Application for DCO by FOSSE GREEN
Representation by Interested Party reference [redacted]
Deadline 3

A Comments on REP2-030 Applicant's response to Written Representations

1.The Applicant has repeated the same comments against a number of relevant representations. Rather than referencing each of the many instances where the same response has been given by the Applicant, I am selecting one example against which I am making comments in reply.

Table 6-1 Applicant's response to members of the public
Landscape and Visual – Hedgerows page 212

2.1 Applicant's response

In response to the assertion that there is lack of clarity and consistency in the documentation regarding hedgerow removal, the Applicant refers to Fig 3-17 Maximum Vegetation Removal Plan (AS-029) and paragraph 3.2.2 of the Biodiversity Net Gain Report (APP-194) which states that 3.48 km of hedgerow habitat will be lost as a result of the proposed development.

2.2 Comments in reply

2.2.1 The Applicant's response to ExQ1 ENC.1.22 (REP2-029) (page 62) is that "the areas of hedgerow removal set out in the Hedgerow Removal Plan (AS-112) aligns with Figure 3-17 Maximum Vegetation Removal Plan (AS-029)" to "deliver a realistic assessment of tree/hedgerow impacts based on available information". The Maximum Vegetation Removal Plan identifies Vegetation Removal Areas but does not identify as a separate legend, lengths of hedgerow which are proposed to be removed, instead some of the areas of Vegetation Removal includes lengths of hedgerow which are to be removed. These lengths of hedgerow are then transposed to the Hedgerow Removal Plan (AS-112).

2.2.2 The draft DCO (REP2-005) defines "hedgerow plans" (Article 2 (1)) as the plans identified in the table at Schedule 12. Schedule 12 identifies those plans as EN010154/APP/2.9 which is the Hedgerow Removal Plan (AS-112). There is a general power in Article 39(4) of the draft DCO to remove hedgerows within the Order limits and Article 39(5) specifically authorises the removal of hedgerows identified in column 2 of the table in Schedule 11 and shown on the Hedgerow Removal Plan (AS-112). Schedule 11 of the draft DCO headed "Hedgerows to be removed" contains 4 Parts, each listing the lengths of hedgerows to be removed as identified on the Hedgerow Removal Plan (AS-112). The total lengths of hedgerow identified in Schedule 11 amount to 1.985 km.

2.2.3 Paragraph 3.2.2 of the Biodiversity Net Gain Report (APP-194) states that 3.48km of hedgerow habitat is to be removed. There is no reference to any plan. The figure of 3.48km is inconsistent with figure of 1.985 km of hedgerow removal identified in the draft DCO.

Where are the additional 1.5km of hedgerow to be removed and why are these lengths not shown on the Hedgerow Removal Plan (AS-112) and listed in the draft DCO (REP2-005)?

Table 6-1 Applicant's response to members of the public
Socio-Economics and Land Use – Loss of BMV land page 215

3.1 Applicant's response

-There is not 20 ha or more land permanently sealed.
-The 4.6 ha is acknowledged to be permanently lost as it relates to permanent planting that would be left in place on decommissioning. It could still revert back to farmland thereafter.
- The solar stations, BESS compound and Onsite Substation will include concrete pads, therefore sealing the ground, within gravel compounds. The swales and access tracks will be crushed stone or gravel and able to drain, therefore not sealed.
- The concreted areas would be removed on decommissioning.

3.2 Comments in reply

3.2.1 Paragraph 2.4.5 of my REP1-106 sets out my calculations of the land which will be permanently lost (updated in the light of further information supplied by the Applicant at Deadline 2):-

- **4.6 ha** of permanent planting. This figure is taken from paragraph 12.7.44 of Chapter 12 (AS-016).

-**9 ha** of 100 solar stations (0.09 ha each Table 3-3 Chapter 3 APP-028).

-**6.82 ha** BESS compound. This figure is taken from the Applicant's Response to Written Representations at Deadline 1 -North Kesteven District Council (REP2-030) Scheme Design page 119.

-**1.63** ha Onsite substation (155m x 105 m). These measurements are taken from paragraph 3.3.49 of Chapter 3 APP-028.

- **5.7** ha Access Tracks. This figure is taken from the table as part of the Applicant's Response to Written Representations at Deadline 1-North Kesteven District Council (REP2-030) Scheme Design page 119.

- The impermeable swales constructed on three sides of each of the 100 Solar Station Compounds as set out in the Framework Surface Water Drainage Strategy (APP-147) and illustrated on the plan at Annex C to the strategy. The swales will be 6m wide, the total area across the Principal Site is not stated. There will also be a lined impermeable sustainable drainage system and attenuation swale in connection with the centralised BESS (paragraph 4.5.5 of the FBSMP (REP1-041).

Excluding the swales, the areas referred to above which are permanently lost would total 27.75 ha.

3.2.2 The Applicant seeks to suggest that as the swales are free draining, they are not permanently sealed. However, paragraph 4.5.5 of the FBSMP (REP1-041) makes it clear that the swale around the centralised BESS will be impermeably lined. Paragraph 9.6.58 of Chapter 9 Water Environment (APP-034) states that the swales around the BESS areas (for both distributed and centralised BESS areas) and onsite substation area would be lined with an impermeable membrane or barrier to prevent any pollution entering the ground. These areas are not free draining as the Applicant asserts and will be permanently sealed.

3.3.3 The Applicant argues that the access tracks will be crushed stone or gravel, able to drain and therefore not permanently sealed. The Mallard Pass DCO was promoted by the Applicant. Paragraph 12.4.16 of Chapter 12 Land Use and Soils (APP-042) acknowledged that the areas of access tracks and solar stations would be treated as permanently sealed over. It was accepted in paragraph 12.4.20 that even though the outline Decommissioning and Environmental Management Plan required the solar station and tracks to be restored to agricultural use at the end of the operational phase, "it is assumed that restoration may not be back to comparable quality, at least initially, following decommissioning". The onsite substation (Table 12-5 refers) was also considered as permanently sealed over for the same reasons as the access tracks and solar stations. Why has the Applicant changed its approach to the question of permanent sealing?

Table 6-1 Applicant's response to members of the public
Socio-Economics and Land Use – Cumulative Impacts page 220

4.1 Applicant's response

In response to REP1-106 the Applicant admits that it has in error omitted reference to the Brant BESS Scheme in paragraph 12.10.5 of Chapter 12 Socio-Economics and Land Use (APP-040), the list of 25 cumulative schemes that were taken into account in assessing cumulative impacts in that chapter, but that the scheme was considered as part of the assessment.

The Applicant considers that the Screening Opinion 23/0584/EIASCR and Scoping Opinion 23/0390/EIASCO for a 400 MW BESS on the north side of Green Man Road, Navenby, which were omitted from the list of 25 cumulative schemes in paragraph 12.10.5 of Chapter 12 Socio-Economics and Land Use (APP-040) are for the Navenby BESS scheme which is subject to planning application 25/0491/FUL which is included in paragraph 12.10.5.

4.2 Comments in reply

4.2.1 Paragraph 12.10.5 of Chapter 12 Socio-Economics and Land Use (APP-040) sets out a list of 25 schemes taken from the short list of developments and which were taken into account in assessing the cumulative impact of other developments on the proposed development in that chapter. Whilst the Brant BESS Scheme was listed in the shortlisted developments in Chapter 15 and shown on Figure 15-2, it was specifically not included in the final list of 25 schemes which were included in the cumulative assessment in Chapter 12. It is not correct therefore that the Applicant has scoped the Brant BESS scheme into the

assessment and as the Applicant admits it should have been included, the assessment is therefore defective.

4.2.2 The Screening Opinion 23/0584/EIASCR and Scoping Opinion 23/0584/EIASCO for a 400MW BESS on the north side of Green Man Road, Navenby do not form part of the planning application 25/491/FUL for the proposed BESS on the south side of Green Man Road, Navenby and cannot be said to be part of the Navenby BESS scheme. Whilst the Applicant may be relying on the Screening and Scoping Opinions to support their planning application for the proposed BESS on the south side of Green Man Road, the Screening and Scoping Opinions relate to a different site. At the public consultation event on 13 November 2024 in relation to the proposed BESS on the south side of Green Man Road, the Applicant stated that it could pursue a planning application for one or both of the sites either side of Green Man Road. Both sites should have been separately included in the list of developments in paragraph 12.10.5 of Chapter 12 (APP-040).

Table 6-1 Applicant's response to members of the public
Traffic and Transport – Response to REP1-106 page 229

5.1 The Applicant's response

In response to my submission at REP1-106 the Applicant refers to HGV routing through Harmston and the conclusion in Chapter 13 Traffic and Transport (APP-038) that the proposed development will not result in any significant effects, a view which is endorsed by paragraph 11.18 of the LIR from LCC (REP1-053).

5.2 Comments in reply

Haddington

5.2.1 My REP1-106 submission did not mention Harmston. Part of the submission related to the inconsistency between the HGV Routing Plan which shows HGVs being routed through Haddington (Fig 13-4 AS-072) and the Applicant's statement that no HGVs will pass through the village (paragraph 13.4.67 of Chapter 13 APP-038). Although the Applicant has failed to address this point in its response to my submission, the same point was raised by ExAQ1. The Applicant responded at TT.1.05 (REP2-029 page 96) by acknowledging that the reference in paragraph 13.4.67 of Chapter 13 to there being no HGVs being routed through Haddington was an error and that it is expected that there would be 84 daily HGV movements (42 in each direction) through Haddington.

5.2.2 The figure of 84 daily HGV movements through Haddington is inconsistent with the figures given by the Applicant in Chapter 13 in relation to the local link receptor L11 which is the relevant receptor for Haddington village. It covers South Hykeham Road and Butts Lane as shown on the plan below:-

Map showing the village of Haddington

5.2.3 Table 13-26 of Chapter 13 (APP-038) sets out the construction traffic impact at L11 over a 12 hour weekday. This shows that there will be 288 additional vehicle movements at L11 over a 12 hour weekday as a result of the proposed development over and above the future baseline figure of a total of 5092 vehicles. Appendix 13-D Receptor Traffic Flow Tables (APP-166) shows that of the 288 additional vehicle movements, 109 will be HGV (not the 84 stated by the Applicant in its response to ExA Q1) and 179 will be LGV.

5.2.4 Table 13-14 Collision Data Summary of Chapter 13 shows that there has been 1 serious collision at Butts Lane and 2 slight and 2 serious collisions at the junction of Butts Lane with Haddington Lane between 2018 and 2023.

5.2.5 Table 13-38 of Chapter 13 is the Receptor Assessment for Road Safety. L11 is listed as High Initial Magnitude although this has been downgraded to Low. Paragraph 13.7.55 of Chapter 13 refers to the IEMA Guidelines which suggest that receptors which record an increase of 30% or above in total traffic or of 10% or above in HGV flows should be analysed on a case by case basis to determine whether their magnitude should be rated low, medium or high. Paragraph 13.7.56 of Chapter 13 explains that the “high” magnitudes were as a result low HGV flows in the baseline period and have therefore been downgraded. No other factors appear to have been taken into account when making this determination.

5.2.6 I would request that the assessment of the magnitude of impact for L11 as low for Road Safety be reviewed in the light of the following:-
- There have been 3 serious and 2 slight recorded collisions along the length of road.
- There is frequently a speed camera on Butts Lane suggesting that the excessive speed of vehicles along this stretch of road is of concern.
- The road has a sharp corner at the junction of Butts Lane with South Hykeham Road
- The addition of 78 HGV movements as a result of the proposed development during peak hours of 7.00 am -8.00am and 6.00pm- 7.00pm each day along this stretch of road will increase the likelihood of further collisions.

Clay Lane, Bassingham

5.2.7 The Applicant has not responded to my submission at REP1-106 (paragraph 6.2) concerning the unsuitability of Clay Lane, Bassingham for the projected level of vehicle movement during construction. There are two proposed access points C-011 and C-012 on Clay Lane, a narrow single track country lane with passing places. The impact of the use of Clay Lane (L18) by construction traffic is shown on Table 13-26 of Chapter 13 Traffic and Transport (APP-038). During a 12 hour weekday there will be an additional 506 vehicle movements, an increase of 489% over future baseline travel flows.

5.2.8 Table 13-28 of Chapter 13 assesses the sensitivity of L18 Clay Lane for Severance, Pedestrian Delay, Non-motorised User Amenity and Fear and Intimidation and has been given a "Very Low" score as Clay Lane is described as being in a rural setting with no pedestrian or cycle facilities. Given that Clay Lane is part of the Stepping Out Walks network, whilst there may not be specific facilities for cyclists or pedestrians, it should be acknowledged that Clay Lane is used extensively by walkers and cyclists and the sensitivity score should be upgraded accordingly.

5.2.9 Table 13-36 of Chapter 13 is the Receptor assessment for Non-Motorised User Amenity. Despite the IEMA guidelines that 100% increase in total traffic flows would result in substantial changes to magnitude, the Initial Magnitude score has been adjusted from High to Medium in relation to L18 Clay Lane. Paragraph 13.7.45 states that the high magnitude is caused by very low baseline traffic flow figures. The justification for the downgrading is discussed in paragraph 13.4.23 where a "movement rule" has been applied where fewer than 600 vehicles use the receptor over 12 hours, equating to fewer than one vehicle per minute. This departure from the IEMA guidelines is an arbitrary device created by the Applicant as a means of avoiding the inevitable resultant impact of major significance on such receptors.

5.2.10 The 489% increase in baseline traffic flows along Clay Lane, resulting in an additional 506 vehicle movements per day along a narrow country track, must surely not justify a downgrading of the magnitude from High to Medium? Assuming that the sensitivity score as set out on paragraph 5.2.8 above is also adjusted to High, this should result in a Major significance of impact.

Number of construction workers vehicles

5.2.11 Table 13-22 of Chapter 13 shows that here will be 600 construction workers, of which an estimated 208 will be driving their own vehicles, generating at least 416 vehicle movements over a 12 hour weekday. The assumption that 45% of construction workers will drive their own vehicles (and the remainder would travel by shuttle bus) is based on similar percentages used in the Gate Burton solar scheme. Paragraph 13.6.14 of Chapter 13 Transport and Access (REP4-012) of the Gate Burton DCO states that 45% of construction staff will travel by private vehicle. No justification for this figure is given. In the Cottam DCO, paragraph 14.7.13 of Chapter 14 (APP-049) states that it is assumed that 50% of workers will arrive by shuttle bus as they are non-local workers who will stay in local accommodation. The figure is justified as being similar to other DCO applications such as Longfields Solar. In

paragraph 13.3.4 (h) of Chapter 13 Transport and Access (APP-046) of Longfields Solar DCO it was estimated that 45% of the workforce would be sourced locally and 55% likely to be non-local and therefore travel by shuttle bus. There seems to be no evidential basis for the guestimates used in these solar DCOs for the number of non-local workers who would travel by shuttlebus.

Table 6-1 Applicant's response to members of the public
Ecology and Nature Conservation – Impact on Bats page 242

6.1 Applicant's response

The Applicant's assessment identified no significant adverse impacts on ecological receptors as a result of the proposed development. Significant benefits will be established during operation on various habitat types e.g new hedgerow planting will increase connectivity for species such as bats. Mitigation will increase the diversity of flora and provide new habitat niches to encourage fauna such as invertebrates and birds.

6.2 Comments in reply

6.2.1 The Applicant's reiteration that it has carried out an assessment that has identified no adverse impact on bats as a result of the proposed development does not deal with the issues set out in my REP1-106 about:-
(1) the failure of the assessment to consider the impact of noise, lighting and habitat fragmentation in the light of research papers that have apparently not been read by the Applicant,
(2) the post-development monitoring by the Welsh Government on large-scale developments in the Gwent levels which show that biodiversity mitigation strategies have failed,
(3) the proposed destruction of 3.48 km of hedgerow which provides commuting routes for bats (paragraph 3.2.2 Biodiversity Net Gain Report (APP-194)), (although see my comments in paragraph 2 above as this figure is inconsistent with the 1.985 km for hedgerow removal set out in the draft DCO),
(4) the presence of an assemblage of bat species of national importance, and
(5) the recent research showing that bats are negatively affected by solar arrays and the reasons for this are not understood.

6.2.2 In the response to ExAQ1 ENC1.08 about the extent and adequacy of the mitigation measures proposed in Table 8-13 of Chapter 8 "Summary of embedded avoidance and mitigation measures" (APP-033), Natural England replied that they have "not reviewed in detail all of the avoidance and mitigation measures proposed to avoid impacts to protected species" (REP2-052). It is disappointing that a public body whose role is to protect the natural world, has failed to properly consider the impact of the proposed development on our flora and fauna.

B Comments on REP2-029 Applicant's response to ExAQ1

GC.1.01 General and Cross-topic questions-Grid Connection Offer

7.1 The Applicant's response

The Applicant awaits "confirmation from NESO of its confirmed connection date for the solar (expected to be issued no later than the end of Q3 2026)" ie September 2026.

7.2 Comments in reply

7.2.1 If, as the Applicant repeatedly asserts (ISH1 ENV2-003 at 31:24 and REP1-046), NESO has already confirmed a connection date, how can NESO confirm in September what has apparently already been confirmed by them? The fact is that Applicant has not received a "confirmed" connection date as I set out in my submission at REP2-032, more likely an informal non-binding indication of the Gate 2 connection.

7.2.2 The expected confirmation date of the Gate 2 Phase 2 offers has recently been further delayed by NESO well beyond the close of the examination and the timeframes are now:-
Gate 2 Phase 2 transmission and large embedded offers-between early September 2026 and mid-January 2027
Gate 2 Phase 2 distribution offers- between mid-October 2027 and mid-March 2027.
(NESO website "Connections reform Timeline Update 13 February 2026" accessed online 19 February 2026)

GC.1.14 General and Cross-topic questions-Implications if the Navenby Substation is not consented

8.1 The Applicant's response

Under the commercial agreement between the Applicant and NGET, should no new substation at Navenby be available, it would fall to NGET to find an alternative point of connection for the proposed development.

8.2 Comments in Reply

In response to the same question by NGET (REP2-051), the existence of any obligation by NGET to provide an alternate point of connection is not acknowledged. NGET state that the deliverability of the proposed solar farm would, in those circumstances, be a matter for the Applicant to clarify.

FS.1.09 Restoration of solar farms to productive farmland

9.1 The Applicant's response

-The Applicant is not aware of any solar farms that have been restored to its original ALC classification but suggest that an analogy can be drawn with the restoration of soils post construction in relation to projects to install cabling. An example cited by the Applicant is the 57 km of cables laid in connection with the Triton Knoll off shore wind farm.
-The Applicant refers to the Lancaster University study which considered that "solar farms can be designed and managed to deliver positive plant and soil outcomes".

9.2 Comments in reply

9.2.1 The Triton Knoll Electrical System Order 2016 provided the infrastructure to connect the offshore windfarm to the National Grid substation at Bicker Fen. The DCO provided for the appointment of an Agricultural Liaison Officer (ALO) to oversee the re-instatement of the agricultural land over which the cable passed. The ALO (pers. comm.) has explained that the 57km linear cable corridor was approximately 30m wide; the excavated soils were stored on site for a maximum of 3.5 years until the cable trench was backfilled with the stored soils; that during this time the soil structure of the stored soils inevitably deteriorated; that the land would have a loss of crop yield for 2-3 years after the land was restored; that any existing land drainage pipes would be "wrecked" by the trench excavation.

9.2.2 I suggest that whilst the example of the Triton Knoll cable project may be analogous to the cable laying along the proposed cable corridor as part of the proposed development during construction, it bears no relation to the work that is proposed on the principal site either at construction or decommissioning:-
- The construction work on the principal site will involve the whole of each solar field being extensively excavated rather than a 30m cable corridor running across the field where the remainder of the field is left undisturbed.
- We only have the experience of the construction phase of the Triton Knoll project. This does not provide any experience of how agricultural soils might respond on decommissioning after 60 years of operation when the soil has been compacted by, for example, maintenance vehicles. Nor is there any experience of returning the soil to its former ALC condition after the attempt to remove cabling and the 200,000-300,000 piles in the ground which are likely to have corroded by then.

9.2.3 The Applicant repeatedly refers to the research by Lancaster University as authority for the proposition that solar farms can deliver positive soil outcomes (ISH1 on 7 January 2026 (Session 5) (ENV2-011) (1:35:56 to 1:36:46). I refer to my response to this point in my REP1-106. The Lancaster University research into 32 solar farms concluded that reduction in solar radiation and changes to microclimate caused by solar panels may be driving lower plant productivity and growth and called for further research to investigate the impact of solar farms on wider biodiversity eg invertebrates, birds and mammals and the effects of BESS on soils.

9.2.4 The Applicant said that the 2025 Lancaster University report recognises that solar farms can be designed and managed to deliver positive soil outcomes. However, this is heavily caveated in a further paper by the same author entitled "Enhancing soil carbon in solar farms through active land management: a systematic review of the available evidence" by Fabio Carvalho *et al* in Environmental Research: Ecology Vol 3 Number 4 published 11 November 2024. The paper was based on a review of the available academic literature and suggested that improvement in grassland management could lead to increased soil carbon stocks but that soil carbon responses are highly context-dependent. In addition, soil properties can be slow to respond to changes in management practices following land use conversion.

FS.1.11 Framework Soil Management Plan

10.1 The Applicant's Response

The detailed SMP would provide the details of the approach to managing soils during construction, operation and decommissioning. The request by the ExA goes beyond the purpose of a framework management plan and is requiring more detail than has been necessary in previous made DCOs.

10.2 Comments in reply

The FSMP (REP1-037) only deals with soil management during construction, there is no mention of operation or decommissioning. (This is despite the FDEMP (REP2-017) stating in Section 3-8 (page 34) that the FSMP details threats to soil resources during decommissioning). Other made DCOs have detailed outline soil management plans that include sections on operation and decommissioning, for example the Applicant's own Outline Soil Management Plan in the Mallard Pass DCO (REP6-16) which runs to 52 pages with illustrations of the machinery to be used. This also advises at paragraph 4.28 that soil which has been removed should be replaced in the same area, not sold off-site as the Applicant proposes for Fosse Green. Similarly, the Springwell DCO Outline Soil Management Plan (REP3-042) contains 46 pages including sections on operation and decommissioning. Helios DCO Outline Resource Management Plan (REP2-011) contains 54 pages with separate sections on operation and decommissioning. The FSMP should provide similar details to those provided in these DCOs.

FS.1.14 Framework Soil Management Plan- restoration

11.1 The Applicant's response

The Applicant has updated the FSMP (REP1-037) to include a commitment to restoring the cable corridor to its current ALC grade.

11.2 Comments in reply

The Applicant has not given a similar commitment in the FSMP to restore the soils within the principal site to their current ALC condition. In response to Natural England's comments

that a commitment should be made to return **all** agricultural land to its current ALC grade following decommissioning, the Applicant responded that the FSMP "contains industry standard good practice measures to reduce impacts on soil which will ensure that the ALC grade will be unaltered through operation and decommissioning of the proposed development". (Table 12-2 page 12-15 of Chapter 12 Socio Economics and Land Use (APP-037). If the Applicant is so confident that the current ALC grades of the soils within the principal site can be restored on decommissioning, there should be no reason why the commitment in the FSMP to restore the soils within the cable corridor cannot be extended to the soils within the principal site on decommissioning.

WE.1.05 Assessment of Effects- water run-off, operational phase

12.1 The Applicant's response

In response to the ExA question about evidence demonstrating that the Applicant's proposal to plant native grass and wildflower would manage the runoff from the solar panels, the Applicant refers to sources "that support the view that solar panels have a minimal impact on field runoff when compared to existing conditions".

12.2 Comments in reply

12.2.1 The Applicant refers to the research paper by Cook D.D and McCuen R H (2013) "Hydrologic Response of Solar Farms" in Journal of Hydrologic Engineering 18(5) 528-543 which the Applicant states concluded that the increase in peak runoff of approximately 0.31% represents a non-significant impact when appropriate boundary features and vegetation management are in place.

12.2.2 The study was based on modelling created to simulate storm-water runoff over a land surface without panels and then with solar panels added. Various sensitivity analyses were conducted including changing the storm duration and volume, soil type, ground slope, panel angle and ground cover. When the land cover type was changed under the panels with the spacer section left as patchy grass or bare ground, the volume of the runoff increased significantly and the peak discharge increased by 100%. The potential for erosion of the soil at the base of the solar panels was studied. The kinetic energy of the water draining from the solar panel could be ten times greater than the rainfall. The study concluded that "it is very possible that the soil below the base of the solar panel could erode owing to the concentrated flow of water off the panel, especially if it is bare ground in the spacer section. Thus a good, well-maintained grass cover beneath the panels and in the spacer section is highly recommended".

12.2.3 In Yavari R *et al* (2022) "Minimizing environmental impacts of solar farms: a review of current science on landscape hydrology and guidance on stormwater management" (Environmental Research Infrastructure and Sustainability 2 (2022) 032002), the Cook and Mc Cuen paper was reviewed and it was noted that there was no available study that directly evaluated runoff generation on solar farms through field measurement. It went on to say "Thus, we are still lacking critical insight into whether solar farms change runoff

generation and whether existing site and stormwater management practices are adequate to prevent adverse impacts. As a result, existing hydrologic models of solar farms are largely uncalibrated".

12.2.4 The Applicant refers to Baiamonte G *et al* (2023) Impact of solar panels on run off generation process In Hydrological Processes Vol 37, Issue 12 and says that it concludes that "to prevent erosion and compaction, a grass cover beneath the panels and in the interspace between the panels is highly recommended" This research was also based on modelling, using a rainwater simulator to measure runoff by assuming different panel arrangements. Results were compared to a control reference of the same plot with no panels (bare soil). The study showed that solar panels increased the peak discharge by about 11 times compared to the control plot. The study did not either use modelling or field data to measure the impact of the increased discharge of water on the presence of vegetation so it is of limited value.

12.2.5 The Applicant refers to research from Pennsylvania University in 2023 which found that the presence of well-established vegetation, prevented any significant changes in runoff characteristics. The Applicant has not provided a reference for this research. The only relevant paper I have been able to find that was published in 2023 by Pennsylvania University was a short article dated 15 February 2023 by Mc Phillips *et al* entitled "Maximizing hydrological and environmental benefits of solar farms". The article concerns the control of stormwater and refers to vegetation in the context of being "critical to helping stormwater slow down and soak into the ground", concluding that there is almost no research as to whether solar farms lead to net increases in stormwater runoff.

12.2.6 There is research by the same author in 2024 which the Applicant may be referencing. McPhillips *et al* "Quantifying soil moisture and evapotranspiration heterogeneity within a solar farm" In Journal of Hydrology Vol 638 July 2024. The research considered the implications for stormwater management practices in a study of two small solar farms in Pennsylvania, one 2.6 ha, the other 7 ha. The field study, which did not investigate the impact of vegetation, showed that the dripline of the solar panels was the area with the highest moisture and greatest incidence of saturation and pointed to the need for some engineered structural stormwater management.

12.2.7 The Applicant refers to the Building Research Establishment (BRE) (2014) Agricultural Good Practice Guidance for Solar Farms Ed. J Scurlock which "supports the idea that solar farms, particularly those with vegetation maintained underneath the panels, have minimal impacts on runoff". I can find no reference in the guidance to the impacts of water runoff from solar panels, the guidance is about the management of livestock on solar farms.

12.2.8 The Applicant refers to the Welsh Government (2020) Soil policy evidence programme 2020/21 "The Impact of solar photovoltaic (PV) sites on agricultural soils and land" which the Applicant says identified that rivulets and compaction are in general due to poor soil management. The Welsh Government 2020/21 Soil Policy Evidence Programme included four work packages specifically considering the impact of solar photovoltaic sites on agricultural soils and land. Work package 1 was a literature review, Work package 2 was

the development and history of solar PV sites, Work package 3 was a review of solar PV site impacts on land and soil and Work package 4 was the summary.

12.2.9 In Work Package 3 dated March 2023 (paragraph 2.4.4) the impacts on soils during the operational phase are discussed and states “there is likely to be some instances of run-off from solar panels, which could result in the compaction of soils at the base of the panels. Over time rivulets can form along the trailing edge of the panels with potential risk of soil erosion creating rills and gullies.”

Figure 6 Channels created by panel runoff within 12 months of site operation commencing (Welsh Government (2020) Soil policy evidence programme 2020/21 “The Impact of solar photovoltaic (PV) sites on agricultural soils and land”)

12.2.10 The summary in Work Programme 4 concludes that “the key impact of solar PV sites on land and soil may be caused by compaction leading to soil structural damage” and that “the reversibility of soil compaction may take many years and in some cases compaction may be permanent”. It was acknowledged that there are gaps in evidence, knowledge and experience about recovery times of soil characteristics following compaction, the extent and depth of soil compaction, interactions between the soil and piles/beams, corrosion of the piles/beams and soil contamination from the piles/beams.

12.2.11 In conclusion, the Applicant’s assertion that cited sources “support the view that solar panels have a minimal impact on field runoff when compared to existing conditions” is not a true reflection of the research which the Applicant has quoted. The research by Cook and McCuen (2013) and Baiamonte (2023) was based on modelling and not empirical evidence from field measurement. The studies did not either use modelling or field data to measure the impact of the increased discharge of water on the presence of vegetation so they are of limited assistance. The Building Research Establishment (BRE) (2014) paper has nothing to do with water runoff. The Welsh Government Soil Policy Evidence Programme illustrates that run-off from solar panels can cause soil erosion and compaction which may be permanent.