Lime Down
Solar Park

Environmental Statement

Volume 3, Appendix 11-7: Flood Risk Assessment and Drainage Strategy – Lime Down E1 (Tracked)

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Appendix 11-7: Flood Risk Assessment and Drainage Strategy – Lime Down E1

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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 E1.

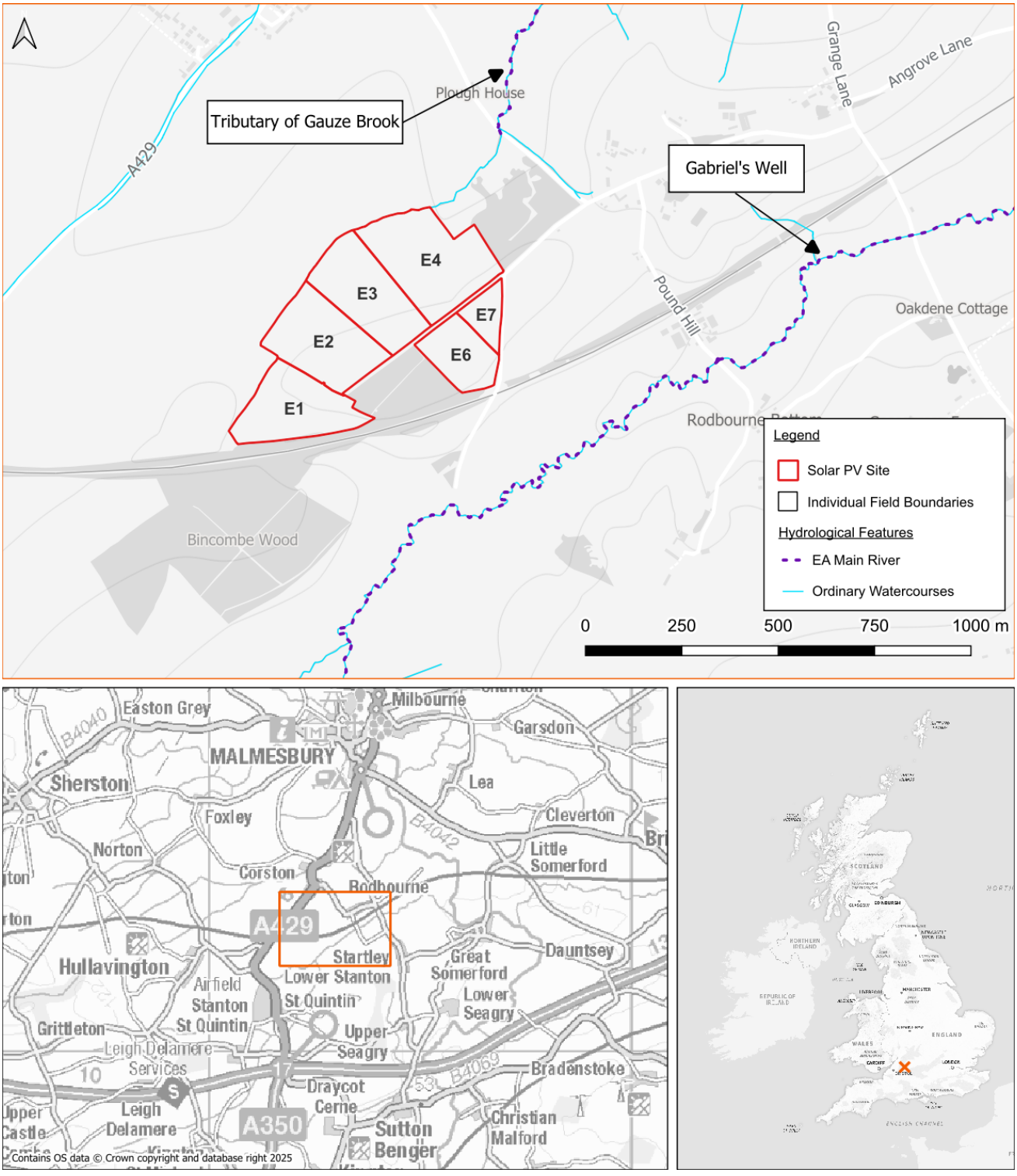


Figure 1: Site Location

1.2 Site Location

1.2.1 Lime Down E1 is located approximately 3.2km southwest of Malmesbury, a town in north Wiltshire. The Site is centred at National Grid Reference 392677E, 183040N.

1.3 Existing Site Conditions

1.3.1 Online mapping (including Google Maps / Google Streetview imagery)i accessed May 2025 shows that the Scheme area comprises agricultural / arable fields. The Scheme area is bordered by more rural land in all orientations with a railway line to the south. Access is provided via an unnamed road leading off Pound Hill.

1.4 Topography

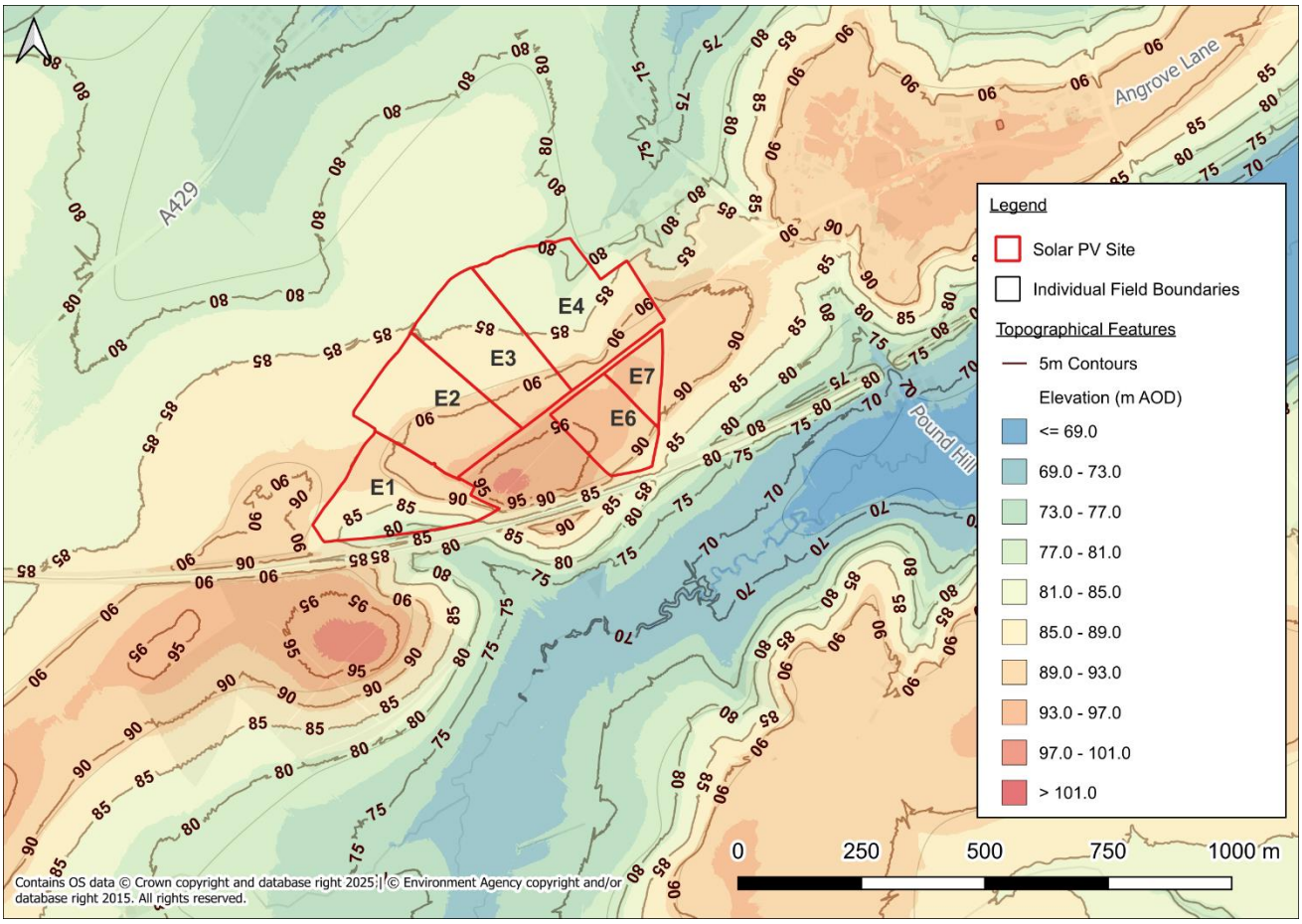


Figure 2: LiDAR Plan

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 E1 slopes from approximately 97m AOD in the southwest to approximately 80m AOD in the north (Figure 2).

1.5 Hydrology

1.5.1 The nearest watercourse is Gabriel's Well, a Main River, which is located approximately 200m to the south of Lime Down E1.

1.5.2 Other watercourses in the area include a tributary of Gauze Brook, which begins as an Ordinary Watercourse at the north-eastern boundary of Lime Down E1, before it becomes a Main River approximately 260m north-east.,

1.5.3 Main Rivers are within the jurisdiction of the EA and land drainage ditches and Ordinary Watercourses which fall within the jurisdiction of the Wiltshire County Council Lead Local Flood Authority.

1.6 Water Framework Directive Status

1.6.1 Lime Down E1 is located within the Avon Bristol Rural Catchment, largely within the Gauze Brook – source to conf R Avon (Brist) Water Body Catchment and partially within the Rodbourne Bk – source to conf R Avon (Brist) Water Body Catchment.

1.6.2 The Gauze Brook – source to conf R Avon (Brist) Water Body catchment has a Cycle 3 Ecological status of Moderate in 2019 in 2022 and a Failing chemical status in 2019 (no data in 2022).

1.6.3 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).

1.6.4 A summary of the Water Body Classifications for the catchments are included as Annex A.

1.7 Geology

1.7.1 Reference to the British Geological Survey (BGS)ii online mapping (1:50,000 scale) indicates that Lime Down E1 is not underlain by superficial deposits (see Figure 3 for deposit location).

1.7.2 Lime Down E1 is identified as being underlain by Kellaways Clay Member, comprising of mudstone (see Figure 4 for deposit location):

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 British Geological Survey boreholes located at Lime Down E1.

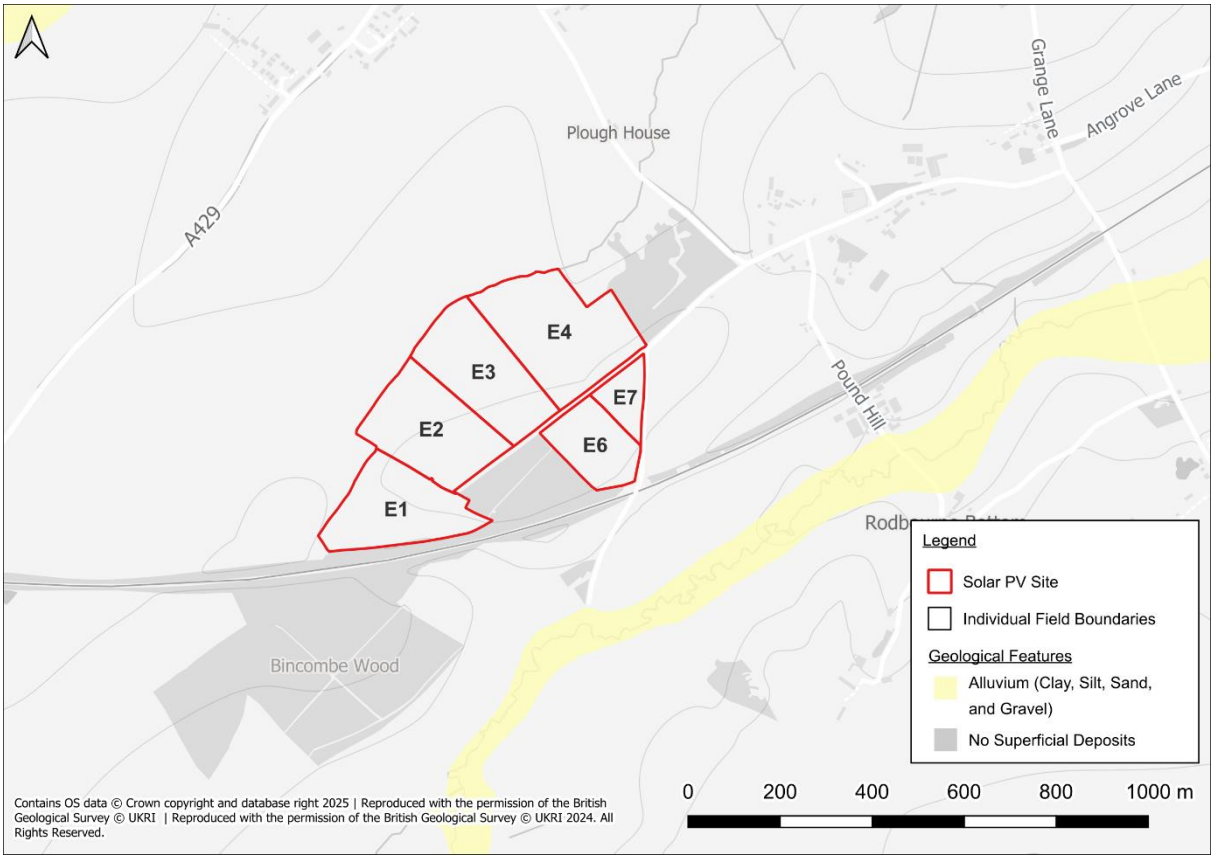


Figure 3: Superficial Deposits

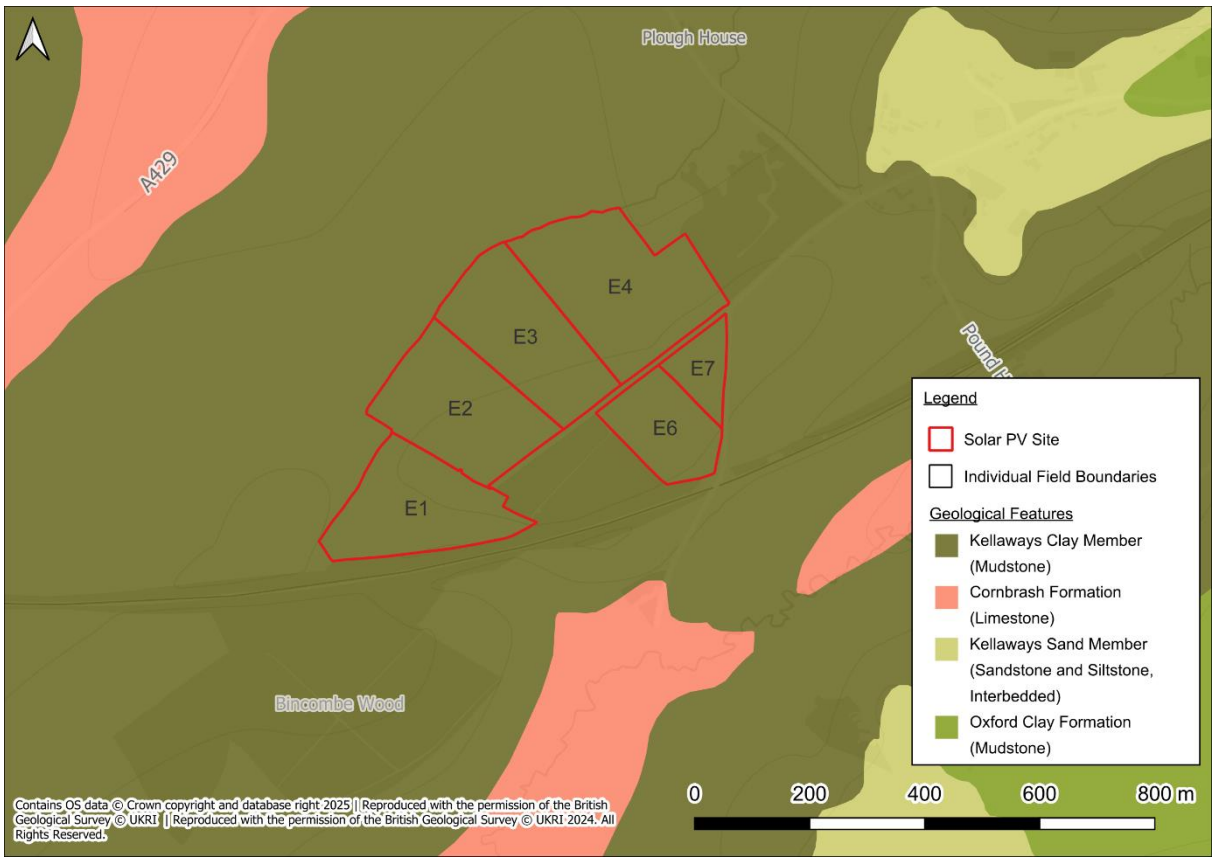


Figure 4: Bedrock Deposits

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 Forest Marble Formation is classified as a Secondary A Aquifer.

1.8.2 According to the EA's Aquifer Designation data, obtained from MAGIC Map's online mapping [accessed 02/06/25], the Kellaways Clay Member is classified as Unproductive.

1.8.3 Lime Down E1 is not underlain by superficial deposits and there are no identified aquifers.

1.8.4 The EA's 'Source Protection Zones' data, obtained from MAGIC Map's online mapping [accessed 02/06/25], indicates that Lime Down E1is not located within a Groundwater Source Protection Zone.

1.9 Proposed Site Conditions

1.9.1 Lime Down E1 proposes a ground mounted solar photo-voltaic plant with associated electrical infrastructure, including a substation located in Field E6, and access. See **ES Volume 1, Chapter 3: The Scheme [EN010168/APP/6.1].**

1.9.2 An **Outline Landscape and Ecological Management Plan (LEMP) [EN010168/APP/7.18]** has been developed to support the DCO application. This details that the vast majority of the Site is proposed to be utilised for Solar PV Panels and supporting infrastructure, with internal access and peripheral areas comprising landscaped buffers, in line with the embedded mitigation described throughout the ES.

1.9.3 Where a 132 kV or 400 kV substation is proposed within this area, the detailed design will include a controlled drainage strategy for the substation compound. This will include sealed drainage or sealed drainage components where required, together with suitable treatment, interception, containment and isolation measures to prevent spills, leaks or firewater from affecting ground or controlled waters. The drainage principles for substations are set out in **the Firewater Containment and Drainage Strategy – Lime Down Substation [EN010168/EXAM/9.9],** which is the governing reference for containment and release matters.

2. Assessment of Flood Risk

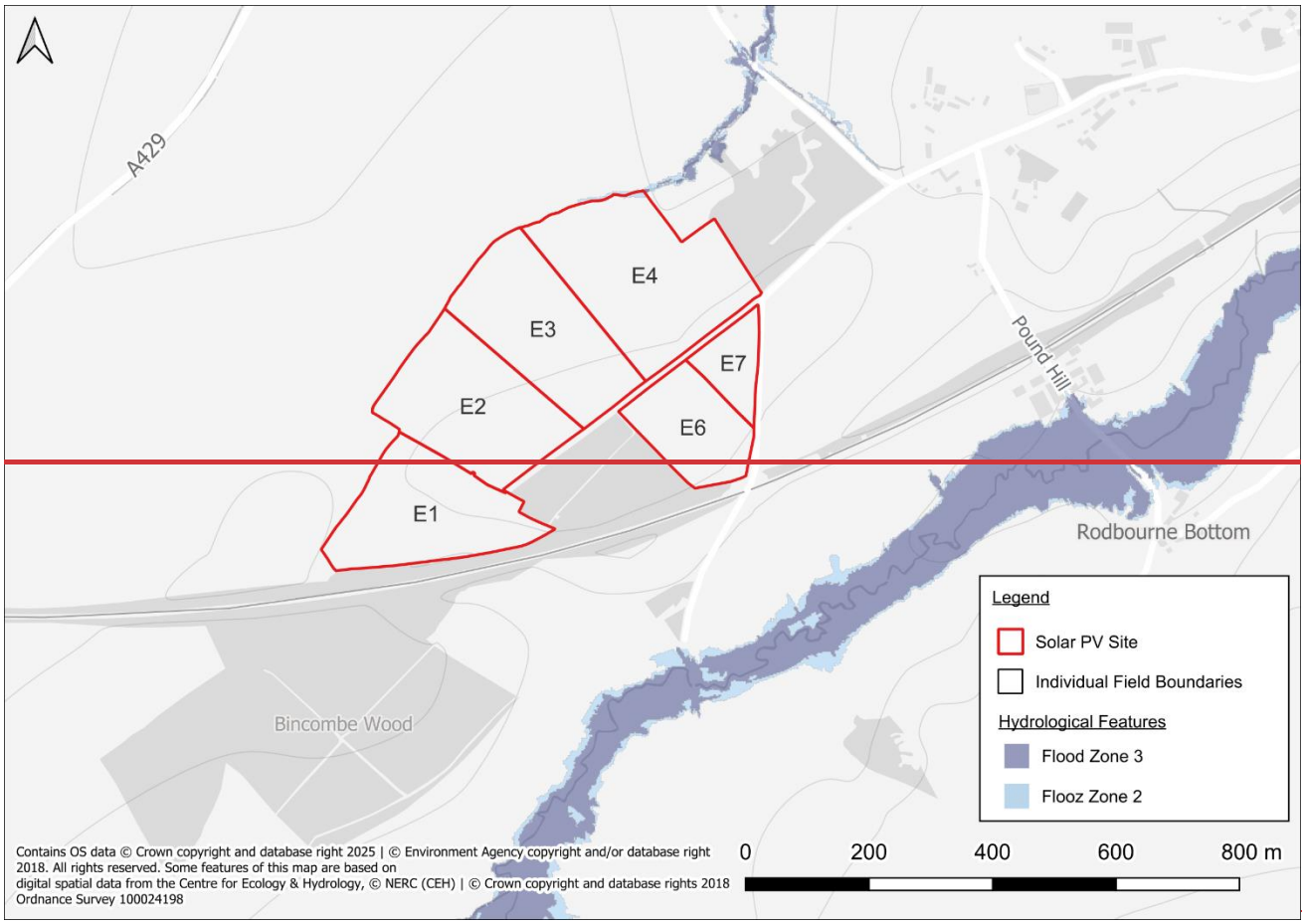
2.1.1 The aim of this section of the report is to assess and summarise the existing flood risk at Lime Down A.

2.2 Tidal Flood Risk

2.2.1 Lime Down E1 is situated at a minimum of approximately 80m 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 E1 is almost entirely within Flood Zone 1, meaning it is at low risk from fluvial flooding (<0.1% annual probability). A small part of Field E4 extends into Flood Zone 2, associated with a tributary of Gauze Brook flowing north-east, but this does not encroach into any areas proposed for Scheme. The proposed substation in Field E6 is located entirely within Flood Zone 1 and outside any mapped fluvial flood extents, and is therefore considered to be at low risk of fluvial flooding.



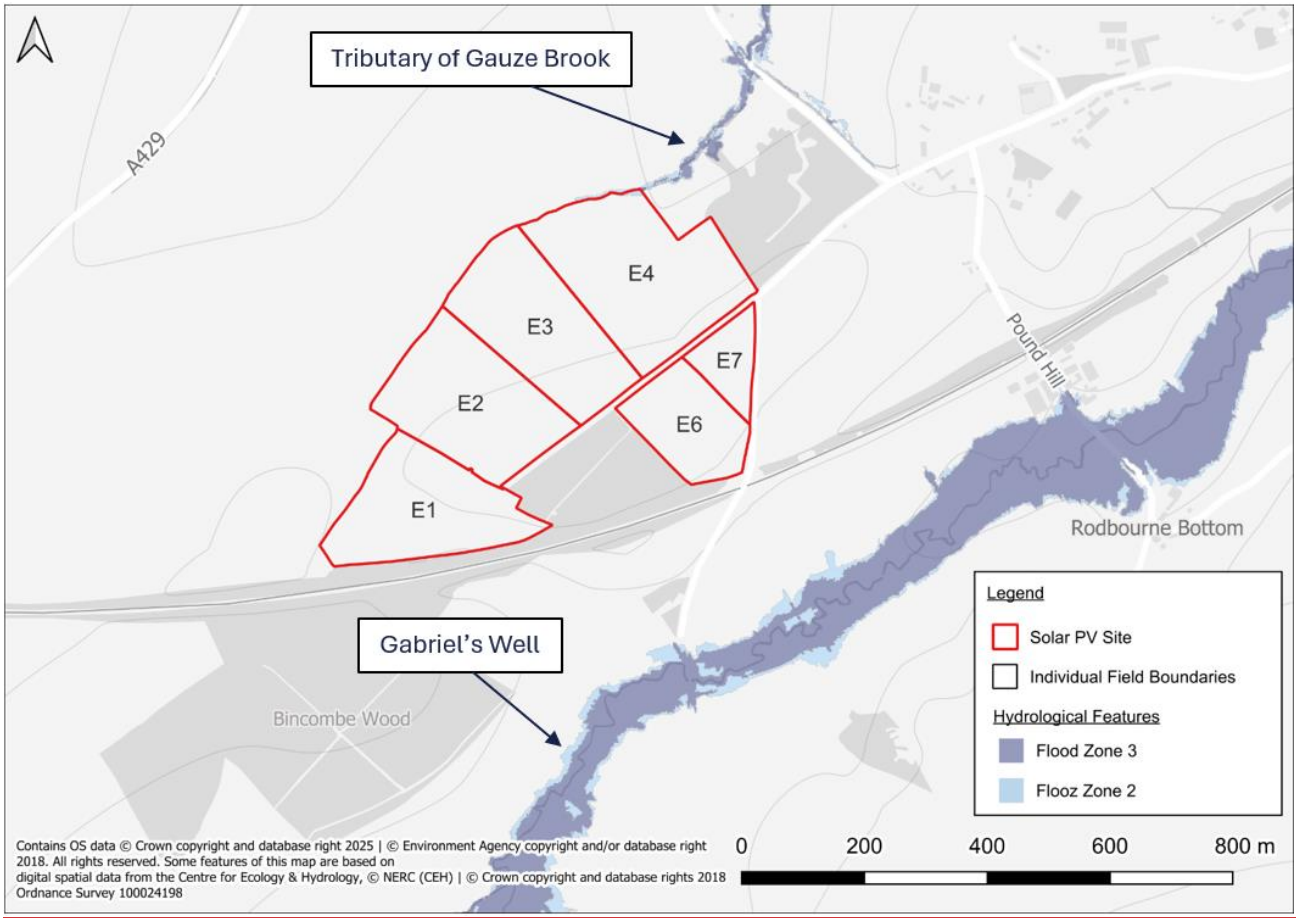


Figure 5: EA's Flood Map for Planning

2.3.2 As above, the nearest watercourse is a tributary of Gauze Brook, located at the north-eastern boundary of the Lime Down E1 which flows in a north-easterly direction. Any out of channel flooding from the Ordinary Watercourse will flow in a north-easterly direction following the areas sloping topography.

2.3.3 The EA 'Historical Flood Map' indicates that Lime Down E1 has no recorded history of flooding on the Lime Down E1 or in the immediate vicinity. The nearest recorded flood event occurred approximately 60m south of Lime Down E1, in May 1932.

2.3.4 There is no Site-specific information within third party reports relating to fluvial flood risk.

2.3.5 In the absence of modelled flood data, surface water flood maps can be used to provide an understanding of potential fluvial flood risk from any smaller watercourses. There are no formal flow routes picked up by the surface water mapping which direct water into Lime Down E1.

2.3.6 To estimate flood levels for a 1% Annual Exceedance Probability (AEP) event with a 71% climate change allowancev, Manning's open channel flow formula was applied. A detailed explanation of the calculation, including sources of data and the chosen coefficients, is provided in Annex B. This method was selected as it provides a practical estimate of flow characteristics based on channel shape, roughness, and gradient, particularly where detailed hydraulic modelling has not been undertaken. Cross-sectional data from EA LiDAR, captured in Q1 2020 and detailed in Annex B, informed the calculations. The estimated

flood levels suggest limited extents, expected to be smaller than those shown on the EA's 0.1% surface water mapping. This mapping is referenced for context only and was not used as an input to the calculation.

2.3.7 It is noted that the Manning's calculation was completed prior to the release of updated NaFRA2 mapping in January 2025. The revised mapping shows a reduction in surface water flood extents across the Site. This supports the view that the current Manning's calculation remains conservative, and there is no requirement to update it.

Consultation

2.3.8 Consultation has been undertaken throughout the EIA process with the EA and Wiltshire Council. Comments and recommendations received have been noted and applied throughout this Flood Risk Assessment and Drainage Strategy. A record of consultation and The Applicant's responses are included in ES Chapter 11: Hydrology, Flood Risk and Drainage.

2.3.9 Lime Down E1 is not located within an Internal Drainage Board.

Summary

2.3.10 Given the above, Lime Down E1 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 E1 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 at Fields E1 – E4 and a small section in the southernmost extent of Field E6. The areas of risk in Fields E2 – E4 are associated with the presence of the tributary of Gauze Brook which flows in a north-easterly direction. Other areas of risk across Lime Down E1 are associated with topographic depressions within the Fields and ponding along the railway line to the south.

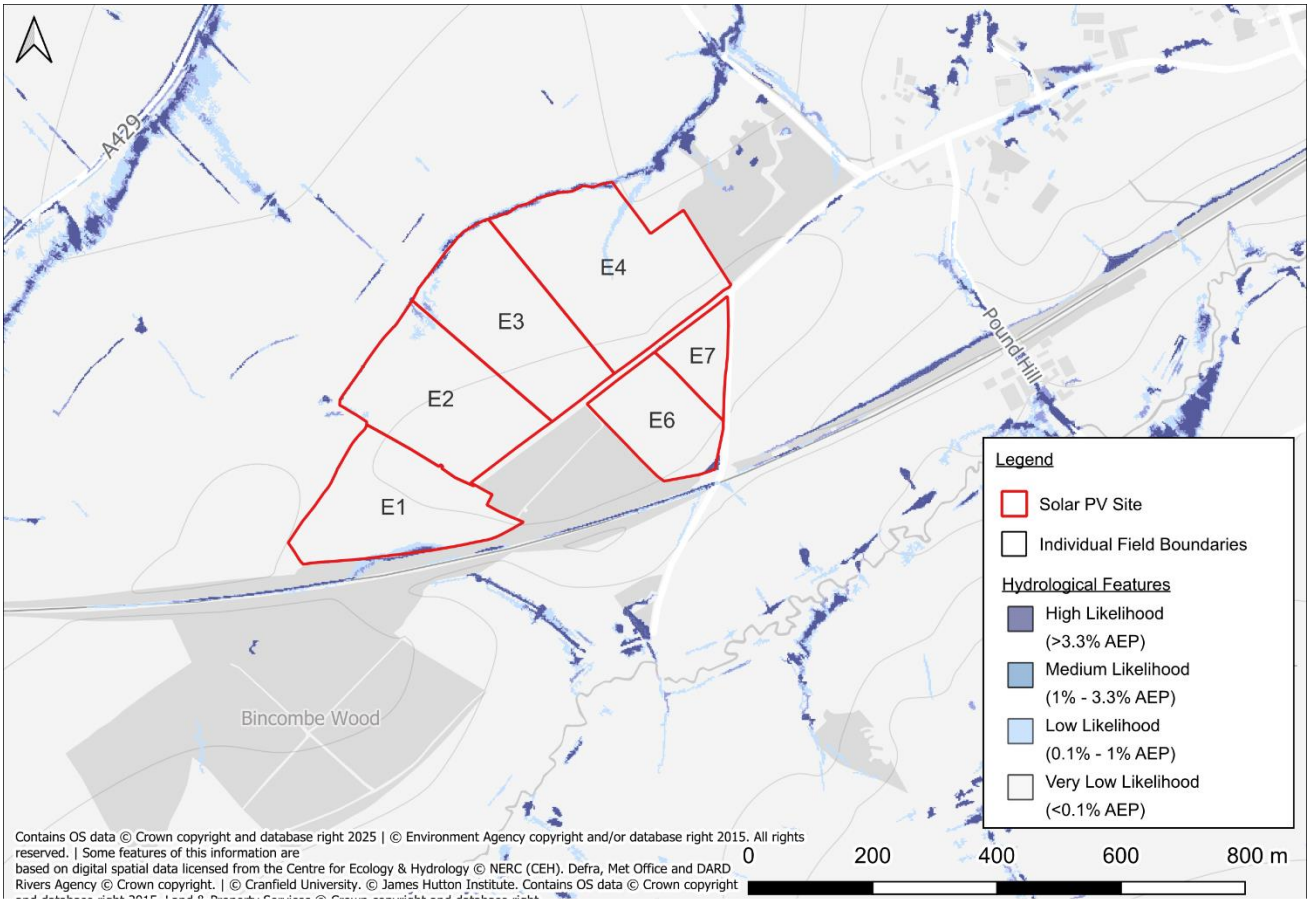


Figure 6: EA's Long-Term Flood Risk Map (Flood Risk from Surface Water)

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 300mm which is considered passable to people and vehicles. Some depths between 300mm and 600mm are anticipated in Fields E1 and E6 however these are small areas associated with topographic low points, and do not form flow routes within the Site.

2.4.4 The proposed substation in Field E6 is located in the northern part of the field, outside the mapped surface water flow paths. Although the southern extent of Field E6 shows some localised risk, the substation will be sequentially located within the area of lowest risk and raised above surrounding ground levels.

2.4.5 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 Drainage Strategy – Covering Report [EN010168/APP/6.3]**) to suggest that Lime Down E1 has historically experienced surface water flooding.

2.4.6 Based on the above and considering the embedded mitigation as part of the design of the solar panels, the overall risk of surface water flooding is considered to be Low. The proposed solar panels 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.

2.4.7 Associated electrical infrastructure, such as inverters, transformers, cabling and substations, will be located outside mapped flood extents where feasible, or otherwise elevated above the design flood level

with appropriate freeboard, in line with the embedded mitigation strategy outlined in **Appendix 11.1: Flood Risk Assessment and Drainage Strategy – Covering Report [EN010168/APP/6.3].**

2.4.8 Smaller electrical components such as 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. The potential for the development to exacerbate surface water flood risk off-site is also addressed through the use of appropriate SuDS features, as described in the Covering Report.

2.5 Groundwater Flood Risk

2.5.1 The geology is identified above in Section 1.0. There were no boreholes identified from BGS records at Lime Down E1.

2.5.2 There is no information within relevant third-party reports (listed 'Sources of Information' in **ES Volume 3, Appendix 11-1: Flood Risk Assessment and Drainage Strategy – Covering Report [EN010168/APP/6.3]**) to suggest that Lime Down E1 has experienced historical groundwater flooding.

2.5.3 No buildings, other than the supporting unstaffed infrastructure, and no basement levels are identified on plans which may otherwise be at increased risk from groundwater seepage.

2.5.4 Soilscapes[vii] mapping indicates that Lime Down E1 is located in 'impeded drainage'.

2.5.5 It can be concluded that the risk of groundwater flooding is Low and no Site-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 E1's rural setting, the presence of sewerage infrastructure is unlikely. Utility records have been checked and identify no public sewers within Lime Down E1.

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 E1, therefore there is no associated risk.

2.7.2 The EA 'Flood Risk from Reservoirs' map shows that Lime Down E1 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 unnamed Gauze Brook tributary and potentially impact Lime Down E1. 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 E1 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 E1 from all sources of flooding is **Negligible** to **Low**, however, it would be prudent to include the below mitigation measures.

2.10 Embedded Mitigation

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

2.11 Impact on Off-Site Flood Risk

2.11.1 The Solar PV Panels and associated electrical infrastructure, including inverters, transformers, cabling, and substations, will, where possible, be located outside the flood extent. If this is not feasible, they will be elevated with appropriate freeboard above the local flood level. These components will be installed on concrete foundations or pads mounted on frames, allowing floodwater to flow freely underneath. This approach prevents any loss of floodplain volume and ensures there is no increase in flood risk elsewhere - areas where panels are proposed in Flood Zones 2 / 3 have undergone the appropriate floodplain storage calculations – see **ES Volume 3, Appendix 11-6 and 11-8 [EN010168/APP/6.3]**. The components are insignificant in size with detailed dimensions provided in ES Chapter 3: Scheme Description. Additionally, any units incorporating hardstanding will feature SuDS measures to mitigate any increase in surface water runoff. Together, these measures ensure the Scheme does not contribute to an increase in flood risk.

2.11.2 Surface water management has been considered in **ES Volume 3, Appendix 11-1: Flood Risk Assessment and Drainage Strategy – Covering Report [EN010168/APP/6.3].**

3. Conclusions and Recommendations

3.1.1 Lime Down E1 is for a ground mounted solar farm and associated electrical infrastructure and access.

Flood Risk

3.1.2 Lime Down E1 is situated almost wholly within Flood Zone 1 with the exception of the northernmost extent of Field E4 which is located in Flood Zone 2. The extent of Flood Zone 2 is considered to be associated with a tributary of Gauze Brook (which flows in a north-easterly direction) and does not encroach into the area proposed for Scheme.

3.1.3 The majority of Lime Down E1 is at Very Low risk of surface water flooding; however, there are some small areas of Very Low to High risk particularly at Fields E1 – E4 and a small section in the southernmost extent of Field E6. The areas of risk in Fields E2 – E4 are associated with the presence of the tributary of Gauze Brook. Other areas of risk across Lime Down E1 are associated with topographic depressions within the Fields and ponding along the railway line to the south.

3.1.4 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.

3.1.5 The Solar PV Panels and other electrical infrastructure, such as inverters, transformers, cabling and substation which is 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.

3.2 Recommendations

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

Annexes

Annex A- Water Body Catchment Classifications Summaries

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 sub element	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	
Cadium 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

Rodbourne Bk – source to conf R Avon (Brist) 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	High	High	Good	Good	2015	
Invertebrates	High	High	High	Good	2015	
Macrophytes and Phytobenthos Combined	High	High	Good	Good	2015	
Macrophytes subelement	High	High	Good	Good		
Physio-Chemical Quality Elements	Moderate	Moderate	Moderate	Good	2027 - Low Confidence	Disproportionately expensive: Disproportionate burdens
Acid Neutralising Capacity						
Ammonia (Phys-Chem)	High	High	High	Good	2015	
Dissolved Oxygen	Poor	Poor	Poor	Good	2015	
Phosphate	Poor	Poor	Poor	Good	2027 - Low Confidence	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	Does not support good	Does not support good	Supports Good	Does not support good		Disproportionately expensive: Unfavourable balance of costs and benefits
Morphology	Supports Good	Supports Good	Supports Good			
Supporting Elements (surface Water)				N/A	2015	
Specific Pollutants				N/A	2015	
Copper						
Triclosan						
Zinc						
Iron						
Maganese						
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	
Cadium and Its Compounds						
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
Priority substances	Good	Good	N/A	Good	2015	
Cypermethrin (Priority)	Good	Good	N/A	Good	2015	
Fluoranthene	Good	Good	N/A	Good	2015	
Lead and Its Compunds						
Nickel and Its Compunds						
Other Pollutants	N/A	N/A	N/A	N/A	2015	Did not require assessment

Gauze Brook - source to conf R Avon (Brist) Water Body Catchment Classification Summary

Annex B – Manning's Open Channel Flow Mapping

[i] https://www.google.co.uk/maps
[ii] https://www.bgs.ac.uk/map-viewers/geoindex-onshore/
[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
[vii] https://www.landis.org.uk/soilscapes/

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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.

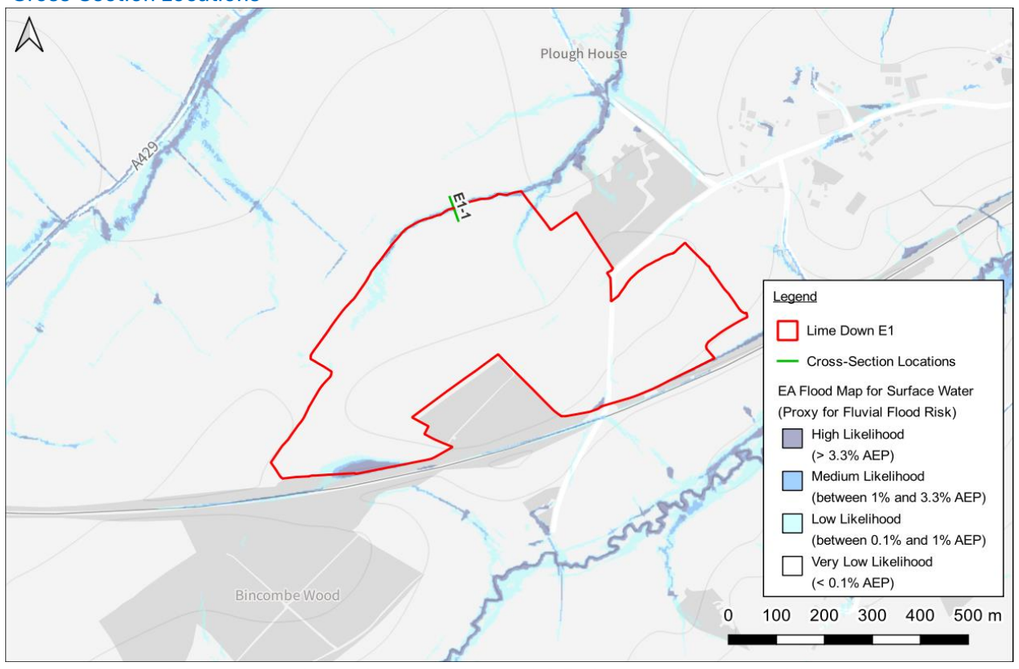
In the absence of detailed flood extent data covering the site, the extents of the EA surface water flood map (0.1% AEP event, present day) have been compared to underlying LiDAR data to provide an estimate of water levels. The surface water flood map has been used as a proxy for fluvial flooding given the similarity to the EA Flood Zone 2 extent and the additional detail it affords.

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 (m^3/s)	Flow +71% CC Uplift (m^3/s)	Equivalent Flood Level (m AOD)
E1-1	0.1% AEP EA FMfSW water level	81.75	10.2	17.4	81.90 (+146mm)

Tabulated Cross-Section Properties // E1-1

(Calculated by Flood Modeller)

Node	Flow (m^3/s)	Stage (m AOD)	Depth (m)	Velocity (m/s)	Froude no.	Area (m^2)	Conveyance (m^3/s)	Width (m)	W Perim. (m)	Slope
E1-1	0.000	80.751	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0155
E1-1	0.001	80.785	0.034	0.200	0.491	0.004	0.007	0.255	0.265	0.0155
E1-1	0.006	80.819	0.068	0.318	0.551	0.017	0.044	0.510	0.531	0.0155
E1-1	0.016	80.853	0.102	0.417	0.589	0.039	0.131	0.765	0.796	0.0155
E1-1	0.035	80.887	0.136	0.505	0.618	0.069	0.281	1.020	1.062	0.0155
E1-1	0.063	80.921	0.170	0.586	0.642	0.108	0.510	1.275	1.327	0.0155
E1-1	0.103	80.955	0.204	0.662	0.661	0.156	0.829	1.530	1.592	0.0155
E1-1	0.152	80.987	0.236	0.732	0.678	0.208	1.225	1.754	1.827	0.0155
E1-1	0.214	81.019	0.268	0.798	0.693	0.268	1.717	1.979	2.062	0.0155
E1-1	0.288	81.051	0.300	0.862	0.706	0.334	2.314	2.203	2.296	0.0155
E1-1	0.376	81.082	0.331	0.922	0.718	0.408	3.023	2.428	2.531	0.0155
E1-1	0.480	81.114	0.363	0.981	0.729	0.489	3.852	2.652	2.766	0.0155
E1-1	0.599	81.146	0.395	1.037	0.739	0.577	4.808	2.877	3.000	0.0155
E1-1	0.734	81.178	0.427	1.092	0.749	0.672	5.898	3.101	3.235	0.0155
E1-1	0.870	81.205	0.454	1.147	0.758	0.758	6.985	3.244	3.387	0.0155
E1-1	1.017	81.232	0.481	1.200	0.766	0.848	8.170	3.386	3.540	0.0155
E1-1	1.187	81.263	0.512	1.243	0.773	0.955	9.536	3.623	3.785	0.0155
E1-1	1.376	81.293	0.542	1.286	0.780	1.070	11.052	3.860	4.030	0.0155
E1-1	1.584	81.324	0.573	1.329	0.786	1.192	12.724	4.097	4.275	0.0155
E1-1	1.812	81.355	0.604	1.371	0.793	1.322	14.558	4.334	4.521	0.0155
E1-1	2.062	81.386	0.635	1.414	0.799	1.459	16.560	4.571	4.766	0.0155
E1-1	2.333	81.416	0.665	1.456	0.805	1.603	18.737	4.808	5.011	0.0155
E1-1	2.626	81.447	0.696	1.497	0.811	1.754	21.095	5.045	5.256	0.0155
E1-1	2.780	81.462	0.711	1.507	0.943	1.845	22.333	7.083	7.298	0.0155
E1-1	2.831	81.466	0.715	1.511	0.953	1.874	22.736	7.321	7.537	0.0155
E1-1	3.226	81.495	0.744	1.542	0.945	2.092	25.910	7.706	7.928	0.0155
E1-1	3.496	81.513	0.762	1.562	0.974	2.238	28.077	8.527	8.753	0.0155
E1-1	3.787	81.531	0.780	1.579	0.995	2.399	30.416	9.348	9.579	0.0155
E1-1	4.149	81.550	0.799	1.599	1.062	2.594	33.324	11.230	11.464	0.0155
E1-1	4.593	81.571	0.820	1.620	1.052	2.835	36.895	11.714	11.949	0.0155
E1-1	4.772	81.579	0.828	1.629	1.050	2.930	38.330	11.946	12.182	0.0155
E1-1	5.360	81.604	0.853	1.651	1.072	3.247	43.054	13.427	13.664	0.0155
E1-1	6.263	81.637	0.886	1.690	1.063	3.705	50.307	14.367	14.606	0.0155
E1-1	7.065	81.663	0.912	1.724	1.061	4.097	56.745	15.228	15.469	0.0155
E1-1	7.946	81.690	0.939	1.761	1.062	4.512	63.826	16.089	16.332	0.0155
E1-1	8.017	81.692	0.941	1.764	1.062	4.545	64.391	16.149	16.392	0.0155
E1-1	8.684	81.711	0.960	1.787	1.068	4.860	69.750	17.026	17.270	0.0155
E1-1	9.398	81.730	0.979	1.810	1.073	5.192	75.483	17.903	18.148	0.0155
E1-1	10.164	81.750	0.999	1.827	1.085	5.563	81.639	19.238	19.484	0.0155
E1-1	10.244	81.752	1.001	1.829	1.086	5.602	82.282	19.373	19.619	0.0155
E1-1	11.077	81.771	1.020	1.853	1.088	5.978	88.969	20.235	20.482	0.0155
E1-1	11.962	81.790	1.039	1.878	1.091	6.371	96.080	21.097	21.345	0.0155

Node	Flow (m^3/s)	Stage (m AOD)	Depth (m)	Velocity (m/s)	Froude no.	Area (m^2)	Conveyance (m^3/s)	Width (m)	W Perim. (m)	Slope
E1-1	12.010	81.791	1.040	1.879	1.132	6.393	96.467	22.753	23.001	0.0155
E1-1	12.058	81.792	1.041	1.880	1.146	6.416	96.855	23.380	23.628	0.0155
E1-1	12.639	81.808	1.057	1.859	1.125	6.798	101.523	24.393	24.641	0.0155
E1-1	13.007	81.815	1.064	1.866	1.125	6.970	104.475	24.845	25.094	0.0155
E1-1	14.360	81.839	1.088	1.898	1.120	7.566	115.342	25.828	26.078	0.0155
E1-1	15.814	81.862	1.111	1.932	1.117	8.184	127.019	26.811	27.062	0.0155
E1-1	15.938	81.864	1.113	1.935	1.116	8.238	128.021	26.910	27.161	0.0155
E1-1	17.990	81.896	1.145	1.970	1.119	9.130	144.499	28.865	29.117	0.0155
E1-1	18.347	81.901	1.150	1.978	1.118	9.275	147.367	29.069	29.321	0.0155
E1-1	20.322	81.926	1.175	2.028	1.116	10.020	163.231	29.758	30.013	0.0155
E1-1	22.421	81.952	1.201	2.079	1.116	10.783	180.090	30.448	30.704	0.0155
E1-1	24.642	81.977	1.226	2.131	1.117	11.563	197.933	31.137	31.395	0.0155
E1-1	24.730	81.978	1.227	2.133	1.117	11.594	198.640	31.172	31.430	0.0155
E1-1	26.783	82.001	1.250	2.171	1.120	12.339	215.127	32.204	32.463	0.0155
E1-1	28.951	82.025	1.274	2.209	1.123	13.108	232.538	33.237	33.497	0.0155
E1-1	29.217	82.028	1.277	2.212	1.123	13.208	234.680	33.415	33.675	0.0155
E1-1	31.513	82.053	1.302	2.241	1.128	14.062	253.119	34.945	35.206	0.0155
E1-1	33.801	82.075	1.324	2.277	1.131	14.842	271.499	35.921	36.182	0.0155
E1-1	36.742	82.103	1.352	2.315	1.136	15.869	295.122	37.492	37.755	0.0155
E1-1	37.078	82.106	1.355	2.320	1.137	15.982	297.819	37.641	37.904	0.0155
E1-1	40.799	82.138	1.387	2.370	1.142	17.211	327.709	39.193	39.458	0.0155
E1-1	42.962	82.156	1.405	2.400	1.145	17.904	345.078	39.991	40.257	0.0155
E1-1	45.197	82.173	1.422	2.429	1.148	18.611	363.032	40.789	41.056	0.0155
E1-1	45.422	82.175	1.424	2.430	1.148	18.693	364.841	40.954	41.220	0.0155
E1-1	46.762	82.189	1.438	2.426	1.151	19.278	375.601	42.609	42.876	0.0155
E1-1	47.691	82.196	1.445	2.436	1.152	19.577	383.063	42.967	43.234	0.0155
E1-1	51.506	82.220	1.469	2.497	1.155	20.627	413.703	43.325	43.593	0.0155
E1-1	55.471	82.245	1.494	2.558	1.159	21.686	445.551	43.684	43.952	0.0155
E1-1	59.582	82.269	1.518	2.619	1.163	22.753	478.577	44.042	44.311	0.0155
E1-1	61.654	82.284	1.533	2.632	1.166	23.422	495.221	45.116	45.385	0.0155
E1-1	64.978	82.305	1.554	2.665	1.171	24.381	521.916	46.190	46.460	0.0155
E1-1	66.281	82.315	1.564	2.667	1.175	24.848	532.382	47.264	47.534	0.0155
E1-1	71.982	82.346	1.595	2.734	1.181	26.328	578.173	48.215	48.486	0.0155
E1-1	72.737	82.350	1.599	2.742	1.196	26.523	584.237	49.520	49.791	0.0155
E1-1	75.581	82.368	1.617	2.757	1.189	27.419	607.080	50.004	50.274	0.0155
E1-1	79.224	82.386	1.635	2.797	1.192	28.323	636.342	50.487	50.758	0.0155
E1-1	84.515	82.411	1.660	2.856	1.197	29.592	678.839	51.024	51.296	0.0155
E1-1	89.980	82.436	1.685	2.914	1.202	30.874	722.739	51.561	51.833	0.0155
E1-1	97.456	82.470	1.719	2.985	1.210	32.646	782.785	52.635	52.908	0.0155
E1-1	97.921	82.475	1.724	2.975	1.214	32.912	786.520	53.709	53.982	0.0155

[i] https://www.google.co.uk/maps
[ii] https://www.bgs.ac.uk/map-viewers/geoindex-onshore/
[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
[vii] https://www.landis.org.uk/soilscapes/