SUNNICA ENERGY FARM

WRITTEN REPRESENTATION OF DR ANNE Noble, BSc, PhD, FACTS

Summary

As an agronomist with a keen interest in environmental matters I appreciate the need to reduce our carbon footprint and impacts on the global environment. However, I do not believe that taking 2,800 acres of highly productive land, which also supports a number of rare species, out of production for a scheme which will never repay the carbon costs involved is an effective use of land.

The range of crops grown and yields achieved are not consistent with this being low quality land. In my experience this is some of the best and most versatile land we have, and is an irreplaceable asset.

The land ranges from medium soils to lighter, the majority overlying chalk. This gives a diverse range of habitats and, combined with the spring and autumn cropping, an unusual array of bird and plant species. The curlew in particular are extremely rare and this range of habitat has allowed them to breed successfully. The impacts of construction in terms of noise, traffic etc could have a disruptive effect on their success.

The pressures on food sustainability are at odds with the increasing loss of land to housing, infrastructure and various rewilding and carbon sequestration projects. This increases the pressures on the remaining land to produce ever-higher yields. Taking versatile land out of production will result in increased intensification of farming on the remaining land, with increased fertiliser and pesticide use, which would seem contrary to the aim of farming in a more sustainable way.

History

The Sunnica solar farm covers a wide area of farmland in the west of Suffolk and east of Cambridgeshire and surrounds a number of small rural villages. The area has a rich history of agriculture, practising one of the most intensive agricultural regimes in late Medieval England owing to its favourable climate. In contrast to the pasture-dependant west and north the mixed husbandry of the east was biased towards spring grains, in particular barley. Advanced agricultural techniques, effective institutional arrangements and sensitive decision making by manorial reeves made eastern England more productive than any other region in England[1][i].

Land classification

The land proposed for the Sunnica scheme is extremely productive. It grows a range of crops, some of which are only grown in certain geographic areas of the UK where the soils and climate are right. The light, free draining soil allows for early sown crops, which are then harvested early in the year, but also crops such as sugar beet which are usually harvested between Sept and February.

[1] Source History of East Anglian Food

The Agricultural Land Classification was originally devised in 1977 as a Land Use Capability Classification [2]

This system assessed land on:

> its capability under a moderately high level of management and not necessarily its present use
>
> Land which suffers from limitations which can be removed or reduced at acceptable cost is graded on the severity of remaining limitations

From this has come the ALC currently used for land classification which identifies Best and Most Versatile land This guidance specifies that land should be assessed by auger borings at 1 per hectare and by soil pits and analysis to confirm the findings.

The British Society for Soil Science has issued a Guidance Note for Planners:

> This guidance note is written for development planning and control professionals. It will help them evaluate Agricultural Land Classification (ALC) reports submitted in support of a planning application or spatial plan submission in England and Wales.
>
> It is Government policy to protect the nation's 'best and most versatile land' for agricultural production.
>
> The location of such land is determined by use of the Agricultural Land Classification system – the Revised guidelines and criteria for grading the quality of agricultural land (MAFF 1988) [ii]. This interprets information about the underlying soil, landscape and climate to place land in one of several classes according to the severity of limitations on agricultural use. The ALC system (MAFF 1988) is the **only** approved system for grading agricultural land quality in England and Wales. The top three grades (1, 2 and 3a) are the nation's Best and Most Versatile (BMV) land which is recognised by the National Planning Policy Framework [3] (England) and Planning Policy Wales. Where significant development of agricultural land is necessary, local planning authorities are required, where possible, to focus development of agricultural land on areas of poorer quality in order to retain grades 1 to 3a for agricultural production.

This guidance is designed to assist planning officers in assessing the quality of the reports which they see and provides a checklist against which a report can be judged.
If the answer to any of the checklist questions is 'FAIL', then there may be justification in seeking a professional assessment of the report's quality and reliability. ALC surveys can be influential in planning decisions. They can be subject to specialist challenge at any point in time, even years in the future. It is very important reports are assessed thoroughly.

[2] The Soil Survey Land Use Capability Classification D S. Bibby, D. Mackney

[3] https://www.gov.uk/guidance/national-planning-policy-framework Paragraph 170

Background

		YES	NO
1	Is the company / author a specialist in ALC?	PASS	CONCERN
2	Have published soil maps been mentioned 5?	PASS	CONCERN

Climate data

3	Is *interpolated*6 climate data included for the site (esp. Field Capacity Days (FCD), Moisture Deficits (MD) and Maximum grade on climate)?	PASS	FAIL
4	Is the data consistent with that expected for the area?	PASS	FAIL

Site and standalone limitations

5	Have gradients, micro-relief and flooding been considered /acknowledged?	PASS	CONCERN

Soils and interactive limitations

6	Have top soils and subsoils been field surveyed? References to soil pits, auger samples & lab samples should be included.	PASS	FAIL
7	Are the soil types clearly described, including reference to gleying, slowly permeable layers (SPL), soil wetness class (SWC) and drought?	PASS	FAIL
8	Have the reasons for ALC grading been clearly described?	PASS	FAIL
9	Have soil structure and porosity been described?	PASS	CONCERN
10	Have soils been described using Soil Survey Field Handbook (Hodgson19977)?	PASS	CONCERN
11	Have soils been described using Munsell8 soil colour notations?	PASS	CONCERN

Conclusions and references

12	Is there a table clearly showing areas of ALC grades?	PASS	CONCERN
13	Is there a list of references (normally including Soil Survey of England and Wales mapping, the MAFF 1988 ALC guidelines, Munsell soil colour charts and the Soil Survey Field Handbook – Hodgson 1997)?	PASS	CONCERN
14	Have the limitations been justified when concluding the ALC grade(s)on the site?	PASS	FAIL

Schedule of auger borings and soil pits

15	Has a map of auger boring & soil pit locations been included?	PASS	FAIL
16	Have laboratory analyses been included to confirm topsoil particle size distribution?	PASS	CONCERN
17	Has a schedule of auger boring information been provided?	PASS	FAIL
18	Do the auger borings show horizon depths, colours and textures?	PASS	FAIL
19	Do the auger boring records clearly show soil wetness class?	PASS	FAIL
20	Do the auger boring records clearly show topsoil stone content?	PASS	CONCERN
21	Do the auger boring records clearly show depth to gleying and depth to slowly permeable layer (SPL)?	PASS	CONCERN
22	Do the auger boring records clearly show moisture balance (MB) values for drought (Wheat & Potatoes)?	PASS	CONCERN
23	Has detailed soil pit information been provided in the report and do the pit descriptions show horizon depths, colours and textures?	PASS	FAIL
24	Do the soil pits / pit clearly show soil wetness class (WC)?	PASS	FAIL
25	Do the soil pits / pit clearly show moisture balance (MB) values for drought?	PASS	FAIL
26	Do the soil pit / pits clearly show soil structure and porosity in the subsoil?	PASS	CONCERN

The number of pits dug (6) is not adequate for the land area surveyed and they do not appear to have been dug in areas where the grading changes. From the pictures provided in chapter 6.2 appendix 12b these pits were dug as part of the archaeological investigations and were not concurrent with the auger borings. There are only photographs of two of the 6 locations and no map is provided – in itself a FAIL on the BSSS chart. The pits do not show wetness class and, in an area high in Ca no lab analysis has been done. Where chalk and clay levels reach target figures this alone can raise the grade of the soil. Of itself, this casts doubt on the quality of the soil surveys. When soils are known to grow a wide variety of crops care must be taken to ensure BMV land is correctly identified as it is a scarce and irreplaceable resource.

The ADAS survey undertaken previously over a part of the Sunnica site has been downgraded one grade because irrigation was used to increase the grade. However there is no justification shown for changing the entire site and no calculations are shown.

The maps showing the plots of the auger borings seem to have many which lie on headlands, along field boundaries, even on tracks. These auger borings in no way reflect the quality of the soil in the fields.

Since the ALC is circulated to the Councils and other statutory bodies, such as Natural England, who then take it largely at face value as having been done by a professional body, it is imperative that the surveys should be done with complete professionalism and lack of bias towards the applicant who will be paying the surveyors fees. Any doubts raised by failures of the survey according to the BSSS guidelines need to be investigated so the full impact of the scheme can be properly determined.

Food Production

The land as a whole can easily produce over 38,000t of food a year. 15% of the land will produce enough potatoes for 500,000 people per year, and a further 10% will produce enough sugar for those people for a year, producing only enough electricity for 100,000 homes (250,000 people) seems a small return for the loss of land

The UK imports over 45% of its food. Savills report that 69% of our imported food comes from countries with lower environmental scores than the UK, and this figure rises to 77% for fruit, vegetables and cereals. Whilst some of this is seasonal and exotic crops which cannot be grown here, lower standards in some countries means that crops can be produced at less cost than in the UK. At present the UK produces in the region of 54% of the fresh vegetables, 71% of the potatoes and only 16% of the fruit we consume.

> The area proposed for the Sunnica proposal is capable of producing potatoes, onions, carrots, parsnips, sugar beet and cereals. Many crops such as carrots, sugar beet, onions and parsnips prefer lighter soils to grow successfully. In the Anglian region the agrifood industry contributes £34 billion per year
> to the UK's Gross Value Added (GVA), sustains >150,000 jobs and
> provides 18% of national farm-gate output5

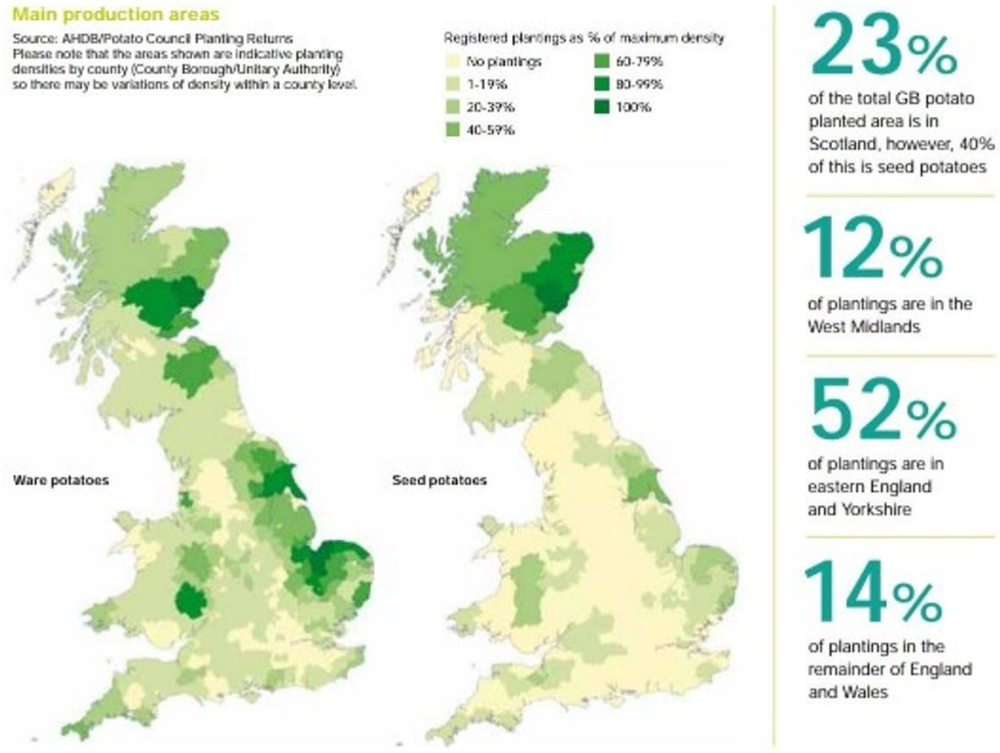
Sugar beet factories are all in the east of England and draw their beet from the area local to each factory, reducing their carbon footprint. Sugar beet are generally planted in March but may not be harvested until the following February, something which is only possible on lighter, free-draining soils. Sugar beet are only irrigated if there is spare water available at the end of the season, it is not economical to irrigate beet routinely.

Figure 1: Sugar Beet factory locations

The light soils also allow carrots to be planted very early under plastic- if these carrots are not available the alternative is to import from Europe, increasing food miles and carbon footprint.

52% of potato plantings are in the East of England and Yorkshire where soils are light and crops can be harvested in September and October. The requirement from supermarkets for clean skinned potatoes means that light soils which can be irrigated to reduce scab, but which also does not stain the potatoes are much in demand.

The pressures of diseases and pests such as potato blight and nematodes mean that potatoes cannot be grown on the same fields year after year as wheat is in some areas, instead they have a 6–7-year rotation with a range of other crops.
Taking land which can be used for growing these crops increases the pressure on the remainder of the soils which are suitable. This may result in reduced rotations with subsequent increases in pest and disease pressures leading to increased pesticide usage – something the government and farmers are trying to reduce.



[4]

Source AHDB [5]

The soil types in the area represent less than 10% of the UK land area and the crop maps show a wide variety of crops grown[6].

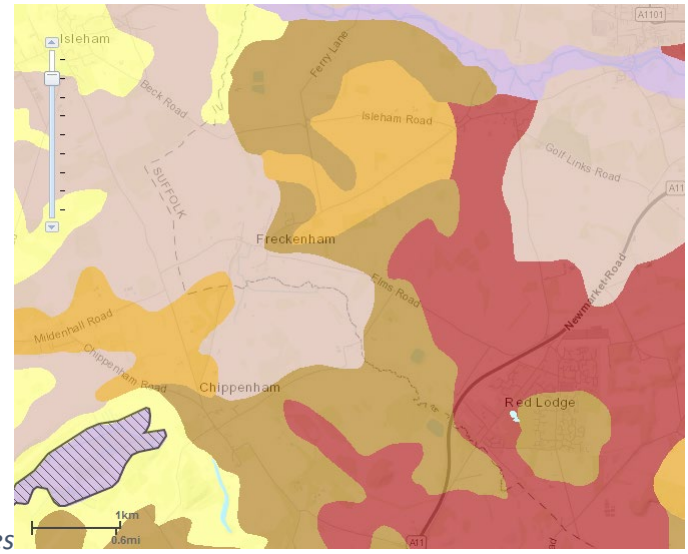


Figure 2 soil types

[4] Savills report agri-food Sustainability June 2022
[5] . AHDB Potato Production
[6] United Kingdom Soil observatory

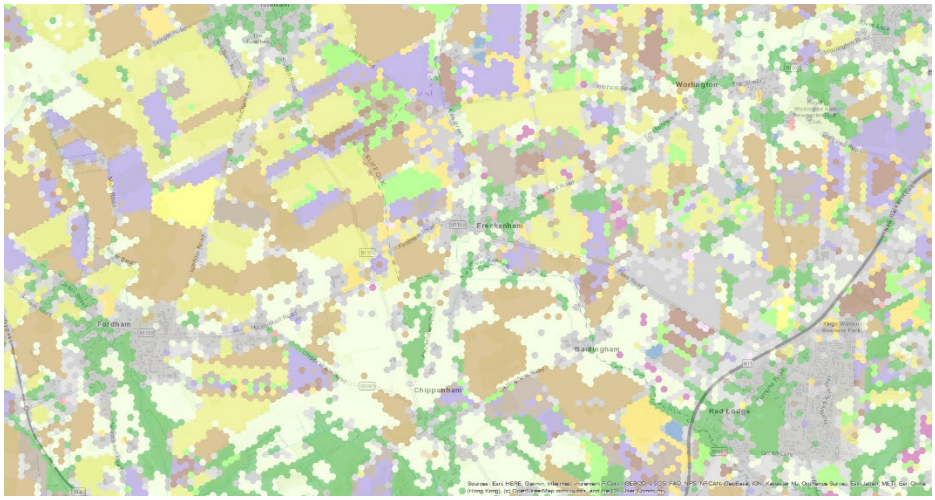
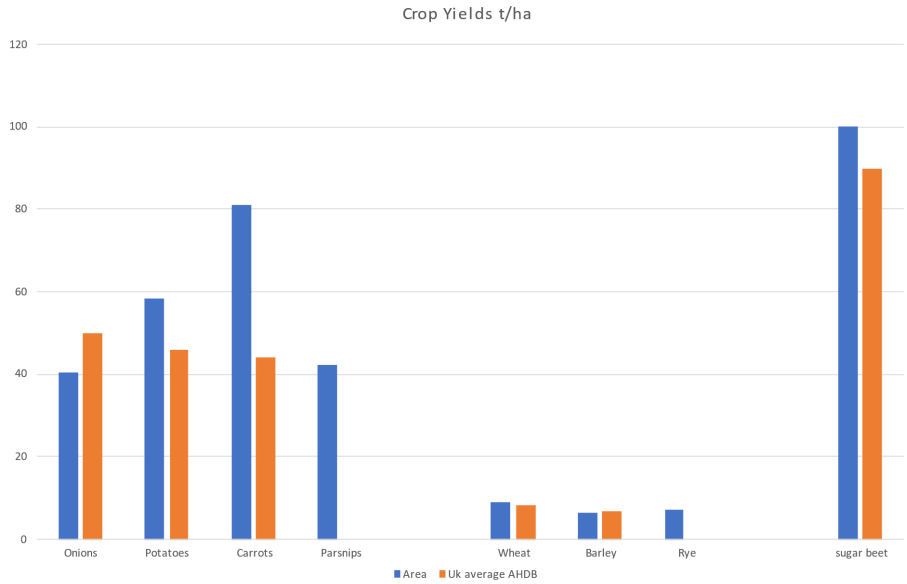


Figure 3 Crop types

This cropping and the yields attained are evidence that the ALC as submitted by Sunnica is substantially incorrect, as detailed in reports from Reading Agricultural Consultants and Patrick Stephenson



Yields of cereals and sugar beet are usually at or above the National Average yields and are very rarely irrigated. Potatoes are irrigated but in the region of 90% of potatoes are irrigated regardless of where they are grown.

Irrigation

Only 0.4% of the UK agricultural land has the facility to irrigate crops (World Bank 2018) and only around 1% of water abstraction in England and Wales is used in irrigated agriculture

Land currently well to moderately suitable for rainfed potato production is projected to decline by 74-95% by the 2050's due to increased droughtiness but 85% of arable land in Eastern and Southern England will be suitable for irrigated production. Relocation of potato growing as a result of climate change will be constrained by water availability.[7]

90% of potatoes grown in the UK have irrigation at specific times of the growth cycle to help reduce disease levels and keep the potato skin free of blemishes. Farmers in this area, with government support and Water Management grants, have built reservoirs which are filled over the winter months, both by rainfall and by abstraction from rivers with licenses granted by the Environment Agency (EA). This winter abstraction can assist the EA controlling water levels in the river and reduce flooding into areas where it causes great damage.

Irrigation technology is now such that soil moisture levels can be carefully monitored and water only applied as required, this is highly accurate use of water.

Climate change is likely to increase our reliance on this winter abstraction for irrigation as foreseen by the Farming Transformation Fund Water Management grant

The relatively flat landscape in eastern England is ideally suited to this system of winter abstraction and irrigation, in areas where the topography is less flat this whole process would not be economic.

Water usage in terms of litres/kg yield for crops is generally considerably lower (sugar beet and vegetables need around 300l/kg whereas meat requires in excess of 4000l/kg)[8]. Grass still has a requirement for water, especially in the establishment phase. Grazing sheep under the panels in a dry year such as 2022 is not going to be possible without water.

This area is particularly valuable as the light free draining soils mean that crops can be planted very early in the year, and sugar beet is harvested right through the winter. This allows local produce firms to source fresh product virtually 12 months of the year.

If crops are not grown here, they could be imported, possibly from areas with a greater water shortage than ourselves and also with less good environmental credentials.

Carrots are 88% water, onions 89% water, potatoes 80% water -importing a lorry of 26t carrots imports nearly 23t water.

Water erosion

The rotation of crops within the Sunnica area is such that land remains bare for the shortest time possible, leading to very little erosion by either water or wind. Crops are generally planted across rather than up/down slopes to reduce erosion. Contrast with Sunnica where panel arrays are running downhill with the concentrated water giving the potential for erosion.

The planting of grasses will not commence until construction is complete and Sunnica have stated the grass will not form a sward covering the ground for 5 years. During this time there is high

[7] Climate change impacts on potato production Cranfield University, Cambridge University Farms, Potato Council

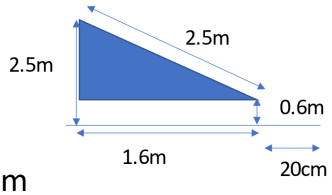
[8] Water Footprint.org

potential for water erosion taking soil plus nitrates and phosphates into adjacent watercourses. This could lead to eutrophication of water and consequently significant adverse effects on water life[9]

By removing the most fertile topsoil [10], erosion reduces soil productivity and, where soils are shallow, may lead to an irreversible loss of natural farmland. Even where soil depth is good, loss of the topsoil is often not conspicuous but nevertheless potentially very damaging. Severe erosion is commonly associated with the development of temporary or permanently eroded channels or gullies that can fragment farmland. The soil removed by runoff from the land, for example during a large storm, accumulates below the eroded areas, in severe cases blocking roadways or drainage channels and inundating buildings [11.]

Water erosion

- Panels 2.5 x 1.3
- 0.6m AGL, max height 2.5m AGL



- Ground coverage 1.6m x 1.3m wide 2.08sqm
- 10mm rain =0.0208cu m water -= 20.8l
- Assuming rain drops off onto 20cm soil you have an area under each panel of 1.3m wide x 20cm = 0.26m2
- So 20.8l water dropping onto 0.26m2 soil
- 769,000 litres equivalent/ha = 77mm rainfall/ha

Biodiversity/ecology

Current nutrient status

The fields have been managed to grow high yields of good quality produce. This is achieved by maintaining good levels of nutrients in the soil. Potatoes need high levels of both phosphate and potash to produce the quality required. These nutrient levels will take a number of years to reduce[12] where soils had been maintained at P index 2 ADAS trials showed it was taking 5-10 years to reduce the P level by 5mg/l despite crops being grown.

Establishment of grass under panels

These high nutrient levels will result in the growth of highly competitive arable weeds, which will necessitate control by either herbicides or regular mowing.

[9] The Reduction and Prevention of Agricultural Diffuse Pollution (England) Regulations 2018

[10] The Reduction and Prevention of Agricultural Diffuse Pollution (England) Regulations 2018

[11] European Soils Data Centre

[12] AHDB REPORT 570 March 2019 Cost-effective Phosphorus Management on UK Arable Farms

The native species of grasses mentioned in the reports are unlikely to establish and form a good habitat in the periods of time assumed by Sunnica.

Establishment of calcareous grassland

Applying a 150mm layer of chalk mixed with topsoil to fields and then planting chalk grassland species is highly unlikely to result in habitat which supports a range of chalk grassland species for many years. Best Practice Guidance for Land Regeneration[13] cites the acceptable lower limit of organic matter as4%. It is doubtful if any of the fields in the proposal will achieve this. There is also a requirement for low levels of phosphate which are also highly unlikely considering the land rotation which includes both pigs and potatoes, on top of high soil base levels.

Acid grassland

Establishment of acid grassland requires a pH of between 4 and 5.5[14] Arable land is maintained at a pH of approximately 6.5 to ensure good yields of crops. The pH will decrease over a period of time, but that is likely to be in excess of five years. While pH can be successfully increased quite rapidly by addition of lime, decreasing pH is more difficult and requires addition of acid forming fertiliser or sulphur, which in itself may create issues in water courses. The application does not include any measures to reduce the pH more rapidly, so it is unlikely the acid grassland would establish successfully in this time.

The length of time required for these grassland areas to establish and create a diversity of habitat is not clear and, taking into account the construction period and potential for dry springs, could easily require 5 years or more. In the meantime, the necessary spraying and mowing to reduce weeds will eliminate some of the rarer plants in cultivated margins present on the site.

Biodiversity Net gain

There is a general lack of information as to the qualifications of the staff undertaking the surveys despite requests to Sunnica for those details. Neither the PEIR nor the submitted DCO documents detail the qualifications, contrary to normal practice. Although the reports were signed off by a small number of qualified staff, we question the adequacy of the reports as substantiated by the ecology expert employed by the SNTS group

The NE metric employed by Sunnica fails to allow for the differences between continuous cereals and a 6–7-year rotation of broad-leaved and monocot crops which allows for a much greater diversity of animal, plant and insect life in and around the field margins. No attempt has been made to factor in these varying effects.

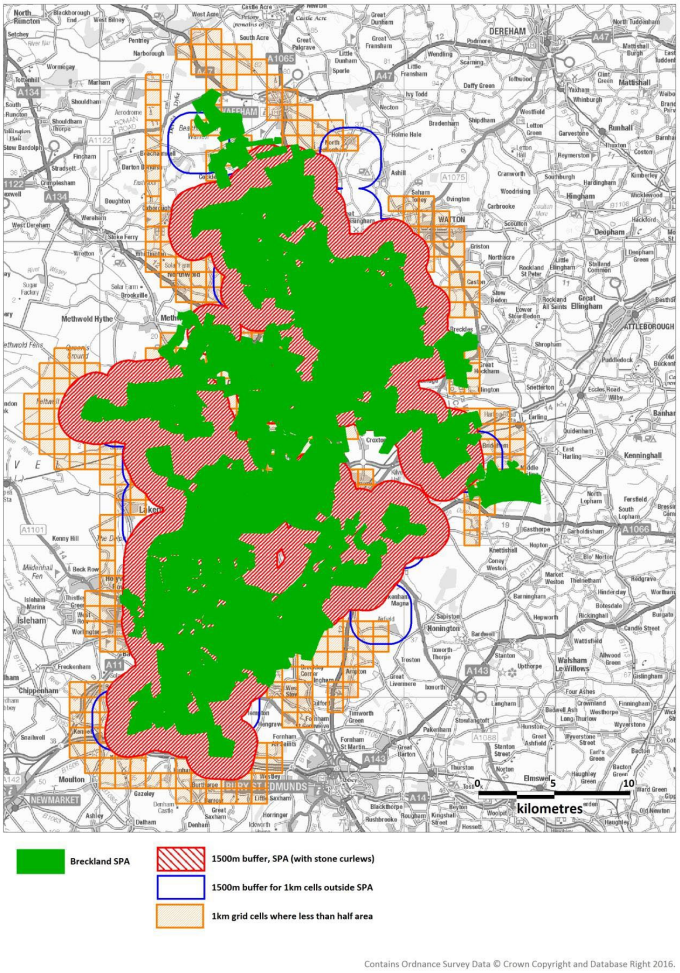
Stone Curlews

[13] Best Practice Guidance for Land Regeneration (https://www.forestresearch.gov.uk/research/best-practice-guidance-for-land-regeneration

The stone curlews should be treated as part of Breckland SPA according to BTO. The Brecks report[14] shows buffer areas close to both Isleham and Worlington. The plots now designated as stone curlew plots are situated in or close to fields of panels, in contrast to the broad open fields and heaths where the birds usually nest.

There seems to be no work cited on the success of plots situated in fields of solar panels. The requirement that these plots are kept relatively free of weeds and ground cover by cultivations and spraying raises the question of how this can be achieved in a practical manner by farm machinery. As there is no information in the DCO as to where in the fields these plots will be sited it is a concern that they will be placed in the most convenient locations for these operations to take place, rather than the most suitable locations the birds.

Map 1: Stone Curlew buffers



Lee Brook

The Lee Brook and the Lark which it flows into are both chalk streams which are now rare worldwide – of the 210 chalk streams in the world 160 are in England. In many places chalk streams are at risk from abstraction for drinking water, industry and agriculture. Although the requirement for irrigation into agriculture is during the spring and summer months, farmers in this region have

[14] Stone Curlews Buffers in the Brecks Durwyn Liley, 21st July 2016

prepared for this by building winter storage reservoirs. These fill naturally from rainfall but farmers are also granted licences to abstract over the winter, particularly when water levels are high and extracting water can reduce the risks of flooding downstream.

The orientation of south facing panels means that, in this area, arrays run downhill. This concentrates rainfall into channels in the soil at the base of the panels, multiplying the effects of the rain

The Reduction and Prevention of Agricultural Diffuse Pollution (England) Regulations 2018 [15] says:

> You must take reasonable precautions to prevent soil loss caused by horticultural and farming activities. Soil loss can lead to erosion and allow pollutants to get into watercourses. Planting headland rows and beds across the base of sloping land, under sowing or sowing a cover crop to stabilise soil after harvest and establishing grass buffer strips in valleys, along contours, slopes, field edges and gateways

There is no mention of erosion in the OLEMP. Grass species will not be sown under the panels until construction is complete, in Sunnica East A this has the potential to cause erosion of nutrient rich soil into the Lee Brook, contrary to Government policy. This can result in eutrophication of the brook and loss of rare species. This may be compounded if the brook is not regularly cleared, but there appears no mention of how this will be achieved in the management plans.

Solar panels offset from Lee Brook by 8m [16] may not leave sufficient area to prevent this erosion or to allow machinery access to clear soil and organic matter from the brook.

The surveys in the area rely on old EA surveys. Rare fish were present in the EA reports and in sampling done in 2020, but no field surveys for fish were carried out by AECOM.

Sunnica West B

With the proximity to Chippenham Fen and Snailwell Poors Fen there is potential for pollution of streams leading into both areas during construction, particularly construction of the underground cable route which requires more invasive techniques and crosses Sunnica West B. The effects of the cabling process on smaller waterways and ditches are not clearly defined. The nature of Fen is such that over winter there are many wet, boggy areas which interconnect with each other and bigger waterways.

Climate change predicts wetter winters and drier summers, with increased likelihood of the extremely heavy localised showers which can result in soil being washed out of fields into roads and into water courses. The low lying nature of both Snailwell and Chippenham Fens must make them more susceptible to this type of pollution which is hard to mitigate against.

[15] https://www.gov.uk/government/publications/farming-rules-for-water-in-england.

[16] EN010106/APP/6.2 1.7.7) https://infrastructure.planninginspectorate.gov.uk/projects/eastern/sunnica-energy-farm/?ipcsection=docs

Great Crested Newt (GCN)

GCN have been recorded on several occasions in gardens in Worlington between the Moat where eDNA was recorded and the redline boundary of the scheme. The presence of young GCN strongly suggests a good breeding colony of newts in the area.

A large ditch deemed ideal for GCN lies between the Moat and the redline boundary and was not recorded in the surveys. Nor were any field surveys done in the area.

Experienced herpetologists have considered this ditch as suitable for GCN and should have been included in the surveys, especially as it is so close to the Moat where eDNA was found.

Icknield way

This historic right of way has many veteran trees which provide both nesting and hunting areas for a range of bats. Loss of any of these trees, and the disturbance during construction is likely to disturb bats.

Trees provide habitats for a wide range of species from animals such as squirrels through to tiny insects. This ecosystem is fragile and, once lost, takes many years to replace- potentially much longer than the lifetime of this scheme. Many of these trees are very slow growing and the compaction of the soil by machinery will make their re-establishment extremely difficult.

The removal of trees and hedges under other circumstances would simply not be allowed. It can in no way be justified because it allows a solar scheme with no green credentials to go ahead.

Conclusions

The need for green energy is accepted but proposals such as Sunnica should be well-designed and minimise harm to the environment and people living in it.

Sunnica will cause the loss of over 1000ha of prime agricultural land, at a time when Food Sustainability is a major consideration and versatile land is at a premium.

It will create harm to the flora and fauna in the area, including protected red-listed species.

The Cranfield report on the carbon footprint of the proposal shows that the scheme will never be carbon neutral, in fact it will emit carbon.