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RIDGE CLEAN ENERGY
SUNNY OAKS RENEWABLE ENERGY PARK, WHITERAILS ROAD, WOOTTON, IW

FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY

AUGUST 2022

the journey is the reward

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Project Code:	**25978**
Prepared by:	**GRT**
Approved by:	**KWF**
Issue Date:	**August 2022**
Status:	**FINAL**

Mayer Brown Limited, Unit B15, Whitecross Business Centre, Whitecross Lane, Shanklin, Isle of Wight PO37 7EJ
Telephone 01983 866234 iowoffice@mayerbrown.co.uk www.mayerbrown.co.uk

Ridge Clean Energy

Sunny Oaks Renewable Energy Park, Whiterails Road, Wootton, IW
Flood Risk Assessment & Drainage Strategy

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1 Development Description and Location

Introduction

1.1 This Flood Risk Assessment has been undertaken in accordance with paragraphs 167 to 169 of the National Planning Policy Framework (NPPF) revised July 2021 (**Ref. 1**) and the associated Planning Practice Guidance, entitled Flood Risk and Coastal Change, published online on the 6th March 2014. (**Ref. 2**). As past guidance retains key elements from "Planning Policy Statement 25: Development and Flood Risk (PPS 25)" (**Ref. 3**) published by Communities and Local Government in December 2006 it may also be referenced where appropriate. This is of particular significance as the Environment Agency's published guidance in relation to flood risk consideration previously referenced this document despite the introduction of the NPPF. 'Development and Flood Risk: A Practice Guide Companion to PPS25' (**Ref. 4**) published by the Department for Communities and Local Government in February 2007, is also referenced, as is the Isle of Wight Council's Strategic Flood Risk Assessment Mk 2 June 2010 produced by Entec Consultants **(Ref 5)** and, to a lesser extent, the Preliminary Flood Risk Assessment produced by Amec on behalf of the Isle of Wight Council and dated November 2011 **(Ref 6)**. Policy DM14 Flood Risk of the Core Strategy Island Plan adopted March 2012 **(Ref 7)** (which also references PPS 25) is also considered.

1.2 This Flood Risk Assessment considers both whether the proposed development is appropriate in planning terms and the impact of the proposal on the local hydraulic regime, in accordance with, inter alia, the above referenced documents. The conditions currently existing in the area of the site are described, together with the methods used to identify and assess potential impacts from the proposal. The mitigation measures proposed to avoid or reduce the impacts are identified including the strategy for the drainage of surface water flows arising from the site. It should be noted that there will be no specific permanent welfare facilities on the site, and as such no foul flows to consider or connect.

1.3 The following questions/headings are based on the site specific flood risk Assessment checklist located on the National Planning Practice Guidance webpage (https://www.gov.uk/guidance/flood-risk-and-coastal-change#Site-Specific-Flood-Risk-Assessment-checklist-section) The headings have been rearranged and amended to allow the best presentation of the document and reflect previous guidance referred to in other local documents. As this document serves as both a Site Specific Flood Risk Assessment and a Drainage Strategy, the document also includes expansion and

additions to these main points, where necessary, to provide further insight into the drainage strategy for the site.

1a - What type of development is proposed and where will it be located?

1.4 It is proposed to develop an area of land at Whiterails Road, Wootton, on either side of that road, as a Renewable Energy Park. This will include solar photovoltaic panels, inverters, transformers and associated infrastructure such as maintenance tracks. A Battery Energy Storage System (BESS) and substation would be located to the south of Whiterails Road. Access to the site will be via Whiterails Road and Briddlesford Road. The site is undeveloped greenfield agricultural land.

1.5 As shown in **Figure 1.1** below, the development site is located southwest of Wootton, on either side of Whiterails Road:

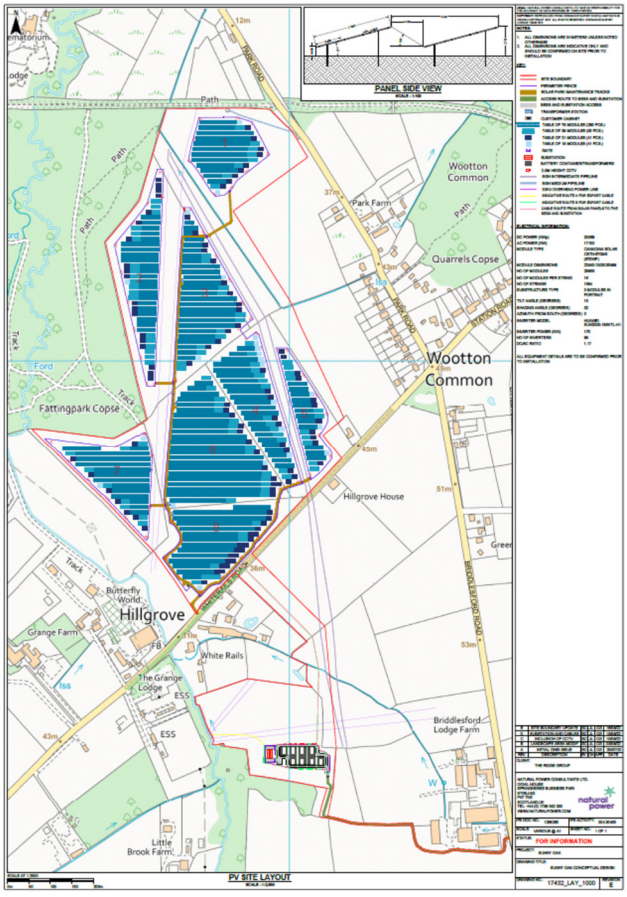


Figure 1.1. Location Plan

1.6 The area of the site is approximately 32.4 Ha. However only a relatively small proportion of this site area will be developed.

1.7 Existing levels for the site range from approximately 46.9 mAOD at the north-eastern most point of the roadside boundary with Whiterails Road, to a lowest level of around 22.4 mAOD on the northern edge of the site.

1b - What is the vulnerability classification?

1.8 The proposed development is a solar farm/park. The flood risk vulnerability classification of such a development proposal, according to Table 2 of the Technical Guidance of the NPPF, is considered to be 'Essential Infrastructure'. This is further underlined in the July 2021 iteration of the National Planning Policy Framework, Annexe 3 (p74). Essential Infrastructure proposals are appropriate for Flood Zones 1 and 2, but should only be permitted in Flood Zone 3 if the Exception Test is passed.

1c – Is the proposed development consistent with the Local Framework Documents?

1.9 The proposed development is consistent with the objectives of the Island Plan Core Strategy document. Further insight in this regard can be found within the Design, Access and Planning Statement produced by the BCM Ltd.

1.10 Locally, Planning Policy DM14 relating to Flood Risk, taken from the Island Plan: Core Strategy (March 2012) reads as follows:

"The Council will expect development proposals to reduce the overall and local risk of flooding on the Island. development proposals will be expected to:

1. Demonstrably meet the aims and objectives of the Council's Strategic Flood Risk Assessment. When undertaking FRAs in Flood Zones 2 and 3, an allowance for climate change has to be provided. PPS25 requires this allowance to be a minimum of 100 years.

2. Provide appropriate on-site sustainable draining systems (SuDS) for the disposal of surface water in order to ensure there is no net loss of flood storage capacity or impact on water quality. This will need to meet national and local standards for SuDS to a sufficient level so as to gain approval by the SuDS Approving Body.

3. In addition to national requirements for a Flood Risk Assessment, planning applications for all new developments on sites over 0.25 hectares in Flood Zone 1 should be accompanied by a Drainage Strategy.

4. Where a proposal is in an identified Flood Risk Area, as defined by the Council under its responsibilities as a Lead Local Flood Authority, the Council will expect it to support the objectives and measures of the relevant flood risk management plans and strategy.

SuDS should be sensitively designed and located to promote biodiversity, enhanced landscape and good quality spaces that improve public amenities in the area. Proposed SuDS schemes should demonstrate consideration of the contribution they can make to the Island's Green Infrastructure Strategy. The contribution made to the GI network should be proportionate to the scheme proposal and any wider environmental mitigation requirements the proposed development associated with the SuDS scheme requires.

On greenfield sites, SuDS will be required to achieve no increase in the relevant net runoff rate to that prior to development. All other sites should aim to achieve a reduction from the existing run-off rate but must at least result in no net additional increase in run off rates. All developments will be expected to maintain and improve (wherever possible) river and groundwater quality. For specific locations around the Island, a Flood Risk and Vulnerable Coastal Communities SPD will be developed which will address the specific flood risk related issues that will need to be considered by development proposals within areas covered by the SPD. The SPD will outline what measures will need to be demonstrated so that new developments would not be at risk of flooding as a result of climate change, or would not worsen flood risk elsewhere."

1.11 Section EV 14, Managing Flood Risk in New Development, of the Island Planning Strategy Development plan, published for consultation July 2021 reads as follows:,

The council will expect development proposals to reduce on site and off site risk of flooding on the Island. Development proposals will be expected to:

a) be safe from flooding and not increase the risk of flooding elsewhere;

b) apply the sequential test and then, if necessary, the exception test when in flood zones 2 and/or 3;

c) use opportunities provided by new development to reduce the causes and impacts of flooding and manage residual risk;

d) provide appropriate on-site sustainable drainage systems for major development for the disposal of surface water, in order to ensure there is no net loss of flood storage capacity or impact on water quality;

e) where located within an area at risk from flooding or future risk of flooding, undertake a site-specific flood risk assessment and comply with national planning requirements;

f) safeguard land required for current and future flood management.

1.12 Nationally, in respect of flood risk consideration of development proposals paragraphs 167 and 169 of the NPPF states that:

> *'When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should*

only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;

b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;

c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;

d) any residual risk can be safely managed; and

e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate. The system used should:

a) Take account of advice from the lead local flood authority;

b) Have appropriate proposed minimum operational standards;

c) Have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and

d) Where possible, provide multifunctional benefits.

1d - Please provide evidence that the Sequential Test or Exception Test has been applied in the selection of this development type.

1.13 A risk-based sequential test approach should be typically applied at all stages of planning, to ensure appropriate placement of development. In terms of flood risk, the aim is to steer new development to areas at the lowest risk of flooding, i.e. Flood Zone 1. However, the vulnerability classification of the proposed development should then be used to inform designers and decision makers whether there may be the opportunity to place suitable development in higher risk flood zones. Strategic Flood Risk Assessments (SFRA) provide the basis of applying the formal Sequential Test, at the time of the production of that document this was on the basis of the Zones in Table D.1 of PPS 25. Table 1: Flood Zones of the NPPF Technical Guidance then provided this information, which is now available on line as part of the planning practice guidance for flood risk and coastal change available at www.gov.uk.

1.14 In this instance, due to the site's location, flood zone classification and vulnerability classification, specific sequential testing is not required in respect of flood risk considerations. A local SFRA document was prepared by Entec Consultants in November 2007, with an update in June 2010, on behalf of the Council. Appendix O of the IOW SFRA Mk2 specifically assesses Wootton for flood risk. However, the specific mapping that, inter alia, qualitatively assesses various development sites in this area, does not encompass this site. Also, there is little specific commentary on any issues surrounding Palmers Brook itself, the upper reaches of which pass through the site on its western boundary in both the northern and southern portions of land, either side of Whiterails Road.

1.15 As such, to inform flood risk considerations at the site, we approached the Environment Agency and requested Product 4 JFlow data for the site. The most pertinent extract plan, from the information provided by the EA on the 9th of March 2022, is shown below:

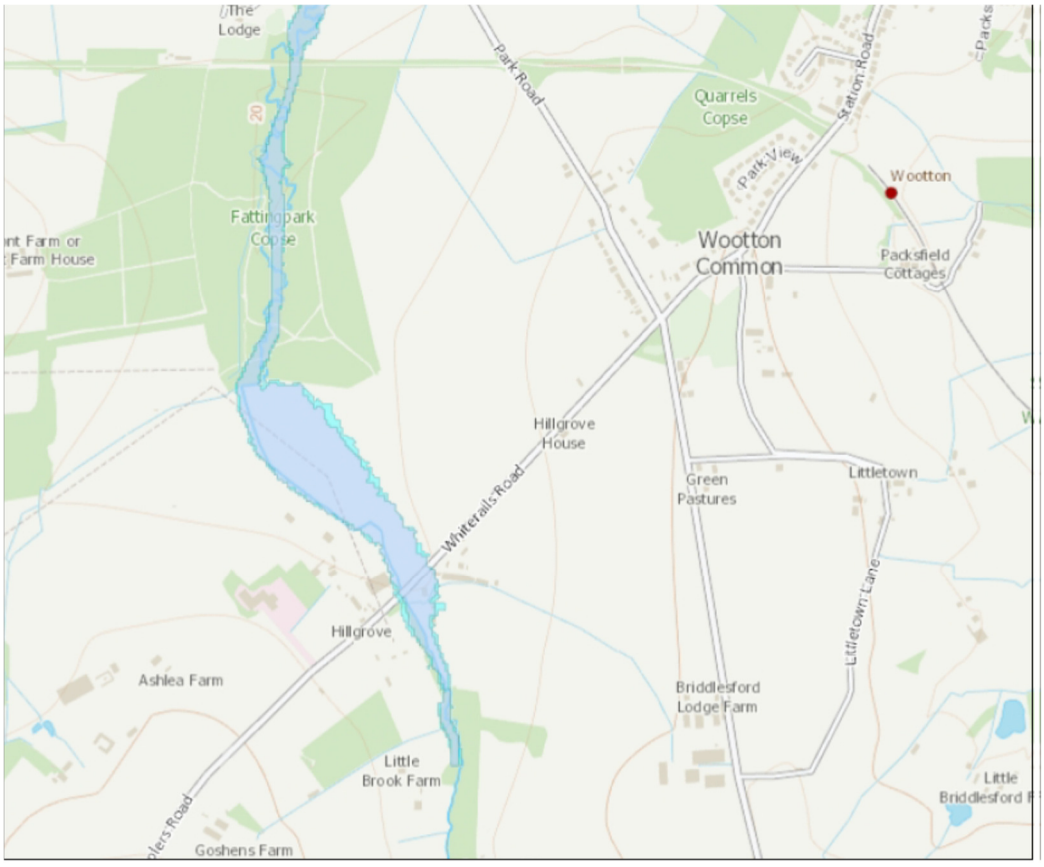


Figure 1.2. Flood Maps for Planning – All Zones

1.16 The above figure shows the extent of Zone 2 & 3 extents where they intersect the development site. To give a more detailed idea of how the flood extents actually impacts upon the proposal, we have overlaid the flood risk extents, topographical survey and

development layout and produced a simple compound drawing depicting this, which is shown below in Figure 1.3 with a full-scale version accompanying this report;

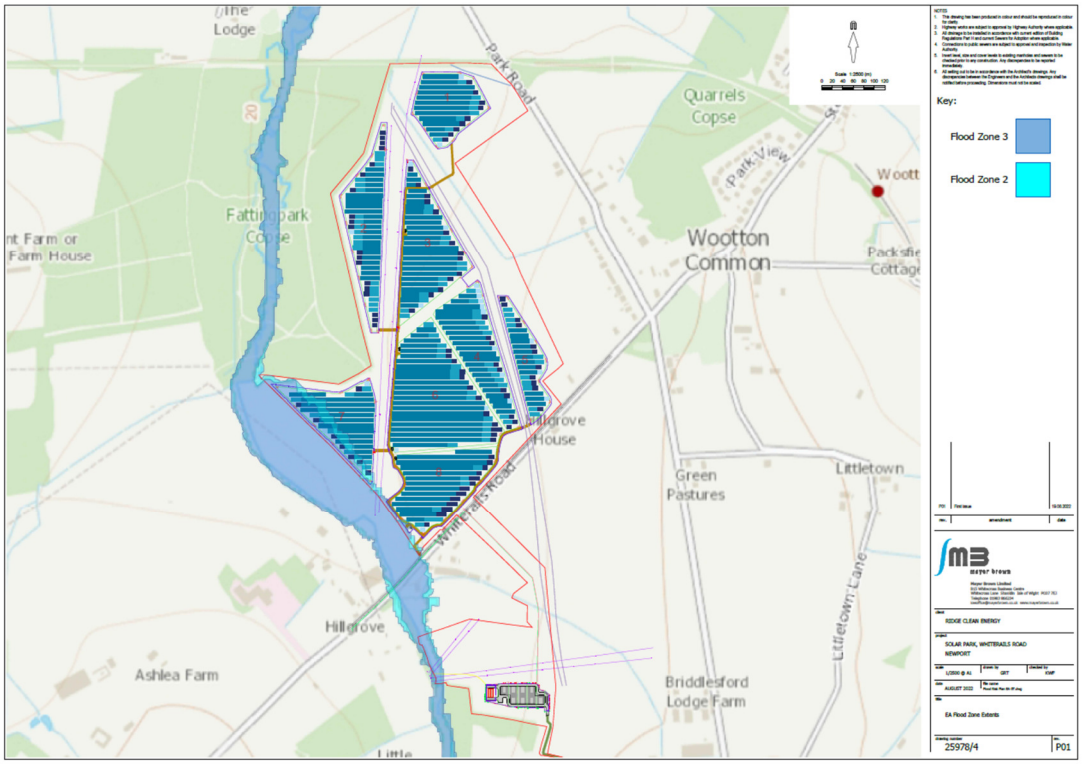


Figure 1.3. Flood Maps for Planning – All Zones – Development Layout Overlay.

1.17 Whilst the full formal Sequential Test process for site selection in consideration of flood risk, as outlined in the NPPF, is not required, that way of thinking has been applied to the layout of the site internally. As stated above, the majority of the panels are in Flood Zone 1. Whilst some of the solar panels are within the Flood Zone 2 & 3 extent, it is a very subtle intersection, and they have been designed to reflect this. We should note that, whilst we are aware of the EA`s changed guidance on the matter of climate change (2020), the revised climate change data to accurately consider these changes appears to be lagging behind the revised guidance. Certainly, no climate change adjusted data was provided as a result of our Product 4 request. Notwithstanding the above, through experience at other sites, across the country, and local discussions, we have accommodated this later in this document.

1.18 In terms of the Exception Test, it is considered that the development will provide wider sustainability benefits to the community and environment that outweighs the limited residual flood risk, for the following reasons:

- Creation of short-term employment opportunities during the construction phase of the development, the Applicant encourages the use of local contractors where

appropriate and applicable and local accommodation and amenity facilities would be utilised, bringing economic benefits to the local area;

- The primary function of the development is to produce domestically generated, cheap and renewable energy for export to the Local Distribution Network, which provides wider sustainability benefits in relation to addressing climate change and supporting the UK's domestic energy security;
- The development is classed as "Essential Infrastructure" in Table 2 of the Planning Practice Guidance, which is appropriate in the higher risk Flood Zone 3a, in terms of flood risk vulnerability;
- The development will diversity and support a strategically important Island-based dairy farm business, which also processes milk from other farms on the island thus supporting broader Island businesses.
- The Applicant has worked closely with Island-based ecologists and landscape architects to bring forward an enhancement strategy that results in a substantial net gain in habitat and biodiversity whilst complementing the local landscape context. Further information of the net gain in habitat and biodiversity is outlined in the Ecological Impact Assessment which accompanies this FRA;
- Whilst not being afforded planning weight, and under no obligation to support the proposed development, the Applicant has progressed discussions with the local community on how the proposal's community benefit fund could be utilised. Ideas have included energy rebates or energy audits of local properties. The Applicant has also progressed discussions with local schools to promote educational opportunities and with the Island's Community Pantry to support the rollout of further pantry facilities;
- This Flood Risk Assessment will demonstrate that the proposed development is safe in terms of flood risk, both in terms of on-site risks and downstream receptors.
- As such, the development passes the requirements of the Exception Test.

1.19 Regardless of the requirement or otherwise for Sequential and Exception testing this Flood Risk Assessment will demonstrate that the proposed development is safe in relation to flood risk and surface water drainage.

2 Definition of a Flood Hazard

2a - What sources of flooding could affect the site?

Potential source of flooding	Yes / No
Fluvial flooding	Yes
Tidal flooding	No
Groundwater flooding	Yes
Overland flow flooding	Yes
Failure of the urban drainage system	Yes
Failure of local infrastructure	No

2a - For each identified source, describe how flooding would occur, with reference to any historic records wherever these are available

2.1 Whilst fluvial flooding is not considered to be a substantial issue, Palmers Brook does run close to the site. The river could theoretically breach its banks and flood the western side of the site and realise the present-day flood extents depicted in the Environment Agency's modelling, so further consideration is required.

2.2 In addition, the impacts of climate change need to be considered so as to ensure the safety of the development for its design life. The design life is generally considered to be around 40 years for such infrastructure. However, in the absence of any climate change data, it is challenging to design to a specific design life. Though, we consider the proposals submitted to be robust and safe in terms of flood risk, as detailed in the remainder of this report.

2.3 These risks will be considered against the water level, spot height and flood depth levels provided by the EA for the Present Day Flood Zone 2 & 3 probabilities as shown in the data below in Figures 2.1 & 2.2.

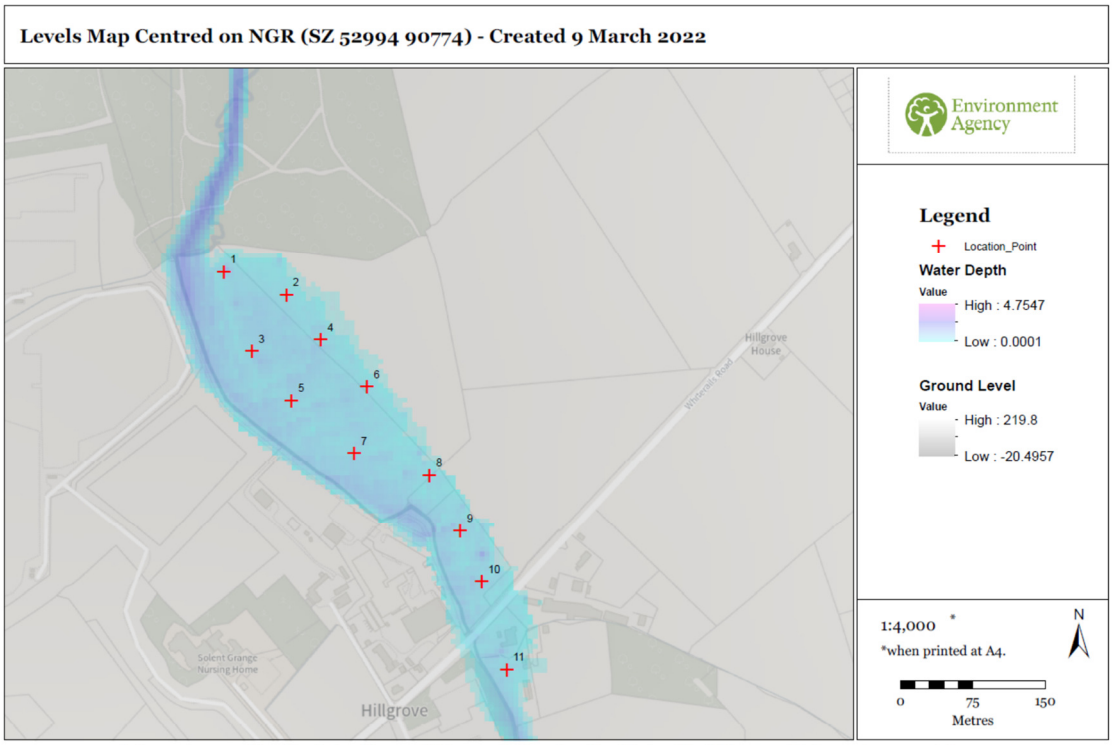


Figure 2.1. EA Levels Map

Water Depths & Levels for NGR (SZ 52994 90774)

	Water Surface Level (mAOD*)			Water Depth (metres)	
Point	1% Annual Probability/1 in 100 Year (Flood Zone 3)	0.1% Annual Probability/1 in 1000 Year Present Day (Flood Zone 2)	Ground Level	1% Annual Probability/1 in 100 Year (Flood Zone 3)	0.1% Annual Probability/1 in 1000 Year Present Day (Flood Zone 2)
1	25.18	25.43	25.02	0.16	0.41
2	25.73	25.75	25.49	0.24	0.26
3	25.74	25.85	25.59	0.15	0.26
4	26.19	26.35	25.99	0.20	0.36
5	26.71	26.74	26.43	0.28	0.31
6	27.13	27.14	26.87	0.26	0.27
7	26.75	26.83	26.57	0.18	0.26
8	28.39	28.54	28.34	0.05	0.20
9	29.19	29.22	28.91	0.28	0.31
10	30.27	30.28	29.91	0.36	0.37
11	31.49	31.51	31.24	0.25	0.27

* Levels in metres above Ordnance Datum Newlyn

Figure 2.2. EA Levels Map Spot Levels & Depths

2.4 Clearly there would be no flood risk to the site directly from the sea – however, Palmers Brook eventually drains to The Solent. In a similar vein to fluvial considerations – even allowing for climate change adjustments – any tidal influence on the river this far upstream would not be sufficient to impact the site. However, the effect of tide locking may have a subtle impact on the river's ability to discharge, which will be considered as

part of the fluvial considerations mentioned above. For clarity, according to the Council`s SFRA document, tide levels are predicted at around 4.2m to 4.4 mAOD in a 2115 climate change adjusted scenario for the Wootton area of The Solent. Whilst the EA are now questioning the use of the climate change adjustments calculated within the SFRA, suggesting their own revised guidance for such matters, with a minimum land level of 22.5 mAOD within the site, for this purpose we consider the data adequate to prove no direct tidal impact.

2.5 Flooding from groundwater could be a source of flooding to the site should the existing levels in the underlying groundwater table prove to be high. Severe storm events could cause groundwater levels to rise above ground level and prevailing ground conditions may impact upon the ability of underlying geology to drain freely and/or retain water.

2.6 With this in mind, overland flows could affect the development during times of severe storms, if design levels of the development do not consider overland flow paths of flood waters.

2.7 Local drainage should be considered as every drainage system has a design capacity, which at some point can be exceeded. Severe storm events can cause the failure of the local drainage. However, it should be noted that this development will not connect to any existing piped networks in the area.

2.8 No specific infrastructure protects the site from flood risk (flood defences, etc.), so other than the local drainage system it is not considered that any such risks exist at the site. The EA Product 4 data we requested does not list any specific flood defence structures in Palmers Brook. Whilst there may be various minor areas of bank protection along the length of the river, these could not be construed as specifically protecting a site at this elevation, predominantly above the level of the stream.

2.9 Figure 78 of Appendix O of the Isle of Wight Council's SFRA Mk 2 identified various surface flooding events recorded by Southern Water. Whilst, as mentioned above, the mapping does not encompass the whole of the site, the extreme north-eastern corner can be seen in the lower left corner of the map. This mapping shows no substantial events to have occurred in or adjacent to this site historically and we have no reason to believe that any such events have occurred further south-west. See map extract below.

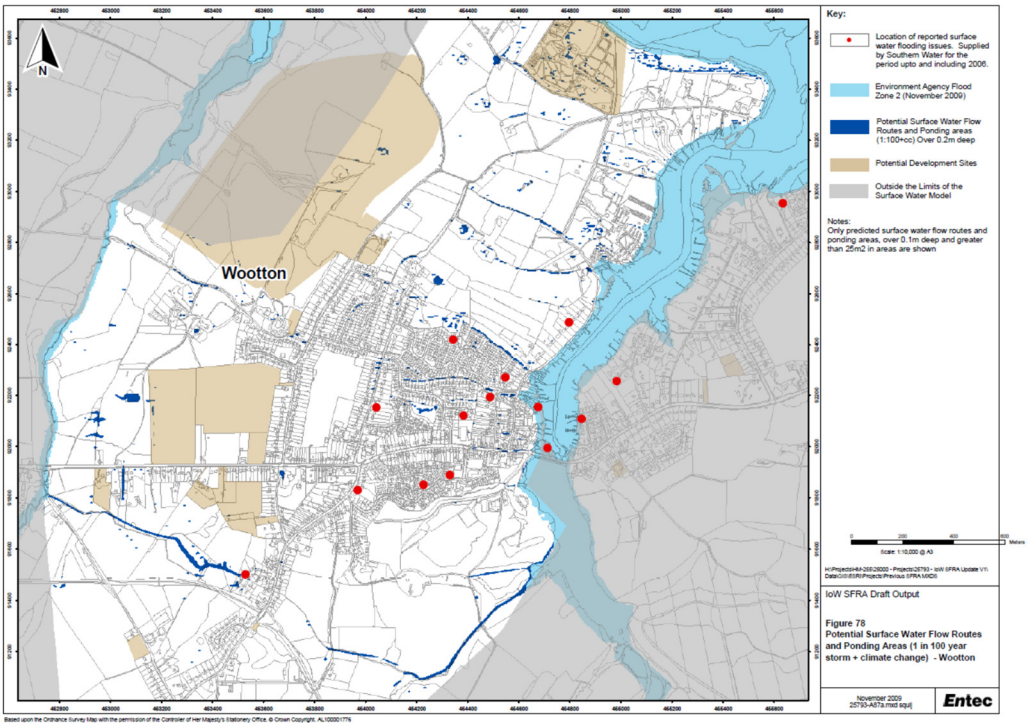


Figure 2.3. Figure 78 SFRA Appendix O.

2.10 Evidence of an existing sewer network is observed in the vicinity of and within the site. Manholes, inspection chambers and gullies were noted during site walkover surveys, so further research and consideration is required in this regard.

2a - What are the existing surface drainage arrangements for the site?

2.11 The site is undeveloped and as such there is no formal piped surface water drainage system. There appear to be some ditches in the area, feeding into Palmers Brook, though the brook and infiltration are the main forms of drainage. We have not undertaken an analysis of QBar (mean annual flood event) runoff value from the whole site using Microdrainage (drainage software), due to the proposed surface water drainage methodology for the site, which is explained further below.

3 Probability

3a – Which flood zone is the site within?

3.1 The proposed development site is located almost entirely within Flood Zone 1 of the Environment Agency (EA) Flood Zone Maps as available at https://flood-map-for-planning.service.gov.uk/. However, Flood Zones 2 & 3a subtly intersect the south-western edge of the site, where Palmers Brook runs broadly south to north. In the southern parcel of land, the brook and associated flood zone also run adjacent to the site.

3b– If there is a strategic Flood Risk Assessment covering the site what does it show?

3.2 As stated above, a Strategic Flood Risk Assessment was undertaken by Entec Consultants in November 2007 on behalf of the Isle of Wight Council and subsequently updated in June 2010. This document assesses the Island with regard to flood risk issues by providing an island wide view as well as separate appendices for each settlement identified as part of the spatial strategy for regeneration and growth through the Core Strategy.

3.3 Sources of flooding and the effects of climate change are assessed, along with flood risk management and mitigation measures. Appendix O of the SFRA Mk2 specifically assesses Wootton with regard to flood risk issues and qualitatively assesses potential development sites within this Key Regeneration Area. The pertinent issues of the SFRA Mk2 for Wootton are outlined in this Report, however, the specific appendix for this area of the Island does not provide any great insight over flooding issues near this site.

3b - What is the probability of the site flooding taking account of the contents of the SFRA and of any further site specific Assessment?

3.4 The site is located within Flood Zone 1, Flood Zone 2 and Flood Zone 3a. Flood Zone 3a, as described in Table 1 of the NPPF Technical Guidance, has a high probability of flooding and comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

3.5 Flood Zone 2, as described in Table 1 of the NPPF Technical Guidance, has a medium probability of flooding and comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1%) in any year.

3.6 Flood Zone 1 is shown to be at less than 0.1% chance of flooding in any year, this is sometimes known as having a 1:1000 year chance.

3.7 With no specific further analysis of the site available in the SFRA, we have referred instead to the flood extents provided by the EA, extracts of which have been provided for reference, above.

3.8 As stated previously, flooding from tidal and infrastructure failure are not considered to represent a tangible risk to the site so will not be considered further here.

3.9 Risks from fluvial flooding should be considered, due to the presence of Palmers Brook. The vulnerability classification of this proposal means that risks from such sources are not considered to be an issue. In the north of the site, the solar arrays can be positioned within the plan view of the present-day flood extent at an appropriate height.

3.10 However, as discussed above, we have no climate change adjusted flood data. Whilst we have attempted to calculate our own climate change allowances and as such, heights, using the new guidance, this has not been possible. However, with our client's experience in this specific area and our expertise in flood risk consideration, we consider that the scheme as designed would provide an ample factor of safety to ensure the proposal is safe in terms of flood risk for its lifetime, particularly considering its suitability for all flood zones present.

3.11 Furthermore, there is substantial precedent set in the UK planning system to demonstrate that locating solar panels within areas prone to flooding is acceptable. As an example, the Sutton Bridge solar park is located within flood zone 3a and was approved by South Holland District Council in March 2021. The decision included a specific planning condition to ensure that the solar panels were constructed appropriately within the flood zone (raising above flood levels). That development also included a number of other electrical and site components within the flood zone, however such other equipment is located outside areas prone to flooding at the Sunny Oaks Renewable Energy Park.

3.12 In the southern portion of the site, where the battery / substation is positioned, the flood zones intersect an undeveloped area of the site. It is not envisaged that any specific mitigation is required in this area. The access track, constructed with a permeable surfacing solution, will effectively represent a neutral addition in terms of the existing hydrological regime and surface water runoff contribution. The area will drain through infiltration, as it does in the existing scenario. In terms of the substation itself, we do not consider this requires any specific positive drainage, due to the permeability of the underlying soils.

3.13 We do not consider that the panels themselves will significantly impact upon the speed of surface water run-off from the site, and as such overland flows reaching the brook, due to the layout providing separation between each panel. Their arrangement, orientation and the spaces between the panels mean that they do not represent a full impermeable area and they will in fact simply drain to the area of land surrounding them. So, interception, evaporation and infiltration will acceptably deal with the runoff, and continue to slow the flow of water reaching the brook, as in the pre-development scenario. There is also permanent planting proposed between the panels. Thus, supporting and improving water interception and infiltration. This will also remove periods when the ground is bare during the cycle of crop cultivation which is a feature of the current use. The development will not therefore exacerbate any existing issues with overland flows.

3.14 In terms of groundwater flooding, the bedrock geology beneath the site is the Hamstead Member. This is comprised of varying quantities of clay, loams silt and sand. These sedimentary rocks are shallow-marine in origin. They are detrital, ranging from coarse to fine grained, forming interbedded sequences. The level of permeability can be highly variable and as such they are not generally considered suitable for direct infiltration drainage (i.e. soakaways). However, dependent upon type, loams retain water but will allow excess water to drain away. It is considered that all types of specific ground conditions likely to be encountered within the range of this soil type would be sufficiently permeable for disposal of surface water across a large infiltration area, as in the existing situation. As such the use of permeable surfacing for access roads, which effectively replicates natural drainage characteristics, and a continued reliance on infiltration in the area of the solar panels, would be suitable.

3.15 The British Geological Survey website also suggests that on the outer edges of, and surrounding, the site the superficial deposit named, Head 1, is present. Such deposits consist of gravel, sands, silt and clay, with gravel tending to be predominant in this area. As such, this will give even more permeable areas for runoff to infiltrate into, further underlining that there will be no issue from groundwater flooding in this location.

3.16 It is also worthy of note that the IOW SFRA states (Section 3.3, page 22) that:

“Groundwater flooding on the Isle of Wight is not considered by the Environment Agency as a significant issue”

3.17 The site is not located within a Groundwater Source Protection Zone, as stated within the IW SFRA and from the EA Source Protection Zone map.

3.18 The SFRA does not identify any sites within the immediate vicinity of the site that have been subject to flooding from surface water, though the SFRA does not cover the whole of this site.

3.19 Surface water flooding has been linked to some of the flooded properties during the 2000 floods on the Island. A recurring theme has been drains not being able to discharge because of raised river levels and thus the capacity of the drains was soon exceeded resulting in surface water flooding. The localised and site-specific nature of these flooding incidents does not lend them to being assessed at the strategic level and they were not included within the SFRA.

3.20 It is also noteworthy that the Preliminary Flood Risk Assessment produced by Amec on behalf of the Isle of Wight Council and dated November 2011, makes no mention of any incidents in this area of Wootton.

3.21 The current levels across the site ensure that during severe storm events flooding from a failure in the local drainage system is unlikely to occur and in any case, would not be exacerbated by the proposed development. Particularly as further research (consideration of Southern Water records secured through various projects in the vicinity, local knowledge, etc.) has revealed that the majority of that drainage comprises of sealed rising mains forming part of the Seaclean Wight waste transfer system, taking predominantly foul flows from various areas of the Island to Sandown Wastewater Treatment Works.

3.22 As we have mentioned, in general, overland flow flooding should not be an issue. These risks are limited due to the topography of the site and geology. Also, the layout of the panels ensures the opportunity to ensure gaps for exceedance routes between these small structures and for drainage to the aforementioned watercourse to be maintained with no increase in runoff rate. This is true of the site and downstream receptors.

3.23 It is also worthy of note that, due to the standard methodologies employed, it is not considered that there would be material impact on overland flow from ground compaction due to the construction process. Measures adopted would include the installation of the access tracks prior to other construction activities, with HGVs restricted to these maintenance tracks. To access locations away from these tracks, tracked vehicles or vehicles with low PSI tyres will be used. It should also be noted that the current agricultural use already involves compaction of the ground due to the heavy agricultural vehicles involved in the processes, an activity which would cease due to the presence of the solar panels.

3.24 Having considered all of the flood risks associated with the proposed use of the site it is considered that, for each potential source of flooding identified in Section 2a, the probability of flood risk is as follows:

Probability of flooding	Low / Medium / High
Fluvial flooding	Medium
Tidal flooding	Low
Groundwater flooding	Low
Overland flow flooding	Low
Failure of the urban drainage system	Low
Failure of local infrastructure	Low

3.25 The above findings reflect the site's position in Flood Zone 1 with a limited chance of flooding in both the present day and climate change adjusted scenarios. However, the recognition of a continuing medium risk of flooding from fluvial sources acknowledges the presence of Palmers Brook and the flood zones associated with it. We consider that a medium level of risk would be present in the existing situation.

3d - What are the existing rates and volumes of run-off generated from the site?

3.26 The site is a greenfield undeveloped site and considering the underlying geology, permeability can be variable but acceptable, though as described above, at its outer edges and in surrounding areas, permeability appears as if it could be good. Whilst surface water is disposed of via evapotranspiration, interception and infiltration, some will be drained via direct runoff to the watercourse, Palmers Brook and ultimately reach The Solent. Therefore, for the purpose of a broad assessment, the runoff from the site could broadly be lower than average, possibly below the industry recognised average of 5 litres per second per hectare.

3.27 Due to the nature of the proposal, it has not been considered necessary to specifically undertake an analysis of the QBar (mean annual flood event) runoff value from the site using Microdrainage (drainage software). QBar is calculated as a baseline to assist in establishing the size and form of attenuation storage, where large areas of new completely impermeable surface are being introduced, which is not the case here.

4 Climate Change

4a - How is flood risk at the site likely to be affected by climate change?

4.1 The detrimental effect of climate change in terms of pluvial considerations is taken into account within PPS 25 with a 20% increase in rainfall intensity. The NPPF Technical Guidance (In Table 5, page 11) uses a 30% increase for rainfall between 2085 and 2115, as does the EA. This rate is now set at 40%. However, where the development proposal falls within Zone 1 the effects of climate change are not generally considered significant enough to cause concern. Considering Figures 3.1 (above) of the Council's SFRA Mk 2, where the effect of climate change has been modelled on zone 3 extents, it should be noted that this has very little impact upon the site area. With only a small portion of the developable area falling within such extents. It also needs to be kept in mind that as, 'Essential Infrastructure', the proposal is acceptable in Flood Zone 1 & 2 and, provided the Exception Test is passed, also in Flood Zone 3.

4.2 However, the EA has relatively recently changed its guidance on climate change. In the day-to-day processing of planning applications, this has led to them requesting that we contact them direct to source climate change adjusted data. As stated above, we recently requested Product 4 data, unfortunately, this request resulted in only base, present day 1 in 100 year flood water surface levels for the area. These were produced in 2004. As we have said, the EA have changed their methodology for the consideration of climate change adjustments. Where they were broadly 20%, they are now 40%.

4.3 The new guidance is available here - *https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances*.

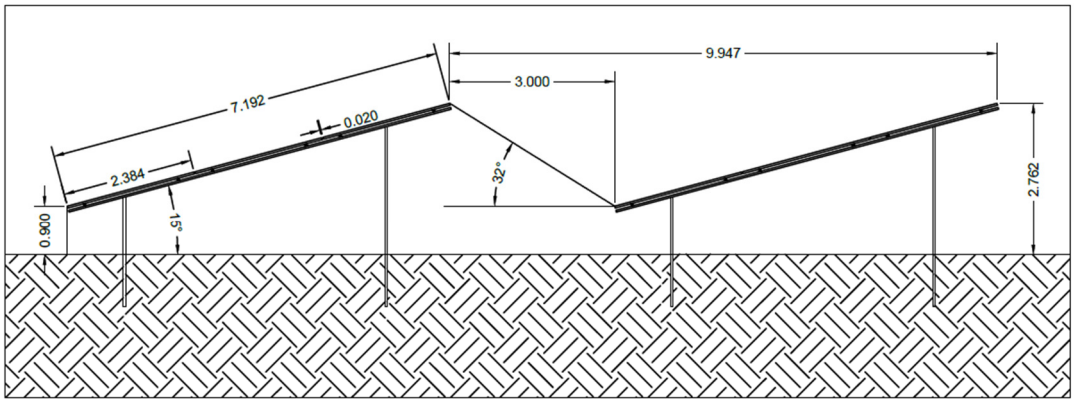
4.4 In our opinion, the new guidance is neither as easy to follow as previous flood risk climate change guidance nor as clear for the layman trying to consider whether a development proposal may be acceptable in flood risk terms. The EA states that the 'Higher Central' increase in flow rate of 49% should be applied when determining the potential increase in flood risk to people. This percentage is derived from the table for the Isle of Wight Management Catchment peak river flow allowances, extract below. The guidance states that we need to consider the Higher Central Allowance for Essential Infrastructure.

Isle of Wight Management Catchment peak river flow allowances			
	Central	Higher	Upper
2020s	15%	22%	37%
2050s	17%	26%	51%
2080s	33%	49%	99%

Figure 4.1. IW Management Catchment Allowances.

4.5 Nationally, Mayer Brown have previously agreed with the EA a methodology for calculating the impact of this percentage allowance on river catchments, though this is based upon having some form of climate change data. The approach has been to calculate the difference between the modelled 1 in 100 year level and 1 in 100 year + 20% climate change level, if available. Dividing this value by 20 would give a per 1% increment of level change in metres. Multiplying this number by the required percentage (49% in this instance) would give a value which, when added to the 1 in 100 year flood level, gives a modelled flood level in mAOD for the 1 in 100 year + 40% climate change event.

4.6 Due to the lack of climate change data, we cannot use this approach. However, it is considered that the scheme as designed would provide an ample factor of safety to ensure the proposal is safe in terms of flood risk for its lifetime, particularly considering its suitability for all flood zones present. The extract from the panel design detail, shown below, gives heights and dimensions for the panels, relative to the general topography in that area, resulting in a robust and suitable scheme in terms of flood risk considerations. It is expected that such panel configuration would be secured by way of planning condition.



PANEL SIDE VIEW

Figure 4.2. Panel Design

4.7 The substation and battery compound on the southern side of Whiterails Road is positioned well outside of the modelled flood extents, so it is not anticipated that any mitigation measures will be required in this area.

5 Detailed Development Proposals

5a Please provide details of the development layout, referring to the relevant drawings including foul and surface water drainage arrangements.

5.1 This development proposal, known as the Sunny Oaks Renewable Energy Park, is for the construction of a number of solar photovoltaic (PV) arrays, battery energy storage system (BESS) and a substation, along with transformers, associated electrical and supporting infrastructure, such as site access tracks and buried cables to transfer the power collected, to the local electricity network.

5.2 Full details of the layout can be found in the drawings produced by BCM, forming part of this planning submission.

5.3 There are no foul flows to be dealt with from this development site. No welfare facilities are to be provided on-site, due to the predominantly unmanned nature of the proposal. With a requirement for only quick maintenance visits, for cleaning the solar arrays and dealing with breakdowns and general servicing, it is not considered necessary to provide such facilities.

5.4 Turning now to surface water disposal, as discussed above, the Geology of Britain Viewer from the BGS website has been referred to, which as the name suggests, details drift/superficial deposits and underlying geology across Britain, including the Isle of Wight.

5.5 According to this map, geology beneath the site is the Hamstead Member. This is comprised of varying quantities of clay, silts, loams and sand. The level of permeability can be quite variable and as such they are not generally considered suitable for direct infiltration drainage (i.e., soakaways) but surface water drainage disposal over a wider area (i.e., permeable surfacing) is likely to, and indeed does, perform satisfactorily.

5.6 However, as stated previously, the ‘Head 1’, superficial deposits, which predominantly consist of gravel layers, identified in various area of the of the site, may suggest even better permeability soil layers are available. Alluvium is also featured in the area of Palmers Brook.

5.7 On the basis of the above information, it is considered likely that the predominant ground conditions likely to be encountered within the range of these soil types will be suitable for disposal of surface water via infiltration over a large area. As such, the use of a drainage strategy involving minimal intervention, allowing water shed from the limited surface area of the arrays to simply drain via infiltration adjacent to each unit, is

considered to be acceptable. Permeable surfacing for the access roads and any limited parking and circulation areas – which effectively replicates natural drainage characteristics – is also proposed.

5.8 Such methods of surface water disposal are considered to fall under the heading of Sustainable Urban Drainage Systems. These systems attempt to replicate, as far as possible, the natural drainage characteristics of an undeveloped site. Through the use of such simple techniques as allowing surface water to naturally percolate into the ground within the site, the aim should be to limit the level of surface water flow entering formal drainage systems to that in the pre-development situation. Due to the use of infiltration as the predominant method of surface water disposal, we do not consider that there will be any increase in peak flow rate to Palmers Brook and, as such, no detrimental impact upon downstream receptors.

5.9 A plethora of guidance on the design and application of sustainable drainage systems has been published by the former DETR (now known as the DTLR), Environment Agency, Susdrain and other bodies. These all provide guidance on the design of various forms of sustainable drainage systems and this proposal accords with them.

5.10 Overland flows will undoubtedly continue to reach Palmers Brook, but we have no reason to consider that these should be any more, in terms of either volume or speed, than in the pre-development scenario.

5.11 During construction, standard practices to prevent any silted run off reaching receptors will be employed. The reestablishment of vegetation, post-construction, will mean these measures need only be temporary.

5b Where appropriate, demonstrate how land uses most sensitive to flood damage have been placed within the site that are at least risk of flooding.

5.12 A solar park use such as that proposed is considered to be 'Essential Infrastructure' and can therefore be positioned in Flood Zones 1, 2 & 3 (provided the Exception Test is passed). The majority of this land parcel is in Zone 1, which means that the proposal has been appropriately located in view of flood risk considerations. The small portion of the proposed use that is intersected by the Zone 3 designation, can also be considered to have been appropriately located, as the use is acceptable, according to central government policy, in such a flood zone.

6 Flood Risk Management Measures

6a How will the site be protected from flooding, including the potential impacts of climate change, over the development's lifetime?

6.1 There will be no specific ongoing flood risk management measures for this development, as the site falls predominantly within Flood Zone 1, which has a limited probability of being affected by flooding. Whilst it is accepted that climate change will have an impact upon the hydraulic regime at this site and within the vicinity, this proposal does not represent a detrimental change to that regime. The impacts of climate change have been included in the scheme as designed, for the panels within Food Zone 3. Details of these heights can be secured through the imposition of a suitably worded condition requiring a final design for the layout, in accordance with the typical section plans accompanying this application.

6.2 We do not consider that a Flood Warning and Evacuation Plan is required for the site. There is no day to day or overnight physical presence required on site. Maintenance and servicing visits would number only one or possibly two visits per month, during day time hours and any standard risk assessment for such a visit would include consideration of inclement weather and site conditions.

7 Off Site Impacts

7a How will the proposals ensure that the proposed development and the measures to protect the site from flooding will not increase flood risk elsewhere?

7.1 Due to its position predominately within Flood Zone 1 it is not considered necessary to introduce specific measures to protect the site from flooding. It is not considered that the proposal will increase flood risk elsewhere. Surface water runoff rates will remain broadly the same, due to the inherent permeability of the bedrock and superficial geology beneath the site, as well as the fact that the proposal does not introduce substantial continuous areas of impermeable surfacing.

7b How will the proposals prevent run-off from the completed development causing an impact elsewhere?

7.2 As stated above, the introduction of only small, separated areas of impermeable surface (the arrays) with clear gaps surrounding them will mean that surface water runoff arising from them will not form large volume bodies of water that would gather speed and not have the opportunity to permeate into the ground. Rather, the limited flow arising from the runoff from each of the arrays will fall to the ground in that area and infiltrate naturally as it does now.

7.3 It should also be kept in mind that the new hedge, tree and wildflower planting will further improve natural uptake and interruption of moisture from the ground during storm events.

7.4 Any overland flows arising from severe, unprecedented, or repeat storm events will undoubtedly reach Palmers Brook, as they do now. However, aping the existing natural characteristics of the surface water drainage regime at the site will ensure that no increased off-site impacts will result.

8 Residual Risk

8a - What flood-related risks will remain after the proposals have been implemented to protect the site from flooding?

8.1 The site's location predominantly within Flood Zone 1 with its acknowledged low probability of flooding, means that there will be no residual flooding risks following development of the site.

8.2 Any residual risk from the limited development occurring within the area of the site covered by Flood Zone 3, has been mitigated through the design of the scheme.

8.3 To prevent flooding from failure of the local urban drainage system, regular maintenance should be undertaken of the gullies, sewers and laterals in the vicinity of, and within, the site. Defences, weirs, river confluences, ditches and channels should also be maintained to prevent flooding from occurring for storm events.

8b - How, and by whom, will these risks be managed over the lifetime of the development?

8.4 There are no ongoing additional risks to be managed as a result of this proposal.

9 Policy Analysis

9.1 To ensure compliance, it is considered appropriate to specifically analyse each relevant local and national policy to consider how the proposals comply. The relevant policy has been reproduced in Section 1 for reference purposes; a brief description of how this proposal accords with it is provided below.

Paragraph 167 and 169 of the National Planning Policy Framework (NPPF).

9.2 The proposal is considered to be Essential Infrastructure and has been appropriately located in Flood Zone 1. The area of the site that falls within Flood Zones 2 & 3 has been limited as much as possible and, as the Exception Test has been applied and passed, has also been positioned acceptably, satisfying point A.

9.3 The development's layout, level and form mean that it is appropriately flood resistant and resilient and could therefore be brought back into use without recourse to significant refurbishment, satisfying Point B.

9.4 Whilst it does not incorporate a designed sustainable drainage system, it accords with the aims of the sustainable urban drainage system principles by virtue of its continuing to utilise a surface water drainage strategy utilising infiltration as its method of disposal. This satisfies point C and Paragraph 169.

9.5 We do not consider there to be any residual flood risks to manage, due to the majority of the site being within Flood Zone 1, the nature of the proposed development, the lack of any overnight accommodation and the fact that the surface water management strategy remains as in the pre-development scenario. We consider that this satisfies Point D.

Policy DM14 Flood Risk of the Core Strategy Island Plan

9.6 The analysis included within this report demonstrates that we have considered and met the main aims and objectives of the SFRA document. We have considered climate change and the proposed designs allow for its impacts, satisfying Point 1.

9.7 See Paragraph 9.4. There is no net loss of flood storage capacity due to the design, size arrangement and spacing of the proposed panels, satisfying Point 2.

9.8 This site-specific flood risk assessment incorporates a drainage strategy, satisfying point 3.

9.9 This policy, and the accompanying SFRA, does not further define a Flood Risk Area. We therefore consider that they are aligned with Flood Zones 2 & 3. We consider that we have supported the objectives and measures of flood risk management plans in general,

through the sequential approach to the placement of this proposal, both globally and within the site, and the full consideration of all potential sources of flooding and their impact both within the site and off it. This satisfies Point 4.

REFERENCES

1. Communities and Local Government (2021) National Planning Policy Framework (NPPF).

2. Planning Practice Guidance, Flood Risk and Coastal Change, 6th March 2014.

3. Communities and Local Government (2006) Planning Policy Statement 25 (PPS25) – Development and Flood Risk. HMSO, London.

4. Development and Flood Risk: A Practice Guide Companion to PPS25. (Feb 2007). Communities and Local Government. HMSO, London.

5. Isle of Wight Council's Strategic Flood Risk Assessment Mk 2 (2010) produced by Entec Consultants.

6. Preliminary Flood Risk Assessment (2011) produced by Amec on behalf of the Isle of Wight Council.

7. Policy DM14 Flood Risk of the Core Strategy Island Plan adopted March 2012.