Submission ID: [redacted]

Comments on Green Hill Solar Farm ENO010170
Hydraulic Modelling Technical Note. Lavendon Flood Alleviation Study. 19 / 10 / 2025.
The report states that based on the modelling undertaken it is concluded that the proposed solar farm development cannot feasibly incorporate on site measures within Area G that would provide a measurable reduction in flood risk to Lavendon. Modelling was used to simulate a range of future rainfall events. A middle range was chosen based on a 3.3% AEP with a return period of 30 years and a climate change uplift of 25%.[ref page 12.] In the results summary , page [17 item 2.6.4.] the model confirms that the maximum flood depth would reach 700mm at a property North of the A428 { assume Lower Farm }. A model using a more severe 0.1% AEP and a CC of 40% has not been included.We question why.
A report produced for MKCC in August 2025 by AECOM researched the storm event which occurred directly over Milton Keynes between September 22nd to 29th / 2024. Out of 6 flood hot spots recorded, Lavendon had the most severe rainfall. "This was so intense that the ground became saturated very quickly resulting in a high level of surface water run-off and fluvial flooding." The storm peaked on Sept 22nd and was classified as >0.1% AEP with a return period exceeding 1000 yrs. This report was available before the Arthian study was undertaken.
The attached photo shot was taken of the access bridge to the Lower Farm property. This shows a timber post upon which has been marked, in white the height of the storm water flood passing under at 11.00pm on the 22nd Sept 2024. This measures 1,65m from the limestone channel bed. Below is the 700mm line indicating the maximum height modelled at 3.3% AEP. Below that are the small reduction markers of levels if earth bunding is introduced. The 1.6 m depth is equivalent to > 0.1% AEP. The drainage channel flows 1km down to Lavendon and passes under the A428 via a concrete culvert. This could not cope with the force of the flood water and over spilled into adjoining properties and the village.
A report by a consultant Hydrologist Mark Shepherd is attached which researches the fact that the solar panel installation in Site G will increase the rate of surface storm water run-off into the large drainage channel and breach the flood defences in Lavendon Village the Lower Farm properties and Equestrian Livery business. As GHS cannot propose any further flood defence options for Site G it should be withdrawn from the development.

RESPONSE TO APPLICANT'S RESPONSES TO WRITTEN REPRESENTATIONS AT DEADLINE 1 : HYD-003 – LAVENDON

The applicant allegedly recognises the recorded flooding history within Lavendon and surrounding catchment, (a comment that is at odds with REP1-023 as well as APP-097 and APP-107) but this is not supported by the content of their other relevant reports that are selective in their content.

The applicant references the baseline described in ES Chapter 10 Hydrology Flood Risk and Drainage [REP1-023], which includes the following (all underlining and boldness made by the author for emphasis):

1. National Policy Statement (NPS) for Energy EN-1 (Ref 10.12)

   Clause 10.3.20: NPS EN-1, paragraph 5.8.13, requires Site-specific flood risk assessments for all energy projects located in Flood Zones 2 and 3 in England. For projects located in Flood Zone 1, an assessment is required for all proposals that involve:

   - land which has been identified by the EA as having critical drainage problems [1];
   - land identified (for example in a local authority strategic flood risk assessment) as being at increased flood risk in future [2]; and
   - land that may be subject to other sources of flooding (for example surface water) [3]; where the EA or NRW, Lead Local Flood Authority, Internal Drainage Board or other body have indicated that there may be drainage problems.

   Clause 10.3.21: Relevant factors for the Secretary of State to consider when determining an application for development consent are listed at paragraph 5.8.36 of that section. Paragraph 5.8.36 states: "*in determining an application for development consent, the Secretary of State should be satisfied that where relevant":*

   - The Sequential Test has been applied and satisfied as part of the site selection report [4];
   - A sequential approach has been applied at the **site level** to minimise risk by directing the most vulnerable uses to areas of lowest flood risk;
   - The proposal is in line with any relevant national and local flood risk management strategy [5];
   - Sustainable drainage systems (SuDS).. ..have been used unless there is clear evidence that their use would be inappropriate;
   - In flood risk areas the project is designed and constructed to remain safe and operational during its lifetime, without increasing flood risk elsewhere [6].

2. National Planning Policy Framework (NPPF) (Ref 10.15)

Clause 10.3.32: In relation to flood risk, inappropriate development in areas at high risk of flooding should be avoided by directing development away from areas at the highest risk [6], but where development is necessary, making it safe without increasing flood risk elsewhere [6] and considering the effects of climate change

Clause 10.3.33 : NPPF states that a site-specific Flood Risk Assessment (FRA) is required for the following scenarios:

- All proposals involving land within Flood Zone 1 which has been identified by the EA as having critical drainage problems [1];
- All proposals involving land within Flood Zone 1 identified in a strategic flood assessment as being at increased flood risk in future [2]; and
- All proposals involving land within Flood Zone 1 that may be subject to other sources of flooding [3], where its development would introduce a more vulnerable use.

3. Milton Keynes MK Plan addressed in Clause 10.3.39, extracts from which include the following:

Policy FR1 Managing Flood Risk

Plan: MK will seek to steer all new development towards areas **with the lowest probability of flooding**. **The sequential approach** to development, as set out in national guidance, **will therefore be applied across the Borough** [7], taking into account all sources of flooding as contained within the Council's Strategic Flood Risk Assessment (SFRA).

Development within areas of flood risk from any source of flooding, will only be acceptable if it is clearly demonstrated that it is appropriate at that location, **and that there are no suitable available alternative sites at a lower flood risk** [8]

Development proposed in an area at risk of flooding[9] will be required:

- To ensure that opportunities to reduce the causes and impacts of flooding to the site and the surrounding area are taken as far as possible, in order to improve the existing situation, taking into account climate change. At a minimum, proposals will need to demonstrate no increase in flood risk to the site or surrounding area;
- To clearly demonstrate that the benefits of the development to the community, outweigh the risk of flooding when applying the sequential test and exception test (where required);

[n] are internal cross-references to the applicants responses

A site-specific FRA will be required for:

- All sites of 1ha or more in Flood Zone 1;
- **All sites** within Flood Zone 2 **or 3; [10]**
- **All sites highlighted as being at high risk from surface water flooding**, or which are located within a Critical Drainage Catchment (CDC), as identified in the Milton Keynes Surface Water Management Plan [11]. In this case **the FRA will be required to demonstrate that the development will not increase the flood risk to the CDC** and where possible will provide an improvement to the existing situation; and
- The FRA should include an assessment of flood risk to and from the proposed development, and demonstrate how the development will be safe, **will not increase flood risk elsewhere [6]** and where possible will **reduce** flood risk overall in accordance with the NPPF and PPG."

Policy FR2 Sustainable Drainage Systems (SUDS) and Integrated Flood Risk Management

- Development will ensure **no adverse impact** on the functions and setting of a watercourse and its associated corridor [7]

Policy FR3 Protecting and Enhancing Watercourses

"The Council will resist proposals that would adversely affect the natural functioning of main rivers, ordinary watercourses [8] and wet or dry balancing lakes, this includes through the culverting of open channels [9], unless for access purposes."

The developer is requested to indicate where in the multitude of reports prepared that they have specifically addressed the requirements of Policy FR1, but before doing so take into consideration the remaining comments in this response.

4. Green Hill G Flood Risk and Drainage Considerations – Fluvial Flood Risk

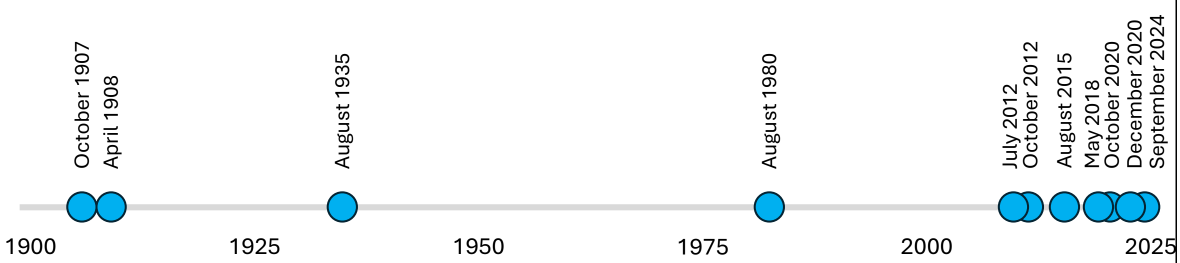
Clause 10.6.87 : Fluvial flooding could occur if the land drainage ditches overtopped their banks during or following an extreme rainfall event *(please reference [1] as there appears to be discontinuity here)*.

Clause 10.6.88 : According to the EA's updated Flood Map for Planning, the entirety of Green Hill G is situated in Flood Zone 1 with the exception of a limited area within Field GF13 which is identified as being in Flood Zone 3 *(please reference [10])*, associated with a land drainage ditch and unnamed Ordinary Watercourse. However, these extents remain outside of any areas of proposed development (*please reference* [5]). The EA Historical Flood Map indicates that Green Hill G has not historically flooded and neither has the area nearby.

The developer states that the "entirety of Green Hill G ... with the exception of the area within Field GF13...". As the developer has continuously used the exception to their advantage through their FRA and relied on the bigger picture for their assessments, this by no means relieves them of their responsibility to address all areas that do indeed fall into the area of proposed development – especially by their own admission. The comment that "these extents remain outside of any areas of proposed development" appear to be in complete contradiction and disregard of MK's policy referenced in [5], [6], [7] *and* [8]. *The Developer cannot simply cherry-pick extractions to their advantage – they are bound by the entirety of policies.*

Modelling was used to simulate a range of future rainfall events. A middle range was chosen based on a 3.3% AEP with a return period of 30 years and a climate change uplift of 25%.[ref page 12.] In the results summary , page [17 item 2.6.4.] the model confirms that the maximum flood depth would reach 700mm at a property North of the A428 { assume Lower Farm }. A model using a more severe 0.1% AEP and a CC of 40% has not been included. Could the developer please explain why this has not been presented in their reports particularly in the light of the Section 19 Report referenced in the author's response to Clause 10.6.90 and 10.6.91.

The developer further states that the EA Historical Flood Map indicates that Green Hill G has not historically flooded and neither has the area nearby! If proper research had been carried out, it would have been very clear to the contrary. For ease of reference for the developer, a summary of verified, documented flood events in Lavendon that were included in the independent report are shown in the following timeline:



Again, the developer has apparently not had the opportunity to review any of the references attached to the independent report which quite clearly documented reports on these events. For ease of reference these were:

- *WSP UK on behalf of Milton Keynes City Council, "Flood Investigation Report 2014" (covering 14 July 2012 flooding event), 2016 (final version)*
- *Aecom on behalf of Milton Keynes Council, "Independent Flood Review Milton Keynes – 27th May 2018 Flood Event", September 2019*
- *Environment Agency, "Report on December 2020 Flooding in the Great Ouse catchment Appendix B and Appendix C"*
- *David Smith Associates, Flood Investigation Report Lavendon, 23 December 2020*

[n] are internal cross-references to the applicants responses

- *Milton Keynes City Council, Agenda Item September 2024 Floods and subsequent Notices of Motions – Motivation 4 September 2024 Floods, 4 November 2024*
- *Milton Keynes City Council Environmental & Place Scrutiny Committee, "Scrutiny Report Flood and Water Management Annex C Lavendon Flood Actions Public Realm and Environmental Scrutiny Report: Lavendon Flood Actions Prior to 2020 Flood Event", 27 March 2025*
- *Milton Keynes City Council, Annex C Lavendon Flood Actions Public Realm and Environmental Scrutiny Report, 27 March 2025*
- *Milton Keynes City Council "MHA PSP4 MKCC Section 19 Flood Investigation Report: 21st – 29th September 2024 Flood Event", August 2025*

The conclusions drawn in Clause 10.6.89 are therefore factually incorrect.

Please review these documents in the context of my comments on Clause 10.6.92. The developer is requested to respond in writing to each of these documented reports either acknowledging or otherwise their content.

Clause 10.6.90 and 10.6.91: the developer states that *"The previous EA RoFSW Map indicates that Green Hill G ranges from a very low risk of surface water flooding (less than 0.1% annual probability) to low risk of surface water flooding (between a 1% and 0.1% annual probability) to medium risk of surface water flooding (between a 3.3% and 1% annual probability) to high risk of surface water flooding (greater than 3.3% annual probability)."*

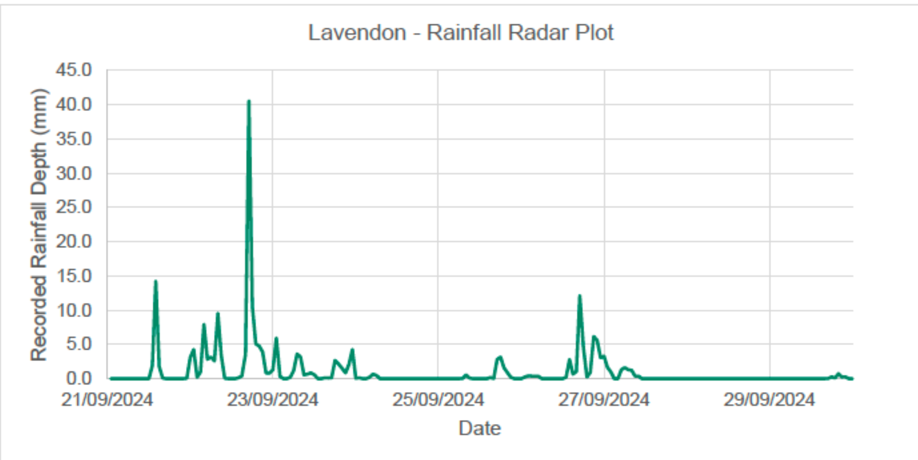
As the developer has consistently not appeared to have reviewed any of the attachments to the initial independent report, I will present some excerpts from the most recent Section 19 Flood Investigation Report on the 2024 Flood Event (and similar information can be obtained from the Section 19 Flood Investigation Reports for the 2014, 2018 and 2020 flood events, copies of which can be made available on request):

Executive Summary – Flood Hotspots

44 properties were affected in Lavendon during the September 2024 flood event. Analysis of rainfall data recorded across Lavendon, estimates that the rainfall event had a >0.1%AEP. Although rainfall was recorded throughout the storm event, maximum rainfall depths were recorded on the 22nd September. The primary sources of flooding in Lavendon were surface water runoff, which exceeded the capacity of the drainage network and caused many roads to act as informal drainage channels. High levels of surface water flooding likely contributed to the extent of fluvial flooding of the unnamed ordinary watercourse in Lavendon.

Section 2. Flood Hotspots

Six flood hotspots were determined by MKCC on the basis of flood reports from Milton Keynes as a result of the significant flooding in September 2024. The six

hotspots are shown in Figure 1-1 including Bletchley, Bradwell, Emberton, Lavendon, Newport Pagnell and Stony Stratford.
Section 2.1.4.1 Lavendon Overview Lavendon is not located in an ACDP. However, Lavendon has been identified in MKCC SWMP as a **Critical Drainage Catchment (CDC2)**, noted as an area where flood risk is considered to be the most severe in Milton Keynes.
Section 2.1.4.2 Flood History Lavendon has experienced historical flooding due to 'channel capacity exceedance' from an Unnamed Ordinary Watercourse as detailed in the EA Recorded Flood Outlines. A Section 19 report has been published for Lavendon as a result of significant flooding in December 2020. It was determined that flooding was caused by heavy rainfall over a relatively short period of time falling onto a near saturated or saturated catchment.
Section 4.1 Overview Analysis of DEFRA Rain Gauge Data and Met Office Radar Data (provided by MKCC) of the rainfall from 21st - 29th September was undertaken. Using a six-day rolling average duration, maximum rainfall results indicate magnitudes exceeding the 1 in 1000-year return period across parts of Milton Keynes. The methods used to estimate the return periods from the datasets are set out in Section 4.3.
Section 4.3.1 Recorded Rainfall Event Overview Rain gauges and radar locations in the north recorded maximum rainfall accumulations during the first period of rainfall, as shown in Figure 4-5 for Lavendon. Figure 4-5: Lavendon - Recorded Rainfall Radar Depth Plot 
Section 4.3.3 Rainfall Radar Data Table 4-2 shows the largest observed 144-hour (6-day) total (cumulative 60 min rainfall data) was 222 mm and was recorded in Lavendon. Maximum rainfall depths were high across all hotspots, most notably in Lavendon, Bradwell and Bletchley.

[n] are internal cross-references to the applicants responses

Table 4-2: Rainfall Radar Data

Radar Data Location (NGR)	Maximum Rainfall Depth (mm)
Lavendon (491717, 253655)	222
Emberton (48926, 4249260)	112
Newport Pagnell (487792, 244068)	80
Stony Stratford (479165, 240249)	121
Bradwell (48417, 7239766)	183
Bletchley 1 (485978, 233310)	175
Bletchley 2 (488069, 231820)	182

Section 4.3.4 Event Rarity

The estimated rainfall totals presented in Section 4.3.2 and Section 4.3.3 were used to estimate event rarity for the flood event using the Depth-Duration-Frequency (DDF) rainfall model. DDF curves describe rainfall depth as a function of duration for given return periods at specified locations within the UK and can be reproduced using the Flood Estimation Handbook (FEH) Website.

Return periods are expressed as Annual Exceedance Probability (AEP). AEP is a statistical measure used to describe the likelihood of a given event, such as flooding, occurring in any given year and is often expressed as a percentage.

Table 4-3 presents the return periods estimated using the FEH Website for the maximum rainfall depths recorded at the five rain gauges and seven radar rainfall locations over a 144 hours (6 day) period. Table 4-3 highlights the intense nature of the rainfall event due the low return periods across Milton Keynes. Figure 4-8 illustrates the locations of the rain gauges and radar rainfall locations along with their associated return period estimates. This further highlights the high intensity and prolonged duration of the rainfall event. However, return periods are notably higher in Newport Pagnell suggesting the spatially variable nature of the rainfall.

While the probability of the rainfall event is considered low, the potential impact of such events can be severe, often leading to significant flooding and damage. However, DDF models have greater uncertainty for higher magnitude rainfall events due to limitations with the data as higher magnitude events are rarer, leading to fewer data points for accurate statistical analysis.

Table 4-3: Maximum Rainfall Depths and associated Return Period Estimates at Rain Gauges and Radar data locations

Rain Gauge	Maximum Rainfall Depth	Estimated Return Period
Quinton	166	>0.1% AEP
Towcester	161	>0.1% AEP
Brackley	155	0.2 – 0.1% AEP
Birchmoor	187	>0.1% AEP
Drayton Parslow	147	0.2 – 0.1% AEP
Radar Data Location	**Maximum Rainfall Depth**	**Return Period**
Lavendon (491717, 253655)	222	>0.1% AEP
Emberton (48926, 4249260)	112	1.3% - 1% AEP
Newport Pagnell (487792, 244068)	80	20% - 10% AEP
Stony Stratford (479165, 240249)	121	0.5% - 0.2% AEP
Bradwell (48417, 7239766)	183	>0.1% AEP
Bletchley 1 (485978, 233310)	175	>0.1% AEP
Bletchley 2 (488069, 231820)	182	>0.1% AEP

<u>Section 5.4.1.1 Lavendon Flood Impacts</u>
This section contains records, photos, site observations from the flooding event.

<u>Section 5.4.1.3 Lavendon Flood Sources and Mechanisms</u>
Following a review of the data and site walkover it is concluded that the flooding within the Lavendon hotspot was a result of the following:

- Analysis of rainfall data recorded across Lavendon, estimates that the rainfall event had a > 0.1% AEP. This analysis highlights the intensity and rarity of the rainfall event.
- Castle Road conveys flows towards Olney Road, with both roads acting as an informal drainage route. These findings correspond with EA RoFSW Map, as surface water is shown to flow from the unnamed Ordinary Watercourse, onto Castle Road and flow towards Olney Road during all AEP events.
- Review of the data highlights that surface water flows were conveyed along roads from the upper catchment. Numerous gullies were identified during the site visit. Rainfall analysis estimates that the rainfall event was a >0.1% AEP event across Lavendon. Due to rarity of the rainfall event, this suggests that the AEP of the event was greater than the design standard for drainage systems and the capacity of the gullies was likely exceeded.

The developer is requested to explain the different conclusions drawn between the Section 19 Report referenced above and their own investigations, where apparently the same source data was used.

The developer also appears to have not acknowledged or omitted relevant content from the Milton Keynes Council Surface Water Management Plan (Final Report April 2016), some content of which differs from relevant developer reports. To assist the developer, some appropriate excerpts have been included below:

Section 2.3 references Data Collection sources. I may be incorrect, but have historic records of flooding (GIS layer) from Milton Keynes and historic records of flooding from all sources (GIS layer) from the Environment Agency been used in the developers' reports?

Section 3.7 Historical Flood Records
Table 3.2 lists all available historical flooding data by source:

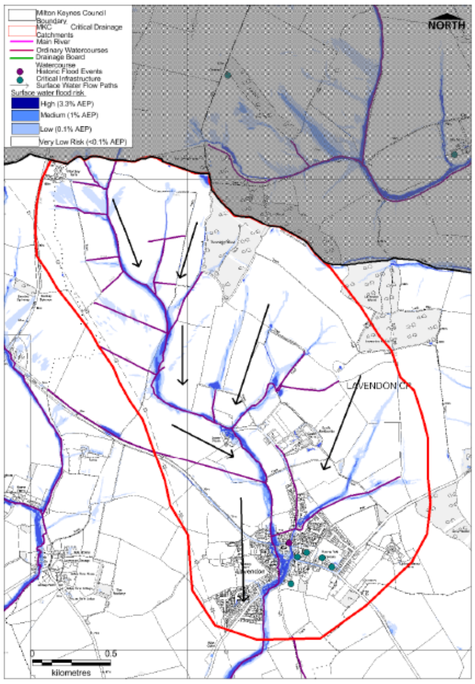
Date	Description	Location	Data Source
Surface Water			
05 Jul 2006	Flooding on Main Carriageway – Incident Support Unit called.	A5 Carriageway	Highways England
06 Jul 2006	Flooding on Slip Road Carriageway - Incident Support Unit called.	A5 Carriageway	Highways England
06 Nov 2006	Underpass flooding beneath the Main Carriageway due to blocked ditch.	A5 Carriageway	Highways England
01 Dec 2006	Flooding Main Carriageway across L1/2 n/b, c.res. And L1/2 s/b - Cut grips.	A5 Carriageway	Highways England
20 Jul 2007	Standing water on the Main Carriageway.	A5 Carriageway	Highways England
20 Jul 2007	Standing water on the Main Carriageway.	A5 Carriageway	Highways England
22 Feb 2010	Runoff from offside verge across Slip Road due to a blockage in the drainage system.	A5 Carriageway	Highways England
Sept. 1992	Flooding from surface water drain surcharge.	John Street, Newport Pagnell	Environment Agency
Sept. 1992	Flooding from surface water drain surcharge.	Caldecote St, Newport Pagnell	Environment Agency
Sept. 1992	Flooding from surface water drain surcharge.	Priory St, Newport Pagnell	Environment Agency
July 2007	Pluvial. Excess surface water runoff. Drainage system overwhelmed. Source: Review of Summer 2007 Floods - Anglian Region.	Stoke Goldington	Environment Agency
Aug. 2008	Pluvial. Drainage system capacity exceeded. Source: Bedford Parish File.	Lavendon	Environment Agency

***Ordinary Watercourses**: Information on historical flooding was gathered during the preparation of the 2008 SFRA from Environment Agency flood outlines and measured flood levels, published reports and a review of the local newspaper.*			
1998 & 1947 (Great Ouse) and 1968 (Loughton Brook)	The Environment Agency flood event outlines only show flooding to gardens and grounds, not buildings, for these events	New Bradwell	See above
Aug 1980	Flooded due to an obstruction or blockage of a culvert. The local newspaper reports flood damage to Long Meadow School but does not give a date.	Shenley Brook End	See above
November 2004 and November 2007.	The local newspaper reports flooding to Wadesmill Lane, under the v10 road bridge. It reports that a local resident claims that the street floods once or twice a year. The newspaper attributes the flooding to the brook next to the community centre	Walton Park	See above
Unknown	The newspaper reports flooding to Bourton Low in Walnut Tree due to blockage to a culvert on Caldecotte Brook. *Since the flooding, improvements have been made to the Caldecotte Brook and the trash screen outfall.*	Bourton Low in Walnut Tree	See above
Unknown	The newspaper reports flooding to a garden in Ellesborough Grove.	Two Mile Ash	See above
August 1980	The Environment Agency flood outline reports that the channel capacity of the ordinary watercourse was exceeded.	Ravenstone	See above
August 1980	The Environment Agency flood outline reports that the channel capacity of the ordinary watercourse was exceeded.	Lavendon	See above

Section 4.1 Identification of Critical Drainage Catchments Overview *The intermediate assessment was used to identify areas where the flood risk is considered to be most severe; these areas have been identified as Critical Drainage Catchments (CDCs). The definition of a CDC in this context has been agreed as:* *‘a discrete geographic area (usually a hydrological catchment) where multiple or interlinked sources of flood risk cause flooding during a severe rainfall event thereby affecting people, property or local infrastructure.’* *The CDC comprises the upstream ‘contributing’ catchment, the influencing drainage catchments, surface water catchments and, where appropriate, a downstream area if this can have an influence on the CDC. In spatially defining the CDC the following have been taken into account:* • *Surface Water flood depth and extent – areas shown within the uFMfSW as predicted deep or extensive levels of surface water flooding;* • *Surface Water flood hazard – areas shown within the uFMfSW as predicted high hazard as a result of flooding (hazards is defined as a function of flood depth and velocity);* • *Potential impact on people, properties and critical infrastructure – including residential properties, commercial properties, main roads (access to hospitals or evacuation routes), rail routes, rail stations, hospitals and schools;* • *Groundwater flood risk – based on the BGS Susceptibility to Groundwater Flooding dataset identifying areas most susceptible to groundwater flooding;* • *Historical flooding events – based on information from various RMAs;* • *Significant underground linkages – including underpasses, tunnels, large diameter pipelines (surface water, sewer or combined) or culverted rivers;* • *Cross boundary linkages – CDCs have not been curtailed by political or administrative boundaries; and,* • *Source, pathway and receptor – the source, pathway and receptor of the main flooding mechanisms* *Lavendon is CDC2.*
CDC2: Lavendon *A direct excerpt from the Surface Water Management Plan is as follows:*

CDC2: Lavendon

Ward	Olney
Flood Source	Surface water, ordinary watercourses and groundwater.
Description	Lavendon is a small village located at the northern extent of the borough with elevations ranging from ~95mAOD at the top of the valley to ~65mAOD along the fluvial floodplain. There is an extensive surface water flow path flowing from north to south Lavendon in conjunction with a number of smaller surface water flow paths flowing from higher to lower elevations. Consequently, surface water ponding is apparent across the valley floor. The uFMfSW identifies central Lavendon (comprising Northampton Road, Rectory Orchard, High Street and Olney Road) as an area which may be at high risk of surface water flooding. A number of culverted and non-culverted watercourses are present within the area (under the jurisdiction of MKC) which may combine with pluvial sources and result in flooding. The BGS groundwater dataset suggests that there is the potential for groundwater flooding to occur at the surface.
Historical Flooding	The Environment Agency holds 1 record of surface water flooding from April 1980 which is reported to have occurred as a result of the drainage system exceeding capacity.
Surface Water Flood Risk	**Summary of properties at risk of surface water flooding in Lavendon:** – 38 residential and 16 non-residential properties are at high risk (3.3% AEP). – 55 residential and 20 non-residential properties are at medium risk (1% AEP). – 111 residential and 41 non-residential properties are at low risk (0.1% AEP). **Risk to critical infrastructure in Lavendon:** – 2 educational facilities are at low risk (0.1% AEP).



Contains Ordnance Survey data © Crown copyright and database right 2016

Figure 4-3 Lavendon Surface Water Flood Risk

The developer's attention is drawn to the Surface Water Flood Risk comments as well as the surface water flow paths. ***<u>Three of the surface water flow paths run through sites G-9 and G-13.</u>***

Section 6 Prioritisation of Critical Drainage Catchments

Although CDC2 was removed from the Surface Water Management Plan at this stage due to it being important enough to receive its own attention, an indication of flooded buildings across different AEP events were tabled.

CDC Number	CDC Name	CDC Area (km^2)	Flooded buildings 1 in 30 AEP event	Flooded buildings 1 in 100 AEP event	Flooded buildings 1 in 1000 AEP event	Critical Infrastructure
CDC15	Stony Stratford	1.21	34	119	408	10
CDC8	Newport Pagnell	4.68	52	217	1070	8
CDC10	Olney	1.76	71	199	586	14
CDC20	West Bletchley	13.72	299	717	2377	46
CDC4	Woburn Sands	5.28	52	194	769	17
CDC1	Ravenstone	3.47	8	12	27	0
CDC14	Bradwell Abbey	1.74	85	170	438	4
CDC13	Wymbush/ Two Mile	1.15	52	80	191	4
CDC12	Medbourne/Crownhill	8.47	118	193	604	13
CDC11	Brinklow	1.91	6	68	342	4
CDC17	Oldbrook	1.46	149	339	714	7
CDC19	Bradwell	3.59	115	292	828	9
CDC6	Downs Barn and Conniburrow	6.43	88	260	677	7
CDC7	Stoke Goldington **(FIR)**	4.45	30	42	74	1
CDC2	Lavendon **(FIR)**	4.68	38	55	111	5
CDC9	Bletchley and Fenny Stratford	3.84	20	64	341	29
CDC18	Bradwell (west of Conniburrow)	1.85	44	105	310	7
CDC16	Wolverton	2.91	21	86	389	17

With reference to the latest Section 19 Report, the occurrence of a 1 in 1,000 AEP event has already taken place based on rainfall records referenced in the report.

Clause 10.6.92 : As described in the fluvial section above, the surface water flooding extents largely match the courses of the land drainage ditches.

I cannot understand how a statement of "largely" is considered to be a technical or engineering term. How is "largely" defined by the developer? This appears to be reminiscent of a comment that the developer dismissed from the Lavendon representative commenting on the proposal as "relying on simplified assumptions".

I suppose 50.1% would be a "largely" match, but how has this conclusion been substantiated? Is this mistakenly an inadvertent oversight by the developer? How is the public to know what "largely" means? Is the "unlargely" portion one that poses a higher risk as per MK's policy and has been described as such to avoid more investigations or substantiation? This specific issue in terms of what "largely" is should be defined – is it a 50.1% match, a 75% match, a 90% match? And what of the remainder? Whatever the remainder is, it cannot breach MK's policy referenced in [5], [6], [7] and [8].

The developer states that The EA Historical Flood Map indicates that Green Hill G has not historically flooded and neither has the area nearby. The developer has completed their FRA using FEH design parameters in accordance with the Environment Agency and Lead Local Flood Authorities, citing that local anecdotal flood records do not replace design datasets.

In this regard, the developer's attention is brought to the following:

Office Guidance for both the Environment Agency (EA) and Lead Local Flood Authorities (LLFAs) state that assessments, particularly Strategic Flood Risk Assessments (SFRAs) and site-specific FRAs, should be based on the "best available evidence". National datasets, while essential, are often a national-scale model and are designed to be refined by more detailed, local information where it exists.

The Flood Estimation Handbook (FEH) acknowledges that incorporating local data (like historical flood outlines, river level records, and even photographic evidence) can significantly reduce the uncertainty in design flood frequency estimates. It encourages practitioners to "seek and exploit local data" to produce better estimates and results that are more robust to challenge.

Under LLFA Section 19 Investigations Lead Local Flood Authorities have a statutory duty under Section 19 of the Flood and Water Management Act 2010 to investigate significant flooding. The results of these official investigations, which *do draw on eyewitness accounts, photos, and local records, become formal, verifiable local evidence that should be incorporated into the knowledge base.*

There is nothing anecdotal about rainfall records from a weather station, nor by definition photos/videos and precise flood levels relative to a fixed point collected by a community group. These can be legally and rightfully introduced as part of Historic Flood Extent data.

Verified rainfall records, documented flood events as acknowledged by Parliament, MKCC and different media outlets (including the BBC), photographs and videos have already been included in the independent engineer's report, and the developer is encouraged to revisit this information in the light of their stance of using national datasets. The developer's comment that "local anecdotal flood records do not replace the design datasets required for planning and would not be accepted for determining runoff rates or drainage capacity" would be correct if the independent report had referenced anecdotal evidence. It has clearly not, and it is requested that the consultants' model be recalibrated to include local historical flood data.

Again, the developer has apparently not had the opportunity to review any of the references attached to the independent report which, according to the EA and LLFAs, would be admissible as "best available evidence". For ease of reference these were:

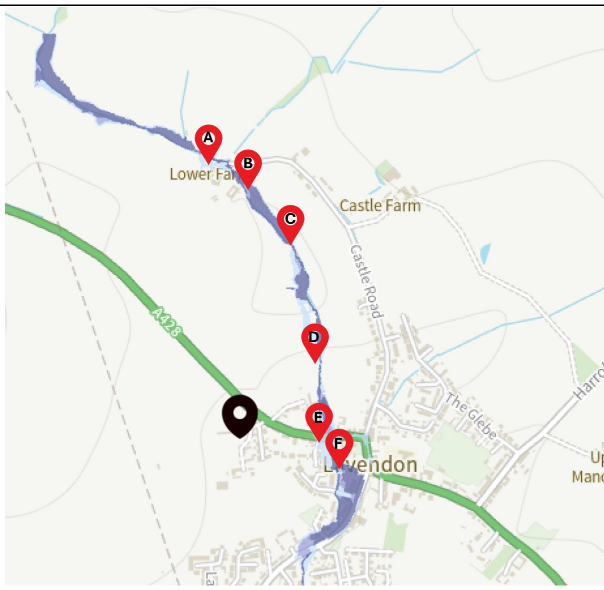
- *Environment Agency Department for Environment Food & Rural Affairs, "Rainfall Runoff Management for Developments Report SC030219", October 2013*
- *Aecom on behalf of Milton Keynes Council, "Milton Keynes Council Surface Water Management Plan Final Report", April 2016*
- *EWE Associates Ltd, "Proposed Residential Conversion Lower Farm Lavendon Buckinghamshire Flood Risk Assessment" Final RevA October 2016*
- *WSP UK on behalf of Milton Keynes City Council, "Flood Investigation Report 2014" (covering 14 July 2012 flooding event), 2016 (final version)*
- *Aecom on behalf of Milton Keynes Council, "Independent Flood Review Milton Keynes – 27th May 2018 Flood Event", September 2019*
- *Environment Agency, "Report on December 2020 Flooding in the Great Ouse catchment Appendix B and Appendix C"*
- *David Smith Associates, Flood Investigation Report Lavendon, 23 December 2020*
- *Buckinghamshire Fire & Rescue Services, "Flooding in North Buckinghamshire and Milton Keynes", 23 December 2020*
- *Gov.uk press release Department for Environment, Food and Rural Affairs together with Environmental Agency, "Frequently Flooded Allowance: Funding for repeatedly flooded communities", 5 April 2023*

[n] are internal cross-references to the applicants responses

- *NREL PV-SmaRT, "Photovoltaic Stormwater Management Research and Testing Project Report", 2024*
- *BBC News, "Major roads closed after heavy rain hits towns", 22 September 2024*
- *Buckinghamshire Fire & Rescue Services, "Flooding Related Incidents", 23 September 2024*
- *Milton Keynes City Council, Agenda Item September 2024 Floods and subsequent Notices of Motions – Motivation 4 September 2024 Floods, 4 November 2024*
- *The Bucks Herald, "Buckingham hit by flash floods", 24 December 2020*
- *MK Citizen, "'Underwater' village where even the church gets flooded begs Milton Keynes council for help", 4 February 2025*
- *Milton Keynes City Council Environmental & Place Scrutiny Committee, "Scrutiny Report Flood and Water Management Annex C Lavendon Flood Actions Public Realm and Environmental Scrutiny Report: Lavendon Flood Actions Prior to 2020 Flood Event", 27 March 2025*
- *Milton Keynes City Council, Annex C Lavendon Flood Actions Public Realm and Environmental Scrutiny Report, 27 March 2025*
- *Milton Keynes City Council "MHA PSP4 MKCC Section 19 Flood Investigation Report: 21st – 29th September 2024 Flood Event", August 2025*
- *Milton Keynes Conservatives, "Conservative Cllr Peter Geary Demands Action for Flooded Lavendon Residents", 20 November 2025*
- *Milton Keynes Council Preliminary Flood Risk Assessment (2011 PFRA) (Covering Green Hill G)*
- *Milton Keynes Local Flood Risk Management Strategy (2016 LFRMS) (Covering Green Hill G)*
- *Milton Keynes City Council Strategic Flood Risk Assessment (2024 SFRA) (Covering Green Hill G)*
- *JBA Consulting on behalf of Milton Keynes City Council, Unknown Report "Appendix M – Summary of Flood Risk in Milton Keynes", unknown date*
- *Videos of the September 2024 floods have been attached hereto in the files "Lavendon Flood_1.mp4" through to "Lavendon Flood_20.mp4".*

It is requested that the developer take time to review these documents, explain why they were not considered and respond with their written position on these documents.

Pursuant to the site inspection that was carried out on 12 December 2025, a visual referenced indication of the extent of the 2024 flooding was requested. Here they are:



Location A

High water mark from Sep '24 flood

[n] are internal cross-references to the applicants responses

Location B

This picture shows a timber post upon which has been marked, in white the height of the storm water flood passing under at 11.00pm on 22nd September 2024. This measures 1.65m from the limestone channel bed. Below is the 700mm line indicating the maximum height modelled at 3.3% AEP. Below that are the small reduction markers of levels if earth bunding is introduced. The 1.6m depth is equivalent to > 0.1% AEP. The drainage channel flows 1km down to Lavendon and passes under the A428 via a concrete culvert (Location E). This could not cope with the force of the flood water and over spilled into adjoining properties and the village.

Location C

Location D

High water mark from Sep ‘24 flood

Location E

High water mark from Sep ‘24 flood

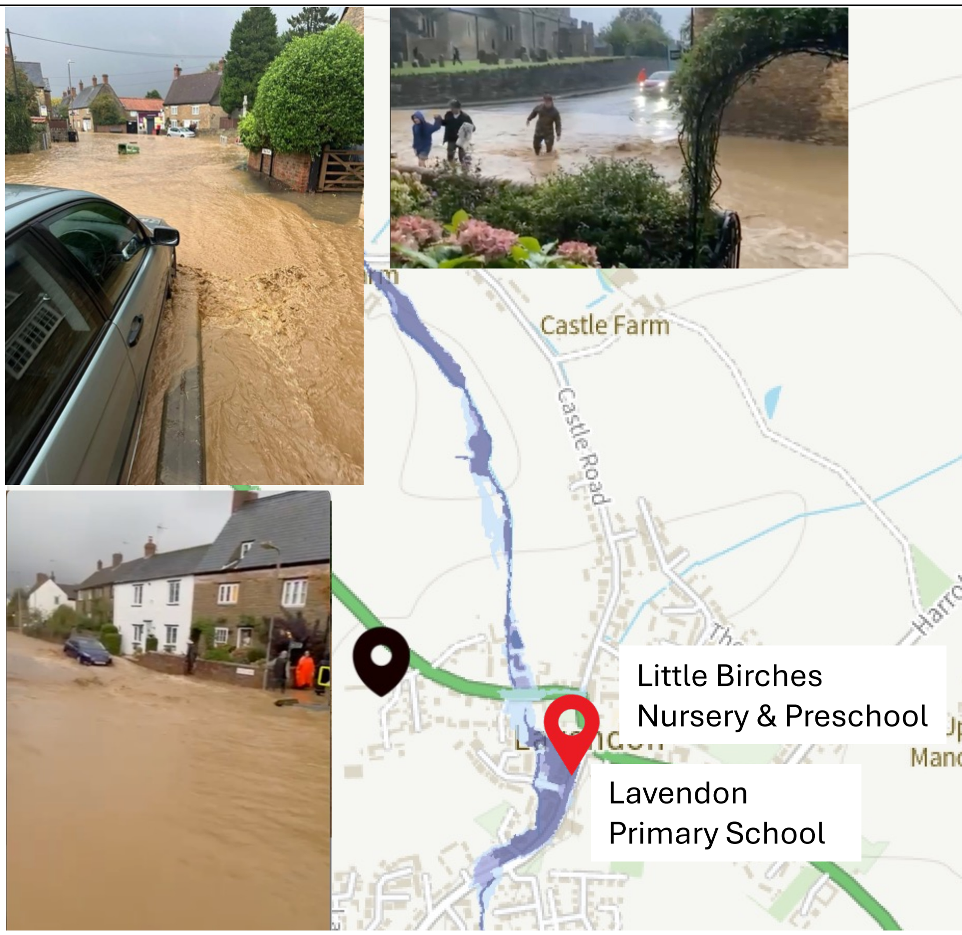
Location F

High water mark from Sep '24 flood

The developer, in accordance the documents referenced as part of their own design and FRA, should read the notes from the Environment Agency (EA) and Lead Local Flood Authorities (LLFAs) and Flood Estimation Handbook (FEH) and include these as Historic Flood Events to recalibrate their hydraulic models.

With specific reference to the following verified photos taken from the most recent floods, I sincerely hope that the developer is fully aware that the lack of incredibly detailed, careful and extremely comprehensive FRA based on their own admissions of flood zoning and failure to adhere to MK policy could in reality lead to danger to life and limb, especially in a flood-flash scenario. I would trust that this on its own would cast a different light on their approach to the proposed development.

Little Birches Nursery and Preschool, as well as Lavendon Primary School, fall squarely within the flood area at the bottom of Castle Road. In fact, the flood levels rose to above door threshold level at Little Birches Nursery during the 2024 floods. Little Birches caters for 44 children from ages 0 to 4 years. Lavendon Primary School caters for 160 children between the ages of 4 and 11.



The safety of our children must be the absolute priority. The potential for a flash flood, triggered or exacerbated by this solar farm development, to sweep through a nearby nursery and primary school is not just a technical risk—it is a direct threat to young lives. To continue producing reports that defend this proposal, while sidestepping this profound humanitarian concern, is unconscionable. The developer must immediately recognize that human life and safety supersede profit and rigorously redesign the plan to ensure zero additional flood risk to the most vulnerable members of our community.

Following Clauses 10.6.86 to 10.6.93, there is no mention of previous work completed by another consultant commissioned by MKCC summarising flood risk in Milton Keynes. Appendix M states the following, with the highlighted sections being brought to the developer's attention:

Appendix M– Summary of Flood Risk in Milton Keynes

Milton Keynes City Council

JBA consulting

Ward	Fluvial flood risk	Formal flood defences	Surface water flood risk	Susceptibility to groundwater flooding, according to JBA map					Reservoir inundation
				No risk	5m below surface	0.5m to 5m below surface	0.025m to 0.5m below surface	Within 0.025m of surface	
Olney	The Great Ouse River flows through Olney and Chicheley Brook flows through the south of the ward. Flood Zones 2 and 3 surround these watercourses and smaller tributaries. Some properties in Lavendon are within these zones. The Environment Agency historic flood outline dataset shows that there has been a history of flooding along these watercourses.	None	Mapping shows that surface water flood risk generally follows similar paths to the watercourses and roads. Settlements particularly at risk include Sherington, Olney, Lavendon, Filgrave and Emberton	✓	✓	✓	✓	✓	Inundation from two lakes, Caldecotte Lake, and Willen Lake, may affect the land adjacent to the Great Ouse River.

Clause 10.7.4 : Flood Risk and Resilience

The developer has stated that critical infrastructure within the Scheme (the conversion units, substations and energy storage compounds) are sequentially located within Flood Zone 1 and therefore in land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%).

The developer is requested to explain the different conclusions drawn between the latest Section 19 Report referenced above and their own investigations, where apparently the same source data was used.

Clause 10.7.4 : Baseline Improvement Measures

The developer has stated that "The solar panels have the potential to concentrate rainfall under the leeward edge of the panels themselves. Research in the United States by Cook and McCuen (Ref 10.23) suggested this increase would not be significant however, there is a potential increase in silt-laden runoff. With the implementation of suitable planting (such as a wildflower or grass mix) the underlying ground cover is strengthened and is unlikely to generate surface water runoff rates beyond the baseline scenario. This is detailed in the supporting OLEMP [EX1/GH7.4_A]".

Let's review the actual content of this cited reference.

1. *The paper states "Additionally, it is possible that the velocity of water draining from the edge of the panels is sufficient to cause erosion of the soil below the panels, especially where the maintenance roadways are on bare ground"*
2. *For the purposes of the paper, a model had to be developed. In this regard the paper states "Rainfall was modeled after an natural resources conservation service (NRCS) Type II Storm (McCuen 2005) because it is an accurate representation of actual storms of varying characteristics that are imbedded in intensity-duration-frequency (IDF) curves. For each duration of interest, a dimensionless hyetograph was developed using a time increment of 12 s over the duration of the storm (see Fig. 3). The depth of rainfall that corresponds to*

each storm magnitude was then multiplied by the dimensionless hyetograph. For a 2-h storm duration, depths of 40.6, 76.2, and 101.6 mm were used for the 2-, 25-, and 100-year events. The 2- and 6-h duration hyetographs were developed using the center portion of the 24-h storm, with the rainfall depths established with the Baltimore IDF curve. The corresponding depths for a 6-h duration were 53.3, 106.7, and 132.1 mm, respectively. These magnitudes were chosen to give a range of storm conditions."

The developer's attention is brought to the fact that 222mm of rainfall was recorded during the September 2024 floods, and that design parameters call for not just a 100-year event.

3. *Under the paper's section on Storm Magnitude, it was stated that there were no significant changes to peak discharge under a 25-year flood analysis. It also stated that "These results reflect runoff from a good grass cover condition.."*
4. *Under conclusions, the paper states "The potential for erosion of the soil at the base of the solar panels was also studied. It was determined that the kinetic energy of the water draining from the solar panel could be as much as 10 times greater than that of rainfall. Thus, because the energy of the water draining from the panels is much higher, it is very possible that soil below the base of the solar panel could erode owing to the concentrated flow of water off the panel, especially if there is bare ground in the spacer section of the cell..".*

These conclusions have not been included in the developer's references, nor qualified their statements, so the developer's statements are incorrect. Please can the developer explain why the appropriate contents of this particular paper were not accurately presented.

Can the developer also please explain why a 2013 research article based on a 1:100 flood event has been used to support their reports while there are many more recent research articles (the following examples are all from 2023) available that take into consideration more advanced techniques and considerably more data.

There are several other published peer-reviewed articles covering this matter. Gullotta et al (2023) in their paper entitled "Modelled Stormwater Runoff Changes Induced by Ground-Mounted Photovoltaic Solar Parks: A Conceptualisation in EPA-SWMM" simulated stormwater runoff in ground-mounted PV panel solar farms.

In their covering abstract, they state "Outflow discharge from the park is compared to that from a reference catchment to evaluate variations of peak flow and runoff volume. Results highlight no practical changes in runoff in the short term after installation. However, in the long term, modifications in soil cover may lead to some potential increase of runoff. For instance, increments of the peak flow from the solar park up to 21% and 35% are obtained for roughness coefficient reductions of 10% and 20%, respectively."

They address ground cover and observed "In the short term after installation of the PV park, no significant changes in ground cover are expected with the respect to the pre-installation scenario. In the long term, operation of the PV solar parks involves the use of maintenance vehicles that could affect the soil properties in the area between panel rows - in terms of compaction and reduced hydraulic conductivity (Pisinaras et al. 2014; Choi et al. 2020). Moreover, the area under the panel rows may experience, in time, a lower vegetation growth rate as compared to the space between rows because of the reduced amount of photosynthetic active radiation (Armstrong et al. 2016; Jahanfar et al. 2019)." *They also stated "For fixed solar park extension and precipitation input, changing from sandy to clay soils results in increased peaks flow and total runoff volumes, due to the reduction in infiltration capacity".* *In their results and discussion referring to their model simulations they state "As a consequence of the increased runoff velocity, total runoff volumes from the solar park are greater than those from the reference catchment for all analysed events. Indeed, the potential of water infiltration is related to the ponding time above the subcatchment surface, which decreases as runoff velocity increases. For the events showed in Fig. 6, runoff volumes from the solar park increase with respect to the reference catchment in the order of 1–3% for a 10% Manning coefficient reduction and in the order of 2–5% if the Manning coefficient is reduced by 20%."* *In conclusion they state "The modelling exercise shows that when the surface roughness of the solar park is decreased, peak flow increases in the order of 6–35% as compared to the pre-installation scenario. Increased values (1-5%) of total runoff volume are obtained as well".* *This paper essentially highlights the impact of lower vegetation growth and changing soil conditions over time and how this leads to increased surface runoff.*
In another research paper by Baiamonte et al (2023) entitled "Impact of Solar Panels on Runoff Generation Process" their conclusion stated: *"In this article, the impact of solar panels on the runoff generation process was investigated from both an experimental and theoretical point of view. The different arrangement of solar panels with respect to the maximum slope direction of the hillslope where the panels are placed was also analysed. Physical models introduced in the literature helped explain the impact of solar panels on runoff generation. The models were calibrated for the experimental layouts and were then upscaled to different hillslope length values.* *Results showed that solar panels increased the outlet discharge when panels were arranged in a cross slope (layout B) and aligned slope (layout C), by 11.7 and 11.5 times, respectively, compared to bare soil (layout A—no panels). This clearly indicates (i) the important effect of the panels on discharges that are much greater*

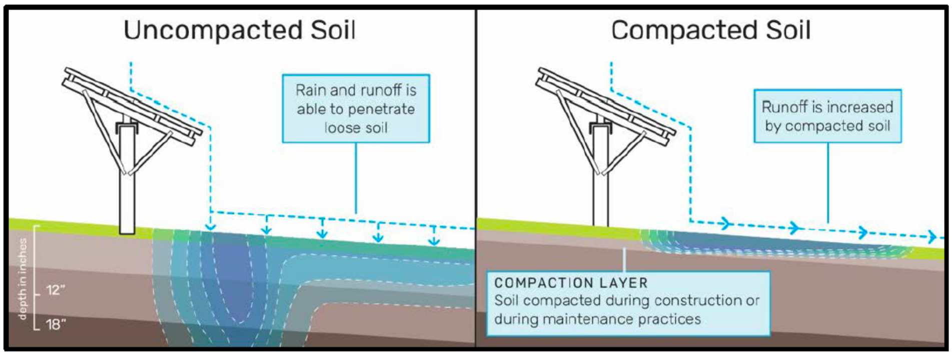
than those occurring on bare soil, and (ii) that the panels' orientation slightly affects the outlet discharge, since for both of the studied orientations, the discharge ratios were similar to each other."

Please could the developer comment on the findings of this research.

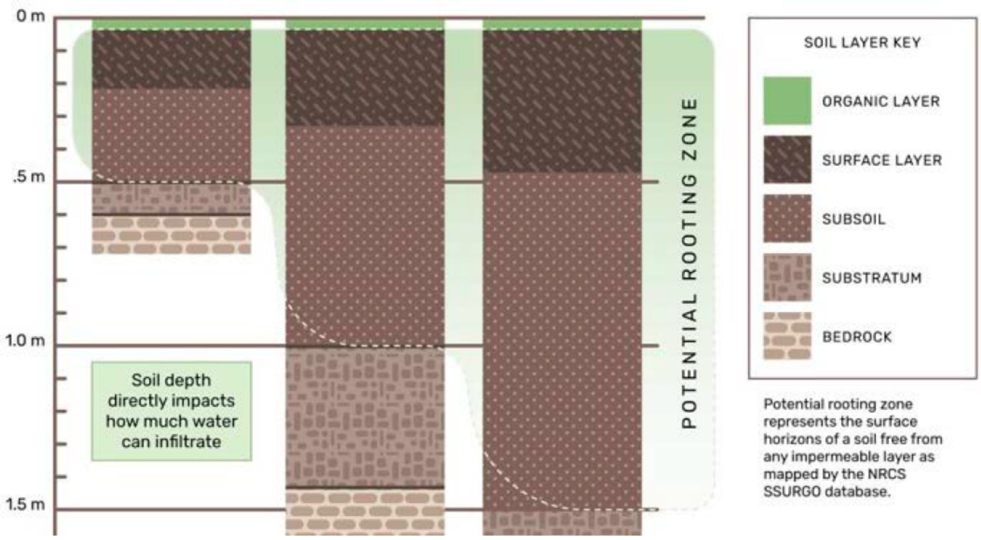
Another eye-opening publication was one from the US-based National Renewable Energy Laboratory (NREL) (2023) entitled "PV Stormwater Management Research and Testing (PV-SMaRT): Final Technical Report".

Key findings from this publication were:

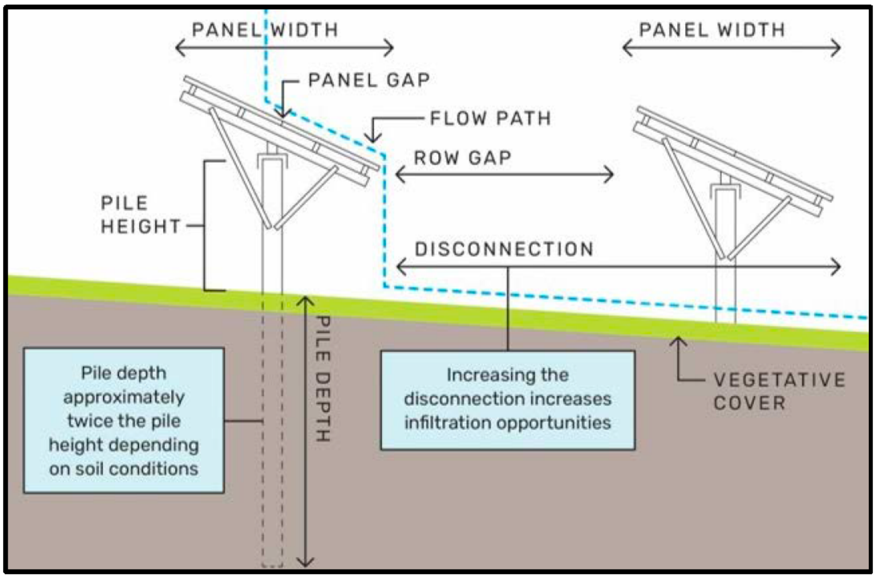
1. *Compaction—managing soil compaction and bulk density across the site. Runoff increases on average by 98% with compacted vs. loose soil in full sun areas*



2. *Soil depth—including soil depth (rooting depth) in stormwater modeling and design.* ***Runoff increases on average by 78% as soil depth decreases from 150 cm to 50 cm.***



3. *Disconnection—ensuring appropriate distance between arrays for infiltration. Runoff increases on average by 14% as panel spacing decreases from 35-feet to 15-feet. (Great Plains Institute 2023).*



Please could the developer comment on the findings of this research, particularly the findings concerning soil depth.

Clause 10.8.30 : Increase in Permanent Impermeable Area
The developer has stated that "the panelled areas are designed to remain permeable, with grassland beneath and between the panels maintained to encourage infiltration and minimise runoff."

As part of this author's cited research can the developer please expand on how the proposed PV panels will allow sufficient light to pass through to any vegetation beneath the panels to avoid lower vegetation growth due to reduced amounts of photosynthetic active radiation. This is in the light of research that highlights how changing vegetation condition over time will lead to increased runoff.

Clause 10.8.34 : Increase in Discharge to Local Watercourse
The developer has stated that "Discharge from panelled areas is not proposed and will continue to mimic the existing greenfield regime."

In the light of author-cited research can the developer please confirm that they hold true to this statement and provide clear evidence to the contrary if they do.

Clause 10.8.37 : Increase in Discharge to Local Watercourse
The developer has stated that "With embedded mitigation in place, the residual effect is Minor Adverse, and therefore Not Significant ."

In the light of the general content of this response to the developer's response as contained in Clauses 10.6.88, 10.6.90, 10.6.91, 10.6.92, 10.7.4 10.8.30 and 10.8.34 and Table 10.6.

In the applicants response it is stated that the scheme does not introduce any hydrological mechanism that would increase downstream flows to Lavendon. This conclusion is consistent with paragraph 3.10.75 of NPS EN-3, which states that solar PV panels drain to existing ground and that their hydrological effect is not, in general, significant.

Can the developer please advise as to whether paragraph 3.10.75 of NPS EN-3 supersedes NPS EN-1, paragraph 5.8.13.

In the applicants response it is stated that "The independent engineer's report cited by the representor has been reviewed. Its conclusions rely on simplified assumptions regarding impermeable area, runoff concentration and catchment behaviour that do not reflect the Scheme design or the drainage regime assessed in APP-107. Assertions regarding increased flood levels are not supported by the evidence base used in the FRA."

The applicant's response is largely dismissive and perhaps uninformed. This response has presented:

1. *Paragraph 5.8.13 of NPS EN-1 has not been adequately addressed as Lavendon has been declared a Critical Drainage Catchment by MKCC.*
2. *Paragraph 5.8.36 of NPS EN-1 has not been addressed as the project is in a flood risk area and the project should be designed and constructed to remain safe and operational during its lifetime, without increasing flood risk elsewhere i.e. Lavendon.*
3. *The developer has misleadingly stated that Green Hill G has not historically flooded and neither has the area nearby. If proper research had been carried out, it would have been very clear to the contrary. There have been eight commissioned reports on flood events – none of these have been addressed by the developer.*
4. *The developer has by their own admission stated in Clause 10.6.87 that fluvial flooding could occur if the land drainage ditches overtopped their banks during or following an extreme rainfall event.*
5. *The developer has admitted that they have relied on the bigger picture for their assessments, but this by no means relieves them of their responsibility to address all areas that do indeed fall into the area of proposed development, in particular Flood Zone 3, irrespective of how big or small the area.*
6. *The developer appears to have ignored the Section 19 Flood Investigation Report on the 2024 Flood Event in which Lavendon has been identified in MKCC SWMP as a Critical Drainage Catchment (CDC2), noted as an area where flood risk is considered to be the most severe in Milton Keynes.*
   The same Section 19 report tables Lavendon as a flood hotspot, documents flood history, analyses DEFRA Rain Gauge Data and Met Office Data, the recorded rainfall event overview, the rainfall radar data.

Most importantly, the report analysis of rainfall data recorded across Lavendon, estimates that the rainfall event had a > 0.1% AEP. This analysis highlights the intensity and rarity of the rainfall event but has been completely overlooked by the developer.

7. *The developer appears to have omitted key information from the Milton Keynes Surface Water Management Plan (Final Report April 2016). This plan contains the surface water flow paths in Lavendon - three of the surface water flow paths run through sites G-9 and G-13.*
8. *The developer has chosen not to follow the Office Guidance for both the Environment Agency (EA) and Lead Local Flood Authorities (LLFAs) which state that assessments, particularly Strategic Flood Risk Assessments (SFRAs) and site-specific FRAs, should be based on the "best available evidence". National datasets, while essential, are often a national-scale model and are designed to be refined by more detailed, local information where it exists.*
9. *The developer has relied on their interpretation of the Flood Estimation Handbook (FEH) although the FEH acknowledges that incorporating local data (like historical flood outlines, river level records, and even photographic evidence) can significantly reduce the uncertainty in design flood frequency estimates.*
10. *The developer has confused and incorrectly dismissed what they referred to as "anecdotal" evidence submitted when in fact every form of supporting documentation was verified and should have been taken into consideration. It is no excuse to ignore submission evidence based on a false perception of what is anecdotal or not. The developer, in accordance the documents referenced as part of their own design and FRA, should read the notes from the Environment Agency (EA) and Lead Local Flood Authorities (LLFAs) and Flood Estimation Handbook (FEH) and include these as Historic Flood Events to recalibrate their hydraulic models.*
11. *There is no reference to other consultant reports commissioned by MKCC on Flooding Risk in Milton Keynes where a clear conclusion was drawn that surface water flood risk mapping shows that surface water flood risk generally follows similar paths to the watercourses and roads, and settlements that are particularly at risk include Lavendon.*
12. *Eight other reports on flood risk prepared by professionals have reached a different conclusion to the developer's reports.*
13. *The developer has cited one 2013 research article (tested under far less extreme rainfall scenarios) claiming that the impact on surface runoff is insignificant. The developer forgot to include the full conclusion of this article, which determined that the kinetic energy of the water draining from the solar panel could be as much as 10 times greater than that of rainfall.*
14. *The author could locate three 2023 publications stating contrary positions to the developer's cited reference. The report from the US-based National Renewable Energy Laboratory (NREL) concluded that Runoff increases on average by 78% as soil depth decreases from 150 cm to 50 cm.*

In the applicants response it is stated that "The shallow topsoil and clay horizons noted by the representers are captured within the hydrological soil classifications used to derive greenfield runoff rates. These datasets, together with FEH rainfall and site levels, provide the accepted basis for assessing both infiltration potential and runoff. The FRA confirms that the development does not increase flow to ordinary watercourse north of Site G and that baseline connectivity is unchanged."

Has this last sentence been a typo or has it been misinterpreted by the author? Why are watercourses north of Site G relevant?

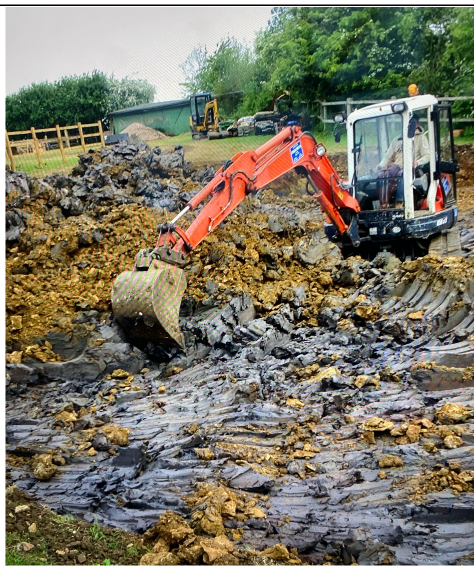
In APP-107 Clause 1.6.1 the geology refers to the British Geological Survey (BGS) online mapping (1:50,000 scale) which indicates that the Site is underlain by superficial deposits of Oadby Member generally comprising Diamicton. The superficial deposits are identified as being underlain by Cornbrash Formation consisting of Limestone.

In Clause 1.6.2 it is stated that the geological mapping is available at a scale of 1:50,000 and as such may not be accurate on a Site-specific basis.

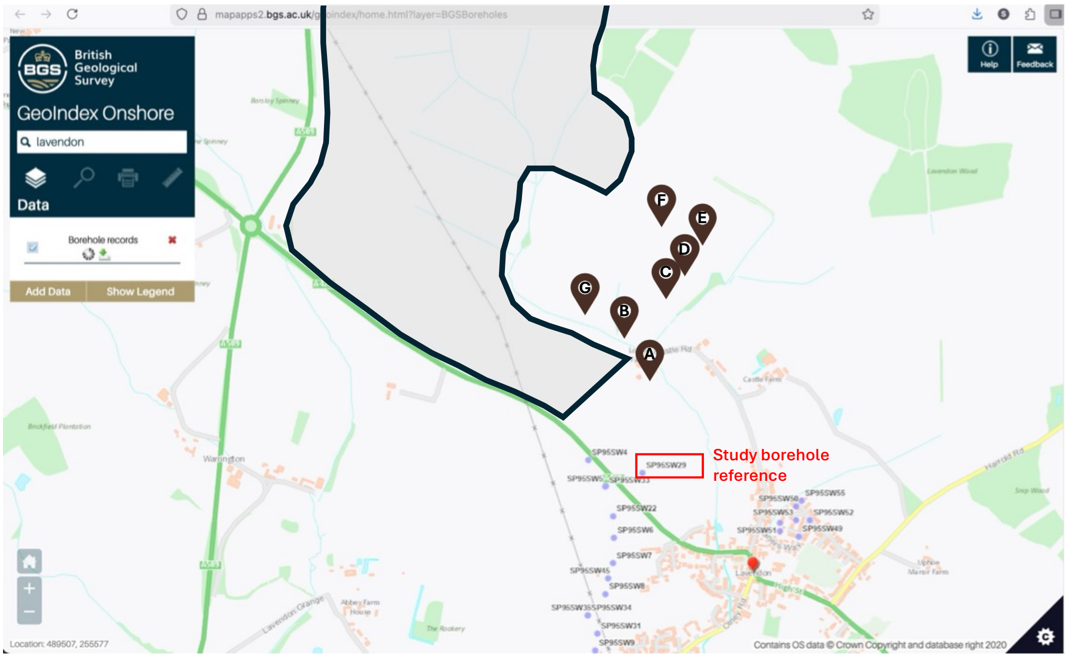
In Clause 1.6.3 it is stated that the following geology was encountered at borehole SP95SW29:

- *Topsoil to 0.3m below ground level (bgl);*
- *Bedded sandy and shelly limestone from 0.3m to 0.55m bgl;*
- *Light brown clayey, silty, sandy limestone from 0.55m to 1.25m bgl;*
- *Medium dense clayey sand with limestone gravel from 1.25m to 1.70m bgl; and*
- *Dark greyish-brown sandy, shelly limestone from 1.70m to 2.10m bgl*

Although the geological record from the borehole is not disputed, the profile has been taken from almost 200m "east" of the Site, although the actual position has been included in the image overleaf. Actual data gathered by the responders from site G-13 suggests to the contrary, as was included by means of photos in the independent engineer's report and site exploration. These photos were taken about 150m west of the Site (reference A for the next image):



The respondents took the time to physically visit the site and dig coordinated trial holes at more relevant points to the development. Trial holes were excavated until hard limestone was found. The plan/location of these trial holes compared to the quoted borehole reference is:



The images from our trial holes with reference measurements have been included as follows:

Trial Hole Reference B 	*Original image included in the independent engineer's initial report. This had no depth reference but is probably in the order of 75mm.*
Trial Hole Reference C 	*The reference stick on the left is graduated in 100mm intervals so topsoil depth in the order of 350mm.*
Trial Hole Reference D 	*The reference stick on the left is graduated in 50mm intervals so topsoil depth in the order of 200mm.*

Trial Hole Reference E 	*The reference stick on the left is graduated in 50mm intervals so topsoil depth in the order of 175mm.*
Trial Hole Reference F 	*The reference stick on the left is graduated in 50mm intervals so topsoil depth in the order of 150mm.*

In summary, although the geological mapping is available at a scale of 1:50,000 (and stated by the developer that as such may not be accurate on a Site-specific basis), physical evidence points to the contrary. The area within which the trial holes were excavated is approximately 11 ha. To be of any use for site-specific purposes, this would require a mapping scale of 1:5,000 for high accuracy, but at least 1:20,000 would be required for study purposes.

Could the developer please justify the use of the standard design parameters referred to throughout his reports in the light of the Office Guidance for both the Environment Agency (EA) and Lead Local Flood Authorities (LLFAs) state that assessments, particularly Strategic Flood Risk Assessments (SFRAs) and site-specific FRAs, should be based on the "best available evidence". National

datasets, while essential, are often a national-scale model and are designed to be refined by more detailed, local information where it exists.
In the light of research quoted by the developer on runoff values and conclusions drawn from the consultant reports, the assertion is that surface runoff and flood risk is insignificant may need to be revisited. All conclusions have been drawn from the assumption of adequate topsoil (around 300mm to 400mm) being present – local evidence suggests otherwise. *As per published research from the US-based National Renewable Energy Laboratory (NREL), runoff increases on average by 78% as soil depth decreases from 150 cm to 50 cm. The single source of research cited by the developer excluded soil depth as a research parameter. The same paper acknowledged that the kinetic energy of the water draining from the solar panel could be as much as 10 times greater than that of rainfall. Thus, because the energy of the water draining from the panels is much higher, it is very possible that soil below the base of the solar panel could erode owing to the concentrated flow of water off the panel, especially if there is bare ground in the spacer section of the cell.* *The same developer-cited report also stated that for smoother surfaces, the velocity of runoff increased and the losses decreased, which resulted in increasing runoff volumes (42% increase of peak discharge and 4% increase in runoff volume), which occurred when ground cover was changed to gravel or bare ground.* *This finding has been correlated and confirmed with the other research articles cited by the responders.* *Although topsoil is fundamentally different from gravel, the existing depth from a good representation of trial holes across the area affected by Site G is approximately 150mm.* *Please could the developer explain why site-specific data was not used, and expand on the conclusions drawn by their cited reference (in the light of other references included herein) to determine the impact of this research on the methodology used by the developer and its subsequent conclusions.*

Submitted in my personal capacity and without prejudice.

Mark Shepherd PrEng
17 December 2025