Carlton-on-Trent Parish Council ([redacted]

Flooding

Carlton-on-Trent has periodically experienced flooding, typically when heavy rainfall amasses and water levels in the Trent rise. Our latter experience of flooding is not of fluvial but of pluvial with sudden down pours such as Babet and Henk; properties were evacuated, with some families unable to return for almost a year.

Properties to the south of the village were the worst affected, approximately one third of the properties were impacted upon, 20 were flooded, while others experienced damp related issues in subsequent months. All businesses were affected, either on the night by flood water or loss of income because of raised water levels affecting access for them and customers.

Water ran off the hills into the Trent valley which was consequently flooded; there was nowhere for the water to go until it naturally subsided.

The speed the water appeared, and because this was pluvial, meant there was no warning, there was no time to empty cupboards or move furniture, one resident likened it to someone opening a dam.

Residents were evacuated to the village hall throughout the night, some still in damp night clothes the following morning as they were taken by surprise; they left everything including medication (and in one case, their false teeth).

Some had no where else to go.

If water hasn't been absorbed into the ground before it gets to us, and the tributaries and Trent River are already at capacity, there is nowhere else for it to go but onto the old flood meadows and plains. As water levels continue to rise so the village will be flooded, as will the A1, even affecting the Great Northern railway.

In addition to the pluvial water and our own fluvial water, Carlton-on-Trent is the penultimate village to receive pumped water from nine other villages, including the large conurbation of Sutton-on-Trent. Pluvial water enters the mains sewers and is then pumped 'up stream' to Carlton. At such times the pumping houses (we have two) are working at maximum capacity, but as the main pump at Cromwell is already full water has nowhere to go.

The speed at which the water leaves the hills and fields is intrinsically linked with how rapidly the Trent valley fills.

The Government will always advocate the use of permeable surfaces (such as on domestic drives) to allow water to penetrate the ground, solar panels are not permeable and like concrete, increase the flow of water. The smoother the surface the quicker the flow.

The notion that rainfall run-off will be absorbed into the ground below the lower row of panels, is a **fallacy**, the rain shadow is real as can be seen; consequently, panel cover significantly reduces the amount of land available for water absorption.

Rain fall runs off the panels and creates rivulets as can be seen below, these grow and increase the rate water runs off the fields.

Here the ground has been drilled and yet rivulets have already started to form, these will not be broken down or managed to prevent rivulets growing as this would prevent the grass seed from growing. Speed increases where the soil is heavy and compact. The soil type at Carlton-on-Trent is clay, which is heavy.

Water does not run off the panel evenly along the bottom edge but will naturally descend to the lowest corner and cause a dripline.

The dripline persistently falling causes the soil to become compact, which adds to increasing the speed at which the water runs off the field.

Elements Green plan to place panels going west to east on [DB043 DB042 DB041 DB044 DB045 DB046] fields sloping towards Ossington Road, then down towards the village. The topography means the increased water runoff will travel down the panels and into the stream passing behind

Castle Hill Cottages, and on into the village. **NB:** sections of this stream have not been included on the maps. This watercourse also passes under the railway, which was unable to cope during storm Babet. We are unable to locate any response or inclusion of a consultation with any of the railway networks.

Fields DB050, DB047, DB049 and DB048 drain into two other water courses and through the village, having first passed under the railway and A1. These water courses are often unable to cope with winter rainfall resulting in DB048 and DB049, known locally as “Low Moor” (for a reason!), frequently have standing water over winter. With excesses such as Babet and Henk water flooded onto the A1 at these points causing the closure of a major national road artery, with all the associated financial repercussions.

During construction the heavy equipment will have increased the compact nature of the soil, not only will this affect fertility (there will be less = less root growth to assist water absorption into the ground) but will also again increase water flow. While it is proposed that sheep will graze beneath the panels it should also be noted that livestock compact the ground. Historically landowners when creating a pond, used sheep to paddle the base of the freshly dug pit to compact the ground to help retain water. It is current practice that grazing land is regularly ‘moled’ (a process to allow water to break through the solid pan of topsoil into the drainage channels created) this is critical land management in our region due to the heavy clay. When cattle or pigs are moved and the field subsequently used for cereal production, it is necessary to plough (not shallow cultivate) to break up the pan they create in the clay, for root growth and water penetration.

Areas where water is standing shows how much the soil has been compacted due to sheep. (Sheep faeces and wool evident in image as are hoof prints around the water)

Bare patches of earth under the panels show how lack of sunlight and weather deteriorate and reduce the natural growth = bad for water absorption.

Soil Health is directly related to continuous weather, and natures natural cycle of growth and decomposition. An absence of 40 years of this natural cycle and the soil will have significantly deteriorated (see below) and take many years to recover.

Image: Under Egmanton solar panels

We have included a Flood Risk Assessment to an appeal for a solar farm at Glebe Farm, Taunton (Appeal ref: APP/d3315/A/13/2203242 made by Tony Burch, Professor Adrian Armstrong and Steve Rose and Steve Maslen from DBA Consulting. This is particularly pertinent to our situation as panels are to be aligned the same direction and topography akin to our own; Appendix 1.

The Planning Inspector Jessica Graham, concludes in the appeal:

> "17. The planning application was accompanied by a Flood Risk Assessment (FRA). A carefully considered and professionally well-informed letter of objection to the proposed development makes the important point that it would be unsound to assume that rain falling on each row of solar panels would flow evenly into the rain-shadow of the row below, so as to mobilise the same percentage of the ground for infiltration as was available before the panels were installed. Rather, because the panels would be set at a downward slope and aligned to follow the contours of the land, rain-water would be likely to fall in a column from the lowest corner of each panel, and could then form rivulets flowing down through the rain-shadows of the rows below without utilising their whole area for infiltration, thus increasing the amount of water run-off from the site.
>
> 18. I find that argument persuasive."

Carlton-on-Trent will be the recipient of water runoff from the panels at Eakring, Maplebeck, passing through Caunton (which has its own solar projects increasing runoff), Norwell with more panel runoff before arriving at Carlton-on-Trent, by the time this combined flow reaches Carlton-on-Trent, the accumulated runoff from all these sites further exacerbates local flood and drainage pressures.

During the meetings of 26th November (recording ISH pt 1 29mins 27 secs) and 27th November (recoding ISH pt 2) we were informed by the applicant, that flood land was not included; that fields had been carefully selected. This is not the case. Throughout consultation Elements Green were informed the Low Moor fields were often saturated to capacity or under water during winter; hence why that stretch of road floods so readily. Following consultation one areas to the south of us at Cromwell were removed. We were informed on 27th November by the applicant that the zonal flood maps for the UK had been revised earlier this year and so they had altered their scheme.

It is important to note that the flooding to those fields had taken place before the zonal maps were revised, Elements Green had not heeded the information they were given. Likewise Low Moor also floods, despite being on the same contour lines and the same side of the railway line with no clear barriers between them, this area has been put into flood zone 2 and so the applicant has failed/decided not to heed the information they have been given.

The area marked with the target is shown as flood zone 2. However, this is on the same contour as land to the south which is dark blue. The drain across this area goes under the railway and A1, water flow is slow as there is no fall away, consequently the field invariable is covered in water.

During periods of heavy rainfall, the water flows over the road to the west and floods fields on the other sides too.

The increased panel coverage will increase the occurrence of pluvial flooding as experienced during Babet. More frequent and larger floods are likely because the ground can't absorb the water. As a result, more people and homes will be affected, leading to higher costs for individuals. Insurance premiums and coverage may also change, creating wider knock-on effects for the public and the Government.

Emergency services will face increased pressure, requiring more time, resources, and funding to respond effectively. Commerce at a national level will also be disrupted, especially if major transport routes such as the A1 and the East Coast Main rail line are forced to close due to flooding. Cost to the country for storm Babet alone was estimated at £450 – £600 million.

The Applicant acknowledged that connection to the grid was simpler and cheaper within this location, at the same time acknowledging that it was still viable elsewhere but of course at a higher cost. The long-term and perpetual cost to the government, as well as local communities outweighs the short-term one-off cost to the Applicant.

Loss of Best and Most Versatile Land (BMV) and soil degradation

We are in danger of increasing food cost and CO_2 as more of our food is transported from overseas; furthermore, the standards of food production in our country far exceed those of others.

The government has declared that NO land with the status of "good" will be used as part of a solar development.

Land is graded from 1 – 5, with two subcategories in 3, 'a' and 'b'. Grade 1 to 3a is considered the UK's "Best and Most Versatile" (BMV) farmland. Planning authorities must give special consideration to protecting it when deciding where to permit development (source CPRA)"

Issues arise when land categorised as grade 3 could fall into the subcategory of a or b. The quality of the soil is affected by several components, composition, nutrient provision, water retention,

biological activity, as well as the depth. A single field could contain soil of different categories depending on proximity to woodland or water, and varying depths.

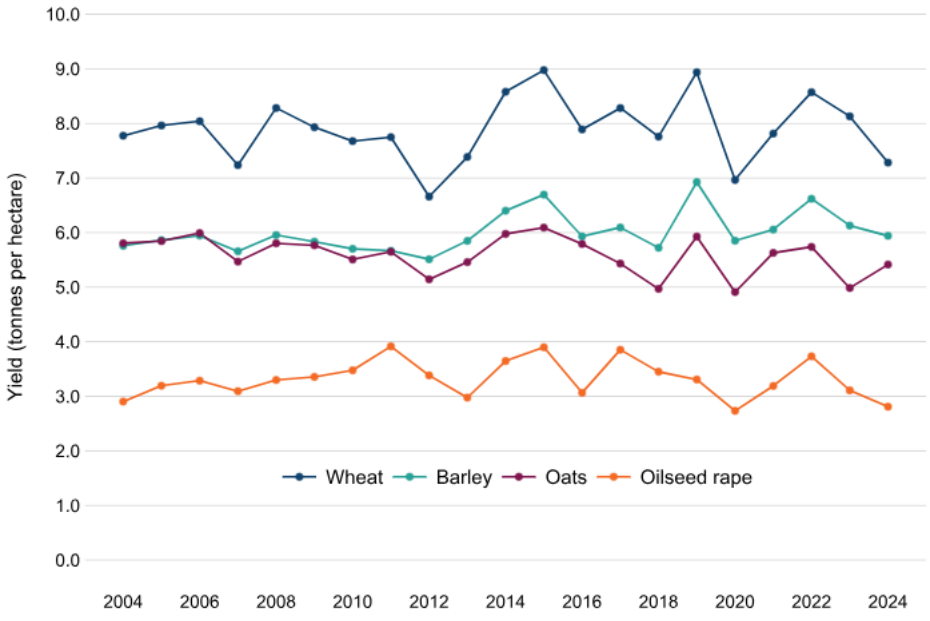
The quality and quantity of the food produced is key to identifying whether the land is 'good' or not.

All the fields identified to go under panels in Carlton-on-Trent area are currently, and as far back as living memory (and beyond), been used for food production; usually crops such as wheat, barley, oil seed rape and some, though not often, oats and beans. In addition, sheep grazing has occurred between end of harvest and drilling the following the following crop, showing that land is used to maximise its potential productivity. It is reasonable to argue therefore that all the land is and has been successfully producing food.

A successful crop is invariably determined by the ton/acre produced, this will vary on the soil type, and a farmer will compare their yield to a neighbour on the same land type. [Light sandy soils yield a poorer cereal crop than clay but are good for carrots; you would select a crop suitable to the soil type]. A good wheat crop would yield 3 – 3.5 ton per acre. The fields identified to be taken out of food production at Carlton-on-Trent typically produce 3.5 tons of wheat per acre (8.645 tons/hectare), however, we know that in some years the harvest has been comfortably over 4 tons per acre (9.88 tons/hectare). This land therefore qualifies to be Best and Most Versatile.

1.2 Yields

Figure 2: United Kingdom crop yields between 2004 and 2024



UK main cereal crops and oilseed rape all showed decreases in 2024, except for oats which saw an 8.6% increase (see Figure 2). There was some variation in yields across the UK nations reflecting the different regional challenges.

Source: Department for Environment Food & Rural Affairs

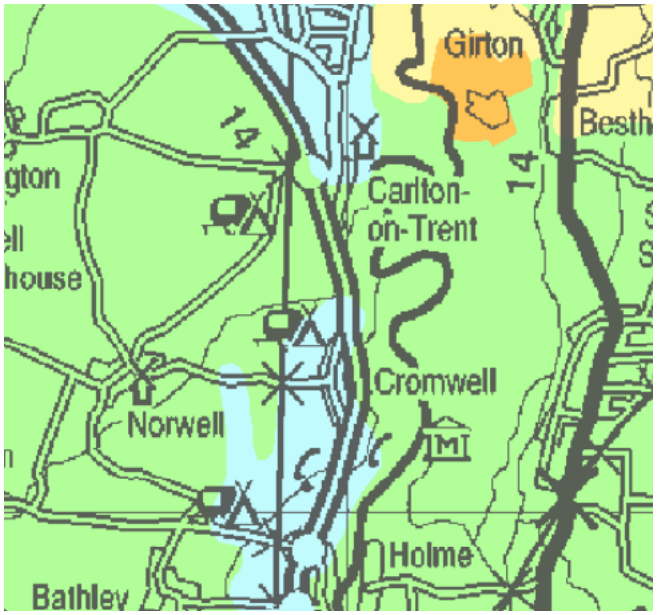
We are in danger of increasing food cost and CO_2 production as more of our food is transported from overseas; furthermore, the standards of food production in our country far exceed those of others.

These fields were clearly not part of the scrutiny checks that we were told on 27th November took place regarding field selection. We already know field selection was not stringent, because fields at Cromwell initially in the scheme, have since been removed, furthermore DB048 & DB049 - Low Moor floods, flood. Flood water brings with it silt, old riverbeds are examples of good soils because of these silts.

The land at Cromwell, now removed from the scheme is clearly Grade 2 on the maps for BMV, these were removed due to flooding factors which questions was land quality ever properly considered.

It is fair to say the report delivered at the hearing meetings was confusing, Mr Kernan recognised there were errors in his calculations (we are grateful for this acknowledgement, and appreciate we are all fallible) however Mr Kernan acknowledged the project was using BMV land and justified this because it was only 2000 hectares – though this figure is wrong, but solar projects are not supposed to use any BMV land.

We challenge the assumption that the fields at Carlton are of poor grade 3, an assumption based on the land to the northeast of the Trent, separated by the river, the village, the A1 and the railway, is grade 4. However, the grade 2 fields at Cromwell, along the same corridor of contours with no obstruction, are just 549 meters away. Additionally continuing in a northward direction land is also grade 2.



The balance of probability, these fields are, at worse, grade 3A or grade 2 which means GOOD.

Land Selection

Clearly fields were not stringently selected as the Applicant would have us believe, the inclusion of BMV land and fields that flood show this to be the case. This belief is further endorsed following a conversation with a local famer [redacted] of [redacted] It transpires that he, like many farmers, were contacted by Elements Green and asked if they wished to put solar panels on their land. A letter from [redacted] can be found in the appendix which explains the events as they occurred. The acquisition of land was random, no request for specific fields to adjoin others in a scheme, everything was done in isolation; there was no transparency, nothing to indication any individual acquisition would become part of a much larger scheme.

We have also attached for reference the front sheets of the second series of letters [redacted] received.

Quality of land after 40 years

The Applicant purports to the land being the same quality once the panels are removed – in 40 years.

We do not believe this is the case.

There is a noticeable deterioration in the quality of the grass when items have been left on the lawn, even for short periods. Once these objects were removed, the soil beneath them is completely different from the surrounding area, and the ability to grow grass affected.

In an earlier image, panels that had been in situ for ten years, had significant bare patches of earth underneath where the sun and weather could not reach; this was not due to the sheep grazing as some would try to explain away, or where the sheep would collect!

Soil Health is directly related to continuous weather, and natures natural cycle of growth and decomposition. An absence of 40 years of this natural cycle and the soil will have significantly deteriorated and take many years to recover.

The National Institute of Agricultural Botany (NIAB) specialize in agronomy and crop production systems. Their ethos is to improve and maximise crop production for which you need healthy soil.

A farmer's core asset is the soil, if you do not take care of it then productivity is affected. Organic matter decays seasonally creating the nutrients to maintain that top all important layer – essential for the growth. We have demonstrated how lack of weather affects the ground's ability to grow even the simplest of crops – grass.

Well maintained and managed soil is a natural carbon store. If soil is not maintained its ability to hold carbon is greatly affected, this is counterproductive to the principle of establishing solar. These are key messages at Groundswell (Groundswell - Regenerative Agriculture Festival Groundswell) where all agencies are represented and with all Regenerative Farming.

We also have reservations regarding the long-term effect of chemicals leaching from the panels into the ground (PFAS chemicals and toxic metals such as cadmium, lead, arsenic) Our assumption is this will depend on the quality of panels used. We endorse the comments made by Mr Betts from NSDC asking that panels are responsibly sourced.

Additionally, we wish to highlight the potential long-term effect of the piles in the ground. Should these not be removed in their entirety after 40 years the land will not be as it was today contrary to the claims of the Applicant.

In conclusion: the land is BMV, selection was sporadic, flooding has not been taken into consideration. The land will be in a poorer condition after 40 years of panel cover.

Impact on the wildlife

GNR has acknowledged that there will be "*significant, adverse effects during both the construction phase and early operational period*."[1] on the wildlife in the area. The design of this solar farm is likely to lead to land fragmentation, which will inevitably result in the disruption and loss of the natural habitat and wildlife. The loss of wildlife we experienced this first hand following the construction of Egmanton Solar farm, deer and badger appeared dead on the A1 as they were forced out of the terrain and into the traffic.

To mitigate Carlton-on-Trent Parish Council would always advocate the use of double fencing as outlined in a section below.

The study conducted by Elements Green has raised several concerns, the primary one being accuracy.

Table A8.4.3 indicates that there are no barn owls within the specified order limits. However, this study is incorrect; there are confirmed sightings of at least one barn owl flying along Ossington Road at dusk, as well as another observed entering the village on multiple occasions. These findings raise concerns regarding the accuracy and reliability of the research undertaken.

[1] 'Great North Road Solar and Biodiversity Park' https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN010162-000382-GNR_6.1A_ES_Volume%201_Cover%20and%20Contents%20%28Clean%29.pdf?utm_source=chatgpt.com Page 20 subsection 98

Table A8.4.3: SoCC Breeding Territories

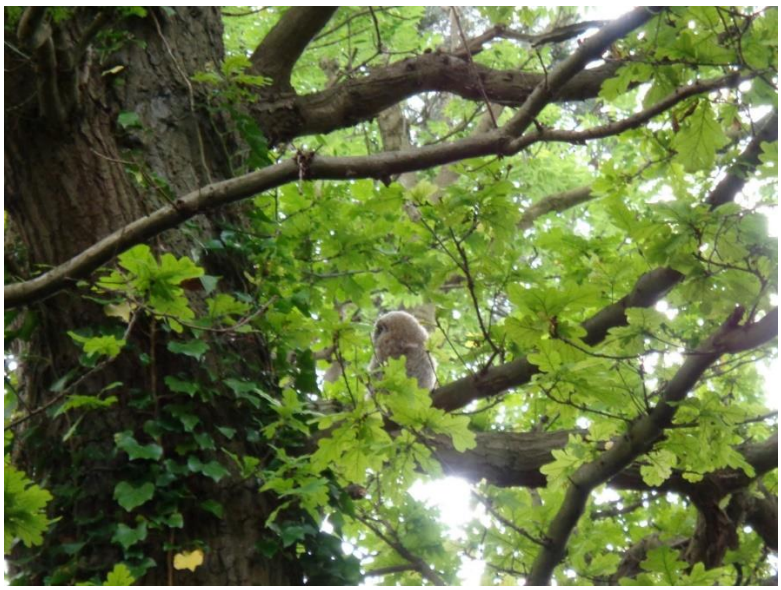
Common name	Scientific name	BTO Code	Legal & Conservation Status[16]	No. of territories	
				Within OL	Outside OL
Barn Owl	*Tyto alba*	BO	Sch1, LBAP	0	4
Bullfinch	*Pyrrhula pyrrhula*	BF	NERC, Amber, LBAP	3	7
Coot	*Fulica atra*	CO	LBAP	0	1
Corn Bunting	*Emberiza calandra*	CB	NERC, Red, LBAP	3	0
Dunnock	*Prunella modularis*	D.	NERC, Amber, LBAP	145	57
Greenfinch	*Carduelis chloris*	GR	Red	4	15
Grey Partridge	*Perdix perdix*	P.	NERC, Red, LBAP	11	3
Grey Wagtail	*Motacilla cinerea*	GL	Amber, LBAP	1	0
Greylag Goose	*Anser anser*	GJ	Amber	0	5
Hobby	*Falco subbuteo*	HY	Sch1, LBAP	1	0
House Sparrow	*Passer domesticus*	HS	NERC, Red, LBAP	3	22
Kestrel	*Falco tinnunculus*	K.	Amber, LBAP	7	4
Kingfisher	*Alcedo atthis*	KF	Annex I, Sch1, LBAP	2	2
Lapwing	*Vanellus vanellus*	L.	NERC, Red, LBAP	3	2
Linnet	*Carduelis cannabina*	LI	NERC, Red, LBAP	62	22
Mallard	*Anas platyrhynchos*	MA	Amber, LBAP	7	4
Marsh Tit	*Poecile palustris*	MT	NERC, Red, LBAP	0	3
Meadow Pipit	*Anthus pratensis*	MP	Amber, LBAP	2	1

[16] See Appendix B for definitions

This still from a video shows two raptor birds observed along the Ossington Road at Kneesall. In total there were six, four red kites and two buzzards – the fields either side were having hay removed (the video to be shown to the ExA on their visit for confirmation). The table below is clearly wrong. This raises concerns regarding the accuracy of the reports and suggests a lack of comprehensive research and on-site surveys conducted in the area.

Common name	Scientific name	BTO Code	Legal & Conservation Status[16]	No. of territories	
				Within OL	Outside OL
Mistle Thrush	*Turdus viscivorus*	M.	Red, LBAP	4	1
Moorhen	*Gallinula chloropus*	MH	Amber	0	5
Oystercatcher	*Haematopus ostralegus*	OC	Amber, LBAP	0	1
Peregrine	*Falco peregrinus*	PE	Annex I, Sch1, LBAP	1	0
Raven	*Corvus corax*	RN	LBAP	1	0
Red Kite	*Milvus milvus*	KT	Annex I, Sch1, LBAP	0	2
Reed Bunting	*Emberiza schoeniclus*	RB	NERC, Amber, LBAP	48	9
Rook	*Corvus frugilegus*	RO	Amber	2	1
Sedge Warbler	*Acrocephalus schoenobaenus*	SW	Amber	2	1
Skylark	*Alauda arvensis*	S.	NERC, Red, LBAP	233	91
Snipe	*Gallinago gallinago*	SN	Amber, LBAP	0	1
Song Thrush	*Turdus philomelos*	ST	NERC, Amber, LBAP	20	55
Sparrowhawk	*Accipiter nisus*	SH	Amber, LBAP	3	2
Starling	*Sturnus vulgaris*	SG	NERC, Red, LBAP	2	0
Stock Dove	*Columba oenas*	SD	Amber, LBAP	5	9
Swift	*Apus apus*	SI	Red, LBAP	0	1
Tawny Owl	*Strix aluco*	TO	Amber, LBAP	1	2
Tree Sparrow	*Passer montanus*	TS	NERC, Red, LBAP	2	0
Whitethroat	*Syliva communis*	WH	Amber	88	30
Willow Warbler	*Phylloscopus trochilus*	WW	Amber, LBAP	4	2

In addition, we are asked to believe in the entire Order Limits there is only one tawny owl. As shown in the photographs, this is not the case, evidently there is more than one tawny owl to produce two chicks! These images were taken looking into a coppice which overlooks fields Elements Green wish to cover in panels. It is highly unlikely therefore that we are the only community in the 1,765 hectares that have tawny owls in their locality.



This indicates the disruption to wildlife would be far greater than anticipated should GNR be approved, not least of which would be damage during the set-up and early stages of the solar farms. Experience from other solar farm projects has shown that once the panels are removed, the land often does not fully recover to its previous condition, resulting in the long-term destruction of habitats.

We reiterate the concerns outlined in the representation by “Buglife – The invertebrate conservation trust," solar panels alter the light, shade, and moisture conditions beneath and around the arrays. This will result in environmental changes leading to reduced grass and vegetation growth and alterations in the soil composition due to water runoff and limited sunlight, ultimately diminishing and harming the area's biodiversity.

Tabletop surveys are susceptible to inaccuracies concerning the precise habitats located in the vicinity of the proposed solar panel site. The onsite records are inaccurate and misleading. The size of the project warrants a more in-depth analysis, collating accurate data, with the opportunity for local knowledge to shape and verify the outcome.

Unless a thorough in-person survey is undertaken multiple times daily over an extended period exceeding the current timeframe, the developer may not acquire an accurate understanding of the habitats likely to be affected. Such limitations could lead to misconceptions among the public and decision-makers regarding the true extent of ecological impact, potentially resulting in an underestimation of the environmental consequences.

We would like it noted that Carlton Wood is classed as an Ancient Woodland, and as such deserves special protection. We do not believe that siting a substantial sized substation next to this wood is advantageous to the wildlife (and certainly would not be expected from a Biodiversity park!). We believe there are several other sites that would serve equally as well.

The destruction of the corridor

Encasing fields in tall deer fencing prevents the movement of any mammal larger than a rabbit. The Applicant at one meeting in Caunton advocated that to prevent impact and reduce the amount of

fencing they were going to fence larger areas where possible. Carlton-on-Trent Parish Council is wholehearted AGAINST this suggestion. This will seriously impact on the natural corridors across the land, the pipeline effect, vital for wildlife movement. This policy flouts the very principles of the Local Nature Recovery Strategy, a strategy that Government has asked every authority to create (Local Nature Recovery Strategy for Nottinghamshire and Nottingham | Nottinghamshire County Council). This also goes against the principles of the wider National Wildlife Corridor, part of the key principal ethos behind the planting of Trees through Government grants such as "England's Woodland Creation Offer (EWCO)" and the "Trees for Climate" grant scheme offered through England's Community Forests. Such corridors facilitate the movement of animals between feeding grounds, breeding sites, nesting/range or hibernation locations, water sources, and seasonal refuges. Disruption or removal of these pathways can impede wildlife mobility, potentially restricting animals to small, fragmented habitats and reducing their capacity for migration, dispersal and integration of one group with another increasing their vulnerability to inbreeding. Consequently, such disruptions may elevate the risk of local extinctions, given that isolated groups have reduced opportunities for population reinforcement or replacement by neighbouring populations.

Further to this, there is disruption to the ecological process, the corridors are not just for the movement of animals; many plant species depend on animals, wind, and flowing water to distribute their seeds through natural corridors. These corridors are essential for maintaining genetic diversity, enabling plants to establish in new areas, supporting wildflower and shrub communities, and facilitating the spread of rare or sensitive species. While it could legitimately be argued that seeds cold still travel through the fenced off area, the animals that transport them can't and the weather patterns would also be disrupted and impacted upon (see early image under panels) The destruction of these corridors leads to genetic isolation of plant populations, restricts the spread and recolonisation of rare species, and results in a decline in wildflower diversity. As hedgerow, woodland-edge, and meadow species diminish and seed dispersal mechanisms break down, plant communities become increasingly simplified and less resilient, ultimately weakening the stability of the entire ecosystem. There will be a disruption in the predator/prey dynamic and the migration cycles of the animals. These factors cause a disruption in the cycle which ultimately after 40 years will produce a short term and long-term instability.

The government's overarching objective is to implement nationwide nature recovery strategies that require all authorities to consider their respective corridors, pipelines, and connectivity. The GNR appears to be creating a barrier, effectively disrupting these corridors and undermining the objectives of local nature recovery initiatives. This creates a negative impact.

Furthermore, the studies conducted thus far have not included an assessment of wildlife levels across the entire area. Such an evaluation is necessary, as the extensive fencing—like that experienced at Egmanton—has significant adverse effects on local wildlife. This could potentially hinder ongoing conservation efforts and may result in a regression of nature recovery initiatives, exacerbating the current challenges.

Long term impacts on habitat (These statics can be found: https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN010162-000196-GNR_6.2.8_ES_Ch_08_Ecology_and_Biodiversity.pdf)

- Permanent conversion of open farmland and loss of breeding habitat for farmland birds

The Environmental Statement indicates that the illustrative photovoltaic (PV) area would cover a substantial portion of the Order Limits, with the designated array spanning approximately 440 hectares within a wider 1,025 hectare site. The conversion of open areas used by ground-nesting birds could result in the local loss or displacement of breeding territories. The Environmental Statement estimates a potential loss of up to approximately 178 skylark territories, based on a conservative estimate. Although the document models some compensation measures, it also notes the inherent uncertainties in these projections.

- Changes to Species Composition and Long-term Local Declines for Non-adaptive Species

Even with buffers around the panels, microclimatic changes, shading, and modifications to vegetation management beneath and around the arrays tend to favour certain species, such as scrub and edge species or potentially invasive plants, while disadvantaging specialist open-farmland species. Over extended periods, these shifts can alter community composition and lead to declines in species that rely on large, contiguous arable or grassland habitats.

- Hydrological, Soil and Wetland Impacts Affecting Aquatic and Wetland Biodiversity

The installation of panel arrays and associated infrastructure will alter surface runoff, soil compaction, and micro-drainage patterns. These hydrological changes, if not carefully managed, will impact aquatic invertebrates, amphibians, and water-dependent bird species. Local consultation documents indicate that residents have expressed concerns regarding potential effects on flooding and surface runoff.

- Biodiverse pockets of wildlife already exist

The notion that Elements Green are going to plant trees, create hedges and develop pockets of biodiverse wildlife oasis is a fallacy – these do not negate those habitats that will, by their own admission, be destroyed during the construction phase. Additionally, it should be recognised that in every field currently there are the awkward corners to farm, the nooks and crannies created by an uneven hedge line – these all havens for wildlife. The addition of partner agencies to ensure these habitats are reinstated does not constitute creation of a Biodiversity Park. In reality Natural Regeneration will take place over areas, it is good that Elements Green are looking to give nature a hand, however ‘enhancements’ of 64,500 trees and 50 km of hedgerows ring hollow when the core proposal guts 1,000+ hectares of productive land, causes destruction of other trees and hedge lines for four decades.

Cumulative Impact / Visual Impact

The Development's Excessive Scale Overwhelms Local Communities

Carlton-on-Trent will be surrounded by panels to the north, south and west; to the east we have the Trent, we will not be able to travel out of the village without going through panels, and to the west there are also turbines. The industrialisation of our immediate countryside is considerable, alas once through the proposed GNR development, we would still get no respite as other solar farms already exist, some are being built, others approved and others in the planning process. The sequential effect is considerable, overwhelming and depressing.

There are so many schemes that need to be taken into consideration and yet the Applicant informed us at the Hearing meeting that they had taken a "*story telling approach"* (recording 34:45). They decided there were to many countryside routes the public could use, so took the option of investigating the impact on none. They could have selected a few, however, it is our belief that each scenario would have shown the sequential visualisation to be significant, hence their decision.

We whole heartedly endorse all the points made by NSDC Visualisation Specialist at the Hearing Meeting, the Applicant has not made adequate assessment to accumulative visualisations, they have taken a "light-touch" approach.

This is an industrial-scale project covering an area larger than many towns, far exceeding what is necessary for a single project in this region. Such a scale is not justified when smaller, concentrated solar installations could achieve similar energy outputs with minimized disruption.

This vast project will directly impact more than 20 rural parishes. Parish councils have already voiced concerns through surveys and responses to Phase 2 consultations, highlighting the strain on hundreds of residents who rely on the tranquillity and connectivity of these interconnected rural communities. The enormity of the development disrupts not just individual households but entire networks of villages, schools, farms, and rights of way, eroding the social fabric that defines the unique life in these parishes.

The Government advocate that each household should be within 500 meters (15 minutes) walking distance of a greenspace for recreation and wellbeing, recognising the importance of connecting with nature for physical and mental health. Access to green space in England - GOV.UK The GNR Solar project is counterproductive to this ethos, aiming for a green space to be confronted by the strobe effect of walking through an industrialised landscape.

Panel arrays are scattered across dozens of zones (e.g., N1 to N12.4 in the north, E1 to E11 in the east, S1 to S8 in the south, and W1 to W20 in the west), integrated into diverse grasslands and arable fields with inverters, gravel tracks, tall deer fencing threading through the landscape.

Fencing Choices

The indicates fencing will be used around the developments as being a single 1.8m high fence. The Primary Reference: In Chapter 5 – Development Description (submitted 22 July 2025), Section 5.4.3.5 details the perimeter fencing for the solar park (the main development area) as a **Deer Fence (timber and wire)**. This is designed to secure the site while incorporating wildlife provisions.

- **Height**: 1.8 m above ground level (AGL), with a range of 1.6–2.1 m.
- **Materials**: Timber posts combined with wire mesh or strands.

In order to minimise visual impact, we strongly recommend a double row deer fencing is mandated as a condition given that it has clear advantages over the single fence type. The table below illustrates this.

For comparison (based on standard UK solar industry practices):

Feature	Two-Row Deer Fencing (Recommended)	Single High Deer Fence (Less Ideal)
Deer Exclusion	Excellent (deer rarely attempt double jump)	Good, but occasional breaches by large deer
Visual Impact	Low-profile; easier to hedge-screen	High and skyline-dominant
Biodiversity Fit	Allows mammal movement in corridor; sheep grazing	May block small wildlife; harder for grazing
Cost & Planning	Often cheaper; preferred by councils for rural sites	More expensive; frequent objections in LVIA

Deer can jump height, but will not when a double bounce is required, hence lower, less intrusive fencing is equally secure a stock proofing method against the deer.

Other points:

- Increased traffic on rural lanes during construction, noise from maintenance, and a loss of dark skies (at nighttime) and wildlife corridors.
- Farmlands that currently support local agriculture, countryside sporting pursuits and leisure will be lost
- Public footpaths & bridlewaysare to be permanently deleted with the suggestion new routes are given Permissive (ie not forever) status
- New routes are restrictive and enclosed by fencing and panels, isolating residents and diminishing the area's appeal as a haven for walking, cycling, and farming heritage.
- Loss of historical landscape features including loss due to high hedges and impact of deer fencing, accumulative effect, and mitigation measures yet to be considered by Elements Green.
- Wire lines are a true representation of the visual impact, we asked for visualisations to be produced as a photomontage.

Glint and Glare

Although the developers have stated that panels are designed such that glint and glare will be minimal, they acknowledge in point 6.2.16 Environmental Statement Volume 2 – Chapters Chapter 16 16.3 para 92 that they will reflect the sun.

The potential for glint and glare from the panels around Carlton on Trent is great due to the concentration of panels and the slope of the fields meaning they cannot be screened. This impact will be far reaching due to the proximity of the river Trent, the railway and the A1 major trunk road as well as all the local traffic such as pedestrians, horse riders, cyclists, drivers and wildlife.

The developers have chosen to ignore the river completely, but it is believed that the boats could be affected by glint and glare and should have been included in any assessment.

Railways

Glint and glare from solar farms can affect train drivers by causing temporary visual distraction or nuisance, impacting signal visibility and thus passenger safety.

It is therefore felt that standard modelling outlined in 6.4.16.1 Environmental Statement Volume 4 – Technical Appendices Technical Appendix A16.1 – Glint and Glare, which has been applied in this area, is not appropriate.

The East Coast Main Line, an already very busy track, runs along the Eastern perimeter of the development site. Indeed, Network Rail has objected to the development in its relevant representation on the basis that works may interfere with the safe operation of the railway.

The issues with flooding in the Carlton on Trent area, mentioned under flooding above, mean that the railway track has been raised in this area to ensure trains can operate in most times of flood. As of December 2025, the track will become even busier with a new timetable and 10,000 more trains annually. Many old diesel trains are being replaced by cleaner, faster, electric trains. These new trains are taller and thus the driver sits at a higher elevation in relation to the surrounding fields. This will negate any modelling used in the application for assessing the impact of glint and glare. There needs to be a field study undertaken in which the height of the track is ascertained, and the new train's dimensions are used to ensure that glint and glare from the panels adjacent to the track is not a problem for Northern bound trains.

Wildlife

Solar panels can significantly impact migrating birds through collision risks as they mistake glinting panels for water, altering flight paths, and increasing mortality rates.

The Trent basin is an important area for migrating geese with huge skeins flying in v-formation following the line of the B1164 east bound over Carlton on Trent in Autumn, likely headed from Iceland to Wintering grounds in Lincolnshire and Norfolk and returning west bound in Spring.

The solar panels densely lining either side of the B1164 are likely to be seen as lakes and will have many of these geese trying to land seeking new wintering stops, but the resulting collisions will cause severe injury and death.

Locating solar farms away from major migration flight paths is crucial and it is felt that this has been completely ignored in the assessments by the developer.

Human Health

The fields around Carlton on Trent feature numerous footpaths which are very popular with walkers. People usually approach from the village, walking up the B1164 and turning right into the field at point W3Wclassics.listen.lavendar and heading North through what will be panels. Given the slope of the fields these walkers could suffer the effects of glare from panels as they head up the B1164 and as they walk along the footpath. The glint and glare assessment doesn't consider this group worthy of consideration with public rights of way not being considered as receptors.

The panels in Carlton on Trent are on sloping fields that cannot be screened however high hedges are left to grow, meaning that some residents such as those on Castle Hill will constantly be looking at a sea of glass whenever they leave their house and indeed one house will look out over this from inside the house on a daily basis. With an upstairs office for working from home being above the 2m level at which modelling was carried out, the residents feel that the impact will be more than the 30 minutes per day outlined in 6.4.16.1 Environmental Statement Volume 4 – Technical Appendices Technical Appendix A16.1 – Glint and Glare para 66. Having been told that modelling had shown turbines 1km from their home could not possibly cause shadow flicker, these residents watch the shadow flicker on their walls and are, as you might expect, very sceptical of the modelling being applied to glint and glare.

Properties within the village of Carlton will have sight of the panels and as they go about their daily lives – making beds, cleaning windows, etc their eye will be drawn by the glare of acres of panels. Whilst this may not be sufficient in duration or intensity to cure ocular damage, it is a constant highlight of the industrial landscape surrounding the village, resulting in depression.

6.2.16 Environmental Statement Volume 2 – Chapters Chapter 16 para 103 states that any mitigation will only be designed once the PV array design is known. This leaves residents uncertain about the potential impact, whether it be from their home or as they walk or drive around the area, which in itself is already causing anxiety.

Though not the ocular impact the assessment refers to, anxiety and depression are health impacts in themselves and cannot be underestimated.

Roads

Solar panels not only cause a distraction to drivers, they also pose a safety hazard by causing temporary blindness from the glint and glare of sunlight on glass.

The A1 is a very busy trunk road with over 50,000 average daily users on this stretch and the road is frequently closed due to accidents. Travelling North on the A1 there will be stretches where the slope of the fields in the Carlton area makes the panels susceptible to glare on sunny days, which will make accidents more likely.

Likewise, on the hill of B1164 between Carlton on Trent and Ossington there will be swathes of panels visible due to the slope of the fields that cannot be screened to prevent any glare.

The increased risk of accidents associated with distraction and temporary blindness is unacceptable to residents.

Aviation

Glint and glare can affect planes, causing temporary visual impairment, distraction and interference with pilot vision, especially during landing and take-off.

The Trent valley around Carlton is frequently used as a ‘training air space’ used by pilot cadets at RAF Cranwell. There is military aircraft in transit use the River Trent as their navigational aid, as well as civilian.

There are several civilian landing fields in the local, including Gamston and Darlton; while we note that Caunton has no objection to the proposal, we are also aware that the landowner has also done solar projects of their own.

The safety of aircraft is paramount. One person's approval does not negate what could be very real and devastating consequences unless mitigating factors have been put in place.

Since there cannot be appropriate mitigation until the panel design is determined and no-one actually knows what impact glint and glare will have until the sun hits the panels in the fields it is very important to raise concerns at this stage. There should be a window of consultation on such matters once the design is determined and then it is felt that there needs to be a very clear programme of monitoring and management of the scheme if it goes ahead. A suitable scheme should have a designated point of contact for any issues so that mitigation like changing the angle of panels or removal of panels can occur promptly during installation and after the development is complete should a problem be identified. Without such a reassurance it is not possible to support any development.

[redacted]

1st December 2025

To whom it may concern,

I have lived my entire life at [redacted] and am following the footsteps of my father and his before; I am a multi generation farmer and had no intention of being anything other than a farmer.

I was first contacted to ask if I would house a battery storage unit on my farm and offered a considerable amount of money to do so, I expressed an interest but was then told my land wasn't required.

Shortly after I received a letter to ask if I wanted to put solar panels on my land, I was interested to hear what they had to say, and I was visited by an agent; we walked the entire farm.

At no time was I told this was part of a larger scheme.

I received an offer letter of £800/acre, but after discussing with my wife, decided this was not a route I wanted to go down; we wouldn't be able to continue to farm our cattle and so did not respond.

In January 2025 we received two further letters, one being recorded delivery, at the top of the letter in bold red writing it says:

IMPORTANT. THIS COMMUNICATION MAY AFFECT YOUR PROPERTY.

We are not in the scheme and found the letter intimidating.

The envelope also contained an extensive form titled "**Land Interest Questionnaire**". The maps in the bundle highlighted our land even though we are outside of the red line and we were asked to fill in full details about our farm and working practise. We were asked about our mortgage and what tenancies we held; the level of detail being requested was very personal. We were appalled.

Yours faithfully,

[redacted]

Great North Road Solar and Biodiversity Park

Land Interest Questionnaire ('LIQ')

This is a Land Interest Questionnaire ('LIQ') served on behalf of Elements Green Trent Limited ('the Applicant') and relates to the Land and Property as shown on the attached plan(s)

The information requested is required in connection with the proposed application for a Development Consent Order ('DCO') for the construction, maintenance, and operation of the Great North Road Solar and Biodiversity Park ('the Project')

The Applicant requires details of all parties holding an interest in the Land as part of statutory obligations for the format and content of the application for a DCO and to ensure that everybody who has an interest in the Land is given the opportunity to comment during consultation and when the proposed application for a DCO is submitted.

PLEASE READ THE ATTACHED NOTES BEFORE COMPLETING THIS QUESTIONNAIRE.

Carter Jonas will process your personal information in this questionnaire in accordance with the Data Protection Act 2018.

*We kindly request that you complete the attached form and return it using the pre-paid envelope provided or via email. It would be helpful if you were able to provide the information within **14 days**.*

This information is solely for the purpose of identifying landowners, persons with an interest in land and occupiers. It is not intended by any party to confer any ownership or the Land, right/interest in the Land or right to occupation of the Land and gives no proprietary interest in the Land to the Applicant.

Additional information can be written on the reverse of the last sheet if necessary.

[redacted]

Carter Jonas

2 Snow Hill
Birmingham
B4 6GA

T: 0121 794 6250

Our ref: J0080206/GNR_0221

9 January 2025

IMPORTANT: THIS COMMUNICATION MAY AFFECT YOUR PROPERTY

To Whom it May Concern,

Elements Green Trent Limited– Great North Road Solar and Biodiversity Park

As you may be aware from the Elements Green consultation earlier this year, the company is developing proposals for a new solar and biodiversity park located to the northwest of Newark-on-Trent, Nottinghamshire. The scheme is a Nationally Significant Infrastructure Project (NSIP) where, under the Planning Act 2008, a Development Consent Order (DCO) will be progressed to consent the works. It is a statutory requirement for DCO applicants to ensure all potentially affected parties are identified and kept up to date with the scheme through a process called "Land Referencing".

The Land Referencing process identifies those people or organisations who have an interest in land within the draft order limits. By obtaining this information, all parties can remain informed as the project evolves and receive notifications on consultation opportunities and the DCO application, ensuring their land or property interest is represented throughout the entire development consent order process.

Carter Jonas has been appointed by Elements Green to assist in the Land Referencing process. We are one of the largest providers for infrastructure land advice in the UK and advise a number of clients on a broad range of schemes nationally.

From information we have obtained from the Land Registry and other publicly available sources, we believe you have an interest in a property or land within the area that may potentially be affected by the project. To assist us with Land Referencing, we would be grateful if you could complete the enclosed Land Interest Questionnaire form and return it using the Freepost envelope provided. Please complete and return the form within 14 days of receipt of this letter.

If you require any assistance with the form, please contact us at 0121 794 6250 to speak to a member of the Carter Jonas Land Referencing Team; alternatively, you can email us at land.referencing@carterjonas.co.uk. For general information about the project please visit: www.gnrsolarpark.co.uk

Thank you for your cooperation.

Yours faithfully

Andrew Prowse

Planning Inspectorate

Appeal Decision

Appeal Ref: APP/D3315/A/13/2203242

Land at Glebe Farm, Tolland, Lydeard St Lawrence, Taunton.

By Jessica Graham BA(Hons) PgDipl

Extract

"17. The planning application was accompanied by a Flood Risk Assessment (FRA). A carefully considered and professionally well-informed letter of objection to the proposed development makes the important point that it would be unsound to assume that rain falling on each row of solar panels would flow evenly into the rain-shadow of the row below, so as to mobilise the same percentage of the ground for infiltration as was available before the panels were installed. Rather, because the panels would be set at a downward slope and aligned to follow the contours of the land, rain-water would be likely to fall in a column from the lowest corner of each panel, and could then form rivulets flowing down through the rain-shadows of the rows below without utilising their whole area for infiltration, thus increasing the amount of water run-off from the site.

I find that argument persuasive."

The Planning Inspectorate

Appeal Decision

Site visits made on 18 and 30 December 2013

by Jessica Graham BA(Hons) PgDipL

an Inspector appointed by the Secretary of State for Communities and Local Government

Decision date: 13 February 2014

Appeal Ref: APP/D3315/A/13/2203242
Land at Glebe Farm, Tolland, Lydeard St Lawrence, Taunton TA4 3PR

- The appeal is made under section 78 of the Town and Country Planning Act 1990 against a refusal to grant planning permission.
- The appeal is made by AEE Renewables UK 21 Ltd against the decision of Taunton Deane Borough Council.
- The application Ref 41/13/0001, dated 5 April 2013, was refused by notice dated 7 June 2013.
- The development proposed is a change of use from agriculture to solar farm with agriculture.

Decision

1. The appeal is dismissed.

Procedural matter

2. I visited the appeal site on 18 December 2013, but visibility was too poor to make a proper assessment of its visual context. I therefore made a further site visit on 30 December, when I spent several hours walking nearby public rights of way and considering the appeal site from various public viewpoints, including the locations suggested by the Council in its Statement of Case.

Main issues

3. The main issues in this appeal are
   (a) the effect that the proposed development would have on the character and appearance of the area;
   (b) whether the proposal makes adequate provision for the drainage of surface water; and
   (c) following on from (a) and (b), whether the overall impacts of the proposed development would be, or could be made, acceptable.

Reasons

Character and appearance

4. The appeal site consists of agricultural fields on a south-west facing hillside, to the south of the village of Tolland. The proposed development would involve the installation of 16,632 solar PV panels over an area of some 7.5ha, fixed at an angle of 25º to the ground on steel-framed tables. Rows of tables would be aligned in an east-west direction, with the panels facing south. The rows would

stretch the length and breadth of the appeal site, following the contours, but leaving an open buffer zone alongside hedgerows and trees. There would also be three inverter/transformer buildings, and a substation. Deer fencing to a height of 2m, with a single strand of barbed wire above, would be installed around the perimeter of the appeal site and a new hedgerow would be introduced along the eastern boundary. The ground beneath the panels would be seeded, to become managed grassland grazed by sheep.

5. The National Character Area of this part of the countryside, as set out in the Character of England project published by the Countryside Agency in 1999, is defined as "Wooded and Farmed Vale Fringes – West Deane". Key features of this landscape are identified as undulating terrain; farmland interspersed with significant areas of woodland; agricultural land use, both pasture and arable; small to medium fields of irregular shape; and a strong native hedgerow network, punctuated with native trees. I saw at my site visit that the appeal site is fairly typical of the scale and character of fields within this rural landscape.

6. The village of Tolland lies over the hill to the north, while the small settlement of Brompton Ralph looks out toward the appeal site from the opposite side of the valley to the west. Other existing development within the locality is generally of a small agricultural or domestic scale. The current proposal would, by contrast, cover some 7.5ha of land with man-made infrastructure. I appreciate that the grass planted beneath the solar panels would be grazed by sheep, such that agricultural use would still be made of the appeal site. However, the large, precision-engineered PV panels, the associated buildings housing electrical equipment, and the perimeter security fencing would become the predominant features of the appeal site, largely obscuring the grass from view. These features are more typical of industrial development than pastoral or arable farmland, and in my judgment would fundamentally and harmfully alter the existing character of the open fields that form the appeal site, to the detriment of the surrounding rural landscape.

7. The most marked visual impact of the proposed development would be experienced by users of the long-distance footpath known as the West Deane Way, which runs alongside the north-eastern boundary of the appeal site for some 400m. Walkers heading north-west along the path currently emerge from a relatively enclosed section, which winds through the wooded valley bottom, then ascend through open countryside past the appeal site toward the top of the hill, moving through undulating landscape that affords impressive panoramic views. The proposed new hedgerow along the eastern boundary would, once it had grown up, provide some screening of the solar PV panels in views from the eastern approach, but the solar farm would be very close, and conspicuous, in views out from the section of the West Deane Way that adjoins the appeal site.

8. I appreciate that reaction to views is to a large extent subjective, such that some walkers may be cheered to encounter a large-scale renewable energy installation of this kind, while others may be dismayed. Nevertheless, in objective terms, it is clear that the proposed development would be a dominant feature in close-range views, and so would significantly alter the experience of walking this section of the West Deane Way. The presence of the extensive array of panels to the south-western side of the path could to some extent be screened by strengthening the existing boundary hedgerow, but I share the

Council's opinion that increasing the height of that hedge would lead to a feeling of being "hemmed in" between two hedgerows. As a result the panoramic views over open countryside would be lost, and this would become a relatively uninteresting length of footpath to walk.

9. The proposed development would also be prominent in views from another footpath that approaches from the east, where walkers are high above the appeal site before descending steeply to Watersmeet. The proposed new hedge along the eastern boundary would do little to screen the solar farm in views from this elevated position, where it would appear as a highly intrusive element in the foreground of the existing panorama of rolling rural hills. While this path is not part of the designated West Deane Way, there is evidence to suggest that it is well-used, and its scenic qualities much appreciated, by local residents and by visitors to the area.

10. In addition, the proposed development would affect views from a number of other footpaths which converge on Brompton Ralph. Again, the elevated position of viewpoints from these footpaths, close to the village, afford impressive panoramic views over the undulating landscape within which the appeal site lies. Amid the predominant pattern of pastoral and arable fields, punctuated mainly by areas of woodland and the occasional group of small buildings, the solar farm would appear as a large, alien feature at odds with the character of the rural countryside surrounding it.

11. To a lesser extent, it would also be visible from the Brompton Ralph churchyard. While I appreciate that the churchyard provides valuable space for quiet contemplation, which is aided by views of the open landscape beyond, I do not consider that the presence of the solar farm would, at this distance, be so intrusive as to harm the setting (and consequently the significance) of the churchyard, or the Grade II Listed church it serves.

12. The B3188 passes to the west of the appeal site. The presence of intervening boundary hedgerows would provide some screening, and while glimpses of the development would be seen through gaps and gateways, the likelihood that most users of this highway would be in vehicles rather than on foot indicates that the visual impact experienced here would be less harmful than at the public footpaths discussed above.

13. However, on the western edge of the B3188, the front elevation of Gandstone House faces directly toward the appeal site on the opposite side of the valley, at a distance of only some 350m from its boundary. While intervening vegetation would again provide some screening, this would not be as effective as in lower-level views from the road, and I consider that the extent to which the proposed development would dominate views out from this property would cause material harm to its outlook. I note that the submitted Landscape and Ecological Management Plan proposes the planting of semi-mature trees on land opposite Gandstone House, but as the occupier points out, while such planting may in time serve to screen views of the solar panels during summer months, in doing so it would block long views over the countryside to the Quantock Hills, which would also be detrimental to the outlook.

14. It is fair to note that the development proposal would retain and reinforce the existing hedgerows, and that the alignment of the solar panels would follow, rather than conceal, the undulating contours of the land. However, the

retention of these particular landscape features would not obviate the harm to the overall character of the landscape that I have identified above.

15. Drawing all of these considerations together, I conclude that the proposed development would cause substantial damage to the character of the landscape, and would give rise to significant adverse visual impacts. In my judgment these harmful effects could not be adequately mitigated by the provision of screen planting, or by the imposition of conditions. I therefore find that the scheme would conflict with the objectives of Policy CP 1 of the Adopted Taunton Deane Core Strategy 2011-2028, which states that proposals for the development of renewable energy will be favourably considered provided their scale, form and design can be satisfactorily assimilated into the landscape without harming the character of the area. It would also conflict with the aims of CP 8 of the Core Strategy, which among other things seeks to conserve and enhance the natural environment.

Drainage

16. The appeal site slopes, quite steeply, down toward the watercourse that runs along the valley bottom. While the appeal site lies within Flood Zone 1 of the Environment Agency's indicative map, which suggests that it has a low probability of flooding, the dwelling known as "Watersmeet" lies in the flood plain some 300m downstream from the appeal site and, I am told, has been the subject of flooding in the recent past. Its owners are therefore understandably concerned that, should the proposed development result in any increase in surface water run-off from the appeal site, this could increase the risk of flooding at their property.

17. The planning application was accompanied by a Flood Risk Assessment (FRA). A carefully considered and professionally well-informed letter of objection to the proposed development makes the important point that it would be unsound to assume that rain falling on each row of solar panels would flow evenly into the rain-shadow of the row below, so as to mobilise the same percentage of the ground for infiltration as was available before the panels were installed. Rather, because the panels would be set at a downward slope and aligned to follow the contours of the land, rain-water would be likely to fall in a column from the lowest corner of each panel, and could then form rivulets flowing down through the rain-shadows of the rows below without utilising their whole area for infiltration, thus increasing the amount of water run-off from the site.

18. I find that argument persuasive. I also note that it is a concern which informed the proposed "Sustainable Drainage Scheme (SuDS)" incorporated in the appellant's FRA, following consultation with the Environment Agency. The FRA recognises that intensification of the run-off into small channels could occur beneath the lower end of the panels, and that this could increase run-off above that associated with the undeveloped appeal site: it goes on to explain that the design of the SuDS has therefore incorporated a system of bunds, swales and scrapes to promote infiltration, limit erosion and provide on-site storage, thereby effectively managing the surface water run-off from the site.

19. The FRA, and the design of the proposed SuDS, has been assessed by the Environment Agency. The professional advice of that Agency is that the proposal does not demonstrate that the risks of flooding from the development can be fully mitigated. In particular, it has concerns that the design of the swale and bund feature in the south-west corner of the site would be

inadequate to prevent any exceedance flows from simply entering the nearby watercourse in an uncontrolled manner, with possible implications for the flood risk downstream. Further, given the lack of information as to the extent of permeability of the proposed access tracks on the site, the Environment Agency is concerned that no allowance has been made for potential run-off from these routes in calculating the swale/bund detention volume.

20. I share those concerns. I have given careful thought as to whether, were I otherwise minded to grant planning permission, they could (as the appellant suggests) be adequately addressed by imposing conditions. I am not convinced that the use of conditions would be an appropriate course of action in this case. It is not possible to determine, in the absence of further information, whether a re-designed swale and bund feature, preventing the uncontrolled escape of exceedance flows and providing adequate detention volumes, could be incorporated without materially altering the development that is currently proposed. That being the case, I agree with the Environment Agency that there is no certainty, on the basis of the evidence provided, that appropriate flood risk management and drainage measures can be achieved within the proposal.

21. I therefore conclude that the proposed development would conflict with the terms of Policy CP8 of the Core Strategy, which state that development sites will need to ensure that flood risk is not exacerbated from increased surface water flows, by ensuring that existing greenfield rates and volumes are not increased off-site.

Whether the impacts of the proposal are, or can be made, acceptable

22. One of the core principles set out in paragraph 17 of the NPPF is the need to support the transition to a low carbon future in a changing climate, and to encourage the use of renewable resources. Paragraph 93 then goes on to explain that planning plays a key role in helping shape places to secure radical reductions in greenhouse gas emissions, and supporting the delivery of renewable and low carbon energy and associated infrastructure. Paragraph 98 advises that applications for renewable energy projects should be approved if the impacts are, or can be made, acceptable.

23. Evidence submitted by the appellant, and not disputed by the Council, is that the proposed solar farm would have a total maximum capacity of 4.22 MWp of electrical energy, to be supplied directly to the national grid, with peak performance power identified as 3.52 MW. That equates to the requirement for electrical energy of more than 1,000 residential properties. This would constitute a significant contribution toward meeting national targets concerning the derivation of energy from renewable sources, reducing carbon emissions and mitigating climate change. The proposed development would also help to increase the security and diversity of the electricity supply. Diversification of enterprise at Glebe Farm, helping to secure its future viability, would be an additional economic benefit.

24. A number of local residents have questioned the need for the proposed Solar Farm, expressing concern that it would not actually contribute toward the reduction of greenhouse gases, and would have no local benefit. However, the NPPF advises that applicants should not be required to demonstrate the overall need for renewable or low carbon energy, and recognises that even small-scale projects provide a valuable contribution to cutting greenhouse gas emissions.

25. I note the appellant's contention that the proposed development would provide an opportunity to enhance biodiversity on the appeal site. While a small number of shrubs would be removed to accommodate the infrastructure, the creation of a new hedgerow, and the introduction of species-rich grassland beneath the solar panels, could potentially provide flora and fauna with a better opportunity to flourish than an intensively-managed arable use of the appeal site. However, in the absence of any detailed information quantifying the nature and extent of any net biodiversity gain, and how it would be maintained, this is a potential benefit to which I attach only limited weight.

26. It is also material to note that the Solar Farm is intended to subsist for a temporary period of 25 years, and that an appropriately worded condition could be used to secure its removal at the end of that period, returning the appeal site to its original, solely agricultural, use. The temporary nature of the proposed development reduces the weight that I would otherwise attach to its harmful impacts, were they to be permanent.

27. Placing all of these considerations in the balance, I find that the benefits of the proposed development carry significant weight in its favour. However, that weight is not sufficient to overcome the serious harm that would be caused to the character of the landscape, and the substantial adverse visual impacts for users of the public footpaths I have identified. In my judgment these adverse impacts of the scheme are not acceptable, and could not be made acceptable, and on that basis alone planning permission should be refused. When the failure to demonstrate that the proposed development would not increase flood risk downstream, and the adverse impact on the outlook from Gandstone House, are also taken into account then the balance weighs even more heavily against the proposed development.

Conclusion

28. I therefore determine that the appeal should be dismissed.

Jessica Graham

INSPECTOR

Impact of solar parks on runoff generation and associated land drainage/flood risk consequences.

BHS - 5th June 2014

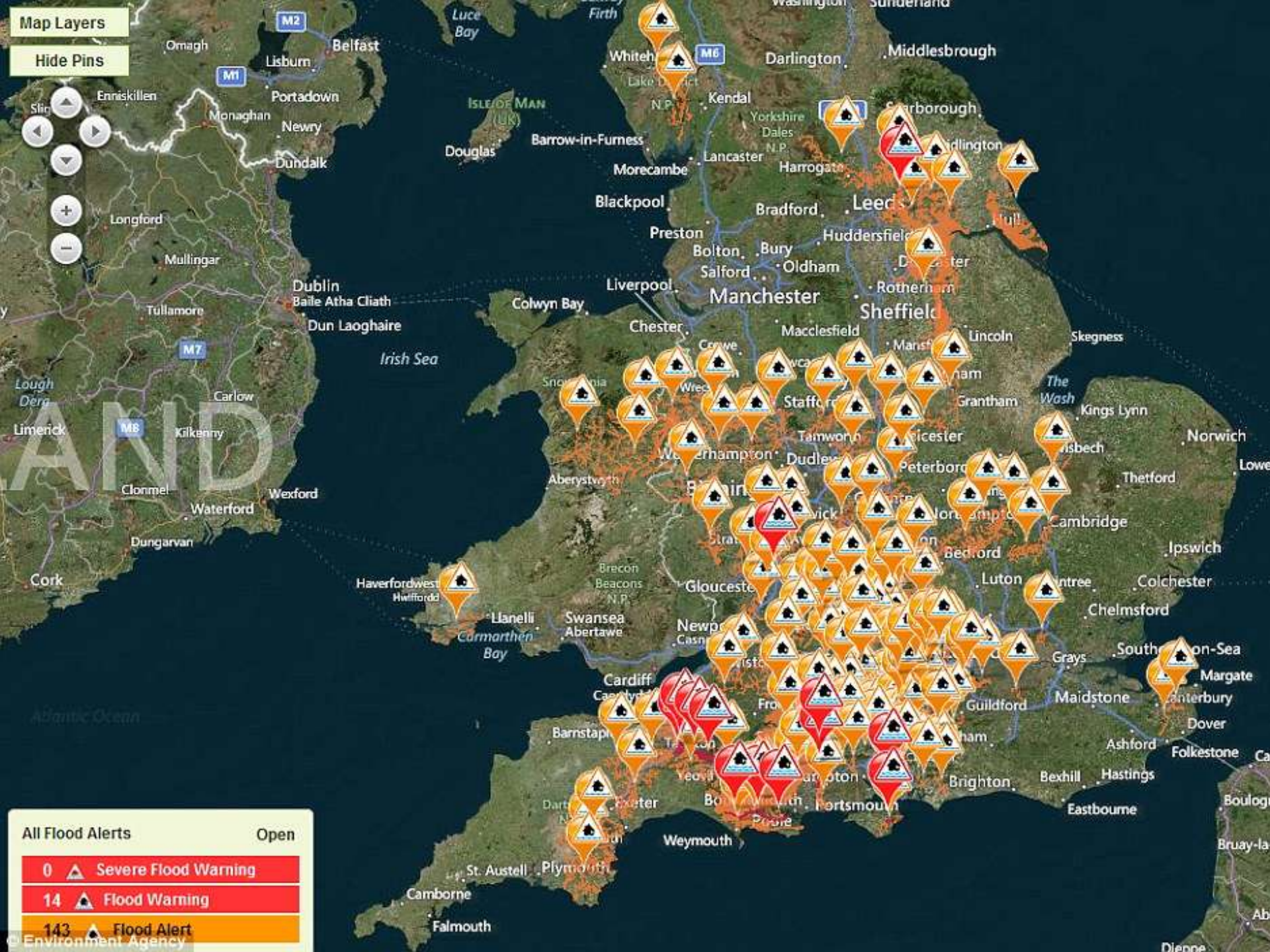
Tony Burch (EA retired)
Prof Adrian Armstrong
Steve Rose (JBA)
Steve Maslen (JBA)

Large-scale solar PV deployment in the UK - 2011 to Feb 2014

Large-scale solar PV deployment in the UK - 2011 to Feb 2014*		
	No.	Capacity MWp
Operational	184	850
Under construction	48	538
Awaiting construction	194	1,656
TOTAL	**425**	**3,037**
In planning	98	1,149
GRAND TOTAL	**523**	**4,168**

Land use assuming 2ha/MWp
Land ha
425
269
828
1,518.5
574.5
2,084 ha

*Source: Dept of Energy & Climate Change - UK Solar PV Strategy Part 2 - April 2014


Map Layers
Hide Pins
All Flood Alerts
Open
0 Severe Flood Warning
14 Flood Warning
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Belfast
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Dun Laoghaire
Tullamore
Carlow
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Limerick
Clonmel
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Dungarvan
Cork
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Isle of Man (UK)
Barrow-in-Furness
Morecambe
Lancaster
Kendal
Darlington
Middlesbrough
Scarborough
Harrogate
Blackpool
Preston
Bradford
Leeds
Huddersfield
Bolton
Bury
Salford
Oldham
Liverpool
Manchester
Rotherham
Sheffield
Colwyn Bay
Chester
Macclesfield
Lincoln
Skegness
Grantham
Kings Lynn
Norwich
Thetford
Cambridge
Ipswich
Colchester
Chelmsford
Luton
Peterborough
Leicester
Tamworth
Stafford
Wolverhampton
Dudley
Aberystwyth
Brecon Beacons N.P.
Haverfordwest
Llanelli
Swansea
Carmarthen Bay
Gloucester
Cardiff
Newport
Barnstaple
Weymouth
Plymouth
St. Austell
Camborne
Falmouth
Guildford
Maidstone
Grays
Margate
Dover
Folkestone
Ashford
Brighton
Bexhill
Hastings
Eastbourne
Portsmouth
Southampton
Yorkshire Dales N.P.
Lake District N.P.
The Wash
Irish Sea
Atlantic Ocean

The 2014 floods

The Somerset Moors

(a reminder)


GETTY IMAGES

The aftermath

What the 'experts' say about all that flooding in 2014

- "**Water management techniques** could have helped prevent the effect of flooding on villages, towns and over surrounding land seen recently."
- "We need to look at how forestry, **land management** and soft-engineered flood alleviation schemes can hold back water in the upper reaches of rivers….."

YES - quite right …. But it's all been said before……

…But its all been said before…..

DEFRA/EA R&D project FD2114 Review of impact of rural land use & management on flood generation

(E. O'Connell et al)

- *"There is substantial evidence that local flooding can be affected by changes in (*rural*) land management and management practices."*

…But its all been said before…..

Making Space for Water

- The Government will promote changes in rural land management to ameliorate runoff and reducing the incidence of flooding on a local scale

…But its all been said before…..

Catchment Flood Management Plans

- CFMPs apply the recommendations of FD2114
- They promote the use of rural land use and soil management to reduce rural runoff to reduce flooding at settlements in accordance with MSfW policy.
- They identify where it can be effective

…But its all been said before…..

Best Farming Practice & Environmental Stewardship

- *Encourage farmers to reduce runoff, soil erosion and pollution through good land and soil management*

…But its all been said before….

National Planning Policy Framework

- *"When determining planning applications LPA's should ensure flood risk is not increased elsewhere & is **reduced** wherever possible."*

What's been said before

- FD 2114 - rural land use & soil management affects local flooding
- M S for W - managing rural land & soil is part of government **policy** to manage flood risk
- CFMPs – **implement the policy** and say where it's **effective**.
- Best Farming Practice & Environmental stewardship **contribute to it's delivery**
- NPPF - provide an **opportunity to deliver the policy** … when considering applications for Solar Parks in rural areas

So what do FRAs for solar parks say ?

Flood Risk Assessments for Solar Parks some uncertainties for discussion

1. **Soil compaction or soil degradation due to construction and during operational lifetime**

2. **Assumption - Solar panels don't increase runoff significantly**

3. **Standard of mitigation - 100 year or what?**

The first uncertainty
Soil degradation

An example
Before
(Grade 2 agricultural Land! Carbon footprint? EIA?)

after

Soil condition – some numbers

Source: Richard Smith EA

Runoff volumes generated by 25mm of rain in 24 hours – plot size 10m x 4.5m

Runoff & soil condition

Runoff from maize stubble (IGER 2000)

Winter - Feb / April 2000, North Wyke Devon

Compacted stubble		Chisel ploughed stubble	
Runoff		Runoff	
m3/ha	% of rainfall	M3/ha	% of rainfall
433.5 m3/ha	20%	5.8 m3/ha	0.5%

Runoff from grassland (NSRI Cranfield 2007)

Grass – poor soil structure		Grass – good soil structure	
Runoff		Runoff	
m3/ha	% of rainfall	m3/ha	% of rainfall
	~60%		~2%

The problem soil condition

The solution - Deliver MSfW, Planning & CFMP policies and Best Farming Practice

1. **FRA's** need to take into account **soil condition**
2. **Pre-development runoff** calcs. should assume **soil is in good condition** in accordance with Best Farming Practice. (NPPF Reducing flood risk)
3. After construction the soil should be **chisel ploughed** to mitigate soil compaction during construction
4. **Planning applications** should include an enforceable **soil management plan** to keep soil in good condition & for **decommissioning**.

The second uncertainty
Do solar panels increase runoff?

- **Assumption - Solar panels don't increase runoff significantly** because…. rain falls off them and, regardless of ground slope, it flows evenly across the rain-shadow of the down slope row of panels… so most, if not all of the ground is mobilised for infiltration.

The assumption explained

In practice

Kinetic compaction & rivulets forming

Example to illustrate scale of issue

Area of rain-shadow not mobilised for infiltration				
8.25MW				
16ha site				
35,000 panels				
Solar panel footprint	5% not mobilised	10% not mobilised	20% not mobilised	30% not mobilised
50,000m2	2,500m2	5,000m2	10,000m2	15,000m2
%age of site area	1.6%	3.2%	6.2%	9.6%

- Area of rain-shadow not mobilised for infiltration is a function of **ground slope**
- **Research** is needed to guide practitioners
- Until then apply the **precautionary principle**

Appeal Decision
Appeal Ref: APP/D3315/A/13/2203242
Land at Glebe Farm, Tolland, Lydeard St Lawrence, Taunton TA4 3PR

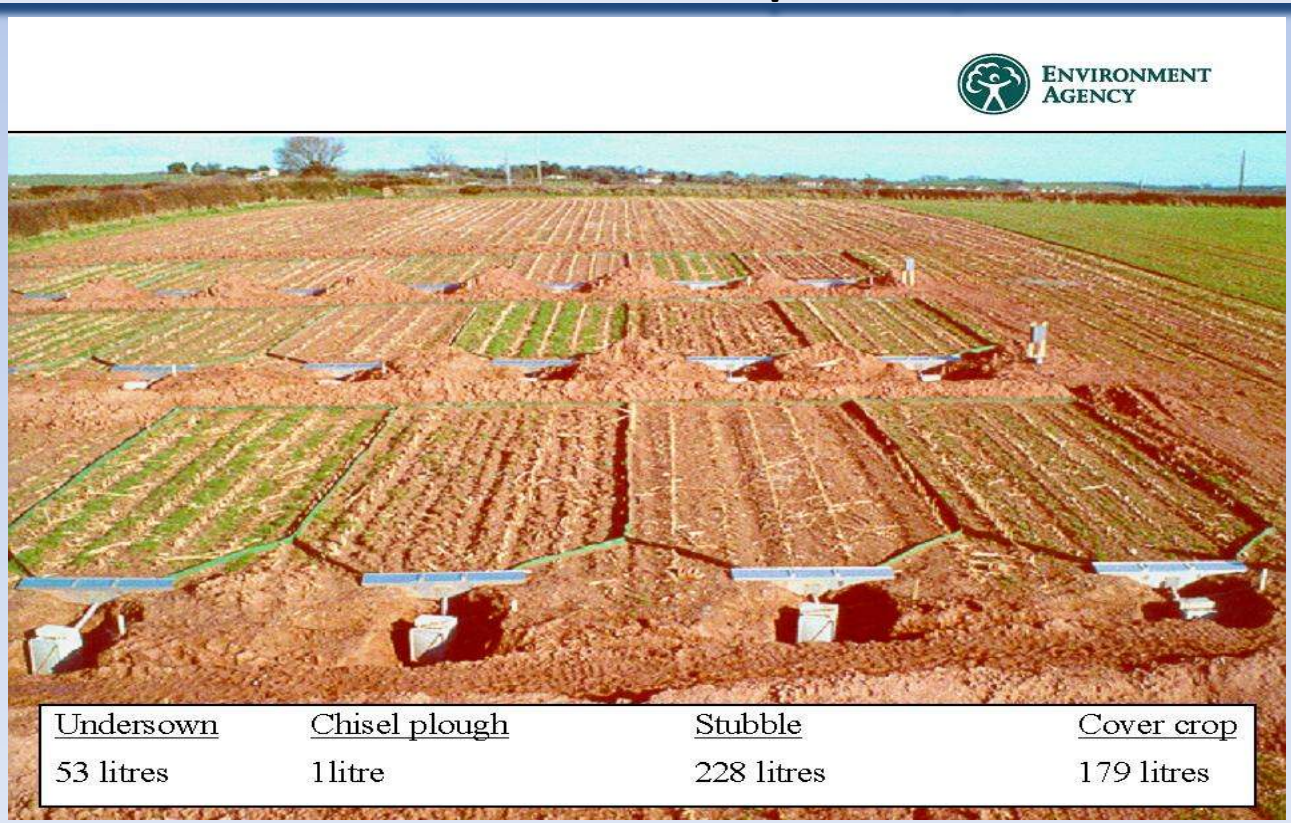
17. The planning application was accompanied by a Flood Risk Assessment (FRA). A carefully considered and professionally well-informed letter of objection to the proposed development makes the important point that **it would be unsound to assume that rain falling on each row of solar panels would flow evenly into the rain-shadow of the row below, so as to mobilise the same percentage of the ground for infiltration as was available before the panels were installed.** Rather, because the panels would be set at a downward slope and aligned to follow the contours of the land, rain-water would be likely to fall in a column from the lowest corner of each panel, and could then form rivulets flowing down through the rain-shadows of the rows below without utilising their whole area for infiltration, thus increasing the amount of water run-off from the site.

18. **I find that argument persuasive.**

The third uncertainty
Standards of mitigation

- Flood risk to settlements - 100 year
- Flood risk to agricultural land - 10 to 20 year?
- Drowning of agricultural land drainage outfalls - 2 to 10 year ?

Thank-you Richard et al for reminding us poorly managed (or regulated) agricultural land and soil is the flood-risk elephant in the room, now and as agriculture responds to climate change and Govt. incentives for solar parks, bio-fuels etc



Source: Richard Smith EA Runoff volumes generated by 25mm of rain in 24 hours – plot size 10m x 4.5m