biodiversity, navigation, pollution, water resources, foul drainage or Environmental Impact Assessment.

Flood Risk Assessment (FRA) Guidance

You should refer to the Planning Practice Guidance of the National Planning Policy Framework (NPPF) and the Environment Agency's Flood Risk Standing Advice for information about Flood Risk Assessment (FRA) for new development in the different Flood Zones. These documents can be accessed via:

National Planning Policy Framework Planning Practice Guidance:

<http://planningguidance.planningportal.gov.uk/>

Environment Agency advice on FRAs:

<https://www.gov.uk/flood-risk-assessment-for-planning-applications#when-to-follow-standing-advice>

<https://www.gov.uk/government/publications/planning-applications-assessing-flood-risk>

381197-WX - JFLOW Fluvial Water depths (m) Without Flood Defences. 100 year (1% AEP) centred on land at Lime Down [390090,182825].
Created 01.11.2024



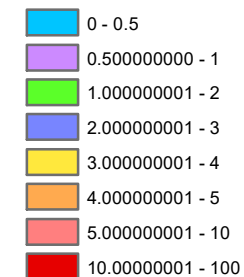
Scale 1:50,000



Legend

100yr JFLOW Depth

Metres



Information Warning

We do not recommend the use of water depths/levels derived from JFLOW for site specific investigations such as Flood Risk Assessments.

381197-WX - JFLOW Fluvial Water depths (m) Without Flood Defences. 1000 year (0.1% AEP) centred on land at Lime Down [390090,182825].
Created 01.11.2024



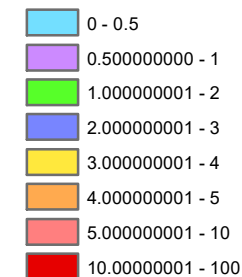
Scale 1:50,000



Legend

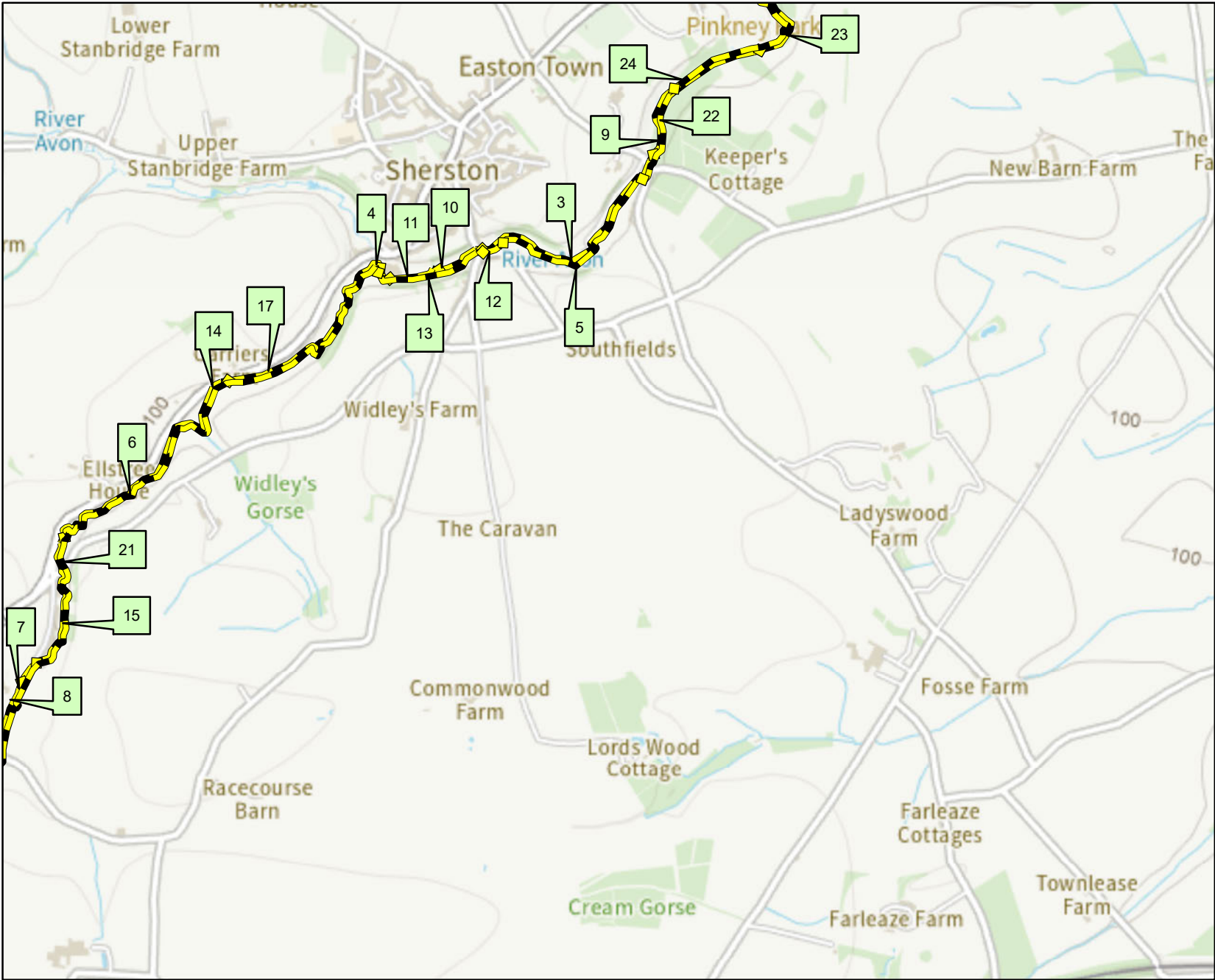
1000yr JFLOW Depth

Metres



Information Warning

We do not recommend the use of water depths/levels derived from JFLOW for site specific investigations such as Flood Risk Assessments.



Scale: 1:20,000



Legend

Defences

- Barrier Beach
- Beach
- Bridge Abutment
- Cliff
- Demountable Defence
- Dunes
- Embankment
- Engineered High Ground
- Flood Gate
- Natural High Ground
- Promenade
- Quay
- Spillway
- Wall

This data has been extracted from the Asset Information Management System (AIMS OM) which was created to draw various data sources into one database and has been populated with information of varying quality.

Product 4 - AIMS Information

381197-WX

Date:

22/10/2024

Map Ref	Asset ID	Asset Type	Right or left bank	Asset Description	Approx length (m)	Actual fluvial downstream crest level (mAOD)	Actual fluvial downstream crest level accuracy	Actual fluvial upstream crest level (mAOD)	Actual fluvial upstream crest level accuracy	Actual fluvial coastal crest level (mAOD)	Actual fluvial coastal crest level accuracy	NGR	Most recent inspection	Overall condition
3	40115	Natural High Ground	Left	Natural Bank	878.51	DNR	DNR	DNR	DNR	DNR	DNR	ST8592785717	07/04/2009	2 - Good
4	40116	Natural High Ground	Left	Stone wall	63.60	DNR	DNR	DNR	DNR	DNR	DNR	ST85158562	07/04/2009	2 - Good
5	40419	Natural High Ground	Right	Natural Bank	714.43	DNR	DNR	DNR	DNR	DNR	DNR	ST85898565	07/04/2009	2 - Good
6	40420	Natural High Ground	Left	Natural Bank	959.72	DNR	DNR	DNR	DNR	DNR	DNR	ST84218478	19/12/2007	3 - Fair
7	4605	Natural High Ground	Left	Natural channel with masonry retaining wall	89.38	DNR	DNR	DNR	DNR	DNR	DNR	ST8389484163	23/10/1996	3 - Fair
8	4606	Natural High Ground	Left	Natural Bank	1229.01	DNR	DNR	DNR	DNR	DNR	DNR	ST83618359	19/12/2007	3 - Fair
9	4730	Natural High Ground	Left	Natural Bank	275.81	DNR	DNR	DNR	DNR	DNR	DNR	ST8615986133	07/04/2009	3 - Fair
10	4731	Natural High Ground	Left	Natural channel with stone retaining wall	181.67	DNR	DNR	DNR	DNR	DNR	DNR	ST85438562	07/04/2009	2 - Good
11	4849	Natural High Ground	Left	Natural Bank	189.57	DNR	DNR	DNR	DNR	DNR	DNR	ST8525585581	07/04/2009	2 - Good
12	4851	Natural High Ground	Right	Stone Wall	83.61	DNR	DNR	DNR	DNR	DNR	DNR	ST85568567	07/04/2009	2 - Good
13	4852	Natural High Ground	Right	Natural Bank	425.87	DNR	DNR	DNR	DNR	DNR	DNR	ST85348558	07/04/2009	2 - Good
14	4853	Natural High Ground	Left	Natural channel with gabion retaining wall	35.34	DNR	DNR	DNR	DNR	DNR	DNR	ST8458185202	23/10/1996	2 - Good
15	4854	Natural High Ground	Left	Masonry Wall	537.87	DNR	DNR	DNR	DNR	DNR	DNR	ST84028445	23/10/1996	3 - Fair
17	88456	Natural High Ground	Left	Natural Bank	825.00	DNR	DNR	DNR	DNR	DNR	DNR	ST8491285333	19/12/2007	3 - Fair
21	89868	Natural High Ground	Right	Natural Bank	3685.06	DNR	DNR	DNR	DNR	DNR	DNR	ST8404084431	19/12/2007	3 - Fair
22	98384	Natural High Ground	Right	Natural Bank	708.60	DNR	DNR	DNR	DNR	DNR	DNR	ST8619186219	07/04/2009	3 - Fair
23	98385	Natural High Ground	Right	Natural channel with stone retaining wall	561.70	DNR	DNR	DNR	DNR	DNR	DNR	ST86538659	07/04/2009	3 - Fair
24	98386	Natural High Ground	Left	Natural channel with masonry retaining wall	1001.16	DNR	DNR	DNR	DNR	DNR	DNR	ST8650586598	07/04/2009	2 - Good

Notes

* Overall Condition has been taken from the most recent inspection

* Inspections are of a purely visual nature and do not necessarily reflect the true condition of the asset

* Condition: 1 = very good, Condition 2 = good, Condition 3 = fair, Condition 4 = poor, Condition 5 = very poor

* Crest level accuracy: 1 = ± 0.01 to 0.05m, 2 = ± 0.05 to 0.15m, 3 = ± 0.15 to 0.75m, 4 = ± 0.75 or greater

* DNR = data not recorded

Annex F – Greenfield Calculations

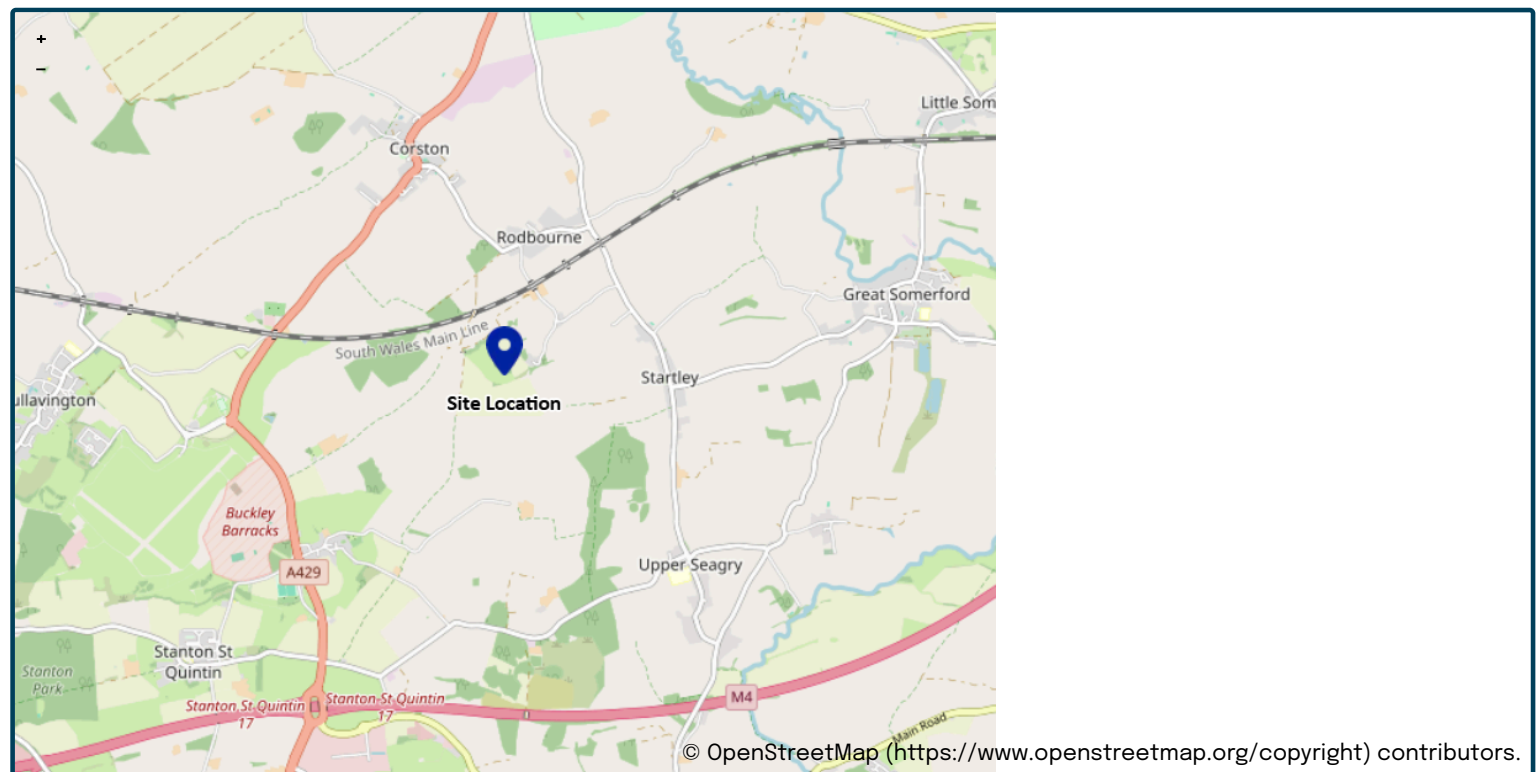
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). 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	23/06/2026
Calculated by	GH
Reference	317212
Model version	2.2.3

Location

Site name	Lime Down E2
Site location	



Site easting (British National Grid)	393199
Site northing (British National Grid)	182070

Site details

Total site area (ha)	0.105	ha
----------------------	------------------------------------	----

Greenfield runoff

Method

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

FEH statistical (2025)

	<u>My value</u>	<u>Map value</u>
SAAR9120 (mm)	821 mm	
BFIHOST19scaled	0.352	
QMed-QBar conversion	1.075	1.075
QMed (l/s)	0.6 l/s	
QBar (FEH statistical 2025) (l/s)	0.7 l/s	

Growth curve factors

	<u>My value</u>	<u>Map value</u>
Hydrological region	8	8
1 year growth factor	0.78	
2 year growth factor	0.93	
10 year growth factor	1.49	
30 year growth factor	1.95	
100 year growth factor	2.43	
200 year growth factor	2.78	

Results

Method	FEH statistical (2025)
Flow rate 1 year (l/s)	0.5 l/s
Flow rate 2 year (l/s)	0.6 l/s
Flow rate 10 years (l/s)	1.0 l/s
Flow rate 30 years (l/s)	1.3 l/s
Flow rate 100 years (l/s)	1.7 l/s
Flow rate 200 years (l/s)	1.9 l/s

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.

Annex G – Hydraulic Calculations

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
Storage	0.008	5.00	100.000	1200	0.000	0.000	0.750	99.250

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	Check Discharge Rate(s)	x
Rainfall Events	Singular	Drain Down Time (mins)	1440	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		
Analysis Speed	Normal	Starting Level (m)			

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	45	0	0

Node Storage Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	99.250	Product Number	CTL-SHE-0031-4000-0750-4000
Design Depth (m)	0.750	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	0.4	Min Node Diameter (mm)	1200

Node Storage Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	99.250
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	80

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	1.0	1.0	0.750	24.9	26.2

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	Storage	60	99.669	0.419	2.9	3.2164	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)				
60 minute winter	Storage	Hydro-Brake®	0.3	4.2				

Annex H – Outline Drainage Sketch

Annex 1 – SuDS Maintenance Schedule

Bioretention Systems Maintenance Schedule

Maintenance Schedule	Required Action	Typical Frequency
Regular inspections	Inspect infiltration surfaces 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 inspection of flows after rain	Annually
	Assess plants for disease infection, poor growth, invasive species etc and replace as necessary	Quarterly
	Inspect inlets and outlets for blockage	Quarterly
Regular maintenance	Remove litter and surface debris and weeds	Quarterly (or more frequently for tidiness or aesthetic reasons)
	Replace any plants, to maintain planting density	As required
	Remove sediment, litter and debris build-up from around inlets or from forebays	Quarterly to biannually
Occasional maintenance	Infill any holes or scour in the filter medium, improve erosion protection if required	As required
	Repair minor accumulations 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 to be > 20 years

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 18.3

Detention Basins Maintenance Schedule

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter and debris	Monthly
	Cut grass - for spillways and access routes	Monthly (during growing season), or as required
	Cut grass - meadow grass in and around basin	Half yearly (spring – before nesting season, and autumn)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Monthly (for first year), then annually or as required
	Check any penstocks and other mechanical devices	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, outlet and forebay	Annually (or as required)
	Manage wetland plants in outlet pool – where provided	Annually (as set out in Chapter 23)
Occasion Maintenance	Reseed areas of poor vegetation growth	As required
	Prune and trim any trees and remove cuttings	Every 2 years, or as required
	Remove sediment from inlets, outlets, forebay and main basin when required	Every 5 years, or as required (likely to be minimal requirements where effective upstream source control is provided)
Remedial Actions	Repair erosion or other damage by reseeding or re-turfing	As required
	Realignment of rip-rap	As required
	Repair/rehabilitation of inlets, outlets and overflows	As required
	Relevel uneven surfaces and reinstate design levels	As required

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 22.1

Filter Drains Maintenance Schedule

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter (including leaf litter) and debris from filter drain surface, access chambers and pre-treatment devices	Monthly, or as required
	Inspect filter drain surface, inlet/outlet pipework and control systems for blockages, clogging, standing water and structural damage	Monthly
	Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies	Six Monthly
	Remove sediment from pre-treatment devices	Six monthly, or as required
Occasional Maintenance	Remove or control tree roots where they are encroaching the sides of the filter drain, using recommended methods (eg NJUG, 2007 or BS 3998:2010)	As required
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace overlying filter medium	Five yearly, or as required
	Clear perforated pipework of blockages	As required

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 16.1

Filter Strip Maintenance Schedule

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter, debris, leaf litter, and other accumulated material from the filter strip surface	Monthly, or as required
	Inspect the filter strip for bare patches, erosion, rutting, ponding, channel formation, and signs of compaction	Monthly
	Check inflow areas, level spreaders, and downstream outfalls to ensure runoff is evenly distributed across the strip	Monthly
	Mow vegetation to maintain an appropriate grass height and remove arisings where necessary	3 to 6 times per year during the growing season
	Inspect vegetation cover and re-seed sparse or damaged areas	Six Monthly
	Remove accumulated sediment at the upstream edge and other areas where deposition occurs	Six Monthly, or as required
Occasional Maintenance	Aerate compacted ground to restore infiltration performance	As required
	Re-grade the surface where flow paths have become concentrated or bypassed sections have developed	As required
	Undertake partial or complete re-seeding where vegetation cover has significantly deteriorated	As required

Green Roofs Maintenance Schedule

Maintenance Schedule	Required Action	Typical Frequency
Regular Inspections	Inspect all components including soil substrate, vegetation, drains, irrigation systems (if applicable), membranes and roof structure for proper operation, integrity of waterproofing and structural stability	Annually and after severe storms
	Inspect soil substrate for evidence of erosion channels and identify any sediment sources	Annually and after severe storms
	Inspect drain inlets to ensure unrestricted runoff from the drainage layer to the conveyance or roof drain system	Annually and after severe storms
	Inspect underside of roof for evidence of leakage	Annually and after severe storms
Regular Maintenance	Remove debris and litter to prevent clogging of inlet drains and interference with plant growth	Six monthly and annually or as required
	During establishment (ie year one), replace dead plants as required	Monthly (but usually responsibility of manufacturer)
	Post establishment, replace dead plants as required (where > 5% of coverage)	Annually (in autumn)
	Remove fallen leaves and debris from deciduous plant foliage	Six monthly or as required
	Remove nuisance and invasive vegetation, including weeds	Six monthly or as required
	Mow grasses, prune shrubs and manage other planting (if appropriate) as required - clippings should be removed and not allowed to accumulate	Six monthly or as required
Remedial Actions	If erosion channels are evident, these should be stabilized with extra soil substrate similar to the original material, and sources of erosion damage should be identified and controlled	As required
	If drain inlet has settled, cracked or moved, investigate and repair as appropriate	As required

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 12.5

Headwall Outfall Maintenance Schedule

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter, debris, sediment and vegetation from around headwalls, flap valves and outfalls	Monthly (or as required)
	Visual inspection of headwalls, outfall structures and surrounding banks for damage or erosion	Monthly
	Check for blockage or restriction at outfall and through flap valve	Monthly
	Ensure flap valves open and close freely and are not jammed	Monthly
	Inspect watercourse immediately upstream and downstream for signs of scour, deposition or pollution	Monthly
	Inspect structural condition of concrete, masonry or prefabricated elements	Half yearly
	Check protection measures such as rip-rap, gabions or aprons	Half yearly
Occasional Maintenance	Clear accumulated silt or debris from outfall channel and apron	Annually (or as required)
	Lubricate flap valve hinges and moving parts where applicable	Annually
	Vegetation management to maintain clear access and flow paths	Annually
	Replace damaged or corroded flap valves	As required
	Reinstate scour protection where displaced or degraded	As required
Remedial Actions	Clearance following flooding, blockage or pollution incident	As required
	Stabilise banks and reinstate channel morphology at outfall location if their failure occurs	As required

Infiltration Basins Maintenance Schedule

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter, debris and trash	Monthly
	Cut grass - for landscaped areas and access routes	Monthly (during growing season) or as required
	Cut grass - meadow grass in and around basin	Half yearly: spring (before nesting season) and autumn
	Manage other vegetation and remove nuisance plants	Monthly at start, then as required
Occasional Maintenance	Reseed areas of poor vegetation growth	Annually, or as required
	Prune and trim trees and remove cuttings	As required
	Remove sediment from pre-treatment system when 50% full	As required
Remedial Actions	Repair erosion or other damage by reseeding or re-turfing	As required
	Realign the rip-rap	As required
	Repair or rehabilitate inlets, outlets and overflows	As required
	Rehabilitate infiltration surface using scarifying and spiking techniques if performance deteriorates	As required
	Relevel uneven surfaces and reinstate design levels	As required
Monitoring	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and pre-treatment systems for silt accumulation; establish appropriate silt removal frequencies	Half yearly
	Inspect infiltration surfaces for compaction and ponding	Monthly

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 13.2

Pervious Pavements Maintenance Schedule

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required - once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth - if required, take remedial action	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 20.15

Pipes Maintenance Schedule

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inlets, outlets and surface control structures – Inspect surface structures, removing obstructions and silts as necessary. Check there is no physical damage. Strim Vegetation 1 m min. surround to structures and keep hard aprons free from silt and debris.	Monthly
	Inspect chambers and below-ground control chambers – Remove cover and inspect, ensuring that water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt. Undertake inspection after leaf fall in autumn.	Monthly
Occasional Maintenance	Check topsoil levels are 20mm above edges of baskets and chambers to avoid mower damage.	As necessary
Remedial Works	Unpack stone in basket features and unblock or repair and repack stone as design detail as necessary.	As required
	Repair physical damage if necessary.	As required

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Box B.2

Pipes, Gullies, Catchpits, and Manholes Maintenance Schedule

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter, debris, leaves and floatables from grating and chamber	Monthly (or as required)
	Visual inspection of grating, cover and frame for damage or displacement	Monthly
	Check for evidence of blockage, surcharge, standing water, or odours	Monthly
	Inspect inlet and outlet pipes for blockage, damage or silt build-up	Monthly
	Check chamber walls and benching for cracks or structural deterioration	Half yearly
	Measure silt and debris accumulation within the sump	Half yearly
	Ensure grating slots and covers are clear and safe for traffic/pedestrians	Half yearly
Occasional Maintenance	Structural repair to chamber, benching or pipe connections	As required
	Replace damaged or corroded gratings, covers or frames	As required
	Remove silt and debris from sump once 50% of sump depth is full	Annually (or as required)
	Jet and cleanse inlet pipework	Annually (or as required)
Remedial Actions	Clearance following flooding, pollution incident, or blockage occurrence	As required
	Upgrade or modify catchpits if capacity is observed as insufficient	As required

Ponds and Wetlands Maintenance Schedule

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter and debris	Monthly (or as required)
	Cut the grass - public areas	Monthly (during growing season)
	Cut the meadow grass	Half yearly (spring, before nesting season, and autumn)
	Inspect marginal and bankside vegetation and remove nuisance plants (for first 3 years)	Monthly (at start, then as required)
	Inspect inlets, outlets, banksides, structures, pipework etc for evidence of blockage and/or physical damage	Monthly
	Inspect water body for signs of poor water quality	Monthly (May - October)
	Inspect silt accumulation rates in any forebay and in main body of the pond and establish appropriate removal frequencies; undertake contamination testing once some build-up has occurred, to inform management and disposal options	Half yearly
	Check any mechanical devices, eg penstocks	Half yearly
	Hand cut submerged and emergent aquatic plants (at minimum of 0.1m above pond base; include max 25% of pond surface)	Annually
	Remove 25% of bank vegetation from water's edge to a minimum of 1 m above water level	Annually
	Tidy all dead growth (scrub clearance) before start of growing season (Note: tree maintenance is usually part of overall landscape management contract)	Annually
	Remove sediment from any forebay	Every 1-5 years, or as required
	Remove sediment and planting from one quadrant of the main body of ponds without sediment forebays.	Every 5 years, or as required
Occasional Maintenance	Remove sediment from the main body of big ponds when pool volume is reduced by 20%	With effective pre-treatment, this will only be required rarely, eg every 25-50 years
Remedial Actions	Repair erosion or other damage	As required
	Replant, where necessary	As required
	Aerate pond when signs of eutrophication are detected	As required
	Realign rip-rap or repair other damage	As required
	Repair / rehabilitate inlets, outlets and overflows.	As required

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 23.1

Soakaway Maintenance Schedule

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspection for sediment and debris in pre-treatment components and flood of inspection tube or chamber and inside of concrete manhole rings	Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
	Trimming any routes that may be causing blockages	Annually (or as required)
Occasional Maintenance	Inspection for sediment and debris in pre-treatment components and flood of inspection tube or chamber and inside of concrete manhole rings	As required, based on inspections
Remedial Actions	Reconstruct soakaway and/or replace or clean void fill, if performance deteriorates or failure occurs	As Required
	Replacement of clogged geotextile (will require reconstruction of soakaway)	As Required
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year and then annually
	Check soakaway to ensure emptying is occurring	Annually

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 13.1

Attenuation Storage Tanks Maintenance Schedule

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 21.3

Swales Maintenance Schedule

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter and debris	Monthly, or as required
	Cut grass - to retain grass height within specified design range	Monthly (during growing season), or as required
	Manage other vegetation and remove nuisance plants	Monthly at start, then as required
	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect infiltration surfaces for ponding, compaction, silt accumulation, record areas where water is ponding for > 48 hours	Monthly, or when required
	Inspect vegetation coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
	Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Half yearly
Occasional Maintenance	Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required	As required or if bare soil is exposed over 10% or more of the swale treatment area
Remedial Actions	Repair erosion or other damage by re-turfing or Reseeding	As required
	Relevel uneven surfaces and reinstate design levels	As required
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface	As required
	Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip	As required
	Remove and dispose of oils or petrol residues using safe standard practices	As required

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 17.1

[REDACTED]

iii <https://magic.defra.gov.uk/>

iv <https://flood-map-for-planning.service.gov.uk/>

v <https://environment.data.gov.uk/hydrology/climate-change-allowances/river-flow>

vi <https://check-long-term-flood-risk.service.gov.uk/postcode>

[REDACTED]