

**7000 Acres**

**7000 Acres Response to the Gate Burton Energy Park Ltd Application on the subject of:**

**Flooding Risk**

Deadline 2 Submission – 8 August 2023

## Gate Burton Energy Park Flooding Representation

Covering an area of 1,690 acres with 3.5 million square metres of inclined 4.5-metre-high glass panels will prevent the natural mitigation of surface water runoff into clay soil during periods of heavy rain and storm conditions.

To mitigate the surface water run-off from domestic properties, even when there are road drains, which have the capacity to receive surface water from impervious driveways, roofs, etc, it is a legal requirement to comply with Defra's Sustainable Drainage Systems (SuDS) Directive by installing one cubic metre of subterranean infiltration for every 50 square metres of impervious surface area.

Yet, despite Defra's concerns to prevent local flooding from impervious surfaces, there appears to be no similar requirement for the GBEP developer to prevent storm water runoff from an estimated 3.5 million square metres of glass pv panels inclined at an angle of 30 degrees, into the ditches delivering into the River Till, along with storm water from all the other large solar projects, all of which are sited in River Till catchment area.

Using the same formula adopted by Defra's SuDS Directive for rainwater infiltration, the GBEP developer would have to provide a storage capacity of 70,000 cubic metres of infiltration to contain the surface water run-off from its solar arrays.

The developer has provided very limited capacity, or facilities for rainwater mitigation and has given the flooding risks, or the effects on the water table of adjacent land scant consideration.

Gate Burton Energy Park Environmental Statement Volume 3 Appendix 9-D 'Flood Risk Assessment' makes scant reference to the effect the development will have on the River Till and its tributaries and appears to concentrate mainly on the flood risk to the installation and equipment within the development itself.

The developer's Flood Risk Assessment states:

*'7.2.2 The proposed strategy aims to mimic the natural drainage conditions of the site as much as possible. The proposed solar PV panels will be held above ground individually on narrow diameter piled legs. This prevents sealing the ground with an impermeable surface beneath solar panels allowing rainfall/runoff to infiltrate to ground throughout the Scheme. As a result, it is considered that the Scheme's impermeable area will remain consistent to its pre-development state.'*

This is entirely inaccurate. To maintain the solar arrays and prevent shadows being cast on those behind, accessways are provided which run between the rows of panels and will inevitably become compacted and impermeable due to maintenance traffic.

Also, the area beneath the panels (up to 50% of the development area) will not be available for infiltration of rainfall which will rapidly run off the panels, eroding channels carved by erosion along the 'dripline' of the solar arrays in the impervious soil compacted by maintenance traffic.

The Developer's FRA States:

*'7.2.4 The Scheme will provide minimal alterations to the existing topography and ground conditions on-site. Any excess peak surface water runoff generated within the site boundary will be attenuated onsite before it is infiltrated to ground. Attenuation will be provided in the form of swales and infiltration basins. These features will be strategically located based on existing overland flow routes to capture runoff. Check dams will be placed strategically within swales to optimise their storage potential on steeper slopes. Where the attenuation lies within the solar field, the legs of the solar panel will be extended so that the solar panel lies above any potential flooding.'*

A 'swale' excavated to contain 70,000 litres of water one metre deep would occupy an area of 17.3 acres, which far exceeds any outline proposals for mitigation in the developer's FRA and could hardly be regarded as maintain the existing topography.

The Developer's FRA states:

*'7.2.6 The proposed surface water drainage network has been designed to accommodate runoff from all storms up to and including the 1% AEP +40% for climate change. For an extreme storm event, any exceedance flows that cannot be retained by the proposed attenuation flow overland, following the existing topography, where ultimately, they will be contained within the SuDS features.'*

The proposed surface water drainage is based solely on the infiltration of the land in its current condition and its area of permeability, but again, no account has been taken of the sheltered area beneath the panels, which reduces the direct infiltration area by up to 50% and the concentrated runoff from the panels which will be 'spectacular' under storm conditions and concentrated at the dripline.

Properties along B1241 in Kexby Grange already experience flooding and damage to property on average every 3 years, due to overflowing of the Padmoor Drain under periods of heavy rain, storm and meltwater conditions.

Land drainage from Gate Burton, Cottam, West Burton and Tillbridge Solar 'Parks' all drain into the catchment area of the River Till, which is pumped up into the Fosdyke Navigation Canal at Odder to the west of Saxilby and then flows into the Brayford Pool in the centre of Lincoln.

Under storm conditions, when the water level in the river Witham is high, the Environment Agency and Upper Witham Drainage Board routinely turn off the transfer pumps from the river Till to the Fosdyke Canal to prevent flooding around the Brayford Pool in centre of Lincoln, causing the river Till to overflow its flood banks, inundating farmland and the access roads to the villages of Stow, Sturton by Stow, Bransby and Broxholme.

I have serious concerns about the restriction of access to remote communities by emergency services due to the increased flood risk arising from all four Solar projects.

It is impossible to consider the effects of flooding arising from Gate Burton Energy Park in isolation, since the other 3 Solar Projects are sited on the same water catchment area and will combine to exacerbate an already existing problem of inundation of farmland and roadways to villages downstream of the river Till, where drains back up and water overflows its flood banks.



Example of flooding of Fleets Road, South East of Sturton by Stow, November 2019

High water levels in the River Till also exacerbate flooding problems over 10 miles away, due to rising water levels in drainage dykes delivering into the Till causing a reduction in the hydraulic gradient.

When one considers the storm water runoff from 10 square miles of solar panels delivering onto the catchment area of the River Till, the flooding will be 'spectacular', and no amount of 'mitigation' by the developers will equal that already provided by the soil itself and the existing drainage systems, which have stood the test of time.

Most of the soil on the proposed development areas has a high clay content, which despite its ability to hold moisture and produce high crop yields, becomes saturated during prolonged periods of heavy rain, allowing excess water to shed off more rapidly and directly into the dykes.

Another characteristic of clay soil is its hard, impervious nature when dry, following a drought, when rainwater from a sudden storm will run off faster than it can be absorbed.

The developer's FRA States:

*'7.2.3 It is considered that rainfall will mostly permeate into the ground where it falls, and that any runoff generated within arable fields collects in local low spots where it infiltrates to ground or enters a watercourse as appropriate where the site drainage interacts with one.'*

The developer has failed to understand the hydrodynamics of a concentrated flow of rainwater running off the c.4 metre-high panels onto the confined area of the 'drip line' on the compacted panel maintenance access lanes between the solar arrays, together with the sheltered, 4-metre-wide area directly beneath the panels, covering around half the acreage of the development, not being available for infiltration.

Also, the hydraulic shear force of the fast-moving water will carve its own channels, by erosion, mobilising clay, finely divided particulates, and disturbing natural vegetation, which will negatively affect aquatic invertebrates and the general ecology of the dykes, drains and the River Till.

It is a matter of concern that the Environment Agency and Upper Witham Drainage Board have not also raised their concerns regarding the increased flooding risk, which is patently obvious.

Nowhere in the developer's Flood Assessment is there an estimate of the maximum quantity of surface water running from 1,690 acres of solar panels during periods of high rainfall.

Periods of heavy rain exceeding 50mm falling in a 24-hour period are not unknown in Lincolnshire, which on my estimation would produce around 0.35 million cubic metres of

surface water run off from the panels, much of which would not be absorbed along the drip line of the panels, particularly when the topsoil becomes rapidly saturated.

Even if Defra's 70.000 cubic metre SuDS infiltration capacity formula was applied to the installation, this would be completely inadequate and rapidly exceeded.

In support of my concerns, I hereby attach a copy of my letter to Environment Agency's Director of Operations for Lincolnshire and drone photographs of the flooding which occurred to the southeast of Sturton by Stow in November 2019 and is not an isolated incident.

Roger Jones, CChem, MRSC,

Senior Member of the Water Management Society

Mr Leigh Edlin  
Lincolnshire Operations Director  
Environment Agency  
Searby Road  
Ceres House  
Lincoln  
LN2 4DW

Roger Jones

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[REDACTED]  
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[REDACTED]

30 June 2023

Dear Mr Edlin,

**Re: Flood Risk Arising from Solar Projects Surrounding the River Till and its tributaries.**

Please find enclosed aerial photograph of the flooded roads and farmland when the River Till burst its banks in November 2019, cutting off several villages around Sturton by Stow, together with the areas of agricultural land covered by the Solar Projects for information.

November 2019 was not an isolated incident and flooding is predicted to worsen with extreme climate events in the future.

You will no doubt be aware that during periods of heavy rain, when the River Witham is in spate the Upper Witham Drainage Board shuts down the River Till transfer pumps at Odder, which deliver into the Fosdyke Navigation Canal, allowing the River Till to overflow on to surrounding farmland in order to prevent flooding of the Brayford Pool in the centre of Lincoln

I am extremely concerned that there are three very large Solar Projects (Cottam Solar, Till Bridge Solar and Gate Burton Energy Park) currently being considered by the Planning Inspectorate, all of which are sited on the catchment area of the River Till, which if approved, will result in several thousand acres of farmland being covered with thousands of 4-metre-high glass panels.

During periods of heavy rain, the water running off an estimated 10 square miles of glass panels will run directly onto compacted, low porosity clay soil providing only limited attenuation and allowing direct and spectacular discharge into the water courses of the River Till, exacerbating areas already prone to frequent flooding.

Although these three applications are being considered separately by the Planning Inspectorate, their combined effects on flooding cannot be considered in isolation.

Could you therefore please advise what measures the Environment Agency have taken to prevent the three Solar Installations causing flooding in the catchment area of the River Till.

Yours sincerely,

Roger Jones, CChem, MRSC

Senior Member of the Water Management Society