

**WRITTEN REPRESENTATION FOR
SPR EA1N and EA2 PROJECTS (DEADLINE 1)**



FLOOD RISK

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Summary

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Upton House
Market Street
Charlbury
Oxfordshire, OX7 3PJ
United Kingdom
tel +44 (0)1608 810374
fax +44 (0)1608 810093
e-mail info@gwp.uk.com
www.gwp.uk.com

**REPORT ON FLOOD RISK IMPACT OF SCOTTISH POWER
RENEWABLES EAST ANGLIA OFFSHORE WINDFARM ON
FRISTON VILLAGE**

For

SUBSTATION ACTION SAVE EAST SUFFOLK (SASES)

October 2020

Report Title: Report on Flood Risk Impact of Scottish Power Renewables East Anglia Offshore Windfarm on Friston Village

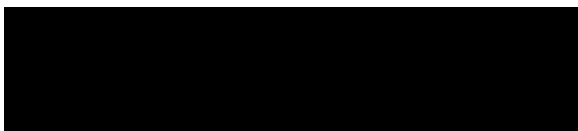
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DRAWINGS

Drawing Number	Drawing Title	Version
SASESFRA2010-1	SPR Proposed Development Area	b
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SASESFRA2010-3	Local Topography of Substation Site Location (LiDAR DEM)	b
SASESFRA2010-4	LiDAR DEM Generated Storm Water Runoff Routes	b
SASESFRA2010-5	Storm Runoff Routes Through Friston Village	b
SASESFRA2010-6	Geological Setting	b
SASESFRA2010-7	Environment Agency Fluvial (River) Flood Risk Map	b
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APPENDICES

Appendix 1	Friston Baseline Depth Maps
Appendix 2	Flood Event 6 th October 2019 in Friston
Appendix 3	SPR Land Occupation Plans for Friston
Appendix 4	SPR Work Plans for Friston
Appendix 5	SPR Restoration Plan
Appendix 6	Land Depression Receiving Field Drainage and Runoff within Proposed Site Footprint

REPORT ON FLOOD RISK IMPACT OF SCOTTISH POWER RENEWABLES EAST ANGLIA OFFSHORE WINDFARM ON FRISTON VILLAGE

1. INTRODUCTION

1. This report is an independent technical review of matters pertaining to flood risk associated with the proposed Scottish Power Renewables (SPR) East Anglia Offshore Windfarm development and its impact on Friston Village (see Drawing No. SASESFRA2010-1). This work has been commissioned by Substation Action Save East Suffolk (SASES).

2. SUMMARY AND CONCLUSIONS

2. SPR propose the construction of more than 14 hectares of hardstanding infrastructure in a small rural agricultural catchment that currently drains through the middle of Friston village. The construction phase will disturb and de-vegetate more than 25 hectares of the catchment, almost 10% of the watershed.
3. Friston village is already vulnerable to and suffers from regular pluvial storm water runoff flood water and sediment inundation. Suffolk County Council (SCC) commissioned a detailed hydraulic model study of the flood risk in the village (BMT, 2020), which confirmed both its current vulnerability and the source of much of this water coming from the proposed development site. Local residents advise this model under-estimates actual flooding observed despite the model not allowing for localised infiltration depressions.
4. The stripping of vegetation and the later construction of impermeable hardstanding by SPR will increase the peak and total flows and sediment loading leaving the proposed development footprint.
5. The Applicant has promoted this site as a low flood risk location, however contrary to national planning (NPPF) and energy policies (EN-1) and the local flood management strategy (Suffolk Local FRMS), the Applicant has not considered all forms of flood risk including pluvial and groundwater. There are other sites considered and deselected by the Applicant that are in the same river flood zonation category and that have lower pluvial and groundwater flood risk – the Applicant has not chosen the location with the lowest risk of flooding (contrary to NPPF (158)).
6. The Applicant recognises the increase in flood risk to Friston caused by the permanent development and proposes detention basins to reduce the peak storm flows arriving at the village. These detention basins will be above ground level on their downslope (western) side and each could contain > 10,000m³ of water, creating a significant impoundment risk immediately above the village, potentially requiring future regulation under the Reservoir Act.
7. The Applicant does not consider reduction of total flows leaving the site - this is contrary to the specific stated position of SCC (Suffolk Local FRMS), and the wider policy framework (NPPF, EN-1) to not support development which increases flood risk.
8. The Applicant has failed to demonstrate the viability of ground infiltration which would be necessary to reduce total flows leaving the site. Furthermore, the Applicant has not considered the potential for Friston Village to have an increase in groundwater flooding risk due to the use of infiltration basins.
9. The Applicant has failed to consider the required drainage for the wider construction area nor the increased turbidity of that runoff which will require clarification prior to off-site discharge, and therefore has not proven that adequate construction phase drainage is achievable.
10. Policy non-compliance, lack of evidence of viable surface water management schemes, and therefore a demonstrable increase in flood risk, mean the development is objectionable in flood risk terms.
11. Improvement to flood risk mitigation will be required if the development is to progress, including demonstrating viability of infiltration to reduce total flows without increasing groundwater flooding risk, developing viable construction phase and operational water management schemes, and ensuring the on-site storm water impoundment risk is fully mitigated.

3. QUALIFICATIONS OF AUTHOR

12. This Report has been prepared by Mr Clive Carpenter of GWP Consultants LLP (GWP). Clive has a BSc(Hons) in Geology, an MSc in Hydrogeology and Groundwater Resources, is a Fellow of the

Geological Society (FGS), Chartered Geologist (C.Geol), Chartered Member of the Chartered Institute of Water and Environmental Management (C.WEM, CIWEM) and Associate Member of The Academy of Experts (AMAE). Clive has more than 30 years of post-graduate experience in water resources management, water hazard mapping and risk reduction, flood risk assessment, climate change vulnerability assessment, disaster risk reduction and environmental impact assessment, both in the United Kingdom and overseas.

4. INSTRUCTIONS

13. SASES instructed GWP (Mr Clive Carpenter) in June 2019, to provide expert independent advice and review of the SPR environmental statement and related documentation, with respect to the flood risk impact on Friston Village, and to ascertain whether flood risk has been i) assessed in accordance with policy on site location; ii) adequately investigated; and iii) adequately mitigated.
14. SASES are aware of existing pre-development elevated flood risk within Friston Village and a well documented history of storm generated floodwater and sediment inundation of properties within the village. SASES requested GWP (Mr Clive Carpenter) to consider the suitability of the site for such a large scale development, whether other sites may be better locations and whether the application itself was adequate in terms of flood risk assessment and mitigation.

5. SITE VISIT, LITERATURE REVIEW AND RESEARCH

15. Mr Clive Carpenter undertook a walkover site inspection, including photographic inventory, of: Friston Village; the upstream watershed including the proposed site location of the substations; and the downstream watershed as far as the A1094, on Tuesday 28th July 2020, in the company of two local residents.
16. The walkover survey included:
 - An inspection of the main drainage ditch passing north-to-south through the village;
 - Traverses across the fields up to 1km north of the village, following the upstream drainage route north and east onto the western extent of the proposed footprint of the site;
 - Following the 500m buried culvert and channel south through the village; and
 - Tracing the open channel south 500m to a spreading/retention area and siphon under the main A-road.
17. At the time of the site visit, the weather was dry and there was no flowing water in the fields, drainage ditches or water course.
18. Specific attention was paid to previously unreported local topographic depressions within the proposed development footprint (see Drawing Nos. SASESFRA2010-2 and 3) which currently and self-evidently receive and store surface water runoff and field drainage; and the topography of the proposed location of the two storm water attenuation structures.
19. In preparing a critique and review of the SPR application, in addition to the SPR environmental reports and associated documentation, national and local flood policy and planning documents were secured from Environment Agency and county council and local council websites. A list of reviewed documents is provided in Section 12.
20. In addition, we have ourselves undertaken a storm water runoff routing analysis for the Friston catchment, using high resolution LiDAR data to confirm the pathways that storm water runoff will take in the watershed (see Drawing Nos. SASESFRA2010-4 and 5).
21. Subsequent to the analysis being completed, a numerical hydraulic flood model for Friston Village, commissioned by Suffolk County Council (<http://www.greensuffolk.org/flooding/surface-water-management-plans/friston-surface-water-management-plan>) was made available (BMT, May 2020) to SASES, confirming the elevated flood risk in the village and the direct hydraulic connection to the proposed sub-stations footprint (see Appendix 1). An initial review of the report by local residents has revealed the model has under-estimated the flood depths actually observed (see Appendix 2) for the calibration storm event at certain locations *i.e.* the flood risk is understated.

6. OVERVIEW OF IMPACTS OF THE PROPOSED DEVELOPMENT

22. The Initial Assessment of Principle Issues identified by the Planning Inspectorate (16 July 2020, Ref: EN010077) includes Flood Risk, Water Quality and Water Resources.
23. An ephemeral water course passes through the middle of Friston Village (see Drawing No. SASESFRA2010-5), draining a rural catchment area (see Drawing No. SASESFRA2010-4) of approximately 3km². Friston Village is already vulnerable to storm water inundation from this upper catchment, both as discrete flows along drainage ditches, and more dispersed flows off agricultural fields and onto the local roads (see Appendix 1 and Appendix 2). The model is reported as calibrated against the October 2019 storm event (see Appendix 2).
24. The combined SPR windfarm schemes will be constructing and operating 3 new substations, kilometres of cable route, and related supporting buildings, access roads and parking areas, in this catchment area.
25. The construction phase will require vegetation and soil stripping and stockpiling, excavation and landform rise (see Appendix 3 and Appendix 4), disturbing an area of > 260,000m² (not including cable routes) of the upper Friston catchment, increasing storm runoff and generating highly turbid water. No details are provided of this temporary works runoff water capture, storage and treatment.
26. The site operational phase will introduce substantial areas (c 145,000m²) of hardstanding including impermeable buildings, access roads and car parking areas (see Appendix 5), all generating increased stormwater runoff volumes and peak flows. The hardstanding areas will also cover and bury existing surface depressions (see Drawing No. SASESFRA2010-3) which currently capture, store and in all likelihood infiltrate field runoff from parts of the site footprint.
27. The substations and related infrastructure and construction corridors are located on and contribute to the overland flow routes (see Drawing Nos. SASESFRA2010-4 and 5 and Appendix 1) passing through the development site and directly into the village.
28. A failure to provide adequate storm water storage, and increases in storm water runoff flows and sediment arriving in the village as a result of the proposed development, will increase flood risk due to the restricted conveyance and on-going flood risk in the village.
29. The potential use of infiltration basins (whilst not yet proven to be viable) would result in significant increase in groundwater recharge and inflow to the Sand and Gravel deposit on the western edge of the site (see Drawing No. SASESFRA2010-6). This deposit ends within Friston Village (see Drawing No. SASESFRA2010-6). The use of infiltration basins will increase groundwater flow into the village and may therefore increase groundwater flooding risk within the village. This has not been assessed by the Applicant.

7. APPLICANTS' ASSESSMENT

7.1 Flood Risk Content

30. The SPR Environmental Statement Chapter 20 is entitled Water Resources and Flood Risk. Appendix 20.3 is entitled Flood Risk Assessment (FRA). The FRA considers the entire project area, including the Friston Watercourse catchment area.
31. The Friston Watercourse is designated a Main River from the centre of Friston Village (see Drawing No. SASESFRA2010-1), downstream of which the Environment Agency (EA) is the statutory consultee, upstream of which the Lead Local Flood Authority (LLFA) is the statutory consultee. The FRA states Suffolk County Council is the LLFA.
32. The FRA documentation contains Environment Agency and DEFRA public domain flood risk products, including fluvial (river) and pluvial (storm water runoff) flood maps (see Drawings Nos. SASESFRA2010-7 and 8) and some EA flood model outputs, as well as a detailed policy analysis.
33. The FRA confirms there is: no design documentation on the necessary surface water flood risk mitigation structures; no surveys completed to date on the drainage network in the vicinity of Friston Village; no surface water and drainage management plan developed; and a need for further studies, surveys and assessment to inform the design and plan.
34. A RAG Site Selection Criteria assessment has been undertaken to compare environmental impacts and to identify preferred site locations. Flood risk is only considered with respect to proximity to

Flood Zone 3 (see Drawing No. SASESFRA2010-7), a flood zone used to define fluvial *i.e.* river flood risk. There is no consideration of other flood risks *i.e.* pluvial (storm water runoff – see Drawing No. SASESFRA2010-8) or groundwater flooding. The Friston site is identified as low flood risk based on the above criteria.

7.2 Applicant's Conclusions

35. The FRA identifies no historic flooding in the footprint of the substations. It does identify historic reports of highway drainage problems in the vicinity of Friston but states these are outside of the substation footprint area.
36. The FRA identifies the substation site to be within Flood Zone 1 (*i.e.* land at risk of river flooding less than 1 in 1000 Years, as defined by the Environment Agency) and states this addresses the Sequential Test, which it describes as designed to locate development into areas of the lowest flood risk possible. The FRA goes onto state that the Exception Test must consider surface water and other sources of flooding within each flood zone when applying the sequential approach.
37. The FRA clearly identifies parts of the substation site, specifically including parts of the National Grid substation and cable sealing end compounds to be at **HIGH RISK OF SURFACE WATER FLOODING** (*i.e.* during a 1 in 30 Year event) (para. 125). Additionally, the FRA identifies parts of the access roads are likely to cross areas of **HIGH RISK OF SURFACE WATER FLOODING** (para. 127).
38. The FRA clearly states the surface water flood risk extends downstream to Friston, where there are several reports of historical flooding (para. 127).
39. The FRA states a detailed drainage design will be developed to address the on-site and off-site flood risk from surface water, stating a change in surface water runoff as a result of the increase in impermeable area, which will require attenuation prior to discharge at a controlled rate agreed with the LLFA (para. 129). No details are provided in the FRA or Environmental Statement (ES), with the FRA stating further geotechnical and drainage surveys and studies are required to inform the surface water drainage design. The FRA states the attenuation ponds will aim to reduce peak flows by 20% compared to existing runoff rates.
40. The FRA states additional landscape features will be used to attenuate existing surface water flow routes, to reduce flood risk to Friston Village. No size, volumes or locations are provided, other than indicative structure in the Landscape Plan (see Appendix 5) with their design to follow future catchment modelling.
41. The FRA states local drainage contractors will undertake surveys of local drainage infrastructure – confirming therefore no detailed assessment of the local drainage infrastructure has been undertaken to date.
42. The FRA states a Surface Water and Drainage Management Plan will be developed to meet the requirements of the national policy frameworks, but no details are provided.

8. FLOOD RISK POLICY FRAMEWORK

43. The SPR ES contains a detailed analysis of national, sector and local policies relevant to flood risk. These are therefore not discussed below in any detail. These documents include:
 - Over-arching National Policy Statement for Energy (EN-1) (DECC, 2011);
 - National Planning Policy Framework (NPPF) for Flood Risk and Coastal Change (MHCLG, 2014);
 - Preliminary Flood Risk Assessment for Suffolk (SCC, 2017);
 - Strategic Flood Risk Assessment (SCDC, 2018);
 - Suffolk Local Flood Risk Management Strategy (SCC, 2016);
 - East Suffolk Catchment Flood Management Plan (EA, 2009); and
 - Friston Surface Water Management Plan (SCC, 2020).
44. The NPPF makes specific comment about use of the sequential, risk-based approach to the location of development, stating:

'the aim should be to keep development out of medium and high flood risk areas (Flood Zones 2 and 3) and other areas affected by other sources of flooding where possible'.

45. The NPPF goes on to state:

'... other forms of flooding should be treated consistently with river flooding in mapping probability and assessing vulnerability to apply the sequential approach across all flood zones'.

46. The Suffolk FRM Strategy (2016) clearly states planning authorities should only approve development ... *'that does not increase overall risk of all forms of flooding ...'.*

47. Over-arching National Policy Statement for Energy (EN-1) states (5.7.3):

*'The aims of planning policy on development and flood risk are to ensure that **flood risk from all sources of flooding is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest risk.** Where new energy infrastructure is, exceptionally, necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and, where possible, by reducing flood risk overall.'*

48. Of particular relevance to this planning application, EN-1 goes onto state (5.7.20 to 5.7.22):

'Site layout and surface water drainage systems should cope with events that exceed the design capacity of the system, so that excess water can be safely stored on or conveyed from the site without adverse impacts';

49. The SCC/SCDC have drawn particular attention (as advised by SPR themselves in the Environmental Statement Volume 3 Appendix 20.1 Water Resources and Flood Risk Consultation Responses) to the above requirement stating 'it is apparent any exceedance events would have an adverse impact on Friston'.

*'The surface water drainage arrangements for any project should be such that **the volumes and peak flow rates** of surface water leaving the site are no greater than the rates prior to the proposed project, unless specific off-site arrangements are made and result in the same net effect'; and*

*'It may be necessary to provide surface water storage and **infiltration to limit and reduce both the peak rate of discharge from the site and the total volume discharged from the site.** There may be circumstances where it is appropriate for infiltration facilities or attenuation storage to be provided outside the project site, if necessary through the use of a planning obligation'.*

50. These statements are particularly noteworthy as they require the Applicant to ensure total volumes and not just peak flows must be reduced to pre-proposed project quantities.

9. GWP ASSESSMENT OF IMPACTS

9.1 Problems with Applicants' Methodology

51. The FRA and related flood risk documentation has been used by the Applicant to: support a Sequential Test on site location selection; assess increased flood and sediment risk due to the proposed development; and identify flood mitigation measures.

52. There are problems with the methodologies of each of these components as follows:

i The Sequential Test and RAG assessment only consider fluvial flood risk. There is no consideration of pluvial (or any other) flooding risks. If there had been, the site selection process would have identified more favourable locations in flood risk terms;

ii The local flood risk assessment is based solely on large scale public domain maps on fluvial (river) and pluvial (storm runoff) flood risk. There has been no attempt to understand or quantify the existing and on-going flood risk in Friston Village and its limited drainage conveyance. Flood and sediment impact risk has only been assessed using 'percentage of catchment disturbed' values as a flood metric – this is entirely inadequate. SPR state future surveys will be undertaken, but the requirement of EN-1 is for flood risk from all sources to be taken into account at all stages of the planning process to ensure that development is directed away from areas of highest risk. Leaving the question of flood risk to Friston Village to future assessment is clearly contrary to EN-1;

- iii The proposed flood mitigation measures only consider reducing the Peak flows leaving the site and not reducing the Total flows to pre-development rates. Given the existing pre-development flood risk in Friston demonstrates pre-development flow restriction, increasing Total flows leaving the site will increase flood risk in the village;
 - iv The proposed flood mitigation measures have no proven design and have not proven they are achievable. The little detail provided indicates the flood mitigation measures are designed for the constructed operational site and not the larger Temporary Works construction disturbed areas.
53. Both SCDC and Anglian Water state all forms of flooding need to be assessed.
54. SCC and SCDC both state there is little acknowledgement of Ordinary Watercourses in the SPR submissions – the water course north of Friston Village is an Ordinary Watercourse – and localised flood risk must be assessed.
55. SCC and SCDC state the Main River through Friston has not been considered in sufficient detail and is at much higher risk from silt laden runoff that stated by SPR, which will increase flood risk in Friston.
56. SCC and SCDC state there is no adequate assessment of construction phase or operational phase impacts on surface water flows – which are expected to increase flood risk in Friston.
57. SCC and SCDC state there is no assessment of exceedance flood events which overwhelm the site drainage schemes – exceedance would have an adverse impact on Friston.

9.2 GWP Findings Contrary to Policy

58. With reference to relevant policies, the Applicants' Assessment does not follow:
- i NPPF, Suffolk FRM Strategy and EN-1 all state the importance of assessing flood risk from all sources of flooding at all stages in the planning process. The Applicant has failed to consider pluvial flood risk when considering the Sequential Test and the RAG Assessment, both primary tools for assessing site location;
 - ii The EN-1 clearly states Peak and Total Flows leaving a developed site should be no greater than the pre-development situation. The Applicant has failed to consider Total flows. This is especially important for Friston where the existing drainage is already inadequate during extreme rainfall events.

9.3 Disagreement with Applicants Assessment

- i The Sequential Test completed to date is inadequate as it only considers fluvial (river) flood risks (see Drawing No. SASESFRA2010-7). If it had included pluvial flood risk (see Drawing Nos. SASESFRA2010-4, 5 and 7 and Appendix 1), less vulnerable locations would have been identified in other catchments;
- ii The RAG assessment completed to date is inadequate as it only considers fluvial (river) flood risks. If it had included pluvial flood risk, less vulnerable locations would have been identified in other catchments;
- iii The use of catchment scale indicators to assess increase in flood risk and sediment mobilisation to Friston village is completely inadequate. There has been no technical assessment by the Applicant of the storm runoff flow conveyance through and across the village ditches, culverts and overland flowpaths, nor a walk-over survey of the fields comprising the footprint of the proposed site itself – the Applicant states as much, whilst also recognising the need and their intention to undertake such work. During a walk-over survey of the site by ourselves, local deep depressions (possibly former gravel pits – see Drawing No. SASESFRA2010-3 and Appendix 6) clearly receive surrounding field runoff – this demonstrates the current flood risk in Friston (see Appendix 1 and 2) is caused by flows smaller than currently perceived by the Applicant and mitigation measures will need to be larger;
- iv The Applicant solely focuses on the attenuation of post development Peak flood flows back to pre-development levels and does not consider Total flows. This is not only against government policy but is critical to flood risk reduction in locations which already have restricted flood flow conveyance and are already at flood risk. It is extremely difficult to reduce Total flows to pre-

development levels without infiltration as a mitigation measure. No infiltration testing has been undertaken, therefore the entire viability of the flood risk mitigation measures is unproven;

- v The Applicant states surface water and drainage management plans will be developed at a later stage. This is unacceptable and clearly contrary to EN-1 and other policy. The Applicant needs to prove the development is manageable now, not at a later date, to ensure that the policy requirement to direct development away from the areas of highest risk and to not increase flood risk, are met;
- vi Given the doubts above about the ability to satisfactorily mitigate the risks, the absence of these assessments and scheme designs are fundamental flaws in the applications.

9.4 Conclusion on impacts

59. The SPR FRA does acknowledge:

- i There will be an increase in storm runoff due to the impermeable nature of the buildings, roads and parking areas, in the catchment upstream of Friston;
- ii There will be an increase in sediment mobilisation during the construction phase due to ground disturbance, excavation, soil stripping and stockpiling, in the catchment upstream of Friston;

60. We contend the flood impacts have however been inadequately assessed to date and are therefore insufficiently understood to enable mitigation measures to be conceptually designed. Using catchment scale percentages of disturbance is completely inadequate.

61. The Applicant needs to undertake detailed surveys and modelling of the Friston Village drainage network and upper catchment area, to understand current runoff rates, current flow restrictions, and the extent to which Peak and Total Flow reductions are required. These assessments must necessarily come before the grant of development consent to meet the requirements of EN-1 and to ensure that the authorised development is capable of being delivered without creating flood risks or worsening existing risks.

10. GWP FINDINGS ON FLOOD RISK MITIGATION

10.1 Criticism of Applicant's mitigation proposals

62. The Applicant solely focuses on the attenuation of post development Peak flood flows back to pre-development levels and does not consider Total flows. This is not only against government policy but is critical to flood risk reduction in locations which already have restricted flood flow conveyance and are already at flood risk. It is extremely difficult to reduce Total flows to pre-development levels without infiltration as a mitigation measure. No infiltration testing has been undertaken to date and therefore the entire viability of the flood risk mitigation measures is unproven.

63. The Applicant has also failed to consider the wider areas disturbed during construction works (see Appendix 4), and the longer residency times and lower discharge rates required for clarification of runoff water to remove excess turbidity. With elevated turbidity during construction works, ground infiltration will not be possible without clarification – this will require large settlement lagoons and infiltration basins, whose size has not been estimated and therefore it is not demonstrated there is sufficient area within the site.

64. There is no conceptual sizing of drainage infrastructure, other than basins identified on the landscape plan (see Appendix 5). It is critical the Applicant demonstrates the necessary storm water runoff capture and retention is achievable, during both the construction and operational phases.

65. The topographic slope at the location of the proposed landscape basins, slopes to the west by 2-3m metres. Any attenuation ponds in these areas will need to be excavated by 1-2m at their eastern end, and 1-2m high bunds constructed at the western end. Approximate areas - derived from the landscape plan – appear to be at least 100m x 50m. Potentially therefore > 10,000m³ could be retained in each such structure, which would be above ground at its western end. There are significant concerns that such landscaped structures are not designed to be over-topped by extreme events. If the scheme was to be overwhelmed by an extreme event there is a risk of catastrophic failure of the western above ground bund and the release of > 10,000m³ of water instantaneously through the village. Retention ponds of this size, located immediately above a residential village may require future regulation under the Reservoir Act (1975, amended by the Flood and Water Management Act, 2010) – which requires consideration of a risk-based approach for structures

>10,000m³. The scale of these structures, and the risks associated with them, have not been assessed adequately or at all. It is a very serious shortcoming in the applications.

10.2 **Suggested additional steps to be taken by the Applicant**

66. The difficulty in prescribing mitigation measures is that extensive work must be carried out before the grant of development consent to ensure that the proposals can be satisfactorily delivered in flood risk terms. The Applicant must:
- i Undertake extensive infiltration testing to determine the capacity of the underlying ground to receive sufficient water to ensure Total flows do not exceed pre-development runoff rates;
 - ii Demonstrate the areas required for runoff storage are available and reachable – this includes clarification settlement for the construction phase drainage management, including cabling routes;
 - iii Cabling routes at lower elevations than the substations site will require their own construction phase water management infrastructure;
 - iv Demonstrate this localised groundwater recharge will not result in groundwater flooding in Friston – the gravel deposit ends in the village (see Drawing No. SASSEFRA2010-6);
 - v Undertake above-ground runoff water storage risk assessment, including over-topping design, reservoir failure inundation modelling, and demonstrated consultation on Reservoir Act regulation.
 - vi These measures are not identified as being suitable for post-consent consideration under the terms of requirements in the DCOs. They are matters which require prior consideration to meet the terms of policy.

11. **CONCLUSIONS**

67. SPR propose the construction of more than 14 hectares of hardstanding infrastructure in a small rural agricultural catchment that currently drains through the middle of Friston Village. The construction phase will disturb and de-vegetate more than 25 hectares of the catchment, almost 10% of the watershed.
68. Friston Village is already vulnerable to and suffers from regular pluvial storm water runoff flood water and sediment inundation. Suffolk County Council (SCC) commissioned a detailed hydraulic model study of the flood risk in the village, which confirmed both its current vulnerability and the source of much of this water coming from the proposed development site. Local observations indicate this model underestimates flooding actually reported despite not allowing for localised infiltration depressions.
69. The stripping of vegetation and the later construction of impermeable hardstanding by SPR will increase the peak and total flows and sediment loading leaving the proposed development footprint.
70. The Applicant has promoted this site as a low flood risk location, however **contrary to national planning and energy policies and local flood management strategy, the Applicant has not considered all forms of flood risk including pluvial and groundwater**. There are other sites considered by the Applicant that have lower pluvial and groundwater flood risk – the location at lowest risk of flooding has not been selected.
71. The Applicant recognises the increase in flood risk to Friston caused by the permanent development and proposes detention basins to reduce the peak storm flows arriving at the village. These detention basins will be above ground level on their downslope side and each could contain > 10,000m³ of water, **creating a significant impoundment risk immediately above the village**.
72. The Applicant **does not consider reduction of total flows - this is contrary to the specific stated position of SCC, and the wider policy framework (NPPF, EN-1) to not support development which increases flood risk**.
73. The Applicant has **failed to demonstrate the viability of ground infiltration which would be necessary to reduce total flows leaving the site**. The Applicant has **not considered the potential for Friston Village to have an increase in groundwater flooding risk due to the use of infiltration basins**.

74. The Applicant has **failed to consider the required drainage for the wider construction area nor the increased turbidity of that runoff** which requires clarification prior to off-site discharge, and therefore has not proven the construction phase drainage is viable.
75. Policy non-compliance, lack of evidence of viable surface water management schemes and therefore demonstrable increase in flood risk, mean the development cannot be considered permissible and should be rejected.
76. Improvement to flood risk mitigation will be required if the development is to progress, including demonstrating viability of infiltration to reduce total flows without increasing groundwater flooding risk, developing a viable construction phase water management scheme, and ensuring the on-site storm water impoundment risk is fully mitigated. These matters cannot wait until after the grant of development consent since they go to the principle of whether the proposed development in this location is acceptable in flood risk terms.

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GWP CONSULTANTS
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